



Bicycle and Pedestrian Facility Type Guidance



Bicycle and Pedestrian Facility Selection Matrix

The Bicycle and Pedestrian Facility Selection Matrix identifies which bicycle and pedestrian facilities are appropriate on different travel ways, based on the expected Average Daily Traffic (ADT) of motor vehicles.

While the chart below indicates flexibility between type #3 “Bike Lanes and Shared Use Paths,” type #4 “Bike Lanes or Shoulders,” for traffic volumes of 1,000 to 9,000, this study encourages the use of shared use paths over bike lanes/shoulders. This is due to the preference of a majority of people to have separation between motorists and bicyclists/pedestrians.

The following guidance should be used by City staff during the conceptual design phase of new projects. Exceptions may occur according to projected motor vehicle volumes, variations in volume along segments of street, motor vehicle speed, and necessary transitions between facility types. The decision making process for bicycle and pedestrian facility type selection should be documented by project staff. See Figure 8 for the Future Bicycle and Pedestrian Facility network, created using the matrix below.

		Motor Vehicle Traffic ¹			
		Up to 1,000 ADT	Up to 1,500 ADT	1,000 to 9,000 ADT	1,000 ADT or Higher
Bicycle and Pedestrian Facility Type	1. Shared Street				
	2. Bike and Pedestrian Lanes				
	3. Bike Lanes and Shared Use Paths				
	4. Bike Lanes or Shoulders ²				
	5. Shared Use Paths				

ADT= Average Daily Traffic

1 See Figure 7 illustrating motor vehicle traffic volumes in Baxter.

2 Use only in rare instances where right-of-way is limited.

1. Shared Streets

Description

Shared streets are corridors that are designed to prioritize bicycle and pedestrian travel. They typically have low volumes of motor vehicle traffic, and the motor vehicles present are typically making local trips and traveling at slow speeds. Bicyclists and pedestrians travel with motorists in a shared lane.

	Maximum Daily Traffic Volume	Speed*
Preferred	500 ADT	15 mph
Acceptable	1,000 ADT	30 mph

*Speed is 85th percentile speed along corridor

Considerations

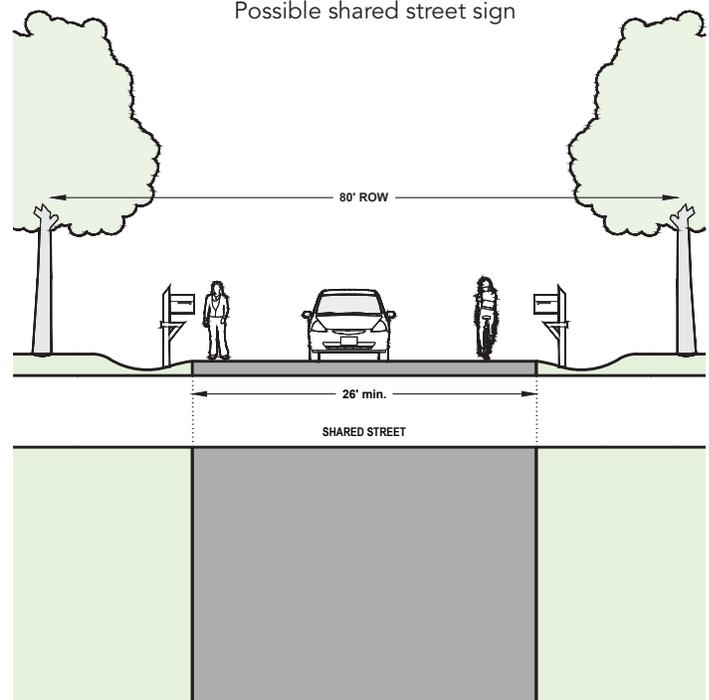
Shared streets are generally attractive to bicyclists and pedestrians of all ages and abilities. They can provide a lower stress and time-efficient alternative to higher volume, parallel roadways, and can provide bicycling and walking connections between neighborhoods, schools, parks, business districts, shared use paths, and other key destinations.

Guidance

1. Shared streets are appropriate on roads with two-way shared vehicular travel lanes.
2. Pavement markings are not preferred on shared streets. To raise awareness amongst motorists that more people will be bicycling and walking on shared streets, supplemental street signs may be added below street name signs at each corner.
3. A shared street should be accessible to people with disabilities. The cross slope should not exceed 2%. Any deficiencies should be included in the City's ADA Transition Plan, so that the issue is corrected on a future resurfacing project.
4. Crossing improvements at higher volume street crossings should be implemented in order to maintain a low stress bicycle and pedestrian facility. These may include median refuge islands, curb extensions, and Rectangular Rapid Flash Beacons (RRFB's).



Possible shared street sign



2. Bike and Pedestrian Lanes

Description

A bicycle and pedestrian lane is a portion of the street designated for preferential use by bicyclists and pedestrians, demarcated with pavement markings and signs. A bicycle and pedestrian lane is for two-way travel and is provided on one side of a two-way street.

	Maximum Daily Traffic Volume	Speed*
Preferred	1,000 ADT	20 mph
Acceptable	1,500 ADT	30 mph

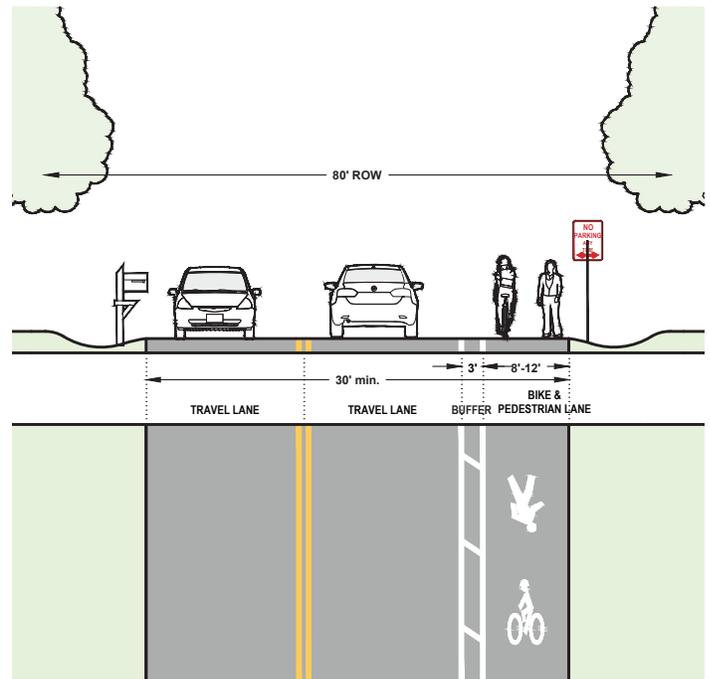
*Speed is 85th percentile speed along corridor

Considerations

A bicycle and pedestrian lane is preferred to a shared street where traffic volumes and speeds are higher. A painted buffer between the bicycle/pedestrian lane and motorists should be added where volumes and speeds approach the acceptable values.

Guidance

1. The desirable width of a bicycle and pedestrian lane is 10-12 feet. The minimum width is 8 feet. Bicycle and pedestrian lanes wider than these values should incorporate a painted buffer or double white line so that they are not mistaken for another motor vehicle travel lane.
2. The minimum buffer width is 2 feet. There is no maximum width. Diagonal cross hatching should be used for buffers <3 feet in width. Chevron cross hatching should be used for buffers >3 feet in width.
3. Pavement markings should include a longitudinal white line, as well as bicycle and pedestrian pavement legends.
4. No parking signs should be posted so bicycle and pedestrian lanes are not mistaken for parking lanes.
5. A bicycle and pedestrian lane should be accessible to people with disabilities. The cross slope should not exceed 2%. Any deficiencies should be included in the City's ADA Transition Plan, so that the issue is corrected on a future resurfacing project.
6. At intersections, bicycle and pedestrian lanes should provide clear indication to bicyclists, pedestrians, and motorists how they should traverse the intersection. The bicyclist and pedestrian route should be direct and legible, with minimal exposure to merging vehicles. Use of green markings or vertical separation is an option.



3. Bike Lanes and Shared Use Paths

Description

Bike lanes are a portion of the roadway designated for preferential use by bicyclists, demarcated with pavement markings and signs. Bike lanes are one way facilities located on both sides of a road, each flowing with the direction of traffic. They are used in combination with shared use paths, giving pedestrians a place to walk off the street.

	Daily Traffic Volume	Speed*
Preferred	1,000 to 5,000 ADT	25 mph
Acceptable	5,000 to 9,000 ADT	30 mph

*Speed is 85th percentile speed along the corridor

Considerations

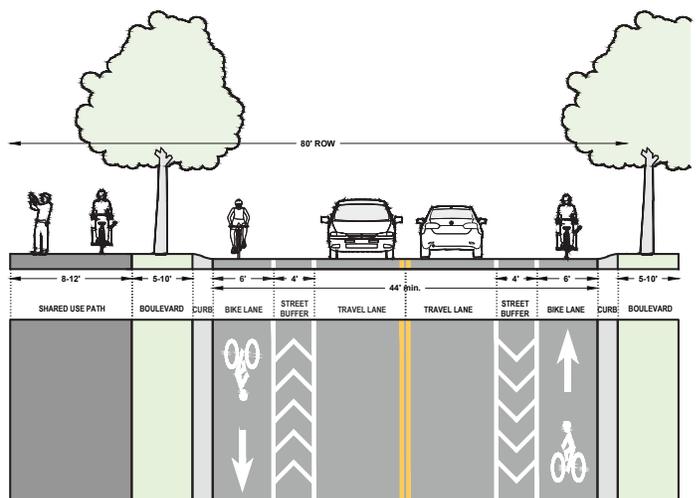
Many bicyclists will choose to ride on shared use path, but some prefer to ride in bike lanes, especially when driveway crossings are frequent and traffic volumes and speeds are low. Increasing the lateral separation between bicyclists and motor vehicles provides a more comfortable environment for people riding in bike lanes. Bicycle lanes with painted buffers should be considered in locations where motor vehicle volumes and speeds approach the acceptable values, or where large vehicles (buses & large trucks) make up more than 5% of traffic.

Guidance

1. The desirable width of a bicycle lane is 6 feet (4 feet minimum). The desirable width of the buffer is 4 feet. The minimum desirable boulevard width is 5 feet wide.
2. The minimum buffer width is 2 feet. There is no maximum width. Diagonal cross hatching should be used for buffers <3 feet in width. Chevron cross hatching should be used for buffers >3 feet in width.
3. Buffers must be broken in locations where vehicles are able to cross the segment (e.g. intersections and some driveways).
4. At intersections, bicycle lanes should provide clear indication to bicyclists and motorists how they should traverse the intersection. The bicyclist's route should be direct and legible, with minimal exposure to merging vehicles.



No Parking sign (R7-9A) shall be used in conjunction with marked bike lanes



4. Bike Lanes or Shoulders

Description

In rare instances where right-of-way is limited, bike lanes or shoulders may be used as a facility type for bicyclists and pedestrians.

	Daily Traffic Volume	Speed*
Acceptable	1,000 to 5,000 ADT	25 mph
Not Preferred	5,000 to 9,000 ADT	30 mph

*Speed is 85th percentile speed along the corridor

Considerations

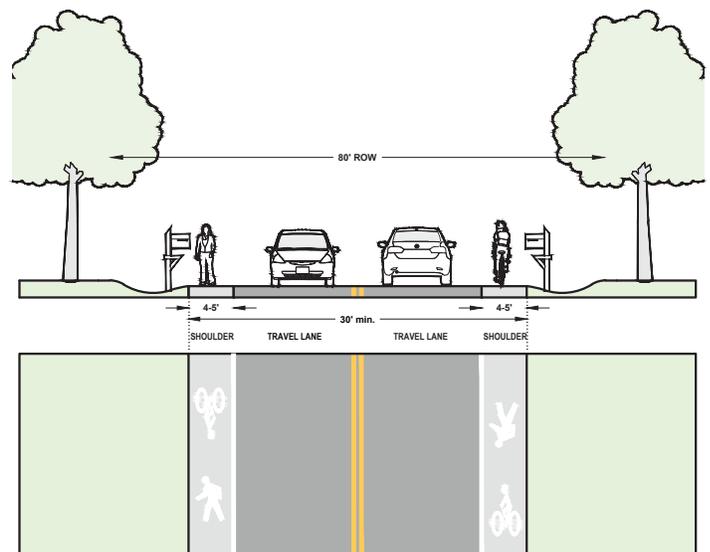
On busier streets, where shared use paths are not provided, bicyclists and pedestrians may travel using space on the sides of the road. These spaces may be demarcated as bicycle lanes or shoulders. As traffic volumes and speeds increase, people biking and walking become less comfortable, and struck from behind crashes increase. To improve visibility, wider lines, contrasting pavement materials, and/or painted buffers should be used, and parking should not be allowed.



No Parking sign (R8-3) shall be used in conjunction with marked bike lanes or shoulders

Guidance

1. The desirable width of a bicycle lane or shoulder is 6 feet (4 feet minimum). White edge line markings should be 8 inches or greater. A double white line may also be used.
2. Contrasting pavement materials, such as light gray concrete or purple/pink Sioux Quartzite seal coat chips, may be used in the shoulder to enhance awareness by differentiating the bike lane or shoulder from the travel lane.
3. Shoulder edge lines are typically tapered at intersections to follow the path of travel for a turning motorist. On streets where bicyclists and pedestrians are expected to use the shoulder, tapering should not be used. Rather the striping should extend to the intersection or transition to a dotted edge line to encourage motorists to yield.
4. At locations with higher volumes of right turning traffic, bike lanes or shoulders should be transitioned to a shared use path prior to the intersection, and then back to a bike lane or shoulder after the intersection.
5. A bicycle lane or shoulder should be accessible to people with disabilities. The cross slope should not exceed 2%. Detectable warning strips may be used where crossings for people with vision impairments are a concern. Any deficiencies should be included in the City's ADA Transition Plan, so that the issue is corrected on a future resurfacing project.



5. Shared Use Paths

Description

A separate path constructed parallel to and within the right-of-way of a roadway is referred to as a shared use path. Bicyclists and pedestrians share this space, which is divided from motor vehicle lanes with a vertical curb and natural or paved buffer. Shared use paths are not necessary on streets with low traffic volumes and speeds.

	Minimum Daily Traffic Volume	Minimum Speed*
Preferred	1,500 ADT	25 mph
Acceptable	1,000 ADT	20 mph

*Speed is 85th percentile speed along corridor

Considerations

Many people express a strong preference for the separation between bicycle/pedestrian and motor vehicle traffic provided by paths when compared to on-street facilities. Shared use paths are desirable along medium- to high-volume and medium- to high-speed roadways, where accommodating bicyclists and pedestrian of all ages and abilities is desired. Shared use paths should be visible to motorists at intersections and driveway crossings. Conflicts can be reduced by minimizing the number of driveway and street crossings present along a path and otherwise providing high-visibility crossing treatments.

- Lighting on shared use paths can improve safety, both at and between intersections. At path-road intersections, lighting should be placed in advance of the crossing so that bicyclists and pedestrians are more illuminated from the approach of the motorist (see FHWA Informational Report on Lighting Design for Midblock Crosswalks, 2008). Between intersections, pedestrian-scale lighting can reduce crashes due to surface hazards (e.g. ice, branches, potholes). Lighting can be provided at certain hours based on an engineering study of shared use path usage at night. This will likely be higher in areas near shopping, restaurants, recreational facilities, and schools.

Guidance

- The desirable shared use path width ranges between 8 feet and 12 feet, depending on the volume of users. A trail width of 8 feet is the minimum to allow enough space for one bicyclist to pass another bicyclist or pedestrian, whereas a width of at least 12 feet can allow for a faster bicyclist to pass a slower rider and pedestrian simultaneously. The minimum desirable boulevard width is 5 feet wide.
- Shared use paths may be constructed on one or both sides of a road. This decision may depend on the number of destinations, available right-of-way, and expected volumes of bicyclists and pedestrians.
- When feasible, maintain shared use path at sidewalk level through driveways to avoid frequent vertical changes and reinforce motorists yielding to shared use path users.
- Shared use path crossings of roadways should follow additional guidance provided in the most recent edition of the American Association of State Highway and Transportation Officials (AASHTO) Guide for the Development of Bicycle Facilities (Guide).

