Definition and background
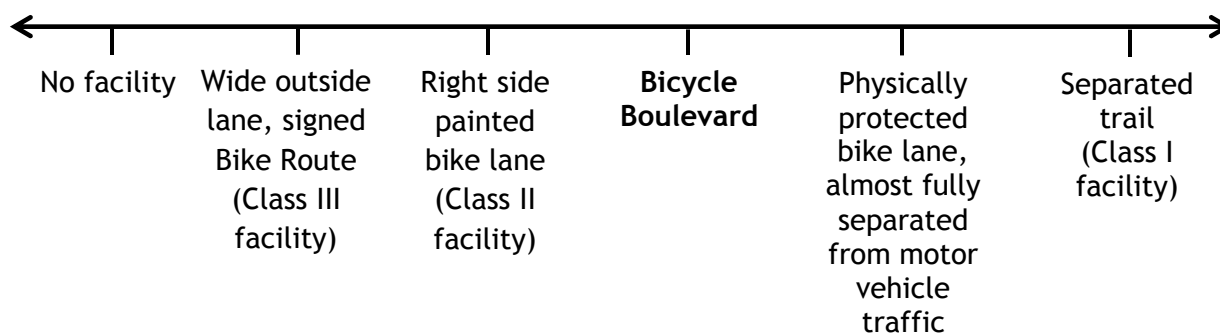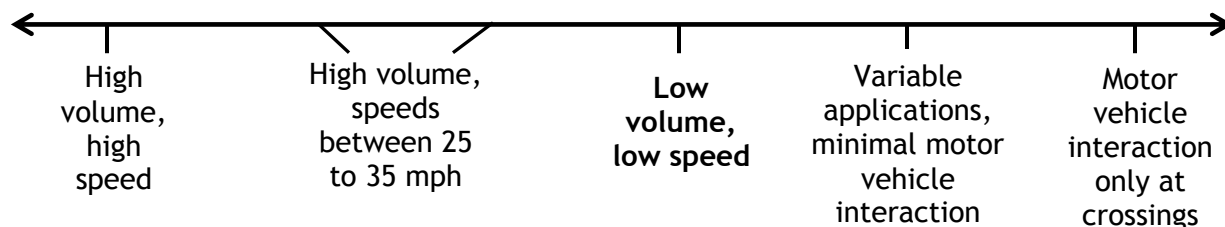
Bicycle boulevards are typically local access streets or neighborhood collectors that have been enhanced with relatively low-cost treatments that enable cyclists to ride in a low-stress environment, due to low motor vehicle volumes and speeds. New research indicates that bike boulevards appeal to the "interested but concerned" cyclist (more on that later). Another key component of their appeal, besides being on low-stress streets, is that their routes are more direct.

In cities like Portland, Oregon and Berkeley, California, bike boulevards are part of a comprehensive transportation network that includes wide shared lanes, painted bike lanes, physically protected bike lanes, and trails. It may be helpful to think of bicycle facilities as existing on a continuum:

| No facility | Wide outside lane, signed Bike Route (Class III facility) | Right side painted bike lane (Class II facility) | **Bicycle Boulevard** | Physically protected bike lane, almost fully separated from motor vehicle traffic | Separated trail (Class I facility) |

…with the relationship to motor vehicle traffic existing like this:

| High volume, high speed | High volume, speeds between 25 to 35 mph | **Low volume, low speed** | Variable applications, minimal motor vehicle interaction | Motor vehicle interaction only at crossings |

Some planning context

In the late 1970s, cities began to build Class III facilities, or wide lanes signed with a green "Bike Route" sign and intended to be shared by both motor vehicles and bike riders. In the early 1980s four- to five-foot striped lanes for bikes became more prominent, since this configuration more clearly defined space for bikes and motor vehicles. These are known as Class II facilities.
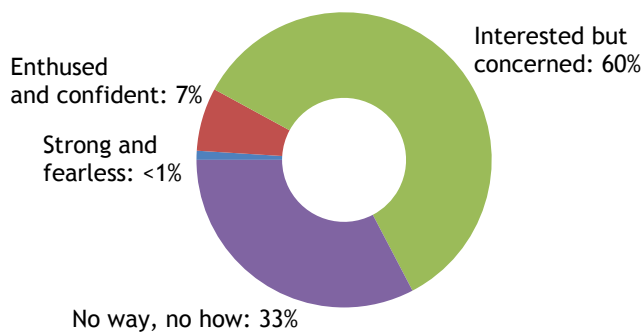
Generally speaking, bike lanes have been painted on arterials, major collectors, and other high-volume streets, because it has been thought that people bicycling for transportation want direct routes to their destinations. While this appears to be generally true, the small

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number of people who choose to ride bicycles for transportation despite the increasing number of miles of bike lanes in the United States indicates that other barriers to cycling exist. Research shows that one of the biggest barriers is concern for safety and, in fact, most cyclists are willing to detour about a half-mile in order to ride on a less stressful facility. (Jennifer Dill, OTREC. Understanding and Measuring Bicycling Behavior: A Focus on Travel Time and Route Choice.)

A 2006 classification of the general population made by Roger Geller of the Portland Bureau of Transportation emphasizes this point further. Geller found that less than 1% of the general population is comfortable riding where there are no bicycle facilities; he calls this group the "strong and fearless." Another 7% of the population he categorizes as the "enthused and confident." This was the extent, in Portland in 2006, of people who were regularly riding bicycles for transportation: less than 8% of the total population.

Geller also found that 33% of the population falls into the "no way, no how" category and 60% of people identify as "interested but concerned." That "interested but concerned" group, or the majority of the population, consists of people who ride bicycles from time to time recreationally and would consider riding for transportation if their concerns were adequately addressed. Overwhelmingly, their concerns relate to safety around motor vehicles.

The increasing awareness of the need to plan bicycle facilities that appeal to the "interested but concerned" has led to the City of Seattle's "all ages, all abilities" approach as they update the Seattle Master Bike Plan, which is currently underway. This matches what we heard here in Olympia during the public engagement process, "Imagine Olympia," which was conducted as part of our Comprehensive Plan update: people want lower-stress bike facilities that can serve a broader spectrum of ages and abilities.

4 Types of Transportation Cyclists in Portland

Interested but concerned: 60%

Enthused and confident: 7%

Strong and fearless: <1%

No way, no how: 33%

Roger Geller, Portland Bureau of Transportation.
www.portlandoregon.gov/transportation/44597?a=237507

Bike boulevard design treatments

Now that the broader context of bicycle facilities planning has been described, let's look at the specifics of bike boulevard design. For that, the National Association of City Transportation Officials (NACTO) 2012 Urban Bikeway Design Guide is an invaluable resource that has defined a range of treatments that can be used to establish a bike boulevard:

1. **Route planning**
   The route should be low stress: the preferred traffic volume is 1,500 motor vehicles per day to a maximum of 3,000, and the preferred speeds are about 20 mph to a max of 25 mph. The route should connect to other low stress facilities, such as trails or protected bike lanes. It should be continuous, direct, and a logical route that is the typical length of an urban bike trip, or between 2-5 miles.

   Bike boulevards are ideally placed about every quarter- to half-mile in the transportation system, which on a typical gridded street system would be every 3-4 to 7-8 blocks, respectively. The city of Berkeley, California provides an excellent case study:

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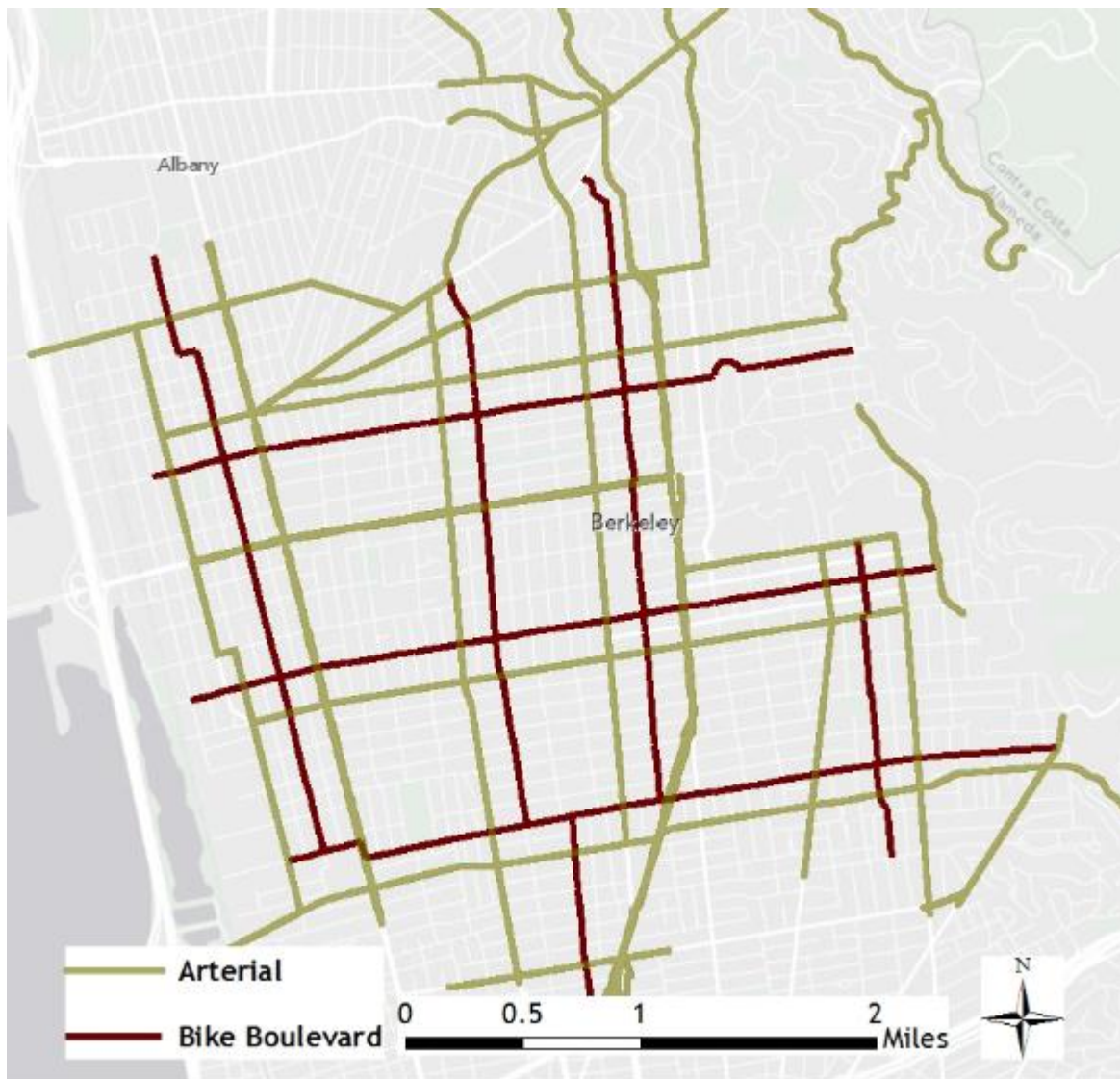
2. **Signs & pavement markings**

The NACTO Guide provides specific guidance on the signs and markings that can be used to identify a bike boulevard, although the City will ultimately use signs and markings that are consistent with the Manual on Uniform Traffic Control Devices (MUTCD). A clear visual message that serves both as a wayfinding tool and cue that the route is frequented by cyclists is a key part of the system-wide design interventions needed to establish the boulevard. Those signs and pavement markings may include sharrows, route signs, and destination signs, like in the following diagram:

Image courtesy of NACTO. Used with permission.

3. **Speed management**

Again, motor vehicle speeds along bike boulevards should be around 20 mph, with 25 mph being the maximum. This assures a minimal speed differential between cyclists and drivers, which increases cyclist safety and lowers stress.

Some of the many examples provided in the guide include speed tables, lowered speed limits, raised crosswalks, bulb-outs, traffic circles (smaller than roundabouts and designed to slow speeds at intersections of low-volume streets), chicanes (strategic curb extensions that require drivers to follow an S-shaped path, such as along 9th Avenue Southwest), pinch points, and center islands, to name a few. Which treatment is required depends on the context of the street.

While NACTO recommends not placing stop signs more than once every half-mile on a bike boulevard, the City will consider the unique circumstances of each intersection. It

is important to monitor speeds and volumes after converting a street to a bike boulevard to ensure that motor vehicle speeds and volumes remain low.

4. **Volume management**

   Again, the ideal volume for a bike boulevard is 1,500 motor vehicles per day, with a maximum of 3,000. In some instances, volume may exceed 3,000 vehicles per day for a short segment of the route, in which case a separated bike lane or painted bicycle lane is acceptable.

   Some of the design treatments to manage vehicle volumes include partial street closures, choker entrances (a landscaped curbed area with a path for bike riders but not motor vehicles), and various kinds of median islands or diverters. The idea behind all of these is to create a through-put for cyclists but not for motor vehicles. This is an example of one kind of diverter:

Image courtesy of NACTO. Used with permission.

5. **Minor street crossings**

   Generally, minor street crossings require no more than signage, traffic calming measures such as traffic circles, and/or stop signs for cross traffic. As always, the exact treatment depends on the street's context.

6. **Major street crossings**
   Since crossing major streets can be a significant barrier for bike riders, the NACTO Guide recommends three different types of treatments, depending on the context of the intersection:
   A. Supplemental signs
   B. Geometric elements (median refuge islands, curb extensions, etc.)
   C. Crossing devices (such as bike-specific traffic signals)

   Some of the factors that influence the recommended design treatment of major street crossings are roadway width, motor vehicle speeds, visibility, and the frequency of gaps in cross traffic. Here is one example that shows bike boxes and a motor vehicle diverter:

   Image courtesy of NACTO. Used with permission.

7. **Offset intersections**
   Since many ideal routes for bike boulevards include periodic jogs to complete the route, the NACTO Guide provides specifics on treatments for those jogs in the network. They may include wayfinding signs, median islands, bike boxes, and pavement markings.

8. **Green infrastructure**
   Many of the design treatments mentioned above are opportunities to build greener infrastructure for stormwater management. These include swales or rain gardens in bulb-outs or curb extensions.

Recommendation

Bike boulevards have the potential to increase the number of cyclists by attracting some of the "interested but concerned" cyclists to ride for transportation on Olympia's city streets. They are consistent with our Comprehensive Plan, with the public input we received during the "Imagine Olympia" process, and the *2009 Bicycle Master Plan*, which recommends that bike boulevards be evaluated for future application.

However, bike boulevards are a fairly new type of facility, and while the NACTO Guide provides design guidelines, the City's ultimate authority on signs and markings, which is a significant part of bike boulevards, is the MUTCD.

Staff recommends an incremental approach to bike boulevard development:

- Evaluate the street network and look for opportunities for bike boulevards, particularly on neighborhood collectors
- Start with a pilot project on one or two streets
    - Start with low cost improvements
    - As the budget allows, introduce higher cost improvements, such as traffic calming
- Evaluate the pilot's success in attracting additional riders as well as community perception of bike boulevards
- Assuming success, gradually add to the network of bike boulevards as the budget allows

Again, the MUTCD will guide the types of improvements used.

Staff makes this recommendation given the relatively experimental nature of bike boulevards, and the significant budget limitations the city faces.