City of Bellevue, Washington

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Walk & Roll: 2007 Pedestrian and Bicycle Transportation Plan

Network Plan Report

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BENEFITS OF BICYCLING & WALKING

Bellevue City Council's commitment to a multi-modal transportation system is demonstrated by policies supporting pedestrian and bicycle travel in existing planning documents and by its investments in pedestrian and bicycle facilities. The City is designing its transportation system to provide for all travel modes, and to reap the benefits associated with pedestrian and bicycle facilities. These benefits include:

Transportation System Benefits

- According to the 2001 National Household Travel Survey, nearly half of all travel trips taken in the United States are 3 mi or less in length; 28 percent are less than 1 mi.[1] By taking advantage of the opportunity to convert short automobile trips to bicycling and walking, communities can reap significant benefits from healthier air and reduced traffic congestion.
- In Bellevue, almost 50 percent of the 30,000 average weekday transit riders (ons/offs) occur on the city's street system outside of downtown Bellevue and outside of the city's park and ride lots. Transit depends on the city to facilitate access to its local bus stops through sidewalk and bikeway investments.

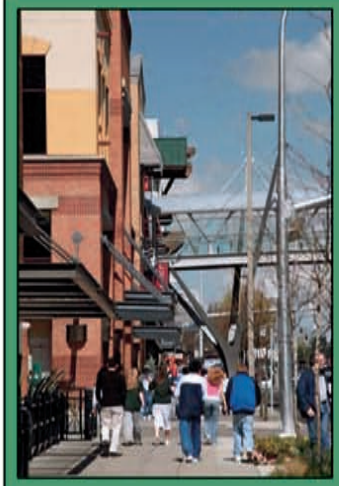
Enabling greater walking and cycling allows all members of society to travel, regardless of their level of mobility or economic situation, including providing basic access to public transit.

Environmental Benefits

- Increased levels of bicycling and walking can play an important role in reducing air pollution. According to the Environmental Protection Agency (EPA), approximately 160 million tons of pollution are emitted into the air each year in the United States. A serious threat to public health, air pollution contributes to the deaths of 70,000 people nationwide each year, according to an estimate from the Harvard School of Public Health.
- Short auto trips produce far more pollution per mile than longer trips. According to the Federal Highway Administration (FHWA) publication, Transportation Air Quality: Selected Facts and Figures, "starting the car cold generates about 16 percent more NOx and 40 percent more CO than starting the car when it is warm."[2]

Economic Benefits

- For many households, a motor vehicle is typically one of the highest expenses after housing. The option of bicycling can improve mobility for people who cannot afford to own and operate a motor vehicle, and would allow some households with autos to own one vehicle instead of two.
- Pedestrian and bicycle transportation allows people to incorporate physical activity into their daily lives which reduces health care costs and morbidity rates.



There are many economic benefits to building pedestrian facilities like this combination sky-bridge and enhanced sidewalk system.

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[1] 2001 National Household Travel Survey, available online at http://www.bts.gov/programs/national_household_travel_survey/, accessed August 12, 2005.

[2] *Transportation Air Quality: Selected Facts and Figures*, Federal Highway Administration. Washington, DC, January 2002.

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- Outdoor activities such as bicycling and walking are the most popular activities for people on vacation from work. They are more popular than visiting museums or national parks, doing beach and water activities, and shopping.
- Businesses invest in locations that have a high quality of life. Corporate employers have an easier time attracting highly skilled workers to these locations.
- According to the National Bicycle and Pedestrian Clearinghouse, trails and greenways can have a positive effect on the value of nearby properties.[3] Recent studies of the preferences of new homebuyers indicate that there is a demand for more livable communities and, specifically, better bicycle and pedestrian facilities in the vicinity.

Quality of Life Benefits

- Accommodating pedestrians and cyclists produces calmer and safer streets, improves walkability and lessens noise and congestion. These changes also increase opportunities for social interaction.
- Providing a livable community is a necessary part of attracting and keeping businesses, and ensuring local communities remain competitive in the 21st century.

Pedestrians add to the ambience and security of streets.

Health Benefits

- A number of research studies have shown a correlation between the built environment and the amount of routine physical activity, such as regular walking trips. A study published in the September 2003 issue of the *American Journal of Health Promotion* titled "Relationship between Urban Sprawl and Physical Activity, Obesity, and Morbidity" found that people living in sprawling counties "were likely to walk less, weigh more, and have greater prevalence of hypertension than those living in compact counties."[4] An earlier study published in the *American Journal of Preventive Medicine* showed a direct relationship between the amount of walking and the age of the home in which a person lives, as a proxy for the style of urban residential development that is common in older versus newer communities.[5] People who lived in older homes were found to walk more.
- Research conducted in 1999 by the Centers for Disease Control and Prevention found that "obesity and overweight are linked to the nation's number one killer—heart disease—as well as diabetes and other chronic conditions." The report also states that one reason for

Increasing abilities for citizens to walk or cycle promotes active and healthy living.

[3] National Center for Bicycling and Walking, available online at http://www.bikewalk.org/index.htm, accessed August 12, 2005.
[4] Ewing R., Schmid T., Killingsworth R., Zlot A. and Raudenbush S., "Relationship Between Urban Sprawl and Physical Activity, Obesity and Morbidity," *American Journal of Health Promotion*, volume 18, no. 1, September 2003.
[5] Berrigan, D. and R.P. Troiano, "The Association Between Urban Form and Physical Activity in U.S. Adults," *American Journal of Preventive Medicine*, volume 23, issue 2, supplement 1, August 2002.

Americans' sedentary lifestyle is that "walking and cycling have been replaced by automobile travel for all but the shortest distances."[6]

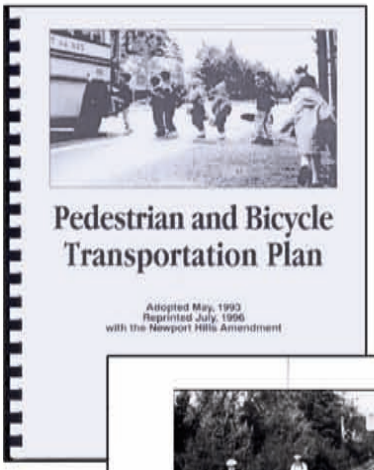
- Today, there are nearly twice as many overweight children and almost three times as many overweight adolescents as there were in 1980. Results of the 1999 National Health and Nutrition Examination Survey showed that 13 percent of children and adolescents were overweight.[7]
- Numerous studies have shown tremendous benefits from even a brief amount of light but routine exercise each day. Bicycling or walking to the store, school, or work also provides a time-efficient way of attaining the U.S. Surgeon General's recommended daily allowance of physical exercise.
- Pedestrian and bicycle transportation offers more opportunities for people to socialize than driving alone in automobiles.

Safety

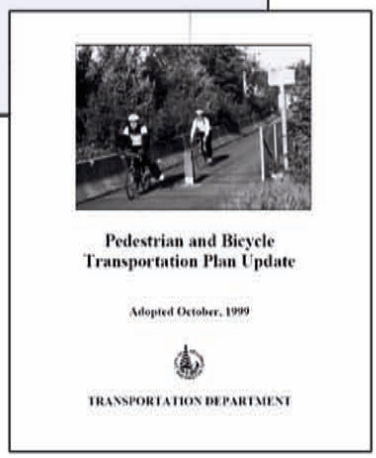
- A Federal Highway Administration (FHWA) study that analyzed vehicle-pedestrian collisions and exposure under various roadway situations found that locations with no sidewalks are more than two times more likely to have vehicle-pedestrian crashes than sites with sidewalks.[8]

Accessibility

- People with disabilities make up nearly one-fifth of the U.S. population, so it is important that sidewalks meet their needs. Additionally, many Americans are aging into sensory or cognitive disabilities. It is important that sidewalks be usable by pedestrians for whom they may represent the only mode of independent travel.



Given these many benefits, Bellevue's Comprehensive Plan acknowledges that responding to anticipated growth in travel necessitates a multi-modal transportation solution that offers the public real choices about how they travel within, to, and through Bellevue. The Transportation Element of the Bellevue Comprehensive Plan states: "It is neither possible nor desirable to build enough roadway improvements to keep pace with ever accelerating demand for travel in single-occupant vehicles. Rather, the Plan focuses on reducing auto dependency by providing viable travel choices. Transit, ridesharing, walking, and bicycling receive strong emphasis, with focus on a fully multi-modal travel system."



Bellevue adopted a Pedestrian and Bicycle Transportation Plan in 1993, and the plan was updated in 1999. Policies from the 1999 Pedestrian and Bicycle Transportation Plan are included in the Bellevue Comprehensive Plan. The system maps, list of prioritized projects, and policies in the Bellevue Comprehensive Plan are revisited in the 2007 update of the plan to assess their continued applicability, to propose modifications where and if necessary, and, in some cases, to provide recommendations for additional initiatives.

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[6] Centers for Disease Control and Prevention, Atlanta, GA,1999.

[7] 1999 National Health and Nutrition Examination Survey, available online at http://www.cdc.gov/nchs/nhanes.htm , accessed August 12, 2005.

[8] Knoblauch, R.L., Tustin, B.H., Smith, S.A., and Pietrucha, M.T. "Investigation of Exposure Based Pedestrian Areas: Crosswalks, Sidewalks, Local Streets AND Major Arterials" (Report No. FHWA/RD-88/038). Federal Highway Administration, September 1988.

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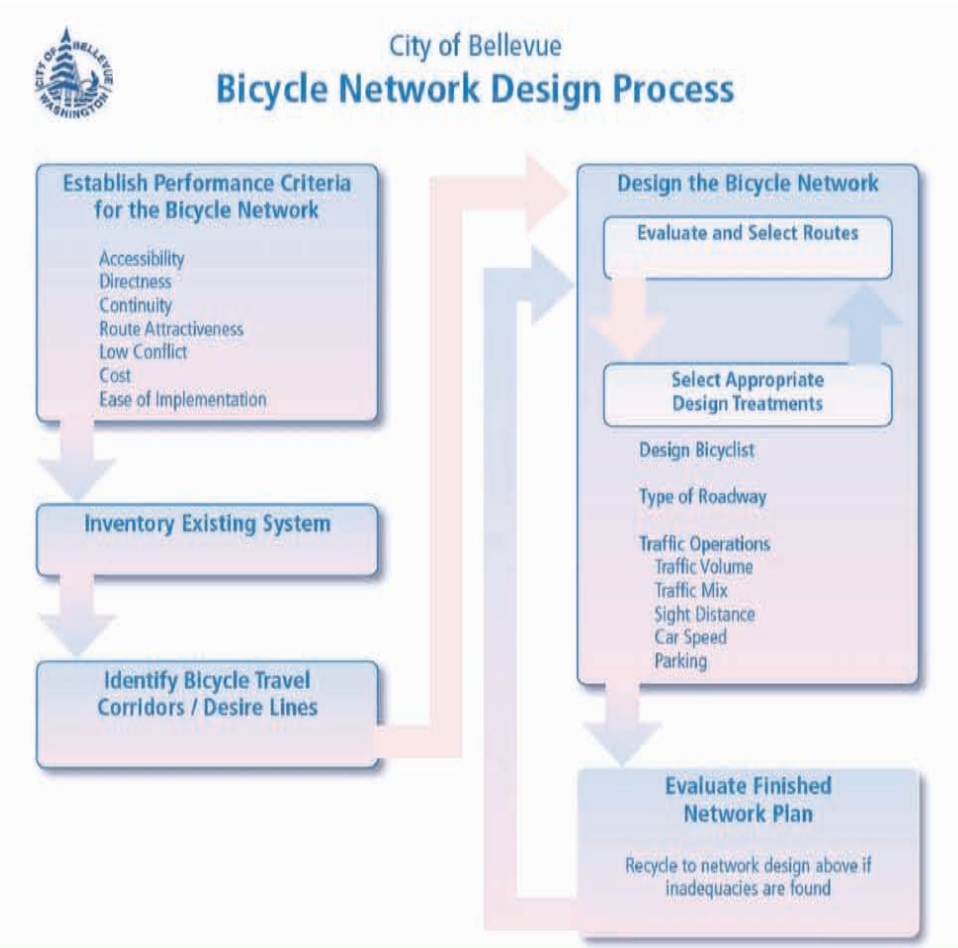
BIKEWAY NETWORK

This part of the plan is a description and list of recommended facilities to accommodate bicyclists throughout Bellevue. Staff have approached this assignment methodically, attempting to avoid applying standards without regard to how a facility will function within the greater context; which can lead to under- or overbuilt facilities, inappropriate for the context. The design process used to arrive at the recommended bicycle plan was created using six steps, as described in *Selecting Roadway Design Treatments to Accommodate Bicycles* (FHWA 1994):

1. Establish performance criteria for the bicycle network
2. Inventory the existing bicycle facility and roadway system
3. Identify bicycle travel desire lines and corridors
4. Evaluate and select specific route alternatives
5. Select appropriate design treatments
6. Evaluate the finished plan against the established performance criteria



Community Comments

In addition to the complete compilation of public comments located in Appendix …, boxes like this one have been inserted into the text throughout the plan. These comments articulate ideas or reflect concerns that were shared by many Bellevue residents during the planning process.

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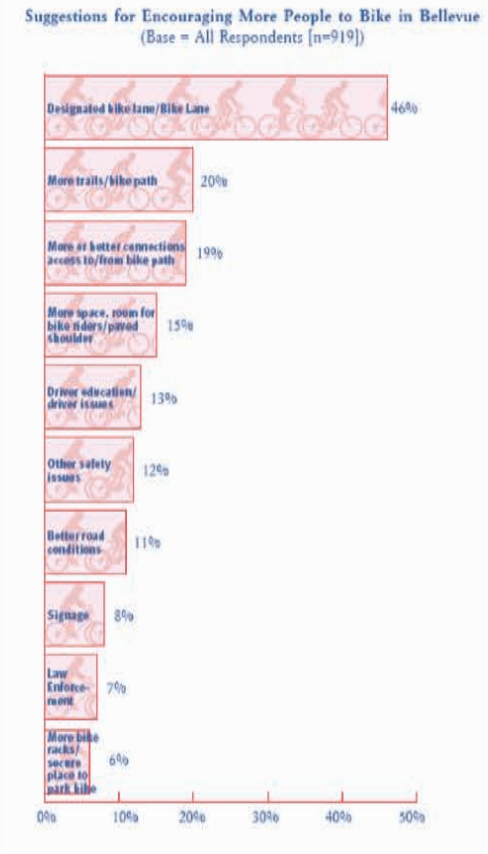
MEETING THE NEEDS OF DIFFERENT CYCLISTS

The web-based surveys conducted in support of this project generated responses from 919 bicyclists and allowed city staff to get an idea of where various types of bicycle facility enhancements are needed within Bellevue. Based on the responses, the top five bicycle facility improvement categories that would make it easier and safer for people to ride a bicycle in Bellevue are: adding designated bike lanes (78%); adding paved shoulders (73%); repairing pavement, fixing potholes, removing loose gravel or sand (57%); adding off-road greenways or trails (56%); and, educating motorists / bicyclists, encouraging share the road, improving attitudes (56%).



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

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

- Bellevue is a built environment with a finite number of corridors that can accommodate multi-purpose trails. Consequently, bicyclists need access to the roadway system in order to create an interconnected system and be able to reach all desired destinations.
- Different types of bicycle facilities are appropriate in different situations, depending on surrounding land use characteristics, available right-of-way space, traffic volume, traffic speed and composition, on-street parking, roadway grade, etc.
- Depending upon an individual bicyclist's level of experience, some types of bikeways are preferred over others. For example, new bicyclists tend to prefer off-road multi-purpose trails and quiet neighborhood streets. More experienced bicyclists usually prefer on-road bicycle facilities such as bike lanes, wide curb lanes, paved shoulders, etc. Sometimes, more experienced bicyclists avoid using trails because they are crowded with other users. (FHWA 1994)

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

This guidance is not a design standard, and should not be used as such. Application of this guidance requires the use of engineering judgement when retrofitting Bellevue streets to provide optimal bicycle facilities.

Accommodating bicycles begins with the understanding that bicyclists vary greatly in age, skill, dimensions and needs.

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BICYCLE DESIGN TREATMENTS

Bicycles are legally classified as vehicles and are ridden on most public roads in Washington, which are open to bicycle traffic with a few exceptions. Bellevue staff approached the task of "selecting appropriate design treatments" by generating a bicycle typology framework that helped identify what type of bicycle facilities are most appropriate in different areas of the city. The typologies are grouped into three distinct bikeway classifications: Bicycle Path (Class I); Bicycle Lane (Class II); and, Bicycle Route (Class III). These three classifications are defined as follows:

- *Bicycle Paths (Class I)* provide for bicycle travel on a paved right-of-way that is completely separated from the street. Bicycle paths are often located along waterfronts, creeks, railroad rights-of-way (active or abandoned), or freeways where there are a limited number of cross streets and driveways that create conflict points. They are typically shared with pedestrians and often called mixed-use or off-street paths.

- *Bicycle Lanes (Class II)* are striped lanes on streets, designated with specific signage and stencils, for the use of bicyclists. Bicycle lanes are the preferred treatment for all arterial and collector streets on the bikeway network. Bicycle lanes should not be installed on low-volume, low-speed residential streets where, because of driveways, bicyclists are safer riding in the middle of the travel lane. Although bicycle lanes are most often developed on both sides of the street; there are instances where a climbing lane on one side of the roadway (in the uphill direction) will be included where there is not enough space for bicycle lanes on both sides.

- *Bicycle Routes (Class III)* designate preferred streets for bicycle travel using lanes shared with motor vehicles. Bicycle routes are designated because they are suitable for sharing with motor vehicles and provide better connectivity than other streets. The following four bikeway types are variations on the standard bicycle route: Type C: Bicycle Shoulder with Fog Line; Type D: Shared Shoulder with Fog Line; Type E: Wide Outside Lane Without Fog Line; and Type F: Shared Wide Outside Lane. These variations provide tools for addressing the following issues: limited right-of-way width may preclude adding bicycle lanes; and, neighborhood streets may provide good bicycle connections and could be marked as bike routes.

An extensive review of all the existing bikeways in Bellevue. There are approximately 190 miles of Class I, II and III bikeways. The breakdown of the bikeways by class includes approximately 11 miles of Class I, 45 miles of Class II and 134 miles of Class III. Figure XX provides a detailed inventory of each class type, destinations, condition, comments and length in miles of each existing bikeway.

The bicycle lane coming up the hill on 108th Ave NE stops abruptly, forcing cyclists into the travel lane. This location was identified as an area lacking continuity in the bicycle system.

Like most cities, Bellevue has bikeways that do not provide a cohesive, gap-free network. However, the bicycling community, ranging from experienced club riders to school children, currently use the existing streets and routes for their own purposes. Among the top complaints of Bellevue cyclists responding to the on-line survey are bicycle facilities that abruptly end without connecting to another facility. This plan looks at the existing opportunities and constraints to help develop a

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comprehensive roads and bikeways system which will make it easier for bicyclists to travel to their destinations.

BICYCLE PATH (CLASS I)

Bicycle paths (Class I) are intended to serve walkers, wheelchairs, runners, bicyclists, or any other non-motorized mode of transportation. Bicycle path planning and design must take into account the various skills and characteristics of these different users. Many inexperienced cyclists don't want to ride in traffic and may not ride on streets until they gain experience and confidence. A separated path provides a learning ground for potential bicyclists and can attract cyclists who prefer a more aesthetic experience. These facilities may also be referred to as "greenways," and should not be confused with sidewalks that share the right-of-way with vehicular roads.

Type A: Off-Street Path

As defined in WSDOT's Design Manual (Chapter 1020 Bicycle Facilities), an off-street path is "a facility physically separated from motorized vehicular traffic within the highway right of way or on an exclusive right of way with minimal cross-flow by motor vehicles. It is designed and built primarily for use by bicycles, but is also used by pedestrians, joggers, skaters, wheelchair users (both non-motorized and motorized), equestrians, and other non-motorized users."

"While the majority of drivers are considerate there are too many that will go out of their way to come as close as they can to you. They will honk, yell, increase their speed. So I simply won't do it anymore. Separate trails for those on bikes and on foot would be my first choice."

"Provide off-the-road Bike paths so there is NO chance a motorized vehicle can hit a bike."

"Developing off-road bikeways will get the average person on a bike, but does not get an experienced cyclist excited."

An off-street path (bike path or multi-use trail) should be at least 10 feet wide; with minimum 2 foot wide graded shoulders on each side to protect users from grade differences. These shoulders can be grass, sand, finely crushed rock or gravel, natural groundcover, or other material. Sections of the trail where shoulders are not possible because of stream crossings or other elevated grade issues should have protection such as rails, fences, or hedges. Parks and urban corridors tend to be popular sections of these trails and should possibly be wider. If it is not possible to increase the width, it is important to consider including a divider line down the center for bi-directional traffic.

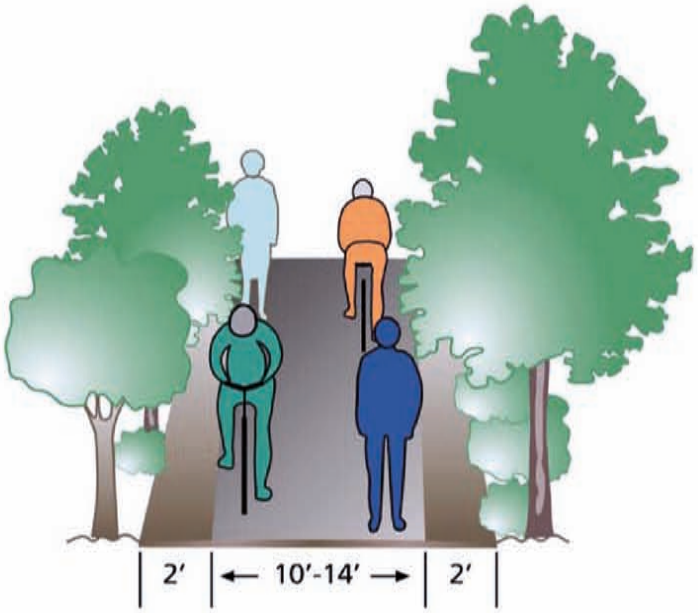
The key components to successful bicycle paths include:

- **Continuous separation from traffic**, by locating paths along a river or a greenbelt such as a rail-to-trail conversion, with few street or driveway crossings; however, this must be balanced with;
- **Frequent connections to land-uses,** such as residential areas, shopping, schools and other destinations;
- **Security:** proximity to housing and businesses increases visibility (despite fears of some property owners, paths do not attracted crime into adjacent neighborhoods); illumination helps provide a sense of security at night;
- **Scenic qualities,** offering an aesthetic experience that attracts cyclists and pedestrians that keeps the contour of the land for aesthetic and environmental reasons but for practicality reasons should not be unnecessarily curved;

- **Well-designed street crossings,** with measures such as signals or median refuges islands (paths directly adjacent to roadways are not recommended, as they tend to have many conflict points);
- **Shorter trip lengths** than the road network, with connections between dead-end streets or cul-de-sacs, or as short-cuts through open spaces;
- **Good design,** by providing adequate width and grades, and avoiding problems such as poor drainage, blind corners and steep slopes; and,
- **Proper maintenance,** with regular sweeping and repairs. Paths that fall into disrepair are not used to their full potential and can be a liability.

Figure X: Example of an Off-Street Path along the I-90 Trail

Figure X: Cross Section of an Off-Street Path Facility



Type A - *Bicycle Facility:*

Off Street Path

Legend	Length (Miles)
Proposed Type A Bikeways (55 Projects)	39.03
Existing Type A Bikeways	11.17
All Other Proposed Bikeways	148.90
All Other Existing Bikeways	178.69

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BICYCLE LANE (CLASS II)

Type B: Bike Lane

As defined in WSDOT's Design Manual (Chapter 1020 Bicycle Facilities), a bike lane is "a portion of a highway or street identified by signs and pavement markings as reserved for bicycle use."

Bike lanes provide bicyclists with their own lane designation along street corridors with high vehicular volumes or speeds. A bike lane is usually stenciled with a bicycle figure and arrow and includes the following dimensional attributes:

Bicycle lane width:

- 4 feet: minimum width of bike lane on roadways with no curb and gutter
- 5 feet: minimum width of bike lane when adjacent to parking, from the face of the curb or guardrail
- 11 feet: shared bike lane and parking area, no curb face
- 12 feet: shared bike lane and parking area with a curb face

Bicycle lane stripe width:

- 6-inch: solid white line separating bike lane from motor vehicle lane (maybe raised to 8-inches for emphasis)[9]
- 4-inch: optional solid white line separating the bike lane from parking spaces

A major study sponsored by the Federal Highway Administration demonstrated that bicycle usage in urban areas is directly proportional to the percentage of arterial streets with bike lanes. US cities with high bicycling populations have 70% more bike facilities per roadway mile and six times more bike lanes per arterial than those with low bicycling populations. Two further studies since have confirmed these findings, noting that bicycle commuting increased in direct proportion to the miles of bike lanes (bike lanes were the strongest variable in predicting bicycle commuting).[10]

"Link between Kirkland and bike paths south of Bellevue need improvement (i.e. a dedicated bike lane on Bellevue Way or 112th)"

"Lake Hills Connector: no shoulder, no bike lanes, but is a MAJOR cycle artery (huge bike lane from Factoria just ENDS at this road). I have had trash thrown at me, deliberately swiped, etc."

"Well striped bike lanes on major arterials- any road with 35 mph or higher speed limit. I can't decide which is more dangerous, trying to ride with the traffic on our arterials or riding on the sidewalks, given meandering walks & frequent crossing of side streets, driveways, etc."

"In some areas, bike lanes are discontinuous. An example is 140th going south. Starting near the 520 overpass there is a bike lane. This lane ends after a few miles and there is a narrow shoulder. A few miles later there is a bike lane again (closer to BCC). The section without the bike lane can be very dangerous, especially in bad weather and at night."

"112 Ave NE is the fastest and most direct route from N to S or S to N. There's no bike lane and the vehicle speeds are high when climbing the uphill grades."

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[9] Bellevue has found it challenging to achieve a 6 inch striping due to constraints of commonly used striping equipment; in lieu of this dimension, most bike lanes are presently striped with a 4 inch dimension white line. It might be more appropriate for the city to consider increasing the dimension to 8 inches for emphasis.

[10] Jennifer Dill, Bicycle Commuting and Facilities in Major Cities, Transportation Research Board, 2003.

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Bicyclists have clearly stated their preference for marked bicycle lanes on roads and streets in numerous studies throughout the US.; Here are a couple of examples.

- A bike commuter route choice study in Austin, TX, showed that the presence of bike facilities was the second most important factor in how cyclists choose routes (the most important factor was length of trip, supporting the fact that cyclists prefer shorter more direct routes to their destinations rather than longer circuitous routes, even if they have to travel on busy streets rather than quiet streets). Bike lanes were preferred over wide outside lanes even when on-street parking is present.[11]

- A 1999 paper to the Transportation Research Board found that increasing the width of a travel lane to 16 feet increased the level of service to the bicyclist by 13 percent. By striping a four foot bike lane on the same roadway, the level of service increased by 31 percent. The authors of this study concluded that "bike lanes are more likely to increase the amount of bicycling than wide curb lanes."[12]

- The Bicycle Compatibility Index incorporates the geometric and operational variables considered by adult bicyclists to be important in terms of their comfort level when riding on the streets with motor vehicles. The authors note that the variable with the largest effect on the index is the presence or absence of a bicycle lane or paved shoulder that is at least 0.9m wide. Striping a bike lane reduced bicyclist stress levels by almost one unit on a five unit scale.[13]

The following features of bicycles lanes increases the comfort of the average cyclist and the overall safety of the roadway.

- Results in more predictable movements of motorists and bicyclists; reducing motorist lane changes when passing bicyclists.
- Allows for additional room for motorists to move right to allow emergency vehicles to pass, space for disabled vehicles to stop or drive slowly.
- Increases turning radius for trucks and space for off-tracking of truck's rear wheels in curved sections.
- Reduces the number of bicyclists using the sidewalk or gutter pan.
- Improves sign distances.
- Increases bikeway visibility in the transportation system.
- Compared to wide curb lanes, bicycle lanes also decrease the frequency of drivers encroaching into the adjoining travel lane when passing bicyclists (Hunter et al. 1999).

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[11] Monique Stimson, Analysis of Commuter Bicyclist Route Choice Using Stated Preference Study, Transportation Research Board, 2003.

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

[13] "Development of the Bicycle Compatibility Index: A Level of Service Concept, Final Report," FHWA-RD-98-072 (1998). http://safety.fhwa.dot.gov/tools/docs/bci.pdf

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Figure X: Example of Bicycle Lanes on 118th Ave SE

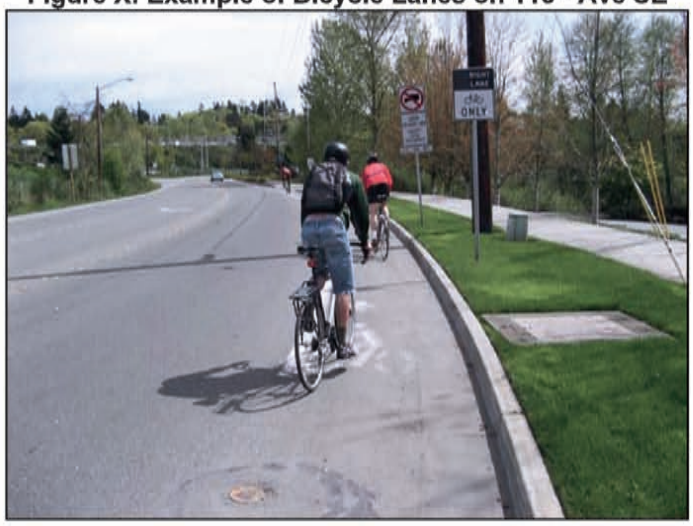
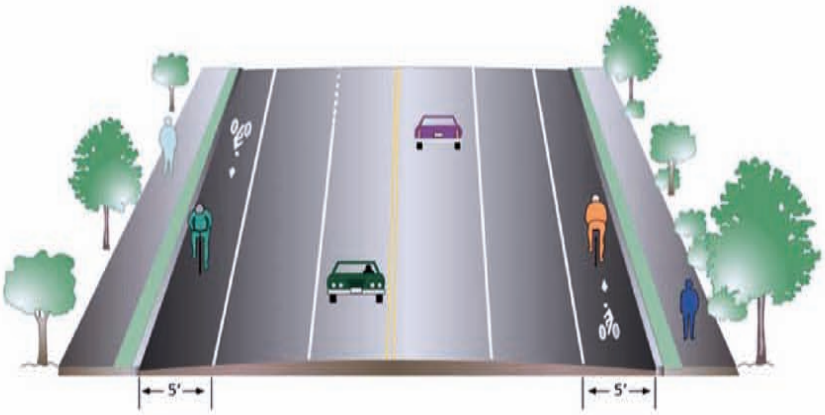


Figure X: Cross Section of Bicycle Lane Facilities
Type B: Bike Lane



Bicycle lanes should always be provided on both sides of a two-way street. One exception may be on steep hills where topographical constraints limit the width to a climbing lane (a five-foot bicycle lane) on one side of the roadway (in the uphill direction) and a shared lane on the other side of the roadway (downhill segment). This allows uphill bicyclists to have designated space for the slow uphill travel and motor vehicles to pass them easily.

On uphill grades, a bicycle climbing lane can provide slow moving bicyclists with extra width to accommodate wobble and maneuvering. This type of facility is particularly useful in Bellevue's topographically varying terrain and it can be used on streets where there is not enough space for standard five-foot-wide bicycle lanes on both sides. The following are the two locations where bicycle climbing lanes are proposed: 1) B-210.1: Add a 5 foot-wide bike lane on the north side of Main St from 156th Ave NE to 158th Pl NE; and, 2) B-223.2 : Add a 5 foot-wide bike lane on the east side of Sunset Way\92nd Ave NE from northern city limits to Lake Washington Boulevard NE.

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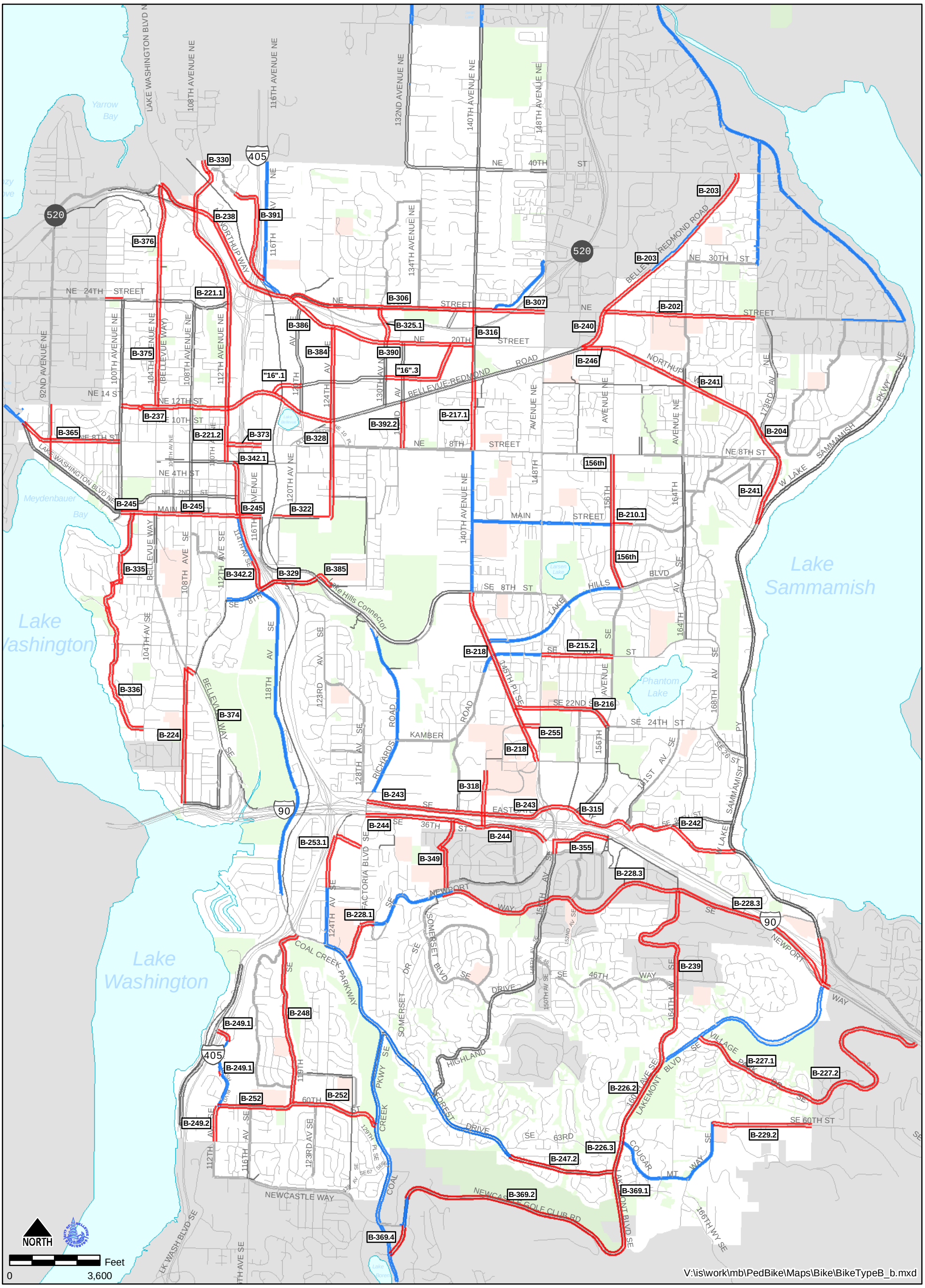
Figure X: Example of a Climbing Lane on NE 24th



Type B - *Bicycle Facility:*

Bike Lane

Legend	Length (Miles)
Proposed Type B Bikeways (72 Projects)	102.10
Existing Type B Bikeways	44.59
All Other Proposed Bikeways	85.84
All Other Existing Bikeways	145.27

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BICYCLE ROUTE (CLASS III)

Creating bicycle routes is an inexpensive but visible way to improve the bicycling environment by taking advantage of Bellevue's existing network. Bike routes can help people quickly find those special ways to get around town that most people only discover over an extended period of time. A bicycle route is identified through signing.

The AASHTO Guide describes signed shared roadways (bike routes) as "those that have been identified by signing as preferred bike routes"[14] and goes on to describe the reasons why routes might be so designated:

- continuity between bicycle lanes, trails or other bicycle facilities
- marking a common route for bicyclists through a high demand corridor
- directing cyclists to low volume roads or those with a paved shoulder
- directing cyclists to particular destinations (e.g. park, school or commercial district)

In addition, designation indicates that there are particular advantages to using the route rather than an alternative. Signed shared roadways generally do not succeed in diverting cyclists away from routes that are more direct, faster, and more convenient even though they may be on quieter streets.

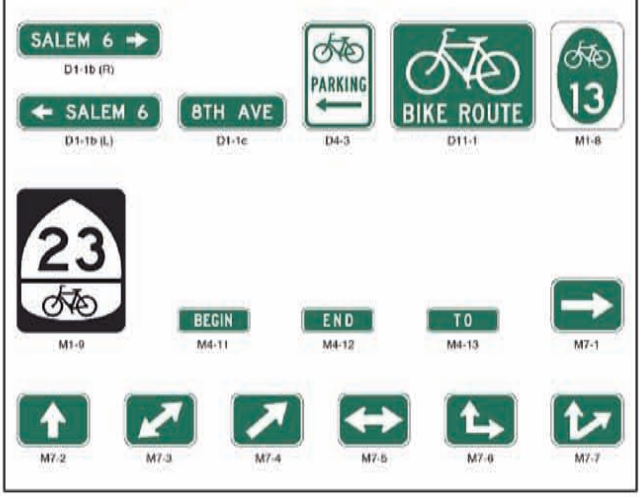
The AASHTO guide recommends considering a number of factors before signing a route

- the route provides through and direct travel
- the route connects discontinuous segments of shared use paths or bike lanes
- bicyclists are given greater priority on the signed route than on the alternate route
- street parking has been removed or limited to provide more width
- a smooth surface has been provided
- regular street sweeping and maintenance is assured
- wider curb lanes are provided compare to parallel roads
- shoulders are at least four feet wide

In all cases, shared use roadway signing should include information on distance, direction and destination, and should not end at a barrier such as a major intersection or narrow bridge. The AASHTO Guide recommends signing a shared signed roadway every 1/4 mile and at every turn (both to mark the turn and to confirm that the rider has made the correct turn).

Signing is governed by the Manual on Uniform Traffic Control Devices (MUTCD), which provides specifications on the design and placement of traffic control signs installed within the public right-of-way. MUTCD examples of signs related to typical bicycle routes are given in Figure 98-4; all are green with white lettering and include: (1) a sign with a bicycle on it; (2) a subplate with destination information; and, if necessary, (3) directional aids.

Figure 9B-4. Guide Signs for Bicycle Facilities



[14] *Guide for the Development of Bicycle Facilities*, 1999., American Association of State Highway and Transportation Officials (AASHTO).

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Bellevue uses four different bicycle typologies in the Bicycle Route (Class III) designation: Type C: Bicycle Shoulder with Fog Line; Type D: Shared Shoulder with Fog Line; Type E: Wide Outside Lane Without Fog Line; and, Type F: Shared Wide Outside Lane. All of these facilities should be provided where delineated bike lanes are not possible. In general, 14 feet of usable lane width is the recommended width, wider if encroaching drainage grates are present. On steep stretches of roadway, wider pavement is suggested for more maneuvering space for the bicyclist.

"All that cyclists need are ROAD SHOULDERS IN BOTH DIRECTIONS on ALL secondary roadways. The 'bike routes' need to actually go somewhere and connect with each other and with other municipalities routes. Shoulders only on ONE side are worthless for a round trip. Ending the shoulders so they don't go THROUGH intersections is just plain a hazard."

"Too much emphasis has been on wide curb and gutter sidewalks leaving no alternative for bicycles other than take up a portion of the auto lane causing vehicles the need to crowd or change lanes. Sidewalks are not a suitable alternative to shoulders. Many cyclists can ride much faster than 10 mph and beyond that sidewalks are simply not suitable for bicycles. I ride over 8,000 miles per year on my bicycles so I speak from experience. If Bellevue is serious about accommodating bicycles, then at least a 3 foot wide riding shoulder should be considered in each direction of major arterials. Fancy planter areas and 8 foot sidewalks may look nice but they do nothing to ease the congestion in the traffic lanes and make it hazardous for bicycles and motorized vehicles to coexist."

Bicycle routes may also benefit from the inclusion of shared lane pavement markings (or "sharrows"). Sharrows are bicycle symbols that are placed in the roadway lane along a wide outside lane facility. The bicycle symbols used in shared lane pavement markings include chevrons pointing in the direction of motor vehicle traffic to indicate that bicyclists should also ride in this direction.

The purpose of shared lane pavement markings is to:

- provide a visible cue to bicyclists and motorists within a narrow traveled way that bicycles are to be expected and welcomed on the roadway,
- indicate the most appropriate location for the bicyclist to ride on the roadway with respect to moving traffic and parked cars,
- reduce the chance of bicyclists impacting open doors of parked vehicles on a shared roadway with on-street parallel parking,
- provide an upgraded facility on roadways where there is not enough space for standard five-foot bicycle lanes, and
- help to connect gaps between other bicycle facilities where more extensive bicycle facilities cannot be located owing to space constraints or operational considerations.

Sharrow markings are not currently included in the latest edition of the Manual on Uniform Traffic Control Devices (MUTCD).[15] A number of US cities are participating in Federally-approved experiments with this marking at this time; locally, the City of Seattle is making extensive use of shared lane markings to enhance the roadway environment for bicyclists.

A 2004 study by the San Francisco Department of Parking and Traffic showed sharrows do provoke drivers to leave about two feet more between their car and cyclists when passing. The study also examined which sharrow design was most effective; in the end they -- like Seattle -- chose the chevron symbol pioneered in Chicago and Paris.[16]

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[15] In January 2007, the National Committee on Uniform Traffic Control Devices (NCUTCD) endorsed the shared lane marking concept, and has recommended its inclusion in the Federal Manual on Uniform Traffic Control Devices (MUTCD) http://members.cox.net/ncutcdbtc/sls/slmtoncjan07.pdf

[16] Alta Planning & Design San Francisco's Shared Lane Pavement Markings: Improving Bicycle Safety. Final Report Prepared for San Francisco Department of Parking & Traffic, February 2004. http://www.sfmta.com/cms/uploadedfiles/dpt/bike/Bike_Plan/Shared%20Lane%20Marking%20Full%20Report-052404.pdf

If sharrows are ultimately approved by MUTCD, the City of Bellevue may want to consider including this shared lane designation in combination with bicycle typology D, E, or F facility locations. As of the development of this plan, sharrow markings are not supported by the City of Bellevue.

Figure X: Example of a Sharrow in Seattle on 19th Ave E

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Type C: Bicycle Shoulder with Fog Line

A **bike shoulder with fog line** can vary in width and has no bicycle stenciling. To provide sufficient space to be an effective facility, the outside motor-vehicle lane plus the shoulder should be greater than or equal to 14 feet. As AASHTO's *Guide for the Development of Bicycle Facilities* states, "adding or improving paved shoulders often can be the best way to accommodate bicyclists in rural areas and benefit motor vehicle traffic." (AASHTO 1999) Such a facility can provide enhanced conditions where needed but the standards for a bicycle lane cannot be achieved.

Studies have shown that many bicyclists' perceived level of comfort is higher when riding in a striped area. In *An Evaluation of Shared-use Facilities for Bicycles and Motor Vehicles*[17], by David Harkey and Richard Stewart, the authors investigated the interaction of motorists and bicyclists in different roadway conditions and came to the following conclusions:

- motorists are less likely to encroach on the adjacent lane when they are passing a bicyclist on facilities with paved shoulders or bicycle lanes
- motorists have less variation in their lane placement when they are passing a bicyclist on a paved shoulder or bicycle lane facility
- bicyclists are more likely to ride further from the edge of the roadway in a bicycle lane or on a paved shoulder than they do in a wide curb lane (providing a greater margin of safety to avoid obstacles and making them more visible)

"Share the Road" or "Bike Route" signs may be used to further enhance the Type C facility and alert motorists to the possible presence of bicyclists. Further, a striped area can provide extra space for motorists to make evasive maneuvers and accommodate driver error, lateral clearance to roadside objects such as the guardrail, signs, and poles, room for motorists to move right to allow emergency vehicles to pass, space for disabled vehicles to stop or drive slowly, increased sight distance for through and entering vehicles, storm water discharge farther from the general use lanes (reducing hydroplaning and splash to following vehicles, pedestrians, and bicyclists), more intersection and stopping distance, greater effective turning radius for trucks and space for off-tracking of truck's rear wheels in curved sections.

Figure X: Example of a Bike Shoulder on SE 36th

[17] Harkey, D.L. & Stewart, J.R. (1997). Evaluation of Shared-Use Facilities for Bicycles and Motor Vehicles. Transportation Research Record, 1578, 111-118.

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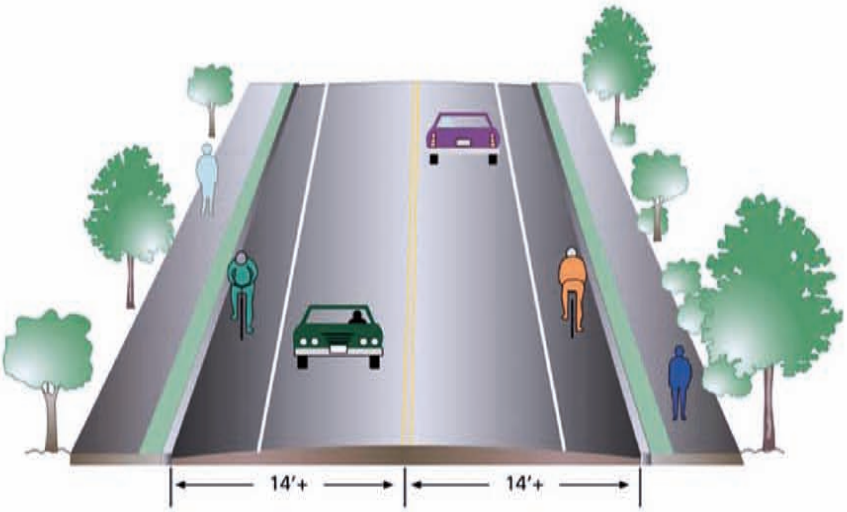
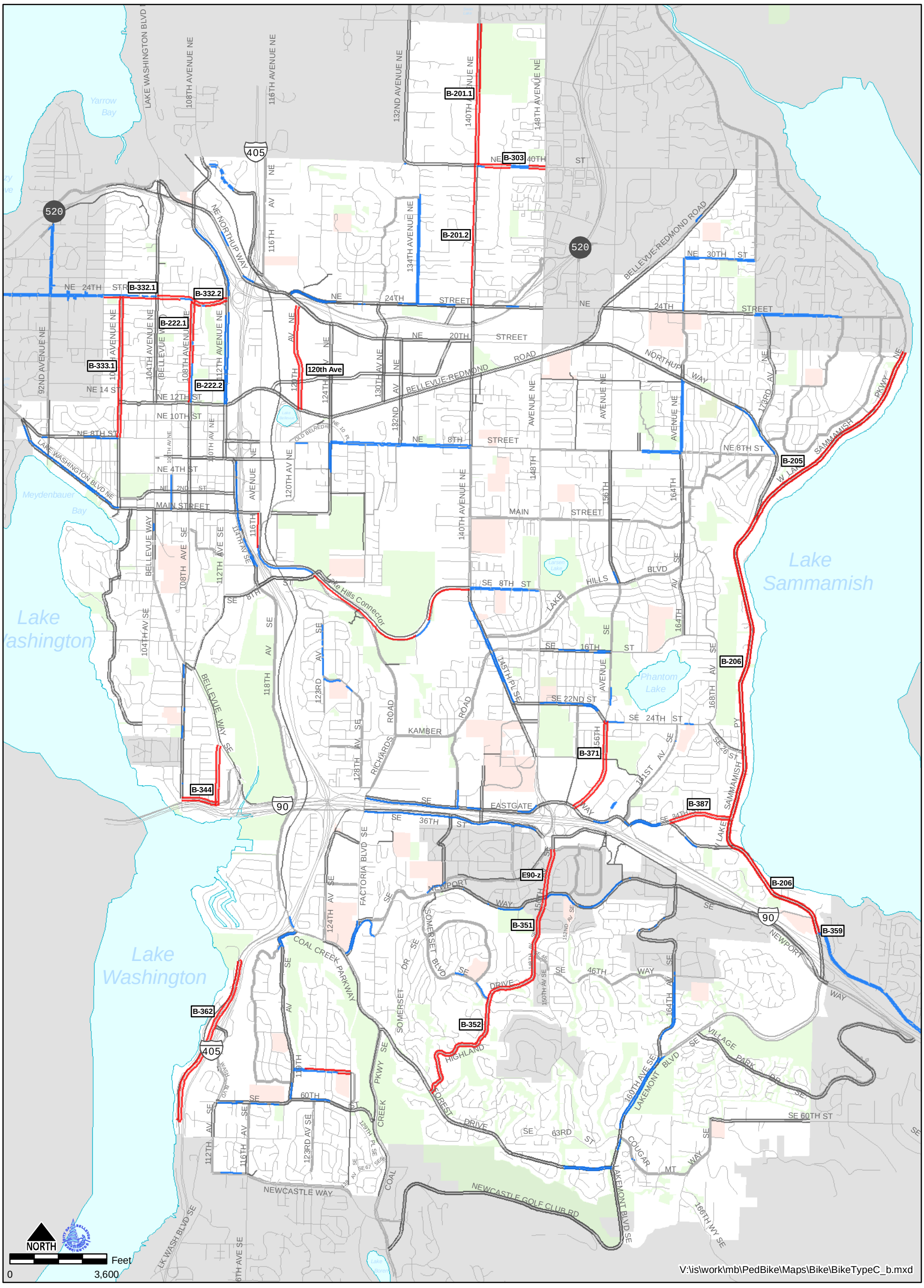
Figure X: Cross Section of Bicycle Shoulder Facilities
Type C: Bike Shoulder with Fog Line
(Motor Vehicle Lane + Shoulder ≥ 14')





Type C - *Bicycle Facility:*

Bike Shoulder with Fog Line

Legend	Length (Miles)
Proposed Type C Bikeways (22 Projects)	32.17
Existing Type C Bikeways	32.90
All Other Proposed Bikeways	155.76
All Other Existing Bikeways	156.96

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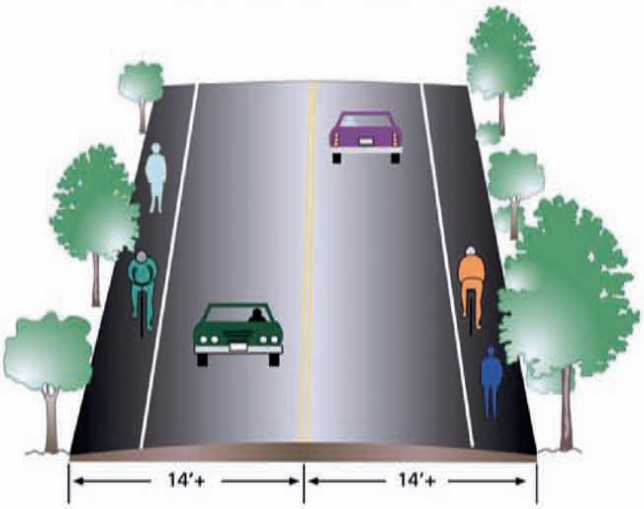
Type D: Shared Shoulder with Fog Line

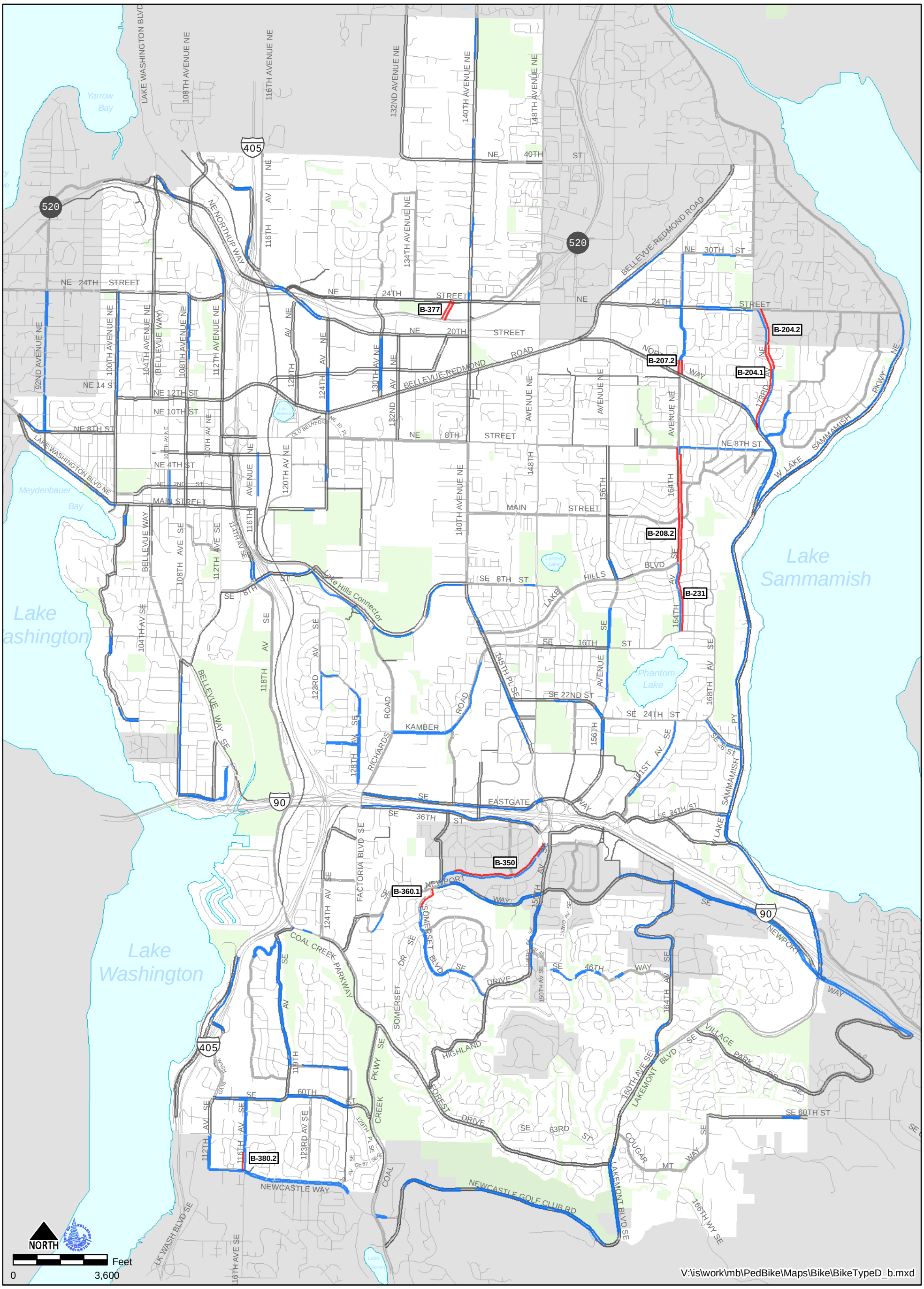
A **shared shoulder with a fog line** is essentially a bike shoulder also used by parked vehicles and/or pedestrians (motor-vehicle lane + shoulder ≥ 14'). This facility differs from a bike shoulder in that there is car parking and/or no sidewalk along the side of the road and, thus, is shared with other users. A roadway with no sidewalk promises to have pedestrians walking on the shoulder, thus making that area shared. Until a sidewalk exists, a street with sufficient width for a bike shoulder or bike lane remains a shared shoulder.

This type of facility should only be considered complete in areas where traffic and speed levels are very low, not warranting the separation of different users. To provide sufficient space to be an effective facility, the outside motor-vehicle lane plus the shoulder should be greater than or equal to 14 feet.

Figure X: Example of a Shared Shoulder on SE 60th Street

Figure X: Cross Section of Shared Shoulder Facilities
Type D: Shared Shoulder with Fog Line
(Motor Vehicle Lane + Shoulder ≥ 14')





Type D - *Bicycle Facility:*

Shared Shoulder with Fog Line

Legend	Length (Miles)
Proposed Type D Bikeways (8 Projects)	4.69
Existing Type D Bikeways	55.25
All Other Proposed Bikeways	183.25
All Other Existing Bikeways	134.61

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Type E: Wide Outside Lane Without Fog Line

As AASHTO's *Guide for the Development of Bicycle Facilities* states, "wide curb lanes for bicycle use are usually preferred where shoulders are not provided, such as in restrictive urban areas."(AASHTO 1999) A **wide outside lane** means that the traffic lane next to the curb (the right most lane) is extra wide so a bicyclist and motorist can comfortably share the same lane. There is no line painted on the street separating the motorists from the bicyclists on this facility. To be an effective bicycle facility, a wide outside lane should be at least 14 feet wide and properly maintained – potholes in the bicycle travel area are filled quickly and debris swept away regularly.

Where there is insufficient width to install bicycle lanes or shoulder bikeways on arterial and collector streets, creating wide outside travel lanes can help accommodate both bicycles and motor vehicles. This may occur on retrofit projects where there are severe physical constraints and all other options have been pursued, such as removing parking or narrowing travel lanes. Wide outside lanes can often be installed by narrowing inner lanes on a multilane arterial, thereby reallocating roadway space so that the outside (curb) lanes are wider.

Though sufficient space exists, a wide outside lane may not effectively serve many cyclists, thus should only be considered a complete bicycle facility if vehicular traffic volumes and speeds are low. However, the benefits of such facility is the easy and quick implementation requiring only re-channelization on many streets. Continuous stretches that are wider than 15 feet should be considered for striping of bike lanes or shoulders since the space exists. "Share the Road" or "Bike Route" signs may be used to further enhance the facility and alert motorists to the possible presence of bicyclists.

Figure X: Example of a Wide Outside Lane on 116th Ave NE

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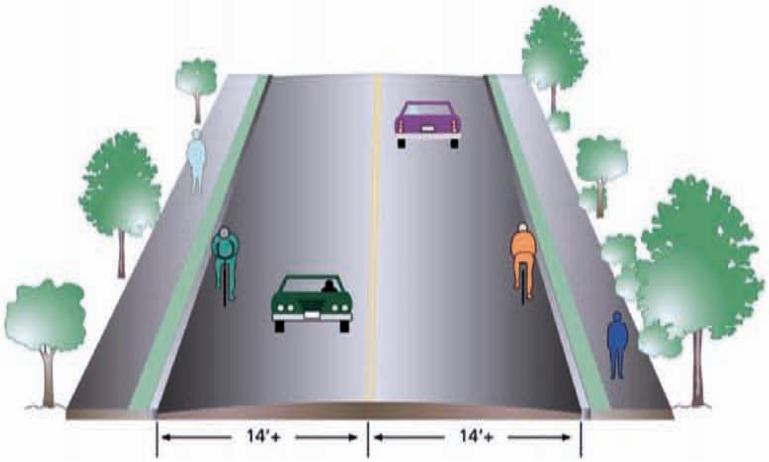
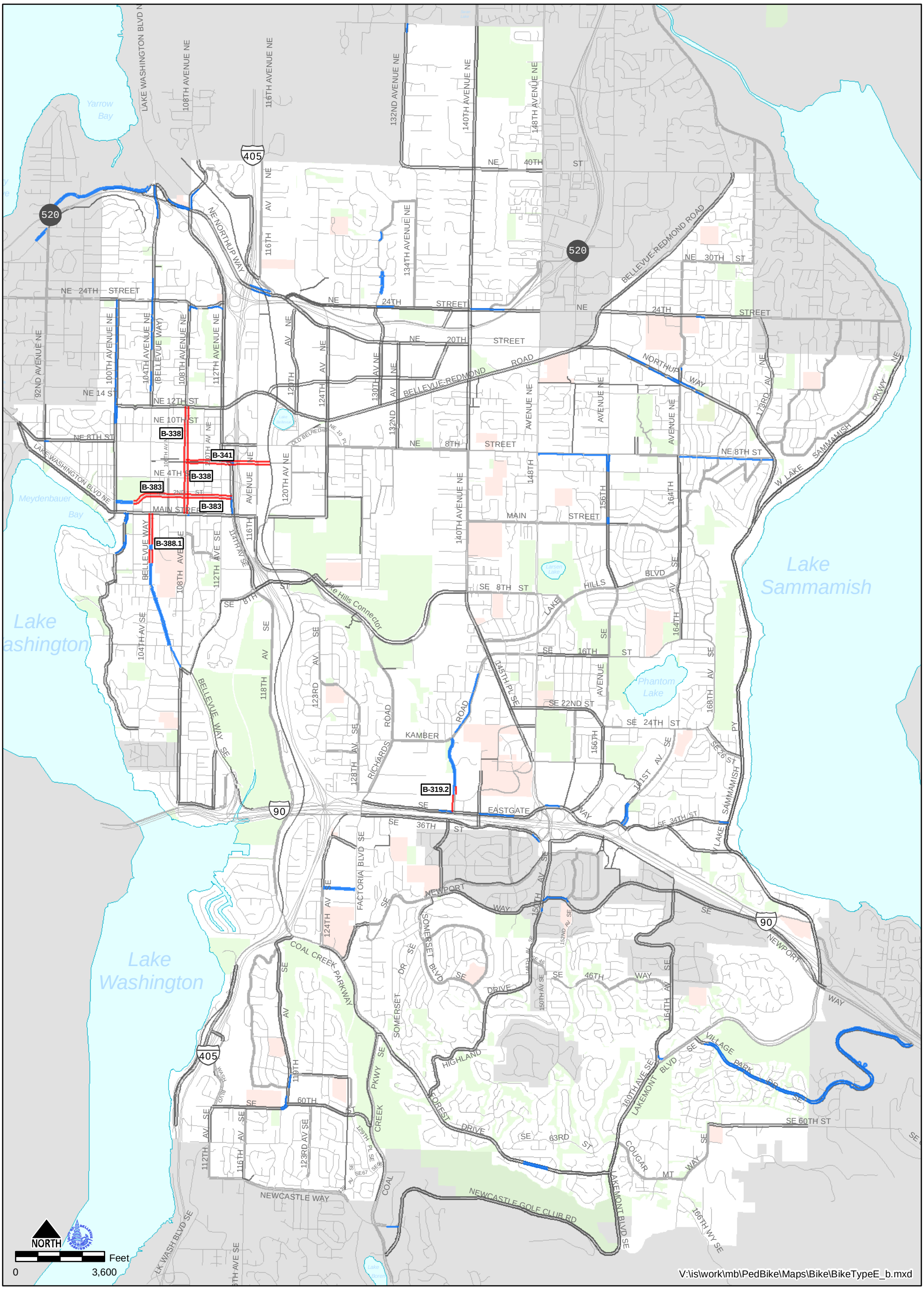
Figure X: Cross Section of Wide Outside Lane Facilities

Type E: Wide Outside Lane Without Fog Line (≥ 14')





Type E - *Bicycle Facility:*

Wide Outside Lane Without Fog Line

Legend	Length (Miles)
Proposed Type E Bikeways (5 Projects)	4.98
Existing Type E Bikeways	17.27
All Other Proposed Bikeways	153.82
All Other Existing Bikeways	145.11

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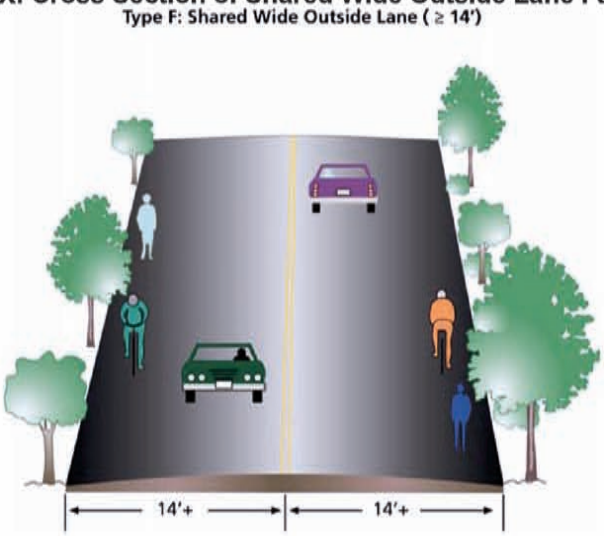
Type F: Shared Wide Outside Lane

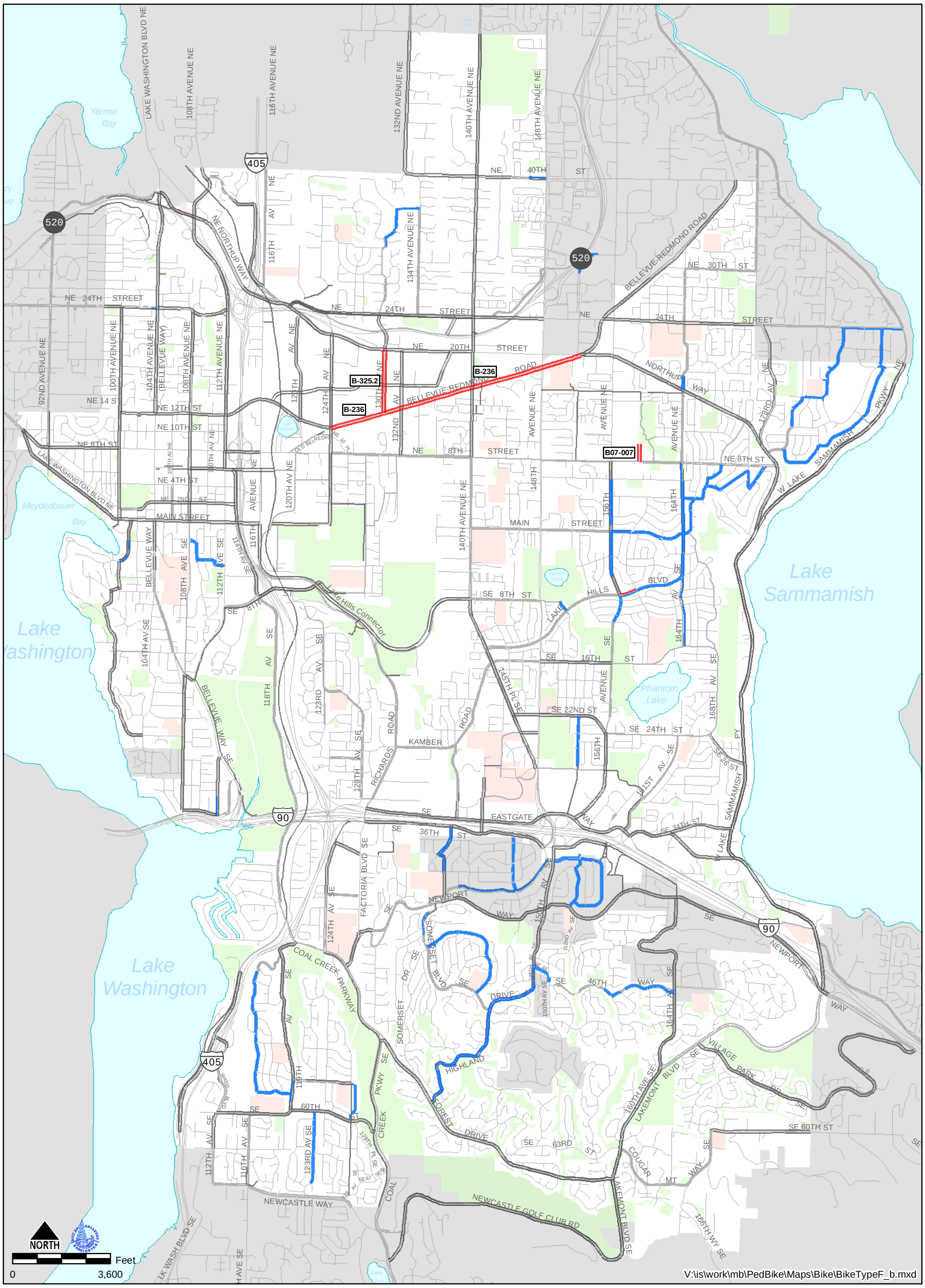
A **shared wide outside lane** is essentially a wide outside lane differing only in that there is car parking and/or no sidewalk along the side of the road—a roadway with no sidewalk promises to have pedestrians walking on the shoulder, thus making that area shared. Until a sidewalk exists, a street with sufficient width to be categorized as having a wide outside lane remains a shared wide outside lane.

This type of facility should only be considered complete in areas where traffic and speed levels are very low, not warranting the separation of different users. To be an effective bicycle facility, a wide outside lane should be at least 14 feet wide and properly maintained – potholes in the bicycle travel area are filled quickly and debris swept away regularly. "Share the Road" or "Bike Route" signs may be used to further enhance the facility and alert motorists to the possible presence of bicyclists.

Figure X: Example of a Shared Wide Outside Lane on Lake Hills Blvd

Figure X: Cross Section of Shared Wide Outside Lane Facilities





Type F - *Bicycle Facility*:

Shared Wide Outside Lane

Legend	Length (Miles)
Proposed Type F Bikeways (4 Projects)	4.97
Existing Type F Bikeways	28.68
All Other Proposed Bikeways	182.97
All Other Existing Bikeways	161.18

Pedestrian Network

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PEDESTRIAN NETWORK

As defined in WSDOT's Design Manual (Chapter 1025 Pedestrian Design Considerations), "Pedestrian travel is a vital transportation mode. It is used at some point by nearly all citizens and is the main link to everyday life for many others. Pedestrians vary in their physical abilities; this variation must be accommodated in design to allow near universal access. Keep the pedestrian space free of obstacles." Pedestrian facilities include sidewalks, traffic signals, crosswalks, refuge islands, pedestrian-scale illumination and benches. Walkways include:

- Sidewalks, located along roadways, separated with a curb and/or planting strip, have a hard, smooth surface. Sidewalks are sometimes used by bicyclists; however, because of frequent intersections, dips, and narrow widths, sidewalks are not meant for bicycles other than new riders who are accompanied by a pedestrian trainer. One of the most common reasons for bicycle/car collisions are attributed to that rider being on the sidewalk. [Note: This section of the report examines sidewalk facility typologies.]

Sidewalks are an important transportation feature for pedestrian mobility, safety, and accessibility.

- Paths, typically used by pedestrians, cyclists, skaters and joggers (shared-use). It is not realistic to plan and design a path for exclusive pedestrian use, as others will be attracted to the facility. Paths may be unpaved (packed gravel). [Note: Typology A: Multi-Use Path are addressed in the Bicycle Facility Section (Chapter X); and, in the Trails facility section].

There are approximately 336 miles of sidewalk in the City of Bellevue. Like most cities, Bellevue has sidewalks that do not provide a cohesive, gap-free network. However, the pedestrian community, ranging from experienced joggers to school children, currently use the existing streets and routes for their own purposes. As one on-line survey respondent indicates: ""Fill in the missing sidewalks so you do not need to walk in the road for part of the distance." This plan looks at the existing opportunities and constraints to help develop a comprehensive walkway system that will make it easier for pedestrians to travel to their destinations.

The clearly visible "goat trail" on Northup Way indicates where frequent walkers travel. This location was identified as an area lacking continuity in the sidewalk system.

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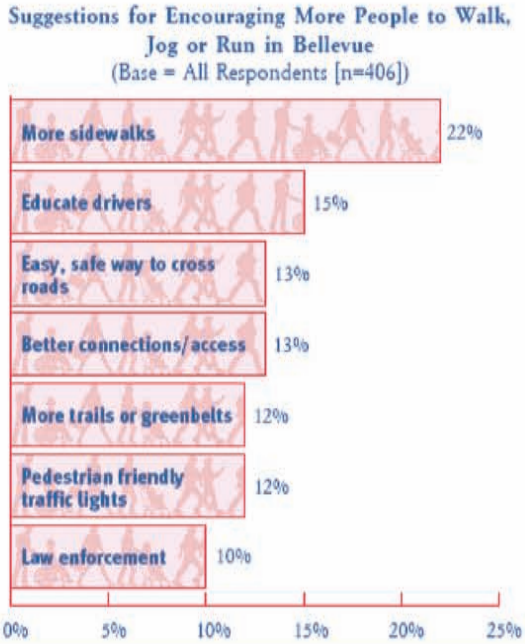
MEETING THE NEEDS OF DIFFERENT PEDESTRIANS

The web-based surveys conducted in support of this project generated responses from 405 pedestrians and allowed city staff to get an idea of where various types of pedestrian facility enhancements are needed within Bellevue. Based on the responses, the top pedestrian facility improvement categories that would make it easier and safer for people to walk, jog or run in Bellevue are: adding sidewalks (65%); adding off-road greenways and trails (56%); repairing sidewalks, fixing cracks, removing loose gravel or sand and improving street/intersection design were each considered very improvement (37%).



The proposed sidewalk network (outlined in this section) includes a variety of facility improvements that respond to the many different issues faced by pedestrians. There are a variety of different design treatments that will be used, depending on whether the roadway is a quiet neighborhood street versus a busy arterial street. Bellevue's proposed off-road greenways and trails improvements are referenced in Chapter X.

There are important reasons for providing a mix of pedestrian facility types. As indicated in WSDOT's Design Manual (Chapter 1025 Pedestrian Design Considerations): "The type of pedestrian facility provided is based on local transportation plans, the roadside environment, pedestrian volumes, user age group, safety-economic analysis, and continuity of local walkways along or across the roadway. Sidewalks can be either immediately adjacent to streets and highways or separated from them by a buffer."[18]

The ADA requires pedestrian facilities used by the general public to be planned, designed, constructed and maintained for use by a wide range of people, including people with disabilities.

For these reasons, the sidewalk facility network is composed of a variety of different facility types that can realistically be implemented, and will appeal to pedestrians with varying levels of experience.

This guidance is not a design standard, and should not be used as such. Application of this guidance requires the use of engineering judgment when retrofitting Bellevue streets to provide optimal pedestrian facilities.

[18] http://www.wsdot.wa.gov/EESC/Design/DesignManual/desEnglish/1025-E.pdf

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PEDESTRIAN DESIGN TREATMENTS

The fundamental component of increased pedestrian activity is a safe place to walk. Just as vehicles need roads, pedestrians need walkways.

Properly planned sidewalks are essential in providing pedestrian mobility, safety, and accessibility, particularly for persons with disabilities, children, and older adults. Sidewalks benefit both pedestrians and motorists by creating separation between pedestrian and vehicular travel paths. In an area where sidewalks are not provided, there is substantially increased risk of vehicle-pedestrian conflicts. A Federal Highway Administration (FHWA) study that analyzed vehicle-pedestrian collisions and exposure under various roadway situations found that locations with no sidewalks are more than two times more likely to have vehicle-pedestrian crashes than sites with sidewalks.[19]

2ft sidewalk on the north side of NE 18th Street heading east from 164th

Although a number of 2 to 4 ft sidewalks were built in the past, this width does not provide adequate clearance or mobility for pedestrians, or people using wheelchairs, to pass in opposite directions. The minimum width for a new sidewalk in Bellevue is five (5) feet. Five foot sidewalks are found in low density areas such as single family neighborhoods. As adjacent land uses become more intense the minimum widths for sidewalks increase to six (6) feet for medium density areas, such as townhouses or small commercial areas, and twelve (12) feet in high density areas, like the city's downtown corridors. These minimum widths are the clear area of the sidewalk and do not include things like street trees, street lights, traffic signal poles, signs and parking meters.

The placement of this fire hydrant on this 3 foot sidewalk on the north side of Main Street (between 107th and 106th) renders the entire sidewalk unusable as a route for wheelchair users.

The final design element of a good sidewalk is providing separation from motor vehicle traffic. Pedestrians are least comfortable walking directly adjacent to moving cars, trucks and buses, so in Bellevue, every effort is made, especially on busy streets, to provide non-pedestrian, non-vehicular space between vehicle travel lanes and the sidewalk. This space also provides an area for

[19] Knoblauch, R.L., Tustin, B.H., Smith, S.A., and Pietrucha, M.T. "Investigation of Exposure Based Pedestrian Areas: Crosswalks, Sidewalks, Local Streets AND Major Arterials" (Report No. FHWA/RD-88/038). Federal Highway Administration, September 1988.

trees, poles signs, etc so that the minimum clear widths for the sidewalk can be maintained. In residential areas a utility/planting stripe of two and one half to four feet is typically provided. In commercial and mixed use areas a space of four to six feet is provided either as a continuous planting stripe or as an area with street tree pits, street lights, and other street furniture.

Sidewalk widths should vary according to the number of pedestrians anticipated to use the sidewalk. Naturally, a sidewalk along a residential street will be narrower than a sidewalk in a busy downtown. The best way to achieve the goal of a clear walking area is to design sidewalks using the zone system.

The zone system divides the sidewalk corridor into four zones to help ensure that pedestrians have a sufficient amount of clear space to travel. Each zone is a distinct sidewalk area; the four pedestrian zones are:

1. curb zone
2. furniture (or planter) zone
3. pedestrian (or walking) zone
4. frontage zone.

Each zone has its function, and omitting or neglecting the design of a zone compromises the quality of the walking experience.

The Curb Zone:

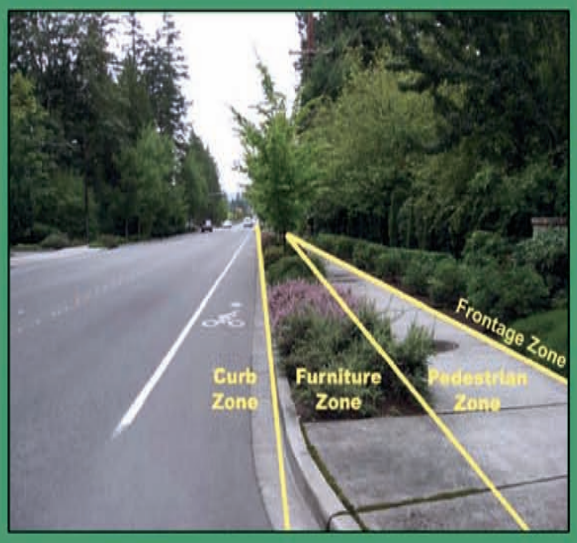
The curb zone defines the pedestrian area, providing a buffer between the sidewalk and the street. This zone usually consists of the width of the curb and may contain space for unloading passengers or freight.

Curbs prevent water in the street gutters from entering the pedestrian space, discourage vehicles from driving over the pedestrian area, and make it easy to sweep the streets. In addition, the curb helps to define the pedestrian environment within the streetscape. At the corner, the curb is an important tactile element for pedestrians who are finding their way with the use of a cane.

The Furniture Zone/Planter Strip:

The furniture zone is located between the curb and pedestrian zones. When landscaped it is referred to as the planter strip. It is easier to meet ADA sidewalk

Pedestrian Zone System



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requirements with separated sidewalks. The furniture zone has many functions:

- Pedestrians are separated from traffic, increasing a walker's sense of security;
- Street furniture and obstructions (bicycle parking, poles, posts, mailboxes, parking meters, fire hydrants etc) can be placed out of the walking zone (these objects should not reduce visibility of pedestrians, bicyclists and signs);
- Room for street trees and other landscaping (plants should be selected that require little maintenance and watering; roots should not buckle sidewalks);
- The sidewalk can stay level across driveways;
- Ramps can be placed correctly: sidewalks, curb cuts and crosswalks line up at intersections.

The Pedestrian Zone:

This is where people walk and should be clear of obstructions, both permanent and temporary objects. The current ADA standard *(ADAAG 4.3.3)* specifies an absolute minimum clear space of 36 inches (width of most wheelchairs); however, the draft update to the ADAAG is recommending a minimum of 48 inches (*PROWAAC R301.3.1)*. The surface should be smooth and uniform.

The pedestrian zone should be straight, or parallel to the adjacent road when the road naturally curves. Pedestrians want to walk in the most direct route possible, and attempts to create meandering sidewalks usually fail because they do not serve the needs of pedestrians. The only exceptions should be when a sidewalk is substantially separated from a roadway, and the natural contours of the pedestrian zone are different from the alignment of the roadway, or to avoid large obstacles such as mature trees.

The Frontage Zone:

The frontage zone, located between the pedestrian zone and the right-of-way, is where people window shop, enter and exit buildings, and sit at outdoor cafes. This zone allows pedestrians a comfortable "shy" distance from the building fronts, in areas where buildings are at the lot line, or from elements such as fences and hedges on private property. Where no furniture zone exists, elements that would normally be sited in that zone, such as sandwich boards, bike racks and other street furniture may occupy the frontage zone.

The recommended width is 2 feet or greater. An absolute minimum of 1 foot is needed for practical purposes, for example to ensure that adjacent property owners don't erect a fence at the back of walk, or for maintenance personnel to make sidewalk repairs. A 2-foot shy distance is needed from vertical barriers such as buildings, sound walls, retaining walls and fences.

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Type A: Residential Street

The minimum width for a new sidewalk in Bellevue is five (5) feet. Five foot sidewalks are found in low density areas such as single family neighborhoods. Sidewalks should never be built adjacent to a roadway if the space exists for a buffer such as a planting strip (where feasible, a planting strip of 4 feet between the sidewalk and the curb should be included).

Access can be easily compromised on Typology A sidewalk facilities by both fixed (e.g., utility poles) and moveable objects (e.g., encroaching vegetation), that reduces the usable width of a sidewalk, or makes it impassable. Currently codes require private property owners to maintain vegetation in a manner that does not result in sidewalk encroachments. Additionally, the city is actively engaged in an inventory of its sidewalk environment to identify those locations that represent ADA accessible route compliance issues.

"The trash containers/yard wastes containers need to be off the side walk.... someone in a wheelchair can NOT get by on the skinny side walk(if you can even call it that) that we have on our streets. Something needs to be done."

"Have homeowners trim their shrubs and trees. In our neighborhood (Somerset), trees hang so low you have to duck to avoid them and shrubs sometimes have taken over half of the sidewalk."

"I would like to see wider sidewalks in Bellevue; without obstructions of planters and electric boxes infringing on that space for walking."

"Improve the condition of the sidewalks - make sure residents do not leave garbage cans blocking the sidewalks or park their cars across the sidewalks."

"Narrow sidewalks next to heavy traffic are unpleasant."

"Bellevue Way (particularly between downtown and say Kirkland) could be a fantastic boulevard, but as it is the walking areas are too close to the roadway to make pedestrians feel very comfortable."

"Many streets in Bellevue were developed before sidewalks were standard, and were annexed into the city through the years. A regular program of adding sidewalks in these neighborhoods would be helpful. Also, because residential neighborhoods were often developed in 'chunks', pedestrian access between them is sometimes difficult. My kids have friends in an adjacent development, but in order to get there, they have to walk out of our neighborhood, on to a major (35 mph speed limit) arterial, then walk into the next neighborhood. If there were some sort of cut-through, the length would be shortened from nearly a mile to half a mile, and it would all be on quiet neighborhood streets."

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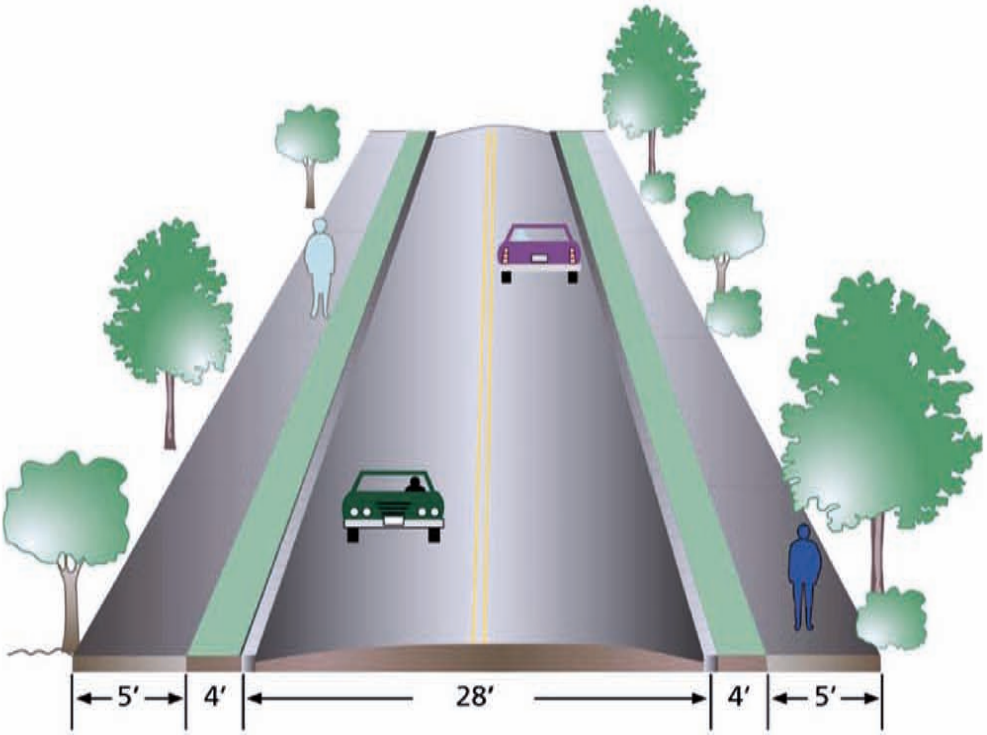
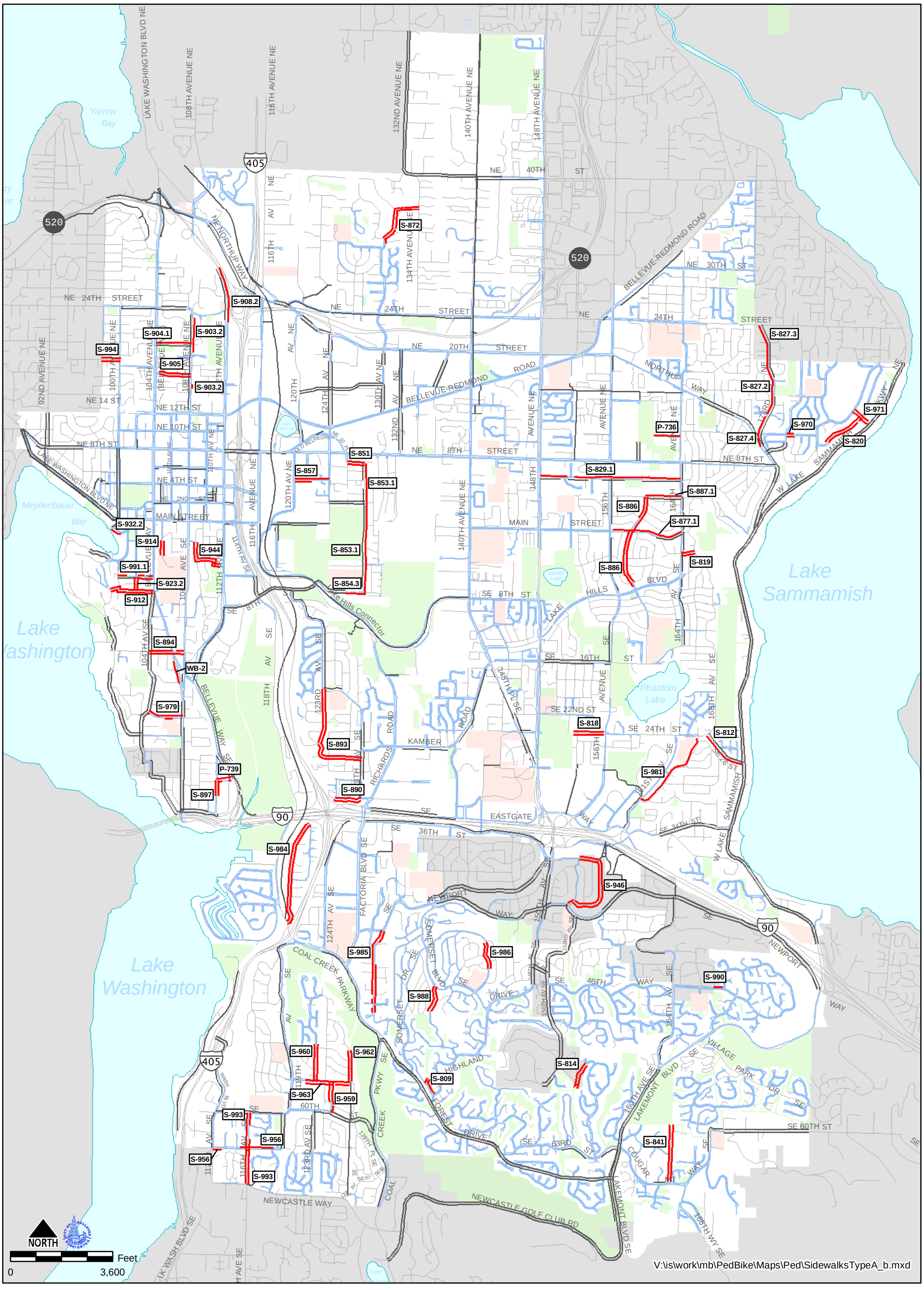
Figure X: Example of a Residential Street on ____

Figure X: Cross Section of a Residential Street





Type A - *Sidewalk Facility:*

Residential Street

Legend	Length (Miles)
Proposed Type A Sidewalks (53 Projects)	25.18
Existing Sidewalks	303.03
All Other Proposed Sidewalks	59.75

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Type B: Collector Arterial Street

There are many locations in Bellevue where clear sidewalk widths greater than the minimum are desirable. Along arterials, not in downtown Bellevue, sidewalk widths of 6 feet are desirable where a planting strip of 4 feet is provided between the sidewalk and the curb.

"I think using more separation (i.e vegetation) along arterials makes pedestrians feel safer and the experience more enjoyable. Also, adding rests stops with bench, water, and trash cans might help people walk longer and the City a little cleaner."

"Build more sidewalks with planter strips and landscaping to provide a barrier between the pedestrian and cars, especially when there isn't a parking lane."

"For future sidewalks, require developers to separate sidewalks from the vehicle traffic with a landscaped strip or vegetated buffer. It doesn't have to be very wide or raised (like a berm) but just something so cars are more than an arm's length away."

"With the expansion of the south Bellevue recreation center there is an increase of usage of the facility. It would be great if the sidewalks could be extended from where they currently end at Sommerset to the new center along Newport way."

"Create more Sidewalks!!! We can not walk from our house to our neighborhood: school (Eastgate), library (Newport), Gym (SBCC), Friends house (Highland Drive). We are becoming increasingly irritated that we have to drive everywhere except towards Lakemont. We are considering moving back to Seattle - we are so annoyed to have to drive to our so called 'neighborhood' destinations. I have to tell my 5 year old who wants to walk to the library and school that it is too scary along side the roads to walk."

Figure X: Example of a Collector Arterial Street at NE140th and 1st Place

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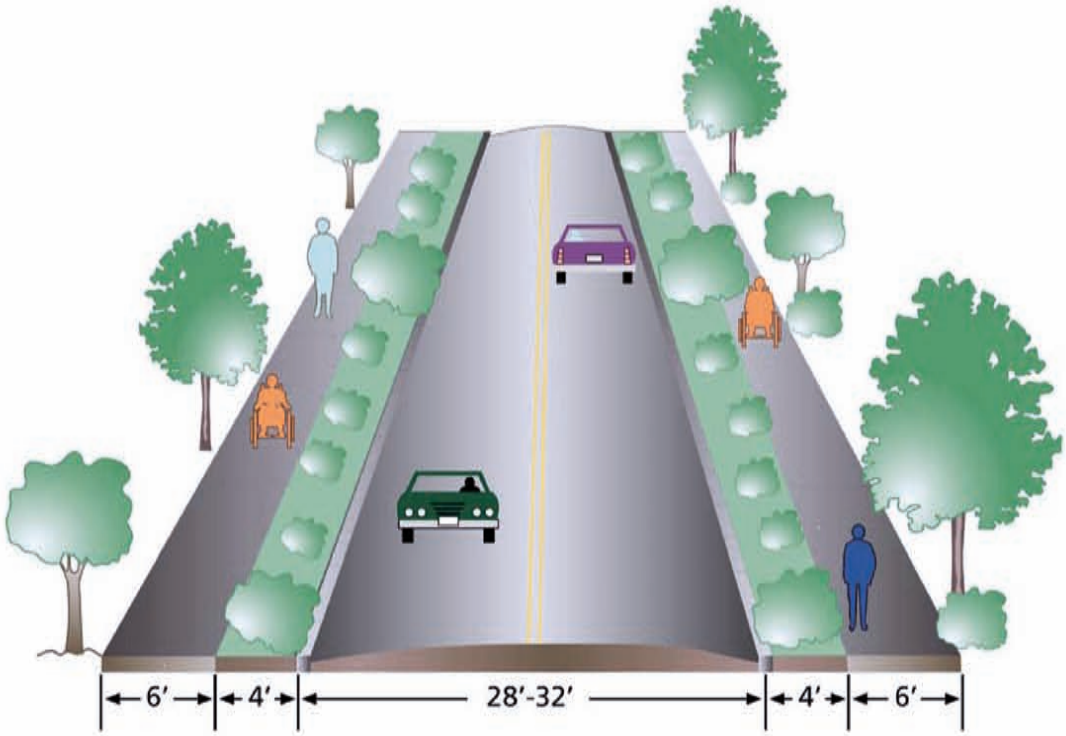
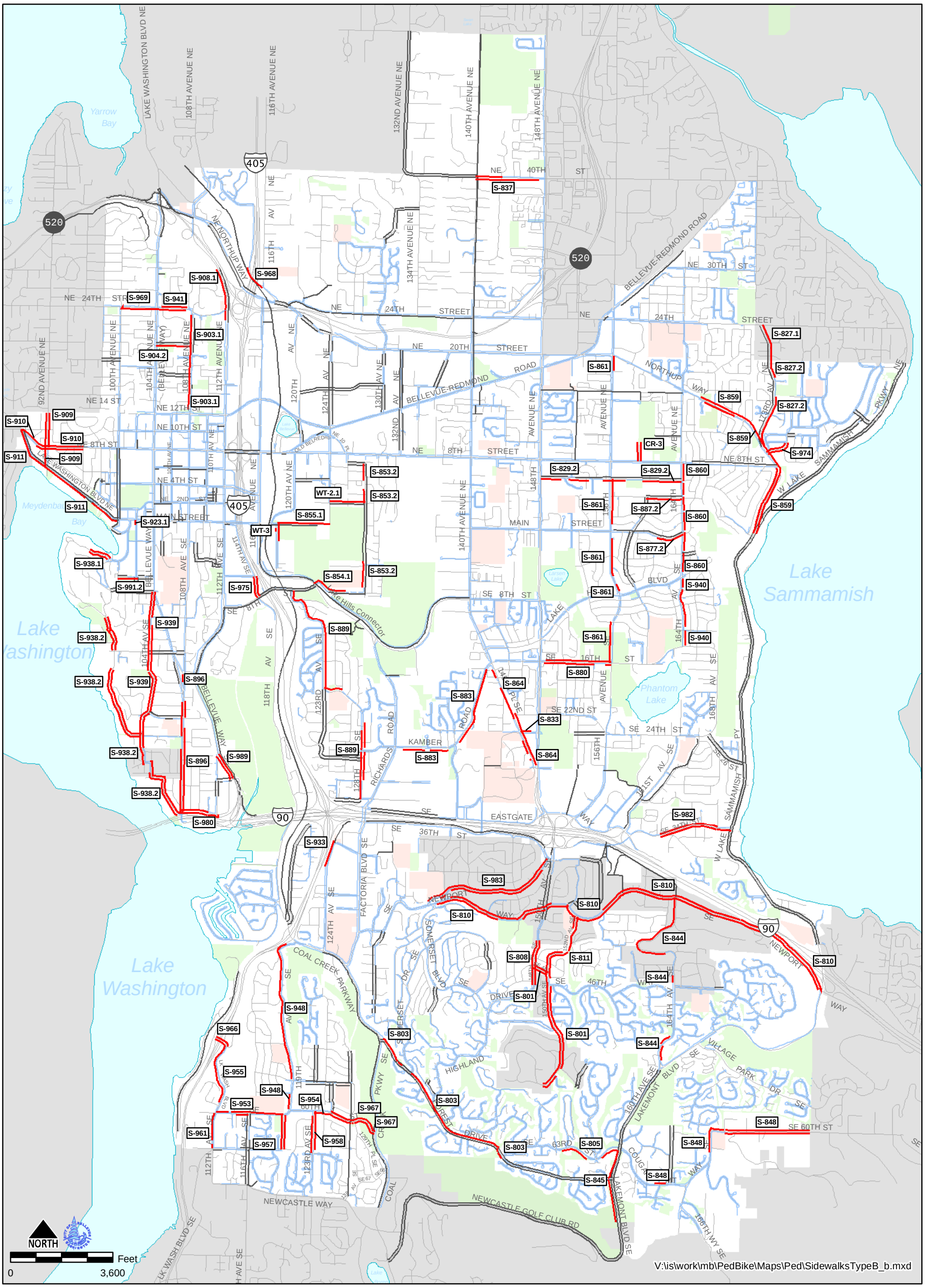
Figure X: Cross Section of a Collector Arterial Street





Type B - *Sidewalk Facility*:

Collector Arterial Street

Legend	Length (Miles)
Proposed Type A Sidewalks (61 Projects)	46.51
Existing Sidewalks	303.03
All Other Proposed Sidewalks	38.43

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Type C: Major/Minor Arterial Street and Downtown Minor Connections

In downtown Bellevue areas the desired sidewalk widths increases to accommodate higher pedestrian volumes. The furniture zone (planting strip) can, in some places, be paved areas adjacent to the sidewalk for street furniture such as benches, bicycle racks, water fountains, or informational boards. Sidewalk widths in these areas should be 8 feet and the planting strip 4 feet.

"My family lives on Bellevue Way, street with heavy traffic and narrow or non existing sidewalks. Since I have two small kids, I really feel very uncomfortable when we have to take a walk from whatever reason (usually that is a walk to Enatai Elementary)."

"Need a more complete system, particularly on arterial streets. Currently have lots of locations where there are disconnected segments of sidewalks - need to fill in the missing pieces."

"Remove/cut back sight distance restricting shrubs which often overhang the sidewalk as well (typical bad example are the shrubs along NE 8th fronting the Bartell's and QFC Villlage driveways -- especially the westernmost driveway near 100th Ave NE. Also City should cut back shrubs (or require the property owner, as appropriate) that overhang long segments of sidewalk -- especially along 5-ft obsolete-standard narrow sidewalks in commercial areas."

"Bellevue is not a pedestrian friendly city. The city core must be made more walker friendly. Narrow sidewalks should either be made wider or should have protection to keep the cars away from walkers. Walk down the east side of 100th Ave between Main and NE 8th St and see if you feel safe. Don't use the excuse that there isn't room."

"Most destinations in Bellevue are not within walking distance of peoples homes. This is the single largest impediment to walking, and it's the main reason why I'll choose to drive at almost any opportunity. Pedestrians seem to be an afterthought in many parts of Bellevue, as indicated by lack of sidewalks and intersections which make pedestrians push a button to get a walk signal. The rounded corners that are present at many intersections allow cars to take turns at a very high speed - this makes intersections in Bellevue 'feel' more dangerous than those in Seattle."

Figure X: Example of a Major/Minor Arterial Street on ____

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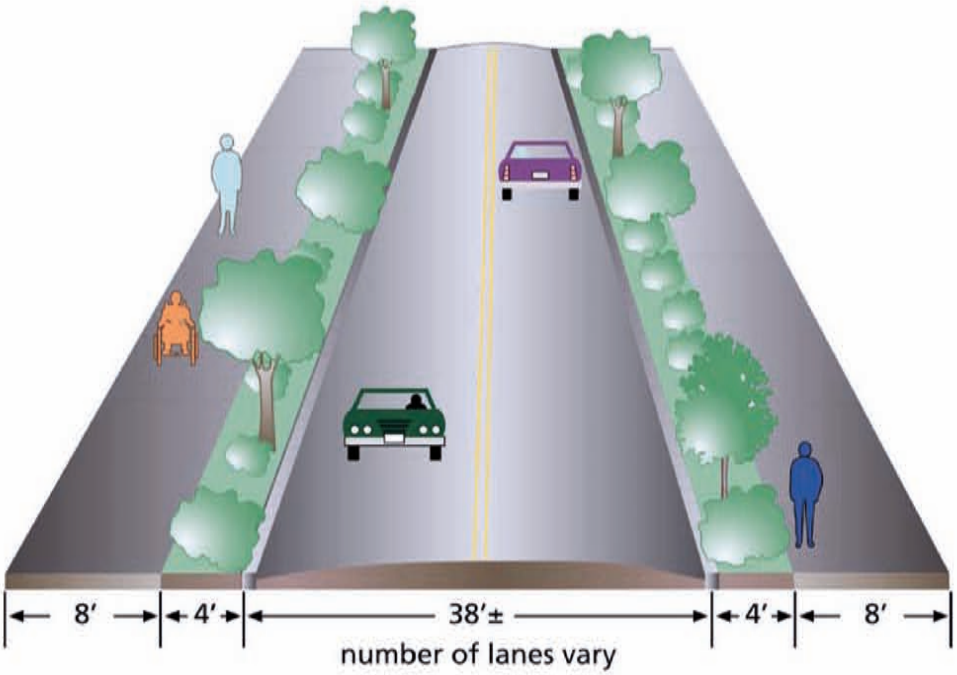
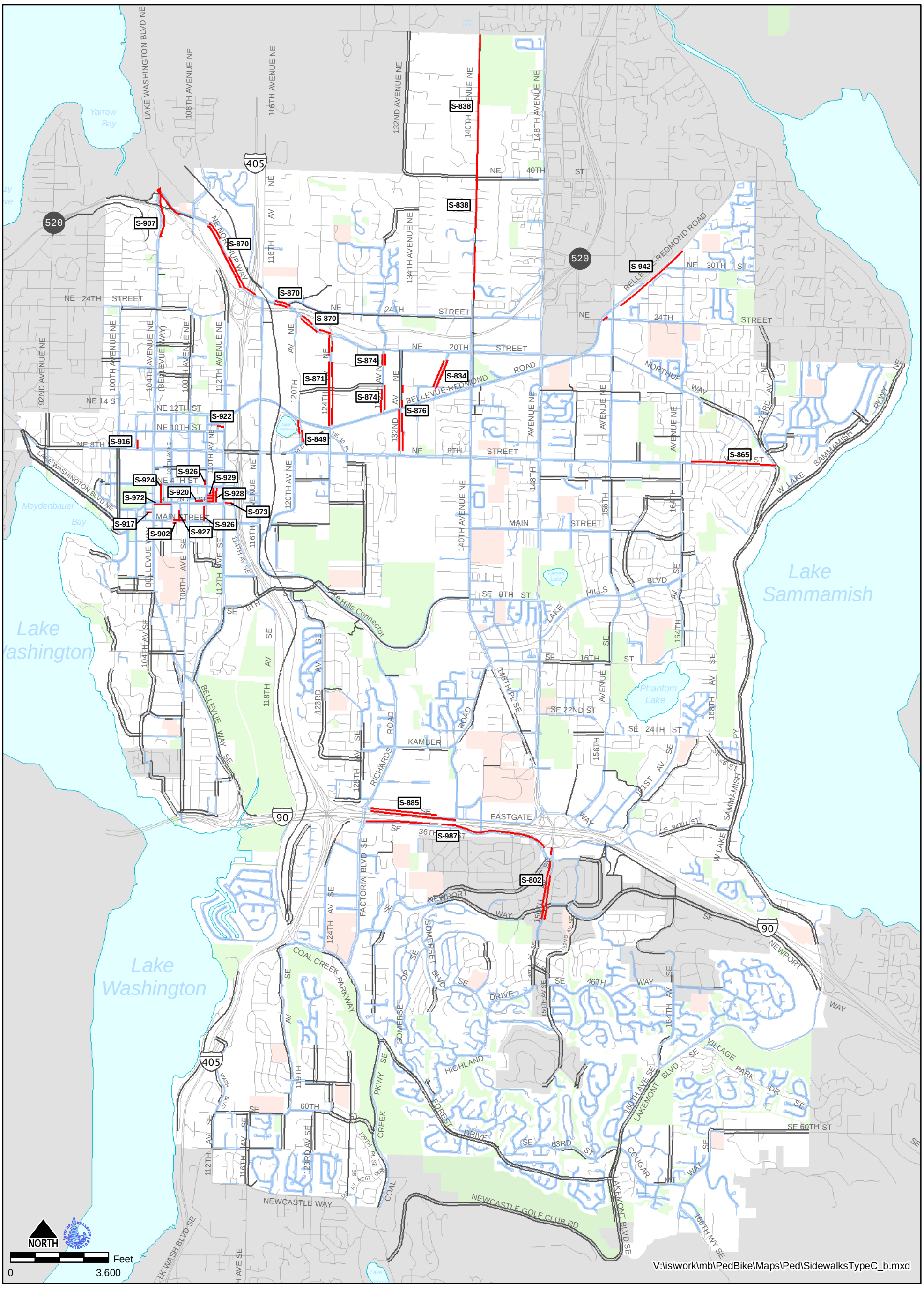
Figure X: Cross Section of a Major/Minor Arterial Street





Type C - *Sidewalk Facility:*

Major/Minor Arterial Street and Downtown Connections

Legend	Length (Miles)
Proposed Type C Sidewalks (25 Projects)	12.46
Existing Sidewalks	303.03
All Other Proposed Sidewalks	72.47

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Type D: Downtown Principal Connection

The Bellevue downtown is an area characterized by a density of mixed uses and clustered pedestrian destinations within a five-minute walk, supporting multiple transit nodes. These are areas that have high pedestrian activity and where priority is given to make walking the transportation mode of choice for trips within the area.

The United States Census 2000 report shows that within downtown Bellevue, single occupant vehicle (SOV) rates were lower than the SOV rate for the city as a whole. This was largely influenced by the relatively large proportion of working downtown residents who walked to work: 16.4 percent of working downtown residents walked to work, as opposed to 2.6 percent of working residents in Bellevue as a whole. This was largely due to the high number of jobs within the downtown area. Downtown Bellevue has more than 30,000 employees and very high employment densities.

Corridors in the Pedestrian and Bicycle Plan identified as Type D facilities are consistent with the guidance found in the Downtown provisions of the Land Use Code, BCC 20.25A.060 Walkways and sidewalks:

"The minimum width of perimeter walkway or sidewalk is 12 feet plus four feet in which street trees are to be planted plus six inches curb along:

a. Bellevue Way between NE 4th and NE 8th; and
b. NE 6th between 110th Avenue NE and 112th Avenue NE; and
c. 106th Avenue NE between NE 4th and NE 8th; and
d. 108th Avenue NE between NE 4th and NE 8th; and
e. 110th Avenue NE between NE 4th and NE 8th; and
f. NE 4th between Bellevue Way and 112th Avenue NE; and
g. NE 8th between Bellevue Way and 112th Avenue NE."

As noted in BCC 20.25A.060, sidewalk widths in these corridors should be 12 feet and the planting strip 4 feet.

"For downtown walking - Wide even and clean sidewalks with occasional benches and pots or curbside flowers or shrubs and keep them maintained. "

"Mixed use & density. I seldom walk to work, although I often walk longer distances in downtown Seattle. This is because there's nothing interesting between home and work to walk along: big campuses, long sidewalks along roads, big buildings that are either offices, or stores that are behind a big parking lot."

"Downtown Bellevue is not pleasant for leisure walking (other than downtown park). The design is totally dominated by cars, it is too noisy, there is no green and not enough park space, greenway, cafes and unique shopping. There needs to be an improved plan to make downtown a pleasant place to live and not just a shopping destination by car."

"To deal with Bellevue's sprawl, additional pedestrian overpasses over 405, 520, North Bellevue Way, and NE 8th St would be extremely helpful. To simply cross these thoroughfares, everyone chooses to drive because there are few safe alternatives. As these traffic corridors cannot afford the additional congestion of street-level pedestrian crossings, Bellevue should plan elevated crossings for cyclists and pedestrians."

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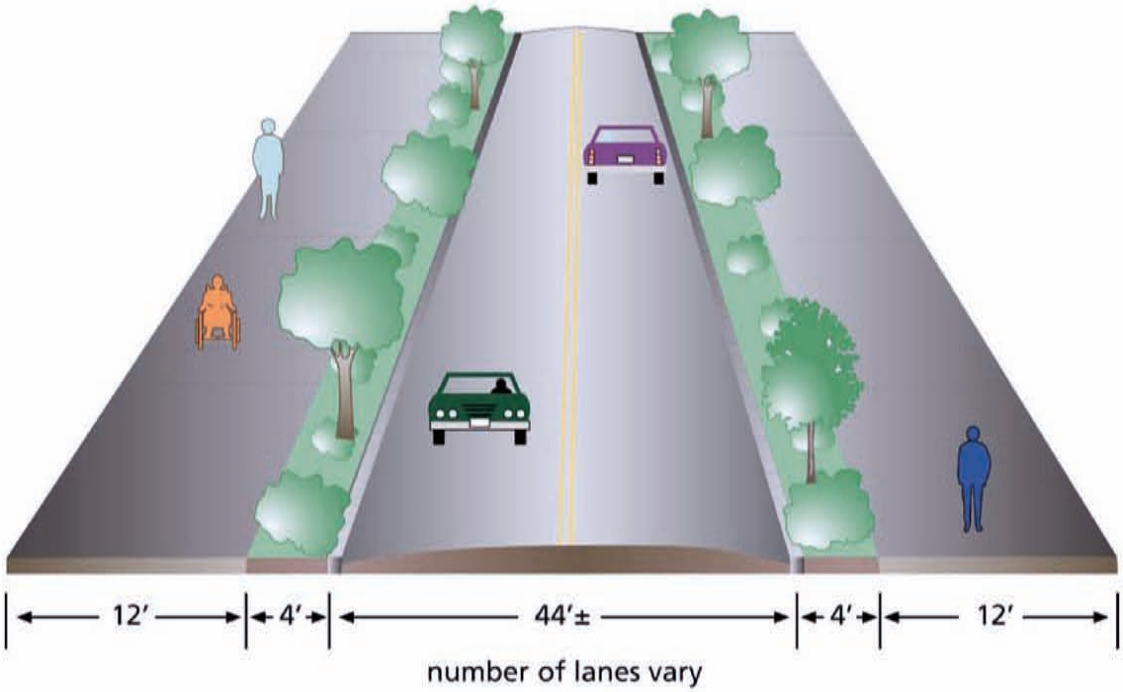
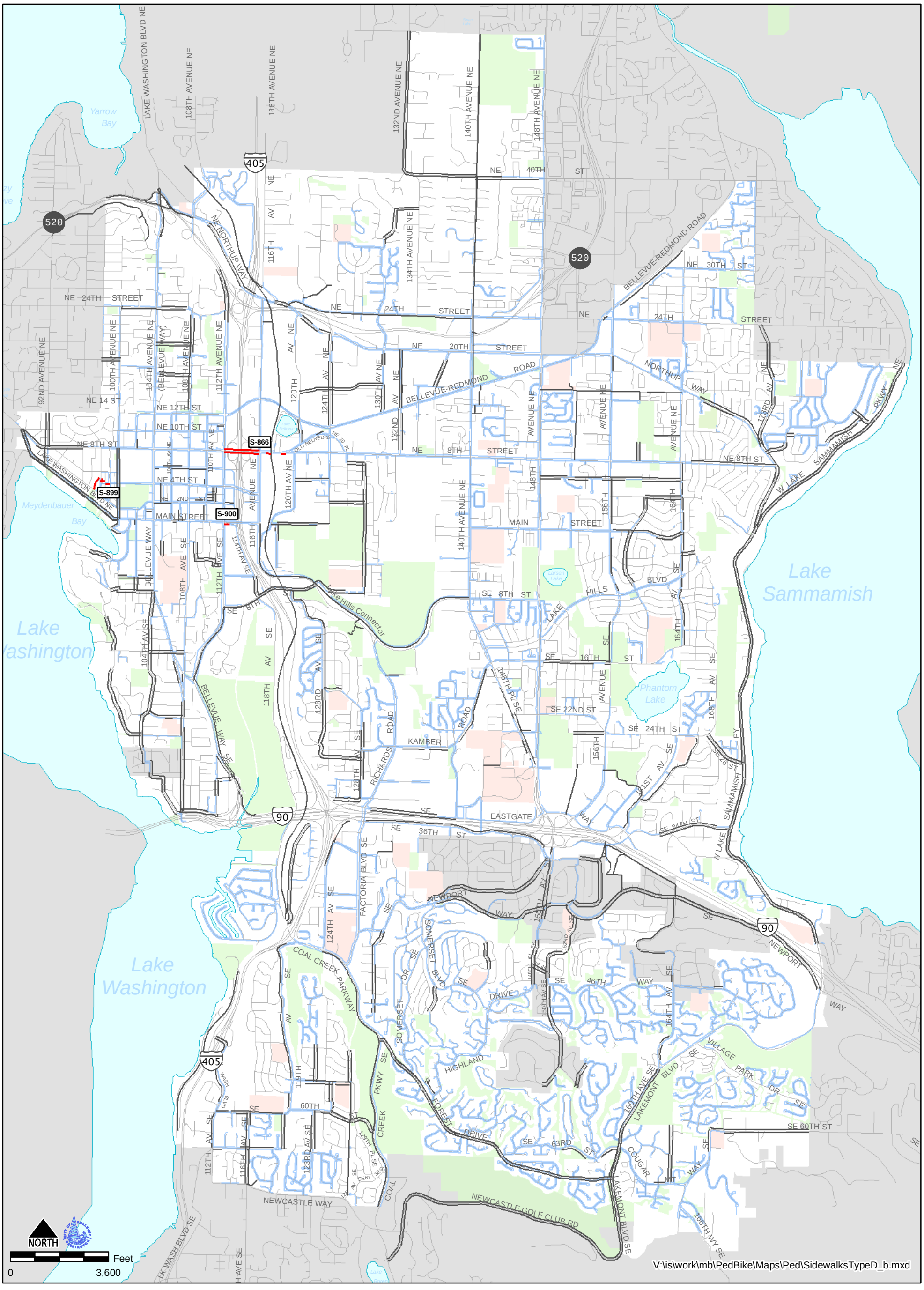
Figure X: Example of a Downtown Principal Connection on ____

Figure X: Cross Section of a Downtown Principal Connection





Type D - *Sidewalk Facility:*

Downtown Principal Connections

Legend	Length (Miles)
Proposed Type D Sidewalks (3 Projects)	0.79
Existing Sidewalks	303.03
All Other Proposed Sidewalks	87.15

Trail Network

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TRAIL NETWORK

Bellevue's trail system is an interconnected, multiuse trail system that guides citizens through the Bellevue's Park and Open Space System and plays a significant role in the implementation of the City's non-motorized transportation plan. Although the primary function is to provide pasive recreational use, trails also provide for viable non-motorized transportation alternatives and connect to larger, more regional systems.

At the heart of Bellevue's trail system is the Lake to Lake Greenway and Trail System which streches from the shores of Lake Lake Washington on the West to Lake Sammamish on the east. The system is also a componeet of the regional Mountains to Sound Greenway that stretches from the Puget Sound to the Cascade Mountains.

Trails are planned and constructed to provide access for a a spectrum of opportunities for different users including walkers, bicyclists, wheelchairs, joggers, skaters, hikers and equestrian. Different users may require different surfacing, widths, and grades. For example, bikers or wheelchairs may require a smoooth, firm, flat surface like asphalt or concrete. In contrast, equestrian or hikers prefer a softer surface such as gravel or bark and are able to traverse steeper terrain. Although some trails are designed for specific uses, Bellevue maintains an open trail policy unless otherwise posted.

The trail system is designed to minimize impacts to sensitive wildlife habitat and enhance the visitor experience. The overall system consists of 70 miles of pedestrian, equestrian and multiple use trails located on park property, public easements and public right of way. Trail construction and maintenance standards seek to create a system that is accessable year-round and accessible for all age groups and abilities.

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The trail systems incorporate various types of signage and amenties to help guide users through the system, interprete significant features, and provide areas for rest and reflection. Trailhead are clearly identified and bollards along the trails provide additional wayfinding information regarding distances to other parks and points of interest. Kiosks located at major trailheads along the Lake to Lake Trail orient users to the system and provide interpretive information on the park. guide the user through the system. Interpretive signs aling the system tell strories and interpret natural and cultural features.

Primitive Hiking Trail

Primitive hiking trails are rustic, off-road trails providing access through natural areas. Trails have minimal improvements and are designed to incorporate rough or steep features to enhance physical and technical challenge. Trails are typically 1-2 feet wide with no additional surfacing material. The trail surface may be uneven and contain natural obstacles such as water, roots, and logs. Trails are designed for the advanced hiker, suitable for foot traffic only, and receive minimal maintenance. The Parks Department does not propose to expand upon the current primitive hiking trail system.

Figure X: Example of a Primitive Hiking Trail

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Figure X: Cross Section of a Primitive Hiking Trail

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"The greenbelt system that the City has put into place is stellar. We walk on a City path near our neighborhood on a regular basis, plus use other paths (such as Weowna Park) for recreation on a regular basis."

"The trails in Bellevue are amazing and make me very happy to live here. Thank you for promoting healthy lifestyles! "

"Runners look for a loop where they can run at least 2, and preferable 3 or 4 miles without encountering a major intersection or obstruction (think of the loop around the mercer slough including the office park to the north). Runners are not all that fond of concrete sidewalks and some reasonably good 'running' routes have been impaired by the development of all concrete sidewalks (concrete is a much 'harder' surface than asphault or other materials and creates or aggravates injuries). "

"There are a few small trail connections that would really improve the pedestrian connectivity in our area of Bellevue. Specifically around the Somerset East open space near the Eaglesmere neighborhood. 1) a trail could be built through the open space that connects Highland drive to 145 Ave. SE (which is a cul-de-sac in Eaglesmere.) 2) A trail could be built that connects a currently unused portion of the south Bellevue opens pace that runs parallel to the cul-de-sac of S.E. 52nd (which is an offshoot of Highland Drive) to the Somerset East open-space. This would require an easement across the back of 2-3 lots, but it would connect Eaglesmere and the other surrounding communities to the South Bellevue open space. 3) There is also an opportunity for a trail to connect the Horizon View neighborhood to 145th Ave SE through an un-built lot that lies between 145th Place SE and 145th Ave SE. This lot lies just on the other side of the City and County border, but has been in use by pedestrians and wild life for the last 30 + years - until it was recently fenced off. This may be out of your jurisdiction, but my understanding is that this area will be annexed in the next 5 years and so it could at least be on your radar."

"More paved paths or trails that are not so isolated for jogging would be great - I use the Phantom Lake path all the time for jogging. It's visible to the road so I feel pretty safe running by myself. Other paths are too desolate so walking alone or running alone doesn't feel safe to me."

"Add more trails and connections between neighborhoods, schools and shopping centers. One new area would be to add a trail system that follows Kelsey Creek from Larson Lake northward to NE 8th. A link from that trail to Bellewood school would be attractive as well. There has been some past discussions about a trail crossing the Kelsey Creek Center if it is redeveloped. Also a study was made by the City to look at alternate mitigation if the creek at the Center is not opened. The project on 145th PL south of SE 8sth is a good addition of pedestrian walkways."

"More trails and greenways - I drive 1.5 miles to nearest trail to walk or run on."

"I love the greenbelts and other walking trails in Bellevue. It's one of the many things I like about living here. My suggestion is do a better job of making people aware of all these wonderful paths, trails, etc. Awareness, outreach, better/more maps, readily available maps (eg online), etc."

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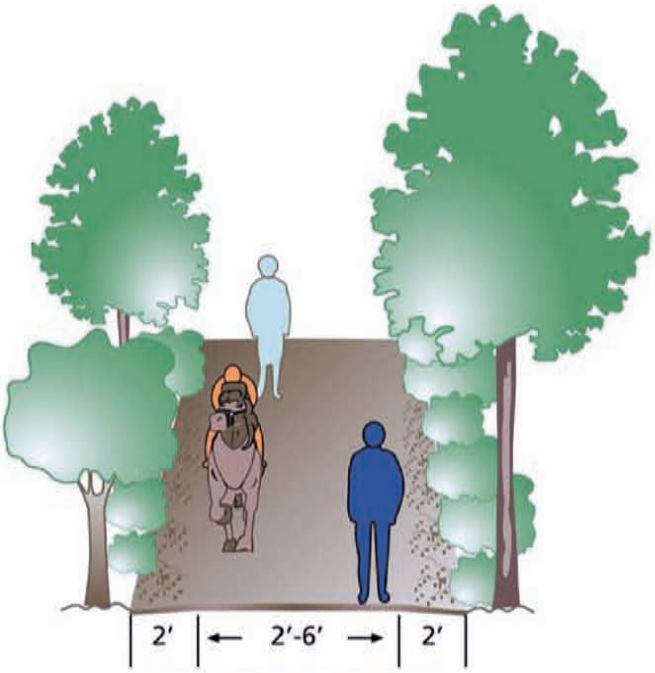
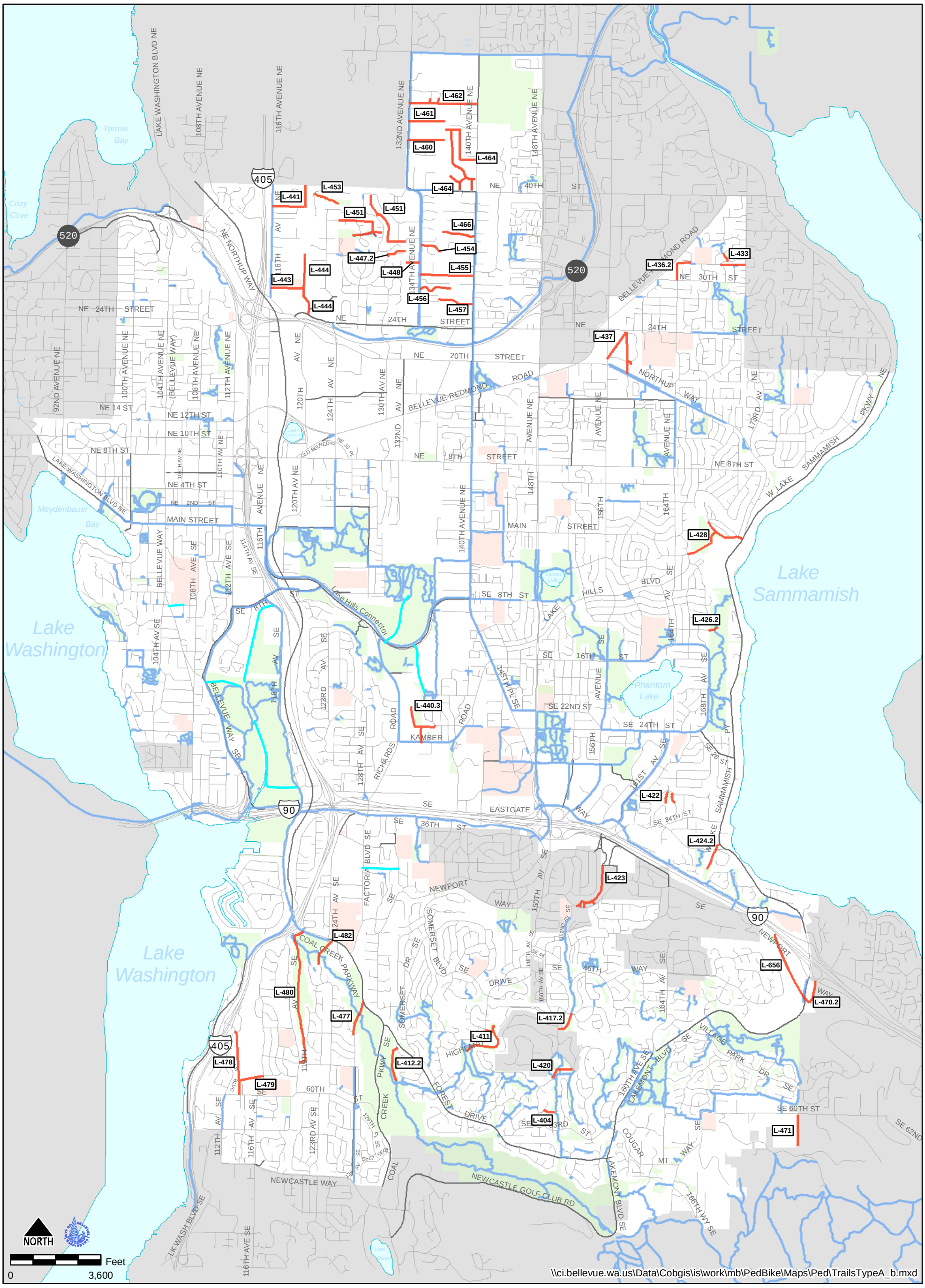
Type A: Pedestrian Walking Trail

Pedestrian walking trails are developed, soft surface trails providing access through the park and open space system. Trails are typically 2'–6' wide and are typically surfaced with bark or gravel, depending on site conditions and use. Trails are free of natural obstacles, but may have stairs, retaining walls, and other man made structures to help users access more challenging terrain and prevent resource degradation. Pedestrian walking trails are designed primarily for pedestrians and/or equestrian traffic and receive regular maintenance.

Figure X: Example of a Pedestrian Walking Trail

Figure X: Cross Section of a Pedestrian Walking Trail





Type A - *Trail Facility:*

Pedestrian Walking Trail

Legend	Length (Miles)
Proposed Type A Trails (39 Projects)	13.90
All Other Existing Trails	96.00
All Other Proposed Trails	10.82

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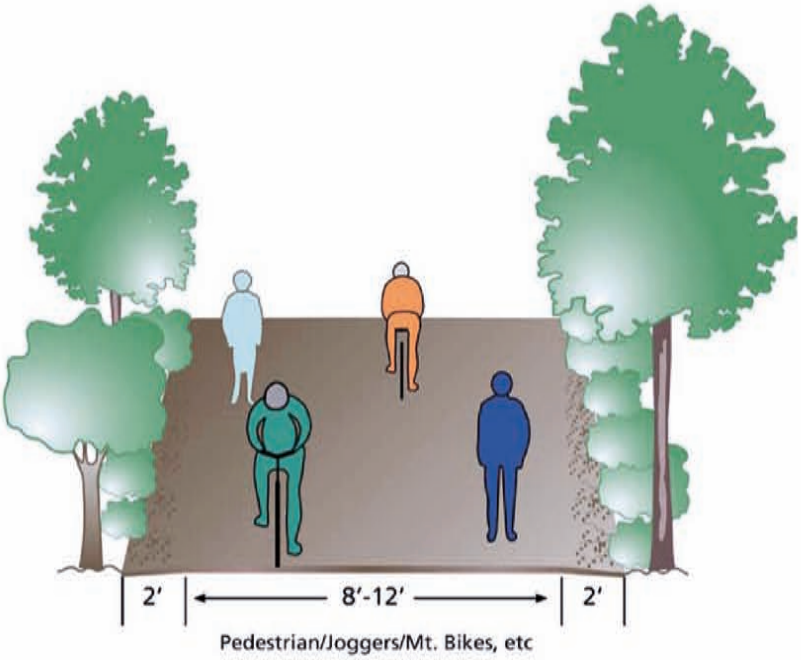
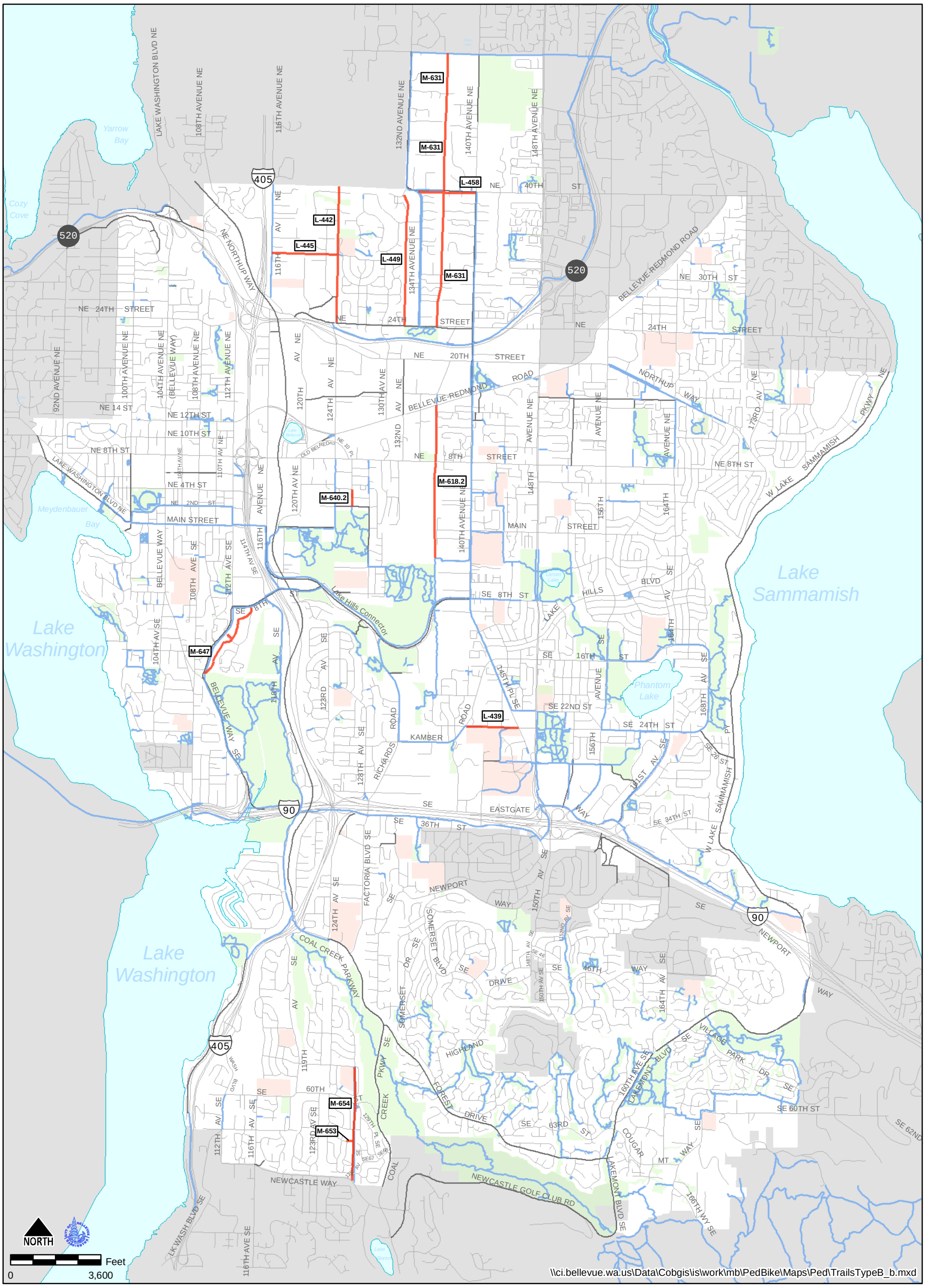
Type B: Multiple Use Gravel Trail

Multiple use gravel trails are developed trails providing access to and/or through parks and open space, schools, neighborhoods, and community hubs. Trails are typically 8'–12' wide to accommodate multiple use traffic in both directions and surfaced with 3/8" compacted gravel. Trails are free of all obstacles and may be ADA accessible. Trails are designed to accommodate pedestrians, equestrian, bikes, and other bubble tire non-motorized use. Multiple use gravel trails receive regular maintenance. The majority of the Lake to Lake trail is an example of a multiple use gravel trail.

Figure X: Example of a Multiple Use Gravel Trail

Figure X: Cross Section of a Multiple Use Gravel Trail





Type B - *Trail Facility:*

Multiple Use Gravel Trail

Legend	Length (Miles)
Proposed Type B Trails (11 Projects)	8.11
All Other Existing Trails	89.11
All Other Proposed Trails	16.61

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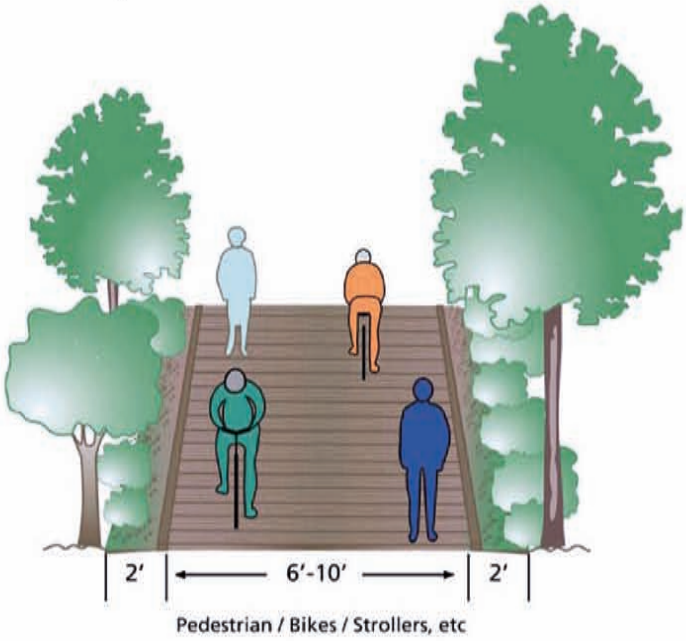
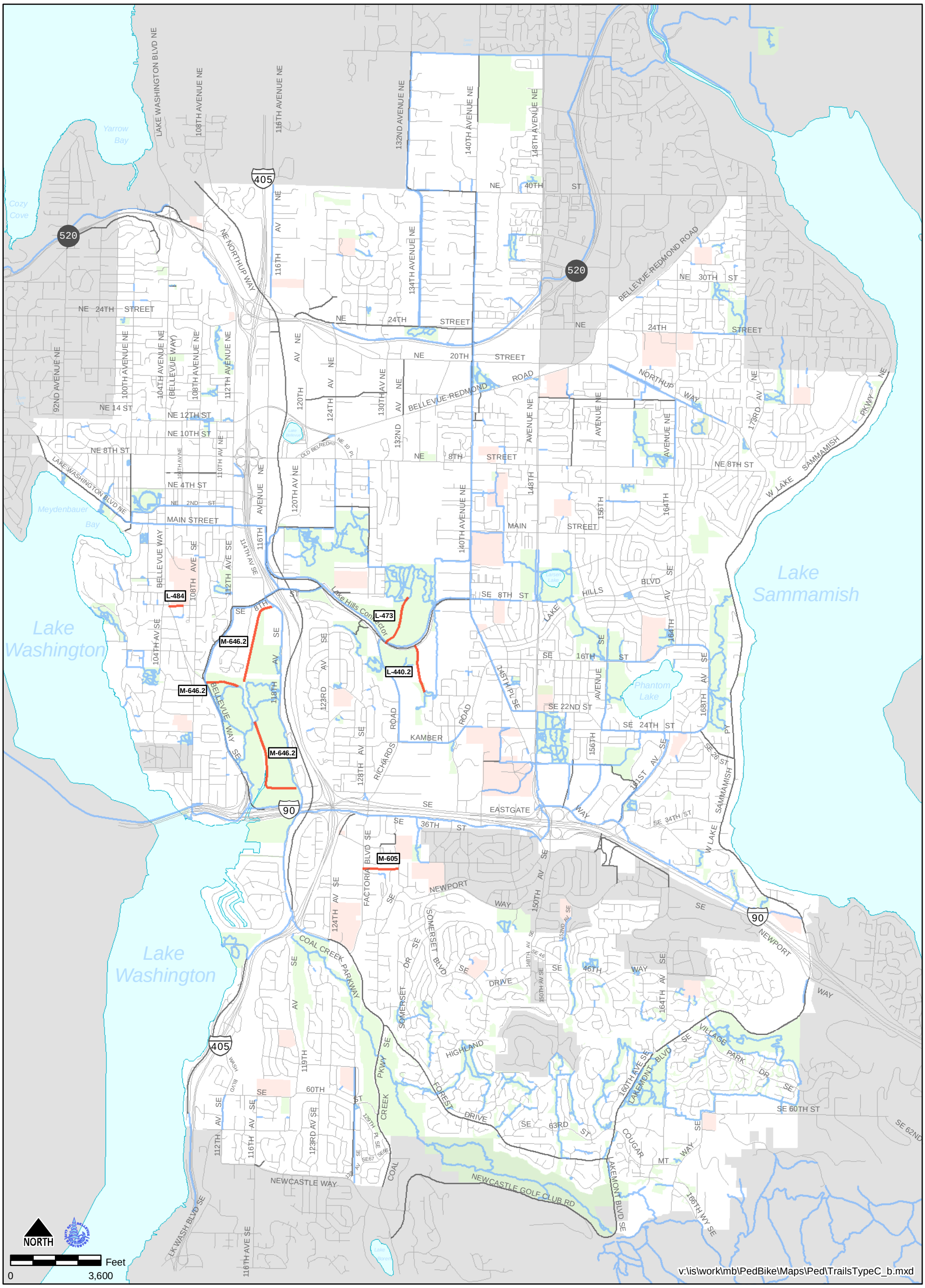
Type C: Boardwalk

Boardwalks are trail structures that provide access for a wide variety of non-motorized use. Boardwalks are used in wet areas to facilitate access, drainage and wildlife passage year round. Boardwalks are typically 6'-10' wide to accommodate multiple use in both directions and is surfaced with wood, trex, or appropriate substitute. Boardwalks are free of all obstacles and ADA accessible. Boardwalks are designed to accommodate many types of non-motorized use including pedestrians and most wheeled modes of transportation. Boardwalks receive regular maintenance.

Figure X: Example of a Boardwalk

Figure X: Cross Section of a Boardwalk





Type C - *Trail Facility:*

Boardwalk

Legend	Length (Miles)
Proposed Type C Trails (5)	2.71
All Other Existing Trails	110.04
All Other Proposed Trails	22.01