High Cross IL 130

Corridor Plan

Completed for the City of Urbana by the
Champaign County Regional Planning Commission

In cooperation with
Illinois Department of Transportation
Champaign County Highway Department
Urbana Township
Somer Township
University of Illinois at Urbana-Champaign

This study was made possible by a grant from the
Illinois Tomorrow Corridor Planning Grant Program

Volume 1 of 2

April 2007

IL130/High Cross Road
CORRIDOR PLAN

Prepared by the Champaign County Regional Planning Commission
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Introduction

1.1 Background

The City of Urbana was awarded a grant from the Illinois Tomorrow Corridor Planning Grant Program in 2003 to study land use and transportation issues on Urbana's east side. As lead agency, the City contracted the Champaign County Regional Planning Commission (CCRPC) to conduct the study. The primary goal of the *Illinois 130/High Cross Road Corridor Study* is to promote logical development that considers interconnectivity of land uses and transportation networks for the City of Urbana, its rural surroundings, and the urbanized area that is comprised of the City of Urbana, City of Champaign, Village of Savoy and Village of Bondville.

The Illinois 130/High Cross Road corridor extends eight miles between Ford Harris Road to the north and Old Church Road to the south. It is composed of two different roadway sections regarding land uses and cross-section. South of University Avenue (US150), it is a two lane bituminous paved roadway serving regional traffic as well as urban area travel. Illinois 130 is Urbana's easternmost transportation artery. The study area includes several land uses: residential, retail (Wal-Mart), office/industrial park, commercial, institutional, and agricultural areas. This area is envisioned by the City of Urbana as a location for commercial, light industrial businesses and residential developments to start, expand, or relocate. High Cross Road extends north of its intersection with University Avenue as a two-lane oil and chip roadway. High Cross Road serves as a connector road between agricultural and small residential areas located north of Interstate 74, the City of Urbana, and other rural areas surrounding the urbanized area.

The Illinois 130/High Cross Road study area includes three local jurisdictions: the City of Urbana, and Urbana and Somer Townships. The study recognizes that any proposed improvements will likely impact a broad spectrum of individuals, businesses and government agencies. In light of the potential impacts, public involvement in the planning stages was essential to gain the support needed for adoption of recommendations developed by this study into local, regional and statewide transportation plans. A map of the study area showing City and Township jurisdictions in the corridor is shown in Figure 1-1.

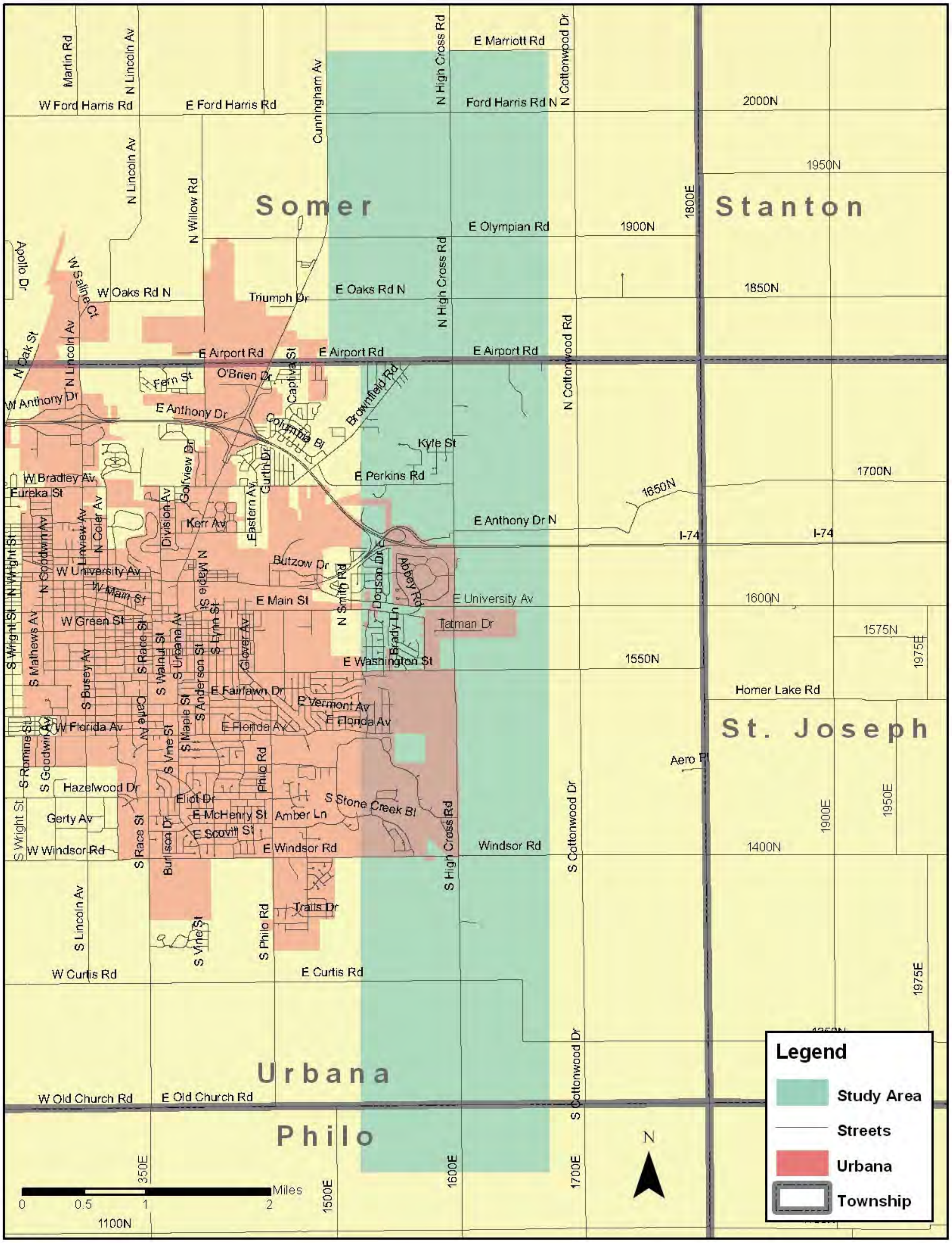
1.2 Study Purpose

The study focused on system-wide integration with other transportation improvements proposed in the corridor (including possible improvements to or relocation of the existing partial interchange with I-74, proposed bus service, bike paths and pedestrian paths) and proposed land uses. The study's findings include a prioritized list of recommended projects, estimated funding needs, and implementation measures related to the study's goals and objectives.

The following products were created during the corridor study planning process, all included in the final report:

- Documentation of the purpose and need for improvements based on existing and anticipated future conditions;
- Description of the assessment process used to identify potential improvement strategies for further detailed study;
- Documentation of findings from the future development alternatives evaluation;
- Identification of potential funding sources for project implementation;
- Description of the Corridor's preferred alternative;
- Coordination with other planned improvements plans and programs within the Corridor;
- Documentation of the public involvement process including its proactive efforts to inform and involve the general public during the study process; and,
- Description of issues that will require further detail.

Figure 1-1: Study Area



1.3 Study Methodology

In addition to mobility, accessibility, safety, environmental and land use development analyses, the study contains substantial public information and local coordination activities. This is important because the study area encompasses concerned citizens and several different planning jurisdictions that each has different local elected officials and local planning agencies. Therefore, for the study to effectively investigate the needs of an eight-mile long transportation corridor, the extensive involvement and coordination with the following organizations was required:

- Illinois Department of Transportation (IDOT)
- Champaign County Highway Department (CCHD)
- Champaign County Regional Planning Commission (CCRPC)
- Champaign Urbana Urbanized Area Transportation Study (CUUATS)
- City of Urbana
- Urbana Township
- Somer Township

A clear formulation of the study's purpose and need is an important element in building consensus for recommended improvements to the IL130/High Cross Road corridor.

2 Planning Process

An extensive planning process was undertaken in order to achieve the overall objective of making proactive recommendations for developing transportation and land use in the IL130/High Cross Road corridor study area. This process began in October 2003 with the formation of the corridor study Steering Committee, comprised of representatives from participating agencies. This committee directed CCRPC staff and was the primary decision maker for the planning process. CCRPC staff worked through the following project phases to complete the IL130/High Cross Road Corridor Study:

1. Involve the public
2. Inventory existing conditions
3. Consider existing plans and policies
4. Determine issues
5. Develop goals and objectives
6. Forecast population, employment, growth
7. Model existing and future conditions
8. Develop alternatives for the future
9. Refine options and identify a preferred alternative
10. Develop an implementation plan
11. Create benchmarks for implementation success

2.1 Involve the public

Planning transportation and land use changes affects every resident in some manner. To achieve the widest possible participation, CCRPC staff encourages involvement from initial development through project completion. In addition, federal law requires early and continuing public involvement that provides opportunities to participate for all stakeholders, independent of gender, race, national origin, age, disability, or income. Staff makes every effort to fulfill these standards in its planning processes. During this process over 1,000 people/businesses were notified via regular mail of public meetings. In addition, advertisements for all public meetings were posted on the CCRPC website, www.ccrpc.org, and in the *News Gazette* before each meeting.

For the IL130 Corridor Study, staff utilized numerous public involvement methods: public workshops; public open houses; presentations to local interest groups; comment cards; online resources; staff availability to the public for questions and comments, and collaboration with municipal boards and councils to communicate information. Appendix 6 contains information on involvement efforts. Appendix 7 includes all public comments received during the study process.

2.2 Inventory existing conditions

Data collection and analysis were primary tasks during the corridor study. This background information illuminates the uniqueness of the study area and helps determine current issues, forces, and trends. In addition, existing conditions data is used as input for the transportation demand model, environmental models, and as a baseline for creating and comparing proposed future development alternatives. Land uses, transportation system attributes, natural areas, historic sites, and services are some of the themes considered in the existing conditions inventory.

2.3 Consider existing plans and policies

There are numerous documents created over the years that have bearing to the study area and its development. The 2005 *Urbana Comprehensive Plan Update* details land use classifications and recommendations for the city. The plan's principles, in conjunction with more recent information on new and impending developments, were used as the basis for land use development in the urban parts of the study area. For rural areas, the Champaign County Zoning Ordinance helped determine potential growth densities and permitted land use types.

Existing plans related to transportation include the 2004 *Long Range Transportation Plan (LRTP) 2025* for the Urbanized Area, and the 2004 *Champaign County Greenways and Trails Plan.* Transportation recommendations for the corridor study area were not limited to the projects listed in these plans; rather, recommendations and projects for the corridor reflect concepts from these plans.

2.4 Determine Issues

In collaboration with local participating agencies and the public, CCRPC compiled a list of issues for the study area. Issues are topics that need mitigation or resolution, such as congested roads, incompatible land uses, or environmental pollution. Some of the more generalized issues in the area include:

- Integration and compatibility with the existing and future transportation system and land use plans—e.g. the *Champaign County Greenways and Trails Plan*, the City of Urbana *Comprehensive Plan Update* and the *Long Range Transportation Plan 2025*.
- User Safety - adequate roadway width for all transportation modes, minimize "conflicts" between users (e.g. motorists, pedestrians, cyclists), minimize crash frequency and severity.
- Impacts to roadway capacity - parts of the corridor are close to operating under congested conditions, e.g. – University Ave. and IL130 intersection and the section of IL130 between Tatman Ct. and University Ave.
- Accessibility - meet accessibility requirements from CUUATS Access Management guidelines; some segments do not meet the spacing standards provided in the guidelines.
- Transit - providing regular bus service.
- Pedestrian and bicycle facilities - need to provide direct links to other transportation modes and easy-to-use paths to desirable destinations.
- Socio-Community Impacts - need to consider impacts to properties and businesses, and opportunities for community economic development and neighborhood enhancement.
- Aesthetics and Views - respecting the landscape in the study area.
- Environmental Impacts – need to consider impacts on potential areas of wildlife habitat such as the Saline Ditch, the University's Brownfield Woods, Trelease Woods, and Trelease Prairie.

2.5 Develop goals and objectives

The formulation of goals and objectives determines what direction planning efforts should take, independent of time frame and individual projects. A goal is defined as an end state that will be brought about by implementing the corridor study's recommendations. Objectives are sub-goals that help organize the implementation of the plan into measurable and manageable parts. The Steering Committee and CCRPC staff collaborated to formulate the goals and objectives for the study area based on the issues identified in the previous step.

Goals for the study area

1 *Improve Mobility*
Increase the efficiency, connectivity and reliability of the transportation system by reducing time wasted in congestion, as well as expanding and improving alternatives to single-occupant vehicle travel, such as mass transit access and more bicycle and pedestrian pathways.

2 *Improve Safety*
Provide safer conditions for those traveling along the corridor by reducing the frequency and severity of the crashes involving those driving, walking, or cycling along IL 130/High Cross Road and their adjacent roadways.

3 *Improve Accessibility*
Provide a balanced corridor transportation system of multiple travel modes with adequate capacity for and convenient access to home, work, shopping, recreation and other existing and proposed activities within the study area.

4 *Preserve the Environment*
Reduce the amount of motor vehicle emissions and noise and vibration impacts in the study area. Buffer sensitive land uses and protect existing wooded areas and the rural residential character of the area north of I-74.

5 *Serve Residential Communities*
Provide adequate multi-modal transportation access and connections in existing and planned residential areas, while ensuring that these connections do not induce non-residential traffic flows.

6 *Serve Planned Regional Commercial Centers*
Provide multi-modal transportation improvements to serve the growing commercial and planned residential areas south of I-74. Ensure safe and direct connections to the existing roadway system.

2.5.1 Objectives

Land Use

- Promote diversified and concentrated land use patterns that relate the density of development to the capacity of the land, roadways, and utility infrastructure, as envisioned by the 2005 *Urbana Comprehensive Plan Update*.
- Reduce the impact of through traffic in the study area by providing opportunities for safe crossing of arterial roads.
- Reduce visual and access confusion by developing site development standards that encourage the use of common driveways (access management), common parking areas, and uniform lighting and sign plans.

- Plan for appropriate transportation improvements to serve the growing commercial and residential area along the corridor south of Interstate 74.
- Investigate measures to improve access, traffic flow and safety, while also protecting the rural residential character of the corridor north of Interstate 74.

Traffic

- Reduce traffic congestion on main roadways, by encouraging the design and construction of transportation improvements that will promote free flow of traffic (LOS C) and managing existing transportation facilities to maximize capacity.
- Reduce pollution and adverse environmental impacts of transportation, including vehicle emissions, traffic noise and vibration, and glare impacts.
- Reduce crashes in both number and severity.

Transit

- Increase ridership by attracting new users with improved and expanded service and intermodal options.
- Increase satisfaction of current transit users by improving transit access, convenience, frequency, speed, and comfort.
- Increase transportation options by making transit accessible and convenient for more people.

Bicycles/Pedestrians

- Improve pedestrian and bicyclist safety by providing and maintaining safe sidewalks, shoulders, bicycle lanes, multiuse paths and pedestrian protection at intersections.
- Plan for improvements depicted in the *Champaign County Greenways and Trails Plan*.
- Improve pedestrian and bicycle access by providing safe and convenient opportunities for improved circulation within residential areas, as well as better connections to major activity centers and commercial areas.

Freight

- Reduce the cost and increase the reliability of goods movement by reducing congestion and improving access to businesses.
- Reduce the volume of truck traffic through residential areas.

2.6 Forecast population and employment

Population and employment forecasts are calculated to determine how more people and more activity centers will affect infrastructure needs, travel and land use patterns in the future. Appendix 1 provides detailed information on forecasting for the study area.

2.6.1. Population forecasts

The City of Urbana completed 20-year population forecasts for the portion of the study area that falls within its municipal limits. The forecasts were based on proposed future land uses as detailed in the *2005 City of Urbana Comprehensive Plan Update*. Champaign County Planning and Zoning provided 20-year forecasts based on the maximum number of allowable residential structures that can be built according to the County Zoning Ordinance. CCRPC staff then allocated those projections into two time horizons: 2015 and 2025. Utilizing the two time horizons allows the transportation model to discern when transportation improvements might be needed based on future growth.

Table 2-1: Study Area Population Forecast Summary

IL130 Population					
	2000	**2005**	**2015**	**2025**	**2000-2025 Change**
Projected Population	9,809	10,086	18,181	21,942	12,133
% Increase from previous listed year	--	3%	80%	21%	124%

2.6.2. Employment forecasts

Employment forecasts were similarly completed by the City of Urbana based on the Comprehensive Plan.

Table 2-2: Study Area Employment Forecast Summary

IL130 Employment					
	2000	**2005**	**2015**	**2025**	**2000-2025 Change**
Projected Employment	3,039	3,336	5,655	11,266	8,227
% Increase from previous listed year	--	10%	70%	99%	271%

2.7. Model existing and future conditions

A transportation model allows the comparison of existing transportation conditions and potential future transportation conditions for a specific geographic area. It quantitatively compares different alternatives in terms of future traffic volumes and the level of congestion they will create, vehicular travel times and speeds, and pedestrian, bicycle, and transit usage. The model also helps identify "problem areas" in the transportation system that planners, engineers, and officials can prioritize for making needed improvements. Detailed information on the transportation modeling process is available in Appendix 2.

It is important to note that a transportation model is merely a tool to help resolve and proactively avoid issues in the transportation system. It is ultimately up to local officials to decide if they want to heed and plan for what the model suggests, and if the resources are available to make the recommended changes.

The model uses population and employment projections to reflect land use. For the transportation model to provide output on an existing conditions scenario, it must have an inventory of the transportation network and population and employment figures as input. So that the model can compare potential future scenarios for development, it must also have different combinations of population and employment forecasts (reflecting land use patterns and densities) and changes to the transportation network for each potential scenario that should be analyzed. With these existing and future conditions outputs, staff, local officials and other interested parties can evaluate which scenario would optimize transportation conditions.

Environmental models were also used to analyze existing and future conditions for noise and air quality impacts. The environmental report (Appendix 3) provides more information about these models.

2.8 Develop alternatives for the future

For the IL130/High Cross Road study area, land uses were identified through the 2005 *Urbana Comprehensive Plan Update*. Identifying alternatives for the future thus focused on transportation facilities. A methodology comprised of public opinion, local knowledge, and best planning and engineering practices was used to create the alternatives. The following sections detail the methodology's progression.

2.8.1 Strings & Ribbons Workshops

The Strings and Ribbons activity provides interested parties with the opportunity to create what they believe to be an alternative that resolves issues identified in the corridor study area. Participants, working in groups, are allocated a certain amount of "money" with which they can purchase transportation projects and amenities. They are asked to keep identified issues and goals in mind as they negotiate with other group members to create one map that shows the group's alternative for future transportation improvements.

Thirteen groups each created an alternative for the IL130 corridor study area during two Strings & Ribbons workshops held in February and April 2006. Each alternative was unique, but many individual projects were chosen by more than one group.

2.8.2 Processing the Strings & Ribbons Alternatives

The next step in the alternatives identification was to process the information collected in the workshops. Each group's alternative was analyzed for transportation, environmental, and community impact factors to determine their effectiveness in realizing the corridor study goals regarding congestion, mobility, environmental sensitivity, and public benefit. Overall, each of the alternatives improved congestion and mobility, but none of the alternatives completely mitigated those issues for the 20-year time horizon. A preliminary environmental analysis indicated that noise and air quality would be acceptable for every alternative.

Creating the 13 alternatives took into account the public opinion and some of the local knowledge portions of the methodology. At this point, technical expertise and other local knowledge perspectives were needed to help fill the gaps that the alternatives had and to begin to narrow down the possible alternatives for future development.

In order to narrow down the alternatives to a more manageable range of choices for local decision makers, each group's project selections were entered into a database where the sum of groups that selected a project was calculated. The projects were then sorted by the total number of groups selecting them. Four alternatives were then created using the most popular projects. These four alternatives were created by CCRPC staff and discussed with the IL130/High Cross Road Steering Committee before their presentation to the general public.

2.8.3 Strings & Ribbons Part Two

In June 2006, participants from the previous workshops and other interested parties were invited to review the alternatives analysis from the original 13 alternatives. The goal or the workshop was to discuss and gather preferences for the four hybrid alternatives. One intention of this was to communicate that participants' ideas had been considered, analyzed, and in many cases utilized. Another intention was to keep the participants engaged in the decision making process by requesting their ranked preferences for the four hybrid alternatives.

Input received during and after this workshop generally showed that none of the hybrid alternatives were fully reflective of the workshop participants' interests. This unanticipated outcome forced a change of direction in how the projects that participants originally identified would be used to create a preferred alternative.

CCRPC staff returned to the list of projects prioritized by the number of groups that chose them, and created one short list of the most popular projects (rather than the four slightly varying short lists that were used for creating the four hybrid alternatives), which would become the basis for a proposed preferred alternative. The projects were then evaluated individually to determine their effectiveness in achieving the corridor study goals, as explained in section 2.9.

The product of the second Strings & Ribbons workshop was the documentation of all comments received, which can be found in Appendix 7. In addition, it resulted in one of the recommendations for the study area: to do a more in-depth analysis, an Access Justification Report, for three potential interchange locations for East Urbana. For more information on the recommendation, please refer to Section 5: Implementation Plan.

2.9 Refining options and identifying a preferred alternative

Five criteria were identified to evaluate the benefits and costs of the short list of proposed projects. Each criterion was comprised of one or more factors, where a total of 100 points was possible for any one project. The higher the overall score, the more effective the project would be in achieving the corridor study goals.

Alternatives Evaluation Criteria		
Impact on Performance Measure Targets		40
Transportation	(30 of 40)	
Environment	(10 of 40)	
Safety		20
Cost		15
Implementation		15
Economic/Community Benefit		10
Total Possible Point Score		100

Table 2-3 details the factors that were considered for each criterion. Table 2-4 shows the ranked projects and scores given to each criterion. The list of ranked projects can be used as a tool for decision makers to help prioritize project implementation. It is not intended that the highest ranked project be the first to be constructed; rather, the significance of the highest ranked project is that it most effectively achieves the corridor study goals. Other factors, such as funding availability and changing land use or traffic conditions, could make projects more imperative than their ranking indicates. The ultimate decision on project prioritization will fall on local government officials, available resources, and perceived need for the project.

Table 2-3: Project Evaluation Criteria Factors

Weight	Criterion	Factors	Determined by
40%	Transportation Impact	Congestion 2025	Level of Service 2025
		Mobility 2025	Anticipated posted speed 2025
		Access Management Compliance	Access Management Guidelines
		Accessibility to proposed shared use paths	Population adjacent to path
		Bicycle Compatibility Index	Facility width, adjacent traffic volumes, speed, etc.
		Continuity to existing shared-use path system	Existing path system
	Environmental Impact	Wetland	Need for land where wetland is
		Air Quality	Level of Service change 2005-2025
		Water Quality	Level of Service change 2005-2025, distance to streams
		Natural Areas / Habitat	Need for land where natural area is, distance to natural area, Level of Service change 2005-2025
		Soils	Need to use land where prime soils exist
		Topography and Geology	Affected surface area
		Noise	Level of Service change 2005-2025
		Visual	Lane width, roadside, traffic control devices, landscape unity
		Light Pollution	Safety and comfort, Use of adjacent buildings
		Land Use	Level of Service change 2005-2025
20%	Safety	Potential reduction in crashes	Traffic volumes, roadway length, lane width, number of lanes
15%	Cost	Construction cost from Strings & Ribbons	Estimated construction cost, not including right-of-way, utilities, engineering, or amenities
15%	Implementation	Ease of right-of-way acquisition	Geographic part of study area
		Barriers to development	Environmentally sensitive areas and infrastructure limitations
		Intergovernmental cooperation	Number of participating agencies for project construction
10%	Economic/Community Impact	Public input	Number of groups that selected the project
		Adjacent future land use revenues	Type of land use adjacent to the project

At this point, the projects list, which is the basis for the preferred alternative, needed to be further refined to fill in any missing gaps and to ensure that the projects logically and efficiently improve the transportation system and access to adjacent land uses. The short list was entered into the transportation model to determine how effectively it would resolve congestion and mobility issues. In addition, it underwent the same environmental analysis as the previous alternatives. Based on the congestion analysis, additional projects were considered to remediate any remaining congestion in the study area, if possible.

Table 2-4: Project Rankings According to Evaluation Criteria

Alternatives	Impact on Performance Measure Targets: Transportation	Impact on Performance Measure Targets - Environment	Safety (Autos)	Safety (Other Modes)	Cost Ranking	Implementation	Economic/ Community Impact	TOTAL SCORE
Weight	30 of 100	10 of 100	15 or 5 of 100	15 or 5 of 100	15 of 100	15 of 100	10 of 100	**100**
Stop light at Washington & IL130/High Cross intersection	23.75	6.67	15	3.75	15	12.5	7.5	**84.17**
On-street bicycle lanes along Washington between IL130/High Cross and Lierman	18.75	6.76	1.25	15	15	15	3.75	**75.51**
Shared Use Path (Pedestrian/Bicycle), west side of IL130/High Cross between Windsor and University	18.75	6.29	1.25	15	11.25	12.5	7.5	**72.54**
Olympian between IL130/High Cross and US45, 2 lane with shoulders	23.75	5.05	15	2.5	7.5	10	2.5	**66.30**
Washington between IL130/High Cross and Dodson, 3 lane with curb and gutter	27.5	6.86	3	1.25	7.5	15	5	**66.11**
Shared Use Path (Pedestrian/Bicycle), along US150 between IL130/High Cross and Cottonwood	13.75	6.67	1.25	15	15	7.5	6.25	**65.42**
Shared Use Path (Pedestrian/Bicycle), along US150 between IL130/High Cross and Smith	7.5	7.14	1.25	15	15	12.5	3.75	**62.14**
Washington between IL130/High Cross and Cottonwood, 4 lane	27.5	5.62	6	2.5	3.75	10	6.25	**61.62**
University Ave between IL130/High Cross and Cottonwood, 4 lane improved	27.5	6.10	6	2.5	3.75	7.5	7.5	**60.85**
IL130/High Cross between University and either Windsor, Curtis, Old Church, or farther as warranted, 4 or 5 lane as warranted	27.5	5.62	6	2.5	0	12.5	3.75	**57.87**
Olympian between IL130/High Cross and Cottonwood, 2 lane with shoulders	23.75	5.05	6	2.5	7.5	10	2.5	**57.30**
Airport Road between IL130/High Cross and US45, 2 or 3 lane improved as warranted	23.75	4.19	12	2.5	3.75	2.5	3.75	**52.44**
Saline Ditch Bridge at Cottonwood, widen to at least 2 full lanes	17.5	4.57	6	1.25	11.25	7.5	1.25	**49.32**
Saline Ditch Bridge at High Cross, widen to at least 2 full lanes	7.5	4.00	3	1.25	11.25	7.5	7.5	**42.00**
High Cross between Olympian and University, 2 lane with shoulders	10	3.05	15	2.5	3.75	0	5	**39.30**

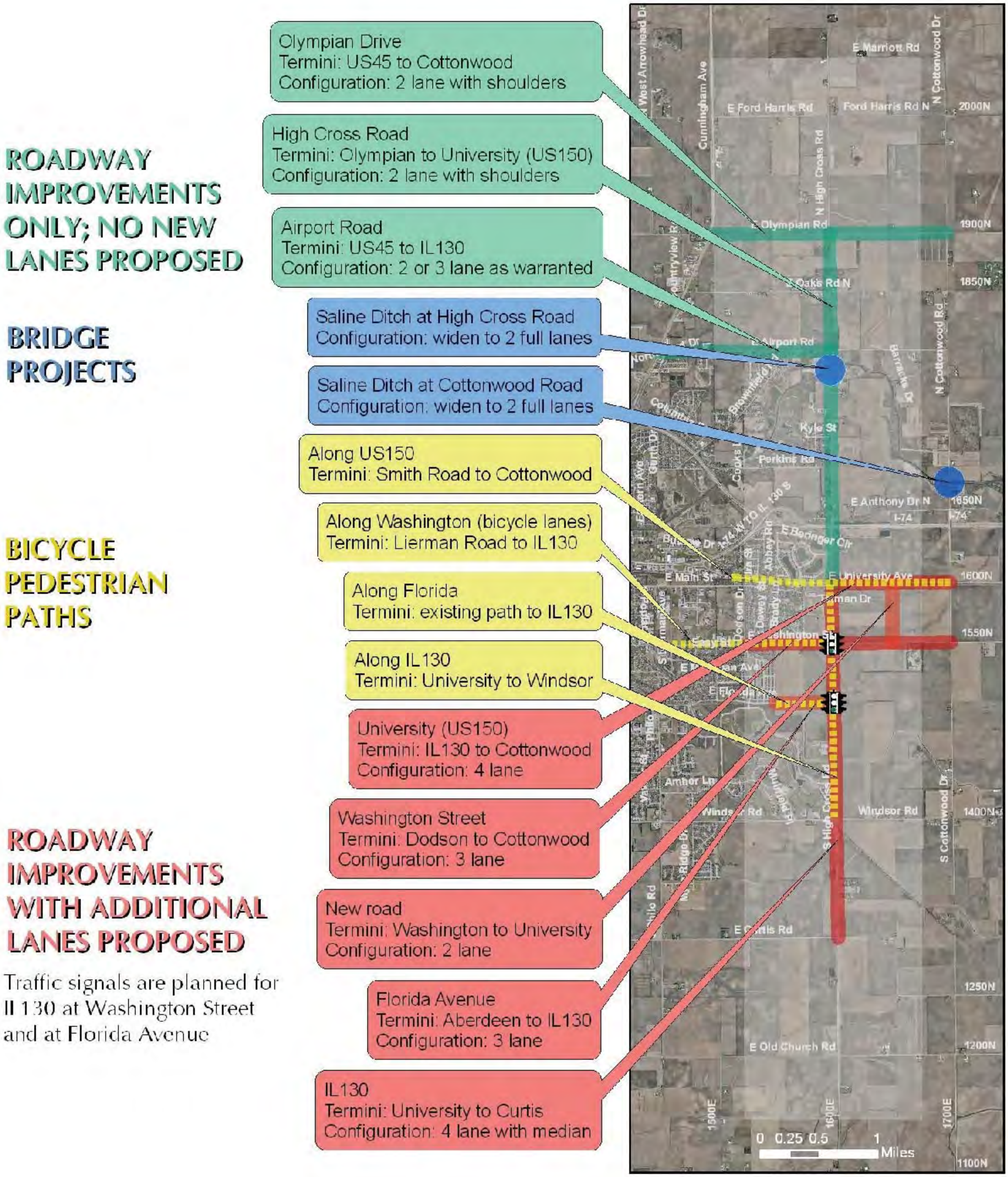
The transportation model indicated that one additional project would be necessary to optimize traffic conditions in the study area. The amended short list was submitted to the corridor study steering committee for discussion and approval. Staff began working on environmental and transportation future conditions analyses for the proposed preferred alternative. Figure 2-1 illustrates the Preferred Alternative proposed projects.

Since the original Strings & Ribbons workshops, a Bicycle and Pedestrian Advisory Commission to the City of Urbana Council has formed. Based on new information and recommendations from the Commission, City staff has changed the Washington Street between IL130 and Lierman Avenue project to a recommended 3 lane facility with on-street bicycle lanes rather than a 4 lane facility. This recommendation would change the project description for the shared use path along Washington Street to on-street bicycle lanes. Sidewalks for pedestrians would be constructed where there are gaps in order to provide access for pedestrians.

2.9.1 Public evaluation of the Preferred Alternative

Staff held a public workshop on October 14, 2006 to give interested parties the opportunity to review the proposed preferred alternative and provide comments. Results from the future conditions analyses were also provided for informational purposes. The preferred alternative was well received, with few negative comments. All comments are available in Appendix 7.

Figure 2-1: Preferred Alternative Transportation Projects



2.10 Develop an implementation plan

The list of recommendations provided in the preferred alternative serves as a basis for creating an implementation plan for the study area. Concepts need to be put into more detail, including who will be responsible for implementing them, how much they might cost to implement, and a time frame for implementation. The implementation plan for the study area is found in Section 5 of this document.

Another aspect of the implementation plan is a set of design concepts that were introduced by CCRPC staff and evaluated by participants in the October 18, 2006 Public Workshop. These ideas, if implemented, will positively affect the study area transportation system, land use developments, natural areas, and residents.

2.11 Create benchmarks for implementation success

Local officials and residents need a set of benchmarks by which the successful implementation of this plan can be measured. Implementation can be monitored by having a list of the concepts and construction projects that need to be completed in order to fulfill the goals, objectives, and implementation measures of this plan. An example of this could be "IL130 south of University Avenue will be improved to a four or five lane roadway." Once this has been completed, a benchmark of this plan will have been achieved. Successful completion of this plan will also consider the 20-year time horizon that was established for this study.

3. Data Collection

The data collection effort included transportation, land use and environmental data assembled from existing sources as well as transportation and land use data collected specifically for this project.

The data collection effort also included summarizing other studies related to planning and transportation that address the IL130/High Cross Road Corridor. Transportation data included traffic volumes, crash data, transit data, roadway geometric data and bicycle and pedestrian data. Corridor data, including functional classification and access management elements, are also presented as well as land use and zoning data for the corridor. Community concerns and environmental issues are also discussed.

The data collected specifically for this study is discussed below. The data contained in the 2004 update of the Long Range Transportation Plan (LRTP) for the Champaign-Urbana-Savoy-Bondville urbanized area was used as the basis for analyzing existing conditions and forecasting future conditions.

3.1 Demographics and Land-Use

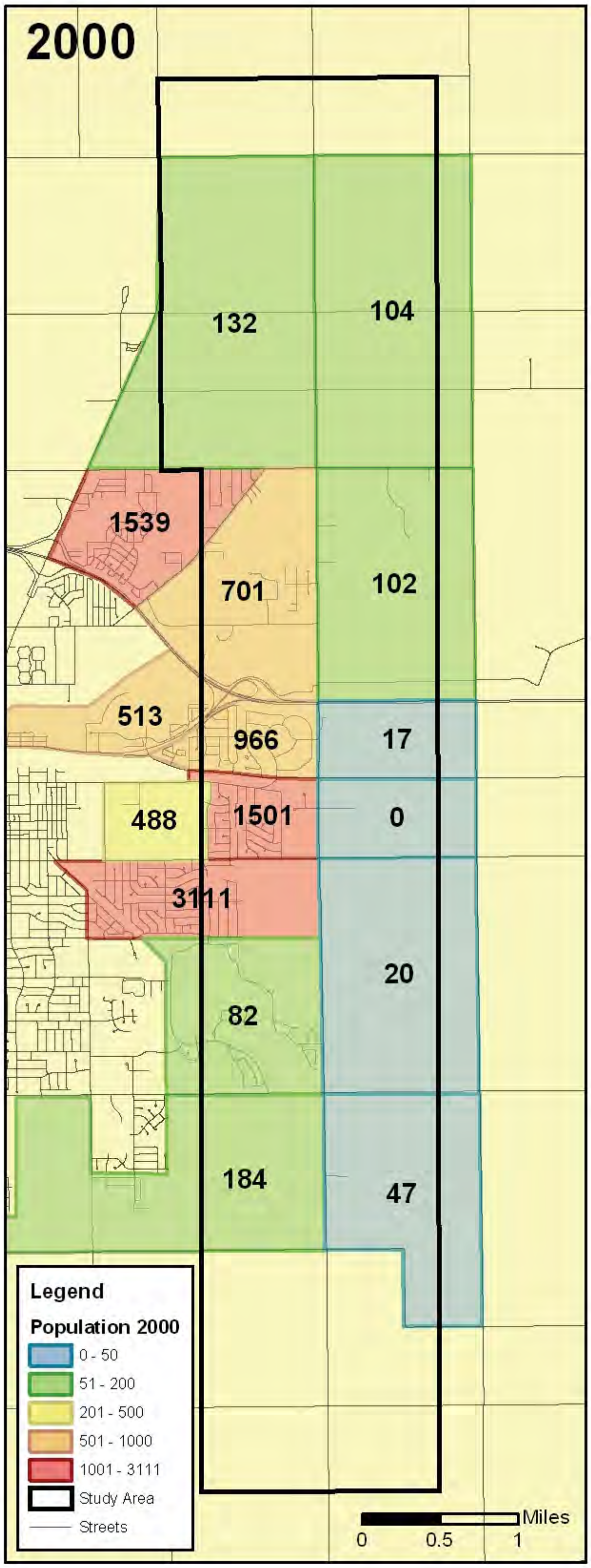
3.1.1 Base Year (2000)

Using reasonable population and employment forecasts was vital to the study process and its recommendations. The study used base year (2000) population, number of households, total employment and retail employment from the Census Bureau and other sources. Using historical trends, local land-use plans, zoning maps, information about local development proposals, re-zonings and base year demographic data, the horizon year (2025) forecasts for population, number of households, and total employment divided by sectors were estimated. Basic information was obtained from the LRTP with the collaboration of the City of Urbana and the Champaign County Regional Planning Commission. Table 3-1 and Figures 3-1 and 3-2 show existing and future population and employment in the study area. Data is divided into Traffic Analysis Zones (TAZs), which are sectors of the community that can be seen in the figures.

Table 3-1: Year 2000 Population and Total Employment by TAZs for Study Area

Traffic Analysis Zone (TAZ)	2000 Population	2000 Employment				
		Industrial	Service	Retail	Other	TOTAL
NEF005_A	132	24	56	16	0	96
URB022	513	1048	18	18	0	1084
URB023	966	2	94	9	0	105
URB028	3111	5	55	38	68	166
URB064_C	184	3	9	0	0	12
URB075_A	82	0	16	48	10	74
URB 082	1501	203	34	28	0	265
URB 083	488	0	17	0	910	927
URB 086	701	4	12	20	3	39
URB 090	1539	4	142	2	0	148
URB 100	104	0	2	0	5	7
URB 101	102	0	0	24	0	24
URB 102	17	0	2	0	5	7
URB 103	0	0	0	0	0	0
URB 104	20	0	0	0	2	2
URB 105	47	0	0	0	0	0
TOTAL	9507	1293	457	203	1003	2956

Figure 3-1: Existing & Future (2025) Population



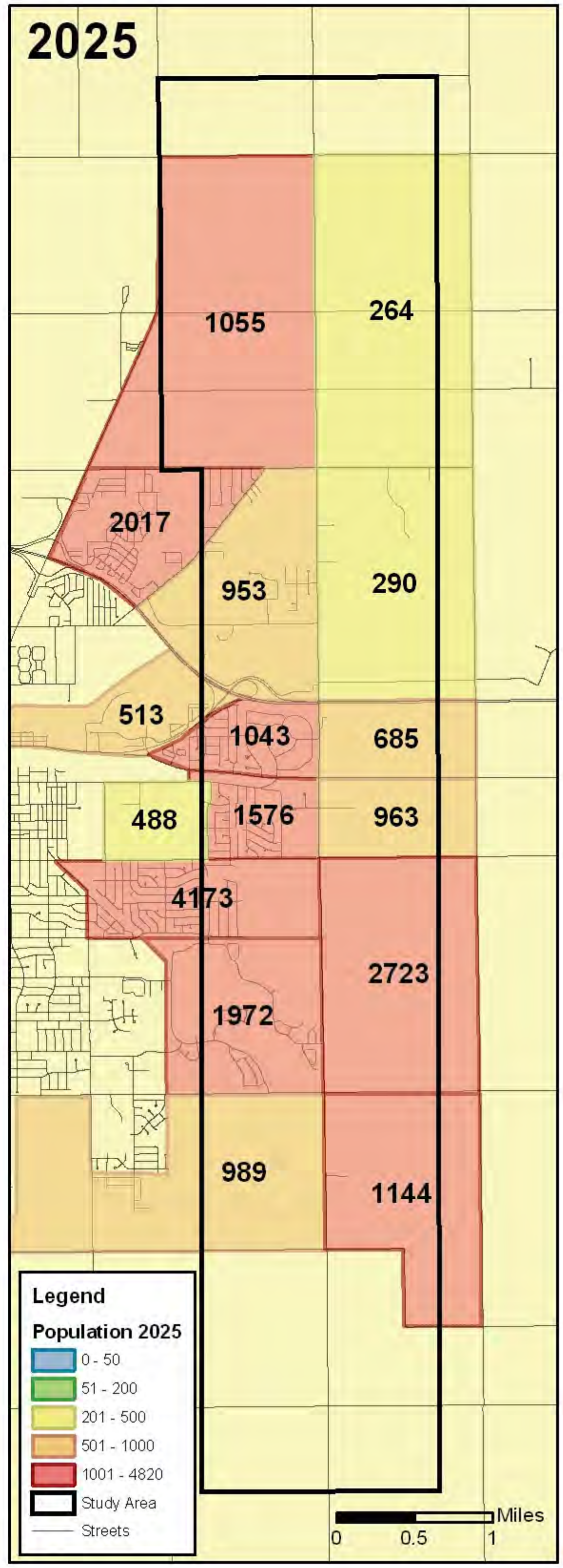
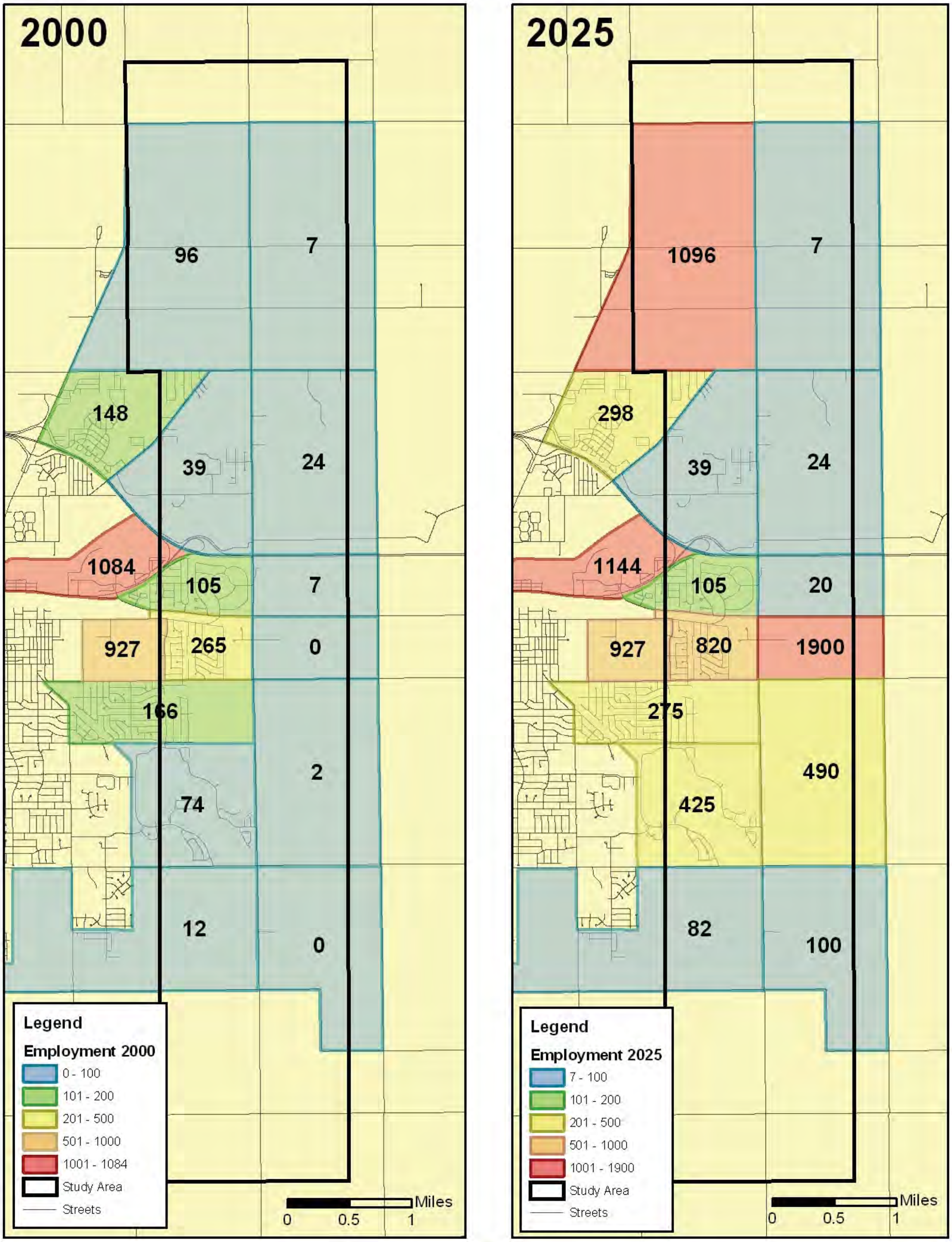


Figure 3-2: Existing & Future (2025) Employment



Existing land use patterns in the study area are presented in Figure 3-3 and Table 3-2. Single-family residential areas dominate developed land in the study area. Light industrial activities are located around Tatman Court. Land north of Interstate 74, south of Windsor Road and east of IL130 is primarily used for agricultural purposes. New homes are being built in Savannah Green, Beringer Commons, and Stone Creek subdivisions, and north of Interstate 74.

Table 3-2: Existing Land Use 2005

Description	Acreage	% of Total
Agriculture	8558	80.95%
Rural Residential	785	7.43%
Residential	667	6.31%
Institution	217	2.05%
Open Space (not vacant)	185	1.75%
Multifamily Residential	49	0.46%
Light Industrial	36	0.34%
Community Business	30	0.28%
Regional Business	23	0.22%
Vacant	19	0.18%
Cemetery	3	0.03%
TOTAL	**10572**	**100%**

3.1.2 Horizon Year 2025

Population, number of households, and total employment classified into sectors including industrial, service, and retail were projected to future planning years 2005, 2015 and 2025, as shown in Table 3-1 and Figures 3-1 and 3-2. Population projections were completed by City of Urbana staff and were deemed to be a moderate growth forecast by CCRPC staff. Distributing future population and employment data to the TAZs required careful analysis, which was completed by CCRPC staff. These analyses utilized current land use patterns; local knowledge; discussions with local planning staffs; community facilities maps, and professional judgment. Barriers to future development such as sewer availability or soil conditions were identified. The land use and zoning maps for Urbana were examined and recent development trends in the study area were identified. Major developments that were in their early stages, such as Wal-Mart or residential subdivision developments such as Beringer Commons and Savannah Green were also identified. The results were the 2005, 2015 and 2025 year estimates of population and total employment for the study area. Analysis maps were created to display population distribution, households and total employment for future years. These allocation figures were discussed with City of Urbana representatives, and their feedback was integrated into the allocation process. Further refinements were carried out to distribute the population, household and employment figures into study area TAZs as appropriate to known land uses. Corridor-level distributions of population and total employment are shown in Table 3-3.

Figure 3-3: Existing & Future (2025) Land Uses

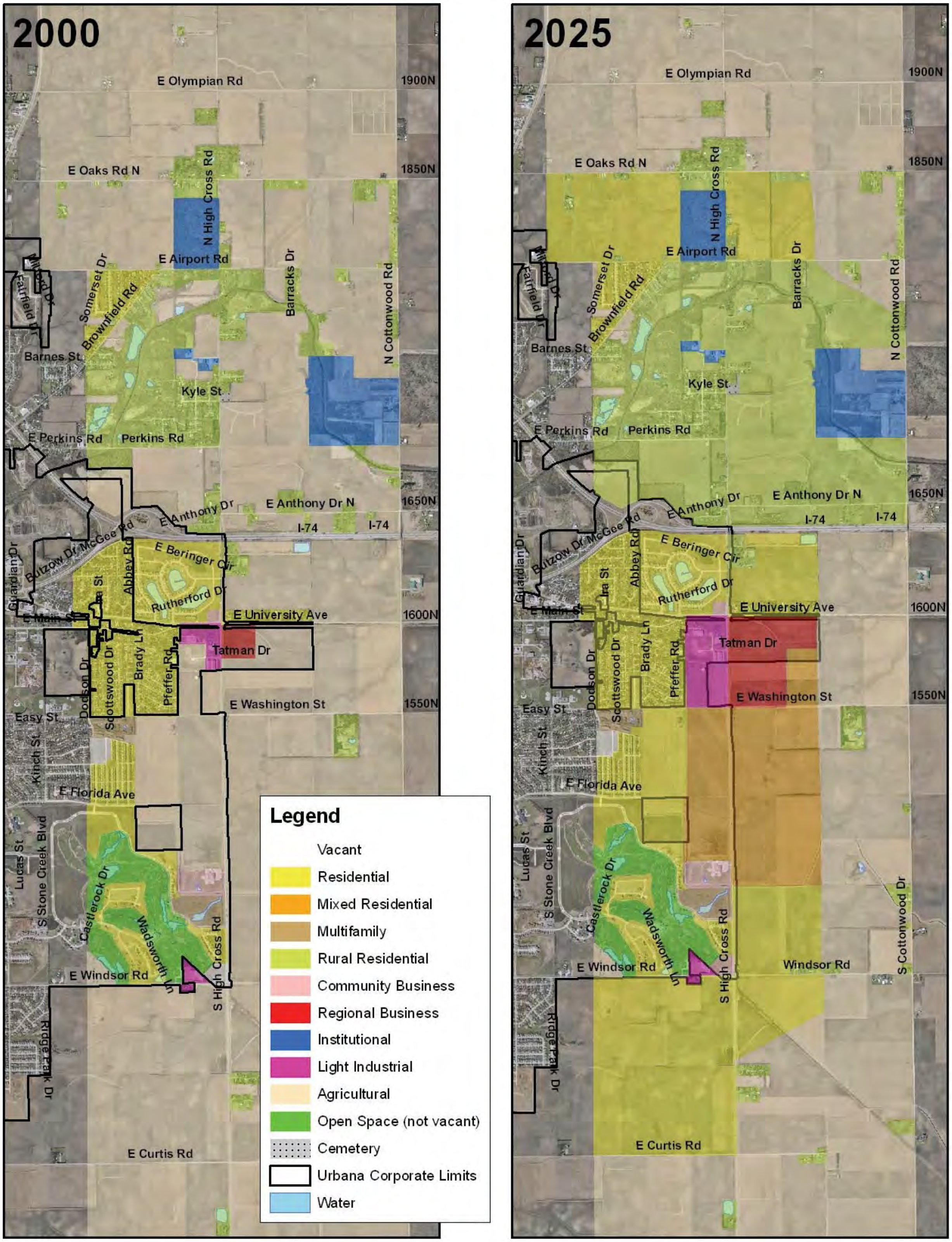


Table 3-3: Year 2025 Population and Total Employment by TAZs

TAZ	2025 Population	2025 Employment				
		Industrial	Service	Retail	Other	Total
NEF 005_A	1055	1024	56	16	0	1096
URB 022	513	1108	18	18	0	1144
URB 023	1043	2	94	9	0	105
URB 028	4173	5	55	147	68	275
URB 064_C	989	3	9	70	0	82
URB 075_A	1972	0	16	399	10	425
URB 082	1576	758	34	28	0	820
URB 083	488	0	17	910	0	927
URB 086	953	4	12	20	3	39
URB 090	2017	4	142	152	0	298
URB 100	264	0	2	0	5	7
URB 101	290	0	0	24	0	24
URB 102	685	0	9	6	5	20
URB 103	963	0	0	1900	0	1900
URB 104	2723	0	0	488	2	490
URB 105	1144	0	0	100	0	100
Total	20848	2908	464	4287	93	7752

Future land uses are shown in Figure 3-3 and Table 3-4. These land use projections for 2025 were prepared by the City of Urbana for the 2005 Comprehensive Plan Update. It is projected that by the year 2025 nearly the entire block of agricultural land west of IL130 and north of Windsor Road will be converted into residential and commercial uses. In addition, several new residential developments and commercial centers are anticipated along the east side of IL130. Figure 3-3 also shows future expansion of light industrial development west of IL130 at the University Avenue intersection. Rural residential development is designated for the area located immediately north of Interstate 74, south of Oaks Road and east of Brownfield Road. The area north of Oaks Road is anticipated to remain agricultural through 2025.

Table 3-4: Future Land Uses, 2025

Description	Acreage	% of Total
Agriculture	5720	54.11%
Residential	2002	18.94%
Rural Residential	1591	15.05%
Mixed Residential	541	5.12%
Institution	217	2.05%
Open Space (not vacant)	185	1.75%
Regional Business	126	1.19%
Light Industrial	89	0.84%
Multifamily Residential	49	0.46%
Community Business	38	0.36%
Vacant	11	0.10%
Cemetery	3	0.03%
TOTAL	**10572**	**100%**

3.2 Neighborhood Concerns

In order to conduct a complete analysis of the IL130/High Cross Road corridor, an understanding of the local and neighborhood concerns was critical. Initial comments from residents, landowners, and business interests focused on environmental considerations, urban versus rural aesthetic, and protecting existing residential land uses. During the study process, hundreds of comments were received covering myriad topics. All comments were taken into consideration when developing alternatives for the future and making recommendations. More information about the public involvement procedures used and the comments received can be found in Appendices 4 and 5, respectively.

3.3 Environmental Factors

The study area has numerous environmentally sensitive areas. Information was collected on topography, geology, soils, air quality, water quality, wetlands, wildlife and vegetation habitat, noise, visual quality and light pollution. The following sections summarize the findings in the Environment Existing Conditions Report, which can be found in Appendix 3.

3.3.1 Topography and Geology

Champaign County is mostly flat in terrain. Elevations range from approximately 855 feet above mean sea level near the north of Rising Township, to 625 feet above mean sea level in low elevations near the Salt Fork River toward the east end of the county. The average percent slope in Champaign County is 0.5, ranked 98th out of 102 counties ranging from 4.25 in the highest slope to 0.4 in the lowest[2].

The topography in the study area is fairly uniform and tends to have lower elevations than the rest of the county. However, there are variations in elevation. The southeast side of the study area along Cottonwood Road south of Washington Street is lower, with elevation less than 700 feet mean sea level, while the north part of the study area tends to have elevations greater than 700 feet mean sea level.

3.3.2 Soil

The following five soil associations are identified according to the Illinois Soil Associations Map: Drummer-Flanagan-Catlin, Houghton-Palms-Muskego, Birbeck-Sabina-Sunbury, Plano-Proctor-Worthen, and Saybrook-Dana-Drummer.

The Drummer-Flanagan-Catlin Association encompasses the majority of the study area. Drummer series is present in most of the study area south along IL130 and in the study area north along Cottonwood Road. The Flanagan series can be mainly found in the middle-west portion of the study area between US150 and Windsor Road and is also scattered throughout the rest of the study area. The central west portion includes most residential areas and several light industrial areas. These two soil series are poorly or somewhat poorly drained dark-colored soils in the surface area. Therefore, these two soil series would require the subsurface drainage system and surface ditches in order to remove ponded water.

Birbeck-Sabina-Sunbury Association covers the northwestern portion of the study area. This includes the Interstate 74 interchanges on Cunningham Avenue and University Avenue and natural areas such as the Saline Branch near High Cross Road. The Birbeck series consists of moderately well drained soils whereas the Sabina series are somewhat poorly drained soils. Both are found adjacent to the Saline Branch and forest areas. Due to the wetness of the soils, these are not favorable for recreational uses, dwelling purposes, or road traffic.

The Saybrook-Dana-Drummer Association is present in the southwestern part of the study area where agriculture is the principal land use. The Dana series consists of moderately well drained and moderately permeable soils. A potential problem associated with the Dana series is erosion on slopes greater than 2 percent, which results in decreased agricultural productivity. The Drummer series, which is a poorly drained soil, is also found adjacent to the Dana series.

The Plano-Proctor-Worthen Association is found in the central south portion and the northwest corner of the study area. The Proctor series consists of well-drained and moderately permeable soils with two to five percent slopes. The Proctor series is rated as good for wildlife habitat and moderate for residential uses.

Hydric soils are defined as soils that formed under conditions of saturation, flooding, or ponding long enough during the growing season to develop anaerobic conditions in the upper part[4]. The soils that either meet the definition of hydric soils or have at least one of the hydric soil indicators are listed as follows: Harpster, Drummer, Pella, Thorp, Peotone, Muskego, Sawmill, and Ambraw. Approximately 43% of the study area is covered by these hydric soils.

Prime farmland, as defined by the U.S. Department of Agriculture, is land that has the best combination of physical and chemical characteristics for producing food, feed, forage, fiber, and oilseed crops and is available for these uses. It could be cultivated land, pastureland, forestland, or other land, but not urban or built-up land or water areas. The soil qualities and moisture supply are those needed for the soil to economically produce sustained high yields of crops when proper management, including water management, and acceptable farming methods are applied[5]. Nearly 95 percent of the total study area acreage meets the prime farmland criteria.

3.3.3 Wetlands

The Clean Water Act (CWA) defines its jurisdictional waters as water bodies including lakes, rivers and streams, and wetlands. Wetlands, for the purposes of the CWA, are those areas that are inundated or saturated by surface water or groundwater at a frequency and duration sufficient to support, and under normal circumstances do support, a prevalence of vegetation typically adapted for life in saturated soil conditions (33 CFR 328.3). Section 404 of the CWA requires a permit from the US Army Corps Engineers for the discharge of dredged or fill material into "Water of the United States" including jurisdictional wetlands, rivers, lakes, and streams.

The United States Fish and Wildlife Service (USFWS) defines wetlands as lands transitional between aquatic and terrestrial systems where the water table is usually at or near the surface, or the land is covered by shallow water. In addition, the definition requires that one or more of the following three attributes be present: (1) at least periodically the land supports predominantly hydrophytes (wetland plants), (2) the substrate is predominantly undrained hydric soil (wetland soils), or (3) the substrate is nonsoil and is saturated with or covered by shallow water at some time during the growing season of each year."

Section 2.4 in Appendix 3 summarizes the wetlands maps obtained from Illinois Department of Natural Resources Clearinghouse using the classification system of USFWS National Wetland Inventory. In Appendix 3, Map 3 shows the location, size, and type of wet habitats within defined areas and Table 2 shows the acreages and description of each type of wetlands within the defined geographic area. The map and table indicate approximately 32.2 acres of wetlands or deepwater habitats within the study area.

3.3.4 Air Quality

The Environmental Protection Act of the State of Illinois (IEPA) regulates the concentrations of six pollutants: ozone (O_3), particulate matter (PM), sulfate dioxide (SO_2), carbon monoxide (CO), nitrogen dioxide (NO_2), and lead (Pb). Table 3 in Appendix 3 shows a summary of each pollutant and standards for the State of Illinois.

The study area is located in the level prairie farmlands of east-central Illinois, in a temperate, humid, and continental climate. The temperature ranges from an average daily minimum of 19.4 F in winter, to an average daily maximum of 83.7 F in summer. The annual precipitation is about 39.7 inches; 60 percent of this amount falls in April through September. The prevailing wind is from the south. The average wind speed is highest, at 11 to 12 miles per hour, from November to April.

3.3.5 Noise

IL130 is one of the major corridors located on the eastern side of the Champaign-Urbana-Savoy-Bondville Urbanized Area. Although high-speed traffic and heavyweight trucks run through this corridor, noise is not considered a significant annoyance since most of the surrounding areas are currently agricultural farmlands. It is expected, however, that new residential developments will occur with the commercial facilities introduced into this area. Thus noise may become a more significant factor. This section mainly focuses on describing the basic concept of noise and measurement, reviewing regulatory noise standards or impact criteria, and estimating existing noise exposure from highway traffic. These elements form the basis for determining noise impact for forecasted future noise levels.

3.3.6 Water Quality

Major issues associated with surface water in terms of transportation are stormwater runoff and its impacts on water quality to surrounding waters. Vehicle exhaust, wear and tear of vehicles, salting and sanding practices, or highway construction, operation and maintenance may deposit contaminants on the roadway surface. These pollutants can be washed off when raining or snowing, disperse through air and eventually be carried by stormwater runoff. Increase of roadway surface and traffic volume can increase vehicle emission and airborne pollutants, and then affect highway runoff and water quality.

Designated use support assessment, causes and sources of impairment are shown in Table 3-5 below. The Saline Branch is partially supported and Boneyard Creek is not supported for Aquatic Life Use. Major sources of impairment for Saline Branch (BPJC06) located in the study area are Municipal point Sources and Agriculture. Although the traffic impacts are not significant, existing water quality of the Saline Branch is not fully supporting the designated use.

Table 3-5: Summary for Study Area Streams

Name	Segment ID	Aquatic Life Use Support	Causes of Impairment	Sources
Saline Branch	BPJC06	Partial	Boron, N, Ammonia, Fish Kills, TN, TP(Total Phosphorus)	Municipal Point Sources
			Total suspended solids, TP, TN	Agriculture
			Physical- habitat alteration	Channelization
			DDT, Methoxphlor, Dieldrin,	Contaminated Sediments
Saline Branch	BPJC08	Partial	TN (Total Nitrogen)	Agriculture
			Dissolved Oxygen	
			Physical-habitat alteration	Hydromodification
Union Dr. Ditch	BPJM01	Not Assessed	-	-
Boneyard Creek	BPJCA	Not Supporting	Physical-habitat alteration	Urban Runoff/ Storm Sewers
				Hydromodification
			DDTs, PCBs, and Hexachlorobenxene	Contaminated Sediments
* Source: IEPA. 305b Report. 2004				

3.3.7 Wildlife and Vegetation Habitat

Champaign County lies in the prairie area with flat landscape, deep loess soil, and poor natural drainage resulting in wet conditions during part of the year. Grasses such as Big Bluestem grass and Indian grass are dominant along with a large number of other species of grasses and forbs (Robe, Kenneth. The tallgrass prairie in Illinois. Http//www.inhs.uiuc.edu/~kenr/prairewhatis.html). Currently, the Illinois Plant Information Network (IPIN) records 1,190 plant species in Champaign County. Also, over 100 breeding bird species are found in Lake of Woods, Middle Fork River Forest Preserve, and Homer Lake Forest Preserve areas.

Based on Land Cover from the Illinois Statistical Summary 1999-2000, Champaign County consists primarily of over 91% agricultural areas, 6% urban development, 1% forest and 1% wetland. Although most of the study area is composed of agricultural lands, areas north of I-74 include upland forest and floodplain forest in and around the Saline Branch.

Brownfield Woods and Trelease Woods are currently listed in the Illinois Natural Areas Inventory (INAI). The INAI was initiated during the1970's; the purpose of building this inventory was to locate and describe the high-quality natural areas remaining in Illinois. In addition to two INAI areas, the University of Illinois (U of I) owns and manages Trelease Prairie and Philips Tract within the study area for the purpose of biological research. All four natural areas are under the jurisdiction of U of I.

3.3.8 Visual Quality

According to a FHWA Memorandum, visual resources are defined as "those physical features that make up the visible landscape, including land, water, vegetative and man-made elements." Each visual resource has visual value and is very subjective to viewers. There can be big difference in values, but there is public agreement that the visual resources of certain landscapes have high visual quality (e.g. Chicago Skyline, natural landscape of Grand Tetons, and desert landscapes of Bryce Canyon). Usually, viewer sensitivity or local values can confer visual significance on landscape features.

Three major indicators to estimate visual quality are vividness, intactness, and unity. Vividness is the memorability of the visual impression received from contrasting landscape elements as they combine to form a distinctive visual pattern. Intactness is the integrity of visual order in the natural and man-built landscape. Unity is the degree to which the visual resources of the landscape join together to form a coherent, harmonious visual pattern. When achieving a balance of these three criteria, the highway can improve visual quality. While the visual intactness and unity of the farm scene like the study area are both quite high, its overall visual quality may be lower because it is not highly vivid.

The degree of changes in visual quality caused by highway projects is visual impact. The most obvious visual impact of highway construction is the highway surface itself, which has such components as number of lanes, width, pavement materials and color. Roadside, including slope retention, drainage, and roadside planning is another factor that affects the visual quality of the highway. In addition, roadway signs, lights and traffic control devices can have significant impact. However, the results of highway projects can either enhance or degrade visual impact. A highway may improve visual quality if it increases the unity and visual harmony of a landscape.

Existing visual resources in the study area include level agricultural areas with grassland, cropland, woodland, and residential and commercial areas. Existing visual quality is reviewed based on views from the roadway. More information and images for this analysis can be found in Appendix 3.

3.3.9 Light Pollution

Light pollution has increasingly become a major concern as an environmental impact of transportation facilities. It has been estimated that between 35% to 50% of all light pollution is produced by roadway lighting. Light pollution may be defined as an unwanted consequence of outdoor lighting and includes such effects as glare, light trespass, and sky glow.

Article VII Street Lighting System under the Urbana City Code regulates the design of street lighting including the details of illumination levels, luminaires, lamps, and poles as well as the installation process and its authorization. The City of Urbana adopts *The American Standard Practice for Roadway Lighting* published by the Illuminating Engineering Society.

Current locations of street lighting are shown in Map 8 of Appendix 3. Streetlights are installed at signalized intersections along IL130, which is classified as an urban arterial by IDOT. Additional lights were installed at the intersection of IL130 and Washington Street. As more commercial and residential development occurs in this area, it is anticipated that various kinds of lighting including parking lights, signs, and commercial lights will be installed.

North of I-74, High Cross Road has no streetlights other than residential access lights. The area north of Airport Road is especially dark since vehicle and pedestrian traffic volumes during the night are fairly low on this rural collector street, and surroundings are natural areas, agricultural lands, and the U of I Atmospheric Observatory, which requires unobstructed darkness during the night. Since several research areas such as Brownfield Woods, Trelease Woods, Trelease Prairie and U of I Atmospheric Observatory need a dark environment at night, any artificial light sources such as vehicle headlights and streetlights may affect the existing purposes for these areas.

3.4 Transportation Network

For the transportation network analysis, the corridor was divided into seven roadway segments, each analyzed individually. Each roadway segment has different land uses or transportation elements that make them unique. The characteristics of the existing street network are summarized in Table 3-6. Data presented includes pavement widths, right-of-way widths, pavement type, IDOT functional classification, number of lanes, posted speed limit, and pavement conditions.

Table 3-6: Existing Street Data

Street	Location	IDOT Functional classification	ROW width (feet)	Pavement width (feet)	Pavement type	Number of lanes	Speed limit (mph)	Pavement conditions
North-South roads								
IL 130	Old Church Rd. – Windsor Rd.	Urban Arterial	120 -155	24 + 8	Over PCC	2	55	Good
IL 130	Windsor Rd. – Tatman Ct.	Urban Arterial	125- 145	24 + 8	Bituminous Concrete	2	55	Good
IL 130	Tatman Ct. – University Ave.	Urban Arterial	145 -158	24 + 8	Bituminous Concrete	2	50	Good
High Cross Rd.	University Ave. – I 74	Urban Collector	50 - 150	21	Bituminous	2		Fair
High Cross Rd.	I 74 – Perkins Rd.	Urban Collector		21	Oil & Chip	2	40	Fair
High Cross Rd.	Perkins Rd. – Airport Rd.	Urban Collector		22	Oil & Chip	2	40	Fair
High Cross Rd.	Airport Rd. – Ford Harris Rd.	Rural Collector		20 at Airport, 16 at Ford-Harris	Oil & Chip	Not marked		Fair

Table 3-6: Existing Street Data *(continued)*

Street	Location	IDOT Functional classification	ROW width (feet)	Pavement width (feet)	Pavement type	Number of lanes	Speed limit (mph)	Pavement conditions
East-West roads								
Old Church Rd.		Rural Collector		24 East 20 West	Oil & Chip	Not marked	Not posted	Fair
Curtis Rd.		Urban Collector			Oil & Chip	Not marked	Not posted	Fair
Windsor Rd.		Urban Arterial	80		Bituminous	3	45	Good
Stone Creek Blvd.		Local	80		Bituminous	3	Not posted	Good
Washington Ave.		Urban Collector	60 – 125	20 East 22 West	Oil & Chip	2	30	Fair
Tatman Ct.		Local	66		Concrete	2	Not posted	Good
University Ave.		Urban Arterial			Bituminous	3	Not posted	Good
Beringer Crossing		Local	60	30	Bituminous	2	Not posted	Good
Perkins Rd.		Local	66	20	Oil & Chip	2	35	Fair
Airport Rd.		Urban Collector	66	19 East 20 West	Oil & Chip	Not marked	Not posted	Fair
Oaks Rd.		Local		18 East 19 West	Oil & Chip	Not marked	Not posted	Fair
Olympian Dr.		Urban Arterial		13.5	Oil & Chip	Not marked	Not posted	Fair
Ford Harris Rd.		Local		18 East 18.5 West	Oil & Chip	Not marked	Not posted	Fair

Traffic signals information such as phasing and timing was collected for the major intersections including IL130 at Windsor Road, IL130 at Tatman Court and IL130 at University Avenue. The remaining major intersections use stop signs for traffic control. Figure 3-4 shows the location of different control devices at the intersections along the Corridor.

3.5 Traffic Volumes

Prior to conducting peak hour manual turning movement counts at the major intersections, 24-hour traffic data was collected by CCRPC staff at 13 different intersections along the corridor and compared with the same kind of data provided by IDOT. The 13 intersections in which 24-hour counts or Average Daily Traffic (ADT) were done are shown on Figure 3-5 and Table 3-7.

Analysis of the 24-hour traffic volumes in the corridor showed typical peak characteristics: a morning peak hour, a midday peak hour and an afternoon peak hour. After examining the ADT counts, it was decided to count the AM peak period of 7:00 AM to 8:30 AM and the PM peak period of 4:30 PM to 6:00 PM. This time frame covers the traditional AM and PM peak hours for the urbanized area.

Manual turning movement counts were collected at the eight major intersections along the corridor for both peak hours. They are shown in Figure 3-6 and Tables 3-8 and 3-9. These counts were conducted during the typical weekday AM and PM peak periods. Observed volumes were recorded by movement and classified as: motorcycles, passenger cars, vans/pick-up trucks, buses, two-axle single units, three-axle single units, four or more axle single units, four or less axle single trailers, five-axle single trailers, six or more axle single trailers, five or less axle multi-trailers, six-axle multi-trailers, or seven or more axle multi-trailers.

Figure 3-4: Traffic Control Devices

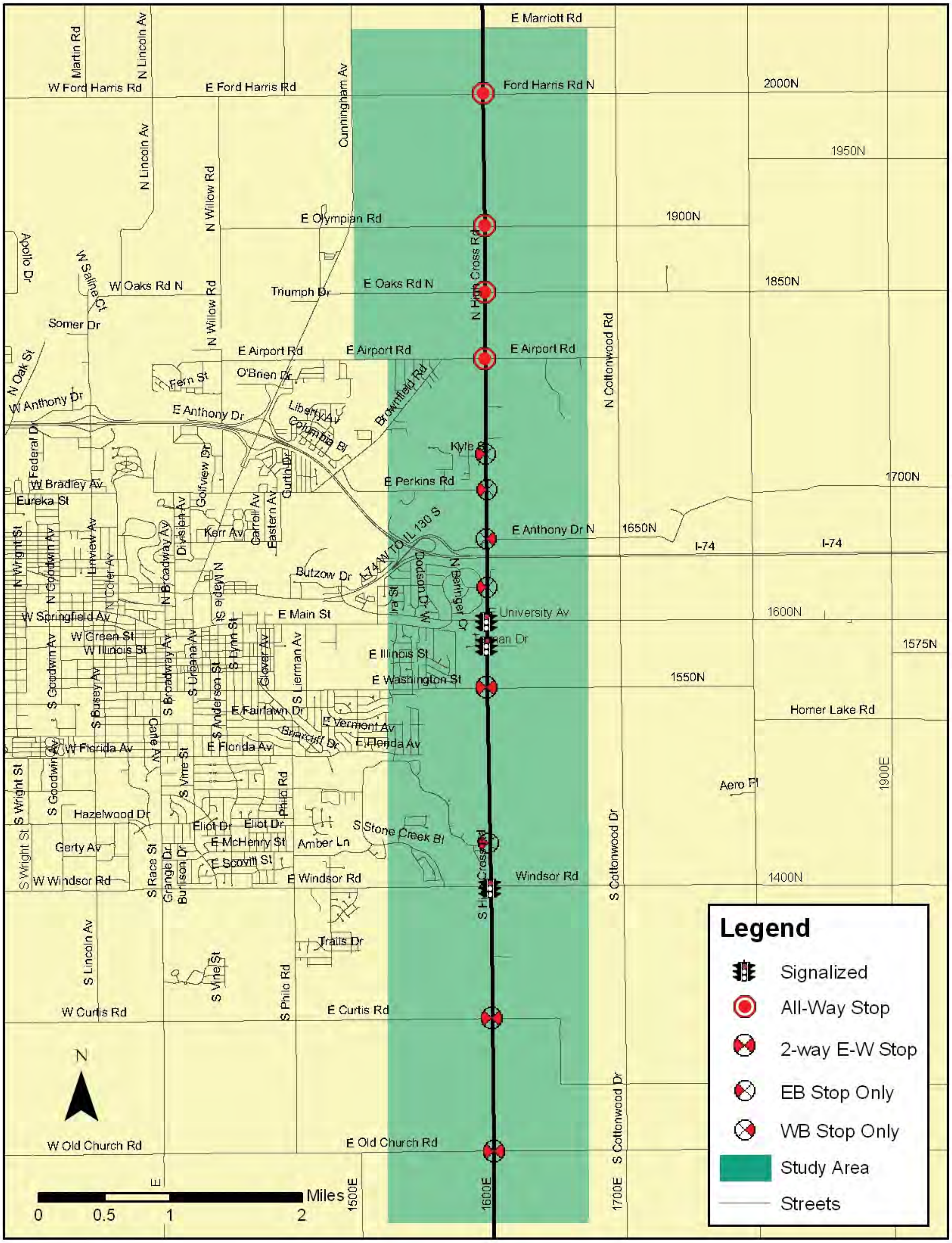


Figure 3-5: ADT Count Locations

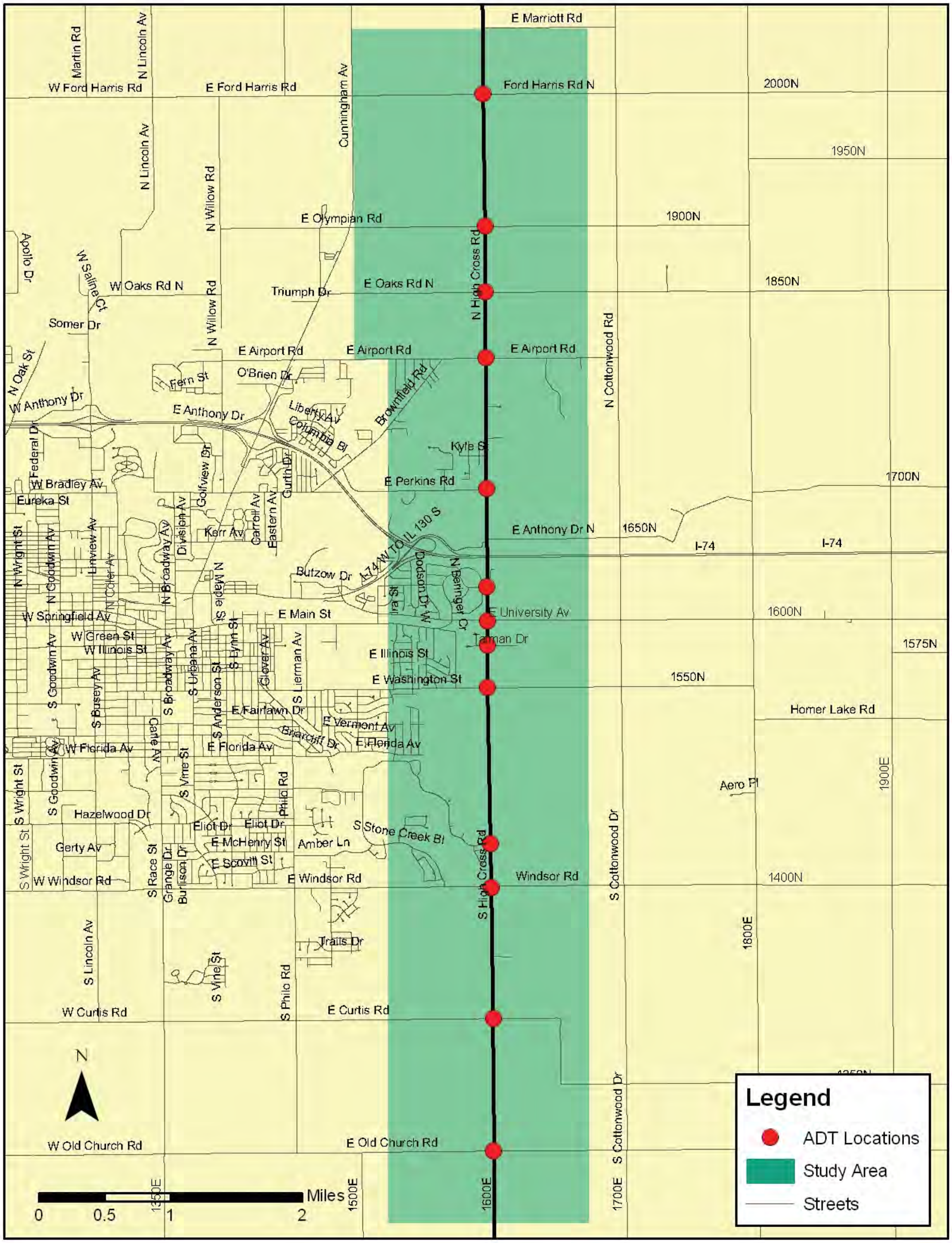


Table 3-7: ADT counts for IL130/High Cross Road

Intersection	Northbound			Southbound			Eastbound			Westbound		
	L	T	R	L	T	R	L	T	R	L	T	R
Old Church Rd. and IL 130	3,659			3,311			424			105		
Curtis Rd. and IL 130	3,674			3,378			441			40		
Windsor Rd. and IL 130	1,112	2,530		137	2,395	1,403	56	503	127	576	1,177	1,132
Stone Creek Ave. and IL 130	100	3,459	-	-	3,649		59	-	86	-	-	-
Washington St. and IL 130	396	3,147		58	3,868		1,012		431	191		51
Tatman Ct. and IL 130	359	3,394	-	579	3,505	-	-	-	-	?	?	?
University Ave. and IL 130	2,207	720	955	125	816	260	431	1,733	2,061	916	1,643	
Beringer Cross. and High Cross Rd.	1,254		-	-	1,332		87			-	-	-
Perkins Rd. and High Cross Rd.	1,269		-	933			685			-	-	-
Airport Rd. and High Cross Rd.	662			307			650			207		
Oaks Rd. and High Cross Rd.	336			182			214			191		
Olympian Dr. and High Cross Rd.	201			152			115			78		
Ford Harris Rd. and High Cross Rd.	165			95			149			97		

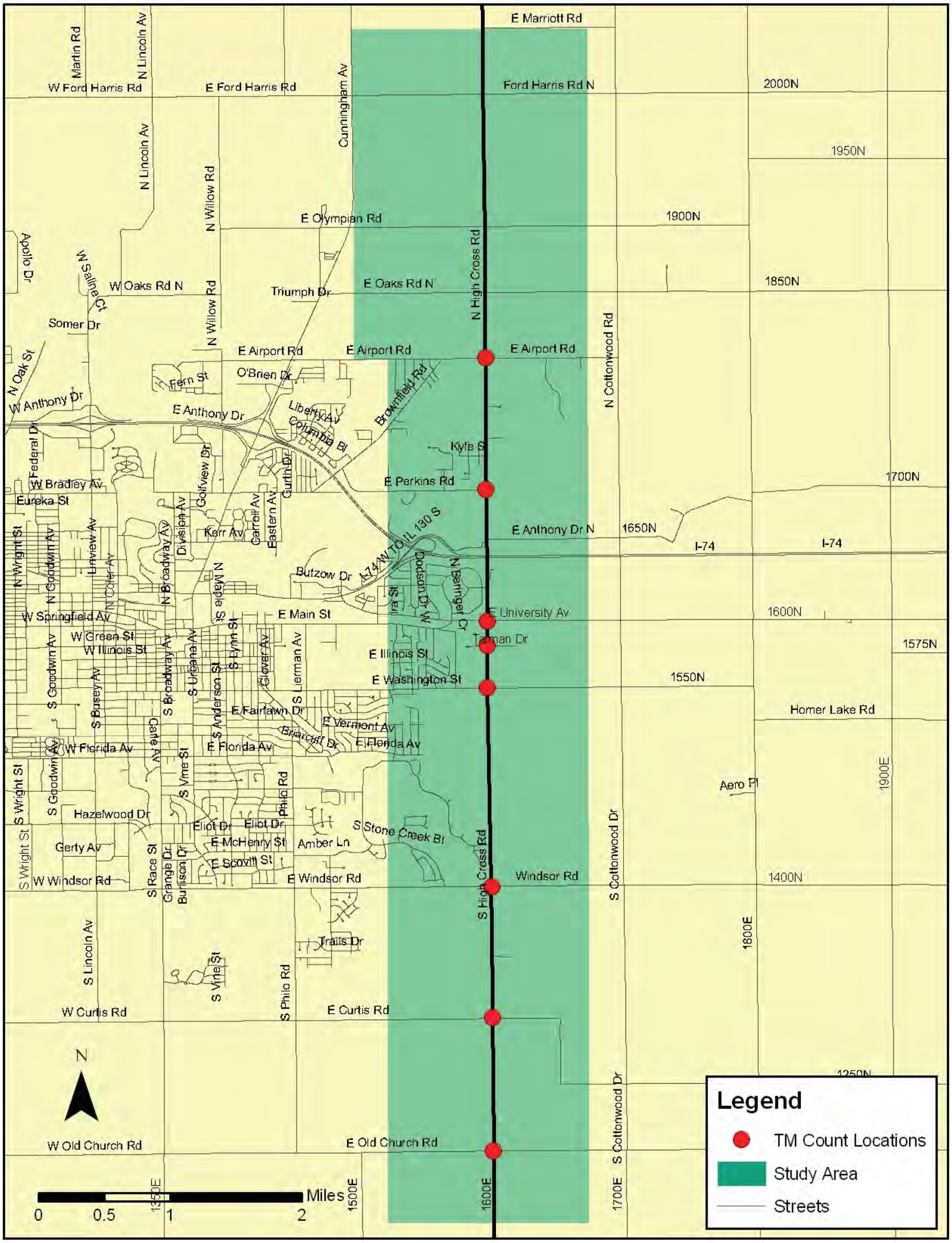
Table 3-8: Turning movement counts for IL130/High Cross Road for AM peak hour

Intersection	Time of Day	Northbound			Southbound			Eastbound			Westbound		
		L	T	R	L	T	R	L	T	R	L	T	R
Old Church Rd. and IL 130	7:00 AM	34	468	1	0	91	5	2	1	7	1	8	7
Curtis Rd. and IL 130	7:15 AM	72	506	0	0	107	17	16	0	10	0	2	4
Windsor Rd. and IL 130	7:15 AM	254	368	0	3	82	192	18	91	32	15	194	30
Washington St. and IL 130	7:30 AM	78	356	0	3	229	54	23	5	15	1	18	2
Tatman Ct. and IL 130	7:15 AM	42	334	0	0	277	54	33	0	16	0	0	0
University Ave. and IL 130	7:15 AM	277	46	29	2	76	65	21	55	104	162	236	9
Perkins Rd. and High Cross Rd.	7:15 AM	20	46	0	0	67	14	9	0	28	0	0	0
Airport Rd. and High Cross Rd.	7:00 AM	39	19	2	1	14	9	1	2	19	2	9	0

Table 3-9: Turning movement counts for IL130/High Cross Road for PM peak hour

Intersection	Time of day	Northbound			Southbound			Eastbound			Westbound		
		L	T	R	L	T	R	L	T	R	L	T	R
Old Church Rd. and IL 130	4:45 PM	10	178	0	5	497	4	9	11	42	3	4	1
Curtis Rd. and IL 130	4:45 PM	7	137	0	0	479	20	26	5	45	0	1	1
Windsor Rd. and IL 130	4:45 PM	55	117	5	11	297	76	145	105	184	1	19	5
Washington St. and IL 130	4:30 PM	10	263	0	10	342	50	69	8	55	2	6	3
Tatman Ct. and IL 130	4:15 PM	40	240	0	0	335	53	75	0	62	0	0	0
University Ave. and IL 130	4:30 PM	142	62	123	12	77	37	52	217	310	56	60	8
Perkins Rd. and High Cross Rd.	4:15 PM	32	53	0	0	42	8	13	0	23	0	0	0
Airport Rd. and High Cross Rd.	5:00 PM	21	34	3	3	17	2	6	16	27	2	13	0

Figure 3-6: Turning Movement Count Locations



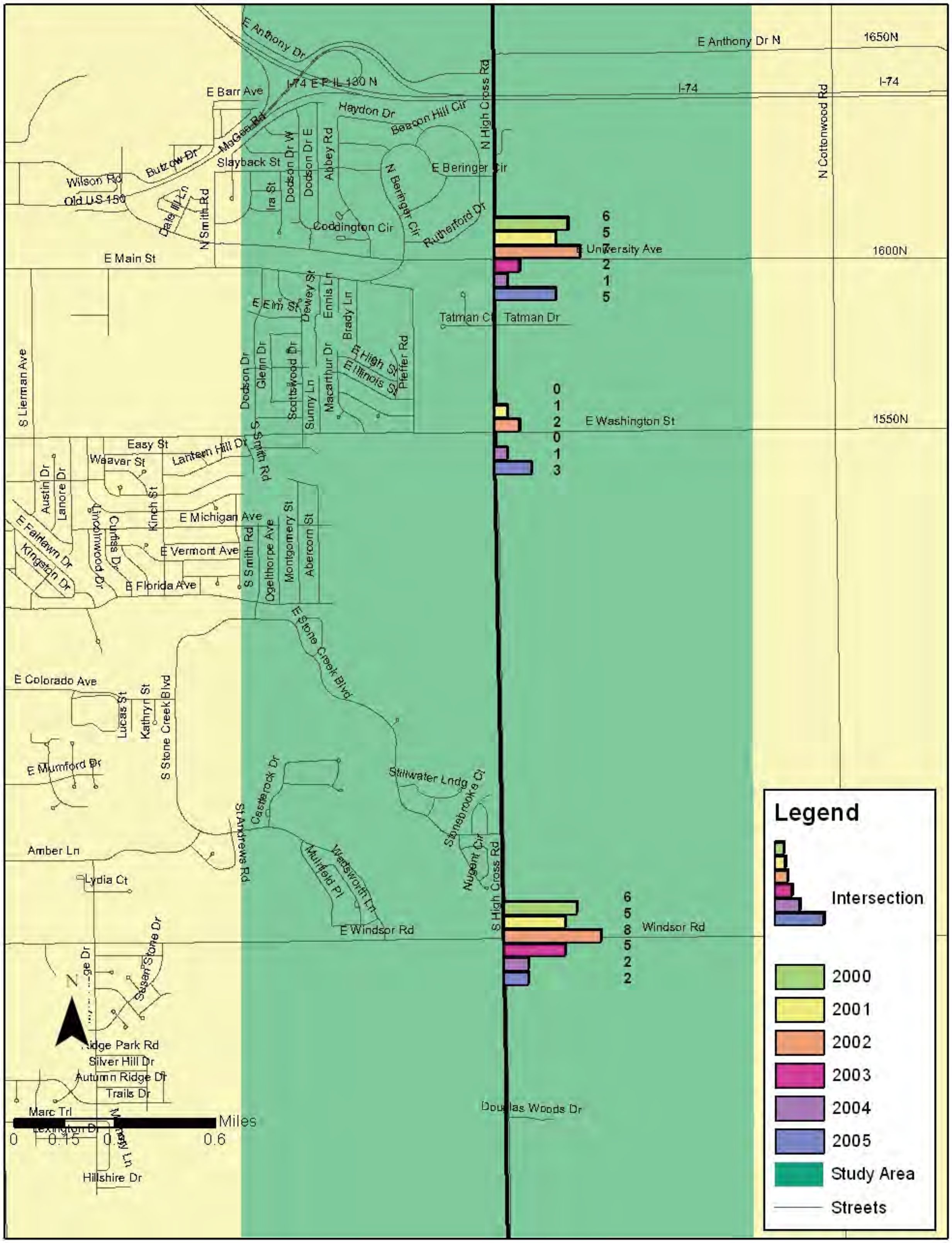
3.6 Safety: Crashes

Crash data was supplied by the State of Illinois through the City of Urbana Police Department. Crashes that occurred on streets crossing or in the vicinity of IL130/High Cross Road were included in the study. The crash data included all crashes that occurred during the 2000-2005 calendar years (the most current years that complete datasets were available). Detailed information including total number of crashes and the number of people injured and killed at each location is presented in Table 3-10 and Figure 3-7.

Table 3-10: Crash data for years 2000-2005

Roadway	Roadway	Year	Total Crashes	Total Killed	Total Injured	Collision Type
IL130/High Cross	Anthony Dr.	2004	1	0	0	Rear end
IL130/High Cross	Airport Rd.	2004	1	0	0	Turning
IL130/High Cross	Beringer Cir.	2004	1	0	0	Turning
IL130/High Cross	CR 800 N	2002	1	0	0	Other
IL130/High Cross	Tatman Ct.	2000	1	0	0	Rear-end
IL130/High Cross	Tatman Ct.	2004	1	0	0	Rear end
IL130/High Cross	University Ave.	2000	3	0	10	Angle
IL130/High Cross	University Ave.	2000	2	0	0	Turning
IL130/High Cross	University Ave.	2000	1	0	0	Rear-end
IL130/High Cross	University Ave.	2001	3	0	0	Rear-end
IL130/High Cross	University Ave.	2001	2	0	0	Turning
IL130/High Cross	University Ave.	2002	1	0	0	Angle
IL130/High Cross	University Ave.	2002	6	0	0	Rear-end
IL130/High Cross	University Ave.	2003	1	0	0	Turning
IL130/High Cross	University Ave.	2003	1	0	0	Rear end
IL130/High Cross	University Ave.	2004	1	0	0	Turning
IL130/High Cross	University Ave.	2005	2	0	0	Turning
IL130/High Cross	University Ave.	2005	1	0	1	Angle
IL130/High Cross	University Ave.	2005	1	0	0	Fixed Obj.
IL130/High Cross	University Ave.	2005	1	0	0	Rear end
IL130/High Cross	Washington St.	2001	1	0	1	Sideswipe
IL130/High Cross	Washington St.	2002	1	0	0	Angle
IL130/High Cross	Washington St.	2002	1	0	0	Rear-end
IL130/High Cross	Washington St.	2004	1	0	0	Turning
IL130/High Cross	Washington St.	2005	1	0	2	Rear end
IL130/High Cross	Washington St.	2005	1	0	1	Turning
IL130/High Cross	Washington St.	2005	1	0	1	Angle
IL130/High Cross	Windsor Rd.	2000	2	0	5	Angle
IL130/High Cross	Windsor Rd.	2000	4	0	1	Rear-end
IL130/High Cross	Windsor Rd.	2001	3	0	2	Angle
IL130/High Cross	Windsor Rd.	2001	1	0	0	Turning
IL130/High Cross	Windsor Rd.	2001	1	0	1	Rear-end
IL130/High Cross	Windsor Rd.	2002	5	0	4	Angle
IL130/High Cross	Windsor Rd.	2002	1	0	0	Turning
IL130/High Cross	Windsor Rd.	2002	1	0	0	Rear-end
IL130/High Cross	Windsor Rd.	2002	1	0	0	Other
IL130/High Cross	Windsor Rd.	2003	2	0	0	Turning
IL130/High Cross	Windsor Rd.	2003	3	0	1	Angle
IL130/High Cross	Windsor Rd.	2004	2	0	5	Turning
IL130/High Cross	Windsor Rd.	2005	2	0	0	Turning

Figure 3-7: Crash Locations 2000-2005



The study performed crash analyses to:

- Provide a basis for the calculation of the estimated future safety related benefits that could be expected from the recommended improvements;
- Serve as a baseline for determining whether or not the recommended improvements to better manage access onto and off of IL130/High Cross Road will lower existing crash rates;
- Provide justification for prioritizing the study's recommended improvements into an overall long range improvement plan; and,
- Identify areas where safety could be improved by implementing study-recommended safety projects.

3.7 Travel Model

The corridor study included the use of the CUUATS Travel Demand Model for the urbanized area to assist in identifying potential improvements for the entire IL130/High Cross Road corridor. Travel demand modeling assists in the identification of traffic impacts that would be expected as a result of changes to the transportation system or land use within an area.

The transportation model:

- Helps assess the feasibility of different improvement strategies;
- Estimates user-benefits for a proposed set of improvements compared to a future baseline condition;
- Identifies sections of the IL130/High Cross Road corridor with current and potential future operational problems.

A full description of the modeling work done for the IL130/High Cross Road Corridor Study can be found in Appendix 2.

3.8 Origin-Destination Survey

One of the critical elements considered during the update of the LRTP for the Champaign-Urbana-Savoy-Bondville urbanized area was the development of a travel survey and an origin-destination survey to identify the different travel characteristics that comprise urbanized area travel. Another element derived from the survey data was the distribution of internal trips versus external trips. Internal trips are those trips that both begin and end in the urbanized area. External trips have at least one trip end located outside the urbanized area. External trips may also be through trips, with neither end of a trip located in the urbanized area. The data obtained from the LRTP travel survey for the Traffic Analysis Zones (TAZs) located in the study area would be used for the purpose of analyzing travel characteristics in the corridor. In addition, data obtained from the LRTP origin-destination surveys done at the intersection of IL130 and University Avenue in March of 2003 would be used as a source for determining the distribution of internal trips versus external trips along the IL130/High Cross Road Corridor.

3.9 Current Transportation Plans

Transportation recommendations in this study took into account, and were consistent and coordinated with, existing and other proposed improvements in the corridor. Some are planned; others have been planned and partially or fully designed, while others have been implemented. The extension of Florida Avenue eastward to IL130 is an example of a proposal improvement for which planning has begun. There could be other highway system, transit, pedestrian and bike system improvements proposed in the future.

3.10 Existing Conditions Analysis

A number of factors have contributed to changing travel patterns and transportation system performance in the IL130/High Cross Road corridor. They include: a new designation of residential and commercial growth in east Urbana, improved accessibility made possible by improvements to University Avenue and Windsor Road, services expansions of the US Post Office, as well as increased industrial development. In combination, these developments have changed travel patterns and placed new demands on the corridor's entire transportation network. This chapter profiles the study's findings on growth and development in the corridor, an analysis of the existing roadway system, an analysis of safety conditions, and a description of traffic patterns.

3.11 Demographics and Land Use

Current demographic information, growth trends, and horizon year projections are important factors in describing the environment or background in which transportation infrastructure decisions are made. This section presents historical trends of population and employment within the study area over the past ten years. These data sets were used to forecast population and employment figures for the 20-year time horizon.

3.11.1 Population

The following population figures were obtained from the US Census Bureau. Population figures show that between 1990 and 2000, the number of persons in the study area rose from 3,917 to 4,240. On average, the study area experienced modest but steady growth over the last ten years. The average annual growth rate was 0.79% per year compared to 0.94% for the urbanized area as a whole.

3.11.2 Employment

Employment data was not available for 1990 to estimate the employment growth rate during the last decade. It can be stated, however, that significant increases in employment have occurred especially south of University Avenue on IL130/High Cross Road.

3.11.3. Land Use

The City of Urbana's *2005 Comprehensive Plan Update* detailed future land uses for the IL130 Corridor Study Area. CCRPC staff completed an analysis of existing versus future land uses for the corridor study using the maps provided in the Plan. Acreages shown in Table 3-11 and Figure 3-3 reflect the maps with the exception of the more symbolic business nodes found at major intersections in Future Land Use Map 7 of the Plan. These nodes currently have no identifiable acreages that could be assigned for the analysis.

Table 3-11: Existing and Future Land Uses Comparison: 2005 versus 2025

Description	Existing Acreage	Future Acreage	Difference	% Difference	% of Existing Total	% of Future Total
Residential	667	2,002	1,335	67%	6.31%	18.94%
Rural Residential	785	1,591	806	51%	7.43%	15.05%
Mixed Residential	0	541	541	100%	0.00%	5.12%
Regional Business	23	126	103	82%	0.22%	1.19%
Light Industrial	36	89	53	60%	0.34%	0.84%
Community Business	30	38	8	21%	0.28%	0.36%
Institution	217	217	0	0%	2.05%	2.05%
Open Space (not vacant)	185	185	0	0%	1.75%	1.75%
Multifamily Residential	49	49	0	0%	0.46%	0.46%
Cemetery	3	3	0	0%	0.03%	0.03%
Vacant	19	11	-8	-73%	0.18%	0.10%
Agriculture	8,558	5,720	-2,838	-50%	80.95%	54.11%
TOTAL	**10,572**	**10,572**			**100%**	**100%**

3.12 Neighborhood concerns

This section presents a summary of the concerns presented by residents of the High Cross Road area north of I-74 to the Urbana Planning Commission in 2003, by University of Illinois research area representatives, and other property owners.

- Wooded areas would be jeopardized by an extension of Interstate 74 and the development of High Cross Road north of I-74.
- There would be negative impacts on unique remnant wetland and wooded areas in Champaign-Urbana area due to development of High Cross Road north of I-74.
- Roadwork along High Cross Road would severely damage tree roots along the edge of Brownfield Wood as well as cause compaction of soil and erosion.
- Presence of housing in the area north of I-74 along with the activities of homeowners and pets profoundly disrupt the movement, behavior, and ecology of wildlife, introduce lawn chemicals and cultivated invasive nonnative plant species, increase surface run-off problems, and cause an increase in trespassing and vandalism, with accelerating risks to increasingly rare species in the County.
- Wildlife corridors would be disrupted by the proposed development and accelerate the decline in native biodiversity that has characterized the rest of Urbana-Champaign for the past century.
- The proposed development has repercussions for biodiversity beyond Champaign County; University-owned forested areas potentially affected by the plan are important stop-sites for Neotropical migratory birds that are experiencing reduction in habitat availability in other parts of their range.
- Decreasing the size of forest patches and increasing distances between patches, even within the order of 300 feet, can have negative impacts on forest species movements.
- Development that increases human traffic and concomitantly alters noise and vandalism levels, surface and soil hydrology, and movement patterns will irreparably degrade remnant sites such as Brownfield Woods, Trelease Woods and Trelease Prairie.

The vast majority of comments received during the planning process focused on environmental concerns such as those listed above. Protecting existing residential areas, minimizing traffic and new road construction, especially north of I-74, were also major themes discussed by residents. A compilation of public comments received during the study process can be found in Appendix 7.

3.13 Environmental Analysis

The following sections summarize the analyses completed for Air Quality, Noise, and Wildlife and Vegetation Habitat.

3.13.1 Air Quality

Major factors affecting air quality at a given location are the amounts and types of pollutants, meteorological conditions such as temperature, wind speed and direction, and topographic features of the region. Target air pollutants associated with transportation are carbon monoxide (CO), particulate matter (PM), nitrogen oxide (NOx), and Volatile Organic Materials (VOM) since transportation emissions are generated from combustion and evaporation of fuels of mobile sources such as motor vehicles, trains, and boats. In addition, the primary targets to be controlled are the number of vehicles and vehicle miles traveled.

Air quality monitoring stations operating in Champaign County are located in the Village of Bondville and the City of Urbana. The monitoring station located in the City of Urbana monitors Ozone (O_3) and $PM_{2.5}$. Table 3-12 shows a summary of the highest pollutant values for O_3 and $PM_{2.5}$ recorded at this station in the last 5 years. All areas within Champaign County meet air quality standards for all six criteria pollutants.

Table 3-12: Air Quality Summary, Urbana Monitoring Station

Pollutant	Averaging Time	Maximum Concentrations					No. of Days Exceeding Federal Standard*				
		2000	2001	2002	2003	2004	2000	2001	2002	2003	2004
O_3	1 hour	0.088	0.081	0.092	0.084	0.074	0	0	0	0	0
	8 hours	0.081	0.074	0.09	0.078	0.066	-	-	1	0	0
$PM_{2.5}$	24 hours	31.4	36.8	24.1	34.9	29.7	0	0	0	0	0
	Annual	14.8	12.6	12.1	13.1	10.4	0	0	0	0	0

3.13.2 Noise

The level of highway-based noise depends on traffic volume, speed of traffic, percentage of trucks in the flow of traffic, distance to the highway, intervening topography, and atmospheric conditions. The noise analysis is discussed in more detail in Appendix 3. Parameters included in this analysis are the vehicle types and their speeds and volumes, distance to the noise sources, noise barriers, and surrounding terrains. One-hour traffic volumes from 7:00 AM to 8:00 AM, the busiest time of the day along IL130, and average speeds by vehicle class were used for analysis.

As can be seen in Map 4 of Appendix 3, all existing traffic noise levels are below FHWA's noise impact criteria, which is 66 L_{eq}. The estimated noise level is highest south of Tatman Court (59.3 L_{eq}) and lowest north of Airport Road (39.2 L_{eq}) during the AM peak hour. Based on these results, it can be concluded that there are no sites that need detailed noise impact study considering existing noise levels.

3.13.3 Wildlife and Vegetation Habitat

Most potential areas for natural habitat in the study area are floodplain forests around the Saline Branch, Brownfield Woods, Trelease Woods, and Trelease Prairie. Map 7 in Appendix 3 shows the potential natural habitats in the study area. According to a short report submitted by a neighborhood association, the Saline Branch would serve more likely as a wildlife corridor for red-tailed hawks, great horned owls, red and gray foxes, as well as other less threatened forms of wildlife. Moreover, the Brownfield and Trelease Woods are reported to be important stopover sites for neotropical migratory birds.

All waterways, from small creeks to major rivers, have a riparian zone or floodplain, which is periodically flooded and represents a transition zone between upland and aquatic habitats[21]. The area surrounding the Saline Branch would be an example of this. Floodplain forests and upland forests are formed next to the Saline Branch and the 100-year floodplain lies along the stream. These riparian forest buffers potentially provide many benefits to immediate and downstream aquatic habitats and may serve as breeding habitat, important travel or migration corridors for wildlife, shelter in winter, and critical resting and refueling stops for migratory songbirds during spring and fall.

However, the continuity of the buffer zone is already damaged due to fragmentation by the road. The Saline Branch area is not an exception. As shown in Map 7 of Appendix 3, the Saline Branch is fragmented by High Cross Road and Cottonwood Road running through the middle of the stream as well as Perkins Road cutting off the connection of the zone. In addition, Airport Road cuts off the connection to Brownfield Woods from the Saline Branch riparian zone. It may affect the function of the Saline Branch as a wildlife corridor, which in turn connects to the Salt Folk River and relates to the decrease in natural area acreage.

3.14 Transportation Analysis

3.14.1 Roadway Characteristics

The IL130/High Cross Road corridor has three distinct areas, as are shown in Figures 3-8A, 3-8B and 3-8C. Starting at Old Church Road traveling northbound, the first 4.0 miles to the north to University Avenue, the roadway is an urban arterial with at-grade intersections spaced at approximately one-mile intervals. The posted speed limit is 55 miles per hour up to Tatman Court, where it reduces to 50 miles per hour.

Between Beringer Crossing and Airport Road, the next 2.0 miles is an urban collector type of roadway traversing a transition zone characterized by a mix of residential and agricultural areas with more frequently spaced at-grade intersections and a greater number of accesses to private properties. Through this portion, the posted speed limit is 40 miles per hour.

The remaining 2.0 miles of High Cross Road between Airport Road and Ford Harris Road is classified as a rural collector because it does not have lane designations, curb, or shoulders and provides unlimited access to private properties. There is no posted speed limit on this roadway section.

The basic cross-sectional design for IL130 is illustrated in Figures 3-8A, 3-8B and 3-8C. Although there are major differences in the intersection design within the urban section of the corridor, the basic cross-section design remains the same. Including one 12-foot wide travel lane in each direction, a 4-foot paved shoulder and 6-foot unpaved shoulder on the outside edge of the traveled way, the existing total width is approximately 44 feet from edge of shoulder to edge of shoulder.

The cross-sectional design for the rural area between Beringer Crossing and Ford Harris Road varies from 21 feet at Beringer Crossing to 16 feet at Ford Harris Road. Lanes are marked between Beringer Crossing and Airport Road only. There are no shoulders along any section of High Cross Road.

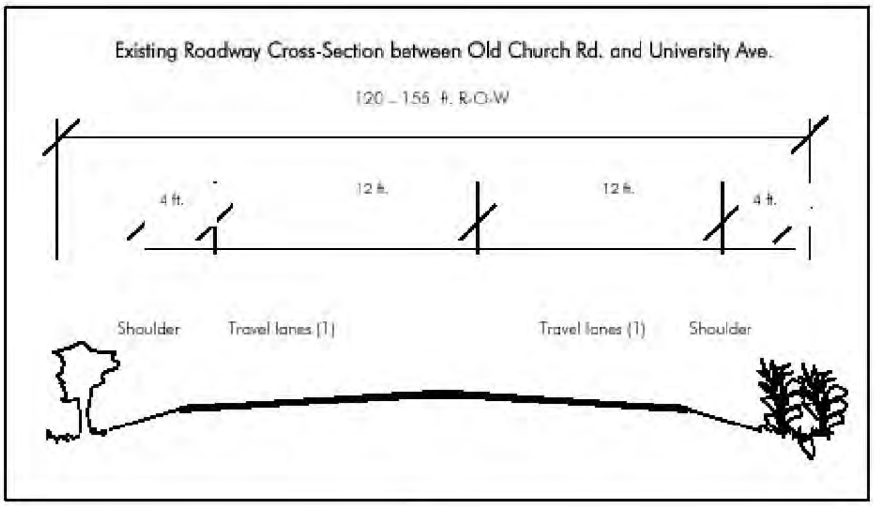
3.14.2 Safety: Crash Locations

A comprehensive analysis of crash data was conducted so that safety issues could be fully considered in the formulation of recommendations for the IL130/High Cross Road Corridor. The investigation suggested that experience on IL130 has not been entirely different from that experienced on comparable highways elsewhere in the urbanized area. However, if only severe types of crashes are grouped together, the study found that these types of crashes occur more frequently on IL130 than on comparable highways elsewhere in the urbanized area. Severe crashes are those where one or more persons are either injured or killed.

A safety analysis for this study was completed with respect to intersections and segments along a portion of the roadway having the same functional classification. Cross-sectional designs, intersection spacing and intersection configuration are generally related to the functional classification of a roadway.

In analyzing crash data on IL130, the study distinguished different crash types according to severity. The category of "Total Crashes" is comprised of both “Severe Crashes” and “Property Damage-Only Crashes”. “Severe Crashes” are typically broken down into two different classes: Injury (a crash involving one or more vehicles with at least one individual non-fatally injured), and Fatal (a crash involving one or more vehicles in which one or more individuals is fatally injured). No fatal crashes were identified in the study area from 2000 to 2005. It should be noted that in 2006, however, there was a fatal crash involving an automobile and a bicycle.

Figure 3-8A: Road Characteristics: Old Church to University



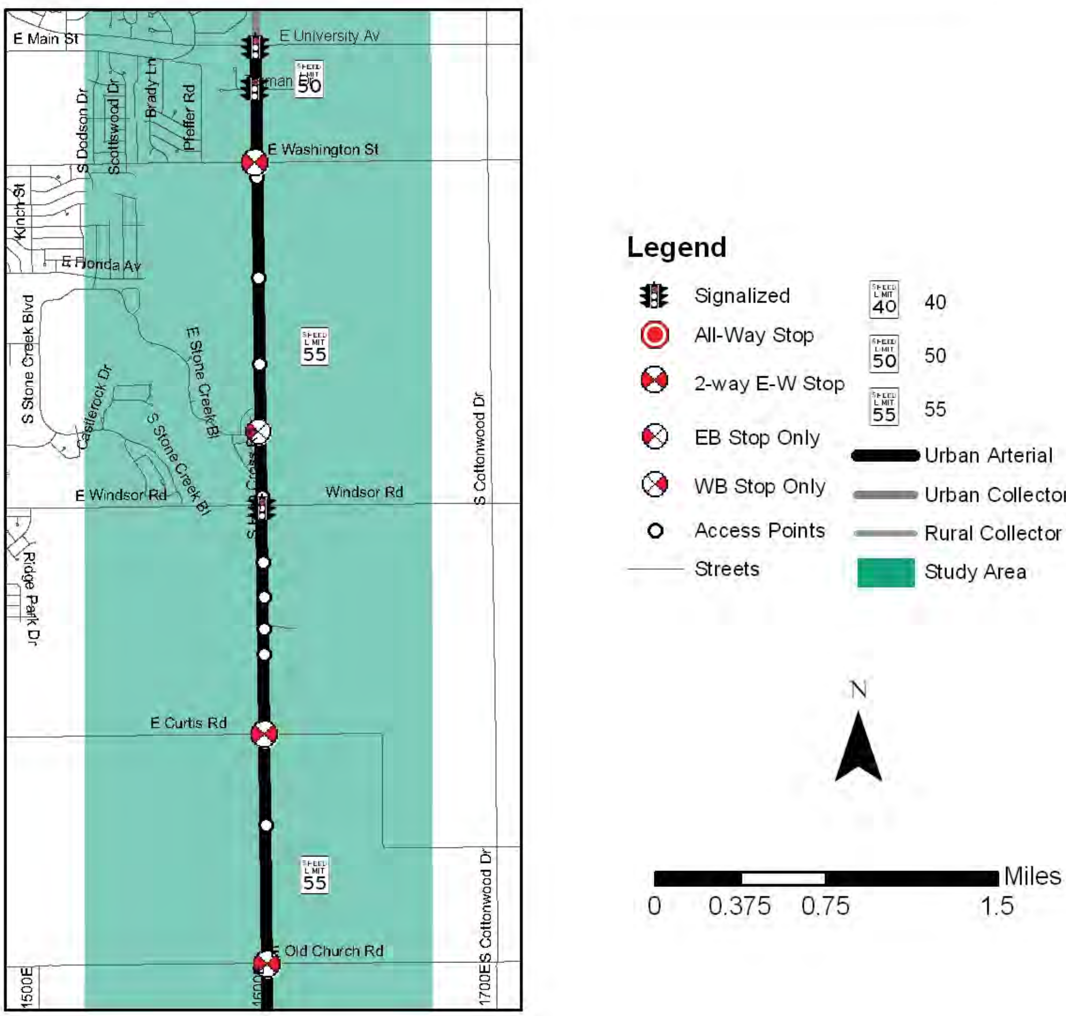
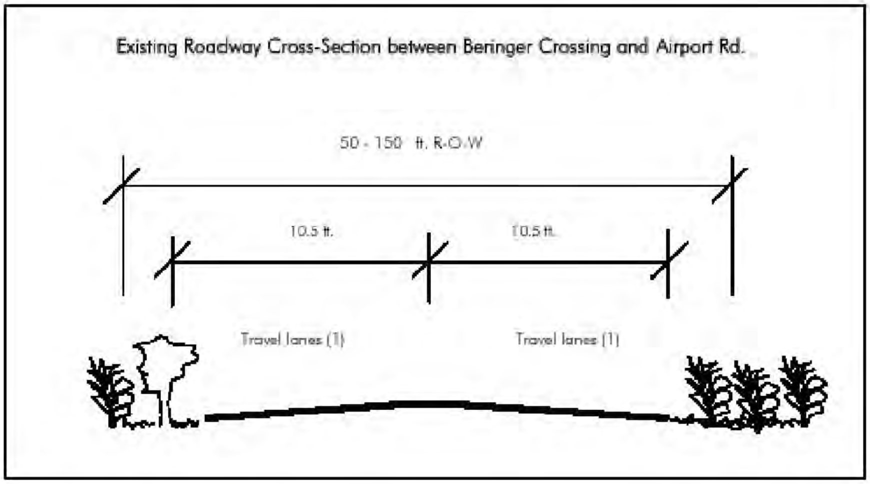


Figure 3-8B: Road Characteristics: Beringer Crossing to Airport



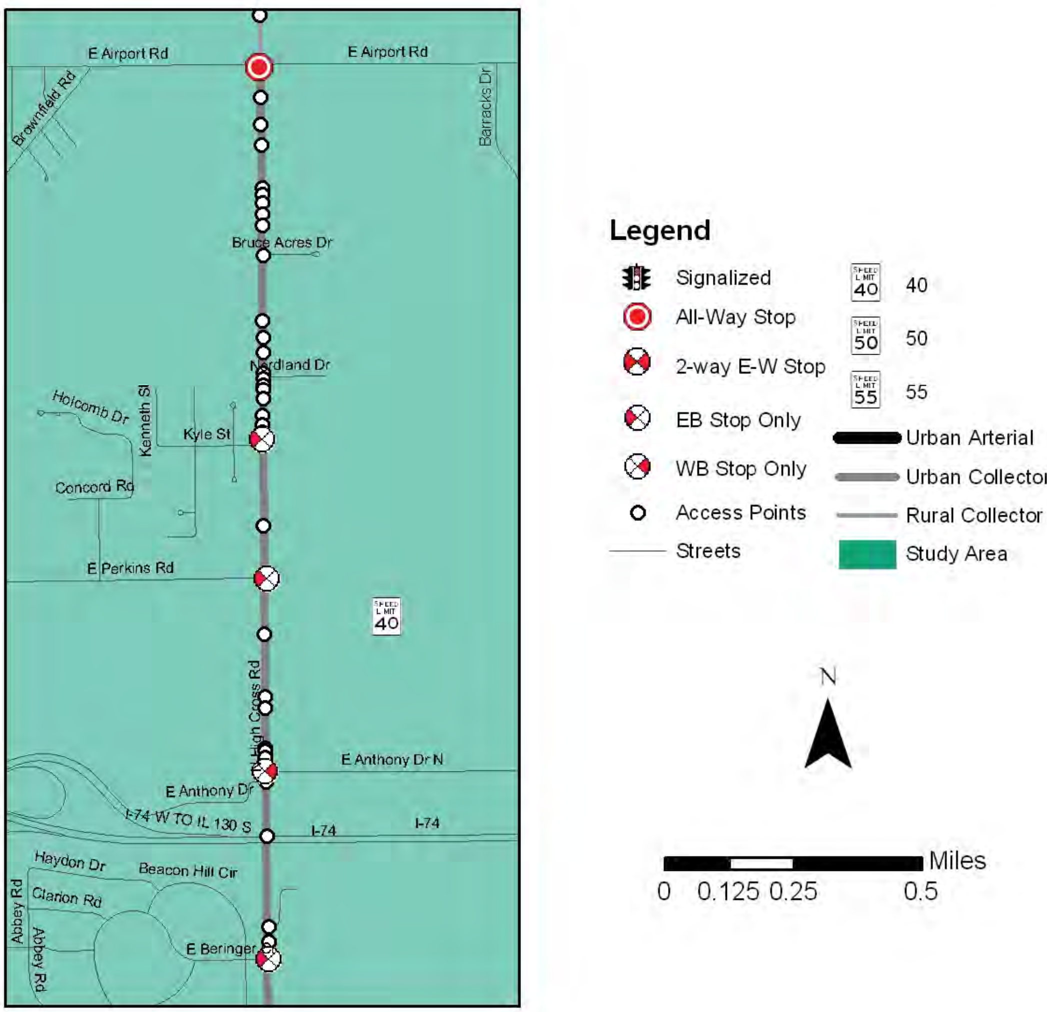
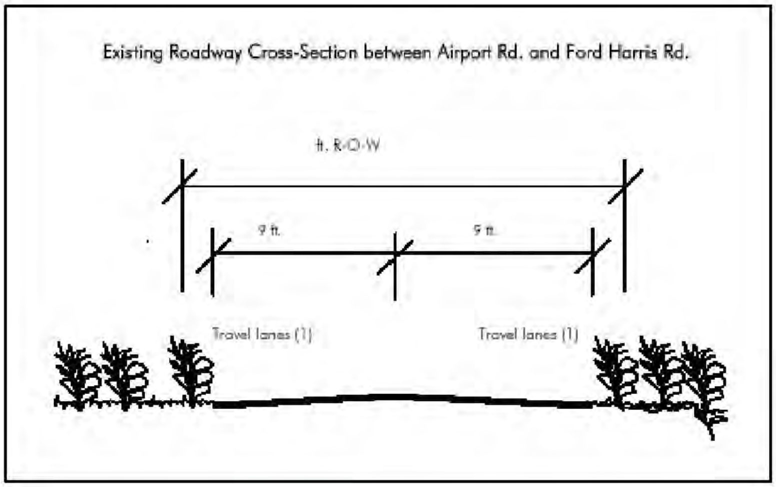
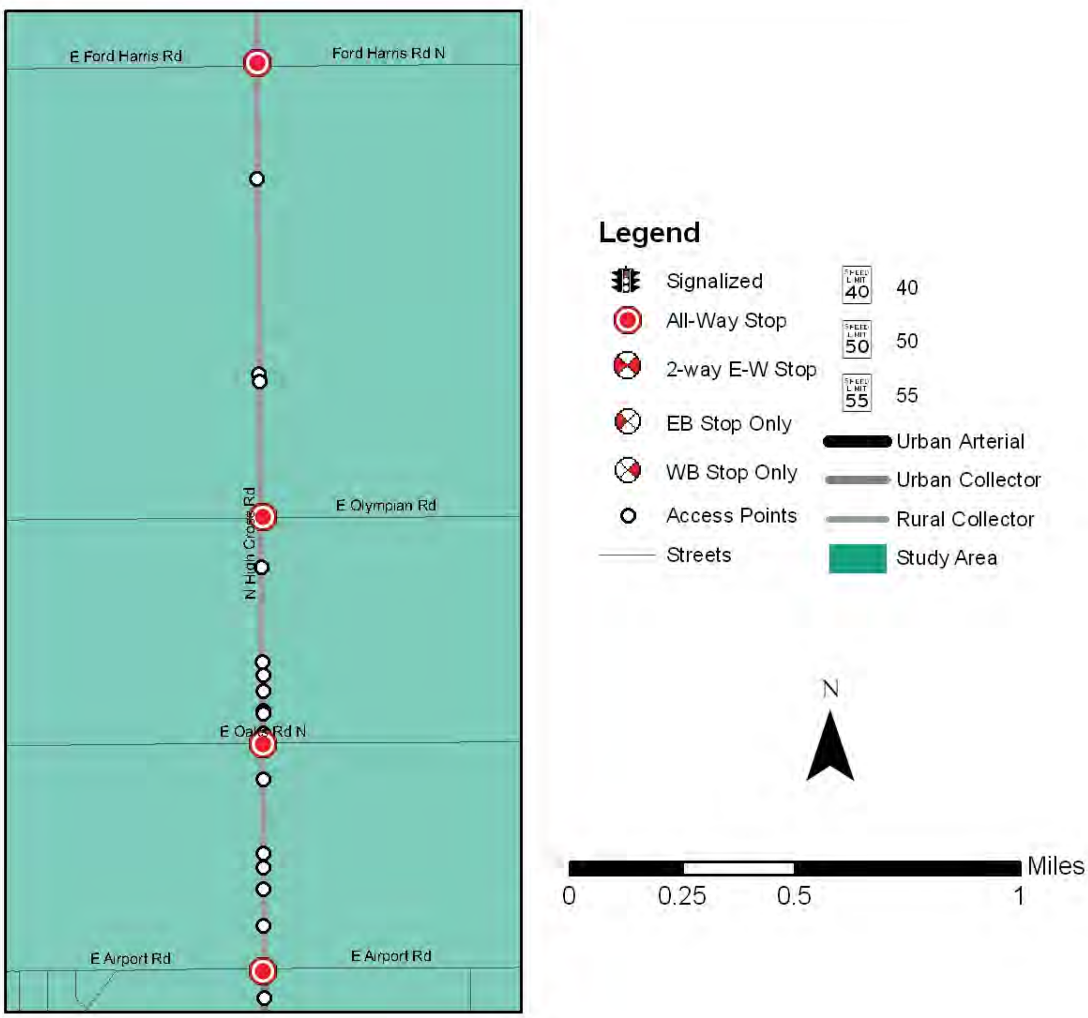


Figure 3-8C: Road Characteristics: Airport to Ford-Harris





3.14.2.1 Intersections
Crash statistics are listed in Table 3-10 by severity and for each intersection in the study area. Of the 67 crashes that occurred in the study area between 2000 and 2005, 63 of them were located in the section of the corridor that extends between University Avenue and Old Church Road.

There are specific locations within the study area, especially at signalized intersections, where crashes are concentrated. Figure 3-7 shows the number of crashes on IL130/High Cross Road between 2000 and 2005 by their location at individual intersections. Analysis shows that the intersections of Windsor Road and University Avenue with IL130 have the highest severe crash ratings of all intersections in the study area. Between 2000 and 2005, approximately 25% of all crashes on IL130 at the Windsor Road intersection involved an injury. The University Avenue intersection has a slightly lower percentage of crashes, with an injury rate of approximately 15%. Eleven injuries and 26 crashes occurred at the intersection of University Avenue and IL130. At the intersection of Windsor Road and IL130, 19 injuries and 28 crashes between 2000 and 2005 were reported.

Vehicles speeds on IL130 may explain the relative difference in crash severity for each section. Near the Windsor Road and University Avenue intersections, where the highest severe crash rates in the study area occurred, vehicle speeds tended to be higher than in other intersections along IL130. As a result, there is potential for added conflict between vehicles on IL130 and those crossing, getting onto, or getting off of IL130 at the existing intersections.

Most of the relatively higher crash intersections are located on the 2.0-mile portion classified functionally as an urban principal arterial between University Avenue and Windsor Road. These intersections are shown in Figure 3-7 and they include:

- Windsor Road, which averages more than 6 crashes per year;
- University Avenue, which averages 6 crashes per year;
- Washington Street, which averages between 0 and 2 crashes per year; and
- Tatman Court, which averages less than 1 crash per year.

In 2003, IDOT signalized the Windsor Road intersection with IL130 and redesigned the University Avenue intersection with IL130, channelizing turning movements through the intersections; consequently, future crash severity is anticipated to improve significantly at these locations.

3.14.2.2 Segments
Crashes that occurred along roadway segments of IL130 were different from intersection crashes. Classification of individual crashes into intersection or segment types involved two steps. First, intersection crashes were identified and given the “intersection” label if they occurred within 105 feet of an existing intersection. Second, all crashes that were not labeled as being of intersection type were given the “segment” label. Only two segment crashes were identified in the Corridor. One crash segment is located on IL130, south of Washington Street. The other crash of this type occurred on the bridge over Interstate 74 when a car collided with the bridge in order to avoid hitting an animal.

3.14.3 Capacity and Level of Service (LOS) Analysis

Capacity analysis is provided in two formats: for each of the major intersections along the corridor and on a segment basis to analyze roadway conditions.

3.14.3.1 Intersection Capacity Analysis

Traffic signal operation has a direct impact on the capacity of an arterial. According to the *Highway Capacity Manual*, Level of Service (LOS) is a qualitative measure describing operational conditions of a traffic stream or intersection. Capacity and LOS analyses were performed for the main intersections along the IL130/High Cross Road corridor using the methods documented in the Highway Capacity Manual (HCM) 2000, Version 1. The capacity and LOS calculations for signalized and unsignalized intersections were performed using the Highway Capacity Software 2000 (HCS 2000) distributed by McTrans, Transportation Research Center, University of Florida.

- *Signalized Intersections*: The methodology implemented by the HCM2000 Chapter 16 addresses the capacity, LOS, and other performance measures for lane groups and intersection approaches and the LOS for the intersection as a whole. Capacity is evaluated as the ratio of demand flow rate to capacity (v/c ratio), whereas LOS is evaluated on the basis of control delay per vehicle (in seconds per vehicle). Control delay is the portion of the total delay attributed to traffic signal operation for signalized intersections. Control delay includes initial deceleration delay, queue move-up time, stopped delay, and final acceleration delay.

- *Unsignalized Intersections*: The procedures in the HCM2000 Chapter 17 can be used to analyze the capacity and level of service, lane requirements, and effects of traffic and design features of two-way stop-controlled (TWSC) and all-way stop-controlled (AWSC) intersections.

Capacity analysis at TWSC intersections depends on a clear description and understanding of the interaction of drivers on the minor or stop-controlled approach with drivers on the major approach. Level of service (LOS) for a TWSC intersection is determined by the computed or measured control delay and is defined for each minor movement. LOS is not defined for the intersection as a whole. LOS criteria are given in Table 3-13.

The criteria for unsignalized intersections have different threshold values than those for signalized intersections primarily because drivers expect different levels of performance from distinct types of transportation facilities. The expectation is that a signalized intersection is designed to carry higher traffic volumes than an AWSC intersection. Thus a higher level of control delay is acceptable at a signalized intersection for the same LOS.

Table 3-13: Level of Service Criteria for Signalized and Unsignalized Intersections

Signalized Intersection		
Level of Service	Control Delay per Vehicle (sec/veh)	Characteristics
A	<= 10	This occurs when progression is extremely favorable and most vehicles arrive during the green phase. There is little or no delay.
B	>10 - 20	This condition generally occurs with good progression, short cycle length or both. There are short traffic delays.
C	>20 - 35	Individual cycle failures may occur, though many vehicles still pass through without stopping. There are average traffic delays
D	>35 - 55	The influence of congestion becomes more noticeable. Longer delays may result from unfavorable progression, longer cycle lengths, or both. The number of vehicles stopping increases and cycle failures are prevalent. There are long traffic delays.
E	>55 - 80	Individual cycle failures are common occurrences. This LOS is considered to be the limit of acceptable delay by most agencies. There are very long traffic delays.
F	>80	This level is considered to be unacceptable to most drivers and often occurs when vehicles entering the intersection exceed the capacity. There are extreme traffic delays.
Unsignalized Intersection (TWSC and AWSC)		
Level of Service	Ave. Control Delay (sec/veh)	Characteristics
A	0 - 10	Describes operations with very low levels of delay
B	> 10 - 15	Describes operations with low levels of delay
C	>15 - 25	Describes operations with average delays
D	>25 - 35	Describes operations with average delays. The influence of congestion becomes more noticeable
E	>35 - 50	Describes operations with higher average delays
F	> 50	LOS F exists where there are insufficient gaps to allow vehicles to enter the traffic stream of the major crossing street. Large queuing on side streets is common at LOS F

Evaluation of the existing traffic operations characteristics in the IL130/High Cross Road corridor was performed using capacity and LOS analyses for eight intersections. Results of this analysis are shown in Table 3-14 and Figure 3-9. Complete capacity and LOS results for each intersection are shown in Appendix 4.

Figure 3-9: Intersection Level of Service, AM & PM

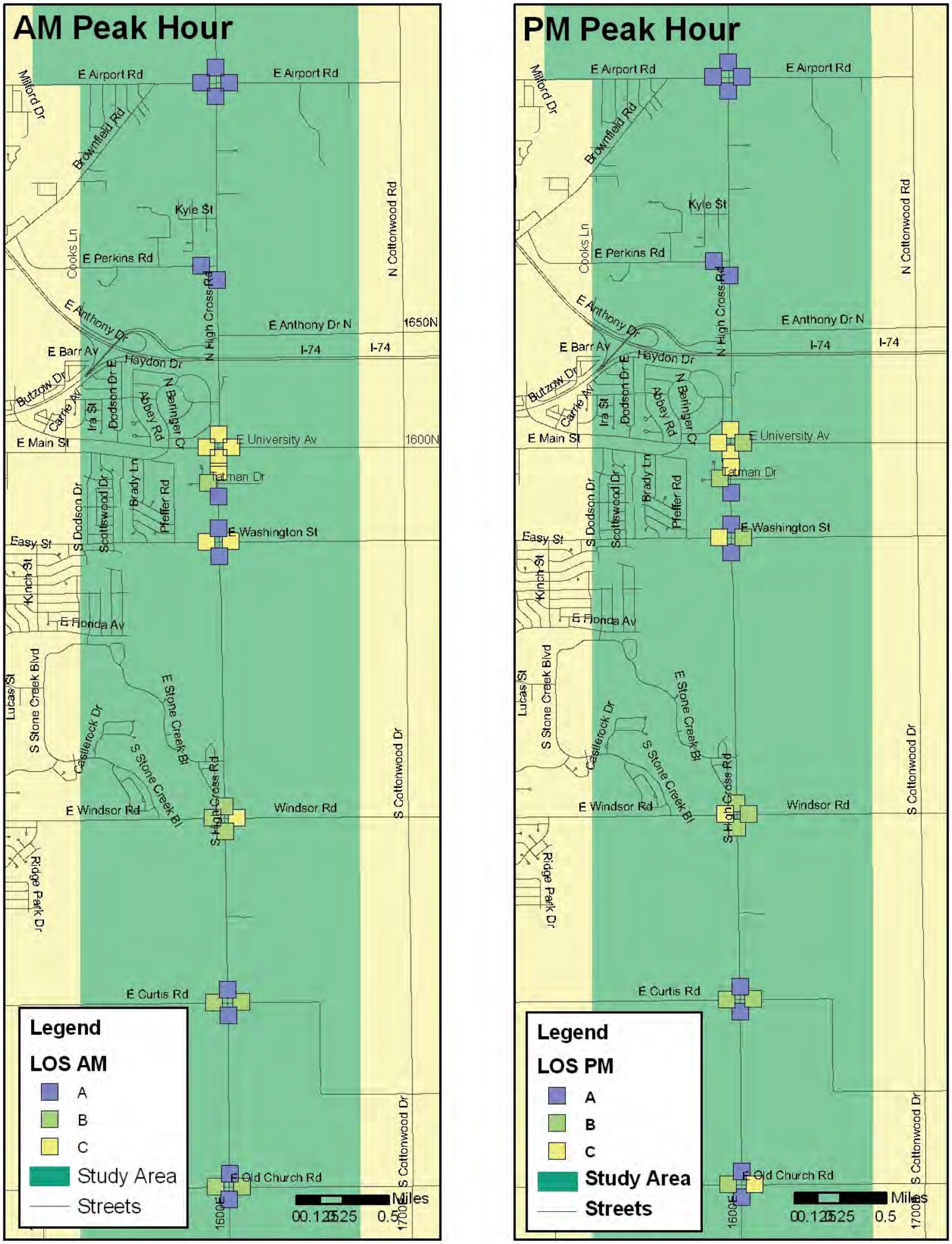


Table 3-14: LOS and Delay Results for A.M. and P.M. Peak Hour for Existing Conditions

Signalized Intersection	Level of Service (LOS)								Approach Delay per Vehicle (s/veh)							
	AM				PM				AM				PM			
	NB	SB	WB	EB	NB	SB	WB	EB	NB	SB	WB	EB	NB	SB	WB	EB
Windsor Rd. and IL 130	B	B	C	B	B	B	B	C	13.5	13.3	23.6	18.6	10.1	14.5	16.9	26.0
Tatman Ct. and IL 130	A	C	-	B	A	C	-	B	5.9	21.7	-	12.1	5.3	25.2	-	12.9
University Ave. and IL 130	C	C	C	C	C	C	B	C	21.1	29.5	22.4	20.7	20.8	28.2	17.5	31.4
Unsignalized Intersection	Level of Service (LOS)								Approach Delay per Vehicle (s/veh)							
	AM				PM				AM				PM			
	NB	SB	WB	EB	NB	SB	WB	EB	NB	SB	WB	EB	NB	SB	WB	EB
Old Church Rd. and IL 130	A	A	B	B	A	A	C	B	7.4	8.3	13.4	10.5	8.4	7.6	15.3	13.7
Curtis Rd. and IL 130	A	A	B	B	A	A	B	B	7.6	8.4	13.6	14.4	8.4	7.5	11.6	14
Washington St. and IL 130	A	A	C	C	A	A	B	C	8.0	8.4	17.5	17.1	8.1	8.0	14.5	17.3
Perkins Rd. and High Cross Rd.	A	-	-	A	A	-	-	A	7.5	-	-	9.0	7.4	-	-	9.0
Airport Rd. and High Cross Rd.	A	A	A	A	A	A	A	A	7.6	6.9	7.2	6.7	7.6	7.2	7.23	7.0

Results of the Level of Service (LOS) analyses show that all signalized intersections are experiencing traffic delays (LOS C) in at least in one of their approaches. At University Avenue and IL130, however, the intersection as a whole is operating at LOS C. The unsignalized intersections are operating at LOS A for the major street during the AM and PM peak hours, with movements at minor streets operating at LOS B and C.

3.14.3.2 Segment Capacity Analysis

Two-way, two-lane highway segments are analyzed based on the methodology provided in Chapter 20, Two-Lane Highways, of the Highway Capacity Manual 2000. HCM Chapter 20 incorporates a new methodology based on speed and percent time spent following (PTSF), using two classes of two-lane highways, each having its own LOS criteria, with the base capacity increased from 2,800 to 3,200 passenger cars per hour (pcph) in both directions. A new directional analysis gives speed and PTSF with Measures of Effectiveness (MOE)-specific heavy-vehicle factors and the capability to analyze passing lanes.

For the analysis, the corridor was divided into eight segments due to its length (approximately eight miles). The termini of these segments were based on major intersections and differing traffic and geometric characteristics. Results of these analyses are shown in Table 3-15 and Figure 3-10. Complete capacity and LOS results for each intersection are shown in Appendix 4.

Figure 3-10: Segment Level of Service, AM & PM

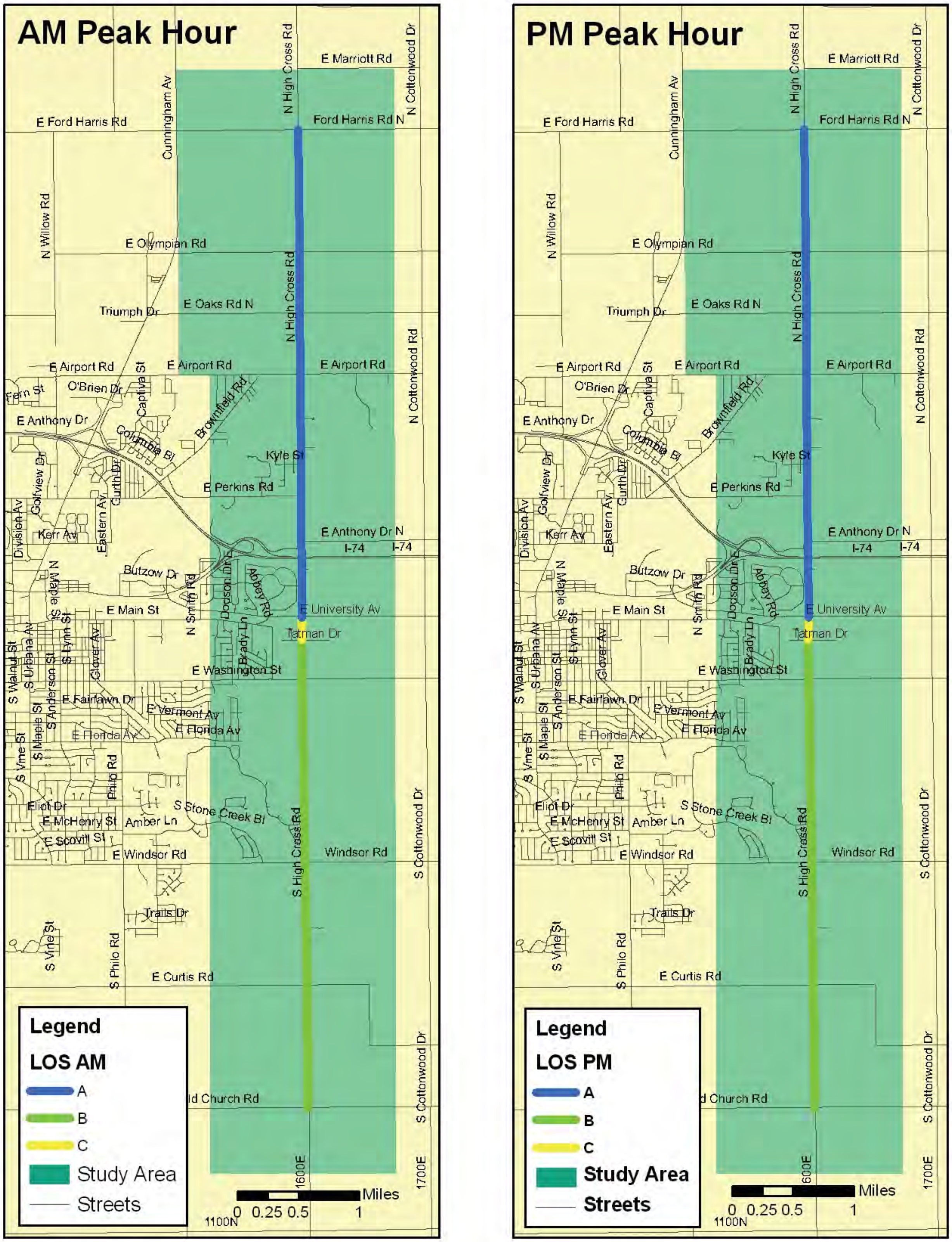


Table 3-15: LOS and Average Travel Speed Results for A.M. and P.M. Peak Hour for Existing Conditions

Roadway	Segment	AM Peak			PM Peak		
		LOS	Average Travel Speed (mph)	% Time Spent Following	LOS	Average Travel Speed (mph)	% Time Spent Following
IL 130	Old Church Rd. – Curtis Rd.	B	52.4	49.9	B	53.1	45.4
IL 130	Curtis Rd. – Windsor Rd.	B	51.9	48	B	52.4	45.2
IL 130	Windsor Rd. – Washington St.	B	52.5	44.7	B	52.5	44.6
IL 130	Washington St.– Tatman Ct.	B	44.2	53.5	B	53	47.5
IL 130	Tatman Ct. – University Ave.	C	45.7	46	C	45.1	49.4
High Cross Rd.	University Ave.– Perkins Rd.	A	36.8	19.7	A	36.6	19.9
High Cross Rd.	Perkins Rd. – Airport Rd.	A	35.3	16.9	A	35.3	14.6
High Cross Rd.	Airport Rd. – Ford Harris Rd.	A	37.9	11.6	A	37.8	10.3

The analysis shows that the corridor is operating at acceptable levels of service in both directions for the AM and PM peak hours. A portion of the corridor, however, specifically the section of IL130 between Tatman Court and University Avenue, is close to operating under congested conditions.

3.14.4 Access Management

CUUATS has adopted an Access Management Classification based on the Access Management Guidelines for use on the urbanized area highway system. Access management controls and regulates the spacing and design of driveways, medians, median openings, curb cuts and traffic signals in order to limit and separate conflict points.

The 4.0 miles between Old Church Road and University Avenue have at-grade major intersections spaced approximately 0.58 miles apart, which is typical for this type of roadway and area type. There are seven intersections. Of these seven intersections, three are controlled by traffic signals. The driving behavior of motorists traveling completely through this portion of east Urbana on IL130 is directly influenced by a traffic signal on an average of every 1.35 miles. In the next 2.0-mile section of High Cross Road, intersection spacing changes significantly: there are seven at-grade intersections, or one every 0.28 miles on the urban collector portion of High Cross Road north of University Avenue. In contrast, the 2.0-mile rural collector portion has three at-grade intersections, which results in an intersection density of approximately one every 0.67 miles. Distances between different access points along the IL130/High Cross Corridor are presented in Figure 3-11 and Table 3-16.

Detailed field inventories were conducted to measure the spacing of driveways, full median openings and traffic signals. The field survey data was crosschecked and compared with information contained in the Roadway Inventory System (RIS) report developed by IDOT.

The highway was divided into three segments based on their access category and distribution of access along the segment. The results of the analysis are shown in Table 3-15. The segments from Ford Harris Road to University Avenue and from Windsor Road to Old Church Road are designated as access level 6 and therefore they are not applicable to the guidelines. The segment from University Avenue to Washington Street does not meet any of the three spacing standards given by the guidelines whereas for the segment from Washington Street to Windsor Road, only the traffic signal spacing met the requirements from the access management guidelines.

Figure 3-11: Distance between Access Points

Access Point		Distance	Combined	Distance
From	To	(in feet)	Distance	(in miles)
Ford Harris	A	1334	5310	1.01
A	B	2288		
B	C	92		
C	Olympian	1596		
Olympian	D	708	2642	0.50
D	E	985		
E	F	156		
F	G	181		
G	H	229		
H	I	17		
I	J	302		
J	Oaks	64		
Oaks	K	424	2646	0.50
K	L	872		
L	M	172		
M	N	246		
N	O	441		
O	Airport	491		
Airport	P	341	5297	1.00
P	Q	279		
Q	R	200		
R	S	452		
S	T	66		
T	U	84		
U	V	113		
V	W	121		
W	Bruce Acres	294		
Bruce Acres	X	684		
X	Y	168		
Y	Z	158		
Z	AA	221		
AA	Nordland	39		
Nordland	AB	94		
AB	AC	44		
AC	AD	102		
AD	AE	171		
AE	AF	92		
AF	AG	84		
AG	Kyle	136		
Kyle	AH	925		
AH	Perkins	429		
Perkins	AI	583	2690	0.51
AI	AJ	636		
AJ	AK	120		
AK	AL	413		
AL	AM	26		
AM	AN	65		
AN	Anthony	153		
Anthony	AO	97		
AO	I-74	597		
I-74	Red Bud	896	1232	0.23
Red Bud	AP	157		
AP	Beringer	179		
Beringer	US 150	1324	1324	0.25
US 150	AQ	146	1035	0.20
AQ	AR	40		
AR	Tatman	849		
Tatman	Washington	1688	1688	0.32
Washington	AS	188	6312	1.20
AS	AT	167		
AT	AU	2324		
AU	TK Wendl's	2014		
TK Wendl's	Stone Creek	1619		
Stone Creek	AV	1476	1663	0.31
AV	Windsor	187		
Windsor	AW	1324	5320	1.01
AW	AX	794		
AX	AY	682		
AY	AZ	664		
AZ	Curtis	1856		
Curtis	BA	2097	5316	1.01
BA	Old Church	3219		
TOTAL			42475	8.04

Ford Harris to I-74

I-74 to Old Church

Table 3-16: Access characteristics and spacing between major intersections

Roadway	Cross Street	Movement	Access Design	Traffic Control	Distance (miles)
IL 130	Old Church Rd.	Full	At-grade	Two-way stop	1.01
IL 130	Curtis Rd.	Full	At-grade	Two-way stop	1.01
IL 130	Windsor Rd.	Full	At-grade	Signal	0.31
IL 130	Stone Creek Blv.	Full	At-grade	One-way stop	1.20
IL 130	Washington St.	Full	At-grade	Two-way stop	0.32
IL 130	Tatman Ct.	Full	At-grade	Signal	0.20
IL 130	University Ave.	Full	At-grade	Signal	0.25
High Cross Rd.	Beringer Cr.	Full	At-grade	One-way stop	0.74
High Cross Rd.	Perkins Rd.	Full	At-grade	One-way stop	1.00
High Cross Rd.	Airport Rd.	Full	At-grade	Four-way stop	0.50
High Cross Rd.	Oaks St.	Full	At-grade	Four-way stop	0.50
High Cross Rd.	Olympian Dr.	Full	At-grade	Four-way stop	1.01
High Cross Rd.	Ford Harris Rd.	Full	At-grade	Four-way stop	END

Table 3-17: Access management analysis for roadway segments

Segment		Ford Harris Rd. - University Ave.	University Ave. - Washington St.	Washington St. - Windsor Rd	Windsor Rd. - Old Church Rd.
Access Category		4	3	3	3
Driveway Desc		Collector	Minor Arterial	Minor Arterial	Minor Arterial
Overall Access Level for Development		6	5	5	6
Driveway Spacing	Minimum Required (ft)	NA	1125	1125	NA
	Minimum Existing (ft)	NA	40	167	NA
	Follow Guideline?	NA	No	No	NA
Unsignalized Median Opening (Full) Spacing	Minimum Required (ft)	NA	660	660	NA
	Minimum Existing (ft)	NA	40	167	NA
	Follow Guideline?	NA	No	No	NA
Traffic Signal Spacing	Minimum Required (ft)	NA	1320	1320	NA
	Minimum Existing (ft)	NA	1035	7973	NA
	Follow Guideline?	NA	No	Yes	NA

3.14.5 Transit

Champaign-Urbana Mass Transit District (CUMTD) is the principal agency responsible for providing transit service in the urbanized area. As can be seen in Figure 3-12, four routes serve the IL130/High Cross Road Corridor: the 10 Gold (Limited Service), the 7 Grey (Limited Service), the 5 Green, and the 15 Urbana link. All four routes stop in the study area approximately every 30 minutes.

Mobility was measured by on-time performance and travel time. According to CUMTD, the standard for on-time performance is no more than five minutes late. Based on the previous definition, CUMTD routes are on time 90% of the time. It is assumed that the routes operating within the study have a minimum on-time performance rating of 90%. The standard for travel time is equal to or less than twice the time as by auto. Buses' average system speed, according to CUMTD, is 12 mph. This speed represents half the auto's average speed obtained from the model. All this means that people using the bus routes serving the study area will spend almost double the time that traveling to the same place by auto.

Accessibility was measured based on the availability of pedestrian access within ¼ mile of a bus routes. Ninety-five (95%) of the population within the study area has good access (within ¼ mile) to the majority of bus routes within the corridor. In some areas, however, access was lacking due to the absence of sidewalks along High Cross Road.

3.14.6 Bikes and Pedestrians

Bicycle and pedestrian modes were also analyzed. While there are no bicycle facilities along the IL130/High Cross Road Corridor, funding has been approved for a shared-use path between Windsor Road and University Avenue on the west side of IL130. There are a few sidewalks, mostly in the commercial/industrial area south of University Avenue. Figure 3-13 shows the existing shared-use paths in Urbana.

IL130 and High Cross Road are both two-lane undivided facilities with maximum lane widths of 12 feet and 11 feet, respectively. No outside lanes are provided along these roadways to accommodate the bicyclist. IL130, in particular, carries high volumes of motor vehicle traffic, but no regular bicycle traffic. Based on field observations, there are no sidewalks along the roadway that can serve bicycle traffic.

Pedestrian facilities include sidewalks, crosswalks and pedestrian signals at major intersections as well as midblock pedestrian crossing signals. Overall, pedestrian traffic throughout the corridor is not significant. Pedestrian traffic within the study area is associated with the large residential developments in the area and the recently constructed Wal-Mart south of University Avenue.

3.14.7 Travel Model

The travel model predicts travel patterns within the corridor. The ability to identify significant travel patterns and movements in the corridor is important because using travel pattern data allows the development of short-term access management strategies to improve safety on the Corridor. In addition, the travel model facilitates both short and long term transportation system recommendations for the corridor.

As shown on Figure 3-14, approximately 6,500 vehicles travel daily on IL130 between Windsor Road and University Avenue. During the PM peak hour, approximately 700 vehicles travel through IL130 between Washington Street and University Avenue, as can be seen in Figure 3-15. According to the trends tracked by the LRTP and forecasts completed for the study, population and total employment around this area will grow significantly between now and 2025. During the same time period, the number of trips in the area will grow from approximately 6,500 to 16,000 vehicles per day in both directions at the intersection of IL130 and University Avenue. This significant increase in the number of trips in the study area will negatively impact 2025 traffic flow conditions on sections of IL130 if current roadway conditions are maintained.

Figure 3-12: Existing Transit Routes in Study Area

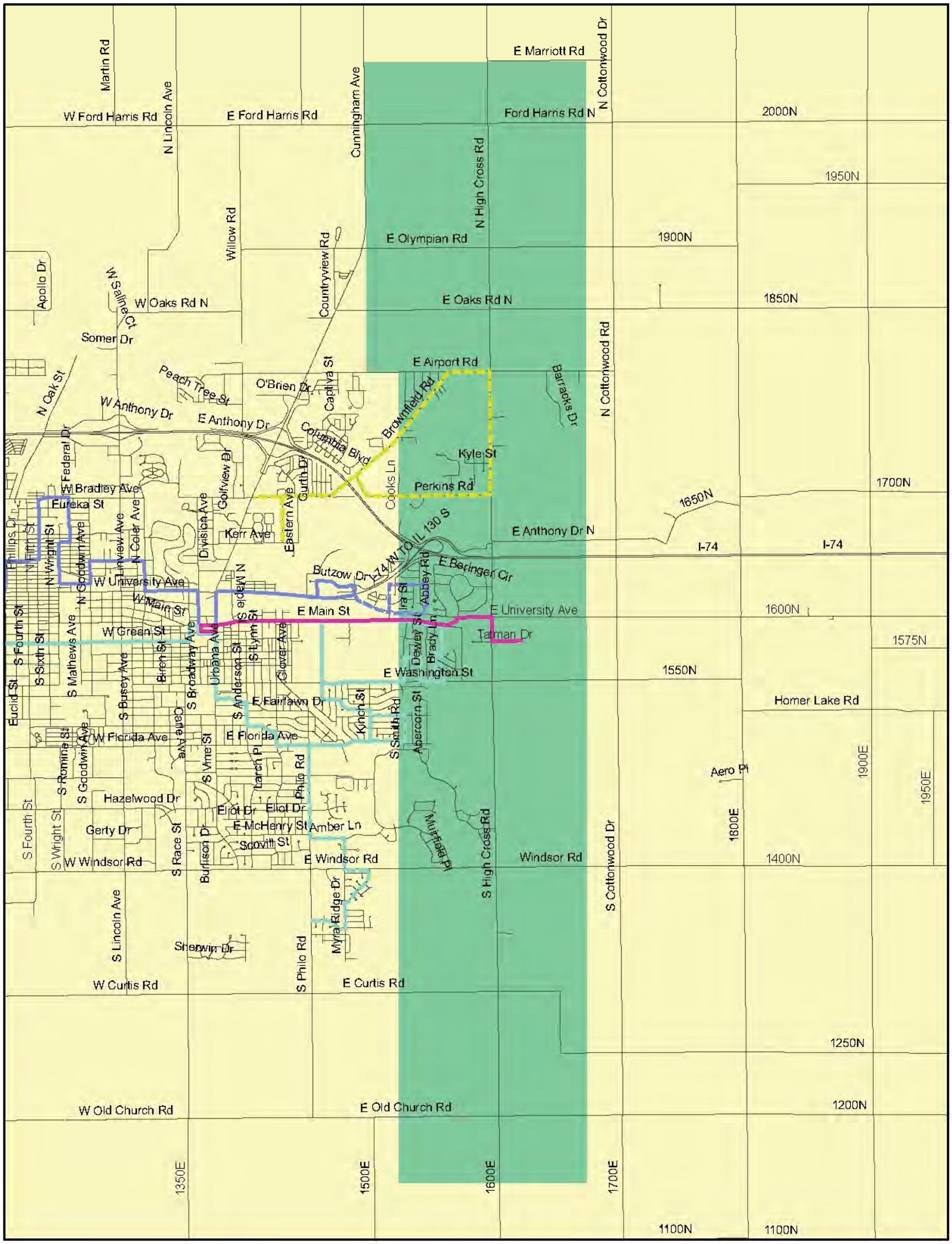


Figure 3-13: Existing Greenways & Trails

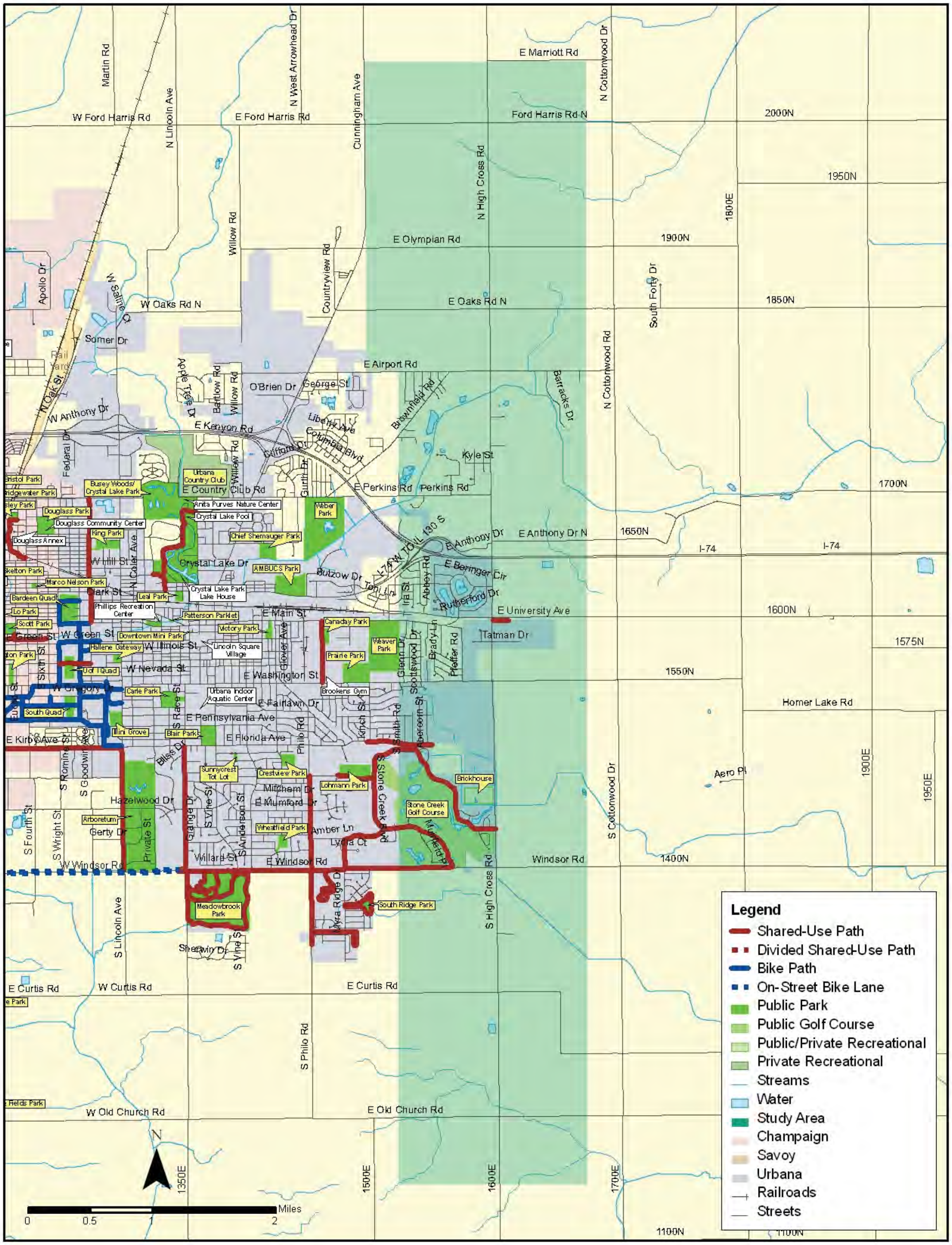
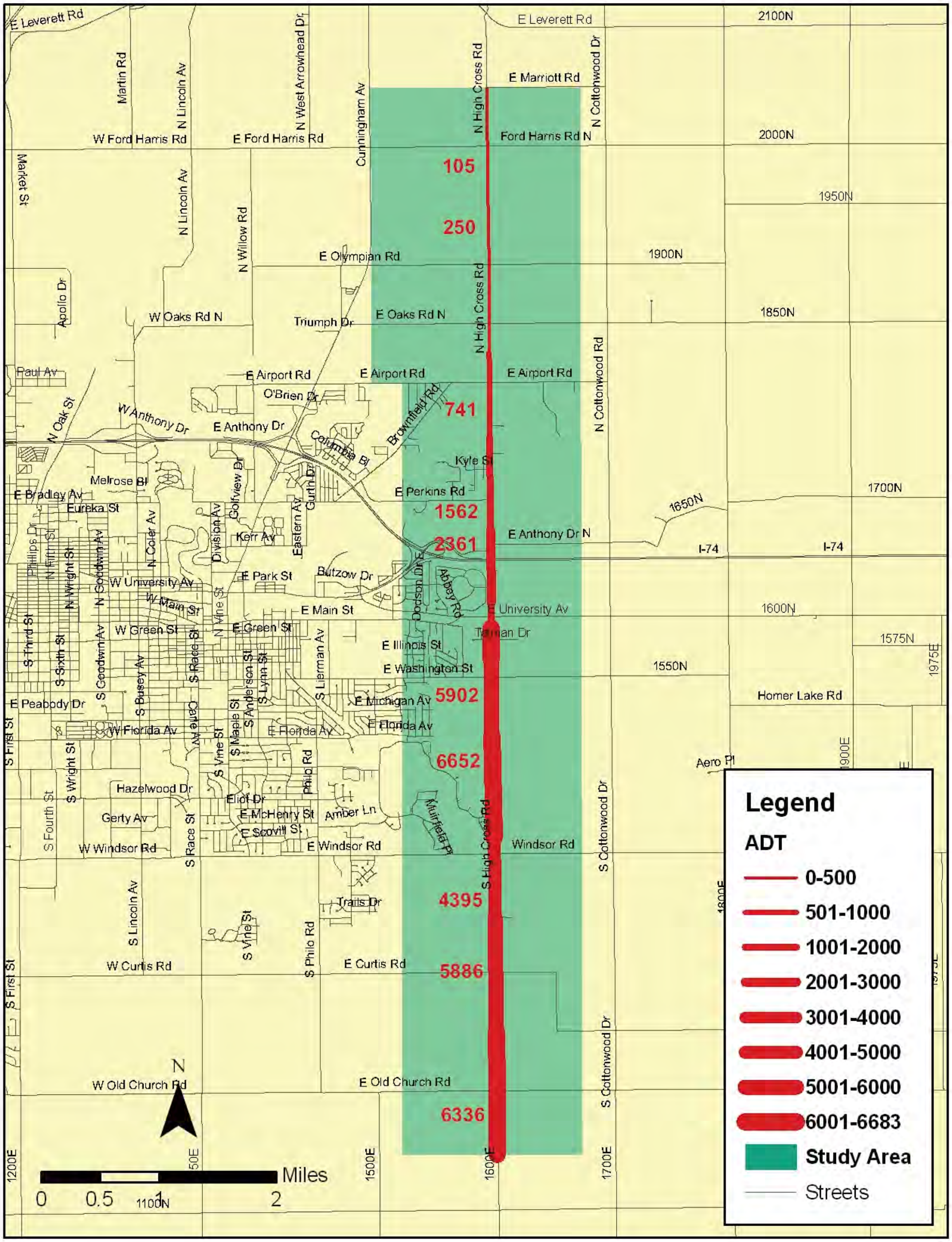


Figure 3-14: Average Daily Traffic Count Ranges

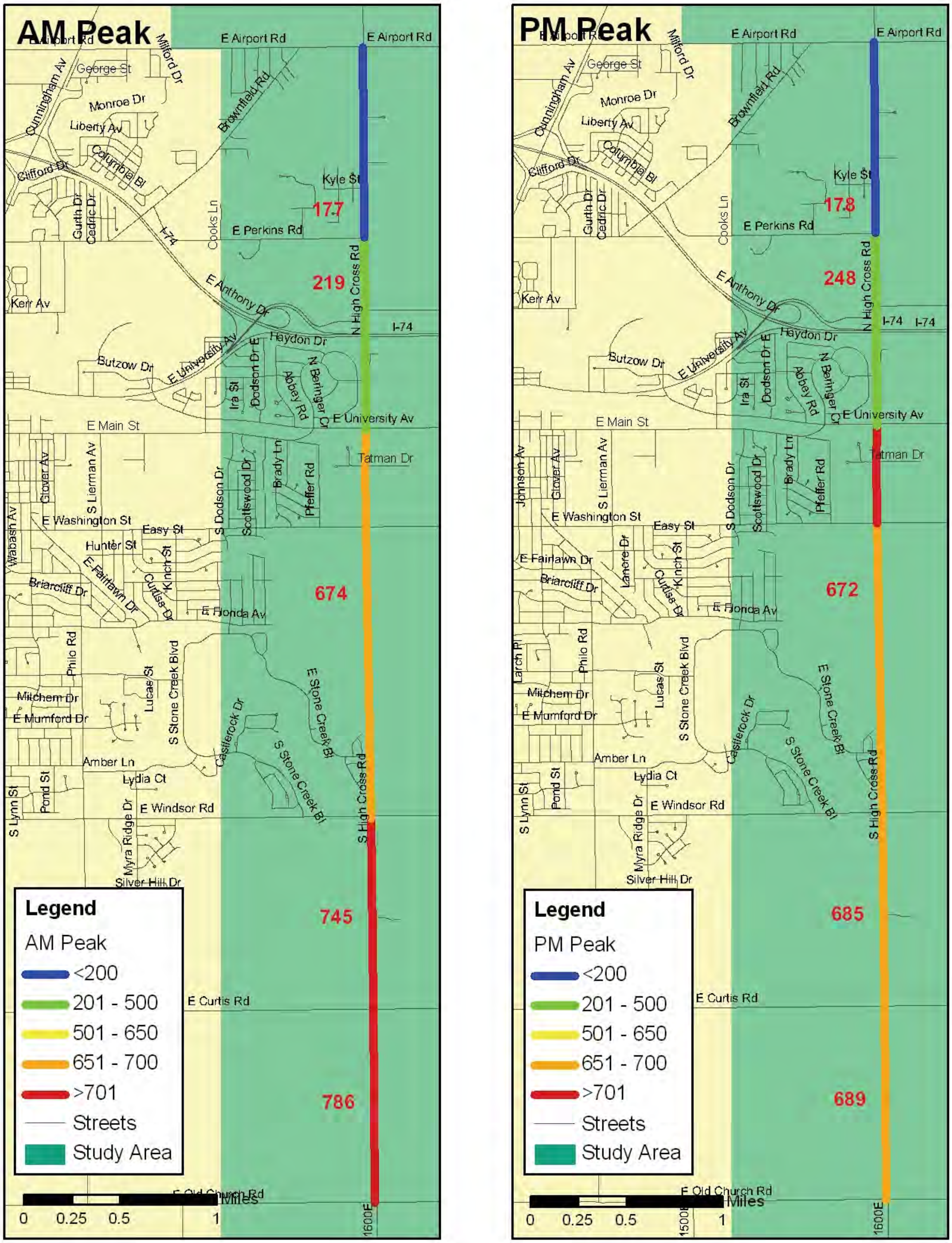


3.14.8 Origin and Destination Survey

During the data collection phase of the LRTP, origin-destination patterns on IL130/High Cross Road were obtained from 90 motorists at the intersections of IL130 at University Avenue and Cunningham Avenue at Airport Road through the LRTP's Origin-Destination survey. These origin-destination patterns were expanded to reflect daily travel patterns and then were incorporated into the urbanized area transportation model.

From these two samples, it is important to note origin and destinations of some external trips. For example, 14% of the motorists traveling northbound at the intersection of IL130 and University Avenue were people whose origin (Philo) and destination (Rantoul and Thomasboro) were outside the urbanized area. Southbound, there is a similar travel pattern in which 12% of the trips have an outside destination such as southeast Champaign County (Broadlands and Philo) coming from outside the urbanized area in North Urbana. At the intersection of Cunningham Avenue and Airport Road, the travel pattern showed 16 % of the trips coming from Danville going to Rantoul and North Urbana, and 12% of the trips coming from Rantoul traveling southbound to Mattoon and Danville.

Figure 3-15: Peak Hour Traffic Count Ranges



4 Future Conditions

The IL130/High Cross Road corridor planning process resulted in a set of transportation projects, the Preferred Alternative (see Figure 4-1). These projects, if implemented, should significantly improve anticipated traffic congestion and safety issues in the corridor. All projects in the Preferred Alternative help achieve the corridor study goals, which are consistent with existing plans for transportation and land use. This section will evaluate how the Preferred Alternative compares to future transportation and environmental conditions that would likely occur under a "No Build" alternative.

4.1 The Preferred Alternative

Considerable public involvement led our efforts to create a Preferred Alternative that balanced the sensitive areas north of I-74 with the planned mixed-use areas south of I-74. It needed to include improvements that could handle the significant traffic that would be created by the commercial, residential, and industrial areas planned for south of I-74, yet channel that traffic in ways that would not significantly interfere with the more rural and natural landscapes to the north. The Preferred Alternative is not a perfect solution for mitigating congestion and other transportation issues in the corridor; some congested or near congested roads will still likely be present even if all projects are constructed. Other concepts such as safety, access, roadway and land use design, and multi-modal options must all be implemented in conjunction with the proposed improvements in order to optimize travel conditions for all users in the corridor.

Table 4-1: Preferred Alternative Improvements Summary

Project Type	Number of Projects	Length (miles)
Road improvements, no new lanes	3	6.50
Bridge improvements	2	NA
Bicycle & Pedestrian Paths	4	5.75
Road improvements with additional lanes*	5	7.75
Total	14	**20**

**Does not include frontage roads for some commercial areas that will be constructed with new developments*

4.2 Preferred Alternative vs. No Build Alternative

Analysis completed during the study process showed how the corridor study area transportation system would likely perform and how the natural environment would be affected in the year 2025 given moderate growth in population and employment assuming that no transportation improvements were made. This "No Build" alternative can be compared to the Preferred Alternative to illustrate how effective each is in mitigating congestion and negative environmental impacts in the study area.

4.2.1 Transportation

The No Build alternative assumes that only projects currently included in the upcoming four year Transportation Improvement Program (TIP) for the urbanized area will be constructed in the study area. There are three projects in the study area that are set to be completed within that time period: a shared use pedestrian/bicycle facility along the west side of IL130 between Windsor Road and US150, improving Windsor Road between IL130 and Philo Road from a 2 lane road to a 4 lane road, and the extension of Florida Avenue from its current terminus to IL130. These projects are also assumed for the Preferred Alternative.

Figure 4-1: Preferred Alternative

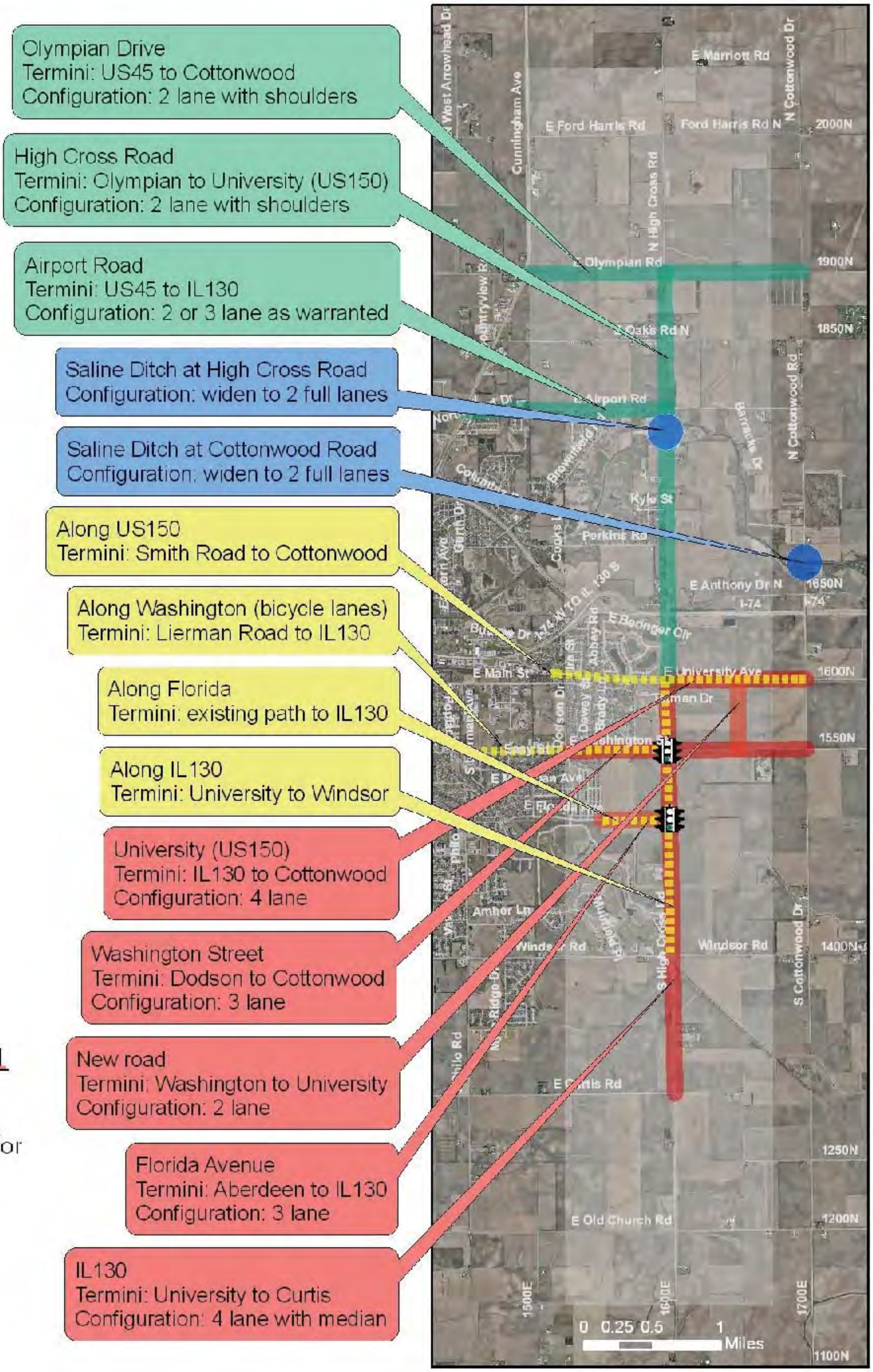
ROADWAY IMPROVEMENTS ONLY; NO NEW LANES PROPOSED

BRIDGE PROJECTS

BICYCLE PEDESTRIAN PATHS

ROADWAY IMPROVEMENTS WITH ADDITIONAL LANES PROPOSED

Traffic signals are planned for Il 130 at Washington Street and at Florida Avenue



4.2.1.1 Mobility

Figure 4-2 shows congestion levels for study area roads in 2025 under the No Build alternative according to the CUUATS Travel Demand Model. The colors green, orange, and red represent progressively worse levels of congestion during the peak hour of travel. Level of Service (LOS) A, B, and C (represented with gray on the figure) are considered acceptable for the roadway network. As can be seen in the figure, the majority of the IL130/High Cross Road corridor will not be able to handle the amount of traffic anticipated in 20 years if no improvements are made.

Figure 4-3 shows congestion levels for study area roads in 2025 under the Preferred Alternative according to the CUUATS Travel Demand Model. With the exception of Curtis Road and a small portion of Main Street east of Smith Road, there are no congestion issues in this scenario. The combination of projects in the Preferred Alternative creates this situation; all projects in the Preferred Alternative are considered necessary to achieve these travel conditions. The expansion of transit services would also be necessary to achieve the illustrated congestion levels; however, no new transit routes were proposed or approved as part of this study. As conditions warrant, local agencies will evaluate the need and possible locations for transit service expansion.

4.2.1.2 Safety

Planning and implementing for safety in the transportation network can be done through access management, which controls how many accesses can be opened along an arterial roadway. In the urbanized area, access management is evaluated and implemented using CUUATS Access Management Guidelines. In both the No Build and Preferred Alternative, access will be evaluated and applied to the projects listed in the LRTP (Windsor Road improvement and Florida Avenue extension). In addition, frontage roads will be constructed as part of the anticipated commercial centers on IL130 south of US150 where practicable for both alternatives. Frontage roads can help improve safety by reducing the number of accesses along the corridor and thus reducing the number of potential conflicts between travelers. Access can also be evaluated and perhaps improved for other Preferred Alternative projects such as the improvement of Washington Street to three lanes between Dodson and IL130.

Safety can also be improved by reducing conflicts between transportation modes (automobiles, transit, bicycles, and pedestrians). For both the No Build and Preferred Alternative, there are myriad design elements that can be applied to roadways, bicycle and pedestrian facilities, and transit facilities to mitigate modal conflicts. Creating on-street bike lanes, off-street shared use (pedestrian & bicycle) paths, bus pullout stations, and pedestrian countdown signals at intersections are some of the many ideas that can help increase safety.

It is difficult to compare safety of the No Build Alternative versus the Preferred Alternative. It is logical, however, that with more traffic volumes in all modes along IL130, if no improvements are made, safety will become an increasingly critical issue.

4.2.2 Environment

Seven environmental factors were considered when analyzing the No Build and Preferred Alternatives. The full environmental report can be found in Appendix 3. The following is a summary of the results.

4.2.2.1 Air Quality

Transportation related air quality concerns include Ozone (O3), Hydrocarbons (HC), Nitrogen Oxide (NOx), and Carbon Monoxide (CO). For this study, CO analysis was performed in order to evaluate the localized traffic impacts on air quality at the busiest intersection of existing and proposed alternatives. The projected CO levels were then compared with the existing levels and the thresholds of 1-hour CO concentration, which is 35 parts per million (PPM) according to National Ambient Air Quality Standards (NAAQS). The intersection of US150 (University Avenue) at IL130 was analyzed for air quality concerns in the study area because it is anticipated to be the busiest intersection in the future.

Figure 4-2: 2025 Level of Service (No Build Alternative)

Figure 4-3: 2025 Level of Service (Preferred Alternative)

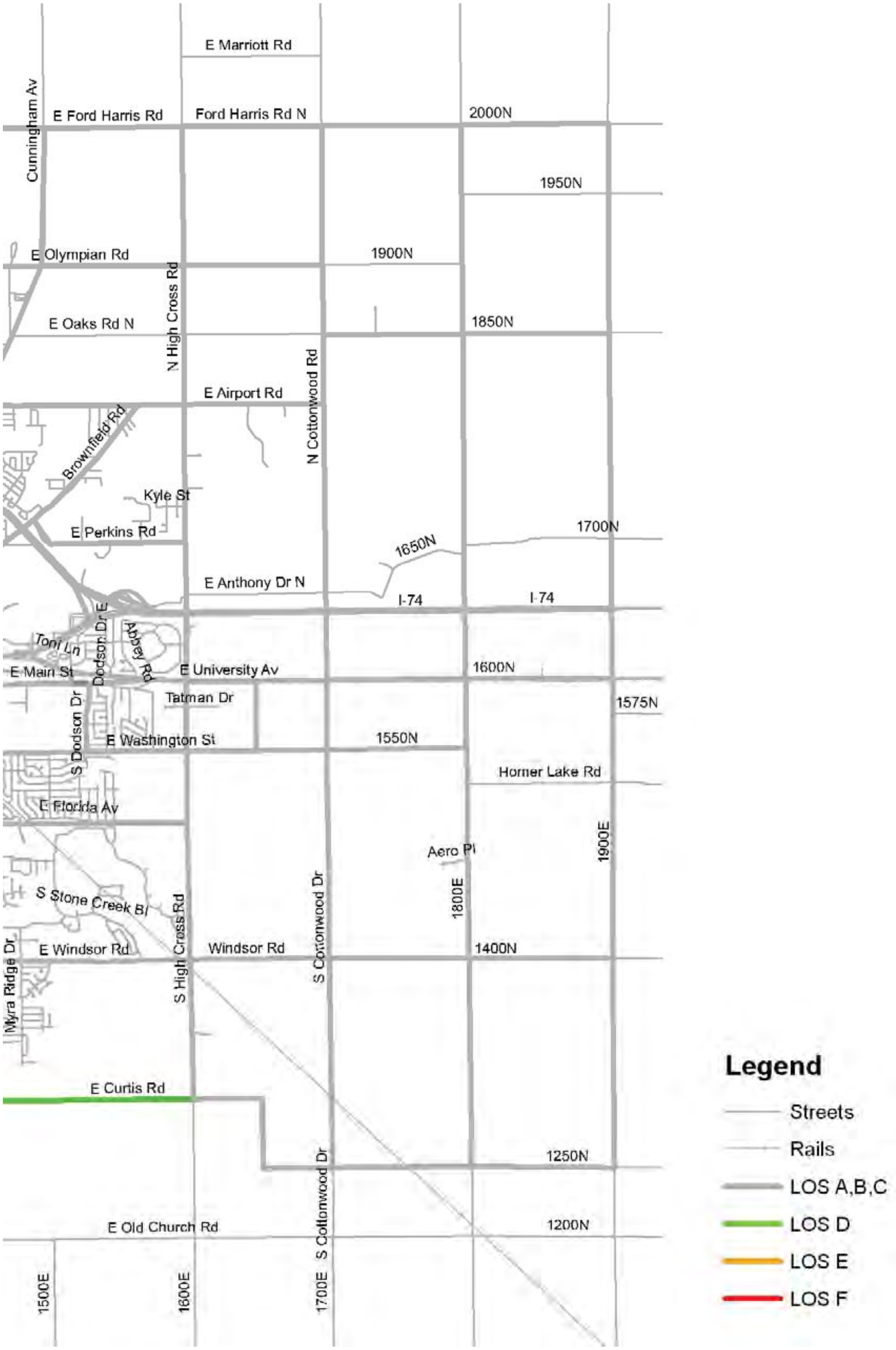


Table 4-2 shows the CO concentrations at the intersection of IL130 and US150 for existing conditions (2005), No Build and Preferred Alternative. The CO concentrations are below federal air quality standards for both the Preferred Alternative and the No Build Alternative. Although the two alternatives have no significant difference in the average of CO concentrations, the No Build Alternative has the higher estimated CO concentration near the IL130 and US 150 intersection. Based on the results of CO analysis, the project will not cause any new violations of the CO standard, and it can be assumed that the study area would be in attainment.

Table 4-2: Maximum 1-hour CO Concentration at the Intersection of IL130 and US150

Receptor ID	Existing Condition (Year 2005)	No Build Alternative (Year 2025)	Preferred Alternative (Year 2025)
1	-	-	-
2	8	10.5	10.4
3	8.5	10.8	10.7
4	11.8	16.9	16.6
5	9.7	15.3	14.7
6	8.3	10.3	10.1
7	6.8	8.8	8.6
8	5.9	7.8	7.6
9	2.7	3.5	3
10	3.4	3.7	3.8
11	5.8	7.2	7.2
12	8	10.1	10
13	5.7	7.7	7.5
14	6.1	8	7.9
Average	7	9.3	9.1
NAAQS	35	35	35

4.2.2.2 Noise

Several major road segments along the IL130 Corridor were selected as sites to estimate and evaluate traffic noise levels. Future traffic volumes were obtained from CUUATS Travel Demand Forecasting Model and put into the FHWA Traffic Noise Model Screening in order to get predicted traffic noise. Table 4-3 shows the noise levels at the nearest building from the centerline of the road for existing and future transportation alternatives.

Table 4-3: Estimated Traffic Noise Levels

Sites	Noise Level (L_{eq} (1)) *		
	Existing 2005	No-Build Alternative 2025	Preferred Alternative 2025
IL130 & N of Windsor Rd	51.4	54.4	54.5
IL130 & S of Washington St	53.6	56.6	56.8
IL130 & S of Tatman Ct	59.3	62.4	61.6
IL130 & N of US150	57	59.9	59.7
High Cross Rd & S of Perkins Rd	44.3	46.5	47.1
High Cross Rd & S of Airport Rd	39.2	42.8	43.9

*This is estimated for distance from the centerline of the roadway to the nearest building.

Traffic noise impact will have occurred when the predicted levels approach or exceed the criteria of 66 dBA or when predicted traffic noise levels substantially exceed the existing noise level, even though the predicted levels may not exceed the criteria. As shown in Table 16, estimated traffic noise levels for the year 2025 are highest at the intersection of IL130 and Tatman Court, and lowest at the intersection of High Cross Road and Airport Road. However, all of the estimated noise levels do not exceed the noise criteria and are kept under 66 dBA.

Increases of predicted noise levels from existing conditions are about 5% for both the No-Build Alternative and the Preferred Alternative. Both alternatives are expected to be similar in terms of the magnitude of the noise. However, the No Build Alternative shows slightly higher noise levels along IL130 between US 150 and Tatman Court, which is one of the busiest roadway segments. Overall, we may conclude that traffic noise impacts by both alternatives would not significantly affect the study area.

4.2.2.3 Wildlife/Vegetation Habitat

Future transportation impacts on wildlife and vegetation habitats in the study area include transportation improvement projects and various developments. Both the No Build and Preferred Alternatives will affect natural habitats because increased traffic volumes may exacerbate existing negative highway/wildlife interactions.

The No Build Alternative would produce no new habitat disturbance in the project area. However, continued and anticipated increases in traffic would result in increased disturbance. On the other hand, the Preferred Alternative includes road widening on Airport Road, which is adjacent to the sensitive natural area of Brownfield Woods. Although the road widening of Airport Road from US 45 to High Cross Road would not have direct impacts such as habitat loss, it would increase habitat disturbance and adversely affect wildlife.

The mitigation measures that can help avoid negative impacts are as follows:

- Proper maintenance of wildlife fencing
- Keeping the highway free of trash
- Eliminating unnecessary lighting and other attractants; this would help prevent wildlife entering the highway
- Signs alerting drivers to possible presence of wildlife
- Include design features such as bridges and/or large-size culverts in order to minimize animal mortalities
- Maintaining natural lighting to the extent possible along the roadway.

4.2.2.4 Wetlands

Wetlands crossing the IL130/ High Cross Road Corridor were identified in the existing conditions section. Out of 32.2 acres of wetland within the study area, 0.06 acres of the forested wetland is crossed by High Cross Road around the Saline Ditch bridge. Using the same method applied in the existing condition (see Appendix 3), estimates of impacted wetland area were produced for each of the alternatives, and the area of impact was calculated from the map using Geographic Information Systems (GIS).

The No Build Alternative would have no impact on the area. Only naturally occurring modifications due to erosion and other minor earthen modifications would occur. The Preferred Alternative would also have no additional impact on existing wetlands. Since the Preferred Alternative maintains High Cross Road north of I-74 as a 2-lane roadway, no additional wetland areas would be affected.

4.2.2.5 Water Quality

Major issues associated with surface water in terms of transportation are storm water runoff and its impacts on water quality to surrounding waters. Vehicle exhaust, wear and tear of vehicles, salting and sanding practices, or highway construction, operation and maintenance may deposit contaminants on the roadway surface. These pollutants can be washed off when raining or snowing, disperse through air and eventually be carried by storm water runoff. Increasing roadway surface and traffic volume can increase vehicle emission and airborne pollutants, and then affect highway runoff and water quality.

Increased traffic may contribute to the deterioration of water quality. In the long run, it can be assumed that the water quality of existing storm water runoff is somewhat degraded due to the existing urban development in the study area, discharges resulting from agricultural areas, and potential contaminants resulting from highway runoff. However, the short-term impacts to water quality of the Saline Branch are expected to be less during the operation of the facility than during construction, assuming proper mitigation measures are implemented in the design and construction of the facility.

Although population growth brings natural increases in traffic volume, the No Build Alternative may further contribute to the deterioration of water quality. However, overall use support would remain the same as the existing condition. Since projected traffic volumes would be similar in the Preferred Alternative, the impact on surface water quality would be similar to the No Build Alternative. Although the construction phase for Saline Ditch bridges would degrade water quality, overall use support would remain the same as the No Build Alternative.

4.2.2.6 Visual Quality

Visual impact depends on the degree of change to the visual resource and the viewers' response to that change. The visual impacts in this section discuss the long-term impacts expected as the result of implementing the Preferred Alternative since the No Build Alternative has no physical change on the road. It was assumed that the No Build Alternative has no new impact on the area although the drivers would not enjoy the same level of views as they currently do due to anticipated traffic increases.

The visible structural features of the Preferred Alternative have been assessed and compared in terms of the degree of changes in visual quality caused by highway projects. As described in the Environmental Existing Conditions Report (Appendix 3), factors affecting the visual quality include the highway surface itself such as the number of lanes, width, pavement materials and color and roadside structures such as slope retention, drainage, and roadside planning. In addition, roadway signs, lights and traffic control devices were added in order to determine the visual impacts. A highway may improve visually if it increases the unity and visual harmony of a landscape.

Field observations were made in August 2003, and photos taken at five different points provide the basis for comparing the various roadway projects that are being considered. Renderings of the proposed views at several locations represent the future views that result from implementing the Preferred Alternative.

Figure 4-4 shows the typical view along IL130 between US 150 and Windsor Road looking from south to north, and Figure 4-5 is a rendering of the proposed view along IL130 between US 150 and Washington Street looking from south to north. While the future view remains the same as the existing view in terms of the scale of the change, the future view shows elements of an urban road due to the new addition of a traffic signal, more lanes, the median, and road signs. The surface appearance of lines and colors of the roadway and the roadside structures were enhanced in the future view.

Figure 4-4:
Existing View: IL130 north of Windsor facing north

Figure 4-5:
Future View: IL130 at Washington Street facing north

Figure 4-6 represents the views of High Cross Road north of I –74. This figure displays the rolling land surface, a farmhouse, cornfields, grassland, ditches, and wooded areas. Overall, the future view (Figure 4-7) keeps the character of a rural roadway, and the scale is the same in both views. Changes in the view include neat lines, flat surface, and roadside characteristics. As a result, it can be said that the visual impact of the transportation projects on this portion of the street could be positive.

Figure 4-6:
Existing View: High Cross north of I-74

Future Conditions

Figure 4-7:
Future View: High Cross north of I-74

Figure 4-8 shows the most sensitive area to the viewers, which is the wooded area near Brownfield Woods along High Cross Road between Airport Road and Oaks Road. With the same level of the scale of the proposed transportation projects, High Cross Road would have a clean surface look while keeping the character of a two-lane rural roadway (Figure 4-9). The Saline Ditch bridge project will add the shoulders and enhanced guardrails. The visual impact on the area could be considered positive.

Figure 4-8:
Existing View: Brownfield Woods

Figure 4-9:
Future View 1: Saline Ditch Bridge

Figure 4-10:
Future View 2: Airport Road

The Airport Road improvement project (Figure 4-10) might have impacts on the existing visual value of the woods seen from the roadway because the expansion of the road width requires the removal of vegetation, and a two-lane roadway might reduce the natural experience when driving through the wooded area.

Based on the factors affecting existing visual quality, it can be concluded that the Preferred Alternative would not significantly alter views of IL130/High Cross Road. Improved design of the Preferred Alternative will provide aesthetically pleasing views in terms of the surface look and roadside landscaping except the portion of Airport Road, which could have diminished visual quality.

4.2.2.7 Light Pollution

Environmental impacts of transportation associated light pollution have two different aspects. For the area south of I-74 along IL130, the corridor is proposed to be a 4-lane roadway. Since more commercial and residential developments are anticipated in this area, transportation related lighting issues would be to add proper lighting in order to improve a sense of safety, security, and attractiveness to residents and drivers. Both the No Build Alternative and the Preferred Alternative would install more lighting. In terms of the light pollution, there would be no negative impact if lighting was installed considering the surroundings.

On the other hand, the area north of I-74 maintains features of current conditions such as a 2-lane roadway along High Cross Road. Although several transportation improvement projects are proposed in the Preferred Alternative, none of them includes a new road or expansion north of I-74.

Excessive transportation lighting of the highway can cause nighttime glare that can extend into adjacent lands, and disturb the routine activities of nocturnal animals. Generally speaking, natural lighting will reduce the attraction of the highway to wildlife, thereby decreasing highway-related wildlife mortalities. By the same token, the U of I Atmospheric Observatory exists along High Cross Road north of Olympian Drive, which requires unobstructed nighttime darkness. Therefore, transportation related lighting in this area should maintain natural lighting levels as much as possible.

The No Build Alternative would increase lighting impacts. Due to the naturally increased traffic in the northern portion of the study area, vehicle headlights would affect wildlife in the natural areas and research facilities. However, the lighting impacts of the Preferred Alternative would be less than the impacts of the No Build Alternative. The projected traffic volume of the Preferred Alternative would be less north of I –74 and slightly more south of the I-74, which means less impact on the natural areas and more impact on the commercial areas. If the proper mitigation measures were considered in the design process of the alternative, the lighting impacts to wildlife as well as to the residents and drivers would decrease.

4.3. Public Comment

Public comment over the course of the planning process has generally indicated the desire for "no change" to transportation or land use north of I-74 and accepting of changes to the transportation network and land use south of I-74. When introduced to the congestion issues that would be created by the No Build Alternative, however, participants in the Strings and Ribbons workshops held in 2006 identified projects both north and south of I-74 that could be done to mitigate the congestion. A complete inventory of public comments can be found in Appendix 7.

5 Implementation

Implementing the recommended improvements in the IL130/High Cross Road Corridor study area would require change on a variety of levels. County and local governments might need to consider changes to local ordinances to reflect recommended transportation improvements or design concepts. To mitigate anticipated congestion, mobility, and safety issues in the transportation system, state and local governments would need to prioritize roadway and alternative transportation mode projects that they might not have considered previously. Developers would be asked to consider design concepts to which they might not be accustomed. And residents would be asked to accept changes in their communities and neighborhoods that reflect better development practices, perhaps at the expense of how their current environment looks and functions.

This section will:

- Detail an implementation plan for the Preferred Alternative
- Provide cost estimates for transportation projects
- Identify potential funding sources for transportation projects
- Provide strategies for implementing ideas in the Plan
- Offer design recommendations applicable to the study area
- Discuss issues that need to be considered in more detail

5.1 Implementation Plan for the Preferred Alternative

The Implementation Matrix on the following pages shows how the different phases of the corridor study process are linked and how they contribute to the end product. In the matrix, information is provided about each Preferred Alternative element in terms of:

- Priority: What is the relative importance of implementing the project? (see Section 5.1.1)
- Estimated Cost: What is the estimated construction cost in 2006 dollars?
- Participating Agencies: Who would need to participate in the implementation of the project?
- Potential funding sources: Where could the funding come from to build this project?
- Issues being resolved: What issues does the implementation of this project resolve?
- How the project helps solve issues: How are the issues resolved?
- Related goals: Which goals identified in the process relate to the project? (see Section 2.5)
- Relevancy to goals score: How well would the project achieve the corridor study goals?
- Obstacles: What are some of the obstacles to implementing the project?

The Implementation Matrix can be used as a quick reference for beginning to implement the recommendations from the corridor study.

5.1.1 Project Prioritization

Preferred Alternative projects have been prioritized into High, Medium, and Low categories. The Implementation Matrix provides a column for prioritization. This project prioritization should be used as a guide for implementing the projects as funding becomes available. Projects are not prioritized within each of these groups, as funding opportunities vary for different types of projects, and those opportunities may affect the order of implementation.

- High Priority projects have positive benefits, such as improving transportation operations and safety, increasing mobility, and/or reducing congestion. In general, these projects could be funded out of existing programs, but need to be compared to existing projects to determine when they should occur. High Priority projects should be implemented within the next one to three years.

Table 5-1: Implementation Matrix for Preferred Alternative Projects

Alternatives	Priority	Estimated Cost (2006$)	Participating Agencies	Potential Funding Sources	Issues being resolved	How project helps solve issues	Related Goals (see Section 2)	Relevancy to Goals Score (out of 100)	Obstacles to Implementation
Roadway improvements only; no new lanes proposed									
Airport Road between IL130/High Cross and US45, 2 or 3 lane improved as warranted	Med	$5,250,000	County, Urbana, Township	County, Urbana, Township, Federal, State	congestion, safety	Increases capacity and options for people traveling to/from US45	1,2,3,4,5,6	52.44	Right of way availability/acquisition, funding, environmental concerns
High Cross between Olympian and University, 2 lane with shoulders	Med	$7,500,000	County, Urbana, Township	County, Urbana, Township, Federal, State	congestion, safety	Increases capacity of roadway, improved surface increases safety	1,2,4,5	39.30	Right of way availability/acquisition, funding, environmental concerns
Olympian between IL130/High Cross and US45, 2 lane with shoulders	Low	$3,000,000	County, Urbana, Township	County, Urbana, Township, Federal, State	congestion, safety	Improves regional access to community; offers other option for traveling east-west in Urbana-Champaign	1,2,3,4,5,6	66.30	Right of way availability/acquisition, funding, environmental concerns
Olympian between IL130/High Cross and Cottonwood, 2 lane with shoulders	Low	$3,000,000	County, Urbana, Township	County, Urbana, Township, Federal, State	congestion, safety	Improves regional access to community; offers other option for traveling east-west in Urbana-Champaign	1,2,3,4,5,6	57.30	Right of way availability/acquisition, funding, environmental concerns
Bridge Projects									
Saline Ditch Bridge at High Cross, widen to at least 2 full lanes	Med	$1,000,000	Township	Township, State	congestion, safety, environment	Widening decreases potential conflict for all modes	1,2,5	42.00	Environmental concerns, funding
Saline Ditch Bridge at Cottonwood, widen to at least 2 full lanes	Low	$1,000,000	Township	Township, State	congestion, safety, environment	Widening decreases potential conflict for all modes	1,2,5	49.32	Environmental concerns, funding

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Table 5-1: Implementation Matrix for Preferred Alternative Projects *(continued)*

Alternatives	Priority	Estimated Cost (2006$)	Participating Agencies	Potential Funding Sources	Issues being resolved	How project helps solve issues	Related Goals (see Section 2)	Relevancy to Goals Score (out of 100)	Obstacles to Implementation
Bicycle/Pedestrian Paths									
Along west side of IL130/High Cross between Windsor and University	High	$850,000	Urbana	Urbana, Federal Enhancement funding	safety, multimodalism	Reduces potential multimodal conflict, promotes other transportation modes	1,2,3,4,5,6	72.54	None
Along Washington between IL130/High Cross and Lierman (bike lanes)	High	$450,000	Urbana, developers	Urbana, developers, grants	safety, multimodalism	Reduces potential multimodal conflict, promotes other transportation modes	1,2,3,4,5,6	75.51	Funding
Along US150 between IL130/High Cross and Smith	Med	$300,000	Urbana, CCFPD	CCDC, grants, Urbana	safety, multimodalism	Reduces potential multimodal conflict, promotes other transportation modes	1,2,3,4,5,6	62.14	Right of way availability/acquisition, funding
Along US150 between IL130/High Cross and Cottonwood	Low	$300,000	Urbana, CCFPD	CCDC, grants, Urbana	safety, multimodalism	Reduces potential multimodal conflict, promotes other transportation modes	1,2,3,4,5,6	65.42	Right of way availability/acquisition, funding
Roadway improvements with additional lanes proposed									
Traffic signal at Washington & IL130/High Cross intersection	High	$250,000	Urbana, IDOT, developers	Urbana, IDOT, developers	congestion, safety	Helps improve traffic flows, increases safety for all travel modes	1,2,3,5,6	84.17	None
Florida extended east to IL130	High	$1,850,000	Urbana, landowners	Urbana, landowners	congestion, safety	Opens new access to IL130, eases congestion on other roads; provides shared use path along roadway	1,2,3,5,6	NA	None
Washington between IL130/High Cross and Dodson, 3 lane with curb and gutter	High	$3,500,000	Urbana, developers	Urbana, developers	congestion, safety	Increases capacity for roadway, improves access to major activity corridor (IL130) for all modes	1,2,3,5,6	66.11	Right of way availability/acquisition, funding

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Table 5-1: Implementation Matrix for Preferred Alternative Projects *(continued)*

Alternatives	Priority	Estimated Cost (2006$)	Participating Agencies	Potential Funding Sources	Issues being resolved	How project helps solve issues	Related Goals (see Section 2)	Relevancy to Goals Score (out of 100)	Obstacles to Implementation
Roadway improvements with additional lanes proposed *(continued)*									
IL130/High Cross between University and either Windsor, Curtis, Old Church, or farther as warranted, 4 or 5 lane as warranted with a landscaped median	High	$10,500,000	IDOT, developers	IDOT, developers	congestion, safety	Increases capacity for roadway, improves access to major activity corridor (IL130) for all modes	1,2,3,5,6	57.87	Funding
-Between Florida and University with Frontage Road	High	NA	IDOT, developers	IDOT, developers	congestion, safety	Increases capacity for roadway, improves access to major activity corridor (IL130) for all modes	1,2,3,5,6	57.87	Funding
-Between Windsor and Florida w potential Frontage Road	Med								
-South of Windsor	Low								
New Road between US150 and Washington east of IL130	Med	$3,500,000	Urbana, developers	Urbana, developers	congestion, safety	Mitigates anticipated congestion issue by taking some traffic off IL130	1,2,3,5,6	39.30	Right of way availability/acquisition, funding, environmental concerns
Washington between IL130/High Cross and Cottonwood, 4 lane	Med-Low	$7,000,000	Urbana, County, Township, developers	Urbana, County, Township, developers	congestion, safety	Increases capacity for roadway, improves access to major activity corridor (IL130) for all modes	1,2,3,5,6	61.62	Right of way availability/acquisition, funding, environmental concerns
University Ave between IL130/High Cross and Cottonwood, 4 lane improved	Med-Low	$7,000,000	IDOT, developers	IDOT, developers	congestion, safety	Increases capacity for roadway, improves access to major activity corridor (IL130) for all modes	1,2,3,5,6	60.85	Right of way availability/acquisition, funding, environmental concerns

- **Medium Priority** improvement projects have positive benefits, but would require significant additional resources and/or strong support from other agencies or interested parties. Implementation of these projects should also occur within the next three to ten years. Funding for these projects is uncertain.
- **Low Priority** projects have mixed or minimal positive benefits and/or funding is highly unlikely in the next 10 years. In general, the costs for these projects do not justify the benefits, given the limited funding sources.

5.1.2 Estimating Preferred Alternative Project Costs

Based on recent transportation projects, estimates can be made for constructing/improving roadways. The Implementation Matrix provides a rough cost estimate for each project in the Preferred Alternative. These estimates are for construction only; they do not include design, engineering, right-of-way acquisition, or utility adjustments, which consume sizable portions of a project budget.

At this time, there are four projects that have identified funding sources in local plans:

- Shared use path along the west side of IL130 between Windsor and US150—funded by federal Transportation Enhancement funds, City of Urbana
- Extension of Florida Avenue east to IL130—funded by City of Urbana, landowners/developers
- Traffic signalization at the intersection of Washington Street and IL130—funded by City of Urbana, developers
- Windsor Road widening and improvements between IL130 and Philo Road—funded by City of Urbana, Champaign County, and Surface Transportation Program (STPU) funds distributed by IDOT.

No other transportation projects have funding currently allocated to their construction. Each recommended project will need to be considered against existing priorities to determine the order in which they should ideally occur. Funding then must be sought based on this reprioritization.

5.2 Potential Funding Sources

5.2.1 Federal Funding

Federal Sources Summary

Surface Transportation Program (STP)

- Annual allocation to Champaign-Urbana-Savoy-Bondville Urbanized Area
- Variety of project types available for funding
- Most reliable source
- Distribution of funds from IDOT for any one MPO typically every 3-4 years

Federal Transit Administration

- Section 5307/5309/5311
- Different projects fall under different sections
- Reliable source; yearly for some sections, others are grant based

Appropriation earmarks

- Every 6 years with new federal transportation authorization bill (SAFETEA-LU)
- Least reliable source
- If awarded, funding amount can be significant

Surface Transportation Program
The Surface Transportation Program (STP) provides funding for all types of transportation projects, including pedestrian and bicycle facilities. Within the metropolitan planning boundary, projects are selected through a project prioritization process and outlined in the Transportation Improvement Program (TIP) created yearly by the Champaign-Urbana Urbanized Area Transportation Study. Outside the planning boundary, projects are selected through the State Highway Improvement Program. Within STP funding, there are several unique funding programs:

- Safety: 10% of STP funds are available only for safety programs such as railway-highway crossing projects and hazard elimination.
- Transportation Enhancements: 10% of STP funds are available for projects that include pedestrian and bicycle facilities, educational programs, landscaping, and historic preservation, among other factors.

Federal Transit Administration Section 5307/5309/5311
Federal funding for public transit provision has been designated through three sections of the transportation appropriations budget: sections 5307, 5309 and 5311.

- 5307: For urbanized areas, grants are available under this section for capital projects and to finance the planning and improvement costs of equipment, facilities, and associated capital maintenance items for use in mass transportation.
- 5309: For urbanized areas, grants and loans from this section assist state and local governmental authorities in financing capital projects for: fixed guideway systems; property and improvements needed for an efficient and coordinated mass transportation system; capital costs of coordinating mass transportation with other transportation; the introduction of new technology, through innovative and improved products, into mass transportation; capital projects to replace, rehabilitate, and purchase buses and related equipment and to construct bus-related facilities; and mass transportation projects planned, designed, and carried out to meet the special needs of elderly individuals and individuals with disabilities
- 5311: For areas outside the urbanized area, grants are available for transportation projects that are included in a State program of mass transportation service projects (including service agreements with private providers of mass transportation service).

Appropriation earmarks
The federal government creates a transportation appropriations bill every six years. Within this bill, a small percentage of the funding goes to earmarked projects garnered through political support and based on community need. Earmarked funds are used in almost any type of transportation construction project. In the most recent SAFETEA-LU appropriations bill, $5.6 million was earmarked for the construction of Curtis Road between Duncan and First Street to meet up with the new interchange at Interstate 57. While this is arguably the biggest funding source opportunity, it also is the least frequent (every 6 years or more), can have a long process (SAFETEA-LU took two years to be passed), and is the least likely to be successful due to the national competition for earmarks.

5.2.2 State Funding

State Sources Summary

Motor Fuel Taxes (MFT)
- Annual allocation to municipalities and County
- Variety of project types available for funding
- Most reliable source

Bonds
- Issued by states and other government levels
- Often requires referendum
- More flexible than other sources in terms of project requirements

Enhancement Funding
- Federal funding distributed through a state grant application process
- Application cycles are every few years; no set cycle
- Good source for bicycle and pedestrian projects

Gas tax increases
- Can be done at federal, state, or local level
- Often requires referendum

Motor Fuel Taxes
Motor Fuel Taxes (MFT) are collected on each gallon of gasoline/diesel sold in the state. The funds are then distributed to:

- Municipalities, based on population
- Counties, based on the number of vehicle registrations in their jurisdiction
- Road districts/townships, based on their proportion of total road mileage in the state

MFT monies can be used for roadway construction and maintenance projects with the authorization of the IDOT District office. Allocations are provided monthly and are a relatively stable source of external income for local governments.

Bonds
Bonds are debt obligations issued by states, cities, counties and other governmental entities to raise money to build projects for their communities. Issuing a bond often requires a referendum to determine if the public backs the idea. Bonds can be used to pay for a variety of projects such as roadway improvements, libraries, and schools. Bonds can be repaid using such tools as: property tax levies that sometimes are assessed only in areas benefiting from the improvement; sales taxes, and special fees (I.e. sewer fees, parking fees, etc.).

Enhancement Funding
While Transportation Enhancement Funding comes from the federal government, it is distributed via state transportation officials.

Gas tax increases
A gas tax can be increased to fund transportation projects at the state level. Counties and municipalities can also institute a gas tax to help pay for one or more transportation projects (temporary) or for general transportation system maintenance and operation (permanent). At this time, no local gas taxes have been levied in Champaign County or its municipalities.

5.2.3 Local Funding

Local Sources Summary

Local Budgets
- Projects typically identified in a Capital Improvements Plan (CIP)
- Projects are often reprioritized for a variety of reasons

Private Contributions
- Can include funding, right of way, easements, trails, etc.
- Often work with local governments to make a project happen

Special Assessments
- One time charge to property owners who benefit from an adjacent road or sewer improvement
- Bond issued to cover up front costs, property owners also pay a share

Special Service Areas
- Tax or assessment in a designated area of the community
- Requires a majority vote of benefiting owners and business

Local Gas Tax
- Can be done at federal, state, or local level
- Often requires referendum

Bonds
- Issued by states and other government levels
- Often requires referendum
- More flexible than other sources in terms of project requirements

Local Budgets

County, municipal, and township budgets all have funding available for roadway construction and improvements. In most cases, plans for how to spend that funding are found in a Capital Improvements Plan (CIP), which generally extends 10 years. If a need to consider a new project becomes apparent, however, projects in the CIP can be reprioritized.

Private contributions

Private donations of land, capital, or infrastructure can be essential to jumpstarting and/or completing a project. As private businesspersons, developers will often give something extra to a development such as open space or a shared-use path. They also sometimes make roadway improvements in anticipation of the traffic their establishment might create, as was the case with Wal-Mart. Public-private partnerships help remove some of the burden from municipal budgets while promoting community involvement and interest in a project.

Special assessments

This type of funding is a one-time charge that state and local governments may impose on property owners who benefit from the construction of adjacent road or sewer lines. A bond is issued to cover the initial costs, and property owners pay their share over a pre-determined timeline.

Special Service Area

Business and property owners may choose to create a special service area (SSA) in concert with a local municipality. Taxes or assessments (whose term typically runs between ten and twenty years) are determined fairly based on proportioning a properties equalized assessed value or width of property frontage or property area. SSAs may fund such things as: marketing, infrastructure improvements, or unique street signs. A SSA must be approved by a majority of the benefiting property owners and business.

Local gas tax (see state funding section)
Bonds (see state funding section)

5.3 Strategies for Implementing Plan Ideas

The following sections offer strategies on how to achieve the goals, objectives, design concepts and construction projects defined in this Plan.

Business and developer recruitment
The City of Urbana should consider attracting businesses and developers which would help make the IL130 corridor a success in terms of the community's desires, in addition to being a financial success for individual property owners and developers. This can be achieved in part by proactive recruitment by entities such as the City's Economic Development Division. The City's 2005 *Comprehensive Plan* and IL130 public process can serve as a basis for deciding what types of development should be targeted for recruitment. The City of Urbana should consider existing zoning for the corridor and consider proactive rezoning for areas where the zoning obviously conflicts with the community's vision as expressed in the 2005 *Comprehensive Plan*. Zoning decisions in the corridor should generally follow the land use direction envisioned by the *Comprehensive Plan*.

Implementing development standards
With four municipalities in the urbanized area there is a certain level of competition between communities for investment in the local market. Although competition can be healthy, in some regions it had led to cities using incentives to "bid" against each other to win investment. Such incentives can be borne by local governments, such as through cost sharing arrangements, or by the public at large, such as when development codes are relaxed. Most development within the IL130 corridor is expected to occur within the City of Urbana. Urbana should carefully weigh the use of incentives for attracting development in the corridor, especially in cases where relaxing development standards would not help solve important transportation and land use needs.

A related issue is how to encourage development which surpasses minimum development standards and is superlative in terms of function and quality. One method to achieve this would be to raise the bar on minimum development standards used by local governments. Another strategy specific to the City of Urbana would be to improve Planned Unit Development standards and processes and to promote their use in the corridor. The intent would be to allow creative solutions for achieving quality design while still holding development to high standards. In terms of transportation, Planned Unit Developments could be used to encourage developments which support transportation choices. Through proper design on a larger scale, trip lengths can be shortened by promoting adjacent uses rather than large, single-use developments. Housing and shopping, for instance, can be adjacent or even mixed successfully when planned carefully. For its success, proper facilities for good circulation between adjacent uses must be installed at the time of development.

Urbana planning staff have provided assistance to property owners in the Route 130 corridor area south of the Interstate by preparing a set of development guidelines. These guidelines help to illustrate the goals and objectives of the community for new commercial development that may occur in this area. A copy of these guidelines can be found in Appendix 5. While the guidelines are advisory, new development must also be responsive to relevant goals of the Urbana Comprehensive Plan, zoning regulations, and the requirements of the Urbana subdivision and development Ordinance.

Early Right-of-Way Acquisition

The Urbana Subdivision and Development Ordinance requires right-of-way dedication consistent with the locations and designations indicated on the Mobility Map of the 2005 *City of Urbana Comprehensive Plan*. Such dedication ordinarily occurs at the time of land subdivision, which may be required for land transfer purposes or to acquire building permits or sanitary sewer hookups. This system helps to ensure that necessary right-of-way is dedicated to serve both existing and potential future development. The Subdivision and Development Ordinance requires that future roadway connections be illustrated by a General Area Plan and/or Preliminary Plat.

Easements

Another considerable expense that has been seen in local transportation projects is the need to move utility lines and other infrastructure to make way for a project. By setting aside some land adjacent to roads that we anticipate will need widening or other improvements in the future, we are avoiding the need to move utilities or purchase land that has been developed.

Easements can also be maintained for the development of open spaces, shared use paths, or future infrastructure needs such as dedicated bus lanes or pull out stations. As a part of the City's subdivision review process, all preliminary plats and final plats are forwarded to all affected agencies and utilities to review the need for easements to ensure access for transportation and utilities. These easements are identified and placed upon the Final Plat.

Project Review

Local governments should insure that a thorough traffic impact analysis be conducted, and that transportation impacts are mitigated through the development. Traffic impact assessments are required by the Urbana Subdivision and Development Code for significant developments that generate identified traffic volume minimums. Extensive traffic studies are also required by IDOT for projects along its facilities.

Development should also provide sidewalks and/or shared use paths so that residents have the opportunity to travel by alternative transportation modes. The Urbana Subdivision and Development Ordinance requires that sidewalks be provided for all new development. In addition, upgrade to a shared use path may be required in certain locations, as indicated in the 2004 *Champaign County Greenways and Trails Plan*, which is incorporated into the City's 2005 *Comprehensive Plan*. The City has begun preparation of a Bicycle Master Plan which will provide further guidance for improved mobility.

Best planning practices indicate multi-modal capability should be included not only within a new development, but providing connections to existing and anticipated future developments. In terms of development quality and characteristics, all new proposed developments should be reviewed to ensure consistency with local agency plans and goals as well as those identified in this corridor study.

Development Impact Fees and Exactions

Cities and counties can by ordinance adopt development impact fees that may be levied against new development at any of several points in the permit process. They are often levied when building permits are issued. These fees can be used to fund a wide range of infrastructure improvements and public facilities, but may not be used on private property. Such fees have the advantage of constituting a uniform cost burden (which can be adjusted over time), by land use, which applies to any project. Impact fees typically come in the form of water and sewer connection fees, road impact fees, school impact fees, and park impact fees.

Champaign County has not yet employed impact fees to the extent that they have been applied in areas such as Chicago. Some fees do apply, however, for sanitary sewer connections and stormwater improvements. The potential for a parkland dedication fee is currently under study by a consortium of local agencies.

Managing Access

Access management controls how many accesses should be accommodated on principal roadways. Controlling access is an important strategy in improving safety and mobility in a corridor. CUUATS has created and approved Access Management Guidelines for the Champaign-Urbana-Savoy urbanized area. The City of Urbana can review, update, and consider formal adoption of these recommendations in the interest of community safety.

5.4 Design Considerations

A variety of design considerations were presented to participants at the October 18, 2006 Public Workshop. Participants were asked to communicate their preference for or against these elements when considering the IL130/High Cross Road study area. Section 5.4.1 identifies those design elements that were favored by a majority of the participants. Section 5.4.2 lists those elements that were considered to be "bad ideas" according to participants. Comments on these elements as well as unique ideas from participants can be found in Appendix 7.

5.4.1 Favorable Design Elements

From a transportation perspective, a roadway with one access for multiple residences is safer and has a better mobility level than a roadway with an access for each residence.

Natural Resources North of I-74

- Signage for motorists to be vigilant of animals
- Minimize lighting that can disturb sensitive natural and residential areas and habitats

Landscape Character in New Residential Developments North of I-74

- Preserve area along Saline Ditch (natural protection area)
- Cluster residential development (one access point for a number of homes versus having individual accesses for each residence)

Landscape Character in New Residential Developments South of I-74

- Make bicycle and pedestrian connections within residential areas
- Use landscaping to help guide pedestrians and bicyclists to and from different parts of the corridor
- Use landscape buffers to reduce land use conflicts, but not be permanent barriers to logical pedestrian movement
- Construct residential roads that calm through traffic and facilitate all traffic modes while reducing conflicts with other travelers (bicycles, pedestrians, other motorists)
- Make road widths within residential areas the minimum width possible according to emergency access needs

Simulated image of possible commercial area on IL130 south of I-74

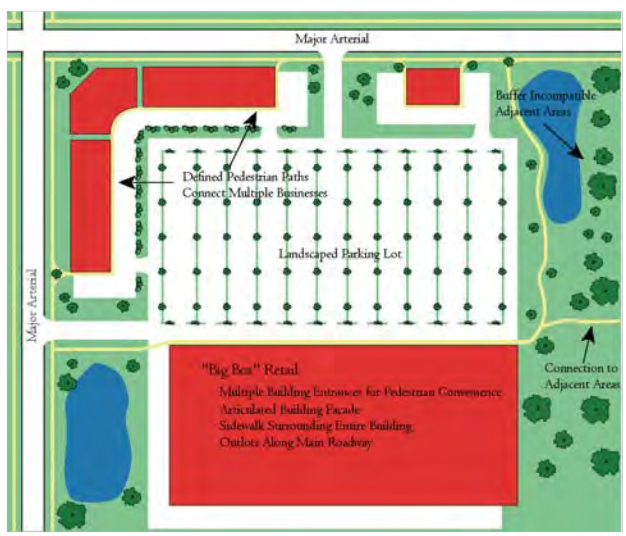
Landscape Character in New Commercial Developments South of I-74

- Make bicycle and pedestrian connections between residential and commercial areas
- Make bicycle and pedestrian connections between commercial buildings
- Assuming that transit service exists, provide transit stops that link to sidewalk systems, and do not conflict with bicycle or road systems
- Use landscaping to help guide pedestrians and bicyclists to and from different parts of the corridor

- Use landscape buffers to reduce land use conflicts, but not be permanent barriers to logical pedestrian movement
- Use landscaping to create distinct travel areas for motorists, bicyclists, and pedestrians within parking lots and adjacent to establishments
- Make entrances and paved walkways lead directly to a bus stop where transit is available

A Menards in Naperville, IL
Source: City of Urbana

Building Design South of I-74
- Encourage building design that looks "complex and engaging" rather than a flat, one-color brick wall. Use architectural distinctions between different parts of the building
- Encourage multiple, distinct entrances to different parts of the building
- Façade Materials: Use materials that are consistent with City of Urbana design guidelines, such as brick
- Encourage the use of windows or faux openings to avoid blank, uninterrupted walls
- Use the building to frame any wall signs to naturally draw attention rather than extensive lighting
- Encourage building design that can be converted to easily meet changing market demands



Source: City of Urbana

Parking Lot Design South of I-74: Visual Appearance
- Parking provision should be minimized and take advantage of different operating hours and parking demand of multiple businesses (i.e. restaurants and retail stores have different "peak" business hours and parking needs)
- Create landscaped parking islands to guide traffic flow, provide some infiltration and reduce runoff, and to enhance aesthetics of the development
- Place parking away from the street and behind businesses to enhance the overall appearance of the building and make pedestrian access easier
- Provide landscaping around the building and parking perimeter to provide a visual buffer
- When practicable, utilize paving materials that reduce runoff

How a parking lot is designed and landscaped can make the difference between a car-oriented hardscape and a pedestrian-friendly place to travel between commercial establishments.

Parking Lot Design South of I-74: Bicycles and Pedestrians

- Provide access from handicap parking spaces to internal sidewalks, with appropriate curb cuts if necessary
- Landscape sidewalks in front of the store to channel customers to safer crosswalk areas
- Provide bicycle racks near store entrances
- Narrow access drive widths near entrances to slow traffic and allow easier pedestrian crossing
- Ensure the parking lot and internal sidewalk circulation take multiple entrances into consideration

All clients should have safe access to a commercial establishment, no matter how they arrive: by bicycle, on foot, in a wheelchair, etc.

A pedestrian path leading to a store entrance
Source: City of Urbana

Parking Lot Design South of I-74: Signage

- Permit attractive, context-sensitive signs that are adequate to serve the needs of businesses
- Place landscaping to visually link signs to the site and building
- Group signage to minimize scattered, independent signs
- Place signs near access drives

Parking Lot Design South of I-74: Lighting

- Place lighting on landscaped islands in the parking lot or on the corner of parking spaces
- Provide pedestrian scale lighting along pedestrian walkways to increase pedestrian safety; this is in addition to lighting provided for motorist safety
- In order to minimize spillover lighting to future residential areas, use downward facing lighting
- Dim/turn off lights after business hours or past 10 p.m. for "24-hour" stores
- Direct building lights away from adjacent residential properties or adequately screen them with landscaping or a fence

Group signage to minimize scattered, independent signs
Source: City of Urbana

Multimodal Transportation in Commercial Areas South of I-74

- Provide bus pullouts with shelters along a commercial corridor or on frontage roads
- Make pedestrian connections through parking lots between roadway sidewalks and building entrances
- Provide bike racks next to bus shelters and entrances to buildings

Multimodal Transportation at Roadway Crossings South of I-74

- Include countdown signals at pedestrian crossings
- Create safe mid-block crossings when there is considerable distance between intersection crossings
- Provide exclusive bicycle crosswalks that are visually distinct from adjacent pedestrian crosswalks if the crosswalks are uniting two off street shared use or bicycle paths

A mid-block crossing in Bellevue, WA
Source: Dan Burden

5.4.2 *Unfavorable Design Elements*

The following design elements were not considered favorably by workshop participants:

Natural Resources North of I-74

- Fencing and crossing points to direct animals safely across road
- Bridges for animal crossings
- Under-road culverts for animal crossings

Parking Lot Design South of I-74: Signage

- Encourage external sign lighting

5.5 Issues Requiring Further Consideration

There are several topics that were discussed during this planning process, but still require discussion among the agencies and stakeholders affected and a more detailed analysis to permit their complete resolution.

5.5.1 *Interchange at I-74*

Much of the discussion during public involvement opportunities revolved around a potential interchange at I-74, whether it consists of completion of the "trumpet shaped" interchange at High Cross Road or relocating the existing partial interchange eastward to Cottonwood Road, 1800E, or an other midpoint location. The *2005 Urbana Comprehensive Plan Update* states on Future Land Use Map 2:

> *Improve interstate interchange access at High Cross Road, Cottonwood Road or 1800E to serve growth south of the interstate. Future study shall take into consideration the intent of the city in its Comprehensive Plan that the sector north of I-74 and east of Brownfield Road as shown on Map 2 be "Rural Residential" and the city should protect this neighborhood as an option that is particularly appropriate in this terrain and only after such consideration will determine an appropriate location (p73).*

Participants at the IL130 workshops voiced their concerns about having an interchange at High Cross Road; over 90% of 150 people who commented about interchange location in the June 2006 Public Workshop preferred that the full interchange, if constructed, be located at County Road 1800E.

The location study for an interchange is beyond the scope of this corridor study. The IL130 Steering Committee decided that all comments about the interchange location would be recorded in Appendix 7: Public Comments and would be forwarded on to whomever might undertake a location analysis for an interchange. The Steering Committee's only recommendation regarding an interchange in this Plan is that an Access Justification Report (AJR) be completed, which is common practice when IDOT considers adding interchanges to its system. Such a study must be initiated by a local government body and have funding secured by that local government. An AJR could take 3-5 years to complete given the complexity of the issue in east Urbana.

5.5.2 *Traffic concerns on rural roads*

As the rural landscape develops with small subdivisions and individual residential or other uses, rural roads begin to be compromised in terms of safety because for every development, an access is typically granted onto the adjacent roadway. As traffic volumes increase with development of both the rural and urban areas, safety becomes more of an issue at these access points. In addition, if development warrants roadway improvements that require additional right-of-way, it can be more difficult to work with multiple property owners to gain their approval for such improvements.

The City and County both have tools available to help mitigate safety concerns in the transportation system, such as subdivision review and ordinances. In the current environment of updating County zoning ordinances, both agencies should continue to work together to minimize these concerns.

5.5.3 Complete Streets (from www.completestreets.org)

Complete Streets are designed and operated to enable safe access for all users. Pedestrians, bicyclists, motorists and bus riders of all ages and abilities are able to safely move along and across a complete street.

Creating complete streets means transportation agencies must change their orientation toward building primarily for cars. Instituting a complete streets policy ensures that transportation agencies routinely design and operate the entire right of way to enable safe access for all users. Places with complete streets policies are making sure that their streets and roads work for drivers, transit users, pedestrians, and bicyclists, as well as for older people, children, and people with disabilities.

Streets that provide travel choices can give people the option to avoid traffic jams, and increase the overall capacity of the transportation network. Integrating sidewalks, bike lanes, transit amenities, and safe crossings into the initial design of a project spares the expense of retrofits later.

A good complete streets policy:

- Specifies that 'all users' includes pedestrians, bicyclists, transit vehicles and users, and motorists, of all ages and abilities.
- Aims to create a comprehensive, integrated, connected network.
- Recognizes the need for flexibility: that all streets are different and user needs will be balanced.
- Is adoptable by all agencies to cover all roads.
- Applies to both new and retrofit projects, including design, planning, maintenance, and operations, for the entire right of way.
- Makes any exceptions specific and sets a clear procedure that requires high-level approval of exceptions.
- Directs the use of the latest and best design standards.
- Directs that complete streets solutions fit in with context of the community.
- Establishes performance standards with measurable outcomes.

An effective complete streets policy should prompt transportation agencies to:

- Restructure their procedures to accommodate all users on every project.
- Re-write their design manuals to encompass the safety of all users.
- Re-train planners and engineers in balancing the needs of diverse users.
- Create new data collection procedures to track how well the streets serve all users.

5.6 Conclusion

The purpose of this study was to plan for the logical development of the transportation system based on anticipated land uses and growth. In working with stakeholders to identify issues, goals, and needs, we have created a product that reflects the resolution of the most crucial issues and shows how their needs can be met.

To successfully implement the recommendations in this document, each agency and person that participated in the process should continue to be involved in future planning and development efforts that affect the study area. Benchmarks for successful implementation should be created for both the concepts and construction projects in this document, including appropriate time frames in which these benchmarks should be met. Every concept and project identified in the corridor study is achievable given adequate funding and staffing support. Every effort should be made to implement these ideas using best planning practices, strict controls, and when possible, new ideas that focus on proactively solving problems before they become critical.

1 Forecast population and employment

Population and employment forecasts are calculated to determine how more people and more activity centers will affect infrastructure needs, travel and land use patterns in the future. Appendix 1 provides detailed information on forecasting for the study area.

1.1 Population forecasts

The City of Urbana completed 20-year population forecasts for the portion of the study area that falls within its municipal limits. The forecasts were based on proposed future land uses as detailed in the *2005 City of Urbana Comprehensive Plan Update*. Champaign County Planning and Zoning provided 20-year forecasts based on the maximum number of allowable residential structures that can be built according to the County Zoning Ordinance. CCRPC staff then allocated those projections into two time horizons: 2015 and 2025. Utilizing the two time horizons allows the transportation model to discern when transportation improvements might be needed based on future growth.

Table 1-1: Study Area Population Forecast Summary

ID	TAZ 2003	2000 Population	2005 Population	2015 Population	2025 Population	Total Change
129	NEF005_A	132	132	870	1,055	**923**
36	URB022	513	513	513	513	**0**
113	URB023	966	1,043	1,043	1,043	**77**
117	URB028	3,111	3,111	4,173	4,173	**1,062**
128	URB064_C	184	309	602	989	**805**
120	URB075_A	82	82	1,972	1,972	**1,890**
115	URB082	1,501	1,576	1,576	1,576	**75**
114	URB083	488	488	488	488	**0**
112	URB086	701	701	827	953	**252**
110	URB090	1,539	1,539	2,017	2,017	**478**
142	URB100	104	104	144	264	**160**
143	URB101	102	102	196	290	**188**
144	URB102	17	17	351	685	**668**
145	URB103	0	0	963	963	**963**
146	URB104	20	20	2,020	2,723	**2,703**
147	URB105	47	47	47	1,144	**1,097**
158	URB106	33	33	33	108	**75**
159	URB107	70	70	120	170	**100**
160	URB108	3	3	3	3	**0**
161	URB109	0	0	0	0	**0**
162	URB110	45	45	70	168	**123**
163	URB111	18	18	3	108	**90**
164	URB112	27	27	0	102	**75**
165	URB113	30	30	74	118	**88**
166	URB114	45	45	45	60	**15**
167	URB115	27	27	27	155	**128**
168	URB116	4	4	4	102	**98**
TOTAL		**9,809**	**10,086**	**18,181**	**21,942**	**12,133**

Population & Employment Forecasts

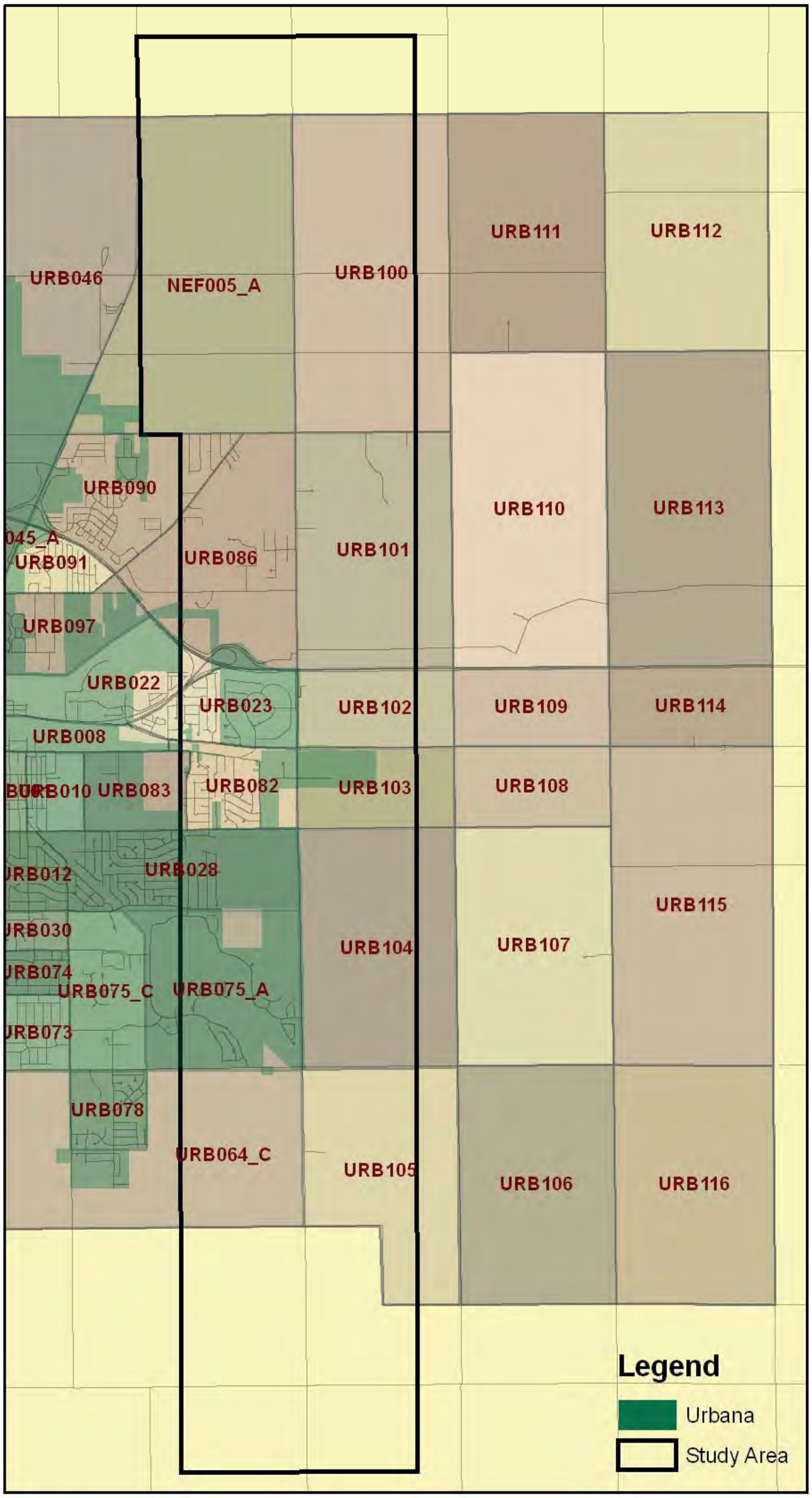
1.2 Employment forecasts

Employment forecasts were similarly completed by the City of Urbana based on the Comprehensive Plan. For the area outside the municipal limits, no new employment was forecasted except in the case of what might occur around a potential interchange with I-74, where commercial and/or industrial development tend to follow near urban areas. The following table assumes that an interchange will be built somewhere along I-74 in the vicinity of the study area, although this study makes no recommendation for or against such an interchange.

Table 1-2: Study Area Employment Forecast Summary

		2000					2005					2015					2025					Total Change
ID	TAZ2003	INDUS	ED/GOV	SERV	RET	TOTAL	INDUS	ED/GOV	SERV	RET	TOTAL	INDUS	ED/GOV	SERV	RET	TOTAL	INDUS	ED/GOV	SERV	RET	TOTAL	
129	NEF005_A	24	0	56	16	96	24	0	56	16	96	24	0	56	16	96	1,024	0	56	16	1,096	**1,000**
36	URB022	1,048	0	18	18	1,084	1,048	0	18	18	1,084	1,048	0	18	18	1,084	1,108	0	18	18	1,144	**60**
113	URB023	2	0	94	9	105	2	0	94	9	105	2	0	94	9	105	2	0	94	9	105	**0**
117	URB028	5	68	55	38	166	5	68	55	38	166	5	68	55	147	275	5	68	55	147	275	**109**
128	URB064_C	3	0	9	0	12	3	0	9	0	12	3	0	9	35	47	3	0	9	70	82	**70**
120	URB075_A	0	10	16	48	74	0	10	16	48	74	0	10	16	399	425	0	10	16	399	425	**351**
115	URB082	203	0	34	28	265	203	0	34	28	265	758	0	34	28	820	758	0	34	28	820	**555**
114	URB083	0	910	17	0	927	0	910	17	0	927	0	910	17	0	927	0	910	17	0	927	**0**
112	URB086	4	3	12	20	39	4	3	12	20	39	4	3	12	20	39	4	3	12	20	39	**0**
110	URB090	4	0	142	2	148	4	0	142	2	148	4	0	142	152	298	4	0	142	152	298	**150**
142	URB100	0	5	2	0	7	0	5	2	0	7	0	5	2	0	7	0	5	2	0	7	**0**
143	URB101	0	0	0	24	24	0	0	0	24	24	0	0	0	24	24	0	0	0	24	24	**0**
144	URB102	0	5	2	0	7	0	5	2	0	7	0	5	6	3	14	0	5	9	6	20	**13**
145	URB103	0	0	0	0	0	0	0	0	380	380	0	0	0	1,140	1,140	0	0	0	1,900	1,900	**1,900**
146	URB104	0	2	0	0	2	0	2	0	0	2	0	2	0	244	246	0	2	0	488	490	**488**
147	URB105	0	0	0	0	0	0	0	0	0	0	0	0	0	25	25	0	0	0	100	100	**100**
158	URB106	0	0	0	10	10	0	0	0	10	10	0	0	0	10	10	0	0	0	10	10	**0**
159	URB107	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	500	500	**500**
160	URB108	0	0	0	5	5	0	0	0	5	5	0	0	0	5	5	0	0	0	5	5	**0**
161	URB109	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1,535	1,535	**1,535**
162	URB110	0	0	0	14	14	0	0	0	14	14	0	0	0	14	14	0	0	0	14	14	**0**
163	URB111	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	**0**
164	URB112	0	0	0	23	23	0	0	0	23	23	0	0	0	23	23	0	0	0	23	23	**0**
165	URB113	0	0	0	29	29	0	0	0	29	29	0	0	0	29	29	0	0	0	1,425	1,425	**1,396**
166	URB114	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	**0**
167	URB115	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	**0**
168	URB116	0	0	0	2	2	0	0	0	2	2	0	0	0	2	2	0	0	0	2	2	**0**
TOTAL		**1,293**	**1,003**	**457**	**286**	**3,039**	**1,293**	**1,003**	**457**	**666**	**3,419**	**1,848**	**1,003**	**461**	**2,343**	**5,655**	**2,908**	**1,003**	**464**	**6,891**	**11,266**	**8,227**

Figure A-1: Study Area Traffic Analysis Zones (TAZs)



1. Introduction

The traffic impacts of the future developments in the IL130/High Cross Road corridor for different scenarios were analyzed using a Travel Demand Model (TDM). A four step modeling process was followed for this purpose. The model input data used for this corridor study is an extension of the existing travel demand model created for the 2004 Long Range Transportation Plan. The existing model included the Champaign-Urbana-Savoy-Bondville urbanized area and areas along the U.S. Route 45 corridor. The model was expanded to include the additional area covering the IL130/High Cross Road Corridor. The modeling was done using advanced computer software (CUBE Voyager), which provided the capabilities to model additional modes such as walking and biking. Additional Traffic Analysis Zones (TAZs) were added to the existing model.

2. Traffic Analysis Zones

In order to analyze the traffic impact of the population and employment growth, the study area is divided into 'Traffic Analysis Zones' (TAZ). Traffic Analysis Zones (TAZs) are the geographical blocks for the travel demand model. TAZs are defined based on land use characteristics, density of population and employment, physical boundaries, census blocks and major roadways. The existing model had 157 TAZs; this was expanded to 168 TAZs to include the IL130/High Cross Road corridor study area. Figure 1 shows the TAZs and the study area boundary for the corridor study.

3. Highway Network

The highway network for this model includes all the major corridors and other significant roadways in the model area. The highway network is composed of nodes and links. Nodes represent intersection points or other changes in the roadway geometry, functional classification and operational characteristics. Each node has the node number, x-coordinate and y-coordinates as attributes. Links represent the roadway segments. There is a link for each direction of the roadway segment. Each link has a set of data attributes (speed, distance, travel time, functional classification etc.,) associated with it. These attributes are used during the modeling process. Table 1 gives the list of link attributes. The roadways are classified into seven different classes depending on their functions. The seven functional classifications of roadways used in this model are:

1- Major Arterial
2- Minor Arterial
3- Collector
4- Local
5- Connector
6- Interstate Highway
7- Ramp

In addition to the nodes, each TAZ has a centroid. A Centroid is a point that represents the concentration of population and employment within the TAZ. These centroids are connected to the major roadways on the boundary of the TAZ through centroid connectors. In a way, centroid connectors act as the small streets that collect traffic from the developments and feed them to the major roadways. Centroid connectors may not follow the exact alignment of local streets, since a centroid connector may represent a group of local streets. The highway network was modified according to the need of each of the future transportation alternatives. Figure 2 shows the roadways that are included in the model for the existing conditions and their functional classification.

Figure 1: Traffic Analysis Zones (TAZs)

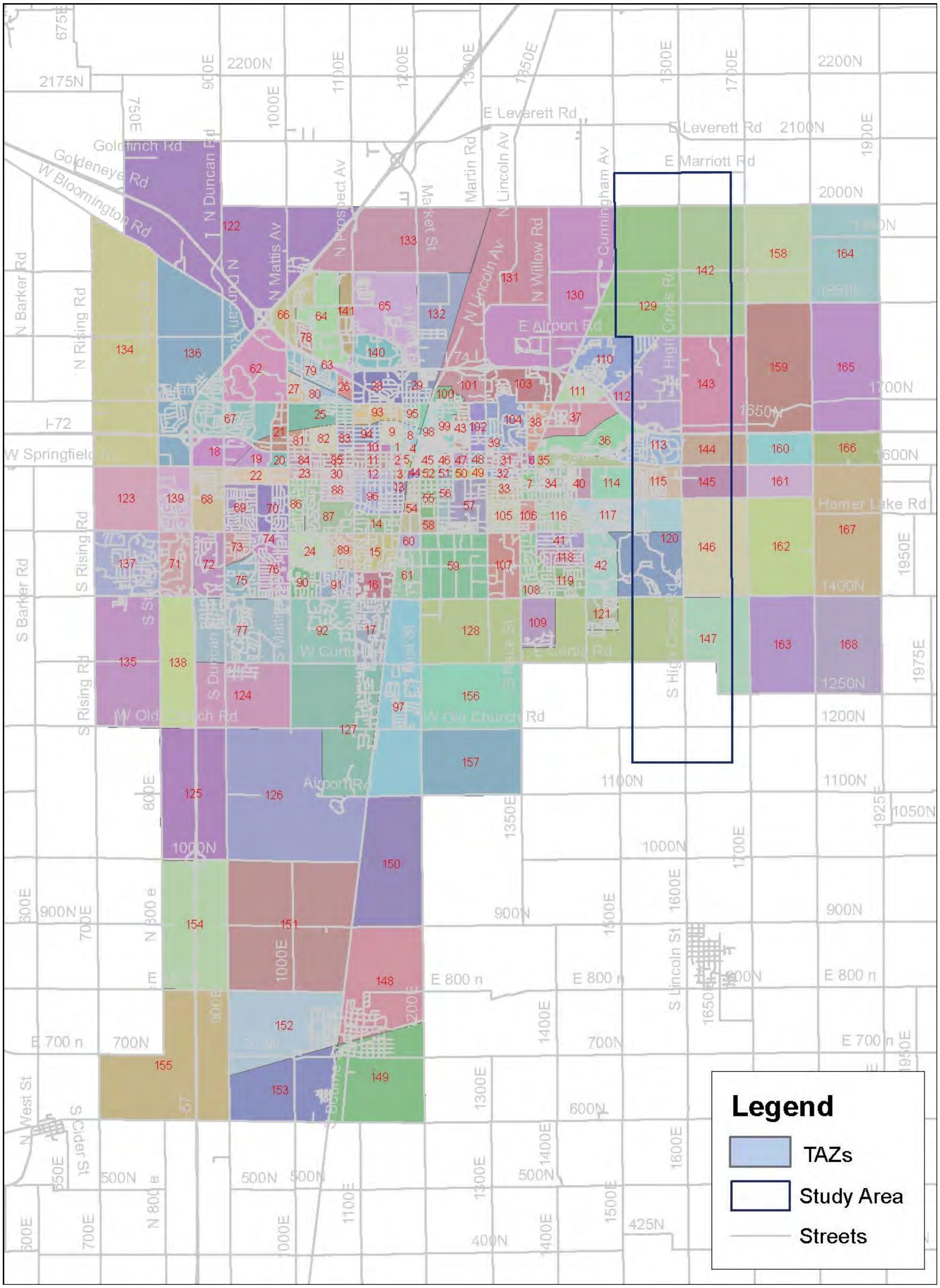


Figure 2: Highway Network

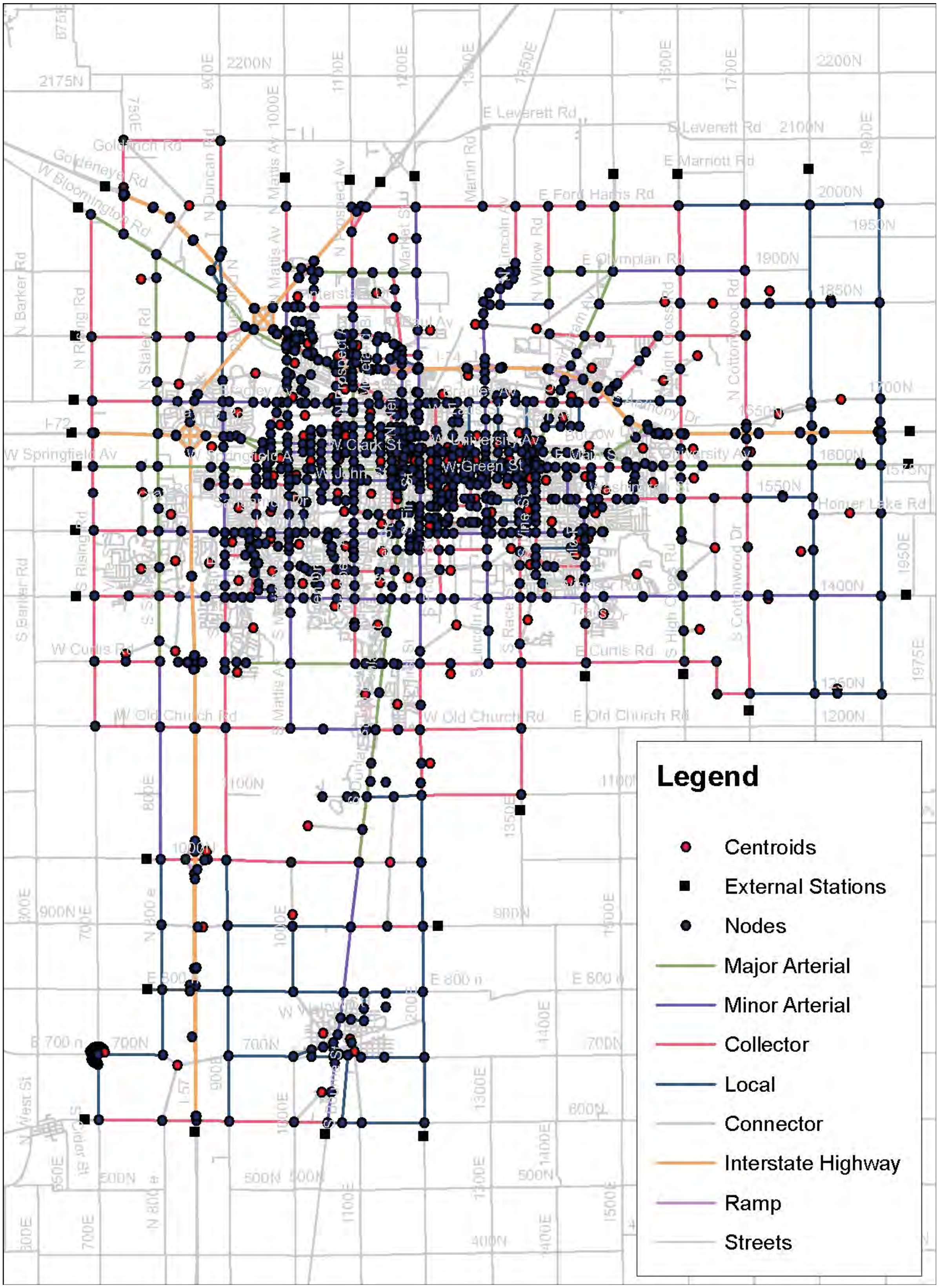


Table 1: Link Attributes

	Attribute	Description
1	A Node	A node number which identifies the "from" node of the link
2	B Node	A node number which identifies the "to" node of the link
3	Functional Classification	Functional classification of roadways (1-7)
4	Distance	Actual node to node distance
5	Time 1	Operational travel time
6	Time 2	Free flow travel time
7	Two Way	Indicates whether the link is two-way or one-way (0-one way, 1-two way)
8	Area Type	1=CBD, 2=Fringe, 3=Residential, 4=OBD, 5=Rural
9	Lanes	Number of lanes in direction of travel
10	Facility Type	1-17 by functional classification, area type, speed and number of lanes
11	Capacity	24-hour capacity
12	Volume	Average Daily Traffic (ADT) from traffic counts

4. External Stations

External stations are points of entry and exit for vehicles entering, exiting or traveling through the study area. These are additional points or nodes that feed traffic to the major roadways inside the model network. They are used to bring in traffic from outside the model network and are located at the boundary of the network. The existing model consisted of 29 external stations. The expansion of the existing model kept the 29 external stations, but moved the external stations to cover the added corridor areas. Figure 3 shows the location of external stations in the model.

5. Transit Networks

In addition to the highway network, a transit network was also coded to model the transit trips within the model area. This network was supported by access links. Access links connect the TAZ centroid to the transit stop. Several different transit networks were used for this study depending on the needs of potential future transportation alternatives. Figure 4 shows the existing transit network.

6. Development Scenarios

The IL130/High Cross Corridor study considered two different socio-economic conditions to be modeled: the existing condition and the future growth scenario. The existing condition is based on the base year 2005 and the future growth scenario is based on the horizon year 2025. Population and employment forecasts were done for future scenario and for existing conditions based on 2000 Census data and other data sources. This data was used in generating trips for the model.

Figure 3: External Stations

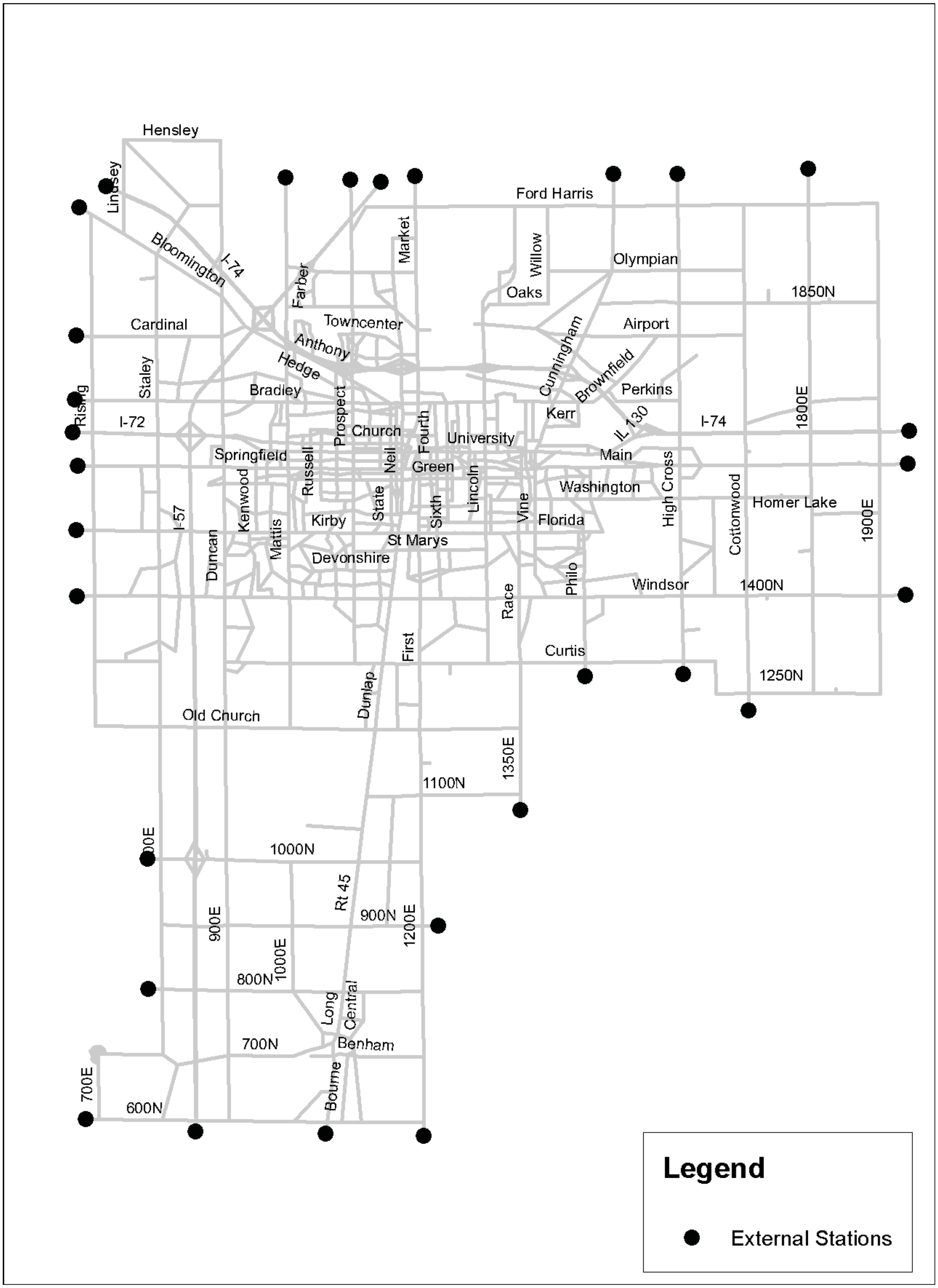
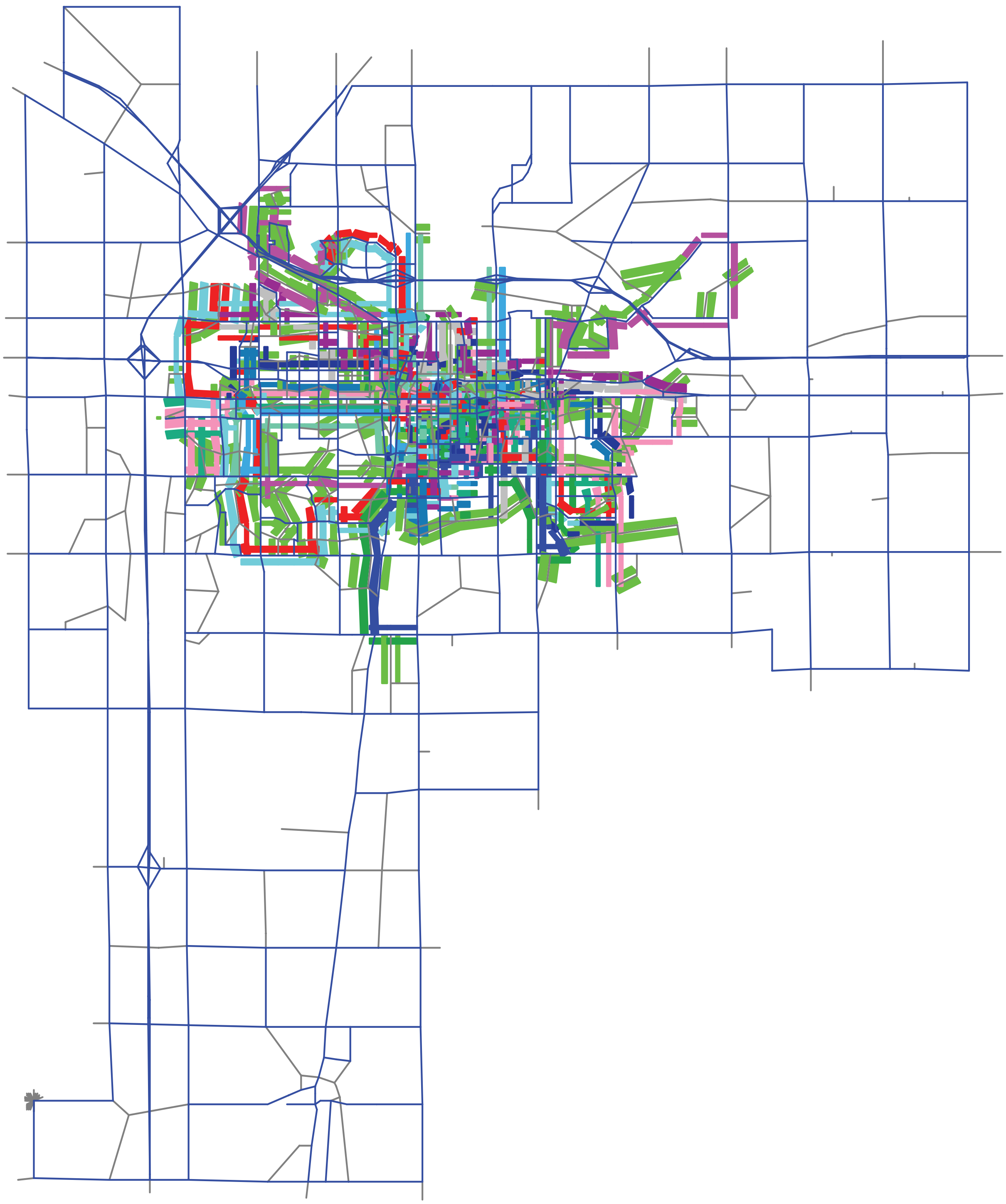


Figure 4: Existing Transit Network



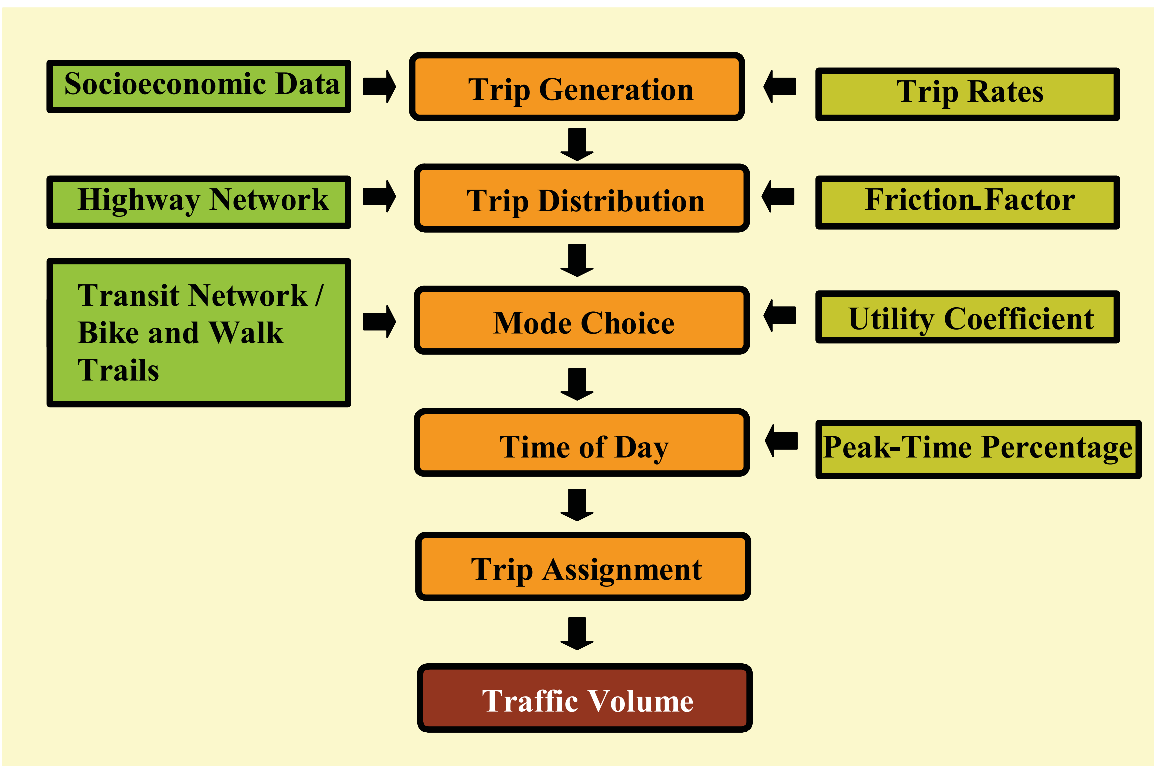
7. Model Process

A four-step travel demand model (TDM) was used for modeling the study area. The four-step model is the most widely used TDM process. This modeling process is easy to implement and is considered to be very effective in predicting the traffic impacts for future developments. This modeling process consists of the following steps:

1. Trip Generation
2. Trip Distribution
3. Mode Choice
4. Trip Assignment

Figure 5 shows the flow chart for a four-step travel demand model.

Figure 5: Model Flow Chart

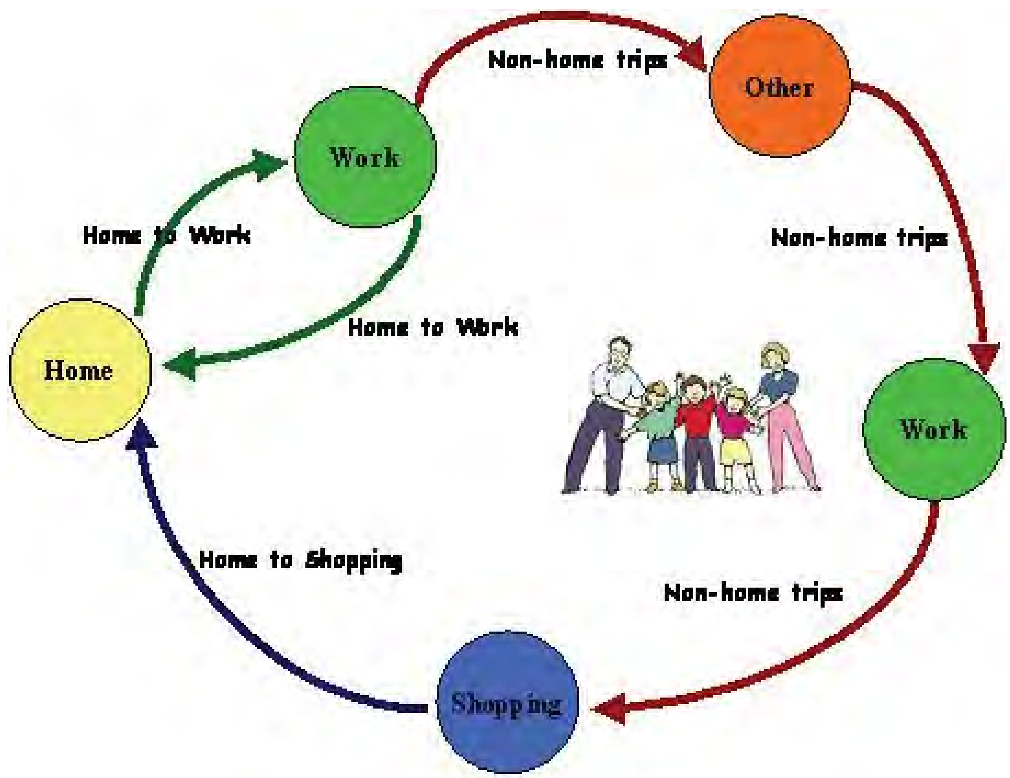


8. Trip Generation

Trip generation refers to the estimation of trips generated by the population and employment in the study area. The trip generation process estimates the number of trips generated by each TAZ. It also includes the trips generated by the areas surrounding the model area. These external trips are accounted for using the external stations as the source of these trips. The trips generated are categorized as production trips and attraction trips. Production trips are trips generated by households in the area and attraction trips are trips generated by the employment centers. The production and attraction trips are further classified into five different purposes. Figure 6 shows the generation of the different trip purposes.

- Home-Based Work (HBW): This category includes to/from work or work-related business trips.
- Home-Based School (HBShc) – This category includes trips to school, college or university for classes, or to school-related meetings.
- Home-Based Shopping (HBSho) – One end of trip is shopping activities.
- Home-Based Other (HBO): This category includes family and personal business trips such as banking, haircuts, visiting friends and relatives, other social or recreational trips taken for entertainment and recreation, and for trips that do not fit any of the other categories.
- Non-home Based trips (NHB) – This category includes trips that do not start or end at home.

Figure 6: Trip Purposes



The estimation of the number of production trips and classification into the five different classes is based on the trip generation rates calculated from the travel survey conducted by CUUATS for the LRTP model in 2003. The population was converted into number of one, two, three and four or more person households. The number of production trips for each trip purpose was calculated using the number of households and the LRTP trip rates. Employment data in each TAZ is categorized into retail, service and other. The 'Other' category consists of industries, education and government jobs. The attraction trips were calculated using the number of jobs and the trip rates for each employment category. The trip rates for the attraction trips were obtained based on the guidance given in the NCHRP Report 365 (Travel Estimation Techniques for Urban Planning). The total trips generated differ for each scenario based on the population and employment. After estimating the trips for the production and attraction, the attraction trips have to be balanced to match the production trips. The balancing is achieved by calculating an adjustment factor for the attraction trips for each trip purpose. This adjustment factor is applied to the attraction trips for each TAZ. This discrepancy is due to the fact that the employment data tends to be less accurate than the population data. Table 2 shows the trip rates for production and attraction for the five trip purposes.

Table 2: Trip Rates

* Trip production rates

HH	Average	HBWork		HBSchool		HBShopping		HBOther		Non-Home-Based	
	Rate	Percent	Rate	Percent	Rate	Percent	Rate	Percent	Rate	Percent	Rate
One-person	6.9	0.17	1.2	0.16	1.1	0.08	0.6	0.27	1.9	0.32	2.2
Two-person	11	0.16	1.8	0.05	0.6	0.14	1.5	0.35	3.9	0.3	3.3
Three-person	12.8	0.21	2.7	0.04	0.5	0.13	1.7	0.31	4	0.31	4
Four+person	14.3	0.16	2.3	0.04	0.6	0.13	1.9	0.42	6	0.25	3.6

* Trip attraction rates

EMP	HBW	Coefficient	HBSchool		HBShopping		HBOther		NHB
			Percent	Rate	Percent	Rate	Percent	Rate	Percent
Total	1.7	-	0.14	-	0.23	-	0.63	-	-
Retail	-	10.4	0.14	1.46	0.23	2.39	0.63	6.552	4.7
Service	-	2	0.14	0.24	0.23	0.39	0.63	1.3	1.4
Other	-	0.6	0.14	0.077	0.23	0.12	0.63	0.4	0.6
Household	-	1	0.14	0.13	0.23	0.21	0.63	0.6	0.6

* During the calibration and validation, trip rates were increased by 10% for trip production and trip attraction.

Estimation of Production Trips

HBWork = 0.17*6.9(X1) + 0.16*11.0(X2) + 0.21*12.8(X3) + 0.16*14.3(X4)
HBSchool = 0.16*6.9(X1) + 0.05*11.0(X2) + 0.04*12.8(X3) + 0.04*14.3(X4)
HBShopping = 0.08*6.9(X1) + 0.14*11.0(X2) + 0.13*12.8(X3) + 0.13*14.3(X4)
HBOther = 0.27*6.9(X1) + 0.35*11.0(X2) + 0.31*12.8(X3) + 0.42*14.3(X4)
NHB = 0.32*6.9(X1) + 0.30*11.0(X2) + 0.31*12.8(X3) + 0.25*14.3(X4)

X1 = Total number of 1-person households in TAZ
X2 = Total number of 2-person households in TAZ
X3 = Total number of 3-person households in TAZ
X4 = Total number of 4+person households in TAZ

Estimation of Attraction Trips

HBWork = 1.7 * (X1)
Co-efficient = 10.4 * (X2) + 2.0 * (X3) + 0.6 * (X4) + 1.0 * (X5)
HBSchool = 0.14 * Co-efficient
HBShopping = 0.23 * Co-efficient
HBOther = 0.63 * Co-efficient
NHB = 4.7 * (X2) + 1.4 * (X3) + 0.6 * (X4) + 0.6 * (X5)

X1 = Total employees in TAZ
X2 = Total RETAIL employees in TAZ
X3 = Total SERVICE employees in TAZ
X4 = Total OTHER employees in TAZ
X5 = Total households in TAZ

External trips
External trips can be grouped into External-External trips (E-E, through trips) or External-Internal/Internal-External trips (E-I/I-E). Through trips are those for which both the origin and destination are located outside of the model area. E-I/I-E trips are those for which either the destination or the origin is located within the model area. The percentage of through trips at each external station is estimated based on the Origin-Destination survey conducted by CUUATS for the LRTP model. A through trip percentage of 40% for freeway external stations and 9% for other external stations were used.

Through trips = Percentage of through trips * ADT
E-I/I-E = ADT – Through trips

The E-I/I-E trips calculated are then classified into the five different trip purposes. From the Origin-Destination survey, the percentage of each trip purpose is estimated and then applied. The following is the percentage of each trip purpose for the E-I/I-E trips:

- HBW – 57%
- HB School – 6%
- HB Shopping – 9%
- HB Other – 21%
- NHB – 7%

After estimating the number of E-I/I-E trips under each trip purpose, the production and attraction trips are arrived upon based on the residency factors. Residency factors indicate the percentage of trips originating from the study area.

Production trips = trips * residency factor
Attraction trips = trips * (1-residency factor)

Table 3 gives the residency factors used in the study. The values were obtained from the Origin-Destination study.

Table 3: Residency Factors

Trip Purpose	Residency factor (%)
HBW	23%
HB School	57%
HB Shopping	18%
HBO	35%
NHB	63%

Production and Attraction Balancing
After arriving at the total production and attraction trips, the attraction trips were balanced to match the production trips. An adjustment factor is calculated for each trip purpose and then applied to the attraction trips of each TAZ. The adjustment factor is calculated as follows:

Adjustment factor = (Total internal trips produced + Total external trips produced-Total external trips attracted)/Total internal trips attracted

Table 4 shows the balanced number of trips for each scenario.

Table 4: Balanced Number of Trips

Scenario	Nodes	Production							Attraction						
		HBW	HB School	HB Shop	HBO	NHB	Trip Purpose Total	Total Trips	HBW	HB School	HB Shop	HBO	NHB	Trip Purpose Total	Total Trips
Existing (2005)	Centroids	96,176	39,712	68,594	191,899	165,407	561,788	688,452	143,740	38,562	79,775	206,909	165,407	634,393	688,452
	External Stations	68,132	3,451	14,376	31,896	8,808	126,663		20,568	4,602	3,195	16,886	8,808	54,059	
Future (2025)	Centroids	127,277	50,855	91,294	254,862	217,968	742,256	881,587	179,598	49,589	103,593	271,374	217,968	822,121	881,587
	External Stations	74,946	3,796	15,813	35,086	9,689	139,331		22,625	5,062	3,514	18,575	9,689	59,465	

9. Trip Distribution

After estimating the trips generated, the model will distribute the trips between the TAZs. Trip distribution is the estimate of the number of trips from one TAZ to another. Trip distribution is based on the difference in production and attraction between each TAZ pair, the friction factor for the trip length and the travel time. Friction factors are estimates of the reduction in trips with the increase in trip length. The trip distribution was completed using the gravity model. The equation used for the gravity model is given below:

$$T_{ij} = \frac{P_i \times A_j \times F_{ij} \times K_{ij}}{\sum_{k=1}^{zones} A_k \times F_{ik} \times K_{ik}}$$

Where:
T_{ij} = the number of trips from zone i to zone j
P_i = the number of trip productions in zone i
A_j = the number of trip attractions in zone j
F_{ij} = the friction factor relating the spatial separation between zone i and zone j
K_{ij} = an optional trip-distribution adjustment factor for interchanges between zone i and zone j

One of the important steps in trip distribution is estimating the travel impedance between the TAZs. In the current model, the shortest travel time between the TAZs is calculated as the impedance. Travel time on a path between a pair of TAZs is the sum of travel times of all the links on that path, the intra zonal travel time and the terminal times. The travel time of a link is the free flow travel time, which is calculated from the link length and the link distance. The intra zonal travel time is the travel time on the local roads that are not coded in the model network. The intra zonal travel time is calculated by dividing by 2 the average inter zonal travel time for all adjacent zones.

Terminal times represent the impedance at both ends of the trip, which reflects the time to walk, park and access the vehicle. Terminal times vary depending on the area type of the origin or destination. Table 5 shows terminal times by area types used in this study. The longer the travel time, the more the resistance to travel and therefore the lesser number of trips distributed between the TAZ pair.

Table 5: Terminal Times

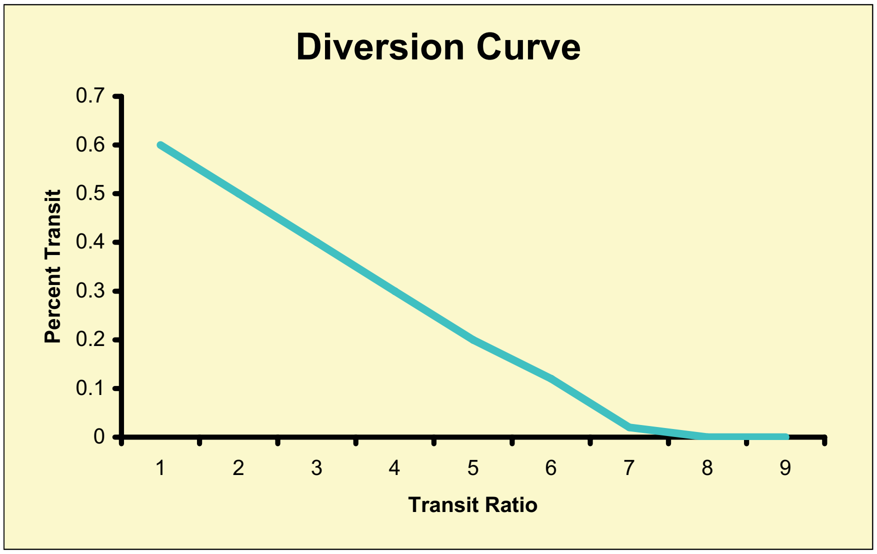
Area Type	Terminal Time (minutes)
CBD	3
CBD Fringe	2
Other Business District	2
Residential	1
Rural	1

10. Mode Choice

In this step, the person trips between the TAZ pairs are split between transit, bike/walk and auto. The transit share is based on the accessibility to transit, the transit impedance and the auto impedance. The access links and the transit network are used to find which TAZ pairs are connected by transit. For each of these TAZ pairs, the transit impedance is calculated. The transit impedance is the sum of the travel times on the transit links, the initial wait times at the transit stops and the transfer time when switching transit routes. Two different wait curves are used to calculate the initial and transfer waiting times. These curves represent the waiting times for different headways. Figure 7 shows the initial and transfer wait curves. The ratio of the transit impedance and highway impedance is then calculated. The mode split for each TAZ pair is obtained using the diversion curve. The diversion curve gives the percentage of transit usage for a transit ratio. Figure 8 shows the diversion curve used in this model.

Figure 7: Wait Curves

Figure 8: Diversion Curve



In addition to the transit routes, bike and walk modes are included in mode choice. The bike/walk mode share is based on the travel time distance between zones. Longer travel time distance between zones attracts less bike/walk trips. The percentage of bike/walk trips is based on the average values obtained from the CUUATS household survey. Table 6 shows the maximum accessible bike/walk distance and the mode share for the five different trip purposes.

Table 6: Mode Share by Bike/Walk mode and Maximum accessible distance

Mode	HBW		HBschool		HBshop		HBO		NHB	
	Max. Distance (miles)	Mode Share (%)	Max. Distance (miles)	Mode Share (%)	Max. Distance (miles)	Mode Share (%)	Max. Distance (miles)	Mode Share (%)	Max. Distance (miles)	Mode Share (%)
Walk	0.5	11	0.45	27	0.25	2	0.85	8	1	17
Bike	4.2	2	3	6	2.7	1	2.95	2	2.2	2

11. Traffic Assignment

The last step in the travel demand modeling process is traffic assignment. In this step, the auto trips are loaded onto the highway network. The production-attraction person trip tables are converted to origin-destination person trips before loading the highway network. An auto occupancy factor of 1.4 is used to convert the person trips to auto trips. There are several assignment methods used such as all-or-nothing, capacity restrained, equilibrium assignment, and stochastic assignment. Equilibrium assignment is mostly used in all newly developed models and is widely recommended. This method is used in this model.

Equilibrium Assignment
This method is based on Wardrop equilibrium principle. This principle states that

"For each origin-destination pair of zones, all used routes have equal travel times, and no unused route has a lower travel time."

The assignment process is an iterative process. In each iteration, the objective is to minimize the objective function.

$$\sum_{L} \int_{0} V_L F(X) dx$$

Subject to

$$V_L = \sum_0 \sum_d \sum_P \delta_{od}^{L_P} t_{od}^P$$

$$\sum_P t_{od}^P = T_{od}$$

$$t_{od}^P > 0$$

Where:

L = the set of all links

p = the set of all paths

o = the set of all origins

d = the set of all destinations

V_L = the number of vehicles on each link L

$F(V_L)$ = a function relating travel time to volume (such as the BPR curve)

t_{od}^P = the number of vehicles from origin 'o' to destination 'd' on path 'p'

$\delta_{od}^{L_P}$ = 1 if a link 'L' belongs to path 'p' from origin 'o' to destination 'd', 0 otherwise

T_{od} = the trip table of all trip interchanges

The steps involved in the process are:

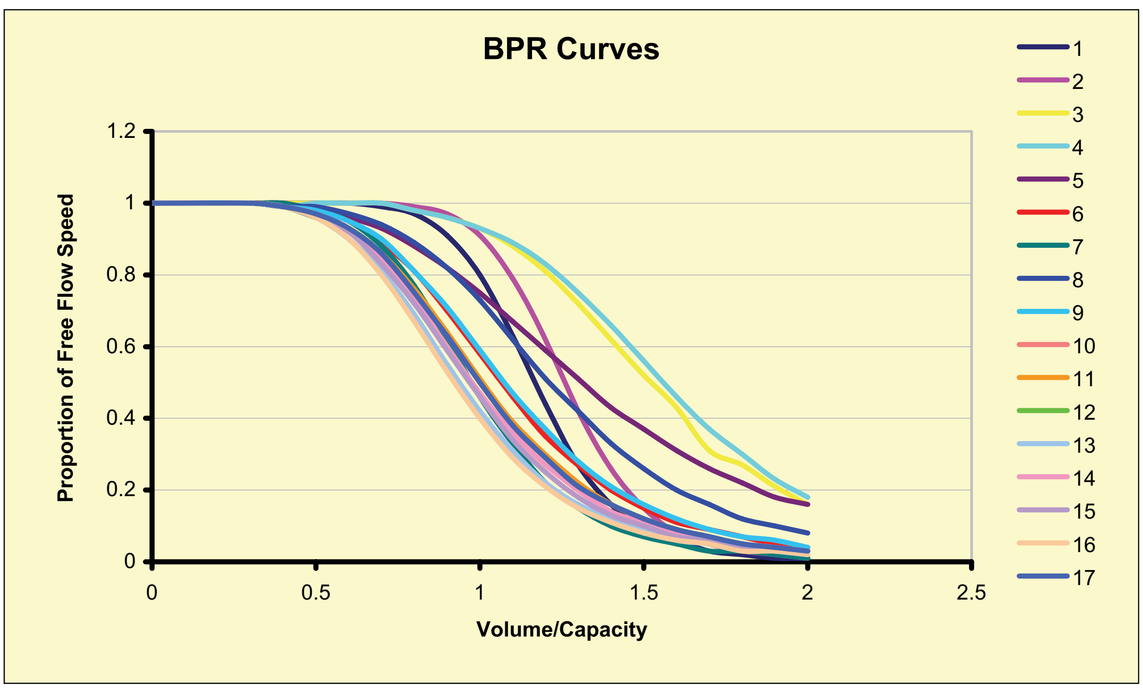
1. Perform an all-or-nothing assignment (load the network based on the shortest path between origin-destination). (Iteration 0)
2. Based on the assigned volumes from the previous step, compute the travel time using the Bureau of Public Road (BPR) curves or Congested Speed curves.
3. Perform all-or-nothing assignment based on the new travel times. (Iteration 1a)
4. Combine iterations 0 and 1a in a linear fashion using a value λ such that iteration1b= ((1-λ) *iteration1a+λ*iteration0) minimizes the objective function (iteration 1b)
5. Check for convergence; if satisfied stop, else return to step 2.

The travel times on each link for each iteration after the initial iteration is obtained by using the BPR (Bureau of Public Road) curves. These curves give the relationship between the Volume/Capacity ratio and the free flow speed for different facility types. As the Volume/Capacity ratio increases the free flow speed decreases. Seventeen different facility types are used in this model. The facility types are combinations of functional class, speed and area type. Table 7 shows the seventeen facility types. Figure 9 shows the BPR curves for the 17 facility types.

Table 7: Facility Types

Roadway Classification	Facility Type	Functional Classification	Free Flow Speed (mph)	Area Type
Highway and Ramps	1	6	65	Any
	2	6	55	Any
	17	7	30-25	Any
Multi-Lane or Rural Roadway	3	5-Jan	55	5
	4	5-Jan	50-45	5
	17	5-Jan	55-45	5
	17	5-Jan	40-25	5
Urban Street	5	5-Jan	55-50	3
	6	5-Jan	55-50	2,4
	7	5-Jan	55-50	1
	8	5-Jan	45-40	3
	9	5-Jan	45-40	2,4
	10	5-Jan	45-40	1
	11	5-Jan	35	3
	12	5-Jan	35	2,4
	13	5-Jan	35	1
	14	5-Jan	30-25	3
	15	5-Jan	30-25	2,4
	16	5-Jan	30-25	1

Figure 9: BPR Curves by Facility Type



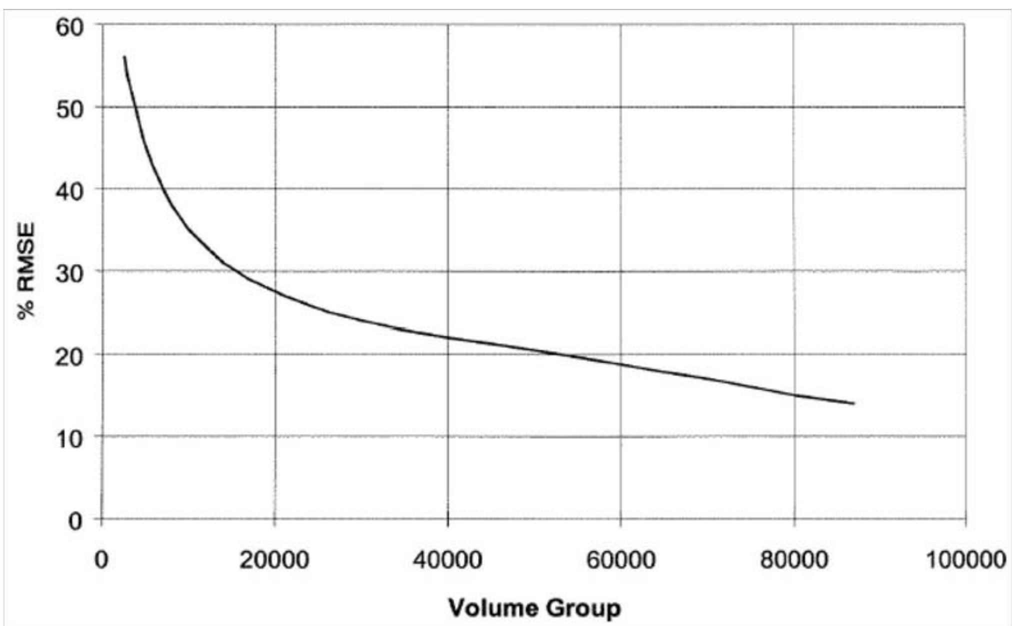
12. Validation

The Root Mean Square Error (RMSE) was used as a measure to validate the assigned traffic volumes from this model. The RMSE gives the relative error of the assigned volumes to the ground counts. RMSE is calculated as follows:

$$\%RMSE = 100 * \sqrt{\frac{\sum_j (Model_j - Count_j)^2}{(Number\,of\,Counts - 1)} \Big/ \left(\frac{\sum_j Count_j}{Number\,of\,Counts}\right)}$$

The current model exhibits a %RMSE of 40.5%. There are no specific targets for %RMSE. However the 'Model Validation and Reasonableness Checking Manual' published by FHWA indicates that the Montana Department of Transportation suggests an appropriate %RMSE of less than 30%. It also shows %RMSE at a few cities that are around 40% (Reno, 36.8% and Phoenix, 40.6%). The Ohio Department of Transportation travel demand model manual suggests that a good rule of thumb for a %RMSE should be about 40% or less. The % RMSE can vary based on the composition of the facility types in the model area. A high percentage of local roads (low volume roads) in the model area will provide a higher %RMSE. If the model area has a high percentage of freeways carrying high volumes then the %RMSE will be low. Figure 10 shows the variation of %RMSE with the link volumes. It can be seen from the figure that as the link volumes increases, the %RMSE decreases.

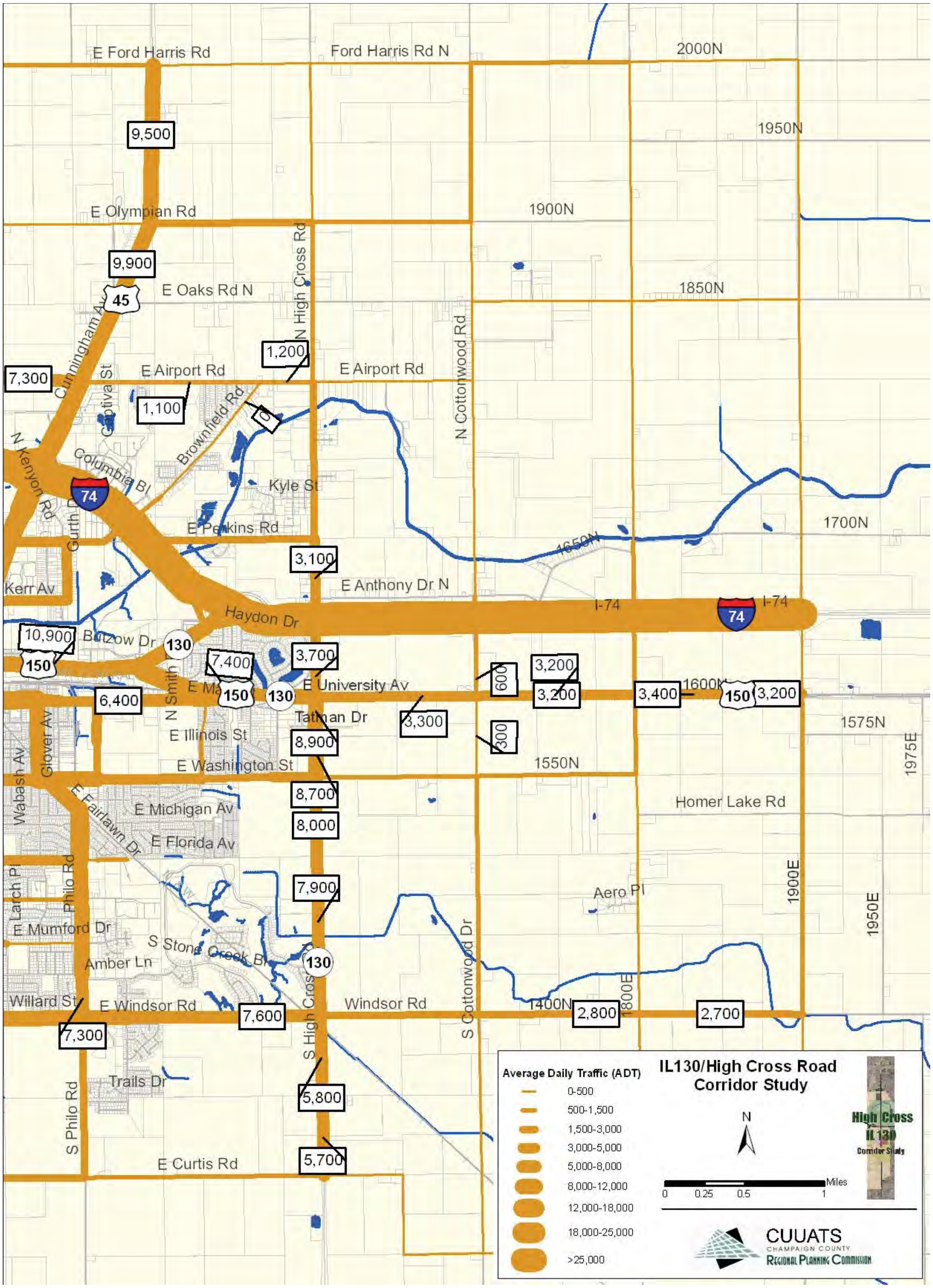
Figure 10: %RMSE Vs Link Volume



Source: Travel Demand Forecasting Manual 1 Traffic Assignment Procedures, Gregory Giaimo, Ohio Department of Transportation, August 2001.

Figure 11: Sample LOS Congestion Map

Figure 12: Sample Volume Bandwidth Map



13. OUTPUTS

Two different outputs were obtained from the model for this study: a set of congestion Level of Service (LOS) maps and volume bandwidth maps for each scenario. These maps were created for each potential future conditions alternative to help compare the alternatives. Figure 11 shows a sample of the congestion map and Figure 12 shows a sample of the volume bandwidth map.

14. REFERENCES

1. *Travel Estimation Techniques for Urban Planning*, William A. Martin, Nancy A.Mcguckin, NCHRP Report 365, 1998.

2. *Long Range Transportation Plan 2025*, Champaign Urbana Urbanized Area Transportation Study, December 2004.

3. *Travel Demand Forecasting Manual 1 Traffic Assignment Procedures*, Gregory Giaimo, Ohio Department of Transportation, August 2001.

4. *Model Validation and Reasonableness Checking Manual*, Federal Highway Administration, June 2001.

1 Introduction

This report describes the existing natural and human environmental conditions in the IL130/High Cross Road study area. Land uses, transportation facilities, air quality, water quality, wetlands, wild life and vegetation habitat, noise, visual quality and light pollution were all considered for the report. Data and information collected for existing environmental conditions will be used in estimating and analyzing future conditions such as the corridor improvement projects that could affect environmental conditions in the area.

1.1 Study Area Description

The IL130/High Cross Road corridor extends eight miles between Ford Harris Road to the north and Old Church Road to the south. Interstate 74 essentially serves as a divider between the wooded and rural residential areas to the north and the urban and agricultural areas to the south.

IL130/High Cross Road is the easternmost transportation artery of Urbana's recent growing corridors. To the south of US150, the IL130 corridor includes land uses such as residential, retail, office/industrial park, commercial and agricultural areas. High Cross Road extends north from US150 and serves as a connector road between agricultural and rural residential areas located north of Interstate 74 and the City of Urbana and surrounding rural areas.

The study area includes some areas of wildlife habitat such as the Saline Branch of Salt Fork River, the University's Brownfield Woods, Trelease Woods, and Trelease Prairie. All of these natural areas are located in the northern part of the corridor whereas the south part of the study area is a typical agricultural landscape with a commercial-light industrial area around the intersection of IL130 and US150.

1.2 Existing Roadway and Traffic Conditions[1]

1.2.1 Network

The IL130/High Cross Road corridor has three distinct areas. Starting at Old Church Road traveling northbound, the first 4.0 miles up to University Avenue is an urban arterial with at-grade intersections, spaced approximately at one-mile intervals. The posted speed limit is 55 miles per hour up until Tatman Court, where the speed limit is decreased to 50 miles per hour.

The next 2.0 miles between Beringer Crossing and Airport Road, High Cross Road is an urban collector type of roadway traversing a transition zone characterized for a mix of residential and agricultural areas. Through this portion, the posted speed limit is 40 miles per hour. The remaining 2.0 miles of High Cross Road between Airport Road and Ford Harris Road is a rural collector without posted speed limit on this roadway section.

Some sidewalks have been constructed in newer development areas, but there are numerous gaps to be filled in order to have a fully pedestrian-friendly corridor. At this time, there are no bicycle facilities, but several are soon to be constructed.

1.2.2 Traffic Volumes

Traffic volumes along IL130/HighCross Road have significantly increased over the last ten years, as can be seen in Table 1. A 20% increase in volume can be noted for the five year intervals indicated in the table. For the segment of IL130 south of Perkins Road, a 40% increase could be seen for each 5-year interval.

[1] This section is an excerpt from Section 3 of the main IL130/High Cross Road Corridor Plan.

Table 1: Traffic Volumes Trends for IL130/HighCross Road

Street	1996	2001	2006
IL 130 at S of Perkins	1,850	2,650	3,904
IL130 at S of US150	-	7,200	8,619
Washington St at W of IL130	1,950	2,300	3,246
* Unit: Vehicles/Day			

Traffic has increased along IL130/Highcross Road since Wal-Mart opened at the intersection of IL130 and US150 in February 2005. Although the existing level of service is still acceptable for the AM and PM peak hours, portions of the corridor, specifically the section of IL130 between Tatman Court and University Avenue, are close to operating under congested conditions at peak hours.

1.2.3 Safety

Although safety on IL130/High Cross Road Corridor is not the most pressing concern at this time, a comprehensive crash analysis found that severe types of crashes occur more frequently on IL130 than on comparable highways elsewhere in the urbanized area.

2 Existing Environmental Conditions

2.1 Land Use

The study area falls under three local jurisdictions: the City of Urbana, Urbana Township, and Somer Township. Land north of Interstate 74, south of Windsor Road and east of IL130 is primarily used for agricultural purposes. The next dominant use within the study area is single-family residential. New houses are steadily being built north of Interstate 74, especially along Airport Road, and in the Beringer Commons and Stone Creek subdivisions south of I-74.

Regarding retail uses, the new Wal-Mart and Aldi stores opened at the intersection of IL130 and US150 in 2005. Light industrial and office activities are located around Tatman Court just west of Wal-Mart. Proposed future land uses are detailed in the Urbana Comprehensive Plan. It is projected that by the year 2025 nearly the entire area of agricultural land west of IL130 and south of Windsor Road will be converted into residential and commercial uses. South of US150 and north of Windsor Road, additional commercial regional development on the east side of IL130 near Wal-Mart as well as the future expansion of light industry west of IL130 and south of University Avenue are anticipated. In 2006, 288 acres were purchased by Menards for commercial and residential development on both sides of IL130 south of US150.

The study area also includes several preservation areas such as the Saline Branch, Brownfield Woods, Trelease Woods and Trelease Prairie, all north of Interstate 74. Another special feature in this area is the University of Illinois research facilities between High Cross Road and Cottonwood Road near Olympian Drive.

2.2 Topography and Geology

Champaign County is mostly flat in terrain. Elevations range from approximately 855 feet above mean sea level near the north of Rising Township, to 625 feet above mean sea level in low elevations near the Salt Fork River toward the east end of the county. The average percent slope in Champaign County is 0.5, ranked 98th out of 102 counties ranging from 4.25 in the highest slope to 0.4 in the lowest[2].

The topography in the study area is fairly uniform and tends to have lower elevations than the rest of the county. However, there are variations in elevation. The southeast side of the study area along Cottonwood Road south of Washington Street is lower, with elevation less than 700 feet mean sea level, while the north part of the study area tends to have elevations greater than 700 feet mean sea level.

Bedrock in the study area is Pennsylvanian and Mississippian. Two distinct Pennsylvanian formations are present in the study area. Pennsylvanian-age rocks of the Spoon Formation, which consists of limestones, sandstone and coals, are dominant whereas the rocks of the Carbondale Formation are found in the southeastern edge of the study area. Middle Mississippian-age rocks of Valmeyran Formation underlie 1800E and the northeastern part of the study area, which mainly consists of limestone with minor amounts of shale and sandstone.

The thickness of surficial materials in the area is approximately 30m (100 ft) to 90m (300 ft). Surficial materials in most of the study area consist of more than 6m (20 ft) of Wedron Formation, which are silty and clayey deposits, overlying deposits of the Glasford Formation. The Glasford Formation consists of less than 6 m of silty and clayey glacial deposits. For the south portion of the study area between IL130 and Cottonwood Road, south of Interstate 74, surficial materials were composed of less than 6m (20 ft) of Henry Formation, overlying deposits of more than 6 m of Wedron Formation over less than 6 m (20 ft) of Glasford Formation. Meanwhile, the area along the Saline Branch consists of less than 6 m (20 ft) of Cahokia Alluvium overlying Henry Formation. The area underneath the Henry Formation is composed of the same materials as other parts of the study area.

2.3 Soil

Soils are influenced and formed by factors such as past geologic activities, nature of parent materials, vegetation, and climate. The Soil Survey of Champaign County, which reports the names and descriptions of soils, was updated in 1998 and published in 2001 by the joint efforts of National Cooperative Soil Survey, Natural Resources Conservation Service, and state and local agencies. Another primary data source for understanding the types of soils is the Illinois Soil Associations Map. A soil association is a group of related soil series that generally occur in a characteristic pattern of landscapes that have identifiable topographic features, slopes, and parent materials. Thus soil associations provide a broad perspective of the soils in a study area.

Dominant soil associations in Urbana are Drummer-Flanagan, Drummer-Xenia, and Dana-Parr-Drummer[3], which are dark or moderately dark colored soils. As can be seen in Map 1, the following five soil associations are identified according to the Illinois Soil Associations Map: Drummer-Flanagan-Catlin, Houghton-Palms-Muskego, Birbeck-Sabina-Sunbury, Plano-Proctor-Worthen, and Saybrook-Dana-Drummer.

The Drummer-Flanagan-Catlin Association encompasses the majority of the study area. Drummer series is present in most of the study area south along IL130 and in the study area north along Cottonwood Road. The Flanagan series can be mainly found in the middle-west portion of the study area between US150 and Windsor Road and is also scattered throughout the rest of the study area. The central west portion includes most residential areas and several light industrial areas. These two soil series are poorly or somewhat poorly drained dark-colored soils in the surface area. Therefore, these two soil series would require the subsurface drainage system and surface ditches in order to remove ponded water.

[2] Illinois State Geological Survey (ISGS). Illinois High and Low. Available at: http://www.isgs.uiuc.edu/hi_low/hilow_intro.html (May 2006).

[3] City of Urbana. 2002 Comprehensive Plan Update: Existing Conditions Report. August 2002.

Birbeck-Sabina-Sunbury Association covers the northwestern portion of the study area. This includes the Interstate 74 interchanges on Cunningham Avenue and University Avenue and natural areas such as the Saline Branch near High Cross Road.

The Birbeck series consist of moderately well drained soils whereas the Sabina series are somewhat poorly drained soils. Both of them are found adjacent to the Saline Branch and forest areas. Due to the wetness of the soils, these are not favorable for recreational uses, dwelling purposes, or road traffic.

The Saybrook-Dana-Drummer Association is present in the southwestern part of the study area where agriculture is the principal land use. The Dana series consists of moderately well drained and moderately permeable soils. A potential problem associated with the Dana series is erosion on slopes greater than 2 percent, which results in decreased agricultural productivity. The Drummer series, which is a poorly drained soil, is also found adjacent to the Dana series.

The Plano-Proctor-Worthen Association is found in the central south portion and the northwest corner of the study area. The Proctor series consists of well-drained and moderately permeable soils with two to five percent slopes. The Proctor series is rated as good for wildlife habitat and moderate for residential uses.

Hydric soils are defined as soils that formed under conditions of saturation, flooding, or ponding long enough during the growing season to develop anaerobic conditions in the upper part[4]. The soils that either meet the definition of hydric soils or have at least one of the hydric soil indicators are listed as follows: Harpster, Drummer, Pella, Thorp, Peotone, Muskego, Sawmill, and Ambraw. Approximately 43% of the study area is covered by these hydric soils, as shown in Map 2.

Prime farmland, as defined by the U.S. Department of Agriculture, is land that has the best combination of physical and chemical characteristics for producing food, feed, forage, fiber, and oilseed crops and is available for these uses. It could be cultivated land, pastureland, forestland, or other land, but not urban or built-up land or water areas. The soil qualities and moisture supply are those needed for the soil to economically produce sustained high yields of crops when proper management, including water management, and acceptable farming methods are applied[5]. Nearly 95 percent of the total study area acreage meets the prime farmland criteria.

[4] Federal Resister, July 13. 1994.
[5] Natural Resources Conservation Service. Soil Survey of Champaign County, Illinois – Part1. 2001.

Figure 1: General Soil Associations

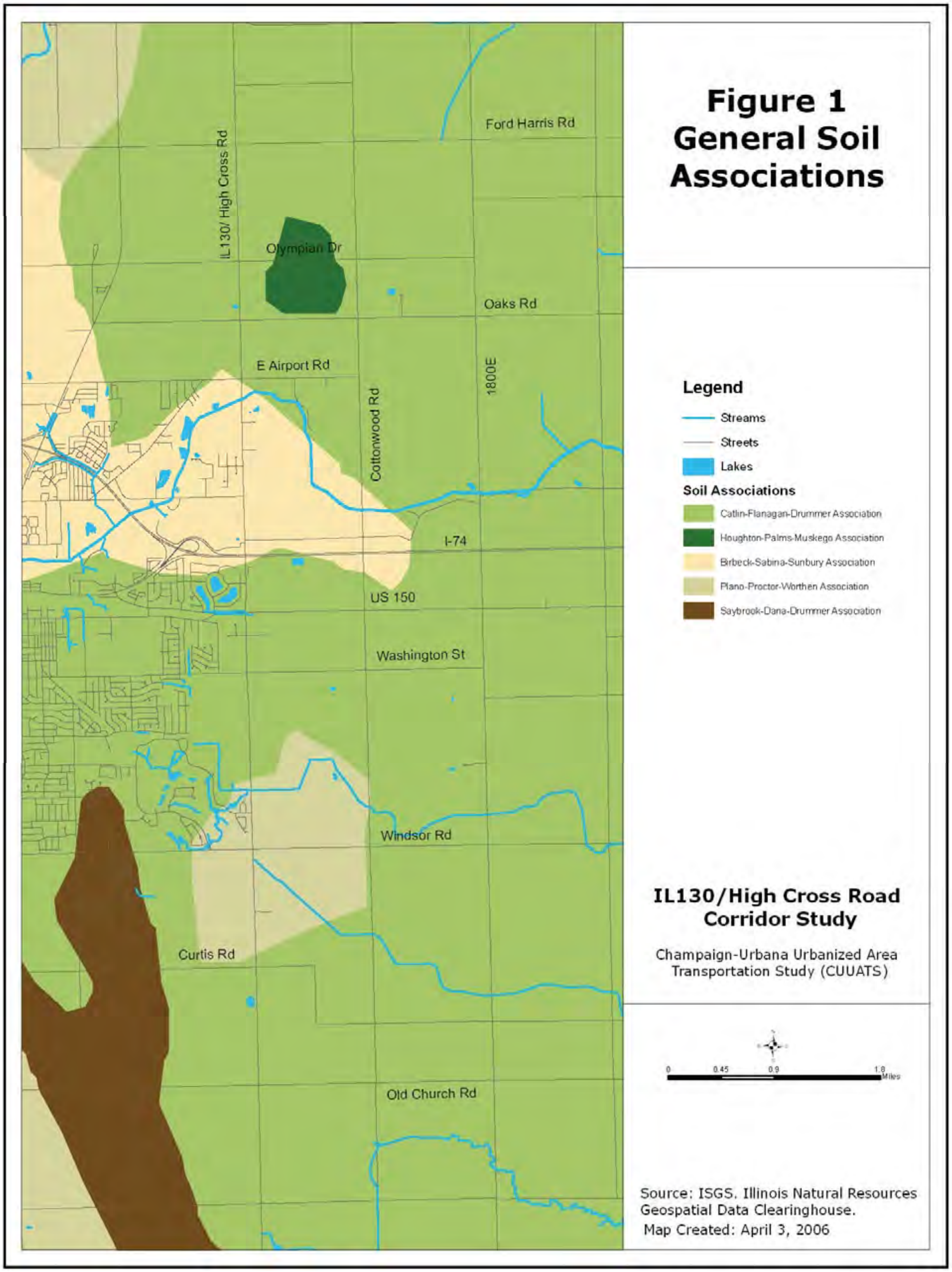
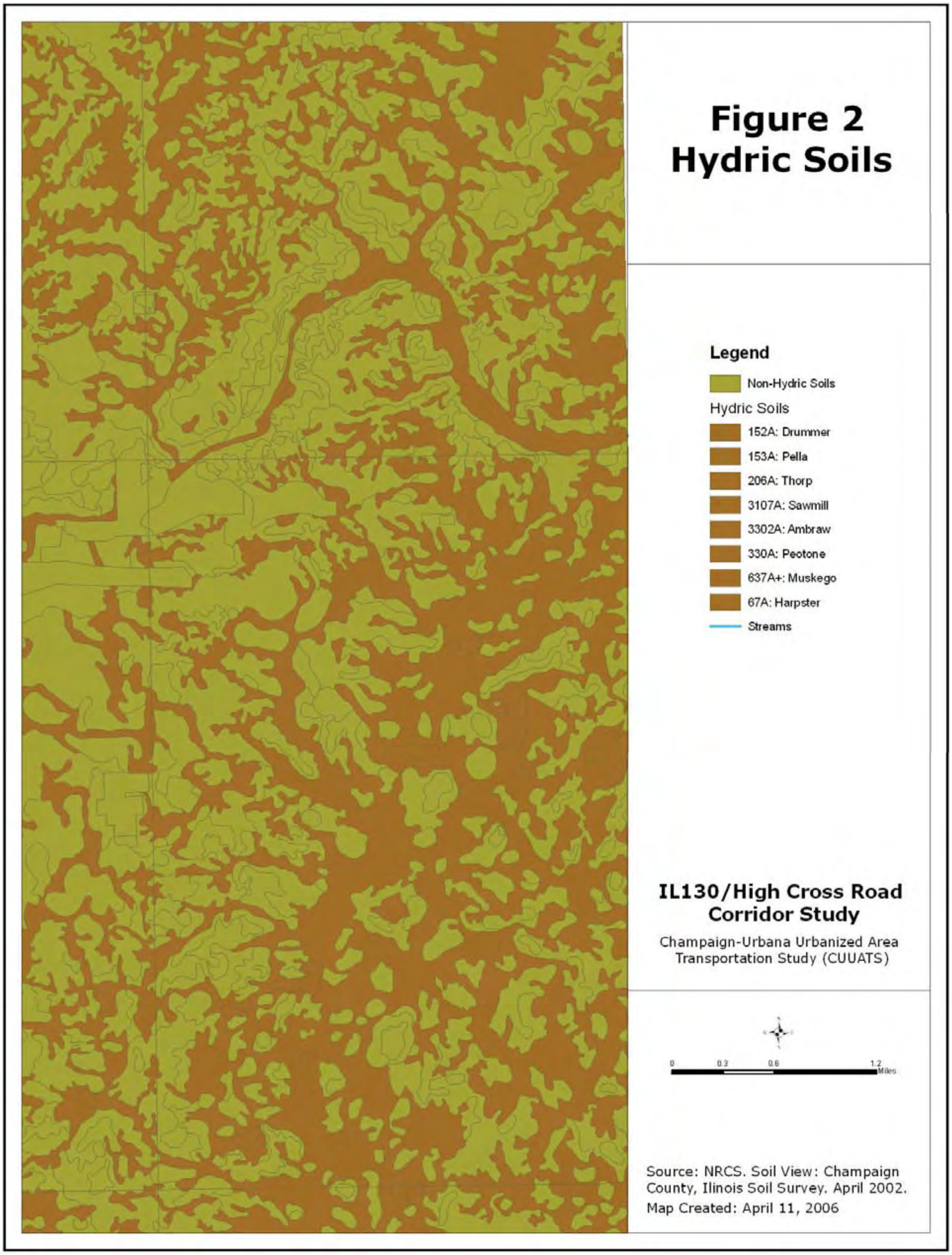


Figure 2: Hydric Soils



2.4 Wetlands

The Clean Water Act (CWA) defines its jurisdictional waters as water bodies including lakes, rivers and streams, and wetlands. Wetlands, for the purposes of the CWA, are those areas that are inundated or saturated by surface water or groundwater at a frequency and duration sufficient to support, and under normal circumstances do support, a prevalence of vegetation typically adapted for life in saturated soil conditions (33 CFR 328.3). Section 404 of the CWA requires a permit from the US Army Corps Engineers for the discharge of dredged or fill material into "Water of the United States" including jurisdictional wetlands, rivers, lakes, and streams.

The United States Fish and Wildlife Service (USFWS) also defines wetlands as lands transitional between aquatic and terrestrial systems where the water table is usually at or near the surface, or the land is covered by shallow water. In addition, the definition requires that one or more of the following three attributes be present: (1) at least periodically the land supports predominantly hydrophytes (wetland plants), (2) the substrate is predominantly undrained hydric soil (wetland soils), or (3) the substrate is nonsoil and is saturated with or covered by shallow water at some time during the growing season of each year."

This section summarizes the wetlands maps obtained from Illinois Department of Natural Resources Clearinghouse using the classification system of USFWS National Wetland Inventory. Map 3 shows the location, size, and type of wet habitats within defined areas and Table 2 shows the acreages and description of each type of wetlands within the defined geographic area.

Table 2: NWI Classification and Acreages on the Study Area

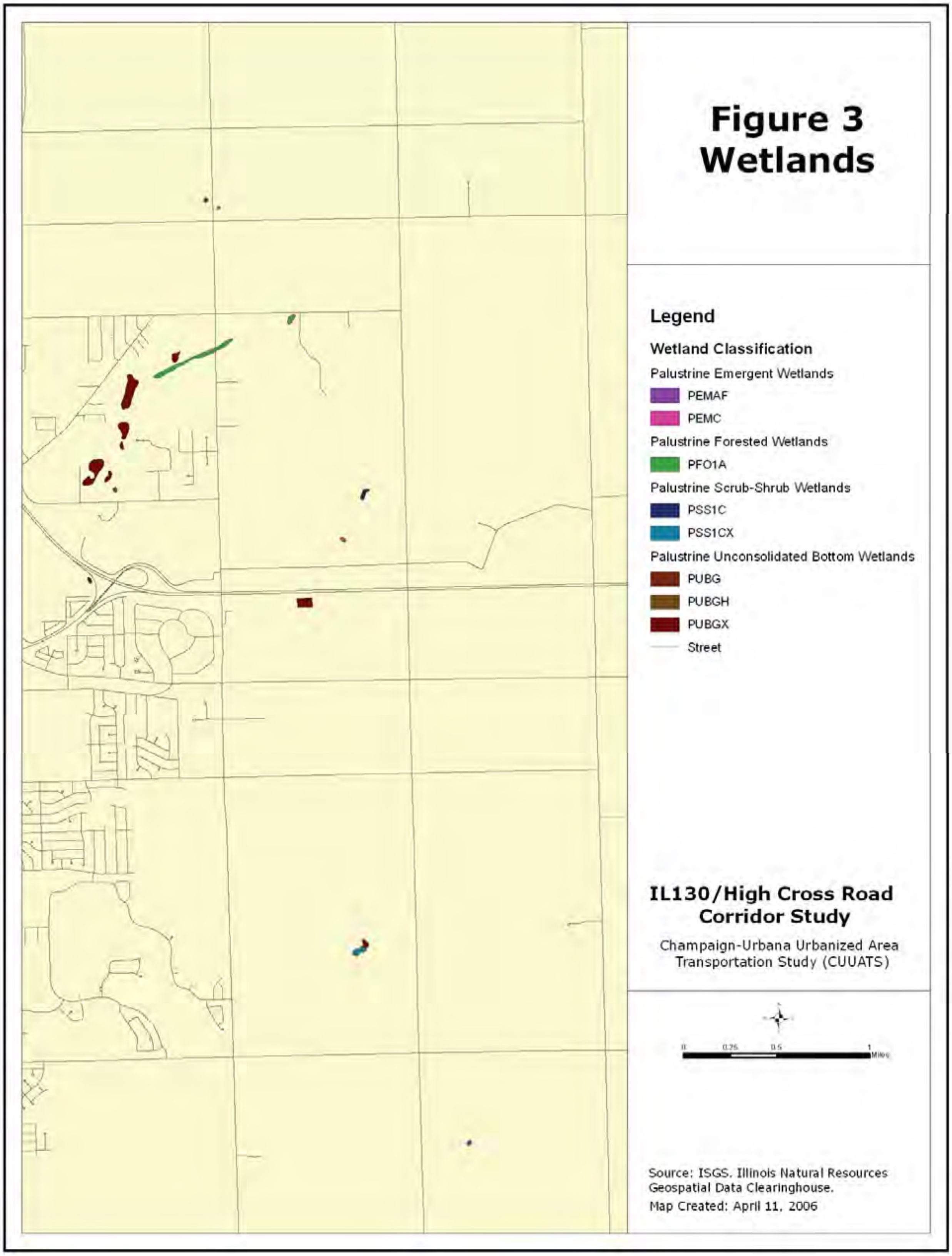
Wetland Classification	Acres	Descriptions
PEMAF	0.39	Palustrine, Erect rooted, herbaceous, wetland plants, Temporarily wet, Showing evidence of farming
PEMC	0.53	Palustrine, Erect rooted, herbaceous, wetland plants, Seasonally flooded
PFO1A	6.3	Palustrine, Forested area, Temporarily flooded
PSS1C	0.89	Palustrine, Scrub-shrub, Persistent
PSS1CX	1.35	Palustrine, Scrub-shrub, Persistent, Excavated
PUBG	0.34	Palustrine, Unconsolidated bottom, Intermittently exposed
PUBGH	0.34	Palustrine, Unconsolidated bottom, Permanently flooded
PUBGX	22.08	Palustrine, Unconsolidated bottom, Intermittently exposed, Excavated

The map and table indicate approximately 32.2 acres of wetlands or deepwater habitats within the study area. All wetland types are palustrine; neither riverine nor lacustrine wetlands were identified on NWI maps.

2.5 Air Quality

This section first describes the air quality criteria, which is the basis of evaluating the impact of the proposed transportation projects on air quality, and then explains the evaluation method applied for estimating the impacts of the project-related emission levels. It is considered that project-related emissions are mainly generated from motor vehicles operating in the study area. Construction emissions are not included in this analysis because construction time is relatively short and won't significantly affect overall air quality levels. Since the study area is currently an attainment area, meaning that ambient air quality standards are within acceptable parameters, an air quality impact analysis was performed only for Carbon Monoxide (CO) at the busiest intersection in the study area: IL130 and US 150.

Figure 3: Wetlands



2.5.1 Air Quality Criteria

The Environmental Protection Act of the State of Illinois (IEPA) regulates the concentrations of six pollutants: ozone (O_3), particulate matter (PM), sulfate dioxide (SO_2), carbon monoxide (CO), nitrogen dioxide (NO_2), and lead (Pb)[6]. Table 3 shows the summary of each pollutant and standards for the State of Illinois. Primary Standards refer to air quality levels required to protect public health with an adequate margin of safety. Secondary Standards or welfare standards refer to air quality levels required to safeguard visibility, comfort, animals, and property from the deleterious affects of poor air quality.

Table 3: Summary of National and Illinois Ambient Air Quality Standard[7]

Pollutant	Average Time	Standard	
		Primary	Secondary
OZONE (O_3)	1-hour/day	0.12 ppm	Same as Primary
	8-hour/day	0.08 ppm	Same as Primary
Coarse Particulate Matter (PM_{10})	Annual Arithmetic Mean	50 ug/m^3	Same as Primary
	24-hour	150 ug/m^3	Same as Primary
Fine Particulate Matter (PM_{25})	Annual Arithmetic Mean	15 ug/m^3	Same as Primary
	24-hour	65 ug/m^3	Same as Primary
Sulfur Dioxide (SO_2)	Annual Arithmetic Mean	0.03 ppm	None
	24-hour	0.14 ppm	None
	3-hour	None	0.5 ppm
Nitrogen Dioxide	Annual Arithmetic Mean	0.053 ppm	Same as Primary
Carbon Monoxide (CO)	1-hour	35 ppm	Same as Primary
	8-hour	9 ppm	Same as Primary
Lead (Pb)	Quarterly Arithmetic Mean	1.5 ug/m^3	Same as Primary

*Standard units are microgram per cubic meter (ug/m^3) or parts per million (ppm)

2.5.2 Existing Conditions

The study area is located in the level prairie farmlands of east-central Illinois, in a temperate, humid, and continental climate. The temperature ranges from an average daily minimum of 19.4 F in winter, to an average daily maximum of 83.7 F in summer. The annual precipitation is about 39.7 inches; 60 percent of this amount falls in April through September. The prevailing wind is from the south. The average wind speed is highest, at 11 to 12 miles per hour, from November to April[8].

Major factors affecting air quality at a given location are the amounts and types of pollutants, meteorological conditions such as temperature, wind speed and direction, and topographic features of the region. Target air pollutants associated with transportation are carbon monoxide (CO), particulate matter (PM), nitrogen oxide (NOx), and Volatile Organic Materials (VOM) since transportation emissions are generated from combustion and evaporation of fuels of mobile sources such as motor vehicles, trains, and boats. In addition, the primary targets to be controlled are the number of vehicles and vehicle miles traveled.

[6] IEPA. Annual Air Quality Report. 2004

[7] Source: IEPA, Annual Air Quality Report 2004.

[8] Natural Resources Conservation Service. Soil Survey of Champaign County, Illinois – Part1. 2001.

Air quality monitoring stations operating in Champaign County are located in the Village of Bondville and the City of Urbana. The monitoring station located in the City of Urbana monitors Ozone (O_3) and $PM_{2.5}$. Table 4 shows a summary of the highest pollutant values for O_3 and $PM_{2.5}$ recorded at this station in the last 5 years. All areas within Champaign County meet air quality standards for all six criteria pollutants.

Table 4: Air Quality Summary, Urbana Monitoring Station

Pollutant	Averaging Time	Maximum Concentrations					No. of Days Exceeding Federal Standard*				
		2000	2001	2002	2003	2004	2000	2001	2002	2003	2004
O_3	1 hour	0.088	0.081	0.092	0.084	0.074	0	0	0	0	0
	8 hours	0.081	0.074	0.09	0.078	0.066	-	-	1	0	0
$PM_{2.5}$	24 hours	31.4	36.8	24.1	34.9	29.7	0	0	0	0	0
	Annual	14.8	12.6	12.1	13.1	10.4	0	0	0	0	0

*Refer to Table 3 for air quality standard.
**Source: IEPA. Annual Air Quality Report. 2000-2004

2.6 Noise

IL130 is one of the major corridors located on the eastern side of the Champaign-Urbana-Savoy-Bondville Urbanized Area. Although high-speed traffic and heavyweight trucks run through this corridor, noise is not considered a significant annoyance since most of the surrounding areas are currently agricultural farmlands. It is expected, however, that new residential developments will occur with the commercial facilities introduced into this area. Thus noise may become a more significant factor. This section mainly focuses on describing the basic concept of noise and measurement, reviewing regulatory noise standards or impact criteria, and estimating existing noise exposure from highway traffic. These elements form the basis for determining noise impact for forecasted future noise levels.

Noise is one of the major adverse impacts associated with transportation improvements or increased traffic. In terms of transportation and environment, transportation noises may be defined as unwanted, unpleasant sounds generated on roadway[9], railway, or airway.

The measurement for sound is sound pressure level, measured in decibels (dB). Table 1 shows typical sound levels in decibels in order to compare common sounds from the various sound sources. For transportation noise, an adjustment or weighting of the high- and low-pitched sounds is made to approximate the way that an average person hears sounds. The adjusted sounds are called "A-weighted levels" (dBA). The sound levels range from 0 dBA to 120 dBA.

Table 5: Typical sound readings of common sounds

Sound Level (dB)	Sound Source
150	Jet Take Off (At close range on ground)
130	Machine gun, riveting machine
117	Jet Plane (At the passenger ramp)
107	Loud power mower
90	Sports car, truck, loud conversation
50-60	Normal conversation
50	Quiet street
40	Quiet room

[9] FHWA. Highway Traffic Noise Analysis and Abatement Policy and Guidance. 1995

Another measuring unit for sound is Sound Exposure Level (SEL), such as L_{eq} and L_{dn}, which describes an equivalent and cumulative noise exposure for a specified period of time. L_{eq} is the receiver's cumulative sound exposure level over a one-hour period, which is usually used for the loudest hours of transportation related activity. FHWA requires the use of 1-hour L_{eq} as the basis to evaluate the potential impact of a new or expanded highway. It is also adopted in this study to measure rail noise impact since FTA does not require the use of specific measurement and L_{eq} allows the comparison of train noise with highway traffic noise.

L_{dn} is the cumulative noise exposure over 24 hours, which is called "Day-Night Sound Level". All noise events occurring between 10:00 pm and 7:00 am have 10 dBA added to them to compensate for the extra sensitivity of sounds occurring during normal sleeping hours. L_{dn} is used in this study for airport noise impact. The Federal Aviation Administration (FAA) designates L_{dn} for estimating aircraft and airport related noise impact.

2.6.1 Noise Regulations

The Federal Highway Administration (FHWA) and the Federal Aviation Administration (FAA) mandate the noise assessments for future projects based on their policies, guidelines, and procedures. State and local regulations approach noise impact as adverse environmental impacts or nuisance to residents from any sources of noise rather than specific sources such as transportation facilities. Transportation-related regulations at the federal level and state and local noise regulations are described below.

Noise Control Act of 1972

This Act gives the Environmental Protection Agency (EPA) the authority to establish noise regulation to control major noise sources including transportation vehicles and construction equipment. This act requires EPA to issue emission standards for motor vehicles used in interstate commerce and requires FHWA to enforce the noise emission standards.

Federal-Aid Highway Act of 1970

This is the federal act including highway noise abatement. This law mandates FHWA highway noise emission standards to mitigate highway traffic noise. Table 6 shows the noise standards issued by the Federal Highway Administration for use in planning design highways. Based on this standard, it is considered that 66 dBA is the normally acceptable noise criteria for highway improvements[10] representing a compromise among various land uses, agencies, and time of the day.

Table 6: Design Noise Level / Land Use Relationship

Land Use Category	Design L_{10} dBA	Land Use
A	60	Special areas such as amphitheaters, parks or open spaces dedicated or recognized by local officials for activities requiring special qualities of serenity and quiet
B	70	Residential and recreational areas
C	75	Commercial and industrial areas
D	NA	Undeveloped areas
E	55*	Residential, hospitals, libraries, etc.

* This applies to interior noise level. Others apply to exterior noise level.

[10] Federal Highway Administration and Nevada Department of Transportation. *Final Environmental Impact Statement and Section 4(F) Evaluation*. Volume1. April 2005.

Illinois Pollution Control Board Order[11]

Title 35 of the Illinois Administrative Code contains the Board's substantive pollution control standards and regulations and the Illinois Environmental Protection Agency's rules for administering pollution control programs. *Subtitle H: Noise* specifies the allowable sound levels according to land use classes. Class C Land Use[12] includes transportation facilities such as railways and terminals, airports, and streets. Table 7 shows the allowable Octave Band Sound Pressure Level (dB) of sound emitted to residential and commercial areas from the Class C Land Use including transportation facilities.

Table 7: Allowable Noise Standard by Illinois Pollution Control Board

Land Class	Sound Level (dB)	Land Use
A	69	Day Time - Residential Area, Hotel, Motel
A	62	Night Time - Residential Area, Hotel, Motel
B	74	Commercial Area

* This table is in the case of 125-Hertz Octave Band Center Frequency

City Code of the City of Urbana

Chapter 16 of City Code of the City of Urbana addresses the noise from motor vehicles and prohibits excessive standing while waiting, the use of sound system, or modified exhaust system of the vehicle as well as automobile horns and squealing of tires.

2.6.2 Existing Highway Noise Levels

The level of highway-based noise depends on traffic volume, speed of traffic, percentage of trucks in the flow of traffic, distance to the highway, intervening topography, and atmospheric conditions[13]. The analysis uses the FHWA Traffic Noise Model 2.5 Look-up Table. Parameters included in this analysis are the vehicle types and their speeds and volumes, distance to the noise sources, noise barriers, and surrounding terrains. Map 6-1 presents the estimated existing noise levels at the nine noise analysis sites. One-hour traffic volumes from 7:00 AM to 8:00 AM, the busiest time of the day along IL130, and average speeds by vehicle class were used for analysis and the results were shown in L_{eq} units.

As can be seen in Map 4 all existing traffic noise levels are below FHWA's noise impact criteria, which is 66 L_{eq}. The estimated noise level is highest south of Tatman Court (59.3 L_{eq}) and lowest north of Airport Road (39.2 L_{eq}) during the AM peak hour. Based on these results, it can be concluded that there are no sites that need detailed noise impact study considering existing noise levels.

11 For detailed information, refer Title 35 of the Illinois Administrative Code subtitle H: Noise.
12 Land uses are classified as three different uses: Land use A is mainly for residential or lodging uses, Land use B for wholesale and retail, and Land use C for industrial and manufacturing.
13 Wisconsin Department of Transportation. *Environmental Procedures Manual M31-11*. September 2003.

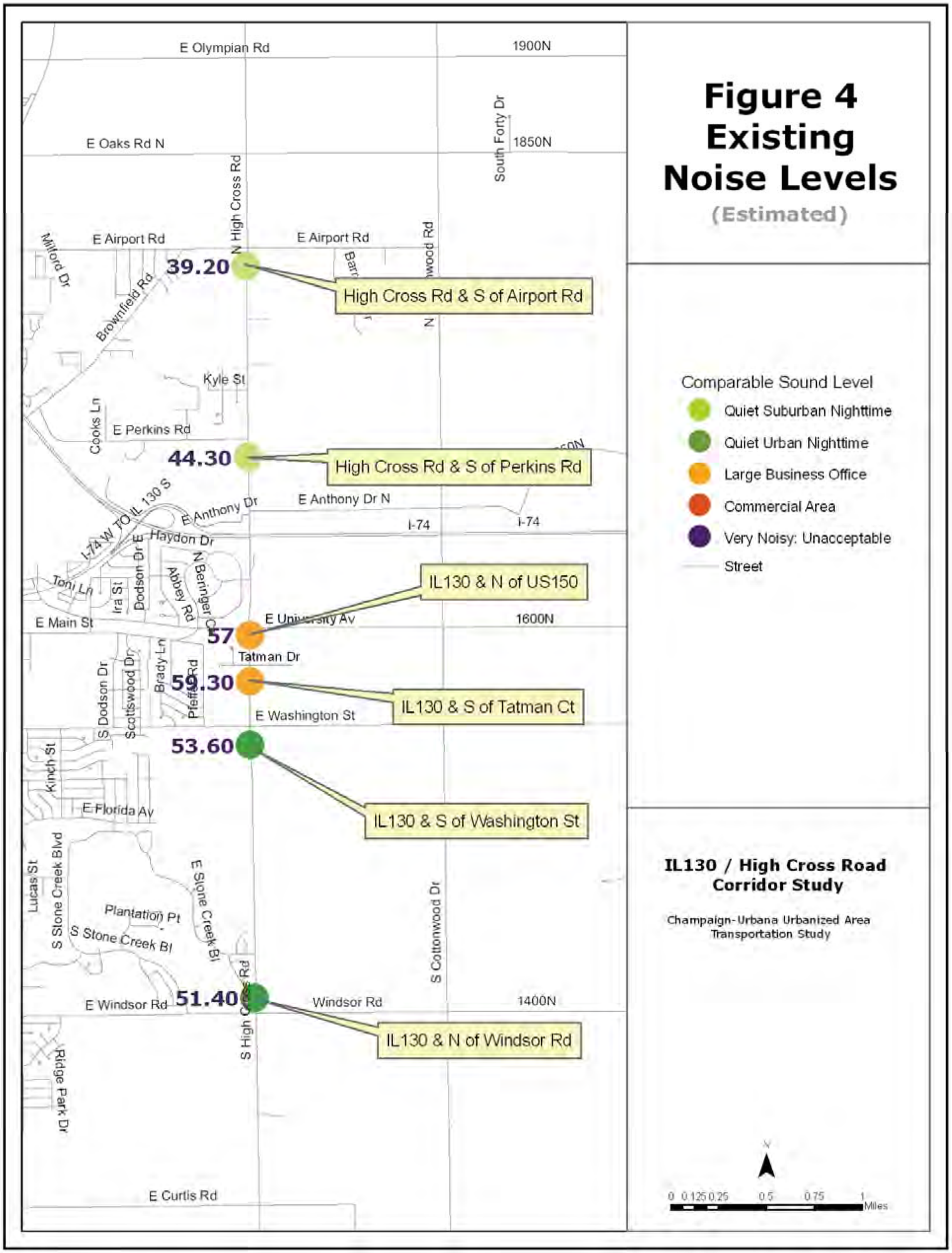


Figure 4
Existing
Noise Levels
(Estimated)
Comparable Sound Level
Quiet Suburban Nighttime
Quiet Urban Nighttime
Large Business Office
Commercial Area
Very Noisy: Unacceptable
Street
IL130 / High Cross Road
Corridor Study
Champaign-Urbana Urbanized Area
Transportation Study
39.20
High Cross Rd & S of Airport Rd
44.30
High Cross Rd & S of Perkins Rd
57
IL130 & N of US150
59.30
IL130 & S of Tatman Ct
53.60
IL130 & S of Washington St
51.40
IL130 & N of Windsor Rd
E Olympian Rd
1900N
E Oaks Rd N
1850N
South Forty Dr
N High Cross Rd
E Airport Rd
Milford Dr
Brownfield Rd
Kyle St
Cooks Ln
E Perkins Rd
E Anthony Dr
E Anthony Dr N
I-74
I-74 W TO IL 130 S
Haydon Dr
Toni Ln
E Main St
E University Av
1600N
Tatman Dr
E Washington St
E Florida Av
Plantation Pt
S Stone Creek Bl
E Stone Creek Bl
S Cottonwood Dr
E Windsor Rd
Windsor Rd
1400N
S High Cross Rd
Ridge Park Dr
E Curtis Rd
0 0.125 0.25 0.5 0.75 1 Miles

2.7 Water Quality

Major issues associated with surface water in terms of transportation are stormwater runoff and its impacts on water quality to surrounding waters. Vehicle exhaust, wear and tear of vehicles, salting and sanding practices, or highway construction, operation and maintenance may deposit contaminants on the roadway surface. These pollutants can be washed off when raining or snowing, disperse through air and eventually be carried by stormwater runoff. Increase of roadway surface and traffic volume can increase vehicle emission and airborne pollutants, and then affect highway runoff and water quality.

The most common contaminants in highway runoff are heavy metals, inorganic salts, aromatic hydrocarbons, and suspended solids that accumulate on the road surface as a result of regular highway operation and maintenance activities[14]. The quality and quantity of contaminants washed from a roadway is a function of the number of vehicles passing, their speed, the number of dry days preceding a given rainstorm and the quantity of rainfall[15]. Among several factors, vehicle miles traveled associated with the number of vehicles passing would be the primary factor to affect the extent of water quality degradation.

Water quality is physical, chemical, and biological integrity of water resources. The Illinois Pollution Control Board has established four primary sets of water quality standards[16] in order to protect and regulate the beneficial uses of Illinois surface waters. The four individual categories are: general use standards, public and food processing water supply standards, Lake Michigan basin water quality standards, and secondary contact and indigenous aquatic life standards, which are related to USEPA designated use categories such as aquatic life use, primary contact use (recreational use or swimming use), secondary contact use, fish consumption, and drinking water use. When a waterbody is assessed as Partial Support or Nonsupport for aquatic life use, one exceedance of an applicable Illinois water quality standard results in identifying the parameter as a potential cause of impairment[17].

2.7.1 Statewide Water Quality

Water resources that need consideration in transportation are streams and lakes. Tables 8-10 show the statewide resource quality summary for streams, potential causes of impairment, and potential sources of impairment. Aquatic Life Use is fully supported in 62.3 % of assessed miles of stream. Major sources of impairment are Agriculture (29.6%), Hydromodification (20.0%), and Municipal point source (12.3%). The tables indicate that impact from Highway/Road/Bridge Construction and Highway Maintenance/Runoff is not serious since the share of impairment is about 2%. Currently, impacts from on-road vehicles are not considered.

Table 8: Statewide Individual Use Support for Streams (miles)

Degree of Use Support	Aquatic Life			Fish Consumption	Primary Contact	Indigenous Aquatic Life	Public Water Supply
	Total	Monitored	Evaluated		(Swimming)		
Full Support	9,147	7,234	1,913	3,975	1,493	32	267
Partial	5,141	3,310	1,831	2,523	937	47	821
Nonsupport	401	300	101	255	1,373	6	0
Total	14,689	10,844	3,845	6,753	3,803	85	1,088

* Source: IEPA. 305b Report. 2004

14 FHWA. Is highway runoff a serious problem? Available at: http://www.tfhrc.gov/hnr20/runoff/runoff.htm
15 Transportation Research Board (TRB). NCHRP Web Document 37: Management of runoff from surface transportation facilities - Synthesis and Research Plan. March 2001.
16 Refer IEPA 305b Report 2004 for detailed water quality standards by individual use categories.
17 IEPA. 305b Report. 2004. P. 30.

Table 9: Statewide Potential Causes of Use Impairment in Streams

Cause Category	Impaired Miles
Ammonia	115
Chlorine	14
Excessive Aquatic-plant Growth	240
Flow Alterations	530
Physical-Habitat Alterations (other than flow)	2,202
Metals	3,332
Nitrate (for public water supply use only)	83
Non-priority Organics	12
Nutrients	2,588
Oil and Grease	31
Organic Enrichment/Low Dissolved Oxygen	2,974
Other Inorganics (Fluoride)	24
Pathogens (Fecal Coliform Bacteria)	2,311
Polychlorinated Biphenyls (PCBs)	2,654
Pesticides (half life <=90 days)	436
PH	1,024
Priority Organics	412
Salinity/TDS/Chlorides	715
Siltation	2,343
Sulfates	585
Suspended Solids	1,753
* Source: IEPA. 305b Report. 2004	

Table 10: Statewide Potential Sources of Use Impairment in Streams

Source Category	Impaired Miles	Percent
Industrial Point Source	193	1.7
Municipal Point Source	1,416	12.3
Combined Sewer Overflow	331	2.9
Collection System Failure	14	0.1
Wildcat Sewer	18	0.2
Agriculture	3,400	29.6
Construction	199	1.7
Urban Runoff/Storm Sewers	1,002	8.7
Resource Extraction	1,036	9
Land Disposal	8	0.1
Hydromodification	2,299	20
Habitat Modification	1,019	8.9
Highway Maintenance/Runoff	59	0.5
Contaminated Sediment	339	3
Natural Sources	119	1
Recreation Activities	34	0.3
* Source: IEPA. 305b Report. 2004		

436 inland lakes representing 150,424 acres were assessed for overall use support. According to IEPA 305b Report, overall use was fully or partially attained on 96.6 percent of the number and 94.6 percent of the acreage assessed.

Water bodies surrounding the study area include the Saline Branch, Union Dr. Ditch, and Boneyard Creek, which are branches of the Salt Fork Vermilion River. Map 5 displays the streams, lakes, and watershed surrounding or traversing the study area.

2.7.1 Water Quality Existing Conditions

Designated use support assessment, causes and sources of impairment are shown in Table 11 below. The Saline Branch is partially supported and Boneyard Creek is not supported for Aquatic Life Use. Major sources of impairment for Saline Branch (BPJC06) located in the study area are Municipal point Sources and Agriculture. Although the traffic impacts are not significant[18], existing water quality of the Saline Branch is not fully supporting the designated use.

Table 11: Summary for Study Area Streams

Name	Segment ID	Aquatic Life Use Support	Causes of Impairment	Sources
Saline Branch	BPJC06	Partial	Boron, N, Ammonia, Fish Kills, TN, TP(Total Phosphorus)	Municipal Point Sources
			Total suspended solids, TP, TN	Agriculture
			Physical- habitat alteration	Channelization
			DDT, Methoxphlor, Dieldrin,	Contaminated Sediments
Saline Branch	BPJC08	Partial	TN (Total Nitrogen)	Agriculture
			Dissolved Oxygen	
			Physical-habitat alteration	Hydromodification
Union Dr. Ditch	BPJM01	Not Assessed	-	-
Boneyard Creek	BPJCA	Not Supporting	Physical-habitat alteration	Urban Runoff/ Storm Sewers
				Hydromodification
			DDTs, PCBs, and Hexachlorobenxene	Contaminated Sediments
* Source: IEPA. 305b Report. 2004				

2.8 Wildlife and Vegetation Habitat

Champaign County lies in the prairie area with flat landscape, deep loess soil, and poor natural drainage resulting in wet conditions during part of the year. Grasses such as Big Bluestem grass and Indian grass are dominant along with a large number of other species of grasses and forbs[19]. Currently, Illinois Plant Information Network (IPIN) records 1,190 plant species in Champaign County. Also, over 100 breeding bird species are found in Lake of Woods, Middle Fork River Forest Preserve, and Homer Lake Forest Preserve areas.

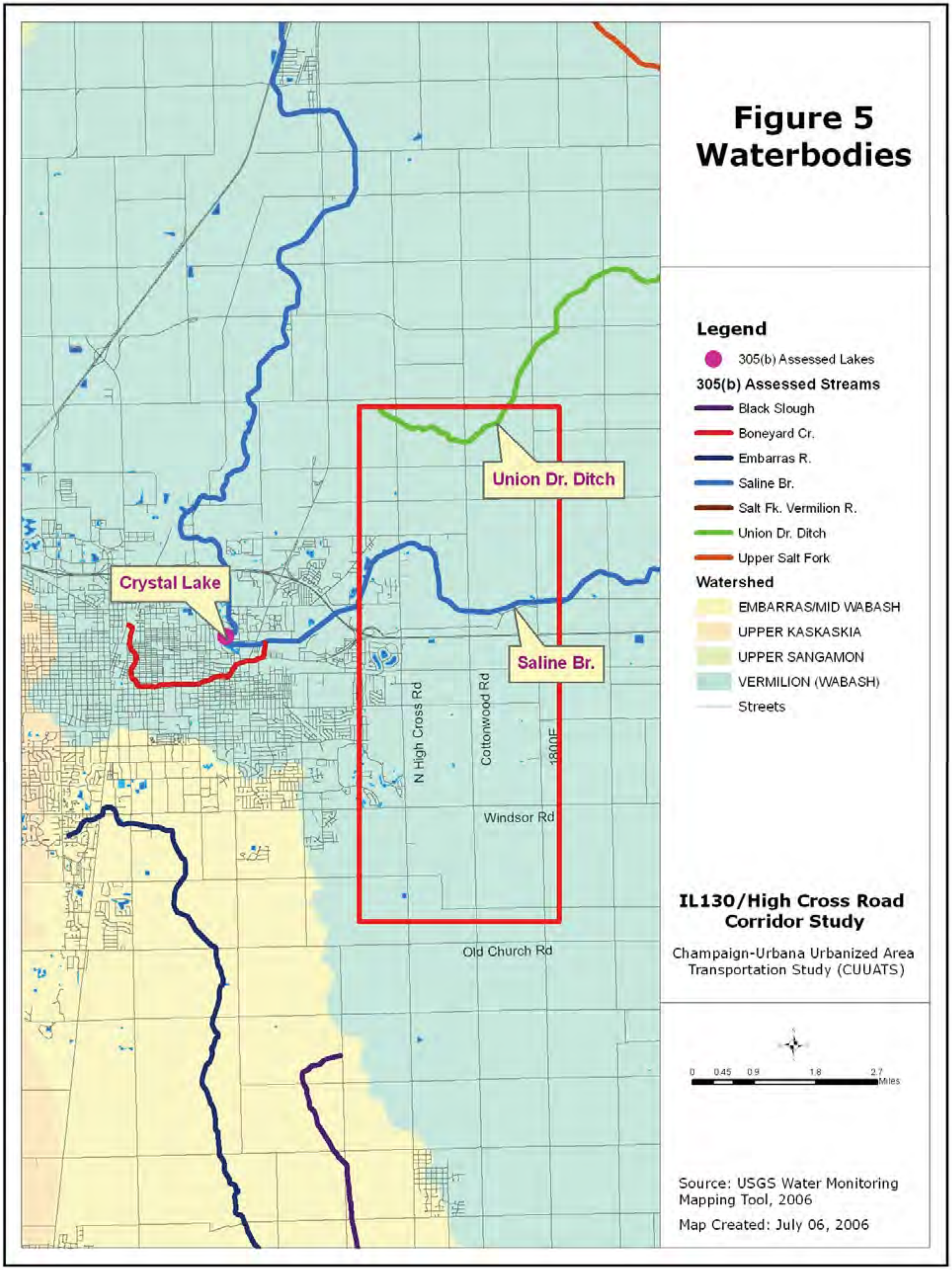
2.8.1 Natural Areas

Based on Land Cover from the Illinois Statistical Summary 1999-2000, Champaign County consists primarily of over 91% agricultural areas, 6% urban development, 1% forest and 1% wetland. Map 6 displays more

[18] A report by FHWA says that "Given that a large number of preventive and corrective measures can and are being taken to suppress the potential of any disturbing effects of highway runoff on nearby receiving waters, it is important to recognize that highway runoff need not be and most often is not a serious problem."FHWA. Is highway runoff a serious problem? Available at: http://www.tfhrc.gov/hnr20/runoff/runoff.htm.

[19] Robe, Kenneth. The tallgrass prairie in Illinois. Available at: http://www.inhs.uiuc.edu/~kenr/prairewhatis.html (June 2006).

Figure 5: Waterbodies Surrounding Study Area



detailed land cover information for the study area. Although most of the study area is composed of agricultural lands, areas north of I-74 include upland forest and floodplain forest in and around the Saline Branch.

Brownfield Woods and Trelease Woods are currently listed in the Illinois Natural Areas Inventory (INAI). The INAI was initiated during the1970's; the purpose of building this inventory was to locate and describe the high-quality natural areas remaining in Illinois. In addition to two INAI areas, the University of Illinois (U of I) owns and manages Trelease Prairie and Philips Tract within the study area for the purpose of biological research. All four natural areas are under the jurisdiction of U of I and information on each site is obtained from the Committee on Natural Areas of U of I website.

Brownfield Woods consists of 64.6 acres of "virgin" deciduous upland forest, primarily of mature oak, ash, and maple, with a high, closed canopy and fairly open understory. Sugar maple has rapidly become the dominant tree species. The Woods is a remnant of a much larger prairie grove that was present at settlement times. A small creek, fed by runoff and field tiles, runs diagonally through the Woods. Brownfield Woods is mostly surrounded by agricultural land to the west and east. Houses can be found to the north, part of the east side, and on the south side.

Trelease Woods is composed of "virgin" deciduous upland forest with 60.5 acre woods and 10.7 acre buffer. Like Brownfield Woods, Trelease Woods is primarily comprised of mature oak, ash, and maple with a high, closed canopy and moderately dense understory. Sugar maple has rapidly become the dominant tree species. The Woods is a remnant of a much larger prairie grove that was present at settlement times and was originally connected with Brownfield Woods. The Woods is not well drained and more prone to canopy tree windfall openings than Brownfield Woods. There are two small, man-made seasonal ponds located in the woods and on the south edge of the woods. Buffer land on the north and northeast sides of the woods are 50 m in depth and were seeded with alfalfa and mixed prairie species in 2002. Agricultural lands surround three sides of the Woods and Trelease Prairie runs up to the south edge of the Woods.

Trelease Prairie is a 19.9-acre recreated tallgrass prairie. Restoration began in the 1940's and is currently maintained by periodic burning. The prairie was divided into quadrants in 1996 with two quadrants being burned under a fall burning regime and two quadrants under a spring burning regime.

Phillips Tract is located to the west side of Trelease Woods and Trelease Prairie across Cottonwood Road. The site, which was formerly a 130-acre farm, is used for larger manipulative studies. The area contains alfalfa, bluegrass, recreated prairie, oldfield, and agricultural fields, a 30-year-old successional area and rotating 1 to 5 year old successional strips, and oldfield/successional woods. The Saline Branch of the Salt Fork River runs through the property.

2.8.2 Protected Species

The US Fish and Wildlife Service (USFWS) defines the "endangered" species as one that it is in danger of extinction throughout all or a significant portion of its range. A "threatened" species is one that is likely to become endangered in the foreseeable future. Currently, 29 species are federally listed for Illinois as endangered, threatened, or candidate species, including the Indiana bat, pallid sturgeon, Higgins eye pearly mussel, Illinois cave amphipod, and decurrent false aster[20].

Table 12 presents the 29 federally listed species of concern in Illinois. There is no species unique to Champaign County. However, several statewide listed species may potentially be found in Champaign County. For example, the Indiana bat (*Myotis sodalis*) potentially appears in all Illinois counties. Also, the prairie bush-clover (*Lespedeza leptostachya*) and the eastern prairie fringed orchid (*Platanthera leucophaea*) may be potentially present in Illinois counties containing dry/mesic/wet prairies.

[20] Rock Island Ecological Services Field Office, US Fish & Wildlife Service. Midwest Region 3 Internet Site. Available at: http://www.fws.gov/midwest/RockIsland/index.htm.

Figure 6: Land Cover and Illinois Natural Areas Inventory sites

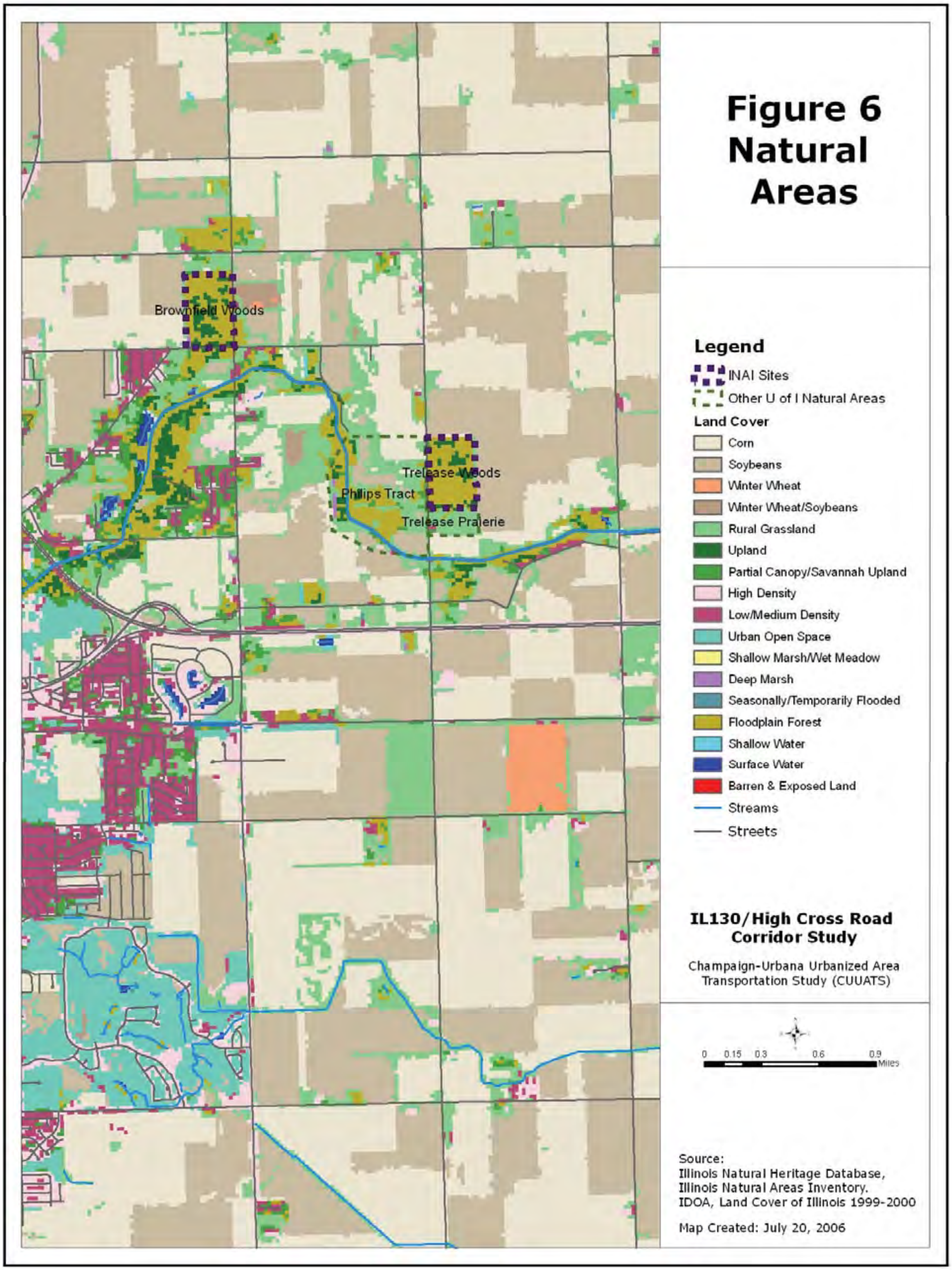


Table 12: Threatened and Endangered Plants and Animals listed in Illinois

Type	Common Name	Scientific Name	Status*	Habitat
MAMMALS	Indiana bat	*Myotis sodalis*	E	Caves, mines; small stream corridors with well-developed riparian woods; upland and bottomland forests
	Gray bat	*Myotis grisescens*	E	Mines and caves
BIRDS	Least tern	*Sterna antillarum*	E	Bare alluvial and dredged spoil islands, Mississippi & Ohio River
	Bald eagle	*Haliaeetus leucocephalus*	T	Breeding/wintering
	Piping Plover	Charadrius mdlodus	E	Critical habitat designated
	Whooping Crane	Grus americana	NE	-
FISHES	Pallid Sturgeon	*Scaphirynchus albus*	E	Mississippi River
REPTILES	Eastern massasauga	*Sistrurus catenatus catenatus*	CAN	Shrubby wetlands
CLAMS	Clubshell mussel	*Pleurobema clava*	E	N. Fork Vermillion River
	Fanshell mussel	*Cyprogenia stegaria = irrorata*	E	Wabash River
	Fat pocketbook pearly mussel	*Potamilis capax*	T	Wabash River
	Higgins' eye pearly mussel	*Lampsilis higginsii*	E	Mississippi River
	Pink mucket pearly mussel	Lampsilis orbiculata	E	Ohio River
	Orange-footed pearly mussel	Plethobasis cooperianus	E	Ohio River
	Sheepnose mussel	*Plethobasus cyphyus*	CAN	Mississippi River
	Spectacle case mussel	*Cumberlandia monodonta*	CAN	Mississippi River
SNAILS	Iowa pleistocene snail	*Discus macclintocki*	E	Algific talus slopes
INSECTS	Hines emerald dragonfly	*Somatochlora hineana*	E	Des Plaines River wetlands
	Karner blue butterfly	*Lycaeides melissa samuelis*	E	Possibly extirpated
CRUSTACEANS	Ilinois cave amphipod	*Gammarus acherondytes*	E	Cave streams
PLANTS	Decurrent false aster	*Boltonia decurrens*	T	Illinois River floodplain
	Eastern prairie fringed orchid	*Platanthera leucophaea*	T	Wet prairies
	Lakeside daisy	*Hymenoxis herbacea*	T	Dry rocky prairies (introduced)
	Leafy prairie clover	*Dalea foliosa*	E	Des Plaines River floodplain
	Mead's milkweed	*Asclepias meadii*	T	Dry/mesic prairies (introduced)
	Prairie bush-clover	*Lespedeza leptostachya*	T	Dry/mesic prairies
	Dune thistle	*Cirsium pitcheri*	T	Lakeshore dunes (introduced)
	Price's potato-bean	*Apios priceana*	T	-
	Small whorled pogonia	*Isotria medeoloides*	T	Dry woodland

* Status: E-Endangered, T-Threatened, CAN-Candidate, NE-Non-essential experimental population.

? Source: Rock Island Ecological Services Field Office, USFWS. County Distributions of Federally Listed Endangered species. Available at: http://www.fws.gov/midwest/RockIsland/activity/endangrd/il_list.htm#A

2.8.3 Habitat Fragmentation

Most potential areas for natural habitat in the study area are floodplain forests around the Saline Branch, Brownfield Woods, Trelease Woods, and Trelease Prairie. Map 7 shows the potential natural habitats in the study area. According to a short report submitted by a neighborhood association, the Saline Branch would serve more likely as a wildlife corridor for red-tailed hawks, great horned owls, red and gray foxes, as well as other less threatened forms of wildlife. Moreover, the Brownfield and Trelease Woods are reported to be important stopover sites for neotropical migratory birds.

All waterways, from small creeks to major rivers, have a riparian zone or floodplain, which is periodically flooded and represents a transition zone between upland and aquatic habitats[21]. The area surrounding the Saline Branch would be an example of this. Floodplain forests and upland forests are formed next to the Saline Branch and the 100-year floodplain lies along the stream. These riparian forest buffers potentially provide many benefits to immediate and downstream aquatic habitats and may serve as breeding habitat, important travel or migration corridors for wildlife, shelter in winter, and critical resting and refueling stops for migratory songbirds during spring and fall.

However, the continuity of the buffer zone is already damaged due to fragmentation by the road. The Saline Branch area is not an exception. As shown in Map 7, the Saline Branch is fragmented by High Cross Road and Cottonwood Road running through the middle of the stream as well as Perkins Road cutting off the connection of the zone. In addition, Airport Road cuts off the connection to Brownfield Woods from the Saline Branch riparian zone. It may affect the function of the Saline Branch as a wildlife corridor, which in turn connects to the Salt Folk River and relates to the decrease in natural area acreage.

2.9 Visual Quality

According to a FHWA Memorandum, visual resources are defined as "those physical features that make up the visible landscape, including land, water, vegetative and man-made elements." Each visual resource has visual value and is very subjective to viewers. There can be big difference in values, but there is public agreement that the visual resources of certain landscapes have high visual quality (e.g. Chicago Skyline, natural landscape of Grand Tetons, and desert landscapes of Bryce Canyon). Usually, viewer sensitivity or local values can confer visual significance on landscape features.

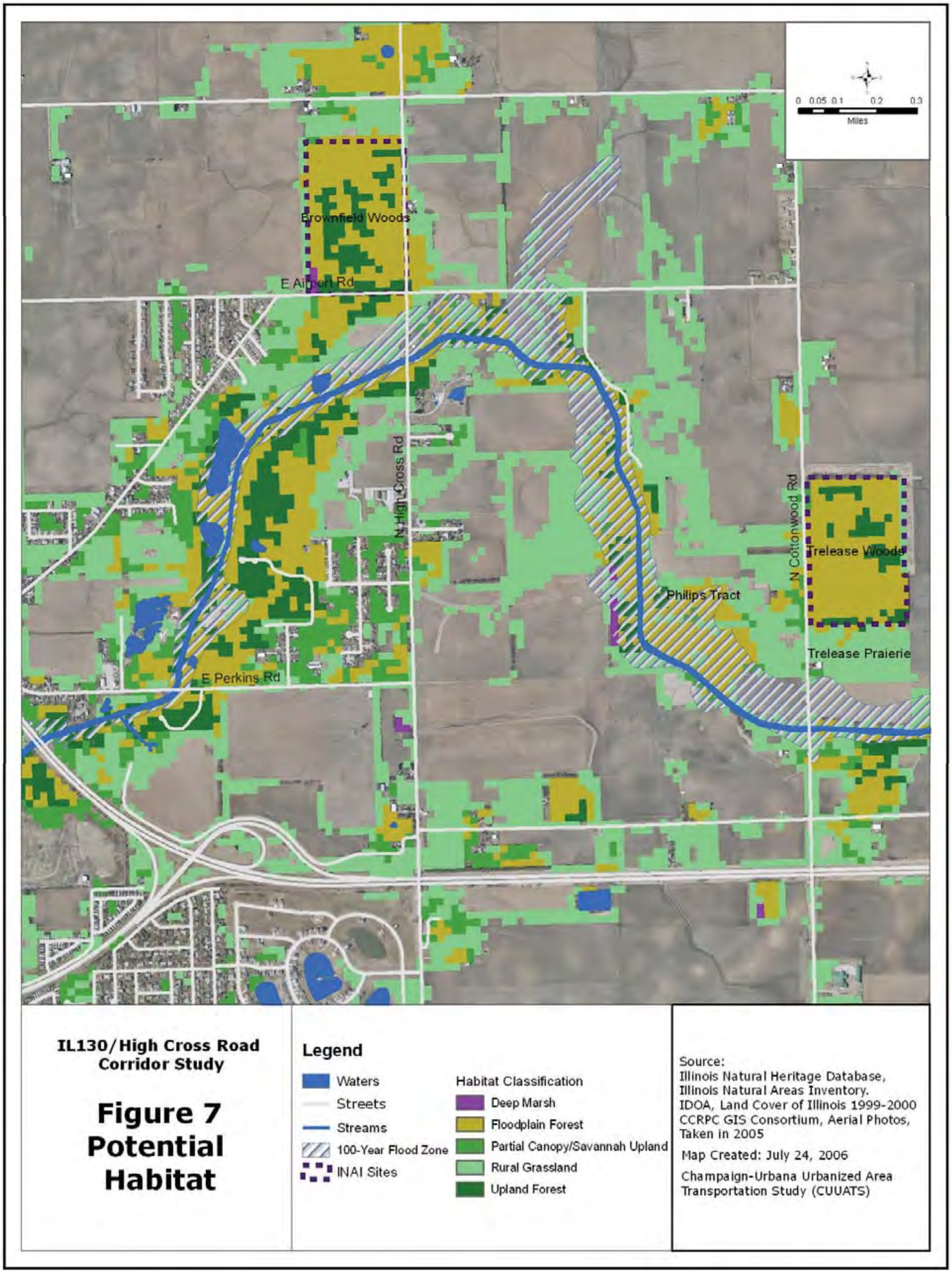
Three major indicators to estimate visual quality are vividness, intactness, and unity. Vividness is the memorability of the visual impression received from contrasting landscape elements as they combine to form a distinctive visual pattern. Intactness is the integrity of visual order in the natural and man-built landscape. Unity is the degree to which the visual resources of the landscape join together to form a coherent, harmonious visual pattern. When achieving a balance of these three criteria, the highway can improve visual quality. While the visual intactness and unity of the farm scene like the study area are both quite high, its overall visual quality may be lower because it is not highly vivid.

The degree of changes in visual quality caused by highway projects is visual impact. The most obvious visual impact of highway construction is the highway surface itself, which has such components as number of lanes, width, pavement materials and color. Roadside, including slope retention, drainage, and roadside planning is another factor that affects the visual quality of the highway. In addition, roadway signs, lights and traffic control devices can have significant impact. However, the results of highway projects can either enhance or degrade visual impact. A highway may improve visual quality if it increases the unity and visual harmony of a landscape. Existing visual resources in the study area include level agricultural areas with grassland, cropland, woodland, and residential and commercial areas. Existing visual quality is reviewed based on views from the roadway. The following photos show visual resources along IL130 from south to north.

Photo 1 shows the typical view along IL130. There are utility poles, scattered buildings, farm facilities, and flat agricultural fields. Any roadway improvements or changes would be noticeable from this perspective. Photos 2 and 3 present the northern portion of High Cross Road. The picture shows the rolling land surface, a farmhouse, cornfields, grassland, ditches, and wooded areas. The roadway surface is paved but not visually attractive in Photo 2.

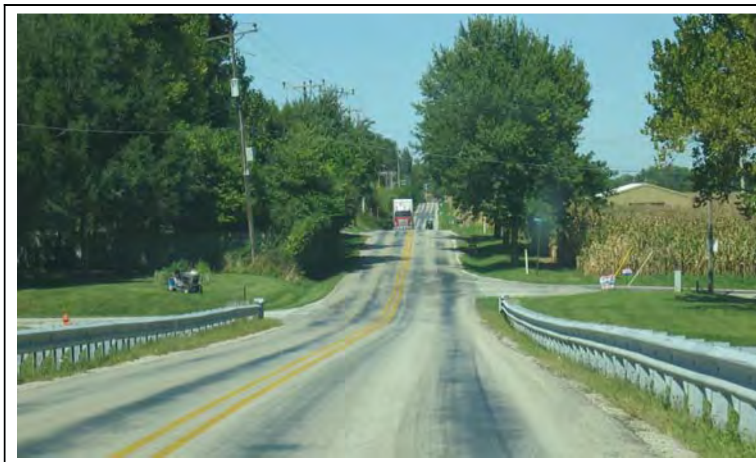
[21] USDA Natural Resources Conservation Service (Illinois). Riparian Forest Buffer. July 2001.

Figure 7: Potential Natural Habitats



View Location

Photo 1. IL130 Between Windsor Road and Washington Street



View Location

Photo 2. Roadway View of north of I-74

View Location

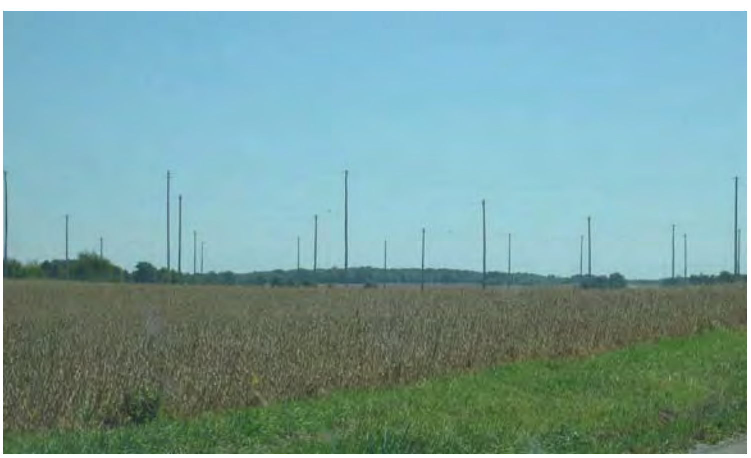
Photo 3. View from the vehicle (North of I-74)

Photo 4 shows wooded areas near Brownfield Woods along High Cross Road between Airport Road and Oak Street. Because trees block the views of the roadway from outside, any changes in this low level roadway might not be seen. However, any expansion of the roadway would affect the existing visual value of the woods seen from the roadway if the expansion requires the removal of vegetation.

View Location

Photo 4. Brownfield Woods area

Photo 5 shows the most distinct view from the rural environmental perspective. Although the U of I Atmospheric Observatory is not balanced with the other part of the roadway, any changes in roadway neither affect this facility nor will be affected by this facility in terms of visual value.



View Location

Photo 5. U of I Atmospheric Observatory

2.10 Light Pollution

This section describes the concept of light pollution, identifies the existing lighting conditions, and discusses the different lighting objectives and issues addressed by different users. The scope of lighting is limited to the transportation related lighting issues such as street lighting, parking lights, and vehicular lights in the study area.

Light pollution has increasingly become a major concern as an environmental impact of transportation facilities. It has been estimated that between 35% to 50% of all light pollution is produced by roadway lighting[22]. Light pollution may be defined as an unwanted consequence of outdoor lighting and includes such effects as glare, light trespass, and sky glow[23]. Glare is excessive brightness causing discomfort or disability. This is typical of the effect experienced when an oncoming driver forgets to dim the high beam headlights. An unshielded luminaire where the lamp can be directly seen is another example for glare. Light trespass is light falling where it is not wanted or needed. Light from a street light or a neighbor's floodlight that illuminates someone's bedroom is an example of light trespass. Sky glow is the result of stray light being scattered in the atmosphere brightening the natural sky background level. This effect is extremely detrimental to astronomers as well as annoying to many people in the general public.

A primary reason for roadway lighting is safety. Street lighting shows the drivers the changes in direction, obstacles, and roadway surface conditions. Non-motorists such as pedestrians, cyclists, and emergent animals on a roadway can be seen with street lighting. Other reasons for street lighting are enhancing security, promoting economic development, and providing aesthetics. However, the lighting needs are not identical for all locations. For example, natural preserves or astronomical observatories require an intrinsically dark landscape.

Article VII Street Lighting System under the Urbana City Code regulates the design of street lighting including the details of illumination levels, luminaires, lamps, and poles as well as the installation process and its authorization. The City of Urbana adopts *The American Standard Practice for Roadway Lighting* published by the Illuminating Engineering Society.

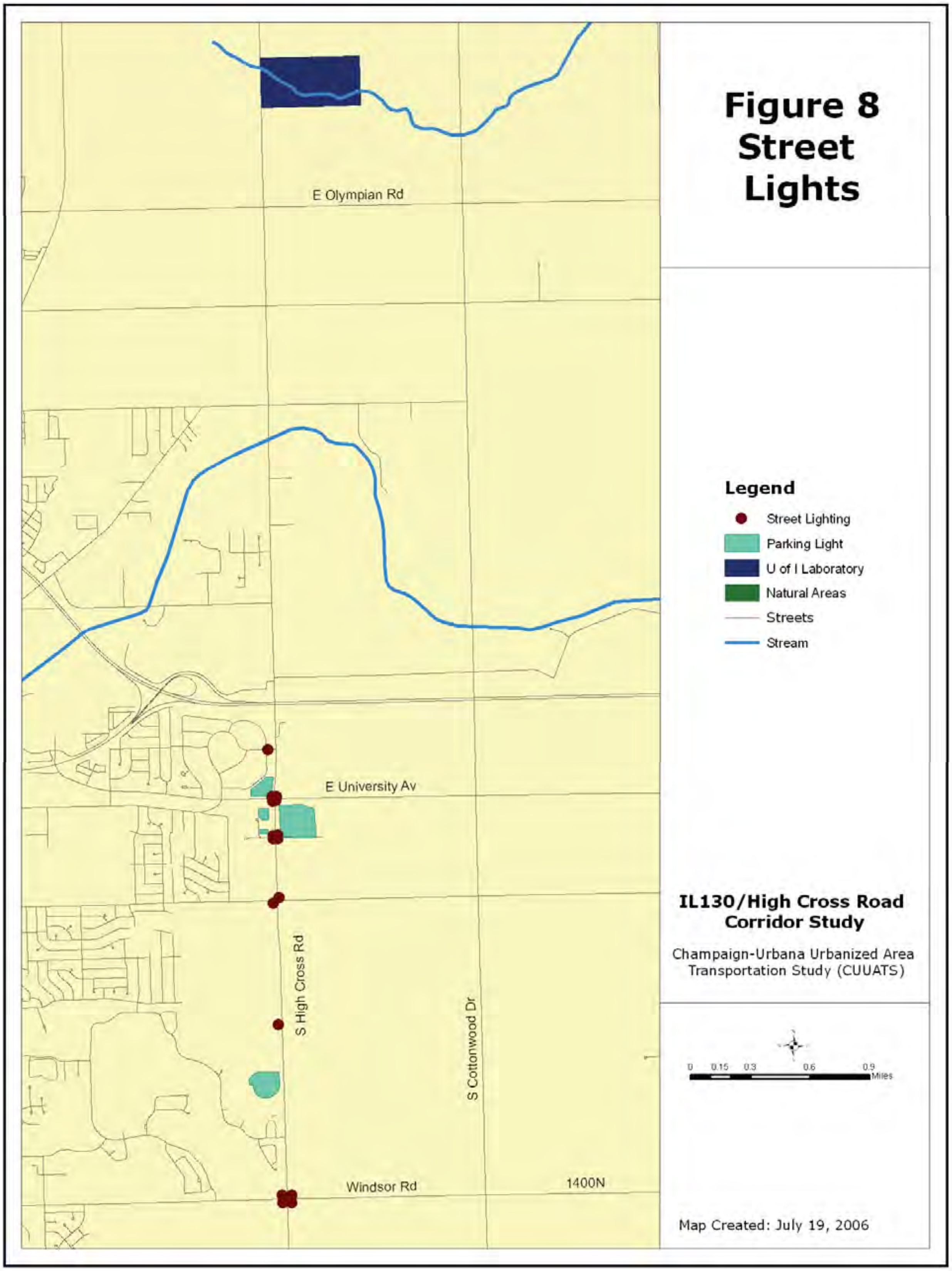
Current locations of street lighting are shown in Map 8. Streetlights are installed at signalized intersections along IL130, which is classified as an urban arterial by IDOT. Additional lights were installed at the intersection of IL130 and Washington Street. As more commercial and residential development occurs in this area, it is anticipated that various kinds of lighting including parking lights, signs, and commercial lights will be installed.

North of I-74, High Cross Road has no streetlights other than residential access lights. The area north of Airport Road is especially dark since vehicle and pedestrian traffic volumes during the night are fairly low on this rural collector street, and surroundings are natural areas, agricultural lands, and the U of I Atmospheric Observatory, which requires unobstructed darkness during the night. Since several research areas such as Brownfield Woods, Trelease Woods, Trelease Prairie and U of I Atmospheric Observatory need a dark environment at night, any artificial light sources such as vehicle headlights and streetlights may affect the existing purposes for these areas.

[22] Shaflik, Carl. Environmental Effects of Roadway Lighting. Available at: http://www.darksky.org/resources/information-sheets/is125.html (July 2006).

[23] Lighting Research Center. Implementation of Decision-Making Tools that Address Light Pollution for Localities Planning Street Lighting. 2003.

Figure 8: Location of Streetlights



3 Environmental Future Conditions

This chapter describes the probable adverse and beneficial environmental effects of the "No Build" and Preferred Alternative for future development in the IL130/High Cross Road corridor study area. Possible mitigation measures are also discussed. Environmental resources in this chapter include air quality, noise, wildlife and vegetation habitat, wetlands, water quality, visual quality and light pollution.

3.1 Air Quality

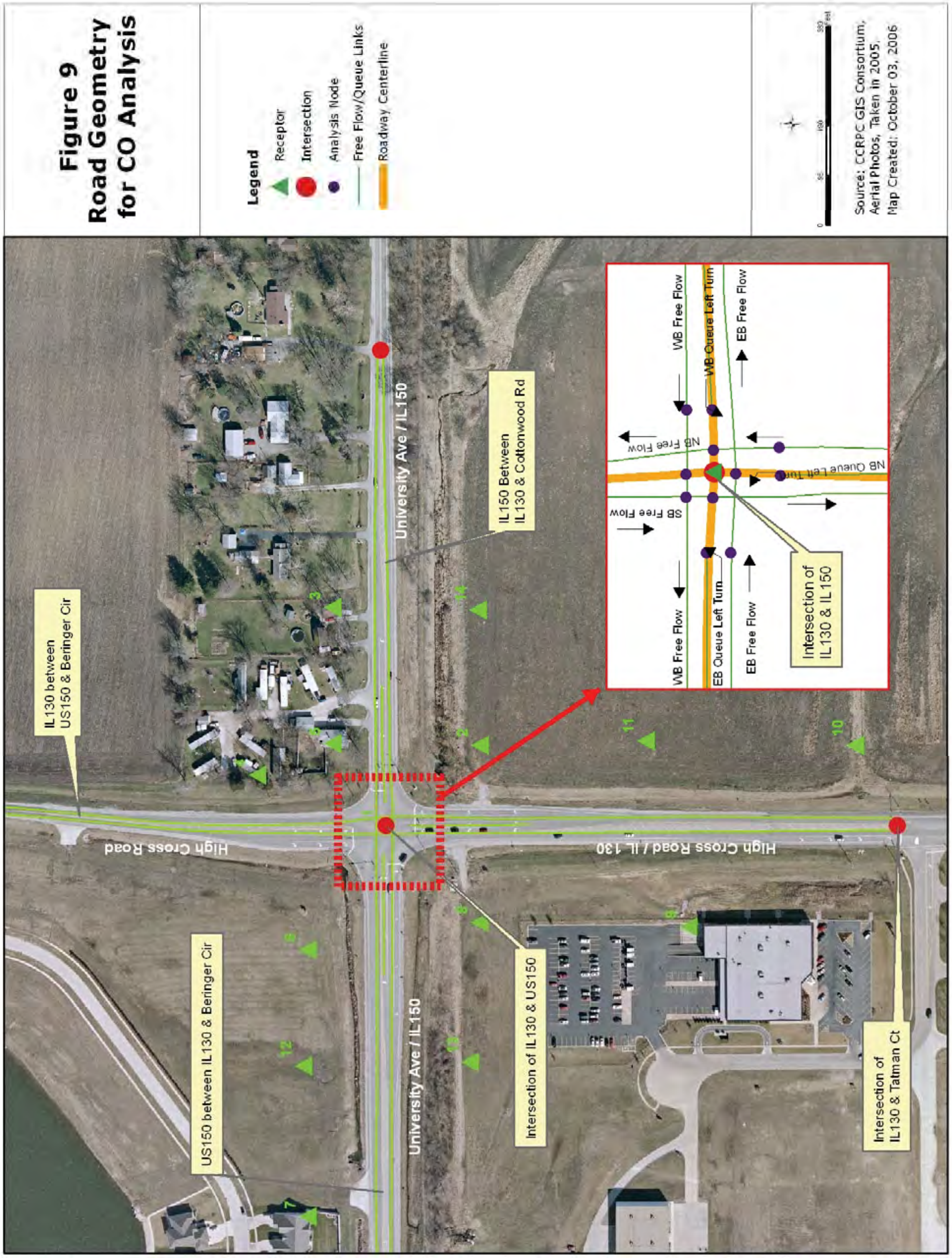
Transportation related air quality concerns include Ozone (O3), Hydrocarbons (HC), Nitrogen Oxide (NOx), and Carbon Monoxide (CO). For this study, CO analysis was performed in order to evaluate the localized traffic impacts on air quality at the busiest intersection of existing and proposed alternatives. The projected CO levels were then compared with the existing levels and the thresholds of 1-hour CO concentration, which is 35 PPM according to National Ambient Air Quality Standards (NAAQS).

The process for conducting CO analysis is twofold. CO emission rates were calculated using Mobile 6. Air dispersion modeling analysis was conducted as the second step to predict CO concentrations from motor vehicles at the intersection of IL130 and US 150. CAL3QHC was used for dispersion modeling because of its higher capability of estimating the emissions from queuing and idling vehicles. Input data required for CAL3QHC were roadway geometries, receptor locations, meteorological conditions and vehicular emission rates as well as traffic information describing the configuration of the intersection being modeled. The results of the modeling analyses for each alternative are shown in Table 13, and receptor locations and road geometries are displayed in Map 9.

Table 13: Maximum 1-hour CO Concentration at the Intersection of IL130 and US150

Receptor ID	Existing Condition (Year 2005)	No Build Alternative (Year 2025)	Preferred Alternative (Year 2025)
1	-	-	-
2	8	10.5	10.4
3	8.5	10.8	10.7
4	11.8	16.9	16.6
5	9.7	15.3	14.7
6	8.3	10.3	10.1
7	6.8	8.8	8.6
8	5.9	7.8	7.6
9	2.7	3.5	3
10	3.4	3.7	3.8
11	5.8	7.2	7.2
12	8	10.1	10
13	5.7	7.7	7.5
14	6.1	8	7.9
Average	7	9.3	9.1
NAAQS	35	35	35

Figure 9: Road Geometry for CO Analysis



The CO concentrations for the IL130 and US 150 intersection are below the federal air quality standards for both of the Preferred Alternative and the No Build Alternative. Although the two alternatives have no significant difference in the average of CO concentrations, the No Build alternative has the higher estimated CO concentration near the IL130 and US 150 intersection. Based on the results of CO analysis, neither alternative will cause any new violations of the CO standard, and it can be assumed that the study area would be in attainment.

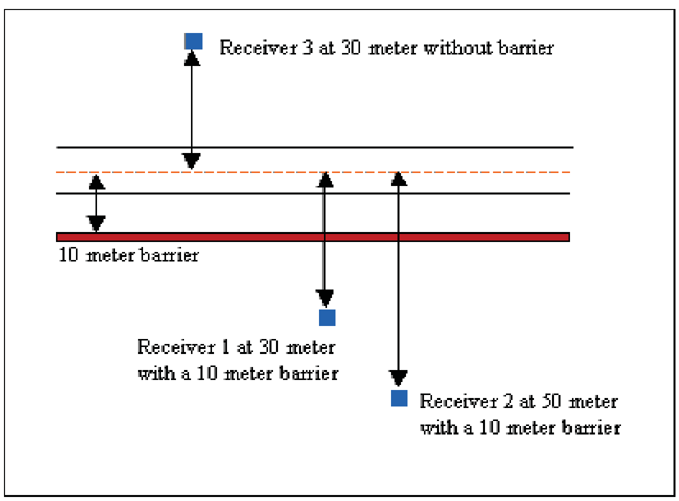
3.2 Noise[24]

3.2.1 Methodology

The level of highway-associated noise depends on traffic volume, speed, percentage of trucks in the flow of traffic, distance to the highway, intervening topography, and atmospheric conditions[25].

The noise analysis uses the FHWA Traffic Noise Model 2.5 Look-up Table, which is a screening tool to evaluate simple highway geometries. Parameters included in this analysis are the vehicle types and their speeds and volumes, distance to the noise sources, noise barriers, and surrounding terrains. Allowed ranges of parameters are mentioned below and Figure 1 displays the example geometry of the Traffic Noise Screening Tool. The noise measurement used in this tool is L_{eq} (1)[26].

Figure 1. Example Geometry of Highway Noise Model Screening Tool



- Five Vehicle Classes: Automobile (2 axles and 4 wheels), medium truck (two axles and 6 wheels), heavy truck (3 or more axles), bus, and motorcycle
- Distance: Distance of the receiver from the centerline of the roadway. 10 to 300 meters (32.8 ft to 984.4 ft in English units) in increments of 10 meters
- Terrain Surface: Acoustically hard surface such as water, asphalt, or concrete or acoustically soft terrain covered with such as grass, dense vegetation, or freshly fallen snow
- Barriers: Single barriers at a height of between 2 to 10 meters (6.6 ft to 32.8 ft in English units) and located at a distance of either 10 or 30 meters (32.8 ft or 98.4 ft) from the centerline of the roadway

[24] Although construction activities are the major source of generating highway noise, this analysis limits the highway noise into the noise coming from highway traffic since construction noise tends to be temporary.
[25] Wisconsin Department of Transportation. *Environmental Procedures Manual M31-11*. September 2003.
[26] L_{eq} (1) is a measurement for the receiver's cumulative sound exposure level over a one-hour period.

3.2.1.1 Input Data

Several major road segments along the IL130 Corridor were selected as sites to estimate and evaluate the traffic noise levels as shown in Map 4 of Chapter 2. Detailed information used in the noise analysis is summarized in Table 14. It includes the land use information of the surrounding areas, terrain surface, and the distance from the streets to the noise receptors. Noise sites along the IL130 corridor are surrounded by relatively hard surfaces such as road pavements and buildings at close distance, although these are commercial areas which are less sensitive to noise.

Table 14. Highway Noise Analysis Sites

Sites	Surrounding Area	Terrain Surface	Distance*
IL130 & N of Windsor Rd	Residential / Agricultural	Soft	200 ft
IL130 & S of Washington St	Agricultural	Soft	200 ft
IL130 & S of Tatman Ct	Commercial	Hard	150 ft
IL130 & N of US150	Commercial	Hard	200 ft
High Cross Rd & S of Perkins Rd	Agricultural	Soft	300 ft
High Cross Rd & S of Airport Rd	Agricultural	Soft	200 ft

* Distance was measured using GIS tools and represents the closest distance to nearby buildings.

Other types of primary inputs affecting traffic noise levels are traffic volumes by vehicle class and average speeds. One-hour traffic volumes from 7:00 AM to 8:00 AM, the busiest time of the day along IL130/High Cross Road, and average speeds by vehicle class are shown in Table 15.

Table 15. Traffic Volume by Vehicle Class and Average Speed at Noise Sites

Site	Vehicle Class	Volume	Speed
IL130 & N of Windsor Rd	Automobile	661	36
	Medium Truck	34	31
	Heavy Truck	12	31
	Bus	7	31
	Motorcycle	0	-
IL130 & S of Washington St	Automobile	663	51
	Medium Truck	15	49
	Heavy Truck	7	48
	Bus	1	48
	Motorcycle	0	-
IL130 & S of Tatman Ct	Automobile	679	34
	Medium Truck	26	33
	Heavy Truck	14	32
	Bus	2	32
	Motorcycle	0	-

Table 15. Traffic Volume by Vehicle Class and Average Speed at Noise Sites *(continued)*

Site	Vehicle Class	Volume	Speed
IL130 & N of US150	Automobile	682	27
	Medium Truck	39	37
	Heavy Truck	8	33
	Bus	3	33
	Motorcycle	0	-
High Cross Rd & S of Perkins Rd	Automobile	160	39
	Medium Truck	21	39
	Heavy Truck	3	53
	Bus	0	53
	Motorcycle	0	-
High Cross Rd & S of Airport Rd	Automobile	85	21
	Medium Truck	4	24
	Heavy Truck	1	25
	Bus	0	25
	Motorcycle	0	-

3.2.2. *Evaluation of Noise Impact*

Future traffic volumes were obtained from CUUATS Travel Demand Forecasting Model[27] and put into the FHWA Traffic Noise Model Screening in order to get predicted traffic noise. Table 16 shows the noise levels at the nearest building from the centerline of the road for existing and future transportation alternatives.

Table 16. Estimated Traffic Noise Levels

Sites	Noise Level (L_{eq} (1)) *		
	Existing 2005	No-Build Alternative 2025	Preferred Alternative 2025
IL130 & N of Windsor Rd	51.4	54.4	54.5
IL130 & S of Washington St	53.6	56.6	56.8
IL130 & S of Tatman Ct	59.3	62.4	61.6
IL130 & N of US150	57	59.9	59.7
High Cross Rd & S of Perkins Rd	44.3	46.5	47.1
High Cross Rd & S of Airport Rd	39.2	42.8	43.9

*This is estimated for distance from the centerline of the roadway to the nearest building.

Noise impacts by future transportation projects are determined based on the traffic noise impact criteria mentioned in the previous chapter. Traffic noise impact will have occurred when the predicted levels approach or exceed the criteria of 66 dBA or when predicted traffic noise levels substantially exceed the existing noise level, even though the predicted levels may not exceed the criteria.

[27] Since the Transportation Demand Model does not currently include truck and bus traffic, only automobile volumes for year 2025 were estimated. Percentages of five-vehicle class keep the same ratio as existing condition.

As shown in Table 16, estimated traffic noise levels for the year 2025 are highest at the intersection of IL130 and Tatman Court, and lowest at the intersection of High Cross Road and Airport Road. However, all of the estimated noise levels do not exceed the noise criteria and are kept under 66 dBA.

Increases of predicted noise levels from existing conditions are about 5% for both the No-Build Alternative and the Preferred Alternative. Both alternatives are expected to be similar in terms of the magnitude of the noise. However, the No Build Alternative shows slightly higher noise levels along IL130 between US 150 and Tatman Court, which is one of the busiest roadway segments. Overall, we may conclude that traffic noise impacts by both alternatives would not significantly affect the study area.

3.3 Wildlife and Vegetation Habitat

This section presents the wildlife and vegetation habitat adjacent roadways, types of impacts by roads and vehicles, and future conditions expected in the study area. The typical types of roadside vegetation are woodland, shrubland, herbaceous vegetation, and wetland. Herbaceous vegetation is present in well-managed roadsides, and then shrubland commonly follows it and is shown in the outer part of roadside. Woody vegetation is also common in the outer part of roadside along a fence or a median strip. In addition, tiny distinct plant communities develop by roadside engineering structures such as culverts, bridges, noise barriers, and guardrails[28].

Presence of roads changes the characteristics of vegetation habitat. Non-native species become abundant and widely distributed while native species are rare. Diversity of plant communities in roadside may be less due to the loss of sensitive native species that are disturbed by roadside condition. In addition, roadside native vegetation is relatively homogeneous and impoverished. In frequently mowed sites, grasses dominate at the expense of most native plants and animals[29].

Wildlife habitats are also affected by roadways and vehicles, which cause a direct habitat loss, degradation of adjacent habitats and the animal mortality. New construction or widening lanes of roadways converts natural land into streets, parking areas, driveways, and adjacent right-of-way resulting in the loss of natural habitat. Construction impacts, noise, decreased air quality, and light pollution[30] may decrease the quality of habitat. However, the negative effects of habitat loss in urban areas is less critical than disturbed habitats in public lands such as parks, wildlife refuges, forests, and wilderness areas.

Habitat fragmentation is another concern for impacts on wildlife and vegetation due to the presence of roadways. According to the NCHRP 305 report, roads and development fragment habitats into smaller and smaller pieces that can disrupt wildlife movement. Such separation can result in the inability of individuals to find each other for reproduction, especially for the species that show reluctance to cross roads. Another impact by roadways intersecting wildlife habitat is animal mortality, which is the most visible negative impact. Factors affecting mortality include traffic volume and speed, proximity of habitat cover and wildlife movement corridor, and species behavior.

Construction and operation/maintenance of a roadway also have effects on wildlife, vegetation, and their habitat. Erosion, maintenance chemicals, salts, and oil can destroy aquatic habitat due to the degradation of water quality. Highway noise stresses wildlife animals and makes for avoidance of the habitat around roadways.

[28] Forman, Richard T.T. et al. 2003. *Road Ecology*. Washington DC: Island Press.
[29] Forman, Richard T.T. et al. 2003. *Road Ecology*. Washington DC: Island Press.
[30] Evink, Gary E. 2002. *Interaction Between Roadways and Wildlife Ecology*. Transportation Research Board. Washington DC.

In regards to the future transportation impacts on wildlife and vegetation habitats in the study area, transportation improvement projects and various developments will change the natural habitats because increased traffic volumes may exacerbate existing negative highway/wildlife interactions regardless of which alternative is selected.

The No Build Alternative would produce no new habitat disturbance in the project area. However, continued and anticipated increases in traffic would result in increased disturbance. On the other hand, the Preferred Alternative includes road widening on Airport Road, which is adjacent to the sensitive natural area of Brownfield Woods. Although the road widening of Airport Road from US 45 to High Cross Road might not have direct impacts such as habitat loss, it would increase habitat disturbance and adversely affect wildlife.

The mitigation measures that can help avoid negative impacts are as follows:

- Proper maintenance of wildlife fencing
- Keeping the highway free of trash
- Eliminating unnecessary lighting and other attractants; this would help prevent wildlife entry onto the highway
- Signs alerting drivers to possible presence of wildlife
- Include design features such as bridges and/or large-size culverts in order to minimize animal mortalities
- Maintaining natural lighting to the extent possible along the roadway.

3.4 Wetlands

Wetlands crossing the IL130/ High Cross Road Corridor were identified based on Map 3 of the existing conditions section. Out of 32.2 acres of wetland within this study area, 0.06 acres of the forested wetland is crossed by the High Cross Road around Saline Ditch Bridge. Using the same method applied in the existing condition, estimates of impacted wetland area were produced for each of the alternatives, and the area of impact was calculated from the map using GIS.

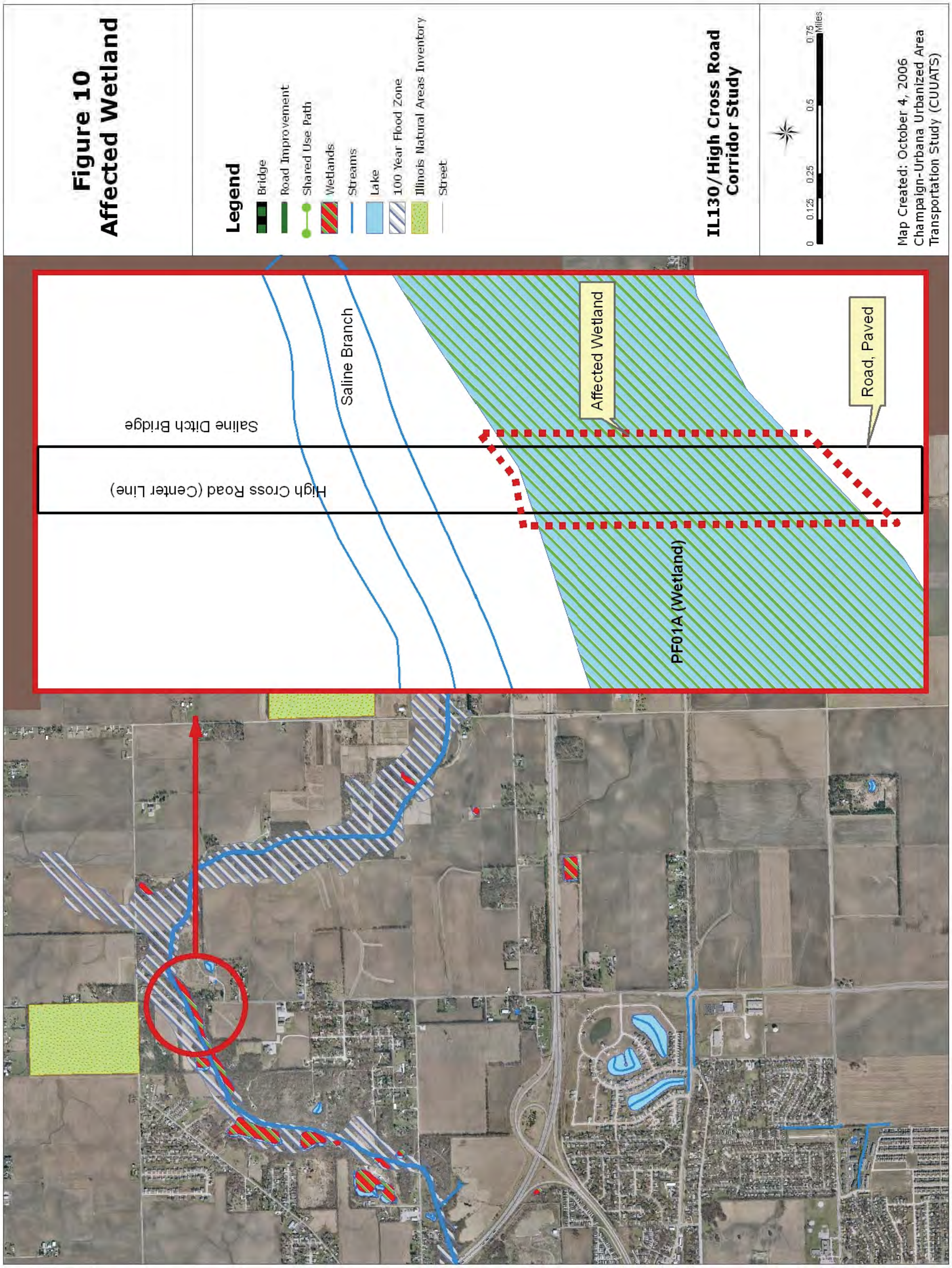
The No Build Alternative would have no impact on the area. Only naturally occurring modifications due to erosion and other minor earthen modifications would occur. The Preferred Alternative would also have no additional impact on existing wetlands. Map 10 presents the new road improvement projects for the Preferred Alternative and the affected areas of forest wetland. Since the Preferred Alternative maintains High Cross Road as a 2-lane roadway, no additional wetland areas would be affected.

3.5 Water Quality

Major issues associated with surface water in terms of transportation are storm water runoff and its impacts on water quality to surrounding waters. Vehicle exhaust, wear and tear of vehicles, salting and sanding practices, or highway construction, operation and maintenance may deposit contaminants on the roadway surface. These pollutants can be washed off when raining or snowing, disperse through air and eventually be carried by storm water runoff. Increasing roadway surface and traffic volume can increase vehicle emission and airborne pollutants, and then affect highway runoff and water quality.

Water quality in the Saline Branch is “partial” for Aquatic Life Use Support. Increased traffic may contribute to the deterioration of water quality. In the long run, it can be assumed that the water quality of existing storm water runoff is somewhat degraded due to the existing urban development in the study area, discharges resulting from agricultural areas, and potential contaminants resulting from highway runoff. However, the short-

Figure 10: Affected Wetlands



term impacts to water quality of the Saline Branch are expected to be minimal during the operation of the facility than during construction, assuming proper mitigation measures are implemented in the design and construction of the facility.

Although population growth brings natural increases in traffic volume, the No Build Alternative may further contribute to the deterioration of water quality. However, overall use support would remain the same as the existing condition. Since projected traffic volumes would be similar in the Preferred Alternative, the impact on surface water quality would be similar to the No Build Alternative. Although the construction phase for Saline Ditch bridges would degrade water quality, overall use support would remain the same as the No Build Alternative.

3.6 Visual Quality

Visual impact depends on the degree of change to the visual resource and the viewers' response to that change. The visual impacts in this section discuss the long-term impacts expected as the result of implementing the Preferred Alternative since the No Build Alternative has no physical change on the road. It was assumed that the No Build Alternative has no new impact on the area although the drivers would not enjoy the same level of views as they currently do due to anticipated traffic increases.

The visible structural features of the Preferred Alternative have been assessed and compared in terms of the degree of changes in visual quality caused by highway projects. As described in Chapter 2, factors affecting the visual quality include the highway surface itself such as the number of lanes, width, pavement materials and color and roadside structures such as slope retention, drainage, and roadside planning. In addition, roadway signs, lights and traffic control devices were added in order to determine the visual impacts. A highway may improve visually if it increases the unity and visual harmony of a landscape.

Field observations were made in August 2003, and photos taken at five different points presented in Chapter 2 provide the basis for comparing the various roadway projects that are being considered. Renderings[31] of the proposed views at several locations represent the future views that result from implementing the Preferred Alternative.

Figure 2 shows the typical view along IL130 between US 150 and Windsor Road looking from south to north, and Figure 3 is a rendering of the proposed view along IL130 between US 150 and Washington Street looking from south to north. While the future view remains the same as the existing view in terms of the scale of the change, the future view shows elements of an urban road due to the new addition of a traffic signal, more lanes, the median, and road signs. The surface appearance of lines and colors of the roadway and the roadside structures were enhanced in the future view.

[31] After views are created for the other purposes of the IL 130 Corridor Study, so that the distance and the scale of views are not always same with the existing views of photos taken for visual impact analysis.

Figure 2:
Existing View: IL130 South

Figure 3:
Future View: IL130 South

Figure 4 represents the views of High Cross Road north of I –74. This figure displays the rolling land surface, a farmhouse, cornfields, grassland, ditches, and wooded areas. Overall, the future view keeps the character of a rural roadway, and the scale is the same in both views. Changes in the view include neat lines, flat surface, and roadside characteristics. As a result, it can be said that the visual impact of the transportation projects on this portion of the street would be positive.

Figure 4:
Existing View: High Cross north of I-74

Figure 5:
Future View: High Cross north of I-74

Figure 6 shows the most sensitive area to the viewers, which is the wooded area near Brownfield Woods along High Cross Road between Airport Road and Oaks Road. With the same level of the scale of the proposed transportation projects, High Cross Road would have a clean surface look while keeping the character of a two-lane rural roadway. The Saline Ditch bridge project will add the shoulders and enhanced guardrails. Thus, the visual impact on the area would be positive.

Figure 6:
Existing View: Brownfield Woods

Figure 7:
Future View 1: Saline Ditch Bridge

Figure 8:
Future View 2: Airport Road

However, the Airport Road improvement project might have impacts on the existing visual value of the woods seen from the roadway because the expansion of the road width requires the removal of vegetation, and a two-lane roadway might reduce the natural experience when driving through the wooded area.

Based on the factors affecting existing visual quality, it can be concluded that the Preferred Alternative does not significantly alter views of IL130/High Cross Road. Better design of the Preferred Alternative will provide aesthetically pleasing views in terms of the surface look and roadside landscaping except the portion of Airport Road, which could have diminished visual quality.

3.7 Light Pollution

Environmental impacts of transportation associated light pollution have two different aspects. For the area south of I-74 along IL130, the corridor is proposed to be a 4-lane roadway. Since more commercial and residential developments are anticipated in this area, transportation related lighting issues would be to add proper lighting in order to improve a sense of safety, security, and attractiveness to residents and drivers. Both the No Build Alternative and the Preferred Alternative would install more lighting. In terms of the light pollution, there would be no new impact if lighting was installed with consideration for the surroundings.

On the other hand, the area north of I-74 maintains features of current conditions such as a 2-lane roadway along High Cross Road. Although several transportation improvement projects are proposed in the Preferred Alternative, none of them includes a new road or expansion north of I-74.

Excessive transportation lighting of the highway will cause the nighttime glare that extends into adjacent lands, and disturbs the routine activities of nocturnal animals. Generally speaking, natural lighting will reduce the attraction of the highway to wildlife, thereby decreasing highway-related wildlife mortalities. By the same token, the U of I Atmospheric Observatory exists along High Cross Road north of Olympian Drive, which requires unobstructed nighttime darkness. Therefore, transportation related lighting should maintain natural lighting levels as much as possible.

The No Build Alternative would increase lighting impacts. Due to the naturally increased traffic in the northern portion of the study area, vehicle headlights would affect wildlife in the natural areas and research facilities. However, the lighting impacts of the Preferred Alternative would be less than the impacts of the No Build Alternative. The projected traffic volume of the Preferred Alternative would be less north of I –74 and slightly more south of the I-74, which means less impacts on the natural areas and more impacts on the commercial areas. If the proper mitigation measures were considered in the design process of the alternative, the lighting impacts to wildlife as well as to the residents and drivers would greatly decrease.

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HCS2000™ DETAILED REPORT

General Information		Site Information	
Analyst		Intersection	*Windsor Road @ IL 130*
Agency or Co.	*CUUATS*	Area Type	*All other areas*
Date Performed	*12/30/2003*	Jurisdiction	*Urbana*
Time Period	*AM Peak (ints peak)*	Analysis Year	*2003*
		Project ID	*IL 130 Corridor Study*

Volume and Timing Input

	EB			WB			NB			SB		
	LT	TH	RT	LT	TH	RT	LT	TH	RT	LT	TH	RT
Number of lanes, N_1	1	1	1	1	1	1	1	1	0	1	1	1
Lane group	L	T	R	L	T	R	L	TR		L	T	R
Volume, V (vph)	18	91	32	15	194	30	254	368	0	3	82	192
% Heavy vehicles, %HV	0	0	0	0	0	0	0	0	0	0	0	0
Peak-hour factor, PHF	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90
Pretimed (P) or actuated (A)	P	P	P	P	P	P	P	P	P	P	P	P
Start-up lost time, l_1	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0		2.0	2.0	2.0
Extension of effective green, e	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0		2.0	2.0	2.0
Arrival type, AT	3	3	3	3	3	3	3	3		3	3	3
Unit extension, UE	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0		3.0	3.0	3.0
Filtering/metering, I	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000		1.000	1.000	1.000
Initial unmet demand, Q_b	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0		0.0	0.0	0.0
Ped / Bike / RTOR volumes	0		0	0		0	0		0	0		0
Lane width	12.0	12.0	12.0	12.0	12.0	12.0	12.0	12.0		12.0	12.0	12.0
Parking / Grade / Parking	N	0	N	N	0	N	N	0	N	N	0	N
Parking maneuvers, N_m												
Buses stopping, N_B	0	0	0	0	0	0	0	0		0	0	0
Min. time for pedestrians, G_p	3.2			3.2			3.2			3.2		

Phasing	EW Perm	02	03	04	Excl. Left	NS Perm	07	08
Timing	G = 10.0	G =	G =	G =	G = 8.0	G = 18.0	G =	G =
	Y = 5	Y =	Y =	Y =	Y = 4	Y = 6	Y =	Y =
Duration of Analysis, T = 0.25						Cycle Length, C = 51.0		

Lane Group Capacity, Control Delay, and LOS Determination

	EB			WB			NB			SB		
	LT	TH	RT	LT	TH	RT	LT	TH	RT	LT	TH	RT
Adjusted flow rate, v	20	101	36	17	216	33	282	409		3	91	213
Lane group capacity, c	218	373	317	258	373	317	809	671		522	671	570
v/c ratio, X	0.09	0.27	0.11	0.07	0.58	0.10	0.35	0.61		0.01	0.14	0.37

Total green ratio, g/C	0.20	0.20	0.20	0.20	0.20	0.20	0.59	0.35		0.59	0.35	0.35
Uniform delay, d_1	16.8	17.4	16.9	16.7	18.6	16.8	5.2	13.6		5.3	11.2	12.3
Progression factor, PF	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000		1.000	1.000	1.000
Delay calibration, k	0.50	0.50	0.50	0.50	0.50	0.50	0.50	0.50		0.50	0.50	0.50
Incremental delay, d_2	0.8	1.8	0.7	0.5	6.4	0.7	1.2	4.1		0.0	0.4	1.9
Initial queue delay, d_3	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0		0.0	0.0	0.0
Control delay	17.6	19.2	17.6	17.2	25.0	17.5	6.3	17.7		5.3	11.6	14.2
Lane group LOS	B	B	B	B	C	B	A	B		A	B	B
Approach delay	18.6			23.6			13.1			13.3		
Approach LOS	B			C			B			B		
Intersection delay	15.7			X_c = 0.73			Intersection LOS			B		

HCS2000™ DETAILED REPORT

General Information		Site Information	
Analyst	*Ahmed Z. Mohideen*	Intersection	*Windsor Road @ IL 130*
Agency or Co.	*CUUATS*	Area Type	*All other areas*
Date Performed	*01/09/2004*	Jurisdiction	*Urbana*
Time Period	*PM Peak (ints peak)*	Analysis Year	*2003*
		Project ID	*IL 130 Corridor Study*

Volume and Timing Input

	EB			WB			NB			SB		
	LT	TH	RT	LT	TH	RT	LT	TH	RT	LT	TH	RT
Number of lanes, N_1	1	1	1	1	1	1	1	1	0	1	1	1
Lane group	L	T	R	L	T	R	L	TR		L	T	R
Volume, V (vph)	145	105	184	1	19	5	55	117	5	11	297	76
% Heavy vehicles, %HV	0	0	0	0	0	0	0	0	0	0	0	0
Peak-hour factor, PHF	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90
Pretimed (P) or actuated (A)	P	P	P	P	P	P	P	P	P	P	P	P
Start-up lost time, l_1	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0		2.0	2.0	2.0
Extension of effective green, e	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0		2.0	2.0	2.0
Arrival type, AT	3	3	3	3	3	3	3	3		3	3	3
Unit extension, UE	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0		3.0	3.0	3.0
Filtering/metering, I	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000		1.000	1.000	1.000
Initial unmet demand, Q_b	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0		0.0	0.0	0.0
Ped / Bike / RTOR volumes	0		0	0		0	0		0	0		0
Lane width	12.0	12.0	12.0	12.0	12.0	12.0	12.0	12.0		12.0	12.0	12.0
Parking / Grade / Parking	N	0	N	N	0	N	N	0	N	N	0	N
Parking maneuvers, N_m												
Buses stopping, N_B	0	0	0	0	0	0	0	0		0	0	0
Min. time for pedestrians, G_p	3.2			3.2			3.2			3.2		

Phasing	EW Perm	02	03	04	Excl. Left	NS Perm	07	08
Timing	G = 10.0	G =	G =	G =	G = 8.0	G = 18.0	G =	G =
	Y = 5	Y =	Y =	Y =	Y = 4	Y = 6	Y =	Y =
Duration of Analysis, T = 0.25					Cycle Length, C = 51.0			

Lane Group Capacity, Control Delay, and LOS Determination

	EB			WB			NB			SB		
	LT	TH	RT	LT	TH	RT	LT	TH	RT	LT	TH	RT
Adjusted flow rate, v	161	117	204	1	21	6	61	136		12	330	84
Lane group capacity, c	277	373	317	254	373	317	588	666		765	671	570
v/c ratio, X	0.58	0.31	0.64	0.00	0.06	0.02	0.10	0.20		0.02	0.49	0.15

Total green ratio, g/C	0.20	0.20	0.20	0.20	0.20	0.20	0.59	0.35		0.59	0.35	0.35
Uniform delay, d_1	18.6	17.6	18.9	16.5	16.7	16.5	5.0	11.5		4.4	12.9	11.3
Progression factor, PF	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000		1.000	1.000	1.000
Delay calibration, k	0.50	0.50	0.50	0.50	0.50	0.50	0.50	0.50		0.50	0.50	0.50
Incremental delay, d_2	8.6	2.2	9.7	0.0	0.3	0.1	0.4	0.7		0.0	2.6	0.5
Initial queue delay, d_3	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0		0.0	0.0	0.0
Control delay	27.2	19.8	28.5	16.5	17.0	16.7	5.4	12.2		4.5	15.5	11.8
Lane group LOS	C	B	C	B	B	B	A	B		A	B	B
Approach delay	26.0			16.9			10.1			14.5		
Approach LOS	C			B			B			B		
Intersection delay	18.6			$X_c = 0.50$			Intersection LOS			B		

HCS2000™ DETAILED REPORT

General Information		***Site Information***	
Analyst	*Ahmed Z. Mohideen*	Intersection	*Tatman Ct @ IL 130*
Agency or Co.	*CUUATS*	Area Type	*All other areas*
Date Performed	*01/09/2004*	Jurisdiction	*Urbana*
Time Period	*AM Peak (ints peak)*	Analysis Year	*2003*
		Project ID	*IL 130 Corridor Study*

Volume and Timing Input

	EB			WB			NB			SB		
	LT	TH	RT	LT	TH	RT	LT	TH	RT	LT	TH	RT
Number of lanes, N_1	1	0	1	0	0	0	1	1	0	0	1	1
Lane group	L		R				L	T			T	R
Volume, V (vph)	33		16				42	334			277	54
% Heavy vehicles, %HV	18		0				2	4			8	4
Peak-hour factor, PHF	0.90		0.90				0.90	0.90			0.90	0.90
Pretimed (P) or actuated (A)	P		P				P	P			P	P
Start-up lost time, l_1	2.0		2.0				2.0	2.0			2.0	2.0
Extension of effective green, e	2.0		2.0				2.0	2.0			2.0	2.0
Arrival type, AT	3		3				3	3			3	3
Unit extension, UE	3.0		3.0				3.0	3.0			3.0	3.0
Filtering/metering, I	1.000	1.000	1.000				1.000	1.000			1.000	1.000
Initial unmet demand, Q_b	0.0		0.0				0.0	0.0			0.0	0.0
Ped / Bike / RTOR volumes	0	0	0	0						0	0	0
Lane width	12.0		12.0				12.0	12.0			12.0	12.0
Parking / Grade / Parking	N	0	N	N		N	N	0	N	N	0	N
Parking maneuvers, N_m												
Buses stopping, N_B	0		0				0	0			0	0
Min. time for pedestrians, G_p	3.2			3.2						3.2		

Phasing	EB Only	02	03	04	NS Perm	NB Only	07	08
Timing	G = 10.0	G =	G =	G =	G = 10.0	G = 8.0	G =	G =
	Y = 4	Y =	Y =	Y =	Y = 5	Y = 3.5	Y =	Y =
Duration of Analysis, T = 0.25						Cycle Length, C = 40.5		

Lane Group Capacity, Control Delay, and LOS Determination

	EB			WB			NB			SB		
	LT	TH	RT	LT	TH	RT	LT	TH	RT	LT	TH	RT
Adjusted flow rate, v	37		18				47	371			308	60
Lane group capacity, c	378		399				758	1038			434	383
v/c ratio, X	0.10		0.05				0.06	0.36			0.71	0.16
Total green ratio, g/C	0.25		0.25				0.57	0.57			0.25	0.25
Uniform delay, d_1	11.8		11.6				5.3	4.7			13.9	11.9

Progression factor, PF	*1.000*		*1.000*				*1.000*	*1.000*			*1.000*	*1.000*
Delay calibration, k	*0.50*		*0.50*				*0.50*	*0.50*			*0.50*	*0.50*
Incremental delay, d_2	*0.5*		*0.2*				*0.2*	*1.0*			*9.5*	*0.9*
Initial queue delay, d_3	*0.0*	*0.0*	*0.0*		*0.0*		*0.0*	*0.0*			*0.0*	*0.0*
Control delay	*12.3*		*11.8*				*5.5*	*5.7*			*23.4*	*12.8*
Lane group LOS	*B*		*B*				*A*	*A*			*C*	*B*
Approach delay	*12.1*						*5.7*			*21.7*		
Approach LOS	*B*						*A*			*C*		
Intersection delay	*13.1*			$X_c = 0.28$			Intersection LOS			*B*		

HCS2000™ DETAILED REPORT

General Information		Site Information	
Analyst	*Ahmed Z. Mohideen*	Intersection	*Tatman Ct @ IL 130*
Agency or Co.	*CUUATS*	Area Type	*All other areas*
Date Performed	*01/09/2004*	Jurisdiction	*Urbana*
Time Period	*PM Peak (ints peak)*	Analysis Year	*2003*
		Project ID	*IL 130 Corridor Study*

Volume and Timing Input

	EB			WB			NB			SB		
	LT	TH	RT	LT	TH	RT	LT	TH	RT	LT	TH	RT
Number of lanes, N_1	1	0	1	0	0	0	1	1	0	0	1	1
Lane group	L		R				L	T			T	R
Volume, V (vph)	75		62				40	240			335	53
% Heavy vehicles, %HV	0		0				0	0			0	0
Peak-hour factor, PHF	0.90		0.90				0.90	0.90			0.90	0.90
Pretimed (P) or actuated (A)	P		P				P	P			P	P
Start-up lost time, l_1	2.0		2.0				2.0	2.0			2.0	2.0
Extension of effective green, e	2.0		2.0				2.0	2.0			2.0	2.0
Arrival type, AT	3		3				3	3			3	3
Unit extension, UE	3.0		3.0				3.0	3.0			3.0	3.0
Filtering/metering, I	1.000	1.000	1.000				1.000	1.000			1.000	1.000
Initial unmet demand, Q_b	0.0		0.0				0.0	0.0			0.0	0.0
Ped / Bike / RTOR volumes	0		0	0						0	0	0
Lane width	12.0		12.0				12.0	12.0			12.0	12.0
Parking / Grade / Parking	N	0	N	N		N	N	0	N	N	0	N
Parking maneuvers, N_m												
Buses stopping, N_B	0		0				0	0			0	0
Min. time for pedestrians, G_p	3.2			3.2						3.2		

Phasing	EB Only	02	03	04	NS Perm	NB Only	07	08
Timing	G = 10.0	G =	G =	G =	G = 10.0	G = 8.0	G =	G =
	Y = 4	Y =	Y =	Y =	Y = 5	Y = 3.5	Y =	Y =
Duration of Analysis, T = 0.25						Cycle Length, C = 40.5		

Lane Group Capacity, Control Delay, and LOS Determination

	EB			WB			NB			SB		
	LT	TH	RT	LT	TH	RT	LT	TH	RT	LT	TH	RT
Adjusted flow rate, v	83		69				44	267			372	59
Lane group capacity, c	446		399				767	1079			469	399
v/c ratio, X	0.19		0.17				0.06	0.25			0.79	0.15
Total green ratio, g/C	0.25		0.25				0.57	0.57			0.25	0.25
Uniform delay, d_1	12.0		12.0				6.1	4.4			14.3	11.9

Progression factor, PF	*1.000*		*1.000*				*1.000*	*1.000*			*1.000*	*1.000*
Delay calibration, k	*0.50*		*0.50*				*0.50*	*0.50*			*0.50*	*0.50*
Incremental delay, d_2	*0.9*		*0.9*				*0.1*	*0.5*			*12.9*	*0.8*
Initial queue delay, d_3	*0.0*	*0.0*	*0.0*		*0.0*		*0.0*	*0.0*			*0.0*	*0.0*
Control delay	*13.0*		*12.9*				*6.3*	*4.9*			*27.2*	*12.7*
Lane group LOS	*B*		*B*				*A*	*A*			*C*	*B*
Approach delay	*12.9*						*5.1*			*25.2*		
Approach LOS	*B*						*A*			*C*		
Intersection delay	*16.1*			$X_c = 0.31$			Intersection LOS			*B*		

HCS2000™ DETAILED REPORT

General Information		Site Information	
Analyst	*Ahmed Z. Mohideen*	Intersection	*US 150 @ IL 130*
Agency or Co.	*CUUATS*	Area Type	*All other areas*
Date Performed	*01/09/2004*	Jurisdiction	*Urbana*
Time Period	*AM Peak*	Analysis Year	*2003*
		Project ID	*IL 130 Corridor Study*

Volume and Timing Input

	EB			WB			NB			SB		
	LT	TH	RT	LT	TH	RT	LT	TH	RT	LT	TH	RT
Number of lanes, N_1	1	1	1	1	1	0	2	1	1	1	1	1
Lane group	L	T	R	L	TR		L	T	R	L	T	R
Volume, V (vph)	21	55	104	162	236	9	277	46	29	2	76	65
% Heavy vehicles, %HV	10	9	15	1	1	11	4	7	14	0	3	6
Peak-hour factor, PHF	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90
Pretimed (P) or actuated (A)	P	P	P	P	P	P	P	P	P	P	P	P
Start-up lost time, l_1	2.0	2.0	2.0	2.0	2.0		2.0	2.0	2.0	2.0	2.0	2.0
Extension of effective green, e	2.0	2.0	2.0	2.0	2.0		2.0	2.0	2.0	2.0	2.0	2.0
Arrival type, AT	3	3	3	3	3		3	3	3	3	3	3
Unit extension, UE	3.0	3.0	3.0	3.0	3.0		3.0	3.0	3.0	3.0	3.0	3.0
Filtering/metering, I	1.000	1.000	1.000	1.000	1.000		1.000	1.000	1.000	1.000	1.000	1.000
Initial unmet demand, Q_b	0.0	0.0	0.0	0.0	0.0		0.0	0.0	0.0	0.0	0.0	0.0
Ped / Bike / RTOR volumes	0		0	0		0	0		0	0		0
Lane width	12.0	12.0	12.0	12.0	12.0		12.0	12.0	12.0	12.0	12.0	12.0
Parking / Grade / Parking	N	0	N	N	0	N	N	0	N	N	0	N
Parking maneuvers, N_m												
Buses stopping, N_B	0	0	0	0	0		0	0	0	0	0	0
Min. time for pedestrians, G_p	3.2			3.2			3.2			3.2		

Phasing	Excl. Left	EW Perm	03	04	NB Only	SB Only	07	08
Timing	G = 6.0	G = 18.0	G =	G =	G = 18.0	G = 10.0	G =	G =
	Y = 3	Y = 5	Y =	Y =	Y = 5	Y = 3.5	Y =	Y =
Duration of Analysis, T = 0.25						Cycle Length, C = 68.5		

Lane Group Capacity, Control Delay, and LOS Determination

	EB			WB			NB			SB		
	LT	TH	RT	LT	TH	RT	LT	TH	RT	LT	TH	RT
Adjusted flow rate, v	23	61	116	180	272		308	51	32	2	84	72
Lane group capacity, c	323	458	369	536	490		886	467	372	264	269	222
v/c ratio, X	0.07	0.13	0.31	0.34	0.56		0.35	0.11	0.09	0.01	0.31	0.32

Total green ratio, g/C	0.39	0.26	0.26	0.39	0.26		0.26	0.26	0.26	0.15	0.15	0.15
Uniform delay, d_1	13.4	19.3	20.3	14.0	21.8		20.5	19.2	19.0	25.0	26.2	26.2
Progression factor, PF	1.000	1.000	1.000	1.000	1.000		1.000	1.000	1.000	1.000	1.000	1.000
Delay calibration, k	0.50	0.50	0.50	0.50	0.50		0.50	0.50	0.50	0.50	0.50	0.50
Incremental delay, d_2	0.4	0.6	2.2	1.7	4.5		1.1	0.5	0.5	0.1	3.0	3.8
Initial queue delay, d_3	0.0	0.0	0.0	0.0	0.0		0.0	0.0	0.0	0.0	0.0	0.0
Control delay	13.8	19.9	22.5	15.7	26.3		21.6	19.6	19.5	25.1	29.2	30.1
Lane group LOS	B	B	C	B	C		C	B	B	C	C	C
Approach delay	20.7			22.1			21.1			29.5		
Approach LOS	C			C			C			C		
Intersection delay	22.5			X_c = 0.51			Intersection LOS			C		

HCS2000™ DETAILED REPORT

General Information		Site Information	
Analyst	*Ahmed Z. Mohideen*	Intersection	*US 150 @ IL 130*
Agency or Co.	*CUUATS*	Area Type	*All other areas*
Date Performed	*01/09/2004*	Jurisdiction	*Urbana*
Time Period	*PM Peak (ints peak)*	Analysis Year	*2003*
		Project ID	*IL 130 Corridor Study*

Volume and Timing Input

	EB			WB			NB			SB		
	LT	TH	RT	LT	TH	RT	LT	TH	RT	LT	TH	RT
Number of lanes, N_1	1	1	1	1	1	0	2	1	1	1	1	1
Lane group	L	T	R	L	TR		L	T	R	L	T	R
Volume, V (vph)	52	217	310	56	60	8	142	62	123	12	77	37
% Heavy vehicles, %HV	0	0	0	0	0	0	0	0	0	0	0	0
Peak-hour factor, PHF	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90
Pretimed (P) or actuated (A)	P	P	P	P	P	P	P	P	P	P	P	P
Start-up lost time, l_1	2.0	2.0	2.0	2.0	2.0		2.0	2.0	2.0	2.0	2.0	2.0
Extension of effective green, e	2.0	2.0	2.0	2.0	2.0		2.0	2.0	2.0	2.0	2.0	2.0
Arrival type, AT	3	3	3	3	3		3	3	3	3	3	3
Unit extension, UE	3.0	3.0	3.0	3.0	3.0		3.0	3.0	3.0	3.0	3.0	3.0
Filtering/metering, I	1.000	1.000	1.000	1.000	1.000		1.000	1.000	1.000	1.000	1.000	1.000
Initial unmet demand, Q_b	0.0	0.0	0.0	0.0	0.0		0.0	0.0	0.0	0.0	0.0	0.0
Ped / Bike / RTOR volumes	0		0	0		0	0		0	0		0
Lane width	12.0	12.0	12.0	12.0	12.0		12.0	12.0	12.0	12.0	12.0	12.0
Parking / Grade / Parking	N	0	N	N	0	N	N	0	N	N	0	N
Parking maneuvers, N_m												
Buses stopping, N_B	0	0	0	0	0		0	0	0	0	0	0
Min. time for pedestrians, G_p	3.2			3.2			3.2			3.2		

Phasing	Excl. Left	EW Perm	03	04	NB Only	SB Only	07	08
Timing	G = 6.0	G = 18.0	G =	G =	G = 18.0	G = 10.0	G =	G =
	Y = 3	Y = 5	Y =	Y =	Y = 5	Y = 3.5	Y =	Y =
Duration of Analysis, T = 0.25						Cycle Length, C = 68.5		

Lane Group Capacity, Control Delay, and LOS Determination

	EB			WB			NB			SB		
	LT	TH	RT	LT	TH	RT	LT	TH	RT	LT	TH	RT
Adjusted flow rate, v	58	241	344	62	76		158	69	137	13	86	41
Lane group capacity, c	526	499	424	381	490		921	499	424	264	277	236
v/c ratio, X	0.11	0.48	0.81	0.16	0.16		0.17	0.14	0.32	0.05	0.31	0.17

Total green ratio, g/C	0.39	0.26	0.26	0.39	0.26		0.26	0.26	0.26	0.15	0.15	0.15
Uniform delay, d_1	13.0	21.3	23.7	13.5	19.4		19.5	19.3	20.3	25.2	26.2	25.6
Progression factor, PF	1.000	1.000	1.000	1.000	1.000		1.000	1.000	1.000	1.000	1.000	1.000
Delay calibration, k	0.50	0.50	0.50	0.50	0.50		0.50	0.50	0.50	0.50	0.50	0.50
Incremental delay, d_2	0.4	3.3	15.4	0.9	0.7		0.4	0.6	2.0	0.4	2.9	1.6
Initial queue delay, d_3	0.0	0.0	0.0	0.0	0.0		0.0	0.0	0.0	0.0	0.0	0.0
Control delay	13.4	24.6	39.1	14.4	20.1		19.9	19.9	22.4	25.5	29.1	27.2
Lane group LOS	B	C	D	B	C		B	B	C	C	C	C
Approach delay	31.4			17.5			20.8			28.2		
Approach LOS	C			B			C			C		
Intersection delay	26.5			X_c = 0.52			Intersection LOS			C		

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TWO-WAY STOP CONTROL SUMMARY

General Information		Site Information	
Analyst	Susan Chavarria	Intersection	Old Church Rd @ IL 130
Agency/Co.	CUUATS	Jurisdiction	Urbana
Date Performed	12/29/2003	Analysis Year	2003
Analysis Time Period	AM Peak (ints peak)		

Project Description	IL 130 Corridor Study
East/West Street: Old Church Road	North/South Street: IL 130
Intersection Orientation: North-South	Study Period (hrs): 0.25

Vehicle Volumes and Adjustments

Major Street	Northbound			Southbound		
Movement	1	2	3	4	5	6
	L	T	R	L	T	R
Volume	34	468	1	0	91	5
Peak-Hour Factor, PHF	1.00	1.00	1.00	1.00	1.00	1.00
Hourly Flow Rate, HFR	34	468	1	0	91	5
Percent Heavy Vehicles	0	--	--	0	--	--
Median Type	Undivided					
RT Channelized			0			0
Lanes	0	1	0	0	1	0
Configuration	LTR			LTR		
Upstream Signal		0			0	

Minor Street	Westbound			Eastbound		
Movement	7	8	9	10	11	12
	L	T	R	L	T	R
Volume	1	8	7	2	1	7
Peak-Hour Factor, PHF	1.00	1.00	1.00	1.00	1.00	1.00
Hourly Flow Rate, HFR	1	8	7	2	1	7
Percent Heavy Vehicles	0	0	29	0	0	0
Percent Grade (%)		0			0	
Flared Approach		N			N	
Storage		0			0	
RT Channelized			0			0
Lanes	0	1	0	0	1	0
Configuration		LTR			LTR	

Delay, Queue Length, and Level of Service

Approach	NB	SB	Westbound			Eastbound		
Movement	1	4	7	8	9	10	11	12
Lane Configuration	LTR	LTR		LTR			LTR	
v (vph)	34	0		16			10	
C (m) (vph)	1510	1103		443			659	
v/c	0.02	0.00		0.04			0.02	
95% queue length	0.07	0.00		0.11			0.05	
Control Delay	7.4	8.3		13.4			10.5	
LOS	A	A		B			B	
Approach Delay	--	--		13.4			10.5	
Approach LOS	--	--		B			B	

TWO-WAY STOP CONTROL SUMMARY

General Information		Site Information	
Analyst		Intersection	*Old Church Rd @ IL 130*
Agency/Co.	*CUUATS*	Jurisdiction	*Urbana*
Date Performed	*1/26/2004*	Analysis Year	*2004*
Analysis Time Period	*PM Peak (ints peak)*		
Project Description	*IL 130 Corridor Study*		
East/West Street:	*Old Church Road*	North/South Street:	*IL 130*
Intersection Orientation:	*North-South*	Study Period (hrs):	*0.25*

Vehicle Volumes and Adjustments

Major Street	Northbound			Southbound		
Movement	1	2	3	4	5	6
	L	T	R	L	T	R
Volume	*10*	*178*	*0*	*5*	*497*	*4*
Peak-Hour Factor, PHF	*1.00*	*1.00*	*1.00*	*1.00*	*1.00*	*1.00*
Hourly Flow Rate, HFR	*10*	*178*	*0*	*5*	*497*	*4*
Percent Heavy Vehicles	*0*	--	--	*0*	--	--
Median Type	*Undivided*					
RT Channelized			*0*			*0*
Lanes	*0*	*1*	*0*	*0*	*1*	*0*
Configuration	*LTR*			*LTR*		
Upstream Signal		*0*			*0*	

Minor Street	Westbound			Eastbound		
Movement	7	8	9	10	11	12
	L	T	R	L	T	R
Volume	*3*	*4*	*1*	*9*	*11*	*42*
Peak-Hour Factor, PHF	*1.00*	*1.00*	*1.00*	*1.00*	*1.00*	*1.00*
Hourly Flow Rate, HFR	*3*	*4*	*1*	*9*	*11*	*42*
Percent Heavy Vehicles	*0*	*0*	*29*	*0*	*0*	*0*
Percent Grade (%)	*0*			*0*		
Flared Approach		*N*			*N*	
Storage		*0*			*0*	
RT Channelized			*0*			*0*
Lanes	*0*	*1*	*0*	*0*	*1*	*0*
Configuration		*LTR*			*LTR*	

Delay, Queue Length, and Level of Service

Approach	NB	SB	Westbound			Eastbound		
Movement	1	4	7	8	9	10	11	12
Lane Configuration	*LTR*	*LTR*		*LTR*			*LTR*	
v (vph)	*10*	*5*		*8*			*62*	
C (m) (vph)	*1074*	*1410*		*357*			*477*	
v/c	*0.01*	*0.00*		*0.02*			*0.13*	
95% queue length	*0.03*	*0.01*		*0.07*			*0.44*	
Control Delay	*8.4*	*7.6*		*15.3*			*13.7*	
LOS	*A*	*A*		*C*			*B*	
Approach Delay	--	--	*15.3*			*13.7*		
Approach LOS	--	--	*C*			*B*		

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TWO-WAY STOP CONTROL SUMMARY

General Information		Site Information	
Analyst	Susan Chavarria	Intersection	Curtis Rd @ IL 130
Agency/Co.	CUUATS	Jurisdiction	Urbana
Date Performed	12/29/2003	Analysis Year	2003
Analysis Time Period	AM Peak (ints peak)		
Project Description	IL 130 Corridor Study		
East/West Street:	Curtis Road	North/South Street:	IL 130
Intersection Orientation:	North-South	Study Period (hrs):	0.25

Vehicle Volumes and Adjustments

Major Street	Northbound			Southbound		
Movement	1	2	3	4	5	6
	L	T	R	L	T	R
Volume	72	506	0	0	107	17
Peak-Hour Factor, PHF	1.00	1.00	1.00	1.00	1.00	1.00
Hourly Flow Rate, HFR	72	506	0	0	107	17
Percent Heavy Vehicles	0	--	--	0	--	--
Median Type	Undivided					
RT Channelized			0			0
Lanes	0	1	0	0	1	0
Configuration	LTR			LTR		
Upstream Signal		0			0	

Minor Street	Westbound			Eastbound		
Movement	7	8	9	10	11	12
	L	T	R	L	T	R
Volume	0	2	4	16	0	10
Peak-Hour Factor, PHF	1.00	1.00	1.00	1.00	1.00	1.00
Hourly Flow Rate, HFR	0	2	4	16	0	10
Percent Heavy Vehicles	0	0	25	0	0	0
Percent Grade (%)	0			0		
Flared Approach		N			N	
Storage		0			0	
RT Channelized			0			0
Lanes	0	1	0	0	1	0
Configuration		LTR			LTR	

Delay, Queue Length, and Level of Service

Approach	NB	SB	Westbound			Eastbound		
Movement	1	4	7	8	9	10	11	12
Lane Configuration	LTR	LTR		LTR			LTR	
v (vph)	72	0		6			26	
C (m) (vph)	1475	1069		425			407	
v/c	0.05	0.00		0.01			0.06	
95% queue length	0.15	0.00		0.04			0.20	
Control Delay	7.6	8.4		13.6			14.4	
LOS	A	A		B			B	
Approach Delay	--	--	13.6			14.4		
Approach LOS	--	--	B			B		

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TWO-WAY STOP CONTROL SUMMARY

General Information		Site Information	
Analyst	Susan Chavarria	Intersection	Curtis Rd @ IL 130
Agency/Co.	CUUATS	Jurisdiction	Urbana
Date Performed	12/29/2003	Analysis Year	2003
Analysis Time Period	PM Peak (ints peak)		
Project Description	IL 130 Corridor Study		
East/West Street:	Curtis Road	North/South Street:	IL 130
Intersection Orientation:	North-South	Study Period (hrs):	0.25

Vehicle Volumes and Adjustments

Major Street	Northbound			Southbound		
Movement	1	2	3	4	5	6
	L	T	R	L	T	R
Volume	7	137	0	0	479	20
Peak-Hour Factor, PHF	1.00	1.00	1.00	1.00	1.00	1.00
Hourly Flow Rate, HFR	7	137	0	0	479	20
Percent Heavy Vehicles	0	--	--	0	--	--
Median Type	Undivided					
RT Channelized			0			0
Lanes	0	1	0	0	1	0
Configuration	LTR			LTR		
Upstream Signal		0			0	

Minor Street	Westbound			Eastbound		
Movement	7	8	9	10	11	12
	L	T	R	L	T	R
Volume	0	1	1	26	5	45
Peak-Hour Factor, PHF	1.00	1.00	1.00	1.00	1.00	1.00
Hourly Flow Rate, HFR	0	1	1	26	5	45
Percent Heavy Vehicles	0	0	0	0	60	0
Percent Grade (%)		0			0	
Flared Approach		N			N	
Storage		0			0	
RT Channelized			0			0
Lanes	0	1	0	0	1	0
Configuration		LTR			LTR	

Delay, Queue Length, and Level of Service

Approach	NB	SB	Westbound			Eastbound		
Movement	1	4	7	8	9	10	11	12
Lane Configuration	LTR	LTR		LTR			LTR	
v (vph)	7	0		2			76	
C (m) (vph)	1075	1459		545			476	
v/c	0.01	0.00		0.00			0.16	
95% queue length	0.02	0.00		0.01			0.56	
Control Delay	8.4	7.5		11.6			14.0	
LOS	A	A		B			B	
Approach Delay	--	--		11.6			14.0	
Approach LOS	--	--		B			B	

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TWO-WAY STOP CONTROL SUMMARY

General Information		Site Information	
Analyst	*Ahmed*	Intersection	*IL 130/Washington Street*
Agency/Co.	*CUUATS*	Jurisdiction	*Urbana*
Date Performed	*7/25/2006*	Analysis Year	*2003 data*
Analysis Time Period	*AM peak hour*		
Project Description	*IL 130 Corridor Study*		
East/West Street:	*Washington Street*	North/South Street:	*Il 130*
Intersection Orientation:	*North-South*	Study Period (hrs):	*0.25*

Vehicle Volumes and Adjustments

Major Street	Northbound			Southbound		
Movement	1	2	3	4	5	6
	L	T	R	L	T	R
Volume	*78*	*356*	*0*	*3*	*242*	*58*
Peak-Hour Factor, PHF	*1.00*	*1.00*	*1.00*	*1.00*	*1.00*	*1.00*
Hourly Flow Rate, HFR	*78*	*356*	*0*	*3*	*242*	*58*
Percent Heavy Vehicles	*0*	--	--	*33*	--	--
Median Type	*Undivided*					
RT Channelized			*0*			*0*
Lanes	*1*	*1*	*0*	*1*	*1*	*0*
Configuration	*L*		*TR*	*L*		*TR*
Upstream Signal		*0*			*1*	

Minor Street	Westbound			Eastbound		
Movement	7	8	9	10	11	12
	L	T	R	L	T	R
Volume	*1*	*18*	*2*	*28*	*9*	*19*
Peak-Hour Factor, PHF	*1.00*	*1.00*	*1.00*	*1.00*	*1.00*	*1.00*
Hourly Flow Rate, HFR	*1*	*18*	*2*	*28*	*9*	*19*
Percent Heavy Vehicles	*0*	*0*	*0*	*4*	*0*	*21*
Percent Grade (%)		*0*			*0*	
Flared Approach		*Y*			*Y*	
Storage		*0*			*0*	
RT Channelized			*0*			*0*
Lanes	*0*	*1*	*0*	*0*	*1*	*0*
Configuration		*LTR*			*LTR*	

Delay, Queue Length, and Level of Service

Approach	NB	SB	Westbound			Eastbound		
Movement	1	4	7	8	9	10	11	12
Lane Configuration	*L*	*L*		*LTR*			*LTR*	
v (vph)	*78*	*3*		*21*			*56*	
C (m) (vph)	*1273*	*1050*		*309*			*353*	
v/c	*0.06*	*0.00*		*0.07*			*0.16*	
95% queue length	*0.20*	*0.01*		*0.22*			*0.56*	
Control Delay	*8.0*	*8.4*		*17.5*			*17.1*	
LOS	*A*	*A*		*C*			*C*	
Approach Delay	--	--	*17.5*			*17.1*		
Approach LOS	--	--	*C*			*C*		

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TWO-WAY STOP CONTROL SUMMARY

General Information		Site Information	
Analyst	Ahmed	Intersection	IL 130/Washington Street
Agency/Co.	CUUATS	Jurisdiction	Urbana
Date Performed	7/25/2006	Analysis Year	2003 data
Analysis Time Period	PM peak hour		
Project Description	IL 130 Corridor Study		
East/West Street:	Washington Street	North/South Street:	Il 130
Intersection Orientation:	North-South	Study Period (hrs):	0.25

Vehicle Volumes and Adjustments

Major Street	Northbound			Southbound		
Movement	1	2	3	4	5	6
	L	T	R	L	T	R
Volume	8	264	2	9	362	49
Peak-Hour Factor, PHF	1.00	1.00	1.00	1.00	1.00	1.00
Hourly Flow Rate, HFR	8	264	2	9	362	49
Percent Heavy Vehicles	0	--	--	22	--	--
Median Type	Undivided					
RT Channelized			0			0
Lanes	1	1	0	1	1	0
Configuration	L		TR	L		TR
Upstream Signal		0			1	

Minor Street	Westbound			Eastbound		
Movement	7	8	9	10	11	12
	L	T	R	L	T	R
Volume	1	8	3	74	10	48
Peak-Hour Factor, PHF	1.00	1.00	1.00	1.00	1.00	1.00
Hourly Flow Rate, HFR	1	8	3	74	10	48
Percent Heavy Vehicles	0	13	0	1	0	0
Percent Grade (%)	0			0		
Flared Approach		Y			Y	
Storage		0			0	
RT Channelized			0			0
Lanes	0	1	0	0	1	0
Configuration		LTR			LTR	

Delay, Queue Length, and Level of Service

Approach	NB	SB	Westbound			Eastbound		
Movement	1	4	7	8	9	10	11	12
Lane Configuration	L	L		LTR			LTR	
v (vph)	8	9		12			132	
C (m) (vph)	1159	1191		392			424	
v/c	0.01	0.01		0.03			0.31	
95% queue length	0.02	0.02		0.09			1.31	
Control Delay	8.1	8.0		14.5			17.3	
LOS	A	A		B			C	
Approach Delay	--	--	14.5			17.3		
Approach LOS	--	--	B			C		

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TWO-WAY STOP CONTROL SUMMARY

General Information		Site Information	
Analyst	Ahmed Z. Mohideen	Intersection	High Cross Rd. @ Perkins
Agency/Co.	CCRPC	Jurisdiction	Urbana
Date Performed	1/26/2004	Analysis Year	2004
Analysis Time Period	AM peak hour		
Project Description			
East/West Street:	Perkins Rd.	North/South Street:	High Cross Rd.
Intersection Orientation:	North-South	Study Period (hrs):	0.25

Vehicle Volumes and Adjustments

Major Street	Northbound			Southbound		
Movement	1	2	3	4	5	6
	L	T	R	L	T	R
Volume	20	46	0	0	67	14
Peak-Hour Factor, PHF	1.00	1.00	1.00	1.00	1.00	1.00
Hourly Flow Rate, HFR	20	46	0	0	67	14
Percent Heavy Vehicles	10	--	--	0	--	--
Median Type	Undivided					
RT Channelized			0			0
Lanes	0	1	0	0	1	0
Configuration	LT					TR
Upstream Signal		1			0	

Minor Street	Westbound			Eastbound		
Movement	7	8	9	10	11	12
	L	T	R	L	T	R
Volume	0	0	0	9	0	28
Peak-Hour Factor, PHF	1.00	1.00	1.00	1.00	1.00	1.00
Hourly Flow Rate, HFR	0	0	0	9	0	28
Percent Heavy Vehicles	0	0	0	0	0	0
Percent Grade (%)		0			0	
Flared Approach		N			N	
Storage		0			0	
RT Channelized			0			0
Lanes	0	0	0	0	1	0
Configuration					LTR	

Delay, Queue Length, and Level of Service

Approach	NB	SB	Westbound			Eastbound		
Movement	1	4	7	8	9	10	11	12
Lane Configuration	LT						LTR	
v (vph)	20						37	
C (m) (vph)	1467						946	
v/c	0.01						0.04	
95% queue length	0.04						0.12	
Control Delay	7.5						9.0	
LOS	A						A	
Approach Delay	--	--				9.0		
Approach LOS	--	--				A		

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TWO-WAY STOP CONTROL SUMMARY

General Information		Site Information	
Analyst	*Ahmed Z. Mohideen*	Intersection	*High Cross Rd. @ Perkins*
Agency/Co.	*CCRPC*	Jurisdiction	*Urbana*
Date Performed	*1/26/2004*	Analysis Year	*2004*
Analysis Time Period	*PM Peak Hour*		

Project Description	
East/West Street: *Perkins Rd.*	North/South Street: *High Cross Rd.*
Intersection Orientation: *North-South*	Study Period (hrs): *0.25*

Vehicle Volumes and Adjustments

Major Street	Northbound			Southbound		
Movement	1	2	3	4	5	6
	L	T	R	L	T	R
Volume	32	53	0	0	42	8
Peak-Hour Factor, PHF	1.00	1.00	1.00	1.00	1.00	1.00
Hourly Flow Rate, HFR	32	53	0	0	42	8
Percent Heavy Vehicles	10	--	--	0	--	--
Median Type	Undivided					
RT Channelized			0			0
Lanes	0	1	0	0	1	0
Configuration	LT					TR
Upstream Signal		1			0	

Minor Street	Westbound			Eastbound		
Movement	7	8	9	10	11	12
	L	T	R	L	T	R
Volume	0	0	0	13	0	23
Peak-Hour Factor, PHF	1.00	1.00	1.00	1.00	1.00	1.00
Hourly Flow Rate, HFR	0	0	0	13	0	23
Percent Heavy Vehicles	0	0	0	0	0	0
Percent Grade (%)		0			0	
Flared Approach		N			N	
Storage		0			0	
RT Channelized			0			0
Lanes	0	0	0	0	1	0
Configuration					LTR	

Delay, Queue Length, and Level of Service

Approach	NB	SB	Westbound			Eastbound		
Movement	1	4	7	8	9	10	11	12
Lane Configuration	LT						LTR	
v (vph)	32						36	
C (m) (vph)	1507						939	
v/c	0.02						0.04	
95% queue length	0.07						0.12	
Control Delay	7.4						9.0	
LOS	A						A	
Approach Delay	--	--				9.0		
Approach LOS	--	--				A		

 Version 4.1f

ALL-WAY STOP CONTROL ANALYSIS

General Information

Analyst	
Agency/Co.	CUUATS
Date Performed	1/26/2004
Analysis Time Period	AM Peak (ints peak)

Site Information

Intersection	High Cross Rd @ Airport Rd
Jurisdiction	Urbana
Analysis Year	2004

Project ID IL 130 Corridor Study

East/West Street: Airport Rd | North/South Street: High Cross Road

Volume Adjustments and Site Characteristics

Approach	Eastbound			Westbound		
Movement	L	T	R	L	T	R
Volume	1	2	19	2	9	0
%Thrus Left Lane	50			50		

Approach	Northbound			Southbound		
Movement	L	T	R	L	T	R
Volume	39	19	2	1	14	9
%Thrus Left Lane	50			50		

	Eastbound		Westbound		Northbound		Southbound	
	L1	L2	L1	L2	L1	L2	L1	L2
Configuration	LTR		LTR		LTR		LTR	
PHF	1.00		1.00		1.00		1.00	
Flow Rate	22		11		60		24	
% Heavy Vehicles	0		0		11		2	
No. Lanes	1		1		1		1	
Geometry Group	1		1		1		1	
Duration, T	0.25							

Saturation Headway Adjustment Worksheet

Prop. Left-Turns	0.0		0.2		0.6		0.0	
Prop. Right-Turns	0.9		0.0		0.0		0.4	
Prop. Heavy Vehicle								
hLT-adj	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2
hRT-adj	-0.6	-0.6	-0.6	-0.6	-0.6	-0.6	-0.6	-0.6
hHV-adj	1.7	1.7	1.7	1.7	1.7	1.7	1.7	1.7
hadj, computed	3.59		3.59		3.59		3.59	

Departure Headway and Service Time

hd, initial value	3.20		3.20		3.20		3.20	
x, initial	0.02		0.01		0.05		0.02	
hd, final value	3.59		3.59		3.59		3.59	
x, final value	0.02		0.01		0.07		0.03	
Move-up time, m	2.0		2.0		2.0		2.0	
Service Time	1.6		1.6		1.6		1.6	

Capacity and Level of Service

	Eastbound		Westbound		Northbound		Southbound	
	L1	L2	L1	L2	L1	L2	L1	L2
Capacity	272		261		310		274	
Delay	6.67		7.20		7.61		6.94	
LOS	A		A		A		A	
Approach: Delay	6.67		7.20		7.61		6.94	
LOS	A		A		A		A	
Intersection Delay	7.26							
Intersection LOS	A							

ALL-WAY STOP CONTROL ANALYSIS

General Information

Analyst	
Agency/Co.	CUUATS
Date Performed	1/26/2004
Analysis Time Period	PM Peak (ints peak)

Site Information

Intersection	High Cross Rd @ Airport Rd
Jurisdiction	Urbana
Analysis Year	2004

Project ID IL 130 Corridor Study

East/West Street: Airport Rd

North/South Street: High Cross Road

Volume Adjustments and Site Characteristics

Approach	Eastbound			Westbound		
Movement	L	T	R	L	T	R
Volume	6	16	27	2	13	0
%Thrus Left Lane	50			50		

Approach	Northbound			Southbound		
Movement	L	T	R	L	T	R
Volume	21	34	3	3	17	2
%Thrus Left Lane	50			50		

	Eastbound		Westbound		Northbound		Southbound	
	L1	L2	L1	L2	L1	L2	L1	L2
Configuration	LTR		LTR		LTR		LTR	
PHF	1.00		1.00		1.00		1.00	
Flow Rate	49		15		58		22	
% Heavy Vehicles	0		0		11		2	
No. Lanes	1		1		1		1	
Geometry Group	1		1		1		1	
Duration, T	0.25							

Saturation Headway Adjustment Worksheet

Prop. Left-Turns	0.1		0.1		0.4		0.1	
Prop. Right-Turns	0.6		0.0		0.1		0.1	
Prop. Heavy Vehicle								
hLT-adj	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2
hRT-adj	-0.6	-0.6	-0.6	-0.6	-0.6	-0.6	-0.6	-0.6
hHV-adj	1.7	1.7	1.7	1.7	1.7	1.7	1.7	1.7
hadj, computed	3.79		3.79		3.79		3.79	

Departure Headway and Service Time

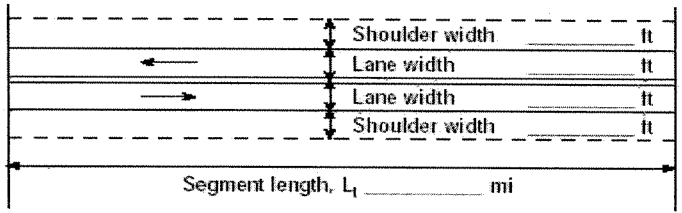
hd, initial value	3.20		3.20		3.20		3.20	
x, initial	0.04		0.01		0.05		0.02	
hd, final value	3.79		3.79		3.79		3.79	
x, final value	0.05		0.02		0.07		0.03	
Move-up time, m	2.0		2.0		2.0		2.0	
Service Time	1.8		1.8		1.8		1.8	

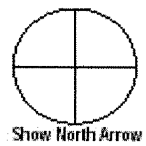
Capacity and Level of Service

	Eastbound		Westbound		Northbound		Southbound	
	L1	L2	L1	L2	L1	L2	L1	L2
Capacity	299		265		308		272	
Delay	7.00		7.23		7.60		7.20	
LOS	A		A		A		A	
Approach: Delay	7.00		7.23		7.60		7.20	
LOS	A		A		A		A	
Intersection Delay	7.29							
Intersection LOS	A							

TWO-WAY TWO-LANE HIGHWAY SEGMENT WORKSHEET			
General Information		***Site Information***	
Analyst	Ahmed Z.Mohideen	Highway	IL 130
Agency or Company	CCRPC	From/To	Old Church / Curtis
Date Performed	1/13/2004	Jurisdiction	Urbana
Analysis Time Period	AM Peak	Analysis Year	2004

Input Data





Class I highway (checked)	Class II highway
Terrain	Level (checked) / Rolling
Two-way hourly volume	786 veh/h
Directional split	85 / 15
Peak-hour factor, PHF	1.00
No-passing zone	0
% Trucks and Buses , P_T	0 %
% Recreational vehicles, P_R	0%
Access points/ mi	1

Average Travel Speed

Grade adjustment factor, f_G (Exhibit 20-7)	1.00
Passenger-car equivalents for trucks, E_T (Exhibit 20-9)	1.2
Passenger-car equivalents for RVs, E_R (Exhibit 20-9)	1.0
Heavy-vehicle adjustment factor, f_{HV} $f_{HV}=1/(1+P_T(E_T-1)+P_R(E_R-1))$	1.000
Two-way flow rate[1], v_p (pc/h) $v_p=V/(PHF * f_G * f_{HV})$	786
v_p * highest directional split proportion[2] (pc/h)	668

Free-Flow Speed from Field Measurement		Estimated Free-Flow Speed	
Field Measured speed, S_{FM}	mi/h	Base free-flow speed, $BFFS_{FM}$	60.0 mi/h
Observed volume, V_f	veh/h	Adj. for lane width and shoulder width[3], f_{LS} (Exhibit 20-5)	1.3 mi/h
Free-flow speed, FFS $FFS=S_{FM}+0.00776(V_f/f_{HV})$	58.5 mi/h	Adj. for access points, f_A (Exhibit 20-6)	0.3 mi/h
		Free-flow speed, FFS $(FSS=BFFS-f_{LS}-f_A)$	58.5 mi/h

Adj. for no-passing zones, f_{np} (mi/h) (Exhibit 20-11)	0.0
Average travel speed, ATS (mi/h) $ATS=FFS-0.00776v_p-f_{np}$	52.4

Percent Time-Spent-Following

Grade Adjustment factor, f_G (Exhibit 20-8)	1.00
Passenger-car equivalents for trucks, E_T (Exhibit 20-10)	1.1
Passenger-car equivalents for RVs, E_R (Exhibit 20-10)	1.0
Heavy-vehicle adjustment factor, f_{HV} $f_{HV}=1/(1+P_T(E_T-1)+P_R(E_R-1))$	1.000
Two-way flow rate[1], v_p (pc/h) $v_p=V/(PHF * f_G * f_{HV})$	786
v_p * highest directional split proportion[2] (pc/h)	668
Base percent time-spent-following, BPTSF(%) $BPTSF=100(1-e^{-0.000879v_p})$	49.9
Adj. for directional distribution and no-passing zone, $f_{d/hp}$(%)(Exh. 20-12)	0.0
Percent time-spent-following, PTSF(%) $PTSF=BPTSF+f_{d/np}$	49.9

Level of Service and Other Performance Measures

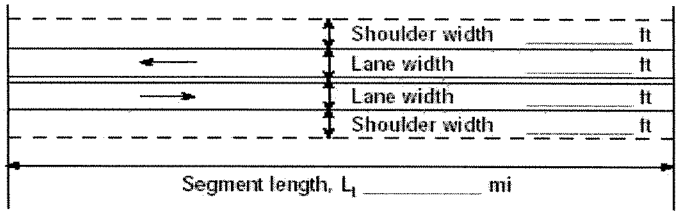
Level of service, LOS (Exhibit 20-3 for Class I or 20-4 for Class II)	B
Volume to capacity ratio v/c $v/c=V_p/3,200$	0.25
Peak 15-min veh-miles of travel, VMT_{15} (veh- mi) $VMT_{15}=0.25L_t(V/PHF)$	197
	786

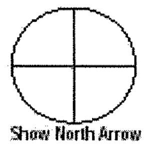
Peak-hour vehicle-miles of travel, VMT_{60} (veh- mi) $VMT_{60}=V^*L_t$	
Peak 15-min total travel time, TT_{15}(veh-h) $TT_{15}= VMT_{15}/ATS$	3.8
Notes	
1. If v_p >= 3,200 pc/h, terminate analysis-the LOS is F. 2. If highest directional split v_p>= 1,700 pc/h, terminated anlysis-the LOS is F.	

TWO-WAY TWO-LANE HIGHWAY SEGMENT WORKSHEET

General Information		Site Information	
Analyst	Ahmed Z.Mohideen	Highway	IL 130
Agency or Company	CCRPC	From/To	Old Church / Curtis
Date Performed	1/13/2004	Jurisdiction	Urbana
Analysis Time Period	PM Peak	Analysis Year	2004

Input Data





Show North Arrow

☑ Class I highway ☐ Class II highway

Terrain ☑ Level ☐ Rolling

Two-way hourly volume	689 veh/h
Directional split	79 / 21
Peak-hour factor, PHF	1.00
No-passing zone	0
% Trucks and Buses , P_T	0 %
% Recreational vehicles, P_R	0%
Access points/ mi	1

Average Travel Speed

Grade adjustment factor, f_G (Exhibit 20-7)	1.00
Passenger-car equivalents for trucks, E_T (Exhibit 20-9)	1.2
Passenger-car equivalents for RVs, E_R (Exhibit 20-9)	1.0
Heavy-vehicle adjustment factor, f_{HV} $f_{HV}=1/(1+P_T(E_T-1)+P_R(E_R-1))$	1.000
Two-way flow rate[1], v_p (pc/h) $v_p=V/(PHF * f_G * f_{HV})$	689
v_p * highest directional split proportion[2] (pc/h)	544

Free-Flow Speed from Field Measurement		Estimated Free-Flow Speed	
Field Measured speed, S_{FM}	mi/h	Base free-flow speed, $BFFS_{FM}$	60.0 mi/h
Observed volume, V_f	veh/h	Adj. for lane width and shoulder width[3], f_{LS} (Exhibit 20-5)	1.3 mi/h
Free-flow speed, FFS $FFS=S_{FM}+0.00776(V_f/f_{HV})$	58.5 mi/h	Adj. for access points, f_A (Exhibit 20-6)	0.3 mi/h
		Free-flow speed, FFS $(FSS=BFFS-f_{LS}-f_A)$	58.5 mi/h

Adj. for no-passing zones, f_{np} (mi/h) (Exhibit 20-11)	0.0
Average travel speed, ATS (mi/h) $ATS=FFS-0.00776v_p-f_{np}$	53.1

Percent Time-Spent-Following

Grade Adjustment factor, f_G (Exhibit 20-8)	1.00
Passenger-car equivalents for trucks, E_T (Exhibit 20-10)	1.1
Passenger-car equivalents for RVs, E_R (Exhibit 20-10)	1.0
Heavy-vehicle adjustment factor, f_{HV} $f_{HV}=1/(1+P_T(E_T-1)+P_R(E_R-1))$	1.000
Two-way flow rate[1], v_p (pc/h) $v_p=V/(PHF * f_G * f_{HV})$	689
v_p * highest directional split proportion[2] (pc/h)	544
Base percent time-spent-following, BPTSF(%) $BPTSF=100(1-e^{-0.000879v_p})$	45.4
Adj. for directional distribution and no-passing zone, $f_{d/hp}$(%)(Exh. 20-12)	0.0
Percent time-spent-following, PTSF(%) $PTSF=BPTSF+f_{d/np}$	45.4

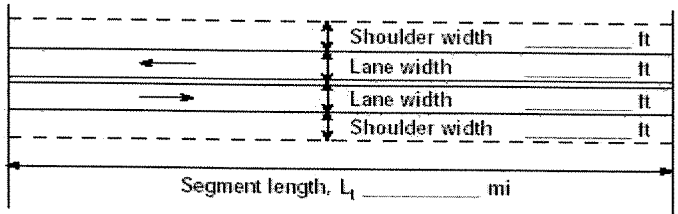
Level of Service and Other Performance Measures

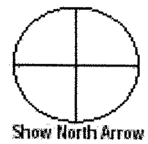
Level of service, LOS (Exhibit 20-3 for Class I or 20-4 for Class II)	B
Volume to capacity ratio v/c $v/c=V_p/3,200$	0.22
Peak 15-min veh-miles of travel, VMT_{15} (veh- mi) $VMT_{15}=0.25L_t(V/PHF)$	172
	689

Peak-hour vehicle-miles of travel, VMT_{60} (veh- mi) $VMT_{60}=V*L_t$	
Peak 15-min total travel time, TT_{15}(veh-h) $TT_{15}= VMT_{15}/ATS$	3.2
Notes	
1. If v_p >= 3,200 pc/h, terminate analysis-the LOS is F. 2. If highest directional split v_p>= 1,700 pc/h, terminated anlysis-the LOS is F.	

TWO-WAY TWO-LANE HIGHWAY SEGMENT WORKSHEET			
General Information		***Site Information***	
Analyst	Ahmed Z.Mohideen	Highway	IL 130
Agency or Company	CCRPC	From/To	Curtis / Windsor
Date Performed	1/13/2004	Jurisdiction	Urbana
Analysis Time Period	AM Peak	Analysis Year	2004

Input Data





Class I highway ☑ Class II highway ☐

Terrain Level ☑ Rolling ☐

Two-way hourly volume	745 veh/h
Directional split	83 / 17
Peak-hour factor, PHF	1.00
No-passing zone	0
% Trucks and Buses , P_T	0 %
% Recreational vehicles, P_R	0%
Access points/ mi	4

Average Travel Speed

Grade adjustment factor, f_G (Exhibit 20-7)	1.00
Passenger-car equivalents for trucks, E_T (Exhibit 20-9)	1.2
Passenger-car equivalents for RVs, E_R (Exhibit 20-9)	1.0
Heavy-vehicle adjustment factor, f_{HV} $f_{HV}=1/(1+P_T(E_T-1)+P_R(E_R-1))$	1.000
Two-way flow rate[1], v_p (pc/h) $v_p=V/(PHF * f_G * f_{HV})$	745
v_p * highest directional split proportion[2] (pc/h)	618

Free-Flow Speed from Field Measurement		Estimated Free-Flow Speed	
		Base free-flow speed, $BFFS_{FM}$	60.0 mi/h
Field Measured speed, S_{FM}	mi/h	Adj. for lane width and shoulder width[3], f_{LS} (Exhibit 20-5)	1.3 mi/h
Observed volume, V_f	veh/h	Adj. for access points, f_A (Exhibit 20-6)	1.0 mi/h
Free-flow speed, FFS $FFS=S_{FM}+0.00776(V_f/f_{HV})$	57.7 mi/h	Free-flow speed, FFS $(FSS=BFFS-f_{LS}-f_A)$	57.7 mi/h

Adj. for no-passing zones, f_{np} (mi/h) (Exhibit 20-11)	0.0
Average travel speed, ATS (mi/h) $ATS=FFS-0.00776v_p-f_{np}$	51.9

Percent Time-Spent-Following

Grade Adjustment factor, f_G (Exhibit 20-8)	1.00
Passenger-car equivalents for trucks, E_T (Exhibit 20-10)	1.1
Passenger-car equivalents for RVs, E_R (Exhibit 20-10)	1.0
Heavy-vehicle adjustment factor, f_{HV} $f_{HV}=1/(1+P_T(E_T-1)+P_R(E_R-1))$	1.000
Two-way flow rate[1], v_p (pc/h) $v_p=V/(PHF * f_G * f_{HV})$	745
v_p * highest directional split proportion[2] (pc/h)	618
Base percent time-spent-following, BPTSF(%) $BPTSF=100(1-e^{-0.000879v_p})$	48.0
Adj. for directional distribution and no-passing zone, $f_{d/hp}$(%)(Exh. 20-12)	0.0
Percent time-spent-following, PTSF(%) $PTSF=BPTSF+f_{d/np}$	48.0

Level of Service and Other Performance Measures

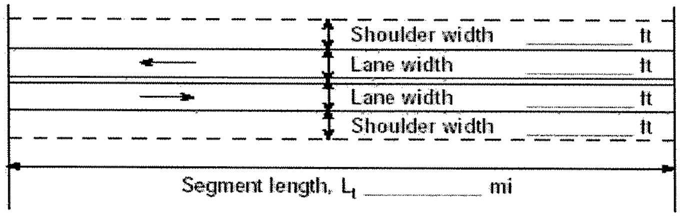
Level of service, LOS (Exhibit 20-3 for Class I or 20-4 for Class II)	B
Volume to capacity ratio v/c $v/c=V_p/3{,}200$	0.23
Peak 15-min veh-miles of travel, VMT_{15} (veh- mi) $VMT_{15}=0.25L_t(V/PHF)$	186
	745

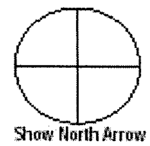
Peak-hour vehicle-miles of travel, VMT_{60} (veh- mi) $VMT_{60}=V*L_t$	
Peak 15-min total travel time, TT_{15}(veh-h) $TT_{15}= VMT_{15}/ATS$	3.6
Notes	
1. If v_p >= 3,200 pc/h, terminate analysis-the LOS is F. 2. If highest directional split v_p>= 1,700 pc/h, terminated anlysis-the LOS is F.	

TWO-WAY TWO-LANE HIGHWAY SEGMENT WORKSHEET

General Information		*Site Information*	
Analyst	Ahmed Z.Mohideen	Highway	IL 130
Agency or Company	CCRPC	From/To	Curtis / Windsor
Date Performed	1/13/2004	Jurisdiction	Urbana
Analysis Time Period	PM Peak	Analysis Year	2004

Input Data





☑ Class I highway ☐ Class II highway

Terrain	☑ Level ☐ Rolling
Two-way hourly volume	685 veh/h
Directional split	76 / 24
Peak-hour factor, PHF	1.00
No-passing zone	0
% Trucks and Buses , P_T	0 %
% Recreational vehicles, P_R	0%
Access points/ mi	4

Average Travel Speed

Grade adjustment factor, f_G (Exhibit 20-7)	1.00
Passenger-car equivalents for trucks, E_T (Exhibit 20-9)	1.2
Passenger-car equivalents for RVs, E_R (Exhibit 20-9)	1.0
Heavy-vehicle adjustment factor, f_{HV} f_{HV}=1/ (1+ $P_T(E_T$-1)+$P_R(E_R$-1))	1.000
Two-way flow rate[1], v_p (pc/h) v_p=V/ (PHF * f_G * f_{HV})	685
v_p * highest directional split proportion[2] (pc/h)	521

Free-Flow Speed from Field Measurement		Estimated Free-Flow Speed	
Field Measured speed, S_{FM}	mi/h	Base free-flow speed, $BFFS_{FM}$	60.0 mi/h
Observed volume, V_f	veh/h	Adj. for lane width and shoulder width[3], f_{LS} (Exhibit 20-5)	1.3 mi/h
Free-flow speed, FFS FFS=S_{FM}+0.00776(V_f/ f_{HV})	57.7 mi/h	Adj. for access points, f_A (Exhibit 20-6)	1.0 mi/h
		Free-flow speed, FFS (FSS=BFFS-f_{LS}-f_A)	57.7 mi/h

Adj. for no-passing zones, f_{np} (mi/h) (Exhibit 20-11)	0.0
Average travel speed, ATS (mi/h) ATS=FFS-0.00776v_p-f_{np}	52.4

Percent Time-Spent-Following

Grade Adjustment factor, f_G (Exhibit 20-8)	1.00
Passenger-car equivalents for trucks, E_T (Exhibit 20-10)	1.1
Passenger-car equivalents for RVs, E_R (Exhibit 20-10)	1.0
Heavy-vehicle adjustment factor, f_{HV} f_{HV}=1/ (1+ $P_T(E_T$-1)+$P_R(E_R$-1))	1.000
Two-way flow rate[1], v_p (pc/h) v_p=V/ (PHF * f_G * f_{HV})	685
v_p * highest directional split proportion[2] (pc/h)	521
Base percent time-spent-following, BPTSF(%) BPTSF=100(1-$e^{-0.000879v_p}$)	45.2
Adj. for directional distribution and no-passing zone, $f_{d/hp}$(%)(Exh. 20-12)	0.0
Percent time-spent-following, PTSF(%) PTSF=BPTSF+$f_{d/np}$	45.2

Level of Service and Other Performance Measures

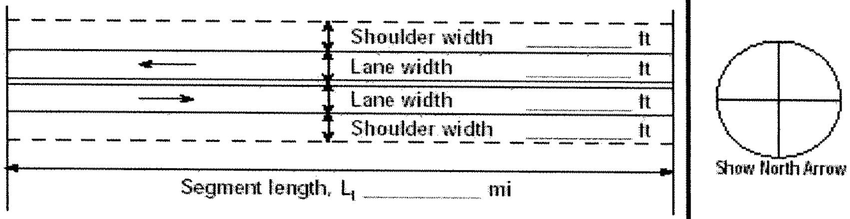
Level of service, LOS (Exhibit 20-3 for Class I or 20-4 for Class II)	B
Volume to capacity ratio v/c v/c=V_p/ 3,200	0.21
Peak 15-min veh-miles of travel,VMT_{15} (veh- mi) VMT_{15}= 0.25L_t(V/PHF)	171
	685

Peak-hour vehicle-miles of travel, VMT_{60} (veh- mi) $VMT_{60}=V*L_t$	
Peak 15-min total travel time, TT_{15}(veh-h) $TT_{15}= VMT_{15}/ATS$	3.3
Notes	
1. If v_p >= 3,200 pc/h, terminate analysis-the LOS is F. 2. If highest directional split v_p>= 1,700 pc/h, terminated anlysis-the LOS is F.	

TWO-WAY TWO-LANE HIGHWAY SEGMENT WORKSHEET

General Information		Site Information	
Analyst	Ahmed Z.Mohideen	Highway	IL 130
Agency or Company	CCRPC	From/To	Windsor / Washington
Date Performed	1/13/2004	Jurisdiction	Urbana
Analysis Time Period	AM Peak	Analysis Year	2004

Input Data



Class I highway Class II highway

Terrain Level Rolling

Two-way hourly volume	674 veh/h
Directional split	62 / 38
Peak-hour factor, PHF	1.00
No-passing zone	0
% Trucks and Buses , P_T	0 %
% Recreational vehicles, P_R	0%
Access points/ mi	4

Average Travel Speed

Grade adjustment factor, f_G (Exhibit 20-7)	1.00
Passenger-car equivalents for trucks, E_T (Exhibit 20-9)	1.2
Passenger-car equivalents for RVs, E_R (Exhibit 20-9)	1.0
Heavy-vehicle adjustment factor, f_{HV} $f_{HV}=1/(1+P_T(E_T-1)+P_R(E_R-1))$	1.000
Two-way flow rate[1], v_p (pc/h) $v_p=V/(PHF * f_G * f_{HV})$	674
v_p * highest directional split proportion[2] (pc/h)	418

Free-Flow Speed from Field Measurement		Estimated Free-Flow Speed	
Field Measured speed, S_{FM}	mi/h	Base free-flow speed, $BFFS_{FM}$	60.0 mi/h
Observed volume, V_f	veh/h	Adj. for lane width and shoulder width[3], f_{LS} (Exhibit 20-5)	1.3 mi/h
Free-flow speed, FFS $FFS=S_{FM}+0.00776(V_f/f_{HV})$	57.7 mi/h	Adj. for access points, f_A (Exhibit 20-6)	1.0 mi/h
		Free-flow speed, FFS $(FSS=BFFS-f_{LS}-f_A)$	57.7 mi/h

Adj. for no-passing zones, f_{np} (mi/h) (Exhibit 20-11)	0.0
Average travel speed, ATS (mi/h) $ATS=FFS-0.00776v_p-f_{np}$	52.5

Percent Time-Spent-Following

Grade Adjustment factor, f_G (Exhibit 20-8)	1.00
Passenger-car equivalents for trucks, E_T (Exhibit 20-10)	1.1
Passenger-car equivalents for RVs, E_R (Exhibit 20-10)	1.0
Heavy-vehicle adjustment factor, f_{HV} $f_{HV}=1/(1+P_T(E_T-1)+P_R(E_R-1))$	1.000
Two-way flow rate[1], v_p (pc/h) $v_p=V/(PHF * f_G * f_{HV})$	674
v_p * highest directional split proportion[2] (pc/h)	418
Base percent time-spent-following, BPTSF(%) $BPTSF=100(1-e^{-0.000879v_p})$	44.7
Adj. for directional distribution and no-passing zone, $f_{d/hp}$(%)(Exh. 20-12)	0.0
Percent time-spent-following, PTSF(%) $PTSF=BPTSF+f_{d/np}$	44.7

Level of Service and Other Performance Measures

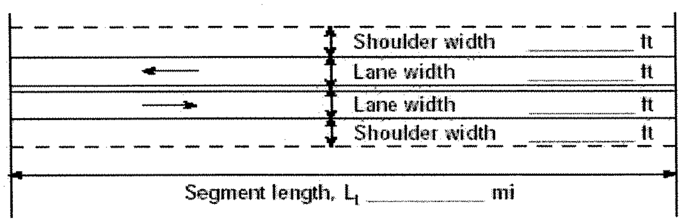
Level of service, LOS (Exhibit 20-3 for Class I or 20-4 for Class II)	B
Volume to capacity ratio v/c $v/c=V_p/3,200$	0.21
Peak 15-min veh-miles of travel, VMT_{15} (veh- mi) $VMT_{15}=0.25L_t(V/PHF)$	253
	1011

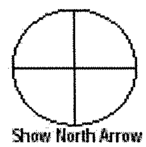
Peak-hour vehicle-miles of travel, VMT_{60} (veh- mi) $VMT_{60}=V*L_t$	
Peak 15-min total travel time, TT_{15}(veh-h) $TT_{15}= VMT_{15}/ATS$	4.8
Notes	
1. If v_p >= 3,200 pc/h, terminate analysis-the LOS is F. 2. If highest directional split v_p>= 1,700 pc/h, terminated anlysis-the LOS is F.	

TWO-WAY TWO-LANE HIGHWAY SEGMENT WORKSHEET

General Information		Site Information	
Analyst	Ahmed Z.Mohideen	Highway	IL 130
Agency or Company	CCRPC	From/To	Windsor / Washington
Date Performed	1/13/2004	Jurisdiction	Urbana
Analysis Time Period	PM Peak	Analysis Year	2004

Input Data





☑ Class I highway ☐ Class II highway

Terrain	☑ Level ☐ Rolling
Two-way hourly volume	672 veh/h
Directional split	65 / 35
Peak-hour factor, PHF	1.00
No-passing zone	0
% Trucks and Buses , P_T	0 %
% Recreational vehicles, P_R	0%
Access points/ mi	4

Average Travel Speed

Grade adjustment factor, f_G (Exhibit 20-7)	1.00
Passenger-car equivalents for trucks, E_T (Exhibit 20-9)	1.2
Passenger-car equivalents for RVs, E_R (Exhibit 20-9)	1.0
Heavy-vehicle adjustment factor, f_{HV} $f_{HV}=1/(1+P_T(E_T-1)+P_R(E_R-1))$	1.000
Two-way flow rate[1], v_p (pc/h) $v_p=V/(PHF * f_G * f_{HV})$	672
v_p * highest directional split proportion[2] (pc/h)	437

Free-Flow Speed from Field Measurement		Estimated Free-Flow Speed	
		Base free-flow speed, $BFFS_{FM}$	60.0 mi/h
Field Measured speed, S_{FM}	mi/h	Adj. for lane width and shoulder width[3], f_{LS} (Exhibit 20-5)	1.3 mi/h
Observed volume, V_f	veh/h	Adj. for access points, f_A (Exhibit 20-6)	1.0 mi/h
Free-flow speed, FFS $FFS=S_{FM}+0.00776(V_f/f_{HV})$	57.7 mi/h	Free-flow speed, FFS $(FSS=BFFS-f_{LS}-f_A)$	57.7 mi/h

Adj. for no-passing zones, f_{np} (mi/h) (Exhibit 20-11)	0.0
Average travel speed, ATS (mi/h) $ATS=FFS-0.00776v_p-f_{np}$	52.5

Percent Time-Spent-Following

Grade Adjustment factor, f_G (Exhibit 20-8)	1.00
Passenger-car equivalents for trucks, E_T (Exhibit 20-10)	1.1
Passenger-car equivalents for RVs, E_R (Exhibit 20-10)	1.0
Heavy-vehicle adjustment factor, f_{HV} $f_{HV}=1/(1+P_T(E_T-1)+P_R(E_R-1))$	1.000
Two-way flow rate[1], v_p (pc/h) $v_p=V/(PHF * f_G * f_{HV})$	672
v_p * highest directional split proportion[2] (pc/h)	437
Base percent time-spent-following, BPTSF(%) $BPTSF=100(1-e^{-0.000879v_p})$	44.6
Adj. for directional distribution and no-passing zone, $f_{d/np}$(%)(Exh. 20-12)	0.0
Percent time-spent-following, PTSF(%) $PTSF=BPTSF+f_{d/np}$	44.6

Level of Service and Other Performance Measures

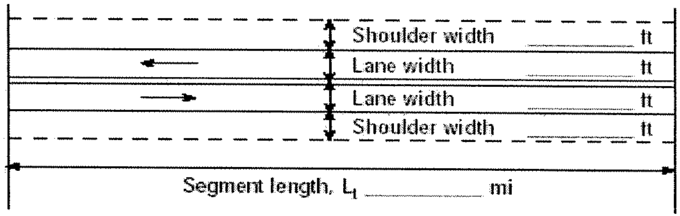
Level of service, LOS (Exhibit 20-3 for Class I or 20-4 for Class II)	B
Volume to capacity ratio v/c $v/c=V_p/3,200$	0.21
Peak 15-min veh-miles of travel, VMT_{15} (veh- mi) $VMT_{15}=0.25L_t(V/PHF)$	252
	1008

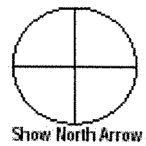
Peak-hour vehicle-miles of travel, VMT_{60} (veh- mi) $VMT_{60}=V*L_t$	
Peak 15-min total travel time, TT_{15}(veh-h) $TT_{15}= VMT_{15}/ATS$	4.8
Notes	
1. If v_p >= 3,200 pc/h, terminate analysis-the LOS is F. 2. If highest directional split v_p>= 1,700 pc/h, terminated anlysis-the LOS is F.	

TWO-WAY TWO-LANE HIGHWAY SEGMENT WORKSHEET

General Information		Site Information	
Analyst	Ahmed Z.Mohideen	Highway	IL 130
Agency or Company	CCRPC	From/To	Washington / Tatman
Date Performed	1/13/2004	Jurisdiction	Urbana
Analysis Time Period	AM Peak	Analysis Year	2004

Input Data





Class I highway	Class II highway
Terrain	Level / Rolling
Two-way hourly volume	664 veh/h
Directional split	55 / 45
Peak-hour factor, PHF	1.00
No-passing zone	0
% Trucks and Buses , P_T	0 %
% Recreational vehicles, P_R	0%
Access points/ mi	0

Average Travel Speed

Grade adjustment factor, f_G (Exhibit 20-7)	1.00
Passenger-car equivalents for trucks, E_T (Exhibit 20-9)	1.2
Passenger-car equivalents for RVs, E_R (Exhibit 20-9)	1.0
Heavy-vehicle adjustment factor, f_{HV} $f_{HV}=1/(1+P_T(E_T-1)+P_R(E_R-1))$	1.000
Two-way flow rate[1], v_p (pc/h) $v_p=V/(PHF * f_G * f_{HV})$	664
v_p * highest directional split proportion[2] (pc/h)	365

Free-Flow Speed from Field Measurement		Estimated Free-Flow Speed	
Field Measured speed, S_{FM}	mi/h	Base free-flow speed, $BFFS_{FM}$	60.0 mi/h
Observed volume, V_f	veh/h	Adj. for lane width and shoulder width[3], f_{LS} (Exhibit 20-5)	1.3 mi/h
Free-flow speed, FFS $FFS=S_{FM}+0.00776(V_f/f_{HV})$	58.7 mi/h	Adj. for access points, f_A (Exhibit 20-6)	0.0 mi/h
		Free-flow speed, FFS $(FSS=BFFS-f_{LS}-f_A)$	58.7 mi/h

Adj. for no-passing zones, f_{np} (mi/h) (Exhibit 20-11)	0.0
Average travel speed, ATS (mi/h) $ATS=FFS-0.00776v_p-f_{np}$	53.5

Percent Time-Spent-Following

Grade Adjustment factor, f_G (Exhibit 20-8)	1.00
Passenger-car equivalents for trucks, E_T (Exhibit 20-10)	1.1
Passenger-car equivalents for RVs, E_R (Exhibit 20-10)	1.0
Heavy-vehicle adjustment factor, f_{HV} $f_{HV}=1/(1+P_T(E_T-1)+P_R(E_R-1))$	1.000
Two-way flow rate[1], v_p (pc/h) $v_p=V/(PHF * f_G * f_{HV})$	664
v_p * highest directional split proportion[2] (pc/h)	365
Base percent time-spent-following, BPTSF(%) $BPTSF=100(1-e^{-0.000879v_p})$	44.2
Adj. for directional distribution and no-passing zone, $f_{d/hp}$(%)(Exh. 20-12)	0.0
Percent time-spent-following, PTSF(%) $PTSF=BPTSF+f_{d/np}$	44.2

Level of Service and Other Performance Measures

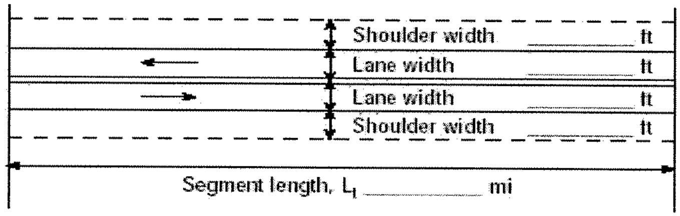
Level of service, LOS (Exhibit 20-3 for Class I or 20-4 for Class II)	B
Volume to capacity ratio v/c $v/c=V_p/3,200$	0.21
Peak 15-min veh-miles of travel, VMT_{15} (veh- mi) $VMT_{15}=0.25L_t(V/PHF)$	53
	212

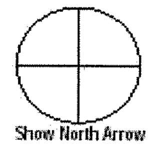
Peak-hour vehicle-miles of travel, VMT_{60} (veh- mi) $VMT_{60}=V*L_t$	
Peak 15-min total travel time, TT_{15}(veh-h) $TT_{15}= VMT_{15}/ATS$	1.0
Notes	
1. If v_p >= 3,200 pc/h, terminate analysis-the LOS is F. 2. If highest directional split v_p>= 1,700 pc/h, terminated anlysis-the LOS is F.	

TWO-WAY TWO-LANE HIGHWAY SEGMENT WORKSHEET

General Information		*Site Information*	
Analyst	Ahmed Z.Mohideen	Highway	IL 130
Agency or Company	CCRPC	From/To	Washington / Tatman
Date Performed	1/13/2004	Jurisdiction	Urbana
Analysis Time Period	PM Peak	Analysis Year	2004

Input Data





Class I highway Class II highway

Terrain	Level Rolling
Two-way hourly volume	733 veh/h
Directional split	61 / 39
Peak-hour factor, PHF	1.00
No-passing zone	0
% Trucks and Buses , P_T	0 %
% Recreational vehicles, P_R	0%
Access points/ mi	0

Average Travel Speed

Grade adjustment factor, f_G (Exhibit 20-7)	1.00
Passenger-car equivalents for trucks, E_T (Exhibit 20-9)	1.2
Passenger-car equivalents for RVs, E_R (Exhibit 20-9)	1.0
Heavy-vehicle adjustment factor, f_{HV} f_{HV}=1/ (1+ $P_T(E_T$-1)+$P_R(E_R$-1))	1.000
Two-way flow rate[1], v_p (pc/h) v_p=V/ (PHF * f_G * f_{HV})	733
v_p * highest directional split proportion[2] (pc/h)	447

Free-Flow Speed from Field Measurement		Estimated Free-Flow Speed	
Field Measured speed, S_{FM}	mi/h	Base free-flow speed, $BFFS_{FM}$	60.0 mi/h
Observed volume, V_f	veh/h	Adj. for lane width and shoulder width[3], f_{LS} (Exhibit 20-5)	1.3 mi/h
Free-flow speed, FFS FFS=S_{FM}+0.00776(V_f/ f_{HV})	58.7 mi/h	Adj. for access points, f_A (Exhibit 20-6)	0.0 mi/h
		Free-flow speed, FFS (FSS=BFFS-f_{LS}-f_A)	58.7 mi/h

Adj. for no-passing zones, f_{np} (mi/h) (Exhibit 20-11)	0.0
Average travel speed, ATS (mi/h) ATS=FFS-0.00776v_p-f_{np}	53.0

Percent Time-Spent-Following

Grade Adjustment factor, f_G (Exhibit 20-8)	1.00
Passenger-car equivalents for trucks, E_T (Exhibit 20-10)	1.1
Passenger-car equivalents for RVs, E_R (Exhibit 20-10)	1.0
Heavy-vehicle adjustment factor, f_{HV} f_{HV}=1/ (1+ $P_T(E_T$-1)+$P_R(E_R$-1))	1.000
Two-way flow rate[1], v_p (pc/h) v_p=V/ (PHF * f_G * f_{HV})	733
v_p * highest directional split proportion[2] (pc/h)	447
Base percent time-spent-following, BPTSF(%) BPTSF=100(1-$e^{-0.000879v_p}$)	47.5
Adj. for directional distribution and no-passing zone, $f_{d/np}$(%)(Exh. 20-12)	0.0
Percent time-spent-following, PTSF(%) PTSF=BPTSF+$f_{d/np}$	47.5

Level of Service and Other Performance Measures

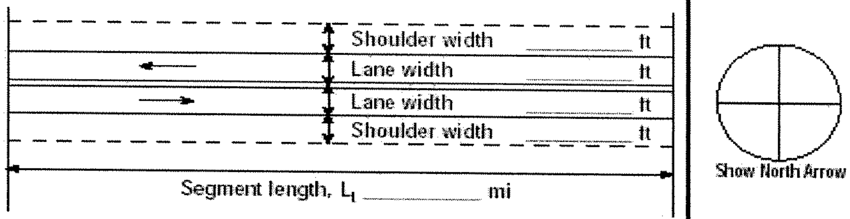
Level of service, LOS (Exhibit 20-3 for Class I or 20-4 for Class II)	B
Volume to capacity ratio v/c v/c=V_p/ 3,200	0.23
Peak 15-min veh-miles of travel,VMT_{15} (veh- mi) VMT_{15}= 0.25L_t(V/PHF)	59
	235

Peak-hour vehicle-miles of travel, VMT_{60} (veh- mi) $VMT_{60}=V^*L_t$	
Peak 15-min total travel time, TT_{15}(veh-h) $TT_{15}= VMT_{15}/ATS$	1.1
Notes	
1. If v_p >= 3,200 pc/h, terminate analysis-the LOS is F.	2. If highest directional split v_p>= 1,700 pc/h, terminated anlysis-the LOS is F.

TWO-WAY TWO-LANE HIGHWAY SEGMENT WORKSHEET

General Information		***Site Information***	
Analyst	Ahmed Z.Mohideen	Highway	IL 130
Agency or Company	CCRPC	From/To	Tatman / US150
Date Performed	1/13/2004	Jurisdiction	Urbana
Analysis Time Period	AM Peak	Analysis Year	2004

Input Data



☑ Class I highway	☐ Class II highway
Terrain ☑ Level	☐ Rolling
Two-way hourly volume	694 veh/h
Directional split	51 / 49
Peak-hour factor, PHF	1.00
No-passing zone	0
% Trucks and Buses , P_T	8 %
% Recreational vehicles, P_R	0%
Access points/ mi	10

Average Travel Speed

Grade adjustment factor, f_G (Exhibit 20-7)	1.00
Passenger-car equivalents for trucks, E_T (Exhibit 20-9)	1.2
Passenger-car equivalents for RVs, E_R (Exhibit 20-9)	1.0
Heavy-vehicle adjustment factor, f_{HV} $f_{HV}=1/(1+P_T(E_T-1)+P_R(E_R-1))$	0.984
Two-way flow rate[1], v_p (pc/h) $v_p=V/(PHF * f_G * f_{HV})$	705
v_p * highest directional split proportion[2] (pc/h)	360

Free-Flow Speed from Field Measurement		Estimated Free-Flow Speed	
Field Measured speed, S_{FM}	mi/h	Base free-flow speed, $BFFS_{FM}$	55.0 mi/h
Observed volume, V_f	veh/h	Adj. for lane width and shoulder width[3], f_{LS} (Exhibit 20-5)	1.3 mi/h
Free-flow speed, FFS $FFS=S_{FM}+0.00776(V_f/f_{HV})$	51.2 mi/h	Adj. for access points, f_A (Exhibit 20-6)	2.5 mi/h
		Free-flow speed, FFS $(FSS=BFFS-f_{LS}-f_A)$	51.2 mi/h

Adj. for no-passing zones, f_{np} (mi/h) (Exhibit 20-11)	0.0
Average travel speed, ATS (mi/h) $ATS=FFS-0.00776v_p-f_{np}$	45.7

Percent Time-Spent-Following

Grade Adjustment factor, f_G (Exhibit 20-8)	1.00
Passenger-car equivalents for trucks, E_T (Exhibit 20-10)	1.1
Passenger-car equivalents for RVs, E_R (Exhibit 20-10)	1.0
Heavy-vehicle adjustment factor, f_{HV} $f_{HV}=1/(1+P_T(E_T-1)+P_R(E_R-1))$	0.992
Two-way flow rate[1], v_p (pc/h) $v_p=V/(PHF * f_G * f_{HV})$	700
v_p * highest directional split proportion[2] (pc/h)	357
Base percent time-spent-following, BPTSF(%) $BPTSF=100(1-e^{-0.000879v_p})$	46.0
Adj. for directional distribution and no-passing zone, $f_{d/hp}$(%)(Exh. 20-12)	0.0
Percent time-spent-following, PTSF(%) $PTSF=BPTSF+f_{d/np}$	46.0

Level of Service and Other Performance Measures

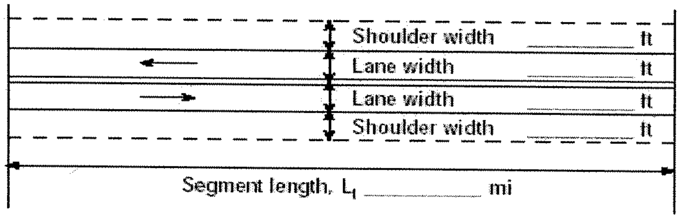
Level of service, LOS (Exhibit 20-3 for Class I or 20-4 for Class II)	C
Volume to capacity ratio v/c $v/c=V_p/3{,}200$	0.22
Peak 15-min veh-miles of travel, VMT_{15} (veh- mi) $VMT_{15}=0.25L_t(V/PHF)$	35
	139

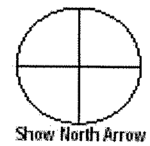
Peak-hour vehicle-miles of travel, VMT_{60} (veh- mi) $VMT_{60}=V*L_t$	
Peak 15-min total travel time, TT_{15}(veh-h) $TT_{15}= VMT_{15}/ATS$	0.8
Notes	
1. If v_p >= 3,200 pc/h, terminate analysis-the LOS is F. 2. If highest directional split v_p>= 1,700 pc/h, terminated anlysis-the LOS is F.	

TWO-WAY TWO-LANE HIGHWAY SEGMENT WORKSHEET

General Information		Site Information	
Analyst	Ahmed Z.Mohideen	Highway	IL 130
Agency or Company	CCRPC	From/To	Tatman / US150
Date Performed	1/13/2004	Jurisdiction	Urbana
Analysis Time Period	PM Peak	Analysis Year	2004

Input Data





☑ Class I highway ☐ Class II highway

Terrain ☑ Level ☐ Rolling

Two-way hourly volume	770 veh/h
Directional split	58 / 42
Peak-hour factor, PHF	1.00
No-passing zone	0
% Trucks and Buses , P_T	8 %
% Recreational vehicles, P_R	0%
Access points/ mi	10

Average Travel Speed

Grade adjustment factor, f_G (Exhibit 20-7)	1.00
Passenger-car equivalents for trucks, E_T (Exhibit 20-9)	1.2
Passenger-car equivalents for RVs, E_R (Exhibit 20-9)	1.0
Heavy-vehicle adjustment factor, f_{HV} f_{HV}=1/ (1+ $P_T(E_T$-1)+$P_R(E_R$-1))	0.984
Two-way flow rate[1], v_p (pc/h) v_p=V/ (PHF * f_G * f_{HV})	782
v_p * highest directional split proportion[2] (pc/h)	454

Free-Flow Speed from Field Measurement		Estimated Free-Flow Speed	
		Base free-flow speed, $BFFS_{FM}$	55.0 mi/h
Field Measured speed, S_{FM}	mi/h	Adj. for lane width and shoulder width[3], f_{LS} (Exhibit 20-5)	1.3 mi/h
Observed volume, V_f	veh/h	Adj. for access points, f_A (Exhibit 20-6)	2.5 mi/h
Free-flow speed, FFS FFS=S_{FM}+0.00776(V_f/ f_{HV})	51.2 mi/h	Free-flow speed, FFS (FSS=BFFS-f_{LS}-f_A)	51.2 mi/h

Adj. for no-passing zones, f_{np} (mi/h) (Exhibit 20-11)	0.0
Average travel speed, ATS (mi/h) ATS=FFS-0.00776v_p-f_{np}	45.1

Percent Time-Spent-Following

Grade Adjustment factor, f_G (Exhibit 20-8)	1.00
Passenger-car equivalents for trucks, E_T (Exhibit 20-10)	1.1
Passenger-car equivalents for RVs, E_R (Exhibit 20-10)	1.0
Heavy-vehicle adjustment factor, f_{HV} f_{HV}=1/ (1+ $P_T(E_T$-1)+$P_R(E_R$-1))	0.992
Two-way flow rate[1], v_p (pc/h) v_p=V/ (PHF * f_G * f_{HV})	776
v_p * highest directional split proportion[2] (pc/h)	450
Base percent time-spent-following, BPTSF(%) BPTSF=100(1-$e^{-0.000879v_p}$)	49.4
Adj. for directional distribution and no-passing zone, $f_{d/np}$(%)(Exh. 20-12)	0.0
Percent time-spent-following, PTSF(%) PTSF=BPTSF+$f_{d/np}$	49.4

Level of Service and Other Performance Measures

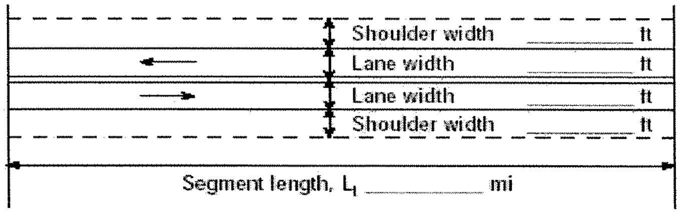
Level of service, LOS (Exhibit 20-3 for Class I or 20-4 for Class II)	C
Volume to capacity ratio v/c v/c=V_p/ 3,200	0.24
Peak 15-min veh-miles of travel,VMT_{15} (veh- mi) VMT_{15}= 0.25L_t(V/PHF)	39
	154

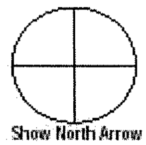
Peak-hour vehicle-miles of travel, VMT_{60} (veh- mi) VMT_{60}=V*L_t	
Peak 15-min total travel time, TT_{15}(veh-h) TT_{15}= VMT_{15}/ATS	0.9
Notes	
1. If v_p >= 3,200 pc/h, terminate analysis-the LOS is F. 2. If highest directional split v_p>= 1,700 pc/h, terminated anlysis-the LOS is F.	

TWO-WAY TWO-LANE HIGHWAY SEGMENT WORKSHEET

General Information		***Site Information***	
Analyst	Ahmed Z.Mohideen	Highway	High Cross road
Agency or Company	CCRPC	From/To	US150 / Perkins
Date Performed	1/14/2004	Jurisdiction	Urbana
Analysis Time Period	AM Peak	Analysis Year	2004

Input Data





Class I highway ☐ Class II highway ☑

Terrain	☑ Level ☐ Rolling
Two-way hourly volume	219 veh/h
Directional split	65 / 35
Peak-hour factor, PHF	1.00
No-passing zone	0
% Trucks and Buses , P_T	13 %
% Recreational vehicles, P_R	0%
Access points/ mi	12

Average Travel Speed

Grade adjustment factor, f_G (Exhibit 20-7)	1.00
Passenger-car equivalents for trucks, E_T (Exhibit 20-9)	1.7
Passenger-car equivalents for RVs, E_R (Exhibit 20-9)	1.0
Heavy-vehicle adjustment factor, f_{HV} f_{HV}=1/ (1+ $P_T(E_T$-1)+$P_R(E_R$-1))	0.917
Two-way flow rate¹, v_p (pc/h) v_p=V/ (PHF * f_G * f_{HV})	239
v_p * highest directional split proportion² (pc/h)	155

Free-Flow Speed from Field Measurement		Estimated Free-Flow Speed	
Field Measured speed, S_{FM}	mi/h	Base free-flow speed, $BFFS_{FM}$	47.0 mi/h
Observed volume, V_f	veh/h	Adj. for lane width and shoulder width³, f_{LS} (Exhibit 20-5)	5.3 mi/h
Free-flow speed, FFS FFS=S_{FM}+0.00776(V_f/ f_{HV})	38.7 mi/h	Adj. for access points, f_A (Exhibit 20-6)	3.0 mi/h
		Free-flow speed, FFS (FSS=BFFS-f_{LS}-f_A)	38.7 mi/h

Adj. for no-passing zones, f_{np} (mi/h) (Exhibit 20-11)	0.0
Average travel speed, ATS (mi/h) ATS=FFS-0.00776v_p-f_{np}	36.8

Percent Time-Spent-Following

Grade Adjustment factor, f_G (Exhibit 20-8)	1.00
Passenger-car equivalents for trucks, E_T (Exhibit 20-10)	1.1
Passenger-car equivalents for RVs, E_R (Exhibit 20-10)	1.0
Heavy-vehicle adjustment factor, f_{HV} f_{HV}=1/ (1+ $P_T(E_T$-1)+$P_R(E_R$-1))	0.987
Two-way flow rate¹, v_p (pc/h) v_p=V/ (PHF * f_G * f_{HV})	222
v_p * highest directional split proportion² (pc/h)	144
Base percent time-spent-following, BPTSF(%) BPTSF=100(1-$e^{-0.000879v_p}$)	17.7
Adj. for directional distribution and no-passing zone, $f_{d/np}$(%)(Exh. 20-12)	2.0
Percent time-spent-following, PTSF(%) PTSF=BPTSF+$f_{d/np}$	19.7

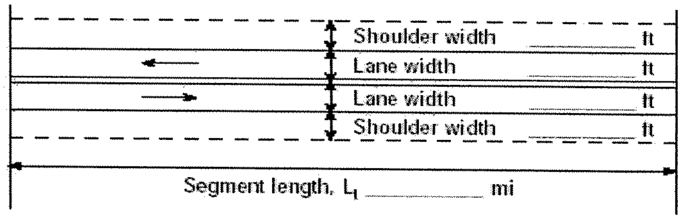
Level of Service and Other Performance Measures

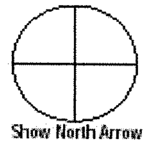
Level of service, LOS (Exhibit 20-3 for Class I or 20-4 for Class II)	A
Volume to capacity ratio v/c v/c=V_p/ 3,200	0.07
Peak 15-min veh-miles of travel,VMT_{15} (veh- mi) VMT_{15}= 0.25L_t(V/PHF)	55
	219

Peak-hour vehicle-miles of travel, VMT_{60} (veh- mi) $VMT_{60}=V*L_t$	
Peak 15-min total travel time, TT_{15}(veh-h) $TT_{15}= VMT_{15}/ATS$	1.5
Notes	
1. If v_p >= 3,200 pc/h, terminate analysis-the LOS is F. 2. If highest directional split v_p>= 1,700 pc/h, terminated anlysis-the LOS is F.	

TWO-WAY TWO-LANE HIGHWAY SEGMENT WORKSHEET			
General Information		***Site Information***	
Analyst	Ahmed Z.Mohideen	Highway	High Cross road
Agency or Company	CCRPC	From/To	US150 / Perkins
Date Performed	1/14/2004	Jurisdiction	Urbana
Analysis Time Period	PM Peak	Analysis Year	2004

Input Data





☐ Class I highway	☑ Class II highway
Terrain	☑ Level ☐ Rolling
Two-way hourly volume	248 veh/h
Directional split	51 / 49
Peak-hour factor, PHF	1.00
No-passing zone	0
% Trucks and Buses , P_T	13 %
% Recreational vehicles, P_R	0%
Access points/ mi	12

Average Travel Speed

Grade adjustment factor, f_G (Exhibit 20-7)	1.00
Passenger-car equivalents for trucks, E_T (Exhibit 20-9)	1.7
Passenger-car equivalents for RVs, E_R (Exhibit 20-9)	1.0
Heavy-vehicle adjustment factor, f_{HV} $f_{HV}=1/(1+P_T(E_T-1)+P_R(E_R-1))$	0.917
Two-way flow rate[1], v_p (pc/h) $v_p=V/(PHF * f_G * f_{HV})$	271
v_p * highest directional split proportion[2] (pc/h)	138

Free-Flow Speed from Field Measurement		Estimated Free-Flow Speed	
Field Measured speed, S_{FM}	mi/h	Base free-flow speed, $BFFS_{FM}$	47.0 mi/h
Observed volume, V_f	veh/h	Adj. for lane width and shoulder width[3], f_{LS} (Exhibit 20-5)	5.3 mi/h
Free-flow speed, FFS $FFS=S_{FM}+0.00776(V_f/f_{HV})$	38.7 mi/h	Adj. for access points, f_A (Exhibit 20-6)	3.0 mi/h
		Free-flow speed, FFS $(FSS=BFFS-f_{LS}-f_A)$	38.7 mi/h

Adj. for no-passing zones, f_{np} (mi/h) (Exhibit 20-11)	0.0
Average travel speed, ATS (mi/h) $ATS=FFS-0.00776v_p-f_{np}$	36.6

Percent Time-Spent-Following

Grade Adjustment factor, f_G (Exhibit 20-8)	1.00
Passenger-car equivalents for trucks, E_T (Exhibit 20-10)	1.1
Passenger-car equivalents for RVs, E_R (Exhibit 20-10)	1.0
Heavy-vehicle adjustment factor, f_{HV} $f_{HV}=1/(1+P_T(E_T-1)+P_R(E_R-1))$	0.987
Two-way flow rate[1], v_p (pc/h) $v_p=V/(PHF * f_G * f_{HV})$	251
v_p * highest directional split proportion[2] (pc/h)	128
Base percent time-spent-following, BPTSF(%) $BPTSF=100(1-e^{-0.000879v_p})$	19.8
Adj. for directional distribution and no-passing zone, $f_{d/hp}$(%)(Exh. 20-12)	0.1
Percent time-spent-following, PTSF(%) $PTSF=BPTSF+f_{d/np}$	19.9

Level of Service and Other Performance Measures

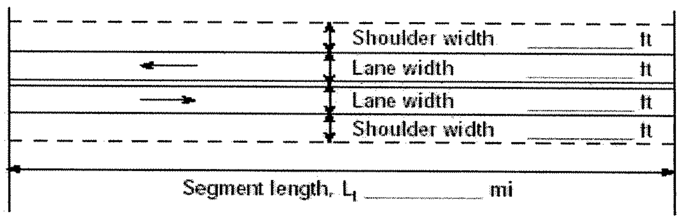
Level of service, LOS (Exhibit 20-3 for Class I or 20-4 for Class II)	A
Volume to capacity ratio v/c $v/c=V_p/3,200$	0.08
Peak 15-min veh-miles of travel, VMT_{15} (veh- mi) $VMT_{15}=0.25L_t(V/PHF)$	62
	248

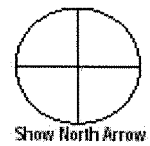
Peak-hour vehicle-miles of travel, VMT_{60} (veh- mi) $VMT_{60}=V*L_t$	
Peak 15-min total travel time, TT_{15}(veh-h) $TT_{15}= VMT_{15}/ATS$	1.7
Notes	
1. If v_p >= 3,200 pc/h, terminate analysis-the LOS is F. 2. If highest directional split v_p>= 1,700 pc/h, terminated anlysis-the LOS is F.	

TWO-WAY TWO-LANE HIGHWAY SEGMENT WORKSHEET

General Information		*Site Information*	
Analyst	Ahmed Z.Mohideen	Highway	High Cross road
Agency or Company	CCRPC	From/To	Perkins / Airport
Date Performed	1/14/2004	Jurisdiction	Urbana
Analysis Time Period	AM Peak	Analysis Year	2004

Input Data





Class I highway ☐ Class II highway ☑

Terrain	☑ Level ☐ Rolling
Two-way hourly volume	177 veh/h
Directional split	65 / 35
Peak-hour factor, PHF	1.00
No-passing zone	0
% Trucks and Buses , P_T	13 %
% Recreational vehicles, P_R	0%
Access points/ mi	22

Average Travel Speed

Grade adjustment factor, f_G (Exhibit 20-7)	1.00
Passenger-car equivalents for trucks, E_T (Exhibit 20-9)	1.7
Passenger-car equivalents for RVs, E_R (Exhibit 20-9)	1.0
Heavy-vehicle adjustment factor, f_{HV} $f_{HV}=1/(1+P_T(E_T-1)+P_R(E_R-1))$	0.917
Two-way flow rate[1], v_p (pc/h) $v_p=V/(PHF * f_G * f_{HV})$	193
v_p * highest directional split proportion[2] (pc/h)	125

Free-Flow Speed from Field Measurement		Estimated Free-Flow Speed	
Field Measured speed, S_{FM}	mi/h	Base free-flow speed, $BFFS_{FM}$	47.0 mi/h
Observed volume, V_f	veh/h	Adj. for lane width and shoulder width[3], f_{LS} (Exhibit 20-5)	4.7 mi/h
Free-flow speed, FFS $FFS=S_{FM}+0.00776(V_f/f_{HV})$	36.8 mi/h	Adj. for access points, f_A (Exhibit 20-6)	5.5 mi/h
		Free-flow speed, FFS $(FSS=BFFS-f_{LS}-f_A)$	36.8 mi/h

Adj. for no-passing zones, f_{np} (mi/h) (Exhibit 20-11)	0.0
Average travel speed, ATS (mi/h) $ATS=FFS-0.00776v_p-f_{np}$	35.3

Percent Time-Spent-Following

Grade Adjustment factor, f_G (Exhibit 20-8)	1.00
Passenger-car equivalents for trucks, E_T (Exhibit 20-10)	1.1
Passenger-car equivalents for RVs, E_R (Exhibit 20-10)	1.0
Heavy-vehicle adjustment factor, f_{HV} $f_{HV}=1/(1+P_T(E_T-1)+P_R(E_R-1))$	0.987
Two-way flow rate[1], v_p (pc/h) $v_p=V/(PHF * f_G * f_{HV})$	179
v_p * highest directional split proportion[2] (pc/h)	116
Base percent time-spent-following, BPTSF(%) $BPTSF=100(1-e^{-0.000879v_p})$	14.6
Adj. for directional distribution and no-passing zone, $f_{d/hp}$(%)(Exh. 20-12)	2.4
Percent time-spent-following, PTSF(%) $PTSF=BPTSF+f_{d/np}$	16.9

Level of Service and Other Performance Measures

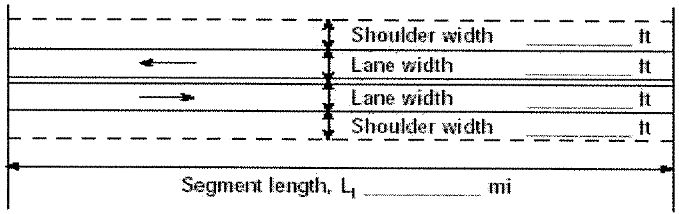
Level of service, LOS (Exhibit 20-3 for Class I or 20-4 for Class II)	A
Volume to capacity ratio v/c $v/c=V_p/3{,}200$	0.06
Peak 15-min veh-miles of travel,VMT_{15} (veh- mi) $VMT_{15}=0.25L_t(V/PHF)$	44
	177

Peak-hour vehicle-miles of travel, VMT_{60} (veh- mi) $VMT_{60}=V*L_t$	
Peak 15-min total travel time, TT_{15}(veh-h) $TT_{15}= VMT_{15}/ATS$	1.2
Notes	
1. If v_p >= 3,200 pc/h, terminate analysis-the LOS is F. 2. If highest directional split v_p>= 1,700 pc/h, terminated anlysis-the LOS is F.	

TWO-WAY TWO-LANE HIGHWAY SEGMENT WORKSHEET

General Information		Site Information	
Analyst	Ahmed Z.Mohideen	Highway	High Cross road
Agency or Company	CCRPC	From/To	Perkins / Airport
Date Performed	1/14/2004	Jurisdiction	Urbana
Analysis Time Period	PM Peak	Analysis Year	2004

Input Data



Class I highway	Class II highway
Terrain	Level / Rolling
Two-way hourly volume	178 veh/h
Directional split	50 / 50
Peak-hour factor, PHF	1.00
No-passing zone	0
% Trucks and Buses , P_T	13 %
% Recreational vehicles, P_R	0%
Access points/ mi	22

Average Travel Speed

Grade adjustment factor, f_G (Exhibit 20-7)	1.00
Passenger-car equivalents for trucks, E_T (Exhibit 20-9)	1.7
Passenger-car equivalents for RVs, E_R (Exhibit 20-9)	1.0
Heavy-vehicle adjustment factor, f_{HV} $f_{HV}=1/(1+P_T(E_T-1)+P_R(E_R-1))$	0.917
Two-way flow rate[1], v_p (pc/h) $v_p=V/(PHF * f_G * f_{HV})$	194
v_p * highest directional split proportion[2] (pc/h)	97

Free-Flow Speed from Field Measurement		Estimated Free-Flow Speed	
Field Measured speed, S_{FM}	mi/h	Base free-flow speed, $BFFS_{FM}$	47.0 mi/h
Observed volume, V_f	veh/h	Adj. for lane width and shoulder width[3], f_{LS} (Exhibit 20-5)	4.7 mi/h
Free-flow speed, FFS $FFS=S_{FM}+0.00776(V_f/f_{HV})$	36.8 mi/h	Adj. for access points, f_A (Exhibit 20-6)	5.5 mi/h
		Free-flow speed, FFS $(FSS=BFFS-f_{LS}-f_A)$	36.8 mi/h

Adj. for no-passing zones, f_{np} (mi/h) (Exhibit 20-11)	0.0
Average travel speed, ATS (mi/h) $ATS=FFS-0.00776v_p-f_{np}$	35.3

Percent Time-Spent-Following

Grade Adjustment factor, f_G (Exhibit 20-8)	1.00
Passenger-car equivalents for trucks, E_T (Exhibit 20-10)	1.1
Passenger-car equivalents for RVs, E_R (Exhibit 20-10)	1.0
Heavy-vehicle adjustment factor, f_{HV} $f_{HV}=1/(1+P_T(E_T-1)+P_R(E_R-1))$	0.987
Two-way flow rate[1], v_p (pc/h) $v_p=V/(PHF * f_G * f_{HV})$	180
v_p * highest directional split proportion[2] (pc/h)	90
Base percent time-spent-following, BPTSF(%) $BPTSF=100(1-e^{-0.000879v_p})$	14.6
Adj. for directional distribution and no-passing zone, $f_{d/np}$(%)(Exh. 20-12)	0.0
Percent time-spent-following, PTSF(%) $PTSF=BPTSF+f_{d/np}$	14.6

Level of Service and Other Performance Measures

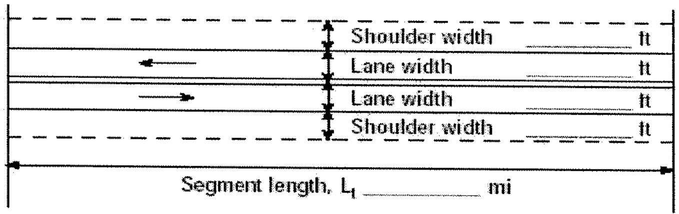
Level of service, LOS (Exhibit 20-3 for Class I or 20-4 for Class II)	A
Volume to capacity ratio v/c $v/c=V_p/3,200$	0.06
Peak 15-min veh-miles of travel, VMT_{15} (veh- mi) $VMT_{15}=0.25L_t(V/PHF)$	45
	178

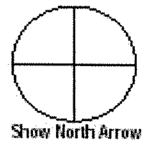
Peak-hour vehicle-miles of travel, VMT_{60} (veh- mi) $VMT_{60}=V*L_t$	
Peak 15-min total travel time, TT_{15}(veh-h) $TT_{15}= VMT_{15}/ATS$	1.3
Notes	
1. If v_p >= 3,200 pc/h, terminate analysis-the LOS is F. 2. If highest directional split v_p>= 1,700 pc/h, terminated anlysis-the LOS is F.	

TWO-WAY TWO-LANE HIGHWAY SEGMENT WORKSHEET

General Information		Site Information	
Analyst	Ahmed Z. Mohideen	Highway	High Cross Rd.
Agency or Company	CCRPC	From/To	Airport / Ford Harris
Date Performed	1/26/2004	Jurisdiction	Urbana
Analysis Time Period	AM peak	Analysis Year	2004

Input Data





Class I highway ☐ Class II highway ☑

Terrain	☑ Level ☐ Rolling
Two-way hourly volume	77 veh/h
Directional split	73 / 27
Peak-hour factor, PHF	1.00
No-passing zone	0
% Trucks and Buses , P_T	13 %
% Recreational vehicles, P_R	0%
Access points/ mi	8

Average Travel Speed

Grade adjustment factor, f_G (Exhibit 20-7)	1.00
Passenger-car equivalents for trucks, E_T (Exhibit 20-9)	1.7
Passenger-car equivalents for RVs, E_R (Exhibit 20-9)	1.0
Heavy-vehicle adjustment factor, f_{HV} $f_{HV}=1/(1+P_T(E_T-1)+P_R(E_R-1))$	0.917
Two-way flow rate[1], v_p (pc/h) $v_p=V/(PHF * f_G * f_{HV})$	84
v_p * highest directional split proportion[2] (pc/h)	61

Free-Flow Speed from Field Measurement		Estimated Free-Flow Speed	
Field Measured speed, S_{FM}	mi/h	Base free-flow speed, $BFFS_{FM}$	47.0 mi/h
Observed volume, V_f	veh/h	Adj. for lane width and shoulder width[3], f_{LS} (Exhibit 20-5)	6.4 mi/h
Free-flow speed, FFS $FFS=S_{FM}+0.00776(V_f/f_{HV})$	38.6 mi/h	Adj. for access points, f_A (Exhibit 20-6)	2.0 mi/h
		Free-flow speed, FFS $(FSS=BFFS-f_{LS}-f_A)$	38.6 mi/h

Adj. for no-passing zones, f_{np} (mi/h) (Exhibit 20-11)	0.0
Average travel speed, ATS (mi/h) $ATS=FFS-0.00776v_p-f_{np}$	37.9

Percent Time-Spent-Following

Grade Adjustment factor, f_G (Exhibit 20-8)	1.00
Passenger-car equivalents for trucks, E_T (Exhibit 20-10)	1.1
Passenger-car equivalents for RVs, E_R (Exhibit 20-10)	1.0
Heavy-vehicle adjustment factor, f_{HV} $f_{HV}=1/(1+P_T(E_T-1)+P_R(E_R-1))$	0.987
Two-way flow rate[1], v_p (pc/h) $v_p=V/(PHF * f_G * f_{HV})$	78
v_p * highest directional split proportion[2] (pc/h)	57
Base percent time-spent-following, BPTSF(%) $BPTSF=100(1-e^{-0.000879v_p})$	6.6
Adj. for directional distribution and no-passing zone, $f_{d/hp}$(%)(Exh. 20-12)	4.9
Percent time-spent-following, PTSF(%) $PTSF=BPTSF+f_{d/np}$	11.6

Level of Service and Other Performance Measures

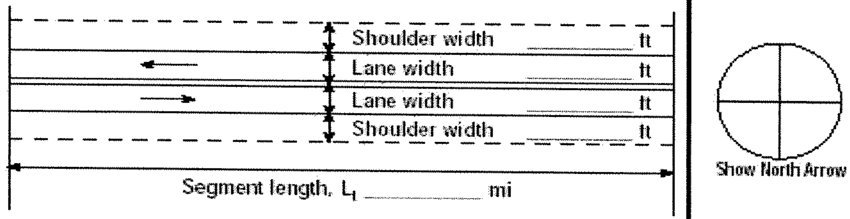
Level of service, LOS (Exhibit 20-3 for Class I or 20-4 for Class II)	A
Volume to capacity ratio v/c $v/c=V_p/3,200$	0.03
Peak 15-min veh-miles of travel, VMT_{15} (veh- mi) $VMT_{15}=0.25L_t(V/PHF)$	39
	154

Peak-hour vehicle-miles of travel, VMT_{60} (veh- mi) $VMT_{60}=V*L_t$	
Peak 15-min total travel time, TT_{15}(veh-h) $TT_{15}= VMT_{15}/ATS$	1.0
Notes	
1. If v_p >= 3,200 pc/h, terminate analysis-the LOS is F. 2. If highest directional split v_p>= 1,700 pc/h, terminated anlysis-the LOS is F.	

TWO-WAY TWO-LANE HIGHWAY SEGMENT WORKSHEET

General Information		Site Information	
Analyst	Ahmed Z. Mohideen	Highway	High Cross Rd.
Agency or Company	CCRPC	From/To	Airport / Ford Harris
Date Performed	1/26/2004	Jurisdiction	Urbana
Analysis Time Period	PM peak	Analysis Year	2004

Input Data



Class I highway ☐ Class II highway ☑

Terrain ☑ Level ☐ Rolling

Two-way hourly volume	96 veh/h
Directional split	60 / 40
Peak-hour factor, PHF	1.00
No-passing zone	0
% Trucks and Buses, P_T	13 %
% Recreational vehicles, P_R	0%
Access points/ mi	8

Average Travel Speed

Grade adjustment factor, f_G (Exhibit 20-7)	1.00
Passenger-car equivalents for trucks, E_T (Exhibit 20-9)	1.7
Passenger-car equivalents for RVs, E_R (Exhibit 20-9)	1.0
Heavy-vehicle adjustment factor, f_{HV} $f_{HV}=1/(1+P_T(E_T-1)+P_R(E_R-1))$	0.917
Two-way flow rate[1], v_p (pc/h) $v_p=V/(PHF * f_G * f_{HV})$	105
v_p * highest directional split proportion[2] (pc/h)	63

Free-Flow Speed from Field Measurement		Estimated Free-Flow Speed	
Field Measured speed, S_{FM}	mi/h	Base free-flow speed, $BFFS_{FM}$	47.0 mi/h
Observed volume, V_f	veh/h	Adj. for lane width and shoulder width[3], f_{LS} (Exhibit 20-5)	6.4 mi/h
Free-flow speed, FFS $FFS=S_{FM}+0.00776(V_f/f_{HV})$	38.6 mi/h	Adj. for access points, f_A (Exhibit 20-6)	2.0 mi/h
		Free-flow speed, FFS ($FSS=BFFS-f_{LS}-f_A$)	38.6 mi/h

Adj. for no-passing zones, f_{np} (mi/h) (Exhibit 20-11)	0.0
Average travel speed, ATS (mi/h) $ATS=FFS-0.00776v_p-f_{np}$	37.8

Percent Time-Spent-Following

Grade Adjustment factor, f_G (Exhibit 20-8)	1.00
Passenger-car equivalents for trucks, E_T (Exhibit 20-10)	1.1
Passenger-car equivalents for RVs, E_R (Exhibit 20-10)	1.0
Heavy-vehicle adjustment factor, f_{HV} $f_{HV}=1/(1+P_T(E_T-1)+P_R(E_R-1))$	0.987
Two-way flow rate[1], v_p (pc/h) $v_p=V/(PHF * f_G * f_{HV})$	97
v_p * highest directional split proportion[2] (pc/h)	58
Base percent time-spent-following, BPTSF(%) $BPTSF=100(1-e^{-0.000879v_p})$	8.2
Adj. for directional distribution and no-passing zone, $f_{d/np}$(%)(Exh. 20-12)	2.2
Percent time-spent-following, PTSF(%) $PTSF=BPTSF+f_{d/np}$	10.3

Level of Service and Other Performance Measures

Level of service, LOS (Exhibit 20-3 for Class I or 20-4 for Class II)	A
Volume to capacity ratio v/c $v/c=V_p/3,200$	0.03
Peak 15-min veh-miles of travel, VMT_{15} (veh- mi) $VMT_{15}=0.25L_t(V/PHF)$	48
	192

Peak-hour vehicle-miles of travel, VMT_{60} (veh- mi) $VMT_{60}=V^*L_t$	
Peak 15-min total travel time, TT_{15}(veh-h) $TT_{15}= VMT_{15}/ATS$	1.3
Notes	
1. If v_p >= 3,200 pc/h, terminate analysis-the LOS is F. 2. If highest directional split v_p>= 1,700 pc/h, terminated anlysis-the LOS is F.	

*HCS2000*TM Version 4.1f

East Urbana Land Auction
Site Development and Design Principles

Introduction

The City of Urbana takes great pride in the quality of life that is shared by all of its citizens. This includes tree-lined brick streets, an extensive network of bicycle trails and access to a wide variety of shopping, restaurants and nightlife. Over the past decade, the City has experienced growth in both new construction and redevelopment of urban centers. Through this period of growth, the City has worked hard to maintain the amenities that make Urbana a unique community.

The High Cross Road Corridor represents a major growth opportunity that will have a lasting impact on our community. As such, the City has compiled this set of design guidelines to comprehensively address site planning to ensure citizens, developers, and business will be proud of the area now and in the future. Each topic outlines the desired design standard and includes possible ways to achieve the standard. The relationship between these design guidelines and the 2005 Urbana Comprehensive Plan are also outlined.

If you have any questions regarding these guidelines, please contact the City of Urbana Community Development Services Department.

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Signage

Intent: Permit attractive, context-sensitive signs that are adequate to serve the needs of businesses. Signs should be evaluated by their impact on the desired character of the HCR commercial corridor, as well as adjacent lower intensity commercial and residential areas.

Related Goals and Objectives: Goal 24.0; Objective 24.2

Related Future Land Use Designations: Community Business
Regional Business

Desired Design Standard: Use signage architecturally consistent with the building design, including materials, colors, lighting and general character. A correlation between building and sign design can promote better recognition of a specific business, while not creating a sign inconsistent with other aspects of this manual.

- Use monument or other sign types that help incorporate signage into the commercial landscape
- Place landscaping to visually link signs to the site and building
- Wall signs can only utilize 10 percent of the building frontage
    - Allow multiple signs for multiple entrances within the confines of the zoning ordinance.
- Group signage to minimize scattered, independent signs
- Place signs near access drives
- Encourage external sign lighting

Pedestrian Access

Intent: Provide sidewalk and bicycle trail connection to commercial properties to fully utilize pedestrian facilities investment by the city, as well as encourage alternative forms of transportation.

Related Goals and Objectives: Goal 10.0; Objectives 10.1, 10.2
Goal 20.0; Objective 20.2
Goal 41.0; Objective 41.3
Goal 46.0; Objective 46.1
Goal 47.0; Objectives 47.4, 47.7
Goal 49.0; Objective 49.1
Goal 50.0; Objective 50.1

Related Future Land Use Designations: Community Business
Regional Business
Mixed Residential (Suburban and Urban)

Desired Design Standard: Construct pedestrian facilities that are consistent with city standards (5' sidewalks, bike path identification, etc). Any access points should be functionally integrated with internal pedestrian circulation outlined in this manual. Use landscaping to visually identify access points.

- All sidewalks must be at least 5' wide to accommodate both pedestrians and bicycles.
- Use similar landscaping or other means to visually link transit stops, access points, and commercial properties (i.e. plant three bushes surrounding a tree at a transit stop and an access point)
- All construction of pedestrian facilities on private property is required to be constructed to city standards

Internal Circulation

Intent: Prevent a disconnection between infrastructure improvements to the HCR area (i.e. bicycle trail) and commercial properties. Encourage the use of alternative forms of transportation by equally integrating all forms into a conscientious site design that meets corporate and community desires.

Related Goals and Objectives: Goal 41.0; Objectives 41.2, 41.3
Goal 42.0; Objective 42.1
Goal 47.0; Objectives 47.4, 47.7
Goal 49.0; Objective 49.1
Goal 50.0; Objective 50.1

Related Future Land Use Designations: Community Business
Regional Business

Desired Design Standard: Pedestrians and bicycles should have safe, attractive methods of navigating from public right-of-way to the building entrance. Use a combination of landscaping, stripping, and other methods to clearly delineate pedestrian walkways through a parking lot. Provide a wide, landscaped sidewalk with facilities for bicycle parking along any façade adjacent to parking or an access drive.

- Use required parking lot landscaping to frame internal sidewalks, including a curb or other method to prevent cars from blocking the space
- Provide access from handicap parking spaces to internal sidewalks, with appropriate curb cuts if necessary
- Landscape sidewalks in front of the store to channel customers to safer crosswalk areas; provide bicycle racks near store entrances
- Narrow access drive widths near entrances to slow traffic and allow easier pedestrian crossing

Landscaping

Intent: Through the use of a mixture of vegetative, fencing, and brick materials, soften the visual impact of parking lots, buildings and other large, singular uses. Landscaping should not simply hide these uses, rather incorporate them into the overall site design to create attractive places consistent with the character of the city.

Related Goals and Objectives: Goal 13.0; Objective 13.4
Goal 14.0; Objective 14.2
Goal 24.0; Objective 24.2

Related Future Land Use Designations: Community Business
Regional Business

Desired Design Standard: Landscaping should be addressed in two realms, screening and beautification. Certain elements of any site, such as waste disposal and loading docks, can be effectively screened to minimize their visual impact. Internal and periphery landscaping for the site, especially a parking lot, breaks up large areas and can be used to creatively address other aspects of this manual.

- Perimeter landscaping is required along High Cross Road frontage and residential uses, existing or planned. Use distinct landscaping to link signage, pedestrian access points, parking areas and the building to distinguish the site
- Place tree islands at the beginning and end of a parking row, as well as at consistent intervals along the row. Encourage parking lot lights to be placed in these islands as discussed in this manual
- Use tree islands to creatively meet the needs of the site, including cart corrals and internal sidewalk buffers

Building Design

Intent: Encourage building design that is consistent with the Regional Business Future Land Use Designation from the 2005 Comprehensive Plan and the desired commercial landscape of the HCR area.

Related Goals and Objectives: Goal 13.0; Objective 13.4
Goal 24.0; Objective 24.2

Related Future Land Use Designations: Community Business
Regional Business

Desired Design Standards: Ranging from a multitude of design considerations, the most important of which are outlined below:

- Articulated Design: Encourage building design that looks “complex and engaging” rather than a flat, one-color brick wall. Use architectural distinctions between different parts of the building (i.e. garden center, automotive, grocery, etc.)
- Multiple Entrances: Encourage multiple, distinct entrances to different parts of the building. Ensure the parking lot and internal sidewalk circulation takes these entrances into consideration, as outlined in other parts of this manual
- Façade Materials: Use materials that are consistent with the recommendations of this manual, such as brick.
- Windows/Openings: Encourage the use of windows or faux openings to avoid blank, uninterrupted walls
- Signage: Use the building to frame any wall signs to naturally draw attention rather than extensive lighting
- Convertibility: Encourage building design that can be converted to easily meet changing market demands

Articulated Transit Nodes

Intent: Provide visible examples of alternative transportation to encourage its use.

Related Goals and Objectives: Goal 41.0; Objectives 41.2, 41.3
Goal 47.0; Objectives 47.4, 47.5
Goal 49.0; Objective 49.1

Related Future Land Use Designations: Community Business
Regional Business
Mixed Residential (Suburban and Urban)

Desired Design Standard: Provide articulated transit nodes, either in the form of a shelter, bench or designated area that clearly defines a connection point to bus service. Any node should be incorporated into the pedestrian and automobile right-of-way.

- Coordinate with the Champaign-Urbana Mass Transit District to determine appropriate bus stops and sheltering requirements
- Use landscaping or other means to clearly link transit nodes to adjacent commercial properties
- Use a design architecturally consistent with the building on which the bus shelter is located.

Shared Parking/Minimized Parking

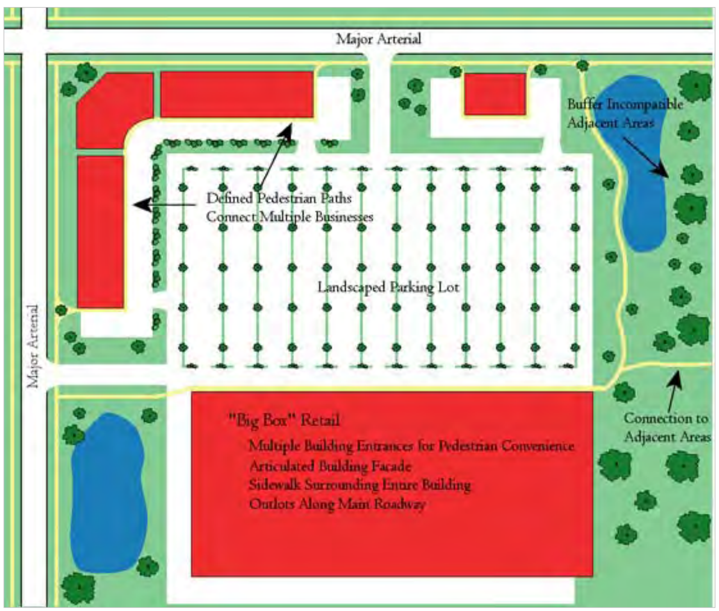
Intent: Minimize the visual impact and land consumption of excessive parking provision by addressing parking needs for the entire site, not individual buildings.

Related Goals and Objectives: Goal 24.0; Objective 24.2

Related Future Land Use Designations: Community Business
Regional Business

Desired Design Standard: Parking provision should be minimized and take advantage of different operating hours and parking demand of multiple businesses (i.e. restaurants and retail stores have different "peak" business hours and parking needs). In tandem with landscaping requirements, the placement of parking lots should help to mitigate negative visual impacts.

- Overflow parking is defined as any parking provided in excess of the requirements of the zoning ordinance, or 20 percent of the required parking, whichever is higher.
- Place overflow parking on the side or rear of the building.
- Overflow parking for outlot buildings should be considered part of the primary business' overflow parking lot
- Outlot buildings surrounded by parking are strongly discouraged



Lighting

Intent: Encourage lighting design and placement that reduces excessive lighting and minimizes negative impacts on nearby residential areas.

Related Goals and Objectives: Goal 17.0; Objective 17.2
Goal 24.0; Objective 24.2

Related Maps: Community Business
Regional Business
Mixed Residential (Suburban and Urban)

Desired Design Standard: Lighting should be addressed in two realms, parking lot and building/sign. Parking lot lighting should be placed in tandem with other elements from this manual (i.e. landscaping in parking lots). Lighting for buildings and signs should be targeted to only illuminate the target area.

- Parking lot lights should be placed in landscaped tree islands, and only in the general parking lot as safety dictates
- Use parking lot lights that are a consistent height
- Lights should be dimmed/turned off after business hours or past 10pm for "24-hour" stores
- Building lights should be directed away from adjacent residential properties or adequately screened by landscaping or a fence.