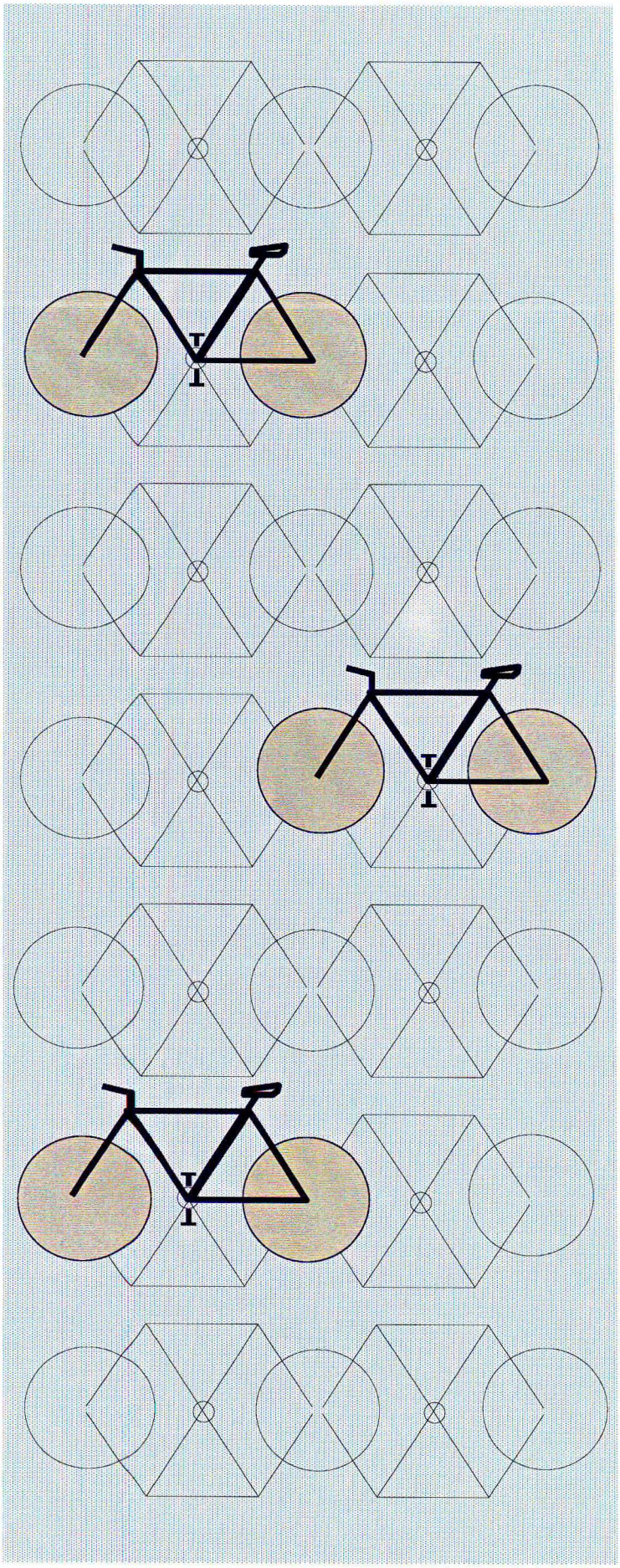

Southern New Jersey

BICYCLE AND PEDESTRIAN MOBILITY PLAN

An Element of the DVRPC Year 2020 Plan

DIRECTION 2020

A Region on the Rise

Report 33

Delaware Valley Regional
Planning Commission

DIRECTION 2020

SOUTHERN NEW JERSEY
BICYCLE AND PEDESTRIAN MOBILITY PLAN

prepared by:

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Created in 1965, the Delaware Valley Regional Planning Commission (DVRPC) is an interstate, intercounty and intercity agency which provides continuing, comprehensive and coordinated planning for the orderly growth and development of the Delaware Valley region. The region includes Bucks, Chester, Delaware, and Montgomery counties as well as the City of Philadelphia in Pennsylvania and Burlington, Camden, Gloucester, and Mercer counties in New Jersey. The Commission is an advisory agency which divides its planning and service functions between the Office of the Executive Director, the Office of Public Affairs, and three line Divisions: Transportation Planning, Regional Planning, and Administration. DVRPC's mission for the 1990s is to emphasize technical assistance and services and to conduct high priority studies for member state and local governments, while determining and meeting the needs of the private sector.

The DVRPC logo is adapted from the official seal of the Commission and is designed as a stylized image of the Delaware Valley. The outer ring symbolizes the region as a whole while the diagonal bar signifies the Delaware River flowing through it. The two adjoining crescents represent the Commonwealth of Pennsylvania and the State of New Jersey. The logo combines these elements to depict the areas served by DVRPC.

DELAWARE VALLEY REGIONAL PLANNING COMMISSION

Publication Abstract

TITLE	Date Published: April 1997
SOUTHERN NEW JERSEY BICYCLE AND PEDESTRIAN MOBILITY PLAN	Publication No. 97002 Direction 2020 Report No. 33

Geographic Area Covered: Four-county southern New Jersey region: Burlington, Camden, Gloucester and Mercer counties.

Key Words: Bicycle, Pedestrian, Mobility, ISTEA, Non-Motorized Transportation, Direction 2020, Intermodal, Off-Road Facilities, County Routes, Implementation.

ABSTRACT

This report provides the bicycle and pedestrian component of Direction 2020, the DVRPC's long range transportation and land use plan for the Delaware Valley. The Bicycle and Pedestrian Mobility Plan covers the four counties located in southern New Jersey. The plan contains information about prevailing policies towards bicycles and pedestrians. It also provides information about current bicycle and pedestrian use, an inventory of existing and proposed bicycle and pedestrian facilities, and goals and objectives for improving bicycle and pedestrian conditions. This information provides the foundation for creating the Proposed Southern New Jersey Year 2020 Bicycle Network.

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EXECUTIVE SUMMARY

The Delaware Valley Regional Planning Commission (DVRPC) has long recognized that an effective transportation system cannot rely exclusively upon the single occupancy vehicle. Traffic congestion, environmental pollution and dependence on uncertain energy reserves are the results of too many automobiles. These problems can be alleviated through effective transportation planning.

Within southern New Jersey, traffic congestion increases journey-to-work time and generates unhealthy levels of ozone, carbon monoxide and particulates, which have caused the area to be designated a non-attainment area under the Clean Air Act. Despite attempts to improve the efficiency of public transportation and to promote van and car pooling in the Delaware Valley region, reliance on the automobile for commuting has increased more than eight percent between 1980 and 1990.

The traditional view of transportation policy has held that bicyclists are generally recreational riders and would share city streets with automobile users. Dedicated bicycle facilities and access for bicycle commuters have been very limited. Moreover, a comprehensive bicycle policy for southern New Jersey has not been available to date.

One important element of DVRPC's multi-modal transportation planning efforts is the Bicycle and Pedestrian Mobility Plan for Southern New Jersey. This plan is part of Direction 2020, the Commission's long range land use and transportation plan for the region. The bicycle component uses existing, proposed and recommended bicycle facilities to develop a regional bicycle network. Concerns related to pedestrian access are addressed through policy recommendations and design guidelines.

To address the needs of bicyclists and pedestrians in southern New Jersey, a variety of sources were utilized. The sources provided valuable data and expertise in developing and expanding the four-county bicycle network. Those who contributed to the plan represent bicycle clubs, county planning offices, NJDOT and non-profit organizations.

Development of the bicycle network began with the preliminary analysis conducted by the RBA Group for the NJDOT statewide bicycle plan. From this, existing conditions within southern New Jersey were examined. Bicycling within southern New Jersey is currently underutilized as an alternative transportation mode. Recognizing that this is primarily due to the scarcity of bicycle facilities located in the four-county region, a network that would encourage the use of bicycles for efficient short distance transportation was developed.

The plan contains information about prevailing policies towards bicycles that have been adopted on the federal, state, county and local levels. In addition, existing bicycle facilities, including trails, routes and lanes, have been inventoried to determine the coverage of the current system. Proposed trails, routes and lanes, as well as abandoned rail lines, have also been included in the inventory. Existing routes and trails were examined in light of their

proximity to transit stations, major employment centers, universities and parks in order to determine the possibility for creating future connections.

Walking, as a commuter mode, is more widely practiced, especially in areas with high population densities and compact land uses. The purpose of the Southern New Jersey Bicycle and Pedestrian Mobility Plan is to promote and encourage bicycling and walking as transportation options. The goals and objectives identified within this plan are designed to address the methods of implementation that must be carried out to ensure that bicycle and pedestrian conditions are comprehensive, safe and accessible.

Because pedestrians generally travel shorter distances than bicyclists, the pedestrian component of the plan identifies the features and policies that are essential to create a pedestrian friendly environment rather than outline a pedestrian network. Some essential elements include connections to trip generators, safe and convenient infrastructure and compact land uses. While no single improvement will be sufficient to attract all people to walk instead of drive, the implementation of the recommendations contained in the goals and objectives can contribute to the creation of an environment that fosters pedestrian activity.

Bicyclists, on the other hand, are more likely to travel longer distances and cross municipal and county borders. Because of the need to ensure that bicycle facilities do not end at political boundaries, the bicycle network for southern New Jersey will complement the plan's goals and objectives and encourage the use of bicycles for short to moderate distance transportation trips.

The proposed network represents more than 1,400 miles of bicycle facilities. Recommended enhancements include more than 800 miles located on state, county or local rights-of-way, and almost 100 miles of dedicated off-road facilities. Since a majority of the long, linear, cross-county roadways are county-owned, the development of the bicycle network focused upon county roads as the backbone of the bicycle network. Therefore, more than 600 miles of facilities that appear on the bicycle network are located along county-owned roadways. Other facilities are located along state and local roads as well as off-road routes. Off-road routes, which may be located along a utility easement or an abandoned rail right-of-way, comprise approximately 100 miles of the network.

Once constructed, the network will provide a viable transportation alternative to the automobile. The goals and objectives that are part of this plan, coupled with the network implementation strategies, identify specific actions that can be undertaken to improve bicycle and pedestrian mobility in southern New Jersey.

CHAPTER I

BICYCLE AND PEDESTRIAN PLANNING AND RECENT LEGISLATION

Both nationally and locally, bicycles have traditionally been used for recreation. Over the past twenty years, the increase in the bicycle's popularity has coincided with the public's recognition of the health and fitness benefits it provides. However, the public's acceptance of the bicycle as an alternative to the automobile is evolving more slowly.

Two relatively recent pieces of federal legislation may instigate the development of bicycling and walking as alternative transportation modes in southern New Jersey. These landmark pieces of legislation - the Intermodal Surface Transportation Efficiency Act of 1991 (ISTEA) and the Clean Air Act Amendments of 1990 (CAAA) - will have a dramatic impact on the way transportation plans, policies and programs are designed. ISTEA provides the mandate and funding opportunities to plan for biking and walking as transportation options; the CAAA delegates the responsibility to the region to develop innovative transportation strategies to reduce dependence on automobiles and improve air quality. The New Jersey Department of Transportation (NJDOT) and the Delaware Valley Regional Planning Commission (DVRPC) have both responded to these two initiatives by preparing statewide and regional bicycle and pedestrian plans.

This chapter is devoted to a review of the impact that ISTEA and the CAAA will have on bicycle and pedestrian planning and development. In addition, a discussion of the purpose and mechanics of the Transportation Improvement Program (TIP) is included.

ISTEA

Historically, the vision driving federal transportation policy has been the creation of a highway network connecting cities across the country. ISTEA represents a major revision of federal transportation policy and creates a new vision for surface transportation. The purpose of ISTEA is "to develop a National Intermodal Transportation System that is economically efficient, environmentally sound, provides the foundation for the Nation to compete in the global economy and will move people and goods in an energy efficient manner.[1]" ISTEA requires states and metropolitan planning organizations (MPO), such as the Delaware Valley Regional Planning Commission (DVRPC), to prepare long range transportation plans which address bicycling and walking. Most of the major elements of ISTEA legislation explicitly urge states and localities to fund bicycle projects and programs. ISTEA will provide over $155 billion nationwide from 1992 to 1997. Approximately $379 million will be available to the four counties in the DVRPC southern New Jersey region.

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[1]U.S. Department of Transportation, "Intermodal Surface Transportation Efficiency Act of 1991, A Summary, p. 5.

TRANSPORTATION IMPROVEMENT PROGRAM (TIP)

The TIP document, compiled annually by DVRPC in conjunction with the states and counties, lists all federally funded transportation projects and projects scheduled to begin construction in the Delaware Valley in the next five to six years. The TIP represents a consensus among state and local officials as to which regional improvements should be made. The process is designed to ensure that projects are consistent with national, state, regional, county and municipal policies.

Projects contained in the TIP were originally conceived in the state, regional and local planning processes. To be considered for inclusion, strong sponsor commitment from a number of agencies is required. Each member government develops project candidates. Public participation is an integral part of this process. In southern New Jersey, all projects are selected by the MPO in conjunction with the state.

A new program under ISTEA, the Transportation Enhancement Program (TE) provides a limited amount of funding dedicated toward non-traditional transportation projects or facilities that otherwise enhance the environs of the transportation network. These projects are all selected by NJDOT in consultation with a statewide committee that includes DVRPC participation. Following selection, these projects are then included on the regional TIP.

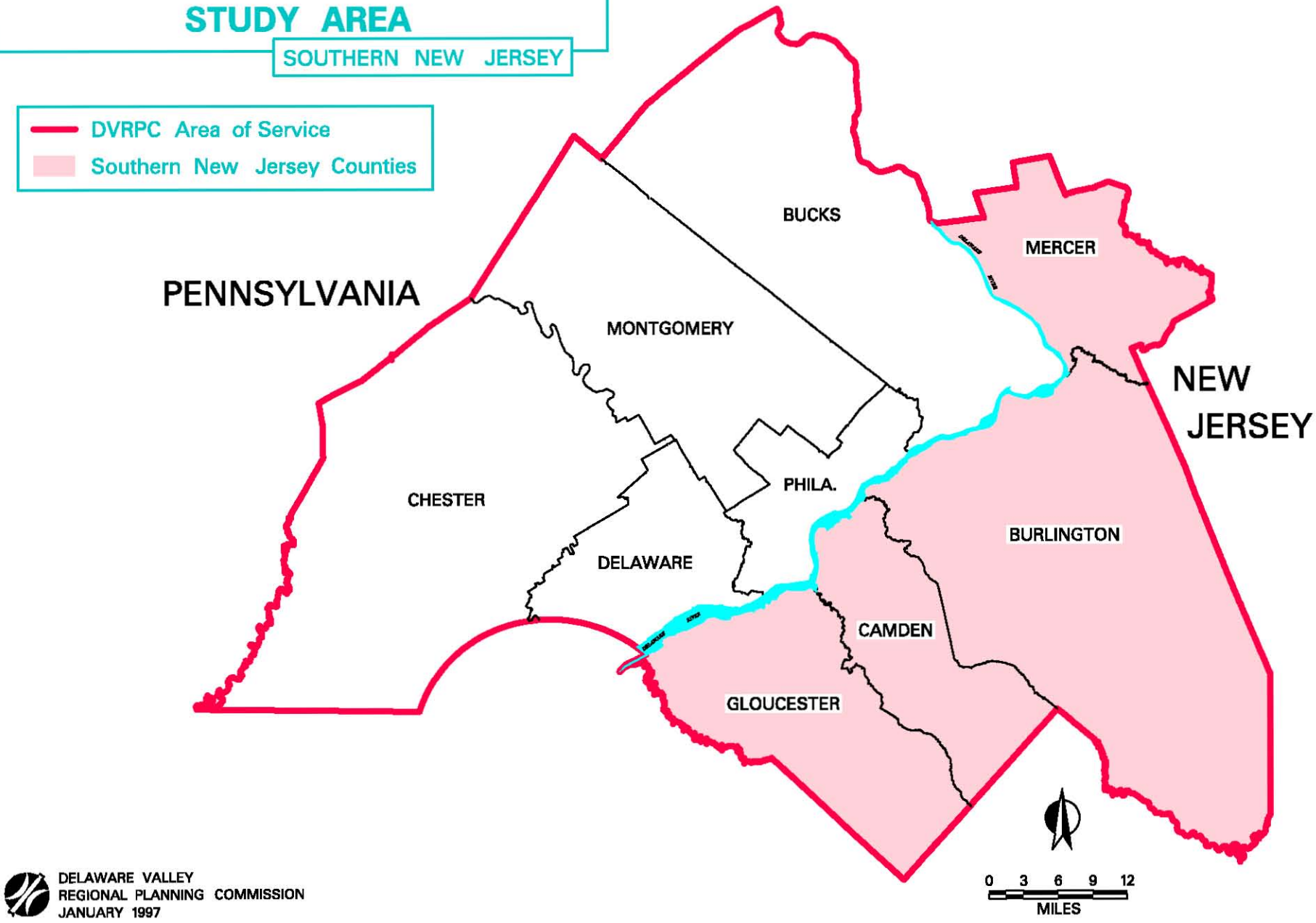
During the 1994 TE process, one southern New Jersey bicycle project was selected through the Transportation Enhancement Program and included in the TIP. During the 1995 TE process, no southern New Jersey bicycle projects were programmed on the TIP. The 1996 TE process saw two projects included on the TIP. While no federal mandate requires that a specific number of bicycle projects be funded, ISTEA clearly encourages that funding be used for bicycle projects. Only projects appearing on the TIP are eligible for ISTEA funding.

Table I contains a listing of the FY 1994 bicycle and pedestrian project applications submitted for funding consideration. Table II consists of those bicycle and pedestrian project applications submitted in FY 1995, and Table III for FY 1996. Only starred projects have been programmed on the TIP. Table IV lists the five bicycle and pedestrian projects programmed on the FY 1997 TIP. The importance of the TIP project list is that it provides insight into what local municipalities envision for their communities. In many cases, however, projects do not appear in a community's master plan.

FIGURE I

YEAR 2020 BICYCLE NETWORK STUDY AREA

SOUTHERN NEW JERSEY



DELAWARE VALLEY
REGIONAL PLANNING COMMISSION
JANUARY 1997

TABLE I
FY 1994: BICYCLE AND PEDESTRIAN
TRANSPORTATION ENHANCEMENT APPLICATIONS

COUNTY	PROJECT NAME	LOCATION	TOTAL COST THIS PHASE
Gloucester	River Drive Walkway & Bike Path	Westville	$815,000
Gloucester	Grenloch Historic Trail	Grenloch	$55,00
Mercer	Lawrence Greenway	Lawrence	$369,000
Mercer	D & R Canal Route 1 Crossing	Lawrence	$250,000
Mercer	Alexander St./Cherry Hill Rd. Bikepath	Princeton	$15,000
Mercer	Stony Brook Ped & Bike Bridge	Princeton	$375,000
Mercer	Rosedale Rd. Walkway Improvements	Princeton	$7,000
Mercer	Stuart Rd. Bikepath	Princeton	$60,000
Mercer	Route 206 Bikepath	Princeton	$40,000
Mercer	Tusculeum Pathway Improvements		$30,000
Mercer	Hightstown Bikepath/Walkway (A)	Hightstown	$65,800
Mercer	Hightstown Bikepath/Walkway (B)	Hightstown	$28,500
Mercer	Business District Ped Improvements	Hightstown	$N/A
Mercer	Hamilton RR Station Connection	Hamilton	$1,395,180
Mercer	Route 29 & 175 View Enhancements	Ewing	$190,000
Mercer	Stacy Park Bicycle/Pedestrian Path	Trenton	$N/A
Mercer	Trenton Sidewalk Reconstruction	Trenton	$N/A
Mercer	Waterfront Park Ped/Bike Path	Trenton	$250,000
Mercer	Washington Rd. Sidewalk	Intermunicipal	$90,000
Mercer*	D & R Canal Multi-purpose Path II	Intermunicipal	$400,000
Mercer	D & R Canal Old Rose-Mulberry	Intermunicipal	$250,000
Mercer	Dinky Line Pedestrian Path	West Windsor	$60,000

* Programmed on TIP

TABLE II
FY 1995: BICYCLE AND PEDESTRIAN
TRANSPORTATION ENHANCEMENT APPLICATIONS

COUNTY	PROJECT NAME	LOCATION	TOTAL COST THIS PHASE
Burlington	Riverton Memorial Park Path	Riverton	$14,000
Burlington	Madison-Pine Ped/Bike Trail Study	Mt. Holly	$69,000
Burlington	Jackson Rd. Walkway	Medford	$195,000
Burlington	Burlington Ave. Sidewalk	Delanco	$114,700
Camden	Gibbsboro Sidewalk Installation	Gibbsboro	$88,254
Camden	E. Atlantic Ave. Ped/Bike Path	Somerdale	$109,700
Camden	Warwick Rd./Nature Trail Park Improvements	Somerdale	$80,300
Camden	Wiggins Park Extension	Camden	$400,000
Camden	B. Franklin Bridge Enhancement	Camden	$254,400
Camden	Branch Ave./DeCow Rd. Path	Pine Hill	$482,813
Camden	Sidewalk Enhancement	Berlin Twp.	$852,840
Camden	Knights Park Trail & Historic Hwy.	Collingswood	$79,000
Camden	Merchantville Abandoned RR Preservation	Merchantville	$35,000,000
Camden	Camden County Ped/Bike Trails	Intermunicipal	$40,000
Gloucester	Malaga Village Sidewalk	Franklin	$137,970
Gloucester	Delsea Middle & High School Sidewalk	Franklin	$30,600
Mercer	Belvidere/Summer St. Greenway	Trenton	$100,000
Mercer	Ped/Bike System Improvements	Ewing	$420,000
Mercer	Johnson Trolley Link	Lawrence	$62,000
Mercer	Community Park Ped/Bike Link	West Windsor	$1,660,000
Mercer	Millstone/Rocky Brook Bikeway	East Windsor	$100,000
Mercer	Stony Brook Ped & Bike Bridge	Princeton	$280,000
Mercer	Cherry Hill Rd. Bikepath Completion	Princeton	$65,500
Mercer	Ped/Bike Linkage to Train Station	Hamilton	$545,970
Mercer	Rosedale Rd. Walkway Improvements	Princeton	$7,000
Mercer	D & R Canal Old Rose-Mulberry	Intermunicipal	$250,000

TABLE III
FY 1996: BICYCLE AND PEDESTRIAN
TRANSPORTATION ENHANCEMENT APPLICATIONS

COUNTY	PROJECT NAME	LOCATION	TOTAL COST THIS PHASE
Burlington	Vincetown Walkway	Southampton	$35,000
Burlington	Route 623 Sidewalk/Bikepath	Medford	$300,000
Burlington	N. Pemberton RR Station	Pemberton	$460,000
Burlington	Burlington Ave. Sidewalk	Delanco	$114,700
Burlington	Downtown Ped Enhancements	Burlington City	$350,000
Camden	Pennsauken Bike/Ped Facilities	Pennsauken	$198,000
Camden	Griffith Morgan Waterfront Park	Pennsauken	$226,000
Camden	New Freedom Rd. Bike/Ped Path	Pine Hill	$419,505
Camden	Branch Ave./DeCow Rd. Path	Pine Hill	$482,813
Camden	Blackwood-Clementon Rd. Bike/Ped Path	Pine Hill	$232,153
Camden	Turnersville-Hickstown Rd. Bike/Ped Path	Pine Hill	$334,925
Camden	Clements-Bridge Rd. Bike/Ped Path	Barrington	$57,100
Camden	Camden County Bike/Ped Extensions	Intermunicipal	$40,000
Camden	Blackwood Historic District Trail	Gloucester	$112,134
Camden	Knights Park Trail & Historic Hwy.	Collingswood	$79,000
Camden	Haddon Ave. Beautification	Berlin Twp.	$322,820
Gloucester	Pedestrian/Transportation Enhancement	Woodbury	$373,915
Gloucester	New Jersey Heartland Trails	Intermunicipal	$284,700
Mercer	Community Park Ped/Bike Link	West Windsor	$275,000
Mercer	Princeton Battle Monument Site Improvements	Princeton	$79,715
Mercer	Cherry Hill Rd. Bikepath Completion	Princeton	$76,000
Mercer	Rosedale Rd. Walkway Improvements	Princeton	$7,000
Mercer	Stony Brook Ped & Bike Bridge	Princeton	$450,000
Mercer	Rocky Brook Bikeway	East Windsor	$66,000
Mercer	Ped/Bike System Improvements	Ewing	$420,000
Mercer	Miry Run Bike Path	Washington	$76,000
Mercer*	D & R Canal Multi-purpose Path III	Trenton	$500,000
Mercer	Belvidere/Summer St. Greenway	Trenton	$187,833
Mercer	Mercer County Waterfront Park II	Trenton	$2,217,252
Mercer*	D & R Canal Old Rose-Mulberry	Intermunicipal	$250,000
Mercer	Community Ped/Bike Linkages	Hamilton	$604,549
Mercer	D & R Canal Route 1 Crossing	Lawrence	$500,000

* Programmed on TIP

TABLE IV
BICYCLE AND PEDESTRIAN PROJECTS
PROGRAMMED ON FY 1997 TIP

COUNTY	PROJECT NAME	LOCATION	TOTAL COST THIS PHASE
Burlington	Street Lighting Improvement	Intermunicipal	$155,100
Burlington	Social Services Walkway	Mt. Holly	$370,000
Mercer	Township Bicycle Routes	Hamilton	$410,000
Mercer	Esplanade of Transportation History	Trenton	$400,000
Mercer	Statewide Trail Plan Implementation Phase	Intermunicipal	$100,000

FUNDING UNDER ISTEA

There are a variety of funding sources available under ISTEA. While most bicycle or pedestrian projects are funded through the Transportation Enhancement program, all of the major ISTEA funding streams include bicycling and walking facilities and programs as eligible activities. The major funding streams are reviewed below.

Surface Transportation Program Funds (STP): STP funds can be used either to fund projects related to safe bicycle use - such as brochures, public service announcements and bicycle maps - or for the construction of bicycle transportation facilities and pedestrian walkways. Ten percent of all STP funds must be set aside for Transportation Enhancement (TE) Projects. Improvements which enhance the environs of the transportation network are included in this category. Enhancements financed under STP funds are not required to have demonstrable impacts on traffic flow or transit operations. These improvements should, however, sensitize people to environmental and social concerns and possess ancillary benefits that will encourage desirable travel patterns.

National Highway System Funds (NHS): These funds can be used to construct bicycle and pedestrian transportation facilities and pedestrian walkways on land adjacent to any highway on the National Highway System.

Congestion Mitigation Air Quality (CMAQ): The purpose of this program is to fund projects or programs that will contribute to the attainment of the National Ambient Air Quality Standards (NAAQS). Projects which result in tangible reductions in CO_2 and ozone precursor emissions and can be completed within the time frame for attainment as required by CAAA are encouraged. Bicycle and pedestrian facility projects and programs may be appropriate projects under CMAQ. Projects submitted under this funding stream must document their air quality benefit and must contribute to emissions reductions necessary to bring the region into attainment for air quality.

Federal Lands Highway Funds: These funds may be used to build bicycle facilities and pedestrian walkways in conjunction with roads, highways and parkways on federal lands. These funds have also been earmarked for bicycle projects with a transportation orientation.

Scenic Byways Program Funds: These funds can be used to construct bicycle and pedestrian facilities along highways.

The above mentioned projects require a 20 percent state or local match, except for Federal Lands projects which are 100 percent federally funded.

National Recreation Trails Fund (Symms Fund): This is the only funding source under ISTEA that provides funding for recreational trails designed to benefit bicyclists, pedestrians and other non-motorized transportation users. Projects must be consistent

with the State-wide Comprehensive Outdoor Recreation Plan. The New Jersey Department of Environmental Protection administers select projects for this program.

CLEAN AIR ACT AMENDMENTS

The Clean Air Act Amendments of 1990 (CAAA) will significantly affect bicycle planning in the region. The CAAA establish an aggressive timetable and program for improving the nation's air quality. Among other air quality problems, the amendments address the urban air pollution problems of ozone, carbon monoxide and particulate matter. The Act identifies six non-attainment categories ranging from marginal to extreme and air quality within specific areas is characterized by one of the six categories. The more severe the rating, the more controls the area is required to implement to improve air quality. The Philadelphia Consolidated Metropolitan Statistical Area includes 14 counties and must attain an acceptable air quality standard by the year 2005. The CAAA recognize highway sources of emissions as significant and their reduction as an important solution to the air quality problem.

New Jersey, through its State Implementation Plan (SIP), is responsible for developing and implementing steps to improve air quality. The purpose of the SIP is to obtain National Ambient Air Quality Standards (NAAQS). One portion of the SIP contains Transportation Control Measures (TCMs). TCMs are measures specifically designed to improve air quality through transportation improvements. Presently, no bicycle or pedestrian projects or programs in southern New Jersey have been funded through TCMs' provisions.

THE IMPACT OF ISTEA AND CAAA

ISTEA has a profound impact on how state and local governments address transportation issues. The flexibility of funding under ISTEA allows for the creation of a more balanced transportation system which will include considerations for bicycle and pedestrian activity. While funding is available for bicycle projects from other sources within the state, such as the Green Acres Program, it is specifically for recreational bicycle and pedestrian projects. Aspects of CAAA which mandate improvements in air quality will further encourage development of alternative forms of transportation within the region.

OTHER FUNDING SOURCES

There are a variety of additional federal, state, county and private funding sources that can assist in the planning, design and acquisition of bicycle and pedestrian facilities. Another federal funding source is the National Park Service's Rivers, Trails and

Conservation Assistance Program which provides funding to municipalities, community groups and partnerships. Projects associated with this program include trail design, greenway plans and inventories of cultural, natural and recreational resources.

The Green Acres Program, administered by the New Jersey Department of Environmental Protection (NJDEP), was created in 1961 to meet the state's growing recreation and conservation needs. Over the last 35 years, this bond referendum has made more than $1.4 billion available and over 350,000 acres of state, county, municipal and nonprofit open space have been or are being preserved. Municipalities and counties are eligible for Green Acres funding, which has typically concentrated upon open space acquisition and recreational facility development.

One example of a county funding source is the Burlington County Open Space and Farmland Preservation Program. This program raises funds through the collection of a maximum tax of two cents per $100 of assessed valuation in order to preserve open space and farmland. This funding will supplement the county's continued active participation in the Green Acres program. In Mercer County, the Open Space Preservation Trust Fund Tax and other resources will provide funding sources for the preservation of open space and natural resources. In 1993, voters in Gloucester County approved a referendum to fund open space preservation. County Freeholders are set to unveil their open space plan in the Spring of 1997.

Bicycle and pedestrian facilities can also be funded through private groups and initiatives such as the Conservation Foundation's American Greenways Dupont Award, the Dodge Foundation, Environmental Endowment for New Jersey and the New Jersey Conservation Foundation. Some of the bicycle and pedestrian related initiatives funded by these organizations include those addressing paths and bridges, energy conservation and pollution prevention, preservation and improvement of natural resources, land planning, land acquisition and conservation easements.

CHAPTER II

CURRENT BICYCLE AND PEDESTRIAN COMMUTING

Bicycling is a nonpolluting, non fossil fuel consuming mode of transportation. While providing health and fitness benefits to the user, it is also an economical form of transportation. Although bicycle ridership has steadily increased over the past decade,[2] the bicycle is still used primarily for recreational purposes rather than to replace trips made by the automobile.

Reducing dependence on and creating alternatives to the automobile is desirable for several reasons. First, bicycles used to replace the automobile for commuter or utilitarian transportation trips reduce air pollutants. Second, reducing motor vehicle congestion is a major public policy objective, and every decision to substitute other travel modes for the single occupant vehicle contributes to reducing congestion. Finally, bicycles offer mobility options for people who cannot afford automobiles.

This chapter explores current bicycle use and pedestrian commuting within southern New Jersey. Although the focus of this section is the bicycle as a transportation option for commuters, the potential use of bicycles is broad and includes recreational and other destinational trips such as shopping and personal business trips.

COMMUTING TRENDS

Between 1980 and 1990, the number of resident workers in southern New Jersey increased by 23.1 percent. Individual county changes in resident workers ranged from a 17.2 percent increase in Mercer County to a 34.9 percent increase in Gloucester County (Table V).

TABLE V
RESIDENT WORKER GROWTH IN SOUTHERN NEW JERSEY
1980 AND 1990

County by Residence	Resident Workers		
	1980	1990	% Change
Burlington	165,874	205,132	23.7
Camden	192,374	234,572	21.9
Gloucester	82,046	110,693	34.9
Mercer	138,963	162,920	17.2
Total	**579,257**	**713,277**	**23.1**

Source: 1980 and 1990 U.S. Census.

[2] Cathy Antonakos. "Environmental and Travel Preferences of Cyclists", p. 2.

As the number of resident workers increased during this ten year period, the percentage of workers driving alone increased at an even greater rate. In all counties, in both 1980 and 1990, "Drive Alone" commanded the largest share of the commuter population (Table VI). During this ten-year period, the percentage of bicycle commuters and the percentage of people who walk to work has decreased slightly.

TABLE VI
PERCENT DISTRIBUTION OF WORKERS BY MEANS OF TRANSPORTATION

County of Residence	Resident Workers		Drive Alone		Vanpool, Carpool		Public Transit	
	1980	1990	1980	1990	1980	1990	1980	1990
Burlington	165,874	205,132	68.2%	78.0%	19.1%	12.2%	3.4%	2.6%
Camden	192,374	234,532	64.7	71.8	18.5	13.3	10.6	8.6
Gloucester	82,046	110,693	70.2	79.0	20.4	12.6	2.9	2.5
Mercer	138,963	162,920	63.5	71.5	19.1	12.7	7.5	6.2
TOTAL	**579,257**	**713,277**	**66.2**	**74.7**	**19.1**	**12.7**	**6.7**	**5.4**

Continued

County of Residence	Bicycle		Walk		Other Means	
	1980	1990	1980	1990	1980	1990
Burlington	0.4%	0.3%	6.6%	4.0%	0.7%	0.6%
Camden	0.3	0.2	3.7	3.2	0.9	0.7
Gloucester	0.3	0.2	4.0	2.6	0.6	0.6
Mercer	0.6	0.5	7.2	5.9	0.4	0.6
TOTAL	**0.4**	**0.3**	**5.4**	**4.0**	**0.6**	**0.6**

Source: 1980 and 1990 U.S. Census.

Moreover, between 1980 and 1990, the average travel time to work increased in each county, except for Camden County (Table VII). In Camden County, the average travel time decreased by 0.7 minutes between 1980 and 1990. To some extent, the decrease in commuter bicyclists may be influenced by the increase in travel time. As workers travel longer distances, long distance commutes by bicycle may become more difficult. Nevertheless, as this chapter will illustrate, there are still a very significant number of walkers in southern New Jersey who commute a short enough distance to be viable bicycle users.

TABLE VII
DISTRIBUTION OF WORKER TRIP BY TRAVEL TIME
(1980)

County of Residence	Share of Trips in Specified Time Range							
	<5	5-14	15-29	30-44	45-59	>60	Tot. Trips	Avg. Time
Burlington	4.3%	28.2%	32.9%	19.0%	8.1%	7.5%	163,795	24.0
Camden	2.5	24.2	37.9	20.5	8.0	6.9	188,659	24.4
Gloucester	4.4	28.0	31.9	20.7	7.9	7.1	81,493	23.9
Mercer	3.0	30.4	42.7	14.1	3.1	6.7	137,130	21.7
Total	**3.4**	**27.4**	**36.7**	**18.5**	**6.8**	**7.0**	**571,077**	**23.6**

Source: 1980 U.S. Census.

DISTRIBUTION OF WORKER TRIP BY TRAVEL TIME
(1990)

County of Residence	Share of Trips in Specified Time Range								
	<5	5-14	15-29	30-44	45-59	>60	>90	Tot.Trips	Avg. Time
Burlington	3.9%	27.1%	33.3%	19.3%	8.9%	6.3%	1.2%	200,868	24.1
Camden	2.8	24.7	38.0	20.2	8.0	5.6	0.8	229,940	23.7
Gloucester	3.8	26.2	31.8	22.4	9.2	5.8	0.8	108,292	24.3
Mercer	3.2	31.1	38.8	15.0	5.1	4.8	2.1	158,879	22.1
Total	**3.4**	**27.1**	**35.9**	**19.1**	**7.8**	**5.6**	**1.2**	**697,979**	**23.6**

Source: 1990 U.S. Census.

BICYCLE COMMUTER CHARACTERISTICS

1990 U.S. Census information provides insights into the characteristics of people who commute by bicycle. Bicycle commuters are fairly evenly distributed between males and females; however, males are slightly more likely to bicycle to work than females (Figure II).

Incomes of bicycle commuters are concentrated along the lowest end of the income spectrum. In 1990, the highest percentage of bicycle commuters reported incomes of less than $5,000 (Figure III). As incomes increased, the percentage of commuter bicyclists decreased. This is true across all counties. These results are consistent with those of a 1991 Harris Poll that revealed that bicycle commuters were most likely to report incomes of $7,500 or less.

Census information does not provide information about the distribution of bicycle commuters by age. Information about age distribution of bicyclists in general, is limited. On the national level, results from the 1991 Harris Poll[3] reveal that "age is the most significant demographic variable" in determining whether a person will bicycle to work. People under 30 years of age are more likely to bicycle than those over age 30 (Table VIII).

TABLE VIII
UNITED STATES BICYCLE COMMUTERS BY AGE

Age Group	Percentage of All Adult Cyclists
18-29	67%
30-39	24%
40-49	17%
50-64	11%

Source: 1991 Harris Poll.

COMMUTER BICYCLE TRIP ORIGIN

The percentage of area bicycle commuters is distributed by census tract by county in Figure IV. The largest number of commuter bicyclists reside in Mercer County which commands a 33.5 percent share of the four-county commuter market. Burlington and Camden Counties each garner approximately 28 percent of the bicycle commuter market while Gloucester County captures 10.5 percent.

The 1990 U.S. Census journey-to-work data reports that less than one percent of commuter trips are made by bicycle, and the majority of these trips appear to be concentrated in Princeton Township and Borough and around Ft. Dix and McGuire Air Force Base (Figure IV). However, the U.S. Department of Transportation's National Bicycling and Walking Study (Case Study 15) acknowledges that the Census information has important shortcomings regarding bicycling and walking. This survey is conducted in late March, when much of the country is affected by inclement weather. Census data only considers frequently used primary modes, and only the work trip is covered.

Bicycle to work trips were most often identified in municipalities that host a large employer (one who employs more than 500 people) or houses a college or university. This may be attributed to the fact that large employers are in a better position to provide the amenities that encourage people to bicycle to work. These amenities include: showers, dressing rooms, and bicycle parking. In a university setting, students and faculty often live close to

[3] Harris Poll, 1991.

campus and create a critical mass helpful for acceptance of biking.

There also appears to be a relationship between the presence of a bikeway in a community and the number of people who commute by bicycle. Communities that have constructed bikeways are more likely to report bicycle commuters. In many cases these bicycle facilities are purely recreational; however the fact that they do exist and are signed within some communities may legitimize the use of the bicycle as a transportation alternative. The small number of communities that host bikeways in southern New Jersey makes it difficult to draw valid conclusions from this observation.

COMMUTER BICYCLE TRIP DESTINATION AND TRAVEL TIME

A review of census information reveals that as with trip origin, most bicycle commuter trip destinations tend to be census tracts that house either a large employer or college or university. Trips made by bicycle within the region tend to be under fifteen minutes. According to 1990 Journey to Work information, mean travel time for bicycle trips is 12 minutes, as opposed to an average time for all modes at 23.6 minutes. The mean bicycling and walking travel time by county is shown in Table IX.

TABLE IX
1990 MEAN TRAVEL TIME IN MINUTES BY MODE OF TRANSPORTATION

County	All Modes (in minutes)	Bicycle/Walk (in minutes)
Burlington	24.1	9.6
Camden	23.7	11.6
Gloucester	24.3	9.8
Mercer	22.1	10.4
Regional	23.6	12.0

Source: 1990 U.S. Census.

BICYCLE POTENTIAL

Bicycling has the potential to fill many travel needs and at the same time improve air quality and increase mobility for people who do not have access to automobiles. While reducing automobile congestion and improving air quality are major public policy goals, the bicycle is currently not being used extensively in the region. If the bicycle were substituted for even one percent of the Single Occupancy Vehicle (SOV) trips in southern New Jersey, more than 500 automobiles would be eliminated from the roadways. Bicycling produces no air or significant noise pollution. Air pollution savings are even greater for short trips because of high emission rates produced by cold automobile starts. According to DVRPC estimates,

if bicycles were to capture five percent of auto work trips of less than or equal to five miles, emissions could be reduced by 98 tons annually .[4]

To determine the potential for bicycle commuting in the four-counties, the commuting practices of commuters who travel two miles or less to work were examined. While estimates of potential bicycle use in North America have often used a trip distance of five miles,[5] the Bicycle and Pedestrian Mobility Steering Committee has recommended that two miles be considered a bikeable distance, given the area's climate, terrain, and limited bicycle facilities.

According to the 1990 Census CTPP information, the total number of southern New Jersey workers who commuted to work in 1990 was 712,614. The total number of workers who commuted two miles or less was 93,047. The modal share by mode of transportation appears in Table X.

TABLE X
SOUTHERN NEW JERSEY COMMUTER TRAVEL MODE
TWO MILES OR LESS

Travel Mode	Number	Percent
Drive Alone	57,329	62
Drive (not alone)	11,290	12
Public Transportation	2,508	3
Walk	19,578	21
Bicycle	1008	1
Other	1334	1
Total	93,047	100

Source: 1990 U.S. Census CTPP.

Currently one of the most under utilized transportation modes is the bicycle. SOV trips account for 62 percent of the commuter trips of two miles or less made in this region, while bicycles are used by just one percent of commuters traveling two miles or less. In contrast, over 20 percent of these commuters walk.

Walking is a prominent commuting mode of those who travel two miles or less for a variety of reasons. A number of older urban and suburban communities contain densely developed areas which create a pedestrian friendly atmosphere. Sidewalks are prevalent

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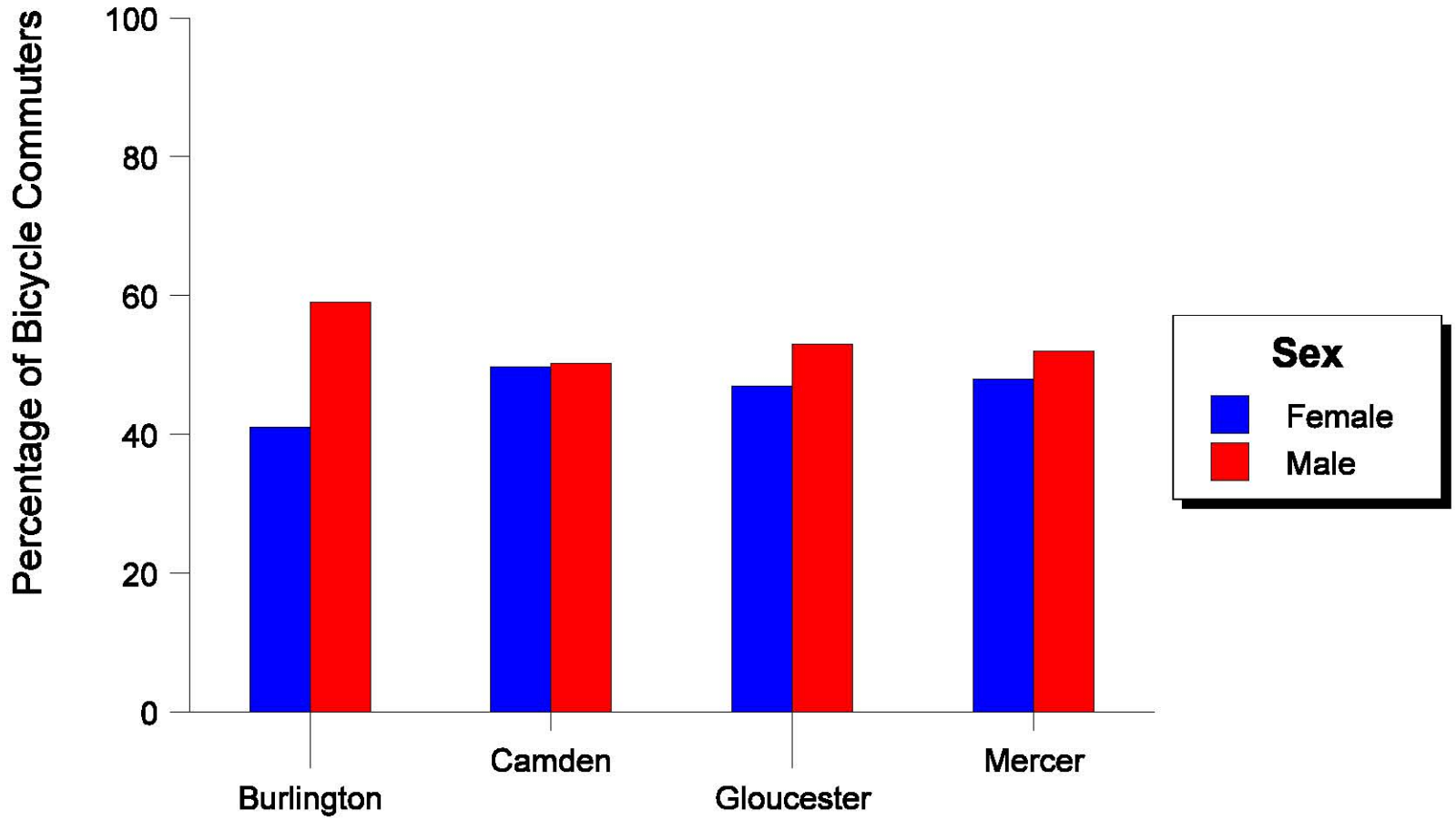
[4] Delaware Valley Regional Planning Commission, "Transportation Control Measures."

[5] Fegan, John. "National Bicycling and Walking Study: Results and Recommended Actions - The Bicycle: Global Perspectives".

in these communities allowing walking commuters to access places of employment safely and quickly. Conversely, the environment in many municipalities in the four-county region is inhospitable towards bicyclists. Conditions for bicycling are dangerous due to high traffic speed and volume. In many instances the physical composition of the roadway is not conducive to accommodate bicycles. Moreover, there is an inability to safely access places of employment by bicycle.

Figure II

Bicycle to Work by Sex
Southern New Jersey
As Percentage of All Bicyclists

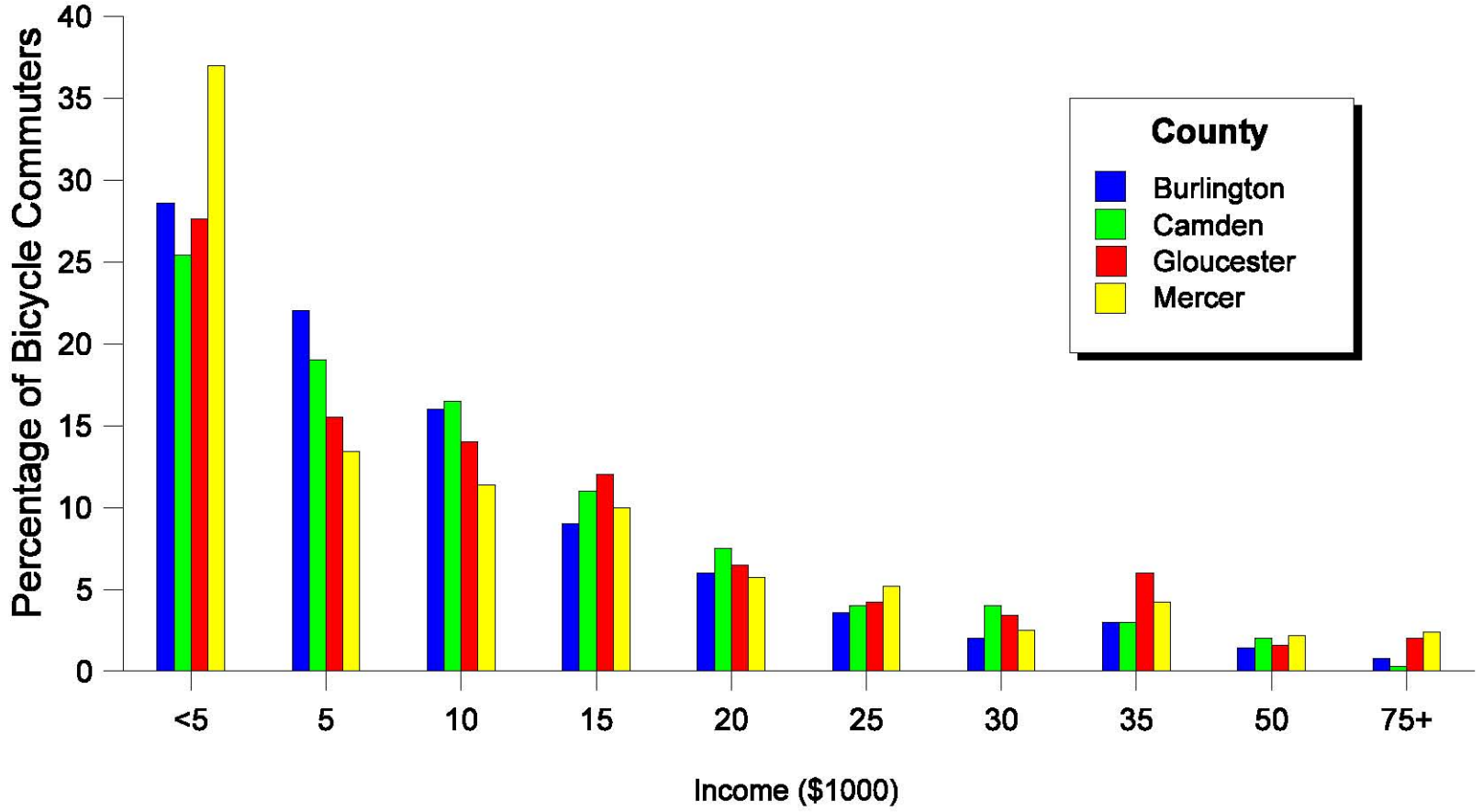


DELAWARE VALLEY REGIONAL PLANNING COMMISSION

Source: 1990 U.S. Census

Figure III

Distribution of Southern New Jersey Bicycle Commuter's Income By County



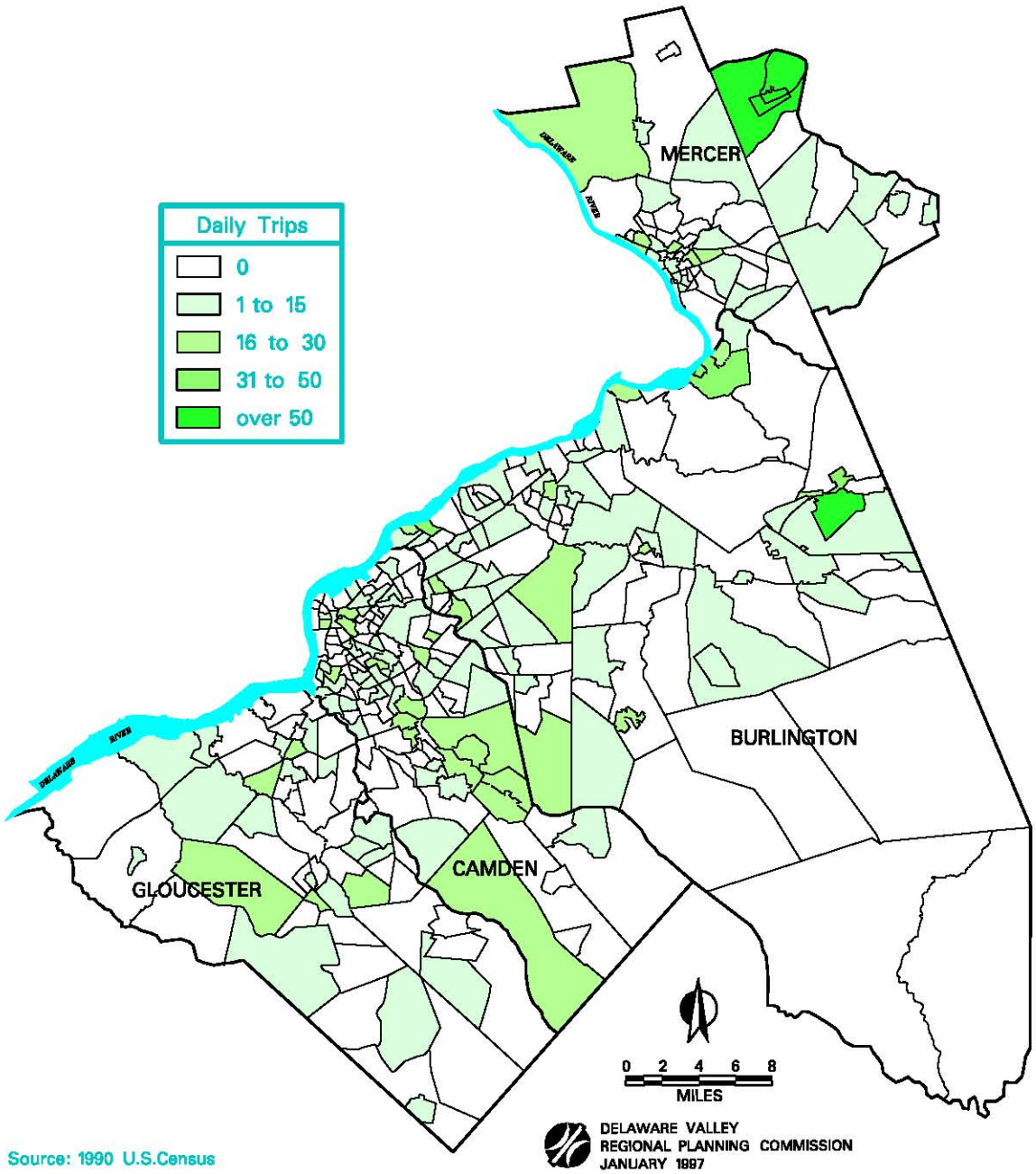
DELAWARE VALLEY REGIONAL PLANNING COMMISSION

Source: 1990 U.S. Census

FIGURE IV

COMMUTER BICYCLE TRIP ORIGIN BY CENSUS TRACT

SOUTHERN NEW JERSEY



Source: 1990 U.S.Census

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JANUARY 1997

CURRENT PEDESTRIAN COMMUTING

All trips involve walking, regardless of their primary mode. From a commuter who walks to a bus, train or automobile to a person who walks to work, pedestrian trips are important components in daily commuting activities. For example, pedestrian trips to school account for one-third of all pedestrian trips in the United States. Facilities constructed for pedestrian use allow for safe and efficient commuting patterns in addition to providing recreational and social gathering places.

Presently, many urban and suburban developments have been constructed without providing adequate pedestrian facilities such as sidewalks or walkable shoulders. This type of development has forced commuters to depend upon their cars in order to get to work.

Walking for shopping and personal business is a function of land patterns and can range from three percent for a typical suburban shopping center to as much as 90 percent in very dense urban areas (NJ DOT Pedestrian Compatible Roadways - Planning and Design Guidelines, December 1993). In general, pedestrian trips are higher within cities or existing centers due to higher densities, compact land uses and the greater availability of pedestrian facilities.

In 1980, within southern New Jersey, 5.4 percent of all commuter trips were made primarily on foot. In 1990, this percentage decreased to 4.0 percent, representing approximately 28,531 walkers. Within the individual counties in 1990, commuter pedestrian trips ranged from a high of 5.9 percent in Mercer County to a low of 2.6 percent in Gloucester County (Table VI).

The percentage of area pedestrian commuters is distributed by census tract by county in Figure V. The largest number of pedestrian commuters reside in Mercer County with approximately 9,600 pedestrian commuters. A majority of the pedestrian commuter market is concentrated in Trenton and throughout Princeton Borough and Township. Burlington County's commuter walking trips, at more than 8,200, are concentrated along older river communities such as Bordentown, Riverton and Burlington City. Concentrations of pedestrian commuters are also found in Mount Holly and around Ft. Dix and McGuire Air Force Base. In Camden County, 7,500 people walk to work, concentrated primarily in and around the city of Camden. Concentrations of pedestrian commuters in Gloucester County, who number approximately 2,800, are found in Glassboro, Woodbury and Woodbury Heights Boroughs.

According to the Federal Highway Administration's National Bicycling and Walking Study, walkers are largely motivated by exercise and enjoyment. Distance is one of the most common cited reasons for not walking. Other factors include: the hassle of carrying things, time constraints and fear of crime. The Seattle Bicycling and Walking Survey concluded that improvements in walking facilities would change the preference of many people in favor of walking (USDOT FHA, National Bicycling and Walking Study: Case Study #1).

IMPEDIMENTS TO PEDESTRIAN USE

To facilitate pedestrian activity, the built environment in in southern New Jersey must encourage walking. This means that planning and design decisions must take pedestrians into consideration. Some of the more common problems related to pedestrian facilities, as identified by the New Jersey Department of Transportation in their state agenda analysis of bicycling and pedestrian activity are listed below:

1. Difficulty in crossing wide arterial streets, especially undivided arterials.
2. Difficulty in crossing highways with two way left turn lanes.
3. Inadequate or non existent pedestrian facilities along roadways.
4. Narrow bridges that do not allow pedestrian access.
5. Excessive traffic speeds in residential and commercial areas.
6. Safety/convenience of walking areas with many poorly channelized driveways.
7. Difficult and hazardous pedestrian movement through interchange areas.
8. Missing sidewalk links.
9. Obstructions in the sidewalk.
10. Security problems on certain isolated pedestrian pathways.
11. No accommodations for pedestrians at some suburban signals.
12. Minimum pedestrian signal clearance time that is inadequate to accommodate slow moving pedestrians.
13. Pedestrians who do not obey signal indicators.
14. Improper application of crosswalk markings.
15. Open parking areas that do not encourage disciplined traffic flow, making pedestrian movement hazardous.
16. Inadequate lighting along pedestrian routes and at crossing points.
17. General lack of consideration of pedestrians by drivers.
18. Lack of coordination and continuity in pedestrian facilities.
19. Suburban land use patterns that discourage pedestrian travel.
20. Lack of organized groups that address pedestrian needs.

Because of the shortage of data on walking habits and walking statistics in general, it is difficult to assess the extent to which such improvements would increase pedestrian activity in the four county region. However, the impediments listed above are common, and many are widespread, throughout southern New Jersey.

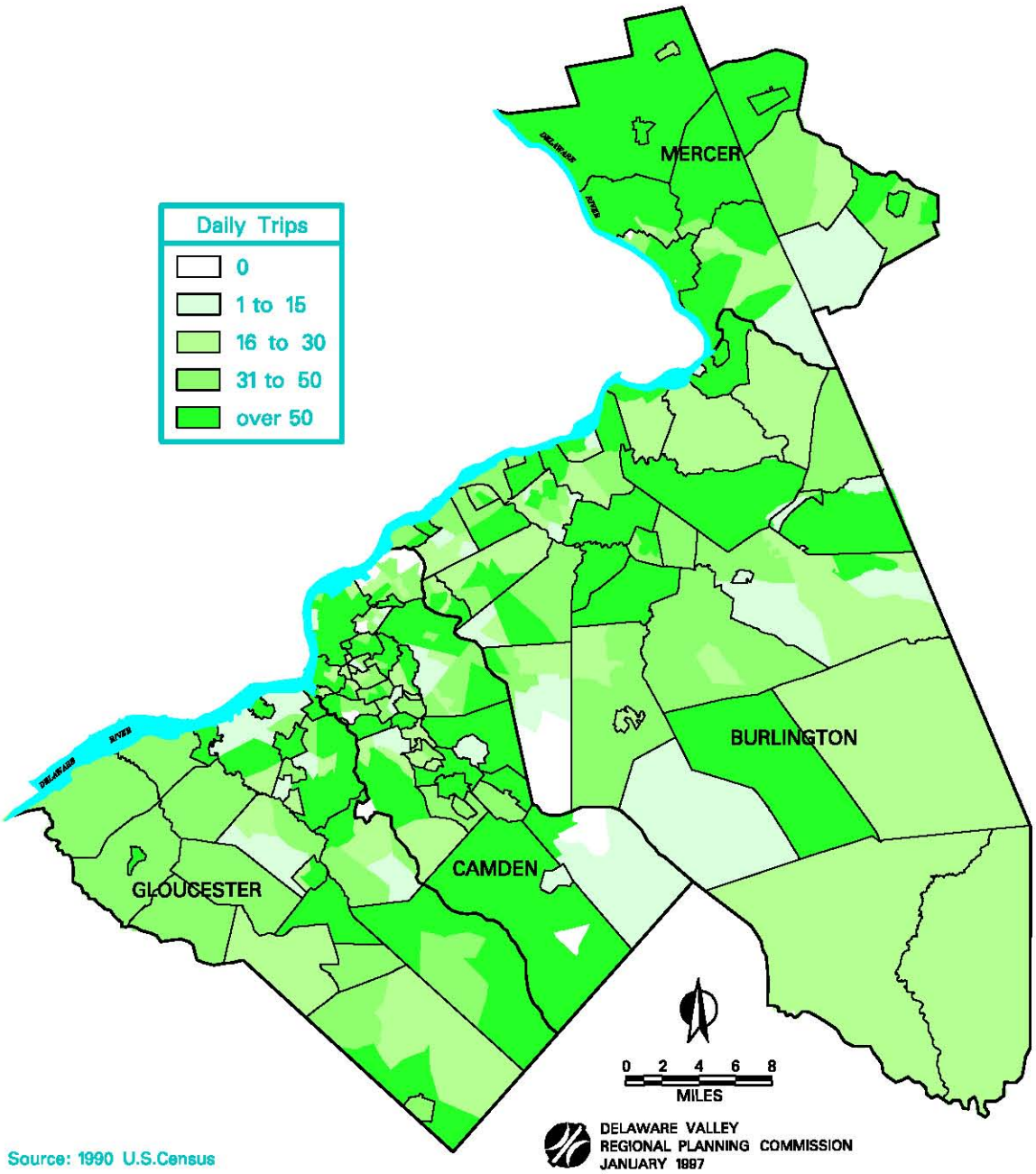
CONCLUSION

Bicycling and walking currently account for a very small share of all commuter trips made in southern New Jersey. Although commuter bicycle and pedestrian trips are scattered across the region, many of these trips appear to be clustered in areas that host large employers and colleges and universities. If bicycling and walking are to become more widespread in this region, a more friendly environment must be created for pedestrians and bicyclists. Creating a bicycle and pedestrian friendly environment requires improved engineering and operation of streets and sidewalks and more compacted land use formations. In the next chapter, the existing bicycle network and bicycle policies are examined to determine the extent to which they encourage commuter bicycle trips.

FIGURE V

COMMUTER PEDESTRIAN TRIP ORIGIN BY CENSUS TRACT

SOUTHERN NEW JERSEY



Source: 1990 U.S.Census

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CHAPTER III

NON-MOTORIZED TRANSPORTATION: EXISTING CONDITIONS

Given past transportation planning policy, it is not surprising to find that the region has a relatively small number of transportation oriented bicycle facilities. In this chapter, the bicycle facilities in the region have been inventoried. Bicycle facilities include lanes, trails and paths - both on- and off-road - that can safely accommodate bicyclists. In southern New Jersey, the vast majority of bicycling activity occurs on roadways that are not designated as bicycle facilities. As long as a roadway is in accordance with the bicycle compatibility guidelines stipulated in the New Jersey Department of Transportation's Bicycle Compatible Bikeways and Roadways, it should be able to accommodate shared use by motor vehicle and bicycle travel with minimal improvements undertaken.

Establishing an inventory of existing bicycle facilities is difficult. While there are a number of maps that purport to show bicycle "routes" throughout the region, many have been identified along roadways that may not be safe for bicyclists. Some "routes" that appear on other maps have been omitted from this inventory - especially in cases where local officials have characterized road conditions as being unsafe for bicyclists.

The inventory provides a baseline measurement for determining the extent to which the current network of bikeways supports and encourages bicycling. Most of the facilities identified in this inventory have been designed to serve the needs of both pedestrians and bicyclists. Because of the number of sidewalks and pathways within new developments located in southern New Jersey, a separate listing of pedestrian-only facilities have not been included.

EXISTING BICYCLE FACILITIES

In 1979, DVRPC prepared a draft inventory of the region's bicycle facilities. The study concluded that the existing system was "fragmented."[6] Almost 20 years later, this is still an apt description of southern New Jersey's bicycle network. While southern New Jersey has more than 70 miles of bicycle facilities, the majority of these bicycle facilities are Class I bikeways which have been constructed within recreational areas such as state, county or local parks.

The existing system cannot accurately be depicted as a network because it lacks the interconnectedness implied by the term. There are few regional connections in place and many existing facilities are isolated islands providing communities with recreational opportunities.

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[6] Delaware Valley Regional Planning Commission. "Bicycle Mobility Study: Draft Report. " October, 1979, p. 81.

All existing bicycle facilities have been mapped on Figure VI. Further, Table XI provides an overview of the important aspects of the region's bicycle facilities. However, the region boasts several outstanding facilities which deserve special attention and are discussed below.

The longest linear route in the region is the Delaware & Raritan Canal Towpath in Mercer County. This facility is part of the 865 acre Delaware & Raritan Canal State Park and extends outside of the region into Hunterdon and Middlesex Counties. In Mercer County, the Towpath follows the main canal route from Mulberry Street, just north of Trenton to New Brunswick. In addition, a recreational trail follows the feeder canal along the banks of the Delaware River. This trail is situated on the abandoned Belvidere-Delaware Railroad right-of-way from Trenton to Frenchtown.

Throughout the region, bikeways have been constructed within municipal parks. Some examples include the Smithville County Park Trail in Eastampton Township, Burlington County and the Newton Lake Park Bicycle Trail in Haddon Township, Camden County. Because these bikeways are primarily recreational, connectors are needed to link these bikeways to each other as well as other points of interest throughout the region.

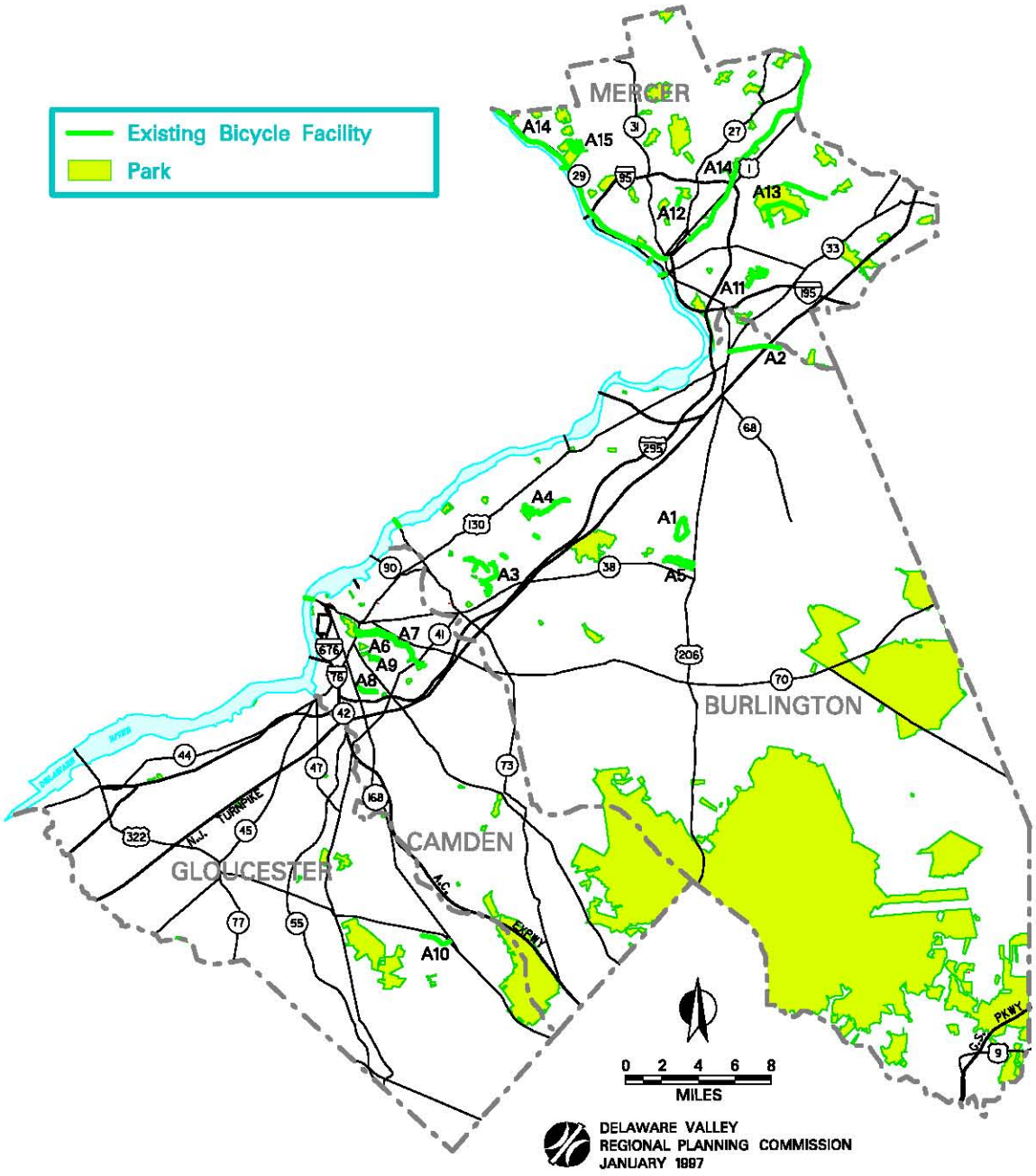
Within Camden County, the Cooper River Park Trail traverses the City of Camden, Cherry Hill and Pennsauken Townships, and Collingswood and Haddon Boroughs. This 3.65 mile paved surface provides both a loop and linear travel from Camden to Haddonfield through connections with Greenwald Memorial Park, Wallworth Park and Hopkins Pond. The Audubon, Haddon Heights and Mt. Ephraim bicycle network, also in Camden County, provides a 1.7 mile loop within Haddon Lake Park.

The Moorestown Township bicycle route, in Burlington County, consists of 12.5 miles of bicycle facilities that link significant points of interest. The route runs along local streets past recreational centers, the township center and parks.

FIGURE VI

EXISTING BICYCLE FACILITIES

SOUTHERN NEW JERSEY



Key to Figure VI

SOUTHERN NEW JERSEY EXISTING BICYCLE FACILITIES

BURLINGTON COUNTY

(A-1) Eastampton Township Bicycle Facility
(A-2) Chesterfield Township Bicycle Facility
(A-3) Moorestown Township Bicycle Network
(A-4) Willingboro Township, Mill Creek Park, North Garfield Park
(A-5) Smithville County Park Trail, Eastampton

CAMDEN COUNTY

(A-6) Cooper River Park Trail
(A-7) Cherry Hill-Haddonfield Bicycle Facility
(A-8) Haddon Lake Park Bicycle Trail
(A-9) Newton Lake Park Bicycle Trail, Haddon

GLOUCESTER COUNTY

(A-10) Monroe Township Bicycle Facility

MERCER COUNTY

(A-11) Veteran's Park Bicycle Path, Hamilton
(A-12) Lawrence Township Bicycle Facility
(A-13) West Windsor Township Bicycle Facility
(A-14) Delaware & Raritan Canal State Park Towpath
(A-15) Washington Crossing State Park, Hopewell
(A-16) Princeton Bike Route

TABLE XI

SOUTHERN NEW JERSEY
EXISTING BICYCLE FACILITIES

Map	Existing Trail	Length (miles)	County	Location	Large Employers [1]	Transit [2]	Description
A-1	Eastampton Bicycle Facility	1.0	Burlington	Located in Eastampton on Woodlane Road within the Carriage Park and Eastampton Farms developments.	0	0	Trail links residential developments and open space with Eastampton Township Middle School.
A-2	Chesterfield Bicycle Facility	0.5	Burlington	Located in Chesterfield along Ward Avenue from Hogback Road to soccer field.	0	0	Path provides needed alternative to dangerous road.
A-3	Moorestown Bicycle Network	12.5	Burlington	Located throughout Moorestown.	1	0	Network links recreational centers, township center and parks.
A-4	Willingboro Bicycle Route	4.7	Burlington	Situated along streets and off-road from North Garfield Park to Mill Creek Park in Willingboro.	1	0	Route connects with a loop biking and walking trail within Mill Creek Park.
A-5	Smithville County Park Trail	1.0	Burlington	Trail runs through park in Eastampton.	0	0	Purely recreational, exclusively in park.
A-6	Cooper River Park Trail	3.65	Camden	Trail traverses City of Camden, Cherry Hill and Pennsauken Townships and Collingswood and Haddon Boroughs	2	3	Provides both a loop and linear travel, connections made with Greenwald Memorial Park, Wallwoth Park and Hopkins Pond.

Map	Existing Trail	Length (miles)	County	Location	Large Employers [1]	Transit [2]	Description
A-7	Cherry Hill/Haddonfield Bicycle Facility	2.5	Camden	Trail is located between Cherry Hill and Haddonfield.	2	2	Trail links Greenwald Memorial Park, Wallworth Park and Hopkins Pond, provides connection with Cooper River Park Trail.
A-8	Haddon Lake Park Bicycle Trail	1.7	Camden	Trail is located within park in Haddon Heights, Mt. Ephraim and Audubon.	1	0	Purely recreational, exclusively in park.
A-9	Newton Lake Park Bicycle Trail	0.7	Camden	Trail is located within park in Haddon.	0	2	Purely recreational, exclusively in park.
A-10	Monroe Township Bicycle Facility	1.5	Gloucester	Path begins at Bluebell Road and runs to Tuckahoe Road along the abandoned Williamstown Line.	0	0	The path links residential neighborhoods with Williamstown High School.
A-11	Veteran's Park Bicycle Path	3.0	Mercer	Path located within park in Hamilton.	1	0	Purely recreational, exclusively in park.
A-12	Ewing-Lawrence Greenway	0.5	Mercer	Trail located in Lawrence.	0	0	Trail connects the Lawrence Neighborhood Service Center to Eggerts Crossing Village.
A-13	West Windsor Township Bicycle Facility	4.25	Mercer	Located along Village Road and New Edinburgh Road in West Windsor.	0	0	The route borders Mercer County Park to the north and west while traversing a residential development.

Map	Existing Trail	Length (miles)	County	Location	Large [1] Employers	Transit[2]	Description
A-14	D&R Canal Towpath	24.5	Mercer	Feeder Canal traverses City of Trenton and Ewing and Hopewell Townships. Main Canal crosses Trenton and Princeton and Lawrence Townships.	20+	1	The trail is part of the Delaware & Raritan Canal State Park and extends outside of the region. The historic towpath is constructed of dirt and crushed stone. Provides bicycling, pedestrian and equestrian facilities.
A-15	Washington Crossing State Park	12.0	Mercer	Path is within park in Hopewell.	0	0	Purely recreational, exclusively in park.
A-16	Princeton Bike Route	2.0	Mercer	Route is located along Stockton Street and Bayard Lane.	2	1	On-road route travels from Marquand Park to Princeton Twp. Community Park.

[1] Single employers of 500 or more employees

[2] NJ Transit, PATCO ans SEPTA rail stations.

EXISTING ROADWAYS

Existing roads and streets provide the greatest potential resource for bicyclists. Under the best of conditions - such as low traffic volumes and operating speeds and adequate shoulder widths - the existing street network can represent a cost-effective means of developing a bicycle network. However, despite the importance of the existing street network, the actual identification, analysis and subsequent selection of the best streets and design treatment is a complex task. Southern New Jersey contains more than 515 miles of state highways and 5,980 miles of county and local roads. The factors that should be considered for the bicycle compatibility of roadways include: peak hour traffic volume, curb lane width, motor vehicle speed, type of traffic, parking conditions, commercial driveways, grade and sight distance. Each of these factors are interrelated and result in variable impacts on the bicyclist. Therefore, to determine the bicycle compatibility of area roadways it is advisable that each be examined individually and ridden if possible, to determine the routes that can most easily accommodate bicycles. AASHTO standards should be consulted to determine whether the roadway is sustainable to accommodate minimum AASHTO standards.

The routes which offer the greatest potential are those with four foot shoulders on both sides of the roadway. Of course, adequate shoulder width is not the only factor in determining the safety of a bicycle route. In addition to the factors mentioned above, additional considerations include: the presence of drainage facilities, open grate bridges, railroad crossings, pavement surfaces free of irregularities, and traffic control devices.

Bicycles are allowed on all roads in southern New Jersey with the exception of I-95, I-195, I-295, I-76, I-676, the Garden State Parkway, the New Jersey Turnpike including the Pennsylvania Extension, US 1 within Trenton, NJ 29 within Trenton, NJ 55, and the Atlantic City Expressway.

DELAWARE RIVER BRIDGES - EXISTING POLICY

Existing bridges along the Delaware River provide the vital link between southern New Jersey and Pennsylvania. These bridges help to make the critical connection between population and employment centers and recreational opportunities outside the region in southeastern Pennsylvania and the routes identified on the Proposed Bicycle Network.

Bicycles and pedestrians are permitted across the Ben Franklin Bridge from 6 a.m. to 7 p.m. via the pedestrian walkway. Bicycles must be walked across the Tacony-Palmyra Bridge on the walkway, and children must be accompanied by an adult. Bicycles and pedestrians are permitted across the Lower Trenton Bridge and the Calhoun Street Bridge. Bicycles must be walked across the walkway on the Washington Crossing Bridge.

No bicycles or pedestrians are permitted across the following bridges: Commodore Barry Bridge, Walt Whitman Bridge, Betsy Ross Bridge, Burlington Bristol Bridge, Turnpike Bridge, U.S. 1 Freeway Bridge and Scudders Falls Bridge.

CHAPTER IV

CURRENT CONDITIONS: THE IMPACT OF PLANNING

If bicycling and walking are to be used for transportation purposes, the built environment must encourage these modes of transportation. Within New Jersey, county and local governments have important tools they can use to influence the future development patterns of their surroundings. Changing how a locality addresses nonmotorized transportation concerns is a process known as "institutionalizing" these concerns. Attention to nonmotorized transportation modes signals recognition, at least to some degree, that a community encourages alternatives to the automobile. Bicycle and pedestrian accessibility can be strongly influenced by the extent to which these issues have been considered in a comprehensive plan. In addition, by adopting or revising subdivision and land development ordinances, local governments can set additional standards that regulate the design and layout of a community. In this chapter planning tools such as comprehensive plans, zoning and subdivision ordinances that are being used to promote bicycle and pedestrian mobility within southern New Jersey are inventoried.

A carefully developed comprehensive plan is important as it can be used by local governments as a tool to promote bicycling by either outlining policies that encourage bicycle use or identifying actual bicycle routes. Several communities within southern New Jersey have provisions within their comprehensive plans for linking residential, recreational, commercial and employment centers with a bicycle network. Several municipalities have also adopted subdivision ordinances to ensure the vision of the comprehensive plan is realized. A number of the municipalities that have adopted subdivision ordinances are noted below. The sections that follow provide an overview of a selective sample of communities with comprehensive plans that address bicycle concerns and a listing of selected municipalities that have adopted subdivision and land development ordinances that call for the creation of bicycle and pedestrian facilities.

MASTER PLANS

BURLINGTON COUNTY

Medford Township's Master Plan (1994) recognizes that automobile traffic has increased, stressing an even further need for pedestrian and bicycle pathways. Within the Conservation Plan Element, the Township recommends that pedestrian and bicycle pathways be used to link public areas, encourage alternative modes of travel and provide unique and enjoyable recreational opportunities.

In its Master Plan (1990), **Bordentown Township** focuses on linking together high interest points such as parks, schools, commercial centers and major employment centers through a series of bikeways throughout the Township.

Evesham Township's Master Plan (1982) acknowledges that pedestrian routes and bikeways are an integral part of the Township's park system. The Recreation Element of the plan describes the bikeway network as "a safe circulation alternative within the Township which will link private, public and commercial areas with different neighborhoods."

Mount Laurel Township's Master Plan (1994) addresses the need to link together major focal points such as schools and active recreation parks through a system of pedestrian and bicycle paths. As mentioned in the Recreation Element, the system will traverse the entire Township while forming a large loop through the center of the Township.

The Master Plan (1990) of **Willingboro Township** calls for the integration of both municipal and non-municipal facilities through an extensive network of bikeways and pedestrian walkways. The Plan holds that increased accessibility will result in more efficient park use.

CAMDEN COUNTY

The Master Plan (1989) of **Audubon Borough** recognizes the importance of safe and easy pedestrian and bicycle access to activity centers such as the business district, schools, and parks. The Recreation Element considers a bike path system that "would consist of placing signs on the streets to be chosen, creating maps showing the designated route, and alerting local and regional Parks Commissions and Bicycling Clubs." Further, it encourages providing walking areas in proximity to multi-family housing which serve a significant number of elderly residents.

Voorhees Township's Master Plan (1995) realizes that pedestrian and bicycle circulation is important to the character of the Township. In order to increase pedestrian and bicycle accessibility, the Circulation Plan proposes that sidewalks and bike paths be provided between major trip generators and attractions such as parks, playgrounds, and schools.

The Master Plan (1990) of **Waterford Township** proposes the preservation of pedestrian trails through the Township's portion of Wharton State Forest.

GLOUCESTER COUNTY

The Master Plan (1989) of **Deptford Township** calls for the creation of both on- and off-road bicycle and pedestrian facilities. The plan states that trails and routes are needed to link recreational facilities, schools and population centers utilizing stream corridors and streets when necessary. The Energy Conservation Element of the plan notes that safe and

efficient trails will lead to less automobile traffic.

Glassboro Borough's Master Plan (1991) realizes the importance of bikeways and sidewalks to the overall well-being of the community. The Energy Conservation Element recommends that bikeways and sidewalks be located between areas of intense development, areas of employment, and various municipal facilities. In addition, the plan suggests locating the sidewalks and bikeways away from streets in order to separate functions and provide a greater measure of safety.

Greenwich Township's Master Plan (1990) acknowledges that pedestrian routes and bikeways are an integral part of a comprehensive park system. The plan recommends a network of interconnected pedestrian routes and bikeways throughout the Township in order to link residential areas, open space, and schools. The Recreation Element proposes locating the system along roads and streamways which will provide a safe circulation alternative.

Harrison Township's Master Plan (1989) addresses the need for pedestrian and bicycle facilities throughout the Township. According to the plan, pedestrian and bicycle networks serve two functions. First, they can reduce a reliance on motorized vehicles. Second, they can help facilitate more community interaction by providing a common activity. The plan recommends that a network of walkways and bikeways be created to connect major community facilities and residential neighborhoods.

The Recreation Element of the **South Harrison Township** Master Plan (1990) proposes numerous linkages throughout the Township. The plan recommends that existing streamways and woodlands serve as the basic linkage between major recreational play areas, schools, and neighborhoods. A system of foot trails is also proposed along natural drainageways and through developed areas.

The Conservation Element of the Master Plan (1993) of **Washington Township** calls for the preservation of the Township's stream corridors and wetlands. The Plan recommends that physical links be developed between stream corridors where they do not naturally exist. The purpose of this is to provide a continuous bicycle and pedestrian system and greenbelt throughout the community.

MERCER COUNTY

Hightstown Borough's Master Plan (1992) proposes a greenway network throughout the Borough that will utilize stream corridors, former railroad rights-of-way, and existing roads. The plan recommends linkages between parks, open spaces, and institutions. Further, there will need to be buffers established to separate the network from other uses.

Lawrence Township's Master Plan (1987) recognizes the importance of pedestrian walkways and bikeways to the vitality of the Township. The proposed walkways and

bikeways will serve to link schools, parks, neighborhoods, commercial centers and routes in adjoining municipalities while providing a general recreational activity.

The **Princeton** Community Master Plan (1989) acknowledges that "a continuous network of sidewalks and bikeways forming linkages between neighborhoods, open spaces, recreational areas, and schools is critical in providing an alternative to motorized vehicular traffic." The Circulation Element proposes an interconnected pedestrian and bicycle network throughout the Borough and Township.

The Recreation and Open Space Element of **Trenton's** Master Plan (1991) calls for the creation of bikeways and walkways throughout the City. These will utilize existing greenways created by the Assunpink Creek, the Delaware River, the Delaware and Raritan Canal, and portions of abandoned railroad right-of-ways. In addition, the Plan proposes a continuous pathway along the Delaware River waterfront.

Washington Township's Master Plan (1990) addresses the need for creating a bicycle and pedestrian trail network. The plan encourages the development of these trails in order to connect residential communities with recreational and public facilities. The Township will look for opportunities to extend its trail system to adjacent communities. In addition, the plan proposes that "where practical and where the natural terrain allows, pedestrian trails should be connected by feeder trails which would help in connecting various sections of the Township to the primary trails."

West Windsor Township's Master Plan (1986) describes the coordination of bicycle and pedestrian circulation as the most efficient method to service future and existing land use patterns as well as major community facilities. Under this plan, bikeways will parallel existing transit lines and roadways.

POLICIES, REGULATIONS AND PRACTICES

Throughout southern New Jersey there are a number of communities that have implemented programs to improve pedestrian and bicycle safety and ensure access. The list is not exhaustive and is intended to highlight some of the pedestrian and bicycle initiatives currently undertaken in southern New Jersey.

BURLINGTON COUNTY

Burlington County: The Burlington County Planning Board requires a system of continuous sidewalks along County roads where appropriate to provide better accessibility for pedestrians and bicyclists. Shoulders along appropriate County roads should be improved to provide continuous mobility for bicyclists.

Medford Township: The Township's Land Development Ordinance requires both bikeways and sidewalks depending upon the probable volume of bicycle and pedestrian traffic.

Moorestown Township: The Township's Land Use Code requires sidewalks on both sides of the street through all subdivisions.

Mount Holly Township: The Township's Land Use Ordinance requires sidewalks for pedestrian traffic traveling from parking areas to principal buildings and for pedestrian rights-of-way.

Mount Laurel Township: The Township's Subdivision Code requires that subdivisions be designed to provide for pedestrian walkways separated from vehicular-use streets.

Springfield Township: The Township's Subdivision Ordinance recommends that portions of designated open space areas in residential developments be developed to accommodate active and passive recreational opportunities including both bicycle and pedestrian paths.

Willingboro Township: The Township's Zoning Ordinance recommends that open space areas include provisions for pedestrian walkways.

CAMDEN COUNTY

Berlin Township: The Township's Land Use and Development Code requires sidewalks adjacent to all types of streets.

Voorhees Township: The Township's Subdivision Ordinance requires sidewalks for all residential developments. Sidewalks are required to meet minimum design and safety specifications.

GLOUCESTER COUNTY

Deptford Township: The Township's Zoning Ordinance requires pedestrian and bikeway systems, independent of street rights-of-way, to be included in all new Planned Unit Developments.

East Greenwich Township: The Township's Land Use Ordinance recommends bicycle paths to link neighborhood playgrounds, residential areas, and service opportunities.

Greenwich Township: The Township's Zoning Ordinance recommends bicycle paths and open space trails to link residential areas to recreation.

Glassboro Borough: The Borough's Land Use Regulations require bikeways depending upon the probable volume of bicycle traffic and the location of the development. Bicycle traffic shall be separated from motor vehicle and pedestrian traffic as much as possible. Sidewalks are required in all developments.

Logan Township: The Township's Development Ordinance requires sidewalks, however, this requirement can be waived under certain conditions. Further, all bikeways are required to meet minimum design and safety specifications.

Pitman Borough: The Borough's Land Use Ordinance generally requires sidewalks for residential and commercial areas but the planning board may waive the requirement for low density residential areas.

South Harrison Township: The Township's Land Use Ordinance requires sidewalks in all types of major development. Further, pedestrian easements may be required to provide circulation or access to schools, playgrounds, shopping, or other community facilities.

Washington Township: The Township's Land Use Ordinance requires sidewalks for all roads except in industrial zones.

MERCER COUNTY

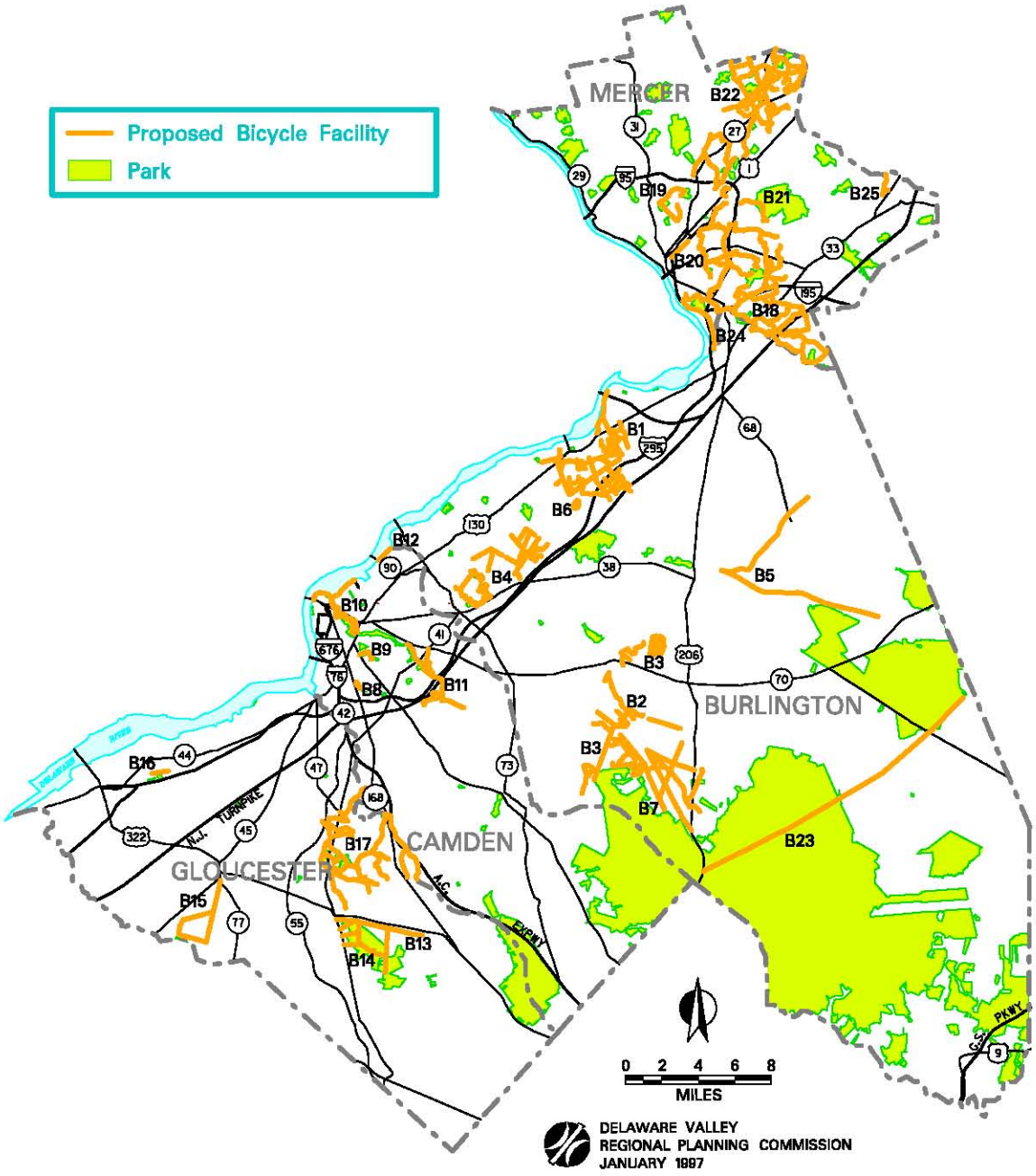
Lawrence Township: The Township's Land Development Ordinance requires sidewalks in all residential subdivisions. Pedestrian way easements may be required to provide circulation or access to schools, playgrounds, shopping, or other community facilities. The ordinance also recommends design guidelines for bikeways.

Washington Township: The Township's Development Regulations require a continuous sidewalk system in village development districts in order to link all residential units to commercial and cultural amenities, transportation, recreation, open space, and schools.

FIGURE VII

PROPOSED BICYCLE FACILITIES

SOUTHERN NEW JERSEY



Key to Figure VII

PROPOSED BIKE FACILITIES AS CHARACTERIZED IN MUNICIPAL AND COUNTY RECREATION, OPEN SPACE AND MASTER PLANS

(B-1) Burlington Township, Burlington County
Bike paths comprising approximately 40 miles are proposed for new residential developments.

(B-2) Medford Lakes Borough, Burlington County
Proposed on-road network

(B-3) Medford Township, Burlington County
Proposed on-road network.

(B-4) Moorestown Township, Burlington County
Two sections of bike paths have been proposed to connect to the existing bicycle network.

(B-5) Pemberton Township, Burlington County
A two branch 10 mile long trail is proposed for the Pemberton-Birmingham rail line right-of-way. One branch will start in Birmingham and extend through Pemberton Borough to the Browns Mills and Country Lakes areas of the Township. The second will branch off from Pemberton Borough and end in Wrightstown.

(B-6) Westampton Township, Burlington County
A bike path is proposed for the future Canterbury Woods development.

(B-7) Shamong Township, Burlington County
Proposed on-road network.

(B-8) Haddon Lake Park Trail, Camden County
A 1.4 mile extension to the park's existing trail has been proposed.

(B-9) Newton Lake Park Trail, Camden County
A 1.2 mile extension of the park's existing loop trail has been proposed.

(B-10) Cooper River Greenway, Camden County
This greenway will link the Cooper River Park Trail with Farnham Park and will continue to Pyne Poynt Park and 29th Street Park.

(B-11) Cherry Hill Township, Camden County

This network will link residential areas with community parks, employment centers and the Woodcrest Station of the PATCO High Speed Line.

(B-12) Pennsauken Township, Camden County

A riverfront bike path has been proposed.

(B-13) Monroe Township, Gloucester County

Proposed extension of existing path to Glassboro.

(B-14) Gloucester County Trails

This bike path will connect Franklin, Monroe and Washington Townships to Glassboro and Clayton Boroughs. The path will link Monroe's existing bike facility to the Glassboro Fish and Wildlife Management Area. It will also provide connections to Delsea Drive (Rt. 47), Williamstown High School, Scotland Run Park and Glassboro-Cross Keys Road (Rt. 689).

(B-15) South Harrison Township, Gloucester County

This route will link residential areas and a school along Commissioners Road to a school on Harrisonville Mullica Hill Road, the Township municipal building and a NJ Transit bus line.

(B-16) Greenwich Township, Gloucester County

This path will run adjacent to the Nehonsey Brook.

(B-17) Washington Township, Gloucester County

The foundation of this network will be existing stream corridors. Links will be provided in order to create a continuous bicycle network.

(B-18) Hamilton Township, Mercer County

This network, found in the Township's Recreation Plan, will be comprised of both on and off-road facilities.

(B-19) Ewing-Lawrence Greenway Loop, Mercer County

This loop will connect with the existing path along Johnson Avenue and with the D & R Canal Towpath via a proposed Campus Trail from Trenton State College to Rider College.

(B-20) D & R Canal Towpath Connection, Mercer County

This proposed connection would join two sections of the towpath between Old Rose and Mulberry Streets in Trenton.

(B-21) Mercer County Park

A 5.0 mile on and off-road bicycle facility is proposed within the park.

(B-22) Princeton Borough & Township, Mercer County

Approximately 23.0 miles of bikeways have been proposed.

(B-23) West Wharton Trail System, Burlington County

This system is located in Wharton State Forest and will use the Southern Branch of the Central New Jersey Railroad right-of-way. It will allow a linkage to Lebanon State Forest.

(B-24) D & R Canal Extension, Mercer County

This will encompass the D & R Canal south of Trenton.

(B-25) Millstone-Rocky Brook Bikeway and Pedestrian Path, Mercer County

This combined bikeway and pedestrian path will utilize the riparian corridors of the Millstone River and Rocky Brook.

CHAPTER V

OPPORTUNITIES FOR INTERMODAL CONNECTIONS

Providing bicycle and pedestrian access to other modes of transportation can have a positive impact on decreasing congestion and improving air quality. According to 1990 Journey to Work Information, within southern New Jersey, more than 38,000 workers commuted to work by public transit and more than 90,000 carpooled. In most cases, the worker relied on some form of transportation to connect with the carpool or transit. The short, automobile cold-start trip, the type associated with the drive to the transit station or park-and-ride lot, produces nearly as much pollution as the much longer trips which carpools or public transit replaces. In the DVRPC region, the typical park-and-ride user travels between one and six miles - a viable commuting distance on foot or by bicycle. For bicycling or walking to be considered as a transportation option in southern New Jersey, appropriate facilities should include safe and secure bicycle and pedestrian trails, paths and lanes, and access to stations and park-and-ride lots and sufficient and secure bicycle parking. In this chapter, the availability of parking at transit stations and park-and-ride lots and policies affecting bicycles on public transit are explored.

TRANSIT STATIONS

Although there are 17 rail transit stations located throughout the region (Figure VIII), only eight have installed bicycle parking racks. Only one station has bicycle storage facilities. The Southeastern Pennsylvania Transportation Authority (SEPTA) provides rail services from Philadelphia to Trenton, the Port Authority Transit Company (PATCO) operates a high speed line from Philadelphia to Lindenwold, and New Jersey Transit (NJ Transit) provides rail and bus service throughout southern New Jersey. The following rail lines are operated in southern New Jersey:

SEPTA'S R3 route provides service between Center City Philadelphia and West Trenton and between Center City Philadelphia and Elwyn. There are no bicycle facilities at the West Trenton station. SEPTA's R7 line provides service between Center City Philadelphia and Trenton and between Center City Philadelphia and Chestnut Hill East. There are 4 bicycle racks at the Trenton station.

NJ Transit's Atlantic City Line operates between Philadelphia and Atlantic City. There are no bicycle facilities at either Atco or Lindenwold stations, however, six bicycle racks are planned for Lindenwold. Cherry Hill Station, on the Atlantic City Line, has six bicycle racks. NJ Transit's Northeast Corridor Line, which provides service between Trenton and New York City, makes stops at Trenton, Princeton and Princeton Junction Stations. Four bicycle racks are located at Trenton Station. There are 37 bicycle racks and 30 bicycle lockers at Princeton Junction Station. Six bicycle racks are planned for Princeton Station.

The PATCO Hi-Speed Line provides service between Center City Philadelphia and Lindenwold, Camden County. Bicycle parking racks are available at Ferry Avenue, Collingswood, Westmont, Haddonfield, Woodcrest, Ashland and Lindenwold stations. The location of rail stations with bicycle racks appears in Figure VIII.

PARK-AND-RIDE LOTS

Park-and-ride lots are off-street parking areas where a commuter arrives by automobile, parks and transfers to another vehicle for the purpose of ride-sharing. These lots serve van pools, car pools and transit services. Park-and-ride lots in close proximity to the user's trip origin offer the potential for exchanging the automobile for the bicycle for the first leg of the journey if adequate bicycle parking facilities are available. The location of current park-and-ride lots are shown in Figure VIII. Many of these are transit stations. None of the existing highway related facilities offer parking for bicycles.

Federal funding has been available for bike and ride facility development since the passage of the Surface Transportation and Uniform Relocation Assistance Act of 1987, but few transit agencies and local governments have taken advantage of the funds. With the passage of ISTEA, states and local governments have another opportunity to invest in bicycle facilities to link bicycles with transit and other commuter modes.

BICYCLE POLICIES ON PUBLIC TRANSPORTATION

Providing bicycle parking facilities at transit stations is just one way of linking bicycles with transit. Allowing commuters to carry bicycles onto transit is another way to create transit linkages. Combining bicycles with mass transit provides the commuter with more options, especially in cases where the final leg of the commute cannot be made on foot because the transit stop is not within walking distance of the work site or is not connected by another form of transportation.

A growing number of transit systems in American cities have allowed bicycles to be carried onto public transit. Philadelphia is one of a handful of cities that permits bicycles on its transit system. While SEPTA allows bicycles on Regional Rail, restricted hours apply, and bicycle use is confined to off-peak hours, making this an option only for those who do not work traditional nine-to-five jobs. Bicycles are allowed between 10:00 a.m. and 3:00 p.m. and after 7:00 p.m. Monday through Friday, all day Saturday and Sunday and some holidays. For those wishing to use their bicycles during peak hours, a folding bicycle can be carried on at all times and no permit is required. A one-time five dollar permit is required of all other bicyclists.

Since 1993, PATCO has operated a "Bicycle on Rails" program which permits riders to bring their bicycles on board during off-peak hours. Bicycles are permitted between 10:00

a.m. and 3:00 p.m. Monday through Friday, all day Saturday and Sunday and on specific holidays. There is a five dollar annual fee and bicyclists must be 18 years or older.

On the Northeast Corridor line, NJ Transit permits two bicycles per handicapped area provided they are connected by bungee cords. Bicycles are allowed on trains between 9:30 a.m. and 4:00 p.m. and after 7:00 p.m. Monday through Friday and all day Saturday and Sunday. However, bicycles are not permitted on board during major holidays.

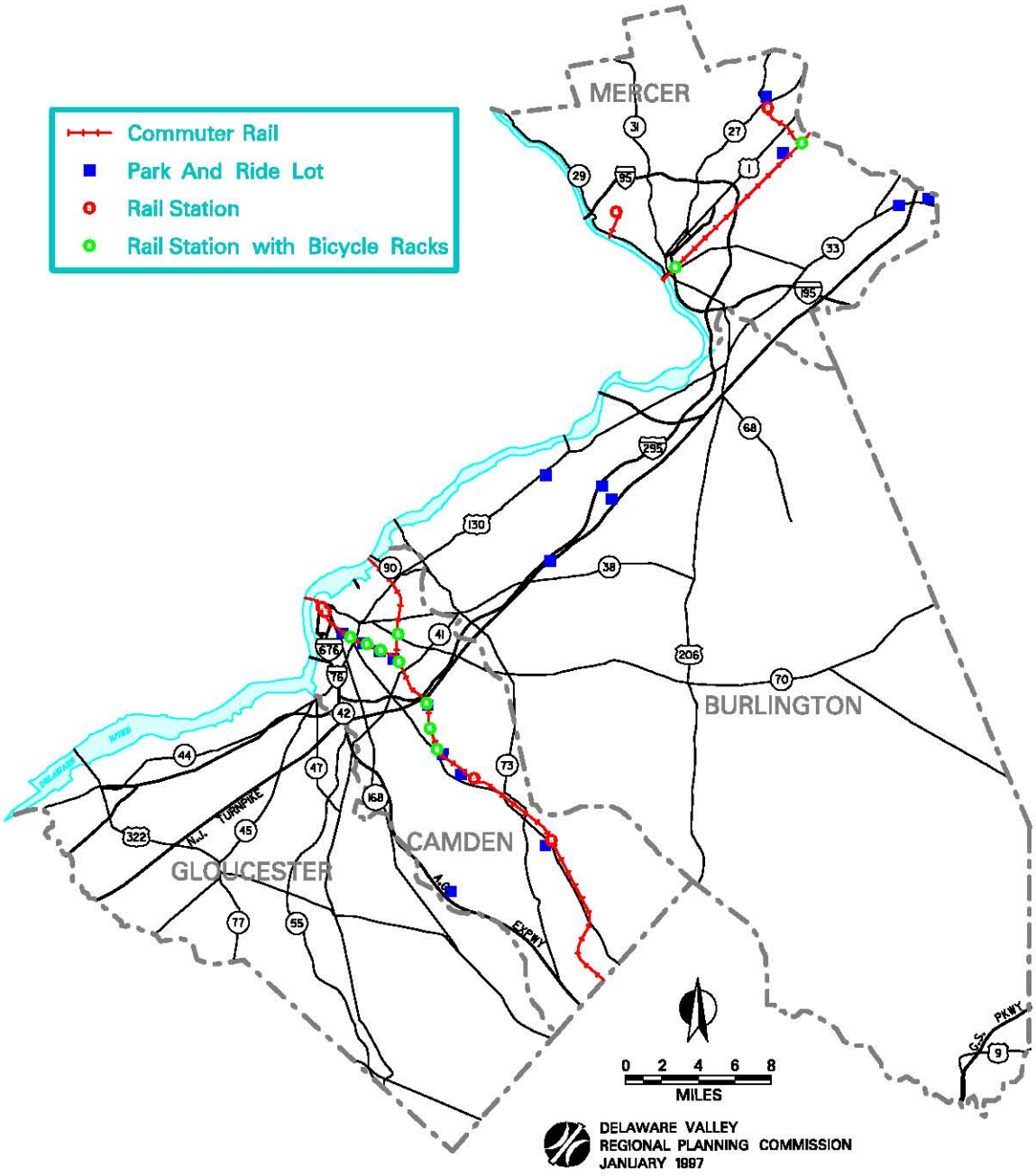
AMTRAK's policy is to allow only collapsible bicycles in its passenger cars. Bicycles are only allowed on trains if transported in baggage service, and then, only if boxed.

Riverbus, Inc. provides ferry service between the New Jersey State Aquarium at Camden and Penn's Landing in Philadelphia. Bicycles are permitted on the ferry at all times.

FIGURE VIII

PARK & RIDE STATIONS AND RAIL SERVICE TRANSIT

SOUTHERN NEW JERSEY



CHAPTER VI

THE ROLE OF RIGHTS-OF-WAY

The use of abandoned rights-of-way as bikeways offer great potential as transportation corridors. Historically, such corridors have been coveted for their recreational value. Trails constructed on abandoned rail corridors are particularly attractive because they are physically removed from cars and traffic, provide continuous connections on previously assembled rights-of-way, often link population centers, employment centers and recreational resources, and are level and suitable for seniors and physically challenged persons. The National Park Service estimates that at least one third of abandoned rail rights-of-way are suitable for alternative public use. Traditionally rails-to-trails projects have been funded through a variety of sources ranging from local and state park bond issues to private donations. ISTEA provides federal dollars to support rail-to-trails programs.

RAIL RIGHTS-OF-WAY

Approximately 180 miles of abandoned rail lines have been identified in southern New Jersey (Figure IX). A rail line can be abandoned even if the tracks remain in place. Conversely, removal of the tracks does not indicate that abandonment has occurred. In order to be declared abandoned, a rail line must meet three criteria: rail service is discontinued, an application is made to the Interstate Commerce Commission (ICC) for abandonment and the ICC approves the request; and rail pay schedules are canceled. While many of these are inactive rail lines and have received ICC approval for abandonment, several are "out of service" and have not secured ICC abandonment approval.

In 1983, Congress adopted section 8 (d) of the National Trails System Act. This subsection, known as “railbanking” provides that the ICC can encourage rail preservation by authorizing a rail line's use as an interim trail until such a time when it may be reactivated as a rail corridor, even before an official abandonment has occurred.

There are 25 separate abandoned rail rights-of-way within the four-county region. Only those rail lines currently identified as containing as significantly contiguous corridor were mapped. Within southern New Jersey, approximately 30 miles of rails-to-trails projects have been proposed and/or developed (Figure X).

FIGURE IX

ACTIVE AND ABANDONED RAIL LINES

SOUTHERN NEW JERSEY

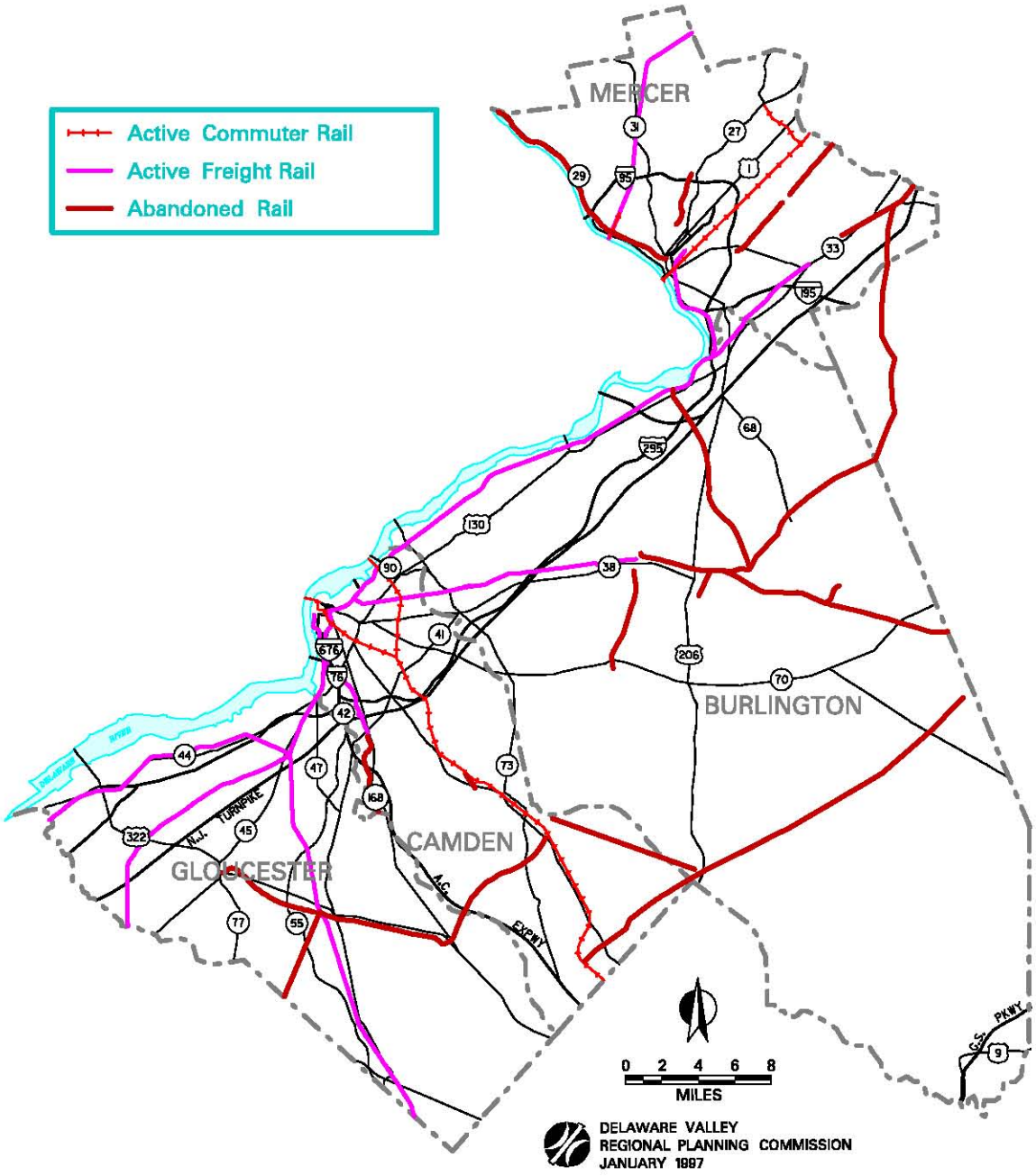
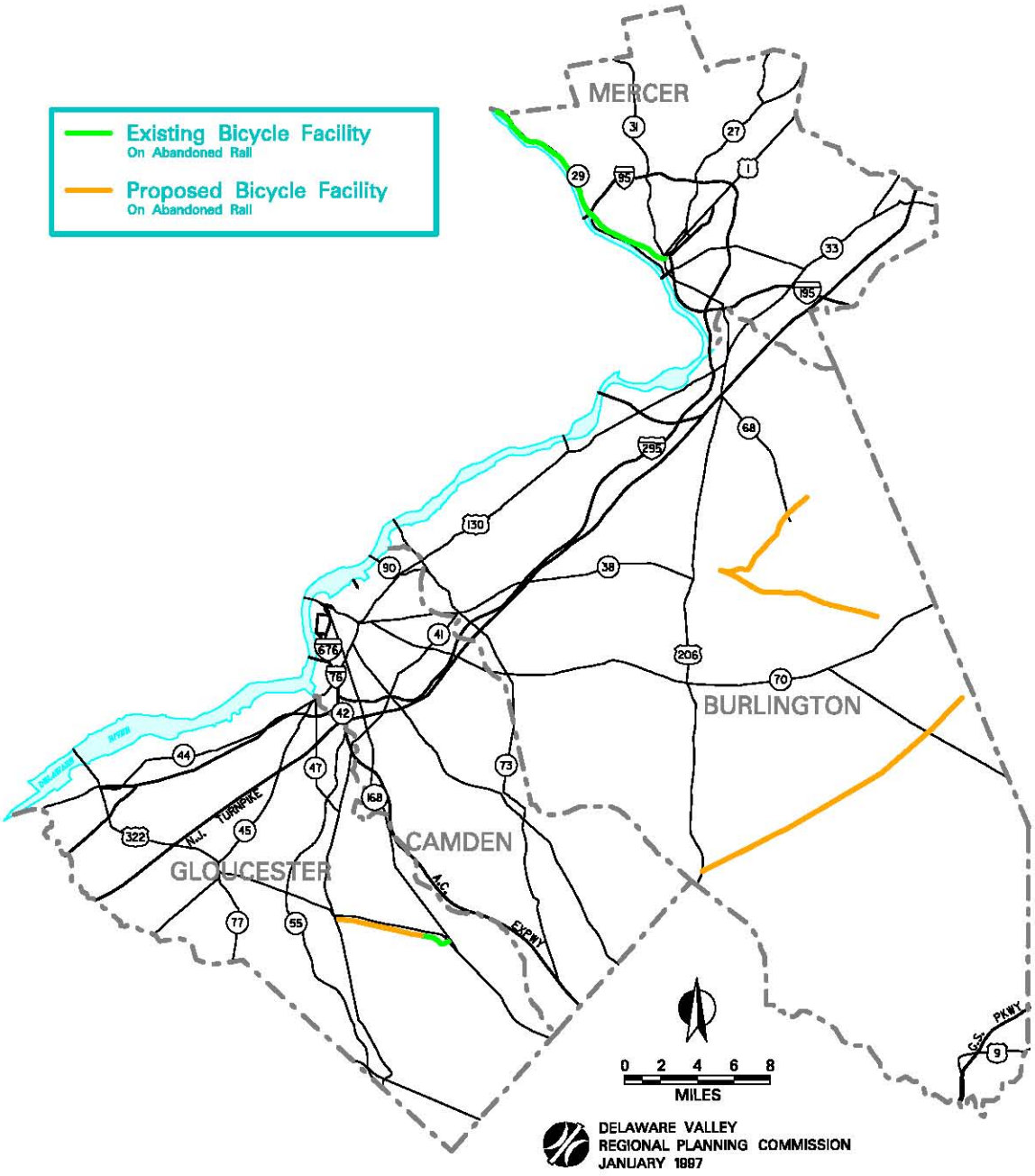


FIGURE X

PROPOSED AND EXISTING TRAILS ON ABANDONED RAIL LINES

SOUTHERN NEW JERSEY



UTILITY RIGHTS-OF-WAY

Utility rights-of-way can provide another source for trail development. Since utility companies frequently purchase land rights after a railroad abandonment, utility corridors often follow former rail lines. In addition, utility corridor characteristics are such that they provide continuous linkages within developed areas and between developed areas. However, some utilities have easements over private property for the installation of their utility lines. These cases require special permission from the utility and the underlying owner before a public use can be added.

Cooperation between the utility company and potential trail users can result in benefits for both parties. Utility companies are provided an uniterrrupted, easily accessible stretch of land. In addition, they benefit from working with only one landowner, the trail's manager, rather than countless individuals. Often utility companies will donate a corridor, thus eliminating the cost of purchasing the land. Utility companies may also provide general maintenance and upkeep of the trail corridor.

Currently, there are many pipeline and utility companies operating in southern New Jersey that will allow or have trail use incorporated into their right-of-way easements. All of these utilities utilize underground corridors. The Transcontinental Gas Corporation (Transco) has a trail use element included in their right-of-way easement. Transco is reluctant to pave their rights-of-way for trail use, but the company supports using crushed stone, gravel or dirt for trail surfaces. The Transco pipeline runs adjacent to the New Jersey Turnpike from East Greenwich Township, Gloucester County to Hamilton Township, Mercer County. This pipeline corridor passes through some of the most populated communities in the region. Other utility companies, with southern New Jersey rights-of-way that have trail use included within their right-of-way easements are: South Jersey Gas Company, Sun Pipeline Company and Columbia Gas Transmission Corporation.

Although they do not have specific trail use elements as a part of their rights-of-way easements, many utility companies are considering or would consider allowing trail use. AT&T owns numerous fiber optic cable corridors throughout the four-county region. The Cedarbrook-Finksburg "A" Cable travels from Elk Township, Gloucester County to Windsor Township, Camden County. Here, this line is known as the "Cedarbrook-Netcong "A" Cable and continues northeast through the region to West Windsor Township, Mercer County. This utility corridor not only crosses the entire southern New Jersey region, but it also has the ability to link many existing, proposed and recommended bicycle facilities. Other companies that would consider trail use on their rights-of-way include: Public Service Electric and Gas and Jersey Central Power and Light Company. This report revealed only one southern New Jersey utility company, Atlantic Electric Company, that was adamant about not allowing trail uses upon their rights-of-way.

OTHER ACTIONS

The National Park Service identified 147 potential trail and greenway corridors on public and private land that could be used to develop a regional system of trails in the Mid-Atlantic states. The National Park Service is directed to develop such a plan under the National Trails System Act. Among the goals of the program are that "trail corridors should be recognized as valuable resource protection mechanisms and as routes for alternative means of transportation, in addition to recreational facilities."[7] The potential trails that have been identified by the Park Service in southern New Jersey include: Batona Trail Northern Extension, Chatsworth-New Gretna Enduro Trail Network, Batona Trail Southern Extension, Glassboro to Bridgeton Corridor, and the New Jersey Trail. These trails have not been reviewed for their feasibility within the overall network nor have alternative uses been examined. In addition, the trails identified by the National Park Service have not been identified as a part of a proposed network.

[7] National Park Service and National Parks and Conservation Associations. "Toward a Regionwide Network of Trails for the Mid-Atlantic States." April, 1992.

CHAPTER VII

BICYCLE AND PEDESTRIAN VISION, GOALS AND OBJECTIVES

In June 1995, the New Jersey Department of Transportation adopted the Statewide Bicycle and Pedestrian Master Plan which will be incorporated into the state's Long Range Transportation Plan. The proceeding section consists of regional goals and objectives that follow those found in the NJDOT State Plan.

Southern New Jersey Bicycle and Pedestrian Mobility Plan Vision Statement:

> **Year 2020 Vision: Southern New Jersey is a place where people will choose to bicycle and walk. Residents and visitors will be able to conveniently walk and bicycle with confidence and a sense of security in every community. Both activities will become a routine part of the transportation and recreation systems.**

Over the past 20 years, a great deal of progress has occurred to improve bicycle and pedestrian facilities in southern New Jersey. Many municipalities have adopted, or are developing bicycle transportation elements and/or multi-use trails elements. Master plans currently under adoption call for the establishment of hundreds of miles of bikeways, bicycle routes, and multi-use trails. Unfortunately, only a small fraction of the planned facilities have been built so far.

Despite these achievements, there is still a need for bicycle transportation planning to be conducted in a more comprehensive and functional manner. Bicycles need to become more fully integrated into all transportation efforts, particularly with respect to highway and road development. Of the roadways currently being built or repaired, many fail to provide sufficient lane width for bicycles and motor vehicles to safely coexist. Bicycling hazards have also resulted from roadway narrowing, intersection design and poor maintenance of road surfaces. At the same time, jurisdictions should provide for the development of separate bicycle rights-of-way along such routes, whenever possible. The use of undeveloped land corridors, such as greenways, abandoned rail lines or utility right-of-ways, should be considered as bicycle route opportunities.

While a great deal of highway planning and construction is done at the state level, bicycle route design has traditionally been performed by local jurisdictions. To facilitate the development of a truly regional bicycle route network, consistent standards for design, construction and signage should be applied. Such common standards should also apply to sidewalks, hiking/equestrian paths and all-terrain bicycle trails.

Although progress has been made in recent years, bicycle facility development in southern New Jersey still lags behind many other North American and European regions. The potential exists for bicycles to serve as a significant alternative mode for short distance

trips, one which could induce thousands of residents out of their automobiles. However, this potential has yet to be realized.

To achieve greater levels of bicycle use, certain things need to happen and certain results need to be achieved. For example, there needs to be better coordination of facility design and development, as well as greater inter-governmental cooperation in route layout and construction and increased participation from all segments of the public and private sector.

In order to produce the vision, policy-related goal statements were created. The goals propose fundamental actions which will result in long-term impacts and benefits.

GOAL

1. **Create a bicycle and pedestrian friendly transportation infrastructure by planning, designing, constructing and managing transportation and recreation facilities which will accommodate and encourage use by bicyclists and pedestrians and be responsive to their needs.**

Objectives

1a. Design all new and improved state highways under the assumption that they will be used by bicyclists and pedestrians and that bicyclists and pedestrians will have the opportunity to share the road with motorists.

1b. Develop or revise policy statements that recognize the importance of bicycling and walking and the need to integrate these modes into the transportation and recreation systems.

1c. Establish capital program funding for improvements to the existing facilities and to implement new facilities.

1d. Develop a planning and scoping procedure that will ensure full consideration of bicycling and walking modes for all projects in the planning and project development process.

1e. Develop bicycle and pedestrian plans to ensure integrated and continuous networks of accessible facilities and to maximize bicycle and pedestrian mobility within the transportation system.

1f. Involve the bicycling and walking community at the earliest stages of planning and implementation of improvements to transportation and recreation facilities in order to ensure full consideration of the needs of bicyclists and pedestrians.

1g. Adopt standard guidelines developed by NJDOT to ensure consistent application of design throughout the state.

1h. Design and manage bicycle and pedestrian facilities to maximize personal security of the users.

1i. Adopt maintenance and management procedures to ensure continuous and efficient use by bicyclists and pedestrians.

1j. Train key design and transportation professionals in the proper application of planning and design guidelines and standards.

GOAL

2. Make community destinations, transit facilities and recreation facilities accessible and convenient for use by all types and skill levels of bicyclists and pedestrians.

Objectives

2a. Provide a support system of ancillary facilities that will serve the needs of bicyclists and pedestrians at destinations. Depending on local conditions and needs, these facilities could include bicycle parking, changing rooms, showers and maps.

2b. Integrate bicycle and pedestrian facility planning, design and maintenance skills into the training and education of all practicing transportation and design professionals.

2c. Promote "traffic calming" on appropriate roads to reduce traffic speeds and increase the use of streets by bicyclists and pedestrians.

2d. Enhance opportunities for land use linkages that increase the efficiency of the transportation system.

2e. Develop a planning process and implement a program of identifying and designating facilities to encourage use by bicyclists and pedestrians.

GOAL

3. Reform land use planning policies, ordinances and procedures to maximize opportunities for walking and bicycling.

Objectives

3a. Adopt policies and ordinances that promote mixed use development at densities that allow and encourage bicycling and walking as the preferred choice of transportation mode to destinations or to transit facilities.

3b. Adopt and/or amend site review procedures and design guidelines to assure convenient pedestrian and bicyclist access to public and private buildings.

3c. Adopt policies and ordinances that minimize automobile parking and provide for secure bicycle parking facilities.

3d. Incorporate programs and procedures that encourage bicycling and walking in accordance with Employee Commute Options plans.

3e. Develop policies for use of state-owned abandoned rail corridors as trails or interim trails.

GOAL

4. Develop education and enforcement programs that will result in reduction of accidents and a greater sense of security and confidence for bicyclists and pedestrians.

Objectives

4a. Conduct a pedestrian and bicycling universal skill training and certified education program for children.

4b. Develop and conduct a public information and awareness campaign targeted towards all roadway users with the intent of modifying behavior and attitudes to create a sense of compatibility among all users.

4c. Provide training for law enforcement officials in the conduct of safety education and enforcement programs for bicyclists and pedestrians.

4d. Provide education programs to companies promoting walking and bicycling to work.

4e. Promote and provide support for Police on Bike programs.

4f. Educate planning and enforcement officials in the importance of traffic calming as a safety countermeasure.

4g. Educate planning and enforcement officials to increase their awareness of bicycling and walking issues.

GOAL

5. Increase bicycling and walking by fostering a pro-bicycling and pro-walking ethic in individuals, private sector organizations, and all levels of government.

Objectives

5a. Establish local citizen's advisory groups to advocate policies, programs and facility improvements that will enhance and promote bicycling and walking.

5b. Develop Employee Commute Option plans that contain elements that encourage bicycling and walking.

5c. Develop a means of ensuring public participation in the development and implementation of plans and policies that impact pedestrians and bicyclists.

5d. Depict bicycling and walking as everyday activities in all state publications, public activities and media campaigns related to transportation and recreation issues.

5e. Develop and conduct a public awareness campaign promoting bicycling and walking and emphasizing the virtues of bicycling and walking as a means of solving community problems, improving personal health and wellness, and enhancing the quality of life.

5f. Support bicycling and walking by providing support facilities and programs in the work place.

CHAPTER VIII

PEDESTRIAN IMPROVEMENTS

A sometimes-forgotten means of personal transportation, walking could become a legitimate mode for short trips in southern New Jersey. Trips such as walking to school, work or simply to the corner store should be a regular part of everyday life. Moreover, walking is recognized as a beneficial recreational activity. However, in many areas of the four-county region, low density development has made pedestrian activity impractical. Spread-out destinations have caused many to rely upon the automobile for all commuting and shopping trips. This has been augmented by the lack of sidewalk systems or pedestrian paths.

It is usually difficult to measure the benefits of sidewalks since people walk where there are sidewalks and sidewalks are built where people walk. According to NJDOT, the installation of pedestrian facilities should not be based upon pedestrian volume, but rather sidewalk need should be based upon the density, type and pattern of land use.

Planning for pedestrian facilities can be accomplished by utilizing the tools available within the structure of the planning process. Master plans, produced at all levels of government, should include pedestrian-related policies. The master plan does not guarantee that pedestrian accommodations will be constructed, however, it simply strengthens the possibility that greater action will be taken to realize the creation of pedestrian facilities.

State, county and local land development ordinances provide the regulatory power to implement the vision and policies of the master plan. These ordinances should promote pedestrian concerns by requiring pedestrian-friendly land development practices. These ordinances should also be used to require the construction of pedestrian amenities. Subdivision regulations can not only be used to require sidewalks but also influence their location and design. Site review standards also provide an opportunity to include pedestrian components in development.

A detailed physical plan for pedestrian improvements is beyond the scope of this plan. The sidewalks and pedestrian paths located throughout the four-county region are too numerous to include in the network and rely primarily upon the local planning process. Improvements to the pedestrian network depend upon local characteristics and conditions. Although no specific pedestrian improvements have been included within the southern New Jersey Bicycle Network, it is possible to analyze the extent of pedestrian planning within the four-county region. Several municipalities in the four-county region have pedestrian elements within their master plans while others have implemented programs to improve pedestrian safety and access.

The Master Plan of Deptford Township recognizes the importance of safe pedestrian facilities in fostering pedestrian activity throughout the Township. Located within the Energy

Conservation Element, the plan states that improved pedestrian facilities will lead to decreased traffic congestion. Pedestrian routes will be used to link a host of destinations including schools, residential areas and recreation. Washington Township, Mercer County has proposed a hierarchy of pedestrian facilities that will traverse the Township. According to the Master Plan, a series of primary pedestrian trails will be connected by smaller feeder trails providing access to the pedestrian network for all areas of the Township. Residential communities and recreational and public amenities will be connected using the pedestrian system. Further, the plan calls for linking Washington Township's pedestrian network with those of surrounding municipalities.

In addition to comprehensive plans, municipalities in southern New Jersey have established various policies, regulations and practices in extending their respective pedestrian planning guidelines. Land use codes, subdivision ordinances, zoning ordinances and development regulations have all been used to guide the enhancement and formation of pedestrian facilities throughout the four-county region. The Mount Holly Township Land Use Ordinance requires sidewalks for pedestrian traffic moving from parking areas to principal buildings. In South Harrison Township, the Land Use Ordinance requires sidewalks in all types of major development, and pedestrian easements may be required to provide circulation or access to schools, playgrounds, shopping or other community facilities. The Subdivision Code of Mount Laurel Township requires that subdivisions be designed to provide for pedestrian walkways separated from vehicular-use streets.

GUIDELINES FOR PEDESTRIAN IMPROVEMENTS

Unlike the proposed bicycle network which relies primarily upon the state and county for improvements, a majority of pedestrian improvements depend upon the municipalities of southern New Jersey. Recommendations on where sidewalk installation is needed have been addressed in the New Jersey State Development and Redevelopment Plan of 1992 (SDRP). The SDRP aspires to change future development by creating compact, mixed-use development patterns in centers and encouraging the growth and redevelopment of existing centers. In its Pedestrian Compatible Planning and Design Guidelines, NJDOT compares the SDRP land use classifications to different classes of state urban and rural roads. According to this comparison, sidewalks are not required along an interstate or freeway in any type of development. However, sidewalks are required along all principal arterials, minor arterials, major collectors and minor collectors/local streets. Developments where these sidewalk are required include: core and development areas of urban centers; core areas of town centers; development areas of town centers except along principal arterials; regional centers; core areas of villages; along minor arterials in hamlets; and in metro and suburban planning areas.

There are many considerations that can ensure safe pedestrian amenities throughout southern New Jersey. NJDOT's Pedestrian Guidelines examines numerous types of pedestrian improvements. These include sidewalk width, walking placement within the

right-of-way, shoulders, intersections, medians, crosswalks, curb ramps and refuge islands, overpasses and underpasses, and upgrading and retrofitting existing highways.

SIDEWALK WIDTH

The minimum width required to allow safe and convenient pedestrian and disabled travel is five feet exclusive of the curb. Areas around schools and other large pedestrian generators should have a minimum sidewalk width of eight feet. Pedestrian facility designers must also consider the use of strollers, shopping carts and wheelchairs, in addition to children with wagons, tricycles and skates. Sidewalks should be clear of trees, hydrants, poles, signs and parking meters to allow unimpeded passage. The NJDOT guidelines state that where sidewalks are adjacent to parking areas an extra two feet of width is needed to offset the opening of car doors.

In some instances, the right-of-way cannot support a five foot sidewalk. Alternatives, such as using a reduced sidewalk width (no less than four feet), constructing roads with narrower travel lanes and prohibiting on-street parking, serve to alleviate the congestion found on the smaller pedestrian facilities.

WALKING PLACEMENT WITHIN THE RIGHT-OF-WAY

An important safety and design factor is the setback distance of a sidewalk from the roadway. High travel speeds, traffic congestion, noise and pollution create an impression of hazard and tend to discourage many pedestrians. It is recommended that the minimum distance between the edge of the sidewalk and the back of the curb is four feet, although eight feet is preferred. This space not only adds to the safety and convenience of walkers but also affords space for snow, trash and leaf storage and plantings.

SHOULDERS

Shoulders are considered adequate alternatives to sidewalks in areas where sidewalks are not required. The shoulders should be at least four feet wide and paved. However, factors such as increases in motor vehicle speed, truck and bus volume, and bicycle and pedestrian traffic need to be considered when promoting pedestrian use of the shoulder.

INTERSECTIONS

Pedestrian activity occurs most frequently at intersections, especially in business districts. Motor vehicle and pedestrian cross traffic and turning movements intersect at these locations creating potentially dangerous situations. NJDOT reports that there are 32 possible vehicle to pedestrian conflicts at the 4-way signalized intersection of two roads.

In order to reduce the risk of pedestrians crossing at intersections a host of preferred design practices have been generated. Some of these are: prohibit right-turn-on-red at those intersections with high pedestrian volumes; provide a pedestrian refuge median when crossing distances exceed 60 feet; install pedestrian crossing buttons; move drainage structures to prevent pedestrians from tripping; and install sidewalk flares at intersections to slow traffic. Moreover, pedestrian-friendly land use planning options should be applied to future project development. Traditional neighborhood layouts that provide

walkers with a variety of crossing opportunities and spread out vehicle turn movements should be encouraged.

MEDIANS

When crossing a multi-lane highway, pedestrians must wait until all lanes of traffic are clear before crossing. Medians allow pedestrian to view each direction of traffic as a separate crossing movement. Medians should be at least eight feet in width. It is suggested that all new or reconstructed highway of four or more lanes contain medians to accommodate pedestrians. Existing highways without adequate space for a median, should be re-striped to create a center lane outside of the stream of traffic. The center lane does not afford a great deal of physical protection to the pedestrian. However, it creates an area that allows the pedestrian to cross the highway in two movements rather than one.

CROSSWALKS, CURB RAMPS AND REFUGE ISLANDS

Crosswalks serve to delineate the preferred space for pedestrian crossing movements at intersections. Installation of crosswalks should occur at all signalized intersections with pedestrian signal heads, all locations where a school crossing guard is stationed, all locations within 1/4 mile of transit stations or schools, mid-block locations where a pedestrian trail crosses a highway, and areas where concentrated pedestrian volumes cross the highway.

Curb ramps were initially required to ensure access for the disabled. However, the construction of curb ramps soon revealed that they could provide benefits to all pedestrians. Curb ramps are utilized by joggers, children, hurried commuters and the elderly because they have eliminated the need to negotiate large curbs, steps and stairs. The NJDOT pedestrian guidelines maintain that curb ramps be located at intersections, painted crosswalks at mid-block locations, crosswalks at exit or entrance ramps, driveways, divisional islands and median islands at mid-block locations.

Refuge islands are similar to medians in that they allow the pedestrian to divide crossing a multi-lane highway into two movements. Refuge islands should preferably be at least six feet wide, however the minimum width permitted for a refuge island is four feet. Islands should be raised above the crosswalk surface to cause the pedestrian to be more visible to motorists.

OVERPASSES AND UNDERPASSES

Pedestrian overpasses and underpasses have the greatest application in urban areas. These grade separation structures are expensive to construct and are usually not utilized to their full potential. They require extra effort and travel distance by pedestrians. In addition, most pedestrians will cross a highway at-grade unless a grade separated facility is more convenient and direct. If this is not apparent, pedestrians will seek to cross the traffic stream. Locations for grade separation facilities include areas where there are schools, shopping centers, recreational areas, parking garages or other types of activities that are separated by highways from the residential districts that generate pedestrian trips.

UPGRADING AND RETROFITTING EXISTING HIGHWAYS

The existing highway system contains many of the problems associated with pedestrian convenience and safety. Improvement of pedestrian amenities must include the upgrading and retrofitting of existing highways. A variety of highway improvements that will improve pedestrian convenience and safety have been endorsed by NJDOT. These entail the incorporation of medians into the widening of any highway to four or more lanes, installation of refuge islands where a continuous median cannot be maintained, preservation of sidewalks adjacent to highway widening projects, and the examination of the impact two-way left-turn lanes have on pedestrian travel.

CHAPTER IX

BICYCLE IMPROVEMENTS: THE SOUTHERN NEW JERSEY BICYCLE NETWORK

THE BICYCLE NETWORK

The Southern New Jersey Bicycle Network illustrates a comprehensive bicycle system that will provide safe and convenient bicycle access throughout the four-county region. By choosing the bicycle over the automobile, travelers are able to reduce congestion, improve air quality, improve their health and save money. The network represents a combination of bicycle compatible roads and designated bicycle facilities which foster the bicycle commuting option (Figure XI).

When the entire network is constructed, southern New Jersey will contain more than 1,400 miles of bicycle facilities. A breakdown of the network mileage is presented in Table XII.

TABLE XII
REGIONAL BICYCLE NETWORK CHARACTERIZATION
(in miles)

	Burlington	Camden	Gloucester	Mercer	Total
Existing	17.5	11.0	1.5	35.5	65.5
Proposed	155.0	21.0	56.0	127.0	359.0
Recommended	444.0	201.0	189.0	144.0	978.0
TOTAL	**616.5**	**233.0**	**246.5**	**306.5**	**1402.5**

The four-county bicycle network comprises existing and proposed bicycle facilities along with recommended network enhancements. A majority of the network, 44.0 percent, is located in Burlington County. Mercer County includes 22.0 percent of the regional bicycle network, while Camden County contains 17.0 percent and Gloucester County 17.5 percent.

EXISTING FACILITIES
Existing bicycle amenities, shown in green on the map, provided the initial foundation for the network which then built upon proposed projects, potential travel routes and the location of key destinations within communities. A majority of the existing system is recreational, situated primarily in parks or along small stretches of local roads. Mercer County contains 35.5 miles, or 55.0 percent of the existing bicycle accommodations in southern New Jersey.

PROPOSED FACILITIES

Proposed bicycle facilities, illustrated by the orange lines, were identified in local or county plans and comprise 25.6 percent of the network. More than 180 miles of the proposed portion of the network is located on local roads. Forty-three percent of proposed bicycle facilities are in Burlington County, while 35.0 percent are located in Mercer County. Off-road facilities (123.0 miles) and county roads (49.0 miles) complete the proposed network section. Proposed facilities in Burlington County include 44.0 miles of off-road facilities, Gloucester County 38.0 miles, Mercer County 29.0 miles and Camden County 11.0 miles.

An important consideration in developing the network was the location of key destinations within a community. The Plan inventoried the location of schools and universities, large employers, transit facilities and shopping centers, although the list of locations to which one could bicycle is unlimited. In order to establish linkages between key destinations and existing and proposed bicycle facilities, enhancements were recommended.

RECOMMENDED ENHANCEMENTS

The four-county bicycle network comprises more than 970.0 miles of recommended enhancements (Table XIII), shown in blue. Sixty-five percent of these enhancements are located along county owned rights-of-way. Local jurisdiction oversees 14.0 percent of the recommended enhancements, while state and off-road routes constitute less than 10.0 percent each. More than 444.0 miles of enhancements are located in Burlington County, 72.0 percent of which is located along county roadways. Camden County enhancements include more than 200.0 miles (75.0 percent on county roads), Gloucester County 189.0 miles (61.0 percent on county roads) and Mercer County 144.0 miles (35.0 percent on county roads).

TABLE XIII

RECOMMENDED ENHANCEMENTS (in miles)

Road Type	Burlington	Camden	Gloucester	Mercer	Total
State	50.0	14.0	39.0	6.0	109.0
County	320.5	151.5	115.0	50.0	637.0
Local	36.0	10.0	20.0	69.0	135.0
Off-Road	38.0	26.0	14.0	19.0	97.0
TOTAL	**444.5**	**201.5**	**188.0**	**144.0**	**978.0**

Included within the network are off-road facilities that comprise 19.0 percent of the network mileage. These off-road facilities are typically located along the right-of-way of an abandoned line or in parks. Like many of the recommended enhancements, off-road amenities provide important connections between various sections of the on-road system.

While county road patterns in southern New Jersey do not follow any particular pattern, the routes identified in the four-county bicycle network primarily run according to the direction of the Delaware River. This pattern travels from the northeast to the southwest in Burlington, Camden and Gloucester Counties, and from the northwest to the southeast in Mercer County. Areas with high population density, as in the City of Camden and the river boroughs in Burlington County, have the greatest concentration of bicycle facilities. Other municipalities such as Moorestown and Hamilton Townships and Princeton Borough also have high densities of network accommodations. The concentration of bicycle facilities is not as great along the outer reaches of the four-county region.

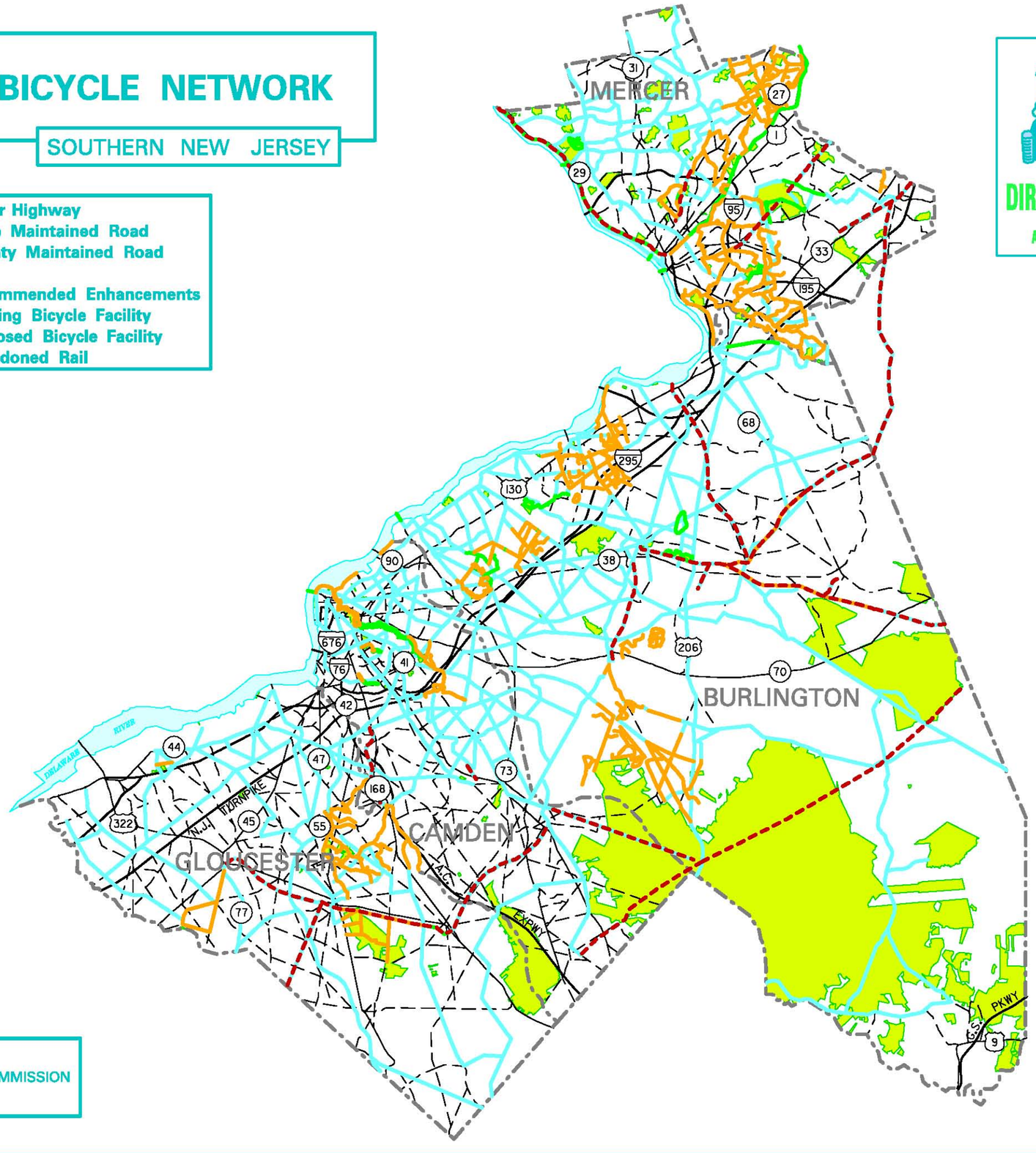
It is important to note that the routes identified on Southern New Jersey Year 2020 Bicycle Network are not necessarily safe and accessible to bicyclists at this time. While some routes may be marginally acceptable today, most will require a capital investment improvement in order to be bikeable.

FIGURE XI

YEAR 2020 BICYCLE NETWORK

SOUTHERN NEW JERSEY

- Major Highway
- State Maintained Road
- County Maintained Road
- Park
- Recommended Enhancements
- Existing Bicycle Facility
- Proposed Bicycle Facility
- Abandoned Rail



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MILES

DIRECTION 2020
A Region on the Rise

DELAWARE VALLEY
REGIONAL PLANNING COMMISSION
APRIL 1997

BICYCLE IMPROVEMENTS

The proposed bicycle network for southern New Jersey relies chiefly on the region's roadways to form the foundation of the system. The network does not identify those roads that are currently safe to bicycle upon, but it does represent the roadways that could be compatible with bicycle use if modest improvements are provided. Once roadway conditions are improved to accommodate bicyclists, continued maintenance is necessary to ensure adequate bicycling conditions.

Before any improvements are undertaken, the local conditions and bicycle compatibility for that particular roadway should be considered in order to determine the level of improvement needed. Compatibility examines specific road characteristics such as traffic volume, speed and pavement width in relation to the bicyclist.

The New Jersey Department of Transportation's Bicycle Compatible Roadways and Bikeways presents general guidelines in examining roadways for bicycle compatibility. These guidelines should be utilized to determine the bicycle compatibility of roads identified on the network. In cases where roads are fully bicycle compatible, minimal improvements such as "Share the Road" signs may be all that are necessary. In cases where roadways are not sufficiently compatible, improvements such as striping road shoulders or installing physical barriers should be considered. In instances where bicycle compatibility is inadequate, improvements such as separated bike paths or off-road paths are recommended.

Some of the roadways shown on the network are now bicycle compatible and can be used today. Here, a "Share the Road" sign could serve to increase safety. Other roadways on the network will require at least minor modifications if they are to accommodate bicycle traffic. In order to ensure adequate bicycling conditions and further development of the network, state, county and local agencies need to assure that roadways are bicycle compatible and incorporate bicycle improvements into the planning, design, construction and improvement of the roadways that appear on the network map.

A variety of possible improvements exist, that used in accord with the compatibility guidelines, can ensure adequate bicycling conditions throughout the network. There are four basic categories into which the bicycle facilities on the network map can be classified.

1. Bike route: a road signed for bicycling but with the bicycle sharing the road surface with other vehicles.

2. Bike lane: a one direction travel lane on both sides of the roadway for preferential or exclusive use of bicycles separated from motor vehicle traffic by a stripe or marking delineating the lane.

3. Bike path: a path within a motorized transportation right-of-way but separated from motor vehicle movement by an intervening strip of land.

4. Off-road path: a bicycle facility completely separated from a street or highway right-of-way.

Within these identifying categories, numerous possibilities exist for improvements to be made on a site by site basis. From simply striping a highway shoulder to creating a dedicated bicycle right-of-way, the range of roadway improvements allows for the development of the bicycle network at different intensity levels. Before improvements are made, many operational factors must be considered when utilizing the various bicycle network design approaches. These include: traffic volume, operating speeds, traffic mix, on-street parking, sight distance, intersections and driveways. Providing the appropriate facility requires a careful assessment of potential usage and vehicular conflicts.

BIKE ROUTE

A bike route provides a recommended travel corridor for bicycles. Signs can be used to designate a preferred way to travel from residential areas to parks, shopping or to other high demand destinations. A bike route sign encourages bicycle use on that particular road in addition to promoting the road as being safe for bicycling. Signing bicycle facilities helps legitimize the presence of bicycles in the eyes of motorists and potential bicyclists. Roadway bicycle signs can be used to create different levels of usage intensity. Signs such as "Share The Road" act as a warning and can be used to caution motorists to expect to encounter bicyclists. This sign does not designate the road as being a bike route, but serves as a caution on a roadway known to attract bicyclists.

Bike route signs, when used alone, usually convey little information. These signs should be used in accord with other signs that give directions, destinations or distances. The numbered bike route sign can be used to identify particular routes or differentiate between routes in those communities with more that one bike route. It is recommended by the US Department of Transportation that bicycle route signs be located at intervals frequent enough to keep bicyclists informed of changes in route direction and to remind motorists of the presence of bicyclists.

Costs associated with bike routes generally involve signing the route. Cherry Hill Township has estimated costs for its on-road bicycle system consisting of routes and restricted bike lanes. Cherry Hill Township estimates to spend $23 per bike route or bike lane sign for its on-road bicycle network. The Pennsylvania Department of Transportation (PennDOT) approximates $20 per "Share The Road" bike route sign. Bike route signs placed at 500 foot intervals total approximately $250 per mile.

BIKE LANE

A bike lane is a one direction travel lane located on both sides of the roadway. Striping a roadway shoulder creates a space that allows for a separation of bicyclists and motor vehicles without designating an official bike lane. The American Association of State Highway and Transportation Officials (AASHTO) recommends a five foot minimum shoulder width for safe bicycling. Many shoulders in southern New Jersey are wide enough to safely accommodate bicycles, and are simply in need of a stripe defining the shoulder

area.

In addition to striping, bike lanes can be created by using preferential bicycle lane symbols, such as bicycles, diamonds or arrows, that point in the direction of traffic flow. These symbols, placed upon the street pavement, can be used to foster bicycle use when used in conjunction with striping or signage. The markings indicate that the identified lane is for the exclusive use of bicycles. The symbols are used to increase a bicyclist's confidence in motorists remaining out of the path of travel. Further, motorists are less likely to swerve out of their lane to avoid bicyclists.

The design of bike lanes must take into account many factors including: lane widths, speed of travel, roadway surface, drainage grates, intersections, bridges, railroad crossings, driveways and parked cars. Each bike lane will be designed according to the configuration of these factors along the intended path of bicycle travel.

Costs associated with bike lanes generally include providing stripes, symbols and signs. According to the Cherry Hill estimates, the Township expects to spend approximately $25 per diamond bike lane logo, $25 per bicycle symbol and $10 per bike route stencil. PennDOT estimates costs for painted four inch edges lines at ¢.15 per linear foot, and costs associated with legends and symbols at $50-75 each. The Burlington County Engineer's Office estimates striping costs at ¢.50 per linear foot or approximately $2,600 per mile.

BIKE PATH

Another option in developing the bicycle network along the region's highways is the creation of bicycle paths. Bicycle paths are bikeways that are physically separated from motor vehicle traffic by an open space or barrier within the highway right-of-way, or are created in an independent right-of-way. Bike paths consist typically of paved multi-use paths or trails that are designed for the exclusive use of bicycles and other nonmotorized users. Paths are not necessarily the sole domain of bicycles. Uses such as walking, jogging and rollerblading are common.

The bike path is a hybrid between the protected bike lane and the off-road path, combining elements of both in its design. Many factors are associated with bike paths such as conflicts of usage, incompatible uses, linkages and proximity to roadways. Costs associated with the bike path generally involve paving, which Burlington County estimates at $100,000 per mile.

OFF-ROAD PATH

Off-road paths are bicycle facilities that are completely separated from the highway right-of-way. Many surveys of potential bicycle users have found that people are more likely to use bicycles for commuting or other trips if they can ride on a protected off-road facility. Corridors such as abandoned railroad rights-of-way and utility rights-of-way have historically been converted into off-road bicycle facilities. Off-road paths provide bicyclists with a variety of options. They can serve as shortcuts and provide recreational

opportunities. Paths also function as alternatives to the roadway system by extending circulation options for bicyclists. In addition, the paths can provide bicycle access to areas that are otherwise served only by incompatible roads or by limited access highways closed to bicycles.

When designing off-road paths for bicycle use several design criteria must be considered. The width of the path is the primary design consideration. According to AASHTO the advised width for a two-directional off-road path is 10 feet. This may change as other factors such as path purpose, travel speed, pavement surface and terrain are examined. Off-road path designers should also consider the number of intersections that coincide with the path, structure of the path pavement, overpasses and underpasses, lighting, and drainage.

Many of the off-road facilities identified on the network are located along abandoned rail rights-of-way. The conversion of abandoned rail lines to off-road paths generally involves two costs: acquisition and construction. According to the Rails-to-Trails Conservancy, acquisition costs for abandoned rail rights-of-way in New Jersey can range from $4,194 to $270,483 per mile. Factors affecting the acquisition price are: adjacent land uses, zoning restrictions and area population. Acquisition costs are further complicated by additional purchase elements such as title searches, appraisals, Phase I environmental assessments and land surveys. Each additional element can add between $1,000 and $3,500 to the acquisition cost. Further, in order to adhere to AASHTO standards, converting a rail corridor to a functioning multi-use path could cost between $70,000 and $100,000 per mile.

CHAPTER X

IMPLEMENTING THE NETWORK

The Year 2020 Southern New Jersey Bicycle Network relies upon a combination of state, county and local roads to provide linkages that create a region-wide bicycle network. To this end, many players have been identified who have important roles in the implementation of the network. These range from organizations that directly provide bicycle related facilities and resources to those with supporting roles. Advocates for bicycle and pedestrian planning have numerous responsibilities involved with the plan's implementation. Managing and providing bicycle and pedestrian facilities, funding, technical planning, implementing strategies and facility design are all roles related to implementing the plan.

New Jersey Department of Transportation

In the Statewide Bicycle and Pedestrian Master Plan, the New Jersey Department of Transportation (NJDOT) introduces a policy and action plan for improving bicycling and walking throughout the state. The plan is viewed as a starting point in a series of documents and products that will be produced to address state-wide bicycle and pedestrian interests.

As the principal provider of bicycle and pedestrian guidance within New Jersey, NJDOT should coordinate the bicycle and pedestrian planning efforts of other state agencies and maintain a current database of county and local bicycle and pedestrian projects and initiatives. NJDOT has authority over all state highways and needs to manage the bicycle and pedestrian programs for these highways. In addition, federal and state funds earmarked for bicycle and pedestrian projects should be administered by NJDOT. NJDOT must provide technical expertise and training to regional, county and local officials. Similarly, consistent and state-wide bicycle and pedestrian facility design and construction standards should be developed. NJDOT should review county and local bicycle and pedestrian project proposals and see to it that county and local governments adhere to these standards.

Metropolitan Planning Organizations

To ensure that bicycle and pedestrian projects are funded and constructed, it is important to have them included on the region's Transportation Improvement Program (TIP). In selecting projects for the TIP, metropolitan planning organizations (MPOs) must adopt selection criteria that give consideration to bicycle and pedestrian projects that contribute to the development of the bicycle network.

Counties

Since a majority of the Southern New Jersey Year 2020 Bicycle Network resides upon county roads, county governments have the primary responsibility to adopt policies that will ensure that road ways can accommodate bicyclists. The counties can encourage implementation of the bicycle network by adopting this plan. Further, county governments need to link bicycle and pedestrian improvements to county highway capital improvement plans.

County planning and engineering departments must coordinate bicycle and pedestrian planning efforts within the county to confirm a consistent policy in dealing with these issues. Policies towards bicycles and pedestrians should be developed in accord with state policies. County recreation and transportation plans should be revised to address bicycle and pedestrian interests. Existing and proposed county transportation facilities should integrate bicycle facility needs. Moreover, counties should look for ways to develop inter-jurisdictional agreements that reach across county boundaries. Counties should accommodate bicyclists and pedestrians in all public, school, recreation and transportation facilities.

Municipalities

Local municipalities have an important role in the development of the bicycle network. Since the network was created with trip generators in mind, local connections will only enhance the travel opportunities available to residents. Locally maintained roads allow for initial access to the bicycle network from residential neighborhoods. Municipal sidewalks serve to create another important section of the network and provide safe and easy access between home, schools, parks and commercial areas.

Local governments have the ability to shape bicycle and pedestrian facilities through favorable land use regulations and site design review. Ordinances should be adopted that encourage mixed land uses, cluster developments, open space, dedication of rights-of-way for trails and interconnected street patterns and sidewalks. Further, municipal comprehensive plans should be amended to reflect a framework that addresses bicycle and pedestrian issues.

Municipalities should also establish local bicycle and pedestrian plans and assure that the plans are part of inter-local agreements that do not terminate at municipal boundaries. As with the role of counties, municipalities should accommodate bicyclists and pedestrians in all public, school, recreation and transportation facilities, and create bicycle and pedestrian access linkages between these facilities. Local government should also link bicycle and pedestrian improvements with capital improvement plans.

Transit Agencies

The Port Authority Transit Company (PATCO) and NJ Transit are the transit agencies that operate primarily in southern New Jersey. In order to advance bicycle and pedestrian concerns, both should continue to incorporate bicycle and pedestrian issues into the plans for transit station areas and to institute policies and programs allowing for bicycles on transit. PATCO and NJ Transit should proceed, in conjunction with municipalities and developers, to provide facilities for bicycle and pedestrian access at transit stations. The transit agencies should sustain their efforts that encourage walking and bicycling as alternative transit access modes.

Bridge Agencies

There are four separate bridge authorities or commissions in southern New Jersey regulating bicycle and pedestrian passage across the Delaware River: Delaware River Port Authority, Burlington County Bridge Commission, New Jersey Turnpike Authority and Delaware River Joint Toll Bridge Commission. As part of DIRECTION 2020, the long range land use and transportation plan for the nine county DVRPC region, the Southeastern Pennsylvania Proposed Bicycle Network was adopted. In order to realize the complete vision of this plan, and the southern New Jersey plan, the two must be linked across the Delaware River. Currently, only five of the existing 12 bridges allow some type of bicycle or pedestrian access. The bridge agencies should continue to accommodate bicyclists and pedestrians in all facets of their facilities planning. Bridge regulations should maintain their favorable stance towards walking and bicycling concerns and look to improve pedestrian and bicycle access where possible.

In addition to the primary participants and providers of bicycle and pedestrian facilities, there are other supporting entities that will play an important role in the development of the bicycle network. State level agencies such as the Departments of Environmental Protection, Community Affairs and Education should incorporate and promote bicycle and pedestrian elements on all agency levels. Transportation Management Associations (TMAs) need to ensure that the concerns of bicyclists and pedestrians are addressed in related policies and programs. Burlington, Camden and Gloucester Counties and municipalities located in the Pinelands must contact the Pinelands Commission in cases of widening road shoulders, and installing sidewalks and bike paths. Other supporting interests include professional organizations, bicycling and walking advocacy groups, developers and employers. All have duties to promote and provide bicycling and walking opportunities throughout southern New Jersey.

APPENDIX A

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