

# MORPC Complete Streets Checklist for Project Sponsors

---

This checklist accompanies the Regional Complete Streets policy and is developed to assist project sponsors in defining and designing their projects in adherence to the policy. A Complete Streets toolkit will be developed over the next year to provide more detailed information on engineering, design, educational, and enforcement strategies. More specifically, the toolkit will elaborate on many of the items discussed in the checklist and Appendix 1.

- ❖ The questions shown in Section A are only informational and are included in the MORPC funding application. You will NOT need to fill them out here but within the funding application itself.
- ❖ Project sponsors who have received MORPC funding will be asked to fill out Section B during Step 1 of the Project Development Process. Answers to these questions will help MORPC staff in reviewing the project and providing assistance where needed.
- ❖ Sections C through H are informational only and provide recommendations for certain stages and aspects of the project.

Being in compliance with the policy means that project sponsors plan for, design, and construct all transportation projects to provide appropriate accommodation for all users of roadways, including motorists, cyclists, pedestrians, transit and school bus riders, delivery and service personnel, freight haulers, and emergency responders. It includes people of all ages and abilities.

The Complete Streets policy promotes a multimodal transportation system that is integrated with sustainable land use developments.

The **goals** of this Complete Streets Policy are:

- 1) To create a comprehensive, integrated, and connected transportation network that supports compact, sustainable development and provides livable communities.
- 2) To ensure safety, ease of use, and ease of transfer between modes for all users of the transportation system.
- 3) To provide flexibility for different types of streets, areas, and users.

*“Complete streets policies are a reminder that providing for safe travel by users of all modes is the primary function of the corridor. Under complete streets, basic facilities for bicyclists, pedestrians, transit users, and disabled travelers are necessities, rather than optional items. Their needs must be included regardless of their presence or lack thereof at stakeholder meetings.” (National Complete Streets Coalition)*

It is important to note that Complete Streets may be achieved incrementally through a series of smaller improvements or maintenance activities over time.

The checklist contains the following sections:

Section A (p. 2):	Project Description & Scope
Section B (p. 6):	Project Design to meet Complete Streets standards
Section C (p. 9):	Construction
Section D (p. 10):	Maintenance & Operation
Section E (p. 11):	General Recommendations
Section F (p. 12):	Recommended Public Input Practice
Section G (p. 13):	Stakeholders
Section H (p. 14):	Other Resources
Appendix 1 (p. 15):	Selected Complete Streets Design Information & Sample Cross-Sections
Appendix 2 (p. 28):	Glossary / Abbreviations

## Section A: Project Description & Scope

The purpose of Section A is to determine the scope and character of your project, including the rationale behind the project and the ways it will affect the surrounding areas. **Please note that the questions shown in this Section A are only informational and are included in the MORPC funding application. You will NOT need to fill them out here but within the funding application itself.** The questions in this section will give you a better understanding of what MORPC staff is considering when determining if a project is addressing all users.

LPA Project Manager:

Project Title:

Describe Project's Purpose & Need:

Project Limits (Include County, Route and Section) & Project Length:

Existing conditions

- A. Explain how the project area currently accommodates pedestrians (including ADA compliance), bicyclists, and transit users.

Explain how the proposed project will accommodate them once completed.











- B. What is the current and projected Level of Service (LOS)? Please provide existing Average Daily Traffic (ADT) counts for all modes for which counts are available. (Vehicular traffic counts are available in MORPC's online traffic count database. Pedestrian and bicycle traffic counts for selected locations are also available on the MORPC website.)

Counts attached

- C. Please provide the percentage of truck traffic (ODOT Type B and C Commercial). MORPC can evaluate the project using ODOT Traffic Survey Reports (if available). Alternatively, you may provide classification counts.

D. Please describe the existing character of the project area, including land use, estimated pedestrian and bicycle traffic, any unofficial walking paths, density of development, street furniture/lighting, emergency call boxes, perceived safety issues, transit routes and stops.

E. Please attach a map of the project area, showing land use and existing and future trip generators. Existing and future trip generators are places that attract customers, employees, students, visitors, and others. The following are some examples:

-  *Employment centers*
-  *Schools/Colleges*
-  *Libraries*
-  *Residential areas*
-  *Recreational facilities (parks, etc.)*
-  *Tourist destinations*
-  *Community gathering places (churches, etc.)*
-  *Entertainment*
-  *Shopping*
-  *Logistic centers*

F. To what extent does the project serve Environmental Justice target populations (includes minorities, people living in poverty, elderly, transportation handicapped, and 0-car households)? This information can be found from the 2000 Census or by contacting MORPC for assistance.

G. Please fill out the following:

Existing ROW Width: _____ Existing Pavement Width: _____ Existing Number of Lanes: <table border="0" style="display: inline-table;"><tr><td>NB/EB</td><td>SB/WB</td></tr></table> _____ Is there an existing 2-way center turn lane? <table border="0" style="display: inline-table;"><tr><td>Yes</td><td>No</td></tr></table> _____ Existing Shoulder Widths: <table border="0" style="display: inline-table;"><tr><td>NB/EB</td><td>SB/WB</td></tr></table> _____ Existing Sidewalk Widths: <table border="0" style="display: inline-table;"><tr><td>N/E</td><td>S/W</td></tr></table> _____ Existing Bike Lane Widths: <table border="0" style="display: inline-table;"><tr><td>NB/EB</td><td>SB/WB</td></tr></table> _____ Existing MUP Width: _____ Existing Speed Limit <table border="0" style="display: inline-table;"><tr><td>MPH</td></tr></table> _____ Number of railroad facilities within the project limits: _____	NB/EB	SB/WB	Yes	No	NB/EB	SB/WB	N/E	S/W	NB/EB	SB/WB	MPH	Proposed ROW Width: _____ Proposed Pavement Width: _____ Proposed Number of Lanes: <table border="0" style="display: inline-table;"><tr><td>NB/EB</td><td>SB/WB</td></tr></table> _____ Is there a proposed 2-way center turn lane? <table border="0" style="display: inline-table;"><tr><td>Yes</td><td>No</td></tr></table> _____ Proposed Shoulder Widths: <table border="0" style="display: inline-table;"><tr><td>NB/EB</td><td>SB/WB</td></tr></table> _____ Proposed Sidewalk Widths: <table border="0" style="display: inline-table;"><tr><td>N/E</td><td>S/W</td></tr></table> _____ Proposed Bike Lane Widths: <table border="0" style="display: inline-table;"><tr><td>NB/EB</td><td>SB/WB</td></tr></table> _____ Proposed MUP Width: _____ Proposed Speed Limit <table border="0" style="display: inline-table;"><tr><td>MPH</td></tr></table> _____	NB/EB	SB/WB	Yes	No	NB/EB	SB/WB	N/E	S/W	NB/EB	SB/WB	MPH
NB/EB	SB/WB																						
Yes	No																						
NB/EB	SB/WB																						
N/E	S/W																						
NB/EB	SB/WB																						
MPH																							
NB/EB	SB/WB																						
Yes	No																						
NB/EB	SB/WB																						
N/E	S/W																						
NB/EB	SB/WB																						
MPH																							

H. What are the functional classifications of the roads covered by this project? Check all that apply.

Functional Classification	<input type="checkbox"/> Urban Interstate Highway	<input type="checkbox"/> Urban Other Expressway	<input type="checkbox"/> Urban Principal Arterial
	<input type="checkbox"/> Urban Minor Arterial	<input type="checkbox"/> Urban Collector	
	<input type="checkbox"/> Rural Interstate Highway	<input type="checkbox"/> Rural Principal Arterial	<input type="checkbox"/> Rural Minor Arterial
	<input type="checkbox"/> Rural Major Collector	<input type="checkbox"/> Rural Minor Collector	<input type="checkbox"/> Local Road*
	<input type="checkbox"/> Other – Please specify: _____		

\* Local Roads have limited eligibility for MORPC funding.

I. Briefly explain how the project will improve safety. MORPC can evaluate the project using its cleaned crash data of the last 3 years. Alternatively, you may submit your own crash data and methodology used. MORPC strongly encourages sponsors of intersection safety projects to conduct a crash study and provide results. Your crash information also needs to include the number of pedestrian and bicycle crashes by severity, as well as if the project area includes any locations (corridors or intersections) that are on MORPC's and/or ODOT's high-crash lists.

J. Project limits should be selected so that they can accommodate existing and future connections. In this regard, were logical termini chosen to include connections through "pinch points" such as overpasses, railroad crossings, and bridges? If the project touches another jurisdiction, was a systems approach taken? Were cross-jurisdictional connections considered? Please explain:

K. Does your project area include recommendations that are contained in any of the following plans? Please check all that apply.

- Pedestrian plans or sidewalk inventories
- Bikeway plans
- Freight plans
- Thoroughfare plans
- Greenways plans
- Active Transportation/Open Space plans
- Short-range and/or Long-range transit plans
- CapitalWays Transportation Plan
- ODOT plans
- Safe Routes to School travel plans
- ADA Transition plans
- Any neighborhood or mobility plans
- Any other plans, e.g., comprehensive plans

If yes, how does your project fulfill any of these plans? Please specify the plan name(s).

L. Is there additional information you would like to provide about the project?

## Section B: Project Design to meet Complete Streets standards

**After your project has received a funding commitment, you will be asked to fill out this section during Step 1 of the Project Development Process (PDP) to better help us review your project through the design process and provide assistance where needed.** If you are receiving funds through other means, this section may be helpful to you during Step 1 of the PDP. **As each complete street is unique, there will not be one right answer.**

The purpose of this section is to ensure you have considered all users in your project, to ask more detailed questions, and to ensure your project meets appropriate design standards. For projects using MORPC attributable federal funding, it will be necessary to meet or exceed standards and procedures acceptable to the Ohio and U.S. Departments of Transportation, such as the Ohio Department of Transportation's Project Development Process and Location & Design Manual. Information on various guidelines and standards is listed on the MORPC Complete Streets website.

One of the goals of MORPC's Complete Streets Policy is to provide flexibility for different types of streets, areas, and users. This means that a Complete Street in a rural area may look very different from a Complete Street in an urban area. *Please also see example street cross-sections in Appendix 1.*

- A.** Please cite the specific design guidance or resources which relate to Complete Streets that you have used in developing the scope of your project. Examples may include appropriate sections of the American Association of State Highway and Transportation Officials (AASHTO) Green Book, the Manual of Uniform Traffic Control Devices (MUTCD), etc. Links to these documents are available on the MORPC website.

- B.** Transit accommodations to the extent needed should be handled in consultation with the local transit authority. Have you consulted your local transit agency to ensure that transit vehicles will be accommodated and access to transit facilities will be provided? Please explain:

- C.** Has a speed study been conducted for the street/corridor? Please consider project conditions and context to determine if a speed study is necessary.

Yes

No

- D.** Has a parking study been conducted for both on-street and off-street parking? Please consider project conditions and context to determine if a parking study is necessary.

Yes

No

- E.** How will the project consider future utility/telecommunications needs?

F. Which, if any, of the following items will be incorporated in your project? Please check all that will apply.

Lighting

911 Call Boxes

Bicycle Facilities

Bike Lanes

Shared-Lane Markings / Sharrows

Shared Bike-Bus Lane

Bicycle Signage (e.g., designated bike route)

Secure Bicycle Parking

Bicycle Detectors

Multi-Use Path

Pedestrian Facilities

Sidewalk with ADA compliant curb ramps

Signalized Crosswalk

Marked Crosswalk with signage, including Mid-Block Crossing

Pedestrian Detectors

Audible Signals

Multi-Use Path

Transit Facilities

Secure Bicycle Parking

Shared Bike-Bus Lane

Priority Bus Lane

Bus Stop, including Paved Passenger Waiting Area

Bus Passenger Shelter

**Real-Time Bus Arrival Information Signs**

Bus Pads

Traffic Calming Elements

Landscaping, including Street Trees

Narrower Traffic Lanes

On-Street Car Parking

Other Physical Changes (e.g., Chicanes, Curb Extensions)

Reduction in Speed Limit

Other(s) (please explain)

If you are not providing any pedestrian, bicycle, or transit facilities, please explain why.

**G.** Are there any Intelligent Transportation Systems (ITS)-related recommendations within the project area, such as emergency or transit vehicle signal pre-emption systems, dynamic message signs, or signal coordination? (Note: If yes, then the project must be part of the regional ITS architecture. The database and document can be found here: <http://www.morpc.org/transportation/highway/Architecture.asp>.

Yes

No

Please explain:

**H.** Please list the stakeholders who are involved during the early stages of the planning process.

**I.** Is there additional information you would like to provide about the project that is unique or wasn't captured previously with regard to the Complete Streets policy?

*Please note:* While we are not asking for estimated future counts for each mode, we encourage project sponsors to conduct pre- and post-counts of all users in the project area. Having this data available region-wide will help us create a reliable forecasting methodology for pedestrian and bicycle counts.

## Section C: Construction

The purpose of this section is to ensure that project sponsors are maintaining adequate access for all users during the construction of their project, which may be done via keeping some facilities open for traffic or via providing clear detour routes.

**A.** During construction, will safe access be maintained for all users, including pedestrians, bicyclists, transit users, and delivery vehicles?

Yes

No

**B.** Will detour routes for all users on site or nearby be provided and clearly marked, including advanced warning signs?

Yes

No

**C.** Is there additional information you would like to provide about the project?

## Section D: Maintenance & Operation

The purpose of this section is to encourage that project sponsors are operating and maintaining their facilities while keeping all users in mind. This section is for informational purpose only and can be used as a self-evaluation tool by the project sponsor. Detailed information on maintenance issues will be discussed as part of the Complete Streets toolkit.

- A.** What agency will be responsible for ongoing maintenance of the facility and how will this be budgeted? If the project sponsor is not responsible for maintenance after the project ends, please indicate responsible agency name. Please attach the maintenance agreement as well.

Please explain:

Maintenance agreement attached

- B.** Describe the signal timing. Include information on the wait time for cars, pedestrians and cyclists, crossing time for pedestrians, cycle length, delay, level of service, and time of day being evaluated.

- C.** Have you coordinated the signal timing within and beyond the project limits and irrespective of jurisdiction to allow traffic flow and discourage speeding?

Yes

No

- D.** Is there additional information you would like to provide about the project?

## Section E: General Recommendations

The following are recommendations by MORPC as included in the Complete Streets policy.

- ⊗ All users should be considered during the entire life cycle of a project, including planning, design, construction, operations, and maintenance.
- ⊗ Street furniture, such as bike racks or benches, should be considered as part of all projects as long as they do not impede any user.
- ⊗ When designing a facility that includes or crosses an existing or future transit route, ensure that the appropriate pedestrian and wheelchair access is provided to and from the transit stops.
- ⊗ Traffic-calming elements including, but not limited to, landscaping, street trees, and narrowing of lanes, should be considered where safe and appropriate.
- ⊗ Project sponsors should consider including street trees and landscape components, with careful analysis of tree, site, and design considerations.
- ⊗ Special consideration should be given to future planned facilities or services.
- ⊗ Each project design should be coordinated with appropriate access management strategies. Access management strategies should consider the placement of sidewalks and ramps to eliminate sight distance issues.
- ⊗ Although this policy focuses on engineering projects, the project sponsor should provide education, encouragement, and enforcement strategies during or after the project. The education component should include government officials, developers, and the public. A toolkit designed by MORPC staff will provide best practices, ideas, and resources to help with these efforts (see Implementation section).
- ⊗ While this policy focuses on transportation, local governments should review their land use and zoning policies to provide for mixed land use developments and projects that provide direct non-vehicular connections within a given development.
- ⊗ Each local community should regularly update its project design standards and procedures and train its staff to adhere to them.
- ⊗ Local governments are encouraged to adopt their own Complete Streets policies, consistent with this regional policy and federal and state design standards. State governments should work with the local Metropolitan Planning Organizations to ensure consistency in policies at the state, regional and local level.

## Section F: Recommended Public Input Practice

The public input process should be commensurate with the scope and complexity of the project and should meet National Environmental Policy Act (NEPA) requirements (when the project is developed through the ODOT Project Development Process). This may include public meetings, stakeholder meetings, direct mailing, a project website, or other suitable methods.

- ⌚ A copy of public involvement plan and link to project website should be provided to MORPC, if available.
- ⌚ Coordination with applicable agencies (Ohio Department of Transportation, Ohio Department of Natural Resources, etc.) should be done to ensure National Environmental Policy Act (NEPA) compliance.
- ⌚ The public input periods and stakeholder meetings should be consistent with the Project Development Process. Determination of the number of public meetings should be made with regard to the number of affected persons, the type of project, and the desired outcome of the public input process.
- ⌚ Meetings should be held at appropriate times to allow a high number of people to attend. When choosing the meeting place, accessibility for pedestrians, bicyclists, and transit riders should be considered.
- ⌚ Sufficient drawings and description of the project should be made accessible to the public via the project website or other means, in order to allow the public to truly understand the project design and process.
  - 📄 Including, but not limited to: meeting notices, agendas, meeting notes, and comments.
- ⌚ Comments should be allowed via email, fax, and regular mail. If appropriate, it is encouraged to get public input via other means, such as porch chats.
- ⌚ Opportunities to comment and attend meetings should be well publicized.
- ⌚ The project sponsor should clearly address each comment and explain why or why not it is being accepted.
  - 📄 Public comments and responses to comments should be made available via website or other means.

## Section G: Stakeholders

Stakeholders should be involved during the early stages of the planning process and be made aware of all details so they can be a part of deciding key elements of the project. The following are examples of potential stakeholders:

- ⊗ Law enforcement
- ⊗ Advocates (bicycle, pedestrian, transit, individuals with disabilities)
- ⊗ Transit Authorities
- ⊗ Schools and libraries, if in vicinity to one
- ⊗ Local business associations
- ⊗ Area commissions and civic associations
- ⊗ Park representatives
- ⊗ Public Health
- ⊗ Representatives from major generators adjacent to or near project
- ⊗ Safe Routes to School committees

## Section H: Other Resources

Below are some sample resources. More resources are available online and as part of the MORPC toolkit.

### Policy Guidance

- ⊗ US DOT Policy Statement: “Design Guidance Accommodating Bicycle and Pedestrian Travel: A Recommended Approach” (<http://www.fhwa.dot.gov/environment/bikeped/design.htm>)
- ⊗ AASHTO Design Publications (listed at <http://design.transportation.org/?siteid=59&pageid=848>)
- ⊗ National Complete Streets Coalition (<http://www.completestreets.org>)
- ⊗ Road Diet Handbook: Setting Trends for Livable Streets (available in MORPC’s library)
- ⊗ ITE Recommended Practice (RP-036A): “Designing Walkable Urban Thoroughfares: A Context Sensitive Approach” 2010 (<http://www.ite.org/emodules/scriptcontent/Orders/ProductDetail.cfm?pc=RP-036A-E>)

### Pedestrian and Bike Information

- ⊗ The Pedestrian and Bicycle Information Center (PBIC) (<http://www.walkinginfo.org>)
- ⊗ Ohio Department of Transportation Bike and Pedestrian Plan (<http://www.dot.state.oh.us/Divisions/TransSysDev/MultiModalPlanning/bicycle/Pages/Default.aspx>)

### Safe Routes to School

- ⊗ National Center for Safe Routes to School (<http://www.saferoutesinfo.org/>)

## Appendix 1: Selected CS Design Information & Sample Cross-Sections

The following are sample Complete Streets cross-sections for rural, suburban, and urban roads. These are only examples and are not meant to be the only allowable Complete Streets you can build. These examples are offered to get you thinking and are not meant as prescriptions. More information will be provided in MORPC's Complete Streets toolkit, including crosswalks, turn lanes, transit shelters, and roundabouts. Design guidelines should always be followed during detailed engineering design of your roadway cross-section.

*Also note that education, enforcement, and encouragement play an important part in making these projects successful and should be included as part of any infrastructure project. Possible strategies and resources will be part of the toolkit.*

### Notes explaining the development of these cross-sections

- Every attempt was made to ensure the following example cross-sections **conformed to national and state standards**. For more notes on this, please see “*Notes on Sources for Design Standards*” for specific citations we used as we developed our examples.

#### Cross-section Examples in this document:

- 1 Rural 4-lane Road
  - 2 Rural 2-lane Road
  - 3 Suburban 5-lane Road (Without Parking)
  - 4 Suburban 5-lane Road (With Parking)
  - 5 Suburban 3-lane Road (Without Parking)
  - 6 Urban 4-lane Road (Without Parking)
  - 7 Urban 4-lane Road (With Parking)
  - 8 Urban 2-lane Road (Without Parking)
  - 9 Urban 2-lane Road (With Parking)
- There is a wide range of acceptable values to consider. Some of the different factors you would consider include design speed, truck traffic volumes, turning lane needs, drainage, maintenance, and type of landscaping and street tree canopy desired.
  - To determine the need for increased accommodations for bicyclists and pedestrians for your project, local or regional plans should be consulted. Particular attention should be paid to bicycle master plans and pedestrian master plans.
  - **ADA** compliance and accommodations are critical elements of designing Complete Streets. There are a wide variety of mobility types to consider, including ambulatory impairments, wheelchair and scooter users, walking-aid users, prosthesis users, hearing impairments, vision impairments, white cane users, dog guide users, and cognitive impairments. Please reference guides such as the AASHTO Pedestrian Guide<sup>1</sup>, the MUTCD, the ADA Accessibility Guidelines for Buildings and Facilities (ADAAG), and the Public Rights-of-Way Accessibility Guidelines (PROWAG) to ensure you properly accommodate these users.
  - Although **public transportation** accommodation is not specifically mentioned within most cross-section examples, we provided these examples with transit in mind. Also see “*Notes on Sources for Design Standards*”. Be sure to consult your local transit agency for local design standards.
  - A **traffic operations and capacity analysis** should be conducted to investigate the possibility of a road diet. A parking study should be conducted to investigate the need for 24-hour on-street parking. For more notes see “*Notes on Sources for Design Standards*”.
  - Bicyclists are legally allowed to use all roads, except for freeway interstates or highways where they are explicitly prohibited. The absence of bicycle facilities on a road does not mean that bicyclists will not use that road. In the following cross-sections, bicyclists may use any lane marked “Lane” (including center turn lanes), in addition to using Paved Shoulders, Multi-Use paths (MUPs), and Bike Lanes. For more on bicycle facilities, see “*Notes on Sources for Design Standards*”.

<sup>1</sup> AASHTO Guide for the Planning, Design, and Operation of Pedestrian Facilities. July 2004.

## Notes related to Transit, Sidewalk, and Other Items

*There are many factors to consider when designing or retrofitting your Complete Street.*

- Safety for all users should be kept at the forefront when designing Complete Streets.
- The minimum sidewalk width in the following cross-sections is at least 5 feet. We have chosen this because sidewalks narrower than 5 feet cannot accommodate two pedestrians walking side-by-side. Sidewalks that are 5 feet wide can accommodate pedestrians with large strollers as well as two wheelchair users side-by-side. AASTHO (p. 58) says the absolute minimum is 4 feet, but recommends a minimum of 5 feet.<sup>1</sup>
- Lighting, signs, poles, benches, and other utilities and street furniture should always be placed outside of the clear width of the sidewalk or bikeway. The clear width of a sidewalk is at least 5 feet, which doesn't mean that you can't build wider sidewalks. Wider sidewalks or lawn areas are always preferred.
- Curb and gutter sections may vary in width from the sample cross-sections. The suburban and urban samples used in this document always show a 2-foot curb and gutter section when there is no on-street parking.
- Larger-size passenger vehicles (such as SUVs), trucks, and transit buses (such as COTA buses) can use any lane that is at least 10 feet wide (see "*Notes on Sources for Design Standards*"). Turning radii, sight distance, and other design considerations will have to be considered during the detailed engineering phase of your roadway. Roads with intense transit use may require design consideration of wider outside lanes. High tractor-trailer traffic may also require design consideration of wider outside lanes.
- The rural cross-sections are intended to provide examples for roads in areas that will remain rural for the next 20-30 years. If the character of an area is predicted to become more suburban or urban within that timeframe (due to increased residential density or new commercial development, for example), then suburban or urban cross-section examples should be used for guidance instead. Consult regional or local planning documents to determine the predicted character of the area in 20-30 years.
- Whenever possible (after thorough traffic operation and capacity analysis), road diet techniques should be considered when retrofitting streets. Some streets may be safer and more US comfortable for all users when a road diet is put in place. Road diet techniques include converting some travel lanes to on-street parking and/or reducing the total number of travel lanes. Existing space is reallocated but the overall area remains the same. In some cases this may reduce the vehicular capacity. Note that FHWA has found that "under most ADT conditions tested, road diets have minimal effects on vehicle capacity, because left-turning vehicles are moved into a common two-way left-turn lane."<sup>2</sup> (Source: FHWA Report) When considering a road diet, a parking study may also be required.
- Design speeds need to be considered when designing the roadway. Lowering the design speed to match the posted speed should be considered where appropriate. A traffic operations and capacity analysis should be conducted to investigate the possibility of lowering the posted speed limit and/or the design speed. Reductions in speed limits must be based on the Ohio Revised Code or a speed study approved by the State.
- Narrowing lane widths should be considered where deemed appropriate by a traffic safety investigation, on low speed and/or lower traffic volume streets. Lanes that are overly wide encourage higher speeds by motor vehicles.
- Landscape features such as street trees should be considered where appropriate. Studies have found that this can visually narrow the roadway, which helps to discourage excessive speeds by motor vehicles. When planting trees in urban or suburban settings, ensure the lawn width is at least 7 feet to minimize damage to sidewalk/pavement by tree roots. Trees should not be placed within the clear zone on higher speed streets or highways.
- When considering street trees, take note of the following factors: site design details, root volume requirements, overhead spatial needs, tree selection, and tree planting. These critical factors will affect tree health and safety, surrounding infrastructure, and motorists, cyclists, and pedestrians. Some special types of trees may not require a 7 foot lawn width.
- National Highway System (NHS) connectors were established in 1982. These roadways are required to have at least one 12-foot lane in each direction in order to accommodate trucks. Example roads include US 40, US 23, or US 33. The following cross-sections assume that the roadways are not part of the NHS. Additional consideration will have to be made if the road is a NHS connector or if tractor-trailers will be regularly using the road.

---

<sup>2</sup> FHWA-HRT-04-082. "Summary Report: Evaluation of Lane Reduction "Road Diet" Measures and Their Effects on Crashes and Injuries.": <http://www.tfsrc.gov/safety/hsis/pubs/04082/>

## Notes related to Bicycle Facilities

*No one type of bicycle facility suits every bicyclist and no designated bicycle facility can overcome a lack of bicycle operator skill.*

- It is generally assumed that bicyclists will not be riding on sidewalks, except for young children. Many communities, including the City of Columbus, prohibit bicycling on sidewalks because of safety concern. Bicyclists are legally allowed to ride in vehicular travel lanes, and motorists must share the road with them. Bicyclists can also ride on paved shoulders and shared-use paths.
- 2009 Federal MUTCD guidance states that SLMs (sharrows) should not be placed on roads with speed limits above 35 mph. There are no speed limit restrictions for providing bicycle lanes.
- When a bicycle lane is built on a street with curb and gutter, debris and water tend to accumulate in the gutter pan. Drain inlets may also be located in the gutter pan and may be hazardous to bicyclists. The cross-sections assume that the gutter pan is not included as part of the bicycle lane width.
- 2009 Federal MUTCD ([http://mutcd.fhwa.dot.gov/pdfs/2009/pdf\\_index.htm](http://mutcd.fhwa.dot.gov/pdfs/2009/pdf_index.htm)) includes a “Bikes May Use Full Lane” sign as a regulatory sign for bicycle facilities. The section on “Bicycles May Use Full Lane” signage is on p. 794 and the sign is illustrated on p.793 in Figure 9B-2. The sign is already in use in some locations in Ohio (for example, in the village of Yellow Springs). Furthermore, this sign is not in conflict with Ohio Revised Code 4511.55. The Code states that bicyclists should “ride as near to the right side of the roadway as practicable.” It also states that it “does not require a person operating a bicycle to ride at the edge of the roadway when it is unreasonable or unsafe to do so.” The “Share the Road” sign is included as a warning sign for bike facilities. Note that the Ohio MUTCD will be updated over the next few years to match the MUTCD, but it does not currently include the “Bikes May Use Full Lane” sign.
- There should be a minimum 4 feet of space between the outer edge of the rumble strip and the outside edge of the paved shoulder. This gives the bicyclists a minimum of 4 feet of space. Gaps should be provided in the rumble strip pattern ahead of intersections to permit bicyclists to merge with traffic and to make left turns.
- At bus stop locations, the bike lane should be marked with a broken line. Bike lane markings (such as at intersections) should follow the recommendations of the AASHTO Bicycle Guide.
- Use care when designing bike lanes in areas with frequent curb cuts and driveways. The same is true for Multi-Use Paths (MUPs). What constitutes “frequent curb cuts” is left to engineering judgment and decisions should be made based on the context of the project area. When designing MUPs and bicycle lanes, special care must be taken at intersections. For more information, see “Notes on Sources for Design Standards”.
- FHWA uses three general categories for bicycle users. B for “Basic or less confident adult riders [who] prefer to avoid roads with fast and busy motor vehicle traffic unless there is ample roadway width to allow easy overtaking by faster motor vehicles. Thus, basic riders are comfortable riding on neighborhood streets and shared use paths and prefer designated facilities such as bike lanes or wide shoulder lanes on busier streets.”<sup>3</sup> (Source: AASHTO Bicycle Guide.) However, note that “Bike lanes can create a false sense of security for inexperienced bicyclists, causing them to give lessened attention to the constantly changing traffic around them.”<sup>4</sup> (Source: ODOT Roadway Based Bicycle Facilities Guide)
- Providing a bike lane does not preclude the use of signage such as “Bikes May Use Full Lane.” Bicycles may use any lane, even if a bike lane is provided. Even those users who feel most comfortable in a bike lane may have to leave the bike lane to reach their destination.
- “Bikes May Use Full Lane” signage is not only instructional to bicyclists, but can help to educate motorists. However, this is not the only education that should be undertaken as part of a Complete Street. More information on education for motorists and bicyclists will be included in the MORPC Complete Streets toolkit.
- The typical bicycle operating space is 40 inches of width. This means that the pavement markings for bicycle wheels should be 20 inches away from the furthest handlebar edge.
- There are “non-typical” bicyclists that may have different considerations. These include recumbent bicycles, tandem bicycles, bicycles carrying trailers, adult tricycles, and long-tail bicycles (such as Xtracycle). The operating space for these bicycles may not match that of the typical bicycle.

---

<sup>3</sup> Page 6 of the AASHTO Bicycle Guide. “Guide for the Development of Bicycle Facilities.” Chapter 1, Planning. 1999.

<sup>4</sup> ODOT Independent Bicycle Facilities Guide. “ODOT Design Guidance for Independent Bicycle Facilities.” Section V. Frequently Asked Questions. October 2005.

## On-street Parking Considerations

- The sample cross-sections assume that the parking lane is a 24-hour parking lane and will not be used for through-travel.
- The sample cross-sections use a standard 8-foot parking lane, which includes the gutter pan but does not include a 0.5-foot curb width.
- When providing on-street parking, the parking lanes should be marked. This encourages motorists to park closer to the curb and discourages motorists from using the parking lane as a travel lane. Additionally, signage can be used to inform motorists.
- The area next to parked cars can be hazardous to bicyclists. There are two injuries possible: they can collide with an opening car door or they can move unexpectedly into the next lane, colliding with a moving vehicle. (The word “move” includes the following: the bicyclist may be pushed by the door, they may fall after the collision, or they may instinctively swerve to avoid the open door.) Bicycle lanes next to parked cars should not be marked in the door zone.
- Based on preliminary research (see footnote 26), it is recommended that a 5-foot door zone buffer be provided. Given a 5-foot door zone buffer next to an 8-foot parking lane, the recommended distance between the outside edge of a bicycle and the curb is a minimum of 13 feet. This is true whether a bike lane is provided or not.
- If there is no bike lane next to parked cars, shared lane markings should be used to indicate where bicyclists can travel safely outside of the door zone. Depending on the width of the travel lane, the sharrow may be placed in the center of the travel lane. This is an acceptable placement for sharrows.
- When sharrows are used next to parked cars, use the following guideline: The middle of the sharrow indicates where the bicycle wheel should travel. The bicycle’s outside edge (handlebars) should be at least 13 feet from the curb, then the sharrows need to be placed at least 14 feet 8 inches from the curb (13 feet + 20 inches = 14 feet 8 inches). This ensures that the handlebars of the bicycle will clear the opening car door safely while traveling in a straight line. Depending on the width of the travel lane, the sharrow may be placed in the center of the travel lane. This is an acceptable placement for sharrows.

## Notes on Sources for Design Standards

Every attempt was made to ensure that the following example cross-sections conformed to national and state standards, such as MUTCD, AASHTO, or ODOT's L&D Manual. Detailed engineering work is necessary when designing a roadway. Assumptions that were made when developing the cross-sections have been noted.

While AASHTO and other guidance provide minimum values that must be adhered to, it is possible to provide more accommodation than the minimum.

The following citations may help you further understand the sample cross-sections provided to you.

### Urban and Suburban Lane Widths

- "Studies have increasingly validated the ability to safely use lanes narrower than 12 ft. lanes on roadways. As noted in a paper on suburban and urban arterials at the 2007 TRB conference, "There is no indication that the use of 10- or 11-ft. lanes rather than 12-ft. lanes for arterial midblock segments leads to increases in accident frequency." A similar conclusion was reached for lane widths at intersections."<sup>5</sup> (Source: Smart Transportation Guidebook)
- Urban lane widths vary from 10 feet to 12 feet. For arterial streets, 12-foot widths are required for roads with 50 mph or more. 11-foot widths are permitted (minimum) on roads less than 50 mph. For collector streets 11-foot widths are permitted (minimum) in commercial/industrial areas.<sup>6</sup> (Source: ODOT L&D Manual)

### Rural Lane Widths

- Rural Lane Widths vary from 9 feet to 12 feet. For arterial roads 11 feet and 12 feet widths should be used, depending on the design speed and Design Year ADT.<sup>7</sup> (Source: ODOT L&D Manual)
- For a road with over 2,000 ADT, the required minimums are 12 feet and paved shoulders are 8 feet.<sup>8</sup> (Source: AASHTO Green Book)

### Rural Rumble Strips

- "If rumble strips are installed, there should be a minimum 4 feet of space between the outer edge of the rumble strip and the outside edge of the paved shoulder, to accommodate cyclists."<sup>9</sup> (Source: AASHTO Bicycle Guide)
- "Rumble strips affect control of the bike, and are dangerous. The ODOT Policy on the Use of Rumble Strips on Shoulders (Policy Number 322-011(P)) states that "Rumble strips generally should not be used on the shoulders of roadways designated as bicycle routes or having substantial volumes of bicycle traffic, unless the shoulder is wide enough to accommodate rumble strips and still provide at least 3.25 ft. for bicyclists. Also, gaps should be provided in the rumble strip pattern ahead of intersections where bicyclists are likely to make left turns and to permit bicyclists to merge with traffic."<sup>10</sup> (Source: ODOT Roadway Based Bicycle Facilities Guide)
- Based on the AASHTO Bicycle Guide, a minimum of 4 feet of space should be provided when rural rumble strips are installed.

### Rural Paved Shoulders

- Based on AASHTO's and ODOT's L&D Manual, the width of paved shoulders can vary between 4 and 8 feet, depending on speed, traffic volume, and other characteristics.
- The width of rural paved shoulders should be considered when providing appropriate accommodations for pedestrians and bicyclists. A 4-foot paved shoulder is a suggested minimum.

<sup>5</sup> Page 46 of the Smart Transportation Guidebook. Chapter 7, Roadway Guidelines. March 2008. <http://www.smart-transportation.com/assets/download/Smart%20Transportation%20Guidebook.pdf> Accessed Feb 2010.

<sup>6</sup> Page 27 of the ODOT L&D Manual. Vol. 1 Roadway Design. October 2009 revision.

<sup>7</sup> Page 24 of the ODOT L&D Manual. Vol. 1 Roadway Design. October 2009 revision.

<sup>8</sup> Page 448 of the AASHTO Green Book. Chapter 7, Rural and Urban Arterials. 2004.

<sup>9</sup> Page 24 of the AASHTO Bicycle Guide. "Guide for the Development of Bicycle Facilities." Chapter 2, Design. 1999.

<sup>10</sup> ODOT Roadway Based Bicycle Facilities Guide. "ODOT Design Guidance for Roadway-Based Bicycle Facilities." Section III. Accommodating Bicyclists on Roadways. October 2005.

### Parallel Parking Lane Widths

- For urban arterials parallel parking lane widths vary. If the parking lane is not a through lane, then 8 feet may be acceptable.<sup>11</sup> (Source: AASHTO Green Book). For urban areas, the recommended parallel parking lane widths in commercial areas is 8 feet.<sup>12</sup> (Source: ITE RP-036A)

### Multi-Use Paths / Shared Use Paths

- Shared use paths are facilities on exclusive right-of-way and with minimal cross flow by motor vehicles. Users are non-motorized and may include but are not limited to: bicyclists, in-line skaters, roller skaters, wheelchair users (both non-motorized and motorized) and pedestrians, including walkers, runners, people with baby strollers, people walking dogs, etc. These facilities are commonly designed for two-way travel.<sup>13</sup> (Source: AASHTO Bicycle Guide)
- A recommended width for a two-directional shared use path is 10 feet. The MUP has a 2-foot graded area on each side. "It may be necessary or desirable to increase the width of a shared use path to 12 feet or even 14 feet due to substantial use by bicyclists, joggers, skaters, and pedestrians."<sup>14</sup> (Source: AASHTO Bicycle Guide)
- "The standard width of an independent shared-use path in Ohio is 10 feet plus two-foot shoulders and three-foot clearance per side."<sup>15</sup> (Source: ODOT Independent Bicycle Facilities Guide)
- "It is unacceptable to build two 5-foot-wide paths (sidewalks, actually) on each side of the street, as each path will be used for two-way travel regardless of the intent. All paths are to be 10-foot-wide and designed for two-way-travel."<sup>16</sup> (Source: ODOT Independent Bicycle Facilities Guide)
- An MUP width of at least 10 feet, with a 2-foot graded area on each side, is a suggested minimum.

### Bike Lane Widths

- The minimum recommended width of a bike lane is 5 feet, which should be located outside the door zone. The door zone [...] is the area that is the width of the car door when the door is open.<sup>17</sup> (Source: MORPC Breaking Barriers to Bicycling Report)
- "The City of Chicago does not stripe a bike lane less than five feet in width. However, the AASHTO Guide and some agencies will stripe bike lanes as narrow as four feet wide in certain situations. If you propose to use a four foot bike lane, make sure that the four feet does not include a joint with the gutter pan, or that drainage gates take up some of the width."<sup>18</sup> (Source: The Chicago Bike Lane Design Guide)
- The recommended practice for walkable urban thoroughfares (with no on-street parking) is that a minimum width of 5 feet be used for bike lanes. The recommended width is 6 feet.<sup>19</sup> (Source: ITE RP-036A)
- "The recommended width of a bike lane is 5 feet from the face of a curb or guardrail to the bike lane stripe. This [...] should be sufficient in cases where a 1-2 foot wide concrete gutter pan exists, given that a minimum of 3 feet of rideable surface is provided, and the longitudinal joint between the gutter pan and pavement surface is smooth. The width of the gutter pan should not be included in the measurement of the rideable or usable surface, with the possible exception of those communities that use an extra wide, smoothly paved gutter pan that is 4 feet wide as a bike lane. If the joint is not smooth, 4 feet of rideable surface should be provided."<sup>20</sup> (Source: AASHTO Bicycle Guide)

---

<sup>11</sup> Page 478 of the AASHTO Green Book. Chapter 7, Rural and Urban Arterials. 2004.

<sup>12</sup> Page 147 of the ITE Recommended Practice 036. Context Sensitive Solutions in Designing Major Urban Thoroughfares for Walkable Communities. Chapter 9. Traveled Way Design Guidelines. 2010.

<sup>13</sup> Page 33 of the AASHTO Bicycle Guide. "Guide for the Development of Bicycle Facilities." Chapter 2, Design. 1999.

<sup>14</sup> Page 35-36 of the AASHTO Bicycle Guide. "Guide for the Development of Bicycle Facilities." Chapter 2, Design. 1999.

<sup>15</sup> ODOT Independent Bicycle Facilities Guide. "ODOT Design Guidance for Independent Bicycle Facilities." Section IV. Supplemental Design Considerations. October 2005.

<sup>16</sup> ODOT Independent Bicycle Facilities Guide. "ODOT Design Guidance for Independent Bicycle Facilities." Section VII. Frequently Asked Questions. October 2005.

<sup>17</sup> Page 12 of MORPC Breaking Barriers to Bicycling: Bicycle Lanes Best Practices and Pilot Treatments. October 2005.

<sup>18</sup> Page 5 of The Chicago Bike Lane Design Guide. "Bike Lane Design Guide." October 2002 revision.

<sup>19</sup> Page 145 of the ITE Recommended Practice 036. Context Sensitive Solutions in Designing Major Urban Thoroughfares for Walkable Communities. Chapter 9. Traveled Way Design Guidelines. 2010.

<sup>20</sup> Page 23 of the AASHTO Bicycle Guide. "Guide for the Development of Bicycle Facilities." Chapter 2, Design. 1999.

### Bike Lanes and MUPs in areas with Frequent Curb Cuts or Driveways

- “Shoulder bike lanes work best where intersections and turning traffic is infrequent.”<sup>21</sup> (Source: ODOT Roadway Based Bicycle Facilities Guide). “Intersection placement and details require the most forethought when planning a new path. Crashes or close calls happen at intersections when the bicyclist on the path and the motorist on the roadway are thinking unconsciously that they don’t have to worry about each other because they are on separate facilities.”<sup>22</sup> (Source: ODOT Independent Bicycle Facilities Guide).
- “[Bike lane] marking discourages motorists from crossing into that portion of the road. Bike lanes can be ideal along stretches of roadway where there are few intersections and where speed differences between motorists and bicyclists are notable. [...] Bike lanes require a high level of attention in campus or shopping areas where there are frequent crossovers, turning movements, and/or complicated intersections.”<sup>23</sup> (Source: ODOT Roadway Based Bicycle Facilities Guide)
- Most bicycle/auto crashes occur at intersections including driveways, parking lots, and alleys.<sup>24</sup> (Source: MORPC Breaking Barriers to Bicycling Report)
- Use care when designing bike lanes or MUPs where there are frequent curb cuts and driveways. What constitutes a “frequent curb cut” should be left to engineering judgment.

### Buses and Lane Widths

- The maximum width of a COTA bus is 8.5 feet.<sup>25</sup> (Source: COTA Guidelines)
- The preferred lane width for a COTA bus is 12 feet.<sup>25</sup> (Source: COTA Guidelines). Current COTA bus routes regularly include roadways that are 10 feet wide.

### Bike Lanes and the Door Zone

- Well designed bike lanes can enhance the comfort level of some bicyclists, and are a useful tool when building Complete Streets, but they need to be properly designed. The door zone is a well-recognized problem, but the definition of the width of the door zone has varied.
- A passenger vehicle properly parked with its door open occupies approximately 10 feet of space from the curb face.<sup>26</sup> (Source: AASHTO and Door Zone Bike Lanes report by Pein) This number may vary by model of car, since different models have different size doors. Not all passenger vehicles are properly parked flush to the curb. Additionally, extra clearance is needed, so that bicycles can safely and comfortably pass an open door without leaving the bike lane.
- “Typical bicycling education programs... have long instructed bicyclists to ride more than a door’s width from parked cars. Bicyclists should be instructed and lead to track a minimum of 5 feet from the side of parked vehicles to provide minimal clearance from potentially opening doors; additional clearance is desirable, particularly as bicyclist speed increases.”<sup>26</sup> (Source: AASHTO and Door Zone Bike Lanes report by Pein)
- “Bicycle [riders] should expect an obstacle-free travel way, as do motor vehicle operators. Bike Lanes that invite and constrain bicyclists to ride in the Door Zone create an unacceptable hazard with a potentially suddenly-appearing fixed object.”<sup>26</sup> (Source: AASHTO and Door Zone Bike Lanes report by Pein)
- “Bicycle tires should track a minimum of 5 ft. from the parking line.”<sup>27</sup> (Source: Bicycling and On-Street Parallel Parking report by Pein)

---

<sup>21</sup> ODOT Roadway Based Bicycle Facilities Guide. “ODOT Design Guidance for Roadway-Based Bicycle Facilities.” Section II. Types of Roadway-Based Bicycle Facilities. October 2005.

<sup>22</sup> ODOT Independent Bicycle Facilities Guide. “ODOT Design Guidance for Independent Bicycle Facilities.” Section IV. Supplemental Design Considerations. October 2005.

<sup>23</sup> ODOT Roadway Based Bicycle Facilities Guide. “ODOT Design Guidance for Roadway-Based Bicycle Facilities.” Section V. Frequently Asked Questions. October 2005.

<sup>24</sup> Page 6 of MORPC Breaking Barriers to Bicycling: Bicycle Lanes Best Practices and Pilot Treatments. October 2005.

<sup>25</sup> Page III-4 and IV-1 of COTA Guidelines. “Planning and Development Guidelines For Public Transit.” February 1999.

<sup>26</sup> AASHTO and Door Zone Bike Lanes report. By Wayne Pein. May 2004  
[http://www.humantransport.org/bicycledriving/library/AASHTO\\_DZBL.pdf](http://www.humantransport.org/bicycledriving/library/AASHTO_DZBL.pdf) Accessed Feb 2010.

<sup>27</sup> Bicycling and On-Street Parallel Parking. By Wayne Pein. Revised December 2003.  
[http://www.humantransport.org/bicycledriving/library/door\\_zone.pdf](http://www.humantransport.org/bicycledriving/library/door_zone.pdf) Accessed Feb 2010.

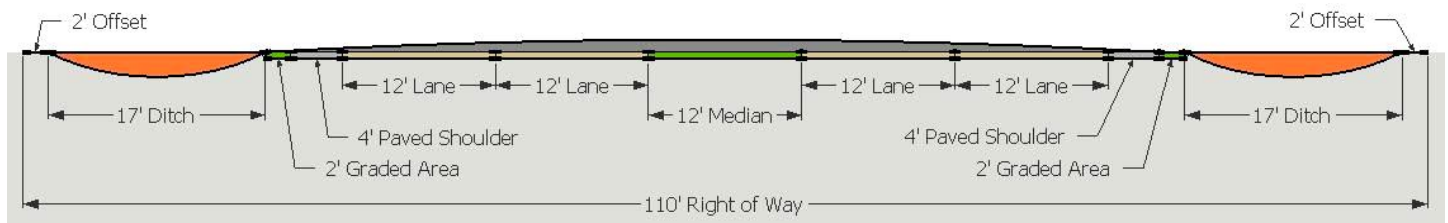
## Selected Cross-Section Examples for Complete Streets

*The examples below are not intended to be prescriptive or to preclude other types of design. They are merely examples and actual road design will vary depending on the individual context.*

### Example 1– Rural 4-Lane Road

#### Recommended Minimum Accommodation Example

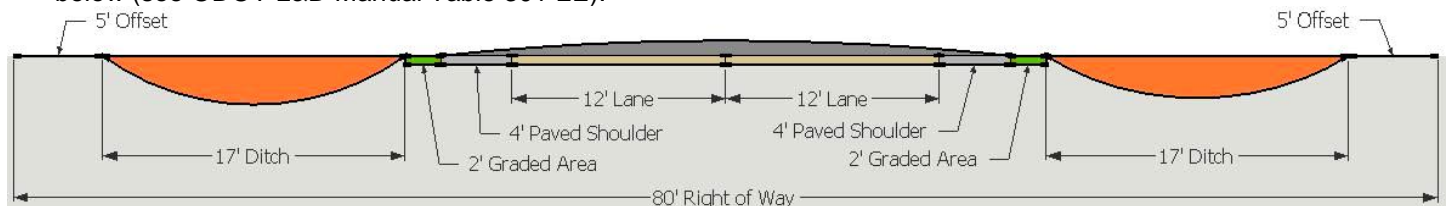
- ▶ Rural road designs should be used in areas that are expected to remain rural for the next 20-30 years.
- ▶ Shoulder width and general road configuration is dependent on the traffic volume of each road.
- ▶ A multi-use path may be built for additional accommodation (see Example 2)



### Example 2 for Complete Streets – Rural 2-Lane Road

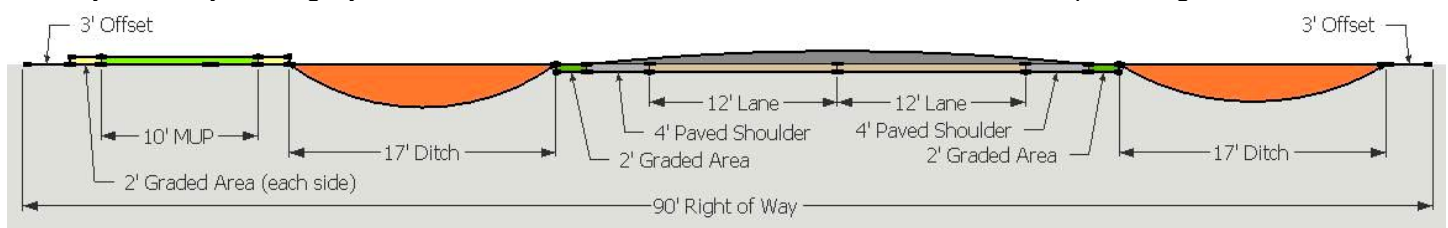
#### Recommended Minimum Accommodation Example

- ▶ Rural road designs should be used in areas that are expected to remain rural for the next 20-30 years.
- ▶ As per the ODOT L&D Manual (Table 301-3E), minimum shoulder width is 4 feet. Minimum shoulder width is 8 feet for roads with both > 1500 ADT and  $\geq 50$  mph design speed.
- ▶ As per the ODOT L&D Manual (Table 301-2E), lane width may be reduced to 11 feet for roads with both < 2000 ADT and design speed of  $\leq 45$  mph.
- ▶ Some roads with combinations of low design speed and low ADT may have lane widths further reduced to 10 feet or below (see ODOT L&D Manual Table 301-2E).



#### Multi-Use Path Option - Example

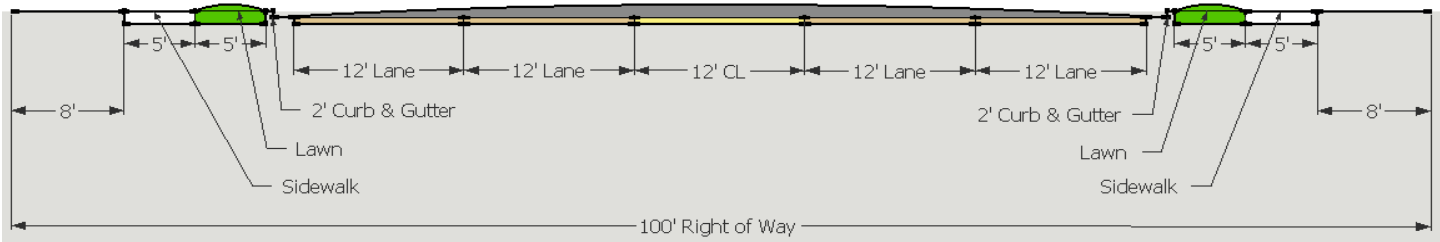
- ▶ The cross-section below shows a rural road with a parallel multi-use path to accommodate additional pedestrian and bicycle traffic. Pedestrians and bicyclists may still legally use the shoulder. Bicyclists may also use the travel lanes.
- ▶ A multi-use path (MUP) may be built parallel to the road to accommodate additional bicycle and pedestrian traffic. Bicyclists may also legally use the travel lanes. The recommended MUP width is 10 ft, plus 2 ft graded shoulders.



### Example 3 for Complete Streets – Suburban 5-Lane Road (Without On-Street Parking)

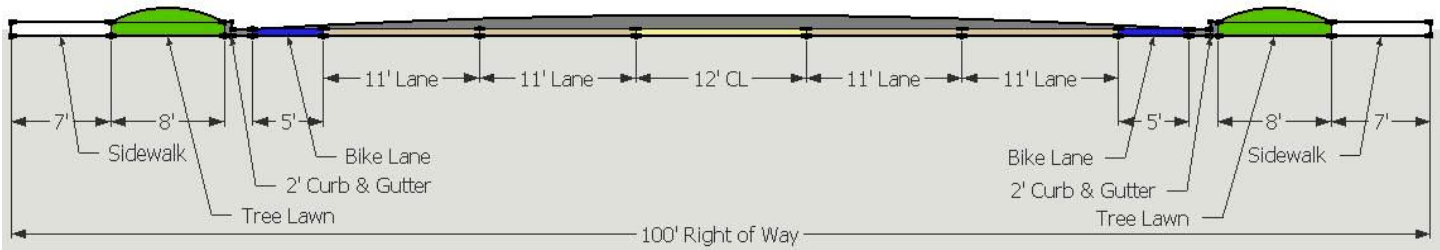
#### Recommended Minimum Accommodations

- ▶ As per the ODOT L&D Manual (Table 306-1E), sidewalks should be provided wherever there are 1 or more residences per acre.
- ▶ Bicyclists can use the travel lanes.
- ▶ Shared lane markings (sharrows) can be used if the design speed is 35 mph or less. At speeds above 35 mph, bicycle lanes are recommended.
- ▶ Drainage is provided by curb and gutter.



#### Example for providing additional accommodation

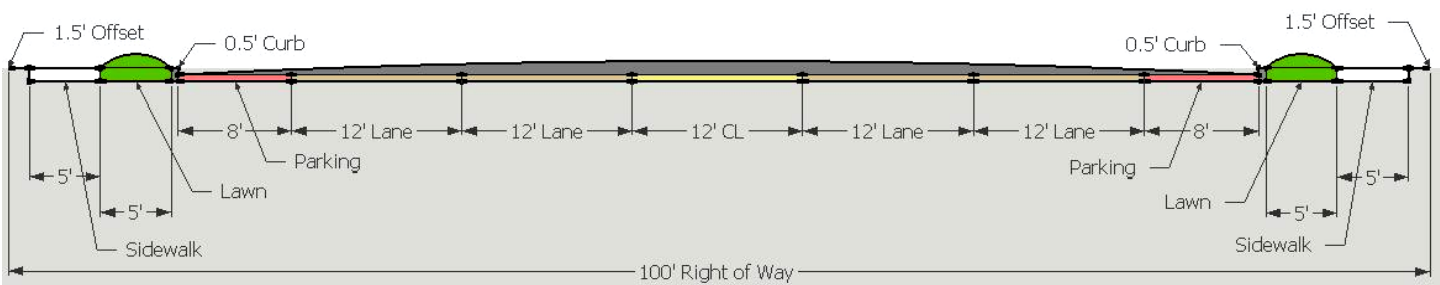
- ▶ In this example, lanes are narrowed to 11 feet (permitted for local, collector, and arterial streets with < 50 mph design speed, as per ODOT L&D Manual Table 301-4E) and bicycle lanes are added.



### Example 4 for Complete Streets – Suburban 5-Lane Road (With On-Street Parking)

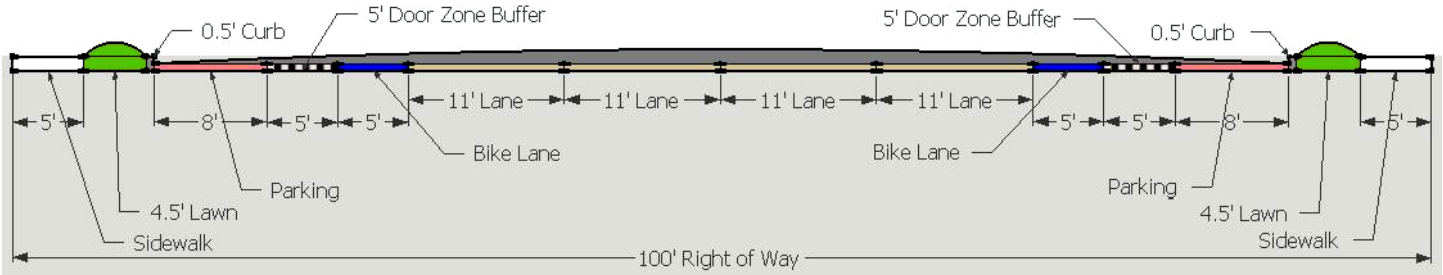
#### Recommended Minimum Accommodations

- ▶ As per the ODOT L&D Manual (Table 306-1E), sidewalks should be provided wherever there are 1 or more residences per acre.
- ▶ Bicyclists can use the travel lanes. Shared lane markings (sharrows) can be used if the design speed is 35 mph or less. At speeds above 35 mph, bicycle lanes are recommended. Bicycle lanes and sharrows should not be placed in the door zone.
- ▶ Drainage is provided by curb and gutter.



## Road Diet - Example

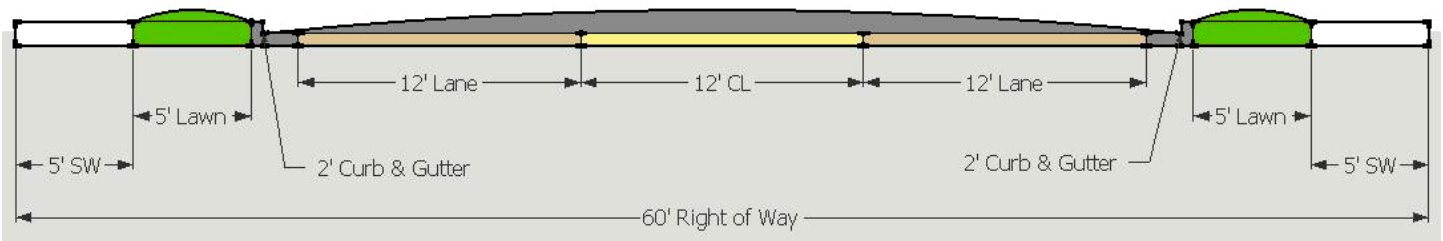
- ▶ In this example, the center turn lane has been removed and travel lanes have been narrowed to 11 feet (permitted for streets with lower design speed, as per ODOT L&D Manual Table 301-4E).
- ▶ This street design is appropriate for a suburban area with higher existing or expected volumes of pedestrian and bicycle traffic. A detailed traffic operation and capacity analysis has indicated that the center turn lane can be removed, and a parking study has shown that the existing on-street parking is still needed.
- ▶ Bicycle lanes should not be placed in the door zone. The door zone must be marked and signed so that motorists and bicyclists understand that it is not a travel lane.



## Example 5 for Complete Streets – Suburban 3-Lane Road (Without On-Street Parking)

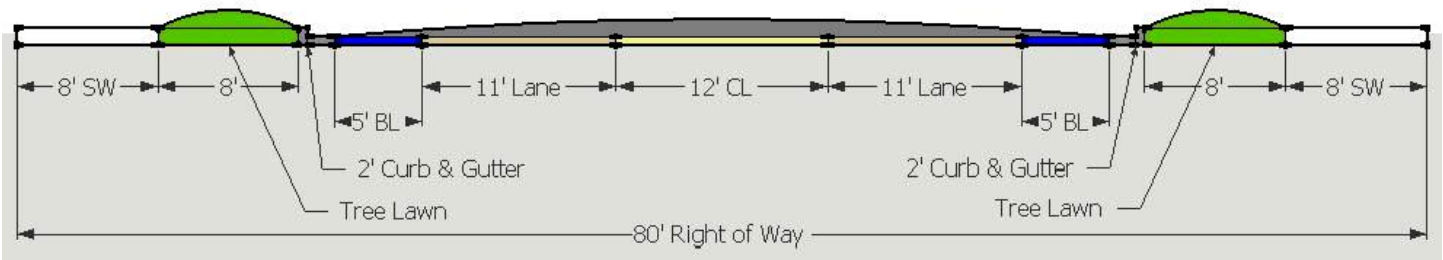
### Recommended Minimum Accommodations

- ▶ As per the ODOT L&D Manual (Table 306-1E), sidewalks should be provided wherever there are 1 or more residences per acre.
- ▶ Bicyclists can use the travel lanes.
- ▶ Shared lane markings (sharrows) can be used if the design speed is 35 mph or less. At speeds above 35 mph, bicycle lanes are recommended.
- ▶ Drainage is provided by curb and gutter.



### Example for providing additional accommodation

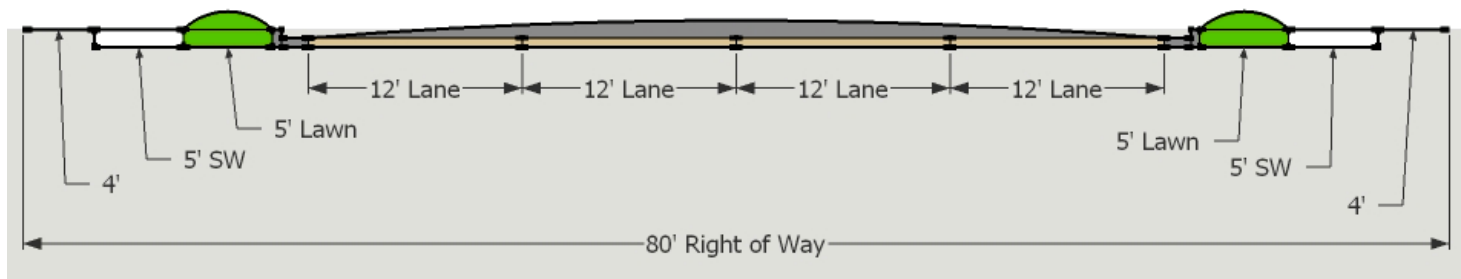
- ▶ In this example, sidewalks have been widened, bicycle lanes have been added, and travel lanes have been narrowed to 11 feet (permitted for streets with lower design speed, as per ODOT L&D Manual Table 301-4E).
- ▶ Lawns have been widened to 8 feet, allowing space for proper growth of street trees.



## Example 6 for Complete Streets – Urban 4-Lane Road (Without On-Street Parking)

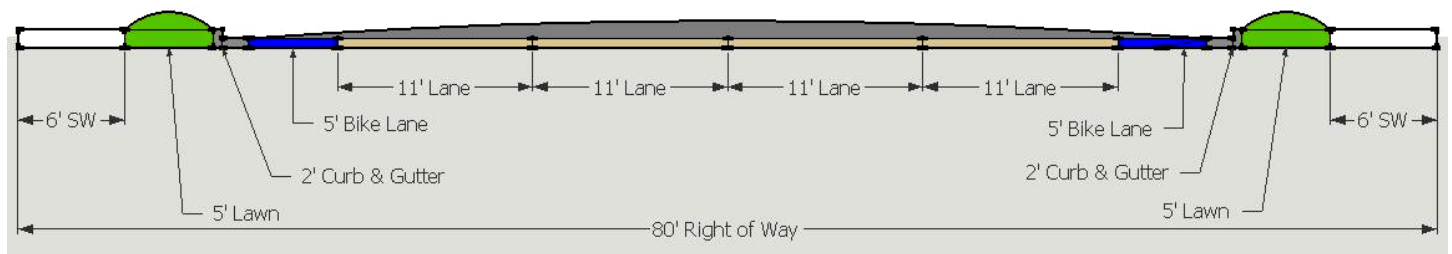
### Recommended Minimum Accommodations

- ▶ As per the ODOT L&D Manual (Table 306-1E), sidewalks should be provided wherever there are 1 or more residences per acre.
- ▶ Bicyclists can use the travel lanes.
- ▶ Shared lane markings (sharrows) can be used if the design speed is 35 mph or less. At speeds above 35 mph, bicycle lanes are recommended.
- ▶ Drainage is provided by curb and gutter.



### Example for providing additional accommodation

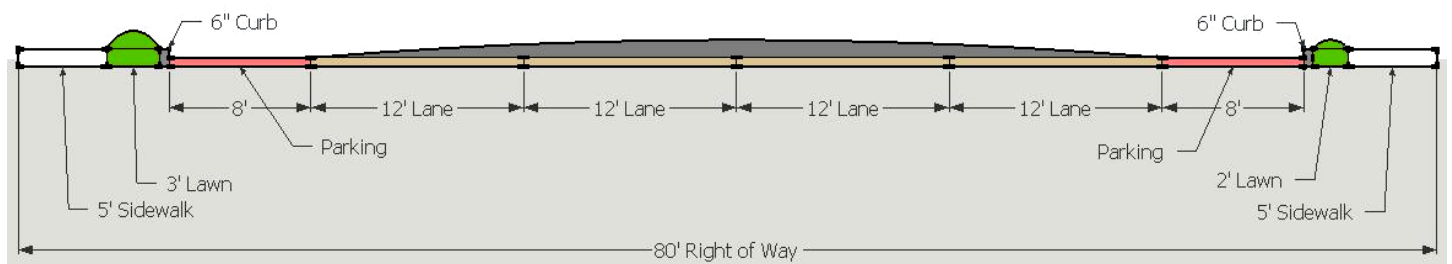
- ▶ In this example, bicycle lanes have been added and travel lanes have been narrowed to 11 feet (permitted for streets with lower design speed, as per ODOT L&D Manual Table 301-4E).



## Example 7 for Complete Streets – Urban 4-Lane Road (With On-Street Parking)

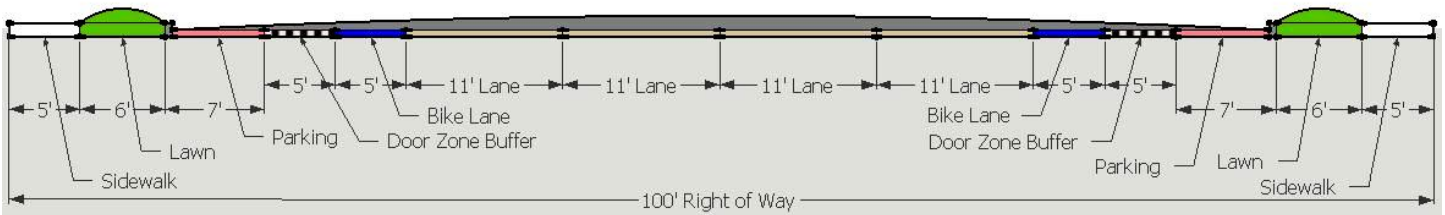
### Recommended Minimum Accommodations

- ▶ As per the ODOT L&D Manual (Table 306-1E), sidewalks should be provided wherever there are 1 or more residences per acre.
- ▶ Bicyclists can use the travel lanes.
- ▶ Shared lane markings (sharrows) can be used if the design speed is 35 mph or less. At speeds above 35 mph, bicycle lanes are recommended.
- ▶ Drainage is provided by curb and gutter.



### Example for providing additional accommodation

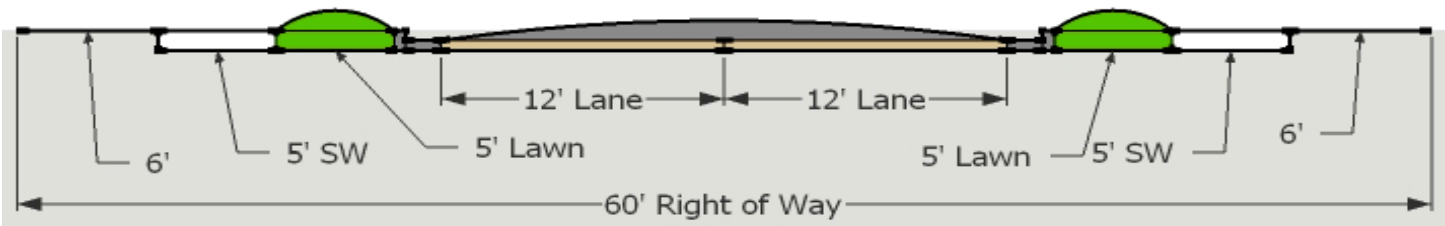
- ▶ The cross-section below shows a street design that is appropriate for an urban area with higher volumes of pedestrian and bicycle traffic (existing or expected). Bicycle lanes have been added. Travel lanes have been narrowed to 11 feet (permitted for streets with lower design speed, as per ODOT L&D Manual Table 301-4E).
- ▶ Bicycle lanes should not be placed in the door zone. The door zone must be marked and signed so that motorists and bicyclists understand that it is not a travel lane.



### Example 8 for Complete Streets – Urban 2-Lane Road (Without Parking)

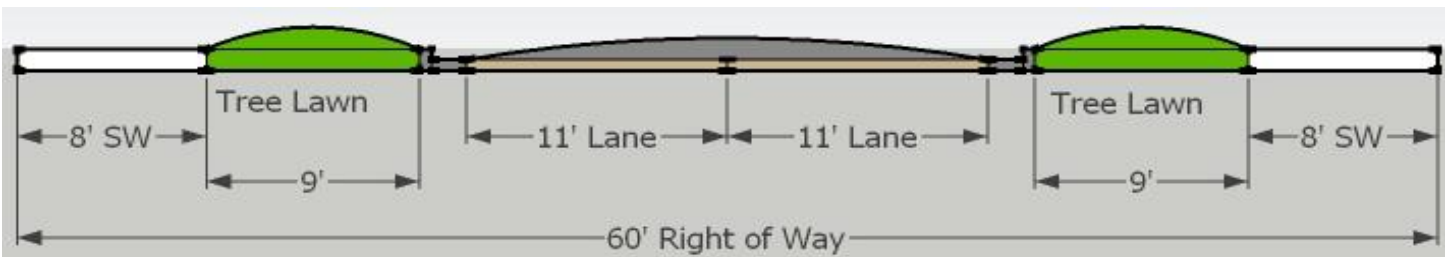
#### Recommended Minimum Accommodations

- ▶ As per the ODOT L&D Manual (Table 306-1E), sidewalks should be provided wherever there are 1 or more residences per acre.
- ▶ Bicyclists can use the travel lanes.
- ▶ Shared lane markings (sharrows) can be used if the design speed is 35 mph or less. At speeds above 35 mph, bicycle lanes are recommended.
- ▶ Drainage is provided by curb and gutter.



### Example for providing additional accommodation

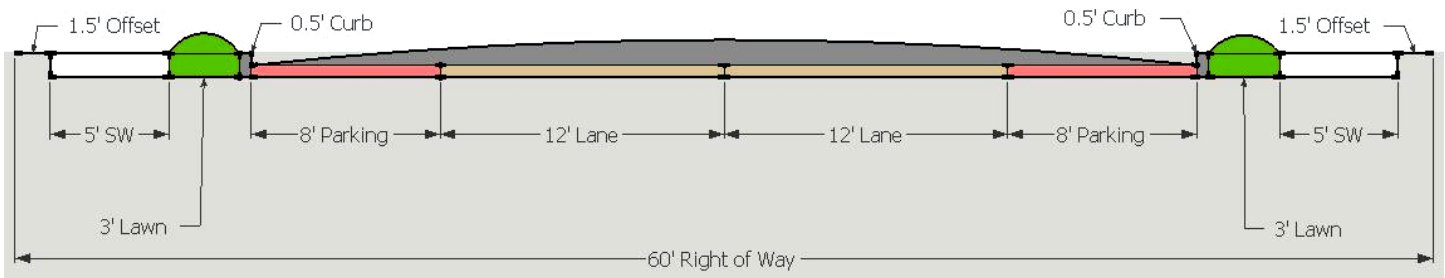
- ▶ In this example, sidewalks have been widened, lawns have been widened to allow space for street trees, and travel lanes have been narrowed to 11 feet (permitted for streets with lower design speed, as per ODOT L&D Manual Table 301-4E).
- ▶ Shared lane markings (sharrows) and/or “Bicycles May Use Full Lane” signage should be installed.



## Example 9 for Complete Streets – Urban 2-Lane Road (With Parking)

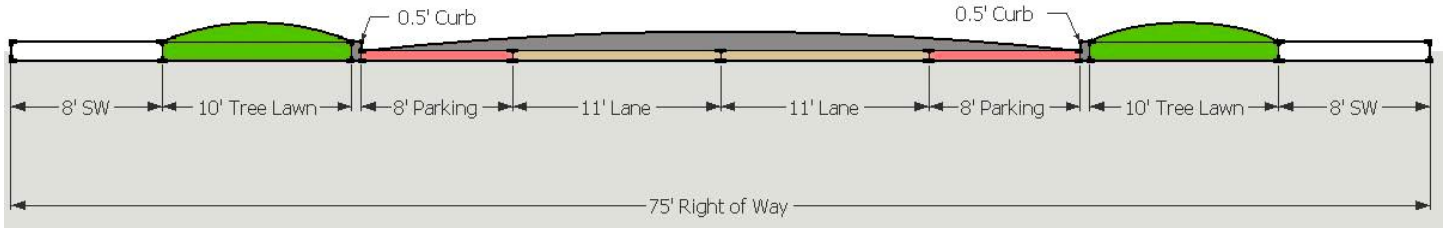
### Recommended Minimum Accommodations

- ▶ As per the ODOT L&D Manual (Table 306-1E), sidewalks should be provided wherever there are 1 or more residences per acre.
- ▶ Bicyclists can use the travel lanes.
- ▶ Shared lane markings (sharrows) can be used if the design speed is 35 mph or less. At speeds above 35 mph, bicycle lanes are recommended.
- ▶ Drainage is provided by curb and gutter.



### Example for providing additional accommodation

- ▶ In this example, sidewalks have been widened, lawns have been widened to allow space for street trees, and travel lanes have been narrowed to 11 feet (permitted for streets with lower design speed, as per ODOT L&D Manual Table 301-4E).
- ▶ Shared lane markings (sharrows) and/or “Bicycles May Use Full Lane” signage should be installed. Sharrows should be placed to guide bicyclists to ride outside the door zone.



## Appendix 2: Glossary / Abbreviations

AASHTO	American Association of State Highway and Transportation Officials
ADA	Americans with Disabilities Act
ADAAG	ADA Accessibility Guidelines for Buildings and Facilities
ADT	Average Daily Traffic
BL	Bike Lane
CL	Center Lane, also known as a “Two Way Left Turn Lane” (TWLTL)
COTA	Central Ohio Transit Authority
CS	Complete Streets
FHWA	Federal Highway Administration
ITE	Institute of Transportation Engineers
L&D Manual	Location & Design Manual
LPA	Local Public Agency
MUP	Multi-Use Path (typically bicyclists and pedestrians)
MUTCD	Manual of Uniform Traffic Control Devices
NHS	National Highway System
ODOT	Ohio Department of Transportation
PROWAG	Public Rights-of-Way Accessibility Guidelines
PS	Paved Shoulder
ROW	Right of Way
SLM	Shared Lane Marking, also known as a “sharrow”
SW	Sidewalk