“Driving a mile to the store for a quart of milk seems to me as much overkill as using a high-powered nail gun to hang a picture.”

- Jeff Mapes, author of Pedaling Revolution: How Cyclists Are Changing American Cities
When I bought my new bike, I sold my old one to my good friend Sarah. I was sad to see it go. Now she rides all around the neighborhood and she got her husband to buy a bike too. And I’m riding farther than I ever did before - on my new bike. That one purchase changed both our lives.

Bicycler PROFILE
Kim

Neighborhood:
HOLLYWOOD / GRANT PARK

Reason for bicycling:
Commute, exercise and because we are a ONE CAR FAMILY.

Favorite Portland bicycling event:
SUNDAY PARKWAYS
5.1 OVERALL APPROACH TO IMPLEMENTATION

5.1.1 Introduction
The Portland Bicycle Plan for 2030 is both an action plan and a capital projects plan. The plan lays out a vision for bicycling as a pillar of Portland's transportation system, with a greatly expanded bikeway network, ubiquitous bicycle parking and robust programs to serve all Portland residents. To achieve this vision, it is necessary to develop a strategy for implementation that considers both the near-term funding climate and the possibility of future funding that may result from successfully acting on the recommendations of this plan.

The approach to developing this plan, articulated in Chapter 1.2, is based on the twin assumptions that it is desirable to attract residents to bicycle for transportation who weren't bicycling in 2009, and that the best way to attract future riders is to develop bikeways that provide them with a sense of safety and comfort. As a consequence of this approach, the Portland Bicycle Plan for 2030 recommends a network with many new miles of low-stress bikeways. This chapter sketches an approach for building this bikeway network over time.

Of course, building the network is only one part of implementing this plan. In order to build the network it will be necessary to update the City's bicycle policies and develop design guidance for new street designs, as recommended in this plan. It will also be necessary to expand the offering of encouragement and education programs and link them to the construction of new projects. It will be necessary to effectively enforce traffic laws to encourage safer conditions for all road users. Ultimately, the implementation of this plan depends on the City's ability to identify and secure funding that will support the projects and programs recommended here.

5.1.2 Implementation approach
In the short term, the approach to implementing an expanded bikeway network must consider what is achievable and realistic given foreseeable funding. With multiple indications that the context for funding implementation may shift, this plan needs the flexibility to respond to changing external conditions.

Portland's current and proposed bikeway network comprises three main facility types: trails, low-stress shared roadways and separated in-roadway bikeways on major collectors. At a gross level, each of these three categories of bikeways lends itself to a focused approach to implementation. Such focused strategies offer certain costs and benefits.

For example, one approach might focus on...
Part Five: Strategic implementation plan

completing the trail system. Trails give the greatest separation from motor vehicle traffic and have been demonstrated to attract riders. They are popular and generate much public support. Trails would serve as the foundation of the fine-grained network. Trail projects also tend to be complex undertakings requiring many partners, and tend to be expensive in comparison to other bikeway facility types.

A second approach would be to focus on building cycle tracks and other high-quality separated in-roadway bikeways on Portland’s main commercial streets and major collectors. Similar to Portland’s 1996 Bicycle Master Plan, that approach would emphasize bikeways on collector streets that remake the streets to serve the mobility and access needs of both drivers and bicyclists. Cycle tracks and other protected bikeways on these main streets would be highly visible markers of Portland’s bikeway network expansion. In most instances, cycle tracks would replace roadway space dedicated to motor vehicle travel or parking – a revision that will require strong community support. As cycle tracks are not common facilities in North America, success of this facility type as a low-stress bikeway remains unproven.

A third approach would be to focus on implementing bicycle boulevards and other low-stress shared roadways. Because these facility types are less expensive to implement than trails or cycle tracks, this approach has the advantage of allowing the most miles of network to be implemented for any given level of funding. Because these facilities are not on collector streets they are neither as visible as separated in-roadway bikeways, nor do they provide the same level of access to commercial destinations as separated in-roadway bikeways.

Portland’s approach to implementing its expanded bikeway network, while occasionally focusing on specific bikeways or bikeway types, will necessarily make advances in all three areas. Ultimately, the overall approach to implementation must find the right balance between creating signature projects that demonstrate Portland’s ultimate build-out as a world-class bicycling city while providing attractive and comfortable conditions for bicycle transportation to as many residents as quickly as possible.

Chapter 5.3 describes in more detail the three principal implementation strategies into which the projects in this plan have been sorted. The first of these – the immediate implementation strategy – focuses on what the City can afford in the immediate future. The ‘80 percent’ implementation strategy will implement a comprehensive network that will place a low-stress bikeway within close proximity to at least 80 percent of Portlanders. The ‘world-class’ implementation strategy thoroughly introduces world-class bikeways to many of Portland’s commercial main streets and major collectors. These latter two strategies are not mutually exclusive. As Chapter 5.3 describes, they can be implemented in parallel, as conditions allow.

This parallel approach to implementing the network would inform several activities as follows:

Developing new bikeways
The focus for new bikeways is on achieving maximum separation from high volumes and high speeds of motor vehicle traffic. The five-year immediate implementation strategy calls for building many more miles of bicycle boulevards and other low-stress shared roadways. Bikeways on streets with high motor vehicle volumes will be designed to maximize separation from cars using cycle tracks, buffered bike lanes or wide bike lanes.

Improving existing bikeways
This will be undertaken through ‘area improvement plans’. Unlike the development of new bikeways, which will mostly follow identified City Bikeways or Major City Bikeways corridors, area improvement plans will target parts of the city where existing bikeways do not meet best practices. Portland has collected a wealth of information about deficiencies and needed improvements in our existing system. Area improvement plans will
look at the package of treatments needed to improve cycling conditions in particular areas of Portland.

**Raising the visibility of bicycling**
Highly visible bicycle demonstration projects that showcase innovative facility types will also help build public support for bicycling. These projects allow the Bureau of Transportation to advance new facility types to adapt to the unique needs of residents in different Portland neighborhoods.

**Being flexible**
Chapter 5.3 identifies potential future funding scenarios. In the past, the Bureau of Transportation has benefited from being flexible and seizing opportunities that arise to develop projects. Flexibility to respond to shifting conditions for implementation is critical for the complete implementation of this the *Portland Bicycle Plan for 2030*.

**Implementing interim facilities**
Where it is not possible to implement the ultimate preferred facility immediately, the Bureau of Transportation will look for ways to implement an interim facility or a parallel facility, or make other changes that improve conditions for bicycling.

*Undertaking large-scale demonstration projects*
The Bureau of Transportation will capitalize on opportunities to undertake large-scale demonstration projects. Examples may include Metro’s Active Transportation Demonstration Projects program (begun in 2009), as well as similar efforts under a reauthorized federal highway bill that will extend from the Non-motorized Transportation Pilot Program that was adopted with the previous federal transportation reauthorization. Potential projects for demonstration projects include:

- Inner N/NE Demonstration Project, (a full build-out of the bikeway system north of the Lloyd District)
- Lents Area Demonstration Project, (a full build-out of the bikeway network in a three-mile radius from the Lents Town Center)
- McLoughlin Corridor Path
- Sullivan’s Gulch Trail
- North Willamette Greenway
- Southwest Active Transportation Corridor Project

5.1.3 **Implementation challenges**
As shown in figure 5-2, a low-confidence estimate of the total cost for construction of the capital projects in the *Portland Bicycle Plan for 2030* is nearly $600 million (in 2008 dollars).
Future funding to support bicycling may be either extremely limited or readily available, depending on political conditions and economic forces. The available funding will significantly affect the quality and physical extent of Portland’s future bicycle network. Appendix F discusses possible sources for new funding.

Furthermore, to deliver a set of bicycle projects of this order of magnitude, should the funding become available, the Bureau of Transportation must develop a strategy for efficient project delivery.

5.1.4 Implementation recommendations:

5.1 A. Amend the Transportation System Plan (TSP) to adopt recommended policies and classifications for bicycle transportation.

Specifically:
- Identify funding, timeline and staffing for an overall update of the TSP
- In the event that an overall update cannot be completed in a timely fashion, consider undertaking a technical update of the TSP to adopt the recommendations of this plan
- Use the update of the TSP to develop policy guidance for resolving conflicts between classification

5.1 B. Identify and pursue multiple strategies to increase funding for green transportation.

Specifically:
- Form a task force to recommend new funding sources for bicycle facilities and other green transportation modes
- Work with elected leaders to position the City of Portland to receive funding under the federal reauthorization

5.1 C. Develop a complete street design guide that includes bicycle design guidelines.

Specifically:
- Identify funding, timeline and staffing to produce a new complete street design guide

5.1 D. Expand encouragement programs that provide services and equipment, support behavior changes, raise awareness and provide incentives that increase bicycling.

Specifically:
- Identify new models, partners and funding for program expansion
- Integrate the delivery of programs with projects

5.1 E. Build as much of the bicycle transportation system as possible, as quickly as possible.

Specifically:
- Prioritize projects that are easily implemented that also improve connectivity, expand coverage and maximize separation from motor vehicle traffic
- Be opportunistic and partner with others
- Make incremental improvements by installing interim facilities (such as climbing bike lanes or wide shoulders) or bikeways on parallel routes where projects are not easily implemented in their ultimate configuration; evaluate opportunities for interim facilities in Southwest Portland based on right-of-way needs, stormwater requirements, pedestrian needs and other issues to fill gaps between projects in the 80 percent implementation strategy
- Continue to build new bicycle boulevards
- Continue to refine the planned network and facilities to accommodate local preference, especially by:
  - Funding and developing an East Portland Bicycle Infrastructure Implementation Action Plan that ensures that 80 percent of households will be within a half-mile of a low-stress
Strategic implementation plan

AS ADOPTED
February 11, 2010

facilities on roadways with no sidewalks

5.1 F. Develop strategies to ensure successful delivery of bicycle projects.

Specifically:
- Begin project development on multiple bicycle transportation projects
- Work with the Bureau of Transportation’s Engineering & Technical Services group and the Development & Capital Program to develop strategies for project delivery

5.1 G Fund and construct projects in areas underserved by the bikeway network that score high in indicators of disadvantage.

Specifically:
- Assure that implementation criteria include comprehensive measures of equity, including poverty, minority status and age
- Establish benchmarks for completed projects in targeted areas
- Regularly update the Equity Gap Analysis to account for changes in the low-stress bikeway network so that the results continue to inform project selection
- Develop a tool for addressing the health and equity effects of planned projects
5.2 BIKEWAY IMPLEMENTATION CRITERIA

5.2.1 Introduction
The Portland Bicycle Plan for 2030 lays out an ambitious range of strategies for implementing the bikeway network. Specific projects have been tentatively identified for the 5-year immediate implementation strategy. Additional work remains to set project priorities beyond the immediate period.

The following bikeway implementation criteria are proposed to help guide project selection in future years:

Equity
- How well does the project serve areas that are both deficient in low-stress bicycle facilities and high in the indicators of disadvantage, as informed by the Equity Gap Analysis?
- Is there geographic equity in the overall selection of projects for any given time period?

Community support
- Is the project supported as a priority for the neighborhood, neighborhood coalition, business association or other stakeholders?

Connectivity, access and barrier reduction
- Does the project address a significant barrier?

Visibility of bicycling
- Does the project add to the overall visibility of bicycling as a primary means of transportation?

Innovation
- Is the proposed treatment type innovative?
- Will it highlight a new type of design and in doing so provide needed information about the performance of the design?
- Will the project advance public acceptance of new design types?

Leverage
- Will the project leverage other investments?
- Does the project enhance existing investments made in the bikeway network?

Return on investment
- Is the project affordable with available funding?
- Will implementation of the project preclude implementation of other projects?
- What is the expected return in terms of increased ridership, based on the potential for bicycling as identified in the Cycle Zone Analysis?

How the criteria are weighted will affect overall implementation. Emphasizing equity is a recommendation of this plan, but a focus on equity alone might produce projects that are not highly visible and do not provide the best return on investment. Focusing only on connectivity, access and barrier reduction could encourage high cost investments. An emphasis on visibility might lead to investments mostly on collector and main street commercial roads in Portland’s Central City. Considering only innovation could lead to opportunities to test new facilities and treatments but neglect network cohesion and directness. An emphasis on leverage would lead more toward enhancing existing facilities. Finally, an emphasis on return on investment could lead to projects that would have the greatest impact on the most bicyclists for the least cost, and might ignore necessary high-cost investments.

This plan recommends being nimble in implementation, which requires sufficient flexibility to respond to changing conditions (such as public support or unexpected sources of revenue, for example). The Portland Bicycle Plan for 2030, and the structure of the
implementation strategies and guiding criteria, provides this flexibility.

5.2.2 Analyzing equity

In the summer of 2009, the Bureau of Transportation contracted with Portland State University to conduct an analysis of equity as it relates to the provision of new bicycle facilities in the Portland Bicycle Plan for 2030.

To make bicycling more attractive to historically disadvantaged populations, this analysis identifies areas of Portland where disadvantaged populations live, work, learn, play and access needed services. The study also addresses bicycle access to transit.

The analysis makes it clear that several clusters of census blocks are underserved. It is also evident that differences in age are more prevalent in outlying areas, whereas differences in poverty and race are more common in inner neighborhoods. Figure 5-1 displays the geometric mean of all indicators of disadvantage studied, including poverty, non-white population, youth and older adults, and compares it to areas that are poorly served by the existing low-stress bikeway network. Darker areas represent higher percentages of disadvantaged population, while the outlined boxes call out those census blocks with high percentages of disadvantaged that also rank in the lowest quartile for access to the existing low-stress bicycle network.

The results of this study highlight many areas of Portland where improvements to the bikeway network would serve significant populations that rank high on the indicators of disadvantage. As new segments of the low-stress network are completed, the gap analysis can be easily repeated for the revised network, yielding a new quartile of areas with the least access to low-stress bikeways. The analysis will also be updated with data from the 2010 Census, when it is available.

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1 Equity Gap Analysis, Final draft report by Jennifer Dill; available online at http://www.portlandonline.com/transportation/index.cfm?c=50736&
5.3 NETWORK IMPLEMENTATION STRATEGIES

5.3.1 Introduction

This chapter elaborates on the approach to network implementation strategies introduced in Chapter 5.1. The Portland Bicycle Plan for 2030 recommends three implementation strategies: the immediate implementation strategy, the ‘80 percent’ implementation strategy, and the ‘world-class’ implementation strategy. Each is associated with funding scenarios that provide a starting point for projects that the City of Portland can expect to build in the future.

The immediate implementation strategy presents those projects the City will tackle in the five years following completion of this plan, while the other two strategies are not specifically related to a timeline. The City does not need to complete the 80 percent strategy before beginning to implement the world-class strategy. Either strategy can be implemented – or elements from both can be implemented – within the same period. What distinguishes one strategy from the other is the availability of funding and community support for the strategy.

As further described below, the two main strategies differ significantly in the types of projects they undertake and the costs and challenges associated with their implementation.
Figure 5-2 compares the facilities, miles of bikeway and costs of all three strategies.

5.3.2 The immediate implementation strategy

The immediate implementation strategy focuses on developing shared roadway bikeways – mainly bicycle boulevards – in the initial five years after this plan’s adoption. While bicycle boulevards are the focus, the approach also seeks to advance both trail projects and pilot projects for cycle tracks, as well as other innovative bikeways on main commercial streets and other roadways with high motorized traffic volumes. This approach allows for efficiently spending the limited but tangible funding available for bicycle transportation in the near term, and will quickly make a cohesive bikeway network available to a majority of Portland residents. Such an approach, by building bicycle ridership, should garner increased support for the growth in bicycling investment that will be necessary to implement the complete Portland Bicycle Plan for 2030.

The immediate implementation strategy includes projects from the 80 percent implementation strategy for which funding is likely within five years following completion of this plan. In addition, projects that are already fully funded in either the near-term or mid-term will also be implemented; these are shown in the list of funded projects in Appendix A.

Funded projects will upgrade Portland’s 30 miles of existing bicycle boulevards and develop an additional 15 miles of bicycle boulevards to nearly complete status. This includes completion of the bicycle boulevard on NE Going Street, addressing the crossings at NE Martin Luther King, Jr. Boulevard and at NE 33rd Avenue.

Beginning in 2011, Portland is likely to have available at least $1.5 million annually for discretionary spending for bicycle infrastructure. Including other likely sources, approximately $10-14 million is expected to be available for discretionary bicycle projects over the next five-year period. This is considered the ‘base funding scenario’ that will fuel the immediate implementation strategy. The Bureau of Transportation proposes to spend much of this funding on relatively economical bikeway projects that address equity issues, expand access, enhance connectivity and overcome existing barriers to bicycling. It will also reserve funding for projects that offer high visibility for bicycling and demonstrate innovative facilities.

1 This includes $50,000 annually from Transportation’s Capital Improvement Program, $500,000 annually from the Affordable Transportation Fund, and, beginning in 2011, $1 million annually from increased general transportation revenues from the Oregon Jobs and Transportation Act passed in the 2009 legislative session. This amount is in addition to the allocations to projects funded through the region’s six-year Metropolitan Transportation Improvement Program (MTIP).
Opportunities will be sought during the five-year immediate implementation strategy to build on the demonstrations of innovative treatments piloted in 2009. These included buffered bike lanes on SW Stark Street and SW Oak Street, and a cycle track on SW Broadway near Portland State University. Project development will proceed for initial improvements to the south portal of Downtown Portland and the next round of shared roadway improvements, which includes an advisory bike lane in East Portland (running north/south roughly along 128th, 129th and 130th avenues).

Other projects that will follow include enhancements for the N Vancouver Avenue / N Williams Avenue corridor, more bicycle boulevards and other shared roadways around Portland, and more high-visibility projects.

### 5.3.3 The ‘80 percent’ implementation strategy

The ‘80 percent’ implementation strategy is so named because its completion will result in at least 80 percent of Portland residents being within one-quarter mile of a developed low-stress bikeway. Implementation of this strategy is also likely to get the City most of the way toward meeting its vision of more than a quarter of all trips made by bicycling.

The 80 percent implementation strategy focuses on spreading available funding widely, so that most Portland residents are close to low-stress bikeways. Most of the bikeway projects assigned to the 80 percent implementation strategy will construct shared roadway bikeways, and most of those will be bicycle...
boulevards. The strategy also includes a number of other high-priority facilities that can be developed as conditions allow. In particular, this strategy recognizes the importance of the trail system as the foundation of the low-stress network. Accordingly, this strategy includes the city’s premier signature trail projects (the Sullivan’s Gulch Trail, the North Willamette Greenway and the Red Electric Trail).

Portland needs to be aggressive in seeking funds, including from sources not yet identified, to build the types and breadth of facilities recommended in this strategy. A detailed discussion of potential funding sources can be found in Appendix F.

5.3.4 ‘World-class’ implementation: completing the network

The ‘world-class’ implementation strategy is so named because its completion will create a truly world-class system of bikeways in Portland. It will establish bicycle infrastructure as an essential element of the urban streetscape. This strategy emphasizes the build-out of high-quality separated in-roadway bikeways, such as cycle tracks and buffered bike lanes, on main commercial streets and other higher volume collector roadways. The projects included in this strategy represent the largest part of the network’s development.

While the construction costs for this strategy...
### Program Scenarios COSTS:

<table>
<thead>
<tr>
<th>Scenario</th>
<th>Moderate</th>
<th>High</th>
<th>World-class</th>
</tr>
</thead>
<tbody>
<tr>
<td>Cost</td>
<td>$1.56 million</td>
<td>$3.9 million</td>
<td>$5.9 million</td>
</tr>
</tbody>
</table>

### PROGRAM LEVELS (continued)

<table>
<thead>
<tr>
<th>Program</th>
<th>Moderate Cost</th>
<th>High Cost</th>
<th>World-class Cost</th>
</tr>
</thead>
<tbody>
<tr>
<td>Brown bags &amp; classes</td>
<td>15 per year  $5,000</td>
<td>30 per year $10,000</td>
<td>30 per year $10,000</td>
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<tr>
<td>Incentives</td>
<td>Continuation of existing state tax credit for bicycle related projects N/A</td>
<td>Development of City of Portland business tax credit program for bicycle related investments $500,000</td>
<td>Development of City of Portland business tax credit program for bicycle related investments $500,000</td>
</tr>
<tr>
<td>Safe Routes to School program</td>
<td>25 schools per year with ten hours of in-classroom bicycle training $500,000</td>
<td>100 schools per year in-classroom bicycle training and bicycle outreach to all elementary schools $1.5 million</td>
<td>All schools participate in Safe Routes with ten hours of in-classroom bicycle training and bicycle outreach to all schools $3 million</td>
</tr>
</tbody>
</table>

**FIGURE 5-3: Program scenarios costs (CONTINUED from previous page)**

### 5.4 PROGRAM IMPLEMENTATION SCENARIOS

#### 5.4.1 Funding for programs

Bicycle encouragement and promotional activities are traditionally funded through a combination of sources that include grants, energy credits and sponsorships. Funding for encouragement and education related to specific capital project implementation may be included in the capital funding.

**Program funding scenarios**

Figure 5-3 illustrates funding requirements for encouragement programs under three funding scenarios. The moderate funding scenario continues funding for programs at a similar rate to the 2009/2010 fiscal year. The world-class scenario shows what funding would be needed to achieve the preferred level of program delivery recommended in this plan.

#### 5.4.2 Integrating program delivery with projects

As projects are completed, programs in encouragement, education and enforcement that are directly related to these projects should be provided.

In implementing the *Portland Bicycle Plan for 2030*, the City of Portland will construct miles of new bikeway facility types. Residents may not immediately understand how to behave...
Strategic implementation plan
AS ADOPTED
February 11, 2010

in the presence of these new bikeway types. This unfamiliarity should be addressed in each project through an integrated approach in the delivery of both projects and programs.

Portland’s experimental bike box project in 2008 is a successful example of this integration. The installation of the bike boxes at targeted intersections was well-coordinated with other education and enforcement efforts. Prior to their installation, advertisements of the new bicycle facilities were located on billboards and bus sides, while new instructional signs were placed at the targeted intersections. This action helped generate significant media attention on the bike boxes.

When the new bike boxes were installed, regular users of the intersections were often aware of them, knew of their intent and were better prepared to react to them. Once the intersections were colored, Portland police officers immediately enforced violations at them. The initial enforcement began as an extension of the education effort, as officers provided instructional pamphlets to violators. After two weeks at each location, police officers began writing tickets to violators.

This approach was extremely successful and set precedence for the creation of new bicycling facilities. Furthering this success means incorporating education, enforcement, encouragement and evaluation when constructing all of Portland’s new bicycle facilities. Incorporating these elements into future projects should be performed during the initial development phase of these projects, as decisions about appropriate enforcement and evaluation may influence both design and project schedule.

A model for integrating project and program delivery

A typical project might proceed as follows.

1. Identify locations where new bikeways are to be developed (ideally, more than one bikeway would be developed simultaneously in a targeted area so that the education and encouragement efforts can benefit from economies of scale)

2. For innovative facilities, collaborate early with the Portland Police Bureau to identify issues related to enforcement (this was a successful model for Portland’s bike boxes, as well as for the demonstration cycle track on SW Broadway, where early discussions with the Portland Police Bureau strongly influenced elements of the design)

3. Develop standard educational materials describing the design and intent of the new bikeway treatments

Portland bike box
Get Behind It
THE BIKE BOX
Portland’s new green space

A healthy community, vibrant neighborhoods... and bicycles everywhere!
4. Several weeks in advance of construction, inform residents within the influence area of the project to the changes they can expect (billboards, bus sides and newspaper advertisements for improvements targeted over large areas, while door hangers, neighborhood newsletters articles and local newspapers for smaller scale projects).

5. Several weeks in advance of implementation, collaborate again with the Portland Police Bureau to identify the implementation date and potential enforcement issues, and schedule enforcement activities (provide officers with necessary educational materials so that initial enforcement can focus more on education than punishment).

6. For projects that encompass a large area, coordinate encouragement efforts to get residents riding on the new facilities.

7. Evaluate the success of the project by conducting before and after bicycle counts in the area or evaluating area wide changes in travel behavior in response to new bikeways (for an innovative facility type, evaluation can illuminate how residents use the facility and whether or not the Bureau of Transportation needs to modify its design).

5.5 EVALUATION AND MEASUREMENT

5.5.1 Introduction

Plans, projects and programs are evaluated to gain information that can guide future decisions. Evaluation can help to measure achievement of objectives, provide accountability to the public (and those who fund projects or programs) and increase community support for expanded efforts.

5.5.2 Measuring performance

This plan recommends the further development of performance measures and benchmarks for bicycling that fall under seven general themes: Bicycle mode share, Bikeway network, Children bicycling, Bicycle safety, Economic vitality, Healthy & livable city and Environment. Each of these themes is discussed in more detail below. Figure 5-4 lists a preliminary set of performance measures sorted into these themes.

The City of Portland has already set two benchmarks for bicycling. In May 2009, Mayor Sam Adams attended the Velo-City 2009 conference in Brussels and signed the Charter of Brussels, committing the City to numerous activities to support bicycling and achieve these two benchmarks:

- At least fifteen percent of all trips by bicycle by the year 2020
- Risk of a fatal bicycle crash reduced by 50 percent by the year 2020

Measuring bicycle mode share

The Portland Bicycle Plan for 2030 lays out a vision of bicycling as a pillar of Portland’s transportation system, with a bicycle mode share of 25 percent of all trips by 2030. Data on bicycling mode share for all trips in Portland has not been collected since Metro performed a Household Activity Survey in 1994-1995. Metro is poised to perform a new Household Activity Survey in 2010. The new data will set the baseline for total bicycle mode share.

Annual data is available from multiple sources to gauge bicycling’s share of work trips. The two principle sources are the American Community Survey (ACS) from the U.S. Census Bureau and the Portland Auditor’s Survey of Portland Residents. The Auditor’s survey asks about both primary and secondary means of travel to work. For 2008, the ACS showed that 6.4 percent of work trips in Portland were made by bicycling. The Auditor’s survey for 2009 reported that seven percent of Portland residents use a bicycle as their primary means of travel to work, and another ten percent as their secondary means. The Auditor’s data is also available by city district.

Data about trips switched from drive-alone to bicycling and other modes is collected as part...
of the evaluation component of SmartTrips programs.

**Bikeway network evaluation**
The bikeway network is the foundation of Portland's bicycle transportation system. There are many ways of measuring the City’s performance on delivering the expanded network recommended in this plan. Many characteristics of the network can be evaluated based on data that is readily available, such as percent of the planned network that has been completed. Others, such as network connectivity, are more difficult to evaluate with existing tools. Although data on user satisfaction with the bicycle network would be valuable, no assessment tool to collect this information exists at the time of the publication of this plan.

**Children bicycling**
This theme is focused on children bicycling to school. The number of children walking or bicycling to school, the number of children trained in safe bicycling skills and the availability of school bike parking all will be measured as part of the Safe Routes to School program.

**Bicycle safety**
The bicycle crash rate is one important measure of bicycle safety. As discussed in Chapter 4.2, changes in crash reporting practices can

<table>
<thead>
<tr>
<th>Themes</th>
<th>Performance category</th>
<th>Performance measure</th>
</tr>
</thead>
<tbody>
<tr>
<td>Bicycle mode share</td>
<td>Bicycle share of all trips</td>
<td>Percent bicycle mode share for all trips (citywide / by district)</td>
</tr>
<tr>
<td></td>
<td>Bicycle share of commute trips</td>
<td>Bicycle share of all commute trips / mode share targets by district</td>
</tr>
<tr>
<td>Bikeway network</td>
<td>Network completion</td>
<td>Percent of residents within a quarter mile of an existing improved bikeway / percent of bikeway miles completed</td>
</tr>
<tr>
<td></td>
<td>Network connectivity</td>
<td>Bikeway network density: miles of bikeway per square mile / percent of missing links (total miles of gaps) in in the active bikeway network improved</td>
</tr>
<tr>
<td></td>
<td>Attractiveness of bicycling for short trips</td>
<td>Bicycle share of all trips less than three miles</td>
</tr>
<tr>
<td></td>
<td>Access to transit stations and centers</td>
<td>Percent of transit centers / stations with direct links to bikeway network from all directions</td>
</tr>
<tr>
<td></td>
<td>Access to low-stress bikeway network</td>
<td>Percent of households within a quarter mile of a low-stress bikeway</td>
</tr>
<tr>
<td></td>
<td>Quality of bicycle facilities (comfort / maintenance)</td>
<td>Percent of residents who feel safe and comfortable on bikeways / percent of residents satisfied with bikeway conditions</td>
</tr>
</tbody>
</table>

**FIGURE 5-4:** Performance measures (CONTINUED on next page)
improve the quality of bicycle crash data by including crashes that do not involve a motor vehicle. Data on user perceptions of safety could be very valuable.

**Economic vitality**

The contribution of bicycling to Portland’s economic vitality can be measured in multiple ways. These ways include assessing the strength of bicycle-related industries and employment, the impact of bicycling on tourism, and the availability of bicycle access and bicycle parking to commercial centers.

**A healthy and livable city**

Three key measures are suggested to better create a healthy and livable city: healthy residents, neighborhood livability and demographic equity. As a measure of healthy residents, the Centers for Disease Control and Prevention publishes statistics for Metropolitan Service Areas on the percentage of adults who meet the recommended levels of physical activity through lifestyle activities (including leisure, household and transportation). Neighborhood livability is a subjective measure for which proxies can be found in the Auditor’s survey. Additional work remains to identify sources for data on the extent to which women, minorities and disadvantaged populations travel by bicycle.

### PERFORMANCE measures:

<table>
<thead>
<tr>
<th>Themes</th>
<th>Performance category</th>
<th>Performance measure</th>
</tr>
</thead>
<tbody>
<tr>
<td>Bikeway network</td>
<td>End of trip facilities (citywide)</td>
<td>Percent of residents satisfied with availability of public bicycle parking</td>
</tr>
<tr>
<td></td>
<td>End of trip facilities at transit</td>
<td>Percent of transit stations that meet TriMet design standards</td>
</tr>
<tr>
<td></td>
<td>Capital spending on bicycle infrastructure</td>
<td>Increase in funding for bicycle facilities</td>
</tr>
<tr>
<td></td>
<td>Geographic equity of the network</td>
<td>Percent of low-stress bikeways improved that serve areas in the lowest quartile of existing service (low-stress bikeway miles per square mile) and the highest quartile of disadvantaged population groups (percent disadvantaged population per block group)</td>
</tr>
<tr>
<td>Children bicycling</td>
<td>Children walking or bicycling to school</td>
<td>Percentage increase in students walking or bicycling to school (percent of schools with 50 percent of children within a mile of walking or bicycling to school)</td>
</tr>
<tr>
<td></td>
<td>Children trained in safe bicycling skills</td>
<td>Percent increase in children trained in bicycling safety</td>
</tr>
<tr>
<td></td>
<td>School bike parking</td>
<td>Percent of Portland schools with adequate bicycle parking</td>
</tr>
</tbody>
</table>

**FIGURE 5-4: Performance measures (CONTINUED from previous page AND on next page)**
The environment
The primary measure for the environment will be level of greenhouse gas emissions.

5.5.3 Developing new assessment and reporting tools
Several performance measures address user satisfaction with various aspects of the bicycle transportation system. One method of assessing satisfaction and reporting on both subjective and objective performance measures could be modeled on Copenhagen’s Bicycle Account. Published every two years, the Bicycle Account is an assessment of bicycling intended for both the citizens of Copenhagen and the City government. U.S. cities with similar programs include San Francisco, California and Seattle, Washington. The Bureau of Transportation has also considered undertaking resident surveys to assess subjective criteria (such as how comfortable a facility feels to bicyclists). To develop this assessment and reporting on a regular basis, the Bureau will need to identify the needed funding to support it.

5.5.4 Annual summer bicycle counts
The Portland Bureau of Transportation’s annual summer bicycle counts have been the City’s principle means of establishing baseline bicycle ridership throughout the city and tracking ridership trends on the bikeway network. Each summer, approximately 100 volunteers assist the City in counting bicyclists at various locations.

PERFORMANCE measures:

<table>
<thead>
<tr>
<th>Themes</th>
<th>Performance category</th>
<th>Performance measure</th>
</tr>
</thead>
<tbody>
<tr>
<td>Bicycle safety</td>
<td>Rate of severe and fatal crashes</td>
<td>Percent reduction in per-trip rate of serious and fatal injury crashes (all trips / riders under age 18)</td>
</tr>
<tr>
<td>Perceived safety</td>
<td></td>
<td>Percent of residents who do not walk or bicycle due to traffic safety concerns / percent of residents with a favorable sense of safety</td>
</tr>
<tr>
<td>Economic vitality</td>
<td>Bicycle-related employment</td>
<td>Percent increase in bicycling-related jobs and businesses / number of bicycle shops per capita</td>
</tr>
<tr>
<td>Employer bicycle parking facilities</td>
<td></td>
<td>Percent of residents satisfied with their ability to store their bicycle at their workplace</td>
</tr>
<tr>
<td>Bicycle tourism</td>
<td></td>
<td>Percent increase of Portland visitors engaged in bicycling / percent increase in dollars into Portland’s economy by tourists engaged in bicycling</td>
</tr>
<tr>
<td>Access to commercial destinations</td>
<td></td>
<td>Percent of households with neighborhood commercial areas within one mile of their home / percent of bikeways on classified main streets that are developed</td>
</tr>
</tbody>
</table>

FIGURE 5-4: Performance measures (CONTINUED from previous page AND on next page)
Part Five: Strategic implementation plan

PERFORMANCE measures:

<table>
<thead>
<tr>
<th>Themes</th>
<th>Performance category</th>
<th>Performance measure</th>
</tr>
</thead>
<tbody>
<tr>
<td>Economic vitality</td>
<td>Commercial area bicycle parking</td>
<td>Percent of commercial corridors (designated main streets) that have a bicycle parking plan completed by the City of Portland and the respective business association</td>
</tr>
<tr>
<td>Healthy &amp; livable city</td>
<td>Healthy residents</td>
<td>Percent of residents meeting the recommended level of physical activity through transportation (such as walking or bicycling)</td>
</tr>
<tr>
<td></td>
<td>Neighborhood livability</td>
<td>Percent of local streets with low traffic volumes (such as less than 3,000 cars per day)</td>
</tr>
<tr>
<td></td>
<td>Demographic equity</td>
<td>Percent of bicycling population: low income, female, non-white, under age 18, over age 65, etc...</td>
</tr>
<tr>
<td>Environment</td>
<td>Reduced vehicle emissions</td>
<td>Percent vehicle miles travelled (VMT) reduction in Portland / percent transportation-related greenhouse gas (GHG) reduction</td>
</tr>
</tbody>
</table>

FIGURE 5-4: Performance measures (CONTINUED from previous page)

around Portland during peak commute times (7:00 to 9:00 a.m. and 4:00 to 6:00 p.m.) to record information such as helmet use, gender and turn movements. Additionally, 24-hour automated counts are conducted using pressure-sensitive pneumatic hoses on Portland's bike-friendly bridges and at selected trail locations. The bicycle counts data is used in a variety of analyses, including:

- Ridership growth on Portland's four main Willamette River bicycle bridges
- Comparison of ridership trends and bikeway development over time
- Comparison of ridership trends and indexed crash rates
- Total ridership, helmet use and gender split trends over time, throughout Portland and within distinct neighborhoods

The longitudinal data collected through Portland's annual counts has many applications, such as:

- Identifying opportunities for improving the bikeway network
- Informing the development of the City's bicycle wayfinding system
- Forecasting bicycle demand for new, retrofitted or improved infrastructure
- Validating travel demand models
- Validating other sources of information on ridership and mode split trends, such as the City Auditor’s Annual Service, Efforts, and Accomplishments Survey, the U.S. Census and others

An added benefit of Portland's bicycle counts program is that it involves the community and generates excitement about biking in Portland at the community level. Additionally, the
quantity of Portland’s bicycle ridership data and the quality of its counts program have made it a model of data collection and community involvement best practices for other cities. The Bureau of Transportation regularly responds to inquiries from public agencies, businesses, private firms, citizens and academic institutions regarding its counts program and ways in which similar practices can be implemented in other places.

5.5.5 Program evaluation
Encouragement activities related to increasing bicycle use are a cost-effective means for shifting the economies away from oil dependence and will be integral components to climate change solutions. It is becoming increasingly important to measure and verify the effectiveness of such programs, as competition for limited funds will likely intensify.

5.5.6 Evaluation and equity
As the bikeway network is constructed, it will be important to continue to analyze equity as it relates to the provision of new bicycle facilities. Measures related to aspects of equity are included in several of the performance themes and proposed measures.

5.5.7 Evaluation and measurement recommendations
5.5 A. Continue to expand the means of evaluating how well the public is being served by Portland’s bikeways network and the programs that support bicycling.

- Refine the performance measures for the bicycle transportation system and set baseline levels and periodic benchmarks to gauge progress toward the objectives of the Portland Bicycle Plan for 2030
- Continue and expand annual bicycle counts
- Improve the transparency and availability of annual bicycle counts data, especially by making it available to the public online and integrating it into Transportation’s Traffic Data (TDAT) software
- Expand collection of before and after data associated with encouragement programs and new infrastructure
- Continue to explore how analysis of geographic information can inform project priorities and improve the equitable delivery of public services
- Expand surveys and evaluation to assess the attributes of the ‘interested but concerned’ population
- Collaborate with Portland State
University’s Center for Transportation Studies and Initiative for Bicycle and Pedestrian Innovation to develop new means of evaluation

- Collaborate with other universities and other cities throughout the United States and elsewhere to establish best practices for measuring and sharing information

- Continue annual SmartTrips evaluations

- Collaborate with Metro to improve their transportation demand models and forecasting to better reflect bicycle trips

- Collaborate with Metro to structure the upcoming regional household activity survey so that it provides useful baseline data for identified areas of targeted bikeway investments