McHenry County Subregional Bicycle Plan

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Prepared for the Chicago Area Transportation Study and the McHenry County Council of Mayors

June 1996

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JUNE 1996

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MCHENRY COUNTY SUBREGIONAL BICYCLE PLAN

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INTRODUCTION

The Intermodal Surface Transportation Efficiency Act of 1991 (ISTEA) focuses considerable attention on enhancing non-motorized travel (bicycle and pedestrian) as a way of meeting transportation related congestion, air quality, infrastructure, and qualify of life challenges. ISTEA requires states and Metropolitan Planning Organizations (MPO's) to consider bicycle and pedestrian projects and programs in the development of long range transportation plans and of Transportation Improvement Programs (TIP's).

ISTEA also includes several funding provisions which could potentially be used to finance the planning, engineering, and construction of bicycle and pedestrian facilities.

As the MPO for the Chicago metropolitan area, the Chicago Area Transportation Study (CATS) must implement these bicycle and pedestrian planning requirements. CATS and the Illinois Department of Transportation (IDOT) allocated federal transportation planning funds to perform subregional bicycle planning to generate recommendations for the 2020 Regional Transportation Plan. Each of the eleven subregional Councils of Mayors, that include all of the municipalities in the six-county region outside the City of Chicago, received funding.

The McHenry County Council of Mayors is one of the eleven subregional Councils of Mayors in northeastern Illinois. The McHenry County Council is composed of the mayor/president (or his/her representative) of every municipality located wholly or partially in McHenry County. Island Lake and Fox Lake which opted to participate on the Lake County Council of Mayors are excluded. The County Engineer (or his representative) is also a voting member. Staff assistance is provided to the Council of Mayors by the McHenry County Highway Department through a contract with the IDOT.

McHenry County Council of Mayors Participants

CHICAGO AREA TRANSPORTATION STUDY
300 West Adams Street • Chicago Illinois 60606

McHENRY COUNTY COUNCIL OF MAYORS

ALGONQUIN
BARNARD MILL
BARRINGTON HILLS
BULL VALLEY
CARY
CRYSTAL LAKE
FOX RIVER GROVE
FOX RIVER VALLEY GARDENS
GREENWOOD
HARVARD
HEBRON
HOLIDAY HILLS
HUNTLEY
JOHNSBURG
LAKE IN THE HILLS
LAKEMOOR
LAKEWOOD
MARENGO
McCULLOM LAKE
McHENRY
OAKWOOD HILLS
PRAIRIE GROVE
RICHMOND
RINGWOOD
SPRING GROVE
UNION
WONDER LAKE
WOODSTOCK
McHENRY COUNTY

Each subregional Council of Mayors has selected the planning approach which best fits its needs. The McHenry County Council's Bicycle Plan was prepared by staff with assistance from a Bicycle Planning Advisory Committee. The Advisory Committee was made up of representatives from the Council of Mayors, park districts, the McHenry County Conservation District, the McHenry County Bicycle Club, the Chicagoland Bicycle Federation members residing in McHenry County and bicyclists involved in education and environmental activism. An effort was made to include advisory committee members who commute to work by bicycle. Advisory Committee members are listed in Appendix A.

The McHenry County Bicycle Plan is intended to be endorsed by the McHenry County Council of Mayors as a whole. It is intended that member municipalities will adopt the Bicycle Plan Implementation Policies (found on page 14), consult the accompanying map of specific projects and programs and implement those that best promote bicycle safety and increase bicycle utilization in their respective communities.

Critical to plan implementation is the establishment of an ongoing bicycle planning advisory committee and assignment of staff assistance. Together they would develop a long term educational effort to promote bicycle programs, projects, rights, and responsibilities.

Bicycle plan recommendations will be forwarded to all agencies and organizations which might potentially implement recommendations (i.e. townships, park districts, IDOT, IDNR, etc.). The Bicycle Plan Policies will be forwarded to CATS and NIPC for inclusion in the bicycle component of the 2020 RTP. In addition, a list of suggested projects will be forwarded as an illustrative list of bicycle facility and program needs.

Individual projects have not been endorsed by the McHenry County Council of Mayors and should not be shown on regional plans. The McHenry County Bicycle Plan is intended to identify and recommend potential projects and programs which will increase bicycle utilization. It is important that project implementors follow the design guidelines published by the Illinois Department of Transportation and the American Association of State Highway and Transportation Officials.

EXISTING CONDITIONS

The primary purpose of the McHenry County Bicycle Plan is to present recommendations which will enhance and encourage utilization of bicycles for commuting and other utilitarian trips. While the focus of the plan is not on recreational bicycle travel, recreational bicyclists will also benefit from the recommended policies, projects, and programs.

BENEFITS OF BICYCLE PLANNING

Bicycling has the potential to improve air quality and traffic congestion by replacing automobile trips. As the county grows, it will become more difficult to provide additional road capacity for the increasing number of vehicles. Bicycling has the potential to offset some of this growth.

Improving bicycling safety and opportunities for commuting and utilitarian trips provides benefits to the entire community. Parents will prefer their children being able to safely bicycle to school, the library, or the park. Adults like the opportunity to use a bicycle for exercise, a quick trip to the convenience store, or to visit friends. Families can ride together for fitness and recreation. Even those people who do not ride bicycles appreciate the qualities of a neighborhood that is calm and secure enough for people to safely bicycle.

Moraine Hills State Park, Red Loop Trail.

The National Bicycling and Walking Study documents many benefits of increased bicycling at the national level. Case Study No. 15 details environmental benefits like emissions reductions, fuel savings, and displacement of vehicle miles traveled. Local estimates of environmental benefits are not currently available.

Bicycle facilities, especially longer, recreational off-road trails, can have an economic benefit. Bicycle riders carry few supplies with them, thus they must purchase food and other necessities as they go.

BICYCLE TRAVEL DATA

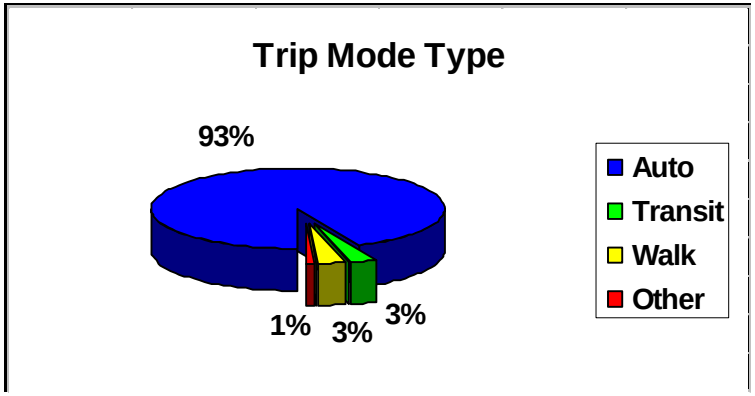
Very little statistical data has been collected about bicycle travel in northeastern Illinois. The surveys that have been conducted concentrated on the recreational use of bicycle trails and paths.

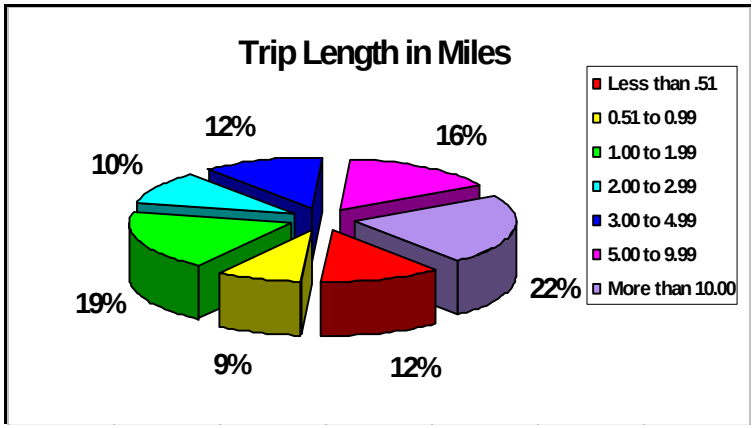
The CATS Household Travel Survey of McHenry County, which was conducted on May 18, 1989, asked a random sample of county residents about the mode of transportation for each trip made on the survey day by each member of the household fourteen years of age and over. Trips made by bicycle were included in the category "other" which totaled less than 1% of all trips in the county.

The survey found there is an average of 1.82 bicycles per household. This compares favorably to the average number of automobiles per household which was 1.64. This figure does not include the 0.55 vans, pickup trucks, and motorcycles per household used for personal business and commuting.

The CATS Household Travel Survey also found that approximately 12% of all trips are less than 0.5 miles in length, 40% are less than 2 miles in length, and 62% are less than 5 miles in length. Various studies have concluded that bicyclists are willing to travel up to about five miles (one way) for a non-recreational trip, with 2.5 miles being the preferred length. It should be noted that the CATS Household Travel Survey counts each trip in a chain of trips separately.

According to the National Bicycling and Walking Study, 40% of all bicyclists are under 16 years of age. The median age of new bicycle buyers is 36; the median age of bicyclists who ride to shopping destinations is 29. The majority of adult bicyclists are males.





Source: CATS Household Travel Survey, Volume 2 (McHenry County), March 1990

EXISTING BICYCLE FACILITY PLANNING EFFORTS

The McHenry County Land Use Plan does not specifically address bicycling, but it does include a transportation objective which calls for "the provision of multi-use trails adjacent to transportation corridors where appropriate and practical". It also includes an environmental objective which calls for the preservation of environmentally sensitive corridors to link trails and open space.

Municipal plans deal with bicycle facilities in different ways. Most references to planned bicycle facilities are found in "parks, recreation and open space" sections; some plans also recognize the transportation function of bicycle facilities. Most plans show a recommended bicycle trail network, though when surveyed, several of these same municipalities indicated they had no officially adopted bicycle trail or route plan.

Woodscreek Park, Crystal Lake.

Over the past few years, the construction of bicycle facilities has been required in some new developments. This results in trail segments that currently terminate at the end of a subdivision, but which will eventually be part of an overall planned network.

In 1987, the McHenry County Conservation District began working on a linear trail system with the opening of the Prairie Trail North, a recreational, multi-use trail extending from Ringwood to Richmond. The Prairie Trail South, from Crystal Lake to the Kane County line opened in 1988. This segment serves both recreational and utilitarian functions. The Prairie Trail South was constructed on abandoned C&NW right of way, while the Prairie Trail North is on right-of-way owned by Metra.

Prairie Trail South, Algonquin.

In 1991, the McHenry County Conservation District and the McHenry County Board adopted the McHenry County Trail Plan. Though its primary purpose is recreational, the trail connections between municipalities will provide safe and efficient facilities for commuter bicyclists and especially those willing to travel longer than average distances.

In 1995, the McHenry County 2010 Transportation Plan was adopted by the County Board. This plan includes a recommended bikeway design element for certain routes in the urban part of the county providing inter-community connections not made by the McHenry County Trail Plan.

THE INVENTORIES

The bicycle planning project included three inventories. First, each municipality in the county was surveyed to obtain the locations of existing and planned bicycle facilities. Similar efforts were undertaken by the other ten subregional Councils of Mayors. The results were forwarded to the Northeastern Illinois Planning Commission (NIPC) which entered the information in their geographic information system to produce a composite of all existing and planned bicycle trails and routes in the Chicago region.

The second inventory, a "Priority Travel Zone" analysis, is a sampling of possible routes linking 30 residential origins to 10 potential destinations. This was also part of a regional effort intended to identify overall bicycle facility needs and deficiencies.

Information about traffic volumes, truck volumes, lane width, paved shoulders, traffic signals, route length and directness, speed, hazards, and bike parking was collected and forwarded to the Chicagoland Bicycle Federation (CBF). The CBF tabulated and summarized the results which can be found at Appendix B.

The third inventory is a compilation of destinations to which a person could bicycle instead of drive, assuming adequate streets or off road facilities were available. The Bicycle Planning Advisory Committee suggested the following destinations:

- schools
- parks and other public open space
- beaches and pools
- fitness centers
- post offices
- municipal buildings
- libraries
- commuter rail stations
- business parks
- industrial parks
- hospitals
- other businesses with 100 or more employees
- commercial centers

Actual destinations were then identified and mapped. The list of destinations is included in Appendix C.

EDUCATIONAL PROGRAMS

Existing bicycling education programs are usually presented by local police departments. They focus on providing preteen school children with basic safety information. Programs emphasize rules of the road and safety equipment (helmets), but do not emphasize fitness, bicycle handling skills, hazard identification and reaction or economic and transportation benefits.

Local bicycle shops frequently offer basic bicycle maintenance workshops through local park district and park department programs or McHenry County College adult education courses. The McHenry County Bicycle Club membership includes a qualified instructor trained to teach a time intensive course called “Effective Cycling”, which would be of interest to those who are already committed to bicycling. Harvard High School teaches a bicycling unit as part of a physical education program that emphasizes lifesports. A summary of the course cirriculum is attached at Appendix D.

ANALYSIS OF EXISTING CONDITIONS

The utilization of bicycles for non-recreational trips is currently very low in McHenry County but there appears to be enormous potential to increase bicycle usage if safe and efficient facilities are available. The inventory of potential destinations identified hundreds of locations often clustered together throughout the county. Unfortunately, access to many of these locations is gained only by using the arterial street system. Shopping centers in particular pose daunting problems. They are

typically located along arterials, surrounded by a sea of parking lots with motorists making unpredictable movements as they jockey for parking spaces. The bicyclist who successfully navigates traffic may then find there is no safe and secure place to park his or her bicycle.

The majority of bicycle racks, regardless of the type of destination, are traditional “school yard” racks which rest unsecured on a parking lot surface or sidewalk. If used correctly, these racks do not support a bicycle frame nor allow the frame to be locked to the rack. Because they are not mounted to anything, the racks are an easy target for vandals. Bicycle racks can be found at Metra Stations in Fox River Grove, Cary, Crystal Lake, Woodstock and Harvard. However, none of these racks provides much security for bicycles which are often left unattended for eight or more hours a day.

Metra Station, Crystal Lake.

There are currently no provisions for carrying bicycles on trains or buses. Bicyclists can ride to a train station or bus stop, but they cannot complete their commute by cycling to their destination after departing from the train or bus.

Most employers do not provide facilities or incentives to encourage bicycling. Shower facilities, parking, guaranteed ride home programs, etc. remove many of the obstacles facing commuters who potentially might ride to work.

The Priority Travel Zone inventory found that the most direct routes from residential locations to other destinations are often unsuitable for even experienced cyclists. The inventory of 30 routes found hazardous conditions including no paved shoulders, railroad grade crossings and “tire eating” drainage grates.

Church Street Railway Crossing Adjacent to Metra Station, Woodstock.

High volume collectors and arterials typically provided insufficient width to accommodate both bicycles and other vehicles in the same lane. Most traffic signals have no provisions for bicyclists. The extensive development activity and gravel mining in eastern McHenry County results in increased truck traffic on collectors and arterials.

The most direct routes between residential areas and potential destinations is often the arterial road system because there frequently is no internal street or trail connection between adjacent subdivisions or between residential and non-residential areas. Even attempts to route trips on the Prairie Trail South in Crystal Lake results in trips along Main Street for at least part of the distance because the active railroad line acts as a barrier to the developments to the east.

Prairie Trail South, Main Street, Crystal Lake.

Municipalities have recognized the benefits of bicycle trails from a recreational standpoint and have planned routes linking residential areas to parks and schools. Some plans have provided further linkages to other activity centers.

Implementation is occurring as part of the development approval process when municipalities require construction of bicycle facilities. Provisions generally have not been made for construction of bicycle facilities in already developed areas.

BICYCLISTS

Bicycle facility planning must take all types of riders into account.

Experienced riders account for less than 5% of all bicycle riders. These riders are able to operate under most traffic conditions. They comprise the majority of the current riders using collector and arterial streets and are best served by:

- direct access to destinations which is usually provided via the existing local street and highway system;
- the opportunity to operate at maximum speed with minimum delays;
- sufficient operating space on the roadway or shoulder to reduce the need for either the bicyclist or the motor vehicle operator to change position when passing.

Casual bicyclists are less confident of their ability to operate in traffic without special provisions for bicycles. Some will develop greater skills and progress to the advanced level, but the majority of adult riders will always be casual bicyclists. Casual riders prefer:

- comfortable access to destinations, preferably by a direct route; either low speed, low traffic-volume streets or designated bicycle facilities;
- well-defined separation of bicycles and motor vehicles on arterial and collector streets (bike lanes or shoulders) or separate bike paths.

Children's use is initially monitored by parents; eventually they are accorded independent access to the system. Children and their parents prefer the following:

- access to key destinations surrounding residential areas including schools, recreation facilities, shopping, or other residential areas.
- residential streets with low motor vehicle speed limits and volumes.
- well defined separation of bicycles and motor vehicles on arterial and collector streets, or separate bike paths.

Casual bicyclists and children often do not mix well with experienced riders and other users (i.e., hikers, skaters) on off road trails because of the differences in speed and bicycle handling skills.

-

Prairie Trail South, Lake in the Hills.

MOTIVATIONAL FACTORS

Numerous studies (though none locally) have examined reasons why more people, including experienced recreational bicyclists, do not use the bicycle as a regular means of transportation. The data consistently point to the same concerns: traffic safety, weather, road conditions, time, distance, convenience, lack of facilities at the destination and predisposition.

According to the National Bicycling and Walking Study, Case No. 4, the following factors stand out as the primary motivating tendencies for bicycle commuting:

- Bicycle commuters are motivated by directness and convenience. They will use a combination of streets and separated paths to create the most direct, timesaving routes.

- Most commuters choose to bicycle for exercise, enjoyment, and environmental concerns, instead of for economic reasons.

- Bicycle commuters tend to be under age 45, and have either lower incomes or higher levels of education and income.

- The average bicycle commute distance in the U.S. is about 2 miles, and the practical maximum distance is up to 5 miles.

- Bicycle commuters are generally experienced riders who have confidence in their ability to ride in traffic; they don't choose an off street path unless it saves time.

- Inexperienced riders tend to be intimidated by motor vehicle traffic especially at intersections, and often choose striped bicycle lanes, sidewalks, or off street paths.

- Off street paths, often preferred by inexperienced bicyclists, are safer than on-street routes only if they are completely separated from automobile traffic, with no cross streets or driveways.

- Difficult topography and weather are factors that can influence ridership, but generally do not permanently discourage serious, experienced commuters.

The study concluded that strategies to remove impediments to bicycling should be based on accommodating bicyclists preferences and tendencies as much as possible. A commuter-oriented bicycle system should consist of a comprehensive system of bicycle facilities offering convenient geographic coverage.

GOALS AND OBJECTIVES

The overall goal of the McHenry County Bicycle Plan is to provide a coordinated approach to increasing the utilization of bicycles for commuting and other utilitarian trips.

Specific goals and strategies are listed below. No priority ranking is implied by their order of listing.

1. Develop a countywide coordinated network of bicycle facilities through a combination of regional, subregional, and local actions by:

- utilizing existing and officially planned bicycle facilities as the framework for additional bicycle facilities planning;
- providing access to land uses which have a high potential for being bicycle trip destinations;
- accommodating bicycles on existing facilities, including bridges and underpasses;
- incorporating bicycle considerations into the development approval and site design process.

2. Make communities more bicycle friendly by:

- improving existing roads to better accommodate bicycles;
- educating both bicyclists and motorists on rights and responsibilities in sharing the road;
- providing connections and/or shortcuts between neighborhoods;
- making destinations along arterials accessible to bicyclists;
- promoting public awareness of bicycling benefits;
- encouraging employers to provide amenities such as secure bicycle parking or showers at destinations where the work force could logically commute by bicycle;
- maintaining facilities used by cyclists;
- connecting destinations across man-made or natural barriers.

3. Integrate bicycle facilities planning with other planning efforts including transportation, land use, environmental and recreational by:

- adopting ordinances requiring the provision of bicycle facilities;
- including bicycle facility recommendations in local comprehensive plans.

4. Encourage safe and lawful operation of bicycles by:

- removing hazards;
- providing traffic control devices which can be easily and efficiently utilized by bicyclists;
- educating motorists and bicyclists to share the road;
- designing roadways that can safely accommodate bicycles;
- providing alternative routes or off road paths in areas where bicycles and motor vehicles cannot safely share the road due to traffic volumes, speeds, truck volumes, steep grades, sight distance, etc.
- following national design standards for designated bicycle facilities.

5. Develop a plan which is financially feasible and has a likelihood of being implemented by:

- encouraging or requiring private sector initiatives;
- including construction of bicycle facilities in conjunction with other transportation projects;
- identifying projects which would be eligible for federal or state funding;
- inviting citizen involvement in local bicycle planning processes.

PLAN IMPLEMENTATION

Successful implementation of the following policies will require an ongoing effort to incorporate bicycle considerations into the day to day decision making of local government agencies. To accomplish this, a bicycle plan implementation advisory committee should be established and staff assistance should be assigned.

ESTABLISH PLAN IMPLEMENTATION ADVISORY COMMITTEE!

The advisory committee would be charged with recommending a long term educational strategy which should include:

- development of a bicycling curriculum which could be taught as part of a physical education lifesports class;
- development of a bicycle rider rights and responsibilities program which could be taught in drivers education classes;
- adult education programs addressing hazard identification, bicycle and bicycle equipment selection, clothing, commuting, etc.
- bicycle to work promotions;
- bicycle awareness programs.

The bicycle plan implementation advisory committee would help local agencies identify priorities and opportunities to coordinate bicycle facilities with other construction projects. This advisory committee should include a combination of bicycle facility users and providers and should include education and law enforcement representation.

BICYCLE PLANNING IMPLEMENTATION POLICIES

Bicycles will be ridden on virtually any road where they are permitted. Existing highways, often with relatively inexpensive improvements will be the framework for bicycle planning in McHenry County. In addition, the McHenry County Conservation Districts Trail Plan provides an excellent framework for inter-community trips. Planning to increase bicycle utilization will require a variety of things from the very simple to the very complex.

The McHenry County Council of Mayors endorses the following policies and recommends that individual member municipalities adopt and implement municipal bicycle plans in accordance with these policies.

1. The top bicycle planning priority is the elimination of hazards to bicycle travel on existing roads and trails.

Municipalities and other highway and trail agencies should inventory hazards and eliminate those that can be eliminated. Hazards which cannot be completely eliminated should be minimized. Examples of hazards to bicyclists include drainage inlets with grates which can catch a bicycle wheel, low railings on bridges, utility covers which are not flush with the pavement, longitudinal cracks or gaps of 1/2" or more (often found where concrete curb and gutter meet the edge of pavement or between two concrete slabs) and railroad tracks that cross roads at sharp angles. Trail hazards include things such as bridge railings, pavement failures (such as those due to growth of tree routes or inadequate drainage), inadequate sight distance and hazardous objects adjacent to the trail.

Hazardous Grates

2. Local bicycle planning should include the provision of new facilities and improvements to existing facilities which will make bicycling safer and more convenient. Such improvements would eliminate barriers to bicycling, provide access to major trip generators (i.e. schools, commercial strips and employment centers), reduce travel time and distance and legitimize the presence of bicycles on the street system.

Improvements which make bicycling safer on the existing street system include paved shoulders, wide curb lanes, or striped and signed bicycle lanes. New facilities which make bicycling faster and more convenient include underpass, overpass or bridge facilities and the construction of strategic short connections which eliminates the need to take a longer, more circuitous routes between major trip generators.

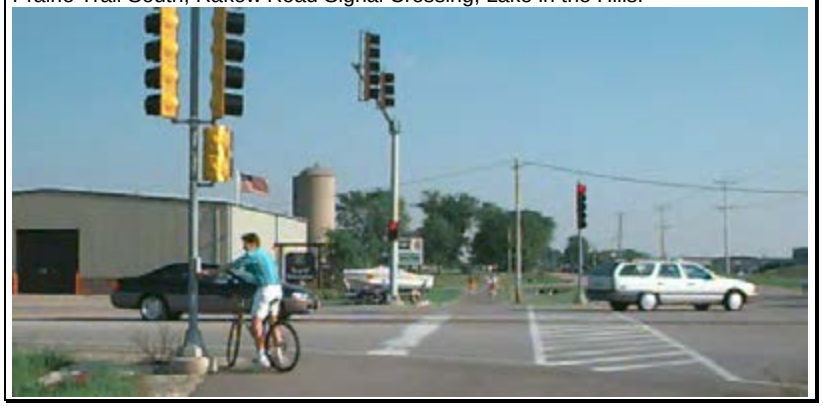
River Road Underpass, McHenry Dam State Park, Yellow Loop Trail.

In addition, the construction of an off road path may be appropriate where traffic, sight distance, curb cuts or other conditions make any type of on-street facilities too hazardous for even the experienced bicyclist. Signing of bicycle paths and routes alerts motorists to the presence of bicyclists, informs motorists that bicyclists do belong on that particular facility and encourages bicyclists to follow a designated route where they can more safely be accommodated. Bicycle parking should be more conveniently located than auto parking.

3. Improvements should be made, particularly at intersections, which will encourage bicyclists to obey traffic control devices.

Improvements such as the bicycle activated traffic signal detector loops will allow bicyclists to obey traffic signals. Pedestrian buttons are usually sufficient on bicycle paths when they are placed where a rider does not have to get off his or her bicycle.

Prairie Trail South, Rakow Road Signal Crossing, Lake in the Hills.



Signal timing should also be adequate for a bicyclist to cross the street. On-street routes (whether or not they are officially designated) should be located on streets with a minimum number of stop signs. Frequent stops and starts make bicycling less efficient and more strenuous, causing bicyclists to either disobey stop signs or find alternate streets with less stops.

4. Bicycle improvements should be considered whenever transportation improvements are designed.

The extent of bicycle improvements which should be considered will depend on expected bicycle utilization, traffic volumes, truck volumes, speeds, etc. Bicycle improvements to low volume residential streets will probably only require the removal of hazards. Resurfacing of a sufficiently wide collector street could include striping of bicycle lanes or striping to allow a paved shoulder.

Oak Spring Road, Libertyville, Lake County.

A collector street that is used as a link between bicycle paths will probably require more significant improvements including removal or reconfiguration of parking, striping, signage, improvement of traffic signals, etc. Arterial improvements could include wide paved shoulders, traffic signal improvements or even off-street parallel bicycle paths.

5. Bicycle paths serving major destinations, shared by both commuting and recreational riders, completely separated from traffic and located along creeks, transit right of way or abandoned rail corridors should be considered whenever possible.

It is recognized that these off-road paths are expensive to provide and maintain. However, less experienced bicyclists will often benefit from these resources by first gaining the confidence and experience they need to ride in traffic on the safer off-road paths.

Adjacent to River Road, Moraine Hills State Park, Red Loop Trail.

To accommodate and encourage utilization by all types of bicyclists, a bike path must be located and designed in such a way that it is safer and more efficient for bicycle travel than the adjacent roadways.

6. Municipalities should revise comprehensive plans, subdivision and P.U.D. ordinances, transportation plans, site plan review requirements, parks and recreation planning, etc. to facilitate bicycling.

Incorporating bicycle provisions into various plans and processes will ensure that recreational and non-recreational aspects of bicycle facilities are considered. It is much easier and more cost effective to include bicycle facilities at the time of new development or when new transportation or open space projects are undertaken than it is to try to come back later and retrofit these facilities.

New developments should be designed to be bicycle friendly, with bicycle access to neighborhood parks, schools, shopping, and nearby bicycle routes and paths. Site plans should be reviewed to ensure bicycle access and parking. Zoning ordinances should be amended to address bicycle parking, site design, and bicycle access requirements.

In the long term, municipalities should consider higher densities and more mixed use developments which encourage more bicycle and pedestrian trips.

7. Bicycle facilities and improvements must be designed in accordance with standard guidelines.

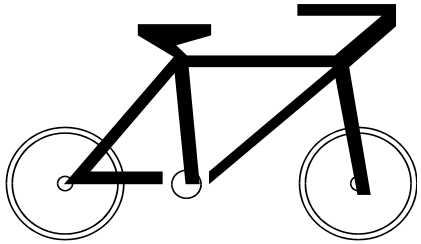
The American Association of State Highway and Transportation Officials (AASHTO) Guide for the Development of Bicycle Facilities is the recognized standard reference for the design of bicycle facilities. Further guidance is provided in the FHWA's Selecting Roadway Design Treatments to Accommodate Bicycles. The Illinois Department of Transportation has based its Policies and Procedures for Accommodating Bicycle Travel in Highway Improvements on these documents.

AASHTO has conducted extensive research of bicycle safe engineering design. The AASHTO guidelines have been accepted by the courts as the standards for engineering bicycle facilities. AASHTO guidelines set out the minimum standards to which facilities should be designed. Local agencies should attempt to exceed those standards when circumstances require. For example, heavily used multi-use trails may need to be wider than the minimum standard to safely accommodate all users. Paved shoulders may need to wider if truck volumes are high.

Chapter IX of the Manual on Uniform Traffic Control Devices (MUTCD) lists the requirements for bicycle traffic control devices. This manual is the official manual, approved by FHWA, for all types of traffic control devices.

AASHTO "Guide for the Development of Bicycle Facilities" Cover.

Guide for the Development of Bicycle Facilities



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Prepared by the
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on Geometric Design

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8. Equitable enforcement of bicycle rights and responsibilities combined with good facilities, encouragement and education will help make bicycling safer and more pleasurable.

Lawmakers and police should be convinced to take bicycling seriously. Police officers need to make both bicyclists and motorists aware of the rights and responsibilities involved in sharing the road.

"Share the Road" Typical Sign Detail.

A policy of training program attendance in lieu of fines or the use of bicycle offense fines to pay for training programs could be instituted for bicyclists and motorists.

9. Motivational and educational programs need to be an ongoing long term effort to increase bicycling.

A person's perception about bicycling and bicycling safety is a major factor in their decision to utilize a bicycle for utilitarian trips. Any change in perception will require time and strong cooperation from motorists, public transportation agencies, schools, local government, business and industry.

Motivational programs include employer offered stipends or employer provided bicycles, bicycle maintenance and supporting facilities to make bicycling possible (showers or convenient and secure parking). Employers could encourage bicycle commuting by offering relaxed dress codes, flex time to take advantage of daylight hours, employee awards or other special events.

Williams Street, Crystal Lake.

Community-wide educational programs could be sponsored through municipal recreation departments, park districts, police departments, or the McHenry County College. Municipalities should publicize the location and extent of community bicycle routes and paths and generally promote the use of the roadway network by bicycle riders.

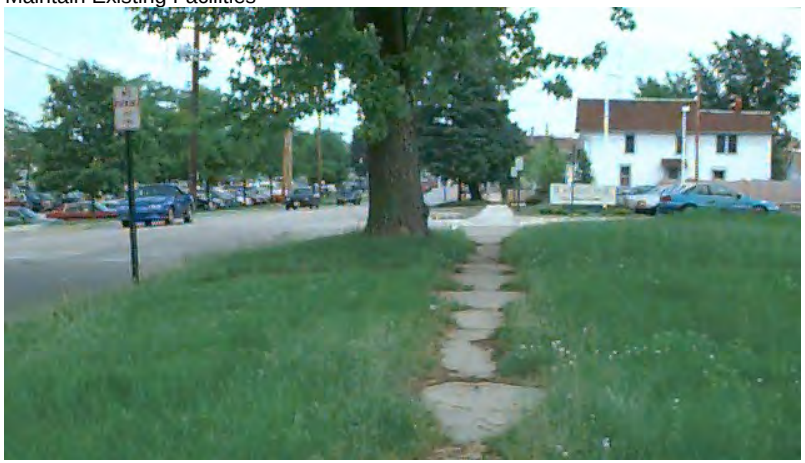
Signing bicycle routes not only calls motorists attention to the presence of bicycles but is a major factor in legitimizing the presence of bicycles on the street network.

Finally, bicycling organizations should take an active role in encouraging responsible bicycling by example and by promotional activities. Clubs can offer rides which pair a novice rider with an experienced rider.

10. Ongoing monitoring and maintenance of bicycle facilities and roads used by bicyclists is important to encouraging utilization of these facilities.

Neglected maintenance will render bicycle facilities unridable. Bike lanes and wide curb lanes are susceptible to having debris such as sand, gravel, or glass accumulate in the area where bicyclists must ride; therefore regular sweeping may be necessary. Pavement edges must be monitored to prevent sharp drop-offs. Off road bicycle paths must also be monitored and maintained with attention given to clearing vegetation and debris, maintaining warning signs, and maintaining a hazard free surface.

Maintain Existing Facilities



11. Municipalities and other local agencies should understand what constitutes negligence and under what circumstances they may be held legally liable for damages or injuries suffered by cyclists. The location, design and maintenance of bicycle facilities is critical to safe usage. Municipalities (and other local agencies) can be held liable for bicyclist injuries whether or not bikeways are provided, especially if they have shown deliberate indifference.

The liability situation for bicyclists on the highway is the same as for other highway users. Bicyclists clearly have a right to use the highways, and the highway agency owes them the same duty of care. The standard of conduct required to meet that duty needs to recognize that bicycles are more susceptible than other highway users to some hazards and that greater care may be required at some locations because the presence of bicycle traffic there is predictable.

Studies have concluded that designation of bikeways will not affect the governmental entity's potential liability because the liability exists with respect to bicyclists on the highways. Unsafe facilities, poor maintenance and failure to eliminate hazardous conditions can contribute to a municipalities potential liability. Accepting responsibility for developing facilities in compliance with applicable laws and guidelines, and improved operation and maintenance of bikeways will benefit the agency by greatly reducing the risk of liability.

Municipalities and other agencies should take the following actions:

- Consider common accident problems and developing counter measures;
- Involve transportation professionals who can determine design considerations such as surface, grades, curvature, sight distance, and traffic control devices;
- Use current guidelines and good judgment (AASHTO, IDOT, MUTCD);
- Keep complaint and maintenance records;
- Evaluate completed projects for accident, usage and complaint experience.

12. Bicycle funding may come from a variety of sources. Local agencies should annually identify the most important bicycle related projects and attempt to secure funding through various ISTEA funding programs (including STP funds through the Council of Mayors, Congestion Mitigation and Air Quality (CMAQ) funding through the Chicago Area Transportation Study, Transportation Enhancement funds through the Illinois Department of Transportation)**, Illinois Department of Natural Resources and private development. Municipalities should look for opportunities to cost effectively incorporate bicycle facilities into their own and other agency transportation projects. There are several bicycle improvements and programs that should be considered even when funding is tight (especially hazard elimination, bicycle awareness, and law enforcement).**

Municipalities also must recognize that the utilization of federal (ISTEA) funds is not without problems. Engineering and land acquisition must follow IDOT procedures and can be costly and time consuming.

APPENDIX A
McHENRY COUNTY BICYCLE PLAN ADVISORY COMMITTEE

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Bicycle Commuter
McHenry County Defenders

Ted Gebeau
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APPENDIX B
PRIORITY TRAVEL ZONE ANALYSIS

Priority Travel Zone Analysis
Regional Needs Assessment

This report was prepared for the Northeastern Illinois Planning Commission by the Chicagoland Bicycle federation. The contents of this report reflect the views of the author who is responsible for the facts and the accuracy of the data presented herein. The contents do not necessarily reflect the views or policies of the Northeastern Illinois Planning Commission. This report does not constitute a standard, specification, or regulation.

I. INTRODUCTION

For the first time ever, the regional long range plan has committed to including a bicycle and pedestrian facilities component. The first step in preparing this component was to conduct an inventory of the transportation system's current needs and conditions for bicyclists and pedestrians.

A two-tiered inventory approach was used to examine bicycling's full potential as a transportation option. The "Designated Facilities" part of the inventory produced a map and GIS database of existing and planned bike paths, multi-use trails, on-road striped bike lanes, and signed on-road bike routes. The "Priority Travel Zone" (PTZ) section of the inventory compiled data on roadway conditions for a sample of bicycle trips connecting residential neighborhoods with a variety of employment, shopping, school, and recreation destinations throughout the region. This report describes the results of the PTZs section of the inventory.

II. OVERVIEW

The PTZ Inventory is being undertaken to identify typical impediments to bicycling in Northeastern Illinois. Through this process, planners are learning a great deal about the obstacles faced by bicyclists, and sometimes by pedestrians, in selected areas.

Destinations, origins, and routes were selected to achieve a good cross-section of cycling conditions in the region. Some routes were chosen because they serve a major activity center, others are focused on a transit station or town center, and others were chosen to achieve a healthy geographical mix. The point is not to look at specific spots where bikeways might be needed, but to examine a set of representative routes. The primary goal is to uncover common barriers to bicycling which could be addressed through local or regional policies.

A methodology was developed for this inventory to examine typical short trips and determine how easy or difficult it is to make those trips by bicycle. Ultimately this assessment will determine how competitive the bicycle mode is with the auto mode for a typical trip and will be used to develop policies that will improve the bicycle's competitiveness.

Many factors affect bicycle mode choice: weather, fitness, equipment, cost operator knowledge, and skill. This report will focus on three factors: convenience, traffic stress and bike parking. These factors were chosen because they are significant and because they are most likely to be directly impacted by government action.

This report includes a series of charts that summarize route data collected by each of the Councils of Mayors and the City of Chicago in he spring and summer of 1995. For each of the three factors listed above, the region's needs are examined and solutions are discussed. Additionally, policies are recommended that can improve conditions in the various sub-regions and throughout the Chicago metropolitan area.

Data was collected for 405 routes: ten from each of the eleven Councils of Mayors and 25 from the City of Chicago. The route evaluations encompassed 1,294.45 miles and 1,051 individual arterial and collector segments. A Problem Summary is found in Appendix A and the scores and terms are defined in the evaluations below.

III. REGIONAL-LEVEL CONCLUSIONS

Two primary recommendations emerge from the forthcoming evaluations.

A. Arterial Improvements

For many trips within the region, bicycle use of the arterial system is unavoidable. While most cyclists prefer the local road network or trails where available, there is often no alternative to arterials when trying to access many of the region's destinations or trying to cross certain significant barriers. Bicyclists end up using arterials for about half the distance of the trips represented in the project sample. The resulting traffic stress scores indicate that the conditions they encounter are commonly difficult and often dangerous.

These unavoidable problematic arterial segments are the primary disincentive to bicycling in northeastern Illinois. Some of the problematic arterial segments could be avoided if changes mere made to the local network to provide alternatives. Those changes are discussed below.

Unfortunately, local network improvements can not provide an alternative to most of the problematic arterial segments that provide unique access to destinations or across barriers. The only solution is to improve conditions within the arterial corridor. This does not mean that a bike way network should be constructed on top of the arterial network, but the arterial network must accommodate bicycles at key points. There are two ways to provide this accommodation.

First , implement routine consideration of the specific access needs of bicyclists in all arterial and collector project planning. The august 1, 1995 IDOT policy for accommodating bicycles in highway improvements is a good model and should be adopted at all levels of government. This policy covers bicycle accommodation on arterials scheduled for improvement.

Second, the region also needs to look at arterial problems where improvements are not scheduled. A program should be initiated to identify and improve the problematic arterial segments that have the most potential demand for bicycle access. It may not be financially feasible to retrofit identified corridors, bridges and intersections to an ideal design; however, funds used to implement changes that would minimally make bicycling possible in key places where conditions currently prohibit bicycling would be well spent. Local roads and trails currently in place already provide the majority of facilities needed to create a healthy bicycling environment. A program to provide the missing arterial links could leverage these tremendous resources to provide a bicycling network that could realistically compete for mode share.

B. Local Network Improvements

Two problems could be solved by improvement in the directness and contiguity of the local road network. First, as mentioned above, some problematic arterial segments could be avoided. Secondly bicycle trips could be shortened to make them more convenient and thus more competitive with auto trips.

Minimally bicyclists should be provided with a local network route alternative whereby distance is at least competitive with the auto trip using the arterial network. Ultimately the local network should offer cyclists a shorter trip than motorized travel where feasible.

The analysis of routes in our sample has shown that many parts of the region were designed without coordination of street networks between developments. Furthermore in many locations, local streets were designed to discourage through traffic. This has resulted in making many trips impossible or circuitous on local roads. Often it is not desirable to improve the contiguity and directness of the local road network for motorized traffic, but bicycles and pedestrians could benefit greatly if links were created.

We recommend a program to make funding easily available to communities to undertake short local links in the street network to facilitate bicycle and pedestrian travel.

In addition, arterial projects that have difficulty accommodating bicycles within the project right-of-way, should make funds available to adjacent communities for bicycle and pedestrian alternatives.

IV. CONVENIENCE EVALUATION

How long it takes to make a trip by bicycle versus how long it takes to make the same trip by car is an important factor in mode choice. For local trips in free-flowing traffic conditions, cars travel about 20 miles per hour and bicycles about 10 miles per hour. For a short trip of the same distance that's a difference of 9 minutes for a three mile trip, 6 minutes for a two mile trip, and 3 minutes for a one mile trip. Double that time for the round trip and you can see why this is a significant factor in mode choice.

A number of conditions can change the differential. Traffic congestion may hinder autos more than bicycles. If bicyclists use a different route, whether that route is longer or shorter will change the time difference. Also on a separate route, different conditions at intersections will affect trip time. The larger arterial route usually has priority at an intersection and gets a longer signal phase. When bicyclists use these roads, they enjoy the same priority as cars. On the other hand, bicyclists using smaller roads that cross larger roads will experience greater delays relative to the auto route. There are of course good reasons for routing bicycles along smaller roads, but the time impacts must be recognized.

The key data for this aspect of the inventory are the relative distance of the auto route and the bike route. Longer bike routes are less desirable. The idea is to make the bike route as short as possible, if possible even shorter than the auto route. Because the car often travels faster, anything that can be done to trim the time differential is important. Then other factors like parking and cost have a better chance of influencing the mode choice towards bicycling.

A. Convenience Measures

In order to analyze the convenience of typical bicycle trips relative to travel by auto the following subregional and regional data was collected and is presented in *Chart 1: Convenience*:

- Number of routes
- Average trip length
- Percentage of low-volume local streets used by the bike route (% Local Streets)
- Percentage of arterials and collectors used by the bike route (% Arterials/Collectors)
- Percentage of off-street bike path used by the bike route (% Off-street Bike Paths)
- Average Directness Score
- Percentage Distribution of Directness Scores

The Directness Score is a four point scale comparing the bike trip to the most convenient auto route.

1= bike route is shorter than the most direct auto route
2= bike route is about the same length as the most direct auto route
3= bike route is a little longer but not more than 25% longer than the most direct auto route
4= bike route is more than 25% longer than the most direct auto route.

B. Directness Analysis

For the most part, subregions with a well-developed regular grid of streets offered the most direct routes. Chicago and West Central both had over 80% of routes equal to the most direct auto route. North Central probably would also be in this category if it were not the rail hub of the region. Surprisingly, the utilization of arterials versus local roads or trails does not appear to affect directness scores. DuPage and to a lesser degree South/Southwest had the greatest variety of directness scores. They were among the highest percentages both for routes shorter than and more than 25 % longer than the most direct auto route. This probably indicates that the most significant factor determining directness is the specific design of the street network. In Chicago, you almost always have several options that are the same level of directness as the auto routes. In more densely developed suburban areas where you have an irregular street pattern it is more hit or miss. Sometimes the local roads take you directly where you want to go, maybe even more direct than the arterials. In other cases local roads can be very meandering.

Since bicyclists are likely to be traveling slower than autos, the idea that bicyclists will be traveling further on over 20% of trips makes it even more difficult for the bicycle to compete for mode share. Cut-through projects which connect segments of the local road system to make it contiguous for bicyclists could mitigate this disadvantage.

V. TRAFFIC STRESS EVALUATION

How secure a rider fells on a route is a major factor that will influence mode choice. Bicycle trips will not be made if they involve too much stress and risk.

A. Traffic Stress Scores

Traffic Stress Scores are taken from the Bicycle Stress Level Measures developed by Alex Sorton, P.E. of the Northwestern University Traffic Institute. A complete explanation of these measures can be found in his paper, "Urban and Suburban Bicycle Compatibility Street Evaluation Using Bicycle Stress Level" (Sorton and Walsh. January 1994). Sorton defines the following one to five scale for bicycling stress levels:

STRESS LEVEL	INTERPRETATION
1. Very Low	Street reasonably safe for all types of bicyclists
2. Low	Street can accommodate experienced and casual bicyclists and/or may need altering or have compensating factors to fit youth bicyclists
3. Moderate	Street can accommodate experienced bicyclists, may need altering and/or contain compensating factors to accommodate casual bicyclists, not recommended for youth bicyclists
4. High	Street may need altering and/or compensating factors to accommodate experienced bicyclists, not recommended for casual or youth bicyclists
5. Very High	Street may not be suitable for bicycle use

The analysis uses these three primary factors to determine stress scores for the overall route, each segment, and individual segment characteristics: peak hour curb lane volume, curb lane width, and speed.

Road segment characteristic stress scores are defined as follows:

- *Peak Hour Curb Lane Volume Stress Score*

Score	Peak Hour Curb Lane Volume	
1	≤	50
2	51	-183
3	184	-316
4	317	-449
5	≥	450

- *Curb Lane Width Stress Score*

Score	Curb Lane Width	
1	≥	15 feet
2	14.9	-13.7 feet
3	13.6	-12.4 feet
4	12.3	-11.1 feet
5	≤	11 feet

- *Speed Street Score*

Score	Speed	
1	≤	25 mph
2		30 mph
3		35 mph
4		40 mph
5	≥	45 mph

- *Segment Stress Score*

The average of the Curb Lane volume Stress Score, the Curb Lane Width Stress Score and the Speed Stress Score

Sorton also recognizes other factors that may impact the stress level of a roadway including on-street parking, truck volumes, the number of commercial drive-ways and intersection design. These factors are more difficult to evaluate.

For our sample, data were collected on truck volumes and certain intersection conditions. These along with comments on other route conditions from evaluators should be considered when examining problems with individual routes. The intersection data was used to develop a simple intersection score described below.

Route stress scores are defined as follows:

- *Arterial Stress Score*

  The highest score for any arterial segment on the route. The worst segment is used because this is what limits use of the route by the typical cyclist.

- *Intersection Stress Score*

  The number of intersection problems is defined as the sum of the number of unsignalized intersections and the number of intersections with right turn problems

Score	Number of Intersection Problems	
1		0
2		1
3		2
4		3
5	≥	4

- *Overall Route Stress Score*

  The higher of the Arterial and Intersection Scores. This is because the poorest aspect of the route is what limits use of the route by the typical cyclist. You will notice that most often the Arterial Score is the limiting factor.

- *Rail Road Crossing Conditions (RR Cross.)*
  3= Major Problem: Tracks not perpendicular to road, no special markings or provision for cyclists to cross 90°
  2= Minor problem: Tracks cross at 90°, but no rubberized crossing
  1= No Problem: Tracks cross at 90° with rubberized crossing or no crossings

- *Drain Grate Conditions (Drain Grates)*
  3= Major Problem: Lots of drain grates with longitudinal slots that could catch a bike wheel
  2= Minor problem: 1 or 2 drain grates with longitudinal slots that could catch a bike wheel
  1= No problem: Drain grates that don't catch bike wheels.

- *Pavement Conditions (Bad Pave.)*
  3= Major problem: Cyclists can not pay attention to traffic because they must concentrate on pavement problems to keep from falling
  2= Minor problem: Occasional pavement hazards
  1= No problem: Good pavement.

Chart 2: Traffic Stress includes subregional and regional data for

- # of Routes
- # of Route miles
- % on Arterials/Collectors
- Average # of Arterial/Collector Segments per route
- Averages for all Stress Scores
- % of Routes or Segments with a Stress Score <= 3 for all Stress Scores
- Average # of arterials crossed at unsignalized intersections
- Average # of arterial intersections with Right Turn Only lanes
- Average Scores for Surface Conditions: RR Crossings, Drain Grates, and Bad Pavement

B. Overall Route Stress Score Analysis

Only one-third of the routes were able to avoid using a road segment that was too stressful for the average adult rider. The region's overall route score of 3.55 indicates that at present, only experienced bicyclists are likely to be comfortable when making trips that use the full range of roadway options. This is emphasized by the fact that only 31% of the routes received an overall score of 3 or less.

The traffic stress scoring methodology assumes that when people consider using a bicycle for a particular trip, their decision is based on an assessment of the route's most difficult section. Therefore, in this analysis, the overall route scores strongly reflect the routes' peak point stress levels.

The overall route scores were derived through a series of comparisons of the conditions of two main aspects of the route: arterial segments and intersections>

For each route, each arterial segment received a score based on three factors: curb lane traffic volume, curb lane width, and traffic speed.

Conditions on the routes' local residential streets and bicycle paths were not included in this analysis. With their inherently low traffic volumes and speeds, most residential streets core very well. In other words, casual bicyclists do not generally object to riding on such streets. Unfortunately, most of the region's destinations are not situated at a nexus of residential roads. If the bicycle is to provide a meaningful alternative to the automobile for short trips, then the arterial segments and intersections that bicyclists must use must offer a similar level of comfort and safety.

At the most basic level, each of the intersection are judged by two criteria: the presence of right turn only lanes (a situation that sets up a conflict between bicyclists who are traveling through the intersection and motorists who are turning right) and the absence of traffic control signals at intersections with arterials (a situation that does not provide bicyclists with a regular opportunity to cross the arterial).

Chicago, Lake and South/Southwest had the poorest Overall route Scores. Chicago was unique among the subregions in that its poor scores came almost exclusively from high traffic volumes. The problems in most of the other sub-regions came primarily from width problems. This suggests that the city may need to look at a different bicycling improvement scenario than the suburbs. Width is much more easily addressed by facility design than volume.

C. Arterial Stress Scores Analysis

Each Arterial Segment Score is an average of the score given for three factors: Curb Lane volume, Curb Lane Width, and Speed.

South/Southwest, Kane and Lake had the most stressful Arterial scores. All three had major problems with width coupled with higher speeds. For southwest and Lake this translated into poor overall route stress scores. In spite of its low segment scores, Kane actually had one of the better overall route stress scores due to the fact that many of Kane's routes did not utilize arterials at all.

The arterial segment picture in South/Southwest is the poorest because they had problems in all three areas; speed, width and volume.

D. Segment Stress Score Analysis

Overall Route Scores are determined primarily by segment conditions. For almost all routes that scored poorly, poor arterial segment scores were the cause.

In only two subregions did the Overall Route Stress Score differ from the Arterial Stress Score by more than 10%. In those two subregions, West Central and Will, there were a high number of routes without arterial segments, thus the intersection conditions were a more significant factor. Even in these two subregions the route scores were still primarily determined by segment factors.

E. Curb Lane volume Stress Score Analysis

Over half of the arterial segments sampled had too many cars. The sample's regional average score for the curb lane volume factor was 3.61, with just over half (51%) of the arterial segments scoring at or below 3. South/Southwest and Chicago have the worst average curb lane volume scores (4.14 and 4.10, respectively) as well as the smallest proportion of segments scored at or below 3 (29% and 34% respectively). West Central, North Central, and Will have the best average curb lane volume score (2.44, 2.79, and 2.98, respectively) and the largest proportion of segments scored at or below 3 (86%, 77%, and 90%, respectively).

These results suggest that for bicyclists, there are too many cars on half of the roads in the region. This not easily fixed. Possible solutions involve moving the cars or moving the bikes to a different road. Transportation control measures are a potentially effective but long term method for moving the cars. Moving the bicyclists may be just a shard because chances are, they are using the high volume arterial or collector as a last resort. A combination of facilities and education may be the best solution. While large auto volumes clearly deter people from bicycling, large volume roads with special facilities or additional curb lane width are usually safer than narrower lower volumes roads. Potential cyclists may be able to be persuaded to endure large auto volumes for short arterial segments if the speeds and widths are comfortable.

F. Curb Lane Width Stress Score Analysis

With the exception of Chicago and North Central, curb lane width problems were the primary culprit for segment problems. The sample's regional average score for the curb lane width factor was 3.30, with just under half (47%) of the arterial segments scoring at or below 3. South/Southwest and Kane have the worst average curb lane width scores (4.19 and 3.70, respectively) as well as the smallest proportion of segments scored at or below 3 (10% and 22%, respectively). West Central, Will, and North Central have the best average curb lane width scores (2.44, 2.53, and 2.70, respectively) with West Central and North Central having the largest proportions of segments scoring at or below 3 (70% and 78%, respectively).

Design changes are the solution. Creating wider curb lanes by reconfiguring lane and median widths on the roadway is the most common and cost effective solution. Any additional width, no matter how small, improves bicycling. If enough width is available or can be added, bike lanes provide better accommodation and encouragement where demand merits it. In non-urban cross sections, paved shoulders, if properly maintained, also function as bike lanes.

G. Speed Stress Score Analysis

These results suggest that for bicyclists, traffic speed is probably the least intimidating aspect of the region's arterial network. The sample's regional average score for the speed factor was 2.55, with fully 82% of the arterial segments scoring at or below 3. Lake and Will have the worst average speed scores (3.46 and 3.39, respectively) as well as the smallest proportion of segments scored at or below 3 (49% and 53%, respectively). North Central and West Central have the best average speed scores (1.46 and 1.45, respectively) and among the largest proportion of segments scored at or below 3 (98% and 94%, respectively -- only Chicago, with a near perfect 99%, is better).

It should be noted that for practical reasons, our analysis is based on posted and not actual speeds. On some roads actual speeds are significantly higher than posted speeds. In areas where curb cuts are common both high speed limits and bikeways adjacent to the road are dangerous. In these cases lower speeds should be established and maintained. In corridors where curb cuts are infrequent, adjacent bikeway or wider shoulder accommodations should be considered. Higher speeds can then be maintained. See *Selecting Roadway Design Treatments To Accommodate Bicycles* (FHWA, 1992), for recommendations on bicycle facilities at various speed levels.

H. Intersection Stress Score Analysis

Data collection regarding conditions at intersections was limited to the number of arterials crossed, the number of unsignalized intersections, and the number of intersections with right turn lanes. Many other factors that significantly affect bicycles at intersections were beyond the scope of this project. For example, it was not feasible to collect and analyze such factors as turning volumes, intersection lane widths, and turn radii. Thus, an analysis of how bicycles function at intersections and what design improvements might be needed is a subject that will need additional study.

I. Crossing Conditions Analysis

Unsignalized crossings do not appear to be a significant problem region-wide. On the number of unsignalized arterials crossed, the subregions fell into two groups. Chicago, Kane, North Central and Southwest all averaged under .4 unsignalized arterial crossing per route. The rest were greater than .7 up to 1.13. Subregions which had the highest averages and problem areas identified in individual route evaluations should be investigated further.

Intersections with right turn problems generated a similar range from .17 to 1.03. Similarly, subregions such as Chicago and Lake which had the highest averages and problem areas identified in individual route evaluations should be investigated further.

Data on the number of arterials crossed is not analyzed because it was not uniformly collected.

J. Surface Conditions Analysis

For the most part subregional averages were well below the minor problem level. Surface Conditions were rated on a 1-5 scale, on which 1 = No Problem, 3 = Minor Problem and 5 = Major Problem. All drain grate averages were below 2. Only Chicago and South/Southwest went above 2 for railroad crossings with 2.17 and 2.6 respectively. The highest average score was a 3.37 in bad pavement for Chicago. The other higher bad pavement average scores were 2.07 and 2.00 in North/Northwest and Will. Outside of consistent minor pavement problems in Chicago, surface conditions to not appear to be a significant overall problem in northeaster Illinois. However isolated problem spots were identified.

IDOT has for several years now approved only bicycle-safe drain grates. We are not aware of any new drain grates that are a problem. Old grates on key bicycle routes should be replaced or retrofitted.

The safety advantages of rubberized RR crossing are widely recognized for all types of traffic including bicycles. Unfortunately they are expensive. Current programs for upgrading RR crossings seem sufficient. On key bicycle routes where tracks are not perpendicular to the roadway, a shoulder flange that allows bicyclists to cross the tracks at a right angle is recommended.

Poor pavement is primarily a condition of the availability of maintenance priorities.

VI. BICYCLE PARKING EVALUATION

Secure, well-located bicycle parking is important to making bicycle trips convenient and practical. If the car is in a garage with an automatic door opener and the bicycle is in a basement behind some boxes, relative trip time will be affected. Similarly, if the bike racks are at a building entrance and the parking lot is a block away, the bike trip gains an advantage. Minimizing the risk of bike theft and maximizing the convenience of bicycle parking improves the bicycle's ability to compete for mode share.

In public areas, government agencies can provide bicycle parking facilities. Zoning ordinances can require developers to provide bicycle parking facilities. On already developed private property, encouragement and marketing activities can influence management to provide parking facilities.

Chart 3: Parking includes subregional and regional data for the percentages of destinations that provide various types of parking accommodations.

Less than half of the destinations sampled had any bicycle racks at all. Less than a quarter of the destination sampled had well-located, well-designed bicycle parking. Bicycle storage hassles at destinations can be a major disincentive to utilitarian bicycle use. Certainly the current programs for providing bicycle racks and lockers should be expanded. Unfortunately these programs normally only address parking on the public property. Private property could be encouraged to provide parking facilities through zoning requirements or tax incentives.

VII. SUMMARY OF POLICY RECOMMENDATIONS

The major product from this analysis will be a set of policies that would help to solve the access, convenience, and parking problems on routes throughout the region.

A. Network Improvements

- Implement routine consideration of the specific access needs of bicyclists in all arterial an collector project planning. The Aug 1, 1995 IDOT policy for accommodating bicycles in highway improvements is a good model and should be duplicated at all levels of government.

- The region should initiate a program to identify and improve the problematic arterial segments where the demand and benefits are greatest.
- Provide a basic level of bicycle accommodation in all arterial projects.
- Provide special facilities where demand or land use warrant.
- Provide special facilities where the arterial provides unique access across a barrier.
- Where Curb lane width is a problem: Create wider curb lanes by reconfiguring lane and median widths on the roadway. Any additional width, no matter how small, improves bicycling. If enough width is available or can be added, bike lanes provide better accommodation and encouragement where demand merits it. In non-urban cross sections, paved shoulders, if properly maintained, also function as bike lanes.
- Where traffic speed is a problem: In areas where curb cuts are common both high speed limits and bikeways adjacent to the road are dangerous. In these cases lower speeds should be established and maintained. In corridors where curb cuts are infrequent, adjacent bikeway or wider shoulder accommodations should be considered. Higher speeds can then be maintained. See *Selecting Roadway Design Treatments To Accommodate Bicycles* (FHWA, 1992), for recommendations on bicycle facilities at various speed levels.
- On key bicycle routes where RR tracks are not perpendicular to the roadway, a shoulder flange that allows bicyclists to cross the tracks at a right angle is recommended.
- The needs of bicycle routes should be incorporated into the process for setting maintenance priorities.

C. Parking Improvements

- Require the provision of bicycle parking facilities in all new development and construction
- Establish a program for providing bicycle parking facilities in public areas where the demand is the greatest
- Expand current programs for providing bicycle racks and lockers in public areas where the demand is the greatest.
- Encourage private property managers to provide parking facilities through tax incentives or other incentives.

PROBLEM SUMMARY

PRIORITY TRAVEL ZONE INVENTORY

Regional.....405 routes in the sample

I. Convenience

21 route (5.2%) shorter than the most direct auto route
278 route (68.6%) the same length as the most direct auto route
90 routes (22.2%) a little longer (less than 25%) than the most direct auto route
16 routes (4.0%) much longer (25% or more) than the most direct auto route

II. Traffic Stress

271 routes (66.9%) had Overall Scores above 3. (Not suitable for typical cyclist)
134 routes (33.1%) had Overall Scores of 3 or less. (Suitable for typical cyclist)
248 routes (61.2%) had Arterial Scores above 3. (Not suitable for typical cyclist)
115 routes (28.4%) had Arterial Scores of 3 or less. (Suitable for typical cyclist)
42 routes (10.4%) had no Arterial Score, as they did not use any arterials/collectors.

Arterials/collectors were used for 718.18 miles (55.5%) of the 1,294.45 miles covered by the 405 trips in the sample. There were a total of 1,051 road segments in the sample.

482 road segments (45.9%) scored above 3. (Not suitable for typical cyclist)
569 road segments (54.1%) scored 3 or less. (Suitable for typical cyclist)

Of the 482 road segments that scored above 3:
344 scored 4 or below (137 scored above 4)
175 (36.3%) had poor speed scores (above 3)

412 (85.5%) had poor curb lane width scores (above 3)
370 (76.8%) had poor curb lane volume scores (above 3)

Comments: Arterial/collector problems on 25.5% of the route miles sampled are causing 61.2% of the trips sampled to be unsuitable for a typical cyclist. Curb lane volume and Curb lane width problems were the most pervasive at 76.8% and 85.5% respectively. Speed was less commonly a problem at 36.3%.

III. Parking

1% of destinations had secure indoor parking
1% of destinations had bike lockers
24% of destinations had good bike racks
44% of destinations had sub-standard bike racks
27% of destinations had other outdoor bike parking
10% of destinations had covered bike parking
39% of destinations had bike parking near the building entrance
7% of the destinations had a secured bike parking area

Chart 1 **Convenience**	City of Chicago	Dupage	Kane	Lake	McHenry	North/ Nothwest	North Central	South/ Southwest	West Central	Will	Regional Totals
Number of Routes	75	30	30	30	30	60	30	62	28	30	405
Total Route Miles	283.75	98.25	67.25	121.65	70.75	169.25	91.25	248.35	57.00	89.50	1297.00
Average Trip Length	3.78	3.28	2.24	4.06	2.36	2.82	3.04	4.01	2.04	2.98	3.20
% on Local Streets	15.5%	53.2%	37.1%	1910.0%	42.0%	44.9%	58.5%	35.6%	77.2%	54.5%	37.3%
% on Arterials/Collectors	84.5%	30.3%	23.9%	57.2%	57.4%	50.7%	41.4%	62.4%	21.0%	43.0%	55.9%
% on Off Road Paths	0.0%	16.5%	39.0%	23.8%	0.6%	4.5%	0.1%	2.0%	1.8%	2.5%	6.8%
Average Directness Score	2.19	2.60	2.23	2.20	2.03	2.28	2.33	2.23	2.18	2.30	2.25
% Distribution of Directness											
Bike Trip Shorter (D=1)	0.0%	13.3%	3.3%	3.3%	16.7%	1.7%	0.0%	14.5%	0.0%	0.0%	5.2%
Bike Trip Same Distance (D=2)	81.3%	30.0%	70.0%	73.3%	63.3%	75.0%	66.7%	56.5%	85.7%	73.3%	68.6%
Bike Trip < 25% Longer (D=3)	18.7%	40.0%	26.7%	23.3%	20.0%	16.7%	33.3%	21.0%	10.7%	23.3%	22.2%
Bike Trip > 25% Longer (D=4)	0.0%	16.7%	0.0%	0.0%	0.0%	6.7%	0.0%	8.1%	3.6%	3.3%	4.0%

Chart 2 **Traffic Stress**	City of Chicago	Dupage	Kane	Lake	McHenry	North/ Nothwest	North Central	South/ Southwest	West Central	Will	Regional Totals
Number of Routes	75	30	30	30	30	60	30	62	28	30	405
Total Route Miles	283.75	98.25	67.25	121.65	70.75	169.25	91.25	248.35	57.00	89.50	1297
% on Arterials/Collectors	84.5%	30.3%	23.9%	57.2%	57.4%	50.7%	41.4%	62.4%	21.0%	43.0%	55.9%
# Arterial/Collector Segments	300	64	23	74	70	124	115	163	77	49	1059
Avg. # Arterial/Collector Segments	4.00	2.13	0.77	2.47	2.33	2.07	3.83	2.63	2.75	1.63	2.61
Avg. Overall Route Stress Score	3.75	3.74	2.63	4.27	3.71	3.67	3.08	3.98	2.90	3.00	3.55
% Routes w/ Overall Score <=3	16.0%	30.0%	50.0%	13.3%	33.3%	35.0%	66.7%	9.7%	67.9%	56.7%	33.3%
Avg. Arterial Stress Score	3.51	3.77	2.07	3.78	3.56	3.36	2.98	3.92	2.37	3.23	3.33
% Routes w/ Arterial Score <=3	22.7%	25.9%	50.0%	20.0%	33.3%	40.0%	70.0%	9.7%	85.7%	45.0%	36.0%
Avg. Segment Stress Score	2.95	3.16	3.55	3.59	3.09	3.37	2.32	3.73	2.11	52.90	3.14
% Segments w/Overall Score<=3	26.7%	51.6%	30.4%	33.8%	62.9%	39.5%	89.6%	16.0%	89.6%	57.1%	54.0%
Avg. Curb Lane Volume Score	4.10	3.75	3.91	3.68	3.41	3.75	2.79	4.14	2.44	2.98	3.61
% Segments w/ CLV Score <=3	34.0%	51.6%	34.8%	54.0%	63.0%	54.8%	77.4%	29.4%	85.7%	89.8%	51.0%
Avg. Curb Lane Width Score	2.81	3.25	3.70	3.64	3.33	3.65	2.70	4.19	2.44	2.53	3.30
Segments w/ CLW Score <=3	67.3%	39.1%	21.7%	25.7%	22.9%	31.5%	78.3%	9.8%	70.1%	55.1%	47.0%
Avg. Speed Score	1.95	2.48	3.04	3.46	2.51	2.72	1.46	2.99	1.45	3.39	2.55
% Segments w/Speed Score<=3	99.3%	70.3%	68.9%	48.6%	82.9%	72.6%	97.4%	73.6%	93.5%	53.1%	82.0%
Avg. Intersection Stress Score	1.99	2.30	1.23	3.10	2.47	2.58	1.63	1.71	2.14	2.30	2.13
% Routes w/ Int Score <=3	82.7%	86.7%	100.0%	50.0%	80.0%	66.7%	93.3%	96.8%	78.6%	90.0%	82.0%
Avg. # of Arterials Crossed	1.80	2.00	1.07	3.33	1.67	3.28	3.70	2.50	3.11	2.07	2.47
Avg. # Unsignalized Intersections	0.21	0.70	0.07	1.13	0.97	1.05	0.40	0.30	0.82	0.87	0.62
Avg. # Ints. w/ Right Turn Only	0.95	0.67	0.17	1.03	0.50	0.57	0.23	0.40	0.32	0.47	0.56
Other Conditions:											
Railroad Crossings	2.17	1.07	1.03	1.17	1.20	1.20	1.30	2.60	1.11	1.53	1.57
Drain Grates	1.80	1.00	1.00	1.23	1.00	1.13	1.07	1.50	1.07	1.37	1.28
Bad Pavement	3.37	1.00	1.23	1.27	1.03	2.07	1.67	1.00	1.32	2.00	1.72

Chart 3 **Parking**	City of Chicago	Dupage	Kane	Lake	McHenry	North/ Nothwest	North Central	South/ Southwest	West Central	Will	Regional Totals
Secure Indoors	4%	0%	0%	0%	0%	0%	0%	0%	0%	0%	1%
Bike Lockers	0%	0%	0%	0%	0%	0%	0%	0%	0%	10%	1%
Good Racks	28%	10%	50%	10%	0%	30%	20%	5%	70%	20%	24%
Sub Standard Racks	20%	30%	80%	50%	60%	60%	70%	50%	20%	20%	44%
Other Outdoor	68%	0%	10%	60%	10%	35%	10%	0%	30%	10%	27%
Covered Parking	4%	0%	0%	30%	10%	20%	20%	50%	20%	0%	10%
Near Building	8%	30%	40%	20%	30%	60%	80%	40%	90%	10%	39%
Secured Area	4%	0%	0%	0%	0%	10%	30%	5%	20%	0%	7%
Number of Destinations	25	10	10	10	10	20	10	20	10	10	135
Percentage of Destinations	18.5%	7.4%	7.4%	7.4%	7.4%	14.8%	7.4%	14.8%	7.4%	7.4%	100.0%

APPENDIX C
McHENRY COUNTY BICYCLE DESTINATIONS

SCHOOLS

1) Algonquin Rd. School (K-5)
2) Fox River Grove Junior High School (6-8)
3) Spring Grove School (K-8)
4) James C. Bush School (K, 2-3)
4) Johnsburg Middle School (4-5)
4) Johnsburg Junior High School (6-8)
5) Johnsburg High School (9-12)
6) Ringwood School (1)
7) Richmond Consolidated Grade Schl. (K-8)
8) Edgebrook School (K-4)
8) McHenry Junior High School (6-8)
9) Hilltop School (K-4)
10) Landmark Elementary School (ECE, 5)
11) Parkland School (6-8)
12) Riverwood School (K-5)
13) Valley View School (K-5)
14) Riley Community Consolidated (K-8)
15) Alden-Hebron Elementary School (P-5)
15) Alden-Hebron Middle & High Schls. (6-12)
16) Briargate School (K-6)
17) Maplewood School (1-6)
18) Cary Junior High School (7-8)
19) Oak Knoll School (K-6)
20) Three Oaks School (P-6)
21) Harrison Elementary School (K-8)
22) Prairie Grove School (K-8)
23) Canterbury School (K-5)
24) Coventry School (K-5)
25) Husmann Elementary School (K-5)
26) Indian Prairie Elementary School (K-5)
27) North Grade School (K-5)
27) North Junior High School (6-8)
28) South Grade School (K-5)
28) Lundahl Junior High School (6-8)
29) West Elementary School (K-5)
30) Central School (2-3)
31) Harvard Community High School (9-12)
31) Jefferson School (3-5)
32) Harvard Junior High School (6-8)
33) Washington School (1-2)
34) Marengo Community High School (9-12)
35) Crystal Lake Central High School (9-12)
36) Crystal Lake South High School (9-12)
37) Cary-Grove High School (9-12)
38) McHenry High Schl. East Campus (9-12)
39) McHenry High Schl. West Campus (9-12)
40) Richmond-Burton High School (9-12)
41) Huntley Community High School (9-12)
41) Huntley Elementary High School (P-8)
42) Locust School (P-8)
43) Hawthorn School (1-3)
44) Clay St. School (1-5)
45) Dean St. School (1-5)
46) Greenwood School (1-5)
47) Olson Middle School (6-8)
48) Northwood Elementary School (1-5)
48) Northwood Elementary Junior High (6-8)
49) Westwood School (P-1)
50) Woodstock H.S. (9-12)
51) Eastview Elementary School
51) St. Margaret Mary School
52) Lake In The Hills Elementary
53) Algonquin Middle School
54) Jacobs High School (9-12)
55) Neubert Elementary School
56) McHenry County College
57) Crystal Lake Montessori School (P-8)
58) Evergreen Park School (4-12)
59) Forest Academy for Young Women(11-18)
60) Immanuel Lutheran School (P-8)
61) Lord & Savior Evangelical Lutheran (K-8)
62) Marian Central Catholic High Schl. (9-12)
63) Montini Catholic Middle School (4-8)
64) Montini Catholic Primary Center (P-3)
65) St. John the Baptist School (P-8)
66) St. John's Lutheran School (P-8)
67) St. Mary School (K-8)
68) Woodstock Christian School (P-8)
69) St. Joseph School (P-8)
70) St Thomas, The Apostle, School (K-8)
71) SS. Peter & Paul School (1-8)
72) Zion Lutheran School (P-8)
73) SEDOM (Special Education)

PARKS & RECREATION

100) Moraine Hills State Park
101) McHenry Dam State Park
102) Chain O' Lakes State Park
103) Hickory Grove
104) The Hollows
105) Beck's Woods
106) Coral Woods
107) Rush Creek
108) Marengo Ridge
109) Harrison Benwell
110) Glacial Park
111) Braewood Park
112) Gaslight Park
113) Holder Park
114) Town Park
115) Presidental Park
116) Riverfront Park
117) Yellowstone Park
118) Surry Detention
119) Lions Park
119) Jaycee Park
120) Candlewood Park
121) Hillhurst Park
122) Hillside Prairie Park
123) Jamesway Park
124) Cary Park
125) Main St. Prairie Park
126) Three Oaks Park
127) Cimarron Parcel
128) Greenfields Park
129) Kaper Park
130) Val Budd Park
131) Deveron Circle
132) Cary Oaks
133) Canterbury Park
135) Della St. Park
136) Edgewater Park
137) Four Colonies Park
138) Hill Farm Park
139) J.R. Ladd Park
140) Knaack Park
141) Lake Park (Main beach)
142) Lapins Park
143) Lippold Park
144) Crystal Lake Main Beach
145) Nature Center
146) Racket Club
147) Seminary Field
148) Spoerl Park
150) Sternes's Woods
151) Veteran Acres
152) West Park & Beach
153) Foxmoor Subdivision Park
154) Downtown mini-park
155) Lions Park, J.C. Park, & Harvard Pool
156) Ayer Park
157) Moose Field
158) Northfield Avenue Park
159) Deicke Park
160) Old Timers Park
161) Cotton Creek Marsh
162) Key Park
163) Olson Park
165) Emricson Park
165) Woodstock Municipal Pool
166) Kishwaukee Park
167) Raintree Park
168) Ryder's Woods
169) Silver Creek Conservation Area
170) Woodstock Square
171) Calvin Spencer City Park
172) Indian Oaks Park
173) Center Street Park
174) Foxridge Park
175) Freund Field
176) Knox Park & McHenry Pool
177) Creekside Park
178) Peterson Park
179) Whispering Oaks Park
180) Algonquin Pool
181) Cary Pool
182) Lake In The Hills Beach
183) Lions Park & Beach
184) Fox River Grove Beach
185) The Body Club, Woodstock Health Club
186) Elite Health Spa
187) Healthbridge Center for NIMC
188) Jazzercise
189) McHenry Nautilus Health & Fitness Club
190) NIMC Fitness Center
191) Shamrock Health & Fitness Center
192) Women's Workout World
193) YMCA

POST OFFICES

300) Algonquin & LITH (old)
301) Algonquin & LITH (new)
302) Cary
303) Crystal Lake
304) Fox River Grove
305) Harvard
306) Huntley
307) Hebron
308) Marengo
309) McHenry
310) Richmond
311) Ringwood
312) Spring Grove
313) Union
314) Wonder Lake
315) Woodstock

CITY/VILLAGE HALLS

400) Algonquin
404) Cary
405) Crystal Lake
407) Fox River Grove
408) Fox River Valley Gardens
410) Harvard
412) Holiday Hills
413) Huntley
414) Island Lake
415) Johnsburg
416) Lake In The Hills
417) Lakemoor
418) Lakewood
419) Marengo
420) McCullom Lake
421) McHenry
422) Oakwood Hills
423) Prairie Grove
424) Richmond
426) Spring Grove
428) Wonder Lake
429) Woodstock

PUBLIC LIBRARIES

500) Algonquin Area Public Library
501) Cary Public Library
502) Crystal Lake Public Library
503) Fox River Grove Public Library
504) Harvard Library
505) Johnsburg Library
506) Marengo Public Library
507) McHenry/Nunda Township Library
508) McHenry Public Library
509) Nippersink Public Library
510) Woodstock Public Library
511) McHenry County College Library
512) Huntley Library

COMMUTER RAIL STATIONS

600) Fox River Grove
601) Cary
602) Crystal Lake
603) Woodstock
604) McHenry
605) Harvard

BUSINESS & INDUSTRIAL PARKS

701) Algonquin Industrial Park
702) Arrowhead Industrial Park
703) Bakely Industrial Park
704) Bernat Industrial Park
705) Cary Industrial Center
706) Cary Point Industrial Park
707) Cobblestone Business Park
708) Cold Headers Industrial Park
709) Crystal Lake Business Center
710) Fountain Head Industrial Park
711) Fritzsche Industrial Park
712) Fuhler Industrial Park
714) Inland Business Park
715) Kishwaukee Industrial Park
716) Lakeview Business Center
717) Larsen Industrial Park
718) Lutter Industrial Park
719) Marengo Commercial Center
720) McHenry City Center Business Park
721) McHenry Corporate Center
722) The Prime Group Business Park
723) Rolling Hills Industrial Park
724) Spring Ridge Industrial Park
725) Tonyan Industrial Park
726) Three Oaks Industrial Park
727) Valenti Business Park
728) Woodstock Business Center

BUSINESS OF 100+ EMPLOYEES

800) Memorial Hospital
801) Northern Illinois Medical Center
802) Intermatic, Inc.
803) McHenry County Government
804) Brake Parts Inc./Hydraulics Inc.
805) Union Special Corp.
806) Precision Twist Drill Corp.
807) Sun Electric Corp.
808) General Power Equipment
809) Sage Products, Inc.
810) Tek Packaging
811) Nissan Forklift Corp.
812) Morton International (Woodstock)
813) Holiday Inn Crystal Lake
814) Morton International (Ringwood)
815) Filtertek, Inc.
817) Seaquist Dispensing
818) TC Industries
819) Black Dot Group
820) Graftek Press Inc.
821) Automatic Liquid Packaging
823) Knaack Manufacturing
824) The Arnold Engineering Co.
825) Claussen Pickle, Co.
826) Modine Manufacturing Co.
827) Follett Library Resources
829) Coilcraft Inc.
830) Dean Foods Co. (Huntley)
831) Dean Foods Co. (Harvard)
833) Aubrey Manufacturing
834) Actown Electrocoil
835) Follett Software Co.
837) Watlow Gordon
838) Dana Corp., Warner Electric Division
839) Vaughan & Bushnell Manufacturing Co.
841) Guardian Electric Manufacturing
843) D.B. Hess Company
844) Fabrik Industries
845) Federal Telecom, Inc.
846) Mathews Company
848) DuraBar Products
849) Northwest Herald
851) Scot Forge Co.
852) McHenry State Bank
853) Woodstock Wire Works Inc.
854) Power Conversion Products
855) Crystal Die & Mold Inc.
857) Prem Magnetics Inc.
858) Eisenmann Corp.
859) Schiffmayer Plastics Corp.
860) Grayhill Inc.
861) Coils Inc.
862) Richco Plastics
863) Harvard Comm. Memorial Hospital
864) Kustom Kare Maintenance
865) Matrix IV Inc.
866) Bartlett Manufacturing Co. Inc.
867) Althoff Industries, Inc.
868) Commonwealth Edison
869) Farr. Co.
870) Automated Mould Industries
871) Durex International Corp.
872) Forms Corp. of America
873) Fuel Systems Textron
875) Medela
876) Eaton Controls
877) Kenmode Tool & Engineering
878) Surgipath Medical Industries
879) Chroma Corp.
881) Sengewald USA Inc.
882) Cunat Bros. Inc.
883) John Sterling Corp.
884) Sub-Sem Inc.
886) Tru-Test Manufacturing
886) Cotter Member Insurance
887) Federal Express Corp.
888) Fox Valley Systems, Inc.
890) Meyer Material Co.
891) Northern Illinois Gas Co.
892) Olsun Electrics Corp.
893) Plaspros
894) Terra Cotta Truck Service
895) W.M. Plastics Inc.
896) Woodstock Plastics

COMMERCIAL CENTERS

900) Crystal Point Mall
901) Huntley Factory Shops
902) Woodstock Square Mall
902) Woodstock Square Business District
903) Algonquin Downtown
904) Algonquin Piggly Wiggly Area
905) Cary Downtown District
906) Cary Jewel District
907) Crystal Lake Wal-Mart Area
908) The Commons
909) Crystal Lake Plaza
910) Crystal Lake Best Buy Area
911) Crystal Lake Rt. 14 Business District
912) Crystal Lake Downtown
913) River Point/Algonquin
915) LITH Cedar Ridge Plaza
916) Ridgefield Antique District
917) Eastwood Plaza-Woodstock
918) Omni Super Store
919) McHenry Downtown
920) Marengo Downtown
921) Harvard Downtown
922) Richmond Downtown
923) Hebron Downtown
924) Fox River Grove Downtown
925) Union Downtown
926) Spring Grove Downtown

APPENDIX D
HARVARD HIGH SCHOOL PHYSICAL EDUCATION
BICYCLE UNIT

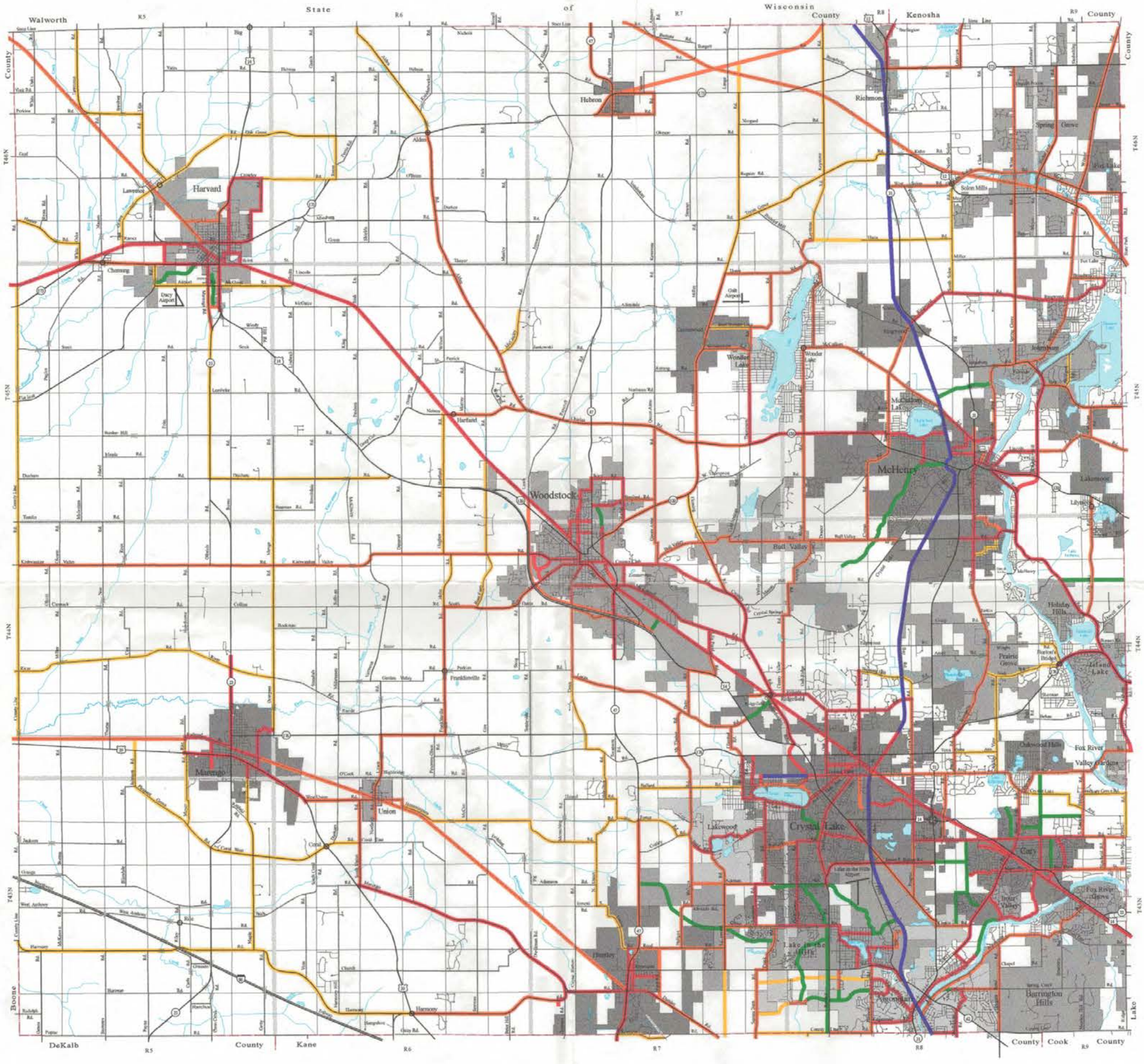
Course Objectives

- The student will be able to correctly answer the Illinois Bicycle Rules of the Road "How Safe Are You?" quiz.
- The student will complete the "Pre-ride Safety and Bicycle Anatomy Inspection."
- The student will demonstrate techniques for safe, comfortable and efficient riding.
- The student will understand the physiological benefits and concerns of bicycling.

Basic Lesson Plan

Day 1:	1. "Rules of the Road" test. 2. Issue helmets.
Day 2:	1. Issue bicycles. 2. Pre-ride safety and anatomy inspection.
Day 3:	1. General rules. 2. Bicycles go to track or closed course, emphasis on cadence and proper adjustment.
Day 4-6:	1. Warm up exercises. 2. Braking techniques; Uphill (ascents) and downhill (descents).
Day 7:	1. Cornering.
Day 8:	1. Mounts and dismounts (moving).
Day 9-12:	1. Different rides emphasizing characteristics of each area.
Day 13-15:	1. Challenge course (may be timed). 2. Skills check list. 3. Written test.

McHENRY COUNTY
SUBREGIONAL BICYCLE PLAN



Suggested Bicycle Facility Network

Scale

Legend

- Existing or Committed Off Road Trails
- Highest Priority Facility Need
- Intermediate Priority Facility Need
- Lowest Priority Facility Need
- Existing or Potential Greenway Corridor

Note:
Bicycle facility needs depicted are for illustrative purposes only.
Bicycle facilities used for recreation only have not been identified.
Individual projects have not been endorsed by the McHenry County Council of Mayors.

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