RESOLUTION NO. 87-M-30

A RESOLUTION REPEALING THE 1974 ORANGE COUNTY BICYCLE PLAN; ADOPTING THE 1987 ORANGE COUNTY BICYCLE PLAN; PROVIDING FOR A POLICY OF INCORPORATING BICYCLE FACILITIES INTO NEW HIGHWAY CONSTRUCTION AND IMPROVEMENT PROJECTS; PROVIDING FOR A POLICY OF IMPROVING BIKEWAY LINKAGES IN AND BETWEEN COMMERCIAL, RESIDENTIAL, INSTITUTIONAL, RECREATIONAL AND OPEN SPACE DISTRICTS; PROVIDING AN EFFECTIVE DATE.

BE IT RESOLVED BY THE BOARD OF COUNTY COMMISSIONERS OF ORANGE COUNTY:

WHEREAS, bicycling is an activity closely related to issues of public health, safety, and general welfare; and

WHEREAS, Orange County's 1985 Growth Management Policy calls for an update of the Orange County Bicycle Plan to reflect current trends in bicycle use; and

WHEREAS, Orange County recognizes bicycling as a form of transportation which is greatly affected by automobile traffic congestion; and

WHEREAS, Orange County desires to create a more comprehensive transportation system by installing and improving bikeway facilities during the process of new road construction and improvement; and

WHEREAS, Orange County recognizes that bicycling is energy efficient, and that providing adequate bikeway facilities may promote bicycle use, thereby aiding in the reduction of fuel consumption by Orange County residents.

NOW, THEREFORE, BE IT RESOLVED BY THE BOARD OF COUNTY COMMISSIONERS OF ORANGE COUNTY, FLORIDA:

Section I. The Board of County Commissioners hereby repeals the 1974 Orange County Bicycle Plan and adopts the 1987 Orange County Bicycle Plan, which is incorporated herein by reference, and which consists of a proposed bikeway routing system, bikeway facility recommendations, support programs, and a five-year improvement program priority list.
Section II. The Board of County Commissioners hereby adopts a policy of encouraging the installation and improvement of bikeway facilities in conjunction with new County road construction and improvement projects; encouraging the use of local, collector, and minor arterial streets as part of the bikeway system when no other safe alternative route is available; encouraging the expansion of bikeway facilities along public and private rights-of-way, including, but not limited to railroad way abandonments, railroad way rights-of-way, and power line easements; encouraging the provision of on-road facilities through bike lanes and wide curb lanes or lane restriping, as feasibility and safety permit.

Section III. Commercial Districts. The Board of County Commissioners hereby adopts a policy of encouraging efforts to establish a network of bikeway linkages between residential areas and retail and office concentrations, and between central business districts and outlying areas.

Section IV. Residential Districts. The Board of County Commissioners acknowledges and agrees that, where feasible, pedestrian, bicycle and vehicular circulation should be separated, and that bikeway linkages should be encouraged between abutting residential areas.

Section V. Institutional Districts. The Board of County Commissioners acknowledges and agrees that adequate bikeway facilities should be provided to make schools accessible to students choosing this form of transportation.

Section VI. Recreation and Open Space Districts. The Board of County Commissioners agrees that, where practical, bike paths should provide interconnecting links between adjacent residential and institutional areas, and should be provided as part of the overall design plan of park and recreational facilities.

Section VII. Continuation of Duties and Powers of Bikeways Ad Hoc Committee until Establishment of Permanent Standing Body to be known as Bikeways Advisory Board. The
Board of County Commissioners acknowledges and agrees that implementation of the 1987 Orange County Bicycle Plan is best achieved through the assistance of a permanent standing body charged with this purpose. However, until such time as Resolution 86-M-01 is amended to reflect both that the Bikeways Ad Hoc Committee shall become a permanent standing body to be known as the Bikeways Advisory Board, and that the Bikeways Advisory Board is to carry out the purposes of this Resolution, the Bikeways Ad Hoc Committee shall continue to operate pursuant to Resolution 86-M-01.

Section VIII. Effective Date. This Resolution and the provisions contained herein shall take effect pursuant to general law.


ORANGE COUNTY, FLORIDA

By: Vice Chairman, Board of County Commissioners

DATE: August 17, 1987

ATTEST: THOMAS H. LOCKER, Clerk to the Board of County Commissioners

By: Deputy Clerk
Orange County
Florida

Bicycle Plan
1987

Prepared by
Orange County Planning Department
ORANGE COUNTY

BICYCLE PLAN

1987 - 1992
ORANGE COUNTY
BOARD OF COUNTY COMMISSIONERS

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I. EXECUTIVE SUMMARY

1.1 PLAN SUMMARY

Any consideration of an integrated transportation plan to serve all Orange County residents must recognize bicycling as a transportation element. Bicycling continues to be increasingly popular with citizens of all ages for health, recreational and environmental reasons. This is especially true in Florida where the climate and geography are favorable year round.

1.1.1 Background

In August, 1974, the Board of County Commissioners adopted the first Orange County Bicycle Plan for reasons that are still valid in 1987, namely:

- bicycling is closely related to public health, safety and welfare;
- it is increasing in popularity both for recreation and transportation; and,
- Orange County residents desire a bikeway system because present facilities are inadequate.

The 1985 Growth Management Policy encourages the incorporation of bicycle facilities into highway construction or improvement; the establishment of an overall bikeway system on minor roadways; and the construction of bikeway facilities on all newly built or improved roads.

In January, 1986, the Board of County Commissioners appointed an Ad Hoc Bikeways Committee to advise them concerning:

- updating the 1974 Bicycle Plan;
- implementing the updated Bicycle Plan and bikeway policies;
- investigating funding sources; and,
- receiving and disseminating pertinent information.
The Committee developed the attached Plan, with staff assistance from the Planning Department, after hearing from various bicycle planning experts. A workshop was held on February 17, 1987, for local officials and staff, featuring a presentation by Dan Burden, Pedestrian/Bicycle Coordinator for the Florida Department of Transportation.

The Plan primarily stresses safety factors and seeks to accommodate an increasing bicycling population in as practical and sensible a manner as possible. Planning for future needs are of primary significance as Orange County builds and rebuilds its roadway system.

1.1.2 Definitions

Section IV of the Plan looks at the different kinds of bikeways including:

- Bicycle or Wide Curb Lanes - A portion of the paved roadway is designated for bicyclists. This portion is adjacent to the roadway used by motorists. All state roads are now built in this manner because of safety factors.

- Bicycle Paths - Off-street facilities used in conjunction with pedestrian facilities, generally within the right-of-way but also independent of the road system (as in linking neighborhoods to school yards, neighborhoods to county parks, etc.).

- Bicycle Routes - A series of low traffic roads designated for use by experienced bicyclists.

Although there are a few cases where separate bike paths are preferred, the Committee agrees with the Florida Department of Transportation that, whenever possible, wide curb lanes or paved bike lanes on the roadway should be adopted as bikeways for all newly built or rebuilt road projects. Separate sidewalks on both sides of the street should be built for pedestrians and the elementary aged or unskilled bicyclists.
Not only do wide curb lanes provide safety benefits for bicyclists, they also aid traffic flow for motorists, large trucks, motorcyclists and moped operators. The extra space assists such vehicles in making turns off or on to the roadway and allows motorists to pass bicycles without changing lanes.

The minimum width for a motorist lane including a wide curb bike lane is fourteen (14) feet. The adjacent inside lanes for motorists are either twelve (12) feet wide (for speeds over forty miles per hour (40 mph)) or eleven (11) feet wide (for speeds under forty miles per hour (40 mph) with and reasonable truck volume). Rural roads should have a four foot paved shoulder, which is more easily maintained than a grass shoulder. Urban roads in a downtown area where speeds are less than twenty-five miles per hour (25 mph) generally do not need wide bike lanes.

### 1.1.3 Survey

Section V summarizes the results of a survey concerning attitudes of Orange County residents towards bicycling. Based on the survey, it is projected there are approximately 275,000 bike riders in Orange County. This equates to approximately forty-seven percent (47%) of the Orange County population.

Two out of three Orange County bicyclists surveyed said they consider County bikeways either not safe or even dangerous; forty percent (40%) of the daily bike riders consider the bikeways to be dangerous. If there were safer bikeways available, eighty percent (80%) of bicyclists indicated they would increase their bike riding and a majority of non-riders would begin to ride.

Concerning financing, seventy-five percent (75%) of the bicycle riders surveyed stated they would be willing to pay a small bike license fee and a surprising fifty-three percent (53%) of non-bicyclists and sixty-four percent (64%) of bicyclists "would support Orange County spending a share of transportation funds on bicycle facilities and programs with the possibility of some road projects being delayed" (Pages 57 and 60).
1.1.4 Safety

Section VI addresses safety. Although in the past children were the majority of bicycle accident victims, adults now account for half of all fatal accidents. Motorists are at error in most bicycle accidents, but bicyclists' errors are a significant factor. Florida has lead the nation in bicycle related fatalities since 1978. Orange County is ranked sixth (1983-1985) among Florida counties as an "at risk" place to bicycle.

Data shows that there are less accidents where there are bike lanes or wide curb lanes or paved shoulders. Data also shows that sidewalks and separate bike paths are more dangerous for bicyclists than on-road facilities in many situations. On the road, the bicyclist is within motorists' normal field of driving vision and is part of the traffic flow.

Besides bike lanes or other on-road facilities, education of both bicyclist and motorist is a key to accident prevention. This is especially true at night when more than half of all bike accidents occur, though only three percent (3%) of all bike riding is done during this time.

1.1.5 Design Standards

Section VII addresses design and construction standards, including those used by the State Department of Transportation.

1.1.6 Support Programs

Section VIII considers support programs such as a Bikeways Advisory Committee; a Bikeways Coordinator or designated staff for the county and region; education for both the child and adult bicyclist and motorist; encouragement of safe bicycling through incentives and publicity; and, enforcement of bike laws as a promotion of safe bicycling.
1.1.7 Support Facilities

Section IX addresses support facilities to protect bicyclists and bikes, including parking for bikes, developing park and ride programs where bike racks are attached to the rear of buses, and other amenities.

1.1.8 Financing

This five year Plan requests the County to fund a total of thirty (30) miles of bikeways. Included are 17.5 miles of bikeways from the County Five Year Transportation Improvement Program (TIP) currently not funded or designed. The remaining 12.5 miles do not coincide with scheduled road projects. If those roads are constructed as recommended by the Committee - bike lanes or wide curb lanes or paved shoulders - rather than by the conventional means of providing wide sidewalks, additional funding will be required. Over the next five years, approximately $4.3 million, or $250,000.00 per mile, will need to be added to fund wide curb lanes or paved shoulders with four foot wide sidewalks.

Section X examines funding sources including assistance at the federal and state level as well as cost estimates and discussion of specific road projects. Traditional "pay-as-you-go" transportation schemes do not work with bikes, which generate neither taxes nor entrance fees. However, as the survey showed, a majority of bike and non-bike users support general road tax dollars being used by the Board of County Commissioners to fund bicycle facilities, even if this means delaying motorist facilities.
1.2 POLICIES/RECOMMENDATIONS

1.2.1 Construct the safest and most feasible bikeways in conjunction with all scheduled road improvement projects. In most cases this means a four foot wide bike lane/paved shoulder, or fourteen (14) foot wide curb lane, as part of the roadway, similar to State policy.

1.2.2 Allocate a set amount of funding on a yearly basis for bicycle programs and facilities, starting with the amount needed to fund the five year program included in the attached Plan (see Page 111). Funding sources should include local transportation funds, recreation funds, state and federal funds, grants and discretionary funds. A specific source of funding: dedicate part of the 1/2 mil capital improvement funds to bikeways.

1.2.3 Encourage bikeway systems connecting community parks and neighborhoods. Include bike trails in district and regional parks.

1.2.4 Create a permanent Bicycle Advisory Committee to keep the Board of County Commissioners informed on bicycle related issues, to serve as a liaison with municipalities and oversee implementation of the Bicycle Plan with emphasis on education/safety programs, and locating funding sources.

1.2.5 Establish a bicycle coordinator position or designate appropriate staff to serve Orange County. The coordinator or staff, assisted by the Committee, will unify bicycle programs and policies, gather bicycle data, improve bicycle education, serve as a contact for school and neighborhood groups, and coordinate information from the State Department of Transportation.

a. Encourage all municipalities to prepare and adopt a Bicycle Plan.

b. Establish education programs for school children, adults and motorists, to heighten awareness of bicycle safety rules.
c. Educate law enforcement agencies on bicycle laws and encourage their enforcement.

d. Designate appropriate staff or volunteers to document all bicycle related accidents in Orange County, including municipalities. This information will be categorized according to the Cross System, which identifies the cause, the conditions, the environment and fault. The data collected will identify the most common and serious problems that bicyclists and motorists face in Orange County so that programs may be devised to specifically address these concerns.

e. Study the use of bikeways by County residents. Periodic surveys will identify use patterns and provide future direction for planning.

f. Publish a map for public distribution which identifies the location of bikeways and bike routes most suitable for bike traffic.
II. INTRODUCTION

In August of 1974, the Orange County Board of County Commissioners adopted the County's first Bicycle Plan. This action effectively recognized bicycling as an integral element of this community. There are many reasons bicycling was actively recognized at this time, and they are best summarized in the Resolution of Adoption for that Plan (Table 1.1).

TABLE 1.1

RESOLUTION

WHEREAS, cycling is an activity closely related to the issues of public health, safety, and general welfare; and

WHEREAS, cycling in Orange County is increasing in popularity as a form of recreation, physical fitness, and transportation, creating a traffic hazard; and

WHEREAS, a study of Orange County residents has demonstrated a desire for a program of implementation of bikeways; and

WHEREAS, inadequate facilities presently exist to accommodate the requirements of the citizens interested in cycling; and

WHEREAS, due consideration and study have been given to this question by interested citizens and County staff in the development of a bicycle plan,

NOW, THEREFORE, BE IT RESOLVED by the Board of County Commissioners of Orange County, Florida:

SECTION I. The Board of County Commissioners hereby adopts the Orange County Bicycle Plan as an element of the Orange County Development Policy, consisting of a Bikeway Routing System and supporting report identifying goals, design and construction standards, support programs and a five-year improvements program priority list.

The 1974 Plan was adopted as an element of the original Orange County Development Policy. However, in the years hence, different transportation issues arose in the Central Florida area which delayed enacting measures in the Plan.
Orange County's 1985 Growth Management Policy calls for an update of the Bicycle Plan to reflect the current trends in bicycle use. The Transportation Element discusses the problems associated with bicycling in our present environment. The specific policies in the Transportation Element of the Growth Management Policy which address bicycling are:

1.3.12 Encourage the State and municipalities to incorporate bicycle and pedestrian facilities in conjunction with new highway construction and improvement projects.

1.3.13 When no other safe alternative is available, Orange County will consider the use of local, collector and minor arterial streets as part of the overall bikeway system.

1.3.14 Encourage additional expansion of bikeways along public and private rights-of-way, where feasible; to include but not limited to railroad way abandonments, railroad way rights-of-way, powerline easements, etc.

1.3.15 The County will provide for bikeway facilities in the improvement or construction of roads by Orange County, when such facilities are part of the County Bicycle Plan.

The Future Land Use Element also has several policies addressing bikeways:

COMMERCIAL SECTION

1.0.9 The County should support more direct pedestrian and bikeway linkages between residential areas and open space areas, retail and office concentrations, sururban centers and functionally related residential and open space areas.

13.2.4 The County should encourage efforts to establish a network of pedestrian and bikeway linkages between Central Business Districts and outlying areas.
RESIDENTIAL SECTION

4.0.3 Pedestrian, bicycle and vehicular circulation should be separated in residential areas. Linkages for pedestrian facilities and bikeways should be encouraged between abutting residential areas. Sidewalks may be designed for common utilization by pedestrians and bicyclists where appropriate safety and design standards are followed.

INSTITUTIONAL SECTION

2.2.5 Where possible, school facilities should be within walking distance of their students. Schools should be accessible by adequate sidewalk and bike path facilities as well as other transportation facilities.

RECREATION AND OPEN SPACE SECTION

3.0.1 Where practical, bike paths and pedestrian walkways that provide interconnecting links to adjacent residential and institutional uses should be provided as part of the overall design plan of park and recreational facilities.

Orange County recognizes bicycling as a form of transportation, therefore it is affected by current transportation issues. It is apparent that the focal issue of transportation is relieving automobile traffic congestion on our roads. To this date, the most frequently applied solution has been to widen existing roads and, to a limited extent, build new roads. As a form of transportation, it would be logical to provide for bikeways during the process of road improvements and new construction. This would result in a more comprehensive transportation system, and would be less costly than attempting to rectify a problem of inadequate bikeway facilities at a future date by independently constructing adequate bikeways.

Preserving and protecting the environment is also a primary goal of Orange County, as well as seeking efficient use of energy sources. Bicycling is one form of transportation that is energy efficient and offers an energy benefit to the County. If bicycling is used as an alternative to the automobile for some trips, then a reduction of fuel use and pollutants produced by the automobile would result. Therefore, if adequate bicycle facilities would promote bicycle use, it is possible they could aid in reducing the fuel consumption of our residents, and result in an energy benefit, as well as reduce air pollutants.
Bicycling is very compatible with the climate and geography in Orange County, another factor promoting its use. The County has a year-round average mean temperature of 72.4 degrees. This area's climate is very conducive for year-round riding. The topography of this area is relatively flat, except for the moderate elevations in West Orange County. Figure 1 is a topographic map of the County which depicts the generalized features by geographic areas.

Bicycle facilities could provide complimentary services to this area's public schools and to the area's parks. School-age children may be induced to ride their bicycles to school if more extensive and adequate bikeways were provided. Also, bikeways could serve to connect parks or other community facilities with surrounding neighborhoods. This would allow safer, more efficient access to these areas. In both of these instances, bikeways should be viewed as a public service, and therefore, a benefit to the residents of Orange County.

As indicated from the survey analysis in Chapter Four, there are an estimated 275,600 bicyclists in Orange County. This is approximately half of the 1986 County population. Therefore, bicycling is not a limited, esoteric concern, but rather, it affects large and diverse segments of the population. Also, the benefits of additional bikeways are not limited to only the bicyclist. Bikeways can provide additional road space by including extra footage for bike lanes, or by separating the motorist and bicyclist, reducing the number of bicyclists on the road.

For the above listed reasons, bicycling, an element of transportation, should be considered in our transportation network and plans. Further study may reveal this as one useful method to help alleviate our increasing traffic problems. This Plan has been prepared with that intent.
BACK OF MAP
III. GOALS AND OBJECTIVES

GOALS

3.1 TO DEVELOP A SYSTEM OF BIKEWAYS THAT WILL MEET THE NEEDS OF BOTH COMMUTING AND RECREATIONAL CYCLISTS.

Objectives

3.1.1 Appropriate design standards will be utilized in incorporating bikeways in the design of County roads.

3.1.2 Review new roadway projects to ensure that bicycling needs are adequately considered.

3.1.3 Identify high-accident locations and hazardous areas and determine what design improvements could be made.

3.1.4 Develop a suitability map for distribution to the public which identifies streets that are suitable for bicycle use.

3.1.5 Establish a systematic program for eliminating hazards to bicycling such as unsafe railroad crossings and drainage grates, where applicable.

3.1.6 Encourage the consideration of bicycling needs in the review of all major development plans by Orange County.

3.1.7 Select those bikeway locations that will best serve the needs of Orange County cyclists based on suitability for bicycle use and potential bicycle traffic.

3.1.8 Determine the feasibility of using utility and drainage easements, or abandoned railroad lines for bike facilities.
3.1.9 Determine how much additional right-of-way will be required to complete the selected bikeway system, and estimate the cost.

3.1.10 Develop a coordinated bikeway system with all the municipalities in Orange County and neighboring counties.

3.2 DEVELOP PLAN FOR FUNDING.

Objective

3.2.1 Provide the appropriate state agencies with the adopted Bikeway Plan in order to secure the maximum amount of State and Federal funds for bikeway construction in Orange County.

3.2.2 Apply for all appropriate grants to increase the available funding pool.

3.2.3 Present bikeway needs to the Conservation and Recreational Lands Committee for inclusion in their plan to acquire such land, and appoint a representative to that Committee.

3.2.4 Seek community, business and civic organization support.

3.2.5 Encourage Orange County to budget funds in each year of the five-year planning period for bikeway planning and construction.

3.3 TO EDUCATE THE PUBLIC IN REGARD TO BICYCLE SAFETY.

Objective

3.3.1 Improve existing bicycle education programs at elementary, junior high and high schools, and include instruction on such topics as riding against traffic, left turns, helmet usage, etc.

3.3.2 Promote a series of bicycle rodeos in the area where young bicyclists can learn the rules of the road through actual experience.
3.3.3 Provide bicycle safety information to parents of school-age children.

3.3.4 Improve motorists' understanding of sharing the road with bicyclists by including bicycle-related segments in drivers' education programs.

3.3.5 Obtain the support of local newspapers to run articles on the various bicycle education programs in the area.

3.4 TO IMPROVE THE ENFORCEMENT OF BICYCLE-RELATED LAWS.

Objective

3.4.1 Encourage training programs for law enforcement personnel in regard to enforcement of bicycle laws.

3.4.2 Emphasize the need for obedience of bicycle laws in school bicycle training programs.

3.4.3 Promote stricter enforcement of bicycle laws by the local authorities, particularly regarding wrong-way riding.

3.4.4 Reduce bicycle theft and improve the recovery rate by providing information about how and where to register bicycles and how to properly secure a bicycle.

3.4.5 Support State-wide registration program.

3.5 TO ENCOURAGE THE INCREASED USE OF BICYCLES BY THE GENERAL PUBLIC FOR COMMUTING AND RECREATION.

Objective

3.5.1 Promote public awareness and acceptance of bicycling by preparing and distributing pamphlets on the benefits of bicycling as well as the rules of the road.
3.5.2 Encourage the installation of secure bicycle parking and support facilities at major bicycle destinations in the area.

3.5.3 Encourage Tri-County Transit to provide secure bicycle parking at transit stops, and a mobile rack system attached to buses.

3.5.4 Encourage the appointment of a bicycle coordinator position in this area to serve as a constant information source and liason for County and municipal governments and the East Central Florida Regional Planning Council as well as to facilitate the implementation of area Bicycle Plans, and coordinate needs and systems improvements within the area.
IV. DEFINITIONS

4.1 BIKEWAYS DEFINITIONS

**Bikeway**
Any paved or improved road, path, or way which in some manner is specifically designated as being open to bicycle travel, and can accommodate bicycle travel, regardless of whether such facilities are designated for the exclusive use of bicycles or are to be shared with other transportation modes or pedestrians.

**Bicycle Route**
A segment of a system of bikeways designated by the jurisdiction having authority with appropriate directional and informational markers, with or without a specific bicycle route number (Figure 2).

**Bicycle Lane**
A portion of a roadway which has been designated for the preferential or exclusive use of bicycles, with through travel by motorists and pedestrians prohibited, but with crossflows by pedestrians and motorists permitted. This designation includes striped bike lanes, paved shoulders, and lanes for joint use by disabled vehicles and bicycles (Figure 2).

**Bicycle Path/Wide Sidewalk**
A bikeway which is physically separated from motorized vehicular traffic by an open space or barrier and which is either within the highway right-of-way or within an independent right-of-way. Crossflows with motorized traffic are minimized (Figure 2 depicts a bike path).

**Bicycle Touring Route**
An existing signed roadway with low traffic counts, to provide for long-range recreation.

**Bicycle**
Every vehicle propelled solely by human power upon which any person may ride, in a seated position, having two tandem wheels, and including any vehicle generally recognized as a bicycle though equipped with two front or two rear wheels, except such
FIGURE 2

BICYCLE FACILITY ALTERNATIVES

1. BIKE ROUTE

2. BIKE LANE

3. BIKE PATH
BACK OF FIGURE
vehicles with a seat height of not more than twenty-five (25) inches from the ground when the seat is adjusted to its highest position, and except scooters, skateboards, and similar devices.

**Wide Curb Lane** A urban roadway with an outside lane width of at least fourteen (14) feet for shared motor vehicle-bicycling usage. Stripping may or may not be utilized to indicate a preferred bicycle travel space.

**4.2 BIKEWAY NEEDS**

Citizen interest and need justifies the development of a bikeway system to provide safe recreation and transportation bicycling in Orange County.

The design of the system should be such that it offers the cyclist safe routes within his general neighborhood and also provides connector links between neighborhoods. The system should provide the necessary links to schools, shopping centers, parks, and work areas to encourage the use of the bicycle as a form of transportation.

Due to the increasing number of cyclists interested in recreational cycling, high quality recreational touring routes should be established with access from the interconnected local system to provide extended recreational trips.

There are numerous potential locations for bikeway facilities, which, if properly utilized, would assist in meeting the County’s bikeway needs. These facilities fall into two major categories: roadways and off-road.

**4.3 ROADWAYS**

The existing types of roadways which may be usable as bikeways include roadways with low traffic counts and exceptionally-wide streets. Roads with low traffic counts may be designated as bike routes.

The signing of a roadway as a bicycle route should be viewed primarily as a system of identifying those routes recommended for cyclists to use which provide
the safest route available and may also be useful by notifying motorists to exercise caution due to the cyclists' presence. Bicycle route signing will tend to increase cycling on those streets which are signed by drawing cyclists from dangerous streets to a recommended route. This will assist in reducing the number of motor vehicle and bicycle conflicts on the more dangerous roadways and thereby increase the overall safety to both cyclists and motorists.

A system of bicycle routes may provide a number of attractive features to the cyclists, such as:

1. A safe route for commuting from one point to another;
2. A recreational route in neighborhoods; and,
3. Provide a scenic route for local residents.

In many areas of the County, it is not possible to provide a bicycle lane or a separated path between all points. This fact alone makes it necessary to direct cyclists from area to area on existing roadways.

4.3.1 Bicycle Lanes

Bicycle lanes are a portion of the roadway which have been designated for the preferential or exclusive use of bicyclists. This designation includes striped bike lanes and use for disabled motor vehicles, and generally consist of three to four feet in width.

Bike lanes are established along streets in corridors where there is significant bicycle demand, and where there are distinct needs that can be served by them. The purpose should be to improve conditions for bicyclists in the corridors and to better accommodate bicyclists through corridors with insufficient room for safe bicycling on existing streets. Bike lanes are desirable when traffic volumes or speeds are such that wide curb-lanes are not practical. Other corridors that may warrant bike lanes include:

1. Corridors with heavy bicycle traffic, where bicyclists must frequently pass each other travelling in the same direction.
2. Insufficiently lighted corridors on which frequent nighttime usage is expected, e.g., those with a nighttime entertainment/shopping/education/recreational center as a common destination.

3. Corridors on which lane designation is not complicated by frequent residential or commercial driveways or roadway intersections.

Additional measures that might not be possible on all streets must be implemented on bike lane streets to improve the situation for bicyclists, (e.g., pavement surface improvements, increased sweeping programs, special signal facilities, etc.). Special efforts should be made to ensure that high levels of service are provided within these lanes (i.e., bicycle-sensitive signal actuators, pavement markings, etc.), if bicycle travel is to be regulated by delineation. Additional night lighting of extensively travelled bicycle corridors also increases safety and comfort.

Bicycle lanes can be provided by widening existing roadways, paving shoulder areas, eliminating parking, or using existing emergency lanes (for disabled vehicles).

Disadvantages associated with bike lanes are:

1. Some bicyclists may not have enough experience to safely integrate with motorized vehicles;

2. Motorist may use this lane for parking, thereby displacing the bicyclist; and,

3. Motorist experience an additional on-road concern.

4.3.2 Wide Curb-Lanes/Paved Shoulders

Like bike lanes, wide curb-lanes/paved shoulders are placed along streets in corridors where there is significant bicycle demand. Unlike bicycle lanes, however, wide curb-lanes/paved shoulders are for shared use by bicycle and motorized traffic. The added lane width, generally extended to fourteen
(14) feet, provides greater room for maneuvering and increases the lateral distance between bicyclists and vehicles.

Wide curb-lanes/paved shoulders are appropriate bicycle facilities where traffic speeds and volumes are tolerable for shared roadway facilities.

Wide curb-lane/paved shoulder facilities are selected when there is insufficient room for a separate bike lane, yet significant demand exists for providing a facility of some kind. To many experienced riders, this is the preferred facility type because it integrates bicycle and vehicular traffic, and forces recognition and awareness on the part of the motorist and bicyclist. Some studies have indicated that on-road facilities have a higher safety index than off-road (sidewalk/bike path) facilities.

Wide curb-lane/paved shoulder facilities can be created by widening roadways, by narrowing traffic lanes, or a combination.

In addition to the safety benefits for the bicyclists, wide curb lanes/paved shoulders provide benefits that will improve traffic flow, add to the capacity of the roadway and enhance overall highway safety. Some of those benefits are:

1. Assists a vehicle in turning right into driveways and narrow connecting streets without encroachment into the adjacent lane.

2. Assists a vehicle in entering the roadway from an intersecting roadway or driveway without encroachment into the adjacent lane.

3. Allows a motorist to pass a bicyclist without delay.

4. Reduces the need for vehicles to change lanes because of bicyclists.

Wide curb lanes/paved shoulder disadvantages are similar to bike lanes. However, it is more likely this facility may be used by motorists. This would call for additional awareness on the part of bicyclists and motorists.
Presently, the Florida Department of Transportation (FDOT) encourages the construction of wide curb lanes (14-16 foot wide) or paved shoulders on its road improvement projects.

4.4 OFF-ROAD FACILITIES

4.4.1 Sidewalks

The use of sidewalks to supplement a bikeway system has received mixed reaction from many cyclists and bikeway planners across the Country.

The basic problems commonly involved in using sidewalks as bikeways are: the width, obstructions in the surface, and the amount of pedestrian traffic on the sidewalk. Generally, sidewalks are four (4) feet wide, which would be adequate for only one-way bicycle traffic if there is low pedestrian traffic. In many cases, sidewalks contain a number of physical obstructions such as power poles, signs, and fire hydrants, which pose dangers to the cyclists and are compounded when pedestrians are involved. However, in Orange County, strong regulations are in place to decrease the occurrence of obstructions on sidewalks.

Many experienced bicyclists feel the use of sidewalks as bikeways produces a more dangerous situation than the use of the roadway due to the possible number of access points which must cross the sidewalks. Another point often mentioned by some cyclists is that the sidewalks are much slower to travel on than the roads because of drops, physical obstructions, and often abrupt endings.

Although the sidewalk may be slower than the roadway, in some instances, the relocation of bicycles to the sidewalk may provide safer alternatives than the roadway. Children and inexperienced cyclists in Orange County may not be equipped or knowledgeable enough to safely share the heavily travelled roadways with motorists. Elementary school-age children in particular should be discouraged from attempting on-road riding on moderate or heavily travelled streets.
If the space available for motor vehicles does not provide adequate room for the cyclists and the amount and speed of the traffic is above any perceived safety minimums for shared roadways, then the use of the sidewalks as an alternative should be evaluated to determine its capability of providing the safest cycling route available. However, seven (7) feet wide sidewalks, which allow sufficient room for both low count pedestrian use and bicyclists, are the desired facility when sidewalks are determined to be the most feasible alternative. Each roadway should be evaluated based on requirements to determine the specific bikeway needs.

If adjacent sidewalks are provided, they should be evaluated to determine:

1. The amount of pedestrian use.
2. Whether the width of the sidewalk is able to accommodate pedestrians and cycle traffic.
3. Obstacles within the surface.
4. The number of conflict points.
5. Their degree of safety compared to roadway.

If the sidewalk provides a safer alternative to the adjacent roadway and is capable of accommodating both pedestrian and cycle traffic, then it may be designated as a bikeway to be used by cyclists.

At points where physical obstructions are located in the sidewalk, additional surface may be necessary to enable both pedestrians and cyclists to maneuver around them safely. When this is not possible, cyclists should be warned as to the presence of these obstructions by special signing.

Curb cuts should be provided for access to the sidewalk along with signs to indicate bicyclists are present and also using the facility.

Orange County presently provides seven (7) foot wide sidewalks/bike paths in conjunction with most road improvement projects. These facilities are placed only on one side of a road. A more ideal situation would be to place bike paths on both sides of a road for a more cohesive system, and separate the bicyclists and the pedestrian.
The disadvantages of bike paths/sidewalks are:

1. Often end abruptly and not cohesive;

2. Not as easily maintained and kept clear of debris as on-road facilities;

3. Recent accident data indicates that bike paths often present more of a safety hazard; and,

4. Only allows limited access and few destination points.

4.4.2 Bicycle Paths

Bike paths are an off-road facility that separates bicyclists and motor vehicles. In optimal situations, this facility would be solely for bicyclists, precluding pedestrian use, and would provide sufficient width for bi-directional cycling. Bike paths should offer opportunities not provided by the road system. They can either provide a recreational opportunity or, in some instances, can serve as direct high-speed commuter routes if crossflow by motor vehicles are minimized. The most common uses are along rivers, canals, utility rights-of-way, abandoned railroad rights-of-way, within college campuses, or within and between parks. There may also be situations where such facilities can be provided as part of planned developments.

Another common application is to eliminate impediments to bicycle travel caused by construction of freeways, or because of the existence of natural barriers. In addition, bike paths may be used in areas of anticipated heavy elementary school-age users. These less experienced bicycle riders may be safer when separated from automobile traffic through bicycle paths.

In some cases, bike paths could also be accommodated within interstate or Expressway rights-of-way, assuming that applicable laws permit, and that safety criteria for bicycle and motorized traffic separation are met. Right-of-way widths would have to be such that adequate room exists for the separated facilities.
LEGEND

ORLANDO URBAN AREA TRANSPORTATION STUDY
YEAR 2005 UPDATE  FINANCIALLY FEASIBLE PLAN
HIGHWAY NETWORK

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MAP 3

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ORANGE COUNTY PLANNING DEPARTMENT
BACK OF MAP
Orange County's Financially Feasible Highway Plan (Figure 3) provides an excellent opportunity to develop bikeways in conjunction with road construction projects. Bikeways developed in this manner can provide the necessary facilities on what are now overburdened roadways for both motor vehicles as well as for cyclists. The roadways in this system are widely scattered throughout the County and provide the opportunity to develop an initial link in the overall Bikeway System. Many of these roads are located in areas which have no other alternatives to provide a thru connection for a bikeway from one point to another.

The inclusion of bikeways in the design stage will eliminate problems, such as altering drainage systems and having to maneuver the bikeway around power poles and other obstructions. In sum, this allows for a more comprehensive and efficient bikeway system.

4.5 CROSS COUNTRY ROUTES

Rights-of-way may be used to provide exclusive bicycle facilities separated from motor vehicle traffic. They offer an opportunity to connect roadways which may be equipped with bicycle facilities. Also, they may be located in a rural area which would be favorable for a recreational path. Primarily, rights-of-way provide existing access, some travelling a great distance throughout many parts of the County. These rights-of-way include abandoned railroads, power transmission lines (Florida Power Corporation and Orlando Utilities Commission), and gas transmission lines (Florida Gas).

4.5.1 Abandoned Railroads

The Department of Natural Resources, through the Division of Recreation and Parks, is the contact agency to locate abandoned railroads in Florida which are available for purchase. Abandoned railroads provide potential areas of exclusive limited access bike paths with a high level of safety and aesthetic qualities (Figure 5). Many homeowners and neighborhood associations seek to purchase these railways to maintain the privacy of their communities.
The following inventory from An Inventory of Abandoned Railroads in Florida, prepared by the Florida Department of Natural Resources in 1985, lists those available in Orange County. Portions of this right-of-way may have been purchased and are no longer available.

1. Mascotte to Winter Garden

Location: Counties: Lake, Orange
Cities: Mascotte, Groveland, Clermont, Minneola, Oakland, Winter Garden

Approximate Length: 20.8 miles
Estimated Acreage: 253
Date of Abandonment: 1977-1984
Comments: This line skirts a number of scenic lakes and ponds and adjoins other abandoned rail lines. The line consists of two segments as follows:

<table>
<thead>
<tr>
<th>Segment</th>
<th>Length</th>
<th>Status</th>
</tr>
</thead>
<tbody>
<tr>
<td>Mascotte to Groveland</td>
<td>1.5</td>
<td>Sold</td>
</tr>
<tr>
<td>Groveland to Winter Garden</td>
<td>19.3</td>
<td>Available</td>
</tr>
</tbody>
</table>

2. Ellsworth Junction to Ocoee

Location: Counties: Lake, Orange
Cities: Astatula, Monteverde, Oakland, Winter Garden, Ocoee

Approximate Length: 28.0 miles
Estimated Acreage: 339
Date of Abandonment: 1983
Comments: This line meanders around Lake Apopka and could provide access to the lake for water-based recreation. The line adjoins several other abandonments.
3. Winter Park to Aloma

Location: Counties: Orange
Cities: Orlando, Winter Park
Approximate Length: 3.9 miles
Estimated Acreage: 47
Date of Abandonment: 1970
Comments: This is a relatively short line located in a highly urbanized area. It could provide recreational access to the numerous lakes and ponds it passes.

4. Ellsworth Junction to Winter Garden

Location: Counties: Lake, Orange
Cities: Apopka, Winter Garden
Approximate Length: 27.2 miles
Estimated Acreage: 330
Date of Abandonment: 1970-1983
Comments: This line, when combined with the adjoining Ellsworth to Ocoee line, could create a loop suitable for trail use.

An abandoned railroad was purchased by Orange County for the purpose of constructing a bike path in the mid 1970's. The Board of County Commissioners allocated the necessary funds to construct a bike path on the right-of-way from Cady Way to the Naval Training Center. This path has proven quite successful, evident by the use it receives.

In some cases, the right-of-way property has reverted to the property from which it was originally purchased. In these instances, the use of these rights-of-way would need to be negotiated with the property owners. The Seaboard Coast Line has retained the ownership to the property on some lines. However, the railroad company has indicated willingness to allow utilization of this property for other activities.
back of map
V. SURVEY ANALYSIS

A survey was conducted in the spring of 1986 to sample the opinions of residents in Orange County on bicycling. Various survey methods were considered, but a stratified random telephone survey was chosen. A telephone survey provides quick and dependable access to the public. Also, this method allows for conversation and explanation by the person conducting the interview. The telephone survey allows a sampling of those not directly interested in the topic (non-bicyclists), who may not have taken the effort to mail in responses.

The University of Florida Bureau of Economic and Business Research listed the first quarter 1986 population of Orange County at approximately 576,000. This equates to approximately 200,000 households in the County. In comparison, a similar survey was conducted in April of 1974, by volunteers from the Bicycle Council of Central Florida. The estimated population at that time was 418,918. In that survey, 429 questionnaires were completed, representing .4 percent of the County's households.

The telephone numbers used in the sample were selected from the 1985 Cross-Reference Directory. The directory lists all Orange County phone numbers in numerical order by each prefix or exchange. From each of the exchanges, eliminating those that were primarily businesses or government prefixes, fifty-two (52) were listed. The total number of telephone numbers were counted for each exchange. Based on the population count, a percentage of each exchange was chosen. Approximately 1,500 telephone numbers were selected as the available pool. This was divided into lists of thirty (30) each. Each surveyor was directed to attempt to complete twenty (20) surveys from the list of thirty possible numbers. This would result in a total sample size of 1,000.

The survey was conducted the week of April 14, 1986. The surveyors represented various groups such as the League of Women Voters and the Central Florida Freewheelers Bicycle Club. All respondents were to be at least eighteen (18) years of age. Approximately seven hundred (700) telephone contacts were made, and of this number, five hundred and sixty-seven (567) were used for the survey analysis. The responses not used were eliminated if incorrect, incomplete or ambiguous.
The 567 responses that were tabulated represent a sampling of approximately 0.3 percent of the households in Orange County. As the survey analysis depicts, the completed questionnaires provided a very representative and diverse sampling of this County. Plotting geographic distribution by zip code maps indicates a wide dispersal covering every area in the County, including every municipality and community. Following is the survey used and an analysis of the responses.

**TABLE 5.1**

4/8/86

**ORANGE COUNTY BICYCLE SURVEY**

1. Do you live in Orange County? _____ If yes, zip code? _________________

2. Do you ride a bicycle? yes (1) no (2) _____ 1

3. How many bicycles are there in your household? ______ 2

   0 (1) 1 (2) 2 (3) 3 (4) 4-6 (5) more (6)

4. What are the ages of the bicycle riders in your household? ______ 3

   1-11 (1) 12-18 (2) 19-34 (3) 35-50 (4) 51+ (5)

   IF THERE ARE ANY BICYCLIST IN CATEGORY 1 OR 2, PROCEED TO #5

5. Do the schoolage bicyclists ride their bicycle to school? ______ 4

   yes (1) no (2) If yes, how far: _____ (blocks)

   If no, why not: _____ To Far

       _____ Too much traffic

       _____ Insufficient Facilities

       _____ Other

   * * * * * * * * IF ANSWER TO #2 WAS NO, PROCEED TO QUESTION #15 * * * * * *

   Questions to be answered by cyclist.

6. How often do you ride your bicycle in a week? ______ 5

   Less than once (1) 1-2 (2) 3-4 (3) 5 (4) Daily (5)
7. For what primary purpose do you ride your bicycle? 

(1) _____ Recreation (sport racing, distance riding, visit friends, around neighborhoods, ride with family, exercise, etc.)
(2) _____ Transportation (to work, to school, to shop, errands, etc.)
(3) _____ Other __________________________

8. Which type of bicycle facility do you prefer most? 

(Rank in order of preferences: 1 - most preferred; 4 - least preferred)

(1) _____ Sidewalk shared with pedestrians
(2) _____ Designated bikelanes on roadways
(3) _____ Local roads with little traffic
(4) _____ Separate path for cyclist

9. How "safe" is bicycling in Orange County? 

Safe  Fairly Safe  Not Very Safe  Dangerous
(1)     (2)     (3)     (4)

If answered not very safe or dangerous, what is the primary reason?


10. Have you been in an accident with a motor vehicle while riding your bicycle? 

Yes (1)  No (2)

11. Did you report the accident? 

Yes (1)  No (2)

12. Would you ride your bicycle more if safe bikeway facilities were provided? 

Yes (1)  No (2)

13. Would you be willing to pay a small licensing fee each year for bicycle programs? 

Yes (1)  No (2)

14. Would you support Orange County spending a share of transportation funds on bicycle facilities and programs with the possibility of some road projects being delayed? 

Yes (1)  No (2)
Questions to be answered by non-cyclist

15. What factors keep you from riding a bicycle?
   (1) Road Conditions
   (2) Traffic
   (3) Motorist attitude
   (4) Lack of facilities at destination (shower/change)
   (5) Lack of facilities to store/lock bicycle
   (6) Other

16. Would you ride a bicycle either for transportation or recreation if safe bikeways were provided?
   Yes (1) No (2)

17. Do you feel most bicyclist ride their bicycles in a proper manner?
   Yes (1) No (2)

18. Would you support Orange County spending a share of transportation funds on bicycle facilities and programs with the possibility of some road projects being delayed?
   Yes (1) No (2)

QUESTIONS TO BE ANSWERED BY ALL

I would like your response to a few personal questions on education and income. This information is in strict confidence and will only be used to give a profile of the overall survey respondents.

19. How many years of school have you completed?
   (1) Less than 12
   (2) High school graduate
   (3) Attended college
   (4) College graduate

20. In general, what is your family income?
   (1) Less than $15,000/year
   (2) $15,000 to $29,999
   (3) $30,000 or more
21. What is your sex?

Male (1)   Female (2)

SURVEY RESULTS AND ANALYSIS

The following results have been complied from the 567 completed surveys. This represents approximately 0.3 percent of Orange County households.

QUESTION #2: DO YOU RIDE A BICYCLE?

<table>
<thead>
<tr>
<th>Yes</th>
<th>49.7%</th>
</tr>
</thead>
<tbody>
<tr>
<td>No</td>
<td>50.3%</td>
</tr>
<tr>
<td></td>
<td>100.0%</td>
</tr>
</tbody>
</table>

282 of the 567 respondents, or 49.7%, indicated they ride a bicycle. Applying this to 1985 population counts for Orange County would suggest a total of approximately 275,665 bicyclists County-wide. This figure may be inflated due to the lack of a qualifying statement, such as whether one presently rides a bicycle. Also, as noted in Question #6 below, over 25% of those who considered themselves a bicyclist ride an average of less than once a week. Even with a qualifier, the survey exhibits a substantial number of bicyclists, or those who have an interest in bicycling in Orange County.

QUESTION #3: HOW MANY BICYCLES ARE THERE IN YOUR HOUSEHOLD?

<p>| | |</p>
<table>
<thead>
<tr>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>0</td>
<td>43.4%</td>
</tr>
<tr>
<td>1</td>
<td>22.4%</td>
</tr>
<tr>
<td>2</td>
<td>18.3%</td>
</tr>
<tr>
<td>3</td>
<td>9.3%</td>
</tr>
<tr>
<td>4-6</td>
<td>6.2%</td>
</tr>
<tr>
<td>7+</td>
<td>0.4%</td>
</tr>
<tr>
<td></td>
<td>100.0%</td>
</tr>
</tbody>
</table>
Of the 567 respondents, 43.4% answered none; 127 (22.4%) answered they have one bicycle for a total of 127; 104 (18.3%) answered they have two bicycles for a total of 208 bicycles; 53 respondents (9.3%) answered they have three bicycles for a total of 159 bicycles; 35 respondents (6.2%) answered they have between four and six bicycles for an average total of 175 bicycles; and two respondents (0.4%) answered they have more than six bicycles for an average total of 14 bicycles. The total number of bicycles in these households is 683. Based on the survey respondents, this would yield an average of 1.2 bicycles per household in Orange County.

Extrapolating from this data, it can be assumed that County-wide there are approximately 240,000 bicycles in 200,000 households. This estimate may be low because some respondents who answered "no" to Question #2 were not asked this question, therefore they were listed in the no bicycle category. Therefore, if someone in that household other than the respondent owns a bicycle, it may not be reflected in our survey.

**QUESTION #4: WHAT ARE THE AGES OF THE BICYCLE RIDERS IN YOUR HOUSEHOLD?**

<table>
<thead>
<tr>
<th>Ages</th>
<th>Percentage</th>
</tr>
</thead>
<tbody>
<tr>
<td>1-11</td>
<td>5.5%</td>
</tr>
<tr>
<td>12-18</td>
<td>10.8%</td>
</tr>
<tr>
<td>19-34</td>
<td>39.2%</td>
</tr>
<tr>
<td>35-50</td>
<td>27.2%</td>
</tr>
<tr>
<td>51+</td>
<td>17.3%</td>
</tr>
</tbody>
</table>

This question received 324 responses. The assumption is made that there were no bicycle riders in the remaining 243 households, and this may alter the results of this question. Some surveyors did not ask this question to those who answered "no" to Question #2. Therefore, if there were bicyclists in a household where a non-bicyclist answered the survey, the bicyclists would not surface in our results. This may account for the relatively low amount of school-age children shown in the results, as no one was surveyed who was under 18 years of age. The largest group of surveyed bicycle riders are between the age of 19 and 34. This is also the most populous age category in Orange County.
QUESTION #5: DO THE SCHOOL-AGE BICYCLISTS RIDE THEIR BICYCLES TO SCHOOL?

This question did not receive sufficient response to allow conclusive analysis.

QUESTIONS SIX THROUGH FOURTEEN WERE ANSWERED ONLY BY THOSE ANSWERING YES TO QUESTION #2 (BICYCLIST).

QUESTION #6: HOW OFTEN DO YOU RIDE YOUR BICYCLE IN A WEEK?

<table>
<thead>
<tr>
<th>Frequency</th>
<th>Percentage</th>
</tr>
</thead>
<tbody>
<tr>
<td>Less than once</td>
<td>25.6%</td>
</tr>
<tr>
<td>1-2</td>
<td>25.9%</td>
</tr>
<tr>
<td>3-4</td>
<td>23.0%</td>
</tr>
<tr>
<td>5</td>
<td>7.1%</td>
</tr>
<tr>
<td>Daily</td>
<td>18.4%</td>
</tr>
<tr>
<td>Total</td>
<td>100.0%</td>
</tr>
</tbody>
</table>

More than 51% of the respondents ride bicycles an average of no more than twice a week. This would suggest approximately half of the bicyclists do not depend upon this as a form of transportation on a continuing basis and this is supported by the large number of responses indicating recreation as their primary purpose for riding (Question #7). Approximately 25% of the respondents ride bicycles an average of less than once a week. However, more than twenty-five percent (25%) of those sampled ride at least five times a week, which suggests an active bicycle riding population in Orange County.

Further analysis relating to how often bicyclists ride is as follows:
According to the survey results, half of the bicycle riders between the ages of 1 and 11 ride an average of less than once a week. Of those remaining, 25 percent ride an average of once or twice, and 25 percent ride an average of three or four times per week. However, as stated earlier, schoolage children are probably under-represented in this survey, therefore these results may not be indicative of the general school-age population. The results of the 12-18 age group survey are more equally distributed; 16 percent ride an average of less than once a week and in the remaining categories each received 21 percent of the responses. The 19-34 and 35-50 age groups also have a relatively equal distribution, except in the category of five times per week. Most notable about these results is in the two largest age group categories (19-34 and 35-50, which accounts for over 66 percent of all bicycle riders), over half frequently ride their bicycles at least three times per week. This identifies a bicycle riding population that is more active, and may be more aware of the current concerns confronting bicyclists. Those over the age of 51 show a tendency to ride less frequently. Over 60 percent of these bicyclists ride on average less than twice a week. These results reveal the bicyclist most likely to be on the road often is between the ages of 19 and 50.

QUESTION #7: FOR WHAT PRIMARY PURPOSE DO YOU RIDE YOUR BICYCLE?

<table>
<thead>
<tr>
<th>Purpose</th>
<th>1-11</th>
<th>12-18</th>
<th>19-34</th>
<th>35-50</th>
<th>51+</th>
</tr>
</thead>
<tbody>
<tr>
<td>Recreation</td>
<td>85.8%</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Transportation</td>
<td>12.8%</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Other</td>
<td>1.4%</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

100.0%
According to the survey, recreation is the primary purpose of bicycle usage in Orange County. This may be because bicycling serves as a good form of exercise, is relatively inexpensive, and can be considered a family activity. Also, our climate and level terrain is an inducement for this activity. This is reflected by the large number of responses (85.8%) to this question. Bicycle ridership for the purpose of transportation (to work, to school, to shop, errands, etc.) was low. This may be because transportation uses require additional accommodations not needed for recreational purposes. Features such as transportation routes to major employment centers and additional support facilities are needed to effectively support such a utilitarian use of the bicycle. Also, as noted earlier, bicycle riders under the age of 18 are under-represented in this survey. It is very possible there is a higher percentage of bicyclists in this age group who depend upon the bicycle for transportation to school and to work.

A further breakdown of the primary purpose of use for bicyclist by age is as follows:

<table>
<thead>
<tr>
<th>PURPOSE BY AGE</th>
<th>1-11</th>
<th>12-18</th>
<th>19-34</th>
<th>35-50</th>
<th>51+</th>
</tr>
</thead>
<tbody>
<tr>
<td>Recreation</td>
<td>100.0%</td>
<td>63.2%</td>
<td>84.7%</td>
<td>90.7%</td>
<td>94.0%</td>
</tr>
<tr>
<td>Transportation</td>
<td>---</td>
<td>36.8%</td>
<td>15.3%</td>
<td>9.3%</td>
<td>6.0%</td>
</tr>
<tr>
<td></td>
<td>100.0%</td>
<td>100.0%</td>
<td>100.0%</td>
<td>100.0%</td>
<td>100.0%</td>
</tr>
</tbody>
</table>

The younger age groups tend to rely on the bicycle for transportation purposes more than the older age groups. However, recreation is the primary purpose of riding, regardless of age.

<table>
<thead>
<tr>
<th>FREQUENCY BY PURPOSE</th>
<th>Recreation</th>
<th>Transportation</th>
</tr>
</thead>
<tbody>
<tr>
<td>Less than once per week</td>
<td>27.3%</td>
<td>11.1%</td>
</tr>
<tr>
<td>1 - 2 times per week</td>
<td>29.3%</td>
<td>5.6%</td>
</tr>
<tr>
<td>3 - 4 times per week</td>
<td>23.1%</td>
<td>22.2%</td>
</tr>
<tr>
<td>5 times per week</td>
<td>5.4%</td>
<td>16.7%</td>
</tr>
<tr>
<td>Daily</td>
<td>14.9%</td>
<td>44.4%</td>
</tr>
<tr>
<td></td>
<td>100.0%</td>
<td>100.0%</td>
</tr>
</tbody>
</table>
The results of the table above show that those bicyclists who ride primarily for recreation tend to ride less frequently than those who utilize their bicycles for transportation. Of those who ride for recreation, almost sixty percent ride less than twice a week, compared with over sixty percent of those who ride for transportation who ride at least five times a week.

**QUESTION #8: WHICH TYPE OF FACILITY DO YOU PREFER MOST?**

The respondents were asked to rank the facilities in order of preference: 1 is the most preferred and 4 is least preferred. (For tabulation purposes, the figures shown below are the percentages of the most preferred).

<table>
<thead>
<tr>
<th>Facility</th>
<th>Percentage</th>
</tr>
</thead>
<tbody>
<tr>
<td>Sidewalk with pedestrians</td>
<td>11.4%</td>
</tr>
<tr>
<td>Designated bikelanes on roadways</td>
<td>17.6%</td>
</tr>
<tr>
<td>Local roads with little traffic</td>
<td>11.4%</td>
</tr>
<tr>
<td>Separate path for cyclist</td>
<td>59.6%</td>
</tr>
</tbody>
</table>

The majority of the respondents prefer to cycle on a bikepath separate from pedestrians and motorists. This is probably based on the perception of a separate path being safer than the other alternatives listed and the orientation to recreational riding. The increasing automobile traffic levels in Orange County may be a factor influencing many of the respondents. The next most preferred facility was designated bikelanes on roadways. Local roads, or bikeroutes, and sidewalks were the least preferred of the facilities.

One important point that should be noted is that the different types of bikeways, i.e. bike lanes and bike paths, are not clearly defined. Few people outside of bicycle enthusiasts are thoroughly aware of the advantages and disadvantages of each type of facility.

Further analysis on the preference of bicycle facilities by the primary purpose of use is as follows:
FACILITY BY PURPOSE

<table>
<thead>
<tr>
<th></th>
<th>Recreation</th>
<th>Transportation</th>
</tr>
</thead>
<tbody>
<tr>
<td>Sidewalk</td>
<td>12.4%</td>
<td>5.7%</td>
</tr>
<tr>
<td>Bikelanes</td>
<td>17.8%</td>
<td>14.3%</td>
</tr>
<tr>
<td>Local Roads</td>
<td>12.4%</td>
<td>2.9%</td>
</tr>
<tr>
<td>Separate Path</td>
<td>57.3%</td>
<td>77.1%</td>
</tr>
<tr>
<td></td>
<td>100.0%</td>
<td>100.0%</td>
</tr>
</tbody>
</table>

A separate path is the preferred facility regardless of the primary purpose of riding a bicycle. Most notable, however, is that a separate path is preferred so overwhelmingly by those who rely on the bicycle for transportation. Seventy-seven percent (77%) of these bicyclists preferred a separate path. This result would tend to contradict the prevailing belief of many bicycling enthusiasts that bikelanes are the best facility for transportation purposes. The respondents were likely unfamiliar with bike lanes and wide curb lanes, as there are few presently in the County. Bicycling experts currently contend that bikelanes on roadways offer bicyclists greater access and allow a higher speed of travel than bikepaths. Since bikepaths separate bicyclists and motorists, many County residents may perceive this facility to be safer than bike lanes.

QUESTION #9: HOW "SAFE" IS BICYCLING IN ORANGE COUNTY?

<p>| | |</p>
<table>
<thead>
<tr>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>Safe</td>
<td>5.7%</td>
</tr>
<tr>
<td>Fairly safe</td>
<td>30.2%</td>
</tr>
<tr>
<td>Not very safe</td>
<td>34.9%</td>
</tr>
<tr>
<td>Dangerous</td>
<td>29.2%</td>
</tr>
<tr>
<td></td>
<td>100.0%</td>
</tr>
</tbody>
</table>

Over 64% of the respondents feel bicycling in Orange County is not safe. The primary reasons given by respondents for this perceived unsafe state of bicycling are: lack of adequate bicycle facilities; motorists have a negative attitude towards bicyclists; and, existing road conditions are not conducive to bicycling.

Further analysis on the "safety" index of bicycling in Orange County correlated by the frequency of riding is as follows:
FREQUENCY BY SAFETY

<table>
<thead>
<tr>
<th>Frequency</th>
<th>Safe</th>
<th>Fairly Safe</th>
<th>Not Very Safe</th>
<th>Dangerous</th>
</tr>
</thead>
<tbody>
<tr>
<td>1/Week</td>
<td>7.0%</td>
<td>29.6%</td>
<td>38.0%</td>
<td>25.4%</td>
</tr>
<tr>
<td>1-2/Week</td>
<td>4.1%</td>
<td>28.8%</td>
<td>42.5%</td>
<td>24.6%</td>
</tr>
<tr>
<td>3-4/Week</td>
<td>9.2%</td>
<td>26.2%</td>
<td>30.8%</td>
<td>33.8%</td>
</tr>
<tr>
<td>5/Week</td>
<td>---</td>
<td>35.0%</td>
<td>50.0%</td>
<td>15.0%</td>
</tr>
<tr>
<td>Daily</td>
<td>3.8%</td>
<td>36.5%</td>
<td>19.2%</td>
<td>40.4%</td>
</tr>
</tbody>
</table>

The results of this correlation show overall that regardless of the frequency of use, the highest response is "not safe" or "dangerous." However, the response of the higher frequency riders (five times a week and/or daily), is notable. Fifty percent (50%) of those who ride an average of five times a week consider bicycling not very safe. This is compared to a response of 34.9 percent (average) of all bicyclists (as noted in the previous chart). Over 40 percent of those who ride daily consider bicycling in Orange County dangerous. This is compared to a response of 29.2% for all bicyclists.

**QUESTION #10: HAVE YOU BEEN IN AN ACCIDENT WITH A MOTOR VEHICLE WHILE RIDING YOUR BICYCLE?**

<table>
<thead>
<tr>
<th>Response</th>
<th>Percentage</th>
</tr>
</thead>
<tbody>
<tr>
<td>Yes</td>
<td>10%</td>
</tr>
<tr>
<td>No</td>
<td>90%</td>
</tr>
</tbody>
</table>

**QUESTION #11: DID YOU REPORT THE ACCIDENT?**

<table>
<thead>
<tr>
<th>Response</th>
<th>Percentage</th>
</tr>
</thead>
<tbody>
<tr>
<td>Yes</td>
<td>50%</td>
</tr>
<tr>
<td>No</td>
<td>50%</td>
</tr>
</tbody>
</table>

Ten percent (10%) of the respondents were involved in accidents with motor vehicles, yet only half of these were reported. This suggests that only half of all the accidents involving bicyclists are actually reported to law enforcement agencies in Orange County. This under-representation of information may conceal accurate measures on the safety of bicycling in Orange County. Accurate data is needed to determine the hazardous traffic locations and practices so they may be properly addressed.
QUESTION #12: WOULD YOU RIDE YOUR BICYCLE MORE IF SAFE BIKEWAY FACILITIES WERE PROVIDED?

Yes 80.7%
No 19.3%
100.0%

The overwhelmingly positive response to this question suggests bicycling could rise even higher in popularity if additional adequate facilities were in place to serve the County.

QUESTION #13: WOULD YOU BE WILLING TO PAY A SMALL LICENSING FEE EACH YEAR FOR BICYCLE PROGRAMS?

Yes 74.5%
No 25.5%
100.0%

The respondents answered in the affirmative by a three to one margin. This suggests that bicyclists recognize the need for funding mechanisms, no matter how minute, to help improve bicycling in Orange County.

QUESTION #14: WOULD YOU SUPPORT ORANGE COUNTY SPENDING A SHARE OF TRANSPORTATION FUNDS ON BICYCLE FACILITIES AND PROGRAMS WITH THE POSSIBILITY OF SOME ROAD PROJECTS BEING DELAYED?

Yes 64.1%
No 35.9%
100.0%

This question was answered in the affirmative by almost a two to one margin. The question was posed in a direct manner to emphasize that funds spent on bicycle improvements would possibly come from transportation dollars collected through the various taxes and fees imposed in Orange County that are spent on road improvements. This response suggests that bicyclists see a strong need for the provision of additional bikeways and bicycle programs, even at a time when many people apparently feel that our road system should be the focal point of all attention and transportation dollars. As
noted in Question #6, over half of the bicyclists ride an average of less than twice a week. Therefore, the overwhelming affirmative response in this question might suggest that spending transportation dollars for bikeways is supported by the bicycle enthusiasts, as well as by those who seldom ride.

Further analysis on the question of funding support correlated with how safe is bicycling considered in Orange County is as follows:

**FUNDING BY SAFETY**
(Support more Funding for Bikeways)

<table>
<thead>
<tr>
<th></th>
<th>Safe</th>
<th>Fairly Safe</th>
<th>Not Very Safe</th>
<th>Dangerous</th>
</tr>
</thead>
<tbody>
<tr>
<td>Yes</td>
<td>60.0%</td>
<td>56.0%</td>
<td>67.7%</td>
<td>70.0%</td>
</tr>
<tr>
<td>No</td>
<td>40.0%</td>
<td>44.0%</td>
<td>32.3%</td>
<td>30.0%</td>
</tr>
<tr>
<td>100.0%</td>
<td>100.0%</td>
<td>100.0%</td>
<td>100.0%</td>
<td>100.0%</td>
</tr>
</tbody>
</table>

As might be expected, those most apt to support spending a share of transportation funds on bicycle facilities and programs are those who do not consider bicycling safe in Orange County. As noted, those who consider bicycling "not very safe" or "dangerous" supported funding by over a two to one margin.

**QUESTIONS 15 THROUGH 18 WERE ANSWERED ONLY BY NON-CYCLISTS.**

**QUESTION #15: WHAT FACTORS KEEP YOU FROM RIDING A BICYCLE?**

<table>
<thead>
<tr>
<th>Factor</th>
<th>Percentage</th>
</tr>
</thead>
<tbody>
<tr>
<td>Road conditions</td>
<td>14.4%</td>
</tr>
<tr>
<td>Traffic</td>
<td>17.9%</td>
</tr>
<tr>
<td>Motorist attitude</td>
<td>1.0%</td>
</tr>
<tr>
<td>Lack of facilities at destination</td>
<td>0.3%</td>
</tr>
<tr>
<td>Lack of facilities to store/lock bicycle</td>
<td>1.8%</td>
</tr>
<tr>
<td>Other</td>
<td>64.6%</td>
</tr>
<tr>
<td></td>
<td>100.0%</td>
</tr>
</tbody>
</table>
The majority of the respondents fell in the category of "other." The predominant explanation given for other was age, as many felt they were too old to ride a bicycle. This may be attributed to our growing senior citizen population. However, over 35% of the respondents indicated reasons that could be addressed through continued bikeway planning and construction. The number of bicyclists could theoretically increase by approximately 97,650 people if 35% of the current non-cycling population choose to ride, assuming the reasons they cited for discouraging riding were rectified.

**QUESTION #16: WOULD YOU RIDE A BICYCLE EITHER FOR TRANSPORTATION OR RECREATION IF SAFE BIKEWAYS WERE PROVIDED?**

<p>| | |</p>
<table>
<thead>
<tr>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>Yes</td>
<td>53%</td>
</tr>
<tr>
<td>No</td>
<td>47%</td>
</tr>
</tbody>
</table>

This response substantiates Question #15, as over half of those not currently riding indicate they would become bicyclists if safe bikeways were provided. This response suggests over half of the non-cyclist population are currently discouraged from engaging in this activity due to safety concerns.

**QUESTION #17: DO YOU FEEL MOST BICYCLISTS RIDE THEIR BICYCLES IN A PROPER MANNER?**

<p>| | |</p>
<table>
<thead>
<tr>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>Yes</td>
<td>48.9%</td>
</tr>
<tr>
<td>No</td>
<td>51.1%</td>
</tr>
</tbody>
</table>

Approximately half of the respondents feel most bicyclists do not ride their bicycles in a proper manner. This suggests a need for better educational programs for bicyclists, as well as enforcement of bicycle laws.
QUESTION #18: WOULD YOU SUPPORT ORANGE COUNTY SPENDING A SHARE OF TRANSPORTATION FUNDS ON BICYCLING FACILITIES AND PROGRAMS WITH THE POSSIBILITY OF SOME ROAD PROJECTS BEING DELAYED?

Yes 53%
No 47%
100%

Over half of the non-cyclists responded in support of this question. This suggests non-cyclists also realize the importance and positive impact bikeway facilities and programs could have in Orange County by increasing safety for both bicyclists and motorists.

QUESTIONS 19 THROUGH 21 WERE ANSWERED BY CYCLISTS AND NON-CYCLISTS. THESE QUESTIONS WERE ASKED TO DETERMINE THE SOCIO-ECONOMIC CHARACTERISTICS OF THE SURVEY RESPONDENTS FOR TABULATION PURPOSES AND WILL NOT BE DISCLOSED.

The Orange County Parks and Recreation Department conducted a survey in September 1985. Bicycling fared well as an activity favored by the County residents. A summary of the responses are shown in Appendix C.
6.1 ISSUE IDENTIFICATION

As the number of bicyclists have increased on the County's roadways, the number of opportunities for conflict between motorists and bicyclists has also grown. This has resulted in an alarming increase in the number of accidents involving bicyclists and motorists. Since 1980, Florida has been among the leaders in the nation in bicycle fatalities. Table 6.1 depicts this occurrence. Table 6.3 and 6.4 highlight the accident information in Florida for 1984 and 1985.

TABLE 6.1
LEADING STATES/FATAL ACCIDENTS
1980-85

<table>
<thead>
<tr>
<th></th>
<th>FL</th>
<th>CA</th>
<th>NY</th>
<th>TX</th>
</tr>
</thead>
<tbody>
<tr>
<td>1980</td>
<td>99</td>
<td>101</td>
<td>63</td>
<td>54</td>
</tr>
<tr>
<td>1981</td>
<td>118</td>
<td>115</td>
<td>68</td>
<td>62</td>
</tr>
<tr>
<td>1982</td>
<td>121</td>
<td>95</td>
<td>66</td>
<td>64</td>
</tr>
<tr>
<td>1983</td>
<td>88</td>
<td>105</td>
<td>61</td>
<td>48</td>
</tr>
<tr>
<td>1984</td>
<td>118</td>
<td>93</td>
<td>68</td>
<td>51</td>
</tr>
<tr>
<td>1985</td>
<td>100</td>
<td>136</td>
<td>65</td>
<td>59</td>
</tr>
</tbody>
</table>

Note: The actual number of fatalities in Florida are slightly higher than indicated here. This is due to differences in recording fatalities by the National Highway Traffic Safety Administration and Florida Department of Transportation. FARS data for Florida are consistently lower than those actually recorded in Florida.

Nation-wide, fatal bicycle accidents declined from an all time high of 1,200 in the late seventies to 849 in 1984. During this same period, Florida's accident rate rose from 61 fatalities to 118. Thus Florida, with 4.63 percent of the U.S. resident population, has 13.9 percent of the fatal bicycle accidents, or three times as great as the national average on a per capita basis.
This increase is due to a number of reasons, including the bicyclist's violation of laws and safety rules; inattentive motorists; adverse road conditions due to debris, fixed objects, poor riding surface, curbs, and gratings.

Although the popular view may be that children are primarily involved in accident statistics, this is not entirely the case. Information distributed by the Florida Department of Transportation in its Annual Accident Summary, indicate children (14 and under) made up ninety percent (90%) of all fatal accidents nationwide for many years. But with the popularization of bicycling in the early 1970's, more adults joined children in this activity, and now are an equal one-half of those killed while bicycling. In 1984, adults (15 and over) comprised sixty-six percent (66%) of the nations fatalities. In 1984, twenty-nine (29) of the fatalities were senior adults (55 and over).

A startling fact reported in the 1984 Florida Department of Transportation Bicycle Accident Summary, is that in eighty-two percent (82%) of adult bicycle accidents, the motorists committed the primary error resulting in the accident. This includes motorists turning right or left across the cyclist's path and motorists pulling into the path of a bike rider at a stop sign or driveway. However, bicyclists share in committing errors leading to accidents when adults and children accident figures are combined. Bicyclists committed an error in eighty-four percent (84%) of accidents. This growing trend highlights the need for bicycle education programs for both motorists and bicyclists.

The bicycle safety atmosphere in Florida is also reflected in Orange County. The Florida Highway Patrol reported fourteen (14) deaths each year for 1984 and 1985 in the Central Florida area. Ten of the municipalities in Orange County reported a total of 186 accidents and two (2) fatalities in 1985. However, reporting and recording of bicycle related accidents has not been strictly maintained and those numbers could possibly be higher. Orange County was ranked the sixth most "at risk" place to bicycle in this State by the Department of Community Affairs, Bureau of Public Safety Management. This was based on the accident rate, accident magnitude and trends for a three year period (Table 6.2). The accident rate measured the number of fatalities and injuries per one thousand of the population. Accident magnitude measured the absolute number of fatalities and injuries. This tends to disfavor the counties with a large
bicycling population. Accident trends measure the short-term average and the long-term average of accident figures. This reflects any improvements being made to better bicycling conditions within a County.

Each of these factors is indexed separately then combined, to determine an average score which leads to the County ranking.

TABLE 6.2
1983 - 1985 COUNTY RANKING: DEPARTMENT OF COMMUNITY AFFAIRS PROBLEM MATRIX

5. Pinellas 10. Dade 15. Martin

There are various factors involved in improving the "safety index" for bicycling. The role of bikeways in accident reduction has proven to be a valid factor. An increasing amount of available information confirms that bikeways play a vital part in decreasing bicycle accidents, as evidenced in the cities of Gainesville and Sarasota. However, the main reason for the increase in bicycle accidents would appear to be the lack of education on proper bicycle use by both the bicyclist and the motorist.

Anyone may purchase a bicycle and immediately start riding. There is no system requiring a check-ride, licensing, training or registration; such as is required for motorists and motor vehicles. A surprisingly large number of bicyclists are not familiar with the rules of the road as they pertain to bicycles.

On the other side, too many motorists don't realize that bicycles can legally ride on the road. They are bike-path oriented and vehemently believe that all bicycles belong on a bike-path and not on the roads.

These two factors lead to many bicycle accidents. This situation will not improve by itself, and therefore should not be ignored. All national predictions
foresee a steady increase in the popularity of bicycling. That fact, combined with Florida's above average population increase, will result in more motorists and bicyclists on already over-crowded roads.

Two aspects of the bicycle accident situation are notable:

1. In Florida, three percent (3%) of the bicycle riding is done at night but over sixty percent (60%) of the bicycle accidents occur at night. Most of this can be blamed on the bicyclists; riding at night without any (or with inadequate) lights, and wearing dark clothes.

2. The incidence of drunk bicyclists involved in accidents has risen dramatically. During the last ten (10) years, the number of fatal bicycle accidents in which the bicyclist was intoxicated has jumped from under three percent (3%) to twenty percent (20%).

Bicycle facilities also factor in accident causation. The following is extracted from a report titled: The Characteristics of Adult Bicycle Users, Ferold Kaplan, 1975.

<table>
<thead>
<tr>
<th>Facility Type</th>
<th>Miles Traveled</th>
<th>Number Of Accidents Reported</th>
<th>Rate Per Million Miles</th>
</tr>
</thead>
<tbody>
<tr>
<td>1. Off-Street Bicycle Facility (path)</td>
<td>264,000</td>
<td>81</td>
<td>291.6</td>
</tr>
<tr>
<td>2. On-Street Bicycle Facility (lane, route)</td>
<td>241,000</td>
<td>14</td>
<td>58.1</td>
</tr>
</tbody>
</table>
### SUMMARY OF GAINESVILLE BICYCLE/MOTOR VEHICLE ACCIDENTS
#### BY FACILITY TYPE
#### 1983 - 1986

<table>
<thead>
<tr>
<th>Facility Type</th>
<th>1983</th>
<th>1984</th>
<th>1985</th>
<th>1986</th>
<th>Total</th>
</tr>
</thead>
<tbody>
<tr>
<td>Bike Lane</td>
<td>11 (4)</td>
<td>11 (3)</td>
<td>19 (8)</td>
<td>9 (5)</td>
<td>50 (20) 8.2%</td>
</tr>
<tr>
<td>Wide Curb Lane</td>
<td>9 (2)</td>
<td>9 (1)</td>
<td>11 (1)</td>
<td>8 (2)</td>
<td>37 (6) 6.1%</td>
</tr>
<tr>
<td>Parking/Refuge Lane</td>
<td>1 (0)</td>
<td>2 (1)</td>
<td>2 (1)</td>
<td>4 (1)</td>
<td>9 (3) 1.5%</td>
</tr>
<tr>
<td>Sidewalk/Bikepath</td>
<td>71 (57)</td>
<td>74 (43)</td>
<td>63 (50)</td>
<td>66 (49)</td>
<td>274 (199) 45.4%</td>
</tr>
<tr>
<td>No Bike Facilities</td>
<td>58 (3)</td>
<td>52 (6)</td>
<td>65 (11)</td>
<td>41 (1)</td>
<td>216 (21) 35.8%</td>
</tr>
<tr>
<td>Unknown</td>
<td>3</td>
<td>3</td>
<td>3</td>
<td>9</td>
<td>18     3.0%</td>
</tr>
<tr>
<td><strong>TOTAL</strong></td>
<td>153 (66)</td>
<td>151 (54)</td>
<td>163 (71)</td>
<td>137 (58)</td>
<td>604 (249) 100.0%</td>
</tr>
</tbody>
</table>

**NOTE:** For x(y), y is the number of people within x, who were riding against traffic.

**Note on above breakdown:**

The facility breakdown in this study was 146 miles of sidewalks/bike paths versus 45 miles of bike lanes/curb lanes/refuge lanes. Of the 274 sidewalk/bike path accidents, 19.9, or 72.6%, of the bicyclists were riding against the flow of motorized traffic operating in the adjacent street. Thus, although the motorists were often found at fault in the accident, it was the bicyclist using a bike path counter to traffic that led up to the accident. In most cases, these facilities either encourage or require the bicyclist to ride against traffic. Wide curb lanes do not appear to encourage wrong way riding. Only one of the eleven accidents involved this behavior.

Of the 50 accidents in bike lanes, twenty (20), or 40%, of the accidents involved a bicyclist riding against traffic. Additional law enforcement may be needed to keep bike lane accidents to a minimum.

Of the 604 accidents studied, the bicyclist committed the primary error in 45 percent of the cases, while the motorist committed the primary error in 51 percent. In the remaining four percent (4%) of accidents, both bicyclist and motorist were making equally faulty moves, such as the bicyclist riding at night without lights and the motorist operating on the wrong side of the street.
Both of the above reports are typical of similar reports around the Country which depict sidewalks and bike-paths as less safe for bicyclists than riding on-road facilities such as bike lanes and wide curb lanes. However, it is uncertain whether the studies are based on an equitable distribution of riders on both types of facilities. It can be inferred, however, that if more bicyclists ride on off-road facilities, then higher occurrences of reported accidents are a probability. Other reasons for the difference in reported accidents may be explained by the following conclusion:

1. At intersections, motorists entering or crossing the highway may not notice bicyclists coming from their right, as they are not expecting contra-flow vehicles. Even bicyclists coming from the left often go unnoticed, especially when sight distances are poor. This is in part due to the relatively small size of bicycles and the motorist orientation to the roadway.

2. Sight distances at driveways and intersections (highway) are often poor. Landscaping, shrubbery and fences tend to compound the problem.

3. Poor visual relationships between cyclists and motorists also occur at intersections. The emergence of a high speed bicycle (as opposed to pedestrian speed) into the crosswalk area is often unanticipated by motorists, particularly those completing turns.

4. In some urbanized areas, conflicts are common between bicyclists and fixed objects (e.g., parking meters, utility poles, sign poles, bus benches, trees, fire hydrants, mailboxes, etc.). This results in the bicyclist diverting his attention from motorists and pedestrians.

5. Sharing space with pedestrians creates a number of problems. Walkers, joggers, and roller skaters can, and often do, change their speed and direction almost instantaneously. Similarly, pedestrians often have difficulty predicting the direction an oncoming bicyclist will take.
The following information extracted from Palo Alto’s Bicycle and Bikeways Information Packet, demonstrated one community's experiences and conclusions regarding bike-paths and bike-lanes.

Page 10 - Findings, Analysis and Conclusions

A. Bikeway System

1. Usage and accident data

Bicycle counts taken at twelve locations on the bikeway system streets indicate a thirteen percent (13%) increase in bicycle volumes. This indicates that public attitudes and feelings about the bikeways system are positive and supportive.

2. Motor vehicle-bicycle accident statistics

Comparisons of "before and after" bikeways system

a. Fifty-four percent (54%) increase where bicycle paths are used

b. Eighteen percent (18%) decrease where bicycle lanes are used

c. Although only fifteen percent (15%) of the bicycle travel occurred on bicycle paths, seventy percent (70%) of the reported bicycle/motor vehicle accidents occurred on these locations.

The accident rate increase on sidewalk/bikepaths and the accident rate decrease on bicycle lanes seems to support the need for more bicycle lanes and fewer exclusive bicycle paths and shared sidewalk/bicycle paths.

The obvious advantage bike-lanes and wide curbs offer over bike paths is that the bicyclist is in the roadway with the motorist, therefore allowing greater visual contact. Bike paths separate the bicyclist from the motorist, which can be a disadvantage when a route has numerous curb cuts and intersections, or inadequate space. The bicyclist is not considered in the traffic flow and is not as likely to be noticed by the motorist. Bike lanes and wide curbs increase the overall safety of the transportation network by creating more on-road space. This space allows adequate room for the bicyclist without impinging on the motorist's space. Also, the motorist has a bit more space for turning actions and for moving into traffic from side streets.
Bike lanes/wide curb lanes/paved shoulders are more expensive to construct than wide sidewalks, especially since four foot wide sidewalks are also included with on-road facilities. Bike lanes and wide curb lanes have the advantage of potentially allowing access to any point accessible by a road and offer more of a continuous network, whereas bike paths are sporadic and often end abruptly. This forces the bicyclist to complete his/her travel on a road not improved for bicycle use, which statistics show to be the least safe facility. Sidewalks will be available to accommodate school-age children and less experienced bicyclists travelling at lower speeds. The more experienced bicyclists would be able to travel faster to more destinations on on-road facilities.

Regardless of the type of bikeway facility preferred, one point of agreement would be that the inclusion of a bikeway has a positive effect in reducing bicycle accidents.

All road projects should be reviewed to determine if one facility type is more appropriate than another. The factors to be considered include the intended primary users, destination points, the number of curb cuts and the route length.
<table>
<thead>
<tr>
<th>AGE</th>
<th>TOTAL</th>
<th>MALE</th>
<th>FEMALE</th>
<th>TOTAL</th>
<th>MALE</th>
<th>FEMALE</th>
</tr>
</thead>
<tbody>
<tr>
<td>0 - 4</td>
<td>4</td>
<td>4</td>
<td>0</td>
<td>44</td>
<td>33</td>
<td>11</td>
</tr>
<tr>
<td>5 - 9</td>
<td>5</td>
<td>3</td>
<td>2</td>
<td>612</td>
<td>474</td>
<td>136</td>
</tr>
<tr>
<td>10 - 14</td>
<td>12</td>
<td>10</td>
<td>2</td>
<td>1,524</td>
<td>1,130</td>
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<td>23</td>
<td>19</td>
<td>4</td>
<td>1,557</td>
<td>1,230</td>
<td>324</td>
</tr>
<tr>
<td>20 - 24</td>
<td>14</td>
<td>12</td>
<td>2</td>
<td>1,007</td>
<td>739</td>
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<tr>
<td>25 - 34</td>
<td>13</td>
<td>11</td>
<td>2</td>
<td>940</td>
<td>743</td>
<td>195</td>
</tr>
<tr>
<td>35 - 44</td>
<td>7</td>
<td>6</td>
<td>1</td>
<td>346</td>
<td>266</td>
<td>80</td>
</tr>
<tr>
<td>45 - 54</td>
<td>4</td>
<td>2</td>
<td>2</td>
<td>189</td>
<td>157</td>
<td>32</td>
</tr>
<tr>
<td>55 - 64</td>
<td>8</td>
<td>8</td>
<td>0</td>
<td>151</td>
<td>119</td>
<td>32</td>
</tr>
<tr>
<td>65 - 74</td>
<td>12</td>
<td>10</td>
<td>2</td>
<td>165</td>
<td>122</td>
<td>43</td>
</tr>
<tr>
<td>75 &amp; Older</td>
<td>9</td>
<td>7</td>
<td>2</td>
<td>104</td>
<td>93</td>
<td>11</td>
</tr>
<tr>
<td>Not Stated</td>
<td>6</td>
<td>5</td>
<td>1</td>
<td>244</td>
<td>181</td>
<td>59</td>
</tr>
</tbody>
</table>

| TOTAL    | 117   | 97   | 20     | 6,883  | 5,287 | 1,579  |

SOURCE: Florida Department of Transportation
### TABLE 6.4

**FLORIDA FATALITIES AND INJURIES**

**FOR 1985 BY AGE**

<table>
<thead>
<tr>
<th>AGE</th>
<th>FATALITIES</th>
<th>INJURIES</th>
</tr>
</thead>
<tbody>
<tr>
<td>4 and under</td>
<td>1</td>
<td>34</td>
</tr>
<tr>
<td>5 - 9</td>
<td>4</td>
<td>649</td>
</tr>
<tr>
<td>10 - 14</td>
<td>15</td>
<td>1,551</td>
</tr>
<tr>
<td>15 - 19</td>
<td>21</td>
<td>1,515</td>
</tr>
<tr>
<td>20 - 24</td>
<td>7</td>
<td>963</td>
</tr>
<tr>
<td>25 - 34</td>
<td>9</td>
<td>980</td>
</tr>
<tr>
<td>35 - 44</td>
<td>14</td>
<td>402</td>
</tr>
<tr>
<td>45 - 54</td>
<td>7</td>
<td>186</td>
</tr>
<tr>
<td>55 - 64</td>
<td>12</td>
<td>166</td>
</tr>
<tr>
<td>65 - 74</td>
<td>5</td>
<td>141</td>
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<tr>
<td>75 and over</td>
<td>9</td>
<td>124</td>
</tr>
<tr>
<td>No age given</td>
<td>5</td>
<td>431</td>
</tr>
</tbody>
</table>

**TOTALS**  
109 7,142

**SOURCE:** Florida Department of Transportation
BACK OF CHART
6.2 FLORIDA BICYCLE SAFETY LAWS

6.2.1 Bicycle Regulations (See Section 316.2065, Florida Statutes)

- Every person propelling a vehicle by human power shall have all of the rights and all of the duties applicable to the driver of any other vehicle under this chapter, except as to special regulations in this chapter, and except as to provisions of this chapter which by their nature can have no application.

- A person operating a bicycle shall not ride other than upon or astride a permanent and regular seat attached thereto.

- Any person operating a bicycle shall keep at least one hand upon the handle-bars.

- No bicycle shall be used to carry more persons at one time than the number for which it is designed or equipped, except that an adult rider may carry a child securely attached to his person in a backpack or sling.

- No person riding upon any bicycle, coaster, roller skates, sled, or toy vehicle shall attach the same or himself to any vehicle upon a roadway. This section shall not prohibit attaching a bicycle trailer or bicycle semi-trailer to a bicycle if that trailer or semi-trailer has been designed for such attachment and solely for carrying cargo.

- A person propelling a vehicle by human power upon and along a sidewalk, or across a roadway upon and along a crosswalk, shall have all the rights and duties applicable to a pedestrian under the same circumstances.

- A person propelling a bicycle upon and along a sidewalk, or across a roadway and along a crosswalk, shall yield the right-of-way to any pedestrian and shall give an audible signal before overtaking and passing such pedestrian.
No parent of any minor child and no guardian of any minor ward shall authorize or knowingly permit any such minor child or ward to violate any of the provisions of this section.

6.2.2 Bicycling on the Roadways

Any person operating a bicycle upon a roadway at less than the normal speed of traffic at the time and place and under the conditions then existing shall ride as close as practical to the right-hand curb or edge of the roadway except under any of the following situations:

1. When overtaking and passing another bicycle or vehicle proceeding in the same direction.

2. When preparing for a left turn at an intersection or into a private driveway.

3. When reasonably necessary to avoid conditions including but not limited to: fixed or moving objects, parked or moving vehicles, bicycles, pedestrians, animals, surface hazards, or substandard width lanes that make it unsafe to continue along the right-hand curb or edge. For purposes of this section, a substandard width lane is a lane that is too narrow for a bicycle and another vehicle to travel safely side by side within the lane.

4. Any person operating a bicycle upon a one-way highway with two or more marked traffic lanes may ride as near the left-hand curb or edge of such roadway as practical.

Persons riding bicycles upon a roadway shall not ride more than two abreast except on paths or parts of roadways set aside for the exclusive use of bicycles. Persons riding two abreast shall not impede traffic when traveling at less than the normal speed of traffic at the time and place and under the conditions then existing and shall ride within a single lane.
6.2.3 **Lights and Reflectors**

Every bicycle in use between sunset and sunrise shall be equipped with a lamp on the front exhibiting a white light visible from a distance of at least 500 feet to the front and a lamp on the rear exhibiting a red light visible from a distance of 600 feet to the rear, and a red reflector. A bicycle may be equipped with lights or reflectors in addition to those required by this section.

6.2.4 **Definition of a Bicycle** (See Subsection 316.003(2), Florida Statutes)

Every bicycle propelled solely by human power, or any moped propelled by a pedal-activated helper motor with a manufacturer's certified maximum rating of $1 \frac{1}{2}$ brake horsepower, upon which any person may ride, having two tandem wheels and including any device generally recognized as a bicycle though equipped with two front wheels, except such vehicles with a seat height of no more than twenty-five (25) inches from the ground when the seat is adjusted to its highest position, and except scooters and similar devices.

6.2.5 **Definition of Vehicle** (See Subsection 316.003(64), Florida Statutes)

Every device, in, upon, or by which any person or property is or may be transported or drawn upon a highway, excepting exclusively upon stationary rails or tracks.

6.2.6 **Left Turns by Vehicle** (See Subsection 316.151(2), Florida Statutes)

The driver of a vehicle intending to turn left at any intersection shall approach the intersection in the extreme left-turn lane lawfully available to traffic moving in the direction of travel of such vehicle, and, after entering the intersection, the left turn shall be made so as to leave the intersection in a lane lawfully available to traffic moving in such direction upon the roadway being entered. A person riding a bicycle intending to turn left in accordance with this section shall be entitled to
the full use of the lane from which such a turn may legally be made. Whenever practical, the left turn shall be made in that portion of the intersection to the left of the center of the intersection.

6.2.7 Left Turns by Bicycle (See Subsection 316.151(3), Florida Statutes)

In addition to the normal left turn, a person riding a bicycle intending to turn left shall have the option of following the course described hereafter. The rider shall approach the turn as close as practical to the right curb or edge of the roadway. After proceeding across the intersecting roadway, the turn shall be made as close as practical to the curb or edge of the roadway on the far side of the intersection. Before proceeding, the bicyclist shall comply with any official traffic control device or police officer regulating traffic on the highway along which he intends to proceed.

6.2.8 Signalling When Turning (See Subsection 316.155(2), Florida Statutes)

A signal of intention to turn right or left shall be given continuously during not less than the last 100 feet travelled by the vehicle before turning, except that such a signal by hand or arm need not be given continuously by a bicyclist if the hand is needed in the control or operation of the bicycle.
6.3 BICYCLE SAFETY RULES

The boom in bicycling has brought with it a number of problems. The increase in ridership has not been accompanied by a corresponding increase in bicycling proficiency, resulting in a traumatic bicycle accident rate. There has also been increase in bicycle thefts.

As the number of bicyclists grow, the need for more proficient cyclists with a knowledge of the laws and safety rules will grow also. The following are some common sense rules that, in addition to the bicycle statute, the bicyclist should know. The cyclist should:

6.3.1 Obey all applicable traffic regulations, signs, signals, and markings. Bicycles are classified as vehicles and have the same rights and responsibilities of other vehicles.

6.3.2 Observe all local ordinances pertaining to bicycles.

6.3.3 Know your place in traffic according to the law. Keep to the right and ride with traffic, not against it. The law allows you to ride two abreast but it is not advisable except on the open country roads. Ride as close to the right edge of the pavement as practical but don't ride so close that a pedal could hit the curb.

6.3.4 Watch out for drain grates, soft shoulders, loose sand or gravel, leaves and other hazards. If you do run off the pavement, do not try to come right back onto the pavement until traffic is clear. If you over-correct on returning to the pavement, you could fall into the path of oncoming traffic.

6.3.5 Don't carry packages in your hands, they can cause loss of control. Use bags, baskets, or luggage carriers for this purpose.

6.3.6 Use a mirror to monitor rear approaching traffic. There are many different mirror types and styles and many are inexpensive.
6.3.7 Wear a helmet. Around seventy-five percent (75%) of the injuries to a bicyclist involved in an accident are to the head and face.

6.3.8 Be highly visible. Wear bright-colored clothes; bizarre if need be. A normal motorist’s perceptions are conditioned to items similar in size and speed to his/her vehicle; you must be unique in order to attract attention from amongst all of the eye-attracting objects along the road.

6.3.9 Don’t ride too close to parked cars, as a door opening can catch you. Watch for vehicles getting ready to pull out by the position of its front wheel or by its brake lights.

6.3.10 Use hand signals to indicate stopping or turning. Let the motorist know of your intentions through hand signals; the same hand signals that motorists should use. Bicyclists have the option of indicating a right turn by extending the right hand. Cease any hand signals in time to have both hands on the handlebars when making the turn.

6.3.11 Bicyclists have the option of making a left turn in one of two methods. One is the standard vehicular left turn, moving into the proper left turn position and making the turn when clear to do so. The other method is to continue straight through the first part of the intersection to the far right hand curb corner. Then, when it is clear to move, proceed across the rest of the intersection. You will be making an "L" shaped turn and, of course, you will obey all traffic signals. Then too, you can get off of your bike and walk it through the intersection as a pedestrian.

6.3.12 Ride in a straight line, without weaving. If you ride in a predictable manner and use hand signals so that motorists can see what you intend to do, they will give you your place on the road without any trouble.

6.3.13 Give the right-of-way to all pedestrians.

6.3.14 If you must ride at night, the law requires a white light to the front and a red light to the rear. This is a minimum requirement. Within reason, you can’t have too many lights and reflectors on you and your bike. The main object is to be seen by the motorists.
6.3.15 Slow down and look and listen at all intersections. Even though you may have the right-of-way, you may have to concede it in order to preserve your skin.

6.3.16 You must not ride your bike in a timid or indeterminate manner. This is a sure way to get hurt. You are entitled to the use of a portion of the road. You must be assertive, but not arrogant or belligerent. By using a mirror in order to be aware of traffic behind you and using proper bike riding techniques, you can be an acceptable part of traffic. Stopping for red lights until you have a green light, stopping for stop signs, and getting into the proper turn lanes are all part of this.

6.3.17 Never carry more persons on your bicycle than it was designed to carry.

6.3.18 Ride a safe bike. Have it inspected to insure good mechanical condition. Most of this inspection can be done by the bicyclist. Many of the dangerous defects on a bicycle are obvious and can be detected by even a novice bicyclist.

6.3.19 Ride a bicycle that fits properly. If the bicyclist can not easily put a foot down when stopping, he/she could lose their balance and fall over. Also, a properly fitting bicycle allows the rider to pedal in a more efficient manner.

6.3.20 It is unlawful to wear headphones while riding a bicycle.
A quick check of the bicycle laws within Orange County will reveal a lack of continuity. For example, it is unlawful to ride a bicycle on sidewalks within the city limits of Orlando, but right next door, the City of Edgewood designates the sidewalks along Orange Avenue as bike paths. Such incongruity could be eliminated if there was uniform adoption of the new Orange County Bikeways Plan along with the 1983 Bicycle Law and its amendments. If a bicyclist did not have to struggle with local disparities, it might smooth the way for the bicyclists to better understand and comply with the new Plan and Law. In order for the Bike Plan to be most beneficial to the public, it would be helpful if the municipalities in Orange County understand and help enforce the Plan.

Orange County is a contiguous populated area with arbitrary municipal boundaries. These individual civic identities make it difficult to apply one Plan to the area. But if we are to successfully address the bicycling problem in Orange County, we should attempt to cast aside local differences as they would apply to bicycling and address the problem as a cohesive group. Bicycling, as would be expected of most transportation elements, is not confined to the boundaries of a single municipality. Therefore, a comprehensive approach involving several local jurisdictions would likely result in a more effective, addressable, and implementable Plan.
VI. DESIGN AND CONSTRUCTION STANDARDS

Bikeway design is recognized as an essential component of safety for the bicyclist and motorist. In addition, proper and efficient construction of bikeways provides a long-term economic benefit due to reduced maintenance. There are several factors to consider in the design of bikeways which, if properly addressed, will provide safe and usable facilities. These factors include, but are not limited to, the following:

1. Bikeway Length
2. Design Speed
3. Widths and Clearances
4. Grade Requirements
5. Drainage
6. Bikeway Turns
7. Lighting
8. Bridges and Culverts
9. Intersections and Crossings
10. Surface Material
11. Traffic Control Devices

In Orange County, road improvement and construction as well as sidewalk and bikeway construction comply with the State of Florida Manual of Uniform Minimum Standards for Design, Construction, and Maintenance for Streets and Highways, commonly referred to as the "green book," and in accordance with the American Association of State Highway and Transportation Officials (AASHTO) Standards. Therefore, all bicycle facilities in Orange County will be constructed according to these standards, which may be referenced in the above-mentioned documents. See Appendix C (page 155) for memorandum from the Florida Department of Transportation (FDOT) regarding bikeway construction policy.
8.1 **EDUCATION**

Education is at the heart of a successful bicycling program. Engineering improvements to bikeways which can enhance safety are dependent on the bicyclist's proper use of the facilities. The focus of bicycle encouragement is frequently education. This includes education of the values of bicycling, safety education, etc.

There are many groups of individuals who require some form of education:

1. Bicyclists (children and adults) need to know about bicycle safety, maintenance, operation, the rights of motorists and how to share the road with them.

2. Parents need to know the basics of bicycle safety and operation to reinforce children's bicycle education at school.

3. Motorists must understand the rights and responsibilities of bicyclists and how to share the road with them.

4. Law enforcement officers require bicycle education in order to understand the violations which lead to bicycle accidents.

5. Engineers and planners need to fully understand bicycle operations and safety aspects to adequately design for bicycles.

6. Numerous professionals interact with bicyclists in some aspect of their work and might benefit from bicycle education focused through their respective professional and technical organizations.
Bicycling Education For Children

The key to ensuring good bicycling habits in the cycling public is the establishment of effective educational programs in the elementary schools. The goal of these programs is the development of safe and efficient cyclists by installing positive attitudes toward bicycling as a lifelong activity. These programs would increase knowledge concerning bicycle safety and operations, and improve bicycle handling skills.

Because of the normal process of cognitive and psycho-motor development in young children, it is both difficult and inappropriate to introduce bicycle training into the curriculum before age nine (9). Prior to this age, children appear to lack the judgemental ability to handle the complexities of traffic situations. It is for this reason that introduction of a comprehensive bicycling education program is recommended in fourth grade. The Florida Legislation recently passed House Bill 550 and Senate Bill 622 which permit bicycle curriculum to be taught in public schools beginning at grade four. It is the age that children to venture out on their bicycles beyond their immediate neighborhood, encountering commercial intersections, and heavier traffic. It is also at this age that children can make the more complex speed-distance judgements required to select safe gaps in traffic.

Since children under age nine are obviously riding bicycles, they too need some form of bicycling education. It would be inappropriate, however, to encourage very young children to use their bicycles for transportation until they are mature enough to handle them safely. Instead, it is recommended that a single message bicycle safety education campaign be developed and implemented for students in grades kindergarten through third grade. According to bicycle accident research, children in this age group are most frequently involved in one type of bicycle accident, the driveway-rideout. The victim rides down a driveway or over a curb directly into the street without scanning or yielding to traffic. Since most children in this age group receive instruction from their parents, it is important that parents of these children also receive proper guidelines on what to teach through flyers or neighborhood workshops.
Before the components of the recommended bicycling educational program are reviewed in detail, it is necessary to consider some general guidelines concerning the philosophy and implementation strategy behind the entire program.

First, it must be emphasized that the overall tone of the program must be positive. Educational messages, particularly those dealing with safety and accidents, should avoid scare tactics to make their point. Bicycling should be presented as a form of transportation for children and adults. Since bicycling is a physical skill, on-bike training should be included whenever possible. This training should focus on skills which directly relate to operating the bicycle in traffic: scanning, tracking a straight line, rock dodging, etc. Instructors in the on-bike program should undergo an extensive training program and be certified as a Bicycling Instructor by the Florida Department of Transportation. In order to provide the level of training deemed essential in bicycling, the education program must provide sufficient opportunity for repeated skill practice. Further, enough classroom time is required to encourage discussion of critical elements and provide in-depth review of accident related information. This cannot be done in one day, or even one week. Instead, the program should ideally provide ten (10) to twenty (20) hours of instruction offered over a three (3) to five (5) week period. The program should be evaluated through the use of pre and post skill and knowledge tests and wherever possible, through observations of students riding to and from school.

Adult Bicycling Education

Providing educational material to adult bicyclists can be a difficult problem because of the inability to create a "captive audience." There currently are no mechanisms available for requiring every adult bicyclist to learn about bicycle safety, maintenance and operation. Instead, adults must recognize that they need information on training, identify a source for this information, and then seek out that source. This takes a considerable amount of commitment and dedication on the part of the cyclist. All too often, the people who need the training the most, never take the steps to receive it.

There are several possible sources of bicycling information that would require varying degrees of initiative on the part of adult bicyclists. These include a
bicycle mobile display unit, a bicycling education tape series, and development of continuing education programs at local schools or through community and neighborhood associations.

**College Level Bicycling Education**

While most college campuses in this Country experience very high levels of bicycling, there rarely is any official acknowledgement of bicycling in the curriculum. Perhaps related to this is the fact that campuses frequently report high accident volumes, major theft problems and general dissatisfaction with the performance of cyclists in the traffic system.

It would be the purpose of a college bicycling education program to improve the bicycling related knowledge, skills, and behavior of students, and to provide them with the encouragement and support to consider the bicycle as a viable transportation and recreation vehicle throughout their lives.

**Motorists Education**

Motorist education is best served through driver education and drivers' licensing and can be augmented by periodical promotional campaigns focused on the motor vehicle driver. The Florida Driver's License Handbook should be expanded to include a section which describes the bicycle/motor vehicle relationship. This should be incorporated in Chapter Three - "Your Driving." This should deal with the following major aspects:

1. Laws governing bicycle operation (e.g., bicyclists are governed by the same traffic laws as motor vehicles).

2. Appropriate positions of bicyclists while riding straight and turning (e.g., a through bicyclist will stay in the through lane and not follow the curb at a right turn lane. A left turning bicyclist may turn as a pedestrian would or as motor vehicles turn.).

3. Identification of bicycle and motor vehicles right-of-way relationship (e.g., Bicycles are vehicles and motorists are to yield to bicycles as they would other motor vehicles.).
4. Most common potential locations and conditions of bicycle/motor vehicle conflict (e.g., driveways, higher speed roads, and during night-time hours).

5. Common bicyclist actions which lead to accidents (e.g., failure to search for vehicles, wrong-way riding, night-time riding without lights and reflectors, etc.).

These items should be expanded even further within the Adult and High School Driver Education Curricula.

Other professionals should be educated through technical publications and seminars focused on their interaction with bicyclists.

**Effective Cycling**

Effective Cycling is a nationally recognized bicyclist training program designed to increase the number of qualified bicycle instructors. Enthusiastic and well-trained bicyclists undergo an intensive and stringent training course in order to become certified bicycle safety instructors. Presently in Florida, there are approximately thirty (30) instructors in this relatively new program. In one year, the course training period, there will possibly be four (4) Effective Cycling instructors in the Orlando area.

Once this program is underway and training of other bicyclists has begun, it is anticipated that it will pay its own way. The primary costs involved are for training materials and administrative support. Until it can become self-sustaining, it will require an administrative office and staff support from established organizations in Orange County. Establishments possibly capable of initially supporting this type of training are community colleges, recreation departments, YMCA's and neighborhood centers. This program would initially be geared toward adults and would be a substantial effort towards improving bicycling education in this community.
8.2 ENCOURAGEMENT

An encouragement program is one which seeks to encourage bicyclists to use their bicycles more often, to encourage non-bicyclists to become bicyclists, and to develop an accommodating attitude within and throughout the general public towards bicycling. Currently, the methods being used to encourage bicycling are public acceptance campaigns and incentive programs.

Public acceptance programs have proven effective in encouraging bicycle use. Various localities have tried differing methods as part of their public acceptance efforts. They are all effective when they:

1. are community based;
2. are addressed to meet community needs; and
3. have enthusiastic support within the community.

A program should be undertaken, in cooperation with the Florida Department of Transportation Bicycle Program, to develop media spots for both TV and radio to publicize bicycle use and bicycle related activities. These Public Service Announcements (PSA) would provide the general public with information to encourage: bicycle use; proper use of bicycle facilities; and, proper education of bicyclists. They would be used to educate bicyclists of potential hazards and present the safety aspects of bicycling. Publicity could also be used to communicate the bicycle theft problem prior to the initiation of a bicycle registration program.

The County, through a Bicycle Committee and/or Coordinator, should develop a broad-based campaign to be implemented at both the County and City levels which includes not only TV and radio spots but local events, such as bike-a-thons, celebrity rides, recreation events, bike days and perhaps competitive bicycling events.

Incentive programs are positive inducements to stimulate bicycle use. These programs include employer programs and mapping. In encouragement of bicycling, probably the single most effective measure that can be undertaken is mapping. Mapping can encourage the various aspects of bicycling: suitability
maps for commuting, recreation maps for local recreation trips, and touring maps for long distance trips.

Another tremendously important method of encouragement is the development of employer incentive programs. These employer programs are an essential element in developing the use of bicycles for work trips. In summary, the recommended encouragement procedures to be undertaken as part of a comprehensive bicycle program would include:

1. Public Acceptance/Publicity
2. Mapping
3. Incentive Programs
4. Employer Sponsorship Programs
5. Bicycle Security
8.3 **ENFORCEMENT**

Today, nearly every other Floridian owns and occasionally rides a bicycle. Perhaps it is infrequent use of the bicycle and habits left over from childhood riding that lead most adult bicyclists into trouble. At any rate, the once consistent level of accidents between young bicyclists and motorists has recently increased significantly with a strong and steady rise of accidents involving adult bicyclists and motorists.

Bicyclists are, at times, the most undersized, underpowered vehicle in traffic. If an accident takes place, it is the bicyclist, rarely the motorist, who comes out the painful loser. Yet, bicyclists seem to scoff proven principles of traffic flow, and seem to have impunity in all but the most extreme near misses, even in the presence of law enforcement officials. The most common violation of bicycle laws is wrong-way riding. This is a leading cause of bicycle related accidents, yet it is not strictly adhered, and rarely strictly enforced. Why do bicyclists take such risks? Do they assume the general public will look out for them? Or do they feel invincible; perhaps due to their freedom of movement, able to avoid any accident at the last moment?

**The Solution**

The alarming and critical nature of this problem propelled the Florida Bicycle Council to adopt the passage of the "1983 Bicycle Safety Law" as its number one goal in 1983. It has decreed that full implementation of this law in future years should be a high priority. The Florida Legislature concurred with this recommendation, giving almost unanimous support in passage of the proposed bill. This new law, Chapter 316 of the State Statutes, which took effect on June 3, 1983, provides Florida with the most modern and enforceable standards in the nation. This law brings Florida substantially into full compliance with the Uniform Vehicle Code.

The bicycle is defined as a vehicle. This new change makes clear that bicyclists have the same rights and duties as any other vehicle operator, and removes any vagueness or uncertainties on how bicyclists are to behave in traffic.
As a further measure of the intent of state officials to solve this problem, the Bureau of Highway Safety, through funds provided by the National Highway Traffic Safety Administration, has developed five separate programs of education and enforcement to begin reducing this problem. Florida is now undertaking one of the most comprehensive approach to safety efforts for bicycles nationwide.

This is the most modern and comprehensive bicycle law enforcement training course ever developed. It borrows heavily from research writings of the most knowledgeable and experienced bicycle enforcement and bicycle program specialists. It incorporates the latest research of accident investigation/analysis, bicyclist conspicuity studies, and bicyclists behavior analysis.

The Goal of Bicycle Enforcement

The rapid and significant increase in the use of bicycles for transportation has brought a corresponding rise in bicycle/motor vehicle collisions, as well as unsafe road sharing between bicyclists and motorists. Motorists in general, parents and the serious bicyclist in particular, are all concerned with the lawless practices of the few that continue to operate outside of the norms of traffic.

Media awareness campaigns, bicycle safety instruction in the schools, and a gradual redesign and maintenance of our roadways to better accommodate this new element of traffic, are all helpful. But without law enforcement, the growth in the accident rates, lawless habits, and unpredictable behavior are likely to increase.

Bicycle law enforcement can greatly improve other community efforts such as education and media awareness. As new facilities are built, law enforcement will lead toward improved riding practices and acceptable behavior. It is the direct contact, and, in some cases, simply the awareness of a law enforcement officer to inappropriate bicycling practices, that puts the substantial and necessary backbone into a community-wide solution to bicycling safety. In general, community enforcement programs are well served by the following goals:
1. To achieve voluntary compliance with the law.

2. To identify and correct poor cycling (bicyclist), or road sharing (motorist) practices.

3. To provide uniform enforcement of the laws.

4. To incorporate bicycle safety programs into the schools, and other points of public contact, to gain community-wide support of the enforcement effort.

5. To involve parents in educating their children in safe bicycling practices.

6. To reduce riding practices and behavior most likely to lead to serious accidents and injury.

7. To teach young riders the principles behind the vehicle laws.

The focus of a community enforcement program should be to identify the most serious accident producing behavior and practices, and through selective enforcement, take the necessary steps to reduce this behavior.

The success of the programs should not be measured strictly in the change in annual accidents, but the total improvement in the riding behavior of either target groups, or the bicycling community as a whole.

The attitude and respect bicyclists and motorists have toward one another should be a focus of this effort. Generally, steps taken should lead toward more predictable riding and driving practices, improved awareness and visibility of the bicyclist in traffic, and a greater interest on the part of both bicyclists and motorists to be responsible and responsive to one another in traffic. Each community must carefully evaluate its own accident and behavioral problems, then design a specific approach toward improving conditions. A proper enforcement program should include the following sections:
1. Identification - adoption of bicycle registration according to the State model. The focus of this section is to reduce bicycle theft and improve recovery and return of stolen bicycles.

2. Apprehension - administered by the law enforcement department utilizing resources and support obtained from the State, which provides for citation of bicycle violators by the patrol officers. One of the key aspects of apprehension is the education and motivation of law enforcement officers in enforcing traffic laws relating to bicycles. A model program for police officer education has been developed by the State for local law enforcement agencies.

3. Adjudication - developed at the local level, may include:

   A. Peer Courts
   B. Juvenile Courts
   C. Parental Discipline
   D. Violator Schools
   E. Combinations of the above

In summary, the recommended enforcement methods include: bicycle registration to aid in violator and bicycle identification; apprehension of bicycle violators; and adjudication to educate violators and reinforce education programs. The enforcement program can indicate shortcomings in education and engineering measures being undertaken and can provide the data necessary to tailor education and engineering efforts to address accident problems.
8.4 COMMITTEE AND COORDINATOR

In preparation for the annual Capital Improvements Program, many of the proposed recommendations will require a responsible body or agency to see them through the implementation process. In some instances, an existing County department would be responsible for actual planning action or programs. However, some of the tasks identified in the recommendations might be more appropriately addressed by a body solely responsible for the concern of bicycling, such as a permanent advisory committee.

The recommendation for a committee is viable only if their responsibilities do not duplicate those of county staff, and provide a service to the county. As bicycling continues to grow in popularity, the needs will also grow. Bicycling is a dynamic concern, therefore it warrants frequent monitoring. However, as stated above, a committee is justified only if it provides an unduplicated service to this community. Potential tasks that can be performed by a committee are identified below. These tasks and responsibilities are loosely based on by-laws establishing a Bicycle Committee in the city of Eugene, Oregon. Identified responsibilities include:

1. Annually review the Orange County Bicycle Plan and propose Plan amendments based on this review.

2. Each year, after the annual review, establish a list of recommended bikeway priorities to serve as a proposed bikeway budget for the coming year.

3. Maintain community awareness and coordinate county bicycle plans and programs with municipalities, the surrounding counties, and the State.

4. If appropriate, review preliminary and final road project plans to consider the most appropriate bikeway facility.

5. Seek consensus among staff, committee, affected citizens or other interested groups on bikeway design and implementation.
6. Promote and implement educational and law enforcement programs recommended in the Plan.

7. Keep the public informed about existing and proposed bikeways and bicycle programs.

8. Encourage citizen participation in identifying problem areas, reviewing existing facilities, and planning and implementing new ones.

The Eugene, Oregon model has a committee consisting of an equal number of professional staff representing the city government and of lay members who are citizens of the city. In Orange County, this may be applied by appointing staff from various county government departments - Parks and Recreation, Engineering, Highway, and Planning - to the committee. This would allow a forum for various opinions and positions with the purpose of improving the present bicycling environment.

If a Bikeways Committee is considered for permanent standing, an annual review based on duty accomplishments may be conducted each year to determine its effectiveness.

A bicycle coordinator is not an immediate need, but may become essential as bicycling grows as a priority in this community. Presently, the basic duties of a coordinator could be managed by county staff. At this time a work load does not exist to justify creating a position only serving this one element of transportation. However, potential duties of a bicycle coordinator should be recognized in the event funding becomes available and circumstances warrant creating this position. These duties include:

1. Assist the committee and staff by providing all relevant data concerning recommendations for bikeway inclusion or road projects.

2. Prepare and present education programs designed for use in the school system that will heighten the awareness of bicycle safety rules and laws to school-age children.
3. Prepare and present a program designed to educate law enforcement agencies on current bicycling concerns.

4. Document information from all reported bicycle related accidents according to the Cross system, which identifies the prevailing conditions, environment, causation and fault. This is needed to identify the most common and serious problems bicyclists and motorists have in Orange County, so that eventually programs may be devised to specifically address these localized concerns.

5. Perform occasional studies to determine the use patterns on wide curb lanes/bike paths and wide sidewalks/bike paths.

6. Prepare bicycle suitability maps to identify routes favorable for bicycle usage.

Consideration should be given to supporting a bicycle coordinator at the regional level, possibly housed in the East Central Florida Regional Planning Council. This would provide a comprehensive approach to bicycling considering the needs of a much larger area. Also, it would be less of a financial burden on any one jurisdiction since all the governments in the region would be supporting this position.
IX. SUPPORT FACILITIES

Unlike activities that involve only the human body or easily stored equipment for transportation and/or recreation, bicycling involves machinery that needs to be protected and bikeways that should be accessible during the daylight or evening hours. However, this aspect of bicycling is often overlooked during the planning stages. The inclusion of a few basic support facilities, complimentary to bicycling, may have a positive impact in increasing this activity.

This section discusses various types of support facilities, and suggests how they may interact with a bike system. It also stresses the importance of incorporating support facility design into bicycle planning in order to provide an inclusive and comprehensive bikeway system for Orange County.

9.1 PARKING

A network of bikeways should be complimented by secure bicycle parking facilities at major activity centers such as large public and private employment centers, transit stations, schools, shopping centers, recreation areas and municipal facilities. Without adequate parking facilities, bicyclists are forced to chain their bikes to poles, trees, or similar available objects. This often creates barriers for pedestrians and increases the potential for accidents.

A bike rack provides some protection against theft when used with a well-constructed theft-resistant padlock. Many different types of racks and locks are now available. Among these are:

A. Standard Rack
B. V-Bar Rack
C. Radial Rack
D. Tree Guard Rack
E. Key/Coin Locker Rack
F. Locker.
Bike racks are most useful if they are located close to the entrances of work places or in a central shopping location. Placement of the racks under cover is an added incentive. They should be located so that cars cannot run into them. Bike lockers and the use of bike parking storage rooms provide the most secure environment. However, lockers are much more expensive than bike racks. Bike racks inside a building (lobby, atrium, breezeway) offer a more secure environment.

In addition to providing peace of mind to the bicyclist, adequate facilities also offer an aesthetic benefit to the general public. Careful placement of parking and storage facilities may reduce the clutter of parked bicycles that is often evident when insufficient facilities are present. Proper facilities may also improve safety in an area by restricting the parking of bicycles to certain locations while maintaining a free flow of pedestrian traffic in other areas.

Demand should be determined before lockers are installed to ensure these facilities will be utilized with regularity and because of the realization that bicycling funding will be limited, therefore competitive.

In order to encourage the use of recreational touring routes, it may be necessary for bicyclists to transport their bicycles to the trail. Where situations such as this occur, parking areas are necessary and practical. If possible, the existence of a parking area with an access route to the trail would provide the necessary parking. Including an area for automobile parking may greatly enhance the popularity of the proposed touring routes in East Orange County and West Orange County. If County parks are associated, the parking could be more easily provided.

At some future date, there may be a need to provide access to parking areas for commuters who wish to transport their bicycles to points on the outskirts of the city, then bike in to work. For example, centrally located access points five to fifteen miles from the downtown area, which are on a bicycle network, would offer the bicyclist the opportunity to avoid the heaviest automobile congested areas. A bikeway network may not be directly accessible from the biker's original point of departure, but he/she may be willing to drive a short distance to an access point. Parking for automobiles would be available at this designated
area. This would assist in eliminating some of the congestion of automobiles around large employment centers, such as the peak traffic periods in downtown Orlando, Martin Marietta, or Maitland Center.

9.2 PARK AND RIDE

The development of a park and ride concept included in both the bikeway system and the transit system could encourage cyclists to ride to a bus terminal, leave their bikes in a rack or locker, and proceed to work or shopping area by bus. This concept could be known as "Bike-the-Bus". Tri-County Transit could adopt a plan to install bike racks on the back of their buses for transport of bicycles to a terminal point. In addition, bike racks could be installed at various bus stops. There must be adequate bicycling parking facilities to insure the safety of the bicycles.

This program could increase the number of commuters who depend on both the bicycle and mass transit for daily transportation, subsequently reducing automobile traffic congestion two-fold. This program of placing racks for bicycles on the back of buses may be attractive to bicyclists who live some distance from an activity center that is serviced by Tri-County Transit. An example would be students of Rollins College, University of Central Florida, or Valencia College who live or work a substantial distance from campus, but desire to travel by bicycle while on campus. Another example would be the bicyclist who wishes to exercise on his/her lunch hour by riding a bicycle, but does not desire to bicycle to work from home.

Before widespread implementation of these concepts, a pilot program could be undertaken at the college campuses in this area. Tri-County Transit buses serving the campuses could be equipped with bicycle racks, as has been done in many other communities.

9.3 REST AND SCENIC AREAS

Rest and scenic areas are most desirable on recreational routes. Where possible, rest areas should be located in conjunction with scenic views. Scenic routes should take advantage of public park and recreation areas whenever possible. In
most cases, rest areas can be kept to a minimum amount of development and in
many areas, a cleared opening would be sufficient. In areas where there is heavy
use, facilities such as picnic tables and trash barrels may be warranted.

9.4 **LIGHTING**

Proper lighting of bikeways is a prerequisite for safe operation where
considerable night use is anticipated. Lighting provides the cyclist notification
as to the direction of the bikeway, the presence of obstacles, pedestrians, or
other bicycles.

A recent state law requires bicycles ridden between dusk and dawn to be
equipped with front and rear lights. This lighting system may be adequate to call
attention to the bicyclist, but it may not provide sufficient light to brighten
some bikeways, most notably bike paths. Therefore, additional lighting may be
necessary for nighttime cycling.

Bike lanes and bike routes should receive adequate illumination from roadway
lighting systems since these types of facilities are located on roads. Bike lane
and bike route locations should be discouraged on unlit or sparsely lit roads as a
measure of safety for bicyclists and motorists. If bikeway placement is oriented
towards bike lanes, then lighting is not such a problem.

In areas where bike paths offer the most viable alternative to the bicyclist, these
paths must be illuminated. A minimum of ten feet of clearance has been
suggested by one report. Placing street lights in accordance with the County's
Subdivision Regulations should provide a standard distance. Some bike paths may
receive illumination from existing street lights, if strategic placement has them
in close proximity to one another and the street lights provide adequate
brightness. Road improvement projects and new construction of roads should be
planned to provide bike lanes and/or bike paths and ensure adequate lighting is in
place for continuous use.
X. CAPITAL IMPROVEMENTS PROGRAM

10.1 FUNDING SOURCES

The extent of implementation possible of any phase of this Plan is understandably based on the availability of local, State, and Federal funds, as well as grant programs. Further, adequate mechanisms must be in place if bikeway planning is to effectively compete for these available funds. Current efforts toward bikeway provision in Orange County have been in sidewalk construction. The emphasis has been on constructing five foot wide (5') sidewalks near and about school sites. In most instances these sidewalks are also serving bicyclists. These efforts were taken under the guidance of Chapter 234, Florida Statutes. This legislation calls for the elimination of hazardous walking conditions. Since 1983, over $1.4 million has been spent to construct these facilities to eliminate hazardous walking conditions within two (2) miles of public schools.

The recommendations of this Plan propose bike lanes where determined to be more appropriate, and the construction of seven foot (7') bike path/sidewalks were deemed more appropriate for reasons discussed in the Plan. This approach is costlier than current practices, therefore the need to acquire a larger funding pool is evident. Recent occurrences, such as the creation of a State Bicycle Program, an increased awareness of bicycling, and a growing bicyclist-motorist accident rate, have resulted in an increase of funding sources. However, many of these programs are not specifically slated for bicycling purposes, but rather towards the general use of transportation. In this era of competitive funding, the governing body is in the position of deciding the most appropriate use of available funds based on the needs and problems confronting a community. This process often places bicycle facilities in a losing position. Therefore, to augment the possibility of funding for bikeways calls for increasing the available pool of funds and increasing the priority of providing adequate bicycle facilities. There are a number of sources which may be called upon to assist in the development of the Bikeway System.
Federal Assistance

The 1973 Federal Highway Act permitted the use of up to two million dollars of Florida's Federal Highway Funds for the construction of bikeways. Subsequent highway acts have expanded the availability of highway funds for bicycle and pedestrian facilities and reinforced Congress' intent that such projects are to be encouraged. The 1982 Highway Improvement Act allows funding for nonconstruction bicycle projects related to the safe use of bicycles for transportation. This Act also allows bicycle facilities to be constructed as independent projects not associated with a Federal-aid route. However, these facilities must be for transportation, rather than for recreational purposes. It should be noted that funds are not reserved exclusively for bicycle or pedestrian facilities, but are, in fact, highway funds which may be used for highways, bikeways, and walkways at the option of state transportation agencies.

As stated above, Federal funds can be used for bicycle facilities not associated with a Federal-aid route. However, the Federal Highway Administration (FHWA) apportions a certain amount of Federal-aid highway funds as authorized by Congress to the State for the planning, construction, and improvement of roads and bridges. The FHWA encourages the construction of bicycle and pedestrian facilities as part of the regular Federal-aid highway program.

Bicycle and pedestrian facilities approved as incidental features of larger highway construction projects are constructed concurrently with the improvement for motor vehicle traffic and within the normal right-of-way of the highway. These incidental features may be financed with the same type of Federal-aid funds (except Interstate construction funds) and the cost if borne through the Federal share payable for the basic highway projects. These facilities are not subject to funding limitations.

Bicycle and pedestrian facilities may also be funded as an independent walkway, independent bicycle project, or a non-construction bicycle project. The Federal-aid share for these projects is one hundred percent (100%). As of 1983, a state could spend up to $4.5 million of Federal-aid funds in a fiscal year for independent bicycle and pedestrian facilities, provided a nation-wide total of $45 million is not exceeded. The funds come directly out of those apportioned to each state for highways.
The Land and Water Conservation Fund Act of 1965, as amended, is administered by the National Park Service. This Service provides matching grants to State and local units of government for the acquisition and development of public outdoor recreation areas and facilities. Projects for public bike paths may be eligible to receive Land and Water Conservation Fund assistance. These trails must be within designated recreation sites which would be dedicated in perpetuity to outdoor recreation. In Florida, this fund program is administered by the Department of Natural Resources; Division of Recreation and Parks.

The Department of Housing and Urban Development (HUD), in accordance with Part 24 of the Code of Federal Regulations, may allocate funds for bicycle facilities. Bikeways are considered an eligible activity when shown to benefit a specific concern. The basic criteria for funding are eligibility, feasibility and the activity must benefit an area where at least fifty-one percent (51%) of the residents are low and moderate income. However, due to recent budget cuts, bikeways would likely be a low priority item.

**State Assistance**

The Florida Department of Transportation’s (FDOT) current policy is to provide for the needs of bicyclist and other non-motorized roadway users within five miles of urbanized area limits (population 50,000 or more). This policy will generally provide for the construction of wide curb lanes, bicycle lanes, or paved shoulders in conjunction with other planned roadway improvements. And, as of 1986, most State maintained roads will include one of the aforementioned on-road bikeways when road improvements are made.

The State uses a variety of funding mechanisms for road projects. The majority of funds are combinations of Federal and State sources and are considered General Highway Revenues. Therefore, in the dispersal of these funds, bicycle facilities must compete for its share of monies.

Periodically, the State administers grant awards targeted for bicycle facilities and program support. Currently, the Governor's Energy Office has awarded FDOT $470,000 from the Oil Overcharge Grant to be used for local bike program implementation and media materials development. This is a competitive grant
that will benefit ten of the Metropolitan Planning Organizations (MPO) throughout the State. This award will fund a bicycle coordinator position for two years at an annual salary of $18,750. This Coordinator will receive training, as well as additional support, from an Engineering/Planning Consultant hired by the State. The consultant will also develop a full hour video detailing the need for alternative transportation.

**Local Assistance**

Current possible sources of transportation funds at the local level (Orange County) are primarily Impact Fees, gas taxes, and Ad Valorem Taxes. These are general transportation funds. The key to securing funding for adequate bicycle facilities (bike lanes/seven foot bike paths) is to demonstrate the importance of these facilities in the overall transportation system. As previously mentioned, the County currently constructs wide sidewalks in conjunction with most road improvement projects through the use of transportation funds.

Another possible form of assistance for bicycling may be the Parks and Recreation funds. Recreation funds, or funds generated through an increase in the Recreation budget through subsequent funding mechanisms, could assist in providing bicycle touring routes and bikeways serving to connect parks. This could be accomplished by apportioning a share of this fund for bicycle programs and facilities, thereby tapping into the revenue used to support Parks and Recreation. This would consist primarily of revenue from general funds. This will be a viable source only if Parks and Recreation receive a substantial increase in funding.

The 1/2 mil ad valorem tax for capital improvements is the funding source for the construction of sidewalks to eliminate hazardous walking conditions. As previously discussed, this primarily involves providing sidewalks in the vicinity of public schools, and is based in part on recommendations from the Orange County Public Schools System. Between 1985 and 1989, approximately 1.3 million dollars of sidewalk construction is planned which will provide 23.6 miles of sidewalks. The 1/2 mil ad valorem tax for Capital Improvements is also used to help finance engineering projects, water management projects, parks projects,
etc. This tax generated $9 to $10 million in revenue during the 1986 Fiscal Year, and $13 to $15 million is anticipated for the next fiscal year. The majority of the money raised goes to engineering projects, i.e. transportation. This is a competitive project funding process and priority is determined by the Board of County Commissioners.

Regardless of the type of bikeway facility constructed, these are all possible revenue sources. However, it may be more useful if each type of bicycle project is correlated with the most appropriate funding source, i.e., bikeway construction in conjunction with road improvement projects specifically funded through gas taxes and impact fees; recreational bike trails and routes funded through Park funds. Also, it is apparent that local funds, primarily 1/2 mil ad valorem tax for capital improvements, are being used to provide bikeway facilities. However, more revenue is needed to expedite the provisions of these facilities and to provide other recommended facilities, i.e., on-road, which are more expensive to construct than the current practice of constructing off-road facilities.

**Private Sector**

The development community may assist in the provision of bikeways, specifically in the residential neighborhoods. Recreation has been identified as the primary purpose for bicycle riding, and many school-age children are particularly fond of bicycling. Bikeway facilities in the neighborhoods would allow direct and easy access to residents of a neighborhood, enhancing its recreational environment. Providing neighborhood bicycle facilities may preclude the need of some bicyclists, mostly school-age children, from venturing out of the neighborhoods onto busy arterials. A few residential developments in Orange County provide paths, trails, and/or bike lanes. But most neighborhoods have been developed without consideration for forms of transportation other than the automobile.

Residents of a neighborhood can benefit immensely from a few improvements, enhancing recreational bicycling. This includes developers making the following improvements:
1. Provide wide curb lanes or striped bike lanes on major roads in a development (as done on Lake Orlando Parkway in the Rosemont Subdivision);

2. Install paths/trails through cul-de-sacs to connect to a central causeway or common area; and,

3. Provide a bikeway system connecting schools, parks and neighborhood centers.

These recommendations may be strengthened by including them in the Land Development Regulations. Projects could be reviewed for bikeway/pedestrian facility inclusion in the Development Review Process. Maintenance of the paths and trails would become the responsibility of the neighborhood association. These measures would improve the quality of the residential development and the recreational facilities for its residents, decrease the number of recreational bicyclists on arterial roads, and in general, improve the quality of bicycling in Orange County.
10.2 FIVE-YEAR BIKEWAYS RECOMMENDATION LIST

This recommendation list for bikeway construction in Orange County over the next five years was formulated by including bikeways with scheduled road improvements. Figure 8 shows the scheduled road improvements in Orange County during the period of 1986-1991. Field studies determined the feasibility of including a bikeway with each road improvement. Several factors were considered, most notably: 1) How well the route interconnects with roads and neighborhoods in the surrounding area; 2) The most suitable type of facility (bike lanes or seven (7') foot wide paths); and, 3) Potential use of facility by bicyclist travelling to various destination points.

Currently, State roads will have bikeways included in conjunction with most road improvements through wide curb lanes or paved shoulders. Funding is available for County roads through the mechanisms listed in Section 10.1 (Page 106). These mechanisms included Impact Fees, Ad Valorem Tax, the Constitutional Gas Tax, Recreation Funds, and Federal Revenue Sharing. The selected routes offer a good initial foundation for a future comprehensive bikeway system. Also, these routes offer many advantages to bicyclists similar to the benefits motorists will receive by widening the roads. The reasons for including a bikeway with the project are also similar to the reasons these roads were chosen to be improved, such as the route's essentialness to the overall road system, increasing traffic, and greater access to major activity centers. Each project should be looked at individually to determine its merits and the type of facility which would be the most effective.

Table 10.1 (Page 115) shows the scheduled road improvement projects. The table gives the road, route, length, and the funding source for the road project.
## TABLE 10.1

<table>
<thead>
<tr>
<th>ROAD</th>
<th>ROUTE</th>
<th>LENGTH</th>
<th>FUNDING</th>
</tr>
</thead>
<tbody>
<tr>
<td>Conway Road&lt;sup&gt;1/5&lt;/sup&gt;</td>
<td>Lake Underhill Road to Judge Road</td>
<td>5.00 miles</td>
<td>FDOT</td>
</tr>
<tr>
<td>University Boulevard&lt;sup&gt;1&lt;/sup&gt;</td>
<td>Goldenrod Road to Alafaya Trail</td>
<td>5.00 miles</td>
<td>CGT&lt;sup&gt;2&lt;/sup&gt;</td>
</tr>
<tr>
<td>Alafaya Trail&lt;sup&gt;5&lt;/sup&gt;</td>
<td>State Road 50 to University Boulevard</td>
<td>2.50 miles</td>
<td>FDOT</td>
</tr>
<tr>
<td>Apopka-Vineland Road</td>
<td>Conroy-Windermere Road to Sand Lake Road</td>
<td>3.00 miles</td>
<td>CGT&lt;sup&gt;2&lt;/sup&gt;</td>
</tr>
<tr>
<td>Clarcona-Ocoee Road</td>
<td>Hiawassee Road to Edgewater Drive</td>
<td>3.00 miles</td>
<td>Impact Fees</td>
</tr>
<tr>
<td>Conroy-Windermere Road</td>
<td>Apopka-Vineland Road to Kirkman Road</td>
<td>3.00 miles</td>
<td>Impact Fees</td>
</tr>
<tr>
<td>Curry Ford Road&lt;sup&gt;5&lt;/sup&gt;</td>
<td>State Road 436 to State Road 551</td>
<td>1.50 miles</td>
<td>FDOT</td>
</tr>
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<td>Dean Road</td>
<td>Lake Underhill Road to University Boulevard</td>
<td>4.00 miles</td>
<td>Impact Fees</td>
</tr>
<tr>
<td>Dr. Phillips Boulevard</td>
<td>Conroy-Windermere Road to Sand Lake Road</td>
<td>2.00 miles</td>
<td>TCO&lt;sup&gt;3&lt;/sup&gt; (Developer Funded)</td>
</tr>
<tr>
<td>Econlockhatchee Trail</td>
<td>Curry Ford Road to Lake Underhill Road</td>
<td>2.00 miles</td>
<td>FRS&lt;sup&gt;4&lt;/sup&gt;</td>
</tr>
<tr>
<td>Fairbanks Avenue</td>
<td>Interstate-4 to Edgewater Drive</td>
<td>1.00 mile</td>
<td>Optional Gas Tax</td>
</tr>
<tr>
<td>Forest City Road</td>
<td>Edgewater Drive to Seminole County Line</td>
<td>2.00 miles</td>
<td>Optional Gas Tax</td>
</tr>
<tr>
<td>ROAD</td>
<td>ROUTE</td>
<td>LENGTH</td>
<td>FUNDING</td>
</tr>
<tr>
<td>-----------------------------</td>
<td>--------------------------------------------</td>
<td>--------</td>
<td>-------------------------------</td>
</tr>
<tr>
<td>Goldenrod Road(^5)</td>
<td>Curry Ford Road to University Boulevard</td>
<td>5.50</td>
<td>FDOT and Impact Fees</td>
</tr>
<tr>
<td>Hiawassee Road</td>
<td>Clarcona-Ocoee Road to Old Winter Garden Road</td>
<td>5.50</td>
<td>Impact Fees</td>
</tr>
<tr>
<td>John Young Parkway</td>
<td>Interstate-4 to Oak Ridge Road</td>
<td>2.50</td>
<td>Impact Fees</td>
</tr>
<tr>
<td>Lake Avenue</td>
<td>Forest City Road to U.S. 17-92</td>
<td>3.00</td>
<td>(\frac{1}{2}) mill Ad Valorem Tax</td>
</tr>
<tr>
<td>Oak Ridge Road</td>
<td>State Road 441 to Orange Avenue</td>
<td>1.50</td>
<td>Optional Gas Tax</td>
</tr>
<tr>
<td>Old Winter Garden Road</td>
<td>Hiawassee Road to Kirkman Road</td>
<td>1.00</td>
<td>Impact Fees</td>
</tr>
<tr>
<td>Sand Lake Road(^5)</td>
<td>State Road 441 to Orange Avenue</td>
<td>1.75</td>
<td>FDOT</td>
</tr>
<tr>
<td>Silver Star Road(^5)</td>
<td>State Road 441 to Chantelle Drive</td>
<td>2.50</td>
<td>FDOT</td>
</tr>
<tr>
<td>Turkey Lake Road</td>
<td>Sand Lake Road to termination south</td>
<td>2.75</td>
<td>Impact Fees</td>
</tr>
<tr>
<td><strong>TOTAL</strong></td>
<td></td>
<td><strong>58.00</strong> miles</td>
<td></td>
</tr>
</tbody>
</table>

1. Bikeways included in approved design plan
2. Constitutional Gas Tax
3. Transportation Corridor Ordinance
4. Federal Revenue Sharing
5. Florida Department of Transportation Road Project
As indicated in Table 10.1, approximately fifty-eight (58) miles of road improvement projects are scheduled between 1986 and 1991. However, approximately eighteen (18) miles of the proposed projects are State (FDOT) maintained roads. These are likely to have wide curb-lanes or paved shoulders included which may be used by bicyclists. Another twenty-two point five (22.5) miles of road improvement projects are beyond the public hearing stage, thus the design sections are established. Wide sidewalks will be included on most of these projects. Table 10.2 shows the total cost of providing bikeways on the remaining facilities. The cost/mile figures were estimated by the Orange County Traffic Engineering and Highway Departments, and Florida Department of Transportation. As has been stated, the County currently provides sidewalks on most road projects. Therefore, the cost shown for sidewalks/bike paths is a very close estimate of the amount anticipated to be spent by Orange County during the next five years to continue to provide wide sidewalks. However, seven foot-wide sidewalks may not be the intended facility on all the roads scheduled for improvements.

In this present bicycling environment, bike lanes would be in addition to the placement of wide sidewalks, thereby increasing the total cost of a road project. However, bike lanes may not be the most feasible facility on all road improvement projects, as wide sidewalks may not suffice in handling all bicycle traffic. Due to the cost involved, it is unlikely that both facilities would be provided on all road projects. To resolve the issue on the type of facility most suitable for bicycle use patterns in Orange County, additional study and analysis should be conducted over the five-year planning period to determine the safest and most feasible facility.

The costs shown in Table 10.2 are for comparison purposes and to give an estimate of the dollar amount needed to provide wide curb lanes or bike lanes on scheduled road improvement projects through 1991. A generalized cost comparison of road improvement projects with wide sidewalks and road improvement projects with wide curb lanes/bike lanes, reveal the latter to be more expensive by approximately nine percent (9%). The cost of four Orange County road projects with wide sidewalks (Dean Road, Forest City Road, Oak Ridge Road, and University Boulevard), averaged $2,765,000.00 per mile (based on OMB projected total project cost). Silver Star Road, Curry Ford Road, and
Conway Road, Florida Department of Transportation urban area road projects, will have wide curb lanes or paved shoulders and has an average cost per mile of $3,014,000.00. This is a difference of $249,000.00, or approximately nine percent (9%). Therefore, an additional $249,000.00 per mile would be needed if providing wide curb lanes/bike lanes became County policy. Please note, this is just an estimate for comparison purposes and specific road improvement cost would vary depending on a variety of factors. Applied to the 17.5 miles of scheduled County road projects which have not yet been designed, would reveal a need for an additional $4,357,500.00 over the next five years to build roads with wide curb lanes/bike lanes, as illustrated in Table 10.2.

<table>
<thead>
<tr>
<th>FACILITY</th>
<th>MILES</th>
<th>TOTAL ROAD PROJECT</th>
<th>TOTAL COST</th>
</tr>
</thead>
<tbody>
<tr>
<td>Wide Curb Lanes/ Bike Lanes</td>
<td>17.50</td>
<td>$3,014,000.00</td>
<td>$52,745,000.00</td>
</tr>
<tr>
<td>(both sides of a road and four foot wide sidewalks)</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Sidewalk/Bike Paths</td>
<td>17.50</td>
<td>$2,765,000.00</td>
<td>$48,387,500.00</td>
</tr>
<tr>
<td>both sides (7' wide on one side and 5' wide on one side)</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>$249,000.00</td>
<td>$4,357,500.00</td>
</tr>
</tbody>
</table>

A "stop-gap" list was formulated to identify areas where minor, inexpensive measures would improve the existing bikeways. These measures include bikeway maintenance and barrier removal. This list was suggested by area bicyclists. By no means is it all inclusive, rather, this depicts the impact even minor efforts can have in improving our bikeway system. Also, additional minor bikeway extensions which connect several recommended bikeways on scheduled road improvements are listed in Table 10.4. These minimal bikeway extensions enhance the routing system by linking neighborhoods and providing additional
access. Example of areas where minor extensions are recommended on County roads, or roads connected to a County route system, include the following routes listed in Table 10.3.

**TABLE 10.3**

**STOP-GAP LIST**

1. **Sextant Court connection with Autumvale Drive - Section 34, Township 22, Range 30.**

   There is a fourteen (14) inch high barrier at the perimeter of Chickasaw Elementary School property. If this barrier was installed to keep automobile traffic off the school grounds, the same purpose could be accomplished by removing the concrete wall and installing posts. This would provide bicyclists access and allow travel from Azalea Park area to New Azalea Park.

2. **Kirkman Road, from Raleigh Street to the entrance of Valencia Community College - West Campus - Section 21, Township 22, Range 29.**

   Bikeways on both sides of the highway would allow bicyclists easier access to the College.

3. **Truman Road bicycle path, Orlando Naval Training Center bikeway system.**

   This bikeway should have a barrier to prevent motor vehicles from using the path, as has been occurring at times such as inclement weather. Presently, there is a post at each end of this section of the bike path. However, additional barriers are needed to prohibit motorists from gaining access to the path.

4. **Dr. Phillips Boulevard, Sand Lake Road to Conroy-Windermere Road.**

   Provide sidewalks on both sides of this developer extended road. This will provide bicycle/pedestrian access to the elementary school.
The estimates shown on the preceding pages list costs for alternative approaches to bikeway provision: 1) wide sidewalk/bike paths; or, 2) wide curb lanes/bike lanes.
TABLE 10.4
RECOMMENDED BIKEWAY EXTENSIONS

<table>
<thead>
<tr>
<th>Road</th>
<th>Recommended Length</th>
<th>Facility</th>
<th>Estimated Cost</th>
</tr>
</thead>
<tbody>
<tr>
<td>Oak Ridge Road Connector (U.S. 441 to Texas Avenue)</td>
<td>0.75 mile</td>
<td>Sidewalk</td>
<td>$73,500.00</td>
</tr>
<tr>
<td>State Road 50 extension (Dean Road to Econlockhatchee Trail)</td>
<td>0.50 mile</td>
<td>Recreational Bike Path</td>
<td>$24,500.00</td>
</tr>
<tr>
<td>Econlockhatchee Trail extension (State Road 50 to Lake Underhill Road)</td>
<td>2.00 miles</td>
<td>Bike Lanes</td>
<td>$900,000.00*</td>
</tr>
<tr>
<td>Lake Underhill Road (Goldenrod Road to Alafaya Trail extension)</td>
<td>4.50 miles</td>
<td>Bike Lanes</td>
<td>$2,025,000.00*</td>
</tr>
<tr>
<td>Orange Avenue (Oak Ridge Road to Sand Lake Road)</td>
<td>1.50 miles</td>
<td>Sidewalk</td>
<td>$147,000.00</td>
</tr>
<tr>
<td><strong>TOTAL</strong></td>
<td><strong>12.25 miles</strong></td>
<td></td>
<td><strong>$3,170,000.00</strong></td>
</tr>
</tbody>
</table>

*Based on Florida Department of Transportation estimate of $450,000.00 per mile to construct two additional feet of roadway for wide curb lanes on both sides of road and resurfacing independent of a road improvement project.

As noted, there is a cost difference between bike lanes and bike paths. The cost given above for wide curb lanes/bike lanes are for constructing lanes on both sides of the road and resurfacing independently of an ongoing road improvement project. Also, it should be noted that to accommodate expected trends and use in Orange County, seven feet (7') wide bike paths will serve a dual purpose of bike path/sidewalks. Striping may be laid on the path to indicate a pedestrian section and a section for bicyclist. Or, signage to indicate dual use may be sufficient. But, seven feet (7') wide paths are suggested in areas where paths are recommended, due to economic constraints and where safety permits. Several criteria should be used to determine which type of facility (lane or path) is more suitable for a certain location. The criteria include: the intended primary user, motor vehicle speed, volume of daily traffic, type of traffic (trucks, buses, autos), rights-of-way availability, number of curb cuts, and, on-road parking. The recommendation list for the proposed bikeways considered these factors. However, extraneous circumstances also should be considered, and may change.
the type of facility proposed in the recommendation list. The following is a brief summary of the character of each bikeway proposal.

Conway Road

Bikeways will be included in conjunction with road improvements. Wide curb-lanes and seven feet (7') wide sidewalk/bike paths will be provided the length of the project according to preliminary designs.

University Boulevard

Road improvements are underway. A five (5) foot sidewalk/bike path will be included on the south side of the road, and a seven (7) foot wide sidewalk/bike path on the north side of the road.

Alafaya Trail

This road is scheduled to be improved by the State. A seven (7) foot path currently exists on the east side of the road. However, scheduled road widening may cause removal of this bikeway. The recommended facility to be constructed is a bike lane. The majority of the bikeway users most likely will be college-age students and older. This group should be more proficient handling their bicycles, therefore, capable of negotiating an on-road facility. This route will allow access to the University of Central Florida and connect several neighborhoods along Alafaya Trail.

Apopka-Vineland Road

Bike lanes/wide curb lanes are the recommended facility on this road. The ADT count last measured at approximately 9,300 along this stretch. The posted speed limit allows for a moderate rate of speed, which should be compatible with bike lanes. This route will connect several neighborhoods located in the Dr. Phillips area.
**Clarcona-Ocoee Road**

Bike lanes/wide curb lanes are the recommended facility on this road. This route connects proposed bikeways on Hiawassee and Forest City Roads.

**Conroy-Windermere Road**

Bike lanes/wide curb lanes are the recommended facility on this road. This route connects with a proposed bikeway on Apopka-Vineland Road. This route provides access to the rapidly developing neighborhoods in this area.

**Curry Ford Road**

This is a State maintained road. Bike lanes/wide curb lanes are the recommended facility. This route links with an existing bikeway on Curry Ford Road and connects with a proposed bikeway on Goldenrod Road. Further extension of a bikeway would provide a link to Valencia Community College and a proposed facility on Econlockhatchee Trail, increasing access to the rapidly developing eastern area of the County.

**Dean Road**

Bike lanes/wide curb lanes are the recommended facility. This route provides excellent access for bicyclists to Downey Park and to Union Park Elementary School. An extension further north of State Road 50 connects with University Boulevard, which allows access by the college population. This route also connects with an existing bike path on the south side of State Road 50.

**Econlockhatchee Trail**

Bike lanes/wide curb lanes are the recommended facility. The current ADT counts along this stretch ranges between 1,300 and 3,436. Extension further north would provide access to Valencia Community College East Campus and connect with the proposed bike path extension on State Road 50.
**Forest City Road**

Seven foot-wide and five foot-wide sidewalks will be included in conjunction with County road improvements. This route connects with a proposed bikeway on Lake/Kennedy Avenue. Also, this route would provide access to the several neighborhoods located in this area.

**Goldenrod Road**

This is a State maintained road. Bike lanes/wide curb lanes are the recommended facility for the majority of this proposal. This route would provide access for neighborhoods from Curry Ford Road to University Boulevard, and would be an essential route in East Orange County.

**Hiawassee Road**

Preliminary engineering on this road recommends wide sidewalk/bike paths, seven and five feet in width. There are several neighborhoods along this route which would receive access by this proposal. Also an elementary school is located at the southern end of this road and the expected bicycle use would best be served by this type of facility. This would be the essential route in West Orange County.

**John Young Parkway Extension**

This road is expected to handle heavy vehicular traffic. However, the stretch from 33rd Street to Oak Ridge Road is in an urban area, therefore traffic must travel at a moderate speed. This route would connect with an existing bikeway on Oak Ridge Road. Bike lanes/wide curb lanes are the recommended facility because of safety and cost concerns. There are several multi-family units in the area, housing a large number of potential bicyclists. This would be a very useful addition to the bikeway system.
Lake Avenue

Existing use patterns should be carefully considered in determining the most suitable facility. The majority of this route traverses the City of Eatonville, and provides access to two public schools. This route would provide access to the neighborhoods on or near this road.

Oak Ridge Road

A bike path/sidewalk is the recommended facility on this road. This is a very heavily trafficked area serving as a collector for Orange Avenue and Orange Blossom Trail. A bike path/sidewalk would better serve the two schools and the YMCA located in this area. This would separate the bicyclists from this heavily trafficked road, yet provide access to the neighborhoods and schools. Also, this route connects to existing bikeways on Hoffner Avenue and Oak Ridge Road.

Orange Avenue

This route connects proposed bikeways on Oak Ridge Road and Sand Lake Road. This establishes a network providing the Pine Castle, Belle Isle, and Taft bicyclists access to Florida Mall and other centers in the area. The recommended bikeway facility is bike path/sidewalk. Due to the high traffic count, rate of vehicular speed, and the type of traffic on this road, it would be more appropriate to separate bicyclists from the road.

Old Winter Garden Road

Bike lanes/wide curb lanes are the recommended facility. There are numerous curb cuts on this section. This route connects a proposed bikeway on Hiawassee Road to the wide curb lanes on Kirkman Road.

Sand Lake Road

This is a State maintained road and is likely to include wide curb lanes. This route is part of a system connecting the Pine Castle, Belle Isle and Taft communities. It would provide excellent access to the Florida Mall and other shops in the area.
Silver Star Road

This is a State maintained road and will include wide curb lanes. There are not many curb cuts along this stretch of road. This route would serve as a connector to the College Park area due to the extension to Princeton Street. Future plans for this area may connect this bikeway to the proposed bikeway on Hiawassee Road.

Over the next five years, Orange County could provide thirty-one (31) miles of new bikeways, depending on the type of facilities chosen. As mentioned, the selected routes offer a good foundation for a comprehensive bikeway system, and could have an immediate positive impact on the state of bicycling in Orange County.

In addition, through cooperation with FDOT and the surrounding municipalities, another 26.65 miles of bikeways could be provided over the next five years. Table 10.5 depicts planned bikeways in the surrounding municipalities.
### TABLE 10.5

#### APOPKA

<table>
<thead>
<tr>
<th>ROAD</th>
<th>ROUTE</th>
<th>LENGTH</th>
<th>FACILITY</th>
</tr>
</thead>
<tbody>
<tr>
<td>State Road 424</td>
<td>Errol Parkway to State Road 435</td>
<td>2.1 miles</td>
<td>Sidewalk/Bike Path</td>
</tr>
<tr>
<td>Monroe</td>
<td>State Road 435 to Sheeler Road</td>
<td>1.0 mile</td>
<td>Sidewalk/Bike Path</td>
</tr>
<tr>
<td>State Road 424</td>
<td>U.S. 441 to 10th Street</td>
<td>0.6 mile</td>
<td>Sidewalk/Bike Path</td>
</tr>
<tr>
<td>U.S. 441</td>
<td>Unity to Hawthorne</td>
<td>1.1 mile</td>
<td>Sidewalk/Bike Path</td>
</tr>
<tr>
<td>U.S. 441</td>
<td>State Road 345 to Piedmont-Wekiva Road</td>
<td>2.0 miles</td>
<td>Sidewalk/Bike Path</td>
</tr>
<tr>
<td>State Road 437A</td>
<td>McGee to Sheeler Road</td>
<td>0.5 mile</td>
<td>Sidewalk/Bike Path</td>
</tr>
<tr>
<td>Hawthorne</td>
<td>U.S. 441 to 17th Street</td>
<td>1.3 miles</td>
<td>Sidewalk/Bike Path</td>
</tr>
<tr>
<td>State Road 437A</td>
<td>13th Street to Central</td>
<td>1.0 mile</td>
<td>Sidewalk/Bike Path</td>
</tr>
</tbody>
</table>

**7.2 miles**

#### WINDERMERE

<table>
<thead>
<tr>
<th>ROAD</th>
<th>ROUTE</th>
<th>LENGTH</th>
<th>FACILITY</th>
</tr>
</thead>
<tbody>
<tr>
<td>Fifth Avenue</td>
<td>Main Street to Lake Street</td>
<td>0.27 mile</td>
<td>Bike Path</td>
</tr>
<tr>
<td>Lake Street</td>
<td>5th Avenue to 6th Avenue</td>
<td>0.13 mile</td>
<td>Bike Path</td>
</tr>
<tr>
<td>Sixth Avenue</td>
<td>Lake Street to Jennifer Lane</td>
<td>0.30 mile</td>
<td>Bike Path</td>
</tr>
<tr>
<td></td>
<td></td>
<td><strong>0.70 mile</strong></td>
<td></td>
</tr>
</tbody>
</table>
Three touring bike route systems are also proposed in the County. The major expenditure would be for signage designating the route. Cost of "Bike Route" signs is approximately $615.00/mile. The touring routes are shown in Figure 11. The location, mileage, and cost are as follows:

Northwest Bike Route 21.5 miles $13,222.50
Windermere Bike Route 26.5 miles $16,297.50
East Orange Bike Route 17.0 miles $10,455.00

TOTAL MILES - 65.0 miles $39,975.00 - TOTAL COST

The proposed routes, in conjunction with the existing bikeways, would establish an extensive framework for a County-wide bikeway system. Future bikeways could tie-in to the bikeways in place, leading to a comprehensive system. In addition, constructing the recommended bikeways would provide the opportunity for Orange County to truly measure the bicycle usage of its residents. The survey results in Chapter Three reveal that more Orange County residents would ride their bicycle if additional adequate bikeways were provided.

There are approximately forty-two (42) miles of existing bikeways in Orange County, including the municipalities. This certainly shows a deficit in a populated area of over 575,000 persons. Table 10.6 lists the existing bikeway system. Figure 10 shows the existing bikeways.

<table>
<thead>
<tr>
<th>ROAD</th>
<th>ROUTE</th>
<th>LENGTH</th>
<th>FACILITY</th>
</tr>
</thead>
<tbody>
<tr>
<td>Lake Orlando</td>
<td>Rosemont</td>
<td>3.00 miles</td>
<td>Bike Lane</td>
</tr>
<tr>
<td>Orlando Naval Training</td>
<td>University Boulevard to Bennett</td>
<td>4.00 miles</td>
<td>Bike Path</td>
</tr>
<tr>
<td>Alafaya Trail</td>
<td>State Road 50 to University Boulevard</td>
<td>2.00 miles</td>
<td>Bike Path</td>
</tr>
</tbody>
</table>
TABLE 10.6 (continued)

<table>
<thead>
<tr>
<th>ROAD</th>
<th>ROUTE</th>
<th>LENGTH</th>
<th>FACILITY</th>
</tr>
</thead>
<tbody>
<tr>
<td>East State Road 50</td>
<td>Dean Road to Bonneville Drive</td>
<td>3.50 miles</td>
<td>Bike Path</td>
</tr>
<tr>
<td>Lake Underhill Road</td>
<td>Bennett Drive to State Road 436</td>
<td>4.00 miles</td>
<td>Bike Route/Lane</td>
</tr>
<tr>
<td>Lake Lancaster</td>
<td>Lake Route</td>
<td>1.80 miles</td>
<td>Bike Path</td>
</tr>
<tr>
<td>Oak Ridge Road/Texas</td>
<td>Rio Grande Avenue to Radebaugh</td>
<td>4.50 miles</td>
<td>Bike Route/Lane/Path</td>
</tr>
<tr>
<td>Avenue</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Turkey Lake</td>
<td>Park Route</td>
<td>1.80 miles</td>
<td>Bike Path</td>
</tr>
<tr>
<td>Hoffner Avenue</td>
<td>Conway Road to Hansel</td>
<td>2.60 miles</td>
<td>Bike Path (partially)</td>
</tr>
<tr>
<td>South Bay</td>
<td>Neighborhood Route</td>
<td>1.40 miles</td>
<td>Bike Route/Lane</td>
</tr>
<tr>
<td>Curry Ford Road</td>
<td>Bumby Avenue - State Road 436</td>
<td>2.90 miles</td>
<td>Bike Route/Lane</td>
</tr>
<tr>
<td><strong>TOTAL</strong></td>
<td></td>
<td><strong>31.50 miles</strong></td>
<td></td>
</tr>
</tbody>
</table>

City of Maitland

<table>
<thead>
<tr>
<th>ROAD</th>
<th>ROUTE</th>
<th>LENGTH</th>
<th>FACILITY</th>
</tr>
</thead>
<tbody>
<tr>
<td>Lake Sybelia</td>
<td>Neighborhood Route</td>
<td>1.90 miles</td>
<td>Bike Route</td>
</tr>
<tr>
<td>Sandspur Road</td>
<td>Lake Sybelia to Maitland Avenue</td>
<td>0.70 miles</td>
<td>Bike Route</td>
</tr>
<tr>
<td>Horatio Avenue</td>
<td>Maitland Avenue to County Line</td>
<td>2.50 miles</td>
<td>Bike Route/Lane</td>
</tr>
<tr>
<td>Maitland Avenue</td>
<td>Sandspur Road to Sybelia</td>
<td>0.40 mile</td>
<td>Bike Route/Lane</td>
</tr>
<tr>
<td><strong>TOTAL</strong></td>
<td></td>
<td><strong>5.50 miles</strong></td>
<td></td>
</tr>
</tbody>
</table>
TABLE 10.6
(continued)

<table>
<thead>
<tr>
<th>ROAD</th>
<th>ROUTE</th>
<th>LENGTH</th>
<th>FACILITY</th>
</tr>
</thead>
<tbody>
<tr>
<td>City of Winter Park</td>
<td>Wymore Road to U.S. 17-92</td>
<td>0.30 miles</td>
<td>Bike Route</td>
</tr>
<tr>
<td>Lee Road</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Park Avenue</td>
<td>Ridgewood Avenue to York</td>
<td>0.20 miles</td>
<td>Bike Route</td>
</tr>
<tr>
<td></td>
<td>Avenue</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Webster Avenue</td>
<td>U.S. 17-92 to Interlachen Avenue</td>
<td>0.30 miles</td>
<td>Bike Route</td>
</tr>
<tr>
<td>Canton Avenue</td>
<td>Denning Drive to Interlachen Avenue</td>
<td>0.20 miles</td>
<td>Bike Route</td>
</tr>
<tr>
<td>Denning Drive</td>
<td>Gardner Drive to Beloit Avenue</td>
<td>0.40 miles</td>
<td>Bike Route</td>
</tr>
<tr>
<td>Pennsylvania/Winter</td>
<td>Park Avenue to City Limits</td>
<td>0.75 miles</td>
<td>Bike Route</td>
</tr>
<tr>
<td>Park Road</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Lake Virginia</td>
<td>Lake Avenue to Aloma Avenue</td>
<td>0.50 miles</td>
<td>Bike Route</td>
</tr>
<tr>
<td>Interlachen Avenue</td>
<td>Osceola Avenue to Palmer</td>
<td>0.20 miles</td>
<td>Bike Route</td>
</tr>
<tr>
<td></td>
<td>Avenue</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Palmer Avenue</td>
<td>Park Avenue to Lakemont</td>
<td>0.20 miles</td>
<td>Bike Route</td>
</tr>
<tr>
<td></td>
<td>Avenue</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Glenridge Way</td>
<td>Winter Park Road to Lakemont Avenue</td>
<td>0.20 miles</td>
<td>Bike Route</td>
</tr>
<tr>
<td>Lakemont Avenue</td>
<td>City Limits to Magnolia</td>
<td>0.70 miles</td>
<td>Bike Route</td>
</tr>
<tr>
<td>Phelps Avenue</td>
<td>Mizell Avenue to Palmer</td>
<td>0.20 miles</td>
<td>Bike Route</td>
</tr>
<tr>
<td></td>
<td>Avenue</td>
<td></td>
<td></td>
</tr>
<tr>
<td>ROAD</td>
<td>ROUTE</td>
<td>LENGTH</td>
<td>FACILITY</td>
</tr>
<tr>
<td>-----------------------</td>
<td>------------------------------</td>
<td>---------</td>
<td>----------------</td>
</tr>
<tr>
<td>City of Winter Park</td>
<td>Palmer Avenue to Lake Howell</td>
<td>0.30 miles</td>
<td>Bike Route</td>
</tr>
<tr>
<td></td>
<td>Branch Road</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Temple Drive</td>
<td>Alomo Traner to City Limitis</td>
<td>0.20 miles</td>
<td>Bike Route</td>
</tr>
<tr>
<td>Dunraven Drive</td>
<td>Stradhaven to Mizell Avenue</td>
<td>0.20 miles</td>
<td>Bike Route</td>
</tr>
<tr>
<td>Graer Drive</td>
<td>Sherbrook to Cady Way</td>
<td>0.10 miles</td>
<td>Bike Route</td>
</tr>
<tr>
<td><strong>TOTAL</strong></td>
<td></td>
<td><strong>4.95 miles</strong></td>
<td></td>
</tr>
</tbody>
</table>

Following are maps of Orange County showing the existing bikeways (lanes and paths) and the proposed bikeways. In addition to the mapped bikeway system, there will always exist a system of unmapped bikeways developed by the bicyclist to best meet his needs. These systems would be evident in the neighborhoods and heavily trafficked areas. The recommended bikeways expand this system by connecting neighborhoods and activity centers. Therefore, the additional amount of strategically placed bikeways would expand the total system by more than the actual mileage constructed by the County. Appendix E, page 161, illustrates the bikeways in more detail.
LEGEND

PROPOSED AND EXISTING BIKEWAYS

MAP II

BIKEWAYS
BIKE ROUTES
TOURING ROUTES
APPENDIX A

ORANGE COUNTY LEGAL DEPARTMENT
BIKEWAY LIABILITY
SUMMATION
MEMORANDUM

TO: J. David Marsh, Planning Supervisor
    Long Range Planning Section
FROM: Susan Tedder
    Legal Research Assistant
DATE: October 7, 1986
RE: Orange County's Liability Regarding Bikeway Signage

Whether the County would incur liability for accidents resulting from the placement of signs on County bikeways depends on the type of government activity that caused the accident. Florida courts tend to distinguish between "planning" and "operational" level functions. Planning functions, meaning those requiring policy decisions, are protected from liability on the theory of sovereign immunity. Examples of planning functions include the establishment of speed limits, decisions to change or build a road, and decisions on the type of traffic control device or signage to be used on a particular road or intersection. Decisions concerning whether to use bikeway signs, what type of signs to use, and where to place such signs clearly fall within this category of governmental activity. So long as any signs used are properly maintained, the County should be immune from suit for accidents resulting from the above planning decisions.

Operational functions encompass the actions of government in implementing its policies. Accidents resulting from a failure at this level would subject the County to liability. Examples of operational functions include the failure to maintain an existing traffic signal in proper working order, and the failure to cut back vegetation that obscures a traffic sign or culvert. The failure to maintain bikeway signage would also be considered operational, resulting in County liability for accidents caused by the improper maintenance.
As a general rule, an inherent defect in a plan for improvement cannot subject the government to liability. However, the government may not claim immunity if it creates a dangerous condition which is not readily apparent to persons who could be injured by the condition, and the government has knowledge of the presence of people likely to be injured. In such cases, the government must take steps to avert the danger or give proper warning. The failure of government to act will be considered by the Court as a failure at the operational level.

To illustrate the above concept: decisions as to the location of a road, the width and number of lanes, and the placing of traffic control devices are generally not actionable because they are planning level decisions. The fact that a road is built with a sharp curve does not in itself establish grounds for liability. However, if the government knows when it creates the curve that vehicles cannot safely negotiate the curve at speeds of more than 25 m.p.h., the government must take steps to warn the public of the danger. The failure to warn would be considered a negligent omission at the operational level, resulting in government liability.

Regarding the personal liability of employees for such accidents, employees are protected by statute so long as they act within the scope of their employment, and do not act in bad faith, with malicious intent, or in a manner exhibiting a wanton and willful disregard of human rights, safety, or property. As to when employee conduct would subject the County to liability, the same planning/operational dichotomy is used. If there is a Code already in force, and the accident occurs because of the employee's failure to implement the Code, the County will be liable for the actions or omissions of the employee since Code implementation is an operational activity. However, the creation of a Code is a planning activity, and the County will be immune from liability for bad planning decisions absent the conditions mentioned in the third paragraph of this memo.
APPENDIX B

RESOLUTION ESTABLISHING THE
BIKEWAY BIKEWAYS AD
HOC COMMITTEE
RESOLUTION NO. 86-M-01

A RESOLUTION RELATING TO THE ESTABLISHMENT OF THE BIKEWAYS AD HOC COMMITTEE; PROVIDING AN EFFECTIVE DATE.

RECITALS:

1. The Board of County Commissioners of Orange County, Florida ("Board") in its Growth Management Policy has made provision for the establishment of bikeways within Orange County.

2. On August 27, 1974, the Board adopted a Bicycle Plan.

3. The Board desires to update the Bicycle Plan.

4. The Board finds that an Ad Hoc Committee could assist it in the revision of the Bicycle Plan and in its implementation, could provide needed outside expertise and would assure citizen input.

NOW, THEREFORE BE IT RESOLVED BY THE BOARD OF COUNTY COMMISSIONERS OF ORANGE COUNTY, FLORIDA:

Section 1. Bikeways Ad Hoc Committee. The Board establishes the Bikeways Ad Hoc Committee for the purposes stated below.

Section 2. Membership. The Bikeways Ad Hoc Committee shall consist of seven members appointed by the Board serving without compensation and at the pleasure of the Board. All members shall reside in Orange County. Members shall meet the following eligibility requirements in addition to those conditions of appointment stated in O.C. Resolution NO. 83-M-108:

A. One member shall be a member of the League of Women Voters.

B. Two members shall be members in good standing of an organized bicycle club.
C. One member shall be on the staff of or nominated by the East Central Florida Regional Planning Council.

D. One member shall be a member of the Orange County Homeowner's Association, Inc.

E. One member shall be an employee of or nominated by the Orange County School Board.

F. One member shall be a member of the Home Builders Association of Mid Florida, Inc.

Section 3. Terms of Membership. Except for the initial term, each member shall serve for two year terms. Each term commences January 1. Initial terms shall be set by the Board at the time the first appointments are made so that the initial terms of three members expire December 31, 1986.

No members may serve longer than six consecutive years. Members may be reappointed. The Board will fill vacancies by appointment for any unexpired term.

Section 4. Duration. The existence of the Bikeways Ad Hoc Committee shall continue until terminated by the Board.

Section 5. Scope and Purpose. The Bikeways Ad Hoc Committee has been formed for the following purposes and to perform the following duties:

A. To advise the Board concerning the update of the 1974 Bicycle Plan.

B. To advise the Board concerning the implementation of the Bicycle Plan and Bikeways policies.

C. To investigate financing of capital improvements related to the Bicycle Plan.

D. To receive and to disseminate information to and from their respective organizations and the public at large.

Section 6. Meeting; Procedure. The Bikeways Ad Hoc Committee shall meet at least semiannually. Minutes shall be kept and filed with the Board. The members shall
elect a chairperson and vice-chairperson. They may adopt rules of procedure to govern the conduct of their meetings.

Section 7. Support Staff. Support staff for the Bikeways Ad Hoc Committee will be provided from the Orange County Planning Department.


Section 9. Severability. If any provision of this Resolution or the application thereof to any person or circumstance is held invalid, the invalidity shall not affect other provisions or applications of this Resolution which can be given effect without the invalid provision or application and to this end the provisions of this Resolution are declared severable.

Section 10. Effective Date. This Resolution shall take effect immediately upon its adoption.


BOARD OF COUNTY COMMISSIONERS
OF ORANGE COUNTY, FLORIDA

By: __________________________
   Chairman

ATTEST: THOMAS H. LOCKER,
Clerk to the Board of
County Commissioners

By: __________________________
   Deputy Clerk
APPENDIX C

SUMMARY OF
ORANGE COUNTY PARKS
AND RECREATION SURVEY
RESULTS OF THE ORANGE COUNTY PARKS & RECREATION SURVEY

Activities engaged in:

1. Picnicking
2. Swimming pools and swimming in lakes
3. Bicycling
4. Fishing
5. Tennis

Activities which people would like provided:

1. Picnicking
2. Boating/canoeing
3. Bicycling
4. Fishing
5. Camping
6. Swimming pool
7. Playgrounds
8. Tennis
9. Racquetball

Individuals surveyed:

1. 26-50 yrs. old 37.6%
2. 50+ 26.6%
3. 1-15 yrs. old 19.9%
4. 16-25 yrs. old 15.9%

Finance:

1. Bond issue 68.8%
2. Impact fee 66.6%
3. Special tax 53.1%

Help offset operating cost:

1. Entrance fees 75.6% - average suggested fee - $1.08
2. Special facilities fee 88.3% (Swimming pools, golf, tennis, racquetball, softball, etc.)

The most frequent reason for not using county facilities:

1. Did not know about them
2. Parks were too far away

Active parks tend to provide more exposure and visibility in terms of advertising recreational opportunities available.
APPENDIX D

FLORIDA DEPARTMENT OF TRANSPORTATION POLICY
FOR INCORPORATION OF BICYCLE
AND PEDESTRIAN FACILITIES
DATE: January 30, 1986

TO: District Design Engineers, District PD&E Engineers and Consultants

FROM: D. C. Bullard, State Design Engineer - Roadways


SUBJECT: POLICY FOR INCORPORATION OF BICYCLE AND PEDESTRIAN FACILITIES IN DESIGN - DM01041

The Department's current policy is to give special emphasis to the needs of bicyclists and pedestrians in and within one mile of urban areas. This policy will generally provide for the construction of wide curb lanes, bicycle lanes or paved shoulders for the needs of bicyclists and sidewalks for pedestrians in conjunction with other planned roadway improvements. The lack of adequate right of way and the cost associated with acquisition in built up areas will not allow us to provide the additional width for bicyclists on all projects. Roadway improvements in the smaller urban areas (5,000 to 50,000 population) and the more rural areas will be reviewed on a case-by-case basis depending on anticipated bicycle travel and the need for wider pavement or paved shoulders based on other safety and operational benefits. Anticipated bicycle travel is to be considered of sufficient volume when the roadway section is identified for bicycle improvements in the Transportation Improvement Program, the State Transportation Plan (Bicycle Element) or other approved Community Comprehensive Bicycle Transportation Plans.

Wide Curb Lanes

In addition to the safety benefits for the bicyclists, wide curb lanes provide benefits that will improve traffic flow, add to the capacity of the roadway and enhance overall highway safety. Some of those benefits are:

1. Assists a vehicle in turning right into driveways and narrow connecting streets without encroachment into the adjacent lane.
2. Assists a vehicle in entering the roadway from an intersecting roadway or driveway without encroachment into the adjacent lane.
3. Allow a motorist to pass a bicyclist without delay.
4. Reduces the need for vehicles to change lanes because of bicyclist.
Wide curb lanes are to be provided as the minimum treatment in conjunction with other roadway improvements (curb and gutter construction) in or within one mile of all urbanized (population 50,000 or more) areas unless right of way is inadequate and the cost associated with acquisition for this purpose is not feasible. For those projects that require additional right of way for the construction of the road, the additional width to provide wide curb lanes will be acquired unless the additional cost is extreme. With severe right of way limitations 11' interior lanes, 11' continuous two-way turn lanes or painted medians may be used under interrupted flow operating conditions at low speed up through 40 MPH. The presence of heavy truck traffic (design hour trucks greater than 10%) and intersection design controls should be evaluated in reducing the center-most lane to 11'. The minimum width for wide curb lanes is 14' measured from the edge of the adjacent travel lane to the lip of the gutter, or 15' to the face of curb if the 1'6" gutter is not constructed.

Heavily congested roadways with significant levels of commerce and numerous intersections are served best with wide curb lanes and not marked as a bike lane or bike route. In no case should an edge line be marked 2 or 3' in on a 14' wide curb lane, since this tends to channel bicyclists into a space that is too narrow.

Wide curb lanes are also to be considered in urban areas (5,000 - 50,000 population) based on anticipated bicycle travel needs as previously identified.

The FHWA has agreed to a striping policy for urban resurfacing projects that will allow restriping to provide wide curb lanes by using 11' interior lanes. (See DM10008 dated January 13, 1984.) This policy is to be applied on all future appropriate urban and urbanized area (curb and gutter) State and Federally funded resurfacing projects.

Bicycle Lanes
Bicycle lanes (4' minimum width) may be warranted in lieu of wide curb lane in some areas of the State. Collectors and the more lightly traveled arterials that have only a moderate level of commerce, and have fewer turning movements, may serve bicyclist with a bike lane.

Roadway sections with low to moderate traffic and where it is desirable to attract bicyclists should be considered for 4' wide bike lanes in the initial roadway improvement. A 4' minimum width with urban curb and gutter construction or 5' minimum width with rural type (no curb) construction will be required.
Paved Shoulders

Shoulder pavement (4' minimum width) is to be constructed as the minimum treatment in conjunction with all new construction, reconstruction, lane addition, resurfacing and widen-resurface projects with open type (no curb) drainage in or with one mile of urbanized areas when the post construction ADT greater than 1600. Shoulder pavement in the smaller urban and rural areas will be evaluated on a case-by-case basis depending on anticipated bicycle travel and the need based on other safety and operational benefits.

Shoulder pavement on non-interstate projects will normally be constructed using Base Group 16 on the Optional Base Chart. The surface will consist of a 1" minimum structural course and a friction course over the full width of the shoulder when a friction course is required.

Pedestrian Facilities (Sidewalks)

Sidewalks will normally be constructed in conjunction with all new construction, major reconstruction and lane addition curb and gutter projects. As a general practice, sidewalks should be constructed along both sides of arterial streets that are not provided with shoulders even though pedestrian traffic may be light. Exceptions may be made to the construction of sidewalks on both sides of the street when the roadway parallels a railroad or drainage canal and pedestrians would not be expected and in some cases on bridges. If sidewalks are constructed on the approaches to bridges, they should be continued across the structure.

The standard width for sidewalks is 5' when separated from the curb by a buffer strip. A 4' minimum may be used in areas with few pedestrians. When sidewalks are constructed adjacent to the curb, the minimum width should be 6'. Additional width for sidewalks may be justified in highly developed urban areas and in the vicinity of schools.

This memo supersedes DM01036 dated March 16, 1984. Additional design criteria for bicycle facilities is given in the Department's "Bicycle Facilities Planning and Design Manual - 1982".

DCB:oj
APPENDIX E

BIKEWAY SYSTEM
BY
COUNTY SECTIONS
PROPOSED & EXISTING BIKEWAYS

MAP 7
BIBLIOGRAPHY


7. Florida Department of Natural Resources, An Inventory of Abandoned Railroads in Florida, Division of Recreation and Parks, Tallahassee, Florida, 1983.


