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Best Practice White Paper #2: Prioritization

Seattle Bicycle Master Plan Update

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INTRODUCTION

As part of Seattle’s Bicycle Master Plan Update, the City will develop a project prioritization framework based on the Plan’s updated goals and objectives framework. By developing and implementing a prioritization framework, Seattle can develop a prioritized list of critical and strategic bicycle improvements that will be incorporated into the City’s annual work programs and Capital Improvement Program. These capital improvements will ultimately enable funding to be allocated to specific projects. This white paper presents a range of common prioritization criteria, key considerations for Seattle (both formally adopted and informally practiced), and prioritization methodologies to help inform the development of the Seattle’s future bikeway prioritization methodology and process. Best practices are drawn from several of Seattle’s peer cities, including Portland, Minneapolis, and Vancouver, B.C., as well as global leaders in cycling network development like Copenhagen and London. These cities take different approaches, yet similar themes emerge across all peer cities. The focus of this paper is on how cities prioritize capital facilities (not programs or other actions).

WHY IS BICYCLE PROJECT PRIORITIZATION NEEDED IN SEATTLE?

Like many cities and regions across the nation, Seattle faces difficult transportation investment tradeoffs in the current economic climate—both across modes and within bicycling alone. The reality of Seattle’s constrained city budget necessitates cost-effective and strategic investments in bicycling infrastructure. This will certainly require prioritizing bicycle infrastructure investments across facility types, cyclist markets, geographies, and a range of other different variables that might impact project prioritization. Key issues that Seattle seeks to address include:

- What are common project evaluation criteria use to prioritize identified bikeway improvements?
- What prioritization methodologies are being employed for bicycle projects and other modal projects?
- How should funds be allocated between new facilities and upgrades to existing facilities?
- How should Seattle prioritize funding between citywide and neighborhood-scale projects, geographies, and populations?

Leading bicycling cities across North America and Europe employ a variety of methodologies and guidelines that address these challenges and inform plan implementation.

PROJECT PRIORITIZATION METHODOLOGIES

There is no one size fits all prioritization framework. Prioritization processes and their underlying methods must reflect the community’s unique vision, goals, and objectives of its bicycle network (as one layered component of the city’s transportation system), as well as the role of bicycling in the city’s multimodal transportation strategy. Understanding these guiding principles can help determine how a prioritization framework can be structured to help identify projects that address the community’s vision. The goals of Seattle’s Plan—including increasing ridership, safety, connectivity, equity, and livability— and their underlying objectives should shape the prioritization methodology.

In addition to this basic tenet of project prioritization, other key factors that require consideration when creating a prioritization framework include:

- Do prioritization criteria reflect community goals for bicycling? Any city that establishes prioritization criteria and criteria weighting should clearly define desired outcomes and reflect these outcomes.
- Have other programs and strategies (like safe routes to school or transit enhancements) been identified that inherently direct project prioritization?
- Is the prioritization framework desired to be more objective, subjective, or a mixture of both?
- Are there factors that could impact the speed of implementation? Common factors include grant availability, near-term street repaving/reconstruction programming, political backing, or specific projects that achieve key Plan goals like equity or safety.
- Is data available for objective analysis? If not, how long will data collection take and at what cost?

The following sections highlight some successful prioritization tools, methods, and criteria used in a range of modal project types, including transit and pedestrian prioritization processes.

Methodologies developed for the Puget Sound region

The 2007 King County Healthscape project, led by Urban Design 4 Health, developed the [King County Transportation Programming Tool](#) (TPT) as a way to compare benefits across projects and prioritize non-motorized projects according to community objectives. The TPT is a spreadsheet methodology that prioritizes active transportation improvements by evaluating topic areas such as project type (e.g., pathway, barrier elimination, spot improvement, traffic calming, or bikeway corridor improvement), safety, proximity to transit, new connections, accessibility, and potential demand. Each topic area undergoes a micro-evaluation using a set of outcome-based criteria, which are listed in Figure 1.¹

The ability to prioritize between different facility or project types is important as it reflects the relative value a community might place on different types of facilities and score them according to their goals and objectives for bicycling. For example, a community that seeks to increase trips made by less confident cyclists that ride sparingly might place a higher weight on projects that emphasize separated facilities, aggressive intersection treatments, and traffic calming. Another benefit of this tool is that, in addition to conventional network improvement prioritization and project-by-project prioritization, the TPT tool can examine short segments within the same corridor to determine implementation phasing, if funding is limited. This methodology was recently applied in Federal Way's draft Bicycle and Pedestrian Master Plan.

¹ Note: These primary criteria, particularly the sub-criteria within the Safety and Equity primary criteria, tend to score facilities that offer greater separation from motorized traffic.

Figure 1 Primary Outcome Criteria for the HealthScape King County Transportation Programming Tool

Primary outcome criteria	Transportation			Environment		Health		Safety		Equity
	Factors affecting primary criteria/secondary criteria	Increase in bike/walk trips	Increase in transit trips	Decrease in vehicle trips	Decrease in per capita emissions	Decrease in per capita GHGs	Increase in physical activity	Decrease in obesity	Decrease in vehicle conflicts	Decrease in ped/bike-vehicle conflicts

Source: Urban Design 4 Health, HealthScape 2007

Common project evaluation criteria

Several of Seattle’s peer cities, including Portland, Minneapolis, and Vancouver, B.C., use similar criteria for prioritizing bicycle projects. These are presented in Figure 2. Numerous recurring themes appear in each of these cities’ prioritization criteria, including equity; community support; connectivity, access, and barrier reduction; innovation; leverage; travel demand; and return on investment. Some cities include unique criteria, such as the ability of a project to extend the visibility of bicycling, inclusion in an adopted plan, timeliness, impact on parking, and project cost.

Minneapolis’ project selection criteria (Figure 2) were developed for use in the implementation of their 2011 Bicycle Master Plan. The Bicycle Advisory Committee assists the City in annually reviewing and selecting projects for inclusion in the 5-year Capital Improvement Plan. To date, the prioritization criteria are used in a narrative manner and are not assigned scores or weights.

Portland’s Bike Plan for 2030 sets a policy framework of building out a network of low-stress bikeways proximate to 80% of residents, including mostly bike boulevards (neighborhood greenways), off-street paths, and separated cycle-tracks. Considering the environment of limited funding, Portland focuses resources on building out more miles of inexpensive neighborhood greenways and only dedicates funding to a few significant trail projects in the near term. The BMP does not prescribe the order of implementation of bikeway projects. Similar to Minneapolis, Portland does not use prioritization criteria quantitatively, but rather qualitatively assesses projects as funding opportunities arise.

The criteria presented in Figure 2 for Vancouver, B.C. was used to develop the project priorities set in the work program, *Cycling in Vancouver: Looking Forward to 2010 and 2011*. Vancouver initially used a criteria matrix and weighting scheme to prioritize bicycle projects. The weighting scheme assigned the highest importance to safety improvements; the potential to increase bicycling trips and the potential for cost sharing and coordination with other agencies came next. The rest of the criteria were assigned lower weighting values that placed them on a secondary level.

However, Vancouver has since stepped back from that method as they are now focusing investment on improvements to existing facilities rather than new facility construction. Since Vancouver has a strong bicycle network backbone, the emphasis of their bicycle program has shifted to upgrading existing facilities to entice new cyclists in areas with low cyclist volumes. The City’s Active Transportation Program recognized the need to adopt a more nimble, adaptive approach to be able to take advantage of new information and opportunities as they arise. The

City now establishes priority projects and annually revisits the plan in light of changes in the built environment and community needs and priorities.

How can this be applied in Seattle?

While Seattle is still in the phase of updating and building out its bicycle facility network, it can look to Vancouver as an example of how to use prioritization during near-term network build out and future phases when the bicycle network is extensive and more mature. Likewise, community support will be an important factor in the development of the bicycle network, considering the nature of Seattle's strong neighborhood involvement. Similarly, Seattle's topography plays a major role in the choice to bike. This is a criteria area that is seldom, if ever, used, but is highly applicable to Seattle's context. Based on the Bicycle Master Plan Update's goals to increase ridership, connectivity, and livability and objectives to apply a context sensitive approach and build leading-edge bicycle facilities, projects that aim to improve bicycle mobility through Seattle's hillier neighborhoods (through the use of climbing lanes, buffering to provide more comfort, etc.) could be considered a higher priority.

Perhaps most important is the ability to leverage opportunity. A flexible approach to bikeway prioritization that allows for opportunistic action can speed the pace of implementation and reduce implementation costs. Likewise, understanding the competing modal needs of a corridor should be integrated into any future evaluation framework. In deciding which criteria to use and in what way, Seattle should consider a two-tiered approach:

STEP 1. Develop and adopt a formal qualitative, policy-based prioritization methodology for bikeway development with the intent of identifying the **types** of projects appropriate for implementation in specific phases based on a variety of policy needs. This initial step in the evaluation framework should be directly tied to the plan goals and objectives, in addition to considering facility types, market types, and implementation timeframe. As sub-step of this could include guidance on when to establish a mainline versus parallel bikeway along multimodal corridors with competing demands for space.

STEP 2. Establish a finer-grained quantitative project prioritization mechanism that prioritizes individual projects. The City should ensure all criteria are measurable and should determine what methods for data collection and analysis will be necessary to apply the criteria during the prioritization process. SDOT must weigh the cost, effort, and quality of data needed to ensure project prioritization uses reliable data inputs. Potential criteria may include:

1. Safety
2. Connectivity
3. Equity
4. Access (reduces or eliminates a barrier)
5. Leverage (e.g., does the project help leverage an existing investment?)
6. Travel demand

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Figure 2 Bicycle project evaluation criteria of leading North American bicycling cities

Criterion	Minneapolis	Portland	Vancouver, B.C.
Equity	<ul style="list-style-type: none"> ▪ Geographic equity: does the project supplement the existing bicycle system by removing barriers and closing system gaps? ▪ Demographic equity: does the project serve populations with lower than average rates of bicycling, considering race/ethnicity, class, gender, and age? 	<ul style="list-style-type: none"> ▪ 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? 	N/A
Safety	<ul style="list-style-type: none"> ▪ Does the project provide a safer and more appealing alternative to what currently exists in a given corridor? 	N/A	<ul style="list-style-type: none"> ▪ Degree to which facility addresses known or perceived safety concerns. (Weighting: 7)
Community Support	<ul style="list-style-type: none"> ▪ Has there been or is there public outreach planned for the project? What is the level of community support for the project? 	<ul style="list-style-type: none"> ▪ Is the project supported as a priority for the neighborhood, coalition, business association, or other stakeholders? 	N/A
Connectivity, Access, and Barrier Reduction	<ul style="list-style-type: none"> ▪ Does the proposed project supplement the existing bicycle system by removing barriers and closing system gaps? ▪ Does the project connect Minneapolis to surrounding communities and facilitate the ability to take longer trips by bicycle? ▪ Does the project provide bicycle access to popular destinations such as schools, parks, and public spaces? 	<ul style="list-style-type: none"> ▪ Does the project address a significant barrier? ▪ Will the treatment make the facility usable by the interested but concerned? ▪ Does the project close a significant gap in the connectivity of the bikeway network? ▪ Does the project facilitate access to key destinations? ▪ Does the treatment mesh with deficiencies the Portland Bureau of Transportation identified in its Cycle Zone Analysis? 	<ul style="list-style-type: none"> ▪ Existing bicycle volume; considers whether proposed facility is already on a “desire line.” (Weighting: 1) ▪ Proximity to parallel cycling facilities of same or higher level of service; reflects desire for a connected grid of bicycle routes. (Weighting: 2) ▪ Degree to which facility will overcome gap, barrier, or bottleneck in cycling network. (Weighting: 3)
Innovation	<ul style="list-style-type: none"> ▪ Does the project allow the City to pilot a new approach or design element to improve safety, comfort, and/or accessibility that is not currently used in Minneapolis? ▪ Does the project incorporate a successful approach that has been tried in other cities but not used in Minneapolis? 	<ul style="list-style-type: none"> ▪ 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? 	N/A

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Criterion	Minneapolis	Portland	Vancouver, B.C.
Visibility of Bicycling	N/A	<ul style="list-style-type: none"> ▪ Does the project add to the overall visibility of bicycling as a primary means of transportation? 	N/A
Leverage	<ul style="list-style-type: none"> ▪ Does the project leverage funding from external sources? 	<ul style="list-style-type: none"> ▪ Will the project leverage other investments? ▪ Does the project enhance existing investments made in the bikeway network? 	<ul style="list-style-type: none"> ▪ Potential for cost sharing and coordination with other agencies; opportunities to implement bike facilities as part of other infrastructure projects would generate efficiencies. (Weighting: 4)
Travel Demand	<ul style="list-style-type: none"> ▪ Is the project expected to increase the number of people bicycling and/or the number of trips taken by bicycle? ▪ Does the project meet or help create a demand for bicycling in population and employment concentrations, with a focus on high trip generation areas? Is the project anticipated to serve travel needs in all seasons? 	<ul style="list-style-type: none"> ▪ What is the expected return in terms of increased ridership, based on the potential for bicycling as identified in the Cycle Zone Analysis? 	<ul style="list-style-type: none"> ▪ Potential for generating new bicycle trips, considering type of facility, end-of-trip facilities nearby, destinations along the route, connections to transit, topography of corridor. (Weighting: 5)
Return on Investment	<ul style="list-style-type: none"> ▪ How much will each project cost, how many users will benefit, and what level of safety and convenience benefit will it provide to users? ▪ Are operations and maintenance responsibilities defined? ▪ Are there differences between projects in the ability to maintain the facility over time? 	<ul style="list-style-type: none"> ▪ 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? 	N/A
Adopted Plan	<ul style="list-style-type: none"> ▪ Is the project part of an approved regional, city, agency, or neighborhood plan? 	N/A	N/A
Timeliness	<ul style="list-style-type: none"> ▪ Is the project timely and will it be ready for construction in the funding cycle? 	N/A	N/A
Cost	N/A	N/A	<ul style="list-style-type: none"> ▪ Cost per kilometre. (Weighting: 2)
Parking impact	N/A	N/A	<ul style="list-style-type: none"> ▪ Potential impact on on-street parking and loading; considers impacts on supply of curbside for parking and loading and on City revenues. (Weighting: 1)

Case Study:

Bikeway prioritization in Copenhagen

As one of the most bicycle-friendly cities in the world, Copenhagen's existing network of bicycle infrastructure and cycling rates are far more advanced than that of any city in the U.S. However, Seattle can learn from the approach they have used to prioritize network development and promote cycling in order to become the world's premier cycling city.



Image from Nelson\Nygaard

Copenhagen's most recent strategic cycling plan, *Good, Better, Best – The City of Copenhagen's Bicycle Strategy, 2011-2025*, sets long-term guidelines and priorities to reach the goal of becoming the best bicycle city in the world. Project priorities are based on political and community goals that focus on getting more people to cycle; retaining existing cyclists; ensuring a favorable cost-benefit ratio for investments; and developing a coherent bikeway network of high-quality facilities supported by target social marketing campaigns (including newcomers and children). Specific indicators that are assessed include the effect on travel time, comfort, perceived safety, statistical safety, and ability to leverage implementation from new development projects and other multimodal transportation improvements.

In addition to evaluating these effects, Copenhagen uses a variety of qualitative and quantitative methods, recognizing that prioritizing bicycle projects is not a science but rather an art. Their approach includes gathering stakeholder input through focus groups with cyclists and non-cyclists, before and after studies of projects (both interviews and data collection), estimated travel time benefits for all modes (not only cyclists), comfort level, and safety.

The City also developed the *Cycle Track Priority Plan, 2006-2016* to plan for 70 kilometers of new cycle tracks and cycle lanes. Similar to the *Good, Better, Best – The City of Copenhagen's Bicycle Strategy, 2011-2025*, the cycle track priority plan emphasizes travel time, perceived safety and comfort, and improving access to cycle tracks by expanding capacity on existing cycle tracks or parallel corridors and developing new cycle tracks. The decision to construct a new cycle track or use neighborhood traffic calming methods is made on a case-by-case basis.

While the City utilizes multiple methods to determine and prioritize bicycle projects, they also employ an open public process that informs when data can provide a solid basis for a decision and when City and community expertise should form the decision.

Source: Personal Interview with Andreas Rohl, City of Copenhagen Bicycle Coordinator

LEARNING FROM OTHER MODAL PRIORITIZATION EFFORTS

Multiple Account Evaluation

Multiple Account Evaluation (MAE) is an approach that assesses tradeoffs between corridor alternatives and/or different corridors based on identified desired outcomes. Quantitative and qualitative criteria for each outcome, or account, are used to foster discussion about priorities and tradeoffs. The MAE does not prescribe a specific right answer but rather can be used as a discussion tool to better inform decision-makers.

Key goals are established and assessment criteria for each account are determined, using both qualitative and quantitative measures depending on the information available. Scoring for each criterion is typically based on a seven point scale that follows natural data breaks: significant benefit, moderate benefit, slight benefit, neutral, slightly adverse, moderately adverse, and significantly adverse. The MAE methodology sums scores within each account and does not create one composite score for each alternative, encouraging the consideration of how measurable outcomes relate to broader values and to one another.

How can this methodology be used for bicycle planning and implementation?

This approach was developed in the United Kingdom for evaluation of major transportation projects (typically transit corridor projects) and can be useful for many applications, including bicycle corridor development and prioritization. The difference between other methodologies is that MAE prioritizes improvements based on corridor outcomes rather than bicycle suitability scoring.

The MAE was recently used in the corridor alternatives analysis for the Seattle Transit Master Plan (TMP). The MAE process helped the City better understand how criteria/measures are used as trade-off discussion points, as well as various corridor improvements' relative ability to meet TMP goals.

Other cost-benefit tools that could be used as inputs to an MAE corridor prioritization process are readily available online. These include the [Health Economic Assessment Tool](#) (HEAT) for Bicycling and Walking, New Zealand Transportation Agency's (NZTA) [Economic Evaluation Manual](#), and the Pedestrian and Bicycle Information Center's [Benefit-Cost Analysis of Bicycle Facilities Online Tool](#), which uses a methodology from NCHRP Report 552.

Enhancing past prioritization efforts in Seattle

Seattle's Pedestrian Master Plan (PMP) process employed a GIS-based prioritization framework methodology to identify pedestrian network deficiencies and assign priorities for improving the pedestrian infrastructure. This prioritization framework evaluates the relationship of key criteria including existing and latent demand, equity (using socioeconomic and health characteristics), and pedestrian quality indicators for links (along the roadway) and nodes (crossing locations). This method is particularly useful because it clearly defines varying levels of deficiency and need and is a methodology already being used within SDOT—making expansion and enhancement of the methodology more palatable. Seattle could further enhance this process by either:

1. Developing a composite scoring system that merges the PMP prioritization framework with multiple account evaluation criteria and methods

OR

2. Integrating corridor segments that with detrimental cycling environments into the MAE process as *one* criterion for alternatives analysis.

How can this be applied in Seattle?

As described above, the MAE was developed as a discussion tool for assessing corridors and modes with regard to key outcomes. The MAE approach is a more robust and fine-grained evaluation methodology that can expose potential corridor benefits with greater accuracy. Seattle can use the MAE during the BMP update prioritization process to facilitate important discussions regarding which areas or corridors should take precedence and which priority bicycle facilities would best serve those areas, in terms of important goals like equity, safety, and increased ridership.

Additionally, a method Seattle could use to determine priority areas is the Cycle Zone Analysis, which was developed for the *Portland Bicycle Plan for 2030*. This methodology considers characteristics of each geographic zone—including road and bicycle network density and connectivity, land use, slope, barriers, and bikeway quality—to identify areas that will capture large numbers of bicycle trips. This methodology could demonstrate which areas are best suited for near-term investments and which areas are in need of innovative facility treatments.

KEY CONSIDERATIONS

SDOT will need to develop clear criteria for prioritizing bikeway improvements during implementation of the BMP Update. Key challenges and trade-offs that have been addressed in other emerging bicycling cities are highlighted in the following sections.

How can Seattle prioritize between new facilities vs. upgrades?

SDOT must balance the competing needs for bicycle network expansion with upgrading existing facilities to higher safety standards or to allow for greater comfort and capacity. Generally, cities have yet to develop specific criteria that prioritize a new facility over an upgraded facility, or vice versa.² Instead, many cities establish policy guidance and prioritization frameworks that direct plan implementation and bicycle investments. This allows cities to remain opportunistic as grant funding, roadway reconstruction projects, and other implementation mechanisms become available—as opposed to being tied to strict implementation standards or prioritization criteria.

According to the recently updated AASHTO Guide for the Development of Bicycle Facilities 4th Ed. (2012) roadway retrofits for bicycle facilities are best accomplished as part of a repaving or reconstruction project because installation is cleaner and costs are reduced. Seattle should consider this as a criterion when prioritizing an upgrade over a new facility

² Note: The City of Minneapolis uses a prioritization criterion that indirectly favors bikeway expansion at the expense of retrofit opportunities (e.g., “Does the proposed project *supplement* the existing bicycle system by removing barriers and closing system gaps?” [*emphasis added*])

One example Seattle can look to for guidance is the recently adopted Santa Monica Bike Action Plan. As part of the Plan’s implementation strategy, the City developed a series of phased improvements demonstrating inherent priorities (see Figure 3). In the near term, the plan focuses on developing the backbone of neighborhood bikeways, elevating them from signed bicycle routes. New low cost neighborhood bikeways are the top priority, a few high cost, catalytic projects are a second priority, and limited bikeway safety retrofits are the lowest priority. In the long term, the plan aims to reach a high rate of cycling by investing in transformative projects. At this stage, high quality retrofits will be considered, yet still as a third priority below new infrastructure that fill important gaps in the system.

Figure 3 Santa Monica Bike Action Plan project prioritization framework

General Priorities	Near Term Goal: Develop backbone of new neighborhood bikeways and catalytic projects	Long Term Goal: Implement highly visible, transformative, and visionary improvements that will see massive influx of cycling	One-Year Update
High Priority	Low cost, neighborhood bikeways with limited separation	Gap closure projects that are high cost and/or present major modal trade-offs	High priority neighborhoods are near full implementation
Medium Priority	Catalytic projects – limited number of high cost, high quality, low stress, high visibility, catalytic projects	Infill effort of higher cost, higher quality infrastructure	Critical east-west neighborhood greenway and north-south cycle track are in planning phase
Low Priority	Bikeway retrofits – only if existing bikeway is of low quality or presents hazards such as bike lanes along high turnover parking corridors	High quality retrofit enhancements (e.g. expand capacity to double bike lanes in high demand corridors) and basic retrofits (bikeways that were recently striped)	Several commercial corridor bikeways have been retrofitted (conventional bike lane to buffered bike lane conversion)

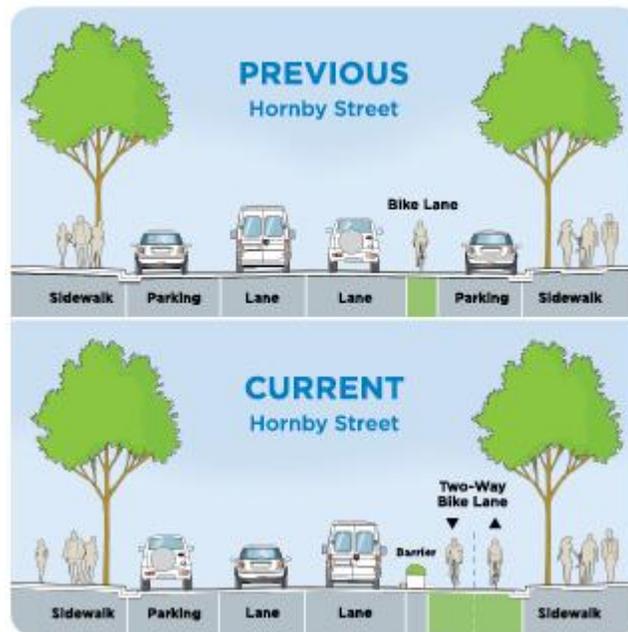
As mentioned in the *Common project evaluation criteria* section, Vancouver B.C. initially employed a criteria and weighting-based priority scheme to index bicycle projects that emphasized new facility construction. However, because Vancouver has implemented a large portion of its planned bikeway network (including full build out of its network backbone), funding has shifted to upgrading existing facilities to entice new cyclists in areas with low cyclist volumes. This is the case with several of Vancouver’s high profile downtown cycle track projects. Hornby Street (Figure 4) was a street converted from a high stress bike lane to a high quality, low stress separated facility.

Ultimately the decision to prioritize expansion of the bikeway network versus upgrading existing facilities should depend on:

- Community goals for cycling numbers, target cycling markets, bikeway equity, safety, etc.
- Level of network build out (i.e. is the bikeway network extensive enough to serve existing cyclists and expand ridership beyond the regular cyclist market?)
- Opportunities to retrofit existing bikeways through programmed roadway projects, land development requirements, or as specific safety-related funding become available (regardless of its priority ranking)
- A Complete Streets policy (which Seattle has) or, in the case of the Seattle Bicycle Master Plan update, complete Mobility Corridors as a mechanism for opportunistic bikeway implementation

- Ability to capitalize on other transportation projects to ensure seamless bicycle connections (e.g., bridge retrofits and major capital projects like the Alaskan Way Viaduct removal)

Figure 4 Bike facility upgrade example in Vancouver BC



Hornby Street bike lane to cycle track conversion in Vancouver BC
Source: City of Vancouver, BC

How should Seattle balance resources between citywide and neighborhood-scale projects?

Projects at several scales are necessary to capture the mobility benefits provided by different types of trips, including trips that are regional, downtown and urban village access, and recreational in nature. Citywide and regional projects establish or improve access across a wide geographic range and can provide mobility benefits for long haul commute and recreational trips. Neighborhood-scale projects improve the viability of bicycling for short trips (two miles or less) within or between neighborhoods, to downtown, or even to major transit centers and transportation hubs. Seattle will need to consider the mobility versus destination access tradeoffs between focusing resources on citywide and neighborhood-scale projects.

Citywide. Large-scale projects, while more costly, can provide a high level of mobility within a city and region. For example, the Minneapolis Bicycle Master Plan developed a functional classification for bicycle facilities, including arterial bikeways (regionally significant, high cyclist volumes), collector bikeways (feed into arterial bikeways), and neighborhood bikeways (provide local connections). Minneapolis' strategy includes prioritizing bike paths and arterial bikeways

over collector and neighborhood bikeways, and maintaining arterial bikeways at a high level of quality.³

This is a similar approach being employed in London, a city experiencing a massive upswing in bicycle use and bicycle infrastructure investment. In order to achieve their bicycle mode share goals (400% increase in trips above 2000 levels by 2025), London is developing a network of Cycle Superhighways through a public-private partnership with Barclays. The spoke and hub system provides access to London's city center from outer London on wide, well-marked lanes with bicycle priority signals. Four Cycle Superhighways are currently operating and an additional eight will open by 2015.⁴

Neighborhood-scale. Depending on the goals and objectives of a bicycle plan, prioritizing the development of inexpensive, low-stress bicycle routes through neighborhoods may be more appropriate. As described in the "Common project evaluation criteria" section, Portland's Bike Plan for 2030 establishes relatively low cost neighborhood greenways as the top priority during the first 5 years of implementation. This strategy was put in place in order to spread available funds widely so that a majority of residents will live close to a low-stress facility in the short term. Limited funds will still be available for trail projects, cycle tracks, and other innovative bicycle facilities on or near major roadways. However, Portland's priority is to increase investment in higher quality arterial and collector bicycle infrastructure in the future by increasing the proportion of residents with access to bicycle facilities in the near term.⁵ Since Seattle's goals and objectives focus on increasing cycling for all trip purposes, increasing connectivity, cycling access for all, and building neighborhood greenways, Portland's approach may also be suitable for Seattle.

How can Seattle ensure equity in BMP implementation?

Seattle will need to consider geographic and demographic equity in the prioritization process. Equity analysis will ensure that neighborhoods and populations that have been historically underserved by transportation improvements will be provided with the same level of bicycle facilities as the rest of the city. Analyzing geographic equity can include bicycle facility coverage by neighborhood or other geographic unit. For example, the Minneapolis BMP developed a set of travelsheds for use in prioritization that are based on geographic areas delineated by major barriers (e.g. freeways, waterways, etc.) and that act as channels for bicycle commuters to downtown. The BMP determined that each travelshed should have at least one arterial bikeway in order to form a spoke and hub system with ring arterial bikeways providing access between spokes.

Demographic equity analysis involves evaluating concentrated areas of disadvantaged populations, including non-Caucasian, low-income, youth, and elderly populations, to assess the degree to which these areas are served by the bicycle network. An Equity Gap Analysis informed the Portland Bicycle Plan and included a variety of indicators listed in Figure 5. The Equity Gap Analysis identified areas where disadvantaged populations live and where they need access compared to areas that are poorly served by the existing low-stress bikeway network.⁶

³ City of Minneapolis. *Minneapolis Bicycle Master Plan*. June 2011.

⁴ Barclays Cycle Superhighways. Retrieved 7/10/2012 from: <http://www.tfl.gov.uk/roadusers/cycling/11901.aspx>

⁵ City of Portland Bureau of Transportation. *Portland Bicycle Plan for 2030: A World Class Bicycling City*. February 2010.

⁶ City of Portland Bureau of Transportation. *Portland Bicycle Plan for 2030: A World Class Bicycling City*. February 2010.

Figure 5 Equity Gap Analysis Indicators, Portland Bicycle Plan for 2030

Indicator	Description	Values
Income	High Poverty	> 14.75%
	Medium Poverty	7.04% - 14.75%
	Low Poverty	< 7.04%
Race/ethnicity	Above citywide average percent non-white	> 21.91%
	At or below citywide average percent non-white	<= 21.91%
Age: Youth (1-18)	Above citywide average percent youth	> 20.52%
	At or below citywide average percent youth	<= 20.52%
Age: Youth (65+)	Above citywide average percent older adults	> 11.26%
	At or below citywide average percent older adults	<= 11.26%

Source: Dill, Jennifer and Brendon Haggerty (2009). *Equity Analysis of Portland's Draft Bicycle Master Plan – Findings*, PSU Center for Transportation Studies.

How can Seattle evaluate bicycle programs?

In addition to prioritization of bicycle projects, another important consideration for Seattle during the BMP update is bicycle program prioritization, including education, encouragement, and enforcement. Example programs include Bicycle Sundays, the Walk, Bike, Ride Challenge, bike parking programs, and bicycle helmet safety awareness programs.

Although most cities have not established sophisticated evaluation processes to test the effectiveness of bicycle programs, some cities have begun evaluating the fundamental ability to achieve community or bicycle plan goals. In the Minneapolis Bike Master Plan, non-infrastructure bicycle initiatives are prioritized based on performance criteria that link into the same goals as bicycle projects. The list below provides a basic example of how this could be structured in Seattle:

- Goal #1: Increase bicycle mode share → How many people does the initiative serve/reach?
- Goal #2: Bicycling in Minneapolis is safe and comfortable → Will the initiative result in fewer crashes, injuries, and fatalities?
- Goal #3: Destinations in Minneapolis are reasonably accessible by bicycle → Is the message effective enough to change habits?

How can this be applied in Seattle?

Even though an objective prioritization process is being employed in the Bicycle Master Plan Update, Seattle should clearly define parameters for flexibility in the prioritization methodology. This is seldom done in a coordinated manner in bicycle planning and represents an opportunity for Seattle to establish a best practice in bikeway prioritization and implementation. Prioritization conditions or relaxation factors addressed in the previous sections should form the basis of a formal “Prioritization Flexibility Framework”.

Furthermore, Seattle’s Racial Equity Impact Analysis Toolkit, required for all department work plans, will inform the implementation of the BMP Update. However, additional indicators of disadvantaged populations, including low-income, youth, and elderly, could be included in the prioritization process. These can even be included in larger evaluation frameworks, such as the Multiple Account Evaluation.

WHAT’S NEXT IN PRIORITIZING BICYCLE PROJECTS?

In addition to commonly used quantitative prioritization criteria detailed in the sections above, additional benefits from bicycling are increasingly considered by communities, including travel time, transportation cost, health, economic, and community benefits. This is an approach replicated in the King County TPT methodology and could be applied to the Multiple Account Evaluation methodology explained above.

Travel Time Benefits. Although bicycle travel represents a relatively small portion of total travel, it is a relatively large portion of travel time (typically 15-30%). Therefore, priority treatments and operational conditions—like switching the direction of stop signs in neighborhood cycle routes and dedicated bicycle signal phases—can improve the bicyclists’ travel experience. Seattle can begin quantifying the cumulative bicycle travel time impacts of various corridor projects to determine order of magnitude priorities.

Health Benefits. Studies have linked active transportation to reduced pollution emissions, increased physical activity and fitness, improved mental health, and reduced household expenses and financial stress. Additionally, low-income residents may rely on public transportation, bicycling, and walking as affordable transportation options to access medical facilities and healthy food.⁷ Seattle can use the HEAT tool (mentioned in the *Multiple Account Evaluation* section) to quantify the health impacts of various bikeway corridor projects.

In addition, communities are increasingly recognizing the health benefits of active transportation and performing health impact assessments (HIA) when evaluating transportation programs, plans, and projects. For example, Clark County, WA performed an HIA for the 2010 Bicycle and Pedestrian Master Plan in order to maximize health benefits from strategies implemented through the plan. The assessment evaluated the impact of the network development on obesity trends (and related illnesses), access to food, and injuries and fatalities for the County as a whole and disadvantaged groups.⁸

⁷ Litman, Todd. *Evaluating Public Transportation Health Benefits*. Victoria Transport Policy Institute. June 2010.

⁸ Clark County Public Health. *Comprehensive Health Impact Assessment: Clark County Bicycle and Pedestrian Master Plan*. December 2010.

Transportation Cost Benefits. Alternative transportation modes, including transit, bicycling, and walking, can reduce the cost of transportation and make Seattle more affordable. The Center for Neighborhood Technology found that transportation costs can range from 15% of household income in compact, accessible neighborhoods to over 28% in areas with an auto-oriented urban form and limited transportation options.⁹ Transportation and housing cost measures can be included in the MAE process, using criteria such as the number of households paying 40% or more of household income for housing costs and the average transportation cost for residents within the area or near the corridor.

Economic Benefits. Bicycling can provide additional economic benefits to the community in the form of increased revenue for businesses, sales tax revenue for the City, and job growth. Studies have found that transit users, pedestrians and bicyclists support businesses more than drivers by going to stores in commercial areas more often and spending more money.¹⁰ Research also shows that Complete Streets with bicycle and pedestrian infrastructure can bolster the economy through increased property values and taxes¹¹ and job growth.¹² Street designs that promote bicycling and walking improve conditions for existing businesses and help to revitalize neighborhoods and attract new development. Bicycle infrastructure projects also create jobs. A study by the Political Economy Research Institute at the University of Massachusetts found that the construction of on-street bicycle lanes generates 14.4 direct, indirect, and induced jobs per \$1 million of public investment, and bike boulevards stimulate 11.7 jobs per \$1 million.¹³ Estimates of economic impact and job growth for different priority facility types can be included in an MAE exercise using tools like New Zealand Transportation Agency's (NZTA) Economic Evaluation Manual or the Pedestrian and Bicycle Information Center's Benefit-Cost Analysis of Bicycle Facilities Online Tool.

KEY OPPORTUNITIES FOR SEATTLE

As Seattle considers its framework for prioritizing improvements to numerous bicycle corridors, it can learn from the methodologies and strategies of other cities in North America and even Europe. This white paper not only reinforces commonly used methods and criteria, but also introduces opportunities to prioritize bicycle corridors that achieve the Bicycle Master Plan Update's goals and objectives—including increasing ridership, safety, connectivity, equity, and livability. When developing the project prioritization plan and evaluation criteria, Seattle should consider integrating the following into the framework:

Consider how priorities might change over time. Seattle should clearly define when it is appropriate to upgrade existing facilities over expanding the network. Potential criteria could include funding opportunities, whether a street is programmed for reconstruction, urgent safety concerns, whether new bikeway implementation in sub-areas or high priority areas are near

⁹ Center for Neighborhood Technology, "\$4 per Gallon Gas – Are We Ready?", [http://www.cnt.org/repository/Published.Planetizen-\\$4perGallonGas.pdf](http://www.cnt.org/repository/Published.Planetizen-$4perGallonGas.pdf)

¹⁰ Macdonald, Elizabeth; Sanders, Rebecca; Anderson, Alia. "Performance Measures for Complete, Green Streets: A Proposal for Urban Arterials in California." University of California Transportation Center. 2010

¹¹ Richard Campbell and Margaret Wittgens, 2004, "The Business Case for Active Transportation: the economic benefits of walking and cycling" (Go for Green: the Active Living and Environment Program), 32.

¹² National Complete Streets Coalition, Local Government Commission. "It's A Safe Decision: Complete Streets in California." February 2012.

¹³ Garrett-Peltier, Heidi. *Estimating the Employment Impacts of Pedestrian, Bicycle, and Road Infrastructure*. Political Economy Research Institute University of Massachusetts, Amhurst. December 2012.

completion, and ease of enhancing “low-hanging fruit” bikeways (e.g., requires no parking removal, requires only bike lane restriping without moving the centerline, etc.).

Beyond bicycle network build out, the City could also develop a strategy for prioritizing between “hard” and “soft” infrastructure. As bikeway networks expand in cities around the world, funding allocation tends to shift slightly toward greater encouragement and education efforts. In some cases, this is a function of cities increasing the total funding allocation for bicycle investments; while in others it is a strategic direction to begin leveraging their extensive network investments with marketing and “culture change” promotional efforts.

Look at commonly used transit and pedestrian prioritization frameworks. Seattle has a prime opportunity to enhance typical prioritization methodologies for bikeways (and pedestrian facilities in the case of Seattle’s Pedestrian Prioritization Framework developed by SvR Design) by integrating criteria and scoring similar to the Multiple Account Evaluation approach. Because this method was employed in the Seattle Transit Master Plan, much of the data and scoring is already available.

Quantify community benefits. Seattle could expand project evaluation efforts by demonstrating how bicycle projects will improve bicycling conditions and attract latent demand, as well as provide a tangible benefit for non-bicycle users. A key question that bicycle project prioritization should answer is how a project can meet the Bicycle Master Plan Update’s livability goals. By quantifying multi-user benefits, SDOT can clearly demonstrate Bicycle Master Plan implementation is a community investment, not just bicycle investment. The criteria described in the “What’s next in prioritizing bicycle projects?” section could be used to make this case.

Be opportunistic and adaptable. As is the case of Vancouver B.C., Santa Monica, and many other communities, a flexible approach to bikeway prioritization that allows for opportunistic action can speed the pace of implementation and reduce implementation costs. One prioritization criteria that Seattle might consider is whether a project is located along a corridor that will see massive transformation from a major transit or roadway project. Seattle’s Complete Streets ordinance requires bicycles to be accommodated in all routine system improvements. Similarly, the Mobility Corridor policies developed in the Seattle Transit Master Plan (as well as future policy support in the Bicycle Master Plan Update) will further enable opportunistic implementation activity.