

BIKEWAY

FEASIBILITY
STUDY



BI
XIN

SOUTH TEXAS DEVELOPMENT COUNCIL

L A R E D O

B I K E W A Y F E A S I B I L I T Y S T U D Y

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Prepared By:

METROPOLITAN PLANNING ORGANIZATION
BUILDING S-1, LAREDO MUNICIPAL AIRPORT
P. O. BOX 1365
LAREDO, TEXAS 78040

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PART I
INTRODUCTION

INTRODUCTION

At a time when energy costs are high, the unemployment rate is also high, and the value of the dollar is low, with an instinct for survival, we turn toward alternatives. In some instances it does not always occur that progress requires the invention of something new in order that we may improve. In the case of the bicycle, we reach back to a form of transportation which has been historically, in the United States, used as a means of recreation, as a way of travel for children to and from school, and in a few instances, as a necessary tool for earning ones livelihood. The intention here will be to look to the use of the "bicycle" as a means of transportation with an emphasis on safety and efficiency for whichever purpose used; however, a trend toward increasing the potential use of the bike as a means of transporting the working person from his home to his job and back would be deemed promising.

PART II
CHARACTERISTICS

CHARACTERISTICS

Bicycling activities can be separated into two major categories, recreational and utility-oriented riding. For the bike rider in search of recreation, exercise, or a race, the actual trip is an end in itself while for the rider travelling with the destination in mind, the school, grocery store, neighborhood center or home, the objective is the termination of the trip. Focusing on the terminus causes the rider to place a high priority on a more direct route, acceptable grade profiles, and a minimum amount of delay or inconvenience. Although, according to the Federal Highway Administration where cycle trip surveys were conducted, the use of bicycles for recreational purposes tends to outweigh the utility-oriented use overall, the urban area trips are equal to or greater than recreational trips. Perhaps this grows out of the fact that within an urban area, all or most of a bikeway system will be conducted on or along city streets with few scenic route attractions.

Bikeway Classifications:¹

- Class I: A completely separated right-of-way designated for the exclusive use of bicycles. Cross-flows by pedestrians and motorists are minimized.
- Class II: A restricted right-of-way designated for the exclusive or semi-exclusive use of bicycles.

¹Bikeway Classifications and Definitions taken from the Department of Transportation/FHWA's, Bikeways-State of the Art-1974, pp. 5 and 6.

Through travel by motor vehicles or pedestrians is not allowed. However, vehicle parking may be allowed. Cross-flows by motorists, for example, to gain access to driveways or parking facilities, is allowed; pedestrians cross-flows, for example, to gain access to parked vehicles or bus stops or associated land use, is allowed.

Class III: A shared right-of-way designated as such by signs placed on verticle posts or stenciled on the pavement. Any bikeway which shares its through-traffic right-of-way with either or both moving (not parking) motor vehicles and pedestrians is considered a Class III bikeway.

Definitions:²

X Bike Route: A street or system of streets and ways with signs denoting them as a "Bike Route." The signs warn motorists to anticipate bicycles on these streets and indicate to cyclists a desirable routing because of low traffice volumes or good grade profiles, a possibility of scenic views or continuity to activity centers. Most commonly, "Bike Routes" imply streets in mixed usage but they may include segments of various types of exclusive bicycle facilities described below. In non-capitalized form, "bike route" indicates the

²Ibid,

bicycles' line of travel to reach a specific destination. (A Class II facility.)

**Bikeway,
Cycleway:** Generic terms encompassing all of the exclusive bicycle facility treatments described below. Both most commonly denote bicycle facilities which are off the street or highway pavement but not necessarily separate from the roadway, right-of-way.

Bike Lane: An on-street treatment in which separate auto and bicycle travel lanes are designated visually by signs and street markings. (A Class II facility.)

Protected Lane: An on-street bike lane in which a positive physical separation is placed between bicycles and moving motor vehicle traffic. Separation may be achieved through stiped buffer areas, raised and possibly landscaped median stripes or by placing the land between parked cars and the curb. (A Class I facility.)

**Bike Path,
Pathway:** Generic terms denoting bicycle facilities off the roadway surface, though not necessarily, out of the roadway right-of-way.

Sidewalk Path or Wide Side-walk Treatment: A bike path within the roadway right-of-way which may be used by pedestrians as well as cyclists.

(May be Class I, II, or III.)

Independent
Path:

A cycle facility on its own right-of-way, entirely separate from streets and highways. Includes pathways specially provided for bicycles, park and greenbelt trails, service roadways along utility rights-of-way, drainage and irrigation canals, etc. (Class I or II.)

It is difficult to describe a function of a bicycle facility by using either a classification or a particular term, consequently, both are used in combination to help clarify the type of activity performed on the facility.

The signed bike route or Class III facility does little more than guide the cyclist and offers little or no safety benefits. It does, however, attempt to lead the cyclist through or along utility routes where traffic volume is low and grade profiles are preferable to centers of activity or recreational routes.

The bike lane or Class II treatment provides the bicyclist with an actual space along the roadway and thereby makes his presence known to motorists. This lends a sense of security to both the cyclist and the motorist as the motorist is given the limits of the bikeway and the cyclist a territory in which to operate. While the lane markings do not physically separate cyclist and motorist, they do act as mental barriers and aid greatly in their positioning on a

roadway. Directional bike lanes moving with the flow of traffic are placed on each side of the street. This is usually done between the parking area and motor vehicle travel lane as seen in Figure 1. Another treatment may be to place the bike lane along the curb where no parking is allowed as shown in Figure 2.

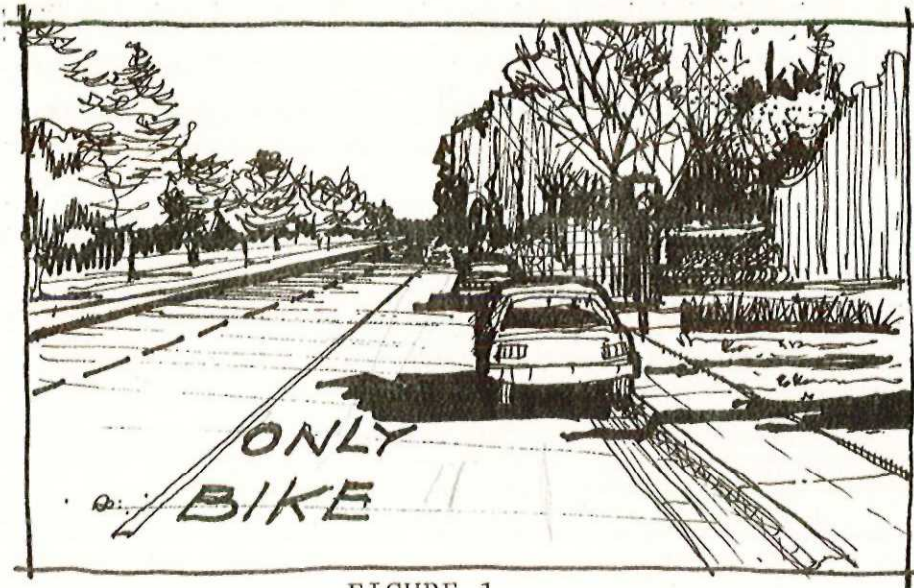


FIGURE 1

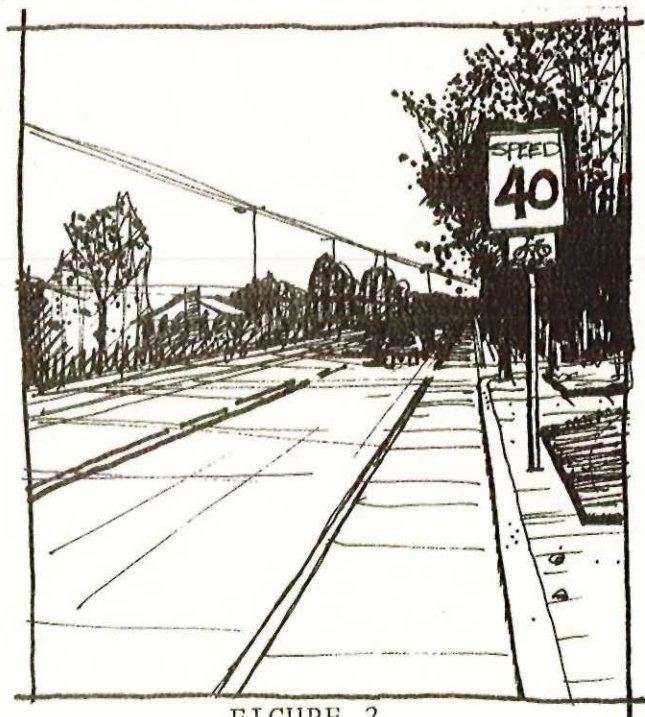


FIGURE 2

Along one-way streets, lanes have been placed on the left side of the street avoiding contact with the usual right hand parking and allowing the motorists efficient use of their outside rear-view mirror. This lane treatment has been employed by the City of Denver, Colorado (see Figure 3). Bi-directional lanes have been employed, but generally are limited to the Class I or independent pathways and sidewalks. The major reason being that riding into oncoming traffic has been identified as a major factor in the cause of accidents between bicycles and motor vehicles.

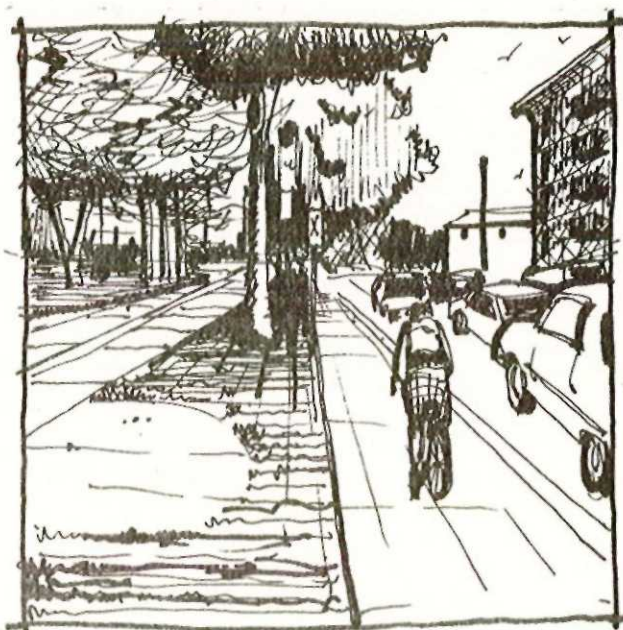


FIGURE 3

Protected lanes are bike lanes where a physical barrier, bumper blocks, raised berms, or traffic bars are used to distinctly separate the bicycle from the auto. This treatment is expensive to implement and maintain. It becomes difficult for the cyclist to cross at mid-block where it is necessary

for him to move into the proper directional lane. Accumulation of debris even with the use of mechanical street/sweepers occurs and may tend to discourage the cyclist from using the lane.

Sidewalk facilities have not been the most satisfactory set up for bike use. They may be classified I, II or III depending on the volume of pedestrian activity. The sidewalk facility fails because intersections with driveways provide extremely poor visibility relationships, with major villains being, shrubbery, fences, and landscaping, and the motorists' poor perspective both during the process of backing into the street and being at the point of completing a turn into the driveway. Needless to say, sharing space with the pedestrian also creates problems. Pedestrians, aside from moving at a slower speed (three or four times slower than the cyclist), are more mobile and can change direction rather abruptly. Children play on sidewalks and often leave their toys on the walks, creating a hazardous course.

The independent bikeway, operating in its own right of way is perhaps the most attractive of facilities (see Figure 4). These bikeways usually tend to be recreational in character. The independent pathway can fail, however, if little attention is paid to grade profiles, sight distance relationships, curvature, and proper pavement surfacing. Sometimes pathways are put up simply out of convenience.

Rights-of-way are acquired, be they levees, utility line maintenance paths, or abandoned railroad rights-of-way and are quickly converted into independent pathways leading nowhere. Care must be taken to plan with sensitivity to meet the cyclists needs.

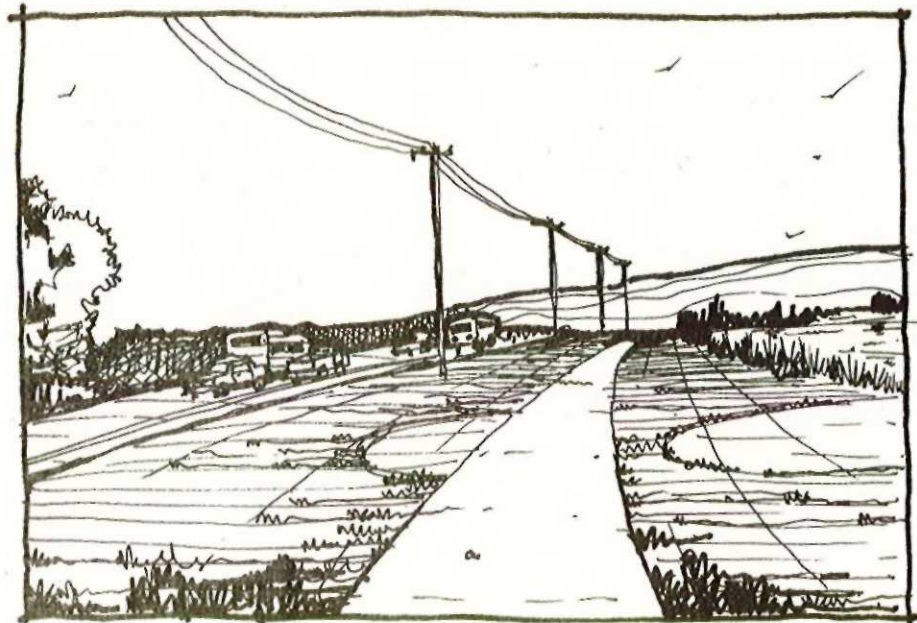


FIGURE 4

PART III
DESIGN CONSIDERATIONS

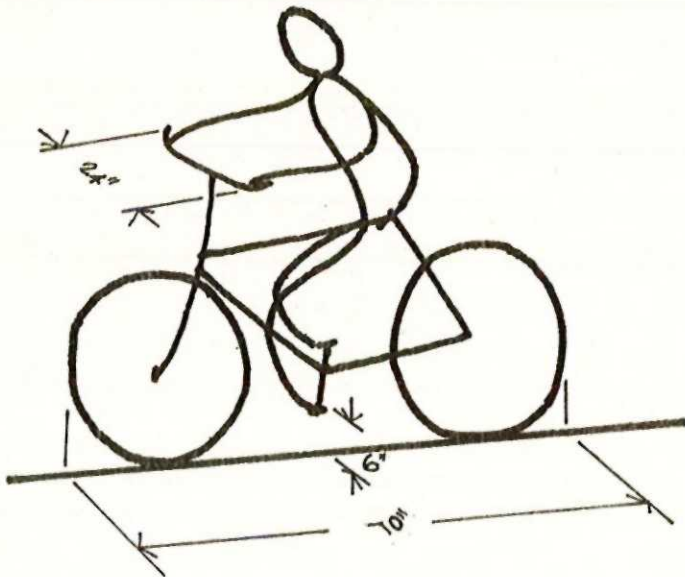
DESIGN CONSIDERATIONS

Current design standards are rather flexible. They suggest rather than fix dimensions, but can be used as basic guides from which to design a bikeway. The standards, which many areas have adopted are German-based and are shown in Figure 5.³ The drawings indicate the space occupied by the bicycle plus the space necessary to compensate for the weaving motion of the bicycle from side to side and an additional clearance space for obstructions. While ~~four feet~~^{feet} seems an adequate dimension for a bikeway facility, additional space must be provided. First, to allow other bicyclists to pass safely; and secondly, to allow cyclists to socialize since bicycling does frequently involve more than one person. For an independent bikeway then, an eight-foot wide path allowing approximately three riders to pass simultaneously and also allowing the passage of a maintenance vehicle, would be a nominal size. Where on street lanes are used, a six foot bike lane can accommodate two cyclists and in a case where the bikeway is set along side parked vehicles, the six feet are adequate to allow the cyclist to avert the open door of the more common motor vehicles (2'-9" to 3'-0").

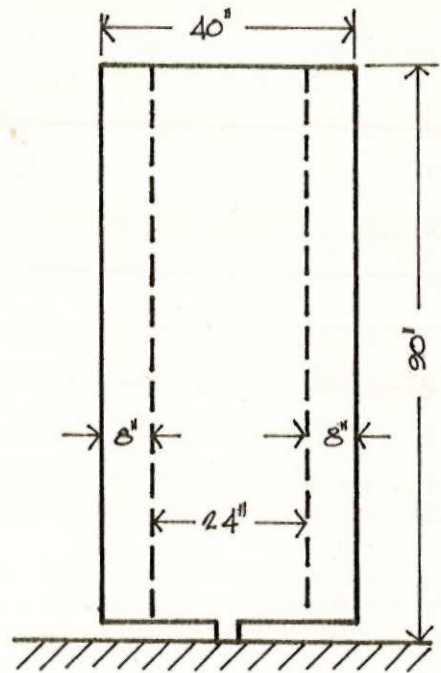
The required width of a road to carry on-street bike-ways can be determined by the addition of automobile travel lane and parking lane widths to the preferred bike lane width. Using eight feet where parking is permitted for the

³Illustration taken from the Department of Transportation/ FHWA's, Bikeways-State of the Art-1974, p. 25.

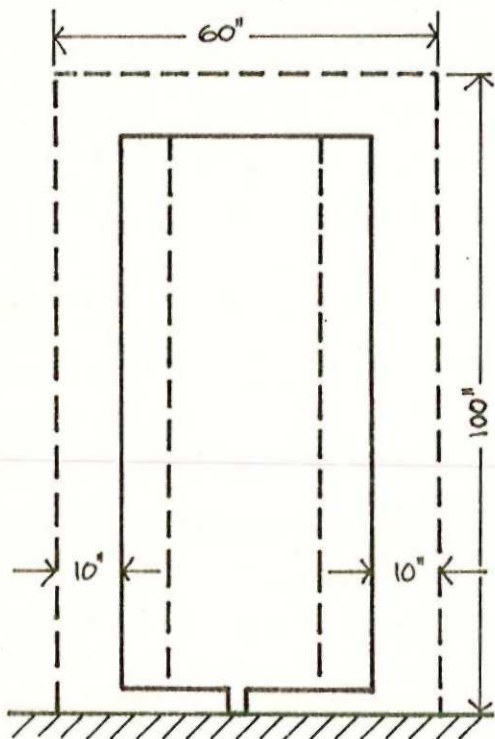
FIGURE 5



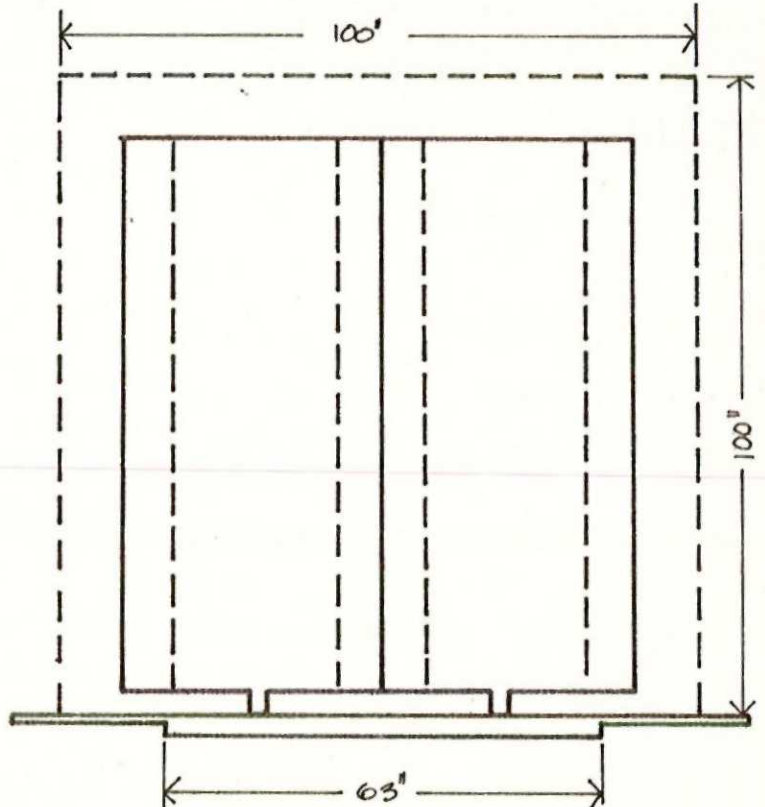
TYPICAL BICYCLE DIMENSIONS



BICYCLE OPERATING SPACE



OPERATING SPACE PLUS
MINIMUM CLEARANCES



TYPICAL BICYCLE
PATH DIMENSIONS

parking shoulder and the figures in the following table taken from the Traffic Engineering Handbook for the width of the travel lane:

X MINIMUM MOTOR VEHICLE TRAVEL LANE WIDTHS

<u>Type</u>	<u>Width in Feet</u>
Expressway	12
Arterial	11
Collector	
Single Family Residential	10
Other	11
Local	
Single Family Residential	10
Other	11

we arrive at a minimum for a collector or local street dimensions, where parking is permitted on both sides and bike lanes are set in each direction, of 44 feet, 28 feet where parking is not allowed on either side, and 36 feet with parking on only one side. These dimensions account only for a minimum bike lane width of four feet. The more comfortable six foot width would create local collector streets widths of 48, 32, and 40 feet respectively.

According to the Department of Transportation Bikeways - State of the Art, 20% of bicycle accidents involve striking fixed obstacles, 15% involve bike-to-bike collisions, and only about 5% of the accidents involve bike-motor vehicle collisions. With regard to speed, the Oregon State Highway Division in January 1974 published the following design standards: 29 M.P.H. is recommended for bikeways with grades

between +3% and -7% where the grade is steeper than -7%, a 30 M.P.H. speed is recommended and where climbing grades on a one-way are greater than +3%, a 15 M.P.H. design speed may be used.

Because bicycles do not have shock absorbing systems and ride on very high pressure, low air volume tires, especially the more popular 10-speed bicycles, the riding surface should be as smooth as possible. Also to be taken into account where pavement is concerned is an 8,000 pound design load of a maintenance truck making occasional trips along the bikeway.

Bikeway graphics constitute a very important part in the development of a successful bikeway system. Directions involving the proper use of the facility, ease of transition from one type of facility into another and initiation and termination of the bikeway must be done with sensitivity toward the cyclist. Some of those signs available are shown on Figures 6 and 7. Again there needs to be stressed the idea that the signs are not simply for the cyclist but also for the automobile driver to be made well aware of the presence of the bicycle. Signs should be used to emphasize areas of high activity and points of potential conflict. The effectiveness of the bikeway depends on proper signing and maintenance of lane markings. As lane markings and symbols fade so do their effectiveness.

MOTOR VEHICLE DIRECTED AND WARNING SIGNS

FIGURE 6



Black on yellow Background
(Uniform Manual W 11-1)



Black on white Background

BIKE ROUTE DESIGNATION SIGNS (White on green Background)



Standard Route Sign
(Uniform Manual D 11-1)



Message Plates

To be mounted above the official marker to designate the beginning and ending of the bike route, and to trailblaze to the bikeway.



Directional Plates

To be mounted below the official marker to guide cyclists along the bikeway and to trailblaze to the bikeway.

FIGURE 6

CYCLIST DIRECTED WARNING SIGNS
(Black on yellow Background)

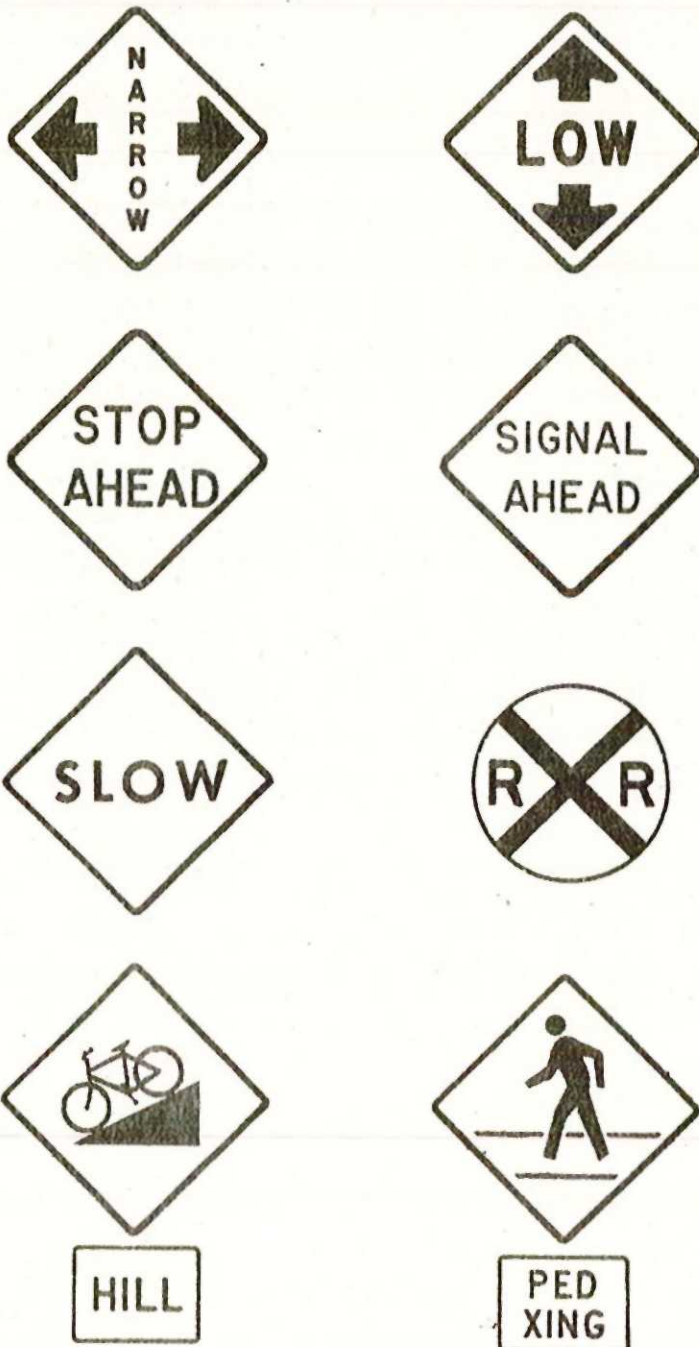


FIGURE 7

PART IV
LOCAL FEATURES

LOCAL FEATURES

The City of Laredo lends itself well to the extended use of bicycles. The terrain is generally involved in a gently sloping attitude, with an occasional hill to test the rider. The climate is usually warm and sunny with an average annual rainfall of about 19 inches a year and a winter lasting around 40 to 60 days.

Apart from its natural assets there are economic aspects which make the bicycle an attractive mode of transportation in Laredo. A median family income of about \$5,000, according to the South Texas Development Council's Regional Land Use Plan, makes the purchase and maintenance of a motor vehicle somewhat unattractive. Many of the automobiles purchased at a low cost and poorly maintained become a problem along city streets. The tendency is to pollute the air to a greater degree than well maintained autos, and if the vehicle reaches a point where the cost for repairs and/or towing outweigh the cost of the auto itself, they are simply abandoned or left to stand and rot. The spiralling rise in the cost of living, interest rates and insurance rates for the purchasing and repairing of automobiles will only help to make this situation worse. This in combination with an unemployment rate of some 15% gives cause to suggest that bikeways could prove beneficial not only to the children who ride to school or the weekend

riding adults, but also to a part of the labor force of the city.

Along these same lines are the students who are attending Laredo Junior College--Texas A&I, a rapidly growing facility. These students operating on loans, grants and scholarships, and often quite abreast of social issues, of which the energy crisis is one, turn to bicycles to ease the tight budget in which they must exist. The LJC--A&I campus, according to the Laredo Junior College Master Plan 74-84 by Caudill Rowlett and Scott, should more than double in size by the year 1984.

Another important feature is a previously planned bikeway for the Zacate Creek, Model Cities Areas, which as proposed extends along side the Creek bed from Scott Street to Pace. An advantage of this bikeway facility is that it will be located approximately in the center of the City geographically and will connect the northern part of the city to the fringes of the central business district. It could become, if properly administered and maintained, an excitingly scenic tour aside from being highly utilitarian. Figure 8 illustrates the type of facility to be used.

Laredo is unique in one respect concerning bicycles, and this is the long standing history of the "cartonero." The "cartonero" is the fellow who rides a customized bicycle, usually three wheeled, but in contrast to the common three wheeler with the carrying basket in the rear, it has a large

basket in the front to carry cardboard, newsprint and any miscellaneous items which he can use or sell. These three wheeled vehicles do a great part, ecologically, in keeping the streets of Laredo clean; however, they have a tendency to obstruct traffic due to their sheer size and extremely slow velocity. Although generally concentrated within the central business district, they do travel out especially to the supermarkets and smaller commercial areas where they are likely to find their intended treasure.

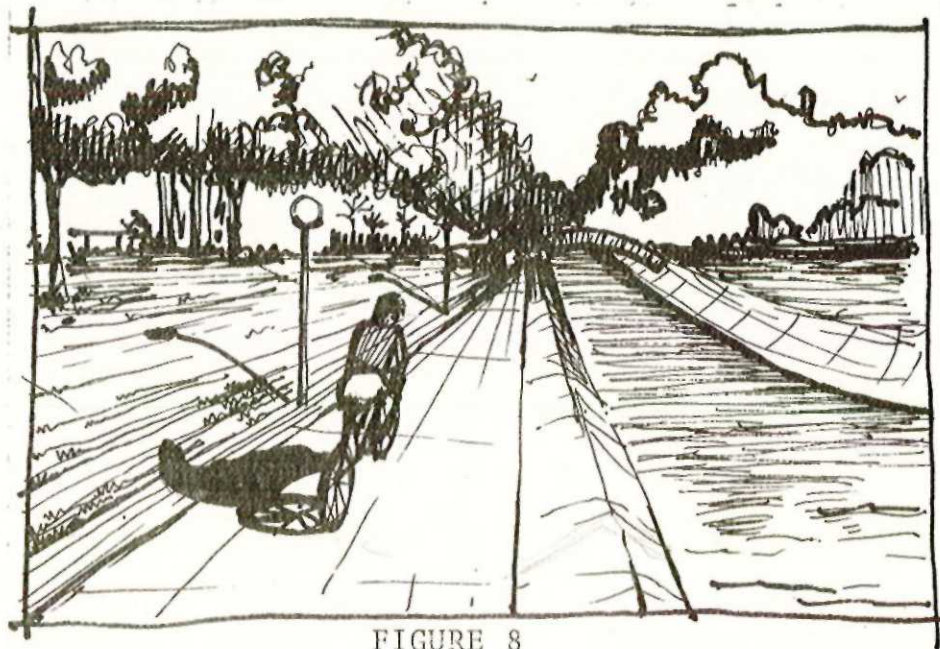


FIGURE 8

The narrow streets and the condition of these streets are a negative aspect for the bikeway facility. However, the majority of the narrow streets occur in and around the downtown area and some of the problems they create have been alleviated by the recent conversion by the city to a one-way street system. The condition of some of the paved streets is

not extremely conducive to bicycle riding but unpaved streets are even less receptive to the cyclist, and these occur throughout the City of Laredo.

Another drawback for the bikeway is that Laredo does not have a leash law and is not especially lacking in the number of dogs roaming its streets. There are very few people who enjoy being chased, much less being bitten by a dog. The incidence of dog bites in Laredo is relatively high. According to the Laredo-Webb County Health Department, there were 230 reported incidents in 1970, and the number has risen to 407, as of October 17, for the year 1975. The figures show almost a doubling within a five-year period.

PART V
LOCAL NEEDS

LOCAL NEEDS

The City of Laredo, as previously stated, is generally conducive to the bicycle rider for reasons of climate, terrain, and because of particular economic factors. A good bikeway network could aid greatly in strengthening its transportation system.

In terms of what this city needs, this study suggests a focus on three major elements: 1) A Bicycle Education Program, 2) a Leash Law, and 3) a System of Bikeways. Although the three elements may be developed independently of each other, the logical sequence would be the one mentioned above.

A Bicycle Education Program lends strong support to a bikeway facility. Even though a good bikeway system that is well engineered and properly enforced will complement an educational program and vice versa, the basis for the long term success of a bikeway facility rests on a strong foundation and that is a good educational program beginning at an early age. The implementation of Bicycle Safety Programs in elementary schools is a primary need which should be considered regardless of whether or not there exists a bikeway facility.

Frequent public service announcements over radio and television would help make the public aware of bicycle safety and serve to continually remind bicycle riders of their responsibility as members of a transportation system that will

operate much more efficiently with the cooperation of each of the different modes of transportation.

Along with education and public information it is possible through the promotion of bicycle oriented gatherings to instill respect and pride in the bike rider for himself and others. Tours, races, bike riding competitions, etc., help bring people together on a common ground concerning bicycles, and can reinforce a sense of community, of accomplishment, and aid in developing an internal method of enforcement of bicycle regulations.

Concerning a Leash Law, the statistics speak pretty loudly for themselves. Although a leash law is not in the end a necessity, it is supported in this study because of its potential to encourage many bike riders who do not care to tolerate a dog(s) barking and snapping at his heels, to get out and ride. According to current statistics of reported dog bites, the City of Laredo is averaging approximately 1.3 per day:

The maintenance of a dog pound and enforcement of a leash law are expensive ventures; however, it is possible that, when weighed against: 1) the cost of police man-hours spent in taking the call on a dog bite and reporting it, 2) the Health Department's follow-up on the case, 3) the fear of dogs instilled in the victim, 4) the cost of the doctor, 5) the removal of dogs from the Laredo streets when they have been run over, and 6) the costs involved in accidents where

someone is willing to brake for animals and becomes subject to a possible rear-end collision, the expenses would balance themselves out. Bicyclists who are being chased by a dog are forced to shift their attention from the safe operation of the bicycle to the impending possibility of a dog bite, and therefore, become subject to potential accidents. As previously stated, the bikeway will function without a leash law, however, for reasons of safety, health, and as a potential promoter of the use of bicycles, should be considered as a strong element in the development of a good bikeway facility.

The third element is the System of Bikeways. In the following chapter this study presents, in a very schematic way, the possible corridors which would best lend themselves to a Bikeway System. The primary concern should be to interconnect where possible, the schools of Laredo and also the Neighborhood Facilities. From a visual survey it is apparent that the majority of bike riders are young children of elementary and junior high school age. The neighborhood facilities are visited by the cities poor and are also prime candidates for bike usage. Using the proposed Zacate Creek bike path⁴ as a spring board and sending out feeders from it, a rudimentary facility could be developed to fill the current needs of the Laredo Urban area and allow for growth of the system as necessary.

⁴Detailed Project Report for Flood Control, Zacate Creek, Laredo, Texas, U.S. Army Engineer Dist. Fort Worth Corps of Engineers, Fort Worth, Texas. April 1973, p. 11 22.

In terms of rural or the more recreational bike routes, there are three very promising corridors. Lake Casa Blanca is Laredo's major recreational attraction and is receiving improvements in the form of the Hacienda de Los Dos Laredos, an aviary, an open-air theater, an animal zoo barn, a senior citizens park and low water crossing. An independent bike path leading to the Lake and around some of its new displays would be a scenic as well as educational trip.

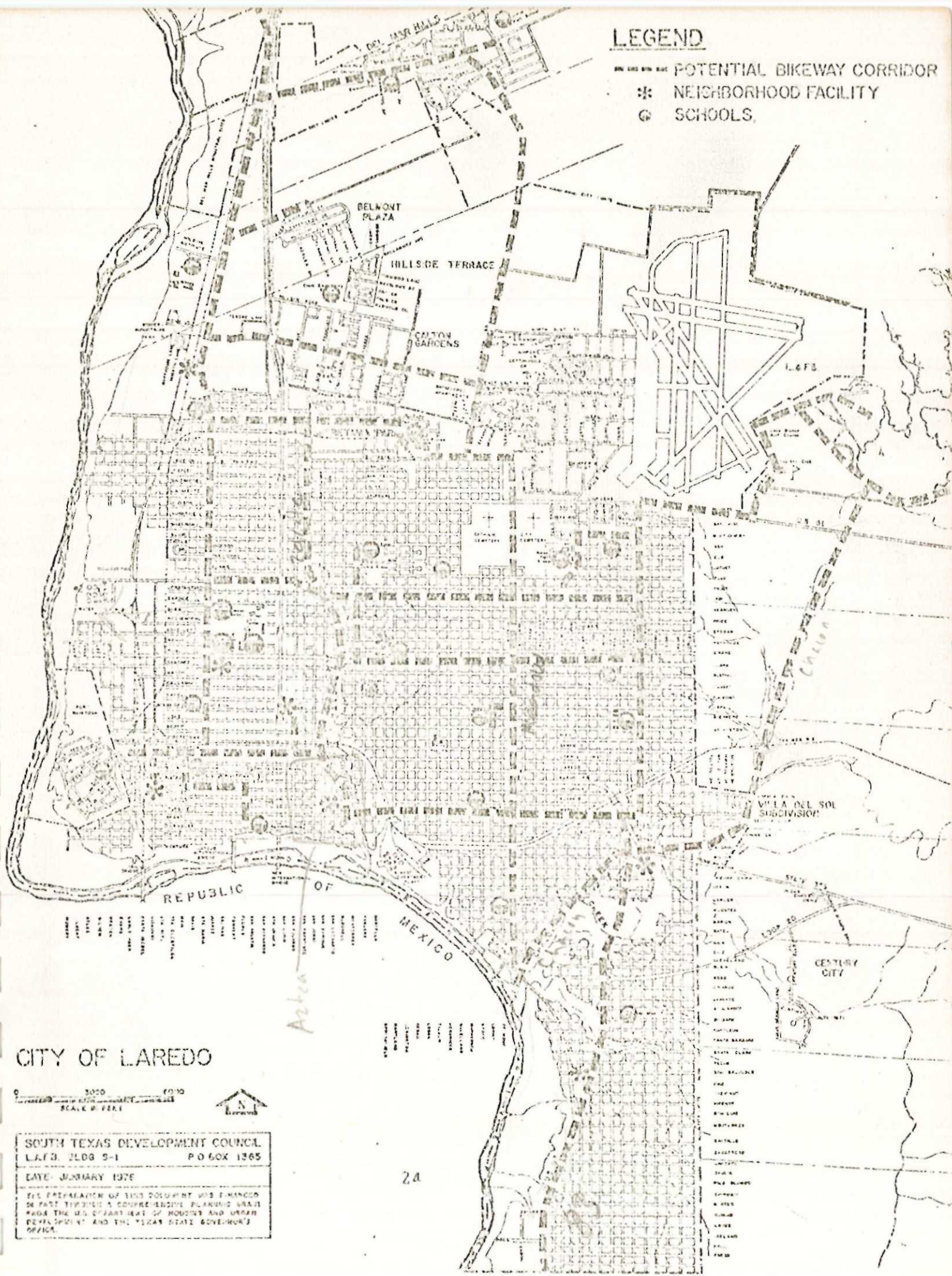
Santa Isabel Creek, north west of Laredo, is being considered for a multipurpose dam with recreational facilities. It is located about 10 miles outside the Laredo City limits. Here there is a potential independent bike path of scenic value, with many changes in elevation and few straight-a-ways. The ride would be challenging and the recreational facilities would offer a welcome break before the return trip.

On the eastern side of Laredo, Chacon Creek has been recommended in the South Texas Development Council's Open Space and Recreation Plan (1972) for development as a scenic and nature area with hiking and bicycle trails, low water dams, and playfields. This corridor would act as a direct link between the south most part of the city and the Lake Casa Blanca facilities.

PART VI
POTENTIAL
BIKEWAY CORRIDORS

LEGEND

- POTENTIAL BIKEWAY CORRIDOR
- ⊛ NEIGHBORHOOD FACILITY
- ⊙ SCHOOLS



CITY OF LAREDO

0 3000 6000
SCALE IN FEET



SOUTH TEXAS DEVELOPMENT COUNCIL
L.A.F.S. BLDG 9-1 P.O. BOX 1365

DATE: JANUARY 1976
 ITS PREPARATION OF THIS DOCUMENT WAS FINANCED
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 DEVELOPMENT AND THE TEXAS STATE GOVERNMENT'S
 OFFICE.

PART VII
CONCLUSION

CONCLUSION

The bicycle is a simple, clean, economic, and enduring machine. However, when it is pitted against the more gainly and arrogant automobile it must take a position of humility. Ideally, a bikeway is a search for a more peaceful co-existence between the two rather than a segregation. It serves to promote an alternative mode of transportation, adds a degree of safety to the use of a bicycle and confirms the bike as "an equal" to the automobile in the transportation system.

Bikeways do not necessitate any particularly special features to compensate for the handicapped and/or the elderly since the major concerns of the bicyclist are those of the elderly and handicapped--easy access on and off, quality of the road surface, desirable grade profiles. The only exception is in the case of the use of a sidewalk as a part of the bikeway system, where ramps must be included at points where the bicycle will either enter or depart from that particular facility.

This feasibility study shows Laredo to be ideal from a physical as well as economic standpoint for bikeway facilities. Before a bikeway system can be established, however, a Bikeway Plan should be completed. To this point we have simply observed from a general view that a bikeway system is feasible.

The history of bikeways is a young one and, therefore, resources (tried and true) from which one may draw are far from comprehensive. Potential bikeway facilities must be studied in detail for each and every urban or rural area, with special consideration given to the particular characteristics of the area.

This study supports and recommends the initiation of a Bikeway Plan for Laredo. The Plan should outline routes and alternatives, a budget, evaluation, and/or monitoring methods, future development of the bikeway system as it ties in with the area's land use plan and long-range transportation Plan, and any other programming deemed necessary for the efficient and above all safe operation of the bicycle as a means of transportation in the multi-modal transportation system.