



Iowa Trails 2000

Connecting People and Trails: Local Community Planning for Bicyclists and Pedestrians



A Handbook for Local Communities

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**Iowa Department
of Transportation**

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List of Definitions

DEFINITIONS OF BICYCLE AND PEDESTRIAN FACILITIES AND TERMS

ADA

American With Disabilities Act of 1990. Broad legislation mandating provision of access to employment, services, and the built environment to those with disabilities.

Bicycle Facilities

A general term denoting improvements and provisions made by public agencies to accommodate or encourage bicycling, including parking and storage facilities, and shared roadways not specifically designated for bicycle use.

Bicycle Lane or Bike Lane

A portion of a roadway which has been designated by striping, signing and pavement markings for the preferential or exclusive use of bicyclists

Bicycle Route System (Bike Route)

A system of bikeways designated by the jurisdiction having authority with appropriate directional and information route markers, with or without specific bicycle route numbers. Bike routes should establish a continuous routing, but may be a combination of any and all types of bikeways.

Bikeway

A generic term for any road, street, path or way which in some manner is specifically designated for bicycle travel, regardless of whether such facilities are designated for the exclusive use of bicycles or are to be shared with other transportation modes.

Crosswalk

Any portion of a highway at an intersection or elsewhere distinctly indicated for pedestrian crossing by lines or other markings on the surface. Unmarked extensions of the shoulder, curb line or sidewalk are also referred to as crosswalks.

Curb Radius

A measure of the sharpness of the corner formed by two intersecting streets.

Curb Ramp

A combined ramp and landing within a public sidewalk to accomplish a change of level at a curbed street crossing.

Designated Shared Roadway

A shared roadway which has been designated by signing as a preferred route for bicycle use. (Same as Bike Route.)

Grade Separation

The vertical separation of conflicting travel ways with a structure, usually a bridge or underpass.

List of Definitions

Greenway

A linear open space established along either a natural corridor, such as a riverfront, stream valley or ridgeline; or overland along a railroad right-of-way converted to recreational use, a canal, or other route. A greenway, as a broad conservation concept, may or may not allow public access or formal trail development.

Median

A raised or painted portion of a divided highway separating travel lanes carrying traffic in opposite directions.

Parkway

The space provided to separate the sidewalk from the vehicular travel facilities, usually landscaped and used for various utilities and signing.

Pavement Markings

Painted or applied lines or symbols placed on a roadway surface for regulating, guiding or warning traffic.

Pedestrian Signal

The signal head that indicates the walk/don't walk phase of a traffic signal.

Public Walkway

A pedestrian facility on public or private space intended to provide passage for public use.

Rail-Trail

A shared use path, either paved or unpaved, built within the right-of-way of an existing or former railroad.

Raised Crosswalk

A variation of a speed hump in which a crosswalk is raised to sidewalk level and frequently surfaced to coordinate with the sidewalk rather than the street.

Refuge Island

A raised, curbed or painted area within an intersection that allows the pedestrian to cross a portion of the street in one movement and continue or wait to cross the next portion.

Right-of-way

The right of one vehicle operator or pedestrian to proceed in a lawful manner in preference to another.

Shared Roadway

A roadway which is open to both bicycle and motor vehicle travel. This may be an existing roadway, street with wide curb lanes, or a road with paved shoulders.

Shared Use Path

A bikeway physically separated from motorized vehicular traffic by an open space or barrier, and either within the highway right-of-way or within an independent right-of-way. Shared use paths may also be used by pedestrians, skaters, wheelchair users, joggers and other non-motorized users.

Shoulder

The portion of the roadway contiguous with the traveled way for accommodation of stopped vehicles, for emergency use and for lateral support of sub-base, base and surface courses. When paved and of sufficient

width, shoulders provide space for bicycle and pedestrian travel. A shoulder is usually separated from the travel lane by striping, and may be signed as a bike lane under moderate traffic conditions.

Sidepath

A two-way shared use path located immediately adjacent to a roadway, like an extra wide sidewalk. Not recommended in most applications due to space limitations, operational problems, and safety hazards at intersections.

Sidewalk

The portion of a highway, designed for preferential or exclusive use by pedestrians. (AASHTO) It is usually separated from the roadway with a curb and/or parkway and constructed of a hard durable material.

Speed Humps/ Tables

Raised street sections placed either at intersections or in other locations where they are intended to slow traffic. They are usually 10-12 feet in longitudinal length.

Traffic Calming

Roadway design measures used to slow or divert traffic to increase the safety and attractiveness of streets, especially for pedestrians.

Trail, Multi-Use Path or Bicycle Path

Same as Shared Use Path. However, the term bicycle path is becoming less common, since such facilities are rarely used exclusively by cyclists.

Wide Curb Lane

An outside or curbside travel lane of sufficient width for a bicyclist and motorist to share the lane with a comfortable degree of separation. The bicycle space is not striped, and generally the total width is less than a road with a paved shoulder or bike lane treatment.

Chapter One

INTRODUCTION: CONNECTING PEOPLE AND TRAILS

Many communities in Iowa have expressed a desire to develop a plan for better accommodating pedestrians and bicyclists in their community. This desire results from the recognition that walking and bicycling are popular recreational activities and, are increasingly important as "alternative transportation modes." Recognizing the desire on the part of communities to create better conditions for bicycling and walking, the Iowa DOT developed this handbook as part of *Iowa Trails 2000*.

This handbook outlines the steps and resources required to create a comprehensive system of bicycle and pedestrian facilities. Such a system can serve local needs and connect communities to the Iowa State Trails System and other regional attractions.

Iowa's trails have been, and will continue to be, developed through the combined efforts of citizens and state, regional and local governments. By working cooperatively, state and local governments can serve local bicycle and pedestrian needs and connect communities to the Iowa State Trails System and other significant regional attractions.

Why Plan Locally for Bicycling and Walking?

Everybody walks, and many people enjoy bicycling. Today, many communities are exploring ways to encourage these activities. Some reasons many communities are focusing on bicycling and walking today include:

- The enormous popularity of trails.
- State and national surveys indicate that pedestrians and bicyclists are the most common trail users, and Iowans would like more trail opportunities closer to home.
- Pedestrian and bicycle transportation provide many benefits, including:
 - transportation alternatives
 - increased physical activity
 - improved air quality (reduced auto emissions)
 - friendlier, livelier and more pleasant communities
- State and federal transportation programs encourage increased investment in alternatives to automobile travel and provide funding for bicycle and pedestrian facilities.
- Increasing motor vehicle volumes and speeds have degraded conditions for bicycling and walking.
- It is federal policy as expressed in The National Bicycling and Walking Study to
 - double the current (1994) percentage (from 7.9 percent to 15.8 percent) of total trips made by bicycling and walking, and to
 - reduce by 10 percent the number of bicyclists and pedestrians killed or injured in traffic crashes.

Why Plan Locally for Bicycling and Walking?



Everybody walks, and many people enjoy bicycling. Today, many communities are exploring ways to encourage these activities.

Benefits of Walking and Bicycling

Health:

Inactivity is second only to smoking as a national health hazard according to the Center for Disease Control and Prevention: walking and bicycling by children appear to have fallen 40 percent between 1977 and 1995.

Transportation Alternatives:

One third of the population does not drive; independent mobility is important for everyone.

Air Quality:

Transportation sources are responsible for half of all pollution in the United States; bicycling and walking trips replace between 7.6 and 28.1 billion motor vehicle miles, saving between 4.4 and 16.3 million metric tons of exhaust.

What is Bicycle and Pedestrian Planning?

Not so many years ago, most urban and suburban communities had sidewalks and many low volume, low speed roads. Many rural communities had few sidewalks, but traffic was sparse and moved at lower speeds than today. Increases in population and automobile use have resulted in complex transportation systems that accommodate more traffic. Motorized traffic has been accommodated without always considering the needs of non-drivers. In response to a growing interest in walking and bicycling, planners and engineers have developed guidance to improve conditions.

Bicycle and pedestrian planning should be guided by the following principles.

Principle # 1: Local bicycle and pedestrian systems should provide safe and comfortable facilities.

Research has contributed to our understanding of the needs of bicyclists and pedestrians. For instance, there is unequivocal evidence that sidewalks protect pedestrians and contribute to overall traffic safety. Other research indicates that bicycle lanes increase the safety of bicyclists on roadways between intersections and enhance a bicyclist's sense of comfort in traffic. Research is inconclusive as to whether bicycle lanes help or complicate movements at intersections. Careful design judgment is required for the best application of many bicycle and pedestrian improvements.

There are many ways to increase the perception of safety. For example, attractive surroundings are more welcoming to pedestrians and bicyclists. Tree-lined streets with minimum traffic, traveling at low speeds, and well-maintained roads and sidewalks invite bicycling and walking. Buildings in good condition also increase an individual's sense of comfort and safety in a neighborhood. Higher density environments that provide sidewalks and short distances between residential and commercial areas also encourage walking.

Areas that are inherently unfriendly to bicyclists and pedestrians can be improved with practical design treatments. For example, the safety and comfort of pedestrians and bicyclists can be improved at multi-lane crosswalks with the addition of refuge islands and recessed stop lines. Furthermore, the addition of landscaping may also increase a person's sense of comfort and safety.

Principle #2: Direct access to destinations and continuity through connected facilities encourages the use of bicycle and pedestrian facilities.

Efforts should be made to connect local facilities with adjacent communities and state and regional trails.

Pedestrians need a continuous system of sidewalks and crossing

opportunities that connect residential areas to schools, jobs, shopping, and other services. There should be a pro-active approach by government that will require sidewalks in new developments and in-fill of missing sidewalk links.

Bicyclists are also dependent on continuity, especially if bicycles are used for transportation. A broad range of improvements can accommodate bicycling, including the signing and re-striping of existing roadways, as well as, building off-road trails. The most efficient bicycle plans accommodate the highest priority destinations of local cyclists through connected facilities.

Access can further be improved by considering pedestrians and bicyclists in site design and transit planning. Walkways to and within large developments and shelters for transit users provide convenience and comfort for pedestrians. "Bikes-on-buses" programs increase the efficiency of public transit. Bicycle parking should be available at transit stations, shopping areas, schools, libraries and parks.



It is all too common to see sidewalks that end abruptly.

Principle #3: The design and extent of a bicycle and pedestrian system should reflect the needs of the community.

Communities differ in the type of bicycle and pedestrian facilities they require. The character of a community, its existing infrastructure and the needs of local bicyclists and pedestrians determine the opportunities and constraints that define a reasonable approach to planning. Rural communities that are characterized by relatively narrow roads with shoulders, limited public land holdings, and long distances between farms and towns are quite different from urban areas with high traffic volumes, curbed streets, and compact land uses. University and college towns, as well, have special needs.

Opportunities for off-road trail facilities also vary by community location and type. Suburban communities often fare well, especially if they have actively planned for open space preservation along rivers and abandoned railroad rights-of-way. They can develop inter-urban trails, create local bikeway networks, and include sidewalks in new development.

Opportunities to create linear trails in urban areas are sometimes constrained by dense land use and intense development pressure. However, in many cities, riverwalks and railroad corridors have been developed as important public spaces. Cities usually have the advantage of a grid street pattern and a relatively complete sidewalk system that offers alternatives for bicycle travel and places to walk.

Rural areas gain multiple benefits when shoulders of roadways are paved for bicyclists and town centers are designed to be pedestrian

friendly. A correlation exists between high levels of bicycling and walking and the presence of a college or university. Educational institutions should always be included in a community's non-motorized planning efforts.

Principle #4: A bicycle and pedestrian plan should be implemented in phases over a reasonable period of time.

The development of a bicycle system network and pedestrian circulation system will be determined, in part, by input from the public, the configuration of the existing infrastructure and linear corridors, and availability of funding. It is important to select popular initial projects that can be readily implemented. In addition, early projects should include low cost items that will make a difference to the community. Subsequent projects will include those that require more coordination and a longer funding horizon.

It is advantageous to secure local funding from a variety of sources. Demonstrating that a plan can be executed through a combination of already-planned transportation projects, various grant programs and local volunteer efforts builds support for allocating needed matching funds and accessing local budgets.

Who Should be Involved?

Many local, regional, and state agencies can impact trail, bicycle, and pedestrian planning. Included among these agencies are: transportation, public works, and planning departments at the local, county, regional, and State levels; county conservation boards; and the Iowa Department of Natural Resources (DNR).

It is essential that citizens also become involved in the planning process, partly because a strong public voice and vision will greatly empower local decision-makers. The business community, including private developers and Chambers of Commerce, represent some impacted constituents. Associations of homeowners and neighborhoods can also participate.

Citizen Advisory Committee

In most communities, there are individuals who are especially interested in trails, pedestrian issues, and/or bicycling. These people may be parents, environmentalists, homeowners, members of bicycle clubs, or advocates for the elderly or those with disabilities. They might be individuals who simply like to walk and bicycle and who want to enhance their communities with better recreational and transportation facilities. The involvement of these individuals in the planning process should be encouraged. A citizens' advisory committee can help to create consensus, identify issues and needs, and review planning efforts.

It is essential that citizens also become involved in the planning process, partly because a strong public voice and vision will greatly empower local decision-makers.

Bicycle/Pedestrian Coordinator

Many communities will not hire or appoint a full-time bicycle, pedestrian, and trail planner. However, every community should assign one person to coordinate and oversee trail, bicycle, and pedestrian planning projects. Usually, several departments, including planning, public works, traffic, police, parks, and schools have reason to contribute to these efforts. It is extremely helpful to have one individual who can coordinate these various internal departments as well as work with other agencies.

Involved Public Officials

It is imperative that public officials express their support for the planning process. In smaller communities with minimal staff, public officials may provide leadership and fulfill the coordinator's role. In most communities, there will be dissension by someone at some time to some aspect of a trail, bicycle, or pedestrian plan. Creative and proactive leadership can diffuse problems that might stall or stop important projects.

Finally, it is important to know that technical assistance is available. The Iowa Department of Transportation (DOT) provides technical assistance through its Transportation Center Planners. The Iowa DOT also has a Bicycle and Pedestrian Coordinator who can answer many questions about planning, design, and funding. Many projects are funded through the Metropolitan Planning Organizations (MPOs) which, along with the Regional Plan Affiliations (RPAs), also provide technical assistance. Additional resources include the Iowa Department of Natural Resources (DNR), the local office of the Federal Highway Administration (FHWA), and the Bicycle and Pedestrian Clearinghouse, a national source for publications and information. (See Appendix Three for contact information for District Transportation Planners, MPOs/RPAs and other resources.)

The City of Seattle, Washington has found that the following entities facilitate the bicycle and pedestrian planning process:

- A Bicycle/Pedestrian and/or Trail Advisory Committee
- A Bicycle/Pedestrian Coordinator
- Committed Citizens and Public Officials

For Information and Assistance Contact:

Your District Transportation Planner (see map and list in Appendix Two) or the

State Bicycle and Pedestrian Coordinator
Iowa Department of Transportation
800 Lincoln Way
Ames, IA 50010

Phone: (515) 239-1621

Chapter Two

CREATING YOUR COMMUNITY BICYCLE AND PEDESTRIAN PLAN

Iowa's residents and visitors sometimes travel long distances to explore regional and state trails and enjoy bicycle touring. Bicycling and walking however, remain essentially local activities. Most people walk within one-half mile of their homes and bicycle less than two miles per trip. Local governments are primarily responsible for implementing most bicycle and pedestrian projects, whether on trails, streets or sidewalks. Regional and state policies and programming requirements provide direction and partial funding for many projects—but most projects are locally initiated and implemented.

The following steps describe the process for creating a local plan to accommodate the recreational and transportation needs of bicyclists and pedestrians while increasing their overall safety and enjoyment.

STEP 1: EVALUATE EXISTING CONDITIONS

The best plans are developed when pre-plan conditions are understood and taken into consideration. The time and energy expended in initial research and public involvement will prevent expensive delays and produce a widely accepted plan. Bicycle and pedestrian planning does not occur in a vacuum and is often severely constrained by community conditions. At the same time, there may be many opportunities to understand the surrounding environment by studying the demographics and infrastructure of the community. Land use and transportation patterns, the demographics and trip patterns associated with bicycling and walking, traffic accident data, and the planning activities and facilities of adjacent communities influence a community's final plan.

Land Use and Transportation

Existing Information

Local, regional, and state transportation plans provide information about existing land use and transportation conditions. This information helps community planners to assess areas needing improvement. It is important to consider the following elements when developing a Bicycle and Pedestrian plan:

- Roadway Infrastructure:
 - interconnected grid or sub-division pattern
 - traffic counts
 - pavements and lane widths
 - travel speeds on area roadways
 - location of traffic signals
 - location of existing bikeways

STEPS TO CREATING A BICYCLE AND PEDESTRIAN PLAN

Step 1: Evaluate Existing Conditions

Step 2: Seek Public Input

Step 3: Planning Considerations

Step 4: Create a Bicycle System Plan

Step 5: Pedestrian System Planning

Step 6: Develop Implementation Plan

- Land Use:
 - distance to shopping, housing and schools
 - mixed or separated use patterns
 - location of sidewalks; what policies relate to their installation
 - presence of barriers and obstacles, such as major highways, rivers, railroad yards, factories and warehouses
 - presence of railroad rights-of-way and rivers that could be developed as trails

New Information

Additional studies can be conducted to better understand the land use and transportation environment. These studies can include:

- *Traffic Studies*: Speed studies, traffic counts, bicycle and pedestrian counts, and roadway measurements must sometimes be conducted to determine candidate locations for improvements.
- *Walking Audit*: A subjective assessment of sidewalks and general pedestrian conditions conducted by such individuals as local officials, planners, interested adults and children. (See Appendix 4 for sample audit form.)
- *Sidewalk Inventories*: Map existing sidewalks. Note the condition of walkways, important destinations and gaps in the system.
- *Bikability Checklist*: The National Highway Traffic Safety Administration (NHTSA) is developing a bicycle audit to be used for the assessment of bicycle conditions. Even an informal bicycle ride through the community can aid planners as they assess biking conditions.
- *Surveys*: Additional insights about general conditions can be obtained by formal and informal surveys. For instance, in one community a brief questionnaire in the local paper asked residents to identify “difficult” intersections. Some of those identified became the focus of prototype pedestrian design alternatives.

Product/Action

Key to developing a successful plan is the identification of elements that support or discourage pedestrian and bicycle travel. Sometimes it becomes clear that destinations are not far apart, but the connecting roadway system is limited to a few heavily traveled arterials that accommodate neither bicycles nor pedestrians. Land use inventories and maps are useful for identifying potential destinations for bicycle travel and priority service areas for pedestrian improvements. Assessments of traffic patterns and the available street infrastructure can help to identify both problem areas and streets that accommodate bicyclists or pedestrians fairly well.

- Develop one or more maps that indicate:
 - potential destinations
 - existing bikeways
 - trail corridors
 - known pedestrian activity areas
 - signalized intersections
 - traffic data
 - problem and opportunity areas
- Write a description of the environment summarizing the primary strengths and opportunities as well as the problems and constraints in the existing conditions for bicyclists and pedestrians.

Evaluating Users

Bicyclist Skill Levels

When planning for bicyclists and pedestrians, design considerations should meet the needs of a variety of age and skill levels. The Federal Highway Administration identifies three levels of cycling ability:

Group A: Advanced Bicyclists — These are experienced riders who can operate under most traffic conditions. They prefer to operate on the existing street and highway system.

Group B: Basic Bicyclists — These are casual or new adult and teenage riders who are less confident of their ability to operate in traffic without special provisions for bicycles. These riders prefer low-speed, low traffic volume streets or designated bicycle facilities.

Group C: Children — These are pre-teen riders whose roadway use is monitored by parents. Eventually they are accorded independent access to the system. They and their parents prefer residential streets with low motor vehicle speed limits and volumes, sidewalks, and trails.

Local bicycle planning and design should, as much as possible, consider the needs of all three skill groups. However, Group B bicyclists will be the primary user of most bikeway networks.

Trip Patterns

Next to auto travel, walking is America's most favored travel mode, surpassing bus, rail, taxi and bicycle choices by a 4-to-1 ratio. In large cities (+ 1 million) that have rail systems, walking represents more than 13 percent of all person trips, as opposed to 7 percent nationwide.

Bicycle travel represents only 1 percent of all trips and the 1990 U.S. Census found that only 0.4 percent of work trips are made by bicycle. In communities with superior accommodations for bicyclists, the percentage is much higher. For instance, biking to work is 25 percent in Davis, California and 11 percent in Madison, Wisconsin.

The National Bicycling and Walking Study concludes that, "... if bicycling facilities are designed to allay safety concerns and are linked in such a way that access matches the access motorists have come to expect, then utilitarian bicycling will increase."

The National Bicycling and Walking Study states that there are three primary factors that correlate with high levels of bicycle commuting:

- Relatively short work trip distances
- Relatively high ratio of bike lanes to arterials
- Presence of a university

The most common factors that deter bicycling include:

- Concern about traffic safety
- Adverse weather
- Poor roadway conditions
- Trip distances

Factors that encourage bicycling include:

- Safe bicycle lanes
- Financial incentives
- Shower and storage facilities
- Rise in gas prices

TABLE 1
Bicycling and Walking Trips by Age Group (NPTS, 1995)

Age Group	Percent Walking Trips	Percent Bicycling Trips
16 & under	10%	3.5%
24 & under	8%	2.2%
25-59	4%	<1%
60 & over	5%	<1%

Walking trips are correlated with similar factors. Additionally, studies have shown that those who do not have regular access to a car walk more. As a group, non-drivers include school-age children and the elderly, college-age students, and those who cannot afford or choose not to own a car.

The Nationwide Personal Transportation Survey (NPTS) finds a correlation between bicycling and walking and younger age groups as indicated by Table 1.

TABLE 2
Bicycling and Walking Trips by Purpose (NPTS, 1995)

Trip Purpose	Bicycling	Walking
Work	9%	9%
School/Church	9%	15%
Shopping/Personal	22%	42%
Social/Recreational	60%	34%

Bicycle and Walking Trip Purpose

In most studies, bicycling is found to be primarily a recreational activity. Surveys find that between 55 percent and 96 percent of respondents describe the purpose of their bicycling as recreational. However, many people (from 7 percent to 65 percent in various surveys), say that they also use bicycles for work/school/utility trips. The 1995 NPTS summarizes bicycle and walking trip purposes as shown in Table 2.

Trip Purpose on Trails

It is commonly assumed that trails are used mostly for recreational purposes. A study of suburban trails in northeastern Illinois revealed some surprising results. Sixty-six percent of bicyclists and 54 percent of pedestrians were using the trails for other than recreational purposes. Twenty-five percent of the respondents indicated that they had chosen to use the trail instead of driving to their destination.

Product/Action

Information on the demographics and trip making patterns associated with bicycling and walking can help planners develop realistic goals. For instance, college towns have a higher potential level of bicycle use. Communities with public transit might have higher levels of walking.

MPOs and RPAs can assist local governments with access to Census Travel to Work data for percentages of walking and bicycling trips to work in the region. They can also provide average work trip length data. This data can offer some insight into local patterns. However, Census data is not a definitive measure of non-motorized trip making. Work travel accounts for only 20 percent of all trips and just 9 percent of bicycling and walking trips and Census data applies only to trips taken in late March. Some regional agencies might have produced additional travel studies that would offer insights into local travel patterns.

- If data is available, produce a summary of local travel patterns including any available information about bicycle and pedestrian trip making and average trip length for all modes.

Analyzing Crashes

The National Highway Traffic Safety Administration, (NHTSA) maintains detailed statistics on traffic deaths and injuries. A pedestrian or bicyclist is killed or injured by a motor vehicle every 4 minutes. Pedestrian and bicyclist fatalities have decreased between 1987 and 1997, by 21 percent (pedestrians); and 14 percent (bicyclists), respectively. National statistics and trends offer insight into general patterns and offer a point of comparison for local information.

Trends would indicate walking and bicycling are getting safer. It is also possible that people are walking and bicycling less. To the extent that national trip data captures non-motorized travel, it appears that bicycling is increasing somewhat and walking is decreasing.

The good news is that there is a general downward trend in traffic fatalities and this trend seems to be applying to pedestrians and bicyclists as well as motorists. The bad news is that certain people, especially children, might be walking and bicycling less than they once did, and this might be partly due to significant injuries and

The National Highway Traffic Safety Administration is sponsoring research to refine development of bicycle/pedestrian crash analysis software for use by local governments.

Contact: Marv Levy, NHTSA,
mlevy@nhtsa.dot.gov.

Although children seem to be bicycling and walking less, they remain vulnerable to death and injury in traffic:

- Bicyclists under age 16 accounted for 31 percent of fatalities and 43 percent of injuries in traffic crashes.
- More than one-fourth of children who were killed in traffic accidents were pedestrians.

The primary factors causing bicycle fatalities are:

- Failure to yield right-of-way: 21.2%
- Riding, working, playing, etc in roadway: 17.3%
- Improper crossing of roadway or intersection: 15.1%
- No factor reported: 27.9%

The primary factors causing pedestrian fatalities are:

- Walking, working, playing in the roadway: 30.5%
- Improper crossing of roadway or intersection: 30.5%
- Darting or running into the roadway, 14.7%
- Failure to yield right-of-way: 13.0%
- No factor reported: 23.3%

deaths associated with these activities.

Additional insight from national bicycle and pedestrian crash analysis include the facts that:

- Most bicyclist and pedestrian fatalities occurred in urban areas, at non-intersection locations, and in the evening and night time hours.
- Males greatly outnumber females as bicyclist (76 percent) and pedestrian (68 percent) fatalities.
- Alcohol involvement – either for the driver or the victim – was reported in one-third of the traffic crashes that resulted in bicyclist fatalities and in 45 percent of the pedestrian fatalities.

Product/Action

National data can serve as a point of comparison as communities look at their own crashes. Not enough is known about non-motorized trip making to draw definitive conclusions about declines or increases in actual crash rates in relationship to exposure. However, it is possible to do at least three exercises to determine the relative severity of the problem on the local level.

- Plot all known bicycle/pedestrian crashes on a map; note locations and check for clustering of accidents at particular locations or types of location.
- Determine a rate of bicycle and pedestrian crashes in relationship to population; compare this rate with the national and state rate.
- Examine police reports and record accidents according to the categories established by the FHWA to see if patterns of accident type emerge.

Area Attractions and Planning Efforts

As communities begin their planning process, it is important to consider destinations and attractions beyond local borders. Some reasons for such considerations can be:

- A community may want to connect with an existing or potential state, regional or adjacent community trail, sidewalk or bikeway system.
- A state park, or some other important destination, might be within biking distance from town.

Product/Action

Connecting to these other amenities will be important to local residents and require a planning effort that reaches beyond the local jurisdiction.

- Map nearby trails and attractions.
- Note points of connection to neighboring pedestrian and bicycle facilities.
- Document any agreements between communities that might impact local planning efforts.

STEP 2: SEEK PUBLIC INPUT

Public involvement in bicycle and pedestrian planning is essential and works best when the community is involved from the beginning. Bicycle and pedestrian facilities can rarely be implemented to meet all of a community's needs. Choices must be made that prioritize investment and citizen involvement is essential to determine what priorities should be served.

Identify Interested Citizens

The environment for walking and bicycling affects many individuals and interest groups. Organizations representing the interests of bicyclists, walkers, trail users, the elderly, the disabled, parents and schools, youth, retail services, business organizations, farmers, and the development community are all potential participants. Failure to involve interested groups can result in opposition that can cripple progress. Furthermore, many individual citizens have developed passionate and well-articulated views about the needs of pedestrians and bicyclists. An efficient process can channel this energy and incorporate the attitudes and needs of interested individuals.

Citizen Advisory Committee

Frequently, a group of interested citizens is invited to join representative local staff to form a Plan Advisory Committee. This format is valuable because issues can be raised and citizens have the chance to influence plan development. Larger communities may form a Technical Advisory Committee as well, drawing on expertise from other agencies. This is a practical option for complex planning processes that require inter-governmental coordination and complex grant applications.

A Plan Advisory Committee can become a standing Bicycle/Pedestrian Advisory Committee that provides continuing public involvement and support. In Seattle, Washington, a citizen based B/P Advisory Committee regularly reviews all City projects that might have an impact on bicyclists and pedestrians. This citizens' group is recognized as a primary factor in Seattle's successful bicycle and pedestrian program.

Product/Action

- Identify participant organizations in and around the community.
- Establish a Plan Advisory Committee of citizens and professionals.
- For complex plans, establish a Technical Advisory Committee of professionals.
- Establish a standing citizen-based Bicycle/Pedestrian Advisory Committee.

STEPS TO CREATING A BICYCLE AND PEDESTRIAN PLAN

Step 1: Evaluate Existing Conditions

Step 2: Seek Public Input

Step 3: Planning Considerations

Step 4: Create a Bicycle System Plan

Step 5: Pedestrian System Planning

Step 6: Develop Implementation Plan

Public Participation

There are generally two phases during which participation by the public is solicited. In the planning phase, citizens join professionals to identify needs and define the network of facilities. During the review phase, the public attends meetings to comment on the plan at its various stages of development.

Open Meetings vs. Invited Workshops

The complexity of each phase depends on the dynamics of the community. In small communities, both phases might involve public meetings. Larger communities might choose to conduct one or more planning workshops to which specific professionals and members of the public are invited. "Invited" workshops represent a concerted effort to involve representatives of each interest group. There are several models for such workshops.



Bicycle Planning "Charrette"

- At a charrette, small groups develop and present to each other a network proposal for some or all of the area under consideration.
- The community of Kalamazoo, Michigan held a very successful "Kids' Planning Charrette." Fifth grade children participated in activities intended to clarify how they experienced the pedestrian and bicycle conditions in their neighborhoods and around their school. Besides having fun, the children were frank, observant, and articulate about conditions that are not always perceived by adults.
- Invited workshops bring professionals and citizens together to share information on topics ranging from regional trail planning to bicycle/pedestrian safety initiatives.
- Pedestrian Roadshows make use of federally developed materials, along with information about local conditions, to inspire public officials and citizens to improve the pedestrian environment.

Plan Presentations

Plan presentations can occur at special plan-specific meetings or at regularly scheduled city council meetings. A special meeting set up solely for the presentation of the draft plan tends to generate more informal exchanges between participant and presenters. This can be valuable, especially early in the process, when important issues or omissions can be addressed. It can also identify opposition to any elements of the plan at an early stage when dialogue with planners and public officials can generate constructive responses. One or more additional presentations or hearings will present the final draft plan to the public and to officials for adoption.

Addressing Opposition

As popular as trails can be, many have also generated vocal and persistent opposition during planning. In some cases, such as Missouri's Katy Trail and Iowa's Cedar Valley Nature Trail, this opposition seriously threatened project implementation. A pro-active public participation process offers the best chance to address opposition from the beginning. It is important to communicate with concerned individuals and groups, who frequently are those with property adjacent to a trail corridor. However, even a proposal to install sidewalks can stimulate debate in some communities. Officials can help to deter public efforts to derail projects by being good listeners and having alternatives available, if necessary.

Product/Action

- Hold planning meetings to solicit citizen and professional involvement in plan development.
- Hold at least two plan review opportunities, one for the draft plan and a second on final plan recommendations.
- Reach out pro-actively to work with potential opposition.

Communications

It is always practical to approach interested citizens even before the formal planning process begins. A letter or call to inform people of the upcoming plan development will yield more responsive involvement. Communication about the plan through special meetings, newsletters, websites, and articles in local newspapers can generate support while keeping interested parties informed.

Participants should be informed about upcoming projects and events so they have time to place notices in newsletters. This is a very effective communication tool. Because not all interested individuals are members of organizations, use of multi-media and municipal mailings is also useful. A project newsletter published several times during the planning process can be a useful progress report. It can be distributed to organizations, individuals, and the media through mailings and website postings.

Product/Action

- Give participating organizations early notice of upcoming plan development and events/meetings.
- Develop and distribute a regular newsletter about the planning process.
- Develop regular media contacts.
- Promote media coverage of all special planning events such as audits or "Kids' Planning Charrettes."

Pedestrian Roadshows can be made available to communities by trained facilitators who work with local planners and officials to organize a workshop and walking audit to examine pedestrian conditions.

Information is available on the internet at:
<http://safety.fhwa.dot.gov/walk>

Contact: Levenson Boodlal,
leverson.boodlal@fhwa.dot.gov

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STEP 3: PLANNING CONSIDERATIONS

Bicycle and pedestrian planning should be understood in the larger context of state, regional, and local planning. These other planning efforts create opportunities to expand the impact of local facility planning. Local systems should connect to the State Trail System. Additional opportunities to address non-motorized travel exist in land-use and site planning, as well, and through roadway design and traffic operations. Some community types have special needs and advantages as they consider bicycle and pedestrian planning. In Iowa, this is especially true of rural and college towns.

Connecting to the State Trails System

The State of Iowa has developed a plan for a statewide system of trails. Additionally, several regional agencies and many local communities have planned and constructed trails. These facilities provide an inter-urban armature of relatively long distance trails. They serve a regional population and connect destinations of broad interest to Iowans and visitors. People often travel to these trails; in fact, the trail itself can be a destination.

In contrast to state trails, local systems include trails, bikeways, and walkways that provide access between a community and the state system; provide safe and convenient facilities for bicyclists and pedestrians at the local level; reflect the community style; and, respond to the needs of its citizens.

Trails and Roadways for Non-motorized Transportation and Touring

Accommodations for bicyclists and pedestrians are made in two contexts:

- Independent multi-use trails
- Roadway-based facilities

Pedestrians and bicyclists want to go to most of the destinations that are accessed by cars. Even very extensive trail systems cannot serve all of these destinations. Inevitably, the road right-of-way, consisting of traffic lanes, shoulders, intersections, parkways and sidewalks serves as the primary planning area for bicycle and pedestrian accommodations. Bicycle travel can be greatly enhanced by roadway improvements, including various strategies to reduce hazards and create bikeways.

It is in the interests of local governments to participate in developing State and regional trails. Economic benefits are detailed in the *Iowa*

Trails 2000 handbook, "Implementing Trail-Based Economic Development Programs." Local participation in projects that complete the State system offers residents trail opportunities close to home and creates a facility that will stimulate additional interest in bicycle and pedestrian planning. Local communities should connect neighborhoods to the trail through a local system of facilities. Most of these facilities will make use of the existing roads. Roads can be made considerably safer for bicyclists and pedestrians through the measures recommended in this handbook. Access to the State system can be further enhanced by the use of signs to guide people to trails.

Product/Action

- Include, as priority projects in local bicycle/pedestrian planning, any portions or connections to the State and regional trail system that travel through the community.
- Follow the "Trail Design Guidelines," developed for *Iowa Trails 2000*, as well as the "Design Considerations" summarized in Chapter Three below.
- Include and sign connections from the local community to the state trail.

Land-Use and Site Design

Community Layout

Land use patterns are notoriously difficult to influence. Yet, the proximity of development and potential for access between destinations is a primary factor in walking and bicycling patterns. Research shows that areas with higher densities and mixed use development are more conducive to walking. In many lower density suburban environments, however, bicycling is often discouraged by obstacles such as busy streets without bicycle accommodations and inadequate crossing opportunities.

Site Access

Both the basic development pattern and the design of individual sites can encourage or discourage bicycling and walking. For example, large parking lots in the front of buildings, berms that discourage easy access, and blank walls are intimidating. However, interesting facades and buildings that face the street and are closer to sidewalks create a more pedestrian "friendly" environment. Parking for cars should either be provided on the street or behind the development. Parking for bikes should also be provided in a protected location and close to the building to encourage non-motorized access.

Transit Connections

Walkways should connect to loading areas from nearby destinations. Bus stops are frequently located in muddy locations without sidewalk connections, that discourages transit usage. Bicycle parking should be available at all fixed rail service stations, bus service hubs, and express



Many Transit Agencies are adding bus racks to buses.

Source: Sportworks NW, Inc.

On February 28, 2000 FHWA Administrator Kenneth Wykle signed off on a new U.S.DOT policy, ***Accommodating Bicycle and Pedestrian Travel: A Recommended Approach***. The key principle of this policy is that bicycling and walking facilities will be incorporated in all transportation projects, unless circumstances that preclude incorporation are demonstrated.

For information:
www.fhwa.dot.gov/environment/bikeped/Design.htm

stops. In many cities, bicycles are accommodated on transit vehicles. Loading the bicycle onto a rack on the bus or into a transit car combines the flexibility of the bicycle with the efficiency of transit for longer distances.

Product/Action

The following land-use planning tools are recommended to positively impact walking and bicycling:

- Encourage in-fill development.
- Provide connections between adjacent developments through a comprehensive network of local streets and/or a series of non-motorized paths.
- Allow back access to retail areas from bordering residential neighborhoods to shorten trip distances for those on foot or bike.
- Design pedestrian connections and adequate crossing opportunities between adjacent areas of strip development and across busy streets that border those developments.
- Require sidewalks in conjunction with development, including appropriate sections of the public right-of-way and private access to buildings.

Roadway Design and Traffic Operations

Roadway Design Issues

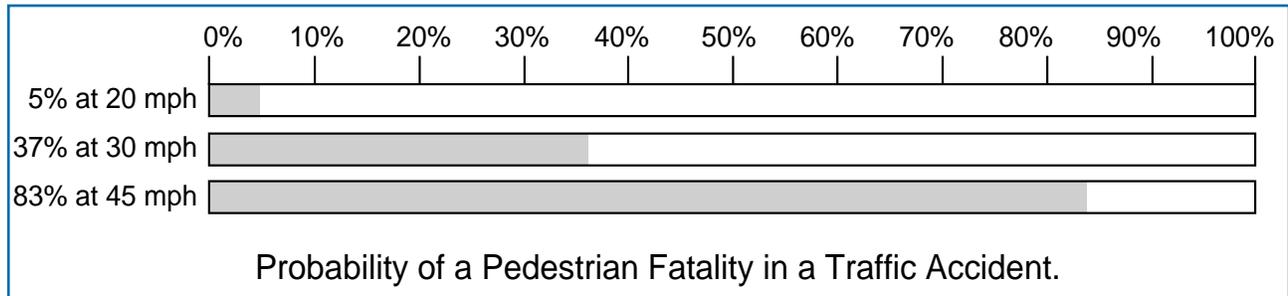
Pedestrians and bicyclists encounter many problems on the roads, such as high speeds, high volumes, extremely wide intersections that are difficult to cross, and lack appropriate facilities. Federal policy supports the consideration of non-motorized needs on all federally funded roadways. The state of Iowa has recently adopted a new, "Bicycle and Pedestrian Accommodation Guidance," which will be applied to state roadways primarily at the time of roadway construction or re-construction. The focus of this guidance is the provision of bicycle accommodations within highway right-of-way where the need is demonstrated. (See Appendix Three for a copy of this guidance.)

Speed and Its Impact

According to research conducted in Germany, the impact of speed on the severity of pedestrian and bicycle crashes is dramatic. In crashes where the vehicle is traveling at 20 mph, fewer than 5 percent of pedestrians are killed; at vehicle impact speeds of 30 mph, close to 40 percent of pedestrians struck have died; and, at 45 mph, more than 80 percent are killed.

Based largely on this and other studies of the impact of speed in the traffic mix, many European countries are implementing policies to maintain very low speeds in congested pedestrian areas and residential neighborhoods. The results of a program in Graz, Austria, after one year, show:

- Serious traffic related injuries were reduced by 24 percent.
- Median speeds were not significantly reduced citywide and traffic flow was more homogenous.
- Traffic behavior improved, especially that of motorists toward pedestrians.
- Noise levels have been reduced.



Traffic Calming

Traffic calming is the term used to describe a variety of techniques that slow or constrain traffic so that pedestrians, bicyclists, and motor vehicles share the road on more equal terms. Traffic calming measures are most often used on residential or central business district streets where increasing pedestrian access and safety is desirable. In Seattle, where such measures have been introduced in many neighborhoods, studies have found significant reductions in motor vehicle speeds, the number and severity of accidents, and air pollution.

Traffic calming introduces variety to street design. A related trend is the introduction of more flexible street design standards, especially in residential development. The use of national standards for the design and dimensions of residential streets has resulted in excessively wide and monotonous streets that encourage speeding and discourage pedestrians. Some communities are finding that they want to reclaim street space for multiple uses, including play space for children and a safer, more interesting environment for pedestrians and bicyclists. A trend toward “skinny streets” in residential areas is intended to create a more intimate, attractive, people friendly environment.

Properly designed and implemented traffic calming measures:

- Slow and/or divert traffic
- Reduce traffic accidents
- Reduce pollution
- Increase the safety and pleasure of walking and bicycling
- Provide opportunities for street “greeting”
- Improve the visual appeal of neighborhoods
- Provide opportunities for the shared use of streets as public space

Communities should consider the impact of roadway projects and whenever possible, incorporate designs that accommodate and encourage bicycle and pedestrian travel.

Product/Action

- Adopt a local policy to consider bicycle and pedestrian needs in all roadway projects.
- Conduct speed studies in several neighborhoods to get a sense of where problems might exist.
- Consider the implementation of traffic calming installations in neighborhoods with speeding concerns.
- Suggest some traffic calming installations if a neighborhood has a speeding problem and the residents are opposed to the installation of sidewalks.
- Reduce speed limits and constrain traffic, as needed, to increase the safety of bicyclists and pedestrians.

Community Design Considerations

Some environments require special consideration of the needs of bicyclists and pedestrians.

Rural Communities

The small populations and sparse development patterns of Iowa's many rural communities create a different demand and need for bicycle and pedestrian accommodations. Rural areas attract bicyclists, but have limited facilities for them. The land-use patterns consist of small towns and farmland with large tracts of state park land. Roads are primarily two-lane state or county highways with no shoulders. Most people live in large lot, single-family housing except those "in town" where housing is more dense.

Rural Downtowns

Iowa's rural crossroads communities have a unique charm. Unfortunately, the highways that form the major street axes for these communities often present difficult conditions for bicyclists and pedestrians. In some communities, a large amount of through traffic traverses "downtown" and it can include potentially hazardous truck traffic. Sidewalks and on-road bicycle facilities are needed to serve local residents and touring cyclists.

It may be necessary to reduce the speed of through traffic within these communities. One method used in rural communities in Great Britain is to construct an "entrance" to the community with a short span of brick pavers and a special warning sign that asks motorists to slow their speed and watch for pedestrians and cyclists.



Mass rides like Iowa's RAGBRAI visit many small towns.

Source: Main Street Iowa

Rural Recreational Touring Routes

Bicycle touring has become a popular vacation and short-trip recreation activity throughout America. Some rural Iowa counties have already begun to develop bicycle route networks to serve touring cyclists. Bicycle touring routes should guide cyclists to scenic and suitable backroads. Paved shoulders are preferable for rural bicycle routes. Touring routes should avoid roads that are excessively dangerous for cyclists, such as those with very high traffic speeds and sharp turns.

Several route options can be provided for touring cyclists:

- *Looped routes* of 16 to 64 kilometers (10 to 40 miles) in circumference can traverse scenic areas and points of interest.
- *Long distance touring routes* should connect to adjacent counties. The interconnected network should enable a cyclist to cross through the state in a direct manner.

Touring routes should be linked to the internal bicycle network in urban areas and small towns. It is essential to develop a bicycle map and clear signing for established touring routes. Maps can identify points of interest such as parks, historic sites, small communities, ice cream shops, bed and breakfast inns, etc.

Product/Action

- Install sidewalks in downtown areas, if lacking.
- Work with state and county to get roadway shoulders paved.
- Work with county and other local governments to create routes and maps and to install signs.
- Design and manage the rural highway system to allow shared use by bicyclists and pedestrians - generally on paved shoulders.
- Increase tourism and recreational opportunities through preservation of rural character and bicycle/pedestrian friendly highways.
- Promote safe walking and bicycling through education of motorists, bicyclists, and pedestrians - "Share the Road" signs should be used on preferred routes.
- Maintain rural paved shoulders.

College Towns

College towns are typically those in which development has been strongly influenced by the presence of a college or university. There is usually a central destination for work, school, and shopping, though the population in these towns fluctuates in response to the university or college calendar.

Demographics

Iowa college towns are associated with a young, educated population. The colleges tend to attract a higher income and more diverse population due to the cultural and other amenities available at the schools. The demographics of these communities suggest that there is a low level of car ownership and a high percentage of walkers and cyclists.

Journey to Work Census information shows that typical college towns have some of the highest percentages of workers who commute by biking or walking. Along with the high level of social acceptance, the density of the campus setting is conducive to walking and cycling. Students are usually young, live close to campus, and often lack other means of transportation. The National Bicycle and Walking Study researched levels of bicycle commuting in 20 cities across the country. The report concludes that, “the most significant variable appears to be the dominating presence of a university. These cities have considerably higher rates of bicycling than other cities. In fact, no other factor correlates so consistently with high levels of bicycle commuting.”

College campuses often generate mixed-use, densely populated communities. Student apartments close to campus are filled to capacity and nearby business districts are supported by students who arrive on foot and by bicycle.

Connection to Campus

Clear and direct on-road bicycle facilities should provide suitable routes for students between home, campus, and other destinations. Reduced automobile traffic on congested streets surrounding the campus could increase opportunities for bicycling and walking.

On-campus Bicycling

Many universities across the country have implemented successful on-campus bicycle systems, including the University of California at Davis, University of Wisconsin at Madison, the University of Colorado at Boulder, and Cornell University in Ithaca, New York. Campus cyclists must operate in a complex network of interconnecting pathways, sidewalks, and roadways. They are often viewed as reckless as they travel between these environments. Good planning and design can reduce conflicts.

University transportation engineers have developed organized spaces for bicycles on campus. They have established “bicycle dismount zones” on pathways where bicycle and pedestrian traffic are in conflict; clearly marked transition areas between campus pathway systems and on-road bikeways; and educational programs for cyclists and motorists.

Bicycle Racks in University Areas

Bicycle parking on university campuses is a key issue. If racks are not provided, riders lock their bicycles to any stationary object near their destination. Bicycles locked to stair railings at entrances can create a hazard by impeding emergency access to buildings. Furthermore, poorly designed and badly located bicycle racks leave riders no choice but to attach their bicycles to trees, benches, and railings.

The first step in providing adequate bicycle parking is to inventory legally and illegally parked bicycles at locations throughout campus. This should provide a general idea of the number of new parking spaces needed (see Appendix One for Bicycle Parking guidance).

Periodic reviews of campus bicycle parking facilities should be conducted to identify maintenance needs and areas where more bicycle racks are needed.

Product/Action

- Work with the college to make the campus, major buildings, and other facilities of universities and educational institutions fully accessible to pedestrians and bicyclists, within a radius of at least three miles.
- To improve safety, extend pedestrian route networks, shorten existing pedestrian routes, and increase advantages of walking.
- Orient transportation systems in college and university towns towards the movement of people instead of vehicles to, from, and within campuses.
- Decrease the need for valuable parking spaces by increasing the development of bikeways, walkways, and secure bicycle parking facilities.
- Use traffic calming techniques to make the bicycle and pedestrian environment more appealing.
- Legitimize walking and bicycling through education of motorists, bicyclists, and pedestrians.

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STEP 4: CREATE A BICYCLE SYSTEM PLAN

Bicyclists want access to most of the same places as motorists, and they can legally use any roads from which they are not officially banned. Many roads are useable for local bicycling but others are undesirable because of such factors as excessive traffic and high speeds. Bicyclists have varying levels of comfort in traffic, depending on skill levels and aversion to risk. The average adult bicyclist is uncomfortable in heavy, fast traffic and prefers an improved designated bicycle facility system.

A bicycle facility network is a continuous, connected system of trails and on-road bikeways that accommodates the needs of the average cyclist safely and conveniently. This network offers information through signs and pavement markings, and special facilities as needed. The following six criteria should be considered in the development of a bicycle network plan.

Bicycle Network Criteria

Directness - A bicycle network plan should provide the most direct routes to major destinations.

Continuity - A continuous, connected system of bicycle facilities should serve major destinations. If there is a significant break in a proposed route, that route should be left off the designated system until the gap can be connected or bridged.

Safety - Where a choice exists, bikeways should be designated on streets with less traffic and lower speeds. When travel speeds are high and traffic is heavy, on-street bicycle lanes or side-path facilities may be considered. When a bikeway crosses a major arterial road, a stop sign or traffic signal should control the crossing traffic.

Comfort - Comfort for a cyclist includes the safety of smooth pavements and light traffic, as well as intangible pleasures like tree-shaded streets, pleasant neighborhoods, and interesting views. On streets with significant traffic, bike lanes increase the comfort of average riders.

Access to Destinations - It is essential to provide routes that lead to major destinations, and to make specific destinations bicycle accessible. Access routes that do not require traveling through parking lots, and conveniently located, well-designed bike racks

contribute to improved access.

Timely Implementation - A bicycle network plan is only as good as the possibility of its being implemented. Many significant improvements are low cost and others can be accomplished as part of already planned street and bridge projects. Prioritizing projects, developing alternatives for controversial proposals, and using funding efficiently will assure timely implementation.

Planning for bicycle transportation has much in common with planning for other modes. A network of facilities that meets demands for circulation and access is required. The process of planning this network requires the identification of priority destinations and connecting corridors, the evaluation of alternatives, and the programming of projects.

Priority Destinations

When developing a facility network, it is important to identify priority destinations, which can include:

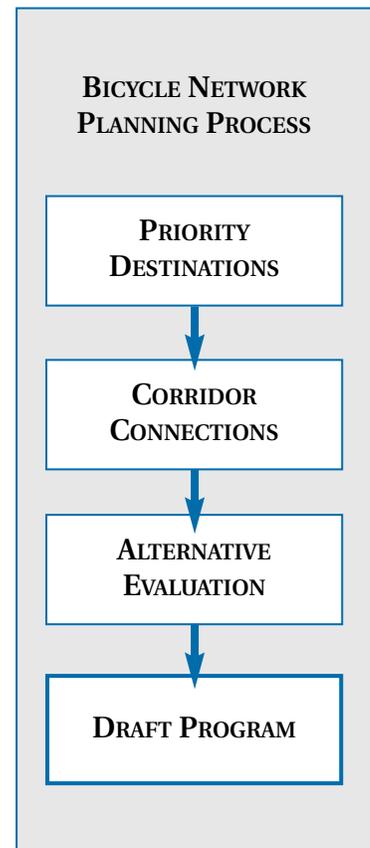
- Existing trails, parks, and recreational facilities
- Central business districts
- Shopping areas
- Schools and universities
- Community centers
- Public services, including libraries and post offices
- Employment centers

The public participation process will identify additional destinations. In addition to priority destinations, participants can be asked to identify:

- Favored routes
- Hazardous or difficult intersections
- Obstacles (e.g. high-volume bridges without sidewalks or bike lanes and freeways)
- Corridors considered to have trail potential
- Priority bicycle parking locations

Corridor Connections

Corridor connections are the obvious connections through the



community between residential areas and priority destinations. By connecting priority destinations along available roadway and trail corridors, it is possible to generate bicycle “desire lines.” Corridors that connect destinations can be identified, and along with trail potentials, will form the basis of the initial network. There might be just one or several roads within each corridor. By applying the network criteria, and evaluating roads for their bicycle compatibility, planners can identify bicycle network candidate roads. Trail opportunities must also be evaluated. While many trail opportunities can accommodate multi-use paths, some are suitable for walking only or will be designated for incompatible motorized uses.

Product/Action

- Map that illustrates potential trail opportunities; priority destinations; “desire line” corridors; and, hazards and obstacles, as known.
- If possible, conduct these mapping exercises during or after a planning “charrette.”

Alternative Evaluation

Alternative evaluation determines which street and trail opportunities are most suitable for bicycle travel. Steps to consider when evaluating trail opportunities include:

Evaluating Trail Opportunities

Opportunities for trail development exist within many types of linear corridors. Some of the most desirable corridors are abandoned railroads. Operating railroads with wide rights-of-way also sometimes share the corridor with a trail. Assess the status of area railroad corridors:

- Are any abandonments planned?
- Are extra wide rights-of-way on operating railroad alignments available that might accommodate a “trail with rail” facility?
- What is the ownership status of already abandoned railroads?

Additional trail opportunities exist along waterways, highways and within utility rights-of-way. Assess other corridors:

- Do canals, rivers or existing greenways offer trail opportunities?
- Are substantial riparian corridors publicly owned?
- Do neighboring communities or other public agencies own portions of corridors to which your community might connect?
- Might public easements be granted along desirable utility corridors?
- Do highway rights-of-way offer adequate width for a trail that would serve identified priority destinations?

Evaluating Roadway Opportunities

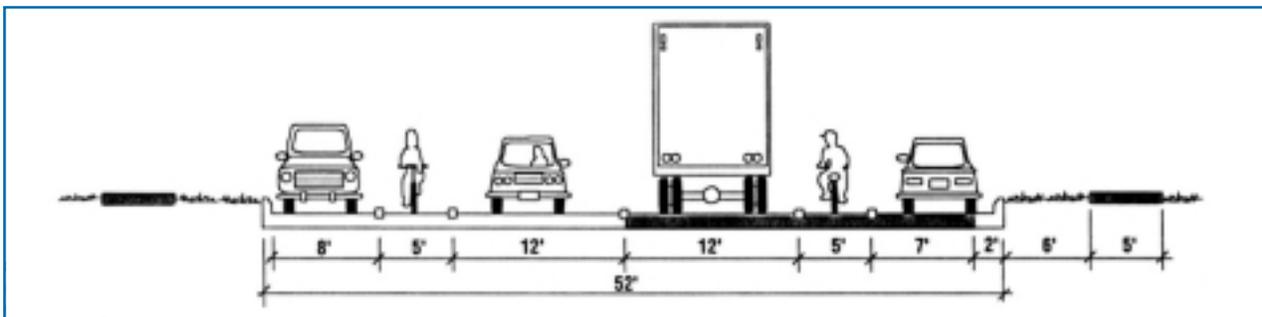
While bicyclists have legitimate access to most roads, some roads are definitely preferable to others. Research indicates that the primary conditions that impact the bicycle compatibility of roads are:

- Roadway widths
- Traffic volumes
- Traffic speeds

Roadway width, the single most important factor, is modified by:

- The presence of a parking lane.
- The presence and usable width of a paved shoulder.

Other conditions impact bicycle traffic, too, and can be incorporated to varying degrees in the evaluation of roads. Surface condition, traffic controls, truck traffic, parking turnover, right-turning vehicle volume, and adjacent land-use, all influence bicycling.



Space Requirements for Standard Roadway, Parking and Bike Lane Widths

Source: Pinsof and Musser, Bicycle Facility Planning, American Planning Association, 1995

Bicyclists are given adequate operating space on roadways in one of two ways:

- A shared lane of adequate width to allow the safe operation of a bicycle and motor vehicle.
- An exclusive bicycle lane.

The width required for sharing a traffic lane with cars is proportional to automobile speeds. On low-speed narrow residential streets, bicycles and cars move at similar speeds. As speeds increase, the requirements for road widths increase to allow for safe operating distances between bicycles and motor vehicles.

The FHWA publication, *Selecting Roadway Design Treatments to Accommodate Bicycles*, (see Design References, Appendix One), offers suggested widths for various types of shared roadways. Generally, a lane width of from 12 to 15 feet is considered adequate for shared use by bicyclists and motorists in most traffic conditions. The provision of bicycle lanes requires from 4 to 5 feet of space per travel direction. If a road requires 12-foot travel lanes, 8-foot parking lanes, and 5-foot bicycle lanes, a roadway width of 50 to 52 feet would be required to handle two-way traffic with parking.

However, localities throughout the United States have incorporated these needs into varying configurations. For instance, in the City of Chicago, a combined bicycle/parking lane of 11 to 12 feet is paired with a travel lane of 10 to 11 feet on some streets. This allows 44-foot wide streets (a fairly common width in Chicago), to provide bicycle lanes. Lane widths of less than 12 feet are gaining acceptance where traffic moves relatively slowly, as on busy city streets, and where it is fairly light, as on residential streets.

Product/Action

Once basic information is known, roadway evaluation can be approached several ways. An informal evaluation works well when planners and traffic engineers are familiar with local roads. This approach involves the following steps:

- Examine traffic data and roadway dimensions for the roads that connect priority destinations.
- Note location of traffic controls at arterial crossing locations.
- Determine which roads might be candidates for bikeway treatments, using design considerations and references as summarized in Chapter Three.
- Based upon priority destinations, locate bicycle parking recommendations.

Bicycle Compatibility Index

In recent years, several research teams have worked to standardize methods to assess the bicycle compatibility of roads. These methodologies rely on formulas to assign a number that represents relative bicycle compatibility to segments of the road. These formulas have, to varying degrees, been correlated with bicyclists' experience of comfort and safety. The "Bicycle Compatibility Index (BCI)" is under development by a team of researchers under FHWA sponsorship. It assigns values to several factors, including:

- Curb lane width and volume
- Traffic speeds in the 85th percentile
- Type of roadside development
- Presence of a parking lane, a bicycle lane, or paved shoulder.

The BCI adjusts for the presence of trucks, parking turnover, and number of right turns. Once the compatibility factor is determined, alternative scenarios can be tested. For instance, a road with poor compatibility can be redesigned to provide a bicycle lane or other improvements that would improve its BCI score.

The trail and roadway evaluations will eliminate some corridors and streets. The remaining "candidates" will form the initial facility network.

Information on the BCI is available in Bicycle and Pedestrian Research 1988, Transportation Research Record 1636, Washington D.C., 1998, ISSN 0361-1981 and at <http://www.nas.edu/trb>.

Also, two FHWA reports, "Development of the Bicycle Compatibility Index: A Level of Service Concept," "The Bicycle Compatibility Index: A Level of Service Concept, Implementation Manual," are available from The Federal Highway Document Center. Fax (310) 577-1421

Product/Action

The initial facility network should be presented to the public, ideally in an interactive meeting. It should be refined as needed to reflect legitimate concerns and comments. Once consensus is formed, further evaluation of the corridors will determine what actual improvements should be programmed.

- Determine priority destinations.
- Evaluate trail opportunity and corridor availability.
- Conduct informal or formal evaluation of roadway bicycle compatibility, as needed.
- Define preliminary network and present to public.
- Develop alternative routes, if necessary.
- Initiate coordinated planning with other agencies as needed.

The two primary resources on national bicycle facility design guidance are:

The American Association of State Highway and Transportation Officials' **Guide for the Development of Bicycle Facilities**, 1999

The Federal Highway Administration's **Manual on Uniform Traffic Control Devices, Chapter IX**. A new edition of the manual will be published soon.

Draft Bicycle Network Program

A draft Bicycle Network Program is the preliminary listing of priority projects for eventual implementation. It will include a list of corridors, projects, general costs, and will also identify implementing agencies and an initial implementation schedule. The evaluation process will have narrowed down the corridors to specific trails and streets. The trail planning process should consider which uses are to be accommodated within available trail corridors. A general assessment can be made of appropriate projects for each street. The bicycle network will be made up of a variety of facilities, including those in the following illustrations. These and other design considerations are discussed in Chapter Three of this handbook.

Bicycle routes on shared roadways - use road "as is;" sign with directional information.



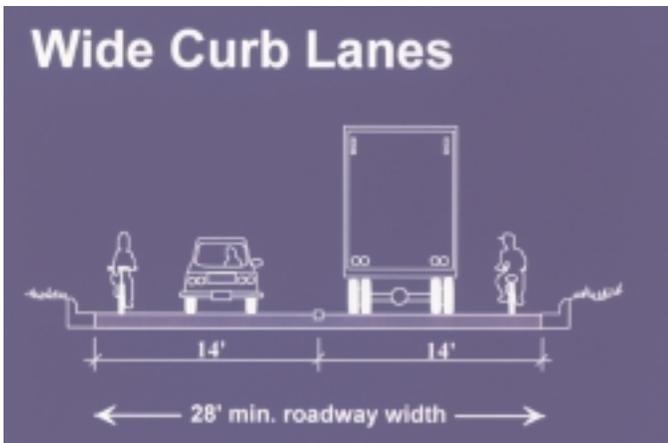
Source: Terri Musser for Bicycles &, Inc.

Bike lanes - mark pavement; use appropriate regulatory signs.



Source: Terri Musser for Bicycles &, Inc.

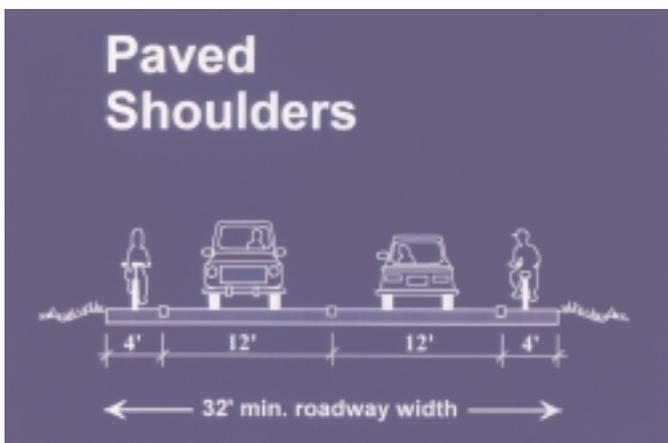
Wide curb lanes - 13 to 15 foot lane width; use "Share the Road" sign.



Source: Terri Musser for Bicycles &, Inc.



Paved Shoulders - pave a minimum of 4 feet; optional bicycle route, "Share the Road" signing.



Source: Terri Musser for Bicycles &, Inc.



Multi-use trail or path - use with care within roadway right-of-way; use appropriate regulatory and warning signs.



Source: Terri Musser for Bicycles &, Inc.



Bicycle parking is an important adjunct to a bicycle facility network. The planning process should determine priority destinations and develop recommendations for bicycle parking.

Product/Action

- Choose appropriate improvements for each corridor.
- Identify locations for bicycle parking.
- Refer to *Iowa Trails 2000* for guidance on trail design.
- Refer to Chapter Three for references and design guidance for bicycle facilities.
- Rank improvements by ease of implementation.
- Develop cost estimates for elements of program improvements based on local prices.
- Present the Draft Bicycle Network Program for public comment and incorporate appropriate changes.

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Step 6: Develop Implementation Plan

STEP 5: PEDESTRIAN SYSTEM PLANNING

Pedestrian planning differs from bicycle planning partly because almost everyone walks. Individuals from every age group and ability level use the pedestrian environment and most destinations need to be accessible by walking. People may be walking less these days, especially in environments that lack pedestrian accommodations. However, many communities are attempting to reverse this trend since walking is healthful, brings people in contact with their neighbors, and offers mobility to those who cannot or choose not to drive.

A pedestrian friendly community must provide facilities that allow people to walk safely. In some circumstances, roadways and developments must be retrofitted to make walking easier and more inviting. Facilities alone will not encourage walking. Revitalizing downtowns and planning for density and mixed-use development are equally important.

Pedestrian Network Criteria

The Pedestrian Transportation System

Pedestrian facilities, like those for any transportation mode, are most effective when they are part of a system that assures connections, continuity, access, and safety. A community-wide system of facilities that is well designed and maintained is essential. It is important to consider the needs of pedestrians during transportation and development projects. In an interconnected pedestrian system, sidewalks are continuous; crossing streets safely is made possible; and, where appropriate, measures are taken to slow automobile traffic.

The Sidewalk Corridor

In most communities, sidewalks are the primary transportation facility for walking. As such, the sidewalk system must be continuous and provide access to all pedestrian destinations. The sidewalk corridor is usually parallel to the road from corner to corner. It encompasses the area from the edge of the road to the property line and provides an area for walking, separated from vehicle traffic, and additional space for signs, streetscaping, and amenities. It must be adequately maintained to remain useful.

Ames, Iowa has revitalized the CBD



Criteria for a Good Sidewalk Corridor

Accessibility - Sidewalks should be easily accessible to individuals of all ability levels.

Continuity and Connectedness - As the primary transportation facility for walking, the sidewalk route should be clear to users and should not be interrupted by gaps and intervening obstacles and conflicting uses.

Safety - Sidewalks should be adequately separated from traffic, well lighted and free of dangerous surface irregularities.

Landscaping - Trees and landscaping within the sidewalk corridor should be used to contribute to physical, psychological and visual comfort.

Social Space - The social aspect of sidewalk corridors should not be ignored so that standing, sitting, visiting and children's play can occur.

Community Form - Sidewalk corridors should be recognized as a community asset and used to contribute to the character of neighborhoods and business districts, and to strengthen community identity.

Street Corners

Street corners are busy places. They are of vital importance to the safe integration of automobile and pedestrian traffic. Here, people socialize, buy their newspapers, mail letters, and window shop while waiting for changing lights or buses. The most dangerous and complicated part of an individual's walk – crossing intersections – occurs at street corners. Street corners house much of the hardware (traffic signals, etc.) that controls the complicated movements at intersections.

Criteria for a Good Street Corner

The following elements should be provided to ensure safe and well functioning street corners.

Adequate Space – Corners should be large enough to accommodate the typical number of pedestrians waiting to cross, congregating for social reasons or waiting for transit. They also must be able to accommodate curb ramps, poles and signs, as well as street furniture, transit shelters and other amenities.

Separation From Traffic – Corner design should effectively discourage the encroachment of motor vehicles into the pedestrian area.

Sidewalks and ADA

The Americans with Disabilities Act (ADA) requires that new and altered public sidewalks and street crossings be accessible. Design standards do not exist for these improvements but local governments are, nevertheless, required to create accessible pedestrian facilities. New design guidance is available for public rights-of-way, sidewalks and trails in a newly released publication: [Accessible Rights of Way: A Design Guide](#). (See Chapter Three for information.)

For more information about ADA requirements, contact the U.S. Architectural and Transportation Barriers Compliance Board, (Access Board) at <http://www.access-board.gov>

Phone: (800) 872-2253

Visibility – Pedestrians must be able to see and be seen by motorists at all times. Traffic controls and signals must also be visible from the pedestrian perspective.

Legibility – Signals, signs and pavement markings should communicate clear messages to the pedestrian.

Accessibility – All corner features including ramps, landings, call buttons, pavement markings and textures must meet ADA standards.

Transportation planning has, "... responded to traffic congestion ... by recommending that we build additional roads. Two-lane streets are widened with turning lanes, intersections are expanded, two lanes become four, and four lanes become six. Wider roads attract more traffic and **more traffic going at faster speeds makes walking more dangerous.**"

- **Mean Streets 1998**,
Surface Transportation Policy Project

Crosswalks

Crosswalks accommodate the most hazardous stage of any pedestrian trip, crossing the street. The purpose of crosswalks is to concentrate pedestrian crossing movements so that the potential number of conflict points between pedestrians and motor vehicles are reduced. There are two types of crosswalks: marked and unmarked.

Crosswalks are the natural extension of the sidewalk at corners (or if there is no sidewalk, the area that would extend if there were a sidewalk). The majority of crosswalks are unmarked. Crosswalks are sometimes marked at mid-block locations. Pedestrians have the right-of-way at crosswalks but are required by law to obey traffic control devices and laws.

Criteria for Good Crosswalks

Clarity – It is clear where to cross and easy to understand possible conflict points with traffic.

Visibility – Pedestrians can see and be seen by approaching traffic – lighting is adequate and obstacles and the location of the crosswalk do not obscure the view.

Appropriate Intervals – The potential demand for crossing is reasonably well served by available crossing opportunities.

Adequate Crossing Time – The pedestrian is allotted or can take an adequate amount of time to cross and does not need to wait an unreasonably long time to begin crossing.

Limited Exposure – The distance required to cross is short or it is divided into shorter segments with median refuges.

Continuous Path – The crosswalk is a direct extension of the pedestrian travel path and is free of obstacles and hazards.

Identifying Priority Service Areas

Walking trips are short trips. Unlike bicyclists who sometimes want to traverse an entire city or region, pedestrians tend to do most of their walking close to home, work, school and commercial activity areas, like central business districts and shopping centers. Some of the areas where pedestrian considerations should and often do occur, include:

- Central business districts
- School routes
- Residential areas
- University/college areas

Additional areas of attention where pedestrian considerations should, but often do not, occur include:

- Access to downtown from surrounding neighborhoods
- Arterial and collector roadways that serve commercial and residential areas
- Neighborhood commercial areas
- Access to parks and community centers
- Hospitals and elderly housing facilities

Product/Action

Define priority pedestrian service areas in your community using existing conditions information and the public participation process.

Evaluating Current Conditions for Pedestrians

Conditions can be precarious for pedestrians. Sometimes, there are no sidewalks or they are in poor condition. The roadway is intimidating with fast traffic, wide intersections, dangerous freeway exits, and inadequate opportunities to cross safely. There are long distances and no pedestrian connections between adjacent developments.

Several tools can help to evaluate local conditions:

Pedestrian Audits

One of the best ways to evaluate a community's pedestrian environment is to conduct one or more "pedestrian audits." These are "walks" taken in various neighborhoods during which citizens and public officials answer questions about the walking environment. These informal exercises usually reveal a great deal about the walking environment. Even more insights are gained when children and



Pedestrian "Desire Lines" can be quite literal.

"Pedestrians and vehicles must have equal status in analyzing the options at an intersection, and thus, some loss in motor vehicle capacity may be necessary to accommodate pedestrians."

Design and Safety of Pedestrian Facilities,

a recommended practice of the
Institute of Transportation Engineers

people with disabilities participate in these audits. (See Appendix Four for a sample audit.)

Sidewalk Inventory

For communities with a significant number of sidewalks, it is useful to inventory existing sidewalks, their condition, missing sections and roads that have no sidewalks at all. If an entire inventory cannot be conducted in the planning process, citizens can often supply some of this information at a public meeting - they will identify the missing pieces that matter to them.

Crosswalk Inventory

It is also helpful to consider the pedestrian crossing environment as a whole system. Which signalized crosswalks have walk phases? Are signals visible to pedestrians? Are traffic gaps adequate at non-signalized intersections?

Hazard Reporting

Some communities have adopted programs through which pedestrians and bicyclists can report hazardous conditions. A complementary "spot improvement" program allocates a relatively small budget to quickly fix minor problems. More expensive and difficult problems are included in future planning and programming. (See Appendix Four for a sample hazard reporting card.)

Analysis of Pedestrian Capacity

The 1994 Highway Capacity Manual (HCM), offers an extensive treatment of pedestrian capacity. It describes the basic principles of pedestrian traffic flow and procedures for the analysis of pedestrian facilities. The intended use of the HCM analysis techniques is to assess and plan for adequate capacity at locations of concentrated pedestrian activity - especially sidewalks, crosswalks and street corners. A balance is sought between the needs of pedestrians and motor vehicles.

Product/Action

- Use public participation process to conduct pedestrian audit to assess general conditions and define needs.
- Inventory sidewalks and produce a spreadsheet indicating missing segments, gaps and state of repair.
- Examine all or a sample of representative intersection locations and identify problem locations for pedestrian crossing.
- Develop prototype solutions for common conditions at intersections.
- Consider adoption of a hazard reporting and "spot improvement program."

Draft Pedestrian Network Plan

Developing specific pedestrian plans that address design options and policies that favorably impact walking is a relatively new activity for municipal government. A local pedestrian plan is generally policy driven. The City of Portland, Oregon, adopted a pedestrian plan that developed prototype design and policies to improve conditions in the primary sub-areas of the walking environment: the sidewalk corridor, street corners, and crosswalks. Designs and policies were adopted to complete the sidewalk network, to improve the pedestrian capacity and safety of street corners, and to increase the safety of crossing streets.

The evaluation process will have identified many needs. Facility improvements will be developed based upon these needs. Many communities annually program sidewalk in-fill projects as well as assuring that sidewalks are built with new road and development projects.

The Institute of Transportation Engineers suggests the following guidance for sidewalk installation (See Table 3). Intersection reconstruction projects offer the opportunity to assess conditions for pedestrians at the corner and in the crosswalks. Crosswalk pavement markings, traffic control and signal improvement projects, curb cut installations and other projects to address special pedestrian needs are sometimes programmed separately. The pedestrian network plan will be dependent on policies to ensure progress on the sidewalk network and include pedestrian considerations in other roadway projects.

Product/Action

- Draft policies to build, in-fill and maintain sidewalks, to improve intersections and crossing opportunities, and to slow traffic in specific areas.
- Prioritize sidewalk in-fill and repair needs considering priority service areas, information on the sidewalk inventory, and sidewalk installation guidance to determine relative importance.
- Identify difficult intersections and prioritize improvements according to priority service areas and public input.
- Determine if traffic should be slowed in some locations to address safety concerns; prioritize locations.
- Refer to Appendix One for pedestrian and traffic calming design considerations and references.
- Develop cost estimates for elements of program improvements based on local prices.
- Present Draft Plan at public meetings and incorporate comments.

Table 3: ITE Sidewalk Installation Guidance

Land Use/Roadway Functional Classification and Dwelling Unit	New Urban and Suburban Streets	Existing Urban and Suburban Streets
Commercial and Industrial (All Streets)	Both sides	Both sides. Every effort should be made to add sidewalks where they do not exist and complete missing links.
Residential (Major Arterials)	Both sides.	Both sides.
Residential (Collectors)	Both sides.	Multifamily-both sides.
		Single family dwellings-prefer both sides; require at least one side.
Residential (Local Streets) More than 4 Units Per Acre	Both sides.	Prefer both sides; require at least one side.
1 to 4 Units per Acre	Prefer both sides; require at least one side.	At least 4-foot shoulder on both sides required.
Less than 1 Unit per Acre	One side preferred; shoulder on both sides required.	One side preferred, at least 4-foot shoulder on both sides required.

Notes:

- 1) Any local street within two blocks of a school site that would be on a walking route to school sidewalk and curb and gutter required.
- 2) Sidewalks may be omitted on one side of a new street where that side clearly cannot be developed and where there are no existing or anticipated uses that would generate pedestrian trips on that side.
- 3) Where there are service roads, the sidewalk adjacent to the main road may be eliminated and replaced by a sidewalk adjacent to the service road on the side away from the main road.
- 4) For rural roads not likely to serve development, a shoulder at least 4 feet in width, preferably 8 feet on primary highways, should be provided. Surface material should provide a stable, mud-free walking surface.

*Source: Charles V. Zeeger, et al,
Institute of Transportation Engineers*

STEP 6: DEVELOP IMPLEMENTATION PLAN

It is one thing to develop a bicycle and pedestrian plan, and another to get it implemented! By following Step 1 through Step 5 of this handbook, planners and citizens should create momentum through the public process and gain official support. Step 6 examines how to further institutionalize a local plan through coordination with other planning efforts and incorporation into the regional transportation planning process. In order to create a bicycle and pedestrian friendly community, it is imperative that projects are programmed and funded and that policies are adopted that assure long-term commitment to plan implementation.

Planning Context

Many local planning factors affect the successful development of bicycle/pedestrian friendly communities. Land use planning and zoning, street design, open space and park planning, as well as investment decisions, all contribute. Coordination of bicycle/pedestrian planning with other local planning efforts is essential for effective results and efficient use of resources. Coordination with regional and state planning is necessary to ensure funding, as well as to use funds efficiently.

Value of Coordination

Coordination empowers implementation. Bicycle and pedestrian improvements should be accomplished in the context of other projects as often as possible. For instance, if a roadway is being widened, then bicycle traffic and pedestrian crossing issues should be considered early in the planning process. In this way, a bicycle lane or median refuge islands might be included in the project, at relatively little cost.

Coordination with other agencies is generally necessary to implement inter-community trail systems. Planning, design, signing and maintenance require coordination. Costs and staff time can be saved by pooling projects of a similar type or applying for federal funding for a program to benefit multiple communities. For instance, a group of Chicago suburban communities have established a joint program to provide bicycle parking at commuter rail stations.

Product/Action

- Adopt the bicycle and pedestrian plan into the community comprehensive plan and look at other local planning efforts for opportunities to implement aspects of the plan.
- Work with other communities, regional and state agencies to develop joint planning and funding initiatives.

STEPS TO CREATING A BICYCLE AND PEDESTRIAN PLAN

Step 1: Evaluate Existing Conditions

Step 2: Seek Public Input

Step 3: Planning Considerations

Step 4: Create a Bicycle System Plan

Step 5: Pedestrian System Planning

Step 6: Develop Implementation Plan

Programming Projects

When specific projects are identified, planning evolves into programming. Programming begins with prioritizing projects.

Criteria for prioritizing projects include:

- Relative need for the facility as identified in the public process.
- Importance to completion of a system of connected facilities.
- Opportunity to accomplish in the context of another improvement.
- Relative cost – inexpensive projects that can be readily implemented should proceed quickly.
- Schedule – projects that require complex planning and funding applications will necessarily be programmed over a longer time period.

These and other factors can be weighted to decide on corridor and project priorities.

Assigning Costs

Project costs must be assigned as accurately as possible. Reliable cost estimates result from careful consideration of the process and details of the project. Average costs and wage-rate figures are often inadequate to properly assess real costs. Professionals familiar with prevailing labor, service and material costs and with Iowa Department of Transportation procedures should prepare cost proposals.

Annual and Longer Range Programs

Projects should be organized into short-range (usually, annual) and long-range programs. Short-range projects are those with the highest priority. Five- or 10-year programs will include projects that require a longer planning horizon.

Ideally, among the short-term projects, some will be highly visible and popular. This will build momentum for the planning effort. Adding bicycle parking improvements or designating bicycle routes with directional signing to local attractions are inexpensive options. Another way to get quick results is to work with an already programmed improvement to add on a bicycle lane or sidewalk project.

Product/Action

- Prioritize bicycle projects and pedestrian improvements.
- Develop short- and long-range programs through which plan projects will be implemented.
- Carefully define the scope and costs of projects to improve funding prospects.

Funding

Bicycle and pedestrian projects can be funded through a wide variety of sources. Trails have been created out of little more than volunteer effort and bake sales. At the same time, many projects require substantial public funding. The major source of public funding for bicycle and pedestrian projects is currently coming through the state from TEA 21 funds. TEA 21 (the Transportation Equity Act for the 21st Century) is the 1998 reauthorization of ISTEA (the Intermodal Surface Transportation Efficiency Act of 1991). This legislation sets national policy for funding roads, transit and now, occasionally, trails. ISTEA strengthened public involvement in the planning process and made transportation funds more flexible so they could be used for bicycle and pedestrian projects as well as highways. ISTEA/TEA 21 is the source of the Transportation Enhancements Program and other programs that can fund non-motorized transportation projects. (See Chapter 6 of *Iowa Trails 2000* for additional sources of funding).

Working with Transportation Projects

Most non-motorized transportation improvements should not need to be funded as independent projects. As supported by federal and state of Iowa policies, bicycling and walking accommodations should be routinely considered in transportation projects. Most federal and state transportation funds, such as the Surface Transportation Program (STP) of TEA 21 may be used for these modes. Many improvements specified in local plans can be implemented in the context of other transportation projects. Furthermore, the entire transportation system will become more conducive to walking and bicycling as routine accommodations are undertaken.

Federal and State Transportation Funding

The primary sources of federal and state funding for bicycle and pedestrian projects include various programs authorized by TEA 21. The most significant of these programs are as follows:

Transportation Enhancement Program: funds bicycle and pedestrian projects (among several other project categories) that serve the transportation system; new area of eligibility is safety and educational activities for pedestrians and bicyclists. Provisions include:

- \$3.3 billion nationwide over six years
- Available for bicycle or pedestrian projects that relate to “surface transportation”
- 80/20 match applies to state program, not necessarily to individual projects
- Match may be other federal funds, in-kind services or contributions

Hazard Elimination Program: directed toward elimination of hazardous roadway conditions. Provisions include:

- \$3.3 billion nationwide over six years
- Bicyclists added to the list of road users for whom hazardous locations can be treated
- Trails and traffic calming measures explicitly made eligible activities
- 90 percent federal share

CMAQ (Congestion Mitigation and Air Quality) Program: funds projects that improve air quality in non-attainment areas. Provisions include:

- \$270 million nationwide over six years
- Bicycle and pedestrian projects remain eligible

Transit Enhancements Program: funds to improve access to transit. Provisions include:

- \$25-\$35 million nationwide over six years
- Bicycle and pedestrian projects are eligible for this new funding category
- 95 percent federal funds

Recreational Trails Program: Special category of TEA 21 specifically for trail development. Provisions include:

- \$270 million nationwide over six years
- 50 percent federal share

Additionally, bicycle and pedestrian projects remain eligible for Scenic Byways Program; Bridge Programs; Federal Lands Highways; and, Section 402 safety programs that are administered through the Governors' Highway Safety Program.

Whichever funding source is being sought, it will likely fund only a portion of the overall costs of the project. Requirements for local matches generally range from 50:50 to 80:20. For this reason, a community should set aside an annual budget of funds that can be used toward bringing significant outside dollars into the community through such programs. (Chapter 6 of the *Iowa Trails Plan 2000* includes guidelines for the various TEA 21 funding areas including the Iowa DOT's Transportation Enhancement Program).

Inclusion of Projects in the TIP

Key to implementing bicycle and pedestrian projects through transportation funding sources is to get them included in the MPO and RPA Transportation Improvement Program (the TIP) and the State Transportation Improvement Program (the STIP). Local bicycle and pedestrian planning should coordinate with regional planning agencies to expedite the inclusion of their projects into the TIP. (Contacts for District Transportation Planners and for the MPOs and RPAs throughout the state are listed in Appendix Three).

The projects must be shown to have a reasonable chance of being funded to be included in the TIP. As discussed above, careful planning and cost estimating is important. Competition is fierce for funding, and it is helpful if the regional agency has evaluation criteria that allow good non-motorized projects to score well. Rural areas that are not within MPOs will work through the RPA to have a project included in the regional TIP. A community may also apply directly to the state for inclusion in the STIP if the project has statewide or regional significance. The District Transportation Planners should be contacted for more information.

The League of Illinois Bicyclists and the Chicagoland Bicycle Federation have initiated a project to engage their members in recommending bicycle improvements for scheduled roadway projects. Roadway projects from the region's TIP are geographically divided to allow members to see what projects are coming up. Respondents to a survey indicate destinations, bicycle traffic, safety concerns, and other comments that would demonstrate the need for bicycle accommodations.

More information is available at http://www.chibikefed.org/>tip_project.htm

Product/Action

- Seek inclusion of projects on the regional TIP or Iowa's STIP.
- Work with the District Transportation Planner for your area.
- Encourage your regional planning agency to establish a non-motorized technical and/or advisory group to help local governments with coordination, planning and project programming.

Strategies and Policies

Developing a plan is the first step toward creating a bicycle and pedestrian-friendly community. No one agency or department can accomplish this goal alone. Coordination with other planning efforts is necessary and many actors are involved in plan implementation. The check list on the following page summarizes the actions that must be taken (strategies and policies), the actors who must be involved (implementers), and the planning efforts through which a bicycle and pedestrian friendly community can be achieved.

Product/Action

Every community will have its own priorities, opportunities and constraints. The emphasis of the implementation plan is facility development. There are additional ways to improve conditions for bicycling and walking. Safety education and law enforcement can play important roles. Other seemingly unrelated activities like housing density and site design have important implications, as previously discussed. The following Checklist for Local Communities offers a smorgasbord of strategies and policies to be selected and developed as appropriate for each community.

Implementing Bicycle & Pedestrian Friendly Planning

Checklist for Local Communities

PLANNING	STRATEGIES & POLICIES	IMPLEMENTOR
Local Bicycle/ Pedestrian Plan	<ul style="list-style-type: none"> • Make bicycle/pedestrian plan an inter-departmental effort; establish mechanism to assure coordination • Basic plan elements include: needs assessment; facility network plan; education and enforcement programs; and, a funding and implementation strategy. 	Local government: multiple departments.
MPO/RPA Bicycle/ Pedestrian Transportation Plan	<ul style="list-style-type: none"> • Request amendment of the MPO/RPA Plan to adopt local bicycle plan. • Seek opportunities to implement State Trail projects within local jurisdiction. • Include projects in TIP for ISTEPA Funding. 	MPO/RPA Local government: multiple departments
Inter-Local Agreements	<ul style="list-style-type: none"> • Develop inter-jurisdictional agreements as needed for acquisition, development and maintenance. 	Local government and MPO/RPA
Master/ Comprehensive Plans	<ul style="list-style-type: none"> • Incorporate affirmative policies for bicycle/pedestrian accommodation. • Adopt a local bicycle/pedestrian plan or element including policies and programmed projects. • Modify local street standard to accommodate shared bicycle/motor vehicle use. • Include ordinances that encourage: mixed use; cluster zoning combined with more open space; dedication of rights-of-way for trails; and interconnected street patterns. 	Local government: planning departments
Capital Improvement Plans	<ul style="list-style-type: none"> • Incorporate bicycle/pedestrian projects and establish schedule for implementation. 	Local government: multiple departments
Transportation/Highway Plans	<ul style="list-style-type: none"> • Identify roads in local jurisdiction for preferential development of bicycle facilities. • Identify roads for sidewalk construction and crossing improvements. • Adopt policy to make all roads safer for shared use. • Tie-in bicycle/pedestrian improvements with highway or municipal street capital improvement plan. • Review all proposed road maintenance and improvement plans for opportunities to incorporate bicycle/pedestrian friendly design. • Develop uniform signage to identify bicycle facilities and trails and educate motorists of potential bicycle use on road. 	Local government: public works departments
Parks, Open Space & Recreation Plans	<ul style="list-style-type: none"> • Incorporate trails and greenway plans as part of master parks plan. 	Local government: parks and recreation departments

PLANNING	STRATEGIES & POLICIES	IMPLEMENTOR
	<ul style="list-style-type: none"> • Encourage and use alternative methods of open space, greenway acquisition: non-profit purchase and financing options; conservation easements; transfer of title options; as well as the usual government financing options. • Adopt a corridor/greenway element that includes multi-use trail development. • Work with adjoining parks and recreation agencies and communities to plan and implement coordinated facilities. 	
Zoning	<ul style="list-style-type: none"> • Zone for cluster development, mixed use and open space preservation. • For strip development, consolidate road access but encourage interconnections between developments to encourage pedestrian and bicycle access. • Examine roadway standards and change to allow traffic calming, and interconnected, narrower, slower roads and paths. • Review ordinances that ban bicycles from roadway or shoulder areas--most are not warranted. 	Local government: planning departments
Site Design Review	<ul style="list-style-type: none"> • Establish a method to amend site designs to improve non-motorized access to and between sites. 	Local government: planning departments
Local Traffic	<ul style="list-style-type: none"> • Consider traffic calming, but maintain maximum access for pedestrians and bicyclists. • Consider traffic free zones as well as bicycle boulevards and other preferential treatments. • Establish a hazard reporting system for bicyclists and pedestrians. • Establish a regular maintenance program for bicycle facilities; sidewalks and shoulders used by bicyclists and pedestrians. • Improve bicycle/pedestrian access to shopping centers. 	Local government: planning departments
School Access Plans	<ul style="list-style-type: none"> • Assure safe routes for bicyclists and pedestrians. • Provide adequate bicycle parking. • Provide bicycle safety education. 	Local government: planning departments; school officials and parents
Private Development	<ul style="list-style-type: none"> • Consider bicycle access incentives such as showers and lockers at employment locations. • Provide bicycle access and parking. • Provide public access to bicycle facilities whenever possible. • Connect bicycle/pedestrian facilities to adjacent developments. 	Development companies

Chapter Three

DESIGNING LOCAL BICYCLE AND PEDESTRIAN NETWORKS

Bicycle and pedestrian networks are made up of a variety of facility types. Sidewalks, trails, paths, and various kinds of bikeways contribute to the basic infrastructure that accommodates bicycling and walking. Existing roadway rights-of-way serve as the primary way for non-motorized as well as motorized traffic. Trail opportunities complement roadways to complete the non-motorized network.

Following is a discussion of and guidance for design considerations for various bicycle and pedestrian accommodations within the transportation system. In addition to the linear components of a non-motorized network, traffic control, intersection design, and auxiliary facilities such as bicycle parking are covered.

THE IMPORTANCE OF GOOD DESIGN

Well-designed bicycle and pedestrian facilities are those that are safe, attractive, convenient and easy to use. They minimize user conflicts, and promote proper use.

Poorly designed facilities are those that are used very little, or used in an inappropriate manner. Poor design is unsafe and can create maintenance difficulties.

Good planning sets the stage for good design. Since most bicycling and a great deal of walking is on or adjacent to streets, the best accommodations result from including bicycle and pedestrian needs at the inception of transportation projects. When added as an afterthought, bicycle and pedestrian facilities will likely be under-designed and costly.

Planning and design resource documents are listed in Appendix One. Of these, several are of primary importance to the local design of pedestrian and bicycle facilities. These include:

Manual on Uniform Traffic Control Devices (MUTCD). This manual contains unified national standards for signs, signals, markings, and devices on all streets and highways open to public travel. "Part IX: Traffic Controls for Bicycle Facilities" establishes national recommendations for signing and marking both on-road and off-road bicycle

facilities. A completely rewritten Part IX will be included in an upcoming new edition of the MUTCD. Proposed changes to Part IX include:

- Bringing the new AASHTO bicycle facilities guide and MUTCD into conformity
- New bike lane signs and markings
- New “Share the Road” signs
- New loop detector markings for bicyclists
- Variable-size signs for use on shared-use paths

The MUTCD is available from the U.S. Government Printing Office, Superintendent of Documents, P.O. Box 371954, Pittsburgh, PA 15250-7954, (202) 783-3238. FAX orders: (202) 512-2250.

Guide for the Development of Bicycle Facilities, 1999. American Association of State Highway and Transportation Officials (AASHTO). These national guidelines and minimum design criteria have been published by AASHTO to provide information on the development of new facilities to enhance and encourage safe bicycle travel. Most state transportation departments use the AASHTO Guide as the standard for bicycle facility development. The Guide is available from AASHTO, 444 N. Capitol Street NW, Suite 249, Washington, DC 20001, (202) 624-5800.

Selecting Roadway Design Treatments to Accommodate Bicycles. This manual was published by FHWA in 1994 to assist transportation planners and engineers in selecting roadway design treatments to accommodate bicycles. It offers guidelines on the desirable width for various types of design treatments based on the anticipated type of bicycle users and various combinations of traffic operational factors. Document #FHWA-RD-92-073 is available at no cost from the FHWA Reports Center, (301) 577-0818. FAX orders: (301) 577-1421.

Design and Safety of Pedestrian Facilities: A Recommended Practice, 1998. Institute of Transportation Engineers (ITE). This is a compilation of articles by experts on the design of pedestrian facilities. Articles address many aspects of roadway, walkway and crosswalk design, as well as, grade separation, signing and signalization. It is available from ITE, 525 School St., S.W., Suite 410, Washington, DC 20024-2797. (202) 554-8050. FAX orders: (202) 863-5486.

AASHTO is in the process of developing a **Guide For the Development of Pedestrian Facilities**. It will be similar in scope to the AASHTO bicycle guide and will provide planning and design guidance. It will be available in early 2002. (See above for contacting AASHTO).

Accessible Rights-of-Way: A Design Manual, 2000. U.S. Architectural and Transportation Barriers Compliance Board (Access Board). This recently published manual addresses the legal and design aspects of accommodating disabled individuals within the street environment. Available from The Access Board, (800) 872-2253
<http://www.access-board.gov>

FHWA is in the process of preparing a two-part report. **Designing Sidewalks and Trails for Access: Part I: Review of Existing Guidelines and Practices**, is complete; **Part II: Best Practice Design Guide**, is under review. To request a copy of the draft documents call (202) 366-7660 or (202) 366-3409. This report addresses the needs of a variety of vulnerable groups, including the elderly, the disabled and children. Design details are offered for sidewalks and trails that are meant to assure the accommodation of the widest possible range of users for each type of facility.

CONNECTING TO THE STATE TRAIL SYSTEM

Ideally, every community should be connected to a significant trail. If a community is served by nearby trails, the benefits can be increased by improved access. Access is improved by:

- Local bicycle and pedestrian facilities
- Signing
- Amenities

Local Facilities

Local bicycle and pedestrian facilities allow and encourage bicycling and walking in a community. These facilities should complement and connect to state and regional trails. Design guidance for trails and multi-use paths is summarized in Chapter Four of *Iowa Trails 2000*. Design considerations for bicycle and pedestrian facilities within the transportation system are discussed below.

Signing

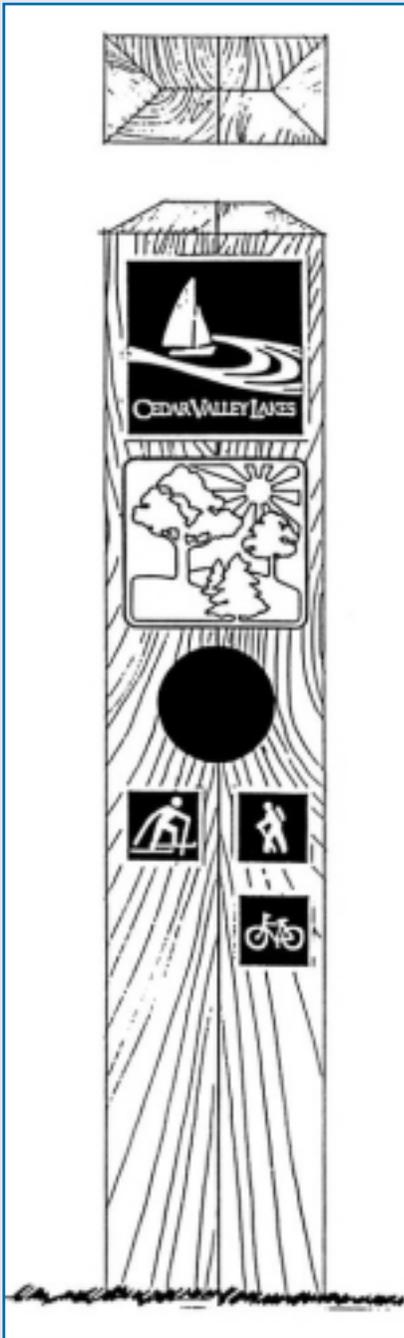
There are four basic types of signs that offer information about the bicycle and pedestrian environment:

- Directional signs give street names, trail names, direction arrows, and other navigational information.
- Cautionary signs warn of upcoming roadway crossings, steep grades, blind curves, and other potential hazards.
- Regulatory signs tell the “rules of the road” prohibiting certain uses or controlling direction of travel.
- Interpretive signs offer educational information and are often used on trails.

The street environment is generally signed with directional, cautionary and regulatory signs and markings as specified by the MUTCD.

Trails, and sometimes community bicycle networks, are signed with identifying names and logos. In some cases, inter-jurisdictional trail systems share a logo, as is the case of the Cedar Valley Lakes Trail System in Waterloo and Cedar Falls, Iowa.

Additional information about trail signing can be found in Chapter Four of *Iowa Trails 2000*. Signing of bicycle and pedestrian facilities is discussed as it relates to the facility considerations that follow.



Trail Access Sign

Amenities

The general environment surrounding a specific facility will influence the level of user comfort. Amenities, provided by the public and private sectors, can enhance the trail experience and increase the economic benefits of the trail. Benches, water fountains, bicycle parking facilities, and pull out bays for maps along trails all make using trails, bikeways and sidewalks more pleasant. Additional amenities that encourage bicycle and pedestrians are casual restaurants, outdoor cafes, bike shops, gas stations and mini-marts, public toilets and pedestrianized central business districts. The Cities of Ames, Waterloo, Des Moines and many other Iowa communities have revitalized their Central Business Districts to encourage walking to shop and to enhance the enjoyment of public spaces.

BICYCLE FACILITIES AND ACCOMMODATIONS

Shared Roadways

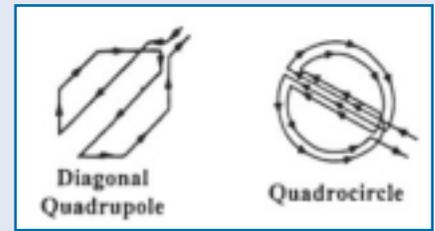
Some streets are useable as is for bicycle travel. These include many residential streets, and some collectors and minor arterials. Major arterials and many minor arterials and collectors require some type of improvement to accommodate most bicyclists. The ideal on-street bicycle network is made up primarily of minor arterials and residential collectors. These are generally through streets that do not have the very high speeds and volumes of major arterial roadways.

Removing Hazards

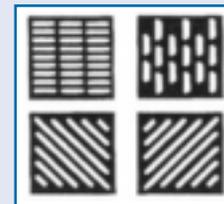
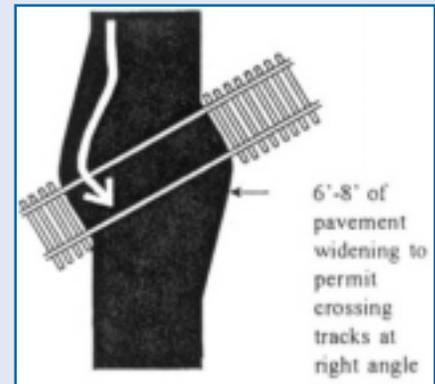
"To varying extent, bicycles will be used on all highways where they are permitted," (AASHTO, 1999). Therefore, all roadways should be made as safe as possible for bicycle travel.

Bicyclists, even more than motorists, need a smooth, debris-free pavement. Certain design features that can make any roadway a safer place for bicycling include:

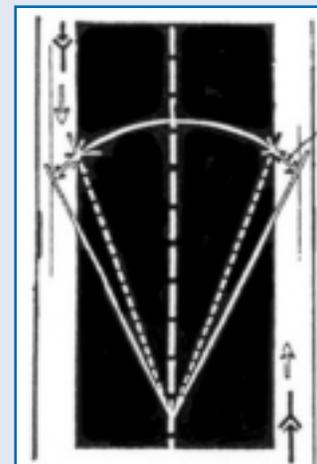
- Signals that can be activated by a cyclist.
- Pavement markings placed over the most sensitive part of a loop so that cyclists know where to position themselves to trip the light.
- Bike-friendly railroad crossings with rubberized crossings and/or a widened pavement that allows a cyclist to cross tracks at right angles.
- Bike-friendly drainage grates without slats that run parallel to the curb and "eat" bicycle tires.
- General attention to maintenance needs at the right-hand edge of the roadway.



Pavement markings allow bicyclists to "trip" the signal



Bicycle-safe drainage grates

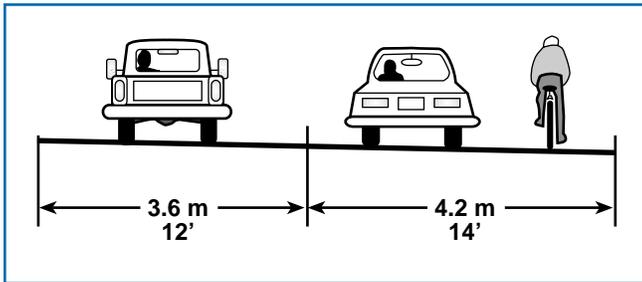


Expand focus of maintenance activities

Increasing Lane Width

“Width is the most critical variable affecting the ability of a roadway to accommodate bicycle travel,”(AASHTO, 1999). This does not necessarily mean that all roads should be widened. Lane widths can sometimes be re-configured to provide a wider outside travel lane (12-foot to 14-foot) for shared bicycle, motor-vehicle use.

Special Considerations



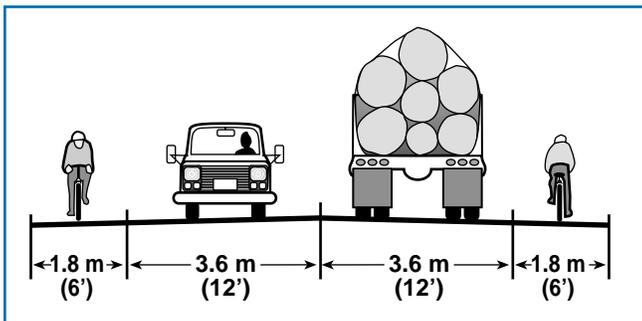
Wide Curb Lane

Source: Oregon Department of Transportation

- Wide curb lanes on arterial roadways improve the cycling environment but are not designated bicycle facilities.
- A wide curb lane integrates bicycle and vehicle traffic and forces recognition and awareness on the part of motorists, particularly at intersections.
- Wide curb lanes on urban arterials accommodate bicycle use, whereas, striped and signed bike lanes accommodate and encourage increased bicycle use.
- Shared lanes should not be wider than 14 to 15 feet; greater width encourages motor vehicles to double up; if more than 15 feet of space is available, bicycle lanes should be considered.

Paving Shoulders

Paved and maintained shoulders improve conditions for bicycle travel on roads without curb and gutter.



Shoulder Bikeway

Source: Oregon Department of Transportation

Special Considerations

- Shoulders must be paved and maintained to a surface standard equivalent to regular travel lanes.
- Paved shoulders that are intended for bicycle use should continue through intersections and should not be routinely used as right-turn lanes for vehicular traffic.
- Rumble strips should not be used on shoulders designated for bicycle travel; if used, additional paved width (4 feet) for cyclists should be provided on the right side of a narrow rumble strip.
- Shoulders may be designated as lanes for preferential bicycle use through appropriate signage and pavement markings if they meet the recommended AASHTO width of four feet or greater. (See section below on bicycle lanes for additional considerations).

Bicycle Routes

Bicycle routes are shared roadways that are signed for preferential use by bicyclists. Bicycle route signing is recommended for relatively low volume, low speed streets that form part of a bicycle facility network that serves destinations of importance to bicyclists.

Special Considerations

- Hazards to bicycle travel should be removed from designated streets.
- Signed routes should serve a destination unless the purpose of the route is to explore a certain neighborhood, such as an historic district.
- Supplemental information added to bicycle route signing to indicate direction and distance to destinations is very useful.



Variations on Bicycle Route Signing

Sidewalks As Bicycle Routes

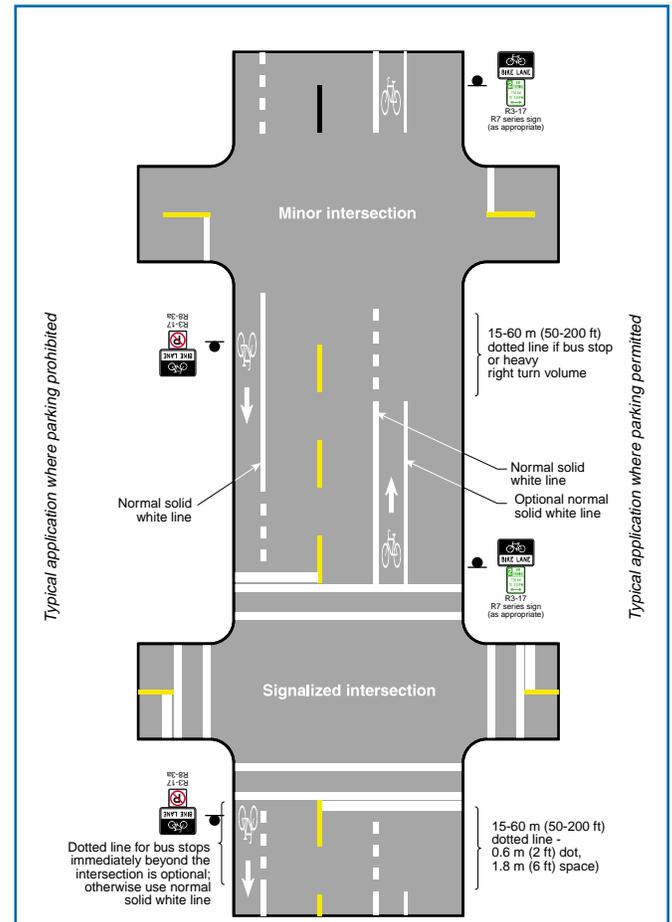
It is generally inadvisable to sign sidewalks as bicycle routes. Even very wide sidewalks do not necessarily add to the safety of bicyclists, since a wide width encourages faster bicycling and increases the potential for conflicts with pedestrians and with motor vehicles at intersections.

Special Considerations

- Sidewalk facilities may be used as bikeways for short distances to provide system continuity where the roadway is not appropriate for bicycle travel.
- Sidewalks may be used as bikeways on narrow bridges.
- Sidewalk riding by young children is common and acceptable.

Bicycle Lanes

Bike lanes are striped portions of the roadway designated for preferential use by bicyclists. The lanes must be a minimum of 4 feet in width (5 feet where adjacent to parking), exclusive of curb and gutter. Bicycle lanes have been shown to increase the predictability of movements by bicyclists and motorists.



Typical pavement markings for bike lane on two-way street (AASHTO)

Source: Richard Moeur for AASHTO

Special Considerations

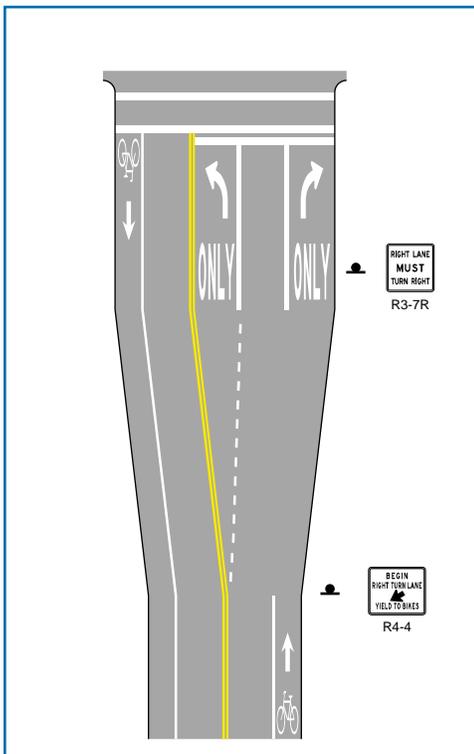
- Bike lanes should always be placed to the right of the travel lane and to the left of the parking lane.
- Bike lanes are one-way facilities.
- Pavement-markings indicate direction of travel.

Bike Lanes At Intersections

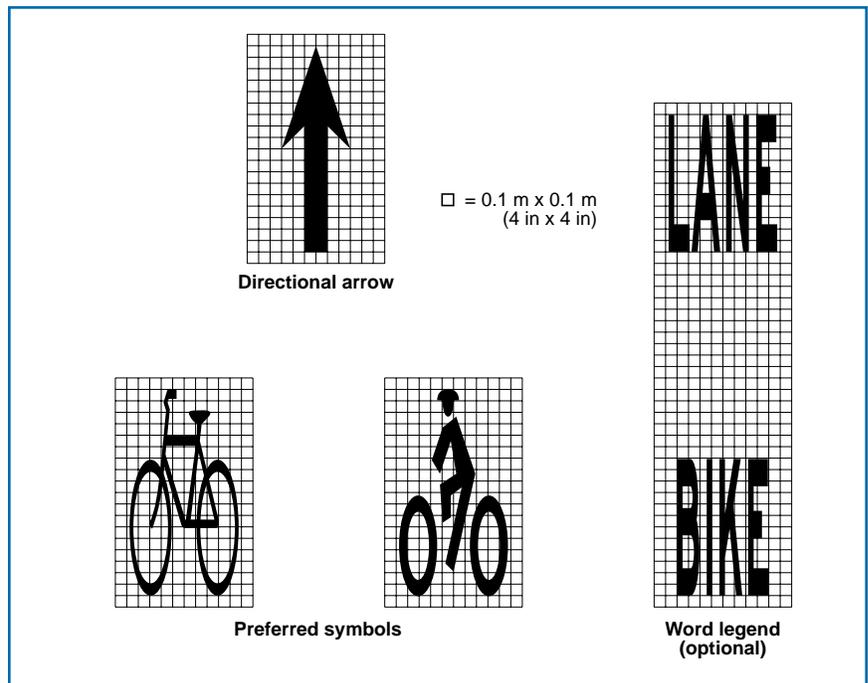
Intersections present special problems for bicyclists. However, where space is limited due to multiple turn lanes, the approaching bike lane may be dropped in advance of the intersection, whereby the cyclist assumes proper lane position to proceed straight, and then picks up the designated bike lane on the other side of the intersection.

Special Considerations

- "Bike lane stripes should not be installed across pedestrian crosswalks; and in most cases should not continue through any street intersections," (AASHTO, 1999).
- AASHTO provides guidance for bike lane treatments at various types of intersections.



A Bike Lane Approaching an Intersection with Throat Widening
 Source: Richard Moeur for AASHTO



Typical Bike Lane Symbols
 Source: Richard Moeur for AASHTO

- Bicycle lanes are generally designated by pavement markings and symbols.
- The diamond symbol previously used on signs and as a pavement marking should no longer be used for bike lanes.

One-Way Streets

One-way streets can be difficult for bicyclists. Legally, bicyclists must ride with traffic. On one-way streets, bicyclists often use the sidewalk or ride against traffic, a significantly hazardous practice. Some communities provide bike lanes on matched one-way streets. Cyclists can also be given the legal right to ride the “wrong” way on a one-way street in a contra-flow lane, when other options are not available.

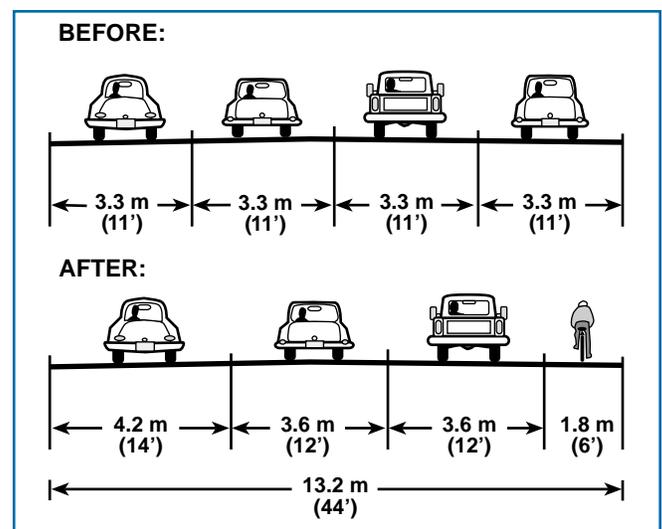
Contra-Flow Bicycle Lane

Design solutions need to include elements to make both motorized and non-motorized users aware of the special conditions that exist on a one-way street that incorporates a contra-flow bike lane:

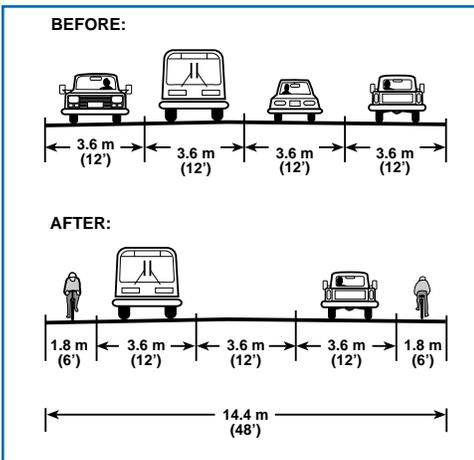
- The contra-flow lane should be signed and marked 4 to 6 feet from the left curb with a “centerline” stripe and pavement stencils for bikes only.
- The entire contra-flow bike lane may be colored blue or red to make the unusual situation highly visible.
- A regular bicycle lane is typically provided on the right side of the street.
- On-street parking may or may not be present on the side that flows with vehicular traffic but is not recommended on the contra-flow side.
- Each intersection is signed for two-way bike traffic and one-way motor vehicle traffic.
- Special treatment should be installed at signals to provide a clear green for wrong-way bike traffic.

Finding Space For Bike Lanes

There are several ways to find space on roadways (short of pavement widening) for bike lanes. The Oregon Department of Transportation recommends the following considerations when looking at an existing roadway for bicycle lane opportunities.



*Travel Lanes Reduced from 4 to 3 on a One-Way Street
Source: Oregon Department of Transportation*



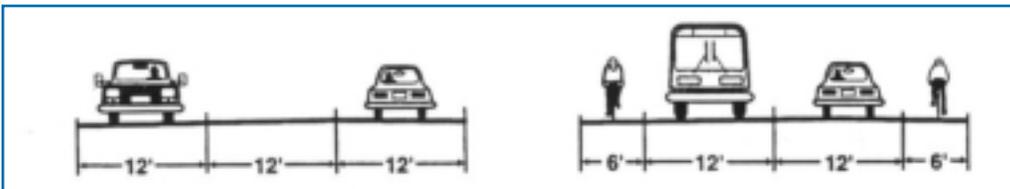
Travel lanes reduced from 4 to 2, with center turn lane

Reducing Number of Vehicular Travel Lanes

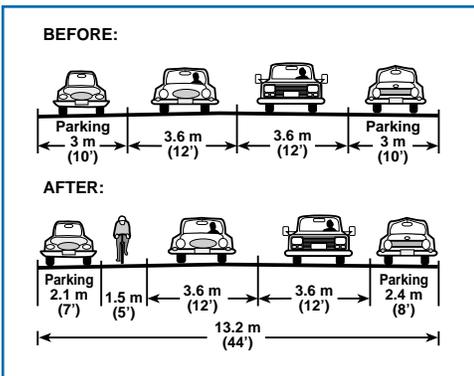
Many one-way couplets were originally two-way streets. This can result in an excessive number of travel lanes in one direction.

On two-way streets with four travel lanes and a significant number of left-turn movements, re-striping for a center turn lane, two travel lanes, and two bike lanes can actually improve traffic flow. (See Appendix Five, "Do We Really Need 4 Lanes of Traffic?")

On other streets, continuous center lanes may be present in areas with no adjacent land uses to generate turning movements. This center space can thus be reallocated to bicycle lane space.



Travel lanes reduced from 3 to 2



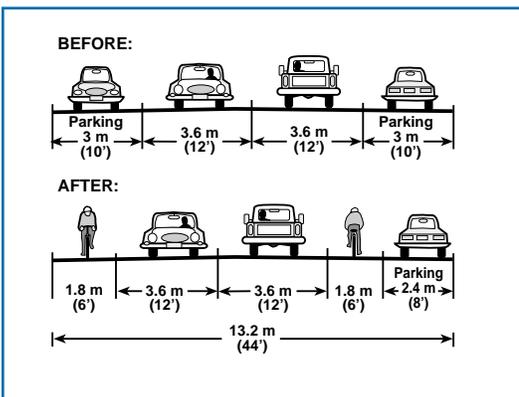
Narrowing parking on a one-way street

Reassess the Need for and Configuration of On-Street Parking

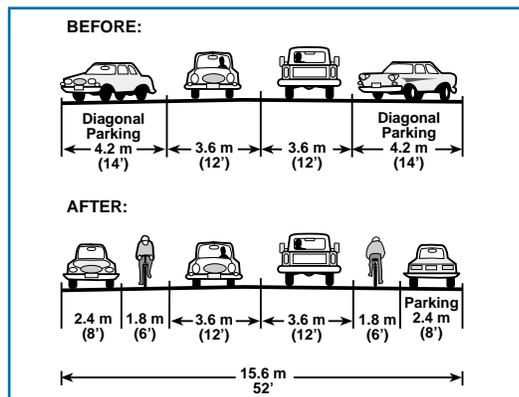
Parking can be narrowed to 7 feet, particularly in areas with low truck parking volumes, as today's cars are smaller.

In some cases, parking may be needed on only one side to accommodate residences and/or businesses. Note: It is not always necessary to retain parking on the same side of the road through an entire corridor.

Diagonal parking takes up an inordinate amount of roadway width. It can be hazardous, as drivers backing out often have poor visibility of oncoming traffic. Changing to parallel parking reduces availability by less than one-half of total parking space.



Parking removed on one side of a two-way street



Changing from diagonal to parallel parking on two-way street

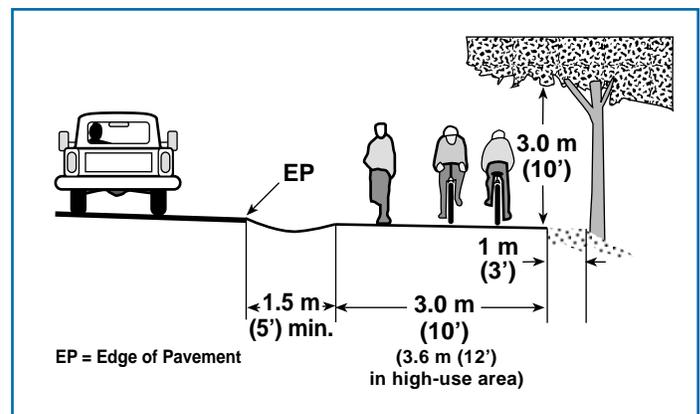
Shared Use Paths

Shared-use paths or trails, made of asphalt or concrete, should be 10 to 12 feet wide. They should be separated from the roadway system and designed for use by bicyclists, pedestrians, in-line skaters and other non-motorized users. Sidepaths are shared-use paths that immediately parallel roadways, like extra-wide sidewalks.

- Multi-use paths and trails are most appropriate within undeveloped linear park-type corridors, such as abandoned railroad beds, along stream banks, and within utility rights-of-way.
- Care must be taken to properly locate and sign/mark intersections of paths with streets and roadways.

Special Considerations

- Contrary to popular belief, a sidepath rider is more likely to be involved in a collision with a motor vehicle than a cyclist on the street.
- Thus, for non-motorized user safety, sidepaths should be considered only when the following criteria can be met:
 - There are relatively few intersecting streets and there are good sight triangles, including driveways.
 - The path parallels a high-speed or high-volume roadway with poor on-street riding conditions.
 - There is 15 to 20 feet of barrier-free space adjacent to the road for path and clear zones.



*Multi-use path standards
Source: Oregon Department
of Transportation*

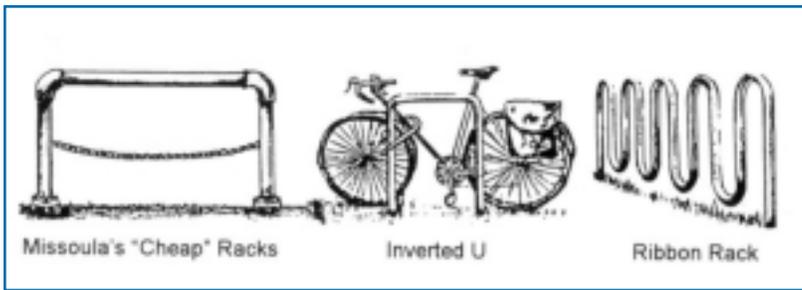
Bicycle Parking

A component not to be overlooked in any local bicycle plan is the provision for adequate bicycle parking destinations. Investments in bicycle parking will:

- Increase overall parking capacity at little cost.
- Eliminate the clutter, pedestrian hazards and tree damage from randomly parked bicycles.
- Let people know that they and their bikes are welcome to shop locally.
- Attract additional users to the bicycle system.

Short-Term

Short-term bicycle parking facilities include those racks where a cyclist can lock up quickly and easily. Racks that are complicated to use, or any old-fashioned racks that only hold the wheel of the bicycle, should be avoided.



Short-Term Bicycle Parking

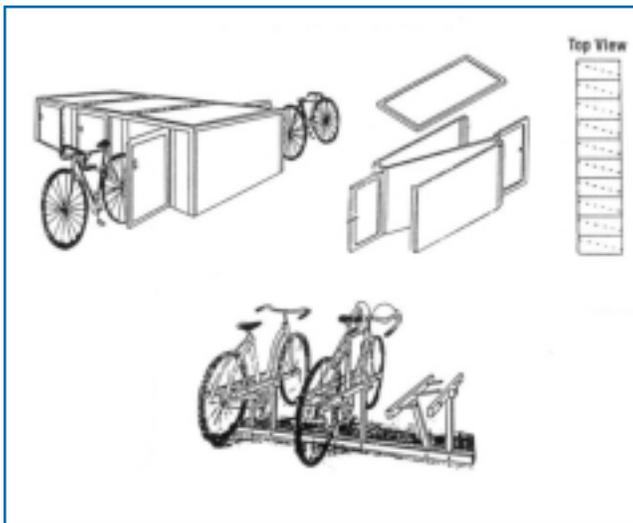
Recommended short-term bicycle parking racks meet the following criteria:

- Simple design that can be permanently installed in the ground.
- Accept the popular U-shaped bike locks, as well as cables and chains with padlocks.
- Allow a cyclist to easily lock the bike frame and one wheel to the rack.

Long-Term

Long-term bicycle parking should be encouraged in areas where it is necessary for employees, transit commuters or tenants to park for more than two hours. One simple way to provide long-term parking is to allow bicycles to be brought and stored inside the workplace. Other options include installing high-security racks, bicycle lids, bicycle lockers, and/or designating locked rooms or cages for bicycle storage.

Recommended long-term bicycle parking facilities should provide:



Different Needs for Longer Stays

- A fully enclosed, secure space for the bicycle, or
- A rack that can secure the frame and both wheels without removing either wheel.

Special Considerations

The most important considerations to ensure successful bicycle parking are a good rack and a good location. When choosing a site, consider the following:

- *Racks must be convenient*
Bicycle parking must be as convenient or more convenient than auto parking. In strip developments, strive to place parking units no further than 50 feet from the main building entrance or no further than the closest non-handicap automobile parking spaces. In commercial neighborhoods, smaller racks should be dispersed along sidewalks to provide close access to multiple storefronts.

- *Racks must be visible*

Parked bicycles should be easily visible from the street or adjacent to high pedestrian traffic to discourage bike theft and vandalism. Adequate lighting of the parking area is also critical.

- *Racks must be accessible*

Locate racks far enough away from walls and other obstacles so that a bicycle can maneuver in and out even when other bikes are using the rack.

- *Racks should not interfere with other uses*

This includes taking care not to infringe on pedestrian travel zones, as well as separating bike and auto parking areas to protect parked bicycles from being damaged by motor vehicles.

- *Racks should ideally be protected from inclement weather*

Whenever possible, install bicycle parking under an existing awning or overhang, and always place racks on a paved surface.

PEDESTRIAN FACILITIES AND ACCOMMODATIONS

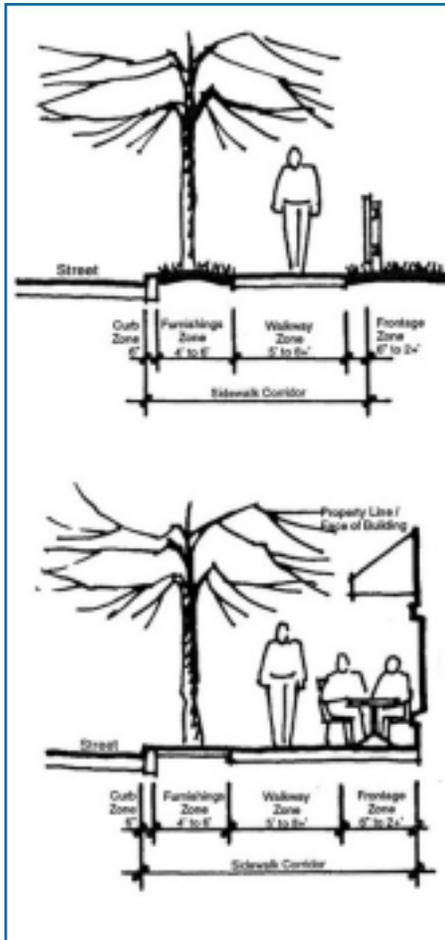
The Sidewalk Corridor

The sidewalk corridor represents the primary transportation facility for walking. As such, the sidewalk system must be continuous and provide access to all the destinations a pedestrian would like to go. The sidewalk corridor varies in width because it should provide at least 5 feet of walking space and additional space for signs, landscaping and amenities. The sidewalk must be adequately maintained to remain useful. The sidewalk corridor is made up of three areas: the walkway area, or what is commonly called the sidewalk; the furnishing zone or parkway area; and, the frontage zone.

The sidewalk or walkway is the area intended for pedestrian travel. Sidewalks separate pedestrians from traffic; must be continuous and well maintained; and, should be a minimum 5 feet in width in residential areas and 6 to 8 feet in commercial areas.

Special Considerations

- The Americans with Disabilities Act (ADA), requires that a useable area of at least 3 feet be provided within the walkway and that it should have a cross slope of no more than 2 percent.
- Surface should be firm, stable and resistant to slipping.
- Sidewalks should cross driveways; the sidewalk surface and grade should be maintained across the driveway.
- Pavement markings and/or traffic controls can further demarcate the pedestrian zone.



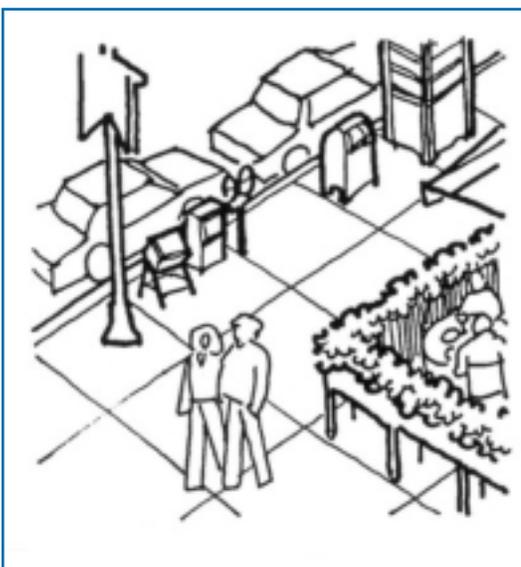
Two common types of sidewalk corridors

Source: Portland Pedestrian Design Guide

The **furnishing zone** or **parkway** planting strip separates the sidewalk from traffic and provides an area for landscaping, lighting, signs and utilities. Transit stops are located in the furnishing zone. It varies in width but should be between 4 and 6 feet wide. Landscaping and appropriate lighting create a more pleasant walking environment.

Special Considerations

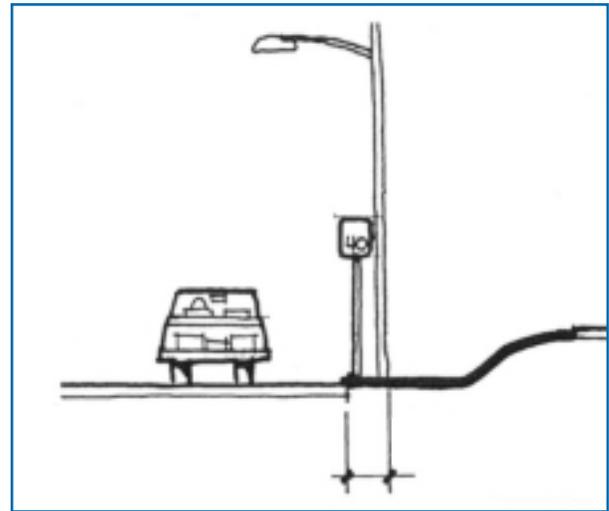
- On residential streets the parkway plantings contribute to the ambience of the neighborhood and cool the walkway.
- In commercial areas the furnishing zone can be paved or planted; it is usually desirable to include planters and trees even where it is paved.



Downtown furnishing zone

Source: Portland Pedestrian Design Guide

- Major arterials often lack an adequate furnishing zone:
 - a worn path is often visible in the grass
 - the sidewalk is immediately adjacent to travel lanes, and/or
 - the walkway is interrupted with utility boxes and light poles.
- Every attempt should be made to provide an adequate, continuous walkway, separated from traffic by a furnishing zone, along arterial streets.
- The comfort and safety of transit use should be maximized with paved landing areas, transit shelters and un-obstructed walkways.



Arterial furnishing zone in an inadequate sidewalk corridor

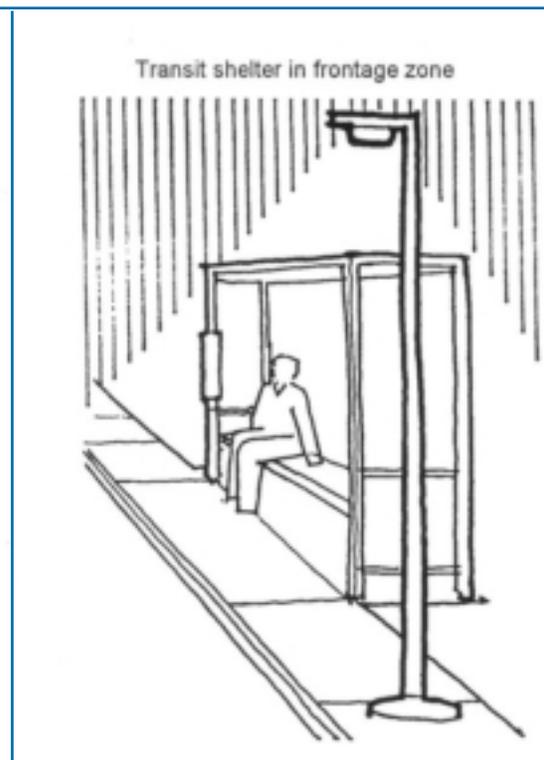
The **frontage zone** is a space from a few inches to several feet in the area between the walkway and the adjacent property line. This zone provides a comfortable shy distance for pedestrians from walls, fences and bushes. Sometimes outdoor cafes, benches and planters fill the frontage area.

Special Considerations

- Sidewalk amenities such as canopies, signs, flags, fences and planters are allowable but should not block the walkway.
- ADA requires that building appurtenances may not project more than 4 inches (100mm) in the frontage area between the heights of 2 feet 3 inches (686 mm) and 6 feet 8 inches (2030 mm).



Source: Portland Pedestrian Design Guide



Source: Planning, Design and Maintenance of Pedestrian Facilities, FHWA

Crossing Streets

There are two types of crosswalks:

- Unmarked
- Marked

The crosswalk is the natural extension of the sidewalk as the pedestrian crosses the street. **Crosswalk markings** are used to clarify and visually enhance the pedestrian crossing area where pedestrians can be expected in significant volumes. They are always installed at signalized intersections with pedestrian signal heads. Priority locations for the installation of marked crosswalks, include:

- Approved school crossings and along recommended safe school routes.
- Areas of substantial conflict between motorists and pedestrians.
- At arterial crossings in central business districts.
- Wherever there is a need to clarify or to increase the visibility of the crossing area.

Special Considerations

- Crosswalks should not be marked indiscriminately because motorists may cease to notice or respect their significance.
- If warranted by demand, mid-block pedestrian crosswalks can be marked.
- Mid-block crosswalks should not generally be installed if an intersection is within 400 feet of the location.

Several crosswalk marking designs are in common use. The ladder and zebra stripe markings are useful where extra visibility is desired.

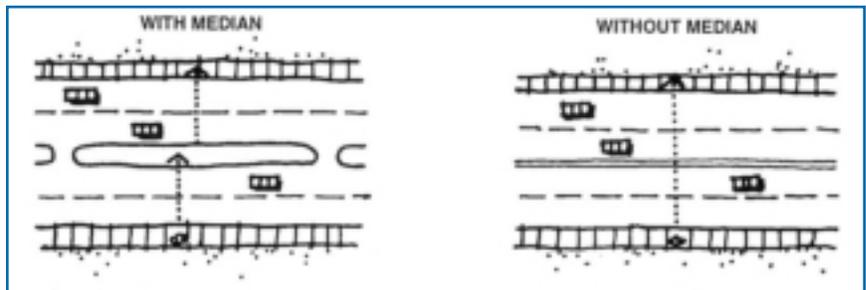
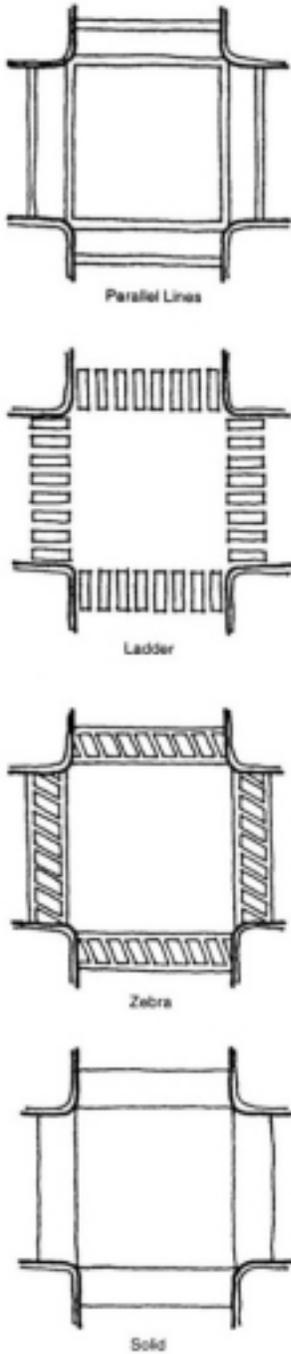
Median Refuge Islands are used to assist pedestrians who must cross wide streets. Refuge islands should be a minimum of 6 feet wide and 12 feet long. They are safer when raised and constructed with barrier curbs. Curb cuts must accommodate wheelchairs and are sometimes used by bicyclists, as well.

Special Considerations

- Median refuge islands are appropriate for crosswalk distances that are greater than 60 feet.
- Are appropriate at complex intersections and for some mid-block crosswalks.

Four styles of crosswalk markings
Source: Planning, Design and maintenance of Pedestrian Facilities, FHWA

At right: Pedestrians can stage crossing of multi-lane roadways.



Requires two 8-second gaps. Ped. can look in one direction at a one time.

Requires one 14-second gap. Ped. must look in both directions.

Right-Turn Lane Islands allow pedestrians to deal with just one vehicle movement at a time. This is especially important where the curb radius is large and vehicle turning movements are relatively fast. Right-turn slip lanes can pose difficulties for pedestrians, especially if designed to allow continuous right turns. For pedestrians it is best if turning vehicles must yield to cross traffic in order to create a phase for pedestrians to cross.

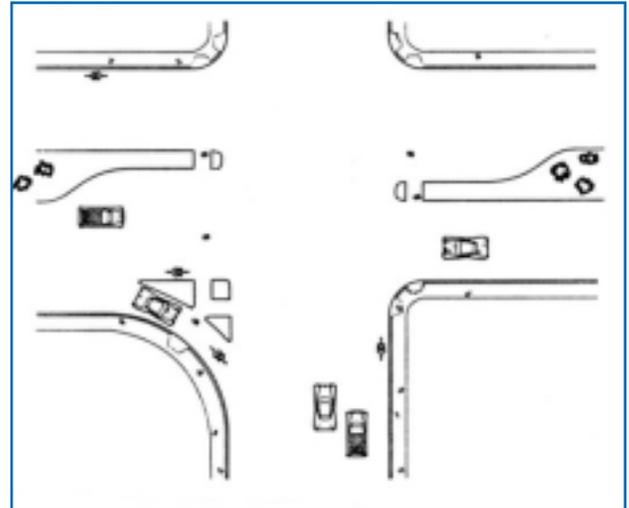
Special Considerations

- Right-turn lane islands shorten legs of crossing and increase visibility and sight lines
- Channels turning vehicles

Raised concrete **medians** that provide left turning bays have been found to be safer than dual left turn “scramble” lanes. When medians are landscaped, they contribute to the attractiveness of the roadway and create human-scale boulevards instead of utilitarian and intimidating arterial roadways.

Special Considerations

- Medians are appropriate for multi-lane roadways
- Increase pedestrian and vehicle safety
- May be landscaped to provide a pleasant roadway
- Are safer than two-way left turn lanes



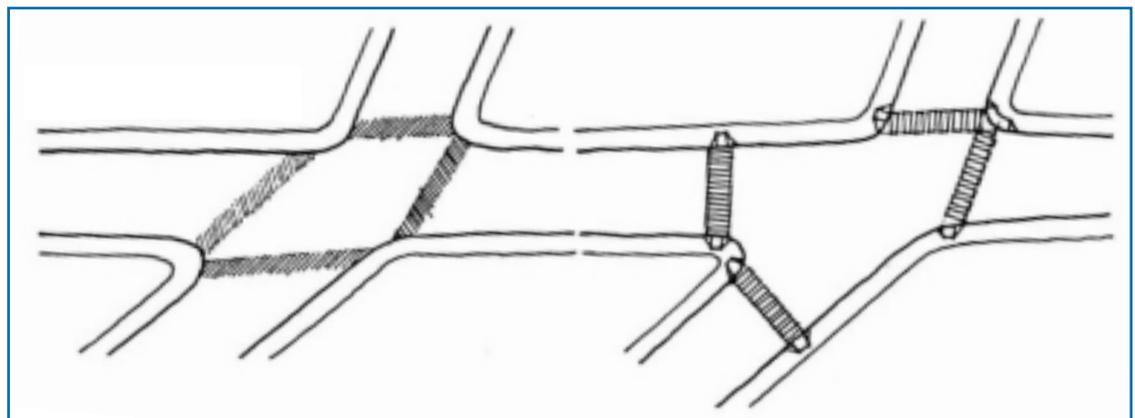
Medians and right-turn islands allow for safer crossings

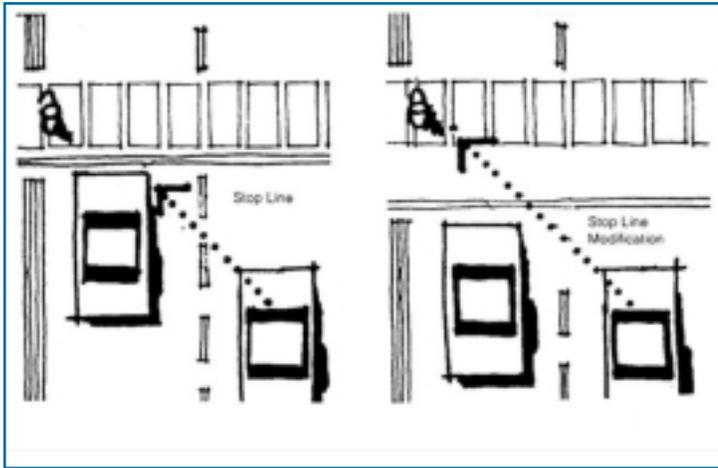
Crosswalks at **angled intersections** should be located as close as possible to a ninety degree angle with the intersecting street. This configuration shortens the pedestrian crossing distance. Shorter distances are safer for pedestrians and allow for optimal timing of traffic lights.

Special Considerations

- Crosswalks that are perpendicular rather than angled provide shorter crossing distances and are, therefore, safer.
- In some cases, a 90-degree crossing requires that the crosswalk be offset from the corner.

*Below: Straightening and shortening crosswalks at skewed intersections
Source: Planning, Design and Maintenance of Pedestrian Facilities, FHWA*





Sight lines are improved by recessed stop lines
 Source: *Planning, Design and Maintenance of Pedestrian Facilities, FHWA*

Recessed Stop Lines are especially important where multiple travel lanes and multiple turning lanes can block the driver's view of crossing pedestrians. The driver has a larger field of vision when stopped further back from the crosswalk. Since the driver might have difficulty seeing intersecting traffic if stopped too far back from the intersection, various considerations must take place when deciding how far back to place the stop line.

Special Considerations

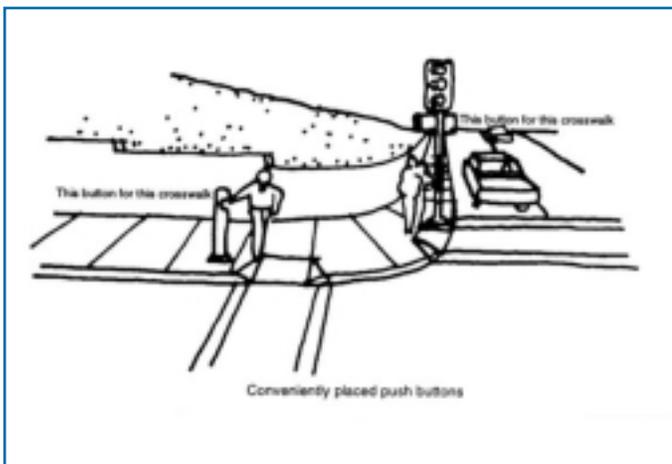
- Recessed stop lines increase driver sight lines.
- Are appropriate on multi-lane and one-way streets.

Street Corners

Street corners concentrate pedestrian activities and should be designed to make the pedestrian experience safe and pleasant. The corner is the staging area for street crossings, houses various utility functions such as traffic signal equipment, and provides services, including transit access.

Special Considerations

- Poles and other utilities should be carefully placed so that the corner is not obstructed and visibility is protected.
- Traffic controls should be clearly visible to pedestrians, not just motorists.
- The corner should be designed to prevent motorists from encroaching on the pedestrian area.
- Ramps, traffic signal call buttons and transit waiting areas should be accessible to all pedestrians, including those with disabilities.



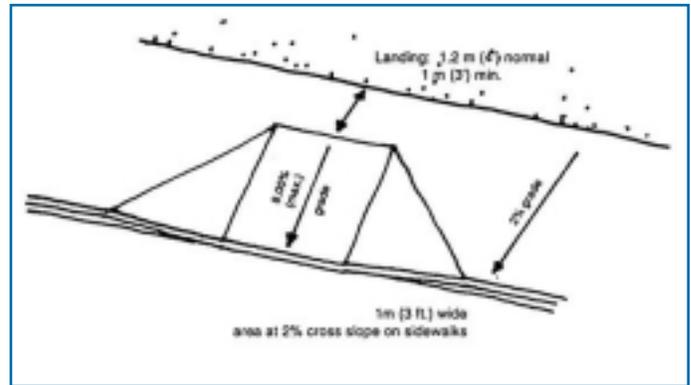
Curb cut should direct pedestrians, including those in wheelchairs, directly into the crosswalk
 Source: *Oregon Bicycle & Pedestrian Plan*

Curb cuts/ramps must be ADA compatible in design and placement and must be adequately maintained to operate optimally. The best placement of curb cuts is that which directs the wheelchair directly into the crosswalk. Generally two curb cuts, one in each direction are preferable to one wide corner cut. Every curb cut should have a level landing area at the top and bottom of the ramp. On streets with a grade, care should also be taken to make the crosswalk level. A tactile surface that is perceptible to a blind or visually impaired person should be included in the middle area of the curb cut as it approaches the crosswalk.

Special Considerations

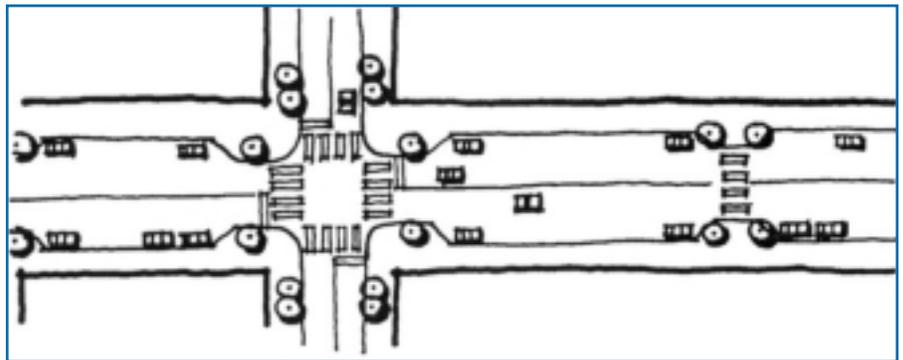
ADA requirements include:

- The slope of the ramp should be no more than 1:12 (8 percent).
- The cross-slope should be no greater than 1:50 (2 percent).
- Every ramp should have a landing at the top and bottom, the cross-slope of which should not exceed 1:50 (2 percent) and it should be 4 feet (1220 mm) in length.
- The width of the ramp and the landing should be at least 3 feet (915 mm).



*Typical perpendicular curb ramp design
Source: Portland Pedestrian Design Guide*

Curb Bulbs and Extensions effectively narrow the intersection, causing motor vehicles to slow down when approaching the intersection, while shortening the crossing distance for pedestrians. Pedestrians can see and be seen better at extended curbs. The additional corner space can be used for benches, bicycle parking and landscaping, as well as other pedestrian amenities. In general the smaller (tighter) the **corner radius**, the better the condition is for pedestrians. Advantages include a larger pedestrian area, more flexibility in the placement of curb ramps, a shorter crosswalk, and slower vehicle turning movements.



*Curb bulbs shorten crossing distances
Source: Planning and Implementing Pedestrian Facilities in Suburban and Developing Areas, TRB*

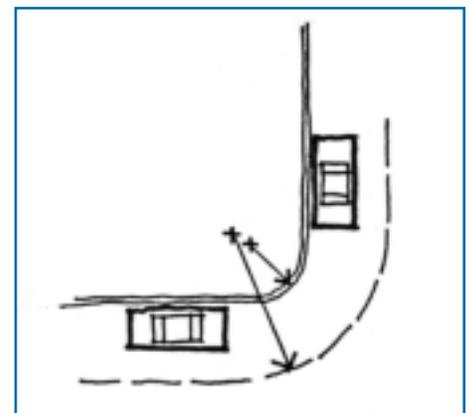
Special Considerations

- Larger corner radii create longer crossing distances and encourage faster vehicle turns.
- Curb Bulbs/Extensions improve pedestrian site lines and visibility.
- Shorten crosswalk distances
- Provide space for sidewalk amenities
- The “effective radius” of tight corners can be adequate for larger vehicles where cars are parked.

It is critical that **lighting** is adequate at corners so that pedestrians are visible to motorists at night. Nicely designed lighting also enhances the pedestrian environment.

Special Considerations

- Adequate lighting increases pedestrian safety.
- It is especially important at the intersections of high volume, high speed roadways and at transit stops.



*“Effective Radius” with parked cars
Source: Portland Pedestrian Design Guideline*

References and Resources for Non-Motorized Transportation Planning

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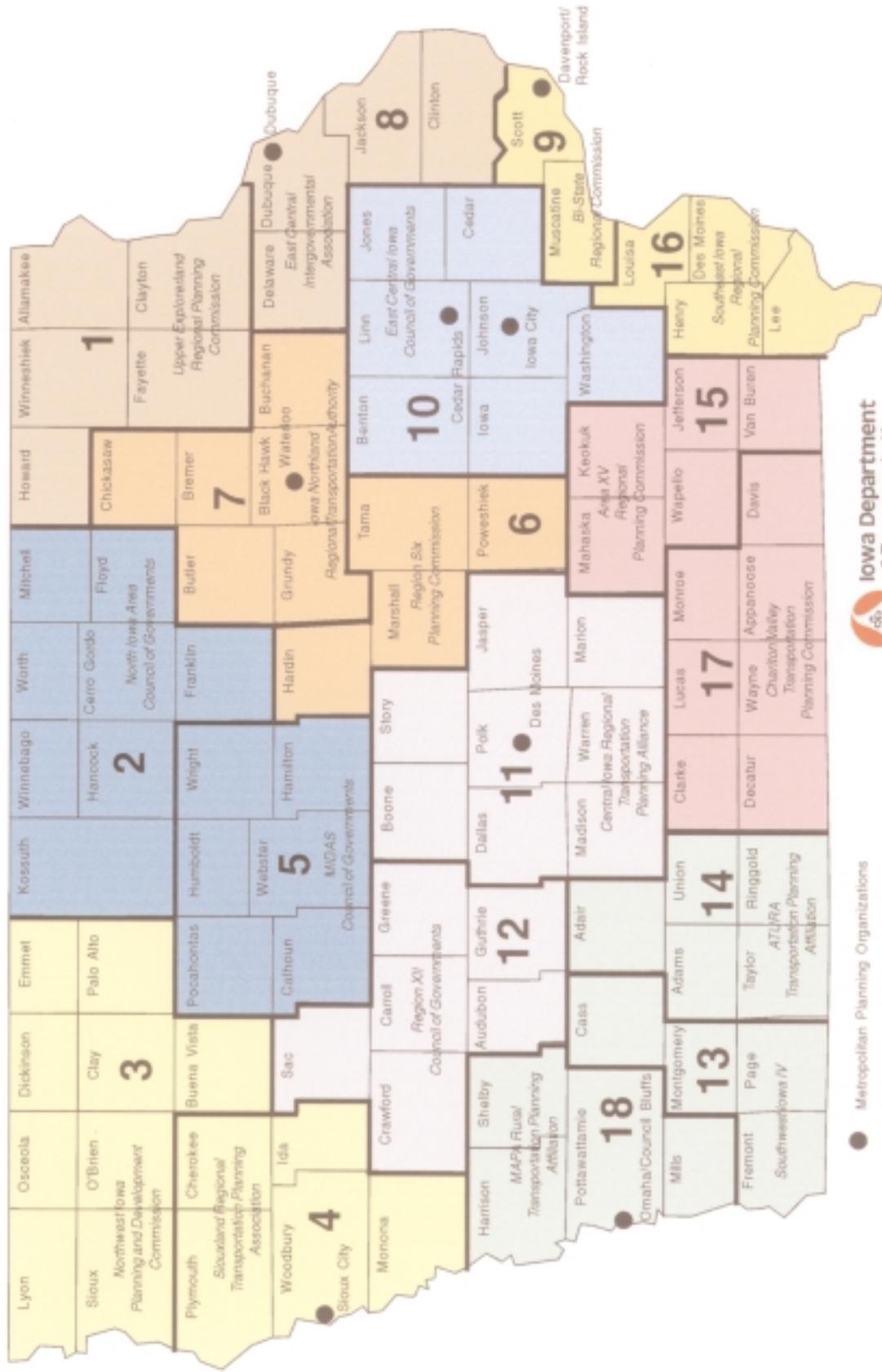
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Trail Intersection Design Guidelines, 1996. Florida Department of Transportation, 605 Suwannee St., MS-82, Tallahassee, FL 32399-0450.

Technical Assistance Resources

Metropolitan Planning Organizations and Regional Planning Affiliations



Regions	Policy Board	DOT Representatives District Transportation Planners
Region 1	Upper Explorerland Regional Planning Commission Chad Quick P.O. Box 219 Postville, IA 52162-0219 319-864-7551 fax: 319-864-7535 e-mail: uerpc@postville.means.net	Rod Larsen c/o Waterloo Construction P.O. Box 1888 Waterloo, IA 50704 319-235-9503 fax: 319-235-9021 e-mail: rodney.larsen@dot.state.ia.us
Region 2	North Iowa Area Council of Governments Joe Myhre 121 Third Street, NW Mason City, IA 50401 641-423-0491 fax: 641-423-1637 e-mail: niacog@netins.net	Krista Billhorn 1420 Fourth Street, SE P.O. Box 741 Mason City, IA 50401 641-423-7584 fax: 641-423-0246 e-mail: krista.billhorn@dot.state.ia.us
Region 3	Northwest Iowa Planning & Development Commission Dave Horan P.O. Box 1493 Spencer, IA 51301 712-262-7225 fax: 712-262-7665 e-mail: nwipdc@ncn.net	Mark Johnson P.O. Box 987 Sioux City, IA 51102-0987 712-276-1451 fax: 712-276-2822 e-mail: mark.johnson@dot.state.ia.us
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Region 5	MIDAS Council of Governments Steve Hoesel 602 1st Avenue South Fort Dodge, IA 50501-4604 515-576-7183 fax: 515-576-7184 e-mail: shoesel-midas@dodgenet.com	Krista Billhorn 1420 Fourth Street, SE P.O. Box 741 Mason City, IA 50401 641-423-7584 fax: 641-423-0246 e-mail: krista.billhorn@dot.state.ia.us
Region 6	Region Six Planning Commission Marty Wymore 24 2 North Center Street Marshalltown, IA 50158-4911 641-752-0717 fax: 641-752-3978 e-mail: region6@mcleodusa.net	Mike Clayton 1020 S. Fourth Street Ames, IA 50010 515-239-1202 fax: 515-239-1472 e-mail: mike.clayton@dot.state.ia.us
Region 7 and Waterloo MPO	Iowa Northland Regional Transportation Authority Sharon Juon 501 Sycamore, Suite 333 Waterloo, IA 50703 319-235-0311 fax: 319-235-2891 e-mail: inrcog@inrcog.org	Rod Larsen c/o Waterloo Construction P.O. Box 1888 Waterloo, IA 50704 319-235-9503 fax: 319-235-9021 e-mail: rodney.larsen@dot.state.ia.us

Region 8 and Dubuque MPO	East Central Intergovernmental Association William J. Baum Nesler Centre, Suite 330 P.O. Box 1140 Dubuque, IA 52004 319-556-4166 fax: 319-556-0348 e-mail: ecia@mwcinc.net	Fred Dean Iowa 130 P.O. Box 2646 Davenport, IA 52809 319-391-2167 fax: 319-388-9266 e-mail: frederick.dean@dot.state.ia.us
Region 9 and Davenport MPO	Bi-State Regional Commission Gary Vallem 1504 Third Avenue P.O. Box 3368 Rock Island, IL 61204-3368 309-793-6300 fax: 309-793-6305 e-mail:gvallem@bi-state-ia-il.org	Fred Dean Iowa 130 P.O. Box 2646 Davenport, IA 52809 319-391-2167 fax: 319-388-9266 e-mail: frederick.dean@dot.state.ia.us
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Region 13	Southwest Iowa Planning Commission Patrick Hall 1501 Southwest 7th Street Atlantic, IA 50022 712-243-4196 fax: 712-243-3458 e-mail: swipco@netins.net	Mike Slyby P.O. Box 406 Atlantic, IA 50022 712-243-3355 fax: 712-243-6788 e-mail: michael.slyby@dot.state.ia.us
Region 14	ATURA Transportation Planning Affiliation Timothy Ostroski, Exec. Director Southern Iowa Council of Governments 101 East Montgomery Street P.O. Box 102 Creston, IA 50801-0102 641-782-8491 Fax: 641-782-8492 e-mail: ostroski@sicog.com	Mike Slyby P.O. Box 406 Atlantic, IA 50022 712-243-3355 fax: 712-243-6788 e-mail: michael.slyby@dot.state.ia.us

Region 15	<p>Area XV Intermodal Surface Transportation Efficiency Act Organization Ellen Foudree Indian Hills Community College P.O. Box 1110 Ottumwa, IA 52501 641-684-6551 fax: 641-684-6551 e-mail: area15@se-iowa.net</p>	<p>Bob Krause 307 W. Briggs P.O. Box 587 Fairfield, IA 52556-0587 641-472-4171 fax: 641-472-3622 e-mail: robert.krause@dot.state.ia.us</p>
Region 16	<p>Southeast Iowa Regional Planning Commission Brian Tapp, Executive Director 214 North Fourth Peterson Building, Suite 3A P.O. Box 397 Burlington, IA 52601 319-753-5107 fax: 319-754-4763 e-mail: brtapp@aol.com</p>	<p>Bob Krause 307 W. Briggs P.O. Box 587 Fairfield, IA 52556-0587 641-472-4171 fax: 641-472-3622 e-mail: robert.krause@dot.state.ia.us</p>
Region 17	<p>Chariton Valley Transportation Planning Commission Dennis Ryan, Policy Chair Monroe Co. Board of Supervisors Courthouse Albia, IA 52531 641-932-7706 fax: 641-932-2863 e-mail: cvrcd@se-iowa.net</p> <p>Tracy Daugherty-Jordan R C & D R.R. #3, Box 116A Centerville, IA 52544 641-437-4376 fax: 641-437-4638</p>	<p>Bob Krause 307 W. Briggs P.O. Box 587 Fairfield, IA 52556-0587 641-472-4171 fax: 641-472-3622 e-mail: robert.krause@dot.state.ia.us</p>
Region 18 and Council Bluffs MPO	<p>MAPA Rural Transportation Planning Affiliation Louis Violi 2222 Cuming Street Omaha, NE 68102 402-444-6866 fax: 402-342-0949 e-mail: mapa@novia.net</p>	<p>Mike Slyby P.O. Box 406 Atlantic, IA 50022 712-243-3355 fax: 712-243-6788 e-mail: michael.slyby@dot.state.ia.us</p>

City	Policy Board	DOT Representatives (District Transportation Planners)
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Davenport & RPA 9	Bi-State Regional Commission Gary Vallem 1504 Third Avenue P.O. Box 3368 Rock Island, IL 61204-3368 309-793-6300 fax: 309-793-6305 e-mail: gvallem@bi-state-ia-il.org	Fred Dean Iowa 130 P.O. Box 2646 Davenport, IA 52809 319-391-2167 fax: 319-388-9266 e-mail: frederick.dean@dot.state.ia.us
Des Moines	Des Moines Area Metropolitan Planning Organization Tom Kane Argonne Armory 602 East First Street Des Moines, IA 50309-1881 515-237-1339 fax: 515-237-1303 e-mail: tj Kane@dmampo.org	Lorne Wazny Park Fair Mall, Suite 7 Des Moines, IA 50306 515-237-3313 fax: 515-237-3323 e-mail: lorne.wazny@dot.state.ia.us
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Waterloo & RPA 7	Iowa Northland Regional Council of Governments Sharon Juon 501 Sycamore, Suite 333 Waterloo, IA 50703 319-235-0311 fax: 319-235-2891 e-mail: inrcog@inrcog.org	Rod Larsen c/o Waterloo Construction P.O. Box 1888 Waterloo, IA 50704 319-235-9503 fax: 319-235-9021 e-mail: rodney.larsen@dot.state.ia.us

State of Iowa Bicycle and Pedestrian Accommodation Guidance

IOWA DEPARTMENT OF TRANSPORTATION

BICYCLE AND PEDESTRIAN ACCOMMODATION GUIDANCE

**ADOPTED BY THE
IOWA TRANSPORTATION COMMISSION**

May 11, 1999

BICYCLE AND PEDESTRIAN ACCOMMODATION GUIDANCE

Iowa's roadways serve several modes of transportation including trucks, automobiles, buses, motorcycles, bicycles, and pedestrians. Bicyclists carry the same rights and responsibilities, as motor vehicle drivers are currently legal on virtually all public roadways in Iowa.

It is federal transportation policy to "promote increased use of bicycling, and encourage planners and engineers to accommodate bicycle and pedestrian needs in designing transportation facilities for urban and suburban areas." The Iowa Department of Transportation will consider the needs of all transportation users and also encourage metropolitan and regional planning agencies to plan for bicycle and pedestrian accommodations in their areas.

Bicycle Accommodation Guidance

The department's policy is to provide safe, convenient and adequate bicycle facilities along the state highway system. As part of the development of every highway construction project, the department will consider the following situations to determine whether further bicycle accommodation is needed within the highway corridor.

- When highways in and around rural communities are the primary means of bicycle transportation due to the limited availability of other facilities.
- When the highway provides primary access to a park, recreational area or other significant destination.
- When the highway provides unique access across a natural or man-made barrier, i.e., bridges over the rivers or roads or over/under access-controlled facilities and roadways.
- The highway provides a connection in an otherwise continuous bicycle facility.
- When the highway project negatively affects the recreational or transportation utility of an independent bikeway or trail. Highway projects will negatively affect at-grade paths and trails when they are severed, when the projected roadway traffic volumes increase to a level that prohibits safe crossings at-grade, or when the widening of the roadway prohibits sufficient time for safe crossings.

The department will also provide further bicycle accommodation within the highway corridor if a Regional Planning Affiliation (RPA) or Metropolitan Planning Organization (MPO) can provide a forecast of the bicycle traffic five years after project completion that shows the volume of two-way bicycle traffic averages at least 25 bicycles per day during the peak three months of the bicycling season and motor vehicle traffic on the highway or street exceeds 1,000 vehicles per day. The forecast of bicycle and motor vehicle traffic will be reviewed and approved by the department. In addition to the forecast, the RPA or MPO will show through an analysis of alternatives, that the best alternative is accommodation within the state highway corridor. The department will provide a methodology to the RPAs and MPOs to follow when developing the travel forecasts and when evaluating alternatives.

Design Guidance

The department will utilize the *AASHTO Guide for the Development of Bicycle Facilities* as the basis for design guidance. Further guidance is provided in FHWA's *Selecting Roadway Design Treatments to Accommodate Bicycles*.

The location of the bicycle accommodation may be on the highway (e.g. bike lanes, paved shoulders, etc.) or off the highway as a separated bicycle path. In most cases, the preferred location of bicycle accommodation is on the highway. The *AASHTO Guide for the Development of Bicycle Facilities* lists several reasons bicycle accommodations are preferred on the highway:

- At intersections, motorists entering or crossing the highway often will not notice bicyclists on separated bicycle paths approaching from their right, as they are not expecting contra-flow vehicles. Motorists turning to exit the highway may likewise fail to notice the bicyclist. Even bicycles coming from the left often go unnoticed, especially when sight distances are limited.
- Signs posted for roadway users are backwards from contra-flow bike traffic on separated bicycle paths, and therefore these cyclists are unable to read the information without stopping and turning around.
- Many bicyclists will use the highway instead of the separated bicycle path because they have found the highway to be more convenient, better maintained, or feel safer riding on the road.
- Although the separated bicycle path should be given the same priority through intersections as the parallel highway, motorists falsely expect bicyclists to stop or yield at all cross-streets and driveways. Efforts to require or encourage bicyclists to yield or stop at each cross street and driveway are inappropriate and frequently ignored by bicyclists.
- Stopped cross-street motor vehicle traffic or vehicles exiting side streets or driveways may block the separated bicycle path crossing.

In some cases, a separated bicycle path may be appropriate due to the factors such as traffic volume, type of motor vehicles, traffic speed, and skill level of users.

Types of Bicycle Improvements/Design Treatments

There are several ways in which roadways can be constructed to enhance bicycle transportation. Adding or improving shoulders can often be a feasible way to accommodate bicycles in rural areas. Bicycle lanes and wide curb lanes are the primary improvements for urban areas, where available road space is a concern. The following design treatments are extensively explained in the *AASHTO Guide for the Development of bicycle Facilities*.

- **Shoulders:** A paved portion of the roadway to the right of the edge stripe. AASHTO recommends paved shoulders specifically for bicycle accommodation improvements in rural areas. Shoulders will be paved in accordance with design standards and paved shoulder studies. Bicycle traffic on a paved shoulder will typically be one-directional with the flow of traffic; therefore both shoulders will be paved when providing accommodation for bicyclists.

- **Wide Curb Lanes:** An outside travel lane on highway sections with a width of greater than 12 feet (14 feet typically). Used primarily in urban areas, the wide curb lanes can allow road use by both bicyclists and motorists without conflict.
- **Bicycle Lane:** A portion of the roadway, which has been designated by striping, signing and pavement markings for the preferential or exclusive use of bicyclists. Bicycle lanes should always be one-way facilities carrying traffic in the same direction as adjacent motor vehicle traffic, and they should not be placed between parking spaces and the curb. Bicycle lanes offer a channelizing effect on motor vehicles and bicycles.
- **Separated Bicycle Path:** A bikeway physically separated from motorized vehicular traffic by an open space or barrier, and either within the highway right-of-way or within an independent right-of-way.

Incidental design factors that improve the safety of bicycle travel will be considered on all state highway improvements. These include, but are not limited to:

- Drainage grates and utility covers suitable for bicycle travel
- At-grade railroad crossings that accommodate bicycle movements

Implementation

Consideration of bicycle accommodation will occur at all stages of planning and project development. When feasible, the recommended design treatments will be implemented as part of new construction, reconstruction, or preservation of the roadway.

Accommodations requiring grading and/or the purchase of right-of-way will normally not be considered as part of a highway preservation improvement. Consideration of bicycle accommodation will not occur as part of highway maintenance activities. When accommodation is provided as part of a highway improvement project, the cost for the facility will be considered an additional highway construction cost.

Providing bicycle accommodation independent of a highway construction project will be considered with construction funding obtained from local jurisdictions or other federal and non-road use tax state sources.

Maintenance

- The department will be responsible for the ongoing maintenance of bicycle facilities within the state highway right-of-way.
- The department will not be responsible for maintenance of bicycle facilities within the state highway right-of-way.

Pedestrian Accommodation Guidance

The department will consider the impacts to pedestrian accommodation at all stages of the project development process and encourage pedestrian accommodation efforts when impacted by highway improvements. Cost of these accommodations made at the time of the highway improvement will be considered additional roadway construction costs. Providing pedestrian accommodation independent of a highway construction project will be considered with construction funding obtained from local jurisdictions or other federal and non-road use tax state sources.

Sample Pedestrian Audit and Hazard Reporting Forms

Pedestrian Task Force Committee



Walkability Checklist

The goal of the pedestrian audit is to assess the quality of the walkable environment in our chosen study areas. Facilities, safety, security, aesthetics, pleasure, motorist behavior, and access to transit all contribute to walkability. Furthermore, a good pedestrian environment should be useable and safe for all including the young, the elderly and those with disabilities.

Getting Started:

Go to your designated starting area. Look over the checklist and the map so that you are familiar with the questions and your route. As you walk, check the problems you encounter for each section of the route. The sections are marked on the map. Note locations of things you would like to see changed right on the map.

How to use the Audit:

- ◊ Note section numbers (from map) on the audit form.
- ◊ For each section, use a check mark to indicate the specific problems encountered.
- ◊ Note comments and mark problem locations on map.
- ◊ Assign an overall rating for each of the six basic questions by circling one option.

Section	Section	Section	Section	Section

1. Is there a place to walk?

- No sidewalks
- Sidewalks are discontinuous
- Sidewalks are blocked
- Sidewalks are in bad shape

• Overall Rating: 1 awful; 2 many problems; 3 some problems, not too bad; 4 good; 5 very good.

Walkability Checklist

Section	Section	Section	Section	Section

2. Is it possible to cross the street safely?

- No crosswalks where needed
- No ped signal on traffic light
- Light not timed adequately
- Road/intersection too wide

• Overall Rating: 1 awful; 2 many problems; 3 some problems, not too bad; 4 good; 5 very good.

3. ADA access, needs of elderly and children are accommodated?

- Curb cuts/ramps not available
- Ramps lead to traffic lane rather than crosswalk
- Width or condition of sidewalk inadequate
- Sidewalk/street boundary is not discernable to blind
- Signal actuators are not accessible
- Timing of lights is inadequate for slower walkers

• Overall Rating: 1 awful; 2 many problems; 3 some problems, not too bad; 4 good; 5 very good.

4. Is it pleasant and convenient to walk?

- Needs more grass, flowers, trees
- Dirty, litter and trash
- Not well lit
- Too much traffic
- Pedestrian access lacking to key destinations
- Walkways do not access buildings

• Overall Rating: 1 awful; 2 many problems; 3 some problems, not too bad; 4 good; 5 very good.

5. Do drivers behave well?

- Do not yield to crossing pedestrians
- Block crosswalk with turning movements
- Drive too fast for conditions
- Back up without looking

• Overall Rating: 1 awful; 2 many problems; 3 some problems, not too bad; 4 good; 5 very good.

6. Is transit access convenient?

- Bus stop not served by sidewalk
- Bus stop not close to destination
- Difficult to get to bus stop
- Bus shelter difficult to use

• Overall Rating: 1 awful; 2 many problems; 3 some problems, not too bad; 4 good; 5 very good.

THE CITY OF KALAMAZOO NON-MOTORIZED TRANSPORTATION PLAN



The City of Kalamazoo wants to improve conditions for bicycling and walking. Please identify hazards and facility needs on these cards and return them as you leave the meeting.

SAFETY HAZARD	<input type="checkbox"/>
FACILITY NEED	<input type="checkbox"/>

LOCATION (*Street, Cross Streets, Landmarks*):

PROBLEM (*What is it and Why is it a problem?*):

RECOMMENDATION (*What should be done about it?*):

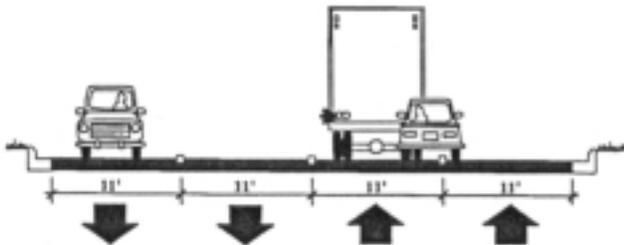
REPORTED BY: Name:

Address: Day Phone:

“Do We Really Need Four Lanes of Traffic?”

Do We Really Need 4 Lanes of Traffic?

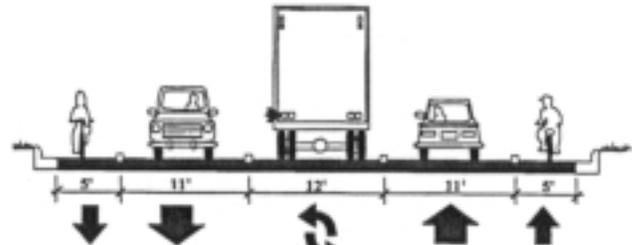
This Design?



AUTOMOBILE-ORIENTED STREET DESIGN

- Benefits motorists (who want the ability to speed and pass turning vehicles on either the left or right)

Or This Design?



MULTI-MODAL STREET DESIGN

- Benefits motorists (who need to make a left turn)
- Benefits other motorists (who are stuck behind someone making a left turn)
- Benefits businesses (through improved turning access to their establishment)
- Benefits the neighborhood (through traffic calming — cars can't speed and pass one another)
- Benefits pedestrians (makes for easier street crossings and offers potential for mid-block refuge islands)
- Benefits bicyclists (provides space for on-street bike lanes)

Has it Been Done Before?

A partial sampling of communities who have had success with this type of street conversion:

- | | | |
|-----------------------|---------------------|------------------|
| ▶ Santa Barbara, CA | ▶ Madison, WI | ▶ Austin, TX |
| ▶ Deerfield Beach, FL | ▶ Cambridge, MA | ▶ Boulder, CO |
| ▶ Palo Alto, CA | ▶ Mountain View, CA | ▶ Salem, OR |
| ▶ Santa Cruz, CA | ▶ Salem, WA | ▶ Baker City, OR |
| ▶ Portland, OR | ▶ Greenbelt, MD | ▶ Seattle, WA |
| ▶ East Lansing, MI | ▶ Santa Monica, CA | ▶ Sunnyvale, CA |

Where Will it Work?

Experience from these communities indicates that a 2-lane-with-turn-lane can be very effective on streets with traffic volumes up to approx. 18,000 ADT. Other successful conversions carry up to 24,000 ADT. Ultimately, feasibility is dependent on number of turning movements, which will need to be further examined on a corridor by corridor basis prior to project implementation.

Source: research by Bicycles & Co., Inc. May 1998