

# CHAPTER 4: FACILITY DESIGN

## INTRODUCTION

The facility design criteria represented on the following pages is intended as a guideline in the planning and design of new and/or reconstructed streets and streetscape design elements. These guidelines are representative of current best management practices for Complete Streets design and bicycle, pedestrian, and motor vehicle facilities. These guidelines should be considered in conjunction with other national, state, and local guidelines including the *Americans with Disabilities Act Accessibility Guidelines (ADAAG)*, the *Manual of Uniform Traffic Control Devices (MUTCD)*, the American Association of State Highway Transportation Officials (AASHTO) *Design and Safety of Pedestrian Facilities* and *Design and Safety of Bicycle Facilities*.

## FACILITY SELECTION AND CHARACTER CLASS

The appropriate Complete Street facilities for any given roadway corridor in the Louisville Metro area are dependent on two factors — area character, as established by the Form District(s) and functional classification of the roadway. Specific design characteristics as well as facilities unique to each user group can be associated with any given Thoroughfare Type identified in Chapter 2, “Design Framework.”

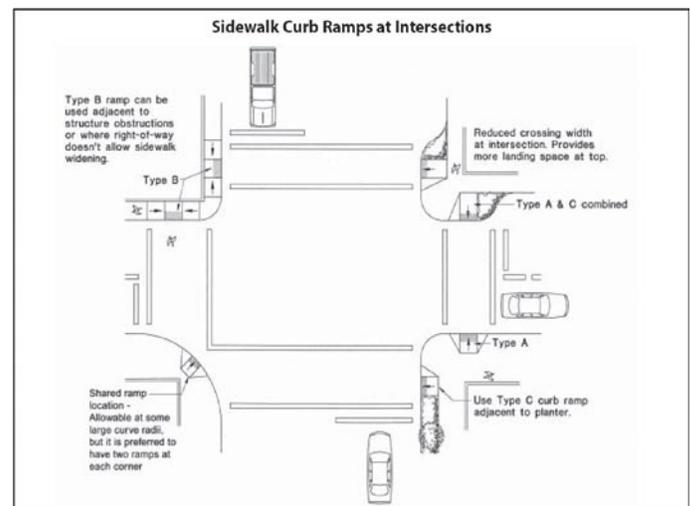
To use this Manual, first determine the appropriate facilities for the thoroughfare type being designed based on the Functional Class/Character Class Matrix found on page 24. Typical cross-sections for each Functional Class/Character Class pair have been developed to show the spatial relationship between the Complete Street facilities associated with each Thoroughfare Type and their preferred dimensions (see Appendix A).

## PEDESTRIAN DESIGN CRITERIA

The *Americans with Disabilities Act Accessibility Guidelines* states:

“Title II of the Americans with Disabilities Act requires public entities that build sidewalks and trails to provide program access to existing facilities and altered facilities to be readily accessible to individuals with disabilities. Title III of the ADA requires places of public accommodation to remove barriers to access when it is readily achievable to do so and to meet the requirements for new construction and alteration in the *ADA Standards for Accessible Design* or UFAS [*Uniform Federal Accessibility Standards*] and employ good design principles to ensure that facilities are accessible to and usable by people with disabilities.”

Accessible curb ramps shall be provided at all intersections having curbs or other barriers to entry from a street-level pedestrian walkway or whenever a new street, road, or highway is constructed or altered. Accessible curb ramps shall be provided at all newly constructed or altered pedestrian walkways where they intersect a street, road, or highway. Every effort should be made to use directional curb ramps and ADA detectable warnings shall be used at the end of sidewalks to crossings or road improvements. The warnings should be located at the very edge of the transition from the curb onto the roadway.



ACCESSIBLE CURB DESIGN OPTIONS, SOURCE:PEDESTRIAN & STREETScape GUIDE, GDOT.

## Thoroughfare Typology

### CHARACTER CLASS (FORM DISTRICTS)

Rural (R)	Suburban (S)	Traditional (T)	Downtown (D)
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### FUNCTIONAL CLASS (ROAD CLASSIFICATIONS)

See Glossary and Appendix A for an explanation of abbreviations



#### Major Arterial (A)

	<p><b>Auto</b> AR-1 to AR-3</p> <p><b>Cyclist</b> SH, SUP, SL, Transit</p> <p><b>Pedestrian</b> SH, SUP, Transit</p> <p><b>Transit</b> Stops</p>	<p><b>Auto</b> AS-1 to AS-12</p> <p><b>Cyclist</b> SH, BL, SUP, Transit, SL</p> <p><b>Pedestrian</b> Sidewalk, SUP, Transit</p> <p><b>Transit</b> Stops</p>	<p><b>Auto</b> AT-1 to AT-09</p> <p><b>Cyclist</b> BL, Transit, SL</p> <p><b>Pedestrian</b> Sidewalk, Transit</p> <p><b>Transit</b> Designated Pull-offs Shelters</p>	<p><b>Auto</b> AD-1 to AD-9</p> <p><b>Cyclist</b> BL, Transit, SL</p> <p><b>Pedestrian</b> Sidewalk, Transit</p> <p><b>Transit</b> Designated Pull-offs Shelters</p>
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#### Minor Arterial (A)

	<p><b>Auto</b> AR-1 to AR-3</p> <p><b>Cyclist</b> SH, SUP, SL, Transit</p> <p><b>Pedestrian</b> SH, SUP, Transit</p> <p><b>Transit</b> Stops</p>	<p><b>Auto</b> AS-1 to AS-12</p> <p><b>Cyclist</b> SH, BL, WC, SL, SUP, Transit</p> <p><b>Pedestrian</b> Sidewalk, SUP, Transit</p> <p><b>Transit</b> Stops</p>	<p><b>Auto</b> AT-1 to AT-09.</p> <p><b>Cyclist</b> BL, SUP, SL, Transit</p> <p><b>Pedestrian</b> Sidewalk, SUP, Transit</p> <p><b>Transit</b> Designated Pull-offs Shelters</p>	<p><b>Auto</b> AD-1 to AD-9</p> <p><b>Cyclist</b> BL, Transit, SL</p> <p><b>Pedestrian</b> Sidewalk, Transit</p> <p><b>Transit</b> Designated Pull-offs Shelters</p>
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#### Collector (C)

	<p><b>Auto</b> CR-1 to CR-4</p> <p><b>Cyclist</b> SH, SUP, SL, Transit</p> <p><b>Pedestrian</b> SH, SUP, Transit</p> <p><b>Transit</b> Stops</p>	<p><b>Auto</b> CS-1 to CS-12</p> <p><b>Cyclist</b> SH, BL, SL, WC, SUP, Transit</p> <p><b>Pedestrian</b> Sidewalk, SUP, Transit</p> <p><b>Transit</b> Stops</p>	<p><b>Auto</b> CT-1 to CT-12</p> <p><b>Cyclist</b> BL, WC, SL, SUP, Transit</p> <p><b>Pedestrian</b> Sidewalk, SUP, Transit</p> <p><b>Transit</b> Stops</p>	<p><b>Auto</b> CD-1 to CD-9</p> <p><b>Cyclist</b> SL, WC, Transit</p> <p><b>Pedestrian</b> Sidewalk, Transit</p> <p><b>Transit</b> Stops</p>
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#### Local (L)

	<p><b>Auto</b> LR-1 to LR-2</p> <p><b>Cyclist</b> SH, SL, SUP, Transit</p> <p><b>Pedestrian</b> SH, SUP, Transit</p> <p><b>Transit</b> Stops</p>	<p><b>Auto</b> LS-1 to LS-2</p> <p><b>Cyclist</b> SH, SL, SUP, Transit</p> <p><b>Pedestrian</b> Sidewalk</p> <p><b>Transit</b> Stops</p>	<p><b>Auto</b> LT-1 to LT-9</p> <p><b>Cyclist</b> BL, WC, SL, SUP, Transit</p> <p><b>Pedestrian</b> Sidewalk, SUP</p> <p><b>Transit</b> Stops</p>	<p><b>Auto</b> LD-1 to LD-9</p> <p><b>Cyclist</b> BL, WC, SL</p> <p><b>Pedestrian</b> Sidewalk</p> <p><b>Transit</b> Stops</p>
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#### Alley/Lane (AL)

	<p><b>Auto</b> ALS-1</p> <p><b>Cyclist</b> SL</p> <p><b>Pedestrian</b> SL</p>	<p><b>Auto</b> ALS-1</p> <p><b>Cyclist</b> SL</p> <p><b>Pedestrian</b> SL</p>	<p><b>Auto</b> ALT-1 to ALT-3</p> <p><b>Cyclist</b> SL</p> <p><b>Pedestrian</b> SL</p>	<p><b>Auto</b> ALD-1 to ALD-4</p> <p><b>Cyclist</b> SL, WC</p> <p><b>Pedestrian</b> SL</p>
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IMAGE ABOVE FROM THE TRANSECT BY DUANY PLATER-ZYBERK, [HTTP://WWW.DPZ.COM/TRANSECT.HTM](http://www.dpz.com/TRANSECT.HTM)

Accessible pedestrian signals (APS) shall be considered based on the criteria specified in the Manual of Uniform Traffic Control Devices (MUTCD). When an accessible pedestrian signal is used, it shall include a push button locator tone, a raised arrow oriented in the direction of travel, a speech WALK message, a vibrotactile WALK indication to warn pedestrians before entering the roadway. The push buttons should be a maximum of five feet from the ramp. The locator tone should be variable but five dB louder than the ambient street noise level.

### SIDEWALK WIDTHS AND CROSSINGS

Sidewalks should be continuous and installed with a minimum clear width of five feet (7 ft. desirable) in the pedestrian zone. The width may be reduced to four feet for a length of two feet, if there is insufficient space due to street elements as long as the confining elements are separated by five feet. See the appropriate cross sections for the size specified with a particular Functional and Character Class. Crosswalks shall be used to improve the safety of a pedestrian crossing, especially on multi-lane roads with average daily traffic (ADT) above 10,000. The walking speed used for crossings and signalization shall be three and a half feet per second (following the Draft Guidelines for Accessible Public Rights of Way) with the walk interval being at least seven seconds. Shorter or longer times may be considered when a study and justification are completed. Countdown signals shall be used at high-pedestrian traffic intersections.

Pedestrian refuges may be used at multi-lane intersections or turning lane islands where crossing may take longer than one signal cycle. Pedestrian signals should be coordinated with refuge islands and may need additional push buttons. The refuge islands shall meet ADA Accessibility Guidelines including regulations on slopes, detectable warnings, and crossing from the refuge to the pavement at grade. Railroad crossings also shall have detectable warnings, cross at 90 degrees, and meet slope guidelines at the appropriate pedestrian crossing points as shown in the figure. ADAAG and AASHTO guides provide designers with many tables of information for more specific design of sidewalks including changes in level, grates and gaps, obstacles, and protruding objects. This information shall be followed at all times.



ACCESSIBLE PEDESTRIAN SIGNAL



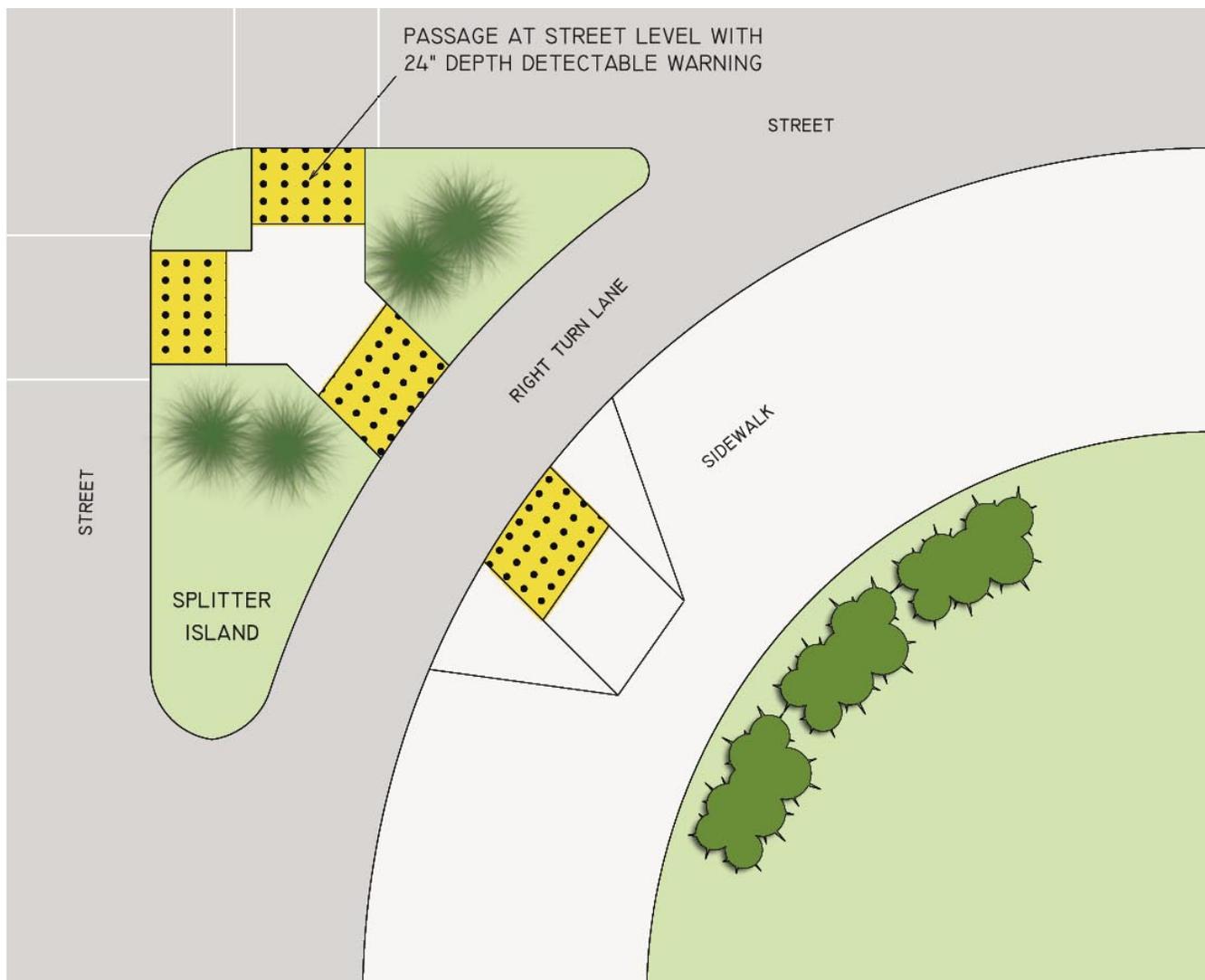
CROSSWALK WITH ADA TACTILE WARNINGS ON RAMPS

## SLOPES

Maximum grades on sidewalks should be five percent where possible. When topography does not allow, the AASHTO Green Book recommends that the running grade of sidewalks be consistent with the running grade of adjacent roadways. ADAAG permits the running grade of the sidewalk to be consistent with the grade of the adjacent roadways but recommends that the minimum feasible slope be used. ADAAG specifies that sidewalks should lie in a continuous plane with a minimum of surface warping. Cross slopes should not exceed 1:50 or two percent.



MEDIAN REFUGE ISLAND, SOURCE: [HTTP://WWW.PEDBIKEIMAGES.ORG/](http://www.pedbikeimages.org/), ITE PEDESTRIAN BICYCLE COUNCIL



A SPLITTER ISLAND THAT ACTS AS A REFUGE ISLAND FOR PEDESTRIANS

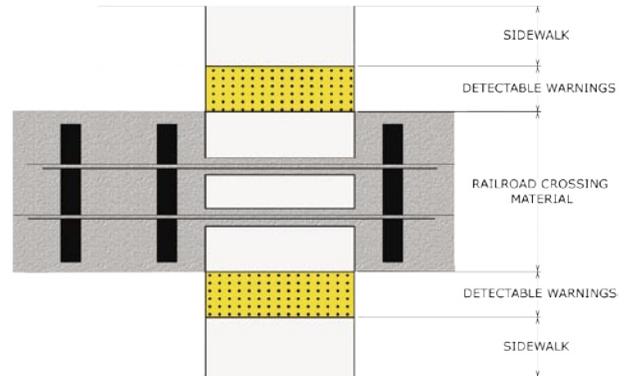
## SURFACES

The type of walking surface often determines how difficult an area is to negotiate. ADAAG defines accessible surface characteristics as needing to be firm, stable, and slip-resistant. AASHTO requires sidewalks to have all-weather surfacing. The sidewalk material, such as concrete, should pass through the entrances as continuous material and contrast with the surrounding material for directing visually impaired. The pedestrian sidewalk material shall be strengthened to withstand use by vehicular traffic by increasing thickness and adding reinforcement. Sidewalks should be used along private access easements in Traditional and Suburban classes. Rural class areas may use wider shoulders instead of sidewalks if road classification, traffic volume, and amount of truck use warrants. Otherwise, a shared use path may be a suitable pedestrian facility in less dense areas of the city or used in conjunction with environmental amenities.

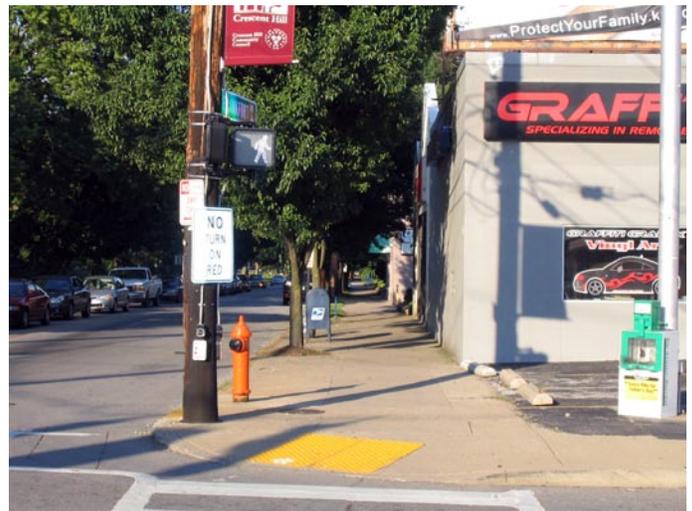
Even if vehicular connectivity is difficult, pedestrian connectivity should always be considered with all new developments and redeveloped land. (These might include: pass-through routes at the end of cul-du-sacs, shared use paths along riparian corridors or MSD easements.)

## SHARED USE PATHS

Shared Use Paths are a shared facility for pedestrians and bicyclists that may or may not be associated along a roadway. The walking surface shall be accessible, firm, stable, and slip-resistant as ADAAG dictates. AASHTO requires it to have all-weather surfacing. The minimum of ten feet shall be used for all shared use paths while 12 feet is a preferred width. The size allows for two-way travel as well as for maintenance vehicles to clean accordingly. The ADAAG and AASHTO guides shall also apply to shared use paths for slopes and cross-slopes



ACCESSIBLE PEDESTRIAN RAILROAD CROSSING



ACCESSIBLE SURFACES INCLUDES DETECTABLE WARNINGS WHERE THE SIDEWALK TRANSITIONS TO THE ASPHALT PAVEMENT

## INTERCHANGE CROSSINGS

Pedestrians and bicyclists should have facilities that allow them to transverse an interchange. Due to the confined space under interchanges, the bicycle facilities should become shared use paths prior to crossing the ramps. Ideally, the ramps would be signalized and allow for bicycle and pedestrian crossing and access along the roadway under the interchange. Then after the crossings have occurred, the bicycle facility can continue in its original form. All design decisions concerning crossings must be approved by both State and Federal officials due to their jurisdiction of the roadways.



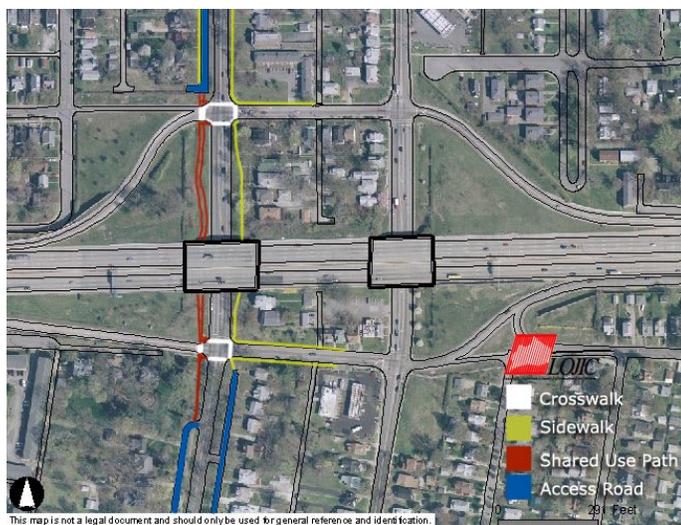
SHARED USE PATH AT WITHERSPOON AND PRESTON



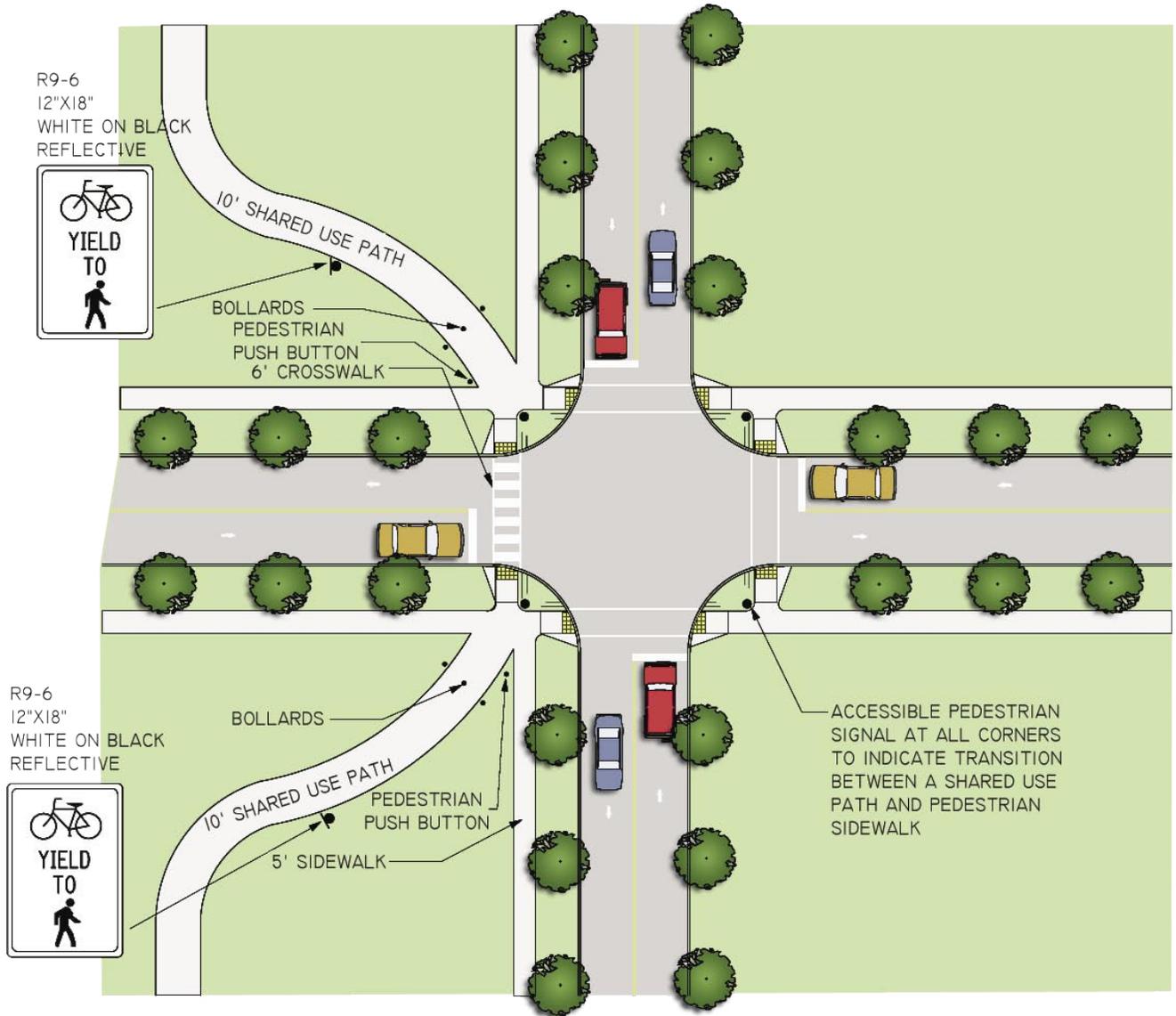
SHARED USE PATH/INTERCHANGE CONCEPT AT BARDSTOWN ROAD AND I-265



SHARED USE PATH PASSING UNDERNEATH I-65



SHARED USE PATH ON SOUTHERN PARKWAY UNDER I-264



SHARED USE PATH CROSSING AT AN INTERSECTION



SHARED USE PATH AT WITHERSPOON AND PRESTON

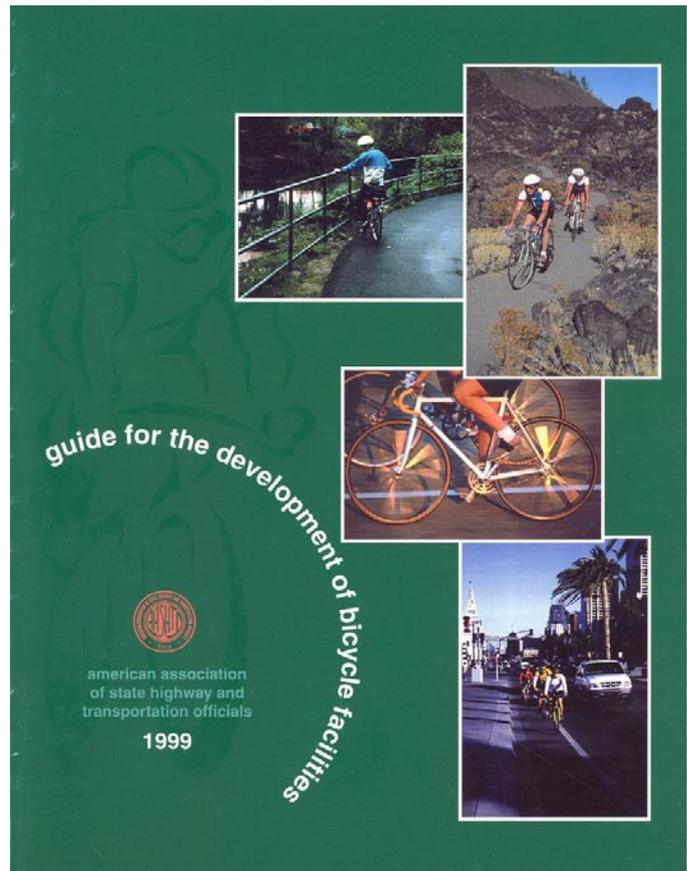
## BICYCLE DESIGN CRITERIA

Well-designed bicycle facilities take into account several factors including the skill level of the cyclist, traffic volumes (ADT), road geometrics, Right-of-Way width, mix of vehicle types, presence of on-street parking, sight distance, and the design and spacing of access points. Bicycle facilities are designed either in conjunction with a road corridor or as an “off-road” facility in association with a greenway or shared use path.

This Manual should be used in conjunction with AASHTO’s *Guide for the Development of Bicycle Facilities*, which discusses many issues on users, facility types, criteria and design guides for specific problem areas. The Kentucky Transportation Cabinet (KYTC) Road Design Guide Exhibit 1500-01, *Recommended Bicycle Facilities*, on page 33 should also be considered when designing bicycle facilities, which recommends on-road bicycle facilities based on both posted speeds and traffic volumes (ADTs) of the roadway.

Designing on-road bicycle facilities in Louisville Metro presents a number of challenges because a significant portion of the roadway network already exists. Part of the solution involves public education to increase awareness of cyclists rights on the roadways. Another part of the solution is improving existing facilities and adding additional on-road facilities. A level of service analysis was conducted by Louisville Metro, funded by the Kentuckiana Planning and Development Authority (KIPDA), that assessed current bicycle and pedestrian facilities. The study, *Suitability of Louisville Metro Roads for Bicycling and Walking*, suggested several strategies for introducing bicycle facilities into the current roadway network including: reducing the number of motor vehicle lanes; reducing the lane widths; changing the on-street parking; and/or sharing the roadway.

Several facilities allow for bicyclists and motor vehicles to share the roadway including: shared lanes (SL), wide curb lanes (WC), and shoulders (SH) (see page 31). Wide curb lanes, where bikes are adjacent to traffic, should be a minimum of 14’ wide. Shared lanes, where bikes are in the lane with traffic, shall have a minimum width of 12’.



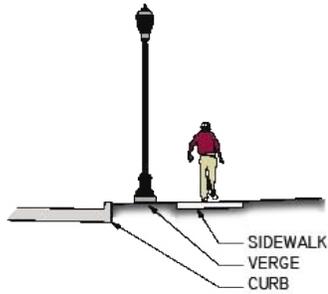
AASHTO GUIDE FOR THE DEVELOPMENT OF BICYCLE FACILITIES

Rumble strips, as they are needed based on the roadway design, shall follow the policy described on the Federal Highway Administration (FHWA) safety website which describes a five foot nominal gap that allows bicyclists to enter and leave a shoulder while still raising the attention of motorists. A Kentucky policy on rumble strips and bicycles is needed. See [http://safety.fhwa.dot.gov/roadway\\_dept/rumble/rumble53001.htm#attachment](http://safety.fhwa.dot.gov/roadway_dept/rumble/rumble53001.htm#attachment) for more information on the federal guidelines.

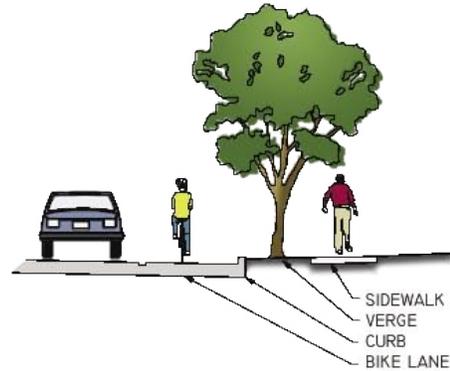
Bike lanes shall be provided on both sides of a two-way street and generally placed along each outside lane with the same direction of travel as the motorized traffic (see page 34).

On one-way streets, bike lanes shall be placed in the right-most lane and flow in the same direction of travel as motorized traffic. Advance queues may be installed on one-way streets where there is no on-street parking or right turn lanes. Advance queues are intended to make the bicycle traffic to be more visible to motorists.

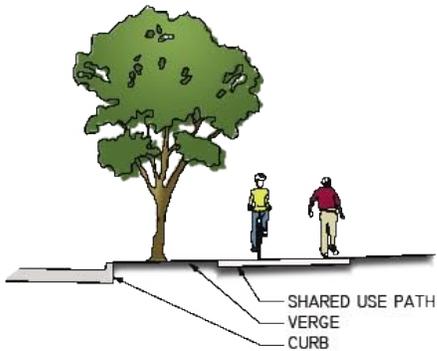
# CHAPTER 4: FACILITY DESIGN



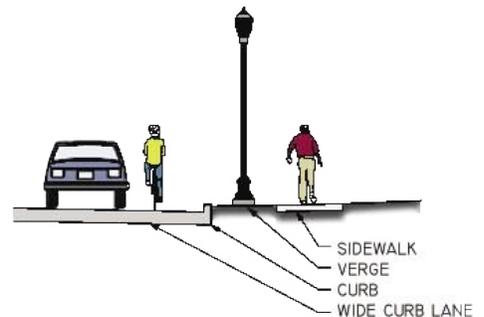
STREET EDGE SHOWING JUST SIDEWALK



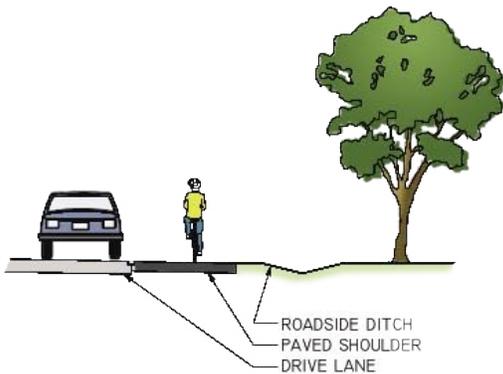
BIKE LANE AND ADJACENT SIDEWALK



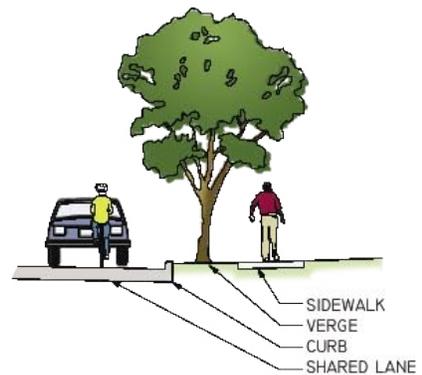
SHARED USE PATH WITH BOTH PEDESTRIANS AND BICYCLISTS



WIDE CURB LANE WHERE MOTORISTS AND BICYCLISTS SHARE A WIDER LANE



SHOULDER AS A BICYCLE FACILITY



SHARED LANE WHERE MOTORISTS AND BICYCLISTS SHARE A TYPICAL LANE WIDTH

This is done by having the bike lane’s stop bar striped immediately adjacent to the crosswalk while the remaining lanes would have their stop bar six feet further back. Advance queues are only practical where there is a high volume of bicycle traffic to justify their use (page35).

Bicycle lane markings and signs shall be installed in accordance with Chapter 9C of the Manual of Uniform Traffic Control Devices (MUTCD). Typical signage along bike facilities may include MUTCD signs R4-4, W11-1 & W16-1, R3-16, and R3-16a. Pages 36 and 37 illustrate the coordination of signs and markings typically found at intersections.

Pavement markings typically include arrows to indicate the direction of travel and the bike symbol to indicate the preferential use of the lane (page 36). The bike lane shall be delineated from the motor vehicle traffic using a six inch solid white line. A four inch solid white line may be used on the curb-side of the bike lane to separate it from the parking lane. Thermoplastic pavement markings with a non-slip surface are recommended for delineating the bike lane. Striping shall end at stop bars/pedestrian crosswalks and in most cases, not continue through intersections. Where there is heavy right turn movement, or a bus stop, a broken line shall be used to allow for the turning movement but also to indicate the cyclist merging into the through or turn lane prior to entering the intersection (page 37).

As new facilities are developed or redone on roads with induction loops, the loops should be tested for sensitivity



BICYCLIST WITH AN ADVANCE QUEUE



VANE-STYLE GRATE WITH OPENINGS PERPENDICULAR TO THE DIRECTION OF TRAVEL

of smaller vehicles such as motorcycles and bicycles.

All bike facilities including roadways, bike lanes, and shoulders, shall have a smooth surface free of structures and obstacles. Bike lanes shall keep a minimum of 3.5 feet clear from the leading edge of grates or inlets (see inset on page 36). Gutters shall not be significantly sloped to the curb edge thus creating a hazard for bicyclists. Slotted, vane-style grates or grates with narrow openings perpendicular to the direction of travel shall be used if gutter inlets are needed on a bicycle facility.

Bicycle parking shall follow the Land Development Code Appendix 9A, Bicycle Parking Design Manual, 2002. Innovative bicycle parking is encouraged as discussed in the street furnishings section.



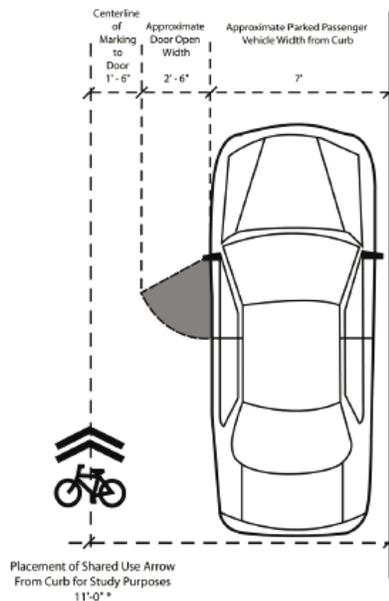
ARTISTIC BICYCLE PARKING AT FOURTH AND MUHAMMAD ALI BOULEVARD

## SHARED LANES

Traffic lanes are often too narrow to be shared side-by-side by bicyclists and passing motorists. Where parking is present, bicyclists wishing to stay out of the way of motorists often ride too close to parked cars and risk being struck by a suddenly opened car door (being “doored”). Where no parking is present, bicyclists wishing to stay out of the way of motorists often ride too close to the roadway edge, where they run the risks of being run off the road, being clipped by overtaking motorists who misjudge passing clearance, or of encountering drainage structures, poor pavement, debris, and other hazards.

Riding further to the left avoids these problems, and is legally permitted where needed for safety. However, this practice can run counter to motorist expectations. The Shared-Lane Marking indicates the legal and appropriate bicyclist line of travel, and cues motorists to pass with sufficient clearance.

PLACEMENT OF SHARED USE ARROW FROM CURB



The Shared Lane Marking is intended to:

1. Help bicyclists position themselves in lanes too narrow for a motor vehicle and a bicycle to travel side by side within the same traffic lane;
2. Encourage safe passing of bicyclists by motorists;
3. Reduce the chance of a bicyclist’s impacting the open door of a parked vehicle in a shared lane with on-street

parallel parking;

4. Alert road users of the lateral location bicyclists may occupy; and

5. Reduce the incidence of wrong-way bicycling.

The Shared Lane Marking shown will be used to assist bicyclists with positioning in a shared lane with on-street parallel parking and to alert road users to the location a bicyclist may occupy within the traveled way.

## STANDARD SHARED LANE MARKING:

If used in a shared lane with on-street parallel parking, Shared Lane Markings shall be placed so that the centers of the markings are a minimum of 3.3 m (11 ft) from the curb face, or from the edge of pavement where there is no curb.

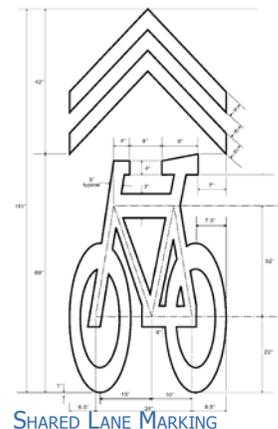
Shared Lane Markings shall not be used on shoulders or in designated bicycle lanes.

The Shared Lane Marking should not be placed on roadways with a speed limit above 55 km/h (35 mph).

When used, the Shared Lane Marking should be placed immediately after an intersection and spaced at intervals not greater than 75 m (250 ft) thereafter.

When the shared lane marking is used, the distance from the curb or from the edge of pavement or paved shoulder may be increased beyond 3.3 m (11 ft).

The Shared Lane Marking shall be made from non-slip, textured thermoplastic material whenever possible.



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## RECOMMENDED BICYCLE FACILITY TYPES RURAL CROSS SECTION

POSTED SPEED LIMIT	AVERAGE ANNUAL DAILY TRAFFIC (AADT) VOLUME (DESIGN YEAR)		
	LESS THAN 2000	2000 - 10,000	OVER 10,000
LESS THAN 30 MPH	12' SL	12' SL ①	6' SH
30 - 40 MPH	6'-SH	6'-SH	6'-SH
41 - 50 MPH	6'-SH	6'-SH	6'-SH
OVER 50 MPH	6'-SH	6'-SH	6'-SH

## RECOMMENDED BICYCLE FACILITY TYPES URBAN CROSS SECTION (NO PARKING)

POSTED SPEED LIMIT	AVERAGE ANNUAL DAILY TRAFFIC (AADT) VOLUME (DESIGN YEAR)		
	LESS THAN 2000	2000 - 10,000	OVER 10,000
LESS THAN 30 MPH	12' SL	14' WC	5' BL
30 - 40 MPH	5'-BL	5'-BL	5'-BL
41 - 50 MPH	5'-BL	6'-BL	6'-BL
OVER 50 MPH	6'-BL	6'-BL	6'-BL

## RECOMMENDED BICYCLE FACILITY TYPES URBAN CROSS SECTION (PARKING)

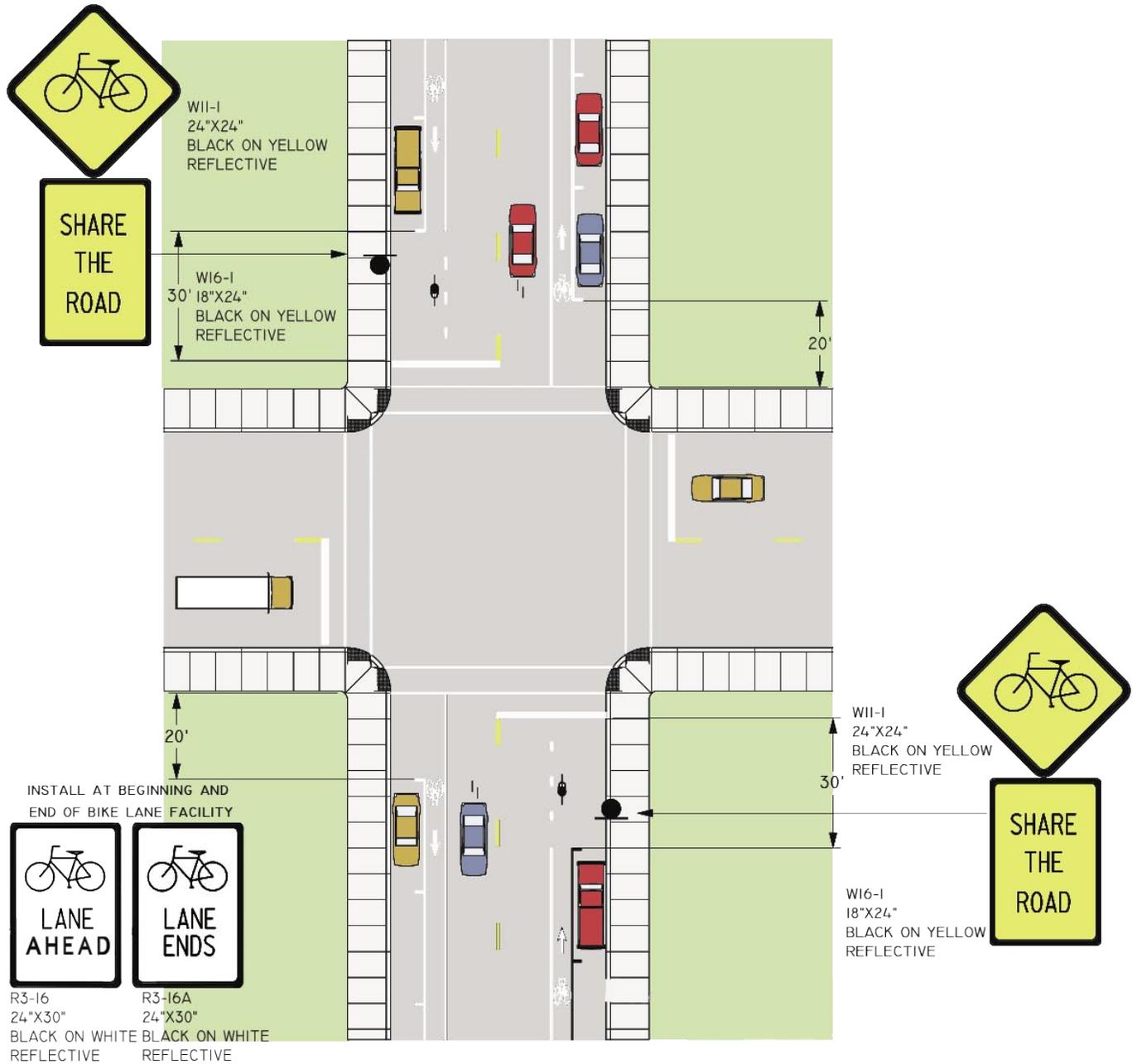
POSTED SPEED LIMIT	AVERAGE ANNUAL DAILY TRAFFIC (AADT) VOLUME (DESIGN YEAR)		
	LESS THAN 2000	2000 - 10,000	OVER 10,000
LESS THAN 30 MPH	14' WC	14' WC	5' BL
30 - 40 MPH	5'-BL	5'-BL	6'-BL
41 - 50 MPH	6'-BL	6'-BL	6'-BL
OVER 50 MPH	NA	NA	NA

LEGEND: WC = WIDE CURB LANE      SH = PAVED SHOULDER  
 SL = SHARED LANE              BL = BICYCLE LANE ②

- ① WHEN PROJECTED TRUCK VOLUMES EXCEED 30 TRUCKS PER HOUR USE 6' - SH.  
 ② THE WIDTH OF BICYCLE LANE INCLUDES THE WIDTH OF GUTTER PAN.

SOURCE: KYTC DESIGN MANUAL

BIKE LANE WITH PARKING  
INTERSECTION WITH 2-WAY ARTERIAL STREET

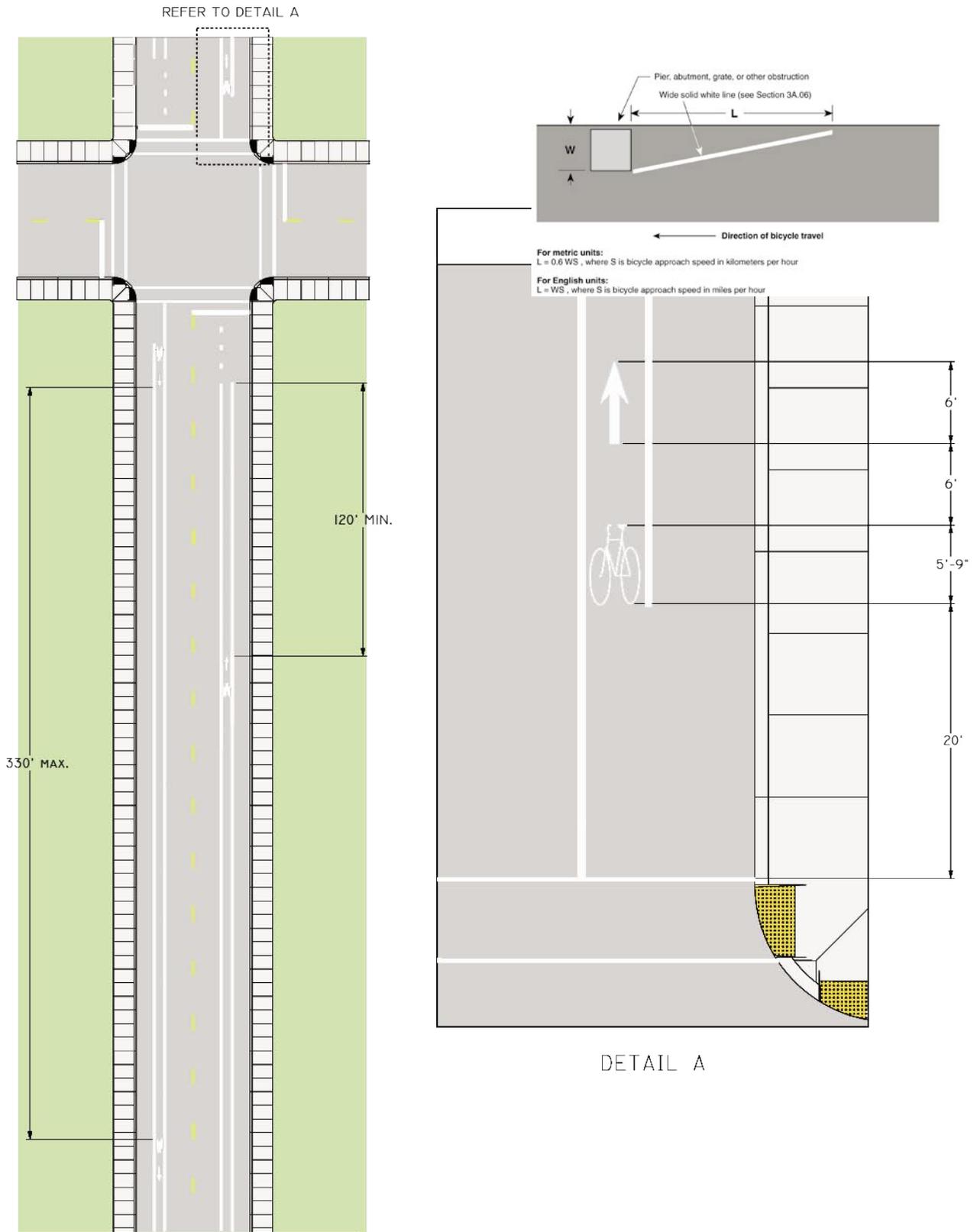


NOTE: BICYCLE SIGNAGE DETAILS LISTED WITHIN APPENDIX



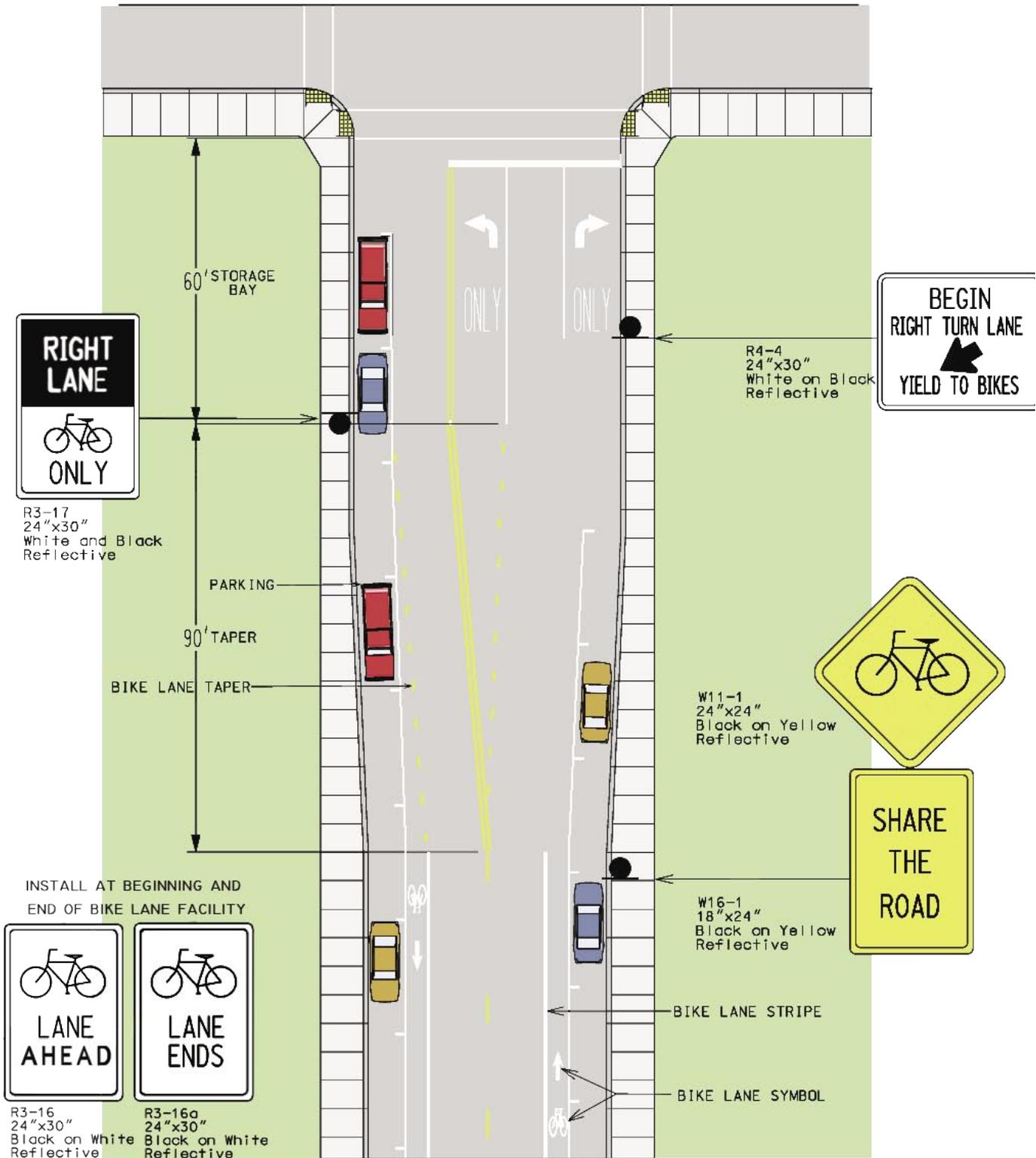
# CHAPTER 4: FACILITY DESIGN

## BIKE LANE SYMBOL AND ARROW SPACING



**NOTE: BICYCLE SIGNAGE DETAILS LISTED WITHIN APPENDIX**

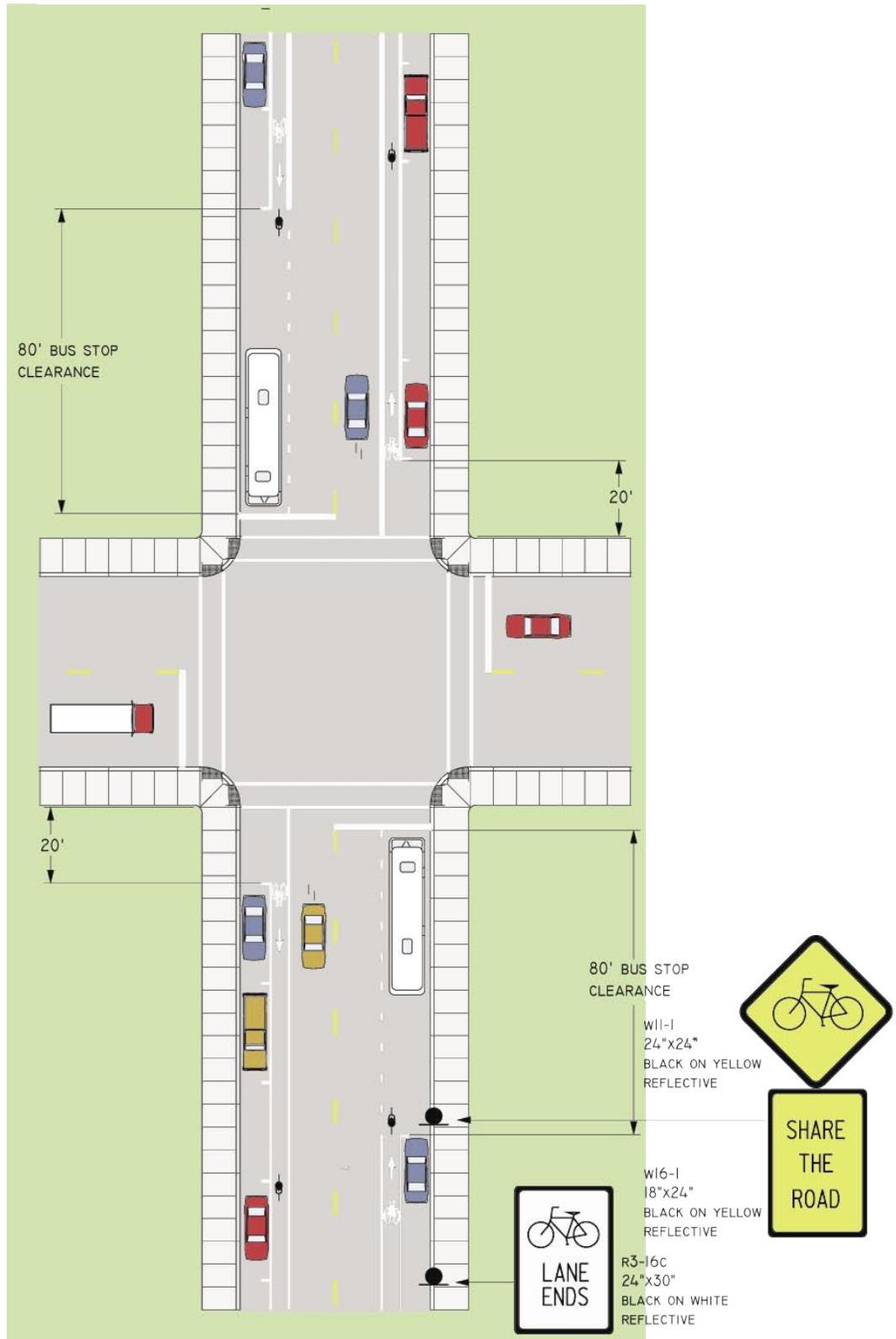
## TYPICAL BIKE LANE SIGNAGE



**NOTE: BICYCLE SIGNAGE DETAILS LISTED WITHIN APPENDIX**

# CHAPTER 4: FACILITY DESIGN

## BIKE LANE WITH BUS STOP NON-CANNELIZED INTERSECTION



**NOTE: BICYCLE SIGNAGE DETAILS LISTED WITHIN APPENDIX**

## TRANSIT DESIGN CRITERIA

There are three primary factors to consider when selecting the location and type of transit facility for a development. These factors are the planned use of the development, the scope of the development, and the presence of transit service in the area. Other contributing factors include surrounding land uses, character of the neighborhood, environmental and/or topographic factors, service demands, and transit agency policy. Currently, TARC locates transit facilities based on the percentage of elderly residents in a neighborhood, surrounding land uses, physical constraints, and at the request of a rider.

Transit amenities are provided to ensure that patrons have a safe, accessible, and pleasant location to board a transit vehicle. Therefore, easements should be dedicated to accommodate future transit boarding areas and stops and the shelters, pads and benches associated with them.

Transit shelters or other related objects shall be located either in front of or behind the Pedestrian Zone. Transit shelters shall include seating and an accessible waiting pad connected to the existing sidewalk network. The waiting pad should be a stable, firm surface at least eight feet in length with a clear width of five feet. The grade of the pedestrian waiting pad shall be ADA compliant and should be less than two percent in slope with a preferred curb height between 6 inches and nine inches. Trash receptacles should be located within 20 feet of a transit shelter. Mass transit stops located out of the traveled way with a bus pull off should accommodate only the bus and should not be used for parking.

The minimum criteria for installing a shelter at a bus stop is based on Character Class and boarding volumes as follows:

- Rural = 10 boardings a day
- Suburban = 25 boardings per day
- Downtown/Traditional = 50-100 boardings per day

All new transit stops shall conform to TARC's design guidelines.



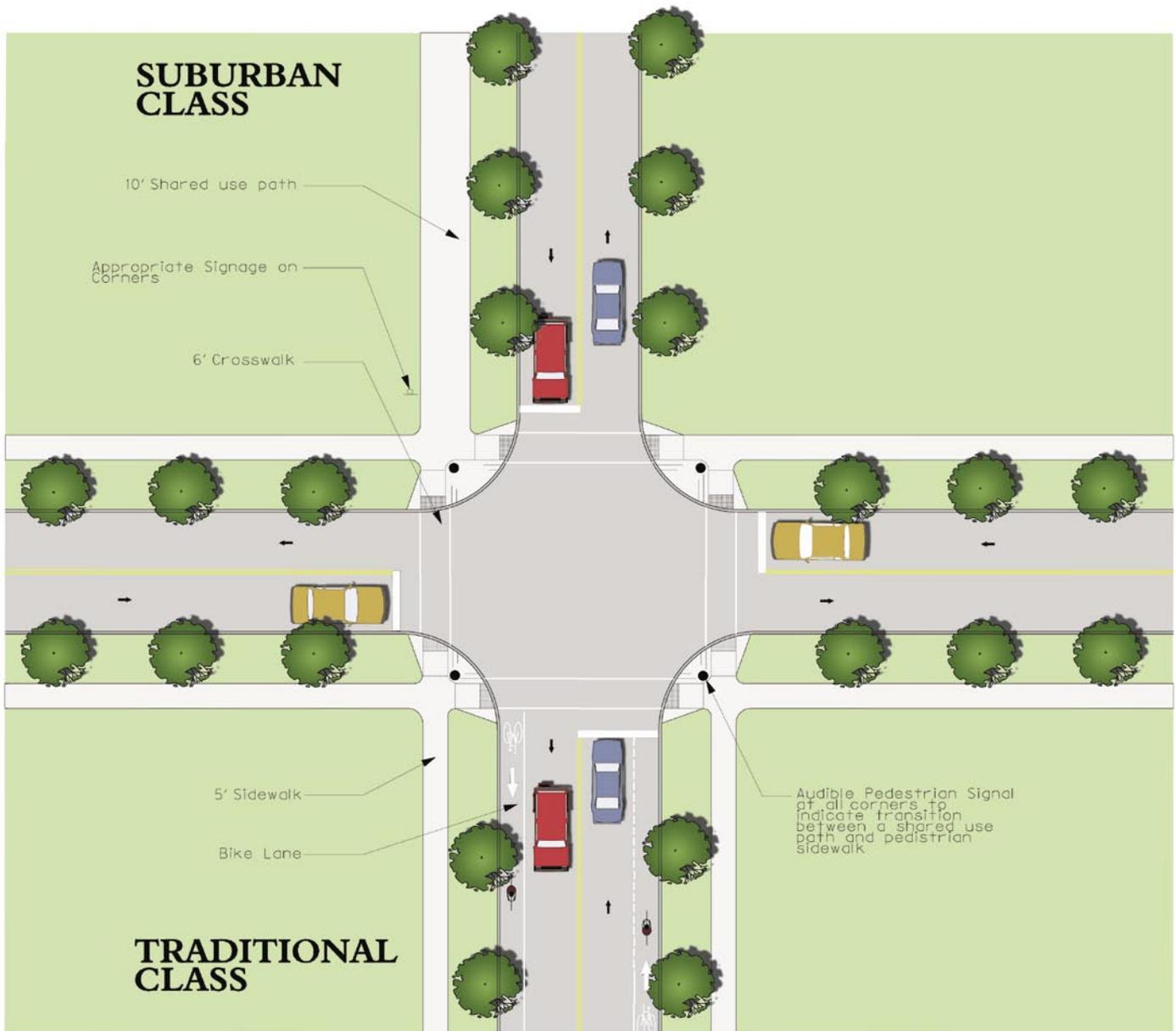
TARC BUS SHELTER AT BARDSTOWN ROAD AND EASTERN PARKWAY



TARC BUSES HAVE BIKE RACKS



TARC BUS STOP WITH BRIGHTSIDE LANDSCAPING



## TRANSITIONS

The Complete Street facility design criteria contained in this Manual is based on Character Class and Functional Roadway Class. Each typical section in Appendix A conveys relational and dimensional criteria for various facilities as they occur in a given Character Class or on a specific Functional Class of road. However, many of the roadways within Louisville Metro, particularly collector level roads and greater, will traverse more than one Character Class. Roadways may also change from one Functional Class to another as they traverse the county. Both of these conditions create transitional issues associated with a Complete Street facility design.

Character Class transitions will occur at Form District boundaries, when the adjacent Form Districts fall within differing Character Classes. There are four possible Character Class transitions: Downtown-Traditional; Traditional-Suburban; Traditional-Rural, and; Suburban-Rural. Associated with each of these Character Class transitions may be variations in the application of a particular facility. The two most critical variations from a public safety standpoint would be the transition from a shared lane bicycle facility to a dedicated bicycle lane and a sidewalk transitioning to a shared-use path. The appropriate design for these two transitions is illustrated on this page and the next.

It is recommended that a transition in facilities resulting from a change in Character Class occur at the nearest roadway intersection whenever possible. This is particularly important when dealing with an on-road facility such as a bike lane. Changes in landscape character or street furnishings however, can occur at the common property boundary between the two Character Classes rather than the nearest street in order to emphasize the character of the Form District. The design intent of an approved neighborhood plan, corridor study, or Streetscape Master Plan (see Chapter 5, Review and Approval Process) within close proximity to the site should be considered in the design of any transition area.

The possible transitions between the Downtown Character Class and a Traditional Character Class could include:

- Shared lane to dedicated bicycle lane
- Wide sidewalk without a verge to a standard sidewalk with a verge

The possible transitions between a Traditional Character Class and a Suburban Character Class could include:

- Shared lane to dedicated bicycle lane
- Sidewalk (with or without a verge) to a shared-use path
- Sidewalk with little or no building setback to a sidewalk with a deep building setback

Transition between a Traditional Character Class and a Rural Character Class would most likely occur in a Village Form District between the center and the outlying village. Similar transitions would also occur should a Town Center Form District be established to serve a rural area. The possible transitions between these Character Classes could include:

- Sidewalk (with or without a verge) to a shared-use path
- Shared lane to a dedicated bicycle lane
- Dedicated bicycle lane to a shared lane (not signed) with a shoulder
- Shared lane on a bicycle route (signed) to a shared lane (not signed) with a shoulder
- Dedicated bike lane to a shared use path

Landscape design and the frequency and location of street furnishings would also vary between these two Character Classes as described in previous sections of this chapter.

The possible transitions between a Suburban Character Class and Rural Character Class could include:

- Sidewalk with a verge to a shared-use path
- Dedicated bicycle lane to a shared lane
- Dedicated bicycle lane to a shared lane (not signed) with a shoulder and a shared-use path
- Shared lane on a bicycle route (signed) to a shared lane (not signed) with a shoulder
- Wide curb lane to a shared use path

### BICYCLE FACILITY TRANSITIONS

Transitioning from one type of bicycle facility to another (such as from a bike lane to a shared-use path) remains an engineering problem around the nation and around the world.

Whenever a transition of this sort is necessary, planners and engineers should refer to national and international best practices and standards of design in all cases. In Portland, Oregon, transportation planners studied lane color transition from European countries and has had success implementing this concept in high conflict situations (see *Portland's Blue Bike Lanes Report*).



BIKE FACILITY TRANSITION FROM BIKE LANE TO SHARED USE PATH  
(SOURCE: PORTLAND, OR OFFICE OF TRANSPORTATION)

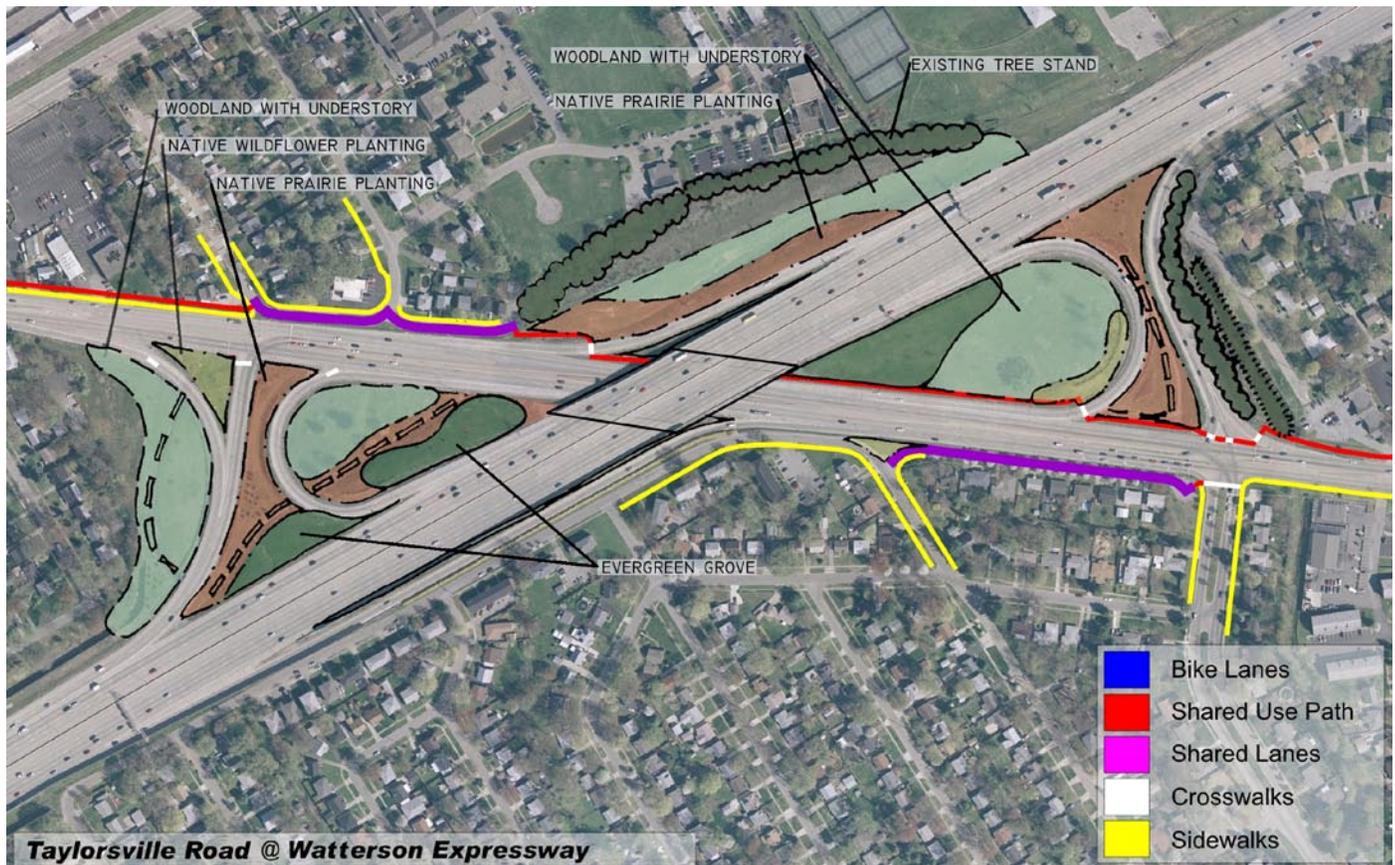
## GATEWAYS/INTERCHANGES

Over a hundred years ago, Louisville’s city leaders recognized that great communities are built through careful planning and design. They realized the functional needs of a growing population could be balanced with aesthetics preserving the natural beauty inherent in the native landscape. This is most evident in the parkway system designed by landscape architect, Frederick Law Olmsted. As transportation systems have expanded throughout the city, efforts have been made to incorporate scenic qualities. In the late 1960s, there was enough public interest in fostering the scenic quality of highways that Federal legislation provided funding incentives for roadside enhancements.

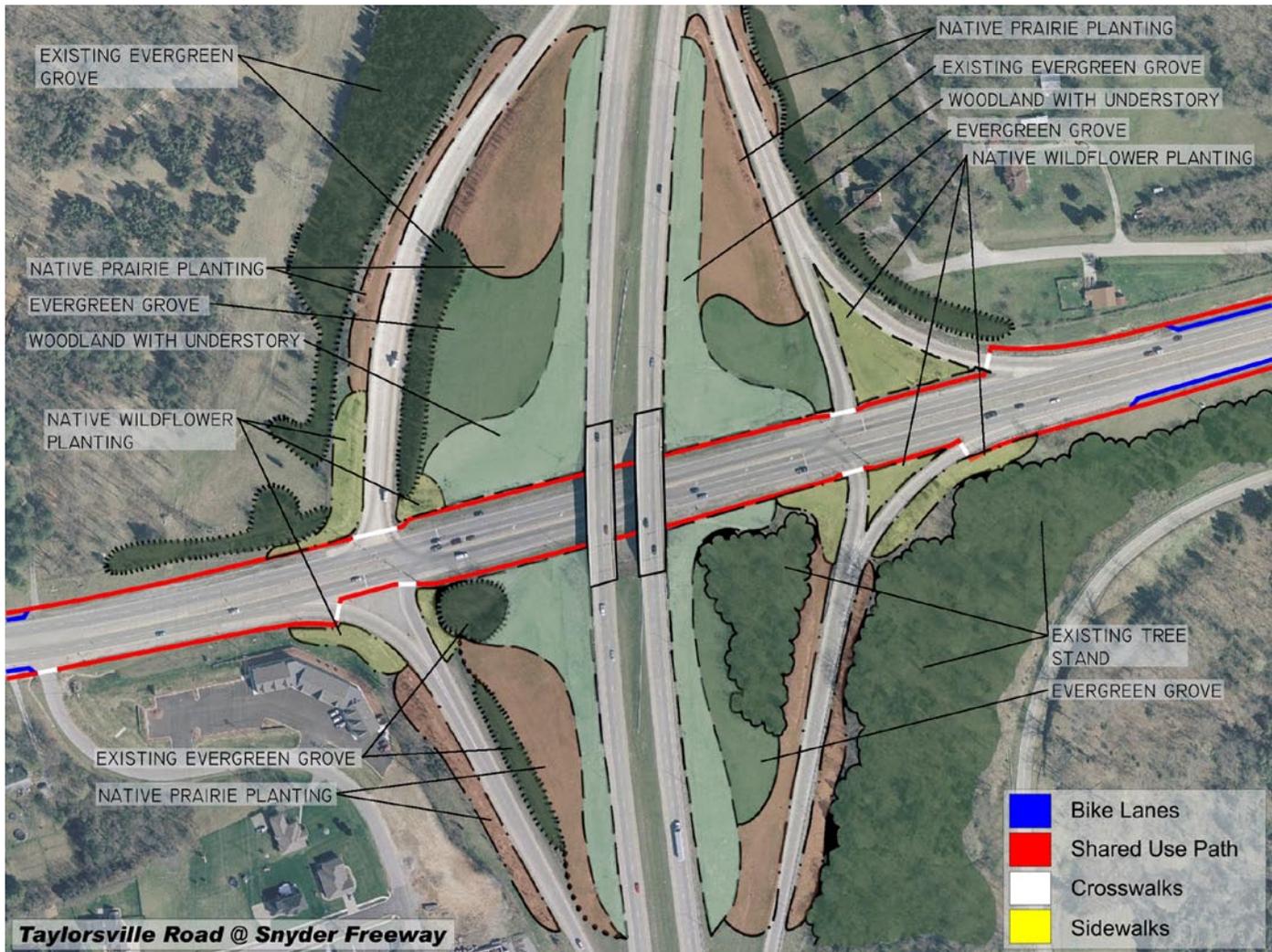
On a local level, incentives like Operation Brightside (created in 1986), planning documents such as the 1991 *Highway Beautification Master Plan*, the 1994 *Master Plan for Renewing Louisville’s Olmsted Parks and*

*Parkways*, and the policies of the late 1990s continue to recognize the importance of planning and designing aesthetically pleasing and easy to maintain transportation corridors. The Mayor’s Strategic Plan for 2004-2007 outlines a vision for a “community all people are proud to call home” where Louisville is a clean and green city that promotes environmental standards in air and water quality, creating sustainable projects, and practicing “responsible stewardship of public assets.”

In 1991, the *Highway Beautification Master Plan* was completed due to the leadership of Brightside and collaboration with state and local agencies to result in a plan that balances beauty and function of the transportation corridors. The master plan proposes to “recognize the highway landscape as an extensive system of open space that ties the city together.” It establishes that the transportation corridors can be an environmental and visual resource in addition to safely moving large volumes of traffic at high speeds.



A CONCEPTUAL LANDSCAPE LAYOUT FOR TAYLORSVILLE ROAD AT I-264/WATTERSON EXPRESSWAY



A CONCEPTUAL LANDSCAPE LAYOUT FOR TAYLORSVILLE ROAD AT I-265/SNYDER EXPRESSWAY

A glance at a Kentucky state highway map will immediately show Louisville Metro as a major hub of the state highway system. Three interstates enter Jefferson County to pass through the downtown core and outlying areas of Louisville Metro at the northern, eastern, and southern county lines. This provides the opportunity to implement improvements at the perimeters on the I-64, I-65, I-71, and soon the I-265 corridors for gateway designations. Already, The Ohio River Bridges – Kennedy Interchange project is taking a first step to develop a transportation project that includes mobility for many modes of transportation and landscape guidelines for Spaghetti Junction, segments of I-64/I-71, I-65, and I-64 in the downtown core that create western gateways for Louisville Metro. This project furthers the vision of the *Highway Beautification Master Plan* and could be a model for creating gateways at the northern (I-

71), eastern (I-64), and southern (I-65), perimeters of Louisville Metro.

The driver’s experience of the highway landscape is primarily a visual one that is viewed at a high rate of speed. However, as drivers are queued off and onto the highways at controlled points, such as interchanges, the vehicle speeds decrease which allows the occupants a prolonged viewing experience of the roadside landscape. Most existing interchanges are large, one-dimensional green planes. They have little landscape interest and are canvases waiting to be painted in shades of green and seasonal colors.

The beautification of all interchanges will require a site-

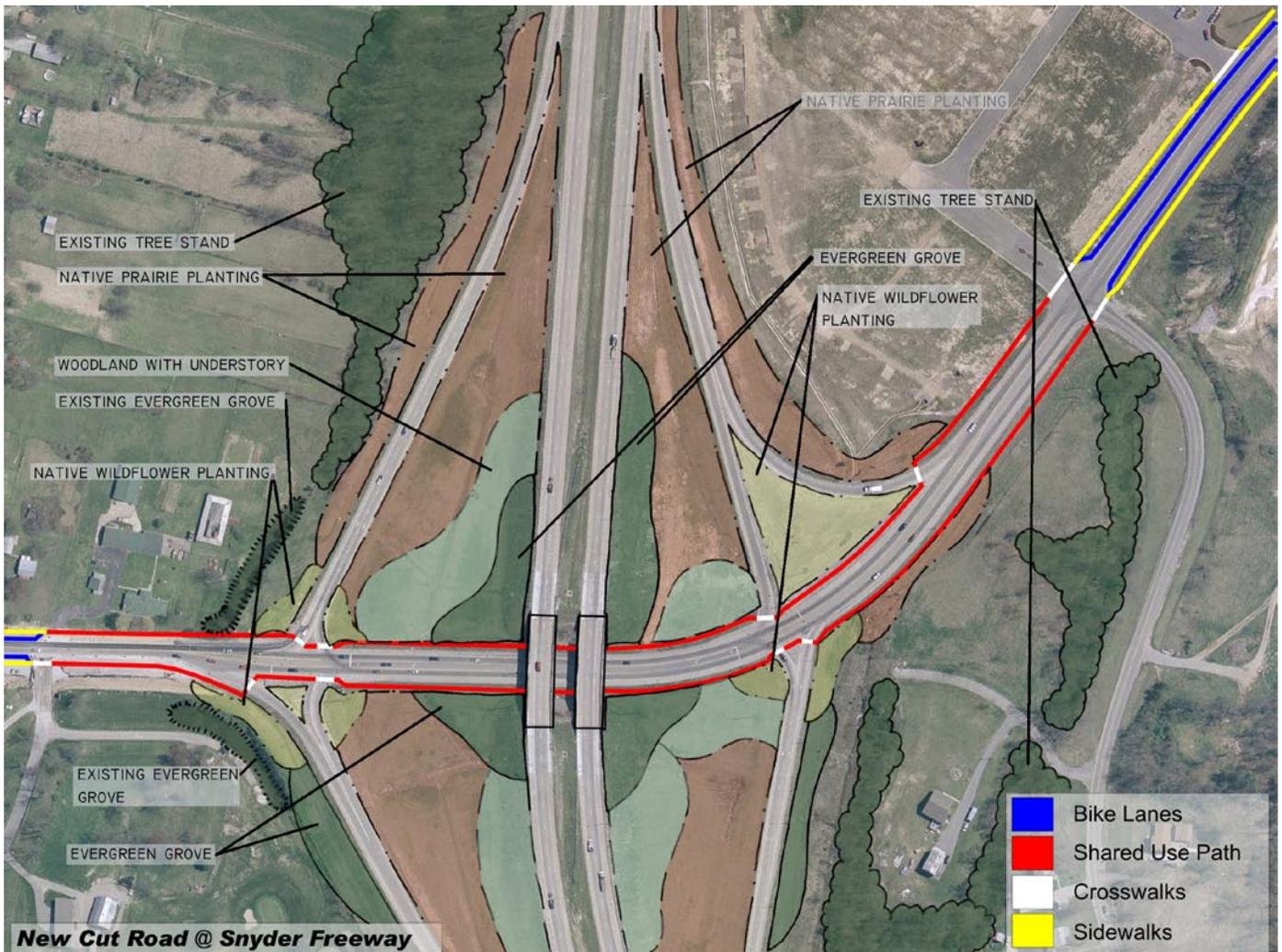
## CHAPTER 4: FACILITY DESIGN

specific design and should follow the Design Criteria listed in the Highway Beautification Master Plan. In addition, the existing visual quality of an area should be considered when designing the roadside landscape of an interchange. *The Highway Beautification Master Plan* states, “In many ways the roadside landscape extends beyond the right-of-way fence.” This is evident in the priority corridors of Taylorsville Road and New Cut Road, which illustrate the differences in the character of interchanges.

Taylorsville Road at I-264 has a physical context of an older residential, urban setting. As Taylorsville progresses east and intersects with I-265, the character of the area is new residential with some retail areas.

New Cut Road has a roadside landscape that extends long beyond the right-of-way fence at the I-265 interchange. As New Cut Road leaves the more urban areas of Louisville Metro, the corridor land uses include a mix of established subdivisions, a historic park, a growing industrial presence, and a sensitive wet woods, which all have a backdrop to the forested knobs of the nation’s largest urban forest, the Jefferson Memorial Forest. Each interchange has unique physical context that should be evaluated in the design of the roadside landscape.

Each of the conceptual plans for the highway interchanges demonstrates how the use of native species and massing of plants can create a context sensitive, low maintenance and beautiful landscape around the roadways. The woodland areas should be planted



A CONCEPTUAL LANDSCAPE LAYOUT FOR NEW CUT AT I-265/SNYDER EXPRESSWAY

with native hardy canopy trees such as maple, oak and ash. These areas should contain a large portion of colorful understory trees such as redbud and dogwood. The wildflower areas provide splashes of color at the intersections where vehicle speeds are slower. The prairie plantings will also add color while providing a lower maintenance landscape from the typical trimmed lawn areas around most interchange areas. Invasive plants such as crown vetch and burning bush should be removed from the interchange landscape areas. The use of native species will bring natural beauty to the interchanges while protecting some of the natural plant heritage of the area.

The plans and initiatives established by Louisville Metro describe the combined vision and strategies to enhance the transportation corridors and begin to illustrate the partnerships that will be needed for successful implementation. The state highway's long range plans provide the opportunity for developing individual project scopes that include a comprehensive approach to designing transportation corridors that are safe roadways and an environmental and visual resource. The Highway Beautification Master Plan envisions a broad corridor concept plan that utilizes "masses and layers of green, with seasonal accents of color and meadow like openings... [that] become self-sustaining over time." Including landscaping components within a highway construction project to support the master plan's corridor concept is feasible and is exhibited in The Ohio River Bridges project.

In order to plan, design, implement, and maintain the beautification efforts, several project cooperators must be involved; namely: KYTC District 5, Louisville Metro Public Works, Brightside, neighborhood organizations, small cities, and Metro Parks. Partnerships for funding, installation, and maintenance must be fostered and cooperators' efforts in the transportation corridors must dovetail from conception in order to ensure success and longevity of any project. Projects in the highway corridors will be designed on a case by case basis due to the variety of opportunities and constraints of each site. As the project planning progresses, the role of each cooperator can be fully defined. However, the beginnings of some roles can already be outlined. For instance,

KYTC District 5 will oversee permitting and promote greener stewardship of the highway right-of-ways at the state level. Brightside can continue their BrightSite efforts to fulfill the corridor concept plan that proposes seasonal accents of color and meadow like openings to compliment the greening of the highway "open space" landscape.