Falmouth, Maine

Bicycle and Pedestrian Master Plan

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Prepared by
The **Falmouth Trails Advisory Committee**

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Introduction

Many changes have occurred in Falmouth since adoption of the original Bicycle and Pedestrian Master Plan in 1996. The East Falmouth Bikeway is essentially complete and work on the West Falmouth Bikeway has begun. Community Park has been established; the Village Center District emphasizing pedestrian scale design on Route One has been created; and, the Exit 10 Commercial Project is underway. Along with these changes, there has been an increased interest by the public in bicycling and walking, as reflected in the increased use of paved shoulders throughout the community, recent public opinion surveys, and the Town's commitment to bicycle and pedestrian planning in the Regional Master Planning Process.

New information and the growth of the community have resulted in the need to update the Town's Bicycle and Pedestrian Master Plan. Although the basic theory and analytical methods remain the same, the goals and recommendations have been revised and expanded to accommodate the changes in the Town's population, commercial development, and outdoor recreation interests that have occurred since the last plan was written. Population centers have been more clearly defined, the criteria for bikeways and pedestrian facilities have been expanded to provide better continuity and access, and guidance is provided for the design of facilities when the amount of space within the public right-of-way is limited.

Figure 1 – The paved shoulders on Route 88 are used by cyclists and pedestrians alike.

Some things about the Bicycle and Pedestrian Master Plan have not changed. It is still intended as a blueprint for guiding public investment in making the community more accessible to people bicycling and walking. It does not tell people where they can or cannot perform these activities. In order to achieve this goal of improving access, the master planning process has attempted to:

1) respect the capability and needs of user groups;
2) provide the most benefit to the most number of people; and,
3) provide a comprehensive system without unnecessary duplication or overlap of facilities.

Part 1: Concepts

Basic Planning Concepts

Centers of Population

Although population in Falmouth is dispersed by urban standards, there are places within the community where population is concentrated at higher densities than in others. A visual impression of how the population is concentrated can be determined by drawing circles around neighborhoods that contain more than 50 housing units within a one-quarter mile radius. Each of these quarter mile circles is called a population cluster. If two or more of these clusters lie adjacent to each other, they represent a *population center* for planning purposes.

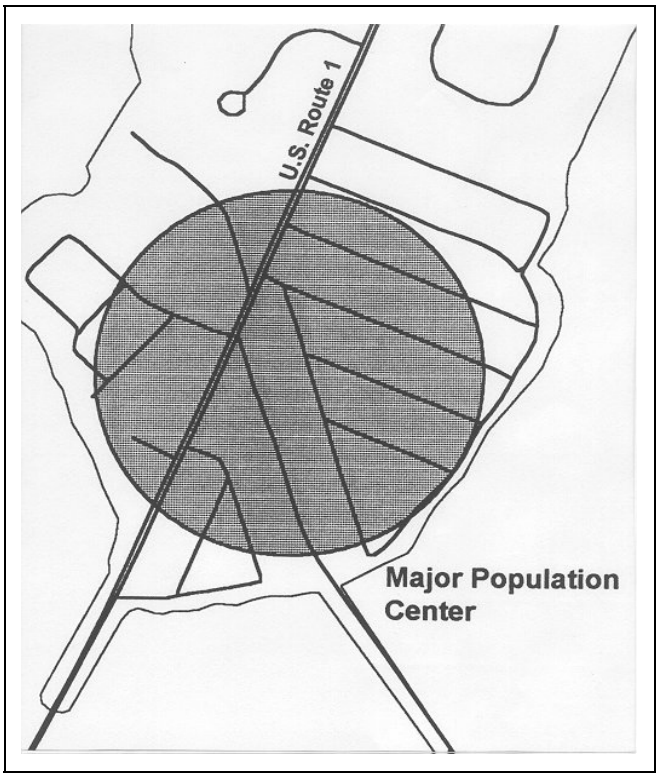


Figure 2 - Population center as graphically depicted on master plan maps.

Activity Centers

Places where people congregate, such as shopping centers, Town Hall, schools, Legion Field, or the Town Landing, are called *activity centers*. These can be identified on a map by stars or other symbols. The shortest route between these activity centers and population centers tells us which are the most desirable routes, all things being equal, for bicycle and pedestrian facilities, as well as roads.

Figure 3 - The residential area on lower Route 1 known as “The Flats” is a major Falmouth population center and potential source of cyclists and pedestrians.

Figure 4 - Centers of social, cultural, and commercial activity in the Route 1 area provide geographic destinations for pedestrians and cyclists.

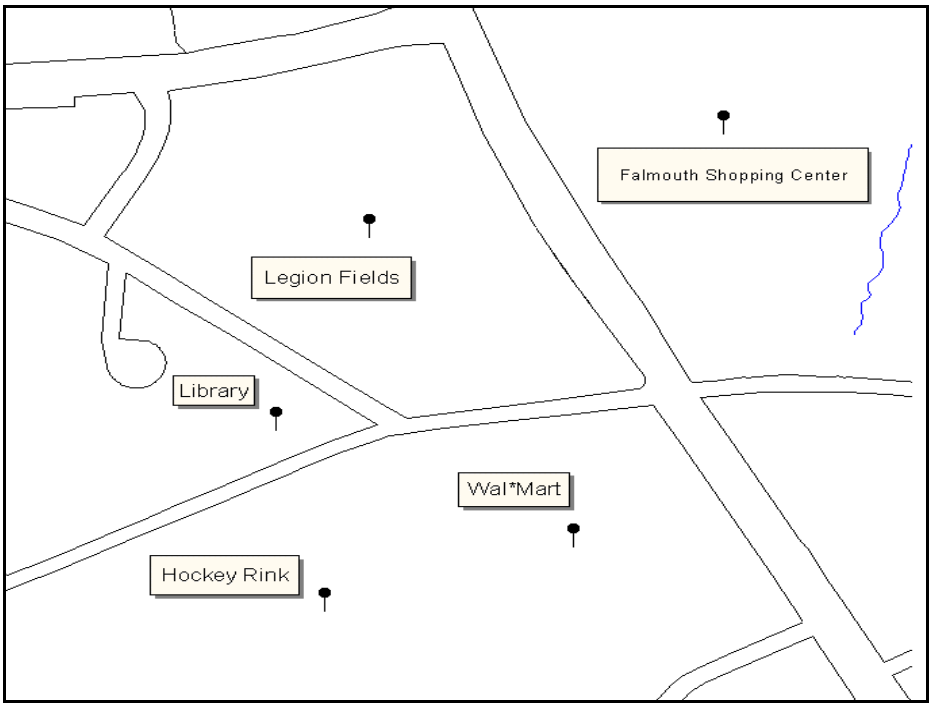


Figure 5 - Activity centers as depicted on master plan maps.

Linkages

The purpose of the Master Plan is to link population centers with activity centers along the most direct routes possible, and in different ways, depending on whether people are walking or bicycling. A linkage is created when a facility, such as a paved shoulder, sidewalk, or recreation path, provides a clearly defined way for a bicyclist or a pedestrian to get from one destination to the next without encountering undue conflict with motorists.

User Groups

People traveling by different means often have different needs for a transportation system. Walkers need to be able to travel short distances over routes uncongested by moving vehicles, including bicycles. Bicyclists need smooth surfaces to travel on that aren't too steep, and don't bring them into conflict with trucks, buses, and cars. Moreover, people walk and bicycle for different reasons, and thus the kind of bicycling and walking that people do as well as where they are going are important factors in their choice of facilities.

People who travel in the same way and for the same purpose are called a *user group*. The concept of the user group is essential in order to design and locate transportation facilities efficiently.

Bicycles

Three types of bicyclists are generally recognized in the planning literature.

Group A are adult bicyclists who have experience traveling in different kinds of traffic conditions. They prefer to ride in the travel lane of most roadways, are capable of traveling long distances, and operate according to the same rules of the road as govern any other vehicle using the public road system. Group A bicyclists travel at speeds averaging 12 to 25 mph, depending on weather and road conditions.

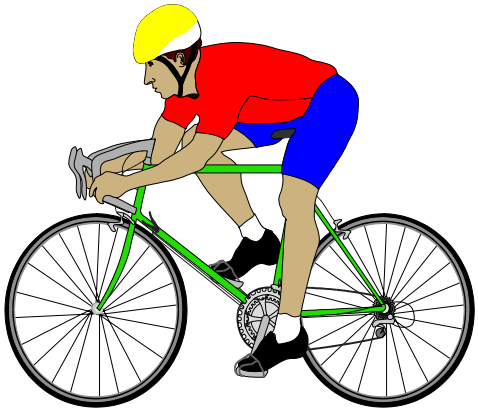


Figure 6 - Group A cyclists feel comfortable in traffic and travel long distances.

Figure 7 - Group B cyclists prefer to be separated from vehicular traffic and will not go long distances.

Group B bicyclists are teens and adults who are less experienced than those in Group A. They are more numerous than Group A bicyclists, but tend to travel shorter distances and at slower speeds. They may also need separate travel lanes such as paved shoulders and striped bicycle lanes to feel comfortable traveling on most roadways. For planning purposes, two miles is considered about the limit that Group B bicyclists will travel to reach a major activity center. Group B bicyclists tend to travel at speeds averaging 8 to 12 mph and usually do not ride during inclement weather.

Group C bicyclists are primarily children and young teens who are expected to have a low level of experience bicycling and perhaps poor judgment as to the rules of the road governing the operation of motor vehicles. They are likely to travel short distances and require very quiet streets or separate bike paths to operate their bicycles safely. Group C bicyclists generally travel at speeds less than 10 miles per hour.

Typical Facilities

There are basically two types of facilities needed by bicyclists. One is the public road system, where bicyclists and motorists travel side by side on the same pavement surface. Under Maine law, bicyclists are operating a vehicle and must obey the same rules of the road as motorists. The other kind of facility is a recreation path. These typically consist of paved or stonedust trails separated from motor vehicle traffic within neighborhoods, parks, and greenways. Recreation paths are multipurpose facilities shared by pedestrians, inline skaters, and many other users. Recreation paths are discussed on page 9.

Figure 8 - Paved shoulders on less traveled roads provide adequate room for Group A and B cyclists. Width of the shoulder increases with traffic volume, speed, and percentage of trucks.

Roadways

There are three main obstacles to bicycle access on suburban roads like those in Falmouth. The most common problem is that the roads tend to be narrow, so that there is insufficient room for motorists and bicyclists to pass each other at the same time without one or the other crossing over into an oncoming lane or leaving the pavement. This problem can be alleviated by narrowing motorist travel lanes to the minimum dimension possible and paving part of the gravel shoulders on both sides of the road. A white line should show the boundary between the motorist travel lane and the shoulder on roads where the traffic speed exceeds 30 mph.

The second biggest problem is that most intersections tend to be designed only for trucks, buses, and cars. A typical intersection today has large areas of unmarked pavement, the traffic moves in all directions, and the lights change quickly. Bicyclists and pedestrians feel at the mercy of the motorists, and the motorists are not sure where bicyclists or pedestrians are expected to cross. Traffic circulation in these intersections can be made more predictable by adding traffic islands to separate traffic flow, painting bicycle lanes and crosswalks to show

people where the bicyclists and pedestrians will cross, and increasing the amount of time bicyclists and pedestrians have to cross the intersection by adjusting the light signals.

The third biggest problem is that many bridges are too narrow. Most bridges built in the past did not include paved shoulders or sidewalks. The solution is to make these bridges wider, but this is a costly and sometimes difficult undertaking that is usually only done when bridges are replaced with new structures. However, this work can be undertaken sooner if special funding is available.

Specific Guidelines for Improving Roadways for Bicyclists

Although road improvements to accommodate bicyclists requires a study of actual road and traffic conditions, the following generalizations may be helpful in envisioning the types of facilities most needed in Falmouth. The dimensions given should be considered the minimum that are usually needed.

- On most local streets where the average traffic speed is 30 mph or less, and the traffic type consists mainly of passenger vehicles, then a single shared travel lane 12 to 14 feet wide is often appropriate. Such a road may be suitable for bicyclists of any skill level.

- On most collector and arterial roads where the average traffic speed is 40 mph or less, and the traffic type consists mainly of passenger vehicles, then 4 foot paved shoulders are appropriate. Such a road may be suitable for Group A and B bicyclists.

- On most state highways or where the average traffic speed is greater than 40 mph, or where trucks are an important component of the traffic type, then 6 foot paved shoulders are appropriate. Such a road may be suitable for Group A bicyclists only.

- Within commercial districts or other densely developed areas where there are multiple travel lanes, or a combination of travel and center turning lanes, and at intersections where there are dedicated left and right hand turning lanes, then 5-foot bike lanes are usually needed. Both Group A and Group B bicyclists benefit from bike lanes under these conditions.

- On all road segments where there are curbs, railings, and bridge foundations abutting the paved portion of the roadway, extra space is needed next to the shoulder or bike lane. This is called the shy distance, and its purpose is to allow space for pedals, arms, legs, gear and other things that stick out to the side of the bicyclist that might catch on nearby obstructions. The typical shy distance for bicyclists is one to two feet. For example, if a Group B bikeway typically has a paved shoulder 4 feet wide without a curb, then it should be a minimum of 5 feet wide with a curb.

- Bicycle access can be improved on all roadways and for bicyclists of all skill levels by keeping road edges in good condition. This includes keeping the pavement free of cracks, sand, broken glass, and other debris, as well as ensuring a smooth transition between pavement surface and drainage grates, manhole covers, and other structures embedded in the pavement surface. The design of drainage grates must not catch or trip bicycle tires.

- Bicycle access and neighborhood quality can be improved throughout Falmouth by reducing traffic speed. Motorist travel lanes should be striped to the minimum dimensions consistent with good engineering judgement, curves should be retained, and roadside features like stone walls, street trees, lawns, and other landscape amenities should be preserved. These

design characteristics serve three purposes. One is to create the impression that the width of the road is narrower than it really is. The second is to make drivers aware that there are obstacles and activities near the roadway that warrant the driver's caution. The third is to enhance the beauty and quiet of the Town's streets. Each of these actions helps to ensure slower traffic.

Pedestrians

Needs

People walk for exercise and recreation, to visit neighbors, and to access buildings in commercial districts and cultural areas after parking a car. Each of these needs may be served by the use of one or more facilities.

People walking for exercise and recreation are likely to use quiet streets near their own homes, or they may drive to a pleasant environment suited for walking, such as Community Park, Macworth Island, or a recreation trail. People visiting their neighbors use local streets and sidewalks to the greatest extent possible. People walking from one store to another in a commercial district use sidewalks, pedestrian plazas, and malls.

The distance that people are willing to walk to reach a destination varies greatly. For shopping within commercial districts, it is best if most destinations lie within a circular area of one quarter mile or less, or about the distance that can be covered easily in about 5 to 10 minutes. To reach a favorite recreation site, a bus terminal, or for exercise, the distance is likely to be twice as much, or about one half mile. Population centers and activity centers that lie within these limits should be linked together with sidewalks and recreation trails in a way that provides pedestrians many choices of routes and destinations.

Figure 9 - Recently constructed sidewalks on Route 1 provide safe and convenient passage in a high traffic location.

Typical Facilities

The main need of pedestrians is to be separated from automobile traffic and to have a firm, dry surface to walk on. This need is usually satisfied by an off-road facility, such as a sidewalk, recreation path, or trail. Walking paths can made of many materials, but smooth and firm surfaces are important for most pedestrians, including young children, the elderly, and anyone pushing a wheeled vehicle such as a baby carriage. Although in Falmouth today, the needs of pedestrians are often met by using gravel shoulders next to motor vehicle travel lanes, this situation is not ideal and the object of Town policy should be to provide off-road facilities for pedestrians to the greatest extent practicable.

The most common pedestrian facilities needed in new residential developments and in commercial areas are sidewalks. On local streets within subdivisions, where use is low, sidewalks may be only 4 feet wide, as required in the Subdivision Ordinance. Sidewalks along collector and arterial roads should be wider, perhaps 5 to 6 feet wide, in order to allow space for handicap access or for two people to walk side by side. In high use areas, such as where there are clusters of stores, restaurants, and theaters, or, in front of large facilities where many people enter and leave the building at one time, sidewalks should be replaced with plazas and pedestrian malls.

Sidewalks should be provided on both sides of the main road in business districts and wherever state highways like Route One and Route 100 contain turning lanes. Crosswalks, landings, pedestrian islands, the timing of traffic signals, and other pedestrian features should be incorporated into roadway design carefully.

When retrofitting older streets for pedestrian access, several factors need to be considered. Most of the public road system was laid out at a time when the Town was more rural than it is now, and paved shoulders, underground utilities, street trees, and sidewalks within the right-of-way were not considered necessary or desirable. The lack of space within the right-of-way requires careful design and possibly some compromises in the location of pedestrian and bicycle facilities. For example, in many areas, sidewalks may be possible on only one side of the street. This is not likely to be a problem because of the relatively low population density typical of many of the Town's neighborhoods. On the other hand, there may be cases when even a single sidewalk seems difficult to fit into an existing neighborhood. When space inside the right-of-way is extremely limited, a paved footpath or stone dust trail, while not optimal, may still provide some sorely needed access.

Off-road facilities should always be planned in activity centers that serve large numbers of children and the elderly. Examples include areas containing libraries, schools, ball fields, retirement communities, and recreational facilities, such as skating rinks, the ice arena, and town parks. Children and the elderly are more vulnerable to the hazards of automobile traffic than young and middle-aged adults, and so they require more separation from roadways than other pedestrians.

Recreation Paths

Recreation paths are multipurpose facilities that provide exercise, recreation, and transportation for people of all ages. They can provide a useful and interesting alternative to sidewalks and roadside bikeways where space is available. They are usually located in park-like settings within existing town parks, utility corridors, and old railroad rights-of-way.

Recreation paths sometimes divide the paved portion of the trail into separate lanes for pedestrians and bicyclists. The minimum width for such a facility would be about 10 feet. The pedestrian lane would be 4 feet and the bicycle lane would 6 feet. This arrangement allows pedestrians and bicyclists to pass each other without interference. The minimum width for a recreation trail in a low use area would be a single travel lane about 8 feet wide.

Recreation paths in scenic locations and in downtown areas tend to attract higher numbers of people than planners expect, with the result that many recreation paths in the past have had to be widened soon after they were built. The more attractive the location, the more interesting the destinations at either end of the path, and the more people who live in the area, the more likely it is that the trail will have to be much wider than 10 feet.

Part 2:
Goals and Objectives

Plan Philosophy

Bikeways, sidewalks, and recreation paths are important outdoor recreation resources. They are also important alternatives to motor vehicle transportation, often giving young people and elderly people the only means they have for traveling on their own.

Bicycle and pedestrian facilities are also important because they are an excellent measure of a Town's quality of life. People often define the limits of their neighborhoods by how far they can walk comfortably, without encountering inhospitable roadways, parking areas, and other obstructions. Neighborhoods and commercial areas that are pleasant for bicycling are also pleasant places to live and work. In a community that is designed to accommodate bicyclists and pedestrians, the negative effects of motor vehicle traffic are mitigated by well-planned neighborhoods and commercial areas.

The principles guiding the planning of bicycle and pedestrian facilities are similar. The goal is to provide linkages between the places where people live and where they want to go, along routes that are as short, attractive, and efficient as possible, consistent with avoiding major conflicts with automobile traffic. All bikeways, sidewalks, and recreation paths should be considered as part of an integrated alternative transportation network that is comprehensive and continuous throughout the community.

Figure 10 – This newly constructed recreation path between Depot Road and Center Park provides an attractive route for pedestrians, cyclists, and baby carriages alike.

Bicycles

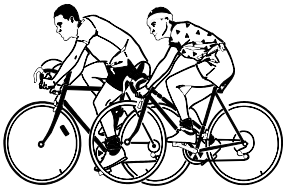
Goal

Improve access for bicyclists town-wide by incorporating bicycle access into the planning, design, and administration of capital improvement programs, especially road reconstruction and park development projects.

Objectives for Group A Bicyclists

- Reduce the potential conflict between motorists and bicyclists on Town roads by increasing pavement width where necessary, and by lowering traffic speed where possible
- Determine the amount of additional pavement needed for bicycle access by taking into account traffic speed, traffic volume, and current pavement width, among other factors, using a standardized evaluation methodology
- Reduce the barriers to bicycle travel posed by narrow bridges by incorporating additional pavement width in the form of paved shoulders or wide outside travel lanes on new bridge structures
- Make traffic flow at busy intersections slower and more predictable, particularly those in commercial zones where there is a high percentage of truck traffic
- Keep pavement surfaces clean and free of cracks, potholes, and debris

Objectives for Group B Bicyclists



- Link populations centers within a two mile radius of activity centers with at least one road improved for bicycle access or a recreation path
- Improve roads for bicycle access by adding paved shoulders at least 4 feet wide (5 feet wide if a curb is present) on both sides of the street
- Provide access between points of interest within commercial zones by providing bike lanes, recreation paths, or both
- Make traffic flow at all intersections along the route slower and more predictable
- Provide bicycle parking at activity centers
- Design routes that have easy grades -- any gradients 8% or more should be short in length

Objectives for Group C Bicyclists

- Provide linkages between neighborhoods, and between neighborhoods and schools, parks, and recreational facilities, using local streets or recreation paths
- Provide linkages between points of interest within parks and recreation areas, such as ball fields, playgrounds, and skating ponds, through the use of recreation paths and park roads

Pedestrians

Goal

Improve year round access for pedestrians within commercial areas and population centers by incorporating pedestrian access into the design and maintenance of streets, parks, recreation facilities, store fronts, parking areas, and other destinations, with a special emphasis on facilities that are continuous, easy to use, and visually attractive.

Objectives for Commercial Centers

- Provide safe access beside and across collector and arterial roads, with special attention to the design of crosswalks at busy intersections
- Connect store fronts to the sidewalks along streets without causing pedestrians to walk down parking aisles
- Link stores, theaters, and restaurants with recreational and institutional facilities through an integrated system of sidewalks and pathways that provide continuity and multiple routes of travel
- Link commercial centers to population centers and schools with sidewalks or recreation paths if they lie within a one half mile radius of the commercial district boundary

Objectives for Population Centers

- Provide safe access beside and across collector and arterial roads through the use of sidewalks
- Link homes with destinations like schools, parks, and other neighborhoods through an integrated system of sidewalks or paths that provide shortcuts, loops, and multiple routes of travel that avoid conflict with motor vehicle traffic to the greatest extent practicable
- Link population centers with other population centers that lie within a one half mile radius

Figure 11 – Sidewalks improve the quality of life in a community.

Part 3: Recommendations

Town Policy on Standards

Results of Research

When the needs of all user groups are studied, the result is a set of recommendations for improvements that are more comprehensive than envisioned in the 1996 Bicycle and Pedestrian Master Plan. A minimum level of bicycle access is now recommended on all Town roads, and pedestrian access is now recommended to a much greater extent within developed areas.

Along with the knowledge of greater need is the awareness that the Town has limited resources. There are limitations to financial resources, the time available on the part of Town officials and staff to implement plans, and limitations to the amount of public support that exists for building facilities of any kind, given other needs of the community. There are also physical limitations to achieving the kind of facilities many would like. For bicycle and pedestrian facilities, there is often limited space within the right-of-way of many of the Town's roads. Paved shoulders and sidewalks must, therefore, often compete with utility lines, street trees, and scenic roadside features that most people want to preserve.

Improvements Should be Gradual

Given the disparity between the needs of all user groups and the resources available to provide better access, the Town has determined that an incremental approach to improvement of facilities is both necessary and justified. A consequence of this policy is that the Town acknowledges that it cannot always build improvements that meet all current standards and guidelines for size, width, or surface material that are usually described in the planning and engineering literature for bicycle and pedestrian facilities. For example, most guidelines for bicycle access would require the Town to build paved shoulders 4 to 5 feet wide on most of its collector and arterial roads, even for Group A bicyclists. This is clearly unrealistic for cost and space reasons. Even if the Town had unlimited funds for these improvements, upgrading all of the Town's roads to this standard would be a lengthy and difficult process of reconstruction.

On the other hand, the Town can make a variety of choices in how it builds new roads, sidewalks, and recreation paths that significantly improve access compared to existing conditions. The facilities may not be ideal, but they can be better than they are now. For this reason, it is important for the community to realize that the Town cannot guarantee that the facilities it builds will always meet all published standards or that they are free of risk. There is always an element of risk in using any facility, a risk that is greater or less depending to a large degree on the judgment of the people using the facility. In light of this policy, the Town will not be advertising or signing most of the facilities it builds as bicycle or pedestrian facilities. Such designations might invite unwary people into situations in which their skills or knowledge are inadequate to handle the potential hazards that exist on any roadway or trail.

The Town's bikeways are simply paved shoulders, and the shoulders may sometimes be less than the width recommended in the literature. The Town's sidewalks may lie on only one side of the street instead of both sides, or they may be a little narrower than recommended in the

literature. Nonetheless, the Town believes that it is still preferable to have narrow paved shoulders for bicycle access and narrow sidewalks for pedestrians, rather than to have no paved shoulder or sidewalks at all.

Recommendations for Road Design Town-wide

In response to this problem, the first and perhaps the most important recommendation of the Bicycle and Pedestrian Master Plan is to develop a uniform set of design standards for Falmouth's roads that will guide all future road reconstruction projects. The standards should specify the width of motorist travel lanes and shoulders, design speed, traffic calming elements, landscaping, sidewalks, intersection control, and drainage solutions. All of the Town's public roads should be classified according to this system, making road design and reconstruction projects systematic, predictable, and responsive to community-wide goals for an enhanced quality of life.

The standards should seek to achieve the following goals:

1. Enhancement of community character through the preservation or planting of street trees, roadside landscaping, the retention of rural elements such as stonewalls, and the preservation of scenic vistas.

2. Reduction of traffic speed by striping motorist travel lanes the minimum dimensions possible, retaining reasonable curves, and by roadside landscaping. Road design should not allow traffic speed to increase as a solution to increased traffic volume. Instead, the design should seek to maintain volume through slower speeds and closer spacing of vehicles.

3. Increased accessibility of all roads to bicyclists, pedestrians, and other nonmotorists by:
   a. implementing Goals 1 and 2 above;
   b. improving bicycle facilities as shown in the Bicycle and Pedestrian Master Plan;
   c. improving pedestrian facilities as shown in the Bicycle and Pedestrian Master Plan;
   d. widening bridges to allow bicycle and pedestrian access; and,
   e. redesigning intersections to make motorist crossings slower and nonmotorist crossings more predictable.

Bicycles

Group A Bicyclists

All Town roads should be minimally accessible to Group A bicyclists. The term "minimally accessible" means that the road should have enough pavement width to accommodate both motor vehicle and bicycle traffic at the motor vehicle speeds and volume that typically occur on that section of road. This would be evaluated by a standardized methodology that takes the needs of experienced bicyclists into account, but does not guarantee that paved shoulders four or five feet wide would be required. Given the traffic volumes and speeds on many of the Town's local and collector routes, a pavement width consisting of motor vehicle traffic lanes 11 feet wide and paved shoulders 2 or 3 feet wide may often be appropriate. The Town Council has recently adopted a policy for standardized pavement widths on roads town-wide that attempts to balance the needs of everyone concerned, including motorists, bicyclists, pedestrians, and homeowners (see Appendix 1). The minimum paved shoulder widths recommended in this table will generally meet the needs of Group A bicyclists.

Improvements made to roads for Group A bicyclists should be conducted in conjunction with ordinary road reconstruction work, which is done on a regular basis in order to improve subbase conditions, improve drainage and roadway alignment, or to widen the road to meet new engineering standards. Adding paved shoulders is often a part of these projects, even if bicycle access is not a consideration. The intent of the Bicycle and Pedestrian Master Plan, however, is that bicycle access would always be a consideration in the redesign of the roadway.

The Regional Transportation Advisory Committee for Region 6 (RTAC) has indicated that some roads in Falmouth are in need of improvements for Group A bicyclists more than others, a fact that is also indicated by the research performed by FTAC as part of the development of this plan. Roads that appear to need some improvement as soon as possible, due to traffic conditions, are the following:

1. Route One is the primary means of access to all of the commercial and residential areas that are located within the Route One population center. It is also an important commuter route between Falmouth and Portland. Paved shoulders exist on many parts of Route One and they should continue to be incorporated into any new roadway designs whenever parts of the road are rebuilt. Paved shoulders do not now exist within the Route One Business District, but they should be included in any future redevelopment of the roadway in this area.

2. Route 9 is a commuter route between Falmouth and Portland. About half of the route was proposed for improvement under the 1996 Master Plan. Paved shoulders are still needed on several sections of the route. Longwoods Road is particularly narrow (22 ft) and the traffic speed there is high.

3. Allen Avenue Extension and the portion of Falmouth Road between Allen Avenue Extension and Middle Road is an urban highway that links the Deering area of Portland with eastern Falmouth. The Maine Department of Transportation (MDOT) has rebuilt Allen Avenue Extension to 30 feet wide between the curbs, a little below the minimum needed in this area. The Falmouth road section is similar except that the curbs are not continuous on both sides of the road. Thus, the effective pavement width is often closer to 32 feet. The City of Portland should be encouraged to add paved shoulders on the Portland side of Allen Avenue Extension.

4. Gray Road is a commuter route between Falmouth and Portland. The section between Portland and Leighton Road was shown as a Group A facility in the 1996 Master Plan. Continuing development along the Route 100 Corridor and a high proportion of truck traffic indicate that wide paved shoulders are needed throughout the length of Gray Road in Falmouth. MDOT's current 6-Year Plan includes reconstruction of Gray Road between Leighton Road and the Piscataqua River, and the Town should ask that paved shoulders be included as part of this project.

5. Blackstrap Road is a local commuter route to Portland and provides an important link to the rest of the community for residents in the northwest part of town. It also provides access for residents in the Brook Road population center to a bus transit line on Washington Avenue Extension in Portland. Like Longwoods Road, most of Blackstrap Road is narrow (22 ft) and traffic speed is high. The section within the D.O.T. urban compact line is a little wider (26 ft), but still too narrow for most bicyclists. MDOT is planning to add paved shoulders on Blackstrap Road in Cumberland. The shoulders should also be paved throughout the length of Blackstrap Road in Falmouth.

Group B Bicyclists

Group B bikeways serve multiple transportation needs for both Group A and Group B bicyclists by connecting population centers with various commercial, institutional, and recreational activity centers. The recommendations below are similar to those of the original Master Plan in 1996, with a few exceptions.

Group B bikeways in Falmouth should usually have paved shoulders 4 or 5 feet wide. The Town Council's policy on standardized pavement widths (see Appendix 1), discussed above under Group A bicyclists, takes this issue into account. The maximum paved shoulder widths recommended in the table will generally meet the needs of Group B bicyclists.

The Group B bikeways recommended are as follows:

1. The East Falmouth Bikeway is designed to link the area along Falmouth Foreside with destinations along Route One and the Village Center Districts via Route 88 and Depot Road. Much of this work is complete. However, two changes are recommended. First, the section of Route One from the Martin's Point Bridge to the intersection of Route 88 is proposed to be upgraded from a Group A facility to a Group B facility. This change reflects the designation of this area as a continuous population center, in contrast to the 1996 Plan, which showed discontinuous population clusters along this route. Secondly, the Falmouth Village Connectivity Study (December, 2000) recommends additional road linkages in the Village Center District to relieve traffic congestion on Route One. Improved access for bicyclists and pedestrians within the Village Center District should be an important consideration in the planning and design of these linkages.

2. The West Falmouth Bikeway is designed to link the Brook Road area with the Exit 10 project, Huston Park, Community Park, the Middle School and the High School. This work has begun with the reconstruction of upper Leighton Road. The work that remains to be done is described in detail in the West Falmouth Bikeway Report (September, 1999). The Town should continue with further planning and construction of this project as recommended in the report.

3. The Cross Town Bikeway is designed to link the High School and Community Park region with eastern Falmouth via Woodville Road, Woods Road, Middle Road, and Lunt Road. Woodville Road is the only section that has been completed to date. The barriers that remain include the lack of paved shoulders on Woods Road, the intersection of Middle and Falmouth Roads, and the narrow bridge over Interstate 295 on Lunt Road. These portions of the project should be completed as funding and opportunity permits.

4. The Pleasant Hill Bikeway is designed to link the population center located in the Pleasant Hill area with the Plummer-Motz School and the Middle Road Population center, as well as the Cross Town Bikeway. The bridge on Middle Road that crosses over the Presumpscot River has adequate width for bicycle access, but the shoulders on the rest of the route between the Portland City line and Lunt Road should be paved.

Group C Bicyclists

Better access for children bicyclists can be achieved through the use of sidewalks and recreation paths in a variety of settings. Because there is a large overlap in the needs of both children bicyclists and pedestrians, the recommendations below refer to improvements that serve both user groups.

1. Bicycle access should be incorporated into the design and development of Community Park and all other future Town parks.
2. Community Park should be linked with Falmouth High School and Middle School over a recreation path that crosses the East Branch of the Piscataqua River. There is some discussion of this route in the West Falmouth Bikeway Report, but the trail should also be studied as part of the Master Plan for Community Park. A recreation path should also be constructed linking Huston Park with Community Park so that bicyclists do not need to go out on Winn Road to travel from one facility to another.
3. In Subdivision review, there should be a requirement to provide bicycle and pedestrian access across cul-de-sacs, hammerheads and other dead ends when it is possible to link two parts of a neighborhood across short distances. Current subdivision policy only requires the provision of sidewalks along local streets.
4. The proposed recreation path between Pine Grove Park and the Ice Arena over the pipeline corridor of the Portland Water District should be constructed.
5. The recreation path through Legion Fields that connects the ball fields and the tennis courts within the park and to Depot Rd and Bucknam Road should be completed.

Pedestrians

Priorities for New Facilities

Pedestrian facilities should be provided to those who need them the most. They should also provide access between the places where people live and where they want to go in the most logical way possible, making a complete and interconnected system. Thus, in choosing which of the many pedestrian facilities to build first, all other factors being equal, four factors should be taken into account:

- Population density;
- Use by children and the elderly;
- Importance of the destinations; and,
- Traffic conditions along the expected routes of travel.

When these factors are analyzed town-wide, the general pattern for building sidewalks according to priority turns out to be the following:

1. The most important pedestrian facilities from a Town-wide perspective are those within activity centers and those which serve large numbers of children and the elderly.
2. The next most important pedestrian facilities are those that connect activity centers to surrounding neighborhoods.
3. The last priority is providing connections within individual neighborhoods.

Recommended Projects Listed by Priority

1. Complete unfinished projects in the Commercial Districts
   - FTAC recommendations for the Village Center area (see Appendix 1)
   - Sidewalks already begun on both sides of Route One
   - Sidewalks on both sides of Route 100 from Portland North to Leighton Rd
   - A sidewalk on the commercial side of the street on Leighton Rd from the MTA bridge to the West Branch of the Piscataqua
   - A sidewalk on at least one side of Route 100 from Leighton Rd to Falmouth Rd

2. Link the Village Center District and the Middle Rd Population Center
   - Lunt Rd from the Library to Lunt School

3. Provide connections within the Middle Road Population Center
   - Falmouth Rd from Middle Rd to Blueberry Lane
   - Middle Rd from Lunt Rd to the Turnpike Spur Bridge

4. Link the Village Center District to nearby population centers along secondary routes
   - Bucknam Rd from Route 1 to Middle Rd
   - Depot Rd from Route 1 to Route 88

5. Link the Route One Business District to the Macworth Flats Population Center
   - Sidewalks on both sides of Route One from the Route One Business District to the Martin's Point Bridge

6. Link the Pleasant Hill Population Center with the Middle Rd Population Center
   - Middle Rd from the Portland Line to Lunt Rd

7. Provide connections within the Pleasant Hill Population Center
   - Allen Avenue Extension from the Portland Line to the Presumpscot River Bridge
   - Pleasant Hill Rd
   - Ledgewood Rd

8. Provide connections within the Town Landing Population Center
   - Johnson Rd from Valley Rd to Route 88
   - Route 88 from the Cumberland Line to Depot Rd

9. Provide connections within the Route One Population Center along secondary routes
   - Route 88 from Depot Rd to Route 1

General Policy Development

There are a number of policies that should be developed to improve access for children and adults within and between subdivisions. This work is not rated in order of priority because it is involves ongoing work of the Planning Board rather than a capital improvement.

- Encourage the development of sidewalks and recreation paths between new and old subdivisions
- Require bicycle and pedestrian access across cul-de-sacs, hammerheads and other dead ends in new subdivisions when it is possible to link two parts of a neighborhood across short distances (see recommendations for Group C bicyclists)

Part 4: Implementation

Introduction

The key to the implementation of the Master Plan is the Advisory Committee. Although an advisory committee can be organized and appointed in various ways, the committee currently in operation was appointed as a subcommittee of the Comprehensive Plan Advisory Committee (CPAC) in January of 1998. It consists of five members representing individuals with knowledge and experience in grassroots public participation, bicycling, walking, and other outdoor recreation interests. The Falmouth Trails Advisory Committee (FTAC), as the subcommittee has come to be called, has been instrumental in providing oversight, advocacy, and education on behalf of the projects recommended in the Master Plan.

Advisory Committee

Membership

The Comprehensive Plan Advisory Committee appoints the Falmouth Trails Advisory Committee as a subcommittee to work on implementation of the Bicycle and Pedestrian Master Plan. The members are solicited for the job on the basis of their knowledge and experience of the issues involved and a willingness to work on their own initiative, even if staff support is not always available. Because the purpose of FTAC is to oversee implementation of an approved plan, a large and diverse committee is not considered necessary or helpful. This approach has proven to be successful since the first FTAC members were appointed in 1998.

Duties, Authority and Reporting

FTAC is responsible for reporting to the Comprehensive Plan Advisory Committee regularly regarding its activities. FTAC is empowered by CPAC to gather information, to make recommendations, to coordinate with consultants and Town staff, and to hold meetings to gather comments from the public on Master Plan projects. CPAC expects FTAC to oversee the implementation of the Master Plan and to report on the progress of capital improvement projects related to the Master Plan.

FTAC should prepare progress reports and action plans on a periodic basis, as needed, but at least once annually. Progress reports should include an assessment of the success of current projects, the adequacy of funding, work remaining to be done, and recommendations for improvements to the program. Action plans should outline the projects that FTAC should undertake in the following year to further implement the Master Plan. It should include a description of the projects to be accomplished and a budget for accomplishing the work. The budget should be based on an estimate of the time and expenses needed to hire various consultants to assist FTAC and town staff perform research, develop plans and cost estimates, and perform other tasks necessary to implement the Master Plan.

In order to obtain this information and to stimulate the development of new or existing programs, FTAC is expected to coordinate with Town staff, especially the Directors of Planning, Public Works, and Parks and Community Programs. FTAC should also coordinate with consultants

who may be already working on Master Plan projects, or who have been hired to assist FTAC prepare its recommendations.

Meetings

FTAC shall hold regular meetings. All meetings of FTAC are open to the public. FTAC may solicit public comment and increase public participation by holding special meetings in which particular residents and constituency groups affected by Master Plan projects are invited.

Road Reconstruction Projects

The Problem of Design before Input

Road reconstruction projects will sometimes involve an increase in pavement width to accommodate bicycle and pedestrian traffic. In these instances, the residents in the area affected by the project should be consulted prior to the development of design plans. In the past, this step was often omitted, and drawings were presented to the public before residents had an opportunity to fully understand and respond to the changes proposed. The result was that people often resisted the project, and creative solutions that dealt with the concerns of both the residents and the Town became difficult to achieve. To ensure that Town officials work closely with residents to design projects that are sensitive to neighborhood context and values, the following public participation process is recommended.

Step by Step Process

The earliest stages of planning a road reconstruction project should be the same as at present. Road segments that need widening and other improvements based on Town transportation goals, road maintenance issues, drainage concerns, and the goals of the Bicycle and Pedestrian Master Plan should be identified. Budgeting and surveying should proceed in order to get the project underway.

In the second stage, the Town should invite residents in the area affected by the project to an informational meeting. The meeting should be sponsored by FTAC, the Public Works Department, the Planning Department and other groups as needed and appropriate. The meeting should begin with a presentation that includes the following information.

1. The Town's transportation goals and the Bicycle and Pedestrian Master Plan. These plans help people understand how their neighborhood relates to the transportation needs of the whole community and how the road design and planning process has an objective basis. The plans can be supplemented with technical details as applicable, such as the need for drainage improvements and curbs.

2. Survey plans of the proposed project area. Surveys help people visualize the scope of the project and its potential impacts on individual properties and the neighborhood. The drawings should show the street right-of-way, property boundaries, road alignment, driveway entrances, pavement width, drainage structures, curbs, street trees, stone walls, fences, lawns and other roadside features.

3. Typical mitigation measures to reduce the impacts of road widening. This information helps people appreciate how a thoughtful design can accommodate the needs of both the neighborhood and the community as a whole. Typical mitigation measures might include replanting street trees and relocating walls and fences. These measures can be illustrated

with photographs of past projects, informal sketches of the current situation, and various other visual approaches. If there are several ways to solve a problem, the different options should be shown.

The residents should then be invited to discuss their concerns regarding the project. A record of the comments made by the residents should be kept and a short summary report should be sent to all of the residents in the project area. Besides furthering the design process, the summary report would clarify information obtained from the meeting and help to avoid misunderstandings and distortions that might arise later on.

The third stage of the process should be to develop a design plan that reflects the Town's overall transportation policies, while taking into account the concerns expressed by residents at the neighborhood meeting. The Town's consultants, working under the supervision of the Public Works Department, would prepare the drawings. FTAC and other Town officials might make additional recommendations based on their understanding of the public participation process. In cases where the solutions are particularly difficult, then a second neighborhood meeting may be needed in order to explore additional options. The fourth stage of the planning process should be to present the proposed design at a public hearing.

Guidelines for the Process

- In order to maintain a positive and constructive dialogue between the Town and the neighborhood, all meetings and reports should use language that is constructive, objective, and positive.

- The Town should offer solutions to neighborhood impacts that can be applied town-wide. This will help to ensure that residents are treated equitably throughout the community and that the typical mitigation measures proposed are within budgetary limits.

- Comments and concerns of local residents as revealed by the public participation process should be recorded in writing and sent to neighborhood residents in order to avoid misunderstandings and loss of information.

- The right-of-way is a public resource, dedicated for use by the whole community. The design of the roadway should, therefore, reflect the Town's overall policies regarding transportation needs, safety, and bicycle and pedestrian access. The public participation process should be used to assess and to mitigate adverse impacts on neighborhood character that might arise as a result of these roadway improvements.

Setting Priorities When R.O.W. Space Is Limited

The Problem of Insufficient Space in the Right-of-Way

Many improvements needed to improve bicycle and pedestrian facilities can be made during a road reconstruction project. This is the time when it is most feasible to add paved shoulders and sidewalks, and to realign the centerline of the road to create more usable space within the right-of-way, if necessary. Even so, there are likely to be many instances where insufficient space exists to accommodate both a paved shoulder and a sidewalk, if the Master Plan calls for both along the same section of street.

In these instances, the Town will need guidance on how to proceed in making hard choices on the size and type of new facilities for the area. The following rules have been developed to aid in this decision-making process.

Where Pedestrian Facilities Should Take Priority Over Shoulder Bikeways

In densely developed areas, where pedestrian facilities are likely to be used by a high number of children and the elderly, the town should make the provision of sidewalks, or recreation paths as appropriate, the highest priority. Bikeways in the form of paved shoulders that parallel the motorist travel lanes should be of secondary importance. The consequence of this choice is that the paved shoulders may be less than the 4 or 5 feet in width that are usually recommended in the literature, or that a wide outside travel lane may be installed instead of a shoulder separated by a white line. If additional space is needed, some compromise in the width of the sidewalk may also be considered, particularly if the sidewalk is separated from the roadway by landscaping, a tree lawn, or other partial barrier.

In commercial districts, where both traffic and pedestrian use is expected to be high, the Town should consider acquiring additional right-or-way space as a last resort. A precedent for this has been established in the case of Depot Road, where five feet of additional right-of-way space was acquired from an abutter in order to build both a paved shoulder and a sidewalk on the north side of the street between Route One and the Town Library.

Compromises in the design of sidewalks and bikeways that are designed to link neighborhoods to destinations containing major commercial, institutional, and recreational facilities should consider the nature and type of bicyclists and pedestrians who are most likely to need the facility, as well as the nature of the road and the traffic conditions along the route. If the users include many children and the elderly, and if traffic volume is high, then sidewalks or recreation paths should take the highest priority, just as they would in commercial districts. This would be the case, for example, on Lunt Road, which connects Lunt School and Plummer-Motz School with the Library, Legion Fields, and the rest of the Village Center District.

Where Pedestrian Facilities and Shoulder Bikeways Should Be Equal

Pedestrian access doesn't always require a sidewalk. An alternative facility might be a meandering footpath that generally follows the street but is laid out in a way to minimize conflicts with street trees, utility poles, street signs, and other items in the right-of-way. Such a facility is appropriate for less densely developed areas where pedestrian access needs to be improved, but the amount of use is expected to be less and the destinations are not as numerous as they are in a commercial district. This would be the case on much of Route 88, and the section of Middle Road between the Portland Town Line and Plummer-Motz School.

The construction of a paved or stonedust footpath in these instances could save enough space to make both a pedestrian facility and bicycle facility possible along the same route, although some compromise in the design of both might be necessary. For example, the paved shoulder might be three feet wide instead of four feet, and a paved footpath might be three feet wide instead of five feet. Compromises of this nature are particularly appropriate where the Master Plan calls for both a pedestrian facility and a Group A bicycle facility on the same section of street.

As indicated in the Recommendations, the Town should strive to make Group B bikeways meet AASHTO standards to the greatest extent practicable. Thus, where a pedestrian facility and a Group B bikeway coincide, the width of the footpath next to the road should perhaps

compromise a little more than the width of the paved shoulder, all other factors being equal. The reason behind this is that a footpath increases pedestrian access a great deal even if it is not four or five feet wide, whereas on busy roads basic bicyclists usually need a shoulder at least four feet wide to feel comfortable riding there.

Where No Pedestrian Facility is Shown on the Map

Bicycle facilities are needed in many parts of the community where the Master Plan maps do not show any improvements for pedestrian access. This is because these areas have a low population density and development is dispersed. Nonetheless, the Town acknowledges that pedestrians continue to walk along the roads in these areas, often using the paved shoulders that have been built to improve safety for both motorists and bicyclists.

General Priority Setting for All Projects

Setting priorities for funding projects should follow the same principles as shown in other parts of the Master Plan. As the work of implementing the Master Plan proceeds, decisions must be made on where to spend the scarce resources available. The process of making these decisions involves sifting through a number of options, based on the following considerations.

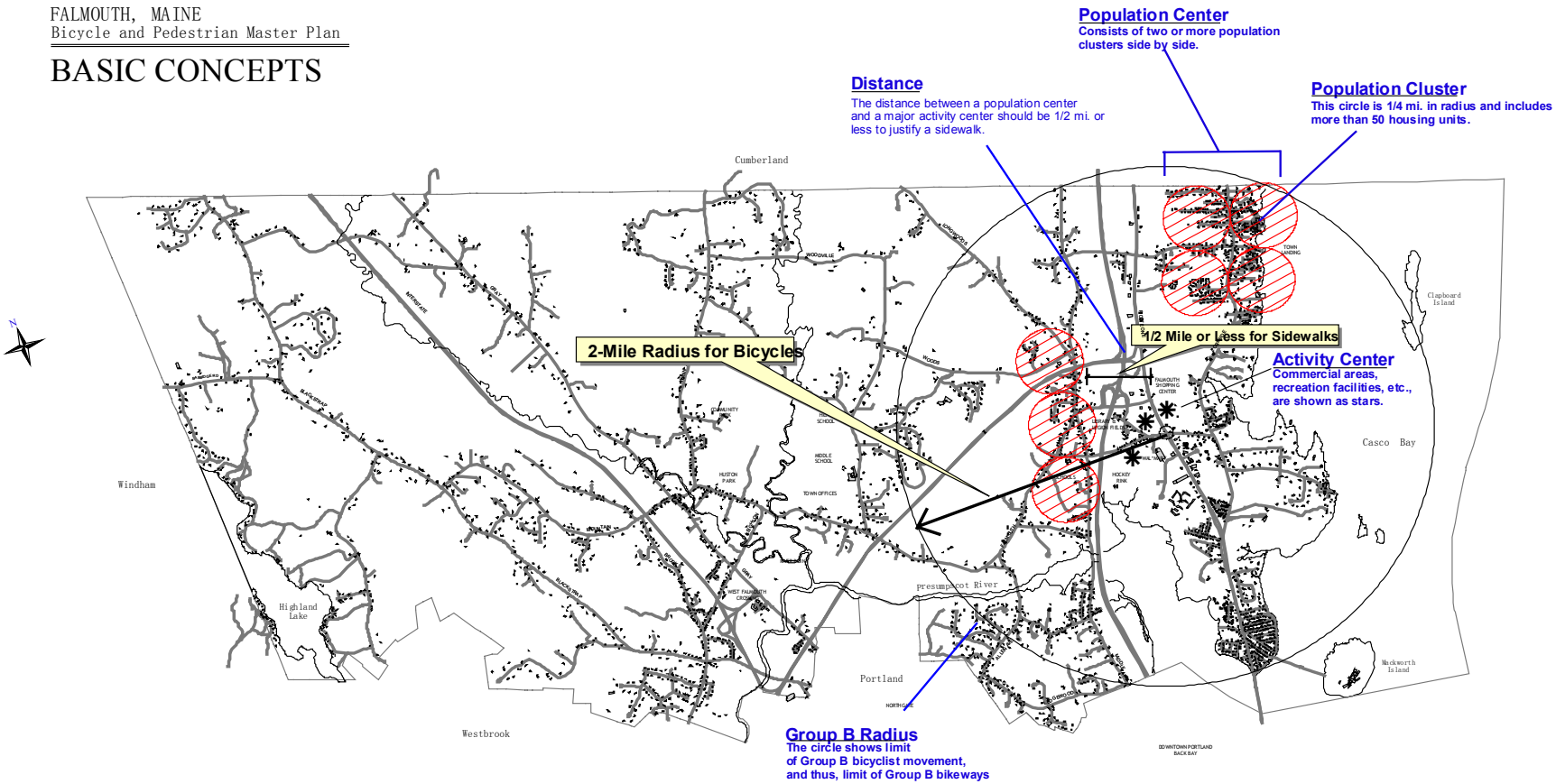
- The importance of the destination to which the facility provides access.
- The density of population in the area served by the facility, and the demographics of the population, such as the numbers of children and the elderly.
- The degree to which obstructions such as busy roads, narrow bridges, difficult intersections, lack of sidewalks, or the lack of paved shoulders along the route are currently a barrier to access for the population to be served. The greater the number and severity of obstructions, and the more vulnerable the users, the more important the facility is from a town-wide perspective.
- The commonsense need to provide continuity by completing facilities that have already been partially installed.
- The opportunity to leverage funds through coordination with other capital improvement programs and regional and state transportation plans, as well as other funding sources.
- The cost of the improvement relative to the benefit.

Beyond Engineering

A well-rounded bicycle and pedestrian program does not depend alone or even primarily on improving facilities. Other needs include education to improve bicycling, driving, and pedestrian practices, law enforcement to enforce the rules of the road, and encouragement for alternative means of transportation. Appendix 2 provides information from the Federal Highway Administration on these other aspects of bicycle and pedestrian programs. In this next phase of implementing the Bicycle and Pedestrian Master Plan, FTAC will begin to explore and develop these programs to ensure proper use and maintenance of the facilities that are created to improve bicycle and pedestrian access.

FALMOUTH, MAINE
Bicycle and Pedestrian Master Plan

BASIC CONCEPTS



SCALE

4000 0 4000 Feet

-------- NOTES --------

1. Group A bicyclists travel town-wide and are not limited to a 2 mile radius.
2. Building footprints are not shown on other maps for the sake of clarity.

Map Prepared By:

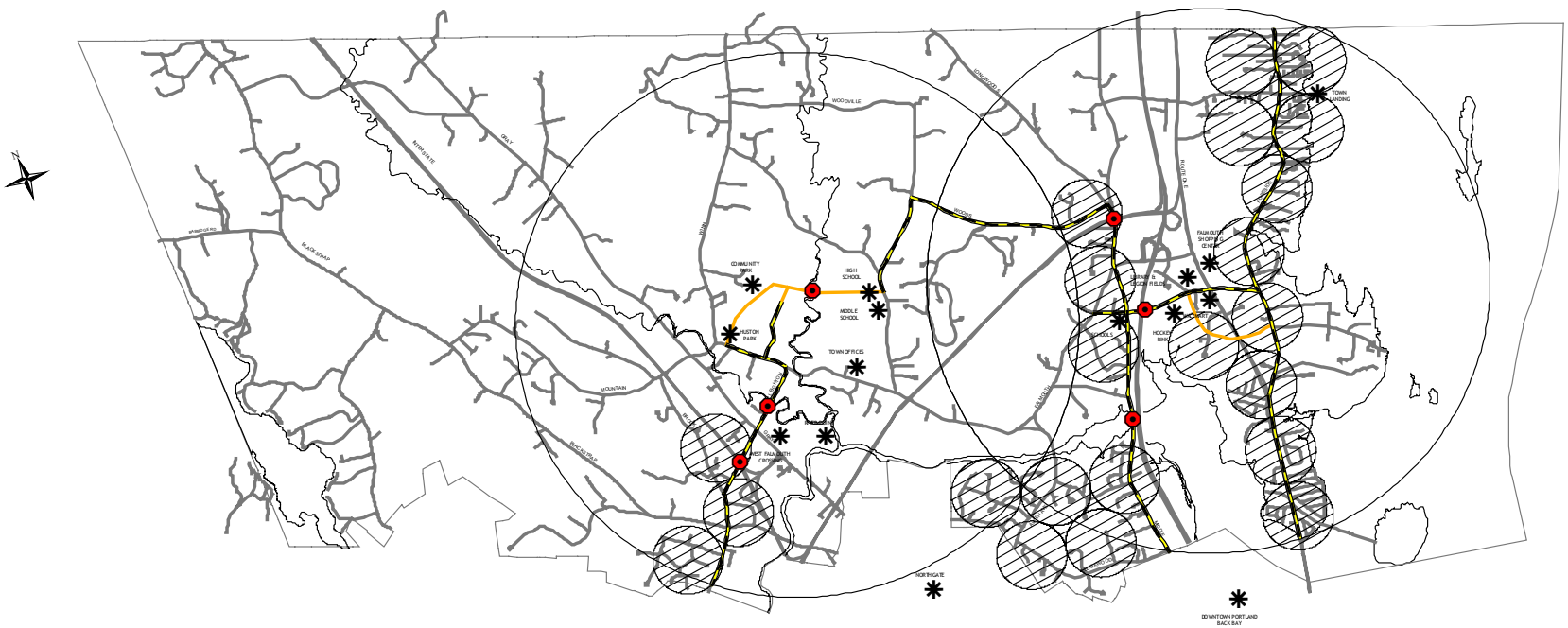
Jennifer Phinney
GIS Administrator

FALMOUTH, MAINE
Bicycle and Pedestrian Master Plan

BICYCLES

Notes:

1. The Town Council has adopted minimum pavement widths for all Town roads that strike a balance between traffic safety, traffic flow, pedestrian and bicycle access, and neighborhood character (see Appendix). Roads with paved shoulders built to the minimum dimensions shown in this table will generally meet the needs of Group A bicyclists. Roads with paved shoulders built to the maximum dimensions shown in this table will generally meet the needs of Group B bicyclists. All roads should be at least minimally accessible to Group A bicyclists.
2. For the sake of simplicity, only Group B bikeways are shown on this map.
3. Group C bicyclists should remain on local streets and recreation paths, or under the supervision of adults.



SCALE

4000 0 4000 Feet

LEGEND

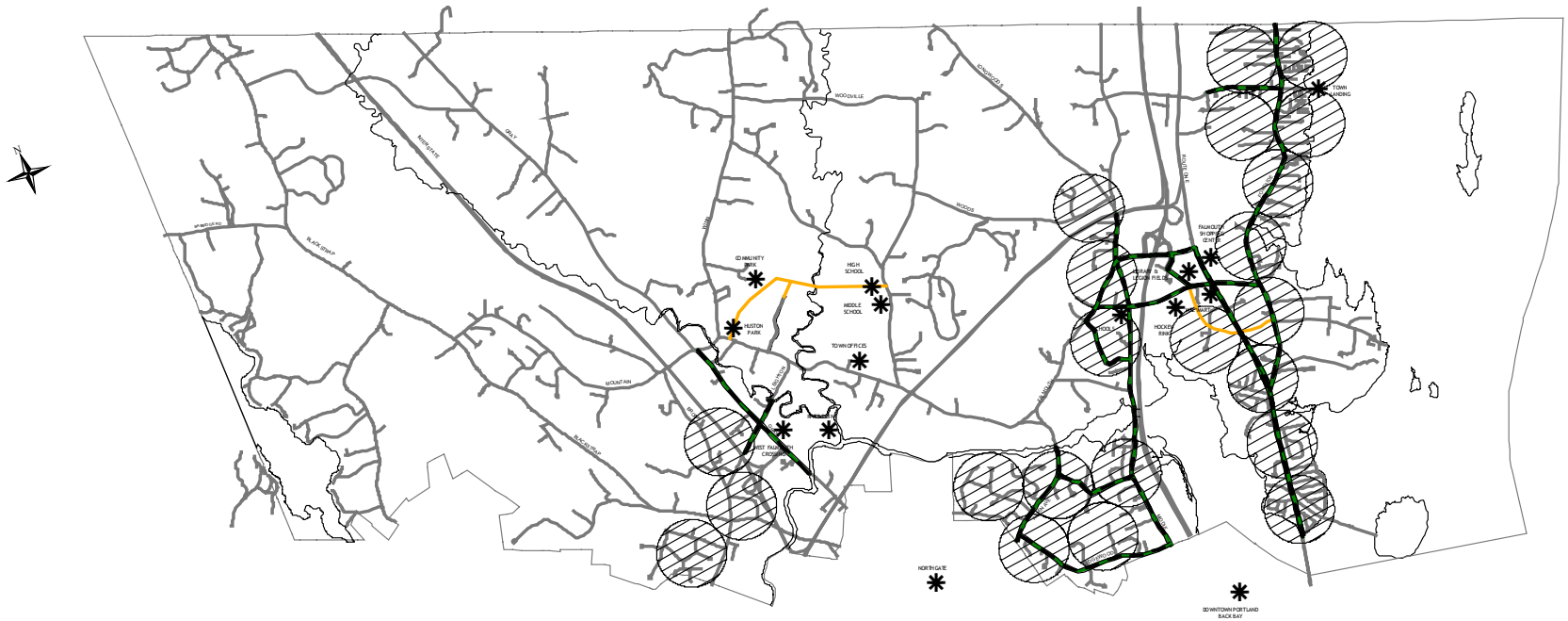
- Major Activity Center
- Population Cluster - Each quarter mile radius circle contains more than 50 housing units. (2 or more clusters = a population center)
- Two Mile Radius Circle - Describes typical limit to Group B bicyclist movement.
- Group B Bikeways (existing and proposed)
- Bridges
- Multipurpose Recreation Paths (existing and proposed)

Map Prepared By:

Jennifer Phinney
GIS Administrator

FALMOUTH, MAINE
Bicycle and Pedestrian Master Plan

PEDESTRIANS



SCALE

4000 0 4000 Feet

-------- LEGEND --------

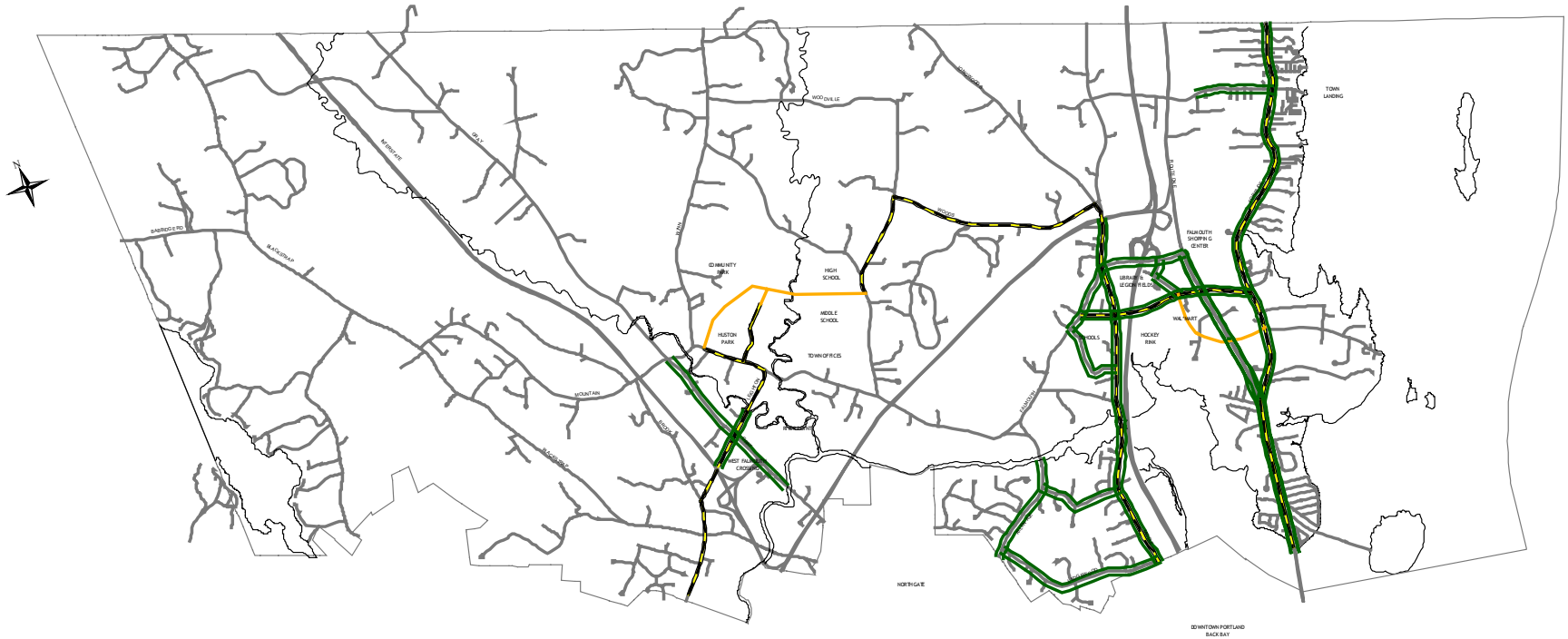
- Major Activity Center
- Population Cluster - Each quarter mile radius circle contains more than 50 housing units. (2 or more clusters = a population center)
- Sidewalks (existing and proposed)
- Multipurpose Recreation Paths (existing and proposed)

Map Prepared By:

Jennifer Phinney
GIS Administrator

FALMOUTH, MAINE
Bicycle and Pedestrian Master Plan

MASTER PLAN



SCALE

4000 0 4000 Feet

-------- **LEGEND** --------

Sidewalks

Group B Bikeways

Recreation Path

Map Prepared By:

Jennifer Phinney
GIS Administrator

Appendix 1

To: Town of Falmouth and CPAC
From: Falmouth Trails Advisory Committee
Re: Village Center sitewalk
Date: 4/8/00

At the request of the Town Manager, FTAC conducted an on-site, destination-oriented evaluation of the existing and planned pedestrian facilities within the Village Center. In an attempt to enhance the current focus on pedestrian access with proposed TIF funding, we offer these recommendations:

- Interior connections – Clearwater Dr. to Bucknam Rd.
  - General recommendations for all businesses: Indicate sidewalk-to-front door pathway across narrowest part of parking, i.e. painted crosswalk.
  - Provide painted pathway across business driveways, and islands where crossing distance is greater than 32' as per Village Center Design Guidelines.
  - Provide site-to-site connections, i.e. McDonald's – Subway; Maine Bank –Mangino's
  - Create pedestrian corridor to link isolated businesses (Mr.Bagel) along existing parking dividers on south side of Walmart lot.
  - Complete pedestrian corridor along north side of Walmart lot to Twombley Rink
  - Create pedestrian corridors to Shaw's along existing parking dividers across parking lot on north side of south entrance (near ATM), and south side of north entrance.
  - Provide path along east side of Family Ice to Clearwater Dr.
  - Extend sidewalk along Clearwater Dr. to Family Ice
  - Extend sidewalk along south side of Depot Rd. from Rt.1 to Twombly path.
  - Extend sidewalk to Bucknam Rd. along both sides of Rt.1.
  - Extend sidewalk from Medical Center to intersection at Bucknam/Rt.1
  - Continue pathway from playgound past Legion bldg. to Depot/Lunt intersection

- Crossings
  - Complete crosswalk at Clearwater Dr.
  - Reduce width of intersection at Bucknam Rd. to allow crosswalks.
  - Create crossing at south end of sidewalk limit to link Pinegrove Park to Water District ROW.
  - Create crossing at s. entrance to Shaw's.
  - Mid-block crossings on Depot Rd. at Hat Trick Dr and Lunt Rd.

To assure pedestrian access to the Village Center itself, we also identified these important links beyond the Village Center District:

- Neighborhood connections
  - Extend sidewalk past library on Lunt Rd. to Falmouth Rd.
  - Extend sidewalk on Depot Rd. to Rt.88
  - Investigate possible connection to Fundy Rd. from Rt.88
  - Develop pathway through Pinegrove Park to Rt.1
  - Develop pathway along Water District ROW to Clearwater Estates
  - Extend sidewalk along Bucknam Rd. to Legion Dr.
  - Extend sidewalk south from Dudley's to Martin's Pt.
  - Extend sidewalk north from Bucknam Rd. past onramps

With these recommendations, FTAC seeks to build on the pedestrian facilities as outlined in the Master Plan for Bikes, Trails, and Pedestrians. We applaud the efforts that the Town has made to create a pedestrian downtown, and hope these links will assure the success of realizing that goal.

Implementation Schedule

Bicycle and Pedestrian Master Plan

December, 2002

Implementation Time Frames:

Short-term – Within one year Mid-term – Within two years Long-term – Within five years or more On-going

Recommendations	Time Frame	Responsibility
Bicycles		
1. Develop a uniform set of design guidelines for Falmouth's roads that will guide all future road reconstruction projects.	Short-term	Public Works Department in cooperation with FTAC, the Planning Department, and the Department of Public Safety
2. Incorporate Group A bicycle access into road reconstruction programs.	On-going	Public Works Department with support from FTAC
3. Incorporate Group B bicycle access into road reconstruction programs.	On-going	Public Works Department with support from FTAC
4. Widen the pavement surface on State and Maine Turnpike Authority maintained bridges.	Long Term	Cooperative arrangements through Town of Falmouth, the State, and the Maine Turnpike Authority.
5. Incorporate bicycle and pedestrian access into the design of Community Park and all other Town parks.	On-going	Department of Parks and Community Programs with support from RACPAC and FTAC
6. Develop an ordinance amendment that requires bicycle and pedestrian access across cul-de-sacs, hammerheads, and other dead end streets when it is possible to link two parts of a neighborhood across short distances.	Short-term	Planning Department

7. Link Community Park to the High School and Middle School over a recreation path that crosses the East Branch of the Picataqua River, as described in the West Falmouth Bikeway Report.	Long-term	Cooperative arrangement between the Department of Parks and Community Programs and the Falmouth School Department with support from RACPAC and FTAC
8. Complete the proposed Recreation Path between Pine Grove Park and the Ice Arena over the pipeline corridor of the Portland Water District.	Long-term	Planning Department
9. Complete the Recreation Path within Legions Fields that is already under construction.	Mid-term	Department of Parks and Community Programs
Pedestrians		
10. Implement FTAC recommendations for providing pedestrian linkages within the Village Center District, beginning with the development of design guidelines for site plan and subdivision review.	Mid-term	Planning Department
11. Complete sidewalk improvements that have already begun on both sides of Route One.	On-going	Public Works Department
12. Develop policies that encourage the building of sidewalks and recreation paths between new and old subdivisions.	On-going	Planning Department with support from FTAC
13. Build sidewalks between the Village Center District and the Middle Road Population Center.	On-going	Public Works Department with support from FTAC
14. Build sidewalks within the Route One and Town Landing Population Center.	On-going	Public Works Department with support from FTAC
15. Build sidewalks within the Pleasant Hill Population Center.	On-going	Public Works Department with support form FTAC
16. Build sidewalks along Leighton Road and Gray Road within the limits of the Exit 10 project.	Ongoing	Planning Department and Planning Board
17. Build a sidewalk on at least one side of Gray Road from Leighton Road to Falmouth Road in conjunction with the MDOT reconstruction of Route 100.	Ongoing	Public Works Department with support from FTAC

Recommended Pavement Widths for Roads in Falmouth
Approved by the Town Council

Roadway Classification	Travel Way Width(ft.)	Shoulders(ft.)			
		Non-Curbed		Curbed Section	
		Bicycles		Bicycles	
		Group A	Group B	Group A	Group B
Minor Local - < 100 ADT Speed Limit 15-25 MPH	18	none	none	n/a	n/a
Local – 100-250 ADT Speed Limit 15-25 MPH	18	none	none	2	none
Subcollector –251-1000 ADT					
Speed Limit 25 MPH	20	2	4	2	4
Speed Limit 26-45 MPH	22	2	4	3	5
Collector – Over 1000 ADT					
Speed Limit 25-45 MPH	22	3	4	3	5
Arterials	24	4	4	5	5

Implementation Cost
for Bicycle and Pedestrian Master Plan

Falmouth Trails Advisory Committee

Draft 10/29/02

Sidewalks

1. Total distance of sidewalks in feet not yet built or funded: 48,000
2. Average cost per linear foot: $40
3. Total project cost: $1,920,000
4. Average Falmouth Share: 50%
5. Falmouth's estimated cost: $960,000

Bicycle Access

1. Total distance of roads in feet with AADT under 5,000 without paved shoulders: 65,400
2. Average cost of road reconstruction per linear foot: $120
3. Total project cost: $7,848,000
4. Average additional pavement width in feet needed to provide bicycle access: 2
5. Portion of road reconstruction cost due to adding two feet of paved shoulders: 14%
6. Cost of paved shoulders due solely to providing bicycle access: $1,099,000

Recreation Paths

1. Estimated project cost for East Branch Connector: $1,000,000
2. Estimated project cost for Route One Bypass: $450,000
3. Total cost both projects: $1,450,000
4. Falmouth's share under Transportation Enhancement Program: 20%
5. Falmouth's share if both projects funded: $290,000

APPROXIMATE COST FOR ALL PROJECTS: $2,349,000

Notes

1. The purpose of these estimates is to suggest the approximate magnitude of the costs for implementing the recommendations of the Bicycle and Pedestrian Master Plan. The numbers are generalized estimates based on unit costs, not on data for specific projects.
2. Unit costs are averages and are subject to frequent change based on better information.
3. The principle cost of sidewalks is the alteration of the drainage system within the right-of-way. Landscaping, erosion control, curbs, and other site work is usually necessary.
4. Roads over 5,000 AADT will require shoulders for reasons other than bicycle access.
5. Projects seeking funding from the Transportation Enhancement Program must compete with similar projects and for limited resources. There is no guarantee that either of the two recreation paths proposed in the Bicycle and Pedestrian Master Plan would be funded.

Appendix 2

L E S S O N 24

Education, Encouragement, and Enforcement

24.1 Purpose

When bicycle and pedestrian programs began in the late 1960's, the emphasis was strictly on providing facilities. As communities gained experience and began to identify other needs, the concept of the comprehensive "4-E" program emerged, combining the elements of engineering, education, enforcement, and encouragement.

The past 30 years have seen a great deal of growth and much creativity in the field. Communities with long-standing bicycle and pedestrian programs have developed a wide variety of programs to educate local citizens, encourage more bicycling and walking, and enforce the rules of the road. This is in contrast to a far greater number of communities that have begun building new facilities– through the funding infusions of the Intermodal Surface Transportation Act of 1991 (ISTEA) and the Transportation Equity Act for the 21st Century (TEA-21),but have not begun to establish support programs in the areas of education, enforcement, and encouragement.

This lesson explores the fundamental features of education, enforcement, and encouragement programs for bicycling and walking, and provides examples of successful programs from around the country.

24.2 Comprehensive Programs – Why They're Important

Historically, providing for bicyclists meant providing bicycle facilities. This was the focus during the early phase of program development in the United States, but by the late 1970s, it was replaced in some progressive communities such as Boulder, CO, and Madison, WI, with a more comprehensive 4-E approach, which combined engineering and planning with enforcement, education, and encouragement. By then, it had become clear that simply providing a

bicycle- and pedestrian-friendly road or trail environment, as important as it is, cannot solve all bicycle and pedestrian problems. Some safety problems, for example, may be more easily solved through programs than through facilities. In order to understand the importance of the other elements of a comprehensive program, consider the following two examples:

A mock-up of a miniature downtown area enables these children in Greensboro, NC, to learn pedestrian safety.

Example 1: A person decides to ride her bicycle to work. Between home and the office, there is a road with bicycle-friendly design features (e.g., wide outside lanes, bicycle lanes, etc.). While riding, she barely misses a 10-year-old wrong-way rider coming at her, is almost cut off by a motorist turning left in front of her, and finally finds no place to securely park her bicycle at the office. She locks her bike to the leg of a newspaper rack and goes into the office. When she leaves work, the sun has gone down; she has no bike lights. She calls a taxi to take her and her bicycle home.

Analysis: While she was able to take advantage of one element of a comprehensive program (the on-road facilities), the lack of other elements caused her serious inconvenience and danger. Youngsters need to learn which side of the road to use and the traffic laws should be enforced; motorists should learn to watch for bicyclists and to yield to them just as they would to other motorists. These common bicyclist and motorist errors lead to many crashes and may be addressed through education, enforcement, and awareness programs. Secure and convenient bicycle parking should be provided at all popular destinations as a routine matter. In some communities, this is dealt with in the parking ordinance.

Example 2: A person gets in his car on a sunny summer afternoon to drive to a nearby store. The store is less than a mile away and he is buying a quart of milk. There are sidewalks, but he doesn't even think of walking. He drives there, buys his milk, and drives home. In so doing, he contributes to air quality and congestion problems. And he wastes gasoline.

Analysis: While the existence of sidewalks or places to walk is important, it does not necessarily convince people to walk if they habitually take a car for every trip. The average American household generates 10 auto trips per day and many of them are short-distance errands. Breaking the driving habit requires effort and understanding. A good awareness campaign, including media spots and other elements, can help develop that understanding and encourage people to make the effort to walk for short trips. Walking takes little extra time compared to driving for very short distances. When one considers the costs (environmental, economic, personal health) of driving, and the exercise and health benefits of walking, walking is often preferable.

The lack of education and awareness among bicyclists and motorists can be addressed through new programs aimed at both adults and children.

These two hypothetical examples point out the importance of going beyond the old focus on facilities alone to include other aspects as

well. They suggest the potential roles that agencies such as the police department, the school district, and private parties such as the local television station and newspaper can play in improving the bicycling and walking situation in a community.

It is important to keep in mind that some elements may not contribute directly to increased numbers of non-motorized travelers. However, these elements are important for other reasons, primarily safety.

24.3 Successfully Mixing the 4-E's

How, exactly, can a successful mix of engineering, enforcement, education, and encouragement be determined? The answer is that participants from a wide range of agencies and groups must get involved in the process. The Geelong, Australia, model is a good one to illustrate this point. The Geelong Bike Plan Team included members from the enforcement community, roads department, safety agencies, school system, and bicycling community. In assembling their comprehensive program, the project managers enlisted the help of those who would, ultimately, be responsible for implementing it.

This is the process suggested here. A "bike-pedestrian plan task force" should be assembled to mold and steer the program. The following structure is suggested for the task force. While the same department may be represented on several subcommittees, this would not necessarily require different individuals. Individual members should deal with those aspects within their areas of expertise.

Task Force Structure

Subcommittees:

Steering Committee
Physical environment
Education and awareness
Encouragement
Data collection

Physical Environment
Public works (traffic engineering, streets)
Planning (transportation, land use)
Parks and recreation (parks planning)
Cyclists and pedestrians
College campus planning

Education and Awareness
Parks and recreation (programming)
School district (elementary and junior high)
High school and college
Health
Cyclists and pedestrians

Enforcement
Police (traffic)
Cyclists and pedestrians

Determining the Scope of a Comprehensive Program

Because so little is known about the bicycling and walking situations in most communities, it is difficult to predict in advance what level of expenditure and program activity will be needed to implement a comprehensive program. Until the needs have been identified and the problems assessed, the necessary scope of the program will probably remain unknown. However, the basic approach suggested here is to make bicycle and pedestrian considerations part of the normal process of governing. In many cases, this may require little extra expense.

The most successful bicycle and pedestrian education programs for children are implemented through local school systems.

For example, if a police officer stops a bicyclist for running a red light, this should not be seen as a new or extra duty. It is simply part of traffic enforcement and it will pay the community back in terms of decreased crash rates. Similarly, adding pedestrian- or bicycle-related questions to a transportation needs survey will not necessarily require large amounts of money. It allows transportation planners to do a better job of planning for the community's travel needs and can pay off in reduced motorized travel demand. Finally, changing from a dangerous drainage grate standard to a bicycle-safe design costs no more, but can reduce an agency's potential liability.

There will be some projects (e.g., a new bicycle bridge) that require a significant expenditure of funds. However, if the need for a project is clearly documented through surveys and studies, it can take its place in the Transportation Improvement Program. In such an arena, its strengths and weaknesses can be weighed against those of other potential projects.

Steps in the Process

There are four primary steps in the process of mixing the elements of engineering, education, enforcement, and encouragement to create a comprehensive bicycle-pedestrian program.

First, it is important to develop an understanding of the local bicycling and walking situations. This means looking closely at non-motorized travel in the community, determining its limitations and potential, as well as current levels of use and safety problems. This understanding forms the basis for the work that follows.

The second step is to set realistic goals and objectives. These should be based on data from the information-gathering step and they should be measurable and achievable.

Third, participants should address those goals and objectives through the development of an action plan. The plan should be a blueprint for the community's work in all the elements of the comprehensive program. It should include phasing and funding considerations.

Fourth, as work on the action plan progresses, it should be evaluated based on its effects on the goals and objectives. Without an evaluation process, it is impossible to determine the effects of one's work. With evaluation, one can judge and document success, correct errors, and fine-tune the program.

24.4 Elements of a Good Education Program

- **Provide instruction in lawful, responsible behavior among bicyclists, pedestrians, and motorists.**

1. Teach important bicycling and walking skills to youngsters.

Approach: Using information gathered from the user studies as well as the crash studies, work with school administrators and teachers to identify target ages for key educational messages. Review course options and identify opportunities for implementing bicycling and walking curricula for the target ages.

Result: A program of instruction that effectively reaches the target audience.

Examples: Missoula, MT's school district has included bicyclist education in its core curriculum since 1980; the program is taught by physical

education instructors. Boulder's bicycle-pedestrian program staff includes a full-time education person in charge of implementing curricula in cooperation with the local school system. Madison's program works with the local schools to do the same.

2. Teach important bicycling and walking skills to adults.

New and returning university students should be included in training programs. It is during the first few weeks of classes that most crashes occur.

Approach: Using information gathered from the user studies as well as the crash studies, work with college and high school administrators and teachers to identify key educational messages. Review course options and identify opportunities for implementing bicycling and walking curricula for the target ages.

Result: A program of instruction that effectively reaches the target audience.

Examples: Effective cycling instructors in Seattle, WA and Tucson, AZ, among other communities, have offered adult courses through the local junior colleges. Missoula and several other communities have offered cycling classes to traffic law violators through the local municipal court systems.

3. Include bike and pedestrian information in driver training.

Approach: Using information from the crash studies, work with local driver training instructors and violators to identify key messages for delivery to new drivers, as well as those required to take remedial driving courses. Assemble a model curriculum unit and deliver it to all local instructors.

Result: A model curriculum and delivery mechanism for reaching drivers during training.

Examples: The Gainesville, FL Bicycle Coordinator taught 14- and 15-year-old driver education students how to share the road with bicycles. The coordinator brought copies of bicycle/automobile crash reports to illustrate her points. She then divided the class into groups, each with an accident report. Groups analyzed how the crashes happened and how they could have been avoided.

- **Deliver important safety messages through various print and electronic media.**

1. Determine which safety messages are most important for which audiences.

Approach: Using information gathered from the crash studies, identify important messages for the whole range of target audiences.

Result: A prioritized list of messages identified as to their target audiences.

Examples: The Gainesville program determined that one of the audiences most in need of attention was the college student population. Key safety messages for these bicyclists were identified.

Education programs should target adult bicyclists and motorists.

2. Create a process for effectively delivering those messages.

Approach: Work with the local media and other groups to determine how best to reach the audiences identified above, given the resources available.

Result: A long-term strategy for delivering selected messages to key target audiences.

Examples: In 1986, Madison, WI's bicycle program created an ambitious bicycle helmet campaign, working with local bicycling groups and the media. They did before-and-after studies of both helmet wearing rates and their success in delivering their messages. In Gainesville, FL, officials commissioned a safety specialist to create college student-oriented bicycling comic strips for publication in the campus newspaper and for printing as brochures.

24.5 Elements of a Good Enforcement Program

- **Improve existing traffic laws, as well as their enforcement.**

1. Review and, if necessary, modify laws that affect bicyclists and pedestrians.

Approach: In cooperation with the police department and city attorney, review local and State bicycle and pedestrian laws and compare with the current version of the Uniform Vehicle Code and Model Traffic Ordinance. Focus, in particular, on those regulations that may unnecessarily restrict bicycle or pedestrian traffic or that seem out-of-date when compared to the national models.

Result: A report listing suggested changes to local and State traffic laws.

Examples: Palo Alto, CA, after reviewing potential crash problems and liability concerns, decided to allow bicycle traffic on a key expressway. In doing so, they opened a new route for fast cross-town travel.

2. Enforce laws that impact bicycle and pedestrian safety.

Approach: Using information from the crash studies, determine which traffic violations are implicated in the most common serious car/bike and car/pedestrian crashes. Working with the police department, traffic court, and city attorney, develop a plan for enforcing the key laws.

Result: A plan for equitable enforcement of bicycle, pedestrian, and motor vehicle traffic laws.

Examples: Since the mid-1980's, Madison, WI's police department has used a "bicycle monitor" program, staffed by specially deputized university students, to enforce bicycle traffic laws. Seattle's department aggressively polices crosswalks and routinely gives motorists tickets for violating pedestrian rights of way. Missoula's bicycle patrol routinely gives tickets to motorists who violate the law.

Philadelphia, PA police officers use bicycles to patrol city streets.

3. Review and, if necessary, modify procedures for handling youthful violators.

Approach: In cooperation with the police department, develop procedures for handling young bicycle and pedestrian law violators.

Result: A set of procedures for dealing with young bicyclists and pedestrians.

Examples: For years, Dallas operated a youth court for young bicyclists caught violating traffic laws. The City of Santa Barbara, CA, a pioneer in bicycle enforcement, developed a campaign that included special tickets for youngsters, a publicity campaign, and a training film for officers. Missoula, MT has a special warning ticket for youngsters: one copy goes to the violator, one is mailed to the parents, and one is kept at the police station.

- **Reduce the incidence of serious crimes against non-motorized travelers.**

1. Develop a strategy for reducing the number of bikes stolen and increasing the proportion of recovered bikes.

Approach: Based on the police department's bike theft study, develop a strategy for reducing the impact of bike theft rings and other sophisticated thieves. Also consider a means to inform the public of simple steps they can take to keep their bikes from being stolen.

Result: A plan for reducing bike theft in the community.

Examples: Missoula, MT used their 1982 bicycle theft study as the basis for TV spots, appearances on news shows, news releases, brochures and posters, all of which promoted using high-security locks. They also developed a computerized bicycle registration procedure that has helped identify and return many licensed bikes to their owners.

2. Develop a strategy for reducing assaults on bicyclists and pedestrians.

Approach: Based on the study of bicyclist and pedestrian harassment and assault, develop a standard procedure for dealing seriously with these complaints.

Result: Policies and procedures for dealing with bicyclist and pedestrian assault and harassment.

Examples: For years, the Missoula bicycle program has worked with the city attorney's office on a case-by-case basis to resolve complaints of bicyclist harassment. Their efforts resulted in irresponsible motorists receiving numerous warnings and citations.

- **Use non-motorized modes to help accomplish other unrelated departmental goals.**

1. Implement non-motorized patrols in appropriate areas.

Approach: Based on the experiences of other communities, determine the need and potential of non-motorized patrols in the community and develop an implementation plan.

Result: A plan for funding and creating non-motorized police patrols in the community.

Examples: Seattle, WA has pioneered the mountain bike patrol as a way of dealing with street crime. Begun in 1987, the patrol has grown to more than 100 officers and the founders have given training seminars to police departments all over the country. Each year, hundreds of mountain bike officers gather for a national conference sponsored by the League of American Wheelmen; many also attend the annual "Beat the Streets" patrol competition hosted by the City of Seattle.

24.6 Elements of a Good Encouragement Program

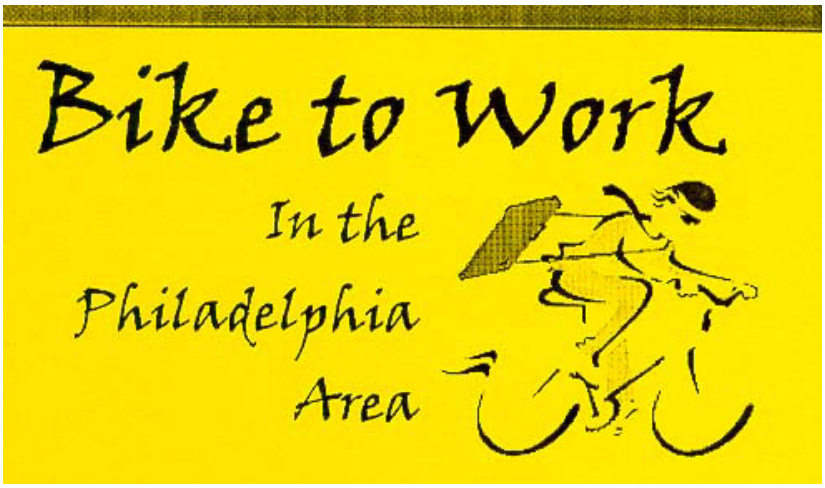
- **Reduce or eliminate disincentives for bicycling and walking and incentives for driving single-occupant motor vehicles.**

1. Add non-motorized options to agency motor pools.

Approach: Identify all agency motor pools and determine which can be modified to include bicycles. In addition, consider which trips can be efficiently taken on foot. Create a plan of action for adding non-motorized options where possible. Promote the approach as a model for other local employment centers.

Result: A plan for using non-motorized modes in satisfying agency transportation needs.

Examples: The City of Seattle recently created a "non-motorized pool," adding bicycles to the motor vehicles available for employee use. The bikes are proving to be extremely popular.



Promotional flyers can give safety tips, rules, and specific laws, and contacts and resources in the area.

2. Require companies and agencies to produce balanced transportation plans for their workforce's commuting needs.

Approach: Review city policies and practices, as well as those of private companies and other large employers, that reward driving private automobiles or discourage walking or bicycling. Work with all appropriate agencies and companies to modify those provisions.

Result: A set of proposed options (policies, ordinances, programs) that address institutional biases against bicycling and walking.

Examples: In Palo Alto, CA, a transportation plan for Stanford University suggested helping staff purchase bicycles if they would use them for commuting to work. The City reimburses those who use their bicycles for work-related trips. The university campus in Davis has, for many years, severely restricted motor vehicle parking. This has been identified as one of the major factors in encouraging students and faculty to ride bikes to the campus.

- **Provide ways for non-participants to receive a casual introduction to bicycling and walking.**

1. Include entry-level bicycling and walking activities in local recreational programming.

Approach: Identify existing programs or groups that could become sponsors for introductory-level bicycling and walking activities. Based on user studies, create a list of potential activities and match them with groups willing to offer sponsorship.

Result: A schedule of introductory-level non-motorized recreational activities.

Examples: Eugene, OR's recreation department sponsored a variety of recreational rides and workshops for novice adult riders through their network of parks. The Chesterfield County Parks Department in Richmond, VA, sponsors an annual "Peanut Ride," which visits peanut farms in the area, allowing participants to learn more about local agriculture while getting exercise.

2. Promote utilitarian non-motorized transportation through introductory fun events.

Approach: Through a combination of promotional events and media publicity, encourage citizens to walk or ride in place of driving.

Result: An annual series of promotions supporting non-motorized travel.

Examples: Boulder's annual Bike Week has become a major event over the years, encompassing a schedule of senior citizen rides, bike polo, business challenges, bicycle parades, and non-polluter commuter races. During their Bike to Work Day in 1992, approximately 7,000 people rode bicycles to work.

3. Offer key target audiences detailed information on utilitarian non-motorized travel.

Approach: Based on the user studies, determine which audiences are most likely to bicycle or walk; further determine their detailed informational needs and create a plan for getting that information to the target audience.

Result: A plan for giving detailed useful information to key target audiences.

Examples: The Ann Arbor, MI, program has run seminars at local hospitals and other employment centers, helping participants learn how commuting by bicycle might work for them. In Los Angeles, the El Segundo Employers Association, in cooperation with the Southern California Association of Governments, has produced maps, pamphlets, and seminars to promote non-motorized transportation among their workers.

Local agencies can work together to promote bicycling and walking, transportation, and safety.

- **Use electronic and print media to spread information on the benefits of non-motorized travel.**

1. Develop and disseminate a limited set of simple, but important, pro-bicycling and pro-walking messages.

Approach: Based on the user studies, determine the educational needs of bicyclists and walkers, assemble a list of the most important messages, and create a media campaign to get them across. Include the experiences of current non-motorized travelers as a way of personalizing the messages and lending added credibility.

Result: A media campaign promoting the benefits of bicycling and walking directed at key target audiences.

Examples: San Diego has used bus-mounted advertising to promote the benefits of non-motorized travel. Seattle, in cooperation with a local TV station, has created a series of local promotional television spots.

24.7 Conclusion

A comprehensive bicycle-pedestrian program directed toward the goal of increasing safe travel by non-motorized modes must combine the efforts of many people. No one office can do it all. Officials in public works, planning, enforcement, education, and recreation agencies all have a role and must work together to achieve the desired end.

In order to measure future success, it is important to first determine current conditions. Since non-motorized travel is so seldom measured, we know little about it. With data on use, user attitudes and behavior, safety, and security problems, it is possible to begin assembling an achievable set of goals and objectives. These goals and objectives should be used to guide the development and implementation of an action plan. The plan should include physical elements such as roadway improvements and trail systems, as well as non-physical elements such as enforcement and educational programs.

Evaluating the elements of the action plan is a critical step in determining future direction and past success. Success should be measured both in terms of services delivered and effects achieved. Evaluation must be seen as a key ingredient to implementation, rather than as an extra duty to be performed if there is time or money.

Combining these steps into a comprehensive program will allow a community to achieve and measure success.

24.8 References

Text and graphics for this lesson were derived from:

Federal Highway Administration, National Bicycling and Walking Study, *Case Study 11: Balancing Engineering, Education, Law Enforcement, and Encouragement*, 1994.