Motor vehicle traffic volume and speed are critical contextual considerations for bicyclist and pedestrian safety and comfort. Proximity to motor vehicle traffic is a significant source of stress, safety risks, and discomfort for bicyclists, and corresponds with sharp rises in crash severity and fatality risks for vulnerable users when motor vehicle speeds exceed 25 miles per hour. Furthermore, as motorized traffic volumes increase, it becomes increasingly difficult for motorists and bicyclists to share roadway space.

Two tools are provided to help planners and engineers determine appropriate types of bicycle and pedestrian accommodations for any given context. The first tool is a pair of bicycle facility selection matrices that provide guidance on selecting an appropriate facility type based on posted speed limit, traffic volume, and context. The second tool is a table of context characteristics of common facility types (Table 4.1), which summarizes various attributes of the primary bicycle and pedestrian facility types used in Iowa and provides additional guidance on facility selection.

Bicycle facility selection matrices

Numerous types and widths of bicycle facilities are available and some are more appropriate than others for any given context. To select an appropriate facility based on traffic volume and speed, Figure 4.15 and Figure 4.16 should be consulted. These matrices include preferred and acceptable values for each facility type. Designers should utilize forecast traffic volumes if available. Additionally, designers should default to selecting the preferred facility when possible.

Context characteristics of common facility types table

Table 4.2 provides several pieces of critical information that provide guidance for the selection of appropriate bicycle and pedestrian facility types:

Description – What the facility type is and how it should be applied. Intended Users – Whether the facility type accommodates bicyclists, pedestrians, or both.

Context – Whether the facility type is appropriate in urban settings, rural areas, or both. Specific mention is made if the facility is appropriate in the urban periphery but not in true urban areas.

Posted Speed Limit – The maximum speed limit with which the facility type is compatible.

Motor Vehicle Traffic Volume – The maximum traffic volume (in average Annual Daily Traffic or ADT) with which the facility type is compatible. These thresholds are generalized. Especially in urban areas, factors such as outside lane width, percent of heavy truck traffic, speed limit, and presence of on-street parking can have significant effects on the appropriateness of a facility. For urban areas, the designer should calculate the Bicycle Level of Traffic Stress (LTS) score to determine whether the facility is appropriate (i.e., receiving a score of LTS 1 or LTS 2).

Other Considerations – Further information regarding the appropriateness of each facility type.

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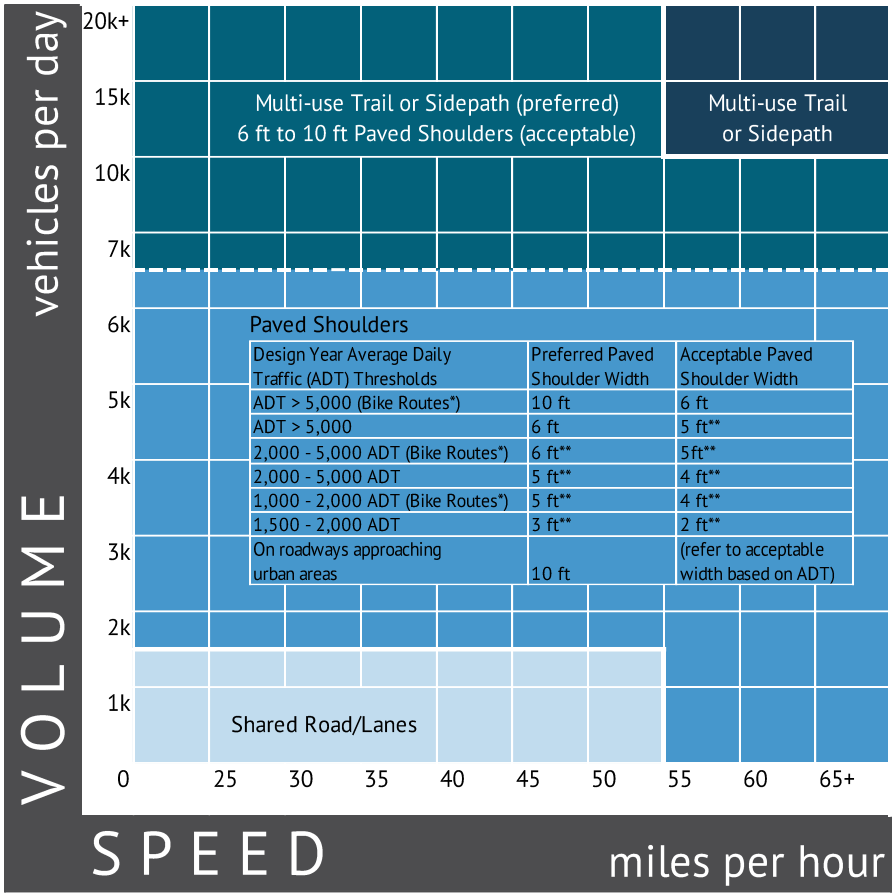
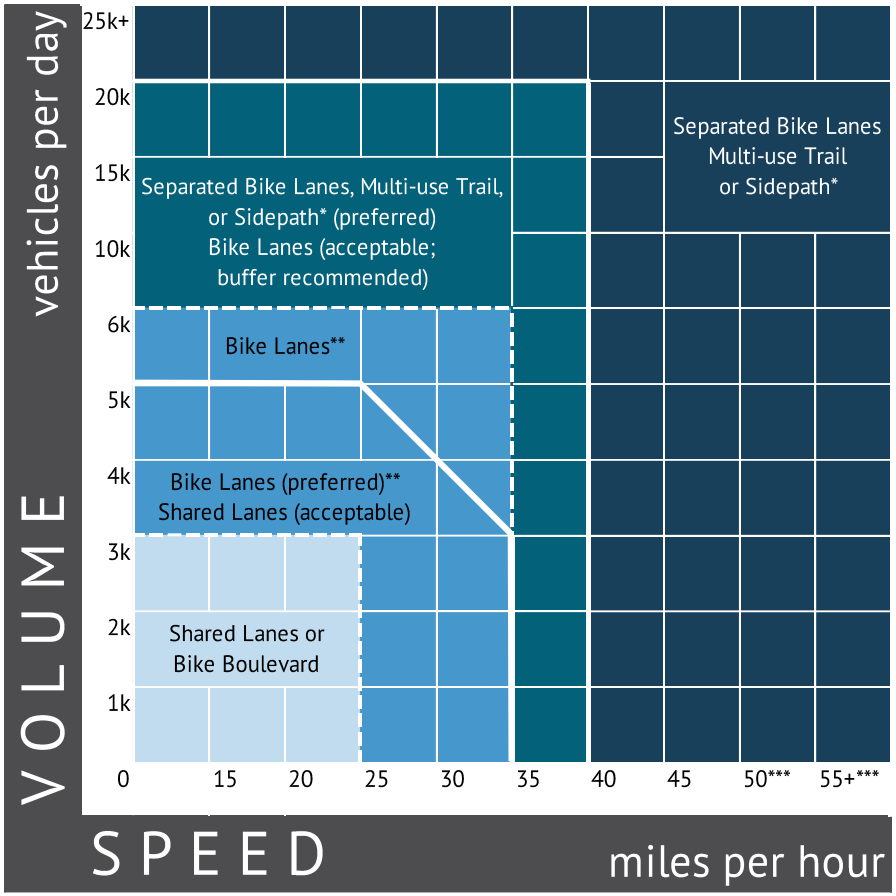
Figure 4.17: Rural facility selection matrix



**On roadways where a higher level of bicycle traffic is expected (e.g., bike routes identified by cities, counties, RPAs, and MPOs, as well as official US Bicycle Routes and national trails).*
***Paved width exclusive of rumble strips.*

Figure 4.18: Urban and suburban facility selection matrix



**To determine whether to provide a multi-use trail/sidepath or separated bike lane, consider pedestrian and bicycle volumes or, in the absence of volume, consider land use.*
***Advisory bike lanes may be an option where traffic volume < 4,000 ADT.*
****Speeds 50 mph or grater in urban areas are typically found in urban/rural transition areas.*

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Table 4.1: Context characteristics for common facility types

Facility Type	Description	Intended Users	Context	Posted Speed Limit	Motor Vehicle Traffic Volume[i]	Other Considerations
Multi-Use Trails and Sidepaths	Multi-use trails and sidepaths are typically designed as two-way facilities physically separated from motor vehicle traffic and used by bicyclists, pedestrians, and other non-motorized users. The term "sidepath" refers to a multi-use trail along a roadway.	Bicyclists and Pedestrians	Urban and Rural	Urban: Any speed (typically 30 mph or higher) Rural: Any speed (typically 55 mph or higher)	Urban: Any volume (typically 15,000 ADT or greater) Rural: Any volume (typically 6,500 ADT or greater).	Sidepaths should be at least 10 feet wide (wider where higher bicycle and pedestrian traffic is expected, e.g., urban areas). Special consideration must be given to the design of roadway crossings to increase visibility, clearly indicate right-of-way, and reduce crashes. Alternative accommodations should be sought when there are many intersections and commercial driveway crossings per mile.
Paved Shoulders	Additional pavement width outside of the travel lanes that reduce crashes, aid maintenance, and provide space for bicyclists and pedestrians (although paved shoulders typically do not meet accessibility requirements for pedestrians).	Bicyclists	Rural and Urban Periphery	Any speed (typically 45 mph or higher)	6,500 ADT or lower (preferred); Any volume (acceptable) Shoulder width to accommodate bicyclists depends on traffic volume. See Figures 4.17 and 4.18 for guidance on selecting appropriate width.	Provides more shoulder width for roadway stability. Shoulder width should be dependent on characteristics of the adjacent motor vehicle traffic. Placement of the rumble strip is critical to providing usable space for bicyclists and pedestrians.
Shared Roads/ Lanes	Shared roads or shared lanes are standard travel lanes shared by bicyclists and motor vehicles. Signage and shared lane markings (also known as "sharrows") should be used on higher-traffic shared roads.	Bicyclists	Urban and Rural	Urban: 25 mph or lower (preferred); 35 mph or lower (acceptable) Rural: 55 mph or lower	Urban: 3,000 ADT or lower (preferred) 5,000 ADT or lower (acceptable) Rural: 1,500 ADT or lower	May be used in conjunction with wide outside lanes. Explore opportunities to provide parallel facilities for less confident bicyclists. Where motor vehicles are allowed to park along shared lanes, place markings to reduce potential conflicts with opening car doors. On low speed (<25 mph) low traffic (<3,000 ADT) streets, traffic calming and diversion can be used to slow traffic or create a "bicycle boulevard.
Separated Bike Lanes	Separated bike lanes, also known as cycle tracks, are physically separated by a vertical element from the adjacent motor vehicle lanes. Buffered bike lanes that do not include a vertical element are not considered separated bike lanes.	Bicyclists	Urban	Any speed, typically 30 mph or higher	Any volume (typically 6,000 ADT or greater)	Separation can be achieved through a vertical curb, a parking lane, flexposts, plantings, removable curbs, or other measures. Special attention should be paid to intersection treatments. "Protected intersection" design should be incorporated to the extent possible.

Facility Type	Description	Intended Users	Context	Posted Speed Limit	Motor Vehicle Traffic Volume[ii]	Other Considerations
Bike Lanes & Buffered Bike Lanes	4- to 6-foot wide lanes designated for exclusive use by bicyclists. Typically applied to arterial and collector streets where volumes and/or speeds would otherwise discourage bicycling. May include striped buffers (typically 18 inches to 3 feet in width) for further separation.	Bicyclists	Urban	35 mph or lower (preferred) 40 mph or lower (acceptable; buffer preferred above 35 mph)	6,000 ADT or lower (preferred) 20,000 ADT or lower (acceptable; buffer preferred above 10,000 ADT)	Painted buffers are encouraged when roadway width allows, regardless of traffic speeds and volumes. Where on-street parking is adjacent to a bike lane, provide a bike lane of sufficient width to reduce probability of conflicts due to opening vehicle doors and objects in the road. In locations with high on-street parking turnover, consider placing buffers between the parking lane and bike lane. Analyze intersections to reduce bicyclist/motor vehicle conflicts.
Sidewalks	A pedestrian walkway located within public right-of-way, typically adjacent to property lines. Sidewalks provide vertical and/or horizontal separation between vehicles and pedestrians and are the most common pedestrian facility type.	Pedestrians	Urban and Urban Periphery	Any speed	Any volume	Sidewalks should be provided as the default pedestrian accommodation within communities. When retrofitting sidewalks in a community, it is best to first concentrate on busier streets and around places where walking is more common: schools, transit stops, commercial areas, etc. Sidewalks should be a minimum of 4 feet wide in residential areas and 5 feet wide along arterial and collector streets.

[i] Speed and traffic volume are interrelated and must be considered together when selecting an appropriate facility for bicyclists. Typically, as speeds increase, the traffic volume threshold for providing separation (e.g., via a multi-use trail or separated bike lanes) decreases. Refer to Figures 4.17 and 4.18 for guidance in considering both variables.
[ii] See endnote vii.