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(This compendium is not included in this document. The materials are available by request from the city.)

- Public Comments and Responses Spreadsheet
- Shared Lane Marking (Sharrows) Memorandum
- Preliminary Cross Section Map
- Generalized Cost Estimates Spreadsheet

ACKNOWLEDGEMENTS

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This Bicycle Master Plan is a City of Seattle document. It has been prepared by the Seattle Department of Transportation, in coordination with multiple city agencies and other community, regional, and state organizations.

Guidance and support for the development of this Plan was also provided by the Bicycle Master Plan Citizens Advisory Board (see members listed below).

Approved May 22, 2007 by the Seattle Bicycle Advisory Board.

The City of Seattle would like to thank the individuals who participated in the Citizens Advisory Board and assisted in the development of this Plan.

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EXECUTIVE SUMMARY

The Seattle Bicycle Master Plan defines a set of actions, to be completed within 10 years, to make Seattle the best community for bicycling in the United States. By increasing support for bicycling, the city will make its transportation system more environmentally, economically, and socially sustainable. Seattle is currently in a unique position to make major improvements to bicycling in the city as a result of several concurrent initiatives:

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

(Source: American Association of State Highway and Transportation Officials Guide for the Development of Bicycle Facilities, 1999)

- The city established a Complete Streets Policy in April 2007 and is implementing this policy.
- A major new funding source is now in place to construct new bikeways—the “Bridging the Gap” transportation funding initiative passed by Seattle voters in late 2006—it provides dedicated funding over the next nine years for bicycle lanes, multi-use trails, and other safety improvements.
- Seattle is currently undertaking a major initiative to meet or beat the global warming pollution reduction target of the Kyoto Protocol.

The Plan is a visionary, yet practical, action strategy to make Seattle a world-class city for bicycling. It provides the framework and actions needed to create a Bicycle Facility Network and develop the supporting facilities and programs necessary to make bicycling a viable choice for a wide variety of trips. Improving the convenience and safety of bicycling in the city will provide cost-effective, healthy, and convenient transportation for residents who bicycle. It will also increase social interaction on streets, offer alternatives to driving on congested roadways, and reduce pollution—public benefits that will make Seattle an even better place to live.

Bicycling in Seattle



- Every day, approximately 6,000 Seattle residents use a bicycle as their primary mode of transportation to work¹. Thousands more bicycle to school, to access transit, to visit friends, to go shopping, or to improve their health².
- Between 1992 and 2000, the total number of bicyclists entering and leaving the Central Business District during the morning peak period increased by 57%³.
- Approximately 1,800 bicyclists use the Burke-Gilman Trail on a typical weekday, and 2,200 bicyclists use the trail on a typical Saturday⁴.

Bicycling is already a popular mode of transportation in Seattle. While many residents and visitors currently bicycle, there are many more people who would bicycle if new bicycle

¹ U.S. Census 2000.

² Approximately 11 percent of bicycle trips are for the purposes of earning a living or going to school; 89 percent of bicycle trips are for other purposes. Source: US DOT, National Household Travel Survey, 2001.

³ Counts were taken between 6:30 and 9:00 a.m. at 29 Downtown entry points on a typical Wednesday in September in 1992 and 2000.

⁴ Moritz, B. and Cascade Bicycle Club. Burke-Gilman/Sammamish River Trail Survey, 2005. Counts taken from 7 a.m. to 7 p.m.

EXECUTIVE SUMMARY

lanes, signed bicycle routes, trails, and improved roadway crossings were provided throughout the city. Seattle currently has approximately 25 miles of bicycle lanes and 40 miles of multi-use trails. However, with over 2,000 miles of roadways throughout the city, there are many gaps that need to be filled. Over the four-year period between 2002 and 2005, there were 1,088 police-reported bicycle crashes in the city. It is likely that more bicycle crashes occurred that were not reported to police.

This Plan is critical for the following reasons:

- Bicycling is an affordable mode of transportation that provides physical activity, produces no pollution, and supports social interaction.
- As a vehicle, the bicycle is very efficient in its use of public space.
- Bicycling supports healthy lifestyles.
- Although Seattle has made great progress by building a trail network that is a model for cities throughout the world, Seattle lacks a connected system of bicycle facilities. Bicyclists face barriers, such as freeways, roadway crossings, and topography in many parts of the city. Many people would choose to bicycle if they had a connected network of comfortable, safe bicycle facilities throughout the city.
- Unsafe behaviors from both motorists and bicyclists increase the chances of injuries on roadways.
- Existing and emerging policies support improving and connecting bicycle facilities.
- There is a growing amount of public support for more bicycling and better bicycle facilities, as reflected by support for the city's Complete Streets Policy and voters supporting "Bridging the Gap."



Goals and Objectives of the Plan

The City of Seattle Bicycle Master Plan was created to achieve two goals:

- **Goal 1. Increase use of bicycling in Seattle for all trip purposes. Triple the amount of bicycling in Seattle between 2007 and 2017⁵.**
- **Goal 2. Improve safety of bicyclists throughout Seattle. Reduce the rate of bicycle crashes by one third between 2007 and 2017⁶.**

The city has identified four principal objectives (provided below) to achieve the goals of the Plan. The objectives are supported by 38 specific actions that will be accomplished over the next ten years, as well as a number of strategic performance measures that will enable the city to monitor progress over time. A summary of each objective is provided below. For more detailed information on the objectives, actions and performance measures, please refer to the full Master Plan report (see <http://www.seattle.gov/transportation/bikemaster.htm>).

- **Objective 1: Develop and maintain a safe, connected, and attractive network of bicycle facilities throughout the city.** One of the most important outcomes of this Plan is a detailed assessment of Seattle's transportation system resulting in specific recommendations for new bicycle facilities throughout the city. The Plan map (see inset: Recommended Bicycle Facility Network) identifies the location and initial

⁵Tripling the amount of bicycling is contingent upon the completion of key connections in the Bicycle Facility Network. The Plan identifies 20 capital projects to make these key connections (see Chapter 3). The amount of bicycling is measured by counting bicyclists at a consistent sample of locations in the city.

⁶The rate of bicycle crashes is the number of police-reported bicycle crashes in a year divided by the number of bicyclists counted at the sample locations.

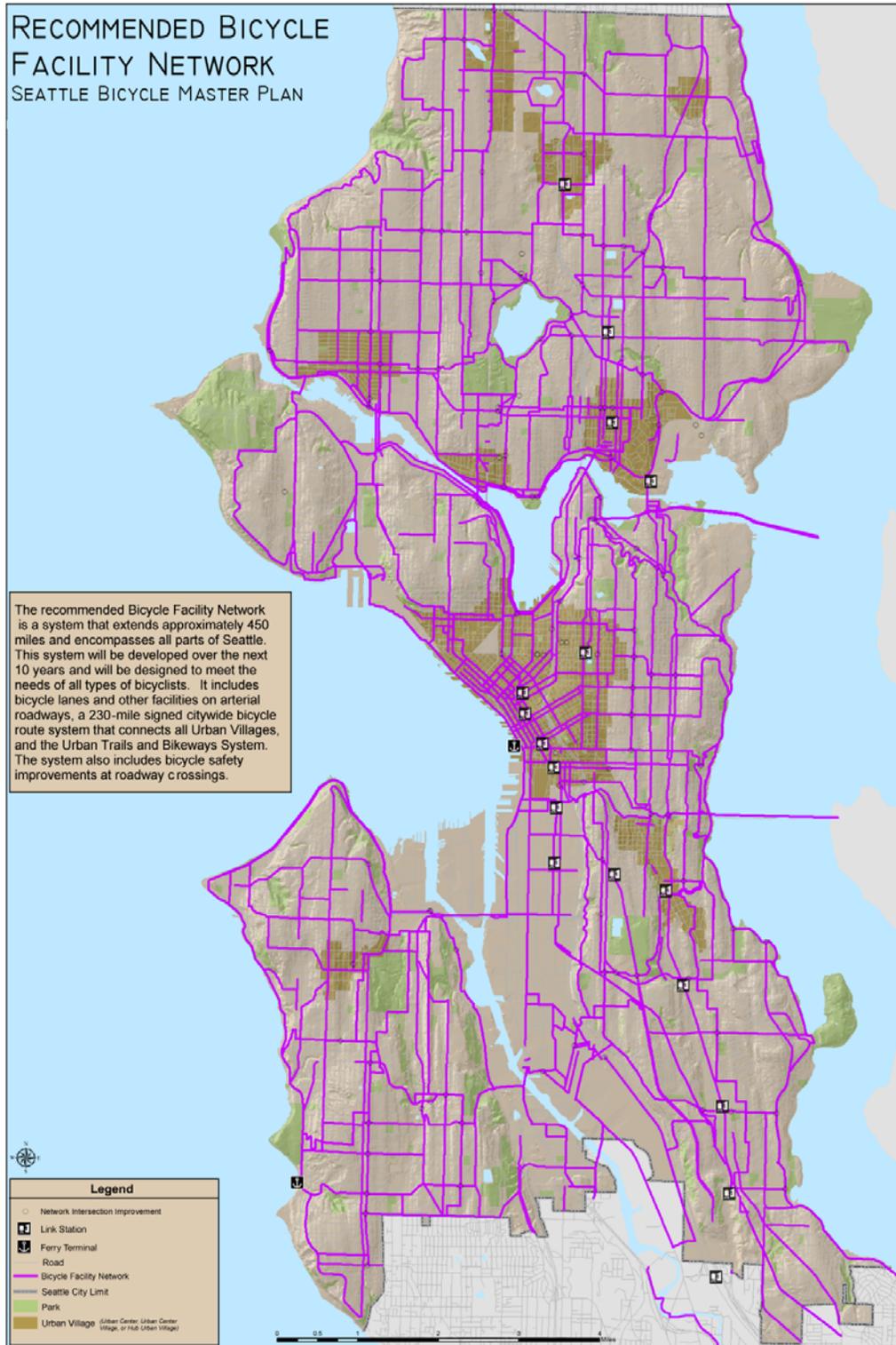
facility recommendation for a system that encompasses approximately 450 miles. This system extends to all parts of the city and will be designed to meet the needs of all types of bicyclists. The system will include bicycle lanes and other facilities on arterial roadways, a citywide bicycle route system, and completion of the Urban Trails and Bikeways System. A number of non-arterial streets with low traffic volumes and speeds complete the gaps in this system. (These are not shown on the Recommended Bicycle Facility Network map.) The Plan will also result in bicycle safety improvements at roadway crossings and improvements to the maintenance of the bicycle network.

Bicycle Facility Network Summary

| Miles of Recommended Facilities | | | |
|--|-----------------|---|--|
| <i>Facility Type</i> | <i>Existing</i> | <i>Short-Term 2007-2009 (includes existing)</i> | <i>Total 2007-2016 (includes existing)</i> |
| <i>Bicycle lanes/climbing lanes</i> | 25.5 | 63.7 | 143.3 |
| <i>Shared lane pavement markings</i> | 0.3 | 54.2 | 110.5 |
| <i>Bicycle boulevards</i> | 0.0 | 7.6 | 18.1 |
| <i>Other on-road bicycle facilities</i> | 2.2 | 4.2 | 46.1 |
| <i>Signed local street connections</i> | 0.0 | 28.6 | 75.9 |
| <i>Multi-use trails</i> | 39.4 | 41.9 | 58.2 |
| <i>Other off-road bicycle facilities</i> | 0.2 | 1.0 | 2.6 |
| TOTAL NETWORK | 67.6 | 201.2 | 454.7 |

- Objective 2: Provide supporting facilities to make bicycle transportation more convenient.** In order for bicycling to be a fully viable form of transportation in Seattle, other programs and facilities are needed to complement the Bicycle Facility Network. This includes integrated bicycle and transit services, adequate bicycle parking at all destinations, showers at employment centers, convenient repair services, and coordination with a variety of other essential components of a multi-modal transportation system. Partnerships will be needed with area transit agencies and other service providers to accomplish these actions.
- Objective 3: Identify partners to provide bicycle education, enforcement, and encouragement programs.** As the Bicycle Facility Network is built and more people are encouraged to ride, new programs will be needed to educate bicyclists and motorists about how to co-exist safely in the roadway environment. Partnerships will be needed between SDOT, the Seattle Police Department (SPD), the Bicycle Advisory Board, the Bicycle Alliance of Washington, and Cascade Bicycle Club in order to accomplish this objective.
- Objective 4: Secure funding and implement bicycle improvements.** In order to implement this Plan, it will be necessary to include bicycle accommodations in all future transportation projects, secure grant funding, train staff, integrate the recommendations of the Plan into city policies and regulations, and coordinate with other jurisdictions in the region. In addition, new roadway design treatments will need to be evaluated for their effectiveness, and performance measures will

be used to monitor progress over time. Finally, it will be important to reassess priorities and update this Plan in future years as new needs and opportunities are identified.



Sample of recommended Bicycle Facility Network Map.

For more information, visit our website at <http://seattle.gov.transportation.bikemaster.htm>

Public Outreach

This Plan is the product of extensive public outreach, background research, inter-agency coordination, and detailed field work. There is a very high level of public interest in the Plan, as shown by the large turnout at public meetings. Previous plans and initiatives from the Seattle Department of Transportation (SDOT) and organizations representing parks and recreation, public transit, freight mobility, land use, open space, trails, pedestrian access, and regional coordination were reviewed and incorporated within the recommendations for this Plan. The foundation of the network plan was a detailed field inventory of over 600 miles of Seattle roadways (including all arterial streets where bicycles are permitted).

Public Involvement in the Seattle Bicycle Master Plan

- More than 450 people attended the first public meeting at the University of Washington in August 2006.
- More than 330 people attended the public meetings in Ballard and Columbia City in December 2006.
- Nearly 1,600 people responded to the online Bicycle Master Plan survey.
- More than 100 people e-mailed comments to SDOT during the planning process.
- More than 180 people provided almost 500 comments on the draft Bicycle Master Plan.
- Representatives of the Cascade Bicycle Club, Bicycle Alliance of Washington, Seattle Bicycle Advisory Board, other organizations, and neighborhood residents attended monthly meetings of the Citizens Advisory Board (CAB) during the planning process.



Characteristics of the Bicycle Network

This Plan recommends a 450-mile network of bicycle facilities that, when implemented, will put more than 95 percent of Seattle's residents within one-quarter mile of a bicycle facility (see Recommended Bicycle Facility Network Map). The network of bicycle facilities will provide access across the rivers, waterways, freeways, and rail corridors that are currently barriers to bicycling in the city, and create hundreds of miles of new bike lanes, bike routes, trails, and transit connections. The recommended Bicycle Facility Network and supporting actions will serve all types of bicyclists—from new bicyclists to experienced riders. Components of the Bicycle Facility Network include:



- **Bicycle facilities on arterial roadways**—these facilities will provide direct access to transit stations, offices, businesses, residences, and other destinations. This category includes bicycle lanes, climbing lanes, shared lane markings, and paved shoulders throughout the city.
- **Roadway crossing improvements**—this category includes safety improvements to key intersections, particularly in locations where trails and signed bicycle routes cross arterial roadways. Crossing improvements may include new traffic signals, pedestrian signal heads, curb extensions, median crossing islands, and other types of improvements.
- **A citywide Signed Bicycle Route System**—this system of routes will connect all Urban Villages in Seattle. Signed routes will extend along multi-use trails, bicycle boulevards, non-arterial streets with low traffic speeds and volumes, and lower volume arterial streets with bicycle lanes.

EXECUTIVE SUMMARY

- **A completed Urban Trails and Bikeways System**—this system, adopted in the SDOT Transportation Strategic Plan (TSP), includes multi-use trails and streets with bicycle lanes that together form an interconnecting system.



Innovation

The city embraces an innovative approach to improving bicycle transportation. Seattle is already widely recognized for its outstanding trail system, and the city will continue to serve as a national leader through the rapid implementation of this complete, connected, citywide bicycle network. The Plan also includes the following innovations:

- Shared lane markings to indicate the proper direction of bicycle travel, encourage bicyclists to ride away from parked car doors, and to increase drivers' expectations to see bicyclists on roadways.
- Climbing lanes on hills to provide designated space for bicyclists on uphill slopes and to encourage bicyclists to move away from parked car doors and share motor vehicle lanes on downhill slopes.
- Bicycle boulevards to provide a high-quality bicycle experience for people with a wide variety of skills and ability to ride in traffic.
- A comprehensive bicycle route signage system that shows distances to major destinations.
- New bicycle safety treatments, such as warning signs, pavement markings, and traffic controls where multi-use trails and bicycle routes cross arterial roadways.
- Bicycle and pedestrian bridges to make critical connections across barriers.
- Exploration of new bicycle detection technologies at signalized intersections.
- Support for using new technologies for counting and surveying bicyclists.

Implementation Plan

This Plan is designed to be implemented. The recommendations are realistic and achievable because they are based on detailed field work and close agency and public coordination. In most cases, the facilities and actions identified in the Plan will require additional traffic analysis and neighborhood involvement in order to ensure proper implementation. The Plan identifies a variety of partnerships to develop and maintain bicycle facilities, support the education of motorists and bicyclists about bicycle safety, and encourage more people to bicycle for utilitarian and recreation purposes.



Keys to Successful Plan Implementation

- Continue institutional commitments to improving bicycle transportation.
- Devote adequate staff resources to implementing the Plan.
- Provide sustained funding for projects and programs.
- Learn from implementing projects and adjust approaches, as necessary.

It is anticipated that three full-time staff will be needed to implement the Plan recommendations within the ten-year timeframe. The pre-2007 staffing of the Program will not be adequate because the volume of work recommended in this Plan is a significant increase over previous years.

- **Short-Term Implementation (2007 to 2009)**

Within the next three years, the Plan recommends the installation of 133.6 miles of new bicycle facilities. Facility recommendations during this period may ultimately vary because many are tied closely to repaving projects. The city will use funding from the “Bridging the Gap” initiative and other sources to focus immediately on a number of key on-street bicycle facilities, including 55 roadway crossing improvements, 28.6 miles of signed bicycle routes, 7.6 miles of new bicycle boulevards, 53.9 miles of shared lane markings, and 38.2 miles of bicycle lanes and climbing lanes on arterial roadways. The city will also construct a key bicycle and pedestrian bridge (the Thomas Street Overpass) and add an additional two miles to the Urban Trails and Bikeways System. Partnerships for bicycle and pedestrian safety education, enforcement, encouragement, and bicycle transit access improvements will also be developed in this short-term period.

- **Medium-Term Implementation (2010 to 2012)**

From 2010 through 2012, the city will reconfigure arterial roadways and will install many additional miles of bicycle lanes, climbing lanes, and shared lane markings. Seattle will also complete the Signed Bicycle Route System, complete the majority of the bicycle boulevards recommended in this Plan, install additional roadway crossing improvements, construct additional sections of the Urban Trails and Bikeways System, and finish an online bicycle wayfinding system. In addition, the Plan will be updated during this time period to reflect new priorities that arise.

- **Long-Term Implementation (2013 to 2016)**

During the latter stage of implementation of the 10-year timeframe for this Plan, Seattle will complete the Urban Trails and Bikeways System, roadway crossing improvements, and the majority of bicycle facilities on arterial roadways. Major construction projects to provide bicycle and pedestrian bridges and bicycle facilities in constrained roadway corridors are likely to be designed during this long-term timeframe. The completion of new bicycle and pedestrian bridges and major roadway reconstruction projects are visionary projects that are likely to occur further in the future, but they are identified as important needs in this Plan.

The level of investment that will be required in order to implement this Plan is relatively modest in comparison to other transportation facilities. The estimated cost to implement this Plan over 10 years is approximately \$240 million (based on 2007 dollars)⁷. The Plan cost includes approximately \$35.7 million for on-road bicycle facilities, \$7.0 million for roadway crossing improvements, \$63.7 million for multi-use trail facilities (includes the Burke-Gilman Trail missing link), \$80.6 million for major capital projects (e.g., bicycle and pedestrian bridges), \$46.5 million for bicycle facility maintenance, and \$5.9 million for other projects (e.g., bicycle parking, bicycle maps, bicycle education, etc.).

⁷ The \$240 million cost does not include potential right-of-way acquisition, utility revisions, and other project mobilization costs. Since agreements have already been reached with railroads and utilities, completion of the Urban Trails System does not generally require the costs associated with acquiring additional right-of-way. Therefore, these additional costs would be for projects at spot locations, so they are relatively small.

Plan Outcomes

Outcomes of implementing this Plan over the next 10 years include:

- Bicycle facilities on 62 percent (295 miles) of Seattle's arterial streets.
- A 230-mile system of signed bicycle routes, connecting all parts of Seattle.
- A signed route within ¼ mile of 72 percent of Seattle's schools.⁸
- 50 percent more (19 additional miles of new) multi-use trails.
- A bicycle facility within ¼ mile of 95 percent of Seattle residents.



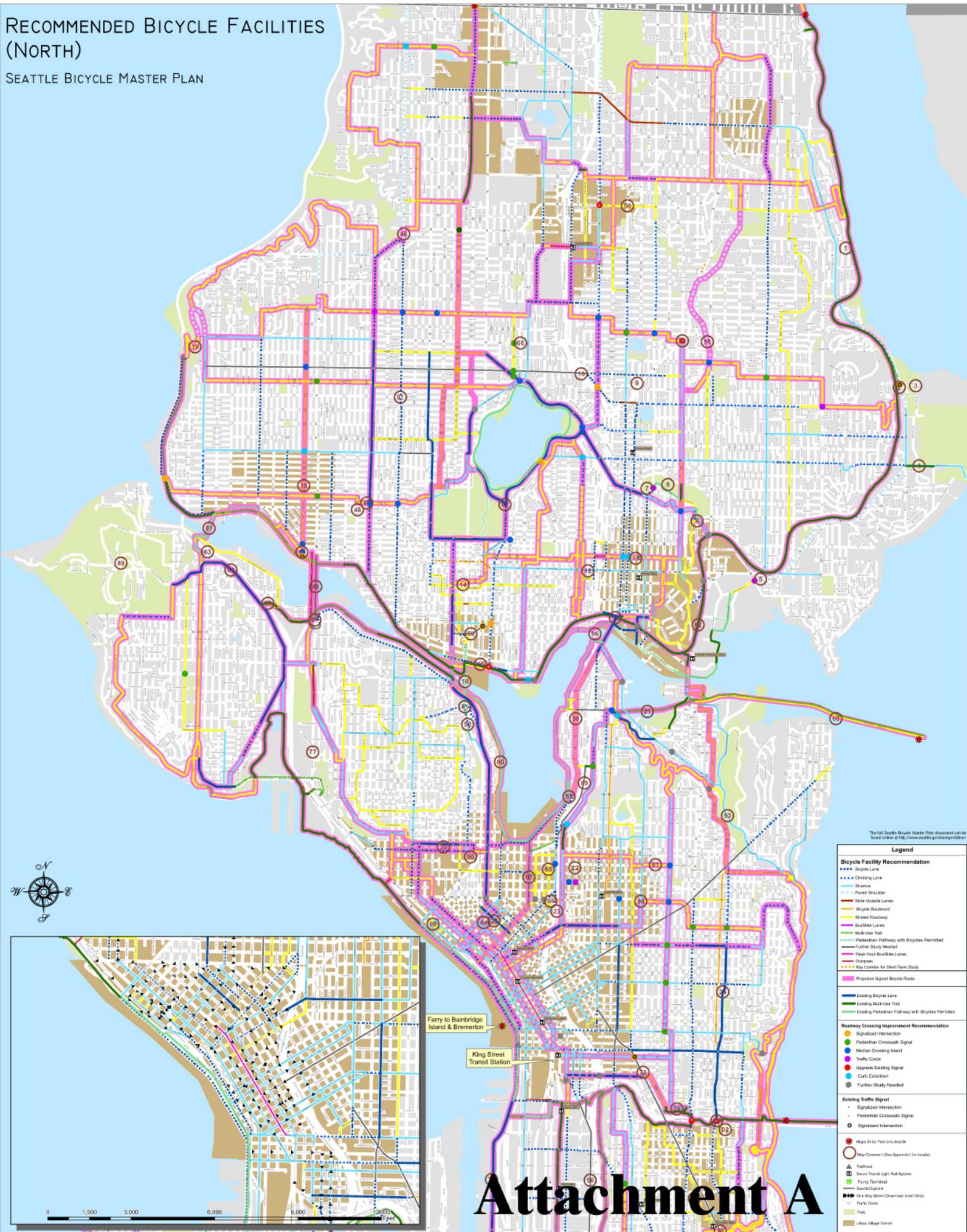
This Plan not only establishes the vision, but also very practical steps that are needed in the future to ensure that Seattle will become a world-class city for bicycling. This Plan is an important first step -

much work lies ahead. By providing the necessary human and financial resources to accomplish this Plan, Seattle could very well exceed its current goals for increasing the use and safety of bicycling. It will therefore be important in the future to measure progress, reassess priorities, and strive to further increase the use and safety of bicycle transportation as the city moves forward with the implementation of this Bicycle Master Plan

⁸ Within the context of the city's upcoming Pedestrian Master Plan, additional connector bicycle routes may be added to bring all schools to within ¼ mile of a roadway with bicycle route signs.

RECOMMENDED BICYCLE FACILITIES (NORTH)

SEATTLE BICYCLE MASTER PLAN



The full Seattle Bicycle Master Plan document can be found online at <http://www.seattle.gov/transportation>

| Legend | |
|---|---|
| | Bicycle Lane |
| | Clarking Lane |
| | Shoreline |
| | Shared Shoulder |
| | Wide Outside Lanes |
| | Bicycle Boulevard |
| | Shared Roadway |
| | BuSbike Lanes |
| | MuSbike Trail |
| | Pedestrian Pathway with Bicycles Permitted |
| | Further Study Needed |
| | Peak Hour BuSbike Lanes |
| | Crosswalk |
| | Map Comment for Short-Term Study |
| | Proposed Signal Bicycle Roads |
| | Existing Bicycle Lane |
| | Existing MuSbike Trail |
| | Existing Pedestrian Pathway with Bicycles Permitted |
| Roadway Crossing Improvement Recommendation | |
| | Signalized Intersection |
| | Pedestrian Crosswalk Signal |
| | Median Crossing Island |
| | Traffic Circle |
| | Upgrade Existing Signal |
| | Curb Extension |
| | Further Study Needed |
| Existing Traffic Signal | |
| | Signalized Intersection |
| | Pedestrian Crosswalk Signal |
| | Signalized Intersection |
| | Major Entry Point into Bicycle |
| | Map Comment (See Appendix for details) |
| | Trailhead |
| | Sound Transit Light Rail Station |
| | Ferry Terminal |
| | Sound Transit Station |
| | One-Way Street (Overturn Inset Only) |
| | Traffic Circle |
| | Park |
| | Urban Village Center |

Attachment A

RECOMMENDED BICYCLE FACILITIES (SOUTH)

SEATTLE BICYCLE MASTER PLAN

Legend

Bicycle Facility Recommendation

- Bicycle Lane
- Climbing Lane
- Sharrow
- Painted Shoulder
- Wide Outside Lanes
- Bicycle Boulevard
- Shared Roadway
- Buiklike Lanes
- Multi-Use Trail
- Pedestrian Pathway with Bicycles Permitted
- Further Study Needed
- Peak Hour Buiklike Lanes
- On-street
- Key Corridor for Street Turn Study
- Proposed Signal Bicycle Hooks

Roadway Crossing Improvement Recommendation

- Signalized Intersection
- Pedestrian Crosswalk Signal
- Median Crossing Island
- Traffic Circle
- Upgrade Existing Signal
- Curb Extension
- Further Study Needed

Existing Traffic Signal

- Signalized Intersection
- Pedestrian Crosswalk Signal
- New Signalized Intersection

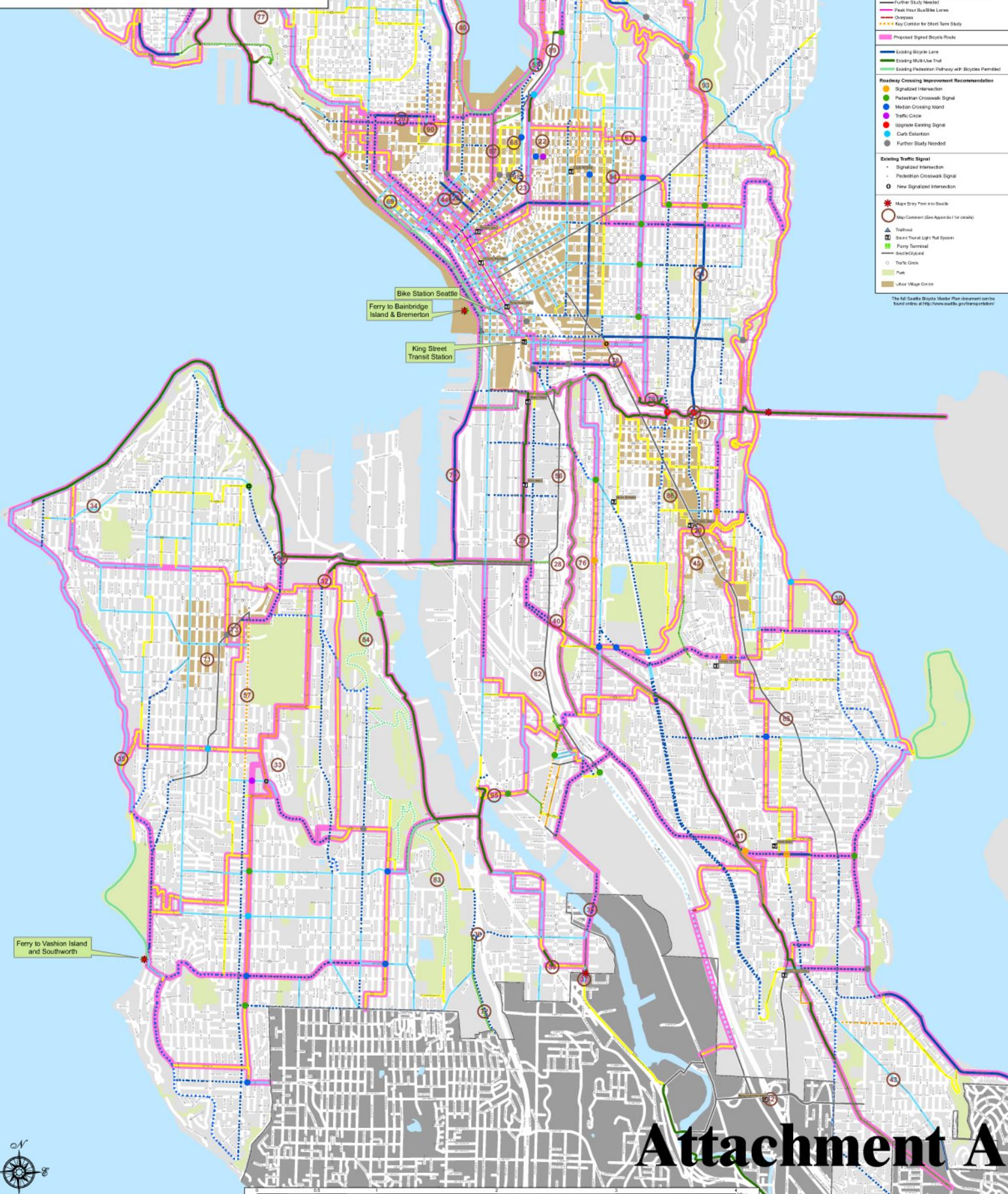
Map Data Point to Seattle

- Map Context (See Appendix 1 for details)

Other Features

- Trailhead
- Street Transit Light Rail System
- Ferry Terminal
- Buiklike/Lane
- Traffic Circle
- Park
- Urban Village Center

The full Seattle Bicycle Master Plan document can be found online at <http://www.seattle.gov/transportation>



Attachment A

Chapter 1. Introduction

Bicycling is a popular activity in Seattle. Every day, approximately 6,000 people in Seattle's workforce use a bicycle as their primary mode of transportation¹. Thousands more bicycle to school, to access transit, to visit friends, to go shopping, and to improve their health². The membership of the Cascade Bicycle Club provides clear evidence of the popularity of bicycling throughout the Puget Sound Region - the club's 7,200 members make it one of the largest regional bicycle clubs in the nation. In addition, Seattle is home to the Bicycle Alliance of Washington, one of the most effective statewide advocacy groups in the U.S.

Between 1992 and 2000, the total number of bicyclists entering and leaving Downtown Seattle during the morning peak period (6:30 a.m. to 9:00 a.m.) increased by 57%³.

The City of Seattle has been a national leader in the development of urban trail systems, improving bicycle access across key barriers (most notably bridges) and in improving bicycle access to transit. SDOT was one of the first city transportation departments in the country to establish a bicycle program, which has been going strong for over 35 years.

These successes have led to a great deal of support for bicycling among Seattle's residents and elected leaders. Seattle residents passed the "Bridging the Gap" initiative in November 2006 to provide \$365 million over nine years for street repaving, seismic repairs for bridges, pedestrian and bicycle improvements, and transit projects. Of this funding, approximately \$3 million per year will be directly available for bicycle lanes, multi-use trails, and other safety improvements, beginning in 2007. The guiding principle of the city's Complete Streets policy, adopted in April 2007, is "To design, operate and maintain Seattle's streets to promote safe and convenient access and travel for all users-- pedestrians, bicyclists, transit riders, and people of all abilities, as well as freight and motor vehicle drivers."

The Burke-Gilman Trail is one of the most popular trails in the U.S. Approximately 1,800 bicyclists use the trail on a typical weekday, and 2,200 bicyclists use the trail on a typical Saturday.⁴



However, there are many challenges to bicycling in Seattle. Although Seattle has made great progress by building a trail network that is a model for cities throughout the world, Seattle lacks a connected system of bicycle facilities. Bicyclists face barriers, such as freeways, roadway crossings, and topography in many parts of the city. Many people would choose to bicycle if they had a connected network of comfortable, safe bicycle facilities throughout the city.

¹ U.S. Census 2000.

² Approximately 11 percent of bicycle trips are for the purposes of earning a living or going to school; 89 percent of bicycle trips are for other purposes. Source: US DOT, National Household Travel Survey, 2001.

³ City of Seattle downtown bicycle counts, 1992, 1995, and 2000.

⁴ Moritz, B. and Cascades Bicycle Club. Burke-Gilman/Sammamish River Trail Survey, 2005. Counts taken from 7 a.m. to 7 p.m.

⁵ As estimated by the League of American Bicyclists.

Chapter 1. Introduction

Bicycling is an important part of Seattle's transportation system for many reasons:

- Bicycling is an affordable mode of transportation, requiring only a fraction of the cost that it takes to own and operate a motor vehicle. The American Automobile Association estimates that the average American spends nearly \$8,000 per year to own and operate an automobile, while bicyclists typically spend less than \$200 per year.⁵
- Bicycling instead of driving a car can help to improve the environment by reducing greenhouse gases that contribute to global warming, and reducing the amount of pollution in our air and water.
- As a vehicle, the bicycle is very efficient in its use of public space. For example, there is space for approximately 10 to 12 bicycle parking spaces in one automobile parking space.⁶
- Unsafe behaviors from both motorists and bicyclists increase the chances of injuries on roadways. Because bicyclists' needs have historically been underserved, the current transportation system does not function well for bicyclists and precipitates conflicts between motorists and bicyclists. In cities that have effectively accommodated bicyclists, these conflicts tend to dissipate. Bicycling provides an opportunity for routine physical activity - which is increasingly important given the sedentary lifestyles of many Seattle residents. Recent health studies have shown up to a 50% reduction in Type 2 diabetes among people who engage in moderate physical activity - such as bicycling to work - on a regular basis.⁷



This Plan envisions a comprehensive network of on-and off-street bicycle facilities that connects all parts of Seattle, providing residents and visitors with convenient access to transit stations, workplaces, parks, commercial areas and many other destinations throughout the city. Within the next three years, the Plan recommends the implementation of 133 miles of new bicycle facilities. Within the next ten years, the Plan will create a 450-mile network of bicycle facilities, ultimately putting nearly all of Seattle's residents within one-quarter mile of a bicycle facility. The Plan also recommends a wide variety of partnerships to develop and maintain bicycle facilities, further support bicycle safety education, and encourage more people to bicycle for utilitarian and recreation purposes.

Bicycling serves a wide variety of community goals that fall under the jurisdiction and missions of many city departments and projects. Bicycling supports:

- Public health
- Quality of life/livability
- Environmental health
- Transportation choice
- Accessibility
- Recreation

--City of Seattle Bicycle Advisory Board, 2002

⁶ Pedestrian and Bicycle Information Center, "Bicycle Parking: Costs," Available online: www.bicyclinginfo.org/de/park_costs.cfm.

⁷ Journal of the American Medical Association, October 1999, based on a study by the Harvard School of Public Health.

This Plan comes at an important time in Seattle's history. On November 7th, 2006, Seattle voters passed a comprehensive transportation levy that will provide a significant source of funding for transportation maintenance and improvements over the next nine years. This funding will help to accelerate the implementation of this Plan, including the development of capital projects that support bicycle mobility.



More than 450 people attended the first Bicycle Master Plan public meeting.

Citizens have shown significant interest in this Plan and have provided considerable feedback during the planning process. Attendance at public meetings exceeded 750 people over the course of three public meetings held between August and December 2006. In addition, more than 1,600 city residents submitted comments during the six-month planning process. Input from these citizens, recommendations from other key planning efforts, and a thorough inventory and analysis of the city's existing transportation system combine to form the basis of this Bicycle Master Plan. A list of public comments on the Draft Plan and the city responses to these comments is included in the Public Comments and Responses Spreadsheet, which is part of the Compendium of Supporting Materials for this Plan.

Implementing this Plan over the next 10 years will provide:

- Bicycle facilities on 62 percent (295 miles) of Seattle's arterial streets
- A 230-mile system of signed bicycle routes, connecting all parts of Seattle
- 50 percent more (19 miles of new) multi-purpose trails
- Partnerships to improve bicyclist safety and increase bicycling throughout Seattle

The level of investment that will be required in order to implement this Plan is relatively modest in comparison to other transportation facilities. The estimated cost to implement this Plan over 10 years is approximately \$240 million (based on 2007 dollars). The Plan cost includes approximately \$35.7 million for on-road bicycle facilities, \$7.0 million for roadway crossing improvements, \$63.7 million for multi-use trail facilities (includes the Burke-Gilman Trail missing link), \$80.6 million for major capital projects (e.g., pedestrian and bicycle bridges), \$46.5 million for bicycle facility maintenance, and \$5.9 million for other projects (e.g., bicycle parking, bicycle maps, bicycle education, etc.).

Plan Background

Seattle's network of bicycle facilities has developed over time. The city adopted its first Bicycle Master Plan in 1972. The oil shortages of 1973 and 1979 boosted interest in bicycling. Railroad downsizing starting in the 1970s provided an opportunity for the city to develop multi-purpose trails along abandoned railroad corridors. In the late 1970s through the 1990s, the city focused on securing rights-of-way and constructing this system of trails, which became extremely popular among residents and visitors to the city. Significant portions of the Burke-Gilman, Alki, I-90, and Duwamish Trails were constructed during this period. New trails offered opportunities for people to become more comfortable riding a bicycle for utilitarian and recreation trips, however it soon became clear that improvements would also be needed to the roadway system in order to connect bicyclists directly to their destinations. The city's first



The city's first Bicycle Master Plan was adopted in 1972.

Bicycling Guide Map and the Spot Improvement Program were established during this period.

More recently, the city has focused more of its attention on developing an on-road network of bicycle facilities to complement the multi-purpose trail network. This Plan is a direct result of the need to improve bicycle access on Seattle’s roadway system. Seattle currently has approximately 40 miles of multi-purpose trails, and 25 miles of on-road bicycle lanes. The city’s current network of trails and bike lanes is complemented by a number of other facilities, including bicycle route signs, bicycle parking, and bicycle racks on buses. There are also several miles of other on-road bicycle facilities, including wide outside lanes, rush hour bikeways, bus/bike lanes, and paved shoulders (see Table 1: Existing Bicycle Facilities).

Table 1. Existing Bicycle Facilities

| Facility Type | Miles ¹ |
|--|--------------------|
| <i>Bicycle lanes/climbing lanes</i> | <i>25.5</i> |
| <i>Shared lane pavement markings</i> | <i>0.3</i> |
| <i>Bicycle boulevards</i> | <i>0.0</i> |
| <i>Other on-road bicycle facilities²</i> | <i>2.2</i> |
| <i>Multi-use trails</i> | <i>39.4</i> |
| <i>Other off-road bicycle facilities³</i> | <i>0.2</i> |
| TOTAL NETWORK | 67.6 |
| <i>¹ For on-road bicycle facilities, total miles represent roadway centerline miles with bicycle facilities (e.g. bicycle lanes on both sides of the roadway are not counted separately.)</i> | |
| <i>² Other on-road bicycle facilities include wide outside lanes, edgelines, paved shoulders and peak hour bus/bicycle only roadways. Key corridors for short-term study and corridors where an improvement is needed, but the facility is unknown are also counted in this category.</i> | |
| <i>³ Other off-road bicycle facilities include sidepaths, one-way bike-on-sidewalk pairs and pedestrian/bike-only bridges.</i> | |



Bicycle racks and lockers, a BikeStation®, and bicycle racks on buses are all part of the existing system of facilities that support bicycling. Some have been provided by the city or other public agencies, while others have been provided by private entities. Over 2,300 sidewalk bicycle racks have been installed in business districts since September of 1993, and bicycle parking requirements are included in the Seattle Municipal Code (23.49.019). More detail about the existing bicycling conditions in Seattle is provided in Appendix A: Existing Conditions for Bicycling.

Plan Development

The Plan was developed by gathering and analyzing public input, meeting with the Bicycle Master Plan Citizens Advisory Board (CAB), coordinating with city staff, other local agencies, and reviewing previous plans for bicycle facilities. In addition, the planning process included extensive field analysis of Seattle’s existing transportation network to determine locations where bicycle facilities can be integrated into the existing street network. Over 600 miles of roadways were analyzed, including all of Seattle’s arterial roadways.



The project team analyzed over 600 miles of roadways in the field during summer 2006.

Public input during the planning process was a critical part of identifying bicycling needs throughout the city, and was gathered through several methods, including:

- Monthly meetings with a Citizens Advisory Board (CAB), which included representatives of the Seattle Bicycle Advisory Board, Cascade Bicycle Club, Bicycle Alliance of Washington, and neighborhood residents.
- Three public meetings (450 people attended a meeting at the University of Washington on August 29, 2006; 215 people attended a meeting in Ballard on December 5, 2006; 110 people attended a meeting in Columbia City on December 7, 2006).
- An online Bicycle Master Plan questionnaire (over 1,500 people provided responses between August and September 2006).
- Meetings with representatives of surrounding jurisdictions that were coordinated through the Puget Sound Regional Council (PSRC) (August 29, 2006 and December 6, 2006).
- Review by Seattle District Councils (December 2006 and January 2007).
- Additional comments submitted by citizens to SDOT (over 300 letters and e-mails during the planning process).
- Presentations, upon request, to the Freight Mobility Advisory Committee, Southeast Seattle Transportation Plan Core Community Team, North Seattle Industrial Association and Manufacturing Industrial Council.



The SDOT Bicycle and Pedestrian Program consulted with a variety of other SDOT divisions, city and transit agencies, and other groups throughout the planning process. Those meetings were also important for identifying the best strategies for integrating bicycle infrastructure improvements into the city's overall multi-modal transportation network (see Appendix B: List of Public Meetings Held During the Planning Process).

Plan Updates

This Plan is a living document and updates will be necessary in the future to assess progress, take advantage of emerging opportunities and re-evaluate priorities as needed. As new sections of the bicycle facility network are developed and new technologies are adopted, bicycling mode share will likely increase and travel patterns will change. Priorities will shift and new opportunities will become apparent. These changes will be reflected in yearly updates to the list of short-term projects. Updates to the full Bicycle Master Plan will occur every five years, as a part of the Transportation Strategic Plan Update.

Chapter 2. Goals, Objectives and Policy Framework

Goals and Objectives

The two primary goals of this Bicycle Master Plan are:

- **Goal 1: Increase use of bicycling in Seattle for all trip purposes. Triple the amount of bicycling in Seattle between 2007 and 2017¹.**
- **Goal 2: Improve safety of bicyclists throughout Seattle. Reduce the rate of bicycle crashes by one third between 2007 and 2017².**



These goals essentially encompass all activities of the city related to bicycling and provide the underpinning for all of the Plan recommendations. Many of the Bicycle Facility Network improvements within the Plan can be achieved easily by making improvements using the Complete Streets approach (e.g., incorporating bicycle facilities into roadway reconstruction projects, repaving projects, etc.). The Plan also targets substantial capital investments at key locations within the network that may require additional funding and public support. Both short-term and long-term projects are necessary to create the accessible, connected network of bicycle facilities that is critical for attracting additional bicyclists and making bicycle trips safer.

Seattle will develop a continuous, complete network of bicycle facilities to make it safer and easier for more people to bicycle throughout the city.

The city has identified four principal objectives for achieving the goals of the Plan. Chapters 3 through 6 describe the objectives in detail. Strategic performance measures are also tied to each principal objective to monitor progress in implementing each recommendation. Monitoring of performance measures will occur periodically. Some will be measured on a yearly basis while others will be measured over longer periods of time depending on the availability of source data. More detail on performance measures is provided in Chapter 7.

- **Objective 1: Develop and maintain a safe, connected, and attractive network of bicycle facilities throughout the city.** One of the most important outcomes of this Plan is a detailed assessment of Seattle's transportation system, resulting in recommendations for new facilities types throughout the city. This Plan identifies the location and initial design concept for a system that encompasses over 450 miles. This system extends to all parts of the city and will be designed to meet the needs of all types of bicyclists. The system will include bicycle lanes and other facilities on arterial roadways, a citywide bicycle route system, and completion



¹Tripling the amount of bicycling is contingent upon the completion of 20 critical bicycle connections. The amount of bicycling is measured by counting bicyclists at a consistent sample of locations in the city.

²The rate of bicycle crashes is the number of police-reported bicycle crashes in a year divided by the number of bicyclists counted at the sample locations and by the average motor vehicle traffic volumes measured throughout the city in a year.

of the Urban Trails and Bikeways System. The Plan will also result in bicycle safety improvements at roadway crossings, and improvements to the maintenance of the bicycle network. For more information on this objective, see Chapter 3.

One strategic performance measure has been established to measure progress towards this objective:

- Percentage of Bicycle Facility Network completed.

- **Objective 2: Provide supporting facilities to make bicycle transportation more convenient.** In order for bicycling to be a fully viable form of transportation in Seattle, other programs and facilities are needed to complement the Bicycle Facility Network. This includes integrated bicycle and transit services, adequate bicycle parking at all destinations, showers at employment centers, convenient repair services, and coordination with a variety of other essential components of a multi-modal transportation system. Partnerships will be needed with area transit agencies and other service providers to accomplish these actions. For more information on this objective, see Chapter 4.

Three strategic performance measures have been established to measure progress towards this objective:

- Number of bicycle racks installed through the SDOT Bicycle Rack Program.
- Percentage of estimated 2017 bicycle parking demand met by current bicycle racks and lockers at transit stations in Seattle (recommended for consideration by Sound Transit and KC/METRO).
- Number of bicycles carried on KC/METRO and Sound Transit buses (recommended for consideration by KC/METRO and Sound Transit).



- **Objective 3: Identify partners to provide bicycle education, enforcement, and encouragement programs.** As the Bicycle Facility Network is built and more people are encouraged to ride, new programs will be needed to educate bicyclists and motorists about how to co-exist safely in the roadway environment. Partnerships will be needed between SDOT, the Seattle Police Department (SPD), the Seattle Bicycle Advisory Board (SBAB), the Bicycle Alliance of Washington (BAW), and Cascade Bicycle Club (CBC) in order to accomplish this objective. For more information on this objective, see Chapter 5.

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

(Source: American Association of State Highway and Transportation Officials Guide for the Development of Bicycle Facilities, 1999)



Chapter 2. Goals, Objectives and Policy Planning

Two strategic performance measures have been established to measure progress towards this objective:

- Number of Seattle Bicycling Guide Maps distributed
 - Number of Seattle residents participating in pedestrian or bicycle safety education programs or events (recommended for consideration by Seattle area bicycle advocacy organizations).
- **Objective 4: Secure funding and implement bicycle improvements.** In order to implement this Plan, it will be necessary to include bicycle accommodations in all future transportation projects, secure grant funding, train staff, integrate the recommendations of the Plan into city policies and regulations, and coordinate with other jurisdictions in the region. In addition, new roadway design treatments will be evaluated for their effectiveness, and performance measures will be monitored to measure progress over time. Finally, it will be important to reassess priorities and update this Plan in future years as new needs and opportunities are identified. For more information on this objective, see Chapter 6.



SDOT crew member adds markings at a Chief Sealth Trail crossing.

Three strategic performance measures have been established to measure progress towards this objective:

- Percentage of targeted SDOT staff who participate in training on bicycle planning, design, and engineering issues.
- Amount of grant funding applied for and obtained for bicycle programs.
- Number of Bicycle Spot Improvements completed.

Policy Framework

Bicycling is consistently supported in numerous city, regional, and state policies as not only an important element of Seattle's multimodal system, but as an element of achieving sustainable growth and encouraging healthy communities:

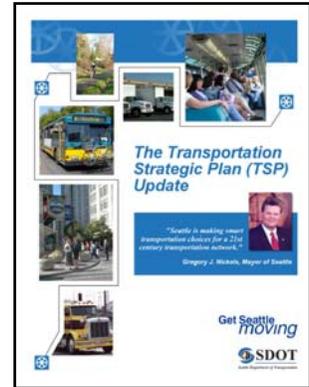
- *Destination 2030* is the Puget Sound region's transportation vision that lays out policies and strategies for meeting its commitment to the state's Growth Management Act. The plan calls for creating a regionally integrated network of bicycle and pedestrian facilities linked to urban centers and transit facilities and seeks to have non-motorized trips account for 20% of all trips within the region by 2030.

"Walking and bicycling can be practical alternatives to driving, especially for short trips. They can also contribute greatly to neighborhood quality and vitality, and help achieve city transportation, environmental, open space, and public health goals."

--Seattle Comprehensive Plan, January 2005

Chapter 2. Goals, Objectives and Policy Planning

- *Seattle's Comprehensive Plan* is the guiding vision for the city and includes the establishment of the Urban Village Land Use Strategy and the Urban Trails System. The plan seeks to facilitate walking and bicycling as viable transportation choices "in, around, and between urban centers and villages."
- *The SDOT Transportation Strategic Plan (TSP)* provides direction for the accelerated provision and maintenance of a comprehensive bicycle network through improved safety and access to urban villages, schools, and the Urban Trails System, as well as through bicycle education and promotion. A key goal of the TSP is the routine accommodation of bicycle facilities as a component of all SDOT reconstruction, channelization, resurfacing, and paving projects, as well as other capital investments that affect Seattle's right-of-way.



By increasing the convenience and safety of bicycling in the city, the Bicycle Master Plan will help achieve the following principles laid out in the TSP:

- Make the best use of the streets we have to move people, goods and services.
- Increase transportation choices.
- Make transit a real choice.
- Encourage walking and biking—they're the easy, healthy way to get around.
- Improve our environment.
- Connect to the region.
- Make the most of transportation investments.

- *Seattle's Climate Action Plan* is a commitment by the city to meet or exceed the Kyoto protocols for reducing greenhouse emissions. Among the top recommendations put forth by Mayor Nickels' Green Ribbon Commission is a significant expansion of Seattle's bicycle facilities, including a completed Urban Trails System and regulations or incentives for bicycle parking, lockers, and showers in new development.

"Since motor vehicle emissions are the single largest source of climate pollution in Seattle, the city must do even more to provide climate-friendly transportation choices such as public transit, biking and walking – and to encourage greater use of those alternatives."

--Seattle Climate Action Plan, September 2006

- *Complete Streets* is a policy adopted by the City of Seattle in April 2007 that codifies the routine accommodation of bicycles as a part of all roadway system improvements.

These policies and strategies have guided the development of the Bicycle Master Plan, and will play an important role in building support for its full implementation.

Seattle's Complete Streets Policy - Guiding Principle: "To design, operate and maintain Seattle's streets to promote safe and convenient access and travel for all users--pedestrians, bicyclists, transit riders, and people of all abilities, as well as freight and motor vehicle drivers."

--City of Seattle Complete Streets Policy, April 30, 2007, Ordinance Number 122386.

Coordination with Other Modes

Bicycle mobility improvements are an important component of creating an efficient, safe multi-modal transportation system in Seattle. As part of the vision for a multi-modal transportation system, the Bicycle Master Plan recommendations have been compiled with consideration for the needs of pedestrian, transit, freight, and automobile modes. The type of bicycle facility provided in each roadway corridor depends on available space, the role of the roadway in the overall Bicycle Facility Network, and the designation of the roadway relative to other modes of travel in Seattle.



There are a number of corridors in the Bicycle Facility Network where bicyclists must share the roadway with transit vehicles. Buses and bicycles are able to co-exist on roadways when they give each other space when passing and make predictable movements. Recommended bicycle facilities in transit corridors, such as bicycle lanes, climbing lanes, and shared lane markings help indicate the roadway space that is needed for bicyclists and improve the predictability of their movements, resulting in positive effects on motor vehicle and transit operations. Special attention will be paid to the city's Urban Village Transit Network (UVTN) corridors where transit service must be fast, frequent, and reliable. Minimum performance thresholds have been established for UVTN corridors to monitor transit speed and reliability, and to make adjustments as needed.

Most of the recommended bicycle facilities can be developed by painting new lines or markings in the roadway or narrowing existing travel lanes. These actions are likely to have minimal impacts on other modes. In several corridors, bicycle facilities will be provided by removing existing travel lanes, which may potentially impact transit service (depending on bus frequency, intersection and bus stop spacing, traffic volume, on-street parking, overall roadway width, etc.). Therefore, it will be particularly important to coordinate bicycle facility recommendations with transit service improvements as Seattle's Urban Village Transit Network is developed. Urban Village Transit Network roadways (including the proposed Streetcar Network) should be designed to meet or exceed performance thresholds for a reasonable level of speed and reliability for transit service while maintaining safe conditions for bicyclists. Appendix C: Key Locations for Coordinating Bicycle Facility Design with Future Rapid Transit Service includes a map showing these locations.

Development of the on-road bicycle facility recommendations tried to minimize bicycle facilities on major truck streets. The exceptions are critical links in the recommended citywide bicycle system (see Appendix D: Key Locations for Coordinating Bicycle Facility Design with Freight Transportation). These facilities will undergo thorough traffic engineering review for compatible operation with trucks during the design process.

In order to give full consideration to the needs of other transportation modes, the Bicycle Master Plan process included meetings with other SDOT divisions as well as a wide variety of agencies and organizations representing these modes. The planning process also included a thorough review of numerous relevant city and regional planning documents, including the policies cited in the previous section and the documents listed below:

- Seattle Transit Plan (including the Urban Village Transit Network)
- Freight Mobility Strategic Action Plan
- Open Space 2100 Plan
- Puget Sound Regional Council Destination 2030 Plan
- Seattle Right-of-Way Improvements Manual
- Relevant sections of Title 11 of the Seattle Municipal Code (the Traffic Code)
- Subarea and Corridor Plans (e.g., Center City Circulation Report, Southeast Transportation Study, South Lake Union Transportation Study, University Area Transportation Study, Northgate Coordinated Transportation Investment Plan)
- Bicycle Facility Reviews and Maps (e.g., Seattle Bike Map, Left by the Side of the Road Puget Sound Regional Bicycle Network Study (Cascade Bicycle Club), Seattle Bicycle Facilities Collaborative Report, Urban Trails Plan, PSRC Regional Bicycle and Pedestrian Implementation Strategy for the Central Puget Sound Region)

Chapter 3. Bicycle Facility Network

Objective 1: Develop and maintain a safe, connected, and attractive network of bicycle facilities throughout the city.

Providing a network of bicycle facilities throughout Seattle is fundamental to achieving the goals of this Plan. Additional bike lanes, roadway crossing improvements, multi-use trails, and other facilities are needed in some areas of the city in order for bicyclists to reach key destinations and encourage more Seattleites to bicycle.



Wayfinding signs will be installed on the lower level of the West Seattle Bridge as part of a citywide wayfinding system.



Delridge Way SW offers an opportunity for bicycle lanes to be striped.

Figure 1: Conceptual Map of Major Bicycle Destinations and Key Bicycle Corridors shows some of the most important existing and future corridors for bicycling in Seattle¹. While some of these corridors have existing bicycle facilities, some are in need of physical improvements to ensure they adequately accommodate bicycle travel. The interconnected network of on- and off-road bicycle facilities recommended in this Plan will serve these critical corridors, as well as many other parts of the city.

To achieve the goal of tripling the amount of bicycling in Seattle between 2007 and 2017, several key projects in areas with high bicycling demand will need to be completed (see Figure 1: Major Bicycle Destinations and Key Bicycle Corridors). These key connections include:

Lower-Cost Projects

- Redesign the existing bicycle lanes on Dexter Avenue N.
- Make wayfinding and spot intersection improvements on the West Seattle Low Level Bridge.
- Install bicycle lanes on Delridge Way SW.
- Create an Interurban bicycle boulevard to Green Lake and Burke-Gilman Trail.
- Install bicycle lanes, shared lane markings, and signs to improve the connections between Capitol Hill and the UW Campus.
- Install shared lane markings on 2nd Avenue and 4th Avenue to provide a north-south connection through Downtown Seattle (includes removing the existing bicycle lane on 2nd Avenue).
- Install bicycle lanes on Alaskan Way in Downtown Seattle (when Alaskan Way is reconstructed)

¹Figure 1 is a conceptual map showing existing and future bicycle connections throughout Seattle. Major activity centers include hub urban villages, Sound Transit station areas, major parks, and major neighborhood commercial areas. Key connections represent bicycle transportation corridors between activity centers. Examples of these connections include a new bicycle facility on SR-520, a trail connection between the Chief Sealth Trail and Downtown, and the completed Ship Canal Trail. The colors of the lines in each corridor represent the quality of existing bicycle connections. Line thickness indicates general levels of existing or anticipated bicycle activity in major corridors. In general, a corridor is considered to have "good" bicycling conditions if it is served by an existing bicycle lane, trail, or low-volume non-arterial street for a majority of its length. "Fair" corridors have these types of facilities for a portion of their lengths but may also have several barriers to bicycle connectivity. "Poor" corridors have limited or no bicycle facilities and may have significant barriers to bicycle connectivity. "No bicycle facility" means that there is currently no bicycle accommodation in the corridor.

Chapter 3. Bicycle Facility Network

- Provide good bicycle connections to and work with local transit agencies to provide adequate bicycle parking at all light rail and other major transit hubs.
- Complete the citywide Signed Bicycle Route System.
- Install or upgrade traffic signals to improve bicycle crossings at all intersections identified for signal improvements in the Plan.
- Provide bicycle access to and from the ferry when the Colman Dock Ferry Terminal is reconstructed.

Higher-Cost Projects

- Provide a bicycle facility connection between Downtown Seattle and the UW Campus via Eastlake Avenue N.
- Complete the Ship Canal Trail, including connections to the Fremont Bridge and Ballard Bridge.
- Construct a Chief Sealth Trail Crossing of I-5 between S Spokane Street and S Lucile Street (and provide a trail on the east side of I-5 between the Chief Sealth Trail and the I-90 Trail).



The next phase of the Chief Sealth Trail will be to extend the trail across I-5 to downtown.

“The most useful thing that the city can do to encourage bicycling in Seattle is to create and maintain a connected system of bicycle lanes and trails that get people where they need to go throughout the city.”

—Seattle Resident

- Construct the Burke-Gilman Trail section between 11th Avenue NW and 17th Avenue NW.
- Construct a new bicycle and pedestrian bridge across I-5 between Wallingford and the University District.
- Provide a bicycle facility connection between the I-90 Trail and Downtown Seattle.
- Construct multi-purpose trail connections from the SR-520 Bridge to the UW Campus and to Downtown Seattle as a part of the bridge reconstruction project.
- Improve the bicycle lanes on Alaskan Way S/E Marginal Way S between S Spokane Street and Downtown, and complete the E-3 Busway Trail between S Spokane Street and Downtown.
- Either Rehabilitate the existing Ballard Bridge or add a new bicycle and pedestrian bridge adjacent to the Ballard Bridge.



Bicycle access onto and off the Ballard Bridge should be improved.

Further Evaluation of Bicycle Facility Recommendations

The projects that are recommended in this chapter will require additional evaluation during the implementation process to determine if there are other factors that may either help or hinder their development. Additional traffic analysis will be needed in some cases to determine the optimum design for specific locations. Like other public projects, neighborhood involvement will also be an important part of the evaluation process. Some locations shown on the map may be determined, after more detailed analysis, to require different or more costly improvements and, therefore, may become longer-term projects. However, for every project, the first assumption will be that the bicycle facilities, as shown in the Bicycle Master Plan, will be implemented. If the city decides not to proceed with implementing the Bicycle Master Plan recommendation on a particular roadway, it will document the reason for this decision. The burden is on the city to explain why it is not implementing a recommendation in the Plan.

Figure 1. Conceptual Map of Major Bicycle Destinations and Key Bicycle Corridors



Bicycle Facility Network Definition

Implementation of this Plan will establish a 450-mile network of bikeways throughout the city of Seattle. This Bicycle Facility Network is composed of all of the locations throughout the city where specific improvements have either already been made or are proposed in the future to accommodate bicycles. Subsets of the complete Bicycle Facility Network include bicycle lanes and other facilities on arterial roadways, the Urban Trails and Bikeways System, and the Signed Bicycle Route System.

Almost all Bicycle Facility Network segments will have some type of visible cue (i.e. a bike lane, a bike route sign, a pavement marking, a trail, etc.) to indicate that special accommodations have been made for bicyclists. While the network will provide primary routes for bicycling, it is important to note that, by law, bicyclists are permitted to use *all* roadways in Seattle (except limited access freeways or where bicycles are otherwise prohibited). Therefore, the Bicycle Facility Network will serve as a core system of major routes that can be used to safely access all parts of the city and other parts of the transportation system.

Portions of the Bicycle Facility Network identified as “short-term” are recommended to be implemented in the next three years. Other segments of the network will require a longer period to implement due to their higher complexity (see Table 2: Miles of Facilities Recommended for Bicycle Facility Network on next page). The completed Bicycle Facility Network will connect all parts of the city and will provide a bicycle facility within one-quarter mile of 95% of all Seattle residents (see Figure 2: Recommended Bicycle Facility Network page 17).

Descriptions of recommended bicycle facility types are provided in Appendix E: Bicycle Facility Descriptions. These facilities include:

Facilities for network segments:

- Bicycle lanes
- Climbing lanes
- Shared lane markings
- Multi-use trails
- Bicycle boulevards
- Shared roadways
- Bridge facilities

Facilities for roadway crossings:

- Signalized intersections (adding traffic signals)
- Pedestrian crosswalk signals (with appropriate elements to facilitate bicycle crossings)
- Curb extensions
- Median crossing islands
- Overpasses and underpasses
- Warning signs

The Recommended Bicycle Facility Network Map shows all facilities in the Bicycle Facility Network, in detail (North Seattle and South Seattle Bicycle Facility Network maps are enclosed in binder pocket—see separate documents).



Fold-Out Maps: Recommended Bicycle Facilities (North and South maps) (see binder pocket)

An important subset of the Bicycle Facility Network is a 230-mile system of signed bicycle routes. This system includes local routes that connect destinations such as urban villages, transit stations, major parks, and other destinations within the City of Seattle; and regional routes that connect Seattle with other communities in the Puget Sound Region.

Table 2. Miles of Facilities Recommended for Bicycle Facility Network

| Facility Type | Miles of Bicycle Facilities ¹ | | |
|--|--|-------------------------------------|--------------------------------|
| | Existing | Short-Term Recommended ² | Total Recommended ³ |
| Bicycle lanes/climbing lanes | 25.5 | 63.7 | 143.3 |
| Shared lane pavement markings | 0.3 | 54.2 | 110.5 |
| Bicycle boulevards | 0.0 | 7.6 | 18.1 |
| Other on-road bicycle facilities ⁴ | 2.2 | 4.2 | 46.1 |
| Signed local street connections ⁵ | 0.0 | 28.6 | 75.9 |
| Multi-use trails | 39.4 | 41.9 | 58.2 |
| Other off-road bicycle facilities ⁶ | 0.2 | 1.0 | 2.6 |
| TOTAL NETWORK | 67.6 | 201.2 | 454.8 |

¹For on-road bicycle facilities, total miles represent roadway centerline miles with bicycle facilities (e.g., bicycle lanes on both sides of the roadway are not counted separately).

²Short-term bicycle facilities include existing and short-term projects scheduled for 2007-2009.

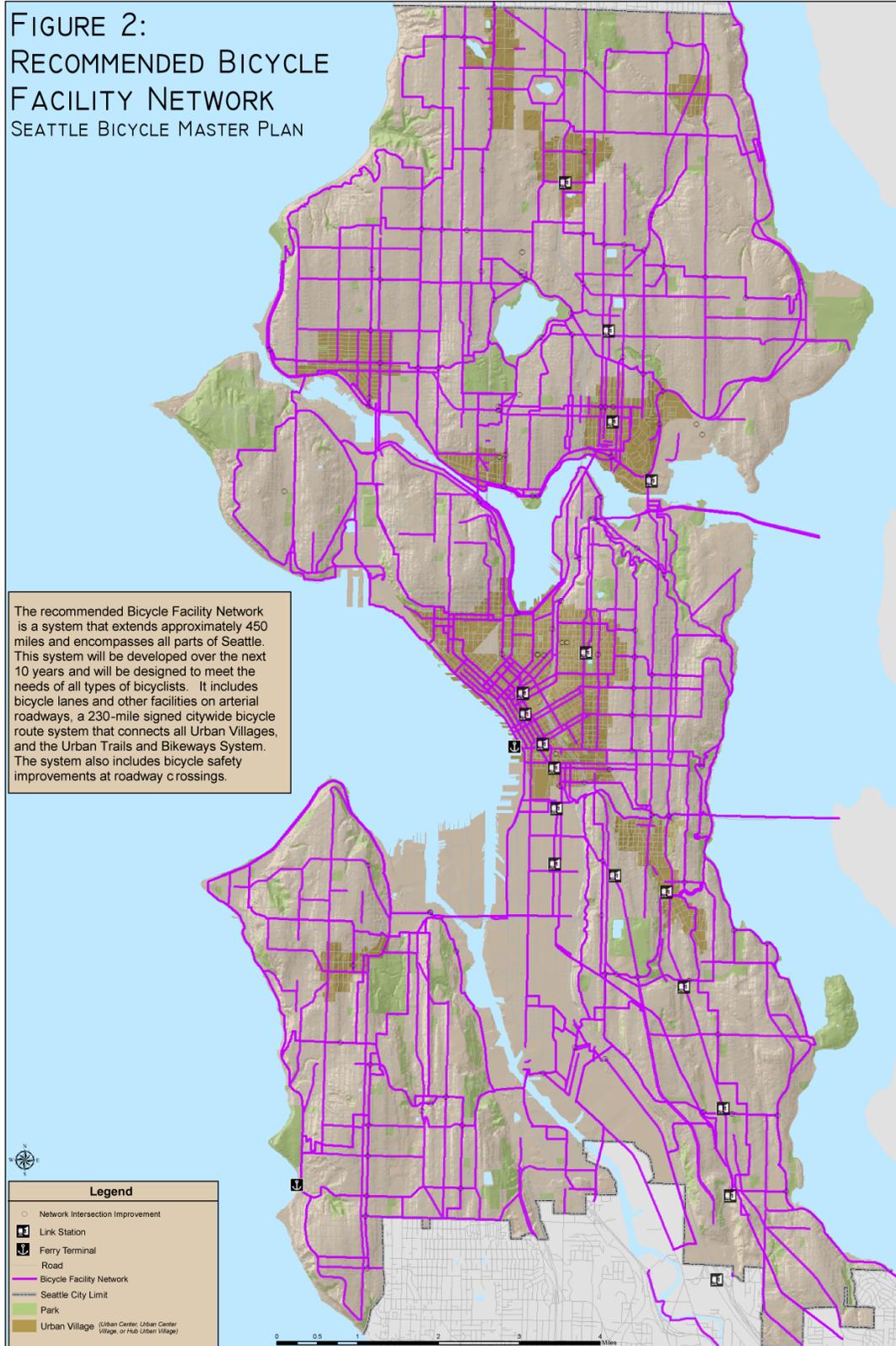
³Total recommended miles include the existing, previously planned, short-term categories, as well as other medium- and long-term recommendations in the 10-year timeframe, 2007-2016.

⁴Other on-road bicycle facilities include wide outside lanes, edgelines, paved shoulders, and peak hour bus/bicycle only roadways. Key corridors for short-term study and corridors where an improvement is needed, but the facility is unknown are also counted in this category.

⁵Signed local street connections include shared roadways with bicycle route signs but no other designated bicycle facilities. The recommended Signed Bicycle Route System is approximately 234 miles, including 50 miles of bike lanes/climbing lanes, 32 miles of shared lane pavement markings, 14 miles of bicycle boulevards, 7 miles of other on-road bicycle facilities, 47 miles of multi-use trails, 2 miles of other off-road facilities, and 82 miles of non-arterial streets without any other type of bicycle facility.

⁶Other off-road bicycle facilities include sidepaths, one-way bike-on-sidewalk pairs, and pedestrian/bicycle-only bridges.

Figure 2. Recommended Bicycle Facility Network (see next page)



A Network to Meet the Needs of Different Types of Bicyclists

The proposed Network includes a variety of facility improvements that respond to the many different issues faced by bicyclists. Some parts of the Network will be located along independent corridors that are separated from roadways. Other parts of the network will require motorists and bicyclists to coexist in the same right-of-way. Even among “on-road” bikeways, there are a variety of different design treatments that will be used, depending on whether the roadway is a quiet neighborhood street versus a busy arterial street.

“I like to bicycle on arterial roads because they are most direct.” --Seattle resident

“I would love to bike to the store and to other errands, but the traffic, even here in West Seattle, scares me. Also I have two small children, and I really don't want to jeopardize them...I really like the idea of making bike boulevards on quiet residential streets.” --Seattle resident

“I generally ride 17 to 20 miles per hour, and appreciate on-street facilities that don't force me into being a pedestrian or make me stop all the time.” --Seattle resident

There are important reasons for providing a mix of bicycle facility types:



- Seattle is a built environment with a finite number of corridors that can accommodate multi-purpose trails. Consequently, bicyclists need access to the roadway system in order to create an interconnected system and to be able to reach all desired destinations.
- Different types of bicycle facilities are appropriate in different situations, depending on surrounding land use characteristics, available right-of-way space, traffic volume, traffic speed and composition, on-street parking, roadway grade, etc.
- Depending upon an individual bicyclist's level of experience, some types of bikeways are preferred over others. For example, new bicyclists tend to prefer off-road multi-purpose trails and quiet neighborhood streets. More experienced bicyclists usually prefer on-road bicycle facilities such as bike lanes, wide curb lanes, paved shoulders, etc. Sometimes, more experienced bicyclists avoid using trails because they are crowded with other users.

For these reasons, the Bicycle Facility Network is composed of a variety of different facility types that can realistically be implemented and will appeal to bicyclists with varying levels of experience.



already been striped on 25 miles of Seattle

Action 1.1: Provide bicycle facilities on designated arterial streets.

Seattle's arterial streets offer the most direct routes to workplaces, shopping areas, schools, transit hubs, and other destinations. They also tend to have gentle grades, compared to some notably steep non-arterial streets in the city. A lack of bicycle facilities on the city's arterial street system prevents more people from making trips by bicycle and makes conditions less comfortable for bicyclists now. This action helps to fulfill Seattle's Complete Streets policy by ensuring that safe and comfortable bicycle travel is facilitated.

This Plan recommends bicycle lanes or climbing lanes on 143.3 miles of arterial roadways throughout Seattle. In addition to bike lanes or climbing lanes, the city will implement other types of on-road bikeways, including shared lane markings, paved shoulders, shared bus-bike lanes, and other facilities. In total, designated bicycle facilities are recommended on 295 miles of arterial roadways in the city (see Figure 3: Designated Bicycle Facilities on Arterial Streets). Facility types are defined in Appendix E: Bicycle Facility Descriptions.

Figure 3. Designated Bicycle Facilities on Arterial Streets



As a part of the detailed analysis that was completed during this Plan, typical roadway cross-sections were developed that indicate the proper placement of bicycle facilities in a variety of roadway design configurations. Appendix F: Guidance for Retrofitting Seattle Streets to Create Dedicated Bicycle Facilities provides illustrations, photographs, and lists of considerations for incorporating bicycle facilities in common curb-to-curb roadway cross-sections in Seattle.

There are several roadways in the city where the existing bicycle lanes have less than the optimal width (e.g., sections of Dexter Avenue N, Martin Luther King, Jr. Way S, 12th Avenue E). These locations will be improved with the new types of treatments identified on the Recommended Bicycle Facilities Map and in Appendix F (e.g., narrow existing travel lanes to provide more space for bicycle lanes, utilize climbing lanes and shared lane markings, post “Look for Bicycles” when opening doors signs near parking regulation signs, etc.).



Seattle currently has approximately 40 miles of multi-use trails.

Action 1.2: Complete the Urban Trails and Bikeways System.

The Urban Trails and Bikeways System was originally adopted as the “Urban Trails System” in the SDOT Transportation Strategic Plan (2005). This system provides a spine network of high-quality

bicycle facilities, many of which are on separated rights-of-way from motorized traffic. A map of this system is included in the existing conditions report (see Figure A.6:

Urban Trails and Bikeways System on next page). SDOT should complete the Urban Trails and Bikeways System, as it includes a number of key components of the Bicycle Facility Network, such as completing the Burke Gilman Trail missing links, the Chief Sealth Trail, gaps in the Duwamish Trail system, the Interurban Trail bicycle boulevard, the Ship Canal Trail extension, the Mountains to Sound Greenway Trail between the I-90 Trail and Downtown Seattle, and the SR 520 Trail and its connections to Eastlake Avenue, Lakeview Avenue, Montlake Avenue, and Melrose Avenue.

Wherever possible, the City will preserve the maximum amount of green space when a trail corridor is developed and will add trees and landscaping to existing trail corridors (except for utility corridors).

This Plan recommends changing the name of this previously-adopted system from “Urban Trails System” to “Urban Trails and Bikeways System” to improve public understanding that the system utilizes some facilities other than multi-use trails, including sidewalks for pedestrians and bicycle boulevards and streets with bicycle lanes for bicyclists. This name change should be reflected in all future Seattle documents.



Shared lane markings have been installed on S Jackson Street.



Climbing lanes have been installed on E Union Street to allow slower bicyclists riding uphill to be in a bicycle lane and encourage faster bicyclists riding downhill to move further from parked cars and share the travel lane.

Figure 4. Urban Trails and Bikeways System



Action 1.3: Install a Signed Bicycle Route System.

The Bicycle Facility Network map identifies approximately 234 miles of signed bike routes that link all major destinations in Seattle. The signed route system will be a trunk route network connecting major destinations throughout the city. Appropriate sign design and placement will be critical to the success of the signage program. Signage for one to two routes will be tested in the short term after the Plan is adopted. Based on the results of this pilot program, the remainder of the network will be implemented. As new bicycle route signs are installed on each route, outdated signs will be removed. Signs should be catalogued and replaced immediately if missing or damaged.

The Signed Bicycle Route System will provide:

- Connections between Seattle's Urban Villages
- Signs directing bicyclists to all new Sound Transit rail stations
- A signed bicycle route within ¼ mile of 72 percent of Seattle's schools
- A signed bicycle route within ¼ mile of 88 percent of Seattle's parks

This important subset of the Bicycle Facility Network includes local routes that connect key parks, transit stations, urban villages, schools², and other destinations within the City of Seattle as well as regional routes that connect Seattle with other communities in the Puget Sound Region. These routes will indicate locations where bicycling conditions are favorable and which connect directly to major destinations throughout the city. Names of major activity centers (e.g., Urban Village Centers, other transportation hubs, and regional parks) will be the specific destinations listed on the bicycle route signs (see the major activity center names on Figure 1: Major Bicycle Destinations and Key Bicycle Corridors). The signed bicycle routes will also draw attention to bicycling as an efficient form of transportation (see Figure 4: Recommended Signed Bicycle Route System on page 21).



Signed bicycle routes utilize multi-use trails, bicycle boulevards, non-arterial roadways with low traffic volumes and speeds, and low-volume arterial roadways with bicycle lanes.

The system currently includes 18 miles of planned bicycle boulevards. Bicycle boulevards are non-arterial streets that are designed to allow bicyclists to travel at a consistent, comfortable speed along non-arterial roadways and to cross arterials conveniently and safely. Other non-arterial roadways in the signed bicycle route system could also be developed into bicycle boulevards in the future because they are already comfortable for a wide range of bicyclists. The following actions should be considered in order to develop a typical non-arterial street into a bicycle boulevard:



Bicycle route signs will be installed to connect Urban Villages throughout Seattle. They will also show bicyclists how to access nearby destinations.



This bicycle boulevard in Berkeley, CA is designated by both signs and pavement markings. (Photos by Michael Moule)

² Signed connections from the trunk bicycle routes to schools will require detailed study and are beyond the scope of this Plan. Many signed bicycle routes between the recommended trunk routes and schools as well as school walking routes may be identified through the Pedestrian Master Plan process.

- Install pavement markings and signs to indicate that the roadway is a bicycle boulevard.
- Provide safe and convenient arterial crossings using traffic signals or other geometric improvements.
- Use traffic control or traffic calming to reduce conflicts with other non-arterial cross-streets.
- Slow motor vehicle traffic on the bicycle boulevard using traffic calming treatments.
- Limit the amount of motor vehicle traffic on the bicycle boulevard by managing traffic movements in the surrounding area.

The complete signed route system will utilize many roadways and multi-purpose trails that are already excellent places to ride, but it also includes several locations that should be improved prior to being designated. It will be particularly important to address safety concerns in locations where signed bike routes cross busy roadways. In some cases, a temporary detour may be appropriate. When partial or temporary bicycle routes are signed, they should have logical endpoints that allow the bicyclists to continue on their journey.

“Make sure that the City of Seattle works closely with King County Parks and other regional jurisdictions on trail system connectivity and standard signage.” --Seattle resident

There will also be many feeder streets that connect between the trunk network and important local destinations, such as transit stations, schools, and commercial districts. Signs will be posted throughout the city to direct bicyclists to the trunk bicycle routes. Pavement markings may be used to supplement signs in some locations. Guidelines for the design and placement of signs and markings are provided in Appendix G: Bicycle Route Signage and Wayfinding Protocol.

Action 1.4: Improve bicycle safety and access at arterial roadway crossings.

Improvements are needed at arterial roadway crossings in the Bicycle Facility Network to provide bicyclists with continuous, safe routes between destinations. Seattle has a number of streets that carry high-speed, high-volume traffic, such as 15th Avenue NW and Rainier Avenue S. Many other arterial streets are also challenging to cross, particularly during peak travel periods. In order to make it possible for bicyclists to travel throughout the city, there needs to be opportunities to cross major streets. Recommended improvements include treatments such as traffic signals, median crossing islands, curb extensions combined with signs, and/or markings (see crossing improvements on North Seattle and South Seattle Bicycle Facility Recommendations Maps—separate documents). These crossings must also be safe and accessible for pedestrians.



Space is limited for bicyclists waiting to cross W Nickerson Street to the Fremont Bridge.



A bicyclist uses an existing pedestrian crosswalk signal to cross Stone Way N.

Figure 4. Recommended Signed Bicycle Route System





A median crossing island helps bicyclists on the Burke-Gilman Trail cross 30th Avenue NE.

While the recommended facility network map (see folded in binder) identifies many critical needs, it does not represent a complete inventory of the city’s intersections. The city should evaluate the Bicycle Facility Network for other potential bicycle crossing improvements. The first priority will be to improve intersections where existing bicycle facilities cross arterial roadways. Other key crossings should be considered as each new segment of the bicycle network is implemented. In addition, all future roadway improvement projects should address bicycle

crossing needs as a routine part of the design process. Specific design guidelines for bicycle crossing improvements are provided in Appendix H: Roadway Crossing Design for Bicycles.

Action 1.5: Improve complex corridors and focus areas in the Bicycle Facility Network.

Bicycle improvements are proposed in a number of complex corridors and focus areas throughout the city (e.g., areas with right-of-way constraints, potential conflicts between multiple user groups, and multiple alternatives for providing bicycle facilities). In some cases, several alternative design treatments have been proposed to address the complex issues along these routes. The alternative that is ultimately chosen

will depend on a variety of factors, including additional design development, cost, public input, trade-offs among other modes of transportation within the same corridor, or future development projects that provide new opportunities to improve bicycling conditions.



Eastlake Avenue E is a critical connection between the University of Washington and Downtown Seattle. Further study is needed to improve bicycle conditions on this roadway.

In other portions of the Network, one type of bicycle facility is proposed in the short term, but a different facility is proposed in the future when a roadway or bridge reconstruction project occurs or when bicycle demand increases.

For routes in the Network where complex issues are at play, circled numbers are included on the Bicycle Facilities Recommendations Map that correspond with a more detailed explanation in Appendix I: Bicycle Facility Recommendations for Key Corridors and Focus Areas.

Action 1.6: Make key operational improvements to complete connections in the Bicycle Facility Network.

There are many spot locations in the Bicycle Facility Network where bicycle access should be improved by making changes to roadway operations. The following is a list of general operational improvements that will be made by the city to complete bicycle connections:

- Supplement “Dead End” and “Do Not Enter” signs, as appropriate, to indicate that bicycle and pedestrian access is allowed. Add the words “Except Bicycles and Pedestrians” (or other indication that bicycle and pedestrian access is permitted) to “Dead End” and “Do Not Enter” signs that only apply to motor vehicles. Many of these streets should only prohibit access to motor vehicles because they often lead to connector paths for



bicyclists and pedestrians. Examples of locations for this improvement include:

- 25th Avenue S & S Massachusetts Street
- S Henderson Street at access to short Duwamish Trail segment at 10th Avenue S
- 17th Avenue S, 18th Avenue S, and 19th Avenue S to I-90 Trail
- 20th Avenue NE at Ravenna Park
- 17th Avenue NW to connector trail between NW 88th Street and NW 90th Street
- Melrose Avenue E & Melrose Connector Trail
- **Redesign traffic diverters to allow more convenient bicycle access.** The city should redesign traffic diverters to accommodate the pass-through of bicycles. This includes providing curb cuts of adequate width (meeting ADA and AASHTO guidelines). Example locations where diverters should be improved for bicycle access include:
 - 42nd Avenue S & S Morgan Street
 - E Republican Street & 17th Avenue E
 - Broadway E & E Edgar Street
- **Provide bicycle turn pockets at key intersections.** Left-turn pockets allow bicyclists to wait in a designated space for a gap in traffic before turning left. These pockets are particularly beneficial on roadways with relatively high traffic volumes and significant bicycle turning movements. Locations with raised medians provide good opportunities to add pockets. A bicycle left-turn pocket is currently used at 8th Avenue NW and NW 77th Street in Seattle.

Improve bicycle access at pedestrian crosswalk signals. The design of pedestrian crosswalk signals should be changed in order to improve their convenience for bicyclists. Many of the pedestrian crosswalk signals that have been installed to improve arterial roadway crossings are difficult for bicyclists to use because they must dismount and become pedestrians in order to use the push button and receive the WALK signal. Further, crosswalks with pedestrian signal heads are provided only on one side of the street at these crossings. Therefore, bicyclists crossing from one side of the roadway cannot use the signal without crossing to the opposite side of the street. In order to improve bicycle access, SDOT has established a program to test installing signals and crosswalks on both sides of non-arterial roadways at selected intersections with pedestrian crosswalk signals. Motorist movements at these intersections are also restricted to left- and right-turns only to prevent cut-through traffic. At these intersections, detection is needed for bicyclists in locations that can be accessed from the street. This detection should be *in addition to* accessible pedestrian push buttons that are provided for pedestrians. Currently, push-buttons for bicyclists are acceptable on non-arterial streets. As technological improvements increase the accuracy and feasibility of electronic bicycle detection methods (e.g., video, inductive loops, infrared, etc.), they will be preferred.



A bicycle-only left-turn pocket has been provided in the median at the intersection of 8th Avenue NW and NW 77th Street to help bicyclists cross 8th Avenue NW.

"Most often crossing light activation buttons cannot be reached by a person on a bike. Buttons or electronic detection (in the case of arterial streets) should be placed in locations that are conducive to a safe and convenient crossing for all users." --Seattle resident

- **Change the timing of traffic signals to accommodate bicyclists.** Traffic signal timing should consider all modes including bicycling. Therefore, all traffic signals should facilitate safe bicycle crossings. This includes providing a minimum green time and a minimum yellow time to ensure that bicyclists are able to clear intersections, per the *AASHTO Guide for the Development of Bicycle Facilities* (1999 or latest edition). This is critical on the Signed Bicycle Route System. Signal timing changes must also be coordinated with transit on Urban Village Transit Network Roadways. It is important to ensure that adjusted signal timing for bicycle crossings also facilitates safe pedestrian crossings.



Lack of detection on the street requires bicyclists to cross on the sidewalk.

- **Explore new technologies to detect bicyclists at traffic signals.** In the future, explore new detection technologies such as infrared or video sensors that can tell the difference between bicycles and motor vehicles. This can help improve bicycle detection at actuated signalized intersections and make it possible to detect bicyclists at pedestrian crosswalk signals.



A bicycle box has been installed on N Roy Street to help bicyclists make left turns onto Queen Anne Avenue N.

- **Explore innovative timing and designs for bicycles at traffic signals.** This includes modifying pedestrian crosswalk signals to have separate push-buttons or sensors to detect bicyclists, pedestrians, and motor vehicles. This



This bicycle box is in Victoria, BC. The color green will be used for bicycle boxes in Seattle.

allows the traffic signal to stop arterial traffic for a shorter amount of time for bicyclist crossings than for pedestrian crossings. Separate crossing signals are provided for bicycles and pedestrians at these intersections. The City of Tucson, AZ has successfully used this signal design. Bicycle boxes should also be considered at signalized locations with high numbers of left-turning bicyclists (e.g., Roy Street at Queen Anne Avenue N). The design of all types of

traffic signals should not confuse pedestrians and should comply with the Americans with Disabilities Act.

- **Improve bicycle accommodations on bridges.** Bicycle accommodations on bridges need to be improved as well as on their approaches and access ramps. In the short term, bicycle access should be improved using signage, marking, maintenance, and other spot improvements. In the long term, bridges should be replaced with new facilities or retrofitted with facilities that provide full bicycle access (e.g., bicycle lanes or wide sidewalks - minimum 10 feet wide). Bridges are critical for providing bicycle connectivity throughout Seattle. Critical bridges for bicyclists include:
 - Ballard Bridge
 - 14th/16th Street Bridge
 - Montlake Bridge
 - Fremont Bridge
 - Aurora Bridge
 - West Seattle Low Level Bridge
 - All bridges across I-5

- Explore the possibility of using “Bicyclists Allowed Use of Full Lane” signs. These signs should be considered in high-traffic areas, such as Downtown Seattle, to remind motor vehicle drivers of the legal right of bicyclists to use the roadway. Guidelines for use of these signs, including number of travel lanes, speed limits, and other roadway factors will need to be developed. The signs have been used in San Francisco.
- Explore the possibility of using “Share the Road” with bicycles signs. There are places where “Share the Road” signs may help alert motorists to the presence of bicyclists. For example, these signs could be posted in the Elliott Avenue W and 15th Avenue W corridor.
- Continue to provide alternative bicycle access during road or trail construction projects. Detour routes for bicyclists should continue to be provided as a part of all construction projects that affect bicycle access, regardless of whether or not the roadway is in the Bicycle Facility Network.



“Bicyclists Allowed Use of Full Lane” signs have been installed in San Francisco.

“Detours must be created with the safety of the cycling community as well as cars and trucks in mind.”

--Seattle resident

- Allow bicyclists to use public hill-climb assists. Bicyclists should be allowed to use public hill-climb assists, such as elevators and escalators that are incorporated into buildings and other structures in areas with steep terrain. Opportunities for elevators are limited, but may be useful for improving access in a few parts of the Bicycle Facility Network. For example, bicyclists will be allowed to utilize the elevators that will serve the Beacon Hill light rail station to avoid major hills in the area.



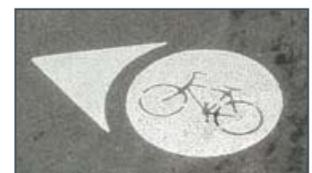
“Provide advance green for bike crossings along with bike boxes at lane heads especially in high-traffic, high-bike-density areas.”

--Seattle resident

- Investigate potential improvements for bicycle access through the Seattle Pedestrian Master Plan. SDOT will develop a Pedestrian Master Plan in 2007-2008, and this Plan is an appropriate place to examine several issues related to bicycle access. These issues include:
 - Pedestrian crosswalk signal design (i.e., improve access for both pedestrians and bicyclists).
 - Curb ramp design (For multi-use trails, curb ramps will be as wide as the width of the trail. For standard sidewalks that are commonly used by bicyclists, further evaluation is needed for curb ramp design).
 - Additional locations for pedestrian pathways with bicycles permitted (e.g., potential pathways through parks, improvements to stairs).
 - Designation of street sections for bicycle and pedestrian use only.

Action 1.7: Provide wayfinding guidance through complicated connections in the Bicycle Facility Network.

Wayfinding signs and pavement markings should be provided to help bicyclists navigate through complicated sections of the Bicycle Facility Network (in addition to official Signed Bicycle Routes). There are a number of locations in the city where it is necessary to use non-arterial streets, alleys, or sidewalks to connect between existing or proposed bicycle facilities. While many of these complicated connections are



Pavement markings can help guide bicyclists along complicated routes.

shown on the Seattle Bicycling Guide Map, there are currently no signs or markings along the actual connection to facilitate wayfinding. The city will install a combination of signs and markings to guide bicyclists through these connections. Examples include:

- The connection between the existing bicycle lanes on Delmar Drive E and the existing multi-purpose trail on the southwest side of the Montlake Bridge.
- Connections to the I-90 Trail.
- Connections to the Magnolia Bridge.
- Connections from neighborhood streets in West Seattle to the Low Level Bridge Trail.
- Connections from northeast Seattle neighborhoods to the Burke-Gilman Trail.



Signage and pavement markings will be added to improve wayfinding along the West Seattle Low Level Bridge.

Action 1.8: Improve the quality and quantity of bicycle facility maintenance.

Bicycle facility maintenance will be improved by establishing clear maintenance responsibilities and continuing to involve the public in identifying maintenance needs. Maintenance agreements between SDOT and other city agencies should be renegotiated to take advantage of the strengths of each agency. In addition, there are also opportunities to utilize volunteers to assist with some maintenance tasks. These actions will improve the efficiency and quality of bicycle maintenance in the city.

- **Renegotiate the 1987 maintenance agreement between SDOT and Seattle Department of Parks and Recreation (DPR).** The maintenance agreement should be updated to reflect the many new facilities that have been completed. The renegotiated agreement should continue to divide maintenance responsibilities along the same lines as in the past, i.e., DPR will be primarily responsible for trails that also serve as linear parks or greenways; SDOT will be primarily responsible for other trails. The SDOT Street Maintenance Division should be part of the team that renegotiates this agreement.
- **Negotiate a maintenance agreement between SDOT and Seattle City Light on maintenance of trails in utility corridors.** The maintenance agreement should build on the principles agreed to in previous agreements to construct trails in City Light rights-of-way. The SDOT Street Maintenance Division should be part of the team that negotiates this agreement.
- **Encourage bicycle organizations and other community groups to assist with minor maintenance activities.** The city will work with bicycle organizations, community groups, civic organizations, and businesses to provide periodic upkeep along trail corridors and bicycle facilities on bridges. This will help improve bicycle facility safety, reduce maintenance costs, and build goodwill with neighborhood residents.

"It is all well and good to create bike lanes and wide shoulders. If they are full of debris and unsafe, it's worse than if they weren't there...keep them clear." --Seattle resident

- **Continue to respond to citizen complaints and maintenance requests.** The current Bike Spot Safety program accepts maintenance complaints and requests from citizens. It uses these requests to make short term improvements and to set maintenance priorities. SDOT should continue and expand this program to identify problems that need immediate attention, to identify recurring problems at particular locations, and to set major maintenance priorities.



Routine maintenance is needed to control vegetation along trails.

- Consider different types of weather conditions when developing and maintaining bicycle facilities. Weather and seasonal issues will be considered in the development and maintenance of bicycle facilities within reasonable limits. For example, slip-resistance will be a factor considered in the selection of pavement markings for bicycle facilities, and roadway and trail sweeping may be done more frequently in the fall when leaves can cover some facilities. Drainage will also be addressed in the design of all bicycle facilities.

If bicyclists notice glass or debris on a roadway, they should report it promptly to SDOT, either by calling the Street Maintenance Dispatcher at (206)386-1218 or by filling out a request online at <http://www.seattle.gov/transportation/potholereport.htm> so that SDOT can clean it up.

The tables below provide general guidance on the frequency of multi-purpose trail and on-road bicycle maintenance activities, though maintenance needs will vary for different types of facilities and different locations (see Table 3 and Table 4). SDOT, Seattle Public Utilities, and Seattle Department of Parks and Recreation are responsible for specific activities.

Table 3. Multi-Purpose Trail Maintenance Activities^a

| Activity | Spot Maintenance | Routine Maintenance |
|------------------------|---|--|
| Improve drainage | <ul style="list-style-type: none"> Unplug individual drains (Seattle Public Utilities). Repair trails after land slides. | <ul style="list-style-type: none"> Clean all culverts, catch basins, and drainage structures on a regular schedule as needed (Seattle Public Utilities). |
| Trim vegetation | <ul style="list-style-type: none"> Cut or remove vegetation that falls or grows onto trails (Seattle Public Utilities has certain responsibilities; other responsibilities will be established through agreement between SDOT and Seattle Department of Parks and Recreation). | <ul style="list-style-type: none"> Trim all vegetation within 3 feet of either side of all trails up to 10 feet above the ground; trim additional vegetation to improve sight distances near intersections. (Responsibility to be established through agreement between SDOT and Seattle Department of Parks and Recreation.) |
| Replace pavement | <ul style="list-style-type: none"> Fill potholes. Remove surface irregularities. | <ul style="list-style-type: none"> Replace pavement (every 10 to 20 years, but will vary significantly depending on conditions). This Plan needs to be updated based on a sidewalk management system that will be used to estimate budget needs for pavement rehabilitation (scheduled to be completed in 2009). |
| Replace signs | <ul style="list-style-type: none"> Replace missing or damaged warning, regulatory, or wayfinding signs. | <ul style="list-style-type: none"> Replace signs based on manufacturer recommendations related to reflectivity and readability (every 15 to 20 years). |
| Inspect structures | <ul style="list-style-type: none"> Address structural problems. | <ul style="list-style-type: none"> Include trail structures in the same inspections schedule as all other structures in the city; if structure is deteriorating, it should be added to the citywide schedule for structure repair/replacement. |
| Clean trash and debris | <ul style="list-style-type: none"> Enlist the help of bicycle and pedestrian organizations, | <ul style="list-style-type: none"> A schedule needs to be developed for working with bicycle |

| | | |
|---------------------------|---|---|
| | neighborhood groups, and other citizens to help clean broken glass and other sharp objects, loose gravel, leaves, and other debris. | organizations and other groups on trash and debris removal. |
| Provide adequate lighting | <ul style="list-style-type: none"> • Replace burned-out and broken lighting fixtures. | <ul style="list-style-type: none"> • Maintain lighting for trail-roadway crossings |

a. The University of Washington owns and maintains the Burke-Gilman Trail between I-5 and NE 45th Street.

Table 4. On-Road Bicycle Facility Maintenance Activities

| Activity | Spot Maintenance | Routine Maintenance |
|--|---|--|
| Sweep bicycle lanes and other on-road bicycle facilities | <ul style="list-style-type: none"> • Perform spot sweeping if debris collects in bicycle lanes after major rain storm. • Perform spot sweeping if sand is left in bicycle lanes after a snow/ice storm. | <ul style="list-style-type: none"> • Sweep bicycle lanes (two times per year). • Key roadways in the bicycle facility network that experience a large amount of debris should be given consideration for higher frequency sweeping. • If adjacent travel lanes are swept mechanically, sweepers should reach as close to the curb as possible and make sure material is not deposited in the bicycle lanes. |
| Repair and replace pavement | <ul style="list-style-type: none"> • Fill potholes. • Remove surface irregularities. | <ul style="list-style-type: none"> • Resurface bicycle facilities as a part of street repaving projects. • Give consideration to repaving Bicycle Facility Network streets more frequently (include bicycle facilities as a factor in determining the city repaving schedule). |
| Improve drainage | <ul style="list-style-type: none"> • Unplug individual drains (Seattle Public Utilities). | <ul style="list-style-type: none"> • Include bicycle facilities in all routine roadway drainage improvements. |
| Replace signs | <ul style="list-style-type: none"> • Replace missing or damaged warning, regulatory, or wayfinding signs. | <ul style="list-style-type: none"> • Replace signs based on manufacturer recommendations related to reflectivity and readability (every 15 to 20 years). |
| Replace pavement markings | <ul style="list-style-type: none"> • Replace faded or damaged pavement markings that cause confusion for bicyclists or other roadway users. | <ul style="list-style-type: none"> • Conduct annual replacement program to replace bicycle pavement markings based on a regular basis, as needed. • Replace bicycle pavement markings when roadways are resurfaced |
| Ensure bicycle detection at traffic signals | <ul style="list-style-type: none"> • Respond to citizen complaints about loops that do not detect bicycles. | <ul style="list-style-type: none"> • Test sensitivity of inductive loops at each approach to all intersections in the city with actuated signals, including left-turn lanes, to ensure that bicycles can be detected. |
| Provide adequate lighting | <ul style="list-style-type: none"> • Replace burned-out and broken lighting fixtures. | <ul style="list-style-type: none"> • Lighting is evaluated on a spot basis. |

Action 1.9: Fix spot maintenance problems on existing city streets and bikeways.

Making maintenance improvements on existing on and off road bicycle facilities should be given high priority. Spot improvements, such as removing of specific surface irregularities, filling seams between concrete pavement sections, and facilitating safe railroad crossings should be made on an as-needed basis (see Tables 3 and 4, above). SDOT should address these maintenance problems in conjunction with utility providers (e.g., utility providers may have responsibility for utility hole covers, steel plates, etc.). Public feedback is critical for identifying maintenance issues.

- **Widen congested trail segments.** The city will apply the FHWA Shared Use Path Level of Service methodology³ to congested multi-use trail segments to identify sections that are congested and should be widened. Special attention should be given to trail sections with high use by both pedestrians and bicyclists, since these two types of trail users have different speeds and characteristics. Trail widening is often a major capital project.
- **Remove unused bollard receptacles at trail entrances.** Bollard receptacles at trail entrances that are no longer going to be used should be removed. These bollard receptacles are of special concern at night. The placement and design of bollards on trails should also avoid potential conflicts between different modes.
- **Fill seams between concrete pavement sections of streets.** There are many streets in the city where the concrete seam is located at or near the most appropriate place for bicyclists to ride (typically on the right side of the outside travel lane near the on-street parking). This can create a problem, particularly for bicyclists with narrow, road bike tires. Several streets that have this issue are important connections in the city's bicycle network. In some cases, this seam is located in a marked bicycle lane. In the short-term, these seams should be filled on the most important streets for bicycle connectivity. As streets are repaved in the future, seams should be located away from where bicyclists would typically ride.

Examples include:

- Renton Avenue S, south of Rainier Avenue S.
- W Emerson Street transition to Ballard Bridge access ramp.
- Montlake Avenue NE near Montlake Bridge
- E John St and E Olive Way from Bellevue Avenue E to 15th Avenue E.



This seam on Renton Avenue S is approximately one inch wide in some places.



"Please fix roads that have parallel gaps in the pavement. There are a lot of roads that are made of concrete with big gaps running parallel to traffic." --Seattle resident.

- **Make physical improvements to improve railroad crossings.** Multi-purpose trails and roadways should be designed to allow bicyclists to cross railroad lines perpendicular to the rails (or as close to perpendicular as possible). This may include adding pavement to the roadway shoulder area, modifying striping and markings, and posting warning signs. Flange fillers are another possible treatment to improve safety on rail lines that are still in place but no longer active. Top priorities for railroad crossing improvements should be



Inactive railroad tracks on Alaskan Way S where flange fillers have been used.

³ The FHWA Shared Use Path Level of Service methodology determines the level of comfort on a trail from a bicyclist's perspective. The model uses trail width, total number of users, and percentage of different user types to estimate the amount of delay that bicyclists will experience in passing other trail users.

along multi-purpose trails and signed bicycle routes, but all roadways should be designed to provide bicyclists with safe rail crossing opportunities.

- **Repave roadways that have poor pavement condition and provide critical connections in the Bicycle Facility Network.** There are a number of roadways in need of repaving throughout the city. Several of these roadways are critical to the Bicycle Facility Network but currently have particularly poor pavement condition. Examples of important bikeway connections that should be repaved in the short-term include:
 - Dexter Avenue N between Mercer Street and the Fremont Bridge.
 - Montlake Avenue NE near the Montlake Bridge.
 - Lake Washington Boulevard S.
 - Beach Drive SW.
 - Sand Point Way NE.
 - Airport Way S.
- **Improve the quality of street surfaces by reducing the problem presented by steel plates.** The city's Standard Specifications and Traffic Control Manual require that whenever steel plates are used, they are shimmed and textured with a no-skid surface to reduce slipping hazards. The locations of these plates should also be highlighted by paint so that bicyclists can prepare to cross them. Further, city inspectors are required to monitor the installation of steel plates by both city work crews and contractors to ensure that all plates meet these guidelines. Inspectors must adhere to this requirement and do rigorous inspections.
- **Remove drainage grates with drain openings parallel to the direction of travel.** Grates will be replaced, as needed, when streets are repaved and bicycle facilities are added as part of Seattle's Complete Streets policy. Of particular importance are drain grates located in curb lanes without parking. Citizens are also encouraged to contact the Pedestrian and Bicycle Program with problem grates.

"Please emphasize clearing broken glass off of streets, sidewalks, and bike paths." --Seattle resident

Action 1.10. Prioritize bicycle facility development and maintenance to maximize the use and safety benefits of these investments.

Several factors will be considered to prioritize bicycle facility development and maintenance in accordance with the Transportation Strategic Plan. The bicycle improvements that will be made first will be those that serve high volumes of users, improve safety, are cost-effective, and improve geographic equity. Prioritization criteria will be developed and may include the following:



User volumes

- Improve conditions in corridors where there is high potential to increase bicycle trips
- Increase the connectivity and safety of the Urban Trails System, Signed Bicycle Route Network, and other parts of the Bicycle Facility Network

Safety

- Improve bicycle conditions (by providing facilities that make bicycle and motorists behavior more predictable) in areas with high numbers of police-reported crashes
- Improve bicycle conditions proactively in locations where there is a high potential risk of crashes

Cost-effectiveness

- Implement bicycle facilities as a part of other projects, such as roadway repaving and reconstruction
- Make improvements that have been identified as important bicycle facilities in previous plans

Geographic equity

- Provide facility connections in areas where bicycle lanes and trails are missing or disconnected
- Implement projects that have been identified as important bicycle facilities by the public

Chapter 4. Support Facilities

Objective 2: Provide supporting facilities to make bicycle transportation more convenient.

This chapter describes the actions that will be necessary to improve support facilities to make bicycling efficient and convenient to all Seattle residents. In order for bicycling to be a fully viable form of transportation in Seattle, other programs and facilities are needed to complement the Bicycle Facility Network. This includes integrated bicycle and transit services, adequate bicycle parking at all destinations, showers at employment centers, convenient repair services, and coordination with a variety of other essential components of a multi-modal transportation system.

Connections between Bicycling and Transit

Consistent with the trend in other North American cities over the past twenty years, an increasing linkage has developed in Seattle and King County between bicyclists and transit agencies. While Seattle is served by a number of transit agencies, it is the relationship with King County Metro Transit (KC/METRO) and the newer regional Sound Transit agencies that most define the connection between bicycles and transit in the city. Details on the history of bicycle and transit integration in Seattle and opportunities for improving bicycle access to the KC/METRO and Sound Transit systems are discussed in Appendix J: Bicycle and Transit Integration in Seattle.



Approximately 10,000 bicycles were loaded on King County Metro buses per week throughout the region in August 2002.

Sound Transit TOTAL Access Policy

In 1999, Sound Transit adopted general policies guiding development of service supporting bicycle access to regional transit service. Based on a concept of TOTAL Access (see below), the policies are intended to ensure that the unique characteristics of bicycling and long-haul high-capacity transit are utilized in an efficient manner that accommodates an increasing number of trips accessed by bike.

“Sound Transit is committed to encouraging and providing bicycle access and has adopted a policy of total access for cyclists on transit vehicles and at stations.”

--Sound Transit website

T: To the transit system

O: On the vehicles

T: Through and across barriers created by the system

A: At the stations

L: Low-cost, effective and efficient

The actions in this section describe how bicycle access can be improved through a number of transit initiatives. Strengthening the connection between bicycling and transit will increase the utility of both transportation modes in Seattle.

Action 2.1: Improve bicycle storage facilities at transit stations.

Bicycle parking improvements are needed at transit stations. This includes providing bicycle racks and lockers at existing transit stations and reserving adequate space during transit station construction to provide future bicycle racks and lockers. The following specific actions will be undertaken:

- **Provide sufficient space for bicycle storage at transit stations and multimodal hubs.** SDOT will work with Sound Transit and KC/METRO to provide bicycle parking at existing transit stations and multi-modal hubs in downtown Seattle, such as Westlake, Colman Dock, King Street Station. These parking facilities should include both short-term and long-term parking and should meet the City of Seattle bicycle parking design standards. SDOT will help participate in the purchase of bicycle racks and lockers at these transportation centers. The PSRC studied transit hub locations in 2002 to determine bicycle parking demand, and this demand should be accommodated. Where space is limited, local transit agencies should consider the opportunities for high-capacity bicycle parking at stations. This type of facility utilizes space efficiently by allowing bicycles to be stacked on two levels.
- **Bicycle parking needs should be considered at heavily-used bus stops.** This will require a separate study to determine if additional bicycle parking is needed at certain bus stops. This study could be conducted as a partnership between SDOT and KC/METRO.
- **Provide sufficient space for bicycle storage at future transit stations.** As transit systems develop in the future, bicycle parking demand should be evaluated using the PSRC Regional BikeStation Project methodology to determine the amount of space that is needed for bicycle racks and lockers. Space for bicycle parking should be included in station designs from the onset of a project.



Adequate bicycle parking at transit hubs will help increase the attractiveness of bicycling in Seattle.

The Montlake BikeStation project, scheduled for completion in late 2007, will provide lockers for a total of 54 bicycles and rack space for 42 bicycles.

Action 2.2: Continue to fund and promote the use of staffed bicycle facilities.

SDOT and KC/METRO provide funding support for the BikeStation Seattle® transportation center on 3rd Avenue S in Pioneer Square. This facility provides support services to bicyclists, including secure, staffed bicycle parking and resources for repairs, maps, and other information. It is located near the King Street Transit Hub, making it easy for bicyclists to make trips by linking bicycling and transit. Additional locations for staffed bicycle parking stations have been identified by PSRC in conjunction with the city and local transit agencies - funding and implementation of these facilities should continue to be pursued.¹



Bikestation Seattle® provides secure, staffed bicycle parking and other support services for bicyclists.

¹ The Puget Sound Regional Council Destination 2030 (2001) early action strategy includes six commuter bicycle stations in the region. Two of these bicycle station locations are in the City of Seattle: the King Street Station and the Montlake Flyer stop on SR-520.

Action 2.3: Improve bicycle access to transit stops, stations, and ferries.

SDOT, KC/METRO, and Sound Transit should increase efforts to work together in order to improve bicycle access to the transit system. This includes improving bicycle access to transit stops and stations, providing bicycle storage at stations, and accommodating bicycles on transit vehicles and ferries.

The new bicycle facilities that will be developed as a part of the Bicycle Facility Network will help improve the ability of bicyclists to connect to transit throughout the city. In particular, the signed bicycle route system recommended in this Plan includes connections from main bicycle routes to all existing and future Sound Transit light rail stations and other transit hubs. These bicycle facility improvements will increase accessibility within the catchment area for the transit system.

To complement this effort, coordination will be needed between SDOT and all local transit agencies to improve bicycle access and route information in order to make the transition between modes as seamless as possible. Specifically, the following actions are needed:

- **Integrate bicycle route information into transit route maps and signs.** SDOT should partner with KC/METRO to distribute bike route maps at all locations where transit information is provided. Additionally, KC/METRO and SDOT should work together to develop wayfinding signs that provide information on nearby bike routes.
- **Improve bicycle access and egress to and from rail stations.** SDOT should work with Sound Transit to improve bicycle access to trains in King Street Station and in other future rail stations.
- **Provide bicycle access in proposed streetcar corridors.** The streetcar corridors under construction between Westlake Center and Lake Union include and intersect critical roadways for bicycle connectivity north of Downtown Seattle. As the city further develops its streetcar network, potentially with operations along the curb lane, there will be increased challenges for bicyclists to avoid the rail flangeway on these streets. Streetcar streets must be designed to facilitate bicycle travel in as safe a manner as possible. In addition, bicycles should be allowed on board streetcar vehicles so that bicyclists can bypass roadways with tracks. Where possible, on-road bicycle facilities should be incorporated into roadway redevelopment projects associated with streetcar development in South Lake Union and other locations.
- **Design roadways so that bicycles and bus transit co-exist safely and efficiently.** Bikes and bus transit must be seen as compatible and not subject to design trade-offs. Bicycle lanes should not be removed under the assumption that this will improve bus service; if high-capacity transit is desired, a shared bus/bike facility should be considered. The E-3 Busway is an example where facilities for buses, light-rail transit, and bicycle and pedestrian access co-exist.
- **Improve bicycle access and egress to and from Washington State Ferry terminals.** SDOT will strengthen efforts to further coordinate with Washington State Ferries. These efforts should:
 - Improve bicycle access and egress to and from the Colman Dock Ferry Terminal when the electronic fare system is established. This includes providing designated bicycle waiting space and boarding space (e.g., striped lanes, pathways, and/or waiting areas to be used only for bicyclists). In addition, the loading procedure for bicycles could be modified to reduce conflicts between motor vehicles and bicyclists as they approach the loading area.
 - Improve bicycle waiting areas and other facilities at the Fauntleroy Ferry Terminal to increase the safety and convenience of bicycle access and egress to and from ferries.

“One of the largest daily bicycle access points to Downtown Seattle is through Colman Dock—there are literally hundreds of bicyclists that use the ferry on a daily basis.” - Seattle resident

Action 2.4: Accommodate more bicycles on transit vehicles.

In cities where transit service is fully integrated with bicycle travel, bicyclists are able to bring their bicycles on board transit vehicles in order to use them when they disembark at their destination. While Seattle has one of the more bicycle-accessible transit systems in the nation, growth in the popularity of this “Bike & Ride” service has led to the identification of new service and facility needs. Some options include installing high-capacity bicycle racks on buses, increasing bus service frequency, accepting bicycles on buses at more bus stops, allowing bicycles on board light rail vehicles, and improving bicycle access on ferries.

- **Install racks that can hold three bicycles on the front of all buses.** KC/METRO has installed bike racks on the front of all its buses, allowing two bicyclists to load their bicycles on the bus at the same time. However, two-bicycle racks are often filled during rush hours and on rainy days. KC/METRO and other bus companies serving Seattle have already begun to add capacity for bicyclists by installing racks with space for three bicycles on their buses. KC/METRO should also consider providing additional space for bicycles on board buses that are used in the proposed Bus Rapid Transit (BRT) system. This may be done by providing special buses with additional rack capacity or allowing seats to flip up and increase storage space for bicycles during times with low ridership. Local transit agencies should also consider allowing bicyclists to ride free on some heavily-traveled roadway corridors that do not have bicycle facilities.
- **Increase the frequency of bus service in corridors where bicycle-on-bus capacity is perceived as a problem.** Even with bicycle racks that hold three bicycles, some high-bicycle-use corridors may have filled racks during peak hours. Lack of space for bicycles on the bicycle racks can be mitigated if buses arrive more frequently. The Transit Now initiative adopted in King County may offer opportunities to increase the frequency of bus service in these corridors.
- **Facilitate safe and efficient bicycle loading onto transit vehicles in Downtown Seattle.** SDOT will work with KC/METRO to explore the possibility of allowing bicyclists to load their bicycles on buses within the Downtown Ride Free Area. While it may not be possible to allow bicyclists to load at all bus stop locations, there may be specific stops where bicycle loading can be permitted. Important considerations include bus headways, street slopes, and stop locations relative to bicycle facilities. In addition, safe and efficient bicycle access to Sound Transit vehicles should be facilitated in the Downtown Seattle Transit Tunnel. In all cases, signage should be provided to indicate when and where bicyclists may or may not load their bicycles.



King County Metro bus bicycle racks currently have room for two bicycles.

Bicyclists may load and unload their bicycles at any KC/METRO bus stop, except within the Ride Free Area in downtown Seattle, between 6 AM and 7 PM. This is a safety policy to reduce the potential of cyclists being between two buses in heavy downtown traffic. Consideration should be given to modifying this policy to allow bicyclists to board at certain designated stops in the Downtown area. (These could be stops located near bicycle route map kiosks.)

- **Accommodate bicycles on board Light Rail Transit and other regional transit vehicles.** Sound Transit access policy for bicycles includes accommodating bicyclists on transit vehicles and at transit stations. This applies to Link light rail, Sounder trains, and Sound Transit Express buses. The existing Link light rail system requires bicyclists to remain with their bicycles at all times on board Link trains. Bicyclists may not block stairs or aisles. They must yield priority seating to passengers with disabilities or senior citizens. Train operators may require bicyclists to wait for the next train due to overcrowding. Sound Transit should continue efforts to develop on board facilities to secure



MAX light rail cars in Portland, OR have designated space for handling bicycles.

- **Continue to count and report bicycle-on-transit ridership.** Bike-on-bus ridership should continue to be counted and recorded by KC/METRO with the purpose of tracking ridership growth over time. In addition, Sound Transit should begin to conduct bike-on-bus counts. The methodology used to count bicycles should count individual boardings. Bicyclist boardings should also be counted on a regular basis on the light rail system when service begins.

Approximately 10,000 bicycles were loaded on KC/METRO buses per week throughout the region in August 2002.

- **Improve bicycle access on the Washington State Ferry System.** The city should work with Washington State Ferries to improve bicycle access on the ferries that serve Seattle. This includes providing racks, hooks, or other storage devices on the ferries to utilize space as efficiently as possible and to minimize risk of damage to bicycles and motor vehicles. SDOT should also work with Washington State Ferries to address issues related to bicycle loading and unloading.
- **Allow bicycles on streetcars.** SDOT should work with local transit agencies to allow bicycles on board streetcars. Bicycles may be stored on the transit vehicles with bicycle hooks, bicycle racks, or in designated bicycle space.
- **Encourage the use of bicycle racks on taxis.** Taxi companies are encouraged to install bicycle racks on their vehicle fleets to provide bicyclists with the option to use this private transportation service. This would extend the ability of bicyclists to reach destinations throughout Seattle.

Bicycle Storage

Bicycle parking facilities are currently provided by local agencies in response to public requests and through the development process. The city provides bicycle racks through the SDOT Rack Program, and local transit agencies provide bicycle lockers at several transit hubs. Short- and long-term bicycle parking facilities are also required by the Seattle Municipal Code based on the size and type of new developments. In general, short-term parking is provided in commercial areas and in front of public buildings where bicycles are usually parked less than several hours. Long-term parking is generally provided at workplaces, residential areas, and transit access points where bicycles are usually parked for a day or longer. The actions below should be taken to improve bicycle storage in Seattle.

Action 2.5: Increase the availability of bicycle parking throughout the city.

Secure bicycle parking located in close proximity to building entrances and transit entry points is essential in order to accommodate bicycling. Secure bicycle parking helps to reduce the risk of bicycle damage and/or theft.

SDOT's Bicycle Spot Improvement Program includes funding to provide bicycle racks on public property adjacent to commercial buildings, multi-family dwellings, and schools throughout the city. Through this program, racks are installed at the request of citizens, and business or property owners or managers (see Bicycle Rack Location Criteria on the following page). The Seattle Municipal Code requires a minimum number of bicycle parking spaces for different types of land uses. When new buildings are constructed or properties undergo other major changes, bicycle racks and lockers are included as a condition of development. Several strategies are needed to increase the availability of bicycle parking in Seattle.



City of Seattle Bicycle Rack Location Criteria

- Racks are installed in public space within city of Seattle limits, usually on a sidewalk with six or more feet of clear sidewalk space remaining.
- Racks are placed at convenient, usable locations in close proximity to building entrances without impeding pedestrians.
- Racks are placed with adequate clearance from curb ramps and crosswalks, street furniture, driveways, and parked cars.
- Racks can be installed in bus stops or loading zones only if they do not interfere with boarding or loading patterns and there are no alternative locations.
- Racks on private property are usually paid for by the property owner. City racks are not available for purchase, but Bicycle Program staff can help property owners choose appropriate racks and installation locations.

- **Continue to provide bicycle racks through the Bicycle Spot Improvement Program.** Bicycle Spot Improvement Program funding should be increased so that more bicycle racks can be installed upon the request of citizens. In addition, this program should continue to be advertised through the bicycle program website, city brochures, and other sources to increase awareness of opportunities for installing new bicycle parking throughout the city.
- **Re-establish a proactive bicycle rack installation program.** A proactive bicycle rack installation program should be re-established to provide additional bicycle parking in Urban Villages, particularly on commercial and high-density residential blocks of Urban Village areas. Schools, libraries, and community centers should also be targeted for bicycle rack installation. It will be important to work closely with adjacent property owners to make sure that racks are properly located and do not interfere with loading zones and other business related activities.
- **Strengthen legislation to require more bicycle racks and lockers as a part of new developments.** Currently, the city's bicycle parking requirements are included in Title 23 of the Seattle Municipal Code. Changes to this code were made in December 2006² (see Appendix K: City of Seattle Bicycle Parking Requirements).



² Land Use Code Ordinance 122311, Adopted December 21, 2006

The Code requires a minimum number of off-street bicycle parking spaces to be provided by office, retail, hotel, and residential developments in the Downtown Area³. It also sets minimum bicycle parking requirements for a wide variety of land uses in other parts of the city.

The changes listed in Table 5 should be made to the Seattle Municipal Code bicycle parking requirements. Table 5 includes recommendations that are above and beyond the requirements of the current Land Use Code (updated in December 2006).

Table 5. Recommended Changes to Existing Bicycle Parking Requirements

| <i>Within Downtown Seattle</i> | |
|---|---|
| <i>Existing Requirement^{a,b}</i> | <i>Recommended Requirement</i> |
| Structures containing 250,000 square feet or more of office gross floor area shall include shower facilities and clothing storage areas for bicycle commuters. One shower per gender shall be required for every 250,000 square feet of office use. | Structures containing 100,000 square feet or more of office gross floor area shall include shower facilities and clothing storage areas for bicycle commuters. One shower per gender shall be required for every 100,000 square feet of office use. |
| <i>Outside Downtown Seattle</i> | |
| <i>Existing Requirement^c</i> | <i>Recommended Requirement</i> |
| 1 long-term bicycle parking space for every 12,000 square feet of medical service, eating and drinking establishment, general sales and services, and entertainment building floor area. | 1 long-term bicycle parking space for every 4,000 square feet of medical service, eating and drinking establishment, general sales and services, and entertainment building floor area/1 long-term bicycle parking space for every 2,000 square feet of medical service, eating and drinking establishment, general sales and services, and entertainment building floor area in Urban Center or Station Area Overlay District. |
| 1 long-term bicycle parking space for every 4,000 square feet of heavy sales and services building floor area. | 1 long-term bicycle parking space for every 2,000 square feet of heavy sales and services building floor area/1 long-term bicycle parking space for every 1,000 square feet of heavy sales and services building floor area in Urban Center or Station Area Overlay District. |
| 1 long-term bicycle parking space for every elementary school classroom. | 4 long-term bicycle parking spaces for every elementary school classroom. |
| 2 long-term bicycle parking spaces for every middle school classroom. | 6 long-term bicycle parking spaces for every middle school classroom. |
| 1 long-term bicycle parking space for every 4 units of multi-family housing. | 4 long-term bicycle parking spaces for every 4 units of multi-family housing. |
| 1 long-term bicycle parking space for every 20 residents at congregate residences. | 4 long-term bicycle parking spaces for every 20 residents at congregate residences. |

^aExisting requirements for Downtown Seattle reflect the Seattle Municipal Code adopted in April 2006.

^bThe Downtown bicycle parking regulations do not apply to the Pike Market Mixed Zone.

^cExisting requirements for outside of Downtown Seattle reflect changes to the Seattle Municipal Code adopted in the commercial code section of the Land Use Code Ordinance 122311 (December 2006).

³ The Downtown bicycle parking regulations do not apply to the Pike Market Mixed Zone.

- Continue to utilize the PSRC bicycle parking demand estimation methodology to determine the amount of bicycle storage needed at transportation facilities. Sound Transit currently requires space for at least 40 long-term bicycle parking spaces to be provided at all rail transit facilities. More bicycle parking can be required based on area bicycle volumes and travel patterns, topography, nearby residential and employment density, proximity to the Urban Trails and Bikeways System and other existing and planned bicycle facilities, projected transit ridership, etc. In 2002, PSRC developed a methodology to estimate the potential demand for bicycle parking at transit hubs. This methodology should be used to establish appropriate requirements for rail and bus transit hubs, major transfer points, BikeStations, and park and ride lots in the city.
- Increase the amount of bicycle parking provided at public parks, schools, community centers, and libraries. SDOT will work with the Seattle Parks and Recreation Department, Seattle Public Schools System, and Seattle Public Libraries to ensure that adequate bicycle parking is provided at important public destinations. These destinations include city parks, schools, community centers, and libraries.
- Consider installing covered, on-demand, longer-term bicycle parking. SDOT will work with local transit agencies and the Seattle Parks and Recreation Department to examine the possibility of installing covered, on-demand, longer-term bicycle parking. Public agencies do not need to administer this bicycle parking program. Unlike locker facilities, this type of bicycle parking facility also has the advantages of not needing to be rented, not requiring keys, and not being a potential receptacle for trash. Certain types of covered, on-demand bicycle parking facilities can be locked with a padlock provided by the bicyclist.
- Provide incentives for operators of private parking facilities to add secure, high-quality bike parking. It will be important for the city and transit agencies to maintain bicycle racks and lockers⁴ and use enforcement to deter misuse of these facilities. Abandoned bikes and locks can make existing racks unusable. Other racks can be obstructed by planters, news boxes and other street furniture.



Bicycle racks have been provided at the South Park Library.

"Required bicycle parking shall be provided in a safe, accessible and convenient location. Bicycle parking hardware shall be installed according to its manufacturer's instructions and the Seattle Department of Transportation design criteria, allowing adequate clearance for bicycles and their riders. Directional signage shall be installed when bike parking facilities are not clearly visible from the street or sidewalk. When any covered automobile parking is provided, all required long-term bicycle parking shall be covered. When located off-street, bicycle and automobile parking areas shall be separated by a barrier or painted lines."

--Seattle Municipal Code, 23.49.019

⁴While the city will participate in helping to fund bicycle lockers, it does not currently manage or maintain bike lockers and is not likely to manage them in the future. Currently, only Metro provides lockers in the city.

Action 2.6: Require office development and redevelopment projects to include shower and locker facilities.



The city should amend its development ordinance to strengthen existing requirements for shower and locker facilities based on employment densities (see Table 5, above, for specific recommendations). For employees who are considering bicycling to work, such facilities make it possible to shower and change into work clothes after the commute.

Chapter 5. Education, Enforcement & Encouragement

Objective 3: Provide bicycle education, enforcement, and encouragement programs through partnerships.

The Bicycle Facility Network is designed to provide safe, convenient access for bicyclists to travel to destinations throughout Seattle. Like facilities for other transportation modes, this network of bicycle facilities must be used appropriately to be effective. For example, bicycle facilities are designed under the assumption that bicyclists ride the correct direction on streets and stop at red traffic lights. It is also assumed that motorists yield to bicyclists when turning and do not drive or park in designated bicycle lanes.



Community partners can offer programs, such as this helmet workshop.

Therefore, it is not acceptable for bicyclists or motorists to disregard traffic rules. Breaking these laws puts bicyclists and other roadway users at risk and is inconsistent with the city's overarching goal of increasing safety. Efforts must be made to encourage, among motorists and bicyclists alike, a culture of respect and shared usage that welcomes new riders to Seattle's roads and trails. The education, enforcement, and encouragement programs recommended in this chapter are intended to help grow the number of bicyclists while also increasing safe and appropriate behavior by bicyclists and all other roadway users in Seattle.



Bicyclists waiting at the intersection of Dexter Avenue and Mercer Street.

Bicyclist Rights and Responsibilities

Bicyclists have the legal right under Washington State law to travel on all roadways other than limited-access roadways (and other locations that are specifically signed to prohibit bicycle travel). Bicyclists share the same responsibility as drivers to operate safely and respectfully in the roadway environment and obey all traffic laws. The bicycle facilities recommended in this Plan are intended to improve bicyclist safety and increase the number of people who bicycle in Seattle. However, bicyclists are not limited to using roadways with designated bicycle facilities.

Bicycle Program Background

Bicycle education, enforcement and encouragement programs have been an important part of the bicycling experience in Seattle for many years. These programs have been implemented by various organizations and agencies in order to improve bicycle safety and encourage more bicycling throughout the city.

"Education of cyclists and drivers is also important. Many cyclists do not ride with consideration for the traffic laws, and many motorists are not aware of how to drive safely around bicyclists." --Seattle Resident

As the Bicycle Facility Network is built and more people are encouraged to bicycle, new programs will be needed to educate bicyclists and motorists about how to co-exist safely in the roadway environment. Drivers should be expected to treat bicyclists as legitimate users of the road and operate safely around bicyclists. Unsafe behavior by either bicyclists or drivers should be targeted through education and enforcement efforts. In addition, programs will be needed to promote bicycling as a fun, healthy form of transportation in the city.

As the agency responsible for planning, building, maintaining and operating Seattle's transportation infrastructure, SDOT is primarily focused on the "physical" elements of the Bicycle Network. However, the city recognizes that education, enforcement and encouragement programs are also essential activities in order to achieve the goals of this Plan. For that reason, this chapter addresses activities that are needed in order to support existing programs, as well as programs that will be needed in the future to support bicycle transportation in Seattle.



Bicycle rodeos can teach children bicycle skills and good bicycling behavior.

Partners for Bicycle Programs

Bicycle education, enforcement, and encouragement programs are offered by a wide variety of agencies and organizations in Seattle. Appendix L: Partners for Bicycle Programs lists a sample of some of the groups that either already have a role in providing bicycle programs for Seattle residents, or could make good partners for the city in the future.

"Strong efforts aimed at encouraging changes in travel behavior, and educating system users about basic safety and traffic laws, need to be made regularly to have an effect and create mutual respect among all roadway users. Successfully raising public and government awareness about the importance of bicycle and pedestrian transportation, as well as how to best implement regional and local networks and safely use them, will rely upon ongoing collaboration between citizen interest groups and government agencies."

--Regional Bicycle and Pedestrian Implementation Strategy for the Central Puget Sound Region

The actions listed below are recommended to improve bicycle education, enforcement and encouragement in Seattle.

Action 3.1: Educate Seattle transportation system users about new bicycle facility types.

The city will provide Seattle residents with information about the purpose of new bicycle facility treatments (e.g., bicycle boulevards, shared lane markings, etc.) and safe behaviors for using these facilities. SDOT will work with the Seattle Police Department (SPD) to educate users about the new facilities, including the following strategies:

- Develop web pages and disseminate information about each treatment.
- Install temporary orange warning flags, flashing lights, or cones at locations where new facilities are installed, where appropriate.
- Increase police patrols for a period of time as roadway users adjust their behavior after a new facility is installed.



Orange flags warn roadway users that 3rd Avenue is restricted to buses and bicycles only during rush hours.

Action 3.2: Promote bicycle and pedestrian education and encouragement in Seattle through partnerships with community organizations.

The city will contract with a team of organizations to offer bicycle and pedestrian education and encouragement programs in Seattle. While bicycle safety issues are important, these programs must also focus on pedestrian safety, including pedestrian interactions with bicyclists and motor vehicle drivers. These programs can be offered at community centers, libraries, schools, community festivals, and other public venues. For programs that target children, youth specific curricula and age-appropriate language should be used to explain concepts and safety issues. Key components of bicycle safety

education programs are included in Appendix M: Key Components of Bicycle Education Programs. Examples of services that could be offered through this program include:

- Hands-on bicycle and pedestrian safety training for children and adults.
- Bicycle commuter classes.
- Bicycle “ambassadors” at intersections in all parts of Seattle who can provide helmets and bicycle lights, assist with bicycle maintenance, and remind bicyclists about laws and safe behaviors.
- Media outreach to promote bicycling and increase awareness of bicycle safety, including billboards, direct mail, television and radio advertisements, etc.
- A “Share the Road” campaign to increase safe travel behavior and respect between all types of roadway users.
- Community rides in all parts of Seattle that are comfortable for less-experienced bicyclists
- Outreach to lower-income and minority populations that are typically under-represented in the Seattle bicycle community.
- “Drive with Care” campaign targeted to improve motorist behavior around bicyclists (similar to City of Chicago).
- Outreach through Seattle Public Utilities newsletters and bills.
- Work with businesses to develop programs that encourage their employees and customers to bicycle.



Bicycle ambassadors can provide helmets and bicycle lights, assist with bicycle maintenance, and remind bicyclists about laws and safe behaviors.

While contributing to bicycle and pedestrian programs within its own jurisdictional boundaries, the City of Seattle expects PSRC and other localities to contribute to a regional effort to improve bicycle safety. This regional effort should include education of pedestrians, bicyclists, and motorists; enforcement of laws related to pedestrians and bicyclists; and promotion of bicycling and walking as convenient transportation options. Bicyclists, motorists, and pedestrians are not confined to any particular jurisdiction, so all citizens in the region should receive these education, enforcement, and encouragement messages. In addition, the programs can be delivered more cost-effectively on a regional basis. For example, with a regional strategy, the organizations that provide hands-on bicycle and pedestrian safety training can use the same equipment in multiple jurisdictions. Billboards, brochures, and other media messages can also be produced in greater quantities at a lower unit cost if they are distributed regionally.



Example materials from StreetSmart, a public safety program of the District of Columbia, Maryland, and Virginia.

Action 3.3: Increase enforcement of bicyclist and motorist behavior to reduce bicycle and motor vehicle crashes.

The Seattle Department of Transportation will work with the Seattle Police Department to enforce laws that reduce bicycle/motor vehicle crashes and increase mutual respect between all roadway users. This enforcement program will take a balanced approach to improving behaviors of both bicyclists and motorists.

Motorist behaviors that will be targeted include:

- Turning left and right in front of bicyclists.
- Passing too close to bicyclists.
- Parking in bicycle lanes.
- Opening doors of parked vehicles in front of bicyclists.
- Rolling through stop signs or disobeying traffic signals.
- Harassment or assault of bicyclists.

Bicyclist behaviors that will be targeted include:

- Ignoring traffic control (particularly traffic signals).
- Riding the wrong way on a street.
- Riding with no lights at night.
- Riding without helmets.
- Riding recklessly near pedestrians on sidewalks.

Bicyclist safety is a shared responsibility between all roadway users. Enforcement priorities should be established through a collaborative process involving SDOT, SPD, the Bicycle Advisory Board, the Bicycle Alliance of Washington, and the Cascade Bicycle Club.

Action 3.4: Support efforts to obtain funding for bicycle education and enforcement programs.

SDOT will work with local organizations to pursue additional funding for bicycle safety education and enforcement programs (see list of existing programs offered by local organizations in Appendix L: Partners for Bicycle Programs). By providing support to grants and other funding applications, the city can help organizations that conduct education and enforcement to increase their resources and reach more Seattle residents.

Action 3.5: Update and distribute the Seattle Bicycling Guide Map.

As new bikeways are added to the network over the next ten years, regular updates will be needed to the Seattle Bicycling Guide Map to ensure that bicyclists are aware of new routing options and to reflect changes in the bicycle route network. The maps can be distributed in paper form, be posted online as a .pdf document, and may also be used as the basis for a web-based bicycle route-finding program (see the following action). Similarly, agencies that produce regional bicycle maps and other information of interest to bicyclists should be encouraged to update information relating to Seattle bicycle improvement efforts. In addition, SDOT should work with transit agencies such as KC/METRO, Sound Transit, and Washington State Ferries to distribute the maps.

Action 3.6: Develop an online bicycle route wayfinding program.

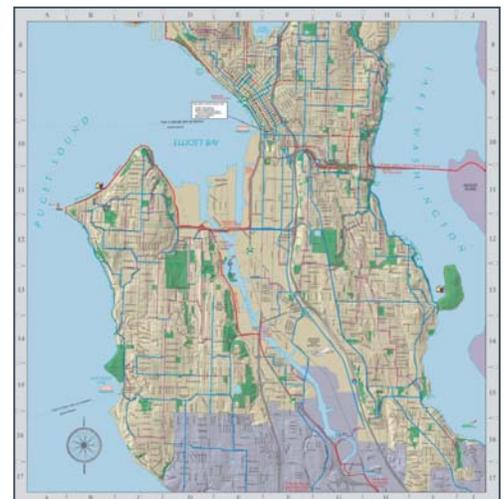
An online bicycle route wayfinding program should be developed by the PSRC, with support from SDOT, to help bicyclists determine preferred routes to destinations throughout Seattle and the Puget Sound Region. This program would allow bicyclists to enter their origin and



A motorist turning too closely in front of bicyclists is exhibiting dangerous behavior.



Wrong-way riding increases the risk of bicycle crashes and should be targeted through law enforcement efforts.



The Seattle Bicycling Guide Map will be used as a basis for developing an on-line wayfinding tool. For more information, visit our website at: <http://www.seattle.gov/transportation/bikemaster.htm>

destination and generate an optimal route to follow, given their experience level, time-sensitivity, willingness to ride on steep hills, or other potential factors.

This online program could also include tourist destinations, park amenities, transit access information, school locations, and other information that may be useful to bicyclists as it becomes available to integrate easily into a web-based format. The online .pdf version of the current Bicycling Guide Map is consistently one of the most visited web resources on the SDOT website, illustrating the significant demand for this type of program.

“Implement a computerized wayfinding program.” -- Seattle resident

Action 3.7: Encourage bicycling by displaying bicycle route system maps in key Downtown and Urban Village locations.

Downtown Seattle and the Urban Village Centers are important hubs in the city’s Signed Bicycle Route system. Many routes in the system connect bicyclists between neighborhoods to the Downtown Area. Downtown is an important destination for commuters, recreational bicyclists, tourists, and many potential bicyclists. In addition, the Signed Bicycle Route System connects all Urban Villages, so these key locations should have easy-to-understand information for bicycle wayfinding. Bicycle route system kiosks should be displayed at key locations in the Downtown area, Urban Villages, and other key destinations throughout the city such as along the Burke-Gilman Trail in Gas Works Park and at BikeStation Seattle®.

Action 3.8: Promote bicycling as an alternative to driving alone through Transportation Demand Management (TDM) Programs.

Bicycling should continue to be promoted as a non-polluting, healthy form of transportation through Transportation Demand Management (TDM) programs, such as Commute Trip Reduction programs, the SDOT Way To Go Program, and the Healthy Streets Initiative.

- The Washington State Commute Trip Reduction (CTR) Law requires employers to work with employees to reduce the number and length of drive-alone commute trips made to the worksite. The city and SDOT support this law and encourage all commuters to use alternatives to driving alone to work. Employees are encouraged to ask their employers to take actions to improve bicycling as a part of their CTR programs, including:
 - Provide bicycle parking facilities.
 - Provide bicycle maps, brochures, and other promotional materials.
 - Hold a “bicycle commute challenge” for employees who commute the most days by bicycle.
 - Develop agreements with local bicycle shops to provide reduced price items for companies with CTR programs.
- SDOT’s Way To Go Program includes a variety of initiatives intended to improve livability by reducing automobile usage for non-work trips. Since improving conditions for bicycling will help achieve this goal, bicycling should be emphasized as a viable mode of travel in Way To Go initiatives, such as the Commuter Cash program and the One Less Car Challenge.

Action 3.9: Expand Safe Routes to Schools to encourage children to walk and bicycle to school.

The city should build on its existing efforts to work with the Seattle Public Schools, public health organizations, parent associations, and local walking and bicycling advocacy groups to develop safe bicycle and pedestrian routes to Seattle schools. These routes could be identified as a part of local Safe Routes to Schools programs and could be improved in conjunction with the implementation of the City of Seattle Pedestrian Master Plan.



Chapter 6. Goals, Implementation

Objective 4: Secure funding and implement bicycle improvements.

Implementation of this Plan will be a collaborative effort between a variety of city departments and agencies and several outside organizations. SDOT will lead this effort, so all SDOT staff should be aware of the Plan recommendations and seek to implement them as a part of their regular work. The SDOT Pedestrian and Bicycle Program will provide technical expertise on issues related to bicycling and ensure that implementation of the Plan moves forward.

Key divisions within SDOT for planning and implementing bicycle improvements include:

- Traffic Management
- Street Maintenance
- Capital Projects and Roadway Structures
- Major Projects
- Policy and Planning

Progress on implementing the Plan will be monitored on an annual basis with the goal of completing most of this Plan by 2016.

Every transportation project offers an opportunity to implement a piece of this Master Plan. Therefore, institutionalizing bicycle improvements will be essential for successful implementation of this Plan. Seattle's Transportation Strategic Plan states that bicyclists' needs should be considered in the planning, design, construction, and maintenance of all transportation projects in the city.

Action 4.1: Provide bicycle facilities as a part of all transportation projects.

In accordance with the City of Seattle's Complete Streets Policy, the city will to the maximum extent possible:

- Accommodate bicycles as a part of all new roadway projects.
- Provide bicycle facilities as a part of all bridge projects (replacement and major retrofit), on the bridge structure and on bridge access ramps and approaches.
- Incorporate requirements for bicycle facilities in the city Right-of-Way Improvements Manual, standard specifications, and standard plans.
- Actively seek opportunities to provide bicycle lanes, shared lane markings, and other on-road bicycle facilities as a part of repaving projects. (This includes roadways in the Bicycle Facility Network as well as other roadways.)
- Develop trails in conjunction with the installation of underground cable, water, sewer, electrical, and other public or private efforts that utilize or create linear corridors.
- Continue to develop trails in railroad corridors no longer needed for railroad purposes. Where appropriate, develop trails adjacent to trails (e.g. sections of the Elliott Bay and Burke Gilman Trails). Continue to develop trails along utility corridors (e.g. Chief Sealth Trail).
- Leverage other types of projects that could potentially include bicycle facilities (e.g., building construction, property redevelopment, utility maintenance, etc.).



A bicycle lane was striped on Roy Street when the roadway was repaved.



The I-90 bridge trail was constructed as part of the bridge project. A similar trail will be provided on the SR-520 Bridge when it is replaced..

Chapter 6. Implementation

- Provide special appropriations or funding to fill in key gaps in the Bicycle Facility Network.
- Fix potholes, surface hazards, sight distance obstructions, and other maintenance problems on a regular basis.

Routine accommodation of bicycles should also apply to Washington State DOT, Washington State Ferries, Port of Seattle, KC/METRO, and Sound Transit projects within the city.

*City of Seattle Complete Streets Policy
Ordinance Number 122386, Adopted by Seattle City Council on April 30, 2007*

Guiding Principle: To design, operate and maintain Seattle's streets to promote safe and convenient access and travel for all users--pedestrians, bicyclists, transit riders, and people of all abilities, as well as freight and motor vehicle drivers.

Full text of the Complete Streets Policy is available online from the City of Seattle Legislative Information Service: <http://clerk.ci.seattle.wa.us/~public/CBOR1.htm>

Action 4.2: Dedicate funding for high-priority bicycle project planning and implementation.

The city should take advantage of existing funding provided through the general fund, "Bridging the Gap" initiative and other public and private sources, and dedicate portions of this funding to critical bicycle projects. Some of the most significant connections that are needed in Seattle, such as bicycle and pedestrian bridges and multi-purpose trails, will not be implemented through routine roadway repaving and reconstruction projects and will instead require an independently-funded capital improvement. In addition, there are a number of street retrofit projects that are important bicycle routes but hard to fund from traditional sources and in need of a separate, dedicated funding source. The city may be able to obtain funds for these projects by pursuing federal and state grants, seeking special appropriations or including them in future levy and bond initiatives.

Examples of these projects include (note that this list is similar higher-cost project list as provided at the beginning of Chapter 3):

- Re-construct Linden Avenue North between N 130th and N 145th Streets. with bike lanes, sidewalks and new pavement.
- Provide a bicycle facility connection between Downtown Seattle and the UW Campus via Eastlake Avenue N.
- Construct a Chief Sealth Trail Crossing of I-5 between S Spokane Street and S Lucile Street (and provide a trail on the east side of I-5 between the Chief Sealth Trail and the I-90 Trail).
- Construct the Burke-Gilman Trail section between 11th Avenue NW and 17th Avenue NW.
- Construct a new bicycle and pedestrian bridge across I-5 between Wallingford and the University District.
- Provide a bicycle facility connection between the I-90 Trail and Downtown Seattle.
- Construct multi-purpose trail connections from the SR 520 Bridge to the UW Campus and to Downtown Seattle as a part of the bridge reconstruction project.



Funding should be set aside to extend the I-90 Mountains to Sound Greenway Trail into Downtown Seattle.

- Improve the bicycle lanes on Alaskan Way S/E Marginal Way S between S Spokane Street and Downtown and complete the E-3 Busway Trail between S Spokane Street and Downtown.
- Either Rehabilitate the existing Ballard Bridge or add a new bicycle and pedestrian bridge adjacent to the Ballard Bridge.

Action 4.3: Establish a bicycle facility grant match reserve fund.

The city will develop a bicycle facility grant match reserve fund. This source would make it possible for the city to have matching funds available to take advantage of state and federal grants, even if other city funding sources are not available. To develop this fund, the city could set aside a certain percentage (e.g., 5 percent) of money from current bicycle projects and raise funds from private individuals and organizations. The fund would be secured by the time the "Bridging the Gap" funding initiative is completed. After this investment period, the annual interest from the match reserve fund (3 to 4 percent) will be used to implement bicycle facility maintenance improvements.

Action 4.4: The SDOT Bicycle and Pedestrian Program should provide the necessary staff expertise and commitment to implement this Master Plan within the timeframe identified.

This Master Plan envisions a considerable acceleration in the pace of bicycle facility construction throughout the city. SDOT will hire three additional staff members in order to administer programs, design projects, monitor progress, conduct public outreach, and perform other new tasks related to implementation of this Bicycle Master Plan.

Action 4.5: Continue to make minor improvements for bicycling through the Bicycle Spot Improvement Program.

The SDOT Pedestrian and Bicycle Program currently constructs low cost improvements to enhance bicycle safety and convenience through the Bicycle Spot Improvement Program. This program has become a national model that has been emulated by many city and state DOT's around the country. SDOT should continue to make the following types of improvements through this program:

- Surface improvements (patch potholes, fill seams between concrete panels in the street, replace drain grates, etc.).
- Signing and striping (bicycle lane striping and stenciling, motor vehicle warning signs at trail crossings, etc.).
- Access improvements (adjust electronic detection for bicyclists at traffic signals, traffic island modification, etc.).
- Sidewalk bicycle rack installation.
- Other low cost bicycle improvements as appropriate.



SDOT field crew installs a bicycle lane marking.

SDOT has installed over 2,300 bicycle parking racks on sidewalks in business districts since September 1993.

Action 4.6: Continue to receive regular input and guidance from the Seattle Bicycle Advisory Board.

The Seattle Bicycle Advisory Board should continue to provide regular input and guidance to the Pedestrian and Bicycle Program on bicycle issues. This will include monitoring the progress of implementation.

"It is the intent of the City Council to create the Seattle Bicycle Advisory Board which shall advise the City Council, the Mayor, and all the departments and offices of the City on matters related to bicycling, and the impact which actions by the City may have upon bicycling, and shall have the opportunity to contribute to all aspects of the City's planning processes insofar as they may relate to bicycling."

--City of Seattle Resolution 25534, May 16, 1977

Action 4.7: Provide bicycle planning and facility design training for appropriate SDOT project-level staff and consultants, and encourage staff from other agencies to attend.

Staff and consultants working on projects that affect bicycle access, directly or indirectly, should be strongly encouraged to attend training sessions on bicycle planning and facility design. Staff at other agencies, such as Seattle Department of Parks and Recreation, KC/METRO, Sound Transit, Washington State Ferries, etc. should be invited as well. Training includes attending conferences such as Pro-Walk/Pro-Bike, courses offered through professional organizations such as ITE as well as formal and informal (sack lunch presentation) sessions delivered by the Pedestrian and Bicycle Program and/or consultants with an expertise in bicycle and pedestrian planning and engineering. Periodic training may focus on particular topics of importance, such as intersection design, trail design, or innovative design treatments.

Action 4.8: All divisions of SDOT should consult the Bicycle Master Plan when working on projects.

All SDOT divisions should consult this Plan to ensure that the recommended facilities and maintenance practices are implemented in accordance with this Plan and the city's Complete Streets Policy. For roadway repaving and reconstruction projects, the Bicycle Master Plan recommendation represents the first alternative that should be considered. However, further study and additional public involvement may ultimately result in an even better strategy to provide bicycle access. The SDOT Pedestrian and Bicycle Program should be consulted when technical guidance is needed on bicycle issues.

In addition, the Bicycle and Pedestrian program staff should review other city planning documents, including the Seattle Transit Plan, Freight Mobility Strategic Action Plan and the Pedestrian Master Plan (anticipated in 2008) when proposing implementation of the Bicycle Facility Network.

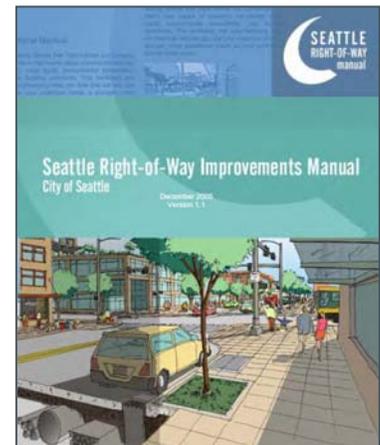
Action 4.9: Integrate the recommendations of the Bicycle Master Plan into other city ordinances, plans, and guidelines.

The recommendations of this Plan should be integrated into other city policy documents. This includes updating the Right-of-Way Improvements Manual, Transportation Strategic Plan, city ordinances, design guidelines, and other written policies (see Appendix N: Integration of Bicycle Recommendations into other Transportation Plans and Guidelines).

The SDOT Right-of-Way Improvements Manual will be updated with all bicycle design guidelines that are included in this Plan. All new bicycle design standards will be similarly incorporated into the SDOT Standard Specifications.

SDOT will redefine the city's bicycle classifications based on the systems identified in this plan. The Transportation Strategic Plan currently classifies bicycle facilities into urban trails and bicycle streets. These classifications of roadways and trails should be revised to include:

- Bicycle Facility Network
- Signed Bicycle Routes



Action 4.10: Coordination within SDOT and between SDOT and other agencies and organizations where necessary to implement the Bicycle Master Plan.

The SDOT Pedestrian and Bicycle Program should be included in the scoping and review of all plans, projects and programs that may provide opportunities to promote and implement recommendations of this Plan. In general, this includes most SDOT initiatives. Likewise, the Bicycle and Pedestrian Program should consult other SDOT modal programs and agencies when implementing its policies, plans, and programs.

Implementation of this Plan will require significant coordination between SDOT and other organizations. The roles of key partners are discussed in relation to specific recommendations in previous sections of this Plan, and are summarized below:

- Seattle Department of Parks and Recreation (trail development and maintenance of trails in parks).
- Seattle City Light (maintenance of trails in utility corridors)
- Seattle Public Utilities (drainage).
- Department of Planning and Development (bicycle parking and shower requirements).
- Puget Sound Regional Council (regional non-motorized planning, administration of federal and state funding for grant funded projects, regional wayfinding coordination, regional strategy for bicycle parking at transit hubs, incorporation of more detailed questions about bicycle and pedestrian trips in the regional transportation survey; and bicycle promotion).
- Transit Agencies (bicycle access to stations, space for bicycle storage at stations, bicycle facilities on transit vehicles, and bicycle-on-transit counts).
- Advocacy Organizations (bicycle education and encouragement).
- Seattle Police Department (enforcement of bicyclist and driver behavior).
- Health Agencies (encouragement and outreach to underserved populations; consultation regarding effective promotion, assessment, evaluation, and safety).
- Washington State DOT (WSDOT).

Action 4.11: Update the Bicycle Master Plan on a regular basis.

As the Plan recommendations are implemented, priorities for bicycle improvements may change and new needs and opportunities may be identified. The Bicycle Master Plan will be updated on a regular basis as a part of all Transportation Strategic Plan Updates (typically every five years). In addition, the list of short-term projects for implementation should be revised by SDOT on an annual basis, within the

framework of the overall Bicycle Master Plan.

Action 4.12: Evaluate new bicycle facility treatments.

New bicycle treatments should be evaluated to determine their effectiveness. Brief studies of these facility treatments should be done in the first three years after the Plan is adopted, and the results of these evaluations will be used to refine, adjust, and guide the future use (or discontinuation) of these treatments. This includes evaluating the following facilities (potential evaluation measures are shown in parenthesis):

- Shared lane and bicycle lane markings (evaluate their use by bicyclists, placement relative to parked cars and vehicles in travel lanes, maintenance needs, effects of any travel lane rechannelization and/or narrowing on the safety and comfort of all roadway users).
- Signage and wayfinding (assessment by stakeholders, use by bicyclists, interpretation of signs, effectiveness of sign and/or pavement marking placement).



The Citizens Advisory Board provided feedback throughout the planning process for this Bicycle Master Plan. Public input is essential for future plan updates.

- Roadway crossing treatments (use of right-of-way space, effectiveness of warning and regulatory signs, effectiveness of pavement markings).
- Bicycle boulevards (use by bicyclists, use of right-of-way space, change in traffic speeds, and effectiveness of pavement markings).

The brief studies should include behavioral observations (of bicyclists and other roadway users) and user surveys to gauge public understanding of and satisfaction with the new facilities. Results from these studies should be incorporated into Plan updates.

Action 4.13: Monitor progress using performance measures.

An important aspect of evaluating progress in implementing this Plan is to establish performance measures that are reported on a periodic basis. Measures are described in Chapter 7 to quantify the overall goals of the Plan and objectives described in each chapter. Several new performance measures have been established. For each of these new performance measures, SDOT will collect the data necessary to establish baseline measurements in 2007. It will be important to have adequate funding to collect the data required for these performance measures.

The performance measures should be evaluated on a bi-annual basis to ensure that they are the most appropriate, cost-effective measures for assessing progress towards the Plan goals. Performance monitoring will be led by the SDOT Policy and Planning Division, with support from the SDOT Pedestrian and Bicycle Program. Monitoring should be reported to the Seattle Bicycle Advisory Board on a periodic basis, depending upon the schedule for data collection.

SDOT's performance measures should be coordinated and integrated with external bicycle transportation monitoring efforts, such as a "Bicycle Plan Implementation Report Card". Outside groups may monitor progress on the Bicycle Master Plan goals (bicycle use and safety), facility network development, and people's perceptions of bicycling (from both bicyclists and non-bicyclists). These groups may gather this information through online surveys and random-phone surveys.

Bikeway Implementation Strategies

The following are implementation strategies for bikeways that are recommended in this Plan (See Bicycle Facility Network recommendations maps in binder):

Construct or Reconstruct

This category includes construction and reconstruction of roadways, multi-purpose trails, bridges, and pedestrian/bicycle overpasses and underpasses. Construction refers to projects that develop facilities that did not previously exist; reconstruction refers to changes to existing facilities.

In accordance with the Seattle Complete Streets Policy, bicycles should be accommodated any time a new road is constructed or an existing road is reconstructed. Seattle roadways should be designed according to the bicycle facility design guidelines in Appendix E: Bicycle Facility Descriptions, Appendix F: Guidance for Retrofitting Seattle Streets to Create Dedicated Bicycle Facilities, and Appendix H: Roadway Crossing Design for Bicycles.

This may involve adding pavement to the side of existing two-lane roadways that have informal parking in gravel areas adjacent to the roadway to provide shoulders or bicycle lanes and on-street parking pockets in appropriate locations. Since Seattle is a built



Sections of the Chief Sealth Trail were constructed in December 2006.

environment, opportunities to provide this type of treatment are limited and will typically be found in the far northern and southern parts of the city where roadways have not been developed with curb and gutter.

All new or replacement bridges should be consistent with the complete streets ordinance (Council Bill # 115861) to accommodate bicycles with bicycle lanes on both sides of the bridge, or in some cases, a separated multi-purpose path. If the bridge is in a developed area or an area that may experience high pedestrian use in the future, separate facilities should be provided for bicyclists and pedestrians.

The current Federal law for bicycle and pedestrian access on bridges was established in the Transportation Equity Act for the 21st Century (TEA-21) and re-affirmed by the Safe, Accountable, Flexible, Efficient Transportation Equity Act: A Legacy for Users (SAFETEA-LU). This law states:

“In any case where a highway bridge deck is being replaced or rehabilitated with Federal financial participation, and bicyclists are permitted on facilities at or near each end of such bridge, and the safe accommodation of bicyclists can be provided at reasonable cost as part of such replacement or rehabilitation, then such bridge shall be so replaced or rehabilitated as to provide such safe accommodations.” (23 U.S.C. Section 217)

While opportunities to develop new multi-purpose trail corridors are limited by the existing built environment of the city, there are a number of gaps in existing trails and important trail extensions that should be completed as a part of this Plan. In addition, several new corridors have been identified for new trails to be constructed.



Add Pavement Markings

Some roadways can accommodate new bicycle lane stripes, bicycle lane markings, or shared lane markings without any other changes. While there are a limited number of locations throughout the city where it is possible to simply add striping or markings, this is a relatively low-cost treatment that can often be done quickly.

Travel Lane Narrowing

Some Seattle streets have travel lanes that can be narrowed to provide additional space for on-road bicycle facilities. Travel lanes can be narrowed during repaving projects or by grinding out existing markings and replacing them with new markings.

Repaving projects provide a clean slate for revising pavement markings. Consistent with the city's Complete Streets Policy, during road repaving projects, the roadway should be restriped to create bicycle lanes and shoulders (in some cases the city can narrow travel lanes to a minimum 10-foot width, depending on traffic speeds and composition). In addition, if a roadway does not have a curb and gutter and the roadway edge is relatively flat with few obstructions, the total pavement width can be widened to include paved shoulders or bicycle lanes. Accessible curb ramps must be added for pedestrians during repaving projects.

Grinding projects involve removing existing lane stripes as well as providing new striping for bicycle lanes, shared lane markings, or edgelines. Since there are many roadways that will not be repaved in the next several years, existing markings will need to be removed through grinding in order to create the recommended bicycle facilities.

Lane Rechannelization

There are a number of streets in Seattle where space for bicycle lanes or other on-road bicycle facilities could be provided by removing existing travel lanes. This treatment is recommended for roadways where it is desirable to improve pedestrian crossings at multiple locations, add bicycle lanes and climbing lanes, and reduce rear-end and turning crashes. Travel lane rechannelization often involves converting an existing four-lane roadway to a two-lane roadway with a center-turn lane. This allows bicycle facilities to be installed as well as raised median islands or a crossing island. This treatment reduces bicycle and pedestrian crossing distance and exposure to vehicular traffic, and has been shown to improve motor vehicle flow and reduce rear-end and left-turning crashes when used in appropriate locations.

Removing travel lanes may or may not require tradeoffs between travel modes within a roadway corridor. An engineering and policy analysis must be conducted to evaluate the impact of removing travel lanes on all modes.

This includes considering factors such as:

- Pedestrian crossing opportunities and safety.
- Transit capacity and performance (additional transit operational analysis is needed for UVTN corridors).
- Bicycle network connectivity.
- Peak-hour motor vehicle capacity.
- Access to adjacent businesses.
- Opportunity to reduce crashes of all types.
- Opportunity to reduce vehicle travel speeds, thereby reducing injury severity to pedestrians and bicyclists involved in collisions.
- Roadway substructure (if part of the roadway that was formerly a median or streetcar lane is reconfigured to carry heavy trucks, there may be additional maintenance costs).



Rainier Avenue S was converted from a four-lane roadway to one travel lane in each direction, a center-turn lane, and bicycle lanes.

In UVTN corridors, transit speed and reliability is a priority consideration due to its existing and/or planned ability to move large numbers of people.

Consolidate On-Street Parking to One Side of the Roadway

Consolidating on-street parking to one side of the street provides additional space for bicycle lanes or climbing lanes. Since available on-street parking is limited in many neighborhoods, this action is recommended only in areas where significant excess capacity exists and where it does not cause too many people to have to cross the road to reach their parked cars.

Remove On-Street Parking from both Sides of the Roadway

Removing existing on-street parking provides additional space for bicycle lanes or climbing lanes. In some cases, parking removal is also needed to complete multi-purpose trails. This action is relatively rare. It is used only when the parking is under-utilized or it is long-term commuter parking (as opposed to residential or retail parking). The SDOT Transportation Strategic Plan (TSP) identifies strategies for managing parking wisely (see pages 93-98 of the TSP).

Allow Full-Time On-Street Parking

It is not possible to provide on-street bicycle facilities when on-street parking is restricted during peak hours, because the correct riding position for bicyclists changes

depending on the presence of parked cars. Allowing full-time on-street parking can sometimes make it possible to provide bicycle lanes, climbing lanes, or shared lane markings adjacent to parked cars.

In order to use this strategy, traffic patterns must be studied to determine if it is feasible to lift parking restrictions. An engineering analysis is needed for UVTN corridors to determine potential impacts to transit speed and reliability.



Curb extensions were constructed on SW Juneau Street to slow motor vehicles.

Calm Traffic on the Street

In order to create bicycle boulevards, non-arterial roadways will typically require traffic calming treatments to slow motor vehicle speeds and make bicycling conditions more comfortable. These treatments may include traffic circles, chicanes, traffic diverters, and other measures. Detailed information regarding the SDOT traffic control program can be found online at <http://www.seattle.gov/transportation/trafficcircles.htm>.

Post Bicycle Route Signs

This Plan recommends that the City of Seattle remove its existing signed bicycle routes and develop a new signage system to provide more direct bicycle connections between key destinations in the city. This new signage system should continue to be updated in the future to ensure that the signs are as effective as possible at helping people find destinations. The new signed bicycle route system is discussed in Chapter 3.

Cost Estimates

Rough cost estimates for implementing this Plan are provided in Appendix O: Cost Estimates. In many cases bicycle facility improvements can be provided as a part of larger transportation projects, such as a roadway corridor reconstruction project. The cost estimates for this Plan include both construction and design (see Appendix O: Cost Estimates).



Speed cushions are used on Beach Drive SW to slow traffic on this popular bicycle route.

Implementation Schedule

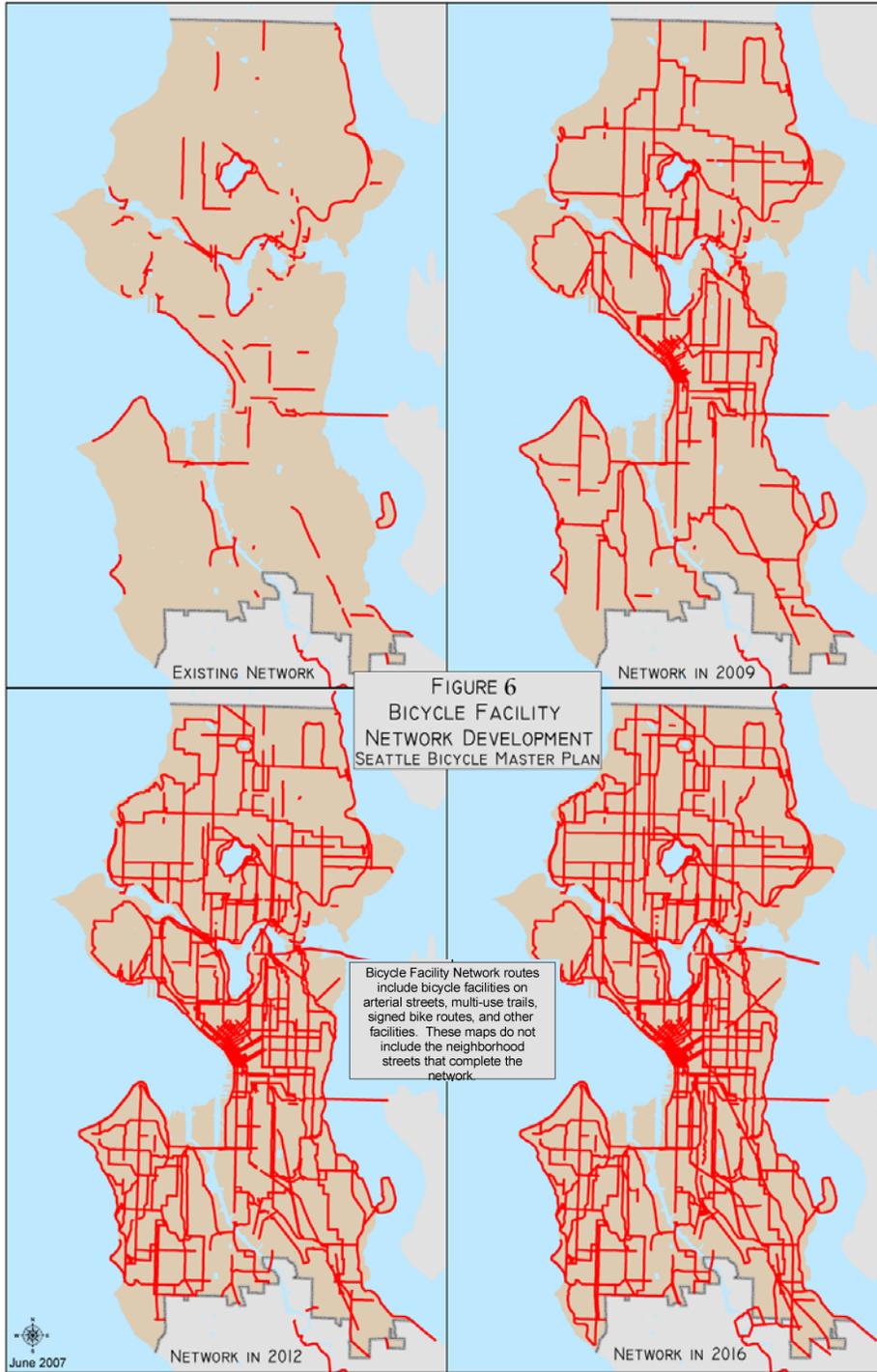
A majority of the Bicycle Master Plan recommendations will be implemented over the next 10 years. This includes recommendations for bicycle facilities, programs, and institutionalization. The implementation table summarizes the timing of the major recommendations of this Plan (see Table 6: Implementation Schedule).

Bicycle Facility Phasing

The bicycle facility improvements that are identified in this Plan will be constructed over the next 10 years. Some improvements will be made immediately after the Plan is adopted, while others will take longer to design and develop (see Figure 5: Bicycle Facility Network Development). Therefore, the recommendations are divided into four phasing categories (identified in the GIS database of Bicycle Facility Network recommendations):

- Short-Term (0 to 3 years after Plan adoption)
- Medium-Term (0 to 6 years after Plan adoption)
- Long-Term (0 to 10 years after Plan adoption)
- Future (0 to more than 10 years after Plan adoption)

Figure 6. Bicycle Facility Network



While a project may be included in the medium- or long-term category, the city should take advantage of opportunities that arise in the short-term to develop the project (e.g., grant funding, leveraging other projects, etc.). This is why all phasing categories begin immediately after the Plan is adopted.

Short-Term Recommendations (completed by 2009)

Short-term projects will help create early successes that will help build momentum for other recommendations of the Plan. Many of these projects will be completed where it is relatively easy to add bicycle lanes, climbing lanes, and shared lane markings to roadways. Wherever possible, bicycle route signs should be posted during this time period (for some routes, new signals and other crossing improvements will be needed before the signs can be installed). Short-term projects will also include several bicycle facilities that are more challenging to implement in places where critical Bicycle Facility Network gaps exist.

Medium-Term Recommendations (completed by 2012)

Medium-term projects tend to include more complex bicycle facility improvements as a part of capital projects. These include many projects that require repaving or reconstruction of roadways, as well as some re-stripping projects. Many of the Urban Trails should be completed within the medium-term timeframe.

Long-Term Recommendations (completed by 2016)

Long-term projects are capital projects that will require several years to program in the budget, design, and construct. These include Urban Trails that have not been funded or designed and some new bicycle and pedestrian bridges.

Future Recommendations (completed beyond the 10 year planning horizon)

There are several critical connections in the Bicycle Facility Network that will require significant planning, design, public involvement, capital investment, and construction time. These future category projects include new bicycle and pedestrian bridges, bicycle facilities that will be built as part of larger bridge rehabilitation or replacement projects and major roadway reconfigurations.

Future Vision

This Plan not only establishes the vision, but also very practical steps that are needed in the future to ensure that Seattle will become a world-class city for bicycling. This Plan is an important first step - much work lies ahead. By providing the necessary human and financial resources to accomplish this Plan, Seattle could very well exceed its goals to triple the amount of bicycling and reduce the bicycle crash rate by one-third. It will, therefore, be important in the future to measure progress, reassess priorities, and strive to further increase the use and safety of bicycle transportation as the city moves forward with the implementation of this Bicycle Master Plan.

Possibilities that have been suggested by citizens and should be considered as bicycling increases throughout the city are listed below:

- Increasing the number of neighborhood roadways designated as bicycle boulevards.
- Reconfiguring roadways with fewer travel and/or narrower lanes and more space for bicycle facilities.
- Making intersection improvements to allow bicyclists on non-arterial streets to safely cross arterial streets.
- Focusing on bridges so that over time, all bridges provide safe, convenient access for bicycles.



Chapter 6. Implementation

- Installing new types of bicycle facilities at intersections (more bicycle boxes, bicycle turn pockets, traffic signals for bicycles only, and special signal phasing for bicyclists).
- Providing more bicycle and pedestrian bridges and underpasses across freeways and other major roadways (this increases the number of route choices that are available to bicyclists)
- Converting on-street parking into space used for bicycle facilities.
- Encouraging commercial businesses to front on multi-purpose trails.
- Providing high-capacity bicycle parking in more retail areas, parks, schools, and public buildings such as libraries and community centers.
- Creating staffed bicycle facilities offering high-capacity parking, repairs, and rentals at more transit hubs.
- Ensuring that all new commercial, office, and industrial buildings are equipped with lockers and showers for bicyclists.



Implementing the recommendations of the Bicycle Master Plan is an important first step in an ongoing commitment that will help establish these future possibilities.



Table 6. Implementation Schedule (Part 1)

| 1. BICYCLE FACILITIES Recommendations | SDOT Partners | Implementation Schedule | | | | | | |
|---|------------------|---|--------|--------|--------|--------|------------|--------------|
| | | Year 1 | Year 2 | Year 3 | Year 4 | Year 5 | Years 6-10 | Future Years |
| Short-Term Bicycle Facilities for Segments and Roadway Crossings | W, PR, B | | | | | | | |
| Medium-Term Bicycle Facilities for Segments and Roadway Crossings | W, PR, B | | | | | | | |
| Long-Term Bicycle Facilities for Segments and Roadway Crossings | W, PR, B | | | | | | | |
| Urban Trails and Bikeways Network | PR, W, B | | | | | | | |
| Signed Bicycle Routes | B, PR, PS | | | | | | | |
| Routine Bicycle Facility Maintenance | W, PR | (See Maintenance Text and Table) | | | | | | |
| Spot Bicycle Facility Maintenance | W, PR | (Make Spot Improvements As Needed) | | | | | | |
| Negotiate/Renegotiate Maintenance Agreements | PR, L | | | | | | | |
| Volunteer Assistance with Maintenance | BC, C, BU, S | (Assistance with Maintenance As Needed) | | | | | | |
| Track Citizen Complaints and Maintenance Requests | PR, L | | | | | | | |

B = Seattle Bicycle Advisory Board
 BC = Bicycle Clubs/Advocacy Organizations
 BU = Seattle businesses
 C = Community volunteer groups
 EO = Elected officials
 F = Washington State Ferries
 G = City of Seattle government agencies (all levels)
 HE = Local health organizations
 L = Seattle City Light

M = King County Metro Transit (METRO)
 N = Neighboring municipalities
 O = Outside contractors
 PD = Seattle Metropolitan Police Department
 PR = City of Seattle Parks and Recreation Department
 PS = Puget Sound Regional Council
 S = Seattle Public and Private Schools
 ST = Sound Transit
 T = Seattle tourism organizations
 W = Washington State Department of Transportation (WSDOT)

Table 6. Implementation Schedule (Part 2)

| 2. SUPPORTING BICYCLE FACILITIES Recommendations | SDOT Partners | Implementation Schedule | | | | | | |
|---|------------------|-------------------------|--------|--------|--------|--------|------------|--------------|
| | | Year 1 | Year 2 | Year 3 | Year 4 | Year 5 | Years 6-10 | Future Years |
| Provide Bicycle Racks and Bicycle Lockers | M, ST, BU, S | | | | | | | |
| Strengthen Bicycle Parking Requirements | EO, BU | | | | | | | |
| Fund and Promote Staffed Bicycle Facilities | BU, PS, ST, M | | | | | | | |
| Improve Bicycle Access to Transit | ST, M, F, PS | | | | | | | |
| Improve Bicycle Storage at Transit Stations | ST, M, PS | | | | | | | |
| Accommodate More Bicycles on Transit | M, ST, F | | | | | | | |

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Table 6. Implementation Schedule (Part 3)

| 3. BICYCLE PROGRAMS Recommendations | SDOT Partners | Implementation Schedule | | | | | | |
|--|-----------------------------|-------------------------|--------|--------|--------|--------|------------|--------------|
| | | Year 1 | Year 2 | Year 3 | Year 4 | Year 5 | Years 6-10 | Future Years |
| Support Efforts to Obtain Funding for Programs | BC, B, T, HE | | | | | | | |
| Update and Distribute Bicycle Map | BC, PR, BU, T, M, ST, F, HE | | | | | | | |
| Increase Enforcement Related to Bicycling | PD | | | | | | | |
| Develop Online Bicycle Route Wayfinding System | PS, BC | | | | | | | |
| Promote Bicycling through the Way To Go Program | BC, HE | | | | | | | |
| Provide Bicycle Safety Education/Training | BC, HE, N, PS, S | | | | | | | |
| Donate and Sell Bicycle Helmets | BC, BU, HE | | | | | | | |
| Provide Bicycle Commuter Assistance | BC, BU | | | | | | | |
| Expand Safe Routes To Schools Programs | S, BC, HE | | | | | | | |
| Provide Websites for Bicycle Education and Promotion | BC, HE | | | | | | | |
| Organize and Promote Bicycle to Work Day | BC, BU, HE, C, M, ST, F, W | | | | | | | |
| Promote Bicycling in Regional TDM Programs | BC, HE | | | | | | | |
| Organize and Promote Bicycle Saturdays and Sundays | PR, HE, BC | | | | | | | |

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Table 6. Implementation Schedule (Part 4)

| 4. PLAN FUNDING AND IMPLEMENTATION Recommendations | SDOT Partners | Implementation Schedule | | | | | | |
|---|--------------------|--|--------|--------|--------|--------|------------|--------------|
| | | Year 1 | Year 2 | Year 3 | Year 4 | Year 5 | Years 6-10 | Future Years |
| Establish Dedicated Bicycle Funding Sources | EO, B | | | | | | | |
| Add Staff to SDOT Pedestrian and Bicycle Program | EO, B | | | | | | | |
| Continue to implement Bicycle Spot Improvement Program | B | | | | | | | |
| Utilize Contractors for Bicycle Projects | O | | | | | | | |
| Receive Oversight from Bicycle Advisory Board | B | | | | | | | |
| Offer Bicycle Planning and Facility Design Training | W, M, N, ST, PS, O | | | | | | | |
| Review Bicycle Master Plan Recommendations for all Projects | O | | | | | | | |
| Consult Pedestrian and Bicycle Program on all Projects | O | | | | | | | |
| Integrate Plan Recommendations into Other Guidelines | EO, G | | | | | | | |
| Update Bicycle Master Plan | O, BC | | | | | | | |
| Evaluate New Bicycle Facility Treatments | O, B | | | | | | | |
| Monitor Progress Using Performance Measures | B, O | (See individual performance measures for data collection timing) | | | | | | |
| Prepare Bicycle Benchmarking Report | B, O, BC | | | | | | | |
| Reconsider Performance Measures | B, O | | | | | | | |

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Chapter 7. Performance Measures

As described in Chapter 6, several performance measures should be monitored to determine the amount of progress being made toward achieving the goals and objectives of the Plan. The measures summarized in Table 7 and described below are intended to quantify the overall goals of the Plan and objectives described in the previous chapters. These performance measures will be reviewed and updated every two years to ensure that the city continues to use the best available metrics to assess Plan implementation. Performance monitoring will be led by the SDOT Policy and Planning Division, with support from the SDOT Pedestrian and Bicycle Program.

Table 7. Bicycle Master Plan Performance Measures

| | Performance Measure | Baseline Measurement | Performance Target | Data Collection Frequency | Data Collection Responsibility |
|--------------------|--|--|---|---------------------------|--|
| Goal 1 | Number of bicyclists observed at counting locations throughout Seattle | To be counted in 2007 | Triple the number of bicyclists between 2007 and 2017 | Every two years | SDOT, Volunteer groups, Bicycle advocacy organizations |
| Goal 2 | Number of reported bicycle crashes per total number of bicyclists counted and annual traffic volumes | To be calculated in 2007 | Reduce the bicycle crash rate by one third between 2007 and 2017 | Every two years | SDOT, Law enforcement agencies, Volunteer groups, Bicycle advocacy organizations |
| Objective 1 | Percentage of Bicycle Facility Network Completed | 65 miles of existing facilities | Provide 450 miles of recommended facilities by 2017 (includes existing) | Every two years | SDOT Policy and Planning Division & SDOT Pedestrian and Bicycle Program |
| Objective 2 | Number of bicycle racks installed through the SDOT Bicycle Parking Program | Approximately 3,000 existing bicycle racks | Provide 6,000 racks by 2017 (includes existing) | Every two years | SDOT Pedestrian and Bicycle Program |
| Objective 3 | Number of Seattle Bicycling Guide Maps distributed | 23,338 maps distributed in 2005 | 150,000 bicycle maps to be distributed between 2007 and 2017 | Every year | SDOT Pedestrian and Bicycle Program or its designated representative |
| Objective 4 | Percentage of targeted SDOT staff who participate in training on bicycle issues | To be counted in 2007 | 100% of targeted staff participating in training every year | Every year | SDOT Pedestrian and Bicycle Program |
| | Number of bicycle project grant applications applied for and obtained for bicycle programs | To be tracked in 2007 | At least one grant application for every available funding opportunity | Every year | SDOT Policy and Planning Division |
| | Number of Bicycle Spot Improvements Completed | To be counted in 2007 | Depends on needs & priorities set each year | Every year | SDOT Pedestrian and Bicycle Program |

a. This table does not include the performance measures recommended for consideration by non-city agencies or organizations.

Performance Measure Framework

This Plan establishes two types of performance measures. The performance measures used to monitor progress towards the goals will quantify long-term trends in bicycle use and safety. The performance measures related to the objectives are strategic—they will calculate the amount of progress that has been made toward specific 2017 performance targets.

Several of the performance measures have been used previously by SDOT, while others are new. For each new performance measure, SDOT will collect the data necessary to establish baseline measurements in 2007.

A few of the performance measures listed below are recommended for organizations other than SDOT to consider. These measures are important metrics for tracking progress on this Plan, but they will not be included in official SDOT performance reports.

Long-Term Performance Measures

Long-term performance measures monitor progress towards the goals of increasing bicycle use and improving bicycle safety.

Goal 1: Increase use of bicycling in Seattle for all trip purposes. Triple the amount of bicycling in Seattle between 2007 and 2017¹.

Long-Term Performance Measure 1.1 (New): Number of bicyclists observed at counting locations throughout Seattle.

Bicycle counts should be taken at up to 30 locations throughout the city every other year to benchmark the amount of bicycling in the city. Count locations could include Downtown entry points, locations on each of the city's major trails, arterial roadways with bicycle lanes or shared lane markings, and intersections of arterial roadways with existing or planned bicycle facilities. SDOT should continue to support and work with the Cascade Bicycle Club on counts, especially the ones done on Bike to Work Day and on the Burke Gilman Trail. The official counts for this performance measure should be taken around the same date each year, on the same day of the week, and under similar weather conditions. In other cases, one-time before and after counts should be taken to measure increases in bicycle use related to a specific bicycle lane, shared lane marking, or trail project.



Additional bicycle counts may be obtained by requiring bicycles to be included in current, manual traffic counts. This data set would not represent all bicycle activity throughout Seattle, but would begin to provide some basic data on the use of bicycle facilities. Counts may also include observations of important bicyclist behaviors, such as wearing helmets, riding on the correct side of the street, obeying traffic controls, and using lights at night. The city will need the assistance of local bicycle advocacy and other organizations to take these counts. In addition, pneumatic tubes should be used to reduce the labor required to count bicyclists on trails. Bicycle counting technologies, such as video and infrared detection should be explored for counts in all types of locations, and the city should move toward adopting these technologies.

- *Data Collection Responsibility: SDOT, Volunteer groups, Seattle area bicycle advocacy organizations.*
- *Data Collection and Reporting Frequency: Every Two Years.*

¹Tripling the amount of bicycling is contingent upon the completion of key connections in the Bicycle Facility Network. The Plan identifies 20 capital projects to make these key connections (see Chapter 2). The amount of bicycling is measured by counting bicyclists at a consistent sample of locations in the city.

Long-Term Performance Measure 1.2 (Recommended for PSRC consideration): Bicycle mode split. Bicycle mode split should be documented every five years through the Puget Sound Regional Travel Survey. Documenting mode shift from personal automobile use to bicycle use is an important benchmark for demonstrating that the City of Seattle is achieving its pollution reduction goals and meeting the Kyoto Protocol. PSRC should improve the survey and reporting methodology to capture an accurate sample of bicycling trips and to report data for each jurisdiction in the region separately. This will allow the City of Seattle to benchmark progress towards shifting single-occupant vehicle trips to bicycle trips.



Photo taken by Amber Trillo

- *Data Collection Responsibility: PSRC.*
- *Data Collection and Reporting Frequency: Every Five Years.*

Goal 2: Improve safety of bicyclists throughout Seattle. Cut the rate of bicycle crashes by one third between 2007 and 2017².

Long-Term Performance Measure 2.1 (New): Number of police reported bicycle crashes per total number of bicyclists observed during the bi-annual bicycle count. This measure would compare bicycle crash trends (as reported in police records) in terms of bicycle exposure. Exposure would approximate the bi-annual bicycle counts at up to 30 locations throughout the city. Note that police-reported crashes do not represent all bicycle collisions³.



- *Data Collection Responsibility: SDOT, Law enforcement agencies, Volunteer groups, Seattle area bicycle advocacy organizations.*
- *Data Collection and Reporting Frequency: Every Two to Five Years.*

Strategic Performance Measures

Strategic performance measures calculate the amount of progress that has been made toward specific 2017 performance targets.

Objective 1: Develop and maintain a safe, connected, and attractive network of bicycle facilities throughout the city.

Strategic Performance Measure 1.1 (New): Percentage of Bicycle Facility Network completed. This measure will track progress toward completing the entire recommended 450-mile Bicycle Facility Network by 2017. An additional option that will be considered is tracking the percentage of network miles completed for different facility types (e.g., bicycle lanes, climbing lanes, shared lane markings, multi-purpose trails, and bicycle boulevards). This performance measure builds on SDOT's existing measure of the number of bicycle lane miles created each year.

²The rate of bicycle crashes is the number of police-reported bicycle crashes in a year divided by the number of bicyclists counted at the sample locations.

³A study by Stutts and Hunter of a sample of cases collected at eight hospital emergency rooms in three states, showed that only 56 percent of the pedestrians and 48 percent of the bicyclists were successfully linked to cases reported on their respective state motor vehicle crash files^a. This study looked at only the most serious crashes (involving emergency room treatment). We can assume that less-severe crashes were accurately reported at an even lower rate.

Source: Stutts, J.C. and W.W. Hunter. "Police-reporting of Pedestrians and Bicyclists Treated in Hospital Emergency Rooms," *Transportation Research Record No 1635*, Transportation Research Board, 1998. P. 88-92.

- *Data Collection Responsibility: SDOT Policy and Planning Division and SDOT Pedestrian and Bicycle Program.*
- *Data Collection and Reporting Frequency: Every Two Years.*

Objective 2: Provide amenities that make bicycle transportation more convenient.

Strategic Performance Measure 2.1 (Existing): Number of bicycle racks installed through the SDOT Bicycle Parking Program. This measure will monitor progress towards providing short-term bicycle parking near key destinations throughout Seattle by 2017. It is estimated that 11,000 racks are needed to meet the estimated demand for bicycle parking in key areas of the city (this estimate of 11,000 includes the approximately 3,000 racks that are currently available in the city)⁴. SDOT installed 61 racks in 2005.



- *Data Collection Responsibility: SDOT Pedestrian and Bicycle Program.*
- *Data Collection and Reporting Frequency: Every Two Years.*

Strategic Performance Measure 2.2 (Recommended for Sound Transit and KC/METRO consideration): Percentage of estimated 2017 bicycle parking demand met by current bicycle racks and lockers at transit stations in Seattle. Sound Transit and KC/METRO should provide SDOT with the number of bicycle parking spaces available at each transit stop and station in Seattle. Bicycle parking demand for 2017 should be estimated using the PSRC Regional BikeStation Project methodology.

- *Data Collection Responsibility: Sound Transit, KC/METRO.*
- *Data Collection and Reporting Frequency: Every Two Years.*

Strategic Performance Measure 2.3 (Recommended for KC/METRO and Sound Transit consideration): Number of bicycles carried on KC/METRO and Sound Transit buses. KC/METRO should obtain more complete, year-round data on bike-on-bus boardings. For example, KC/METRO should count bicycle-on-bus boardings each month, and provide SDOT with these counts. This measure would include all routes served by KC/METRO throughout the region, and would not be exclusive to the City of Seattle.

- *Data Collection Responsibility: KC/METRO.*
- *Data Collection and Reporting Frequency: Every Year.*

⁴The city will double the number of bicycle racks available to 6,000 racks by 2017. However, it is estimated that 11,000 racks are needed. The estimated need for 11,000 bicycle racks is based on the following assumptions: 1) An average of one bicycle rack is needed per 100 feet of arterial roadway block face in all Urban Village Centers (includes Hub Urban Villages, Urban Centers, and Urban Center Villages). This average of one rack per 100 feet of arterial roadway block face overestimates the number of bicycle racks by counting arterial roadway sidewalks that may be too narrow to install bicycle racks or may have lower bicycle parking demand, but underestimates the number of bicycle racks by not including racks on adjacent non-arterial streets in commercial districts with higher bicycle parking demand. 2) An average of 10 bicycle racks are needed per public school (includes administration buildings, resource centers, etc., and varies depending on the size and location of the school). 3) An average of five bicycle racks are needed per private school (varies depending on the size and location of the school and students living within bicycling distance). 4) An average of five bicycle racks are needed per community center (varies depending on the size and location of the community center). 5) An average of three bicycle racks are needed per library (varies depending on the size and location of the library). Since approximately 3,000 bicycle racks are already in place, 8,000 racks will need to be installed between 2007 and 2017 to meet the estimated demand. Therefore, the city should consider looking for ways to fund, locate, and install additional racks.

Objective 3: Partner with organizations to develop bicycle education, enforcement, and encouragement programs.

Strategic Performance Measure 3.1 (Existing): Number of Seattle Bicycle Guide Maps distributed. This measure will monitor progress toward improving bicycle wayfinding and encouraging people to use the city's bicycle facilities. The SDOT Pedestrian and Bicycle Program should continue to track the number of bicycle maps that are distributed. This currently includes paper maps, but in the future should include the number of times online maps are accessed. 150,000 Bicycle Guide Maps should be distributed between 2007 and 2017. 23,338 maps were distributed in 2005⁵.

- *Data Collection Responsibility: SDOT Pedestrian and Bicycle Program or its designated representative.*
- *Data Collection and Reporting Frequency: Every Year.*



Strategic Performance Measure 3.2 (Recommended for Seattle area bicycle advocacy organizations consideration): Number of Seattle residents participating in pedestrian or bicycle safety education programs or events. Seattle area bicycle advocacy organizations should track the number of participants in education or encouragement activities (e.g., Bike to Work Day, bicycle commuter classes, bicycle safety training, bicycle camps, etc.), for inclusion in the Bicycle Benchmarking Report. The number of participants in these

bicycle activities should triple between 2007 and 2017.

- *Data Collection Responsibility: Seattle area bicycle advocacy organizations, Volunteer groups.*
- *Data Collection and Reporting Frequency: Every Year.*

Objective 4: Secure funding and implement bicycle improvements

Strategic Performance Measure 4.1 (New): Percentage of targeted SDOT staff who participate in training on bicycle planning, design, and engineering issues. This measure will help indicate the level of internal training that is provided on bicycle issues. The following types of staff should receive bicycle training: planners, designers, project managers, staff working on projects with signs and paint, staff working on signals, crew chiefs, and field crews. SDOT should take advantage of everyday opportunities to provide these targeted staff with bicycle training. This includes Complete Streets training, Pedestrian and Bicycle Program presentations, field demonstrations of products (e.g., pavement markings, multi-use trail ramps, and bollards), ProBike/ProWalk conference sessions, mobile workshops, walking audits, and out-of-town expert presentations. 100 percent of targeted SDOT staff should receive some type of training every year.

- *Data Collection Responsibility: SDOT Pedestrian and Bicycle Program.*
- *Data Collection Reporting Frequency: Every Year.*

⁵ The number of bicycle maps distributed by the city is typically higher during the year after a revised version of the map is published. A good goal for distribution is an average of 15,000 maps per year.

Strategic Performance Measure 4.2 (New): Amount of grant funding applied for and obtained for bicycle programs. The SDOT Policy and Planning Division should continue to track the amount of bicycle project funding that SDOT applies for and obtains through grant sources. This measure has been collected internally in the past.

- *Data Collection Responsibility: SDOT Policy and Planning Division.*
- *Data Collection and Reporting Frequency: Every Year.*

Strategic Performance Measure 4.3 (Existing): Number of Bicycle Spot Improvements Completed. This measure will track SDOT's responsiveness to public requests for bicycle spot improvements. SDOT completed 49 spot bicycle and pedestrian improvements in 2005 (bicycle and pedestrian improvements were reported together).

- *Data Collection Responsibility: SDOT Pedestrian and Bicycle Program.*
- *Data Collection and Reporting Frequency: Every Year.*



Bicycle spot improvements can fix pavement problems.