BICYCLE DEVELOPMENT PLAN

June 2007

Prepared for:

City of Peoria, Arizona

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ACKNOWLEDGEMENTS

The consultant team of Sprinkle Consulting, Coffman Studio, and HDR Inc. would like to thank the numerous individuals who directed and contributed to the development of the *Peoria Bicycle Development Plan*.

Special thanks go to:

- Brandon Forrey (Project Manager), Transportation Planning Engineer, Traffic Engineering Division, City of Peoria
- Jamal Rahimi, City Traffic Engineer, Traffic Engineering Division, City of Peoria
- Karen Flores, Planner, Community Development Department, Planning Division, City of Peoria
- Jeff Sargent, Park Projects Administrator, Community Services Department, Parks Division, City of Peoria
- Mark Stambaugh, Senior GIS Technician, Community Development Department, City of Peoria
- John Wenderski, Deputy City Manager, City of Peoria
- Lisa Houg, Contract Officer, Finance Department, City of Peoria
- Bill Lazenby, Co-President, Coalition of Arizona Bicyclists
- Peggy Rubach, Multi-Modal Planner, Maricopa County Department of Transportation

Additional thanks go to the citizens of Peoria who gave their time and ideas at the Community Open House Workshop.

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EXECUTIVE SUMMARY

The Traffic Engineering staff, with the assistance of Sprinkle Consulting, Inc., Coffman Studios and HDR Inc., has completed this *Bicycle Development Plan* to provide the City of Peoria with a "blueprint" for the continuing development of its network of on-street bicycle facilities. In the course of preparing this plan, the consultant team performed an evaluation of bicycling conditions on the City's roadway network and, where necessary, made recommendations toward improving bicycling conditions on specific segments. Various "Bicycle Friendly" practices and policies in use across Maricopa County, Arizona, and the rest of the United States were also reviewed and summarized. The consultant team, drawing upon input from City staff and residents, recommends certain policies and practices that are appropriate to the goals and objectives articulated in the City's *General Plan* and other documents.

The consultant team evaluated bicycling conditions on Peoria's roadway network using the Bicycle Level of Service Model, a methodology adopted by numerous municipal, county and state planning agencies and departments of transportation across the country. In consultation with city staff, a target level of bicycle accommodation—equal to or better than a score of "C" (<3.5) in the Bicycle Level of Service evaluation—was chosen for the city. On average, the city's arterial streets scored a "D" (3.7) on the evaluation, which does not meet the targeted level of accommodation for bicyclists. The consultant team analyzed the traffic and geometric conditions of the segments that did not meet the target level of accommodation (approximately 70 miles in length) and is recommending strategies for improving conditions for bicyclists on those segments. There are five recommended strategies:

- Re-striping of roadways for bike lanes or shoulders (19 miles)
- Posting "Share the Road" signage (3 miles)
- Adding or expanding paved shoulders (10 miles)
- Performing detailed corridor studies to investigate the possibility of sidepath construction (28 miles)
- Performing detailed corridor study to investigate alternative solutions for especially constrained roadway segments (13 miles)

After identifying the appropriate improvement strategies for each roadway segment, the consultant team prepared a prioritized list of potential improvements, using a neo-traditional Benefit-Cost Index, which weighs various benefits (potential improvement in bicycle accommodation, potential demand for a bicycle facility along that specific segment, and any citizen-identified needs for improvement on that segment) against an estimated cost for the type of improvement recommended for each segment. The results of the Benefit-Cost Index were used to group the improvement recommendations into three "tiers" of short-, medium-, and long-range projects. The mileage and estimated cost of these various tiers is as follows:

- Tier I (short-term projects): 29 miles, $2.4 million
- Tier II (mid-range projects): 18 miles, $13.7 million
- Tier III (long-range projects): 14 miles, $24.3 million

While this Bicycle Development Plan has established priorities for implementation of bicycle facility improvements on the City's roadway network, it will be important for city staff to be alert to opportunities to include bicycle improvements in new development and roadway reconstruction projects, so that public transportation investment benefits can be maximized and future needs for retro-fitting can be reduced.

The policy recommendations included in this plan address enacting a performance-based standard for accommodating bicyclists on Peoria's streets, as well as updating the City's planning procedures and development standards to facilitate the development of new bicycle facilities throughout the City.

INTRODUCTION: IMPETUS AND PRECEDENTS

This *Bicycle Development Plan* is part of an effort to improve conditions for bicycling within the City of Peoria, thereby maximizing the benefits of bicycling to its residents and visitors. These are primarily transportation benefits, realized in the form of reduced emissions and alternative means of accessing important destinations within the city, but there are significant recreational, public health, and quality of life benefits derived from bicycling as well. Each of these benefit types will be touched on at points in the plan. But it is important to stress at the beginning of this plan that it was created in response to specific transportation-related requirements that originate both at the state and municipal levels.

According to the *Scope of Work*, the purpose of this *Bicycle Development Plan* is to "provide a comprehensive vision, strategies and action elements for the improvement of bicycle traffic and facilities within the City of Peoria." Such improvements are desirable outcomes according to many points of view, but they are also expressly mandated by the State of Arizona; Title 9, the Cities and Towns portion of the Arizona Revised Code, requires all cities in the state to adopt *General Plans* and identifies specific elements that those plans shall include. All *General Plans* for Arizona cities must include a circulation element which shows existing and proposed transportation facilities of many modes, including "bicycle routes."[1] Furthermore, cities with populations in excess of 2,500 are mandated, as part of the Growth Area Element of their plans, to "make automobile, transit, and *other multimodal circulation* more efficient"[2] (emphasis added). Finally, for cities with populations of 50,000 or greater (like Peoria), the state also requires the inclusion of bicycle routes in the recreation element of their *General Plans*[3], while the bicycle transportation requirements are the same as those for smaller cities. The development of this transportation plan for bicycling, which focuses on on-street bicycling facility needs and improvements, is in keeping with these legislated requirements in that it will show existing bicycle facility conditions and propose improvements that will make bicycle transportation more efficient by allowing cyclists greater access to destinations within the City of Peoria.

[1] Arizona Revised Code, Section 9-461.05, Subsection C.2
[2] Arizona Revised Code, Section 9-461.05, Subsection D.2.a
[3] Arizona Revised Code, Section 9-461.05, Subsection E.2.g

This *Bicycle Development Plan* is not the City's first response to the Planning requirements set forth by the Legislature. The City's *General Plan*, most recently revised in December 2006, identifies several "Major Themes" which either pertain to bicycle transportation directly or which could be better realized with the improved bicycle facilities.[4] These themes include:

- Providing a balance of residential and employment opportunities
- Protecting Natural Resources and Community Character
- Providing a Residential-Oriented Street System
- Meeting the Recreational Needs of the Community
- Enhancing Peoria's "Old Town"

Peoria's development aspiration, as expressed in the *General Plan*, is to achieve a balance of "commercial and high-paying employment opportunities to foster community sustainability, reduce commute times and improve air quality." As the community develops towards this future, bicycle transportation can contribute to each of these desired outcomes. If a balance of residential, commercial, and employment areas is achieved within the city, there will be great potential demand for bicycling between residences, shops, and workplaces. Improved bicycling conditions on all streets will allow a broader range of transportation options for Peoria commuters, allowing them to leave their cars in the garage for certain trips, thereby contributing less to the problems of air pollution and traffic congestion. For the same reasons, an improved bicycle transportation network assists in the protection of natural resources and community character; by providing alternatives to the automobile, some of the negative effects associated with the automobile can be attenuated. Bicycle lanes are specifically identified as an element of a "residential oriented street system" in the *General Plan*. Bike routes are also specifically mentioned as a critical element of Peoria's recreational infrastructure, the development and maintenance of which is identified in the *General Plan* as being very important to the community.

[4] City of Peoria General Plan, pages 1-5 and 1-6

Within the required Circulation Element of the Peoria's *General Plan*, the City "outlines bikeway, pedestrian, and transit needs as critical components to the City's circulation system." The City's *General Plan* goes on to state that due to Peoria's expected population growth over the next few decades, "upgrades and expanded multi-modal opportunities are a high priority need."[5] Among the Goals of the General Plan's Circulation Element is Goal 3.1, which is to "Provide for a multi-modal transportation system that will serve the community and region in a safe, efficient, cost effective and aesthetic manner while minimizing adverse impact to neighborhoods, businesses, and the natural environment." The bicycle-specific objective that serves this adopted goal of a multi-modal transportation system, and which this *Bicycle Development Plan* seeks to directly address, is Objective 3.1.E., to "Develop a comprehensive, coordinated, and continuous on and off-street bicycle and multi-use pedestrian transportation system."

This *Bicycle Development Plan* concentrates its recommendations for improvement on Peoria's arterial streets for two separate but inter-related reasons: because arterials provide the public with necessary links to complete their bicycle trips and because bicycling conditions on arterials are very challenging. With regard to the first reason, bicycle transportation is an important element of the "multi-modal transportation system" that city planners have identified as a goal for the City, a goal that the City Council has endorsed through its adoption of the *General Plan*. Both in previous bicycle plan projects and in current practice, the City of Peoria has established a standard for bicycle lanes on collector streets. These existing facilities provide good bicycle circulation within neighborhoods bounded by the one-mile grid of arterial streets, but access across or along arterial streets, whether to other neighborhoods or workplaces, shops, schools, parks and other recreational destinations, is very difficult. The overwhelming majority of destinations for bicycle trips are located along arterial streets or at intersections thereof. Arterial streets are critical to recreational bicycling as well. Development of the on-street bicycling network needs to happen in conjunction with the development of off-street facilities, such as those recommended in the newly adopted *Parks, Recreation and Open Space and Trails Master*

[5] Peoria General Plan, page 3-2

Plan; trips to and from off-road facilities will require some travel along or across arterial roadways.

Secondly, as will be explained in detail in later sections of this plan, the conditions for bicycling on Peoria's arterial streets are very challenging. Peoria's roadways carry high numbers of vehicles at speeds between 35 and 50 miles per hour. As documented in the "List of Deficiencies" section of this plan, many of Peoria's arterial streets (as presently marked) have insufficient dedicated space for cyclists, leaving little room for them to feel safe operating their vehicles. These conditions combine to inhibit the comfortable operation of bicycles on Peoria's streets. If a critical mode of transport is effectively excluded from a multi-modal network, then that network does not meet the requirements set forth by the City and the State. Such a system falls short of its objective to be comprehensive, coordinated and continuous; such a system is also failing to realize its peak efficiency.

It is clear from the *General Plan* and from the Arizona Revised Code that bicycles are first and foremost vehicles that must be accommodated in the transportation network. Better accommodation of bicyclists on all streets is listed as Objective #1 in the list of Goals and Objectives below. This "complete streets" objective was consistently rated as "very important' by participants in the Public Open House Workshop held on November 2, 2006 as part of this plan process.[6] The *Bicycle Development Plan* identifies opportunities for improving bicycle conditions on Peoria's streets and proposes cost-effective strategies realizing those improvements.

[6] The Public Open House Workshop presented residents with an overview of the plan process, and allowed review of some preliminary work products and analyses. Participants were invited to give feedback in various ways. Their responses were incorporated into several aspects of this plan, most notably the identification of deficiencies (Chapter 2) and the Prioritization of Improvements (Chapter 4). Relevant public responses are described in those sections where they are applied. A sample public response sheet is included as Appendix E of this document. Copies of all public responses are on file with the City of Peoria Traffic Engineering Department.

I. COMMUNITY VISIONING: GOALS AND OBJECTIVES

This statement of Community Vision, Goals, and Objectives draws from the Circulation Element of the *Peoria General Plan*, the *Parks, Recreation, Open Space and Trails Master Plan* (PROST), and other regional and national sources on bicycle transportation. The following Vision, Goals and Objectives focus and complement those expressed within the above documents. The objectives are grouped by the types of specific results they are intended to bring about. Certain objectives are also followed by recommended policies that will aid in their being achieved. If these objectives are to be reached, it will be crucial that staff carry them forward from this document and work to have them incorporated into binding development agreement stipulations, future revisions of the City's *General Plan,* and future City ordinances, as appropriate to each objective.

VISION

A system of on-street bicycle facilities in the City of Peoria that contributes to a multi-modal transportation system that serves the community and region in a safe, comfortable, convenient, cost-effective, and aesthetic manner while enhancing neighborhoods, businesses and the natural environment.

GOAL

Develop a safe, comprehensive, coordinated, continuous, comfortable, and convenient on-street bicycle transportation system that interconnects with adjoining jurisdictions' on-street bicycle facilities, local and regional destinations, transit facilities, and the off-street trail and path system both within and adjacent to Peoria.

Complete Streets

Objective 1: The City will require all new and reconstructed road projects to provide accommodations for all bicycle user groups along and across all corridors.

Connectivity

Objective 2: The City will develop a safe, comprehensive and convenient network of on-street bicycle facilities that provides connections between schools, parks and open spaces, sports and recreation facilities, mountain preserve areas, neighborhood/residential areas, and business and commercial centers.

Objective 3: The City will develop on-street bicycle connections wherever possible in conjunction with the planned off-street path and trail system.

Objective 4: The City will work with adjoining jurisdictions, the Flood Control District of Maricopa County, Maricopa County, and the Maricopa Association of Governments (MAG) to ensure the continuity of bicycle routes and standards at municipal boundaries.

Objective 5: The City will provide for the linkage of bicycle facilities with existing and future public transit systems and facilities.

Objective 6: To link on-street bicycle facilities with paths and trails, the City will coordinate the master planning and development of projects adjacent to the New River and Agua Fria River corridors with the New River and Agua Fria *Watercourse Master Plans*, the *Central AZ Project Feasibility Study*, the *West Valley Multi-modal Transportation Corridor Master Plan*, the *West Valley Recreation Corridor*, and any other related future plans or studies.

Implementation

Objective 7: The City will seek all available funding sources to implement the citywide bicycle system in addition to encouraging incremental development by the private sector through various new development and/or redevelopment projects.

Objective 8: The City will continue to coordinate planning, design, construction and on-going maintenance of on-street bicycle facilities as part of the City's Capital Improvement Program (CIP) and maintenance budgeting process.

Education/Promotion

Objective 9: The City will coordinate the provision of user-friendly maps and brochures that clarify routes and encourage bicycle riding.

Objective 10: The City will encourage its Police Department and other appropriate agencies to promote and educate concerning traffic laws and bicycle safety in Peoria Schools.

Objective 11: The City will promote bicycling as a means of personal mobility for local daily travel trips for all purposes and as a form of healthy recreation and exercise.

End of Trip Provisions

Objective 12: The City will encourage bicycle riding by establishing standards for provision of end-of-trip facilities such as drinking water, toilets, showers, lockers, and bicycle parking in all developments, with the type and number of facilities to be determined by the scale and purpose of the development.

Safety and Security

Objective 13: The City will coordinate the development of a bicycle transportation system that increases user safety along routes and crossings by incorporating the latest bicycle safety techniques and the principles of Crime Prevention through Environmental Design (CPTED).

Objective 14: The City will encourage its Police Department to increase levels of enforcement of traffic laws most often violated by all legal roadway users that affect bicycle use and to improve tolerance and courtesy among all roadway users.

Objective 15: The City will encourage and support new and existing bicycle safety and education programs that promote bicycle use and user group compatibility and enforcement of traffic rules.

Active Living

Objective 16: The City will increase the proportion of citizens who engage in physical activity by making bicycling facilities easily accessible from their homes and linked to desired destinations.

Safe Routes to School

Objective 17: The City will increase youth health and activity levels by promoting and encouraging bicycle and walking through Safe Routes to School Programs.

II. EXISTING CONDITIONS AND CONTEXT

This chapter describes various aspects of the present conditions for bicycling on Peoria's streets from various perspectives. The "List of Deficiencies," an element mandated in this project's Scope of Work, describes the evaluation of bicycling conditions on Peoria's streets that was performed as part of this study. This chapter also provides some context for that evaluation by describing the expected growth of Peoria over the next several decades, summarizing the state of bicycle planning and accommodation in neighboring jurisdictions, summarizing the benefits to be gained from building a more bicycle-friendly Peoria, and detailing some of the "best practices" of bicycle planning and accommodation in use throughout the Valley, the State of Arizona and around the United States.

LIST OF DEFICIENCIES: BICYCLING CONDITIONS IN PEORIA

This "List of Deficiencies" for the *Peoria Bicycle Development Plan* focuses on the level of bicycle accommodation along Peoria's arterial street network, which serves as the "connective tissue" among Peoria's neighborhoods, commercial districts and recreational destinations. This builds upon Peoria's previous emphasis on developing bicycle facilities on collector streets, and contributes to the goal of developing a comprehensive bicycle transportation system throughout the city. In this section, the level of bicycling accommodation at several major destinations around Peoria is evaluated and reported and citizen-identified needs are compiled, both for improved cycling conditions along roadway segments, as well as for improved intersections of arterial streets with paved paths and collector streets.

Bicycling Conditions on Arterial Streets: Bicycle Level of Service Evaluation

A Peoria bicyclist shares the travel lane with motor vehicles along Deer Valley Road

The consultant team analyzed bicycling conditions on nearly one hundred miles of streets in Peoria's network, using a popular method of analysis known as the Bicycle Level of

Service, Version 2.0. This statistically reliable mathematical model yields numerical scores stratified into service categories (A, B, C, D, E, and F[7]) for each roadway, reflecting users' perceptions of how safe or comfortable the roadways are for bicycle travel. Factors considered in this analysis include: volume, mix, and speed of vehicular traffic on the roadway; the width of the outside travel lane and the width of any shoulder or bike lane; the pavement condition; and the presence and occupancy rate of on-street parking (for a detailed description of this widely-used method and its development, see Appendix A). As the consultant team surveyed the network, it was observed that while most of the roads in Peoria have a symmetrical cross section, i.e. they have the same configuration and dimensions across both directions of travel, there were a few asymmetrical streets with lanes of different widths in opposite directions or with a curb on one side and an open shoulder on the other. These differences were recorded and their totals tallied separately.[8]

The distance-weighted average roadside condition along the study network in Peoria is 3.7, which equals a Bicycle Level of Service score of "D".[9] Bicycle Level Service (LOS) "D" is also the most frequently occurring score, found along 38.9 centerline (symmetrical) miles and 4.9 roadside (asymmetrical) miles of the study network. The total Bicycle Level of Service mileages for the two types of roadway cross section are as follows:

[7] Level of Service categories for non-motorized modes are similar to those for motor vehicles, with one important exception: the Highway Capacity Committee has designated Level of Service "D" as standard minimum "acceptable" level of service. The Bicycle Pedestrian Level of Service Models, however, were developed with input by bicyclists and pedestrians operating in real environments, who assigned letter grades on an A-F scale, with A representing the most accommodating conditions and F representing the least accommodating conditions. In practice, then, an "acceptable" level of service is determined with each evaluation, depending on local needs and expectations. For more information see NCHRP 3-70.

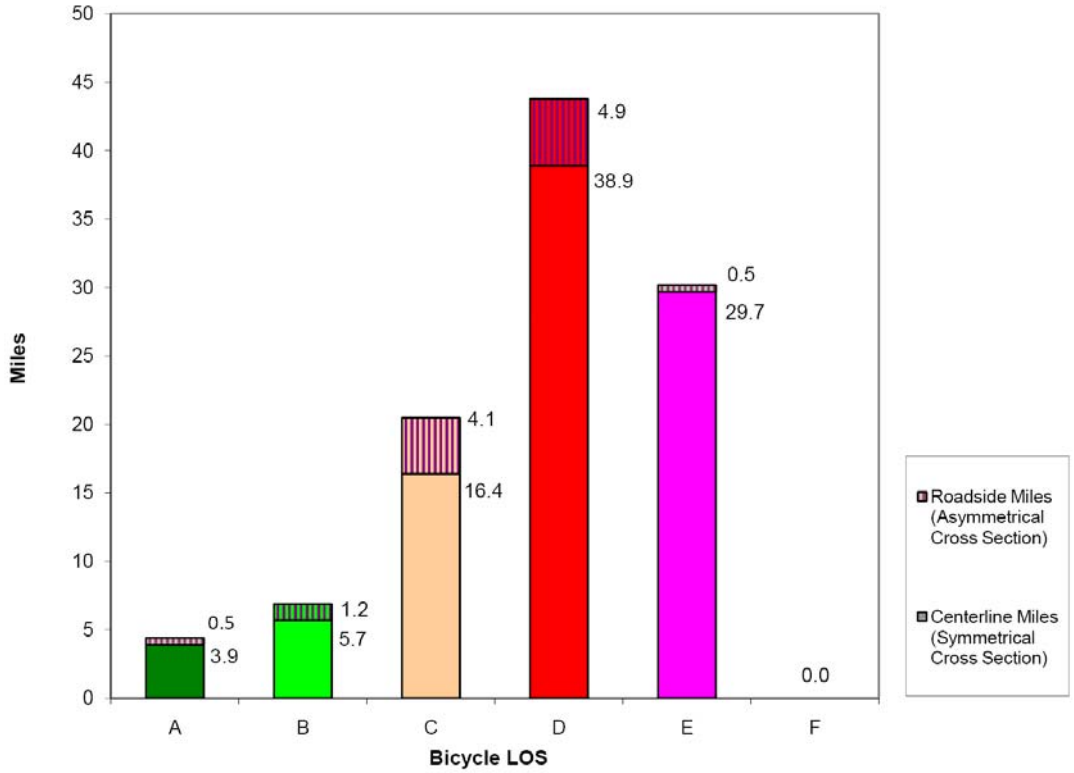
[8] Most of the streets surveyed (94 *centerline* miles) presented a symmetrical cross-section. The remaining streets (3.8 miles) presented an asymmetrical cross-section, meaning that there was some difference in the configuration of the roadway in the opposing directions. For example, on Union Hills Drive between 107th and 111th Avenues, the total width of the outside lane (W^t) is 16.5 feet in the westbound lane and 14.5 feet in the eastbound lane. This is perhaps the crucial difference between the westbound lane achieving a LOS score of "C" and the eastbound lane achieving a score of "D". The opposing sides of the 3.8 miles of asymmetrical roadways were recorded separately, yielding a total of 7.6 *roadside* miles.

[9] In order to calculate a distance-weighted average for the arterial roadways studied, the results of the symmetrical streets were doubled (converting their result from centerline to roadside miles) and added to the results for the asymmetrical streets, yielding a total of 185.3 roadside miles with an average Bicycle Level of Service score of 3.8, or a grade of "D".

- Bicycle LOS A: 3.9 centerline (symmetrical) miles
  0.5 roadside (asymmetrical) miles
- Bicycle LOS B: 5.7 centerline (symmetrical) miles
  1.2 roadside (asymmetrical) miles
- Bicycle LOS C: 16.4 centerline (symmetrical) miles
  4.1 roadside (asymmetrical) miles
- Bicycle LOS D: 38.9 centerline (symmetrical) miles
  4.9 roadside (asymmetrical) miles
- Bicycle LOS E: 29.7 centerline (symmetrical) miles
  0.5 roadside (asymmetrical) miles
- Bicycle LOS F: 0.0 centerline (symmetrical) miles
  0.0 roadside (asymmetrical) miles

The results of the Bicycle LOS evaluation for both types of streets are illustrated graphically below in Figure 2A, and on the accompanying map, "City of Peoria Inventory of On-Road Bicycling Conditions and Facilities."

Figure 2A: Bicycle Level of Service Results for Arterial Street Network, Peoria AZ: Mileage for Bicycle LOS Grades Average Roadside Score: 3.7= Bicycle LOS "D"



After viewing the preliminary results of this analysis, the Bicycle Development Plan Steering Committee agreed that Bicycle Level of Service "C" was a reasonable target score for arterial streets in the City of Peoria. With this in mind, not meeting the targeted Bicycle Level of Service "C" is a principal definition of a deficiency in the existing network. Along this study network 70% of the miles surveyed do not meet this level of bicycling accommodation. More specifically there are 69 centerline (symmetrical) miles of arterial roadway and 5.4 roadside (asymmetrical) miles that scored below a Bicycle LOS grade of "C."

Those segments with a Level of Service of "D" or lower are listed in Table 2A below (in alphabetical order); for a full report of the Bicycle Level of Service Results, see Appendix B.

Table 2A: Roadway Segments with a Bicycle Level of Service Grade of "D" or Lower

Road Name	From	To	Length (miles)	Bicycle LOS Score (1..7)	Bicycle LOS Grade (A..F)
67th Ave	Olive Ave.	Mountain View Rd	0.5	**4.05**	**D**
67th Ave*	Mountain View Rd	Peoria Ave.	0.5	**4.47**	**D**
67th Ave*	Peoria Ave	Cactus Rd	1.0	**3.80**	**D**
67th Ave*	Sweetwater Ave	Thunderbird Rd	0.5	**3.97**	**D**
75th Ave	Olive Ave	Mountain View Rd	0.5	**4.17**	**D**
75th Ave	Mountain View Rd	Peoria Ave	0.5	**4.17**	**D**
75th Ave	Cholla St	Cactus Rd	0.5	**4.40**	**D**
75th Ave	Sweetwater Ave	Acoma Dr	1.0	**4.37**	**D**
75th Ave	Greenway Rd	Bell Rd	0.6	**4.36**	**D**
83rd Ave (NB)	Northern Ave	Olive Ave	1.0	**4.42**	**D**
83rd Ave	Olive Ave	S of Vogel Ave	0.3	**4.15**	**D**
83rd Ave	Monroe St	Peoria Ave	0.4	**3.62**	**D**
83rd Ave	Peoria Ave	Cholla St	0.5	**3.96**	**D**

Road Name	From	To	Length (miles)	Bicycle LOS Score (1..7)	Bicycle LOS Grade (A..F)
83rd Ave	Cholla St	Cactus Rd	0.5	**3.81**	**D**
83rd Ave	Sweetwater Ave	Thunderbird Rd	0.5	**4.35**	**D**
83rd Ave	Mariners Way	Bell Rd	0.7	**4.24**	**D**
83rd Ave	Lake Pleasant Pkwy	Deer Valley Rd	1.0	**3.87**	**D**
83rd Ave	Deer Valley Rd	Williams Rd	0.5	**4.42**	**D**
83rd Ave#	Williams Rd	Pinnacle Peak Rd	0.5	**4.34**	**D**
91st Ave	Northern Ave	Royal Palm Rd	0.2	**4.10**	**D**
91st Ave (SB)	Royal Palm Rd	Butler Dr	0.3	**3.82**	**D**
91st Ave (NB)	Royal Palm Rd	Butler Dr	0.3	**4.14**	**D**
91st Ave (NB)	Butler Dr	Olive Ave	0.5	**3.68**	**D**
91st Ave	Olive Ave	Peoria Ave	1.0	**4.28**	**D**
91st Ave	Peoria Ave	Grand Ave	0.8	**4.05**	**D**
91st Ave	Grand Ave	Cactus Rd	0.2	**4.40**	**D**
91st Ave	Greenway Rd	Bell Rd	1.0	**4.06**	**D**
91st Ave	Bell Rd	Union Hills Rd	1.0	**4.33**	**D**
91st Ave	Union Hills Rd	Beardsley Rd	1.0	**3.57**	**D**
91st Ave	Beardsley Rd	Lake Pleasant Pkwy	0.5	**3.69**	**D**
91st Ave	Lake Pleasant Pkwy	Deer Valley Rd	0.5	**3.56**	**D**
91st Ave (NB)	Deer Valley Rd	Pinnacle Peak Rd	1.0	**3.52**	**D**
91st Ave	Pinnacle Peak Rd	Happy Valley Rd	1.0	**4.35**	**D**
107th Ave (NB)	Union Hills Dr	Sack Drive	0.2	**3.87**	**D**
107th Ave	Sack Dr	Palm Tree Dr	0.3	**3.62**	**D**
107th Ave	Beardsley Rd	Rose Garden Ln	0.5	**3.88**	**D**
Beardsley Rd	83rd Ave.	91st Ave	1.0	**3.80**	**D**

Road Name	From	To	Length (miles)	Bicycle LOS Score (1..7)	Bicycle LOS Grade (A..F)
Beardsley Rd	Lake Pleasant Rd	107th Ave	0.6	**3.81**	**D**
Cactus Rd	83rd Ave	87th Ave	0.5	**4.42**	**D**
Cactus Rd	87th Ave	91st Ave	0.5	**4.40**	**D**
Deer Valley Rd	83rd Ave	91st Ave	1.0	**4.33**	**D**
Grand Ave^	83rd Ave	91st Ave	1.0	**4.18**	**D**
Jomax Road (EB)	67th Ave	Terramar Blvd	1.1	**3.64**	**D**
Jomax Road	Terramar Blvd	75th Ave	1.1	**3.64**	**D**
Jomax Road	75th Ave	E of 83rd Ave	1.0	**3.58**	**D**
Lake Pleasant Rd	Beardsley Rd	Deer Valley Rd	1.0	**4.04**	**D**
Lake Pleasant Rd	Deer Valley Rd	Williams Rd	0.5	**4.08**	**D**
Northern Ave	67th Ave	91st Ave	3.0	**4.29**	**D**
Northern Ave	91st Ave	Loop 101	0.7	**4.28**	**D**
Northern Ave	103rd Ave	107th Ave	0.5	**3.54**	**D**
Olive Ave#	99th Ave	107th Ave	1.0	**4.39**	**D**
Peoria Ave	67th Ave	71st Ave	0.5	**4.47**	**D**
Peoria Ave	75th Ave	79th Ave	0.5	**4.28**	**D**
Peoria Ave	79th Ave	83rd Ave	0.5	**4.08**	**D**
Peoria Ave	83rd Ave	85th Ave	0.3	**3.84**	**D**
Peoria Ave	85th Ave	87th Ave	0.3	**3.90**	**D**
Peoria Ave	87th Ave	99th Ave	1.5	**4.06**	**D**
Pinnacle Peak Rd#	83rd Ave	91st Ave	1.0	**3.88**	**D**
Pinnacle Peak Rd	91st Ave	Lake Pleasant Pkwy	1.2	**4.17**	**D**
Thunderbird Rd	71st Ave	75th Ave	0.5	**4.50**	**D**
Thunderbird Rd	91st Ave	94th Ave	0.5	**4.03**	**D**

Road Name	From	To	Length (miles)	Bicycle LOS Score (1..7)	Bicycle LOS Grade (A..F)
Union Hills Rd*	Loop 101	83rd Ave	0.1	**4.25**	D
Union Hills Rd	91st Ave	W of 91st Ave	0.2	**4.40**	D
Union Hills Rd (WB)#	107th Ave	111th Ave	0.5	**3.90**	D
67th Ave@	Pinnacle Peak Rd	Happy Valley Rd	1.0	**5.41**	E
67th Ave@	Happy Valley Rd	S of Jomax Rd	1.1	**4.56**	E
75th Ave	Peoria Ave	Cholla St	0.5	**4.52**	E
75th Ave	Cactus Rd	Sweetwater Ave	0.5	**4.55**	E
75th Ave	Acoma Dr	Greenway Rd	0.5	**4.63**	E
83rd Ave	Cactus Rd	Sweetwater Ave	0.5	**4.57**	E
83rd Ave	Thunderbird Rd	Mariners Way	1.3	**4.56**	E
83rd Ave	Union Hills Rd	Village Pkwy	0.5	**4.53**	E
83rd Ave	Village Pkwy	Beardsley Rd	0.5	**4.53**	E
83rd Ave	Happy Valley Rd	Jomax Rd	1.1	**4.86**	E
91st Ave (SB)	Butler Dr	Olive Ave	0.5	**4.58**	E
Beardsley Rd	91st Ave.	99th Ave	1.0	**4.63**	E
Bell Rd*	75th Ave	79th Ave	0.5	**4.71**	E
Bell Rd*	79th Ave	83rd Ave	0.5	4.76	E
Bell Rd	Loop 101	87th Ave	0.5	**5.03**	E
Bell Rd	87th Ave.	91st Ave	0.4	**5.28**	E
Cactus Rd	67th Ave	71st Ave	0.5	**4.66**	E
Cactus Rd	71st Ave.	75th Ave	0.5	**4.65**	E
Cactus Rd	75th Ave	79th Ave	0.5	**4.52**	E
Cactus Rd	79th Ave	83rd Ave	0.5	**4.58**	E
Deer Valley Rd	75th Ave	83rd Ave	1.0	**4.59**	E

Road Name	From	To	Length (miles)	Bicycle LOS Score (1..7)	Bicycle LOS Grade (A..F)
Grand Ave^	Railroad Tracks	83rd Ave	1.6	**4.65**	E
Happy Valley Rd	91st Ave	Lake Pleasant Pkwy	1.0	**4.73**	E
Lake Pleasant Rd	Westwing Pkwy	Carefree Hwy	4.7	**5.05**	E
Northern Ave	Loop 101	103rd Ave	0.8	**4.58**	E
Northern Ave	107th Ave	111th Ave	0.5	**4.54**	E
Olive Ave	67th Ave	71st Ave	0.5	**4.78**	E
Olive Ave	71st Ave	79th Ave	1.0	**4.63**	E
Olive Ave	79th Ave	83rd Ave	0.5	**4.66**	E
Olive Ave	83rd Ave	87th Ave	0.5	**4.97**	E
Olive Ave	87th Ave	91st Ave	0.5	**4.99**	E
Olive Ave	93rd Ave	95th Ave	0.3	**4.80**	E
Olive Ave#	95th Ave	99th Ave	0.4	**4.95**	E
Olive Ave#	107th Ave	111th Ave	0.5	**4.56**	E
Peoria Ave	71st Ave	75th Ave	0.5	**4.67**	E
Thunderbird Rd	67th Ave	81st Ave	0.5	**4.58**	E
Thunderbird Rd	75th Ave	79th Ave	0.5	**4.53**	E
Thunderbird Rd	79th Ave	83rd Ave	0.5	**4.53**	E
Thunderbird Rd	88th Ave	91st Ave	0.5	**4.75**	E
Union Hills Rd	83rd Ave	87th Ave	0.5	**4.59**	E
Union Hills Rd	87th Ave	91st Ave	0.5	**4.59**	E

LEGEND

* City of Glendale right-of-way
\# Maricopa County DOT right-of-way
@ City of Phoenix right-of-way
^ Arizona DOT right-of-way

Segments shaded gray have asymmetrical cross-sections; an entry has been made for each direction.

Other "Deficiency" Types: Observations and Citizen Identification

In addition to the roadway-specific conditions discussed above, there are more generalized challenges to the improvement of on-street bicycling conditions in Peoria as well as some destination-specific issues of access to "important destinations" around the city. The *Scope of Work* identified several key destinations around Peoria where accessibility by bicycle was to be assessed. Thus, as part of the Community Open House Workshop, members of the public were asked to identify: destinations to which they would like to have better bicycling access; crossing points that need improvement; and roadway segments that need better bicycling accommodation. These citizen perceptions, as well as consultant observations of generalized conditions and destination access, are all discussed in this section.

Demand for better bicycling conditions is likely to increase as Peoria's reputation as an active community grows.

As a general note, there is some anecdotal evidence that Peoria is perceived as a place where on-street cycling can be more difficult than in other jurisdictions in the West Valley. Several participants who regularly cycle longer distances for recreational or commuting purposes expressed frustration with a lack of continuity across jurisdictional lines. For example, one participant mentioned that Union Hills Drive is a popular commuting route through both Phoenix and Glendale (with bike lanes much of the way), but that it becomes very difficult to negotiate within Peoria. The consultant team's analysis using the Bicycle Level of Service Model bears this out; the results for Union Hills Drive as it crosses Peoria are (from East to West) as follows:

- Bicycle Level of Service "D" from the New River to 83rd Ave
- Bicycle Level of Service "E" from 83rd Avenue to 91st Avenue
- Bicycle Level of Service "D" from 91st into Sun City.

The short section of Union Hills Drive on the West side of Sun City, between 111th and 115th Avenues, has an asymmetrical cross section; because of a wider lane and an open shoulder, the eastbound lane scored a Bicycle LOS "C", while the westbound lane scored a Bicycle LOS "D".

Other challenging bicycling conditions were observed by the consultant team and citizen participants. These include the difficulty of crossing under the embankment for Loop 101 Highway, the bicycle accessibility of important destinations, as well as concerns about individual roadway segments. These are briefly described below.

Crossing the Loop 101 Highway Alignment:

A significant impediment to bicycling in Peoria is the Loop 101 Freeway. The embankment for the Loop 101 is only crossed by arterial streets (Northern, Olive, Peoria, Grand, Thunderbird and Bell). All of these roads narrow significantly as they actually go under the 101 overpass, constricting an already tight flow of motor vehicle traffic and further reducing any comfortable space for bicycles (each of these roads rated a Bicycle LOS "D" or lower in the evaluation). This difficulty for cyclists to get across the 101 alignment was mentioned by several participants at the Community Open House Workshop, and addressing this obstacle will require creative thinking, given the constraints of altering a freeway overpass.

Peoria residents at the public Open House Workshop on November 2, 2006

Access to the 83rd Avenue and Bell Road Commercial District (Arrowhead Towne Center):

Bicycle access to this major retail and entertainment district is very limited due to the fact that both Bell Road (Bicycle LOS "E") and 83rd Ave (Bicycle LOS "D") have extremely high motor vehicle volumes and no marked space for cyclists in the roadway. The level of bicycle access to this area is further constrained by high volumes on 75th Ave (Bicycle LOS "D") and the proximity of the Loop 101 to the West.

Access to Rio Vista Community Park:

On-street bicycling Access to Rio Vista Community Park is extremely limited as well, due to its being situated just to the West of the Loop 101 and its only street access being off of Thunderbird Road (Bicycle LOS "E" at Rio Vista Blvd). The park is accessible via the New

River Pathway, but only along the east bank; there is no access from the park to the residential area on the west bank of the river that does not involve negotiating the traffic conditions on Thunderbird Road.

Access to the Peoria Sports Complex:

The streets around the Peoria Sports Complex are largely the same ones that serve the 83rd Avenue and Bell Road shopping district, consequently this destination faces the same constraints: very high traffic volumes, no bike lanes or shoulders, and lack of a comfortable crossing of the 101 from the west.

Access to Downtown Peoria:

Downtown Peoria is reasonably well accessed from immediately adjacent neighborhoods via the numerous local streets of the surrounding grid pattern. However, it is far more difficult to access from farther away. Bicycling along 83rd, Grand and Peoria Avenues is intimidating; each avenue scored Bicycle Level of Service "D" due to very high traffic volumes and the absence of shoulders or bike lanes. The crossing of the diagonally-oriented Grand Avenue corridor also presents a challenge to access between Old Town Peoria the other "quadrants" of the interchange, such as the Peoria Town Center shopping plaza.

Other Destinations Identified by Workshop Participants:

At the Open House Workshop held on November 2nd, participants identified destinations to which they felt bicycling access could be to be improved. Many citizens did independently identify the above (scope-identified) destinations. Arrowhead Mall and Harkins Theatre, both part of the larger 83rd and Bell commercial district were each mentioned, and participants also expressed wishes for improved bicycle access to the Sports Complex, Rio Vista Park[10] and "Old Town" Peoria.

[10] Three respondents identified a desire to get to "Thunderbird Park," which might reference a local common name for Rio Vista Park on Thunderbird Road. There is also a Thunderbird Park in Glendale, at Pinnacle Peak Road and 59th Ave.

The consultant team assisted residents in identifying priority roadway segments.

Of the other destinations mentioned by respondents of the workshop, arterial-network connections to off-network cycling opportunities were cited frequently. The most popular response was Lake Pleasant Park, which was also identified by participants as the starting point for many popular recreational road-cycling routes. The "New River corridor," the "canal," "Glendale Trails," and the "Skunk Creek Trailhead" were each identified, signifying a desire for easier on-street access to off-street bicycling facilities. Also mentioned was interest in access to several un-paved, off-road bicycling facilities; the "Black Canyon Trail off of Carefree Highway" was mentioned specifically.

In addition to shopping and cycling opportunities, respondents indicated a desire for improved access to recreational areas and parks. As noted above, access to Rio Vista Park and Lake Pleasant Park was cited, while the White Tank Mountains and the Pyramid Peak Preserve were also identified as desired destinations. Connections to northern Peoria were also important to those who attended the workshop, with participants identifying such destinations as Lake Pleasant and the West Wing development multiple times, and also identifying specific segments, such as "99th Ave. from Jomax to Carefree Highway", " 83rd Ave. between Deer Valley and Jomax", and "Lake Pleasant Parkway" in general.

Citizen-identified Roadway Segments of Concern:

As part of the Community Open-House Workshop, participants were given strips of tape to place on a map of the city which would identify roadway segments that they felt needed improved bicycling conditions. Citizen participants of the meeting identified over forty-five miles of roadways that were along the study network. Of these forty-five miles, 86% had scored a "D" or "E" in the aforementioned Bicycle Level of Service evaluation. This relationship can be seen as an indication that the committee's designation of Level of Service "C" as a community target is appropriate to the expectations of Peoria residents, and it can also be seen as evidence that the

Bicycle Level of Service methodology reflects well the levels of safety and comfort that Peoria cyclists will feel on the other roadways throughout the city.[11]

Citizen-identified Roadway Crossings of Concern:

Participants at the Community Open House Workshops also identified, by placing stickers on a map, locations where crossings of roadways are in need of improvement. A summary of those responses which coincide with the study network is shown in Table 2B below. Several of these crossings were also previously identified in the Parks, Recreation, Open Space and Trails Master Plan. Improvements to particular crossing locations require detailed and site-specific engineering studies.

Table 2B: Crossings of Concern: *Citizen-identified locations in need of improved crossing conditions.*

Roadway	At	Frequency of Identification
83rd Ave	Union Hills Dr./ New River	4
Hwy 101	Skunk Creek	4
Bell Rd	New River/ Hwy 101	3
83rd Ave	Skunk Creek	2
Deer Valley Rd	New River	2
91st Ave	Deer Valley Rd	1
95th Ave	Olive Ave	1
Bell Rd	83rd Ave	1
Grand Ave	87th Ave	1
Hwy 101	Peoria Ave	1
Hwy 101	Thunderbird Rd	1
Northern Ave	111th Ave	1
Northern Ave	New River	1
Pinnacle Peak Rd	New River	1

Summary of List of Deficiencies

This scope-required List of Deficiencies is the starting point for the *Peoria Bicycle Development Plan*. The list identifies those arterial roadway segments that are in most critical need of improved bicycling accommodation. The list, compiled through the joint processes of technical evaluation (via the Bicycle Level of Service method) and public input (via the workshop

[11] Citizens identified several other segments as needing improvement that either scored well on the Level of Service Analysis or for which the data necessary to calculate Bicycle Level of Service was unavailable, either due to construction or a lack of traffic volume data. Citizen responses included other types of segments as well, including collector streets and desired off-street path alignments.

exercises and surveys), names over 90 distinct roadway segments that are in need of some sort of consideration for improvement. Later in this plan, improvements are recommended to these segments and other conditions. The data embedded in this list are also useful in prioritizing these improvements in conjunction with other factors including cost, potential use, public popularity and connectivity with existing bicycle facilities both within the city and in neighboring jurisdictions (see Chapter 3).

CONTEXT: LOCAL AND NATIONAL TRENDS RELATED TO BIKE PLANNING

The City of Peoria is at a crucial junction with regard to bicycle planning for a number of reasons. As has been alluded to elsewhere in this document, the City has grown in both population and in area since its incorporation in 1954, when its extent measured a single square mile. The City had a population of 12,000 in 1970, which grew past 100,000 in the late 1990's, was estimated at 132,000 in 2004, and is expected to surpass 200,000 by 2015. The incorporated area of the city has grown correspondingly to 162 square miles as of 2006, but the growing population has put tremendous pressure on the City's roadway network. While the new growth brings with it a great deal of motor vehicle traffic, it also brings residents who expect the active, outdoor-focused lifestyle that the climate of the Sonoran Desert allows for a significant part of the year. Jurisdictions around the Phoenix metropolitan area and the West Valley are becoming increasingly responsive to this growing demand for active living opportunities and for alternative transportation options. Likewise, cities, counties, and states across the country are capitalizing on the various benefits bicycling provides to their citizens' transportation, health, and environmental needs. The List of Deficiencies above itemizes the difficulty bicyclists face on Peoria's roadway network; if these conditions are not addressed the expected growth over the next few decades will undoubtedly exacerbate them. But planning also necessitates wise policies to guide future roadway construction, reconstruction, and land development. The following sections review various regional and national trends in bicycle planning as well as details the benefits gained by Peoria becoming a more "bicycle-friendly" city.

BICYCLE PLANNING IN NEIGHBORING JURISDICTIONS

This *Bicycle Development Plan* for the City of Peoria is an independent initiative by the City. Similar initiatives have been taken, to varying degrees, by other jurisdictions around Peoria. In order to provide some local context, this section describes some of the bicycle planning efforts in those neighboring communities.

County and Regional Level

Maricopa County

The Maricopa County *Bicycle Transportation System Plan* was adopted in 1999 and focuses on the 112 miles of urban arterials in unincorporated Maricopa County, currently in the roadway network for bicycling. The plan states "the ultimate bicycle network for Maricopa County includes all streets functioning as an arterial or lesser classification." The Plan is currently being revised by County staff with anticipated completion this year.

The most significant impact of proposed County bicycle facilities (bike lanes) to Peoria are routes north of the City and within Sun City to the west. The 1999 Plan identifies bicycle facilities within or linking into Peoria at the following locations (numbers in parenthesis correspond to project numbers in the County Plan):

- Loop 303 as it enters Peoria at approximately the 115th Avenue alignment (Segment #28)
- Castle Hot Springs Road north of SR 74 (Segment #29)
- 99th Avenue between Olive Avenue and Pinnacle Peak Road (Segments #35, #36, #37, #38)
- Pinnacle Peak Road between approximately 99th Avenue/Lake Pleasant Road and 81st Avenue (Segment #39)
- 107th Avenue between Boswell Boulevard and Union Hills Drive (Segment #42)
- 107th Avenue between Union Hills Drive and Jomax Road (Segment #43)
- New River Road north of Lake Pleasant Park Road (just north of the Carefree Highway, Segment #104)

Maricopa Association of Governments (MAG)

A Master Plan is currently being developed for MAG by Sprinkle Consulting with completion expected in mid 2007. Rather than being a collection of route maps and facility guidelines, this document is a resource guide for addressing bicycle facility implementation issues that are common throughout the MAG region. The plan will include goals and objectives, guidelines for the installation of mid-block crossings, criteria for bicycle project evaluation, a discussion on the health benefits of bicycling, graphic representations of improved bicycle facilities in different settings and a series of representative problem area solutions.

Additionally, MAG produces a "Bikeways" Map every two years which is a compilation of all existing bicycle facilities within the communities of the MAG region. Bicycle facilities are identified by various types. The fold-out map also provides photos of typical facility types. MAG is exploring options to translate this map into an interactive web-based map.

Municipalities

Phoenix

Phoenix shares its western border with Peoria along 67th Avenue from Pinnacle Peak Road to just north of the Carefree Highway. A stated policy of the Bicycle Element of the Phoenix *General Plan* is to incorporate bike lanes on new arterial and collector streets. This policy is further incorporated into street cross-sections in the Street Classification Map. Major East/West arterials with proposed bike lanes that link into Peoria from Phoenix include: New River Road, Carefree Highway, Dove Valley Road, Dynamite Boulevard, Happy Valley Road, and Pinnacle Peak Road. A north/south bike lane connection is proposed along 67th Avenue between Dynamite Boulevard and Jomax Road.

Glendale

Glendale shares the longest common border with Peoria of any adjacent community, lining its entire southern border and approximately half of its eastern border. Glendale will begin an update of its Bicycle Plan this year, as part of an update of its Transportation Plan. Glendale's bicycle facilities consist primarily of Bike/Parking Lanes on Collector Streets (1/2 mile).

East/west streets with Bike/Parking Lanes connecting into Peoria include: Mountain View Road, Cholla Street, Sweetwater Avenue, and Hillcrest Boulevard.

Greenway Road provides a bike lane connection to the Arizona Canal which in turn links into Peoria with both paved paths and unpaved trails. Bike/parking lanes on Utopia Road and Rose Garden Lane approach but do not meet the Peoria boundary, separated from Peoria by the Loop 101 (Utopia) and the New River and private land (Rose Garden).

North/South Bike/Parking Lanes connect into Peoria along 71st Avenue at Pinnacle Peak Road.

Currently, Glendale Avenue is the only arterial street in the City of Glendale with a Bike Lane.

A paved multi-use path parallels the east side of 67th Avenue linking into Peoria at Pinnacle Peak Road. This path provides direct linkages into Glendale's Thunderbird Conservation Park. Additional paved paths and unpaved trails link into Peoria from Glendale along Skunk Creek, the Arizona Canal/Thunderbird Paseo/Sun Circle Trail, and New River. These important connections have been addressed in the *Peoria Parks, Recreation, Open Space and Trails Master Plan* (PROST, 2006).

Surprise

Surprise's planning area currently shares a common border with Peoria east of the Agua Fria River between Beardsley Road and Bell Road and lands north of Sun City West and northwest to north of SR 74. Surprise's network of bicycle facilities is addressed in the Alternative Modes Plan of the *General Plan*. Bicycle facilities are composed primarily of bike lanes on minor arterials and bike lanes on collectors without on-street parking. Those east-west routes along minor arterials with direct connections into Peoria or its planning area include: Union Hills Drive, Beardsley Road, Happy Valley Road, and Dixeleta Drive. North-south routes on minor arterials that will link into Peoria include Reems Road, Cotton Lane and Citrus Road at Dove Valley Road.

Bike routes are proposed along Grand Avenue linking into Peoria through El Mirage, Youngtown, and Sun City. Multi-use paths are proposed along additional roadways with linkages into Peoria including: SR 74, Dove Valley Road, Jomax/Happy Valley Road, Bell Road, and Sarival Avenue. Regional trails that link into Peoria include facilities along the Central Arizona Project Canal, the Loop 303, and the Agua Fria River, all of which have been addressed in the *PROST Master Plan*.

Youngtown

There are no existing or planned bicycle facilities in the town of Youngtown.

BENEFITS OF BICYCLE FRIENDLY COMMUNITIES AND NATIONAL BEST PRACTICES

While bicycle plans such as this one are mandated by the state to address critical transportation needs, they can also yield other types of benefits, especially in the areas of public health and environmental protection. These additional benefits resonate with public constituencies and are often useful in rallying the support needed for implementation of plan recommendations. This section describes some of these broader benefits that the City can derive from improved bicycling conditions and also provides some national context by way of examples of practices and policies from other communities around the United States. In this section, the health and other benefits to be derived from bicycling and other forms of "Active Transportation" are explained. This section will also describe some of the ways of estimating the demand for active transportation and factors that inhibit or encourage people to make use of active forms of transportation. This section will also describe various active-transportation-oriented facilities, programs, and policies in use around the U.S., including many specific case studies and other examples.

Active Transportation

Active transportation (also sometimes called *non-motorized* or *human powered transportation*) refers to walking, bicycling and their variants such as wheelchairs, in-line skates, scooters, etc. These active modes play important, but often overlooked roles in an efficient, equitable and healthy transportation system. Active modes are used for both recreation and utilitarian

transportation, alone and in conjunction with other modes such as public transit and automobile travel.

Active Transportation Benefits

Improved active transportation conditions and increased use of these modes provides a multitude of benefits to the residents and visitors of the City, particularly when it substitutes for motor vehicle travel. Some of these benefits are obvious and widely recognized. Others are less well known. This section describes various categories of the benefits. This information is useful for evaluating policies and programs that support active transportation.

Health Benefits

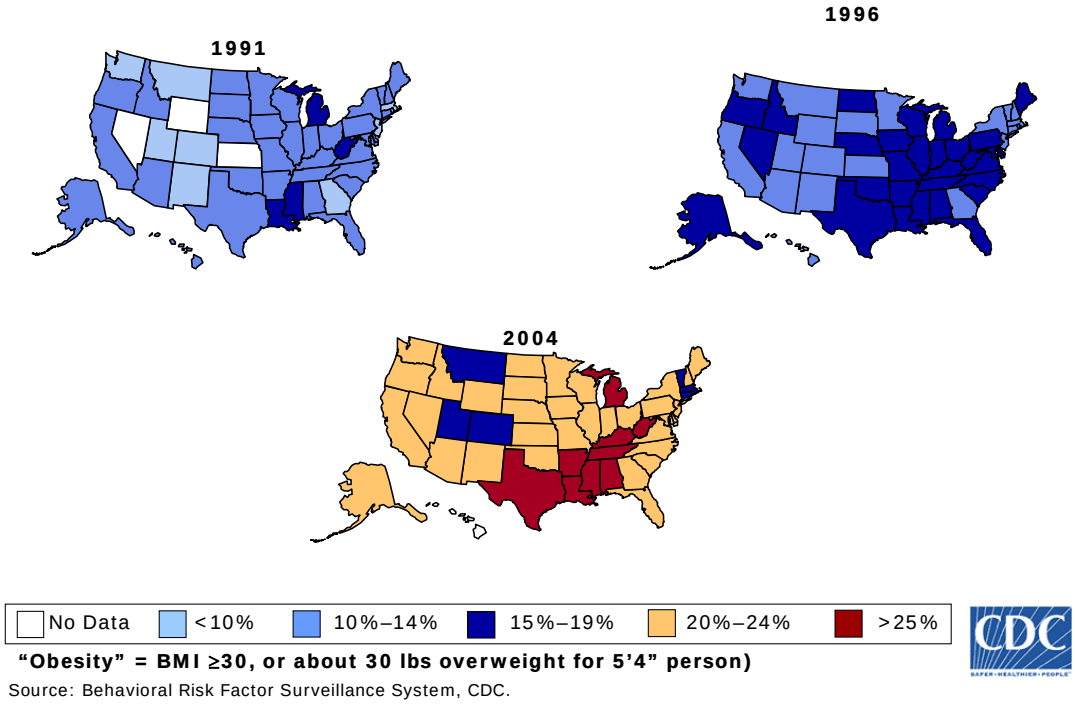
Physical activity and fitness are important for public health. In recent years, public health officials throughout Arizona and the United States have become increasingly alarmed at declining physical fitness, excessive body weight, and resulting increases in diseases associated with a sedentary lifestyle among the general population (US Surgeon General, 1999). The health problems associated with inadequate physical activity include:

Heart disease	Hypertension	Stroke	Diabetes
Obesity	Osteoporosis	Depression	Some types of Cancer

There are many ways to be physically active, but many, such as sports or exercising in a gym, require special time, money, and skill, which discourages most people from participating regularly over their full lifetime. Many experts believe that more active transport is the most practical and effective way to improve public fitness (WHO, 2003). One major study concluded, "Regular walking and cycling are the only realistic way that the population as a whole can get the daily half hour of moderate exercise which is the minimum level needed to keep reasonably fit (Physical Activity Task Force, 1995). Residents of automobile dependent communities are found to have health risks, including increased obesity and increased hypertension (Ewing, et al, 2003; Frumkin, Frank and Jackson, 2004).

Inactivity and Obesity Trends (National, State and Regional Data) Transportation and health surveys indicate that during the last few decades Americans have been cycling and walking less, driving more, exercising less, and gaining weight. Figure 2B illustrates (in color) how the portion of residents considered obese (Body Mass Index ≥ 30) in Arizona has dramatically risen from 10-14% to 20-25% during the last 15 years.

Figure 2B: Obesity Trends Among U.S. Adults (CDC, 2004)



According to a survey conducted in 2004 by the Centers for Disease Control, 23.1 percent of adults nationwide were obese. Slightly lower percentages of adults in Arizona and in Maricopa County were obese (21.1 percent and 21.3 percent, respectively). The same survey found that 22.8 percent of adults nationwide did not exercise within the past 30 days. Slightly higher percentages of adults in Arizona and in Maricopa County did not exercise (24.2 percent and 25.8 percent, respectively) (CDC, 2004).

The health care costs attributable to obesity amounted to $752 million in Arizona alone and to $75 billion nationally in 1998-2000 (Finkelstein *et al.*, 2004).

The 2005 Arizona *Nutrition and Physical Activity State Plan* identified an epidemic of health problems related to lack of physical activity. Among some of the most dramatic statistics the State presented are:

- 57.1% of Arizona adults have a Body Mass Index that classifies them as either overweight (BMI 25-29.9) or obese (BMI 30 or above).
- The rate of Arizonans who are classified as obese increased 80% between 1998 and 2002.
- 54.8% of Arizona deaths in 2002 were from diseases for which overweight or obese persons are at increased risk.

(Arizona Nutrition & Physical Activity State Plan, 2005)

Basic Mobility for Non-Drivers

Currently, the MAG Region in general and the City of Peoria in particular are highly automobile-dependent, owing in large measure to the relatively poor alternatives to automobile travel. Non-motorized travel options provide the groundwork for potentially significant benefits.

Cycling and walking provide basic mobility for people who are physically, socially, and economically disadvantaged, providing access to essential activities and services such as medical clinics and stores, education, and employment (ICMA, 2005).

Improved walking and cycling provide affordable transportation, which is particularly important for lower-income households. Households in "smart growth" communities with multi-modal transportation systems and more accessible land use patterns tend to spend less money on transportation per capita than comparable households in more automobile-dependent communities (Bernstein, Makarewicz and McCarty, 2005).

Additional Benefits

There are many additional benefits for communities with a bicycle-friendly and active transportation system. For example, increased bicycling and walking provides benefits to motorists and businesses when it substitutes for automobile travel (both directly and in conjunction with public transit), by reducing traffic and parking congestion, reducing road and

parking facility costs, accident risk, and the need for motorists to chauffeur non-driving family members and friends. These benefits can be significant. For example, increased bicycling and walking to schools can reduce traffic congestion on neighborhood roads, reduce parking problems at schools, and reduce school busing costs. Similarly, businesses can save hundreds of dollars a year in avoided parking costs for each employee who uses an alternative mode rather than driving to work.

Because walking and bicycling tend to replace short trips which have high energy consumption and pollution emission rates, their environmental benefits tend to be proportionately large. For example, shifting 1% of mileage from driving to non-motorized modes is likely to reduce energy consumption and emissions by 2-4%.

Non-motorized transportation improvements provide economic development benefits by supporting tourism and retirement industries. Such improvements are popular community amenities that tend to increase the value of nearby properties (NBPC, 1995). Pedestrian-friendly, new urbanist community design tends to increase property values as well (Eppli and Tu, 2000).

Travel Demand

Travel demand refers to how much people would travel under various circumstances. A number of geographic, demographic and transportation system factors can affect non-motorized travel demand. A number of methodologies and models have been developed to help planners predict how specific changes in these factors can affect walking and bicycling activity (Schwartz, et al, 1999; Dill and Carr, 2003; Schneider, Patten and Toole, 2005; Petritsch, 2005).

When walking and bicycling increase, a portion of this additional travel often substitutes for motor vehicle travel, which can help achieve transport planning objectives such as congestion reduction, road and parking facility cost savings, energy conservation and pollution emission reductions. According to some estimates, 5-10% of automobile trips can reasonably be shifted to non-motorized transport in a typical urban area (Mackett, 2000). A given increase in walking and bicycling can provide a proportionately larger reduction in motor vehicle travel since a relatively

short non-motorized trip often substitutes for a longer car trip. For example, a shopper might choose between walking to a small local store and driving a longer distance to shop at a supermarket. In addition, bicycling and walking improvements can also help support shifts from driving to public transit.

Since walking and bicycling trips are relatively short and slow compared with motorized travel, non-motorized travel represents a relatively small portion of total travel *distance* (which is how transportation professionals tend to measure travel) but a relatively large portion of travel time (which is how users tend to perceive travel-mode-utility). For example, an average walking trip of 0.7 miles and 16 minutes represents only about 1.7% of average daily travel distance but about 25% of average daily travel time. As a result, a small improvement in walking and bicycling travel convenience, speed, and comfort can significantly affect the relative utility of these modes.

Current Walking and Bicycling Activity

Conventional travel surveys provide some information on the amount of bicycling and walking in an area, but generally undercount non-motorized travel because survey respondents tend to overlook short trips, travel by children, recreational travel, and walking and bicycling links of transit and automobile trips. For example, a *bike-bus-walk* trip is often classified simply as a *bus* trip, and an *automobile-walk* trip is often coded simply as an *automobile* trip, even if the bicycling and walking occur on public facilities and represent a significant portion of travel time (Litman, 2003).

The 2001 *National Household Travel Survey* (NHTS) made a special effort to obtain walking and bicycling travel data, and as a result found significantly higher levels of non-motorized travel than indicated by typical surveys (Weinstein and Schimek, 2005). That survey found that about 0.8% of all trips are by bicycle, 8.7% of trips are just by walking, and another 1.7% of trips involve both walking and public transit, indicating that more than 11% of all trips involve non-motorized travel, as summarized in Table 2C. This makes non-motorized modes the second most common travel mode, after automobile.

Table 2C: Walking and Bicycling Trips (FHWA, 2004; Weinstein and Schimek, 2005)

	Walking Trips		Walk & Transit		Bicycling Trips		Combined Trips	
	Billion	Percent	Billion	Percent	Billion	Percent	Billion	Percent
1990 NPTS	18.0	7.2%	4.7*	1.5%	1.7	0.7%	24.4	9.4%
1995 NPTS	20.3	5.3%	5.7*	1.5%	3.3	0.9%	29.3	7.7%
2001 NHTS	35.3	8.7%	6.9	1.7	3.3	0.8%	45.7	11.2%

This table indicates the portion of total trips made by bicycling and walking according to three national travel surveys. However, such surveys tend to undercount non-motorized travel so the actual portion of trips by these modes is probably somewhat higher. (Estimated based on 86% of transit trips involve a walking link, as in 2001.)*

Walking Activity

Using NHTS data, Weinstein and Schimek (2005) found that Americans average 3.8 walking trips per week or 0.54 trips per day. About 15% of respondents report walking on a particular day and about 65% of respondents reported walking during the previous week. The *median* walk trip took 10 minutes and was about ¼ mile in length, much less than the *mean* walking trip (i.e., a minority of walking trips are much longer than average). The following table summarizes their walking trip data. This indicates that about a quarter of walking trips are for recreation and exercise (including dog walking), and these non-utility trips tend to be longer than average in distance and duration.

Table 2D: NHTS Walking Trip Attributes (Weinstein and Schimek, 2005)

Purpose	Frequency	Mean Distance	Median Distance	Mean Duration
	Percent	Mile	Mile	Minutes
Personal business/shopping/errands	48%	0.44	0.22	11.9
Recreation/exercise	20%	1.16	0.56	25.3
To transit	16%	N/A	N/A	19.6
To or from school	7%	0.62	0.33	13.3
To or from work	4%	0.78	0.25	14.1
Walk dog	3%	0.71	0.25	19.0
Other	2%	0.57	0.22	14.8
Totals	*100%*	*0.68*	*0.25*	*16.4*

This table summarizes the results of NPTS walking trip data. N/A = not available.

In Arizona, comparable surveys show a correlation with the national statistics. For example, the Maricopa Regional Household Travel Survey was conducted by Nu-Stats for the Maricopa Association of Governments from February through December 2001. Table 2E lists the percentage of walk trips, the mean duration, and the minimum and maximum percentages by geographic area.

Table 2E: Maricopa Travel Survey – Walking Trip Attributes (MAG, 2002)

Purpose	Frequency (percent)	Mean Duration (minutes)	Minimum and Maximum
Home-based work	1.9%	22.01	0% - Apache Junction 3.5% - Gilbert
Home-based shopping	3.7%	16.08	0% - Northwest 7.6% - East Central Phoenix
Home-based other	10.6%	13.36	5.4% - Sun City/Sun City West 15.9% - West Central Phoenix
Non-home-based	6.8%	10.92	3.1% - Sun City/Sun City West and Southwest 12.2% - Gilbert
All trips	7.4%	13.32	1.9% - Sun City/Sun City West 21.4% - Southwest

Note: "home-based" refers to the origin point of trips.

Bicycling Activity

Using available travel surveys, researchers Barnes and Krizek (2005b) estimated that adult bicycling trips nationally average 7 to 10 miles in length and 40 minutes in duration, and that roughly 1% of adults in the United States ride a bicycle on a particular day, 5.3% in a week, 16% in a month, and 40% in a year. Over large geographic areas such as metropolitan areas or states, the portion of adults who bicycle on a particular day ranges between about 0.3% and 2.5%. Over smaller areas such as specific parts of metropolitan areas, the range could go as high as 15%. They conclude that total adult bicycling can be estimated in a particular area as 0.3% plus 1.5 times the rate of home-based work trips made by bike. They find that a relatively large portion of bicycling is performed by a relatively small number of cyclists. The 5% most active cyclists generate about half the riding days, the other 95% generate the other half. Because so many of the trips are generated by such a small number of people, a relatively small part of the population can have a big impact on the total amount of bicycling in an area. If 4% of the public were in the "frequent" category, rather than the 2% that probably are now, that could conceivably lead to a 40% increase in the total amount of biking.

Table 2F shows levels of non-motorized commuting in Phoenix and other large US cities. Phoenix currently has lower rates of walking commuting and higher rates of cycle commuting than the national average.

Table 2F: Non-motorized Commuting In Large U.S. Cities (2000 Census; Dill & Carr, 2003)

City	Walked	Biked	Total Bike & Walk
	Percent	Percent	Percent
Philadelphia, Pa.	10.4	0.63	11.03
San Francisco, Ca.	8.8	1.8	10.6
New York, N.Y.	9.3	0.42	9.72
Chicago, Ill.	5.6	0.51	6.11
Tucson, Ariz.	3.4	2.22	5.62
Mesa, Ariz.	**2.1**	**1.64**	**3.74**
Los Angeles, Calif.	2.9	0.63	3.53
Houston, Tex.	2.6	0.35	2.95
San Diego, Calif.	2.3	0.48	2.78
Phoenix, Ariz.	**1.9**	**0.87**	**2.77**
Indianapolis, Ind.	2.5	0.18	2.68
Dallas, Tex.	2.2	0.2	2.4
Detroit, Mich.	2.3	0.1	2.4
Columbus, Ohio	2	0.22	2.22
San Jose, Calif.	1.7	0.42	2.12
Jacksonville, Fla.	1.5	0.4	1.9
Total for U.S.	*2.7*	*0.5*	*3.2*

Note: A limited survey conducted for the 2003 ADOT Statewide Bicycle/Pedestrian Plan *indicates that bicycle use for recreation and/or exercise and commuting are the most frequent reasons for bicycle use in Arizona (ADOT 2003).*

Survey statistics from a MAG-sponsored travel survey are comparable to the above. Table 2G lists the percentage of bicycling trips, the mean duration, and the minimum and maximum percentages by geographic area. These data are from the Maricopa Regional Household Travel Survey.

Table 2G: Maricopa Travel Survey – Bicycling Trip Attributes (MAG, 2002)

Purpose	Frequency (percent)	Mean Duration (minutes)	Minimum and Maximum
Home-based work	1.3%	28.72	0% - four areas 5.1% - Tempe/Guadalupe
Home-based shopping	0.9%	14.53	0 – five areas 4.3% - Sun City/Sun City West
Home-based other	1.4%	17.00	0.5% - North Phoenix 3.4% - Tempe/Guadalupe
Non-home-based	0.5%	18.70	0% - four areas 1.5% - Tempe/Guadalupe
All trips	1.1%	19.56	0.3% - East Central Phoenix 3.3% - Tempe/Guadalupe

Note: "home-based" refers to the origin point of trips.

The 2002 *National Survey of Pedestrians and Bicyclists Attitudes and Behaviors* (USDOT, 2002), which involved phone interviews with more than 9,600 adults age 16 and older throughout the U.S., found the following:

- Nearly 80% of adult Americans take at least one walk of five minutes or longer during the summer months, while fewer than 30% ride a bike, according to a major new survey released by the U.S. Department of Transportation.
- *Bicycling* is most common among younger residents. Nearly 40% aged 16 to 24 ride a bicycle during the summer, 26% aged 45 to 54 cycle, but only about 9% of those age 65 and older report they cycle.
- *Walking* declines slightly as people age. Eighty-two percent of those aged 16 to 24 take walks, 80% aged 45 to 54 walk, and 65% aged 65 and older report taking walks.
- Only half of all adults are satisfied with their communities' designs for bicycling safety, whereas three out of four adults are satisfied with their communities' designs for pedestrian safety.
- Survey respondents were also asked to recommend changes to their communities for either bicycling or walking. Most persons suggested changes in bicycle and pedestrian facilities. For those recommending changes, 73% wanted new bicycle facilities, such as trails, bicycle lanes, and traffic signals and 74% wanted pedestrian facilities including sidewalks, lighting, and crosswalks.

Note: The 2003 ADOT survey mentioned in the note to Table 2F above reveals that concerns regarding "no facilities to ride on" ranked among the highest ranked reasons why people do not ride more often (ADOT 2003).

- People who do not take walks cite these reasons: disability or other health problems (25%); unfavorable weather (22%); and too busy or no opportunity (19%). Those who do not bike cite lack of access to a bicycle (26%); too busy or no opportunity (17%); disability or other health problems (10%).
- Males are more likely to take a bike ride during the summer than are females. However, both groups are about equally likely to take walks during the summer.[12]

Latent Demand

This and other surveys indicate significant *latent demand* for active transportation, that is, many people would like to bicycle and walk more than they currently do, if they had suitable conditions and resources (Komanoff and Roelofs, 1993; Pucher, Komanoff, and Schimek, 1999). A survey of Americans attitudes toward walking found (STPP, 2003):

- More than half of respondents (55%) say they would like to walk more often either for exercise or utilitarian trips.
- The type of walking Americans would like to do more of is walking for exercise or fun, followed by walking to a specific destination. Majorities associate walking with exercise, relaxation and fun.
- Excessive distance to common destinations (stores, schools, etc.) is the largest constraint to utilitarian walking.
- Large majorities of Americans support policies to ensure the safety of walkers and to make their communities more walkable. The most popular policies to improve pedestrian safety include tougher enforcement of the speed limit, and designing streets with more sidewalks and safe crossings.

[12] This data is from a *national* survey. Obviously seasonal climate conditions in Arizona have contribute to a localized seasonal fluctuation in exercise habits. The breakdown of preferred activity by gender is likely still applicable to Arizona residents, though.

- Majorities favor making it easier for children to walk to school, improving public transportation, and increasing federal spending on pedestrian safety.
- When offered various options for improving transportation in their community, 35% choose improved public transportation, 31% choose developing communities where people do not have to drive long distances to work or shop, and only 25% choose building new roads.

Several researchers and practitioners have developed methods to assess the comparative latent demand for non-motorized travel at either the Traffic Analysis Zone (TAZ) or corridor level. One such popular method, the *Latent Demand Method,* is a relatively easy-to-use technique for estimating potential demand for bicycle travel. Landis (1996) describes the model and examples of its application. It is similar to conventional four-step models, but uses a number of simplifying assumptions to reduce data requirements. It estimates the probability of bicycle (or pedestrian) travel on individual roadway (or even off-street) corridor segments based on area demographics and the proximity, frequency and magnitude of adjacent trip generators. These trip attractors/generators (employment, shopping, parks and schools) are geo-coded and stratified according to proximity. Non-motorized trips are predicted using the latent demand (i.e., gravity model equation), which has different bicycle or pedestrian trip probabilities versus distance for each trip purpose. The resulting database and GIS map allows planners to anticipate the relative bicycle use among transportation corridors within a metropolitan area for construction prioritization. An analysis described above was conducted for the Maricopa Association of Governments' *Pedestrian Plan 2000*, and a similar analysis for bicycling was performed for the City of Scottsdale in 2007.

For *Pedestrian Plan 2000*, the Latent Demand Method was applied to approximately 1000 miles of major roadways in the MAG Region. The study corridor areas were analyzed and ranked regionally according to their latent travel demand, or potential pedestrian activity. The Latent Demand modeling results were stratified into groups approximately representing the four general classifications of pedestrian (activity intensity) areas outlined in the 1995 MAG *Pedestrian Area*

Policies and Design Guidelines. The stratification schedule of the Latent Demand Scores into the four general pedestrian (activity) area types is:

- Latent Demand 100% to 80% = Highest potential for pedestrian activity. Represents the "District" area type from the 1995 *MAG Pedestrian Area Policies and Design Guidelines* which are "...areas of high intensity with a wide variety of land uses with a regional appeal..."
- Latent Demand 79% to 60% = Second highest potential for pedestrian activity. Represents the "Campus" area type from the 1995 MAG Pedestrian Area Policies and Design Guidelines which are "...high intensity areas with a single or limited mix of land uses..."
- Latent Demand 59% to 30% = Third highest potential for pedestrian activity. Represents the "Community" area type from the 1995 MAG Pedestrian Area Policies and Design Guidelines which are "...areas of low to medium intensity..."
- Latent Demand 29% to 0% = Fourth highest potential for pedestrian activity. Represents the "Neighborhood" area type from the 1995 MAG Pedestrian Area Policies and Design Guidelines which are "...areas of low intensity with a limited mix of land uses..."

This classification then permits the establishment of appropriate roadside walking environment performance guidelines in the Region.

The continued rapid growth of Peoria and the MAG region in general indicate a growing latent demand for bicycling. Consider the following:

- The population of the City of Peoria has grown from 12,000 in 1970, to over 108,000 in 2000, to an estimated 132,000 in 2004.[13]
- The City of Peoria has projected that population will continue to grow at a rate of 5% annually until 2010, at which point it will exceed 175,000. The City has also projected that population will then grow at a rate of 3% to around 243,000 by 2022 and then grow by 2% to just over 300,000 by 2030.

[13] The 2005 Mid-Decennial Census conducted by the U.S. Census Bureau estimated Peoria's population at 138,143.

- The Maricopa Association of Governments has projected a more conservative growth trend for Peoria—to just over 253,000 by 2030—but that figure is still approximately 192% the estimated 2004 population.

(City of Peoria Growth Trends Manual, 2006)

These numbers can give a rough idea of how much growth in bicycling and walking may occur in the next 30 years. More detailed estimates for individual travel corridor levels require development and application of calibrated logit (or mode choice) models. Currently, calibrated models sensitive to the specific provision of bicycle or pedestrian facilities are not available. However, a current study, initiated and funded by the Florida DOT, seeks to predict bicycling and walking trips at the corridor level. Comprehensive models are being developed for mode shift (from motorized to non-motorized trips that result when bicycling and walking facilities are built), induced utilitarian travel (bicycling and walking trips that would not have been made had bicycling and walking facilities not been built), and induced non-motorized recreational travel. These models are planned to be available by the end of the first quarter of 2007.

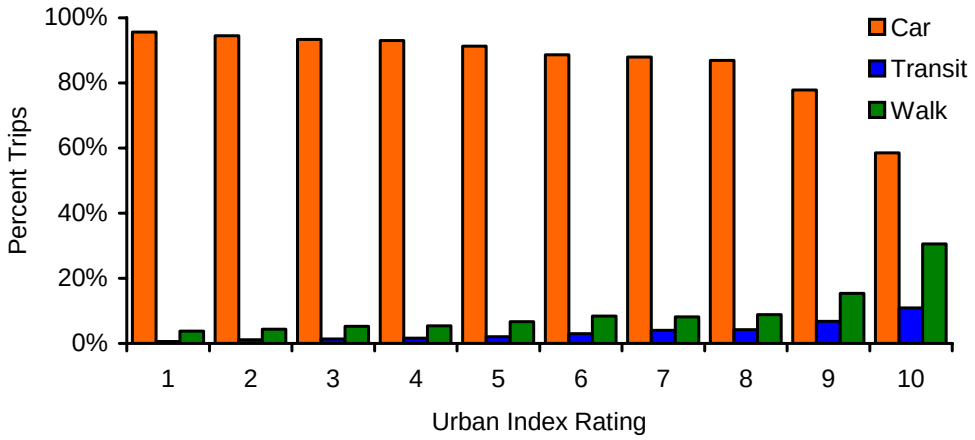
Factors That Affect Active Travel

Both urban form and demographics are factors that affect walking and bicycling activity; they are discussed in more detail below.

Urban Form

A number of studies have attempted to model the effects of geographic factors on non-motorized travel (W.L. Schwartz, et al, 1999; Barnes and Krizek, 2005a). Walking tends to increase with land use density, mix, and connectivity. Described differently, walking tends to serve relatively short trips and so represents a greater share of total trips in compact communities where destinations are closer together. Using travel survey data from Portland, Oregon, Lawton (2001) found that land use density, mix, and road network connectivity significantly affect residents' mode split and non-motorized travel. Those living in the most urbanized areas drive significantly less, and walk significantly more than residents of more automobile-oriented, suburban neighborhoods, as indicated in Figure 2C.

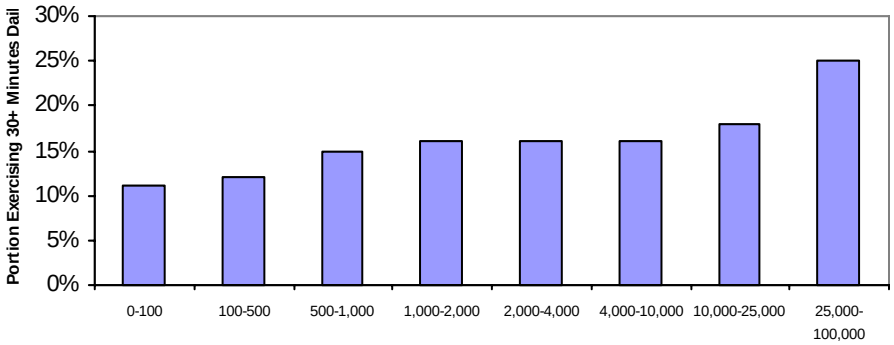
Figure 2C: Urbanization Impact on Mode Split (Lawton, 2001)



As an area becomes more urbanized the portion of trips made by transit and walking increases, and driving declines.

Similarly, Khattak and Rodriguez (2003) found that residents of more walkable, multi-modal neighborhoods tend to achieve most of the minimum amount of physical activity required for health (20 minutes a day most days of each week). Unpublished analysis by transport modeler William Gehling found that the portion of residents who walk and bicycle at least 30 minutes a day increases with land use density, from 11% in low density areas (less than 1 resident per acre) up to 25% in high density (more than 40 residents per acre) areas.

Figure 2D: Portion of Population Walking & Bicycling 30+ Minutes Daily
(Unpublished Analysis of 2001 NHTS by William Gehling)



As land use density increases the portion of the population that achieves sufficient physical activity through walking and bicycling increases. Based on 2001 NHTS data.

Frank, et al (2006) developed a *walkability index* that reflects the quality of walking conditions, taking into account residential density, street connectivity, land use mix and retail floor area ratio (the ratio of retail building floor area divided by retail land area). They found that in King County, Washington a 5% increase in their walkability index is associated with a 32.1% increase in time spent in active transport (walking and bicycling), a 0.23 point reduction in body mass index, a 6.5% reduction in VMT, and similar reductions in air pollution emissions.

Cao, Handy and Mokhtarian (2005) used a travel survey performed in Austin, Texas to evaluate the effects of land use patterns on strolling (walking for pleasure or exercise) and utilitarian walking trips. They found that the pedestrian environment at the origin (home) has the greatest impact on strolling trips, while the pedestrian environment at the destination appears to be at least as important for utilitarian trips. They found that people are more likely to stroll or walk to a store when fewer vehicles travel residential and commercial streets. They found that strolling accounts for the majority of walking trips, and tends to be undercounted.

Certain types of destinations tend to attract bicycling, including schools, college/university campuses, employment centers, recreation centers, and parks.

Topography and climate can affect walking and bicycling, but not as much as might be expected. For example, the cities of Seattle, Portland and Missoula, MT report significantly higher levels of cycle transportation than many "Sunbelt" cities that are flat and have mild climates. Community attitudes seem to have a major impact on bicycling activity. Bicycling tends to be much more common in communities that have developed a supportive culture than in otherwise comparable communities that lack this level of support. It may take several years for a community to fully achieve its non-motorized travel potential. First year impacts are frequently modest, but tend to increase as individuals become more accustomed to non-motorized travel and as additional support facilities (pedestrian and bicycle network, bicycle parking, etc.) develop.

Demographics

Bicycle commuting tends to be more common among younger males, lower income employees, and higher-income college educated employees.

Households with no automobiles report more utility walk trips than those that do have a motor vehicle (Weinstein and Paul Schimek, 2005). People living in households without cars reported slightly higher average numbers of utility walk trips and a slightly longer average distance per trip. However, the biggest difference was the number of people reporting *any* utility walk trips: 12% for those with access to a car and 46% for those without.

Minorities (Blacks or Latinos) tend to walk more for utilitarian purposes and less for exercise than Whites. However, Whites were more likely to report exercise trips. As before, these differences in the number of people reporting the trips tended to be larger than the differences in trip distance and duration. Owning a household dog appears to increase walking trips, although it is possible that, at least in some cases the causation goes the other way, and households that enjoy walking tend to own dogs, perhaps for company and security.

Facilities and Programs

Considerable research indicates that walking and bicycling activity is affected by roadway conditions and the quality of sidewalks, crosswalks, bike lanes, and paths (Petritsch, 2005). Road and pathway connectivity has a major impact on walking and bicycling activity (Dill, 2005). A road system with smaller blocks and connected streets (rather than numerous dead-ends and cul-de-sacs) tends to encourage non-motorized travel. Wide roads with heavy, high-speed vehicle traffic tend to discourage non-motorized travel, which is sometimes referred to as the *barrier effect* or *severance* ("Barrier Effect," Litman, 2004).

Phoenix metropolitan area surveys reflect these national findings. For example, the Chandler Bike Survey in 1998 showed that respondents generally ride where they perceive there to be minimal conflicts with motor vehicles; the top two facility types used by the survey respondents

were 1) quiet, low traffic streets and 2) off-road trails, paths, and canal banks (*Chandler Bicycle Plan – Update* 1999).

Walkability

Communities that improve non-motorized travel conditions often experience significant increases in non-motorized travel and related reductions in vehicle travel. One study found that residents in a pedestrian friendly community walked, bicycled, or rode transit for 49% of work trips and 15% of their non-work trips, 18- and 11-percentage points more than residents of a comparable automobile oriented community (Cervero and Radisch, 1995). Morris (2004) found that residents living within a half-mile of a bicycling trail are three times as likely to bicycle commute as the country average. Dill and Carr (2003) found that residents of a *new urbanist* neighborhood, which has sidewalks and more mixed land use, made significantly fewer vehicle trips and more walking and bicycling trips than residents of more conventional, automobile-oriented neighborhoods.

Bikeways

Several studies indicate that increased bike lanes and paths tend to increase the amount of bicycling that occurs in a community. Several North American communities with extensive bikeway systems (Palo Alto, Madison, Boulder, Eugene) have bicycling rates five to ten times higher than the national average[14]. In general, considering a cross-section of metropolitan areas, regression analysis indicates that each mile of bikeway per 100,000 residents increases bicycle commuting 0.075 percent, all else being equal (Nelson and Allen, 1997; Dill and Carr, 2003). A 1991 survey found that 46% would bike to work if designated trails were built (Guttenplan and Patten, 1995).

Researchers Dill and Carr (2003) found that "higher levels of bicycle infrastructure are positively and significantly correlated with higher levels of bicycle commuting" (p. 122). Table 2H shows the same cities and bike/walk percentages as Table 2F, along with their respective bike lanes and paths per square mile.

[14] These communities do have significant university campuses within their jurisdictional limits.

Table 2H: Non-motorized Commuting in Large U.S. Cities (2000 Census; Dill & Carr, 2003)

City	Walked Percent	Biked Percent	Total Bike & Walk Percent	Bike Lanes & Paths Per Square Mile
Philadelphia, Pa.	10.4	0.63	11.03	**1.3**
San Francisco, Ca.	8.8	1.8	10.6	**0.87**
New York, N.Y.	9.3	0.42	9.72	**0.64**
Chicago, Ill.	5.6	0.51	6.11	**0.35**
Tucson, Ariz.	3.4	2.22	5.62	**1.76**
Mesa, Ariz.	**2.1**	**1.64**	**3.74**	**0.37**
Los Angeles, Calif.	2.9	0.63	3.53	**0.34**
Houston, Tex.	2.6	0.35	2.95	**0.43**
San Diego, Calif.	2.3	0.48	2.78	**0.92**
Phoenix, Ariz.	**1.9**	**0.87**	**2.77**	**0.48**
Indianapolis, Ind.	2.5	0.18	2.68	**0.5**
Dallas, Tex.	2.2	0.2	2.4	**NA**
Detroit, Mich.	2.3	0.1	2.4	**NA**
Columbus, Ohio	2	0.22	2.22	**0.13**
San Jose, Calif.	1.7	0.42	2.12	**1.02**
Jacksonville, Fla.	1.5	0.4	1.9	**NA**
Total for U.S.	*2.7*	*0.5*	*3.2*	***NA***

Note: NA = Not available.

Using a detailed travel survey in the Twin Cities (Minnesota) metropolitan area Krizek and Johnson (2005) found that the proportion of residents who bicycle increases with proximity to off-road bicycling facilities, although the effect was not strong enough to be considered statistically significant. Studies comparing bicycling activity before and after bikeways were implemented provide evidence of their impacts on travel. Examples are summarized below (Contra Costa, 2003):

- *City of Portland.* The City of Portland is widely recognized as being one of the most progressive large cities in the United States in terms of promoting bicycle commuting and developing bikeways. The research and findings support the contention that the investment in bikeways contributes to an increase in bicycle commuting and ridership. A 137% average increase in bicycle ridership was measured after bike lanes were constructed at eight locations in the city, despite conditions that are considered

detrimental to bicycling, such as hilly geography, a cold, wet climate, and increasing roadway vehicle traffic.

- *City of San Francisco.* An increase in bicycle ridership was also witnessed at eight locations in San Francisco after bike lanes were installed, ranging from 23% to 83%. The consistency of these increases appears to support the connection between the improvements and increases in usage.
- *City of Seattle*. Research published in the FHWA document *Guidebook on Methods to Estimate Non-Motorized Travel* indicates the potential bicycle commuter mode share in Seattle for areas within reasonable distance of a regional bikeway system was about 8%. This study is based on extensive surveys and other research tools designed to establish the potential bicycle ridership for specific corridor improvements.
- *University communities.* Studies of five university communities (Davis, Madison, Gainesville, Boulder, and Eugene) also showed a link between the quality of a bikeway system and ridership.

Policies

A variety of progressive policies, planning reforms, and special programs are helping to improve walking and bicycling conditions and encourage active transportation. Some examples are described below.

Smart Growth Land-Use Policies

Smart Growth is a general term for policies that integrate transportation and land use decisions by encouraging more compact, mixed-use development within existing urban areas, and discouraging dispersed, automobile dependent development at the urban fringe. (A popular school of thought within Smart Growth is known as "New Urbanism.") Smart Growth proposes alternatives to urban sprawl; major differences between these two land use patterns are compared in Table 2I. Smart growth seeks to increase walking and bicycling activity by creating more accessible land use patterns, with more origins and destinations within walking and bicycling distances, by creating streetscapes and traffic management practices that are more supportive of

alternative modes, and by explicitly incorporating policies and programs that support use of alternative modes.

Table 2I: **Comparing Smart Growth and Sprawl** ("Smart Growth," VTPI, 2005)

	Smart Growth	Sprawl
Density	Compact development.	Lower-density, dispersed activities.
Growth pattern	Infill (brownfield) development.	Urban periphery (greenfield) development.
Land use mix	Mixed land use.	Homogeneous (single-use, segregated) land uses.
Scale	Human scale. Smaller buildings, blocks and roads. Careful detail, since people experience the landscape up close, as pedestrians.	Large scale. Larger buildings, blocks, wide roads. Less detail, since people experience the landscape at a distance, as motorists.
Public services (shops, schools, parks)	Local, distributed, smaller. Accommodates walking access.	Regional, consolidated, larger. Requires automobile access.
Transport	Multi-modal transportation and land use patterns that support walking, bicycling, and public transit.	Automobile-oriented transportation and land use patterns, poorly suited for walking, bicycling and transit.
Connectivity	Highly connected roads, sidewalks and paths, allowing relatively direct travel by motorized and non-motorized modes.	Hierarchical road network with numerous loops and dead-end streets, and unconnected sidewalks and paths, with many barriers to non-motorized travel.
Street design	Streets designed to accommodate a variety of activities. Traffic calming.	Streets designed to maximize motor vehicle traffic volume and speed.
Planning process	Planned and coordinated between jurisdictions and stakeholders.	Unplanned, with little coordination between jurisdictions and stakeholders.
Public space	Emphasis on the public realm (streetscapes, pedestrian environment, public parks, public facilities).	Emphasis on the private realm (yards, shopping malls, gated communities, private clubs).

This table compares Smart Growth with sprawl land use patterns.

Sprawl tends to decrease walking and bicycling activity through low-density or dispersed land development and street design that accommodates high motor vehicle speeds and volumes. Low-density development disperses activities, resulting in greater travel distances, often rendering walking and bicycling impractical. High motor vehicle speeds and volumes negatively affect non-motorized users' perceptions of safety/ comfort while bicycling or walking in the roadway or roadside environment. Sprawl ends up discouraging many people from active participation in transportation, i.e., walking or bicycling.

Thus, the success of efforts to increase levels of walking and bicycling will depend on the degree of "smart growth" for active living and transportation in the City of Peoria. Statewide, the *Arizona Nutrition and Physical Activity Plan* is evidence of this intent. At the Valley's regional and local levels, a number of initiatives, both formal and informal, are underway. One potential means that shows promise is a focused growth initiative that provides seed money to new or redeveloping community initiatives. Communities use these monies to develop plans for smart growth within, for example, town centers, other activity centers, and existing and emerging high-density corridors. An existing example of such a regional initiative is the Atlanta Regional Commission's Livable Centers Initiative (LCI), which provides $1 million per year in seed money for planning studies. Recipients are local governments and non-profit organizations that are working to enhance livability and mobility for their residents. The Atlanta Regional Commission has also committed $500 million for transportation projects resulting from completed LCI studies (Atlanta Regional Commission, 2006)

End of Trip Facilities

Experience indicates that end of trip facilities (bike parking and changing rooms) help encourage active transportation, particularly utilitarian bicycling (Browning, 1999; APBP, 2002). Changing facilities are especially important in areas where there are a high percentage of office workers and 'white collar' professionals. Some communities have incorporated bicycle parking and changing facility requirements into their parking standards ("Bike Parking," VTPI, 2005). For example Portland, Oregon has established minimum bicycle parking requirements for institutional, residential, and commercial developments. The requirements are either based on a percentage of the automobile parking available at a site (e.g. 3-5% for retail and entertainment establishments) or a ratio of the number of people who come to a site (e.g. one space for every ten students at a school). Vancouver, British Columbia requires showers at new buildings, using a ratio, based on its bike parking requirement, of one pair of gendered shower and changing facilities for every 30-35 bicycle parking spaces. Other cities, such as Boston, Denver and Iowa City have enacted bicycle parking standards as well.

Education and Encouragement Programs

A variety of education and encouragement programs can support non-motorized transportation ("Walking and Bicycling Encouragement," VTPI, 2005):

- Education programs that teach bicycling skills.
- Bicycling and walking events and activities, particularly on trails and bicycling routes.
- Bicycling and walking commute campaigns. These often involve contests as to which workers and worksites commute most by non-motorized modes.
- Bicycling maps showing recommended bicycling routes and facilities, roadway conditions (shoulders, traffic volumes, special barriers to bicycling, etc.), hills, recreational facilities, and other information helpful to cyclists.
- Bicycle commuting incentives.
- Individual marketing campaigns, which encourage and help residents to use alternative modes.
- Tourist promotion materials highlighting bicycling and walking.

Such programs have proven successful at increasing walking and bicycling activity, although their effectiveness varies depending on the type of program, the incentives it includes, and the program goals. Walking and bicycling promotion programs are often targeted at specific groups, such as commuters to a particular destination, or a demographic group that could particularly benefit from more active transportation, or better skills. For example:

- Public health programs have encouraged overweight residents to walk regularly for fitness. These may include a combination of education materials, group walking events, and having participants record how much they walk.
- Bicycling law enforcement programs, which encourage police to cite bicycle traffic law violators, with a "diversion" program by which cyclists who are cited can choose to take a bicycle traffic safety course instead of paying a fine.

- Contests can see which worksites or schools have the highest rates of walking and bicycling during a particular time period.

Traffic Management and Speed Control Programs

Traffic Calming, *Traffic Management,* and *Speed Control* programs apply various design features and strategies intended to reduce vehicle traffic speeds and volumes on a particular roadway. These programs can range from minor modifications of an individual street to comprehensive redesign of a road network.

These programs tend to reduce traffic accident risk, particularly for walking and bicycling, and increase non-motorized travel (Morrison, Thomson and Petticrew, 2004; "Traffic Calming," VTPI, 2005).

Roadway Planning and Maintenance Policies

Road and pathway design and operational practices can be changed in various ways to improve walking and bicycling conditions. For example, it can become standard practice to increase the width of outside traffic lanes on multi-lane arterials to provide more space for bicycles. Similarly, rural road shoulders can be paved and maintained to provide a suitable space for bicycling. Sidewalk construction, repair and maintenance warrants and standards can be modified to improve walking conditions.

"Complete Streets"

In 2001 the FHWA issued a policy statement in response to section 1202 (b) of the Transportation Equity Act for the 21st Century (TEA-21); this policy statement stipulated that "bicycling and walking facilities will be incorporated into all transportation projects unless exceptional circumstances exist." Exceptional circumstances include: explicit prohibition of bicycles or pedestrians on a given roadway; evidence of pedestrian and bicycle accommodation adding a cost factor that is excessively disproportionate (defined as 20% or greater of the total cost of the project) to the need or probable use; or where there is an indication of absence of need for such facilities. This policy has been instrumental to a movement to have such 'complete

streets' policies officially adopted by state and local jurisdictions as well. The National Complete Streets Coalition has defined "complete streets' as being "designed and operated to enable safe access for all users. Pedestrians, bicyclists, motorists and bus riders of all ages and abilities are able to safely move along and across a complete street." While individual solutions to the challenge of the FHWA policy will vary from city to city and street to street, the intent of the movement is to require transportation agencies to design for safe access for multiple modes of transportation. As of 2006, nine states and numerous localities have adopted 'complete streets' policies; in Arizona, the Governor's Traffic Safety Advisory Council has made development of a statewide 'complete streets' policy a priority and is working with the Coalition of Arizona Bicyclists toward that goal for the 2007 legislative session.

School-, Campus-, and Worksite-Based Programs

School, campus and worksite transport management programs encourage commuters to reduce automobile trips and use alternative modes. They can include a variety of encouragement activities, incentives and physical improvements (VTPI, 2005).

These programs can have significant impacts on travel, typically reducing automobile trips by 5-15% for programs that rely only on promotion campaigns, and 10-30% for programs that include financial incentives, such as *parking pricing* (charging for parking) or *parking cash out* (allowing commuters to choose cash instead of parking subsidies). In urban areas, most travel typically shifts to walking and public transit, while in suburban areas more travel shifts to bicycling and ridesharing.

Examples and Case Studies

This section lists and describes examples and case studies of (measurable and documented) successful policies, programs, partnerships, educational programs that result in bicycle-friendly, active and healthy communities.

Bicycle Commuting Contest (*www.climatesolutions.org*)

The Thurston County, Washington Bicycle Commuter Contest encourages individuals to bicycle to work, school, and to run errands throughout the month of May. The contest has been a participatory event for Thurston County residents and employees since 1988. The goal of the Bicycle Commuter Contest is to promote bicycling as an efficient, non-polluting method of travel. Participants keep track of how often and how far they commute by bicycle, and win prizes in a variety of categories. In 1999, 574 participants rode a total of nearly 15,000 miles. Individuals and teams compete to see who can:

- Ride the most miles.
- Ride the most number of days in their age category.
- Tally more total miles than any other team.
- Ride the most days per team-member (advantage to smaller teams).
- Compile the most days ridden by all members (advantage to larger teams).
- Compile the most days ridden by first-time participants (advantage to teams that recruit first-time riders).

Bike To Work Week Campaign (*www.biketoworkvictoria.bc.ca*)

A *Bike-to-Work-Week* campaign is held annually in Victoria, British Columbia. In 2000 it included:

- A bicycle commuting contest with more than 200 teams at different worksites competing in various classes to see which can achieve the most bicycle commuters. All participants are eligible for prizes and drawings.
- A friendly contest between drivers and cyclists determines who gets the first cup of hot coffee at a downtown coffee shop without violating traffic rules.
- Free bicycle skills training workshops for employees who want to learn more about bicycle commuting.
- An elementary school literary competition between bikes and cars. Bicycling and driving parents leave the school at a specified time, travel to the downtown public library, check out a book, and return to the school while following all the rules of the road. Students that

estimate the closest time differences between the two modes are eligible to win great bike prizes.

- A Bike-to-Work-Week non-profit organization that plans and coordinates activities.

Go for Green (*www.goforgreen.ca*)

Go for Green is a Canadian non-profit, charitable organization encourages people to pursue healthy, outdoor physical activities while being good environmental citizens. It encourages active transportation (walking and bicycling), sponsors the Commuter Challenge, and school transport management programs. Go for Green provides participants with information and materials, including newsletters, reports, case studies, and merchandise (logo shirts and hats).

Bikestation Seattle (*www.bikestation.org/seattle*)

Since 2003, Bikestation Seattle has provided commuters with secure bicycle parking, bicycle repair, bicycle rental, car-sharing, and convenient connections to bus lines and other modes of travel. Commuters pay an annual administrative fee of $20 and an annual service plan fee of $96 to use the Bikestation's services. Other Bikestations are located in Berkeley, Long Beach, Palo Alto, and San Francisco.

Bethlehem, PA Bicycle Commuter Facility (*www.car-free.org*)

The Bethlehem Bicycle Commuter Facility affords its members access to bicycle tools, a shower facility, work sink, bathroom, washer/dryer unit, secure bicycle parking and a bike wash. There is a $400 annual fee for membership, half of which is payable by 20 hours of community service. There is a $100 security deposit for the keys.

Loaner Bicycles

The Downtown Management Commission of Boulder, CO, has made available 100 bicycles and 50 helmets for residents and tourists; all that's required is a credit card as a deposit. Champlain College in Burlington, VT, gives bikes to students who agree not to keep a car on campus.

Employer-Funded Commuter Bikes

The Nabisco bakery in Buena Park, CA, gives new bicycles to employees who commute to work three out of five days for a six-month period. Those who commute on their own bikes are given $300, the cost of a moderately priced new bike. Ten percent of the plant's 480 workers now commute regularly by bicycle, helping Nabisco satisfy the Los Angeles area's anti-pollution rules. "These commuters have become biking enthusiasts," reports Nabisco transportation coordinator Byron Kemp. "For them, biking is now an important social activity, and they regularly participate in fun rides on weekends."

Apple Computer provides free use of mountain bikes for employees at its Cupertino, CA, facility, as part of a Commuter Alternatives program. The chemical company Ciba-Geigy was able to avoid building a new garage at a facility in Switzerland by encouraging its employees to ride to work. Any worker willing to give up his or her parking space was given a new bicycle, an option 230 employees chose.

National Bike to Work Month (*www.bikeleague.org*)

The League of American Bicyclists has declared May to be National Bike Month since 1956. The League also promotes Bike to Work Week and Bike-to-Work Day. They invite communities, corporations, clubs, and individuals to join in sponsoring bicycling activities during the month of May in order to increase awareness and acceptance of bicycling. The League produces a *National Bike Month Event Organizer's Kit*, to help individuals and organizations that promote these events.

Eugene Encourages Bicycle Transportation (*www.ci.eugene.or.us/PW/bike*)

Eugene, Oregon has a well-planned and well used bicycling network that includes 28 miles of off-street paths, 78 miles of on-street bicycle lanes, and 4 bicycle/pedestrian bridges spanning the Willamette River. These result in 8% of commute trips by bicycle.

International Walk to School Day and Walking Wednesdays (*www.walktoschool.org*), (*www.iwalktoschool.org*)

With origins in the United Kingdom and first organized in the United States in 1997, International Walk to School Day is now a global event with participants in all 50 states and over 30 countries. Over 40 schools in Arizona were expected to participate in the 2006 International Walk to School Day. Usually scheduled on the first Wednesday in October, International Walk to School day has generated follow-on events, with some schools choosing to promote walking throughout that week or the entire month, while others choose to organize Walking Wednesdays throughout the year. Copper Creek Elementary School in Glendale, Arizona has organized a monthly Walking Wednesday and has given away small prizes for students to collect as acknowledgement of their accumulated walking trips. Many other schools worldwide have submitted descriptions of their programs and incentives to the International Walk to School website.

Toronto Pedestrian Charter (*www.city.toronto.on.ca/pedestrian*)

The City of Toronto adopted a Pedestrian Charter in October 2002. It reflects the concept that walkability is one of the most important measures of the quality of a city's public realm, its health and vitality. The Charter serves as a guide to decision-makers, both in the City and in the community at large, that walking should be valued as the most sustainable of all forms of travel, and that it has enormous social, environmental and economic benefits. It outlines what pedestrians have a right to expect from the City in terms of meeting their travel needs; to establish principles to guide the development of policies and practices that affect pedestrians; and to identify the features of an urban environment and infrastructure that encourage and support walking. The Six Principles of the Toronto Pedestrian Charter include:

- *Accessibility:* Walking is a free and direct means of accessing local goods, services, community amenities, and public transit.[15]

[15] According to the AASHTO *Green Book*, "the two major considerations in classifying highway and street networks functionally are access and mobility. The conflict between serving through movement and providing access to a dispersed pattern of trip origins and destinations necessitates the differences and gradations in the various functional types" (p. 6) Access refers to access to property, *i.e.*, trip origins and destinations. Mobility pertains to the through movement as it relates to operating speed and trip travel time. Exhibit 1-5 in the AASHTO *Green Book* illustrates the relationship between mobility/access and functional class (particularly for motor vehicles). Arterials primarily provide mobility, which necessitates limitations on access. Collectors provide both mobility and access. Local streets primarily provide access, which limits mobility.

- *Equity:* Walking is the only mode of travel that is universally affordable and allows children and people with specific medical conditions to travel independently.
- *Health and Well-being:* Walking is a proven method of promoting personal health and well-being.
- *Environmental Sustainability:* Walking relies on human power and has negligible environmental impact.
- *Personal and Community Safety:* An environment in which people feel safe and comfortable walking increases community safety for all.
- *Community Cohesion and Vitality:* A pedestrian-friendly environment encourages and facilitates social interaction and local economic vitality.

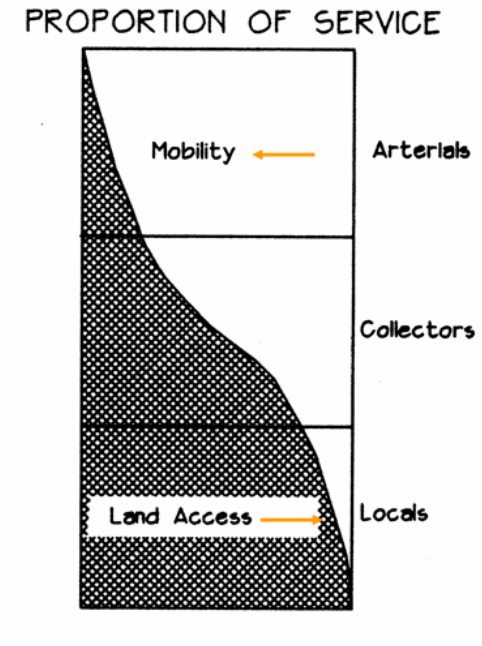


Figure 2E. Relationship of Functionally Classified Systems in Serving Traffic Mobility and Land Access (adapted from AASHTO, 2004)

Arizona Public Health Association

The Association adopted a Resolution at their annual meeting in September 2005 stating: "Support for Land Use and Transportation Policies to Promote Public Health." It states, "require builders to plan for mass transit, sidewalks, and bicycle paths in new residential development" among other broader statements. This resolution is based upon the American Public Health Association Resolution 2004-4.

Arizona Nutrition and Physical Activity State Plan

This five-year action plan seeks to reduce the burden of chronic disease and obesity in Arizona through nutrition education and physical activity. Chapter 6 addresses the physical environment and healthy community design. Excerpts pertaining to active community environments and active transportation are given below:

> "Active community environments is a term used to describe communities where people of all ages and abilities can easily enjoy walking, bicycling, and other forms of recreation. These communities support and promote physical activity with adequate sidewalks, bicycle facilities, paths, trails, parks and recreational facilities. These communities also have implemented mixed-use industrial and residential areas using a linked network of streets that allow for easy walking between homes, work, schools and stores (U.S. Department of Health and Human Services, 2003)."
>
> "Active transportation is a term used to describe purposefully getting from point A to point B by walking, bicycling or using any other sort of active mode of transportation. The capability for physical activity is partly determined by how communities are designed and built. With the increase in and expansion of suburbs, residents are using active modes of transportation less and less and using their motorized modes of transportation more. Specifically, since 1977, trips made by walking have declined 40%. Currently, 90% of all adult trips and 70% of all children's trips are made in vehicles. Furthermore, 25% of all trips are within a mile or less and 75% of these short trips are made by car (Schmidt, 2003).
>
> Unfortunately, existing policies, which include current zoning practices and disconnected development patterns, have created environments that make active transportation extremely challenging. This is understandable considering the way designs

> cause fear of traffic and safety considerations, walking is one of the most hazardous methods of transportation in the United States. These challenges can be reduced by creating communities that have safe, connected and integrated bicycle and pedestrian systems and improving crosswalks, street and sidewalk lighting and traffic signals. Traffic calming should be considered through residential areas to make routes safer for residents to use as active transportation or for recreation (Arizona Department of Health Services, 2005)."

Policies and Programs: Conclusions

The various programs, studies, and policies above all serve to illustrate the significant role that bicycling and walking play in the development of an active and equitable community. Clearly, the promotion of active transportation modes can greatly improve the health and mobility of citizens in the City of Peoria, while simultaneously easing strain on the overall transportation network. Promotion of bicycling and walking is naturally enhanced through monetary funding, and many such funding opportunities are discussed towards the end of Chapter 3.

III. ACTION PLAN

This chapter includes different types of recommendations to improve bicycling conditions in the City of Peoria. The first section, Recommended Strategies, makes specific recommendations for improving roadway segments of the study network that were assessed in the "List of Deficiencies" section above. This chapter also includes several policy recommendations geared towards new development that will help Peoria "build-in" bicycle facilities to future roads and destinations as the city continues to grow. Later in this chapter, the costs and benefits of the recommended improvements are estimated and used to establish priority groupings for implementation. Finally, this chapter summarizes various established sources of funding assistance for bicycle facility improvements that the City may wish to pursue.

NEEDS PLAN: RECOMMENDED IMPROVEMENTS

This Needs Plan details several recommended strategies to improve the level of bicycle accommodation on the City of Peoria's streets. The recommendations herein are based on the survey of existing conditions performed in the preparation of the "List of Deficiencies" (described above in Chapter 2), input gained from city residents during the Community Open House Workshop, as well as discussion with City staff and the Bicycle Development Plan Steering Committee regarding a reasonable level of accommodation for bicycling on the city's streets. The strategies here represent cost-effective methods of achieving the desired level of accommodation. The matching of strategies to specific roadway corridors is detailed in Appendix C, and shown on the accompanying map, "City of Peoria On-Road Bicycling Needs."

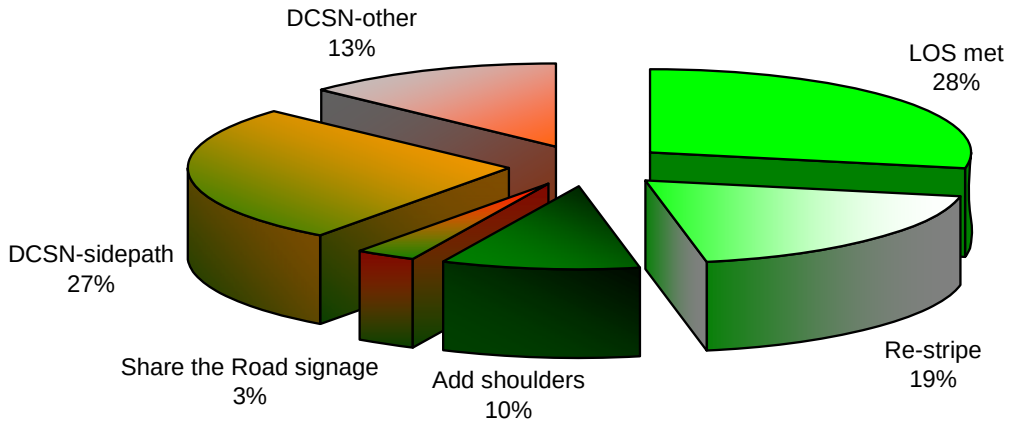
Strategies for Improving Accommodation of Bicycling on Peoria's Streets

The roadways of the study network can be divided into three strategic categories. The first category includes those roadways which already have bike lanes or whose present characteristics provide the desired level of cycling accommodation; these are labeled in the accompanying database as "LOS Met" or "Exist". The second category consists of those for which a relatively simple improvement could raise the level of bicycling accommodation, either through re-striping the existing roadway or expanding the width of an open shoulder; these are labeled as "Re-stripe Candidate" or "Add Paved Shoulder". Finally, the third category consists of strategies for which

no recommendation could be made at this point which would cost-effectively bring the roadways up to the desired level of accommodation. The strategies in this category include posting "Share the Road" signage or performing detailed corridor analyses to examine the needs of these particular roadways. These are labeled as "Share the Road Signage" or "DCSN" (for Detailed Corridor Study Needed). The "DCSN" strategy is divided further into those for which a sidepath might be possible or those for which some other strategy will have to be found through detailed design-alternative testing studies.

These various strategies are described in detail below; see the chart in Figure 3A for the distribution of the miles among these strategies and the accompanying map and database in Appendix C for their location. (*Note: the entries in the accompanying database are sorted first by the recommended strategies, and then in numeric/alphabetical order.*)

Figure 3A: Distribution of Recommended Strategies by Mileage.



LOS Met

Of the one hundred miles of roadway surveyed for this study, almost thirty miles already met or exceeded the level of accommodation (Bicycle Level of Service Score of "C"[16]) designated by the Bicycle Development Plan Steering Committee. On the map that accompanies this needs

[16] For a detailed explanation of the *Bicycle Level of Service Method*, see Appendix A. For the Social, Environmental and Economic considerations of accommodating bicycling in the transportation network, see the "Benefits of Bicycle Friendly Communities" section of Chapter 2.

plan, these segments are identified as "LOS Met." These segments do not "drop out" of the plan, however, because their level of accommodation will likely be degraded over time, especially as Peoria grows and traffic volumes increase. These segments need to be kept in mind if opportunities to improve them further arise as part of an adjacent land development, roadway reconstruction or widening project. Adherence to objectives and policies described elsewhere in this plan will ensure that these roadway segments continue to serve the needs of bicycle transportation in the City of Peoria for years to come. These streets could also perhaps be considered as "anchor segments" in a planning strategy that is focused on connectivity; in such a strategy priority could be given to improving segments that are close or connect to segments that already meet the desired level of bicycle accommodation.

Re-Stripe Candidate

There are approximately 19 miles of roadway segments whose existing cross-sections could better accommodate bicyclists with a relatively simple reconfiguration of their lane marking stripes. Segments identified in this category have the necessary overall width to allow at least a three-foot wide shoulder and at least eleven-foot wide travel lanes on the roadway. These are minimum recommendations for use of this strategy; there are a number of segments on which either one of these dimensions is able to be larger. The attached spreadsheet describes the recommended re-striped lane dimensions for each individual segment. These minimum recommended lane widths are based on the 2004 AASHTO *Policy on Geometric Design of Highways and Streets*. The AASHTO *Policy* states in its foreword that its intent is to recommend "range of values for critical dimensions." These ranges allow for flexibility, as the *Policy* describes:

> Minimum values are either given or implied by the lower value in a given range of values. The larger values within the ranges will *normally be used where the social, economic, and environmental impacts are not critical* (emphasis added).[17]

With regard to the width of lanes on Urban Arterials, the *Policy* states:

[17] AASHTO *Policy*, 2004. xliii

> Lane widths may vary from 10 to 12 ft. Lane widths of 10 ft. may be used in highly restricted areas having little or no truck traffic. Lane widths of 11ft. are used quite extensively for urban arterial street designs. The 12 ft. lane widths are most desirable and should be used where practical, on higher speed, free flowing, principal arterials.[18]

The *Policy* clarifies further,

> Under interrupted-flow operating conditions at low speeds (45mph or less), narrower lane widths are normally adequate and have some advantages.[19]

All of the Peoria streets for which an eleven-foot outside travel lane has been recommended operate under interrupted-flow operating conditions and at speeds 45 miles per hour or less; twelve-foot travel lanes have been maintained on any higher speed or free-flowing roads.[20]

When designating dimensions for the re-striping of existing pavement cross-sections to include rideable shoulders, a minimum width of three feet to the outside of the repositioned edge stripe is recommended. Where more than three feet are available it is recommended that the extra space be used, but three-foot shoulders have been shown by research and practice to provide a tangible sense of comfort to cyclists. While the AASHTO *Guide for the Design of Bicycle Facilities (1999)* expresses a preference for four-foot wide shoulders, it also states, "However, where 4-foot width cannot be achieved, any additional shoulder width is better than none at all." Wherever a shoulder between three and four feet wide is recommended in this Needs Plan, it is because there was no more width available in the cross-section without reducing motor vehicle lanes to less than 11 feet or moving a curb; <u>all recommended shoulder and motor-vehicle travel lane widths have been selected because they will achieve the targeted level of bicycle accommodation within the confines of the existing roadway cross-section.</u>

As with any of the recommendations in this Needs Plan, these re-striping strategies represent opportunities for quickly improving bicycling conditions on a number of roadways in the city via

[18] ibid., p. 472
[19] ibid., p.473
[20] The AASHTO *Policy* defines "high speed" as 50 mph or greater (p.72) and "uninterrupted traffic flow" as "flow not influenced by signalized intersections"(p.74)

a relatively inexpensive solution. These roadway segments should remain under consideration for further improvement in conjunction with new land development, and roadway reconstruction or widening projects that may come to fruition over time.

Add Paved Shoulder

There are many miles of roadway in Peoria along which parcels have not yet been built-out and consequently the roadways are not yet equipped with curbs and gutters. Some of these roadways presently have low traffic volumes and are therefore already well suited for bicycling, and even others have been named as "re-stripe candidates" because there is available width in the existing cross-section to re-position the edge line to offer more room to bicyclists. Unfortunately, there are still more of these open-shoulder roads that have no more room to give from the travel lane to the shoulder. Bicycling conditions on these roads could be improved, however, by the relatively inexpensive widening of their shoulders. If shoulders are developed on these segments they should extend to a minimum of four feet beyond the existing edge stripe. Due to high traffic volumes, speeds or truck traffic, certain segments may require wider shoulders to meet the desired level of bicycling accommodation; the exact recommended widths are described in Appendix C. There are approximately 10 miles of roadway for which adding to the shoulder is the recommended strategy.

As these open-shouldered roads usually lie along undeveloped parcels (either at the margin of present development patterns or in an in-fill situation), it is very important that the City pay close attention to these segments over time. Given the continuous strong growth expected in Peoria in the next few decades, it is very likely that these roadway segments will be widened and lined with curbs. These segments, perhaps, will be the first generation of streets constructed in Peoria with the "Complete Streets" philosophy in mind; they will serve, in a way, as demonstration projects for the objectives and policies described elsewhere in this plan. Until that time, however, improved bicycle accommodation through the relatively simple modification of broadening their shoulders will give the residents of Peoria and the West Valley the opportunity to reveal the demand for more complete streets in the future.

Share the Road Signage

Certain roadway segments present very little opportunity for improvement to bicycling conditions, due to constraints that are unlikely to change without major reconstruction. Our recommendation in this category is for "Share the Road" signage, to communicate to cyclists and motorists alike that there are no separated bicycle facilities on these segments and users of both modes need to be aware of their obligations to safely share the same lanes. We have limited our recommendation of these signs to only those segments where there is very little prospect of improving the existing bicycling conditions, and where bicycle access is especially crucial to multi-modal mobility in Peoria. These segments total approximately three miles. This strategy is used primarily as segments pass under the Loop 101 Freeway and already narrow lanes are constricted; it is also used as roadways cross some bridges. Further study beyond this project could expand this strategy to include user-activated warning lights in addition to signage that would give motorists a real-time indication to be alert to the presence of cyclists.

As with the other categories, vigilant attention during large construction projects may reveal opportunities for better accommodation along these physically constrained corridors but, in the immediate future, signage can assist with the absorption of cyclists into the flow of traffic.

Detailed Corridor Study Needed (DCSN)

Many segments presented minimal opportunity for improving bicycling conditions to Bicycle Level of Service "C" through any of the strategies mentioned above. Any tangible improvement to these segments will require extensive and detailed operational-level investigations of the constraints and opportunities along these corridors. Many of these "Detailed Corridor Study Needed" (DCSN) corridors have been labeled "sidepath candidates" because the consultant team observed what could be sufficient right-of-way along these segments to allow for the proper design of a sidepath's intersections. Individual corridor studies will be needed to verify the extent of available rights-of-way as well as the design options and feasibility of developing a sidepath[21] along any given segment.

[21] While sidepaths appear to many to be appropriate bicycle facility alternatives, crash statistics and operational challenges from across the United States and around the world provide ample warning that in many settings, they are not (see AASHTO *Guide for the Development of Bicycle Facilities,* pp.33-35). Preliminary corridor-specific design is needed for each to determine their

Other corridors in this category did not seem to have sufficient available right-of-way for sidepath construction. Finding solutions for these segments will be very challenging due to their constraints. There are, however, some preliminary suggestions for how to begin operational-level studies of these segments in the "comments" field of the accompanying spreadsheet of recommendations. There are approximately 28 miles of roadway that could be sidepath candidates and an additional 13 miles of other "DCSN" segments.

As with all other categories in this Needs Plan, it will be very important to seize opportunities that arise for improvement of bicycling conditions along these segments in association with adjacent land development and roadway reconstruction or widening projects. Furthermore, if detailed operational and design-option studies are undertaken on any segments, it may be wise to aggregate several aligned segments into one study, as they may be subject to similar constraints and may benefit from the same ultimate strategy.

Recommended Strategies: Summary and Conclusions

This Needs Plan identifies Peoria roadways along which bicycling conditions could be improved through relatively quick and inexpensive solutions. If these improvements are realized and their mileage combined with those roadways which already provide Peoria residents and visitors with relatively comfortable bicycling conditions (i.e., they meet the target Bicycle LOS score of "C"), then half of the miles in the study network could be at the desired level of accommodation without substantial alteration of existing roadway cross-sections. The improvement of the remaining miles will be more challenging and require intense corridor-specific development and testing of design alternatives. However, the identification of these various degrees of potential for improvement should help the city target its resources for improving corridors and/or studying design alternatives as it begins to address the needs of the corridors identified in this Needs Plan.

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feasibility from an operational/safety standpoint. For more information on the design requirements of sidepaths see Petritsch, T.A., B.W. Landis, H.F. Huang, and S. Challa, "Sidepath Safety Model: Bicycle Sidepath Design Factors Affecting Crash Rates." Presented at the 85th Annual Meeting of the Transportation Research Board, Washington, DC, January 26, 2006. Accepted for publication in *Transportation Research Record: Journal of the Transportation Research Board.*

PRIORITIZATION

Introduction

The Needs Plan identifies the most appropriate bicycle improvement for each segment of the study network. In this section, the recommended improvements from the Needs Plan are prioritized to help guide implementation. This Prioritization List is an integral component of the *Peoria Bicycle Development Plan* as it provides an important link between the *Bicycle Devlopment Plan's* adoption and tangible changes in the city. The criteria, process, and groupings of the priroitization list are described below.

Criteria

The primary ranking criteria used to prioritize the study network segments are **existing bicycling conditions,** potential **bicycle travel demand, public input,** and (unit) facility construction **cost**. The existing bicycling conditions measure is based on the Bicycle Level of Service evaluation, the results of which are described in Chapter 2 and displayed in Appendix B. Bicycle travel demand is a measure of estimated potential for bicycle travel along the study network and is based on the proximity of each segment to trip attractors such as parks, schools, and commercial development centers[22]. This type of "latent" demand analysis shows the potential for bicycle travel *if appropriate bicycle facilities are assumed to exist* throughout the City's transportation network. For prioritization purposes, public input is represented by the number of "votes" each segment received at during the *Plan's* public outreach and workshop phase. Finally, cost is measured as a per mile cost of improvement for the identified facility need.

Prioritization Process

The cumulative cost of the recommended bicycle projects identified in the priorities list is over $40 million. The unit costs of the various strategies are shown in Table 3A.

[22] A template outlining concentric zones was placed over a map of the city. The center of the template was moved from segment to segment and a tally was kept of various types of "attractors" in each of the expanding zones: schools, parks, paths and trails, commercial areas, and "important destinations" identified in the *Scope of Service.*

Table 3A: Bicycle Facility Construction Cost[23]

Map Symbol and Facility Recommendation		COST ($/MILE)
	Restripe roadway for bike lanes or shoulders	8,500
	"Share the Road" signage	20,000
	Add Paved Shoulders	200,000
	Detailed Corridor Study Needed (Sidepath Candidate)	750,000
	Detailed Corridor Study Needed (change to constrained corridor may require reconstruction of curb-and gutter or acquisition of right-of way).	2,000,000

An objective prioritization methodology was necessary to identify those projects which will most effectively serve the City's needs. The methodology selected for prioritizing the candidate retrofit study network segments is a Benefit-Cost Index. The Benefit-Cost Index is based upon traditional benefit-cost ratios used in infrastructure investment planning and programming. It provides an indication of the relative value of improving a transportation facility with respect to other (candidate) transportation facilities. The Benefit-Cost Index for bicycle facilities and its constituent terms follow:

$$Benefit / CostIndex = \frac{0.5\Delta LOS + 0.4BicycleDemandScore + 0.1PublicInput}{Cost}$$

Where:

- "ΔLOS" is the difference between the Plan's *target* level of service grade for bicyclists (LOS "C," or 3.5 numerically) and each road segment's *existing* level of service grade.
- "Demand" is the potential bicycling activity along a particular road segment, as assessed by this plan's latent demand methodology.
- "Public Input" is the number of votes a particular road segment received during the Open House Workshop.

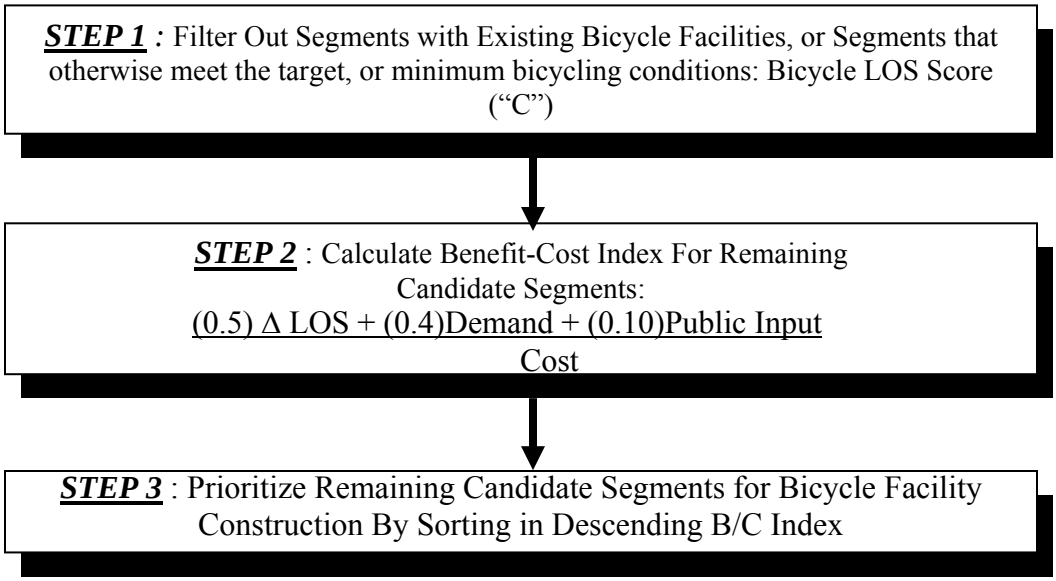
[23] Costs are based on discussions with City staff and on costs in other communities nationwide. The cost estimate for restriping assumes that restriping is done in concert with the City's regular schedule of street resurfacing (existing lane markings can be hydro-blasted and re-positioned, but this process will cost more and may leave 'ghost' markings of the previous configurations). The values for Detailed Corridor Studies are planning estimates, calculated to ensure that needed projects are not eliminated from the prioritization process; costs for individual corridor studies will vary.

- "Cost" is the particular roadway segment's bicycle facility construction cost (per mile), illustrated in Table 3A below. The facility for each network segment was identified in the Needs Plan.
- "0.5," "0.4," and "0.1" are the respective weightings assigned to the terms in the numerator. The "ΔLOS" score comprises 50% of the total benefit value. The bicycle demand score is weighted at 40%. The remaining 10% of the benefit value was used for Public Input. The cost portion of the benefit-cost index was the only factor in the denominator, and thus represents 100% of the denominator.

This Benefit-Cost Index was employed in a four-step prioritization process. This process is graphically illustrated in Figure 3C and is discussed in detail below.

The first step is to "filter out" roadways that currently have bicycle facilities (a striped designated bike lane or paved shoulder at least three feet wide constitutes a "bicycle facility") or currently meet the target Level of Service of "C." By filtering out these roads, the City will be able to extend the on-street bicycle and pedestrian network in the most cost effective way. The remaining roads are the retrofit candidates.

Figure 3C: Project Prioritization Process

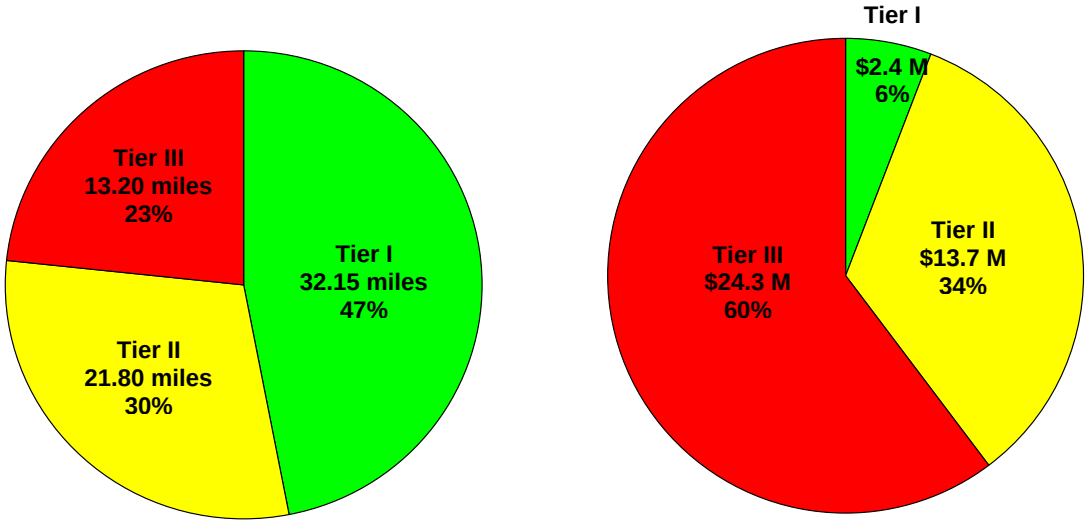


STEP 4 : Group Candidate Segments into Short-term, Mid-Range and Long-Range Categories

The second step in the prioritization process involves calculating the Benefit-Cost Index for each candidate roadway segment.

The third step in the prioritization process, subsequent to calculating the Benefit-Cost Index for each roadway segment, is to rank the roadway segments based on the Benefit-Cost Index. The resulting Prioritization List (needs ranking) is included as Appendix D. The list is sorted by descending Benefit-Cost Index, with the most cost effective facilities at the top of the lists. After this sorting process, the fourth and final step was to divide the Prioritization List into three categories: Tier I (Short-Term Projects), Tier II (Mid-Range Projects), and Tier III Long-Range Projects. The sorting by Benefit-Cost Index score resulted in groupings that were almost identical to how the segments would have been organized by cost alone. Those improvements that are relatively inexpensive—restriping, share the road signage, and shoulder-widening—rose to the top of the list, and as such they comprise the first group of Short-Term projects (Benefit-Cost Index scores are also useful in comparing projects within a group). It is interesting to note that the predicted 'budget" to accomplish all of these recommendations is only $2.4 million, which would address the bicycling conditions of 47% of the analyzed roadway miles with just 6% of the total estimated cumulative cost (see figure 3B).

Figure 3B: Priority Tiers as percentages of total "affected" mileage and of estimated cumulative cost.



Miles

Estimated cumulative cost

Those improvements which are likely to entail greater construction costs and detailed corridor studies (the "Sidepath Candidate" and "Detailed Corridor Study Needed" categories) are divided between the Mid-and-Long-Range projects, with those scoring over five on the Benefit-Cost Index being assigned to the Mid-Range group, and those scoring under five being assigned to the Long-Range group. The segments which scored in Tier I are listed in Table 3B, while the full prioritization list is displayed in Appendix D.

Table 3B: Tier I (short-term) prioritized segments.

Road Name	From	To	Facility Need	Bicycle LOS	Delta LOS	Demand Score	Votes	Cost/mi ($)	Benefit-Cost Index	Tier
Thunderbird Rd	88th Ave	91st Ave	Re-stripe Candidate	E	1.25	100	3	8,500	943.79	I
Cactus Rd	87th Ave	91st Ave	Re-stripe Candidate	D	0.90	91	0	8,500	705.41	I
83rd Ave	Village Pkwy	Beardsley Rd	Re-stripe Candidate	E	1.03	64	1	8,500	647.80	I

Road Name	From	To	Facility Need	Bicycle LOS	Delta LOS	Demand Score	Votes	Cost/mi ($)	Benefit-Cost Index	Tier
Northern Ave	107th Ave	111th Ave	Re-stripe Candidate	E	1.04	55	2	8,500	637.94	I
Peoria Ave	87th Ave	99th Ave	Re-stripe Candidate	D	0.56	80	2	8,500	607.76	I
Deer Valley Rd	83rd Ave	91st Ave	Re-stripe Candidate	D	0.83	68	1	8,500	605.03	I
83rd Ave	Mariners Way	Bell Rd	Re-stripe Candidate	D	0.74	78	0	8,500	594.96	I
83rd Ave	Northern Ave	Olive Ave	Re-stripe Candidate	D	0.92	58	0	8,500	556.28	I
75th Ave	Olive Ave	Mountain View Rd	Re-stripe Candidate	D	0.67	68	1	8,500	555.76	I
75th Ave	Mountain View Rd	Peoria Ave	Re-stripe Candidate	D	0.67	68	1	8,500	555.76	I
91st Ave	Royal Palm Rd	Butler Dr	Re-stripe Candidate	D	0.64	73	0	8,500	540.63	I
83rd Ave	Cholla St	Cactus Rd	Re-stripe Candidate	D	0.31	88	0	8,500	509.59	I
Northern Ave	91st Ave	Loop 101	Re-stripe Candidate	D	0.78	49	1	8,500	500.22	I
Northern Ave	67th Ave	91st Ave	Re-stripe Candidate	D	0.79	41	0	8,500	436.24	I
Thunderbird Rd	91st Ave	94th Ave	Re-stripe Candidate	D	0.53	55	0	8,500	422.05	I
Jomax Rd	67th Ave	Terramar Blvd	Re-stripe Candidate	D	0.14	70	1	8,500	401.94	I
67th Ave	Olive Ave	Mountain View Rd	Re-stripe Candidate	D	0.55	45	0	8,500	381.15	I
91st Ave	Deer Valley Rd	Pinnacle Peak Rd	Re-stripe Candidate	E	0.02	61	1	8,500	322.63	I
Thunderbird Rd	83rd Ave	88th Ave	Share the Road Signage	N/D	0.00	100	3	20,000	237.50	I
Beardsley Rd	99th Ave	Lake Pleasant Rd	Re-stripe Candidate	D	0.00	49	0	8,500	230.59	I
107th Ave	Union Hills Dr	Sack Dr	Re-stripe Candidate	D	0.37	22	0	8,500	217.48	I
Northern Ave	103rd Ave	107th Ave	Re-stripe Candidate	E	0.04	36	0	8,500	181.73	I

Road Name	From	To	Facility Need	Bicycle LOS	Delta LOS	Demand Score	Votes	Cost/mi ($)	Benefit-Cost Index	Tier
107th Ave	Sack Dr	Palm Tree Dr	Re-stripe Candidate	D	0.12	22	0	8,500	140.49	I
Olive Ave	91st Ave	93rd Ave	Share the Road Signage	N/D	0.00	63	0	20,000	126.00	I
Olive Ave	93rd Ave	95th Ave	Share the Road Signage	E	0.00	63	0	20,000	126.00	I
Northern Ave	Loop 101	103rd Ave	Share the Road Signage	E	0.00	36	2	20,000	97.00	I
Lake Pleasant Rd	Westwing Pkwy	Carefree Hwy	Add Paved Shoulders	E	1.55	83	2	200,000	39.39	I
Happy Valley Rd	91st Ave	Lake Pleasant Rd	Add Paved Shoulders	E	1.23	82	1	200,000	33.75	I
91st Ave	Butler Dr	Olive Ave	Add Paved Shoulders	E	1.08	73	0	200,000	28.74	I
91st Ave	Pinnacle Peak Rd	Happy Valley Rd	Add Paved Shoulders	D	0.85	77	1	200,000	27.78	I
83rd Ave	Olive Ave	S of Vogel Ave	Add Paved Shoulders	D	0.65	79	0	200,000	24.31	I
Pinnacle Peak Rd	91st Ave	Lake Pleasant Rd	Add Paved Shoulders	D	0.67	64	2	200,000	24.07	I
Lake Pleasant Rd	Deer Valley Rd	Williams Rd	Add Paved Shoulders	D	0.58	51	1	200,000	19.04	I
Lake Pleasant Rd	Beardsley Rd	Deer Valley Rd	Add Paved Shoulders	D	0.50	51	1	200,000	17.99	I
Jomax Rd	Terramar Blvd	75th Ave	Add Paved Shoulders	D	0.14	70	1	200,000	17.08	I

This prioritization list represents the final *needs* ranking, but not necessarily the *order* for construction. This final needs ranking provides an objective basis for City staff to select roadway segment candidates for bicycle retrofit improvements.

POLICY RECOMMENDATIONS

In light of planning discussions, technical surveys and public input considered during the development of this *Bicycle Development Plan*, certain policy positions are recommended for adoption by the City. These policies are linked to objectives outlined in Chapter 1; relevant category headings and objectives are reprinted here to show their linkage to policy

recommendations, which are presented in boldface type for clarity. Each policy recommendation is followed by a brief explanation of its intent and origin. It will be crucial to the success of these policy recommendations that City staff carry them forward, along with the objectives outlined in Chapter 1 from this document and work to have them incorporated into binding development agreement stipulations, future revisions of the City's *General Plan,* and future City ordinances.

Complete Streets

Objective 1:

The City will require all new and reconstructed road projects to provide accommodations for all bicycle user groups along and across all corridors.

Policy: The City will adopt roadway performance standards that provide reasonable and convenient bicycling within every collector and arterial roadway corridor, by providing in roadway cross-sections bike lanes or shoulders with the dimensions necessary to achieve, at minimum, a Bicycle Level of Service score of "C," where feasible, depending upon each roadway's design criteria.

Policy: The City will incorporate bicycle lanes or shoulders—that meet or exceed the Bicycle Level of Service "C" performance standard, where feasible, on all new arterial and collector roadways.

Policy: The City will incorporate bicycle lanes or shoulders—that meet or exceed the Bicycle Level of Service "C" performance standard—where feasible, on all existing arterial and collector roadways, in conjunction with the repaving program or other roadway improvement projects.

Policy: The City will require submittal of a Multi-Modal Plan for all new developments, for joint review by the Planning and Zoning Division, the Development Engineering Division, and the Traffic Engineering Division.

It is recommended that the City establish an expectation that all its future roadways, and as many of its existing ones as are feasible, be accommodating to all modes of travel allowed by law. These policies address the need for providing truly multi-modal roadways, or "complete streets." Because the definition of what provides safe and comfortable conditions is influenced by many highly variable criteria, it is not certain that one standard cross-section will deliver the desired result. By adopting a Bicycle Level of Service-based performance standard, the City can provide safe and comfortable bicycling conditions as it designs or reconstructs each roadway. The particular cross-sectional dimensions of each new facility will be determined by design criteria which are also used in the design of the motor-vehicle travel lanes of these new or reconstructed roadways: design speed, expected traffic volume, and expected truck volume. Instructions for calculating Bicycle Level of Service are included in Appendix A.

Implementation

Objective 8:

The City will continue to coordinate planning, design, construction, and on-going maintenance of on-street bicycle facilities as part of the City's Capital Improvement Program (CIP) and maintenance budgeting process.

> **Policy: The City will coordinate bicycle facility wayfinding signage standards and policies with other local jurisdictions within standards per the *Manual on Uniform Traffic Control Devices*.**

In order to provide consistent wayfinding assistance to cyclists who travel across jurisdictional boundaries, it is recommended that the City coordinate with other local, county, and state jurisdictions to develop a standard wayfinding signage format and language relating to both on- and off-street bicycle facilities.

End of Trip Provisions

Objective 12:

The City will encourage bicycle riding by establishing standards for provision of end-of-trip facilities such as drinking water, toilets, showers, lockers, and bicycle parking in all developments, with the type and number of facilities to be determined by the scale and purpose of the development.

Policy: The City will include requirements for bicycle parking in the Zoning Ordinance.

It is recommended that the City apply bicycle parking guidelines to land uses for which the city already has motor vehicle parking requirements. Secure bicycle parking is an important element of creating a bicycle-friendly community. Many cites around the country, including a number throughout Arizona, have adopted requirements for bicycle parking in their local zoning and/or development codes. Such ordinances are usually based on the parking and loading requirements of the local zoning code. For example, in the City of Scottsdale, buildings which are required to have 40 or more motor vehicle spaces are also required to provide one bicycle parking space for each ten motor vehicle spaces. Certain neighborhood-oriented businesses are also required to provide at least four bicycle parking spaces, while other small businesses are offered credits against their vehicular parking requirements if they provide bicycle parking.[24] The City of Tempe has a more detailed requirement, which has calculated bicycle requirements based on land use independently of motor vehicle requirements and also has higher requirements in the area closest to Arizona State University.[25]

The City of Scottsdale specifies further that parking facilities "provide a stationary object to which the operator can lock the bicycle frame and both wheels using a user-provided U-shaped lock or cable and lock."[26] Certain parking codes, such that adopted by Portland, Oregon, differentiate between short- and long-term parking and have guidelines for higher-security standards for long-term (day-long or more) parking at workplaces and residences.

[24] City of Scottsdale AZ, Revised Code, Appendix B Basic Zoning Ordinance, Sections 9.103, 9.104
[25] City of Tempe AZ, *Zoning and Development Code*, Section 4-603
[26] City of Scottsdale AZ, Revised Code, Appendix B Basic Zoning Ordinance, Section 9.103,

Elements of Peoria's bicycle parking ordinance should include:

- Calculation ratios based on motor vehicle parking requirements, land use, or building square footage
- Specifications regarding the location of the required facility, in consideration of building access, security, user maneuverability, and shelter (if desired).
- Specifications for the racks and parking spaces themselves, including their compatibility with "U-locks," that support the bicycle upright and that they allow the locking of the frame as well as one or more wheels.

An example of a very comprehensive bicycle parking code is Chapter 33.266.200 of the Code and Charter of the City of Portland, Oregon.

Policy: The City will explore development incentives to encourage developers to include showering and changing facilities in commercial buildings, thereby encouraging bicycle commuting.

It is recommended that the City adopt a development incentive for inclusion of showers and changing facilities in certain workplaces, thereby encouraging bicycle commuting.
Incentives that could persuade developers and owners of commercial properties to install showering and changing facilities for the benefit of bicycle commuters include:

- Exemption of the area dedicated to showering and changing facilities from inclusion in floor-to-area ratio (FAR) cap calculations.
- Awarding credits against transportation impact fees in return for construction of showering and changing facilities.
- Exemption of the area dedicated to showering and changing facilities from inclusion in *ad valorem* tax calculations.

Safe Routes to School

Objective 17

The City will increase youth health and activity levels by promoting and encouraging Bicycle and Walking Safe Route to School Programs.

> **Policy: The City will require preliminary plans for new residential developments to show bicycle and pedestrian access routes to the nearest existing or planned school sites, parks, and open spaces which will serve the future residents of the proposed development.**

It is recommended that the city facilitate "Safe Routes to School" in future development by requiring preliminary plats or plans for intended residential developments to show bicycle and pedestrian access routes to schools. Review of this requirement could be part of the Multi-Modal plan review process described above.

POTENTIAL FUNDING SOURCES

There are numerous sources which can potentially be used to fund the construction of bicycle facilities identified in the Needs Plan. Many of these sources are available on the federal level, as dictated in the recently passed transportation legislation. Most of these programs are administered by the Arizona Department of Transportation. Additionally, there are other state and local funding sources which can be used to help finance programs. Finally, numerous private funding sources exist which can be used by the City to implement bicycle-related programs.

The various funding sources are described below, categorized as federal, state, regional, local, and private:

Federal Sources

Bicycle transportation facility 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.

Safe, Accountable, Flexible, Efficient Transportation Equity Act: A Legacy for Users (SAFTEA-LU, Public Law 109-203) was signed into law August 10, 2005. SAFETEA-LU authorizes the Federal surface transportation programs for highways, highway safety, and transit for the 5-year period 2005-2009. It replaces TEA-21, its legislative predecessor.

Federal-aid Highway Program

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. Within the City of Peoria, U.S. Highway 60 (Grand Ave.) and Loop 101 (Agua Fria Freeway) are designated as part of the National Highway System.

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. Modifications of public sidewalks to comply with the Americans with Disabilities Act are also covered.

Ten (10) percent of each State's annual STP funds are set aside for **Transportation Enhancements (TE)**. The law provides a specific list of activities that are eligible TE projects 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 ten (10) percent of each State's STP funds are set aside for the **Highway Enhancement and Railway-Highway Crossing programs**, which can be used to address bicycle and pedestrian safety issues. Each state is required to implement a Hazard Elimination Program to identify and correct locations which 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."

Highway Bridge Replacement and Rehabilitation (HBRRP) funds are available for pedestrian walkways and bicycle transportation facilities on highway bridges. If a highway bridge deck is replaced or rehabilitated, and bicycles are permitted at each end, then the bridge project must include safe bicycle accommodations (within reasonable cost).

Recreational Trails Program (Section 1109) 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). Examples of trail uses include hiking, bicycling, in-line skating, equestrian use, cross-country skiing, snowmobiling, off-road motorcycling, all-terrain vehicle riding, four-wheel driving, or using other off-road motorized vehicles.

The Transportation and Community and System Preservation (TCSP) Program is a comprehensive initiative of research and grants to investigate the relationships between transportation and community and system preservation and private sector-based initiatives. States, local governments, and Metropolitan Planning Organizations are eligible for discretionary grants to plan and implement strategies that improve the efficiency of the transportation system; reduce environmental impacts of transportation; reduce the need for costly future public infrastructure investments; ensure efficient access to jobs, services, and centers of trade; and examine private sector development patterns and investments that support these goals.

Section 1117 of SAFTEA-LU, Public Law 109-203 authorized the TCSP Program through FY 2009. A total of $270 million is authorized for this program in FY's 2005-2009.

The **Congestion Mitigation and Air Quality (CMAQ) Improvement Program**, established in 1991 and reauthorized by SAFETEA-LU, is intended to realign the focus of transportation planning toward a more inclusive, environmentally-sensitive, and multimodal approach to addressing transportation problems. A major source of funding for many bicycle-related construction and safety projects, CMAQ is administered locally by MAG and its Transportation

Improvement Program. MAG has $132 million in planned CMAQ funding for bicycle and pedestrian projects over the next 20 years.

Federal Lands Highway Program (FLHP) funds may be used to construct roads and trails within (or, in some cases, providing access to) federal lands. FLHP funds total about $800 million per year. Recreation interests often benefit from FLHP funds.

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 SAFETEA-LU include numerous bicycle, pedestrian, trails, and traffic calming projects in communities throughout the Country.

Federal Transit Program

Title 49 USC 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.

The **Suburban Mobility Initiatives Program** was established in response to a need to develop solutions to suburban mobility challenges. The objective of the program is to provide assistance to suburban public agencies in their efforts to reduce dependence on the single occupant vehicle.

The **Regional Mobility Program** provides technical assistance, develops planning methods and conducts outreach, research, demonstration, and project evaluations that assist local communities in improving regional transportation mobility.

Highway Safety Programs

Pedestrian and bicyclist safety remain priority areas for **State and Community Highway Safety Grants** funded by the federal 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). As of May 2006, Arizona had received over $3.49 Million in Section 402 Grants for fiscal year 2006.

Research, development, demonstrations, and training to improve highway safety (including bicycle and pedestrian safety) are carried out under the Highway Safety Research and Development (Section 403) Program.

Federal/State Matching Requirements of the above Funds/Sources

In general, the Federal share of the costs of transportation projects is 80 percent with a 20 percent State or local match. However, there are a number of exceptions to this rule.

- Federal Lands Highway Program projects and Section 402 Highway Safety funds are 100 percent federally funded.
- Bicycle-related Transit Enhancement Activities are 95 percent federally funded.
- Hazard elimination projects are 90 percent federally funded. Bicycle-related transit projects (other than Transit Enhancement Activities) may be up to 90 percent Federally funded.
- Individual Transportation Enhancement Activity projects under the STP can have a match higher or lower than 80 percent. However, the overall Federal share of each State's Transportation Enhancement Program must be 80 percent.
- States with higher percentages of Federal lands have higher Federal shares calculated in proportion to their percentage of Federal lands.
- The State and/or local funds used to match Federal-aid highway projects may include in-kind contributions (such as donations). Funds from other Federal programs may also be used to match Transportation Enhancement, Scenic Byways, and Recreational Trails program funds. A Federal agency project sponsor may provide matching funds to Recreational Trails funds provided the Federal share does not exceed 95 percent.

Safe Routes to School Program

The Safe Routes to Schools, which is included in the Federal Reauthorization bill – Safe, Accountable, Flexible, Efficient Transportation Equity Act for the 21st Century – A Legacy for Users (SAFETEA-LU), is designed to enable and encourage children to walk and bicycle to school, and to "facilitate the planning, development, and implementation of projects and activities that will improve safety and reduce traffic, fuel consumption, and air pollution in the vicinity of schools." Safe Routes to school projects include on-street bicycle facilities, off-street bicycle facilities, and secure bicycle parking facilities.

The funds are apportioned to each state based on their relative share of enrollment in primary and middle schools. Not less than 10% or more than 30% of the funds are for non-infrastructure related activities to encourage walking and bicycling to school. Not less than 70% or more than 90% are for infrastructure related projects that will substantially improve the ability to safely walk and bicycle to school.

Other Federal Sources

Land and Water Conservation Fund (LWCF) Grants,

National Park Service Land and Water Conservation Fund (LWCF) Grants: This federal funding source was established in 1965 to provide "close-to-home" parks and recreation opportunities to residents throughout the United States. Money for the fund comes from the sale or lease of nonrenewable resources, primarily federal offshore oil and gas leases, and surplus federal land sales. LWCF grants can be used by communities to build a variety of parks and recreation facilities, including trails and greenways. LWCF funds are distributed by the National Park Service to the states annually. Communities must match LWCF grants with 50 percent of the local project costs through in-kind services or cash. All projects funded by LWCF grants must be used exclusively for recreation purposes, in perpetuity. Projects must be in accordance with each State's Comprehensive Outdoor Recreation Plan.

Community Development Block Grants (CDBG)

US Department of Housing and Urban Development (HUD:) CDBG provides eligible metropolitan cities and urban counties (called "entitlement communities") with annual direct grants that they can use to revitalize neighborhoods, expand affordable housing and economic opportunities, and/or improve community facilities and services, principally to benefit low- and moderate-income persons. Eligible activities include building public facilities and improvements, such as streets, sidewalks, sewers, water systems, community and senior citizen centers, and recreational facilities. Several communities have used HUD funds to develop greenways, including the Boscobel Heights "Safe Walk" Greenway in Nashville, Tennessee.

Healthy People 2010 Community Implementation Grants Program

Federal Department of Health and Human Services: The Federal Department of Health and Human Services plans to award hundreds of "micro-grants" to community organizations for activities that support the goals of Healthy People 2010, the Nation's public health agenda for the next decade. Worth up to $2,010 each, the micro-grants represent a new, low-cost approach to foster effective prevention efforts at the community level. Each grant will support efforts by local groups to promote health education, quality care, access to care, and other projects that support the far-reaching national health goals of Healthy People 2010.

State of Arizona Sources

(Note: The following information is taken largely from the recently adopted (2003) ADOT *Statewide Bicycle Pedestrian Plan*)

State revenues include the State sales tax, Highway User Revenue Funds, Local Transportation Assistance Funds, Arizona State Parks Heritage Funds, and Arizona Game and Fish Department Funds. Additional funding was considered as part of the State of Arizona *Vision 21* process, which was a recent multi-year study to determine multimodal transportation needs and potential funding sources to meet those needs. Following is a brief summary of each source.

State Sales Tax

The State sales tax revenues, as with local jurisdiction sales tax revenues, are generally budgeted to high priority programs and needs which generally have not included bicycle and pedestrian improvements; however, these revenues are available for bicycle and pedestrian facilities and programs. An increase in the State sales tax is currently under consideration for dedication to transportation purposes. This increase can and should be utilized in part for bicycle and pedestrian transportation projects and safety programs.

Highway User Revenue Fund (HURF)

The HURF, made up of State gas tax revenues, the vehicle license tax, and other miscellaneous fees and services, is a revenue source constitutionally restricted to roadway purposes, which includes all improvements contained within the roadway right-of-way. Arizona jurisdictions have utilized HURF to provide landscaping and to construct bicycle lanes, paved shoulders, sidewalk facilities, and shared-use pathways that are within the right-of-way. The State Highway Fund receives 50.5 percent of annual HURF monies, while cities and counties receive the remainder.

Local Transportation Assistance Fund (LTAF)

Recent legislation has changed the eligibility of LTAF funds, which are generated by the Arizona Lottery. LTAF must now be used for transit purposes in all jurisdictions. These funds may be available for construction of sidewalks, bike racks, and other facilities that directly relate to transit use. In FY 2001, the lottery contributed $23 million to the LTAF; however, due to State budget constraints, funding from the program is currently not available for use for transit purposes.

Arizona State Parks Heritage Funds

Monies are appropriated statewide from this fund to a variety of projects including paved and unpaved trail development. Trail funds are a 50-50 match to locally provided money. When trails are a part of other projects, such as an interpretive center, park development, trailheads,

etc., they may be eligible for other Heritage Fund categories. The specific trails fund category of the Arizona Heritage Fund is only available to trails currently listed or nominated to the Arizona State Trails System.

Arizona Game and Fish Department Heritage Funds

The Game and Fish Department provides 100 percent funding grants for projects including habitat creation, interpretive displays, signage, improved access areas for wildlife, and other improvements. The grants do not require agency matches, and are awarded annually through a nomination and approval process similar to that of the Arizona State Parks Heritage Funds.

Growing Smarter Planning Grant Program

The Arizona Department of Commerce offers the Growing Smarter Planning Grant to help small and rural municipalities or counties in developing comprehensive plans that meet State Growing Smarter requirements. Revised comprehensive plan provisions entail greater attention towards multimodal transportation and recreational areas.

Vision 21

The Vision 21 Governor's Transportation Task force was convened in 1999 to develop a long-range multimodal transportation vision for Arizona's transportation future. The mission statement of the Task Force is to evaluate needs and recommend funding strategies to meet those needs for all modes of transportation, including walking and bicycling. The Task Force is not limited to State-only facilities, but is incorporating and planning for all levels including local jurisdiction needs.

The Task Force evaluated a large selection of potential funding sources, including increased gas tax, gas tax indexed to inflation, vehicle miles traveled tax, BTU/Energy taxes, motor fuels sales tax, general statewide sales tax surcharge, personal income tax surcharge, property tax increase for transportation, and exactions/developer impact fees. Several of these potential revenue sources can either specifically be designated in part to non-motorized transportation needs including bicycling and walking, or can at least be eligible for spending on these needs. It is the

stated intent of the Task Force to comprehensively address multimodal needs, and therefore the Task Force attempted to arrange its revenue package recommendations to include spending on non-motorized forms of transportation. The Vision 21 final report was published in December 2001.

Local Sources

(Note: The following information is taken largely from the recently adopted (2003) ADOT *Statewide Bicycle Pedestrian Plan*)

General Funds

One of the primary local revenue sources of cities, towns, and counties available for use in pedestrian- and bicycle-related improvements are general funds resulting from sales taxes, property taxes, and other miscellaneous taxes and fees. There are generally few restrictions on the use of these funds for numerous government services. Design and construction of bikeways and walkways using this funding source usually receives limited support from local governments unless their constituents lobby effectively for such use.

In some cases a component of local general funds can be dedicated to transportation improvements, including pedestrian amenities and bikeways. Some cities have voted to collect a percentage of city sales tax specifically for transportation. Examples include:

- A half-cent sales tax became effective January 1, 2002, that will fund Glendale's new transportation plan. Some of the projects programmed in the 2003-2012 Capital Improvement Plan utilizing transportation sales taxes include downtown pedestrian circulation enhancements, bike route improvements along 63rd, and the citywide shared-use paths system.
- Of the three percent tax on utilities in Peoria, 1.5 percent goes to the Streets Fund for street light maintenance and electricity.
- Scottsdale voters approved a 0.2 percent sales tax for use strictly on transportation-related capital projects. This fund will support citywide sidewalk improvements, the bikeways

program, and neighborhood traffic calming. This "transportation privilege tax" and interest earnings brought in $16.2 million for the city in FY 2001.

- The City of Yuma collects a 0.5 percent sales tax ("Road Tax") to fund design, construction, and maintenance of streets and roadways and their rights-of-way.

Counties, too, can choose to collect sales taxes specifically for transportation. The Arizona Department of Revenue collects an additional 0.5 percent transportation excise tax on sales in Pinal and Gila counties. This money may be used for the construction, reconstruction, and repair for a number of public facilities, including streets, sidewalks, crosswalks, bridges, tunnels, steps, and recreational areas. In FY 2002, Gila County raised $2.6 million, and Pinal County generated $6.7 million for transportation projects.

Development Impact Fees

New developments, both residential and commercial, place a strain on existing public facilities, such as parks and streets. Development impact fees are paid by developers to help cover the additional costs resulting from new construction, and these funds may be used for the provision of paved shoulders, bike lanes, and sidewalks built as part of the required roadway cross section. In some circumstances, shared-use paths have been constructed by jurisdictions using impact fees if they serve transportation needs generated by the new development. Examples include the town of Payson, which collects $600 for streets on each new residential dwelling unit, and Pima County, which charges $1,550 for each new home built in the unincorporated areas for roadway improvement projects. Jurisdictions in the MAG region charge up to $9,000 in impact fees per detached dwelling unit for the provision of parks, roadways, and other public improvements.

Parks and Recreation Funds

Local parks and recreation funds are generally derived from property and sales taxes and some fee revenues. Land acquisition, recreational facilities, restrooms, lighting, landscaping, trails, and pathways are often funded through City and County community services, public works, and/or parks and recreation departments. Maintenance costs for shared-use paths are often incurred by these departments, development agreements or home owners' associations.

Flood Control District Funds

Flood Control District funds can be used to construct shared-use pathways as well as flood control structures, railing, bridges, bank protection, and other devices that can facilitate pathway development. This source has limited availability but should be considered as pathway projects are developed that can be combined with flood control improvements. For instance, flood control maintenance roadways can be designed and constructed to accommodate maintenance vehicles while allowing use by bicyclists and pedestrians as well. New flood control district facilities can be designed to accommodate bicycle and pedestrian use, such as provision of new railing that can meet bike-pedestrian safety guidelines. Pathway under-crossings of major roadways and sidewalks on bridges can be "piggybacked" when any major bridge structure work is conducted or when new bridges are built.

Revenue and General Obligation Bonds

Bonds are usually considered a financing mechanism rather than revenue source, and debt service obligations should receive consideration before this mechanism is pursued. In this discussion revenue and General Obligation (G.O.) bonds are considered as a funding source because when bond packages are presented for voter approval they are often tied to specific facility or program improvements. For instance, a G.O. bond package can be forwarded to voters for citywide sidewalk and lighting improvements or for specific sidewalk, pathway, bicycle lane, or other enhancements that are clearly defined in the legal language of the bond.

In this respect, bonds should be considered a revenue source because identified pedestrian and bicycle projects will be constructed according to truth-in-bonding requirements versus competing with numerous other local demands on general funds. Revenue bonds, such as those repaid through State Highway User Revenue Funds, also can be considered a revenue source because specific projects will be "locked in" and constrained (provided revenue projections and cost estimates bear out as projects are developed). Numerous MAG jurisdictions have used bond funds for path and trail development including Phoenix and Scottsdale.

Private Sources

AmeriCorps' National Civilian Community Corps (NCCC)

One project that NCCC members work on is the building or improving of trails. AmeriCorps' NCCC members created or improved more than 200 miles of hiking trails in 25 states nationwide. Teams cleared trees and brush, leveled trails to comply with federal guidelines on handicapped access, implemented erosion control techniques, and created and updated signs. These trails are located in rural, urban, and national parks from California to Maine, and are used by tens of thousands of Americans each year.

Bikes Belong Coalition

Bikes Belong Coalition seeks to assist local organizations, agencies, and citizens in developing bicycle facilities projects that will be funded by TEA-21 or its subsequent programs. Bikes Belong Coalition will accept applications for grants of up to $10,000 each, and will consider successor grants for continuing projects. Funding decisions are made on a rolling basis. http://bikesbelong.org/site/page.cfm?PageID=21 (grant applications due quarterly)

American Greenways Awards Program, The Conservation Fund

The American Greenways Awards program is a program started by the Conservation Fund. The Fund works with private companies such as DuPont and Kodak to provide funding for greenway development.
http://www.conservationfund.org/?article=2372 (grant applications due from March 1 to June 1 annually)

Fish America Foundation

Fish America Foundation provides funding to public and private organizations for projects that enhance or conserve water and fisheries resources, including community efforts. In the last 18 years, the Foundation has provided 620 grants totaling more than $4.9 million to improve the fisheries resource in all 50 states and Canada. To apply for a grant, one sends a completed

application, a letter of support from a state resource agency, and evidence of the organization's nonprofit status. The grant award is approximately $10,000. This grant can include greenways that enhance or conserve water resources.
http://www.fishamerica.org/faf/grants/index.html (grant proposals due July 31 annually)

Oracle Corporation Giving Program

Oracle provides grants to medical research, endangered animal protection, environmental protection and K-12 math, science and technology education. Past recipients have included trail groups.

National Trails Fund American Hiking Society

The American Hiking Society's National Trails Fund is the only privately funded national grants program dedicated solely to hiking trails. National Trails Fund grants have been used for land acquisition, constituency building campaigns and traditional trail work projects. Since the late 1990s, the American Hiking Society has granted nearly $200,000 to 42 different organizations across the US.

National Tree Trust (NTT)

NTT has grants available for tree seedlings through the Community Tree Planting program. Seedlings, which can be planted alongside a trail, are available for delivery January through April, and the main requirements for the grant are as follows:

- Trees must be planted on public land.
- Project must utilize volunteers for planting and/or maintaining seedlings.
- Matching funds are required, which may include volunteer hours, donated items and non-federal moneys.
- Two years of annual reporting are required for each grant.

www.nationaltreetrust.org

The Global ReLeaf Program

The Global ReLeaf Forest Program is American Forests' education and action program that helps individuals, organizations, agencies, and corporations improve the local and global environment by planting and caring for trees. The program provides funding for planting tree seedlings on public lands, including trailsides. Emphasis is placed on diversifying species, regenerating the optimal ecosystem for the site and implementing the best forest management practices. This grant is for planting tree seedlings on public lands, including along trail rights-of-way.

http://www.americanforests.org/global_releaf/grants/ (proposals due January 15 and July 1 annually)

Wilburforce Foundation

Wilburforce Foundation is dedicated to protecting nature's richness and diversity through funding programs that help preserve our remaining wild places. The Foundation's geographic area of interest is the Western U.S. and Western Canada., with specific interest in the wild lands of the desert Southwest. Programs that protect core areas of critical wildlife habitat, such as open space or trail programs, are considered for funding by the Foundation.

http://www.wilburforce.org/ (proposals are accepted on a quarterly basis)

American Conservation Association

A private operating foundation organized to advance knowledge and understanding of conservation; to preserve the beauty of the landscape and the natural and living resources in areas of the U.S. and elsewhere; and to educate the public in the proper use of such areas.

Recreational Equipment Incorporated (REI)

REI awards grants to nonprofit organizations interested in protecting and enhancing natural resources for outdoor recreation. These conservation grants support, among other projects, those that protect lands and waterways and make such areas more accessible to users.

The Robert Wood Johnson Foundation

The Robert Wood Johnson Foundation seeks to improve the health and health care of all Americans. One of the primary goals of the Foundation is to "promote healthy communities and lifestyles." Specifically, the Foundation has an "Active Living by Design" grant program that promotes the principles of active living, including non-motorized transportation. Multiple communities nationwide have received grants related to promotion of trails and other non-motorized facilities. The Robert Wood Johnson Foundation is online at www.rwjf.org.

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APPENDIX A: THE BICYCLE LEVEL OF SERVICE METHOD

— Bicycle Level of Service Method A-2

APPENDIX A: THE BICYCLE LEVEL OF SERVICE METHOD

Technical Description

On-road bicycling conditions in the City of Peoria have a tremendous effect on people's choice to bicycle and the selection of their route. As part of this study, the consultant team has performed an evaluation of bicycling conditions on most of the arterial roadways throughout the City. The *Bicycle Level of Service*[i] *Model (Version 2.0)* was used as the foundation of the evaluation of the existing bicycling conditions. This popular statistically-calibrated mathematical equation is one of the most accurate methods of evaluating the bicycling conditions of shared roadway environments. It uses the same measurable traffic and roadway factors that transportation planners and engineers use for other travel modes. With statistical precision, the *Model* clearly reflects the effect on bicycling suitability or "compatibility" due to factors such as roadway width, bike lane widths and striping combinations, traffic volume, pavement surface conditions, speed and type of motor vehicles, and on-street parking.

The *Bicycle LOS Model* is based on the proven research conducted in the last decade and documented in *Transportation Research Record 1578*[ii] published by the Transportation Research Board of the National Academy of Sciences. It has been developed with a background application of over 200,000 miles of evaluated urban, suburban, and rural roads and streets across North America. It is adopted by numerous states and metropolitan areas as the standard methodology for determining existing and anticipated bicycling conditions. Many urbanized area planning agencies and state highway departments are also using this established method of evaluating their roadway networks. These include metropolitan areas across North America such as Baltimore MD, Orlando FL, Richmond VA, Bainbridge Island WA, Atlanta GA, Chicago IL, Gainesville FL, Birmingham AL, Philadelphia PA, San Antonio TX, Houston TX, Buffalo NY, Anchorage AK, Lexington KY, and Tampa FL as well as state departments of transportation such as the Maryland Department of Transportation, Florida Department of Transportation (see the website http://www.dot.state.fl.us/planning/systems/sm/los/default.htm), Delaware Department of Transportation (DelDOT), New York State Department of Transportation (NYDOT), Maine Department of Transportation (MeDOT), and many others.

The Bicycle LOS evaluation results have been used primarily in developing the "List of Deficiencies," task 3 of the Peoria Bicycle Development Plan Project Plan. Other applications of the evaluation (when used with other criteria) include planning, and prioritizing roadway sections for bicycle facility construction. It can also be used to track changes in bicycling conditions within the City's transportation network.

In addition to describing the *Model*, this section also documents the data requirements and the associated collection and compilation guidelines.

Bicycle Level of Service Model

Version 2.0 of the *Bicycle LOS Model* has been employed to evaluate segments within the City of Peoria's street network. Its form is shown below:

$$\text{Bicycle LOS} = a_1 \ln (Vol_{15}/L_n) + a_2 SP_t(1+10.38HV)^2 + a_3(1/PC_5)^2 + a_4 (W_e)^2 + C$$

Where:

Vol_{15} = Volume of directional traffic in 15 minute time period

$Vol_{15} = (ADT \times D \times K_d) / (4 \times PHF)$

where:
ADT = Average Daily Traffic on the segment or link
D = Directional Factor
K_d = Peak Daily Factor
PHF = Peak Hour Factor

L_n = Total number of directional *through* lanes
SP_t = Effective speed limit

$SP_t = 1.1199 \ln(SP_p - 20) + 0.8103$

where:
SP_p = Posted speed limit (a surrogate for average running speed)

HV = percentage of heavy vehicles (as defined in the 1994 Highway Capacity Manual)

PC_5 = FHWA's five point pavement surface condition rating

W_e = Average effective width of outside through lane:

where:

$W_e = W_v$ - (10 ft x % OSPA) and $W_l = 0$

$W_e = W_v + W_l$ (1 - 2 x % OSPA) and $W_l > 0$ & $W_{ps} = 0$

$W_e = W_v + W_l$ - 2 (10 x % OSPA) and $W_l > 0$ & $W_{ps} > 0$ and a bike lane exists

where:

W_t = total width of outside lane (and shoulder) pavement
OSPA = percentage of segment with occupied on-street parking
W_l = width of paving between the outside lane stripe and the edge of pavement
W_{ps} = width of pavement striped for on-street parking
W_v = Effective width as a function of traffic volume
and:
$W_v = W_t$ if ADT > 4,000veh/day
$W_v = W_t$(2-0.00025 x ADT) if ADT ≤ 4,000veh/day, and if the street/road is undivided and unstriped

a_1: 0.507 a_2: 0.199 a_3: 7.066 a_4: - 0.005 C: 0.760

(a_1 - a_4) are coefficients established by the multi-variate regression analysis

The *Bicycle LOS* score resulting from the final equation is stratified into service categories "A, B, C, D, E, and F" (according to the ranges shown below) to reflect users' perception of the road segment's level of service for bicycle travel. This stratification is in accordance with the linear scale established during the referenced research (i.e., the research project bicycle participants' aggregate response to roadway and traffic stimuli). The *Model* is particularly responsive to the factors that are statistically significant. An example of its sensitivity to various roadway and traffic conditions is shown on the following page.

Bicycle Level-of-Service Categories

LEVEL-OF-SERVICE	BLOS SCORE
A	≤ 1.5
B	> 1.5 and ≤ 2.5
C	> 2.5 and ≤ 3.5
D	> 3.5 and ≤ 4.5
E	> 4.5 and ≤ 5.5
F	> 5.5

$$\text{Bicycle LOS} = a_1 \ln (Vol_{15}/L_n) + a_2 SP_t(1+10.38HV)^2 + a_3(1/PR_5)^2 + a_4 (W_e)^2 + C$$

a_1: 0.507 a_2: 0.199 a_3: 7.066 a_4: -0.005 C: 0.760

Baseline inputs:

ADT	=	12,000 vpd	% HV	=	1	L	= 2 lanes
SP_p	=	40 mph	W_e	=	12 ft	PR_5	= 4

	BLOS	% Change
Baseline Bicycle LOS Score	3.98	N/A

Lane Width and Lane striping changes (T-statistic = 9.844)

W_t	=	10 ft	4.20	6% increase
W_t	=	11 ft	4.09	3% increase
W_t	=	12 ft - - (baseline average) - - - -	3.98 - - -	no change
W_t	=	13 ft	3.85	3% reduction
W_t	=	14 ft	3.72	7% reduction
W_t	=	15 ft (W_l = 3 ft)	3.57 (3.08)	10%(23%) reduction
W_t	=	16 ft (W_l = 4 ft)	3.42 (2.70)	14%(32%) reduction
W_t	=	17 ft (W_l = 5 ft)	3.25 (2.28)	18%(43%) reduction

Traffic Volume (ADT) variations (T-statistic = 5.689)

ADT	=	1,000 Very Low	2.75	31% decrease
ADT	=	5,000 Low	3.54	11% decrease
ADT	=	12,000 Average (baseline average) - -		3.98 no change
ADT	=	15,000 High	4.09	3% increase
ADT	=	25,000 Very High	4.35	9% increase

Pavement Surface conditions (T-statistic = 4.902)

PR_5	=	2	Poor	5.30	33% increase
PR_5	=	3	Fair	4.32	9% reduction
PR_5	=	4	Good (baseline average)	3.98	no change
PR_5	=	5	Very Good	3.82	4% reduction

Heavy Vehicles in percentages (Combined speed and heavy vehicles T-statistic = 3.844)

HV	=	0	No Volume	3.80	5% decrease
HV	=	1 - - -	Very Low - (baseline average)	3.98	no change
HV	=	2	Low	4.18	5% increase
HV	=	5	Moderate	4.88	23% increase[a]
HV	=	10	High	6.42	61% increase[a]
HV	=	15	Very High	8.39	111% increase[a]

Data Collection and Inventory Guidelines

Following is the list of data required for computation of the *Bicycle LOS* scores as well as the associated guidelines for their collection and compilation into the programmed database. Unless otherwise specified, the Consultant will collect the data.

Average Daily Traffic (ADT) - is the average daily traffic volume on the segment or link. The programmed database will convert these volumes to Vol_{15} using the Directional Factor (D), Peak to Daily Factor (K_d) and Peak Hour Factor (PHF) for the road segment. This data was obtained from the *City of Peoria Average Daily Traffic Flow Map for 2005*.

Percent Heavy Vehicles(HV) - is the percentage of heavy vehicles (as defined in the *1994 Highway Capacity Manual*). This data was obtained from the *2003 Weekday Truck Percentage on Arterial Streets*, from the Maricopa Association of Governments' *2003 Arterial Traffic Volume Survey*, when available, otherwise supplemented from a look-up table that takes into account Posted Speed Limit, Average Daily Traffic and Urban/Rural setting.

Number of lanes of traffic (L) - is the total number of *through* traffic lanes of the road segment and its configuration. (e.g., D = Divided, U = Undivided, OW = One Way, S = Center Turning Lane). The programmed database will convert these lanes into directional lanes. The presence of continuous right-turn lanes should be noted in the comments field.

Posted Speed Limit (S_p) – is recorded as posted.

W_t total width of pavement - is measured from the center of the road, yellow stripe, or (in the case of a multilane configuration) the lane separation striping to the edge of pavement or to the gutter pan of the curb. When there is angled parking adjacent to the outside lane, W_t is measured to the traffic-side end of the parking stall stripes.

W_{ps} width of pavement striped for on-street parking – is recorded only if there is parking to the right of a striped bike lane. If there is parking on two sides on a one-way, single lane street, report the combined width of the striped parking.

W_l width of paving between the outside lane stripe and the edge of pavement - is measured from the outside lane stripe to the edge of pavement or to the gutter pan of the curb. When there is angled parking adjacent to the outside lane, W_l is measured to the traffic-side end of the parking stall stripes.

OSPA % - is an estimate the percentage of the segment (excluding driveways) along which there is occupied on-street parking at the time of survey. Record each side separately. If the parking is allowed only during off-peak periods and parking restrictions change widths and laneage, indicate the geometric changes in the comments field. Note: Indicate any "angled parking" in the comments field.

Designated Bike Lane – is indicated as "Y" if there is a bike lane on the segment; otherwise the field is coded as "N."

Pavement Condition:

Travel Lane (PC_t) - is the pavement condition of the motor vehicle travel lane according to the FHWA's five-point pavement surface condition rating shown below. Half-point values (4.5, 3.5, and occasionally 2.5) may also be coded.

Shoulder or Bike lane (PC_l) - is the pavement condition of the shoulder or bike lane according to the FHWA's five point pavement surface condition rating shown below. Half-point values (4.5, 3.5, and occasionally 2.5) may also be coded.

RATING	PAVEMENT CONDITION
5.0 (Very Good)	Only new or nearly new pavements are likely to be smooth enough and free of cracks and patches to qualify for this category.
4.0 (Good)	Pavement, although not as smooth as described above, gives a first class ride and exhibits signs of surface deterioration
3.0 (Fair)	Riding qualities are noticeably inferior to those above; may be barely tolerable for high-speed traffic. Defects may include rutting, map cracking, and extensive patching.
2.0 (Poor)	Pavements have deteriorated to such an extent that they affect the speed of free-flow traffic. Flexible pavement has distress over 50 percent or more of the surface. Rigid pavement distress includes joint spalling, patching, etc.
1.0 (Very Poor)	Pavements that are in an extremely deteriorated condition. Distress occurs over 75 percent or more of the surface.

Source: U.S. Department of Transportation. Highway Performance Monitoring System-Field Manual. Federal Highway Administration. Washington, DC, 1987

This evaluation method is easily updated in the future. The electronic files will be submitted to the City at the end of the project. Columns highlighted (in the electronic file) in red are the data input fields. As traffic and roadway conditions change (primarily only traffic volumes will change, unless road reconstruction occurs) the database or programmed spreadsheet can be updated.

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[i] Landis, Bruce W. "Real-Time Human Perceptions: Toward a Bicycle Level of Service" *Transportation Research Record 1578*, Transportation Research Board, Washington DC 1997.

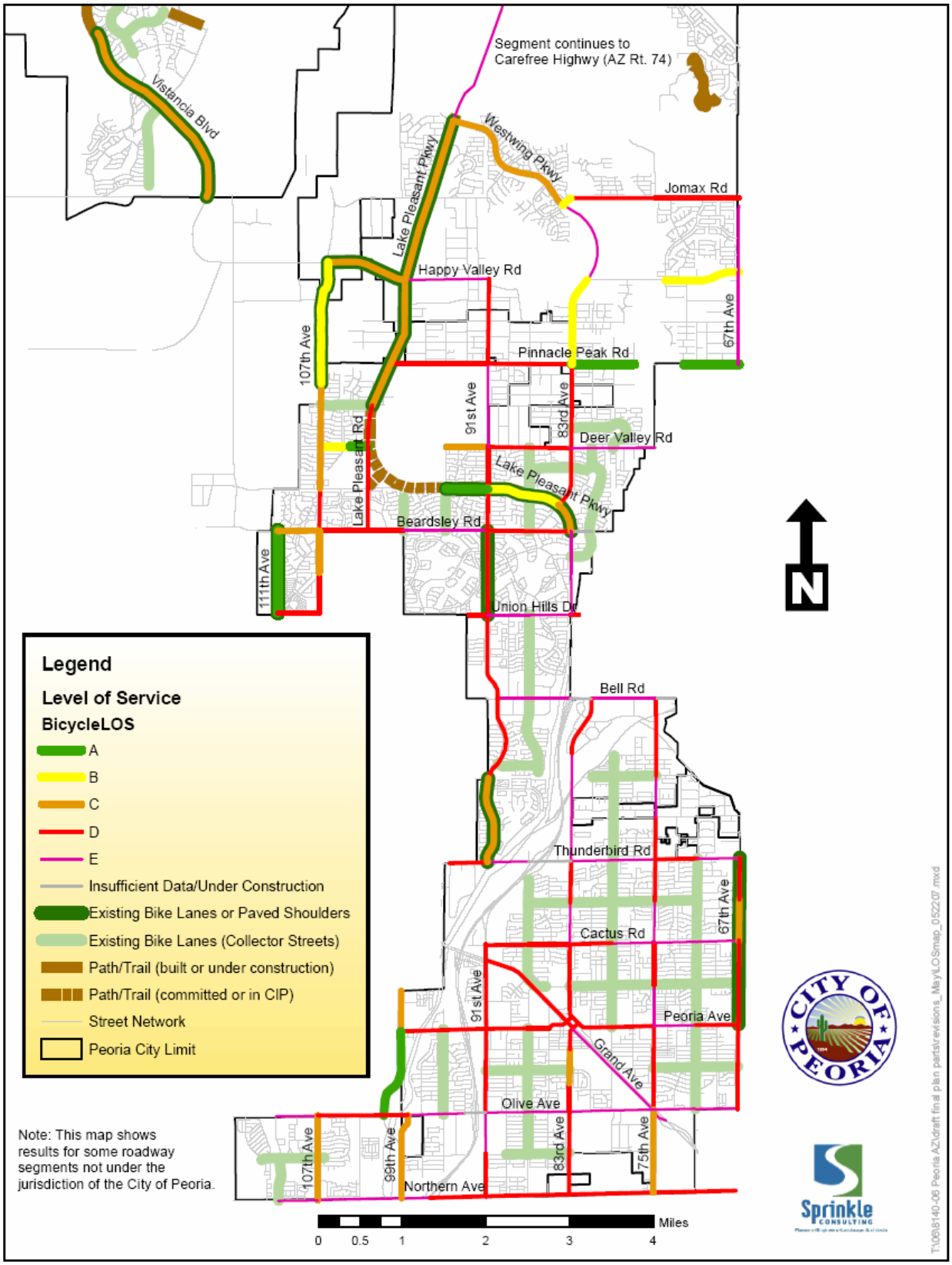
[ii] FDOT, 2002 Quality / Level of Service Handbook, Florida Department of Transportation (2002), pp.20-21.

APPENDIX B: EXISTING ON-STREET BICYCLING CONDITIONS

— Map: Inventory of On-Street Bicycling Conditions and Facilities B-2

— Database: City of Peoria Bicycle Level of Service Evaluation Results.....B-3

Inventory of On-Street Bicycling Conditions and Facilities



Bicycle Level of Service Evaluation Results

Road Name	From	To	ID	Length (Ls) (mi)	Lanes (L) Th #	Lanes (L) Con	YR 2005 Roadway ADT	Tks. (HV) (%)	Post. Spd. (SP_p) mph	Width Of Pavement W_t (ft)	Width Of Pavement W_l (ft)	Width Of Pavement W_{ps} (ft)	Occ. Park. (OSPA) (%)	Pavecon PC_t (1..5)	Pavecon PC_l (1..5)	Bike Lane/ Pavd. Shldr. (Y/N)	Cross Sec. (C/S)	Bicycle LOS Score (1..7)	Bicycle LOS Grade (A..F)
67th Ave	Olive Ave	Mountain View Rd	1	0.5	4	U	*24,800*	*4*	40	13.0	2.7	0	0	5.0	5.0	N	C	**4.05**	D
67th Ave*	Mountain View Rd	Peoria Ave	2	0.5	4	U/D	*24,800*	*4*	40	12.8	0.0	0	0	5.0	-	N	C	**4.47**	D
67th Ave*	Peoria Ave	Cactus Rd	3	1.0	4	S	26,450	*4*	40	14.8	3.0	0	0	4.5	4.5	y	C	**3.80**	D
67th Ave*	Cactus Rd	Sweetwater Ave	4	0.5	4	U	*28,100*	*4*	40	16.0	5.0	0	0	4.0	4.0	Y	C	**3.30**	C
67th Ave*	Sweetwater Ave	Thunderbird Rd	5	0.5	4	U	*28,100*	*4*	40	14.0	3.0	0	0	4.5	4.5	Y	C	**3.97**	D
67th Ave@	Pinnacle Peak Rd	Happy Valley Rd	6	1.0	2	S	*20,018*	*10*	45	17.0	5.0	0	0	3.5	3.5	Y	S	**5.41**	E
67th Ave@	Happy Valley Rd	S of Jomax Rd	7	1.1	4	S	15,911	*4*	45	11.0	0.0	0	0	5.0	-	N	C	**4.56**	E
75th Ave	Northern Ave	Olive Ave	8	1.0	4	S	13,669	*4*	40	17.0	5.0	0	0	5.0	5.0	Y	S	**2.57**	C
75th Ave	Olive Ave	Mountain View Rd	9	0.5	4	U	14,714	*4*	40	14.2	0.0	0	0	4.0	-	N	C	**4.17**	D
75th Ave	Moutain View Rd	Peoria Ave	10	0.5	4	U	14,668	*4*	40	14.2	0.0	0	0	4.0	-	N	C	**4.17**	D
75th Ave	Peoria Ave	Cholla St	11	0.5	4	U	17,823	*4*	40	12.3	0.0	0	0	4.0	-	N	C	**4.52**	E
75th Ave	Cholla St	Cactus Rd	12	0.5	4	U	14,187	*4*	40	12.3	0.0	0	0	4.0	-	N	C	**4.40**	D
75th Ave	Cactus Rd	Sweetwater Ave	13	0.5	4	U	18,657	*4*	40	12.3	0.0	0	0	4.0	-	N	C	**4.55**	E
75th Ave	Sweetwater Ave	Acoma Dr	14	1.0	4	U	15,821	*4*	40	12.2	0.0	0	0	4.5	-	N	C	**4.37**	D
75th Ave	Acoma Dr	Greenway Rd	15	0.5	4	U	17,032	*4*	40	12.5	0.0	0	0	3.5	-	N	C	**4.63**	E
75th Ave	Greenway Rd	Bell Rd	16	0.6	4	U	16,408	*4*	40	12.5	0.0	0	0	4.5	-	N	C	**4.36**	D
83rd Ave (SB)	Northern Ave	Olive Ave	17	1.0	2	S	8,557	*3*	40	26.0	0.0	0	0	4.0	-	N	C	**1.64**	B
83rd Ave (NB)	Northern Ave	Olive Ave	17	1.0	2	S	8,557	*3*	40	11.0	0.0	0	0	4.0	-	N	C	**4.42**	D
83rd Ave	Olive Ave	S of Vogel Ave	18	0.3	2	U	6,820	*2*	35	11.0	0.0	0	0	3.5	-	N	S	**4.15**	D
83rd Ave	S of Vogel Ave	Monroe St	19	0.3	2	S	6,915	*2*	35	17.0	0.0	0	0	3.5	-	Y	C	**3.31**	C
83rd Ave	Monroe St	Peoria Ave	20	0.4	2	U	7,010	*2*	25	12.5	0.0	0	0	3.5	-	N	C	**3.62**	D
83rd Ave	Peoria Ave	Cholla St	21	0.5	4	S	12,762	*2*	30	12.6	0.0	0	0	3.0	-	N	C	**3.96**	D
83rd Ave	Cholla St	Cactus Rd	22	0.5	4	S	11,682	*3*	35	12.7	0.0	0	0	4.5	-	N	C	**3.81**	D
83rd Ave	Cactus Rd	Sweetwater Ave	23	0.5	4	U	14,635	*4*	40	12.3	0.0	0	0	3.5	-	N	C	**4.57**	E

Bicycle Level of Service Evaluation Results

Road Name	From	To	ID	Length (Ls) (mi)	Lanes (L) Th #	Lanes (L) Con	YR 2005 Roadway ADT	Tks. (HV) (%)	Post. Spd. (SP_p) mph	Width Of Pavement W_t (ft)	Width Of Pavement W_l (ft)	Width Of Pavement W_{ps} (ft)	Occ. Park. (OSPA) (%)	Pavecon PC_t (1..5)	Pavecon PC_l (1..5)	Bike Lane/ Pavd. Shldr. (Y/N)	Cross Sec. (C/S)	Bicycle LOS Score (1..7)	Bicycle LOS Grade (A..F)
83rd Ave	Sweetwater Ave	Thunderbird Rd	24	0.5	4	U	15,396	4	40	12.3	0.0	0	0	4.5	-	N	C	4.35	D
83rd Ave	Thunderbird Rd	Mariners Way	25	1.3	4	U	16,492	4	40	12.9	0.0	0	0	3.5	-	N	C	4.56	E
83rd Ave	Mariners Way	Bell Rd	26	0.7	6	D	14,174	4	40	12.0	0.0	0	0	4.0	-	N		4.24	D
83rd Ave	Union Hills Rd	Village Pkwy	27	0.5	6	S	27,037	4	40	11.4	0.0	0	0	4.5	-	N	C	4.53	E
83rd Ave	Village Pkwy	Beardsley Rd	28	0.5	6	S	27,037	4	40	11.4	0.0	0	0	4.5	-	N	C	4.53	E
83rd Ave	Lake Pleasant Pkwy	Deer Valley Rd	29	1.0	4	S	11,591	3	35	11.7	0.0	0	0	5.0	-	N	C	3.87	D
83rd Ave	Deer Valley Rd	Williams Rd	30	0.5	4	S	15,931	4	40	11.8	0.0	0	0	4.5	-	N	S	4.42	D
83rd Ave#	Williams Rd	Pinnacle Peak Rd	31	0.5	2	U	15,931	4	35	14.8	0.0	0	0	4.0	-	N	S	4.34	D
83rd Ave	Pinnacle Peak Rd	Happy Valley Rd	32	1.0	2	S	9,114	2	40	24.0	0.0	0	0	4.0	-	N	S	1.96	B
83rd Ave	Happy Valley Rd	Jomax Rd	33	1.1	2	U	7,126	6	40	12.9	0.0	0	0	4.0	-	N	S	4.86	E
91st Ave	Northern Ave	Royal Palm Rd	34	0.2	4	S	10542	4	40	12.7	0.0	0	0	4.5	-	N	C	4.10	D
91st Ave (NB)	Royal Palm Rd	Butler Dr	35	0.3	2	S	10542	4	40	15.0	0.0	0	0	4.5	-	N	C	4.14	D
91st Ave (SB)	Royal Palm Rd	Butler Dr	35	0.3	2	S	10542	4	40	17.0	0.0	0	0	4.5	-	N	C	3.82	D
91st Ave (NB)	Butler Dr	Olive Ave	36	0.5	2	U	10542	4	40	15.0	2.8	0	0	4.5	4.5	N	S	3.68	D
91st Ave (SB)	Butler Dr	Olive Ave	36	0.5	2	U	10542	4	40	11.7	0	0	0	4.5	-	N	S	4.58	E
91st Ave	Olive Ave	Peoria Ave	37	1.0	4	S	13,040	4	40	12.2	0.0	0	0	4.5	-	N	C	4.28	D
91st Ave	Peoria Ave	Grand Ave	38	0.8	4	S	10,260	4	40	13.8	0.0	0	0	4.0	-	N	C	4.05	D
91st Ave	Grand Ave	Cactus Rd	39	0.2	4	S	26,640	4	35	13.8	0.0	0	0	4.0	-	N	C	4.40	D
91st Ave (SB)	Thunderbird Rd	Greenway Rd	40	1.0	4	D	8,841	4	35	14.0	4.0	0	0	4.0	4.0	Y	C	3.17	C
91st Ave (NB)	Thunderbird Rd	Greenway Rd	40	1.0	4	D	8,841	4	35	14.0	3.0	0	0	4.0	4.0	Y	C	3.35	C
91st Ave	Greenway Rd	Bell Rd	41	1.0	4	S	8,523	4	35	12.0	0.0	0	0	4.0	-	N	C	4.06	D
91st Ave	Bell Rd	Union Hills Rd	42	1.0	4	S	11,332	4	40	12.0	0.0	0	0	4.0	-	N	C	4.33	D
91st Ave	Union Hills Rd	Beardsley Rd	43	1.0	4	S	12,487	4	40	14.0	3.5	0	0	4.0	4.0	Y	C	3.57	D
91st Ave	Beardsley Rd	Lake Pleasant Pkwy	44	0.5	4	S	7,363	3	40	12.8	0.0	0	0	4.5	-	N	C	3.69	D

Bicycle Level of Service Evaluation Results

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91st Ave	Lake Pleasant Pkwy	Deer Valley Rd	45	0.5	4	S	7,363	*3*	40	13.8	0.0	0	0	4.5	-	N	C	**3.56**	**D**
91st Ave (SB)	Deer Valley Rd	Pinnnacle Peak Rd	46	1.0	2	U	9,234	*3*	40	16.0	3.0	0	0	4.5	4.5	N	S	**3.16**	**C**
91st Ave (NB)	Deer Valley Rd	Pinnacle Peak Rd	46	1.0	2	U	9,234	*3*	40	14.0	3.0	0	0	4.5	4.5	N	C	**3.52**	**D**
91st Ave	Pinnacle Peak Rd	Happy Valley Rd	47	1.0	2	U	8,230	*3*	40	12.7	0.0	0	0	3.5	-	N	S	**4.35**	**D**
99th Ave#	Northern Ave	Olive Ave	48	1.0	2	D	1,397	*2*	35	13.8	0.0	0	0	3.0	-	N	S	**3.16**	**C**
99th Ave#	Olive Ave	Peoria Ave	49	1.0	4	D	6,065	*3*	40	20.0	0.0	0	0	4.0	-	N	C	**1.42**	**A**
99th Ave#	Peoria Ave	N of Desert Cove Ave	50	0.5	4	D	11,387	*4*	40	20.3	0.0	0	0	3.0	-	N	C	**3.32**	**C**
107th Ave	Northern Ave	Olive Ave	51	1.0	4	S	5,322	*2*	30	11.7	0.0	0	0	4.0	-	N	C	**3.31**	**C**
107th Ave (SB)	Union Hills Dr	Sack Drive	52	0.2	2	U	4,599	*3*	40	22.0	0.0	0	0	3.5	-	N		**2.43**	**B**
107th Ave (NB)	Union Hills Dr	Sack Drive	52	0.2	2	U	4,599	*3*	40	14.0	0.0	0	0	3.5	-	N		**3.87**	**D**
107th Ave	Sack Dr	Palm Tree Dr	53	0.3	2	U	4,599	*3*	40	14.0	0.0	0	0	4.5	-	N	S	**3.62**	**D**
107th Ave	Palm Tree Dr	Beardsley Rd	54	0.5	4	S	4,599	*3*	40	12.5	0.0	0	0	4.5	-	N	C	**3.47**	**C**
107th Ave	Beardsley Rd	Rose Garden Ln	55	0.5	4	S	8,352	*3*	40	12.5	0.0	0	0	4.0	-	N	C	**3.88**	**D**
107th Ave	Rose Garden Ln	Deer Valley Rd	56	0.5	4	S	*6,053*	*3*	40	13.8	0.0	0	0	4.5	-	N		**3.45**	**C**
107th Ave	Deer Valley Rd	Williams Rd	57	0.5	4	S	3,754	*3*	40	13.8	0.0	0	0	4.0	-	N	C	**3.32**	**C**
107th Ave (SB)	Williams Rd	Villa Chula	58	0.3	3	S	1,828	*3*	40	15.5	0.0	0	0	4.5	-	N	S	**2.58**	**C**
107th Ave (NB)	Williams Rd	Villa Chula	58	0.3	3	S	1,828	*3*	40	10.5	0.0	0	0	4.5	-	N	C	**3.23**	**C**
107th Ave	Villa Chula	Happy Valley Rd	59	1.5	2	S	1,792	*4*	45	17.5	5.5	0	0	4.5	4.5	Y	S	**1.83**	**B**
111th Ave	Union Hills Dr	Beardsley Rd	60	1.0	2	U	1,917	*2*	30	18.0	4.7	0	0	4.5	4.5	Y	C	**0.00**	**A**
Beardsley Rd	83rd Ave	91st Ave	62	1.0	4	S	9,867	*3*	40	12.5	0.0	0	0	5.0	-	N	C	**3.80**	**D**
Beardsley Rd	91st Ave	99th Ave	63	1.0	4	S	12,743	*4*	40	12.7	0.0	0	0	3.0	-	N	C	**4.63**	**E**
Beardsley Rd	99th Ave	Lake Pleasant Rd	64	0.4	4	S	*11,646*	*4*	40	14.0	3.0	0	0	5.0	5.0	N	S	**3.46**	**C**
Beardsley Rd	Lake Pleasant Rd	107th Ave	65	0.6	4	D	10,549	*3*	35	11.8	0.0	0	0	5.0	-	N	C	**3.81**	**D**
Beardsley Rd	107th Ave	111th Ave	66	0.5	4	D	5,022	*2*	35	11.8	0.0	0	0	5.0	-	N	C	**2.62**	**C**

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Road Name	From	To	ID	Length (Ls) (mi)	Lanes (L) Th #	Lanes (L) Con	YR 2005 Roadway ADT	Tks. (HV) (%)	Post. Spd. (SP_p) mph	Width Of Pavement W_t (ft)	Width Of Pavement W_l (ft)	Width Of Pavement W_{ps} (ft)	Occ. Park. (OSPA) (%)	Pavecon PC_t (1..5)	Pavecon PC_l (1..5)	Bike Lane/ Pavd. Shldr. (Y/N)	Cross Sec. (C/S)	Bicycle LOS Score (1..7)	Bicycle LOS Grade (A..F)
Bell Rd*	75th Ave	79th Ave	68	0.5	8	D	47,246	*5*	40	13.9	0.0	0	0	4.0	-	N	C	**4.71**	E
Bell Rd*	79th Ave	83rd Ave	69	0.5	8	D	47,246	*5*	40	13.5	0.0	0	0	4.0	-	N	C	4.76	E
Bell Rd	Loop 101	87th Ave	71	0.5	6	D	72,340	*6*	40	16.0	0.0	0	0	4.0	-	Y	C	**5.03**	E
Bell Rd	87th Ave	91st Ave	72	0.4	6	D	61,487	*6*	40	13.0	0.0	0	0	4.5	-	N	C	**5.28**	E
Cactus Rd	67th Ave	71st Ave	73	0.5	4	U	21,551	*4*	40	12.0	0.0	0	0	4.0	-	N	C	**4.66**	E
Cactus Rd	71st Ave.	75th Ave	74	0.5	4	U	21,313	*4*	40	12.0	0.0	0	0	4.0	-	N	C	**4.65**	E
Cactus Rd	75th Ave	79th Ave	75	0.5	4	U	16,512	*4*	40	12.0	0.0	0	0	4.0	-	N	C	**4.52**	E
Cactus Rd	79th Ave	83rd Ave	76	0.5	4	U	18,498	*4*	40	12.0	0.0	0	0	4.0	-	N	C	**4.58**	E
Cactus Rd	83rd Ave	87th Ave	77	0.5	4	U	13,469	*4*	40	12.0	0.0	0	0	4.0	-	N	C	**4.42**	D
Cactus Rd	87th Ave	91st Ave	78	0.5	4	U	15,932	*4*	40	12.8	0.0	0	0	4.0	-	N	C	**4.40**	D
Deer Valley Rd	75th Ave	83rd Ave	79	1.0	4	S	20,812	*4*	45	11.9	0.0	0	0	5.0	-	N	C	**4.59**	E
Deer Valley Rd	83rd Ave	91st Ave	80	1.0	2	U	14,862	*3*	35	14.2	0.0	0	0	3.5	-	N	C	4.33	D
Deer Valley Rd	91st Ave	95th Ave	81	0.5	2	U	2,747	*2*	35	10.5	0.0	0	0	4.0	-	N	C	**3.18**	C
Deer Valley Rd	Lake Pleasant Rd	105th Ave	82	0.2	2	U	242	*2*	30	15.0	0.0	0	0	4.0	-	N	S	**0.00**	A
Deer Valley Rd	105th Ave	107th Ave	83	0.4	4	S	242	*2*	30	12.5	0.0	0	0	4.0	-	N	C	**1.75**	B
Grand Ave^	Railroad Tracks	83rd Ave	84	1.6	6	D	23,000	*4*	45	10.0	0.0	0	0	5.0	-	n	c	**4.65**	E
Grand Ave^	83rd Ave	91st Ave	85	1.0	4	D	*23,000*	*4*	45	15.7	2.5	0	0	3.0	3.0	N	C	**4.18**	D
Happy Valley Rd	67th Ave	Terramar Blvd	86	1.8	4	D	3,900	*2*	35	12.0	0.0	0	0	5.0	-	N	C	**2.15**	B
Happy Valley Rd	91st Ave	Lake Pleasant Pkwy	87	1.0	2	U	7,959	*6*	40	13.5	0.0	0	0	4.5	-	N	S	**4.73**	E
Happy Valley Rd	Lake Pleasant Pkwy	107th Ave	88	1.0	4	D	*7,959*	*7*	50	17.5	5.5	0	0	4.0	4.0	Y	S	**3.29**	C
Jomax Road (WB)	67th Ave	Terramar Blvd	89	0.5	2	U	4,300	*2*	35	18.0	6.0	0	0	4.0	4.0	Y	S	**1.48**	A
Jomax Road (EB)	67th Ave	Terramar Blvd	89	1.1	2	U	4,300	*2*	35	12.0	0.0	0	0	4.0	-	N	C	**3.64**	D
Jomax Road	Terramar Blvd	75th Ave	90	1.1	2	U	4,300	*2*	35	12.0	0.0	0	0	4.0	-	N	S	**3.64**	D
Jomax Road	75th Ave	E of 83rd Ave	91	1.0	2	S	5,285	*2*	35	12.0	0.0	0	0	5.0	-	N	C/S	**3.58**	D

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Jomax Road	E of 83rd Ave	83rd Ave	92	0.1	2	S	5,285	2	35	23.0	0.0	0	0	5.0	-	N	C	1.66	B
Lake Pleasant Pkwy	Beardsley Rd	83rd Ave	93	0.4	4	D	18,758	4	40	16.3	4.5	0	0	5.0	5.0	Y	S	2.98	C
Lake Pleasant Pkwy	83rd Ave	87th Ave	94	0.4	4	D	8,191	3	40	16.0	4.0	0	0	5.0	5.0	Y	S	2.49	B
Lake Pleasant Pkwy	87th Ave	91st Ave	95	0.5	4	D	6,931	3	40	15.4	3.3	0	0	5.0	5.0	Y	S	2.35	B
Lake Pleasant Pkwy	91st Ave	95th Ave	96	0.5	4	D	1,552	3	40	15.4	3.3	0	0	5.0	5.0	Y	S	0.00	A
Lake Pleasant Rd	Beardsley Rd	Deer Valley Rd	97	1.0	2	U	6,566	3	40	13.0	0.0	0	0	4.0	-	N	S	4.04	D
Lake Pleasant Rd	Deer Valley Rd	Williams Rd	98	0.5	2	U	7,004	3	40	13.0	0.0	0	0	4.0	-	N	S	4.08	D
Lake Pleasant Pkwy	Williams Rd	Westwing Pkwy	99	3.5	4	D	7,627	7	50	18.0	5.0	0	0	5.0	5.0	Y	C	2.98	C
Lake Pleasant Rd	Westwing Pkwy	Carefree Hwy	100	4.7	2	U	5,292	7	50	14.5	0.0	0	0	4.0	-	N	S	5.05	E
Northern Ave	67th Ave	91st Ave	101	3.0	4	S	14,365	4	45	14.0	0.0	0	0	4.0	-	N	C	4.29	D
Northern Ave	91st Ave	Loop 101	102	0.7	4	D	14,263	4	45	14.0	0.0	0	0	4.0	-	N	C	4.28	D
Northern Ave	Loop 101	103rd Ave	103	0.8	4	U	14,851	4	45	11.9	0.0	0	0	4.0	-	N	S	4.58	E
Northern Ave	103rd Ave	107th Ave	104	0.5	4	S	11,510	4	45	18.0	0.0	0	0	4.0	-	N	C	3.54	D
Northern Ave	107th Ave	111th Ave	105	0.5	4	U	11,185	4	45	11.0	0.0	0	0	4.0	-	N	C/S	4.54	E
Olive Ave	67th Ave	71st Ave	106	0.5	4	U	22,421	4	45	12.0	0.0	0	0	4.0	-	N	C	4.78	E
Olive Ave	71st Ave	79th Ave	107	1.0	4	S	24,757	4	45	12.8	0.0	0	0	4.5	-	N	C	4.63	E
Olive Ave	79th Ave	83rd Ave	108	0.5	4	S	25,804	4	45	12.8	0.0	0	0	4.5	-	N	C	4.66	E
Olive Ave	83rd Ave	87th Ave	109	0.5	4	U	23,648	4	45	10.5	0.0	0	0	4.0	-	N	C	4.97	E
Olive Ave	87th Ave	91st Ave	110	0.5	4	U	24,543	4	45	10.5	0.0	0	0	4.0	-	N	C	4.99	E
Olive Ave	93rd Ave	95th Ave	112	0.3	4	U	29,355	4	45	12.9	0.0	0	0	4.0	-	N	C	4.80	E
Olive Ave#	95th Ave	99th Ave	113	0.4	4	S	26,338	4	45	12.5	0.0	0	0	3.5	-	N	C	4.95	E
Olive Ave#	99th Ave	107th Ave	114	1.0	4	S	24619	4	40	13.8	0.0	0	0	4.5	-	N	C	4.39	D
Olive Ave#	107th Ave	111th Ave	115	0.5	4	S	24,724	4	45	14.0	0.0	0	0	4.0	-	N	C	4.56	E
Peoria Ave	67th Ave	71st Ave	116	0.5	4	U/D	16,872	4	40	12.5	0.0	0	0	4.0	-	N	C	4.47	D

Bicycle Level of Service Evaluation Results

Road Name	From	To	ID	Length (Ls) (mi)	Lanes (L) Th #	Lanes (L) Con	YR 2005 Roadway ADT	Tks. (HV) (%)	Post. Spd. (SP_p) mph	Width Of Pavement W_t (ft)	Width Of Pavement W_l (ft)	Width Of Pavement W_{ps} (ft)	Occ. Park. (OSPA) (%)	Pavecon PC_t (1..5)	Pavecon PC_l (1..5)	Bike Lane/ Pavd. Shldr. (Y/N)	Cross Sec. (C/S)	Bicycle LOS Score (1..7)	Bicycle LOS Grade (A..F)
Peoria Ave	71st Ave	75th Ave	117	0.5	4	U	21,113	4	40	13.0	0.0	0	0	3.5	-	N	C	4.67	E
Peoria Ave	75th Ave	79th Ave	118	0.5	4	U	16,317	3	35	12.3	0.0	0	0	3.5	-	N	C	4.28	D
Peoria Ave	79th Ave	83rd Ave	119	0.5	4	U	15,355	3	30	12.5	0.0	0	0	3.5	-	N	C	4.08	D
Peoria Ave	83rd Ave	85th Ave	120	0.3	4	S	10,894	3	35	13.0	0.0	0	0	4.0	-	N	C	3.84	D
Peoria Ave	85th Ave	87th Ave	121	0.3	4	S	10,894	3	35	12.5	0.0	0	0	4.0	-	N		3.90	D
Peoria Ave	87th Ave	99th Ave	122	1.5	4	S	14,947	3	35	13.6	0.0	0	0	3.5	-	N	C	4.06	D
Pinnacle Peak Rd	67th Ave	72nd Ave	123	0.7	2	U	1,394	2	25	14.0	0.0	0	0	4.0	-	N	S/C	0.76	A
Pinnacle Peak Rd	77th Ave	83rd Ave	124	0.5	2	U	901	2	30	22.3	11.3	0	0	5.0	5.0	Y	S	0.00	A
Pinnacle Peak Rd#	83rd Ave	91st Ave	125	1.0	2	U	7,182	3	45	14.0	0.0	0	0	5.0	-	N	S	3.88	D
Pinnacle Peak Rd	91st Ave	Lake Pleasant Pkwy	126	1.2	2	U	4,861	4	50	14.0	0.0	0	0	4.0	-	N	S	4.17	D
Thunderbird Rd	67th Ave	81st Ave	127	0.5	4	U	25,419	4	40	12.5	0.0	0	0	4.5	-	N	C	4.58	E
Thunderbird Rd	71st Ave	75th Ave	128	0.5	4	U	24,533	4	40	12.5	0.0	0	0	5.0	-	N	C	4.50	D
Thunderbird Rd	75th Ave	79th Ave	129	0.5	4	U	26,186	4	40	12.5	0.0	0	0	5.0	-	N	C	4.53	E
Thunderbird Rd	79th Ave	83rd Ave	130	0.5	4	U	26,230	4	40	12.5	0.0	0	0	5.0	-	N	C	4.53	E
Thunderbird Rd	88th Ave	91st Ave	132	0.5	4	U	26,975	4	40	14.6	0.0	0	0	3.0	-	N	C	4.75	E
Thunderbird Rd	91st Ave	94th Ave	133	0.5	4	U	17,263	3	35	14.4	0.0	0	0	3.5	-	N	C	4.03	D
Union Hills Rd*	Loop 101	83rd Ave	134	0.1	6	D	19,956	4	40	12.0	0.0	0	0	5.0	-	N	C	4.25	D
Union Hills Rd	83rd Ave	87th Ave	135	0.5	4	U	26,776	4	40	12.6	0.0	0	0	4.5	-	N	C	4.59	E
Union Hills Rd	87th Ave	91st Ave	136	0.5	4	S	25992	4	40	12.5	0.0	0	0	4.5	-	N	C	4.59	E
Union Hills Rd	91st Ave	W of 91st Ave	137	0.2	4	S	19,957	4	40	12.5	0.0	0	0	5.0	-	N	C	4.40	D
Union Hills Rd (EB)#	107th Ave	111th Ave	138	0.5	2	U	10,459	3	30	16.0	0.0	0	0	4.5	-	N	S	3.48	C
Union Hills Rd (WB)#	107th Ave	111th Ave	138	0.5	2	U	10,459	4	30	14.5	0.0	0	0	4.5	-	N	C	3.90	D
Vistancia Blvd	City Limit	Whispering Ridge Rd	139	2.5	4	D	11,000	4	45	16.1	4.8	0	0	5.0	5.0	Y	C	2.79	C
Westwing Pkwy	Jomax Rd	Lake Pleasant Rd	140	1.8	4	D	5,545	3	40	12.0	0.0	0	0	5.0	-	N	C	3.07	C

Bicycle Level of Service Evaluation Results

Road Name	From	To	ID	Length (Ls) (mi)	Lanes (L) Th #	Lanes (L) Con	YR 2005 Roadway ADT	Tks. (HV) (%)	Post. Spd. (SP_p) mph	Width Of Pavement W_t (ft)	Width Of Pavement W_l (ft)	Width Of Pavement W_{ps} (ft)	Occ. Park. (OSPA) (%)	Pavecon PC_t (1..5)	Pavecon PC_l (1..5)	Bike Lane/ Pavd. Shldr. (Y/N)	Cross Sec. (C/S)	Bicycle LOS Score (1..7)	Bicycle LOS Grade (A..F)

LEGEND

* City of Glendale right-of-way
\# Maricopa County DOT right-of-way
@ City of Phoenix right-of-way
^ Arizona DOT right-of-way

L = Total number of through lanes
Con = Configuration of the road segment
ADT = Average Daily Traffic on the segment
HV = estimated percentage of trucks
OSPA = percentage of segment with occupied on-street parking

Segments shaded gray have asymmetrical cross-sections; an entry has been made for each direction.
Italicized numbers indicate estimates.

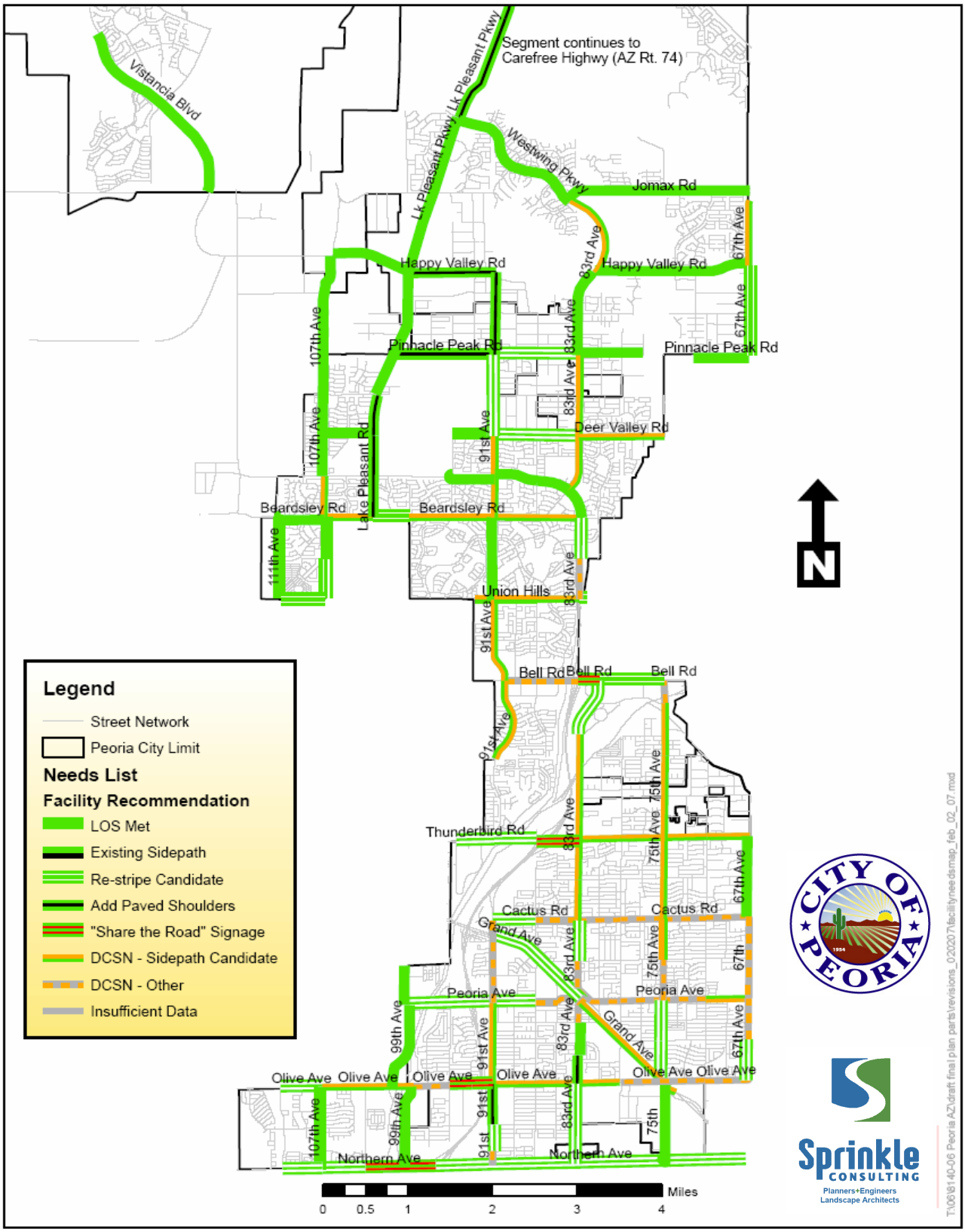
W_t= width of outside travel lane
W_l= width of striped paved shoulder/bike lane adjacent to outside travel lane
W_{ps} = width of parking lane if Wl also present
PC_t = FHWA's five point pavement surface condition rating of the travel lane ("5" is new, "1" is poor)
PC_l = FHWA's five point pavement surface condition rating of the Wl ("5" is new, "1" is poor)

APPENDIX C: FACILITY NEEDS

— Map: Inventory of On-Street Bicycling Facility Needs C-2

— Database: Needs Plan.....C-3

City of Peoria Inventory of On-Street Bicycling Facility Needs



Needs Plan

Road Name	From	To	ID	Length (Ls) (mi)	Lanes (L) Th #	Lanes (L) Con	YR 2005 Roadway ADT	Tks. (HV) (%)	Post. Spd. (SP_p) mph	Width Of Pavement W_t (ft)	Width Of Pavement W_l (ft)	Width Of Pavement W_{ps} (ft)	Occ. Park. (OSPA) (%)	Pavecon PC_t (1..5)	Pavecon PC_l (1..5)	Bike Lane/ Paved Shldr. (Y/N)	Cross Sec. (C/S)	Bicycle LOS Score (1..7)	Bicycle LOS Grade (A..F)	Recommended Strategy	Strategy Comments
67th Ave	Olive Ave	Mountain View Rd	1	0.5	4	U	*24,800*	*4*	40	13.0	2.7	0	0	5.0	5.0	N	C	**4.05**	**D**	**Re-stripe**	Restripe 11', 11' ,3.7"
67th Ave*	Mountain View Rd	Peoria Ave	2	0.5	4	U/D	*24,800*	*4*	40	12.8	0.0	0	0	5.0	-	N	C	**4.47**	**D**	**DCSN-other**	DCSN- Constrained corridor; consider shared lane symbol/signage, or signing alternate routes on local streets. Detailed study may reveal further potential.
67th Ave*	Peoria Ave	Cactus Rd	3	1.0	4	S	26,450	*4*	40	14.8	3.0	0	0	4.5	4.5	Y	C	**3.80**	**D**	**DCSN-other**	DCSN- Has bike lane but high volume,
67th Ave*	Cactus Rd	Sweetwater Ave	4	0.5	4	U	*28,100*	*4*	40	16.0	5.0	0	0	4.0	4.0	Y	C	**3.30**	**C**	**LOS met**	Target level of service met.
67th Ave*	Sweetwater Ave	Thunderbird Rd	5	0.5	4	U	*28,100*	*4*	40	14.0	3.0	0	0	4.5	4.5	Y	C	**3.97**	**D**	**LOS met**	Target level of service met.
67th Ave@	Pinnacle Peak Rd	Happy Valley Rd	6	1.0	2	S	*20,018*	*10*	45	17.0	5.0	0	0	3.5	3.5	Y	S	**5.41**	**E**	**DCSN-sidepath**	A paved shoulder currently exists, but re-striping will not achieve the target LOS; as such, a DCSN is needed.
67th Ave@	Happy Valley Rd	S of Jomax Rd	7	1.1	4	S	15,911	*4*	45	11.0	0.0	0	0	5.0	-	N	C	**4.56**	**E**	**DCSN-sidepath**	Phoenix may have planned paved path along here.
75th Ave	Northern Ave	Olive Ave	8	1.0	4	S	13,669	*4*	40	17.0	5.0	0	0	5.0	5.0	Y	S	**2.57**	**C**	**LOS met**	Target level of service met.
75th Ave	Olive Ave	Mountain View Rd	9	0.5	4	U	14,714	*4*	40	14.2	0.0	0	0	4.0	-	N	C	**4.17**	**D**	**Re-stripe**	Restripe: 11',11',4'
75th Ave	Moutain View Rd	Peoria Ave	10	0.5	4	U	14,668	*4*	40	14.2	0.0	0	0	4.0	-	N	C	**4.17**	**D**	**Re-stripe**	Restripe: 11',11',4'
75th Ave	Peoria Ave	Cholla St	11	0.5	4	U	17,823	*4*	40	12.3	0.0	0	0	4.0	-	N	C	**4.52**	**E**	**DCSN-other**	DCSN-Perhaps use frontage roads in this block as bikeway.
75th Ave	Cholla St	Cactus Rd	12	0.5	4	U	14,187	*4*	40	12.3	0.0	0	0	4.0	-	N	C	**4.40**	**D**	**DCSN-sidepath**	DCSN- Room for possible sidepath?
75th Ave	Cactus Rd	Sweetwater Ave	13	0.5	4	U	18,657	*4*	40	12.3	0.0	0	0	4.0	-	N	C	**4.55**	**E**	**DCSN-sidepath**	DCSN- Room for possible sidepath?
75th Ave	Sweetwater Ave	Acoma Dr	14	1.0	4	U	15,821	*4*	40	12.2	0.0	0	0	4.5	-	N	C	**4.37**	**D**	**DCSN-sidepath**	DCSN- Room for possible sidepath?
75th Ave	Acoma Dr	Greenway Rd	15	0.5	4	U	17,032	*4*	40	12.5	0.0	0	0	3.5	-	N	C	**4.63**	**E**	**DCSN-sidepath**	DCSN-Widen existing sidepath into sidewalk?
75th Ave	Greenway Rd	Bell Rd	16	0.6	4	U	16,408	*4*	40	12.5	0.0	0	0	4.5	-	N	C	**4.36**	**D**	**DCSN-sidepath**	DCSN-Widen existing sidepath into sidewalk?
83rd Ave (SB)	Northern Ave	Olive Ave	17	1.0	2	S	8,557	*3*	40	26.0	0.0	0	0	4.0	-	N	C	**1.64**	**B**	**Re-stripe**	Restripe to create bikelanes: 14' continuous turn lane, 12' travel lane, 5' shoulder (Dimensions derived from both directions)
83rd Ave (NB)	Northern Ave	Olive Ave	17	1.0	2	S	8,557	*3*	40	11.0	0.0	0	0	4.0	-	N	C	**4.42**	**D**	**Re-stripe**	Restripe to create bikelanes: 14' continuous turn lane, 12' travel lane, 5' shoulder (Dimensions derived from both directions)
83rd Ave	Olive Ave	S of Vogel Ave	18	0.3	2	U	6,820	*2*	35	11.0	0.0	0	0	3.5	-	N	S	**4.15**	**D**	**Add shoulders**	Add paved shoulder to allow 11' and 4'
83rd Ave	S of Vogel Ave	Monroe St	19	0.3	2	S	6,915	*2*	35	17.0	0.0	0	0	3.5	-	Y	C	**3.31**	**C**	**LOS met**	Target level of service met, already has a bike lane.
83rd Ave	Monroe St	Peoria Ave	20	0.4	2	U	7,010	*2*	25	12.5	0.0	0	0	3.5	-	N	C	**3.62**	**D**	**DCSN-other**	DCSN- Consider back-in angle parking and/or shed lane symbol
83rd Ave	Peoria Ave	Cholla St	21	0.5	4	S	12,762	*2*	30	12.6	0.0	0	0	3.0	-	N	C	**3.96**	**D**	**DCSN-other**	DCSN- Constrained corridor; consider shared lane symbol/signage, or signing alternate routes on local streets. Detailed study may reveal further potential.
83rd Ave	Cholla St	Cactus Rd	22	0.5	4	S	11,682	*3*	35	12.7	0.0	0	0	4.5	-	N	C	**3.81**	**D**	**Re-stripe**	Restripe 11',11',3'
83rd Ave	Cactus Rd	Sweetwater Ave	23	0.5	4	U	14,635	*4*	40	12.3	0.0	0	0	3.5	-	N	C	**4.57**	**E**	**DCSN-sidepath**	DCSN- Room for possible sidepath? Both sides might work.

Needs Plan

Road Name	From	To	ID	Length (Ls) (mi)	Lanes (L) Th #	Lanes (L) Con	YR 2005 Roadway ADT	Tks. (HV) (%)	Post. Spd. (SP_p) mph	Width Of Pavement W_t (ft)	Width Of Pavement W_l (ft)	Width Of Pavement W_{ps} (ft)	Occ. Park. (OSPA) (%)	Pavecon PC_t (1..5)	Pavecon PC_l (1..5)	Bike Lane/ Paved Shldr. (Y/N)	Cross Sec. (C/S)	Bicycle LOS Score (1..7)	Bicycle LOS Grade (A..F)	Recommended Strategy	Strategy Comments
83rd Ave	Sweetwater Ave	Thunderbird Rd	24	0.5	4	U	15,396	4	40	12.3	0.0	0	0	4.5	-	N	C	**4.35**	**D**	**DCSN-sidepath**	DCSN- Room for possible sidepath? More potential on east side.
83rd Ave	Thunderbird Rd	Mariners Way	25	1.3	4	U	16,492	4	40	12.9	0.0	0	0	3.5	-	N	C	**4.56**	**E**	**DCSN-sidepath**	DCSN- Room for possible sidepath? More potential on west side, south of Skunk Creek.
83rd Ave	Mariners Way	Bell Rd	26	0.7	6	D	14,174	4	40	12.0	0.0	0	0	4.0	-	N		**4.24**	**D**	**Re-stripe**	Restripe 11',11',11',3'
83rd Ave	Union Hills Rd	Village Pkwy	27	0.5	6	S	27,037	4	40	11.4	0.0	0	0	4.5	-	N	C	**4.53**	**E**	**DCSN**	DCSN in divided portion south of Village Parkway, perhaps by trimming median.
83rd Ave	Village Pkwy	Beardsley Rd	28	0.5	6	S	27,037	4	40	11.4	0.0	0	0	4.5	-	N	C	**4.53**	**E**	**Re-stripe**	Re:stripe 11',11',11', 5' (Take width from scramble lane north of Village parkway)
83rd Ave	Lake Pleasant Pkwy	Deer Valley Rd	29	1.0	4	S	11,591	3	35	11.7	0.0	0	0	5.0	-	N	C	**3.87**	**D**	**DCSN-sidepath**	DCSN- Room for possible sidepath?
83rd Ave	Deer Valley Rd	Williams Rd	30	0.5	4	S	15,931	4	40	11.8	0.0	0	0	4.5	-	N	S	**4.42**	**D**	**DCSN-sidepath**	DCSN- Room for possible sidepath? East side might be better.
83rd Ave#	Williams Rd	Pinnacle Peak Rd	31	0.5	2	U	15,931	4	35	14.8	0.0	0	0	4.0	-	N	S	**4.34**	**D**	**DCSN-sidepath**	DCSN- Room for possible sidepath? More potential on east side.
83rd Ave	Pinnacle Peak Rd	Happy Valley Rd	32	1.0	2	S	9,114	2	40	24.0	0.0	0	0	4.0	-	N	S	**1.96**	**B**	**LOS met**	Target level of service met, already has a bike lane.
83rd Ave	Happy Valley Rd	Jomax Rd	33	1.1	2	U	7,126	6	40	12.9	0.0	0	0	4.0	-	N	S	**4.86**	**E**	**DCSN-sidepath**	DCSN-Sidepath- This segment is not yet built out; it might be possible to widen shoulders on east side.
91st Ave	Northern Ave	Royal Palm Rd	34	0.2	4	S	10,542	4	40	12.7	0.0	0	0	4.5	-	N	C	**4.10**	**D**	**DCSN-other**	DCSN-This block is constrained and segmented. Study should incorporate entire block from Northern to Olive .
91st Ave (NB)	Royal Palm Rd	Butler Dr	35	0.3	2	S	10,542	4	40	15.0	0.0	0	0	4.5	-	N	C	**4.14**	**D**	**Re-stripe**	Restripe: 11,'4'
91st Ave (SB)	Royal Palm Rd	Butler Dr	35	0.3	2	S	10,542	4	40	17.0	0.0	0	0	4.5	-	N	C	**3.82**	**D**	**Re-stripe**	Resripe: 11', 6'
91st Ave (NB)	Butler Dr	Olive Ave	36	0.5	2	U	10,542	4	40	15.0	2.8	0	0	4.5	4.5	N	S	**3.68**	**D**	**Re-stripe**	Restripe: 11', 4' (other side: widen shoulder)
91st Ave (SB)	Butler Dr	Olive Ave	36	0.5	2	U	10,542	4	40	11.7	0	0	0	4.5	-	N	S	**4.58**	**E**	**Add shoulders**	Add paved shoulder to allow 12"and 4' (other side can re-stripe)
91st Ave	Olive Ave	Peoria Ave	37	1.0	4	S	13,040	4	40	12.2	0.0	0	0	4.5	-	N	C	**4.28**	**D**	**DCSN-sidepath**	DCSN- Room for possible sidepath?
91st Ave	Peoria Ave	Grand Ave	38	0.8	4	S	10,260	4	40	13.8	0.0	0	0	4.0	-	N	C	**4.05**	**D**	**DCSN-other**	DCSN-This block has realtively wide curb lanes, but not enough total width to alow re-striping.
91st Ave	Grand Ave	Cactus Rd	39	0.2	4	S	26,640	4	35	13.8	0.0	0	0	4.0	-	N	C	**4.40**	**D**	**DCSN-other**	DCSN-This block has realtively wide curb lanes, but high volumes, due to it also serving as approach to Hwy 101 ramp.
91st Ave (SB)	Thunderbird Rd	Greenway Rd	40	1.0	4	D	8,841	4	35	14.0	4.0	0	0	4.0	4.0	Y	C	**3.17**	**C**	**LOS met**	Target level of service met, already has a bike lane.
91st Ave (NB)	Thunderbird Rd	Greenway Rd	40	1.0	4	D	8,841	4	35	14.0	3.0	0	0	4.0	4.0	Y	C	**3.35**	**C**	**LOS met**	Target level of service met, already has a bike lane.
91st Ave	Greenway Rd	Bell Rd	41	1.0	4	S	8,523	4	35	12.0	0.0	0	0	4.0	-	N	C	**4.06**	**D**	**DCSN-sidepath**	DCSN- Room for possible sidepath?
91st Ave	Bell Rd	Union Hills Rd	42	1.0	4	S	11,332	4	40	12.0	0.0	0	0	4.0	-	N	C	**4.33**	**D**	**DCSN-sidepath**	DCSN- Room for possible sidepath?
91st Ave	Union Hills Rd	Beardsley Rd	43	1.0	4	S	12,487	4	40	14.0	3.5	0	0	4.0	4.0	Y	C	**3.57**	**D**	**LOS met**	Target level of service met.
91st Ave	Beardsley Rd	Lake Pleasant Pkwy	44	0.5	4	S	7,363	3	40	12.8	0.0	0	0	4.5	-	N	C	**3.69**	**D**	**DCSN-sidepath**	DCSN- Room for possible sidepath?

Needs Plan

Road Name	From	To	ID	Length (Ls) (mi)	Lanes (L) Th #	Lanes (L) Con	YR 2005 Roadway ADT	Tks. (HV) (%)	Post. Spd. (SP_p) mph	Width Of Pavement W_t (ft)	Width Of Pavement W_l (ft)	Width Of Pavement W_{ps} (ft)	Occ. Park. (OSPA) (%)	Pavecon PC_t (1..5)	Pavecon PC_l (1..5)	Bike Lane/ Paved Shldr. (Y/N)	Cross Sec. (C/S)	Bicycle LOS Score (1..7)	Bicycle LOS Grade (A..F)	Recommended Strategy	Strategy Comments
91st Ave	Lake Pleasant Pkwy	Deer Valley Rd	45	0.5	4	S	7,363	*3*	40	13.8	0.0	0	0	4.5	-	N	C	**3.56**	**D**	**DCSN-sidepath**	DCSN- Room for possible sidepath?
91st Ave (SB)	Deer Valley Rd	Pinnnacle Peak Rd	46	1.0	2	U	9,234	*3*	40	16.0	3.0	0	0	4.5	4.5	N	S	**3.16**	**C**	**Re-stripe**	Restripe: 11', 4' (Dimensions derived from both directions)
91st Ave (NB)	Deer Valley Rd	Pinnacle Peak Rd	46	1.0	2	U	9,234	*3*	40	14.0	3.0	0	0	4.5	4.5	N	C	**3.52**	**D**	**Re-stripe**	Restripe: 11', 4' (Dimensions derived from both directions)
91st Ave	Pinnacle Peak Rd	Happy Valley Rd	47	1.0	2	U	8,230	*3*	40	12.7	0.0	0	0	3.5	-	N	S	**4.35**	**D**	**Add shoulders**	Add paved shoulder to allow 12' and 4'
99th Ave#	Northern Ave	Olive Ave	48	1.0	2	D	1,397	*2*	35	13.8	0.0	0	0	3.0	-	N	S	**3.16**	**C**	**LOS met**	Target level of service met.
99th Ave#	Olive Ave	Peoria Ave	49	1.0	4	D	6,065	*3*	40	20.0	0.0	0	0	4.0	-	N	C	**1.42**	**A**	**LOS met**	Target level of service met.
99th Ave#	Peoria Ave	N of Desert Cove Ave	50	0.5	4	D	11,387	*4*	40	20.3	0.0	0	0	3.0	-	N	C	**3.32**	**C**	**LOS met**	Target level of service met.
107th Ave	Northern Ave	Olive Ave	51	1.0	4	S	5,322	*2*	30	11.7	0.0	0	0	4.0	-	N	C	**3.31**	**C**	**LOS met**	Target level of service met.
107th Ave (SB)	Union Hills Dr	Sack Drive	52	0.2	2	U	4,599	*3*	40	22.0	0.0	0	0	3.5	-	N		**2.43**	**B**	**Re-stripe**	Re-stripe with 5' bike lane
107th Ave (NB)	Union Hills Dr	Sack Drive	52	0.2	2	U	4,599	*3*	40	14.0	0.0	0	0	3.5	-	N		**3.87**	**D**	**Re-stripe**	Re-stripe 11', 3'
107th Ave	Sack Dr	Palm Tree Dr	53	0.3	2	U	4,599	*3*	40	14.0	0.0	0	0	4.5	-	N	S	**3.62**	**D**	**Re-stripe**	Re-stripe 11', 3'
107th Ave	Palm Tree Dr	Beardsley Rd	54	0.5	4	S	4,599	*3*	40	12.5	0.0	0	0	4.5	-	N	C	**3.47**	**C**	**LOS met**	Target level of service met.
107th Ave	Beardsley Rd	Rose Garden Ln	55	0.5	4	S	8,352	*3*	40	12.5	0.0	0	0	4.0	-	N	C	**3.88**	**D**	**DCSN-sidepath**	DCSN- Room for possible sidepath?
107th Ave	Rose Garden Ln	Deer Valley Rd	56	0.5	4	S	*6,053*	*3*	40	13.8	0.0	0	0	4.5	-	N		**3.45**	**C**	**LOS met**	Target level of service met.
107th Ave	Deer Valley Rd	Williams Rd	57	0.5	4	S	3,754	*3*	40	13.8	0.0	0	0	4.0	-	N	C	**3.32**	**C**	**LOS met**	Target level of service met.
107th Ave (SB)	Williams Rd	Villa Chula	58	0.3	3	S	1,828	*3*	40	15.5	0.0	0	0	4.5	-	N	S	**2.58**	**C**	**LOS met**	Target level of service met.
107th Ave (NB)	Williams Rd	Villa Chula	58	0.3	3	S	1,828	*3*	40	10.5	0.0	0	0	4.5	-	N	C	**3.23**	**C**	**LOS met**	Target level of service met.
107th Ave	Villa Chula	Happy Valley Rd	59	1.5	2	S	1,792	*4*	45	17.5	5.5	0	0	4.5	4.5	Y	S	**1.83**	**B**	**LOS met**	Target level of service met.
111th Ave	Union Hills Dr	Beardsley Rd	60	1.0	2	U	1,917	*2*	30	18.0	4.7	0	0	4.5	4.5	Y	C	**0.00**	**A**	**LOS met**	Target level of service met.
Beardsley Rd	83rd Ave	91st Ave	62	1.0	4	S	9,867	*3*	40	12.5	0.0	0	0	5.0	-	N	C	**3.80**	**D**	**DCSN-sidepath**	DCSN- Room for possible sidepath?
Beardsley Rd	91st Ave	99th Ave	63	1.0	4	S	12,743	*4*	40	12.7	0.0	0	0	3.0	-	N	C	**4.63**	**E**	**DCSN-sidepath**	DCSN- Room for possible sidepath?
Beardsley Rd	99th Ave	Lake Pleasant Rd	64	0.4	4	S	*11,646*	*4*	40	14.0	3.0	0	0	5.0	5.0	N	S	**3.46**	**C**	**Re-stripe**	Re-stripe: 11', 11', 3'
Beardsley Rd	Lake Pleasant Rd	107th Ave	65	0.6	4	D	10,549	*3*	35	11.8	0.0	0	0	5.0	-	N	C	**3.81**	**D**	**DCSN-sidepath**	DCSN- Room for possible sidepath?
Beardsley Rd	107th Ave	111th Ave	66	0.5	4	D	5,022	*2*	35	11.8	0.0	0	0	5.0	-	N	C	**2.62**	**C**	**LOS met**	Target level of service met.

Needs Plan

Road Name	From	To	ID	Length (Ls) (mi)	Lanes (L) Th #	Lanes (L) Con	YR 2005 Roadway ADT	Tks. (HV) (%)	Post. Spd. (SP_p) mph	Width Of Pavement W_t (ft)	Width Of Pavement W_l (ft)	Width Of Pavement W_{ps} (ft)	Occ. Park. (OSPA) (%)	Pavecon PC_t (1..5)	Pavecon PC_l (1..5)	Bike Lane/ Paved Shldr. (Y/N)	Cross Sec. (C/S)	Bicycle LOS Score (1..7)	Bicycle LOS Grade (A..F)	Recommended Strategy	Strategy Comments
Bell Rd*	75th Ave	79th Ave	68	0.5	8	D	47,246	*5*	40	13.9	0.0	0	0	4.0	-	N	C	**4.71**	**E**	**Re-stripe**	Re-stripe: 11',11',11',11', 5.5'
Bell Rd*	79th Ave	83rd Ave	69	0.5	8	D	47,246	*5*	40	13.5	0.0	0	0	4.0	-	N	C	**4.76**	**E**	**Re-stripe**	Re-stripe: 11',11',11',11', 5.4'
Bell Rd*	83rd Ave	Loop 101	70	0.3	Extremely poor bicycling conditions within constrained roadway (freeway ramps, underpasses, etc.)															**Share the Road signage**	"Share the Road" signage: Through turn/decel lanes and underpass.
Bell Rd	Loop 101	87th Ave	71	0.5	6	D	72,340	*6*	40	16.0	0.0	0	0	4.0	-	Y	C	**5.03**	**E**	**DCSN-other**	DCSN- Constrained corridor; consider shared lane symbol/signage, or signing alternate routes on local streets. Detailed study may reveal further potential.
Bell Rd	87th Ave.	91st Ave	72	0.4	6	D	61,487	*6*	40	13.0	0.0	0	0	4.5	-	N	C	**5.28**	**E**	**DCSN-other**	DCSN- Constrained corridor; consider shared lane symbol/signage, or signing alternate routes on local streets. Detailed study may reveal further potential.
Cactus Rd	67th Ave	71st Ave	73	0.5	4	U	21,551	*4*	40	12.0	0.0	0	0	4.0	-	N	C	**4.66**	**E**	**DCSN-other**	DCSN- Constrained corridor; consider shared lane symbol/signage, or signing alternate routes on local streets. Detailed study may reveal further potential.
Cactus Rd	71st Ave	75th Ave	74	0.5	4	U	21,313	*4*	40	12.0	0.0	0	0	4.0	-	N	C	**4.65**	**E**	**DCSN-other**	DCSN- Constrained corridor; consider shared lane symbol/signage, or signing alternate routes on local streets. Detailed study may reveal further potential.
Cactus Rd	75th Ave	79th Ave	75	0.5	4	U	16,512	*4*	40	12.0	0.0	0	0	4.0	-	N	C	**4.52**	**E**	**DCSN-other**	DCSN- Constrained corridor; consider shared lane symbol/signage, or signing alternate routes on local streets. Detailed study may reveal further potential.
Cactus Rd	79th Ave	83rd Ave	76	0.5	4	U	18,498	*4*	40	12.0	0.0	0	0	4.0	-	N	C	**4.58**	**E**	**DCSN-other**	DCSN- Constrained corridor; consider shared lane symbol/signage, or signing alternate routes on local streets. Detailed study may reveal further potential.
Cactus Rd	83rd Ave	87th Ave	77	0.5	4	U	13,469	*4*	40	12.0	0.0	0	0	4.0	-	N	C	**4.42**	**D**	**DCSN-other**	DCSN- Constrained corridor; consider shared lane symbol/signage, or signing alternate routes on local streets. Detailed study may reveal further potential.
Cactus Rd	87th Ave	91st Ave	78	0.5	4	U	15,932	*4*	40	12.8	0.0	0	0	4.0	-	N	C	**4.40**	**D**	**Re-stripe**	Restripe: 11',11',3'
Deer Valley Rd	75th Ave	83rd Ave	79	1.0	4	S	20,812	*4*	45	11.9	0.0	0	0	5.0	-	N	C	**4.59**	**E**	**DCSN-sidepath**	DCSN- Room for possible sidepath?
Deer Valley Rd	83rd Ave	91st Ave	80	1.0	2	U	14,862	*3*	35	14.2	0.0	0	0	3.5	-	N	C	**4.33**	**D**	**Re-stripe**	Re-stripe: 11', 3'
Deer Valley Rd	91st Ave.	95th Ave	81	0.5	2	U	2,747	*2*	35	10.5	0.0	0	0	4.0	-	N	C	**3.18**	**C**	**LOS met**	Target level of service met.
Deer Valley Rd	Lake Pleasant Rd	105th Ave	82	0.2	2	U	242	*2*	30	15.0	0.0	0	0	4.0	-	N	S	**0.00**	**A**	**LOS met**	Target level of service met.
Deer Valley Rd	105th Ave	107th Ave	83	0.4	4	S	242	*2*	30	12.5	0.0	0	0	4.0	-	N	C	**1.75**	**B**	**LOS met**	Target level of service met.
Grand Ave^	Railroad Tracks	83rd Ave	84	1.6	6	D	23,000	*4*	45	10.0	0.0	0	0	5.0	-	n	c	**4.65**	**E**	**DCSN-sidepath**	DCSN- Future paved path in Prost Plan along this segment.
Grand Ave^	83rd Ave	91st Ave	85	1.0	4	D	*23,000*	*4*	45	15.7	2.5	0	0	3.0	3.0	N	C	**4.18**	**D**	**Re-stripe**	Restripe: 12', 12' 4.8'; Be extra careful of requirements of U.S. Highway
Happy Valley Rd	67th Ave	Terramar Blvd	86	1.8	4	D	3,900	*2*	35	12.0	0.0	0	0	5.0	-	N	C	**2.15**	**B**	**LOS met**	Target level of service met.
Happy Valley Rd	91st Ave	Lake Pleasant Pkwy	87	1.0	2	U	7,959	*6*	40	13.5	0.0	0	0	4.5	-	N	S	**4.73**	**E**	**Add shoulders**	Add paved shoulder to allow 12' and 5'
Happy Valley Rd	Lake Pleasant Pkwy	107th Ave	88	1.0	4	D	*7,959*	*7*	50	17.5	5.5	0	0	4.0	4.0	Y	S	**3.29**	**C**	**LOS met**	Target level of service met.
Jomax Road (WB)	67th Ave	Terramar Blvd	89	0.5	2	U	4,300	*2*	35	18.0	6.0	0	0	4.0	4.0	Y	S	**1.48**	**A**	**Re-stripe**	Re-stripe: 4',11',11',4'
Jomax Road (EB)	67th Ave	Terramar Blvd	89	1.1	2	U	4,300	*2*	35	12.0	0.0	0	0	4.0	-	N	C	**3.64**	**D**	**Re-stripe**	Re-stripe: 4',11',11',4'
Jomax Road	Terramar Blvd	75th Ave	90	1.1	2	U	4,300	*2*	35	12.0	0.0	0	0	4.0	-	N	S	**3.64**	**D**	**Add shoulders**	Add paved shoulder to allow 12' and 5'

Needs Plan

Road Name	From	To	ID	Length (Ls) (mi)	Lanes (L) Th #	Lanes (L) Con	YR 2005 Roadway ADT	Tks. (HV) (%)	Post. Spd. (SP_p) mph	Width Of Pavement W_t (ft)	Width Of Pavement W_l (ft)	Width Of Pavement W_{ps} (ft)	Occ. Park. (OSPA) (%)	Pavecon PC_t (1..5)	Pavecon PC_l (1..5)	Bike Lane/ Paved Shldr. (Y/N)	Cross Sec. (C/S)	Bicycle LOS Score (1..7)	Bicycle LOS Grade (A..F)	Recommended Strategy	Strategy Comments
Jomax Road	75th Ave	E of 83rd Ave	91	1.0	2	S	5,285	2	35	12.0	0.0	0	0	5.0	-	N	C/S	**3.58**	**D**	**DCSN-other**	DCSN- A bicycle facility should be included in the cross-section when build-out occurs.
Jomax Road	E of 83rd Ave	83rd Ave	92	0.1	2	S	5,285	2	35	23.0	0.0	0	0	5.0	-	N	C	**1.66**	**B**	**LOS met**	Target level of service met.
Lake Pleasant Pkwy	Beardsley Rd	83rd Ave	93	0.4	4	D	18,758	4	40	16.3	4.5	0	0	5.0	5.0	Y	S	**2.98**	**C**	**LOS met**	Target level of service met. (Shoulder gets swallowed by turn lanes at north end of segment)
Lake Pleasant Pkwy	83rd Ave	87th Ave	94	0.4	4	D	8,191	3	40	16.0	4.0	0	0	5.0	5.0	Y	S	**2.49**	**B**	**LOS met**	Target level of service met.
Lake Pleasant Pkwy	87th Ave	91st Ave	95	0.5	4	D	6,931	3	40	15.4	3.3	0	0	5.0	5.0	Y	S	**2.35**	**B**	**LOS met**	Target level of service met.
Lake Pleasant Pkwy	91st Ave	95th Ave	96	0.5	4	D	1,552	3	40	15.4	3.3	0	0	5.0	5.0	Y	S	**0.00**	**A**	**LOS met**	Target level of service met.
Lake Pleasant Rd	Beardsley Rd	Deer Valley Rd	97	1.0	2	U	6,566	3	40	13.0	0.0	0	0	4.0	-	N	S	**4.04**	**D**	**DCSN-sidepath**	DCSN- Future paved path in Prost Plan along this segment.
Lake Pleasant Rd	Deer Valley Rd	Williams Rd	98	0.5	2	U	7,004	3	40	13.0	0.0	0	0	4.0	-	N	S	**4.08**	**D**	**Add shoulders**	Add paved shoulder to allow 12' and 4'
Lake Pleasant Pkwy	Williams Rd	Westwing Pkwy	99	3.5	4	D	7,627	7	50	18.0	5.0	0	0	5.0	5.0	Y	C	**2.98**	**C**	**LOS met**	Target level of service met, already has a bike lane.
Lake Pleasant Rd	Westwing Pkwy	Carefree Hwy	100	4.7	2	U	5,292	7	50	14.5	0.0	0	0	4.0	-	N	S	**5.05**	**E**	**Add shoulders**	Add paved shoulder to allow 12' and 5.5'
Northern Ave	67th Ave	91st Ave	101	3.0	4	S	14,365	4	45	14.0	0.0	0	0	4.0	-	N	C	**4.29**	**D**	**Re-stripe**	Re-stripe: 11', 11',3.5', This segment may be designated as a 'superstreet' by the City of Glendale.
Northern Ave	91st Ave	Loop 101	102	0.7	4	D	14,263	4	45	14.0	0.0	0	0	4.0	-	N	C	**4.28**	**D**	**Re-stripe**	Re-stripe: 11', 11', 3.5' , "Share the Road" signage as pass under Hwy 101.
Northern Ave	Loop 101	103rd Ave	103	0.8	4	U	14,851	4	45	11.9	0.0	0	0	4.0	-	N	S	**4.58**	**E**	**Share the Road signage**	"Share the Road" signage, as crossing over bridge
Northern Ave	103rd Ave	107th Ave	104	0.5	4	S	11,510	4	45	18.0	0.0	0	0	4.0	-	N	C	**3.54**	**D**	**Re-stripe**	Re-stripe with 5' bike lane
Northern Ave	107th Ave	111th Ave	105	0.5	4	U	11,185	4	45	11.0	0.0	0	0	4.0	-	N	C/S	**4.54**	**E**	**Share the Road signage**	"Share the Road" signage
Olive Ave	67th Ave	71st Ave	106	0.5	4	U	22,421	4	45	12.0	0.0	0	0	4.0	-	N	C	**4.78**	**E**	**DCSN-other**	DCSN- Constrained corridor; consider shared lane symbol/signage, or signing alternate routes on local streets. Detailed study may reveal further potential.
Olive Ave	71st Ave	79th Ave	107	1.0	4	S	24,757	4	45	12.8	0.0	0	0	4.5	-	N	C	**4.63**	**E**	**DCSN-other**	DCSN-This segment includes the bridge over Grand Avenue. Consider routing bicycles along exitramps/frontage roads that connect doen to Grand.
Olive Ave	79th Ave	83rd Ave	108	0.5	4	S	25,804	4	45	12.8	0.0	0	0	4.5	-	N	C	**4.66**	**E**	**DCSN-sidepath**	DCSN- Room for possible sidepath?
Olive Ave	83rd Ave	87th Ave	109	0.5	4	U	23,648	4	45	10.5	0.0	0	0	4.0	-	N	C	**4.97**	**E**	**DCSN-sidepath**	DCSN- Room for possible sidepath?
Olive Ave	87th Ave	91st Ave	110	0.5	4	U	24,543	4	45	10.5	0.0	0	0	4.0	-	N	C	**4.99**	**E**	**DCSN-sidepath**	DCSN- Room for possible sidepath?
Olive Ave	91st Ave	93rd Ave	111	0.2	Extremely poor bicycling conditions within constrained roadway (freeway ramps, underpasses, etc.)															**Share the Road signage**	"Share the Road" signage: Through Underpass
Olive Ave	93rd Ave	95th Ave	112	0.3	4	U	29,355	4	45	12.9	0.0	0	0	4.0	-	N	C	**4.80**	**E**	**Share the Road signage**	"Share the road" signage, possibly with loop detector and flashing warning.
Olive Ave#	95th Ave	99th Ave	113	0.4	4	S	26,338	4	45	12.5	0.0	0	0	3.5	-	N	C	**4.95**	**E**	**DCSN-other**	DCSN- Constrained corridor; consider shared lane symbol/signage, or signing alternate routes on local streets. Detailed study may reveal further potential.
Olive Ave#	99th Ave	107th Ave	114	1.0	4	S	24619	4	40	13.8	0.0	0	0	4.5	-	N	C	**4.39**	**D**	**DCSN-sidepath**	DCSN- Room for possible sidepath?

Needs Plan

Road Name	From	To	ID	Length (Ls) (mi)	Lanes (L) Th #	Lanes (L) Con	YR 2005 Roadway ADT	Tks. (HV) (%)	Post. Spd. (SP_p) mph	Width Of Pavement W_t (ft)	Width Of Pavement W_l (ft)	Width Of Pavement W_{ps} (ft)	Occ. Park. (OSPA) (%)	Pavecon PC_t (1..5)	Pavecon PC_l (1..5)	Bike Lane/ Paved Shldr. (Y/N)	Cross Sec. (C/S)	Bicycle LOS Score (1..7)	Bicycle LOS Grade (A..F)	Recommended Strategy	Strategy Comments
Olive Ave#	107th Ave	111th Ave	115	0.5	4	S	24,724	4	45	14.0	0.0	0	0	4.0	-	N	C	**4.56**	**E**	**Re-stripe**	Restripe to 11',11', 4'
Peoria Ave	67th Ave	71st Ave	116	0.5	4	U/D	16,872	4	40	12.5	0.0	0	0	4.0	-	N	C	**4.47**	**D**	**DCSN-sidepath**	DCSN- Room for possible sidepath?
Peoria Ave	71st Ave	75th Ave	117	0.5	4	U	21,113	4	40	13.0	0.0	0	0	3.5	-	N	C	**4.67**	**E**	**DCSN-other**	DCSN-Perhaps use frontage roads in this block as bikeway.
Peoria Ave	75th Ave	79th Ave	118	0.5	4	U	16,317	3	35	12.3	0.0	0	0	3.5	-	N	C	**4.28**	**D**	**DCSN-other**	DCSN- Constrained corridor; consider shared lane symbol/signage, or signing alternate routes on local streets. Detailed study may reveal further potential.
Peoria Ave	79th Ave	83rd Ave	119	0.5	4	U	15,355	3	30	12.5	0.0	0	0	3.5	-	N	C	**4.08**	**D**	**DCSN-other**	DCSN- Constrained corridor; consider shared lane symbol/signage, or signing alternate routes on local streets. Detailed study may reveal further potential.
Peoria Ave	83rd Ave	85th Ave	120	0.3	4	S	10,894	3	35	13.0	0.0	0	0	4.0	-	N	C	**3.84**	**D**	**DCSN-other**	DCSN- Constrained corridor; consider shared lane symbol/signage, or signing alternate routes on local streets. Detailed study may reveal further potential.
Peoria Ave	85th Ave	87th Ave	121	0.3	4	S	10,894	3	35	12.5	0.0	0	0	4.0	-	N		**3.90**	**D**	**DCSN-other**	DCSN- Constrained corridor; consider shared lane symbol/signage, or signing alternate routes on local streets. Detailed study may reveal further potential.
Peoria Ave	87th Ave	99th Ave	122	1.5	4	S	14,947	3	35	13.6	0.0	0	0	3.5	-	N	C	**4.06**	**D**	**Re-stripe**	Restripe : 11,11.6, 3ft; "Share the Road" signage through interchange
Pinnacle Peak Rd	67th Ave	72nd Ave	123	0.7	2	U	1,394	2	25	14.0	0.0	0	0	4.0	-	N	S/C	**0.76**	**A**	**LOS met**	Target level of service met, also site of future paved path according to PROST plan.
Pinnacle Peak Rd	77th Ave	83rd Ave	124	0.5	2	U	901	2	30	22.3	11.3	0	0	5.0	5.0	Y	S	**0.00**	**A**	**LOS met**	Target level of service met.
Pinnacle Peak Rd#	83rd Ave	91st Ave	125	1.0	2	U	7,182	3	45	14.0	0.0	0	0	5.0	-	N	S	**3.88**	**D**	**Re-stripe**	Restripe: 11', 3'
Pinnacle Peak Rd	91st Ave	Lake Pleasant Pkwy	126	1.2	2	U	4,861	4	50	14.0	0.0	0	0	4.0	-	N	S	**4.17**	**D**	**Add shoulders**	Add paved shoulder to allow 12' and 4'
Thunderbird Rd	67th Ave	71st Ave	127	0.5	4	U	25,419	4	40	12.5	0.0	0	0	4.5	-	N	C	**4.58**	**E**	**DCSN-sidepath**	DCSN- Room for possible sidepath?
Thunderbird Rd	71st Ave	75th Ave	128	0.5	4	U	24,533	4	40	12.5	0.0	0	0	5.0	-	N	C	**4.50**	**D**	**DCSN-sidepath**	DCSN- Room for possible sidepath?
Thunderbird Rd	75th Ave	79th Ave	129	0.5	4	U	26,186	4	40	12.5	0.0	0	0	5.0	-	N	C	**4.53**	**E**	**DCSN-sidepath**	DCSN- Room for possible sidepath?
Thunderbird Rd	79th Ave	83rd Ave	130	0.5	4	U	26,230	4	40	12.5	0.0	0	0	5.0	-	N	C	**4.53**	**E**	**DCSN-sidepath**	DCSN- Room for possible sidepath?
Thunderbird Rd	83rd Ave	88th Ave	131	0.5	Extremely poor bicycling conditions within constrained roadway (freeway ramps, underpasses, etc.)															**Share the Road signage**	"Share the Road" signage: Through Underpass
Thunderbird Rd	88th Ave	91st Ave	132	0.5	4	U	26,975	4	40	14.6	0.0	0	0	3.0	-	N	C	**4.75**	**E**	**Re-stripe**	Restripe: 11',11',4'
Thunderbird Rd	91st Ave	94th Ave	133	0.5	4	U	17,263	3	35	14.4	0.0	0	0	3.5	-	N	C	**4.03**	**D**	**Re-stripe**	Restripe: 11',11',4'
Union Hills Rd*	Loop 101	83rd Ave	134	0.1	6	D	19,956	4	40	12.0	0.0	0	0	5.0	-	N	C	**4.25**	**D**	**Re-stripe**	Restripe: 11', 11', 11', 3'
Union Hills Rd	83rd Ave	87th Ave	135	0.5	4	U	26,776	4	40	12.6	0.0	0	0	4.5	-	N	C	**4.59**	**E**	**DCSN-sidepath**	DCSN- Room for possible sidepath?
Union Hills Rd	87th Ave	91st Ave	136	0.5	4	S	25992	4	40	12.5	0.0	0	0	4.5	-	N	C	**4.59**	**E**	**DCSN-sidepath**	DCSN- Room for possible sidepath?
Union Hills Rd	91st Ave	W of 91st Ave	137	0.2	4	S	19,957	4	40	12.5	0.0	0	0	5.0	-	N	C	**4.40**	**D**	**DCSN-sidepath**	DCSN- Room for possible sidepath?
Union Hills Rd (EB)#	107th Ave	111th Ave	138	0.5	2	U	10,459	3	30	16.0	0.0	0	0	4.5	-	N	S	**3.48**	**C**	**Re-stripe**	Restripe: 11', 5' (Dimensions derived from both directions)

Needs Plan

Road Name	From	To	ID	Length (Ls) (mi)	Lanes (L) Th #	Lanes (L) Con	YR 2005 Roadway ADT	Tks. (HV) (%)	Post. Spd. (SP_p) mph	Width Of Pavement W_t (ft)	Width Of Pavement W_l (ft)	Width Of Pavement W_{ps} (ft)	Occ. Park. (OSPA) (%)	Pavecon PC_t (1..5)	Pavecon PC_l (1..5)	Bike Lane/ Paved Shldr. (Y/N)	Cross Sec. (C/S)	Bicycle LOS Score (1..7)	Bicycle LOS Grade (A..F)	Recommended Strategy	Strategy Comments
Union Hills Rd (WB)#	107th Ave	111th Ave	138	0.5	2	U	10,459	*4*	30	14.5	0.0	0	0	4.5	-	N	C	**3.90**	**D**	**Re-stripe**	Restripe: 11', 5' (Dimensions derived from both directions)
Vistancia Blvd	City Limit	Whispering Ridge Rd	139	2.5	4	D	11,000	*4*	45	16.1	4.8	0	0	5.0	5.0	Y	C	**2.79**	**C**	**LOS met**	Target level of service met, already has a bike lane.
Westwing Pkwy	Jomax Rd	Lake Pleasant Rd	140	1.8	4	D	5,545	*3*	40	12.0	0.0	0	0	5.0	-	N	C	**3.07**	**C**	**LOS met**	Target level of service met, will decrease as volumes rise (will be "D" if volume reaches 7500).

LEGEND

* City of Glendale right-of-way
\# Maricopa County DOT right-of-way
@ City of Phoenix right-of-way
^ Arizona DOT right-of-way

Segments shaded gray have asymmetrical cross-sections; an entry has been made for each direction.
Italicized numbers indicate estimates.

L = Total number of through lanes
Con = Configuration of the road segment
ADT = Average Daily Traffic on the segment
HV = estimated percentage of trucks
OSPA = percentage of segment with occupied on-street parking

W_t= width of outside travel lane
W_l= width of striped paved shoulder/bike lane adjacent to outside travel lane
W_{ps} = width of parking lane if Wl also present
PC_t = FHWA's five point pavement surface condition rating of the travel lane ("5" is new, "1" is poor)
PC_l = FHWA's five point pavement surface condition rating of the Wl ("5" is new, "1" is poor)

APPENDIX D: FACILITY IMPROVEMENT PRIORITIZATION LIST

— Database: Prioritization List D-2

Facility Improvement Prioritization List (Note: roadway segments not under the jurisdiction of the City of Peoria have been excluded from this list.)

Seg ID	Road Name	From	To	Length (mi)	Facility Need	Bicycle LOS	Delta LOS	LOS 100 scale	Demand Score	Votes	Votes 100 scale	Cost/mi ($)	Benefit-Cost Index	Tier	Segment Cost ($)	Cumulative Cost ($)
132	Thunderbird Rd	88th Ave	91st Ave	0.50	Re-stripe Candidate	E	1.25	65	100	3	75	8,500	943.79	I	4,250	4,250
78	Cactus Rd	87th Ave	91st Ave	0.50	Re-stripe Candidate	D	0.90	47	91	0	0	8,500	705.41	I	4,250	8,500
28	83rd Ave	Village Pkwy	Beardsley Rd	0.50	Re-stripe Candidate	E	1.03	54	64	1	25	8,500	647.80	I	4,250	12,750
105	Northern Ave	107th Ave	111th Ave	0.50	Re-stripe Candidate	E	1.04	54	55	2	50	8,500	637.94	I	4,250	17,000
122	Peoria Ave	87th Ave	99th Ave	1.50	Re-stripe Candidate	D	0.56	29	80	2	50	8,500	607.76	I	12,750	29,750
80	Deer Valley Rd	83rd Ave	91st Ave	1.00	Re-stripe Candidate	D	0.83	43	68	1	25	8,500	605.03	I	8,500	38,250
26	83rd Ave	Mariners Way	Bell Rd	0.70	Re-stripe Candidate	D	0.74	39	78	0	0	8,500	594.96	I	5,950	44,200
17	83rd Ave	Northern Ave	Olive Ave	1.00	Re-stripe Candidate	D	0.92	48	58	0	0	8,500	556.28	I	8,500	52,700
9	75th Ave	Olive Ave	Mountain View Rd	0.50	Re-stripe Candidate	D	0.67	35	68	1	25	8,500	555.76	I	4,250	56,950
10	75th Ave	Mountain View Rd	Peoria Ave	0.50	Re-stripe Candidate	D	0.67	35	68	1	25	8,500	555.76	I	4,250	61,200
35	91st Ave	Royal Palm Rd	Butler Dr	0.35	Re-stripe Candidate	D	0.64	34	73	0	0	8,500	540.63	I	2,975	64,175
22	83rd Ave	Cholla St	Cactus Rd	0.50	Re-stripe Candidate	D	0.31	16	88	0	0	8,500	509.59	I	4,250	68,425
102	Northern Ave	91st Ave	Loop 101	0.65	Re-stripe Candidate	D	0.78	41	49	1	25	8,500	500.22	I	5,525	73,950
101	Northern Ave	67th Ave	91st Ave	3.00	Re-stripe Candidate	D	0.79	41	41	0	0	8,500	436.24	I	25,500	99,450
133	Thunderbird Rd	91st Ave	94th Ave	0.45	Re-stripe Candidate	D	0.53	28	55	0	0	8,500	422.05	I	3,825	103,275
89	Jomax Rd	67th Ave	Terramar Blvd	0.50	Re-stripe Candidate	D	0.14	7	70	1	25	8,500	401.94	I	4,250	107,525
1	67th Ave	Olive Ave	Mountain View Rd	0.50	Re-stripe Candidate	D	0.55	29	45	0	0	8,500	381.15	I	4,250	111,775
46	91st Ave	Deer Valley Rd	Pinnacle Peak Rd	1.00	Re-stripe Candidate	E	0.02	1	61	1	25	8,500	322.63	I	8,500	120,275
131	Thunderbird Rd	83rd Ave	88th Ave	0.50	Share the Road Signage	N/D	0.00	0	100	3	75	20,000	237.50	I	10,000	130,275
64	Beardsley Rd	99th Ave	Lake Pleasant Rd	0.45	Re-stripe Candidate	D	0.00	0	49	0	0	8,500	230.59	I	3,825	134,100
52	107th Ave	Union Hills Dr	Sack Dr	0.20	Re-stripe Candidate	D	0.37	19	22	0	0	8,500	217.48	I	1,700	135,800
104	Northern Ave	103rd Ave	107th Ave	0.50	Re-stripe Candidate	E	0.04	2	36	0	0	8,500	181.73	I	4,250	140,050
53	107th Ave	Sack Dr	Palm Tree Dr	0.30	Re-stripe Candidate	D	0.12	6	22	0	0	8,500	140.49	I	2,550	142,600
111	Olive Ave	91st Ave	93rd Ave	0.25	Share the Road Signage	N/D	0.00	0	63	0	0	20,000	126.00	I	5,000	147,600
112	Olive Ave	93rd Ave	95th Ave	0.25	Share the Road Signage	E	0.00	0	63	0	0	20,000	126.00	I	5,000	152,600
103	Northern Ave	Loop 101	103rd Ave	0.85	Share the Road Signage	E	0.00	0	36	2	50	20,000	97.00	I	17,000	169,600
100	Lake Pleasant Rd	Westwing Pkwy	Carefree Hwy	4.70	Add Paved Shoulders	E	1.55	81	83	2	50	200,000	39.39	I	940,000	1,109,600
87	Happy Valley Rd	91st Ave	Lake Pleasant Rd	1.00	Add Paved Shoulders	E	1.23	64	82	1	25	200,000	33.75	I	200,000	1,309,600
36	91st Ave	Butler Dr	Olive Ave	0.50	Add Paved Shoulders	E	1.08	57	73	0	0	200,000	28.74	I	100,000	1,409,600
47	91st Ave	Pinnacle Peak Rd	Happy Valley Rd	1.00	Add Paved Shoulders	D	0.85	45	77	1	25	200,000	27.78	I	200,000	1,609,600
18	83rd Ave	Olive Ave	S of Vogel Ave	0.35	Add Paved Shoulders	D	0.65	34	79	0	0	200,000	24.31	I	70,000	1,679,600
126	Pinnacle Peak Rd	91st Ave	Lake Pleasant Rd	1.15	Add Paved Shoulders	D	0.67	35	64	2	50	200,000	24.07	I	230,000	1,909,600
98	Lake Pleasant Rd	Deer Valley Rd	Williams Rd	0.50	Add Paved Shoulders	D	0.58	30	51	1	25	200,000	19.04	I	100,000	2,009,600
97	Lake Pleasant Rd	Beardsley Rd	Deer Valley Rd	1.00	Add Paved Shoulders	D	0.50	26	51	1	25	200,000	17.99	I	200,000	2,209,600
90	Jomax Rd	Terramar Blvd	75th Ave	1.05	Add Paved Shoulders	D	0.14	7	70	1	25	200,000	17.08	I	210,000	2,419,600
109	Olive Ave	83rd Ave	87th Ave	0.50	DCSN - Sidepath Candidate	E	1.47	77	72	2	50	750,000	9.64	II	375,000	2,794,600
130	Thunderbird Rd	79th Ave	83rd Ave	0.50	DCSN - Sidepath Candidate	E	1.03	54	91	3	75	750,000	9.45	II	375,000	3,169,600
25	83rd Ave	Thunderbird Rd	Mariners Way	1.30	DCSN - Sidepath Candidate	E	1.06	55	97	1	25	750,000	9.21	II	975,000	4,144,600
110	Olive Ave	87th Ave	91st Ave	0.50	DCSN - Sidepath Candidate	E	1.49	78	72	0	0	750,000	9.04	II	375,000	4,519,600
33	83rd Ave	Happy Valley Rd	Jomax Rd	1.10	DCSN - Sidepath Candidate	E	1.36	71	74	1	25	750,000	9.03	II	825,000	5,344,600

Facility Improvement Prioritization List (Note: roadway segments not under the jurisdiction of the City of Peoria have been excluded from this list.)

Seg ID	Road Name	From	To	Length (mi)	Facility Need	Bicycle LOS	Delta LOS	LOS 100 scale	Demand Score	Votes	Votes 100 scale	Cost/mi ($)	Benefit-Cost Index	Tier	Segment Cost ($)	Cumulative Cost ($)
135	Union Hills Dr	83rd Ave	87th Ave	0.50	DCSN - Sidepath Candidate	E	1.09	57	65	4	100	750,000	8.60	II	375,000	5,719,600
136	Union Hills Dr	87th Ave	91st Ave	0.50	DCSN - Sidepath Candidate	E	1.09	57	65	4	100	750,000	8.60	II	375,000	6,094,600
129	Thunderbird Rd	75th Ave	79th Ave	0.50	DCSN - Sidepath Candidate	E	1.03	54	91	0	0	750,000	8.45	II	375,000	6,469,600
108	Olive Ave	79th Ave	83rd Ave	0.50	DCSN - Sidepath Candidate	E	1.16	61	66	2	50	750,000	8.24	II	375,000	6,844,600
127	Thunderbird Rd	67th Ave	71st Ave	0.50	DCSN - Sidepath Candidate	E	1.08	57	62	3	75	750,000	8.08	II	375,000	7,219,600
15	75th Ave	Acoma Dr	Greenway Rd	0.50	DCSN - Sidepath Candidate	E	1.13	59	69	1	25	750,000	7.96	II	375,000	7,594,600
79	Deer Valley Rd	75th Ave	83rd Ave	1.00	DCSN - Sidepath Candidate	E	1.09	57	71	1	25	750,000	7.92	II	750,000	8,344,600
128	Thunderbird Rd	71st Ave	75th Ave	0.50	DCSN - Sidepath Candidate	D	1.00	52	62	3	75	750,000	7.80	II	375,000	8,719,600
23	83rd Ave	Cactus Rd	Sweetwater Ave	0.50	DCSN - Sidepath Candidate	E	1.07	56	73	0	0	750,000	7.63	II	375,000	9,094,600
16	75th Ave	Greenway Rd	Bell Rd	1.00	DCSN - Sidepath Candidate	D	0.86	45	78	1	25	750,000	7.50	II	750,000	9,844,600
13	75th Ave	Cactus Rd	Sweetwater Ave	0.50	DCSN - Sidepath Candidate	E	1.05	55	62	1	25	750,000	7.30	II	375,000	10,219,600
14	75th Ave	Sweetwater Ave	Acoma Dr	1.00	DCSN - Sidepath Candidate	D	0.87	46	69	1	25	750,000	7.05	II	750,000	10,969,600
12	75th Ave	Cholla St	Cactus Rd	0.50	DCSN - Sidepath Candidate	D	0.90	47	64	1	25	750,000	6.89	II	375,000	11,344,600
24	83rd Ave	Sweetwater Ave	Thunderbird Rd	0.50	DCSN - Sidepath Candidate	D	0.85	45	73	0	0	750,000	6.86	II	375,000	11,719,600
37	91st Ave	Olive Ave	Peoria Ave	1.00	DCSN - Sidepath Candidate	D	0.78	41	77	0	0	750,000	6.83	II	750,000	12,469,600
30	83rd Ave	Deer Valley Rd	Williams Rd	0.50	DCSN - Sidepath Candidate	D	0.92	48	60	1	25	750,000	6.74	II	375,000	12,844,600
63	Beardsley Rd	91st Ave	99th Ave	1.00	DCSN - Sidepath Candidate	E	1.13	59	51	0	0	750,000	6.66	II	750,000	13,594,600
116	Peoria Ave	67th Ave	71st Ave	0.50	DCSN - Sidepath Candidate	D	0.97	51	57	0	0	750,000	6.43	II	375,000	13,969,600
41	91st Ave	Greenway Rd	Bell Rd	1.05	DCSN - Sidepath Candidate	D	0.56	29	81	0	0	750,000	6.27	II	787,500	14,757,100
42	91st Ave	Bell Rd	Union Hills Dr	1.05	DCSN - Sidepath Candidate	D	0.83	43	61	0	0	750,000	6.15	II	787,500	15,544,600
29	83rd Ave	Lake Pleasant Pkwy	Deer Valley Rd	0.70	DCSN - Sidepath Candidate	D	0.37	19	65	1	25	750,000	5.09	II	525,000	16,069,600
137	Union Hills Dr	91st Ave	W of 91st Ave	0.25	DCSN - Sidepath Candidate	D	0.90	47	34	0	0	750,000	4.95	III	187,500	16,257,100
44	91st Ave	Beardsley Rd	Lake Pleasant Pkwy	0.50	DCSN - Sidepath Candidate	D	0.19	10	72	1	25	750,000	4.84	III	375,000	16,632,100
45	91st Ave	Lake Pleasant Pkwy	Deer Valley Rd	0.50	DCSN - Sidepath Candidate	D	0.06	3	72	1	25	750,000	4.38	III	375,000	17,007,100
62	Beardsley Rd	83rd Ave	91st Ave	1.00	DCSN - Sidepath Candidate	D	0.30	16	62	0	0	750,000	4.35	III	750,000	17,757,100
72	Bell Rd	87th Ave	91st Ave	0.40	DCSN - Other	E	1.78	93	84	0	0	2,000,000	4.01	III	800,000	18,557,100
55	107th Ave	Beardsley Rd	Rose Garden Ln	0.50	DCSN - Sidepath Candidate	D	0.38	20	44	1	25	750,000	4.01	III	375,000	18,932,100
65	Beardsley Rd	Lake Pleasant Rd	107th Ave	0.60	DCSN - Sidepath Candidate	D	0.31	16	49	0	0	750,000	3.70	III	450,000	19,382,100
118	Peoria Ave	75th Ave	79th Ave	0.50	DCSN - Other	D	0.78	41	88	2	50	2,000,000	3.03	III	1,000,000	20,382,100
77	Cactus Rd	83rd Ave	87th Ave	0.50	DCSN - Other	D	0.92	48	91	0	0	2,000,000	3.02	III	1,000,000	21,382,100
76	Cactus Rd	79th Ave	83rd Ave	0.50	DCSN - Other	D	1.08	57	78	0	0	2,000,000	2.97	III	1,000,000	22,382,100
39	91st Ave	Grand Ave	Cactus Rd	0.20	DCSN - Other	D	0.90	47	81	1	25	2,000,000	2.92	III	400,000	22,782,100
75	Cactus Rd	75th Ave	79th Ave	0.50	DCSN - Other	E	1.02	53	78	0	0	2,000,000	2.90	III	1,000,000	23,782,100
119	Peoria Ave	79th Ave	83rd Ave	0.55	DCSN - Other	D	0.58	30	88	2	50	2,000,000	2.77	III	1,100,000	24,882,100
27	83rd Ave	Union Hills Dr	Village Pkwy	0.50	DCSN - Other	E	1.03	54	64	1	25	2,000,000	2.75	III	1,000,000	25,882,100
11	75th Ave	Peoria Ave	Cholla St	0.50	DCSN - Other	E	1.02	53	64	1	25	2,000,000	2.74	III	1,000,000	26,882,100
106	Olive Ave	67th Ave	71st Ave	0.50	DCSN - Other	E	1.28	67	51	0	0	2,000,000	2.70	III	1,000,000	27,882,100
117	Peoria Ave	71st Ave	75th Ave	0.50	DCSN - Other	E	1.17	61	57	0	0	2,000,000	2.67	III	1,000,000	28,882,100
107	Olive Ave	71st Ave	79th Ave	1.00	DCSN - Other	E	1.13	59	59	0	0	2,000,000	2.66	III	2,000,000	30,882,100
73	Cactus Rd	67th Ave	71st Ave	0.50	DCSN - Other	E	1.16	61	55	0	0	2,000,000	2.62	III	1,000,000	31,882,100

Facility Improvement Prioritization List (Note: roadway segments not under the jurisdiction of the City of Peoria have been excluded from this list.)

Seg ID	Road Name	From	To	Length (mi)	Facility Need	Bicycle LOS	Delta LOS	LOS 100 scale	Demand Score	Votes	Votes 100 scale	Cost/mi ($)	Benefit-Cost Index	Tier	Segment Cost ($)	Cumulative Cost ($)
74	Cactus Rd	71st Ave	75th Ave	0.50	DCSN - Other	E	1.15	60	55	0	0	2,000,000	2.61	III	1,000,000	32,882,100
38	91st Ave	Peoria Ave	Grand Ave	0.80	DCSN - Other	D	0.55	29	81	1	25	2,000,000	2.46	III	1,600,000	34,482,100
21	83rd Ave	Peoria Ave	Cholla St	0.35	DCSN - Other	D	0.46	24	88	0	0	2,000,000	2.36	III	700,000	35,182,100
121	Peoria Ave	85th Ave	87th Ave	0.25	DCSN - Other	D	0.40	21	91	0	0	2,000,000	2.34	III	500,000	35,682,100
120	Peoria Ave	83rd Ave	85th Ave	0.35	DCSN - Other	D	0.34	18	91	0	0	2,000,000	2.27	III	700,000	36,382,100
34	91st Ave	Northern Ave	Royal Palm Rd	0.15	DCSN - Other	D	0.60	31	73	0	0	2,000,000	2.25	III	300,000	36,682,100
20	83rd Ave	Monroe St	Peoria Ave	0.35	DCSN - Other	D	0.12	6	79	0	0	2,000,000	1.74	III	700,000	37,382,100
71	Bell Rd	Loop 101	87th Ave	0.50	DCSN - Other	E	0.00	0	84	0	0	2,000,000	1.68	III	1,000,000	38,382,100
91	Jomax Rd	75th Ave	E of 83rd Ave	1.00	DCSN - Other	D	0.08	4	70	1	25	2,000,000	1.63	III	2,000,000	40,382,100

APPENDIX E: ALPHABETIZED FACILITY IMPROVEMENT LIST

— Database: Alphabetized Facility Improvement List E-2

Alphabetized Facility Improvement List (Note: roadway segments not under the jurisdiction of the City of Peoria have been excluded from this list.)

Seg ID	Road Name	From	To	Length (mi)	Facility Need	Bicycle LOS	Delta LOS	LOS 100 scale	Demand Score	Votes	Votes 100 scale	Cost/mi ($)	Benefit-Cost Index	Tier	Segment Cost ($)
1	67th Ave	Olive Ave	Mountain View Rd	0.50	Re-stripe Candidate	D	0.55	29	45	0	0	8,500	381.15	I	4,250
8	75th Ave	Northern Ave	Olive Ave	1.00	LOS Met	C	0.00	0	47	0	0	LOS Met	LOS Met	N/A	LOS Met
9	75th Ave	Olive Ave	Mountain View Rd	0.50	Re-stripe Candidate	D	0.67	35	68	1	25	8,500	555.76	I	4,250
10	75th Ave	Mountain View Rd	Peoria Ave	0.50	Re-stripe Candidate	D	0.67	35	68	1	25	8,500	555.76	I	4,250
11	75th Ave	Peoria Ave	Cholla St	0.50	DCSN - Other	E	1.02	53	64	1	25	2,000,000	2.74	III	1,000,000
12	75th Ave	Cholla St	Cactus Rd	0.50	DCSN - Sidepath Candidate	D	0.90	47	64	1	25	750,000	6.89	II	375,000
13	75th Ave	Cactus Rd	Sweetwater Ave	0.50	DCSN - Sidepath Candidate	E	1.05	55	62	1	25	750,000	7.30	II	375,000
14	75th Ave	Sweetwater Ave	Acoma Dr	1.00	DCSN - Sidepath Candidate	D	0.87	46	69	1	25	750,000	7.05	II	750,000
15	75th Ave	Acoma Dr	Greenway Rd	0.50	DCSN - Sidepath Candidate	E	1.13	59	69	1	25	750,000	7.96	II	375,000
16	75th Ave	Greenway Rd	Bell Rd	1.00	DCSN - Sidepath Candidate	D	0.86	45	78	1	25	750,000	7.50	II	750,000
17	83rd Ave	Northern Ave	Olive Ave	1.00	Re-stripe Candidate	D	0.92	48	58	0	0	8,500	556.28	I	8,500
18	83rd Ave	Olive Ave	S of Vogel Ave	0.35	Add Paved Shoulders	D	0.65	34	79	0	0	200,000	24.31	I	70,000
19	83rd Ave	S of Vogel Ave	Monroe St	0.40	LOS Met	C	0.00	0	79	0	0	LOS Met	LOS Met	N/A	LOS Met
20	83rd Ave	Monroe St	Peoria Ave	0.35	DCSN - Other	D	0.12	6	79	0	0	2,000,000	1.74	III	700,000
21	83rd Ave	Peoria Ave	Cholla St	0.35	DCSN - Other	D	0.46	24	88	0	0	2,000,000	2.36	III	700,000
22	83rd Ave	Cholla St	Cactus Rd	0.50	Re-stripe Candidate	D	0.31	16	88	0	0	8,500	509.59	I	4,250
23	83rd Ave	Cactus Rd	Sweetwater Ave	0.50	DCSN - Sidepath Candidate	E	1.07	56	73	0	0	750,000	7.63	II	375,000
24	83rd Ave	Sweetwater Ave	Thunderbird Rd	0.50	DCSN - Sidepath Candidate	D	0.85	45	73	0	0	750,000	6.86	II	375,000
25	83rd Ave	Thunderbird Rd	Mariners Way	1.30	DCSN - Sidepath Candidate	E	1.06	55	97	1	25	750,000	9.21	II	975,000
26	83rd Ave	Mariners Way	Bell Rd	0.70	Re-stripe Candidate	D	0.74	39	78	0	0	8,500	594.96	I	5,950
27	83rd Ave	Union Hills Dr	Village Pkwy	0.50	DCSN - Other	E	1.03	54	64	1	25	2,000,000	2.75	III	1,000,000
28	83rd Ave	Village Pkwy	Beardsley Rd	0.50	Re-stripe Candidate	E	1.03	54	64	1	25	8,500	647.80	I	4,250
29	83rd Ave	Lake Pleasant Pkwy	Deer Valley Rd	0.70	DCSN - Sidepath Candidate	D	0.37	19	65	1	25	750,000	5.09	II	525,000
30	83rd Ave	Deer Valley Rd	Williams Rd	0.50	DCSN - Sidepath Candidate	D	0.92	48	60	1	25	750,000	6.74	II	375,000
32	83rd Ave	Pinnacle Peak Rd	Happy Valley Rd	1.00	LOS Met	B	0.00	0	67	2	50	LOS Met	LOS Met	N/A	LOS Met
33	83rd Ave	Happy Valley Rd	Jomax Rd	1.10	DCSN - Sidepath Candidate	E	1.36	71	74	1	25	750,000	9.03	II	825,000
34	91st Ave	Northern Ave	Royal Palm Rd	0.15	DCSN - Other	D	0.60	31	73	0	0	2,000,000	2.25	III	300,000
35	91st Ave	Royal Palm Rd	Butler Dr	0.35	Re-stripe Candidate	D	0.64	34	73	0	0	8,500	540.63	I	2,975
36	91st Ave	Butler Dr	Olive Ave	0.50	Add Paved Shoulders	E	1.08	57	73	0	0	200,000	28.74	I	100,000
37	91st Ave	Olive Ave	Peoria Ave	1.00	DCSN - Sidepath Candidate	D	0.78	41	77	0	0	750,000	6.83	II	750,000
38	91st Ave	Peoria Ave	Grand Ave	0.80	DCSN - Other	D	0.55	29	81	1	25	2,000,000	2.46	III	1,600,000
39	91st Ave	Grand Ave	Cactus Rd	0.20	DCSN - Other	D	0.90	47	81	1	25	2,000,000	2.92	III	400,000
40	91st Ave	Thunderbird Rd	Greenway Rd	1.00	Exist	C	0.00	0	81	1	25	Exist	Exist	N/A	Exist

Alphabetized Facility Improvement List (Note: roadway segments not under the jurisdiction of the City of Peoria have been excluded from this list.)

Seg ID	Road Name	From	To	Length (mi)	Facility Need	Bicycle LOS	Delta LOS	LOS 100 scale	Demand Score	Votes	Votes 100 scale	Cost/mi ($)	Benefit-Cost Index	Tier	Segment Cost ($)
41	91st Ave	Greenway Rd	Bell Rd	1.05	DCSN - Sidepath Candidate	D	0.56	29	81	0	0	750,000	6.27	II	787,500
42	91st Ave	Bell Rd	Union Hills Dr	1.05	DCSN - Sidepath Candidate	D	0.83	43	61	0	0	750,000	6.15	II	787,500
43	91st Ave	Union Hills Dr	Beardsley Rd	1.00	Exist	D	0.07	4	40	1	25	Exist	Exist	N/A	Exist
44	91st Ave	Beardsley Rd	Lake Pleasant Pkwy	0.50	DCSN - Sidepath Candidate	D	0.19	10	72	1	25	750,000	4.84	III	375,000
45	91st Ave	Lake Pleasant Pkwy	Deer Valley Rd	0.50	DCSN - Sidepath Candidate	D	0.06	3	72	1	25	750,000	4.38	III	375,000
46	91st Ave	Deer Valley Rd	Pinnacle Peak Rd	1.00	Re-stripe Candidate	E	0.02	1	61	1	25	8,500	322.63	I	8,500
47	91st Ave	Pinnacle Peak Rd	Happy Valley Rd	1.00	Add Paved Shoulders	D	0.85	45	77	1	25	200,000	27.78	I	200,000
51	107th Ave	Northern Ave	Olive Ave	1.00	LOS Met	C	0.00	0	40	0	0	LOS Met	LOS Met	N/A	LOS Met
52	107th Ave	Union Hills Dr	Sack Dr	0.20	Re-stripe Candidate	D	0.37	19	22	0	0	8,500	217.48	I	1,700
53	107th Ave	Sack Dr	Palm Tree Dr	0.30	Re-stripe Candidate	D	0.12	6	22	0	0	8,500	140.49	I	2,550
54	107th Ave	Palm Tree Dr	Beardsley Rd	0.50	LOS Met	C	0.00	0	22	1	25	LOS Met	LOS Met	N/A	LOS Met
55	107th Ave	Beardsley Rd	Rose Garden Ln	0.50	DCSN - Sidepath Candidate	D	0.38	20	44	1	25	750,000	4.01	III	375,000
56	107th Ave	Rose Garden Ln	Deer Valley Rd	0.50	LOS Met	C	0.00	0	44	1	25	LOS Met	LOS Met	N/A	LOS Met
57	107th Ave	Deer Valley Rd	Williams Rd	0.50	LOS Met	C	0.00	0	59	1	25	LOS Met	LOS Met	N/A	LOS Met
58	107th Ave	Williams Rd	Villa Chula	0.25	LOS Met	C	0.00	0	74	0	0	LOS Met	LOS Met	N/A	LOS Met
59	107th Ave	Villa Chula	Happy Valley Rd	1.45	Exist	B	0.00	0	74	0	0	Exist	Exist	N/A	Exist
60	111th Ave	Union Hills Dr	Beardsley Rd	1.00	Exist	A	0.00	0	14	0	0	Exist	Exist	N/A	Exist
61	Beardsley Rd	E of 83rd Ave	83rd Ave	0.25	N/D	N/D	N/D	N/D	63	0	0	N/D	N/D	N/A	N/D
62	Beardsley Rd	83rd Ave	91st Ave	1.00	DCSN - Sidepath Candidate	D	0.30	16	62	0	0	750,000	4.35	III	750,000
63	Beardsley Rd	91st Ave	99th Ave	1.00	DCSN - Sidepath Candidate	E	1.13	59	51	0	0	750,000	6.66	II	750,000
64	Beardsley Rd	99th Ave	Lake Pleasant Rd	0.45	Re-stripe Candidate	D	0.00	0	49	0	0	8,500	230.59	I	3,825
65	Beardsley Rd	Lake Pleasant Rd	107th Ave	0.60	DCSN - Sidepath Candidate	D	0.31	16	49	0	0	750,000	3.70	III	450,000
66	Beardsley Rd	107th Ave	111th Ave	0.50	LOS Met	C	0.00	0	36	0	0	LOS Met	LOS Met	N/A	LOS Met
71	Bell Rd	Loop 101	87th Ave	0.50	DCSN - Other	E	0.00	0	84	0	0	2,000,000	1.68	III	1,000,000
72	Bell Rd	87th Ave	91st Ave	0.40	DCSN - Other	E	1.78	93	84	0	0	2,000,000	4.01	III	800,000
73	Cactus Rd	67th Ave	71st Ave	0.50	DCSN - Other	E	1.16	61	55	0	0	2,000,000	2.62	III	1,000,000
74	Cactus Rd	71st Ave	75th Ave	0.50	DCSN - Other	E	1.15	60	55	0	0	2,000,000	2.61	III	1,000,000
75	Cactus Rd	75th Ave	79th Ave	0.50	DCSN - Other	E	1.02	53	78	0	0	2,000,000	2.90	III	1,000,000
76	Cactus Rd	79th Ave	83rd Ave	0.50	DCSN - Other	D	1.08	57	78	0	0	2,000,000	2.97	III	1,000,000
77	Cactus Rd	83rd Ave	87th Ave	0.50	DCSN - Other	D	0.92	48	91	0	0	2,000,000	3.02	III	1,000,000
78	Cactus Rd	87th Ave	91st Ave	0.50	Re-stripe Candidate	D	0.90	47	91	0	0	8,500	705.41	I	4,250
79	Deer Valley Rd	75th Ave	83rd Ave	1.00	DCSN - Sidepath Candidate	E	1.09	57	71	1	25	750,000	7.92	II	750,000
80	Deer Valley Rd	83rd Ave	91st Ave	1.00	Re-stripe Candidate	D	0.83	43	68	1	25	8,500	605.03	I	8,500

Alphabetized Facility Improvement List (Note: roadway segments not under the jurisdiction of the City of Peoria have been excluded from this list.)

Seg ID	Road Name	From	To	Length (mi)	Facility Need	Bicycle LOS	Delta LOS	LOS 100 scale	Demand Score	Votes	Votes 100 scale	Cost/mi ($)	Benefit-Cost Index	Tier	Segment Cost ($)
81	Deer Valley Rd	91st Ave	95th Ave	0.50	LOS Met	C	0.00	0	65	1	25	LOS Met	LOS Met	N/A	LOS Met
82	Deer Valley Rd	Lake Pleasant Rd	105th Ave	0.20	LOS Met	A	0.00	0	48	0	0	LOS Met	LOS Met	N/A	LOS Met
83	Deer Valley Rd	105th Ave	107th Ave	0.35	LOS Met	B	0.00	0	48	0	0	LOS Met	LOS Met	N/A	LOS Met
86	Happy Valley Rd	67th Ave	Terramar Blvd	1.85	LOS Met	B	0.00	0	67	1	25	LOS Met	LOS Met	N/A	LOS Met
87	Happy Valley Rd	91st Ave	Lake Pleasant Rd	1.00	Add Paved Shoulders	E	1.23	64	82	1	25	200,000	33.75	I	200,000
88	Happy Valley Rd	Lake Pleasant Rd	107th Ave	0.95	Exist	C	0.00	0	84	0	0	Exist	Exist	N/A	Exist
89	Jomax Rd	67th Ave	Terramar Blvd	0.50	Re-stripe Candidate	D	0.14	7	70	1	25	8,500	401.94	I	4,250
90	Jomax Rd	Terramar Blvd	75th Ave	1.05	Add Paved Shoulders	D	0.14	7	70	1	25	200,000	17.08	I	210,000
91	Jomax Rd	75th Ave	E of 83rd Ave	1.00	DCSN - Other	D	0.08	4	70	1	25	2,000,000	1.63	III	2,000,000
92	Jomax Rd	E of 83rd Ave	83rd Ave	0.10	Exist	B	0.00	0	70	1	25	Exist	Exist	N/A	Exist
93	Lake Pleasant Pkwy	Beardsley Rd	83rd Ave	0.40	LOS Met	C	0.00	0	65	1	25	LOS Met	LOS Met	N/A	LOS Met
94	Lake Pleasant Pkwy	83rd Ave	87th Ave	0.40	LOS Met	B	0.00	0	61	1	25	LOS Met	LOS Met	N/A	LOS Met
95	Lake Pleasant Pkwy	87th Ave	91st Ave	0.50	LOS Met	B	0.00	0	56	1	25	LOS Met	LOS Met	N/A	LOS Met
96	Lake Pleasant Pkwy	91st Ave	95th Ave	0.50	LOS Met	A	0.00	0	65	1	25	LOS Met	LOS Met	N/A	LOS Met
97	Lake Pleasant Rd	Beardsley Rd	Deer Valley Rd	1.00	Add Paved Shoulders	D	0.50	26	51	1	25	200,000	17.99	I	200,000
98	Lake Pleasant Rd	Deer Valley Rd	Williams Rd	0.50	Add Paved Shoulders	D	0.58	30	51	1	25	200,000	19.04	I	100,000
99	Lake Pleasant Pkwy	Williams Rd	Westwing Pkwy	3.50	Exist	C	0.00	0	51	1	25	Exist	Exist	N/A	Exist
100	Lake Pleasant Rd	Westwing Pkwy	Carefree Hwy	4.70	Add Paved Shoulders	E	1.55	81	83	2	50	200,000	39.39	I	940,000
101	Northern Ave	67th Ave	91st Ave	3.00	Re-stripe Candidate	D	0.79	41	41	0	0	8,500	436.24	I	25,500
102	Northern Ave	91st Ave	Loop 101	0.65	Re-stripe Candidate	D	0.78	41	49	1	25	8,500	500.22	I	5,525
103	Northern Ave	Loop 101	103rd Ave	0.85	Share the Road Signage	E	0.00	0	36	2	50	20,000	97.00	I	17,000
104	Northern Ave	103rd Ave	107th Ave	0.50	Re-stripe Candidate	E	0.04	2	36	0	0	8,500	181.73	I	4,250
105	Northern Ave	107th Ave	111th Ave	0.50	Re-stripe Candidate	E	1.04	54	55	2	50	8,500	637.94	I	4,250
106	Olive Ave	67th Ave	71st Ave	0.50	DCSN - Other	E	1.28	67	51	0	0	2,000,000	2.70	III	1,000,000
107	Olive Ave	71st Ave	79th Ave	1.00	DCSN - Other	E	1.13	59	59	0	0	2,000,000	2.66	III	2,000,000
108	Olive Ave	79th Ave	83rd Ave	0.50	DCSN - Sidepath Candidate	E	1.16	61	66	2	50	750,000	8.24	II	375,000
109	Olive Ave	83rd Ave	87th Ave	0.50	DCSN - Sidepath Candidate	E	1.47	77	72	2	50	750,000	9.64	II	375,000
110	Olive Ave	87th Ave	91st Ave	0.50	DCSN - Sidepath Candidate	E	1.49	78	72	0	0	750,000	9.04	II	375,000
111	Olive Ave	91st Ave	93rd Ave	0.25	Share the Road Signage	N/D	0.00	0	63	0	0	20,000	126.00	I	5,000
112	Olive Ave	93rd Ave	95th Ave	0.25	Share the Road Signage	E	0.00	0	63	0	0	20,000	126.00	I	5,000
116	Peoria Ave	67th Ave	71st Ave	0.50	DCSN - Sidepath Candidate	D	0.97	51	57	0	0	750,000	6.43	II	375,000
117	Peoria Ave	71st Ave	75th Ave	0.50	DCSN - Other	E	1.17	61	57	0	0	2,000,000	2.67	III	1,000,000
118	Peoria Ave	75th Ave	79th Ave	0.50	DCSN - Other	D	0.78	41	88	2	50	2,000,000	3.03	III	1,000,000

Alphabetized Facility Improvement List (Note: roadway segments not under the jurisdiction of the City of Peoria have been excluded from this list.)

Seg ID	Road Name	From	To	Length (mi)	Facility Need	Bicycle LOS	Delta LOS	LOS 100 scale	Demand Score	Votes	Votes 100 scale	Cost/mi ($)	Benefit-Cost Index	Tier	Segment Cost ($)
119	Peoria Ave	79th Ave	83rd Ave	0.55	DCSN - Other	D	0.58	30	88	2	50	2,000,000	2.77	III	1,100,000
120	Peoria Ave	83rd Ave	85th Ave	0.35	DCSN - Other	D	0.34	18	91	0	0	2,000,000	2.27	III	700,000
121	Peoria Ave	85th Ave	87th Ave	0.25	DCSN - Other	D	0.40	21	91	0	0	2,000,000	2.34	III	500,000
122	Peoria Ave	87th Ave	99th Ave	1.50	Re-stripe Candidate	D	0.56	29	80	2	50	8,500	607.76	I	12,750
123	Pinnacle Peak Rd	67th Ave	72nd Ave	0.65	LOS Met	A	0.00	0	60	0	0	LOS Met	LOS Met	N/A	LOS Met
124	Pinnacle Peak Rd	77th Ave	83rd Ave	0.75	LOS Met	A	0.00	0	77	0	0	LOS Met	LOS Met	N/A	LOS Met
126	Pinnacle Peak Rd	91st Ave	Lake Pleasant Rd	1.15	Add Paved Shoulders	D	0.67	35	64	2	50	200,000	24.07	I	230,000
127	Thunderbird Rd	67th Ave	71st Ave	0.50	DCSN - Sidepath Candidate	E	1.08	57	62	3	75	750,000	8.08	II	375,000
128	Thunderbird Rd	71st Ave	75th Ave	0.50	DCSN - Sidepath Candidate	D	1.00	52	62	3	75	750,000	7.80	II	375,000
129	Thunderbird Rd	75th Ave	79th Ave	0.50	DCSN - Sidepath Candidate	E	1.03	54	91	0	0	750,000	8.45	II	375,000
130	Thunderbird Rd	79th Ave	83rd Ave	0.50	DCSN - Sidepath Candidate	E	1.03	54	91	3	75	750,000	9.45	II	375,000
131	Thunderbird Rd	83rd Ave	88th Ave	0.50	Share the Road Signage	N/D	0.00	0	100	3	75	20,000	237.50	I	10,000
132	Thunderbird Rd	88th Ave	91st Ave	0.50	Re-stripe Candidate	E	1.25	65	100	3	75	8,500	943.79	I	4,250
133	Thunderbird Rd	91st Ave	94th Ave	0.45	Re-stripe Candidate	D	0.53	28	55	0	0	8,500	422.05	I	3,825
135	Union Hills Dr	83rd Ave	87th Ave	0.50	DCSN - Sidepath Candidate	E	1.09	57	65	4	100	750,000	8.60	II	375,000
136	Union Hills Dr	87th Ave	91st Ave	0.50	DCSN - Sidepath Candidate	E	1.09	57	65	4	100	750,000	8.60	II	375,000
137	Union Hills Dr	91st Ave	W of 91st Ave	0.25	DCSN - Sidepath Candidate	D	0.90	47	34	0	0	750,000	4.95	III	187,500
139	Vistancia Blvd	City Limit	Whispering Ridge Rd	2.50	Exist	C	0.00	0	N/D	0	0	Exist	Exist	N/A	Exist
140	Westwing Pkwy	Jomax Rd	Lake Pleasant Rd	1.80	LOS Met	C	0.00	0	79	0	0	LOS Met	LOS Met	N/A	LOS Met

APPENDIX F: PUBLIC OPEN HOUSE WORKSHOP RESPONSE MATERIALS

In the course of the Public Open House Workshop conducted at Peoria City Hall on November 2, 2006, participants were asked to give their feedback in 3 ways.

1) By filling out the survey form reproduced on pages F-2 and F-3.
2) By ranking the relative importance preliminary goals and objectives of the Bicycle Development Plan.

(Results of these first two response mechanisms are reported in relevant parts of the Bicycle Development Plan.)

3) By applying colored tape to a map of the city to show where they would like to see improved bicycling conditions. Each participant was given a length of tape that was equal to six miles on the scale of the workshop maps. These tape segments were tabulated and recorded as the "votes" in the prioritization section.

Peoria Bicycle Development Plan
Open House Workshop Response Form
November 2, 2006

Station 1: Welcome

Tell us about yourself:

_____
Name (optional)

_____
Address (optional)

_____&_____
Nearest major intersection

_____ _____ _____
City State Zip

( ) _____ _____
Home Phone (optional) E-mail Address (optional)

Male: ____ Female: ____ Age (optional): _____

_____ How long have you lived in Peoria? _____
Occupation (optional)

Tell us about how often and why you ride a bike:

Over the past year, how often have you ridden a bicycle for the following reasons?

	Never	Less than once a month	1-3 times a month	Weekly	2-6 times a week	Daily	Average distance (round trip)
Travel to Work							
Travel to Shopping							
Travel to School							
Physical Exercise							
Recreation / Social Destination							
Leisure (no specific destination)							

Peoria Bicycle Development Plan
Open House Workshop Response Form
November 2, 2006

Your Desired Destinations

Please use the table below to list attractions or destinations in Peoria that you believe would benefit from **improved bicycle connections.**

Name of Attraction or Destination	Nearest Major Intersection
	&
	&
	&
	&
	&
	&

Bicycle Parking

Please use the table below to list attractions or destinations in Peoria that you believe would benefit from **new or improved bicycle parking facilities**

Location	Nearest Major Intersection
	&
	&
	&
	&
	&
	&

Other Bicycle-Related Needs

Please use the space below to tell us about any other bicycle related needs you feel need to be improved around Peoria.