

# BICYCLE FACILITIES



## IMPROVING TRANSPORTATION DESIGN FOR BICYCLING IN WASHINGTON

WSDOT's primary goal is to make sure people get to where they're going safely no matter whether they drive, take the bus or train, bike, or walk. To help achieve our safety goals and make everyday bicycle travel better, WSDOT is developing a statewide system of interconnected corridors, parking, signage, and programs. Designing our transportation system to better accommodate bicyclists will help to resolve multiple complex and interrelated issues, including traffic congestion, air quality, climate change, public health, and livability.

WSDOT recognizes that bicyclists and pedestrians are vulnerable road users making up about 16 percent of all traffic fatalities statewide. When involved in a traffic collision, cyclists are seriously injured or killed over 90 percent of the time. Motor vehicle drivers and occupants are seriously injured or killed 39 and 30 percent of the time respectively. Nationally and in Washington State, pedestrian and cyclist deaths have been rising while overall traffic fatalities have declined. Improving safety for bicyclists and pedestrians often requires either slowing down vehicle speeds or physically separating or protecting bicyclists from fast moving traffic. This poster provides examples of some of the different types of bicycle facility designs that, when applied in the appropriate circumstances, will help improve safety for the traveling public.

### MOST PROTECTED

1



SHARED USE PATHS OR TRAILS

2



PROTECTED BIKE LANES: RAISED AND CURB SEPARATED

Complete curb separation or optional mountable curb

3



PROTECTED BIKE LANES: AT-GRADE, PROTECTED WITH FLEXIBLE BOLLARDS OR OTHER SEPARATION

4



BUFFERED BIKE LANE

5



BIKE LANE

6



SHARED LANE MARKINGS

Centerline of pavement marking placed at least 4' from curb

1



### Shared Use Paths or Trails

Physically separated facilities like shared-use paths for bicyclists and pedestrians encourage more walking and bicycling. These facilities are often found along waterways, abandoned or active railroad and utility rights-of-way, limited access highways, or through parks and open space areas. Along high-speed, high-volume highways, paths and trails can be safer and more desirable than sidewalks or bike lanes. Paths and trails immediately adjacent to roadways may cross numerous



intersecting roads and driveways that create hazards and other problems for path users. Creating safe and accessible intersections between paths and the road network is one of the most important aspects of design. For additional detail, see AASHTO's *Guide for the Development of Bicycle Facilities*, Section 5 Design of Shared Use Paths and NACTO *Urban Bikeway Design Guide*. See also *WSDOT Design Manual*, Chapter 1515.

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### Protected Bike Lanes: At Grade, Protected with Flexible Bollards or Other Separation

A protected bike lane, sometimes called a cycle track or separated bike lane, is a type of preferential lane as defined by the MUTCD (See Federal Highway Administration (2009), *Manual on Uniform Traffic Control Devices*, Section 2G.01). Protected bike lanes are bike facilities that use a variety of methods for physical protection from passing traffic. By dedicating and protecting space for the cyclist, these facilities reduce risk of 'dooring' compared to a conventional bike lane and eliminate the risk of a fallen bicyclist being run over by a motor vehicle. In situations where on-street parking is allowed, protected bike lanes are located to the curb-side of the parking (in contrast to conventional bike lanes). Bollards, or posts can be installed along a bike lane to make the separation clear to cyclists and drivers, and increase cyclists' sense of security. Bollards can range from flexible posts to more rigid posts. See NACTO *Urban Bikeway Design Guide* for additional design detail and MUTCD Section 3B.24 for signage and marking requirements.



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### Conventional Bike Lanes

Bike lanes designate an exclusive space for bicyclists through the use of pavement markings and signage and are primarily installed to increase the mobility of bicyclists in congested areas. They are best applied where motor vehicle speeds are lower. The bike lane is located directly adjacent to motor vehicle travel lanes and flows in the same direction as motor vehicle traffic. Bike lanes are typically on the right side of the street, between the adjacent travel lane and curb, road edge, or parking lane. See AASHTO's *Guide for the Development of Bicycle Facilities*, Chapter 4 *Design of On-Road Facilities* and *WSDOT Design Manual*, Chapter 1520.09 *Bicycle Lane Design* for additional detail.



2



### Protected Bike Lanes: Raised and Curb Separated

Raised bicycle lanes may be at the level of the adjacent sidewalk, or set at an intermediate level between the roadway and sidewalk to separate the bicyclists from pedestrians. A raised bike lane may be combined with a parking lane or other barrier between the bike lane and the motor



vehicle travel lane, and may allow for one-way or two-way travel by bicyclists. These facilities may be most appropriate along higher speed streets with few driveways and cross streets or along streets with multiple lanes, high traffic volumes, high speed traffic, high demand for double parking, and high parking turnover where bike lanes may not provide enough protection. For additional detail, see NACTO's *Urban Bikeway Design Guide* and MUTCD Figure 9C-3 for signage and marking requirements.

4

### Buffered Bike Lanes

Buffered bike lanes are conventional bicycle lanes paired with a designated buffer space, frequently using painted markings, separating the bicycle lane from the adjacent motor vehicle travel lane and/or parking lane as defined by MUTCD Section



3D-01. See MUTCD Sections 3D-02 and 3B.24 for signage and marking requirements. See also NACTO *Urban Bikeway Design Guide* for additional design detail.

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### Bike Boulevards or Neighborhood Greenways

Bicycle boulevards are streets with low motorized traffic volumes and speeds, designated and designed to give bicycle travel priority. Bicycle Boulevards use signs, pavement markings, and speed and volume management measures to discourage through trips by motor vehicles and create safe, convenient bicycle crossings of busy arterial streets. On bike boulevards, shared lane markings, or "sharrows," are preferred road markings used to indicate a shared lane for bicycles and motor vehicles. Among other benefits shared lane markings provide direction and reinforce the legitimacy of bicycle traffic on the street and recommend proper bicyclist positioning. The Shared Lane Marking is the bike-and-chevron "sharrow," illustrated in MUTCD figure 9C-9 and cannot be used on shoulders, in designated bicycle lanes, or to designate bicycle detection at signalized intersections. (MUTCD 9C.07 03).



### LEAST PROTECTED

Illustration concept credit to NACTO

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### Bike Crossings-Intersections, Parking & Signage



Properly designed intersections are critical to ensure bicycle safety and connectivity. Designs for intersections with bicycle facilities should reduce conflict between bicyclists and vehicles by heightening the level of visibility, denoting a clear right-of-way, and facilitating eye contact and awareness with competing modes. Intersection treatments can resolve both queuing and merging maneuvers for bicyclists, and are often coordinated with timed or specialized signals. See NACTO *Urban Bikeway Design Guide* for additional intersection design detail and Association of Pedestrian and Bicycle Professionals *Bicycle Parking Guidelines* for more bicycle parking guidance.

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