L E S S O N 1

# The Need for Bicycle and Pedestrian Mobility

## 1.1 Purpose

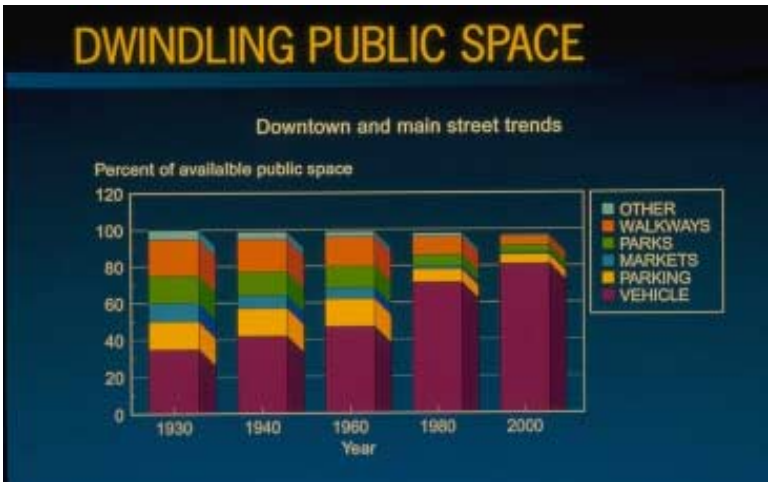
This lesson explores the history of community design and its effect on bicycle and pedestrian travel. It explains the intricate relationship between transportation systems and land use, and how this relationship has evolved in the United States. This session also discusses the importance of planning for non-motorized transportation modes as viable alternatives to the use of private automobiles, as it relates to quality of life, economic factors, health, safety and welfare. Finally, the lesson explores the new emphasis on bicycle and pedestrian planning that has resulted from national legislation and grassroots support in local communities.

## 1.2 How Cities Grow: An Historical Perspective

Perhaps more than any other factor, transportation modes have influenced the way cities grow and the forms they take. Before the advent of the automobile, cities were more compact and smaller in terms of area and population.

Travel between cities was arduous. Transport of goods and materials was limited, generally, to short distances. People walked, rode horses or burros, or traveled in animal-drawn carts. Trips for work, shopping, socializing, and business were limited to walking distance for most people.

The introduction of the bicycle was a major innovation and substantially extended the range people could travel. Even today, the bicycle is a major mode of transportation in some countries of the world, such as China. It is used to haul heavy loads, pull trailers, and provide everyday transport. In these countries, the cost of driving is prohibitive for the average citizen. Per capita income is low and the price of motor vehicle fuel and services is very high. Studies have shown that as per capita income rises, people switch to private motor vehicle ownership and the extent of walking and bicycling decreases.




***In the United States, 20th century cities reflect the influence of motor vehicles as the dominant transportation mode.***

In the United States of the 20th century, cities reflected the influence of the motor vehicle as the dominant transportation mode. Although many cities have historic city centers, which date from pre-auto days, density, land use mixes, pedestrian scale and architectural "quaintness" are not replicated in newer areas. In central cities, they are preserved and showcased as relics of earlier times.

People visit them for the unusual experience of leaving their cars behind and walking around. Only within the confines of large, modern suburban shopping malls can they experience anything like this close to home.

People usually get in their cars to go to school, to work, or to buy groceries. They drive to health clubs and exercise. They drive out of town to go hiking. They carry bicycles on their cars to meet friends and go for a bike ride.

A lot of this is just plain habit. People don't think about walking or bicycling as being easy to do. Some of it, however, is a response to:

- Cities that concentrate all commercial development at major intersections, and that "buffer" these uses from nearby homes in ways that may screen out the lights and noise, but that also prevent pedestrian access. People can walk or bike to the shopping center, but only if they travel far out of their way and use major arterial streets. Under these conditions, mothers hesitate to send little Susie to the store on her bicycle for a loaf of bread.

- Cities with subdivision ordinances and street design standards that require wide streets and sometimes do not require sidewalks. The concept of "traffic calming"–where motor traffic within neighborhoods is slowed and put on an equal footing with non-motorized street users–is considered a somewhat dubious innovation.

- It isn't easy to use public transportation in suburban locations. Effective public transit requires a higher density of users. Suburban schedules provide service at infrequent intervals. It is usually faster to drive than to take the bus.

- Streets are designed without giving serious consideration to their potential use by bicyclists and pedestrians. The possibility of someone actually walking around outside the neighborhood is not always accommodated in design. Too often, bridges, underpasses, and roadways do not include sidewalks and other facilities that make walking easier. Street cross-sections, signal actuation, median designs, and maintenance practices do not often account. Even where special lanes or other facilities are not provided, modest improvements can be made to facilitate bicycle and pedestrian travel. Often, the improvements also result in improved traffic operations.

- Often, barriers to bikes and pedestrians are put up because designers just don't stop to think. Bikes and pedestrians are generally not allowed at drive-up windows for bank tellers, restaurants, dry cleaners, and similar establishments. They have to go inside through another entrance. Parking garages may allow direct access into adjoining office buildings…but what if the pedestrian wants to park a

***Streets should be designed with serious consideration to their potential use by bicyclists and pedestrians.***

bicycle…or walk up a ramp to the street? Construction zones may put pedestrians and bicyclists at risk. Snow removal may pile snow along the curb, forcing bicyclists to the middle of traffic lanes. The list goes on and on.

***Suburban land use planning encourages separation of land use, such as in this housing development.***

- Suburban land use planning encourages low density and separation of land use types. Employment centers are separate from residential areas; residential developments are predominantly low-density, single-family. Buffer zones with townhouses, patio homes, and garden apartments may separate the subdivisions from offices or shopping. Land is relatively cheap and developers can provide an affordable version of the "American Dream."

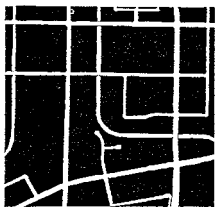
- Suburban streets are newer, wider, usually built for higher-speed traffic than they are in older parts of town. Speed limits are higher. Traffic is lighter and so people can zip around easily at about 10 miles per hour over the speed limit. People perceive these streets as dangerous for bicycling and they lack the skills and confidence to ride on them.

- Over time, cities have tended toward larger blocks of land, fewer small streets and lanes, and aggregation of land uses. Think about it. Every time a pedestrian comes to a corner, he or she has the opportunity to change directions, to enjoy a different view and browse along a different street facade. Long, continuous blocks diminish the number of choices. Many small blocks have more "surface area" than a few large ones…more windows to look in, more doors, more architectural variety.

***Venice, Italy***
*1,500 intersections per square mile*

***Rome, Italy***
*500 intersections per square mile (Downtown)*

***Los Angeles***
*160 intersections per square mile*



***Irvine, California***
*15 intersections per square mile*

***SOURCE:*** *Great Streets*

Allan Jacobs, Chair of the Department of City and Regional Planning at the University of California at Berkeley, presented an intriguing look at the phenomenon at the 1989 Pedestrian Conference in Boulder and later in his book, *Great Streets*. Jacobs' examined intersections as variables that make significant contributions to the "walkability" of cities. Jacobs prepared diagrams showing typical one-mile-square areas of cities throughout the world – all on the same scale to allow easy comparison (see examples, drawings represent 1square mile).


***Research has shown that even low to moderate levels of exercise can have tremendous benefits.***

He asked people to look at these and tell him which diagram looked like it represented a place where they would like to be dropped off to spend an afternoon walking (the cities were unidentified). People selected areas where blocks were small, with streets that did not follow a regular, grid alignment.

Jacobs also noted that street patterns tend to become simplified over time. In central Boston, in the 1890's, there were more than 430 intersections and 276 city blocks. Now, there are about 260 intersections and 170 city blocks. The blocks have become larger; there are fewer businesses and people are walking less. Is there a relationship? (*Pedestrian and Bicyclist Safety and Accommodation Participant Workbook*, FHWA-HI-96-028, *1996*)

## 1.3 Modern Suburban Travel

Most modern suburban communities in the United States are not designed for bicycle and pedestrian travel. This was not always the case. In communities across the country that were built prior to 1950, there are remnants of walkable, bikable streets where destinations are closer to residential areas. In fact, many of these older neighborhoods are the hottest real estate property in town. More and more people are beginning to appreciate well-designed communities such as these, where bicycling is enjoyable and the streets are lined with trees and sidewalks (the trend toward neo-traditional neighborhood design reflects this–see Lesson 6). The following provides one view of how suburban residential design has changed in America:

"Over the last 40 years, as automobiles replaced streetcars, the need for locating houses close to the streetcar stop disappeared. Retail business concentrated near the residential subdivisions and apartment complexes. . . Curbs and sidewalks, symbols of a pedestrian and streetcar-oriented world, became expansive and unnecessary features in this new, low-density environment. House lots became wider to accommodate garages, and houses themselves were set back from the street to reduce the noise and nuisance of passing cars."

(Richard K. Untermann, *Linking Land Use and Transportation*,University of Washington, 1991)

## 1.4 Benefits of Bicycling and Walking

Increased levels of bicycling and walking would result in significant benefits in terms of health and physical fitness, the environment, and transportation-related effects. Research has shown that even low to moderate levels of exercise, such as regular bicycling or walking, can reduce the risk of coronary heart disease, stroke, and other chronic diseases; help reduce health care costs; contribute to greater functional independence in later years of life; and improve quality of life at every stage. A recent British Medical Association study concluded that the benefits in terms of life years gained from the increased physical activity of bicycling far outweigh any possible negative effects in life-years lost from injuries or fatalities.

Replacing automobile trips with non-motorized and non-polluting bicycling or walking trips would yield significant environmental benefits. According to *Plan B, The Comprehensive State Bicycle Plan for Minnesota*, public savings from reduced pollution, oil importation, and congestion costs alone have been estimated at between 5 and 22 cents for every

automobile-mile displaced by bicycling or walking. Increased use of these non-motorized transportation modes can help urban areas reduce their levels of ozone and carbon monoxide to meet air quality standards required under the 1990 Clean Air Act Amendments.

Efforts to facilitate bicycling and walking can also result in more general transportation benefits besides offering additional travel options for those who are unable to drive or who choose not to drive for all or some trips. Roadway improvements to accommodate bicycles, such as the addition of paved shoulders, have been shown to reduce the frequency of certain types of motor vehicle crashes. Urban area congestion can be reduced. Measures to reduce vehicle speeds, which can encourage greater pedestrian activity in residential or downtown shopping and business areas, also impact positively on motor vehicle safety. Greenways along waterways, railway lines, or other public rights-of-way yield recreational, educational, environmental, and aesthetic benefits in addition to providing corridors for walking and bicycling transportation. A general enhancement of the "livability" of our cities parallels a truly intermodal transportation system in which bicycling and walking are valuable components.

Given these many benefits, it is not surprising that a recent Harris Poll showed that while 5 percent of respondents currently walk or bicycle as their primary means of transportation, two-and-a-half times this number would prefer to meet their transportation needs by walking or bicycling if better facilities were available. Survey results may overestimate actual behavior, but they do indicate areas to be addressed.(*National Bicycling and Walking Study*, FHWA Publication No. FHWA-PD-94-023, 1991)

## 1.5 Government Commitment and Support

Support for bicycling and walking must be found within the Federal Government, and State and local government offices. Whereas individuals and private organizations can accomplish much in increasing public awareness, identifying needs, etc., it is primarily government that is responsible for creating safer and more appealing places to bicycle and walk. This is accomplished not only through direct improvements to the roadway environment, but also through planning, policymaking, and other government activities. Support and commitment at every level of government are thus the keys to significant increases in the use of bicycling and walking as modes of transportation.

As noted in FHWA's 1991 *National Bicycling and Walking Study*, the U.S. Federal Government is firmly committed to supportibg bicycling and walking. The Intermodal Surface Transportation Efficiency Act of 1991 (ISTEA) made significant additional commitments to the future of bicycling and walking transportation in the United States.

States responded to the challenges of the ISTEA legislation, and many are already ahead of its requirements. As mandated, bicycle and pedestrian coordinators have been identified in all 50 States,

***Multi-use trails have been built as part of major highway improvement projects in Florida.***

and a number of States are in the process developing bicycle and pedestrian plans. Metropolitan Planning Organizations (MPOs) and individual communities are also beginning to respond to the mandates and opportunities of the ISTEA legislation.

Together, these events offer strong encouragement for the future of bicycling and walking transportation in the United States. As stated on the cover of a recent brochure produced by the Bicycle Federation of America, "There has never been a better time to promote bicycling than now."

## TEA-21 Funding Sources for Bicycle and Pedestrian Projects

Bicycle and pedestrian projects are broadly eligible for funding from almost all the major Federal-aid highway, transit, safety, and other programs. Bicycle projects must be "principally for transportation, rather than recreation, purposes" and must be designed and located pursuant to the transportation plans required of States and Metropolitan Planning Organizations.

***National Highway System*** funds may be used to construct bicycle transportation facilities and pedestrian walkways on land adjacent to any highway on the National Highway System, including Interstate highways.

***Surface Transportation Program*** (STP) funds may be used for either the construction of bicycle transportation facilities and pedestrian walkways, or non-construction projects (such as maps, brochures, and public service announcements) related to safe bicycle use and walking. The Transportation Equity Act for the 21st Century (TEA-21) adds "the modification of public sidewalks to comply with the Americans With Disabilities Act" as an activity that is specifically eligible for the use of these funds.

Ten percent of each State's annual STP funds are set aside for ***Transportation Enhancement Activities (TEAs).*** The law provides a specific list of activities that are eligible TEAs and this includes "provision of facilities for pedestrians and bicycles, provision of safety and educational activities for pedestrians and bicyclists," and the "preservation of abandoned railway corridors (including the conversion and use thereof for pedestrian and bicycle trails)."

Another 10 percent of each State's STP funds are set aside for the ***Hazard Elimination and Railway-Highway Crossing programs***, which address bicycle and pedestrian safety issues. Each State is required to implement a Hazard Elimination Program to identify and correct locations that may constitute a danger to motorists, bicyclists, and pedestrians. Funds may be used for activities including a survey of hazardous locations and for projects on any publicly owned bicycle or pedestrian pathway or trail, or any safety-related traffic-calming measure. Improvements to railway-highway crossings "shall take into account bicycle safety."

***Congestion Mitigation and Air Quality Improvement Program*** funds may be used for either the construction of bicycle transportation facilities and pedestrian walkways, or non-construction projects (such as maps, brochures, and public service announcements) related to safe bicycle use.

***Recreational Trails Program*** funds may be used for all kinds of trail projects. Of the funds apportioned to a State, 30 percent must be used for motorized trail uses, 30 percent for non-motorized trail uses, and 40 percent for diverse trail uses (any combination).

Provisions for pedestrians and bicyclists are eligible under the various categories of the ***Federal Lands Highway Program*** in conjunction with roads, highways, and parkways. Priority for funding projects is determined by the appropriate Federal Land Agency or tribal government.

***National Scenic Byways Program*** funds may be used for "construction along a scenic byway of a facility for pedestrians and bicyclists."

***TEA-21 provides a variety of funding opportunities for on-road bike lanes, trails, sidewalks, and bridges that accommodate bicycles and pedestrians.***

***Job Access and Reverse Commute Grants*** are available to support projects, including bicycle-related services, designed to transport welfare recipients and eligible low-income individuals to and from employment.

***High-Priority Projects and Designated Transportation Enhancement Activities*** identified by TEA-21 include numerous bicycle, pedestrian, trail, and traffic-calming projects in communities throughout the country.

#### *Federal Transit Program*

Title 49 U.S.C. (as amended by TEA-21) allows the ***Urbanized Area Formula Grants, Capital Investment Grants and Loans***, and ***Formula Program for Other Than Urbanized Area*** transit funds to be used for improving bicycle and pedestrian access to transit facilities and vehicles. Eligible activities include investments in "pedestrian and bicycle access to a mass transportation facility" that establishes or enhances coordination between mass transportation and other transportation.

TEA-21 also created a ***Transit Enhancement Activity*** program with a 1-one percent set-aside of **Urbanized Area Formula Grant** funds designated for, among other things, pedestrian access and walkways, and "bicycle access, including bicycle storage facilities and installing equipment for transporting bicycles on mass transportation vehicles."

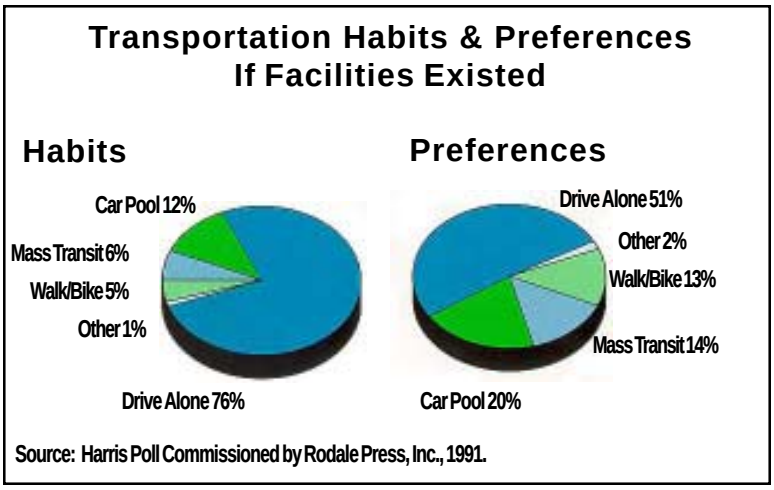
#### Highway Safety Programs

Pedestrian and bicyclist safety remain priority areas for ***State and Community Highway Safety Grants*** funded by the Section 402 formula grant program. A State is eligible for these grants by submitting a Performance Plan (establishing goals and performance measures for improving highway safety) and a Highway Safety Plan (describing activities to achieve those goals).

Research, development, demonstrations, and training to improve highway safety (including bicycle and pedestrian safety) is carried out under the **Highway Safety Research and Development (Section 403) program**. (*A Summary of Bicycle and Pedestrian Provisions of the Federal-Aid Program*, FHWA-PD-98-049, 1998).

## 1.6 Public Support for Bicycling and Walking

Regardless of the commitment of Federal, State, and local governments to bicycling and walking transportation, and regardless of the "walkability" or "bicycleability" of our cities and towns, the full potential of bicycling and walking as transportation modes will not be realized if the public is unwilling to recognize and embrace them as viable transportation options. Both government and the private sector can play key roles here by working to increase public




awareness of bicycling and walking and actively promoting their use. Programs to increase employee use of non-motorized transportation, including innovative Transportation Demand Management plans, police-on-bikes, and U.S. Postal Service employees on bicycles, all can help to legitimize non-motorized transportation.

If recent survey results are any indication, the public already strongly supports increased travel options. The 1991 Harris Poll cited earlier showed that 46 percent of adults age 18 and older — 82 million Americans — had ridden a bicycle in the previous year. Of these:

- 46% stated they would sometimes commute to work by bicycle if safe bicycle lanes were available;
- 53% would if they had safe, separate, designated paths on which to ride;
- 45% would if their workplace had showers, lockers, and secure bicycle storage; and
- 47% would if their employer offered financial or other incentives. (*Pathways for People,* 1992).

Similarly, 59 percent of the respondents reported that they would walk, or walk more, if there were safe, secure designated paths or walkways, and 55 percent would if crime were not a factor. Overall, 5 percent of respondents reported that either walking or bicycling was their primary means of transportation; but given adequate facilities, 13 percent would prefer to meet their transportation needs by walking or bicycling. Respondents also indicated that they want their government to enhance their opportunities to walk and bicycle. (*Pathways for People,* 1992)

Another indication of the public's desire for increased opportunities to bicycle and walk can be found in the overwhelmingly positive responses to the *Federal Register* notice soliciting comments for the National Bicycling and Walking Study. Most of the respondents clearly indicated a desire to walk and bicycle more if appropriate facilities were provided. (*National Bicycling and Walking Study,* FHWA-PD-94-023, 1991)

## 1.7 Transportation and Planning Trends

Thus far, this lesson has described the challenges and potential for increasing non-motorized travel in the United States. Renewed interest and financial support for bicycling and walking has led to improvement projects in nearly every city in the country. Although progress is slow and the problems often seem insurmountable, several trends in transportation planning point to a promising future for bicycling and walking. This section presents an overview of current trends and their implications for non-motorized travel, with examples from communities throughout the United States.

**1. New land use, transportation, and environmental trends point to a promising future.**
In general, both the public and the professional community are becoming dissatisfied with the status quo. New energy, funding, and political support are being given to programs that reduce reliance on the private motor vehicle and encourage bicycling and walking. Here are a few examples of these trends:

**a. Seattle, Portland, San Diego, and Los Angeles move to develop effective transit systems.**

- Voters in Los Angeles taxed themselves heavily to start rebuilding the once-famous transit system. Initial sections are open and operating.

- Trips into downtown Seattle have shifted heavily toward use of transit and bicycling, with improved facilities and strong support from

political bodies. Increases in walking trips from the nearby Capital Hill District are also reported.

- San Diego, starting with $60 million, gained high-volume ridership overnight when it introduced its 16-mile "Red Line" and the Tijuana Trolley.

- Portland is reclaiming views of mountain landmarks with successful introduction of an extensive system of buses and light rail.

- Many other cities, including Honolulu, Orlando, and Minneapolis are now increasing emphasis on transit and transit planning.

**b. Traditional Neighborhood Design (TND) and Neo-Traditional Town Planning are hot trends on the planning scene.**
Neo-traditional planning is a topic of debate and disagreement within the planning community. Advocates of "traditional" plans propose a nostalgic approach. They look to historic designs for small communities where traffic was light, people knew their neighbors, and land use encouraged walking and bicycling.

A great deal of experimentation is taking place in the United States at this time. Florida alone has 15 neo-traditional communities on the drawing board. Projects to retrofit existing neighborhoods in conformance with traditionalist precepts have been proposed in Bellingham, Washington; Stuart, Florida; and projects in California, Texas, Alaska, Virginia, Maryland, North Carolina, and Georgia. See Lesson 6 for more information on this concept.

**c. Traffic-calming strategies can reduce the speed of and emphasis on motor vehicles.**
Traffic calming employs physical measures to slow down motorists through changes to the horizontal and vertical alignment of the road and giving greater design priority to pedestrians, bicyclists, and community amenities. Traffic-calming measures are becoming standardized in communities throughout the country. See Lesson 11 for a full explanation of the fundamental traffic-calming techniques.

**d. Transportation Demand Management (TDM) proves popular.**
Whereas the early 1980s saw engineers experimenting with ways to push more vehicles through an existing and expanding transportation network, the trend in the 1990s has turned toward getting people to make fewer single-occupant auto trips. Using the TDM concept, employers, government agencies, and others direct their energies into convincing the public to use the auto for solo trips less and less. This is done through pricing incentives (recouping the true cost of parking, for example); subsidies to more efficient transportation modes; helping people overcome perceived hurdles; pushing for improved land use policy; and flexible work hours.

Can TDM really work? In Australia, it does. In many ways, Australia is similar to the United States: highly suburbanized, auto-crazy, with similar land use patterns and levels of auto ownership. The parallels, however, only go part way. In Australia, gasoline consumption and trips per household are half of U.S. figures. What can be learned from this example? Australian cities, while similar to U.S. cities in many ways, also have important differences. The following

***Traditional Neighborhood Design incorporates design features that encourage walking and bicycling.***

attributes are part of urban form and transportation systems in Australia:

- Strong neighborhoods with neighborhood centers.
- Neighborhood schools within 1/4-mile walking distance for most children.
- Pedestrian access is required between adjacent neighborhoods.
- Local Area Traffic Management (LATM) providing safe motor vehicle speeds and operations through neighborhoods.
- Parking that is limited and frequently market-priced. Only one parking space per 10,000 square feet of floor area is required in Sydney.
- Convenient transit transfers are provided.
- Transit service is fast and convenient.
- Few freeways go into the Central Business Districts (CBDs); no new lanes are built on existing freeways.
- Major activities are located in mixed-use centers accessed by a multi-modal transportation system.
- There is a strong intermodal transportation system.
- Decision-making is flexible and more decentralized than in the United States; flexible block grants are allowed through general policy.

**e. Transportation Management Associations (TMAs) and Commuter Assistance Centers (CACs).** Many cities or regions are setting up fully staffed organizations, with trained professionals who focus on getting people out of single-occupant vehicles. Some cities, such as Los Angeles, have dozens of TMAs. Florida already has 17 such associations with more than 40 expected to start up over the next several years.

Each association is funded by local government, employers, and others with a strong interest in reduced parking demand, and future reductions in traffic-induced transportation costs. Many TMAs and CACs encourage bicycling and pedestrian/transit trips.

**2. New tools are available for bicycle and pedestrian programs**

A new wave of post-interstate highway construction is surging across America. A resounding demand by the public, responded to by Congress, has set a dynamic direction for future transportation planning and construction. The 1991 Intermodal Surface Transportation Efficiency Act (ISTEA) and the 1998 Transportation Equity Act for the 21st Century (TEA-21) provided tremendous funding infusions for bicycle and pedestrian facilities.

***Many cities or regions are setting up fully staffed organizations, with trained professionals who focus on encouraging alternative transportation.***

**a. New funding sources have become available.**

- **State, regional, and local entities will all be involved in determining the ultimate use of federal transportation funds.**

  This, in itself, is a hopeful sign for non-motorized transportation. Agencies, in many cases, have supported, but have not been able to fund, improved transit, increased choice of transportation modes, and non-motorized transportation facilities and programs.

***Enhancement monies.***
Ten percent of the total Surface Transportation Program funds are earmarked for "enhancement" activities. Provision is made allowing use of these funds for pedestrian, bicyclist, trail, and preservation programs.

***Clean Air Act.***
The second generation of the Clean Air Act, passed in 1991, has put teeth into the original Act and now requires cities with the poorest air quality records to make significant improvements. Substantial penalties are specified for non-compliance.

*The availability of bike lockers at rail stations is important to encourage commuting.*

***Transit funding is no longer given only token recognition.***
Transit programs and intermodal efficiency are emphasized in ISTEA and TEA-21. Indeed, the term "intermodal," found throughout the new legislation, reflects a tangible commitment to a balanced transportation system.

Indirectly, Federal support for transit can benefit bicycling and walking. People have to walk or ride to and from bus stops and transit stations. Consideration is being given to improving access to transit and encouraging adoption of local policy, standards, and ordinances that can result in better conditions. Similarly, more and more cities are accommodating bicycles on buses, ferries and trains. Phoenix, Arizona has a model program. The intermodal emphasis encourages such linkages, along with provision of bicycle lockers, shower facilities, "loaner" or low-priced rental bikes at downtown transit stations, and benefits for bicyclists.

***Environmental emphasis.***
Cities with the lowest air quality and largest populations are allocated a portion of the federal transportation funds for reduction of auto emissions. Since the greatest reductions will be through displacement of single-occupant vehicle trips, funds may be used for related non-motorized transportation programs.

- **Other Environmental Improvement Funds.** Other Federal and State legislation has been enacted to further improvement of air quality, noise reduction, water quality, and other pollution (e.g., hazardous wastes). Substantial funding is available.

- **Growth Management Act(s).** A number of States are considering requirements for urban containment, urban infill, implementation of TDM strategies, and other measures to reduce urban sprawl and associated costs. Florida recently entered the second phase of its nationally recognized growth management legislation. TDM practices are now encouraged on additional highway and roadway miles. Developers in Florida have supported this new policy, since TDM has proven to be less expensive than the cost of building additional traffic lanes.

- **Other legislation.** California has passed a series of initiatives aimed at not only cleaning up the air, but also at significant alterations of transportation habits. California businesses must now achieve a significant reduction in auto trips or pay substantial fines. Other States, such as Oregon and Washington, are studying these measures and may propose similar legislation. The California policy is expected to benefit bicyclists, pedestrians, and transit users, since use of alternative transportation modes is encouraged.


**b. New, federally sponsored research shows increased support for bicycling and walking programs.**
Led by the Federal Highway Administration and National Highway Traffic Safety Administration, the Federal government has initiated a broad range of research and other studies addressing bicycle and pedestrian transportation.

The National Bicycling and Walking Study provides a comprehensive look at ways to encourage bicycling and walking in the United States. The Study mirrors the ISTEA legislation.

The Study is also expected to have a significant influence on State and local policy. Combined with other research now underway. It can be expected that our knowledge about many aspects of pedestrian and bicycle transportation will be greatly advanced over the next few years.

**c. Professional associations are increasingly pro-walking and pro-bicycling.**
Associations such as the American Association of State Highway and Transportation Officials (AASHTO), Transportation Research Board (TRB), the Institute of Transportation Engineers (ITE), and the American Society of Civil Engineers (ASCE) are putting more and more positive energy into support of bicycle and pedestrian transportation.

They are working to educate their members about design planning construction practices and related issues. ITE, for example, has published manuals on traffic calming, supports traditional neighborhood design and is adding new chapters on walking and bicycling solutions to its major handbook and other publications. New organizations are forming to focus exclusively on alternative transportation systems.
In addition, engineers and planners in the bicycle and pedestrian field have established their own professional organization - The Association of Pedestrian and Bicycle Professionals (APBP). This new organization promotes excellence in the emerging professional discipline of pedestrian and bicycle transportation.

**d. Greater public involvement in decisionmaking is encouraged.**
It is expected that the public will become much more involved in transportation planning and policy, especially on the local and State levels. ISTEA and a general trend toward citizen activism are leading to the formation of bicycle advisory councils (BACs) and pedestrian advisory councils (PACs) in many areas. Combined with existing community organizations, clubs, and advocacy networks, they will play increasing roles in transportation and land use decisions.

**e. Facilities on greenways and other recreation areas can help meet transportation needs.**
ISTEA and TEA-21 allow use of highway funds for bicycle and pedestrian facilities that have transportation purposes. Today, only purely recreational facilities, such as closed-loop trails that have no possible transportation use, are excluded from funding consideration.

The availability of funds for recreation transportation facilities dovetails with the increasing emphasis and funding for preservation and enhancement of greenbelts and with the “Rails to Trails” movement utilizing abandoned rail rights-of-way. State initiatives, such as Arizona’s Heritage Fund add to the pot by funding trails and other recreation, preservation, and conservation projects. In some cities, trail systems provide continuous, scenic and grade-separated access to most major destinations using

canal banks, flood control channels, river corridors, parks, and greenbelts. Built to the current design standards, these trails can serve many types of users for many different trip purposes.

**f. Voters having repeatedly shown their support for bicycle and pedestrian facilities**.

Here are a few examples:

- Seattle voters recently approved a $120 million bond issue for purchasing land and constructing urban trails. The measure passed with the greatest voter turnout for any election and won by the widest margin in decades.

- In Pinellas County, Florida, with the backing of the Friends for the Pinellas Trail, voters approved a controversial, 10-year, $100 billion transportation bill. The approval margin was razor thin. Neighboring Hillsborough County (Tampa) rejected a similar bill—also by a narrow margin. All the local analysts gave credit for the Pinellas win to the citizens group that backed the trail and encouraged voter turnout.

- In 1990, Arizona voters gave approval by almost a two-to-one margin to the Arizona Heritage Fund. This was an exceptionally strong showing, considering the fact that only 3 of the 13 ballot propositions that year were approved. Of the 3, the Heritage Fund received the most votes. The Fund takes about $20 million annually from lottery profits and divides it between State Parks and the Arizona State Game and Fish Departments.

The money is used for parks, trails, preservation of historic and cultural sites, and wildlife conservation. About $500,000 was allocated for trails in the first funding year. Among criteria used in selecting projects for funding are the trail's accommodation of a variety of users and its potential to provide linkages to other trails and destinations.

**3. Pedestrians are increasingly being considered in planning and design.**
With the encouragement of planning gurus such as William Whyte (*City — Rediscovering the Center, The Social Life of Small Urban Spaces*) and the late Donald Appleyard (*Livable Streets*), a generation of professionals sympathetic to the need for "a sense of place," "people places," "activated streets," and "livable cities" has come of age. Old buildings are being preserved.

Once-deteriorating downtowns are being rediscovered and revitalized, often with a strong pedestrian emphasis. Design review requirements and urban design guidelines are being incorporated into ordinances and adopted into planning documents.

The roles that engineers, planners, architects, and landscape architects can play in creating streets, plazas, parks, and other public spaces that offer amenity, interest, variety, and a feel for the special, unique qualities of a given city are starting to be appreciated.

The need for coordination, for working with other professional disciplines as well as with citizen groups, city maintenance departments, police officers, school officials, and others is being realized and addressed in the planning process. To create pedestrian and bicyclist-friendly cities takes cooperation and a "big picture" approach backed by the power to put forward adoptable recommendations with policy or regulatory status.

***Revitalization of America's downtowns is occurring throughout the country.***

**a. Livable cities' success stories.**
Although the "livable cities" movement is still in its early days, many U.S. cities have already logged considerable accomplishments:

- **Washington, D.C.**, had the vision of transforming the city into an inviting pedestrian environment. The effort took years. It was complex and, ultimately, rewarding. Today, our Nation's Capital owes much of its success to coordinating the opening of the Metro system with construction of pedestrian facilities. A special police force was hired for security and parking control. Fast-moving traffic on key streets was slowed through implementation of a series of strategies that included eliminating one-way streets. Right turns on red lights were reinforced through pro-pedestrian policy. On some streets, all traffic in a given direction is now required to turn.

  Sidewalks were widened and given decorative pavement in many cases. Medians were added. All this occurred over the past 15 years. The result is dramatic. The pedestrian improvements are complemented by our Nation's best and most complete transit system. All this took place in a city where 90 percent of the work force commutes in and out daily.

- **Boston — Harvard Square.** For the first time in its history, Harvard Square has been redesigned as a major public gathering place. Transit vehicles, which were below ground 20 years ago and later brought up to the surface, were retreated once again to quiet underground busways enhanced with public art. Although the Square, from a pedestrian viewpoint, is not perfect, it represents a splendid re-dedication of land to public use by pedestrians. Other commons (with underground parking), Newberry Street, and Faneuil Hall Marketplace provide exemplary pedestrian environments.

- **Savannah, Georgia and Charleston, South Carolina.** Still in the process of rebuilding following widespread destruction by hurricane Hugo, these cities offer powerful examples of good pedestrian planning and public spaces. Airy waterfront piers, one with citizen porch swings that are so popular that they never stop swaying, show a positive outgrowth from a devastating natural disaster.

- **Honolulu, Hawaii — Kalakala Street, Waikiki.** One of the most dramatically transformed streets, Kalakala has gone from noisy, sooty gray ugliness to a bright, breezy, and fragrant street with a 50/50 ratio of automobile to pedestrian space. The street is lively, the scale is right, and people throng.

- **Victoria, Vancouver, Canada.** It's only a few miles from the U.S. border and it's an ideal downtown. The character of historic streets has been recaptured. Alleys create a fine-grained network that enables pedestrians to avoid many intersections. In the heart of it all is a mall that contributes to the ambiance, rather than detracts from it. At the insistence of the public, mall developers were required to provide ground-level retail, to pave the streets with rich detail, and to design for interaction and architectural interest. The result works beautifully.

- **Portland, Oregon — Pioneer Square.** This active downtown gathering space is paved with inscribed bricks sponsored by citizens at $35 a piece. The Square is an ideal place to see and be seen. Its form creates an irregular, theatrical setting with a variety of elevations, vantage points, perches, and perspectives. It's an informal urban theater, with lunchtime crowds creating their own entertainment. There is a strong link to the city's transit system, which approaches the Square via a transit mall where cars are allowed, but not encouraged. Nearby, is Freeway Park, with its famous Halprin sculpture-fountain.

**b. There is a new emphasis on bicyclist and pedestrian safety and on safety-related research.**
Nationally, pedestrians and bicyclists account for 14 to 15 percent of all traffic fatalities. In urban areas, this figure is even higher. As more and more people walk and ride bicycles, it is important that safety improvements and programs keep pace.

Accordingly, the Federal Highway Administration and National Highway Traffic Safety Administration

have dedicated funds to identifying and prioritizing bicycle and pedestrian research needs. Research projects are being carried out by a team headed by the University of North Carolina's Highway Safety Research Center.

**c. The need to train professionals about bicycling and walking has been recognized.**
Traffic engineers and urban planners rarely receive adequate training related to non-motorized transportation. Only one out of a hundred highway professionals has taken a college course on non-motorized transportation and these courses were offered in overseas colleges. None are offered in the United States on a regular basis. The planner or engineer who today is being told to go out there and make things right for bikes and pedestrians has to rely on personal experience, courses such as this one, self-education, and luck.

This is a global problem. Recent Chinese transportation reports and magazine articles, written in a country where fewer than one in 10,000 people travel by car, address ONLY motorized transportation modes. The word "bicycle" is not mentioned. Worldwide, the status of the automobile has dominated professional practice.

Bicycles are often seen as having low status, associated with the poorer classes or underdeveloped nations. Even in bicycle-friendly Copenhagen and Amsterdam, pedestrian and bicycle officials talk about difficulties in dealing with planners and engineers who think only in terms of motorized solutions.

The Federal Highway Administration has given high priority to training professionals involved in bicycle and pedestrian transportation. Development of college-level courses and other training, combined with future revision of professional reference documents and activities planned by organizations such as the American Society of Civil Engineers and the American Planning Association will, over time, make professionals better-equipped to deal with non-motorized transportation modes.

**d. There is a new awareness of risk management strategies related to bicycling and walking.**
The courts are becoming *de facto* bicycle and pedestrian facility designers. There continue to be very sizeable settlements ($2 to $15 million) against government entities that neglect the basics of design for bicycles and pedestrians.

Although some highway professionals and city officials now are reluctant to build new facilities for fear of legal action, they should be aware that they can also be sued for failure to take action.

Many court settlements are for failure to act, failure to maintain, failure to operate properly, failure to perform to accommodate all users of existing streets, highways, and paths. The transportation professional with no formal training in walking and bicycling accommodation is put at a serious disadvantage.

**e. The public involvement process is becoming more inclusive.**
Design and research have historically focused on vocal, adult citizens. Children, the elderly, the poor, and the disabled seldom stand up at city council or planning commission hearings to advocate policy and improvements that could make it easier for them to get around.

Children account for a large percentage of bicycle and pedestrian crashes and yet relatively little sophisticated crash research was done in the United States until adults took to bicycling and walking, started to get hurt, and complained about it. Children are not involved in decisionmaking. They don't know who to complain to. They can't drive. Their writing skills are still developing. They must depend on others for resources and transportation.

The same basic situation can be applied to the elderly, the poor, and the disabled. Their numbers are increasing. They are dependent on walking and bicycling for mobility. They are disproportionately at-risk when dealing with traffic and in potentially hazardous situations. ALL must be considered in research, planning, and design.

**f. The bicycle and pedestrian industries are becoming more aware of the need to educate and to deliver safety messages.**
The bicycle and pedestrian associations and industries have historically had little active involve-

*The elderly, children, and the poor are the least likely to be accommodated by today's dominant transportation modes.*

ment in safety and education programs. With a few notable exceptions, bicycle manufacturers and support industries, safety associations, and others who should know better have not been proactive in efforts to promote safety.

Advertisements and bicycle safety films show bicyclists wearing helmets. Increasingly, bicycle dealers provide information about safety, maintenance, and ways to develop good riding skills. Some offer training and literature, and refer bicyclists to clubs where they can ride with experienced bicyclists and become part of the "bicycle culture" of the community.

**g. The U.S. bicycle and pedestrian programs—getting back on track.**
The 1970s saw a surge of funding for bicycle programs and research. A few projects were completed. Starting in the 1980s, however, almost 100 percent of the safety money was channeled into a few, auto-related areas.

In 1988, Florida canvassed all 50 Governor's Highway Safety Representatives in the United States and leaders in State departments of transportation. It was found that all of them felt that there was not a pedestrian problem and, therefore, there was no need to do anything about it. One said, "There is no money for funding—so how can there be a problem?" In the 1980s, more than 90,000 pedestrians and bicyclists were killed.

During this time, few States spent money on bicycle and pedestrian crash-reduction programs, even though a full decade of research from the 1970s pointed out the need and showed how to approach solutions.

Fortunately, bicycle and pedestrian transportation is experiencing a resurgence of interest, funding, and research. Lessons learned over the past 20 years are being tested and applied to new thinking about design, education, enforcement programs, and the positive roles bicycling and walking can play in realigning our thinking about cities. There is increasing awareness of the need to improve air quality, to decrease traffic congestion, and to revive a sense of "community." People are giving a fresh look at the efficiency and pleasure of leaving the car in the garage and heading out on two wheels or two feet to go about their business. As transportation tends toward the human scale, a new urban form–finer-grained, more richly detailed, and community-oriented– will evolve. In time, the new transportation will build a new kind of city.

This course session has introduced many issues, ideas, attitudes, and planning tools. It presents a broad-brush overview. Additional detail on many of these topics are explored in depth during other training course sessions.

## 1.8 Exercise: A Pictorial Essay

**Part 1**
Take photographs of both good and bad locations to bicycle and walk in your community. Photographs can document conditions in several locations or within one particular development (commercial or residential). Your photo log should capture the overall environment (such as streetscape), specific barriers and/or good features, and general land wuse relationships to the transportation facility. Prepare a short write-up for each photograph explaining the

problems or positive features you inventoried.

**Part 2**
Using the specific locations you documented in Part 1, conduct an evaluation of engineering issues related to the following facility design aspects:

1. Need for bicycle/pedestrian facilities–How would you establish the need for facilities (either existing or proposed improvements)? What data would you collect? What type of analysis procedures or comparisons would be useful in assessing need? If you documented existing facilities in your photographs, how would you evaluate effectiveness to those detractors that would suggest that money spent on facilities for pedestrian and bicycles is a waste of resources. Please develop some proposed guidelines, within the context of effective and reasonable public policy, for use by a local agency in addressing issues related to bicycle and pedestrian facilities.

2. Incorporation of needed facilities in new design –Describe how any deficiencies you noted in your photo logging exercise could have been addressed if pedestrian and/or bicycle facilities were included in the original design and construction. Tabulate and evaluate the associated impacts. If you documented existing designs, describe and quantify impacts associated with accommodating pedestrians and/or bicycles in the facility(ies) you photographed.

3. Incorporation of needed facilities in retrofit design–Assuming that you documented deficient locations for pedestrian and bicycle travel, list and describe possible ways to rectify and retrofit existing facilities so that these locations can more readily accommodate pedestrian and/or bicycle travel modes.

***In time, the new transportation era will build a new kind of city.***

# 1.9 References

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