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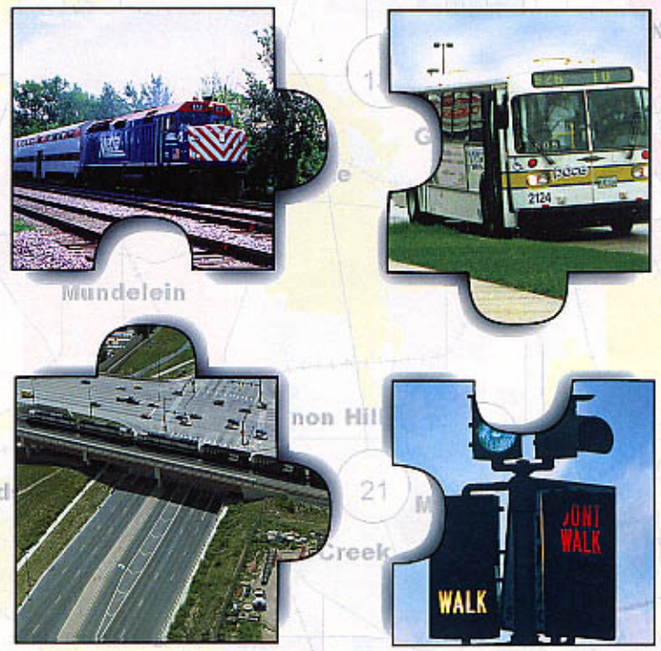
Draft Environmental Impact Statement

Lake County TRANSPORTATION IMPROVEMENT *Project*

Illinois Department of Transportation

and

Illinois State Toll Highway Authority



Lake County, Illinois
September 2001

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FHWA-IL-EIS-00-01-D

LAKE COUNTY, ILLINOIS, TRANSPORTATION IMPROVEMENT PROJECT

DRAFT ENVIRONMENTAL IMPACT STATEMENT

Submitted Pursuant to 42 U.S.C. 4332 (2)(c) and 49 U.S.C. 303
by the
U.S. Department of Transportation, Federal Highway Administration, the Illinois State Toll Highway Authority, and the Illinois Department of Transportation
September 2001

Date: 9-4-2001	Date: 9-4-2001	Date: September 4, 2001
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The Lake County Transportation Improvement Project (LCTIP) is a joint effort of the Illinois Department of Transportation (IDOT) and the Illinois State Toll Highway Authority (ISTHA), in cooperation with other agencies and local officials. The project has identified a system of strategic roadway, rail, and bus improvements, as well as the package of transportation management strategies necessary to help address the key congestion and mobility problems in the study area.

Three alternatives are presented in detail in this report: the No-Action Alternative (Baseline), IL 53 Freeway/Tollway Alternative, and the IL 83/US 45 with US 12 Alternative. A package of supporting transportation improvements (i.e., rail, bus, bike, transportation management strategies) would be common to both build alternatives. The No-Action Alternative (Baseline) consists of adding lanes to 74 route miles of existing roadways, double tracking the North Central Service, and other rail and bus system improvements. Implementing the roadway improvements associated with the No-Action Alternative (Baseline) would require 195 ha (482 ac) of new right-of-way. For this study, the No-Action Alternative (Baseline) is considered either a stand-alone alternative, or common to the roadway (build) alternatives (IL 53 Freeway Tollway and the IL 83/US 45 with US 12 Alternatives).

The IL 53 Freeway/Tollway Alternative consists of the construction of a new highway in central Lake County either as a freeway or tollway facility. It would begin at the terminus of IL 53 at Lake–Cook Road and extend north approximately 20 kilometers (13 miles) to a point south of IL 120, and continue for about 23 route kilometers (14 route miles) both to the east and to the west. The eastern terminus would be US 41, and the western terminus would be Wilson Road, with arterial improvements extending along existing IL 120 from Wilson Road to the intersection of IL 60 and IL 120 and additional lanes on I-94, from IL 120 to IL 132. Other arterial improvements are proposed at interchange locations to provide reasonable traffic operations. Approximately 513 ha (1,268 ac) of new right-of-way would be required for construction of the road improvements.

The IL 83/US 45 with US 12 Alternative includes about 101 route kilometers (63 route miles) of improvements on both existing roads, as well as new alignment. The improvements to major roadways include additional lanes on portions of IL 83, IL 21, US 12, I-94, and bypasses for Mundelein and Libertyville. Existing intersections and interchanges along the widened highway corridors would be improved to provide reasonable traffic operations. Approximately 248 ha (613 ac) of new right-of-way would be required for construction of the road improvements. The typical right-of-way width for the proposed improvements would generally be 130 feet for a 4-lane arterial, 160 feet for a 6-lane arterial, and 300 feet for an 8-lane tollway.

The package of supporting transportation improvements includes the expansion of commuter rail service, improvements to local and express bus service, increasing rideshare opportunities, improvements to bicycle and pedestrian facilities and transportation management strategies, which are designed to make transportation facilities function more effectively, work more reliably, and work more safely.

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Acronyms List

ACG	al Chalabi Group
ADID	Advanced Identified Wetlands
ADT	Average Daily Traffic
ASTM	American Standard of Testing Measures
BMP	Best Management Practices
BSC	Biological Stream Characterization
CAA	Clean Air Act
CATS	Chicago Area Transportation Study
CBF	Chicagoland Bicycle Federation
CERCLA	Comprehensive Environmental Response, Compensation, and Liability Act
CERCLIS	Comprehensive Environmental Response, Compensation, and Liability Information System
CEQ	Council on Environmental Quality
CFR	Code of Federal Regulations
CO	Carbon Monoxide
CORRACTS	Corrective Action Report
COSIM	Carbon Monoxide Screen for Intersection Modeling
COST	Citizens Organized for Sound Transportation
CP	Canadian Pacific
CRP	Conservation Reserve Program
CWA	Clean Water Act
dB	decibels
DEIS	Draft Environmental Impact Statement
EAI	Expansion of the Existing Airports
EJ&E	Elgin, Joliet, and Eastern
FEIS	Final Environmental Impact Statement
ELPC	Environmental Law and Policy Center
FEMA	Federal Emergency Management Agency
FHWA	Federal Highway Administration
GIS	Geographic Information System
HHS	Health and Human Services
HMIRS	Hazardous Material Information Reporting System

HUD	U.S. Department of Housing and Urban Development
IBI	Index of Biotic Integrity
IDH	Illinois Division of Highways
IDNR	Illinois Department of Natural Resources
IDNR-OWR	Illinois Department of Natural Resources-Office of Water Resources
IDOT	Illinois Department of Transportation
IEPA	Illinois Environmental Protection Agency
IESPB	Illinois Endangered Species Protection Board
IHPA	Illinois Historic Preservation Agency
INAI	Illinois Natural Areas Inventory
INHS	Illinois Natural History Survey
ISGS	Illinois State Geological Survey
ISTHA	Illinois State Toll Highway Authority
IWPA	Interagency Wetland Policy Act
LCFPD	Lake County Forest Preserve District
LCTIP	Lake County Transportation Improvement Project
LCDOT	Lake County Department of Transportation
LCWI	Lake County Wetland Inventory
LUST	Leaking Underground Storage Tanks
MBI	Macroinvertebrate Biotic Index
MD	Milwaukee District
MG	Municipal Groups
MPO	Metropolitan Planning Organization
NAAQS	National Ambient Air Quality Standards
NAMS	National Air Monitoring Station
NCS	North Central Service
NEPA	National Environmental Policy Act
NFA	No Further Action
NFIP	National Flood Insurance Study Program
NIPC	Northeastern Illinois Planning Commission
NO_2	Nitrogen Dioxide
NPC	National Project Commission
NPDES	National Pollutant Discharge Elimination System
NPL	National Priority List
NRCS	National Resource Conservation Service

NRHP	National Register of Historic Places
NWI	National Wetland Inventory
O_3	Ozone
PAMS	Photochemical Assessment Monitoring Site
Pb	Lead
PM_{10}	particulate matter
ppm	parts per million
RAG	Resource Agency Group
RCRA	Recovery Act
RCRIS	Recovery Information System
ROD	Record of Decision
RTA	Regional Transportation Authority
RTP	Regional Transportation Plan
SHPO	State Historic Preservation Officer
SHWS	State Hazardous Waste Sites
SIP	State Implementation Plan
SLAMS	State/Local Monitoring System
SMC	Lake County Stormwater Management Commission
SO_2	Sulfur Dioxide
SOV	Single-occupancy vehicle
SPMS	Special Purpose Monitoring Station
SRA	Strategic Regional Arterials
SWCD	Soil & Water Conservation District
TAG	Technical Advisory Group
TAZ	Traffic Analysis Zones
TDM	Travel demand management
TIP	Transportation Improvement Program
TMA	Transportation Management Association
TMDL	total maximum daily load
TNM	Traffic Noise Model
TSM	Transportation system management
UP	Union Pacific
USACOE	US Army Corp of Engineers
USFWS	US Fish and Wildlife Service
USDA-NRCS	US Department of Agriculture–Natural Resources Conservation Service

USDOT	US Department of Transportation
USEPA	US Environmental Protection Agency
USGS	US Geological Survey
USNPS	US National Park Service
VHD	Vehicle hours of delay
VMT	Vehicle miles of travel
VOCs	Volatile organic compounds
WDO	Lake County Watershed Development Ordinance
WWTP	Wastewater treatment plants

Executive Summary

Introduction

Lake County has an abundance of vibrant communities, growing employment centers, natural resources—and traffic congestion. According to the 2000 census, the county has grown to over 640,000 residents, already surpassing the population forecasted for the year 2010. The county's rapid development has outpaced its transportation infrastructure, making congestion relief the top priority of residents, community leaders, and elected officials. In response, the Illinois Department of Transportation (IDOT) and the Illinois State Toll Highway Authority (ISTHA) formed the Lake County Transportation Improvement Project (LCTIP). The LCTIP planning process, which began in the spring of 1998, has four main objectives:

- Identify the major congestion problems,
- Recommend a package of improvements,
- Determine whether the IL 53 extension is part of the comprehensive transportation solution, and
- Provide information to Lake County and others to assist their transportation planning efforts.

The LCTIP process (Figure S-1) has used an innovative approach toward the development of transportation improvements, taking a comprehensive look at the transportation needs, and examining solutions that are both broad in type and geography. Extensive public outreach accompanied the technical work throughout the planning process. The outcome from this process was two finalist build alternatives that emerged from a thorough and comprehensive alternatives evaluation. These alternatives have been developed at a sufficient level of detail to both comparatively evaluate their travel benefits as well as their environmental effects. The environmental analysis contained in this document is comprehensive in its coverage of resource issues; however, for practical purposes, the large study area required the use of available information provided by resource and planning agencies. Overall, the purpose of the planning process is to provide an analysis of transportation alternatives at a sufficient level of detail to assist decision-makers in the selection of a preferred alternative.

About the LCTIP Draft Environmental Impact Statement

This Executive Summary provides an overview of the transportation, environmental, and socioeconomic effects of two finalist build alternatives being considered, as well as a No-Action Alternative (Baseline). Companion to this Executive Summary is the Draft Environmental Impact Statement (DEIS). An Environmental Impact Statement is prepared for all major Federal actions that will significantly effect the quality of the human environment, as mandated by the National Environmental Policy Act (NEPA), and consistent with the environmental technical guidance provided by the Federal Highway Administration.[1] The LCTIP has the potential for requiring federal actions, including the use of federal funds for a portion or all of the improvements associated with either of the finalist build alternatives or the No-Action Alternative (Baseline), as well as regulatory permits for impacts on navigable waterways, and jurisdictional wetlands. Regulatory agencies, such as the U.S. Army Corps of Engineers, are not being requested at this time to consider the granting of any permits. After selection of a preferred alternative, supplemental studies would be required, at a corridor level of detail, as part of a formal consultation process regarding any required permits. These agencies, however, are being

[1] FHWA Technical Advisory T 6640.8A

asked to review this planning process and the environmental consequences of the proposed alternatives and provide any comments related to the process or the environmental consequences associated with the alternatives considered in the DEIS.

The LCTIP DEIS addresses the environmental issues specified by the federal guidance. However, there are three aspects of the analysis that required special approaches.

- First, separate population, employment and travel demand forecasts were developed for each project alternative. These forecasts were used to rigorously assess travel performance and identify potential secondary and cumulative impacts.
- Second, the analysis considers the potential for Section 4(f) (U.S. Department of Transportation Act of 1966) resource involvement (publicly-owned parks, recreation areas, wildlife and waterfowl refuges, and historic sites of national, state, or local significance); however, this analysis does not represent a formal Section 4(f) evaluation. At this stage of analysis, the project alternatives represent a preliminary concept that would be subject to more detailed engineering analysis that could possibly avoid or minimize the effects to Section 4(f) resources. Further study is also needed to formally determine the applicability of Section 4(f) for some sites.
- Third, the analysis of environmental effects is largely based on existing and available data provided by resource and planning agencies. The extensive transportation improvements required a practical approach for considering the environmental effects across a large study area. Existing data were refined with field reconnaissance as necessary. This data was compiled in a Geographical Information System (GIS) database consisting of 80 data layers (Figure S-2).

In general, the processing of an Environmental Impact Statement (EIS) is carried out in two stages. During the first stage, the DEIS is prepared and distributed for review and comment to federal, state, and local agencies with jurisdiction by law or special expertise, and the public. During this comment period, which lasts 45 days, a Public Hearing is held.

Following the public comment period, preparation can begin on the Final EIS. In the case of the LCTIP, a Final EIS and formal Record of Decision (ROD) would be prepared once a preferred alternative is selected. The FEIS/ROD would document the rationale for selection of the preferred alternative and provide a foundation for the county and others to assist their planning efforts. Beyond the FEIS/ROD, supplemental planning studies, including detailed engineering design and refined environmental analysis, would be conducted for logical portions of the preferred alternative.

The Role of the Sponsoring Agencies

The sponsoring agencies, IDOT and ISTHA, have solicited the involvement of transportation providers, planning agencies, elected officials, and the public through a variety of forums. The planning process has produced several major outcomes including:

- A comprehensive two-way dialogue regarding transportation issues at all levels, residents, interested groups, agencies, and elected officials,
- A comprehensive assessment of the transportation problems and needs in Lake County,
- A rigorous process for developing and evaluating transportation alternatives leading to the recommendation of two finalist build alternatives and a No-Action Alternative (Baseline) for detailed study, and
- A foundation to Lake County and other transportation providers for their own transportation facility planning efforts.

The sponsoring agencies will use the combined content of the study process and the information contained in the DEIS to assist in their decision to select a preferred alternative.

Study Area

The study area includes all of Lake County, Illinois, and portions of eastern McHenry County and northern Cook County (Figure S-3). Lake County is part of the Chicago metropolitan region.[2] The Chicago region, comprised of six counties (Cook, DuPage, Kane, Lake, McHenry, and Will), has a diverse economic base. Long known for its industrial activity, the region also houses many corporate headquarters, key educational and research institutions, and the center of the nation's transportation network, and is a major force in financial markets. Located 41.8 km (26 mi) from Chicago's loop and 54.7 km (34 mi) from downtown Milwaukee, Lake County enjoys a strategic geographic position as a gateway to the state and the metropolitan area, and serves as a critical link in the interregional transportation system. The study area covers roughly 1,295 km^2 (500 mi^2), and includes over 70 incorporated cities and villages.

Transportation Need

During the early steps of the LCTIP, a needs analysis was conducted to evaluate the range of transportation issues and problems for the existing roadway and transit systems in the study area. This evaluation involved technical analyses, as well as the gathering of information and experiences from transportation agencies, elected officials, and the public. The transportation needs identified in the study area are extensive—see the LCTIP's *Transportation System Performance Report (*January 1999*)* for complete details. The following are some of the major findings:

- Development has outpaced transportation improvements.
- North-south travel patterns are predominant.
- Congestion is widespread. Currently, one-third of the roadway network is congested during peak travel periods.
- Nearly 90 percent of all work trips are made by automobiles.
- Less than 5 percent of all work trips are made by transit.
- Lake County experiences nearly 1.73 million daily vehicle trips; one-half start and end in the county, and the other half either travel into, leave from, or pass through the county.
- Nearly 50 percent of Lake County's rail stations have insufficient parking.

During the early stage of the study, surveys were undertaken to gather opinions of residents, agencies, and elected officials concerning the transportation issues in Lake County. Respondents consistently cited congestion as the most important quality of life issue. Respondents broadly supported major highway improvements as a means to relieve congestion, followed by transit.

By 2020, congestion will encompass most of Lake County's roadways. Even with implementation of committed and reasonably expected improvements, congestion will worsen considerably by the year 2020. Major improvements are needed in Lake County to prevent gridlock.[3] On the basis of a comprehensive and thorough assessment of the existing transportation needs in the county (LCTIP 1999), the LCTIP resolved to focus their effort on major congestion problems, and in doing so, also provide a foundation for transportation planning by other agencies. The major transportation needs are to:

- Improve north-south travel capacity and efficiency,

[2] The regional discussion focuses on those counties in the Northeastern Illinois Planning Commission jurisdiction. These include Cook, DuPage, Kane, Lake, McHenry, and Will counties.

[3] LCTIP No-Action Alternative (Baseline). See also the DEIS, Section 3, *Alternatives*.

- Improve regional and local travel,
- Improve safety, and
- Improve modal connections.

These four basic needs served as the corner stones of the project that served to define the range of reasonable transportation alternatives considered in this process, as well as the measures used to comparatively evaluate their performance. For more details regarding transportation needs, refer to the DEIS, Section 1, *Purpose and Need.*

Alternatives Development and Evaluation Process

The LCTIP developed a wide range of transportation alternatives based on the needs stated above. The process began with the development of a No-Action Alternative (Baseline) that identified the highway and transit improvements likely to be constructed over the next 20 years regardless of any other major transportation improvements. The Baseline includes adding travel lanes to 74 miles of existing roadways and additional rail and bus service (Figure S-4). Even with all of these improvements, congestion is estimated to double by the year 2020. For this reason, the Baseline represents a starting point for developing alternatives that address the major transportation needs in Lake County.

The alternatives development process included a thorough examination of a wide range of transportation improvement options, including: roadway, transit, non-motorized (pedestrian and bike), and transportation system management/travel demand management strategies. The process would conclude with finalist alternatives that included several components (Figure S-5). The following summarizes the major features of the alternatives development and evaluation process:

- The LCTIP conducted an extensive evaluation of transit improvements. The development of these improvements was accomplished by working directly with the transit experts at RTA, Metra, and Pace. The improvements, totaling nearly $700 million, include expanded commuter rail service, additional stations, additional station parking, bus service expansion, transfer stations between rail and bus services, park-and-ride lots, and bicycle and pedestrian upgrades.
- The LCTIP developed a number of roadway options with an innovative computer-aided approach, targeting the most congested routes and the most effective combinations of improvements. The initial range of alternatives were established with the use of a transportation performance benchmark. As a result, each of the initial alternatives provided a comparable level of broad, systemwide transportation benefits. In the beginning of the process, 12 roadway options were developed, which were reduced to nine, and later reduced to seven for detailed evaluation and screening. Engineering refinements were added to the seven roadway options reflecting environmental concerns and engineering enhancements, including interchanges, expanded intersections, feeder roads, shifted alignments, constrained roadway footprints, and community bypasses.
- The seven roadway options were evaluated in detail using transportation measures that reflect the project's purpose and need. The specific transportation measures used to compare the roadway options were travel time savings, traffic reduction on north-south roads, and uncongested travel on north-south roads. Based upon the evaluation results, the two top performers were the IL 83/US 45 with US 12 Alternative and the IL 53 Freeway/Tollway Alternative. Both options were consistently in the top end of each measure, leading to their selection as finalist alternatives (see Figures S-6 and S-7). Recommended upgrades to the rail and bus transit systems were also identified and will be common to the finalist alternatives mentioned above. These alternatives, along with the No-Action Alternative (Baseline), were

examined in more detail, which is fully documented in the DEIS, Section 3, *Alternatives*, and Section 4, *Environmental Consequences*.

- Transportation System Management (TSM) and Travel Demand Management (TDM) were considered as part of the roadway improvements. TSM strategies are designed to make transportation facilities function more effectively, work more reliably, and work more safely. TDM strategies are designed to decrease vehicle demand on the roadway system by increasing vehicle occupancy or changing the attractiveness of competing modes of transportation.
- Environmental resource effects were considered early and throughout the alternative development and evaluation process. Considerable effort was made to avoid or minimize impacts during each stage of alternative development. The environmental considerations associated with the process have been effective at minimizing environmental impacts and understanding the relative magnitude of environmental impact.

Public Involvement

The LCTIP implemented an extensive public involvement program designed to encourage maximum input from agencies, transportation and planning organizations, business and civic groups, as well as area residents. The LCTIP has hosted or participated in nearly 100 meetings, including forums with interested groups, two major public informational meetings, a transportation fair, and over two dozen study group meetings. The study groups consisted of representatives from resource and regulatory agencies, transportation service providers, planning organizations, and elected officials. The public outreach program also included:

- A local project office, which served as a drop-in center for interested individuals to discuss the project or review specific plans,
- Regular newsletters that provide detailed information on project activities and progress, and provide an opportunity for public comment (distribution of over 6,000),
- A web site, which includes study information, summaries of meeting minutes, reports, and an opportunity for the public to send comments and feedback to the project team (over 5,000 visitors), and
- Extensive media coverage.

Through this structured program, everyone with an interest in transportation has had the opportunity to receive study information and offer input to the study.

The LCTIP is a collective planning effort that has garnered widespread support through its outreach efforts, bringing together transportation service providers, communities, and elected officials. The study has embraced a process that allowed for the investigation of a broad analysis of alternative solutions, including the ideas of others. Based on input received, the LCTIP considered an east-west improvement scenario, which focused on improving east-west arterials, alternative solutions put forth by others, travel benefits to the county's roadways, and addressed public perceptions that smaller projects, like adding turning lanes at intersections, synchronizing traffic signals, etc., could meet Lake County's transportation needs.

The public involvement process that has helped to determine the need, the objectives, and the alternatives, is a measurable success. The LCTIP process has fostered collective planning and received widespread support from a broad cross section of the public. Public support for major improvements (particularly the IL 53 extension) has been consistently strong, with a 2:1 margin of support at Public Informational Meeting #1, a 4:1 margin at Public Informational Meeting #2, and a 4:1 margin of support among communities and organizations, as noted in Table S-1 (on the following page). For additional details regarding the LCTIP public involvement

activities, refer to the DEIS, Section 5, *Coordination*.

Alternatives Considered in Detail

No-Action Alternative (Baseline)

The alternative development process began with the development of a No-Action Alternative (Baseline) consisting of transportation improvements, operational improvements, and routine repairs that are anticipated to be constructed by 2020 regardless of any other major improvements. The development of the No-Action Alternative (Baseline) required extensive coordination with the region's transportation service providers to gather information on planned or anticipated transportation improvements in the study area. The 1998-2002 Transportation Improvement Program (TIP), with 48 km (30 mi) of funded improvements, was the foundation for developing the No-Action Alternative (Baseline).[4] Recognizing that other projects would be funded beyond 2002, an additional 71 km (44 mi) of roadway improvements were subsequently identified—a process that also involved close coordination with the transportation providers. Thus, the No-Action Alternative (Baseline) comprises a total of 119 km (74 mi) of lane additions to existing roadways (Figure S-4). The No-Action Alternative (Baseline) also assumes that routine repairs and operational improvements would continue for the existing roadway system, and transportation improvements identified in the 2020 Regional Transportation Plan would be in place for those parts of the region outside the LCTIP study area.

In addition to the roadway improvements, the No-Action Alternative (Baseline) would include transit improvements consisting of the full build out of the North Central Service commuter rail line (52 trains per day), five new Metra stations, and express bus service on selected routes. For this study, the No-Action Alternative (Baseline) is considered either a stand-alone alternative, or common to the LCTIP finalist build alternatives (i.e., IL 53 Freeway/Tollway Alternative and the IL 83/US 45 with US 12 Alternative).

IL 53 Freeway/Tollway Alternative

The IL 53 Freeway/Tollway Alternative consists of the construction of a new highway in central Lake County either as a freeway or tollway facility (Figure S-6). This alternative would begin at the terminus of IL 53 at Lake–Cook Road and extend north for a distance of 20.1 km (12.5 mi) to a point south of IL 120. There, the alternative would continue for about 22.7 km (14.1 mi) both to the east and to the west, partially on new alignment. The eastern terminus would tie into the existing interchange complex west of US 41, and the western terminus would be Wilson Road at IL 120. Arterial improvements would also extend along existing IL 120 from Wilson Road to the intersection of IL 60 and IL 120,

TABLE S-1
Summary of Comments Regarding the IL 53 Set of Improvements

Forum	Support	Oppose
1999 Public Informational Meeting (percent)*	56%	33%
2000 Public Informational Meeting (percent)*	79%	19%
Communities (number)	20	2
Organizations (number)	18	7

* Total percent for the 1999 and 2000 Public Informational Meetings do not add up to 100%. The remainder is associated with other alternatives presented at the meetings.

Source: Lake County Transportation Improvement Project

as well as additional lanes on I-94, from IL 120 to IL 132.

Access to the IL 53 facility would be gained on grade-separated interchanges at major arterials. Improvements would be made to arterial highways through the interchange influence area to provide for proper roadway operations and safety. The length of improvements to arterial feeder roads generally extends to the nearest major intersection.

The IL 53 Freeway/Tollway Alternative would be constructed with three through lanes in each direction separated by a barrier median. The typical right-of-way width required for the roadway is 91 m (300 ft), which would include a 23 m (76 ft) pavement (11.5 m, or 38 ft in each direction), 8.5 m (28 ft) paved median, 3.7 m (12 ft) right shoulders, and grassed areas with roadside ditches. Where necessary to avoid critical natural and community resources, refinements have been made to the typical cross section to avoid or minimize impacts. These refinements included a constrained right-of-way width of 76 m (250 ft) in spot locations.

The facility would be constructed as either a freeway or tollway. Both facility types have the same basic design elements and similar operational characteristics, but the tollway would require provision of toll collection facilities. However, the east leg would be non-tolled. For the purposes of this study, construction of the alternative as a freeway versus tollway facility would be a future funding choice if the alternative was selected.

IL 83/US 45 with US 12 Alternative

The IL 83/US 45 with US 12 Alternative includes approximately 101 km (63 mi) of improvements on existing roads, as well as new alignment (Figure S-7). Approximately 80 percent of the improvements are on existing facilities and 20 percent are on new alignments to bypass more concentrated areas of development. Table S-2 summarizes the roadway improvements for this alternative.

Existing intersections and interchanges along the widened highway corridors would be improved to provide reasonable traffic operations at major highway junctions. The typical cross section for the proposed improvements included in the alternative would vary based on the type of facility and proposed number of lanes. The typical right-of-way width would generally be 40 m (130 ft) for a 4-lane arterial, 49 m (160 ft) for a 6-lane arterial, and 91 m (300 ft) for an 8-lane tollway. Where it is necessary to avoid critical natural and community resources, refinements have been made to the typical cross section to avoid or minimize impacts. These refinements included a constrained right-of-way width, typically to 30.5 m (100 ft) for a 4-lane arterial facility, 36.6 m

TABLE S-2
IL 83/US 45 with US 12 Alternative Improvements

Roadway	Improvement
Hicks Road	Widen from 2 to 6 lanes from IL 53 to IL 83
IL 83	Widen from 4 to 6 lanes from Hicks Rd. to US 45
Mundelein Bypass	New 4-lane road from IL 60/US 45 to IL 120 bypass
I-94	Widen from 6 to 8 lanes from IL 60 to IL 132
IL 21	Widen from 4 to 6 lanes from Lake Cook Rd. to IL 60; IL 137 to I-94
Libertyville Bypass	IL 60: Widen from 4 to 6 lanes from IL 21 to I-94 St. Mary's Rd.: Widen from 2 to 4 lanes from IL 60 to IL 137 IL 137: Widen from 4 to 6 lanes from IL 21 to I-94
US 12	Widen from 4 to 6 lanes from IL 53 to IL 176
IL 120 (New Alignment)	New 4-lane arterial from Alleghany Rd. to Almond Rd.

(120 ft) for a 6-lane facility, and 76 m (250 ft) for an 8-lane facility, applied in spot locations.

Supporting Improvements

A number of modal options were considered during the study of transportation improvements, including improvements to bus and rail transit, TSM and TDM strategies, and bike and pedestrian facilities. An examination of these transportation options shows that they play an important role in reducing single-occupancy vehicles, even though the widespread congestion in Lake County cannot be satisfied by these types of improvements alone. The proposed supporting improvements are in addition to the No-Action Alternative (Baseline) improvements, and would be common to the roadway build alternatives (Figures S-8 through S-11). The following is a summary of the types of recommended strategies and services.

- **Rail—**Expansion of commuter rail service, signal improvements, transfer stations between lines, and the consolidation of freight service.
- **Bus—**Express services, shuttle services, transfer stations, and new bus routes.
- **Transportation System Management—**Modernization of traffic signal control systems that adjust themselves to optimize traffic flow, freeway/arterial traffic flow management, incident detection and response, system surveillance, intersection improvements, communication with traffic/transit management center, and traveler information services.
- **Travel Demand Management—**Increased rideshare opportunities, improved pedestrian and bicycle facilities, additional park-and-ride facilities, expanded vanpool programs, parking management, and transit incentives.
- **Bicycle and Pedestrian—**New bicycle and pedestrian facilities along the rights-of-way of improved arterial facilities with connection to existing paths, and extensions of existing paths with connections to employment centers and rail stations.

Travel Performance Evaluation

A comparative analysis of the finalist alternatives was conducted using several transportation performance measures. A summary of the analysis is shown in Table S-3, and a brief description of the analysis follows. The results of the analysis for the IL 53 Freeway/Tollway Alternative and IL 83/US 45 with US 12 Alternative are relative to the No-Action Alternative (Baseline), year 2020.

- Travel time saved for local trips was about the same for both finalist build alternatives, with the IL 53 Freeway/Tollway Alternative saving about 33 hours of annual travel for the average motorist over the No-Action Alternative (Baseline). The IL 83/US 45 with US 12 Alternative would save about 34 hours annually.
- The IL 53 Freeway/Tollway Alternative would provide more relief to roadways

TABLE S-3
Travel Performance Comparison for Finalist Build Alternatives

Alternative	Regional Travel		Local Travel		North-South Uncongested Lane Miles	Safety
	Geographic Area	System Continuity	Local Trips	County Routes		
IL 53 Freeway/Tollway	✓*	✓		✓	✓	✓
IL 83/US 45 with US 12			✓			

* ✓ Denotes the best performing Alternative for a category.

under the county's jurisdiction compared to the IL 83/US 45 with US 12 Alternative. The IL 53 Freeway/Tollway Alternative would result in 17 fewer lane miles of congestion over the No-Action Alternative (Baseline), while the IL 83/US 45 with US 12 Alternative would result in 13 additional lane miles of congestion over the No-Action Alternative (Baseline).

- The IL 53 Freeway/Tollway Alternative would reduce travel times over a larger (up to 65%) geographic area, thereby improving regional access to a greater extent than the IL 83/US 45 with US 12 Alternative.
- Comparatively, the IL 53 Freeway/ Tollway Alternative would reduce the overall system crash rate by 7 percent, while the IL 83/US 45 with US 12 Alternative would reduce the crash rate by about 1%, compared to the No-Action Alternative (Baseline).
- The IL 53 Freeway/Tollway Alternative would have less congestion on existing north-south routes than the IL 83/US 45 with US 12 Alternative. The analysis indicated that when compared to the No-Action Alternative (Baseline), the IL 53 Freeway/Tollway Alternative would improve conditions by 12 percent, while the IL 83/US 45 with US 12 Alternative would improve conditions by 7 percent.
- Both build alternatives offer opportunities for improved modal connections including access to planned park-and-ride facilities, bicycle and pedestrian connections, existing and planned rail stations, and accommodation of local and express bus service.

Environmental Impacts

The primary impacts associated with the finalist alternatives are residential and commercial displacements, wetland resources, floodplains, forest preserves and parks, farmland, and cultural resources. The population growth-inducing aspects of the build alternatives are minor. Regardless of the alternative, there would be less than a 4 percent addition to the 2020 population with the build alternatives; thus, 96 percent of the population will be in place, regardless of the recommended alternative (Figure S-12). Efforts were made throughout the alternatives development process to minimize impacts to critical resources. Although each of the alternatives could potentially impact Section 4(f) resources (i.e., publicly owned lands including county forest preserve property and parks), the range of impact for any alternative would be 8 ha (20 ac) or less. Each alternative would also impact less than 40 ha (100 ac) of wetlands. Impacts to cultural resource sites that have the potential to be eligible for the National Register of Historic Places range from less than 10 to more than 20. Residential and commercial displacements associated with each alternative range from less than 100 to well over 300. Additionally, displacement of off-street parking is substantial for one of the alternatives, and at minor levels for the others. These and other environmental impacts are discussed in detail in Section 4 of the DEIS, *Environmental Consequences*. A brief discussion of the environmental impacts is provided below, in addition to a summary in Table S-4 (on pages ES-14 and ES-15).

Socioeconomics

- **Influence on Growth**—Using a methodology endorsed by the Northeastern Illinois Planning Commission (NIPC), the LCTIP developed specific population and employment forecasts for the No-Action Alternative (Baseline) and build alternatives. The analysis showed that nearly 300,000 new residents would be added to the county (over 1990 levels) regardless of either build alternative being implemented. To put the population growth issue in perspective, about 96 percent of Lake County's population is expected to occur even with the No-Action Alternative (Baseline). There would be less than a 4 percent difference

with the implementation of either build alternative. The forecasts for the build alternatives showed that the additional population would mostly concentrate in the central and north central parts of the county. Overall, the growth inducing aspects of the build alternatives are minor compared to the growth expected by the year 2020 without major transportation improvements (Figure S-12).

- **Community and Land Use Change**—The effects on community cohesion and the pattern of land use development would vary slightly depending on the alternative. The No-Action Alternative (Baseline) would have no substantive effect on community function or the pattern of future land development. The IL 83/US 45 with US 12 Alternative would have no material effect upon community function, but would slightly influence development patterns in the central and north central parts of the county. Lastly, the IL 53 Freeway/Tollway Alternative would introduce a physical barrier into the landscape that would not necessarily disrupt community function, but would require special design considerations to address roadway proximity impacts. Furthermore, this alternative would influence development patterns in the central and north central part of the county.

- **Residential and Commercial Displacements**—The displacement of residential and commercial structures is widely varied depending upon the project alternative. The No-Action Alternative (Baseline) would have the fewest number of displacements with 90, and the IL 53 Freeway/Tollway Alternative would have the next least with 122 additional displacements. The IL 83/US 45 with US 12 Alternative would have the greatest number of displacements with a total of 382, of which, over half are businesses. The business displacements for the build alternatives are expected to effect 3,428 employees under the IL 83/US 45 with US 12 Alternative, and 178 employees under the IL 53 Freeway/Tollway Alternative. Numerous businesses would also be affected by parking losses even though the business would remain. The IL 83/US 45 with US 12 Alternative would displace 2,514 parking spaces, whereas the IL 53 Freeway/Tollway Alternative would displace 109 spaces.[5]

Agriculture

Agriculture is a declining activity in Lake County with farmlands giving way to development at a rapid pace. Since 1950, Lake County has lost 73% of its farmland. Based upon this rapid pace of development, most of the developable lands in the county will be exhausted in the next 20 to 30 years. The IL 53 Freeway/Tollway Alternative would have the most direct impact upon farmland resources with the displacement of 315 ha (780 ac). The IL 83/US 45 with US 12 Alternative would have the second greatest impact on farmlands with the displacement of 91 ha (226 ac). The No-Action Alternative (Baseline) would have the least impact with the displacement of 32 ha (80 ac) of farmland.

Natural Resources

- **Wetlands**—Each of the project alternatives would directly impact less than 40 ha (100 ac) of wetlands. The IL 53 Freeway/Tollway Alternative would impact 37.2 ha (91.7 ac) of wetlands, of which, 39.3 percent are high to moderate quality wetlands. The IL 83/US 45 with US 12 Alternative would impact 23.4 ha (57.7 ac) of wetlands, with 64.6 percent high to moderate quality wetlands. The No-Action Alternative (Baseline) would directly impact 31.6 ha (78.1 ac) of wetlands.

- **Water Quality**—Potential changes in ground water or surface water quality were evaluated. The potential water quality impact to residences relying upon wells would be greater with the IL 83/US 45 with US 12 Alternative than for the

[5] Parking displacements potentially have short-term and long-term adverse affects on business revenues; therefore, they have been considered for the build alternatives.

others. Stream concentrations of heavy metals will remain below applicable water quality standards for all three alternatives. Impacts from chlorides would not be a concern for either the IL 53 Freeway/ Tollway Alternative or the No-Action Alternative (Baseline). With the IL 83/US 45 with US 12 Alternative, one watershed would experience an exceedance of the chloride water quality standard. This excursion would occur in a small area and mitigation measures or changes in drainage patterns could reduce this impact.

- **Threatened and Endangered Species**—The No-Action Alternative (Baseline) and the IL 83/US 45 with US 12 Alternative would potentially impact three Illinois Natural Area Inventory (INAI) sites. The most substantive impact would occur with the No-Action Alternative (Baseline), which would involve the Oak Grove Botanical Area, with one federal-listed plant species (Eastern Prairie Fringe Orchid). The IL 53 Freeway/Tollway Alternative does not directly impact any INAI sites. Both the IL 53 Freeway/ Tollway Alternative and the IL 83/US 45 with US 12 Alternative could potentially impact one state-listed fish species (Iowa Darter). Future work associated with the preferred alternative would include detailed threatened and endangered species field surveys to determine the presence of listed species.

- **Floodplains**—Lake County is rich in water resources, including lakes, rivers, and streams. These numerous water courses would be encountered to some extent by the project alternatives. The IL 53 Freeway/Tollway Alternative would encroach upon 10 floodplains, whereas the IL 83/US 45 with US 12 Alternative would encroach upon 33 floodplains. The No-Action Alternative (Baseline) would encroach upon the greatest number of floodplains with 38.

Air Quality

Conformity with air quality standards is assessed as part of the development of each successive Regional Transportation Plan (RTP) for Northeastern Illinois and State Transportation Improvement Plan (TIP). The most recent plans, the year 2020 RTP and 2001-2006 TIP, which include an extension of IL 53 in Lake County, were found to conform with federal air quality standards. At the project level, a micro-scale carbon monoxide analysis was performed, which indicated that the No-Action Alternative (Baseline) and build alternatives were also compliant with air quality standards.

Traffic Noise

Noise impacts were assessed to determine the relative degree of potential noise impact for the project alternatives. Traffic noise modeling was performed to determine the areas of potential impact and the number of residential properties effected by traffic noise exceeding the accepted Noise Abatement Criteria. The No-Action Alternative (Baseline) would have the greatest number of potential impacts with 1,211 residential properties, followed by the IL 53 Freeway/Tollway Alternative with 417 properties, and the IL 83/US 45 with US 12 Alternative with 273 properties. Additional studies would be required to determine more precise impacts and the feasibility of noise abatement measures such as berms or walls.

Cultural Resources

Cultural resource impacts were assessed to identify potential effects for the project alternatives. The assessment relied upon the use of existing and available data, and limited field observations and reconnaissance. The IL 53 Freeway/Tollway Alternative could potentially impact three historic structures and four archaeological sites. The IL 83/US 45 with US 12 Alternative could potentially impact six historic structures and two archaeological sites. The No-Action Alternative (Baseline) could potentially impact the greatest number of cultural resources with 13 historic structures and 10 archaeological sites. Future analysis for the preferred alternative would include efforts to further avoid or minimize possible effects, conduct field investigations fully compliant with current practices, and identify mitigation measures where impact is unavoidable.

Parks and Forest Preserves

The No-Action Alternative (Baseline) and build alternatives would impact park and forest preserve lands (Section 4(f) properties). The No-Action Alternative (Baseline) would potentially impact 14 forest preserves and 8 parks (7 ha or 17 ac). The IL 83/US 45 with US 12 Alternative would potentially impact 7 forest preserves and 12 parks (8 ha or 19 ac), whereas the IL 53 Freeway/Tollway Alternative would impact 4 forest preserves and 1 park(8 ha or 20 ac). This relatively low level of impact reflects efforts that have been made throughout the planning process to avoid or minimize impacts to these lands and other sensitive resources. Additional analysis and coordination would be performed in subsequent phases to make formal Section 4(f) determinations and further avoid or minimize these impacts.

Many other resource issues are thoroughly discussed in Section 4 of the DEIS, *Environmental Consequences*. Please refer to this section for more details.

6 Parking displacements potentially have short-term and long-term adverse affects on business revenues; therefore, they have been considered for the build alternatives.

Summary

The LCTIP has implemented a structured, rigorous technical process for developing and evaluating a broad range of transportation alternatives. State-of-the-art technical tools and innovative techniques were used to define the transportation problems and evaluate potential solutions in a study area that spans hundreds of miles of roadways, three counties, 70 communities and approximately 129,500 hectares (500 square miles) —to an equal level of detail. This effort has been supported by extensive input from area residents, interested groups, agencies, transportation providers and elected officials.

The avoidance or minimization of impacts to environmental resources was a key consideration early and throughout the planning process. The differences in impacts across the suite of initial alternatives were not distinguishing. As a result, the evaluation process focused upon travel performance measures, which were closely linked to the project's purpose and need. On the basis of this evaluation, the IL 53 Freeway/ Tollway Alternative and IL 83/US 45 with US 12 Alternative were selected as finalists. Each finalist and the No-Action Alternative (Baseline)were then further refined, including the development of separate population, employment and travel demand forecasts. These forecasts were used to more rigorously assess the alternative's travel performance and identify potential secondary and cumulative impacts.

The LCTIP worked closely with staff at the RTA, Metra, and Pace to develop a comprehensive package of proposed transit improvements that are common to either of the roadway finalists. Proposed rail improvements include expansion of commuter rail service, signal improvements, transfer stations between lines, and the consolidation of freight service. Proposed improvements to bus service include express services, shuttle services, transfer stations, and new bus routes. Other supporting

improvements include potential upgrades to bike and pedestrian facilities, as well as travel demand management and transportation system management strategies.

Through a comprehensive technical analysis and extensive public outreach, the LCTIP has identified a system of strategic roadway, rail, bus and TSM/TDM strategies necessary to help address the major congestion problems facing Lake County. The technical work and input received as part of the LCTIP will be important factors in a decision by IDOT and ISTHA regarding a preferred alternative and subsequent planning activities.

TABLE S-4
Summary of Environmental Consequences

	No-Action	IL 53 Freeway/Tollway	IL 83/US 45 with US 12
Cost (1999 dollars)	$483 million	$861 million	$1.095 billion
Socioeconomic Impacts			
Population (2020)	796,942	27,500 more people over No-Action[a]	18,000 more people over No-Action[a]
Households (2020)	290,570	10,962 more households over No-Action[b]	7,640 more households over No-Action[b]
Employment (2020)	389,545	4,444 more jobs over No-Action[b]	4,200 more jobs over No-Action[b]
Community and Land Use Changes	No change to community function or the pattern of future land development.	Since the early 1960's the communities have considered the potential for a major new highway in central Lake County; and therefore have been able to plan for its potential change to land use.	No material change in community function, or pattern of future land development.
New Right-of-Way[c]	195 ha (482 ac)	513 ha (1,268 ac)	248 ha (613 ac)
Residential Relocations (Additional Ancillary Outbuildings associated with Residential Relocations)	67	113 (45)	187 (25)
Business Relocations	23	9	195
Parking Impacts (# of displaced parking spaces)	—[d]	109 (0)	2,514 (258)
Percent of Total Assessed Value Converted	0.20	0.30	0.47
Environmental Justice	No disproportional impact	No disproportional impact	No disproportional impact
Public Services and Facilities	0	0	9
Agricultural Impacts			
Direct Farmland Impacts	32 ha (80 ac)	315 ha (780 ac)	91 ha (226 ac)
Market Value of Affected Crops	$21,000	$205,000	$59,300
Farm Operations	Minimal effect	36 farm parcels	20 farm parcels
Natural Resources			
Wetlands (all direct impacts)	32 ha (78 ac)	37 ha (92 ac)	23 ha (58 ac)
ADID Wetlands	5 ha (13 ac)	4 ha (9 ac)	2 ha (4 ac)
Class I	—[e]	5 ha (12 ac)	1 ha (2 ac)
Class II	—[e]	10 ha (25 ac)	14 ha (35 ac)
Class III	—[e]	23 ha (56 ac)	8 ha (20 ac)

	No-Action	IL 53 Freeway/Tollway	IL 83/US 45 with US 12
Floodplain Impacts	38 FIS floodplains	10 FIS	33 FIS
Longitudinal Encroachments	9	0	12
Transverse Encroachments	1	12	17
Threatened and Endangered Species	1	1	1
Water Quality	Does not exceed criteria	Does not exceed criteria	Potentially exceeds chloride standard
Air Quality	Does not exceed criteria	Does not exceed criteria	Does not exceed criteria
Noise	1,211 residential structures[f]	417 residential structures[f]	273 residential structures[f]
Potential Section 4(f) Resources Cultural Resource Impacts			
Historic Structures	13[g]	3	6
Archaeological Sites	10	4	2
Potential Forest Preserve and Local Park 4(f) Impacts	7 ha (17 ac)	8 ha (20 ac)	8 ha (19 ac)
No. of Forest Preserves	14	4	7
No. of Local Parks	8	1	12
Special Waste			
CERCLIS	0	0	0
LUST	20	3	34

Note: For purposes of a summary, all area values are rounded to the nearest whole number. Impacts are summarized individually for each alternative.

a Represents additional population for roadway improvements only.
b Represents additional households for both roadway and transit improvements.
c Includes new right-of-way requirements only—use of existing right-of-way would be associated with each alternative.
d Parking displacements were not investigated for the No-Action Alternative (Baseline).
e No field verification of wetlands performed for No-Action Alternative (Baseline), therefore, no qualitative assessment completed.
f Structures near the proposed improvements that would exceed the noise abatement criteria for residential areas—does not include those that would be displaced.
g Based on available Phase 1 preliminary engineering and environmental documentation reports .

SECTION 1

Purpose and Need

1.1 Project Purpose

The purpose of the Lake County Transportation Improvement Project (LCTIP) is to identify the major transportation improvements that would help to address the key congestion and mobility problems in the study area through a system of strategic roadway, rail, and bus improvements.

Since 1998, the LCTIP has conducted a process to identify the major transportation improvement needs in Lake County. The process has included a detailed evaluation of the transportation needs of the study area, an examination of a large number of alternative sets of transportation improvements that would effectively address the major transportation needs, and an evaluation of the potential environmental and societal impacts of the finalist alternative transportation improvements discussed in this document. Overall, the purpose of the process and this document is to provide an analysis of the finalist alternatives at a sufficient level of detail to assist decision-makers in the selection of a preferred alternative for future implementation in Lake County.

1.2 Background

1.2.1 Regional Planning Context

The 2020 Regional Transportation Plan (RTP) was developed through a detailed series of land use and transportation considerations as a long-range framework for transportation strategies and decisions in northeastern Illinois. The RTP developed and evaluated two regional surface transportation scenarios: a Build scenario and a No-Build scenario. Companions to the Build and No-Build scenarios were two future regional airport scenarios: expansion of the existing airports (O'Hare and Midway) or construction of a new airport in the south suburbs (CATS 1997b). For the LCTIP, the expansion of the existing airports scenario will be used.

The RTP No-Build scenario and its corresponding population and employment forecasts assumed that only the committed projects in the 1998-2002 Transportation Improvement Program (TIP) would be in place by 2020.[1] The RTP Build scenario assumed that all major highway and transit projects recommended in the 2020 RTP would be in place by 2020, including the extension of IL 53 into Lake County.

The 2020 RTP set out a comprehensive strategy for transportation improvements in the region. This regional transportation vision established the platform to conduct a focused analysis of transportation improvements in Lake County that would achieve the RTP's regional goals and objectives.

1.2.2 Project History

The need for an improved transportation system in Lake County has been the focus of years of planning and study. As early as 1962, regional plans singled out the need for an improved north-south transportation link for the northeastern Illinois region, referred to as the Lake-Will Expressway, a north-south circumferential interstate route (IDH 1963). In 1964, the Department of Public Works and Buildings (currently known as the Illinois Department of Transportation [IDOT]) rendered a route location decision to construct IL 53 (a portion of the Lake-Will Expressway concept) from Dundee Road in Cook County to Peterson Road in Lake County (20.9 km or 13 mi) as a fully access-controlled facility.

In 1969, Congress enacted the National Environmental Policy Act (NEPA), resulting in the restructuring of the Federal Highway Administration's (FHWA's) planning

[1] The 1998-2002 TIP was the current TIP available when the No-Action (Baseline) scenario was developed.

requirements. These requirements included compliance with the RTP for all proposed transportation projects. The IL 53 proposal has been included in regional plans and their updates, including the 2020 RTP.

The NEPA mandated that major federal public works actions consider the environmental consequences of those actions prior to funding, permitting, or construction. The IL 53 proposal was the subject of environmental analysis and documentation on two prior projects that were never completed. In the early 1990s, IDOT initiated the most recent engineering and environmental studies for the IL 53 extension using 2010 population, employment, and travel demand forecasts. IDOT's efforts were supplemented in 1993 to include the Illinois State Toll Highway Authority (ISTHA). In July 1993, the state legislature authorized ISTHA to expand the tollway system to include the IL 53 extension as a tollway. From 1993 to 1997, IDOT and ISTHA collaborated on the study of the IL 53 extension, with IDOT as the lead agency and ISTHA serving as a cooperating agency in the Phase I engineering and environmental process.

In 1997, the ongoing study of IL 53 was put on hold pending the adoption of the 2020 RTP and its accompanying population, employment, and travel demand forecasts. Subsequent thereto, IDOT and ISTHA restructured the study and formed the LCTIP. The revised process would consider major improvements to all aspects of the transportation system, including roadways, rail, and bus, as well as overall transportation management strategies. For the roadway improvements, alternatives would include improvements with and without the IL 53 extension. This DEIS describes the evaluation of the alternative transportation improvements considered as part of a broader examination of transportation problems in the Lake County area.

1.3 Project Need

1.3.1 Population and Employment Growth

Lake County is growing at a quick pace. Population trends show that Lake County grew from 382,638 in 1970 to 516,418 in 1990; by 1999 it had reached 617,975 (US Census Bureau 1999) as illustrated in Table 1-1 and Figure 1-2. Job growth was even more dramatic with employment almost doubling between 1970 and 1990. Both population and job growth are concentrated in the southern and central townships of the county (see Figures 1-3 and 1-4).

TABLE 1-1
Population and Employment Statistics for Lake County

	1970	1980	1990	1999
Population	382,638	440,372	516,418	617,975
Employment	116,350	162,030	228,606	289,925
Change (number)		**1970-1980**	**1980-1990**	**1990-1999**
Population		57,734	76,046	101,557
Employment		45,680	66,576	61,319
Percent Change		**1970-1980**	**1980-1990**	**1990-1999**
Population		15.1%	17.3%	19.7%
Employment		39.3%	41.1%	26.8%

Sources: US Census Bureau 1970, 1980, 1990a, 1999 population data
Lake County Department of Planning, Zoning & Environmental Quality 1989 (1970, 1980 employment data)
NIPC 1997 (1990 employment); 1999 Illinois Department of Employment Security (1999 employment data)

Suburban growth in the Chicago metropolitan area is similar to other urban centers across the country. Between 1970 and 1999, the five suburban counties surrounding Cook County grew between 60.4 and 121.3 percent (see Table 1-2). Lake County realized an increase of 235,337 new residents during this period, an increase of 61.5 percent. During this period, Lake County had the second largest change in actual population of any suburban county in the Chicago metro area.

Growth in the suburban counties is projected to continue into the future. The recent increase in population shows that Lake County is growing at a rapid pace despite a lack of major new transportation improvements. Population forecasts by the Northeastern Illinois Planning Commission (NIPC) show that an additional 249,333 people will reside in Lake County by 2020 (over and above 1990 population levels) without any major highway or transit improvements (CATS 1997a). This population growth is expected to be greatest in the northern and western portions of Lake County, where land is available for development. Regional population forecasts show that implementation of all the projects in the 2020 RTP would add 60,530 (8 percent) additional residents to Lake County by 2020 (CATS 1997a) (see Figure 1-5).

Between 1970 and 1999, employment increased by nearly 150 percent, or 173,575 jobs. This trend is expected to continue with regional planning agencies projecting total Lake County employment to continue to increase from 228,606 in 1990 to 389,595 in 2020 without major transportation improvements (see Figure 1-6). There will be 160,989 new jobs in Lake County without provision of transportation improvements. The implementation of all the projects in the 2020 RTP would add an additional 4,444 jobs in Lake County by 2020 (CATS 1997a). Most of the major employment in Lake County continues to be located in the southern and eastern portions of the county.

The rate of employment growth between 1970 and 1999 substantially exceeded the rate of population growth for that same period. The migration of jobs to areas like Lake County is consistent with manufacturing and business interest in locations where an abundance of relatively inexpensive land is available and obtainable in large parcels.

Transportation has not been, nor is expected to be, a major driver in population growth in Lake County; this is supported not only by the 2020 forecasts, but also by the county's historical growth patterns and geographic position in the metropolitan area. Lake County provides quality residential living and offers a favorable setting for business and commerce. All of these have been factors in the fast-paced population growth during the last three decades.

Overall, as population and employment have increased, transportation improvements have not kept pace. Whereas population and employment have substantially increased between 1980 and 1999, less than 5 percent of the major roads have been improved to meet the growing traffic demand. With the county adding an average of 11,000 new residents per

TABLE 1-2
Population Statistics for the Five Suburban Counties Surrounding Cook County

	1970	1990	1999	Absolute Change 1970-1999	% Change 1970-1999
Du Page Co.	491,882	781,666	892,547	400,665	81.5%
Kane Co.	251,005	317,471	402,622	151,617	60.4%
Lake Co.	382,638	516,418	617,975	235,337	61.5%
McHenry Co.	111,555	183,241	246,812	135,257	121.3%
Will Co.	249,498	357,313	478,392	228,894	91.7%

Source: US Census Bureau 1970, 1990, 1999

year over the past decade, the transportation system has not been able to provide adequate service. Major improvements are needed to address the growth that is coming regardless of transportation improvements.

1.3.2 Existing System Performance

During the early steps of the LCTIP, a needs analysis was conducted to evaluate the range of transportation issues and problems for the existing roadway and transit systems in the study area. This evaluation involved technical analyses, as well as the gathering of information and experiences from transportation agencies, elected officials, and the public. The transportation deficiencies identified in the study area are extensive—see the LCTIP's *Transportation System Performance Report, January 1999* for complete details. The following are some of the major findings:

- Development is fast outpacing transportation improvements.
- North-south travel patterns are predominant.
- Congestion is widespread. Currently, one-third of the roadway network is congested during peak travel periods.
- Nearly 90 percent of all work trips are made by automobiles.
- Less than 5 percent of all work trips are made by transit.
- Lake County experiences nearly 1.73 million daily vehicle trips; half start and end in the county, and the other half either travel into, leave from, or pass through the county.
- Nearly 50 percent of Lake County's rail stations have insufficient parking.

During the early stage of the study, surveys were taken to gather opinions of residents, agencies, and elected officials concerning the transportation issues in Lake County. Respondents consistently cited congestion as the most important quality of life issue. Respondents broadly supported major highway improvements as a means to relieve congestion, followed by transit.

By 2020, transportation deficiencies will encompass most of Lake County. Even with implementation of committed and reasonably expected improvements (74 miles of roadway capacity improvements and North Central Service [NCS] rail expansion and upgrades), congestion will double by 2020.[2] Major improvements are needed in Lake County to prevent gridlock.

The LCTIP recognized that this project would not be able to address all of the transportation problems. The LCTIP resolved to focus their efforts on the major system deficiencies, and, in doing so, also provide a foundation for transportation planning by other agencies. On the basis of extensive technical studies embodied in the *Transportation System Performance Report—January 1999*, the LCTIP identified four transportation needs:

- Improve north-south travel capacity and efficiency
- Improve regional and local travel
- Improve safety
- Improve modal connections

The remainder of this section discusses these need statements. Together, the project's purpose and need have served to shape the range of reasonable transportation improvement alternatives presented in Section 3.

1.3.3 Improve North-South Travel Capacity and Efficiency

Lake County has widespread roadway congestion. The LCTIP project team performed a comprehensive technical analysis of travel patterns (a travel desire analysis) to evaluate the direction people are traveling within the county. Figure 1-7 clearly shows the travel desire to be predominantly in the north-south direction. Strongly supporting this conclusion are daily

[2] The LCTIP No-Action (Baseline) Alternative. See also Section 3, *Alternatives*.

travel patterns, showing that nearly half of daily trips (about 720,000 trips) either enter or leave Lake County. The general orientation of these trips is to and from the south as well as to and from the north, wherein lie most of the major employment centers (largely located in the southern townships of Lake County and the northern townships of Cook County). Approximately 66 percent of Lake County residents are employed within the county, while 30 percent are employed to the south in neighboring Cook County (Lake County Department of Planning, Zoning, and Environmental Quality 1994).

Currently in the county, almost 50 percent of the vehicle miles of travel occur on interstate and principal arterial facilities during peak travel periods. These roadways account for only 26 percent of the roadway system in the county, and 60 percent of these primary roads are oriented in a north-south direction.

Lake County's geographic position as a major entrance to the State of Illinois and the Chicago metropolitan area also contributes to a high volume of north-south travel. The through trip component is approximately 125,000 vehicles per day, and the largest volumes of through travel are in the eastern half of Lake County, generally along the I-94 corridor.

Overall, travel is expected to worsen considerably by 2020. In the next 20 years, vehicle miles of travel are projected to increase 40 percent, and technical analyses show this increase would impact north-south roadways the most. An analysis of average daily traffic shows that 55 percent of this growth would be on the north-south roadways (LCTIP 1999).

1.3.4 Improve Regional and Local Travel

The roadway network in Lake County serves both local and regional trips equally. Presently, the network supports nearly 1.73 million trips on a daily basis. About 50 percent of those trips start and end within the county, and the other 50 percent either leave, enter, or pass through the county.

Local trips (shorter distance trips) are a substantial component of daily travel in Lake County, with approximately 884,000 trips beginning and ending in the county. About 50 percent of the vehicle miles of travel in the county are made on 74 percent of the roadway network, comprised of minor arterial facilities, collectors, and local roads. Interim strategies, such as intersection improvements and coordinated traffic signals, have been implemented at a number of locations over the past decades; however, these spot improvements have not been effective at keeping pace with the continued rising levels of congestion.

During the past 15 years, travel has increased on the county-maintained roadway system more than 230 percent (Lake County Division of Transportation 1998). During this same period, added lane miles of improvement have increased less than 5 percent. The rise in local system travel is directly linked to population growth and inefficiencies in travel on Lake County's primary roadway system. Congestion on the primary routes (interstate routes and principal arterial facilities) has caused atypical travel patterns such as travelers diverting to alternate routes; often times using secondary or local roads not intended for longer trips. The result is widespread use of the local road network for commuter trips. The preponderance of cut-through traffic was echoed in the LCTIP's survey of people's opinions on transportation issues facing Lake County (LCTIP 1999). There is a need to attract longer distance travel to the appropriate type of facility (i.e., principal arterial facilities and interstate routes), which would assist in relieving travel congestion on the local network.

Longer distance trips represent another major component of Lake County's automobile travel. Each day over 720,000 trips are entering or leaving the county, and about 125,000 trips are passing through the county. Primary routes (interstates and principal arterials) represent only 26 percent of the total roadway system in the county and carry almost 50 percent of the vehicle miles of travel during peak travel periods. Many of the county's primary routes have reached capacity

and are experiencing severe congestion during peak travel periods.

1.3.5 Improve Safety

Much of Lake County's highway system is reflective of its past. Nearly 80 percent of the roadway network is comprised of 2-lane roadways that once served a rural/agricultural landscape. Today, many of those same roadways are over capacity and serve a suburban county with one of the largest populations in the state.

An outdated roadway system carrying traffic volumes that far exceed its capacity is an important contributing factor to vehicular crashes. Based on available data (1993-1995), the total number of crashes in Lake County ranged from 17,072 to 18,149 (IDOT 1993-1995). Slightly over 50 percent of all crashes occur during the peak P.M. travel period. The majority of all crashes involve property damage, and are followed by injury crashes. Fatal crashes account for a fraction of the total crashes. Data shows that the proportion of crashes on the primary road system has steadily increased with rising traffic volumes. In 1993, 70 percent of all crashes occurred on the primary roadway system. In 1995, the number had risen to 78 percent. While the number of crashes on primary roads has increased, the crash rates (crashes per million vehicle miles of travel) are the lowest when compared to other facility types. This is consistent with regional as well as national trends that show that the lowest crash rates occur along higher type facilities (e.g., freeway, tollway) with more limited access.

The average crash rate in Lake County for all roads is similar to other urban counties in the Chicago metropolitan area. Lake County had a calculated crash rate of 3.5 per million vehicle miles driven (IDOT 1993-1995). The county's rate is slightly higher than the annual statewide rate of 3.0 in 1995.

National research involving the relationship between automobile crashes to highway features confirms that an important factor in crash occurrence is traffic congestion. In Lake County, congestion on the primary routes is well documented, and is spreading to the secondary and local roadway system. This is supported by the fact that without major transportation improvements future travel is projected to increase by 28 percent on minor arterial facilities, by 50 percent on collectors, and by 69 percent on local roads (LCTIP 1999). Major improvements are needed in order to increase capacity, improve safety performance, and attract non-local trips to the primary system, thereby reducing the potential for crashes on the secondary system.

There are a number of basic, well-established principles relating roadway safety to elements of the highway, including the relationship of roadway type and volume to congestion, the relationship of traffic congestion to crash frequency, and differences in the safety performance of various roadway types. In the Chicago metropolitan area and Lake County, it is apparent that the increase of crashes is linked to more vehicles traveling more miles than before, as well as increased congestion on roadways with inherent capacity problems. Lake County's present roadway network is attempting to manage a large volume of long- and short-distance trips to and from work, shopping, school, entertainment, and other destinations. This situation has contributed to widespread travel safety concerns on the county's major and secondary roadway networks.

A combination of factors has lead to increasing concern for vehicular safety in Lake County. The challenge in improving travel safety is linked to shifting automobile travel to the appropriate types of roadway facilities that suit the travel and are specifically designed to minimize conflicts between the local and long-distance trip.

1.3.6 Improve Modal Connections

Regional and local transportation planning agencies have continually explored ways to improve the connectivity between transportation modes. In Lake County, several examples of better connections between transportation modes have occurred in recent

years, including the Lake Cook Transportation Management Association's (TMA) shuttle bug service between rail stations and major employment centers. The TMA's and other efforts represent a start; however, additional steps to improve connections between modes would further enhance the efficiency of each mode and the overall transportation system.

The overwhelming use of the highway network in both Lake County and elsewhere in the Chicago metro area has come about through the evolution of a well-connected system of roadways—a network that connects most locations with every other location. However, transit serves a relatively small percentage of the total travel in Lake County. According to the latest census data (US Census Bureau 1990a), less than 5 percent of the commuter trips in Lake County were made by rail and bus. In 1990, 3.7 percent of the work trips were made by rail and 0.5 percent were made by bus. The transit system in Lake County (particularly rail) has served the downtown Chicago work trip well, but as employment and housing have steadily increased in the suburbs, transit service to these varied locations is more problematic.

Research has shown that a successful transit service must be competitive with the automobile in terms of origin and destination.

- **The origin of travel**—Easily accessed with connection from other modes
- **The destination of travel**—Connecting people to where they want to go (i.e., employment centers, activity [shopping, commercial, etc.] centers, recreational centers)

Easy access to the rail stations in Lake County is critical for maintaining and increasing rail transit ridership. The needs assessment for Lake County (LCTIP 1999) showed that 90 percent of the commuter rail patrons arrive at rail stations by automobile. An examination of station parking in the study area shows that 50 percent have usage that is at capacity, but in a few short years this figure could grow to over 80 percent. The need for parking at rail stations will continue to grow (projected to be more than 3,500 additional spaces by 2020), and past experience shows that parking supply is used as quickly as it is provided. It is apparent that an ample supply of parking is crucial to improving the transit user connection at trip origins.

Other forms of access to rail stations (i.e., park-and-ride facilities and feeder bus services) could also expand the ridership catchment area, thereby increasing patronage. In recent years, the bus market in Lake County has shown some flexibility in the type of services provided. The most successful bus services have been those that connect major job centers with other transportation modes (i.e., rail stations). These are good examples, but much more is needed to expand the linkage of transit between the home-to-work trip and employment centers and major transportation nodes (i.e., rail stations, park-and-ride, etc.).

Transit has rarely served the same role as many modern highways by providing bi-directional flow during the commuting period or, to some extent, throughout the day. Changes in employment patterns, however, have been contributing to changing commute patterns (such as suburb to suburb or Chicago downtown to suburbs). These changing patterns of employment are causing transit providers to respond with better connections for reverse commuters. Once again, the needs assessment for Lake County (LCTIP 1999) identified some inherent short comings in the system that currently frustrate appropriate service in the reverse direction, but these encumbrances can be overcome with modest physical improvements. Combined with these physical improvements, the transit community agrees that enhanced reverse commute services would require improved linkages between rail stations and employment centers with a system of feeder/shuttle bus service.

The relationship between origins of travel and major employment centers in Lake County was examined as part of this study. The conclusion showed that a number of these origins and destinations are accomplished by automobile only. The flexibility of rail service is limited, and bus transit is not configured to serve these major travel corridors. However, the LCTIP concluded

that better connection between modes, coupled with enhancement of existing modes (i.e., express bus service from major collection points to employment/activity centers) reflect concepts that begin to address the needs in these corridors by use of other mode choices.

In Lake County, some steps have been taken to improve connections between the roadway, rail, bus, and other modes. However, expansion of the concepts enumerated above would further enhance the efficiency of each mode and the overall transportation system.

SECTION 2

Affected Environment

The LCTIP study area is located in Lake County, Illinois, a part of the Chicago metropolitan region.[1] The Chicago region, comprised of six counties (Cook, DuPage, Kane, Lake, McHenry, and Will), has a diverse economic base. Long known for its industrial activity, the region also houses many corporate headquarters, key educational and research institutions, is the center of the nation's transportation network, and is a major force in financial markets. Located 41.8 km (26 mi) from Chicago's loop and 54.7 km (34 mi) from downtown Milwaukee, Lake County enjoys a strategic geographic position as an entrance to the state and the metropolitan area, and is instrumental in any evaluation of interregional transportation systems. It covers roughly 1,192 km^2 (460 mi^2), is divided into 18 townships, and includes 52 incorporated cities and villages. For this study, the Benton and Zion townships have been combined, and the Deerfield and West Deerfield townships have been combined due to their small size and proximity (Figure 2-1). Although the study area is slightly larger than Lake County, discussions in this chapter are limited to the county for ease of comparison with values that are commonly aggregated at the county level.

An environmental database, compiled as a geographic information system (GIS) database, was developed specifically for the project to use in considering and evaluating environmental concerns. A separate technical memo (LCTIP 2001a) details how the database was developed, refined, and used for this project. The GIS database consists of almost 80 data layers that were compiled largely from existing digital data obtained from various federal, state, and local sources and agencies (see Appendix A), including:

- IL Department of Transportation (IDOT)
- Regional Transportation Authority (RTA)
- Federal Emergency Management Agency (FEMA)
- Northeastern IL Planning Commission (NIPC)
- IL Department of Natural Resources (IDNR)
- IL State Geological Survey (ISGS)
- IL Historic Preservation Agency (IHPA)
- US Geological Survey (USGS)
- Pace Bus
- US Fish and Wildlife Service (USFWS)
- US National Park Service (USNPS)
- Lake County
- Cook County
- Chicagoland Bicycle Federation (CBF)

Data from these sources was converted into a common coordinate system to facilitate spatial analyses and map creation using a single base. Data was updated and validated on a limited, as-needed basis. Source agencies were consulted about the appropriate use of their data to ensure conclusions were valid based on queries from this database.

2.1 Socioeconomic Characteristics

2.1.1 Demographics

2.1.1.1 Regional Demographic Trends

The regional population characteristics for the six-county Chicago metropolitan area are

[1] The regional discussion focuses on those counties in NIPC's jurisdiction. These include Cook, DuPage, Kane, Lake, McHenry, and Will counties.

shown in Table 2-1.[2] Between 1970 and 1990, the region experienced a modest increase in population (an increase of 282,443 people or 4 percent). Between 1970 and 1990, the City of Chicago lost about 585,000 residents, while the suburbs gained nearly 870,000 residents (US Census Bureau 1970-1990); in the suburbs, this population increase trend is forecast to continue in the future. Lake County received the third highest influx of new residents in the region (behind DuPage and suburban Cook counties). During that time, Lake County's population increased 35 percent (adding nearly 134,000 new residents). This trend is forecast to continue in the future, according to NIPC (Lake County Department of Planning, Zoning, and Environmental Quality 1994).

2.1.1.2 Population and Households

In 1990, the population in Lake County was 516,418, a 35 percent increase over 1970 population. Table 2-2 (on the following page) details the population change between 1970 and 1990, and the US Census Bureau 1996 estimates for each township in Lake County.[3]

Between 1970 and 1990, the greatest absolute population increases occurred in the southern and central townships in the county, specifically Vernon, Ela, Libertyville, Warren, and Avon townships, for a combined increase of nearly 110,000 people, or an 82 percent increase in the county population. During the same 20-year period, population losses occurred in the eastern townships of Shields and Deerfield-West Deerfield. Between 1990 and 1996, the trend of population increases continued with the southern and central townships receiving the largest portion of new residents. Over this period, population across the county increased by 66,565 people.

Increasing population, combined with decreasing household size, has led to an increase in the number of households in the county (in 1990, the average number of persons

TABLE 2-1
Regional Population Trends

	1970	1990	Change 1970–1990	% Change 1970–1990
Chicago Metropolitan Area	6,978,733	7,261,176	282,443	4.0
City of Chicago	3,369,359	2,783,726	(585,633)	(17.4)
Suburban Cook Co.	2,123,010	2,321,341	198,331	9.3
DuPage Co.	491,882	781,666	289,784	58.9
Kane Co.	251,005	317,471	66,466	26.5
Lake Co.	382,638	516,418	133,780	35.0
McHenry Co.	111,555	183,241	71,686	64.3
Will Co.	249,498	357,313	107,815	43.2

Source: US Census Bureau 1970-1990

[2] For this study, the 1990 census detail, which is the most comprehensive and detailed census data available, provides a consistent source for providing a comparison of demographic facts. The 2000 census data is being released over a period of time extending from March 2001 to 2003. As of this publication, 2000 census data is not available at the appropriate level of detail. 2000 census data, however, will be used to a limited extent, where available, to update area trends.

[3] 1996 US Census Bureau estimates are the most recent detailed data available for each township. Section 1, *Purpose and Need,* identified 1999 values; however, this information is only available for the entire county. In this section, 1996 values provide greater insight into location of population changes.

per household in Lake County was 2.96, compared to 3.71 in 1970). Between 1970 and 1990, an estimated 71,019 new households (69 percent increase) were established in Lake County. Similar to population growth, the greatest household increases occurred in the southern and central townships in the county. Vernon Township experienced the greatest influx of households, adding 14,000 new households over the 20-year period. Shields was the only township that declined in number of households from 1970 to 1990, declining by nearly 6,000 households , which was primarily influenced by the closure of Fort Sheridan Army base that began in 1988. [4,5]

Population growth has also spurred increases in the housing supply in Lake County. The supply of housing in Lake County increased 65 percent between 1970 and 1990, from 110,448 to 183,283 units. About 40 percent of new housing units were built in Vernon, Warren, and Libertyville townships, all in central Lake County (Lake County Department of Planning, Zoning & Environmental Quality 1994).

TABLE 2-2
Population by Township *

	1970	1990	1996 Est.	Change 1970–1990	% Change 1970–1990	Change 1990–1996	% Change 1990–1996
Antioch	11,639	18,046	20,466	6,407	55.0	2,420	13.4
Avon	19,953	35,989	50,433	16,036	80.4	14,444	40.1
Benton-Zion	30,866	35,590	39,393	4,724	15.3	3,803	10.7
Cuba	9,097	14,118	15,631	5,021	55.2	1,513	10.7
Deerfield-W. Deerfield	64,459	64,394	66,044	(65)	(0.1)	1,650	2.6
Ela	12,208	32,433	37,161	20,225	165.7	4,728	14.6
Fremont	12,186	14,280	17,388	2,094	17.2	3,108	21.8
Grant	11,007	14,423	15,796	3,416	31.0	1,373	9.5
Lake Villa	11,593	20,764	23,273	9,171	79.1	2,509	12.1
Libertyville	25,577	42,436	47,410	16,859	65.9	4,974	11.7
Newport	2,660	3,561	4,148	901	33.9	587	16.5
Shields	55,093	43,414	39,992	(11,679)	(21.2)	(3,422)	(7.9)
Vernon	12,835	51,141	59,421	38,306	298.4	8,280	16.2
Warren	16,291	34,785	46,169	18,494	113.5	11,384	32.7
Wauconda	10,494	12,859	16,706	2,365	22.5	3,847	29.9
Waukegan	76,680	78,185	83,552	1,505	2.0	5,367	6.9
COUNTY TOTAL	**382,638**	**516,418**	**582,983**	**133,780**	**35.0**	**66,565**	**12.9**

* Benton and Zion township data and Deerfield-West Deerfield township data have been combined.

Sources: US Census Bureau 1970 and 1990a, 1996, US Census estimate (US Census Bureau 1997)

[4] Household information is also collected as part of the Decennial Census. Household data includes information on households, including non-family households, single-person households, female-headed families, two-parent families, etc.

[5] The Fort Sheridan base closure was completed by 1993.

Two countywide 2020 population and household forecasts are detailed in Table 2-3. The No-Action forecast assumes a reasonable level of transportation improvements would be made before 2020 (ACG 1999).[6] The "2020 RTP" forecast assumes construction of all transportation projects identified in the RTP under the existing airport improvement scenario.

Under the No-Action Alternative (Baseline), Lake County is forecast to have about 797,000 residents and 290,500 households by 2020. With the No-Action transportation improvements, Lake County's population will increase by 54 percent (280,500 people) from 1990, and the number of households will increase by 67 percent (116,600 households).

Under the RTP scenario, Lake County's population is forecast to increase to 826,281 residents (a 3.7 percent increase over the No-Action forecast); the number of households is forecast to increase to 301,531 households (a 3.8 percent increase over the No-Action forecast).

2.1.1.3 Age Distribution

Lake County has a younger population than the region, with a median age of 31.6, compared to 32.4 for the six-county Chicago region and 32.8 for the state. The county also has a higher percent of the population that is under 18, a higher percent between 18 and 64, and a lower percent over 65 (see Table 2-4).

TABLE 2-3
Population and Household Forecasts, Lake County

	1990 [a]	2020 Project No-Action Forecast [b]	% Change	Addition to 2020 No-Action Forecast for 2020 RTP Forecast [c, d]	% Change from No-Action Forecast
Population	516,418	796,942	54.3%	29,339	3.7%
Households	173,966	290,569	67.0%	10,962	3.8%

[a] 1990 population and household data: US Census Bureau
[b] ACG 1999
[c] Existing Airport Improvements 2020 Build development scenario (CATS 1997a)
[d] Population contribution of new commuter rail service on the Elgin Joliet and Eastern Railroad is 2,000

TABLE 2-4
Age Distribution, 1990

	Under 18 (%)	18–64 (%)	65 and older (%)	Median Age
Lake County	28	64	8	31.6
Six-County Region	26	63	11	32.4
Illinois	26	62	13	32.8

Source: US Census Bureau 1990a

[6] Representatives from IDOT, ISTHA, RTA, Lake County, Metra, and Pace identified the reasonable set of transportation improvements to be included in the project No-Action (Baseline), including 74 route miles of arterial highway improvements, adding a second track to the NCS rail line, new Metra stations, and other Metra station improvements and Pace bus service improvements (Section 3.3, *No-Action Alternative [Baseline*]).

2.1.2 Land Use and Development Trends

Historically, Lake County's communities served as satellite cities or bedroom suburbs of Chicago, as traditional rural crossroads, or as resort towns. As the population increased, growth contributed to the transformation of Lake County communities from small towns to metropolitan suburbs. Over the past 30 years, the central and southern tier areas of Lake County have received the bulk of new residents, shifting population concentrations away from the Lake Michigan shoreline (Lake County Department of Planning, Zoning & Environmental Quality 1994).

In 1990, the largest land uses in Lake County were residential, agricultural, and vacant land. Since 1990, a significant amount of agricultural and vacant land has been converted to residential use. In 1990, agricultural plus vacant land (land conceivably open to development) accounted for 43 percent of the land use. By 1997, these two categories represented 37 percent of total land use. By 1997, lands devoted to residential use had increased to 36 percent. Table 2-5 summarizes 1990 and 1997 land uses in Lake County.

A substantial part of the developed land lies within the area that encompasses the majority of the proposed transportation improvement alternatives—this area is generally bound by Lake Cook Road on the south, IL 120 to the north, US 41 to the east, and US 12 to the west (Table 2-6, on the following page). In 1990, 44 percent of the lands were devoted to urban land use; by 1997 that number had increased to 51 percent.[7] In 1990, 45 percent of the lands were agriculture or vacant lands; by 1997, this percentage had dropped to 37 percent. Between 1990 and 1997, the amount of lands devoted to residential uses had grown by more

TABLE 2-5
Land Use Summary

Land Use	1990, ha (ac) [c]	% of Total	1997, ha (ac) [d]	% of Total
Residential	37,800 (93,440)	31%	43,949 (108,638)	36%
Commercial and Services	4,401 (10,880)	4%	4,785 (11,827)	4%
Institutional	3,366 (8,320)	3%	3,381 (8,357)	3%
Industrial	4,143 (10,240)	3%	4,238 (10,476)	3%
Transportation, Communication, Utilities	2,071 (5,120)	2%	2,078 (5,137)	2%
Agriculture	28,221 (69,760)	23%	24,297 (60,060)	20%
Open Space [a]	11,133 (27,520)	9%	11,763 (29,076)	10%
Vacant [b]	24,079 (59,520)	20%	20,650 (51,044)	17%
Water	6,473 (16,000)	5%	6,666 (16,477)	5%
TOTAL	**121,687 (300,800)**	**100%**	**121,687 (300,800)**	**100%**

[a] Open space land includes recreational uses, such as parks, forest preserves, and golf courses.
[b] Vacant land includes forested and grassland areas, wetlands that exceed 10.1 ha (25 ac), non-residential, and other uses that are available for redevelopment.
[c] Source: NIPC 1990 Land Use
[d] Source: CH2M HILL, GIS Database 1999

[7] Developed lands include residential, commercial, institutional, industrial, transportation, communication, and utilities land uses.

than 2,900 ha (7,180 ac), from 32 to 38 percent of the total land area. The least developed portion of the subarea is between US 45 and US 12, chiefly because of the lack of water and sewers serving the area. Growth is beginning to occur, but will remain somewhat limited until the area is served by public utilities.

Another way to gauge the level of development and land use change is to review building permits. Between 1995 and 1999, permits were issued for nearly 22,200 units throughout Lake County. Table 2-7 identifies the 10 communities that have issued the highest number of residential building permits. Nine of these 10 communities are located in

TABLE 2-6
Land Use Summary by Subarea Bound by Lake Cook Road, IL 120, US 41, and US 12

Land Use	1990, ha (ac) [c]	% of Total	1997, ha (ac) [d]	% of Total
Residential	14,892 (36,800)	32%	17,798 (43,980)	38%
Commercial & Services	1,700 (4,200)	4%	1,874 (4,630)	4%
Institutional	1,060 (2,620)	2%	1,125 (2,780)	3%
Industrial	2,275 (5,620)	5%	2,343 (5,790)	5%
Transportation, Communication, Utilities	595 (1,470)	1%	595 (1,470)	1%
Agriculture	11,546 (28,530)	25%	9,328 (23,050)	20%
Open Space [a]	3,828 (9,460)	8%	4,241 (10,480)	9%
Vacant [b]	9,385 (23,190)	20%	7,916 (19,560)	17%
Water	1,303 (3,220)	3%	1,364 (3,370)	3%
TOTAL	**46,584 (115,110)**	**100%**	**46,584 (115,110)**	**100%**

[a] Open land space includes recreational uses, such as parks and golf courses.
[b] Vacant land includes forested and grassland areas, wetlands that exceed 10.1 ha (25 ac), residential, non-residential, and other uses that are available for redevelopment.
[c] Source: NIPC 1990
[d] Source: CH2M HILL, 1997 aerial photography update of NIPC data

TABLE 2-7
Top 10 Communities Issuing Residential Permits, 1995–1999

Municipality	Building Permits Issued	Number of Units	Municipality	Building Permits Issued	Number of Units
Gurnee	1,751	2,558	Round Lake Beach	928	1,001
Waukegan	1,371	2,152	Lake Villa	916	919
Grayslake	1,478	1,551	Vernon Hills	891	911
Lindenhurst	1,004	1,384	Buffalo Grove	744	886
Mundelein	1,083	1,251	Round Lake	643	643

Source: US Census Bureau, Manufacturing and Construction Division 1990b.

the northern and north central regions of Lake County.

2.1.3 Economic Characteristics

2.1.3.1 Employment

In 1970, nearly 60 percent of the region's employment was located in Chicago, with 40 percent in the suburban areas (suburban Cook and the other five counties in the region). By 1990, employment in Chicago represented only 39 percent of total employment in the region; the remaining 61 percent were outside of Chicago. Still, as of 1990, Chicago remains the dominant economic force in the region with the largest share of jobs (Table 2-8).

Lake County's growth includes a substantial increase in the number of jobs and its percentage share of the region's employment. Between 1970 and 1990, employment nearly doubled in Lake County, from approximately 116,000 to nearly 229,000 jobs. This was the second highest percentage increase in jobs in the Chicago region, after DuPage County, and the third highest in terms of absolute number, after suburban Cook and DuPage counties. In 1970, 3.7 percent of the region's jobs were in Lake County; by 1990, the percentage had increased to 5.9 percent.

Table 2-9 (on the following page) provides additional detail on employment trends by township. In 1990, Libertyville, Deerfield-West Deerfield, Waukegan, Vernon, and Shields contain nearly 70 percent of the jobs in the county. Between 1970 and 1990, employment increased for all townships except Waukegan, which waned primarily due to the decline in heavy industry and manufacturing. Vernon, Libertyville, Warren, Deerfield-West Deerfield, and Ela townships all experienced increases of greater than 10,000 jobs during the 20-year period. These townships account for more than 80 percent of the new jobs to Lake County. The pattern of job growth is similar to that of population growth in that the greatest numerical gains occurred in the southern and central townships.

The Project No-Action forecast (ACG 2001) assumes a modest improvement to the transportation system by 2020, and the RTP forecast (CATS 1997a) assumes construction of all transportation projects identified in the RTP.

Under the Project No-Action forecast, by 2020 Lake County is forecast to have 389,545 jobs, an increase of 70 percent (161,000 jobs) from 1990. Under the RTP forecast, Lake County is forecast to have 393,641 jobs, an increase of 72 percent (165,035 jobs).

2.1.3.2 Industries

Employment by industry classification is presented in Table 2-10 (on the following page) for 1980 and 1996.

TABLE 2-8
Regional Employment Trends

	1970	1990	Absolute Change	% Change 1970–1990
Chicago	1,864,000	1,482,381	(381,619)	(20.5)
Suburban Cook	836,300	1,293,652	457,352	54.7
Du Page Co.	146,400	530,322	383,922	262.2
Kane Co.	103,300	145,205	41,905	40.6
Lake Co.	116,350	228,606	112,256	96.5
McHenry Co.	36,300	65,526	29,226	80.5
Will Co.	82,500	99,393	16,893	20.5

Source: NIPC

TABLE 2-9
Employment by Township

	1970	1990	Change (#)	Change (%)
Antioch	2,450	4,561	2,111	86.2
Avon	4,100	8,609	4,509	110.0
Benton-Zion	4,650	6,436	1,786	38.4
Cuba	6,150	9,323	3,173	51.6
Deerfield-W. Deerfield	19,700	34,693	14,993	76.1
Ela	2,500	13,718	11,218	448.7
Fremont	1,500	3,312	1,812	120.8
Grant	1,200	3,688	2,488	207.3
Lake Villa	500	2,968	2,468	493.6
Libertyville	10,800	38,021	27,221	252.0
Newport	700	966	266	38.0
Shields	16,800	20,346	3,546	21.1
Vernon	2,300	28,028	25,728	1,118.6
Warren	3,550	17,599	14,049	395.7
Wauconda	900	4,297	3,397	377.4
Waukegan	38,450	32,041	(6,409)	(16.7)
TOTAL LAKE COUNTY	**116,250**	**228,606**	**112,356**	**96.7**

1970 data: NIPC 1973
1990 data: NIPC 1997

TABLE 2-10
Employment by Industry

	1980		1996	
	Number	% of Total	Number	% of Total
Agricultural Services, Forestry, Fishing	1,555	0.7 %	6,260	1.7 %
Mining	1,114	0.5 %	627	0.2 %
Construction	8,015	3.8 %	19,649	5.5 %
Manufacturing	44,442	21.2 %	56,748	15.7 %
Transportation, Communication, Public Utilities	6,207	3.0 %	10,785	3.0 %
Wholesale Trade	9,291	4.4 %	21,904	6.1 %
Retail Trade	32,996	15.7 %	58,029	16.1 %
Finance, Insurance, Real Estate	12,284	5.9 %	32,441	9.0 %
Services	41,803	19.9 %	95,614	26.5 %
Federal and Civilian Government	8,359	4.0 %	6,536	1.8 %
Military Government	24,735	11.8 %	24,700	6.9 %
State Government	1,290	0.6 %	1,573	0.4 %
Local Government	17,855	8.5 %	25,781	7.1 %
TOTAL	**209,946**		**360,647**	

Source: Bureau of Economic Analysis Data; US Department of Commerce

2.1.3.3 Major Employers

Abbott Laboratories in North Chicago is the largest private employer in Lake County, with more than 14,000 employees. Great Lakes Naval Training Center, also in North Chicago, employs 8,500 and is the second largest employer in the county. Currently, the Great Lakes Naval Training center has expanded its mission, which will cause a build-up in military personnel over the next several years. Five hospitals employ more than 1,000 people. Lake County government is a large employer, with more than 2,500 employees. Table 2-11 lists Lake County businesses with 1,000 or more employees. There are several large employers and employment centers dispersed throughout central and western Lake County. Kemper Insurance, one of the large private employers in Lake County (with about 2,500 employees), is located on IL 22 in Long Grove. Baxter Healthcare, another large Lake County employer (with about 4,000 employees), has a large manufacturing facility on IL 120 in Round Lake. Communities in the southwest quadrant of the county, including Lake Zurich, Barrington, and Wauconda, all have sizeable industrial or business parks. Communities in central Lake County, such as Mundelein, Grayslake, and Round Lake, also have industrial/business parks containing various businesses.

TABLE 2-11
Employment by Industry (Greater Than 1,000 Employees)

Company	Location	Number of Employees
Abbott Laboratories	North Chicago	14,000
Great Lakes Naval Training Center	North Chicago	8,500
Motorola	Libertyville	6,000
Baxter Healthcare	Deerfield and Round Lake	4,000
Six Flags Great America	Gurnee	3,000 (includes seasonal employees)
Allegiance Cardinal Healthcare	McGaw Park	2,700
Kemper Insurance	Long Grove	2,500
Hewitt Associates	Lincolnshire	2,334
Walgreen Co.	Deerfield	1,800
Outboard Marine	Waukegan	1,765
Cherry Electrical Products	Waukegan	1,500
Creative Packaging Corporation	Buffalo Grove	1,500
Highland Park Hospital	Highland Park	1,350
Lake Forest Hospital	Lake Forest	1,280
Victory Memorial Hospital	Waukegan	1,201
Condell Medical Center	Libertyville	1,179
College of Lake County	Grayslake	1,170
Trustmark Insurance Co.	Lake Forest	1,100
W.W. Grainger	Lincolnshire	1,100
Provina St. Therese Medical Center	Waukegan	1,107
Quill Corporation	Lincolnshire	1,000

Source: The Book of Lists, Lake County Business Journal 1999

2.1.4 Environmental Justice

The NEPA evaluation process includes consideration of environmental justice to ensure that low-income and minority households and minority business enterprises do not suffer a disproportionate share of adverse effects resulting from federal actions.[8,9] Executive Order 12898 requires federal agencies to achieve environmental justice by identifying and addressing disproportionately high and adverse human health and environmental effects, including the interrelated social and economic effects of their programs, policies, and activities on minority populations and low-income populations.

2.1.4.1 Racial, Ethnic, and Special Groups

According to the 1990 census, 87.4 percent of the county's population is white, 6.7 percent is African-American, 2.4 percent is Asian or Pacific Islander, 0.3 percent is American Indian, and 3.2 percent are classified as other races. Persons of Hispanic origin account for 6.3 percent of the county population. (Hispanic origin is also counted in other categories.) Table 2-12 (on the following page) lists population by township and classification.

The townships of Benton-Zion, Waukegan, and Shields account for nearly 90 percent of the county's African-American population. The townships with 80 percent of the regions Asian population include Deerfield-West Deerfield, Shields, Waukegan, Warren, Libertyville, and Vernon.

To accurately identify minority or low-income populations in the study area, the US Department of Housing and Urban Development Community Planning software *"Community 2020"* was used, which was based on the 1990 Census data. Based on environmental justice guidelines, each census tract within the study area was examined for racial composition and median household income in comparison to Lake County as a whole. Of the 97 tracts in the county, 31 have a higher percentage of minority populations than the county as a whole. Of those, 25 tracts have a minority population that is at least 20 percent higher than the county percentage (see Figure 2-2). Of the 25 tracts, 18 are in Waukegan or North Chicago and seven are in the bordering communities of Zion, Beach Park, Gurnee, and Park City. Highwood and Mundelein have the only other pockets of minority populations in the study area.

2.1.4.2 Income Characteristics

Median household income in Lake County is higher than the State of Illinois. Six of the 18 townships (Antioch, Avon, Benton-Zion [two townships], Wauconda, and Waukegan) have lower median household incomes than the county median. Only Waukegan's median household income is below the state's median. The largest concentrations of persons living below the poverty level are located in Waukegan (10.7 percent), Benton-Zion (9.2 percent), Grant (7.1 percent), and Avon (6.0 percent) townships. On the opposite end of the spectrum, nine townships have median household incomes greater than $50,000: Cuba, Deerfield-West Deerfield, Ela, Fremont, Libertyville, Newport, Shields, and Vernon.

A census tract evaluation of median family income was performed within the study area to identify low-income populations, as defined by the Department of Health and Human Services (HHS). Overall, the Lake County median household income is high. The $46,047 income is almost $13,000 higher than the state average of $32,252. Since the mean household size for the study area was determined to be

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[8] Low-income is defined by the Department of Health and Human Services as those residents living below the defined poverty guideline. For a family of three, the poverty level is $14,630.

[9] FHWA Order 6640.23 defines minority as "… a person who is: (1) Black (a person having origins in any of the black racial groups of Africa); (2) Hispanic (a person of Mexican, Puerto Rican, Cuban, Central or South American, or other Spanish culture or origin, regardless of race); (3) Asian American (a person having origins in any of the original peoples of the Far East, Southeast Asia, the Indian subcontinent, or the Pacific Islands); or (4) American Indian and Alaskan Native (a person having origins in any of the original people of North America and who maintains cultural identification through tribal affiliation or community recognition)."

approximately three persons, the poverty threshold for the study area is $14,630. No census tracts in the study area were considered to be low-income according to the HHS guidelines. Two census tracts near North Chicago have incomes slightly above this threshold, $14,900 and $15,404, but neither tract would be affected by either build alternative.

2.1.5 Public Services and Facilities

Public services and facilities consist of schools, churches, cemeteries, police and fire departments, city and township halls, hospitals, and public utilities. They are typically located within municipal boundaries and near population centers.

The public school systems in Lake County are organized into 29 elementary school districts, 10 high school districts, and six community unit districts. There are 306 public and private schools and 25 colleges and universities in the study area. Waukegan and Shields townships have the greatest number of schools. The concentration of school facilities reflects the population distribution pattern.

Churches or houses of worship are scattered throughout the study area to serve the religious communities of Lake County. This distribution is consistent with the population density pattern. Densely populated Waukegan has the greatest number of churches.

The 66 cemeteries in Lake County are distributed throughout all townships. Avon, Vernon, and Waukegan each have six, while the remaining townships each have two to four cemeteries.

Within Lake County, there are 27 fire departments and 36 police departments serving local communities. Several

TABLE 2-12
Racial Distribution

Township	Total Population	White	African-American	American Indian, Eskimo or Aleut	Asian or Pacific Islander	Other Race	Hispanic Origin *
Antioch	17,887	99.1	0.1	0.3	0.2	0.3	1.0
Avon	36,073	94.1	0.5	0.3	1.2	3.8	10.5
Benton-Zion	35,579	82.3	13.8	0.3	1.6	2.0	4.8
Cuba	14,192	98.3	0.4	0	1.1	0.2	1.2
Deerfield-W. Deerfield	64,314	94.1	1.8	0	2.6	1.5	4.5
Ela	32,432	97.0	0.8	0	1.8	0.4	2.1
Fremont	14,385	95.6	0.7	0	1.9	1.8	4.8
Grant	14,637	97.9	0.0	0.3	0.5	1.3	2.7
Lake Villa	20,741	97.8	0.9	0.3	0.7	0.4	1.8
Libertyville	42,444	93.0	0.8	0.1	3.7	2.3	6.0
Newport	3,557	98.3	0.0	0.4	0.6	0.6	1.8
Shields	43,479	76.7	17.3	0.5	3.6	1.9	4.1
Vernon	51,074	92.6	1.3	0.1	4.5	1.6	3.6
Warren	34,644	92.2	2.9	0.5	3.2	1.2	3.8
Wauconda	12,808	97.6	0.1	0.3	0.5	1.5	4.2
Waukegan	78,172	61.3	23.4	0.5	2.5	12.3	22.6
LAKE COUNTY TOTAL	**516,418**	**87.4**	**6.7**	**0.3**	**2.4**	**3.2**	**6.3**

* Rows do not total 100 percent because persons of Hispanic origin are also counted in other categories.
Source: US Census Bureau 1990a

communities share fire-fighting services, and the Lake County Sheriff's Department provides coverage for unincorporated areas.

The 11 hospitals in Lake County are located in seven of the 16 townships. Shields and Waukegan townships both have three hospitals, while Avon, Benton, Cuba, Deerfield, and Libertyville townships each have one hospital.

Public utilities include facilities for distributing energy, such as electricity and natural gas, as well as water supplies and wastewater treatment plants (WWTP). Drinking water in Lake County is primarily obtained from Lake Michigan and serves 80 percent of households. Nineteen municipal WWTPs serve the wastewater needs of Lake County. Wastewater treatment is provided by regional treatment plants, the North Shore Sanitary District, or septic systems. These systems are dependent upon population distribution and area infrastructure development. In general, the WWTPs are associated with the population centers within Lake County, except in the west-central and northern portions. According to the Lake County Health Department, Environmental Health Division, 15 to 20 percent (30,000 residents) are on private septic systems. Figure 2-3 depicts the sewered areas of Lake County.

There are six electric substations and 83 high-voltage power transmission lines (142 km, or 88 mi, total length) located in the study area. Warren Township has the most, with 15 lines. A power transmission line corridor traverses the study area north-south through Wheeling, Vernon, Libertyville, Warren, and Newport townships. Another power transmission line corridor extends east-west across the study area through Algonquin, Nunda, Wauconda, Fremont, Avon, Libertyville, Warren, and Waukegan townships (LCTIP 1999).

2.1.6 Transportation Facilities

The major regional transportation systems of Lake County include an established roadway system, passenger and freight rail, water transportation, and airports. Bicycle routes and pedestrian paths are available transportation alternatives. Metra and Pace provide public transportation service in Lake County; both are operating divisions of RTA. Figure 2-4 shows these facilities within Lake County.

2.1.6.1 Existing Roadways

The roadway network in the study area evolved from early trails and pre-automobile routes that followed natural topography and contours. Barriers, such as the Des Plaines River and the railroads, have also influenced the development of the existing roadway network. The existing roadway network east of the Tri-State Tollway corresponds to a more traditional, well-defined grid system. However, west of the Tri-State Tollway, the network is less orderly; it is made up of a combination of east-west, north-south, and diagonal routes. In this area, there is less route continuity with sporadic spacing of roadways. Many routes have relatively short lengths. By virtue of the nature of the roadway network, west of the Tri-State Tollway, travel tends to be more circuitous with limited travel route choices.

With travel mobility as their primary purpose, fully or partially access-controlled facilities run along the east (I-94 and US 41) side of Lake County. A barrier wall or open median separates the opposing traffic lanes of these facilities. I-94 is a 6-lane facility, and US 41 is a 4-lane facility.

Principal arterials generally run for long distances and provide for mobility while also providing local access. Principal arterials in the eastern part of Lake County are both 2 and 4-lane roads. With a few exceptions, principal arterials in the central and western parts of the county are 2-lane roads (See the *Transportation System Performance Report*). Table 2-13 (on the following page) lists roadway functional classes. About 50 percent of all travel miles occur on freeways and principal arterials, which make up 26 percent of the total route miles.

The Chicago metropolitan region is one of the largest hubs for intermodal shipments in the nation. Local rail-to-highway freight transfers serve the entire Midwest. I-94 is a major

north-south cargo movement corridor through Lake County.

2.1.6.2 Existing Rail Network

Chicago is one of the largest rail hubs in the Midwest. Similar to roadways, a distinctive radial rail network is evident; part of the rail network passes through Lake County, with several rail lines appearing as "spokes" on the Chicago hub of yards and freight terminals (Figure 2-4). These railroads are the Union Pacific (UP) North and Northwest Lines, the Wisconsin Central (North Central Service [NCS]) Line, the Milwaukee District (MD) North Line, the Canadian Pacific (CP) Line, and the UP Freight Line. The Elgin, Joliet, and Eastern (EJ&E) is a circumferential belt line, running through many middle and outer suburbs. The rail lines in the study area are used by freight trains, and most are used for commuter rail.

Three Metra commuter rail lines operate in Lake County: the UP North Line, the MD North Line, and the NCS. Table 2-14 shows the service levels provided by Metra during 1997 on the three lines. The UP Northwest Line serves neighboring communities to the south and west but has no stations within Lake County. Table 2-14 shows that most daily trips on Metra occur during the peak 2-hour travel periods in the direction of Chicago commuter travel (southbound in the morning and northbound in the evening). In 1996, 10 percent of the residents in the larger study area (all of Lake County and portions of eastern McHenry and northern Cook counties) were within 0.8 km (0.5 mi) of a Metra station and over 30 percent of the residents were within 1.6 km (1 mi) (Table 2-15, on the following page).[10] Overall, rail transit is used in Lake County for approximately 3.7 percent of all work trips.

TABLE 2-13

Route Miles and Lane Miles in Lake County by Functional Class

Functional Class	Route Miles	% of Route Miles	Lane Miles	% of Lane Miles
Freeway/Tollway	36.3	3.4%	203.0	7.5%
Principal Arterial	243.0	22.4%	716.0	26.5%
Minor Arterial	329.2	30.4%	808.9	29.9%
Collector	310.7	28.7%	646.4	23.9%
Local *	163.7	15.1%	331.6	12.3%
ALL CLASSES	1,082.9	100.0%	2,705.8	100%

* CATS network only includes a portion of local roads (e.g., the network does not include local roads within a subdivision)
Source: CATS 1998

TABLE 2-14

Metra Service Information

Rail Line	No. of Lake Co. Stations	Weekday Lake Co. Boardings	No. of Weekday Trains	Ridership in Peak Period/Direction (% of Total Riders)	Weekend Service
UP North	12	4,640	56	66	Y
MD North	9	5,080	58	76	Y
NCS	8	1,565	10	97	N

[10] All of Lake County and portions of eastern McHenry and northern Cook counties.

The study area is well served by rail transit. Despite figures that show transit is serving a smaller portion of total work trips than 20 years ago, between 1987 and 1997 actual commuter rail ridership grew approximately 30 percent in the Lake County, no doubt reflecting both increased service and population growth. Furthermore, with the growth of employment in the study area, reverse commutes have grown 32 percent (approximately 3,517 total trips on an average weekday) since 1991.

Amtrak has routes that run from Chicago to Milwaukee and destinations further north and west. The Amtrak route in the study area uses the Metra MD North Line and CP Line tracks. There are no station stops within Lake County; the nearest stop to the study area is in Glenview, approximately 9.7 km (6 mi) south of Lake County.

2.1.6.3 Other Modes of Transportation

Bus and Related Services. Pace is the RTA's suburban bus division, providing a combination of fixed-route, dial-a-ride, and paratransit service. Connecting fixed-route bus services are provided at 29 of the 46 Metra rail stations in the larger study area.[11] Thirteen stations have only one route providing service and 16 stations have two or more routes. Of the stations served, access by bus ranges from 2.5 to 5.8 percent. Pace also operates smaller buses called "Shuttle Bugs" to serve the large employment area along the Lake Cook Corridor. The average weekday ridership for the Pace system was about 13,000 in 1998, with about 38 percent on Waukegan routes. In 1996, more than half of the residents in the larger study area (all of Lake County and portions of eastern McHenry and northern Cook counties) lived within 0.8 km (0.5 mi) of a Pace route (Table 2-16, on the following page). Overall, bus transit is used in Lake County for about 0.5 percent of all work trips.

Air Transportation. Two general aviation airports, Waukegan Regional Airport and Campbell Airport, serve Lake County. The Waukegan Regional Airport in Waukegan Township is a designated reliever for O'Hare Airport. Campbell Airport is a privately-owned general aviation airport located in Avon Township, near the Village of Round Lake Park. Outside Lake County, Chicago's O'Hare and Midway and Milwaukee's General Mitchell airports all serve commercial air travelers throughout the Chicago region and Lake County. Palwaukee, Waukegan (in Lake County), and DuPage County airports focus on

TABLE 2-15

Distance to Metra Service in the Larger Study Area[a]

Distance from Transit	Population		
	1990	1996	2020[b]
Within 0.8 km (0.5 mi) of Metra	71,574 10%	82,595 10%	84,748 8%
Within 1.6 km (1 mi) of Metra	218,459 30%	251,777 31%	267,120 27%
Within 8 km (5 mi) of Metra	696,126 97%	790,700 97%	967,133 96%

[a] The larger study area includes all of Lake County and adjacent portions of McHenry and Cook counties.
[b] Existing Airport 2020 RTP No-Build development scenario.
Source: NIPC

[11] All of Lake County and portions of eastern McHenry and northern Cook counties. Also includes Metra service to Kenosha, WI in southern Kenosha County.

corporate flights. Campbell Airport, in central Lake County, serves only private planes.

Pedestrian and Non-Motorized Facilities. Lake County has 933 km (580 mi) of existing on-road bicycle routes, and over 113 km (70 mi) of off-road bicycle trails and paths (CBF 1999). An additional 402 km (250 mi) are proposed for implementation by municipality and county governments.

2.2 Agriculture

According to the *Illinois Agricultural Statistics Annual Summary 2000*, Illinois is rich with agricultural resources and is recognized as a world supplier of food. Illinois is a strong agricultural resource because of its fertile soil and favorable climate. In 1999, Illinois ranked second among all states in the production of corn and soybeans. Other agricultural resources in Illinois that are not as prominent include wheat, sorghum, hay, livestock, and dairy production.

When comparing all Illinois counties, La Salle County is ranked first among all Illinois counties with 1,581 farms, while Lake County ranked 91 out of 102 with 335 farms.

Lake County is not a large producer of either corn or soybean crops. In fact, Lake County ranks 94 in corn crop production and 97 in soybean crop production. Illinois counties that lead in the production of corn included McLean (51,278,500 bushels), Iroquois (48,654,000 bushels) and Champaign (44,986,000 bushels). Lake County produced only 1,440,600 bushels of corn in 1999. Illinois counties that lead in the production of soybeans included McLean (16,105,000 bushels), Iroquois (14,435,400 bushels), and Champaign (13,525,200 bushels). Comparably, Lake County produced only 176,000 bushels of soybeans. Ultimately, Lake County is not a major contributor to the production of any agricultural resource.

2.2.1 Locations of Agricultural Land

Existing agricultural land locations in Lake County are shown in Figure 2-5. The highest concentrations of land under current agricultural use are in the north-central, northwest, and west portions of Lake County. Table 2-17 (on the following page) provides a breakdown of existing agricultural land areas by township in Lake County. Townships along Lake Michigan have very little agricultural land. Overall, 20 percent of Lake County's land area was in agricultural use in 1997.

Farmland in Lake County has been rapidly replaced by suburban housing development. Statewide, the land area devoted to farming has been reduced by 11.7 percent in the past 47 years. The land area devoted to farming in Lake County has declined in every agricultural census since 1950 (Illinois Department of Agriculture 1999). Lake County lost about 71 percent of its farmland, or six times the percentage lost statewide. In 1950, 70,011 ha (173,000 ac) were devoted to farmland; the number dropped to 24,306 ha (60,061 ac) in 1997 (US Census Bureau 1950, LCTIP 1999). The average farm

TABLE 2-16
Distance to Metra Service in the Larger Study Area[a]

Distance from Transit	Population		
	1990	1996	2020 [b]
Within 0.8 km (0.5 mi) of Pace	415,233 58%	468,631 57%	499,489 50%

[a] The larger study area includes all of Lake County and adjacent portions of McHenry and Cook counties.
[b] Existing Airport 2020 RTP No-Build development scenario.
Source: NIPC

size in Lake County in 1997 was 62 ha (152 ac). Figure 2-6 provides information on crop production. The total market value of Lake County agricultural products sold in 1997 was $35,637,000. Crop sales accounted for 92 percent of Lake County agricultural cash receipts in 1997; livestock made up the remaining 8 percent. Smaller specialty farms also exist in Lake County, with landscape nurseries and apple orchards being the most common.

2.2.2 Prime and Important Farmland

The US Department of Agriculture–Natural Resources Conservation Service (USDA-NRCS) has divided farmland into four categories to describe aspects of resource value: prime farmland, unique farmland other than prime, farmland of statewide importance, and farmland of local importance. Based on review of representative soil maps of parts of Lake County that are in agricultural production, approximately 85 percent of the land areas are classified as prime farmland, with most of the remainder being important farmland.

The prime farmland is land that has the best combination of physical and chemical characteristics for producing food, feed, forage, fiber, and oilseed crops. It may exist as cropland, pastureland, rangeland, forestland, or other land not designated in urbanized areas or in bodies of water. Prime farmland produces the highest yields when treated and managed according to acceptable farming methods. In addition, the USDA-NRCS has identified farmland other than prime that is of statewide importance because of its value in the production of food, feed, forage, and oilseed crops. These areas are designated as "important farmland."

TABLE 2-17
Existing Agricultural Land Within Lake County, 1997

Township	Agricultural Land Area, ha (ac)	Total Land Area, ha (ac)	Portion of Land In Agriculture
Antioch	2,647 (6,542)	10,850 (26,811)	24.4%
Avon	1,578 (3,900)	6,175 (15,258)	25.6%
Benton-Zion	848 (2,095)	6,058 (14,970)	14.0%
Cuba	688 (1,700)	6,283 (15,525)	11.0%
Deerfield-W. Deerfield	174 (429)	7,728 (19,096)	2.3%
Ela	1,638 (4,048)	9,299 (22,977)	17.6%
Fremont	3,526 (8,713)	9,277 (22,923)	38.0%
Grant	894 (2,209)	5,963 (14,735)	15.0%
Lake Villa	1,709 (4,223)	6,731 (16,633)	25.4%
Libertyville	1,328 (3,281)	9,458 (23,372)	14.0%
Newport	4,105 (10,143)	8,714 (21,532)	47.1%
Shields	184 (455)	4,603 (11,374)	4.0%
Vernon	594 (1,467)	9,413 (23,259)	6.3%
Warren	1,705 (4,212)	9,506 (23,489)	17.9%
Wauconda	2,663 (6,581)	6,263 (15,475)	42.5%
Waukegan	25 (63)	5,505 (13,604)	0.5%
TOTALS FOR LAKE COUNTY	**24,306 (60,061)**	**121,826 (301,033)**	**20.0%**

Source: CH2M HILL 1997 aerial photography update of NIPC data

2.3 Natural Resources

2.3.1 Geological Setting

2.3.1.1 Surficial Geology and Topography

With the retreat of the glacial system, thick layers of glacially deposited soil (glacial "drift") covered most of Lake County. The drift was mostly in the form of relatively high north-south oriented end moraines separated by low ground moraines. The soil of this undulating topography of ridges and lowlands consisted of glacial drift with lenses of clay, silt, sand, gravel, and scattered humic and wood deposits. A diverse vegetative cover formed throughout the area. A savanna of prairie grass and burr oak formed on the ridges of the end moraine. As the terrain descended to the ground moraine, prairies covered the landscape. Scattered throughout this prairie between the ridges were lakes and wetlands. In some locations where drainage ways had formed between the ridges, wooded floodplains were established. The major near-surface moraines and morainic systems include the Valparaiso System (undifferentiated), the Tinley Moraine, and the Lake Border Morainic System and associated ground moraine (Willman 1971).

Within the moraine systems, sand and gravel deposits were left by glacier meltwater, rivers, streams, and outwash plains. These sand and gravel aquifers are associated with the Des Plaines River Valley and the hills and ridges of western Lake County. Deposits also appear in the vicinity of Channel Lake and Lake Moraine in northwestern Lake County. Figures 2-7 and 2-8 depict the location of these sand and gravel deposits.

Sediments deposited in the deep water of ancient glacial lakes are another defined group of geologic materials in Lake County. These lake sediments consist of silt, sand, gravel, and clay deposits. Sediments were deposited in a quiet water environment and contain well-bedded silt, thin beds of clay (which has given way to a large wetland region), and lenses of sand and gravel along the former beaches. Extreme north central and southwestern Lake County contains extinct lakebeds of the Equality Formation. A 1.6 km (1 mi) wide band of Equality Formation lake sediment lies 3.2 km (2 mi) inland from Lake Michigan.

The glaciers shaped the western half of Lake County. The rough topography of the kame and kettle landscape contains additional ridges (eskers), knobs, and terraces. Drainage on these surfaces is poor and abundant peat deposits have formed. The deposits continue through the Tinley Moraine region where the presence of lakes nearly ceases.

To the east in Lake County, the Des Plaines River and tributary valleys dissect the Lake Border Morainic System and parts of the Tinley Moraine. The river has developed a sandy floodplain along which numerous outwash terraces can be found. Outwash terraces consist of sediments deposited anciently by streams and rivers that flowed out of the rapidly melting glacial ice. East of the Des Plaines River valley, the terrain flattens and gently descends into Lake Michigan.

The highest elevation in Lake County is Gander Mountain (northwest Lake County) and the lowest elevation is southeast near the Des Plaines River and Cook County borders.

The soils in Lake County fall into two taxonomic soil categories: mollisols and alfisols. Mollisols are organic rich soils, while alfisols are a clay rich brown to gray-brown soils. Compressed clays, undisturbed by activity, exhibit good engineering properties.

2.3.1.2 Bedrock and Structural Geology

Lake County is situated on the northeastern flank of the gently sloping Kankakee Arch, where the surface bedrock formation dips easterly at 1.8 to 2.8 m/km (10 to 15 ft/mi) (Woller and Gibb 1976). Paleozoic in origin, the Kankakee Arch is linked to the Wisconsin Arch to the northwest and the Cincinnati Arch to the southeast. Bedrock formations are not naturally exposed in Lake County as it was covered by glacial drift 27 to 92 m (90 to 300 ft) thick during the most recent Wisconsin glacial episode. Figure 2-9 shows a complete columnar section of the bedrock units present in Lake County.

The upper or "surface" bedrock in Lake County consists of sedimentary rocks such as dolomite and shale. In a small area of western Lake County, the Silurian dolomite has eroded and underlying rock from the Ordovician age Maquoketa Group is exposed. These rocks vary in thickness from less than a few centimeters in western Lake County to more than 61 m (200 ft) in southeastern Lake County. The shallow dolomite produces water in varying quantities depending on the presence of water-bearing sands in the overlying drift. The shallow dolomite aquifer is separated from deeper aquifers by the shales of the Maquoketa Group, which range in thickness from 30.5 m (100 ft) in the south to 76 m (250 ft) in the west-central area and are not considered a water source (Woller and Gibb 1976). Below the shale is the Cambrian-Ordovician aquifer, a group of hydrologically connected rocks. Figure 2-10 shows the thickness and slope of bedrock strata from Island Lake to Lake Bluff (Woller and Gibb 1976). The bedrock is intact below the surface weathered zone, can support significant loads, and provides a suitable base for most construction projects, including bridge foundations and highway piers.

The nearest known fault to Lake County is the Sandwich fault, located about 80 km (50 mi) southwest of the county. The fault is about 193 km (120 mi) long, running from Ogle to Will counties. Seismic activity in Lake County is as low as it is in most of Illinois except for the southern extremities of the state. Other natural land use hazards in the county are flooding and wetlands, which are discussed later in this document.

2.3.1.3 Mineral Resources

As of 1992, Lake County ranked 39 in Illinois out of 102 counties based on total value of minerals extracted, processed, and manufactured (Samson and Masters 1992), with sand, gravel, and peat the top minerals extracted. There are no quarries in Lake County. Figures 2-7 and 2-8 depict the distribution of these operations in Lake County. As a result of its glacial history, Lake County contains many locations for the commercial mining of sand and gravel. There are two geologic features associated with these mining operations: the Henry Formation along the Des Plaines River Valley, and the hills and ridges (kames and eskers) west of the Des Plaines River in west-central Lake County. In Illinois and in Lake County, valley trains and outwash plains are the primary source of construction sand and gravel. As of 1992, nine sand and gravel pit locations under six ownerships were active. Lake County produces sand and gravel of all classes. Sand and gravel units mined include Henry, Wasco, Mackinaw, Batavia, and Wedron.

Peat, a dark brown to black residuum of decaying marsh plants, is harvested primarily for horticultural and agricultural purposes, but is occasionally sold in bulk for earthworm cultivation. As of 1992, two of the four companies in Illinois producing peat commercially were in Lake County. Dahl Enterprises and Roots Peat Farm harvest three types of peat (reed sedge, moss, and peat humus) under the broad classification of Grayslake Peat (Samson and Masters 1992). The Volo bog area of Lake County is a textbook example of a peat forming marsh environment.

2.3.1.4 Groundwater Resources

There are four aquifer systems in northeastern Illinois (NIPC 1976). The aquifers are sand and gravel deposits in glacial drift, shallow dolomite limestone formations, Cambrian-Ordovician or deep sandstone aquifer, and the Mt. Simon aquifer. In Lake County, the glacial drift ranges in thickness from 27 m (90 ft) in the southeastern region to more than 91 m (300 ft) in the west-central region. According to the United States Environmental Protection Agency (USEPA) web site (http://www.epa.gov/ogwdw/swp/sumssa.html), as of February 1, 2001, there are no sole source aquifers in Illinois.

The ISGS also publishes a map titled *Potential for Contamination of Shallow Aquifers from Land Burial of Municipal Wastes* (Berg et al. 1984). The map (Figure 2-11) indicates that Lake County is considered to have a relatively low potential for aquifer contamination; up to

15 m (50 ft) of silty clay materials occur in surficial deposits. Exceptions to this geology in Lake County are the Des Plaines River channel, the northern half of the county along Lake Michigan shoreline, and the area adjacent to the Chain O' Lakes. These areas of sand and gravel deposits all have higher potential for aquifer contamination than the rest of the county.

As of 1990, 19 percent of the homes in Lake County used well water for their water supply (*Lake County Framework Plan*, Lake County Department of Planning, Zoning & Environmental Quality 1994). The 19,600 private water supply wells in Lake County typically withdraw from the shallow glacial drift aquifer or the shallow dolomite aquifer system. The two shallow aquifers are both recharged by precipitation (Hughes et al. 1966). The primary threat to the shallow aquifer systems is associated with watershed contamination due to runoff from urbanization (Lake County Department of Planning, Zoning & Environmental Quality 1994).

The public and community supply wells in Lake County typically range from 15 to 457 m (50 to 1,500 ft). The shallow wells are set in sand and gravel, the mid-range wells are set in Silurian dolomite, and the deep wells are set in the Cambrian-Ordovician aquifer (Woller and Gibb 1976). In 1976, there were 199 public wells in Lake County (Woller and Gibb 1976). Currently, there are 115 community supply wells and 24 municipal supply wells (CH2M HILL, GIS Database 1999). Only about 8,000 homes are supplied by public supply wells in Lake County; 4,000 are in the Wildwood and Vernon Hills service areas and the rest are scattered throughout Lake County (Lake County Department of Planning, Zoning & Environmental Quality 1994).

2.3.2 Water Quality and Water Resources

2.3.2.1 Surface Water Resources

The three watersheds in the study area include the Fox River, Des Plaines River, and Lake Michigan. These watersheds parallel each other and run in a north to south direction. Figure 2-12 shows all three watersheds. Information from the Illinois Environmental Protection Agency (IEPA), Illinois Natural History Survey (INHS), and Illinois Department of Natural Resources (IDNR) provided a characterization of these three watersheds.

In Illinois, General Use Water Quality Standards (Title 35, Subtitle C, Part 302, Subpart A) protect waters of the state (streams and rivers) for indigenous aquatic life, agricultural use, primary and secondary use, and institutional use. All water quality data were compared to the General Use Water Quality Standards.

Stream quality is assessed using both the chemical and physical data along with biological data. The predominant stream quality indicator used in the IEPA and IDNR's Biological Stream Characterization (BSC) (Bertrand 1996) is the Index of Biotic Integrity (IBI), an index for describing the health or integrity of the fish community.

The IEPA annually assesses the streams for fish consumption and overall, aquatic life, swimming, drinking water supply, and secondary contact uses. Table 2-18 (on the following page) summarizes the classification systems and gives a comparison of the BSC and the USEPA classifications.

Fox River Watershed. The Fox River originates in Wisconsin on the west side of Milwaukee and flows southwest before entering Illinois at the northwest corner of Lake County. It flows generally south before merging with the Illinois River in Ottawa. The Fox River is 185 km (115 mi) long from the state border to the confluence with the Illinois River. The Upper Fox River Watershed is situated in Lake, McHenry, Cook, Kane, and DuPage counties.

The segment of the Upper Fox River from Algonquin to the Wilmot Dam in Wisconsin is listed as a candidate for the National Wild and Scenic Rivers, and therefore is considered a Class 1 stream in this area. The length in river miles from the Wisconsin-Illinois state border to just south of Elgin (the

beginning of the Lower Fox River) is 74 km (46 mi).

The study area for the project includes 53 km (33 mi) of the Upper Fox River and 694 km^2 (268 mi^2) of watershed. Table 2-19 (on the following page) lists the 16 subbasins in the Fox River study area and presents physical characteristics and biological classifications.

Water quality data was obtained from Fox River AWQMN stations DT 35, DT 22, and DT 06 and Nippersink Creek AWQMN station DTK 04. Comparison of the water quality data obtained from IEPA (1996 and 1998) to the General Use Water Quality Standards indicates there have been no violations of the standards with the exception of fecal coliform and dissolved oxygen (USEPA 1999). Segments of the Fox River from Flint Creek to McHenry Dam and Ferson to Poplar Creek are listed on the Section 303(d) list of water quality impaired streams.

Stream uses within the watershed range from full support (Nippersink Creek, Upper reaches of the Fox River, and Poplar Creek) to partial support (a segment of the lower Fox River and Cotton Creek). Nutrient and ammonia loads were attributed to less than full support assessment (IEPA 2000b). There are no state listed species expected to be in any of the streams within the Fox River Watershed portion of the study area. No individual live mussels have been collected in the study area within 50 years.

There are roughly 52 km^2 (20 mi^2) of lake coverage in the Fox River Watershed. Cedar Lake has been identified as a biologically significant waterbody due to the observation of four threatened fish species in this lake, including the state threatened Iowa darter (*Etheostoma exile*) (Page et al. 1991). Other water bodies in the study area include Cross Lake, Deep Lake, East Loon Lake, West Loon Lake, Bangs Lake, Sullivan Lake, Wooster Lake, Lily Lake, Turner Lake, Round Lake, and Grays Lake.

Des Plaines River Watershed. The Des Plaines River originates in Wisconsin, south of Union Grove. The river enters Illinois in the northeast corner of Lake County and flows south through Lake and Cook counties. The Des Plaines merges with the Kankakee River near Channahon, Illinois (Will County) to form the Illinois River. The entire Des Plaines River Watershed covers 345,874 ha (854,669 ac) in Lake, Cook, DuPage, and Will counties. From the Wisconsin-Illinois border to the junction with the Kankakee River, the river is 176.9 km

TABLE 2-18
Summary of the Classification Systems and Comparison of the BSC and the USEPA Classifications

USEPA Classification	General Description	IEPA/IDOC Biological Stream Characterization	IBI Result [a]	MBI Result [b]
Full Support	Good	Unique Aquatic Resource (Class A)	51–60	<5.0
Full Support	Good	Highly Valued Resource (Class B)	41–50	5.0–5.9
Partial Support (Minor)	Fair	Moderate Aquatic Resource (Class C)	31–40	6.0–7.5
Partial Support (Moderate)	Fair	Limited Aquatic Resource (Class D)	21–30	7.6–8.9
Non-Support	Poor	Restricted Aquatic Resource (Class E)	<20	>8.9

[a] Index of Biotic Integrity (IBI) evaluates stream quality at the community level using 12 metrics encompassing trophic composition, abundance and condition of the fish community.
[b] Macroinvertebrate Biotic Index (MBI) evaluates stream quality and is calculated using the numerical rating of each taxon developed by the IEPA (1989). The formula for the index is:

$$MBI = \frac{\Sigma(n_i t_i)}{N}$$

Where n_i = number of individuals in each taxon i
t_i = tolerance value for taxon i
N = number of individuals

(109.9 mi). The study area includes 62 km (38 mi) of the Des Plaines River and 616 km^2 (238 mi^2) of watershed.

Included in the Des Plaines River system is the West Fork North Branch Chicago River (West Fork), the Middle Fork North Branch Chicago River (Middle Fork), and the Skokie River. The North Branch Chicago River originates east of Libertyville as the Middle Fork. This stream flows south through Lake and Cook counties before merging with the Skokie River in Northfield. The Skokie River originates near North Chicago in Lake County and subsequently merges with the West Fork near Morton Grove. The river at this point then becomes the North Branch Chicago River.

The Des Plaines River is predominantly pools and glides with stream widths from 18 m (60 ft) in Lake County to 183 m (600 ft) in Will County. The river bottom is mainly bedrock covered with sand and gravel. About 31 km (20 mi) of the river have been channeled in Lake and Cook counties (Page et al. 1991).

TABLE 2-19
Fox River Watershed Basins

Drainage Basin	Streams within Basin	Drainage Area, km^2 (mi^2)	Total Stream, km (mi)	Stream, km (mi)	Flow Characteristics	BSC Aquatic Resource Class	IEPA [a] Use Assessment
Nippersink Creek	Nippersink Creek	56.56 (21.84)	63.2 (39.3)	15.0 (9.3)	Perennial	Highly Valued	Full Support
Upper Fox River	Fox River	86.7 (33.49)	185 (115)	36.2 (22.5)	Perennial	Moderate to Highly Valued	Full Support
Sequoit Creek	Sequoit Creek	39.5 (15.25)	12.1 (7.5)	12.1 (7.5)	Perennial	Limited	Not Rated
Dutch Creek	Dutch Creek	17.38 (6.71)	6.6 (4.1)	3.2 (2.0)	Intermittent and Perennial	Moderate	Not Rated
Lower Fox River - 1	Fox River	100.65 (38.86)	185 (115)	18.3 (11.4)	Perennial	Moderate	Full Support
Fish Lake Drain	Fish Lake Drain	22.14 (8.55)	4.0 (2.5)	4.0 (2.5)	Perennial	Not Rated	Not Rated
Squaw Creek	Squaw Creek Eagle Creek	98.67 (38.10)	24.6 (15.3) 2.1 (1.3)	24.6 (15.3) 2.1 (1.3)	Perennial Perennial	Highly Valued	Not Rated Full Support
Boone Creek	Boone Creek	2.62 (1.01)	21.9 (13.6)	1.6 (1.0)	Perennial	Highly Valued	Full Support
Mutton Creek	Mutton Creek Cotton Creek	34.58 (13.35)	6.3 (3.9) 4.2 (2.6)	6.3 (3.9) 4.2 (2.6)	Perennial Perennial	Moderate	Not Rated PS [b]
Sleepy Hollow Creek	Sleepy Hollow Creek	7.8 (3.01)	12.9 (8.0)	5.3 (3.3)	Perennial	Limited	Not Rated
Lower Fox River - 2	Fox River	69.9 (26.99)	185 (115)	20.4 (12.7)	Perennial	Moderate	Full Support
Slocum Lake Drain	Slocum Lake Drain	29.03 (11.21)	NA	NA	Perennial	Not Rated	Not Rated
Tower Lake Drain	Tower Lake Drain	19.04 (7.35)	NA	NA	Perennial	Not Rated	Not Rated
Flint Creek	Flint Creek	90.47 (34.93)	22.5 (14.0)	22.5 (14.0)	Perennial	Limited	Full Support
Spring Creek	Spring Creek	16.37 (6.32)	20.8 (12.9)	7.4 (4.6)	Perennial	Not Rated	Not Rated
Poplar Creek	Poplar Creek	1.89 (0.73)	28.3 (17.6)	28.3 (17.6)	Perennial	Moderate	Full Support

[a] Source: IEPA 2000b
[b] PS/Min I=Partial Support/Minor Impairment

There are 16 basins within the Des Plaines River Watershed. Table 2-20 summarizes the physical characteristics and biological rating of the basins.

Comparison of the water quality data for heavy metal and chlorides that are obtained from two stations (G07 and G08) on the Des Plaines River (1994 through 1998) to the General Use Water Quality Standards indicates that there have been no water quality violations (IEPA 1999). According to the IEPA General Water Use Quality Standards, stream impairment is due to municipal point sources, habitat alterations, salinity, storm sewers, urban runoff, and nutrient loadings. The stream uses range from full support to partial support. The following streams appear on the IEPA's Section 303(d) list of water quality impaired waterbodies: Salt Creek, Des Plaines River, and the North Branch Chicago River. The water quality impairment is primarily attributed to nutrients, siltation, and organic enrichment (USEPA 1999).

TABLE 2-20
Des Plaines River Watershed Basins

Drainage Basin	Streams within Basin	Drainage Area, km^2 (mi^2)	Total Stream, km (mi)	Stream, km (mi)	Flow Characteristics	BSC Aquatic Resource Class	IEPA Use Assessment [a]
North Mill Creek	North Mill Creek Hastings Creek	55.9 (21.6)	28.2 (17.5) NA	20.3 (12.6) NA	Perennial	Limited	Not Rated PS [b]
Upper Des Plaines R.	Upper Des Plaines R.	137 (53.0)	176.0 (109.0)	36.0 (22.4)	Perennial	Highly Valued to Limited	PS [b]
Newport Drainage Ditch	Newport Drainage Ditch	21.8 (8.4)	NA	NA	Intermittent and Perennial	Not Rated	Not Rated
Mill Creek	Mill Creek Avon-Fremont Ditch	79.8 (30.8)	18.7 (11.6) 8.2 (5.1)	18.7 (11.6) 8.2 (5.1)	Perennial Perennial	Moderate	Full Support Not Rated
Bull Creek	Bull Creek	31.9 (12.3)	11.9 (7.4)	11.9 (7.4)	Perennial	Limited	Full Support
Indian Creek	Indian Creek	97.4 (37.6)	22.5 (14.0)	22.5 (14.0)	Perennial	Moderate	PS [b]
Lower Des Plaines R.	Lower Des Plaines R.	59.3 (22.9)	176 (109.0)	25.4 (15.8)	Perennial	Limited	PS [b]
Buffalo Creek	Buffalo Creek	55.9 (21.6)	17.5 (10.9)	17.5 (10.9)	Perennial	Not Rated	PS [b]
Aptakisic Creek	Aptakisic Creek	17.1 (6.6)	5.1 (3.2)	5.1 (3.2)	Perennial	Not Rated	Not Rated
Salt Creek	Salt Creek	11.4 (4.4)	73.9 (45.9)	1.8 (1.1)	Perennial	Moderate	PS [b]
Arlington Heights Br. Salt Creek	Arlington Heights Br. Salt Creek	21.5 (8.3)	9.7 (6.0)	3.5 (2.2)	Perennial	Not Rated	Not Rated
McDonald Creek	McDonald Creek	11.9 (4.6)	14.3 (8.9)	7.4 (4.6)	Intermittent	Limited	Not Rated
Wheeling Drainage Ditch	Wheeling Drainage Ditch	15.3 (5.9)	5.5 (3.4)	5.5 (3.4)	Perennial	Not Rated	Not Rated
West Fork	West Fork North Branch Chicago River	23.3 (9.0)	28.5 (17.7)	13.7 (8.5)	Perennial	Limited	Non-Support
Middle Fork	Middle Fork North Branch Chicago River	50.5 (19.5)	125.0 (77.7)	21.7 (13.5)	Perennial	Limited	PS [b]
Skokie River	Skokie River	56.2 (21.7)	38.5 (23.9)	27.2 (16.9)	Perennial	Limited	PS [b]

[a] Source: IEPA 2000b
[b] PS=Partial Support

The Des Plaines River, Mill Creek, Bull Creek, and an unnamed tributary (located north of Libertyville) have been classified as Class I streams by IDOT and IDNR (IDOT/IDNR 1995). The Des Plaines River is a candidate for the national Wild and Scenic Rivers list for the segments from Wheeling to Libertyville and from Libertyville to near the Wisconsin state line.

The state threatened Iowa darter occurs in two unnamed tributaries of the Des Plaines River in east-central Lake County. Seven state threatened and state endangered mussel species are known from the Des Plaines River system; however, all are outside Lake County.

The Chicago River Watershed is included in the Des Plaines River basin and is comprised of three basins: the West Fork North Branch Chicago River (West Fork), Middle Fork North Branch Chicago River (Middle Fork), and the Skokie River. These rivers generally flow through developed areas and flow into the Chicago Sanitary and Ship Canal.

Water quality data was obtained for one station on the Middle Fork for the period of 1994 to 1998. Comparison of the data to the General Use Water Quality Standards indicated that the total chloride levels exceeded the water quality standard (500 mg/L) in 1994 and 1997. The remaining parameters obtained were within the standards.

The West Fork, Middle Fork, and Skokie River are classified as either partial support or non-support use. They are not classified as Class I streams, nor as candidates for the list of National Wild and Scenic Rivers. There have been no records of populations of threatened or endangered fish or mussels in these streams. The IEPA assessment of these streams indicated that stream impairment was attributed to nutrients, habitat alterations, chlorine, siltation, organic enrichment, pathogens, flow, and salinity.

Lake Michigan Watershed. The Lake Michigan Watershed consists of several waterways along the shoreline with outlets into Lake Michigan. The USGS river mileage survey lists seven streams in Lake County. The shoreline in Lake County is about 39 km (24 mi) long with the watershed ranging from 1.6 to 6.4 km (1 to 4 mi) wide. The drainage area in the study area for the Lake Michigan Watershed is 137 km^2 (53 mi^2).

The Lake Michigan Watershed consists of five subbasins, each of which has outlets to Lake Michigan. Table 2-21 presents the drainage areas and flow characteristics of the basins.

TABLE 2-21
Lake Michigan Watershed Basins

Drainage Basin	Streams within Basin	Drainage Area, km^2 (mi^2)	Total Stream, km (mi)	Stream, km (mi)	Flow Characteristics	BSC Aquatic Resource Class	IEPA Use Assessment [a]
Kellogg Creek	Kellogg Creek	22.74 (8.78)	7.39 (4.59)	7.39 (4.59)	Perennial	Not Rated	Not Rated
Dead River	Dead River	47.92 (18.5)	15.85 (9.85)	15.85 (9.85)	Perennial	Not Rated	Not Rated
	Bull Creek		8.72 (5.45)	8.72 (5.45)	Perennial	Not Rated	Not Rated
Waukegan River	Waukegan River	30.46 (11.76)	11.93 (7.41)	11.93 (7.41)	Intermittent and Perennial	Not Rated	PS [b]
Pettibone Creek	Pettibone Creek	10.77 (4.16)	4.41 (2.74)	4.41 (2.74)	Perennial	Not Rated	PS [b]
Bluff/Ravine	12 Unnamed Streams	25.41 (9.81)	Varies	Varies	Perennial	Not Rated	Not Rated

[a] Source: IEPA 2000b
[b] PS= Partial Support

There is no water quality data readily available for any of the streams in the Lake Michigan Watershed to compare to the General Use Water Quality Standards. None of the streams appear on either the Class I stream list or the National Wild and Scenic Rivers candidate list. The Waukegan River is included on the IEPA's Section 303(d) list of water quality impaired streams. Priority organics and metals are the primary cause of the water quality impairment.

2.3.3 Wetlands

Wetlands are associated with lakes, streams, and their associated floodplains as well as isolated depressions. Within the study area, the relief is generally gently sloping, with poorly defined drainage patterns. Many of the drainageways end in depressions and marshes. The *1987 Corps of Engineers Wetland Delineation Manual* (hereafter, *The Manual)* defines a wetland as "those areas that are inundated or saturated by surface or groundwater at a frequency and duration sufficient to support, and that under normal circumstances do support, a prevalence of vegetation typically adapted for life in saturated soil conditions." In Illinois, the definition of wetlands as defined by the Interagency Wetland Policy Act (IWPA), is similar to the federal definition, with the exception that it specifically states that there needs to be a predominance of hydric soils present. All wetlands meeting these three criteria would be considered jurisdictional areas under state law for all projects using state or state pass-through funding. The IWPA definition includes restored or created wetlands for mitigation that do not currently meet the parameters stated.

For the purposes of complying with the Section 404 program, the federal government endorses the use of two separate delineation manuals, the *1987 Corps of Engineers Wetlands Delineation Manual* and the Department of Agriculture's *National Food Security Act Manual* (third edition). A *1994 Federal Memorandum of Agreement* between the Department of Defense, the Department of Interior, the USEPA, and the Department of Agriculture defines situations to which these two manuals may be applied. It requires the use of the *1987 Corps of Engineers Wetland Delineation Manual* (with current US Army Corps of Engineers' regulatory guidance) by all federal resource agencies on non-agricultural land for Section 404 purposes. When determinations or delineations are made on agricultural lands for Section 404 purposes, the *National Food Security Act Manual* must be used.

The Lake County Wetland Inventory (LCWI), including the Advanced Identified Wetlands (ADID) program and the National Wetland Inventory (NWI), provide information for summarizing the wetlands in Lake County and was the primary source of wetland data for this study. Natural Resource Conversation Service (NRCS) Wetland Maps were not used for this study. After a preferred alternative is selected, the NRCS maps will be used during the formal delineation process.

The LCWI database is locally derived and is considered more locally accurate than the NWI. The LCWI classifies wetlands in Lake County under seven categories: artificial wetlands, converted wetlands, two categories of farmed wetlands, prior converted, urban converted, and wetlands. The LCWI defines the 'wetlands' category as being those areas that are relatively undisturbed as a result of agriculture or development and includes wetlands identified as ADID.

Wetland resources in Lake County were assessed on a watershed level due to the size of the study area. The three primary watersheds in Lake County are the Fox River, Des Plaines River including the North Branch of the Chicago River, and Lake Michigan. The Fox River and Des Plaines River watersheds account for approximately 95 percent of the LCWI identified wetland acreage in Lake County. Much of this total is part of the Chain O' Lakes (see Figure 2-13). Table 2-22 (on the following page) illustrates Lake County wetland types and acreage by watershed. Areas categorized by LCWI as 'wetlands' constitute 97, 94, and 94 percent, respectively, of all the LCWI wetlands in the

Fox River, Des Plaines River, and Lake Michigan watersheds. The other six types of wetlands account for a small percentage of total wetlands mapped by the LCWI in the county.

The total wetland acreage for Lake County mapped by the LCWI as shown in Table 2-22 includes large expanses of open water, including the Chain O' Lakes. By definition, some of these open water bodies would be defined as open water habitat and others as riverine rather than as wetlands. To better assess wetland resources in the county that meet the criteria for wetlands, as defined by *The Manual* and the IWPA, it was necessary to remove the areas that are considered open water such as lakes and rivers from these totals. Open water lakes, ponds, and rivers are "waters of the U.S." and, as such, are still regulated by the US Army Corps of Engineers. Mitigation of impacts to the "water" is assessed in a case-by-case basis. In addition, for this assessment, the totals for the six LCWI categories; artificial wetlands, converted wetlands, both farmed wetlands, prior converted and urban converted were removed from the total. Total wetland resources as mapped by LCWI are approximately 18,500 ha (45,700 ac), not including open water. Much of the open water area removed from this total is associated with the Chain O' Lakes. The NWI indicates that there are approximately 13,390 ha (33,087 ac) of wetlands in Lake County (Suloway and Hubbell 1994). The LCTIP has resolved to use the LCWI data for the remainder of this study. The rationale for this decision is related to the greater care and accuracy of the LCWI information.

There are 203 ADID wetlands in Lake County, totaling about 10,000 ha (25,000 ac). The ADID wetland program is a USEPA initiative developed to shorten permit processing time. Also, it provides some predictability to the Section 404 regulatory program, by providing information to assist local governments in zoning, permitting, and land acquisition decisions. This was a cooperative effort with the USEPA, US Army Corps of Engineers, USFWS, IDNR, NIPC, and various departments and agencies within Lake County. The Lake County ADID inventory was adopted on January 20, 1993 (NIPC 1992). The ADID wetlands were considered

TABLE 2-22
Lake County Wetland Inventory

Wetland Type	Fox River Watershed, ha (ac) [a]	Des Plaines River Watershed, ha (ac)	Lake Michigan Watershed, ha (ac)
Artificial Wetlands	40 (99)	43 (106)	9 (22)
Converted Wetlands	40 (99)	9 (22)	—
Farmed Wetlands	163 (403)	179 (442)	6 (15)
Farmed Wetlands [b]	40 (99)	94 (232)	2 (5)
Prior Converted	15 (37)	9 (22)	—
Urban Converted	81 (200)	283 (699)	121 (299)
Wetlands	11,940 (29,504)	9,996 (24,701)	2,347 (5,800)
Total	**12,319 (30,441)**	**10,613 (26,224)**	**2,485 (6,141)**
Non Wetland [c]	970 (2,397)	526 (1,300)	40 (99)

[a] Rounded to the nearest whole number
[b] Similar to farmed wetlands except that they do not qualify for regulation under Swampbuster because not enough crop damage from flooding and inundation occurs.
[c] Areas that were considered non-jurisdictional wetlands by LCWI yet were mapped as wetlands in the NWI.
Source: Lake County Wetland Inventory (LCWI) 1990

unsuitable for the discharge of dredge or fill material. As a result, the US Army Corps of Engineers has exerted discretionary authority over these wetlands, and any proposed impacts to these wetlands are not eligible for nationwide permitting.

Both the LCWI and the NWI use wetland assessment methodologies largely based on remote sensing methods. Such methods are useful for rough assessment over large areas; however, field-based assessments are always more accurate on an individual wetland site level. Because of limited information on individual wetlands at a countywide level of assessment, the only available qualitative assessment conducted on wetlands at this scale is the ADID study. The ADID study included a general assessment of quality and functions of the wetland resources in Lake County. Wetlands identified as ADID generally embrace three qualities: habitat diversity, stormwater storage, and water quality mitigation. The Lake County ADID inventory characterized the qualities of each ADID wetland, and the LCTIP further assessed the ADID study and identified the highest quality wetlands, which are shown in Figure 2-14. Following the selection of the preferred alternative, impacted ADID wetlands would be verified with a field-based, multi-functional wetland assessment.

Because a qualitative assessment of wetland resources in Lake County is limited to the ADID program, only a general assessment of important wetland resources in the county was performed. Of the 203 wetlands classified as ADID wetlands, more than 130 were considered to have high functional values for wildlife habitat and high quality plant communities. Additionally, ADID wetlands have also been identified as habitats for threatened and endangered species of plants and wildlife. Based on original determinations, over 60 ADID wetlands were identified as having threatened or endangered species present.

A review of the ADID locations in Lake County show that a majority of these sites are located along streams, lakes or within protected lands such as forest preserves, nature preserves, and Illinois Natural Area Inventory (INAI) sites. Figure 2-15 shows the relationship of ADID wetlands and these protected sites. This figure also shows general concentrations of these ADID wetlands. The two largest complexes are within Illinois Beach State Park near Zion and the Chain O' Lakes State Park in the northwestern part of the county. Other smaller concentrations of ADID wetlands can be identified; these areas are broken out by watershed.

Additionally, several non-ADID wetlands located throughout the county may be afforded the same protection as a high quality wetland. These sites may have been smaller than the 2 ha (5 ac) area limitation for inclusion as potential ADID. Additionally, some of these wetlands are afforded higher protection based on their proximity to forest preserves, nature preserves, INAI sites, or other public lands. Approximately 682 wetlands, totaling approximately 1,783 ha (4,406 ac) of non-ADID wetlands, are located within designated lands and could be considered higher quality wetlands. These wetlands are summarized in the watershed discussions.

2.3.3.1 Fox River Watershed

The LCWI reports over 12,200 ha (30,000 ac) of all wetland types are within the Lake County portion of this watershed (Table 2-23, on the following page). According to the GIS database, 107 ADID wetlands (48 percent) are in the Fox River Watershed in Lake County. Total ADID acreage in the Fox River Watershed in Lake County is 5,550 ha (13,714 ac), or roughly 44 percent of the LCWI wetland acreage in the watershed (Figure 2-13).

There are six large ADID wetland complexes within this watershed. The largest ADID complexes are the Chain O' Lakes State Park, which includes the Grass Lake Wetland Complex, north, east, and west of Grass Lake; along Squaw Creek, south of Long Lake near the Village of Round Lake; along the Tower Lake Drain from Tower Lake to the Fox River and Grassy Lake, near North Barrington; the Loon Lake complex, extending to Deer Lake

into the Des Plaines River Watershed; Volo Bog area south of the Chain O' Lakes; and the Wauconda area, extending southwest towards the Tower Lakes complex. As Figure 2-15 shows, most of these ADID wetland complexes are associated with forest preserves, nature preserves, INAI sites, and state parks. In general, the relationship between these wetland complexes and the protected sites indicates that these wetlands are relatively high quality.

Within this watershed, there are approximately 174 non-ADID wetlands totaling 292 ha (723 ac) located within protected areas. Many of these are located in three forest preserve sites: Cuba Marsh, Lakewood, and the northern half of Grant Woods.

2.3.3.2 Des Plaines River Watershed

The LCWI reports over 11,400 ha (27,000 ac) of all wetland types are within the Lake County portion of the Des Plaines River Watershed (Table 2-24, on the following page). According to the GIS database, 102 ADID wetlands (45 percent) are in the Des Plaines River Watershed in Lake County. Total ADID acreage in the Des Plaines River Watershed in Lake County is 2,553 ha (6,311 ac), or approximately 24 percent of the LCWI wetland acreage in the watershed (Figure 2-13).

There are seven large ADID wetland complexes within this watershed. The largest ADID complexes in this watershed are Loon Lake/Deer Lake complex that extends into the Fox River Watershed; the Fourth Lake Fen/Rollins Savanna complex; the Des Plaines River Trails/Wadsworth Prairie complex near Wadsworth; the Middle Fork Savanna complex near Lake Forest; Site 15 Forest Preserve complex, along the Middle Fork of the North Branch of the Chicago River near Green Oaks; Grainger Woods Forest Preserve complex near Vernon Hills; and Ryerson Woods complex near Riverwoods. Figure 2-15 shows that most of these ADID wetland complexes are associated with forest preserve, nature preserves, and INAI sites. In general, the relationship between these wetland

TABLE 2-23
LCWI Subbasin Wetland Totals—Fox River Watershed, Lake County

Drainage Basin	Streams within Basin	Total Wetland, ha (ac) [a]	% of County Wetlands	ADID Wetlands	ADID, ha (ac) [a]
Upper Fox River	Fox River	4,700 (11,614)	20	15	2,100 (5,189)
Sequoit Creek	Sequoit Creek	1,200 (2,965)	4	14	890 (2,199)
Fish Lake Drain	Fish Lake Drain	560 (1,384)	2	9	240 (593)
Squaw Creek	Squaw Creek; Seavey Ditch; Eagle Creek	1,900 (4,695)	7	27	600 (1,483)
Lower Fox River	Fox River	230 (568)	0.9	6	120 (297)
Mutton Creek	Mutton Creek; Cotton Creek	560 (1,384)	2	8	240 (593)
Slocum Lake Drain	Slocum Lake Drain	800 (1,977)	3	7	360 (890)
Tower Lake Drain	Tower Lake Drain	840 (2,076)	3	5	600 (1,483)
Flint Creek	Flint Creek	1,450 (3,583)	5	14	320 (791)
Nippersink		NA	NA	2	80 (198)
TOTAL		**12,240 (30,246)**	**46.9**	**107 [b]**	**5,550 (13,716)**

[a] Rounded to nearest whole number
[b] Some ADID wetlands overlap watershed boundaries inflating the total number of ADID wetlands
Source: CH2M HILL, GIS Database 1999

complexes and the protected sites indicates that these wetlands are of relatively high quality. All but nine of the Lake County Forest Preserve sites in this watershed contain ADID wetland complexes. About eight ADID wetlands are located in nature preserves or INAI sites in this watershed.

In addition, the ADID designation has been applied to segments of stream systems in this watershed that would include adjacent wetlands. These streams include Mill Creek, Bull Creek, Indian Creek, and Buffalo Creek.

Within this watershed, there are approximately 456 non-ADID wetlands totaling 1,360 ha (3,361 ac), located within protected areas. Many of these wetlands are located in eight forest preserve sites; four sites are located along the Des Plaines River and include Wright Woods/Half Day, Gurnee Woods, Wetlands Project, and Van Patten Woods. Two of the forest preserve sites are along the North Branch of the Chicago River: Prairie Wolf Slough and Middle Fork Savanna. The remaining two sites include the Waukegan Savanna and the Rollins Savanna.

2.3.3.3 Lake Michigan Watershed

The LCWI reports over 3,100 ha (7,660 ac) of all wetland types are within the Lake Michigan Watershed (Table 2-25, on the following page). According to the GIS database, 14 ADID wetlands (6 percent) are in the Lake Michigan Watershed in Lake County. Total ADID acreage in this watershed in Lake County is 1,770 ha (4,374 ac), or roughly 57 percent of the LCWI wetland acreage in the watershed (Figure 2-13).

TABLE 2-24
LCWI Subbasin Wetland Totals—Des Plaines River Watershed, Lake County

Drainage Basin	Streams within Basin	Total Wetland, ha (ac) [a]	% of County Wetlands	ADID Wetlands	ADID, ha (ac)
North Mill Creek	North Mill Creek; Hastings Creek	1,000 (2,471)	4	12	490 (1,211)
Mill Creek	Mill Creek Avon-Fremont Ditch	1,500 (3,707)	6	15	570 (1,409)
Newport Drainage Ditch	Newport Drainage Ditch	240 (593)	1	3	40 (99)
Upper Des Plaines River	Upper Des Plaines River	2,900 (7,166)	10	15	360 (890)
Bull Creek	Bull Creek	450 (1,112)	2	6	120 (297)
Indian Creek	Indian Creek	1,300 (3,212)	5	13	360 (297)
Lower Des Plaines River	Lower Des Plaines River	1,100 (2,718)	4	12	200 (494)
Buffalo Creek and 66	Buffalo Creek	500 (1,236)	2	3	80 (198)
Aptakisic Creek	Aptakisic Creek	200 (494)	0.7	0	0 (0)
Skokie River	Skokie River	650 (1,606)	2	4	120 (297)
Middle Fork	Middle Fork North Branch Chicago River	1,100 (2,718)	4	16	200 (494)
West Fork	West Fork North Branch Chicago River	200 (494)	0.8	3	13 (32)
TOTAL		**11,140 (27,527)**	**41.5**	**102** [b]	**2,553 (6,311)**

[a] Rounded to nearest whole number
[b] Some ADID wetlands overlap watershed boundaries inflating the total number of ADID wetlands
Source: CH2M HILL GIS Database 1999

There is only one large ADID wetland complex within this watershed. The Illinois Beach State Park/Spring Bluff Forest Preserve are identified as ADID sites. This ADID complex extends from the Wisconsin state line to Waukegan Harbor, with minimal interruptions for areas like the Zion Nuclear Power Plant. The ADID wetlands extend south past the boundaries of the state park and coincide with the boundaries of designated INAI sites. Only two other ADID wetlands are located in this watershed. Figure 2-15 illustrates the location of ADID wetlands in the study area and the Lake Michigan Watershed.

Within this watershed, there are approximately 50 non-ADID wetlands totaling 130 ha (322 ac) located within protected areas. Many of these wetlands are located in three forest preserve sites: Spring Bluff along Lake Michigan, Lyons Woods, and Greenbelt.

2.3.4 Floodplains

About 21,185 ha (52,350 ac) in Lake County are designated as floodplains, representing 17.4 percent of the land area (LCTIP 1999). Floodplains are defined as those flood prone areas that have been identified as part of the National Flood Insurance Study Program (NFIP) and are depicted on the Federal Emergency Management Agency (FEMA) maps. The floodplain areas, watershed boundaries, and major waterways within the Fox River, Des Plaines River, and Lake Michigan watersheds are shown in Figure 2-12. FEMA has established the 1-percent annual chance (or 100-year) flood as the national standard for floodplain management purposes. The FEMA maps depict floodplains for waterways with tributary areas of at least 2.6 km^2 (1 mi^2), or 260 ha (640 ac).

In addition to the floodplain boundaries, some waterways have identified floodways. The floodway is that portion of the floodplain that must be kept free of encroachment so that the 100-year flood can be carried without substantial increases in flood heights. Regulatory floodways are located in 42 municipalities as well as unincorporated areas of Lake County (FEMA 1994). The relationship between the floodway, floodway fringe, and floodplain is graphically depicted on the waterway cross section in Figure 2-16.

The Lake County Stormwater Management Commission (SMC) regulates development in additional floodplains based on the requirements of the Lake County Watershed Development Ordinance (WDO). Per the WDO criteria, floodplains include any flood prone area with a tributary area of at least 40 ha (100 ac) (rather than 260 ha or 640 ac) and any area of ground depression capable of storing 0.75 ac-ft of water during the 100-year flood event.

The function and role of floodplains are described in the Model Floodplain Ordinance developed by NIPC and the IDNR-Office of

TABLE 2-25
LCWI Subbasin Wetland Totals—Lake Michigan Watershed, Lake County

Drainage Basin	Streams within Basin	Total Wetland [a]	% of County Wetlands	ADID Wetlands	ADID
Kellogg Creek	Kellogg Creek	650 (1,606)	2	3	500 (1,236)
Dead River	Dead River, Bull Creek	1,600 (3,954)	6	4	1,250 (3,089)
Waukegan River	Waukegan River	650 (1,606)	2	3	12 (30)
Pettibone Creek	Pettibone Creek	40 (99)	0.2	0	0 (0)
Bluff/ Ravine	12 unnamed streams	160 (395)	0.6	4	8 (20)
TOTAL		**3,100 (7,660)**	**10.8**	**14** [b]	**1,770 (4,375)**

[a] Rounded to nearest whole number
[b] Some ADID wetlands overlap watershed boundaries inflating the total number of ADID wetlands
Source: CH2M HILL, GIS Database 1999

Water Resources. The ordinance states that:

> "Floodplains and their associated stream, wetland, and shoreline areas are among the State's greatest assets, because of multiple benefits related to environmental quality, natural resource management, and recreational opportunity. Floodplains are generally best able to provide these benefits if kept in a natural condition. Alterations of floodplains have resulted in increased flood and storm water hazards, reduced water quality, loss of habitat and recreational opportunities and poor aesthetics within communities. Wherever possible, the natural characteristics of floodplains and their associated water bodies should be preserved."

The western-most part of the county drains to the Fox River. The Fox River Watershed comprises 43,055 ha (106,390 ac), or 35 percent of Lake County. The far eastern portion drains to Lake Michigan. The Lake Michigan Watershed comprises 13,731 ha (33,930 ac), or 11 percent of Lake County. Between these two watersheds are the Des Plaines River and Chicago River watersheds, which remain separate within Lake County, but join together downstream in Cook County; they are included together as part of the Des Plaines River Watershed for purposes of this analysis. This combined Des Plaines River Watershed comprises 65,070 ha (160,790 ac), or 54 percent of the total area of Lake County (LCTIP 1999).

There are 47 tributaries in the Fox River Watershed, most having associated floodplains. The Chain O' Lakes is an essential natural feature covering much of the land area. Older homes line the shores of numerous lakes. However, direct development in the floodplain is now infrequent, occurring mostly in isolated areas within the unincorporated areas. Of the 43,055 ha (106,390 ac) in this watershed, 11,210 ha (27,700 ac), or 26 percent of the area, are within floodplains. This is, by far, the highest concentration of floodplains within the county, and is primarily attributed to the Chain O' Lakes. Land uses within this watershed include agriculture (22.5 percent), vacant and open space (28.1 percent), and water (10.8 percent). The remaining land area is currently developed (39.6 percent). Of the 11,210 ha (27,700 ac) of floodplain area, 14.8 percent is currently developed (LCTIP 1999).

The Des Plaines River Watershed has 44 tributaries, most having associated floodplains. Over 40 percent of the Des Plaines River floodplain has been set aside as forest preserve and is protected from development. Of the 65,070 ha (160,790 ac) in this watershed, 8,470 ha (20,930 ac), or 13.0 percent of the area, are within floodplains. Land uses within this watershed include agriculture (21.5 percent), vacant and open space (25.9 percent), and water (2.9 percent). The remaining land area is developed (49.7 percent). Of the 8,470 ha (20,930 ac) of floodplain area, 22.1 percent is developed (LCTIP 1999).

The Lake Michigan Watershed has 12 tributaries. Of the 13,731 ha (33,930 ac) in this watershed, 1,505 ha (3,720 ac), or 11.0 percent of the area, are within floodplains. Land uses within this watershed include agriculture (4.4 percent), vacant and open space (24.8 percent), and water (1.1 percent). The remaining land area is currently developed (69.7 percent). This is, by far, the most developed section of Lake County. Of the 1,505 ha (3,720 ac) of floodplain area, 19.9 percent is currently developed (LCTIP 1999).

2.3.5 Biological Resources

The Illinois Natural Heritage Database, the federal lists for threatened and endangered species, and IDNR land cover type mapping were reviewed regarding biological resources within the study area. The review of biological resources was based solely on documentary and records research; it involved no fieldwork.

2.3.5.1 Vegetation and Cover Types

IDNR categorizes 14 vegetative cover types in Lake County. Table 2-26 (on the following page) summarizes the total acreage and

percent of the total acres in Lake County for each cover type. A database compiled by INHS indicates that there are over 1,440 species of plants recorded for Lake County (Iverson 1999).

Approximately 42 percent of the total cover in Lake County is considered developed land, including low, medium, and high-density development, along with urban grasslands. Both high and medium density developments contain a large amount of impervious area, which provides limited cover, foraging, and resting areas for wildlife. Only small amounts of impervious areas are present for low-density designations, which provide greater amounts of foraging and cover habitat. Low-density areas are generally considered to be covered by grassland, shrubland, and woodlands. Other dominant cover types include closed canopy deciduous forest (14 percent), row crops (13 percent), and rural grassland (12 percent). Grasslands are divided into two groups: urban and rural. Urban grassland includes parks, residential lawns, golf courses, cemeteries, and other open space, both private and public. Rural grassland is defined as pastureland, grassland adjacent to waterways, vegetated buffer strips, and Conservation Reserve Program (CRP) land. The CRP is a federal program that removes farmland from active agricultural production.

The most important cover types for wildlife are the forested lands (20 percent), rural grasslands (12 percent), and wetlands (11 percent), which include deep marsh, shallow marsh, shallow water wetlands, and forested wetlands.

Based on the IDNR classification, 11 percent of the county is comprised of open water and wetland communities. This combination of cover types provides important habitat for many species of plants and wildlife, and it harbors many of the threatened or endangered species of birds in the county. Section 2.3.3, *Wetlands*, illustrates the

TABLE 2-26
Cover Types, Lake County

Cover Types	ha (ac) in Lake County	% in Lake County
High Density Development	5,402 (13,348)	4.5
Medium Density Development	13,176 (32,558)	10.9
Low Density Development	11,032 (27,261)	9.1
Rural Grassland	14,025 (34,657)	11.6
Urban Grassland	20,593 (50,887)	17.0
Row Crop	15,902 (39,294)	13.1
Deciduous Forest–Open Canopy	6,961 (17,200)	5.7
Deciduous Forest–Closed Canopy	17,161 (42,406)	14.2
Orchards and Nurseries	448 (1,108)	0.4
Open Water	3,457 (8,542)	2.9
Deep Marsh	3,671 (9,070)	3.0
Shallow Marsh	3,643 (9,001)	3.0
Shallow Water Wetlands	3,920 (8,945)	3.0
Forested Wetlands	2,114 (5,224)	1.7
TOTAL	**121,505 (299,501)**	**100**

Source: Lumen 1996

general distribution of wetland habitats across the county by watershed.

There are few remaining areas of native tallgrass prairie and oak savannas within Lake County. The larger remnant prairie and savanna communities are generally protected and are found within the forest preserve district holdings. A review of the nature preserves list for Lake County shows seven large prairie communities in Lake County. These include:

- Gavin Bog and Prairie
- Highmoor Park Nature Preserve
- Hibernia Nature Preserve
- Illinois Beach State Park (Nature Preserve)
- Lyons Prairie and Marsh Nature Preserve
- Skokie River Nature Preserve
- Wadsworth Prairie Nature Preserve

All the sites listed are protected as either forest preserve or Nature Preserve sites. Additional known prairie sites, not listed above, are the Buffalo Grove Prairie located on private land north of Lake Cook Road near the Wisconsin Central Railroad tracks and the North Shore Prairie located along Sheridan Road in Lake Bluff. The Buffalo Grove Prairie is owned by a utility company, thus no special protected status has been secured for this particular site. The North Shore Prairie is being managed by the Lake Forest Open Lands Association (Taft 1997c). Section 2.3.6, *Special Lands*, details the types of plant communities found within the individual forest preserves including prairie and savanna communities. Most remaining stands of native prairie are not located within forest preserves. Other areas may contain scattered remnants of individual plant species or small groupings of prairie plants. These are mostly scattered, small in size, and generally occur within protected rights-of-way, including utility or railroad corridors. As prairies and savannas have no special protection status, unless they coincide with wetlands or nature preserves, they have historically been developed for agricultural or urban development purposes.

Forest resources within the study area are scattered throughout the entire county. Large contiguous stands of woods are generally located along the existing waterways primarily along the Des Plaines River. Historically, forests and woods were confined to the areas along the major rivers due to the existence of the native prairie communities that once dominated Lake County. The conversion of prairies to agricultural lands prevented the expansion of forested areas throughout the county. Original climax forest in Lake County is believed to be oak-hickory.

Other unique forested communities include the dry mesic to mesic forest seep communities located in the ravines adjacent to Lake Michigan, primarily in the Lake Forest area north of Fort Sheridan. These areas have been identified as post-Pleistocene glaciation refuges for remnant plant communities (Taft 1997a, 1997c).

The remaining large tracts of forest resources in the study area are generally found along the smaller waterways, including Buffalo Creek, Indian Creek, Bull Creek, Mill Creek, and in the southwest corner of Lake County between Lake Zurich, Tower Lakes, and Barrington. A review of aerial photography shows that many of the forested areas identified by IDNR are residential developments that retained large amounts of forested areas within the development.

Other forested areas in Lake County would generally be considered urban or suburban forests, which include trees planted within cities and villages, along with residences that are built in heavily wooded areas.

The least productive cover types for providing habitat for wildlife would include orchards and nurseries, row crops, and high and medium density developments. Wildlife may use these areas to some extent for foraging, but there is little opportunity for nesting or cover for most species. Wildlife species and vegetation communities in these areas are limited to those that are highly tolerant to disturbance.

2.3.5.2 Wildlife

The study area contains a variety of wildlife habitats. The most important cover types for wildlife are the forested lands, rural grasslands, and wetlands. The ongoing development within the county has somewhat limited the distribution of wildlife to these

three cover types. Many of these areas are found within stream and river corridors, forest preserve district holdings, and the more rural areas in the western half of the county. Large forest preserve holdings, such as Independence Grove, MacArthur Woods, Ryerson Woods, and Lakewood, provide large areas of habitat within the central portion of the county. Of these four large preserves, all but Lakewood are located within the Des Plaines River "greenway" that extends north–south, almost the entire length of the county. Lakewood, located near Wauconda, is relatively isolated. Additional large areas of wildlife habitat are found within two state parks located within Lake County. These include Chain O' Lakes State Park and Illinois Beach State Park along Lake Michigan.

With the exception of the Des Plaines River corridor and the Chain O' Lakes region, most of the areas of prime wildlife habitat are scattered throughout the county. The lack of protected corridors linking these habitat areas creates a wildlife island effect. While this island effect is not as important for birds and large mammal species, this can inhibit movement of other forms of wildlife throughout the county. The lack of protected corridors also increases the potential for human/wildlife interaction such as collisions with vehicles and wildlife damage to residential landscaping. Figure 2-15 illustrates the location of forest and nature preserves within the county, along with ADID wetland habitats. This figure also shows a lack of habitat continuity along an east-west direction. Without using farms, stream corridors, wetlands or developed areas, there is little opportunity for east-west wildlife movement in Lake County.

Figure 2-15 also shows the lack of continuous north-south greenway or wildlife corridors outside of the Des Plaines River corridor. Although more open lands are present in the western half of the county, wildlife migrating north–south, west of the Des Plaines River corridor, must also use limited stream corridors and wetland complexes where available, along with farmland, and developed areas for movement.

The developed areas of the county will provide minimal habitat for wildlife. The types of wildlife found within the urban/suburban areas are species that are tolerant of disturbance and human activities. This includes a variety of bird and mammal species.

Birds. The Lake County Forest Preserve District (LCFPD) reports that 293 bird species are known to occur in Lake County. Of this number, 125 species are known to nest in Lake County. LCFPD also indicates an additional 18 species are believed to nest in the county. A full list of all birds known to occur in Lake County is provided in Appendix C. Of the nesting species, there are ten birds of prey, seven game birds, seven herons, seven species of waterfowl, two rails, five shorebirds, two gulls, and three terns, as well as woodpeckers and songbirds. Two heron colonies or rookeries are known to be present, with the potential for more colonies to be present within the county. A heron colony was noted near Indian Creek (Amundsen and Enstrom 1996) and at Almond Marsh. Both of these areas coincide with ADID wetland designations.

All habitat and cover types may be used by birds for foraging, nesting, or breeding. Although it is not generally regarded as bird habitat, even high-density developed land is used by many songbirds, gulls, and doves for forage, rest, and breeding activities. Many of the bird species identified in Lake County are commonly found in or near open water and wetlands. In addition, many of the songbirds (passerines or perching birds), of which 76 species breed within the study area, commonly use water systems for daily feeding and resting activities. Table 2-27 (on the following page) lists the birds that are, for the most part, directly associated with open water and wetlands. In general, these species are more dependent on less disturbed areas that retain some natural features and can be used, to some extent, as indicators of habitat quality. Exceptions to this are Canadian geese and mallards, which are fully adapted to human activities and have proliferated in human presence.

Mammals. The LCFPD lists 42 species of mammals known to occur in Lake County. A full list of mammals known to inhabit Lake County is found in Appendix C. While these species have been noted to occur in the forest preserve holdings, the listing is indicative of the types of mammals that inhabit the county as a whole. All of the mammal species listed are terrestrial, with the exception of beaver (*Castor canadensis*) and muskrat (*Onatria zibethicus*). Mink (*Mustela visons*), which is both aquatic and terrestrial, is also known to occur. The list of species includes eight species of bats, two species of fox, five species of squirrels, and two species of weasels. Most Illinois furbearers have been reported in Lake County, along with 21 rodent species. White-tailed deer (*Odocoileus virginianus*) and coyote (*Canis latrans*) are the only large mammals known to occur in Lake County.

Species considered by LCFPD to be rare in Lake County include Pygmy shrew (*Sorex hoyi*), Franklin's ground squirrel *(Spermophilus franklinii)*, prairie vole (*Microtus ochragaster*), woodland vole (*Microtus pinetorum*), and the badger (*Taxidea taxus*). The gray fox (*Urocyon cinereoargentus*) is the only species considered uncommon. The species that are considered rare or uncommon generally prefer larger, relatively undisturbed areas for habitat. Seventeen percent of mammal species in Lake County are considered rare, with 80 percent considered abundant or common. Abundant and common species can be found in a variety of habitats and are generally tolerant of development and human activities. The forest preserve sites and the rural western portions of the county appear to provide the majority of the necessary habitat requirements for these mammal species.

TABLE 2-27
Bird Species Found In or Near Open Water and Wetlands in Lake County

Common	Scientific	Common	Scientific
Pied-billed grebe*	*Podilymbus podiceps*	Mute swan	*Cygnus olor*
American bittern*	*Botaurus lentiginosus*	Wood duck	*Aix sponsa*
Least bittern*	*Ixobrychus exilis*	Mallard	*Anas platyrhynchos*
Great blue heron	*Ardea herodias*	Blue-winged teal	*Anas discors*
Great egret	*Casmerodius albus egretta*	Hooded merganser	*Lophodytes cucullatus*
Green-backed heron	*Butorides virescens*	King rail*	*Rallus elegans*
Black-crowned night heron*	*Nycticorax nycticorax*	Virginia rail	*Rallus limicola*
Yellow-crowned night heron*	*Nyctanassa violacea*	Sora	*Porzana carolina*
Canada Goose	*Branta canadensis*	Common moorhen*	*Gallinula chloropus*
Ring-billed gull	*Larus delawarensis*	American coot	*Fulica americana*
Herring Gull	*Larus argentatus*	Sandhill crane*	*Grus canadensis*
Common tern	*Sterna hirundo*	Killdeer	*Charadrius vociferus*
Forster's tern*	*Sterna forsteri*	Spotted sandpiper	*Actitis macularia*
Black tern*	*Chlidonias niger*	Upland plover*	*Bartramia longicauda*
Belted Kingfisher	*Megaceryle alcyon*	Common snipe	*Capella gallinago*
Woodcock	*Philohela minor*		

* State or federal-listed threatened or endangered species

Reptiles and Amphibians. According to the LCFPD, 19 species of reptiles, seven of which are turtles and 12 are snakes, and 15 species of amphibians are known to occur in Lake County. The INHS indicates that up to 36 species of reptiles and amphibians (19 reptiles and 17 amphibians) could inhabit Lake County based on range maps (Phillips 1995). Species considered rare or uncommon by LCFPD in Lake County include the Spiny softshell turtle (*Trionyx spiniferus*), Eastern hognose snake (*Heterodon platirhinos*), smooth green snake (*Opreodrys vernalis*), and the red-bellied snake (*Storeria occipitonaculata*). The remaining species of reptiles are considered common or locally common.

The LCFPD lists 15 species of amphibians as occurring in Lake County. Five of the species are newts or salamanders, including the mud puppy (*Necturus maculosus*) that inhabits Lake Michigan. Two species of toads and eight species of frogs also occur. There is no information provided by the LCFPD on the abundance of any amphibian species. Water systems including wetlands, streams, rivers, and lakes are important habitats for both reptiles and amphibians. The full list of reptiles and amphibians as documented by the LCFPD is provided in Appendix C.

Fish. The LCFPD lists 89 species of fish as occurring in Lake County. Of these, 21 species are found only in Lake Michigan and are not within the project study area. Other fish species known in Lake County include 22 minnows and carp, four suckers, six catfish and bullheads, two true basses, 10 sunfish, and 10 perch and darter species. Additional information on fishes is provided in Section 2.3.2, *Water Quality and Water Resources*. A full list of known species within Lake County is provided in Appendix C.

2.3.5.3 Threatened and Endangered Species

Federal-listed Species. According to information provided by the USFWS and the USFWS North Central Region "Red Book," there are only two federal-listed plant species, the Eastern prairie fringed orchid/prairie white-fringed orchid (*Platanthera leucophaea*) and Pitcher's thistle/dune thistle (*Cirsium pitcheri*), occurring in Lake County. Two federal-listed bird species, the piping plover (*Charadrius melodus*) and the interior least tern (*Sterna antillarum*), are listed as occurring in Lake County. Both plant species are federal threatened, whereas both bird species are federal endangered. The Karner blue butterfly, (*Lycaeides melissa samuelis*—federal and state endangered) is also know to occur within the county. The USFWS indicates that the Karner Blue butterfly may be extirpated from the county. Lake County is not known to harbor any identified federal-listed mammals, reptiles, or amphibians. No federal threatened or endangered fish are known to occur within Lake County. Table 2-28 lists the number of known federal-listed threatened and endangered species by taxa. Appendix C lists all federal threatened and endangered species and their associated habitat.

State-listed Species. The list of Illinois threatened and endangered species was reviewed to determine the amount of listed species known to occur within Lake County. Table 2-28 lists the known state-listed threatened and endangered species by taxa. Appendix C lists the state threatened or

TABLE 2-28
Number of Known, Federal and State-listed Threatened and Endangered Species by Taxa in Lake County *

	Plants	Insects	Fish	Amphibians	Reptiles	Birds	Mammals	Mollusks
Number of Federal-listed T&E Species	2	1	0	0	0	2	0	0
Number of State-listed T&E Species	127	4	9	1	4	26	0	1

* Number of known breeding species
Source: Herkert 1994, 1999

endangered species known to occur in Lake County.

- **Plants**—There are 127 state threatened and endangered plant species known to occur within Lake County. Twenty-six of the plant species are state threatened and 101 are considered state endangered. Of the state-listed plant species, 33 are generally found along the Lake Michigan shoreline or similar sandy habitats. Approximately 43 listed species are generally found in bogs or fens and approximately 22 of the species are generally found in prairie habitats. The remaining species inhabited various habitats such as dolomite bluffs, forests and flatwoods, and other wetland communities.
- **Insects**—The Illinois Endangered Species Protection Board identifies four listed species of insects as occurring in Lake County. Three of the insect species are state endangered, including the Karner Blue butterfly, and one species is state threatened. Three of the insect species are butterflies and one is a leafhopper.
- **Fish**—The Illinois Endangered Species Protection Board identifies nine listed species of fishes as occurring in Lake County. Four of the species are specific to Lake Michigan and would not be considered within the study area. The greater redhorse (*Moxostoma valenciennesi*—state endangered) is believed to be extirpated. The pugnose shiner (*Notropis anogenus*— state endangered), blacknose shiner (*Notropis heterolepis*—state endangered), blackchin shiner (*Notropis heterodon*—state threatened), tend to inhabit well-vegetated glacial lakes and clean streams. The Iowa Darter (*Etheostoma exile*) has been recently identified at a few sites in Lake County. The species have been observed near the IL 120/IL 21 interchange within an unnamed tributary to the Des Plaines River, in Bull Creek north of Libertyville, within two unnamed tributaries to the Des Plaines River between Libertyville and IL 120, within various lakes, and near Dilley Road in Mill Creek (Taylor and Wetzel 1999). The banded killifish (*Fundulus diaphanus*) is also found in clean glacial lakes that are vegetated.
- **Amphibians**—The Illinois Endangered Species Protection Board identifies only one listed species of amphibian as occurring in Lake County: the four-toed salamander (*Hemidactylium scutatum*—threatened). This species' habitat requirement is boggy woodland ponds, sphagnum areas adjacent to woodlands, and springfed headwaters of woodland streams.
- **Reptiles**—The Illinois Endangered Species Protection Board identifies four listed species of reptiles as occurring in Lake County. Two of the reptile species are snakes: the eastern massasauga rattlesnake (*Sistrurus catenatus*-endangered) and the Kirtland's snake (*Clonophis kirtlandi* – threatened). The Illinois mud turtle (*Kinosternon flavescens*) is listed as endangered. The Blanding's turtle (*Emydoidea blandingii*) has recently been listed as state threatened. Kirtland's snake prefers wet meadows, open swamp-forests, and wet vacant urban areas. The Massasauga rattlesnake prefers wet prairies, bogs and swamps, and rarely dry woodlands. The mud turtle is generally found near ponds in sand prairie areas. Blanding's turtles prefer marshes, prairie wetlands, sedge meadows, and shallow vegetated portions of lakes.
- **Birds**—The Illinois Endangered Species Protection Board identifies 26 listed species of birds as occurring in Lake County. Seven of the bird species are identified as threatened in Illinois. The remaining 19 species are identified as endangered. Appendix C lists the bird species identified as threatened or endangered species within Lake County.
- **Mollusks**—The Illinois Endangered Species Protection Board identifies one listed mussel species, the spike mussel

(*Elliptio dilatata*), as state threatened. This mussel is found in small or large streams with mud or gravel substrates.

Based on habitat considerations of the state listed species (Herkert 1991, 1994), a general assessment of species distribution was compiled to determine important areas for these species. Eight categories of habitat were derived from the habitat requirements of both threatened and endangered plant and wildlife species. The habitat categories are:

- Prairies/Grasslands
- Lake Michigan
- Bogs/Fens/Special wetland habitats
- Forest/Flatwoods
- Savannas
- General wetlands
- Streams
- Other

For each species, the habitat requirements were reviewed. Based on this general review, nearly two-thirds of the listed species present within Lake County use less common cover types for habitat. These cover types include bogs/fens/special wetland habitats, Lake Michigan, prairies/grasslands, and savannas. For example, ADID wetlands harboring threatened and endangered species are shown in Figure 2-17. Cover types more common to Lake County such as forest/flatwoods, general wetlands, streams, and others (which includes a variety of habitats including urban areas) provided habitats for approximately one-third of the listed species in the county.

Listed species found near Lake Michigan were most likely located within the protected areas of Illinois Beach State Park or near Fort Sheridan, which contains much of the remaining undisturbed dune and interdunal habitats in the county as well as intermittent ravine communities. Many of the bog and fen communities are located in the northern and western half of the county in areas closer to the Fox River/Chain O' Lakes. This would include areas such as Volo Bog and Tower Lakes Fen, among others. While prairie communities are scattered across the county, many of the remnants are located within forest preserves or other protected sites.

Although savanna remnants are not as numerous as prairies, these features have generally been protected in preserves such as the Rollins Savanna Forest Preserve. Other known savanna sites include the Bull Creek Savanna and the Flint Creek Savanna. The Flint Creek Savanna was identified south of IL 22 and west of Lake Zurich (Amundsen 1998a). The Bull Creek Savanna is part of the nature preserve complex near Casey and Almond Roads (IDOT 1995).

The remaining habitat groups including the forests, general wetlands, stream, and others are located relatively uniform across the county. These areas are more likely to be affected by proposed transportation improvements.

The presence of threatened and endangered species of plants and wildlife generally coincide with areas designated as either nature preserves or INAI sites (Figure 2-18). Also shown in Figure 2-18 are seven clusters of sites that would potentially harbor endangered species. These include the Illinois Beach State Park, Antioch/Lake Villa area, Chain O' Lakes State Park, Volo Bog area, Wauconda area, Tower Lakes/Fox River area, and the Des Plaines River corridor.

The LCFPD indicates that ten forest preserve sites each contain six or more species. These are listed below with their closest associated designated lands cluster:

- Lakewood/Wauconda Bog—22 species, Wauconda Area
- Grant Woods—17 species, Volo Bog Area
- Ryerson Woods— Nine species, Des Plaines River Area
- Spring Bluff —Nine species, Illinois Beach State Park
- Fort Sheridan—Seven species, Lake Michigan
- MacArthur Woods—Seven species, Des Plaines River

- Sun Lake—Seven species, Antioch/Lake Villa Region
- Cuba Marsh—Six species, Wauconda Area
- McDonald Woods—Six species, east of Lake Villa Area
- Wadsworth Prairie—Six species, Des Plaines River Area

Additional studies conducted by INHS for various transportation projects enhance existing data on listed species. This includes limited potential habitat for plants in ravine communities along Lake Michigan (Taft 1997a); red-shouldered hawk surveys near Miller Road (Amundsen 1995); studies conducted along Old Rand Road in Wauconda near the Wauconda bog complex (Hill, INHS 2000); botanical surveys, which identified four listed plant species at a potential wetland mitigation site near US 41 and IL 137 (Taft 1996); and numerous surveys conducted along IL 22 for IDOT improvements (Amundsen and Enstrom 1996, Amundsen 1995, 1998a, 1998b, 1998c, and Taft 1997b). Additional INHS studies were conducted along the former FAP 342 right-of-way during previously proposed road improvement projects. These studies showed marginal habitat for seven listed bird species, with overall disturbed plant communities.

2.3.6 Special Lands

2.3.6.1 Protected Lands

Lake County contains numerous properties in the public domain that are managed and protected for their special resources. The county contains 41 forest preserves, two state parks, numerous local parks, 21 nature preserves, and 57 INAI sites (Figures 2-19 and 2-20). These areas provide open space and habitat for different types of plants and wildlife, including common species and threatened and endangered species that rely on this habitat for survival. Forest preserves and parks also provide recreational activities. However, nature preserves and natural areas are usually not developed for public access because they contain sensitive habitats or unique flora and fauna. Some nature preserves and natural areas are privately owned and public access is prohibited. In cases where public forest preserves incorporate a nature preserve or natural area, access is limited or restricted to well-defined trails.

2.3.6.2 Forest Preserves

Of the 41 LCFPD sites, 18 sites occupy approximately 4,613 ha (11,400 ac) and are used for active recreation with trails and an array of activities. The remaining 23 forest preserve sites open to the public have no established recreational facilities, which total an additional 3,313 ha (8,187 ac). Total forest preserve lands account for approximately 7 percent of the total land area in Lake County. LCFPD sites are distributed among 12 of the 16 townships.

LCFPD provides trails for hiking, bicycling, cross-country skiing, horseback riding, and snowmobiling. All of the 18 forest preserve sites are used for recreational activities, and provide the same habitat for wildlife. Two regional trails managed by the LCFPD include the Des Plaines River Trail North and the Des Plaines River Trail South, which parallel the Des Plaines River through Lake County. The northern trail is about 17.7 km (11 mi) and the southern trail about 19.3 km (12 mi). There are plans to continue the two sections until the entire 53.1 km (33 mi) trail from the state line south to Cook County is complete.

The forest preserve system is described in accordance with its relationship to three watersheds in the study area, including the Fox River, Des Plaines River, and Lake Michigan watersheds. Figure 2-19 highlights the location of the forest preserve sites in the watersheds. There are approximately nine forest preserves, 19 nature preserves, and 26 INAI sites near the Fox River in Lake County. These areas account for almost half of the nature preserves and a third of the INAI sites within Lake County.

Five of the nine LCFPD sites have no services or facilities. Table 2-29 (on the following two pages) summarizes the size, function, and

TABLE 2-29

Lake County Forest Preserves and Associated Nature Preserves and Natural Areas

Name of Forest Preserve	Approximate Size, ha (ac)	Function [a]	Nature Preserve / Natural Area
Fox River Watershed			
Cuba Marsh [b]	316 (781) [c]	R	None
Deer Lake-Red Wing Slough	16 (40)	U	None
Fox River Forest Preserve [d]	123 (304) [c]	B, R, S	Lyons Prairie & Marsh and Farm Trails North
Gander Mountain	116 (287) [b]	U	None
Grant Woods [f]	394 (974) [c]	E, R, S	Gavin Bog and Prairie
Grassy Lake	234 (578) [e]	U	Tower Lakes Fen and Wagner Fen
Lakewood [g]	835 (2,063)	A, B, R, S	Wauconda Bog
Sunlake	215 (531)	U	None
West Loop Greenway	No Data	U	None
Des Plaines River Watershed			
Almond Marsh	124 (306) [e]	U	Almond Marsh and Oak Openings
Bannockburn	32 (79) [e]	U	None
Berkeley Prairie	7 (17)	U	None
Brae Lock Golf Course	65 (161) [c]	B, N, S	None
Buffalo Creek [h]	160 (395) [c]	R, S	None
Countryside Golf Course	200 (494)	B, S	None
Des Plaines River Trail	1,341(3,314) [e]	U	Wadsworth Prairie
Duck Farm	142 (351) [c]	S	None
Fourth Lake Fen	92 (227) [c]	U	None
Grainger Woods [i]	104 (257) [c]	H, S	Lloyd's Woods
Gurnee Woods	210 (519)	U	None
Independence Grove	448 (1,107) [c]	U	None
Lake Bluff	34 (84)	U	Skokie River
MacArthur Woods	255 (630) [e]	U	MacArthur Woods
McDonald Woods [j]	123 (304) [c]	R	None
Middle Fork Savannah	208 (514)	U	None
Old School	154 (381) [c]	U	None
Prairie Wolf Slough	174 (430) [c]	R, S	None
River Hill	90 (222) [e]	U	None
Rollins Savannah [k]	495 (1,223) [c]	S	None
Ryerson Woods [l]	223 (551) [c]	B, N, S	Edward l. Ryerson
Site 15	31 (77) [e]	U	None
Van Patten Woods	393 (971) [c]	R, S	None
Wadsworth Prairie	487 (1,203)	U	Wadsworth Prairie
Waukegan Savannah	279 (689) [e]	U	None
Wilmont	57 (141) [e]	U	None
Wright Woods/Half Day Woods [m]	81 (200) [c]	R, S	None

identifies threatened and endangered species in these areas.

There are 27 LCFPD sites within the Des Plaines River system from the Wisconsin border to the Cook County border. Where actual forest preserves are not present, the sites are mostly linked by trails along the river (Table 2-17). There are 10 nature preserves in the watershed. Of those, four are along the Des Plaines River and four are near the Skokie River.

There are four full forest preserves and one partial preserve, Spring Bluff, within the study area of the Lake Michigan Watershed. There are three dedicated nature preserves in the watershed, all of which are associated with Illinois Beach State Park. Table 2-17 summarizes the characteristics of the five forest preserves in the Lake Michigan Watershed. Two golf courses account for more than 200 ha (500 ac) of preserve holdings.

2.3.6.3 Parks

In addition to the Lake County forest preserve system, local and state park districts provide recreational opportunities, including picnic sites, playgrounds, and activities, such as biking, golfing, hiking, and canoeing, as well as passive recreation. There are numerous park districts in the study area, which are primarily municipal or township level districts. Figure 2-19 shows the location of the two state parks: Illinois Beach State Park and the Chain O' Lakes State Park. Combined, the parks draw an average of 3.5 million visitors annually.

2.3.6.4 Illinois Nature Preserves

IDNR defines a nature preserve is "an area of land or water in public or private ownership that is formally dedicated, pursuant to the terms of the law, to being maintained in its natural condition." A major objective of the

TABLE 2-29 CONTINUED

Lake County Forest Preserves and Associated Nature Preserves and Natural Areas

Name of Forest Preserve	Approximate Size, ha (ac)	Function [a]	Nature Preserve / Natural Area
Lake Michigan Watershed			
Greenbelt	226 (559) [c]	R, S	None
Fort Sheridan Golf Course	105 (105) [c]	S	None
Lyons Woods [n]	107 (264) [c]	R	None
Spring Bluff	94 (232)	U	Spring Bluff
Thunderhawk Golf Course	98 (242) [c]	B, S	None

Note: Unless otherwise noted, no data on threatened and endangered species was available to document presence

[a] A = Archives/ Historical Exhibits, B = Banquet/Meeting Facilities, E = Educational Activities, H = Horse Stables and Lessons, N = Nature Center, R= Recreational Opportunities, S = Sports, U= Undeveloped

[b] Cuba Marsh has 2 rare plant species, 3 state-listed endangered birds, and 1 county-listed endangered plant

[c] Data obtained from Lake County Forest Preserve District, *Map and Guide of Lake County Forest Preserve and Trail Maps*, October 1998.

[d] Fox River Forest Preserve has a bird rookery

[e] Data obtained from CH2M HILL, GIS Database 1999

[f] Grant Woods has 1 county-listed threatened plant and the only existing Kentucky Coffee Tree stand in Lake County

[g] Lakewood has 17 state-listed endangered plants or animals, and has a bat colony and breeding habitat for birds

[h] Buffalo Creek Nature Preserve contains important bird habitats

[i] Has 1 state-listed endangered plant

[j] Has 4 state-listed endangered animals

[k] Has 2 state-listed endangered animals

[l] Has 1 state-listed endangered plant, 2 county-listed endangered animals, 4 rare animal species and a high quality floodplain forest

[m] Has 1 state-listed endangered plant and has extensive oak and maple woodlands

[n] Lyons Woods has 3 rare bird species, 2 rare plant species, and large stands of oaks

nature preserve system is the preservation of adequate samples of all the significant natural features of the state, including threatened and endangered species. Natural features include geological and physiographic formations, soils, streams, lakes, and aquatic and terrestrial communities of plants and animals.

The Illinois nature preserve system consists of 291 preserves containing 15,751 ha (38,922 ac). In Lake County, there are 27 Illinois nature preserves totaling 1,893.8 ha (4,679.4 ac), or over 9 percent of Illinois' nature preserves (see Table 2-30). These preserves are distributed among 13 of Lake County's 16 townships (Figure 2-20). Their

TABLE 2-30

Lake County Nature Preserves [a] – Fox River, Des Plaines River, and Lake Michigan Watersheds

			Types of Habitat Present								
Name of Nature Preserve	Watershed [a]	Size ha (ac) [c]	Fen	Grassland Meadow	Lake Michigan Beach	Open Water	Prairie	Savannah	Sedge Meadow	Wetland	Woodland
Barrington Bog	F	16.6 (41.0)							X	X	
Cedar Lake Bog	F	11.1 (27.4)				X				X	
Farm Trails North	F	8.0 (19.8)	X						X		
Gavin Lake Bog and Prairie	F	42.5 (105.0)					X			X	X
Lyons Prairie and Marsh	F	105.0 (259.5)					X			X	
Pistakee/Brandenburg Bog	F	140 (346)							X	X	
Tower Lakes Fen	F	30 (74)									
Turner Lake	F	38.4 (94.9)	X	X		X	X			X	
Volo Bog State Natural Area	F	324.0 (800.6)				X		X		X	X
Wagner Fen	F	40.5 (100)	X				X			X	
Wauconda Bog	F	27.1 (67.0)								X	X
Almond Marsh	DP	44.5 (110.0)		X			X		X	X	X
Eastern Prairie Fringed Orchid	DP	1.5 (3.7)					X				
Edward L. Ryerson	DP	113.0 (279.2)									X
Florsheim Park (Lincolnshire)	DP	31.6 (78)					X		X		X
Highmoor Park	DP	4.2 (10.5)					X	X		X	X
Liberty Prairie	DP	19.0 (47.0)	X				X			X	
Lloyd's Woods	DP	42.5 (105.0)					X			X	X
MacArthur Woods	DP	180.5 (446.0)									X
Oak Openings	DP	6.5 (16.1)					X	X	X	X	X
Reed-Turner Woods	DP	13.4 (33.1)					X	X			X
Wadsworth Prairie	DP	71.2 (175.9)					X			X	
Hybernia	LM	10.9 (26.9)					X	X		X	
Illinois Beach	LM	335.5 (829.0)	X		X	X			X	X	
North Dunes	LM	80.9 (199.9)	X				X	X			
Skokie River	LM	40.4 (99.8)					X		X	X	
Spring Bluff	LM	115.0 (284.1)	X				X	X		X	
TOTAL		**1,893.8 (4,679.4)**									

[a] F= Fox River, DP = Des Plaines River, LM = Lake Michigan

[b] All these nature preserves contain at least one threatened or endangered plant or animal. Additionally, they all contain many uncommon or rare plant or animal species.

[c] Data obtained from the Illinois Nature Preserves Commission, 7/31/00 and Personal Communications February, 2001.

locations do not display an obvious pattern of distribution. Cuba and Libertyville townships contain the largest concentrations with three each.

LCFPD manages 764 ha (1,886 ac) of the Illinois nature preserves in the county; IDNR manages 830 ha (2,050 ac); and park districts, conservation groups, and private entities hold the remaining 300 ha (741 ac). Table 2-30 summarizes the watershed, acreage, and habitat of nature preserves for Lake County. These nature preserves are primarily located in or near forest preserves or state parks. Most of the nature preserves are located in western Lake County. The nature preserves contain a variety of habitat types from wetlands to prairies to woodlands.

2.3.6.5 Illinois Natural Areas

As stated in the Natural Areas Preservation Act, "natural area" is defined as "an area of land in public or private ownership which, in the opinion of the Commission, either retains or has recovered to a substantial degree its original natural or primeval character, though it need not be completely undisturbed, or has floral, faunal, ecological, geological or archaeological features of scientific, educational, scenic or esthetic interest." These INAI sites are usually associated with a nature or forest preserve. Within the study area, there are 57 INAI sites (Figure 2-20). The natural areas in Lake County are distributed among 16 townships. Most of the natural areas are located in western Lake County. There are 28 INAI sites within the Fox River Watershed, 21 in Des Plaines River system, and eight in the Lake Michigan Watershed.

2.3.7 Visual Resources

Lake County is diverse in its natural and human environment and exhibits a variety of visual characteristics. The visual quality of Lake County can be characterized by two terms: vividness and intactness.

- **Vividness—**A memorable visual impression
- **Intactness—**Having a measure of naturalness

The shoreline area along Lake Michigan is dotted by mature communities that have a good balance between development and the natural resources of the area. This area provides strong relationships between landform and water, and the urban areas show strong identity in terms of their sense of community, architectural style, and sense of place. Amongst the patchwork of shoreline communities is the Illinois Beach State Park, and is located along the northern shore of the county. This sizeable piece of property is reasonably intact with extensive forested and wetland areas.

West of I-94 are natural resources, including lakes, wetlands, rivers, and streams. Remnants of the natural setting have been preserved by the LCFPD, the state, and other open space entities. Overall, the natural setting in this area has been altered by widespread suburban development. The northern parts of this area have topographic relief and landform that provide additional visual interest. Low density development in the northern parts of the county with natural features and topographic relief all combine to form an interesting pattern of countryside visual images that are intact.

The visual character in the central and southern part of the county is flat to slightly hilly terrain and is mostly in residential and agricultural uses. The steeper terrain occurs along the edges of major drainage ways. The terrain is broken up by urban uses in the many suburban communities and clusters of residences and subdivisions in unincorporated areas. There are small patches to extensive areas of woodlands, wetlands, grasslands, and other natural features throughout the area. Several older farmsteads and estates are visible at various locations. This area generally lacks the topographic relief as compared to the northern and western parts of the county. Waterforms are present throughout the area, but not to the extent as found in the northwestern area (Chain O' Lakes) and to the east with the Lake Michigan shoreline. Variations in pattern, color, and texture of vegetation are less diverse than other parts of the county. The vividness of the area, as defined by topography, waterform, and

vegetation is considered low to moderate. The most intact resources are the Fox and Des Plaines River corridors, which are also the locations of most of the county's forest preserves.

There are several prominent urban centers in central and southern Lake County, such as Libertyville, Long Grove, Lake Zurich, and Grayslake, that provide a sense of community, architectural style, and sense of place. These urban settings create a coherence and composition that creates integrity in visual quality. Overall, the study area has been heavily altered by human development. Residential subdivisions, commercial development, industrial development, and a variety of supporting infrastructure have altered the natural landscape. Over the years, a rather extensive system of forest preserves and other permanent public land trusts have retained some of the natural conditions of the area. The combination of a moderate level of urban development and the amount of public lands results in a low to medium degree of intactness in the area.

2.4 Air Quality

The study area is located within the Chicago metropolitan area. This area is in violation of the National Ambient Air Quality Standard (NAAQS) for the pollutant ozone. The area is classified as a "Severe" ozone non-attainment area and it includes the counties of Cook, DuPage, Kane, Lake, McHenry, and Will, Aux Sable and Goose Lake townships in Grundy County, and Oswego Township in Kendall County. Due to the non-attainment status of the area, the State of Illinois has developed a State Implementation Plan (SIP) identifying programs intended to reduce ozone precursor emissions. A "Severe" classification means that the region must implement specific programs to attain air quality standards by the year 2007.

A complete listing of the NAAQS are shown in Table 2-31 (on the following page). The primary standards are established at levels that are intended to protect the public health. Secondary standards are required to protect the public welfare from any known or anticipated adverse effects of a pollutant.

Ozone is a colorless gas with a pungent odor and is associated with smog or haze conditions. Ozone is not directly emitted into the atmosphere but is formed when precursor emissions, hydrocarbons, oxides of nitrogen, and carbon monoxide react in the presence of sunlight. Because of these complex relationships and the regional nature of ozone, estimating and controlling ozone formation requires factoring all hydrocarbon, oxides of nitrogen, and carbon monoxide emissions within the region and thus, the impact on ozone concentrations from individual projects or facilities cannot be observed in the immediate study area.

In addition to the SIP requirements, metropolitan planning organizations (MPO) are required to undertake conformity determinations on metropolitan transportation plans and transportation improvement programs before they are adopted, approved, or accepted. Section 176 (c)(4) of the Clean Air Act Amendments of 1990 requires that transportation plans, programs, and projects that are funded or approved under Title 23 U.S.C. must be determined to conform with state or federal air implementation plans. Conformity to an implementation plan is defined in the Clean Air Act as conformity to an implementation plan's purpose of eliminating or reducing the severity and number of violations of the NAAQS and achieving expeditious attainment of such standards. The implementing regulations for determining conformity of transportation projects are found in 40 CFR Part 93, "Criteria and Procedures for Determining Conformity to State or Federal Implementation Plans of Transportation Plans, Programs and Projects Funded or Approved under Title 23 U.S.C. or the Federal Transit Act." Highway or transit projects that are funded or approved by the FHWA or the Federal Transit Administration (FTA) must also be included in a conforming plan before they are approved or funded by IDOT or the Metropolitan Planning Organization (MPO).

Ambient air quality is monitored at 56 locations in the metropolitan Chicago region. The instrumentation used at each site varies, but all six criteria pollutants are monitored at one or more locations. The results of the monitoring are summarized and published annually by IEPA.

There are four monitoring locations in Lake County: Deerfield, Libertyville, and Waukegan that report on ozone, and the Zion station reports on nitric oxide, nitrogen dioxide, ozone, and VOCs. In 1999, all four monitoring locations reported no exceedances of the 1-hour for ozone. Table 2-32 (on the following page) lists monitoring data available at each of the locations, and Table 2-33 (on the following page) provides a summary of air quality in the study area. The Pollutant Standards Index (PSI) for Lake County in 1999 was classified as good, 85 percent of the time, and moderate, 15 percent of the time.[12]

2.5 Noise

Sound is caused by the vibration of air molecules and is measured on a logarithmic scale with units of decibels (dB). Sound is composed of a wide range of frequencies; however, the ear is not sensitive to all frequencies. The "A" weighted scale was devised to correspond with the ear's sensitivity,

TABLE 2-31
Summary of National and State Ambient Air Quality Standards

Pollutant	Averaging Time	Primary	Secondary
Particulate Matter			
10 micrometers (PM_{10})	Annual Arithmetic Mean	50 µg/m^3	Same as Primary
	24-hour	150 µg/m^3	Same as Primary
2.5 micrometers ($PM_{2.5}$) [b]	Annual Arithmetic Mean	15 µg/m^3	Same as Primary
	24-hour	65 µg/m^3	Same as Primary
Sulfur Dioxide (SO_2)	Annual Arithmetic Mean	0.03 ppm (80 µg/m$^{3)}$)	None
	24-hour	0.14 ppm (365 µg/m$^{3)}$)	None
	3-hour	None	0.5 ppm (1,300 µg/m$^{3)}$)
Carbon Monoxide (CO)	8-hour	9 ppm (10 µg/m$^{3)}$)	Same as Primary
	1-hour	35 ppm (40 µg/m$^{3)}$)	Same as Primary
Ozone (O_3)	1-hour/Day [a]	0.12 ppm (235 µg/m^3)	Same as Primary
	8-hour/Day [b]	0.08 ppm	Same as Primary
Nitrogen Dioxide (NO_2)	Annual Arithmetic Mean	0.053 ppm (100 µg/m$^{3)}$)	Same as Primary
Lead (Pb)	Quarterly Arithmetic Mean	1.5 µg/m^3	Same as Primary

Note: All standards with averaging times of 24 hours or less are not to have more than one actual or expected exceedance per year.

[a] The 1-hour ozone standard pertains only to Cook, DuPage, Kane, Lake, McHenry, and Will counties, Aux Sable and Goose Lake townships in Grundy County, and Oswego Township in Kendall County in the Chicago area; and to Madison, Monroe and St. Clair counties in the Metro-East St. Louis area.

[b] The ozone 8-hour standard and the $PM_{2.5}$ standards are included for information only. These standards were proposed by the USEPA in 1997 and have been the subject of litigation. The U.S. Supreme Court issued a ruling upholding the standards on February 27, 2001. However, that ruling found the USEPA's implementation policy unlawful and remanded the case to the USEPA to "develop a reasonable interpretation of the nonattainment implementation provisions insofar as they apply to revised ozone NAAQS."

[12] The IEPA issues the PSI for areas or sectors. The areas correspond to metropolitan areas with a population greater than 200,000.

and sound levels are measured as dBA on this scale. Highway agencies use a 1-hour equivalent sound level, $L_{eq}(h)$, as a descriptor of noise levels. Studies show that a change of 3 dBA is a barely perceivable change in noise. Table 2-34 (one the following page) indicates that an increase of 10 dBA will be perceived as being twice/half as loud.

2.5.1 Noise Sources and Existing Conditions

Highway noise from cars is associated with the interaction of tire treads on the pavement. Heavy truck noise consists of engine noise, engine exhaust noise, and tire noise. As an example, truck engine noise alone usually falls in the range of 75 to 85 dBA (at 15.25 m, or 50 ft, from the source); engine exhaust noise (at 15.25 m, or 50 ft) usually falls in the range of 90 to 100 dBA without mufflers or in the range of 80 to 90 dBA with a good muffler system; and finally, tire noise falls within the range of 75 to 90 dBA (USDOT 1993).

The height of the noise source also contributes to the noise level. For example, the average height of a truck is about 3 m (10 ft), and the truck exhaust stack can range from 2.4 to 3.7 m (8 to 12 ft) high. Therefore, the relative height of the truck noise source requires higher noise barriers for effective mitigation, especially when trucks comprise a significant source of the noise.

Noise levels vary with land uses and population density. Urban settings with higher densities

TABLE 2-32
Air Quality Monitoring Sites in the Study Area

Monitoring Location	Owner/Operator	Air Monitor Network	Pollutant Measured
Deerfield	IEPA	NAMS	Ozone
Libertyville	IEPA	SLAMS, SPMS	Ozone
Waukegan	IEPA	NAMS, SPMS	Ozone
Zion	IEPA	PAMS	Ozone, Nitric Oxide, NO_2, VOC

SLAMS – State/Local Monitoring Station
PAMS – Photochemical Assessment Monitoring Site
SO_2 – Sulfur Dioxide
NAMS – National Air Monitoring Station
SPMS – Special Purpose Monitoring Station
NO_2 – Nitrogen Dioxide
VOC – Volatile Organic Compound

TABLE 2-33
Existing Air Quality in the Study Area

Pollutant Name	Status (1999)
PM_{10}	No sites exceeded the primary annual standard for PM_{10}.
Ozone	There were no exceedances of the 1-hour standard in the Chicago area.
Sulfur Dioxide	There were no exceedances of the 24-hour primary standard or the annual primary standard recorded in Illinois.
Nitrogen Dioxide	There have been no violations of the annual primary since 1980 in Illinois.
Lead	There were no violations of the quarterly primary standard recorded in the region.
Carbon Monoxide	There were no exceedances of either the 1-hour primary standard or the 8-hour primary standard in the region.

Source: IEPA 2000a

have higher noise levels. Newport Township in northern Lake County has the lowest population density (2,486 people per km^2, or 960 people per mi^2). The highest population density (24,864 people per km^2, or 9,600 people per mi^2) occurs in the more urban Waukegan Township. Figure 2-21 defines typical noise levels according to population density. Table 2-35 gives the estimated existing noise exposure for general assessment.

The LCTIP also defined traffic related noise conditions in the study area by developing a set of typical traffic noise level conditions for representative roadway types including freeway/tollways, arterial roadways, and other local roads. Typical traffic noise levels generated from these roadway types are shown in Figure 2-21. For each roadway type, traffic noise levels are shown for a high and low traffic volume at distances ranging from about 15.2 m (50 ft) to 152 m (500 ft) from the edge of the roadway. This data shows how distance, traffic volume, and speed affect noise levels in areas near the roadway. Generally, at distances within 97.5 m (320 ft) from a freeway/tollway, noise levels begin to exceed accepted noise criteria for residential units. That distance is about 36.5 m (120 ft) for arterial facilities and about 18.3 m (60 ft) for local roads.

The method for developing the information in Figure 2-21 employed the use of the Traffic Noise Model (TNM), an approved FHWA model for conducting highway noise analysis. Based on defined roadway conditions (i.e., traffic volume, traffic mix, and traffic speed), the TNM look-up tables were used to determine the typical noise levels at various distances for the representative roadways. The traffic inputs were characterized as:

- A typical peak hour traffic range derived from the LCTIP travel demand model.
- A traffic mix defined as 95 percent automobiles, 3 percent heavy trucks, and 2 percent medium trucks for each roadway type.
- Travel speed for each roadway type consisted of 60 mph for freeways/tollways, 45 mph for arterial facilities, and 35 mph for local roads.

TABLE 2-34
Perceptive Noise Level Changes

Sound Level Change	Relative Loudness
±3 dBA	Barely perceptible change
±5 dBA	Readily perceptible change
±10 dBA	Twice/half as loud or quiet

TABLE 2-35
Estimating Existing Noise Exposure for General Assessment

Population Density (people/mi^2)	L_{eq} Day	L_{eq} Evening	L_{eq} Night
1–100	35	30	25
100–300	40	35	30
300–1,000	45	40	35
1,000–3,000	50	45	40
3,000–10,000	55	50	45
10,000–30,000	60	55	50
Over 30,000	65	60	55

Source: FTA 1995

2.5.2 Noise Criteria for Determining Impact

The FHWA Title 23 Code of Federal Regulations (23 CFR 772) has developed guidelines, noise abatement criteria (NAC), to assess potential noise impacts. This criterion considers appropriate noise levels based upon land use activity. For example, the noise abatement criterion for a residence is 67 dBA. A traffic noise impact occurs when noise levels approach or exceed the NAC for the defined land use activity, or if a substantial increase in predicted noise level occurs even though the applicable NAC has not been reached. Table 2-36 describes the noise abatement criteria for varying activities.

2.6 Cultural Resources

The cultural resources for this study were assessed using existing and available data and limited field investigation for standing structures along the build alternatives. This assessment was intended to identify potential culturalresources likely to be involved, and to inform resource agencies and others of the potential involvement. Pursuant to the National Historic Preservation Act of 1966, as amended, it is fully recognized that further definition of the impacts and coordination with responsible jurisdiction agencies is necessary to determine the level of impact, if any, and appropriate mitigation in future phases of work.

2.6.1 Archaeological Resources

A review of previous archaeological resource investigations and known archaeological sites in Lake County was conducted to address the location, character, and significance of archaeological resources to provide general information about those resources which may be potentially significant. The review was based solely on records research and involved no systematic fieldwork.

TABLE 2-36
Noise Abatement Criteria Hourly Weighted Sound Level

Activity Category	$L_{eq}(h)$*, dBA	Description of Activity Category
A	57 (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	67 (Exterior)	Picnic areas, recreation areas, playgrounds, active sports areas, parks, residences, motels, hotels, schools, churches, libraries, and hospitals.
C	72 (Exterior)	Developed lands, properties, or activities not included in Categories A or B above.
D	—	Undeveloped lands.
E	52 (Interior)	Residences, motels, hotels, public meeting rooms, schools, churches, libraries, hospitals, and auditoriums.

* L_{eq} (h): The hourly value of L_{eq}. L_{eq} is the equivalent steady-state sound level, which in a stated period of time contains the same acoustical energy as the time-varying sound level during the same time period. When measuring or predicting noise levels, a receptor is assumed to be at ear height, located 1.5 m (5 ft) above the ground surface.

Use of interior noise levels shall be limited to situations where exterior noise levels are not applicable (i.e., where there are no exterior activities to be affected by traffic noise, or where exterior activities are far from or physically shielded from the roadway in a manner that prevents an impact on exterior activities).

Note: NAC are noise impact thresholds for considering abatement. (Abatement must be considered when predicted traffic noise levels for the design year approach [i.e., are within 1 dB] or exceed the noise abatement criteria, or when the predicted traffic noise levels are substantially higher [i.e., are more than 14 dB] greater than the existing noise level.) The NAC are not attenuation design criteria or targets. The goal of noise abatement measures is to achieve a substantial reduction in future noise levels. The reductions may or may not result in future noise levels at or below the NAC.

Source: IDOT 2000a

Western and central Lake County is a kame and kettle environment. Recent studies indicate that this environment may contain some of the oldest evidence of human occupation in the Upper Midwest and North America. The associated stone tool producing industry represents a unique and important development in populating the New World. Large game animals predominated the resources sought by small, mobile hunting parties. Before this time, the advance of the Wisconsinan ice sheet made the region inhospitable to human occupation.

Because of rapid development over the last 10 years, large parts of the county have been investigated for archaeological resources. The background literature review revealed that 624 previously recorded archaeological sites are in Lake County. Roughly 77 percent of the archaeological sites are prehistoric, 22 percent are historic, and 1 percent are multicomponent, consisting of both prehistoric and historic affiliations.[13, 14, 15] Thirty mounds, graves, burials, or cemeteries are included in these percentages.

Areas containing high probability for archaeological finds include elevated topography near large bodies of water, beach terraces surrounding relict and existing lakes, terraces along the major river ways, uplands at the heads of tributaries, and along old Native American trails or plank roads (see Figure 2-22). These areas were identified using the Illinois State Museum model, which is GIS-based. The Des Plaines River at Half Day Road is the location of a historic and prehistoric Native American village. The pattern of major Native American sites continues in a southern direction ending in the Portage Site, located outside of the study area in a Cook County forest preserve. In general, the number of significant sites per acre decreases in the area bounded by Lake Cook Road, US 41, IL 120, and US 12 (this is the area that encompasses the majority of the proposed transportation improvement alternatives). A review of the background literature reveals that there is a total of 168 known archaeological sites within the area bounded by Lake Cook Road, US 41, IL 120, and US 12. Roughly, 57 percent of the archaeological sites are prehistoric, 39 percent are historic, and 4 percent are multi-component consisting of both prehistoric and historic affiliations.

2.6.2 Standing Structures

Settlement in Lake County began in 1834 when Daniel Wright constructed a log cabin by the Indian village of Half Day, which was located in the Vernon Township. The next year, a small wave of pioneers constructed several mills and farms along the Des Plaines River and its tributaries. Settlement also occurred along the Lake Michigan shoreline and the Fox River Valley.

The 1840s were a period of rapid growth for Lake County. Most residents engaged in farming in the inland townships. Small agricultural support centers emerged at crossroads or mill sites to provide the farmers with market access and necessary goods and services. Many of these hamlets declined or virtually disappeared when they were bypassed by railroads, although they were often replaced by new communities that emerged around a railroad station. Chicago's growth spilled into Lake County during the 1860s, when Walter S. Gurnee acquired 405 ha (1,000 ac) near the small lakeside community of Port Clinton, divided it into lots, and marketed the tracts to Chicago's wealthy, naming his development Highland Park. Boasting an excellent rail connection with downtown Chicago, Highland Park was incorporated as a city in 1867. Suburbanization continued moves north along the Chicago & NorthWestern rail line during the late 1800s, consuming large sections of the townships of Deerfield and Shields.

Scenic lakes are scattered throughout Lake County's northwestern quadrant. Known as the Chain O' Lakes region, this area consists of a

[13] Prehistoric: Evidence of human occupation beginning as far back as 13,000 B.P. (before present) to as recently as 300 B.P. (before present).

[14] Historic: Evidence of human occupation beginning in the 1600s to the present. Note, there is a gray area of overlap between prehistoric and historic. This gray area is precontact and postcontact.

[15] Multi-component: Evidence of human occupation that consists of cultural material from prehistoric and historic peoples. It also can span over several time periods within the prehistoric or historic time frames.

series of lakes connected by the Fox River. Some time after the Civil War, railroads began to transport sportsmen to the region in order to fish and hunt waterfowl. As additional railroads penetrated the area from Chicago, a number of lakeside resorts opened to provide a summer escape for city dwellers. Lake County's resort industry thrived until the advent of the automobile changed vacationing habits, forcing many resort owners to subdivide their land and promote summer cottage developments during the 1920s.

Following World War II, Lake County experienced tremendous growth. By 1950, the townships of Benton, Fremont, Grant, Lake Villa, and Wauconda doubled in population, while the Township of Avon witnessed a 300-percent increase. Villages and cities annexed substantial sections of land; however, such growth could not be accommodated within existing communities. As a result, a large number of new municipalities organized until a 1969 law created more stringent incorporation standards. Currently, all or parts of 52 incorporated municipalities exist within Lake County.

IHPA files, National Register of Historic Places (NRHP) listings, IDOT's historic structures database, local historical societies, and other local organizations were referenced to provide general information about potentially significant historic structures. Many of the inventoried resources were catalogued in the 1970s, so it is possible that some of the structures are no longer standing.

More than 80 percent of the potentially significant historic structures in Lake County are located along the lakeshore communities, east of I-94. However, major clusters of the surveyed buildings, west of I-94, can be found in Antioch, Barrington, Fox Lake, Grayslake, Lincolnshire, Lake Villa, Lake Zurich, Libertyville, Long Grove, Mundelein, and Wauconda. Within the county, there are seven NRHP historic districts and 55 individual NRHP structures, 85 percent of which are in the lakeshore communities east of I-94. The only communities containing several NRHP sites within the area bounded by Lake Cook Road, US 41, IL 120, and US 12 (the area most likely to be affected by transportation improvements) are Libertyville with four structures and Barrington with one historic district and one individual structure. There are 97 IHPA/landmark sites within the county.[16] About half are located in the lakeshore communities (east of I-94) and half throughout the rest of the county. The IHPA 1974-1977 survey identified 1,977 properties in Lake County, 80 percent of which were in the communities east of I-94.[17] IDOT's compiled inventory identified another 422 potential historic structures, 80 percent of which are located east of I-94.[18] Finally, the IHPA historic site files had information on 27 potential sites west of I-94 (files were not reviewed for communities east of I-94 as no proposed roadway improvements exist in those areas).[19]

2.7 Special Waste

Five regulated substance site classifications have been identified within Lake County that could be potentially involved with the project improvements:

- **Leaking Underground Storage Tanks (LUSTs)—**These records contain an inventory of leaking underground tank incidents.

[16] The "IHPA 1975 County Landmark Survey" included those properties in the county that IHPA surveyors thought had countywide historical significance. It is important to understand that these are not county-designated sites.

[17] The "1974–1977 Sprague Survey" focused primarily on historic resources found in incorporated communities, although occasional rural properties were noted.

[18] IDOT District 1 compiled an "Inventory of Historic Structures: Lake County" during the 1990s, by requesting information from local organizations regarding all potential sites (including NRHP, NRHD, etc). Although the District 1 compilation is not a comprehensive listing of all historic structures in the county, many of the properties it identified were also noted in other various collections reviewed. However, some structures recorded in this listing were not observed elsewhere. This total reports properties only identified in the District's catalog, not those that were counted in another survey.

[19] The "IHPA Historic Site Files" are a collection of folders in which miscellaneous material about various historic properties had been collected over the years.

- **Comprehensive Environmental Response, Compensation, and Liability Information System (CERCLIS)—**The sites that have been reported to the USEPA by states, municipalities, and private sources, pursuant to Section 103 of the CERCLA. CERCLIS contains sites that are on the National Priority List (NPL) and those under consideration for inclusion on the NPL.
- **National Priority List (NPL)—**Also known as Superfund, this database is a subset of CERCLIS and identifies sites for priority cleanup under the Superfund program.
- **State Hazardous Waste Sites (SHWS)—**These records parallel the State of Illinois to CERCLIS. They may also be a part of the federal CERCLIS list.
- **Corrective Action Report (CORRACTS)—**This is a list of handlers with Resource Conservation and Recovery Act Corrective Action Activity. This report shows corrective action core events that have occurred for every handler that has had corrective action activity.

A preliminary check of Lake County special waste sites was performed in 1998 by a database search service. Both federal and State of Illinois records were searched, but no field reviews or testing were performed.

About 750 LUST sites are identified within the Lake County (Figure 2-23). The concentration of LUST sites in the far eastern portion of the county, east of I-94, is substantially higher than in most other areas. Approximately half of the sites are located east of I-94, within less than one-quarter of Lake County. These sites are relatively evenly distributed, with a slightly higher concentration in the vicinity of Waukegan. West of I-94, noticeable concentrations of LUST sites can be identified in Lake Zurich, Barrington, and Libertyville, with additional sites distributed throughout the county. According to the data records, most LUST sites are associated with gas stations and vehicle maintenance facilities, which tend to be located along major arterial roadways.[20]

Nineteen CERCLIS sites are identified within Lake County: 11 in North Chicago and Waukegan, three near Grayslake, two in Wauconda, and one each in Lake Forest and Antioch. Five NPL sites are included in the CERCLIS list. Three of these are in Waukegan, within 0.8 km (0.5 mi) of Lake Michigan, and the other two sites are in Antioch and Wauconda. Twelve SHWS are identified within Lake County; some designated sites are also on the CERCLIS list. As with the CERCLIS sites, most (eight) are in North Chicago and Waukegan. The remaining four are located in Lake Forest, Deerfield, Wauconda, and Antioch. There are 21 CORRACTS sites identified within Lake County. Sixteen of the sites are east of I-94. Ten of the eastern sites are located between Waukegan and Lake Bluff. The remaining five CORRACTS sites are in Barrington, Mundelein, Hainesville, Round Lake, and Fox Lake.

[20] IDOT has performed property site assessments for over a decade. IDOT's data shows that a database check/search only discovers about 50 percent of the UST locations in a study area, the other 50 percent are discovered by a site visit and interviews with residents. Of that 50 percent, 30 to 50 percent are unreported LUSTs.

SECTION 3

Alternatives

3.1 Introduction

This section describes the project alternatives and the processes used to develop, evaluate, screen, and refine them. The material in this section is structured to provide an understanding of the process that began with the consideration of many alternatives, through the selection and evaluation of two finalist build roadway alternatives and a package of supporting transit, TSM, TDM, and bike and pedestrian improvements that are common to both. Figure 3-1 illustrates the overall alternatives development and evaluation process. A comprehensive discussion of the overall process is documented in the *Alternatives Development and Evaluation Report* (LCTIP 2000a).

This section begins with a discussion of how the alternatives development process got started, including a description of the No-Action Alternative (Baseline). This discussion is followed by a description of the recommended transit improvements and a discussion of the process for developing, screening, and evaluating the roadway alternatives and their supporting improvements (in addition to transit), including TSM, TDM, and bike and pedestrian facilities. This section concludes with a comparative evaluation of transportation performance factors for the finalist roadway build alternatives.

3.2 Background

The alternatives development process began with a comprehensive review of the existing transportation system *Transportation System Performance Report* (LCTIP 1999). The review identified growth characteristics, travel patterns, trip characteristics, and the relative severity of the congestion problems. The principal conclusion drawn from this analysis was that congestion was expected to affect most of Lake County's roadways by 2020. The LCTIP recognized that this project would not be able to address all of the transportation problems, and resolved to focus on the major system deficiencies in the county and provide a foundation for future transportation planning by other agencies.

The transportation alternatives for this project are a combination of roadway, bus, rail, and other transportation strategies. Initially, the various modes were evaluated or considered separately and then combined toward the end of the process to create complete alternatives. The LCTIP alternatives development process employed a rigorous approach for developing and evaluating the roadway alternatives. The process used a state-of-the-art computer-aided approach, supported by regionally endorsed travel, population, and employment information provided by the Chicago Area Transportation Study (CATS) and NIPC. The computer-aided approach used task-specific software packages (TP+ and VIPER) to perform the necessary work.[1] These packages were selected because of their advanced features such as large-system capability, graphical interface, and use by a number of major metropolitan planning organizations in the United States.

3.3 No-Action Alternative (Baseline)

The alternatives development process commenced with the development of a No-Action Alternative (Baseline), consisting of transportation improvements that are anticipated to be constructed by 2020 regardless of the recommendations made by

[1] TP+ and VIPER Software are companion software packages. Released in 1997, it has powerful computational features for matrix operations, multi-modal network representation and assignments processes, combined with flexible file formats, graphical analysis, and presentation tools.

the LCTIP. The development of the No-Action Alternative (Baseline) required extensive coordination with the region's transportation service providers to gather information on funded or anticipated transportation improvements in the study area. The 1998-2002 Transportation Improvement Program (TIP), with 48 km (30 mi) of funded improvements, was the foundation for developing the No-Action Alternative (Baseline).[2] Recognizing that additional projects would be funded beyond 2002, an additional 71 km (44 mi) of existing road improvement projects were identified through coordination with transportation providers, bringing the total to 119 km (74 mi) of lane additions to existing roadways. In addition, routine repairs and operational improvements would continue for the existing roadway system. The No-Action Alternative (Baseline) also assumes that the transportation improvements identified in the 2020 RTP Build would be in place for those parts of the region outside the LCTIP study area.

In addition to the roadway improvements, the No-Action Alternative (Baseline) includes transit improvements consisting of the full build out of the NCS commuter rail line (52 commuter trains per day), five new Metra stations, and express bus service on selected corridors.[3] The transportation improvements for the No-Action Alternative (Baseline) are shown in Figure 3-2, and listed in Table 3-1 (on the following page) and Table 3-2 (on page 3-4). For this study, the No-Action Alternative (Baseline) is considered either a stand-alone alternative or common to the roadway (Build) Alternatives.

A population and employment forecast was developed by the project team for the No-Action Alternative (Baseline). The methodology for the No-Action population and employment forecast (year 2020) was endorsed by the NIPC and is documented in a detailed report prepared by the project team (ACG 2001, Appendix B). The methodology assigns mobility and accessibility factors to areas based on the availability of transportation facilities. Improvements in transportation facilities could enhance accessibility, having the potential to effect the future population and employment in a specific area. The No-Action forecast is based upon the differences in accessibility and mobility that would be provided by the No-Action improvements compared to the CATS 2020 RTP Build scenario (CATS 1998). The analysis results indicate that the No-Action improvements would increase population in Lake County by 31,000 new residents and employment would remain essentially unchanged (Figure 3-3).

Travel forecasts for 2020 were then developed by CATS for the No-Action Alternative (Baseline) based on the population and employment. These travel forecasts were used as a platform for developing and evaluating the initial alternatives.

3.4 Supporting Transportation Improvements

A number of modal options were considered during the study of transportation improvements, including improvements to bus and rail transit, TSM and TDM strategies, and bike and pedestrian facilities. An examination of these transportation options shows that they play an important role in reducing single-occupancy vehicles. The widespread congestion in Lake County, however, cannot be satisfied by these types of improvements alone. Presently, work trips by transit and pedestrian/bike account for less than 10 percent of all trips. The application of TSM and TDM strategies are benefiting travel efficiency, but on a very limited basis. The scale of population and employment growth in

[2] The latest TIP was released in November of 2000, however the 1998-2002 TIP was the best available information at the time the No-Action Alternative (Baseline) was developed. The Baseline projects have remained consistent with subsequent TIPs; they have also provided funding for several of the identified projects, bringing the total to nearly 50 miles of committed improvements.

[3] Three stations are located in Lake County; two others are located within the transit ridership influence area of the study area.

Lake County over the next 20 years is considerable, and based upon commuting characteristics, transit and system management practices by themselves are not capable of satisfying the projected transportation needs foreseen in Lake County. Despite the need for major transportation investment in the county's roadway system, these other

TABLE 3-1
Road Projects in the No-Action Alternative

Road	Improvements	Limits	Comments
US 45	Add lanes	Washington St. to IL 176	1998–2002 TIP
I-94	Add lanes	Lake Cook Rd. to IL 22	1998–2002 TIP
	Add on ramp	At Lake Cook Rd. (NB)	1998–2002 TIP
Pulaski Rd.	New extension	O'Plaine Rd. to IL 43	1998–2002 TIP
Midlothian Rd.	New extension	Peterson Rd. to Harris Rd.	1998–2002 TIP
Weiland Rd.	New extension	Aptakisic Rd. to Prairie Rd.	1998–2002 TIP
MLK Dr.	Add lanes	US 41 to Hillcrest Ave.	1998–2002 TIP
	Add lanes and resurface	Hillcrest Ave. to IL 131	1998–2002 TIP
Bradley Rd.	New extension	IL 176 to IL 43	1998–2002 TIP
Buffalo Grove Rd.	Add lanes	IL 83 to IL 22	1998–2002 TIP
Peterson Rd.	Add lanes	IL 60 to IL 83	1998–2002 TIP
	New alignment/ add lanes	IL 83 to Midlothian Rd.	1998–2002 TIP
	Add lanes	Midlothian Rd. to US 45	1998–2002 TIP
Hunt Club Rd.	Add lanes	IL 120 to Washington St. (A22)	1998–2002 TIP
Rollins Rd.	New extension	US 45 to IL 132	1998–2002 TIP
Butterfield Rd.	Add lanes	Allanson Rd. to US 45	1998–2002 TIP
Sunset Ave.	Add lanes	Delany Rd. to IL 131	1998–2002 TIP
Quentin Rd.	Add lanes	Lake Cook Rd. to Baldwin Rd.	1998–2002 TIP
Lake Cook Rd.	Add lanes	Weiland Rd. to I-94	1998–2002 TIP
IL 22	Add lanes	US 41 to IL 83	2001–2005 TIP
	Add lanes	IL 83 to Quentin Rd.	Identified by IDOT
	Add lanes (new alignment bypass around Lake Zurich)	Quentin Rd. to US 14	2001–2005 TIP
IL 21	Add lanes	IL 120 to Washington Street	2001-2005 TIP
	Add lanes	IL 120 to IL 137	Identified by IDOT
IL 83/IL 60	Add lanes	IL 176 to EJ&E	Identified by IDOT
I-94	Add lanes	IL 22 to IL 60	Identified by ISTHA
Rollins Rd.	Add lanes	IL 83 to US 45	Identified by LCDOT
Butterfield Rd.	Add lanes	IL 176 to IL 137	Identified by LCDOT
Busch Rd.	Add lanes	IL 83 to Weiland Rd.	Identified by LCDOT
Quentin Rd.	Add lanes	Lake Cook Rd. to IL 22	Identified by LCDOT
Washington St.	Add lanes	Lake Street to I-94	Identified by LCDOT
	Add on/off ramps	Full access control interchange at I-94	Identified by LCDOT

transportation improvements have an important role in the total transportation solution for Lake County. The proposed improvements described below for rail and bus transit are the product of considerable study and would supplement or be common to the roadway build alternatives. Other supporting improvements (TSM, TDM, bike, and pedestrian) will be described in Section 3.6.2, *Supporting Improvements*, in conjunction with the roadway build alternatives.

3.4.1 Rail and Bus Transit

The LCTIP identified the following objectives to guide the development of the transit improvements:

- Include transit as part of the solution.
- Improve access to and distribution from the fixed route system.
- Maintain and, if possible, increase transit's market share.

The process of forming candidate transit improvements began with a comprehensive inventory of the existing facilities, services, and usage (LCTIP 1999). This review was followed by an analysis of the trends and capacity of the existing system, then a review of the plans, proposals, other studies, and forecasts generated by the various planning agencies and transit system operators in the study area. Future population and employment were used to identify potential transit improvements beyond those in current agency plans. LCTIP developed the initial range of transit improvements to be considered. From this point, the initial proposals were refined, demand/ridership projections were developed, and cost estimates were prepared. A detailed discussion of this process is documented in the *Alternatives Development and Evaluation Report* (LCTIP 2000a).

3.4.1.1 Rail

A number of candidate rail service improvements were identified from existing plans, pending proposals, and input provided by the transit agencies. The final rail improvements that emerged from the study of these proposals are shown on Figure 3-4, and are listed below:

TABLE 3-2

Transit Projects in the No-Action Alternative

Project	Improvements	Comments
Metra		
North Central Service	Double track. Includes parking enhancements at all stations in the project study area.	Identified by Metra
Express Service	Union Pacific Northwest Line/McHenry Extension from Barrington to Chicago	Identified by Metra
Station Improvements	Prairie Crossing near Harris Rd. North Glenview (northern Cook County) Great Lakes Naval Station Pingree Rd. (eastern McHenry County) Grayslake	Combination of 1998-2002 TIP and identified by Metra
Pace		
New Route	Lakehurst to Lake Cook Rd. (Specific route not identified at this time)	1998-2002 TIP
Transportation Centers	Waukegan Transportation Center Gurnee Mills Transportation Center	Identified by Pace
Shuttle Services	UP North Braeside to Lake Cook employment centers North Glenview to I-294 employment centers (Specific routes not yet identified)	Identified by Pace

- New commuter rail service on the EJ&E Railroad between Spaulding (near Hoffman Estates) and Waukegan. Eight stations are recommended for development on this proposed line: Waukegan, North Chicago, Roundout, Leithton, Lake Zurich, Barrington, Prairie Stone, and Spaulding. These locations were selected for their proximity to residential areas, employment centers, and transfer capabilities to Metra's other radial commuter lines.
- Improved service on the MD North line by adding central train control and passing tracks from Roundout to Fox Lake. Install a turnback at Roundout to improve the reliability of commuter train and the level of service, particularly for the reverse commuter.
- Relocate freight traffic from the MD North line and consolidate it on the UP Freight line.
- Add 5,500 parking spaces to current commuter rail stations.
- Construct new stations at the junctions of all rail lines.
- Several rail service extensions are undergoing studies by other agencies and could be incorporated into LCTIP's alternatives as they are completed. These proposals include extending the Skokie Swift service (Chicago Transit Authority yellow line) to Deerfield Road in Highland Park; extending the MD North line commuter service from Roundout to Wadsworth; and extending the MD North line commuter service from Fox Lake to Richmond.

The total estimated cost of these improvements, excluding the ongoing study of the Skokie, Wadsworth, and McHenry extension, is $375 million (1999 dollars). The NCS upgrade, included in the No-Action Alternative (Baseline), is estimated to cost an additional $310 million (1999 dollars). These transit proposals would be common to each roadway alternative.

3.4.1.2 Bus

The LCTIP proposes a combination of bus services to enhance service and ridership that are consistent with long-range plans and regional and local service providers. The bus improvements would be comprised of express bus service in select corridors, improved trunk line bus service in five travel corridors, specialty bus services (e.g., shuttle services between rail stations and major employment campuses), and improved local service. The complete list of these bus improvements is presented in Table 3-3 (on the following page), and further details can be found in the *Alternatives Development and Evaluation Report* (LCTIP 2000a).

The express bus service would be provided for up to 10 routes over the planning period (year 2020); see Figure 3-5. This service would provide reasonably rapid bus transportation between major origins and destinations with a limited number of stops.

The LCTIP analyzed travel patterns in the county to identify corridors with high volumes of auto trips between specific origins and destinations. The LCTIP concluded that five travel corridors in the county have a high volume of home to work trips that would benefit from an efficient trunkline bus service; these corridors are described in Table 3-4 (on page 3-7) and shown in Figure 3-6. Frequent bus headways would be provided along each of these corridors, ranging from 15 to 30 minute intervals for Corridors 1 through 4. Along Corridor 5, a bus rapid transit service with 16 station locations is recommended. Total ridership for the five bus corridors is anticipated to be 6,000 to 10,000 passengers per day.

Other shuttle services would include a bus shuttle service between the Vernon Hills Station (North Central Service) and Corporate Woods on IL 60.[4] A similar service was pioneered by the Lake Cook TMA along Lake Cook Road. The service provided a mix of

[4] A similar service has been implemented and discontinued by Pace. LCTIP recommends that service be implemented when the NCS is upgraded to the full build out (52 trains per day).

scheduled and demand-responsive bus service for employers along the corridor. In January 2001, funding was granted for a shuttle bus service to operate from the North Glenview (Techny) Metra Station. Additionally, an existing local bus service was considered and several routes were identified for increased service frequency (see Table 3-4).

The estimated cost of the bus service improvements is estimated to be over $75 million. Approximately 85 percent of this cost would be related to a bus rapid transit service along Lake Cook Road.

3.4.2 Transportation Centers

Another component of the overall transportation improvements is transportation centers. This component would add opportunities for bus-to-bus and bus-to-rail transfers, as well as improved automobile connections at five key locations: Round Lake, Libertyville, Palatine, Highland Park, and Fox River Grove (Figure 3-6). Transportation transfer centers are important to the integration of modal transportation service with enhancements to auto access, passenger drop-off, bus-to-bus interconnections, and bus-to-rail interconnections.

Each location would include bus stands, bike and pedestrian access, bike storage, and real time displays of service information. Timed coordination of bus schedules is also recommended to allow easy transfer to rail services as well as between bus routes at the transportation centers.

3.5 Roadway Alternatives

3.5.1 Alternatives Development Process

The LCTIP applied a rigorous and highly structured process to the development of roadway alternatives, as documented in the *Alternatives Development and Evaluation Report* (LCTIP 2000a). The process followed these guiding principles:

- The roadway alternatives would include improvements constrained by neither location nor orientation (i.e., east-west or north-south).

TABLE 3-3
Bus Service Improvements

Improvements
Corridor 1—Winthrop Harbor-Waukegan Corridor
Corridor 2—Waukegan-Round Lake Corridor
Corridor 3—Gurnee-Libertyville-Buffalo Grove Corridor
Corridor 4—Highland Park to Fox River Grove Corridor
Corridor 5—Bus Rapid Transit in Lake Cook Corridor
Shuttle Services—Vernon Hills Station-NCS to Corporate Woods
Express Bus Service—Gurnee to Lake Cook Road, via I-94
Express Bus Service—Grayslake to Rolling Meadows via IL-53 EXT
Express Bus Service—Lake Cook Rd to I-190 via I-294
Express Bus Service—Waukegan to Grayslake via IL-120
Express Bus Service—Express bus service on two routes. (Elgin/ Hoffman Estates/Buffalo Grove) (Hawthorn/Long Grove/Libertyville)
Express Bus Service—Express bus service on four routes (East Dundee/ Algonquin/Crystal Lake) (Evanston/Glenview) (Libertyville/Ft Sheridan-Vernon Hills) (Northbrook/Glenview)
Local Service—Increased service frequency on Routes 234, 563, 565, 690, 723, 806
Local Service—Increased service frequency on Route 571

- The roadway alternatives could differ in the type and extent of improvement, but would provide systemwide travel benefits approaching the goals of the endorsed 2020 RTP.

Early in the roadway alternative development process, the LCTIP established that the No-Action Alternative (Baseline) would represent the foundation or initial building block for the roadway alternatives. The LCTIP concluded that the No-Action Alternative (Baseline) with its 119 km (74 mi) of improvements to existing roadways was a good starting point, but by itself would not successfully address future congestion in Lake County—projected to double by the year 2020 under the No-Action Alternative (Baseline) (LCTIP 1999). The roadway alternatives described in the following discussion go beyond the No-Action Alternative (Baseline) to begin to address the projected travel needs of the county.

Another early step in the roadway alternative development process was to establish a benchmark or point of reference for developing the initial range of roadway alternatives. The 2020 RTP was selected as the benchmark because it represented a regional endorsed level of transportation improvement and performance for the area. The transportation improvements represented in the 2020 RTP were quantified as areawide travel performance measures by the project team, and were used as a benchmark to determine when a specific set of roadway improvements achieved the objective, thereby qualifying as an alternative.

The LCTIP developed the initial alternatives (LCTIP 2000a) using broad travel performance measures that described both the efficiency and effectiveness of each alternative over the entire transportation system. These measures included delay per vehicle miles of travel, average network speed, and weighted congested vehicle hours of travel. Later in the process, when the

TABLE 3-4
Candidate Bus Improvements

	Corridor	Description
1	Winthrop Harbor-Waukegan Corridor	Originates near the Wisconsin state line and operates with alternating service on Green Bay Rd. and Lewis Ave. to the Waukegan Transportation Center. The route extends southward from the transportation center into central Waukegan and North Chicago; a branch service continues west from the Gurnee Transportation Center on Washington St to the Gurnee Mills Shopping Center and major employers.
2	Waukegan-Round Lake Corridor	From the Waukegan Transportation Center, route runs west to the Lake Villa rail station, then on Fairfield Rd., south to Rollins Rd., east on Rollins to Cedar Lake Rd., then south on Cedar Lake Rd. to the Round Lake rail station, continuing southeasterly on Nippersink Rd. and IL 134 to IL 120, the Grayslake rail station, and then east on IL 120 to the Waukegan Transportation Center. Service would operate in both directions on this loop route pattern.
3	Gurnee-Libertyville-Buffalo Grove Corridor	From the route end at the Gurnee/Wadsworth Transportation Center, service proceeds on Washington St. to O'Plaine Rd., south to Buckley Rd. (IL 137), then west to Milwaukee Ave and the Libertyville rail station. From the rail station, the bus trunkline continues south on IL 21 to IL 60, proceeds west on IL 60 to Butterfield Rd, then south on Butterfield Rd to US 45, the Vernon Hills rail station, continuing to Milwaukee Ave. (IL 21) and south to Deerfield Rd., the Buffalo Grove Transportation Center/rail station, and terminating at Lake Cook Rd. and Weiland Rd.
4	Highland Park-Fox River Grove Corridor	Service begins at the UP North Line Highland Park rail station, proceeds northerly on Green Bay Rd. then west on Half Day Rd. (IL 22) to US 45 and the Prairie View Station on the MD North Line, then west on Port Clinton Rd. and south on IL 83 to return to Half Day Rd./Lake Zurich Rd. and on to the Fox River Grove Station on the UP Northwest Line.
5	Bus Rapid Transit in Lake Cook Corridor from the lakefront to Palatine Station	Begins at the Highland Park Metra rail station on the UP North Line, uses US 41 to reach Lake Cook Rd. and then continues west with a detour to the Buffalo Grove Metra station on the MD North Line. Using Hicks Rd., it cuts south to terminate at Palatine Station on the UP Northwest Line.

initial alternatives had been screened and refined, a separate set of performance measures, specifically related to the purpose and need (Section 1), were used to evaluate them.

Following the completion of the early steps, the process adapted the use of the LCTIP travel demand model to the development of the preliminary roadway concepts. The modeling process was used to develop preliminary roadway concepts starting from one of five "starting point" improvements that included I-94, US 12, IL 83/US 45, IL 120 (existing and new alignment), and the IL 53 extension. These starting points were selected because they are regional in character, embrace the most prevalent congestion in the county, and exhibit continuity through the study area. Further, these starting points would allow the LCTIP to develop roadway alternatives with a broad geographic range. Using this step by step computer-aided approach, the most congested routes were targeted to develop groups of roadway improvements that approached or met the performance benchmark.

Another aspect of the roadway alternatives development process was the use of environmental resources information. The compilation of this data in the early stages of the process provided the LCTIP with the major environmental resource issues that could be considered during the initial stages of alternatives development. The environmental resource data for the very large study area was managed with the use of a GIS database containing over 80 data layers (see Appendix A). The LCTIP GIS database contains information related to water resources, wetlands, vegetative cover, population, employment, land use, and protected lands to name a few. The initial output from the database was a set of maps denoting the key environmental resources or constraints that were considered in the development of the roadway alternatives.

Public involvement was also an important part of the alternatives development process. Early in the process, input was sought through several forums to define the transportation problems in Lake County. These include:

- Focus group sessions with area residents, which concluded that development is outpacing infrastructure, and that roadway improvements should be the priority, followed by transit.
- A Transportation Fair and Workshop hosted by the LCTIP, which brought together elected officials and transportation providers who were asked to rate the effectiveness of various solutions; roadways were rated the highest, followed by transit and other strategies.
- Meetings and review with established study groups (e.g., the Technical Advisory Group, Municipal Groups, and the Resource Agency Group) that produced several transportation objectives, including the development of alternatives that would attract travel to the appropriate roadways, alternatives that provide would sufficient capacity on the major roadways, and alternatives that would provide improved transit services.

For a complete discussion of the agency coordination and public involvement that occurred during this study, refer to Section 5, *Coordination*.

3.5.2 Preliminary Roadway Concepts

The initial alternatives development process produced 12 preliminary roadway concepts (Figure 3-7). For each of the preliminary concepts, the No-Action Alternative (Baseline) is a common feature. Table 3-5 (on the following page) provides a description of the 12 preliminary concepts. Each preliminary concept was reviewed by the project team to refine the physical configuration (i.e., logical extensions of the improvement limits), and determine if any concepts should be dismissed from further evaluation. Those concepts that were dismissed from further consideration are discussed in Section 3.5.3, *Preliminary Roadway Concepts Dismissed from Further Study*.

TABLE 3-5
12 Preliminary Concepts

Concept	Route Miles of Improvement	Description
I-94 Starting Point—IL 60 to IL 132	63	The starting point improvement included added travel lanes on I-94 from IL 60 to IL 132. Additional roadway improvements include added travel lanes on I-94 from IL 132 to the Wisconsin state line, and along US 12, IL 83/US 45, and IL 60 (Figure 3-7, map 1 of 12).
I-94 Starting Point—IL 60 to Wisconsin State Line	80.9	The starting point improvement for this concept included added travel lanes on I-94 from IL 60 to the Wisconsin state line. Additional roadway improvements include added travel lanes are on IL 83/US 45, IL 60, US 12, and US 41 (map 2 of 12).
	82.7	A second concept was produced from the I-94 (IL 60 to Wisconsin state line) starting point. Additional roadway improvements for this concept include added travel lanes on IL 83/US 45, IL 60, IL 120 (partially on new alignment), and US 41 (map 3 of 12).
IL 83/US 45 Starting Point— Lake Cook Road to IL 120	63	The starting point for this concept represents improvements to IL 83/US 45. Additional roadway improvements for the concept would include added travel lanes on IL 21, I-94 and US 12 (map 4 of 12).
	62	A second concept with the IL 83/US 45 starting point was produced consisting of additional travel lanes IL 21, I-94 and IL 120 (on partial new alignment) (map 5 of 12).
IL 53 Starting Point	27	This concept consists of a 6-lane **freeway** extension of IL 53 northward from Lake Cook Road to a 4/6-lane bypass of the Grayslake area generally following the existing IL 120 corridor. These improvements would mostly be on a new alignment (map 6 of 12).*
	27	A second concept would consist of a 6-lane **tollway** extension of IL 53 northward from Lake Cook Road to a 4/6 lane bypass of the Grayslake area generally following the IL 120 corridor. These improvements would mostly be on new alignment. The eastern leg along IL 120 would be non-tolled. (map 7 of 12).*
	40	A third concept would consist of a 6-lane **arterial** extension of IL 53 northward from Lake Cook Road to a 4/6 lane bypass of the Grayslake area generally following the IL 120 corridor. This concept would also include added travel lanes on I-94 (map 8 of 12).
IL 120 Starting Point– Wilson Road to I-94 (existing or new alignment)	84.6	The starting point improvement for this concept includes added travel lanes on existing IL 120. Additional improvements for this concept include added travel lanes on US 12, IL 83/US 45, I-94, and US 41 (map 9 of 12).
	56	The starting point improvement for this concept would be a new 6-lane arterial partially on new alignment. Additional improvements for this concept include added travel lanes on IL 83/US 45, I-94, and IL 60 (map 10 of 12).
US 12 Starting Point– IL 53 to IL 120	53	The starting point improvement for this concept would include added travel lanes on US 12. Additional improvements for this concept include added travel lanes on IL 120 (on partial new alignment), I-94, and IL 60 (map 11 of 12).
	25.9	The starting point improvement for this concept would involve added travel lanes and the conversion of US 12 to an **expressway.** Interchanges would be constructed at all major intersections and frontage roads would be added to manage local access. This concept would include added travel lanes on I-94 (map 12 of 12).
* Interchange access at Lake Cook Road, IL 22, Midlothian Road, Peterson Road, Wilson Road, Fairfield Road, Alleghany Road, US 45, Hunt Club Road, IL 21, I-94, O'Plaine Road		

3.5.3 Preliminary Roadway Concepts Dismissed from Further Study

3.5.3.1 I-94 Starting Point (IL 60 to Wisconsin State Line)

After careful examination of the preliminary concepts, two I-94 concepts were eliminated from further consideration (Maps 2 and 3 of 12, Figure 3-7). These concepts were both developed from the I-94 starting point with improvements from IL 60 to the Wisconsin state line (Figure 3-7). The principal reason for their elimination was their having substantially more route miles of improvements than other concepts, while providing travel performance within the same bandwidth as the other preliminary concepts. The other key reason for their elimination was these concepts having similarities to the other concepts (i.e., improvements to the same routes). For example, in Figure 3-7, the I-94 concept [map 1 of 12] and the IL 120 concept [map 10 of 12] offer many of the same improvements with less route miles (in this example over 20 fewer route miles of improvement) needed to achieve similar performance. The project team concluded that there was no reasonable justification for retaining concepts that were redundant.

3.5.3.2 US 12 Expressway

The US 12 as an expressway concept was also dismissed from further consideration (Figure 3-7, Map 12 of 12). Although some partial access control could be added to an existing roadway, the practicality of a complete upgrade to an expressway along the existing alignment was considered inappropriate by the LCTIP. Upgrades of this magnitude are rarely pursued in the suburban metropolitan area because of the severe impacts to adjacent properties. Additionally, consideration of an expressway along US 12 (while not considering this type of improvement for other arterial facilities) was deemed to be inconsistent by the LCTIP. Therefore, it was concluded that a roadway concept with US 12 as an expressway was neither reasonable nor consistent with the treatment of other arterial routes, and should be dismissed from further consideration.

3.5.4 Initial Roadway Alternatives

The nine concepts that emerged from the preliminary roadway evaluation were carried forward in the process for further consideration. These roadway concepts were refined to include added engineering detail, resolution of route continuity and logical termini issues, and avoidance or minimization of environmental impacts based upon existing and available data. The process involved staff workshops and field checks to verify conditions and information at critical locations. Each alternative was critically reviewed to identify and implement alignment shifts, constrain right-of-way footprints, and/or community bypasses to avoid or minimize substantive environmental or social impacts. Key roadway intersections were also reviewed and upgraded as necessary to include grade-separated interchanges at some locations; roads crossing or connecting the major improvements were upgraded in accordance with IDOT and ISTHA standard practices. Figure 3-8 shows the nine initial roadway alternatives.

The process of refining the initial roadway alternatives included the application of typical cross sections to each of the alternatives. The typical sections assumed lane, median, and right-of-way widths for each type of roadway improvement being considered (Figure 3-9). The right-of-way widths of the cross section were designed to generally satisfy Lake County's stringent stormwater management standards, provide flexibility in grading requirements, and accommodate bicycle and pedestrian facilities. These typical cross sections were applied to the LCTIP GIS database to assess potential social and environmental impacts. None of the natural resource impacts were considered to be "fatal flaws," serious enough to prohibit the construction of any alternative. Displacement impacts were also reviewed, with five locations being identified as having substantial impact to residential and commercial areas. These locations are IL 21 in Libertyville,

US 45 in Mundelein, IL 60 near Diamond Lake, US 12 in Palatine, and IL 120 in Grayslake. Each area was the subject of further study and refinement to avoid a substantial community disruption (see *Community Bypass Evaluation* below).

The LCTIP presented the nine initial roadway alternatives and preliminary transit improvements at a series of public forums, including the established study groups and a series of Public Informational Meetings. An overwhelming majority of participants agreed that major transportation improvements are needed in one form or another in the study area.

3.5.4.1 Community Bypass Evaluation

One of the most important steps in the refinement process was the analysis of community bypass options in five locations:

- IL 21 in Libertyville
- US 45 in Mundelein
- IL 60 near Diamond Lake
- US 12 in Palatine
- IL 120 in Grayslake

The initial assessment revealed that major roadway improvements on the existing roads in these areas would result in a substantial displacement impact; for additional details refer to the *Alternatives Development and Evaluation Report* (LCTIP 2000a). For the initial roadway alternatives that would affect these areas, the LCTIP examined options for improving travel in these corridors while minimizing residential and commercial displacements. Community bypasses were studied at each location, and bypasses were recommended at four of the five locations. The analysis showed that a bypass of US 12 in Palatine was not necessary. The following is a summary of the analysis and recommendations:

- **Libertyville—**Bypass options were developed to the west using IL 60, Butterfield Road and IL 137, and to the east using IL 60, St. Mary's Road, and IL 137. The east bypass is recommended because it would have one-third to one-half fewer displacements as compared to the other options.
- **Mundelein—**Bypass options were developed to the east using IL 60, Butterfield Road, and IL 137, and to the west using IL 83, or using portions of IL 83 and the IL 53 extension corridor. A west bypass using the IL 53 corridor is recommended because it would have one-third to one-half the number of displacements as compared to the other options.
- **Diamond Lake Area**—A bypass option was developed using a portion of the IL 53 corridor, and is recommended because it would have one-third fewer displacements than the "through route" option.
- **Grayslake**—A bypass option was developed on new alignment to the south of existing IL 120, from Wilson Road to Almond Road. The bypass option was selected because it would displace half as many homes as the "through route" option.

Figure 3-10 shows the bypasses considered and routes selected at each location, and Figure 3-11 is a summary of the bypass evaluation. The selection of a Grayslake bypass resulted in the elimination of one roadway alternative—the IL 120 on existing alignment option (Figure 3-8, map 7 of 9), which was developed with improvements to existing IL 120. The remaining alternatives that include IL 120 defined the improvement as a bypass; therefore, these alternatives were retained for further analysis. The selected bypasses were then incorporated into the remaining roadway alternatives as appropriate.

3.5.4.2 IL 53 Freeway/Tollway Refinements

The refinement process for the initial alternatives included further examination of the IL 53 roadway alternatives. This analysis of the IL 53 freeway and IL 53 tollway options lead to a decision to combine these options into one alternative: the IL 53 Freeway/Tollway Alternative. Two factors provided the necessary justification to combine the options: their identical footprints (roadway cross section, interchange locations,

length, etc.), and their nearly identical systemwide travel performance. Three travel performance measures were considered:

- Vehicle hours of delay during the peak travel period in the year 2020.
- Average systemwide speed during the peak travel period in the year 2020.
- Weighted percent congested travel during the peak travel period in the year 2020.

For the three performance measures considered, vehicle hours of delay (VHD/MVMT), average speed (VMT/VHT), and weighted percent congested (VHT), the percent differences are 2.5 percent, 1 percent, and 1 percent, respectively. The differences between these performance measures are marginal. As such, the IL 53 Freeway/Tollway options were combined, and will be referenced in the following sections as one alternative.

Other refinement consideration of the IL 53 Alternative included an analysis of the alignment. In prior work, a recorded centerline was established and refined, which will be referred to as the "current" alignment. This earlier work included efforts to avoid critical habitat; however, some encroachments would nonetheless occur to ADID wetlands and 4(f) properties (i.e., Leo Leathers Park in Mundelein and Almond Marsh Forest Preserve in Grayslake). The LCTIP revisited these impact issues by examining the feasibility of alternate alignments that may avoid impact to these resources and others. This approach is consistent with efforts to refine the arterial based alternatives. The analysis assumed the following:

- The north-south study corridor is generally defined as an 8 km (5 mi) band width. The Lakewood Forest Preserve established the boundary to the west, and IL 83 was established as the eastern boundary. The boundary on the south is Lake Cook Road, and the boundary on the north is IL 120.
- The east-west study corridor is bounded by existing IL 120 to the north, the current alignment to the south, IL 137 to the west, and Almond Road to the east.
- The south terminal at Lake Cook Road and the east termini along IL 120 (near Almond Road) are fixed due to development and environmental constraints.
- Each alternate alignment was analyzed as a fully access-controlled route, with a 70-mph design speed, 91 m (300 ft) right-of-way width, and potential interchanges at 3.2 to 8 km (2 to 5 mi) spacing.
- Impacts were assessed for the mainline improvement only.

The LCTIP compiled environmental resource data and aerial base mapping to begin the process of identifying potential alignments. Environmental resources were mapped on the aerial base mapping (1997) and included ADID and non-ADID wetlands, lakes, nature preserves, natural areas, forest preserves, and cemeteries. The mapped environmental data allowed the LCTIP to develop a number of alignments that would avoid or minimize impact to the known resources (Figures 3-12, 3-13, and 3-14). Additional refinements to the alignments were performed following field checks to locate recent residential and commercial development, or other information not shown on the aerial photography.

Following the development of the alternate alignments, travel performance for the alternatives was compared to the performance benchmark described earlier in the roadway alternative development process. The assessment results indicated that all of the alignments would meet the performance benchmark and should be further analyzed in terms of societal and environmental impacts.

A summary of the environmental and societal impacts for the alternate alignments for the IL 53 Alternative are presented in Table 3-6 (on the following page) for the current alignment and the best alternate—BCE, and provides a detailed comparison of all the alternate alignments considered.

North-South Corridor. A total of nine new alignments were identified, with eight of them being to the west of the current IL 53 alignment. The alignment to the east ("KK") was eliminated due to its relatively larger number of displacements (88 versus 17) compared to the current alignment.

The western alternate alignments are comprised of three basic segments, with two distinct alignments within each segment. The first segment, between Lake Cook Road and IL 22, has alignments that avoid the Buffalo Creek ADID wetland ("A") or relatively dense residential development ("B"). The second segment, from IL 22 to Schwerman Road, offers two options ("C" and "D"). The third segment provides two options for connecting to the east-west leg of the IL 53 proposal ("E" and "F") while avoiding an 81-ha (200-ac) wetland mitigation site.

When comparing the various alignment combinations, ADID wetland impacts ranged from 0.0 to 0.8 ha (0.0 to 2.0 ac), as compared to 2.6 ha (6.4 ac) along the current alignment. Impacts to non-ADID wetlands ranged from 15.8 to 19 ha (39 to 47 ac), as compared to 11.3 ha (28 ac) along the current alignment. Total displacements ranged from 42 to 109, compared to 24 along the current alignment. The best overall western alignment was identified as "BCE." As summarized below, alignment "BCE" would have 50 percent higher impacts to non-ADID wetlands and 75 percent more commercial and residential displacements when compared to the current alignment. Alignment BCE, however, would have slightly less impacts to ADID wetlands and 4(f) properties when compared to the current alignment.

East-West Corridor. Alternate alignments for the East-West Corridor included an alignment along existing IL 120 from Atkinson Road to Almond Road. This alignment would impact slightly less acreage than the current alignment in terms of parks (1 versus 1.8 ha, or 2.5 versus 4.5 ac), forest preserves (0.85 versus 1.9 ha, or 2.1 versus 4.6 ac), and non ADID wetlands (5.3 versus 6.2 ha, or 13.2 versus 15.3 ac). However, this alignment would result in a higher number of residential and commercial displacements (almost three times greater). Overall, the alternate alignment would not appreciably reduce impacts to key resources, while resulting in a threefold increase in the number of displacements. Additionally, this alternate would eliminate a substantial amount of business parking at the US 45/IL 120 intersection.

In summary, the alternate alignments would not provide any improvement in the overall travel performance. The effects of the alternates vary compared to the current alignment. The total impacts to wetlands are less for the current alignment than the alternates. The alternate alignments would have less impact to forest preserve and park properties; however, the current alignment only impacts these resources slightly more. The alternate alignments have far greater impacts to residences and businesses, ranging from 2 to 3 times more than the current alignment. Based on less overall wetland

TABLE 3-6
Evaluation of Alternate IL 53 (North-South) and IL 120 (East-West) Alignments Corridor: Impact Summary

Corridor	ADID Wetlands ha (ac)	Non-ADID Wetlands ha (ac)	Forest Preserves/Parks ha (ac)	Displacements	Improvement Length km (mi)
North-South Corridor					
Current	2.6 (6.4)	11.5 (28.5)	0/1.26 (0/3.1)	24	19.8 (12.3)
BCE	0.8 (2.0)	17.3 (42.7)	0/0 (0/0)	42	22.5 (14.0)
East-West Corridor					
Current	0.2 (0.6)	6.2 (15.3)	1.9/1.8 (4.6/4.5)	6	
"HH"	0.2 (0.6)	5.3 (13.2)	0.8/1.0 (2.1/2.5)	17	

impacts and substantially less displacement of residential and commercial structures, this analysis concluded that none of the alternate alignments was superior to the current alignments for the north-south and east-west improvements in terms of transportation performance or environmental effects. On the basis of this analysis, the current IL 53 Freeway/Tollway centerline will be retained for further study and refinement.

3.5.5 Other Proposals Considered

During the development of the roadway alternatives, the LCTIP considered two other proposals. One of the proposals, the East-West case study, was developed by the LCTIP and responded to a perception that the major direction of travel in the county is east and west. The other proposal, *Crossroads*, was submitted by interest groups. The following is a summary of the LCTIP's findings with regard to each proposal. A detailed review is contained in the *Alternatives Development and Evaluation Report* (LCTIP 2000a).

3.5.5.1 East-West Case Study

Early in the process of defining transportation problems in Lake County, some people expressed the opinion that east-west roads are more congested than north-south roadways. The LCTIP and other transportation providers in the area recognize that there are east-west travel needs in Lake County, and through a collaborative process identified more than 64 km (40 mi) of east-west roadway improvements as part of the No-Action Alternative (Baseline).

In response to comments, however, the LCTIP developed and tested an "east-west" improvement scenario with an additional 80 route miles of improvements (Figure 3-15). The performance of this scenario, while having considerably more route miles of improvements, was worse than any of the other LCTIP roadway alternatives, achieving only 78 percent of the performance benchmark. These results are consistent with an analysis of travel patterns, which shows that north-south travel is predominant and the system lacks sufficient north-south capacity. Based on these findings, an East-West Improvement was dismissed from any further consideration.

3.5.5.2 Crossroads

The Environmental Law and Policy Center (ELPC) and Citizens Organized for Sound Transportation (COST) have proposed limited roadway improvements and the addition of some rail service as the solution for Lake County's transportation needs in a document titled *Crossroads: Smart Transportation Options for Lake County*. They suggest that implementing these improvements would lead to greater congestion relief when compared to the endorsed 2020 RTP.

The LCTIP analyzed the *Crossroads* proposal with the appropriate 2020 population and employment forecast and compared it to the regionally endorsed 2020 RTP. The RTP improves travel times by about 10 percent on 145 km (90 mi) of major roadways, whereas the *Crossroads* proposal improves travel times by the same margin on only 14.5 km (9 mi) of major roadways (Figure 3-16). As such, the *Crossroads* proposal is not as effective in reducing congestion levels and accommodating Lake County's future growth. For a detailed review of the *Crossroads* proposal refer to a report titled *Review of the Crossroads Proposal* (LCTIP 2000b).

3.5.6 Conclusions – Initial Roadway Refinement Process

The initial roadway alternatives were subjected to numerous refinements, analyses, and considerations. The process considered engineering requirements, environmental/societal impacts, as well as public perception (i.e., East-West Case Study). The results of this comprehensive process concluded that seven roadway alternatives would be carried forward for further study. The alternatives with their refinements are shown in Figure 3-17.

3.5.7 Environmental Considerations

The roadway alternatives development process involved numerous refinements and adjustments that would avoid or minimize impact to environmental and societal resources. Despite these efforts, however, implementation of any alternative would still affect environmental and societal resources to some degree. This section discusses the findings of an assessment of environmental factors for the seven remaining roadway alternatives. The effects of transit improvements were not considered as part of this assessment because these improvements would be common to all roadway alternatives and would provide no distinguishing measure of effect.

At the outset, the LCTIP recognized that the transportation problems in the county would require broad alternatives, covering many miles of roadway improvements. From an environmental perspective, this project also included developing an approach for identifying, measuring, and analyzing impacts at an equivalent level of detail. In response, the LCTIP developed a GIS database containing more than 80 different environmental data layers. The database primarily used existing and available data with some refinements based on reconnaissance level field surveys. The use and accuracy of available data were considered acceptable to the state and federal resource agencies involved in the project. (See Table 5-1, *Coordination for a List of Participating Federal and State Agencies.*)

In the early stages of the project, the GIS database was valuable in the development of the initial transportation improvement sets. Sensitive environmental areas were carefully researched, mapped, and coordinated with state and federal agencies. During the development of the roadway options, this information helped the alternatives development process avoid areas that would likely preclude the implementation of any improvement. During the latter stages of development, alternatives were refined to a greater level of environmental information to further avoid or minimize resource impacts. Thus, from the beginning of the process through the latter stages of alternatives development, the environmental resource issues have been carefully considered.

The environmental and societal effects for 10 factors were assessed for the roadway alternatives. A description of each factor and a description of the criteria for measuring impact are presented in Table 3-7 (on the following page). The estimated impacts for each roadway alternative are shown in Figure 3-18.

The emphasis placed upon avoiding and minimizing impacts during the alternatives development step is evident in the comparison of impacts for the seven roadway alternatives. For the key resources, including forest preserves, local parks, and wetlands, the degree of impact across the seven roadway alternatives was not substantially different. Putting the park impacts into perspective, the range of impact is from 1.2 to 2.8 ha (3 to 7 ac) depending on the roadway alternative. A difference of 1.6 ha (4 ac) across the suite of alternatives when compared to 6,070 ha (15,000 ac) of local parks in Lake County represents an impact difference of less than 0.03 percent. The number of individual park sites affected ranges from one to four, depending on the improvement set. A larger number of affected sites would require greater coordination with responsible resource agencies. Similarly, the range of impact for forest preserves is 1.2 to 6.5 ha (3 to 16 ac), and the number of individual sites affected ranges from two to seven. Considering that Lake County has 8,498 ha (21,000 ac) of forest preserve—a number that is growing annually—the range of impact for the roadway alternatives is less than 0.06 percent. Wetland impacts yield a similar comparison. The combined (ADID/non-ADID) range of wetland impact is 32 to 42 ha (79 to 104 ac), with a difference of 10 ha (25 ac) across the seven roadway alternatives. With over 18,500 ha (45,700 ac) of wetlands in Lake County, the difference of 10 ha (25 ac)

represents an impact of about 0.06 percent (see Figure 3-18).

A qualitative assessment of the resource impacts also revealed only minor differences between the roadway alternatives. Most of the forest preserve impacts are fringe impacts (no impact to an individual parcel is greater than 2 percent of the total land area) that would not impair the use or function of these designated uses. Wetlands designated as ADID represent a highly regulated resource, and in most cases require considerable coordination with resource agencies concerning their impact and mitigation. Efforts were made to avoid ADID wetlands where practicable; however, the impact numbers show that no option would

TABLE 3-7
Environmental and Societal Criteria

Criteria	Definition
Wetlands (ADID)	Impacts to ADID wetlands are measured by summing the hectares within the proposed right-of-way of the proposed improvement. A companion measure in this category is calculating the number of encroachments upon wetlands (multiple encroachments on the same property count as one site).
Wetlands (Non-ADID)	This measure is the sum of non-ADID wetlands directly impacted by the roadway improvements. The measure sums both hectares and the number of individual wetland encroachments.
Designated Lands	These lands include forest preserves, parks, nature preserves, and INAI sites, among others. All of these lands are highly regulated and generally protected under the US Department of Transportation Act of 1966. This measure is a sum of both the total acres of designated land impact, as well as the number of individual property encroachments (multiple encroachments on the same property count as one site).
Designated Lands with T&E	This is a measure of only those designated lands that also have a threatened and/or endangered species associated with the impacted area. The measure is expressed in hectares of impact.
Cultural Sites	Cultural resources are highly regulated by NEPA, and therefore represent a resource that is typically considered for highway improvement projects. This measure is an indication of the number of sites on known resources—those that have been identified through previous works. Each site represents a potential agency coordination effort that would be required to address the potential impact.
Acres of Agricultural Lands (with 0.8 km, or 0.5 mi, of improvement)	Agricultural lands are afforded limited protection through state and federal laws; however, they are recognized as a finite resource. Urban expansion is continually cited as a major reason for the conversion of agricultural lands to other uses. The argument is often applied to roadway improvements. This measure is an indication of the amount of agricultural land within 0.8 km (0.5 mi) that might be at risk to development because of secondary roadway effects (i.e., improved mobility and access).
Multiple Resource Impacts	This is a composite measure where multiple resources occur in the same impacted area, (i.e., wetlands and designated lands). This measure is a quality measure indicating property impacts with more than one resource. The measure is expressed as acres of land with multiple resources directly impacted.
Total Sites (wetland, designated lands, archeological sites)	This measure is the sum of all individual property sites for the named resources. This measure is an indication of the special resource impact that would require extensive coordination with resource agencies.
Displacements	A measure of the residential, commercial, and other structures that would be potentially displaced from construction of a roadway improvement set. The total displacements include structures within the proposed right-of-way and in close proximity (4.6 m, or 15 ft).
Undeveloped Lands within 0.8 km, or 0.5 mi, of Improvement	The notion that highways contribute to growth and development is always present. Therefore, this consideration was designed to examine the underlying issue of urban growth that is commonly perceived as being associated with improved mobility and access. The measure is not designed to predict the rate or time at which land may be converted, but to serve as a symbol/representation for land along the major roadway improvements that may be improved.

completely avoid ADID wetland resources. Thus, this highly regarded resource did not serve to distinguish between the improvement sets. An examination of potential impacts to threatened and endangered species also showed that each of the alternatives would impact this highly regarded resource category to a similar degree.

The residential and commercial displacements of each roadway alternative were also considered. Residential, commercial, and "other" buildings (garages, utility structures, etc.) within the proposed right-of-way or nearby (within 4.6 m or 15 ft) were identified as displacements. The number of displacements, summarized in Figure 3-18, range from 101 to 246 across the suite of roadway alternatives. Given the broad study area, the study team concluded that displacements should not be a reason to dismiss an alternative at this stage.

In summary, environmental resources were considered early and throughout the alternatives development and evaluation process, to an equal level of detail, and over a large study area. Considerable effort was made to avoid or minimize impacts during each stage of alternative development. The LCTIP and involved resource agencies agreed that for this type of study it was appropriate to use existing and available data and were comfortable with its limitations. From both a quantitative and qualitative perspective, the environmental impacts were determined to be similar. The process did not result in any roadway alternative differentiating itself when environmental issues were compared in a comprehensive manner relative to one another.

3.6 Finalist Recommendations

Following the development and refinement of alternatives, the LCTIP began a process of comparative evaluation of the seven remaining roadway alternatives, which would lead to the recommendation of finalist alternatives for inclusion in the DEIS. Guided by the project's fundamental transportation needs listed in Section 1, *Purpose and Need*, the LCTIP used evaluation factors that provide the best measure of transportation performance—measures that assess the inherent transportation capabilities of the roadway improvements. The remainder of this section describes the results of the comparative evaluation for the seven roadway alternatives.

The ability of a project to meet the identified transportation needs is the basic measure by which transportation projects are evaluated and judged. The evaluation factors used to compare roadway alternatives were developed to represent aspects that satisfy those needs. The evaluation process employs a rigorous technical analysis, using the project's travel demand model (with the regionally endorsed population, employment, and travel forecasts as base data) to generate measures that allow performance comparisons of the alternatives. The evaluation factors developed for the analysis were based on two needs: improve local and regional travel and improve north-south travel. Together they provide the most discriminating comparison of the seven roadway alternatives. Improving modal connections was not used as an evaluation factor at this stage because it is not a discriminating factor. All alternatives, however, will be structured to enhance modal connections. Safety was also not used at this stage, although each alternative is anticipated to generally improve safety performance. A greater level of detail is needed to definitively evaluate safety, which will be conducted for the finalists.

The evaluation factors embrace improving travel efficiency with the use of measures that compare travel-time savings and improving north-south travel with measures that show the change in congestion and in traffic volume on north-south routes. The specific measures used to compare and evaluate the roadway alternatives at this stage of the study are described below.

- **Travel Efficiency (Cumulative Travel Times)—**Transportation effectiveness was a measure of how well a roadway alternative would improve travel

efficiency within a geographical area that included Lake County, portions of northern Cook County, and eastern McHenry County. The measure was determined by aggregating travel times for all trips that started and ended within the aforementioned geographical area.

- **Uncongested Lane Miles—**This measure indicates the total lane miles that would be uncongested (defined as Level of Service A, B, or C) for the various roadway alternatives. It is an indicator of how well an alternative reduces the congested travel.
- **Change in Traffic Volume—**This measure reflects the effect of the various roadway alternatives on the volume of traffic on existing roadways. It also serves as a proxy for traffic intrusion in neighborhoods and communities. Traffic removed from local roads helps relieve or minimize cut-through traffic on neighborhood and local roads, which is an important issue among study area residents. The measure is expressed as the number of roadway route miles with an increase or a decrease of at least 3,500 vehicles per day compared to the LCTIP baseline traffic volumes. This measure was summarized for north-south travel.

These three evaluation factors were applied to the seven roadway alternatives. The results of the evaluation are summarized in Table 3-7. An overview of the evaluation results is provided below, followed by individual discussions of each roadway alternative.

The cumulative travel time savings analysis (Table 3-7) shows that the hours of travel saved for all trips in the typical P.M. peak travel period (year 2020) ranges from 62,700 to 83,400 hours of travel. The travel time savings is the difference between the No-Action Alternative (Baseline) and each roadway alternative—the greater the percent difference the greater the travel savings. The analysis showed that the IL 53 Freeway/Tollway Alternative would provide the best overall travel time improvement (19 percent) compared to the No-Action Alternative (Baseline). The least improvement would be provided by either the IL 120 Bypass Alternative or the US 12 Alternative, with a savings of 14 percent over the No-Action Alternative (Baseline).

The uncongested travel measure is an indication of the percent of the north-south roadways in 2020 that would be operating at free-flowing conditions in the P.M. peak period. Depending on the option, between 33 and 41 percent of the network (lane miles) would be operating congestion-free. The IL 53 Freeway/Tollway Alternative would provide the greatest amount of congestion-free travel, and the US 12 Alternative would provide the least.

The volume difference measure shows how the roadway alternatives would affect travel on the existing roadway network. A beneficial effect of the alternatives would be a reduction of traffic volume on existing roads, which would be an indication of reduced cut-through traffic and attraction of trips to major facilities. This measure examines the reduction in traffic on the existing road network for north-south segments, which is also related to the goal of reducing north-south travel congestion. The measure shown in Table 3-8 (on the following page) is simply the number of route miles on which daily traffic volumes would be reduced by 3,500 vehicles or more in 2020 as compared to the No-Action Alternative (Baseline). The IL 53 Freeway/Tollway Alternative provides the greatest reduction in traffic on existing north-south routes; the US 12 Alternative provided the least.

- **IL 53 Freeway/Tollway—**The IL 53 Freeway/Tollway Alternative was the top performer for all three performance measures, providing over 83,400 hours of travel time savings for the 2020 P.M. peak period and 125 routes miles of traffic relief on north-south routes as compared to the No-Action Alternative (Baseline). In addition, the IL 53 Freeway/Tollway Alternative had 41 percent of the north-south lane miles uncongested in the P.M.

peak period, which is the highest when compared to the other alternatives.

- **IL 83/US 45 with US 12—**The travel performance for the IL 83/US 45 with US 12 Alternative was the second best overall performer. The IL 83/US 45 with US 12 Alternative scored second in travel time savings with 75,100 hours for the 2020 P.M. peak period. In terms of relieving traffic on north-south roadways, IL 83/US 45 with US 12 Alternative scored second with 88 route miles. IL 83/US 45 with US 12 Alternative tied for third with two other alternatives, with roughly 38 percent of the north-south lane miles uncongested in the P.M. peak period.
- **IL 53 Arterial—**The travel performance for the IL 53 Arterial Alternative varied by performance measure. The IL 53 Arterial Alternative scored fourth in travel time savings, with 70,200 hours for the 2020 P.M. peak period. In terms of relieving traffic on existing north-south roadways, the IL 53 Arterial Alternative scored third with 83 route miles. This alternative scored second with 39 percent of the north-south lane miles uncongested in the P.M. peak period.
- **IL 83/US 45 with IL 120—**The travel performance for the IL 83/US 45 with IL 120 Alternative also varied by performance measure. This alternative scored third in travel time savings with 71,400 hours for the 2020 P.M. peak period. In terms of relieving traffic on north-south roadways, the IL 83/US 45 with IL 120 Alternative scored fourth with 68 route miles. This alternative tied for third with two other alternatives, with 38 percent of the north-south lane miles uncongested in the P.M. peak period.

TABLE 3-8
Traffic Performance for Refined Roadway Improvement Sets

Alternative[e]	Travel Time Savings [a]			Traffic Relief on North-South Roads [b]		Uncongested North-South Lane Miles LOS A,B,C [c,d]		Score
	Peak Period Hours of Travel Time Saved	% Improvement over No-Action	Score	Miles	Score	Percent	Score	
I-94	65,900	15%	3	67.9	3	38%	5	11
IL 83/US 45 with US 12	75,100	17%	6	88.12	6	38%	5	17
IL 83/US 45 (with IL 120)	71,400	16%	5	68.28	4	38%	5	14
IL 53 Freeway/ Tollway	83,400	19%	7	124.57	7	41%	7	21
IL 53 Arterial	70,200	16%	4	82.8	5	39%	6	15
IL 120 Bypass	64,000	14%	2	65.64	2	37%	2	6
US 12	62,700	14%	1	61.47	1	33%	1	3

[a] Travel Times Savings: This is a measure of the improvement in travel times for all trips that begin and end in Lake, northern Cook, and/or eastern McHenry counties. As an example, a 15-percent improvement would save about 10 minutes for a 1-hour trip during the afternoon rush hour, year 2020.

[b] Traffic Relief on North-South Roads: This is a measure of the total miles of existing north-south roads that would carry at least 3,500 fewer vehicles each day, year 2020.

[c] Uncongested North-South Travel: This is a measure of the percentage of north-south roads that would be uncongested during the afternoon rush hour, year 2020.

[d] A difference of 8 percent represents approximately 100 lane miles.

[e] LCTIP No-Action (Baseline) trip table

- **I-94—**The travel performance for the I-94 Alternative varied by performance measure. This alternative scored fifth in travel time saving, providing 65,900 hours for the 2020 P.M. peak period. In terms of relieving traffic on north-south roadways, the I-94 Alternative scored fifth with 67.9 route miles. This alternative tied for third with two alternatives, with 38 percent of the north-south lane miles uncongested in the P.M. peak period.
- **IL 120 Bypass—**The IL 120 Bypass Alternative was consistently placed sixth amongst the alternatives, with 64,000 hours of travel time savings for the 2020 P.M. peak period, and 66 route miles of traffic relief on north-south roadways compared to the No-Action Alternative (Baseline). Roughly, 37 percent of the north-south lane miles were uncongested in the P.M. peak period.
- **US 12—**The US 12 Alternative consistently performed the worst, with 62,700 hours of travel time savings for the 2020 P.M. peak period and 61 route miles of traffic relief on north-south roadways when compared to the No-Action Alternative (Baseline). Roughly, 33 percent of the north-south lane miles would be uncongested in the P.M. peak period.

Based on the data in Table 3-8, a composite score was determined for each roadway alternative representing an overall score of the three travel performance measures. The composite was developed by assigning a score of 1 through 7 in order of performance for each alternative for each measure, with 7 the best and 1 the worst. Based on the composite scores, the two alternatives selected were IL 53 Freeway/Tollway and IL 83/US 45 with US 12 alternatives (see Figures 3-19 and 3-20).

For each travel performance measure, the IL 53 Freeway/Tollway Alternative was the top performer. The travel performance for the IL 83/US 45 with US 12 Alternative scored either second or third for each performance measure. No other roadway alternative consistently scored as high for each performance measure. The US 12 Alternative was consistently the worst performing option, with 20,700 hours less travel time saving, over 50 percent fewer route miles of traffic relief, and 100 fewer lane miles of uncongested travel compared to the IL 53 Freeway/Tollway Alternative. Given the central premise of the evaluation process—to select alternatives that best met the transportation need—the IL 53 Freeway/Tollway and IL 83/US 45 with US 12 alternatives were selected as the finalist alternatives.

3.6.1 Description of the Finalist Alternatives

There are two finalist (Build) alternatives: IL 53 Freeway/Tollway and IL 83/US 45 with US 12. The No-Action Alternative (Baseline) will also be carried forward in the evaluation. The two build alternatives are comprised of the roadway improvements and the supporting transportation improvements described earlier in this section. The selection of the finalist alternatives was followed by another refinement step that would add more engineering detail. The added engineering detail included better definition of feeder road and intersection/interchange improvements, and additional improvements to each alternative. For the IL 53 Freeway/Tollway Alternative, improvements to I-94 and O'Plaine Road were added to better facilitate travel near a major system terminus, and for the IL 83/US 45 with US 12 Alternative improvements to IL 60 and IL 120 were added. During this refinement step, additional environmental information was collected, allowing the LCTIP to make further adjustments and shifts to roadway alignments that would lessen environmental and societal impacts. A general description of the finalist roadway alternatives and supporting improvements is provided below and includes the refinements described above.

3.6.1.1 IL 53 Freeway/Tollway Alternative

The IL 53 Freeway/Tollway Alternative consists of the construction of a new highway in central Lake County either as a freeway or

tollway facility (see Figure 3-19). The IL 53 Freeway/Tollway Alternative would begin at the terminus of IL 53 at Lake Cook Road and extend northerly for a distance of 21 km (13 mi) to a point south of IL 120. The alternative would continue for about 22.5 km (14 mi) both to the east and to the west. The eastern terminus would tie into the existing interchange complex at US 41, and the western terminus would be Wilson Road, with arterial improvements extending along existing IL 120 from Wilson Road to the intersection of IL 60 and IL 120. Additional lanes are proposed on I-94 from IL 120 to IL 132.

Access to the IL 53 facility would be gained on grade-separated interchanges at major arterials. These include: Lake Cook Road, IL 22, Midlothian Road, Peterson Road, Alleghany Road, US 45, IL 21, I-94, O'Plaine Road, Hunt Club Road, Wilson Road, and Fairfield Road. Improvements would be made to arterial highways through the interchange influence area to provide for proper roadway operations and safety. The length of improvements to arterial feeder roads generally extends to the nearest major intersection.

The IL 53 Freeway/Tollway Alternative would be constructed with three through lanes in each direction separated by a barrier median. The west leg would be four lanes. The typical right-of-way width required for the roadway is 91 m (300 ft), including a 23-m (76-ft) pavement (11.5 m or 38 ft in each direction), 8.5-m (28-ft) paved median, 3.7-m (12-ft) right shoulders, and grassed areas with roadside ditches. Where necessary to avoid critical natural and community resources, refinements were made to the typical cross section. These refinements included a reduction in right-of-way width to 76 m (250 ft).

The facility would be constructed as either a freeway or tollway. Both facility types have the same basic design elements and similar operational characteristics, but the tollway would require provision of toll collection facilities. The east leg would be non-tolled in either case. For the purposes of this study, construction of the alternative as a freeway versus tollway facility would be a future funding choice, depending on the alternative selected.

3.6.1.2 IL 83/US 45 with US 12 Alternative

The IL83/US 45 with US 12 Alternative includes approximately 101 km (63 mi) of improvements on existing roads, as well as new alignment. Approximately 80 percent of the improvements are on existing facilities and 20 percent are on new alignment to bypass established communities (see Figure 3-20). Table 3-9 summarizes the type of improvement proposed for each roadway.

TABLE 3-9
IL 83/US 45 with US 12 Alternative Improvements

Roadway	Improvement
Hicks Road	Widen from 2 to 6 lanes from IL 53 to IL 83
IL 83	Widen from 4 to 6 lanes from Hicks Rd. to US 45
Mundelein Bypass	New 4-lane road from IL 60/US 45 to IL 120 bypass
I-94	Widen from 6 to 8 lanes from IL 60 to IL 132
IL 21	Widen from 4 to 6 lanes from Lake Cook Rd. to IL 60; IL 137 to I-94
Libertyville Bypass	IL 60: Widen from 4 to 6 lanes from IL 21 to I-94 St. Mary's Rd.: Widen from 2 to 4 lanes from IL 60 to IL 137 IL 137: Widen from 4 to 6 lanes from IL 21 to I-94
US 12	Widen from 4 to 6 lanes from IL 53 to IL 176
IL 120 (New Alignment)	New 4-lane arterial from Alleghany Rd. to Almond Rd.

Existing intersections and interchanges along the widened highway corridors would be improved to provide adequate traffic operations at major highway junctions. The typical cross section for the proposed improvements included in the alternative would vary based on the type of facility and proposed number of lanes. The typical right-of-way width would generally be 40 m (130 ft) for a 4-lane arterial, 49 m (160 ft) for a 6-lane arterial, and 91 m (300 ft) for an 8-lane tollway. Where necessary to avoid critical natural and community resources, refinements have been made to the typical cross section to avoid or minimize impacts. These refinements included a reduction in right-of-way width, typically to 30.5 m (100 ft) for a 4-lane arterial facility, 36.6 m (120 ft) for a 6-lane facility, and 76.2 m (250 feet) for an 8-lane tollway. Refer to the *Alternatives Development and Evaluation Report* (LCTIP 2000a) for more details. Typical cross sections are shown in Figure 3-9.

3.6.1.3 Construction and Right-of-Way Costs

The LCTIP developed an estimate of project costs for the roadway alternatives based on a rigorous analysis. The cost estimates are identified in 1999 dollars and include both construction and right-of-way estimates. The construction costs estimates typically assume full roadway reconstruction and are based on major cost items such as grading, pavement, drainage, and bridges and retaining walls. The unit costs for the major construction cost items relied upon current IDOT project experience. The right-of-way estimates included both land and structure acquisition. Standard costs for land cost and structure costs were developed by township using Lake County tax assessor database and other available information such as the *Price Pulse* data. The project team used 1999 data to establish a common base for comparing the roadway improvement sets. See Table 3-10.

3.6.2 Supporting Improvements

3.6.2.1 Transit

As outlined in Section 3.4.1, *Rail and Bus Transit*, a comprehensive package of rail and bus improvements are recommended.

3.6.2.2 Transportation System Management

TSM strategies were fully considered as part of the transportation improvements. TSM applications are designed to make the transportation facilities function more effectively, work more reliably, and operate more safely. These strategies encompass improvements such as modernized traffic signal control systems that adjust themselves to optimize traffic flow, freeway traffic flow management, incident detection and response, system surveillance, intersection improvements, and traveler information services. In Lake County, TSM strategies have been widely deployed and represent the predominant type of improvement over the last decade. Since 1990, nearly 200 TSM projects have been implemented and about 70 more are planned from 2001–2005 (Figure 3-21). Among the existing and planned TSM improvements in Lake County are numerous intersection upgrades, inter-jurisdictional signal systems coordination, enhanced safety applications for highway-rail crossings, I-PASS on the tollway system, transit signal priority and arterial

TABLE 3-10
Construction and Right-of-Way Costs for the Finalist Build Alternatives (in 1999 dollars)

	Construction	ROW	Total
No-Action (Baseline)	$ 414,000,000	$ 69,000,000	$ 483,000,000
IL 53 Freeway/Tollway	$ 674,000,000	$ 187,000,000	$ 861,000,000
IL 83/US 45 with US 12	$ 735,000,000	$ 360,000,000	$ 1,095,000,000

incident management, and variable message signs.

The LCTIP proposes three types of TSM improvements: arterial traffic control systems, transit service management systems, and continuance of the existing programs. The arterial roadways in the county are an important element of the overall transportation system; therefore, particular attention in the TSM strategy has been given to arterial traffic signal control systems to improve traffic flow. This strategy recommends the deployment of an arterial system management strategy for the major routes (Table 3-11) that consistently display the most congestion and delay. As shown in Table 3-11, the priority routes would vary depending upon the build alternative selected.

The arterial strategy would consist of electronic arterial surveillance, signal system interconnects and communication with a traffic management center to manage traffic control and transit priority, variable message signs, incident detection and management, and highway advisory radio. It is recommended that a high-volume corridor in the county (i.e., Lake Cook Road) be selected as a testbed for this combination of technology. A consortium of CATS, Cook County, Lake County, and Northwestern University has funding to study and implement traffic surveillance and control systems in this Lake Cook corridor. Following an appropriate test period, deployment could be advanced to the other priority corridors.

Other features of the TSM strategy include transit management systems. A travel advisory information system would be deployed at Metra stations and parking lots to provide parking availability status and capacity, train schedules, etc. Advanced technology would also be deployed at rail-highway crossings to increase safety. Bus transit management systems would include automatic vehicle location, passenger and fare reporting, route and schedule tracking, voice and data communication between vehicles and the management center, and signal priority to facilitate transit vehicle flow.

TSM strategies are viewed as a complementary component of the overall transportation improvements in Lake County. TSM initiatives and strategies are needed and would support other transportation improvements in the county, but the scale of the projected population and employment growth cannot be addressed by these strategies alone. Experience has shown that despite the fairly aggressive TSM programs deployed in the last decade, roadway congestion has far outpaced these measures. Therefore, a major

TABLE 3-11
Priority Routes for Traffic Control Systems

IL 53 Freeway/Tollway Alternative	IL 83/US 45 with US 12 Alternative
I-94 (Tollway)	I-94 (Tollway)
IL 53 Freeway/Tollway	IL 120
IL 60	IL 60
IL 22	IL 22
IL 83	US 12
US 12	IL 83
US 41	US 41
IL 120 (existing)	Weiland Road
Weiland Road	Old McHenry's Road
Martin Luther King Jr. Blvd.	Long Grove Road
Washington Street	St. Mary's Road
Butterfield Road	IL 21

investment in transportation infrastructure is necessary to accommodate the travel demand generated by future population growth.

3.6.2.3 Travel Demand Management

TDM strategies represent another component of the LCTIP transportation alternatives. TDM strategies are designed to decrease vehicle demand on the roadway system by increasing vehicle occupancy or changing the attractiveness of competing modes. Currently, there are a number of TDM activities being applied in Lake County, including rideshare programs, employer activities, and public education programs. CATS, as part of the 2020 RTP, endorsed six TDM strategies: rideshare, improved pedestrian and bicycle facilities, park-and-ride facilities, expanded vanpool programs, parking management, and transit incentives. Each of these strategies is applicable to Lake County, and when implemented they could reduce traffic volumes by about 1 percent (LCTIP 1999) on the roadways in the county. Although the overall reduction appears small, TDM measures materially contribute to increasing the number of travel options for commuters.

The LCTIP examined the use of park-and-ride facilities in connection with the build alternatives. Park-and-ride facilities are essentially parking lots at strategic locations that allow people to drop off or leave their cars, and transfer to a bus system, carpool, vanpool, or even a commuter train if a rail station is nearby. In many parts of the United States, these facilities have enjoyed considerable success. In Lake County, two park-and-ride facilities exist at the Buffalo Grove and Gurnee transportation centers. A third park-and-ride facility is planned at a proposed transportation center in Waukegan. The LCTIP recommends additional park-and-ride facilities at the five proposed transportation centers that provide bus-to-bus and bus-to-rail transfer capabilities: Highland Park, Libertyville, Round Lake, Palatine, and Fox River Grove. Additionally, to facilitate carpooling and vanpooling on a broader geographic area, park-and-ride facilities are proposed at major interchanges or intersections where strategic regional arterials (SRAs) intersect, including major interchanges along I-94 and the proposed IL 53 Freeway/Tollway Alternative. Details and maps showing the locations of these facilities for the build alternative are included in *Transit and Transportation Management Strategies for the Lake County Transportation Improvement Project* (LCTIP 2001b). See Figures 3-22, 23, and 24.

Bicycle and pedestrian improvements have been considered as a complementary set of enhancements for the finalist build alternatives. These improvements are structured to mesh with existing and planned routes where appropriate. The improvements are described as potential opportunities that would require further consideration and analysis for the selected build alternative. The IL 53 Freeway/Tollway Alternative provides an opportunity for a linear shared path along its length with connections to existing bike paths via local roads such as IL 60 and IL 21 (Des Plaines River Trail) and IL 176 (Robert McClory Path). Direct connections to a linear bicycle/pedestrian path along the IL 53 Freeway/Tollway Alternative would be possible with extensions of existing paths, particularly between IL 120 and the proposed Des Plaines River Trail extension. Similarly, direct connections would be likely at several employment centers and rail stations such as the Grayslake and Prairie Crossing NCS rail stations , and Kemper Insurance, Motorola, and Baxter Health Care. The IL 83/US 45 with US 12 Alternative would also provide opportunities for new bicycle and pedestrian facilities along the rights-of-way of improved arterial facilities with direct connection to two existing bicycle paths: the Des Plaines River Trail and the Robert McClory Path. Additionally, indirect connections to the Skokie Valley Trail and the Green Bay Trail are possible. This alternative would provide numerous opportunities for connections to rail stations and employment centers. Further details and maps showing the alternatives in relation to existing bicycle/pedestrian paths and employment centers are contained in a technical memorandum titled *Transit and Transportation Management Strategies for the*

Lake County Transportation Improvement Project (LCTIP 2001b) (see Figures 3-22, 23, and 24).

3.6.3 Detailed Evaluation of the Finalist Roadway Alternatives

The final step in the process is a comparative evaluation of the two finalist build alternatives (IL 53 Freeway/Tollway and IL 83/US 45 with US 12 Alternatives). Each alternative was rigorously compared to the project Purpose and Need, which includes:

- Improving local and regional travel
- Improving north-south travel capacity and efficiency
- Improving safety
- Improving modal connections[5]

The comparative evaluation of the finalist build alternatives was based on alternative-specific population and employment forecasts developed for each alternative (ACG 1999, CATS 1997a, ACG 2000). These forecasts were subsequently used by CATS to develop a travel forecast for each of the finalist alternatives. The travel performance for each alternative was then re-evaluated using these refined alternative-specific travel forecasts. The re-evaluation provided new travel performance metrics for each alternative based on travel forecasts that are unique to each alternative, including the No-Action Alternative (Baseline). The following is a summary of the Purpose and Need measures used to compare the alternatives.

3.6.3.1 Improve Local and Regional Travel

Local Travel. Improvements to local travel were measured using "cumulative travel time savings." Travel time savings were derived from calculating the total travel time for all trips in the year 2020 and compared to the No-Action Alternative (Baseline). As shown in Table 3-12, each build alternative would save approximately 19 million hours of annual travel over the No-Action Alternative (Baseline) in 2020. This represents an 8-percent travel time savings over the No-Action Alternative (Baseline).

Early public involvement activities identified the rapid rise in travel along secondary roads as a primary concern of Lake County residents. Lake County officials requested that the LCTIP consider the effect the finalist roadway alternatives would have on future improvement needs along the county-maintained system. The LCTIP used criteria established by the Lake County Division of Transportation (LCDOT) to assess the need for additional capacity along county-maintained roadways. Traffic volumes greater than 15,000 ADT for 2-lane roads and volumes greater than 30,000 along 4-lane roads were considered as over capacity (i.e., requiring additional lanes). Table 3-13 (on the following page) summarizes the total lane miles that would exceed LCDOT's capacity threshold for 2- and 4-lane roads for the No-Action (Baseline), IL 53 Freeway/Tollway, and IL 83/US 45 with US 12 alternatives.

The IL 53 Freeway/Tollway Alternative would have a net reduction of 17 lane miles on 2- and

TABLE 3-12
Local Trips

Alternative	Total Annual Savings (hours)	Percent Improvement over Baseline	Annual Savings/Motorist (hours)	Annual Savings/Motorist ($)[a]
IL 53 Freeway/Tollway	18,700,000	8.3%	33.0 hours	$1584
IL 83/US 45 with US 12	19,100,000	8.5%	33.8 hours	$1622

[a] Based upon 48.00 hours for composite vehicle operating costs, Year 2020.

4-lane county roadways that would be over capacity in the year 2020 when compared to the No-Action Alternative (Baseline). The IL 83/US 45 with US 12 Alternative would have a net increase of 13 lane miles for the number of county roadways that would be over capacity in the year 2020 when compared to the No-Action Alternative (Baseline). Figures 3-25 and 3-26 depict the changes in capacity (i.e., red denotes a worsening, green an improvement) for each finalist alternative when compared to the No-Action Alternative (Baseline). As a new facility, the IL 53 Freeway/Tollway Alternative would attract a considerable volume of traffic from existing roadways, including county routes. Conversely, the IL 83/US 45 with US 12 Alternative would essentially redistribute traffic on the existing system, resulting in an increased burden on county roads.

Regional Travel. Improvement to regional travel was determined by measuring travel to or from several representative points in the area, including Lake Cook/US 12, IL 132/I-94 (Gurnee Mills), IL 60/I-94, and Kenosha (Wisconsin). Kenosha was analyzed as a destination location, whereas the other three locations were analyzed as locations from which trips originated. Each location represents a major business or commercial center proximate to major interchange points on the regional expressway system. The LCTIP travel demand model was used to show how the build alternatives would benefit travel time from all parts of the region to the destination location (Kenosha), or from the three points of origin to all parts of the region. The results of the analysis identified the geographic areas that would experience a travel time improvement (savings) of at least 5 percent compared to the No-Action Alternative (Baseline) during the P.M. peak travel period in the year 2020. Figures 3-27 through 3-30 illustrate the areas of the region that would realize at least a 5-percent travel time improvement. Table 3-14 (on the following page) summarizes the net number of Traffic Analysis Zones (TAZ) that would receive at least a 5-percent travel time savings for the four locations.[6]

The following summarizes the findings in more detail at each location:

- **Trips originating from the Lake Cook/US 12 area—**The IL 53 Freeway/Tollway Alternative improves travel times in McHenry and Lake counties, as well as portions of DuPage, Boone, and Kenosha (Wisconsin) counties. The IL 83/US 45 with US 12 Alternative improves travel times over a 10-percent smaller area that includes Lake and portions of McHenry, Boone, and Kenosha counties.
- **Trips originating from the IL 132/I-94 area—**The IL 53 Freeway/Tollway Alternative improves travel times in much of Lake, Cook, and DuPage, and portions

TABLE 3-13
County Maintained Routes

	No-Action (Baseline)	IL 53 Freeway/Tollway	IL 83/US 45 with US 12
2-Lane Roads Over Capacity	204 lane miles	196 lane miles	213 lane miles
4-Lane Roads Over Capacity	91 lane miles	82 lane miles	95 lane miles
TOTAL	**295 lane miles**	**278 lane miles**	**308 lane miles**
Difference Compared to No-Action (Baseline)		**17 fewer**	**13 more**

[6] A TAZ is a way of describing the urban area and the characteristics of the transportation system. A TAZ provides a method to study the urban area by dividing it into smaller geographic areas.

of McHenry and Will counties. The IL 83/US 45 with US 12 Alternative would improve travel times over a 65-percent smaller area in Lake and northern Cook counties.

- **Trips originating from the IL 60/I-94 area—**The IL 53 Freeway/Tollway Alternative improves travel times in much of Lake, all of McHenry, and portions of DuPage, Kane, Boone, and Kenosha counties. The IL 83/US 45 with US 12 Alternative would improve travel times in a similar area to the IL 53 Freeway/Tollway Alternative; however, it would worsen travel times in a geographical area of about the same size (i.e., DuPage, Will and southern Cook counties). This worsening over a sizeable area is due to maintaining I-94 as the only principal north-south route through the county, whereas the IL 53 Freeway/Tollway Alternative better distributes traffic to the regional system via the existing I-94 and the proposed IL 53 facility.
- **Trips destined for Kenosha County area—**The IL 53 Freeway/Tollway Alternative improves travel times in southern Lake and northern Cook counties and along the I-355 corridor in DuPage County. The IL 83/US 45 with US 12 Alternative would improve travel over a 19-percent smaller area in southern Lake and northern Cook counties, and along the I-94 corridor in eastern Cook County.

The analysis demonstrates that the IL 53 Freeway/Tollway Alternative generally improves regional travel to a greater extent than the IL 83/US 45 with US 12 Alternative. This is primarily due to the IL 53 alternative creating a more balanced regional network, and therefore a more balanced distribution of regional travel.

Regional System Continuity. The analysis of regional travel also considered how each alternative would improve continuity in the regional expressway system.

- The IL 83/US 45 with US 12 Alternative would improve travel flows along I-94, which presently carries a considerable portion of the 125,000 trips passing through Lake County. This alternative improves a major link in the existing expressway system; however, it provides no substantive remedy for continuity travel issues along the region's expressway system.
- The IL 53 Freeway/Tollway Alternative would more effectively address several travel continuity issues in the region, including extending the terminus of IL 53 at Lake Cook Road to a logical system connection with I-94 near Gurnee. The current terminus of IL 53 at Lake Cook Road requires all traffic (90,000 per day) to exit the expressway and use existing arterials to reach destinations throughout Lake County. The extension of IL 53 would complete a link in the regional

TABLE 3-14

Net Traffic Analysis Zones and Geographic Area Receiving a 5-Percent Travel Time Saving, Compared to Baseline

		Lake Cook/US 12	IL 132/I-94	IL 60/I-94	Kenosha
IL 53 Freeway/ Tollway	TAZs	309	1,316	525	470
	Area km^2 mi^2	4,217 1,628	5,444 2,102	4,481 1,730	1,987 767
IL 83/US 45 with US 12	TAZs	199	590	(567) *	547
	Area km^2 mi^2	3,797 1,466	1,893 731	329 127	1,619 625

* ( ) Denotes a negative difference of more TAZs with an increase in travel time.

expressway system that would accomplish several objectives:

- Elimination of the unconventional terminus of IL 53 at Lake Cook Road that results in severe traffic congestion.
- Provision of a logical system connection, and more direct access for travelers destined for locations in central Lake, western Cook, and DuPage and Will counties.
- Provision of a north-south link that responds to a specific travel demand need, as well as providing system redundancy to better manage regional and peak hour travel.

3.6.3.2 Improve North-South Travel Capacity and Efficiency

Systemwide. The need to improve north-south travel capacity and efficiency is measured as the number of uncongested north-south lane miles in Lake County. The number of "uncongested" lane miles for each build alternative was determined by identifying those routes with a Level of Service A, B, or C during the P.M. peak travel period in the year 2020. The results of the analysis indicate that the IL 53 Freeway/Tollway Alternative would result in nearly 70 more uncongested lane miles, and improve conditions by 12 percent, while the IL 83/US 45 with US 12 Alternative would result in about 40 more uncongested lane miles, and improve conditions by 7 percent when compared to the No-Action Alternative (Baseline) as summarized in Table 3-15.

Select Trips. The LCTIP also examined the effects of the alternatives on several north-south trips in the County. This analysis examined a western, central, and eastern north-south trips. The western trip was represented by a trip from Barrington to Volo (see Table 3-16). For this trip, the IL 53 Freeway/Tollway Alternative would provide a 14-percent travel time improvement over the No-Action Alternative (Baseline), while the IL 83/US 45 with US 12 Alternative would provide an 11-percent improvement. The central trip extended from Schaumburg to Grayslake. The IL 53 Freeway/Tollway Alternative would provide a sizable travel time improvement over the No-Action Alternative (Baseline) of 17 percent, while the IL 83/US 45 with US 12 Alternative would provide a 9-percent improvement. The analysis of the eastern trip, extending from Deerfield to Waukegan, showed different results. In this case, the IL 83/US 45 Alternative with US 12 would provide a

TABLE 3-15
Uncongested North-South Travel

Alternative	Uncongested Lane Miles	% Improvement Over No-Action Alternative (Baseline)
No Action (Baseline)	530	—
IL 53 Freeway/Tollway	596	12 %
IL 83/US 45 with US 12	568	7 %

TABLE 3-16
Percent Travel Time Savings Over the No-Action (Baseline) for Three North-South Trips

	Barrington to Volo	Schaumburg to Grayslake	Deerfield to Waukegan
IL 53 Freeway/Tollway	14%	17%	13%
IL 83/US 45 with US 12	11%	9%	24%

24 percent improvement in travel time over the No-Action Alternative (Baseline) compared to a 13-percent improvement for the IL 53 Freeway/Tollway Alternative. The travel time savings ranges from 9 to 24 percent with either alternative improving travel in each case. The IL 53 Freeway/Tollway Alternative provides greater benefits to the western and central parts of the county than does the IL 83/US 45 with US 12 Alternative. In eastern Lake County, the IL 83/US 45 with US 12 Alternative improves travel more, due to a concentration of roadway improvements along the IL 21 corridor and I-94.

3.6.3.3 Improve Safety

The LCTIP developed a quantitative approach for comparing the safety performance of the No-Action (Baseline) and the build alternatives (LCTIP 2000c). The safety assessment was based upon past research of factors that influence crash rates (i.e., congestion, facility type, and access considerations) and current crash trends in Lake County. The crash rate factors were combined with specific roadway data (i.e., geometrics and traffic volumes) to predict the number and types of crashes for various roadway types. Using the assembled data, the analysis estimated the expected crash rate for the project alternatives. The findings include:

- Despite an 8-percent higher VMT than the No-Action Alternative (Baseline), the IL 53 Freeway/Tollway Alternative is expected to reduce the overall crash rate by 7 percent.
- Despite a 5-percent higher VMT than the No-Action Alternative (Baseline), the IL 83/US 45 with US 12 Alternative is expected to reduce the crash rate by 1 percent.
- The LCTIP safety assessment is intended to be a relative comparison, rather than an absolute prediction of accident experience. The results indicate that the IL 53 Freeway/Tollway Alternative is attracting more travel to safer facilities, and is expected to have an overall crash rate that is better than other alternatives.

3.6.3.4 Improve Modal Connections

Both build alternatives have the capacity for improving modal connections. Each alternative would provide opportunities for improving modal connections at the origins and destinations of modal travel. Recommendations that would improve modal connections are:

- Improved parking at existing rail stations to accommodate the additional rail patrons that access the station by automobile.
- Transportation centers that provide improved automobile access, and improved linkages for bus-to-bus and bus-to-rail transfers.
- Improved bus service that provides enhanced service to rail stations, improved service between rail stations and employment centers, and improved service to other major transportation facilities (i.e., O'Hare International Airport).
- Improved information messaging at key locations (i.e., transportation centers) that convey information on transit schedules and mode transfers and traffic signal preemption giving priority to buses.
- Park-and-ride facilities at strategic locations that allow people to drop off their cars and transfer to a bus system, carpool, vanpool, or even a commuter train if nearby.
- Improved connection between existing and planned bicycle and pedestrian paths.

In summary, the IL 53 Freeway/Tollway Alternative would offer several opportunities along each of its corridors for improved modal connections. A new highway (IL 53 Freeway/Tollway Alternative) offers strategic locations (interchange locations) for park-and-ride facilities that represent natural collection points for carpooling, vanpooling, express/trunkline bus services, and shuttle bus services to major employers. The IL 53

Freeway/Tollway Alternative would also provide an opportunity for a new bicycle/pedestrian path along the facility with connections to existing paths via local roads.

The IL 83/US 45 with US 12 Alternative would offer a number of opportunities for improved modal connections, such as improved connection between existing and planned bicycle and pedestrian paths, linkages to existing and planned rail stations and transportation centers, and for accommodation of bus routes.

3.7 Summary

The LCTIP has implemented a structured, rigorous technical process for developing and evaluating a broad range of transportation alternatives. State-of-the art technical tools and innovative techniques were used to define the transportation problems and evaluate potential solutions in a study area that spans hundreds of miles of roadways, three counties, 70 communities and 500 square miles—to an equal level of detail. This effort has been supported by extensive input from area residents, interested groups, agencies, transportation providers and elected officials.

The avoidance or minimization of impacts to environmental resources was a key consideration early and throughout the planning process. The differences in impacts across the suite of initial alternatives were not distinguishing. As a result, the evaluation process focused upon travel performance measures, which were closely linked to the project's purpose and need. On the basis of this evaluation, the IL 53 Freeway/Tollway Alternative and IL 83/US 45 with US 12 alternative were selected as finalists. The finalists were then further refined, including the development of separate population, employment and travel demand forecasts for each finalist and the No-Action Alternative (Baseline). These forecasts were used to more rigorously assess the alternative's travel performance, which are summarized in Table 3-17. In addition to the roadway elements, a comprehensive package of supporting improvements was developed, including upgrades to rail and bus service, bike and pedestrian facilities, as well as travel demand management and transportation system management strategies.

The environmental and societal impacts of the finalist build alternatives and the No-Action Alternative (Baseline) are comparatively evaluated in Section 4, *Environmental Consequences*, and a complete summary of the environmental consequences associated with the alternatives is provided at the end of the section.

TABLE 3-17
Travel Performance Summary for Finalist Build Alternatives

Alternative	Regional		Local		North-South Uncongested Lane Miles	Safety
	Geographic Area	System Continuity	Local Trips	County Routes		
IL 53 Freeway/Tollway	✓	✓		✓	✓	✓
IL 83/US 45 with US 12			✓			
A "✓" denotes the best performance by category.						

SECTION 4

Environmental Consequences

This section describes the beneficial and adverse social, economic, and environmental effects of the project alternatives and mitigation measures that would minimize harm. The information herein is intended to allow the reader to compare the environmental and socioeconomic effects of the project alternatives, including the No-Action Alternative (Baseline), the IL 53 Freeway/Tollway Alternative, and the IL 83/US 45 with US 12 Alternative.

The assessment of environmental consequences presented is based on the latest refinements to the project alternatives. The finalist alternatives were developed at a conceptual level of detail using typical cross-sectional templates (Section 3, *Alternatives*). This detail is sufficient to compare the relative environmental consequences of alternatives. Future phases of work for the preferred alternative would include the necessary detailed engineering to support construction of the facility. During these phases, detailed environmental analyses would be performed. It is also anticipated that further consideration would be given to avoiding and minimizing the environmental consequences discussed in this section.

The resource evaluations in this section relied upon existing and available data, as well as data derived from field reconnaissance for the areas affected by the alternatives. Field verification and enhancement of existing data were undertaken for selected resources (e.g., wetlands, park boundaries, cultural resources, buildings) in an effort to refine data obtained from resource agencies. Field verification of data, however, was not conducted for improvements under the No-Action Alternative (Baseline). The No-Action Alternative (Baseline) is common to both build alternatives, and so the effort required to gather the additional detail would not aid in the differentiation of the environmental consequences between build alternatives. The evaluation of the No-Action Alternative (Baseline) addresses all the resource issues but relies on existing and available data only.

The environmental consequences are presented individually for each alternative (roadway improvements only). The environmental effects of the supporting transportation improvements (e.g., transit, transportation centers) are not considered in this evaluation. Such improvements would be common to the build alternatives, so they would provide no distinguishing measure of effect for the alternatives under consideration.

4.1 Socioeconomic Impacts

4.1.1 Population and Households

The LCTIP took considerable steps to define the impacts of transportation improvements on future population and employment growth. The methodology used for this analysis was endorsed by the Northeastern Illinois Planning Commission (NIPC). These population forecasts show that Lake County is growing despite a lack of major transportation improvements; 280,000 more people are estimated to be in Lake County by 2020 under the No-Action scenario.

Each project alternative would result in slightly different population and household forecasts in 2020. Table 4-1 (on the following page) illustrates the population and household change associated with each alternative, including implementation of the supporting transportation improvements (i.e., rail and bus). There is not a wide range of difference in the forecast population or number of households between the three alternatives—less than a 4 percent difference in population (3.7 percent for the IL 53 Freeway/Tollway Alternative, and 2.5 percent for the IL 83/US 45 with US 12 Alternative), and less than 4 percent difference in the number of

households (3.8 percent for the IL 53 Freeway/Tollway Alternative, and 2.6 percent for the IL 83/US 45 with US 12 Alternative).

Taking a closer look at the population change associated with just the roadway improvements of each alternative, the IL 53 Freeway/Tollway Alternative would contribute 3.4 percent overall (27,500 residents), and the IL 83/US 45 with US 12 Alternative would contribute 2.2 percent overall (18,000 residents; see Figure 4-1). All the forecasts show major population growth in the central and western parts of the county. Further breakdown of these forecasts by township for each alternative is provided below and in Figure 4-2. Figure 4-3 illustrates the change in number of households (by township) for each alternative.

4.1.1.1 No-Action Alternative (Baseline)

Under the No-Action Alternative (Baseline), 2020 population is forecast to increase by 54 percent over the 1990 population of 516,418 to 796,942 (ACG 1999); 2020 households are forecast to increase 67 percent over 1990 households of 173,966 to 290,570 (ACG 1999). Ten townships would experience an increase of more than 75 percent in the number of new residents and households (Fremont, Lake Villa, Wauconda, Antioch, Newport, Warren, Grant, Avon, and Cuba townships), predominantly in western and central Lake County. The forecast growth extends well-established trends in the central and western parts of the county. Growth can be attributed to a number of factors, including community desires for population and economic growth, available land, reasonable land prices, and aesthetic factors (Table 4-2, on the following page). Figure 4-4 illustrates the change in population from 1990 to 2020 by NIPC analysis zone.

4.1.1.2 IL 53 Freeway/Tollway Alternative

Under the IL 53 Freeway/Tollway Alternative, 2020 population in Lake County would increase by 29,339,[1] or 3.7 percent over the No-Action Alternative (Baseline) (from 796,942 to 826,281); number of households would increase by 10,962, or 3.8 percent (from 290,570 to 301,532). The greatest population and household increases from 1990 levels

TABLE 4-1
Forecast Population and Household Growth for Each Alternative
(includes contribution of supporting transportation improvements, such as rail, bus)

Alternative	Population		Households	
	2020 Forecast	% Change	2020 Forecast	% Change
No-Action	796,942	—	290,570	—
IL 53 Freeway/Tollway	29,339 [a]	3.7	10,962 [b]	3.8
IL 53 Freeway/Tollway (roadway improvements only)	27,500	3.4	—	—
IL 83/US 45 with US 12	19,968 [a]	2.5	7,639 [b]	2.6
IL 83/US 45 with US 12 (roadway improvements only)	18,000	2.2	—	—

[a] Projected population increase from No-Action Alternative (Baseline). The population increase attributed to the roadway improvements is 27,500 for the IL 53 Freeway/Tollway Alternative and 18,000 for IL 83/US 45 with US 12 Alternative. The remainder—2,000 people—is attributed to Elgin, Joliet, and Eastern commuter rail improvement.
[b] Projected household increase from the No-Action Alternative (Baseline).
Source: ACG 1999; CATS 1997a; ACG 2000

[1] Includes the population effect of both the roadway and transit (EJ&E) improvements.

generally would occur in the same townships as the No-Action Alternative (Baseline) (Table 4-3, on the following page). Looking at the change between this alternative and No-Action, additional population growth would occur in the central townships of Fremont and Warren, and Shields Township along the northern shore under this alternative. Fremont Township would experience 14.7 percent of the additional growth, Warren Township 11.2 percent, and Shields Township 10.7 percent. Figure 4-5 illustrates the 2020 population effects of the IL 53 Freeway/Tollway Alternative by NIPC analysis zones.

4.1.1.3 IL 83/US 45 with US 12 Alternative

Under the IL 83/US 45 with US 12 Alternative, 2020 population is forecast to increase by an additional 19,968,[2] or 2.5 percent over the No-Action Alternative (Baseline) (from 796,942 to 816,910); households are forecast to increase 2.6 percent over the No-Action Alternative (Baseline) (from 290,570 to 298,209). The greatest

TABLE 4-2
Population and Household Forecasts: No-Action Alternative (Baseline)

Township	Population				Households			
	1990 Census	2020 Forecast	Change from 1990	% Change	1990 Census	2020 Forecast	Change from 1990	% Change
Antioch	18,046	37,571	19,525	108.2	6,846	14,961	8,115	118.5
Avon	35,989	65,780	29,791	82.8	11,846	24,103	12,257	103.5
Benton-Zion	35,590	49,427	13,837	38.9	11,888	17,578	5,690	47.9
Cuba	14,118	24,690	10,572	74.9	5,128	9,681	4,553	88.8
Deerfield-W. Deerfield	64,394	73,270	8,876	13.8	22,315	27,801	5,486	24.6
Ela	32,433	47,491	15,058	46.4	10,161	16,031	5,870	57.8
Fremont	14,280	43,069	28,789	201.6	4,699	15,599	10,900	232.0
Grant	14,423	26,388	11,965	83.0	5,465	10,687	5,222	95.6
Lake Villa	20,764	48,482	27,718	133.5	6,818	17,482	10,664	156.4
Libertyville	42,436	61,721	19,285	45.4	14,874	23,409	8,535	57.4
Newport	3,561	7,320	3,759	105.6	1,169	2,605	1,436	122.8
Shields	43,414	60,134	16,720	38.5	9,930	13,480	3,550	35.8
Vernon	51,141	68,087	16,946	33.1	17,571	25,459	7,888	44.9
Warren	34,785	71,030	36,245	104.2	13,049	28,715	15,666	120.1
Wauconda	12,859	27,474	14,615	113.7	4,610	10,821	6,211	134.7
Waukegan	78,185	85,008	6,823	8.7	27,597	32,160	4,563	16.5
Total	**516,418**	**796,942**	**280,524**	**54.3**	**173,966**	**290,570**	**116,604**	**67.0**

Sources: NIPC 1990; ACG 1999 (Note: Township values are rounded)

[2]Includes the population effect of both roadway and transit (EJ&E) improvements.

population and household increases from 1990 levels generally would occur in the same townships as the No-Action Alternative (Baseline) (Table 4-4, on the following page). Looking at the change between this alternative and the No-Action Alternative (Baseline), additional population growth would occur in the central townships of Warren and Fremont, and Newport Township to the north. Warren Township would experience 11.8 percent of the additional growth, Fremont Township 6.1 percent, and Newport Township 5.7 percent. Figure 4-6 illustrates the population effects of the IL 83/US 45 with US 12 Alternative by NIPC analysis zones.

4.1.2 Community and Land Use Changes

Carefully planned roadway improvements can foster beneficial results, such as making the community more cohesive and serving future growth and planning policies. Lack of planning for roadway improvements can bring undesirable effects to a community, including fracturing community cohesion. The discussion below describes the potential effects of each alternative on community cohesion and developable lands.

4.1.2.1 No-Action Alternative (Baseline)

Under the No-Action Alternative (Baseline), improvements would traverse 30 communities within Lake County (Figure 4-7). Generally,

TABLE 4-3
Population and Household Forecasts, IL 53 Freeway/Tollway Alternative Change from No-Action Alternative (Baseline) (includes contribution of supporting transportation improvements such as rail, bus)

Township	Population				Households			
	1990 Census	2020 Forecast	Change from No-Action	% Change	1990 Census	2020 Forecast	Change from No-Action	% Change
Antioch	18,046	39,007	1,436	3.8	6,846	15,682	721	4.8
Avon	35,989	68,108	2,328	3.5	11,846	25,232	1,129	4.7
Benton-Zion	35,590	51,587	2,160	4.4	11,888	18,479	901	5.1
Cuba	14,118	22,413	(2,277)	(9.2)	5,128	8,750	(931)	(9.6)
Deerfield-W. Deerfield	64,394	74,038	768	1.0	22,315	27,956	155	0.6
Ela	32,433	45,133	(2,358)	(5.0)	10,161	15,255	(775)	(4.8)
Fremont	14,280	49,418	6,350	14.7	4,699	18,018	2,419	15.5
Grant	14,423	26,543	155	0.6	5,465	10,912	225	2.1
Lake Villa	20,764	50,648	2,166	4.5	6,818	18,303	821	4.7
Libertyville	42,436	61,969	247	0.4	14,874	23,775	366	1.6
Newport	3,561	7,736	416	5.7	1,169	2,792	187	7.2
Shields	43,414	66,553	6,419	10.7	9,930	14,495	1,015	7.5
Vernon	51,141	69,059	972	1.4	17,571	25,824	365	1.4
Warren	34,785	78,986	7,956	11.2	13,049	32,325	3,611	12.6
Wauconda	12,859	27,636	162	0.6	4,610	10,891	70	0.6
Waukegan	78,185	87,446	2,438	2.9	27,597	32,844	684	2.1
Total	**516,418**	**826,281**	**29,339**	**3.7**	**173,966**	**301,532**	**10,962**	**3.8**

Sources: NIPC 1990; CATS 1997a (Note: Township values are rounded)

the No-Action Alternative (Baseline) maintains the present roadway network and would not affect community or neighborhood function. The existing roadway network would continue to define the circulation path for entering, leaving, and traveling within the communities. The edge of the roadway improvements would encroach on adjacent properties and in some cases would result in building displacement. The displacements would be scattered throughout the county; therefore, no substantive change in the character of community building stock would occur. Road widening typically would maintain property access, but barrier medians would be installed as part of many roadway improvements, requiring access to be consolidated for some properties. For larger combined driveways and cross streets, a break in the median would be provided to allow left-turn access.

The relation of transportation improvements to land use has been the topic of countless research studies over the years. To determine how this alternative may influence land use decisions, the availability of developable lands (primarily agricultural lands) within 0.8 km (0.5 mi) of the improvements was used as an indicator of the potential for shifting growth. Properties directly adjacent to the proposed improvements are already 62 percent developed, but 2,580 ha (6,375 ac) of land within 0.8 km (0.5 mi) of the improvements are undeveloped and potentially vulnerable to development. Development in the vicinity of the No-Action Alternative (Baseline) is occurring at a rapid pace. In the last 4 years,

TABLE 4-4
Population and Household Forecasts, IL 83/US 45 with US 12 Alternative Change from No-Action Alternative (Baseline) (includes contribution of supporting transportation improvements, such as rail, bus)

Township	Population				Households			
	1990 Census	2020 Forecast	Change from No-Action	% Change	1990 Census	2020 Forecast	Change from No-Action	% Change
Antioch	18,046	38,073	502	1.3	6,846	15,165	204	1.4
Avon	35,989	66,907	1,127	1.7	11,846	24,563	460	1.9
Benton-Zion	35,590	50,930	1,503	3.0	11,888	18,121	542	3.1
Cuba	14,118	24,653	(37)	(0.2)	5,128	9,666	(15)	(0.2)
Deerfield-W. Deerfield	64,394	73,207	(63)	(0.1)	22,315	27,792	(9)	0.0
Ela	32,433	47,858	366	0.8	10,161	16,153	122	0.8
Fremont	14,280	45,702	2,634	6.1	4,699	16,560	962	6.2
Grant	14,423	26,447	60	0.2	5,465	10,743	56	0.5
Lake Villa	20,764	49,200	719	1.5	6,818	17,749	267	1.5
Libertyville	42,436	61,982	261	0.4	14,874	23,603	195	0.8
Newport	3,561	7,738	4187	5.7	1,169	2,755	150	5.8
Shields	43,414	62,051	1,918	3.2	9,930	13,925	445	3.3
Vernon	51,141	68,840	753	1.1	17,571	25,761	303	1.2
Warren	34,785	79,403	8,373	11.8	13,049	32,126	3,411	11.9
Wauconda	12,859	27,474	0	0.0	4,610	10,821	0	0.0
Waukegan	78,185	86,444	1,436	1.7	27,597	32,705	554	1.7
Total	**516,418**	**816,910**	**19,968**	**2.5**	**173,966**	**298,209**	**7,640**	**2.6**

Source: NIPC 1990; ACG 2000 (Note: Township values are rounded)

344 ha (850 ac) of vacant land have been converted to development, representing a loss of about 1.4 percent of undeveloped land near the alternative improvements. Development patterns also show that 99 percent of the undeveloped land in the No-Action influence zone is already bounded by development of more than 50 percent. This strongly suggests that most of the open lands near the No-Action Alternative (Baseline) are vulnerable to development for various reasons, including transportation improvements, and would not be sustainable over the long term without restrictive land use policies or outright purchase of development rights.

4.1.2.2 IL 53 Freeway/Tollway Alternative

This alternative would traverse 15 communities (Figure 4-8). The proposal to extend IL 53 north and upgrade IL 120 has been part of the region's long-range transportation plan since 1960; therefore, many communities nearby have had the opportunity to consider and plan for compatible land uses adjacent to the proposed facility. The proposed alignment avoids community centers that have an established sense of place and character. Most of the alignment runs through areas characterized as large lot residential development, particularly the north-south segment of the alternative. The alignment generally skirts established subdivisions; however, in one case the alignment bisects several developments in the Mundelein area. The right-of-way for the corridor was purchased prior to the full build out of these subdivisions, which has preserved and delineated the roadway footprint. Nonetheless, perceived loss of neighborhood cohesion is likely if the roadway is constructed.

A major transportation facility, such as the IL 53 Freeway/Tollway Alternative, represents a major new element for some communities in central Lake County. New highway facilities always raise the question of fit. In cases where properties are already developed adjacent to the proposed improvement, facility design considerations could be developed to protect these areas from typical highway related concerns (i.e., noise and visual concerns). Design considerations could include noise barriers, landscaping, landscape berms, buffer areas, and roadway lighting sensitive to adjacent land uses. In cases where adjacent lands are undeveloped, additional care should be exercised in planning and zoning to provide for land use patterns that best coincide with a major transportation facility. This could include locating the most traffic intensive uses near the corridor or at interchange locations, while the suburban land uses would extend away from the corridor. With well-managed land use policy and plans, this alternative could advantageously address existing development with sensitive design and accommodate growth with quality development.

About 35 percent of the land directly adjacent to the IL 53 Freeway/Tollway Alternative is developed. Within 0.8 km (0.5 mi) of these improvements, there are 2,469 ha (6,100 ac) of undeveloped land. About 10 percent of these lands are bounded by development by less than 50 percent and have the potential to be sustained as open land over the long term. The IL 53 Freeway/Tollway Alternative is completely within municipal planning boundaries. Similar to the No-Action Alternative (Baseline), the remaining open lands would be vulnerable to development for various reasons other than transportation and would not be sustainable in the future without restrictive land use policies or outright purchase of development rights.

Another impact commonly associated with a new highway is the establishment of new borders that tend to define community or neighborhood edges. The perception of a barrier, however, would not alter travel patterns on state, county, and town roads within the communities. The circulation patterns on the roadway system would be virtually unchanged for vehicles, bicycles, pedestrians, emergency services, and school bus routes. Major crossing routes would be served with an interchange, and secondary routes would cross over or under the new facility. Therefore, the existing roadway

connectivity would still be present under this alternative. In some instances, a few minor roads would be terminated to through travel at the new roadway. Some minor inconveniences in access would occur at the neighborhood level, but in all cases the amount of adverse travel would be insignificant. Crossing road improvements are planned at all the major interchange locations. These improvements may alter access to businesses and homes near the interchange, permitting right-in and right-out turning movements only.

Changes in accessibility can cause advantages and disadvantages. Advantages are conferred to parcels of land near interchanges, which "create unique accessibility and exposure advantages" for sites at interchanges (Downs 1969). The IL 53 Freeway/Tollway Alternative would be designed as an access-controlled facility with interchanges at major crossing roads. Areas near planned interchanges would become more valuable for development because of improved access and visibility (Downs 1969). This alternative would include 12 new interchanges, including Lake-Cook Road, IL 22, Midlothian Road, Peterson Road, US 45, Hunt Club Road, Milwaukee Avenue, I-94, O'Plaine Road, Alleghany Road, Fairfield Road, and Wilson Road. In each case, local municipalities have zoning that applies to the interchange locations. The predominant zoned land use is residential, which reflects current land use policy.

4.1.2.3 IL 83/US 45 with US 12 Alternative

This alternative would be routed through 21 communities (Figure 4-9). The improvements would be on both existing and new alignment. The improvements following existing routes typically would have a 6-lane cross-section that would require considerable displacement of residential and commercial structures. The existing character of these corridors can be expected to change with greater build-out of development or different land uses than already exists.

The IL 83/US 45 with US 12 Alternative would cause only minor changes to property access along the improved routes. Over 70 percent of the improved routes would be on existing roadways, and current property access would be generally provided with some modifications including consolidating ingress and egress in areas of concentrated development and at intersections. Most major roadway intersections would be at-grade intersections with the exception of a new interchange at IL 83 and IL 22. Intersections would be upgraded to accommodate high volume turning movements. To maintain efficient traffic movement and operations at the intersections, access control to nearby properties would be required consisting of limiting the number of ingress and egress points, and limiting turning movements to right-in and right-out.

The IL 83/US 45 with US 12 Alternative has 2,019 ha (4,990 ac) of undeveloped land within 0.8 km (0.5 mi) of the improvements. Because this alternative largely involves improvements to existing facilities there is a substantial amount of existing development (about 56 percent) directly adjacent to the proposed improvements. Similarly, most of the developable lands (97 percent) within 0.8 km (0.5 mi) of the improvements are already surrounded by development, and would be vulnerable to future development for a variety of reasons. It would be unlikely that these open lands would be sustainable without aggressive land use policies or outright purchase of development rights.

Bypasses were incorporated along US 45, IL 21, IL 60, and IL 120 to avoid community impacts to downtown Mundelein, downtown Libertyville, through the Diamond Lake area (a residential area), and through a commercial corridor in Grayslake. In all four of these locations, through-town improvements were determined to be unfeasible because of the disruption and change in character to the areas that widening would cause. Bypasses were selected that minimized displacements, while providing additional capacity to the system and helping to relieve congestion on parallel existing routes. The Mundelein bypass would share the same alignment as the IL 53 Freeway/Tollway Alternative north of IL 60. This area is characterized by large scattered

subdivisions, some of which would be traversed by the bypass. Other subdivisions north of this point would be traversed by the facility causing proximity impacts. A subdivision near the intersection of Diamond Lake Road and IL 83 would also be traversed by the Mundelein bypass, requiring the displacement of many residences. The proximity of the facility to the neighborhood would cause impacts that would be addressed with facility design considerations. Another bypass is proposed around the downtown center of Libertyville and would be routed along St. Mary's road. The proposal includes widening St. Mary's road to a 4-lane facility (currently 2 lanes). This roadway improvement would encroach upon adjacent properties and in a few cases would require building displacements. The extent of the improvements, however, would not materially alter the expansive front yards characteristic of most residences. The presence of a wider roadway footprint in this area would result in the roadway being a more prominent feature in the neighborhood landscape, but neighborhood cohesion would be unaffected—the presence of a wider road would not change the functional interactions that occur in the corridor. A bypass of Grayslake would traverse several subdivisions that were laid out in recognition of a future roadway.

4.1.3 Residential Relocations

4.1.3.1 No-Action Alternative (Baseline)

Sixty-seven residences would be displaced under the No-Action Alternative (Baseline) (Figure 4-10). Based on the 2020 No-Action Alternative (Baseline) forecast, average household size of 2.74 in Lake County (derived from the No-Action Alternative (Baseline) 2020 population and household forecasts), 184 residents would be relocated.

4.1.3.2 IL 53 Freeway/Tollway Alternative

One hundred thirteen residences and 45 ancillary buildings (garages, sheds, etc.) would be displaced as a result of the IL 53 Freeway/Tollway Alternative (Figure 4-11). Of the residences affected, 85 buildings would be single-family homes and 28 units would be in multi-family structures. Most of the multi-family impact occurs at Bourbon Square Townhouses, located near IL 53, south of Lake-Cook Road in Palatine.

Most of the residences to be displaced would be owner-occupied, as 74 percent of all housing in the study area is owner-occupied. There is no shortage of replacement housing across various price ranges in the study area, as evidenced by the residential development that is occurring throughout the area. Based on the 2020 IL 53 Freeway/Tollway Alternative forecast, average household size of 2.74 (derived from the IL 53 Freeway/Tollway Alternative 2020 population and household forecasts), 310 residents would be relocated.

Acquisition, relocation activities, and benefits would comply with provisions of the Uniform Relocation Assistance and Real Property Acquisition Policies Act of 1970, as amended, and both the Illinois Department of Transportation (IDOT) *Land Acquisition Procedures Manual*, or the Illinois State Toll Highway Authority (ISTHA) *Guidelines for the Reimbursement of Costs Incurred in the Displacement of Residences and Businesses.* Relocation resources are available to all relocatees without discrimination.

4.1.3.3 IL 83/US 45 with US 12 Alternative

One hundred eighty-seven residences and 25 ancillary buildings (garages, sheds, etc.) would be displaced as a result of the IL 83/US 45 with US 12 Alternative (Figure 4-12). Of the residences affected, 114 buildings would be single-family homes and 73 units would be in multi-family structures. Most of the multi-family units are along US 12, south of Lake-Cook Road in Palatine. Complexes that would be affected include Turtle Creek Apartments, Port of Call Apartments, Kingsbrooke Townhomes, and Bourbon Square.

Under this alternative, about half of the displaced residences would be rental units and half owner-occupied housing. There is no shortage of replacement housing of either

rental or owner-occupied units across various price ranges in the study area, as evidenced by the residential development occurring throughout the county. Based on the 2020 IL 83/US 45 with US 12 Alternative forecast, average household size of 2.74 in Lake County (derived from the IL 83/US 45 with US 12 Alternative 2020 population and household forecasts), 512 residents would be relocated under this alternative.

Acquisition, relocation activities, and benefits would comply with provisions of the Uniform Relocation Assistance and Real Property Acquisition Policies Act of 1970, as amended, and the IDOT *Land Acquisition Procedures Manual* or the ISTHA *Guidelines for the Reimbursement of Costs Incurred in the Displacement of Residences and Businesses.* Relocation resources are available to all relocatees without discrimination.

Table 4-5 summarizes the anticipated residences and ancillary buildings (garages, sheds, etc.) that would be displaced as a result each alternative.

4.1.4 Business Relocations

4.1.4.1 No-Action Alternative (Baseline)

The No-Action Alternative (Baseline) would displace 23 businesses (Figure 4-10).[3]

4.1.4.2 IL 53 Freeway/Tollway Alternative

The IL 53 Freeway/Tollway Alternative would displace nine businesses (Figure 4-11). These businesses include a mix of commercial, retail and recreational sites (Table 4-6, on the following page). Roughly 178 employees are associated with the displaced businesses, based on business type. Right-of-way would also be required from an additional 32 businesses for this alternative. Although 109 parking spaces would be affected from 6 of the 32 businesses, representing 21 percent of the total parking spaces available at those businesses, there would be replacement parking available on the property or in immediately adjacent areas. Therefore with replacement parking the net impact to parking would be zero.

Certain types of businesses are more sensitive to roadway location than others. Retail businesses and those dependent on accessibility and high visibility are more directly affected by their physical proximity to a roadway. Some retail businesses are likely to develop near interchanges to serve travelers. Others may relocate to interchange areas from other areas in the county. This is often interpreted as growth, but in many instances it amounts only to a redistribution of facilities.

The IL 53 extension provides improved access and mobility to the area that, combined with the appropriate utility infrastructure, could attract business development. The IL 53 Freeway/Tollway Alternative could also cause some minor changes in access for businesses located near cross road improvements. Median barriers and improved intersections would restrict access, possibly requiring right-in,

TABLE 4-5
Residential Relocation Summary

	No-Action	IL 53 Freeway/Tollway	IL 83/US 45 with US 12
Residential Relocations (Additional Ancillary Outbuildings associated with Residential Relocations)	67	113 (45)	187 (25)

[3]No-Action Alternative (Baseline) business displacements were not field verified as for the build alternatives, therefore no additional information is available on these 23 businesses.

right-out access in some locations.

4.1.4.3 IL 83/US 45 with US 12 Alternative

The IL 83/US 45 with US 12 Alternative would displace 113 commercial buildings containing 195 businesses (Figure 4-12). The businesses include a mix of retail (restaurants, hardware stores, and gas stations), commercial office, and industrial (Table 4-7, on the following page). Roughly 3,428 employees associated with the displaced businesses, based on business type.

Although buildings would not be impacted, right-of-way would also be required from an additional 152 businesses along the alignment. Approximately 2,514 parking spaces would be impacted at those businesses. This parking represents 71 percent of the total parking spaces available at those businesses. Most of this parking could be replaced on the property or in immediately adjacent areas. Only 258, or 7.3 percent of the total spaces would be displaced.

Other impacts to businesses both adjacent to and near the proposed improvements could include changes in access to property. Except for improvements to I-94, the IL 83/US 45 with US 12 improvements would result in upgraded arterial facilities (as opposed to a freeway or tollway facility). Barrier medians are assumed along all arterials to be improved, whether 4-lane or 6-lane. Access would be consolidated where possible. For large, combined driveways and cross streets, a break in the median generally would be provided to allow for left-turn access. However, most individual parcels could not be given a median break and would be limited to right-in, right-out access. U-turns would need to be accommodated at many intersections, resulting in adverse travel for property owners and business patrons.

4.1.5 Employment

Figure 4-13 compares the employment increases for the No-Action Alternative (Baseline), IL 53 Freeway/Tollway, and IL 83/US 45 with US 12 Alternatives**.**

4.1.5.1 No-Action Alternative (Baseline)

Under the No-Action Alternative (Baseline), employment is forecast to grow by 160,939 between 1990 and 2020, or 70 percent (Table 4-8, on page 4-12). The greatest employment growth, in terms of increase in the total number of employees, is expected to occur in Vernon, Warren, and Libertyville townships (in central Lake County) as well as in Deerfield and West Deerfield townships,

TABLE 4-6
Displaced Businesses, IL 53 Freeway/Tollway Alternative

Road	Number of Displaced Structures by Business Type	Estimated Number of Employees Associated with the Displaced Business[a]
IL 120	1 equestrian stable	9
IL 120	1 nursery	17
IL 120	1 school bus service	38
IL 120	1 golf driving range	9
IL 53 (feeder)	1 auto sales	21
IL 53	2 retail sale	50
IL 53	2 nurseries	34
Total	**9**	**178**

[a]Source: *Trip Generation Manual* (6th ed.), Institute of Transportation Engineers 1997.

TABLE 4-7

Displaced Businesses, IL 83/US 45 with US 12 Alternative

Road	Number of Displaced Structures by Business Type	Estimated Number of Employees Associated with the Displaced Business*
IL 120 (both mainline and feeder road impacts)	2 retail sales	50
	1 gas station	5
	1 strip mall	50
	1 nursery	17
	1 school bus service	38
	1 church	11
IL 21 (both mainline and feeder road impacts)	8 restaurants	200
	2 banks	32
	3 commercial offices	519
	2 hotels	24
	10 retail sales	250
	1 corner grocery store	10
	2 medical offices	78
	6 gas stations	30
	1 fast food restaurant	20
	2 recreation/cultural center office	18
	2 strip malls	100
IL 83/US 45 (both mainline and feeder road impacts)	5 restaurants	125
	2 banks	32
	2 commercial offices	346
	1 hotels	12
	8 retail sales	200
	1 corner grocery store	10
	2 medical offices	78
	5 gas stations	25
	2 auto repair	10
	5 fast food restaurant	100
	1 nursery	17
	1 auto sales	21
	2 strip malls	100
	2 building materials/storage	28
US 12 (both mainline and feeder road impacts)	6 restaurants	150
	2 commercial offices	346
	1 hotels	12
	3 retail sales	75
	5 gas stations	25
	3 auto repair	15
	1 auto sales	21
	4 strip malls	200
	1 entertainment	14
	2 building materials/storage	14
Total	**113**	**3,428**

*Source: *Trip Generation Manual* (6th ed.), Institute of Transportation Engineers 1997

located southeast Lake County. These townships enjoy good access to I-94 and have been where the majority of employers have located over the past 30 years. In terms of greatest percent increase, Fremont township is forecast to increase by 386 percent (an additional 12,784 employees).

4.1.5.2 IL 53 Freeway/Tollway Alternative

Under the IL 53 Freeway/Tollway Alternative, total employment in Lake County would increase to 393,989, an increase of 165,383 over 1990 levels. This is an increase of 4,444 jobs over the No-Action Alternative (Baseline) (Table 4-9, on the following page). The pattern of new job growth from 1990 conditions is similar to that under the No-Action Alternative (Baseline); Vernon, Warren, Libertyville and Deerfield/West Deerfield townships would see the greatest number of new jobs. Looking at the percent change between this alternative and the No-Action Alternative (Baseline), this alternative would provide additional employment growth in the southern townships of Vernon and Ela, and Fremont township in central Lake County. Vernon township would experience 5.3 percent additional growth, and Fremont and Ela townships would experience 4.5 percent. Figure -14 illustrates the employment effects of the IL 53 Freeway/Tollway Alternative by NIPC analysis zones.

4.1.5.3 IL 83/US 45 with US 12 Alternative

Under the IL 83/US 45 with US 12 Alternative, there would be 393,746 jobs in Lake County in 2020, an increase of 165,040 jobs over 1990 levels (Table 4-10, on the following page). This represents an increase of 4,201 jobs over the No-Action Alternative (Baseline). The pattern of where new job growth would occur from

TABLE 4-8
Employment Forecast, No-Action Alternative (Baseline)

Township	1990	2020 Forecast	Change from 1990	% Change
Antioch	4,561	8,826	4,265	93.5
Avon	8,609	17,354	8,745	101.6
Benton-Zion	6,436	10,721	4,285	66.6
Cuba	9,323	11,224	1,901	20.4
Deerfield-W. Deerfield	34,693	49,946	15,253	44.0
Ela	13,718	24,496	10,778	78.6
Fremont	3,312	16,096	12,784	386.0
Grant	3,688	4,847	1,159	31.4
Lake Villa	2,968	7,622	4,654	156.8
Libertyville	38,021	56,498	18,477	48.6
Newport	966	2,924	1,958	202.7
Shields	20,346	24,250	3,904	19.2
Vernon	28,028	65,924	37,896	135.2
Warren	17,599	42,647	25,048	142.3
Wauconda	4,297	8,974	4,677	108.9
Waukegan	32,041	37,196	5,155	16.1
Total	**228,606**	**389,545**	**160,939**	**70.4**

Sources: NIPC 1990; ACG 1999 (Note: Township values are rounded)

TABLE 4-9
Employment Forecast, IL 53 Freeway/Tollway Alternative

Township	1990 Population	2020 Forecast	Change from No-Action Alternative	% Change
Antioch	4,561	8,395	(431)	(4.9)
Avon	8,609	17,557	203	1.2
Benton-Zion	6,436	10,918	196	1.8
Cuba	9,323	11,606	382	3.4
Deerfield-W. Deerfield	34,693	49,990	44	0.1
Ela	13,718	25,596	1,100	4.5
Fremont	3,312	16,826	730	4.5
Grant	3,688	5,015	169	3.5
Lake Villa	2,968	7,534	(89)	(1.2)
Libertyville	38,021	55,661	(837)	(1.5)
Newport	966	2,927	3	0.1
Shields	20,346	24,173	(77)	(0.3)
Vernon	28,028	69,406	3,482	5.3
Warren	17,599	41,975	(672)	(1.6)
Wauconda	4,297	9,181	207	2.3
Waukegan	32,041	37,229	33	0.1
Total	**228,606**	**393,989**	**4,444**	**1.1**

Sources: NIPC 1990; CATS 1997a (Note: Township values are rounded)

TABLE 4-10
Employment Forecast, IL 83/US 45 with US 12 Alternative

Township	1990 Population	2020 Forecast	Change from No-Action Alternative	% Change
Antioch	4,561	8,718	(108)	(1.2)
Avon	8,609	17,362	8	0.0
Benton-Zion	6,436	10,850	128	1.2
Cuba	9,323	11,574	350	3.1
Deerfield-W. Deerfield	34,693	49,946	0	0.0
Ela	13,718	25,271	775	3.2
Fremont	3,312	16,398	303	1.9
Grant	3,688	4,907	61	1.3
Lake Villa	2,968	7,576	(47)	(0.6)
Libertyville	38,021	57,721	1,222	2.2
Newport	966	2,924	0	0.0
Shields	20,346	24,489	239	1.0
Vernon	28,028	66,309	385	0.6
Warren	17,599	43,467	820	1.9
Wauconda	4,297	9,039	65	0.7
Waukegan	32,041	37,196	0	0.0
Total	**228,606**	**393,746**	**4,200**	**1.1**

Sources: NIPC 1990; ACG 2000 (Note: Township values are rounded)

1990 conditions is similar to that under the No-Action Alternative (Baseline). Vernon, Libertyville, Warren, and Deerfield/West Deerfield townships would see the greatest number of new jobs. Looking at the percent change between this alternative and the No-Action Alternative (Baseline), this alternative would provide additional employment growth in the southern townships of Ela and Cuba. Ela Township would experience 3.2 percent additional growth, and Cuba township would experience 3.1 percent. Figure 4-15 illustrates the employment effects of the IL 83/US 45 with US 12 Alternative by NIPC analysis zones.

4.1.6 Tax Revenues

A short-term tax revenue loss in the region will result from converting taxable land into a nontaxable transportation use. To evaluate tax losses, information was obtained from the Lake County Tax Assessor's office. Values of the taxable properties to be acquired for right-of-way were estimated and separated into commercial and residential when possible due to different tax rates. This assessment included the value of land and improvements to the land (i.e., structures on the property).

Table 4-11 summarizes the results of this analysis.

The tax loss analysis shows that annual assessed value losses are estimated to be 0.20 percent for the No-Action Alternative (Baseline), 0.30 percent for the IL 53 Freeway/Tollway Alternative, and 0.47 percent for the IL 83/US 45 with US 12 Alternative. The potential loss for any alternative would be less than 0.50 percent, so it is likely that no taxing district would suffer a loss greater than 10 percent of its current tax base.

New development resulting from improved accessibility provided by the project may be added to the tax rolls. This could result in an increase in assessed valuation because of the new development and an overall increase in total taxes collected. In addition, an increase in tax revenues may result from an increase in property values due to the improved accessibility provided by either build alternative.

4.1.7 Environmental Justice

4.1.7.1 Racial, Ethnic, and Low-Income Groups

This section describes the potential for disproportionate impacts to low-income and minority populations that could occur with the project alternatives. The assessment included a technical analyses to determine potential effects and the use of public involvement activities that included all residents and population groups in the study process. It did not exclude any person based on income, race, color, religion, national origin, sex, age, or handicap. For each alternative, the influence area is defined by the census tracts bordering the proposed improvements. A disproportionate impact to these populations exists when they bear more than their "fair share." Compared to the general population, it was determined that there would be no disproportionate impact to low-income populations (in accordance with Health and Human Services Poverty Guidelines) or minority populations within the influence area of the alternatives.

TABLE 4-11
Estimated Tax Loss Summary, by Alternative

Alternative	Assessed Value in 1998 (Lake County)	Portion Converted to Nontaxable Use	Percent of Total Assessed Value Converted
No-Action	$16.1 billion	$32.2 million	0.20
IL 53 Freeway/Tollway	$16.1 billion	$48.2 million	0.30
IL 83/US 45 with US 12	$16.1 billion	$76.1 million	0.47

No-Action Alternative (Baseline).
The detailed analysis of the project influence area for the No-Action Alternative (Baseline) showed no disproportionate impact to low-income and minority populations. The analysis showed that the median household income in the influence area was $57,000 or 25 percent greater than the countywide median household income ($46,047). Additionally, the examination of minority populations showed that only 8 percent of the population in the influence area is minority, well below the countywide average of 12.6 percent.

Further analysis show isolated areas of minority populations in Gurnee/Waukegan, Mundelein/Vernon Hills and Buffalo Grove. The census information shows that at the block group level, the potential exists for direct impact to minority populations in the Gurnee/Waukegan area near Martin Luther King Road and IL 131, in the Mundelein/ Vernon Hills area near Butterfield Road and IL 60, and near Lake-Cook Road and US 45. Any displacement to residential or businesses would be small.

IL 53 Freeway/Tollway Alternative.
The detailed analysis of the project influence area for the IL 53 Freeway/Tollway Alternative showed no disproportionate impact to low-income and minority populations. The analysis showed that the median household income in the influence area was $49,279 or 7 percent greater than the countywide median household income ($46,047). Additionally, the examination of minority populations showed that only 6 percent of the population in the influence area is minority, well below the county average of 12.6 percent.

Further analysis of this alternative showed isolated areas of minority populations in Gurnee/Waukegan. Taking a closer at the census information, at the block group level, there would be the potential for direct impact to minority populations in the Gurnee/ Waukegan area near IL 120 and O'Plaine Road. Any displacement to residential or businesses would be small.

IL 83/US 45 with US 12 Alternative.
The detailed analysis of the project influence area for the IL 83/US 45 with US 12 Alternative showed no disproportionate impact to low-income and minority populations. The analysis showed that the median household income in the influence area was $58,374 or 27 percent greater than the countywide median household income ($46,047). Additionally, the examination of minority populations showed that only 6 percent of the population in the influence area is minority, well below the countywide average of 12.6 percent.

Further analysis show isolated areas of minority populations in Mundelein/Vernon Hills. The census information at the block group level shows the potential exists for direct impact to minority populations in the Mundelein/Vernon Hills area near IL 60 and IL 83, and IL 60 and US 45. Any displacement to residential or businesses would be small.

4.1.7.2 Summary of Environmental Justice

An assessment of environmental justice also includes considerations of other factors such as environmental health effects of air and noise pollution upon low-income and minority populations. The air quality analysis (Section 4.4, *Air Quality*) showed that none of the project alternatives would cause exceedances of national ambient air quality standard for carbon monoxide. The noise analysis (Section 4.5, *Noise*) showed that, for all alternatives near the minority populations discussed above, the potential exists for noise volumes either approaching or exceeding the Noise Abatement Criteria (NAC) for residential areas. Noise abatement measures at those locations and others will be considered in the analysis of the preferred alternative.

In summary, no disproportionately high or adverse impacts on minority and low-income populations would result from any alternative.

4.1.8 Public Services and Facilities

4.1.8.1 No-Action Alternative (Baseline)

The No-Action Alternative (Baseline) would not affect municipal or public facilities in Lake County, nor would it provide distinct opportunities for facility enhancements.

4.1.8.2 IL 53 Freeway/Tollway Alternative

The IL 53 Freeway/Tollway Alternative would have minimal affect upon public service facilities. The Church of the Nazarene would lose about 2 percent of its parking with this alternative. The church is located in Mundelein on the east side of the proposed IL 53 alignment and on the south side of IL 176 (Maple Street). Sufficient parking would remain for typical church activities. Other facilities, such as wastewater treatment plants, schools, municipal buildings, and hospitals, would not be affected.

The alternatives would provide numerous opportunities for new bicycle travel. Inclusion of a new bicycle/pedestrian path along the proposed improvements would provide direct and indirect connections to existing paths including the Robert McClory Path and the Des Plaines River Trail. Potential connections between a new bicycle/pedestrian path would be considered for rail stations and employment centers. Candidate facilities near the project alternative are Grayslake and Prairie Crossing/Libertyville rail stations, and business centers such as Kemper Insurance, Motorola, and Baxter Healthcare. The promotion of nonmotorized travel for work trips would improve traffic operations to a minor degree.

4.1.8.3 IL 83/US 45 with US 12 Alternative

This alternative would affect nine public facilities. As many as five buildings may be displaced by this alternative, and four additional facilities would lose some parking area as a result of the proposed improvements.

The Lord of Glory Church is located west of Alleghany Road on the south side of IL 120 and serves the community of Grayslake. Widening of IL 120 would require removal of the facility. The church would need to be relocated within the area.

A building associated with the Grainger Woods Forest Preserve near Mettawa would likely be displaced. The building is located on the east side of St. Mary's Road south of IL 60. The building is associated with a public stable operation. Loss of the building would require consultation and coordination with the Lake County Forest Preserve under Section 4(f) requirements (Section 4.8, *Section 4(f) Considerations*).

Two IDOT buildings would be displaced. The maintenance yard on the south side of US 12 east of Ela Road in Lake Zurich would lose frontage as well as at least one building (shed). The IDOT maintenance facility on the east side of US 45 near the IL 60 intersection in Mundelein would be displaced as a result of intersection improvements.

The David Adler Cultural Center at 1700 N. Milwaukee in Libertyville, south of IL 137 on the east side of IL 21, would be displaced. The facility provides music lessons and art classes to the community.

Four public facilities would lose some parking as a result of the improvements for this alternative. The Congregation Beth Judea School, located north of Hilltop Road on the east side of IL 83 in Long Grove, would lose 10 percent of its parking area. The Lake County Juvenile Justice Center on the east side of IL 21 north of Woodbine Court in Vernon Hills would lose about 5 percent of its available parking to the right-of-way needed for the proposed improvements. The Adler Park School would lose 4 percent of its parking, and the Church of the Nazarene would lose a few parking spaces.

This alternative offers the potential for enhancements to nonmotorized travel. The planned cross section for the arterial improvements include sufficient right-of-way for bicycle and pedestrian paths. The addition

of paths along the planned improvements would provide direct and indirect connection with four major trail systems: Des Plaines River Trail, Robert McClory Path, the Skokie Valley Trail, and the Green Bay Trail. Improved connections to other activity nodes also would be possible, including rail stations and employment centers. Direct connections to rail stations on the North Central Line would include Buffalo Grove, Prairie View, Vernon Hills, and Libertyville. These nonmotorized improvements would relieve traffic operation to a minor degree.

4.1.8.4 Summary of Socioeconomic Impacts

Population forecasts show that Lake County is growing substantially without major transportation improvements. Under the No-Action Alternative (Baseline), 280,000 people would be estimated to be added to Lake County by 2020, mostly in the central and western parts of the county. The IL 53 Freeway/Tollway Alternative would bring an additional 27,500 residents to the county over the No-Action Alternative (Baseline).[4] These additional residents are anticipated to locate mostly in the central part of the county (Figures 4-2 and 4-4). The IL 83/US 45 with US 12 Alternative would bring an additional 18,000 residents over the No-Action Alternative (Baseline). This growth would occur in the same general areas as with IL 53 Freeway/Tollway Alternative (Figures 4-2 and 4-5), predominantly in the central part of the county.

The migration of jobs to areas like Lake County is consistent with manufacturing and business interest in locations where an abundance of land is available, obtainable in large parcels, and relatively inexpensive. Similar to the forecast population growth, regional planning agencies estimate Lake County's employment to continue to increase, mostly in the southern and central parts of the county (Figure 4-13). By 2020, under the No-Action Alternative (Baseline), Lake County is forecast to have 390,000 jobs. This means that, with no major transportation improvements, Lake County's employment will increase by 70 percent (161,000 jobs) over 1990 levels. With both the IL 83/US 45 with US 12 and IL 53 Freeway/Tollway Alternatives, Lake County is anticipated to have 394,000 jobs—a 72 percent increase over 1990 (between 4,200 and 4,400 additional jobs over the No-Action Alternative (Baseline)).

The analysis of minority or low-income populations for the project alternatives show that no environmental justice issue exists, and thus no further analysis or mitigation is required. The public involvement activities for this process included all residents and population groups in the study area, and did not exclude any persons based on income, race, color, religion, national origin, sex, age, or handicap.

All alternatives would require relocations, with IL 83/US 45 with US 12 having the greatest with 195 business and 187 residences (Table 4-12, on the following page). Lake County has a full complement of housing and business stock. In 1990, the overall vacancy rate for residential housing in Lake County was 51 percent (Lake County Department of Planning, Zoning & Environmental Quality 1994). The IL 83/US 45 with US 12 Alternative would displace nine public services and facilities, and the No-Action Alternative (Baseline) and IL 53 Freeway/Tollway Alternatives would affect none. Conversion of land to public roadway would remove taxable property from the tax roles. Table 4-12 lists the estimated assessed value lost for each alternative.

4.2 Agricultural Impacts

This section highlights the major agricultural effects that could occur from the implementation of the project alternatives including farmland losses, impacts to special status farmland or farms, farm production losses, and impacts to farm operations.

Coordination with the Illinois Department of Agriculture was conducted to determine

[4]The Elgin, Joliet and Eastern Railroad improved is anticipated to increase population by an additional 2,000 residents for both the IL 53 Freeway/Tollway Alternative and the IL 83/US 45 with US 12 Alternative.

potential effects to prime farmlands, as well as special farmland types such as farmland of local importance, farmland protected under the Illinois Farmland Preservation Act, and Centennial Farms. Coordination with the Natural Resource Conservation Service (NRCS) is required only for agricultural impacts that occur outside the "official" planning area for incorporated municipalities (2.4 km or 1.5 mi), and for agricultural impacts that are expected to be greater than 1.2 ha per 1.6 km (3.0 ac per 1 mi).

Factors that may adversely affect the efficiency of farming operations include the following:

- **Severed Farm Operation**—Occurs when a new highway/roadway separates one or more parcels from others within a unit, often resulting in adverse travel for the farm operators.
- **Severed Parcel**—Unit of land severed diagonally or laterally by a new highway.
- **Farmer Adverse Travel**—Length of additional travel that a farm operator or owner must undertake to get to fields or roads. Often caused by severance of a farm unit.
- **Landlocked Parcel**—Parcel created by the taking of right-of-way for road construction such that it is not accessible by road or easement after construction.
- **Farm Displacement**—Farmhouses and other buildings may need to be displaced to accommodate the new highway/roadway.

Farmland impacts were determined using the land use data from the LCTIP GIS database. The land use data were provided by NIPC (1990) and updated using 1997 aerial photography. Further updates were considered, using the State Cropland Layers (USDA 1999–2000). A comparison of the 1997 and 2000 data showed only minor differences; therefore, the 1997 update was used for this analysis. The assessment of prime farmland used 1993 soil data compiled by the Natural Resources Conservation Service (USDA). An assessment of effects on eroded soils was also conducted using the 1993 soil data. The results of this assessment are contained in Section 4.3.1, *Geology, Soils,*

TABLE 4-12
Socioeconomic Summary

	No-Action	IL 53 Freeway/Tollway	IL 83/US 45 with US 12
Population 2020 Forecast	796,942	29,339	19,968
(Contribution of Roadway Improvements Only to Build Alternative Forecasts)*	—	27,500	18,000
Households 2020 Forecast	290,570	10,962	7,640
Employment 2020 Forecast	389,545	4,444	4,200
Residential Relocations (Additional Ancillary Outbuildings associated with Residential Relocations)	67	113 (45)	187 (25)
Business Relocations	23	9	195
Number of Employees	NA	178	3,428
Parking Impacts (# of displaced parking spaces)	NA	109 (0)	2,514 (258)
Public Facility Relocations	0	0	9
Percent of Total Assessed Value Converted to Non-Taxable Use	0.20	0.30	0.47

*The remainder—about 2,000 people—is attributed to Elgin, Joliet and Eastern commuter rail improvement.

and Mineral Resources. The prime farmland and eroded soil impacts discussed above were assessed for the build alternatives only.

The potential for the project alternatives to influence growth and development is often referred to as a secondary impact stemming from infrastructure improvements. As new development expands to vacant lands within the county, farmlands most often are impacted. Although better transportation is not the predominant reason for advancing development in Lake County, it does have a role in some development decisions. An analysis of secondary impacts to farmlands is included in Section 4.11, *Secondary and Cumulative Impacts.*

4.2.1 No-Action Alternative (Baseline)

4.2.1.1 Direct Farmland Impacts

About 32 ha (80 ac) of agricultural land in Lake County would be directly affected by the No-Action Alternative (Baseline). Table 4-13 provides a breakdown of agricultural impacts by roadway improvement for the No-Action Alternative (Baseline). Roughly 85 percent of the affected farmland is "prime"; the balance is classified as "important." More than half of the affected farm parcels would involve small impacts of less than 0.4 ha (1 ac). Over 90 percent of the farmland impacts are associated with the proposed improvements to IL 21, Peterson Road, Rollins Road, Bradley Road, Midlothian Road, and Washington Street. Compared to the total available farmland in the county, the No-Action Alternative (Baseline) would affect less than 0.1 percent of those lands. The affected farmland for this alternative would be entirely within a municipal planning boundary and average less than 0.28 ha per project km (1.1 ac per mi). Therefore, NRCS coordination and submittal of form AD-1006 would not be required.

A review of the Illinois Department of Agriculture records show that there are nine Centennial Farms within Lake County. The No-Action Alternative (Baseline) would impact land from two Centennial Farms: the Lodesky Farm located on Washington Street and the Casey Farm located on IL 21. The Lodesky Farm has been in the family for over 150 years, and the present size of the farm is about 40 ha (100 ac). The No-Action improvements along Washington Street would require approximately 0.5 ha (1.3 ac) from the Lodesky property. The Casey Farm located in Libertyville is currently about 12 ha (30 ac) in size. The improvement to IL 21 in this location would require approximately 0.8 ha (2 ac) from the farm.

4.2.1.2 Farm Production Losses

The displaced farmland for the No-Action Alternative (Baseline) would result in an annual crop production loss of approximately $21,000. Table 4-14 (on the following page) provides a

TABLE 4-13

Agricultural Areas Directly Affected by No-Action Alternative (Baseline)

Route	Approximate Agricultural Land Directly Affected		Route	Approximate Agricultural Land Directly Affected	
Buffalo Grove Road	0.16 ha	0.4 ac	Lake-Cook Road	0.36 ha	0.9 ac
Busch Parkway	0.4 ha	1.0 ac	Bradley Road	4.3 ha	10.6 ac
Butterfield Road	0.2 ha	0.5 ac	Midlothian Road	2.75 ha	6.8 ac
Hunt Club Road	0.24 ha	0.6 ac	Casmir Pulaski Drive	0.24 ha	0.6 ac
I-94	0.24 ha	0.6 ac	Peterson Road	3.7 ha	9.2 ac
IL 21	7.4 ha	18.2 ac	Quentin Road	0.12 ha	0.3 ac
IL 22	2.3 ha	5.8 ac	Rollins Road	4.1 ha	10.0 ac
IL 60	0.04 ha	0.1 ac	US 45	2.4 ha	6.0 ac
Washington Street	3.4 ha	8.5 ac	**Total**	**32.4 ha**	**80.1 ac**

breakdown of the amount of farmland affected by this alternative and the resulting farm production loss. The primary crops are corn (70 percent), soybeans (22 percent), wheat (6 percent), and other specialty farms (2 percent) such as landscape nurseries and apple orchards.

4.2.1.3 Farm Operations

The No-Action Alternative (Baseline) would have minimal effect on farm operations. Generally, the roadway improvements follow existing rights-of-way; therefore, farm severance and disrupted access to fields are minimized by the use of existing rights-of-way. The actual impacts to farms, parcels, building displacement, and uneconomical remnants were not calculated for the No-Action Alternative (Baseline). The use of medians with multi-lane improvements would cause some adverse travel of about 1.6 km (1 mi) or less.

4.2.2 IL 53 Freeway/Tollway Alternative

4.2.2.1 Direct Farmland Impacts

Approximately 316 ha (780 ac) of agricultural land in Lake County would be directly affected by the IL 53 Freeway/Tollway Alternative. Table 4-15 summarizes the farmland impacts for this alternative. The impact to farmlands is associated directly with improvements located primarily on new alignment. The data shows that the impacts would be distributed evenly across the two major roadway improvements. Similar to the other alternatives, the IL 53 Freeway/Tollway Alternative would affect mostly prime farmlands (about 77 percent), the balance being classified as important. Overall, this alternative would directly affect 1.3 percent of the county's available farmland. Based on an Illinois Department of Agriculture records search, the IL 53 Freeway/Tollway Alternative would not affect any special status farmlands (i.e., Centennial Farms) (TY Lin Bascor 2000).

This alternative affects approximately 7 ha per project kilometer (29 ac per mile). Whereas all of the affected farmlands for this alternative are located within a municipal planning area, the NRCS would have no requirements for coordination. Therefore, NRCS coordination and submission of form AD-1006 would not be required.

4.2.2.2 Farm Production Losses

Approximately 315 ha per kilometer (780 ac)

TABLE 4-14
Crops and Market Value Affected by No-Action Alternative (Baseline)

Agricultural Lands in Production[a]	15,800 ha (39,100 ac)
Affected Agricultural Lands	32.4 ha (80.1 ac)
Total Market Value (2000)[a, b]	$10,293,000
Market Value of Affected Lands[c]	$21,000

[a] Source: Illinois Department of Agriculture 2001
[b] Includes all crops and livestock, as well as specialty crops such as landscape nurseries, apple orchards, etc.
[c] Per 0.4 ha (1 acre) loss is $260.00

TABLE 4-15
Agricultural Areas Directly Affected by IL 53 Freeway/Tollway Alternative

Route	Approximate Agricultural Land Directly Affected
IL 120	147.5 ha (364.6 ac)
IL 53	167.9 ha (415.0 ac)
Total	**315.4 ha (779.6 ac)**

of productive farmland would be lost with the IL 53 Freeway/Tollway Alternative. This represents an annual production loss of approximately $205,000. Table 4-16 provides a breakdown of the amount of land affected by the improvements and resulting farm production loss.

4.2.2.3 Farm Operations

The IL 53 Freeway/Tollway Alternative would sever about 36 farm parcels, potentially affecting farm operations with landlocked parcels, adverse travel, and angular shapes. This alternative would displace 12 farm residences and 31 farm outbuildings. Over 80 percent of the displaced are located along the east-west improvement paralleling IL 120.

4.2.3 IL 83/US 45 with US 12 Alternative

4.2.3.1 Direct Farmland Impacts

Approximately 91 ha (226 ac) of farmland in Lake County would be directly affected by the IL 83/US 45 with US 12 Alternative. Table 4-17 provides a detailed breakdown of the farmland impacts for this alternative. Similar to the other alternatives, the IL 83/US 45 with US 12 Alternative would impact farmlands that are mostly classified as prime (about 82 percent), and remaining affected farmlands are classified as important. The data shows (Table 4-17) that two improvements account for over 80 percent of the farmland impact from this alternative. Overall, this alternative would directly impact

TABLE 4-16
Crops and Market Value Affected by IL 53 Freeway/Tollway Alternative

Agricultural Lands in Production[a]	15,800 ha (39,100 ac)
Affected Agricultural Lands	315.4 ha (779.6 ac)
Total Market Value (2000)[a, b]	$10,293,000
Market Value of Affected Lands[c]	$205,000

[a] Source: Illinois Department of Agriculture 2001
[b] Includes all crops and livestock, as well as specialty crops such as landscape nurseries, apple orchards, etc.
[c] Per 0.4 ha (1 acre) loss is $260.00

TABLE 4-17
Agricultural Areas Directly Affected by IL 83/US 45 with US 12 Alternative

Route	Approximate Agricultural Land Directly Affected
I-94	2.3 ha (5.6 ac)
IL 120	21.9 ha (54.0 ac)
IL 21	10.8 ha (26.8 ac)
IL 60	1.7 ha (4.2 ac)
IL 83/US 45	54.1 ha (133.7 ac)
US 12	0.65 ha (1.6 ac)
Total	**91.4 ha (225.9 ac)**

about 0.5 percent of the county's available farmlands.

This alternative would have an average farmland impact of 0.9 ha per project kilometer (3.6 ac per mile). The affected farmlands would all be within a municipal planning area; therefore, NRCS coordination and form AD-1006 would not be required.

Illinois Department of Agriculture records show that the IL 83/US 45 with US 12 Alternative would potentially impact land from one Centennial Farm (IDOA 2000). The improvement on IL 21 would require about 0.4 ha (1 ac) of right-of-way from the Casey Farm in Libertyville. The farm has been in the Casey family for over 130 years and the current size is about 12 ha (30 ac).

4.2.3.2 Farm Production Losses

Approximately 91 ha (226 ac) of productive farmland would be lost with the IL 83/US 45 with US 12 Alternative. This represents an annual production loss of about $59,300. Table 4-18 summarizes the amount of land affected by the improvements and resulting farm production loss.

4.2.3.3 Farm Operations

Since most of the improvements are along existing right-of-way, operational impacts are expected to be moderate. About 20 parcels would be severed diagonally or laterally, potentially affecting farm operations with landlocked parcels, adverse travel, and angular shapes. This alternative would displace three residences and seven outbuildings. All displacements would occur along IL 21.

4.2.4 Summary of Agricultural Impacts

Table 4-19 summarizes the breakdown of the agricultural impacts by alternative.

TABLE 4-18
Crops and Market Value Affected by IL 83/US 45 with US 12 Alternative

Agricultural Lands in Production[a]	15,800 ha (39,100 ac)
Affected Agricultural Lands	91.4 ha (225.9 ac)
Total Market Value (2000)[a, b]	$10,293,000
Market Value of Affected Farmland[c]	$59,300

[a] Source: Illinois Department of Agriculture 2001
[b] Includes all crops and livestock, as well as specialty crops such as landscape nurseries, apple orchards, etc.
[c] Per 0.4 ha (1 acre) loss is $260.00

TABLE 4-19
Summary of Agricultural Impacts

Type of Impact	No-Action Alternative (Baseline)	IL 53 Freeway/Tollway Alternative	IL 83/US 45 with US 12 Alternative
Ha (ac) of Impact	32 ha (80 ac)	315 ha (780 ac)	91 ha (226 ac)
Annual Crop Losses	$21,000	$205,000	$59,300
Annual Acreage Losses	$260	$260	$260
Parcels Affected or Severed	NA	36	20
Centennial Farms	9	0	1
% Impact of Prime/Important	85 / 15	77 / 23	82 / 18
Farm Buildings Displaced	NA	43	10

4.3 Natural Resources

4.3.1 Geology, Soils, and Mineral Resources

The project alternatives are not expected to affect bedrock. Some impact to surface geology and topography would be expected during construction, including excavating, grading, and filling over the near-surface deposits. These effects would include changes to surface soils in the construction zone that would increase soil compaction and effectively decrease hydraulic conductivity. Construction would also decrease the erosion resistance of soils with the removal of vegetation. Erosion resistance will be mitigated during construction and then restored through appropriate revegetation and grading.

The erosion potential of soils for the build alternatives were evaluated using the NRCS 1993 soils data. Soil associations along the improvements for each alternative were identified and the erosion potential determined from tables contained within the soil survey.

Two soil associations are found in the IL 53 Freeway/Tollway Alternative—the Elliot-Markham and Morley-Markham-Houghton. The Markham, Morley, Nappannee, Montmorenci, Zurich, and Saylesville soils in these associations are moderately to strongly sloping. The soils consist primarily of silt loams. These eroded soils exist along 18 percent or 8 km (5 mi) of the 43.5 km (27 mi) of improvements. Additional soils in these series, although not noted as eroded, pose an erosion hazard. Specific locations of soils with higher erosion hazards would be identified to mitigate erosion during and after construction. The other soils in the associations are gently sloping to level and pose limited erosion hazard.

The same two soil associations are also found in the IL 83/US 45 with US 12 Alternative. Additional soil associations found in this alternative including the Montmorenci, Corwin-Odell, Zurich-Grays-Wauconda, and Nappanee-Montgomery. The Miami, Montmorenci, Wauconda, Saylesville, and Zurich soils are all silt loams that are moderately to steeply sloping. The soils all have high erosion potential. The eroded soils exist along 17 percent or 15.3 km (9.5 mi) of 101.4 (63 mi) of improvements. Additional soils in these series, although not noted as eroded, pose an erosion hazard. Specific locations of soils with higher erosion hazards would be identified to mitigate erosion during and after construction. The other soils in the associations are gently sloping to level and pose limited erosion hazard.

No operating mineral/material resource businesses would be affected by the project alternatives. A nonoperational sand and gravel operation lies near the intersection of IL 21 and IL 120, and project alternatives could affect this resource. The site's proximity to planned roadway improvements could cause the site to be reactivated and also provide a low-cost source of needed sand and gravel resources. Overall the project could increase short-term demand and sales for these products within Lake County during the construction phase. Consequently, this resource could be depleted. Upon completion of construction, demand and sales would be expected to return to previous levels.

4.3.2 Water Quality and Water Resources

4.3.2.1 Groundwater Resource Impacts

This analysis focuses upon potential effects of the project alternatives to municipal and private water supplies. According to the USEPA web site (as of February 1, 2001), there are no sole source aquifers as defined by section 1424(E) of the Safe Drinking Water Act in Illinois. No measurable change to the available groundwater supply is expected for any of the project alternatives; the additional impervious area associated with the project alternatives would represent a small reduction in recharge area that will be mitigated by stormwater retention/detention basins.

Although roadways are not considered a source for groundwater contamination, those items that are sources are required to be at

least 61 meters (200 ft) away from a well head, the distance used as a surrogate for impact evaluation. The well location from all of the listed databases is only accurate to a quarter-quarter section. Therefore the well can be located anywhere within a 40 acre tract. Wells within 61 m (200 ft) of the proposed project alternatives were identified and are shown in Table 4-20. The well location information was assembled using the ISGS database, the LCTIP GIS database, the IEPA database, and reports from the Illinois State Water Survey (ISWS) to pinpoint the location of residential well systems. The IL 83/US 45 with US 12 Alternative has more homes associated with private wells within 61 m (200 ft) of the proposed improvements than the other alternatives. There are no municipal wells within 122 m (400 ft) used for municipal wells for the build alternatives, and only two municipal wells for the No-Action Alternative (Baseline). The wells are either used regularly as a water supply or standby supply for communities that purchase surface water for their customers.

Municipal and private wells near the proposed project alternatives were identified as having a potential risk for contamination from roadway runoff. The potential for contaminating groundwater supply wells is dependent upon well construction, proximity to potential sources, and geological conditions. The Illinois Groundwater Protection Act provides guidelines and regulations pertaining to protective setbacks from groundwater wells. Consistent with these guidelines and regulations, communities in the study area have established either 61 or 122 m (200 or 400 ft) setback zones for potential contamination sources that could affect the quality of groundwater wells. Geologic conditions also represent an important factor that can either prohibit or permit the transfer of contaminants. Wells founded in rock formations usually are more restrictive to the transfer of surface contaminants than wells founded in sand and gravel formations, such as in west central Lake County.

Groundwater quality for municipal wells is not likely to be affected measurably by any of the project alternatives. One municipal well within 122 m (400 ft) of the No-Action Alternative (Baseline) is finished in the drift material. The IEPA database indicates this well has few limitations, or in other words, has low susceptibility to surface contamination based upon the composition of the surficial geology. The other well is finished in dolomite or a limestone formation that minimizes the transfer of surface contaminants. None of the project alternatives are located within wellhead protection areas identified by the IEPA (1998). Private wells are associated with residential subdivisions or individual properties and typically are finished in glacial drift (sand and gravel) at depths of 30.5 m (100 ft) or less. Shallow wells within 61 m (200 ft), of the roadway improvements that are improperly cased or hydraulically connected to the highway drainage system could experience increased levels of roadway runoff contaminants. Roadway improvements near shallow wells would use best management practices (BMPs) to avoid well interference.

All the project alternatives have several groundwater wells near them. This assessment provides a general measure of the potential for groundwater contamination from roadway runoff. Presumably, the risk for well contamination is greater for those alternatives with the largest number of wells near the

TABLE 4-20
Summary of Potential Water Well Impacts

Alternative	Private Wells	Municipal Systems Using Wells
No-Action	220	2
IL 53 Freeway/Tollway	247	0
IL 83/US 45 with US 12	783	0

proposed improvements (i.e., the IL 83/US 45 with US 12 Alternative). Further investigations are required during future phases of work for the preferred alternative to define more accurately the potential risk of well contamination.

Other areas of potential concern relate to groundwater discharge points associated with sensitive wetland areas, such as fens. Changes in groundwater elevation or quality could affect these sensitive resources. These types of assessments would be made during future phases of work for the preferred alternative and would require further definition of the roadway design and the use of groundwater models to properly assess the effects to such resources.

4.3.2.2 Surface Water Impacts

Long-term surface water impacts could result from the operation of the project alternatives. Pollutants, such as solids, heavy metals (lead, zinc, and copper), and oil and grease, accumulate on roadway surfaces and adjoining rights-of-way as a result of motor vehicle operations on the roadway. Additionally, deicing chemicals and nutrients from fertilizers commonly are found in roadway runoff. The concentrations of these pollutants in roadway runoff are highly variable and are affected by numerous factors, such as traffic characteristics (volume and speed), climate, maintenance practices, and adjacent land uses.

Roadway runoff may affect the quality of receiving waters with a temporary increase in pollutant loading during storms or with a chronic accumulation of heavy metals. The degree of pollutant loading from roadway runoff is linked directly to the amount of roadway traffic. Research has shown that the water quality from roadway runoff is not problematic for roadways with an Average Daily Traffic (ADT) volume of 30,000 vehicles per day or less (Young 1996). Under these conditions, potential impacts are generally short-term, localized acute loadings with a temporary degradation of water quality with few, if any, chronic effects.

Deicing salt is applied seasonally to control snow and ice. Deicing salt provides public mobility and safety by rapidly and reliably improving hazardous road conditions in winter. Salt moves through the environment as runoff, splash, and spray. Studies indicate that 60 to 80 percent of the salt runs into surface water, 15 to 35 percent occurs as splash, and up to 3 percent occurs as spray (Frost et al. 1981; Diment et al. 1973; Lipka and Aulenbach 1976; and Sucoff 1975).

Changes in chloride and heavy metals concentrations as a result of roadway operations were compared to the General Use water quality standards. The average and maximum concentrations in each stream were estimated utilizing methods developed by the U.S. Geological Survey (Driver and Tasker 1990 and Frost et al. 1981) and the Federal Highway Administration (FHWA; Driscoll et al. 1990a, 1990b, 1990c).

No-Action Alternative (Baseline). There are 11 subwatersheds associated with the No-Action Alternative (Baseline): nine in the Des Plaines River Watershed and two in the Fox River Watershed. Tables 2-19 and Table 2-20 present the physical and biological characteristics of these streams.

Pollutant concentrations and habitat modifications have affected the water quality of the streams in these watersheds. According to the IEPA, water quality is good in Mill Creek, Bull Creek, and Flint Creek, whereas in the remaining streams in the study area it is fair to poor, or unrated. The Des Plaines River is a Section 303(d) water quality impaired stream.

Future stream concentrations of copper, lead and zinc for 11 subwatersheds would satisfy applicable General Use water quality standards. The analysis shows that the maximum chloride concentrations expected with the No-Action Alternative (Baseline) would be compliant with the General Use standards.

IL 53 Freeway/Tollway Alternative. There are seven subwatersheds in IL 53 Freeway/Tollway Alternative: five in the Des Plaines River Watershed and two in the Fox River Watershed. Many of these streams are

the same as for the No-Action Alternative (Baseline). Tables 2-19 and 2-20 summarize the physical and biological characteristics of these streams. Water quality in Mill Creek and Bull Creek is good, but fair to poor (or unrated) in the remaining streams. Pollutant concentrations and habitat modifications have prevented the remaining streams, including the Des Plaines River—a Section 303(d) water quality impaired stream—from providing full aquatic support.

Analysis of the pollutant loading for seven subwatersheds affected by the IL 53 Freeway/Tollway Alternative showed only small incremental changes in heavy metal concentrations. All stream concentrations for zinc, copper, and lead are less than the applicable General Use standards. The analysis showed that the average and maximum chloride concentrations would remain below the General Use standards for all subwatersheds affected by this alternative. Chloride concentrations in the Bull Creek and Mill Creek watersheds were estimated to be the highest. Even the maximum values, however, would be compliant with the General Use standard.

IL 83/US 45 with US 12 Alternative. There are 11 subwatersheds associated with this alternative: 7 in the Des Plaines River Watershed and 4 in the Fox River Watershed. The only highly valued aquatic resource is associated with Squaw Creek. Water quality for Mill, Bull, and Flint creeks is rated good by IEPA, but other streams in the study area are fair to poor. The Des Plaines River is the only water quality impaired Section 303(d) stream in the study area.

Analysis of the pollutant loading for the 11 subwatersheds affected by the IL 83/US 45 with US 12 Alternative showed only small incremental changes in heavy metal concentrations. All stream concentrations for zinc, copper, and lead are below the applicable General Use and water quality standards. Chloride concentrations are not expected to increase to levels exceeding the General Use standards in any of the subwatersheds, except for Aptakisic Creek. The average chloride concentration is not expected to exceed the water quality standard; however, the maximum predicted chloride level may exceed the 500 mg/L standard for chloride. Exceedances would occur in a small area of the watershed, and mitigation measures or changes in drainage patterns could reduce the impact.

4.3.2.3 Summary of Water Quality Impacts

Potential changes in groundwater or surface water quality as a result of roadway operation were evaluated. The potential impact on residences that rely on wells would be greatest with the IL 83/US 45 with US 12 Alternative. Two municipal wells are closer to the No-Action Alternative (Baseline), but the geology associated with those wells should minimize any potential impact.

Stream concentrations of heavy metals will increase, but they will remain compliant with applicable water quality standards for all three scenarios. BMPs incorporated into the project would further reduce these concentrations.

The chloride concentrations in the tributaries for the various project alternatives are expected to increase, but such increases would not violate the General Uses standards in most watershed areas. Impacts from chlorides would not be a concern for either the IL 53 Freeway/Tollway or No-Action Alternative (Baseline). With the IL 83/US 45 with US 12 Alternative, a small part of Aptakisic Creek would experience an exceedance of the chloride standard. Studies of salt effects on aquatic biota, including acute and chronic toxicity, indicate that salt does not have significant deleterious impacts on aquatic biota in large or flowing bodies of water where dilution occurs quickly (Jones and Jeffrey 1992). Peak concentrations in small streams can be reduced by using detention basins.

4.3.3 Wetlands

This wetland impacts discussion addresses direct impacts for the project alternatives. Available wetland mapping and the latest aerial photography were combined with field

reconnaissance to confirm the presence of wetland resources in the study area. Wetland resources in Lake County were obtained from the LCWI and incorporated into an overall GIS database. The verification procedure was limited to the areas adjacent to the proposed and existing right-of-way for the two build alternatives. Field observations were used to note adjacent land use, general wetland type, and overall quality based upon dominant vegetation.[5] The potential wetland impacts for the alternatives describe the extent of the wetland area impacted, the effect on wetland function, and the status of the remnant wetland following implementation (i.e., for bisected wetlands).

The first order of assessment utilized the GIS database, which incorporated data from the LCWI, including ADID wetlands. All three alternatives were reviewed to determine potential impacts to both ADID designated and non-ADID wetlands for each corridor. These data are reported in the first part of this section.

The information supplied by the LCWI and ADID lacked the information necessary to determine wetland quality. The second order of assessment provided a qualitative assessment of wetlands, both ADID and non-ADID based on information gathered during the field verifications. As no field verifications were conducted for the No-Action Alternative, the qualitative assessment is limited to the two build alternatives. However, environmental documents for programmed improvements which have completed phase one of the environmental document for the No-Action Alternative (Baseline) were reviewed for the wetland impacts.

The qualitative functional assessment assigned quality rankings to each of the wetlands identified in the field. As a result, an assessment of qualitative impacts for the two build alternatives could be compiled. This qualitative impact assessment is presented in the second part of this section.

Formal delineations would be conducted during future phases of work for the preferred alternative to determine exact size, functions, vegetation communities, and qualitative assessments of wetlands within the proposed right-of-way.

4.3.3.1 ADID/Non-ADID Wetland Impacts

No-Action Alternative (Baseline)

The No-Action Alternative (Baseline) would potentially impact approximately 31.6 ha (78.1 ac) of both ADID and non-ADID wetlands (CH2M HILL 1999; GIS database). The estimated loss of wetland resources is based upon the proposed right-of-way requirements for all individual projects comprising the No-Action Alternative (Baseline).

ADID Wetlands. The No-Action Alternative (Baseline) would potentially impact approximately 5.3 ha (12.9 ac) of ADID wetlands.[6] The proposed improvements to Lake Cook Road, Pulaski Road and IL 22 would have the largest impact to ADID wetlands. Combined, these three improvements account for approximately 75 percent of the ADID wetland impacts for the No-Action Alternative (Baseline). See Figure 4-16. The ADID impacts resulting from this alternative total 0.09 percent of the total ADID wetland acreage in Lake County (203 total ADID wetlands totaling 5,585 ha (13,800 ac) in Lake County). Table 4-21 (on the following page) summarizes the ADID impacts for each roadway improvement under the No-Action Alternative (Baseline).

Non-ADID Wetlands. The No-Action Alternative (Baseline) would potentially impact approximately 26.5 ha (65.2 ac) of non-ADID

[5] Each wetland identified in the field was assigned a unique value, prefaced by the route designate (i.e., 45-1= Wetland #1, US 45). The wetlands were numbered sequentially as they were encountered in the field.

[6] Wetland impacts for the No-Action Alternative (Baseline) were estimated using typical project right-of-way widths for the proposed improvements. No field verifications were conducted in connection with the No-Action improvements, therefore, the total number of wetlands and wetland acreage impact is an estimate based on the best available data.

TABLE 4-21

Potential ADID Impacts for the No-Action Alternative (Baseline)

Roadway Segment	ADID Description	ADID Size ha (ac)	Potential ADID Impact ha (ac)	% Impacted	ADID Functions Identified by Lake County ADID Study	Impacts
Butterfield Road	ADID 113	37.6 (92.9)	0.3 (0.8)	0.8	• Shoreline/Bank Stabilization	Minimal
					• Sediment/ Toxicant Trapping	Minimal
					• Nutrient Removal	Minimal
IL 21	ADID 94 Liberty Prairie	55.4 (137.0)	< 0.01	--	• Threatened & Endangered Species Habitat	Minimal
					• Sediment-toxicant retention	Minimal
					• Stormwater storage	Minimal
					• High Quality Plant Community	Minimal
	ADID 96 Tributary to Bull Creek	6.4 (15.9)	0.15 (0.4)	2.3	• High quality stream	Minimal
					• Stormwater storage	Minimal
					• Sediment-Toxicant Retention	Minimal
	ADID 106 Bull Creek	0.6 (1.6)	0.4 (0.9)	66.7	• Threatened & Endangered Species Habitat	Loss of Habitat
					• Stormwater storage	Loss of storage capability
					• Sediment/toxicant retention	Loss of Retention
IL 22	ADID 168	2.3 (5.6)	0.02 (0.05)	0.8	• High Quality Wildlife Habitat	Minimal Loss of habitat
	ADID 169	17.2 (42.4)	0.9 (2.1)	5.2	• Presence of T&E Plant Species	Potential loss of supporting habitat
	ADID 170 Reed-Turner Nature Preserve [a]	87.9 (217.3)	0.6 (1.4)	0.6	• Threatened & Endangered Species Habitat	Minimal
					• Shoreline-bank stabilization	Minimal
					• Sediment-toxicant retention	Minimal
					• Nutrient removal and transport	Minimal
	ADID 173 Flint Creek	54.3 (134.1)	0.06 (0.2)	0.11	• Shoreline/Bank Stabilization	Minimal
					• Sediment/ Toxicant Trapping	Minimal
					• Nutrient Removal	Minimal
	ADID 175	30.8 (76.1)	0.6 (1.4)	1.9	• Presence of T&E Plant Species	Minimal Loss of Habitat
					• Stormwater Storage	Minimal
					• Sediment/ Toxicant Trapping	Minimal
Lake Cook Road	ADID 187	3.8 (9.5)	0.8 (1.9)	21.1	• High Quality Plant Community	Loss of Habitat
					• Stormwater Storage	Loss of storage
					• Sediment/ Toxicant Trapping	Loss of retention
Pulaski Road	ADID 91	49.4 (122.0)	1.1 (2.7)	2.2	• High Quality Plant Community	Minimal loss of Habitat
					• Sediment/toxicant retention	Minimal retention loss
Rollins Road	ADID 44 Fourth Lake/ Mill Creek Complex	313.9 (775.7)	0.4 (1.0)	0.13	• Presence of T&E Plant Species	Minimal
					• INAI Site	Minimal
					• High Quality Plant Community	Minimal
					• Shoreline/Bank Stabilization	Minimal
					• Sediment/ Toxicant Trapping	Minimal
					• Nutrient Removal	Minimal
	ADID 61 Rollins Savanna	5.7 (14.2)	0.01(0.03)	0.17	• High Quality Plant Community	Minimal
					• Stormwater Storage	Minimal
					• Sediment/ Toxicant Trapping	Minimal
TOTAL		**665.3 (1,644.3)**	**5.3 (12.9)**	**0.8**		

[a] Identified as the Reed Turner Nature Preserve ADID site. Nature Preserve not impacted.

wetlands based on the LCWI. Table 4-22 summarizes the potential impacts for each roadway improvement for the No-Action Alternative (Baseline).

Most of the potentially impacted non-ADID wetlands are located in the Des Plaines River Watershed. Only wetland impacts associated with improvements along the western portions of IL 22 and Peterson Road are located in the Fox River Watershed. Field reconnaissance was not conducted for wetlands under this alternative; therefore, no assessment of quality, size, and function for these wetlands is available. Based on available data, wetland impacts are concentrated along four of the proposed improvements. The proposed improvements to IL 22, I-94, Buffalo Grove Road and US 45 would have the potential to impact about 18.4 ha (45.5 ac) of wetlands, totaling approximately 70 percent of all wetland impacts for this alternative.

IL 53 Freeway/Tollway Alternative

The IL 53 Freeway/Tollway Alternative would potentially impact 118 wetland sites totaling approximately 37.1 ha (91.8 ac). Figure 4-17 shows the location of ADID and non-ADID wetlands potentially impacted by this alternative. The estimated potential direct loss of these wetland resources is based upon the right-of-way requirements for the IL 53 Freeway/Tollway Alternative. Detailed discussions of ADID and non-ADID impacts follow.

ADID Wetlands. Five ADID wetlands totaling approximately 3.5 ha (8.6 ac) (CH2M HILL 1999; GIS database) within the Des Plaines River Watershed would potentially be directly impacted by the IL 53 Freeway/Tollway Alternative. These ADID wetlands are generally located in the north-south segment of the alternative with one ADID wetland along the east-west segment (IL 120). The ADID wetland impacts from this alternative would total less than 0.06 percent of the total ADID wetland acreage in the county (presently there are 203 designated ADID wetlands in the county totaling 5,585 ha (13,800 ac)). The IL 53 Freeway/Tollway Alternative would transversely cross two ADID wetland/stream complexes. These ADID wetland resources are ADID number 170 (Wetland Number 53-19) and ADID Number 143 (Wetland Numbers 53-43, 53-67, 83-19, and 83-40). Because both of these ADID complexes are linear, the IL 53 alignment would bridge these locations to avoid fragmentation, thereby minimizing impacts in these areas to shading and limited filling. Bridging these areas would avoid impacts to natural stream flow and habitat continuity that could occur with an at-grade facility. Table 4-23 (on the following page) summarizes the potential direct impacts to ADID wetlands for the IL 53 Alternative. Appendix D shows the comparison of ADID wetland impacts for the three alternatives, and gives a detailed description of the ADID

TABLE 4-22

No-Action Alternative (Baseline) Scenario; Potential Non-ADID Wetland Impacts

Roadway Segment	Potential Wetland Impacts	Roadway Segment	Potential Wetland Impacts
Buffalo Grove Road	2.4 ha (5.9 ac)	Martin Luther King Road	0.3 ha (0. 7 ac)
Busch Parkway	0.6 ha (1.4 ac)	Bradley Road (new)	1.5 ha (3.7 ac)
Butterfield Road	0.2 ha (0.6 ac)	Midlothian Road (new)	0.1 ha (0.1 ac)
Hunt Club Road	0.3 ha (0.7 ac)	Pulaski Road (new)	0.1 ha (0.2 ac)
I-94	5.1 ha (12.6 ac)	Peterson Road	0.3 ha (0.7 ac)
IL 21	0.6 ha (1.4 ac)	Quentin Road	1.2 ha (3.0 ac)
IL 22	9.2 ha (22.7 ac)	Rollins Road	0.8 ha (2 ac)
IL 60	0.4 ha (1.1 ac)	US 45	1.7 ha (4.3 ac)
Lake-Cook Road	0.5 ha (1.2 ac)	Washington Street	1.2 ha (2.9 ac)
TOTAL	**26.4 ha (65.2 ac)**		

CH2M HILL 1999, LCTIP GIS Database.

wetlands and their potential impacts from construction.

In addition to direct impacts caused by filling or alteration, minimal functional loss of wetland resources is anticipated. Table 4-23 summarizes the potential impacts to wetland functions from this alternative. All five ADID wetlands impacted by this alternative would incur minimal loss of wildlife habitat. Additional functional impacts such as shoreline stabilization, sediment/toxicant trapping, and nutrient removal are considered to arise to a lesser extent. ADID wetland 180 would lose approximately 3 percent of its overall size. This contributes to slightly higher levels of functional impact, and to loss of habitat in particular.

Non-ADID Wetlands. The 113 non-ADID wetlands potentially impacted by the IL 53 Alternative total approximately 34 ha (83.2 ac)

TABLE 4-23
IL 53 Freeway/Tollway ADID Impact Summary [a]

Route	ADID Description	ADID Size ha (Ac)	Potential ADID Impact ha (Ac)	% Impacted	ADID Functions Identified by Lake County ADID Study	Impacts to Functions	Community Type
IL 53	ADID 143 Indian Creek/Kildeer Creek LCTIP Nos. 53-43, 53-67, 83-19, 83-40	63.0 (155.6)	0.7 (1.6)	1.1	• Threatened & Endangered Species Habitat • Shoreline-bank stabilization • Sediment/toxicant retention	Some Loss of Habitat Some loss of bank stabilization Some Loss of sediment /toxicant retention	Sedge Meadow Emergent Marsh
IL 53	ADID 169 LCTIP 53-21, 53-22	42.4 (104.8)	0.3 (0.62)	0.7	• Threatened & Endangered Species Habitat	Minimal Loss of Habitat	Sedge Meadow
IL 53	ADID 170 Reed-Turner Nature Preserve [b] LCTIP 53-19	87.8 (217.0)	0.2 (0.5)	0.2	• Threatened & Endangered Species Habitat • Shoreline-bank stabilization • Sediment-toxicant retention • Nutrient removal and transport	Minimal Loss of Habitat Minimal Minimal Minimal	Sedge Meadow
IL 53	ADID 180 Buffalo Creek Complex LCTIP Nos. 53-7, 53-8, 53-11	63.5 (157.0)	2.2 (5.4)	3.5	• Threatened & Endangered Species Habitat • Shoreline-bank stabilization • Sediment-toxicant retention • Nutrient removal and transport	Some Loss of Habitat Some Loss of bank stabilization Some Loss of sediment /toxicant retention Some Loss of nutrient removal/transport	Sedge Meadow Emergent marsh
IL 120	ADID 200 LCTIP 120-4	7.4 (18.3)	0.1 (0.3)	1.4	• Threatened & Endangered Species Habitat • Shoreline-bank stabilization • Sediment/toxicant retention	Minimal Loss of Habitat Minimal Minimal	Deep Marsh
Total		**264.1 (652.7)**	**3.5 (8.4)**	**1.3**			

[a] Lake County ADID Study
[b] Identified as the Reed Turner Nature Preserve ADID site. Nature Preserve not impacted.

(CH2M HILL 1999; GIS database). These wetlands are a mixture of open marsh, emergent, or forested wetlands. A majority of the wetlands identified within this alternative were located along the existing IL 53 right-of-way. A more detailed assessment of wetland impacts is presented in Section 4.3.3.2.

IL 83/US 45 with US 12 Alternative

The IL 83/US 45 with US 12 Alternative would impact 196 wetland sites with a potential direct impact to approximately 23.4 ha (57.7 ac) of wetlands (CH2M HILL 1999; GIS database). Figure 4-18 shows the location of ADID and non-ADID wetlands potentially impacted by this alternative.

ADID Wetlands. Thirteen ADID wetland sites, all within the Des Plaines River Watershed, would potentially be impacted by this alternative, totaling approximately 1.7 ha (4.2 ac) or less than 0.03 percent of the total ADID wetland acreage in Lake County, 5,585 ha (13,800 ac). Table 4-24 (on the following page) summarizes the potential impacts to ADID wetlands within this alternative. These ADID wetlands are generally scattered uniformly along most of the improvements comprising this alternative. Though this alternative includes mostly widening of existing roadways, many ADID impacts are located along roadway edges. Therefore, ADID wetland impacts tend to be small in size and do not include bisection. Appendix D gives a detailed description of the ADID wetlands and their impacts from this alternative.

In addition to potential direct impacts caused by filling or alteration, minimal functional loss of wetland resources is anticipated. Table 4-24 summarizes the potential impacts to wetland functions from this alternative. A majority of the ADID wetlands would have very minimal impacts to functional capacity. Of the functions listed in Table 4-24, mitigation would be most difficult for habitat losses.

A majority of the potential ADID wetland impacts occur along the I-94 and IL 83 improvements for this alternative. These two improvements account for 1.2 ha (2.9 ac) or over 60 percent of ADID wetland impacts.

Non-ADID Wetlands. The 183 non-ADID wetlands potentially impacted by the IL 83/US 45 with US 12 Alternative total 21.6 ha (53.5 ac) (CH2M HILL 1999; GIS database). These wetlands are a mixture of open marsh, emergent, or forested wetlands. A more detailed assessment of wetland impacts is presented in Section 4.3.3.2.

4.3.3.2 Wetland Functional Assessment Methodology

A wetland functional assessment was developed for the study, drawing from established methods and adapted to be compatible with available data, and the planning level field reconnaissance. The assessment was performed for the wetlands within the study area for both build alternatives based on data collected in the field and from several published sources. The assessment employed a scoring system that assigned points to a wetland based on the value of specific overall functions. Points were assigned per wetland function and added to derive the total score per wetland. The value or weighting (scores assigned) for a given wetland function is based in part on established requirements for mitigating impacts to wetlands expressing these functions. The scores were then divided into three classes; Class I being the most functional (highest quality) wetlands and Class III being the least functional (low-quality) wetlands.[7] The range of wetland scores within the study area was 1 – 28.5. Categorization of wetland quality classes is as follows:

- Class I: The top third of wetland scores (20 – 28.5),
- Class II: The middle third of wetland scores (11 - 19),
- Class III: The lower third of wetland scores (1 – 10).

[7] The methodology was developed by CH2M HILL, based on Minnesota Interagency Wetlands Group. *Minnesota Routine Assessment Method for Evaluating Wetland Functions – Version 2.0*. 1996.

TABLE 4-24
IL 83/US 45 with US 12 Potential ADID Impact Summary [a]

Route	ADID Description	ADID Size ha (ac)	Potential ADID Impact	% Impacted	ADID Functions Identified by Lake County ADID Study	Impacts to Functions	Community Type
I-94	ADID 91 LCTIP 94-11	49.6 (122.5)	0.3 (0.7)	0.6	• High Quality Plant Community • Sediment/toxicant retention	Minimal Habitat Loss Minimal	Cattail Marsh Sedge Meadow
IL 21	ADID 94 Liberty Prairie LCTIP 21-28	55.4 (137.0)	0.02 (0.04)	0.03	• Threatened & Endangered Species Habitat • Sediment-toxicant retention • Stormwater storage • High Quality Plant Community	Minimal Habitat Loss Minimal Minimal Minimal	Wet Prairie
IL 21	ADID 96 Tributary to Bull Creek LCTIP 21-18	6.5 (15.9)	0.1 (0.2)	1.5	• High quality stream • Stormwater storage • Sediment-Toxicant Retention	Minimal Habitat Loss Minimal Minimal	Stream complex
I-94	ADID 99 Headwaters of the Middle Fork, North Branch Chicago River LCTIP 94-10	3.4 (8.6)	0.01 (0.03)	0.3	• High Quality Wildlife Habitat • Sediment-toxicant retention	Minimal Habitat Loss Minimal sediment/ toxicant retention Loss	Emergent cattail marsh
IL 21	ADID 106 Bull Creek LCTIP Nos. 21-17, 21-28	1.6 (3.9)	0.1 (0.2)	6.25	• Threatened & Endangered Species Habitat • Stormwater storage • Sediment/toxicant retention	Some Loss of Habitat Minimal Minimal	Stream Complex
I-94	ADID 108 LCTIP 94-9	11.7 (28.9)	0.4 (1.0)	3.5	• Threatened & Endangered Species Habitat • Sediment/toxicant retention	Some Loss of Habitat Minimal	Sedge Meadow Wet mesic Prairie
I-94	ADID 128 LCTIP 94-5	48.3 (119.4)	0.04 (0.1)	0.08	• High Quality Plant Community • Sediment-toxicant retention	Minimal Habitat Loss Minimal	Sedge Meadow
IL 83	ADID 143 Indian Creek/Killdeer Creek LCTIP Nos. 83-19, 83-40	63.0 (155.6)	0.2 (0.6)	0.3	• Threatened & Endangered Species Habitat • Shoreline-bank stabilization • Sediment/toxicant retention	Minimal Habitat Loss Minimal Minimal	Sedge Meadow Emergent Marsh
IL 83	ADID 151 LCTIP 83-27	39.4 (97.4)	0.2 (0.4)	0.5	• Shoreline-bank stabilization • Sediment-toxicant retention	Minimal Minimal	Wetland Stream Complex
IL 83	ADID 158 Indian Creek LCTIP 83-11	58.6 (144.8)	0.01 (0.03)	0.02	• Shoreline-bank stabilization • Sediment/toxicant retention	Minimal Minimal	Stream Complex
US 12	ADID 183 LCTIP 12-4	36.7 (90.6)	0.3 (0.6)	0.8	• Shoreline-bank stabilization • Sediment/toxicant retention • Nutrient removal and transport	Minimal Minimal Minimal	Buffalo Creek
IL 60	ADID 198 MacArthur Woods LCTIP 60-11, STM-27	14.8 (36.67)	0.1 (0.2)	0.68	• High Quality Plant Community • Sediment/toxicant retention • Stormwater storage	Minimal Minimal Minimal	Northern Flatwoods
IL 120	ADID 200 LCTIP 120-4	7.4 (18.3)	0.1 (0.2)	1.4	• Threatened & Endangered Species Habitat • Shoreline-bank stabilization • Sediment/toxicant retention	Minimal Habitat Loss Minimal Minimal	Deep Marsh
TOTAL		**396.4 (979)**	**1.9 (4.3)**	**0.5**			

[a]Lake County ADID Study

The four wetland functions used in the process are described below.

Presence of federal-listed and/or state-listed species. Wetland reconnaissance fieldwork performed for the LCTIP was not intended to assess presence of federal- or state-listed species. Rather data for federal and state threatened and endangered species were gleaned from published literature sources such as Biological Surveys (various) performed by the Illinois Natural History Survey (INHS), Illinois Department of Conservation (IDOC – now IDNR) Technical Report No. 1: *Northeastern Illinois Wetland Survey for Endangered and Threatened Birds; A Summary of Field Data: 1980-1989*, and correspondence from the Illinois Department of Natural Resources Natural Heritage (database search dated July 6, 2000).

Based on the IDNR database search (July 6, 2000), element occurrences within the study area are summarized in Table 4-25. Review of other published sources did not reveal any element occurrences within the study area that were not reported by the IDNR database search.

Wetlands known to provide refuge for any federally or state listed species were assigned 5.5 points and those wetlands not known to provide refuge for any listed species were assigned 0 points. Points assigned for this function are intended to mirror statewide mitigation requirements, e.g. 5.5:1, for impacted wetlands that harbor listed species. Mitigation requirements for a given resource generally reflect how a wetland function is valued.

Wildlife habitat. Wildlife habitat was assessed by assigning one point per vegetative strata observed during wetland determinations, and assigning a wetland size class (0-8) to each wetland potentially affected. Strata considerations included herbaceous, shrub/sapling, tree, vines, and submergents. If dominant trees were dead, they were included as valuable habitat for wildlife species.

The presence of a larger number of strata and a larger wetland size are attributes that increase ecological niches available to wildlife. Based on coordination with the US Army Corps of Engineers (USACOE), it was determined that although overall wetland size is important, small to moderate size wetlands

TABLE 4-25
IDNR Element Occurrences in or Near Wetlands within the Study Area

Element Occurrence	Adjacent to Wetland # [a, b]
Yellow-headed Blackbird	120-5, 120-23
Crawford's sedge	120-23
Sandhill crane	120-5, 53-7, 53-8
Pied-billed grebe	120-5, 53-43
Least bittern	120-5
Iowa darter	120-342g, 21-19
Oak Grove Botanical Area (INAI)	94-12
Eastern prairie fringed orchid	137-3, 94-11, 94-13
Mountain blue-eyed grass	12-4
±7 threatened and endangered species	120-6, 60-4, 60-9, STM-26, STM-27, STM-28, 21-1
Heron rookery	53-43

[a] 5.5 points were assigned to these wetlands in the wetland functional assessment

[b] Wetland numbers were assigned to wetlands identified during field verification.

in a disturbed environment serve various functions. As a result, the scoring of wetland size does not distinguish differences for wetlands over 20 hectares (50 acres) in size, and attempts to reflect the true value of smaller wetlands in an urbanized area. For this methodology, it is assumed that wetlands of all sizes greater than 20 hectares (50 acres) provide similar levels of ecological function. Size classes are described in Table 4-26.

Floristic diversity. Lists of dominant vegetation were developed during wetland field verifications for each wetland within the study area of the two build alternatives. Plant species lists were only intended for approximation of the wetland boundary and do not comprise a complete floristic list. The use of the Floristic Quality Assessment (FQA) method as developed by Wilhelm et al. (1994) is inappropriate to assess cursory species lists. A FQA would be developed after the selection of a preferred alternative.

For purposes of this study, floristic diversity was assessed by counting the number of living dominant plant species and subtracting all invasive plants, mowed turf grass, and row crop plants. Filamentous algae, prevalent in some wetlands within the study area, was not included in the calculation of the floristic diversity index. Plant species considered as invasive observed during fieldwork include purple loosestrife (*Lythrum salicaria*), reed canarygrass (*Phalaris arundinacea*), giant reed (*Phragmites australis*), garlic mustard (*Alliaria petiolata*), common buckthorn (*Rhamnus cathartica*), common burdock (*Arctium minus*), smooth brome (*Bromus inermis*), corn (*Zea mays*), honeysuckle (*Lonicera* spp.), and Canada thistle (*Cirsium arvense*). Invasive dominants were subtracted from calculation of floristic diversity because they are detriments to floristic diversity. It should be noted that all plants, invasive or not, were included in calculation of the strata class (see Wildlife Habitat function of wetlands) because wildlife would use invasive plant species to some extent for cover and food sources.

Recreation (Generally Passive)/Education Potential. Wetlands in or adjacent to specially designated lands are generally highly valued resources. For purposes of this study, specially designated lands include forest preserves, Illinois Natural Areas Inventory (INAI) sites, and Illinois Nature Preserves. Varying points were assigned to wetlands based on their adjacency to these different specially designated lands categories as follows:

- Wetlands adjacent to or within Illinois Nature Preserves were assigned 10 points.
- Wetlands adjacent to or within INAI sites were assigned 5.5 points.
- Wetlands adjacent to or within forest preserves were assigned 1 point.
- Wetlands not adjacent to or within any specially designated lands were assigned 0 points.

Point assignments for wetlands near or in different classifications of specially designated lands generally mirror mitigation requirements for impacts to these important wetlands.

Not all wetland functions were individually assessed for this study. Functions, such as food chain support and uniqueness, were not assessed. The food chain support function is too complex to be assessed based on the level of detail on the information available for this study. Unique wetlands, such as bogs, fens (northern peatlands), seeps or springs were not

TABLE 4-26
Wetland Size Classes Used in Wetland Functional Assessment

Size Class	0	1	2	3	4	5	6	7	8
Hectare range	0–0.1	0.1 - 0.2	0.2 - 0.4	0.4 - 0.8	0.8 - 2.0	2.0 - 4.0	4.0 – 8.0	8.0 - 20	>20
Acre range	0–0.25	0.25–0.49	0.50 – 0.99	1.0–1.99	2.0 – 4.9	5.0 – 9.9	10–19.9	20–49.9	>50

identified for each alternative during the field verification exercise. Therefore these functions were not assessed.

Similarly, functions such as aquatic habitat, sediment/toxicant trapping, and floodwater/stormwater attenuation were not considered individually due to the complex nature of these functions compared to the data available for this study. These last three functions were considered during the weighting process for wetland size classification as they generally would be considered a function of wetland size. Larger and more diverse wetland complexes generally provide these functions better than wetland complexes of smaller size.

4.3.3.3 General Functional Wetland Assessment

The wetland impacts were assessed for the build alternatives using the wetland functional assessment methodology. Wetlands potentially impacted by the No-Action Alternative were not field-verified; therefore, the wetland functional assessment methodology could not be applied. The impacts for the build alternatives are summarized below.

The IL 53 Freeway/Tollway Alternative would affect a total of 37.1 hectares (91.8 acres) of wetlands. Roughly 12.5 percent, 4.7 ha (11.5 ac) are Class I (high quality) wetlands, 26.8 percent, 10.0 ha (24.6 ac) are Class II wetlands, and 60.7 percent, 22.5 ha (55.7 ac) of the total wetland impacts are Class III wetlands.

The IL 53 Freeway/Tollway Alternative would affect 118 individual wetlands. Of the affected wetlands, 12 field verified wetlands (representing 5 ADID complexes) are designated as ADID. Of the 12 field verified wetlands, wetlands 53-7, 53-11 and 53-43 are Class I, wetlands 53-8, 53-19, 53-21, 53-22, 53-67, 83-19, and 83-40 are Class II, and wetland 120-4 is Class III. Affected wetlands along the IL 53 Freeway/Tollway Alternative identified as Class I that are not designated as ADID include wetlands 120-5 and 120-6.

The IL 83/US 45 with US 12 Alternative would affect 23.4 hectares (57.7 acres) of wetlands. With respect to the wetland functional assessment methodology used for this project, 3.8 percent, 0.9 ha (2.2 ac) are Class I wetlands, 60.8 percent, 14.3 ha (35.1 ac) are Class II, and 35.4 percent, 8.3 ha (20.4 ac) are Class III.

The IL 83/US 45 with US 12 Alternative would affect a total of 196 individual wetlands. Of those, 21 field verified wetlands (representing 13 ADID complexes) are designated in part as ADID. Of the 21 field verified (ADID designated) wetlands, wetlands STM-27, 94-10, and 94-11 are Class I wetlands, wetlands 12-4, 21-18, 21-28, 83-11, 83-19, 83-27, 83-40, 94-5, and 94-9 are Class II, and wetlands 21-17, 60-11, and 120-4 are Class III. Affected wetlands along the IL 83/US 45 with US 12 Alternative identified as Class I (high quality) that are not designated as ADID include wetlands STM-26, STM-28, 21-1, 60-1, 60-5, 60-9, and 120-6.

Wetland Functional Assessment-IL 53 Freeway/Tollway Alternative

The results of the wetland functional assessment were also summarized for the major watershed within the project area. The purpose of this summary is to gain some perspective on both the amount and quality of wetlands affected that may lead regulatory agencies to more effective mitigation of the wetland impacts. Again, information is summarized for the two build alternatives only. Tables E-4 through E-6 in Appendix E, summarize wetland impact data for the IL 53 Freeway/Tollway Alternative, analyzed with respect to watershed, roadway segment, and wetland quality class (per field-based wetland functional assessment methodology).

Fox River Watershed. Roughly 5.3 hectares (13.1 acres) of wetland impacts would occur along parts of the IL 53 Freeway/Tollway Alternative that lie within the Fox River Watershed. Of those impacts, 46 percent are Class II wetlands, and 54 percent are Class III wetlands. All Fox River Watershed wetlands are located along IL 120. There are no Class I wetlands located within this watershed.

Des Plaines River Watershed. Roughly 31.8 hectares (78.7 acres) of wetlands would be affected along parts of the IL 53 Freeway/Tollway Alternative that lie within the Des Plaines River Watershed. Of those impacts, 14.6 percent are Class I wetlands, 23.6 percent are Class II wetlands, and 61.8 percent are Class III wetlands.

Approximately half of the Class I impacts are located along the eastern half of IL 120 near the Almond Marsh complex. Most of the remaining Class I impacts are located near the Indian Creek complex.

Lake Michigan Watershed. There are no wetland impacts proposed for portions of the IL 53 Freeway/Tollway Alternative that lie within the Lake Michigan Watershed.

Wetland Functional Assessment- IL 83/US 45 with US 12 Alternative

Fox River Watershed. Approximately 0.4 hectare (1.1 acres) of wetland impacts would occur along parts of the IL 83/US 45 with US 12 Alternative that lie within the Fox River Watershed. Of the total wetland impacts, 8 percent are to Class II wetlands and 92 percent are Class III wetlands. There are no Class I wetlands located in this watershed for this alternative.

Tables E-1 through E-3 in Appendix E, summarize wetland impact data for the IL 83/US 45 with US 12 Alternative, analyzed with respect to watershed, roadway segment, and Wetland Quality Class (per field-based wetland functional assessment methodology).

Des Plaines River Watershed. Roughly 22.9 hectare (56.6 acre) of wetland impacts would occur along the part of the IL 83/US 45 with US 12 Alternative that lie within the Des Plaines River Watershed. Of those, 3.9 percent are Class I wetlands, 61.9 percent are Class II wetlands, and 34.2 percent are Class III wetlands. Impacts to Class I wetlands for this alternative are distributed relatively evenly among St. Mary's Road, IL 120, IL 21, IL 60 and Interstate 94.

Lake Michigan Watershed. There are no proposed impacts to wetlands along portions of the IL 83/US 45 with US 12 Alternative that lie within the Lake Michigan Watershed.

4.3.3.4 Summary

All project alternatives would have unavoidable wetland impacts. The IL 53 Freeway/Tollway Alternative would have the largest area of overall wetland impacts. Based on the field-verified wetland functional assessment methodology, the IL 53 Freeway/Tollway Alternative would have a higher proportion of high quality wetlands (Class I) impacted, however, fewer impacts to moderate quality (Class II) wetlands than the IL 83/US 45 with US 12 Alternative. Combining the high and moderate quality wetlands, the IL 83/US 45 with US 12 Alternative would impact a higher percentage and larger amount of these wetlands than the IL 53 Freeway/Tollway Alternative. Almost two-thirds of the wetlands impacted for the IL 53 Freeway/Tollway Alternative are considered low quality (Class III) wetlands, whereas only approximately one-third of the wetlands impacted as a result of the IL 83/US 45 with US 12 Alternative are considered Class III wetlands. The area of wetland impact for any of the alternatives is an issue that would be the subject of greater examination for the preferred alternative. Continued efforts would be made to avoid or minimize the impact with further project refinements.

From a countywide perspective, the impacts to wetlands are relatively small. Compared to the total wetlands in Lake County (18,500 ha, or 45,700 ac) the alternatives impact from 0.17 percent for the No-Action Alternative (Baseline) to 0.20 percent for the IL 53 Freeway/Tollway Alternative, of the total wetlands identified by the LCWI. Table 4-27 (on the following page) summarizes impacts to wetlands per alternative, including a summary of qualitative assessment per alternative and per watershed.

Impacts would also occur to wetlands from roadway operations after construction. This includes stormwater runoff from roadways that carries typical roadway pollutants into adjacent water bodies or wetlands. Other impacts occur from roadway deicing

procedures, which introduce sodium chloride into the surrounding areas. The introduction of roadway pollutants including sodium chloride can affect vegetation in proximity to the roadway. Impacts of this nature would not be as substantive for improvements along existing roadways, since these areas are already subject to operational impacts.

For new roadways, the introduction of roadway pollutants can be more substantive than for improvements to existing roadways. This is a result of introducing roadway pollutants to areas that previously received limited impacts from roadways. This would present more impacts to areas along the IL 53 corridor. It should be noted that some roadway pollutants are already entering these areas from cross-streets and local roads adjacent to the existing right-of-way. Different measures can be taken to reduce roadway operation impacts such as alternative deicing materials, routing of stormwater runoff through vegetated swales or sediment basins or by the use of barriers, which could include pollutant tolerant vegetation or other structural elements. Detailed mitigation measures would be designed specifically for the preferred alternative. Additional information on roadway runoff impacts is included in Section 4.3.2, *Water Quality and Water Resources*.

Commonly, regulatory agencies also consider the effects of the direct impacts on portions of impacted wetlands outside the project right-of-way. The consideration of impact to the entire wetland attempts to evaluate the overall impact to wetland functions. A final determination of wetland impacts would be fully addressed after selection of a preferred alternative, completion of formal wetland delineations, and coordination with US Army Corps of Engineers, US Fish and Wildlife Service, US Environmental Protection Agency, Illinois Department of Natural Resources, and the Lake County Stormwater Management Commission.

4.3.4 Floodplain Encroachments

Potential floodplain encroachments were identified by examining Flood Insurance Study (FIS) maps published by Federal Emergency Management Association (FEMA). Guidance from the Lake County Stormwater Management Commission (SMC) was applied in determining storage

TABLE 4-27
Summary of Wetland Impacts

	No-Action (Baseline)	IL 53 Freeway/Tollway		IL 83/US 45 with US 12	
Total Wetland Impacts	31.6 ha (78.1 ac)	37.1 ha (91.8 ac)		23.4 ha (57.7 ac)	
ADID Impacts	5.3 ha (12.9 ac)	3.5 ha (8.6 ac)		1.9 ha (4.3 ac)	
Non-ADID Impacts	26.5 ha (65.1 ac)	33.6 ha (83.2 ac)		21.6 ha (53.5 ac)	
		Percent of impacts	Size	Percent of impacts	Size
Class I	--[a]	12.5	4.7 ha (11.5 ac)	3.8	0.9 ha (2.2 ac)
Class II	--[a]	26.8	10.0 ha (24.6 ac)	60.8	14.3 ha (35.1 ac)
Class III	--[a]	60.7	22.5 ha (55.7 ac)	35.4	8.3 ha (20.4 ac)
Fox River Watershed	--[a]	5.3 ha (13.1 ac)		0.4 ha (1.1 ac)	
Des Plaines Watershed	--[a]	31.8 ha (78.7ac)		22.9 ha (56.6 ac)	

[a] No qualitative assessment conducted for No-Action Alternative (Baseline)

requirements for both floodplain encroachments and added impervious areas associated with the alternatives. FIS floodplain locations were identified directly from the maps. Potential encroachments on SMC floodplains would be determined in future phases of work for the preferred alternative.

The following subsections discuss the potential floodplain encroachments and other drainage concerns for each alternative, including potential mitigation measures. Tables describing floodplain encroachments, added impervious areas, storage requirements, and potential storage locations within each drainage reach are shown in Appendix F. Transverse (crossing) and longitudinal (edge) encroachments are differentiated, since longitudinal encroachments often result in more complex floodplain effects and greater reduction in conveyance. Longitudinal encroachments typically involve more fill, based on a longer zone of impact. Longitudinal impacts are generally considered to be more avoidable than transverse encroachments, based on the potential for design modifications.

Mitigation of floodplain encroachments is required in Lake County through provision of detention and compensatory storage in the area of impact (Lake County Stormwater Management Commission, Lake County Watershed Development Ordinance, amended August 10, 1999). Compensatory storage is a volume of storage within or adjacent to a regulatory floodway or floodplain used to balance the loss of natural flood storage capacity within the floodplain. Detention storage is a volume of storage used to maintain stormwater release rates at or below levels after the addition of relatively impervious areas.

4.3.4.1 No-Action Alternative (Baseline)

The roadway improvements included in the No-Action Alternative (Baseline) pass through three major watersheds: the Fox River Watershed, the Des Plaines River Watershed, and the Chicago River Watershed. Subwatersheds involved in these areas include Flint Creek, Buffalo Creek, Aptakisic Creek, Lower Des Plaines River, Indian Creek, Bull Creek, Mill Creek, Upper Des Plaines River, Squaw Creek, Middle Fork, Skokie River, and West Fork.

The No-Action Alternative (Baseline) would involve 38 FIS floodplains, with a total of 6.9 ha (17.0 ac) of encroachment. Of these 38 locations, 28 would involve the extension of existing culverts or bridges at transverse crossing locations where roadway widening would occur. Encroachment at these locations would be 3.9 ha (9.6 ac). One transverse involvement would occur where a roadway would be constructed along a new alignment. This would occur along the Bradley Road extension, and would have an encroachment area of 0.53 ha (1.3 ac). Finally, nine longitudinal encroachments would occur, all at locations where roadways would be widened, with a total area of 2.5 ha (6.1 ac). Design alternates to avoid or minimize longitudinal impacts would need to be investigated before implementation.

In addition to floodplain effects, the combined roadway improvements for the No-Action Alternative (Baseline) would add 135 ha (333.0 ac) of impervious area. Based on floodplain encroachments and impervious areas, the No-Action Alternative (Baseline) would require 8.3 ha (20.5 ac) of compensatory storage and 14.3 ha (35.3 ac) of detention storage. A preliminary concept for locations of detention and compensatory storage is provided in Appendix F. The required storage could be provided near the areas of encroachment.

4.3.4.2 IL 53 Freeway/Tollway Alternative

The IL 53 Freeway/Tollway Alternative passes through two major watershed areas: the Fox River Watershed and the Des Plaines River Watershed. Subwatersheds involved in these areas include Fish Lake Drain, Squaw Creek, Mill Creek, Bull Creek, Buffalo Creek, Indian Creek, and the Upper Des Plaines River.

This alternative encroaches on 10 FIS floodplains with a total area of 13.0 ha (32.1 ac). All would involve transverse encroachments along the 6-lane roadway to be

constructed on new alignment. No longitudinal encroachments are identified. The IL 53 Freeway/Tollway Alternative would also involve approximately 182 ha (449.0 ac) of additional impervious area. Based on these effects, the IL 53 Freeway/Tollway Alternative would require 15.6 ha (38.5 ac) of compensatory storage and 18.7 ha (46.3 ac) of detention storage. A preliminary concept for locations of detention and compensatory storage is provided in Appendix F. The required storage could be provided near the areas of encroachment.

4.3.4.3 IL 83/US 45 with US 12 Alternative

The IL 83/US 45 with US 12 Alternative passes through three major watershed areas: the Fox River Watershed, the Des Plaines River Watershed, and the Chicago River Watershed. Subwatersheds involved in these areas includes: Slocum Lake Drain, Tower Lake Drain, Flint Creek, Buffalo Creek, Aptakisic Creek, Lower Des Plaines River, Indian Creek, Bull Creek, Mill Creek, Upper Des Plaines River, Squaw Creek, and Middle Fork.

This alternative encroaches on 33 FIS floodplains with a total area of 5.9 ha (14.6 ac). Seventeen of those locations would involve extending culverts or bridges at transverse crossing locations where roadway widening would be required. The total encroachment at these locations would be 3.7 ha (9.2 ac). Another four encroachments would occur at transverse crossing locations, where roadway would be constructed along new alignment. These would occur along the section of IL 83/US 45 north of IL 60 (Mundelein Bypass), and have an impact area of 0.3 ha (0.8 ac). Finally, 12 longitudinal encroachments would occur, all at locations where roadways would be widened, with a total encroachment area of 1.8 ha (4.5 ac). Design alternates to avoid or minimize longitudinal impacts would need to be investigated should this become the preferred alternative. Placing widening on the side opposite the floodplain should be investigated as an option. This alternative also would involve 163.0 ha (403.0 ac) of additional impervious area. Based upon the floodplain encroachments and added impervious area for this alternative, 7.1 ha (17.5 ac) of compensatory storage and 17.1 ha (42.3 ac) of detention storage would be required. A preliminary concept for locations of detention and compensatory storage is provided in Appendix F. The required storage could be provided near the areas of encroachment.

4.3.4.4 Summary of Floodplain Encroachments

The number of floodplain encroachments and the added impervious area varies with each alternative. Generally, the regulatory requirements for compensatory storage and stormwater detention could be satisfied for each alternative near the area of impact (concept plans in Appendix F). Actual compliance with these requirements would be determined by detailed hydraulic analysis during future phases of work. Table 4-28 summarizes the encroachments and added impervious area for each alternative.

TABLE 4-28
Floodplain and Added Impervious Area Impact Summary

	No-Action	IL 53 Freeway/Tollway	IL 83/US 45 with US 12
FIS Encroachments (Amount and Area)	38 encroachments 6.9 ha (17.0 ac)	10 encroachments 13.0 ha (32.1 ac)	33 encroachments 5.9 ha (14.6 ac)
Potential Longitudinal Encroachments	9	0	12
Added Impervious Area	135 ha (333 ac)	182 ha (449 ac)	163 ha (403 ac)
Compensatory Storage	8.3 ha (20.5 ac)	15.6 ha (38.5 ac)	7.1 ha (17.5 ac)
Detention Storage	14.3 ha (35.3 ac)	18.7 ha (46.3 ac)	17.1 ha (42.3 ac)

4.3.5 Biological Resources

The project alternatives generally would displace vegetation and wildlife habitat in the rights-of-way of the improvements. The paved area of the rights-of-way would completely displace existing habitat; however, the cover type outside the edge of pavement to the right-of-way line would be converted to grassy medians and grass with intermittent landscape plantings of trees and shrubs. The new grassy areas can be planted with native prairie vegetation, which reduces maintenance costs and provides a more natural cover type than turf grasses. The direct habitat conversion of cover type and habitat would cause some loss of wildlife habitat that serves as cover for breeding, foraging, and resting. For new roadway alignments, there would be some habitat fragmentation, and disruption of corridors for wildlife movement.

In general, most of the native cover types in the study area already are substantially altered, and wildlife is limited primarily to species that have successfully adapted to urban, suburban, or agricultural development. Overall, the project-related impacts to native cover types and wildlife resources would be minimal. Impacts to wildlife within the project-area could involve small population reductions of species associated with existing and available habitat. Many of the improvements would upgrade existing roadways (i.e., the No-Action Alternative (Baseline) and IL 83/US 45 with US 12 Alternative) and would have a minimal effect upon wildlife species that have already adapted to roadway edges. In some cases, however, species that rely upon higher quality habitat such as wetlands, natural areas, or large wood lots would be affected. Such species are discussed below.

4.3.5.1 No-Action Alternative (Baseline)

Natural habitat bordering the No-Action improvements have limited potential because of extensive development and periodic maintenance (Figure 4-19). Roadway improvements in this area would have minimal impact on the limited wildlife resources in the area.

Vegetation and Cover Types. Most of the proposed improvements involved with this alternative are associated with existing roadways. As a result, most of the cover type conversions and the fragmentation of large forested tracts would be minimal. Most cover types affected by this alternative are urban grasslands, closed canopy deciduous forest, row crops, and open canopy deciduous forest. The greatest potential impact would be related to the proposed Pulaski Road extension, which would bisect the Oak Grove Botanical Area Illinois Natural Area Inventory Site. This would introduce roadway edges to a large contiguous habitat area, potentially limiting north-south wildlife movement in this natural area, decreasing wildlife populations intolerant of roadway edges, and increasing the potential number of collisions between wildlife and vehicles. Although the endangered prairie white fringed orchid has been observed in the Oak Grove site, based on information provided by IDNR, the proposed Pulaski Road extension may not be located near specific known populations of that species. Before construction, the agency sponsoring the project would conduct detailed surveys to determine the potential for affecting that plant species.

Wildlife. Birds and most mammals are mobile; therefore the direct loss of habitat from this alternative would not be as critical as it would be to other species. Typically, these species would seek out other areas to forage, breed, and rest. Their mobility, however, exposes them collisions with vehicles as they attempt to cross roadways that have been widened, or by the addition of new roadways to areas not previously served. Losses to actual species groups should be minimal. Most reptiles and amphibians that occur in Lake County are less mobile, and so they upon the immediate habitat where they live. Additionally, species that depend upon wetland habitat could, to some extent, be affected by the No-Action Alternative (Baseline). This alternative would affect 27 ha (65 ac) of wetlands, many adjacent to existing roadways. Species that occur in these locations generally are adapted or are more tolerant to the existing conditions.

It is expected that the overall effect to these species would be minimal.

Forest preserves, nature preserves, INAI sites, and other large tract forested areas provide important protected habitat. Any impact to these resources are considered important from a wildlife standpoint. Critical areas of impact exist along Rollins Road, IL 21, IL 22, Pulaski Road, and US 45.

4.3.5.2 IL 53 Freeway/Tollway Alternative

The IL 53 Freeway/Tollway Alternative would be located mostly on new alignment. This alternative avoids most of the county's critical habitat areas located in forest preserves, nature preserves, INAI sites, and large forested tracts (Figure 4-20).

Vegetation and Cover Types. Most of the cover type impacts would occur to row crops, urban grasslands, and closed and open canopy deciduous forests. The IL 53 Freeway/Tollway Alternative would affect 15 wooded areas greater than 4 ha (10 ac). Six wooded areas could experience fringe impacts, five could lose trees from their edges, and four could suffer fragmentation of overall habitat. The greatest impacts to deciduous forests would occur south of Long Grove Road at Hicks Road, near the crossing of IL 22, Indian Creek Road, and south of IL 176. The improvements to IL 120 would further affect forested areas east of Grayslake and US 45 near Almond Marsh (Figure 4-20). Fragmentation of these areas could adversely affect wildlife populations that require large undisturbed wooded tracts and favor species that are more adaptive to edge environments. Competition for reduced habitat in these locations could likely cause some reduction in population for some birds and mammals.

Wildlife. The IL 53 Freeway/Tollway Alternative would be an access-controlled facility with a wide cross section, representing a potential barrier for both north-south and east-west wildlife movements. North-south movement is already limited by IL 120 (the east-west segment of this alternative). The east-west improvement planned for this alternative would impose additional barrier effects with access control fencing, median barriers, etc.

This alternative would not affect any major greenways or stream complexes in the county. The proposed east-west segment would cross the Des Plaines River and its natural greenway at the current IL 120 crossing, thereby minimizing the effects of a new crossing. As streams provide natural greenways and corridors for wildlife movement, the bridging of these features provides some limited corridors of accessibility for wildlife. Although there would be some avenues of access for reptiles, amphibians, and mammals, there would be limited impacts due to habitat fragmentation, isolation, and increased vehicle/wildlife collisions. There would be some loss of bird nesting and foraging areas due to the conversion of the undeveloped land within the proposed right-of-way to highway uses.

The proposed IL 53 Freeway/Tollway Alternative would directly affect the habitat and wildlife populations in the area reserved as right-of-way for the IL 53 Freeway/Tollway Alternative. The protected corridor has become a haven for wildlife escaping the continual development of their habitat in areas near the proposed roadway. The conversion of this protected corridor to highway would force wildlife that use the area to move to other locations. This could cause the protected open space near this alternative, consisting of forest preserves, nature preserves, natural areas, and wetland complexes, to experience increases in wildlife densities as well as some overall reduction in wildlife population.

4.3.5.3 IL 83/US 45 with US 12 Alternative

Similar to the No-Action Alternative (Baseline), the IL 83/US 45 with US 12 Alternative would improve mostly existing roadways; therefore, impacts to birds, mammals, reptiles, and amphibians would be minimal (Figure 4-21).

Vegetation and Cover Types. Most cover type impacts would occur to urban grasslands, row crops, closed canopy deciduous forests, rural

grasslands, and open canopy deciduous forests. The impact to large woodlots is comparable to that for the IL 53 Freeway/Tollway Alternative (Figure 4-20). The IL 83/US 45 with US 12 Alternative would affect 13 wooded areas over 4 ha (10 ac) in size. Of the 13 wooded areas, 10 could experience fringe impacts, 2 could affect existing edges, and 1 could have fragmentation of habitat. Fragmentation of wooded habitat is not considered significant for this alternative. As stated, most impacts to woodlots for this alternative would affect existing edges. Only one large deciduous tract along the bypass section west of Mundelein could experience fragmentation.

Wildlife. Since much of this alignment consists of improvements to existing roadways, species living adjacent to those roadways generally are tolerant of this condition. Roadway widening could increase the chances for vehicle collisions with wildlife and increase the barrier effect for less mobile terrestrial species such as reptiles and amphibians. The potential for increased roadkill for this and the other alternatives is not expected to degrade the populations of wildlife species occurring in the area. This alternative consists primarily of roadway improvements and is therefore less likely to fragment and isolate habitat. The Mundelein bypass would be on new alignment and would use part of the IL 53 Freeway/Tollway alignment. There is the potential for limited fragmentation and isolation along this short segment of new roadway.

This alternative would have a little effect on forest preserves, natural areas, and nature preserve resources (less than 2 ha or 5 ac); therefore, no major impacts are anticipated for these important habitat resource areas. There would be no additional crossings of the greenway along the Des Plaines River from this alternative. Improvements are proposed for three roadways that cross the Des Plaines River and the greenway. These improvements are along Interstate 94, IL 60, and IL 137. These proposed improvements would have little additional impact to area wildlife because I-94 is an access-controlled highway, and IL 60 and IL 137 are 4-lane highways.

This alternative would affect the least amount of wetlands compared to other alternatives, reducing potential impacts to wildlife that use wetlands for forage and cover.

4.3.5.4 Summary of Biological Resource Impacts

Both build alternatives avoid major impacts to the most important wildlife habitat in the study area (forest preserves, nature preserves, and natural areas). Generally, the No-Action Alternative (Baseline) would have minimal impact to biological resources, except for an impact to the Oak Grove Botanical Area with the construction of the Pulaski Road extension.

The IL 83/US 45 with US 12 Alternative would have a slightly less impact than the No-Action and the IL 53 Freeway/Tollway alternatives. The IL 83/US 45 with US 12 Alternative affects areas already disrupted by urban development, including roadways. Therefore, improvements to roadways could have limited effect on wildlife resources, compared to new roads on new alignments. Impacts are comparable for the two build alternatives in areas that share common alignments (e.g. the Mundelein bypass).

The IL 53 Freeway/Tollway Alternative could have slightly greater impacts, particularly in the north-south direction. The right-of-way for much of this alternative has been reserved for many years and over time has developed into a corridor for wildlife in a developing area. This alternative would replace the habitat provided by the protected corridor causing displacement of wildlife populations, along with the potential for habitat fragmentation and isolation. The species in this area generally are tolerant of development and would be expected to compete well in other locations if forced to relocate. However, increased wildlife density and competition for available habitat in neighboring areas could cause a small reduction in the overall population.

4.3.6 Threatened and Endangered Species

According to information supplied by the Illinois Department of Natural Resources (IDNR 2000), the project alternatives are near several recorded occurrences of threatened or endangered species. The accuracy of available data, however, does not allow a determination of specific impact to these resources. When a preferred alternative is chosen, additional studies would be conducted to determine potential presence and impacts to threatened and endangered species. These could include floristic, avian, mammalian, herpetological, fish, insect, mollusk, and other surveys.

Generally, bird species represent most of the listed species identified for the study area (IDNR 2000). No threatened or endangered mammal species have been identified in the area. To some degree, each project alternative would reduce potential foraging areas; however, there is abundant habitat in the area to sustain these populations. The specific habitat impacts for each alternative are discussed below.

4.3.6.1 No-Action Alternative (Baseline)

Federal-Listed Species. Improvements under the No-Action Alternative (Baseline) for the Pulaski Road extension could affect the Oak Grove Botanical Area INAI site, which harbors the eastern prairie fringed orchid (*Platanthera leucophaea*, a federal and state threatened plant species). The eastern prairie fringed orchid is scattered throughout the site, and isolating the species in the north remnant of the site may affect its continued existence. Based on the general locations shown by IDNR (2000), it appears that actual roadway alignment would not directly affect the species. Studies conducted near IL 22 also indicated the presence of eastern prairie fringed orchid (Taft 1997b) in several locations. The best available information shows that known sites would not be affected; however, detailed surveys would be required to confirm the presence or absence of the species within the Pulaski Road and IL 22 project rights-of–way.

State-Listed Species. Based on correspondence from IDNR (2000), several state-listed species occur in the area of No-Action Alternative (Baseline) improvements. They are the pied-billed grebe (*Podilymbus podiceps;* state threatened), yellow-headed blackbird (*Xanthocephalus xanthocephalus;* state endangered), queen-of-the-prairie (*Filipendula rubra;* state endangered), pretty sedge (*Carex woodii*; state threatened), and seaside crowfoot (*Ranunculus cymbalaria;* state endangered).

Avian studies by INHS along IL 22 from US 41 to IL 83 (FAP 337) revealed marginal suitable habitat for the pied billed grebe (*Podilymbus podiceps*; state threatened). In this study, no state-listed species were observed nor was direct evidence of breeding observed. It was determined that there is suitable habitat for five state-listed bird species near the alternative, but there was no evidence of their breeding. These birds are the American bittern (*Botaurus lentiginosus;* state endangered), least bittern (*Ixobrychus exilis;* state endangered), Bewick's wren (*Thryomanes bewickii;* state endangered), loggerhead shrike (*Lanius ludovicianus;* state threatened) and Henslow's sparrow *(Ammodramus henslowii;* state endangered). One bird species, the sharp-shinned hawk (*Accipiter striatus*) for which there is marginal suitable habitat within the study area (Amundsen and Enstrom 1996), is no longer a state-listed species. Proposed improvements to this roadway may affect suitable foraging areas, but it was determined that there is no suitable breeding area for these birds within the project limits. Therefore there would be no impacts to these species (IDOT 2000b).

Avian studies by the INHS (Amundsen and Enstrom 1996) recorded an observance of the American bittern along IL 22 between US 14 to Quentin Road (FAP 341). Breeding habitat for three other species of birds was assessed within the vicinity of this section of IL 22. These included the sandhill crane (*Grus canadensis;* state threatened), red-shouldered hawk (*Buteo lineatus;* state threatened), and great egret (*Ardea alba;* formerly state threatened). Amundsen and Enstrom (1996)

observed great egrets foraging within the study area, although they were not observed to be breeding. The red-shouldered hawk was observed north of IL 22 in 1994 between Kelsey Road and US 14, though direct evidence of breeding was not observed. The proposed improvements to this roadway would not affect breeding but may minimally affect marginal foraging areas for these bird species.

The seaside crowfoot (*Ranunculus cymbalaria;* state endangered) was identified near the former Deerfield Road Toll Plaza (ISTHA 1997). Fifty-five delineated colonies were observed in roadside ditches between Deerfield Road and Duffy Lane on both sides of the Tollway. The ISTHA developed a mitigation plan as compensation for potential impacts to these plant populations to meet the requirements of the IDNR.

Fish surveys conducted by the INHS have confirmed the presence of the Iowa darter (*Etheostoma exile;* state endangered) in several stream crossings along IL 21 near IL 120. These stream reaches would be affected by the No-Action Alternative (Baseline). Commitments to minimize and mitigate for potential impacts are:

- Use of bottomless box culverts to avoid disturbing streambeds.
- Locating bridge abutments outside the bank/shoreline to avoid streambed disturbance.
- No in-stream work to occur during spawning of Iowa darter (April to May).
- No earthwork or land-clearing near water bodies harboring this species during spawning.
- Rigorous enforcement of erosion control measures near the tributary harboring this species.
- Limiting earthwork and vegetation removal to the area of proposed improvements.
- Coordinating final plans with the IDNR prior to construction commencing for final clearance of threatened and endangered species issues.

Nature Preserves and INAI Sites. The No-Action Alternative (Baseline) would not impact designated nature preserves (CH2M HILL, GIS Database 1999). This alternative, however, could potentially affect three designated INAI sites totaling 1.25 ha (3.1 ac; Table 4-29). The greatest impact to INAI sites would occur at the Oak Grove Botanical Area INAI Site. Improvements in this area would isolate a small portion of the designated site, leaving a small remnant north of the new Pulaski Road extension.

4.3.6.2 IL 53 Freeway/Tollway Alternative

Federal-Listed Species. Based on information provided by the USFWS (February 2001), there are two locations of federally endangered prairie white fringed orchid near this alternative. This plant has been identified east of the proposed interchange with Illinois Route 22. Based on the proposed alignment, there will be no direct impacts to this plant. USFWS has also indicated the presence of this plant species near the interchange of IL 120 with I-94. The exact location of the plant relative to the existing and proposed roadway has not been provided, therefore, potential impacts to this plant cannot be ascertained. Detailed botanical surveys will be conducted in this area if this alternative is selected.

State-Listed Species. Based on a database search by IDNR (2000), several state-listed species are known to occur near the IL 53 Freeway/Tollway Alternative. State-listed bird

TABLE 4-29
INAI Sites Affected under No-Action Alternative (Baseline)

INAI Site	Roadway Improvement	Potential Impact	Total INAI Site Size
Oak Grove Botanical Area	Pulaski Road	1.1 ha (2.7 ac)	21.0 ha (52 ac)
Buffalo Grove Prairie	Lake-Cook Road	0.1 ha (0.1 ac)	3.8 ha (9.3 ac)
Almond Marsh	US 45	0.1 ha (0.3 ac)	98.0 ha (242.3 ac)

species include the yellow-headed blackbird (state endangered), sandhill crane (state threatened), pied-billed grebe (state threatened), least bittern (state threatened), and heron rookery (treated here as a protected element occurrence). There is the potential to impact foraging areas for these birds. One state-listed plant species, Crawford's sedge (*Carex crawfordii;* state endangered) is known to occur near the IL 53 Freeway/Tollway Alternative. Based on IDNR (2000), two other state-listed bird species are known to occur within 1.6 km (1 mi) of the IL 53 Freeway/Tollway Alternative; the common moorhen (*Gallinula chloropus;* state threatened) and the black tern (*Chlidonias niger;* state endangered). Direct impacts to these species are not anticipated, but they could move their nesting areas over time. No direct impacts are expected to these bird or plant species from the IL 53 Freeway/Tollway Alternative.

Approximate element occurrence locations and correspondence provided by IDNR (2000) show several listed species to be in or near wetlands identified within the IL 53 Freeway/Tollway Alternative. Based on IDNR, Table 4-30 summarizes selected wetlands identified in the IL 53 Freeway/Tollway Alternative and the listed species (including a Heron rookery) that have been observed in them.

One species of fish, the Iowa darter (*Etheostoma exile;* state endangered), was identified within a tributary of the Des Plaines River in the IL 120/IL 21 interchange. The IDOT has taken into consideration protective actions for this fish species as part of proposed improvements to IL 21 under the No-Action Alternative (Baseline). Commitments similar to those made for the proposed IL 21 improvements would be implemented if this alternative is selected. No other known locations of the Iowa darter would be directly affected by this alternative.

Though Blanding's turtle (*Emydoidea blandingii*; state threatened) is known to occur within 1.6 km (1 mi) of the IL 53 Freeway/Tollway Alternative (IDNR 2000) no impact to this species is expected from proposed roadway improvements. It is possible that several wetlands within the study area may be suitable habitat for this species (Phillips 1995).

Nature Preserves and INAI Sites. There are five designated Illinois nature preserves or INAI sites within 1.6 km (1 mi) of the IL 53 Freeway/Tollway Alternative. None of these sites would be directly or indirectly affected by this alternative.

4.3.6.3 IL 83/US 45 with US 12 Alternative

Based on information provided by IDNR (2000) and the USFWS (2001), several state-listed species and one federally-listed species are known to occur in the vicinity of the proposed IL 83/US 45 with US 12 Alternative.

TABLE 4-30
Selected Wetlands Identified in the IL 53 Freeway/Tollway Alternative and Listed Species Observed in Them

Element Occurrence	Adjacent to or in Wetland #
Yellow-headed blackbird	120-23, 120-5
Crawford's sedge	120-23
Sandhill crane	120-5
Pied-billed grebe	120-5, 53-43
Least bittern	120-5
Iowa darter	120-342g
Oak Grove Botanical Area (INAI)	94-12
±4 threatened and endangered species	120-6
Heron rookery	53-43

Federal-listed Species. Based on correspondence provided from USFWS (2001), the federally-listed plant species, the eastern prairie fringed orchid (*Platanthera leucophaea* - Federally threatened, state endangered), is known to occur at several locations along the IL 83/US 45 with US 12 Alternative.

IDNR (2000) has provided additional information on the potential location of this orchid species. Proposed improvements to Interstate 94 in the vicinity of the Oak Grove Botanical Area INAI site would partially impact wetlands numbered 94-11, 94-13, and 137-3. The eastern prairie fringed orchid is known to occur in close proximity to these wetlands, though not within the right-of-way of the proposed road way improvements. The proposed improvements to Interstate 94 would be within the existing right-of-way, therefore no direct impacts to this species are anticipated.

USFWS has identified areas along the east side of Interstate 94, north and south of the Oak Grove Botanical Area INAI site that harbor the prairie white fringed orchid. Proposed improvements to Interstate 94 in this location will be within the existing right-of-way. Therefore no direct impacts to this plant species is anticipated at these locations.

USFWS identified one other location, south of IL 22 along IL 83 as harboring the prairie white fringed orchid. The exact location of the plant relative to the proposed improvements has not been provided. Therefore potential impacts to this plant at this location cannot be ascertained. Detailed botanical surveys will be conducted in this area if this alternative is selected.

State-Listed Species. Based on correspondence by IDNR (2000), several state-listed species are known to occur in close proximity to improvements associated with the IL 83/US 45 with US 12 Alternative. Table 4-31 summarizes listed species known to occur in or adjacent to wetlands identified within the IL 83/US 45 with US 12 Alternative.

Six species of birds were identified within 1.6 km (1 mi) of the proposed improvements (IDNR 2000): yellow-headed blackbird (state endangered), pied-billed grebe (state threatened), least bittern (state threatened), sandhill crane (state threatened), and red-shouldered hawk (state threatened); and eight species of plants: mountain blue-eyed grass (*Sisyrinchium montanum;* state endangered), pretty sedge (*Carex woodii;* state endangered), Crawford's sedge (*Carex crawfordii;* state threatened), and marsh speedwell (*Veronica scutellata*; state threatened). Other plant species were identified for the nature preserves and INAI sites within 1.6 km (1 mi) of this alternative, including dog violet (*Viola conspersa*, state threatened), heart-leaved plantain (*Plantago cordata;* state endangered), ill-scented trillium (*Trillium erectum*; state endangered), purple-fringed orchid (*Platanthera psycodes;* state endangered), and the northern cranebill (*Geranium bicknelli;* state endangered). No direct impacts are expected to these bird or plant species from the IL 83/US 45 with US 12 Alternative.

Due to similarities in the alignments for the IL 83/US 45 with US 12 Alternative and the IL 53 Freeway/Tollway Alternative along 120 near the Almond Marsh site, potential

TABLE 4-31
Selected Wetlands Identified in the IL 83/US 45 with US 12 Alternative and Listed Species Observed in Them

Element Occurrence	Adjacent to Wetland #
Sandhill crane	53-8, 53-7
Iowa darter	21-19
Oak Grove Botanical Area (INAI)	94-12
Eastern prairie fringed orchid	137-3, 94-11, 94-13
Mountain blue-eyed grass	12-4
±7 threatened and endangered species	60-9, 60-4, STM-26, STM-27, STM-28, 21-1

impacts to listed species at this site would be similar for both alternatives. This includes potential proximity impacts to the yellow-headed blackbird (state endangered) and the pied-billed grebe (state threatened).

One species of fish, the Iowa darter (state endangered), was identified within 1.6 km (1 mi) of the proposed improvement project by IDNR at three separate locations. This fish was identified near the southeast quadrant of the interchange of Interstate 94 and IL 176. The fish was also found near IL 21 at two locations. As mentioned previously, this fish was observed near the interchange area of IL 21 and IL 120. This fish is also been identified in a tributary to the Des Plaines River, east of IL 21 within Independence Grove Forest Preserve site, between IL 120 and IL 137. No direct impacts are anticipated for this species, but as noted in Section 4.3.2, this alternative could affect the water quality in streams supporting it. Programmed improvements for IL 21 near IL 120 considered protective actions for the Iowa darter during proposed construction to avoid or minimize potential impacts.

There are no known occurrences of the Blanding's turtle within the proposed IL 83/US 45 with US 12 Alternative. It is possible that several wetlands within the study area may be suitable habitat for this species (Phillips 1995).

Nature Preserves and INAI Sites. There would be no direct impact of nature preserves from this alternative, but there would be impacts to three individual INAI sites (Table 4-32. Total potential impact to INAI sites from this alternative is 0.06 ha (0.15 ac), most of which is to the River Road Woods site.

4.3.6.4 Operational Impacts to Designated Nature Preserves and INAI Sites

During roadway operation, there are potential impacts to water quality and vegetation due to pollutants and toxicants from vehicles or deicing chemicals entering wetlands. Highway operations can also potentially influence vegetation communities by changing water volumes reaching the wetlands. Highway runoff drainage systems may direct additional water into wetland systems or water bodies that may be relied upon by the sensitive communities located within the designated sites. Potential changes to the groundwater regime may also occur.

Sodium chloride (salt) applied to roads for ice control is considered to be the primary long-term water quality issue, as it could affect the growth and health of vegetation by direct runoff, splash, and aerosol spray. Studies indicate that 60 to 80 percent of salt runs off into surface water or wetlands, 15 to 30 percent occurs as splash, and up to 3 percent occurs as spray (Frost et al. 1981; Diment et al. 1973; Lipka and Aulenbach 1976; Sucoff 1975). Depending upon the community's proximity to the highway system, the proposed drainage systems, and soil conditions, these three mechanisms would vary in importance. The quality of stormwater runoff that may drain into these communities is affected by traffic volumes, maintenance procedures, drainage methods, and deicing procedures that affect the chloride levels monitored in runoff.

The No-Action Alternative (Baseline) includes a large inventory of improvements to existing roadways, and therefore includes sodium chloride

TABLE 4-32
Affected INAI Sites under IL 83/US 45 with US 12 Alternative

INAI Site	Impacting Roadway Improvement	Approximate ha (ac)	Total INAI Site Size ha (ac)
Oak Grove	I-94	< 0.004	21.0 (52)
River Road Woods	IL 137	0.06 (0.15)	6.9 (17)
MacArthur Woods	IL 137 and St. Mary's Road	< 0.004	157.4 (389)
Almond Marsh	IL 120		98.0 (242.3)

dispersion from deicing materials. The area of most concern is the Oak Grove Botanical Area, which would be subject to additional sodium chloride dispersion from the proposed extension of Pulaski Road. The new roadway would bisect the northern half of the site and would increase the area subject to sodium chloride. Two other INAI sites affected by the project that would be subject to additional sodium chloride dispersion include the Buffalo Grove Prairie and the Almond Marsh.

The IL 83/US 45 with US 12 Alternative includes numerous existing roadway improvements and therefore includes dispersion of sodium chloride from deicing materials. There would be some additional impacts from sodium chloride from added improvements along these routes. The areas of most concern are MacArthur Woods Nature Preserve, River Road Woods INAI Site, Ascension Sedge Meadow INAI Site, Oak Grove Botanical Area INAI site, parts of the Almond Marsh Nature Forest Preserve, parts of the Edward Ryerson Nature Preserve, Long Grove INAI site, Reed-Turner Nature Preserve, and parts of the Round Lake Marsh INAI site.

The IL 53 Freeway/Tollway Alternative would introduce sodium chloride dispersion to areas that currently receive little or no splash or spray. The Almond Marsh Forest Preserve and ADID high quality wetlands adjacent to the alignment would be the most important resources potentially affected by sodium chloride under this alternative.

4.3.6.5 Summary of Impacts to Threatened and Endangered Species

Two alternatives (No-Action and IL 83/US 45 with US 12) would affect three INAI sites. The most substantive impact would occur under the No-Action Alternative (Baseline), which would involve the Oak Grove Botanical Area (INAI site), with one federal-listed plant species. The IL 53 Freeway/Tollway Alternative would not affect any INAI sites.

Both the IL 53 Freeway/Tollway Alternative and the IL 83/US 45 with US 12 Alternative could affect one state-listed fish species (Iowa darter). Mitigation strategies for protecting the species are discussed in Section 4.3.6.1, *No-Action Alternative (Baseline) State-listed Species*. Based on correspondence with IDNR (2000) and USFWS (2001), the project alternatives would have no other direct impact on threatened and endangered species.

Future work associated with the preferred alternative would include detailed threatened and endangered species field surveys to determine presence or absence, and the required consultation with the IDNR and the U.S. Fish and Wildlife Service.

4.4 Air Quality

Chicago Area Transportation Study is responsible for analyzing regional air quality conformity. The endorsed 2020 RTP includes an extension of IL 53 in Lake County as part of the plan. The 2020 RTP calls out specific freeway/expressway and other major facility improvements; however, it includes only placeholder values for arterial improvements. Neither build alternative is included in the TIP for fiscal years 2001–2006. The 2020 RTP and the TIP were found to conform by the FHWA and the Federal Transit Administration (FTA) on November 2, 2000. These findings were in accordance with the USEPA regulations entitled *Criteria and Procedure for Determining Conformity to State or Federal Implementation Plans of Transportation Plans, Programs, and Projects Funded or Approved Under Title 23 USC or the Federal Transit Act* (40 C.F.R. Part 93). Future air quality analysis would require the recommended alternative to be assessed, as part of a package of regional improvements, for air quality conformity with the appropriate future TIP.

In addition to the SIP requirements, metropolitan planning organizations (MPO) are required to undertake conformity determinations on metropolitan transportation plans and transportation improvement programs before they are adopted, approved, or accepted. Section 176(c)(4) of the Clean

Air Amendments of 1990 requires that transportation plans, programs, and projects which are funded or approved under Title 23 U.S.C. must be determined to conform to state or federal air implementation plans. Conformity to an implementation plan is defined in the Clean Air Act as conformity to an implementation plan's purpose of eliminating or reducing the severity and number of violations of the NAAQS and achieving expeditious attainment of such standards. The implementing regulations for determining conformity of transportation projects are found in 40 C.F.R. Part 93, *Criteria and Procedures for Determining Conformity to State or Federal Implementation Plans of Transportation Plans, Programs, and Projects Funded or Approved under Title 23 U.S.C. or the Federal Transit Act.* Highway or transit projects which are funded or approved by the FHWA or the FTA must also be included in a conforming plan before they are approved or funded by the DOT or an MPO.

In addition to the conformity analysis, a micro-scale carbon monoxide air quality analysis was also performed for the project alternatives. This analysis employed the use of the Illinois Carbon Monoxide Screen for Intersection Modeling (COSIM).[8] The detailed analysis of local carbon monoxide levels focused on potential violations or excursions of the 8-hour carbon monoxide standard. Experience has shown that the 8-hour carbon monoxide standard is more critical than the 1-hour carbon monoxide standard. The analysis results were based on several assumed conditions, including 2020 traffic conditions at the "worst case" intersections for each project alternative. The selection of the "worst case" locations was guided by intersections with the highest peak traffic volumes and nearby receptors sensitive to air quality (schools, homes, nursing homes, etc).

4.4.1 No-Action Alternative (Baseline)

The COSIM analysis evaluated the worst case location for the No-Action Alternative (Baseline) (Table 4-33). At this location, the 8-hour carbon monoxide level was estimated to be below the NAAQS of 9.0 parts per million (ppm).

4.4.2 IL 53 Freeway/Tollway Alternative

The intersection of IL 53 and Lake-Cook Road, representing the worst case condition, was evaluated for the IL 53 Freeway/Tollway Alternative. The 8-hour carbon monoxide concentration for a sensitive receptor near this intersection was 6.6 ppm during the peak travel period in 2020 (Table 4-33).

TABLE 4-33
Carbon Monoxide Screening Analysis at "Worst Case" Locations

Alternative	8-hour Carbon Monoxide (ppm)
No-Action	
Washington /O'Plaine Road	8.7
IL 53 Freeway/Tollway	
IL 53/Lake-Cook Road	6.6
IL 83/US 45 with US 12	
US 12/Lake-Cook Road	6.4

[8] A modeling program used to calculate the carbon monoxide concentrations, based on intersection geometry, user inputs, and worst-case assumptions.

The tollway option for this alternative could produce air quality conditions at toll plaza locations; therefore, an air quality analysis for a plaza location was also conducted. This analysis required a detailed evaluation using USEPA's air quality modeling software consisting of CAL3QHC and Mobile 5a. The potential air quality effects of a toll plaza for 2000 were evaluated assuming that the plaza would be equipped with manual lanes only, and stopped traffic at all lanes of the plaza. The plaza arrangement was configured to reflect a "worst case" scenario for this analysis. The carbon monoxide concentration estimated for the plaza condition would be 4.0 ppm for the 8-hour carbon monoxide standard. This level is well below the NAAQS of 9.0 ppm.

4.4.3 IL 83/US 45 with US 12 Alternative

The air quality analysis for the IL 83/US 45 with US 12 Alternative was conducted for the intersection of US 12 and Lake-Cook Road. The COSIM screening results show that carbon monoxide would not be exceeded for the NAAQS standard at either location (Table 4-33).

4.4.4 Summary of Air Quality Impacts

Overall, the results of the air quality analysis show that all of the project alternatives would be below the 8-hour NAAQS for carbon monoxide of 9.0 ppm.

4.5 Noise

The potential effects of the traffic noise from the project alternatives are described below. The analysis was guided by the FHWA policies and procedures, 23 C.F.R. 772, the IDOT Noise Analysis Policy dated April 3, 2000, and the ISTHA Traffic Noise Study and Abatement Policy. However, for this type of study, an exhaustive analysis would be premature without additional detailed engineering of the proposed improvements. This assessment is intended to provide a relative measure of the potential affects of the alternatives under consideration. A detailed noise assessment would occur during future phases of work for the preferred alternative.

The noise assessment was guided by an objective to determine the relative degree of potential noise impact across the range of project alternatives. To quantify the objective, the number of residential structures that have identified exterior activity that could be affected by noise (experience traffic noise levels that approach or exceed the FHWA Noise Abatement Criteria (i.e., 67 dBA)) were quantified.

The IDOT policy defines noise impacts occurring when design-year traffic noise levels approach or exceed the NAC, with approach defined as 66 dBA for the residential NAC of 67 dBA, or when design-year traffic noise levels are at a substantial increase over existing traffic generated noise levels, defined as an increase greater than 14 dBA.

The ISTHA policy states that once a site has been studied, traffic noise abatement should be considered if the exterior traffic generated noise levels at the site are at or above 67 dBA L_{eq}(h), and that the proposed abatement at the site will achieve a minimum 5 dBA reduction in traffic generated noise levels. Reasonable efforts shall be made to achieve reductions of 8 dBA.

The approach for this analysis required that noise impact zones be defined for the improvements in each alternative (i.e., the distance from the edge of roadway that the NAC would be approached or exceeded). The noise impact zones were determined with the use of the Traffic Noise Model (TNM).[9] The modeling step defined typical traffic noise levels for various roadway types represented in the project alternatives. Based on the defined roadway conditions (i.e., future 2020 traffic volume, traffic mix, and traffic speed, at ground elevation), the TNM look-up tables were used to determine the typical noise levels at various distances from the representative roadways.

[9] TNM is the approved noise model for conducting highway noise analysis by the Federal Highway Administration.

Based on these typical noise level calculations, the NAC is approached or exceeded at a distance within 18 m (60 ft) for local/collector roads, within 36 m (120 ft) for arterial roads, and within 98 m (320 ft) for freeways/tollways from the edge of pavement. These noise impact zones were applied to the improvements for the project alternatives to determine the potential number of residential areas with exterior activity that could be affected by noise levels greater than 66 dBA. Other sensitive receptors, such as hospitals, schools, churches, and special land uses, may occur in the noise impact zones, however, were not specifically identified. The noise effects for the alternatives described below do not include the use of noise abatement measures. It should be assumed that the use of such measures, which will be examined and evaluated for the preferred alternative, will substantially reduce the number of affected residential areas with exterior activity. For this analysis, it is not practical to develop a detailed noise abatement strategy for such an extensive study area. This analysis does, however, indicate the comparative scale of anticipated traffic noise impacts among the project alternatives.

4.5.1 Noise Impacts

4.5.1.1 No-Action Alternative (Baseline)

In residential areas along the No-Action Alternative (Baseline), 1,211 properties have identified exterior activities that could be affected by noise levels approaching or exceeding the NAC (Table 4-34, on the following page). More than 1,100 of the structures would be associated with arterial improvements, whereas 100 of the structures would be affected by improvements along I-94. The number of potentially affected properties includes both single family and multi-family structures and is based on existing development. The largest concentrations of affected properties are along IL 22, IL 60, Buffalo Grove Road, Butterfield Road, and Washington Street. Development may increase along any of these routes, so the numbers are subject to change.

4.5.1.2 IL 53 Freeway/Tollway Alternative

In residential areas along the IL 53 Freeway/Tollway Alternative, 417 properties would be affected with noise levels approaching or exceeding the NAC (Table 4-35, on page 4-53). The largest concentration of affected residential areas would be located along the north-south alignment in the vicinity of Hawley Street and IL 176. The number of potentially affected residential areas includes both single-family and multi-family residences. Similar to other alternatives, an increase in development is a possibility along any of these routes; therefore, this number may be subject to change in the future.

4.5.1.3 IL 83/US 45 with US 12 Alternative

In residential areas along the IL 83/US 45 with US 12 Alternative, approximately 273 properties would be affected with noise levels approaching or exceeding the NAC (Table 4-36, on page 4-53). About 50 percent of the potentially affected residential areas are located on IL 83, IL 21, and US 12. These residential areas include both single-family and multi-family residences. An increase in development is a possibility along any of these routes; therefore, this number is subject to change.

4.5.2 Abatement

This section outlines general noise abatement practices applied to roadway projects. A more detailed analysis, based on the alternative selected, would be conducted to determine the appropriate abatement measures, their feasibility and reasonableness, and their locations during future phases of work.

A number of structural and nonstructural abatement measures are available and have been proven through use in a variety of situations to reduce the traffic noise impacts. Examples of noise abatement measure are described below and may serve as possible methods to reduce project related noise.

Noise walls are commonly applied in urban and suburban areas and are capable of achieving a 5 dBA noise level reduction or more when tall enough to break the line of sight from the noise source to the receiver. For a design goal of 8 dBA minimum reduction, barrier heights must be taller; in practice, barriers 3.7 to 5.5 m (12 to 18 ft) in height are generally common. The reasonableness of a barrier is determined by such factors as potential sound level reduction, cost, aesthetics of the area, views of affected residents, and additional environmental issues created.

Studies indicate that a change of 3 dBA is a barely perceivable change in the noise volume heard. A change of 5 dBA is readily perceived, and an increase/reduction of 10 dBA is perceived as being twice/half as loud.

Sound levels naturally attenuate due to distance. In other words, as the receiver of noise is moved away from the noise source, the noise level would decrease. Generally, sound from moving traffic noise sources will be reduced 3 to 5 dBA with each doubling of distance. For instance, if the traffic noise level is 60 dBA at 15 m (50 ft) from the roadway, it will be 55 to 57 dBA at 30 m (100 ft) [15 m × 2 {50 ft × 2}] from the roadway. The reduction is dependent upon the type of

TABLE 4-34
Residences Within Noise Impact Zones for the No-Action Alternative (Baseline)

Roadway	Residences within Noise Impacts Zone*
Bradley Road between IL 176 and Atkinson Avenue	0
Martin Luther King Drive between IL 41 and IL 131	38
Pulaski Road between IL 43 and O'Plaine Road	22
Sunset Avenue between Delaney Road and Greenbay Road	0
Rollins Road between IL 83 and US 45	7
IL 22 between US 14 and US 41	347
IL 21 between IL 137 and IL 120	11
Buffalo Grove Road between IL 22 and IL 83	95
Busch Road between IL 83 and Weiland Road	54
I-94 between Deerfield Road and IL 22	100
Weiland Road between Long Grove Road and Prairie Road	8
Lake-Cook Road between IL 83 and I-94	52
Butterfield Road between US 45 and Allanson Road; IL 176 and IL 137	105
IL 60 between Lake Road and IL 176	135
US 45 between IL 176 and Washington Street	50
Peterson Road between IL 60 and US 45	8
Hunt Club Road between Washington Street and IL 120	36
Midlothian Road at intersection with IL 60	0
Washington Street between Lake Street and I-94	143
Total	**1,211**

*Excludes residences that would be displaced by the improvement.

TABLE 4-35
Residences within the Noise Impact Zone for the IL 53 Freeway/Tollway Alternative

Roadway	Residences within Noise Impacts Zone
IL 83 at intersection with New IL 53	36
Midlothian Road at intersection with New IL 53	46
Indian Creek Drive at intersection with New IL 53	9
Gilmer Road at intersection with New IL 53	1
New IL 53 between Old McHenry Road and Cuba Road	23
New IL 53 to 1 mile north of Cuba Road	1
New IL 53 between IL 83 and Hawley Street	67
New IL 53 between Hawley Street and IL 176	33
New IL 53 between IL 176 and Winchester Road	68
Fish Lake Road between IL 60 and IL 120	2
New IL 120 between Bacon Road and Alleghany Road	2
New IL 120 between IL 21/IL 137 and US 45	17
US 45 at intersection with New IL 120	20
IL 120 between US 45 and Almond Road	35
IL 120 between Almond Road and Hunt Club Road	7
IL 120 between Hunt Club Road and Milwaukee Road/IL 21	34
IL 120 between O'Plaine Road and IL 43	16
Total	**417**

*Excludes residences that would be displaced by the improvements

TABLE 4-36
Residences within the Noise Impact Zone for the IL 83/US 45 with US 12 Alternative

Roadway	Residences within Noise Impact Zone*
IL 83 between IL 53 and IL 120	47
Midlothian Road between Gilmer Road and Hawley Street	9
IL 120 between IL 83 and Almond Road	29
Alleghany Road between IL 120 and Peterson Road	5
Long Grove Road/IL 53 between IL 53 and IL 83	20
Rockland Road/IL 176 at the proposed intersection of the bypass	12
IL 21 between Lake-Cook Road and IL 60	43
St. Mary's Road between IL 60 and IL 137	31
IL 137 between IL 21 and I-94	28
US 12 between IL 53 and IL 176	47
Hicks Road between Lake-Cook Road and Long Grove Road	2
Total	**273**

*Excludes the residences that would be displaced by the improvements

ground cover. Soft surfaces such as grass will attenuate noise more than harder surfaces such as pavement.

Certain conditions, including openings for side streets, driveways, and other accesses such as sidewalks, stream crossings, recreational trails, and the presence of industrial and commercial development, are not conducive to the use of traffic noise abatement barriers. Frequent breaks or openings in a traffic noise abatement structure created by the conditions described above substantially reduce and compromise the effectiveness, feasibility, and reasonableness of traffic noise abatement. These conditions are typical of the IL 83/US 45 with US 12 Alternative, which limits potential implementation of abatement measures.

Other measures to reduce traffic noise include traffic management measures, comprehensive land-use planning and zoning in developing areas, and shifting the roadway location (noise source) vertically and/or horizontally. Traffic management measures can also be applied to limit motor vehicle type, travel speed, traffic volume, and/or time of operation. These measures and practices are most common on local streets and access within and around residential, commercial, and industrial land uses, and are rarely applied to higher types of roadways. Changes to the roadways' horizontal and vertical alignments generally involve locating the roadway a sufficient distance from noise-sensitive areas. These shifts are normally optimized as standard practice to the extent feasible in the layout of a roadway design for the environs involved. This type of abatement is usually only considered and realistically available for a roadway being placed on a new alignment. In areas where the roadway would be below grade, noise levels would be lower and noise abatement may not be necessary. This type of abatement is generally considered with a roadway improvement on a new alignment, although for a new highway, noise abatement options are more flexible and can be incorporated in the planning process. The most efficient and overall effective traffic noise abatement is accomplished through integrated and comprehensive land use planning and zoning through local communities and municipal jurisdictions.

4.5.3 Summary of Noise Impacts

Noise impacts for the project alternatives vary widely. The No-Action Alternative (Baseline) with its many kilometers of arterial improvements would have the greatest noise impact on nearby residential structures (Table 4-37). Over 1,200 residential structures for this alternative would potentially exceed the NAC for residential properties. For the IL 53 Freeway/Tollway Alternative over 400 residences would be affected and for the IL 83/US 45 with US 12 Alternative over 270 residences would be affected. The noise impacts have been estimated without noise abatement measures, which would most likely be implemented at feasible locations for the preferred alternative to reduce the effects of traffic noise.

A number of structural and nonstructural abatement measures are available and have been proven through use in a variety of situations to reduce the traffic noise impacts, such as noise walls, traffic management measures, responsible comprehensive land-use planning and zoning in developing areas, and shifting the roadway location (noise source) vertically and/or horizontally. The uses of these measures, however, are affected by existing conditions such as closely spaced side streets or driveways along the route designated for

TABLE 4-37
Residential Noise Impact Summary

Alternative	Potential Residential Structures Affected
No-Action	1,211
IL 53 Freeway/Tollway	417
IL 83/US 45 with US 12	273

improvement. For these reasons, the feasibility for incorporating noise abatement measures along the improvements for IL 83/US 45 with US 12 Alternative is more difficult to accomplish. The IL 53 Freeway/Tollway Alternative, however, offers the potential for considerations of a number of abatement options (walls, depressed roadway sections, landscaping, etc.).

4.6 Cultural Resource Impacts

The potential effects of the project alternatives upon cultural resources are described in this section.[10] The potential environmental consequences related to the project alternatives were determined with the use of existing and available data and limited field reconnaissance. Overall, the assessment of cultural resource impacts is intended to provide a relative measure of the potential effects of the alternatives under consideration.

Numerous archaeological and structural resources are located throughout the county. For each alternative, however, only a small number of structures are likely to have the potential to be eligible for the NRHP. The State Historic Preservation Office (SHPO) has not rendered any opinion regarding the potential eligibility of the structures described below.

For this type of study, SHPO has agreed that a feasibility or preliminary assessment is appropriate, which provides an awareness of potential cultural resource effects. They have advised, however, that an extensive survey investigation and determination of eligibility would occur during future phases of work for the preferred alternative. Thus, activities such as the preparation of eligibility forms typically submitted to the SHPO for a determination of potential historic or archaeological sites will be part of next phase of analysis for the preferred alternative.

[10]Due to the sensitive nature of historic and archaeological resources, figures depicting the locations of these sites have not been created for this section of the document.

During the assessment of cultural resources, an evaluation model was developed to predict the potential for archaeological resources in the study area based on known site locations and soil types. The model output suggests that there is high potential for undiscovered archaeological resources in a number of locations throughout the county.

4.6.1 No-Action Alternative (Baseline)

As indicated in Section 2, a review of cultural resource records showed that numerous historic sites and structures are present throughout the county. There are 10 recorded archaeological sites within or near the existing or proposed right-of-way for the No-Action Alternative (Baseline) (Table 4-38, on the following page). These sites would require field verification should they be affected by this alternative. Two of these sites are known to be Native American burial sites; however, their precise location and involvement by the No-Action Alternative (Baseline) needs to be confirmed during future steps of this project.

For the No-Action Alternative (Baseline), historic properties have only been identified where Phase 1 preliminary engineering and detailed environmental studies have been advanced and potential impacts identified. Given the expansiveness of the alternative, it was not practicable to assess other potential historic impacts. Based on available engineering and environmental documents, there are 13 historic sites that could potentially be affected by this alternative. One of these structures, the St. Sava Monastery, is on the NRHP. Four residences, which are part of a larger historic district, may be eligible for the NRHP. There are six other locally important sites, and two county landmarks that could potentially be affected by this alternative. For both historic and archaeological resources potentially affected by this alternative, further roadway refinements are expected in future phases of work which may avoid or reduce involvement or impact to these resources (Table 4-39, on the following page).

4.6.2 IL 53 Freeway/Tollway Alternative

Four recorded archaeological sites are located within the existing or proposed right-of-way (Table 4-40, on the following page). These sites include a historic farmstead, two prehistoric sites of unknown cultural affiliation, and an abandoned historic cemetery. A reconnaissance survey confirmed the presence of the cemetery and noted its neglected condition. For both historic and archaeological resources potentially affected by this alternative, further roadway refinements are expected in future phases of work which may avoid or reduce involvement or impact to these resources.

Of the historic sites reviewed along the proposed roadway improvements for the IL 53 Freeway/Tollway Alternative, three structures were found which have the potential to be eligible for inclusion on the NRHP (Figure 4-22, and Table 4-41, on the following page). These structures, which may be subject to Section 106, are all farmhouses with barns. Based on the current concept, the IL 53 Freeway/Tollway Alternative would directly impact all three of these structures.

4.6.3 IL 83/US 45 with US 12 Alternative

Two recorded archaeological sites are located within the existing or proposed right-of-way of

TABLE 4-38
Potentially Involved Archaeological Sites

Type of Site	General Affiliation
Habitation and Commercial	Historic
Habitation and Commercial	Historic
Habitation and Commercial	Historic
Burial, camp	Prehistoric
Burial	Prehistoric
Commercial	Historic
Unknown	Historic
Habitation	Historic
Habitation and commercial	Historic
Habitation	Historic

Due to the sensitivity of potential archaeological sites, location and other distinguishing information are not disclosed.

TABLE 4-39
Potentially Involved Eligible Historic Properties

Property	Location	Description
Monastery	IL 21 between IL 137 and Washington St.	St. Sava Monastery (on NRHP): 0.04 ha (0.1 ac) of a temporary construction easement
Farms	IL 21 between IL 137 and Washington St.	0.4 ha (1 ac) from two county designated landmarks: Stonehenge Farm and a Centennial Farm
Local Sites	IL 22 between US 14 and Quentin Rd	6 sites of local historic importance; however, none of the sites would be affected if the bypass alternative were selected
Historic District	IL 22 between IL 83 and US 41	Stone Gate Circle Historic District: a retaining wall would be constructed on the property line of 4 houses.

Only historic sites identified as part of other Phase 1 project have been identified for the No-Action Alternative (Baseline).

this alternative (Table 4-42, on the following page). These sites would require evaluation if they should be affected by this alternative. Both sites are prehistoric archaeological sites, with one dating from 8,000 BC to 800 AD. The other is a Native American burial mound dating from as early as 2,500 BC to as recent as 800 AD. These sites have not been confirmed to still be in existence. For both historic and archaeological resources potentially effected by this alternative, further roadway refinements would be expected in future phases of work which may reduce involvement or impact to these resources.

Of the historic sites reviewed, one structure along the proposed roadway improvements for the IL 83/US 45 with US 12 Alternative is listed on the NRHP, the David Adler Cultural Center. In addition, five structures were found that have the potential to be eligible for inclusion on the NRHP (Figure 4-23). These additional structures, which may be subject to Section 106, are a horse stable, two residences, one residence with a barn, and one residence with one set of building entrance piers. All of these structures would be directly affected by the IL 83/US 45 with US 12 improvements (Table 4-43, on the following page).

4.6.4 Summary of Cultural Resource Impacts

The assessment of potential historical and archaeological impacts relied upon the use of existing and available data only, and only limited field observations and reconnaissance. The assessment included neither extensive field investigation, nor determination of eligibility for sites with potential historic or archaeological value. The scope of the analysis, however, was considered appropriate for a preliminary cultural resource assessment of the study area, the wide range of

TABLE 4-40
Potentially Involved Archaeological Sites

Type of Site	General Affiliation
Burial, camp	Prehistoric
Cemetery	Historic
Farmstead	Historic
Camp	Prehistoric

Due to the sensitivity of potential archaeological sites, location and other distinguishing information is not disclosed.

TABLE 4-41
Potentially Involved Eligible Historic Properties

Property	Location	Description
Residence	House with barn near the intersection of IL 83 and IL 137	House: 1.5 story; clapboarded; gable-front main block with cornice returns; gabled ell; asphalt roof; historic front porch with bands of tall windows that feature six-pane transoms. Contemporary barn: gambrel roof with a hay hood; shed roof dormer with a 6-over-6, double-hung sash window; vertical board siding; 4-pane garage doors.
Residence	House with barn near the intersection of I-94 and IL 120	House: 2-story; gabled (T-plan); clapboarded; 2-over-2 and 6-over-6, double-hung, wood sash windows; molded window hoods; 1-story, wrap-around porch on ell. Contemporary garage: asphalt, gable roof; 6-over-6, double-hung, wood sash windows; multiple hinged, 4-pane doors.
Residence	House with shed and barn near the intersection of Hicks Road and Long Grove Road	House: 2-story; clapboarded; multiple additions; asphalt roof; 6-over-1, double-hung, wood sash windows predominate; historic, clapboarded utility shed and garage; gambrel roof barn and 1-story, stuccoed outbuilding on the other side of the fence may have been historically associated with this property.

alternatives considered, and the concept stage of engineering detail, with the understanding that future engineering steps would further minimize or eliminate effect to these resources. The resource agencies involved in the study, including the IHPA, have concurred that this level of detail is appropriate for an analysis of feasible alternatives.

Throughout this study, efforts to avoid or minimize impacts to important environmental and social resources, including historical and archaeological resources, have taken place. These efforts have included reduced roadway footprints in spot locations and roadway alignment shifts. For example, some of the major shifts included the use of community bypasses to avoid important community resources. Future steps for the preferred alternative will include further efforts to avoid or minimize possible effects, field investigations fully compliant with the current practices, and identification of mitigation measures where impact is unavoidable.

TABLE 4-42
Potentially Involved Archaeological Sites

Type of Site	General Affiliation
Mound	Unknown
Burial, camp	Prehistoric

Due to the sensitivity of potential archaeological sites, location and other distinguishing information is not disclosed.

TABLE 4-43
Potentially Involved Eligible Historic Properties

Property	Location	Description
Forest Preserve Office (Grainger Woods)	Forest Preserve office near the intersection of St. Mary's Road and IL 60	Forest Preserve office: 2-story; decorative half-timbered upper story; stuccoed; asphalt gambrel roof; brick foundation above grade; multi-pane windows; brick window sills; associated historic stuccoed stables and modern stables.
Residence	House near the intersection of St. Mary's Road and IL 176	House: Tudor Revival style; 1.5-story; half-timbered; stuccoed; wood shingle, steeply-pitched, side-gable roof; wood sash bay windows; modern casement windows; brick window sills; exterior chimney composed of a cut-stone, irregular-coursed lower-half and brick upper-half; unsympathetic, 1-story, shed-roof rear addition; modern, detached garage.
Cultural Center (David Adler)	Listed on the National Register of Historic Places, located near the intersection of IL 21 and IL 137	Center: large, linear complex of attached buildings; cross-gable main block; stuccoed; wood shingle roof; 6-over-6, double-hung, wood sash windows predominate; fanlight over street-facing entrance on the main block; multiple chimneys; corner tower.
Residence and Entrance Piers	House near the intersection of I-94 and IL 60	House: 2.5-story; wood shingle, gable roof; vinyl-siding; arched and multi-pane windows; 2 corbeled chimneys. Stables: 1-story with 1.5-story, gable-front blocks; east end appears to have been converted into a residence. Two sets of wood entrance piers
Residence	House near the intersection of Hicks Road and Long Grove Road	House: 2-story; clapboarded; multiple additions; asphalt roof; 6-over-1, double-hung, wood sash windows predominate; historic, clapboarded utility shed and garage; gambrel roof barn and 1-story, stuccoed outbuilding on the other side of the fence may have been historically associated with this property.
Residence	House near the intersection of Hick Road and Old Hicks Road	House: Queen Anne style; 2-story with a 1.5 story rear wing; gable-front, wood shingle roof; gableboard with spindlework; brick foundation; wood clapboards; alternating fishscale and cove wood shingles in the peak of the gable; 1-over-1, double-hung, wood sash windows with ornamental hoods; 1-story porch with spindlework on the east facade of the wing.

Agency coordination would occur during this phase including federal agencies, SHPO, Tribal Historic Preservation Officers, Indian tribes, local governments, and other public parties.

Table 4-44 summarizes the potentially affected historic and archaeological resources.

4.7 Special Waste

A special waste database search was conducted to identify known or potential contamination from regulated substances within the proposed corridors for project alternatives. The existence of special waste in the study area was reviewed to identify current and historical activities on or near the roadway improvements. The information contained in this document relied upon reasonably ascertainable site information provided by others. A search was conducted of standard federal, state, and local environmental databases. The following is a partial list of the principal databases searched to identify generator and transporters of hazardous wastes; hazardous waste treatment, storage, and disposal facilities; and sites where releases of hazardous materials have been reported:

- USEPA Comprehensive Environmental Response, Compensation, and Liability Information System (CERCLIS) list of sites either proposed for or on the National Priorities List (NPL), and sites in the screening and assessment phase for possible inclusion on the NPL (last update 4/00)
- USEPA NPL of uncontrolled or abandoned hazardous waste sites identified for priority remedial action (last update 6/00)
- USEPA Resource Conservation and Recovery Information System (RCRIS) list of sites that generate, transport, store, treat, or dispose of hazardous waste (last update 6/00)
- USEPA database of Resource Conservation and Recovery Act (RCRA) facilities undergoing corrective action (CORRACTS) because there was a release of hazardous waste or constituents into the environment from a RCRA facility (last update 4/00)
- U. S. Department of Transportation (USDOT) Hazardous Materials Information Reporting System (HMIRS) lists hazardous material spill incidents (last update 6/99)
- Illinois Environmental Protection Agency (IEPA) State Hazardous Waste Sites (SHWS) lists sites that may or may not be listed on the CERCLIS list (last update 1/00)
- IEPA Available Disposal for Solid Waste in Illinois (LF) lists solid waste disposal facilities or landfills in Illinois (last update 5/00)
- IEPA database of Leaking Underground Storage Tank (LUST) sites with reported LUST incidents (last update 7/00)

A site reconnaissance also was performed, consisting of a windshield survey to verify site

TABLE 4-44
Potentially Affected Historic and Archaeological Resources

Alternative	Historic Structures	Archaeological Sites
No-Action Alternative (Baseline)	13*	10
IL 53 Freeway/Tollway	3	4
IL 83/US 45 with US 12	6	2

*Based on available Phase 1 preliminary engineering and environmental documentation reports.

locations from the database. Other investigations consisting of sampling, monitoring, analytical, geotechnical, and site owner interviews were not conducted. The database search concluded that each alternative could encounter uncontrolled special waste sites, above ground storage tanks, or LUSTs.

A broad risk assessment was applied to each project alternative based upon the types of sites encountered. The ranking guidelines were based primarily on the environmental database and records review. This ranking system ranges from 1, indicating a property with a high potential for contamination/cleanup costs, to 3, indicating no evidence of releases.

- Rank 1—High Risk: Sites identified as requiring rigorous remediation (i.e., RCRIS-TSD, State Hazardous Waste site, CERCLIS, CORRACTS, RAATS)
- Rank 2—Moderate Risk: LUST sites except those with a No Further Action (NFA) designation by IEPA.
- Rank 3—Low Risk: Sites using hazardous materials but having no indication of releases from those materials.

4.7.1 No-Action Alternative (Baseline)

The No-Action Alternative (Baseline) would not directly affect any CERCLIS sites. Two CERCLIS sites are within 1.6 km (1 mi) of improvements (Figure 4-24). Grayslake Gelatin is 1.6 km (1 mi) south of Washington Street in Grayslake. Peterson Sand and Gravel is 0.8 km (0.5 mi) east of the intersection of IL 21 and IL 137. (This site however was purchased by the Lake County Forest Preserve in the late 1980's and subsequently cleaned up.) The potential for this alternative to encounter any contaminants from either site is low. Twenty LUST sites are within the proposed right-of-way for the No-Action Alternative (Baseline) improvements, and 27 LUST sites immediately outside the proposed right-of-way for this alternative's improvements. The potential risk for this alternative related to the LUST sites is moderate. It is anticipated that some or many of these sites have releases that would affect the right-of-way and would require cleanup.

4.7.2 IL 53 Freeway/Tollway Alternative

The IL 53 Freeway/Tollway Alternative would not directly affect any CERCLIS sites. The inventory of known sites shows that six sites (Figure 4-25) would be within 1.6 km (1 mi) of the improvements for the IL 53 Freeway/Tollway Alternative, including the ARF Landfill (now Waste Management Countryside Landfill), Skokie Valley Asphalt (now Curran Contracting), Grayslake Gelatin, and EDCO/S&S Landfill, all in Grayslake. Near the south end of proposed improvements, the Arlington Heights Landfill and Lennon Wallpaper (Cook County) are also within 1.6 km (1 mi) of the proposed improvements. The potential for this alternative to encounter any contaminants from these sites is low. The proposed IL 53 Freeway/Tollway Alternative is mainly on new alignment; therefore, this alternative would encounter few LUST sites, if any, along the mainline improvement. However, three LUST sites may be affected along feeder road improvements for this alternative. Overall, the potential risk associated with this alternative related to the LUST sites would be low.

4.7.3 IL 83/US 45 with US 12 Alternative

The IL 83/US 45 with US 12 Alternative may require a permanent easement from one listed CERCLIS site. The site, Peterson Sand and Gravel, was purchased by the Lake County Forest Preserve in the early 1980s and subsequently cleaned up. Other known sites within 1.6 km (1 mi) of improvements for this alternative include the ARF Landfill (now Waste Management Countryside Landfill), Skokie Valley Asphalt (now Curran Contracting), Grayslake Gelatin, and EDCO/S&S Landfill, all in Grayslake; and Lakeland Estates in Wauconda, within 0.8 km (0.5 mi) northeast of the IL 59 and US 12 interchange. At the south end of IL 53, in Cook

County, the Arlington Heights Landfill and Lennon Wallpaper are within 1.6 km (1 mi) of the project alternative (Figure 4-26). None of the CERCLIS-listed sites would pose a risk for this alternative. Thirty-four LUST sites are within the proposed rights-of-way for these improvements. Fourteen other sites are immediately outside the right-of-way for the improvements. Based on the guidelines established above, the risk associated with this alternative related to the LUST sites would be moderate. It is anticipated that some or many of these sites have releases that would affect the right-of-way and would require cleanup.

4.7.4 Summary of Special Waste

The three alternatives would have different affects upon special waste sites. None would directly involve any CERCLIS sites. The alternatives would principally affect LUST sites. The IL 83/US 45 with US 12 Alternative could involve 34 sites and the No-Action Alternative (Baseline) 20; the IL 53 Freeway/Tollway Alternative would have three encroachments. In cases where a site cannot be avoided, further investigations would be conducted for the preferred alternative to determine the extent, and the areas of contamination would be managed and disposed of in accordance with Federal and State laws and regulations and in a manner that would protect human health and the environment.

4.8 Section 4(f) Considerations

The Section 4(f) analysis identified the potential impact to protected resources; that is, of publicly-owned public parks, recreation areas, wildlife and waterfowl refuges, and historic sites of national, state, or local significance. This assessment is intended to identify Section 4(f) resources likely to be involved, and to inform resource agencies and others of the potential involvement. It is fully recognized that further definition of the impacts and coordination with responsible jurisdiction agencies is necessary to determine the level of impact, if any, and appropriate mitigation in future phases of work for the preferred alternative. This section describes potential Section 4(f) impacts identified based upon available data and field reconnaissance appropriate for this level of analysis; however, future refinements could modify or eliminate the effects upon these resources. Through future stages of engineering analysis and refinement, this potential impact will be better understood and subsequently coordinated further with the responsible jurisdiction agencies.

As discussed in Section 3, *Alternatives*, the LCTIP alternatives development process considered environmental and societal resources throughout the study. Considerable efforts were made to avoid and/or minimize impacts to these resources, including Section 4(f) resources. These efforts resulted in less than 0.03 percent of impacts to parks in Lake County (across the range of alternatives considered--1.2 to 2.8 ha [3 to 7 ac] of parkland impacts), and less than 0.06 percent of impacts to forest preserve land in Lake County (across the range of alternatives considered—1.2 to 6.5 ha [3 to 16 ac]). Although, these efforts succeeded in minimizing resource impacts, each of the alternatives would have some impact on Section 4(f) resources. Further, given the large area covered by the alternatives, the differences between alternative impacts were not considered distinguishable. Therefore, at this stage of development and level of engineering detail it was not possible to dismiss alternatives because of a Section 4(f) involvement. As a result, alternatives dismissed earlier in the process may need to be revisited as part of future studies.

Formal Section (4) designation and evaluation will be the subject of future studies, to conclusively identify the nature and extent of any Section 4(f) impact. Thus, activities such as the preparation of eligibility forms typically submitted to the SHPO for a determination of potential historic or archaeological sites will be part of next phase of analysis.

In this section standing structures, forest preserve and local park impacts that may

require Section 4(f) coordination are identified. Standing structures are also discussed in Section 4.6, *Cultural Resource Impacts*. At this point no state or federal recreation lands and wildlife refuges impacts have been identified.

4.8.1 Description of Potentially Involved 4(f) Resources

Section 4(f) resources that may be involved include county forest preserve lands, local parks, and standing structures. In Lake County these resources are abundant, with more than 8,090 ha (20,000 ac) of forest preserve, over 6,070 ha (15,000 ac) of local parks, and numerous standing historical structures. After three successive rounds of engineering refinements to avoid impacts to these resources, some sites may still be involved. Following is a description of the potentially involved Section 4(f) resources.

Nineteen Lake County forest preserves are identified as Section 4(f) properties that lie within the No-Action Alternative (Baseline) or build alternatives. Table 4-45 (on pages 4-63 through 4-65) lists the properties, their amenities, and uses. Eighteen local municipal parks have been identified as Section 4(f) resources that lie within the No-Action Alternative (Baseline) or build alternatives. Table 4-46 (on page 4-66) lists the properties, their amenities, recreational uses, and operating entities. Twenty-two eligible historic properties are identified as Section 4(f) properties that may lie within the No-Action Alternative (Baseline) or build alternatives. Eligibility is based on whether a site is included on or eligible for inclusion on the NRHP. The potentially involved properties are described in Table 4-47 (on page 4-67 and 4-68). However, for the No-Action Alternative (Baseline) projects, historic properties have been identified only where Phase 1 preliminary engineering and detailed environmental studies have been advanced and potential impacts identified. Given the expansiveness of the alternatives, it was not practicable to assess whether there were other potentially eligible historic sites for the No-Action Alternative (Baseline). As agreed to by the IHPA, cultural resources will be evaluated in greater detail under the preferred alternative to determine eligibility for inclusion in the NRHP.

4.8.2 Potential Section 4(f) Resource Impacts

4.8.2.1 No-Action Alternative (Baseline)

The No-Action Alternative (Baseline) could potentially affect 22 Section 4(f) forest preserve and local park properties throughout Lake County (Table 4-48, on page 4-69, and Figure 4-27). Generally, encroachment of these properties would be less than 1 percent of the total land area. However, there are two exceptions: both the Bannockburn Forest Preserve and Heather Ridge Golf Course would have larger area uses of 2.1 percent and 20.4 percent, respectively.

Most of the impacts are minor, requiring small amounts of land, most developed facilities and recreational use areas associated with the Section 4(f) properties would not be involved. Most of the impacts would affect the edges of the properties and would have little influence on developed facilities or natural resources. There are several exceptions, however, including potential impacts to recreational trails at Rollins Savanna, Deer Grove, and Prairie Wolf Forest Preserve; wetland involvement at Site 15; potential impacts to special habitat at Rollins Savanna; and potential impact to golf course operations at Heather Ridge.

The No-Action Alternative (Baseline) could potentially impact 14 LCFPD properties and eight local parks, with an estimated total loss of 6.9 ha (17.14 ac), representing less than 1 percent of the total area associated with the affected properties. Overall, the potential impacts to individual sites are small; however, one site potentially has an impact greater than 1 percent of the total land area for the site (Table 4-48).

TABLE 4-45
Potentially Involved Lake County Forest Preserves

Parcel	Location	Size	Description of Lake County Forest Preserves
Almond Marsh	South of IL 120 and east of US 45, along an unnamed tributary to the Des Plaines River	124 ha (306 ac)	The site incorporates an INAI site of the same name and two nature preserves identified as Almond Marsh and Oak Openings. A third nature preserve is 1.2 km (0.75 mi) south (Liberty Prairie Nature Preserve). No developed facilities are present.
River Hill	North of IL 120, east of IL 21, immediately south of Gurnee Woods	90 ha (224 ac)	This preserve is bisected by the Des Plaines River. There are no nature preserves or INAI sites associated with this preserve, nor any developed facilities.
Buffalo Creek Forest Preserve	North of Lake-Cook Road, between Arlington Heights Road and IL 53	160 ha (416 ac)	Includes tall-grass prairie with some small wetlands and Buffalo Creek. A wide range of birds, such as bobolinks, meadowlarks, and pheasants, occupy this preserve, and the state endangered Cormorant has been recorded at this site. Activities and facilities at Buffalo Creek include trails, picnic facilities, parking, and fishing. There are no nature preserves or INAI sites. Parts of this site were purchased with OSLAD funds. If it is determined that there would be impact this portion of the site as a part of future analysis, there would need to be coordination with IDNR similar to the coordination procedures for Section 6(f) properties.
Countryside Golf Course	West of US 45/IL 60 and both north and south of Hawley Road in Mundelein	200 ha (494 ac)	Amenities include the golf course, banquet facilities, pro shop, driving range, parking, restrooms, and concessions.
Wright Woods	South to IL 22 from Grainger Woods on the north and its western boundary of IL 21	132 ha (327 ac)	Includes a rich oak and maple woodland. Pretty sedge (*Carex woodii),* a state-listed endangered species, is found at this site. Activities include fishing and facilities include trails, parking, restrooms, and picnic and playground areas. A trail extends south 1.6 km (1 mi) to Ryerson Woods and is not contiguous to the Des Plaines River. The Des Plaines River bisects most of this site.
Grainger Woods	Southeastern Lake County near Mettawa, south of MacArthur Woods	104 ha (257 ac)	The purple-fringed orchid (*Habenaria peramoena*) is a federal (threatened) and state-listed endangered species found in this forest preserve. Activities and facilities are limited to equestrian lessons and boarding. The 43 ha (105 ac) Lloyd's Woods Nature Preserve is between the Grainger Woods and Wright Woods/Half Day Forest preserve on the south. A majority of the Grainger Woods Site is roughly 0.8 km (0.5 mi) east of the Des Plaines River, but a narrow belt of land extends along the river connecting this site to MacArthur Woods and Wright Woods.
Half Day Woods	East of Wright Woods	81 ha (201 ac)	This preserve consists of oaks and stands of native prairie. Activities include fishing and ice-skating. Facilities at this preserve include trails, picnic and playground areas, and an athletic field. This site extends over the watershed divide into the Chicago River basin. There are no nature preserves or INAI sites associated with either Wright Woods or Half-Day Woods.

TABLE 4-45 CONTINUED
Potentially Involved Lake County Forest Preserves

Parcel	Location	Size	Description of Lake County Forest Preserves
MacArthur Woods Forest Preserve	South of the EJ&E Railroad on the east side of the Des Plaines River and north of IL 60	207 ha (511 ac)	Includes a dedicated nature preserve located in the eastern portion of the woods. The southern portion of this site extends along the river to Grainger and Wright Woods. This site incorporates both a nature preserve and an INAI site of the same name. No developed facilities are present.
Independence Grove	South of River Hill, immediately north of IL 137	448 ha (1,106 ac)	Currently under development in central Lake County along the Des Plaines River. The LCFPD headquarters are located at Independence Grove, and amenities include a dog exercise area and trails. This site includes a wetland restoration site east of IL 21. There are no nature preserves adjacent to this site, but the 19 ha (47 ac) Liberty Prairie Nature Preserve is located roughly 0.8 ha (0.5 mi) west of Independence Grove. The St. Francis Boys Camp and the River Road Woods INAI sites are located within the boundaries of this forest preserve site, east of the Des Plaines River.
Wilmont Woods Forest Preserve	South of IL 137 and east of IL 21	57 ha (142 ac)	There are multiple-use trails within the site. This site is located at the confluence of Meadow Haven Creek, Tributary Number 1, and the Des Plaines River.
Old School Forest Preserve	Near Libertyville in south-central Lake County, south of IL 176. The western boundary is St. Mary's Road and the eastern boundary is I-94. A portion of the site extends west of St. Mary's Road to the Des Plaines River	200 ha (494 ac)	Includes oak woodlands and small prairies. This land was acquired in parcels between 1974 and 1976. This was the first forest preserve in Illinois to combine native prairie restoration with recreational facilities. Wildlife includes bluebirds, fox, and owls. Activities include trails, fishing, picnic and playground facilities, parking, restroom facilities, sledding, and sports fields. This preserve is connected by trails north of IL 176 to Independence Grove and Wilmont to the north (1.6 km [1 mi]) and via a greenbelt along the EJ&E railroad to MacArthur Woods, roughly 0.8 hectare (0.5 mile) south. There is a 0.3 ha (0.75 mi) section of the river between Old School and MacArthur Woods that does not contain forest preserves or trails, disrupting the continuous greenbelt to the Wisconsin border along the river. There are no nature preserves or INAI sites.
Bannockburn Forest Parcel	2.4 km (1.5 mi) east of Ryerson Woods and 1.6 km (1mi) southwest of Prairie Wolf Forest Preserve	32 ha (79 ac)	Bannockburn Forest Preserve is a small isolated preserve. A portion of the East Fork of the Chicago River runs through this site. There are no nature preserves or INAI sites associated with this preserve, nor developed facilities.
Prairie Wolf Forest Preserve	Along IL 60 about 1.6 km (1 mi) east of I-94.	175 ha (431 ac)	Prairie Wolf is a new development that includes a wetland restoration site. Activities include biking, skiing, and hiking trails. This site extends nearly 3.2 km (2 mi) along the Middle Fork. A complex of small nature preserves and INAI sites are located 0.8 km (0.5 mi) east of this forest preserve. The nature preserves are Highmoor Park and Hybernia. The INAI sites are known as the Hybernia-Highmoor Prairie.
Des Plaines River Trail	South of IL 173 along the Des Plaines River.	1,342 ha (3,314 ac)	Incorporates parts of the Wadsworth Prairie Nature Preserve and the Wadsworth Prairie and Savanna INAI sites. No developed facilities are present at the site.

TABLE 4-45 CONTINUED
Potentially Involved Lake County Forest Preserves

Parcel	Location	Size	Description of Lake County Forest Preserves
Site 15	Along the Middle Fork of the North Branch of the Chicago River, south of IL 137	31 ha (77 ac)	This site is at the south end of an extensive ADID wetland area that extends north along the Middle Fork. There are no nature preserves near this site, but three small INAI sites are associated with Site 15, including two separate sites known as the Oak Grove White Fringed Orchid Site North, and the Oak Grove White Fringed Orchid Site. These INAI sites lie immediately adjacent to the Union Pacific Railroad tracks. No developed facilities are present at this site.
Ryerson Woods	Situated on the east side of the Des Plaines River and extends from south of Duffy Lane to the Cook County Line	223 ha (550 ac)	Land was donated to the Lake County Forest Preserve beginning in 1966. Several rare species are found in Ryerson Woods including the spotted salamander (*Ambystoma maculatum*), blue-spotted salamander (*Ambystoma sp.*), and wood frog (*Rana sylvatica*); state threatened or endangered species eastern massasauga rattlesnake (*Sistrurus catenatus*), red-shouldered hawk (*Buteo lineatus*), veery (*Catharus fuscescens*), and the purple-fringed orchid are also present. This nature preserve houses a rare northern flatwoods forest and has most of the high quality floodplain forest that remains in northeastern Illinois. Activities and facilities include a visitor/nature center, banquet facilities, and trails. Approximately 113 ha (279 ac) are dedicated Illinois nature preserves of the same name. The Edward Ryerson Conservation INAI site is incorporated partially within the boundaries of this forest preserve site and the Hermann's Woods INAI sites is 0.16 km (0.1 mi) east of Ryerson Woods Forest Preserve. Ryerson Woods forms a linear greenbelt along the Des Plaines River for almost 42 km (26 mi).
Deer Grove Forest Preserve	Between Ela and Hicks Roads and north of Dundee Road in Cook County	729 ha (1,800 ac)	This forest preserve has bicycle and equestrian trails, walking paths, and picnic shelters. This forest preserve can be accessed from either Dundee or Quentin Road.
Rollins Savanna	Immediately west of US 45 and Third Lake, south of Rollins Road in central Lake County	496 ha (1,224 ac)	State-listed endangered species found at this site include such fish as the Iowa darter (*Etheostoma exile*) and the Sandhill crane (*Grus canadensis*). Activities are limited to snowmobile trails. There are no nature preserves or INAI sites associated with the Rollins Savanna. This is the southernmost portion of a 16 km (10 mi) crescent of open lands and lakes, with few interruptions, that extends west and north to the Red Wing Slough INAI site near the Wisconsin state line.
Brae Loch Golf Course	Along the west side of US 45 between Washington Street and IL 120 in the Village of Grayslake	65 ha (161 ac)	The Brae Loch Golf Course offers banquet facilities and gift shop.

Source: Lake County Forest Preserve District 2000

TABLE 4-46
Potentially Involved Parks

Jurisdiction	Description of Local Municipal Parks
Mundelein Park District	Leo Leathers Park is a 13 ha (32 ac) facility located south of IL 176, between IL 83 and US 45. Access to this facility is off of a local street at the south end of the property. The park offers a variety of recreational amenities, including a lake and a trail system.
Lake Zurich Park District	Sparrow Ridge Park, a 1.2 ha (3 ac) facility, is located on the west side of Rand Road (US 12) south of Old Rand Road. The park contains a playground and a retention basin. The area near Rand Road is fenced and wooded. Paulus Park is a 17 ha (42 ac) facility located on the east side of Rand Road (US 12), north of IL 22. Paulus Park offers a wide variety of activities including swimming, picnicking, sledding, and skating.
Village of Long Grove	Open Space A is 0.78 ha (0.94 ac) and is located on the east side of IL 83 and north of Gilmer Road along Indian Creek. Open Space B is 10.1 ha (24.89 ac) and is located on the west side of IL 83 and north of Gilmer Road. Open Space C is 5.26 ha (13 ac) and is located on the south side of Hicks Road at Old McHenry Road. There is no vehicular access to this site. The only amenity is a trail. Open Space D is 14 ha (34 ac) and is located on the west side of IL 83, south of IL 22. The only amenity is a trail.
Long Grove Park District	Oak Hills Park is located at the southeast corner of IL 83 and IL 22. There are currently no amenities or facilities at this 23.47 ha (58 ac) site. This park is a 10-year prairie restoration project and a future trail is planned.
Vernon Hills Park District	Royal Oaks Park is a 2 ha (5 ac) facility located on the east side of IL 83, south of US 45. There are no amenities or facilities at this location.
Village of Vernon Hills	Vernon Hills A Conservation area is 0.95 ha (2.38 ac) and is located on the east side of IL 83 south of IL 60. Vernon Hills B Conservation area is 2.4 ha (6 ac) and is located on the east side of IL 83 south of IL 60 and north of VHA Conservation.
Libertyville Township Open Space District.	This property is located on the west side of St. Mary's Road, south of IL 137. It is a 19.42 ha (48 ac) site with an established trail system that connects to adjacent residential areas.
Other Local Park Uses	The Chevy Chase Golf Course is a 51.39 ha (127 ac) course located on the west side of IL 21, just north of Lake-Cook Road, in Wheeling. Facilities include public golf, a driving range, concessions, restrooms, and banquet facilities. Heather Ridge Golf Course is 2.5 ha (6.29 ac) and is located on the west side of IL 21 north of IL 120. The Lake County Fairgrounds is 36.1 ha (89.02 ac) and is located west of US 45 between IL 120 and Central Avenue in the Village of Grayslake. Lafferty Park is a 6.2 ha (40.0 ac) park in the Village of North Barrington, Ela Township. Knox Park is a 4.9 ha (12.1 ac) park in the Village of North Barrington, Ela Township. A conservancy area, of unknown size, is located on the northwest corner of Gardner Road and IL 22 in North Barrington.

TABLE 4-47
Potentially Involved Eligible Historic Properties

Property	Location	Description	Involved Alternative		
			No-Action*	IL 53 Freeway/Tollway	IL 83/US 45 with US 12
Monastery	IL 21 between IL 137 and Washington St.	St. Sava Monastery (on NRHP): 0.04 ha (1 ac) of a temporary construction easement	X		
Farms	IL 21 between IL 137 and Washington St.	0.4 ha (1 ac) from two county designated landmarks-Stonehenge Farm and a Centennial Farm	X		
Local Sites	IL 22 between US 14 and Quentin Rd	6 sites of local historic importance; however none of the sites would be affected if the bypass alternative were selected	X		
Historic District	IL 22 between IL 83 and US 41	Stone Gate Circle Historic District: a retaining wall would be constructed on the property line of 4 houses.	X		
Residence	House with barn near the intersection of IL 83 and IL 137	House: 1½ story; clapboarded; gable-front main block with cornice returns; gabled ell; asphalt roof; historic front porch with bands of tall windows that feature six-pane transoms. Contemporary barn: gambrel roof with a hay hood; shed roof dormer with a 6-over-6, double-hung sash window; vertical board siding; 4-pane garage doors.		X	
Residence	House with barn near the intersection of I-94 and IL 120	House: 2-story; gabled (T-plan); clapboarded; 2-over-2 and 6-over-6, double-hung, wood sash windows; molded window hoods; 1-story, wrap-around porch on ell. Contemporary garage: asphalt, gable roof; 6-over-6, double-hung, wood sash windows; multiple hinged, 4-pane doors.		X	
Residence	House with shed and barn near the intersection of Hicks Road and Long Grove Road	House: 2-story; clapboarded; multiple additions; asphalt roof; 6-over-1, double-hung, wood sash windows predominate; historic, clapboarded utility shed and garage; gambrel roof barn and 1-story, stuccoed outbuilding on the other side of the fence may have been historically associated with this property.		X	
Forest Preserve Office (Grainger Woods)	Forest Preserve office near the intersection of St. Mary's Road and IL 60	Forest Preserve office: 2-story; decorative half-timbered upper story; stuccoed; asphalt gambrel roof; brick foundation above grade; multi-pane windows; brick window sills; associated historic stuccoed stables and modern stables.			X

TABLE 4-47 CONTINUED
Potentially Involved Eligible Historic Properties

Property	Location	Description	Involved Alternative		
			No-Action*	IL 53 Freeway/Tollway	IL 83/US 45 with US 12
Residence	House near the intersection of St. Mary's Road and IL 176	House: Tudor Revival style; 1½-story; half-timbered; stuccoed; wood shingle, steeply-pitched, side-gable roof; wood sash bay windows; modern casement windows; brick window sills; exterior chimney composed of a cut-stone, irregular-coursed lower-half and brick upper-half; unsympathetic, 1-story, shed-roof rear addition; modern, detached garage.			X
Cultural Center (David Adler)	Listed on the National Register of Historic Places, located near the intersection of IL 21 and IL 137	Center: large, linear complex of attached buildings; cross-gable main block; stuccoed; wood shingle roof; 6-over-6, double-hung, wood sash windows predominate; fanlight over street-facing entrance on the main block; multiple chimneys; corner tower.			X
Residence and Entrance Piers	House near the intersection of I-94 and IL 60	House: 2½-story; wood shingle, gable roof; vinyl-siding; arched and multi-pane windows; 2 corbeled chimneys. Stables: 1-story with 1½-story, gable-front blocks; east end appears to have been converted into a residence. Two sets of wood entrance piers.			X
Residence	House near the intersection of Hicks Road and Long Grove Road	House: 2-story; clapboarded; multiple additions; asphalt roof; 6-over-1, double-hung, wood sash windows predominate; historic, clapboarded utility shed and garage; gambrel roof barn and 1-story, stuccoed outbuilding on the other side of the fence may have been historically associated with this property.			X
Residence	House near the intersection of Hick Road and Old Hicks Road	House: Queen Anne style; 2-story with a 1½-story rear wing; gable-front, wood shingle roof; gableboard with spindlework; brick foundation; wood clapboards; alternating fishscale and cove wood shingles in the peak of the gable; 1-over-1, double-hung, wood sash windows with ornamental hoods; 1-story porch with spindlework on the east facade of the wing.			X

*Only historic sites identified as part of other Phase 1 project have been identified for the No-Action Alternative (Baseline).

TABLE 4-48
Summary of Potential Forest Preserve and Local Park 4(f) Impacts for the No-Action Alternative (Baseline) [a]

Property	Owner	Total ha (ac)	Affected ha (ac)	% Affected	Potential Use
Bannockburn Forest Preserve	LCFPD	31.8 (79)	0.67 (1.66)	2.11	No recreational facilities
Grainger Woods	LCFPD	104 (257)	0.02 (0.06)	0.02	Minimal impact
Independence Grove	LCFPD	448 (1,106)	0.77 (1.9)	0.16	LCFPD headquarters; dog exercise area, trails unaffected
Prairie Wolf Forest Preserve	LCFPD	175 (431)	0.93 (2.29)	0.53	Potential biking, hiking, skiing uses
Ryerson Woods	LCFPD	222.5 (550)	0.11 (0.26)	0.05	Uses at edge of property only
Wright Woods	LCFPD	132 (327)	0.13 (0.33)	0.10	Uses to southern perimeter
Countryside Golf Course	LCFPD	200 (494)	0.15 (0.38)	0.08	No anticipated uses to golf course facility
Des Plaines River Trail	LCFPD	1,342 (3,314)	0.26 (0.64)	0.02	Uses to southern edge; part of parkland along river
Ryerson Woods	LCFPD	313 (772)	0.39 (0.96)	0.12	Uses at edge of property only
Site 15	LCFPD	31 (77)	0.05 (0.12)	0.19	Site contains ADID wetlands and INAI sites
Deer Grove	LCFPD	729 (1,800)	1.4 (3.48)	0.20	Potential impact to bike trail
Rollins Savanna	LCFPD	496 (1,224)	0.44 (1.10)	0.09	Presence of State-listed species, snowmobile trail
Brae Loch Golf Course	LCFPD	65 (161)	0.46 (1.13)	0.71	No anticipated uses to golf course facility
Half Day Woods	LCFPD	81.3 (201)	0.31 (0.77)	0.38	No recreational uses would be involved.
Paulus Park	Lake Zurich PD	17 (42)	0.09 (0.22)	0.53	No facilities located in the affected park will be affected.
Lafferty Park	Village of North Barrington	5.5 (13.6)	0.054 (0.13)	0.98	No facilities located in the affected park will be affected.
Knox Park	Village of North Barrington	4.9 (12.1)	0.017 (0.04)	0.35	Temporary construction easement. No facilities located in the affected park will be affected
Conservation Area	Village of North Barrington	Unknown	0.003 (0.007)	Unknown	No facilities located in the affected park will be affected
Heather Ridge B Golf Course	Gurnee	2.5 (6.3)	0.51 (1.27)	20.4	Potentially golf course and operations uses
Open Space B	Village of Long Grove	7.3 (18)	0.065 (0.16)	0.89	No recreational would be involved
Oak Hills Park	Long Grove Park District	24.3 (60)	0.076 (0.19)	0.30	Currently no recreational facilities; trail planned
Lake County Fairgrounds	Lake County	36 (89)	0.016 (0.04)	0.04	Uses to eastern edge of property
Total Area	**4,468.1 (11,034)**		**6.9 (17.7)**		

[a] See Table 4-47 for a summary of potentially eligible historic structures

The No-Action Alternative (Baseline) may involve 13 historic sites within the existing or proposed right-of-way (Table 4-48 and Figure 4-27). One site, the St. Sava Monastery which is listed on the National Register of Historic Places, could potentially be affected by a temporary construction easement (0.04 ha or 0.1 ac). A subdivision, comprised of 12 Lustron homes has been found to have the potential to be eligible for the NRHP as a historic district. Four of these residences may be potentially affected; a retaining wall would be constructed on the property line of these residences. The other structures include two county designated landmark farms and six locally important sites.

4.8.2.2 IL 53 Freeway/Tollway Alternative

The potential forest preserve and local park Section 4(f) resource impacts associated with the IL 53 Freeway/Tollway Alternative are summarized in Table 4-49 and Figure 4-28. Roughly 8.0 ha (20.1 ac) may be required for roadway improvements under this alternative from four LCFPD properties and one local park. Overall, the IL 53 Freeway/Tollway Alternative could affect 0.15 percent of the total land area represented by the involved sites.

The percentage of land area required from the forest preserve and local park properties would be relatively small compared to the total land areas. Most impacts to forest preserve properties would be fringe impacts, which would not affect developed facilities or recreational areas. Under the IL 53 Freeway/Tollway Alternative, Leo Leathers Park would be divided. Alternative centerlines for Leo Leathers Park and Almond Marsh were analyzed to identify avoidance options. The analysis resulted in higher wetland uses and displacements, so the current alignment was determined to be most practical (see Section 3). Direct impacts to the park include a small pond, a bike/pedestrian trail, and some natural vegetation, and so the resource would be bridged. Overall, potential impacts to individual sites are small, but there are four sites for which uses are greater than 1 percent of the total site land area (Table 4-49). Three historic structures were found to have the potential to be eligible for inclusion on the NRHP. These structures are all farmhouses with barns (Table 4-47 and Figure 4-28).

4.8.2.3 IL 83/US 45 with US 12 Alternative

Potential impacts to existing forest preserves and parks that could result from the IL 83/US 45 with US 12 Alternative are

TABLE 4-49
Summary of Potential Forest Preserve and Local Park 4(f) Impacts for the IL 53 Freeway/Tollway Alternative

Property	Owner	Total ha (ac)	Affected ha (ac)	% Affected	Potential Use
Almond Marsh	LCFPD	124 (306)	2.0 (5.0)	1.6	No recreational facilities
River Hill	LCFPD	90 (224)	2.6 (6.6)	2.9	Part of parkland corridor
Buffalo Creek Forest Preserve	LCFPD	160 (416)	0.6 (1.6)	0.4	Currently agriculture*
Countryside Golf Course	LCFPD	200 (494)	1.4 (3.5)	0.7	Golf facilities
Leo Leathers Park	Mundelein Park District	13 (32)	1.4 (3.4)	10.8	Passive recreation
Total Area	**587 ha (1,472 ac)**		**8.0 ha (20.1 ac)**		

Note: See Table 4-46 for a summary of potentially eligible historic structures
*Parts of this site were purchased with OSLAD funds. If it is determined that there would be impact this portion of the site as a part of future analysis, there would need to be coordination with IDNR similar to the coordination procedures for Section 6(f) properties.
Source: CH2M HILL 1999.

detailed in this section. There could be seven LCFPD properties and twelve local parks with an estimated total loss of 7.47 ha (18.51 ac) that could be potentially involved with this alternative (Table 4-50, on the following page, and Figure 4-29). Generally, the potential impacts to individual sites are small; however, there are seven sites for which uses are greater than 1 percent of the total land area for the site (Table 4-50). For Leo Leathers Park and Almond Marsh, an analysis of alternative centerlines and bypass options was performed to identify avoidance options. The analysis resulted in higher wetland uses and displacements; thus the current alignment was determined to be most practical (see Section 3). Most of the impacts would be fringe uses with minimal effect on developed facilities or recreational areas. Many of the impacts represent losses of natural vegetation, although none of these losses affect special or rare habitat. Impacts upon 10 sites could have some effect on trail facilities and/or access. Generally, these would be minor and could be mitigated.

One building, the David Adler Cultural Center, is on the NRHP. Five other structures, including a residence with one set of building entrance piers, were found which are potentially eligible for inclusion on the NRHP. See Table 4-47.

4.8.3 Summary of Potential Section 4(f) Resource Impacts

Potential Section 4(f) resource impacts could occur with each of the alternatives. A summary of the potential Section 4(f) property uses for each alternative is in Table 4-51 (on page 4-73).

The IL 83/US 45 with US 12 Alternative could potentially affect the most forest preserves and local parks with a greater than 1 percent loss, and historic properties. Comparatively, for all alternatives, the total impacts to Section 4(f) resources is small compared to the total area dedicated to forest preserves, parks, and cultural resources in Lake County. It is expected that future coordination, minimization and mitigation activities associated with the preferred alternative could result in a further reduction of these impacts.

4.9 Energy

Highway improvement projects can both consume and conserve fossil fuels. Consumption would occur as a result of both construction and operation of the project alternatives. Conservation would occur as a result of improved efficiency for travel.

Construction of the project alternatives would require the consumption of energy for processing construction materials, construction activities, and the long-term maintenance of 119.1 route km (74.0 mi) for the No-Action Alternative (Baseline), 42.7 route km (26.5 mi) for the IL 53 Freeway/Tollway Alternative, and 100.8 route km (62.7 mi) for the IL 83/US 45 with US 12 Alternative. Energy consumption by vehicles in the area may increase during construction due to possible traffic delays.

Construction of both build alternatives would reduce future traffic congestion and vehicular stopping and slowing conditions. Additional benefits would be realized from increased capacity and smoother riding surfaces. This would result in less direct and indirect vehicular operational energy consumption for the build alternatives than for the No-Action Alternative (Baseline). In the long term, post-construction operational energy efficiencies should offset construction and maintenance energy requirements and result in a net savings in energy usage.

Both build alternatives include provisions for improved bicycling and walking conditions, thereby encouraging travel by these nonmotorized, nonenergy-consuming modes of transportation. Additional nonmotorized, energy-efficient travel improvements, common to both project alternatives, consist of various recommended bus and rail improvements throughout the study area.

TABLE 4-50
Summary of Potential 4(f) Impacts for the IL 83/US 45 Alternative

Property	Owner	Total ha (ac)	Affected ha (ac)	% Affected	Potential Use
Almond Marsh	LCFPD	124 (306)[a]	1 (2.4)	0.8	Vegetation uses
Countryside Golf Course	LCFPD	200 (494)	0.05 (0.2)	0.03	Potential impact to trail and vegetation
MacArthur	LCFPD	207 (511)[a]	0.15 (0.37)	0.07	River access and trail uses
Independence Grove	LCFPD	448 (1,106)[a]	0.71 (1.76)	0.16	River access and trail uses
Old School Forest Preserve	LCFPD	200 (494)[a]	0.11 (0.27)	0.06	Access to facility, trail and underpass uses
Wilmont Forest Preserve	LCFPD	57 (142)[a]	0.23 (0.58)	0.4	Potential uses to Des Plaines River Trail and vegetation
Wright Woods/Half Day	LCFPD	132 (327)[b]	1.13 (2.8)	0.86	Potential uses to trail and vegetation
Sparrow Ridge Park	Lake Zurich PD	1.2 (3)	0.016 (0.04)	1.38	Impact to landscape buffer
Paulus Park	Lake Zurich PD	17 (42)	0.09 (0.22)	0.53	No recreational uses
Leo Leathers Park	Mundelein PD	13 (32)	0.84 (2.09)	6.46	Passive recreation
Open Space A	Long Grove	0.78 (0.94)	0.38 (0.94)	48.7	No recreational uses
Open Space C	Long Grove	5.26 (13)	0.5 (1.23)	9.5	Access, trail, and vegetation uses
Open Space D	Long Grove	14 (34)	0.14 (0.34)	1.0	Access, trail, and vegetation uses
Oak Hills Park	Long Grove Park District	23.47 (58)	1.57 (3.87)	6.7	Impact to open space and vegetation; no impact to restoration area
Royal Oaks Park	Vernon Hills Park District	2 (5)	0.02 (0.05)	1.0	Vegetation uses
Chevy Chase Golf Course	Wheeling	51.39 (127)	0.12 (0.31)	0.23	Access and parking uses
Libertyville Township Open Space	Village of Libertyville	19.42 (48)	0.18 (0.45)	0.9	Trail, access, and vegetation uses
VHA Conservation	Village of Vernon Hills	0.95 (2.38)	0.093 (0.23)	9.8	Impact along edge
VHB Conservation	Village of Vernon Hills	2.4 (6)	0.14 (0.36)	5.8	Impact at edges
Total Area	**1,518.9 ha (3,751.3 ac)**		**7.5 ha (18.5 ac)**		

Note: See Table 4-47 for a summary of potentially involved eligible historic properties
[a]CH2M HILL 1999 - GIS Database
[b]Lake Count Forest Preserve District 2000

4.10 Construction Impacts

Construction impacts are generally of short duration and end shortly after project completion. The expected short-term construction impacts associated with the No-Action and build alternatives are identified below.

4.10.1 Construction-Related Jobs

Table 4-52 lists the jobs generated per alternative, based on construction costs and an FHWA multiplier of 9.75 jobs per million dollars of construction. Project expenditures would also generate indirect and direct employment opportunities in industries that supply materials and overhead items to the project. Estimates of additional project related-work generated are based on the U.S. Department of Labor multiplier of 12.7 jobs per million dollars of construction.

4.10.2 Erosion and Sediment Control

Typical construction activities associated with bridges, culverts, and roadway approaches involve grading, filling, and excavation. These activities increase the erosion potential due to the reduction in vegetative cover and increased impervious areas resulting from soils disturbance by heavy equipment. Placement of structures in streams may increase turbidity (suspended solids) and sedimentation and temporarily alter downstream hydraulics and substrate conditions.

Covering of natural substrate is the potential result of increased sedimentation during construction, thereby affecting necessary habitat conditions for some species of fish, mussels, or macroinvertebrates. Impact magnitude would vary according to site-

TABLE 4-51
Summary of Potential Section 4(f) Impacts

	No-Action	IL 53 Freeway/Tollway	IL 83/US 45 with US 12
Number of Forest Preserves	14	4	7
Number of Local Parks	8	1	9
Total ha of Forest Preserve and Local Parks Involved (ac)	6.9 (17.1)	8.0 (20.1)	7.5 (18.5)
Number of Properties with Greater than 1 percent Loss of Area	2	3	9
Number of Historic Properties*	13	3	6

*Based on available Phase 1 preliminary engineering and environmental documentation reports.

TABLE 4-52
Jobs Generated per Alternative

	No-Action	IL 53 Freeway/Tollway	IL 83/US 45 with US 12
Jobs Generated[a]	3,300	6,600	7,200
Additional Project-Related Jobs Generated[b]	4,300	8,600	9,300
Estimated Construction Costs[c]	$338 million	$674 million	$735 million

[a]This estimate is based on a construction costs and a FHWA multiplier of 9.75 jobs per million dollars of construction
[b]This estimate is based on U.S. Department of Labor multiplier of 12.7 jobs per million dollars of construction
[c]Construction cost only (1999 dollars)

specific conditions, such as the type of crossing structure and stream substrate.

Erosion control measures would be implemented throughout the study area, in particular at stream crossings for the preferred alternative in accordance with IDOT policy as stated in *IDOT Joint Design/Construction Procedure Memorandum on Erosion and Sediment Control.* An erosion control plan must be prepared as part of the contract documents. These measures would minimize soil loss and subsequent sedimentation. Table 4-53 summarizes the stream crossings for each alternative. The magnitude of erosion control measures is commensurate with the number of stream crossings.

Each alternative would result in the disturbance of 0.4 or more ha (1 or more ac) of total land area. Accordingly, each is subject to the requirement for a NPDES permit for stormwater discharges from the construction site. This is discussed under Section 4-13, *Permits/Certifications*.

Areas of special concern where erosion and sediment control are needed would be identified in a detailed analysis of the preferred alternative.

4.10.3 Air Quality

The primary effect from construction upon air quality would be fugitive dust (particulate) from soil exposed to wind and traffic. The quantity of fugitive dust would vary depending on the construction location, extent of activity, silt content, soil moisture, temperature, and wind speed. Construction activities would generate fugitive dust that may be bothersome in nearby areas. However, the contribution of any of the alternatives to the total suspended particulates in the surrounding area would be small and of short duration. Generally, the overall impacts of each alternative would be similar.

During construction, blowing dust from areas cleared or excavated for access or construction purposes can be minimized by applying water to unpaved road surfaces. The effectiveness of watering for fugitive dust control depends on the frequency of application. It is estimated that watering an entire area twice daily would

TABLE 4-53
Summary of Stream Crossings by Alternative

Watershed	Subwatershed	No-Action	IL 53 Freeway/Tollway	IL 83/US 45 with US 12
Des Plaines River	Buffalo Creek	4	2	2
	Bull Creek	6	1	2
	Aptakisic Creek	3	—	1
	Indian Creek	8	5	8
	Mill Creek	5	1	1
	Middle Fork	2	—	3
	Upper Des Plaines	8	4	5
	Lower Des Plaines	3	—	5
	West Fork	3	—	—
	Arlington Heights Branch	2	—	—
Fox River	Flint Creek	3	—	1
	Fish Lake Drain	—	1	—
	Slocum Lake Drain	—	—	1
	Squaw Creek	—	1	—
	Tower Lake Drain	—	—	1
Total		**47**	**15**	**30**

reduce dust emissions by as much as 50 percent. These measures would be employed as needed during construction of the preferred alternative.

4.10.4 Construction Noise

Trucks and machinery used for construction produce noise that may affect some land uses and activities during the construction period. Individuals inhabiting the homes along the proposed improvements would at some time experience perceptible construction noise from implementation of the project. IDOT's *Standard Specifications for Road and Bridge Construction* as Article 107.35, adopted January 1, 1997, contains mitigation measures to minimize or eliminate the effects of construction noise on receptors.

4.10.5 Traffic/Temporary Access

Access to all properties would be maintained by staged construction temporary access roads or other appropriate means. Traffic may be stopped for short periods, temporarily inconveniencing motorists while construction equipment is moved on or across the highway. Emergency service routes and access for emergency vehicles would be maintained.

Road construction activities involve lane closures and detours. These activities interrupt normal traffic flow, and generally impede travel in the vicinity of road construction. Construction on existing roadways would cause greater traffic delay than construction on new alignments. Therefore, the IL 53 Freeway/Tollway Alternative would have less traffic delay associated with construction than the other project alternatives.

4.10.6 Solid Waste

In accordance with state and federal regulations, the contractor would dispose of grass, shrubs, trees, old pavement, miscellaneous debris, and other sold wastes generated during construction.

4.10.7 Utility Services

Construction activities would be coordinated with public utilities to avoid potential conflicts and minimize planned interruptions of service. When service interruptions are unavoidable, every effort would be made to limit their duration.

4.11 Secondary and Cumulative Impacts

4.11.1 Approach

Potential secondary and cumulative impacts are described in this section. These terms are defined as follows:

- *Secondary effects* are indirect impacts "caused by an action and are later in time or further removed in distance but are still reasonably foreseeable" (40 C.F.R 1508.8).
- *Cumulative effects* are "impacts which result from the incremental consequences of an action when added to other past and reasonably foreseeable future actions" (40 C.F.R 1508.7).

In 1997, the Council on Environmental Quality (CEQ) developed an 11-step approach to evaluate cumulative effects (see Table 4-54, on the following page). Steps 1 through 4 address scoping, which sets the boundaries for the analysis by narrowing the focus to meaningful issues and the sustainability of affected resources. Steps 5 through 7 describe the affected environment (resources, ecosystems, and human communities) in terms of the stresses it experiences and its response to change, capacity to withstand stresses, regulatory thresholds and baseline condition. Steps 8 through 11 determine the environmental consequences. The last four steps include cause-and-effect relationships, magnitude, significance, and measures to avoid, minimize, mitigate, monitor, and manage consequences. As noted, this analysis has determined that the secondary and cumulative effects of the project alternatives would be limited and controllable through mitigation and monitoring.

A review of the project impacts concluded that seven resource areas would potentially result in secondary and cumulative impacts **(Step 1)**,

which are summarized in Table 4-55 (on the following page).

The geographic extent of this analysis **(Step 2)** is shown in Figure 4-30, which captures the area of population growth attributed to the build alternatives. The additional population growth attributed to the build alternatives would be 18,000 for the IL 83 with US 12 Alternative, and 27,500 for the IL 53 Freeway/Tollway Alternative (see Section 4.1.1 for more detail). These increases are small compared to the 280,000 additional people projected to come to Lake County by 2020, with the No-Action Alternative (Baseline).

The time period for this analysis is 1990 through 2020 **(Step 3)**. This period included the periods 1990 to 2000 and 2001 to 2020. From 1990 to 2000, Lake County was characteristic of many suburban areas, with an outward shift in growth from established communities. Shoreline communities experienced slower growth or decline, while the central part experienced greater growth. During the 1990s, population growth and development was concentrated in the central part of the county and advanced into the western part. The latter part of the analysis period will see growth most pronounced in the western and north-central parts of the county. This period extends through the regional projection in the NIPC Land Use Plan (2020).

Other actions **(Step 4)** may cause secondary and cumulative effects on the resources, ecosystems, and human communities within the project corridor. These actions are under construction or are reasonably foreseeable, given their stage of planning and development. The impacts of these actions must be considered along with those of the finalist alternatives.

Substantial development in Lake County is expected to continue regardless of whether major transportation improvements are implemented. Most of the communities in the county are providing for new commercial and residential growth at a rapid pace. Expansion of these types of land uses typifies the reasonably foreseeable actions in the county, beyond the proposals presented in this document for major transportation improvements. Other specific actions identified within the project influence zone are

TABLE 4-54
Steps in Cumulative/Secondary Analysis

Environmental Impact Assessment Component	Analysis Steps
Scoping	1. Identify the significant cumulative effects issues associated with the proposed action, and define the assessment goals. 2. Establish the geographic scope for the analysis. 3. Establish the time period for the analysis. 4. Identify other actions affecting the resources, ecosystems, and human communities of concern.
Describing the Affected Environment	5. Characterize the resources, ecosystems, and human communities identified in scoping in terms of their response to change and capacity to withstand stresses. 6. Characterize the stresses affecting these resources , ecosystems, and human communities and their relation to regulatory thresholds. 7. Define a baseline condition for the resources, ecosystems and human communities.
Determining the Environmental Consequences	8. Identify important cause-and-effect relationships between human activities and resources, ecosystems, and human communities. 9. Determine the magnitude and significance of cumulative effects. 10. Modify or add alternatives to avoid, minimize or mitigate significant cumulative effects. 11. Monitor the cumulative effects of the selected alternative and adapt management.

the expansion of Motorola facilities in Deer Park, the Great Lakes Naval Training Center in North Chicago, and the proposed University Center in Grayslake. No other substantive actions have been identified within the project influence zone.

The affected environment analyses **(Steps 5-7)** characterizes the existing key resources, ecosystems and human communities in terms of their response to change; stresses imposed on them; their capacity to withstand these stresses; the pertinent regulations, standards and development plans that establish thresholds (levels of stress beyond which the desired condition degrades); and their current status (baseline condition). This information is summarized in Table 4-56 (on the pages 4-78 and 4-79). Four critical resources are discussed in further detail to provide a perspective of the existing conditions.

Wetlands. Currently, there are over 45,000 acres of wetlands in the county. Historically, the loss of wetlands was associated with agriculture. Today, the loss of wetlands is attributed to urban development. Regulatory requirements have effectively provided for the replacement of lost wetlands, slowing the loss of total wetland acres.

TABLE 4-55
Potential Cumulative/Secondary Effects

	Resources/Eco-systems/Human Communities	Potentially Important from Cumulative/Secondary Effects Perspective
Land Use	a. Relationship between land use and transportation b. Agricultural land conversion c. Socioeconomic d. Public services: medical, fire, police, educational, places of worship, cemeteries	a. Facilitate already establish growth trends b. Farm and farmland loss c. Population and employment growth, changing community cohesion, building displacements d. Overburdened services
Water Resources	a. Wetlands b. Floodplains c. Ground and surface water quality	a. Degradation or loss (erosion, filling), potential for more flooding, loss of biological resources b. Degradation or loss (erosion, filling), potential for more flooding c. Sedimentation; contamination from pollutants such as salt spray from deicing chemicals; altered hydrology, potential impact to designated water uses
Air Quality	a. Exceedance of standards for carbon monoxide and other air pollutants b. Long-range transport of air pollutants c. Conformity with State Implementation Plan	a.–c. Degradation of regional air quality; long-term human health effects.
Noise	Traffic-generated noise levels	Increases in traffic noise over existing conditions or noise abatement criteria
Cultural Resources	Historic structures and archaeological sites	Loss of resources or proximity effects
Sociocultural Resources	Demographics – impacts to racial, ethnic and special groups	Environmental justice – disproportionate impact to minority and low income groups.
Biological Resources	a. Flora and fauna diversity b. Habitat fragmentation c. Threatened and endangered species d. Intrusion into designated lands (e.g., nature preserves, forest preserves) e. Tree loss during construction	a.–e. Degradation of habitats and plant and animal populations; impacts from construction and ongoing operation

TABLE 4-56

Affected Environment

Resource	Response to Change	Stresses	Capacity to withstand Stresses	Regulatory Thresholds	Baseline Condition
Land Use	Increase in development, consumer services, and public services. Increase in Infrastructure demand (road, rail, bus, etc.). Utility.	Water resources, air quality, noise pollution, habitat reduction.	Regulations and standards are used to minimize adverse effects. Development standards can require compensatory storage and natural drainage measures to mitigate effects of new development.	County and municipal zoning and land planning ordinance; Lake County SMC and IDNR.	Suburban development widespread and rapidly expanding. Many municipalities have ambitious growth plans. Rural/low density suburban giving way to suburban/urban character.
Agricultural Land Conversion	Loss of prime farmland soils	Advancing development	Improving agricultural preservation initiatives and ordinances. Strengthen open space acquisition funds.	USDA Soil and Conservation Service; Illinois Department of Agriculture; county land management plans	Existing farmland is 20% of the county area, and diminishing at a rate of 3% per year.
Socio-economic	Increase in population and employment	Development is outpacing infrastructure. Decrease in mobility, increase in travel times and land density	Municipal providers responding to near term needs on a priority basis recognizing fiscal constraints Municipal planners encouraging infill growth, sensible growth initiatives, and growth near transportation.	Long range infrastructure planning provided by IDOT, ISTHA, county, and others, to improve transportation service	96% of the 2020 population will occur regardless of major transportation improvements
Public Services	Increase in demand for and access to education, health care, fire and police services, and transit	Increase in population and development, which increases demand on service.	An expanded tax base and increased revenues would help offset the costs of the increase in various services to expanding communities.	State, county, and municipality government provide the delivery of services, operation and long-term maintenance.	The study area is responding to growing demands on basic public services, however, trends show that population growth is outpacing needed infrastructure improvements.
Floodplains	Loss of floodplains	New Development and associated infrastructure improvements	The Lake County SMC, IDNR (OWR), and USACOE have ample regulatory authority to control encroachment upon floodways and floodplains, and provide compensatory storage as required.	Cognizant resource agencies enforce a policy of no net loss of flood storage through a permit review process.	Regulatory requirements have stabilized or slightly improved flooding in the area.
Wetlands	Direct impacts: loss of wetlands Indirect impacts: hydrology issues	Continued growth and development	Mitigation for wetlands is stabilizing the loss of wetland acreage.	IDNR, USACOE, and USFWS enforce a no net loss of resources for projects subject to federal and state jurisdiction.	45,700 acres of wetlands in Lake County. Losses have been stabilized by mitigation requirements.

TABLE 4-56 CONTINUED
Affected Environment

Resource	Response to Change	Stresses	Capacity to withstand Stresses	Regulatory Thresholds	Baseline Condition
Water Quality	Increase in chloride concentrations in streams. Increase in erosion and sediment from other development (road, comm., utility, etc.)	New development, salt spray, stormwater runoff, and construction and operation of roadway improvements	The use of BMPs for all project development would minimize pollutant and sediment concentration in runoff. New development plans must incorporate natural drainage measures as well as detention basins designed to reduce runoff and pollutant loads.	All streams fall under the General Use Water Quality Standards. IEPA provides water quality certification under Section 401 of the Clean Water Act, which is mandatory for all projects requiring Section 404 permits. Safe Drinking Water Act protects municipal water sources from contamination.	Stream quality has been steadily improving over the past 15 years. SMC, USACOE, USEPA, LCFPD, and SWCD programs have been improving water quality.
Air Quality	Increase in air pollution	Increase in traffic volumes and congestion	Transportation improvements would reduce congestion and travel time, thereby helping compliance with standards. New technology producing cleaner fuels, and more efficient cars.	National and State Ambient Air Quality Standards, IEPA Construction and Operating Permits	Existing conditions show no exceedance days for particulate, sulfur dioxide, nitrogen dioxide, lead, carbon monoxide, nitric oxide, or VOCs, with the exception of ozone. Heightened public awareness has lead to ozone action days, transit expansion, and non-motorized vehicle initiatives.
Noise	Increase in noise pollution	Increase in traffic volumes and new noise sources	Noise protection measures would be implemented according to IDOT/ISTHA policies.	Refer to Section 2.5, *Noise*	Refer to Section 2.5, *Noise*, and Figure 2-21.
Cultural Resources	Preservation of historic and archaeological resources	Increase in development and transportation improvements	Design considerations that would modify the facility, thereby minimizing or avoiding resource impact. Established programs providing awareness and protection: – IL Main St. Program – Local designations – Statewide inventories – Context sensitive design	Historic and archaeological resources reviewed with the ISHPO in accordance with the requirements of 36 C.F.R 800.4; Section 106 of the Natural Historic Preservation Act; Local/County preservation ordinances	Potentially eligible historical and archaeological resources are located in the study area and near each project alternative.
Threatened and Endangered Species	Impacts to habitats harboring special status plan and animal species	Increase in development and transportation improvements	Design considerations that would modify the facility, thereby minimizing or avoiding resource impact. Streams/rivers would not be impeded thereby allowing wildlife movement along these waterway corridors.	USFWS (under Section 7 of the Federal Endangered Species Act), INDR (under the Illinois Endangered Species Protection Act), IDOT, ISTHA, and Illinois	Bird species represent the majority of listed species in the study area. Urban tolerant species are dominant throughout the County, and species intolerant to urban conditions are concentrated in protected areas.

Threatened and Endangered Species. Listed species and special habitat are improving in protected areas (i.e. nature preserves, forest preserves, etc) of the county. Since the early 1980's appearance of listed species has increased slightly in these critical habitat areas. Advancing development, however, has degraded foraging areas, and fragmented habitat, causing an overall reduction in available habitat. These conditions have resulted in concentrations of listed species in the protected land areas.

Water Quality. Since the early 1990's, water quality in the county's rivers and streams has been improving. For example, the Des Plaines River has shown advancements from low quality to moderate quality. These trends are linked to improved stormwater management practices, and improvements in municipal wastewater treatment. These trends have occurred despite rapid development throughout the county.

Agriculture. About 20 percent of the county is designated for agricultural use. The development in Lake County has been consuming farmland at a rapid rate. Since, 1950, Lake County farmland has decreased by 71%. In the last decade, the county's population has increased by 25%, while farm acreage has declined by 25%, or 20,000 acres (Lake County Department of Planning, Zoning & Environmental Quality 1994). Neither the county nor municipalities have aggressive farmland protection initiatives to slow this trend.

The cause-and-effect relationships **(Step 8)** between the key resources, ecosystems and human communities and the various stress factors identified for the project alternatives are summarized in Table 4-57 (on the following page). The table indicates the response of a given resource to a change in its environment.

The magnitude and significance of negative secondary and cumulative effects **(Step 9)** of the project on the resources in the influence zone are expected to be limited and controllable. Efforts have been made to avoid and minimize impacts, and measures would be implemented to mitigate the loss of resource. The magnitude of effect is discussed for several resource areas under the headings of, "Potential Socioeconomic/Land Use Effects" and "Natural Resource Effects".

Potential Socioeconomic/Land Use Effects. Population and employment have been increasing rapidly in Lake County for the last 3 decades, despite the absence of major transportation improvements. Various factors are propelling this growth; therefore, the continued pace of growth is expected to occur for sometime regardless of whether transportation improvements are made.

Population and employment forecasts for 2020 are only slightly higher for the build alternatives than for the No-Action Alternative (Baseline). As described in Sections 2 and 4, regional population forecasts show that with No-Action Alternative (Baseline), Lake County's population would increase by 54 percent between 1990 and 2020. With the build alternatives, Lake County's 2020 population is forecast to be 3 to 4 percent more than the forecast for the 2020 No-Action Alternative (Baseline). Generally, most of the population difference for the build alternatives over the No-Action Alternative (Baseline) would be localized in the central and north central parts of the county.

Although major transportation improvements would have a small growth impact upon Lake County, these improvements would have some influence on the location of growth, and to some extent, the type of development that would occur. The potential effects of the project alternatives upon the extent and location of this growth are described below.

Under the No-Action Alternative (Baseline), population and employment growth would occur in a manner similar to that of the past three decades. The forecasted population for the No-Action Alternative (Baseline) shows the largest increases in future growth would expand to the west and north central parts of the county—consistent with patterns that have occurred for the past decade and are currently observed today (Figure 4-4). The No-Action Alternative (Baseline), however, rather than

keeping pace with growth, would result in a lower level of transportation service in the county. Over time, this alternative would be unable to serve the needs of this growth, and quality of life factors would likely deteriorate with the area becoming less desirable for residents and business owners alike. Ultimately, increased congestion and decreased accessibility would reach a point of inconvenience and intolerance that would eventually affect development investment and potentially contract the tax base.

Under the IL 53 Freeway/Tollway Alternative, about 60 percent of the additional population (27,500 in the year 2020) would locate primarily in central Lake County (Fremont, Warren, and Shields townships) (Figure 4-5). The added mobility and access provided by this alternative would result in growth concentrations to these areas. However,

TABLE 4-57
Cause-and-Effect for Resources, Ecosystems and Human Communities

Resource	Cause of Change	Potential Effect of Change
Land Use	Growth, accompanied by new transportation, residential, commercial, industrial and service-oriented development	Loss of prime farmland soils. Loss of open land. Shift from rural/suburban to suburban/urban. Increased traffic, congestion and travel times. Increase in infrastructure demand (bus, rail, water, sewer).
Water Resources	New development, with increased impervious surface area Stormwater runoff during construction and operation Stream channel erosion Salt spray and other nonpoint source pollution Human access	Degradation of surface and groundwater. More rapid, higher discharge runoff pattern. Over draught of groundwater. Impaired groundwater recharge rates. Wetland degradation, fragmentation and loss. Disturbance of hydrology. Diminished flood control capacity. Sediment delivery and pollutant loading. Deterioration of recreational water bodies Litter and refuse deposits.
Air Quality	Highway construction, traffic volumes, and congestion	Increased air pollution from vehicle emissions.
Noise	Traffic, human access	Increased noise levels throughout the area.
Cultural Resources	Right-of-way acquisition Streambank erosion Land leveling and construction Vandalism	Cultural site degradation. Fragmentation of historic districts. Development pressure.
Socio-cultural Resources	Right-of-way acquisition Public services	Environmental justice implications for minority and low-income groups residing in higher-density neighborhoods inside the corridor. Disruption of community mobility. Loss of neighborhoods or community character. Traffic noise.
Biological Resources	Highway construction Urban development	Habitat fragmentation and loss outside of protected areas such as nature preserves, natural areas and parks. Impacts to state and federally-listed species known to exist within the Project Corridor. Loss of biological diversity; introduction of pest species. Degradation of sensitive ecosystems. Detrimental effects on food chains.

despite the influence of IL 53 Freeway/Tollway Alternative, this influence zone will experience tremendous growth regardless of transportation improvements. The 1990 population in this influence zone was 100,000, and will increase to 200,000 without transportation improvements. Less than 20,000 new residents are being added by IL 53 improvements in the area of greatest growth. See Figure 4-5.

Lastly, under the IL 83/US 45 with US 12 Alternative, 2020 population is forecast to increase about 18,000 over the No-Action Alternative (Baseline). The townships that would experience the greatest increase in growth would be Warren and Fremont in the central part of Lake County, and Newport Township in the northern part of the county (Figure 4-6). Regardless of the transportation scenario, most of the buildable land in the study area would likely be developed during the next 20 years. However, despite the influence of the IL 83/US 45 with US 12 Alternative, this influence zone will experience tremendous growth regardless of transportation improvements. The 1990 population in the IL 83/US 45's influence zone was 80,000, and will increase to 150,000 without transportation improvements. About 10,000 new residents are being added by the IL 83/US 45 improvements in the area of greatest growth (Figure 4-6).

Based on the population forecasts, transportation plays a small role in the future growth of the county—the build alternatives would increase population by only 3 to 4 percent over the No-Action Alternative (Baseline) by the year 2020. Since transportation and utility infrastructure improvements are already well established in Lake County, there are other factors that play a larger role in the rate and patterns of development in Lake County, including the quality low-density residential living, available and affordable land, a favorable environment for business and commerce, and local land use planning.

The concept of major transportation improvements in Lake County is consistent with regional plans. The current long-range transportation plan for northeastern Illinois, *2020 Regional Transportation Plan*, recommended major transportation improvements, subject to detailed feasibility studies; its predecessor, the *2010 Transportation System Plan*, adopted in 1989, also included major transportation improvements in Lake County as an important element in the regional transportation system.

There are over 50 municipalities in Lake County, and each municipality controls land use decisions in its jurisdiction. Over the years, considerable land use planning has taken place on local, county, and regional levels. Many communities have ambitious plans, whereas other communities show constraint. The regional and county planning efforts, as well as some local community plans, have addressed transportation needs and issues in the county and identify major transportation improvements.

The local plans in Lake County promote contiguous and urbanized growth throughout the southern two-thirds of the county. More than 75 percent of the area surrounding the project alternatives is planned for development by 2020. The remaining 25 percent of the area would be preserved in open space, with some remaining undeveloped lands. The factors affecting growth in Lake County are already well entrenched. Regardless of the transportation alternative selected for the county, the growth pattern is expected to be similar (Section 4.1.1, *Population and Households*). Land management in the county is controlled at the local level, not by state transportation agencies. Municipal governments have the jurisdictional control to provide for orderly development at acceptable levels, and fully recognize that realization of their planning goals requires the support of infrastructure such as transportation. Currently, Lake County and others are making advances toward updating their planning tools. The county is updating their land use plan with an emphasis on concentrating growth in areas with mature infrastructures. Additionally, the county is updating their transportation plan through a coordinated

effort with the LCTIP and other transportation providers. Examples of new development that infill mature areas are regularly occurring, as well as new development that balances housing and environmental resources.

The project alternatives would affect local communities in different ways. Based on the discussion presented above, the local municipality has a considerable number of tools at its disposal to address the potential affects of a transportation improvement within its boundaries. One of the most effective tools could be the creation of a project specific corridor planning council. The corridor planning council would comprise affected communities along a project. These communities would be engaged in a process of developing land use and design guidelines that would address the potential effects of a major highway improvement. Through this mechanism and others, the affected communities would be able to appropriately plan for the integration of a major transportation facility in their communities.

Potential Natural Resources Effects

Development in Lake County, whether it be transportation improvements or commercial and residential development would have secondary and cumulative effects upon the county's natural resources (i.e., wetlands, water resources, biological resources, and agriculture).

Wetlands. The secondary and cumulative effects of the project alternatives upon wetland resources examined past, current, and possible future conditions.

Suloway and Hubbell (1994) estimated that over 90 percent of Illinois's original 3,237,500 ha (8 million ac) of wetlands have been destroyed by human modification. Once, wetlands covered more than 23 percent of Illinois. Currently, wetlands and deepwater habitats now make up only 4.9 percent of Illinois land. Wetland degradation in Illinois and Lake County was historically associated with agriculture; however, recent degradation in Lake County is attributed to urban development.

The Lake County Forest Preserve has estimated that there are slightly more than 18,500 ha (45,700 ac) of wetlands in the county (LCWI). It is estimated that 5 percent of these wetland areas are considered "pristine," (i.e., undisturbed by human activity (Dreher 1992)). Many of the undisturbed, pristine wetlands have been classified in Lake County as ADID.

Biologically, losses of non-ADID wetlands are effectively managed through mitigation. For ADID wetlands, their qualities make it difficult to reproduce these conditions with mitigation. Therefore, there is always special care to avoid or minimize loss of these resources. The alternative development process for the project alternatives took special care to avoid and minimize losses to all wetlands, especially ADID wetlands. However, as the numbers in Table 4-58 indicate, some loss of ADID wetlands are expected for all the project alternatives. Certainly, future steps of project development could further minimize these effects, but the losses shown above represent the best available information.

The percent of wetland loss for each of the project alternatives represent a small fraction of the total LCWI wetland acreage for the county—Table 4-58. From a countywide perspective, it is anticipated that the cumulative loss of wetland acreage (development activities) in the county will slow in the future. More aggressive wetland regulations now require higher mitigation ratios. Under the protection granted to wetlands (Section 404 of

TABLE 4-58
Percent of Lake County Lost per Alternative

Alternative	LCWI Total	ADID Wetlands Total
No-Action	0.17%	0.09%
IL 53 Freeway/Tollway	0.21%	0.06%
IL 83/US 45 with US 12	0.13%	0.03%

the CWA), new mitigation guidelines require wetland losses greater than 0.1 ha (0.25 ac) to be replaced at a ratio of 1.5 to 1 or greater (depending on the type and quality of wetland affected the mitigation ratios may be higher). Thus, in some cases more wetlands are being created than destroyed by an individual project. Additionally, in-kind replacement has been elevated as an objective, which lessens the potential for changing wetland composition in the county. These mitigation requirements are applicable to both private and public projects. The Illinois Interagency Wetland Policy Act of 1989 (applicable to state or state funded projects) also provides protection to wetlands and requires mitigation for all wetland impacts regardless of size. Overall, this legislation has been effective for mitigating the loss of wetlands from public or large private projects, which has helped to slow total wetland loss across the county. The Lake County SMC represents another level of oversight that could help maintain the survivability of wetlands. The SMC has developed a county wetland protection ordinance that would fill potential gaps in State and Federal regulations. Extensive coordination and reviews would be initiated with SMC staff for State sponsored projects that are carried forward in the planning process.

Lake County has been a leader in the state regarding wetland protection with the adoption of the Lake County ADID Program. This program attempts to identify wetlands of the highest quality to avoid impacts to these wetlands. The program, developed cooperatively with the USEPA, NIPC, the Lake County SMC, and regulated by the U.S. Army Corps of Engineers, mandates that developers review options to developing wetlands. If impacts are unavoidable to high quality wetland resources, then higher mitigation ratios are established to offset total acreage and wetland function losses.

Land management is another mechanism that can minimize the potential conversion of special resources. Examples are conservation communities that preserve natural features including farmlands, wetlands, streams and forests. Already existing forest preserves, state parks and natural areas provide long term protection to special resources within their boundaries. In 1998, Lake County voters passed a referendum authorizing the expenditure of $80 million for land purchases to be added to the forest preserve system.

The combination of these practices applied to the wetland losses from the project alternatives, as well as to secondary effects of urban development would effectively slow the rate of wetland loss in the county, and the overall the cumulative effect. The current trends show that these regulations have stabilized the loss of wetlands. The long-term viability of wetland resources will be sustained with rigorous mitigation resulting in an increase in larger wetland complexes (via wetland banks), and a decrease in smaller complexes.

Biological Resources. The most important vegetative cover types for wildlife are the forested lands (20 percent of county land area), rural grasslands (12 percent), and wetlands (11 percent), which includes deep marsh, shallow marsh, shallow water wetlands, and forested wetlands. These cover types provide critical habitat for several native communities in Lake County including prairies, forests, flatwoods, savannas, and in general wetlands. These communities harbor many of the threatened and endangered species in the county.

Forest habitat in Illinois now occupies less than 20 percent of the original presettlement conditions. Within Lake County, a majority of large tracts of wooded areas lie within the boundaries of the Lake County Forest Preserve District or within the three State Park units. Some of these areas support large contiguous tracts of forest habitat along the major stream systems in the county (i.e., along the Des Plaines River), most of which are owned and managed by the Lake County Forest Preserve District. The remaining large tracts of wooded lands are generally located in the less densely developed areas of the county, within the remaining agricultural areas, or along streams and creeks. In the urbanizing part of the county, forested habitat is being

regularly displaced by development leaving small islands of wooded habitat.

Land development is the single largest factor in the disappearance of biological resources. Figure 4-31 shows the critical resources that reside in the project influence zone. East of the Des Plaines River, high quality habitat generally is protected by forest preserve and nature preserve properties. The critical habitat west of the Des Plaines River is less protected, and therefore subject to removal and fragmentation by land development. Resources remaining in this area would be isolated from other habitat areas, and over time, this fragmentation would reduce their habitat function and value.

Cumulatively, the project alternatives and advancing development would fragment habitat west of the Des Plaines River resulting in an environment dominated by urban tolerant species. Less tolerant species would concentrate in protected areas. Establishing a system of connected greenway corridors will help promote the sustainability of these resources.

Water Quality. Development patterns historically have affected the water quality of streams by increased stormwater runoff and wastewater discharges. For example, the water quality of the Des Plaines River has been distressed by pollutants from urban and suburban areas. In 1972, the main stem of the Des Plaines River was designated as severely impaired for half its length within Lake County and moderately impaired for the remaining segment. Water quality violations occurred throughout the Des Plaines River from 1978 through 1983 for dissolved oxygen, ammonia, total dissolved solids, copper, lead, and chlorides. Over the last 10 years, however, water quality in the entire Des Plaines River system has markedly improved, even with sharp increases in population growth.

Table 4-59 summarizes the changing water quality conditions for the Des Plaines River for IEPA's aquatic support classifications. Between 1988 and 1990 over 60 percent of the main stem (Lake, Cook, and Will counties) was classified Partial Support, Moderate Impairment with 13 percent considered Non-Support. In Lake County, roughly 16 km (10 mi) were rated as Full Support and the remaining 39 km (24 mi) Partial Support with half moderate and half minor impairment.

The water quality improved in 1994–1995, with 80 percent of the Des Plaines River classified as Partial Support with only minor impairment. The only Full Support segment occurred in Lake County. The IEPA *Illinois Water Quality Report 2000* indicates 50 percent of the Des Plaines River stem in Lake County is now Full Support, showing further advancements in water quality.

This trend is linked to improved stormwater management, as well as improved wastewater treatment. Development in Lake County is subject to the stormwater management regulation administered by the SMC. The SMC would review a system of compensatory storage and detention to abate the effects of uncontrolled stormwater runoff for the project. The range of state and local regulations are controlling the effects of development upon water resources. Properly applied, water quality throughout the influence area could improve, even with more growth.

Agriculture. In 1997, agricultural lands in Lake County comprised about 20 percent (about 26,306 ha, or 60,060 ac) of the county's total land area (121,687 ha, or 300,800 ac). In

TABLE 4-59
Changing Water Quality Conditions In Des Plaines River (1988–1995)

Year	Full Support (Aquatic)	Partial Support Minor	Partial Support Moderate	Non-Support
1988–1989	9.5%	15.6%	61.6%	13.3%
1990–1991	9.5%	15.6%	61.6%	13.3%
1992–1993	3%	59%	22%	15.6%
1994–1995	3%	80%	17%	0%

recent decades, farmland in Lake County has declined with advancing development. Improving transportation mobility and access could affect development decisions near the project alternatives causing a further reduction in farmlands. The project alternatives would each displace agricultural lands in varying amounts:

- No-Action Alternative (Baseline) would require 32 ha (80 ac) of farmland.
- IL 53 Freeway/Tollway Alternative would require 316 ha (780 ac) of farmland.
- IL 83/US 45 with US 12 Alternative would require 91 ha (226 ac) of farmland.

Clearly, a high percentage of the available land for development in Lake County is agriculture that over time will be displaced by advancing development. Estimates of the current pace of development show that, even without major transportation improvement, lands available for development would be built-out within the next 20 to 30 years. Land development is the single biggest factor in the displacement of farmland resources in the county. With most of the farmlands within the planning and growth boundaries of the 50 municipalities within the county, the sustainability of this resource will be difficult to maintain in the face of advancing development. Development activities throughout the county frequently require wetland mitigation. Farmlands are commonly used as mitigation sites.

The cumulative effect of mitigation, similar to development, is resulting in less farmland. The preservation of farmland can be sustained only with stringent land use policy, outright purchase for open space preservation, or purchase of development rights. The Lake County Forest Preserve District obtained the support of Lake County voters to fund monies for additional land purchases in Lake County. Farmlands contiguous to existing forest preserves or possessing some high quality habitat would be targets for acquisition. These actions combined with others would have some impact on farmland retention.

The right-of-way requirements for the project alternatives comprise commercial/industrial, residential, agricultural, parks/forest preserves, and open lands. When the alternatives were developed, several environmental issues were considered that influenced the location of the improvement **(Step 10).** Among the environmental constraints analyzed were the potential for involvement with Section 4(f) land, avoiding and minimizing the filling of wetlands and floodplains, and avoiding impacts to Section 106 properties eligible for inclusion in the National Register of Historic Places. Other factors affecting the location of improvements were housing and business displacements, severance of prime farmlands, and community interests. The alternatives development process was based on the philosophy of avoidance first, minimization second and mitigation last. Refer to Section 4.12, *Mitigation Concepts and Commitments*, for a discussion of the proposals and concepts for the mitigation of resource losses or managing short-term and long-term social effects.

Monitoring programs for various effects in the influence zone will be developed for the preferred alternative **(Step 11)**.

4.11.2 Conclusion

To conclude, the study area is undergoing rapid population and employment growth. This growth is estimated to continue to year 2020. County and municipal governments within the influence zone have planned for this growth and have adopted land use plans for 80 percent of the area. The remaining lands are protected park and preservation lands.

The project alternatives combined with other local development efforts would act to accommodate growth and development, either present or planned, within the influence zone. The portion of future growth attributable to the project alternatives is low, amounting to about 3 percent of population within the study area in the year 2020. In addition, a number of regulatory mechanisms are already in place to offset or moderate the adverse effects of social and economic growth. Also, the magnitude of

secondary and cumulative impacts for the finalist alternatives are not substantive, and thus would require mitigation commensurate with this relatively low level of impact. The issue of secondary and cumulative impacts will also be examined in further detail for the preferred alternative as part of supplemental studies.

4.12 Mitigation Concepts and Commitments

Mitigative measures are provided to compensate for acknowledged impacts. The following are proposals and concepts for the mitigation of resource losses or managing short-term and long-term social effects.

4.12.1 Traffic

A traffic management plan would be required during the construction period. The purpose of the plan would be to maintain traffic flow and reliable access to residences, businesses, community facilities and services, and local roads during construction. The No-Action and IL 83/US 45 with US 12 alternatives would require considerably more traffic management because of their focus on improvements to existing roadways. The IL 53 Freeway/Tollway Alternative would be largely on new alignment; therefore, management of traffic would be required only at road crossings or in instances where the new improvement would follow existing roadways for short distances. There would be coordination with fire, police, and emergency services to minimize delays and response times during construction.

4.12.2 Community Impacts

Community impact mitigation would consist of maintaining or enhancing connectivity, updating land use plans that reconsider land uses along improved routes, and roadway design considerations for developed and undeveloped areas. The following efforts could be made:

- Maintain existing circulation patterns for vehicular, bicycle and pedestrian movements. Look for opportunities to expand transit, bicycle, and pedestrian movement across or along planned roadway improvements.
- Encourage local municipalities to reexamine land use plans and zoning adjacent to planned improvements to determine future uses most compatible with a high volume roadway environment. Another approach to address related land use issues would be the creation of a corridor planning council comprising affected communities along the project. The council would be engaged in the process of developing land use and design guidelines that would address the potential effects of a major highway improvement.
- Include roadway design considerations, such as noise barriers, landscaping, landscape berms, buffer areas, and roadway lighting sensitive to adjacent land uses, with the improvements to minimize community impacts.

4.12.3 Air Quality

Construction would be required to comply with applicable state and local air quality regulations. The regulation would apply at least to fugitive dust control and open burning of construction debris.

4.12.4 Noise

All construction equipment would be required to have mufflers constructed in accordance with the manufacturer's specifications. Mufflers and exhausts must be maintained in good working order. Daily operating hours for construction would coincide with the construction schedule needs, unless otherwise specified.

Noise abatement measures for reducing traffic noise levels to residential and other properties would be subjected to consideration for reasonableness and feasibility, and follow the guidance provide by the FHWA policies and procedures, 23 C.F.R. 772, the IDOT Noise

Analysis Policy dated April 3, 2000, and the ISTHA Traffic Noise Study and Abatement Policy. Initially, depending on the alternative selected for implementation, specific analyses would be conducted to determine the future noise levels for properties that approach or exceed the FHWA NAC or are predicted to substantially exceed existing noise levels. Traffic impacts would occur when:

- Design-year traffic noise levels exceed the NAC
- Design-year noise levels are within 1 dBA of the NAC
- Design-year traffic noise levels are more than 14 dBA above traffic-generated noise levels

Following the determination of impact, a noise abatement analysis would be conducted at all locations determined to have a traffic noise impact. Noise abatement would be tested at each location for reasonableness and feasibility. The feasibility criteria would be considered as a reduction in sound level of at least 8 dBA, and reasonableness at the receptor would generally be defined as being cost-effective.

Other measures to reduce traffic noise including traffic management measures and shifting the roadway location would be examined on a case-by-case basis.

4.12.5 Cultural Resources

Each project alternative could affect cultural resources of historical or archeological value. During the study, the LCTIP coordinated with the IHPA to discuss the level of study and obtain available information for known resources. The agencies concurred that future work would be required to define cultural resource effects accurately and to appropriate mitigation for the preferred alternative. The additional steps would include the following:

- Coordinate with federal agencies, IHPA, local historic societies, Indian tribes, and other public agencies concerning cultural resources.
- Conduct comprehensive field investigations to identify and locate potentially eligible properties (archeological sites and historic structures), both known and unrecorded.
- Employ detailed roadway design considerations that would avoid or minimize impacts to cultural resources.
- Prepare eligibility documentation for affected sites and structures with historical value, and submit it to SHPO for a determination.
- Determine whether eligible sites comply with agency consultation and documentation requirements
- Develop mitigate measures for sites that are unavoidably affected.

4.12.6 Borrow and Disposal

The requirements for borrow and the amount of unused excavated material have not been determined. These quantities would be addressed after the preferred alternative is selected. The amount and location of borrow cannot be ascertained until preliminary engineering drawings have been developed, and typically during design and construction. Borrow sites would be identified, and a site plan would be prepared including an excavation plan, haul route plan, and end use plan. Appropriate environmental studies would be conducted for the selected borrow areas including an evaluation of the environmental features of the sites and their potential environmental effects.

To the extent possible, cut materials with the proper engineering properties would be used for fill. The contractor would dispose of unusable excavated material in accordance with state and local regulations and other special provisions to ensure protection of wetlands and waterways. All waste and demolition material from the project would also be disposed of in accordance with the applicable regulation.

4.12.7 Water Quality and Hydrology

Proper erosion control measures would be employed to minimize erosion and sedimentation for any project alternative. These measures are a condition of the Section 404 Permits, prescribed in design and construction guidance by IDOT and ISTHA, and should be coordinated with the local Soil & Water Conservation District (SWCD). Erosion control devices would be installed before commencing construction that could cause erosion. Temporary or permanent erosion control measures to be used would include such measures as silt fencing, sediment basins, detention basins, interceptor ditches, seeding and sodden, rip-rap on exposed banks, erosion mats and mulching. Disturbance of stream vegetation would be kept to a minimum. Construction activities near special or sensitive streams would be conducted during low or normal flow periods if necessary.

Stream crossings and structure sizing would be performed in accordance with state and federal guidelines regarding floodplain encroachment and hydraulic capacity. All new structures would comply with these guidelines. Drainage systems, including ditches and farm drain tiles, would be maintained and restored in a manner that would not impound water. Compensatory storage and stormwater detention facilities would be considered in the design of the facilities and would be reviewed by the Lake County Stormwater Management Commission. The requirements for both compensatory storage and detention are enumerated in Section 4.3.3, *Wetlands*. A conceptual plan for satisfying these requirements is presented in Appendix D.

Other stormwater management practices, known as BMPs, may be needed to mitigate potential water quality impacts. In addition to detention facilities, other BMPs, such as vegetated strips, would be evaluated to minimize transport of sediment and heavy metals. Deicing management practices, such as anti-icing and additives, can also minimize salt application quantities. Further evaluation of these practices would be included in future work on the preferred alternative.

Accidental spills of hazardous materials and wastes during construction or operation of the facility would require special response measures. These occurrences would be handled in accordance with local government response procedures. The first response typically is through the fire department and emergency service personnel to ensure public safety and to prevent harm to the environment. Depending on the nature of the spill, IDNR and IEPA would be notified to provide additional instructions regarding cleanup. Refueling or maintenance of construction equipment would not be allowed within 30.5 m (100 ft) of wetlands or water bodies to avoid other accidental spills.

4.12.8 Biological

4.12.8.1 Upland Forest and Prairie Loss

Mitigation of upland prairie and forested areas should comply with guidelines established by the IDOT for habitat replacement. For effected upland prairies, mitigation efforts would include:

- Reestablishing in-kind upland prairies, with an emphasis on replacement occurring in wetland buffer zones
- Relocating the topsoil and seed bank, reseeding in kind, and transplanting sod and individual plants
- Planting native prairie vegetation within roadside right-of-way

Tree replacement would be in accordance with IDOT's Tree Removal and Replacement Policy. Guidelines for tree and vegetation replacement include:

- Replacing losses of forest habitat associated with large wooded tracts (4 ha [10 ac] or more)
  - Replacing existing native hardwoods
  - Replacing adventive species with native hardwoods

  - Replacing indigenous understory
- Replacing losses for other tree and vegetation material
  - Replacing scattered landscape material in accordance with IDOT's Guidelines for Use of Landscape Items
  - Replacing trees and vegetation on Section 4(f) lands to be coordinated with the agency having jurisdiction over the subject property

An attempt would be made to minimize and mitigate impacts to wildlife. For large parts of both the No-Action Alternative (Baseline) and the IL 83/US 45 with US 12 Alternative, the proposed improvements are primarily to existing roadways. These roadways are, for the most part, limited barriers to wildlife movement.

As streams provide avenues of wildlife movement, bridges or open bottom culverts can be installed where practical to provide additional corridors of movement for smaller wildlife.

Roadside barriers, such as fences and jersey walls, may restrict wildlife from entering roadways. They can also trap wildlife that enter the roadway, allowing no avenue of escape. In areas where large numbers of wildlife are present, such as forest preserves, fencing and other barriers will be limited to areas necessary for public safety. For project segments that are new roadways or new alignments, features to facilitate wildlife movement and reduce vehicle/wildlife collisions will be incorporated into the plans where possible.

Larger stream crossings in the IL 53 Freeway/Tollway Alternative will be bridged along with parts of the floodway. These stream corridors will remain open for wildlife movement.

For sensitive wildlife areas, such as forest preserves, prairie remnants, and ADID and general wetlands, large box culverts can be installed where practical to serve as avenues for wildlife movement. The placement of culverts would be most critical for areas where a wildlife habitat area is bisected by new roadways. Culverts combined with low barrier walls along the roadway will provide a safer means of crossing the roadway.

Short barrier walls in sensitive areas would be designed mainly to restrict the movement of small animals, including reptiles, amphibians, and smaller mammals. The walls would not limit the movement of larger mammals in order to prevent them from being trapped within the roadway. IDOT is proposing snake barriers as a mitigative option for proposed improvements to Willow Road in Cook County to mitigate impacts to Massasauga rattlesnakes that may result from roadway operations (IDOT 1999). Similar devices would be included where practical.

These features would be most critical in areas that may harbor threatened or endangered species near the roadways.

Threatened and Endangered Species. All alternatives could affect the Iowa darter fish species near the interchanges of IL 21 and IL 120. IDOT has already committed to providing mitigative measures for programmed proposed improvements to IL 21. Such measures would be incorporated into the plans for the selected preferred alternative. Section 4.3.6.1 provides specific details of this mitigation plan.

The ISTHA has developed a mitigation plan, coordinated through IDNR, for potential impacts to the endangered seaside crowfoot plant found near the former Deerfield Toll Plaza. Proposed improvements to I-94 proposed must recognize the potential presence of the plant. If encountered, a mitigation plan will be developed similar to the plan that met requirements of IDNR for the Deerfield Toll Plaza area.

Detailed surveys of fauna and flora would be conducted after the selection of a preferred alternative. If threatened or endangered species are encountered that have not yet been recorded, a plan would be developed to avoid affecting the identified species. If avoidance is impractical, a mitigation plan would be

developed, and coordinated with either the U.S. Fish & Wildlife Service or the IDNR through the formal consultation process.

Plans for staged construction may be incorporated into the final plans for the selected alternative to minimize disruption of breeding seasons for sensitive species.

4.12.9 Wetland Mitigation

The overall concept for wetland mitigation would incorporate avoidance and minimization, establishing wetland compensation objectives, applying established ratios for compensation commensurate with proposed impacted wetlands, identifying locations for wetland compensation sites, and adopting plans for long-term monitoring and maintenance of replacement wetlands. Each action is described below.

4.12.9.1 Avoidance and Minimization

The first step of the process would focus on further efforts to avoid and minimize effects to wetland resources. The LCTIP has rigorously applied such practice to wetland resources during the development of alternatives. Recognizing the conceptual engineering detail of the project alternatives, further efforts can be made in future phases of work for the preferred alternative to avoid and minimize additional wetland effects. Avoidance and minimization can be accomplished in the following ways:

- Alignment shifts of roadways
- Narrower roadway cross-section with the use of:
  - Narrower center median
  - Narrower shoulder
  - Retaining walls
  - Steeper roadway embankments
  - Enclosed drainage systems
- Bridging critical wetland resources

Avoiding or minimizing disruption to wetland resources may be constrained by other critical resources or local issues. In some cases, when a choice must be made between wetlands and other critical resources, some resources or project issues may be afforded priority over wetland loss. Examples include:

- Avoidance of public recreational lands protected under Section 4(f)
- Avoidance of nature preserves
- Avoidance of threatened or endangered species
- A disproportionate amount of residential and business relocations
- Maintenance of minimum safety requirements

4.12.9.2 Wetland Compensation Objectives

The objectives for mitigation would be established jointly by the project's sponsoring agencies and resource agencies with attention to the following major issues:

- Type
  - In-kind replacement
  - Functional replacement
- Ratio for replacement
- Location for replacement

Ratios For Compensation. Wetland compensation ratios have been established by the State of Illinois in the Interagency Wetland Policy Act (IWPA) for all state-funded projects. These established ratios are generally more stringent than those established by the U.S. Army Corps of Engineers (Table 4-60, on the following page). The highest mitigation ratio of 5.5:1 would apply for the following:

- Alteration of wetlands that contain state or federally-listed threatened or endangered species
- Wetlands that contain essential habitat for state or federally-listed species
- Presence of an INAI site
- A mean C value of 4.0 or more (Swink and Wilhelm 1994)
- Individual wetlands with a Floristic Quality Index (Swink and Wilhelm 1994) of 20 or more

The compensation ratios shown in Table 4-60 represents the current compensation guidelines required for wetland impacts in Illinois by the IWPA; however, Lake County has instituted the USEPA's ADID wetland program. Compensation ratios for ADID wetlands would be developed with the regulatory agencies on a case-by-case basis.

Location of Wetland Mitigation. The location of the compensation sites would be determined following agreement on wetland replacement ratio and other mitigation objectives. Appropriate environment studies would be conducted for the selected mitigation site including an evaluation of the environmental features of the site and potential effects. The environmental studies would include historic/archaeological surveys, biological surveys, and potential for threatened and endangered species. Preferences for mitigation are as follows:

- Onsite—within 1.6 km (1 mi) of the project
  - One overall compensation site
  - Multiple large to medium sites
  - Participation in ongoing wetland creation programs (i.e., Lake County Forest Preserve)
  - Scattered sites (small) in proximity to wetland impacts
  - Restoration and enhancement of existing wetlands
  - Acquisition/land protection
- Offsite, within basin—areas greater than 1.6 km (1 mi)
- Offsite, out of basin—compensation not provided within the watershed of affected wetlands.

4.13 Permits/Certifications

4.13.1 Permits/Certifications

Regulatory permits are required under any project alternative selected. Regulatory agencies, such as the U.S. Army Corps of Engineers, are not being requested to consider the granting of 404 permits or other permits at this time. Supplemental studies would be required, at a corridor level of detail, as part of formal consultations regarding permits. Such studies would include formal wetland delineation, biological surveys, and surveys of threatened and endangered species for the selected alternative. The agencies are being asked to review the planning process and the environmental consequences of the project alternatives and to render any comments germane to the process or the environmental consequences associated with the finalist alternatives. Issuance of permits by the agencies would require detailed engineering for the preferred alternative. This study does not include the development of the detailed engineering plan for any alternatives. Therefore, submittal of permit applications to all pertinent regulatory agencies would not occur until after the selection of a preferred alternative and the development of final engineering plans. Avoidance and

TABLE 4-60
Wetland Compensation Ratios (IWPA)

Degree of Adverse Impact	Onsite	Offsite	Out-of-Basin
Minimal Alteration	1.0:1[a] / 1.5:1[b]	1.5:1	2.0:1
Significant Alteration	1.5:1	2.0:1	3.0:1
Destruction	2.5:1	4.0:1	5.5:1

[a]This ratio applies to all other types of wetland vegetation, substrate, or wetland type except those wetlands that have woody vegetation, subject to Corps approval.
[b]This ratio applies if the vegetation of the affected wetland is woody.

minimization strategies required under permit conditions would be developed at that time. Permits could include:

- Section 404 (individual permit) of the CWA from U.S. Army Corps of Engineers
- Section 401 (CWA) Water Quality Certification from the IEPA
- Section 10 of the Rivers and Harbors Act of 1899 from U.S. Army Corps of Engineers and the U.S. Coast Guard
- NPDES permit from the IEPA
- Illinois Department of Natural Resources–Office of Water Resources (IDNR-OWR) permits for impacts to regulatory floodways and stream crossings
- IHPA approval under Section 106 of the National Historic Preservation Act (1966)
- Coordination with McHenry Soil & Water Conservation District (SWCD) for soil erosion and sediment control
- Coordination with Lake County SMC for project compensatory storage, stormwater detention, and wetland mitigation (This would be applicable only to projects implemented by local agencies under the No-Action Alternative (Baseline). State projects under the No-Action Alternative (Baseline) would coordinate with local agencies but are not required to meet the guidelines of the Lake County SMC.)

Each project alternative would involve water bodies and wetlands. The discharge of dredge or fill materials into waters of the U.S., including jurisdictional wetlands, would be subject to requirements of Section 404. The permitting process for the build alternatives would vary depending on their implementation as either a single project or a phased project. Assuming either build alternative is implemented as a single project, an Individual Permit would most likely be required from the U.S. Army Corps of Engineers Chicago District for all wetland effects associated with the project. Should the build alternatives be phased or implemented over time as several projects, the likely regulatory scenario would be an Individual Permit for each separate project. It is assumed that the No-Action Alternative (Baseline) would be implemented by various entities as individual projects overtime and that separate Individual Permits would be required for each project involving wetlands as they are implemented under the No-Action Alternative (Baseline). For some projects, however, wetland effects may be minimal, and would qualify for the Regional Permit Program within the Chicago District.

The Section 404 permit is contingent upon receipt of a 401 Water Quality Certification from the IEPA. IEPA provides water quality certification pursuant to Section 401 of the CWA. Each of the project alternatives would be subject to the requirements of Section 401 Water Quality Certification.

A recent cooperative agreement between the Corps of Engineers and the local SWCDs requires a detailed review of erosion and sediment control in conjunction with Section 404 permitting. In Lake County, a compliance review would be conducted by the McHenry County SWCD. Each project alternative would be required to prepare and submit a Soil Erosion and Sediment Control Plan for review and approval during the Section 404 permitting phase. The recommendations provided in the Soil Erosion and Sediment Control Plan would require implementation and periodic inspection.

Each project alternative would disturb more than 0.4 ha (1 ac) of land area. Accordingly, they are subject to the requirements of an NPDES permit for stormwater discharges from the construction site. Permit coverage would be obtained either under the USEPA general permit for stormwater discharges from construction site activities, or under an individual NPDES permit. Requirements applicable to such a permit would be followed, including preparation of a stormwater pollution prevention plan. Such a plan would identify potential sources of pollution that may reasonably describe and ensure the implementation of practices that would be used to reduce the pollutants in discharges

associated with construction site activity and to assure compliance with terms of the permit.

The OWR issues permits for work within regulatory floodways and for the crossing of streams with more than 259 ha (640 ac) of drainage area. Each project alternative would require issuance of this permit. The involvement of stream floodways and floodplains for each alternative as described under Section 4.3.3, *Wetlands.*

The Corps of Engineers defines the Des Plaines River as navigable throughout its course (Public Notice, April 22, 1983). Each project alternative would improve crossings of the Des Plaines River. Under Section 10 of the River and Harbors Act of 1899, any crossing of a navigable water body requires Section 10 Permits from the Corps of Engineers. Under the Section 10 Permit, a review by the U.S. Coast Guard is required. All three alternatives would require Section 10 permits in conjunction with Section 404 permits issued by the Corps.

The NRCS reviews projects involving farmlands to determine if farmed wetlands would be affected. Each project alternative would be assessed to determine the presence of farmed wetlands. The NRCS would coordinate with the Corps of Engineers regarding the issuance of Section 404 permits if farmed wetlands are affected by any project alternatives.

The SMC administers stormwater controls throughout the county. The SMC criteria would be applicable to projects implemented by local county, township, or municipal agencies under the No-Action Alternative (Baseline). Although an SMC permit would not be required for State sponsored projects under the No-Action (Baseline) and Finalist Alternatives, extensive coordination and reviews would take place with SMC staff for alternatives carried forward.

4.14 Relationship of Short-Term Uses versus Long-Term Productivity

This section examines the short-term costs and long-term gains for the project alternatives. The short-term costs of land, human capital, financial, and energy resources would be realized as long-term benefits to the traveling public. The long-term benefits would include improvements in travel time, regional travel, traffic congestion, and safety.

4.14.1 Short-Term

The project alternatives have varying short-term costs, with the build alternatives requiring a greater commitment of resources than the No-Action Alternative (Baseline). Overall, the IL 83/US 45 with US 12 Alternative would require the greater investment of resources.

Land would be removed under the project alternatives as follows: 482 ha[11] (195 ac) under the No-Action Alternative (Baseline), 513.1 ha (1,268 ac) under the IL 53 Freeway/Tollway Alternative, and 248.1 ha (613 ac) under the IL 83/US 45 with US 12 Alternative from (Section 4.1.2, *Community and Land Use Changes).*

Roadway improvements can divide existing land use patterns, bring a community more tightly together, or guide future community growth and development. Carefully planned improvements can foster beneficial results, such as making the community more cohesive and serving future growth and planning policies. Lack of planning, however, can have undesirable results, such as fracturing community cohesion. The discussion below describes the potential effects of each alternative on community cohesion.

[11]New right-of-way required.

4.14.1.1 No-Action Alternative (Baseline)

Improvements under the No-Action Alternative (Baseline) would traverse 30 communities within Lake County. Generally, the alternative maintains the present roadway network and would have a minimal change on community function. The roadway network would continue to define circulation patterns for entering, leaving, and traveling within the communities. The edge of the roadway improvements would encroach on adjacent properties and, in some cases, displace buildings. The number of displacements would be small enough that the character of community building stock would not change. Road widening typically would maintain property access, but barrier medians would be installed as part of many roadway improvements, requiring access to be consolidated for some properties. Most individual parcels would not get a median break and would be limited to right-in, right-out access. For some land use types and cross streets, a break in the median generally would be provided to allow left-turn access. In some instances, construction of a wider roadway could become a physical barrier, when it may not have been before upgrading. In such cases, the roadway becomes more of a barrier to bicycle or pedestrian movement.

4.14.1.2 IL 53 Freeway/Tollway Alternative

This alternative would traverse 15 communities. The proposal to extend IL 53 north and upgrade IL 120 has been part of the region's long-range transportation plan since 1960; therefore, many communities in the vicinity of this alternative have had the opportunity to consider and plan for compatible land uses adjacent to the proposed facility. In cases where properties are already developed adjacent to the proposed improvement, facility design considerations could be developed to reasonably protect these areas from typical highway related concerns (i.e., noise and visual concerns). These design considerations could include noise barriers, landscaping, landscape berms, buffer areas, roadway lighting sensitive to adjacent land uses, etc. In cases where that land is undeveloped, additional care in planning and zoning should be exercised to provide for land use patterns that best fit the presence of a major transportation facility. This could include locating the most traffic intensive uses near the corridor or at interchange locations, while the suburban land uses would extend away from the corridor. With well-managed land use policy and plans, this alternative could have the distinct advantage of accommodating growth with quality development.

A major transportation facility, such as the IL 53 Freeway/Tollway Alternative, represents a new land use element for the communities in central Lake County. The scale of the facility by itself establishes new borders in the community that tend to define community or neighborhood edges. The perception of a barrier, however, would not alter travel patterns within the community. The circulation pattern that exists on the local roadway system today would be maintained (crossing over or under the new facility) for vehicles, bicycles and pedestrians, as well as emergency services and school bus routes. Therefore, the roadway connectivity that exists in the communities today would continue to be present with this alternative. Major projects such as the IL 53 Freeway/Tollway Alternative also present opportunities for enhancing nonmotorized movement, which tend to reduce the barrier effect. These enhancements could include shared bicycle and pedestrian paths along and across the facility with direct and indirect access to existing paths and community nodes.

4.14.1.3 IL 83/US 45 with US 12 Alternative

This alternative would traverse 21 communities, and improvements would occur on both existing and new alignments. Improvements on existing routes typically would have a 6-lane cross-section that would displace residential and commercial structures.

Bypasses were incorporated along routes US 45, IL 21, IL 60, and IL 120 to avoid community impacts in downtown Mundelein

and Libertyville, through the Diamond Lake area (a residential area), and through a commercial corridor in Grayslake. In all four locations, through-town improvements would be unacceptable because of the disruption and change in character that widening would cause. Bypasses were selected to minimize displacements and community disruption while providing additional capacity to the system and helping to relieve congestion on parallel existing routes.

In terms of construction related jobs, the project alternative would generate 3,300 jobs with the No-Action Alternative (Baseline), 6,600 jobs with the IL 53 Freeway/Tollway Alternative, and 7,200 jobs with the IL 83/US 45 with US 12 Alternative (Section 4.10, *Construction Impacts*). It would cost $338 million[12] to construct the No-Action Alternative (Baseline), $674 million to construct the IL 53 Freeway/Tollway Alternative, and $735 million to construct the IL 83/US 45 with US 12 Alternative. These project expenditures would induce additional employment in the county and the region from wage and salary respending.

Energy would be consumed during the construction of the proposed improvements and by motorist during the construction period (i.e., construction delay). The number of proposed improvements and the time required for completion would have a corresponding affect on the fossil fuels consumed. The energy consumed would generally be proportional to the number of lane miles of improvement associated with each alternative. Accordingly, the IL 83/US 45 with US 12 Alternative would require more energy consumption for construction than the other alternatives.

4.14.2 Long-Term

The alternatives provide long-term travel benefits. The No-Action Alternative (Baseline) would double congestion over the next 20 years, resulting in travel delays and associated cost. The build alternatives, however, would reduce travel times, travel delay, and overall transportation costs (Section 3.6.2, *Detailed Evaluation of the Finalist Roadway Alternatives*). Both build alternatives would provide substantial travel time savings over the No-Action Alternative (Baseline).

The IL 53 Freeway/Tollway Alternative annually would save 18.7 million hours in travel time over the No-Action Alternative (Baseline), and the IL 83/US 45 with US 12 Alternative 19.1 million hours of travel time. The IL 53 Freeway/Tollway Alternative would provide greater regional travel benefits than both the IL 83/US 45 with US 12 Alternative and the No-Action Alternative (Baseline) in terms of providing improved travel time to a greater regional area. The IL 53 Freeway/Tollway Alternative would also provide an additional link in the regional highway system, thereby accommodating more direct travel, as well as redistributing traffic from other congested segments of the system.

The IL 53 Freeway/Tollway Alternative would provide 596 lane miles of uncongested north-south travel, 66 more lane miles than the No-Action Alternative (Baseline). The IL 83/US 45 with US 12 Alternative would provide 568 lane miles of uncongested north-south travel, 38 more lane miles than the No-Action Alternative (Baseline).

Compared to the No-Action Alternative (Baseline), the IL 53 Freeway/Tollway Alternative would improve safety by 7 percent greater safety, the IL 83/US 45 with US 12 Alternative by roughly 1 percent.

4.15 Irreversible and Irretrievable Commitments of Resources

The proposed project alternatives would require a commitment of natural, physical, human, and fiscal resources that would constitute an irretrievable and irreversible loss.

[12] Construction cost only; does not include right-of-way cost.

A discussion of those commitments is provided below.

4.15.1 Land

Land acquired to construct the project would be an irreversible commitment during the time the land is used as a highway. Right-of-way requirements would convert land from residential, agricultural, commercial, and natural environmental resource uses. The commitment of land would be 195 ha (482 ac) for the No-Action Alternative (Baseline), 613 ha (248 ac) for the IL 83/US 45 with US 12 Alternative, and 513 ha (1,268 ac) for the IL 53 Freeway/Tollway Alternative. The direct use of land would be lost to future development, residential, commercial, or open space. The growth inducing effects of the project alternatives upon land use within the study area is subject to speculation. Factors other than improved access weigh heavily in the growth trend for Lake County (Section 4.1.2, *Community and Land Use Changes*).

4.15.2 Raw Materials

Considerable amounts of fossil fuel, labor, and highway construction materials, such as steel, cement, aggregate, and asphalt material, would be required. In addition, considerable labor and natural resources are used in fabricating and preparing construction materials. Those resources generally are irretrievable, but their use would not have a substantial adverse effect on continued availability. Of these resources, the IL 83/US 45 with US 12 Alternative would require the largest commitment, followed by the IL 53 Freeway/Tollway and No-Action Alternative (Baseline)s.

4.15.3 Human Resources

Human energy would also be an irretrievable commitment of resources to the design and construction of the project alternatives. Human effort, expressed as person-hours or person-years of labor, can be categorized as:

- Engineering effort for design and construction
- Construction effort
- Effort expended to maintain and operate the preferred alternative after completion

4.15.4 Economic

Construction of a build alternative would involve irretrievable federal, state, and local funding. Although the fiscal commitments are large, they reflect the commitment to improve travel not only in Lake County but also in the Chicago Metro area. The No-Action Alternative (Baseline) would cost $483 million to construct, the IL 53 Freeway/Tollway Alternative $861 million, and the IL 83/US 45 with US 12 Alternative $1.095 billion (in 1999 dollars) minus right-of-way costs. Land converted from private to public use would displace local tax revenue.

4.15.5 Natural

The effort made throughout the LCTIP process to avoid and minimize impact to natural resources resulted in relatively low levels of impact to natural resources, considering the rather sizeable improvements proposed. The alternatives would, however, affect natural resources to a varying extent including: wetlands, parks/forest preserves, threatened and endangered species land, cultural sites, agricultural land, and undeveloped land. See Table 4-61 (on pages 4-99 and 4-100) for a summary.

The basis for committing resources is founded on the concept that residents in the study area, region, and state would benefit from the improved capacity and safety that would result from the proposed improvements. The benefits such as reduced commuting times, improved access to businesses and community services and increased safety are expected to outweigh the commitment of resources in the long term.

4.16 Summary of Environmental Consequences

Table 4-61 summarizes the environmental effects of the No-Action Alternative (Baseline) and the two build alternatives.

These effects would be minimized as much as possible with the use of appropriate design techniques and considerations, construction methods, and mitigation measures as discussed in this document and companion technical reports.

TABLE 4-61
Summary of Environmental Consequences

	No-Action	IL 53 Freeway/Tollway	IL 83/US 45 with US 12
Cost (1999 dollars)	$483 million	$861 million	$1.095 billion
Socioeconomic Impacts			
Population (2020)	796,942	27,500 more people over No-Action[a]	18,000 more people over No-Action[a]
Households (2020)	290,570	10,962 more households over No-Action[b]	7,640 more households over No-Action[b]
Employment (2020)	389,545	4,444 more jobs over No-Action[b]	4,200 more jobs over No-Action[b]
Community and Land Use Changes	No change to community function, or the pattern of future land development.	Since the early 1960's the communities have considered the potential for a major new highway in central Lake County; and therefore have been able to plan for its potential change to land use.	No material change in community function, or pattern of future land development.
New Right-of-Way[c]	195 ha (482 ac)	513 ha (1,268 ac)	248 ha (613 ac)
Residential Relocations (Additional Ancillary Outbuildings associated with Residential Relocations)	67	113 (45)	187 (25)
Business Relocations	23	9	195
Parking Impacts (# of displaced parking spaces)	—[d]	109 (0)	2,514 (258)
Percent of Total Assessed Value Converted	0.20	0.30	0.47
Environmental Justice	No disproportional impact	No disproportional impact	No disproportional impact
Public Services and Facilities	0	0	9
Agricultural Impacts			
Direct Farmland Impacts	32 ha (80 ac)	315 ha (780 ac)	91 ha (226 ac)
Market Value of Affected Crops	$21,000	$205,000	$59,300
Farm Operations	Minimal effect	36 farm parcels	20 farm parcels
Natural Resources			
Wetlands (all direct impacts)	32 ha (78 ac)	37 ha (92 ac)	23 ha (58 ac)
ADID Wetlands	5 ha (13 ac)	4 ha (9 ac)	2 ha (4 ac)
Class I	—[e]	5 ha (12 ac)	1 ha (2 ac)
Class II	—[e]	10 ha (25 ac)	14 ha (35 ac)

TABLE 4-61 CONTINUED
Summary of Environmental Consequences

	No-Action	IL 53 Freeway/Tollway	IL 83/US 45 with US 12
Class III	—[e]	23 ha (56 ac)	8 ha (20 ac)
Floodplain Impacts	38 FIS floodplains	10 FIS	33 FIS
Longitudinal Encroachments	9	0	12
Transverse Encroachments	1	12	17
Threatened and Endangered Species	1	1	1
Water Quality	Does not exceed criteria	Does not exceed criteria	Potentially exceeds chloride standard
Air Quality	Does not exceed criteria	Does not exceed criteria	Does not exceed criteria
Noise	1,211 residential structures[f]	417 residential structures[f]	273 residential structures[f]
Potential Section 4(f) Resources Cultural Resource Impacts			
Historic Structures	13[g]	3	6
Archaeological Sites	10	4	2
Potential Forest Preserve and Local Park 4(f) Impacts (area)	7 ha (17 ac)	8 ha (20 ac)	8 ha (19 ac)
Potential Forest Preserve and Local Park 4(f) Impacts (number of properties)	22	5	19
Special Waste			
CERCLIS	0	0	0
LUST	20	3	34

Note: For purposes of a summary, all area values are rounded to the nearest whole number. Impacts are summarized individually for each alternative.

[a] Represents additional population for roadway improvements only.
[b] Represents additional households for both roadway and transit improvements.
[c] Includes new right-of-way requirements only—use of existing right-of-way would be associated with each alternative.
[d] Parking displacements were not investigated for the No-Action Alternative (Baseline).
[e] No field verification of wetlands performed for No-Action Alternative (Baseline), therefore, no qualitative assessment completed.
[f] Structures near the proposed improvements that would exceed the noise abatement criteria for residential areas—does not include those that would be displaced.
[g] Based on available Phase 1 preliminary engineering and environmental documentation reports.

SECTION 5

Coordination

Since the initiation of the study in spring 1998, the LCTIP has met with representatives from federal and state resource agencies, county and local officials, transportation service agencies, business and civic groups, and local residents. Through a structured coordination and communication program designed to encourage maximum input, everyone with an interest in transportation has gathered information and offered input to the study. The LCTIP's program has been tailored to three primary audiences: agency and elected officials, interested groups, and the public.

This study has been designed to encourage maximum input from government, transportation, and planning organizations, as well as the public. This section provides a summary of the agency coordination and public involvement that has occurred during the preparation of the DEIS.

5.1 Federal, State, and Local Agency Coordination

5.1.1 Introduction

At the beginning of the study, groups were established with various agencies and elected officials to inform them of study activities, encourage meaningful dialog, and receive feedback on major study issues. Established groups include the Resource Agency Group (RAG), Municipal Groups (MGs), Technical Advisory Group (TAG), and the Lake County Board Joint Committee. These groups have provided input to the process, including perceptions on transportation needs/issues, assistance with obtaining data, study approach, and study output review. Following is an overview of the four groups and their role in the study.

5.1.2 Resource Agency Group

The RAG, comprised of state and federal resource and regulatory agencies involved in the NEPA process, included representatives from the agencies listed in Table 5-1.

The role of the RAG was to:

- Communicate issues, concerns, and regulatory requirements associated with resources in the study area
- Review technical aspects of the study
- Review and provide input in developing evaluation factors, criteria, and other performance measures to be used in alternative development and screening
- Serve as a communication link to and from the representative agencies and the group
- Attend meetings regularly and share agency information

It was recognized from an environmental perspective that this study would require a different approach for identifying, measuring, and analyzing impacts. The RAG has been instrumental in assisting the study team in

TABLE 5-1
Resource Agency Group Membership

• US Environmental Protection Agency (USEPA)*	• Illinois Department of Agriculture (IDOA)
• US Fish and Wildlife Service (USFWS)	• Illinois Department of Natural Resources (IDNR)*
• US Army Corp of Engineers (USACOE)	• Illinois Historic Preservation Agency (IHPA)
• USDA Natural Resources Conservation Service (NRCS)	• US Department of Housing and Urban Development (USHUD)
• Illinois Nature Preserves Commission (INPC)	

* Two agencies that serve on this group, USEPA and IDNR, also served on the TAG.

developing a reasonable approach for considering environmental concerns over the large study area (which is in excess of 1,295 km^2, or 500 mi^2). The recommended approach involved developing an environmental database, compiled as a GIS database. Through group exercises, members reviewed environmental data, provided input, and agreed that the use and accuracy of available data is acceptable for this study. The RAG, through group exercises, also participated in refining the objectives developed by the TAG by examining how the objectives relate to the Purpose and Need.

The RAG contributed to the alternatives development process and agreed that the initial sets of roadway and transit improvements represented a reasonable range of alternatives for consideration.

The group met nine times in a group forum to discuss analysis methodology, resource issues, and regulatory issues (see Table 5-2, on the following page). Minutes from these meetings are included in the study record, and included in the *Public Involvement and Coordination Summary Report*.

Correspondence with resource agencies is included in Appendix G. Correspondence early in the study process involved data sharing from existing agency databases and identification of resource issues to be addressed in the environmental documentation. Correspondence later in the study process included input from the USFWS addressing the presence of federally threatened and endangered species in the vicinity of the finalist alternatives.

The purpose of the individual meetings with IDNR, IDOA, USEPA, USACOE, USFWS, and USHUD prior to release of the DEIS was to discuss the approaches and revisions to some of the study methodologies based on their area of expertise and interest. Overall the resource agencies were satisfied with the overall process and the level of detail used in the analysis. The IDNR agreed with the study approach and more specifically agreed with the functional wetland assessment methodology applied to the impacted wetlands in the study area.

The USEPA was supportive of the LCTIP's planning process, and suggested that it be used on other projects. Regarding the Finalist Alternatives, the USEPA noted their agency's emphasis on wetland impacts, while also acknowledging the trade-offs associated with impacts to other resources. The USEPA also concurred with the LCTIP 's wetland assessment methodology.

The IDOA requested that additional information be included in the agricultural analysis, including: (1) a more definitive assessment of prime and important farmland impacts for the build alternatives; (2) the use of the most recent satellite imagery; (3) an assessment of the number of farm operation impacts, and (4) an assessment of the number of uneconomic farm remnants created by the alternatives. Based on the suitability of the analysis for this type of study, the analyses identified in points 1 and 2 were incorporated into the study and the results are reflected in this DEIS. Points 3 and 4 would be addressed as part of future analyses for the preferred alternative.

The USACOE agreed with the overall process and agreed in concept with the wetland assessment methodology. Based on meeting dialog the USACOE suggested that a field review with USACOE and LCTIP staff be conducted to verify the methodology and scoring system applied in the assessment. Following the field review the USACOE suggested two refinements to the assessment: eliminate Class IV wetlands, and modify the scoring system to acknowledge the value of smaller wetland sites. Both of these suggestions were implemented and the results of the revised assessment methodology are included in this DEIS.

The USFWS indicated agreement with the wetland methodology however, expressed some concern for the flood attenuation scores. Further discussion of this issue led to concurrence with the process by USFWS for a macro level analysis.

The USHUD stated that their primary issue is growth patterns in the region. Specifically they will be examining the growth impacts associated with each alternative. Overall they have

indicated agreement with the level of effort that has been expended in this study.

5.1.3 Municipal Groups

There are 73 municipalities in the study area. Given the large number of jurisdictions involved, each municipality was assigned to one of six groups, based on geography, to allow for small group interaction with the study team. The objective of meeting with municipalities was to gather local perspectives and input, as well as provide information to the municipalities. Specific roles and responsibilities include:

- Review study progress
- Provide input on general study direction
- Understand the process

TABLE 5-2
Resource Agency Group Meetings

	Meeting Date	Topic
Meeting 1	April 1998	Introduction to study, role of the RAG, GIS application overview, and pilot demonstration.
Meeting 2	June 1998	IDOT's and ISTHA's expectations for working with the RAG. The resource and regulatory agencies' expectations for a successful process. Review of the basic elements of the GIS database for this study. Review of the appropriate level of detail desired for information in the GIS database.
Combined Meeting *	August 1998	Transportation Workshop and Fair: • Series of presentations providing an overview of the modes that may be applicable to the LCTIP, including arterial, highway, rail, bus, and transportation management strategies. Representatives from regional planning agencies and interest groups were available at presentation booths to discuss specific initiatives and programs. • Group exercises following the formal presentations to discuss the applicability of these strategies to the study area.
Meeting 3	August 1998	Purpose and Need for the project, results of the individual agency meetings, and GIS analysis methods.
Meeting 4	October 1998	Transportation system performance analysis, review Purpose and Need, environmental evaluation factors, review project schedule
Meeting 5	December 1998	Transportation System Performance Report preview, alternatives development, evaluation methodology
Meeting 6	June 1999	Alternatives development, environmental considerations
Meeting 7	May 2000	Summary of comments from PIM #1 and PIM #2 and overview of materials presented at the meetings, review of the finalist two alternatives, environmental resource measures, and proposed refinements/ enhancements to environmental database for next steps of the process.
Meeting 8	October 2000	PIM #2 summary; overview of TAG Meeting #6 and MG Meeting #5; presentation and discussion of the finalist alternatives as it relates to refinements, alternative specific population and employment forecasts, environmental impacts, and travel performance; and presentation and discussion of impact assessment methods wetlands, biological, water resources, noise, air quality, cultural resources, and secondary and cumulative impacts.
Individual Meetings	May 2001	Individual meetings with IDNR, IDOA, USEPA, USFWS and USHUD to discuss the approaches and resource assessment methodology prior to release of the DEIS

* Joint Transportation Workshop and Fair with representatives from the TAG, the MGs, Lake County Board, and area legislators

- Participate at public events
- Identify need for local or community meetings

The MGs contributed to the study team's understanding of local transportation issues, increasing the sensitivity to local issues that can be addressed as part of a larger study. The technical analyses completed by the study team, such as the *Transportation System Performance Report*, were supported by the perceptions and insights shared by local officials at these meetings. The group helped the study establish a broad base at the local level. As the group members communicated study findings and issues to their constituents, they often identified opportunities for further LCTIP interaction via the speakers' bureau events.

The group convened six times to discuss the transportation issues facing the study area, the results of technical analyses, and alternative concepts (see Table 5-3). Minutes from each meeting are included in the study record, and included in the *Public Involvement and Coordination Summary Report.* All meetings were open to the public and public input and comments were solicited at the end of each meeting.

5.1.4 Technical Advisory Group

The TAG consists of representatives from transportation service providers, resource agencies, local government, and regional planning agencies. These representatives are listed in Table 5-4 (on the following page).

The TAG provided input on technical issues relating to transportation needs and alternatives development and evaluation. Specific roles and responsibilities included:

- Review the progress of the study and provide input to the study team on technical approaches, technical input, and output from the study
- Serve as a communication link to and from the representative communities and agencies
- Serve as a visible part of the study by attending study events (such as public

TABLE 5-3
Municipal Groups Meetings

	Meeting Date	Topic
Meeting 1	May/June 1998	Introduction to study and role of the MG. Group exercise to identify transportation issues facing the study area.
Combined Meeting*	August 1998	Transportation Workshop and Fair: • Series of presentations providing an overview of the modes that may be applicable the LCTIP, including arterial, highway, rail, bus, and transportation management strategies. Representatives from regional planning agencies and interest groups were available at presentation booths to discuss specific initiatives and programs. • Group exercise following the formal presentations to discuss the applicability of these strategies to the study area.
Meeting 2	January 1999	Findings of the *Transportation System Performance Report.*
Meeting 3	July 1999	Presentation of the initial roadway and transit improvements, including transportation performance and potential impact data. (Meeting prior to PIM #1)
Meeting 4	May 2000	Presentation of the roadway refinement process, transportation performance measures, and recommended finalist improvements. (Meeting prior to PIM #2)
Meeting 5	October 2000	Refinements to finalist transit enhancements and roadway alternatives including a discussion of the refinement process, transportation performance data, and potential impacts.

* Joint Transportation Workshop and Fair with representatives from the TAG, the RAG, Lake County Board, and area legislators

meetings) and identifying local meeting needs

This group provided a forum for the study team to present and discuss technical processes. For example, early in the study, the TAG assisted the study team in establishing a number of study objectives from transportation issues identified at other public and group meetings. Working through a group workshop, the representatives identified the following objectives:

- Road Network
  - Attract travel to the appropriate functional facilities
  - Provide sufficient capacity on major corridors
  - Reduce network congestion
- Public Transportation
  - Determine appropriate level of transit that can be achieved
  - Improve transit connections to final destinations
- Environmental
  - Protect and preserve important environmental and societal resources
- Other
  - Focus improvements to support local economic development objectives and land use preferences
  - Consider regional travel needs

The TAG representatives from the various transportation service providers were also instrumental in working with the LCTIP to identify projects that would be built regardless of the recommendations made by the LCTIP (creating the No-Action Alternative [Baseline]). The group was supportive of an open examination of alternatives, regardless of jurisdiction. This lead to a wide examination of alternatives in terms of both geography and mode (i.e., road, rail, and bus).

The group met seven times during the study. Table 5-5 (on the following page) summarizes the topics discussed at these meetings. Minutes from each of these meetings are included in the study record, and included in the *Public Involvement and Coordination Summary Report*. All meetings were open to the public and public input and comments were solicited at the end of each meeting.

5.1.5 Lake County Board Joint Committees

The LCTIP met with the Lake County Board Joint Committees (Planning, Building & Zoning and Public Works & Transportation) seven times during the study. The Lake County Board Joint Committees identified improving transportation as one of their top priorities. They adopted a resolution in support of this process and provided a forum for the LCTIP and other interested groups to discuss transportation issues and study findings. At the

TABLE 5-4
Technical Advisory Group Membership

• Illinois Department of Transportation	• Lake County Department of Planning and Development
• Illinois State Toll Highway Authority	• Cook County Highway Department
• Chicago Area Transportation Study	• McHenry County Highway Department
• Northeastern Illinois Planning Commission	• Kenosha County Division of Highways
• Regional Transportation Authority	• Federal Transit Administration
• Metra	• Municipal Group #1 Representatives (2)
• Pace	• Municipal Group #2 Representative
• Illinois DNR (ex-officio member)*	• Municipal Group #3 Representative
• USEPA (ex-officio member)*	• Municipal Group #4 Representative
• FHWA (ex-officio member)	• Municipal Group #5 Representative
• Lake County Division of Transportation	• Municipal Group #6 Representative

* The USEPA represents the federal resource agencies and the IDNR represents state resource agencies.

beginning of the study, this group helped the LCTIP define the transportation issues facing the county. As the study progressed the LCTIP met with elected officials to share information at key study milestones and to solicit input. The Lake County Board Joint Committees supported the study process and suggested analyses for further examination. For example, one examination included how the transportation proposals would influence the county road system. In response, the LCTIP did an extensive analysis of the changes to the county route system.

The *Transportation System Performance Report*, *Alternatives Development and Evaluation Report*, and this DEIS will serve as a foundation for future transportation planning in the county. Table 5-6 (on the following page) provides an overview of the specific topics discussed at each meeting. Meeting minutes are included in the study record, and included in the *Public Involvement and Coordination Summary Report.*

5.2 The Public and Interested Groups

Opportunities for public involvement included a community-based working office in Mundelein, an interactive web site, and a wide variety of forums for public comment, including focus groups, PIMs, speakers' bureaus, and agency and elected official meetings. Up-to-date study information was provided in regular newsletters and on the study web site. The study team employed a broad range of activities to maximize the

TABLE 5-5
Technical Advisory Group Meetings

	Meeting Date	Topic
Meeting 1	June 1998	Introduction to study and role of the TAG. Group exercise to identify transportation issues facing the study area.
Combined Meeting *	August 1998	Transportation Workshop and Fair: • Series of presentations providing an overview of the modes that may be applicable to the LCTIP, including arterial, highway, rail, bus, and transportation management strategies. Representatives from regional planning agencies and interest groups were available at display booths to discuss specific initiatives and programs. • Group exercise following the formal presentations to discuss the applicability of these strategies to the study area.
Meeting 2	October 1998	Overview of the "Technical Tools" that will be employed on this study including: GIS, travel demand forecasting, and regional growth scenarios. Presentation included an overview of the perceived transportation issues in the study area as well as a workshop to assist in the development of project objectives.
Meeting 3	January 1999	*Transportation System Performance Report* findings; project No-Action (or Baseline) Improvements; overview of the alternatives development & alternatives evaluation process
Meeting 4	June 1999	Purpose and Need for the study; alternatives development process; Preliminary roadway and transit improvements
Meeting 5	May 2000	Roadway refinement process; performance measures; finalist roadway & transit improvements
Meeting 6	October 2000	Finalist transit enhancements; finalist roadway alternatives including discussion of refinements, impacts, and performance

* Joint Transportation Workshop and Fair with representatives from the RAG, the MGs, Lake County Board, and area legislators.

participation of groups and individuals in the planning process.

5.2.1 Poll and Focus Groups

During the early months of this study, surveys were conducted by the study team to gauge the perception of the transportation system user in the study area and to acquire input on the transportation issues of the study area. Public input was first gained through a series of four focus groups conducted in March 1998. The primary objective of this exercise was to identify perceived problems and potential solutions regarding transportation in the study area. The results were used to identify the issues of importance from the participants' perspective that could be further explored. The focus groups were comprised of people who commuted by automobile or public transportation, those who commuted short as well as long distances to work, and those who did not commute to work. The participants reflected a variety of commuting patterns and opinions.

The overall perception of the participants was that the transportation problems of Lake County were rapidly worsening. Participants felt that improving the transportation system should be a top priority for the county. The most frequently cited issue was road improvement, followed by train and bus system improvements. See the *Transportation System Performance Report, Appendix A.*

The focus group exercise was followed by an extensive countywide survey. Between April and May 1998, 500 random telephone interviews were conducted with licensed drivers in Lake County. The survey respondents were comprised of automobile and transit commuters, as well as people who walked or car/van pooled.[1]

The phone survey results are included in the *Transportation System Performance Report, Appendix B.* The majority of respondents identified congestion on main roads, at intersections, and in residential areas as the most important transportation issue in Lake

TABLE 5-6

Lake County Board Joint Committee Meetings

	Meeting Date	Topic
Meeting 1	May 1998	Introduction to study and process, define transportation issues.
Combined Meeting *	August 1998	Transportation Workshop and Fair: • Series of presentations providing an overview of the modes that may be applicable the LCTIP, including arterial, highway, rail, bus, and transportation management strategies. Representatives from regional planning agencies and interest groups were available at presentation booths to discuss specific initiatives and programs. • Group exercise following the formal presentations to discuss the applicability of these strategies to the study area.
Meeting 2	January 1999	Findings from the *Transportation System Performance Report.*
Meeting 3	May 1999	Population and employment forecasts, alternatives development and evaluation process; *Crossroads* review.
Meeting 4	August 1999	Initial component improvements for roadway, transit, and traffic management (Prior PIM #1).
Meeting 5	May 2000	Refinements and evaluation to finalists.
Meeting 6	November 2000	Refinements to finalist alternatives. Response to the county's request for data on the effect the LCTIP alternatives would have on county roads and growth distribution.

* Joint Transportation Workshop and Fair with representatives from the TAG, the RAG, the MGs, and area legislators

County. The need for improvements to major north-south and east-west routes was a common response. Public transportation registered less concern by the public.

When asked to rate possible transportation solutions, 75 percent of respondents indicated that road improvements should be planned in advance of development. Additionally, respondents indicated a strong interest in solutions that would improve the road network, including intersection improvements, road widening, new highways, and traffic signal coordination. The poll and focus group information, coupled with input from the agency and elected officials and technical analyses, provided the basis for developing alternative solutions.

5.2.2 Public Informational Meetings

Two rounds of public meetings were held during the study process. For each round, meetings were held in multiple locations throughout the study area for the convenience of participants. The meetings were announced through study newsletters, advertisements in local newspapers, news releases, and invitation letters to interested individuals/groups on the study mailing list.

The public meetings were conducted in an open-house format, with personnel from the LCTIP, their consultants, IDOT, ISTHA, PACE, Metra, RTA, and CATS present to answer questions and receive comments about the study. A Public Hearing will be held after release of this DEIS for public review and comment. The hearing will also be held in different locations in the study area, and conducted in an open-house format.

5.2.2.1 Public Informational Meeting #1

In August 1999, the LCTIP presented the initial roadway, rail, and bus improvements. More than 800 people attended the events to review the proposed improvements, ask questions, and provide input. In addition to the strong turnout at the meetings, nearly 600 written and oral comments were received.

The overwhelming majority of participants agreed that major transportation improvements are needed in one form or another. Following is a summary of the major recurring comments and questions.

- A majority of commenters supported major transportation improvements; by a margin of 2:1, commenters supported the IL 53 set of improvements
- Commenters expressed a high degree of frustration with existing traffic congestion and a desire for road improvements to be built as soon as possible
- Many were concerned with the failure of road improvements to keep pace with development
- Many believed growth would happen regardless of road improvements
- Some wanted to know if more can be gotten from the existing transportation system (e.g., traffic signal coordination, road underpass/overpass at railroad crossings, and additional turning lanes at intersections)
- Others wanted to know if IL 53 would cause development and growth
- Some supported improving existing roads and seeing what happens
- Some were interested in providing improvements for alternative types of transportation (transit, bicycles, and pedestrians)
- Some asked if the quality of environmental resources is being considered when assessing impacts

Newsletter No. 3 (Fall 1999), located in Appendix H, provides a summary of staff responses to these comments and questions. A full summary of the meeting is available in the project file, including responses to individual comments received at the meeting.

5.2.2.2 Public Informational Meeting #2

The second round of public meetings was held in May 2000. Nearly 4,000 comments were

received at the meetings, which underscores the strong support that has evolved for this planning process. Following is a summary of the comments gathered at the event.

- The majority of comments centered on the IL 53 set of improvements; by a margin of 4:1, people expressed their support for the extension of IL 53
- Some wanted to know what is being done to improve existing roads
- Some asked if the finalist alternatives would cause more growth
- Some asked if improving existing roads would have fewer impacts

Newsletter No. 4 (Summer 2000), located in Appendix I, provides a summary of staff responses to these comments and questions. A full summary of the meeting is available in the project file, including responses to individual comments received at the meeting.

5.2.3 Project Videos

Three videos were developed during the study. The first video was an introductory video describing the project. The second and third videos were prepared for the first and second public meetings. These videos provided an overview of the progress and accomplishments of the project to date, as well as introduced the materials presented at the meetings. A copy of each video was distributed to all elected officials in the study area, and was included in the project record. The videos were also shown on local cable television in several communities.

5.2.4 Speakers' Bureau

A speakers' bureau was established as a forum to speak with interested groups and the media about the study. The speakers' bureau included:

- A presentation (slide show) that was updated throughout the study
- Study-related materials for distribution
- Study team staff to respond to questions

This type of venue served multiple purposes, including elevating the awareness of this study and its progress, ability to meet with organizations on short notice, and demonstrating the LCTIP's interest in receiving input.

Through this forum, the study team participated in approximately 60 meetings. Table 5-7 (on the following page) summarizes the groups that were involved in these events. Summaries of each meeting are included in the study record, and included in the *Public Involvement and Coordination Summary Report*.

5.2.5 Project Office

A project office established in Lake County in Mundelein is staffed by a management team consisting of the project managers and an administrative assistant. The office serves as a central location for public outreach, including phone inquiries, small group meetings, and press conferences, and as a drop-in center for interested individuals to visit and discuss the study or review specific materials. The office received over 1,000 visitors/phone inquiries during the study.

5.2.6 Newsletters

Five study newsletters were distributed throughout the development of the DEIS. The newsletters describe important study information and provide opportunities for public input. For example, the first two study newsletters that were distributed included postage paid comment forms. The newsletters were distributed by mail and posted to the study web site. Table 5-8 (on page 5-11) provides an overview of each newsletter.

In addition to the newsletters, two study brochures were developed and distributed. The first brochure provided an introduction and overview of the study and planning process. The second brochure provided a detailed description of the alternatives development and evaluation process. The first brochure was distributed at early group meetings and the Transportation Workshop and Fair. The second brochure was posted to the study web

site, mailed to group members and elected officials, and available as a handout at the PIMs.

5.2.7 Web Site

A study web site, http://www.lakecountytip.com, was established as another means of disseminating information about the study. The site, updated regularly, was promoted via study newsletters and other means. Initially, the site contained general study information, including an introduction to the study, study organization, and schedule. It also contained a form-based inquiry/feedback page. As the study progressed, the following information was posted on the site:

- Study group meeting summaries
- PIM summaries
- Newsletters
- Frequently asked questions and answers
- Study findings and reports, including:
  - Transportation System Performance Report

TABLE 5-7
Group Meeting List

American Society of Civil Engineers	Lake Cook TMA	Lincolnshire Rotary
Antioch Lions Club	Lake County and DuPage County Chapter of APWA	Lindenhurst Village Board
Antioch Rotary	Lake County Chamber of Commerce	Long Grove Rotary
Barrington Area Council of Governments	Lake County Farm Bureau	McHenry EDC
Barrington Lions Club	Lake County Municipal League	Mundelein High School
Buffalo Grove Chamber of Commerce	Lake County Partners	Mundelein, Vernon Hills, Libertyville Kiwanis
Citizens to Protect Quality of Life Through Better Transportation	Lake Forest City Council	Mundelein Village Board
Deerfield, Bannockburn, Riverwoods Chamber of Commerce	Lake Forest Hospital	Northern IL Business PAC
Deerfield Senior's Men Club	Lake Forest, Lake Bluff Kiwanis Club	Northwest Municipal Conference
Grayslake AARP	Lake Forest, Lake Bluff Lions Club	Power Breakfast
Grayslake Chamber of Commerce	Lake Zurich Rotary	Rotary of Mundelein, Vernon Hills
Grayslake Chapter of American Business Women's Association	Lake Zurich Revitalization Project	Stevenson High School
Greater Lincolnshire Chamber of Commerce	Lake Zurich Village Board	Transportation forum sponsored by the League of Women Voters
Gurnee Breakfast Exchange	Libertyville Junior Women's Club	Vernon Hills, Grayslake, Gurnee, and Kildeer Village Boards
Highland Park Good Morning Rotary	Libertyville Kiwanis Club	Wauconda Rotary
Highland Park Kiwanis Club	Libertyville, Mundelein, Vernon Hills Chamber of Commerce	Waukegan Rotary
Highland Park Lions Club	Libertyville Noon Rotary	Zion Benton Kiwanis Club
Kiwanis Club of Gurnee	Libertyville Sunrise Rotary	Zion Chamber of Commerce Zion Exchange Club

  - Initial, refined, and finalist alternatives
  - Transit improvements
  - Alternatives Development and Evaluation Report
  - Draft Environmental Impact Statement
- Links to other web sites:
  - IDOT, http://www.dot.state.il.us
  - ISTHA, http://www.illinoistollway.com

The study web site was accessed by nearly 5,000 users, and approximately 300 comments were received by the form-based inquiry/feedback page.

5.2.8 Mailing List

A mailing list of over 3,500 names was maintained and updated regularly throughout the course of the study. The list included interested individuals, representatives of interest groups, state, county, and local elected officials, and appropriate agency personnel. The mailing list was used to generate labels for newsletter mailings and letters for more specific mailings, such as meeting invitations.

5.3 The Effect of Coordination Activities

Providing information and receiving feedback has been a foundation element of the study process. Through a structured program that has provided numerous opportunities for input, the LCTIP has been able to obtain the broadest participation at all levels: the public, interested groups, agencies, and elected officials.

Using a multitude of communication tools, the public has had numerous avenues to get involved. With nearly 100 meetings—including interested groups, two major public meetings, a transportation fair, numerous TAG and MG meetings, newsletters, web site, and media—the people in Lake County have had a chance to hear and be heard. Through an unprecedented outreach program, the LCTIP has gained a thorough understanding of the transportation issues facing Lake County and area residents have also become better educated about transportation. Residents cite congestion as their primary quality of life issue, and place an emphasis on improving the roadway system, followed by transit. People recognize that the rapid rise in population has contributed greatly to the transportation crisis Lake County faces. Continued growth in the county will only worsen the transportation problems facing the county if no major improvements are implemented.

TABLE 5-8
Newsletter Overview

Newsletter No.	When Distributed	Topics
1	Fall 1998	Introduction to study Public involvement avenues Transportation issues
2	Spring 1999	Transportation system performance findings No-Action (Baseline) network & forecasts Alternative development and evaluation process
3	Fall 1999 – Following PIM # 1	Presentation of initial alternatives and impacts Crossroads review Public comments/responses
4	Summer 2000 – Following PIM # 2	Finalist roadway and transit improvements Public comments/responses
5	Summer 2001	DEIS release, key findings, Public Hearing invitation

The LCTIP is a collective planning effort that has garnered widespread support, bringing together transportation service providers, communities, and elected officials. The study has embraced a process that allowed for the investigation of a broad analysis of alternative solutions, including the ideas of others. Based on input received, the LCTIP considered an east-west improvement scenario, which focused on improving east-west arterials (see Section 3, *Alternatives*). The LCTIP considered alternative solutions put forth by interest groups (Section 3, *Crossroads Plan*) and perceptions that smaller scale projects, such as adding turning lanes at intersections, synchronizing traffic signals, etc., could meet Lake County's transportation needs. In addition, the LCTIP analyzed the effects of the finalists on the roadways maintained by the county.

Early perceptions that new highways would cause massive growth were another important consideration of the LCTIP. Through a rigorous analysis using methodologies endorsed by NIPC, the LCTIP was able to isolate the growth impacts of the project No-Action (Baseline), transit, and finalist roadway alternatives. It was clear from the analysis that the impact of transportation on growth in Lake County is minimal. The analysis reinforced the realization that factors other than transportation are driving Lake County's rapid growth and that transportation improvements are needed to keep the county out of gridlock.

The thousands of comments received during this study have emphasized a frustration with growing congestion and the need for major improvements. The LCTIP has focused the transportation discussion on the major problems and potential solutions. The central premise has been to provide ample opportunities for every person that has an interest in transportation to voice their opinions so that the best decision can be made.

The public involvement process that helped determine the need, the objectives, and the alternatives is a measurable success. Support for major improvements, in particular the IL 53 extension, has been clearly expressed by Lake County residents, business groups, communities, and elected officials. Thousands of individuals and numerous communities, business groups, and elected officials have expressed their support, citing its superior transportation benefits, cost effectiveness, minimal impact to existing homes and businesses, and/or minimal disruption during construction as compared to other alternatives. Table 5-9 summarizes the comments that were received at various public forums during the study.

TABLE 5-9
Summary of Comments Regarding the IL 53 Set of Improvements

Forum	Support	Oppose
1999 Public Informational Meeting*	56%	33%
2000 Public Informational Meeting*	79%	19%
Communities (number)	20	2
Organizations (number)	18	7

* Total percent for the 1999 and 2000 Public Informational Meetings do not add to 100 percent. The remainder is associated with other alternatives presented.

Source: LCTIP

SECTION 6

List of Preparers

Name	Area of Expertise	Degree and Years of Experience
Federal Highway Administration		
Jon-Paul Kohler	FHWA Review	B.S., Civil Engineering 1984 To Present
Don Keith	Right-of-Way Expertise	B.S., Mathematics and Meteorology 1972 To Present
Illinois Department of Transportation		
IDOT Central Office, Office of the Chief Counsel		
Rich Christopher	General Content and Oversight	J.D. B.A., English 1980 To Present
IDOT District 1, Bureau of Programming		
Peter E. Harmet, P.E.	Project Manager	B.S., Civil Engineering 1986 To Present
David A. Niemann	Environmental Studies, Natural Resource Coordination, Analysis and Review, Hazardous Waste	Ph.D., Botany M.S., Botany B.S., Ornamental Horticulture 1988 To Present
Pat Pechnick, P.E.	General Content and Oversight	B.S., Civil Engineering 1983 To Present
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Kathleen Ames	General Content and Impact Review	M.S., Environmental Engineering B.A., Biology 1974 To Present
Michael Bruns	Noise Analysis Review	B.S., Thermal and Environmental Engineering 1973 To Present
Susan Dees	Natural Resources Coordination, Analysis, and Review	B.S., Zoology 1991 To Present
Peter J. Frantz, P.E.	General Content and Oversight	B.S., Civil Engineering 1966 To Present
Amy Spies Karhliker	Water Quality and Wetland Resources Coordination, and Section 404 Permit Review	B.A., Anthropology 1997 To Present
Richard Nowack	Natural Resources Coordination, Analysis, and Review	B.S., Biology 1976 To Present
Charles Perino	Water Quality and Wetland Resources Coordination, Analysis, and Review	Ph.D., Plant Taxonomy M.S., Plant Taxonomy B.S., Geology 1973 To Present
George B. Rose	Natural Resources Coordination, Analysis, and Review	Ph.D., Ecology M.S., Zoology B.A., Zoology 1970 To Present

Name	Area of Expertise	Degree and Years of Experience
John L. Rowley	Agriculture Coordination, Analysis, and Review	B.S., Agriculture Education 1959 To Present
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John A. Walthall	Archaeological Coordination, Analysis, and Review	Ph.D., Archaeology M.A., Anthropology B.A., Anthropology 1967 To Present
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Walt Zyznieuski	Air Quality Coordination, Analysis, and Review	M.A., Environmental Studies 1981 To Present
IDOT Central Office, Office of Planning and Programming		
Carla Berroyer	General Content and Oversight	B.S., Liberal Arts 1976 To Present
Randy Blankenhorn	General Content and Oversight	B.S., Business Administration 1984 To Present
Illinois State Toll Highway Authority		
Clarita R. Lao, P.E.	General Content and Oversight	Graduate Studies, Public Administration B.S., Civil Engineering 1977 To Present
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Christine Norrick, AICP	Environmental Planner	M.U.P., Urban Planning B.A., Urban Planning 1985 To Present
Jim Miller, P.E.	Transportation Engineer	M.S., Civil Engineering B.S., Civil Engineering B.S., Physics 1994 To Present
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Name	Area of Expertise	Degree and Years of Experience
Kim Kolody	Transportation Engineer	M.S., Civil Engineering B.S., Civil Engineering 1997 To Present
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Jeff Barnett	Transportation Engineer/GIS	M.S., Civil Engineering B.S., Civil Engineering 1997 To Present
Jason Cole	Transportation/Environmental Planner	B.S., Civil Engineering 1999 To Present
T. Y. Lin BASCOR—Subcontractor		
John McCormick, P.E.	Transportation/Environmental Planner	M.S., Civil Engineering B.S., Civil Engineering 1985 To Present
Joel Marhoul, P.E.	Transportation/Environmental Planner	B.S., Civil Engineering B.A., Political Science 1996 To Present
Jackie Stevenson, P.E.	Transportation/Environmental Planner	B.S., Civil Engineering 1988 To Present
Amalia M. Baymundo	Transportation/Environmental Planner	B.S., Civil Engineering 1999 To Present
Huff and Huff—Subcontractor		
Linda Huff, P.E.	Environmental Scientist	M.S., Chemical Engineering M.B.A., Econometrics 1976 To Present
James Novak	Environmental Scientist	B.S., Environmental Studies 1989 To Present
Erica Spolar	Transportation Engineer	B.S., Civil Engineering 1993 To Present
Sean LaDieu, P.E.	Civil Engineering	B.S., Civil Engineering 1993 To Present
Amy Moon	Environmental Scientist	M.S., Biology 1996 To Present
Cindee Walsh	Natural Resources	B.S., Landscape Architecture 1986 To Present
Scott Bretcha	Natural Resources	B.S., Biology 2000 To Present
Vlecides-Schroeder Associates—Subcontractor		
Joanne Schroeder	Transit Planner	Graduate Studies, Urban and Regional Planning B.A., French 1968 To Present
Beata Walsh	Transit Planner	M.A., Policy Planning B.A. 1973 To Present
Virginia Morin	Transit Analysis	B.A. 1975 To Present

Name	Area of Expertise	Degree and Years of Experience
Thomas Donalek	Transit Research and Analysis	Graduate Studies, Architecture B.A., Architecture 1996 To Present
ARI—Subcontractor		
Karen Poulson	Archaeology	M.A., Anthropology B.A., Anthropology 1986 To Present
David Keene	Archaeology	Ph.D., Anthropology M.A., Philosophy B.S., Anthropology 1981 To Present
Heritage Research—Subcontractor		
Michael McQuillen	Archaeological History and Historic Preservation	M.S., Historic Preservation 1998 To Present
John Vogel	Archaeological History and Historic Preservation	Ph.D., American History 1980 To Present
Land Design Collaborative—Subcontractor		
James Gamble	Visual Assessment	B.A., Landscape Architecture 1987 To Present
Robert Zolomij	Visual Assessment	M.A., Landscape Architecture B.S., Landscape Architecture 1986 To Present
Telford Consulting—Subcontractor		
Michael Goode	Mass Transit Project Development and Implementation	M.B.A. B.S., Civil Engineering 1971 To Present
Consoer Townsend Envirodyne—ISTHA General Engineering Consultant		
William M. Barbel	Environmental Documentation	1965 To Present
Brian J. Smith	Environmental Documentation	M.S., Geography and Planning B.S., Wildlife and Fisheries Sciences 1983 To Present
al Chalabi Group—IDOT Consultant		
Suhail al Chalabi	Population and Employment Forecasts	M.Sc., Ekistics (Planning) B.A., Architecture 1983 To Present

SECTION 7

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APPENDIX A

Thematic Organization of GIS Database

	Layer Name	Source	Description	Scale	Date
TRANSPORTATION	AIRPORT	USGS / LCTIP	Airports from USGS Modal Transport layer	1:24000	January 1999
	BIKE95	NIPC	NIPC Bike paths	1:24000	August 1995
	CBF	CBF	CBF recommended and cautionary bicycle routes	Unknown	1998*
	IDOTROADS	IDOT	IDOT Road Inventory (IRIS) Database	1:100000	Unknown
	IDOT Signals	Lake County	Signalized intersections by IDOT	Unknown	August 2000
	LCDOT Signals	Lake County	Signalized intersections by Lake County DOT	Unknown	August 2000
	METRARAIL	RTA	Metra commuter rail lines	Unknown	1998*
	PACEB	Pace Bus	Updated Pace Bus Routes 1999	Unknown	1999
	PACEBUS-CL	Pace Bus	Pace Bus Routes	Unknown	1997
	RD	USGS	USGS Roads	1:24000 and varies	1998*
	RR	USGS	USGS Railroads	1:24000 and varies	1998*
	STATIONS	RTA	Metra commuter rail stations	Unknown	1998*

* Date compiled or obtained from source

	Layer Name	Source	Description	Scale	Date
ENVIRONMENTAL	ADID	Lake County	ADID Wetlands in Lake County	Unknown	1992
	AADID	LCTIP	Master ADID wetlands within 500 ft of proposed improved routes adjusted to aerial photography base	Unknown	2000
	AQMB300	IGIS CD-ROM	Major bedrock aquifers within 300 ft of ground surface	1:500000	1986
	AQMB500	IGIS CD-ROM	Major bedrock aquifers within 500 ft of ground surface	1:500000	1985
	AQMBG500	IGIS CD-ROM	Major bedrock aquifers at depths greater than 500 ft below ground surface	1:500000	1985
	AQMSG	IGIS CD-ROM	Major sand and gravel acquifers	1:500000	1985
	AWETFINAL	LCTIP	Field verified wetlands proximate to the two finalist alternatives	Unknown	2000
	BASINS	Lake County SMC / LCTIP	Watersheds and sub-basins	Unknown	1998
	BSC-LINE; BSC-POLY	IDNR	IDNR Biological Streams Characterization	Unknown	1993
	CTYHYD	Lake County	Lake County Hydric Soils	Unknown	Unknown
	ENV_CONSTR	LCTIP	Areas identified by the LCTIP as potentially high-impact	Unknown	1999
	ENV_PHOTO	LCTIP	Points identifying location of photographs	Unknown	1999
	FEMA	FEMA CD-ROM	FEMA Q3 Flood data	1:24000	1996
	GAUGESTN	IEPA / LCTIP	Water qulity gauging stations	Unknown	Unknown
	LAKES	USGS	Lakes from USGS Hydrological features layer	1:24000	1998*
	LANDCOV	IDNR	IDNR Land Cover	Unknown	1996
	LCWI	Lake County	Lake County Wetlands Inventory (LCWI)	Unknown	1992
	ALCWI	LCTIP	LCWI wetlands within 500 ft of proposed improved routes adjusted to aerial photography base	Unknown	2000
	MCHWET	NIPC	ADID Sites in McHenry County	Unknown	1998
	NWIWETLAND	US FWS	National Wetlands Inventory (NWI)	Unknown	Unknown
	STREAMS	USGS	Streams from USGS Hydrological features layer	1:24000	1998*
	STREAMS-POLY	USGS	Streams from USGS Hydrological features layer	1:24000	1998*
	TANDE	IDNR	IDNR Threatened and Endangered (T&E) Species	Unknown	1998*
	TOXIC	EDR	EDR Hazardous Waste sites	Unknown	1998*
	WELLS	IGIS CD-ROM	IDNR Wells	Unknown	1995
	WELLSPLS	IDNR	IDNR Wells plus additional attribute data for public wells	Unknown	1995/1999

* Date compiled or obtained from source

	Layer Name	Source	Description	Scale	Date
DESIGNATED LANDS	FIN_LOCPRK	LCTIP	Local Parks proximate to the teo finalist alternatives	Unknown	2000
	FORPRES	Lake County Cook County McHenry County/ LCTIP	Lake and Cook County Forest Preserves and McHenry County Conservation Districts (digitized by the LCTIP)	Unknown	1998*
	NATAREA98	IDNR	Illinois Natural Areas Inventory Sites	1:24000	1998
	NATPRES	IDNR	Nature Preserves	1:24000	1998
	PARKS3	NIPC	NIPC Greenways Plan Parks	Unknown	1990
	STPARK	IGIS CD-ROM	State Parks	1:24000	1992
	TRAILS3	NIPC	NIPC Greenways Plan Parks	Unknown	1990

* Date compiled or obtained from source

	Layer Name	Source	Description	Scale	Date
SOCIOECONOMIC	ARCHMOD	Illnois State Museum	Archaeological predictive model	1:500000	1994
	ARCHSITES	IHPA	Archaeological sites	Unknown	2000
	ASTRUCTURES	LCTIP	Structure outlines for buildings proximate to the two finalist alternatives	Unknown	2000
	CEMETERY	USGS / LCTIP	Cemeteries from USGS manmade features layer, IDNR and other sources	Unknown	1998*
	ACEMETERY	LCTIP	Cemeteries within 500 ft of proposed improved routes adjusted to aerial photography base	Unknown	1999
	CHURCH-POLY	USGS / LCTIP	Churches – polygons from USGS manmade features layer	1:24000	1998*
	CHURCH-PT	USGS / LCTIP	Churches – points from USGS manmade features layer	1:24000	1998*
	EMPLOYER	Lake County / LCTIP	Lake County Employer database – 70% match geocode	Unknown	1998*
	GOLF	USGS / LCTIP	Golf courses from USGS manmade features layer and other sources	1:24000	1999
	HISTDIST, HISTSITE	NPS / LCTIP	National Register of Historic Places - sites and districts	Unknown	Unknown
	HOSPITAL	USGS / LCTIP	Hospitals – polygons	1:24000	1998*
	LANDUSE	NIPC / LCTIP	1990 NIPC Landuse (updated to 1997 from Aerial photography)	1:24000	1997
	QPLSS-CL	NIPC	NIPC quarter-section boundaries	Unknown	1995
	QPLSS-AGG	LCTIP	Aggregated NIPC quarter-sections (to rough 9-sq mile areas) for exhibits	Unknown	Unknown
	PNAORDNB20.DAT	Al Chalabi Group	Project No Action No-Build Scenario 2020 Population and Employment figures by quarter-section	Unknown	Unknown
	ORD20.DAT	NIPC	INFO FILE – Fall 1997 release of the O'Hare No-Build Scenario forecast 2020 Population and Employment figures by quarter-section	Unknown	Unknown
	ORD96.DAT	NIPC	INFO FILE – Fall 1997 release of the O'Hare No-Build Scenario 1996 Population and Employment figures by quarter-section	Unknown	Unknown
	ORD90.DAT	NIPC	INFO FILE – Fall 1997 release of the O'Hare No-Build Scenario 1990 Population and Employment figures by quarter-section	Unknown	Unknown
	QSPOPEMP.DAT	NIPC	CATS Conformity Analysis 2020 population forecasts	Unknown	Unknown
	SCHOOL-POLY	USGS / LCTIP	Schools – polygons from USGS manmade features layer	1:24000	1998*
	SCHOOL-PT	USGS / LCTIP	Schools – points from USGS manmade features layer	1:24000	1998*

* Date compiled or obtained from source

	Layer Name	Source	Description	Scale	Date
BASE MAPPING	BD	USGS	USGS Boundary features	1:24000	1998*
	COUNTY	IGIS CD-ROM	County Boundaries	Unknown	Unknown
	HP	USGS	USGS Elevation Contours	1:24000	1998*
	MS	USGS	USGS Manmade features	1:24000	1998*
	MS-PT	USGS	USGS Manmade features – points	1:24000	1998*
	MUNIC	Lake County / IGIS CD-ROM	Municipal Boundaries	Unknown	1996
	ORTHO	CH2M HILL; Walker and Associates	Orthodigitally rectified aerial photography covering the study area	1:400	1997
	PLSS	IGIS CD-ROM	Public Land Survey System section boundaries	1:24000	1998*
	PLSS_TSHIPS	IGIS CD-ROM / LCTIP	Public Land Survey System township boundaries	1:24000	1998*
	QUADS	IGIS CD-ROM	USGS 7.5' quad boundaries	Unknown	1992
	SAB	LCTIP	Study Area Boundary	Unknown	1998*
	SC	USGS	USGS Surface Cover	1:24000	1998*
	TWNSHIPS	Lake County / LCTIP	Political Townships	Unknown	1999
	UTIL	USGS / LCTIP	Power Lines	Unknown	Unknown

* Date compiled or obtained from source

1) IDOT = Illinois Department of Transportation

2) IGIS CD-ROM = Illinois Geographic Information System CD-ROM (IL Department of Natural Resources)

3) USGS = U.S. Geological Survey

4) LCTIP = Lake County Transportation Improvement Project

5) IHPA = Illinois Historic Preservation Agency

6) NIPC = Northeastern Illinois Planning Commission

7) EDR = Environmental Data Resources, Inc.

8) CBF = Chicagoland Bicycle Federation

9) RTA = Regional Transportation Authority

10) ESRI = Environmental Systems Research Institute, Inc.

11) Lake County SMC = Lake County Stormwater Management Commission

The Socio-Economic, Land Use and Accessibility Impacts of Finalist Transportation Alternatives in Lake County, Illinois

Prepared for the
Illinois Department of Transportation
and the
Illinois State Toll Highway Authority

August 24, 2001

ACG The al Chalabi Group, Ltd.

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(continued)

The Socio-Economic, Land Use and Accessibility Impacts of Finalist Transportation Alternatives in Lake County

I. Introduction - The Assignment

The Illinois State Toll Highway Authority (ISTHA) and the Illinois Department of Transportation (IDOT) are undertaking, jointly, a study of transportation problems and their potential solutions in Lake County. Two finalist transportation improvements have been identified. One key component of this study is the quantification of the impacts on development in Lake County of these two finalist alternatives, which are:

- The IL-53 Extension Alternative
- The IL-83/US 45 with US 12 Alternative

In support of this study, IDOT commissioned The al Chalabi Group, Ltd. (ACG) to prepare a set of socio-economic, accessibility and land use forecasts that were to be used to generate the transportation forecasts and the evaluation measures of the finalist alternatives. The study recognizes that these socio-economic, accessibility and land use forecasts, themselves, are influenced both by the proposed transportation improvements and the time that those improvements are put into place.

The assignment required ACG to determine the impact of each of the major transportation improvements in the Study Area proposed by the October 1997 adopted 2020 Regional Transportation Plan (RTP). Once the socio-economic impact of each project was identified, it was possible to sum these project impacts for alternatives. The first task of the analysis was to generate a set of socio-economic forecasts for a "baseline" transportation alternative (i.e. the "No Action" Alternative). The No Action (Baseline) Alternative assumes that all RTP projects outside the study area, except those listed below, will be built according to the RTP schedule. It also assumes the implementation of most, but not all, of the RTP projects proposed for Lake and Eastern McHenry Counties, including improvements to 74 miles of existing arterials. The specific RTP projects that are not included in the No Action (Baseline) Alternative are:

- The IL-53 Extension.
- The circumferential rail transit service along the existing EJ & E right-of-way.
- The extension of the improved rail service of the current Metra-Milwaukee North Line beyond its existing terminus at Fox Lake near the McHenry County Line. The RTP recommended extending this line into the Town of Richmond in McHenry County.

The impacts of the two finalist alternatives were then to be measured, separately and independently, against this No Action (Baseline) Alternative. This analysis required the development of three sets of socio-economic forecasts:

- No Action (Baseline) Alternative
- IL-53 Extension Alternative
- IL-83/US45 with US12 Alternative

Exhibit 1 shows the projects included in the IL-53 Extension Alternative. Exhibit 2 shows the projects of the IL-83/US 45 with US 12 Alternative.

The methodology for this impact analysis is described in the following chapter of this report. This report is a summary of several analyses, the first of which was presented in the report, The Socio-Economic and Land Use Impacts of 2020 Regional Transportation Plan (RTP) Projects in Lake County, published in May 1999.

Lake

McHenry

Cook

Existing Commuter Rail
Rail Service Enhancements
Proposed IL-53 Extension (RTP)
I-94 Add-lanes (RTP)
No Action Roadway Improvements
Existing Major Roads
Limited Access Road
Primary Road
Secondary Road
NIPC Planning Zones
County Boundary

Exhibit 1
Proposed Transportation Improvements
IL-53 Extension Alternative

Prepared by
ACG: The al Chalabi Group, Ltd.
August 2001

6 0 6 12 Miles

Lake

McHenry

Cook

Exhibit 2
Proposed Transportation Improvements
IL-83/US 45 With US 12 Alternative

- Existing Commuter Rail
- Rail Service Enhancements
- I-94 Add-lanes (RTP)
- I-94 Add-lanes (Additional)
- No Action Roadway Improvements
- Finalist Build Alternative Improvements

Existing Major Roads

- Limited Access Road
- Primary Road
- Secondary Road
- NIPC Planning Zones
- County Boundary

Prepared by
ACG: The al Chalabi Group, Ltd.
August 2001

6 0 6 12 Miles

II. The NIPC/CATS Regional Transportation Planning Process and Forecasts

A. Historical Background

The 2020 Regional Transportation Plan (RTP), adopted in October 1997, represents the eighth comprehensive transportation plan for the Chicago region. The first such plan was prepared in the early 1960's with a 1980 planning horizon. Each planning cycle introduced methodological improvements which attempted to better replicate actual individual and societal behavior given varying transportation proposals. The 2020 planning process incorporated an important improvement; it internalized the interrelationship between socio-economic forecasts and the resultant transportation plan.

Prior to the 2020 planning cycle, NIPC had generated its socio-economic forecasts using as input:

- The Commission's adopted development policies and plans, including the prior adopted RTP.
- The extent of existing development (land use and infrastructure) and availability of developable land.
- The prevailing social and economic market conditions in the Chicago region and its component sub-areas.

The Chicago Area Transportation Study (CATS) used the NIPC socio-economic forecasts to evaluate alternative transportation plans and to recommend a plan for adoption. The adopted transportation plan then became one of the inputs used by NIPC to generate the next cycle of its socio-economic forecasts.

The 2020 Regional Transportation Plan cycle integrated these two processes. It started with an initial set of socio-economic forecasts which were used to generate alternative transportation improvements which, in turn, generated the socio-economic forecasts that would result if the proposed improvements were implemented. Determining the interrelationships between transportation improvements and urban development has been made possible by the adaptation, by NIPC, of the DRAM/EMPAL forecasting model and the availability, at CATS, of a sketch (quick-responding) transportation model, the Combined Model.

B. Theoretical Underpinning of the DRAM/EMPAL and Combined Models

The theoretical construct of the DRAM/EMPAL Model is that accessibility influences locational decision which, in turn, influences accessibility. In selecting a

location for an activity (e.g. industrial plant, office building, residence), the decision-maker considers the accessibility of the various potential sites to concentrations of various activities (e.g. labor force, job concentrations, schools, recreational activities). This fact is general knowledge to every market analyst, real estate broker and developer; and is used in conducting their day-to-day business. It also is understood that improving the access of developable or redevelopable sites increases the development potential of those sites. The access measures provided to NIPC, for use in its DRAM/EMPAL model, are generated by CATS using the "Combined Model."

The Combined Model, as reflected in its name, combines the trip distribution, modal split and highway assignment steps into a single process. Its measure of impedance is a composite cost of travel by both transit and highway. This is an important distinction. For several reasons, primary among which is the substantial degree to which transit is used in this region, the modal split is influenced, significantly, by the contribution of transit as well as highways to this combined impedance. This impedance is the only variable, among the many DRAM/EMPAL variables, which changed when examining the impact of the Regional Transportation Plan, in general, and the proposed IL-53 Extension Alternative or IL-83/US 45 with US 12 Alternative, in particular, on socio-economic forecasts. All other variables, such as: existing development by type, existing infrastructure (highways, transit, sewerage, utilities, etc.), available developable land, redevelopment potential, density, local plans, etc., are assumed to remain constant.

Both highway and transit facilities are contributors to regional development. In regard to the model outputs, if the transit or highway does not improve accessibility (reduce impedance) to an area, that area will not attract development as a result of the highway or transit improvement. However, it also is true that, if the transit or highway does not improve accessibility, the Combined Model (or any other transportation model) will not assign significant ridership to that proposed transit or vehicles to the proposed highway.

C. The NIPC Socio-Economic Forecasts

The NIPC socio-economic forecasts, generated in the Spring of 1997, developed two ground transportation improvement alternatives. The first set assumed no transportation improvements beyond those already committed by 1996, henceforth referred to as the No-RTP alternative. The second set assumed the implementation of all the ground transportation improvements recommended in the 2020 RTP, henceforth the RTP alternative.

It should be noted that the arterial improvements in the RTP alternative were general and not specific to exact location. The specific arterial improvements as included in the No Action (baseline) were detailed with the participation of County and local officials using the guidelines set forth in the RTP. In addition, the RTP

included a circumferential commuter rail (EJE) which is not included in the No Action (baseline) alternative. With the exceptions noted above, the only remaining difference between the RTP and No Action (baseline) alternatives is the IL-53 Extension.

During the development of the RTP, the issue of meeting the future aviation needs of the Chicago region was unresolved; it remains unresolved to this date. Accordingly, two airport development scenarios were evaluated:

- Accommodating all the forecasted 2020 enplanements (82.3 million) at the two existing airports, O'Hare and Midway. (The Existing Airports Scenario).

- Accommodating the 82.3 million enplanements at O'Hare, Midway and a new, supplemental South Suburban Airport. (The South Suburban Airport Scenario).

A total of four alternative forecasts were prepared by NIPC. Table 1, following, shows 1990 and 2020 Lake County population and employment, and differences in population and employment growth between the RTP and No-RTP for each of the two airport scenarios.

Because of its proximity to O'Hare, Lake County would experience slightly more growth in both population and employment (approximately 6 and 5 percent, respectively) under the Existing Airport Scenario than under the South Suburban Airport Scenario. This was the alternative used throughout this analysis.

Table 1
Impacts of 2020 Regional Transportation Plan Projects
Population and Employment Forecasts
Lake County, Illinois

	No-RTP Alternative	RTP Alternative	Differences (RTP minus No-RTP)
1990 Statistics			
Population	516,401	N/A	N/A
Employment	228,606	N/A	N/A
2020 Existing Airports			
Population	772,411	832,884	60,473
Employment	389,528	393,989	4,461
2020 South Suburban Airport			
Population	749,306	806,194	56,888
Employment	351,346	355,600	4,254
1990-2020 Existing Airports			
Population	256,010	316,483	60,473
Employment	160,922	165,383	4,461
1990-2020 South Suburban Airport			
Population	232,905	289,793	56,888
Employment	122,740	126,994	4,254

Note: As part of its 2000 update and revision of regional socio-economic forecasts, NIPC lowered its 2020 population forecasts for Lake County and increased its 2020 employment forecasts (by approximately 26,000 and 33,000, respectively). The advanced stage of ACG's analysis precludes use of these revisions. However, the changes, particularly in regard to differences between RTP and No-RTP Alternatives, are relatively insignificant; the differences are 336 persons and 1,415 jobs fewer.

III. Methodology for Disaggregating the RTP System Impacts to Impacts of Individual Projects

A. Overview

The NIPC/CATS forecasts, generated in the Spring through the Fall of 1997, provided the controls for all the forecasts prepared by ACG. The NIPC/CATS forecasts, and associated data, are quite extensive and voluminous and cover a wide spectrum of activities:

- The NIPC population and employment forecasts for the RTP and No-RTP networks by each of NIPC's 317 planning zones (usually 9 square miles) as well as CATS subzones (usually a quarter square mile).

- Change in highway work-trip interchange tables between RTP vs. No-RTP alternatives and transit boardings and alightings.

- Change in impedances, as generated by the CATS Combined Model, resulting from the addition or subtraction of individual or groups of transportation projects.

The NIPC/CATS forecasts provided the collective impacts of all RTP projects. At the initiation of the Lake County Transportation Improvement Project the DRAM/EMPAL model was not tested for evaluating impacts of individual projects. It was not practical to wait for the completion of the necessary research by NIPC to allow for the application of the DRAM/EMPAL to specific projects. The socio-economic forecasts constitute the first step of generating the transportation data necessary for alternative analysis. Accordingly, iterative estimates were undertaken to generate the socio-economic impacts from the extensive NIPC and CATS regional data. And, to ensure that the resultant project-specific impacts and forecasts were consistent with the NIPC methodologies, policies and guidelines, several intermediate presentations were made to Commission staff. Upon completion of the forecasts by ACG, they were presented to the NIPC Planning Committee. Following this presentation, NIPC concluded, "(I)t is our staff judgment that the method ACG used to allocate the forecasts among projects is a reasonable one and that the results are consistent with the Commission's endorsed forecasts". The full NIPC letter is included in the Appendix.

The ACG methodology can best be described as a rigorous accounting system, with many logical constraints, that:

- Balances increases in the attractiveness of an area for development with decreases in other areas and balances the sum total of net changes, by zone, with the NIPC control totals.

- Relates changes in travel impedances to changes in the development potential of planning zones.

- Balances commuter rail boardings and/or highway work-trips with connections between jobs and labor force.

- Balances the subtotal of the impacts of specific projects with the impacts of the RTP system, both on a region-wide basis and by NIPC planning zone.

Two specific methods were used in allocating the full impact of all the RTP projects, as forecasted by NIPC, to each of the specific transportation projects. The first method pairs areas which would experience more growth with those of lesser growth and links these pairings to changes in accessibility caused by individual projects. Accessibility differentials are presented as a 317 by 317 matrix (NIPC planning zones). Two sets of such accessibility matrices were available: the first, presented differences between building the full RTP and no RTP projects; the second, presented the impact of the IL-53 Extension, alone. The accessibility impacts of other projects, collectively or individually, are deduced from these two sets.

The second method recognizes that the changes in accessibility, due to a specific project, impact not only development but also the level of utilization of these projects. Transit and highway projects which improve accessibility attract riders and drivers, respectively. Changes in the points of origin and destination of work trips, under various transportation alternatives, reflect the socio-economic changes due to transportation improvements.

B. Population and Employment Impacts of the RTP System

Exhibits 3 and 4 show the NIPC-generated population change, 1990 - 2020, by NIPC planning zone, assuming No-RTP and RTP, respectively. Under both alternatives, the NIPC forecasts show that most of the growth does occur in the region's core (i.e. the City of Chicago inner communities) or its outer rings. The intermediate rings (i.e. the City of Chicago edge communities and the inner suburbs), especially the fully-developed suburbs around O'Hare, experience no significant growth and, in many cases, show a decline in population. Some of this lack of residential growth can be attributed to the scarcity of developable land and the ability of commercial and office development to outbid other uses. However, a portion of the outward dispersal of population also can be attributed to the proposed transportation improvements.

Exhibit 5 shows the difference in the NIPC 2020 population forecast, by NIPC planning zones, between the RTP and No-RTP alternatives. It is evident from this map that the implementation of the highway and transit projects of the RTP would

facilitate the growth of population, outward, predominately toward the northern, northwestern and western parts of the region. According to NIPC, the City of Chicago (especially its central core) as well as most of Cook and DuPage Counties, attract fewer persons under the RTP than under the No-RTP. Balancing this, most of Lake and eastern McHenry and Kane Counties would attract more people under the RTP.

Shown on Exhibit 5 are the major RTP projects in Lake County and eastern McHenry County. These projects include: the extension of IL-53, widening of I-94, double-tracking of the North Central Service (NCS) and UP Northwest rail service improvement. All have impacts on the urban development of Lake County. Arterial improvements are not shown as they are too dispersed. However, these arterials, collectively, also impact development; and such impacts need to be, and are, estimated in this analysis. Overall, the implementation of the RTP would cause a shift in forecasts of approximately 124,000 persons from the blue areas (losses) to the brown areas (gains) in Exhibit 5. Lake County would be the recipient of approximately one half of the gains.

Exhibit 6 shows the difference in the NIPC 2020 employment forecasts. The pattern in this exhibit is the opposite of the population shifts. The implementation of the RTP would cause the greater centralization of employment. Employment growth in outer McHenry, Central Will and Southwestern Cook would be less under the RTP scenario. This lesser growth would be balanced by greater growth in the Chicago Central Area, the vicinity of O'Hare and South-central Lake County. Approximately 58,000 forecasted jobs would be shifted from the blue areas (less) of Exhibit 6 to its brown areas (more). The net impact of job shifts in Lake County is smaller and forecasted to be an additional employment of 4,461.

The concentration of jobs at points accessible by transit or highway allows people to reside farther out, along these transportation facilities. The NIPC DRAM/EMPAL model recognizes this relationship. The NIPC forecasts, concluding that implementation of the RTP would result in further dispersion of population and greater concentration of jobs, is a geographic manifestation of this relationship. Both transit and highway projects are contributors to this phenomenon.

Exhibits 7 and 8 show the residential (household) and non-residential (employment) changes that have taken place recently in the region and study area, respectively. The source of the former data is NIPC/Census; the source of the latter is the Illinois Department of Employment Security. Exhibit 6 shows that Lake County has grown by 21,763 households between 1990 and 1995. This growth was slightly higher than that forecast by NIPC for the same period. Much of this growth is in the central part of the county. Subsequent 2000 Census data shows the 1990-2000 growth for Lake County population at 127,938, indicating a continuous growth at an even higher rate. Exhibit 7 shows employment change in Lake County, between 1991 and 1997, with a growth of 48,218 jobs. Employment growth is one and a half times that forecasted by NIPC for the same period. These recent

developments reinforce the basic findings of the NIPC forecasts that Lake County will experience substantial growth in population and employment whether or not the IL-53 Extension is built.

C. Determining the Development Impacts on Population and Employment Distribution of the Individual Transportation Projects in Lake County (IL-53 Extension Alternative)

1. Collective Impacts of RTP with IL-53 Extension Alternative

The preceding section showed the collective impacts of the entire RTP system on the development of Northeastern Illinois. The collective impacts of all the RTP projects (both highway and transit) on Lake County are:

- 60,473 more persons by 2020
- 4,461 more jobs by 2020

These additional persons and jobs in Lake County have been predicted by the NIPC DRAM/EMPAL model because the RTP improves the accessibility of Lake County to the rest of the region, especially to the areas with high concentrations of jobs. This 60,473 added persons represents an 11.7 percent growth of the population, 1990 to 2020. Added jobs represent a 2.7 percent employment growth in Lake County, 1990-2020.

NIPC has determined that the 2020 forecasts for the six-county region, as a whole, would remain the same whether or not the RTP projects were implemented. Accordingly, the additional population and employment forecasts in Lake County due to the RTP Build, must be balanced with lower forecasts elsewhere in the region. Also, it should be noted, that the implementation of the RTP system would cause forecast shifts within Lake County, itself.

The impact of each individual transportation project on urban development (i.e. population, households, jobs, etc.) for a specific area is proportional to that project's ability to improve the accessibility of that area to various parts of the region. This is the basic theoretical construct of NIPC's DRAM/EMPAL model. Accessibility is measured in terms of impedance - a combined measure of travel time and cost. The DRAM/EMPAL model also is sensitive to the timing of the transportation improvements. Projects which are completed early in the planning period would have more of an impact on development, in 2020, than projects which would not be completed until later in the planning period. Areas opened to development early have a longer period over which to mature and expand. As stated earlier, ACG relied completely on the data input and output of the NIPC DRAM/EMPAL and the related CATS transportation models for disaggregating the RTP system-wide impacts into the impacts of individual projects.

The RTP impact of 60,500 persons had been attributed, by some, solely to the proposed IL-53 Extension Alternative. This, clearly, is not supported by the facts. The following summary of the disaggregating analysis shows that transit projects contribute approximately 23,000; IL-53 Extension, 27,500; and other highway improvements, 10,000 persons. In its letter of 11/30/98, NIPC concludes that these disaggregations are reasonable. In its letter of 5/10/99, NIPC reconfirms that its forecasted RTP impacts of 60,473 represent the impact of all transportation projects, not the impact of the IL-53 Extension, alone. Copies of these letters are included in the Appendix.

2. Population Impacts of Rail Projects

a. Method I - Changes in Accessibility

As stated earlier, two separate methods were used to estimate the impacts of rail improvements on the population forecasts. The first method examined the changes in accessibility due to transit improvements as compared to highway improvements. The NIPC DRAM/EMPAL model forecasted that the implementation of the RTP would cause zones in the Central Area of the City of Chicago, which are within four miles of Union Station, to have 27,226 fewer people than if the No-RTP scenario is implemented. The implication of this finding is that this represents people who would have lived closer to the job concentration of the Chicago Central Area if there were no RTP improvements. Conversely, the RTP projects would allow these persons to live farther out (predominantly in Lake, McHenry and Kane Counties) and commute to the jobs in the Chicago Central Area.

The forecast of fewer persons for the Chicago Central Area is not due to fewer jobs there. Actually, the number of jobs in the above-cited zones (within four miles of Union Station) would be 4,740 higher under the RTP. The sole reason why the population in this area would be lower is the improved accessibility. The remaining questions are: whether this improvement in accessibility between the Chicago Central Area and outer zones in Lake, McHenry and Kane Counties is due to transit or highway improvements; and what percent of the change in population can be specifically assigned to Lake County. Before proceeding with answering these questions, it should be noted that the areas adjacent to the North Central Rail Stations - from the limits of the Central Area to O'Hare - exhibit some of the same characteristics as the Chicago Central Area. Within the six zones adjacent to the stations along this rail between the Central Area and O'Hare Airport, there would be 7,603 fewer persons and 8,570 more jobs under the RTP scenario.

The population of Lake County would be experiencing a gain of 60,473 under the RTP scenario. This gain represents approximately one-half the shifts of population resulting from the implementation of the RTP. Actually, of the 20 NIPC zones with the greatest gain under the RTP scenario, 14 of them are located within Lake County. ACG mapped and analyzed the changes in accessibility from each of the Lake County zones due to:

- implementation of all RTP projects (RTP impedances minus No RTP impedances)

- implementation of the IL-53 Extension, alone.

This analysis, as described in the following text and tables, revealed that very little of the change in accessibility from Lake County to the Chicago Central Area or the zones adjacent to stations on the North Central Service could be attributed to the IL-53 Extension. This is accomplished in a three-step process. Table 2 shows the changes in impedances (from the combined model) to one of 13 zones in the Chicago Loop (Zone 18), under each of the two transportation scenarios, for each of the 14 Lake County Zones with the greatest population gains.

Table 2
Changes in Accessibility Due to All RTP Projects and IL-53 Extension Alone From Selected Zones in Lake County to Zone 18 in the Chicago CBD

		Changes in Accessibility		
Lake County Zone	**Population Gain Due to RTP**	**Due to All RTP Projects**	**Due to IL-53 Extension**	**% Due to IL-53 Extension**
416	6,363	2.04	0.02	1%
423	5,498	3.91	0.05	1%
429	5,166	0.48	0.13	27%
411	3,904	2.75	0.01	0%
412	3,022	2.60	0.04	2%
405	2,839	2.21	0.04	2%
420	2,812	2.26	0.08	4%
417	2,510	1.19	0.48	40%
431	2,347	2.98	0.04	1%
403	2,312	1.93	0.04	2%
401	1,972	1.52	0.04	3%
404	1,935	2.10	0.06	3%
410	1,926	2.15	0.06	3%
407	1,782	0.93	0.16	17%
Total	**44,388**	**2.15**	**0.08**	**4%**

The above-described process was repeated for each of the 13 Central Area Zones. Table 3 shows the average share of improvement in accessibility that can be

attributed to the IL-53 Extension, from each of the 13 Central Area Zones; this calculated share is shown in the third column. This table also shows that population which would shift out of each zone if the RTP is implemented. Using these population shifts for each zone and the calculated shift due to the IL-53 Extension, the IL-53 Extension share is estimated to account for 20 percent of the improvement in accessibility between the Central Area and Lake County. With only one minor exception, (add lanes to I-94) addressed later, there are no other major highway improvements that can claim a share of the improvement in accessibility between these Lake County Zones and the Chicago Central Area. Consequently, rail must be responsible for a maximum of 80 percent of the growth that would shift from the Chicago Central Area to Lake County.

Table 3
Percent of Accessibility Improvement
Due to IL-53 Extension
Summary and Weighted Average
All Chicago Central Area Zones to Lake County

Central Area Zone	Population Shift Out Due to RTP	% Due to IL-53 Extension	Population Shift Due to IL-53 Ext.
5	845	6%	51
12	1,590	20%	318
13	5,750	24%	1,380
14	1,844	22%	405
15	2,263	13%	294
16	3,569	23%	821
17	994	7%	70
18	3,026	4%	121
19	1,632	16%	261
20	1,597	28%	447
21	1,269	33%	419
22	828	38%	315
23	2,019	22%	444
Total	**27,226**	**20%**	**5,346**

Lake County zones are the recipient of most of the benefit of commuter rail transit improvements. However, Eastern McHenry County will benefit from the upgrade of UP Northwest service to the town of McHenry; and South Cook County will benefit from the South Suburban Commuter Rail corridor to Crete. Allocating the shifts in population from the Chicago Central Area, due to transit improvements, to the three sub-areas on the basis of the sumproduct of the

population gain (due to the RTP projects in each sub-area and the forecasted transit ridership for each proposed commuter service) yields the following:

- Lake County - 75 % of Central Area shift due to transit
- McHenry County - 20 % of shift due to transit
- South Cook County - 5 % of shift due to transit

Using the above-cited relationships and the shifts calculated earlier, the population that would shift out of the Chicago Central Area into Lake County due to the implementation of the commuter rail improvements is calculated as follows:

- Total population shifting out of Chicago Central Area
  = 27,226
- Population shift to Lake County due to rail improvements
  = .8 * .75 * 27,226 = 16,336

The zones along the North Central Rail Stations from the Central Area limits to O'Hare are another concentration of population which, due to this rail improvement, would move into Lake County. Table 4 shows the average share of improvement in accessibility that can be attributed to the IL-53 Extension. On average, the IL-53 Extension accounts for 15 percent of the improvements in accessibility between these zones and Lake County.

Table 4
Percent of Accessibility Improvements
Due to IL-53 Extension
Summary and Weighted Average
North Central Stations (Central Area to O'Hare) to Lake County

North Central Zones	Population Shift Out Due to RTP	% Due to IL-53 Extension
9	2,092	19%
10	1,452	17%
11	1,405	18%
139	756	10%
141	499	8%
142	1,399	10%
Total	**7,603**	**15%**

No other outer County would improve its accessibility to the area as a result of the North Central double-tracking. However, there is a highway improvement project, other than the IL-53 Extension, which may improve accessibility between Lake County zones and the O'Hare vicinity. This project is the addition of one lane, in each direction, along the I-94, on the three-mile stretch from IL-22 to IL-60. There are no specific data on improvement in accessibility to the O'Hare Area due to

this add-lane project. However, this impact cannot exceed half the impact of the IL-53 Extension. Accordingly, the shift in population from the zones adjacent to North Central Stations to Lake County Zones can be calculated as follows:

Total population shift
= 7,603

Population shift due to IL-53 Extension
= .15 * 7,603 = 1,140

Population shift due to I-94 add lanes
= 1,140/2 = 570

Population shift due to North Central Rail
= 7,603 - 1,140 - 570 = 5,893

The I-94 add-lanes may have an impact on improving accessibility between the Chicago Central Area and eastern Lake County. However, the impact, if any, is very limited and is compensated for by not considering any shifts in population to Lake County from zones adjacent to UP Northwest Stations in Chicago (outside the Central Area) or Northwest Cook. All these shifts were assigned to the highway improvements.

In conclusion, the population shift to Lake County, due to the two major transit projects (North Central Rail and the UP Northwest) using the changes in accessibility method, is:

16,336 + 5,893 or 22,229

Similar calculations are used to estimate the shifts in population due to the EJ&E Circumferential Rail. The project would allow residents to live in Lake County and work in Northwest Cook or Western DuPage Counties. This improvement in access is forecasted to shift 2,000 persons from Western DuPage and Northwestern Will to Lake County. In many ways, the impact of this project is similar to that of the IL-53 Extension, although at a much smaller scale.

b. Method II - Changes in Rail Boardings

The improvement in accessibility due to the commuter rail improvements is reflected in the increase in the commuter rail boardings, as forecasted by Metra. The increase in commuter rail ridership was very significant for the two major transit projects considered: double-tracking the North Central Service; and improving the service on the McHenry (North) branch of the UP Northwest Line. The morning boardings, at the stations in Lake County, of the expanded North Central Service are forecasted to increase by more than 6,000 daily riders above the Metra study "baseline" forecast. The Metra study baseline forecasts reflect 2020

socio-economic activities (RTP scenario) while maintaining the existing level of service. It should be noted that the 2020 baseline ridership is higher than existing (1996) ridership. Another 3,500 residents of Lake County, above the Metra study baseline forecasts, are forecasted to ride the improved UP Northwest Line. These large numbers of riders (above the baseline) would not have been attracted to the rail system and, to the rail corridor, itself, if the rail had not improved the accessibility of the area. For comparison, ridership statistics show that only 9,572 Lake County workers commuted to work by rail in 1990.

The additional 9,500 daily morning riders (6,000 NC + 3,500 UP) from Lake County represent a doubling of rail riders over that of 1990. Their ability to live in Lake County and work in downtown Chicago, or in the vicinity of O'Hare, has been made both possible and desirable by the transit improvements. The population impact of the rail depends on whether one or more household members use the train for the trip to work. Assuming that each of these daily commuters represents one household, and recognizing that the NIPC-forecasted 2020 average household size for Lake County is 2.76, the maximum total population attracted to Lake County due to the improved commuter service would be 26,220. The minimum population impact can be derived by assuming that all workers in the household (estimated at 1.72) use the rail for work trips; this minimum population would be 15,244. The implications of the minimum level: if one worker in a household uses commuter rail, all other workers in the household would commute by rail.

As will be presented later, the double tracking of the North Central Service and the McHenry extension of the UP Northwest would cause the export of 6,600 jobs and the import of income. The imported income would, in turn, generate 2,600 local service jobs. Assuming that 50 percent of the holders of these jobs would chose to live in Lake County (1990 average of Lake County residents who worked there), and assuming 1.72 jobs per household, the secondary impact of the projects is:

- Households attracted to fill 50 percent of service jobs
  = 2,600 * .5/1.72

- Population of above households
  = 756 * 2.76
  = 2,086

Accordingly, the range of total population shifting to Lake County, as calculated by the boarding method, is:

- Minimum = 15,244 + 2,086 = 17,330
- Maximum = 26,220 + 2,086 = 28,306
- Mid-Point = — — = 22,818

The above-cited findings corroborate recent research and challenge a

commonly-held assumption that the introduction of new or expansion of existing rail service merely changes the mode of travel. Even with the use of traditional transportation models, it has been demonstrated that added transit causes:

- Changes in the trip distribution by assigning more trips to the Central Area.

- Through modal split models, a portion of the added trips select the rail as the predominant mode.

Theoretically, new rail service improves the image of its corridor as being more accessible to the jobs and arterial activities of the Central Area. The changed image attracts more persons to the rail corridor than would actually use the rail. Research and forecasts undertaken for and by Metra and other Chicago Area rail providers document this observation. The history of the Chicago region and its developments along railroad lines is another documentation of this fact. Railroads, as well as highways, disperse population allowing them to live farther from their jobs.

c. Reconciliation of Rail Impacts

The above two procedures provided a first estimate of the impacts of transit projects on shifting the distribution of population forecasts within the Chicago Region. Once the initial impacts of the highway projects were determined (as described in the following section), a comprehensive balancing process was undertaken. This is the process described earlier as "a rigorous accounting system". The impact of every project on each of the 317 NIPC Planning zones was identified; every increase in population in a given zone was matched with decreases in one or more zones. The increases and decreases had to be explained by the explicit or implied changes in accessibility generated by the specific project. In some cases, the matching of increases and decreases for any one project involved more than two zones or areas, but included a chain reaction. The end product of this process includes the following net population impacts on Lake County.

• North Central Service Improvements	+ 12,500
• UP Northwest/McHenry Extension	+ 8,500
• Milwaukee District-North Line	0
• EJ&E Circumferential	+ 2,000

The final sum of the North Central and UP Northwest impacts is 21,000, slightly lower than the 22,229 impact generated by the accessibility method and the 22,818 mid-point of the range generated by the boarding method. However, it is higher than the 17,330 minimum forecast generated by the boarding method.

3. Population Impacts of Highway Projects

The process of estimating the impact of highway projects on population was not different than that used for transit. The origin-destination method, comparable to the transit boarding method, was more complex; therefore, lesser emphasis was placed on it. The origins and destinations of specific highway users are more diffused and more difficult to trace.

The IL-53 Extension was the primary focus of the analysis; the impact of this project on improving accessibility for Lake County extended far beyond the County borders into Northwest and West Cook, DuPage, and Northern Will Counties. The impact of the arterial improvements are more localized to areas within Lake County and adjacent areas in Northwest Cook and eastern McHenry Counties.

A more-graphic method for presenting the impact analysis process also was used. The maps, following, illustrate the logical steps used to determine the impact of the IL-53 Extension on the shifts in population forecasts. The data used to prepare the following accessibility maps are the same as those used for the rail analysis.

As an overview, the IL-53 Extension concentrates jobs in proximity to its exits, in a manner similar to the concentration of jobs around the commuter rail stations. DuPage County, due to its central location within the regional highway network, acts in a very similar manner to the Chicago Central Area in its role as the focus of the rail system. Accordingly, most of the increases in forecasted population to Lake County caused by the IL-53 Extension are balanced by decreases in the forecasted populations of DuPage County, West and Northwest Cook and Northern Will Counties. As presented in the transit analysis, the IL-53 Extension causes shifts in population from the Central Area to Lake County; but these shifts are not as significant as those described earlier.

Exhibits 9, 10, 11, 12 and 13 show the change in accessibility for four zones in Lake County and one zone in North Cook County due to the implementation of the IL-53 Extension Alternative. The following conclusions can be drawn from these maps.

- Exhibit 9: the IL-53 Extension Alternative would significantly improve the access from North Central Lake County (NIPC Zone 421 - at the northern end of the north-south leg of the extension) to the zones along I-355, especially those in Central DuPage County. Access also will be improved to Will County and the zones along the Eisenhower Expressway. To a lesser extent, access improvements also will occur to South Cook County and a band along the existing IL-53 in North Cook County. This zone will not experience a loss in accessibility to any part of the region, although improvements in accessibility to most of Lake, McHenry and Kane Counties, the

North Shore communities and the northern parts of the City of Chicago (including the Central Business District) would be minimal.

- Exhibit 10: This exhibit examines improvement in accessibility for the Lakefront zone closest to the northeastern terminus of the IL-53 Extension (NIPC Zone 419). Again, the greatest improvement in accessibility occurs to the zones in Northern Cook and Central DuPage, along IL-53 Extension and I-355. Improvement in accessibility to zones in Will County, along I-55 and the proposed I-355 South, also would occur as a result of building the IL-53 Extension Alternative. From this Lakefront zone, accessibility to Northern Lake or McHenry Counties is not improved significantly.

- Exhibit 11: This exhibit examines accessibility for the northwestern-most zone in Lake County (NIPC Zone 401) to the rest of the region. The greatest improvements in accessibility occur to zones along the Tri-State (I-294) Tollroad and between the Tollroad and I-355. Accessibility to several nearby zones actually deteriorates due to the congestion resulting from nearby development. Accessibility from this zone to Central Chicago and the zones east of O'Hare does not improve significantly. Recognizing that this zone does attract more development under the RTP alternative and recognizing the proximity of this zone to the expanded and improved North Central (transit) Service, it is apparent that those who are attracted to live here and work in the Loop do so because of the improved rail service.

- Exhibit 12: This exhibit shows changes in accessibility from a zone in the southwestern corner of Lake County (NIPC Zone 431) to the rest of the region. For this zone, the IL-53 Extension brings a mixture of modest changes. The IL-53 Extension improves, moderately, access to the Northwest Tollroad - Kennedy and I-290 (Eisenhower) and, via these expressways, to the Dan Ryan and Edens Expressways; accordingly, access to the inner zones adjacent to these highways is improved. Access to the Chicago Central Area is unchanged. Access to DuPage and Western Will Counties deteriorates.

- Exhibit 13: This exhibit shows changes in accessibility from a zone in North Cook County near the northern terminus of I-355 (NIPC Zone 104). Accessibility from this zone to DuPage, Will and almost all other zones in the region deteriorates. This deterioration is due to the additional traffic on I-355, due to the IL-53 Extension.

The previous five exhibits graphically illustrate the impacts of the IL-53

Extension Alternative on the accessibility in five separate NIPC Zones to the six-county region. Exhibits 14, 15 and 16 illustrate the impacts of all RTP projects on the accessibility of three of these NIPC Zones. Comparison of the two sets of exhibits (14, 15, and 16 vs. their IL-53 Extension Alternative counterparts, 10, 11, and 12) provides examples of how these accessibility maps were used to separate the impacts of the IL-53 Extension from those of other projects.

- Exhibit 14: This exhibit examines improvements in accessibility of the Lakefront Zone closest to the northeastern terminus of the IL-53 Extension (NIPC Zone 419 - comparable to Exhibit 10). This exhibit clearly illustrates that there will be improved access from this zone to most of the region. Access will double along two separate corridors: one, along the Lakefront; and the second, along I-355 and its proposed extension. As seen earlier, in Exhibit 10, the impact of the IL-53 Extension on improvement in access to the Lakefront zones is limited to the second corridor (I-355). Accordingly, the improvement in accessibility for Zone 419 to the Lakefront zones must be due to other RTP projects, including those outside Lake County. Zone 419 is forecasted by NIPC to attract 718 persons more under the RTP than under the No RTP alternative. Other than the EJE, there are no transit improvements proposed in close proximity to Zone 419; thus, none of the 718 additional persons can be balanced, via transit, with decreases in the Chicago Central Area Population. There are two major highway projects impacting this zone: the IL-53 Extension; and the add lane to I-94 at the South end of Lake County. The proximity and magnitude of the IL-53 Extension necessitated assigning almost all the 718 additional population to this project, balanced by decreases in DuPage/Northwest Cook. A very small fraction of the additional population was allocated to the impact of the EJE and the add lanes, balanced by decreases in North Cook and along the EJE in DuPage and Will Counties. The same line of reasoning was used for the two zones south of 419, with the exception of gradually increasing the impact of the add lane and EJE as the distances to those projects were reduced.

- Exhibit 15: This exhibit examines improvements in accessibility for the northwesternmost zone in Lake County (NIPC Zone 401 - comparable to Exhibit 11). Here, we can see that the full RTP increases access from Zone 401 to all but one zone in the region. Of special interest is the improvement in accessibility to the O'Hare Airport area and the Central Area of Chicago. It is clear from Exhibit 11 that the IL-53 Extension Alternative does not improve access to these areas; but it does improve the access to Eastern DuPage, Western and Southwestern and South Cook. It is evident, from these two illustrations, that it is the improved rail access that

permits residents to live in this zone and work in the job concentrations in the Central Area and around O'Hare, whereas the IL-53 Extension allows people to move to this zone and work in DuPage County. There are no excess jobs in the Cook County zones which experienced improvement in accessibility to Zone 401. NIPC forecasted that Zone 401 would receive 848 additional persons under the RTP alternative. Two thirds of this increase was attributed to the IL-53 Extension and balanced against increases in DuPage County; the balance was attributed to North Central Rail and balanced against decreases in the Central Area and O'Hare.

- Exhibit 16: This exhibit describes the impacts of all RTP projects on this southwesternmost zone in Lake County (NIPC Zone 431 - comparable to Exhibit 12). Implementation of the full RTP provides major increases to all but one NIPC Zone. Access is doubled to the City of Chicago, to South Cook, Central and Eastern Will Counties. Again, as in NIPC Zone 401, it is quite clear that it is improved rail service that doubles this access, particularly to the City of Chicago and its Central Area. Comparing this exhibit to Exhibit 12 shows the relatively small impact of the IL-53 Extension Alternative compared with the extensive impact of the full RTP, especially that of rail improvements on the North Branch of the UP Northwest and the EJE circumferential rail. NIPC forecasted 2,347 additional persons for this zone under the RTP alternative. Almost all these persons are attributed to the improvement in rail accessibility to the Chicago Central Area.

4. Balancing of Increases by Mode

The processes and analyses described above provided, initially, an order of magnitude forecast by major transportation facility. The detailed forecast was achieved following the linking of increases and decreases of population, by planning zone; and by positing a logical explanation for the attribution of part or all of the zonal change to any of the proposed transportation or transit projects. The balancing of the population increases and decreases, by zone, while maintaining work trip interchanges, by mode, on the basis of the NIPC/CATS forecasts limits possible solutions to a very few.

It must be pointed out that we are observing net improvements and deteriorations of the transportation network 20 years into the future (25 from the forecast period), and their impacts on a population that is growing and always in flux. More than 50 percent of the households in Lake County change housing location every 5 years; and, nationally, persons change jobs every 5 years. Consequently, a 25-year forecast period can affect the job and residence location decisions of nearly the entire County population. Therefore, the growth of transit

users in Lake County can be assumed to be due to the location and accessibility of the area rather than a switch from highway to rail by existing residents.

Exhibit 17 shows the population shifts resulting from the implementation of the transit projects in Lake County and adjacent townships. There are considerable impacts of proposed improvements in rail on the areas currently un- or underdeveloped in the northwest portion of the County because such proposed rail would serve this area so well. Exhibit 18 shows the population shifts resulting from the implementation of the highway projects. It should be noted that while the IL-53 Extension Alternative increases population along its corridor, much of this development already has occurred, especially since 1990. A summary table, Table 3, in the "Summary of Findings" chapter presents the overall net impact of each major RTP project, including the IL-53 Extension Alternative, on population changes in Lake County. It has been determined that the population increase of 60,500 (difference between RTP and No-RTP alternatives) is attributable, to each mode, as follows:

- Rail (including EJE Circumferential) – 23,000
- IL-53 Extension Alternative – 27,500
- Other Highway Improvements – 10,000

5. Employment Impacts of Rail and Highway

The process for estimating the impact of the Lake County RTP projects on net employment change in Lake County, as well as the distribution of these changes by NIPC zone, is not significantly different than the process described for determining the population impacts. For rail transit projects, each morning boarding in Lake County represents an exported job. It is assumed that the destination of the exported job is in the general vicinity of the alighting station. The points of origin of the additional morning boardings (above transit baseline), by zone, and morning alightings determine the job shifts occurring as a result of the transit enhancements. The NIPC/CATS data, as modified by Metra for the Major Investment Study (MIS) for the North Central Service, provided this information. It should be noted that the MIS is based on the 2020 RTP.

Exhibit 19 shows the distributional changes occurring as a result of implementing the transit projects. Exhibit 20 shows the distributional changes occurring as a result of implementing the highway projects. In generating this last Exhibit, the origins and destinations of highway-oriented work trips were taken from O/D trip tables from the 2020 RTP. The O/D trip tables were analyzed in the same manner as the transit boardings and alightings, described earlier.

Exhibits 17 and 18, presented earlier, illustrate the very different impacts of these two modes on employment/residence relationships. Rail transit allows an individual to live a considerable distance from his/her place of employment.

Because rail in the Chicago region is long-standing, mature, and responsive to regional needs, it is well used; because it was put in place long ago, many towns, neighborhoods, and work places grew up alongside it. Because it is radial and focused on the Chicago Central Area, it provides excellent access to that central employment district. Because of its considerable job impacts, O'Hare Airport also was connected to the rail network. Consequently, rail access from Lake County is long-distance and focused on the Chicago Central Area and O'Hare. It is a net exporter of jobs.

Improved highway access in Lake County, on the other hand, tends to encourage the development of nearby employment centers within the county. It allows small businesses, entrepreneurs and business executives to locate their work places close to their residences. For this reason, highway improvements in a suburban residential area tend to encourage the proximate development of employment (generally office) clusters. It tends to be a net importer of jobs, although this is a fairly recent phenomenon. Extensive suburbanization, improved telecommunication, growth of small and entrepreneurial businesses and greater numbers of cars per household have freed work place developments from traditional central areas and regional centers. Employment impacts, by major mode, are shown on Tables 6, presented later in the "Summary of Findings".

In conclusion, rail development, in general, tends to further concentrate jobs in the Chicago Central Area and along the existing concentration of jobs near O'Hare Airport. The IL-53 Extension, on the other hand, disperses employment and attracts job concentrations to its vicinity. Overall, there is a net increase of 4,450 jobs in Lake County as a result of all the RTP projects. The highway projects are responsible for an increase of 8,200 jobs in Lake County, whereas the rail projects are responsible for a net decrease of 3,750 jobs.

D. Determining the Development Impacts on Population and Employment Distribution of Individual Projects in Lake County (IL83/US 45 with US 12 Alternative)

1. Collective Impacts of RTP with IL83/US 45 with US 12 Alternative

Subsequent to the development of the "Disaggregation Methodology" for the proposed IL-53 Extension Alternative, a second alternative, the IL-83/US 45 with US 12 Alternative, was submitted for similar analysis. Under this methodology, the collective impacts of all the RTP projects, (excluding IL-53 Extension) with the IL-83/US 45 with US 12 Alternative on Lake County are:

- 51,000 more persons by 2020
- 4,211 more jobs by 2020

For the IL-83/US 45 with US 12 Alternative, ACG employed the same philosophy and similar methodologies to determine both highway and transit usage. Both impacts are derived independently, using established origin and destination data (both historical and forecast). For transit, both the point of origin and volume of ridership are well-defined by station boardings. For highways, the methodology is similar, but employs a more-general origin/destination data set. Work-oriented trip tables, using interchange tables among zones rather than stations, are the data source. Forecasts for both highway and transit impacts were done independently and simultaneously.

Exhibits 21 and 22 show the population impacts attributed to building vs. not-building the IL-53 Extension and IL-83/US 45 with US 12 alternatives.

2. Description of the Methodology Used in Comparing Impacts of RTP vs. IL-83/US 45 with US 12 Alternative

The Chicago Area Transportation Study (CATS) used the May 1999 socio-economic forecasts generated by ACG as inputs in its regional transportation planning model and provided the Project consultants (CH2MHill) with the No Action (Baseline) trip tables. CH2MHill used this data to develop and evaluate a full range of alternatives for Lake County. Two finalist alternatives were selected for further analysis and ACG was asked to generate the population and employment impacts of the IL-83/US 45 with US 12 Alternative. This alternative, consisted of the No Action (baseline) improvements plus:

- Add-lanes to IL-83, US 12, IL 21, with bypasses of Mundelein and Libertyville.

- Add-lanes to I-94 from IL-60 to IL-132.

CH2MHill provided ACG with congested peak time of travel for the above alternative from the centroid of each NIPC planning Zone (DRAM/EMPAL Zones of DEZ) to each other DEZ (a matrix 317 by 317). From these matrices, a weighted average accessibility measure for each zone for each alternative was developed. Zones that experienced no change in the weighted average are assumed to attract the same population/households and employment. Zones which would experience a decline in accessibility (i.e. increase in travel time) would attract fewer households or jobs; the reverse also is true. The relationship between population/employment and accessibility is assumed to be proportional, assuming all other factors to be constant.

3. Net Impacts Due to IL-83/US 45 with US 12 Alternative Improvements

Exhibits 23 and 24 show the employment, respectively, due to the improvements implied in the IL-53 Extension and IL-83/US 45 with US 12 Alternatives. These implications, although somewhat different than those shown in Exhibits 21 and 22, are not clearly obvious from comparing these two sets of maps.

There are three zones in Lake County which would experience a slightly slower growth in population if the IL-83/US 45 with US 12 Alternative were built rather than if it is not built and no additional arterial improvements are undertaken. Increased population growth would occur in the central and northeastern portion of the County.

There are four zones in Lake County which would experience a smaller employment growth under the IL-83/US 45 with US 12 Alternative rather than under the No Action (baseline) Alternative. These zones are in the northwest portion of the County. Most zones in the south and central portion of the County would experience employment growth under the IL-83/US 45 with US 12 Alternative.

4. Net Impacts of the Two Finalist Alternatives

The following table (Table 5) shows the net impacts of the two Finalist Alternatives on changes in population and employment growth in Lake County. Table 7, in the following chapter, shows the detailed impacts of transit and highway projects under the IL-83/US 45 with US 12 Alternative.

Table 5
Net Socio-Economic Impacts (1990 - 2020)
of Finalist Alternatives in Lake County

	Population	Employment
IL-53 Extension Alternative	27,500	4,200
IL-83/US 45 with US 12 Alternative	18,000	3,950

IV. Summary of Findings

A. Summary Tables of Impacts

Table 6 presents the impacts of each of Lake County's proposed transportation projects on net population and employment change within Lake County. As noted earlier, the net changes for each project in Lake County are balanced by an equal and opposite change elsewhere in Northeastern Illinois. The combined impacts of IL-53 Extension and synergistic interacting projects are highlighted.

Table 6
Impacts of 2020 Regional Transportation Plan Projects
Net Population and Employment by Project
Including the IL-53 Extension Alternative
(Net Lake County Impacts, Only)

Transit Projects	**Population**		**Employment**	
North Central Service Improvements	+12,500			┐
				-4,000
UP Northwest/McHenry Extension	+8,500			┘
Milwaukee District - North Line	0		0	
EJE Circumferential	+2,000		+250	
Sub-Total	+23,000		-3,750	
Highway Projects				
Tri-State (I-94) Add Lanes and IL 22 Improvements East of I-94	+5,500		+4,000	
IL 22 Improvements West **of** I-94 and Other Arterials South of IL 176	+3,000		0	
Arterial Improvements North of IL 176	+1,500		0	
IL-53 Extension Alternative	**+23,000**	┐	**+4,200**	┐
Synergistic Effects of Projects Interacting with IL-53 Extension Alternative	**+4,500**	**27,500** ┘	**0**	**4,200** ┘
Sub-Total	+37,500		+8,200	
Total (Sum of above)	**+60,500**		**+4,450**	
Independent NIPC Total	**+60,473**		**+4,461**	

Table 7 presents the impacts of each of Lake County's proposed transportation projects on net population and employment change within Lake County. In this case, the IL-83/US 45 with US 12 Alternative is substituted for the IL-53 Extension Alternative. The impacts of this alternative are highlighted.

Table 7
Impacts of 2020 Regional Transportation Plan Projects
Net Population and Employment by Project
Including the IL-83/US 45 with US 12 Alternative
(Net Lake County Impacts, Only)

Transit Projects	**Population**	**Employment**
North Central Service Improvements	+12,500	┐
		-4,000
UP Northwest/McHenry Extension	+8,500	┘
Milwaukee District - North Line	0	0
EJE Circumferential	+2,000	+250
Sub-Total	+23,000	-3,750
Highway Projects		
Tri-State (I-94) Add Lanes and IL-22 Improvements East of I-94	+5,500	+4,000
IL-22 Improvements West of I-94 and Other Arterials South of IL-176	+3,000	0
Arterial Improvements North of IL-176	+1,500	0
IL-83/US 45 with US 12 Alternative	**18,000**	**3,950**
Sub-Total	25,300	7,950
Total (Sum of above)	**+51,000**	**+4,200**

B. Study Corroboration

The changes shown in the preceding tables are net changes. Several projects both export and import activities. For example, the two major railroad projects (double tracking of the North Central Service and the McHenry extension of the UP Northwest Line) increase service tremendously and export 6,600 jobs from the County; they allow residents to work in the Central Chicago Area and at O'Hare, among other places. But, they also cause the creation of 2,600 jobs within the County to service the increased population (retail, community facilities, service, etc.). This results in a net impact of minus 4,000 jobs. Two sets of detailed tables, showing the increases and decreases in population and employment, by NIPC planning zone, caused by each of the projects shown in Table 6 and Table 7 were prepared and became the basis for the more-detailed forecasts.

The first set of detailed tables presented the net population and employment changes that must be subtracted from the RTP alternative to generate the IL- 53 Extension Alternative forecasts. In this set, there are 32 and 20 zones that would experience decreases in population and employment, respectively, if the Project Baseline alternative network were used instead of the RTP network. Balancing these decreases, 65 and 17 zones would experience increases in population and employment, respectively. The number of zones in Northeastern Illinois which would experience no change in population and/or employment is 208. Most of these latter zones are located in the southern half of the region and in western Kane and McHenry Counties.

The second set of detailed tables presented the net changes that must be added to the No-RTP network to generate the impacts of the Project Baseline network. In this set, 39 and 21 planning zones would experience increases in population and employment, respectively; also, 40 and 36 planning zones would experience decreases, respectively. Of the total 317 planning zones, 218 would not experience any changes. The socio-economic forecasts associated with the Project Baseline network are the same whether they are derived by subtraction from the RTP alternative or addition to the No-RTP alternative. Consequently, the two methodologies corroborate one another.

C. Consistency with NIPC Forecasts

Following the completion of the above forecasts, by the 317 NIPC planning zones, representatives from IDOT and the consultants formally presented their findings to NIPC, and its Planning Committee for its review and comment. NIPC, in a letter dated November 30, 1998 (attached as an appendix), acknowledged the consultations and concurrence that had taken place between its staff and ACG.

NIPC concluded its letter by stating:

> "It is our staff judgement that the method ACG used to allocate the forecasts among projects is a reasonable one and that the results are consistent with the Commission's endorsed forecasts."

Following the NIPC review and comments, ACG disaggregate the planning zone forecasts to each of the more than 18,000 CATS subzones. During this process of disaggregation, ACG also generated the detailed corollary data required as input to the CATS trip generation model. In generating this detailed set of data, ACG used as its guideline the NIPC disaggregation of the planning zonal data. Two sets of disaggregate data, one assuming the expansion of existing airports and the second assuming the development of the Chicago Third Airport in the South Suburbs, were prepared and submitted to CATS.

D. Study Conclusions

1. The IL-53 Extension Alternative

The major conclusion of the foregoing study is that the proposed IL-53 Extension, alone, is responsible for a population increase of 23,000 persons in Lake County between 1990 and 2020. With its synergistic impacts of 4,500, the proposed IL-53 Extension contributes 27,500 persons. It is also a net importer of jobs to Lake County, providing approximately 4,200 of the 8,200 job growth difference between RTP and No RTP.

Other highway projects identified as part of the No Action (Baseline) contribute 10,000 persons and the remaining 4,000 job increases. Transit projects contribute 23,000 persons of the population increase in Lake County. Transit projects, however, are a net exporter of jobs. By helping retain jobs in the Chicago Central Area and around O'Hare, they contribute a net loss of 3,750 in job growth to Lake County. The total impact of all projects in the IL-53 Extension Alternative is 60,500 persons and 4,450 jobs.

2. The IL-83/US 45 with US 12 Alternative

The IL-83/US 45 with US 12 improvement adds 18,000 persons and 3,950 jobs. The transit projects, under this alternative, would contribute the same number of persons (23,000), as does the No Action (Baseline) Alternative. As in the IL-53 Alternative, the Transit Projects export 3,750 jobs. Highway projects contribute 10,000 persons and 4,000 jobs. The total impact of all projects in the IL-83/US 45 with US 12 Alternative is 51,000 persons and 4,200 jobs.

3. Overall Impacts

The overall impact on population growth in Lake County of either finalist alternative remains relatively small. Lake County is expected to grow from its 1990 population of 516,400 to 772,411 without any of the RTP projects in place and to 832,884, with all RTP projects in place. The contributions, of either the IL-53 Extension or the IL-83/US 45 with US 12 improvements, alone, are even smaller; they are 5.3 percent and 3.5 percent, respectively, of the 1990 population; and they are 3.6 and 2.3 percent of the 2020 No-RTP forecast population. The impact on job growth, in both instances, is negligible.

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APPENDIX C

State Threatened and Endangered Species Present in Lake County

TABLE C-1
State Threatened and Endangered Species

Name		Indicator	Habitat	
Scientific	Common			
Plants				
Agalinis skinneriana	Pale false foxglove	T	Sand and loess hill prairies	
Agropyron subsecundum	Bearded wheat grass	E	Mesic prairies, dolomite outcrops	
Alnus rugosa	Speckled alder	E	Streams, swamps and bogs	
Amelanchier interior	Shadbush	E	Sand, dolomite stream bluffs, bogs	
Amelanchier sanguinea	Shadbush	E	Wooded lake and river bluffs	
Ammophila breviligulata	Marram grass	E	Open dunes, coastal	
Arctostaphylos uva-ursi	Bearberry	E	Sand prairies, dunes	
Asclepias ovalifolia	Oval milkweed	E	Prairies and savannas	
Aster furcatus	Forked aster	T	Seep zones, wooded bluffs and banks	
Astragalus tennesseensis	Tennessee milkvetch	E	Dolomite, gravel prairies	
Beckmannia syzigache	American slough grass	E	Wet prairies	
Betula alleghaniensis	Yellow birch	E	Sandstone outcrops, sphagnum bogs	
Bidens beckii	Water marigold	E	Glacial ponds and lakes, streams	
Botrychium multifidum	Northern grape fern	T	Mesic forests, sand savannas	
Cakile edentula	Sea rocket	T	Open beaches and dunes	
Calla palustris	Water arum	E	Sphagnum bog	
Calopogon tuberosus	Grasspink orchid	T	Prairies, bogs, fens	
Cardamine pratensis var. palustris	Cuckoo flower	E	Calcareous floating mats, marshes	
Carex atherodes	Awned sedge	T	Prairie pothole marshes	
Carex aurea	Golden sedge	E	Interdunal swales, wet meadows	
Carex brunnescens	Brownish sedge	E	Sphagnum bogs	
Carex canescens var. disjuncta	Sedge	E	Sphagnum bogs	
Carex chordorrhiza	Cordroot sedge	E	Sphagnum bogs	
Carex crawei	Crawe's sedge	T	Calcareous fens, sand prairies, interdunal swales	
Carex crawfordii	Sedge	E	Wet soils, meadows, swamps	
Carex cryptolepis	Sedge	E	Wet meadows, calcareous areas	

Carex disperma	Shortleaf sedge	E	Forested bogs	
Carex garberi	Elk sedge	E	Calcareous beach ridges and swales	
Carex lucorum	Sedge	E	Dry openings, oak pine woodlands	
Carex oligosperma	Few-seeded sedge	E	Sphagnum bogs	
Carex rostrata	Beaked sedge	E	Northern peatlands and lake shores	
Carex tonsa	Shaved sedge	E	Sand deposits along rivers and lakes	
Carex trisperma	Three-seeded sedge	E	Acid bogs	
Carex tuckermanii	Tuckerman's sedge	E	Flatwoods, wet-mesic forests	
Carex viridula	Little green sedge	E	Dune swales, spring runs, marl flats	
Carex woodii	Pretty sedge	E	Mesic calcareous forests	
Castilleja sessiliflora	Downy yellow painted cup	E	Gravel and sand prairies	
Ceanothus ovatus	Redroot	E	Sand prairies and savannas	
Chamaedaphne calyculata	Leatherleaf	T	Sphagnum bogs	
Chamaesyce polygonifolia	Seaside spurge	E	Beach and foredunes	
Chimaphila umbellata	Pipsissewa	E	Dry-mesic upland sand forests	
Circaea alpina	Small enchanter's nightshade	E	Dolomite ravines and bluffs	
Cirsium hillii	Hill's thistle	T	Dry, open prairies	
Cirsium pitcheri	Dune, Pitcher's thistle	T	Dunes and beaches	
Comptonia peregina	Sweet fern	E	Acid sand prairies and savannas	
Cornus canadensis	Bunchberry	E	Forested bogs	
Cypripedium acaule	Pink Lady's slipper	E	Forested bogs and fens	
Cypripedium calceolus var. parviflorum	Small yellow Lady's slipper	E	Forested, graminoid fens, mesic sand or silt loam prairies	
Cypripedium candidum	White Lady's slipper	E	Wet mesic prairies and fens	
Cypripedium reginae	Showy Lady's slipper	E	Prairies, forests, barrens, bogs, fens	
Drosera rotundifolia	Round leaved sundew	E	Sphagnum bogs, wet peaty sand	
Eleocharis olivacea	Capitate spikerush	E	Dune swale	
Eleocharis pauciflora	Few flowered spikerush	E	Fens, calcareous dune swales	
Eleocharis rostellata	Beaked spikerush	T	Calcareous seeps, graminoid fens	
Epilobium strictum	Downy willow herb	T	Calcareous bogs, fens, seeps	
Equisetum scirpoides	Dwarf scouring rush	E	Bluffs, ravines slopes	
Eriophorum virginicum	Rusty cotton grass	E	Acid bogs	
Eriophorum viridi-carinatum	Tall cotton grass	E	Wet sand prairies	
Galium labradoricum	Bog bedstraw	T	Bogs, fens, sedge meadows	
Gaultheria procumbens	Wintergreen	E	Acid soils, forests and bogs	
Geranium bicknellii	Northern cranesbill	E	Woodland openings, rock outcrops	
Glyceria borealis	Northern mannagrass	E	Bogs, marshes, ponds, stream banks	

Hypericum kalmianum	Kalm's St. John's wort	E	Mesic sand prairies, interdunal swales	
Juncus alpinus	Richardson's rush	E	Fens, wet sand prairies, interdunal swales	
Juniperus communis	Ground juniper	T	Dunes, glacial bluffs, ravines	
Juniperus horizontalis	Trailing juniper	E	Sand dunes	
Lactuca ludoviciana	Western wild lettuce	E	Dry, mesic prairies	
Larix laricina	Tamarack	T	Bogs and forested fens	
Lathyrus maritimus	Beach pea	E	Gravel coasts and shores	
Lathyrus ochroleucus	Pale vetchling	T	Upland savannas and ravines	
Lechea intermedia	Pinweed	E	Dry, sterile sandy soils	
Oenothera perennis	Small sundrops	E	Sand, gravel prairies, dry prairie slopes	
Orobanche fasciculata	Broomrape	E	Dry sand prairies, alluvial floodplains	
Oryzopsis racemosa	Rice grass	T	Calcareous mesic forest slopes	
Panicum boreale	Northern Panic grass	E	Sand prairies and savannas	
Panicum columbiaum	Hemlock Panic grass	E	Sandstone outcrops and deposits	
Pinus banksiana	Jack pine	E	Sand ridges	
Pinus resinosa	Red pine	E	Dry-mesic sand forests	
Plantago cordata	Heart-leaved plantain	E	Sand or gravel bars	
Platanthera flava var. herbiola	Tubercled orchid	T	Floodplain forests and swamps	
Platanthera clavellata	Wood orchid	E	Mesic sand prairies and thickets	
Platanthera leucophaea	Prairie white-fringed orchid	E	Mesic to wet prairies	
Platanthera psycodes	Purple-fringed orchid	E	Flatwood openings and sand prairies	
Poa alsodes	Grove bluegrass	E	Wooded bluffs and ravines	
Poa languida	Weak bluegrass	E	Mesic upland forests	
Pogonia ophioglossoides	Snake mouth	E	Wet sand prairie, Sphagnum bogs, fens	
Polygonatum pubescens	Downy Solomon's seal	T	Bluff ravines and mesic forests	
Populus balsamifera	Balsam poplar	E	Bluffs, sand dunes, bog margins, mesic prairies	
Potamogeton gramineus	Grass leaved pondweed	E	N/A	
Potamogeton praelongus	White stemmed pondweed	E	Glacial lakes	
Potamogeton robbinsii	Fern pondweed	E	Glacial lakes	
Potamogeton strictifolius	Stiff pondweed	E	Calcareous lakes and ponds	
Ranunculus cymbalaria	Seaside Crowfoot	E	Saline, brackish shores	
Rhamnus alnifolia	Alder buckthorn	E	Calcareous bogs, sand prairies, fens	
Rhynchospora alba	Beaked rush	T	Fens, bogs, interdunal swales	
Ribes hirtellum	Northern gooseberry	E	Northern bogs, swamp forests	
Rorippa islandica subsp. Hispida	Hairy marsh yellow cress	E	Marshes, disturbed wetlands	

Rubus odoratus	Purple-Flowering raspberry	E	Forest clearings, roadsides, fencerows	
Rubus pubescens	Dwarf raspberry	T	Mesic ravine forests, bogs, fens, flatwoods	
Salix serissima	Autumn willow	E	Bogs, marshes, peaty areas	
Salix syrticola	Dune willow	E	Sand dunes	
Sambucus pubens	Red-berried alder	T	Rocky forest slopes and bogs	
Sarracenia purpurea	Pitcher plant	E	Bogs, fens, calcareous mats	
Scheuchzeria palustris	Arrowgrass	E	Bogs and sedge mats	
Scirpus cespitosus	Tufted bulrush	E	Graminoid fens	
Shepherdia canadensis	Buffaloberry	E	Beach ridges, shores	
Sisyrinchium montanum	Mountain blue-eyed grass	E	Mesic prairies	
Sorbus americana	American mountain ash	E	Rocky woods and bogs	
Sparganium chlorocarpum	Green-fruited burreed	E	Muddy, peaty shores, shallow water	
Spiranthes lucida	Yellow-lipped Lady's tresses	E	Calcareous habitats	
Thuja occidentalis	Arbor vitae	T	Glacial till bluffs, side ravines, fens	
Tofieldia glutinosa	False Asphodel	T	Wetlands, fens, interdunal swales	
Tomanthera auriculata	Ear-leaved foxglove	T	Disturbed prairies and savannas	
Triadenum virginicum	Marsh St. John's wort	E	Peaty sand prairies	
Trientalis borealis	Star flower	T	Bogs, sand forests, ravine bluffs	
Triglochin maritima	Common bog arrowgrass	E	Fens and interdunal swales	
Triglochin palustris	Slender bog arrowgrass	E	Spring runs in fens, interdunal swales	
Trillium erectum	Ill-scented trillium	E	Mesic forests	
Utricularia cornuta	Horned bladderwort	E	Bogs, wet peaty sands, fens	
Utricularia intermedia	Flat-leaved bladderwort	E	Bogs, fens, interdunal swales	
Utricularia minor	Small bladderwort	E	Bogs, floating mats, fens, interdunal swales	
Vaccinium corymbosum	Highbush blueberry	E	Wet acid sand prairies, bogs	
Vaccinium macrocarpon	Large cranberry	E	Acid bogs	
Vaccinium oxycoccos	Small cranberry	E	Sphagnum bogs	
Veronica scutellata	Marsh speedwell	T	Marshes, graminoid fens, wetlands	
Viola conspersa	Dog violet	T	Mesic forest and flatwoods	
Viola incognita	Hairy white violet	E	Flatwoods, forested fens, mesic forests	
Birds				
Accipiter cooperii	Cooper's hawk	E	Mature deciduous forests	
Ammodramus henslowii	Henslow's sparrow	T	Prairies and fields	
Asio flammeus	Short-eared owl	E	Prairies, marshes, savannas, dunes	

Asio otus	Long-eared owl	E	Dense pine, mixed conifer deciduous	
Bartramia longicauda	Upland sandpiper	E	Prairies and pastureland	
Botaurus lentiginosus	American bittern	E	Freshwater marshes and shores	
Buteo lineatus	Red shouldered hawk	E	Riparian forests, wooded swamps	
Certhia americana	Brown Creeper	T	Deciduous, mixed woodlands, floodplain forests	
Charadrius melodus	Piping plover	E	Sand dunes and shores	
Chlidonias niger	Black tern	E	Freshwater marshes, ponds, lakes	
Coturnicops noveboracensis	Yellow rail	E	Marshes, wet prairies, sedge meadows	
Euphagus cyanocephalus	Brewer's blackbird	T	Prairie and grasslands	
Gallinula chloropus	Common moorhen	T	Fresh water marshes, streams, lakes	
Grus canadensis	Sandhill crane	E	Large undisturbed fresh water marshes and prairie ponds	
Ixobrychus exilis	Least bittern	E	Fresh water lakes and marshes	
Lanius ludovicianus	Loggerhead shrike	T	Open Agricultural areas, grasslands.	
Nyctanassus violacea	Yellow-crowned night heron	T	Marshes, swamps, lakes, lagoons. Nest in trees near water	
Nycticorax nycticorax	Black-crowned night heron	E	Rookeries, bottomland forests	
Phalaropus tricolor	Wilson's phalarope	E	Prairie potholes, marshes, rivers	
Podilympus podiceps	Pied-billed grebe	E	Well vegetated lakes,ponds, marshes	
Rallus elegans	King rail	T	Fresh water marshes	
Spizella pallida	Clay colored sparrow	E	Freshwater marshes, aquatic vegetation	
Sterna antillarum	Least tern	E	Shallow depressions, sandy islands	
Sterna forsteri	Forster's tern	E	Freshwater sites, marshes on lakes	
Sterna hirundo	Common tern	E	Sand or pebble beaches on islands	
Xanthocephalus xanthocephalus	Yellow-headed blackbird	E	Dense cattail marshes, open water.	
Reptiles				
Clonophis kirtlandii	Kirtland's snake	T	Wet meadows, open swamp forests	
Emydoidea blandingii	Blanding's turtle	T	N/A	
Kinosternon flavescens	Illinois mud turtle	E	Undisturbed sand areas, with ponds	
Sistrurus catenatus	Eastern massasauga	E	Wet prairies, bogs, swamps, dry woods	
Amphibians				
Hemidactylium scutatum	Four-toed salamander	T	Boggy woodland ponds, sphagnum	
Insects				
Hesperia ottoe	Skipper	E	Sand, loess hill prairies	
Incisalia (Callophrys) polios	Hoary Elfin	E	Sunny glades, barrens, dunes,	

	butterfly		forest edges	
Lycaeides melissa samuelis	Karner blue butterfly	E	Beaches, with lupine	
Paraphlepsius lupalus	Leafhopper	E	Sand dunes	
Mussels				
Elliptio dilatata	Spike	T	Small to large streams, lakes, mud or gravel substrates	
Fishes				
Acipenser fulvescens	Lake sturgeon	T	Large lakes and rivers	
Catostomus catostomus	Longnose sucker	T	Clear, cold deepwater lakes and streams	
Coregonus artedi	Cisco	T	Lake Michigan	
Coregonus clupeaformis	Lake whitefish	T	Great Lakes	
Etheostoma exile	Iowa darter	E	Clear, well vegetated lakes, streams	
Fundulus diaphanus	Banded killifish	T	Clear glacial lakes	
Notropis anogenus	Pugnose shiner	E	Clear heavily vegetated lakes	
Notropis heterodon	Blackchin shiner	T	Clear, well vegetated lakes	
Notropis heterolepis	Blacknose shiner	E	Clear vegetated lakes and pools	

APPENDIX D

ADID Wetlands

TABLE D-1
ADID Wetland Impacts Per Alternative

ADID Number	No-Action Ha (Ac)	IL 53 Freeway/Tollway Ha (Ac)	IL 83/US 45 with US 12 Ha (Ac)
44	0.40 (1.00)	—	—
61	0.01 (0.03)	—	—
91	1.1 (2.72)	—	0.28 (0.70)
94	>0.01	—	0.02 (0.04)
96	0.15 (0.37)	—	0.06 (0.16)
99	—	—	0.01 (0.03)
106	0.37 (0.92)	—	0.06 (0.15)
108	—	—	0.40 (1.02)
113	0.32 (0.79)	—	—
128	—	—	0.04 (0.11)
143	—	0.66 (1.63)	0.24 (0.59)
151	—	—	0.17 (0.42)
158	—	—	0.01 (0.03)
168	0.02 (0.05)	—	—
169	0.86 (2.13)	0.25 (0.62)	—
170	0.57 (1.42)	0.2 (0.51)	—
173	0.06 (0.15)	—	—
175	0.55 (1.36)	—	—
180	—	2.2 (5.4)	—
183	—	—	0.25 (0.63)
187	0.78 (1.94)	—	—
198	—	—	0.07 (0.17)
200	—	0.13 (0.33)	0.08 (0.18)
TOTAL	**5.2 (12.9)**	**3.46 (8.55)**	**1.7 (4.2)**

D.1 IL 53 Corridor—Des Plaines River Watershed

D.1.1 ADID Wetland 143—Indian Creek/Kildeer Creek

This wetland is described by the Lake County ADID study as a stream community that contains a sedge meadow and an emergent marsh dominated by bur reed (*Sparganium*) and

arrowhead (*Sagittaria*). This wetland harbors threatened or endangered species of plants and is considered a high quality stream. Other functions performed by this wetland are shoreline / bank stabilization and sediment toxicant retention. The total wetland size in the vicinity of the project is 63.0 ha (155.6 ac), but extends for long distances outside the study area. Approximately 81.3 ha (201 ac) of the large wetland complex are considered ADID.

Due to its configuration relative to the proposed roadway, this wetland is impacted in four separate areas. These were identified in the field as 53-43, 53-67, 83-19 and 83-40. Wetland segments 53-43 and 53-67 were assessed as being a high to moderate quality riparian complex with depressional areas. Segments 83-19 and 83-40 were assessed as being low quality stream and adjacent depressional areas during the field verification. Approximately 0.28 ha (0.69 ac) of 53-43, 0.02 ha (0.04 ac) of 53-67, 0.20 ha (0.50 ac) of 83-19, and 0.16 ha (0.40 ac) of 83-40 would be impacted, totaling 0.66 ha (1.63 ac) or less than 0.9-percent of ADID wetland 180. The proposed impacts are the result of mainline roadway construction and frontage road construction.

While there is no overall functional loss to this wetland, there is minimal impact to functions as a result of the proposed project. As portions of this wetland harbors endangered plant species and high quality plant communities, additional consultation with the Illinois Department of Natural Resources would need to be conducted to determine the potential for impacting both the plant species and the habitat that the ADID wetland provides. Additional minimization and avoidance strategies may need to be developed during susequent planning and design work to reduce or avoid the proposed impacts to this ADID site from this alternate.

D.1.2 ADID Wetland 169

The Lake County ADID Study identifies this wetland as a sedge meadow. The wetland harbors threatened or endangered species of plants. No other functions were identified for this wetland by the ADID study. The wetland in the vicinity of the project size is 1.4 ha (3.4 ac) but extends beyond the proposed project area. Approximately 17.2 ha (42.4 ac) of this large complex are considered ADID. Due to its configuration relative to the proposed roadway, this wetland is impacted in two separate areas. These were identified in the field as 53-21 and 53-22. Wetland segment 53-21 was assessed as being a high quality open water depressional wetland and segment 53-22 was considered to be a low quality depressional area during the field verification. Approximately 0.11 ha (0.26 ac) of 53-21, and 0.15 ha (0.36 ac) of 53-22 would be impacted, totaling 0.25 ha (0.62 ac) or 1.5 percent of the total wetland area of ADID wetland 169. The proposed impacts are the result of mainline roadway construction and adjacent frontage roads.

While there is no overall functional loss to this wetland, there is minimal impact to functions as a result of the proposed project. As portions of this wetland harbor endangered plant species and high quality plant communities, additional consultation with the Illinois Department of Natural Resources would need to be conducted to determine the potential for impacting both the plant species and the habitat that the ADID wetland provides. Additional minimization and avoidance strategies may need to be developed during subsequent planning and design work to reduce or avoid the proposed impacts to this ADID site from this alternate.

D.1.2 ADID Wetland 170—Reed-Turner Nature Preserve

This wetland contains a sedge meadow. Only a portion of this wetland is included within the Nature Preserve confines. This wetland harbors threatened or endangered species of plants and contains a high quality plant community. Other functions performed by this wetland are shoreline / bank stabilization, sediment toxicant retention and nutrient removal and transport. The total wetland size within the study vicinity is 38.7 ha (95.6 ac) and extends outside the proposed project. Approximately 87.8 ha (217 ac) of the total wetland area are considered ADID. The project would directly impact approximately 0.2 ha (0.51 ac) of this wetland. The wetland in the vicinity of the proposed roadway (53-19) was characterized as open water / stream channel of moderate quality during the field verification. The impacts are the result of the mainline roadway construction and frontage roads construction. Total impacts to this ADID wetland from this alternate are less than 0.24-percent. As a result, no loss of wetland functions is anticipated.

D.1.3 ADID Wetland 180—Buffalo Creek Complex

The complex contains a sedge meadow and emergent marsh areas. This wetland harbors threatened or endangered species of plants and contains a high quality plant community. Other functions performed by this wetland are shoreline / bank stabilization, sediment toxicant retention and nutrient removal and transport. The total wetland size is 79.4 ha (196.3 ac), of which 63.5 ha (157 ac) are considered ADID. Due to its configuration relative to the proposed roadway, this wetland is impacted in three separate areas. These were identified in the field as 53-7, 53-8, and 53-11. The wetland segments were assessed as being a high to moderate quality stream complex during the field verification. Approximately 0.22 ha (0.54 ac) of 53-7, 0.36 ha (0.9 ac) of 53-8, and 1.6 ha (4.0 ac) of 53-11 would be impacted, totaling 2.2 ha (5.4 ac) of ADID wetland 180. This represents less than 2.8-percent of the total wetland area. The proposed impacts are the result of mainline roadway construction and grade separation of the channel.

While there is no overall functional loss to this wetland, there is minimal impact to functions as a result of the proposed project. As portions of this wetland harbors endangered plant species and high quality plant communities, additional consultation with the Illinois Department of Natural Resources would need to be conducted to determine the potential for impacting both the plant species and the habitat that the ADID wetland provides. Additional minimization and avoidance strategies may need to be developed during subsequent planning and design work to reduce or avoid the proposed impacts to this ADID site from this alternate.

D.2 IL 120 Corridor—Des Plaines River Watershed

D.2.1 ADID Wetland 200

This wetland is described by the Lake County ADID study as deep marsh dominated by cattails. This wetland harbors several species of State threatened or endangered species of birds. Other functions performed by this wetland are sediment toxicant trapping and stormwater storage. The total wetland size is 7.4 ha (18.3 ac) of which 7.0 ha (17.4 ac) are considered ADID. The project would directly impact approximately 0.13 ha (0.33 ac) of this

wetland. The wetland in the vicinity of the proposed roadway (120-4) was characterized as predominantly a cattail marsh of low quality during the field verification. The impacts are as a result of the construction of the mainline roadway and associated grading and embankments. The loss of 0.13 ha (0.33 ac) results in less than 1.9-percent of the total wetland. As a result, minimal impacts to the functions of this wetland are anticipated.

D.3 IL 83 Corridor—Des Plaines River Watershed

D.3.1 ADID Wetland 143—Indian Creek/Killdeer Creek

Due to its configuration relative to the proposed roadway, this wetland is impacted in two separate areas. These were identified in the field as 83-19 and 83-40. These areas were assessed as being low quality stream and adjacent depressional areas during the field verification. Approximately 0.08 ha (0.19 ac) of 83-19 and 0.16 ha (0.40 ac) of 83-40 would be impacted, totaling 0.24 ha (0.59 ac) or less than 0.3-percent of ADID wetland 143. The proposed impacts are the result of mainline roadway construction and frontage road construction. While there is no overall functional loss to this wetland, there is minimal impact to functions as a result of the proposed project. As portions of this wetland harbors endangered plant species and high quality plant communities, additional consultation with the IDNR would need to be conducted to determine the potential for impacting both the plant species and the habitat that the ADID wetland provides. Additional minimization and avoidance strategies may need to be developed during subsequent planning and design work to reduce or avoid the proposed impacts to this ADID site from this alternate.

D.3.2 ADID Wetland 151

This wetland is described by the Lake County ADID study as a wetland and stream complex associated with Indian Creek. This portion of Indian Creek still retains a high degree of natural character and has not been altered to any significant degree. The primary functions of this wetland are shoreline bank stabilization and sediment/ toxicant retention. The description of this wetland was verified during the field screening that was conducted. The total wetland size in the vicinity of the project is 38.0 ha (94.0 ac), but extends for long distances outside the study area. Approximately 39.4 ha (97.4 ac) of the entire wetland complex are considered ADID. The proposed project would unavoidably impact approximately 0.17 ha (0.42 ac) of this ADID wetland. The wetland in the vicinity of the proposed roadway (83-27) was characterized as a depressional community of low quality during the field verification. The impacts are as a result of the construction of the mainline roadway and associated embankment. This alternative would impact approximately 0.4-percent of this ADID wetland in the vicinity of the project. As a result of this minimal impact level, no loss of wetland function would occur.

D.3.3 ADID Wetland 158 (Wetland 83-11)

This wetland is described by the Lake County ADID study as Indian Creek, which is a stream and wetland complex that maintains a high degree of natural character and is relatively undisturbed. The primary functions of this wetland are shoreline bank stabilization and sediment/ toxicant retention. The description of this wetland was verified during the field screening. The total wetland size in the vicinity of the project is 28.9 ha (71.5

ac), but extends for long distances outside the study area. Approximately 23.7 ha (58.6 ac) of the large wetland complex are considered ADID. The proposed project would unavoidably impact approximately 0.01 ha (0.03 ac) of this ADID wetland. The wetland in the vicinity of the proposed roadway was characterized as forested depression and stream community during the field verification. The impacts are as a result of the construction of the mainline roadway and associated embankment. The impacts to this wetland are less than 0.04-percent of the total wetland in the vicinity of the project alone. As a result of the small amount of proposed impacts, no loss of wetland function would occur.

D.4 US 12 Corridor

D.4.1 ADID Wetland 183

The Lake County ADID Study does not describe this wetland in detail. The wetland is located in the Buffalo Creek Watershed. The primary functions of this wetland are stormwater storage, shoreline bank stabilization and nutrient removal/transport (partial). The total wetland size in the vicinity of the project is 36.7 ha (90.6 ac), but extends for long distances outside the study area. Approximately 9.0 ha (22.2 ac) of the large wetland complex are considered ADID. The proposed project would unavoidably impact approximately 0.25 ha (0.63 ac) of this ADID wetland. The wetland in the vicinity of the proposed roadway (12-4) was characterized as an open water pond with adjacent emergent community during the field verification. The impacts are as a result of the construction of proposed frontage roads. This alternative impacts approximately 0.7-percent of the wetland in the vicinity of the project. As a result of this minimal impact, no loss of wetland function would occur.

D.5 IL 120

D.5.1 ADID Wetland 200

ADID Wetland 200 is described in the IL 53 Freeway/Tollway Alternative discussion above. The project would directly impact approximately 0.08 ha (0.18 ac) of this wetland at this particular location (120-4). The description of this wetland was verified during the field screening that was conducted. The wetland in the vicinity of the proposed roadway was characterized as a depressional, cattail marsh of low quality during the field verification. The impacts in this location are as a result of the construction of the mainline roadway. Less than one percent of this wetland would be impacted by the proposed alternative. As a result, no loss of wetland functions is anticipated.

D.6 IL 21 Corridor

D.6.1 ADID Wetland 94—Liberty Prairie

This complex includes a wet prairie dominated by switch grass (*Panicum virgatum*), blue joint grass (*Calamagrostris canadensis*) and prairie cordgrass (*Spartina pectinata*), a graminoid fen dominated by grass of Parnassus (*Parnassia glauca*), Riddell's Goldenrod (*Solidago riddellii*) and bottle brush sedge (*Carex lurida*) and a sedge meadow dominated by spotted Joe pye weed (*Eupatorium maculatum*) smash skullcap (*Scutellaria sp*.) marsh vetchling (*Lathyrus palustris*)

and tufted loosestrife (*Lysimachia thyrsiflora*). The primary functions of this wetland are stormwater storage and sediment/ toxicant retention. The biological values sited include the presence of state threatened or endangered plant species, an overall high quality plant community and is a designated INAI Site. The total wetland size is 2 ha (5 ac) in the vicinity of the project, but extends for long distances outside the study area. Approximately 55.4 ha (137.0 ac) of the overall wetland complex are considered ADID. The proposed project would unavoidably impact approximately 0.02 ha (0.04 ac) of this ADID wetland. The wetland in the vicinity of the proposed roadway (21-28) was characterized as an open water channel with adjacent forested wetlands during the field verification. The impacts are as a result of the construction of the mainline roadway and associated embankment.

The proposed impacts to ADID wetland 94 are less than 0.03-percent of the total wetland complex. This ADID wetland consists of high quality natural areas within a larger ADID wetland complex. While impacts to wetland functions would be considered minimal, additional minimization and avoidance measures should be developed during the engineering phase to reduce impacts to high quality areas. The habitat function that this wetland provides cannot be easily mitigated and therefore additional measures may be required to minimize functional impacts.

D.6.2 ADID Wetland 96—Tributary to Bull Creek

This wetland is described by the Lake County ADID study as a tributary to Bull Creek, which is part of a stream and wetland complex that includes Oak Openings Natural Area (ADID Site 88) and ADID Sites 93 and 95. The primary functions of this wetland are stormwater storage and sediment/ toxicant retention and is valued as a high quality stream complex. The description of this wetland was verified during the field screening that was conducted. The total wetland size in the vicinity of the project is 2.4 ha (5.9 ac), but extends for long distances outside the study area. Approximately 6.45 ha (15.9 ac) of the overall wetland complex are considered ADID. The proposed project would unavoidably impact approximately 0.06 ha (0.16 ac) of this ADID wetland. The wetland in the vicinity of the proposed roadway (21-18) was characterized as an open water channel with adjacent forested wetlands during the field verification. The impacts are as a result of the construction of the mainline roadway and associated embankment.

The approximate impacts to this ADID wetland are one percent of the total ADID area. This ADID wetland consists of high quality natural areas within a larger ADID wetland complex. While impacts to wetland functions would be considered minimal, additional minimization and avoidance measures should be developed during the engineering phase to reduce impacts to high quality areas. The habitat function that this wetland provides cannot be easily mitigated and therefore additional measures may be required to minimize functional impacts.

D.6.3 ADID Wetland 106—Bull Creek

This wetland is described by the Lake County ADID study as a stream complex that includes areas of state endangered fish species. The primary functions of this wetland are stormwater storage and sediment/toxicant retention. The description of this wetland was verified during the field screening that was conducted. The total wetland size in the vicinity of the project is 0.22 ha (0.55 ac), but extends for long distances outside the study area. Approximately 0.65 ha (1.61 ac) of the overall wetland complex are considered ADID. Due

to its configuration relative to the proposed roadway, this wetland is impacted in two separate areas. These were identified in the field as 21-17 and 21-28. These areas were assessed as partially a channelized stream and open water stream with minimal adjacent depressional wetlands.

Approximately 0.01 ha (0.02 ac) of 31-17 and 0.05 ha (0.13 ac) of 21-28 would be impacted, totaling 0.06 ha (0.15 ac) or roughly 9-percent of the ADID portion of this wetland complex, but a much lower percentage of the total wetland complex. While overall there is no functional loss to this wetland, there is minimal impact to the ADID portion of the wetland. As this wetland harbors an endangered fish species, additional consultation with the Illinois Department of Natural Resources would need to be conducted to determine the potential for impacting both the fish species and the habitat the ADID wetland provides. Additional minimization and avoidance strategies may need to be developed during subsequent planning and design work to reduce or avoid the proposed impacts to this ADID site from this alternate. The proposed impacts are the result of mainline roadway construction and associated embankment.

D.7 IL 60 Corridor and St. Mary's Road Corridor

D.7.1 ADID Wetland 198—MacArthur Woods

This wetland complex is described as a northern flatwoods dominated by Swamp white oak (*Quercus bicolor*) and American elm (*Ulmus americana*), a floodplain forest dominated by silver maple (*Acer saccharinum*) and cottonwoods (*Populus deltoides*), and a shrub swamp dominated by buttonbush (*Cephalanthus occidentalis*) and red osier dogwood (*Cornus stolonifera*). The primary functions of this wetland are stormwater storage and sediment/toxicant retention and is valued as a high quality plant community. The description of this wetland was verified during the field screening that was conducted. The total wetland size in the vicinity of the project is 0.1 ha (0.26 ac), but extends for long distances outside the study area. Approximately 14.8 ha (36.57 ac) of the overall wetland complex are considered ADID. Due to its configuration relative to the proposed roadway, this wetland is impacted in two separate areas. These were identified in the field as 60-11 and STM-27. Wetland segments 60-11 and STM-27 were assessed as being a low quality depressional area during the field verification. Approximately 0.06 ha (0.15 ac) of 60-11 and 0.008 ha (0.02 ac) of STM-27 would be impacted, totaling 0.06 ha (0.16 ac) or approximately 0.4-percent of ADID wetland 198. The proposed impacts are the result of mainline roadway construction and associated embankment.

This minimal impact would not cause a loss of function for this wetland. However, this ADID wetland consists of high quality natural areas within a larger ADID wetland complex. While impacts to wetland functions would be considered minimal, additional minimization and avoidance measures should be developed during the engineering phase to reduce impacts to high quality areas. The habitat function that this wetland provides cannot be easily mitigated and therefore additional measures may be required to minimize functional impacts.

D.8 I-94 Corridor

D.8.1 ADID Wetland 91

This wetland is described by the Lake County ADID study as a cattail marsh and sedge meadow. This wetland is also in the Middle Fork of the Chicago River watershed. The primary functions of this wetland are sediment / toxicant retention and is valued as high quality, diverse plant community. Open water portions of this area provides waterfowl habitat. The description of this wetland was verified during the field screening that was conducted. The total wetland size in the vicinity of the project is 49.6 ha (122.5 ac), all of which is considered ADID wetland. The proposed project would unavoidably impact approximately 0.28 ha (0.7 ac) of this ADID wetland. The wetland in the vicinity of the proposed roadway (94-11) was characterized as a moderate quality forested wetland during the field verification. The impacts are as a result of the construction of the mainline roadway and associated embankment.

The impacts to this wetland as a result of this alternative are approximately 0.6-percent of the ADID wetland within the vicinity of the project. This minimal impact would not cause a loss of function for this wetland. This ADID wetland also consists of high quality natural areas within a larger ADID wetland complex. While impacts to wetland functions would be considered minimal, additional minimization and avoidance measures should be developed during the engineering phase to reduce impacts to high quality areas. The habitat function that this wetland provides cannot be easily mitigated and therefore additional measures may be required to minimize functional impacts.

D.8.2 ADID Wetland 99—Headwaters of the Middle Fork of the North Branch of the Chicago River

This wetland consists primarily of an emergent cattail marsh. ADID sites 97 and 98 are part of this large complex. The primary functions of this wetland are sediment / toxicant retention and is valued as high quality wildlife habitat with an abundance of potential nesting areas for birds. The description of this wetland was verified during the field screening that was conducted. The total wetland size in the vicinity of the project is 3.37 ha (8.32 ac), but extends for long distances outside the study area. Approximately 3.46 ha (8.56 ac) of the overall wetland complex are considered ADID. The proposed project would unavoidably impact approximately 0.01 ha (0.03 ac) of this ADID wetland. The wetland in the vicinity of the proposed roadway (94-10) was characterized as a moderate quality forested wetland during the field verification. The impacts are as a result of the construction of the mainline roadway and associated embankment.

The impacts to this wetland as a result of this alternative are approximately 0.3-percent of the ADID wetland within the vicinity of the project. This minimal impact would not cause a loss of function for this wetland. However, this ADID wetland consists of high quality natural areas within a larger ADID wetland complex. While impacts to wetland functions would be considered minimal, additional minimization and avoidance measures should be developed during the engineering phase to reduce impacts to high quality areas. The habitat function that this wetland provides cannot be easily mitigated and therefore additional measures may be required to minimize functional impacts.

D.8.3 ADID Wetland 108—Oak Grove

This wetland consists of a sedge meadow and wet mesic prairie communities within the Middle Fork of the Chicago River watershed. The primary functions of this wetland are sediment/toxicant retention. This wetland is a designated Illinois Natural Areas Inventory site and contains state threatened or endangered plant species. The description of this wetland was verified during the field screening that was conducted. The total wetland size in the vicinity of the project is 9.6 ha (23.6 ac). Approximately 11.7 ha (28.9 ac) of the overall wetland complex are considered ADID. The proposed project would unavoidably impact approximately 0.4 ha (1.02 ac) of this ADID wetland. The wetland in the vicinity of the proposed roadway (94-9) was characterized as a moderate quality forested wetland during the field verification. The impacts are as a result of the construction of the mainline roadway and associated embankment.

The impacts to this wetland as a result of this alternative are approximately 3.5-percent of the ADID wetland within the vicinity of the project. This ADID wetland consists of high quality natural areas within a larger ADID wetland complex. While impacts to wetland functions would be considered minimal, additional minimization and avoidance measures should be developed during the engineering phase to reduce impacts to high quality areas. The habitat function that this wetland provides cannot be easily mitigated and therefore additional measures may be required to minimize functional impacts.

D.8.4 ADID Wetland 128

This wetland is described by the Lake County ADID study as a sedge meadow dominated by lake sedge (*Carex lacustris*) and tussock sedge (*Carex stricta*) and wet prairie dominated by prairie cordgrass (*Spartina pectinata*) and big bluestem (*Andropogon gerardii*). This wetland is also in the Middle Fork of the Chicago River watershed and is part of a complex that includes ADID wetlands 128 through 135 and 145, which includes the Middle Fork Savanna. The primary functions of this wetland are sediment/toxicant retention and is valued as high quality, diverse plant community. The description of this wetland was verified during the field screening that was conducted. The total wetland size in the vicinity of the project is 42 ha (103.7 ac). Approximately 48.3 ha (119.4 ac) of the overall wetland complex are considered ADID. The proposed project would unavoidably impact approximately 0.04 ha (0.11 ac) of this ADID wetland. The wetland in the vicinity of the proposed roadway (94-5) was characterized as a moderate quality forested wetland and cattail marsh during the field verification. The impacts are as a result of the construction of the mainline roadway and associated embankment.

The impacts to this wetland as a result of this alternative are approximately 0.09-percent of the ADID wetland within the vicinity of the project. This minimal impact would not cause a loss of function for this wetland. This ADID wetland also consists of high quality natural areas within a larger ADID wetland complex. While impacts to wetland functions would be considered minimal, additional minimization and avoidance measures should be developed during the engineering phase to reduce impacts to high quality areas. The habitat function that this wetland provides cannot be easily mitigated and therefore additional measures may be required to minimize functional impacts.

APPENDIX E

Summary of Wetland Impact Data

TABLE E-1
Wetland Impacts by Quality Class along the IL 83/US 45 with US 12 Alternative within the Fox River Watershed

Wetland Quality Class Impacts							
	I (High Quality)		II		III		
Road	**ha**	**ac**	**ha**	**ac**	**ha**	**ac**	**Total ha (ac)**
SMR	0	0	0	0	0	0	0 (0)
US 12	0	0	0	0	0.14	0.34	0.14 (0.34)
Rt 120	0	0	0.04	0.09	0.4	0.99	0.44 (1.08)
Rt 83	0	0	0	0	0	0	0(0)
Rt 176	0	0	0	0	0	0	0(0)
Rt 53	0	0	0	0	0	0	0(0)
Rt 21	0	0	0	0	0	0	0(0)
OPR	0	0	0	0	0	0	0(0)
I94	0	0	0	0	0	0	0(0)
Rt 137	0	0	0	0	0	0	0(0)
Rt 60	0	0	0	0	0	0	0(0)
US 45	0	0	0	0	0	0	0(0)
Total	0	0	0.04	0.09	0.54	1.33	0.58 (1.42)

TABLE E-2

Wetland Impacts by Quality Class along the IL 83/US 45 with US 12 Alternative within the Des Plaines River Watershed

Wetland Quality Class Impacts							
	I (High Quality)		**II**		**III**		
Road	**ha**	**ac**	**ha**	**ac**	**ha**	**ac**	**Total ha (ac)**
SMR	0.07	0.17	0.87	2.16	0.55	1.35	1.49 (3.68)
US 12	0	0	0.53	1.32	0.65	1.61	1.18 (2.93)
Rt 120	0.12	0.3	1.34	3.31	2.48	6.14	3.94 (9.75)
Rt 83	0	0	4.39	10.84	2.25	5.56	6.64 (16.4)
Rt 176	0	0	0	0	0.11	0.26	0.11 (0.26)
Rt 53	0	0	1.06	2.61	0.95	2.35	2.01 (4.96)
Rt 21	0.16	0.39	0.39	0.97	0.43	1.07	0.98 (2.43)
OPR	0	0	0	0	0	0	0 (0)
I94	0.3	0.73	5.36	13.25	0.3	0.74	5.96 (14.72)
Rt 137	0	0	0.21	0.53	0.01	0.02	0.22 (0.55)
Rt 60	0.23	0.57	<0.01	<0.01	0.20	0.49	0.43 (1.06)
US 45	0	0	0.01	0.02	<0.01	<0.01	0.01 (0.02)
Total	0.88	2.16	14.16	35.01	7.98	19.59	23.02 (56.76)

TABLE E-3

Wetland Impacts by Quality Class along the IL 83/US 45 with US 12 Alternative within the Lake Michigan Watershed

Wetland Quality Class Impacts							
	I (High Quality)		**II**		**III**		
Road	**ha**	**ac**	**ha**	**ac**	**ha**	**ac**	**Total ha (ac)**
SMR	0	0	0	0	0	0	0 (0)
US 12	0	0	0	0	0	0	0 (0)
Rt 120	0	0	0	0	0	0	0 (0)
Rt 83	0	0	0	0	0	0	0 (0)
Rt 176	0	0	0	0	0	0	0 (0)
Rt 53	0	0	0	0	0	0	0 (0)
Rt 21	0	0	0	0	0	0	0 (0)
OPR	0	0	0	0	0	0	0 (0)
I94	0	0	0	0	0	0	0 (0)
Rt 137	0	0	0	0	0	0	0 (0)
Rt 60	0	0	0	0	0	0	0 (0)
US 45	0	0	0	0	0	0	0 (0)
Total	0	0	0	0	0	0	0 (0)

TABLE E-4
Wetland Impacts by Quality Class along the IL 53 Freeway/Tollway Alternative within the Fox River Watershed

Wetland Quality Class Impacts							
	I (High Quality)		II		III		
Road	ha	ac	ha	Ac	ha	ac	Total ha (ac)
US 12	0	0	0	0	0	0	0 (0)
Rt 120	0	0	2.44	6.02	2.93	7.25	5.37 (13.27)
Rt 83	0	0	0	0	0	0	0 (0)
Rt 176	0	0	0	0	0	0	0 (0)
Rt 53	0	0	0	0	0	0	0 (0)
Rt 21	0	0	0	0	0	0	0 (0)
OPR	0	0	0	0	0	0	0 (0)
I94	0	0	0	0	0	0	0 (0)
US 45	0	0	0	0	0	0	0 (0)
Total	0	0	2.44	6.02	2.93	7.25	5.37 (13.27)

TABLE E-5
Wetland Impacts by Quality Class along the IL 53 Freeway/Tollway Alternative within the Des Plaines River Watershed

Wetland Quality Class Impacts							
	I (High Quality)		II		III		
Road	ha	ac	ha	ac	ha	ac	Total ha (ac)
US 12	0	0	0.04	0.11	0.03	0.07	0.07 (0.18)
Rt 120	2.39	5.9	0	0	9.11	22.52	11.50 (28.42)
Rt 83	0	0	2.1	5.2	1.2	3.02	3.30 (8.22)
Rt 176	0	0	0	0	0	0	0 (0)
Rt 53	2.25	5.6	4.4	10.92	6.68	16.52	13.33 (33.04)
Rt 21	0	0	0	0	0	0	0 (0)
OPR	0	0	0	0	0	0	0 (0)
I94	0	0	0.97	2.39	2.4	6.01	3.37 (8.4)
US 45	0	0	0	0	0	0	0 (0)
Total	4.64	11.5	7.51	18.62	19.42	48.14	31.57 (78.26)

TABLE E-6

Wetland Impacts by Quality Class along the IL 53 Freeway/Tollway Alternative within the Lake Michigan Watershed

Wetland Quality Class Impacts							
	I (High Quality)		II		III		
Road	ha	ac	ha	ac	ha	ac	Total ha (ac)
US 12	0	0	0	0	0	0	0 (0)
Rt 120	0	0	0	0	0	0	0 (0)
Rt 83	0	0	0	0	0	0	0 (0)
Rt 176	0	0	0	0	0	0	0 (0)
Rt 53	0	0	0	0	0	0	0 (0)
Rt 21	0	0	0	0	0	0	0 (0)
OPR	0	0	0	0	0	0	0 (0)
I94	0	0	0	0	0	0	0 (0)
US 45	0	0	0	0	0	0	0 (0)
Total	0	0	0	0	0	0	0 (0)

APPENDIX F

Floodplain Crossings and Compensatory and Detention Storage Requirements

TABLE F-1
Floodplain Crossings, No-Action Alternative (Baseline)

Watershed/ Subwatershed	Floodplain Crossing Location/Description	Crossing Length (ft)	Improvement Width[a] (ft)	Crossing Type
Quentin Road Improvement, Des Plaines River Watershed				
1. Buffalo Creek	South Fork Tributary B to Buffalo Creek north of US 12 in the Village of Kildeer.	150	36	Transverse
2. Buffalo Creek	South Fork Tributary B to Buffalo Creek south of East Cuba Road in the Village of Kildeer.	250	36	Transverse
3. Buffalo Creek	Buffalo Creek north of East Cuba Road in the Village of Kildeer.	50	36	Transverse
Lake-Cook Road Improvement, Des Plaines River Watershed				
4. Lower Des Plaines River	Des Plaines River floodplain west of IL 21/US 45 in unincorporated Lake County.	400	30	Transverse
5. Lower Des Plaines River	Des Plaines River east of IL 21/US 45 in unincorporated Lake County.	700	30	Transverse
I-94 Improvement, Chicago River Watershed				
6. West Fork	West Fork North Branch Chicago River south of Duffy Lane in the Village of Bannockburn.	2,000	24	Longitudinal
7. West Fork	West Fork North Branch Chicago River south of IL 22 in the Village of Bannockburn.	2,750	12	Longitudinal
8. West Fork	West Fork North Branch Chicago River north of IL 22 in the Village of Lincolnshire, the City of Lake Forest, and unincorporated Lake County.	5,750	24	Longitudinal
IL 22 (Half Day Road) Improvement, Fox River Watershed				
9. Flint Creek	Flint Creek east of Kelsey Road in the Village of Lake Barrington.	150	42	Transverse
10. Flint Creek	East Tributary Flint Creek floodplain east of Kelsey Road in the Village of Lake Barrington.	200	42	Transverse
11. Flint Creek	Honey Lake Drain east of IL 59 in the Village of North Barrington.	150	42	Transverse
IL 22 (Half Day Road) Improvement, Des Plaines River Watershed				
12. Indian Creek	South Branch Indian Creek east of Quentin Road in the Village of Kildeer.	200	21	Longitudinal

TABLE F-1
Floodplain Crossings, No-Action Alternative (Baseline)

Watershed/ Subwatershed	Floodplain Crossing Location/Description	Crossing Length (ft)	Improvement Width[a] (ft)	Crossing Type
13. Indian Creek	South Branch Indian Creek floodplain east of Quentin Road in the Village of Kildeer.	200	21	Longitudinal
14. Indian Creek	Indian Creek east of Krueger Road in the Village of Kildeer.	700	42	Transverse
15. Indian Creek	Tributary to South Branch Indian Creek east of Old McHenry Road in the Village of Long Grove.	450	42	Transverse
16. Indian Creek	South Branch Indian Creek east of IL 83 in the Village of Long Grove.	250	42	Transverse
17. Indian Creek	South Branch Indian Creek floodplain east of IL 83 in the Village of Long Grove.	300	24	Transverse
18. Indian Creek	Indian Creek east of IL 21 in the Village of Lincolnshire.	1,150	42	Transverse
19. Indian Creek	Indian Creek floodplain east of IL 21 in the Village of Lincolnshire.	600	42	Transverse
20. Lower Des Plaines River	Des Plaines River east of IL 21 in the Village of Lincolnshire.	1,650	42	Transverse
IL 22 (Half Day Road) Improvement, Chicago River Watershed				
21. West Fork	West Fork North Branch Chicago River west of I-94 in the Village of Lincolnshire.	200	42	Transverse
Buffalo Grove Road Improvement, Des Plaines River Watershed				
22. Aptakisic Creek	Aptakisic Creek south of Aptakisic Road in unincorporated Lake County.	900	24	Transverse
Busch Road Improvement, Des Plaines River Watershed				
23. Aptakisic Creek	Aptakisic Creek west of Weiland Road in the Village of Buffalo Grove.	150	12	Transverse
IL 83/60 Improvement, Des Plaines River Watershed				
24. Indian Creek	Diamond Lake floodplain south of Midlothian Road in unincorporated Lake County.	100	30	Transverse
Butterfield Road Improvement, Des Plaines River Watershed				
25. Bull Creek	Bull Creek floodplain north of IL 176 in the Village of Libertyville.	350	36	Longitudinal
26. Bull Creek	Bull Creek north of IL 176 in the Village of Libertyville.	200	36	Transverse
Peterson Road Improvement, Fox River Watershed				
27. Squaw Creek	Squaw Creek north of IL 60 in the Village of Round Lake Park.	600	21	Longitudinal

TABLE F-1
Floodplain Crossings, No-Action Alternative (Baseline)

Watershed/ Subwatershed	Floodplain Crossing Location/Description	Crossing Length (ft)	Improvement Width[a] (ft)	Crossing Type
IL 21 Improvement, Des Plaines River Watershed				
28. Bull Creek	Bull Creek north of IL 137 in unincorporated Lake County.	350	24	Transverse
29. Upper Des Plaines River	Belvidere Road Tributary south of US Route 120 in the Village of Gurnee.	200	24	Transverse
30. Upper Des Plaines River	Warren Cemetery Tributary south of I-94 in the Village of Gurnee.	300	24	Transverse
Washington Street Improvement, Des Plaines River Watershed				
31. Mill Creek	Mill Creek floodplain at IL 83 in unincorporated Lake County.	200	24	Longitudinal
32. Mill Creek	Mill Creek floodplain east of Atkinson Road in the Village of Grayslake.	750	12	Longitudinal
33. Mill Creek	Mill Creek west of US 45 in the Village of Grayslake.	400	24	Transverse
Bradley Road Improvement, Chicago River Watershed				
34. Middle Fork	Middle Fork North Branch Chicago River east of I-94 in unincorporated Lake County.	1,300	44	Transverse
Martin Luther King Drive (22nd Street) Improvement, Chicago River Watershed				
35. Skokie River	Skokie River floodplain east of US 41 in the City of North Chicago.	800	36	Transverse
Rollins Road Improvement, Des Plaines River Watershed				
36. Mill Creek	Mill Creek east of Drury Road in unincorporated Lake County.	600	24	Transverse
37. Mill Creek	Mill Creek and associated floodplain east of US 45 in the Village of Gurnee.	200	24	Transverse
38. Mill Creek	Mill Creek and associated floodplain south of IL 132 in the Village of Gurnee.	200	60	Transverse

[a] The improvement width is equal to the proposed roadway width minus the existing roadway width.

TABLE F-2
Additional Impervious Area, No-Action Alternative (Baseline)

Mainline Routes of Baseline Improvements	Existing Paved Area (ft^2)	Proposed Paved Area (ft^2)	Additional Impervious Area (ft^2)
Lake-Cook Road	1,299,000	1,948,000	649,000
IL 22	2,572,000	7,074,000	4,502,000
I-94	1,178,000	1,964,000	786,000
Quentin Road	817,000	1,682,000	865,000
Busch Road	165,000	247,000	82,000
Buffalo Grove Road	304,000	608,000	304,000
Weiland Road	NA [a]	253,000	253,000
IL 60/IL 83	608,000	1,115,000	507,000
Butterfield Road	494,000	1,236,000	742,000
US 45	760,000	2,281,000	1,521,000
Peterson Road	482,000	1,366,000	884,000
Midlothian Road	NA [a]	256,000	256,000
IL 21	1,090,000	1,635,000	545,000
Bradley Road	NA [a]	302,000	302,000
Martin Luther King Drive	178,000	444,000	266,000
Washington Street	1,046,000	1,743,000	697,000
Hunt Club Road	203,000	507,000	304,000
Casmir Pulaski Road	NA [a]	232,000	232,000
Rollins Road	589,000	1,188,000	599,000
Sunset Avenue	139,000	348,000	209,000
TOTAL ADDITIONAL IMPERVIOUS AREA			**14,505,000 ft^2 (333.0 ac)**

[a] These improvements are along new alignment so these is no existing paved area.

TABLE F-3
Compensatory and Detention Storage Requirements, No-Action Alternative (Baseline)

Watershed/ Subwatershed	Roadway Improvement Length (mi)	Compensatory Storage Required (ac)	Detention Storage Required (ac)
Fox River Watershed			
Squaw Creek	0.93	0.3	0.4
Flint Creek	7.00	2.0	3.2
Des Plaines River Watershed			
Buffalo Creek	6.60	1.9	3.0
Bull Creek	8.78	2.5	4.0
Indian Creek	13.13	3.7	5.9
Mill Creek	10.43	2.9	4.7
Upper Des Plaines River	8.91	2.5	4.0
Lower Des Plaines River	3.89	1.1	1.8
Aptakisic Creek	5.50	1.5	2.5
Chicago River Watershed			
Skokie River	1.40	0.4	0.6
Middle Fork	4.64	1.3	2.1
West Fork	6.94	1.9	3.1
TOTAL	**78.15**	**22.0**	**35.3**

TABLE F-4
Storage Requirements Per Reach, No-Action Alternative (Baseline)

Reach Number/ Location	Roadway Improvement Length (mi)	Compensatory Storage Required (ac)	Detention Storage Required (ac)	Opportunities/Constraints for Providing Storage
1	3.10	0.9	1.4	Potential storage site along IL 22 west of Barrington Rd.
2	2.20	0.6	1.0	Potential storage site along IL 22 east of Barrington Rd.
3	1.70	0.5	0.8	Potential storage site along IL 22 east of Lake Zurich at Buesching Rd.
4	2.60	0.7	1.2	Potential storage site along IL 22 west of Quentin Rd and along Quentin south of IL 22.
5	2.00	0.6	0.9	Potential storage site near Buffalo Creek at Quentin Rd and north of US 12.
6	2.40	0.7	1.1	Potential storage site near Buffalo Creek Tributary south of Lake-Cook Rd and north of Lake-Cook Rd east of Quentin Rd.
7	3.50	1.0	1.6	Potential storage sites along IL 22 east of Krueger Rd and east of IL 83.
8	3.00	0.8	1.4	Potential storage site along Butterfield Rd south of Aptakisic Rd.
9	2.70	0.8	1.2	Potential storage site near Aptakisic Creek south of Busch Rd.
10	3.70	1.0	1.7	Potential storage sites along IL 22 east of IL 21 near the Des Plaines River.
11	3.00	0.8	1.4	Potential storage site along IL 22 east of I-94.
12	2.80	0.8	1.3	Potential storage sites along I-94 south of IL 60.
13	3.40	1.0	1.5	Potential storage site along I-94 south of IL 22 near the West Fork North Branch Chicago River.
14	2.10	0.6	1.0	Potential storage site along Lake-Cook Rd east of IL 21 near the Des Plaines River.
15	2.00	0.6	0.9	Potential storage site along Lake-Cook Rd west of IL 21.
16	2.00	0.6	0.9	Potential storage site along Butterfield Rd north of IL 60.
17	3.20	0.9	1.4	Potential storage site along IL 60/83 south of IL 176 and near Diamond Lake.
18	2.50	0.7	1.1	Potential storage site along Peterson Rd at Alleghany Rd.
19	2.40	0.7	1.1	Potential storage site along the Midlothian Rd extension west of Harris Rd.
20	2.20	0.6	1.0	Potential storage site along US 45 south of Peterson Rd.
21	1.90	0.5	0.9	Potential storage site east of Butterfield Rd near Butler Lake.
22	2.30	0.6	1.0	Potential storage site along US 45 south of IL 120.

TABLE F-4
Storage Requirements Per Reach, No-Action Alternative (Baseline)

Reach Number/ Location	Roadway Improvement Length (mi)	Compensatory Storage Required (ac)	Detention Storage Required (ac)	Opportunities/Constraints for Providing Storage
23	4.40	1.2	2.0	Potential storage sites along Washington St near Third Lake, and along US Route 45 near Gages Lake.
24	4.20	1.2	1.9	Potential storage sites south of Washington St west of I-94.
25	4.30	1.2	1.9	Potential storage site along IL 21 south of IL 120 near the Des Plaines River.
26	1.30	0.4	0.6	Potential storage site north of Bradley Rd near I-94.
27	1.40	0.4	0.6	Potential storage site along Martin Luther King Drive east of IL 43.
28	1.00	0.3	0.5	Potential storage site along Casmir Pulaski Rd east of IL 43.
29	1.10	0.3	0.5	Potential storage site along Sunset Ave east of US 41.
30	3.75	1.1	1.7	Potential storage site along Rollins Rd east of IL 83 near Fourth Lake.
TOTAL	**78.15**	**22.0**	**35.5**	

TABLE F-5
Floodplain Crossings, IL 53 Freeway/Tollway Alternative

Watershed/ Subwatershed	Floodplain Crossing Location/Description	Crossing Length (ft)	Improvement Width [a] (ft)	Crossing Type
Proposed IL 53 Mainline, Des Plaines River Watershed				
1. Buffalo Creek	Buffalo Creek south of Cuba Road in the Village of Long Grove.	350	168	Transverse
2. Indian Creek	South Branch of Indian Creek floodplain east of a private road south of IL 22 in the Village of Kildeer.	150	168	Transverse
3. Indian Creek	South Branch of Indian Creek floodplain at a private road south of IL 22 in the Village of Kildeer.	150	168	Transverse
4. Indian Creek	Forest Lake Drain south of Gilmer Road in unincorporated Lake County.	900	168	Transverse
5. Indian Creek	Indian Creek north of Gilmer Road in unincorporated Lake County.	750	168	Transverse
6. Indian Creek	SMC floodplain area south of Indian Creek Road in the Village of Long Grove.	50	168	Transverse
7. Indian Creek	Seavey Drainage Ditch south of IL 176 in the Village of Mundelein.	100	168	Transverse
8. Bull Creek	Bull Creek south of proposed Peterson Road interchange in unincorporated Lake County.	50	168	Transverse
Proposed IL 120 Mainline, Fox River Watershed				
9. Squaw Creek	SMC floodplain area west of the proposed Fairfield Road interchange in unincorporated Lake County.	600	168	Transverse
10. Squaw Creek	Squaw Creek west of the proposed Alleghany Road interchange in the Village of Hainesville and unincorporated Lake County.	4,550	168	Transverse
Proposed IL 120 Mainline, Des Plaines River Watershed				
11. Mill Creek	Mill Creek east of the proposed Alleghany Road interchange in the Village of Grays Lake.	200	168	Transverse
12. Mill Creek	Mill Creek floodplain east of the proposed Alleghany Road interchange in the Village of Grays Lake.	50	168	Transverse

[a] The improvement width of the typical cross section is assumed to be 168 feet, as depicted on Table F–2.

TABLE F-6
Historic Flooding Locations, IL 53 Freeway/Tollway Alternative—Proposed IL 53 Mainline, Des Plaines River Watershed

Watershed/ Subwatershed	Floodplain Crossing Location	Flooding History	Improvement Description
Buffalo Creek	Buffalo Creek located south of Cuba Road.	In the Village of Long Grove, Buffalo Creek flooded in 1957 and reached an elevation of 722 feet at McHenry Road.	Proposed IL 53 mainline, 6-lane improvement.
Indian Creek	South Branch Indian Creek located east of a private road south of IL 22.	In the Village of Kildeer, South Branch Indian Creek flooded in March 1960 and April 1965.	Proposed IL 53 mainline, 6-lane improvement.
Indian Creek	South Branch Indian Creek located at a private road south of IL 22.	In the Village of Kildeer, South Branch Indian Creek flooded in March 1960 and April 1965.	Proposed IL 53 mainline, 6-lane improvement.

TABLE F-7
Additional Impervious Area, IL 53 Freeway/Tollway Alternative

Mainline Routes and Associated Feeder Roads	Existing Paved Area (ft^2)	Proposed Paved Area (ft^2)	Additional Impervious Area (ft^2)
IL 120 Existing Mainline	1,906,000	4,103,000	2,197,000
IL 120 Proposed Mainline	NA [a]	4,383,000	4,383,000
IL 120 Feeder Roads	398,000	941,000	543,000
IL 120 Interchanges	240,000	1,562,000	1,322,000
IL 53 Proposed Mainline	NA [a]	9,472,000	9,472,000
IL 53 Feeder Roads	380,000	934,000	554,000
IL 53 Interchanges	160,000	888,000	728,000
TOTAL ADDITIONAL IMPERVIOUS AREA			**19,199,000 (440.7 ac)**

[a] These improvements are along new alignment so these is no existing paved area.

TABLE F-8
Compensatory and Detention Storage Requirements, IL 53 Freeway/Tollway Alternative

Watershed/ Subwatershed	Roadway Improvement Length (mi)	Compensatory Storage Required (ac)	Detention Storage Required (ac)
Fox River Watershed			
Fish Lake Drain	1.19	1.0	1.2
Squaw Creek	8.78	7.6	8.6
Des Plaines River Watershed			
Buffalo Creek	4.22	3.7	4.2
Bull Creek	4.92	4.3	4.8
Indian Creek	9.89	8.6	9.7
Mill Creek	4.36	3.8	4.3
Upper Des Plaines River	13.79	12.0	13.5
TOTAL	**47.15**	**41.0**	**46.3**

TABLE F-9
Storage Requirements Per Reach, IL 53 Freeway/Tollway Alternative

Reach Number/ Location [a]	Roadway Improvement Length (mi)	Compensatory Storage Required (ac)	Detention Storage Required (ac)	Opportunities/Constraints for Providing Storage
1	1.19	1.0	1.2	Potential storage site along IL 120 east of US 12.
2	4.75	4.1	4.7	Potential storage site along IL 120 east of Fairfield Rd.
3	4.03	3.5	4.0	Potential storage site south of IL 120 near Squaw Creek.
4	4.36	3.8	4.3	Potential storage site south along IL 120 at Alleghany Rd.
5	9.41	8.2	9.2	Potential storage site along IL 120 east of IL 21 at the Des Plaines River.
6	4.38	3.8	4.3	Potential storage sites along IL 120 west of Waukegan Road, and along I-94 south of IL 21.
7	4.92	4.3	4.8	Potential storage sites along IL 53 east of IL 83 and south of IL 176.
8	6.18	5.4	6.1	Potential storage site along IL 53 north of Gilmer Rd.
9	4.22	3.7	4.1	Potential storage sites along IL 53 north of Dundee Rd/IL 68 and north of Lake-Cook Rd.
10	3.71	3.2	3.6	Potential storage site along IL 53 south of IL 22.
TOTAL	**47.15**	**41.0**	**46.3**	

[a] Reaches 1, 2, 5 and 6 include improvements to IL 120; Reaches 3, 4, 7, 8, 9, and 10 include improvements to IL 53.

TABLE F-10
Floodplain Crossings, IL 83/US 45 with US 12 Alternative

Watershed/ Subwatershed	Floodplain Crossing Location/Description	Crossing Length (ft)	Improvement Width[a] (ft)	Crossing Type
IL 83/US 45 Mainline, Des Plaines River Watershed				
1. Buffalo Creek	Buffalo Creek west of IL 83 in the Village of Long Grove.	350	48	Transverse
2. Indian Creek	South Branch of Indian Creek at Oak Grove Road south of IL 22 in the Village of Long Grove.	250	10	Transverse
3. Indian Creek	Indian Creek north of Gilmer Road in unincorporated Lake County.	2,500	40	Transverse
4. Indian Creek	Diamond Lake Drain south of US 45 in the Villages of Long Grove and Vernon Hills.	150	40	Transverse
5. Indian Creek	Seavey Drainage Ditch south of IL 176 in the Village of Mundelein.	100	88	Transverse
6. Bull Creek	Bull Creek south of the proposed Peterson Road interchange in unincorporated Lake County.	50	88	Transverse
IL 83/US 45 Feeder Roads, Des Plaines River Watershed				
7. Indian Creek	IL 60 – Diamond Lake Drain east of US 45 in the Village of Mundelein.	100	40	Transverse
8. Indian Creek	Midlothian Road – Indian Creek west of IL 83 in the Village of Long Grove and unincorporated Lake County.	50	24	Transverse
IL 83/US 45 Interchanges, Des Plaines River Watershed				
9. Indian Creek	Des Plaines River floodplain northwest of proposed IL 83/IL 22 interchange in the Village of Long Grove.	250	32	Longitudinal
IL 21 Mainline, Des Plaines River Watershed				
10. Aptakisic Creek	Aptakisic Creek south of Deerfield Road in unincorporated Lake County.	200	16	Transverse
11. Lower Des Plaines River	Des Plaines River floodplain at Deerfield Road in the Village of Buffalo Grove and unincorporated Lake County.	850	16	Longitudinal
12. Lower Des Plaines River	Des Plaines River floodplain north of Deerfield Road in the Village of Buffalo Grove and unincorporated Lake County.	2,100	16	Longitudinal
13. Indian Creek	Des Plaines River floodplain south of IL 22 in the Village of Lincolnshire.	450	16	Longitudinal
14. Indian Creek	Indian Creek south of IL 22 in the Village of Lincolnshire.	150	16	Transverse
15. Lower Des Plaines River	Des Plaines River floodplain north of IL 22 in the Village of Vernon Hills.	100	8	Longitudinal
16. Lower Des Plaines River	IL 60 – Des Plaines River floodplain east of IL 21 in the Village of Vernon Hills and unincorporated Lake County.	1,850	40	Transverse

TABLE F-10
Floodplain Crossings, IL 83/US 45 with US 12 Alternative

Watershed/ Subwatershed	Floodplain Crossing Location/Description	Crossing Length (ft)	Improvement Width[a] (ft)	Crossing Type
17. Lower Des Plaines River	St. Mary's Road – Unnamed creek floodplain north of IL 60 in unincorporated Lake County.	300	48	Transverse
18. Upper Des Plaines River	IL 137 – Des Plaines River east of IL 21 in unincorporated Lake County.	1,850	40	Transverse
19. Upper Des Plaines River	IL 137 – Tributary No. 1 east of IL 21 in unincorporated Lake County.	750	40	Transverse
20. Upper Des Plaines River	IL 137 – Tributary No. 1 floodplain west of St. Mary's Road in unincorporated Lake County.	700	20	Longitudinal
21. Bull Creek	Bull Creek north of IL 137 in unincorporated Lake County.	350	40	Transverse
22. Upper Des Plaines River	Belvidere Road Tributary south of US Route 120 in the Village of Gurnee.	200	48	Transverse
23. Upper Des Plaines River	Warren Cemetery Tributary south of I-94 in the Village of Gurnee.	300	48	Transverse
24. Upper Des Plaines River	Des Plaines River floodplain south of IL 132 in the Village of Gurnee.	100	20	Longitudinal
IL 21 Feeder Roads, Des Plaines River Watershed				
25. Indian Creek	IL 60 – Seavey Drainage Ditch floodplain west of IL 21 in the Village of Vernon Hills.	300	24	Transverse
26. Indian Creek	IL 60 – Seavey Drainage Ditch floodplain west of IL 21 in the Village of Vernon Hills.	2,200	12	Longitudinal
27. Indian Creek	US Route 45 – Indian Creek floodplain west of IL 21 in the Village of Vernon Hills.	250	12	Longitudinal
I-94 Mainline, Chicago River Watershed				
28. Middle Fork	Middle Fork North Branch of the Chicago River floodplain south of IL 137 in unincorporated Lake County.	6,550	12	Longitudinal
29. Middle Fork	Middle Fork North Branch of the Chicago River floodplain north of IL 137 in unincorporated Lake County.	50	12	Longitudinal
30. Upper Des Plaines River	Des Plaines River east of IL 21 in unincorporated Lake County.	1,150	24	Transverse
31. Upper Des Plaines River	Warren Cemetery Tributary floodplain north of IL 21 in unincorporated Lake County.	450	12	Longitudinal

[a] The improvement width is equal to the proposed roadway width minus the existing roadway width.

TABLE F-11
Historic Flooding Locations, IL 83/US 45 with US 12 Alternative

Watershed/ Subwatershed	Floodplain Crossing Location	Flooding History	Improvement Description
IL 83/US 45 Mainline, Des Plaines River Watershed			
Buffalo Creek	Buffalo Creek flood-plain located west of IL 83.	In the Village of Long Grove, Buffalo Creek reached an elevation of 722 feet at McHenry Road in 1957.	Proposed IL 83/US 45 mainline, 6-lane improvement.
Indian Creek	South Branch Indian Creek located south of IL 22.	In the Village of Long Grove, South Branch Indian Creek reached an elevation of 697 feet near IL 83 in 1960.	Proposed IL 83/US 45 mainline, 6-lane improvement.
Indian Creek	Indian Creek located north of Gilmer Road.	In areas of unincorporated Lake County, Indian Creek reached an elevation of 808 feet in March 1960 and 805.2 feet in April 1965.	Proposed IL 83/US 45 mainline, 6-lane improvement.
IL 83/US 45 Feeder Roads, Des Plaines River Watershed			
Indian Creek	Indian Creek located west of IL 83.	In the Village of Long Grove, Indian Creek reached an elevation of 700 feet at IL 83 in 1960.	Proposed Midlothian Road/IL 63 4-lane improvement.
IL 21 Mainline, Des Plaines River Watershed			
Lower Des Plaines River	Des Plaines River located at Deerfield Road.	In the Village of Riverwoods, the Des Plaines River flooded in the following years: 1938, 1948, 1950, 1960, and 1970.	Proposed IL 21 mainline, 6-lane improvement.
Lower Des Plaines River	Des Plaines River located north of Deerfield Road.	In the Village of Riverwoods, the Des Plaines River flooded in the following years: 1938, 1948, 1950, 1960, and 1970.	Proposed IL 21 mainline, 6-lane improvement.
Indian Creek	Des Plaines River located south of IL 22.	In the Village of Lincolnshire, the Des Plaines River flooded on the following dates: July 1938, March 1948, April 1950, April 1960, March 1962, June 1970, and March 1976.	Proposed IL 21 mainline, 6-lane improvement.
Indian Creek	Indian Creek located south of IL 22.	In the Village of Lincolnshire, Indian Creek reached an elevation of 697 feet in July 1957.	Proposed IL 21 mainline, 6-lane improvement.
Lower Des Plaines River	Des Plaines River located east of IL 21.	In areas of unincorporated Lake County, the Des Plaines River reached an elevation of 650.2 feet in 1938, 647.5 feet in 1950, and 649.8 feet in 1960.	Proposed Town Line Road/IL 60, 6-lane improvement.
Upper Des Plaines River	Des Plaines River located south of IL 132.	In the Village of Gurnee, the Des Plaines River reached an elevation of 661.9 feet in 1938, 660.9 feet in 1960, and 660.14 feet in 1976.	Proposed IL 21 mainline, 6-lane improvement.
IL 21 Feeder Roads, Des Plaines River Watershed			
Indian Creek	Seavey Drainage Ditch located west of IL 21.	In the Village of Vernon Hills, Seavey Drainage Ditch flooded in July 1957, to an elevation of 684.5 feet at Town Line Road, and in April 1960.	Proposed Town Line Road/IL 60, 6-lane improvement.
I-94 Mainline, Chicago River Watershed			
Upper Des Plaines River	Des Plaines River located east of IL 21.	In areas of unincorporated Lake County, the Des Plaines River reached an elevation of 664.8 feet in 1960 and 664.0 feet in 1962.	Proposed I-94 mainline, 8-lane improvement.

TABLE F-12
Additional Impervious Area, IL 83/US 45 with US 12 Alternate

Mainline Routes and Associated Feeder Roads	Existing Paved Area (ft^2)	Proposed Paved Area (ft^2)	Additional Impervious Area (ft^2)
US 12 Mainline	3,492,000	5,949,000	2,457,000
US 12 Feeder Roads	192,000	288,000	96,000
IL 21 Mainline	5,274,000	9,831,000	4,557,000
IL 21 Feeder Roads	408,000	595,000	187,000
IL 83/US 45 Mainline	2,649,000	9,307,000	6,658,000
IL 83/US 45 Feeder Roads	450,000	955,000	505,000
IL 83/IL 22 Interchange	NA [a]	512,000	512,000
IL 120 Mainline	972,000	2,061,000	1,089,000
IL 120 Feeder Roads	131,000	270,000	139,000
I-94 Mainline	4,003,000	5,338,000	1,335,000
I-94 Feeder Roads	48,000	72,000	24,000
TOTAL ADDITIONAL IMPERVIOUS AREA			**17,559,000 (403.1 ac)**

[a] These improvements are along new alignment so these is no existing paved area.

TABLE F-13
Compensatory and Detention Storage Requirements, IL 83/US 45 with US 12 Alternative

Watershed/ Subwatershed	Distance (mi)	Compensatory Storage Required (ac)	Detention Storage Required (ac)
Fox River Watershed			
Flint Creek	4.40	1.2	2.7
Slocum Lake Drain	2.00	0.5	1.2
Squaw Creek	1.00	0.3	0.6
Tower Lake Drain	2.00	0.5	1.2
Des Plaines River Watershed			
Buffalo Creek	10.78	2.8	6.6
Bull Creek	2.88	0.8	1.8
Indian Creek	8.57	2.2	5.2
Mill Creek	5.99	1.6	3.6
Lower Des Plaines River	10.62	2.8	6.4
Upper Des Plaines River	13.91	3.6	8.4
Chicago River Watershed			
Middle Fork	7.65	2.0	4.6
TOTAL	**69.80**	**18.3**	**42.3**

TABLE F-14
Storage Requirements Per Reach, IL 83/US 45 with US 12 Alternative

Reach Number/ Location[a]	Distance (mi)	Compensatory Storage Required (ac)	Detention Storage Required (ac)	Opportunities/Constraints For Providing Storage
1	3.31	0.9	2.0	Potential storage site along IL 21 south of I-94 near the Des Plaines River.
2	3.13	0.8	1.9	Potential storage sites along IL 21 south of IL 120 near Bull Creek and the Des Plaines River.
3	4.44	1.2	2.7	Potential storage site along IL 137 east of IL 21.
4	2.56	0.7	1.6	Potential storage site along St. Mary's Rd south of IL 176.
5	4.46	1.2	2.7	Potential storage sites along IL 21 south of IL 60 near the Des Plaines River.
6	3.60	0.9	2.2	Potential storage sites along IL 21 south of IL 22 near the Des Plaines River.
7	3.03	0.8	1.8	Potential storage site along I-94 south of IL 21.
8	2.27	0.6	1.4	Potential storage site along I-94 north of IL 137.
9	5.38	1.4	3.3	Potential storage site along I-94 south of IL 137.
10	3.94	1.0	2.4	Potential storage site along US 12 north of Dundee Rd/IL 68.
11	2.50	0.7	1.5	Potential storage sites along US 12 south of Cuba Rd and east of Quentin Rd.
12	2.00	0.5	1.2	Potential storage site along US 12 east of Ela Road.
13	2.40	0.6	1.5	Potential storage site along US 12 at Flint Creek Tributary.
14	2.00	0.5	1.2	Potential storage site along US 12 near Timber Lake.
15	2.00	0.5	1.2	Potential storage site along US 12 south of IL 176.
16	2.00	0.5	1.2	Potential storage site along US 12 at Buffalo Creek Tributary.
17	2.34	0.6	1.4	Potential storage site along IL 83/US 45 at Buffalo Creek Tributary.
18	5.93	1.5	3.6	Potential storage sites along IL 83 south of IL 22 at Kildeer Creek and Buffalo Creek; and south of IL 60 at Diamond Lake Drain and Indian Creek.
19	2.88	0.8	1.8	Potential storage site along IL 83 south of Peterson Rd.
20	2.64	0.7	1.6	Potential storage site along IL 83 south of IL 176.
21	3.46	0.9	2.1	Potential storage site south along IL 120 at Alleghany Rd.
22	2.53	0.7	1.5	Potential storage site along IL 120 east of Atkinson Rd.
23	1.00	0.3	0.6	Potential storage site along IL 120 near Squaw Creek.
TOTAL	**69.8**	**18.3**	**42.4**	

[a] Reaches 1 – 6 include improvements to IL 21; Reaches 7 – 9 include improvements to I-94; Reaches 10 – 15 include improvements to US Route 12; and Reaches 16 – 23 include improvements to IL 83/US45.

ILLINOIS
DEPARTMENT OF
NATURAL RESOURCES

524 South Second Street, Springfield 62701-1787 · Jim Edgar, Governor ● Brent Manning, Director

June 4, 1998

Mr. Jeff Frantz
The Illinois State Toll Highway Authority
One Authority Drive
Downers Grove, Illinois 60515-1703

RE: Lake County
Transportation Project
Request for Database
Information

Dear Mr.Frantz:

The Department of Natural Resources has received your request for attending the meeting on June 9th, at 1:00 p.m. to review the data and information process that will be utilized in studying the resource information on the project referenced above. The Illinois Department of Natural Resources will be represented at this meeting by Pat Malone and myself.

I have also pursued your request for utilizing the Natural Heritage Database on a different basis than agreed to in our MOU. As you are aware, we are concerned about releasing this data for larger geographical areas for a variety of reasons: the data requires extensive interpretation, the data is dynamic not static, and it is the responsibility of this agency to examine the potential for adverse impacts from highway projects.

We do, however, acknowledge the value of having this type of data available in GIS format for planning purposes. As a result, we are willing to provide a limited amount of data to the ISTHA/IDOT joint study effort with certain conditions.

Conditions:
1. The data can only be used for initial planning purposes and does not substitute for the need to coordinate with IDNR and to complete all statutory responsibilities. This includes the role IDNR plays in reviewing early proposals in order to recommend surveys or other actions as part of the planning process.

2. The data will be provided on a project-by-project basis only for new highways in concurrence with the Divisions of Natural Heritage and Natural Resources Review & Coordination.... where there is new alignment for a segment of an existing highway or bridge location, the normal procedure for reviewing projects will be utilized. Where a new highway/tollway is being planned, the data will be provided for a reasonable corridor width.

3. The data is valid for a period of one year after which a request for an updated data set will be necessary.

4. The data cannot be transmitted to any source outside of the planning unit of ISTHA (or IDOT). including being released under FOIA requests.

If the above is acceptable, the following data can be provided for a reasonable corridor and not a full county (e.g., 1-2 miles wide):

1. The boundaries of dedicated Nature Preserves; this data should be treated differently than the other data in that there is stronger legal protection for Nature Preserves and a requirement to seek approval from the NP Commission prior to impacting a Nature Preserve. When displaying the information, it is recommended that these boundaries be displayed in a color such as red to highlight their legal status.

2. Boundaries of Illinois Natural Area Inventory sites (and Land and Water Reserves where available) - these should be treated and displayed in a different color from Nature Preserves.

3. Endangered and threatened species information will be provided with a 1/4-mile buffer around each "dot". No species names or information will be provided.

It is presumed that every effort will be made by ISTHA/IDOT to avoid these sensitive resources through the planning process and contact IDNR early in their decision-making process to help determine what surveys are needed.

If you feel this type of information would be useful and agree to the conditions in writing prior to the transfer of data, then IDNR would be willing to work with you. It is important to be sure this is acceptable before staff spends the time preparing the data.

If you have any questions on the above, please contact me at 217-785-5500.

Sincerely,

Steve Hamer

Steve Hamer
Transportation Review Program
Division of Natural Resource Review and Coordination

Illinois Department of Agriculture

Bureau of Land and Water Resources • State Fairgrounds • P.O. Box 19281 • Springfield, IL 62794-9281
217/782-6297 • TDD 217/524-6858 • Fax 217/524-4882

June 11, 1998

Mr. Jeffrey B. Frantz
Illinois State Toll Highway Authority
One Authority Drive
Downers Grove, Illinois 60515-1703

Re: Lake County Transportation Improvement Project

Dear Mr. Frantz:

Upon attending the June 9,1998 Resource Agency Group Meeting, I noticed a chart that had been prepared for the meeting entitled "Who Is Doing The Work On This Project." It mentioned the entities that will be responsible for addressing the impacts to the various segments of the natural environment, with the exception of agriculture. Since farmland conversion will likely be the project's greatest environmental impact, I was quite surprised to see it missing from the chart.

We would request that proper attention be given to the project's agricultural impacts. This would include (a) assessing the impacts, (b) efforts made to avoid or minimize those impacts, and (c) actions taken to mitigate the agricultural impacts. We would further request that only qualified entities be assigned to addressing the agricultural impacts.

Please respond to our concerns. We would appreciate knowing (a) that the project's agricultural impacts will be comprehensively addressed, and (b) who will address the agricultural impacts.

Sincerely,

James R. Hartwig

James R. Hartwig, Supervisor
Office of Farmland Protection and Mined Land Reclamation

JRH:drs

cc: Pete Frantz, IDOT Central Office
John Rowley, IDOT Central Office
Bill Barbel, IDOT District One
Kevin Rund, Illinois Farm Bureau
Lake County SWCD

Illinois Tollway

The Illinois State Toll Highway Authority
One Authority Drive
Downers Grove, Illinois 60515-1703
630/241-6800
Fax: 630/241-6100
T.T.Y. 630/241-6898

June 26, 1998

Mr. James R. Hartwig
Illinois Department of Agriculture
Bureau of Land and Water Resources
State Fairgrounds
P.O. Box 19281
Springfield, Illinois 62794-9281

RE: Lake County Transportation Improvement Project

Dear Mr. Hartwig:

Thank you for your letter of June 11, 1998. In that letter you commented on a display board prepared by CH2M Hill. The purpose of that display board is to list the consultant and subconsultant team for this study; and for the subconsultants only, the board listed the issue areas for which they will be responsible.

However, to answer your question, CH2M Hill, the prime consultant, will be responsible for assessing impacts to agriculture. Their firm is prequalified with the Illinois Department of Transportation for complex studies of this type, including assessing impacts to agriculture as well as other resources.

Your characterization of potential agricultural impacts, which have yet to be identified, as the "project's greatest environmental impact" is premature. This study will assess all manner of impacts to the environment, but this has yet to be initiated. Further, it would be improper for me to prioritize resource issues as your characterization does.

Please feel free to call me at 630/241-6800 extension 3909 if you have any additional questions.

Sincerely,

Jeffrey B. Frantz
Environmentalist

JBF:

cc: Peter J. Frantz, P.E., IDOT
William Barbel, IDOT Dist. 1
Larry Martin, CH2M Hill
John Rowley, IDOT
Kevin Rund, Illinois Farm Bureau
Lake County Soil and Water Conservation District
Lake County Transportation Improvement Projec'

Meeting with U.S. EPA

PROJECT:	Lake County Transportation Improvement Project
ATTENDEES:	Meeting Participants (sign-in sheet attached)
CC:	Pete Frantz, IDOT Central Office
	Dave Lutyens, LCTIP
NOTES PREPARED BY:	CH2M HILL
MEETING DATE:	August 19, 1998

Representatives from the project team meet with John Haugland/Regional Economist of the U.S. Environmental Protection Agency at the Illinois Department of Transportation's downtown office on August 19, 1998. John was referred to the project team by Eugene Goldfarb/USHUD and Mike MacMullen/USEPA. John is leading a group at USEPA Region 5 that is researching sustainable development. The meeting focused on various initiatives to examine sustainable development in the metropolitan area. The project team is interested in hearing about information/research on urban sprawl that may be relevant or useful to this project.

Jeff Frantz/ISTHA began the meeting by providing John with an overview of the project. He then asked John if he had any materials or knew of resources to help the project team address the sustainable development issue. John directed the project team to the following resources:

1. Smart Growth Network: The Urban Land Institute is involved in this initiative. Their website address www.smartgrowth.org.
2. EPA Transportation Partners: The Chicagoland Bicycle Federation and businesses are involved in this initiative.
3. Dave Schultz, Northwestern University
4. USEPA site: www.epa.gov/region5/sprawl
5. RailVolution
6. Metropolitan Planning Council: This organization has initiated a campaign for sensible growth.
7. Smart Growth Index
8. USEPA Brownfields team

John also mentioned that he has started a library of information on sustainable growth and development. He said that he would share this information with the project team.

U.S. Department of Housing and Urban Development
Environmental Staff
Midwest Office
77 W. Jackson Blvd.
Chicago, Illinois 60604-3507
http://www.hud.gov/local/chi/chienv1.html

January 12, 1999

Jeffrey B. Frantz
Senior Environmental Planner
Lake County Transportation Project
25663 Hillview Court
Mundelein, Illinois 60060

Dear Jeff:

SUBJECT: Comparing impacts of various alternatives
Lake County Transportation Project

I enjoyed the December meeting. I continue to be impressed with the manner in which this process is being conducted. The pursuit of a broad range of alternatives is commendable not just for your willingness to look at these early in the process, but also for the resources that you're throwing at this effort. I don't think I've ever seen a process that appeared to take the NEPA mandate as seriously.

At the meeting you introduced the concept of families of alternatives along with a two phased approach to evaluation of these alternatives. The idea is to use one set of factors to ascertain the most viable alternatives within each family, and then the most viable alternatives within each family would be measured against each other (and, presumably, the no-action alternative). The four families identified were:

- I-94 family
- Boundary family
- central arterial family
- Il 53 family

One set of factors would be used for the phase 1 evaluation, another for the phase 2, and a third group (not included in our handouts) would not be used in the evaluation.

Although I endorse the two phased family approach, I have some concerns about which second phase data will help us in distinguishing between the secondary impacts of the various alternatives, particularly those impacts related to sprawl. As I recall quite a number of resource agencies shared the view that secondary impacts of stimulating growth could easily exceed the primary impacts due to road construction. Most of us recognize that certain types of growth are preferable to others, and that strategic planning decisions, such as highways and utilities, can shape and influence

TEL: (312)353-1696 X2727 FAX: (312)353-5417 EMAIL: eugene_goldfarb@hud.gov steve_vahl@hud.gov

growth. Many of us want to avoid promoting development that would use more energy and convert more agricultural land than more compact development. I also think we should identify to what degree, if any, the different alternatives would promote further development of "greenfield" areas at the expense of older established urban areas.

From this perspective the report prepared by ACG was very interesting and informative. This type of analysis will be very helpful in distinguishing between the different alternatives. My question at this point is how will these types of factors fit into the (two tiered) process? I could not readily distinguish the ACG factors in your preliminary list of second phase factors. Your inclusion of ACG obviously means you share these concerns, yet I am confused about how this will fit into the process.

I've also reviewed the list of "data needs for secondary impacts" I submitted this summer (attached). Which of these will be available in your analysis, and why were the others rejected?

As I noted at the meeting, I'd appreciate receiving a copy of the following:

1) the ACG report once it's available,
2) the list of all the factors (in the GIS system), including those that won't be used to evaluate alternatives,
3) The list of data sources for the GIS system, including contacts

I'm also interested in taking you up on your offer of having Jeff bring his laptop over so I can get a better feel of what is in the GIS database.

Thanks again for including me in the process.

Sincerely,

Eugene Goldfarb
Midwest Environmental Officer

Lake County Transportation Project

7/98

Data Needs for Secondary Impacts

Roadway

Major E/W & N/S routes

- Capacity
- Current ADT's
- Projected ADT's given diff alternatives

Demographic

- population projections (by township)?
  - w/ expressway
  - w/ other alternatives
  - not just absolute #'s, but also % change

Energy/Sprawl

- Vehicle miles traveled
  - total
  - per person
  - % change (by township?)
- trying to show - does any alternative promote sprawl (which, by its nature, promotes more & longer trips, therefore more vmt & energy)
- energy/gallons of gasoline - since vmt would not show congestion, this would show how more congested conditions inc use of energy

Air Quality

- Do certain alternatives promote higher vehicle use & therefore higher emissions?
- Do some alternatives promote more congestion & therefore higher emissions?

Mass Transit

- Which alternatives promote mass transit &/or other modes (eg bikes)? How?

Employment Centers

- How would different alternatives affect placement of new employment centers? (If an expressway is built would new employment centers locate near interchanges?) How would this affect older more mature communities?

Local Controls

- Do the local governments affected protect environmentally sensitive (eg. floodplains & wetlands) areas?
- How is farmland protected?

Infrastructure

Will certain alternatives promote growth that will call for new infrastructure (eg. water & sewer)? Can we quantify amount of new infrastructure needed by alternative?

Illinois Tollway

The Illinois State Toll Highway Authority
One Authority Drive
Downers Grove, Illinois 60515-1703
630/241-6800
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T.T.Y. 630/241-6898

June 14, 1999

JUN 16 1999

Mr. Eugene Goldfarb
Environmental Officer
U.S. Department of Housing and Urban Development
77 W. Jackson Blvd.
Chicago, Illinois 60604-3507

RE: Lake County Transportation Improvement Project
Response to 1/12/99 Letter

Dear Mr. Goldfarb:

Thank you for your January 12, 1999, letter about the alternative development and screening process for the Lake County Transportation Improvement Project (LCTIP). The purpose of our Resource Agency Group meetings is to stimulate discussion of issues such those relayed in your letter. I am pleased that those meetings are indeed having that effect. I apologize for taking so long in returning your letter, but the project team felt that we needed to further construct our alternatives development process before we were in a position to answer the questions you raised.

During the December 21, 1998, Resource Agency Group meeting, you introduced the possibility of trying to identify the impact of LCTIP alternatives on new development, or "sprawl" as it is often called, during the second tier of alternatives development and screening. Let me be clear in conveying that while we have not dismissed that possibility, we need to consider the current alternatives development process as it has evolved since our December meeting.

As the alternatives development and evaluation process evolves, we are more aware of the anticipated products during each round of development. Initially, alternatives will be developed separately for each component of the transportation system, i.e., roadways, rail, bus, etc. The roadway alternatives will be developed from five starting points:

- Interstate 94
- US Route 12
- Illinois Route 83 / US Route 45
- Illinois Route 120
- Illinois Route 53

Each of these starting points yields a different set of roadway improvements. The process for developing the roadway alternatives will be computer aided, using a trip table that is associated with the project no-action improvements. The al Chalabi Group (ACG), as you recall, prepared the population and employment distribution associated with the project no-action network of transportation improvements. ACG's work was then taken by Chicago Area Transportation Study and converted to a trip table that could be used in the project's travel model.

This method for developing alternatives at this stage does not provide a reliable means to evaluate the land use related impacts associated with the various alternatives. This can only be accomplished by developing separate population and employment distributions related to each set of improvements. Additionally, at this stage of the alternatives development process, it cannot take into account the effect created by combining the alternatives for the other modes with the roadway alternatives. The project team anticipates developing alternative specific population and employment forecasts only for the finalist alternatives (approximately 2-4). Doing this for the early rounds of alternative development would be expensive, time consuming, and confusing.

For the purposes of this study, sprawl would be an example of secondary and cumulative impacts. While it is clear that sprawl is a very popular topic for discussion at the present time, there is still not a reliable means of identifying the effect of transportation or any other of the many contributing factors on development at the parcel-size geographic scale which you are requesting. There is not even agreement on which factors contribute the most in any given situation, or which can be controlled without adversely affecting the economy.

The list attached to your letter concentrates on transportation related connections to sprawl and does recognize the vast array of factors which have spurred significant development in Lake County without the construction of any major transportation improvements. Development is the product of a number of socio-economic factors. In recent studies on the subject, transportation is one of a half-dozen factors that contribute to development. Other factors include Lake County's geographic position in the Chicago metropolitan area, growing employment opportunities in Lake County, investment in water and sewer lines, the proposed deregulation of these facilities by the Illinois Environmental Protection Agency, the zoning practices of Lake County and its municipalities, and people's desire to live in spacious developments. While this is a transportation related Environmental Impact Statement, any discussion of sprawl in our analysis must be able to recognize the impact of these other factors.

Of the items on your list, they will be addressed in the following manner during our analysis:

- Roadway (ADT and capacity data) - These, as well as a number of other transportation measures, are already a part of the analysis.

- Demographic - We will ask ACG to develop projections for the finalist set of alternatives. For the reasons discussed above, separate projections earlier in the process would be onerous.

- Energy / sprawl - The VMT will be considered in the development of alternatives. Alternatives will also be assessed for their Vehicle Hours of Delay (VHD).

- Air quality - The adopted alternative will have to be part of a conforming plan and TIP.

- Mass transit - As we have discussed from the beginning, a mass transit component will be included with all alternatives. This component is currently under development with the input of the mass transit providers.

- Employment centers - It is important to note that the alternatives are located in areas where development has already occurred.

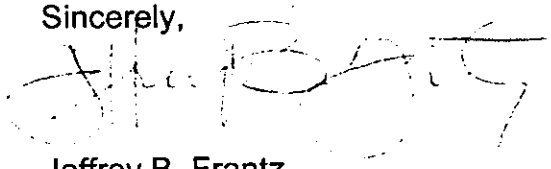
- Local controls - Local controls will certainly be discussed in the environmental document for the study. Beyond local controls - and at least as importantly - both the state and federal governments regulate resource conversion.

- Infrastructure - As with the discussion of employment centers, it is important to note that the alternatives are located in areas where significant development has already occurred. Any such quantification, if technically possible with any degree of reliability, would need to consider the other factors which drive development.

As you requested, I have attached a list of the GIS sources included in the database. I have also asked that CH2M HILL make arrangements with you to view the database.

Please feel free to call me at 630/241-6800 extension 3909 if you have any questions.

Sincerely,



Jeffrey B. Frantz
Senior Environmental Planner

Attachments

JBF:mm

cc: Peter J. Frantz, P.E., - IDOT Central Office
William Barbel - IDOT District One
Larry Martin - CH2M HILL
Jon-Paul Kohler, FHWA
LCTIP files

GIS Database Organized by Source

December 22, 1998

Source	Data Layer Description
USGS (www.usgs.gov) SDTS and DLG files	Elevation contour lines
	Roads
	Railroads
	Modal transport (airports, utilities, pipelines)
	Hydrographic features (lakes, streams and other water courses)
	Manmade features (churches, government buildings, communication towers, etc.)
	Non-vegetative cover
	Surface cover
	Public Land Survey System
	Boundaries
IDNR Dr. Deanna Glosser (217-785-5500)	Threatened and Endangered Species
	INAI Sites
	Nature Preserves
	Biological Stream Characterization
IDNR (CD-ROM) Also available over the web: www.isgs.uiuc.edu	Land cover
	State parks
	State conservation areas (none in the study area)
	State forests
	State fish and wildlife areas (none in the study area)
	Federal lands
	Cemeteries
	County boundaries
	Township boundaries
	7.5' Quadrangle boundaries
	Census block boundaries
	Municipal boundaries
	Wells and borings
US Fish and Wildlife Service (www.nwi.fws.gov)	National Wetlands Inventory (NWI)
FEMA (CD-ROM) Order information: www.fema.gov	FEMA Q3 flood data
National Park Service (www.nps.gov)	Historic sites and districts on the National Register of Historic Sites

NIPC Kim Souliere (312-454-0400)	Land use
	Public land survey system (sections and quarter sections)
	1990, 1996, and 2020 Population and employment data by quarter section
	Bike trails and paths
	1992 Greenways plan trails
	Parks, forest preserves, etc.
	McHenry County ADID study
Lake County Dick Hilton (847/360-7397)	Political township boundaries in Lake County
	Incorporated areas in Lake County as of 12/31/96
	Hydric soils
	ADID wetlands study
	Lake County Wetlands Inventory
	List of employer addresses and number of employees
	Watersheds and basins in lake county
Cook County Mary Jo Horace Alan Hobscheid (312-603-1399)	Cook County forest preserves
	Municipal lines
	Roads and right-of-way
	Railroads
	hydrography
	Cultural features
	USGS public land survey system
RTA (312-917-0700) Sid Weseman Supin Yoder (312-917-0761)	Metra lines and stations
Pace Richard Bazda Brad Thompson (847-228-2393)	Pace bus routes
Illinois DOT Jim Hall (217-785-2752)	IRIS database and road network
Chicagoland Bicycle Federation Randy Neufeld (312-427-3325)	Recommended bicycle routes
Environmental Data Resources, Inc. (Commercial service)	Hazardous Materials Sites

CH2M Hill Request through ISTHA	McHenry County Conservation Areas (digitized from paper map provided by McHenry County)
	1997 Land use updates (updates to NIPC Land use from 1997 aerial photography)
	Historic Sites and district (coverage created from coordinate data on NPS web site)
	Churches (combination of USGS MS cover churches and those identified during data validation)
	Cemeteries (combination of USGS MS cover cemeteries, IDNR cemeteries and those identified during data validation)
	Schools (combination of USGS MS cover schools and those identified during data validation)
	Hospitals (combination of USGS MS cover hospitals and those identified during data validation)
	Lake county employer data geocoded to create coverage
	Basins outside lake county (digitized from USGS 1:24000 hydologic atlas maps)

FEB 2 8 2001

United States Department of the Interior

FISH AND WILDLIFE SERVICE
Chicago Illinois Field Office
1250 South Grove Avenue, Suite 103
Barrington, Illinois 60010
847-381-2253 Fax 847-381-2285

IN REPLY REFER TO:

FWS/AES-CIFO

February 26, 2001

Mr. Rocco J. Zucchero
Lake County Transportation Improvement Project
25663 Hillview Court
Mundelein, Illinois 60060

Dear Mr. Zucchero:

This responds to your letter dated February 1, 2001 requesting information on endangered or threatened species on or near the two proposed transportation alternative projects: 1) the extension of IL 53 as a freeway or a tollway, and 2) the IL 83/US 45 with US 12, as depicted on the maps you enclosed.

Based on the information provided in your submittal and a review of our records, there are many Lake County sites which are known habitats for the federally threatened eastern prairie fringed orchid *(Platanthera leucophaea)*. This threatened plant species inhabits wet prairies of the midwest. If any prairie remnants are found within the project areas, we request that searches for this species be conducted between June 26 and July 11 in coordination with this office, as this is when the orchid typically flowers and is most identifiable. If any eastern prairie white fringed orchid are found, this office should be notified immediately. The locations included in your project that coincide with known orchid locations are as follows:

- Extension of IL 53 as a freeway or tollway
  T45N, R11E, Section 26
  T43N, R10E, Section 24

- IL 83/US 45 with US 12
  T45N, R11E, Sections 26 and 35
  T44N, R11E, Sections 1, 12, 35, and 36
  T43N, R11E, Section 19

Also note that portions of the proposed project sites are located at or near Lake County ADID (Advanced Identification) wetland sites. ADID studies are conducted under the auspices of the U.S. Environmental Protection Agency to identify in advance of specific projects, those wetlands that are of the highest function and value, and therefore unsuitable for disturbance. The results of ADID studies provide landowners and planners with information about the most important aquatic resources in a given area so

that advance planning can take them into account. We strongly caution you to avoid impacts to these sites. The ADID site locations are as follows:

- Extension of IL 53 as a freeway or tollway

T45N, R11E, Section 25 (ADID 79 is in section, though no project lines indicated)
T45, R11E, Section 29 (ADID 200)
T45, R11E, Section 32 (ADID 200)

T45N, R10E, Section 31 (ADID 87)
T45N, R10E, Section 32 (ADID 76 and 193)
T45N, R10E, Section 33 (ADID 193)

T45N, R9E, Section 34 (ADID 81 is in section, though no project lines are shown here)
T45N, R9E, Section 35 (ADID 73 is in section, though no project lines are shown here)
T45N, R9E, Section 36 (ADID 82, 83, 84, and 85 are all in section, though no project lines are shown here)

T44N, R10E, Section 25 (ADID 127)
T44N, R10E, Section 35 (ADID 143)

T44N, R9E, Section 3 (ADID 73)

T43N, R10E, Section 1 (ADID 143, 149, and 157)
T43N, R10E, Section 2 (ADID 143)
T43N, R10E, Section 13 (ADID 170)
T43N, R10E, Section 14 (ADID 169)
T43N, R10E, Section 23 (ADID 170)
T43N, R10E, Section 24 (ADID 170)
T43N, R10E, Section 25 (ADID 180)
T43N, R10E, Section 26 (ADID 180)
T43N, R10E, Section 35 (ADID 183 and 184)

- IL 83/US 45 with US 12

T45N, R11E, Section 32 (ADID 200)

T45N, R11E, Section 35 (ADID 91)

T45N, R10E, Section 34 (ADID 78)

T44N, R11E, Section 1 (ADID 97)
T44N, R11E, Section 4 (ADID 96)
T44N, R11E, Section 9 (ADID 106)
T44N, R11E, Section 10 (ADID 107)
T44N, R11E, Section 12 (ADID 108)
T44N, R11E, Section 25 (ADID 127)
T44N, R11E, Section 34 (ADID 198)

T44N, R10E, Section 25 (ADID 127)
T44N, R10E, Section 35 (ADID 143)
T44N, R10E, Section 36 (ADID 143)

T43N, R11E, Section 2 (ADID 154)
T43N, R11E, Section 3 (ADID 198)
T43N, R11E, Section 7 (ADID 151)
T43N, R11E, Section 18 (ADID 170)
T43N, R11E, Section 19 (ADID 170)

T43N, R10E, Section 19 (ADID 175)
T43N, R10E, Section 25 (ADID 180)
T43N, R10E, Section 35 (ADID 183 and 184)

For project site areas with no project lines indicated on the enclosed maps and specifically cited above, we request additional information as to the proposed purpose.

This letter only addresses federally listed species; the Illinois Department of Natural Resources should be contacted for information on state-listed species. Any impacts to wetlands or waters of the United States will require a permit from the U.S. Army Corps of Engineers. This letter does not preclude separate evaluation and comment by the U.S. Fish and Wildlife Service on wetland impacts proposed for section 404, Clean Water Act authorization.

If you have any questions, please contact Mr. Jeff Mengler at 847/381-2253, ext. 226.

Sincerely,

John D. Rogner
Field Supervisor

cc: ACOE, Mike Murphy
IDNR, Schanzle, Shank
USEPA, MacMullen, Elston
IDOT, Harmet

May 24, 2001

Jeff Mengler
U.S. Fish and Wildlife Service
1250 South Grove Ave. Suite 103
Barrington, IL 60010

RE: Lake County Transportation Improvement Project

Dear Mr. Mengler:

Thank you for your February 26, 2001 letter responding to our request for information on threatened and endangered species on or near the two proposed LCTIP finalist build alternatives; the IL 53 Freeway/Tollway and IL 83/US 45 with US 12 options.

Lake County Transportation Improvement Project

25663 Hillview Court
Mundelein, Illinois 60060

847 438 3442 Tel.
847 438 3472 Fax.

In your correspondence you indicated that there are portions of the proposed project sites that are located at or near Lake County ADID wetland sites that appeared to be omitted on the exhibits we provided to you. As we discussed on May 2nd, the sites you referenced were not identified on our exhibits because they are beyond the area of potential impact. Attached is a copy of the GIS wetland inventory that was developed for the LCTIP. This exhibit highlights the locations of those ADID wetlands you identified as missing (ADID 73, 79 and 81-85).

Also enclosed for your review are two GIS generated maps which highlight the sections where the federally threatened Eastern Prairie Fringed Orchid (*Platanthera luecophaea*) is know to exist near the two finalist alternatives. Additionally, this project has been coordinated with the Illinois Department of Natural Resources regarding the presence of state-listed species. These sites are also shown on the attached exhibits.

The avoidance of ADID wetlands as well as endangered and threatened species has been a key aspect of our rigorous planning process for both build alternatives. We appreciate your participation in this study and look forward to continued coordination with your office.

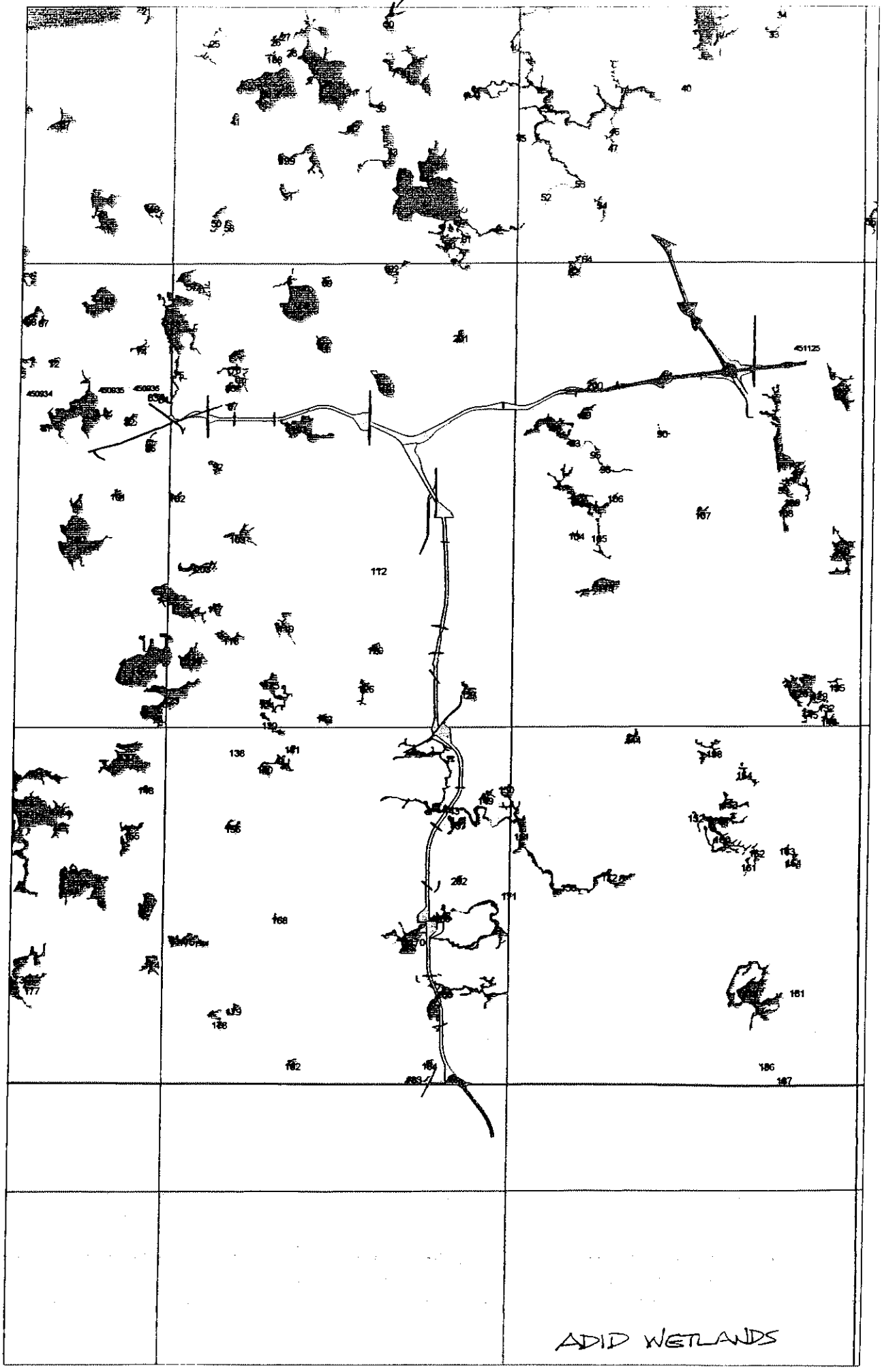
If you have any questions or require additional information, please contact me at 630-241-6800 extension 3909.

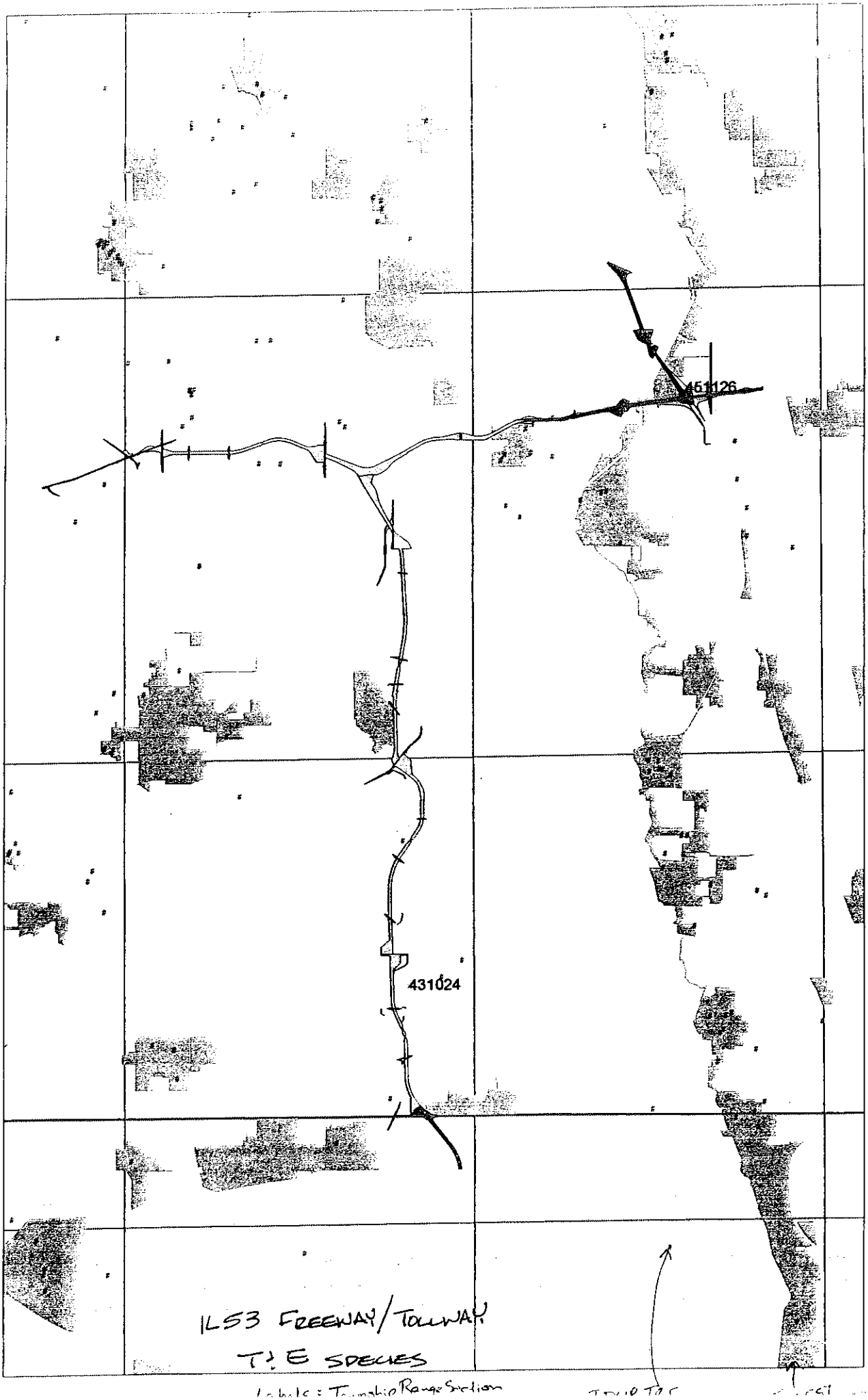
Sincerely

Rocco J. Zucchero
Senior Environmental Planner

Attachment

cc: Mike Murphy/Brian Smith, ACOE
Schanzle/Shank, IDNR
Mike MacMullen/Sue Elston, USEPA

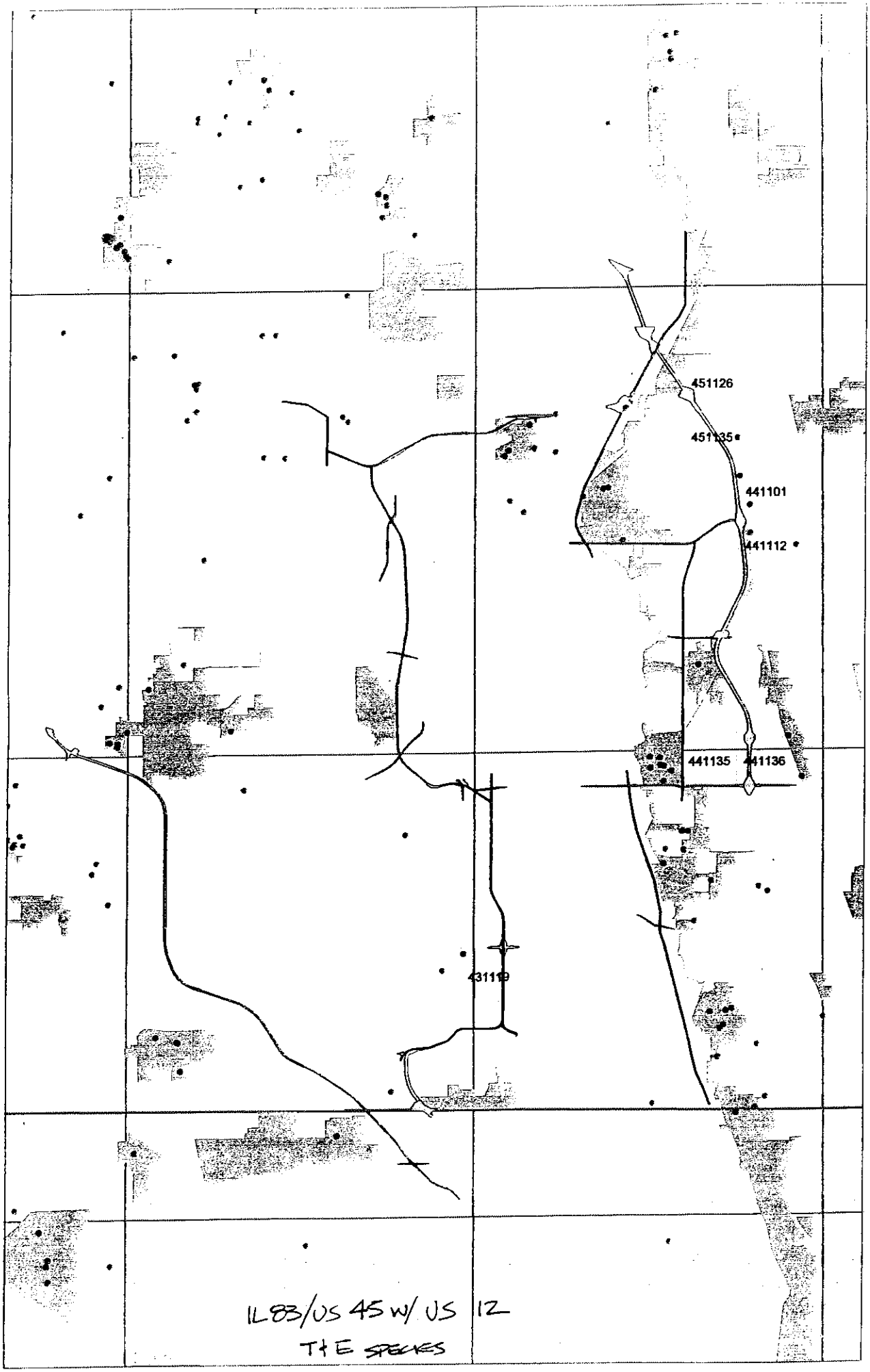

ADID WETLANDS



IL53 FREEWAY/TOLLWAY

T & E SPECIES

Labels: Township Range Section



IL 83/US 45 w/ US 12

T+E SPECIES

DEPARTMENT OF THE ARMY
CHICAGO DISTRICT, CORPS OF ENGINEERS
111 NORTH CANAL STREET
CHICAGO, ILLINOIS 60606-7206

JUN 22 2001

REPLY TO
ATTENTION OF:

Construction-Operations Division
Regulatory Branch
199500235

SUBJECT: Proposed Wetland Evaluation and Assessment Methodology for the Lake County Transportation Improvement Project in Lake County, Illinois

Lake County Transportation Improvement Project
ATTN: Rocco Zucchero
25663 Hillview Court
Mundelein, Illinois 60060

Dear Mr. Zucchero:

This is in reference to the draft Lake County Transportation Project (LCTIP) Wetland Assessment Method. Representatives of the Chicago District met with you on May 1, 2001 to discuss the proposed LCTIP Wetland Assessment Method. In addition, we visited some of the identified wetland sites on May 24, 2001. We are providing these comments in response to our review of the proposed LCTIP Wetland Assessment Method. We believe that our recommendations will facilitate planning and design of the proposed project and the establishment of clear goals and objectives for compensatory wetland mitigation.

The proposed project would involve impacts to several waterbodies in two major watersheds, the Fox River watershed and the Des Plaines River watershed. Impacts to wetlands including waters of the United States associated with this proposed project range from approximately 58 to 96 acres. We have reviewed the LCTIP Wetland Assessment Method and found no clear rationale for the four wetland quality classes or nine wetland size classes.

We recommend that the wetland quality classes be reduced from four to three classes. This revision will facilitate the application of the three general types of mitigation as required under the Section 404(b)(1) Guidelines, avoidance, minimization and compensatory mitigation. A three class system would make evaluation of impacts to moderate and low quality wetlands less arbitrary than the proposed four class system. Class III quality wetlands, being the lowest in quality and function, would likely be more suitable for a form of off-site mitigation or enhancement mitigation. Generally, the mitigation ratio for these wetlands is usually 1.5 to 1.

Class I and Class II quality wetlands should be avoided to the maximum extent practicable and site-specific best management practices should be considered to protect these wetlands from long-term indirect impacts. Class I quality wetlands should be considered generally unsuitable for filling and unmitigable. Due to the continued uncertainty regarding the success of wetland creation and habitat development, impacts to and mitigation for Class I and Class II wetlands shall be subjected to a higher level of discretion and a higher mitigation ratio for impacts. Our recommendation for a three class system would increase the level of discretion over higher quality by increasing the number of wetlands per class.

We also recommend revisions to the wetland size classes used in the LCTIP Wetland Assessment Method. We recommend that four additional classes be provided for wetlands 0 to 20 acres in size (0-2, 2-5, 5-10, and 10-20) to account for functionality and viability of wetlands greater than 2 acres in size. Therefore, additional wetland size classes are recommended in order to more accurately characterize the value of smaller wetlands that may exhibit higher quality or functional value(s).

We thank you for the opportunity to comment on the LCTIP Wetland Assessment Method and participate with the Resource Agency Group of the LCTIP. If you have any questions, please contact Mr. Brian Smith by telephone at (312) 353-6400, extension 4031, or email at brian.l.smith@usace.army.mil.

Sincerely,

Leesa A. Beal
Chief, Permit Section
Regulatory Branch

Copies Furnished:

United States Environmental Protection Agency (MacMullen)
United States Fish & Wildlife Service (Mengler)
Illinois Department of Natural Resources (Schanzle)
Illinois Nature Preserve Commission (Nelson)

Lake County
TRANSPORTATION
IMPROVEMENT
Project

NEWS
NEWS
NEWS

VOLUME 1 NUMBER 3 FALL 1999

The **Lake County Transportation Improvement Project (LCTIP)** *is jointly sponsored by the Illinois Department of Transportation and the Illinois State Toll Highway Authority.*

IN THIS ISSUE:

PUBLISHED BY:
CH2MHILL

REMINDER:

Our Baseline Improvements include improvements expected to be built by 2020. Already, 46 miles (of the total 74 miles) of expected roadway improvements are either under construction or funded in the next 5 years.

LCTIP DEVELOPS WIDE RANGE OF POTENTIAL SOLUTIONS

The Lake County Transportation Improvement Project (LCTIP) has achieved another project milestone—development of the initial roadway and transit improvements. The nine roadway improvement packages and the set of rail and bus improvements establish the range of upgrades to be considered by the LCTIP for evaluation. These improvements were developed based on a comprehensive evaluation of the transportation needs in Lake County conducted earlier this year.

The LCTIP worked closely with Metra, Pace and RTA staff to develop transit proposals that represent reasonable projects for Lake County (see Figures 1-3). The types of improvements identified for consideration for the rail system include commuter rail service expansions, signal improvements, and consolidation of freight service. Improvements for bus service include express services and corridors for additional service. The proposals also include improvements that provide better links between modes. These improvements represent opportunities to enhance transit as part of an overall solution.

...continued on page 4

FIGURE 1. POTENTIAL RAIL IMPROVEMENTS

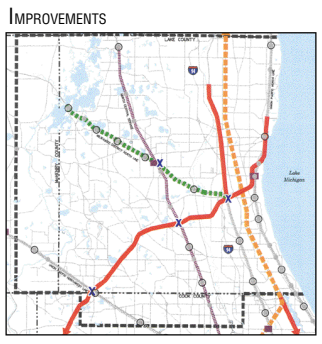


FIGURE 2. POTENTIAL EXPRESS SERVICES AND TRANSFER CENTERS

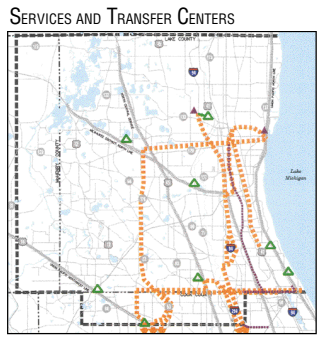
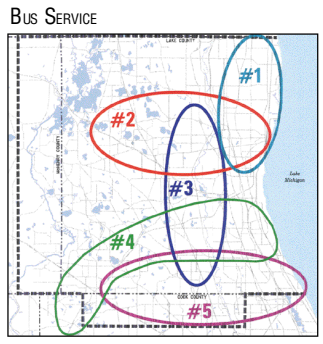


FIGURE 3. CORRIDORS FOR ADDITIONAL BUS SERVICE



POTENTIAL RAIL IMPROVEMENTS LEGEND

- New Commuter Rail Services
- Consolidation of Freight Service
- Signal Improvements
- Rail Line Transfers
- Baseline Improvements

POTENTIAL EXPRESS SERVICES AND TRANSFER CENTERS LEGEND

- Express Services
- Transfer Centers
- Baseline Improvements

Figure 4. I-94 Set of Improvements

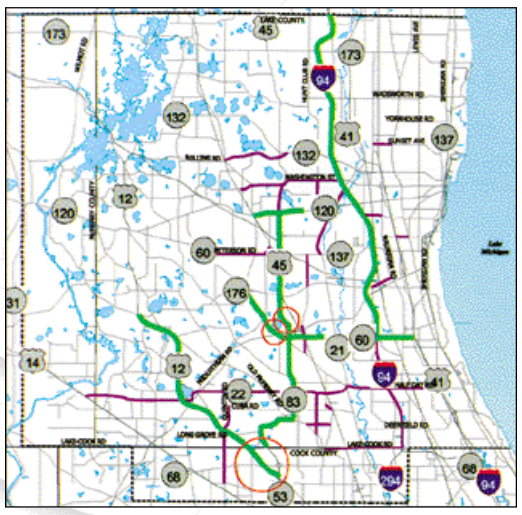


Figure 5. IL 83/US 45 Set of Improvements (with US 12)

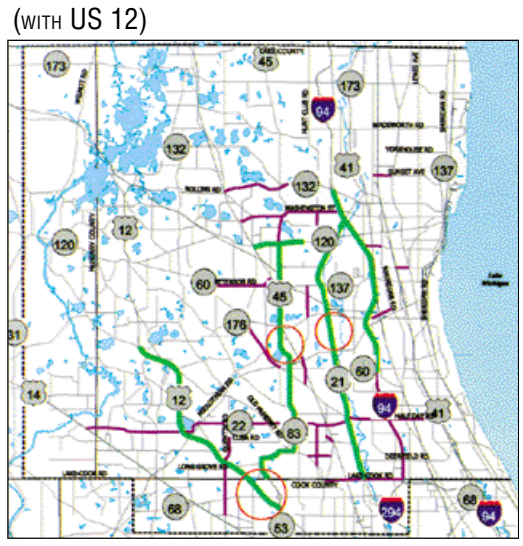


Figure 6. IL 83/US 45 Set of Improvements (with IL 120 Bypass)

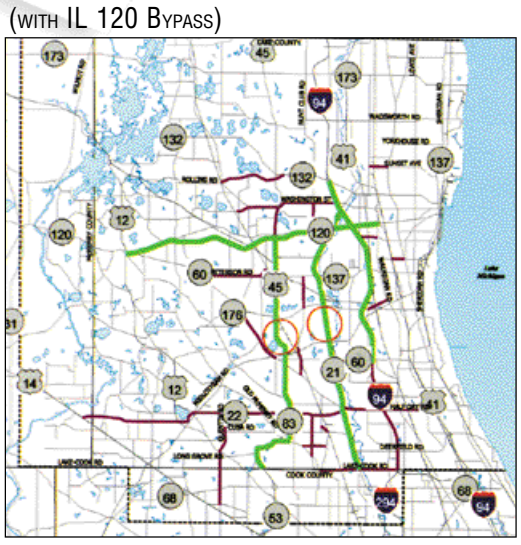


Figure 7. IL 53 Set of Improvements (Freeway)

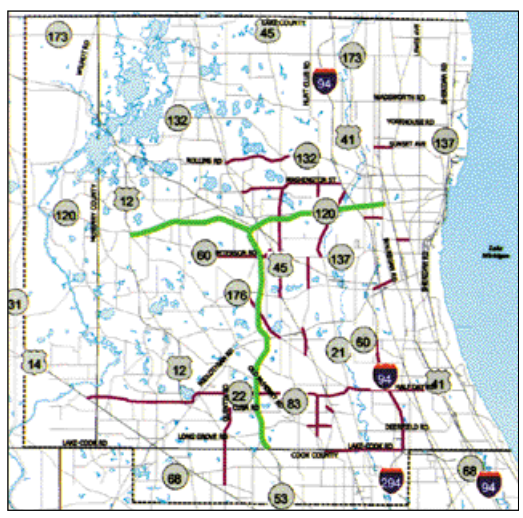


Figure 8. IL 53 Set of Improvements (Tollway)

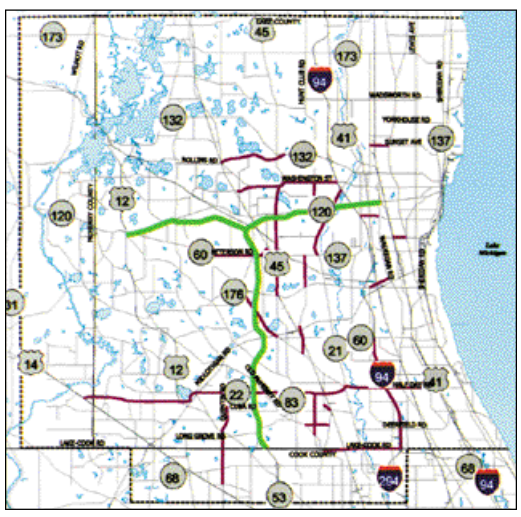
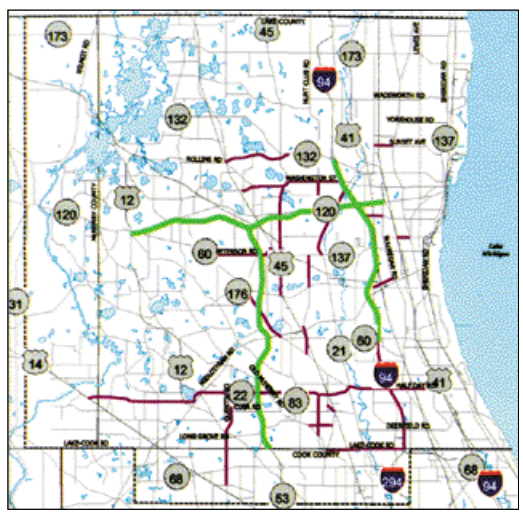


Figure 9. IL 53 Set of Improvements (Arterial)



Map Legend for Road Improvements

Proposed Improvements | Baseline Improvements | Bypass Consideration

Figure 10. IL 120 Set of Improvements (on bypass alignment)

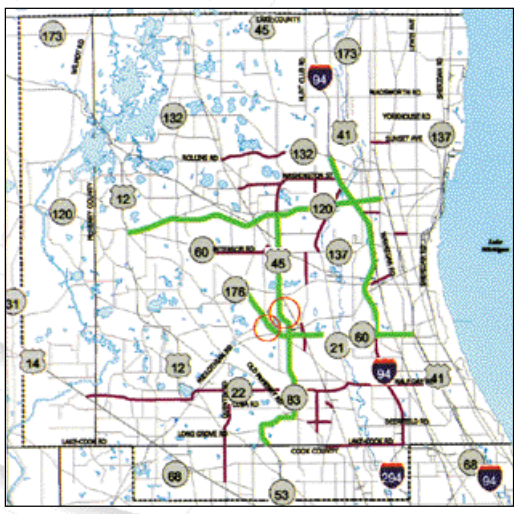


Figure 11. IL 120 Set of Improvements (on existing alignment)

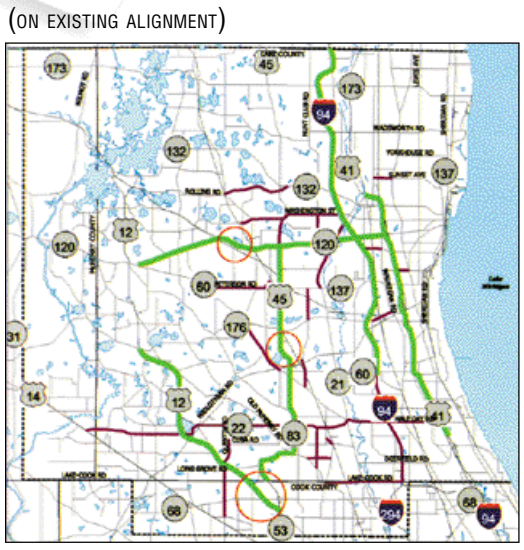
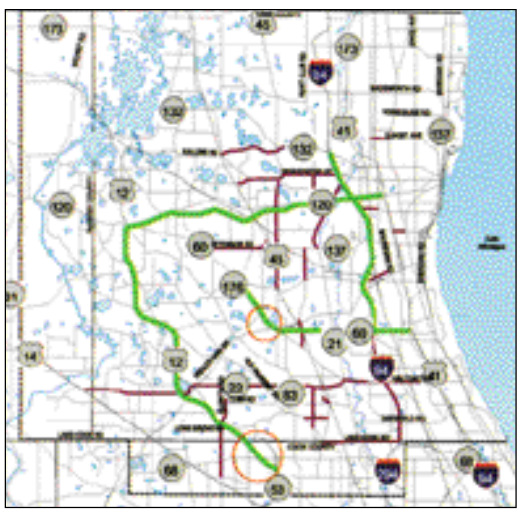
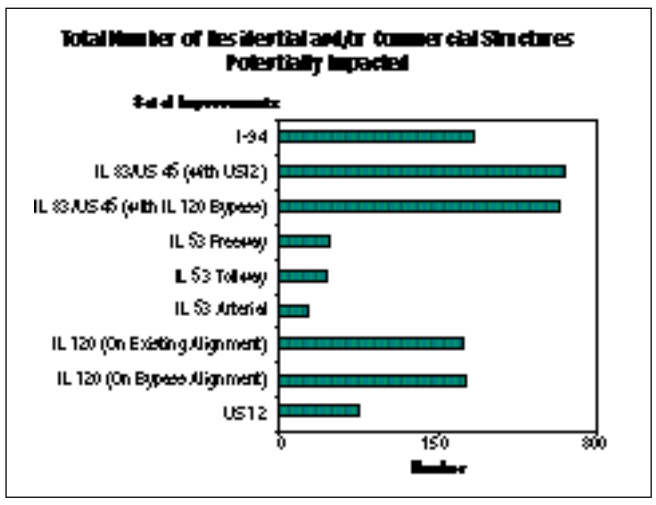
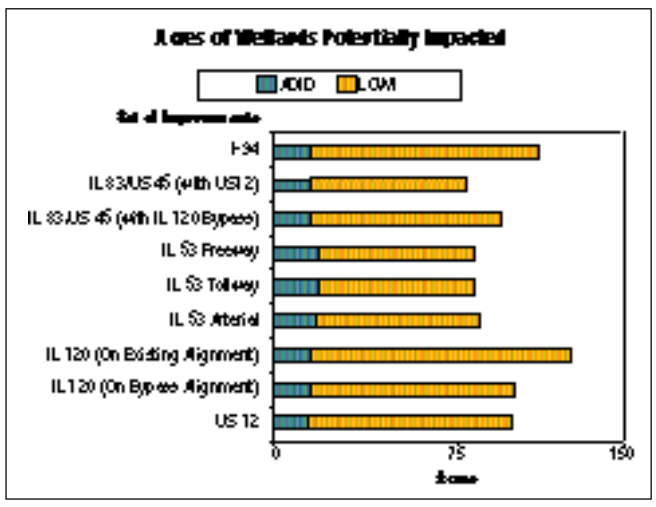


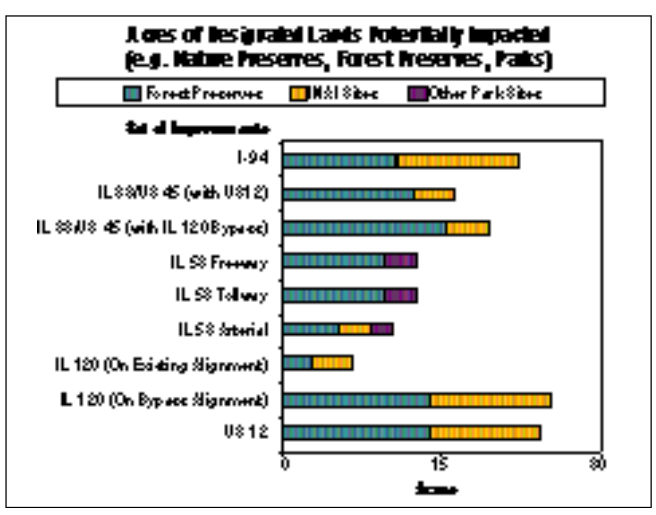
Figure 12. US 12 Set of Improvements



Summary of Potential Residential and Commercial Structures, Wetlands and Designated Lands Impacted For Each Set of Improvements







LCTIP develops wide range of potential solutions (continued from page 1)

Our roadway proposals are in addition to the Baseline Improvements. Doing just the Baseline Improvements is not enough, given existing congestion levels and the projected quarter million new residents in Lake County by 2020. We can't solve all the problems, so we focused on the worst congestion and the most effective combinations using a structured, computer-aided approach. Our nine roadway improvement sets are shown in Figures 4-12.

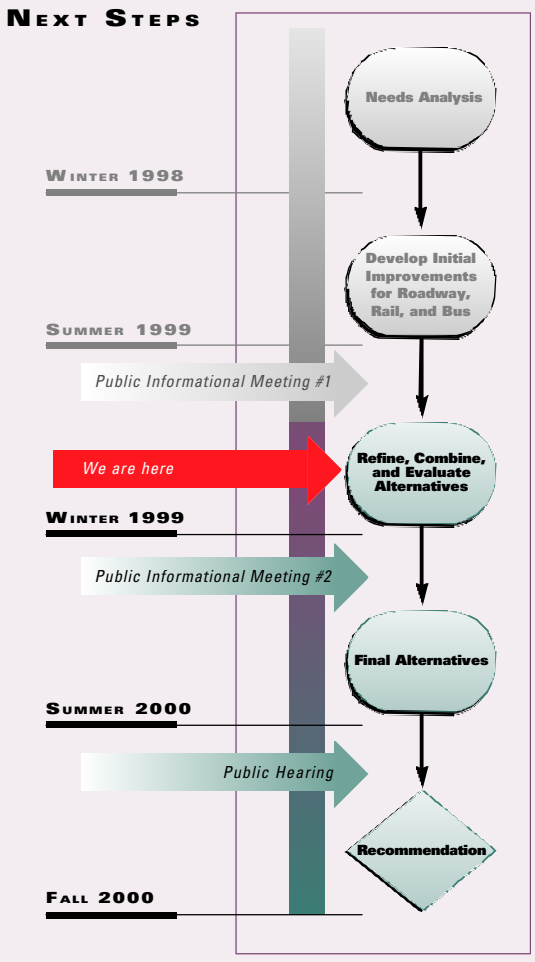
In August we presented these proposals in a series of public informational meetings held throughout Lake County. More than 800 people attended the events to review the proposed improvements, ask questions, and provide input. The overwhelming majority of participants agreed that major transportation improvements are needed in one form or another. The comments received have been reviewed and will assist us in identifying and addressing issues and concerns as we move into the next phase of the process—refining and combining the roadway, rail, and bus improvements to form complete alternatives and then evaluating the alternatives.

What's the next step in the process?

Through each successive stage of development, the alternatives will be increasingly refined and detailed. In the next step of the process, we will further develop the alternatives by:

- Identifying interchange locations
- Refining roadway footprints to avoid or minimize impacts
- Refining roadway and rail alignments and bus routes
- Identifying the feeder road system needed to support the major road improvements

Then we will analyze and compare the alternatives using transportation, environmental, societal, and financial evaluation criteria. Our findings will be summarized and presented in another series of public informational meetings for review and comment. We will continue to work with the public and others as we have throughout the project.

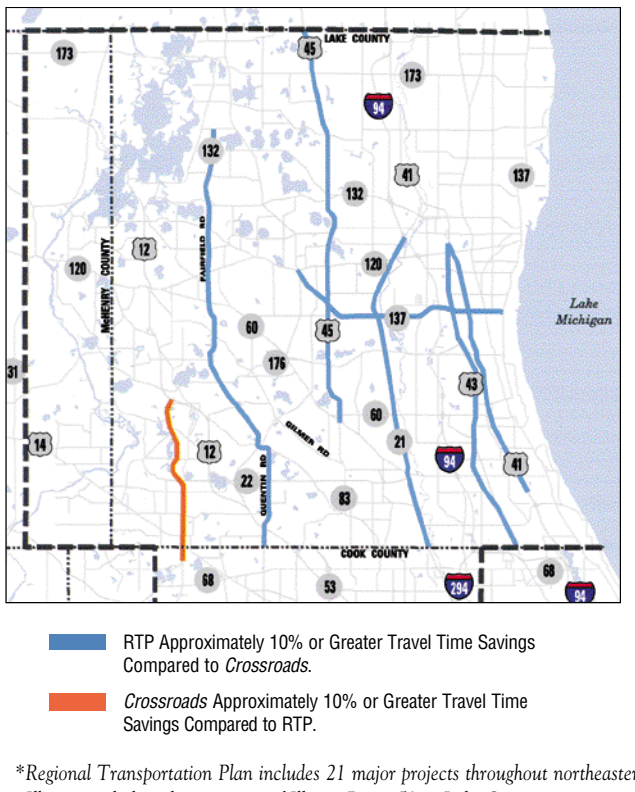


Other proposals... Crossroads

The Environmental Law and Policy Center (ELPC) and Citizens Organized for Sound Transportation (COST) have proposed limited existing roadway improvements and the addition of some rail service as the solution for Lake County's transportation needs in a document titled *Crossroads: Smart Transportation Options for Lake County*. They claim that implementing these improvements would lead to greater congestion relief when compared to the endorsed Regional Transportation Plan (RTP).* Their analysis misused the 2020 population forecasts, resulting in inaccurate conclusions.

Using state-of-the-art techniques, we correctly analyzed the *Crossroads* proposal and compared it to the regionally endorsed 2020 transportation plan. We found that the 2020 transportation plan improves travel times by about 10% on 100 miles of major roadways, whereas the *Crossroads* proposal improves travel times by the same margin on only 8 miles of major roadways (see Figure 13). The *Crossroads* proposal is not as effective in reducing congestion levels and accommodating Lake County's future growth.

Figure 13. Travel Time Comparison 2020 RTP vs Crossroads



**Regional Transportation Plan includes 21 major projects throughout northeastern Illinois, including the extension of Illinois Route 53 in Lake County.*

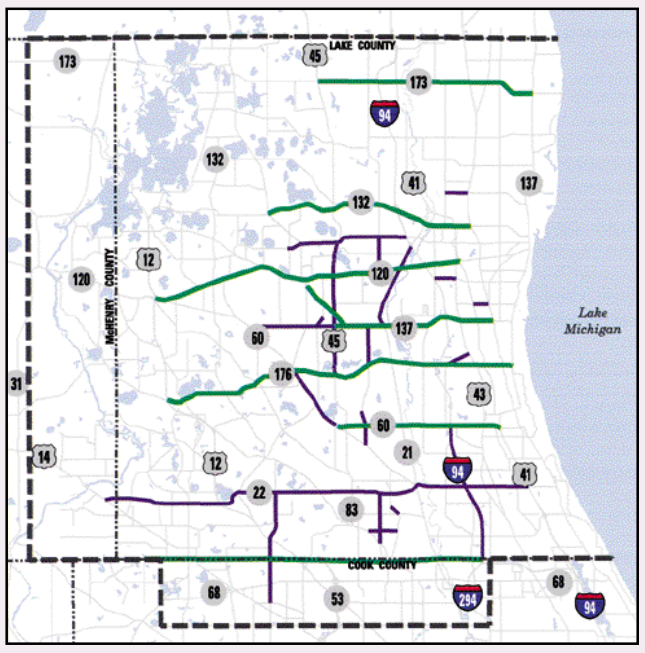
What happens if we improve only east-west roads?

Some people have expressed the opinion that east-west roads are more congested and should be improved. The Lake County Transportation Improvement Project and other transportation providers in the area recognize that there are east-west travel needs in Lake County, and through a collaborative process identified more than 40 miles of east-west roadway improvements as part of the "Baseline Improvements." Improvements to Lake Cook Road, Illinois Route 22, Peterson Road, Washington Street, and Rollins Road are included in the Baseline. These improvements are being proposed regardless of the recommendations made by this project.

In response to comments, we developed and tested an "east-west" improvement scenario (see Figure 14). This scenario performed worse than any of our roadway improvement sets, achieving only 78% of our goal.

These results should not be surprising. An analysis of existing travel patterns shows that north-south travel is predominant and the system lacks sufficient north-south capacity. In developing our alternatives, we targeted the worst congested roadways and most efficient combinations of improvements. All have a mix of north-south and east-west improvements.

Figure 14. East-West Roadway Improvement Scenario



Questions and Comments

In addition to the strong turnout at the public informational meetings held this August, we received nearly 600 written and oral comments. In response to your input, we provide the following responses to the major recurring comments and questions.

A majority of commenters support major transportation improvements.

The Lake County Transportation Improvement Project has identified a wide range of transportation improvement options to address the major transportation problems in Lake County. At the public informational meetings, nine different sets of roadway improvements as well as rail and bus improvements were presented. We received approximately 450 comments specifically about the roadway improvements. The following table summarizes how participants at the public informational meetings felt about the proposed sets of roadway improvements.

Set of Roadway Improvements	Percent
Support I-94 set of improvements	2%
Oppose I-94 set of improvements	0%
Support IL 83 / US 45 set of improvements	2%
Oppose IL 83 / US 45 set of improvements	1%
Support IL 53 set of improvements	56%
Oppose IL 53 set of improvements	33%
Support IL 120 set of improvements	1%
Oppose IL 120 set of improvements	0%
Support US 12 set of improvements	4%
Oppose US 12 set of improvements	1%
Do nothing (Baseline)	0%
Total	**100%**

There is a high degree of frustration with existing traffic congestion. Commenters want road improvements to be built now.

We received many comments expressing concern about the time required for the highway development process. These studies are necessary to provide us with the technical basis to make good transportation decisions. Our intent with this project is to move through the process as efficiently as possible and have an answer to what should be done by the fall of 2000. As for implementing road improvements, projects to widen 46 miles of existing roads are ongoing or funded for construction in the next 5 years.

Many were concerned with the failure of road improvements to keep pace with development.

Population and employment have increased rapidly over the last decade. During this same period, less than 5% of the major roads were improved. With the county adding 11,000 new residents per year, transportation has not been able to keep pace. Studies to address congestion are ongoing. In total, 74 miles of improvements to existing roads are anticipated by 2020 (LCTIP Baseline Improvements). These include improvements to IL Route 22, Lake Cook Rd., Pulaski Rd., Martin Luther King Dr., Midlothian Rd., Weiland Rd., Butterfield Rd., I-94, Sunset Ave., Bradley Rd., Buffalo Grove Rd., US 45, Peterson Rd., Hunt Club Rd., Rollins Rd., and Quentin Rd. Recommendations of the LCTIP would be in addition to these improvements.

Many believe growth will happen regardless of road improvements.

Census data show that Lake County is growing despite a lack of major transportation improvements. Forecasts show that an additional 250,000 people will move to Lake County by 2020,

Questions and Comments (Continued)

regardless of transportation improvements. Using a rigorous analysis, the population impact of any of the LCTIP alternatives would be less than 4% overall. The belief that Lake County will grow anyway is fostered by its historical growth patterns and geographic position in the metropolitan area. Transportation has not been, nor is it expected to be, the major driver of population growth in Lake County.

Get more out of the existing transportation system (i.e., traffic signal coordination, road underpass/overpass at railroad crossings, and additional turning lanes at intersections).

We are considering transportation management strategies like traffic signal coordination as part of this project. It is important to note, however, that these types of strategies typically have limited impacts in terms of reducing overall traffic volumes, usually around 1 percent, and thus do not eliminate the need for major transportation improvements.

Would IL 53 cause development and growth?

Transportation is a minor factor. Between 1980 and 1995 Lake County's population increased by 29%, or 132,000 residents. Over this same period, less than 5% of the roads were improved. Lake County's population is forecast to increase to 800,000 by the year 2020. The extension of IL 53 or other LCTIP alternatives would contribute less than 4% to population in the year 2020.

Local jurisdictions are responsible and have control over land use decisions. The provision of sewer and water infrastructure, and zoning, allow for development. We do our best to keep pace with these land use decisions and try to consider future growth.

Improve existing roads and see what happens.

Whether it's improvements to existing roads or new highways or both, it is obvious that as Lake County continues to add population (projected quarter million increase by 2020), the need for major improvements becomes increasingly evident. Lake County can ill afford to take a "see what happens" approach. It is important that the right solution be pursued now, that best accommodates Lake County's future growth and transportation needs.

Provide improvements for alternative types of transportation (transit, bicycles, and pedestrians).

We are taking a serious look at bus and rail improvements. The alternatives will include a combination of road improvements as well as transit components. The transit components will focus on enhancing services and increasing the number of people using transit to meet their travel needs. The rail and bus strategies under consideration include rail extensions of existing Metra service, rail station parking enhancements, and bus service expansion. Although we are evaluating major improvements to the transit network, currently nearly 90% of all work trips are made by automobile, whereas less than 5% are made by transit. Major improvements to the roads, which complement transit services, are necessary to meet Lake County's transportation needs.

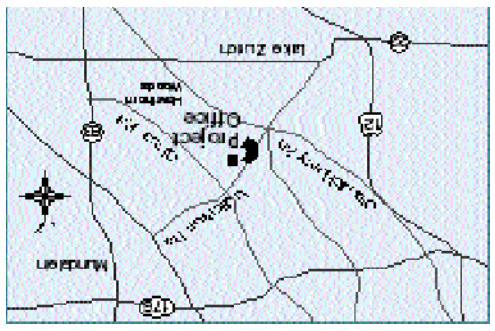
Are you considering the quality of environmental resources when assessing impacts?

Yes, we will undertake a rigorous evaluation of the environmental impacts of the improvements in the next step of our process, when we begin to refine the improvements to avoid or minimize impacts to resources. We will evaluate the alternatives, using environmental, societal, financial, and transportation measures. Our evaluation will involve qualitative as well as quantitative values.

Lake County
TRANSPORTATION IMPROVEMENT *Project*

In This Issue:

- Initial Roadway and Transit Improvements
- Other Proposals
- Public Meeting #1 Questions and Comments



For Further Information

Please contact/visit the project office.

Lake County Transportation Improvement Project

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VOLUME 1 NUMBER 4 SUMMER 2000

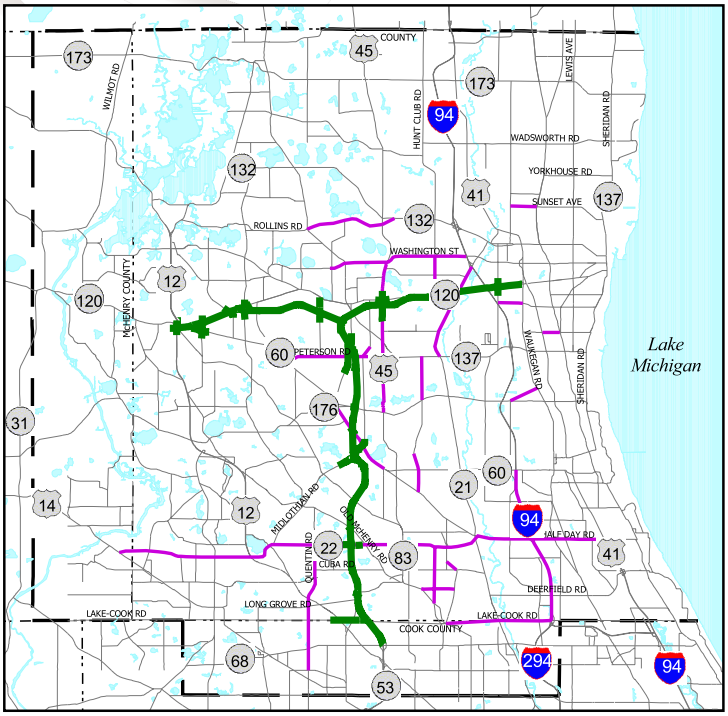
LCTIP NARROWS RANGE OF SOLUTIONS

The Lake County Transportation Improvement Project (LCTIP) has narrowed the field of transportation improvements. They include:

- Two finalist roadway alternatives: IL 53 (Freeway/Tollway) and IL 83/US 45 (with US 12) sets of improvements (see Figures 1-2), and
- Transit improvements consisting of commuter rail and bus service upgrades (see Figures 3-4), which will be common to both roadway alternatives.

The finalist roadway alternatives were selected from an initial set of nine alternatives that were developed in the summer of 1999, using state-of-the-art technical tools and extensive public involvement. The alternatives were developed to address the most heavily traveled corridors and respond to Lake County's top priority-congestion relief.

FIGURE 1. IL 53 (FREEWAY/TOLLWAY) SET OF IMPROVEMENTS



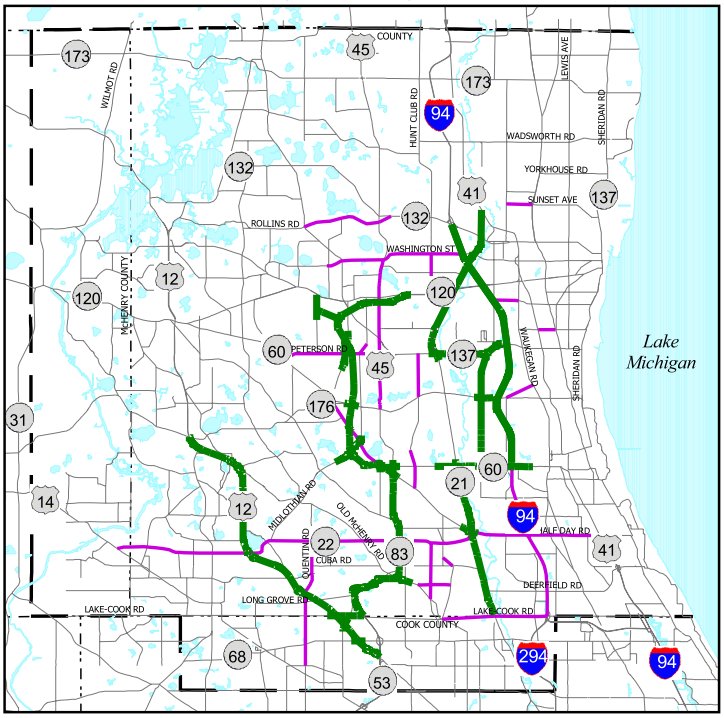
Route	Improvement
IL53	NEW 6-LANE FREEWAY/TOLLWAY
IL120	WIDEN FROM 2 TO 4-LANES/4 TO 6-LANES
(IL120 BYPASS)	NEW 4/6-LANE FREEWAY/TOLLWAY

LEGEND FOR ROAD IMPROVEMENTS

Proposed Improvement

Baseline Improvement

FIGURE 2. IL 83/US 45 (WITH US 12) SET OF IMPROVEMENTS



Route	Improvement
IL 83	WIDEN FROM 4 TO 6-LANES
(IL60/US45 BYPASS)	NEW 4-LANE ARTERIAL
I-94	WIDEN FROM 6 TO 8-LANES
IL21	WIDEN FROM 4 TO 6-LANES
(IL60)	WIDEN FROM 4 TO 6-LANES
(ST. MARY'S ROAD)	WIDEN FROM 2 TO 4-LANES
(IL137)	WIDEN FROM 4 TO 6-LANES
US12	WIDEN FROM 4 TO 6-LANES
IL120 (NEW ALIGNMENT)	NEW 4-LANE ARTERIAL

Figure 3. Potential Rail Improvements

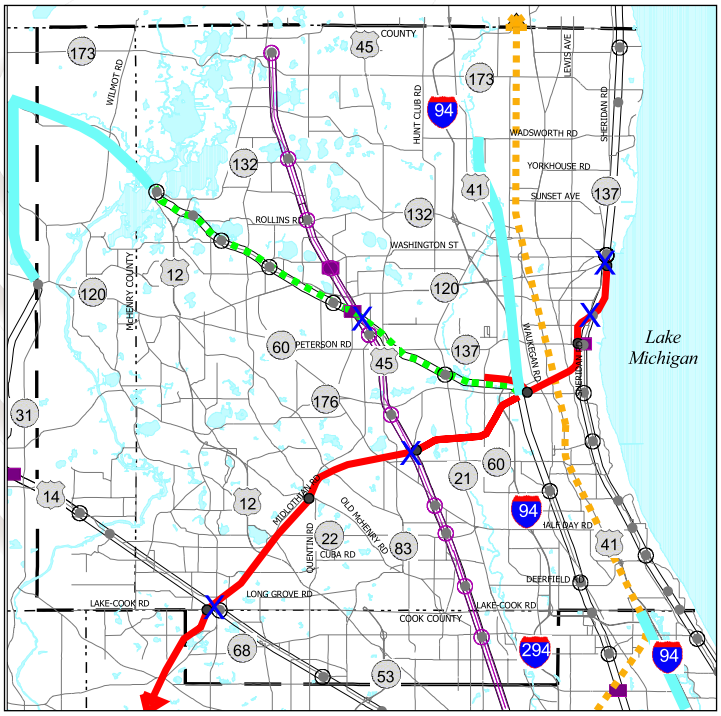
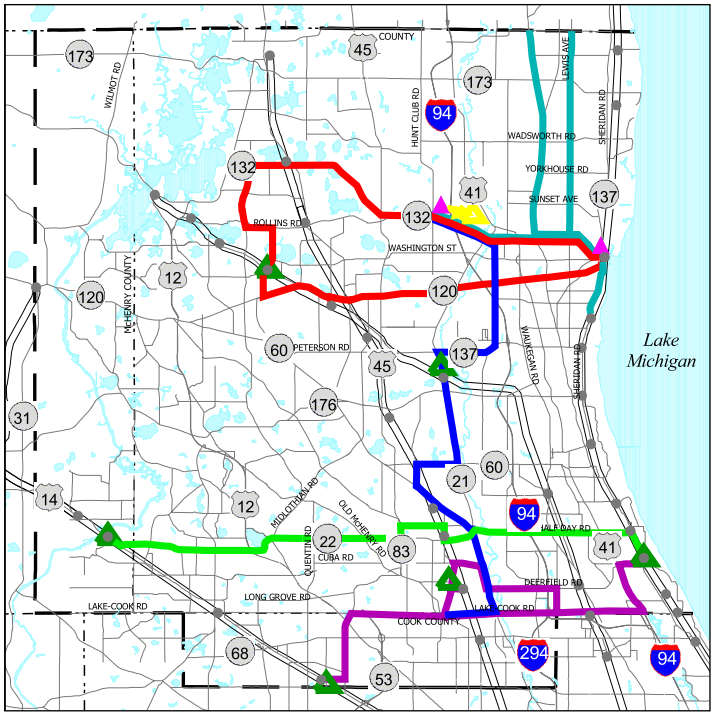


Figure 4. Potential Bus Routes and Transportation Centers



Potential Rail Improvements Legend

- Candidate Commuter Rail Service (EJ&E)
- Consolidation of Freight Service
- Signal Improvements
- Add Track (NCS)
- Parking Capacity Improvements
- Feasibility Study
- Transfer Stations

All Figures: Study Area Boundary; County Boundary

Refinements

After the initial nine alternatives were developed, refinements were made to avoid or minimize impacts and add detail. One of the key refinements was the consideration of bypass routes in Libertyville, Mundelein, and Grayslake. The LCTIP investigated ways to improve the badly congested IL 21, US 45, and IL 120 corridors that would minimize impacts to homes and businesses. For IL 21 in Libertyville, a bypass to the east was selected using IL 60, St. Mary's Road and IL 137; for US 45 in Mundelein, a bypass to the west was selected using the IL 53 extension corridor, and for IL 120 in Grayslake, a bypass to the south was selected.

Alternatives Evaluation

After the refinements were complete, the alternatives were then evaluated on the basis of how each would reduce congestion, reduce traffic on local streets and improve travel times. The IL 53 (Freeway/Tollway) and IL 83/US 45 (with US 12) sets of improvements were the top two alternatives in terms of transportation benefits.

What Are the Next Steps?

During the summer and fall, the finalist alternatives will be further refined to add engineering and environmental detail, and then evaluated. The LCTIP's technical work and public input will be summarized in a draft Environmental Impact Statement, which will be followed by a Public Hearing.

Public Involvement

Public involvement is an important part of the LCTIP, with input being sought through our project office in Mundelein, our Web Site (www.lakecountytip.com), presentations to nearly 100 organizations and communities, project newsletters, advisory groups, and public informational meetings. Participation and support for this planning process has been strong, as evidenced by the nearly 4,000 comments received at our May 2000 public informational meetings. The following summarizes the major themes from that event.

A majority of commenters support the IL 53 set of improvements.

The majority of comments centered on the IL 53 set of improvements. By a margin of 4:1, people expressed their support for the extension of IL 53.

Set of Roadway Improvements	Percent
Support IL 53 Freeway/Tollway	79%
Oppose IL 53 Freeway/Tollway	19%
Support IL 83/US 45 (with US 12)	Less than 1%
Oppose IL 83/US 45 (with US 12)	1.5%

Would the finalist alternatives only cause more growth?

The LCTIP roadway options would add less than 4% to Lake County's total 2020 population. The most important issue is the other 96% that will be here regardless. The County's population has jumped from 516,000 in 1990 to nearly 620,000 today, and is expected to be around 800,000 by the year 2020 regardless of any major roadway improvements. Congestion is widespread already, and major improvements to the highway system are needed just to keep the County out of gridlock.

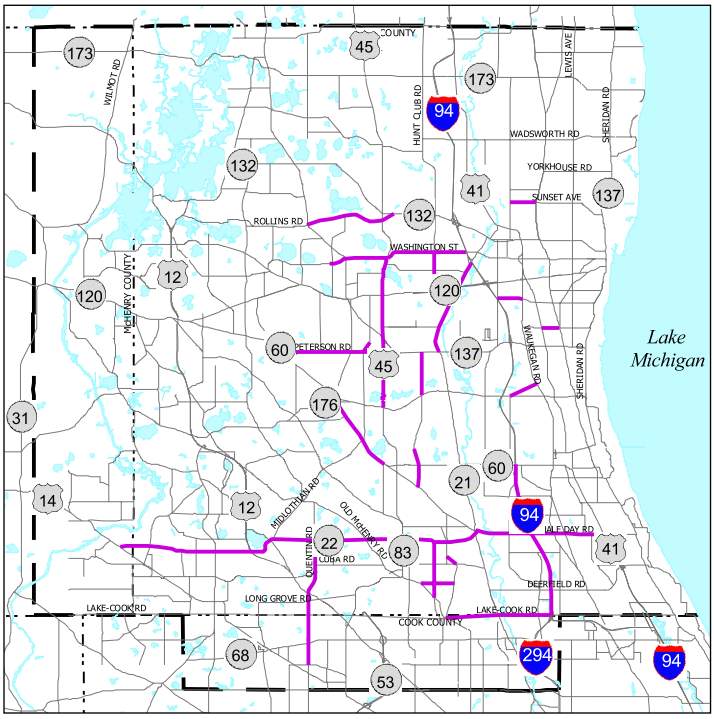
Would improving existing roads have fewer impacts?

Not necessarily. The LCTIP has implemented measures to avoid or minimize impacts for all alternatives and found that the impacts were comparable. The potential impacts associated with improving existing roads is well known as evidenced by bypasses being considered as part of other studies in Lake Zurich, Barrington, and Millburn.

What is being done to improve existing roads?

Based on input from transportation providers, the LCTIP identified those improvements anticipated to be built regardless of the outcome of our study (see Figure 5). These include improvements to IL 22, Lake Cook Road, Pulaski Road, Martin Luther King Drive, Midlothian Road, Weiland Road, Butterfield Road, I-94, Sunset Avenue, Bradley Road, Buffalo Grove Road, US 45, Peterson Road, Hunt Club Road, Rollins Road, Quentin Road, IL 21, and IL 83/IL 60. Over half of these improvements are funded for construction in the next five years. Other projects, such as intersection improvements and signal synchronization, will also continue regardless of our study. With all these improvements in place, congestion will double by 2020. Additional improvements are needed to keep Lake County out of gridlock.

Figure 5. Project Baseline



Lake County TRANSPORTATION IMPROVEMENT Project...

In This Issue:

- Finalist Roadway and Transit Recommendations
- Spring 2000 Public Meeting Summary
- Next Steps

...addressing Lake County's gridlock

For Further Information

Please contact/visit the project office.

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