Public Hearing Draft ◆ August 2009

Anchorage Bicycle Plan

Bicycles as a Mode of Transportation

An element of the MOA Nonmotorized Transportation Plan

ANCHORAGE BIKE PLAN

Anchorage Metro Area Transportation Solutions

Anchorage Metropolitan Area Transportation Solutions
Traffic Department - Municipality of Anchorage

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CHAPTER 1

Background

Introduction

Bicycling is one of the most popular leisure activities enjoyed in Anchorage, a city with a world-class trail system boasting more than 214 miles of trails. Increasingly, bicycle travel is being embraced as a practical means of daily transportation.

Many are turning to a bicycle as their primary mode of transportation, riding bicycles to reach work, attend school, access transit, visit friends, and shop. The exercise of bicycle riding improves health and fitness, and bicyclists save money on gas and other operating expenses compared with the use of a motor vehicle.

Bicycling is recognized as an integral part of the transportation system in the chief planning document for Anchorage transportation, the *Anchorage Bowl 2025 Long-Range Transportation Plan with 2027 Revisions*[1] (2025 LRTP). Goal 6 of the 2025 LRTP is to "Provide a transportation system that provides viable transportation choices among various modes." Specifically, Goal 6 recognizes that walking, bicycling, and transit options are needed, and that they must be made accessible, attractive, and competitive with other modes of transportation to be viable.

Bicyclist using a bicycle lane

Bicycling is an important element in meeting the future transportation needs of Anchorage residents for many other reasons, including the following:

- *Affordability* – Bicycling requires only a fraction of the cost to own and operate a motor vehicle. The American Public

[1] The long-range transportation plan for Anchorage was updated in a joint effort by the Alaska Department of Transportation and Public Facilities, Municipality of Anchorage, and the Anchorage Metropolitan Area Transportation Solutions in December 2005. It was subsequently updated in 2007 to include the Knik Arm Crossing project. Titled the *Anchorage Bowl 2025 Long-Range Transportation Plan with 2027 Revisions*, this plan is referred to as 2025 LRTP.

Transportation Association estimates that the average American spends nearly $8,000 per year to own and operate an automobile.[2] Bicyclists typically spend less than $300 per year.[3] Fuel and other costs associated with operating an automobile are expected to continue to increase.

- *Reduction of traffic congestion* – The reduction in vehicle use that results from travel by bicycle helps to remove some traffic from roadways and intersections. Bicycle use is higher in summer than in other seasons, helping to relieve traffic volumes when the road network carries the greatest number of travelers.
- *Health benefits* – Bicycling provides an opportunity for routine physical activity. Recent studies have shown that Type 2 diabetes can be reduced by as much as 50 percent among people who engage in moderate physical activity, such as regularly bicycling to work.[4]

Bicyclists sharing the roadway – C Street

- *Efficient use of public space* – Approximately 10 to 12 bicycles fit into one automobile parking space.
- *Reduction in automobile emissions* – Bicycling instead of driving a car can help to improve the environment by reducing the amount of pollution in our air and water. Automobile emissions contribute to the harmful greenhouse gasses that are hastening global warming.

Purpose of the Bicycle Plan

The purpose of the Bicycle Plan is to expand the bicycle infrastructure and the use of bicycles for transportation. This plan is intended to meet the needs of bicyclists who wish to use bicycles as a form of transportation. The 508-mile comprehensive bicycle network of on- and off-street bicycle infrastructure identified in this plan would safely and comfortably connect all parts of Anchorage. This network

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[2] Source: "Public Transit Users Avoid High Gas Prices: Save Over $8,000 Per Household Annually," a news release by the American Public Transportation Association, July 31, 2008, http://www.apta.com/media/releases/080731_transit_savings.cfm.

[3] Source: "Bike to Work," a brochure prepared by League of American Bicyclists, http://www.bikeleague.org/programs/bikemonth/pdf/BTWW_Booklet.pdf.

[4] Source: "Reduction in the Incidence of Type 2 Diabetes with Lifestyle Intervention or Metformin," by the Diabetes Prevention Program Research Group, *New England Journal of Medicine,* Feb. 7, 2002, Vol. 346, pages 393-403.

provides residents and visitors with convenient access to workplaces, commercial areas, parks, schools, and other destinations throughout the Municipality of Anchorage (MOA).

Winter bicycling – C Street

Improving the physical bicycle network is not enough to make Anchorage a bicycling-friendly city. Other integral parts of the overall plan include programs to promote enforcement, safety, education, and support facilities, such as bicycle parking and signage. Users of the bicycle network should feel safe and comfortable on the roads and feel that Anchorage honors and welcomes bicycling.

The purpose of the Anchorage Bicycle Plan is consistent with the values identified in the *Anchorage 2020: Anchorage Bowl Comprehensive Plan*[5] (Anchorage 2020), specifically Policies 30, 36, 37, 54, and 55; 2025 LRTP; *Chugiak-Eagle River Comprehensive Plan;*[6] and *Chugiak-Eagle River 2027 Long-Range Transportation Plan* (C/ER LRTP).[7] One policy recommendation in the 2025 LRTP specifically directs MOA to develop a Bicycle Plan, stating:

> As part of the update of the Areawide Trails Plan (Anchorage Nonmotorized Transportation Plan), implement a commuter bicycle study to improve the quality of the bicycle environment by increasing safety in bicycle lanes, creating connectivity of multi-use trails, and educating the public about bicycle ordinances.

Although the 2025 LRTP language identifies the need for a “commuter” bicycle study, the term “utility bicycling” is better suited for use in this plan. The bicycle network is not merely for recreation or exercise. Utility bicycling encompasses any bicycling not done primarily for fitness or recreation; it is simply bicycling as a means of transport.

It is important to note that the recommendations within this plan were developed with the best planning-level information available about viability and right-of-way impacts of every proposed project. Once the design and engineering for a specific project have been started, the project manager should have some flexibility in design and scope.

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[5] In 2001, the MOA published a new comprehensive plan for the Anchorage Bowl titled *Anchorage 2020: Anchorage Bowl Comprehensive Plan*. This plan is referred to as Anchorage 2020.

[6] The Chugiak-Eagle River Comprehensive Plan was updated by the MOA on November 21, 2006.

[7] The C/ER LRTP is currently being updated by the MOA and is expected to be adopted soon.

Relevant Federal and State Requirements

Federal and state regulations establish requirements for the planning and provision of bicycle infrastructure. The Safe Accountable Flexible, Efficient Transportation Equity Act: A Legacy for Users of 2005 (SAFETEA-LU) provides federal funding for transportation projects and requires a listing of proposed bicycle infrastructure as a part of a locality's transportation plan.

Many parts of the country have begun implementing the Complete Streets Concept, which advocates design and construction to enable safe areas for all users. Local and state jurisdictions have adopted policies to create complete streets that include on-street bicycle lanes and separated pathway. A bill that would require the creation of appropriate and safe transportation facilities for all users of the road, including bicycles, as part of future investments made by state departments of transportation—such as the Alaska Department of Transportation and Public Facilities (DOT&PF)—and metropolitan planning organizations—such as the Anchorage Metropolitan Area Transportation Solutions (AMATS)—has been introduced in Congress.

Since a governor's directive in 1995, DOT&PF has funded nonmotorized facilities that include consideration for bicycling in every roadway construction project.

Previous Planning Efforts

For many years, the *Areawide Trails Plan, 1997* (ATP) has served as the guiding document for both pedestrian and bicycle infrastructure for the Anchorage Bowl, Chugiak-Eagle River, and Turnagain Arm areas. Originally developed in 1978, the ATP was extensively updated in 1997, identifying a network of existing and proposed paved and unpaved trails.

The ATP primarily focused on the recreational trail needs of Anchorage residents. It also made recommendations about facilities for specialized uses such as cross-country skiing, horseback riding, dog mushing, skijoring, and snowmobiling. The ATP recognized distinct needs of bicycle commuters and made the first attempt to identify a network of on-street bicycle routes. Given the breadth of the planning effort, however, the topics of bicycle routes on roadways and the development of an integrated bicycle network received only limited discussion.

Other documents that contain recommendations related to bicycle infrastructure include the *Anchorage Downtown Comprehensive Plan*, adopted in December 2007; *Eagle River Central Business District Revitalization Plan*, adopted in October 2003; *East Anchorage Study of Transportation Problems and Needs, Transportation Issues and Solutions Identified by the Public*, completed in August 2002; and *Spenard Commercial District Development Strategy*, completed in 1986. These documents support the goal of establishing and linking bicycle routes and bicycle lanes with commercial and recreational destinations.

Continuing Planning Efforts

To reflect the changes of the past decade in the MOA, particularly increased population growth and development, the ATP requires updating. Preparation of a new plan, the Anchorage Nonmotorized Transportation Plan, has begun. Consisting of three elements—pedestrian, bicycle, and trails plans—the Nonmotorized Transportation Plan examines, evaluates, and provides recommendations to meet the future needs for nonmotorized facilities. Each element of this plan will feature a list of prioritized projects developed by the public and will identify policies and action items to meet planning goals.

Separated pathway – Southport development in South Anchorage

Anchorage Pedestrian Plan

The first element of the Nonmotorized Transportation Plan, the Anchorage Pedestrian Plan, was adopted by the Anchorage Assembly and AMATS in October 2007. This plan identifies a prioritized list of improvements to enhance the pedestrian environment and increase opportunities to choose walking as a mode of transportation to reach school, work, and shopping.

Anchorage Bicycle Plan

The intent of the Anchorage Bicycle Plan (this document) is to integrate bicycle travel into the overall transportation planning process and promote the use of the bicycle as a legitimate means of transportation. The plan focuses on the development of a safe, connected network of bicycle infrastructure that meets the needs of the bicycling community for access to jobs, schools, and services. Implementation of the bicycle facility improvements recommended in this plan is guided by goals, policies, and action item recommendations and by analysis and identification of the physical requirements and overall needs of bicyclists.

Bicyclists on the Ship Creek Greenbelt Trail

Areawide Trails Plan

The Areawide Trails Plan is the element of the Nonmotorized Transportation Plan that will most closely reflect an update of the former ATP. It will primarily concentrate on recreational trails, including greenbelt trails and specialized trails used for activities such as cross-country skiing, horseback riding, dog mushing, skijoring, and snowmobiling, as well as recreational bicycling.

The ATP update is expected to begin in 2009.

Public Process and Plan Development

Development of the Bicycle Plan began in October 2007 with a series of public workshops. The more than 250 participants identified traveled routes, missing links, safety hazards, commuter and desired destinations, and maintenance issues. In addition, a Bicycle Focus Group, composed of a dozen active bicyclists, was formed to provide user group feedback throughout the development of the Bicycle Plan. The Bicycle Focus Group was especially helpful in identifying the initial recommended bicycle network and assisting in subsequent public workshops. Additional public input on the recommended bicycle network was obtained from a public workshop held April 28, 2008, and subsequent comments on the Bicycle Plan web site.

A public review draft of the plan was released by the AMATS Technical Committee for a 50-day review on March 16, 2009. More than 300 comments were received from members of the public, community councils, and interest and advocacy groups. This Public Hearing Draft has been revised to reflect comments on the March 2009 draft.

Bicycle Plan Goals

The following goals have been identified during development of the Bicycle Plan. These goals are of equal importance and are intended to guide the planning process as well as future implementation of the Bicycle Plan:

Overall Goal:	Double the amount of utility bicycling while reducing the number of bicycle crashes by one-third.
Goal 1:	Improve connectivity and safety of the transportation network.
Goal 2:	Establish a bicycle network that adequately responds to the transportation needs and desires of Anchorage residents.
Goal 3:	Develop and maintain a bicycle network that enhances safety by improving compatibility among bicycles and other transportation modes.
Goal 4:	Achieve greater public awareness and understanding of safe bicycling and driving practices, procedures, and skills.

Goal 5: Provide support facilities and amenities designed to enhance the bicycle network and encourage the use of bicycling as a practical transportation system.

Goal 6: Educate the public on the appropriate laws concerning bicycling.

Achieving these goals will take substantial effort on the part of the entire community; improvements to the infrastructure will not be enough. Recommended policies and actions designed to accomplish these goals are listed in Chapter 6. It is anticipated that significant progress will be made toward realizing these goals within the 20-year time frame of this plan. Monitoring implementation of the physical improvements identified in the plan as well as implementation of the policies and actions will be important means of ensuring that the plan goals are achieved.

The three most important statistics available to measure success of the plan are miles of bicycle facilities, bicycle user counts, and crash data. Continuation of the existing data collection efforts relevant to these topics is strongly encouraged in this plan.

A Guide to Terminology in the Anchorage Bicycle Plan

Abbreviations

2025 LRTP	*Anchorage Bowl 2025 Long-Range Transportation Plan with 2027 Revisions*
AASHTO	American Association of State Highway Transportation Officials
ACS	American Community Survey
ADA	Americans with Disabilities Act
AMATS	Anchorage Metropolitan Area Transportation Solutions
AMC	Anchorage Municipal Code
Anchorage 2020	*Anchorage 2020: Anchorage Bowl Comprehensive Plan*
ARRC	Alaska Railroad Corporation
ATP	*Areawide Trails Plan, 1997*
BCA	Bicycle Commuters of Anchorage
BCI	Bicycle Compatibility Index
BFC	Bicycle Friendly Community
C/ER LRTP	*Chugiak-Eagle River Long-Range Transportation Plan*
CIP	Capital Improvement Program
DOT&PF	Alaska Department of Transportation and Public Facilities
FHWA	Federal Highway Administration
ISTEA	Intermodal Surface Transportation Efficiency Act of 1991
MOA	Municipality of Anchorage
mph	miles per hour
MUTCD	*Manual of Uniform Traffic Control Devices for Streets and Highways*
OTC	Off The Chain Bicycle Collective
SAFETEA-LU	Safe Accountable, Flexible, Efficient Transportation Equity Act: A Legacy for Users, 2005
TIP	Transportation Improvement Program
UAA	University of Alaska Anchorage
UMed	University-Medical (District)

Definitions of Key Terms

Back-of-curb Pathway – A pathway built adjacent to the road that is typically 6 to 10 feet wide. Because this type of pathway is located adjacent to traffic, with no physical barriers, users are less protected from vehicles and roadway splash and grit.

Bicycle Boulevard – A shared roadway for which design has been optimized for through-going bicycle traffic and to discourage non-local motor vehicle traffic. These streets typically are local streets with low speed limits and are located parallel to higher-volume arterials

Bicycle Box – A painted rectangular traffic marking located at an intersection. This location allows bicyclists to line up to make left turns ahead of vehicles.

Bicycle Infrastructure – All physical components related to bicycle use that make up the MOA bicycle network. The infrastructure consists of bicycle lanes, paths, racks, bicycle-bus systems, and more.

Bicycle Lane – A one-way on-street facility that carries bicycle traffic in the same direction as adjacent motor vehicle traffic. A bicycle lane is typically 5 feet wide and is marked and signed for bicycle traffic.

Bicycle Route System – A system of signed bikeways designated with appropriate directional and informational route markers. Bicycle routes should establish a continuous routing, but may be a combination of any and all types of bikeways.

Bikeway – A generic term for any road, street, path, or way that in some manner is specifically designated for bicycle travel.

Greenbelt Trail – A paved trail (8 to 10 feet wide) that is typically separated from the road system and that uses tunnels and overpasses at street crossings to avoid traffic conflicts.

Mode Share - The percentage share that a particular type of transportation mode (car, bus, bicycle, or pedestrian) has in relation to other modes.

Nonmotorized Transportation – Human-powered transportation modes that include bicycle and pedestrian travel.

Paved Shoulder Bikeway – A striped, paved area located to the right of the travel lane. This area serves as a location for a vehicle break-down lane, provides for travel by pedestrians where no sidewalk/pathway facilities exist, and accommodates bicycle travel.

Pedestrian – The word encompasses the primary users of pedestrian facilities, including those who travel by wheelchair and those who walk.

Separated Pathway – A shared use pathway located along a roadway and separated from traffic; also referred to as a "multi-use pathway." This type of facility is 8 to 10 feet wide to allow bicycles, pedestrians, and other nonmotorized users to pass. The recommended separation from the roadway is 7 feet (a minimum of 5 feet).

Shared Road Facility – A road without separate facilities for bicycles (bicycle lanes or shoulder bikeways). Bicyclists and vehicles must share the space.

Shared Use Pathway – A pathway intended to accommodate various types of nonmotorized users, including walkers, bicyclists, in-line skaters, skiers, and equestrians; also referred to as a "multi-use pathway." See also separated pathway definition.

Definitions of Key Terms (continued)

Sidewalk – A paved surface that is within a vehicular right-of-way, aligned with a road, and constructed either adjacent to the curb or separated from the curb for use by pedestrians. Compared to a separated pathway, a sidewalk is typically narrower (standard width of 5 feet) and is intended primarily for walking.

Signed Bicycle Route – A local street with signs for bicycle use that primarily serves as a connector between other parts of the bicycle system.

Sweep – A design feature that moves the separated pathway to the front of the stop bar on intersections so that pathway users are visible to traffic.

Trail – An access route for nonmotorized travel typically located in a greenbelt and consisting of a stable surface, either pavement or compacted granular fill. For purposes of this Bicycle Plan, a trail is usually *not* aligned with a road.

Utility Bicycling – Bicycling by commuters and others who use bicycles to meet their daily transportation needs. Utility bicycling encompasses any bicycling not done primarily for fitness or recreation; it is simply bicycling as a means of transport.

Wide Curb Lane – A lane abutting the curb that is typically 14 feet wide. It can accommodate bicyclists and is sometimes designated for bicycle use when right-of-way constraints preclude the installation of “full-width” bicycle lanes. Striping is not required, unless the lane is 15 feet or wider.

CHAPTER 2

Existing Conditions and Issues

This chapter describes the current bicycle network; provides information about bicyclists, including crash statistics; and identifies deficiencies of the bicycle network. The discussion about existing conditions and issues also covers other factors affecting the bicycle network in Anchorage: laws, education, and maintenance.

Existing Anchorage Bicycle Network

Cyclists on the Ship Creek Greenbelt Trail. (*Photo courtesy of Chris Arend*)

The existing Anchorage bicycle network relies primarily on a system of pathways and greenbelt trails. The backbone of this system is the greenbelt trails that follow the major stream corridors of the Anchorage Bowl, including Chester Creek, Campbell Creek, and Ship Creek. The Coastal Trail extends this network along a major part of the Cook Inlet coastline. A small number of on-street bicycle lanes and signed bikeways also link into the overall system. Figure 1 is a map of the current bicycle infrastructure, and Table 1 identifies the lengths of these bicycle facilities.

On-Street Bicycle Infrastructure

Current on-street facilities in Anchorage consist of bicycle lanes, on-street bicycle routes, and paved roadway shoulders. On-street bicycle lanes are fairly rare in Anchorage and nonexistent in Chugiak-Eagle River and Girdwood. The existing signed and marked on-street bicycle lanes in Anchorage are found at these locations:

- Southport, between 100th Avenue and Klatt Road
- Elmore Road, between Tudor Road and Abbott Road

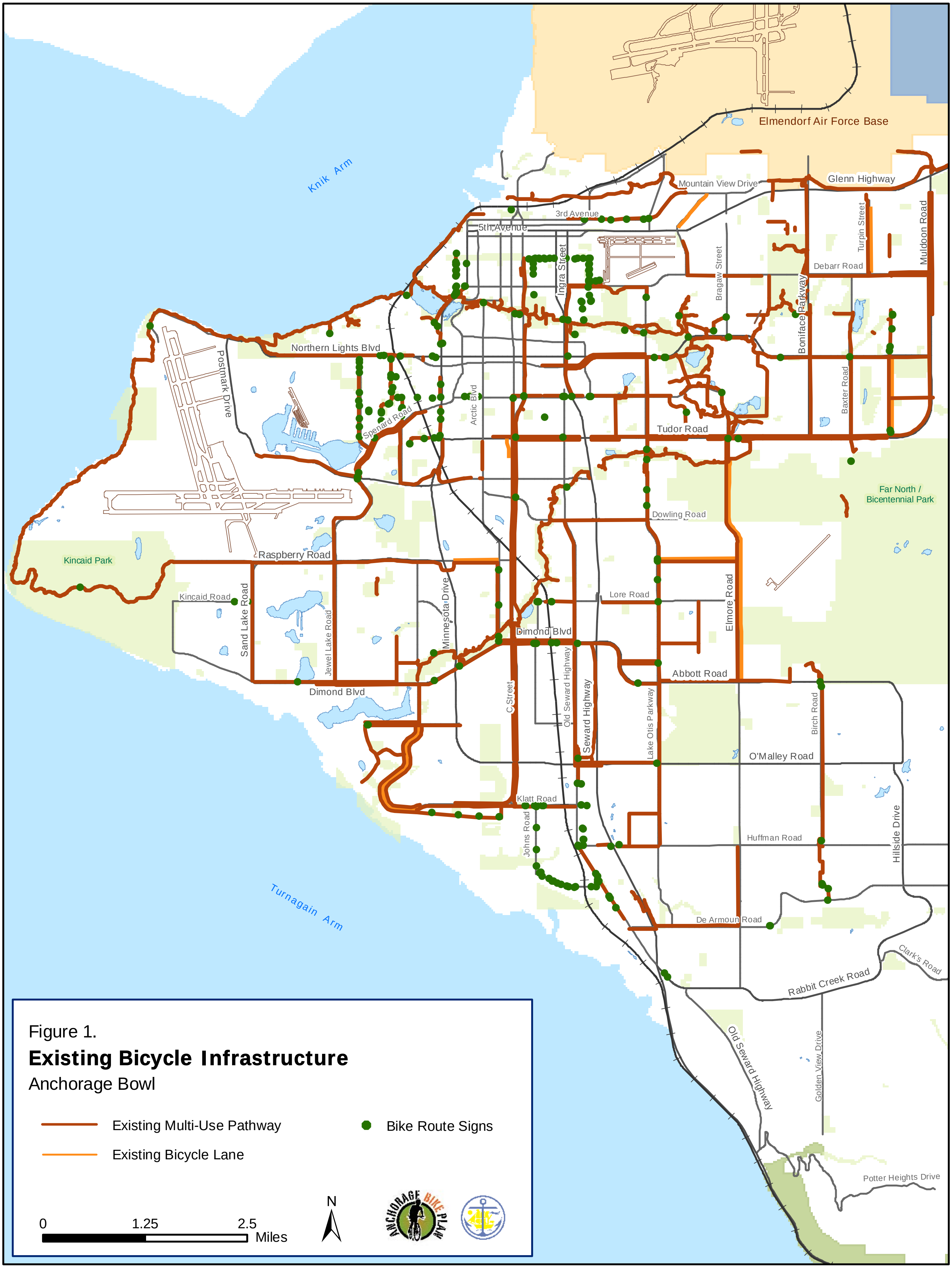


Figure 1.

Existing Bicycle Infrastructure

Anchorage Bowl

- 68th Avenue, between Lake Otis Parkway and Elmore Road
- Business Park Boulevard, between Tudor Road and 48th Avenue
- Raspberry Road, between Minnesota Drive and Arctic Boulevard
- Patterson Street, between Tudor Road and Northern Lights Boulevard

Table 1. Existing Bicycle Infrastructure

Facility Type	Miles
Bicycle lanes	8.1
Multi-use pathways	166.4
Signed, shared roadways	2.4
Greenbelt trails	37.8
Total network	**214.7**

- Turpin Street, between Debarr Road and Boundary Road
- Mountain View Drive, north of the Glenn Highway
- Cordova Street, 9th Avenue to 15th Avenue (currently a two-way facility that will be upgraded to have bicycle lanes on both sides of the road)

Existing bicycle lanes total 8.1 miles and comprise less than 4 percent of the total bicycle infrastructure in Anchorage.

Many existing roadways with widened shoulders and wide curb lanes offer adequate space for bicycle use but are not signed or marked as bicycle lanes. During design, these shoulders typically were included to function as snow storage or break-down lanes, but many currently now function as informal bicycle lanes. Although not currently part of the recognized, existing bicycle system many of these facilities, with the inclusion of signage and lane striping, could be incorporated into the bicycle network. The following are examples of roadways with widened shoulders or wide curb lanes:

- Arctic Boulevard, between 36th Avenue and Benson Boulevard
- Elmore Road, between Huffman Road and O'Malley Road
- Tudor Road, between Minnesota Drive and Business Park Boulevard
- DeArmoun Road, between Seward Highway and 140th Avenue
- C Street, between O'Malley Road and Northern Lights Boulevard

Separated Bicycle Infrastructure

Separated bicycle infrastructure includes both greenbelt trails and separated pathways along roadways. The total inventories of standard-width (8 feet or wider), separated bicycle infrastructure currently available in Anchorage and Chugiak-Eagle River are 204.2 miles and 26.5 miles, respectively.

Bicyclists on a separated pathway – Lake Otis Parkway

Many of these paths are not identified with signs as part of the bicycle route system and may not be appropriately designated as part of the proposed bicycle network because of the number of intersection and driveway conflicts.

Separated Pathways

A separated pathway is a shared-use facility (traveled by bicyclists as well as pedestrians, in-line skaters, and other nonmotorized users) that runs parallel but separated at a distance of 5 to 7 feet from a roadway. Most roadways offer a shared-use pathway on only one side of the road, necessitating the need for two-way travel by bicyclists on shared-use pathways.

The separation serves to create a buffer from sprays and splashes of vehicles, as well as provide a physical buffer from the road. The area between a separated pathway and a roadway also allows for snow storage in winter months. In practice, however, separated pathways are often used for snow storage in winter, especially those that do not meet the recommended separation distance from the curb. An example is the pathway on the south side of 15th Avenue at Merrill Field. Although use of the pathways for snow storage may be necessary as a temporary solution during the performance of maintenance activities, snow often is left on the pathways for several days or more.

Greenbelt Trails

With a few exceptions, greenbelt trails are completely separated from the road system. Separated crossings such as tunnels and overpasses at street and railroad crossings are used to avoid safety conflicts.

Signed Bicycle Routes

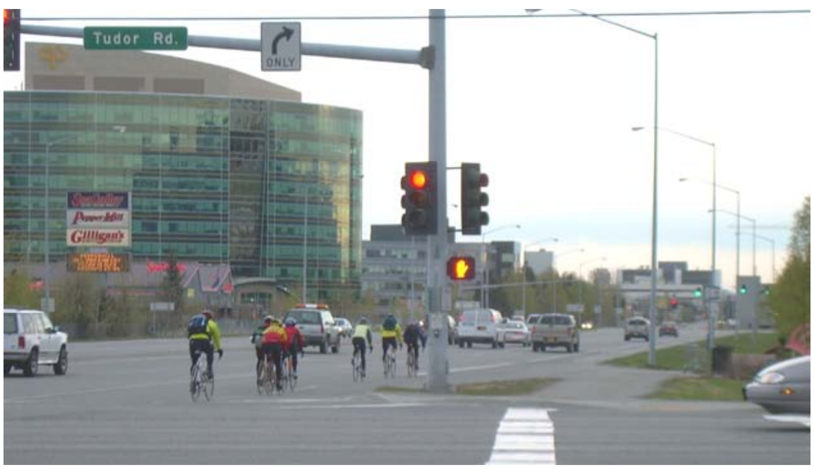
In addition to the separated multi-use paths and on-street bicycle lanes, the on-street bicycle infrastructure in Anchorage includes signed bicycle routes. The signs guide bicyclists in identifying local streets that are preferred routes for bicycle travel. Signed bicycle routes provide continuity between different parts of the bicycle network. These routes do not have marked roadway lanes; instead, bicyclists are expected to share the street with motor vehicles. Such streets typically have low traffic volumes and vehicle speeds. Existing signed bicycle routes are included in Figure 1, Existing Bicycle Infrastructure.

What We Know About Bicycling in Anchorage

To effectively analyze the issues and provide sound recommendations for the existing bicycle system, several key topics were analyzed. Information gathered provided insights about the role of bicycle trips in meeting Anchorage transportation needs, characteristics of bicycle users, where bicyclists are going, the reasons why bicyclists travel, and types of bicycle trips. The causes of bicycle-vehicle crashes also were studied. The findings pertaining to these issues are discussed below.

The Role of Bicycle Trips in the Anchorage Transportation System

Bicycling is not just a major recreational activity in Anchorage; it is also one of the four basic modes of transportation available in Anchorage. The other modes are motor vehicle, transit, and walking. Although this plan recognizes the needs of recreational bicyclists, it focuses largely on improvements for those who practice utility bicycling—commuters and others who use bicycles to meet their daily transportation needs. With rising fuel costs, utility bicycling could become a more prominent transportation choice in the future. Recreational bicyclists may be more inclined to use greenbelt trails to be removed from conflicts with traffic.



Cyclists traveling northbound on paved shoulder – C Street at Tudor Road.

The 2002 Anchorage Household Survey[8] reported approximately 11,500 daily bicycle trips for all purposes, roughly similar to the number of transit trips. The bicycle share of travel equates to about 1 percent of all trips. Conducted during early spring (April and May), this survey probably underreports summertime bicycle use. According to the same survey, about 621 out of 1,293 Anchorage households surveyed (48 percent) reported riding bicycles the previous summer.

How does bicycling in Anchorage compare to bicycling in other parts of the country? Despite the long winters, it appears that Anchorage has a higher than average bicycle use.

[8] The results of this survey by NuStats for the MOA were published in the report *Municipality of Anchorage Household Travel Survey: Technical Report of Methods*, September 26, 2002, and are available at http://www.surveyarchive.org/Anchorage/Final%20methods%20report.pdf.

According to the American Community Survey (ACS) findings for 2006,[9] 1.02 percent of all work trips in Anchorage were made by bicycle. Nationwide only about 0.4 percent of work trips for the same period were made by bicycle. In major cities the bicycle mode share for commute trips increased to 0.68 percent.

Although Anchorage appears to have a higher than average rate of bicycle ridership, the rate is significantly below that achieved in other cities. According to ACS data for 2006, the highest rates of bicycling to work occur in Portland, Oregon (3.4 percent); Minneapolis, Minnesota (2.4 percent); and Seattle, Washington (2.3 percent). Of particular interest is the high rate in Minneapolis, a city with a winter climate similar to that of Anchorage.

A 2008 Sundance Channel film, "Big Ideas for a Small Planet – Transport,"[10] reported that 6 percent of commuters in Portland, Oregon, primarily bicycled to work. The City of Portland reports a total of 275 miles of developed bikeways (bicycle lanes, paths, boulevards) and plans to add 110 miles of bicycle boulevard miles to the existing system.[11]

Data from Bike-to-Work Day

The potential for increases in Anchorage bicycle ridership is shown in the statistics collected in conjunction with the 2007 and 2008 Bike-to-Work Day events. The annual Bike-to-Work Day event in Anchorage is sponsored by MOA Health Department as part of a nationwide effort.[12]

Bike to Work Day bicyclists – Chester Creek Trail

On May 15, 2007 and 2008, volunteers manually counted the

[9] The ACS data were developed from year-round samples and may more accurately reflect bicycle travel than results of the Anchorage Household Survey. On the other hand, the ACS 2006 study only counted bicycle trips to work and left out all other trips, including shopping trips, recreational trips, all trips for persons under 16 years of age, and trips by unemployed persons. Also, because only regular commute patterns were reported, the data do not include people who bicycle 1 or 2 days each week.

[10] No credits are available for the film. The entire film is available online at http://www.sundancechannel.com/films/500318643.

[11] The Portland City Code (Title 16.90.030) defines "bicycle boulevard" as a "roadway with low vehicle traffic volumes where the movement of bicycles is given priority."

[12] The national Bike-to-Work Day was originated by the League of American Bicyclists in 1956. The annual event is observed nationally as a way to promote the bicycle as an option for commuting to work.

number of bicyclists at 12 locations on both roads and greenbelt trails between the hours of 6:30 and 9:00 a.m. Count locations at greenbelt trails were chosen to include both trail and adjacent road bicycle traffic. Some of the greenbelt trail counts may have included recreational bicyclists.

For 2008, 1,884 total bicycle trips were recorded, an increase of 32 percent from the 2007 recorded total. The weather, including temperatures, was similar on both Bike-to-Work days. Although more bicyclists ride during these events than on an average day because of promotional activities associated with Bike-to-Work Day, the numbers of participants are indicators of the potential bicyclists in Anchorage. Table 2 identifies the numbers of bicyclists counted at the various reporting sites.

Table 2. Bike-to-Work Day Counts

	Bicyclists Counted	
Bicycle Count Locations	**2007**	**2008**
Seward Highway and Chester Creek Trail	238	316
A Street and Chester Creek Trail	225	308
Chester Creek Trail, Northern Lights Boulevard overpass at Goose Lake Road	159	242
Coastal/Chester Trail link, west end of Westchester Lagoon	124	188
Tudor Road and C Street	170	171
Tudor Road and Elmore Road	94	160
15th Avenue and Arctic Boulevard/E Street	115	122
Lake Otis Parkway and 36th Avenue	91	103
Campbell Creek Trail at Dowling Road	67	101
10th Avenue and N Street	63	71
Lake Otis Parkway and Abbott Road	55	71
Benson Boulevard and Minnesota Drive	21	31
Total	**1,422**	**1,884**

The highest numbers of bicyclists used the Chester Creek Trail at Seward Highway in both 2007 and 2008. At the Elmore Road and Tudor Road location, the 2008 count leapt by 70 percent from the 2007 figure, apparently reflecting the completion of Elmore Road construction. This new street connects South Anchorage with Tudor Road and features on- and off-road bicycle infrastructure—bicycle lanes and a separated pathway.

Who Bicycles

Although it is known that bicyclists range broadly in age and purpose, little demographic information is available to describe Anchorage bicyclists. ACS data from 2005 provides the following national information:

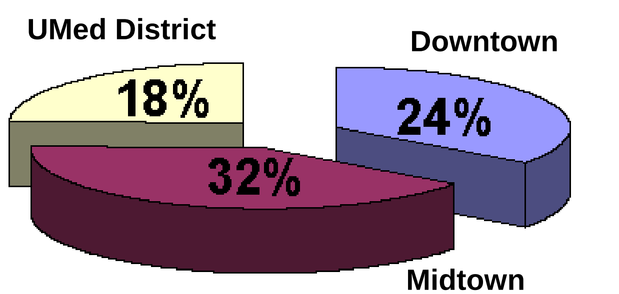
- Men bicycle to work at three times the rate of women.
- Non-white workers ride bicycles to work at a rate that is slightly higher than that for white workers.
- Unlike walking, the bicycle mode share shows almost no variation by income class.

Bicyclist Destinations

Where do bicycle riders go? Information on the destinations of bicyclists was collected at the October 2007 workshops. Participants were asked to draw the routes of their most common bicycle trips on maps of the MOA that included Eagle River-Chugiak and Girdwood. The most common trips coincided with the areas of highest employment and business concentrations: Downtown, Midtown, and the University-Medical (UMed) District. See Figure 2.

Together these areas of town accounted for nearly three-quarters of all bicycle destinations—Midtown attracted 32 percent of trips; Downtown, 24 percent; and UMed District, 18 percent. These data are probably biased in favor of commute trips because those who make school trips and recreational trips were underrepresented in the sample. Still, the information provides useful input for planning bicycle commuting routes. The destination chart in Appendix A presents the responses of participants in the October 2007 workshops.

Figure 2. Major Bicycle Commuter Destinations

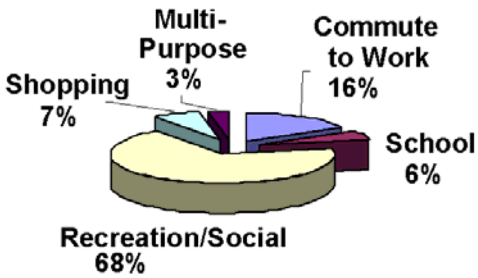


Source: Responses of participants in October 2007 workshops.

Reasons to Bicycle

What are the most common reasons for taking bicycle trips in Anchorage? Figure 3 shows the breakdown of all bicycle trips by trip purpose. This information is extracted from results of the 2002 Anchorage Household Survey, which asked respondents if they used their bicycles during the previous summer and, if so, for what purpose. It is not surprising that the biggest reason for using bicycles in the summertime was for recreation and social purposes (68 percent). The second most common reason,

Figure 3. Reasons to Bicycle



Source: 2002 Anchorage Household Survey

accounting for 16 percent of purposes for using bicycles, was commuting to work. It should be noted, however, that the percentage of school-related bicycle trips would be expected to be much higher in the fall and spring than the 6 percent reported in the summer when school is out of session.

Length of Bicycle Trips

What is the average distance of a typical bicycle trip in Anchorage? According to the findings of the 2002 Anchorage Household Survey, the average bicycle trip took about 30 minutes. Assuming an average speed of 10 miles per hour (mph), the average bicyclist probably travels about 5 miles one way. This distance puts most of the Anchorage Bowl within reach.

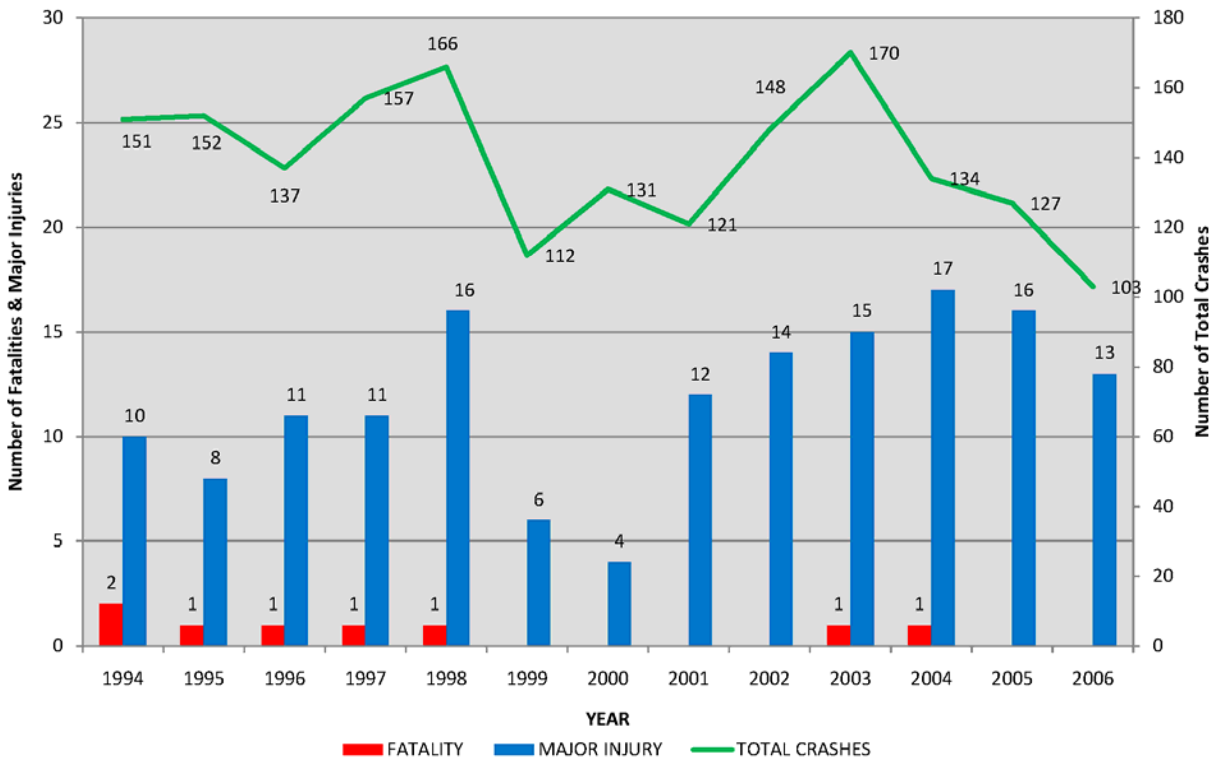
Participants of the October 2007 workshops were also asked about their commute distance and time. Of the 103 respondents, the average trip had a length of 5.6 miles and took 33 minutes. A surprising number of the commutes recorded by workshop participants were more than 15 miles in length, which equates to an hour of travel time for a one-way trip to or from work.

Bicycle Safety Issues and Crash Statistics

Alaska has a bicycle safety problem. For years facility design has relied on separated multi-use trails for bicycle travel; however, such bikeways have been found to increase conflicts. A study by International Transportation Engineers shows twice the crash risk for bicyclists on separated pathways than riding on the road. From 1994 through 2006, a total of 1,827 bicycle-vehicle crashes occurred in Anchorage, or about 141 per year (see Figure 4). Of these crashes, 8 resulted in fatalities, 152 in incapacitating (major) injuries, and 1,282 in non-incapacitating injuries. Bicycle-vehicle crashes are much more likely to result in injury than crashes between motor vehicles. Of the total bicycle-vehicle crashes, nearly 80 percent resulted in injury, compared to an average injury rate of around 30 percent for all recorded collisions in the state. The number of bicycle crashes is even higher than the number of pedestrian-vehicle crashes, which totaled 1,371 during the same time.

Bicycle-vehicle crash investigation

Figure 4. Bicycle-Vehicle Crashes by Type



Source: DOT&PF

Although relatively high,[13] the bicycle-vehicle crash rate does not seem to be increasing over time (Figure 4). In fact, during the past 5 years the trend line indicating total crashes (in green) has been declining despite growing traffic volumes. The efforts of MOA and DOT&PF to improve the bicycle infrastructure may have contributed to the trend of fewer crashes.

The causes of bicycle-vehicle crashes in Anchorage have been investigated by DOT&PF Central Region. The findings are summarized in Table 3 and Figures 5, 6, and 7. Figure 8 shows locations of bicycle-vehicle crashes.

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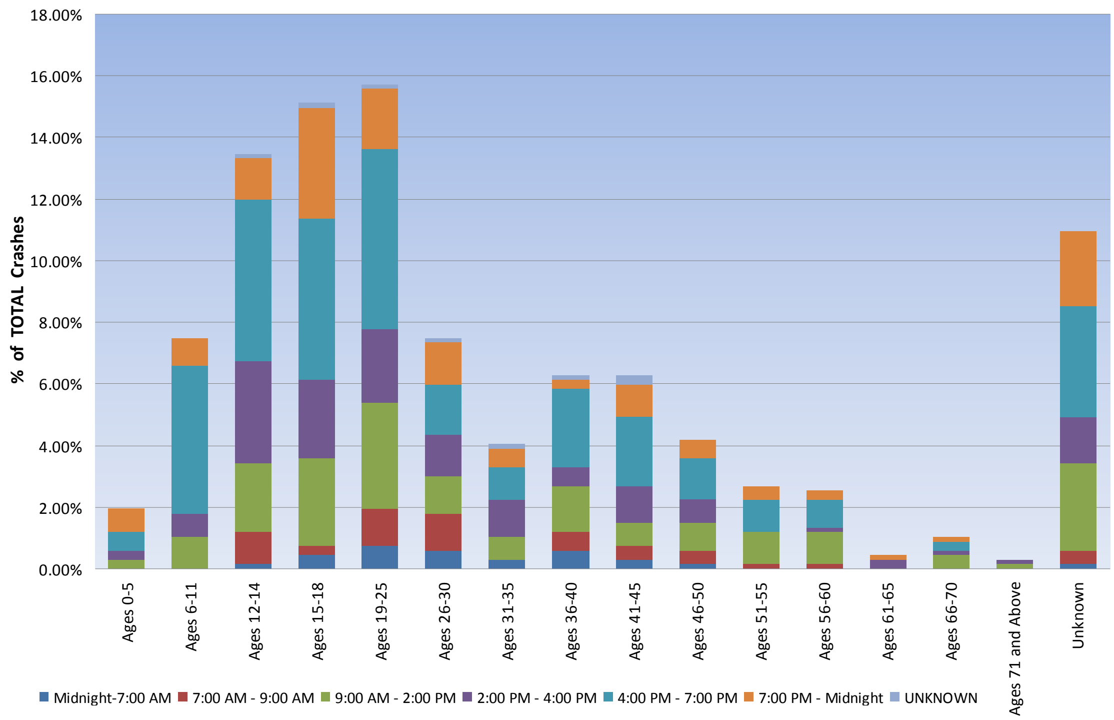
[13] Bicycle crash rates are difficult to compare from one jurisdiction to another, given that little data are available concerning the exposure rates from one jurisdiction to another. For example, Anchorage does not collect data on the number of bicycle riders or the lengths of their trips. As a result, it is not possible to develop a statistic of the number of bicycle crashes per mile ridden, which would be the best method of measuring bicycle crash rates.

Table 3. Results of Bicycle-Vehicle Crash Investigation and Analysis by DOT&PF Central Region

Findings
Ages of Parties Involved
6- to18-year-olds comprised the highest percentage of Anchorage bicyclists involved in crashes with motor vehicles, 19%.
School-age children riding bicycles during school hours (7:00 a.m. to 4:00 p.m.) accounted for about 14% of all crashes.
Bicyclists 19 to 25 years old were involved in 15% of crashes.
15- to 25-year-old drivers were involved in the most collisions with bicyclists, accounting for 24% of all bicycle-vehicle crashes.
Influence of Alcohol
Alcohol was involved in 6% of all bicycle-vehicle crashes.
80% of bicyclists in alcohol-related bicycle-vehicle crashes were found to have been under the influence of alcohol.
20% of vehicle drivers in alcohol-related bicycle-vehicle crashes were found to have been under the influence of alcohol.
Miscellaneous Conditions
89% of crashes occurred during daylight hours.
25% of all crashes were attributed to inattention and failure to yield on the part of the vehicle driver.
Rules-of-the-road conflicts and near misses between motorized and nonmotorized users were a frequent occurrence and were the faults of both parties.
83% of bicycle-related crashes occurred between May and September.
Causes of Bicycle-Vehicle Crashes
More than 65% of bicycle-vehicle crashes occurred at four-way or T intersections; fewer crashes occur in mid-block locations.
12% of bicycle-vehicle crashes were driveway-related.
The most common collision pattern was a right-angle crash of a bicycle with a turning vehicle, in which drivers failed to see or notice the bicyclist. For example, a vehicle preparing to enter a cross street fails to look right after looking left for a gap in the traffic and strikes a bicyclist traveling from the right of the vehicle.
33% of bicycle-vehicle crashes were right-turn-on-red crashes. Drivers in the 19- to 25-year-old age group were most often represented in these types of crashes.

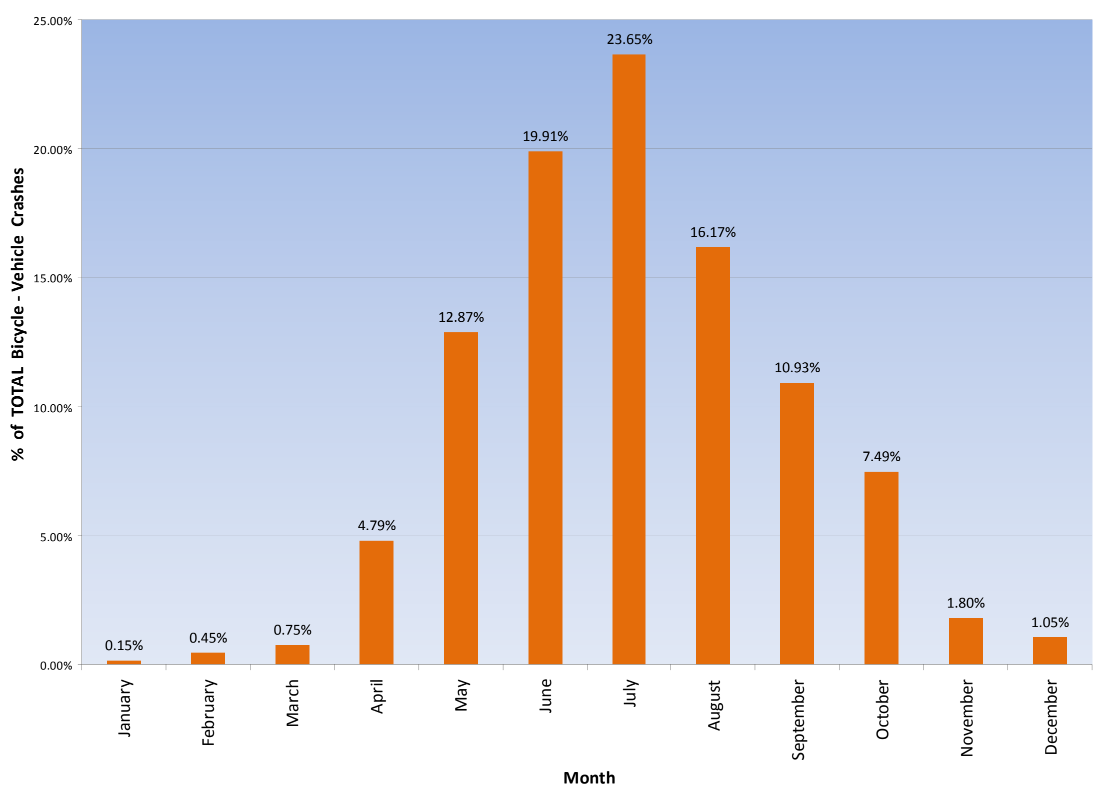
Source: DOT&PF interpretation of 2002–2006 Municipality of Anchorage Crash Data

Figure 5. Bicycle-Vehicle Crashes by Age Group and Time of Day, 2002–2006



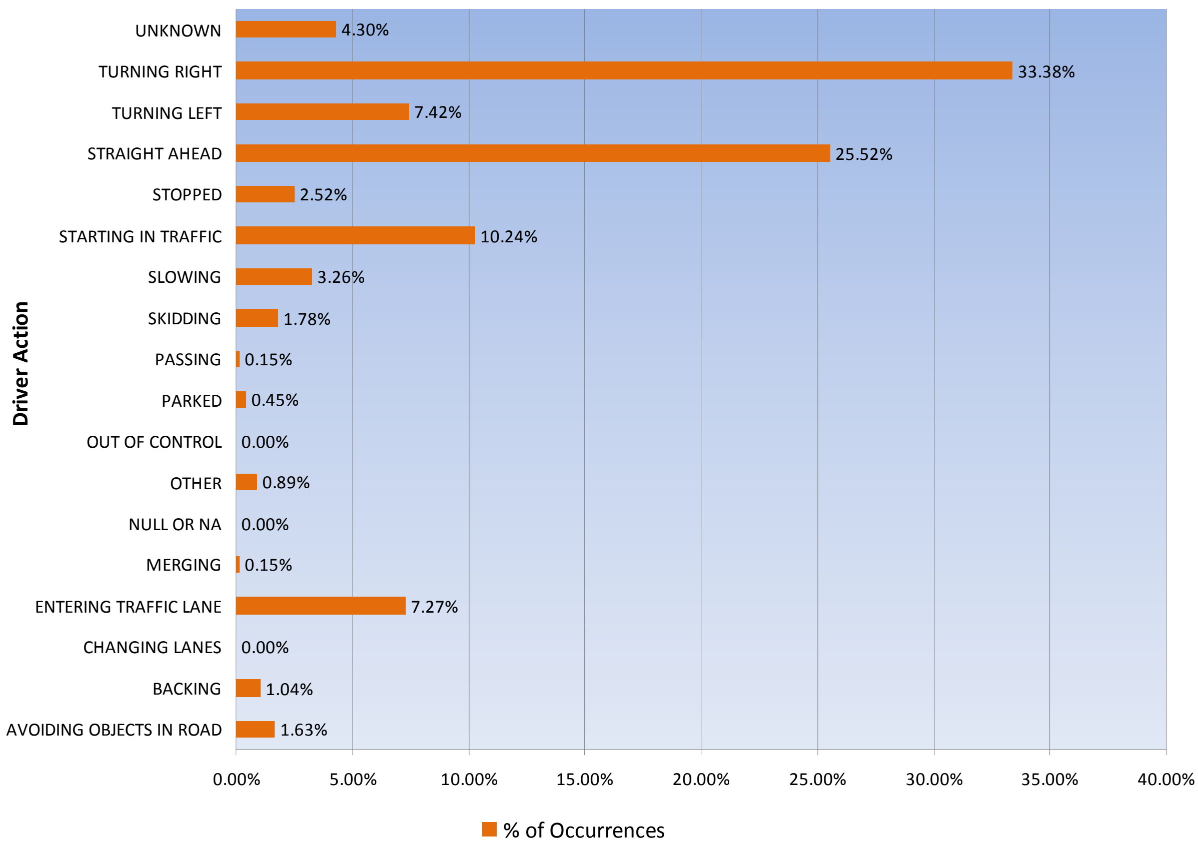
Source: DOT&PF

Figure 6. Bicycle Collisions with Motor Vehicles by Month, 2002–2006



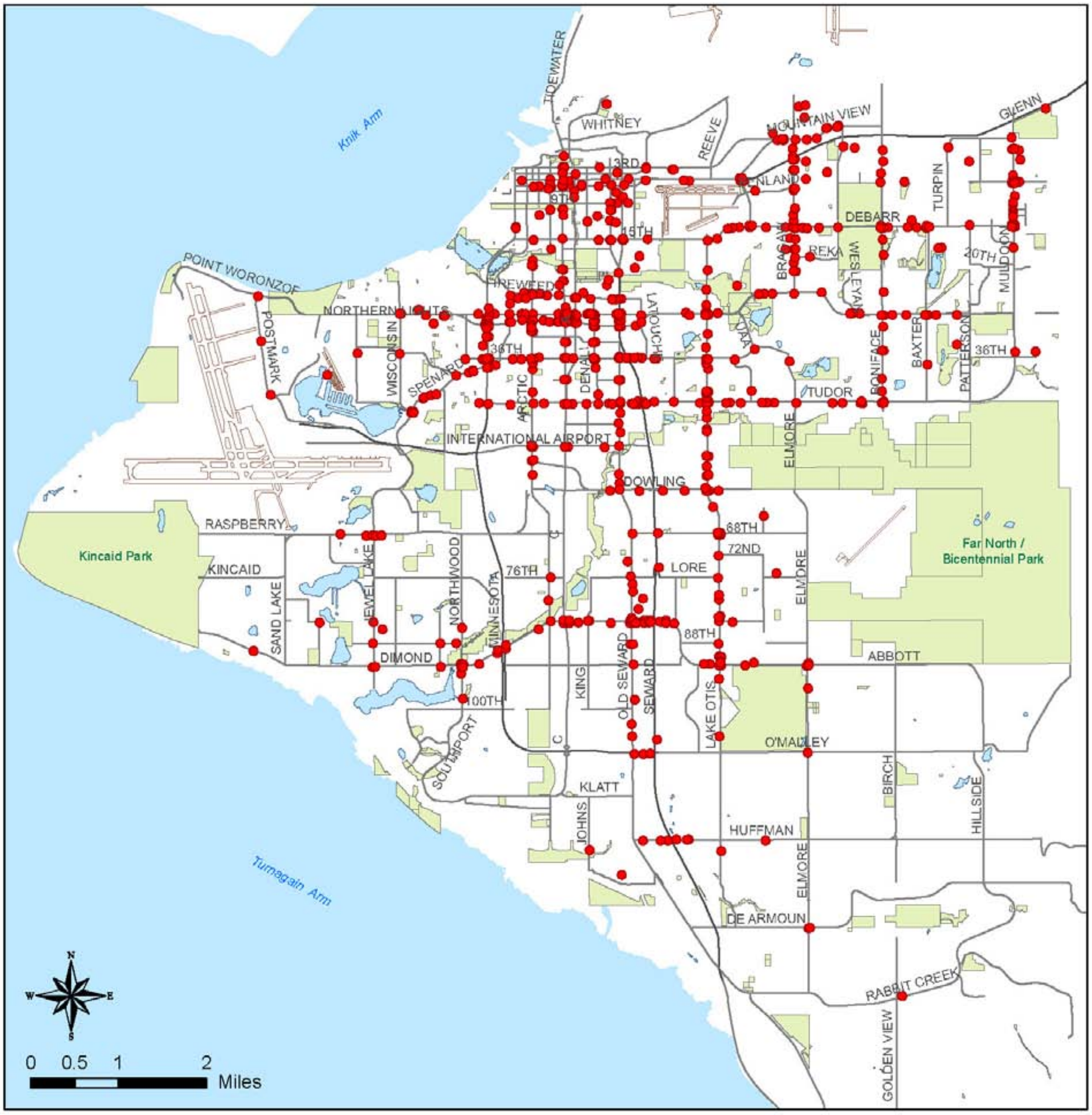
Source: DOT&PF

Figure 7. Driver Actions Before Collision with Bicyclist, 2002–2006



Source: DOT&PF

Figure 8. Bicycle-Vehicle Crashes in the Anchorage Bowl, 2000–2006



Source: DOT&PF and MOA

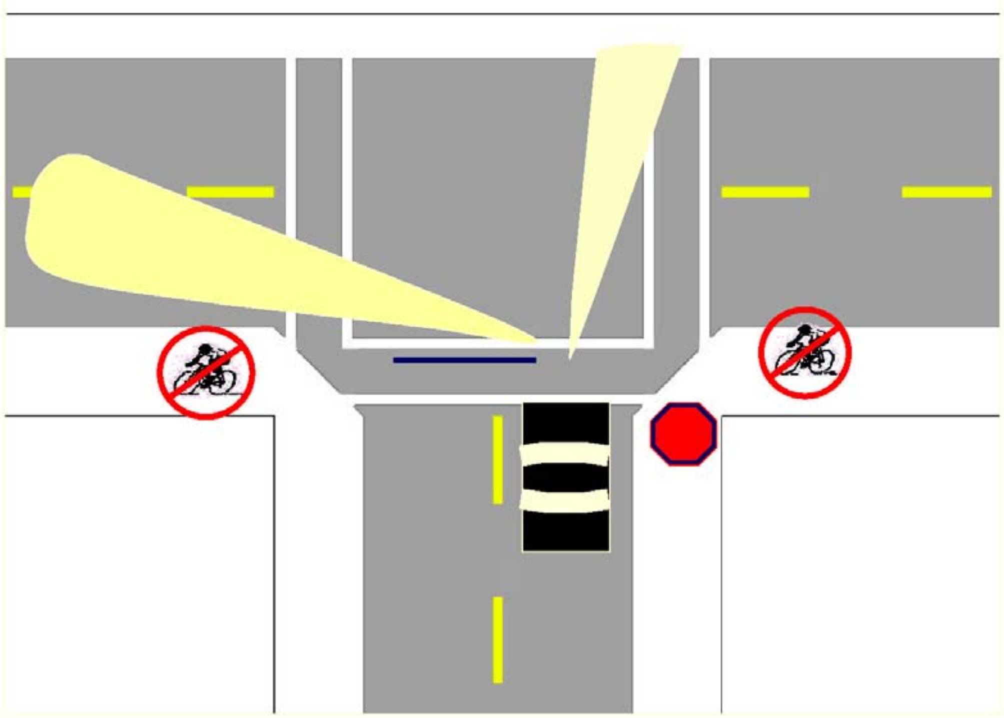
Rules of the Road

The rules of the road are a set of customary practices, especially for the operation of a motor vehicle or bicycle. They have been established to promote efficiency and safety and are intended to minimize confusion or conflict.

In general, rules of the road discuss where to drive, passing and no passing zones, one-way streets, distances between traveling vehicles, and exercising due care on roads. Chapter 9.16 of the Anchorage Municipal Charter, Rules of the Road, is provided in Appendix B.

The DOT&PF investigation found that bicycle-vehicle crashes are more likely to occur at a four-way or T intersection than at other locations. The heavy reliance on shared pathways may contribute to the high incidence of these angle collisions. Multi-use separated pathways, usually located on one side of the roadway, require bicycle traffic to ride against motor vehicle traffic, contrary to the normal rules of the road.[14] This opposite direction of travel leads to safety problems at intersections and driveways so that motorists entering or crossing the roadway often do not notice bicyclists approaching from their right. Even bicyclists coming from the left often go unnoticed, especially when sight distances are limited, as shown in Figure 9.

Figure 9. Sight Distances of Vehicle Operators Showing Limited Visibility of Bicyclists Riding in Shared Pathways



The yellow cones represent the driver's typical field of vision. Drivers at intersections look left for oncoming vehicles, but often they do not look to the right to notice bicyclists and pedestrians.

Source: Knoxville Regional Transportation Planning Organization, *Knoxville Regional Bicycle Plan*, 2002

[14] From *Guide for the Development of Bicycle Facilities* by the American Association of State Highway, 1999, available at http://www.communitymobility.org/pdf/aashto.pdf.

Table 4. Roadway Locations with the Highest Numbers of Bicycle-Vehicle Crashes, 2002–2006

Roadway	No. of Crashes
Northern Lights Boulevard	**53 total**
Muldoon Road to Lake Otis Parkway	20
Lake Otis Parkway to Seward Highway	9
Seward Highway to Minnesota Drive	19
Lake Otis Parkway	**48 total**
15th Avenue to Northern Lights Boulevard	4
Northern Lights Boulevard to Tudor Road	12
Tudor Road to Abbott Road	28
Abbott Road to DeArmoun Road	3
Tudor Road	**35 total**
Muldoon Road to Lake Otis Parkway	12
Lake Otis Parkway to Seward Highway	8
Seward Highway to Minnesota Drive	15
Dimond Boulevard	**33 total**
Seward Highway to C Street	19
C Street to Victor Road	10
Victor Road to Jewel Lake Road	3
Benson Boulevard	**25 total**
Minnesota Drive to C Street	18
C Street to Seward Highway	5
Debarr Road	**24 total**
Muldoon Road to Boniface Parkway	10
Boniface Parkway to Bragaw Street	4
Bragaw Street to Lake Otis Parkway	8
C Street	**21 total**
4th Avenue to Fireweed Lane	9
Fireweed Lane to Tudor Road	9
Muldoon Road	**20 total**
Debarr Road to Boundary Avenue	17

Source: DOT&PF, November 2008.

Where Crashes Occur in Anchorage

Roadways with high traffic volumes and busy intersections are the scenes of a significant number of bicyclist and pedestrian crashes with vehicles. Table 4 presents crash data for eight roadways where the most bicycle-vehicle crashes occurred in Anchorage from 2002 to 2006: Northern Lights Boulevard, Lake Otis Parkway, Tudor Road, Dimond Boulevard, Benson Boulevard, Debarr Road, C Street, and Muldoon Road. Among these roadways, Northern Lights Boulevard is the most difficult for bicyclist to maneuver. This four-lane, one–way street has no shoulders or bicycle lanes. Many bicyclists attempt to use the existing sidewalks, which offer no separation from the road, are narrow (5 feet wide), contain utility poles, and are often sandwiched between the road on one side and a parking lot on the other.

The eight corridors identified in Table 4 share many characteristics. Most have high traffic volumes and a high number of intersections and driveways per mile of roadway. They also typically are locations where multiple pedestrian-vehicle crashes have occurred. None of the corridors has a separated bicycle facility, and all corridors, except Northern Lights Boulevard, have multi-use pathways adjacent to the curb on only one side of the road.

The DOT&PF Central Region investigation noted that turning movement conflicts involving bicyclists riding on separated pathways are the causes of many bicycle-vehicle crashes. Table 5 provides the locations of bicycle crashes at intersections from 2002 to 2006.

Table 5. Intersections with the Highest Numbers of Bicycle-Vehicle Crashes, 2002–2006

Intersection	Total Crashes
Minnesota Drive at Benson Boulevard	9
68th Avenue at Lake Otis Parkway	8
6th Avenue at Muldoon Road	7
Debarr Road at Muldoon Road	7
42nd Avenue at Lake Otis Parkway	6
C Street at Northern Lights Blvd	6
Lake Otis Parkway at Tudor Road	6
Northern Lights Boulevard at Seward Highway	6
Spenard Road at Wisconsin Street	6
Abbott Road at Lake Otis Parkway	6
Arctic Boulevard at Fireweed Lane	5
Dimond Boulevard at southbound Seward Hwy	5
Lake Otis Parkway at Northern Lights Boulevard	5
Mountain View Drive at Price Street	5
5th Avenue at Airport Heights Drive	4
6th Avenue at C Street	4
Benson Boulevard at C Street	4
Tudor Road at northbound Seward Hwy ramp	4
Dimond Boulevard at Victor Road	4
C Street at Dimond Boulevard	4

Source: DOT&PF, November 2008.

Bicyclists crossing at a crosswalk – C Street

The local data mirror the results of national studies, which have shown that crash rates on multi-use trails are 40 percent greater than those for other locations. Bicycling on a separated pathway is more dangerous than riding on the roadway. [15]

Another infrastructure condition that has been identified in crashes is an intersection with two right-turn lanes. One remedy to protect the safety of bicyclists and pedestrians is to prohibit right turns on red. For example, signs saying "no right turn on red" are posted at the intersection of A Street and Benson Boulevard.

Deficiencies of the Bicycle Network

To effectively plan the future network for diverse users—recreational bicyclists, commuter bicyclists, and other bicyclists wishing to use bicycles as a mode of transportation—several immediate concerns need to be addressed. Through public input, meetings, and agency comments, the following deficiencies have been identified in the existing bicycle network:

1. **Separated pathways** – Reliance on multi-use pathways that are adjacent to but separated from roads as the primary focus of the bicycle network creates operational as well as safety issues for bicyclists.
2. **Gaps in the bicycle network** – Major gaps in the network require bicyclists to find their own routes to reach destinations.
3. **Facilities inappropriately designated as part of the bicycle infrastructure** – Many of the older facilities identified in the ATP are merely narrow pathways or sidewalks (less than 8 feet wide) or do not have the minimum 5-foot separation from the roadway; therefore, these facilities are not desirable for bicycle travel.
4. **Signs on the bicycle route system** – Many existing bicycle facilties do not have the proper signs, and many sidewalks have bicycle route signs. In addition, the existing bicycle route signs are not posted in appropriate locations and should be moved to reflect better routes.

[15] Sources: (1) William E. Moritz, Adult Bicyclists in the United States—Characteristics and Riding Experience in 1996, Paper 98-0009, presented at the Transportation Research Board 77th Annual Meeting, Jan. 11-15, 1998, Washington D.C. (2) Lisa Aultman-Hall Lisa and M. Georgina Kaltenecker, Toronto Bicycle Commuter Safety Rates, paper presented at the Transportation Research Board, 77th Annual Meeting, Jan. 11-15, 1998, Washington D.C. (3) Jerald A. Kaplan, Characteristics of the Regular Adult Bicycle User, 1975, M.S. Thesis, University of Maryland; available at http://www.bikexprt.com/research/kaplan/contents.htm.

Winter bicyclist on separated path

These deficiencies and the associated challenges addressed by this Bicycle Plan are discussed below. Solutions to these problems are discussed in subsequent chapters, particularly in the action item recommendations in Chapter 6.

Separated Pathways

As noted above, separated pathways are two-way facilities shared by bicycles, pedestrians, in-line skaters, and others. The *Guide for Development of Bicycle Facilities* (1999) by the American Association of State Highway Transportation Officials (AASHTO) states that these pathways operate best when they offer opportunities not provided by the road network and have continuous separation from traffic. (AASHTO specifies a minimum of 5 feet and a preferred distance of 7 feet to separate the bikeway from the roadway.) AASHTO lists the following operational problems with separated pathways along roadways:

- When the path ends, bicyclists going against traffic tend to continue to travel on the wrong side of the street. Likewise, bicyclists approaching the path often travel on the wrong side of the street to get to the path. Wrong-way travel by bicyclists is a major cause of crashes.
- Bicyclists coming from the right are often not noticed by drivers who are emerging from or entering cross streets and driveways. The drivers are not expecting the bicyclists whose direction of travel is opposite the direction of the flow of vehicle traffic.
- Signs posted for roadway users are backward for bicycle riders who are traveling in a direction against traffic.
- Although users of the shared-use path should be given the same priority through intersections as users of the parallel roadway, motorists falsely expect bicyclists to stop or yield at all cross streets and driveways.
- Stopped motor traffic on cross streets or vehicles using side streets or driveways may block the separated pathway crossing.
- Many utility bicyclists use the roadway instead of the separated pathway because they have found the roadway to be safer, more convenient, or better maintained.

DOT&PF recommends implementation of design techniques to improve the safety of separated pathways. The solution incorporates "sweeps" that align separated pathways in front of stop bars at unsignalized intersections with public streets by bringing the separated pathway closer to the roadway. A sweep minimizes conflicts and reduces crashes because the bicyclists and pathway users become more visible. Sweeps are now included in new construction and are added through retrofit to existing construction. DOT&PF use of sweeps has been a standard for 18 years at unsignalized intersections with public streets.

The Alaska Railroad encourages all crossings of its tracks to be grade-separated (requiring either an underpass or overpass). When a grade-separated crossing is not possible, the network should direct bicyclists to a crossing with an automated device that warns bicyclists about approaching trains. To promote bicyclist safety, at-grade crossings at unprotected locations (with no gates or signals) should be avoided. The design details of track crossings also should be addressed to reduce hazards to bicyclists, especially on separated pathways.

Gaps in the Bicycle Network

Similar to pedestrians, bicyclists typically seek the most direct routes possible to their destinations and are reluctant to deviate far from the most direct route. However, many bicyclists will deviate from direct routes when the route is not perceived to be safe. Ideally, the bicycle network should form a grid system with connections every half mile to provide direct and continuous routes.

The Anchorage greenbelt trail system, which generally follows the major creeks and coastline of the Anchorage Bowl, does not provide direct connections to many destinations within Anchorage. In addition, these greenbelt trails are often busy with slower-moving users and should not be relied on for primary bicycle corridors. Small children, people with pets on leashes, walkers positioned two or three abreast, and in-line skaters are among the trail users who create obstacles that hinder faster-moving utility bicyclists. The greenbelt trails are primarily intended for recreational users, and the roadway bicycle infrastructure is planned for utility bicyclists and others who use bicycles as a method of transportation.

Even with the recent addition of several separated pathways built in conjunction with new road projects, many gaps in the existing network remain (see Figure 1). These gaps are particularly noticeable on the Hillside and in Chugiak-Eagle River where few facilities have been built. Other major gaps in the system include the Sand Lake area, which needs better east-west bicycle facility connections, and the Government Hill neighborhood, which lacks a single bicycle route connection to the rest of the network.

Many otherwise viable parts of the bicycle infrastructure are discontinuous. For example, short segments of multi-use pathways built on the west side of Minnesota Boulevard between Benson Boulevard and Tudor Road abruptly begin and end. The Campbell Trail, which has a gap at the Seward Highway, is the most glaring discontinuous trail in the system and drew the majority of public comment about a needed connection. Bikeway gaps present major difficulties for medium- and long-distance bicycle riders and utility bicyclists.

Inappropriately Designated Bicycle Infrastructure

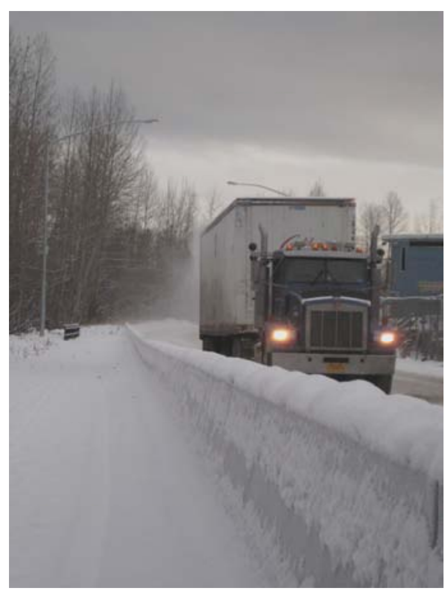
Past labeling of some facilities that are not well-suited for bicycle use as bikeways has exacerbated network gaps and contributed to bicyclist hazards. These facilities include narrow paths, sidewalks, and back-of-curb facilities—walkways that provide no more than 5 feet of space as a buffer between nonmotorized users and the traffic lane.

Back-of-curb pathway – Tudor Road

The ATP established a standard width of 8 to 10 feet for multi-use pathways in Anchorage. The recommended width was selected to allow two-way bicycle traffic and accommodate pedestrians. AASHTO recommends a minimum width of 10 feet with an 8-foot width in rare instances. Because many Anchorage facilities were built according to the ATP, MOA has used 8 feet as the minimum standard for pathways.

Many older facilities identified in the ATP as bicycle friendly do not meet this standard and, in fact, are not desirable for bicycle use. A good example is the ATP designation of multi-use pathways along the north and south sides of Benson Boulevard as part of the bicycle infrastructure. These asphalt pathways are generally around 5 feet in width (with some variation), and should more accurately be identified as sidewalks. Many of these paths shown on Figure 1 and previously identified as part of the trail system have been excluded from the inventory of existing bicycle infrastructure in the development of this Bicycle Plan.

When two-way, shared-use paths are located immediately adjacent to roadways, some form of physical barrier, such as a raised Jersey barrier or guardrail is recommended to keep motor vehicles out of the paths and bicyclists out of traffic lanes. Because these barriers can also be obstructions to motorists, they are often not used. Bicyclists close to fast-moving traffic experience unsafe conditions associated with road splash and high wind gusts. They also frequently encounter snow and ice that has not been removed. When the distance between the roadway and the path is less than 5 feet, the pathway has not been identified as a bicycle facility in this Bicycle Plan.


42-inch concrete separation – Ship Creek Trail at Viking Drive

Exceptions are made when this type of pathway facility is needed to complete missing links for the purpose of ensuring continuity of the bicycle network, and in such cases, the pathways are only used for limited distances and in situations where there are few driveway conflicts. In most situations, the physical space is not adequate to create a separation. These exception locations include the back-of-curb pathway on the Muldoon/Tudor Road curve and 3rd Avenue west of Reeve Boulevard.

Signs on the Bicycle Route System

Current bicycle route signage is inconsistently applied. In many situations, it is not apparent why a facility has signs while a similar facility on an adjacent roadway has no signs. In addition, many of the signed routes that exist today do not meet current standards, either because of narrow widths or discontinuities.

Other Key Considerations for a Viable Bicycle Network

Three main elements are integral to support of the bicycle network: laws, education, and maintenance.

Illegal vehicle parking in a bicycle lane

Laws Affecting Bicyclists

Title 9, Vehicles and Traffic, of the Anchorage Municipal Code (AMC) establishes the rules for operating bicycles and vehicles in Anchorage. Appendix B includes relevant sections of the AMC.

Under Section 9.38, Bicycles, the code explains that bicyclists are granted all rights applicable to the driver of a vehicle. In other words, bicyclists have an equal right to that of motorists for use of the roadways, except where specifically prohibited, such as a freeway. Public input and letters to the editor demonstrate widespread misunderstanding of the basic bicycle laws. Many drivers do not realize that bicyclists are legally permitted to use roadways. Moreover, some drivers consider non-motorized traffic as both a potential danger and a nuisance. Members of the public and the Bicycle Focus Group have shared stories of being cursed at, having food thrown at them, and being run off the road by drivers.

Municipal law also dictates that bicyclists are subject to all duties applicable to motorists and are required to follow the rules of the road, including obedience to all traffic control devices, when they are traveling on a roadway. These requirements include stopping at red lights and traveling with the direction of traffic.

Title 9 notes that bicyclists are to use the right edge of the roadway, except when obstacles are present or when they are making a left turn or avoiding a right turn. Title 9 does not reference bicyclists impeding traffic. Bicyclists who violate traffic laws or do not know or follow the rules of the road become a liability and are vulnerable to crashes. All bicycle users and every other user of the roads should be taught that bicycles are vehicles that have the right to use the road and should be driven according to the same traffic rules. Bicyclists not following the rules of the road can be ticketed.

Title 9 requires that all bicycles possess standard equipment such as lights, reflectors, brakes and bells. Draft revisions to Title 9 propose replacing the requirement for bells with audible signals, either bells or verbal warnings.

Bicyclists traveling on a separated pathway are required to follow pedestrian laws, as specified in AMC Section 9.20, Pedestrian Rights and Responsibilities (available in Appendix B).

Draft revisions to Title 9 that will help to clarify areas of confusion are being prepared by the Traffic Division of the Anchorage Police Department. For example, the current municipal and state codes pertaining to bicycles prohibit riding bicycles on sidewalks in business districts. Because the definition of a business district is very broad (see the definition to the left), it is not always easy to determine where a business district starts and stops. According to this definition of a business district, bicycle travel on the existing pathways (bicycle routes) along Dimond Boulevard and Lake Otis Parkway is illegal. According to the Traffic Division, the intent of this code is to limit conflicts between bicyclists and pedestrians because business districts are areas with high volumes of pedestrian activity. Restricting bicycle use on busy pedestrian sidewalks enhances pedestrian safety. Draft revisions to Title 9 propose only restricting sidewalk bicycle riding in the Central Business District (downtown Anchorage).

> ***Business district** means the territory contiguous to and including the street when within any 600 feet along such street there are buildings in use for business or industrial purposes, including but not limited to hotels, banks, office buildings, railroad stations and public buildings, which occupy at least 300 feet of frontage on one side or 300 feet collectively on both sides of the street.*
>
> – excerpt from Definitions, Title 9, Anchorage Municipal Code

A business district with busy pedestrian activity

Another area of misunderstanding is whether bicyclists are permitted to use a roadway when there is a separated pathway available. For many reasons cited in the first part of this chapter, it is important that bicycle riders have the choice to use the existing streets if they desire to do so.

Chapter 6 includes several recommendations to clarify codes affecting Anchorage laws pertaining to bicycle travel and to remove ambiguous language.

Education

Currently bicyclists receive little education about the rules of the road and drivers do not receive much information about sharing the road with bicycles. Police records of bicycle-vehicle crashes from 2002 to 2006 note many violations and tickets given to both drivers and bicyclists. These included not obeying traffic control devices (such as signs and traffic lights), reckless driving, failure to yield, and driving while under the influence. Both vehicle drivers and bicyclists would benefit from education about the rules of the road, as well as enforcement of the laws. It would be especially useful to remind all travelers that cars yield to bicyclists and pedestrians, bicycles yield only to pedestrians, and pedestrians yield to no one. Specific recommendations are provided in Chapter 6.

The educational effort should also promote awareness of bicyclists in a way similar to that used in campaigns for motorcycle awareness. Reminding motorists that bicyclists are out on the roads and pathways can help to reduce the number of crashes.

Maintenance of Bicycle Infrastructure

Snow blocking routes and bicycle lanes and paved road shoulders that are full of grit, glass, and debris create poor conditions for bicyclists and force them into the vehicle travel lanes to avoid these hazards. Such obstacles also discourage increased bicycling within the MOA. Longitudinal cracks in pathways and heaving from tree roots are other hazards. All of these items can increase the rate at which the riding surface deteriorates and need to be regularly removed.

Roads within Anchorage are owned by either MOA or the State of Alaska. (See Appendix C.) The maintenance for these streets has traditionally been assigned based on road ownership; however, DOT&PF policy requires that the maintenance of separated pathways and sidewalks be provided by MOA through maintenance agreements. In addition, cooperative agreements between MOA and DOT&PF determine which agency maintains a particular roadway and associated pedestrian and bicyclist facilities.

The system of dividing maintenance duties is confusing and can be inefficient. In some locations, DOT&PF maintains the roadway and shoulders, and MOA maintains the pathway; therefore, two separate entities are maintaining one route. If efforts are not coordinated, roadway snow removal often results in snow being pushed onto pathways.

An increase in winter bicycle riders and a policy of temporary snow storage on road shoulders may create conflicts with use of bicycle lanes. Because the first responsibility of maintenance crews is to remove snow from the travel lanes of roadways, the shoulders are often used for snow storage. The solution, which

Bicycle lane with debris

should be discussed and promoted, is to more quickly address removal of snow from shoulders, where bicycles may be traveling.

Snow left on the roadways can deter winter bicycling, and the gravel and debris that remain on bikeways in the spring similarly hinders utility bicyclists. Each spring after the snow melts, approximately 30,000 tons of sand is left on Anchorage roadways. Inadequate cleanup of winter-generated gravel, sand, and debris from the bicycle infrastructure is an issue that is often cited by Anchorage bicycle riders as one of the greatest obstacles to increased bicycle use.

Cleanup of roadways and bikeways must meet the requirements of the NPDES (National Pollutant Discharge Elimination System) permit held jointly by MOA and DOT&PF that allows road drainage and other storm water to drain to rivers and streams. The cleaning also promotes improved air quality because major roadways are a primary source of coarse particle pollution in Anchorage.

Both MOA and the State of Alaska have responsibility for roadway and pathway cleanup. Cleanup scheduling for both entities is primarily based on a logical progression across town, with the busiest roadways being cleaned first. However, the bicycling community has been requesting a higher priority for the most heavily used portions of the bicycle infrastructure to be cleaned first.

MOA relies on its own staff and equipment to perform the work and has not contracted out this service since 2007. A crew of four to five workers and equipment consisting of sweepers, water trucks, and a dump truck are committed to the roadway and pathway cleanup.

DOT&PF recently purchased two pathway plows/sweepers with federal grant funds, but the staff needed to operate the equipment is seasonal and are not employed past April. As a result, DOT&PF relies entirely on a contractor to provide cleanup of its facilities.

Discrepancies between the performance of the State of Alaska and MOA became apparent in 2009 when MOA was able to clean the MOA-owned streets by June, but DOT&PF contractors still had not finished cleanup of roads by July when the grant funds were due to run out.

Chapter 6 includes recommendations to streamline and simplify maintenance responsibilities and establish maintenance priorities that will help promote increased use of roads by bicyclists.

CHAPTER 3

Recommended Bicycle Network

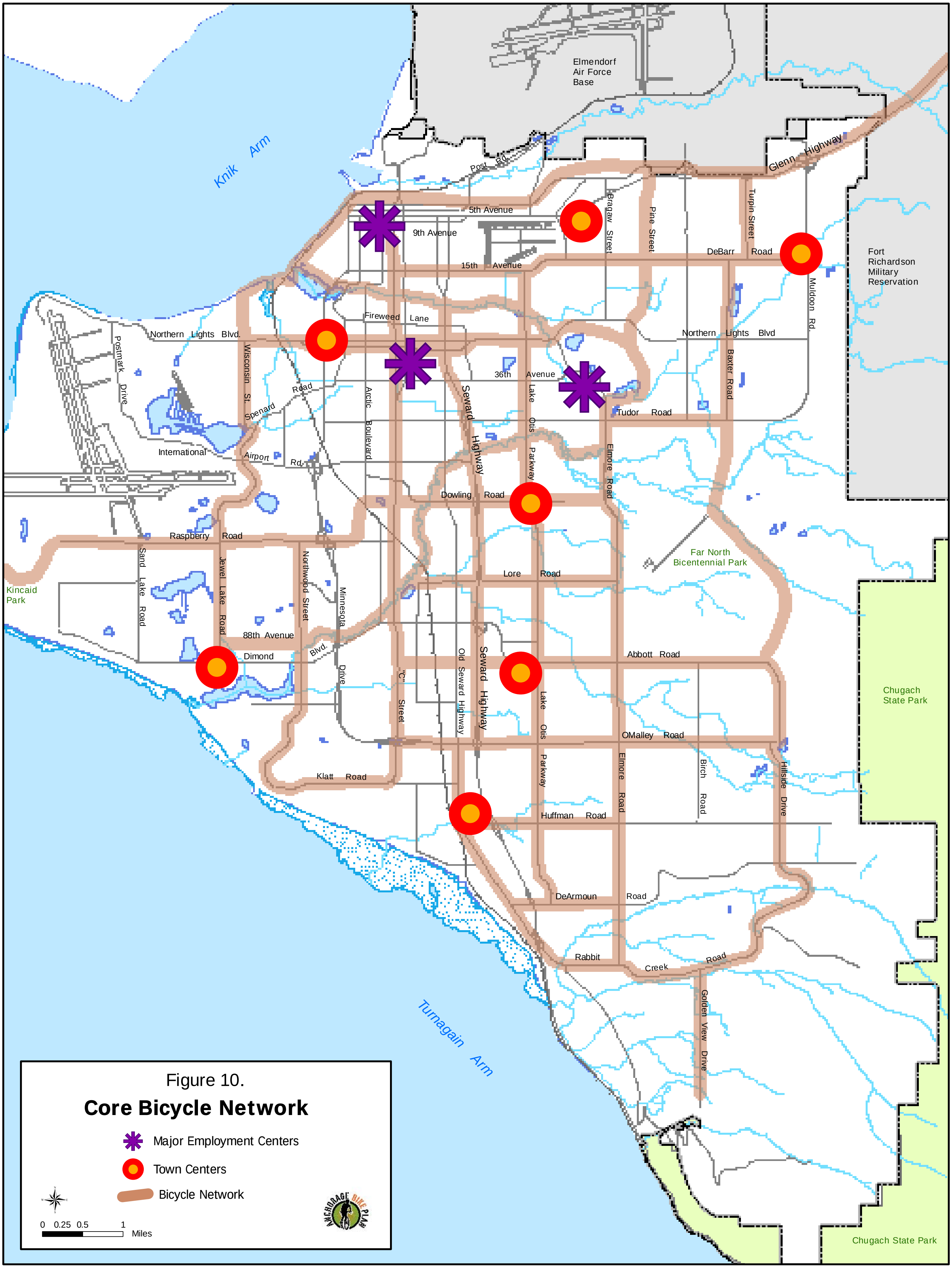
The purpose for establishing a bicycle network is to create integrated bicycle route systems that promote safer and more convenient utilitarian bicycle travel throughout Anchorage. The ideal goal of this plan would be to ultimately make all roads bicycle friendly consistent with national policies cited in Chapter 1. Although the proposed bicycle network described in this plan does not meet this ideal goal, it does create a functional bicycle network with spacing of approximately one-half mile between routes. This half-mile spacing is based on creating convenient routes for utility bicyclists.

Given current monetary constraints, it appears that full implementation of the proposed bicycle network may not be possible within the 20-year framework of the Bicycle Plan. To guide the prioritization of plan implementation, a core bicycle network has been identified (Figure 10). This core network links all major employment centers and town centers identified in the Anchorage 2020 comprehensive plan. Employment centers reflect major bicycle destinations shown in Chapter 2 (Figure 2), and town centers are areas of community activity. The core bicycle network uses these elements to identify the most important routes in the network. Routes on the core network are given higher priority for improvements than are other routes.


On-street bicycle lane

Figures 11 and 12 show the bicycle networks for Anchorage and Chugiak-Eagle River, respectively. A large map providing greater detail for Anchorage is included following the appendices of this plan.

The starting point for developing a bicycle network in Anchorage was identification of the existing transportation system (outlined in Chapter 2). Next, additions were proposed to achieve the desired density of bicycle infrastructure and provide connections for the major origins and destinations (such as Downtown, Midtown, and the UMed District) and the town centers identified in Anchorage 2020.



Knik Arm
Elmendorf Air Force Base
Post Rd.
Glenn Highway
5th Avenue
9th Avenue
15th Avenue
Bragaw Street
Pine Street
Turpin Street
DeBarr Road
Muldoon Rd.
Fort Richardson Military Reservation
Fireweed Lane
Northern Lights Blvd.
Northern Lights Blvd
Postmark Drive
Wisconsin St.
Spenard Road
Arctic Boulevard
36th Avenue
Seward Highway
Lake Otis Parkway
Baxter Road
Tudor Road
International Airport Rd.
Elmore Road
Dowling Road
Raspberry Road
Far North Bicentennial Park
Sand Lake Road
Jewel Lake Road
Northwood Street
Minnesota Drive
Lore Road
Kincaid Park
88th Avenue
Dimond Blvd.
Abbott Road
"C" Street
Old Seward Highway
OMalley Road
Chugach State Park
Klatt Road
Birch Road
Hillside Drive
Huffman Road
DeArmoun Road
Rabbit Creek Road
Golden View Drive
Turnagain Arm
Chugach State Park
Figure 10.
Core Bicycle Network
Major Employment Centers
Town Centers
Bicycle Network
0 0.25 0.5 1
Miles

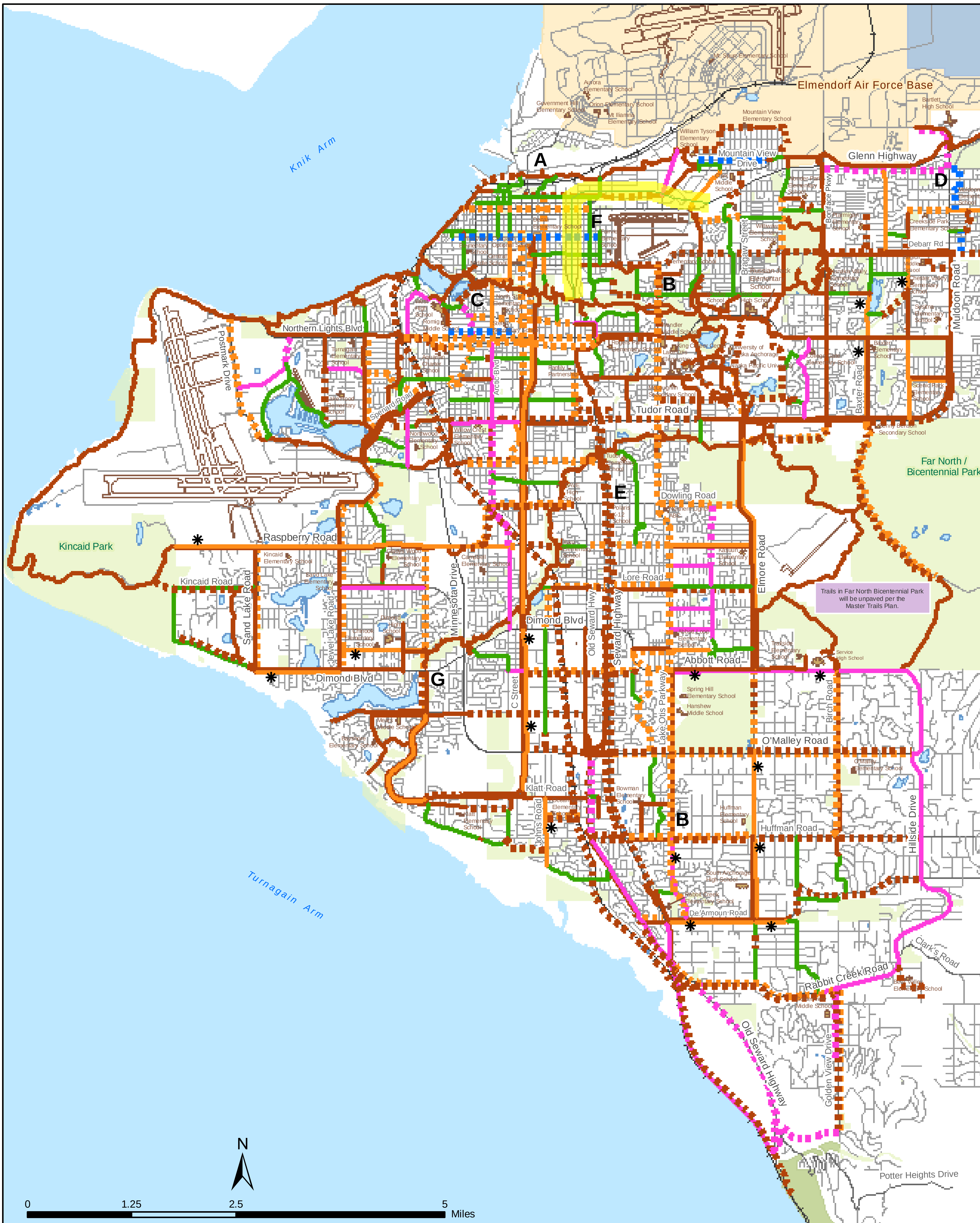


Figure 11.

Proposed Bicycle Network

Anchorage Bowl

On Street Facilities

- Bicycle Lane
- Proposed Bicycle Lane
- Paved Shoulder Bikeway
- Proposed Paved Shoulder Bikeway
- Shared Use Roadway
- Proposed Bicycle Boulevard

Off Street Facilities

- Existing Separated Multi-Use Pathway
- Proposed Separated Multi-Use Pathway
- * Facility eligible to be signed and striped
- Alaska Railroad
- Conceptual Highway to Highway Corridor

Special Study Areas

- A Government Hill
- B Lake Otis Boulevard
- C Midtown
- D Muldoon Road
- E Dowling Roundabouts
- F Ingra\Gambell
- G Dimond & Victor

Note: Bicycle lane facilities are the preferred facility and are contingent on identifying a plan for funding and maintenance.

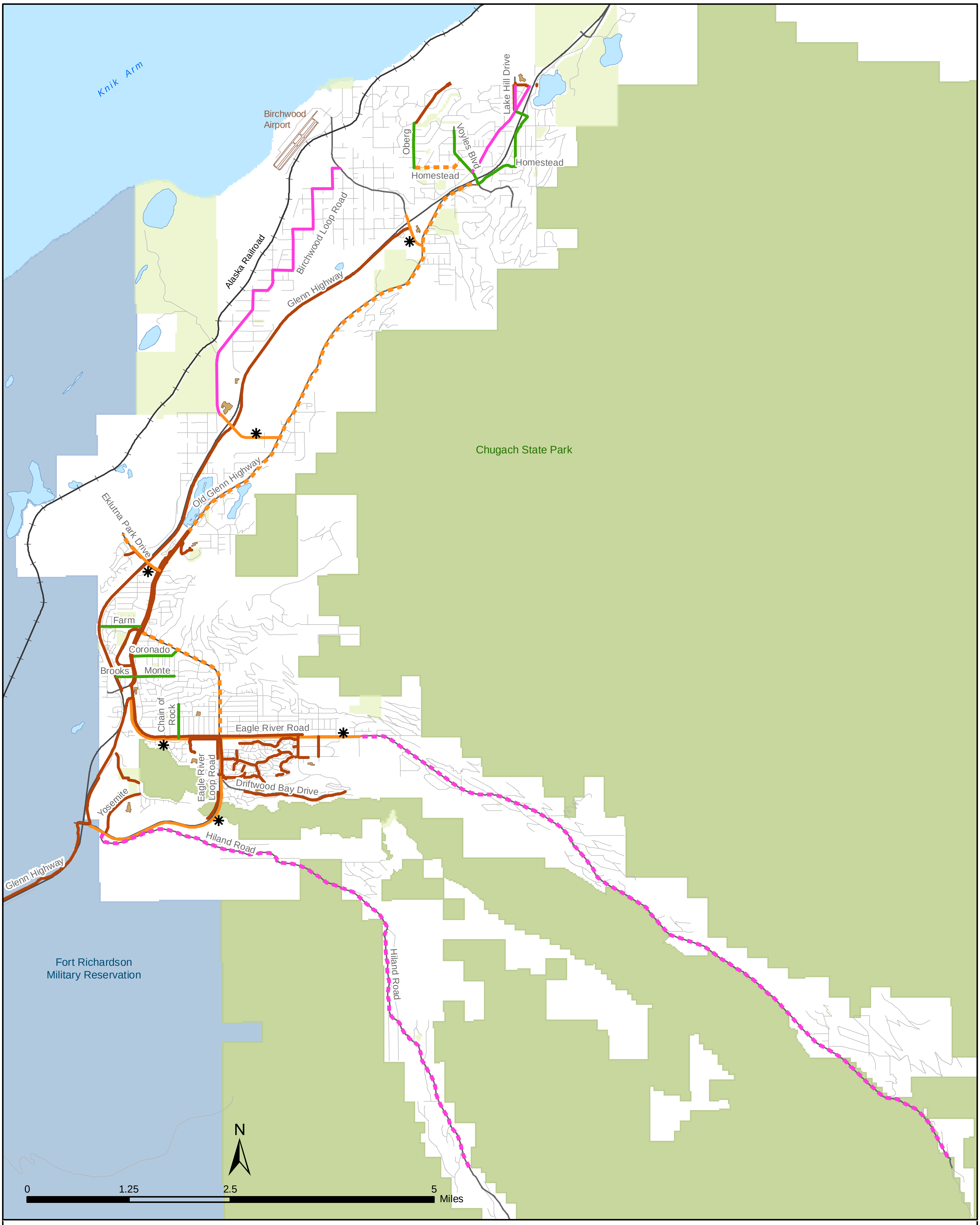


Figure 12.

Proposed Bicycle Network

Chugiak - Eagle River

On Street Facilities

- Bicycle Lane
- Proposed Bicycle Lane
- Paved Shoulder Bikeway
- Proposed Paved Shoulder Bikeway
- Shared Use Roadway

Off Street Facilities

- Existing Separated Multi-Use Pathway
- Proposed Separated Multi-Use Pathway
- Facility eligible to be signed and striped
- Alaska Railroad

Note: Bicycle lane facilities are the preferred facility and are contingent on identifying a plan for funding and maintenance.

The two general types of bicycle infrastructure in the existing bicycle network of Anchorage—on-street facilities and separated pathways (which include pathways along roads and greenbelt trails)—are needed to complete an integrated bicycle network. Evaluating the potential network required determining which facility type was appropriate for use along a specific corridor.

A tool recently developed by the Federal Highway Administration, the Bicycle Compatibility Index (BCI), was useful for this analysis. The BCI is an emerging national standard used to quantify the bicycle-friendliness of a roadway. Although many standards for level of service have traditionally been used for roadway design related to traffic capacity, the BCI measures the comfort level of a bicyclist riding on the roadway with traffic. Factors assessed in identifying a BCI include curb lane width, traffic speed and volume, adjacent land use, and width of bicycle lanes/shoulders. (For a more detailed description of the Bicycle Compatibility Index, see Appendix D.)

The BCI is applied to score roadways from A to F, with A rated as the most attractive for bicyclists. Many professionals feel that a BCI grade of C is the minimum acceptable grade for a casual bicyclist.

The BCI evaluation (see Figures 13 and 14) identified roadways that are currently suitable for bicycle travel without reconstruction. Most of these facilities have been included in the recommended bicycle network as bicycle lanes or other on-street bicycle infrastructure. The BCI was also used to identify future road reconstruction projects where on-street bicycle infrastructure, such as bicycle lanes, could be incorporated. All projects in the C/ER LRTP (for Chugiak-Eagle River) and the 2025 LRTP (for Anchorage) were examined using the BCI methodology to determine whether adding new bicycle lanes in conjunction with a road reconstruction project would achieve an acceptable BCI for bicyclists (meeting the BCI standard of A to C). For locations where BCI scores were D through F, separated pathways or parallel facilities were generally recommended.

The process and rationale used to select the appropriate facility type for each bicycle corridor and the recommended facilities are described below in more detail.

On-Street Facilities

On-street facilities typically consist of bicycle lanes, paved shoulders, and wide curb lanes as well as shared local streets, including bicycle boulevards. On-street facilities avoid curb cuts and conflicts with right-angle turns from cross streets because the bicyclist is recognized as being part of the traffic flow and is more visible to vehicle drivers.

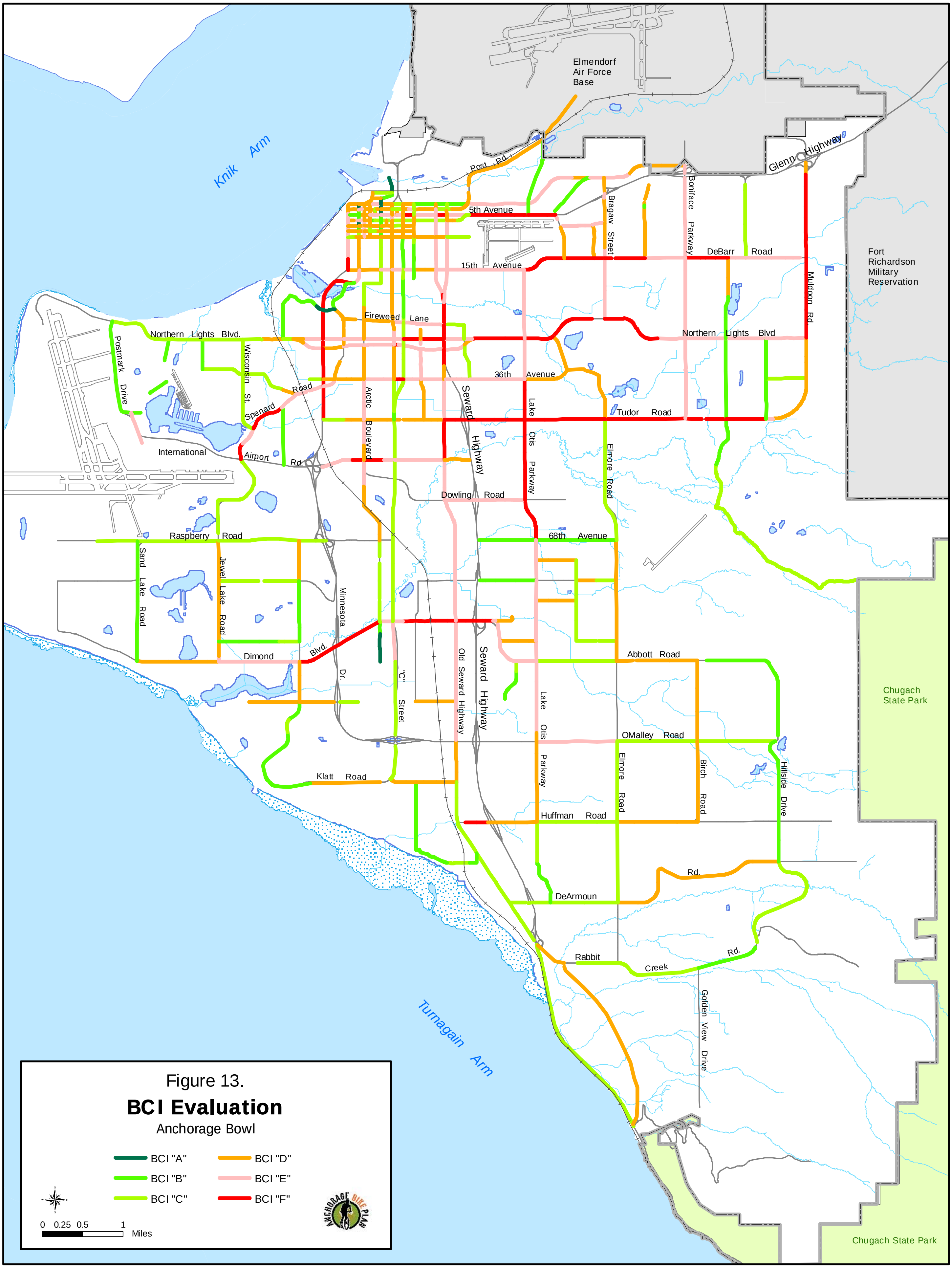


Figure 13.

BCI Evaluation

Anchorage Bowl

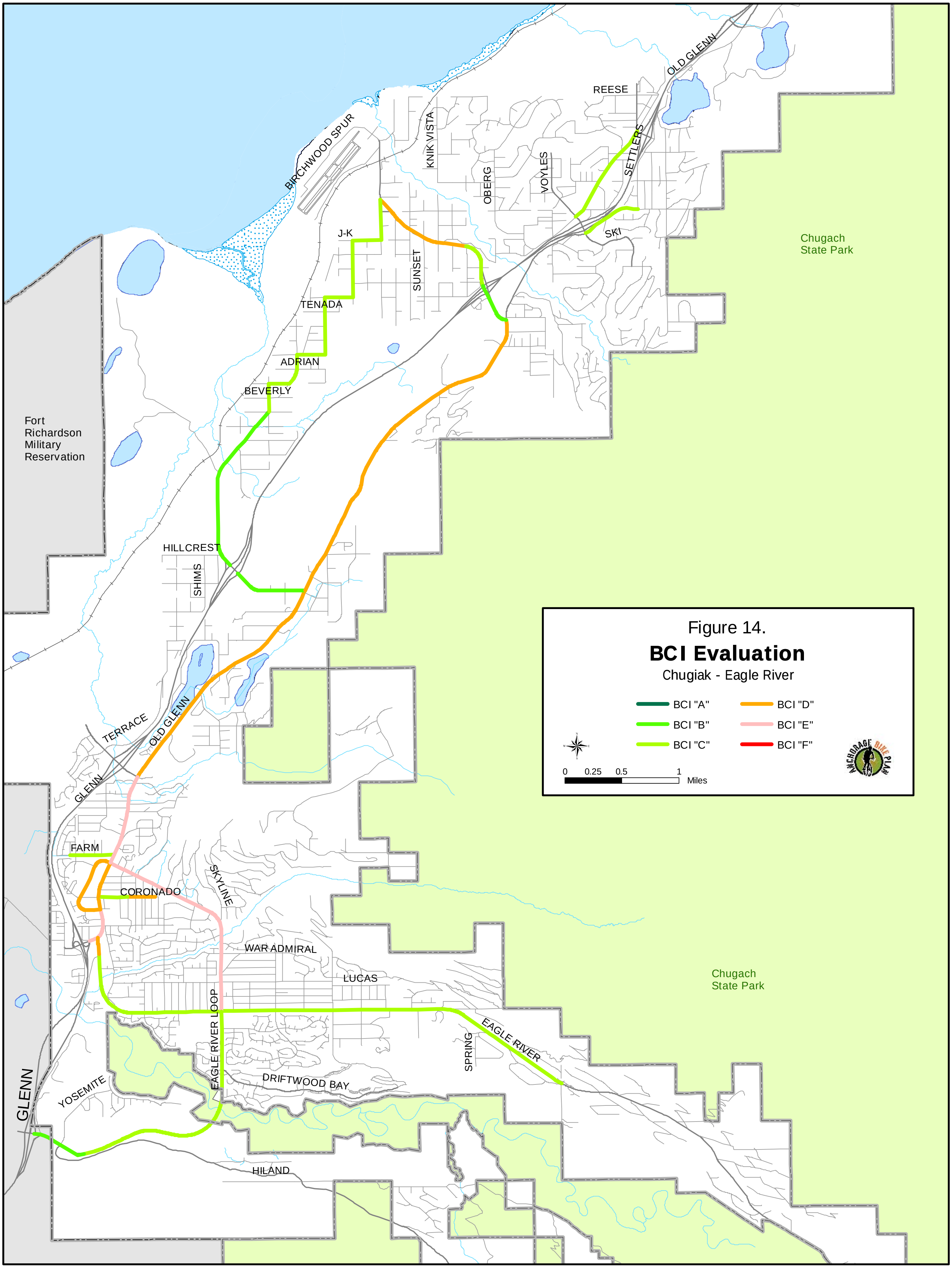


Figure 14.
BCI Evaluation
Chugiak - Eagle River
BCI "A"
BCI "B"
BCI "C"
BCI "D"
BCI "E"
BCI "F"
0
0.25
0.5
1
Miles
Fort
Richardson
Military
Reservation
Chugach
State Park
Chugach
State Park
OLD GLENN
REESE
SETTLERS
VOYLES
OBERG
KNIK VISTA
BIRCHWOOD SPUR
SKI
J-K
SUNSET
TENADA
ADRIAN
BEVERLY
HILLCREST
SHIMS
TERRACE
OLD GLENN
GLENN
FARM
CORONADO
SKYLINE
WAR ADMIRAL
LUCAS
EAGLE RIVER LOOP
EAGLE RIVER
SPRING
DRIFTWOOD BAY
YOSEMITE
GLENN
HILAND

The bicycle lane is the preferred on-street bicycle facility of this Bicycle Plan and is generally recommended for arterial and major collector streets[16] on which the bicycle rider can feel comfortable riding with traffic. Examples of arterials are Northern Lights Boulevard, Old Seward Highway, and Lake Otis Parkway. Examples of collectors are Baxter Road, Wisconsin Street, and Birch Road.

Paved shoulder bikeway – C Street at 36th Avenue

A roadway with bicycle lane facilities generally consists of 5-foot-wide travel ways adjacent to the vehicular travel lanes that are striped, stenciled, and signed for bicycle use in both directions. (See Chapter 4 for a more complete description of bicycle lane design characteristics.)

Bicycle lanes, more than any other on-street bicycle facility, have the potential to increase the amount of bicycling in Anchorage. Comments from local area bicyclists identify the preference for bicycle lanes because they create a comfortable, recognized space for bicyclists. Many participants at the Anchorage Bicycle Plan workshops commented that they would rather travel in bicycle lanes than on shared-use paths. The recognized benefits of bicycle lanes include the following:

- Defining a space for bicyclists to ride, which helps less-experienced bicyclists feel more confident and willing to ride on busier streets
- Providing dedicated on-road space for bicyclists
- Reducing lane changing by motorists when passing bicyclists
- Increasing the visibility of bicyclists in the transportation system
- Reducing pedestrian-bicyclist conflicts by reducing the number of bicyclists on the sidewalks
- Creating a buffer between pedestrians and motor vehicles
- Increasing effective turn radii at driveways and intersections
- Improving sight distances
- Providing space for emergencies and breakdowns

[16] An arterial is a roadway that typically provides for trips of medium to moderately long length, has at-grade intersections, and has limited or partially controlled access, which acts to reduce the number of access points such as driveways that connect directly with the roadway. A collector has many points of access; it collects traffic from local streets and larger properties and channels it to arterial streets.

Some streets where bicycle lanes are the desired treatments have conditions that make bicycle lane installation very difficult. These conditions include harm to the natural environment or character of the natural environment because of additional pavement requirements, severe topographical constraints, and severe right-of-way constraints. In these situations, other types of on-street bicycle infrastructure, such as wide curb lanes and shoulders, can be used to improve riding conditions for bicyclists. For these situations, the volume and speed of the roadway should not be so high that the facility is uncomfortable for bicycle riders. Before wide curb lanes or shoulders are identified as recommended bicycle infrastructure, the roadway should be evaluated using the BCI analysis. Where the BCI evaluation indicates that the comfort level would discourage use by bicyclists (a BCI score of D to F), curb lanes and shoulders should not be incorporated or recommended as part of the bicycle network.

Normally low-travel residential streets would not be striped for bicycle lanes; however, some residential streets are identified to be striped and signed bicycle infrastructure if they can enhance the connectivity of the bicycle network. Because bicycle lanes offer a comfortable space for older or more experienced children to ride, many communities elect to stripe bicycle lanes on low-traffic residential streets to provide an additional level of visibility for younger bicyclists. The recommended bicycle network includes bicycle facility striping on Anchorage streets that directly serve schools. An example is Checkmate Drive from Tudor Road north to create a paved shoulder bikeway leading to College Gate Elementary School.

Another proposed on-street facility is the bicycle boulevard, a shared roadway for which design has been optimized for through-going bicycle traffic. In contrast with other shared roadways, bicycle boulevards discourage cut-through motor vehicle traffic, but typically allow local motor vehicle traffic. Bicycle boulevards are local streets with low traffic volumes that could be used as parallel, alternative routes to arterials, encouraging many more to make the trip by bicycle.

An example of a local street marked as a bicycle boulevard (Portland, Oregon).

The purpose of creating a bicycle boulevard is to improve bicycle safety and circulation through one or more of the following conditions:

- Low traffic volumes
- Discouragement of non-local motor vehicle traffic
- Provision of free-flow travel for bicycles by assigning the right-of-way to the bicycle boulevard at intersections wherever possible
- Traffic control to help bicycles cross major arterial roads

- A distinctive look and ambiance so that bicyclists become aware of the existence of the bicycle boulevard and motorists are alerted that the roadway is a priority route for bicyclists

It is not practical to replace all shared-use roads with bicycle boulevards. This plan identifies several low-traffic streets to be identified as bicycle boulevards: 27th Avenue from Minnesota Drive to Blueberry Road (parallel to Northern Lights and Benson boulevards.), 10th Avenue from P Street to Medfra Street (parallel to 9th Avenue), Peterkin Street from the Glenn Highway path to Meyer Street (parallel to Mountain View Drive), and Grand Larry Boulevard (parallel to Muldoon Road). Staff will need to work with MOA Traffic Engineers to establish these routes.

Separated Pathways

The separated pathway is the principal type of bicycle facility currently used in Anchorage. These facilities are usually designed for two-way travel and accommodate a variety of nonmotorized users, including in-line skaters, bicyclists, joggers, and pedestrians. Separated pathways include both pathways paralleling roadways and greenbelt trails. The greenbelt trails tend to serve specific local locations, however, and do not always work as utility bicycling routes.

Separated pathway – Lake Otis Parkway south of Huffman Road

The separated pathway type of facility has been recommended as part of the bicycle network when all of the following factors apply:

- Bicycle and pedestrian use are anticipated to be high along the corridor.
- The adjacent roadway has high traffic volumes and speeds (BCI of D to F) with no room for on-street bicycle infrastructure.
- The separated pathway would generally be separated at least 5 feet from motor vehicle traffic, with few driveway or roadway crossings.
- No reasonable alternatives were identified for bikeways on nearby parallel streets.
- The existing system of separated pathways was desirable to preserve and provide continuity. (Alternating segments of separated pathways and bicycle lanes along a route creates inconsistentcy and is inconvenient because street crossings by bicyclists may be required when the route changes character.)

One of the most difficult and important factors to be weighed is the minimization of cross-flow conflicts between motor vehicles and bicyclists using separated pathways (see discussion in Chapter 2). Because no national standards are available to assess this factor, the recommendations for location and extension of the existing separated pathway system did not include a rigorous analysis of conflicts; the choices instead relied on generalized knowledge of the pathway system and citizen comments.

The City of Knoxville, Tennessee, has developed a useful tool for evaluating the extent of the potential bicycle-vehicle conflict along any particular corridor. This methodology for Separated Path Crossing Risk Calculation, shown in the accompanying text box, provides a general guide for assessing the appropriateness (and refining the locations) of Anchorage's separated pathways.

Separated Pathway Crossing Risk Calculation

How many points per mile does the proposed pathway score?

Calculation of Points

Residential driveway	1 point
Minor street (<1,000 vehicles, average daily traffic)	2 points
Commercial driveway	2 points
Major street (>1,000 vehicles, average daily traffic*)	4 points

*Crossing of a street with more than 10,000 vehicles in average daily traffic without a signal automatically moves the proposed path into the high-risk category.

Interpretation of Scores

1 to 8 points	Low risk: use special care to treat intersections
9 to 16 points	Moderate risk: pursue alternatives
More than 16 points	High risk: path not recommended

The risk calculation is based on the principle that the more often a separated pathway is crossed by a driveway or street intersection, the more often users of the facility are exposed to risk. Commercial strips with many driveways and a lot of turn movements are particularly dangerous corridors for separated pathways.

The risk calculation scoring is based on a threshold of 12 residential driveways or 6 minor streets per mile. If this threshold is exceeded, a bicyclist would face more than one driveway every 30 seconds or one street every minute, at which point the safety and utility of the separated pathway diminishes dramatically.

An analysis of the pathway along Lake Otis Parkway revealed that that segment from O'Malley Road to Abbott Road (a parkway-like segment that contains few driveway accesses) scored 10 points—a moderate risk. Remaining portions of the separated pathway that extend to Debarr Road were rated as high risk. See Appendix E for the complete analysis. Proposed bicycle projects (Table 6) include a study of Lake Otis Parkway to determine costs for implementing on-road bicycle lanes.

Bicyclist friendly street – Vancouver, B.C.

Signed Shared Roadways

After the major bicycle facility needs had been addressed, development of the recommended bicycle network relied on the use of existing local streets to provide important connections that were lacking between facilities. By definition, local streets are characterized by low speed and low volume. Therefore, it is only necessary to provide signs to let potential bicycle riders know that these connections are available to reach their desired destinations.

The use of signs to identify preferred bicycle routes was found to be applicable for the following situations:

- The route provides continuity to other bicycle infrastructure such as bicycle lanes and separated pathways.
- The road is a common route for bicyclists through a high-demand corridor.
- In rural areas, the route is preferred for bicycling because of low traffic volume or paved shoulder availability.
- The route extends along local streets and collectors that lead to an internal neighborhood destination such as a park, school, or commercial district.

Placing signs on shared roadways indicates that there are advantages to using these routes compared with other routes. The presence of a sign indicates that the responsible entities have taken action to ensure that these roadways are suitable for bicycling and will be maintained. A bicycle logo is proposed for inclusion on street identifier signs to further reinforce the easy identification of bicycle friendly streets.

Bicycle route sign

Bicycle Route Signs

Implementation of the recommended bicycle network will establish a 508–mile network of bikeways throughout Anchorage. Bicycle route signs will be provided on roads with on-street facilities such as bicycle lanes, bicycle boulevards, and widened shoulders to identify routes for bicyclists. These signs also serve as an educational component to notify drivers that bicyclists are actively sharing the roadway.

Separated pathways will have different non-motorized signs to indicate that these pathways are recommended for multiple users including bicyclists.

Separated pathway sign

Support Facilities

For bicycling to be a fully viable form of transportation in Anchorage, other programs and facilities are needed to complement the bicycle network. Examples are further integration of bicycles with transit services, appropriate and sufficient bicycle parking at all destinations, showers at employment centers, convenient repair services, and incentive programs offered by employers. Support facilities are discussed in more detail in Chapter 5.

The Bicycle Network – Recommended Projects

Table 6 lists proposed projects of the recommended bicycle network. (This table is included at the end of Chapter 3.) Tables 7 and 8 summarize the lengths of the facilities used to create the bicycle networks for Anchorage and Chugiak-Eagle River, respectively.

Summary of the Bicycle Network

North-South Routes

The primary north-south routes of the recommended bicycle network are Elmore Road (Rabbit Creek Road to the Glenn Highway), the north/south frontage roads of the Seward Highway, A/C Streets (from Klatt Road to 10th Avenue), Southport/Victor Road, the Jewel Lake/Wisconsin corridor, and a Far North Park route that extends from O'Malley Road to the Glenn Highway. Several of these routes (Elmore Road and Southport Road) already have existing, functioning bicycle lane segments. The A/C Street corridor from O'Malley Road to Benson Boulevard has an existing shoulder, which would require striping and signing. In some cases, extending and improving segments merely requires signage and striping; other segments require road construction (Victor/Northwood Road from 100th Avenue north to 88th Avenue and Seward Highway frontage roads) and construction of missing links (Elmore Road bridges south of DeArmoun Road and south of Abbott Road).

One cross-town project is a separated pathway in the Alaska Railroad corridor that could link town centers (Huffman and Spenard town centers). The pathway is not shown in the core bicycle network because of the high cost of design and construction, but it has been included in the ATP for many years. MOA will continue to pursue planning for this project and encourage the Alaska Railroad Corporation (ARRC) to include a separated pathway in its proposed expansion plans. At this time, the pathway does not have support from ARRC, which plans to increase train speeds to 79 mph in this corridor. ARRC has stated that an adjacent separated pathway is not compatible with these speeds.

Table 7. Miles of Facilities Recommended for the Bicycle Network – Anchorage

Facility Type	Existing Miles	Recommended Miles			
		Short Term[a]	Intermediate Term	Long Term	Total[b]
Bicycle lane[c]	8.1	59.3	13.9	10.4	91.7
Paved shoulder[c]	0	47.8	0.6	0	48.4
Separated pathway	166.4	9.0	32.3	12.4	220.1
Bicycle boulevard	0	4.2	0	0	4.2
Shared road facility	2.4	30.4	2.5	.2	33.1
Greenbelt trail	37.8	2.9	0.3	13.7	54.7
Total Network	**214.7**	**153.6**	**49.6**	**36.7**	**452.2**

[a] Short-term bicycle infrastructure includes existing short-term projects and future construction projects scheduled for 2009 to 2014.

[b] Total recommended miles include existing, previously planned, short-term categories as well as other intermediate- and long-term recommendations in the 20-year time frame, 2009 to 2029.

[c] For on-road facilities, total miles represent roadway centerline miles of bicycle infrastructure; the bicycle lanes on each side of the roadway are not counted separately.

Table 8. Miles of Facilities Recommended for the Bicycle Network – Chugiak-Eagle River

Facility Type	Existing Miles	Recommended Miles			
		Short Term[a]	Intermediate Term	Long Term	Total[b]
Bicycle lane[c]	0	19.1	1.0	0	20.1
Paved shoulder[c]	0	6.0	10	0	16.0
Separated pathway	17.2	0.1	0	0	17.3
Shared road facility	0	4.6	0	0	4.6
Greenbelt trail	16.4	0	0	0	0
Total Network	**33.6**	**29.8**	**11.0**	**0**	**58.0**

[a] Short-term bicycle infrastructure includes existing short-term projects and future construction projects scheduled for 2009 to 2014.

[b] Total recommended miles include existing, previously planned, short-term categories as well as other intermediate- and long-term recommendations in the 20-year time frame, 2009 to 2029.

[c] For on-road facilities, total miles represent roadway centerline miles of bicycle infrastructure; the bicycle lanes on each side of the roadway are not counted separately.

East-West Routes

The primary east-west routes of the recommended bicycle network are O'Malley Road (Hillside Drive to C Street), Abbott Road (Hillside Drive to C Street), International Airport Road (Minnesota Drive to Campbell Trail), Raspberry Road (Kincaid Park to C Street), Campbell Creek Trail, Benson Boulevard, Chester Creek Trail, and Debarr Road (Muldoon Road to C Street). Abbott Road is ready to stripe and sign as a paved bikeway, but O'Malley Road from Hillside Drive to Seward Highway requires reconstruction. A stand-alone project could construct a separated pathway along the north side of O'Malley Road from Old Seward Highway to C Street. This route could travel under the Alaska Railroad bridge to provide a separated connection. The east end of an extension to Raspberry Road will undergo improvements to connect to Dowling Road, work that can include bicycle infrastructure. An additional connection could be provided by a separated pathway project from Raspberry Road at C Street across Campbell Creek to connect to 68th Avenue. This project would entail improvements within the Campbell Creek greenbelt.

International Airport Road will be improved as part of the Seward Highway project, and adding bicycle lanes will create a connection with the existing Campbell Creek Trail. DOT&PF has committed to constructing the undercrossing of the Campbell Creek Trail at the Seward Highway as part of the Seward Highway project.

Special Study Areas

Several projects require special study to examine alternatives and define future work. These projects are typically in areas of Anchorage for which the ability to create safer bicycle routes combined with an existing roadway and building infrastructure is most difficult. Those areas are Government Hill; Midtown; the Dowling Road roundabouts; along Lake Otis Parkway, Muldoon Road, and the Ingra/Gambell couplet; and the Dimond Boulevard and Victor Road intersection.

Bicycle access to the Government Hill neighborhood is difficult because of the existing topography and elements such as the access roads to the Port of Anchorage and the Alaska Railroad main yard and the proposed access roads to the proposed ferry and potential Knik Arm Bridge and Toll Authority crossing. Improved bicycle connections from Government Hill to downtown Anchorage, as well as the Coastal and Ship Creek trails, needs to be examined.

Although it is widely recognized that better east-west bicycle infrastructure is needed through the midtown area of the Anchorage Bowl, it is not immediately apparent how to provide these improvements, given the existing road dimensions. A proposed reconnaissance study would examine the pedestrian and bicycling opportunities in the area between Northern Lights and Benson boulevards (as well as the area up to Fireweed Lane). It has been suggested that the Benson Boulevard bicycle lane would work as a west-to-east corridor, with Fireweed Lane serving as the east-to-west portion of the bicycle couplet; however, many consider Northern

Lights Boulevard to be a more natural east-west route. The study would include developing recommendations for Midtown facility improvements that best address the needs for both bicyclists and motorists.

Another study area involves the Dowling Road roundabouts. Currently Dowling Road east from Lake Otis Parkway to Elmore Road is being constructed with bicycle lanes and separated pathways. That road project will be followed by construction of Dowling Road west from Old Seward Highway to C Street, which will also have bicycle lanes and separated pathways. A third, related road project will construct a new connector to Raspberry Road from Dowling Road at C Street, creating potential for a cross-town bicycle route. Because the Dowling Road roundabouts can be an obstacle to many bicyclists, a study will examine ways to create a more bicycle-friendly route through the roundabouts.

A proposed reconnaissance study would examine construction costs for a project to reduce the pathway setback and creating on--street bicycle lanes along Lake Otis Parkway from DeArmoun Road to Debarr Road. This project, which would entail costs associated with storm drain improvements, would improve the safety of the existing facility for the many bicyclists who currently use this route.

Muldoon Road from Northern Lights Boulevard north to Bartlett High School has also been identified for future study. Muldoon Road currently has some back-of-curb pathways, but the ability to enhance bicycle and pedestrian travel within and to this town center area of Anchorage merits further examination. As a short-term remedy before completion of the special study, a separated parallel bicycle route that uses local roads has been identified east of Muldoon Road. This route will be a combination of bicycle boulevards and separated pathways.

Two additional studies will focus on the Ingra/Gambell couplet area and the intersection of Dimond Boulevard and Victor Road. For the Ingra/Gambell couplet, safety improvements for bicycle connections will be examined. Proposed improvements to Victor Road south of Dimond Boulevard, as well as a Northwood Drive extension, have highlighted the need to identify ways to promote bicycle flow and connectivity in the area around the Dimond Boulevard and Victor Road intersection.

Project Scopes – Costs and Work Involved

The recommended projects range in scope from those with a low cost to implement, such as adding "Bicycle Lane" and "Bike Route" signs and striping of bicycle lanes (on roadways already wide enough to accommodate bicycle lanes), to the higher-cost projects requiring design and reconstruction of roadways, construction of separated pathways, or stand-alone projects such as bridges or upgrades of existing facilities. Two examples of upgrading an existing facility are the installation of sweeps on a pathway and widening a facility from 5 feet to 10 feet. In many cases, striping and signage may be grouped and identified as new capital projects or could be included with planned MOA seasonal maintenance. This Bicycle Plan recommends identifying paved shoulder facilities as part of the bicycle network where bicycle lanes are not possible (because of narrowing at intersections). As space allows, the shoulders will be identified with bicycle route signs and share-the-road signs. These tasks will require coordination with MOA and DOT&PF Traffic Engineers.

Costs for striping and marking improvements to existing roadways are based on using a spray methyl paint to stripe the roadway and assume that no striping currently exists on the road. Although this methyl paint costs more than other available striping paint, it lasts longer. Other paints typically need to be applied every year because of damage from snowplow and vehicle wear.

The costs shown for stand-alone bicycle network improvements requiring construction include design and construction costs. Identification of these costs is helpful in budgeting and implementing the projects if they are not covered under current construction planning.

Several engineering reconnaissance projects are listed in Table 6. In these projects, engineering study would be conducted to determine extents and expected costs. As part of the engineering study, the needed improvements and costs would be identified and the impacts to traffic flow would be assessed. Examples of these reconnaissance projects are (1) the study of feasibility for an addition of bicycle lanes and pedestrian facilities for the Northern Lights and Benson boulevards couplet between LaTouche Street and Lois Drive and (2) analysis of whether the separation between the road and path on Lake Otis Parkway between DeArmoun Road and Debarr Road can be narrowed to install a bicycle lane.

Some project costs are not identified in Table 6, including costs for bicycle infrastructure that will be included with proposed road improvement projects or for funded greenbelt trail projects. Some of these projects are already in progress, and others are only are identified in the 2025 LRTP as future projects.

Table 9 presents a summary of costs identified for the proposed bicycle network. It shows costs for short-, intermediate-, and long-term projects and for greenbelt projects.

Table 9. Summary of Costs for the Proposed Bicycle Network

Project Location	Short Term	Intermediate Term	Long Term	Total
Anchorage roadway	$18,586,800	$21,252,000	$13,975,000	$53,813,800
Anchorage greenbelt	0	$800,000	$52,740,000	$53,540,000
Total Anchorage	***$18,586,800***	***$22,052,000***	***$66,715,000***	***$107,353,800***[a]
Chugiak-Eagle River	$1,648,100	$571,500	0	$2,219,600
Total Network	**$20,234,900**	**$22,623,500**	**$66,715,000**	**$109,573,400**

[a] Includes $29,512,600 for Priority A projects.

The chief role of the project list in Table 6 and this Bicycle Plan is to serve as information for consideration when developing future capital improvement projects in Anchorage.

Implementation and Prioritization

Table 6 also identifies the anticipated timing for implementing all recommended bicycle infrastructure projects. Projects are identified as short term (2009 to 2014), intermediate term (2014 to 2019), or long term (2019 to 2029). Because many projects identified in this plan require building dedicated bicycle lanes or pathways in conjunction with roadway improvement projects, their priorities are determined by the priorities of the underlying roadway projects. For example, the 2025 LRTP identifies 92nd Avenue between Minnesota Drive and King Street as a short-term reconstruction project. It makes sense to include the 92nd Avenue bicycle lane as a short-term project in the Bicycle Plan because it will likely be constructed at the same time as the roadway project. Bicycle infrastructure projects that can be included as a part of a roadway project in the MOA Capital Improvement Program (CIP) are treated similarly in the implementation schedule. (Column 7 of Table 6 provides a planned construction year or identifies the funding source for each of these projects.)

Many recommended bicycle infrastructure projects listed in Table 6 only require striping and signing. Because of the ability to complete such projects quickly, all of these projects have been included in the short-term project category.

Project Priorities

As with other transportation improvement projects, the resources available to construct bicycle infrastructure projects are limited. Although desirable, implementing all projects listed in Table 6 during the recommended time periods is unlikely to occur. To guide decision-making about funding, the plan establishes criteria for priorities. High-priority projects (Priority A in Table 6) include routes and intersections that either have a high number of bicycle-vehicle crashes, as identified in Tables 4 and 5, or are part of the proposed core bicycle network (Figure 10). Use of these criteria will ensure projects that have the potential to reduce accidents and address locations that are expected to be the most heavily used are given the highest priority. The prioritization of bicycle projects is not intended to affect the priorities of the underlying roadway projects, although the identified importance to the Bicycle Plan implementation may be one of many criteria used to rank a roadway project.

Short Term Implementation – 2009 to 2014

Many projects among those identified as short term can be accomplished within 5 years of when this Bicycle Plan is adopted. These new facilities are located on roadways that have been constructed with shoulders of sufficient width to allow adequate room for bicycle lanes or paved shoulder bikeways. Bicycle lanes or bicycle shoulders may simply need striping and bicycle lane markings on the road to identify them and make them part of the bicycle network. Also needed would be "Bike Lane" or "Share the Road" (if the facility is to remain a wide shoulder) signs. In all cases, these routes would be marked with "Bike Route" signs to identify continuous routes for bicyclists. Some short-term projects include separated pathways when the roadway is scheduled for improvements within the next 5 years.

Roadway projects scheduled for maintenance overlays or rut repair projects do not have adequate funding to support road widening or construction of separated pathways and are not identified as projects in Table 6. The total costs to implement short-term projects are $18.5 million for Anchorage and $1.7 million for Chugiak-Eagle River.

Intermediate Term Implementation – 2014 to 2019

Most projects identified within the intermediate term entail reconstruction of existing roadways to create spaces wide enough for bicycle lanes or separated pathways. In some cases, additional funds may be identified to do stand-alone projects, but usually it is more appropriate to include these projects in road projects. Typically the roadway projects with which these facilities are associated are already included in capital funding. They are currently under design and are expected to be constructed by 2019. The total costs to implement intermediate-term projects are $22 million for Anchorage (which includes $800,000 for greenbelt projects) and $571,500 for Chugiak-Eagle River.

Long Term Implementation – 2019 to 2029

Most of these projects would require identification for funding in a future capital improvement program. The approved Bicycle Plan should identify where new facilities should be included with road projects during the design phase of the project. The total cost to implement long-term projects in Anchorage is $67 million (which includes $52.7 million for greenbelt projects).

Table 6. Recommended Bicycle Network

Short Term 2009–2014	Intermediate Term 2014–2019	Long Term 2019–2029	Bicycle Network Project (Priority A projects: ✓)	Type	Construction Year[a]	Distance (miles)	Estimated Project Cost[b]
ANCHORAGE							
shared			2nd Avenue – E Street to H Street	S		0.2	$600
shared			✓ 3rd Avenue – Post Road to E Street	S	LRTP	0.2	$600
sep. path			✓ 3rd Avenue – A Street to Hyder Street	DC		0.6	$721,000
sep. path			✓ 3rd Avenue – Orca Street to Unga Street	DC		0.5	$601,000
shared			4th Avenue – L Street to E Street	S, M		0.41	$13,000
bicycle lane			✓ 5th Avenue – Coastal Trail to Karluk Street	S, M		1.47	$47,000
bicycle lane			✓ 6th Avenue – Patterson Street to Muldoon Road	S, M		1	$32,000
shared			6th Avenue – Pine Street to Boniface Parkway	S		0.45	$14,000
	sep. path		6th Avenue – Zembeck Circle to Glacier Bay Circle	S		0.11	$132,000
shared			7th Avenue – Pine Street to Bragaw Street	S		0.5	$16,000
boulevard			✓ 10th Avenue – P Street to Medfra Street	S, M		1.77	$60,000
shared			10th Avenue – Turpin Street to Patterson Drive	S		0.25	$8,000
shared			10th Avenue – Muldoon Road to Boston Street	S		0.15	$4,000
shared			13th Avenue – Gambell Street to Medfra Street	S		0.4	$12,000
shared			16th Avenue – Beaver Pl. to Patterson Street	S		0.5	$16,000
shared			20th Avenue – Chester Trail to Russian Jack	S		0.8	$986,000
		sep. path	20th Avenue – Sitka Street to 17th Avenue at Orca Street	DC		0.5	$600,000
shared			20th Avenue – Sitka Street to Chester Trail at Tikishla Park	S		0.6	$20,000
boulevard			27th Avenue – Blueberry Road to Minnesota Drive	S, M		0.74	$27,000
shared			32nd Avenue – Arctic Blvd. to Old Seward Highway	S		1	$32,000
	sep. path		32nd Avenue – Cope Street to Arctic Blvd. at AWWU	DC		0.11	$132,000
shared			32nd Avenue – Spenard Road to Cope Street	S		0.15	$4,800
bicycle lane			35th Avenue – Spenard Road to Minnesota Drive	DC	2015	0.12	
	bicycle lane		35th Avenue/McCrae – Wisconsin Street to Spenard Road	R	2011	0.15	
shared			36th Avenue – Fish Creek to Minnesota Drive	S		0.6	$20,000

Table 6. Recommended Bicycle Network

Short Term 2009–2014	Intermediate Term 2014–2019	Long Term 2019–2029	Bicycle Network Project (Priority A projects: ✓)	Type	Construction Year[a]	Distance (miles)	Estimated Project Cost[b]
		sep. path	36th Avenue – LaTouche Street to Rhone Ct.	DC		0.1	$120,000
bicycle lane			36th Avenue – Patterson Street to Muldoon Road	S, M		0.5	$16,000
	bicycle lane	sep. path	36th Avenue – Spirit Drive to Piper Road	DC		0.19	$238,000
sep. path			40th Avenue – Lake Otis Parkway to Dale Street	R	2009	0.8	
sep. path			40th Avenue – Arctic Blvd. to Old Seward Highway	DC		0.34	$419,000
shared			42nd Avenue – 40th Avenue to Eau Claire Street	S		1	$32,000
bicycle lane			48th Avenue (Drive MLK Jr Avenue) – Elmore Road to Boniface Drive	R	2009	1.14	
sep. path			48th Avenue (Drive MLK Jr Avenue) – Elmore Road to Boniface Drive	R	2009	1.14	
shared			56th Avenue – Potter Drive to Campbell Trail	S		0.3	$3,600
sep. path			68th Avenue – C Street to Merlin Street	DC		0.4	$1,350,000
shared			68th Avenue – Merlin Street to Old Seward Highway	S		0.3	$9,600
bicycle lane			✓ 68th Avenue – Seward Highway to Lake Otis Parkway	S, M		0.76	$25,000
	bicycle lane		68th Avenue – Homer Drive to Brayton Drive	R	LRTP	0.1	
bicycle lane			✓ 76th Avenue – Alaska Railroad to Seward Highway	S, M		0.64	$21,000
	bicycle lane		76th Avenue – Brayton Drive to Homer Drive	R	LRTP	0.1	
shared			76th Avenue – Alaska Railroad to Taku Lake Park	S		0.15	$4,800
shared			88th Avenue – Abbott Road to Lake Otis Parkway	S, M	2008	0.4	$13,000
bicycle lane			88th Avenue – Jewel Lake Road to Northwood Street	S, M		0.98	$32,000
shared			88th Avenue – Lake Otis Parkway to Elmore Road	S	2010 &2011	1.15	
bicycle lane			92nd Avenue – Minnesota Drive to King Street	R	LRTP	1	
bicycle lane			92nd Avenue – King Street to Seward Highway	R	LRTP	0.5	
bicycle lane			92nd Avenue – Homer Drive to Brayton Drive	R	LRTP	0.1	
bicycle lane			92nd Avenue/Academy Drive – Abbott Road to C Street	S	2011	1.8	
sep. path			92nd Avenue/Academy Drive – Abbott Road to C Street	S	2011	1.8	
	sep. path		100th Avenue – Minnesota Drive to King Street	R	LRTP	1	
	bicycle lane		120th Avenue – Johns Road to Old Seward Highway	R	2010	0.5	

Table 6. Recommended Bicycle Network

Short Term 2009–2014	Intermediate Term 2014–2019	Long Term 2019–2029	Bicycle Network Project (Priority A projects: ✓)	Type	Construction Year[a]	Distance (miles)	Estimated Project Cost[b]
	sep. path		120th Avenue – Johns Road to Old Seward Highway	R	2010	0.5	
shoulder			✓ Abbott Road – Birch Road to Hillside Drive	DC		1	$32,000
shoulder			✓ Abbott Road – Lake Otis Parkway to Birch Road	S, M	LRTP	1	$13,000
bicycle lane			✓ Abbott Road – Academy Road to Lake Otis Parkway	R		0.4	$13,000
sep. path			Aero Drive – Lakeshore Drive to Cosmos Drive	DC		0.56	$700,000
sep. path			Airport Heights Drive – Penland Pkwy to Glenn Highway	DC		0.14	$175,000
		sep. path	Alaska Railroad Crosstown Trail – Potter Marsh to Fish Creek	S		9.7	$25,600,000
bicycle lane			✓ Arctic Boulevard/E Street – Fireweed Blvd. to 10th Avenue	S, M		1.18	$38,000
bicycle lane			✓ Arctic Boulevard – Benson Blvd. to Fireweed Blvd.	S, M		0.3	$10,000
shoulder			Arctic Boulevard – 36th Avenue to Benson Boulevard	S		0.5	$16,000
shoulder			Arctic Boulevard – Tudor Road to 36th Avenue	S	2012	0.5	
shoulder			Arctic Boulevard – 68th Avenue to Tudor Road	S	2009-10	1.5	
shoulder			Arctic Boulevard – Dimond Blvd. to 68th Avenue	S		1	$32,000
shared			Arkansas Drive – Spenard Road to 36th Avenue	S		0.25	$8,000
shared			Askeland Drive – 68th Avenue to Dowling Road	S		0.6	$20,000
shared			Aspen Road – Spenard Road to Northwood Drive	S		0.4	$28,000
shared			Bainbridge Road – DeArmoun Road to Huffman Road			0.58	$25,000
bicycle lane			✓ Baxter Road – Tudor Road to 21st Avenue at Cheney Lake	S, M		1.5	$48,000
	shared		✓ Baxter Road/Beaver Place – Cheney Lake to Debarr Road	S		0.4	$13,000
bicycle lane			✓ Benson Boulevard – Arlington Drive to LaTouche Street	S, M		1.7	$55,000
	bicycle lane		Birch Road – O'Malley Drive to Abbott Road	R	LRTP	0.5	
	bicycle lane		Birch Road – Huffman Road to O'Malley Drive	R	LRTP	0.5	
shared			Birch Road – DeArmoun Road to Bristol Drive	S		0.6	$20,000
shoulder			Boundary Road – Boniface Drive to Muldoon Road	S, M		1.5	$48,000
shared			Business Park Blvd. – International Airport Road to 48th Avenue	S		0.28	$9,000
bicycle lane			✓ C Street – O'Malley to 10th Avenue	S		6.3	$220,000

Table 6. Recommended Bicycle Network

Short Term 2009–2014	Intermediate Term 2014–2019	Long Term 2019–2029	Bicycle Network Project (Priority A projects: ✓)	Type	Construction Year[a]	Distance (miles)	Estimated Project Cost[b]
	sep. path		✓ Campbell Trail – Seward Highway undercrossing	R	2015	0.1	
	sep. path		✓ Campbell Airstrip Road – Bivouac Parking to Tudor Road	DC		2.25	$3,000,000
	Bicycle lane		✓ Campbell Airstrip Road – Bivouac Parking to Tudor Road	R		2.25	
sep. path			Campbell Trail – Tudor Center Drive to Tudor Crossing	R	2009	0.4	
	sep. path		Campbell Trail – Lake Otis Parkway undercrossing	DS		0.1	$15,000,000
	sep. path		Campbell Trail Spur – Dimond Blvd. to trail, west side C Street	DS		0.05	$300,000
shoulder			Checkmate Drive – Tudor Road to Northern Lights Blvd.	S, M		1.06	$34,000
		sep. path	Chester Creek Trail – repaving to correct tree roots.	DC			$2,000,000
		sep. path	Chester Creek Connection – Colgate Drive to Patterson Drive	DC		0.42	$1,200,000
sep. path			✓ Chester Trail – Ambassador Drive to E. Northern Lights Blvd.	DC	2009	1.85	
sep. path			Chester Trail – UAA Pathway	DC	2009	0.6	
	sep. path		Chester Trail Spur – Castle Heights Park to trail	DC		0.07	$200,000
		sep. path	✓ Coastal Trail – connection to Ship Creek Trail	DC		0.64	$1,700,000
		shared	Colgate Drive – Baxter Drive to Chester Creek	S		0.2	$535,000
shared			Collins Drive – Jewel Lake Road to Strawberry Road	S		0.6	$20,000
shared			Cordova Street – 3rd Avenue to Ship Creek Trail	S, M		0.34	$12,000
bicycle lane			Cordova Street – 10th Avenue to 3rd Avenue	S, M		0.47	$15,000
bicycle lane			Cordova Street – 16th Avenue to 10th Avenue	S, M		0.44	$14,000
shared			Craig Drive – Boniface Drive to Nunaka Valley Park	S		0.25	$8,000
bicycle lane			✓ DeArmoun Road – Seward Highway to 140th Avenue	S, M		1.42	$46,000
sep. path			DeArmoun Road – 140th Avenue to Hillside Drive	R	LRTP	2	
	sep. path		✓ Debarr Road – Orca Blvd. to Turpin Street	DC		2.56	$3,154,000
	sep. path		Debarr Road – Muldoon Road to Crosse Pointe Loop	DC		0.36	$500,000
	sep. path		Dimond Boulevard – Jodphur Street to Sand Lake Road	R	2013	1.5	
	shared		Dimond Boulevard – Jodphur Street to Sand Lake Road	R	2013	1	
bicycle lane			✓ Dimond Boulevard – Sand Lake Road to Jewel Lake Road	S		1.04	$34,000

Table 6. Recommended Bicycle Network

Short Term 2009–2014	Intermediate Term 2014–2019	Long Term 2019–2029	Bicycle Network Project (Priority A projects: ✓)	Type	Construction Year[a]	Distance (miles)	Estimated Project Cost[b]
study (Area G)			✓ Dimond Blvd. at Victor Road – reconnaissance study	DS			$500,000
bicycle lane			✓ Dowling Road West – C Street to Old Seward Highway	R	LRTP	0.62	
Sep. path			✓ Dowling Road West – C Street to Old Seward Highway	R	LRTP	0.62	
bicycle lane			✓ Dowling Road east – Elmore Road to Lake Otis Parkway	R	2009	1	
Sep. path			✓ Dowling Road east – Elmore Road to Lake Otis Parkway	R	2009	1	
study (Area E)			✓ Dowling Road roundabouts – study of bicycle-friendly improvements	S			$800,000
bicycle lane			E Street – north of 15th – signs and potential bike box	S, M		0.05	$50,000
shared			E/F Street –6th Ave to 2nd Avenue	S, M		0.27	$3,000
shared			F Street – 6th Ave to 2nd Avenue	S, M		0.27	$10,000
	sep. path		Edward Street – Debarr Road to 6th Avenue	R	2010	0.45	
	sep. path		✓ Elmore/Bragaw Rd. extension – Providence Dr. to Northern Lts. Blvd.	R	LRTP	1.2	
	bicycle lane		✓ Elmore Road – 48th Avenue to Tudor Road	R		0.25	$20,000
sep. path			✓ Elmore Road – 48th Avenue to Tudor Road	R	2009	0.25	
bicycle lane			✓ Elmore Road – 98th Avenue to Abbott Road	S, M		0.34	$12,000
sep. path			✓ Elmore Road – 101st Avenue to Lilleston Road	DC		0.35	$900,000
bicycle lane			✓ Elmore Road – O'Malley Road to 101st Avenue	S, M		0.35	$12,000
	bicycle lane		✓ Elmore Road – O'Malley Road to Abbott Road		2016	0.75	
bicycle lane			✓ Elmore Road – DeArmoun Road to O'Malley Road	S, M		2	$64,000
	sep. path		✓ Elmore Road – Riverton Avenue to Natrona Avenue	B		0.1	$900,000
	shared		✓ Elmore Road – Rabbit Creek Road to DeArmoun Road	R		0.6	$20,000
	sep. path		✓ Elmore Road Extension – Rabbit Creek Road to DeArmoun Road	DC, B		0.76	$2,000,000
	bicycle lane		✓ Elmore Road Extension – Rabbit Creek Road to DeArmoun Road	R		0.7	$25,000
shared			Evergreen Drive – Rabbit Creek Road to Buffalo Street and DeArmoun Road	S		1.18	$40,000
bicycle lane			Fireweed Lane – Spenard Road to Seward Highway	R	LRTP	1.25	
shoulder			Fireweed Lane – Seward Highway to LaTouche	S, M		1.25	$30,000
		sep. path	Fish Creek Trail – Spenard Road to Northwood Drive	DC		0.34	$820,000

Table 6. Recommended Bicycle Network

Short Term 2009–2014	Intermediate Term 2014–2019	Long Term 2019–2029	Bicycle Network Project (Priority A projects: ✓)	Type	Construction Year[a]	Distance (miles)	Estimated Project Cost[b]
shoulder			Forest Park Drive – Hilltop Drive to Coastal Trail	S		0.34	$11,000
shoulder			Forest Park Drive – Northern Lights Blvd. to Hilltop Drive	S		0.34	$11,000
shared			✓ G Street – 3rd Avenue to 10th Street	S		0.47	$15,000
	sep. path		✓ Gas Line Trail connector to Bivouac Parking – unpaved	DC		0.11	$300,000
	sep. path		Glenn Highway Tunnel Resurfacing	DC		0.5	$1,500,000
shoulder			✓ Golden View Drive – Rabbit Creek Road to Ransom Ridge Road	DC		0.87	$50,000
	bicycle lane		✓ Golden View Drive – Rabbit Creek Road to Romania Drive	R	2013	1.75	
	sep. path		✓ Golden View Drive – Rabbit Creek Road to Romania Drive	R	2013	1.75	
		sep. path	Golden View Drive connector – Old Seward Highway to Golden View Drive	R		1.09	$4,400,000
	study (Area A)		Government Hill – access study	S			$500,000
shared			Griffin Road – DeArmoun Road loop	S		0.56	$18,000
	Sep. path		Highway to Highway – 36th Avenue to 3rd Avenue	DC	LRTP		
shoulder			✓ Hillside Drive – Clark's Road to Abbott Road	S		4	$130,000
shoulder			Hilltop Drive – Forest Park Road to Spenard Road	S, M		0.23	$7,500
sep. path			✓ Huffman Road – Old Seward Highway to Lake Otis Parkway	R	2009	0.5	
Bicycle lane			✓ Huffman Road – Old Seward Highway to Lake Otis Parkway	R	2009	0.5	
sep. path			✓ Huffman Road – Lake Otis Parkway to Birch Road	R	2009	0.5	
	sep. path		Huffman Road – Birch Road to Hillside Drive	R		0.5	$1,500,000
bicycle lane			✓ Huffman Road – Seward Highway to Elmore Road	S, M		1.5	$50,000
	bicycle lane		✓ Huffman Road – Elmore Road to Birch Road	R		1	$32,000
	sep. path		✓ Huffman Road – Elmore Road to Birch Road	R		1	$1,500,000
bicycle lane			Independence Drive – O'Malley Road to Abbott Road	R	2008	1.1	
	study (Area F)		✓ Ingra/Gambell – reconnaissance study to alleviate high crashes	S			$500,000
shared			International Airport Road/Frontage – Spenard Road to Northwood Drive	S		0.5	$16,000
		sep. path	International Airport Road – Southampton Drive to Business Park	R		0.57	$705,000
		bicycle lane	International Airport Road – Southhampton Drive to Homer Drive	R		1.6	$510,000

Table 6. Recommended Bicycle Network

Short Term 2009–2014	Intermediate Term 2014–2019	Long Term 2019–2029	Bicycle Network Project (Priority A projects: ✓)	Type	Construction Year[a]	Distance (miles)	Estimated Project Cost[b]
	bicycle lane		International Airport Road – Homer Drive to Brayton Drive	DC	LRTP	0.1	
bicycle lane			✓ Jewel Lake Road – Dimond Blvd. to International Airport Road	D	LRTP	2.8	
shared			Jodphur Street – Dimond Blvd. to Kincaid Road	S, M		0.58	$20,000
		sep. path	Johns Park – John Road to Timberlane Drive	D		0.53	$1,300,000
bicycle lane			Johns Road – Klatt Road to Huffman Road	S		0.25	$8,000
sep. path			Johns Road – Klatt Road to Ocean View Drive	DC		0.6	$740,000
bicycle lane			Johns Road – Huffman Road to Ocean View Drive	S, M		0.04	$3,000
shared			Juneau Street – Fireweed Lane to Chester Trail	DC		0.08	$5,000
shared			Karluk Street – Chester Trail to 3rd Avenue	S, M		1.26	$42,000
	sep. path		Kincaid Park link – Jodphur Street to Raspberry Road	DC		0.30	$750,000
shared			Kincaid Road – Jodphur Street to Sand Lake Road	DC		1.0	$32,000
		sep. path	Kincaid Road – Jodphur Street to Sand Lake Road	DC		1.0	$2,400,000
Bicycle lane			King Street – Dimond Blvd. to 76th Avenue	S, M		0.50	$20,000
shared			King Street – 104th Avenue to Dimond Blvd.	S, M		1.23	$40,000
Sep path			King Street – Olive Lane at O'Malley Road to 104th Avenue	S, M		0.19	$500,000
shared			✓ Klatt Road – west of Puma Street	DC		0.45	$15,000
shared			Klatt Road – Old Seward Highway east to Trail	S		0.12	$5,000
		sep. path	Knik Arm Crossing	DC	LRTP	4	
shoulder			Lake Hood Drive – Postmark Drive to West Northern Lights Blvd.	DC		0.45	$15,000
sep. path			✓ Lake Otis Parkway – Northern Lights to Debarr Road	DC	LRTP	1	
		sweep	✓ Lake Otis Parkway – Abbott Road to DeArmoun Road	DC		3	$500,000
	study (Area B)	bicycle lane	✓ Lake Otis Parkway – DeArmoun Road to Debarr Road	S		8	$1,000,000
shared			LaTouche Street – 36th Avenue to Bannister Lane	S		0.7	$23,000
shared			✓ Lore Road – Lake Otis Parkway to Elmore Road	R		1	$32,000
	bicycle lane		✓ Lore Road – Seward Highway to Lake Otis Parkway	S, M		0.68	$22,000
shared			✓ McCarrey Street – Klondike Street to Mountain View Drive	S		0.5	$16,000

Table 6. Recommended Bicycle Network

Short Term 2009–2014	Intermediate Term 2014–2019	Long Term 2019–2029	Bicycle Network Project (Priority A projects: ✓)	Type	Construction Year[a]	Distance (miles)	Estimated Project Cost[b]
shared			Medfra Street – Debarr Road to 9th Avenue	S		0.35	$11,200
	study (Area C)		Midtown east-west routes – reconnaissance study	S			$1,000,000
shoulder			Milky Way Drive – Aero Drive to Wisconsin Street	S		0.5	$16,000
	Sep. path		Mountain Air Drive – Rabbit Creek Road to future developments	R	2010	0.71	
shared			✓ Mountain View Drive – Pine Street to Lane Street	S, M		0.13	$5,000
	study (Area D)		✓ Muldoon Rd. – reconnaissance study, Northern Lts. Blvd. to Glenn Hwy.	DS			$1,000,000
boulevard			Muldoon bypass – bicycle blvd. – Boston, State, Valley, Grand Larry, 2nd	S, M		1.25	$45,000
		sep. path	Muldoon Rd. bypass – 10th Avenue to 6th Avenue along creek	DC		0.30	$500,000
		bicycle lane	Muldoon Road – Boundary Road to Glenn Highway	R		0.25	$8,000
shared			N Street – 9th Avenue to L Street	S		0.5	$16,000
shared			Norene Drive – 20th Avenue to Debarr Road	S		0.5	$16,000
	sep. path		✓ Northern Lights Blvd. – Seward Highway to Lake Otis Parkway	DC		1.0	$1,235,000
	sep. path		✓ Northern Lights Blvd.– Wesleyan Blvd. to Muldoon Road upgrades	DC		1.85	$1,000,000
shared			Northway Drive – Debarr Road to Penland Parkway	S		0.4	$13,000
shoulder			Northwood Drive – International Airport Road to Spenard Road	S		0.6	$20,000
	bicycle lane		✓ Northwood Drive – 88th Avenue to Raspberry Road	DC		1.25	$40,000
	bicycle lane		✓ Northwood Drive – Dimond Blvd. to 88th Avenue	R	2012	0.25	
shared			Oceanview Drive – Brandon Street to Johns Road	S		0.8	$13,000
	bicycle lane		✓ Old Seward Highway – Tudor Road to 33rd Avenue	R		0.67	$22,000
sep. path			✓ Old Seward Highway – Huffman Road to O'Malley Road	R	2009/10	1	
shoulder			✓ Old Seward Highway – Huffman Road to O'Malley Road	R	2009/10	1	
shoulder			✓ Old Seward Highway – Rabbit Creek Road to Huffman Road	S		1.75	$57,000
shoulder			Old Seward Highway – Rabbit Creek Road to Potter Creek Road	R		2.6	$85,000
bicycle lane			✓ O'Malley Road – Seward Highway to Hillside Drive	R	LRTP	3.6	
sep. path			✓ O'Malley Road – Lake Otis Parkway to Hillside Drive	R	2012	1.6	
sep. path			✓ O'Malley Road – Old Seward Highway to C Street	DC		0.8	$986,000

Table 6. Recommended Bicycle Network

Short Term 2009–2014	Intermediate Term 2014–2019	Long Term 2019–2029	Bicycle Network Project (Priority A projects: ✓)	Type	Construction Year[a]	Distance (miles)	Estimated Project Cost[b]
sep. path			Patterson Drive – 10th Avenue to Debarr Road	R		0.23	$284,000
bicycle lane			Patterson Drive – Chester Creek to Debarr Road	S, M		0.42	$14,000
bicycle lane			Penland Parkway – Airport Heights Blvd. to Bragaw Street	S	2010	0.53	
boulevard			✓ Peterkin Street – Bunn Street to McPhee Street	S, M		0.8	$30,000
bicycle lane			Petersburg Drive – Dowling Road to Cache Drive	S		0.7	$23,000
bicycle lane			✓ Pine Street – Debarr Road to Klondike Street	S, M		0.68	$22,000
shared			Post Road – 3rd Avenue to Ship Creek Trail	S		0.2	$6,400
bicycle lane			Postmark Drive – International Airport Road to Point Woronzoff Drive	R		1.6	$51,000
shared			Potter Drive – Fairbanks Street to Arctic Blvd.	S		0.75	$24,000
shoulder			Potter Valley Road – Old Seward Highway to Greece Road	S, M		2.0	$70,000
shoulder			✓ Rabbit Creek Road – Evergreen Drive to Clark's Road	S, M		1.16	$40,000
		bicycle lane	✓ Rabbit Creek Road – Seward Highway to Golden View Drive	R		2.1	$67,000
		sep. path	✓ Rabbit Creek Road – Seward Highway to Golden View Drive	R		2.1	$2,600,0000
bicycle lane			✓ Raspberry Road – Kincaid Park entry to Minnesota Drive	S, M		3.4	$109,000
bicycle lane			✓ Raspberry Road – Arctic Blvd. to C Street	S, M		0.15	$5,000
bicycle lane			✓ Raspberry Road Extension to Dowling Road at C Street	DC	LRTP	1	
sep. path			✓ Raspberry Road Extension to Dowling Road at C Street	DC	LRTP	1	
shoulder			Reeve Blvd. – 5th Avenue to Post Road	S, M		0.7	$23,000
		sep. path	Russian Jack Trail – Pine Street to trail connection	DC		0.11	$270,000
bicycle lane			Sand Lake Road – Dimond Blvd. to Raspberry Road	S, M		1.5	$48,000
sep. path			Seward Highway – Tudor Road to 36th Avenue	DC		0.52	$467,000
	sep. path		✓ Seward Highway/Brayton Drive – O'Malley Road to 36th Avenue	R	2015	4.5	
	sep. path		✓ Seward Highway/Homer Drive – O'Malley Road to 36th Avenue	R	2015	4.5	
	sep. path		✓ Seward Highway/Brayton Drive – Rabbit Creek Road to O'Malley Road	R	2015	1.75	
	sep. path		✓ Seward Highway/Homer Drive – Rabbit Creek Road to O'Malley Road	R	2015	1.75	
		sep. path	Seward Highway – Potter Weigh Station to Rabbit Creek Road	R	2015	2.8	

Table 6. Recommended Bicycle Network

Short Term 2009–2014	Intermediate Term 2014–2019	Long Term 2019–2029	Bicycle Network Project (Priority A projects: ✓)	Type	Construction Year[a]	Distance (miles)	Estimated Project Cost[b]
		sep. path	Ship Creek Trail – Glenn Highway to Tyson School	DC		1.52	$4,100,000
shared			Shore Drive – Victor Road to Johns Park	S		0.8	$25,000
		sep. path	Sitka Street – 20th Avenue to Maplewood Street	DC, B		0.11	$800,000
	bicycle lane		Spenard Road – Minnesota Drive to Benson Blvd.	R		0.75	$24,000
shoulder			Spenard Road – Benson Blvd. to Hillcrest Drive	R	2009	0.6	
sep. path			Spenard Road – Hillcrest Drive to 17th Avenue	R	2009	0.3	
shoulder			Spruce Street – 84th Avenue to 72nd Street	S		0.8	$26,000
shoulder			Spruce Street – 72nd Street to Dowling Road	R		0.6	$20,000
shoulder			Strawberry Road – Jewel Lake to Northwood Road	S		1	$32,000
shared			Sunset Drive – 20th Avenue to Debarr Road	S		0.5	$16,000
shared			Timberlane Drive – Johns Park to Klatt Road	S		0.4	$13,000
sep. path			✓ Tudor Road – Elmore Road to Minnesota Drive	DC		3.5	$4,350,000
	sep. path		✓ Tudor Road – Campbell Airstrip Road to Pioneer Drive	DC		1.04	$1,300,000
shoulder			✓ Tudor Road – Minnesota Drive to Old Seward Highway	S		1.5	$48,000
shared			✓ Turnagain Parkway – Northern Lights Blvd. to Illiamna Street	S		0.3	$10,000
bicycle lane			Turpin Street – Debarr Road to Boundary Road	S		1.02	$32,500
shared			Vance Drive – Checkmate to Castle Heights Park	S		0.1	$3,200
shared			Vanguard Road – Independence Drive to Abbott Road	S		0.35	$12,000
bicycle lane			✓ Victor Road – 100th Avenue to West Dimond Blvd.	R	2010	0.5	
sep. path			✓ Victor Road – 100th Avenue to West Dimond Blvd.	R	2010	0.5	
	sep. path		West Northern Lights Blvd – Lois Drive to Arlington Drive	DC		0.15	$185,000
shoulder			Westwind Drive – DeArmoun Road to Huffman Road	S, M	2010	0.95	
bicycle lane			✓ Wisconsin Street – Spenard Road to Northern Lights. Blvd.	S, M		1.23	$40,000
					Anchorage Estimated Cost:		**$107,353,800**

Table 6. Recommended Bicycle Network

Short Term 2009–2014	Intermediate Term 2014–2019	Long Term 2019–2029	Bicycle Network Project (Priority A projects: ✓)	Type	Construction Year[a]	Distance (miles)	Estimated Project Cost[b]
CHUGIAK-EAGLE RIVER							
bicycle lane			Birchwood Spur Road – Pilots Road to Old Glenn Highway	S, M		0.26	$9,000
shared			Chain of Rock Street – Meadowcreek to Eagle River Road	S		0.42	$14,000
shared			Coronado Street – Old Glenn Highway to Loop Road Spur to Eagle River Rd.	S, M		0.59	$19,000
shoulder			Eagle River Road – Greenhouse to Visitor Center	S, M		9.75	$311,000
bicycle lane			Eagle River Road – Eagle River Loop Road to Greenhouse	S, M		1.66	$53,000
bicycle lane			Eagle River Road – Artillery Road to Eagle River Loop Road	S, M		1.6	$510,000
bicycle lane			Eagle River Loop Road – Glenn Highway to Eagle River Road	S, M		2.62	$84,000
bicycle lane			East/North Eagle River Loop – Eagle River Road to Old Glenn Highway	DC		1.88	$60,000
bicycle lane			East/North Eagle River Loop – Glenn Highway to Eagle River Road	DC		1.88	$60,000
shared			Eastside Drive – Voyles Blvd. to Lake Hill Drive	S		0.53	$17,000
	bicycle lane		Eklutna Park Drive – Powder Ridge to end	DC		0.51	$20,000
shared			Farm Avenue – Old Glenn Highway to Breckenridge Drive	S		0.46	$15,000
		shoulder	Hiland Road – Eagle River Loop Road to South Creek.	DC		10	$350,000
	bicycle lane		Homestead Road – Oberg Road to Voyles Blvd.	DC		0.51	$16,500
shoulder			Lake Hill Drive – Old Glenn Highway to Mirror Lake Middle School	S		0.41	$13,100
sep. path			Mirror Lake to Old Glenn Highway	S		0.47	$185,000
shared			Monte Road – Old Glenn Highway to Echo Street	S		0.47	$15,000
bicycle lane			North Eagle River Access Road – Old Glenn Highway to Powder Ridge	S, M		0.66	$21,000
shared			Oberg Road – Homestead Drive to Deer Park Drive	S		0.53	$17,000
bicycle lane			Old Glenn Highway – North Eagle River Access Road to Peters Creek	DC		6.45	$206,000
shoulder			Old Glenn Highway – Voyles Road to end	S, M		1.23	$40,000
shoulder			South Birchwood Loop Road – Glenn Highway to N. Birchwood Loop Road	S, M		4.34	$139,000

Table 6. Recommended Bicycle Network

Short Term 2009–2014	Intermediate Term 2014–2019	Long Term 2019–2029	Bicycle Network Project (Priority A projects: ✓)	Type	Construction Year[a]	Distance (miles)	Estimated Project Cost[b]
bicycle lane			South Birchwood Loop Road – Hillcrest Drive to Glenn Highway	S, M		0.65	$21,000
shared			Voyles Road – Old Glenn Highway to end	S		0.73	$24,000
					Chugiak-Eagle River Estimated Cost:		**$2,219,600**
					TOTAL ESTIMATED COST:		**$109,573,400**

Table Legend

bicycle lane	Bicycle Lane
shoulder	Paved Shoulder Bikeway
sep. path	Separated Pathway
boulevard	Bicycle Boulevard
shared	Shared Road
sweep	Sweeps
study	Special Study Area

Project Type

S	Add signage
M	Add striping & markings
DC	Design, construction
R	Design, construction with road project
DS	Design study
B	Structure – bridge

✓ Indicates that the project is a top-priority, or Priority A, project. Projects have been identified as Priority A based on either inclusion in the core bicycle network or locations with a high number of bicycle-vehicle crashes, plus the presence of road width sufficient to add bicycle lane marking.

Notes:

On-road bicycle lanes are the preferred facility and are contingent on establishing and identifying a plan for funding and maintenance.

[a] LRTP indicates that the project is listed in the *Anchorage Bowl 2025 Long-Range Transportation Plan with 2027 Revisions* (2025 LRTP).

[b] Costs are estimated for striping and signage projects and for other bicycle network projects that are not scheduled in the 2025 LRTP or other Capital Improvement Plan.

Chapter

4

Bicycle Facility Design

Use of Design Guidelines

Safe, convenient, and well-designed facilities are essential to promote bicycle use. Appropriate design of bicycle infrastructure and the accompanying road projects also encourages predictable bicycling behavior. Rather than set forth strict standards, the design guidelines in this chapter present sound courses of action that are valuable in attaining bicycle facility design that is sensitive to the needs of both bicyclists and other roadway users.

All future bicycle facility design will be based on the national guidelines outlined in the AASHTO 1999 *Guide for the Development of Bicycle Facilities* (AASHTO) and the Federal Highway Administration (FHWA) *Manual of Uniform Traffic Control Devices for Streets and Highways* (MUTCD; 2003 edition with 2007 revisions). The current MOA *Design Criteria Manual* is the MOA standard guidance for street design based on AASHTO guidelines. Additional standards used for State of Alaska roadways are Chapter 12, "Non-Motorized Transportation," of the Alaska Highway Preconstruction Manual and the FHWA report Selecting Roadway Design Treatments to Accommodate Bicycles (Report RD-92-073, 1993), both of which reference shared roadway use. To successfully implement the recommended bicycle network, the guidance in these publications should be used when bicycle infrastructure are improved or constructed.

As noted in Chapter 1, the recommendations in this plan were developed with the best planning-level information available about viability and right-of-way impacts of every proposed project. Once the design and engineering for a specific project have been started, the project manager should have some flexibility in design and scope.

Table 10 shows the minimum standards for the bicycle infrastructure identified in this plan. The information here highlights important issues, but more detail is contained in the national documents. Bicycle facility guidelines will not cover all details encountered during facility development. For details not covered, appropriate engineering principles and professional judgment must be applied in providing for the safety and convenience of bicyclists, pedestrians, and motorists. For further detail, refer to AASHTO and the MUTCD documents.

Table 10. Minimum Standards for Types of Bicycle Infrastructure

		Bikeway Width for Various Conditions						
Bicycle Facility Type	**Type of Roadway and Traffic Speed**	**High Traffic Volume with Obstacles**	**Typical Minimum Width (per AASHTO)**	**Low Use, Low Traffic Volumes with Parking**	**Adjacent Travel Lane Width (feet)**	**Use Pavement Marking/ Striping**	**Use Raised Pavement or Rumble Strip?**	**Signage[a]**
Bicycle Lane 	Road with pedestrian facilities	5-ft width for areas with high traffic, bicycle, freight volume, and other obstacles. (Wider widths promote use by vehicles at intersections.)	5 ft (includes gutter pan) with minimum of 3 ft rideable surface	4 ft minimum if adjacent to parking, uncurbed street shoulder; 4 ft lane should not be used with a 7 ft parking lane or 10 ft travel lane.	11 ft; 8 ft on-street parking width adjacent to the bicycle lane	Lane striping Bicycle detector pavement marking	No	R3-17, bicycle lane R3-17 a and b, bicycle lane begins and ends R4-4, begin right turn lane, yield to bicycles D11-1, bicycle route
Paved Shoulder Bikeway 	Road without pedestrian facilities	Additional width needed with speeds in excess of 50 mph or high-volume truck traffic.	4 ft			Striping to mark shoulder and edge of road	No; unless 1 ft clearance from rumble strip to bikeway; 4 ft from rumble strip to edge of shoulder or 5 ft to adjacent guardrail or curb	W11-1, bicycle symbol
Wide Curb Lane			14 ft			Yes for lanes wider than 15 ft	No	W11-1, share the road R4-4, begin right-turn lane, yield to bicycles D11-1, bicycle route

Table 10. Minimum Standards for Types of Bicycle Infrastructure

Bicycle Facility Type	Type of Roadway and Traffic Speed	Bikeway Width for Various Conditions: High Traffic Volume with Obstacles	Bikeway Width for Various Conditions: Typical Minimum Width (per AASHTO)	Bikeway Width for Various Conditions: Low Use, Low Traffic Volumes with Parking	Adjacent Travel Lane Width (feet)	Use Pavement Marking/ Striping	Use Raised Pavement or Rumble Strip?	Signage[a]
Shared Roadway 	20-25 mph – local street					No	No	D11-1, bicycle route W11-1, share the road
Bicycle Boulevard 	20-25 mph – local street					Yes	No	D11-1, bicycle route W11-1, share the road
Bicycle Box 			11 ft or lane width		11	Pavement marking and painting of actual box		Blue painted pavement box with white bicycle symbol

Table 10. Minimum Standards for Types of Bicycle Infrastructure

Bicycle Facility Type	Type of Roadway and Traffic Speed	Bikeway Width for Various Conditions: High Traffic Volume with Obstacles	Bikeway Width for Various Conditions: Typical Minimum Width (per AASHTO)	Bikeway Width for Various Conditions: Low Use, Low Traffic Volumes with Parking	Adjacent Travel Lane Width (feet)	Use Pavement Marking/ Striping	Use Raised Pavement or Rumble Strip?	Signage[a]
Separated Pathway 	Bikeways located within 5 ft of street need 42-inch high physical barrier.		8-10 ft with 3 ft lateral clearance; for two-way travel		Not applicable	No	No	D11-1, bicycle route or D11-1B, nonmotorized path

[a] Installation of signage will be coordinated with MOA and DOT&PF traffic engineers.

For additional specifications, refer to the American Association of State Highway Transportation Officials (AASHTO) 1999 *Guide to the Development of Bicycle Facilities* and the Federal Highway Administration *Manual of Uniform Traffic Control Devices for Streets and Highways* (MUTCD; 2003 edition with 2007 revisions). In addition, the AASHTO guidance and Part 9 of MUTCD should be followed in providing traffic controls for bicycle infrastructure.

ft = feet mph = miles per hour

On-Street Facilities

Bicycle Lanes

A bicycle lane is a one-way, on-street facility that carries bicycle traffic in the same direction as adjacent motor vehicle traffic. Bicycle lanes should always be provided on both sides of a two-way street and be properly marked and signed.

On one-way streets, bicycle lanes should generally be placed on the right side of the street. Bicycle lanes on the left side are unfamiliar and unexpected for most motorists. According to the AASHTO guidance, placement on the left should only be considered when a bicycle lane will substantially decrease the number of conflicts, such as those caused by heavy bus traffic or unusually heavy turning movements to the right, or if there are a significant number of left-turning bicyclists. Because bicycle lanes do not allow pedestrian travel, bicycle lanes are only designated on streets with pedestrian facilities.

Bicvcle lane – Elmore Road

A typical bicycle lane width is 5 feet from the face of curb or guardrail to the bicycle lane stripe. This width should be sufficient in places where a 1- to 2-foot wide concrete gutter pan exists, provided that a minimum of 3 feet of surface is available for bicycle riding and the longitudinal joint between the gutter pan and the pavement surface is smooth. Gutter pans with discontinuous, bumpy seams can force bicycle riders into traffic.

Bicycle lanes are typically striped and have a bicycle emblem and an arrow. Wording that reads "Bicycle Lane" or "Bicycles Only" is optional.

Lane Widths

Exceptions to the standard width for a bicycle lane should be used only after careful review of the existing conditions along the length of the proposed bicycle facility. For example, wider bicycle lanes lead to vehicle use at intersections, which can create conflicts.

Bicycle lane widths of 4 feet minimum may be acceptable when one or a combination of the following conditions exists:

- Physical constraints (for a segment of less than 1 mile that links to existing bikeways on both ends)
- Implementation in conjunction with traffic-calming devices

Maintenance Required

Regular maintenance of bicycle lanes should be a top priority because bicyclists are unable to use a lane with potholes, debris, or broken glass.

- Adjacent parking with very low use and turnover, and low speed limits and traffic volumes
- Adjacent uncurbed street shoulder

These additional guidelines should also be considered when determining bicycle lane width:

- On-street parking adjacent to a bicycle lane should be 8 feet wide (7 feet minimum).
- Travel lane width adjacent to a bicycle lane should be 11 feet (10 feet minimum).
- A 4-foot bicycle lane should not be used in combination with a 7-foot parking lane or a 10-foot travel lane.

Intersections

The treatment of bicycle lanes at intersections poses a special problem for the development of on-street bicycle lanes. Most conflicts between motorists and bicyclists occur at intersections. Good intersection design indicates to road users what route to follow and who has the right of way. Bicyclists' movements are complicated by their slower speed and reduced visibility compared to motor vehicles. Proper striping techniques for bicycle lanes vary depending on the type of intersection involved and whether a separate right turn lane is provided for right turns. The 1999 AASHTO *Guide for the Development of Bicycle Facilities* provides a complete set of bicycle lane striping recommendations for intersection possibilities.

Left-turning movements of bicyclists are generally not given special treatment at intersections. Bicyclists must follow the rules of the road and are permitted to merge into the left-turn lanes for turning. On busy streets, such lane changing can be a difficult task. Many bicyclists simply proceed through an intersection and use pedestrian crosswalks to make the desired turning movement.

Bicycle box – for left-turning bicyclists

A recently developed and innovative approach to bicycle lane treatment, the bicycle box, should be considered for test-case uses in Anchorage areas with high left-turn use and at intersections with high crash rates where bicyclists are likely to proceed straight through the intersection in a bicycle lane and be vulnerable to being struck by a vehicle in a right-hook incident.

As shown in the photograph to the left, the bicycle box is a painted area at an intersection designed to create a location where bicyclists can queue before turning left or going straight. These boxes help prevent bicycle-vehicle collisions, especially those between drivers turning right and bicyclists going straight. The bicycle box is used primarily in conjunction with a signed bicycle lane. The painted area on the road includes a white bicycle symbol and a painted lane approaching the box. The Federal Highways Administration is recommending that the bicycle box be painted green. Although such facilities will not likely be visible under snow cover, the idea is to establish their use during the summer months so that the pattern of use is expected.

An MOA intersection on Mountain View Drive at the entrance to Glenn Square currently has a bicycle box configuration for eastbound bicyclists heading straight through the intersection. The box is marked with striping; the solid painted area (shown in the photograph) is not included.

Markings, Signs, and Other Details

The MUTCD guidelines call for designating bicycle lanes with pavement markings and signs. Signs should be used at the beginning of a marked bicycle lane to call attention to the lane. Other sign placements are intended to notify bicyclists of on-street parking and that the bicycle lane is ending. In addition, the signs inform drivers about the possible presence of bicycles.

Illegal parking in bicycle lane

Development of a functional bicycle facility requires more than just an adequate lane width. In particular, because bicyclists tend to ride a distance of 32 to 40 inches from the curb face, this surface must be smooth and free of obstructions and structures that could trap a bicyclist's tires. These hazards include catch basins, temporary construction signage, parked cars, litter, and debris.

Paved Shoulder Bikeways

Paved shoulder bikeways may also be used as a substitute for bicycle lanes under certain limited situations (see Chapter 2). Where no pedestrian facilities such as sidewalks or pathways exist, as occurs in many areas on the Anchorage Hillside, pedestrians may also walk along the paved shoulder. Although shoulders should be at least 4 feet wide to accommodate bicycle travel, any shoulder width is preferable to none. It is desirable to increase the shoulder width where higher levels of bicycling are anticipated. "Share the Road" signs can also be used in conjunction with bicycle infrastructure that consists of paved roadway shoulders.

Rumble strips or raised pavement markers are not recommended for use and are not used in Anchorage other than on the freeway. Another exception is the use of

Rumble strips and bicyclists – Turnagain Pass

rumble strips on the Seward Highway along Turnagain Arm. Here the pavement construction incorporates a 6-inch-wide rumble strip that separates a paved shoulder from the roadway. AASHTO recommends a minimum 5-foot width outside of the rumble strip. Plans call for modifying the Seward Highway rumble strips in 2009–2010 to ensure the minimum width is available and create recurring gaps for bicyclists to cross the rumble strips.

Wide Curb Lanes

As previously mentioned, wide curb lanes may be used as a substitute for bicycle lanes under certain situations (see Chapter 2). The typical dimension of a wide curb lane is 14 feet. Usable width is normally measured from curb face to the center of the lane stripe, but adjustments need to be made for drainage grates, parking, and longitudinal ridges between pavement and gutter sections. No striping is required for wide curb lanes unless the lane width is 15 feet or more.

On bicycle routes that include wide curb lanes, the MUTCD-directed "Share the Road" signs can be used.

Signed Shared Roadways

Signed shared roadways that are part of the formal bicycle network are primarily local streets that do not need additional treatment to serve as safe bicycle routes. Proper signage can be provided at regular intervals, where space allows**,** along the routes to indicate that these routes are advantageous compared to other routes. These signs are appropriate where the facility is not obvious in character, such as where a bicycle lane or shoulder converts to a separated facility or a greenbelt.

Signed, shared roadway – Ocean View Boulevard

This Bicycle Plan identifies the formal bicycle network, which may include some local streets and shared roadways that can serve as appropriate connectors. Most local streets, however, will serve as informal bicycle routes to provide access to the main network. These local streets generally carry low traffic volumes and have speed limits of between 20 and 25 mph. As a result, these streets can safely accommodate bicyclists (except very young children) with no additional treatment. Streets on which traffic is traveling at higher speeds than for which they were designed can be made more suitable for bicyclists through traffic calming, which is discussed below.

Downtown Facilities

Downtown Anchorage presents special conditions. Because of the narrow roadway right-of-ways and need for on-street parking, there is not room to add bicycle lanes on downtown streets without removing the adjacent parking. Fortunately, the posted traffic speeds are generally low, around 25 mph. Moreover, the newly adopted Downtown Plan calls for a further posted speed reduction to 20 mph. As a result, vehicles and bicyclists traveling in the Downtown core will need to share the road. In addition, bicycle riding on sidewalks and paths is prohibited in the Central Business District.

Separated Pathways

As advised in the ATP (1997), separated pathways should be a minimum of 8 feet wide and provide an additional 2 feet of clearance to lateral obstructions such as signs, fences, trees, and buildings. However, AASHTO sets the minimum width of shared use facilities as 10 feet, noting that in some rare cases 8 feet may suffice. DOT&PF 2002 standards also reflect the 10-foot width. The combined 10-foot width for path and clearance facilitates safe two-way bicycle travel and shared use with pedestrians and others. Because many of the Anchorage pathways were designed with ATP standards, it is recommended that these be upgraded to 10-foot width as funding permits.

Bicycle lane and separated pathway – Southport Road

The design and construction of reduced-width, one-way paths are not recommended. One-way paths are often used as two-way facilities unless measures can effectively ensure one-way operation. Without such measures, it should be assumed that shared-use pathways will serve two-way travel by both pedestrian and bicyclists, and the facilities should be designed accordingly.

Additional design considerations for separated pathways include clear sight triangles (an area with no obstructions to block views of bicyclists or vehicles) at crossings and treatments to ensure smooth transitions across driveways, pathways, and roadways. Signal phases may need to be modified to provide safe bicycle access where a path crosses a signalized intersection.

Additional hazards to address include vehicle right turns on red and large turning radii on streets that encourage fast-turning traffic. The tendency for turning motorists to focus on gaps in approaching traffic creates a safety conflict when the motorist accelerates through the turn and does not anticipate bicyclists or pedestrians who may be approaching along the pathway.

Often the combination of right-turning traffic and poor sight lines creates situations in which vehicles creep into and over crosswalks. Sight lines at intersections need to be maintained with pruning of vegetation and setbacks of buildings. In addition, signs should be located to avoid blocking sight lines and views of bicyclists.

Solutions designed to improve safety at intersections with separated pathways include the use of sweeps and appropriate warning signs to highlight the pathway user. As described in Chapter 2, DOT&PF has begun using sweeps for crossings of separated bicycle infrastructure and non-signalized intersections. By moving the separated pathway to stop at the stop bar of the intersections, the pathway user is in the direct line of sight of vehicle operators.

How bicyclists enter a separated pathway must also be considered. The design of the transition must encourage bicyclists to approach and leave the path traveling on the correct side of the roadway, riding with the traffic flow. Wrong-way bicycle riding is a major cause of bicycle-vehicle crashes and should always be discouraged. Safe transitions to an on-street facility or bicycle-compatible street route require appropriate signing, curb cuts, and merge areas.

Bicycle Route Signs

Bicycle route sign

The bikeway components of the bicycle network should be identified with bicycle route signs. Signs should be used sparingly on the bicycle network and in situations where the bicycle route is not continuous or obvious.

In the MOA, many bicycle route signs are currently located on local streets that are no longer designated as part of the bicycle network under this Bicycle Plan. These signs should be removed to avoid confusion, and new signs should be added where needed. Appendix F identifies the locations where bicycle route signage should be removed from the bicycle network.

Other Bicycle Facility Design Considerations

Design of the following elements and general design categories also affects the operation of a safe and effective bicycle network: sidewalks; traffic signals; crossings of rivers, major roads, and railroad tracks; traffic calming components; universal design and features compliant with the Americans with Disabilities Act (ADA); construction access; and bollards. These topics are discussed below.

Sidewalks

In general, the designated use of sidewalks for bicycle travel is not recommended. Widening sidewalks does not necessarily enhance the safety of sidewalk bicycle travel, because the extra width encourages faster bicycle speeds, which increase the potential for conflict with motor vehicles at intersections and with pedestrians along the corridor.

Sidewalk bikeways should only be considered under these limited circumstances:

- To provide bikeway continuity along high-speed or heavily traveled roadways that have inadequate space for bicyclists and are uninterrupted by driveways and intersections for long distances
- On long, narrow bridges. In such cases, ramps should be installed at the sidewalk approaches. If approach bikeways are intended for two-way travel, sidewalks should be two-way facilities as well.

In residential areas, sidewalk riding by young children is common. This type of sidewalk bicycle use is accepted, but placing signs on these facilities as bicycle routes is not appropriate.

Traffic Signals

Signal timing along a corridor can be a problem for bicyclists who are trying to maintain a constant speed to take advantage of their momentum.

Another concern is that actuated traffic signals do not typically detect the presence of bicyclists. Because bicyclists are considered a part of traffic, the traffic control system should treat them as such. To do otherwise encourages bicyclists to violate the rules of the road.

Design solutions for such hazards may include use of sweeps, appropriate warning signs, all-red signal phases that include a red signal for motor vehicles while pathway users receive a green signal, right-on-red prohibitions, and light cycles that allow adequate time for bicyclists and pedestrians to cross.

Demand-actuated signals, which usually use loop detectors embedded in the pavement, are often problematic for bicyclists. Several improvements may help bicyclists:

- Increase sensitivity of detectors or change detector patterns
- Paint stencils to indicate the most sensitive area of the loops
- Place the pushbuttons that activate crosswalk signals close enough to the roadway for bicyclists to reach without dismounting
- Use quadrupole loop detectors rather than the standard square loops
- Use visual or motion detection rather than loop detectors

The AASHTO guide provides detail on bicycle lane, lane striping, and intersection treatments for use at traffic signals.

Crossings

Waterways, busy roads, and railroad tracks can be significant barriers to transportation that are expensive to remedy. Bicycle infrastructure needs to be included in all major bridge projects. Even if it does not currently exist on either end of the bridge, bicycle infrastructure may be developed within 50 years—the length of time that bridges typically are expected to last.

Bicycle crossings of many wide and busy roadways, including major arterials, highways, and freeways, are challenging and often hazardous. Crossing opportunities can be widely spaced. To provide more crossings, grade-separated crossings or mid-block crossings may be considered.

Because of the tendency of railroad tracks to grab and channelize bicycle tires, railroad crossings present a difficult challenge for bicyclists. Three main factors affect crossing safety: the angle of the crossing, the surface quality, and the width of the flange between the pavement and rail.

All crossings should be perpendicular to the railroad tracks, with adequate signage to alert bicyclists to cross with caution. Each crossing should have signage directing users to dismount and walk their bicycles across the facility. At-grade crossings can be difficult for bicyclists to negotiate because of rough or broken pavement or because of slippery surfaces. Vehicle crossing surfaces made of composite materials can be slippery in wet or cold conditions, presenting a hazard to bicyclists. Crossing designs such as those at Klatt Road are successful because they direct the pathway away from the vehicle crossing surface. The width between the crossing surface and the rail can catch a bicycle wheel, creating a hazard for bicyclists.

Design of railroad crossings on the bicycle network requires a permit from the ARRC. Currently, DOT &PF and ARRC are updating a joint policy on crossing design issues. It is expected that crossings will be reviewed on a case-by-case basis under the joint policy. Safety is the highest priority at crossings.

Traffic Calming Components

Traffic calming programs are used to improve neighborhood livability by addressing the impacts of excessive traffic and speeds. These programs introduce physical features and traffic patterns on local streets to encourage the use of other, more appropriate roadways for through traffic. Traffic calming programs also aim to slow traffic speeds on residential neighborhood collector streets.

Most traffic calming projects involve the installation of such measures as roundabouts, neckdowns, speed humps, diverters, and road narrowing. Although these measures can make neighborhoods more pedestrian- and bicycle-friendly and generally benefit bicycle travel, they can be problematic to bicycles if not well planned and installed. The following considerations apply to all streets, but in particular, those streets in the bicycle network.

Roundabouts

Bicyclists often complain that they feel "squeezed" by motor vehicles while being passed in a roundabout. When implementing roundabouts, careful consideration should be given to the impact of the circle on bicycle travel – usually bicyclists are rerouted off roadways onto separated pathways.

Neckdowns

The use of an intersection with a neckdown—a curb extension that provides a portion of widened sidewalk at a pedestrian crossing—reduces the roadway width and causes bicyclists to travel into the vehicle lane. For streets with centerline stripes, the neckdown should be placed so that the roadway is at least 12 feet and preferably 14 feet wide to allow adequate space for bicyclists to pass through the intersection safely. A 10-foot vehicle lane next to a bicycle lane at least 4 feet wide is also acceptable.

Speed Humps

A speed hump is a rounded, raised area perpendicular to the roadway that reduces the speed of vehicles. Speed humps extend 13 feet across the roadway width, and the area crossed is 3 feet wide and often 4 inches tall. Speed bumps should be spaced 14 or 22 feet apart to slow motor vehicles and provide a smooth ride and recovery for bicyclists.

Diverters

Traffic diverters, which control pedestrian and traffic movement with parallel curbs, are often used at intersections. These features should preserve bicycle turning movement options and through access, unless overriding safety concerns exist. Often installation of road diverters cuts off direct bicycle access. A bicycle cut-through at a full diverter should be a minimum of 4 feet wide to accommodate a bicycle trailer.

Road Narrowing

Road narrowing is a speed control technique adopted by MOA that uses an existing cross section to reduce the overall width of the roadway. This technique is expected to be considered for use only when MOA is developing solutions to address a traffic-calming problem that has been identified in a residential area. Narrowing the vehicle travel lanes by adding striped bicycle lanes or a striped shoulder is a method that successfully reduces traffic speeds and improves the street for bicyclists. Striping is much less expensive than road narrowing, which requires replacement of the curb and gutter.

Universal Design and ADA Features

Universal design refers to facility designs that accommodate the widest range of users or provide accessibility. Since passage of the ADA in 1990, the US Access Board has been assigned responsibility for developing accessibility guidelines to ensure that newly constructed and reconstructed facilities covered by the act are readily accessible and usable by people with disabilities.

Anything that makes facilities more accessible for people with disabilities improves accessibility for everyone. For example, curb ramps are necessary for wheelchair users but also aid parents with strollers or carts, child bicyclists, in-line skaters, and the elderly.

One issue with curb ramp placement is that design often places curb ramps out of alignment with the crosswalk and pathways to slow down bicyclists and stop free-flow movement into the crosswalk or street. This concept should be reexamined; this practice appears to be unique to Alaska and often places the bicyclist or pedestrian farther into the roadway than would occur at the crosswalk location.

Construction and Maintenance Access

Although access for bicyclists must be maintained during construction and maintenance, these activities do not provide for rerouting of bicycle traffic, particularly on bridges. Travel on separated pathways is often disrupted by temporary lane restrictions, detours, and parking of utility trucks and vehicles of construction workers. In addition, traffic control measures instituted during construction should be designed to recognize and accommodate nonmotorized travelers, especially in designated bicycle lanes—where construction roadway signs are often (but should not be) placed.

If the disruption occurs in a bicycle lane over a short distance (approximately 500 feet or less), bicyclists should be routed to share a motor vehicle lane. For longer distances or on busy roadways, a temporary bicycle lane or wide outside lane should be provided. Bicyclists should not be routed onto sidewalks with pedestrians unless the traffic engineer deems no reasonable alternative is available. If the proposed work is on a designated bikeway and there can be no accommodation for bicyclists, a reasonable detour needs to be established and marked with signs (as described in MUTCD, Part 9). During mobile, short-term operations of less than 1 hour, construction roadway signs are not required.

Utility vehicle and tent blocking non-motorized access

The following are important considerations for addressing bicyclists' needs during construction or maintenance activities:

- Pre-construction traffic control plans should be reviewed to identify conflicts with bicycle traffic.
- Construction workers should not be allowed to park personal vehicles on shoulders or shared use pathways.
- Utility vehicles conducting work within the right-of-way can often block pathways and damage surfacing with the use of heavy vehicles. Warning signs or cones should be used to advise path users of utility vehicles on paths, a clear route around vehicles should be established, and flashing beacons should be used.
- The placement of advance construction signs should not obstruct the bicyclist's path. Where there is sufficient room but no planting strip, placing signs half on the sidewalk and half on the roadway may be the best solution.
- In all cases of road surface construction or other disruptions, barricades with flashers should be placed at least 20 feet in advance.
- Metal plates create a slick surface for bicyclists, and are not easily visible at night or in the rain. If metal plates are to be used to accommodate traffic, the plates should not have a vertical edge greater than 1 inch without a temporary asphalt lip to accommodate bicyclists.
- Construction holes or depressions should never be left without physical barriers to prevent bicycle wheels from falling in. For holes that need to be left for more than 2 days, temporary fill should be used to create a level surface for the hole or depression. If a hole is required for fewer than 2 days, a barricade with flashers should be placed to prevent bicyclists from riding into the hole or barricade.
- Snow should not be stored in locations that block or decrease views of bicyclists or sight lines for bicyclists.

Bollards

The most frequently used method of controlling motor vehicle access to multi-use pathways is one or more bollards. These barrier posts are typically 3 to 4 feet high and made of wood, metal, or concrete. Bollards can create a physical hazard for bicyclists because they divert bicyclists' attention from traffic, create navigation problems for emergency and maintenance vehicles, and impose expenses for multiple installations in urban areas where there are frequent road crossings. For these reasons, bollards are not recommended unless there is a demonstrated problem.

If bollards are to be used, the following guidelines should be adhered to for choice of material and placement:

- Bright color and reflectorization for day and night visibility
- A minimum of 3 feet in height
- Removability for emergency and maintenance access
- Location at least 10 feet from the intersection to allow negotiating space
- Use of one or three, but never only two bollards, to ensure proper channelization of trail users
- Spacing at 5 feet between bollards to allow bicyclists, but not vehicles, to pass through

CHAPTER 5

Bicycle Support Programs and Facilities

Developing bicycle infrastructure that provides direct and safe routes is only part of the effort required to create a viable network for utility bicycling in Anchorage. Improved bicycle support facilities need to be available at destinations. Many studies throughout the United States, Australia, England, and other countries have shown that increasing the ease of bicycling with improved connections to transit, available bicycle parking, and other support facilities encourages new and existing bicyclists to bicycle more often.[17]

During preparation of this Bicycle Plan, several strategies were examined to promote facilities and programs that support bicycling. Among the most feasible options identified are coordination between bicyclists and transit providers, development of adequate bicycle parking facilities, encouragement of providing amenities such as showers by developers and business owners, the use of bicycle-riding incentive programs, and advancement of bicycle advocacy groups.

Bicycle rack on People Mover bus

Coordination with Transit

The Anchorage area is served by two transit services: People Mover bus system in Anchorage and MASCOT shuttles providing service primarily between Wasilla and downtown Anchorage.

People Mover has provided two-station bicycle racks on the front of all fixed-route buses since 1998. Because increasing numbers of bicyclists have been using transit and demand for bicycle racks has indicated more were needed, People Mover began adding three-station bicycle racks to all fixed-route replacement buses in 2008.

MOA and Matanuska-Susitna Borough have recently initiated discussions about creating a

[17] Source: "Making Cycling Irresistible: Lessons from the Netherlands, Denmark, and Germany," by John Pucher and Ralph Buehler, in *Transport Review*, July 2008, Vol. 28, No. 4, pages 495-528.

regional transit authority with the intent to expand transit services between the Matanuska-Susitna Valley and Anchorage. When developing future transit services, which may include rail, the regional transit authority should consider how to incorporate the needs of bicyclists in the system design.

Another need to be addressed is secure bicycle parking for those who wish to leave their bicycles at transit stops. The concept of park-and-bike facilities could also be explored.

Bicycle Parking

Bicycle parking facilities are important contributions to making Anchorage a more bicycle friendly city. The provision of bicycle parking involves three distinct elements: supply, location, and design. A supply of well located, secure bicycle parking can help to reduce theft, provide protection from the elements, protect existing vegetation, and legitimize bicycle use. Bicycle parking should be secured so that entire racks cannot be taken. Needs for bicycle parking can be further broken down by short-term and long-term requirements.

Short term bicycle parking

- *Short-term* parking spaces accommodate visitors, customers, messengers, and other persons expected to depart within approximately 2 hours. This length of visit also applies for most retail stores.
- *Long-term* bicycle parking is intended to accommodate employees, students, residents, commuters, and other persons who expect to leave their bicycles parked for approximately 4 hours or longer. This parking need is found in major employment centers such as Downtown and Midtown as well as at schools and universities.

The current zoning code for Anchorage, Title 21, does not contain bicycle parking requirements. The proposed policies identified in Chapter 6 of this Bicycle Plan include incorporation of bicycle parking in the Anchorage development standards.

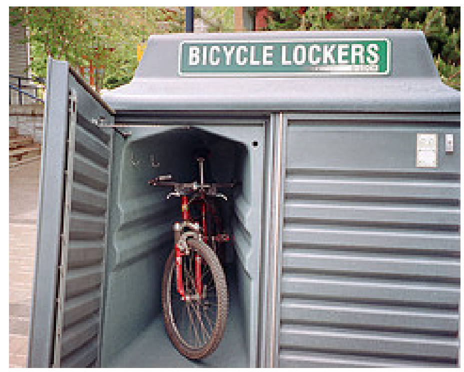
To evaluate the adequacy of proposed Title 21 standard for bicycle parking facilities and determine how it would be applied, given current requirements for vehicle parking spaces, a variety of existing Anchorage areas were examined. The number of required bicycle parking spaces would be lowered if the number of required vehicle parking spaces is reduced in the Title 21 revision process. The results are summarized in Appendix G.

Changes to Title 21 will not address existing development in Anchorage that has little or no bicycle parking. Inclusion of bicycle parking at existing developments should be accomplished through the creation of a retrofit bicycle parking program that offers incentives or subsidies to businesses to install bicycle parking spaces.

A list of the locations where bicycle parking is most needed is included in Appendix H. This list was generated by interested bicyclists and can be expanded through surveys or discussions with local bicycle advocacy groups.

Bicycle Parking Supply

The number of short- and long-term bicycle parking spaces required should reflect the demand but should not impose an excessive burden on small developments or businesses. To evaluate the adequacy of proposed standards, a survey was created in fall 2008 to assess existing bicycle parking demand. A variety of office and retail developments were investigated. None of the studied developments offered bicycle parking equal to or more than 3 percent of the total parking spaces. As Table 11 indicates, a standard requiring parking at that level would be on the low side when compared to standards found in more bicycle friendly cities.



Long-term bicycle parking

Most of the codes reviewed require a minimum number of bicycle parking spaces, with between three and five being a common range. (See Table 11.) Additional bicycle parking beyond the threshold requirements is often calculated based on a ratio of required automobile parking (typically between 5 and 10 percent), number of classrooms or number of students in schools, or square footage of the business or facility. Nevertheless, it appears that a 3 percent standard would meet the needs of Anchorage bicyclists, especially if used in conjunction with a set of good bicycle parking location design standards (discussed below).

Regardless of the standards ultimately adopted, exceptions to the parking standards should be given to businesses below a certain size threshold (for example, gross floor area totaling 3,000 square feet for a retail operation and 10,000 square feet for an office building) and for existing businesses wishing to retrofit bicycle parking on tight lots. In addition, single-family and small multi-family residential dwellings should also be exempt from bicycle parking requirements because most bicyclists store their bicycles inside.

The primary problem with the use of parking percentages to determine bicycle parking requirements involves the downtown zoning districts where no motor vehicle parking, and consequently no bicycle parking, would be required. In addition, the new zoning code is proposing granting a significant vehicle parking reduction when certain criteria are met. As a result, the percentage approach would have the unintended consequence of also reducing the required number of bicycle parking spaces.

Table 11. Bicycle Parking Requirements by Land Use for Other Cities

Land Use	Ann Arbor, MI	Burlington, VT	Edmonton, AB	Eugene, OR	Portland, OR	Iowa City, IA	Seattle, WA	Pomona, CA
Multi-family	1 per 10 units; 50% enclosed, 50% racks	Long term:1 per 4 units; short term: 1 per 10 units	Downtown: 20% of auto; outside Downtown: 5% of auto; min. of 5; max. of 50	1 per dwelling; min. of 4, 100% long term	1 per 20 residents	1 per dwelling; min. of 4	1 per 4 units long term; 1 per every 2 dwelling units Downtown	1 per 20 units; long term: 1 per 4 units
Hotels/Motels	1 per 30 rooms enclosed	Long term:1 per 20 rooms; short term: 2 per 20 rooms	Downtown 20% of auto, min. of 5; max. of 50 spaces. Outside downtown: 5% of auto, min. of 5; max. of 50	1 per 10 guest rooms; min. of 4; 75% long term	Long Term: 1 per 20 rooms, min. of 2; short term: 1 per 20 rooms, min. of 2	None	Long term only: 1 per 20 rooms; 0.05 spaces per hotel room Downtown	Long term: 1 per 25 employees, none if <25 employees; short term: 1 per 3,000 sf
Schools	K–6: 5 per classroom; 7–college: 5 per classroom; racks	Long term: K–12, plus college: 1 per 20,000 sf; short term: K–6, 1 per class; 7–12, 4 per class; college: 3 per 5,000 sf	10% of auto spaces; min. of 5 spaces	K–12: 1 per 8 students; college: 1 per 5 students; min. of 4; 25% long term	K–5: 2 per class; 6–12: 4 per class; college: 1 per 20,000 sf	25% of auto	Elementary: 1 per class; secondary: 2 per class; college: 10% of students + 5% of staff	Elementary: 2 per class; high school: 4 per class; short term: 2 per site
Commercial	1 per 3,000 sf; 30% enclosed, 70% covered	Long term: 1 per 5,000 sf; short term: 1 per 8,000 sf	Downtown: 20% of auto; outside Downtown: 5% of auto; min. of 5; max. of 50	1 per 3,000 sf; min. of 4; long term: 25%	Long term: 1 per 20 auto; min. of 10	15% of auto	Long term: 1 per 5,000 sf; short term: 1 per 4,000 sf	Long term: 1 per 25 employees, none if less than 25 employees; short term: 1 per 3,000 sf
Retail	1 per 3000 sf; 50% covered, 50% racks	Long term: 1 per 30,000 sf; short term: 1 per 10,000 sf	Downtown: 20% of auto; outside Downtown: 5% of auto; min. of 5; max. of 50	1 per 3,000 sf; min. of 4.; 25% long term	Long term: 1 per 12,000-sf building, min. of 2; short term: 1 per 5,000 sf, min. of 2	15% of auto	Long term: 1 per 12,000 sf; short term: 1 per 400 sf	Long term: 1 per 25 employees, none if less than 25 employees; short term: 1 per 3,000 sf
Manufacturing	1 per 25,000 sf covered	Long term: 1 per 20,000 sf; short term: 1 per 50,000 sf	Downtown: 20% of auto; outside Downtown: 5% of auto; min. of 5; max. of 50	1 per 3,000 sf; min. of 4; long term: 75%	Long term: 1 per 15,000 sf, min. of 2	None	Long term: 1 per 4,000 sf; short term: 1 per 40,000 sf	

Table 11. Bicycle Parking Requirements by Land Use for Other Cities

Land Use	Ann Arbor, MI	Burlington, VT	Edmonton, AB	Eugene, OR	Portland, OR	Iowa City, IA	Seattle, WA	Pomona, CA
Recreation	1 per 1,000 sf racks	Short term: 1 per daily user	Downtown: 20% of auto; outside Downtown: 5% of auto; min. of 5; max. of 50	1 per 4000 sf; min. of 4; 25% long term	1 per 20 auto	5% of auto		
Sheltered Bicycle Parking	Required in many cases	Long-term bicycle parking shall protect bicycles from the weather. 1–4 long-term spaces require min. of 1 shower and changing facility; 11–20 parking requires min. of 3 shower facility rooms.	None	Long term (covered) parking is associated with commercial, industrial, or institutional use. Covered parking requirements: 6–10, 100% covered; 11–29, 50% covered; 30 or more, 25% covered	Long term: minimum of 50% covered; if more than 10 short-term spaces are required, 50% covered.	Not addressed	When any covered auto parking is provided, all required long-term parking shall be covered.	Long term: at least 50% covered, in a locked room or within view of security guard or camera
Exemptions	Funeral homes	No short-term bicycle parking required in parking lots. Any expansion or change of use proposed to an existing structure where 4 bicycle spaces or less are required are exempt from providing them.	None	Drive-throughs and site improvements that do not include parking, building alterations, temporary activities. Autzen Stadium has own standards.	Cemeteries, garbage dumps, kennels, storage facility, communication centers	Single family, group living, quick vehicle servicing, industrial uses		

Table 11. Bicycle Parking Requirements by Land Use for Other Cities

Land Use	Ann Arbor, MI	Burlington, VT	Edmonton, AB	Eugene, OR	Portland, OR	Iowa City, IA	Seattle, WA	Pomona, CA
Other Bicycle Parking Specifications	Bicycle parking shall be provided on the same or an adjacent parcel as the principal use within 500 feet of the principal building. Bicycle parking shall be illuminated with a minimum of 0.4 foot candles.	Must meet criteria for Bicycle Parking Guidelines. Parking shall be visually compatible and of a design standard consistent with the environment.	Bicycle parking shall be visibly located where possible in storage rooms, lockers, or racks inside a building, preferably at ground level, in an accessory parking area. Where bicycle parking is not visibly located, directional signage should be used.	Long-term parking includes lockers, lockable enclosures, lockable rooms. Short-term facilities are bicycle racks.	Bicycle racks or lockers for short-term parking. Long-term parking includes lockers, lockable enclosures, lockable rooms. Short-term facilities are bicycle racks.	After the first 50 spaces are provided, additional spaces are required at 50% of the number required. Eating and drinking establishments at 10% of auto.	Transportation facilities require long-term parking. Park and ride and rail transit require at least 202 long-term spaces. Parking lots require 1 long term space per 20 cars.	Long-term parking must be located on site, in a locked room or enclosed by a fence, within view and 100 feet from an attendant or security guard, in an area visible from employee work areas.
Notes	Three types of parking: enclosed, covered bicycle racks, and bicycle racks.	Where long term parking is required, showers and changing facilities for employees shall be provided on site or through an off-site arrangement.	Bicycle racks should not be more than 50 feet from principal building entry.	Eating and drinking establishments require 1 per 600 sf (25% long term). Autzen stadium: min. of 150 bicycle spaces, with 25% sheltered. Temporary bicycle parking (during major events) for 550 bicycles.	Long-term parking must be located a max. of 300 feet from the site. Short term spaces must be within 50 feet of main entrance or inside a building that is readily accessible.	Minimum of 4 spaces where bicycle parking is required. Building officials can defer 50% of bicycle parking where the facility may be difficult to access by bicycle.	Bicycle commuter shower facilities are part of the ordinance. Structures of 250,000 sf or more shall include shower facilities and clothing storage.	Short-term parking serves shoppers, customers, messengers, and other visitors who stay a short time. Long-term bicycle parking serves employees, students, commuters who stay for 4 hours or longer.

max. = maximum; min. = minimum; sf = square feet

Preferred Bicycle Parking Location

The preferred location of bicycle parking depends on whether the parking needs are short term or long term. Short-term bicycle parking should provide individuals with the ability to park in a well-situated and accessible location. The best and most attractive short-term parking is located within 50 feet of building entrances. With multiple main entrances or buildings on a site, bicycle parking should be dispersed among all of the buildings. Multiple-station bicycle racks situated on a sidewalk or pathway can interfere with travel; however, if clearance for pedestrian and bicycle traffic is adequate, placing racks on sidewalks may be appropriate. Trees and light or flag poles are often taken advantage of to secure a single bicycle. Well-located and highly visible bicycle racks and prominent parking deter crime and are more easily utilized by the bicycling community.

Special event parking

Long-term bicycle parking provides employees, students, residents, utility bicyclists, and others a secure and weather-protected place to store their bicycles. This parking is best located on site or within 750 feet of the site. Consideration should be given to requiring or providing bonus points for long-term bicycle parking in all major employment centers, including Downtown, Midtown, and the UMed District.

With secure parking facilities, most utility bicyclists are willing to walk short distances, about three blocks. Options for suitable long-term parking include the following:

- A locked room or area enclosed by a fence with a locked gate, with users obtaining access by a rental agreement or fee
- Within view or within 100 feet of an attendant or security guard
- An area monitored by a security camera
- A location that is visible from employee work areas
- A well-lit area to ensure the security of property and that enhances personal safety

Covered bicycle parking as part of the streetscape

Covered bicycle parking at a school

Covered bicycle parking keeps bicyclists and their bicycles out of the elements, making it more pleasant and safer to ride, park, and retrieve a bicycle. Permanent cover offers the most protection from snow, rain, wind, and ice, and is likely more cost-effective than temporary structures. Cover should be at least 7 feet above the floor or ground and protect the bicycle from blowing snow and ice. Partial cover or extremely elevated cover leaves the bicycles and the bicyclists exposed to the climate. Inexpensive strategies to provide cover can include the use of existing overhangs or awnings.

At least 50 percent of long-term bicycle parking should be covered. An existing overhang or covered walkway, a special covering, weatherproof outdoor bicycle lockers, or an indoor storage area can also act as covered parking. Indoor locations such as a secure room, basement, under a stairwell, and other odd-shaped areas can also serve as suitable bicycle storage and parking areas. Many office building managers allow employees to park their bicycles in their offices.

Costs of Bicycle Parking Facilities

The costs to provide one car parking space are $8,000 in a surface lot and $25,000 in a garage.[18] On the other hand, 10 to 12 bicycle spaces can fit into one car parking space. Bicycle lockers can be provided on a rental basis to bicyclists.

In many cities, long-term rental facilities for bicycle storage are commonly located within public parking garages. This arrangement is currently being considered by the Anchorage Community Development Authority (which manages the two municipally owned garages and two private parking garages as well as several parking lots in downtown Anchorage). This concept should be tested to measure the demand for indoor bicycle parking space rental.

Long term bicycle parking – locked area in a parking garage

Some cities contract out the management of bicycle lockers and rental facilities to local bicycle user groups, which administer the program. During 2009, several trial facilities are expected to be opened and will provide a test of the feasibility of indoor rental parking spaces and bicycle lockers.

18 Construction costs were estimated by the MOA Planning Department for Mayor's Real Estate Task Force, Title 21 Rewrite, EIA Process, September 2008.

Bicycle Parking Design

A bicycle can be a major investment. Many people refrain from riding their bicycles for basic transportation because of a lack of secure bicycle parking spaces. Design standards for racks, spacing, and cover are described below.

Bicycle Parking Racks

Appropriate short-term bicycle racks should possess the following characteristics:

- Holds the bicycle frame, not just a wheel, which can damage bicycles
- Permits use of a U-shaped shackle lock
- Accommodates a wide range of bicycle sizes, wheel sizes, and bicycle types
- Has a finished with chip-resistant paint or material to prevent bicycle paint scratches and damage
- Lacks hazards, such as sharp edges

Several styles of bicycle racks meet these criteria. One device for short-term bicycle parking is the Inverted "U" rack shown in the bottom photograph to the right. This rack, which is 32 to 36 inches tall and 18 to 30 inches wide, provides two bicycle parking spaces and supports each bicycle frame in two places. The device is favored by many bicycle advocates, and some cities have decided to require this specific type of rack.

Short term bicycle parking – two styles of bicycle racks

Title 21 revisions should specify the type of bicycle rack required under the new bicycle parking standards to be in line with the criteria listed above.

As long as each parking space meets the criteria listed above, other types of bicycle racks, such as the one in the upper photograph, can be good solutions. The cost to purchase and install a bicycle rack that parks two bicycles is about $150 to $300.

Examples of bicycle racks that can damage rims

Among bicycle rack styles that are not appropriate and can even damage bicycles are the types shown in the photographs above. Bicycle racks and parking devices that only support one wheel of the bicycle do not meet standards for bicycle parking. These inexpensive racks are commonly used in Anchorage today.

Dimensions and Accessibility of Bicycle Parking Spaces

The need to maneuver in and out of parking spaces should be considered in the design of dimensions for multiple parking spaces. Industry guidelines call for a typical parking space of 2 feet by 6 feet that can be reached without the difficulty of moving another bicycle. An aisle at least 5 feet wide behind all bicycle parking is the recommended standard.

Staggered bicycle racks can also be used to create bicycle parking. Improper installation of bicycle racks—too close to a wall or too densely concentrated—can reduce capacity as much as 90 percent. Bicycle parking should be separated from car parking because motorists often do not leave enough room for bicycles to park and maneuver.

Other Bicyclist Amenities

End-of-trip facilities, such as change rooms, showers, and secure personal lockers, provide an opportunity for utility bicyclists to clean up before work and have the added benefit of encouraging workers to exercise during lunch hours. Seattle, Washington; Portland, Oregon; and other cities are including these types of amenities in building codes, especially for office buildings, government, and public facilities. Other communities have incorporated developer and employer bonuses, such as allowances for higher density and reduced motor vehicle spaces when shower facilities, changing rooms, and bicycle storage are provided on site.

Change rooms must be secure facilities capable of being locked and preferably located in well-lit areas as close as practicable to bicycle storage areas. Well-designed change rooms include showers, non-slip floor surfaces, and lockers for personal gear such as towels, toiletries, and clothing. Lockers located within the change room ensure privacy for users.

Personal lockers that store clothing and damp towels, bicycling gear, and other effects need to be well ventilated, secure, and lockable. Full-length lockers are preferred because of their storage capacity and ventilation qualities.

Shower facility design is usually based on the number of users or staff at the place of employment. The number of showers should be sufficient to ensure that utility bicyclists will not have to wait too long for their turns.

Incentive Programs and Special Activities

Incentive programs for choosing to ride bicycles are available at the national and local level. As part of the 2008 $700 billion financial bailout bill, the federal government offers tax credits for people who chose to bicycle to work. Bicycle commuters will be eligible to receive a monthly credit of up to $20 that can be spent on maintaining, repairing, or purchasing bicycles.

On the local level, several Anchorage firms already offer employee incentives based on use of alternative methods of transportation. These incentives range from prize drawings for participants to incentive amounts paid on a daily basis for not driving a personal vehicle to work.

Bicycle breakfasts have been a popular program offered by the City of Portland; coffee and breakfast are served once a month at one of the local bridges entering the downtown area.

Locally, the Bicycle Commuters of Anchorage (BCA),[19] a group promoting a bicycle-friendly environment in and around the MOA, began sponsored social gatherings and breakfasts for bicyclists in summer 2008.

Ghost Bike Memorial – Anchorage, November 2008

Bicycle Advocacy Groups

Bicycle advocacy groups play important roles in promoting bicycle riding and encouraging safe bicycling practices.

Ghost Bikes is a national group that promotes bicycle safety by creating crash site awareness. The organization erects small memorials for bicyclists who are killed while bicycling. A bicycle painted entirely in white is locked to a street sign near the crash site. The bicycle memorial commemorates the loss of a bicyclist and reminds the public to drive carefully. The

[19] The Web site for this organization is www.bicycleanchorage.org.

first ghost bikes were created in St. Louis, Missouri, in 2003, and they have since appeared in at least 50 cities throughout the world. In Alaska, memorials are allowed as long as they do not interfere with access to traffic control devices or access and if a contact name and telephone number are included on the memorial.

Nationally, groups such as the League of American Bicyclists[20] promote bicycling through advocacy and education to create a bicycle-friendly America. Advocacy efforts include allowing bicycles at drive-through banks and restaurants in some cities. The League of American Bicyclists reviews community and state bicycle networks to assess how bicycle friendly they are, plans events on a national level, and serve as an umbrella group to local and state bicycle advocacy organizations.

The BCA serves a similar purpose in Anchorage, as indicated by the organization's mission statement:

> The Bicycle Commuters of Anchorage (BCA) supports a bike-friendly environment in and around the Municipality of Anchorage. We promote "Share the Road" principles for bicyclist safety, work to improve conditions for bicycle transportation and encourage bicycle use as a sustainable, energy-efficient, economical and nonpolluting form of transportation that fosters health promotion and disease prevention, as well as an enjoyable form of recreation.

Another local group, the University of Alaska Anchorage (UAA) Bike Club, started Off The Chain Bicycle Collective (OTC). OTC is now a separate, incorporated entity with insurance through a private company. The UAA Bike Club and OTC share common goals, provide service (rentals and repairs), and promote educational efforts for bicycling.

The student-run club also hosts a Web page (http://www.uaabikeclub.org) with bicyclist information and a weekly radio show called "Velocipedia" through station KRUA to inform the community about bicycle-related issues.

Drive-through bicycle lane – Portland, Oregon

[20] The Web site for this organization is www.bikeleague.org.

To successfully implement and increase bicycle ridership and participation, a number of support facilities, along with sound physical design and policy recommendations, must be considered. A combination of these strategies will assist Anchorage in developing a successful bicycle network. Design and policy recommendations are described in further detail in Chapter 6.

A group in New York City, the Bicycle Clown Brigade, regularly gathers for activities such as celebrating new bicycle lanes or reminding drivers that bicycle lanes are not parking areas.

CHAPTER 6 Recommended Policies and Action Items

To achieve the goals stated in Chapter 1 and guide implementation of the Bicycle Plan, policies and action items have been identified. They are presented in this chapter.

Overall Goal — Double the amount of utility bicycling while reducing the number of bicycle crashes by one-third.

Goal 1 — Improve connectivity and safety of the transportation network.

Policy 1.1 — Improve connectivity of the road network and include bicycle lanes in road improvement projects.

Action Item Recommendations

1. Include bikeway construction and appropriate signage as indicated in the approved Bicycle Plan.
2. Examine the feasibility of using traditional loop detectors at signalized intersections and modified loop designs at stop bars.
3. Consider visual or motion detection as options at signalized intersections where a high level of bicycle use exists or is anticipated.
4. Consider the needs of bicyclists when designing and reconstructing intersections.

Policy 1.2 — Designate a continuous and direct network of bicycle infrastructure on all collectors and arterials.

Action Item Recommendations

1. Establish a separate designated fund for bicycle facility improvements in the MOA Capital Improvement Program (similar to what was created for pedestrian improvements).
2. Obtain funding to be able to construct the facilities necessary to implement the Bicycle Plan recommendations by the year 2029.

3. Work with MOA and DOT&PF officials to stripe and sign bikeways as identified on the bicycle network maps (Figures 11 and 12).
4. Support continuation of current (or equivalent) federal, state, and local funding mechanisms to implement the recommendations contained in the Bicycle Plan.
5. Seek additional revenue sources as necessary to ensure the timely completion of the bicycle infrastructure identified in the Bicycle Plan.

Policy 1.3 Establish Anchorage as a leader in bicycle ridership and infrastructure among northern cities and make bicycling an integral part of transportation in Anchorage.

Action Item Recommendations

1. Ensure during project review that bicycle infrastructure is included in all roadway construction projects for which a bicycle facility has been identified in the Bicycle Plan.
2. Fully integrate projects identified in the Bicycle Plan into the AMATS Long-Range Transportation Plan.
3. Fully integrate needed projects identified in the Bicycle Plan into the evaluation and selection process associated with the development of the AMATS Transportation Improvement Program (TIP).
4. Review all traffic impact analyses and development projects to ensure that they are consistent with the recommendations in the Bicycle Plan.
5. Continue MOA support of the Nonmotorized Transportation Coordinator position to oversee the implementation of the Bicycle Plan.

Policy 1.4 Create a schedule for progress reports on and updates to the Bicycle Plan.

Action Item Recommendations

1. Create progress reports every 2 to 5 years.
2. Update the Bicycl Plan every 10 years.

Goal 2 Establish a bicycle system that adequately responds to the transportation needs and desires of Anchorage residents.

Policy 2.1 Maximize interface between transit and bicycle infrastructure to increase bicycle-transit trips.

Action Item Recommendations

1. Support continuation of the bicycles on bus program for all public transit routes.
2. Provide secure long-term bicycle parking in conjunction with transit stops, transit centers and park-and-ride lots.
3. Develop a computer search system to allow on-line trip planning that combines bicycle and bus travel.
4. Work with People Mover design team to ensure a smooth interface of bicycle and transit facilties.
5. Work with People Mover to establish more frequest bus service with bicycle racks, especially on north-south and east-west arterials.
6. Work with People Mover to explore the possibility of park-and-bike facilities, to increase long-term bicycle parking.

Policy 2.2 Encourage and accommodate winter cycling.

Action Item Recommendations

1. Establish maintenance priorities that reflect use of bicycle lanes and pathways.
2. Work with support groups to identify approproiate maintenance measures to encourage winter bicycling.
3. Develop long-term, covered bicycle parking areas in employment and town centers to accommodate bicycle parking.
4. Streamline and simplify maintenance responsibilies to help promote increased use of roads and pathways by bicyclists.
5. Work with volunteer groups to promote a winter bike to work day with incentives and coordinate with maintenance activities to accommodate the event.

Goal 3 Develop and maintain a bicycle network that enhances safety by improving compatibility among bicycles and other transportation modes.

Policy 3.1 Develop a policy that requires accommodation of bicyclists in all new road construction.

Action Item Recommendations

1. Work with MOA and DOT&PF leadership to develop policies.
2. Provide intial and ongoing training for engineers and planners on accommodations for bicyclists.

Policy 3.1 Implement a network of on-street bicycle infrastructure where appropriate, with bicycle lanes being the preferred type of on-street bicycle facility.

Action Item Recommendations

1. Use the Bicycle Compatibility Index (BCI) analyses to determine the suitability of on-street bicycle infrastructure.
2. Ensure that new road construction projects incorporate bicycle infrastructure.
3. Amend the MOA Deisgn Criteria Manual to ensure that construction of on-street bicycle infrastructure is planned in addition to construction of separated pathways.
4. Coordinate and develop a policy with DOT&PF to address consistency with and adherence to state and city design manuals.

Policy 3.2 Provide rigorous evaluation of planned new separated pathways adjacent to roadways to assess their suitability.

Action Item Recommendations

1. Examine the following items as part of separated pathway evaluation:
   a. The pathway crossing risk should be calculated by MOA during the review process for each proposed pathway location.
   b. New pathways should be constructed as identified on the bicycle network maps (Figures 11 and 12) to reflect the consideration given to numbers of crossings and other factors during Bicycle Plan development.
   c. Pathways should be planned to cross the fewest driveways and street intersections possible.
   d. A minimum of 18 feet of right-of-way should be available to locate the pathway and provide separation from the roadway. Where that width is not available, space should be provided as available for safety.
   e. Traffic signal timing and turning movements should be reviewed by DOT&PF and MOA Traffic Engineering to incorporate adequate crossing time at intersections for bicycles without causing traffic congestion.
   f. As part of design and routine maintenance, areas around all driveways and intersections should be cleared of visual obstructions.
   g. Safe transition by bicyclists to other bikeways should be provided where the separated pathway begins and ends.

2. Consistent with the MOA *Design Criteria Manual*, plan for a minimum separation of 5 feet between the multi-use pathways and the roadway to demonstrate to bicyclists and motorists that the path functions as an independent facility.
3. Sweeps should be incorporated as part of pathway design at unsignalized road crossings to minimize conflicts with vehicles.

Policy 3.3 Encourage the implementation of consistent bicycle signage throughout the Municipality of Anchorage.

Action Item Recommendations

1. Review locations of existing bicycle route signs with MOA and DOT&PF representatives and relocate as necessary.
2. Ensure that Part 9 of the MUTCD is followed for bicycle facility signage as part of plan review of new projects and review of the existing bicycle network.
3. Work with DOT&PF and MOA Traffic Engineering to rigorously review and implement use of "No Right Turn On Red" signs at selected intersections with high numbers of bicycle-vehicle collisions involving the motorist making a right turn. This solution should only be used at locations where this mitigation will not create other crash patterns.
4. Work with DOT&PF and MOA Traffic Engineering to incorporate a bicycle logo on street identifier signs to identify bicycle friendly streets that are part of the bicycle network.
5. Work with DOT&PF and MOA Traffic Engineering to develop a policy in the DOT&PF Alaska Traffic Manual on use of signage.

Policy 3.4 Review routine maintenance schedules and standards for MOA and DOT&PF to ensure smooth, clean, safe conditions on bicycle infrastructure.

Action Item Recommendations

1. Develop policies with MOA and DOT&PF to prioritize maintenance of on-street facilities based on bicycle use.
2. Continue to coordinate with MOA and DOT&PF Street Maintenance departments to streamline and simplify maitnenance responsibilities and establish maintenance priorities that will help promote increased use of roads by bicyclists.
3. Work with MOA Parks Department to develop a consistent schedule for maintenance of greenbelt pathways.

4. Provide seasonal reminders to MOA and DOT&PF Street Maintenance staffs to ensure on-street bicycle facilites are cleaned as part of road maintenance.
5. Provide seasonal reminders to MOA and DOT&PF Street Maintenance staffs to ensure on-street and separated bicycle facilites are cleaned in preparation of special events and races.
6. Improve the citizens' notification system to inform maintenance staff about maintenance issues.
7. Ensure that bicycle lanes and shoulders are adequately kept free of snow and debris such as broken glass through plowing, washing, and sweeping on a regular basis.
8. Set up a bicycle facility hotline to manage reports of hazards and maitnenance issues.
9. Pursue funding from grant programs to aid in regular restriping of bicycle lanes.
10. Use bicycle safety devices such as bicycle-proof drain grates, rubberized or concrete pads at railroad crossings, and appropriate signage on capital projects wherever practicable.
11. Encourage volunteer assistance in the review and provision of adequate maintenance service on bicycle infrastructure.

Policy 3.5 Provide clearly defined bicycle routes that are safe and free of obstacles during construction and maintenance.

Action Item Recommendations

1. Work with DOT&PF and MOA Traffic Engineering to add language to policies that ensures bicycle infrastructure is rerouted during construction and maintenance.
2. Review traffic control plans to ensure that language is added to contracts to keep bikeways clear during construction.

Private contractor vehicles blocking pathway

3. Work with MOA and DOT&PF Right-of-Way departments to establish appropriate practices that avoid blocking use of pathways and bicycle facilties by utility vehicles.

4. Revise MOA *Standard Specificiations*, Division 10, Article 4.12, Public Conveneince and Access, to include language for rerouting bicycle traffic during construction.
5. Revise MOA *Standard Specificiations*, Division 10, Article 4.13 Traffic Plan, to include bicycles in addition to vehicular traffic.

Goal 4 Achieve greater public awareness and understanding of safe bicycling and driving practices, procedures, and skills.

Policy 4.1 Develop and implement bicycle safety and education programs aimed at all ages to improve bicycle skills, increase the observance of traffic laws, and enhance overall safety of the traveling public.

Action Item Recommendations

1. Work with other agencies to develop an array of educational tools, including the following:
    a. Bicycle safety brochures and posters with bicycle riding tips
    b. Commercials and public service announcements providing bicycle and motor vehicle operator tips and reminders to watch for bicycles.
    c. A Web site for bicycle safety information
    d. Development of a way to easily explain the rules of the road.
2. Support DOT&PF efforts to review and revise the *State of Alaska Driver Manual* used by the Department of Motor Vehicles for license testing with the intent of suggesting revisions that would add emphasis on bicycles, their spaces on the road, and their interactions with motor vehicles.
3. Provide a one-page handout on rules of the road that pertains to vehicles and bicycles sharing the road when a person obtains or renews a driver's license or vehicle registration.
4. Continue promotion, sponsorship, and counting at the annual Bike-to-Work Day.
5. Target educational efforts for the month of April when bicycle riding begins in earnest and bicycle-related crash rates typcially begin to increase for the summer months.
6. Include education consisting of information on right-turn-on-red crashes between bicycles and vehicles, which account for nearly 40 percent of bicycle-vehicle crashes.

7. Promote bicycle safety for children of elementary and middle school age, who are involved in nearly 14 percent of all bicycle crashes in non-school hours.
8. Target bicycle awareness and safety advertisements to air during the afternoon/evening drive time, when nearly 46 percent of all bicycle-related crashes occur.
9. Ensure that educational programs are designed to improve the awareness that bicyclists are allowed and should be expected on all streets.
10. Continue educational efforts to increase helmet use.
11. Encourage and participate in activities for League of American Cyclists instructors in the MOA.

Policy 4.2 Encourage the continuation and improvement of monitoring and analysis of bicycle crash data to formulate ways to improve bicycle safety.

Action Item Recommendations

1. Improve crash reporting by police officers, including the coding of nonmotorized crashes even when a vehicle is not involved.
2. Improve training for police officers in filling out the 12-200 collision report form, particularly regarding at-fault issues so that the vehicle-at-fault information is correctly applied in crashes involving bicycles.
3. Continue to conduct bicycle counts in conjunction with the annual Bike-to-Work Day activities.
4. Plan and promote an additional Bike-to-Work Day event in winter.

Policy 4.3 Encourage consistent enforcement of laws that affect bicycle operation.

Action Item Recommendations

1. Develop a public awareness campaign to educate bicyclists and drivers about the rules of the road.
2. Set up a program to issue warning tickets to bicyclists and motorists for bicycle-related infractions that do not result in crashes.
3. Continue to seek grant funds to continue monitoring and ticketing by the Anchorage Police Department at intersections.
4. Review existing MOA traffic laws to evaluate whether they adequately accommodate bicyclists as a part of the traffic flow.
5. Revise language of AMC Title 9 to clarify the right of bicyclists to use the roadway even if there is an adjacent separated pathway.

6. Revise language of AMC Title 9 and state law to clarify the prohibitions about riding bicycles on sidewalks in business areas.
7. Revise language in AMC Title 9 to remove ambiguities and increase understanding of appropriate bicycle laws.
8. Continue to expand "cops on bicycles" programs with training opportunities for bicycle law enforcement.
9. Encourage stricter regulations and enforcement of laws on window tinting.

Pedal car business on 4th Avenue

Goal 5 Provide support facilities and amenities designed to enhance the bicycle network and encourage the use of bicycling as a practical transportation system.

Policy 5.1 Review zoning codes for bicycle parking to include requirements for bicycle parking in well-monitored, lit, secure areas that are protected from the elements and are convenient to the entrances of buildings.

Action Item Recommendations

1. Continue to work with MOA Planning Department for Title 21 revision draft language to specifically include development of requirements for long-term, short-term, and covered bicycle parking.
2. Work with MOA Planning Department to include requirements for locked bicycle parking enclosures within covered parking garages.
3. Work with MOA Planning Department to ensure that requirements for bicycle parking and support facilities such as showers and personal lockers are included in Title 21 and other appropriate planning documents.
4. Work to develop and provide long-term covered bicycle parking at major employment centers and schools where utility bicyclists are likely to park their bicycles for longer than 2 hours.
5. Work with MOA Planning Department to incorporate a bonus point system that would be adopted for zoning districts to provide consideration of long-term bicycle parking as part of site plan reviews

for developments within the major employment centers—Downtown, Midtown, the UMed District, and town centers.

6. Evaluate parking needs of different bicycle users and work with the community to identify appropriate parking standards for different zoning districts and uses. For example, coffee shops may have bicycle parking requirements that differ from those for factories.
7. Set aside funding or request grants to explore what other bicycle friendly cities are doing. Use the information to create improvements for Anchorage.

Policy 5.2 Include short- and long-term bicycle parking that is covered and protected at public facilities.

Action Item Recommendations

1. Work with Project Management & Engineering, Transit, and the Anchorage Parking Authority to provide and install secure bicycle storage lockers at park-and-ride locations and Downtown, Midtown, and UMed District parking facilities.
2. Initiate a publicly funded bicycle rack program that provides bicycle racks, lockers, and bicycle parking areas in locations where no bicycle parking currently exists.

Policy 5.3 Encourage the inclusion of short- and long-term bicycle parking at private-sector facilities.

Action Item Recommendations

1. Explore grant funding through the MOA Congestion Mitigation Air Quality (CMAQ) program and AMATS to allow business owners to purchase bicycle racks at reduced rates.

Policy 5.4 Increase public awareness of the benefits of bicycling and of available resources and facilities.

Action Item Recommendations

1. Develop and regularly update printed and online bicycle network maps for use by the public.
2. Develop an interactive Web page to help identify bicycling and bus routes throughout the MOA.
3. Partner with nonprofit organizations to host once a month bicycle breakfast events at various locations.

4. Work with nonprofit organizations to promote bicycling as transportation to and from school and work.
5. Continue to support and sponsor Bike-to-Work Day and participant counts.
6. Work with community groups to promote bicycle tourism.
7. Encourage employers to offer incentives and develop facilities to encourage bicycling to work.

Bicycle breakfast hosted by City of Portland, Oregon

Goal 6 Educate the public on the appropriate laws concerning bicycling.

Policy 6.1 With input from other agencies, develop a program to establish and provide public outreach on bicycle and vehicle rules of the road.

Action Item Recommendation

1. Use metropolitan planning organization and State Transporation Improvement Plan funds to hire a Pedestrian and Bicycle Educator to coordinate with schools, community councils, and the public to offer training and education to bicyclists and motorists.
2. Seek additional funding to increase the number of bicycle cops to patrol trails, Downtown, and Midtown.

Chapter 7

Implementation

Implementation of this Bicycle Plan will require a collaborative effort between city and state agencies as well as outside organizations. Funding for both new facilities and maintenance of existing facilities will be key to successful implementation. Existing transportation funding levels are insufficient to support or implement all of the needed bicycle system improvements. To successfully build the bicycle network and implement the recommendations contained in this Bicycle Plan, MOA will need to leverage existing traditional sources of funding as well as seek out new funding sources. This chapter examines funding, describes the role of MOA in plan implementation, and discusses Bicycle Plan updates.


Bicycle lane treatment at a right-turn-only lane

Identifying Funding

The recommended project list (Table 6, presented in Chapter 3) identifies more than 150 bicycle projects. The projects range in scope from simple striping of bicycle lanes to incorporating bicycle lanes and separated pathways into roadway reconstruction projects and include several reconnaissance studies. The total cost of implementing all improvements identified in the Bicycle Plan (not including the facilities that would be constructed as part of roadway projects) is estimated to be $109 million—$56 million for roadway-related projects and $53 million for greenbelt trail projects that are proposed as part of the bicycle network.

Various funding sources, both existing and new, are potentially available to implement recommended projects. These funding sources are briefly described below.

Municipality of Anchorage Capital Improvement Program

The MOA CIP is the local source of funding available for road and drainage improvements. The CIP is funded through bond proceeds that are periodically approved by voters. In recent years, the amount of this funding has been around $40 million annually for transportation-related improvements. The CIP has funded road reconstruction, road drainage, and pedestrian improvement projects, which have included sidewalks and paved separated pathways adjacent to roads. The primary means of implementing the Bicycle Plan projects through the CIP has been to incorporate the bicycle infrastructure in the design of roadway reconstruction projects.

Many proposed projects included in the recommended bicycle network are identified on the CIP list and therefore should be constructed as part of the applicable roadway projects. The following are examples:

- 48th Avenue construction (Elmore Road to Boniface Road; to be renamed, Dr. Martin Luther King Jr. Avenue)
- Northwood Drive pavement rehabilitation (Raspberry Road to Strawberry Road)
- Oklahoma Street surface rehabilitation (Boundary Road to 6th Avenue)
- Victor Road improvements (100th Avenue to Dimond Boulevard)
- Cordova Street bicycle lane and crossing improvement
- Seward Highway pavement rehabilitation at Northern Lights Boulevard and Benson Boulevard
- Northern access to the UMed District (Elmore Road to Bragaw Street)

The CIP has also been used to match other funds or to fully fund stand-alone bicycle facility projects. These projects have typically involved improvements of the multi-use greenbelt trails. As this system is completed, funding of stand-alone bicycle projects that are not a part of the greenbelt system but aid in the overall bicycle transportation system should be considered.

Although the CIP has previously included a separate allocation for pedestrian safety and rehabilitation projects (around $200,000 to $500,000 per year), no separate funding exists for bicycle facility projects. The establishment of a separate designated fund for bicycle facility improvement would facilitate the implementation of this Bicycle Plan by providing money for spot improvements, bicycle lane striping, signage improvements, and other improvements that currently fall in the funding gap.

It is important to note that only projects within the Anchorage Roads and Drainage Service Area (ARDSA) boundaries are eligible for CIP funding because the bonds used to pay for the projects are based on property taxes collected within the service area. As a result, areas outside the service area, such as most of the Anchorage Hillside, are not eligible for this type of funding. The Chugiak, Birchwood, Eagle River Rural Road Service Area (CBERRRSA) has a limited amount of capital funding available through its mil levy that is allocated by the CBERRSA Board.

Federal Transportation Funds

The Intermodal Surface Transportation Efficiency Act of 1991 (ISTEA) directed a new flexibility for federal transportation funds. Transportation enhancement funds under ISTEA, then later the Transportation Equity Act for the 21st Century (TEA-21), and now the Safe Accountable, Flexible, Efficient Transportation Equity Act: A Legacy for Users of 2005 (SAFETEA-LU) have funded bicycle and pedestrian facilities. AMATS allocates these funds. It is the policy of AMATS to include sidewalks and separated pathways along with bicycle infrastructure in the road construction cost because these elements are considered integral parts of the infrastructure similar to drainage and utilities.

In addition to the construction of bicycle infrastructure in conjunction with roadway projects, AMATS has amended one policy (from the AMATS policies and procedures manual) so that 10 to 30 percent of the total AMATS allocation averaged over the 4 years of the TIP should be spent on transportation enhancements.

On-street bicycle lane

SAFETEA-LU requires that a 10 percent minimum must be spent on enhancements to ensure that all states are participating. Although this allocation can cover a variety of non-roadway projects, AMATS has traditionally used transportation enhancement funds for greenbelt trail projects. Major trail projects funded with the use of this money in the 2006–2009 TIP include Phases III and IV of the Ship Creek Trail and the connection of the Chester Creek Trail and the UAA Trail to link trails from the separate crossing at Tudor Road to Goose Lake and the UAA and Alaska Pacific University. Both of these trail projects are missing links and will connect two major trail systems in Anchorage.

AMATS has also given high priority to provide trail rehabilitation on existing trails. As a result, the AMATS transportation enhancement program has been a major source of money for trail rehabilitation.

The purpose of the Highway Safety Improvement Program (HSIP), funded under SAFETEA-LU, is to achieve a significant reduction in traffic fatalities and serious injuries on all public roads. This source of funding could also be used to address corridors that are prone to bicycle-vehicle crashes in Anchorage, such as Lake Otis Parkway and Northern Lights Boulevard (as discussed in Chapter 2).

The MOA CMAQ program funded by a SAFETEA-LU and the TIP is intended to address transportation-related air quality problems. Anchorage, which is a carbon monoxide maintenance area (reflecting past exceedances of airborne particulate matter and ongoing monitoring to confirm maintenance of lower levels of carbon monoxide), is qualified to receive these funds. Bicycle infrastructure and bicycle support programs are eligible for CMAQ funding, and AMATS has used these funds for multi-use trail improvements. The CMAQ funding source could be tapped to implement several of the smaller program recommendations contained in this Plan such as the bicycle rack installation and bicycle education.

The Safe Routes to School Program is a new program established as a result of the passage of SAFETEA-LU in 2005. The concept is to increase the number of children, in kindergarten through eighth grade, who walk or bicycle to school by funding projects that remove the barriers that currently prevent them from doing so. Eligible projects may include, but are not limited to, the following:

- New separated pathways
- Bicycle racks and bicycle lane striping and widening
- New sidewalks and pedestrian facilities and widening of sidewalks
- Curbs, gutters, and curb ramps
- Separated road and railway crossings
- Traffic-calming measures that include raised intersections, median refuges, narrowed traffic lanes, lane reductions, full- or half-street closures, and other speed-reduction techniques

Alaska is authorized to receive $1 million per year through the life of the SAFETEA-LU transportation bill. Because of reductions in actual funding, the amount will be about 85 percent of that authorized amount. DOT&PF is offering a competitive grant program to disperse these funds to communities throughout Alaska. Funds can be used alone, for seed money, or to augment other funding sources. The coordinator of the Safe Routes to School Program has indicated that the projects prioritized in this Bicycle Plan that are specific to schools may be appropriate to submit for construction funding grants.

A potential new opportunity is the use of federal stimulus funds to sign and stripe roadways that are identified as Priority A bicycle lanes in Table 6, making them bicycle-friendly in the near-term. Implementation of these projects would not entail reconstruction and would consist of relatively low-cost improvements.

Grants

Grant funding is provided by many entities. The State of Alaska is the main source of grant funding for bicycle facility improvements in the MOA. In 2008, $200,000 in state grant funds was used to match local CIP pedestrian projects. It is also possible to seek direct State of Alaska grants for individual improvement projects for the bicycle network.

One area of funding that has been largely overlooked in Anchorage is private foundations. Bikes Belong Coalition is sponsored by the U.S. bicycle industry with the goal of putting more people on bicycles more often. Fundable projects include paved bicycle paths and rail-trails as well as mountain bicycle trails, bicycle parks, BMX facilities, and large-scale bicycle advocacy initiatives. The Bikes Belong Grant Program has two application categories: facility and advocacy.

For the facility category, Bikes Belong Coalition accepts applications from nonprofit organizations whose missions focus on bicycles or trails. It also accepts applications from public agencies and departments at the national, state, regional, and local levels; however, these entities are encouraged to align with a local bicycle advocacy group that will help develop and advance the project or program. For the advocacy category, Bikes Belong will only fund organizations whose primary mission is bicycle advocacy. Grants are awarded in November and February.

The REI Bicycle Friendly Communities Grant Program—administered by the Bikes Belong Foundation in partnership with the League of American Bicyclists—supports designated and aspiring Bicycle Friendly Communities (BFCs) that are demonstrating success, employing creative strategies, and showing marked advancements in becoming more bicycle friendly. One goal of the REI/BFC Grant Program is to help communities maintain the significant momentum generated by the BFC application process and use the feedback they receive from the BFC review team. Awards range from $5,000 to $15,000 and can be used for many purposes—from obtaining consulting and technical expertise to building ridership and promoting bicycling. Applications must be invited; the review committee invites advocacy organizations and city planning departments to apply immediately following their BFC award designation or renewal.

Block Grants

Federal block grants from the U.S. Department of Housing and Urban Development (HUD) are awarded to MOA to assist in meeting various needs of city residents. Public improvement projects such as trails, paths, or sidewalks are eligible for funding as "public facilities" if they serve low- or moderate-income areas. Funding could be also used to help start a bicycle shop in such neighborhoods. Low- and moderate-income neighborhoods are defined as areas in which more than 50 percent of the residents have incomes below 80 percent of the median income for the city.

Integrating the Bicycle Plan with Other Planning Documents

To ensure its successful implementation, this Bicycle Plan should be coordinated with other city and state planning documents. These specific actions are proposed to integrate the various publications that guide MOA development, particularly the future of transportation facilities:

- Include Bicycle Plan recommendations in the long-range transportation plans for the Anchorage Bowl and Chugiak-Eagle River
- Add Bicycle Plan recommendations to the list of projects evaluated for funding and scheduling as part of MOA and state capital improvements

- Review roadway design projects for consistency with the Bicycle Plan recommendations and policies
- Ensure that traffic impact studies address need for and impacts on bicycling facilities
- Review platting and zoning cases for consistency with the Bicycle Plan recommendations and policies

Coordination Efforts

Improving the bicycle network and providing connectivity and ease of transition between transportation facilities requires coordination between MOA departments and between MOA and DOT&PF departments, as well as with other government agencies, that have responsibilities for traffic, maintenance, planning, and project management.

MOA Traffic Department is the chief MOA entity responsible for promoting safe and efficient transportation. This department focuses on addressing neighborhood traffic concerns, ensuring operations that maximize public safety, long-range transportation planning (including development of this Bicycle Plan), and providing expertise to ensure that public safety communications and electronic systems are fully functional for all municipal and state agencies. Some signage and striping of the bicycle network can likely be accomplished in conjunction with maintenance and operations provided by the Traffic Department. Ongoing maintenance such as sweeping and snow removal are responsibilities of MOA and DOT&PF street maintenance departments.

A winter bicyclist wearing Bunny boots

Successful implementation of Bicycle Plan strategies will require commitments, leadership, and community input; the implementation will rely on dedicated staff, clear direction to MOA departments, regular coordination between MOA departments and other agencies, steadfast civic officials, and constant public support.

Updating the Bicycle Plan

This Bicycle Plan is a living, flexible document. As new bicycle facility design standards are developed, bicycle infrastructure is improved and added, maintenance enhancements occur, bicycle safety practices evolve, and community travel needs and conditions change, the data and other information in the Bicycle Plan should be periodically revised. To respond to these changing conditions and community desires, the Bicycle Plan needs to be reviewed every 4 to 5 years and updated every 8 to 10 years.

To do this work, the MOA Non-Motorized Coordinator, BCA, and MOA and state agencies should work cooperatively.

This coordination can include, but not be limited to, the following:

- Assist with the implementation of bicycle education programs
- Promote expansion and use of the bicycle network
- Offer input on the design of new bicycle infrastructure and routes
- Provide technical review of any updates to the Bicycle Plan
- Act as a liaison with the public, bicycle advocacy groups, and MOA

APPENDIX

A Bicycle Commuter Destinations

Appendix A
Bicycle Commuter Destinations

Attendees at the October 2007 Bicycle Plan Workshop who have commuted by bicycle in Anchorage submitted information on their places of origin, their destinations, the distances traveled, and the times spent on their commutes. The frequencies of locations were tallied and are shown in the chart below.

				Tallies per Destination Location									
Origin	Destination	Distance (miles)	Commute Time (minutes)	Downtown	Midtown	UMed District	Dimond	Airport Heights	East Anchorage	South Anchorage	Hillside	Jewel Lake	Elmendorf AFB
Northwest Anchorage													
W. 11th	3rd & K	1	5	1									
9th	Frontier Bldg	3	15		1								
9th & Eagle	Blueberry	2	15		1								
9th & Eagle	UAA	4	35			1							
13 & I	Loussac Library	3	15		1								
13& I	Northway Mall market	3	15						1				
13 & I	Airport Heights	3	15						1				
13 & I	Downtown	1	5	1									
15 & K	Carrs Aurora Village	1	5		1								
15 & K	New Seward Hwy & Tudor	6	20		1								
15 & L	Downtown		10	1									
15 & L	Alaska Regional Hospital		30						1				
15 & L	UAA		30			1							
14 & P	APU	4.8	20			1							
21 & Dawson	Spenard at 27th	1	10		1								

				Tallies per Destination Location									
Origin	Destination	Distance (miles)	Commute Time (minutes)	Downtown	Midtown	UMed District	Dimond	Airport Heights	East Anchorage	South Anchorage	Hillside	Jewel Lake	Elmendorf AFB
Arctic & International	APU	5.5	45			1							
Downtown	South Anchorage Sports Pk.		60							1			
Downtown	UAA		20			1							
Downtown	APU	3	25			1							
Downtown	Dimond		35				1						
Downtown	Midtown	2	35			1							
Downtown	Airport	6	35										
Fairview	Home Depot-Northway Mall	2	15						1				
Fairview	UAA		25			1							
Fairview	Potter & C St		30		1								
Fairview: 18 & Juneau	REI	2	15		1								
Fairview: 18 & Juneau	Fred Meyers	0.75	8		1								
Fairview: 18 & Juneau	Pete's Gym	1	12	1									
Gov Hill	Mears	11	45				1						
Turnagain Pkwy	Downtown-Egan	3	15	1									
W. Lagoon	ANMC	5	25			1							
W. Lagoon	UAA		25			1							
Wiconsin	C Street	3.5	15		1								
Northeast Anchorage													
Airport Heights	Downtown	3.5	20	1									
Airport Heights	Downtown	2.5	20	1									
Airport Heights	Downtown	5	15	1									
Airport Heights	Downtown	3.5	25	1									

				Tallies per Destination Location									
Origin	Destination	Distance (miles)	Commute Time (minutes)	Downtown	Midtown	UMed District	Dimond	Airport Heights	East Anchorage	South Anchorage	Hillside	Jewel Lake	Elmendorf AFB
Airport Heights	ANMC	3	20			1							
Airport Heights	Orca	3	15	1									
Airport Heights	Train Depot	4	30	1									
Airport Heights	Mountain View	1.5	10						1				
Baxter Bog	7th & G	7	25	1									
Baxter Rd	8th & G	6	30	1									
Boniface & 34th	Airport	12	35					1					
Chugach Foothills	Midtown	7.5	45		1								
Eastridge	Downtown	3	15	1									
Eastridge at Sitka	Huffman Park Dr.	8	45							1			
Elmendorf	REI	5	30		1								
Lake Otis/Northern Lights	Jewel Lake./Raspberry	9	40									1	
Lake Otis/Northern Lights	Downtown	3	25	1									
Lake Otis/Northern Lights	Midtown	2	20		1								
LaTouche	Fairview Rec. Center	2	10	1									
Mountain View	Midtown	6	35		1								
Mountain View	Airport	11	45					1					
Muldoon & Northern Lights	Valley of Moon	7	60	1									
Muldoon & Northern Lights	Sand Lake & Dimond	20	60									1	
Muldoon & Northern Lights	Camp Creek Park	7	60		1								
Rogers Park	Elmendorf	6	40										1
Rogers Park	Elmendorf-hospital	4	25										1
Rogers Park	8th & I	2.5	20	1									

				Tallies per Destination Location									
Origin	Destination	Distance (miles)	Commute Time (minutes)	Downtown	Midtown	UMed District	Dimond	Airport Heights	East Anchorage	South Anchorage	Hillside	Jewel Lake	Elmendorf AFB
Russian Jack	Raspberry & C	8.5	35									1	
Russian Jack	Concoco Phillips	9	40	1									
Russian Jack	BLM	4	30							1			
Tikishla	ANMC	3	15			1							
24 & Juneau	Independence Park	5	45										
36 & Muldoon	76 & C	8	40						1				
Eagle River													
Eagle River	REI		80		1								
Eaglewood	REI	20	70		1								
Central Anchorage													
32 & C	Camai Childcare	9	50							1			
33rd	UAA	6	40			1							
Midtown	Service	4	25								1		
Midtown	Providence./UAA					1							
Spenard	Huffman	7.5	30							1			
Spenard	Downtown	3	20	1									
Spenard	South Anchorage	10	30							1			
Spenard	RC Rifle Range	15	1:00										
Spenard & Hillcrest	Downtown	1.5	10	1									
Spenard & Hillcrest	Library	1.5	15		1								
Spenard	UAA	4	12			1							
Spenard	Independence Park	6	20				1						

Origin	Destination	Distance (miles)	Commute Time (minutes)	Tallies per Destination Location: Downtown	Midtown	UMed District	Dimond	Airport Heights	East Anchorage	South Anchorage	Hillside	Jewel Lake	Elmendorf AFB
Spenard	Downtown	1	10	1									
Potlach Circle	Midtown	1	10		1								
Windemere	Spenard & Hillcrest	1.5	10		1								
Windemere	Airport	4.5	20					1					
Southwest Anchorage													
Airguard Rd	Federal Building		45	1									
Alamosa & 88th	Airport	4	20					1					
Bayshore	Turnagain Bluff Way	6	35		1								
Bayshore	Dowling & Old Seward Hwy	6	30		1								
Bayshore	Dimond & 100th	1.3	10				1						
Bayshore	Library	6	30		1								
Bayshore	Dimond & C	4	20				1						
Bayshore	Snowy Plover Rd	10	60								1		
Dimond/Arlene	Downtown	8-18	80	1									
Dimond/Arctic	ANMC	6	30			1							
Jewel Lake	UAA	10	50			1							
Fisher/Lynwood	71 & Raspberry											1	
Dimond/Blackberry	36 & C	6	40				1						
Southeast Anchorage													
68th & Lake Otis	36 & C	4	20		1								
68 & Abbott	Downtown	6	30	1									
80th & Lake Otis	West High	10	40		1								

				Tallies per Destination Location									
Origin	**Destination**	**Distance (miles)**	**Commute Time (minutes)**	**Downtown**	**Midtown**	**UMed District**	**Dimond**	**Airport Heights**	**East Anchorage**	**South Anchorage**	**Hillside**	**Jewel Lake**	**Elmendorf AFB**
80th & Lake Otis	DMV/Moose's Tooth	5	20		1								
81st Ave	Fireweed & C	6	25		1								
84th & Abbott Loop	Northern Lights & Spenard	7	45		1								
Abbott & Elmore	8th & I	8.5	35	1									
Abbott at Main Tree	Tudor & C	8.3	35		1								
Campbell Creek Park	UAA	3	15			1							
Goldenview	Frontier Bldg	13	75		1								
Goldenview	University	13	75			1							
Hillside	Midtown	10	50		1								
Hillside	Midtown	12	35		1								
Hillside/O'Malley	Boscoes		35		1								
Huffman	Spenard via Coastal	16	60		1								
Huffman	UAA	6	40			1							
Huffman/Elmore	Boniface & Tudor	8.5	30						1				
Huffman/Lake Otis	7th & C	9	35	1									
Lake Otis/53rd	Dowling/New Seward Hwy	4	20		1								
Lower Hillside	Midtown	5	20		1								
	Destination counts	**578.2**	**3377**	**27**	**36**	**20**	**6**	**4**	**7**	**6**	**2**	**4**	**2**
	Averages	**5.6**	**32.8**										

APPENDIX

B

Relevant Sections of the Anchorage Municipal Code

Appendix B
Relevant Sections of the Anchorage Municipal Code

The following excerpts are taken from the Anchorage Municipal Code. The web page for this information is http://www.municode.com/resources/gateway.asp?pid=12717&sid=2.

Chapter 9.16 RULES OF THE ROAD

9.16.010 Driving on right side of roadway required; exceptions.

A. Upon all roadways of sufficient width a vehicle shall be driven upon the right half of the roadway, but not upon the shoulder, except as follows:

1. When overtaking and passing another vehicle proceeding in the same direction under the rules governing such movement.

2. When an obstruction exists making it necessary to drive to the left of the center of the street, provided, any person so doing shall yield the right-of-way to all vehicles traveling in the proper direction upon the unobstructed portion of the street within such distance as to constitute an immediate hazard.

3. Upon a roadway restricted to one-way traffic.

B. Upon all roadways any vehicle proceeding at less than the normal speed of traffic at the time and place and under the conditions then existing shall be driven in the righthand lane then available for traffic, or as close as practicable to the righthand lane then available for traffic, or as close as practicable to the righthand curb or edge of the roadway, except when overtaking and passing another vehicle proceeding in the same direction or when preparing for a left turn at an intersection or into a private road or driveway.

C. Upon any roadway having four or more lanes for moving traffic and providing for two-way movement of traffic, no vehicles shall be driven to the left of the centerline of the roadway, except when authorized by official traffic control devices designating certain lanes to the left side of center of the roadway for use by traffic not otherwise permitted to use such lanes, or except as permitted under subsection A.2 of this section. However, this subsection shall not be construed as prohibiting the crossing of the centerline in making a left turn into or from an alley, private road or driveway.

(CAC 9.16.010; AO No. 78-72)

9.16.020 Passing vehicles proceeding in opposite direction.

Drivers of vehicles proceeding in opposite directions shall pass each other to the right, and, upon roadways having width for not more than one lane of traffic in each direction, each driver shall give to the other at least one-half of the main-traveled portion of the roadway as nearly as possible.

(CAC 9.16.020; AO No. 78-72)

9.16.030 Rules for overtaking on the left.

The following rules shall govern the overtaking and passing of vehicles proceeding in the same direction, subject to those limitations, exceptions and special rules stated in this section:

A. The driver of a vehicle overtaking another vehicle proceeding in the same direction shall pass to the left thereof at a safe distance and shall not again drive to the right side of the roadway until safely clear of the overtaken vehicle.

B. Except when overtaking and passing on the right is permitted, the driver of an overtaken vehicle shall give way to the right in favor of the overtaking vehicle on audible signal and may not increase the speed of his vehicle until completely passed by the overtaking vehicle.

(CAC 9.16.030; AO No. 78-72; AO No. 89-52)

9.16.040 Permitted conditions for overtaking on the right.

A. The driver of a vehicle may overtake and pass on the right of another vehicle only under the following conditions:

1. When the vehicle overtaken is making or about to make a left turn.

2. On a street with unobstructed pavement not occupied by parked vehicles of sufficient width for two or more lines of moving vehicles in each direction.

3. Upon a one-way street, or upon any roadway upon which traffic is restricted to one direction of movement where the roadway is free from obstruction and of sufficient width for two or more lines of moving vehicles.

B. The driver of a vehicle may overtake and pass another vehicle upon the right only under conditions permitting such movement in safety. In no event may such movement be made by driving off the pavement or main-traveled portion of the roadway, or by driving on or across a solid white line or by driving in a lane which has been designated by the municipal traffic engineer as a parking lane.

(CAC 9.16.040; AO No. 78-72; AO No. 89-52)

9.16.050 Limitations on overtaking on the left.

No vehicle may be driven to the left side of the center of the roadway in overtaking and passing another vehicle proceeding in the same direction unless authorized by the provisions of this title, and unless such left side is clearly visible and is free of oncoming traffic for a sufficient distance ahead to permit such overtaking and passing to be completely made without interfering with the operation of any vehicle approaching from the opposite direction or any vehicle overtaken. In every event, the overtaking vehicle must return to an authorized lane of travel as soon as practicable, and, if the passing movement involves the use of the lane authorized for vehicles approaching from the opposite direction, before coming within 200 feet of any approaching vehicle.

(CAC 9.16.050; AO No. 78-72)

9.16.060 Limitations on driving on left side of roadway.

A. No vehicle may be driven on the left side of the roadway under the following conditions:

1. When approaching or upon the crest of a grade or a curve in the street when the driver's view is obstructed within such distance as to create a hazard if another vehicle might approach from the opposite direction.

2. When approaching within 100 feet of or traversing any intersection or railroad grade crossing.

3. When the view is obstructed upon approaching within 100 feet of any bridge, viaduct or tunnel.

B. The limitations set out in subsection A of this section shall not apply upon a one-way roadway, or under conditions described in Section 9.16.010.A.2, or to the driver of a vehicle turning left into or from an alley, private road, driveway or intersection.

(CAC 9.16.060; AO No. 78-72)

9.16.070 No passing zones.

A. The municipal traffic engineer is authorized to determine those portions of any street where overtaking and passing or driving to the left of the roadway would be especially hazardous and may by appropriate signs or markings on the roadway indicate the beginning and end of such zones, and, when such signs or markings are in place and clearly visible to an ordinarily observant person, every driver of a vehicle shall obey the direction thereof.

B. When signs or markings are in place and define a no passing zone as set forth in subsection A of this section, no driver may at any time drive on the left side of the roadway within such no passing zone or on the left side of any pavement striping designed to mark such no passing zone throughout its length.

C. This section does not apply under the conditions described in Section 9.16.010.A.2, nor to the driver of a vehicle turning left into or from an alley, private road, driveway or intersection.

(CAC 9.16.070; AO No. 78-72)

9.16.080 One-way streets and alleys.

A. The municipal traffic engineer may designate any one-way street or alley, and when so designated the traffic engineer shall place and maintain signs giving notice thereof, and no such regulation shall be effective unless such signs are in place. Signs indicating the direction of lawful traffic movement shall be placed at every intersection where movement of traffic in the opposite direction is prohibited.

B. Upon those streets and parts of streets and in those alleys designated as one-way, vehicular traffic shall move only in the designated direction when signs indicating the direction of traffic are erected and maintained at every intersection where movement in the opposite direction is prohibited.

C. The municipal traffic engineer is authorized to determine and designate streets, parts of streets or specific lanes thereon upon which vehicular traffic shall proceed in one direction during one period and the opposite direction during another period of the day, and shall place and maintain appropriate markings, signs, barriers or other devices to give notice thereof. The municipal traffic engineer may erect signs temporarily for designating lanes to be used by traffic moving in a particular direction, regardless of the centerline of the roadway.

D. It is unlawful for any person to operate any vehicle in violation of such markings, signs, barriers or other devices so placed in accordance with this title.

(CAC 9.16.080; AO No. 78-72)

9.16.090 Driving on roadways laned for traffic.

Whenever any roadway has been divided into two or more clearly marked lanes for traffic in one direction, the following rules shall apply:

A. A vehicle shall be driven as nearly as practicable within a single lane and shall not be moved from the lane until such movement can be made with reasonable safety, and properly signaled as required by Section 9.22.040. A lane change will not be made that causes the vehicle to cross a solid white line, unless there is sufficient paved width to allow passing on the shoulder.

B. Official signs approved by the traffic engineer may be erected directing slow-moving traffic to use a designated lane or allocating specified lanes to traffic moving in the same direction, and drivers of vehicles shall obey the directions of the traffic device.

C. Official signs approved by the traffic engineer may be erected directing vehicles in specified lanes to make specific turns or movements. Vehicles in these lanes shall make the turn or movement indicated by the device and shall not be moved right or left upon the roadway except to make the movement indicated by the traffic device.

D. Drivers of vehicles shall remain entirely within one lane and shall not initiate a lane change when approaching within 100 feet of or while traversing an intersection.

(CAC 9.16.090; AO No. 78-72; AO No. 89-52; AO No. 94-68(S), § 6, 8-11-94)

9.16.100 Following too closely.

The driver of a motor vehicle shall not follow another vehicle more closely than is reasonable and prudent, having due regard to the speed of such vehicle and the traffic upon and the conditions of the street.

(CAC 9.16.100; AO No. 78-72; AO No. 89-52)

9.16.110 Driving on divided streets.

Whenever any street has been divided into two or more roadways by leaving an intervening space, or by physical barrier or clearly indicated dividing section so constructed as to impede vehicular traffic, every vehicle shall be driven only upon the righthand roadway unless directed or permitted to use another roadway by official traffic control devices or police officers. No vehicle may be driven over, across or within any such dividing space, barrier or section, except through an opening in such physical barrier or dividing section or space, or at a crossover or intersection as established, unless specifically prohibited.

(CAC 9.16.110; AO No. 78-72)

9.16.120 Entering or exiting from controlled access roadway.

No person may drive a vehicle into or from any controlled access roadway, except at such entrances and exits as are established by public authority.

(CAC 9.16.120; AO No. 78-72)

9.16.130 Authority to restrict use of controlled access roadway.

A. The traffic engineer may regulate or prohibit the use of any controlled access roadway by any class or kind of traffic which is found to be incompatible with the normal and safe movement of traffic.

B. The traffic engineer adopting any such prohibition shall erect and maintain official traffic control devices on the controlled access street on which such prohibitions are applicable, and when in place no person may disobey the restrictions stated on such devices.

(CAC 9.16.130; AO No. 78-72; AO No. 80-4)

9.16.140 Drivers to exercise due care.

A. A driver of a vehicle shall exercise due care to avoid colliding with any pedestrian upon any roadway and shall give warning by sounding the horn when necessary and shall exercise proper precaution upon observing any child or any obviously confused or incapacitated person upon a roadway.

B. Every driver of a vehicle shall exercise due care to avoid colliding with an animal, other traffic or fixed or moveable objects.

(AO No. 89-52; AO No. 94-68(S), § 7, 8-11-94)

Chapter 9.20 PEDESTRIAN'S RIGHTS AND DUTIES

9.20.010 Obedience to traffic control devices and traffic regulations.

A. A pedestrian shall obey the instructions of any official traffic control devices specifically applicable to him, unless otherwise directed by a police officer.

B. Pedestrians shall be subject to traffic and pedestrian control signs as provided in Section 9.14.040.

C. At all other places, pedestrians shall be accorded the privileges and shall be subject to the restrictions stated in this title.

(CAC 9.20.010; AO No. 78-72)

9.20.015 Blind pedestrians.

A. Every driver of a vehicle shall yield the right-of-way to a blind pedestrian carrying a visible white cane or accompanied by a guide dog.

B. A person who is not legally blind may not use a white cane or a guide dog for the purpose of securing the right-of-way accorded by this section.

(AO No. 89-52)

9.20.020 Right-of-way in crosswalks.

A. When traffic control signals are not in place or not in operation, the driver of a vehicle shall yield the right-of-way, slowing down or stopping if need be to so yield, to a pedestrian crossing the roadway within any marked or unmarked crosswalk.

B. No pedestrian may suddenly leave a curb or other place of safety and walk or run into the path of a vehicle which is so close that it is impossible for the driver to yield.

C. Subsection A of this section shall not apply under the conditions stated in Section 9.20.040.B.

D. Whenever any vehicle is stopped at a marked crosswalk or at any unmarked crosswalk at an intersection to permit a pedestrian to cross the roadway, the driver of any other vehicle approaching from the rear may not overtake and pass such stopped vehicle.

(CAC 9.20.020; AO No. 78-72; AO No. 83-225)

9.20.030 Crossing at right angle.

No pedestrian may cross a roadway at any place other than by a route at right angles to the curb or by the shortest route to the opposite curb.

(CAC 9.20.030; AO No. 78-72)

9.20.040 Crossing at point other than crosswalk.

A. Every pedestrian crossing a roadway at any point other than within a marked crosswalk or within an unmarked crosswalk at an intersection shall yield the right-of-way to all vehicles upon the roadway.

B. No pedestrian may cross a street or thoroughfare at or within 150 feet of where access to a pedestrian tunnel or overhead walkway has been provided for crossing the street or thoroughfare, unless a marked crosswalk is also provided.

C. Between adjacent intersections at which traffic control signals are in operation pedestrians may not cross at any place except in a marked crosswalk.

(CAC 9.20.040; AO No. 78-72; AO No. 89-52)

9.20.050 Additional restrictions on crossing.

A. Crossing roadway in business district. No pedestrian may cross a roadway other than in a crosswalk in the central business district or in any business district.

B. Passing through barrier at railroad grade crossing or bridge. No pedestrian may pass through, around, over or under any crossing gate or barrier at a railroad grade crossing or bridge while such gate or barrier is closed or is being opened or closed.

C. Entering restricted area at Merrill Field. No pedestrian may enter upon or travel on or across any Merrill Field runway or taxiway or other restricted areas posted by the airport manager.

(CAC 9.20.050; AO No. 78-72)

9.20.060 Pedestrians soliciting rides or business.

A. No person may solicit a ride or other favor or engage in other conduct in a manner which unduly distracts a driver's attention.

B. No pedestrian upon a roadway may solicit employment or business, or solicit or collect contributions from the occupant of a vehicle on the roadway.

C. The prohibitions of this section shall include the causing, securing, aiding or abetting of another person to do an act prohibited by A. and B. of this section.

(CAC 9.20.060; AO No. 78-72; AO No. 89-52; AO No. 2003-87, § 1, 7-8-03)

9.20.070 Use of right half of crosswalk required.

Pedestrians shall move, whenever practicable, upon the right half of the crosswalks.

(CAC 9.20.070; AO No. 78-72)

9.20.080 Walking on roadway.

Except when participating in a parade permitted under Section 9.36.140:

A. No person shall remain upon or otherwise obstruct free passage upon a roadway.

B. Where sidewalks are provided, it is unlawful for any pedestrian to walk along and upon the adjacent roadway.

C. Where sidewalks are not provided, any pedestrian walking along and upon a street shall, when practicable, walk only on the left side of the roadway or its shoulder facing traffic which may approach from the opposite direction.

(CAC 9.20.080; AO No. 78-72; AO No. 79-209; AO No. 80-4; AO No. 89-52)

9.20.085 Use of unicycles, coasters, roller skates or roller blades on roadways, sidewalks and public paths.

A. No person may operate a unicycle, coaster, roller skates, in-line roller skates (roller blades) or other similar device on a roadway open to vehicular traffic if a sidewalk or paved pathway is adjacent to such roadway. This prohibition does not apply upon a roadway closed to motorized vehicle traffic. When any of the enumerated devices are operated on a roadway the person operating such device shall obey all traffic control devices, shall not attach themselves to any vehicle on the roadway, and shall obey all other rules of the road applicable to vehicles and bicycles on a roadway except those which by their nature can have no application to the devices enumerated.

B. Every person using a unicycle, coaster, skateboard, in-line roller skates (roller blades) or roller skates or other similar device upon any sidewalk or public path shall use such device in a careful and prudent manner and at a rate of speed no greater than is reasonable and proper under the conditions existing at the point of operation, taking into account the amount and character of pedestrian traffic, grade and surface, and shall obey all traffic control devices. Every person using a unicycle, coaster, skateboard, in-line roller skates (roller blades) or roller skates or other similar device upon any sidewalk or public path shall yield the right-of-way to any pedestrian thereon.

C. The use of roller skates, in-line roller skates (roller blades), skateboards or other similar devices is prohibited within the area bounded by Fifth Avenue on the north, Sixth Avenue on the south, "E" Street on the east and "G" Street on the west (the blocks containing the Town Square and the Performing Arts Center).

D. In addition to all other penalties provided in this Code, upon conviction or imposition of civil penalties for violations of this section the court or administrative hearing officer may forfeit to the municipality, subject to claims of third parties, any roller skates, in-line roller skates (roller blades), skateboards or other similar devices seized as evidence or the instrumentality of the offense pursuant to this section.

1. Any officer issuing a citation for violation of this section may seize and impound as evidence or instrumentality of the offense any device utilized by the cited offender in violation of this section.

E. Violations of this section may be heard by the municipality's administrative hearing officer under the provisions of Title 14of this Code.

(AO No. 89-52; AO No. 94-68(S), § 8, 8-11-94; AO No. 95-117, § 1, 6-29-95)

9.20.090 Driving through safety zone.

No vehicle may at any time be driven through or within a safety zone.

(CAC 9.20.100; AO No. 78-72)

9.20.100 Right-of-way on sidewalks.(Repealed)

(CAC 9.20.110; AO No. 78-72; AO No. 89-52)

9.20.110 Obedience to school crossing guards.

No person may fail or refuse to comply with a lawful order or signal of a school crossing guard in reference to the movement of vehicles in areas where crosswalks exist.

(CAC 9.20.120; AO No. 78-72)

Chapter 9.38 BICYCLES*

*State law references: Removal of identification marks, AS 11.46.260 et seq.

9.38.010 Parental responsibility; applicability of chapter to bicycles operated on pathways.

A. The parent of any child or the guardian of any ward may not authorize or knowingly permit any such child or ward to violate any of the provisions of this chapter.

B. The provisions of this chapter applicable to bicycles shall also apply whenever a bicycle is operated upon any sidewalk, trail, or pathway, subject to those exceptions stated in this chapter.

(CAC 9.38.010; AO No. 78-72; AO No. 89-52; AO No. 2005-77, § 1, 11-22-05)

9.38.020 Applicability of traffic laws to riders.

A. Every person riding a bicycle shall be granted all of the rights and shall be subject to all of the duties applicable to the driver of a vehicle by this title, except as to special regulations in this chapter, and except as to those provisions of this title which by their nature can have no application.

B. A person shall not propel a bicycle so as to suddenly leave a curb or other place of safety and move into the path of a vehicle that is so close as to constitute an immediate hazard.

C. A person propelling a vehicle by human power upon and along a sidewalk, trail or pathway, or across a roadway or driveway intersecting a sidewalk, trail or pathway, shall have all the rights and duties applicable to a pedestrian under the same circumstances.

(CAC 9.38.020; AO No. 78-72; AO No. 2005-77, § 2, 11-22-05)

9.38.030 Obedience to traffic control devices.

A. Any person propelling a bicycle shall obey the instructions of official traffic control devices applicable to vehicles, unless otherwise directed by a police officer, school crossing guard, professional flagman, or other individual operating in an official capacity to assist traffic.

B. Whenever authorized signs are erected indicating that no right turn or left turn or U-turn is permitted, no person operating a bicycle may disobey the direction of any such sign, except where such person dismounts from the bicycle to make any such turn, in which event such person shall then obey the regulations applicable to pedestrians.

(CAC 9.38.030; AO No. 78-72; AO No. 2005-77, § 3, 11-22-05)

9.38.040 Riding on seat required; carrying other persons.

A. A person propelling a bicycle may not ride other than upon or astride a permanent and regular seat attached thereto.

B. No person propelling a bicycle may carry another person, unless the bicycle is equipped with a seat or a trailer for the passenger.

(CAC 9.38.040; GAAB 19.95.040; AO No. 78-72; AO No. 2005-77, § 4, 11-22-05)

9.38.050 Clinging to vehicles.

No person riding upon any bicycle, coaster, roller skates, skateboard, sled, skis or toy vehicle may attach such vehicle or himself to any vehicle upon a roadway.

(CAC 9.38.050; AO No. 78-72)

9.38.060 Riders to use right edge of roadway; riding abreast.

A. Every person propelling a bicycle upon a roadway or upon a trail or pathway shall ride as near to the right edge of the roadway or trail or pathway as practicable, exercising due care when avoiding hazards and passing or meeting other vehicles, bicycles, pedestrians or users of the roadway or trail, except in the following situations:

1. When overtaking and passing another bicycle or vehicle proceeding in the same direction;
2. When preparing for a left turn at an intersection or into a private road or driveway;
3. When reasonably necessary to avoid conditions including, but not limited to, fixed or moving objects, parked or moving vehicles, bicycles, pedestrians, animals, surface hazards, or a road too narrow, which make it unsafe to continue along the right-hand curb or edge;
4. When approaching a place where a right turn is authorized; or
5. When it is necessary for a cyclist to fully occupy one traffic lane while waiting to cross an intersection in order to increase the cyclist's visibility to drivers of other vehicles.

B. Persons riding bicycles upon a roadway may not ride more than two abreast, except on paths or parts of roadways set aside for the exclusive use of bicycles or in the case of a licensed or permitted bicycling event.

(CAC 9.38.060; AO No. 78-72; AO No. 89-52; AO No. 91-105; AO No. 94-68(S), § 31, 8-11-94; AO No. 2005-77, § 5, 11-22-05)

9.38.070 Riding on sidewalk; giving audible warning.

A. No person may ride a bicycle upon a sidewalk within a business district.

B. The municipal traffic engineer is authorized to erect signs on any sidewalk or roadway prohibiting the riding of bicycles thereon by any person, and when such signs are in place no person may disobey such signs.

C. Whenever any person is riding a bicycle upon a sidewalk, trail or pathway, such person shall yield the right-of-way to any pedestrian and shall give an audible signal by voice or by bell before overtaking and passing such pedestrian.

(CAC 9.38.070; AO No. 78-72; AO No. 2005-77, § 6, 11-22-05)

Cross references: Streets and rights-of-way, Tit. 24.

9.38.080 Parking.

Bicycles shall be parked so as not to obstruct traffic or pedestrians.

(CAC 9.38.080; AO No. 78-72; AO No. 80-4; AO No. 2006-45, § 1, 4-11-06)

9.38.090 Carrying articles.

No person operating a bicycle may carry any package, bundle or article which prevents the driver from keeping at least one hand upon the handlebars.

(CAC 9.38.090; AO No. 78-72)

9.38.100 Lamps and other equipment.

A. *Lamps and reflectors.* Every bicycle when in use after dusk and before dawn shall be equipped with a lamp on the front of the bicycle, or worn on the body of the person operating the bicycle, which shall emit a white light visible from a distance of at least 500 feet to the front and with a red reflector on the rear which shall be visible from all distances from 100 feet to 600 feet to the rear when directly in front of lawful lower beams of headlamps on a motor vehicle. A lamp emitting a red light visible from a distance of 500 feet to the rear may be used in addition to the red reflector.

B. *Brakes.* Every bicycle shall be equipped with a brake which will enable its driver to stop the bicycle within 20 feet from a speed of ten mph on dry, level, clean pavement.

C. *Bell.* No person may operate a bicycle unless it is equipped with a bell or other device capable of giving a signal audible for a distance of at least 100 feet, except that a bicycle may not be equipped with nor shall any person use upon a bicycle any siren or whistle.

(CAC 9.38.100; AO No. 78-72; AO No. 2005-77, § 7, 11-22-05)

9.38.110 License required. (Repealed)

(CAC 9.38.110; AO No. 78-72; AO No. 80-4; AO No. 2005-77, § 8, 11-22-05)

9.38.120 Application for license. (Repealed)

(CAC 9.38.120; AO No. 78-72; AO No. 2005-77, § 8, 11-22-05)

9.38.130 Issuance of license. (Repealed)

(CAC 9.38.130; AO No. 78-72; AO No. 2005-77, § 8, 11-22-05)

9.38.140 Attachment of license plate. (Repealed)

(CAC 9.38.140; AO No. 78-72; AO No. 2005-77, § 8, 11-22-05)

9.38.150 Inspection prior to issuance of license. (Repealed)

(CAC 9.38.150; AO No. 78-72; AO No. 2005-77, § 8, 11-22-05)

9.38.160 Re-registration on transfer of ownership. (Repealed)

(CAC 9.38.160; AO No. 78-72; AO No. 2005-77, § 8, 11-22-05)

9.38.170 Applicability of requirements to rented bicycles.

A rental agency may not rent or offer any bicycle for rent unless the bicycle is equipped with the lamps and other equipment required by this chapter.

(CAC 9.38.170; AO No. 78-72; AO No. 2005-77, § 9, 11-22-05)

9.38.180 Bicycle dealers--Report required. (Repealed)

(CAC 9.38.180; AO No. 78-72; AO No. 90-24)

9.38.190 Alteration or mutilation of serial number or registration.

It is unlawful for any person to willfully or maliciously remove, destroy, mutilate or alter the number of any bicycle frame licensed pursuant to this section. Nothing in this section shall prohibit the police department from stamping numbers on the frames of bicycles on which no serial number can be found, or on which the number is illegible or insufficient for identification purposes.

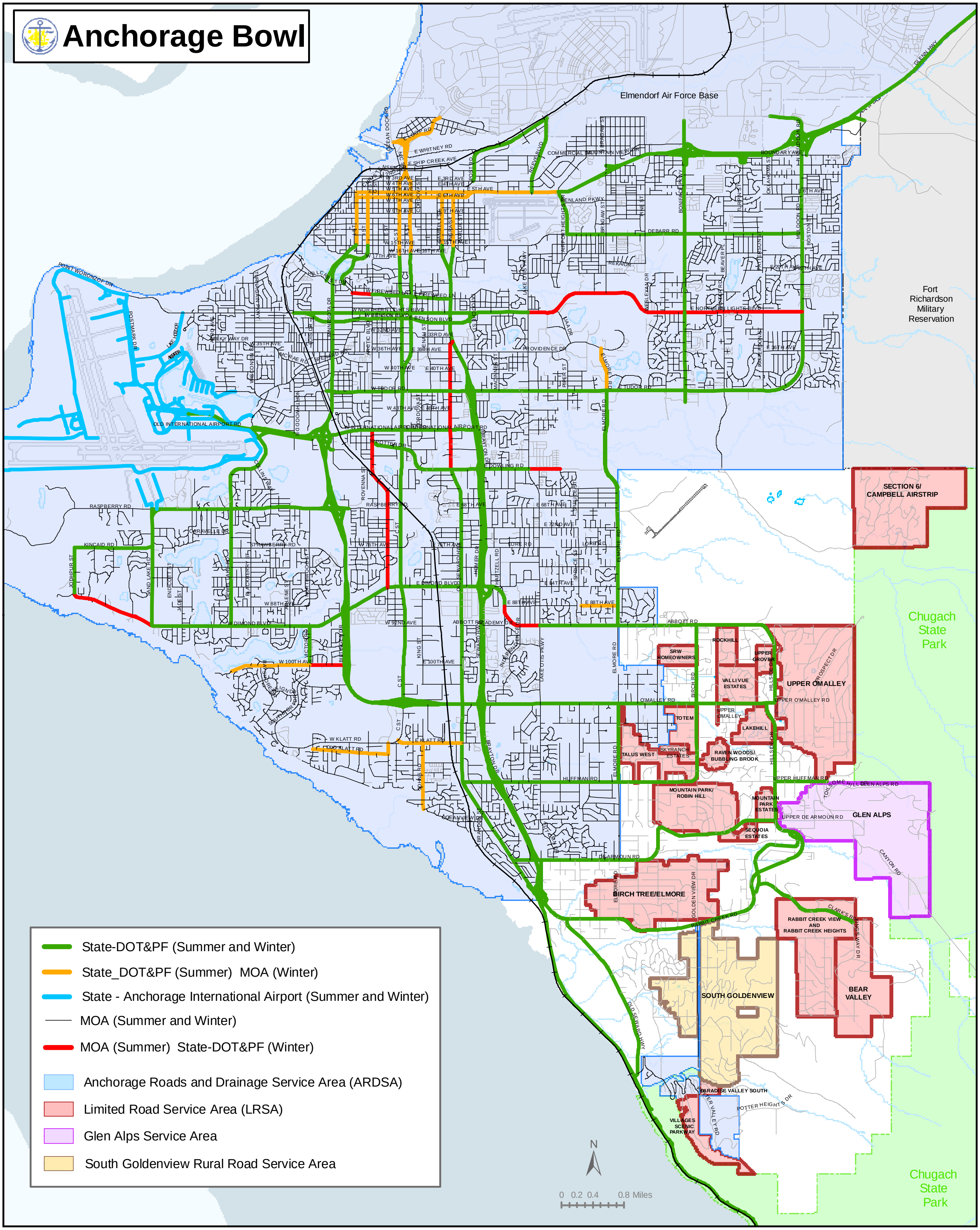
(CAC 9.38.190; AO No. 78-72; AO No. 2005-77, § 10, 11-22-05)

9.38.200 Wearing of bicycle helmets.

Wearing a bicycle helmet is mandatory for any person 15 years of age or younger when on a bicycle in public places. Public places include, but are not limited to, streets, sidewalks, pathways, trails, parking lots and skate parks. Failure to wear a bicycle helmet or other protective headgear is a traffic violation which shall result in a warning for a first offense and which carries a fine of $25.00 for each subsequent offense. The fine may be waived if proof that a bicycle helmet has been obtained is presented to the Anchorage Police Department.

(AO No. 2005-77, § 11, 11-22-05)

Appendix C
Road Maintenance Responsibilities



Map Prepared By:

GIS Services
Data, Projects & Procurement Division
Information Technology Department
Municipality of Anchorage

March 2009

STATE/MOA Maintained Roads

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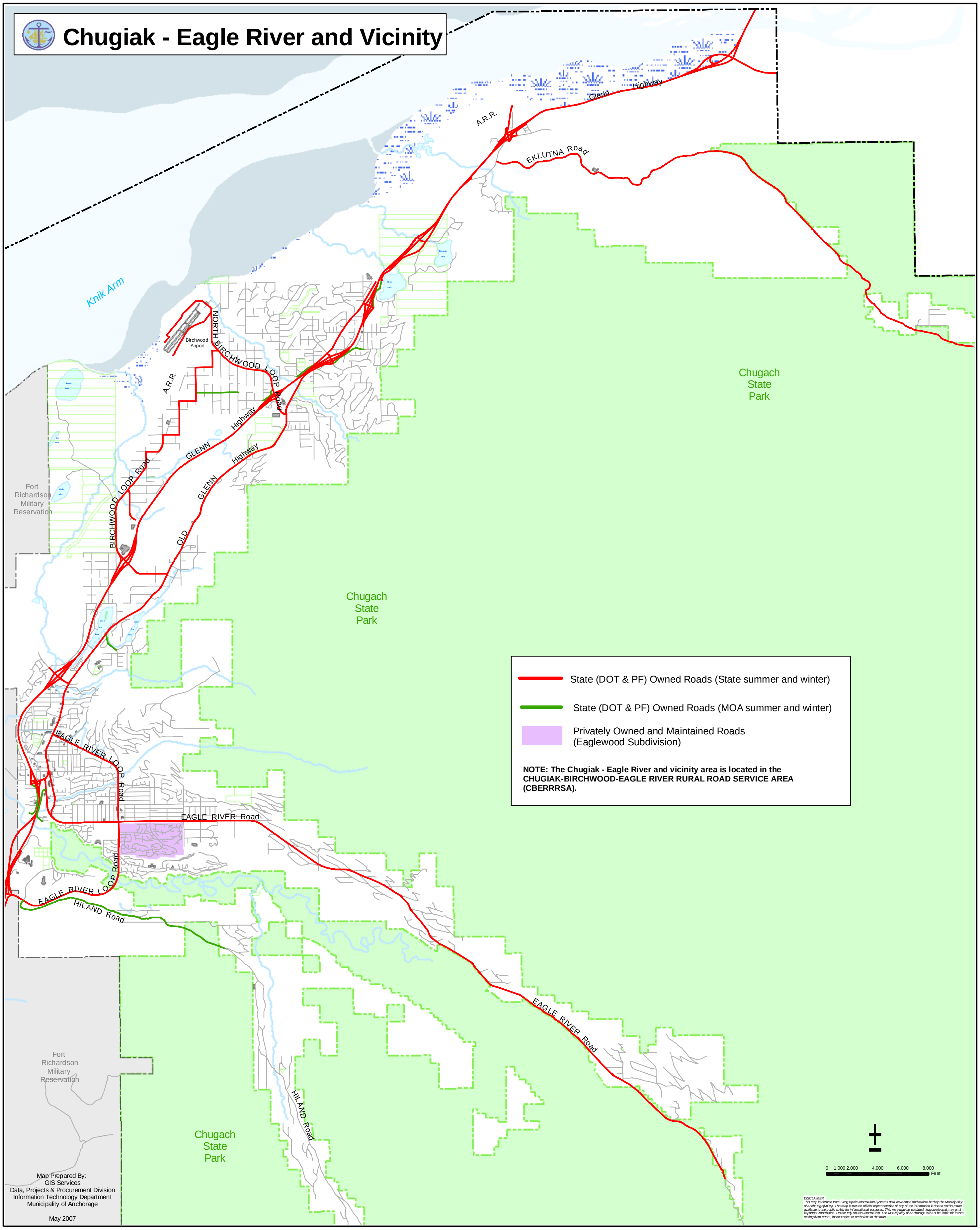


Road Ownership and Maintenance Responsibility

APPENDIX D

Bicycle Compatibility Index

Appendix D
Bicycle Compatibility Index

The information presented in this appendix is adapted from the Federal Highway Administration report titled *The Bicycle Compatibility Index: A Level of Service Concept, Implementation Manual*, FHWA-RD-98-095.

Introduction

One of the most important objectives of the Anchorage Bicycle Plan is to develop a network of on-street bicycle facilities. Determining how existing traffic operations and geometric conditions affect a bicyclist's decision to use or not use a specific roadway is the first step in determining the bicycle compatibility of the roadway. Before 1998, no widely accepted methodology was available for use in determining how compatible a roadway is for allowing efficient operation of both bicycles and motor vehicles. To fill this gap, the Federal Highway Administration (FHWA) developed a methodology for deriving a Bicycle Compatibility Index (BCI) that could be used by bicycle coordinators, transportation planners, traffic engineers, and others to evaluate the capability of specific roadways to accommodate both motorists and bicyclists. The intent was to create a practical instrument for use in predicting bicyclists' perceptions of a specific roadway environment and ultimately determining the level of bicycle compatibility that exists. Development of the BCI tool expanded on research by Sorton and Walsh[1] and the Geelong Planning Committee.[2]

The BCI methodology was developed for urban and suburban roadway segments, focusing on midblock locations without the presence of major intersections. It incorporates variables that bicyclists typically use to assess the "bicycle friendliness" of a roadway; for example, curb lane width, traffic volume, and vehicle speeds. The BCI model developed is applied with understanding of the level of service (LOS) for the designations. Level of service is a standard means of measuring traffic congestion by evaluating the capacity of a road with respect to the number of vehicles that use the road in a given time frame. It measures congestion.

Planners use BCI and LOS to assess roadway compatibility for shared-use operations by motorists and bicyclists and to plan for and design roadways that are bicycle compatible. Several specific applications for the BCI model are discussed below.

Operational Evaluation. Existing roadways can be evaluated with the BCI model to determine the bicycle LOS present on all segments. This type of evaluation may be useful in several ways. First, a bicycle compatibility map can be produced for the bicycling public to indicate the LOS bicyclists can

[1] A. Sorton and T. Walsh, "Bicycle Stress Level as a Tool to Evaluate Urban and Suburban Bicycle Compatibility," *Transportation Research Record 1438*, Transportation Research Board, Washington, DC, 1994.

[2] Geelong Planning Committee, *Geelong Bikeplan*, Geelong, Australia, 1978.

expect on each roadway segment. Second, roadway segments or "links" being considered for inclusion in the bicycle network can be evaluated to determine which segments are the most compatible for bicyclists. In addition, weak links in the bicycle network system can be determined, and priorities can be established for sites needing improvements on the basis of the index values. Finally, alternative treatments (such as addition of a bicycle lane versus removal of parking) for improving the bicycle compatibility of a roadway can be evaluated.

Design. New roadways or roadways that are being redesigned or retrofitted can be assessed to determine whether they are bicycle compatible. The planned geometric parameters and predicted or known operational parameters can be used as inputs to the model to produce the BCI value and determine the bicycle LOS and compatibility level that can be expected on the roadway. If the roadway does not meet the desired LOS, the model can be used to evaluate changes in the design necessary to improve the bicycle LOS.

Planning. Data from long-range planning forecasts can be used to assess the future bicycle compatibility of roadways by using projected volumes and planned roadway improvements. The model provides the user with a mechanism to quantitatively define and assess long-range plans for bicycle transportation.

This appendix documents the use of the BCI in developing the Anchorage Bicycle Plan. The report *Development of the Bicycle Compatibility Index: A Level of Service Concept* [3] provides a complete discussion of the development of the BCI methodology.

Model Development

The approach used by various researchers and FHWA in developing the BCI was to obtain the perspectives of bicyclists by having them view numerous roadway segments captured on videotape and rate these segments with respect to how comfortable they would be riding there under the geometric and operational conditions shown. The reliability of the results obtained using this video technique of data collection—the ability to reflect on-street comfort levels—was validated in a pilot study. The procedure offered several advantages over other forms of data collection, including minimizing the risk to bicyclists, maximizing the range of roadway conditions to which the bicyclists could be exposed, and controlling the variables evaluated by the bicyclists.

As note above, the BCI model was developed for midblock street segments only and is primarily intended for use on "through" streets. In other words, the ratings do not account for major intersections along the route where the bicyclist may encounter a stop sign or traffic signal. Within the research study, the video technique described above was tested for a limited number of intersection sites. The results proved that this technique can be used in developing an intersection BCI, but further research is needed to fully develop such an index.

Using the perspectives of more than 200 study participants in three locations (Olympia, Washington; Austin, Texas; and Chapel Hill, North Carolina), the BCI model was developed for all bicyclists. Table 1 shows calculations for the BCI model. The participants rated each of 67 sites included on a videotape with respect to how comfortable they would be riding there under the conditions shown.

[3] D.L. Harkey, D.W. Reinfurt, M. Knuiman, and A. Sorton, *Development of the Bicycle Compatibility Index: A Level of Service Concept, Final Report*, Report No. FHWA-RD-98-072, Federal Highway Administration, Washington, DC, August 1998.

The ratings were made using a six-point scale in which a one indicated "extremely comfortable" and a six indicated "extremely uncomfortable." This model predicts the overall comfort level rating of a bicyclist using the eight significant variables shown and an adjustment factor (AF) to account for three additional operational characteristics. The model is a reliable predictor of the expected comfort level of bicyclists on the basis of these eight variables describing the geometric and operational conditions of the roadway. The variable with the largest effect on the index is the presence or absence of a bicycle lane or paved shoulder (BL). A bicycle lane (paved shoulder) that is at least 3 feet wide reduces the index by almost a full point, indicating an increased level of comfort for the

Table 1. Bicycle Compatibility Index (BCI) Model

$$BCI = 3.67 - 0.966\mathbf{BL} - 0.410\mathbf{BLW} - 0.498\mathbf{CLW} + 0.002\mathbf{CLV} + 0.0004\mathbf{OLV} + 0.022\mathbf{SPD} + 0.506\mathbf{PKG} - 0.264\mathbf{AREA} + \mathbf{AF}$$

where:

BL = presence of a bicycle lane or paved shoulder ≥ 0.9 m
no = 0
yes = 1

BLW = bicycle lane (or paved shoulder) width
m (to the nearest tenth)

CLW = curb lane width
m (to the nearest tenth)

CLV = curb lane volume
vph in one direction

OLV = other lane(s) volume - same direction
vph

SPD = 85th percentile speed of traffic
km/h

PKG = presence of a parking lane with more than 30 percent occupancy
no = 0
yes = 1

AREA = type of roadside development
residential = 1
other type = 0

AF = $f_t + f_p + f_{rt}$

where:

f_t = adjustment factor for truck volumes
(see below)

f_p = adjustment factor for parking turnover
(see below)

f_{rt} = adjustment factor for right-turn volumes
(see below)

Adjustment Factors

Hourly Curb Lane Large Truck Volume[1]	f_t	Parking Time Limit (min)	f_p
≥ 120	0.5	≤ 15	0.6
60 - 119	0.4	16 - 30	0.5
30 - 59	0.3	31 - 60	0.4
20 - 29	0.2	61 - 120	0.3
10 - 19	0.1	121 - 240	0.2
< 10	0.0	241 - 480	0.1
		> 480	0.0

Hourly Right-Turn Volume[2]	f_{rt}
≥ 270	0.1
< 270	0.0

[1] Large trucks are defined as all vehicles with six or more tires.
[2] Includes total number of right turns into driveways or minor intersections along a roadway segment.

bicyclist. Increasing the width of the bicycle lane or paved shoulder (BLW) or the curb lane (CLW) also reduces the index, as does the presence of residential development along the roadside (AREA). On the other hand, an increase in traffic volume (CLV and OLV) or motor vehicle speeds (SPD) increases the index, indicating a lower level of comfort for the bicyclist. The presence of on-street parking (PKG) also increases the index.

In addition to the primary variables included in the BCI model, three additional variables defining specific operating conditions were examined. These supplemental variables were identified during the pilot phase of the study as having a potential impact on the comfort level of bicyclists: (1) large trucks or buses, (2) vehicles turning right into driveways, and (3) vehicles pulling into or out of on-street parking spaces. An analysis of the overall comfort level ratings made when viewing video clips illustrating these conditions showed that each variable significantly increases the index. In other words, all three variables were found to contribute to lower level of comfort. The rate increases are shown below.

Situation	Rate Increase
Large trucks or buses	0.50
Vehicles pulling into or out of parking spaces	0.60
Right-turning vehicles	0.10

Although the presence of these three specific operating conditions was not evaluated across all possible combinations of geometrics and operations, the results of the limited sample indicated a need for adjustment to the BCI model in the presence of large trucks or buses, a high number of vehicles pulling into or out of on-street parking spaces, or a high volume of right-turning vehicles. Thus, a series of adjustment factors that can be added to the model have been developed for each of these scenarios. These factors were developed based on the theory that the conditions shown to the survey participants represented worst-case scenarios and, subsequently, the increase in the overall mean comfort level rating represented the maximum adjustment that would be required.

In the adaptation of the BCI model for use in Anchorage, the three operational variables were dropped because no information on the presence of large trucks or buses, vehicles turning right into driveways, and vehicles pulling into or out of on-street parking spaces is readily available. The exclusion of these variables does not appear to be a significant deficiency because the amount of local truck traffic is relatively small compared to that in other areas of the country and on-street parking is largely limited to the downtown area.

One variable not included in the development of the BCI model was the grade of the roadway. Results from a preliminary effort showed that changes in grade of 2 percent or less were not distinguishable on the video. The advantages of using video included not exposing bicyclists to high-risk conditions, incorporating a much larger sample of sites, and controlling specific variables to ensure all subjects were exposed to identical

These factors were found to affect the comfort levels of bicyclists:

More Comfort
- A paved shoulder or bicycle lane that is at least 3 feet wide
- Increasing the width of the curb lane
- Presence of residential development along the road

Less Comfort
- Increase in traffic volume
- Increase in motor vehicle speed
- Presence of on-street parking

conditions. The positive aspects of video use were believed to outweigh the absence of this road grade variable.

It is believed that the variables having the most significant effect on the bicycle compatibility of a roadway have been included in the BCI model. Specifically, the variables of width, speed, volume, and on-street parking were shown to have the greatest impact on the index. At this time, the impact of grade relative to these and the other significant variables included in the model is unknown but may be determined in future research efforts.

Once the BCI model was developed, bicycle LOS criteria were established based on the results of applying the model to the three study locations. Currently, there are no bicycle LOS criteria provided in the *Highway Capacity Manual*.[4] However, the definition of LOS according to the manual is founded on the concept of user perceptions of qualitative measures that characterize the operational conditions of the roadway. Two terms used in the manual to describe LOS are comfort/convenience and freedom to maneuver. Both terms are applicable to bicyclists and are directly reflected in the BCI because the rating scale used by the study participants was an indication of comfort level.

By using the distribution of BCI values produced from the representative set of locations included in the study, LOS designations were established for LOS A through LOS F, as shown in Table 2. LOS A (represented by an index of ≤1.50) indicates that a roadway is extremely compatible (or comfortable) for the average adult bicyclist, and LOS F (represented by an index >5.30) is an indicator that the roadway is extremely incompatible (or uncomfortable) for the average adult bicyclist.

Table 2. BCI Ranges Associates with LOS Designations and Compatibility Level Qualifiers

LOS	BCI Range	Compatibility Level[a]
A	≤1.50	Extremely high
B	1.51 – 2.30	Very high
C	2.31 -3.40	Moderately high
D	3.41 – 4.40	Moderately low
E	4.41 – 5.30	Very low
F	>5.30	Extremely low

[a] Qualifiers for compatibility level pertain to the average adult bicyclist.

In developing the BCI model, several other issues were addressed, including the effect of bicycling experience level on perceived comfort levels. The results from a questionnaire completed by the participants were used to stratify the bicyclists into three groups based on their riding habits, such as number of bicycle trips per week and types of facilities used (for example, major roadways and. bicycle paths). A comparison of the comfort level ratings of these three groups showed that across

[4] This design guidance publication is Special Report 209 prepared by the Transportation Research Board, Washington, DC, 1994.

all sites, the "casual recreational" bicyclists were generally less comfortable than "experienced recreational" or "experienced commuter" bicyclists. As a result of these differences, separate BCI models were produced for each of the three groups in addition to the model for all bicyclists. However, in real-world applications, it is most likely that bicyclists of all experience levels will have the opportunity to ride on any given segment of roadway. Therefore, it is recommended that the BCI model developed for all bicyclists and shown in Table 1 be used without modification for most applications. The LOS designations shown in Table 2 were developed on the basis of this model, and thus are only applicable to results produced with the "all bicyclists" model.

In practical application of the BCI, when planners knows that the large majority of riders are indeed casual bicyclists, the approach that should be used to ensure that facilities meet the desired comfort levels of this group is to simply design for a higher level of service. The results of the research showed that the model developed for the casual bicyclist, on average, produced BCI values that were 0.14 to 0.38 greater than those produced by all bicyclists. The difference in BCI values between LOS designations is, on average, 1.0 (see Table 2). By designing for a higher LOS (such as LOS B rather than LOS C) on a facility known to attract a high number of casual bicyclists, the necessary comfort level for this group of bicyclists can be achieved with the BCI model as it is currently developed. Design guidance indicates that where casual bicyclists are expected, the facility should always be designed at LOS C or better.

Another issue addressed was that of possible regional differences in the perceptions of bicyclists. If bicyclists in different geographic regions of the country perceive comfort levels differently, separate models would need to be developed to reflect these differences. An analysis of the comfort level ratings across subjects in the three survey cities showed no differences in the mean overall comfort levels for the four variables rated (speed, volume, width, and overall). This lack of differences indicates that the perceptions of individuals with respect to bicycle compatibility are the same in the three regions where the survey was conducted, and that the BCI model should be applicable across all regions of the country.

The range of conditions included in the development of the model should be representative of most urban and suburban roadway conditions. However, because the sites included in the model development contained a limited range of widths, volumes, and speeds, the model should not be extrapolated beyond the values shown in Table 3. For example, the model may only be appropriate for bicycle lane or paved shoulder widths between 3 and 7.9 feet and curb lane widths between 9.8 and 18.4 feet.

Table 3. Ranges of Variables Used

Description	Variable	Minimum	Maximum
Curb lane width	CLW	9.8 feet	18.4 feet
Bicycle lane/paved shoulder width	BLW	3.0 feet	7.9 feet
Curb lane volume	CLV	990 vph	900 vph
85th percentile speed	SPD	29 mph	55 mph

mph = miles per hour
vph = vehicles per hour

Data Collection and Development

For the most part, the data needed for the development of the Anchorage BCI model were available from state and municipal agencies. The readily available data included lane configuration, annual average daily traffic (AADT), posted speed, type of roadside development, and the existence of on-street parking. In other cases, entirely new sets of data needed to be collected. Because neither the Municipality of Anchorage nor the State of Alaska maintains information on roadway geometrics, it was necessary to hire a consultant to collect information on curb lane width, shoulder, width, and bike lane width. With the use of global positioning system (GPS) devices, the consultant recorded a comprehensive set of roadway cross-sectional data points that were used to calculate the above-mentioned roadway width variables. For the remaining BCI model variables, the default values provided by the developers of the BCI model were used in place of actual data. The variables required for the model and the source of the data used in the Anchorage BCI model are described below.

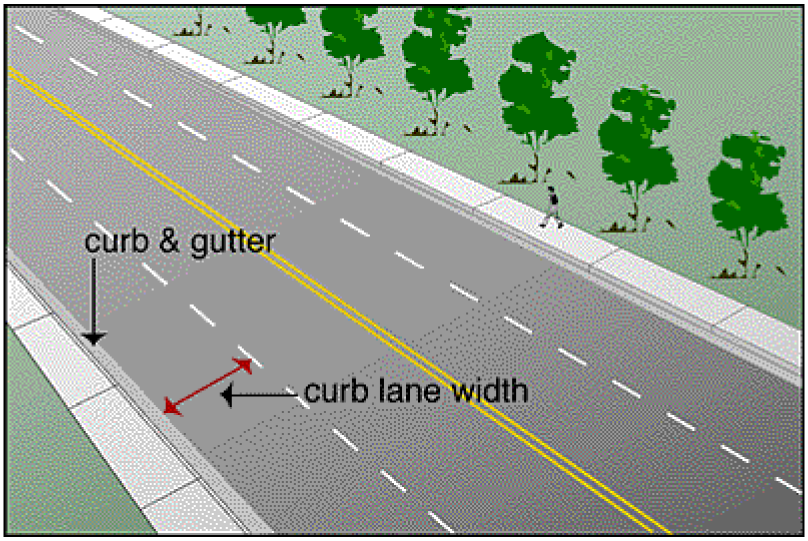
Lane Configuration—the number of through motor vehicle lanes in one direction and the presence or absence of a bicycle lane or paved shoulder. The number of lanes is used in the calculations to determine lane volumes from the AADT.

Curb Lane Width—the width of the motor vehicle travel lane closest to the curb, measured to the nearest foot. If there is no bicycle lane, paved shoulder, or parking lane present, this distance is measured from the center of the lane line or center line to the joint or seam between the pavement edge and the gutter pan, as shown in Figure 1. If no gutter pan is present, the curb lane width is determined by measuring the distance from the center of the lane line or center line to the curb face and then subtracting 10 feet from that distance. The 10-foot value accounts for the space bicyclists will typically leave between themselves and a curb (called the "shy" distance). This value also reflects bicycle lane design widths recommended by the American Association of State Highway and Transportation Officials (AASHTO): 5 feet when no gutter pan is present and 4 feet when a gutter pan exists. This scenario is also illustrated in Figure 1.

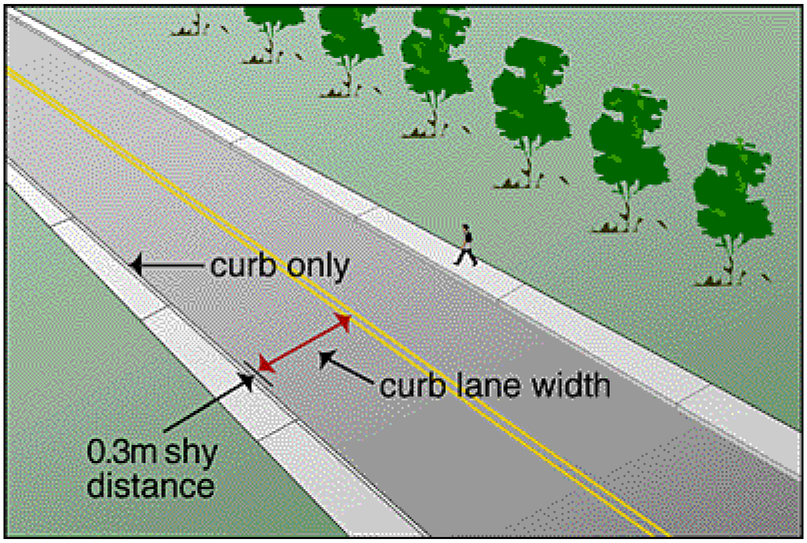
When there is a bicycle lane or paved shoulder, the curb lane width is measured from the center of the lane line or center line to the center of the edge line as shown in Figure 2. If there is a marked parking lane present, the curb lane width is measured as shown in Figure 3. If the parking lane is unmarked, the curb lane width is determined by measuring from the center of the lane line or center line to the curb face (including the gutter pan if present), and then subtracting 8 feet (2.4 meters) from this distance (see Figure 3). The 8-foot value accounts for the fact that vehicles occupy, on average, approximately 7 feet of space when parallel parking and typically park within 0.5 to 1 foot of the curb.

The other scenario common on residential streets is to have no lane markings at all. In this case, the total cross-section width is measured from curb to curb (or gutter pan seam to gutter pan seam) and divided by the number of lanes (typically two) to determine the curb lane width. If parking is also present on this type of unmarked street, the parking lane widths (usually 8 feet) should be subtracted from the total cross-section width before dividing by the number of lanes.

Figure 1. Curb Lane Width Measurement for No Bicycle Lane, Paved Shoulder, or On-street Parking Lane



When gutter pan is present

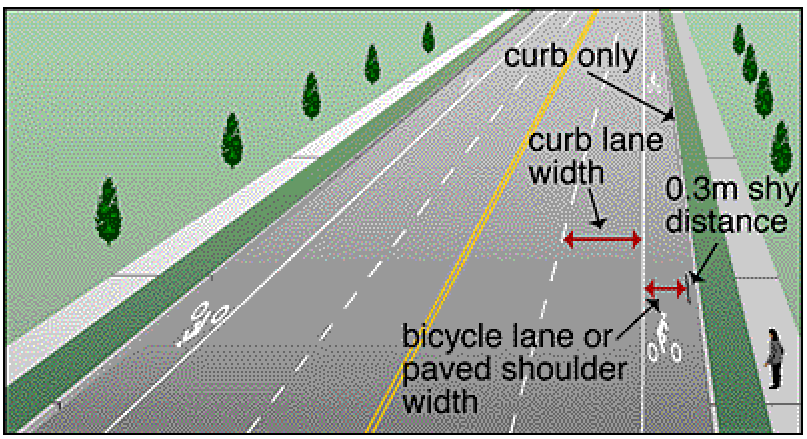


When no gutter pan is present

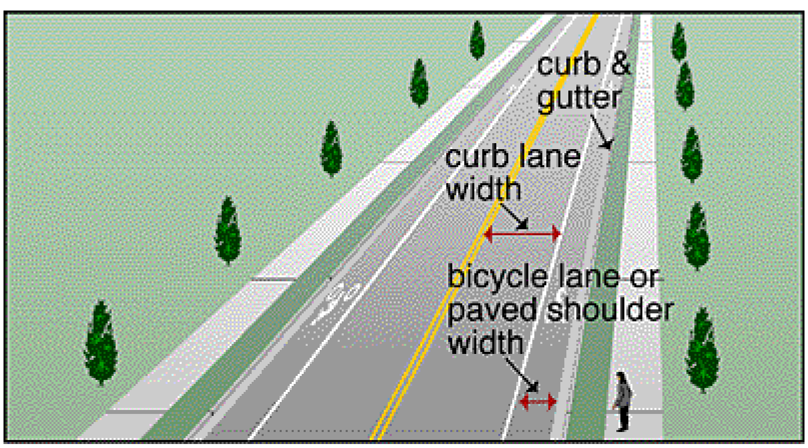
Bicycle Lane (Paved Shoulder) Width—width of the bicycle lane or paved shoulder (if present), measured to the nearest tenth of a foot. A paved shoulder is treated the same as a bicycle lane in the BCI model because recent research has shown that these two types of facilities result in virtually identical operational behaviors by motorists and bicyclists. If there is no parking lane present, the bicycle lane (paved shoulder) width is measured from the center of the edge line separating the bicycle lane from the motor vehicle travel lane to the joint or seam between the pavement edge and the gutter pan, as shown in Figure 2. If no gutter pan is present, the distance is measured from the edge line to the curb face, and then 1 foot (0.3 meters) is subtracted from that distance to account for the space bicyclists will typically leave between themselves and a curb (the shy distance). This scenario is also illustrated in Figure 2.

If a marked parking lane is adjacent to the bicycle lane, the bicycle lane width is measured from the center of the edge line (separating the motor vehicle travel lane and bicycle lane) to the center of the parking lane line separating the bicycle lane and the parking lane, as shown in Figure 4. If the parking lane is not marked, as would be the case in a shared parking/bicycle lane, the bicycle lane width can be determined by measuring the distance from the center of the edge line to the curb face (including the gutter pan if present) and then subtracting 8 feet (2.4 meters) from that distance to account for the width of the parking lane. This scenario is also illustrated in Figure 4.

Figure 2. Curb Lane and Bicycle Lane (Paved Shoulder) Width Measurements Without On-street Parking

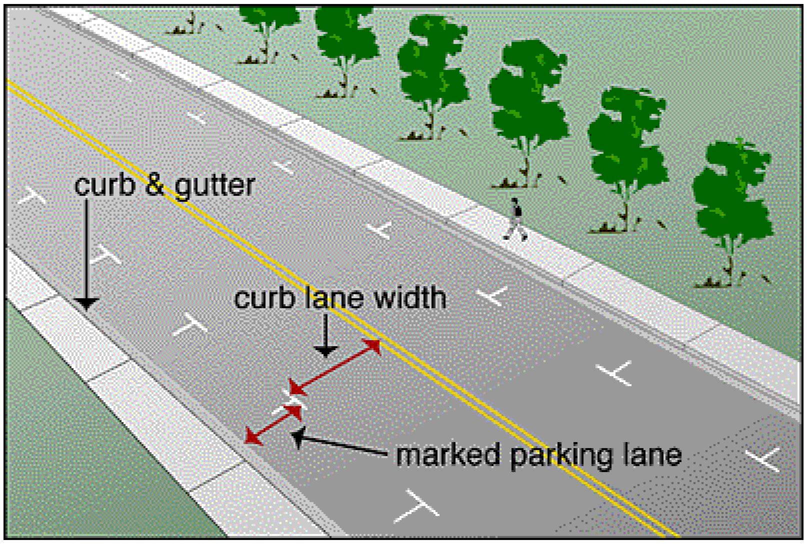


When no gutter pan is present

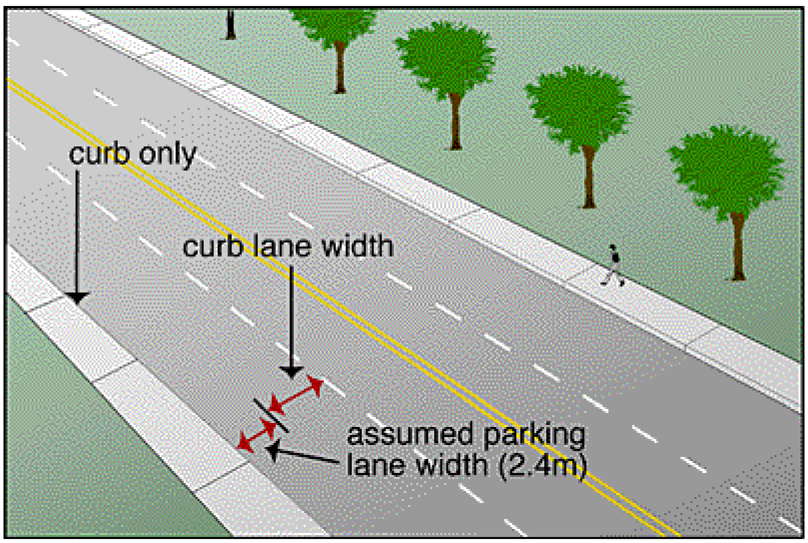


When gutter pan is present

Figure 3. Curb Lane Width Measurement with Parking Lane



When parking lane is marked

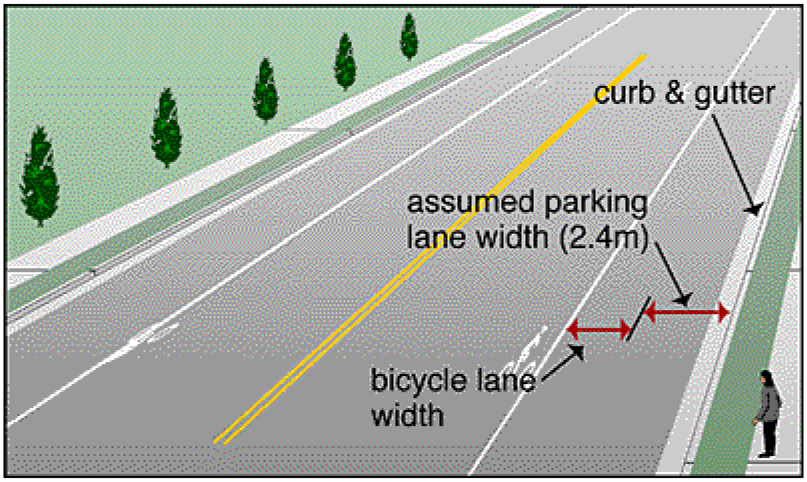


When parking lane is not marked

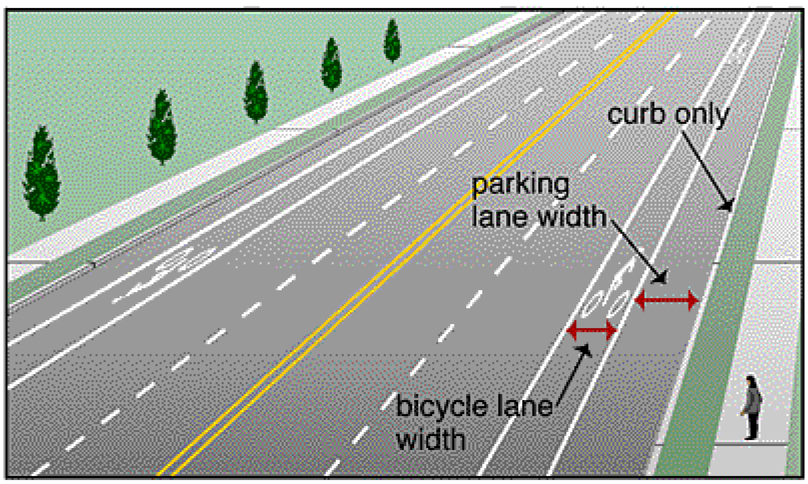
As noted in all possible configurations described above and shown in the figures, the curb lane width and bicycle lane (paved shoulder) width measurements either did not include gutter pan widths or included them but subtracted a value to account for the shy distance of the bicyclist. The BCI model was developed using sites that either had no gutter pan or had gutter pans ranging from 1 foot to 2 feet in width. Most gutter pans in the Municipality of Anchorage fall within this range. As a result, no adjustment was needed to add space to the curb lane width or bicycle lane width.

Motor Vehicle Speed—85th percentile speed of traffic, in miles per hour (mph). Ideally, this value should be obtained from manual or automated speed data collection efforts. However, because these data were not available on a systematic basis, the recommended default value of 9.3 mph added to the posted speed limit was used. Research has shown that 85th percentile speeds for vehicles

Figure 4. Bicycle Lane Width Measurements for Presence of a Parking Lane



When parking lane is not marked



When parking lane is marked

traveling on many urban and suburban streets (including arterial, collector, and local classifications) generally exceed the speed limit by 6 to 14 mph.

Traffic Volume—hourly traffic volume by lane in one direction of travel. Although hourly counts may be available in some locations, it is more likely that AADT counts (collected for continuous 24-hour periods) will be the source of traffic volume information. (This is the case in Anchorage.) Converting these data into hourly counts requires knowing the percentage of daily traffic traveling on the roadway during the hour of interest. In most cases, the hour of interest will be the peak hour. This volume can be determined by using the following equation:

$$PHV = AADT \times K \times D$$

where:

PHV = peak-hour directional volume,

AADT = average annual daily traffic (vehicles per day),

K = peak-hour factor (the proportion of vehicles traveling during the peak hour, expressed as a decimal), and

D = directional split factor (the proportion of vehicles traveling in the peak direction during the peak hour, expressed as a decimal).

The K and D factors are usually determined on the basis of regional or route-specific characteristics. Generally, the K factor ranges from 0.07 to 0.15 while the D-factor ranges from 0.50 to 0.65 in urban and suburban areas. With respect to the Anchorage BCI model development, the recommended default K factor of 10 percent may be assumed (expressed as 0.10), and a default D factor of 55 percent was used (expressed as 0.55). For one-way streets, the D factor becomes 1.0 because 100 percent of the traffic is traveling in the same direction.

Once the directional hourly volume of traffic is determined by using the above formula, it is necessary to assign traffic volumes to the curb lane and other travel lanes for a multilane facility. The lane distribution on non-freeway facilities depends on a variety of factors, including number and location of access points, the type of development, traffic composition, speed, volume, and local driving habits. These factors result in very little uniformity from site to site with respect to how volumes are distributed across lanes. Counts were not generally available by lane in Anchorage. As a result, the recommended default procedure using the following equation, which distributes the hourly volume equally across all through lanes, was applied:

$$CLV = PHV/N \quad OLV = PHV - CLV$$

where:

CLV = hourly curb lane volume,

OLV = hourly volume in all through lanes, except the curb lane,

PHV = peak-hour directional volume, and

N = number of through lanes in one direction.

Presence and Density of On-street Parking—presence of an on-street parking lane and percentage of spaces occupied. The simple presence of an on-street parking lane may not adversely affect the comfort level of the bicyclist. During the development of the BCI model, it was shown that at least 30 percent of the spaces had to be occupied before the parking lane affected the bicyclists' comfort level. Thus, it is necessary to collect occupancy data for the hour being evaluated to determine whether this 30 percent occupancy threshold is being met. In the development of the Anchorage BCI model, it was assumed that all parking areas met this minimum occupancy threshold.

Type of Development—type of development or land use adjacent to the roadway. For purposes of the model, only two classifications are required, "residential" and "other." The residential development type proved to be significantly different from all other types of development and was shown to positively affect the comfort level of bicyclists. To populate this variable, the Anchorage BCI model used existing zoning as a surrogate for land use type.

APPENDIX E

Separated Pathway Risk Calculation – Lake Otis Parkway

Appendix E
Separated Pathway Risk Calculation – Lake Otis Parkway

Street Intersection Name	Number of Residential Driveways (1 point)	Number of Commercial Driveways (2 points)	Number of Minor Streets[a] (2 points)	Number of Major Streets[b] (4 points)	Raw Score	Length of Segment (Miles)	Final Score
Huffman to O'Malley	4	1	6	0	18	1.0	18
O'Malley to Abbott Rd.	0	4	1	0	10	1.0	10
Abbott Rd. to Dowling Rd.	10	3	6	5	48	2.0	24
Dowling Rd. to Tudor Rd.	2	5	5	1	26	1.0	26
Tudor Rd. to 36th Ave.	0	4	2	0	12	0.5	24
36th Ave. to Northern Lights Blvd.	0	3	1	0	8	0.5	16

[a] Minor Streets are generally local streets that intersect Lake Otis Parkway.

[b] Major Streets were defined as those streets that have traffic lights.

Appendix

F Bicycle Route Sign Removals

Appendix F
Bicycle Route Sign Removals

Locations of Signs for Immediate Removal	Quantity.	Sign Type[a]	Reason for Sign Removal
7th Ave. at F Street	2	A	Not a bicycle lane
10th Avenue, Cordova St to Medfra St.	1	B	Move to 9th Avenue
72nd Ave. east of Lake Otis Parkway	1	A	Not a bicycle lane, but widened shoulders
Abbott Rd. at Birch Rd.	1	C	Not a bicycle route
Business Park Blvd. – Huffman Rd north	4	C	Not recommended as bicycle route
Goldenview Drive – at Goldenview Middle School	1	A	Not a continuous bicycle lane
Huffman Rd. at Seward Hwy.	2	C	Not a bicycle route
Kincaid Road, west of Sand Lake Rd.	2	C	Not identified as bicycle route
L St. at 11th Avenue	1	C	Sidewalk
Lake Otis Pkwy. – O'Malley to 16th Ave.	10	C	Not recommended as bicycle route, according to the Bicycle Compatibility Index
Minnesota Blvd. north of Northern Lights Blvd.	2	C	Not recommended as bicycle route, according to the Bicycle Compatibility Index
Minnesota Blvd. – Tudor Rd. to 36th Ave.	4	C	Sidewalk
Northern Lights Blvd. west of Benson Blvd.	1	C	Sidewalk
Northern Lights Blvd east of Seward Hwy.	1	C	Back of curb
Old Seward Hwy., Huffman Rd. to O'Malley Rd.	2	C	Not a bicycle route

[a] Type of bicycle route signs:

A = Bike Lane/No Parking

B = Bike Lane

C = Bike Route

APPENDIX G

Bicycle Parking Standards

Appendix G
Bicycle Parking Standards

Title 21 Update

The current draft of the Title 21 zoning code update contains the following new provisions for bicycle parking facilities.

21.07.090.K, Bicycle Parking Spaces

All nonresidential, multifamily, and mixed-use dwelling developments with more than 40 parking spaces required in table 21.07-5, or that use a parking reduction or alternative in subsection 21.07.090F, shall provide at a minimum four bicycle parking spaces or a number of bicycle parking spaces equal to 3% of the number of required automobile vehicle parking spaces, whichever is greater.

To evaluate the adequacy of this standard and determine how this requirement would be applied given the current parking requirements, a variety of existing activity types were examined. Fewer bicycle parking spaces would be created if the number of required vehicle parking spaces is reduced in the Title 21 revisions. The results are summarized in the table below.

			Number of Bicycle Parking Spaces		
Name & Address	Activity Type and Size	Number of Vehicle Parking Spaces	Required by Draft 3% Standard (described above)[a]	Required with a 5% Standard[a]	Existing
Alaska USA Federal Credit Union 4000 Credit Union Drive	122,017-square-foot high-rise office building	403	13	21	1 bicycle rack with about 30 spaces (old style rack with narrow slots for tires)
Alaska Energy Building 4300 B Street	92,625-square-foot mid-rise office building	309	10	16	1 bicycle rack with 4 spaces (old style rack with narrow slots for tires)
Hilton Gardens 4555 Union Square Dr.	66,561-square-foot building, motel and restaurant	113	4	6	No bicycle racks available
TGI Friday's 190 W. Tudor Rd.	6,753-square-foot restaurant	125	4	7	No bicycle racks available

			Number of Bicycle Parking Spaces		
Name & Address	Activity Type and Size	Number of Vehicle Parking Spaces	Required by Draft 3% Standard (described above)[a]	Required with a 5% Standard[a]	Existing
Wal Mart 3101 A Street	153,447-square-foot discount store	511	16	26	2 regular sized bicycle racks with about 8 spaces (old style rack with narrow slots for tires)
Home Depot 400 Rodeo Place	136,919-square-foot discount store	456	14	23	No bicycle racks available
Northway Mall 3101 Penland Pkwy.	106,385-square-foot mall	428	13	22	4 U-shaped bicycle racks with about 12 spaces
Alaska Regional Hospital 2801 Debarr Rd.	248 bed hospital	124	4	7	Need to field check
Conoco Phillips 700 G Street	435,072-square-foot high rise office building	1,450[b]	44	73	20 U-shaped bicycle spaces in front. 7 old style bicycle racks on 8th Ave. side with 4 spaces each, plus 7 U-shaped spaces. Total equals about 55 spaces.
Barnes and Noble A St. between Northern Lights Blvd. and Benson Blvd.	Not known	169	5	9	2 bicycle racks with 8 spaces (old style rack with narrow slots for tires)
Taco del Mar, Starbucks, clothing store, boutique Southeast corner of Tudor Road and A Street	Not known	38	0	0	No bicycle racks available

[a] Calculation of spaces assumes that the number of bicycle rack spaces is rounded up.

[b] Parking spaces required for location outside Downtown.

Conclusion

The proposed bicycle parking standard contained in the Title 21 revisions appears to be reasonable and, for the most part, would provide an improvement over the number of spaces provided voluntarily by Anchorage businesses. Although some cities require bicycle parking equal to 5 percent or more of the total vehicle parking, this stipulation would push the number of required bicycle parking spaces far above what is typically provided in Anchorage at this time. The difference in required spaces for high-rise office buildings, in particular, would increase sharply.

The Conoco Phillips building located in downtown Anchorage may be one of the largest generators of bicycle traffic because the company maintains an active program to encourage alternative transportation use by employees. The number of bicycle parking spaces provided is above what would be required by the proposed Title 21 standards (55 compared to 44 spaces). However, many of the spaces provided are of the old style that uses narrow slots for bicycle tires and are not wide enough to fit bicycles next to each other. As a result, the effective number of slots is much less than the theoretical total. Although the company bicycle parking facilities are heavily used, the supply of bicycle racks for use by Conoco Phillips employees appears to be adequate. Requiring 73 spaces, the applicable number under a 5 percent standard, would be excessive. Given that this example represents the high end of bicycle parking demand, the 3 percent standard would probably supply more than enough bicycle parking for the average office development as well as other retail developments.

The recommended bicycle parking standard is dependent on adopting a more rigorous standard for bicycle parking design. The old style bicycle parking (with narrow tire slots that can damage bicycle wheels) does not allot enough space between bicycle slots. Allowing this type of bicycle rack would result in a significant undersupply of bicycle spaces. As a result, the revised Title 21 standards should require a U-shape bicycle rack design that provides a secure space with adequate spacing between bicycles.

Although uniform, easy-to-interpret standards are desirable, not all land use developments generate an equal amount of bicycle riders. For example, large warehouse type stores where customers generally purchase large items that cannot easily be transported by bicycle would be expected to attract fewer bicyclists. (The needs of employees should not be ignored however.) The Home Depot information in the table above indicates that 14 bicycle spaces would be required under the proposed standards. This number of spaces appears to be more than is needed for this type of development. Hotels and motels, which serve visitors, may also need fewer bicycle parking spaces. The Hilton Hotel row in the table above indicates that four bicycle parking spaces would be required.

Schools should probably be treated as a separate category. The current vehicle parking requirement for elementary schools consists of one parking space for every 50 square feet of multi-purpose rooms. In some of the smaller elementary schools, this requirement may result in fewer than 40 required vehicle parking spaces, an amount that would require no bicycle parking. A separate standard may be needed to satisfy the demand for bicycle parking at schools. Additional research needs to be done to suggest a proper standard for this type of land use.

Multi-family apartments are often excused from bicycle parking standards in many cities. Many apartment residents store their bicycles indoors or in a provided storage space to keep them secure and out of the weather. Thus, required parking for occupants of multi-family apartments may not be necessary, except to provide bicycle parking for visitors. Additional field work should be conducted to determine the prevalence of bicycle parking in existing multi-family apartments.

APPENDIX

H Downtown Bicycle Parking

Appendix H
Downtown Bicycle Parking

Attendees at a July 2008 Downtown Information Fair offered suggestions on bicycle parking locations in downtown Anchorage. Types of parking included bicycle racks, covered outdoor bicycle racks, locked rooms in parking garages, free-standing bicycle lockers, specific outdoor locked areas (in special locations to fit the bicycles, such as an alcove or locker room), and valet parking (for special events). The chart below shows locations suggested and where the Municipality of Anchorage will be installing bicycle parking facilities in fall 2008.

Location	Specific Area	Bicycle Rack	Covered (outdoor) Parking g	Parking Garage	Bicycle Lockers	Special Location Parking	Valet Parking	Existing Bicycle Racks	MOA to install
Anchorage Museum	7th Avenue	X				X			
Anchorage Museum	West side in new plaza	X							
Bradley Reid Building	5th Avenue at I Street	X							
Captain Cook Hotel	5th Avenue west entry	X							
Captain Cook Hotel	Parking garage			X					
City Hall	6th Avenue side	X				1			Double posts
City Hall	South side of building	X							Bicycle rack
Delaney Park	9th at G		X						
Delaney Park	10th at F Street		X						
Delaney Park	9th at Veterans Memorial		X						
Delaney Park	10th at K St.(MLK memorial)		X						
Delaney Park	9th & A St. Ballfields		X						
Delaney Park	10th Ave, & L Street – soccer area	X							
Elderberry Park	5th Avenue at M Street	X			X				
Federal Building	6th Avenue	X							
Federal Building annex	9th Avenue at C Street	X							
5th Avenue Mall	D Street Door	X			X			X	

Location	Specific Area	Bicycle Rack	Covered (outdoor) Parking g	Parking Garage	Bicycle Lockers	Special Location Parking	Valet Parking	Existing Bicycle Racks	MOA to install
5th Avenue Parking Garage	Stall dedicated to parking			X					
5th Avenue	Between E & C	X							Double posts
4th Avenue	Pioneer Bar area	X							
Hilton Hotel	E Street	X							
J.C. Penney Garage	Under overhang at 6th & D Street								Bicycle rack
J.C. Penney Garage	With Anchorage Parking Authority					X			
Methodist Church	9th Avenue & H Street	X							
Municipal Parking Garage	5th at G Street	X	X		X			X	
Old City Hall	4th & E Street	X							
Oscar Anderson House	5th at M Street	X							
Parking Lot	3rd Ave. at I Street						X		
Performing Arts Center	northeast corner opposite Egan				X				Bicycle rack
Performing Arts Center	Southeast corner	X						X	
Performing Arts Center	Loading dock area			X					
Performing Arts Center	Stage Door							X	
Saturday market parking lot	West Saturday Market Area	X				X			Bicycle locker
Skinny Raven Sports	8th Avenue & H Street	X							
3rd Avenue Lot	3rd Avenue & A Street			X					
Town Square Park	Along E Street	X							

Proposed Bicycle Network
Anchorage Bowl
On Street Facilities
Bicycle Lane
Proposed Bicycle Lane
Paved Shoulder Bikeway
Proposed Paved Shoulder Bikeway
Shared Use Roadway
Proposed Bicycle Boulevard
Off Street Facilities
Existing Separated Multi-Use Pathway
Proposed Separated Multi-Use Pathway
Facility eligible to be signed and striped
Alaska Railroad
Conceptual Highway to Highway Corridor
Special Study Areas
A Government Hill
B Lake Otis Boulevard
C Midtown
D Muldoon Road
E Dowling Roundabouts
F Ingra\Gambell
G Dimond & Victor
Note: Bicycle lane facilities are the preferred facility and are contingent on identifying a plan for funding and maintenance.
0 0.25 0.5 1 1.5 Miles
Anchorage Bicycle Plan Public Hearing Draft August 2009
Knik Arm
Turnagain Arm
Elmendorf Air Force Base
Fort Richardson Military Reservation
Far North / Bicentennial Park
Chugach State Park
Kincaid Park
Trails in Far North Bicentennial Park will be unpaved per the Master Trails Plan.

Anchorage Bicycle Plan Credits

Preparation of the Anchorage Bicycle Plan was coordinated by the Traffic Department of the Municipality of Anchorage—Lance Wilber, Director, and Craig Lyons, AMATS Coordinator.

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ANCHORAGE BIKE PLAN

A M A T S
Anchorage Metro Area Transportation Solutions

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Traffic Department - Municipality of Anchorage