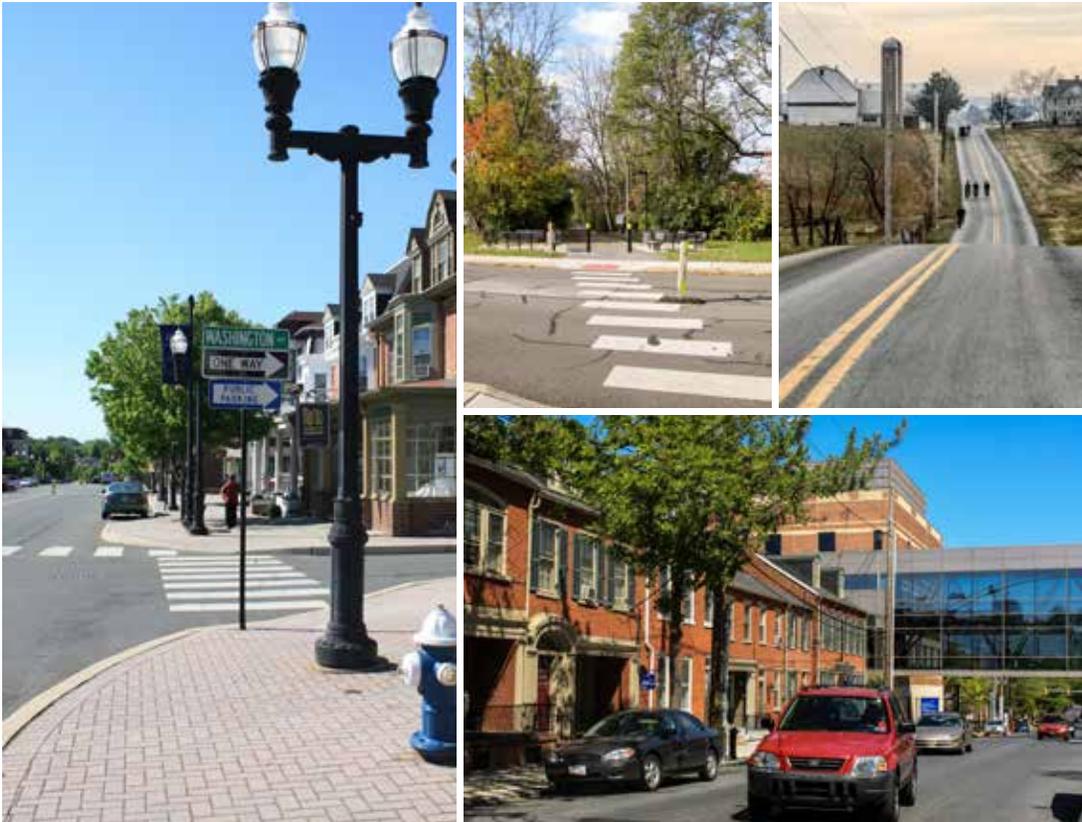


Lancaster County Complete Streets Guidebook

Lancaster County Planning Commission
Lancaster County, Pennsylvania

In partnership with
Lancaster General Health
Lancaster County Coalition for Smart Growth



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Acknowledgments

Prepared by

Staff to the Lancaster County Planning Commission and the Lancaster County Transportation Coordinating Committee with review and input from staff at Lancaster General Health and the Lancaster County Coalition for Smart Growth.

We express our appreciation to these partner organizations for their work with the LCPC and LCTCC to advance a Complete Streets program in Lancaster County.



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1 Introduction

WHAT DO WE MEAN BY COMPLETE STREETS?

The desire to create more livable, walkable communities is an increasingly important consideration of regional and community planners and engineers across the country, including those in Lancaster County. The term Complete Streets is a relatively new one that has entered the planning vocabulary to describe streets that are designed to be safe and convenient for people using all modes of transportation—pedestrians, bicyclists, public transportation, and motor vehicles—and people of all ages and abilities. Complete Streets is an element of Lancaster County’s long-standing commitment to build “complete places” where people want to live and visit.

For many decades, streets have been designed and functioned to favor motorists over the needs of others who also use the roads. Complete Streets is a new way of thinking in which





accommodation of all users is designed into a transportation project from the onset of the project. Complete Street design also includes sustainable measures to treat storm water runoff and minimize or eliminate water accumulation at intersections or other points along the street. In Lancaster County, the definition of Complete Streets specifically includes green infrastructure such as bioswales, rain gardens and other measures that are constructed along the edge of the roadway or in the buffer zone to reduce water runoff. These measures complement and reduce the need for pipes, drains and other grey infrastructure.

CONSIDERATION OF COMPLETE STREETS BEGINS WITH PROJECT DESIGN

Consideration of the needs of all users starts with the initial design of a project. For existing roads, Complete Streets means undertaking measures

(right) Main Street, Ephrata Borough has a defined buffer strip with trees and pedestrian scale lights.

to retrofit the street. For new streets, it means designing these features into a project from the initial design phase. Many elements contribute to creating a streetscape that is safe and attractive for all users. These elements go beyond the provision of sidewalks and include:

- Trees and other landscaping between the road and sidewalk that serve to buffer pedestrians from moving vehicles and cars parked on the side of the road;
- Clearly marked bicycle lanes that provide safe places for bicyclists;
- Crosswalks and pedestrian signals at corners to provide a safe environment for pedestrians to cross the road;
- Accessible curbs to provide for the disabled or



for parents pushing strollers;

- Benches and other street furniture where people can sit and relax;
- Adequate and attractive street lighting;
- Medians on multi-lane roads where pedes-

trians can wait between traffic lanes when crossing busy roads and provision of left turn lanes by motor vehicles at intersections;

- An interconnected network of roads with block lengths in the range of 300'–600' and intersection spacing of about 1000 feet on arterials and 500' on local streets;
- Curb extensions and other traffic calming measures that reduce the distance for pedestrians to cross a street or to help slow the speed of traffic;
- Green infrastructure such as rain gardens and bioswales to control runoff in an environmentally sustainable way and provide an attractive visual amenity.

The purpose of the **Lancaster County Complete Streets Guidebook** is to provide guidance to the municipalities in Lancaster County for adopting a Complete Streets policy and program. The guidelines demonstrate how a range of travel modes can be balanced within an existing right-of-way. They offer state-of-the practice recommended standards for street and pedestrian

infrastructure and a discussion of the measures that are likely to work best in various settings. Some may only apply when a street is being rebuilt while most measures can be implemented with more modest road projects, including maintenance projects. It is important to keep in mind that a Complete Street can be achieved incrementally over a number of years; it doesn't have to be an "everything at once" process.

Every situation where Complete Streets are implemented will present unique challenges and opportunities. There is no "one size fits all" set of standards. These guidelines are intended to provide a baseline for decision-making on a project-by-project basis using the best professional judgment of the planners and engineers involved in a project combined with the desires of community residents and elected officials of the municipality in which the project is located.

This **Lancaster County Complete Streets Guidebook**, as well as other helpful resources can be found on the LCPC website at: <http://www.lancastercountyplanning.org/177/Complete-Streets-for-Lancaster-County>.

WHY COMPLETE STREETS MAKE SENSE

Experience in communities that have embraced Complete Streets has shown that creating environments where people can walk, bike and use transit safely results in vibrant commercial areas and residential neighborhoods that produce economic, health and social benefits for the community and its residents. Moreover, with federal and state grant programs increasingly looking at "livability and quality of life" as key factors in awarding competitive funds, communities that have made these investments will have a competitive edge. Benefits of investing in Complete Streets include:

- **Mobility.** Complete Streets transform streets that were designed primarily or exclusively for automobiles and trucks into places that meet the needs of all users—motorists, pedestrians, bicyclists, transit users and individuals of all ages and abilities.
- **Economics.** Complete Streets attract new commercial and retail establishments and other types of investment which adds to the tax



(left) Northwest Lancaster County River Trail, East Donegal Township — a paved, multi-purpose trail from Columbia Borough to Bainbridge.

base of the community. They make a community more vibrant, attracting people to shop, eat at restaurants or simply walk around and enjoy the non-auto dominated environment. When implemented in residential neighborhoods, they contribute to a safer, more enjoyable place for families and children to live and contribute to increased property values.

- **Improved safety.** Complete Streets reduce pedestrian and bicycle accidents by creating a safe environment for non-motorized trips.
- **Reduced traffic congestion.** Complete Streets enable people to travel by means other than driving and thereby help reduce traffic

congestion on the roads.

- **Improved public health.** Complete Streets encourage people to engage in “active transportation” such as walking and bicycling which contributes to improved health. Active transportation helps to reduce the incidence and severity of obesity and diseases such as diabetes, high blood pressure and heart attacks that are related to sedentary lifestyles and the public cost to treat these diseases.
- **Improved air and water quality.** Complete Streets help reduce the number of automobile trips and result in reduced emissions from motor vehicles and water pollution from oils and

other auto-related pollutants that drip onto road surfaces and wash into rivers and streams.

- **Social justice benefits.** Low income individuals own fewer cars and rely more heavily on walking and public transportation than those of higher incomes. The elderly, youth and disabled also rely more heavily on non-motorized transportation. By creating a safe environment for pedestrians and bicyclists, Complete Streets contribute to a more equitable transportation system for people of all income levels, ages and abilities.

TEN ELEMENTS OF AN IDEAL COMPLETE STREETS POLICY

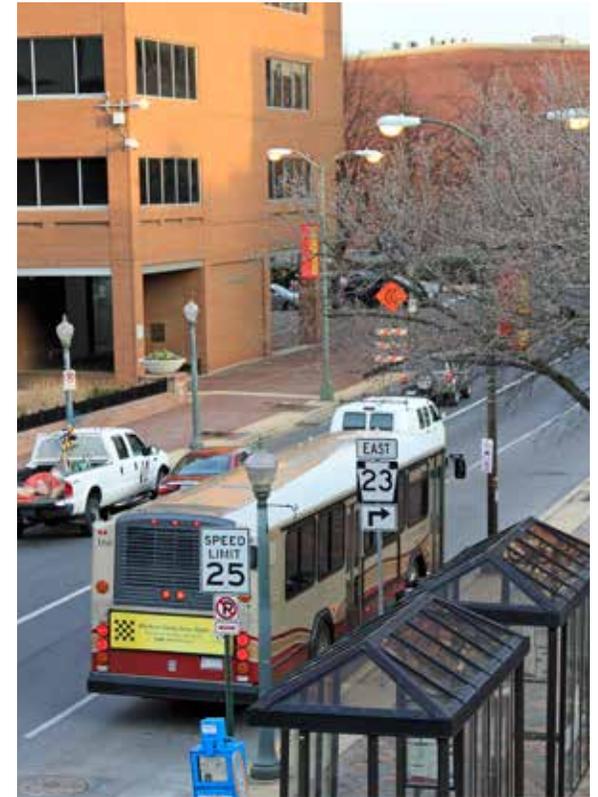
The National Coalition for Complete Streets identifies ten elements of an ideal Complete Streets policy. These elements are:

1. **Sets a vision.** A strong vision can inspire a community to follow through on its Complete Streets policy. Just as no two policies are alike, every community will establish its own vision statement of how a Complete Streets policy helps to achieve the community's goals for the future. This may include renewed economic vitality of a downtown or neighborhood, enhanced safety, improved health through greater participation in active transportation and other desired outcomes.
2. **Specifies all users.** An ideal Complete Streets policy applies to everyone who uses the road. It means providing safe access and safe places to wait for transit users. It means

providing bicycle lanes along certain routes to encourage greater use of active transportation and it means providing sidewalks, crosswalks and medians at busy locations to enhance the safety of all pedestrians, especially older adults and children. It also means providing clear signals to motor vehicle drivers to slow down at busy intersections or when entering an area with heavy pedestrian traffic and to be aware of bicyclists that may be using the road as well.

3. **Considers all projects.** For many years, multi-modal streets were treated as “special projects” requiring extra planning, funding, and effort. The intent of the Complete Streets approach is to view all transportation improvements as opportunities to create safer, more accessible streets for all users. Even small road rehabilitation or maintenance projects can provide an opportunity to make meaningful improvements. For example, a repaving project can provide an opportunity to

(right) Lancaster Square bus stop.



shift a road edge stripe to create more room for cyclists or to create a designated bicycle lane. Routine traffic signal repairs can be used to make changes to the signal timing to allow a longer time for pedestrians to cross the road. A strong Complete Streets policy will apply to all types of projects including new construction, reconstruction, rehabilitation, repair, and maintenance.

4. **Creates a network.** A Complete Streets policy should result in the creation of a complete transportation network for all modes of travel. Instead of trying to make every street perfect for every mode, communities can create an interconnected network of streets that emphasize different modes and provide quality access for everyone.

5. **Involves all relevant agencies.** The streets of a county or a community are built and maintained by state, county, and local agencies and private developers. An effective Complete Streets policy should educate planners, engineers and road supervisors at all of these agencies/entities and seek their support and coordination in implementing the Complete Streets policy. The involvement of state transportation officials at the outset is critical to the success of a project planned along a state road, such as a Community Arterial.

6. **Uses state-of-the-art design criteria.** Communities adopting a Complete Streets policy should review their design policies to ensure they can accommodate all modes of travel, while providing flexibility for project planners and engineers to adapt a project to unique circumstances. Some communities will choose to rewrite their design manual. In doing so they may want to refer to/adopt the design guidelines recommended by professional organizations such the American Association of State Highway and Transportation Officials (AASHTO), Pennsylvania Department of Transportation (PennDOT), the Institute for Transportation Engineers (ITE), those recommended in this Lancaster County Complete Streets Design Guidebook and the federal Americans with Disabilities Act Guidelines.

7. **Is context-sensitive.** An effective Complete Streets policy must be sensitive

to the community context. Making this clear in the initial policy statement will allay fears that the policy will require inappropriately wide roads in quiet neighborhoods or sidewalks on rural roads where pedestrians are unlikely to walk.

8. **Provides for exceptions.** Making a policy work effectively requires inclusion of a process to handle exceptions for projects where accommodating all users is either not allowed or would impose a cost burden out of proportion to the cost of the project. The Federal Highway Administration policy cites the following reasons for justifying an exception for a project: 1) accommodation is not necessary on corridors where non-motorized use is prohibited, such as interstate freeways; 2) cost of accommodation is excessively disproportionate to the need or probable use; and 3) there is a documented absence of current or future need. Many



(left) Crosswalk in Elizabethtown Borough.

communities have included their own exceptions, such as severe topological constraints. In addition to defining exceptions, there must be a clear process for granting them. Any exceptions should be kept on record and publicly available.

9. **Measures performance.** The traditional performance measure for transportation planning has been vehicular Level of Service (LOS) – a measure of automobile congestion. Complete Streets planning takes a broader look at how the system is serving all users. Communities with Complete Streets policies can measure success through a number

of measures: miles of on-street bicycle routes created; new linear feet of sidewalks; changes in the number of people using public transportation, bicycling, or walking (mode shift); number of new street trees; and/or the creation or adoption of a new multi-modal Level of Service standard that better measures the quality of travel experience. The AASHTO *Highway Capacity Manual* (Edition 5) includes this new way of measuring LOS and can be helpful to communities in developing their own method.

10. **Includes implementation steps.** Taking a Complete Streets policy from paper into

practice is not easy, but spelling out specific implementation steps will help. Some policies call for the establishment of a task force or commission to work toward policy implementation. There are four key steps for successful implementation: 1) restructure procedures to accommodate all users; 2) develop new design policies and guides; 3) offer workshops and other educational opportunities to transportation professionals, community leaders, and residents; and 4) institute better ways to measure performance and collect data on how well the streets are serving all users.

PROPOSED COMPLETE STREETS CORRIDOR IMPROVEMENTS | BURLINGTON, VERMONT PLAN BTV SOUTH END ARTS DISTRICT

In the images below and to the right, a vision for a more livable future on South Pine Street in Burlington, Vermont, where the Walkable and Livable Communities (WALC) Institute provided technical assistance in 2013 and 2014. WALC is helping the community adopt best practices to become more walkable, bikeable and people-friendly.

Pine Street Corridor Improvements,

Burlington, Vermont. The following images illustrate a before and after "PhotoVision" of what is possible with traffic-calming and transit-, walking- and bicycling-friendly improvements, and zoning that allows for mixed-use development with housing.

This section of S. Pine Street (below) is notable for wide lanes and high traffic speeds, poor pedestrian right-of-way compliance from motorists, limited marked pedestrian crossings, pedestrian/motor vehicle collisions, and limited on-street and bicycle parking. This area should be traffic-calmed, especially due to the proximity of Champlain Elementary School, on the right.

The proposed improvements to S. Pine Street (right) include:

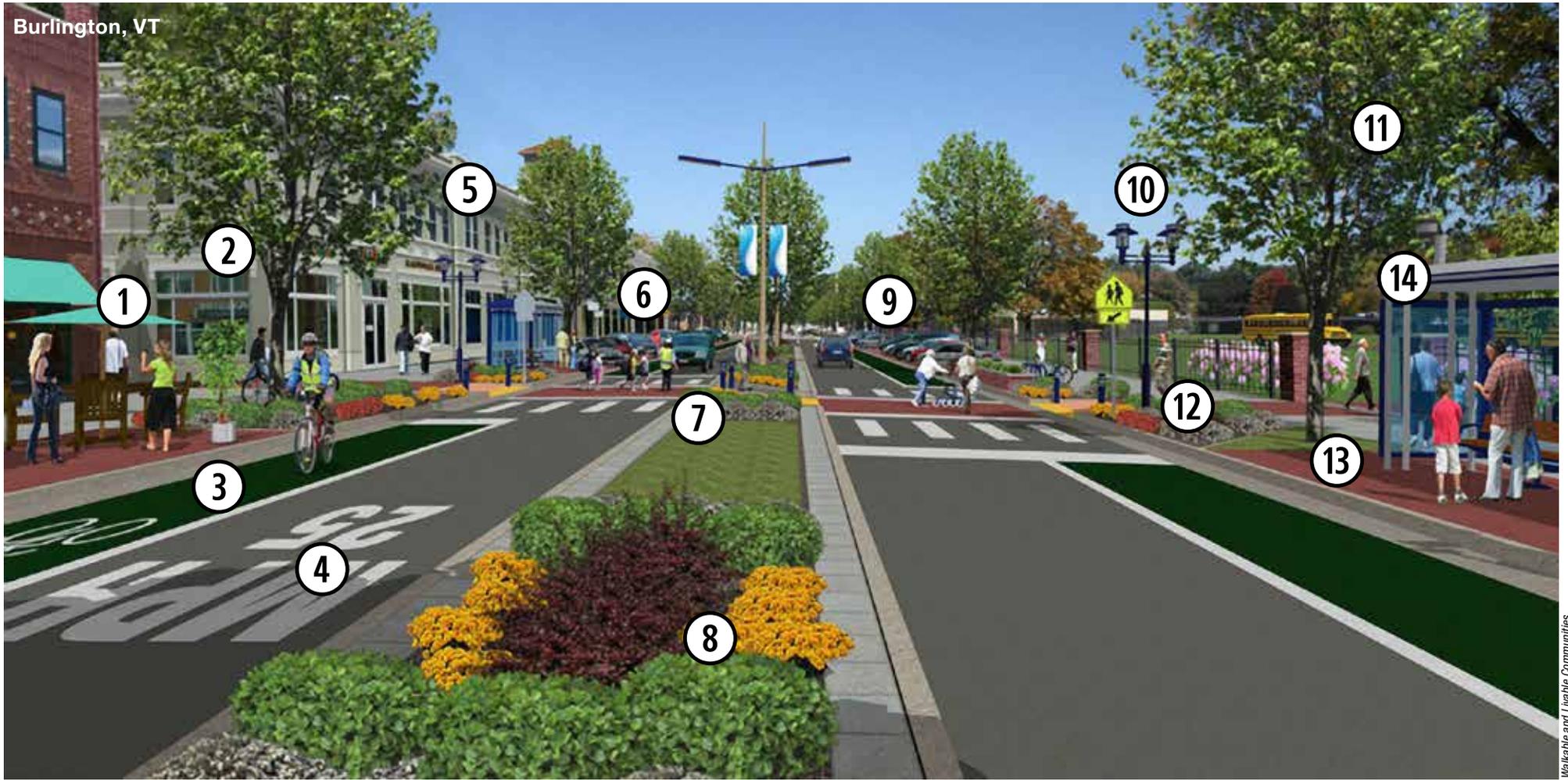
- 10-foot travel lanes,
- marked crosswalk,
- median with pedestrian crossing,
- advanced limit lines,
- street-scale lighting,
- crossing guard for the elementary students and others,
- bike lanes,
- sheltered bus stops,
- conversion of underused school parking lot into park with play areas and decorative safety fencing,
- new head-out angled parking spaces to replace surface parking lots,
- multi-story mixed-use linear buildings with café-style seating,
- parklets,
- bike parking, and
- landscaping.

Utility lines are also buried to increase aesthetic appeal and reduce long-term maintenance and emergency repair costs.



Walkable and Livable Communities

Pine Street Corridor, Burlington, VT, before



Walkable and Livable Communities

Pine Street Corridor, Burlington, VT, proposed Complete Street improvements

- ① Generous sidewalk width
- ② Reduced block length
- ③ Dedicated bicycle lane
- ④ Road diet and traffic calming measures
- ⑤ Businesses front the street
- ⑥ Clearly defined crosswalk
- ⑦ Traversable center median
- ⑧ Median landscaping
- ⑨ Angled street parking
- ⑩ Well-lit sidewalks and pedestrian crossings
- ⑪ Shade trees
- ⑫ Buffer with green zone along roadway
- ⑬ Permeable paving
- ⑭ Bus shelter

2 Implementing Federal, State and Local Policies



FEDERAL POLICIES

Implementation of a Complete Streets program advances federal transportation policy. The U.S. Department of Transportation (DOT) policies support establishment of an interconnected multi-modal transportation system and require inclusion of facilities that support and encourage the use of walking and bicycling as part of **all** highway and bridge construction and rehabilitation projects except under specified conditions. Federal Highway Administration Guidance states:

- ***Bicycle transportation facilities and pedestrian walkways shall be considered, where appropriate, in conjunction with all new construction and reconstruction and transportation facilities, except where bicycle and pedestrian use are not permitted. (23 U.S.C. 217(g)(1))***
- ***Federal transportation policy seeks to increase non-motorized transportation to***

at least 15 percent of all trips and reduce the number of non-motorized users killed or injured in traffic crashes by at least 10 percent. This policy was adopted in 1994 as part of the National Bicycling and Walking Study and remains a high priority.

- ***In any case where a highway bridge deck is being replaced or rehabilitated with Federal financial participation, and bicyclists are permitted on facilities at or near each end of such bridge, and the safe accommodation of bicyclists can be provided at reasonable cost as part of such replacement or rehabilitation, then the bridge shall be so replaced or rehabilitated as to provide such safe accommodations. (23 U.S.C. 217(e))***
- Long range metropolitan and statewide transportation plans, and Metropolitan and Statewide Transportation Improvement Programs shall ***“provide for the development***

and integrated management and operation of transportation facilities (including accessible pedestrian walkways and bicycle transportation facilities) that will function as an intermodal transportation system... (23 U.S.C. 134(c)(2) and 135(a)(2))

- ***The Secretary shall not approve any project or take any regulatory action under this title that will result in the severance of an existing major route or have significant adverse impact on the safety for non-motorized transportation traffic and light motorcycles, unless such project or regulatory action***

The U.S. Department of Transportation (DOT) policies support establishment of an interconnected multi-modal transportation system and require inclusion of facilities that support and encourage the use of walking and bicycling as part of all highway and bridge construction and rehabilitation projects...

provides for a reasonable alternate route or such a route exists.” (23 U.S.C. 109(m))

These provisions indicate the intent of Congress for bicyclists and pedestrians to have safe, convenient access to the transportation system and that every transportation improvement should be viewed as an opportunity to enhance the safety and convenience of these modes. In the planning, design, and operation of transportation facilities, bicyclists and pedestrians should be included as a matter of routine, and the decision to not accommodate them should be the exception rather than the rule.

Funding Requirements and Opportunities

Federal surface transportation law provides a range of programs under which states and MPOs can fund bicycle and pedestrian improvements. Virtually all major transportation funding programs can be used for bicycle and pedestrian-related projects. States and MPOs are specifically encouraged to use the most appropriate funding source for a particular project and not rely primarily on the Transportation Alternatives Program (TAP). The TAP program

was established under the Moving Ahead for Progress in the 21st Century (MAP-21) federal legislation that combined funding for several previously authorized programs—Transportation Enhancements, Safe Routes to School and Recreational Trails—under one program that supports non-motorized modes. Two percent of all federal-aid highway funding from the Highway Account of the Highway Trust Fund each year is reserved for the TAP program.

The Congestion Mitigation and Air Quality Program (CMAQ), Surface Transportation Program (STP), Surface Transportation-Urban (STU) or other programs can be used to fund non-motorized transportation projects.

PENNSYLVANIA POLICIES

Consistent with the U.S. DOT policies on non-motorized modes, the Pennsylvania Department of Transportation (PennDOT) has adopted policies that require all cities and counties in the state that receive funding through the State Highway Fund to spend “reasonable amounts” to provide footpaths and bicycle trails, including curb cuts or ramps as part of a



(left) PennDOT and NJDOT developed a Smart Growth Transportation Guidebook to provide guidance to local communities on implementing context-sensitive transportation projects.

LANCASTER COUNTY COMPREHENSIVE PLAN AND OTHER COUNTY PROGRAMS

Implementation of a Complete Streets program carries out the goals, strategies and actions in the Lancaster County Comprehensive Plan and the plan's functional elements such as Long-Range Transportation Plan (LRTP) and the Growth Management Element.

Lancaster County Comprehensive Plan

The policy element of the Lancaster County Comprehensive Plan, ReVisions, sees Lancaster County as a place in the future where the City of Lancaster is the center of business and activity and the boroughs and small villages are characterized by revitalized Main Streets that preserve the traditions and heritage of the county. Implementation of a Complete Streets policy and program supports achievement of major goals and strategies in the ReVisions policy plan. Some of the goals are:

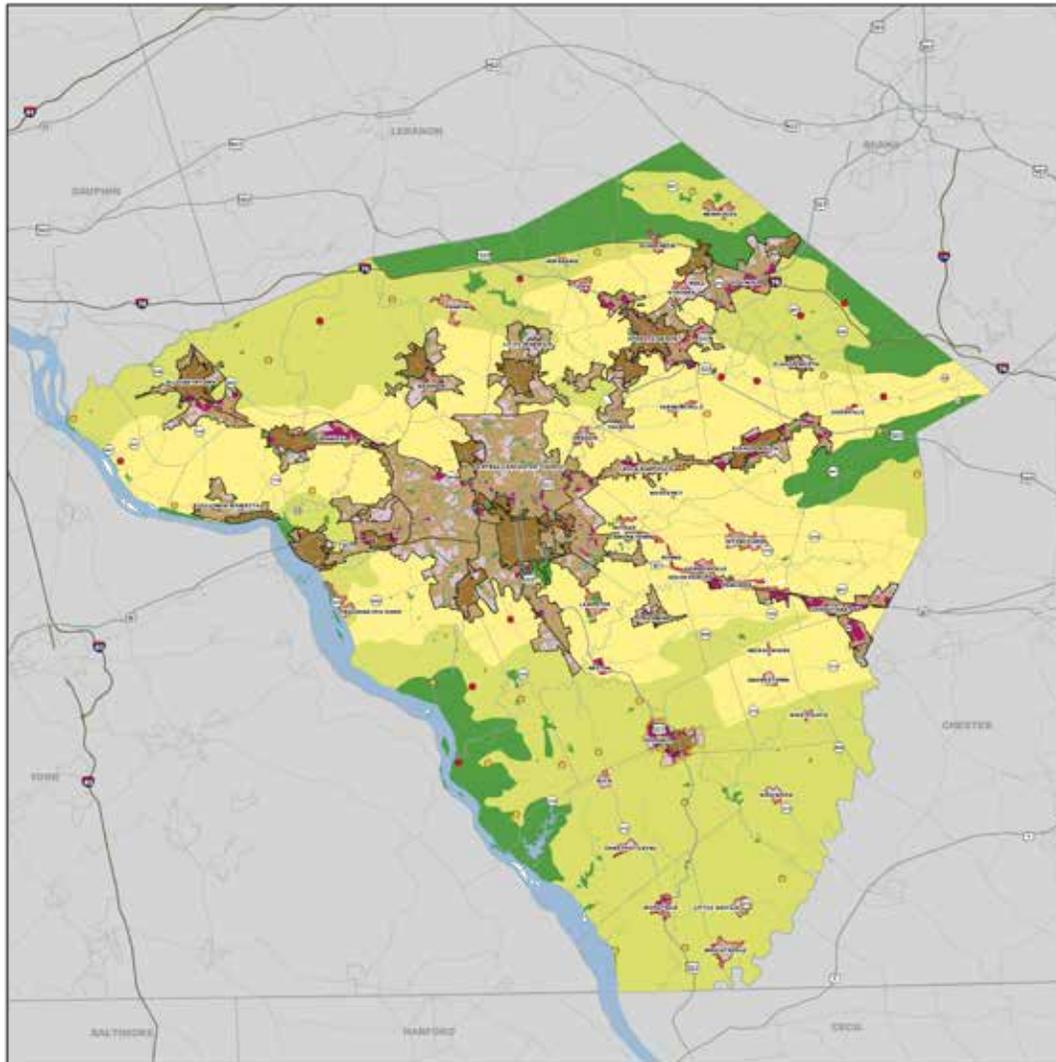
- **Growth Management.** Direct growth to areas within Urban and Village Growth Boundaries.

transportation project. These facilities “shall be provided wherever a highway, road or street is being constructed, reconstructed or relocated.”

Beyond this statement of policy, the Commonwealth has implemented various initiatives to support better linkages between transportation and land use planning. In 2004, PennDOT launched the Pennsylvania Community Transportation Initiative (PCTI) grant program under which funding is awarded for smart transportation initiatives in cities and communities throughout the state. The Smart Transportation

initiative emphasizes funding of high yield, high value projects, investing in existing communities and infrastructure, mixed-use and more compact development, and linking them to transportation options. Projects funded under the program include: Main Street enhancements, streetscape projects, bicycle trail and on-road bicycle lane projects, projects to improve transit access and other projects to improve non-solo driver modes. PennDOT also worked with the New Jersey Department of Transportation to create a [Smart Transportation Guidebook](#). This publication provides guidance to cities and communities on implementing context-sensitive transportation projects that support adjoining land uses. The guidebook proposes a new road typology that reflects consideration of a road's land use context as well as traditional measures of traffic volume and presents new standards (by road type and land use zone) for lane width, parking, bike lanes and for roadside infrastructure such as sidewalks, buffer zones and crosswalks.

(left) Lancaster County's Designated Growth Areas.

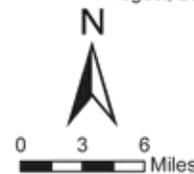


GROWTH MANAGEMENT ELEMENT
Lancaster County Comprehensive Plan

GROWTH MANAGEMENT FRAMEWORK
Legend

- Draft UGA
- Urban Growth Area (UGA)
- Village Growth Area (VGA)
- Municipal Boundaries
- Villages (Non-VGA)
- Crossroads Communities
- Core Reinvestment Areas
- General Reinvestment Areas
- Concentrated Building Areas
- General Building Areas
- Designated Agricultural Areas
- Designated Natural Areas
- Designated Agricultural with Natural Areas

August, 2005



- **Community Character.** Preserve and enhance the characteristics that make Lancaster County a distinctive place.
- **Transportation.** Provide for the safe, efficient, and convenient movement of people and goods.
- **Economy.** Enhance and diversify the economy and ensure economic self-sufficiency.

A range of policies and strategies are presented in the Policy Element to support achievement of the goals. Among these are:

- Design new communities to accommodate citizens from a wide range of economic levels, occupations, age groups, backgrounds, and interests in new residential communities.
- Develop aesthetically pleasing, interconnected transportation systems that encourage walking, biking, and public transit, and discourage high-speed traffic.
- Encourage existing communities to estab-

lish a central focus that combines commercial, civic, cultural, and recreation uses.

- Ensure that the visual, literary, and performing arts are an integral part of community life.

The county Long-Range Transportation Plan (LRTP), **Connections 2040**, is one of the six functional elements of the Comprehensive Plan. Goals and strategies of the LRTP, as presented in **Table 1**, are also advanced by adoption of a Complete Streets policy and program.

Lancaster County has set aside \$1 million annually of its federal funding for the Smart Growth Transportation program.

COMPREHENSIVE PLAN ELEMENTS

- **Growth Management Element.** The Growth Management element of the Lancaster County Comprehensive Plan establishes a framework for future land use and development in Lancaster County. It is designed to achieve a balanced community where urban centers

prosper, natural landscapes thrive and farming remains an integral component of the economy and cultural heritage. The Growth Management Plan consists of an Urban Strategy and a Rural Strategy. Key objectives of the Urban Growth Strategy are to increase the density of development, improve the character of new development, and provide compact, pedestrian-friendly environments. Complete Streets policies support these objectives.

- **Housing Element.** The Lancaster County Housing Plan is designed to meet the growth in residential housing needs by reviving the county's traditional neighborhood structure, to provide a diverse selection of housing types, prices, and locations. The plan emphasizes the importance of maintaining the distinct character of Lancaster County through revitalization of its towns, preservation of the county's farmland and open spaces and development of new neighborhoods in styles consistent with the existing historic architecture and building scale. Complete Streets support the vision for a diversity of housing types

in the county that are connected to nearby stores, restaurants and businesses and work through a network of interconnected streets, sidewalks and bicycle infrastructure.

- **Green Infrastructure Element.** The county's plan for green infrastructure, **Greenscapes**, is a plan for accommodating growth and development while preserving the region's most valuable natural resources, cultural assets and agricultural economy. The green infrastructure system will provide a framework for sustainable growth and economic vitality in Urban Growth Areas, for agriculture and other uses in rural areas, and for outdoor recreation and related activities throughout the county. A Complete Streets policy supports the goals and objectives in **Greenscapes**.

Other Plans and Programs

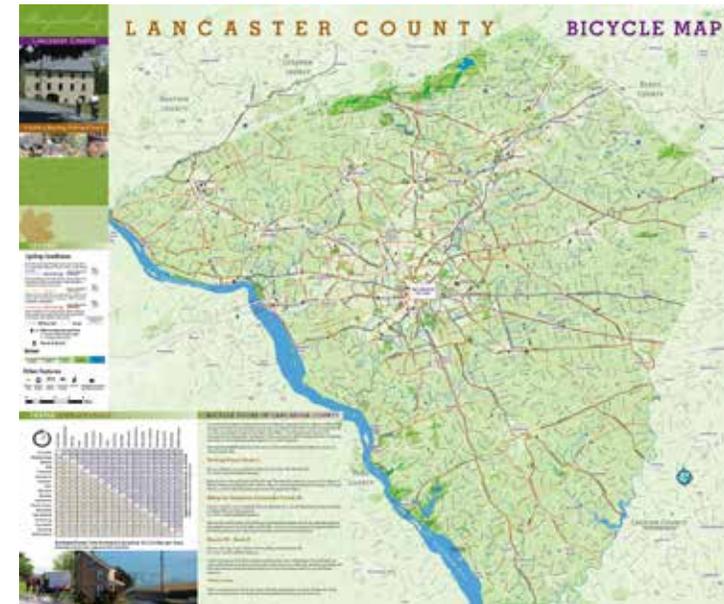
Adoption of a Complete Streets policy and program advances other elements of the county Comprehensive Plan and county programs.

- **Lancaster County Bicycle and Pedestrian Plan.** The Lancaster County Bicycle and

The Lancaster County Bicycle and Pedestrian Plan designates a priority bicycle and pedestrian system of 850 miles of bicycle facilities and 360 miles of pedestrian facilities...

Pedestrian Transportation Plan, Phase I was adopted by Lancaster County in September 2000. The plan established the Lancaster County Citizens Bicycle & Pedestrian Advisory Council (BPAC) and a designated Bicycle and Pedestrian Planner at the LCPC. Phase II of the plan involved extensive field work to document bicycle and pedestrian conditions in the county. The plan advances strategies to overcome barriers to the use of non-motorized modes such as sub-standard design and a lack of connectivity in the non-motorized infrastructure. The Plan designates a priority bicycle and pedestrian system of 850 miles of bicycle facilities and 360 miles of pedestrian

(right) The Lancaster County Bicycle Map features several bicycle tour routes, provides cycling conditions on 850 miles of roads, and includes locations of bicycle shops.



facilities. The **Lancaster County Bicycle Map: A Guide to Bicycling, Walking, and Transit**, rates roads that bicyclists may use as principal transportation routes. Lancaster County started the process of developing an “Active Transportation Plan” during 2015.

- **Smart Growth Transportation Program.** The Smart Growth Transportation (SGT) program funds transportation projects and studies located in the county’s Urban Growth Areas (UGAs) and Village Growth Areas (VGAs) that support economic development and build the infrastructure to establish safer, more walkable, bikeable and transit-accessible communities.

The county has set aside \$1.0 million annually of its federal funding for the SGT program. Applications for funding under the program are accepted every two years. Projects that have been funded under the program include: 1) Extension of the Elizabethtown Bicycle and Pedestrian Pathway Plan, Phase 3; 2) Signage along the Northwest Lancaster County River Trail; 3) Bicycle Study for the City of Lancaster; 4) Non-Motorized Transportation Study of the LIMC region and other projects.

COMPLETE STREETS POLICY STATEMENT

It is the policy of the Lancaster County Transportation Coordinating Committee in its work and in coordination with its partners to encourage streets to be planned, designed, operated, and maintained to enable safe, convenient and comfortable travel and access for users of all ages and abilities regardless of their mode of transportation.

Adopted by the Lancaster County Transportation Coordinating Committee, June 23, 2014

LCTCC AND LCPC ADOPT A COMPLETE STREETS PROGRAM

The Lancaster County Transportation Coordinating Committee (LCTCC) and the Lancaster County Planning Commission adopted identical Complete Streets Policy Statements on June 23, 2014 and July 28, 2014, respectively, and gave their support for a program to implement Complete Streets in the county over a period of years.

The LCTCC and LCPC will work, in coordination with community partners such as LGH and the Lancaster County Coalition for Smart Growth, to assist municipalities with adoption and implementation of Complete Streets policies.



(left) Ephrata Borough has one of the most 'complete' Main Streets in the county, featuring angled parking, pedestrian-friendly crosswalks, and pedestrian amenities.

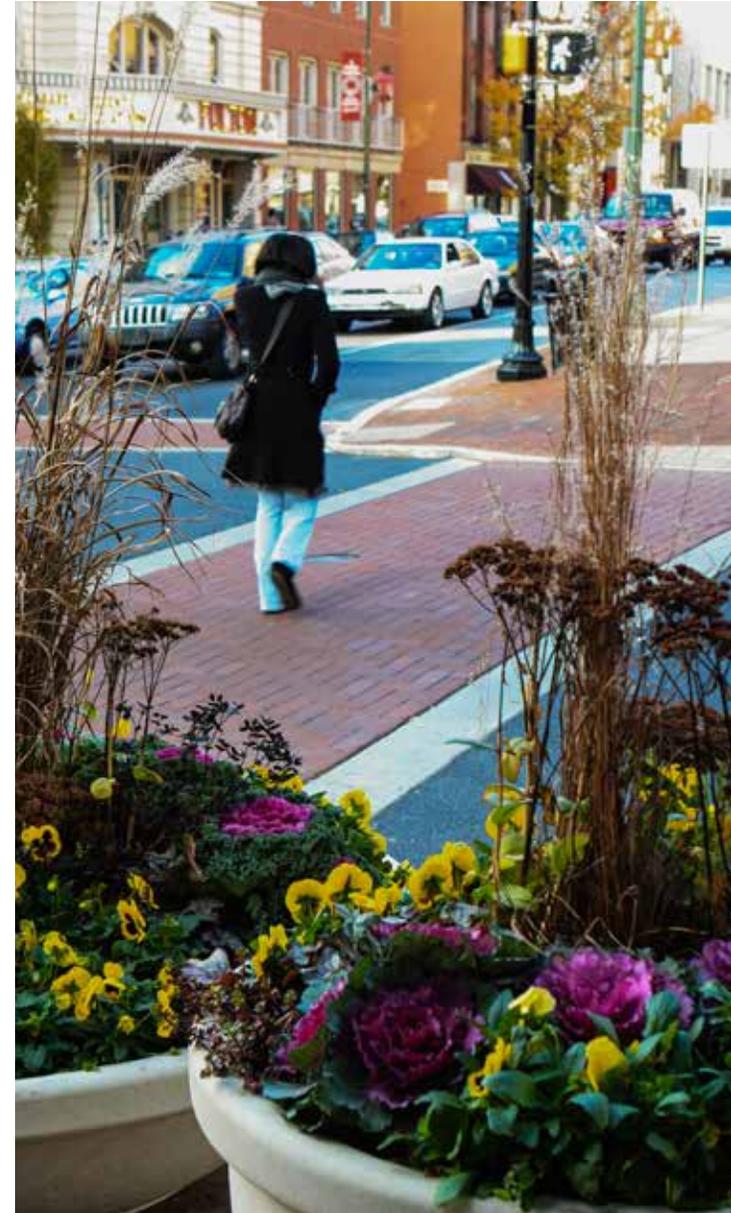


Table 1: Selected Goals and Strategies in *Connections 2040*, the Long-Range Transportation Plan

Goal A <i>Target transportation investments to support the Envision Lancaster County vision, goals, strategies and the Smart Growth Program</i>	
A-2	Target transportation investments to support appropriate growth and development in Urban Growth Areas (UGAs) <ul style="list-style-type: none"> Identify suitable locations within UGAs for high-density, mixed-use, compact development that support walking, biking and transit Maintain or establish a connected, grid networks of streets, alleys, service roads, sidewalks and paths Establish pedestrian-bicycle connections to allow residents of UGAs to access recreational amenities and other destinations
A-4	Encourage transit-oriented development that includes high capacity transit stops/stations
A-5	Continue to implement PennDOT’s Smart Transportation principles by coordinating and connecting land use and transportation
Goal B <i>Maintain/improve the county’s multi-modal infrastructure and services to provide an acceptable level of service</i>	
B-3	Plan for strategic capacity improvements that support economic development and improve system connectivity
B-4	Improve public transportation service through development and implementation of RRTA’s Long-Range Plan
B-5	Improve the intermodal connections between highway, transit, air and rail to better service commuters, tourists and residents
B-6	Support ongoing improvements to the county’s passenger rail system

Table 1 (cont'd)

Goal C Improve safety and security for all users of the transportation system

C-1	Reduce the number of crashes and fatalities
-----	---

C-5	Support overall transportation and safety education for all modes; work with municipalities and the media to promote safety
-----	---

C-7	Develop safe and convenient bicycle and pedestrian accommodations for every type of trip and for all levels and ability
-----	---

- Update the county's bicycle-pedestrian plan

- Encourage municipalities to include bicycle parking as part of major new developments

- Encourage municipalities to include sidewalks as part of future residential land developments where appropriate

Goal D Manage and operate the transportation system to reduce congestion

D-3	Promote available public transportation options
-----	---

D-4	Improve alternatives to single occupant vehicle use
-----	---

Goal E Ensure that transportation investments address protection of the county's agricultural, natural, historic and cultural resources and environmental quality

E-1	Employ transportation design standards that consider community and environmental impacts through context-sensitive solutions
-----	--

E-3	Further integrate the planning and NEPA processes for early understanding of potential project issues among agencies
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- Right-size projects early in the process to control costs and potential impacts

Table 2: Complete Streets Policy Development, 2014–2016

<i>Responsible Entity</i>	<i>Action</i>
LCTCC	Adopt a Complete Streets policy statement
	Designate a Complete Streets coordinator
	Coordinate our work with the Complete Streets workshops
	Incorporate the Complete Streets policy into the LRTP update
	Incorporate the Complete Streets policy into the SGT and TAP programs
	Develop a TIP project review process
	Keep MPO members informed about process
LCPC	Adopt a Complete Streets policy statement
	Incorporate Complete Streets policies, goals, strategies into comprehensive plan update
	Incorporate Complete Streets elements into placemaking activities
	Incorporate Complete Streets into LCPC reviews
	Incorporate Complete Streets into LCPC transect
	Incorporate Complete Streets into county's model SALDO
Municipal Assistance	Develop a model municipal resolution/policy
	Develop/implement a Complete Streets training program (workshops, other)
	Develop a Complete Streets road typology
	Develop a Complete Streets guidebook
	Develop a Complete Streets audit process
Implementation	Develop/approve an MPO program
	Monitor/evaluate/report on implementation

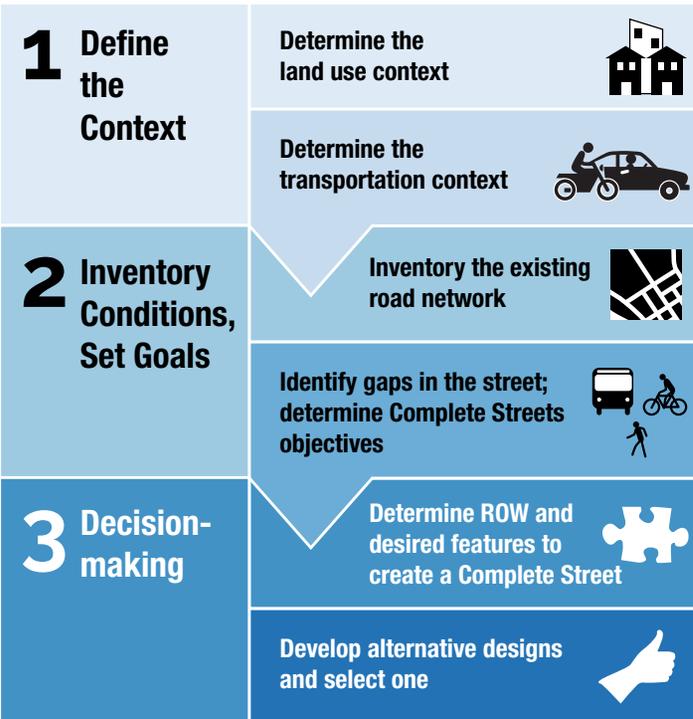
3 The Complete Streets Process

STEPS IN THE COMPLETE STREETS PROCESS

There is no one-size-fits-all approach to creating Complete Streets. The context of a street and presence and condition of the existing infrastructure determine the types of measures

that are needed and appropriate to create a Complete Street at that location. A number of steps are part of the planning process.

1. **Determine the Land Use Context.** The land use context of a street is a major factor in determining the number of lanes and types of facilities that are appropriate to creating a Complete Street. A busy street in a downtown area requires sidewalks wide enough to accommodate large numbers of pedestrians and groups of people walking together. A parking lane on one or both sides of the street to separate pedestrians from moving traffic and a clearly marked bike lane might also be appropriate. On a quieter urban neighborhood street or suburban street, a narrower sidewalk would meet people’s needs and “Share the Road” or bike route signs might be all that is needed to assure safety for bicyclists.



Some cities and counties, like Lancaster



(left) A Complete Street in rural Earl Township, Lancaster County. This road accommodates the limited motorized and non-motorized vehicle traffic in the area.

County, have established a land use transect that ranges from low density/intensity areas with little traffic to high intensity/density urban areas with high traffic volumes.

Implementation of the Complete Streets program in Lancaster County is being coordinated with the Lancaster County Land Use Transect developed by the Lancaster County Planning Commission (LCPC). The transect has seven land use zones. From lowest to highest intensity use, they are:

- T-1 Natural Areas;
- T-2 Agricultural Areas;
- T-3 Rural Centers;
- T-4 Suburban Areas;

- T-5 Urban Neighborhoods;
- T-6 Urban Centers; and
- T-7 Urban Core.

While many elements that make up Complete Streets would probably not apply in natural and agricultural areas, measures such as trails, pathways and bike route signage might be appropriate on some roads in these areas. A more detailed discussion of the Lancaster County Land Use Transect is provided in Chapter 4.

2. Determine the Transportation Context or Road Type.

The transportation context is equally important in determining the measures

that are needed to create a Complete Street. As with land use, a hierarchy exists in the road network, ranging from high volume, high-speed Regional Arterials to lightly traveled, low-speed local roads. The characteristics and function of each road type are different and not all road types are found in each land use zone. By using a Complete Street road typology rather than the traditional functional classification road typology, streets are distinguished by their design characteristics as well as their functional classification. The Complete Streets road typology provides for a broader range of thoroughfare design choices. Lancaster County made a decision to use the street typology presented by the Pennsylvania Department of Transportation (PennDOT) in its **Smart Transportation Guidebook**, incorporating some modifications to these guidelines for local collector and local roads to support and provide consistency with the Lancaster County Model SALDO. The elements that go into creating a Complete Street will vary by road type and land use type.

Walk audits provide an excellent way to educate key decision makers on the needs and benefits of Complete Streets.

- 3. Inventory Current Transportation Facilities and Modes.** Take an inventory of the facilities on a street or in a neighborhood and document the condition of those facilities. Items to look at include the presence or absence and condition of sidewalks, street lights, crosswalks at busy intersections, landscaping and other measures. Communities may wish to organize a **Walk Audit**, in which municipal



planners and officials and other interested parties walk the sidewalks of a particular area or neighborhood and note the condition of these facilities on a form that has been prepared and given to them for this purpose. Walk audits provide an excellent way to educate key decision makers on the needs and benefits of Complete Streets as well as an opportunity to involve local press and get a story covered in the newspaper or one the local radio/TV station which will serve to educate a broader audience.

- 4. Identify Gaps to Creating a Complete Street.** Identify the gaps that exist on the street or in a neighborhood and determine the facilities that are needed in that context to create a Complete Street. For example, note where there are gaps in the sidewalk network, whether existing sidewalks are badly cracked or out of alignment and whether there are

sidewalks leading to the transit stop(s). Note whether there is adequate street lighting in busy commercial, retail areas for people to feel safe walking at night and note whether the curbs are accessible.

- 5. Consider Other Priorities.** Complete Streets support other community goals such as green infrastructure for storm water control, social justice goals to provide increased mobility for all segments of the population, reduced energy consumption, improved public health and other goals. The priority a community gives to each of these goals may be a factor in determining the order in which project investments are made.
- 6. Determine Available Right-of-Way and Desired Features.** Planners need to examine the available right-of-way on a street that is to be converted into a Complete Street and determine the number of vehicle lanes

(left) Mark Fenton, a national walkability expert, conducts a walk audit of a community's pedestrian facilities.



Douglas Charles Phillips Architect

(left) A proposed Complete Street in Columbia Borough which favors pedestrian activity over vehicular activity. Streets can be used as event or gathering spaces, temporarily or permanently.

that are needed. Other infrastructure such as parking lanes, striping of bike lanes, creating a landscaped area or “green zone” between the road and sidewalk must also be decided. The available right-of-way will determine the width that can be allocated to each amenity and whether they can all be accommodated in the right-of-way.

7. **Develop Complete Street Cross-Sections and Adopt the Best Design.** Once the road dimensions have been measured and Complete Streets elements determined, several potential cross-sections should be developed and evaluated. The solution that best meets

the needs and desires of the community should be selected and implemented.

REVIEW OF THE MUNICIPAL SALDO, ZONING CODE AND COMPREHENSIVE PLAN

At the writing of this guidebook, most municipalities in Lancaster County had not yet adopted Complete Streets policies. Lancaster City, Lancaster Township and Elizabethtown Borough adopted policies in 2014. During spring and fall 2014, other municipalities participated in a series of educational workshops offered by the Lancaster County Planning Commission (LCPC), Lancaster General Hospital (LGH), the Coalition

for Smart Growth, and Smart Growth America and expressed strong interest in taking action.

As municipalities move forward with Complete Streets, local government decision makers and planners should recognize that the Complete Streets concept is consistent with goals and strategies in their comprehensive plans and that language already exists in their SALDOs and zoning ordinances in support of Complete Streets. What adoption of a Complete Streets policy and program brings is a comprehensive approach to accommodation of all users, making consideration of alternative modes such as walking, bicycling and transit an integral part of transportation

project planning, design and implementation with the needs of all users considered at the outset of a project. To successfully implement a Complete Streets policy, planners will undertake a review of the language in their municipal codes, and comprehensive plans as they are updated, and incorporate language, where needed, to better support accommodation of all modes and make it reflect best practices in project design.

A review by LCPC staff of the SALDOs and zoning ordinances of municipalities revealed that most have language to accommodate all users as discussed in the following.

Local decision makers and planners should recognize that the Complete Streets concept is consistent with goals and strategies in their comprehensive plans and that language already exists in their SALDOs and zoning ordinances in support of Complete Streets.

(right) Street trees, as well as buffer strips between the sidewalk and street, enhance the pedestrian experience.



1. **Sidewalks.** The majority of municipalities in Lancaster County now require construction of sidewalks on both sides of the street in residential areas. Sidewalks are also required to provide access to and within commercial and industrial areas and community facilities and to continue the existing sidewalk network.

- The City of Lancaster requires sidewalks on both sides of the street in all subdivisions and land developments.
- East Earl Township requires sidewalks in all subdivisions and land developments where curbing is required.

- Average density of dwelling units (DUs) is used by some municipalities as the basis for requiring sidewalks in residential developments. Leacock Township and Providence Township, for example, require sidewalks where the average density is more than 4 DUs per acre.

The minimum sidewalk width required by most municipalities is 4 or 5 feet except in areas that experience heavy pedestrian activity such as shopping centers and schools where the required width is greater.

(right) Lancaster Brewing Company parklet on Walnut and Plum Streets with rain garden, green zone, and café-style seating for customers enhances the neighborhood.

(far right) Original concept for Lancaster Brewing Company parklet.



- 2. Buffer/Green Zone.** Most municipalities require construction of a grass or landscaped buffer between the curb and the edge of the sidewalk, ranging in width from 2'-4', depending on the municipality.
- 3. Block Length.** Shorter block lengths support pedestrian activity by creating more intersecting streets which reduces the distance that pedestrians, bicyclists and transit users have to travel. Most municipal SALDOs specify the maximum length of a block in a residential subdivision, which generally ranges from 1,000–1,200 feet, though some municipalities have higher maximum block lengths.

- Denver Borough, East Cocalico Township, East Donegal Township, Lancaster Township and others prohibit cul-de-sacs where a through street is feasible.
 - Manor Township permits curvilinear streets only where topography and natural features require them on the site. They are not to be used adjacent to an existing grid street system without a transition to blend with the grid.
- 4. Crosswalks.** Some municipal SALDOs specify where crosswalks must be installed:
 - Quarryville Borough requires crosswalks wherever they are needed to facilitate

- pedestrian circulation and give access to community facilities and where blocks are longer than 1,000 feet.
 - Brecknock Township requires crosswalks wherever roads intersect with existing trails.
- 5. Street Width.** Striping a road for a bicycle lane, adding a planted median where pedestrians can wait between signals when crossing a busy road and other Complete Street measures may require reducing lane width. Not only the width, but the number of lanes, may be reduced (e.g. from four to three lanes), a practice referred to as “right-sizing.” The SALDOs in Lancaster County’s municipal-



(far left and left) Marietta Borough street trees enhance the aesthetics of a community and provide shade and natural cooling during the summer months.

ities specify minimum road widths by roadway type but generally don't include flexible standards to allow for reduced lane widths.

6. **Street Trees.** Trees planted along the edge of the sidewalk provide benefits beyond aesthetics. Trees act as a buffer between lanes of traffic and pedestrians which enhances pedestrian safety. They provide shade from the sun for walkers and help keep buildings cool during the summer months, which reduces energy consumption. Trees also contribute to cleaner air by sequestering greenhouse gases, especially carbon dioxide. In their SALDOs, many municipalities have provisions related to the planting of street trees

- East Cocalico Township requires that trees be provided along all road frontages except in certain zones (e.g. agricultural zones, conservation zones and rural residential zones).
- The City of Lancaster requires trees to be planted when roads are constructed, widened or reconstructed and that they be located between the curb and the sidewalk.
- Millersville Borough requires that trees be provided in all new subdivisions and land developments.

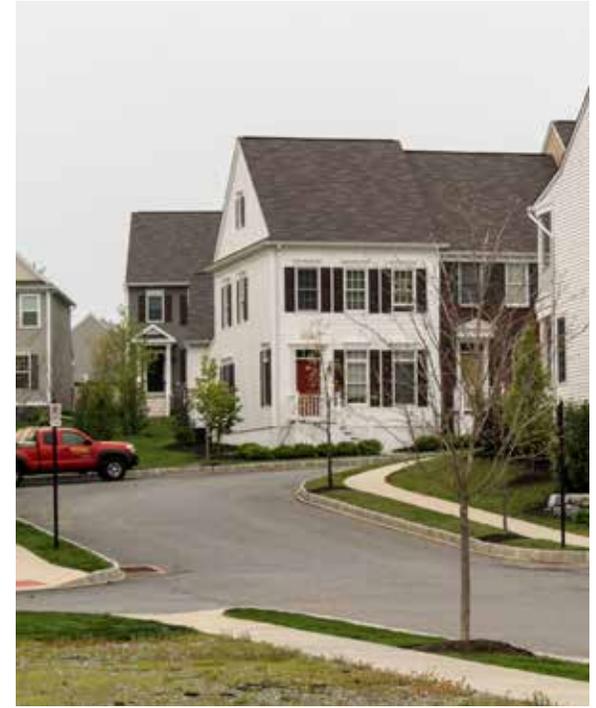
7. **Traditional Neighborhood Developments and other Higher Density Developments.** Some

municipalities have incorporated Traditional Neighborhood Development (TND), Mixed-use (MU) Development and other higher density overlays into their zoning codes. These zoning overlays encourage development that includes a mix of compatible residential, retail and commercial uses and require sidewalks, bike lanes, short block lengths, crosswalks and/or other features to promote walking, bicycling and the use of transit. They include design standards to preserve and maintain a cohesiveness to the community consistent with the surrounding environment.

- Lititz Borough includes a Traditional Neighborhood Development Overlay (TND) in

(right) Clearly defined crosswalks in Millersville Borough are aesthetically pleasing.

(far right) Florin Hill, a Traditional Neighborhood Development (TND) in Mount Joy Borough.



its zoning ordinance (sec. 216) that allows for higher density, intensity and mixed-use development that must meet special design standards and form-based code regulations to ensure compatibility with the historic character of the community.

lage Overlay Zones in which an optional set of design standards can be applied in R-2 zones to achieve or maintain a village-type setting. These zones seek to provide an environment that promotes increased reliance on walking.

- Millersville Borough (Sec. 208), Mount Joy Borough and Mount Joy Township have TND overlays.
- Warwick, Rapho, Penn and Manor have Vil-

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4 Defining a Context for Complete Streets

This chapter presents guidelines that are intended to provide a vision for streets that are primarily located in the urban and village growth areas of Lancaster County and its municipalities. The guidelines also have application to land use zones found throughout the county. The guidelines provide direction for incorporating Complete Streets principles and practices into public works design manuals, municipal SALDOs, zoning code, and practices.

LAND USE CONTEXT: THE LANCASTER COUNTY TRANSECT

As part of its work to educate the public about smart growth and the concepts of density and clustered development, the Lancaster County Planning Commission turned to a visual format and developed a Lancaster County Land Use Transect that consists of seven land use types: T-1 Natural Area, T-2 Agricultural Area, T-3 Rural Center Area, T-4 Suburban Area, T-5 Urban Neighborhood, T-6 Urban Center, and T-7 Urban Core.

The intensity and type of development permitted in each zone, along with the road type on which a project is planned, are the critical factors in determining which elements of a Complete Street would be appropriate. In practice, all land uses do not fit neatly into the land use zone in which they are found and the boundaries between land use zones may not be precise. For this reason, the land use zones in the Lancaster County Transect are broadly defined areas with characteristics that generally define the uses in the zone.



T-1
Natural Area

T-2
Agriculture

T-3
Rural Centers

T-4
Suburban

T-5
Urban

T-6
Urban Center

T-7
Urban Core



T-1 Natural Areas

Healthy and functioning natural lands and ecosystems, including water resources, stream corridors, natural habitat areas, land with high scenic, recreational and natural resource value, and land unsuitable for development due to environmental constraints such as steep slopes, wetlands, floodplains, etc.

Example: Susquehanna River Hills





T-2 Agriculture

The most productive farmland with the greatest intensity of agricultural resources and uses as well as scenic and historic rural landscapes. This zone also contains agricultural land mixed with environmentally sensitive resources.



General Characteristics

Average Density: .03 dwelling units/acre

Housing: Single family detached, mobile homes

Business: Farming, agriculture-related, crafts

Example: East Earl Township farmland



T-3 Rural Centers

Areas of existing development to which new development not directly related to the rural economy is to be directed that otherwise would occur as rural sprawl. Four types of Rural Centers have been designated: Village Growth Areas, Cross-roads Communities, Rural Business Areas and Rural Neighborhoods.



General Characteristics

Average density: 2.5 dwelling units/acre

Housing: Single family detached, duplexes and mobile homes

Example: Village of New Providence



T-4 Suburban

This zone includes subdivisions built since World War II as well as developments consisting of lower intensity commercial, office, light industrial, and civic uses. The development pattern is one of low to moderate density residential development, typically single family detached dwellings with generally separate areas of semi-detached dwellings, townhouses, and apartments.

General Characteristics

Average Density: 5.5 units/acre

Housing: Single family detached, duplexes and townhouses, some multi-family housing

Example: Elm Tree, Rapho Township





T-5 Urban



North Duke Street, Lancaster City

This zone includes a mix of uses including commercial and possibly light industrial uses, civic and institutional uses, and higher density residential development including a significant amount of attached and multi-family dwellings. Mixed-use buildings with commercial uses on the ground floor and residential or office use in the upper stories are common.

General Characteristics

Average density: 7.5 dwelling units/acre

Housing: Single family detached, duplexes and townhouses

Example: North Duke Street, Lancaster City and Grandview Heights, Manheim Township



T-6 Urban Center

This zone includes the central business districts of boroughs, dense residential areas around the central business districts, dense city neighborhoods surrounding Lancaster City's Urban Core, and new town centers. Development includes a mix of uses including commercial and possibly light industrial uses, civic and institutional uses, and higher density residential development including a significant amount of attached and multi-family dwellings.

General Characteristics

Average density: 9.5 dwelling units/acre

Housing: Single family detached, townhouses and multi-family

Example: Lititz Borough





T-7 Urban Core

This zone is the most intensely urban of the T-zones and it is only found in the heart of Lancaster City—the Central Business District. The Urban Core is the focus of a Reinvestment Strategy directed toward sustaining the quality of life in the city by maintaining viable local office and retail centers, expanded employment opportunities, sound institutions, and public places, all supported by a growing tax base.

General Characteristics

Average density: 20 or more units/acre

Housing: Townhouses and multi-family units

Business: Central Business District commercial and retail businesses

Example: Lancaster City Central Business District



East King Street, Lancaster City

**ROAD CONTEXT:
COMPLETE STREETS TYPOLOGY**

A hierarchy also exists in the road network. The elements that go into creating a Complete Street will vary by road type and by land use type. The Complete Street elements that are needed may also change for the same road in various locations along its length. Marietta Avenue (PA 23) is a Community Arterial throughout its length but the character of the road changes depending on the land use context. Lancaster County decided to use the street typology

in the PennDOT *Smart Transportation Guidebook*, which follows the Federal Highway Administration’s Functional Classification System with some added categories. **Table 3** shows an illustrative comparison between the Complete Streets typology and the traditional functional classification system.

The remainder of this chapter describes each Complete Street road type and the Complete Street measures that are recommended for that road type.

Table 3: Lancaster County Complete Streets Typology

	<i>Regional Arterial</i>	<i>Community Arterial</i>	<i>Community Collector</i>	<i>Neighborhood Collector</i>	<i>Main Street</i>	<i>Local Street</i>	<i>Alley, Service Road</i>
Regional Arterial	●				●		
Minor Arterial		●			●		
Collector			●	●			
Local						●	●

Regional Arterial

Regional Arterials are designed to move large volumes of traffic. They are at the top of the street network hierarchy and motor vehicles are the priority transportation mode for which they are designed. However, provision of appropriate infrastructure along some sections of these roads will safely accommodate pedestrians, bicyclists and transit users. Residential and commercial buildings along Regional Arterials are often set further back from the road than along Community Arterials, Community Collectors and Main Streets and shopping centers and malls are often located along these roads. Regional arterials tend to be wider than Community Arterials and more difficult for pedestrians to navigate. On limited access highways such as PA 283 and US 30, bicyclists and pedestrians are prohibited. The look and design of a major arterial is different inside the boundaries of a borough or the City of Lancaster than outside those boundaries where vehicle speeds are higher and development is less concentrated.



Complete Street Elements

Desired Operating Speed	30–35 mph in urban cores and centers; 30–35 mph in urban zones except on suburban corridors where desired speeds range from 35–55 mph; 25–35 mph in suburban zones and 45–55 mph in rural and agricultural zones.
Number of Travel Lanes	2–6 lanes in urban core zones; 2–8 lanes in urban centers; 4–6 lanes on suburban corridors and in suburban centers; 2–4 lanes in village centers and neighborhoods; 2–6 lanes in suburban neighborhoods, rural and agricultural zones.
Lane Width	Lane widths of 10'–12' (14' outside lane if no shoulder or bike lane) in urban core and urban center zone; 11'–12' (14'–15' outside lane if no shoulder or bike lane) in an urban zone and suburban neighborhood; 11'–12' in rural centers, agricultural and natural zones.
On-Street Parking	On-street parking within the borough or city limits supports local businesses and provides a buffer between pedestrians and moving vehicles. An 8' width for parallel parking from the curb is recommended in all urban zones. Along suburban corridors, no standard is recommended. In agricultural and natural zones, no on-street parking standard is recommended.
Bicycle Lanes	5'–6' bicycle lanes are recommended in all zones except rural, agricultural and natural zones where no standard is recommended.
Sidewalks	Although Regional Arterials move volumes of traffic, they also have pedestrian activity, especially within borough or city boundaries where traffic speeds are lower and retail, commercial and residential developments line the street. A clear sidewalk width of 6'–12' (12'–20' total width) is recommended for urban cores and urban centers; 5'–6' clear width in urban centers along urban corridors and in suburban center zones (9'–12' total width in the suburban center); 4'–6' in village centers and village neighborhoods (12'–18' total width in the village center; 12'–16' in village neighborhood) and 5' clear and total width in suburban neighborhoods. In agricultural and natural zones, there is no recommended sidewalk width.
Buffer/Green Zone	Because vehicles travel at higher speeds on Regional Arterials, buffer/green zone of 4'–6' between the vehicle travel lanes or parking lane (if there is one) and the sidewalk in urban core, urban center and urban zones will provide safety for pedestrians, except along suburban corridors where a 6'–10' is recommended. In suburban neighborhood zones, the buffer should be 6' or more. In agricultural and natural zones, no standard is recommended. The buffer should consist of a different material, such as attractive brickwork, than the sidewalk or may be landscaped.
Curb and Gutter	Curb and gutter should be provided.
Median Strip	A 6'–8' median area for pedestrians is recommended (16'–18' for a left turn lane and pedestrian area) in all urban zones. In suburban zones, the pedestrian area remains at 6'–8' but a wider 16'–18' left turn lane and pedestrian area is the standard for a suburban zone. A 4'–6' median is recommended for rural center, agricultural and natural zones.
Crosswalks/Pedestrian Signals	Crosswalks and pedestrian signals should be provided at intersections to enable pedestrians to cross the street safely.
Block Length	Block lengths on Regional Arterials and may be 1000'–1200'. Within the city or borough limits, where there is significant pedestrian activity, a mid-block pedestrian crossing may be provided.

Other Elements to Consider

Traffic Calming Measures	Many traffic calming measures are not appropriate for Regional Arterials where the purpose is to move vehicles at higher speeds. Some forms of traffic calming such as streetside landscaping or changes in horizontal alignment can work to slow vehicles, particularly within the city or borough limits.
Bus Stops	Regional arterials are commonly served by bus transit with stops generally near the intersection and spaced about ¼ – ½ mile from each other.
Street Lighting	Street lighting should be provided to maintain safety for all users.
Utilities	Where possible, utilities should be located underground to maximize room on the sidewalks for pedestrians and provide an improved visual environment.

Community Arterial

Community Arterials, along with Community Collectors, are the most common type of streets in a community. They connect to and augment the Regional Arterials and serve trips of moderate length at a somewhat lower level of mobility than Regional Arterials. They are important streets to design for a variety of transportation modes, including driving, walking, bicycling and transit. Community Arterials are well-suited for transit service since they provide many connections to adjacent neighborhoods. In rural areas, Community Arterials work in conjunction with Regional Arterials to link rural areas to larger towns and cities. Schools, libraries, medical clinics and hospitals, government offices and religious structures are often located along these roads.



Complete Street Elements

Desired Operating Speed	25–30 mph in urban cores and centers; in suburban centers, higher operating speeds of 35–55 mph along suburban corridors are recommended. In suburban neighborhoods, desired operating speeds of 25–35 mph are recommended. In rural centers agricultural and natural zones, desired operating speeds of 35–55 mph are recommended.
Number of Travel Lanes	2–4 lanes are the recommended standard in all zones. Three lanes are common with one in each direction and a center turn lane, which may be landscaped.
Lane Width	Lane widths of 10'–12' (14' outside lane if no shoulder or parking lane) except in rural center, agricultural and natural zones where 11'–12' lanes are recommended.
On-Street Parking	On-street parking supports local businesses and provides a buffer between pedestrians and moving vehicles. A 7'–8' width for parallel parking is recommended in all urban zones. For angled parking, different dimensions are recommended depending on the width of the outside lane. No standard is recommended for rural centers, agricultural and natural zones.
Bicycle Lanes	5'–6' bike lane is recommended in all urban and suburban zones which allows bicyclists to ride safely separated from the moderate to heavy traffic flow. Where on-street parking exists, the 6' width may be preferred. In rural center, agricultural and natural zones, no standard is recommended.
Sidewalks	In urban cores and centers, with their large numbers of pedestrians, a clear sidewalk width of 8'–14' (14'–22' total width) is recommended. Along suburban corridors and in suburban centers, a narrower width of 5'–6' is recommended. In suburban neighborhoods, a 5' clear sidewalk width is recommended. In rural centers, agricultural and natural zones, sidewalks may or may not be provided and no width is recommended.
Curb and Gutter	Curb and gutter should be provided.
Median Strip	Medians are common with a 6'–8' area for pedestrians or 12'–18' for both a left turn lane and pedestrian area in urban core and urban center zones. In urban and suburban zones, the pedestrian area remains at 6'–8' but total area for left turn lane and pedestrian area is 12'–18'. Rural, agricultural and natural zones, a 4'–6' median is recommended.
Crosswalks/Pedestrian Signals	Crosswalks and pedestrian signals should be provided at intersections.
Block Length	Block lengths should be limited to 600' to promote easy street crossing for pedestrians. Mid-block crossings should be considered for blocks over 600' long.

Other Elements to Consider

Traffic Calming Measures	On-street parking, curb extensions and short block lengths may be provided.
Bus Stops	Community Arterial streets often have bus stops.
Street Lighting	Street lighting should provide sufficient light for vehicular and pedestrian safety and be in a style that fits the historic or other special character of the area.
Utilities	Where possible, utilities should be located underground to provide more space for pedestrians.

Community Collector

Community Collectors, along with Community Arterials, are the most common type of roads in communities. They serve an important function, enabling people to move from local neighborhood streets to larger roads that connect to commercial and retail areas and often direct traffic onto or off of state routes. While these roads handle large traffic volumes, they are important streets to design for a variety of transportation modes, including driving, walking, bicycling and transit. To promote a pedestrian-friendly environment, non-residential structures should be oriented towards and located close to the street. Parking should be behind or to the side of buildings or the buildings may rely upon on-street parking. This avoids a large sea of parking facing the road and puts pedestrians on the sidewalk close to building entrances. Residential structures should also face the street and provide easy entry from the sidewalk.



Complete Streets Objectives:

- Balance safety, comfort, and service for all modes
- Perform an important mobility function in the larger network
- Vehicle capacity not to be expanded/some congestion expected
- High-quality pedestrian environment
- High levels of transit accessibility
- Accommodate bicycles separate from vehicles in bike lanes, where possible

Complete Street Elements

Desired Operating Speed	25–30 mph in all urban and suburban zones; 35–55 mph in rural centers, agricultural and natural zones.
Number of Travel Lanes	2–4 lanes except in rural centers, agricultural and natural zones where 2 lanes are standard.
Lane Width	Lane widths of 10'–11' (14' outside lane for a bike route) in all urban zones; 11'–12' along a suburban corridor; 10'–12' in a suburban neighborhood; 11'–12' in rural centers, agricultural and natural zones.
On-Street Parking	On-street parking supports local businesses and provides a buffer between pedestrians and pedestrians and moving vehicles. A 7'–8' width from the curb for parallel parking is recommended for all urban zones; 7' width is recommended for suburban neighborhoods. No parking width standard is recommended for rural center, agricultural and natural zones.
Bicycle Lanes	5'–6' bike lane is recommended for all urban zones; 5' for suburban neighborhoods. No standard is recommended for rural center, agricultural and natural zones. Lanes should be indicated on the road by striping and signage.
Sidewalks	Sidewalks are important to support pedestrian activity. A 6'–10' clear sidewalk width (12'–18' total width) is the recommended standard for urban cores and urban centers; 5'–6' clear width (and total width) for a suburban corridor and 4'–5' clear width (and total width) for a suburban neighborhood; no standard is recommended for rural center, agricultural and natural zones.
Curb and Gutter	Curb and gutter should be provided.
Median Strip	A median may be provided with 6' for pedestrians and 12'–16' total for left turn lane and pedestrian area in all urban zones and suburban neighborhood zone; 4'–6' in rural centers; no standard is recommended for agricultural and natural zones.
Crosswalks/Pedestrian Signals	Crosswalks and pedestrian signals should be provided at intersections.
Block Length	Block lengths should be limited to 600' to promote easy pedestrian crossing of the street. Mid-block crossings should be considered for blocks over 600' long.

Neighborhood Collector

Neighborhood collectors are streets that enable people to move from local neighborhood streets to larger roads that connect to commercial and retail areas. While similar in purpose to the Community Collector, Neighborhood Collectors carry less traffic and don't connect to state routes. Because they go into local neighborhoods, they are important streets to design to accommodate walking, bicycling and transit as well as driving. To promote a pedestrian-friendly environment, non-residential structures should be oriented towards and located close to the street. Parking should be behind or to the side of buildings or the buildings may rely upon on-street parking. This avoids a large sea of parking facing the road and puts pedestrians on the sidewalk close to building entrances.

Complete Streets Objectives:

- Balance safety, comfort, and service for all modes
- Perform an important mobility function in the larger network
- Vehicle capacity not to be expanded/some congestion expected
- High-quality pedestrian environment
- High levels of transit accessibility
- Accommodate bicycles separate from vehicles in bike lanes, where possible



Complete Street Elements

Desired Operating Speed	25–30 mph in all urban zones and suburban zones; 20–35 mph is the desired operating speed except in rural centers, agricultural and natural zones.
Number of Travel Lanes	2 lanes are the recommended standard for all zones.
Lane Width	9'–11' width with a bike lane (14' for a bike route) in urban cores and urban centers; 9'–12' width in urban zones; 10'–11' width in suburban neighborhood, rural center, agricultural and natural zones. Where on-street parking is provided, the higher end of the range provides added room for car doors to open.
On-Street Parking	A 7'–8' width from the curb for parallel parking is recommended for all urban zones; angled parking may also be provided with the standard dependent on the width of the outside lane. For suburban corridors and suburban centers, parking is usually supplied off-street. In rural centers, agricultural and natural zones, no standard is recommended.
Bicycle Lanes	A 5' bike lane width is recommended for urban core, urban center and suburban neighborhood zones and 5'–6' for urban zones; in rural centers, agricultural and natural zones, no bike lane standard is recommended.
Sidewalks	A 6'–8' clear sidewalk width (12'–16' total width) is recommended in urban cores and urban Centers; 4'–5' clear and total sidewalk width in suburban neighborhoods; no standard is recommended for rural centers, agricultural and natural zones.
Curb and Gutter	Curb and gutter should be provided.
Median Strip	6'–8' for a pedestrian area and 8'–10' when the median includes landscaping in urban cores and urban center zones. No median standard is recommended for suburban corridors, rural centers, agricultural and natural zones.
Crosswalks/Pedestrian Signals	Crosswalks and pedestrian signals should be provided at intersections.
Block Length	Block lengths should be limited to 600' to promote easy pedestrian crossing of the street. Mid-block crossings should be considered for blocks over 600' long.

Main Street

A Main Street is the central corridor in a community and focal point of retail and commercial business. Main Streets have been and remain a traditional part of towns and villages. Main Streets are lined with many uses: restaurants, bookstores, pharmacies, cafés, clothing stores, antique shops, offices and a variety of other small businesses. Communities tend to keep large chain stores off of Main Streets and to favor individually-owned businesses which contribute to and reflect the unique character of the town or village. Sidewalks are a critical element of the environment and need to be wide enough to accommodate large numbers of people. The buildings along Main Streets are often developed as mixed-use buildings with retail/commercial on the bottom floor and residential space above. This serves to create activity in the area throughout the day and in the evening.

Design standards for Main Streets should support a pedestrian environment by requiring buildings to be constructed to the front lot line with parking behind the building. Main Streets generally require a consistency in the architecture and design that maintains a harmonious environment supportive of the traditional character of the town or community. Main Streets are typically two-lanes with a speed limit of 20–25 mph. Provision of on-street parking, crosswalks, short block lengths and traffic-calming measures such as bulb-outs at intersections contribute to a pedestrian-friendly environment. Amenities such as benches, attractive street lighting and places for people to gather are also elements of a vibrant Main Street.

Main Streets in many of Lancaster County’s smaller communities are state-owned highways, where rural highways or principal arterials pass through the community’s historic commercial district. Design, operation and maintenance of these streets are controlled by PennDOT and subject to PennDOT’s design standards and policies. Road features that a community or municipality wants to see implemented may conflict with the traditional



state standards. In recent years, however, PennDOT officials, like those in other state DOTs, have become more sensitive to the value that communities place on their Main Streets and may be amenable to working with the community to apply flexibility in their road design standards for a particular project. Listed below are several steps that will help a community achieve successful planning and implementation of walkable Main Streets on state highways (source: ITE):

- Involve PennDOT District 8 officials in the early stages of planning and redevelopment projects located adjacent to a state highway;
- Work collaboratively with PennDOT and all other stakeholders to define a vision, goals and objectives and identify a purpose and need statement for the project;
- Identify potential conflict areas early in the process and develop an early consensus on the concept plan and non-standard design features so they don't delay the project in its last stages of planning and design;
- Discuss design flexibility with the state's design engineers and establish the ranges of acceptability prior to developing street designs; and,
- Be knowledgeable of PennDOT's project design and design exception processes since they will be key to the success of your project.

Complete Streets Objectives:

- High-quality pedestrian environment
- Congestion is accepted as a positive traffic-calming effect
- Frequent and convenient transit service
- Bicycles are accommodated in some manner, preferably separated from vehicles in bicycle lanes if feasible
- Support businesses through right-of-way design

Complete Street Elements

Desired Operating Speed	20–25 mph.
Number of Travel Lanes	2 lanes (one in each direction) typically maintain a Main Street that provides for vehicular traffic needs but keep streets narrow enough for pedestrians to feel secure crossing the street.
Lane Width	10'–12'; a 14' curb lane is also possible.
On-Street Parking	On-street parking supports local businesses and provides a buffer between moving traffic and pedestrians. A 7'–8' width from the curb is recommended for parallel parking. Where adequate right-of-way exists and parking demand exceeds the amount of available space, angled can provide more spaces than parallel parking.
Sidewalks	Sidewalks may be the single most important element on Main Street and should be 6'–14' in width unobstructed (12'–22' total width) and may be wider where pedestrian volumes are heavy. Where amenities such as sidewalk dining exist, the unobstructed sidewalk width can be reduced.
Buffer/Green Zone	A 4'–6' buffer space should be provided for trees, lighting, benches and transit.
Curb and Gutter	Main Streets typically have curb and gutter.
Median Strip	Medians are usually not appropriate for Main Streets where the desired street width is not wide. Medians may sometimes be needed where there is a third travel lane or in areas that require special treatment for aesthetics.
Crosswalks/Pedestrian Signals	Crosswalks and pedestrian signals should be provided at intersections to enable pedestrians to cross the street safely. Mid-block crossings should be considered for blocks over 600'.

Other Elements to Consider

Utilities	Utilities should be placed underground, where possible, which leaves more space on the sidewalk for pedestrians and is visually more pleasing.
Curb Extensions	Curb extensions reduce pedestrian crossing distance at busy intersections.

Local Street

The primary function of a Local Street is to provide access to residences and local businesses such as cafés, bookstores and pharmacies and small markets. The vast majority of Local Streets provide access to residences, either single family or townhouses. Local Streets are designed for low traffic volumes and slow travel speeds. Infrastructure to support walking and bicycling is a high priority and block lengths are typically short which support the use of these modes. On the other hand, many suburban residential developments that have been built since the 1950's were designed with long curving streets and cul-de-sacs that do not provide a high level of connectivity. The new focus on smart growth and active transportation is seeking to change the design of new residential developments to provide greater connectivity in the street network. Trees and grass buffers between the street and sidewalk add to the aesthetics and value of a neighborhood. These streets may have frequent driveway cuts to provide access to the homes. In the older neighborhoods of Lancaster County, houses may not have driveways and residents park their cars on the street. Transit service is not provided on Local Streets but sidewalks enable people to walk to transit stops on nearby arterials. The intent in the design of Local Streets is to maintain a narrow curb-to-curb width but one that is sufficient for on-street parking (on at least one side) and to accommodate delivery trucks, school buses and emergency vehicles.



Complete Streets Objectives:

- Provide livable streets for residents
- Support a safe pedestrian environment for neighborhood adults and children
- Provide on-street parking for residents, visitors and customers of local businesses
- Safely accommodate bicycles

Complete Street Elements

Desired Operating Speed	20–25 mph in urban and suburban neighborhood zones; 20–30 mph in rural centers, agricultural and natural zones.
Number of Travel Lanes	2 lanes.
Lane Width	Local residential streets lane widths typically range between 9'–11' without a bike lane (12'–14' without a bike lane or shoulder for a bike route) in all urban zones. In suburban neighborhoods, road widths may vary from a “wide” road of 34'–36' width with two travel lanes and parking on both sides to a “medium” road of 30' width with one 12' travel lane and parking on both sides of the road to a “skinny” road of 20' width with one travel lane and parking on one side of the road. In rural centers, agricultural and natural zones, a 9'–11' width is recommended.
On-Street Parking	On-street parking is important especially in Lancaster County's many older, historic neighborhoods where many houses lack driveways and garages. On-street parallel parking of 7'–8' also serves as a traffic calming measure that slows travel speeds.
Sidewalks	A 6'–8' clear width (11'–15' total width) is recommended for urban zones. In suburban neighborhoods, a 4'–5' clear sidewalk width (11'–15' total width) is recommended. No sidewalk width standard is recommended for rural center, agricultural and natural zones.
Buffer/Green Zone	In urban zones, a 3'–5' buffer/green zone is recommended in urban zones; in suburban neighborhoods, a 4'–5' buffer is recommended and in rural centers, agricultural and natural zones, no buffer/green zone is recommended.
Curb and Gutter	Curb and gutter should be provided.

Special Road Types

Industrial Street

Industrial areas may be located in an urban, suburban or rural land use zone. These streets provide access to manufacturing or warehouse/distribution uses. Accommodating large trucks that need to use these roads is a primary consideration in the design of Industrial Roads. Travel lanes should be 12' wide, generally with curb and gutter. On-street parking, if it is provided at all, is usually only on one side of the street.



Alleys and Service Roads

Alleys and service roads are narrow lanes or passage ways, mainly used by residents and businesses that border the alley, that extend between or behind buildings in the older parts of cities and towns. They may provide local residents with access to their garages and access for smaller trucks to deliver goods to houses and businesses. Because of their narrow width and very low traffic volumes, some alleys can be improved to serve as safe routes for pedestrians and bicyclists who wish to stay off busy urban streets. Because of their historic nature, the City of Lancaster and the county's boroughs have an extensive network of alleys and service roads. Elizabethtown Borough has used some of its alleys as part of the bicycle-pedestrian pathway that the borough is constructing that will extend from the train station in the western part of the borough, through downtown to the Elizabethtown Area School District Campus in the east.

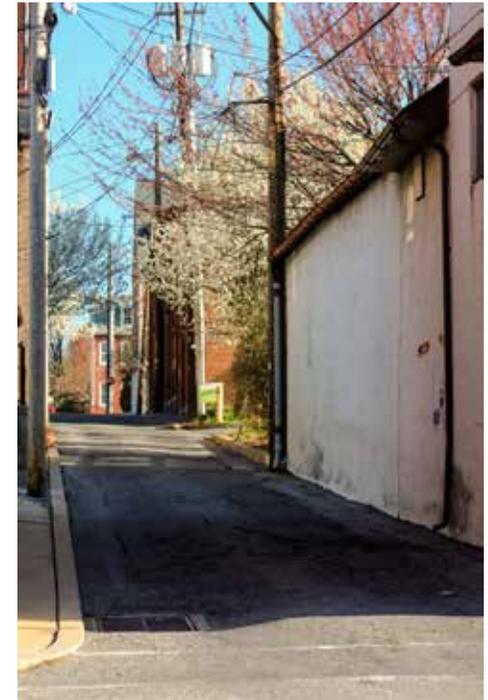


Table 4: Complete Streets Elements Appropriate for Each Type of Road

<i>Transect Zone</i>	<i>Regional Arterial Community Arterial Community Collector</i>	<i>Neighborhood Collector</i>	<i>Main Street</i>	<i>Local Street</i>
T-1 Natural Area	A, B, E, G, L	A, B, G, L	N/A	A, B, G, L
T-2 Agricultural Zone	A, B, E, G, L	A, B, G, L	N/A	A, B, G, L
T-3 Rural Center	A, B, E, F, G, L	A, B, F, G, L	All but J	A, B, G, L
T-4 Suburban Neighborhood	All but J	All but J	All but B, E	All but D, E
T-5 Urban Neighborhood	All elements	All elements	All but B, E	All but D, E
T-6 Urban Center	All elements	All elements	All but B, E	All but D, E
T-7 Urban Core	All elements	All elements	All but B, E	All but D, E

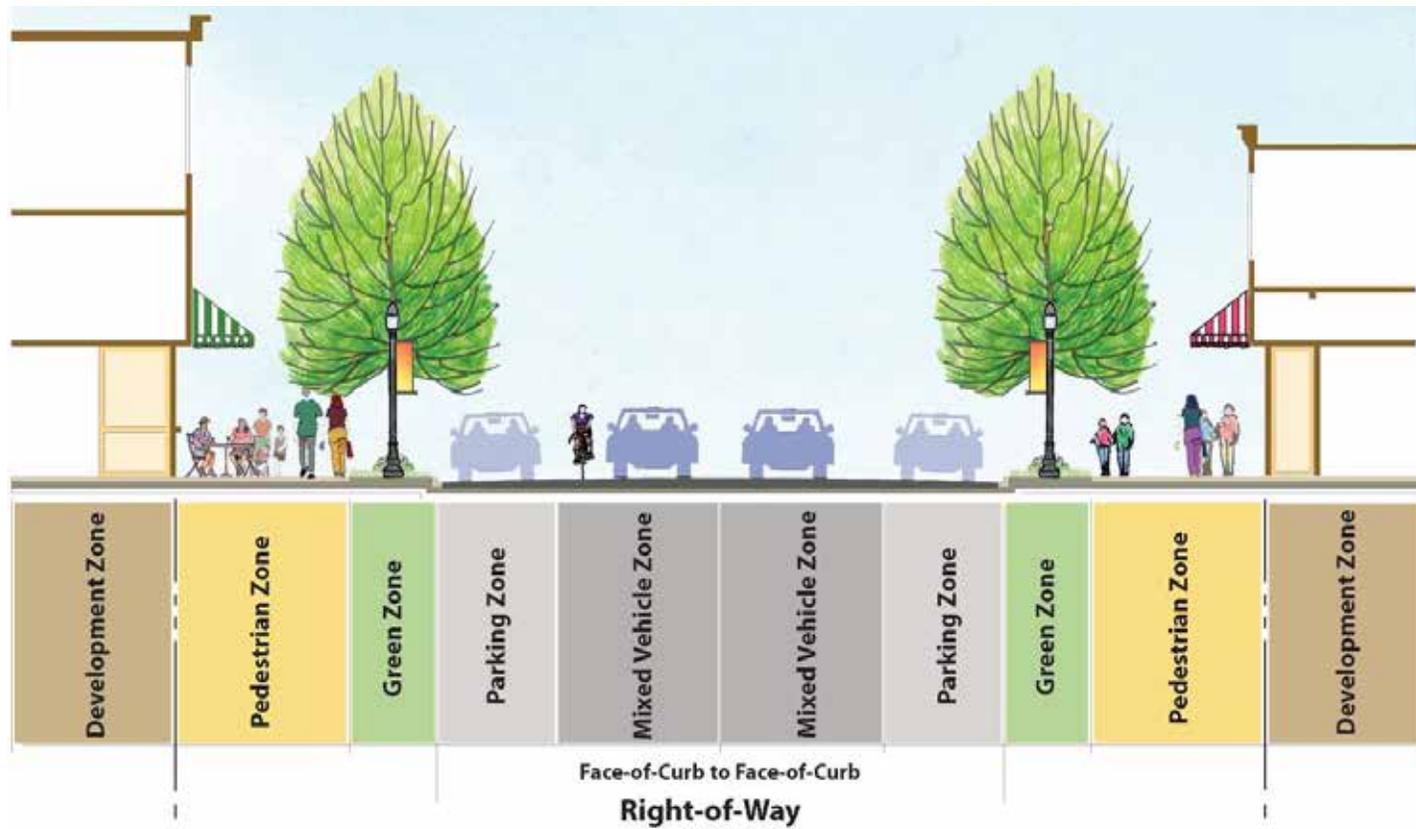
Complete Streets Elements Key					
<i>Identifier</i>	<i>Complete Street Element</i>	<i>Category</i>	<i>Identifier</i>	<i>Complete Street Element</i>	<i>Category</i>
A	Lane Width	Roadway	H	Clear Sidewalk Width	Roadside
B	Paved Shoulder Width	Roadway	I	Buffer/Green Zone	Roadside
C	Parking Lane	Roadway	J	Shy Distance	Roadside
D	Bike Lane	Roadway	K	Total Sidewalk Width	Roadside
E	Median	Roadway	L	Desired Operating Speed	Roadway
F	Curb Return	Roadway	M	Paved Roadway Width (locals only)	Roadway
G	Number of Travel Lanes	Roadway			

5 Context and Design of the Street and Pedestrian Zones

This chapter provides a description of the context for the design of Complete Streets, particularly the elements of the “street zone” which includes the travel lane, shoulder, parking lane, median and bicycle lane and the “pedestrian zone” which

includes the sidewalk, buffer or green zone, crosswalks and pedestrian signals. The zones for a typical Main Street are illustrated below with three “pedestrian zones” and two “street zones.” The land use zone in which the Main Street is

situated sets the context for the road and helps determine whether all zones are present. For other road types such as a Community Collector or Neighborhood Collector different zones would be appropriate.



ELEMENTS OF THE “STREET ZONE”

Travel Lanes

For many decades, engineers in the U.S. have been designing roads to move as many cars as possible at the fastest speed possible while maintaining driver safety. They have relied on functional classification, traffic volume and design speed as the determinants for design of the street. As cities and communities become

engaged in creating more livable communities with streets where pedestrians and bicyclists share the road safely with motor vehicles, a rethinking of traditional street design guidelines has taken hold. Increasingly, planners and engineers are looking at the land use context, as well as the road type, to determine the best design for the street. They are also rethinking speed limits and installing measures to “calm traffic” along certain roads to make them safe

for pedestrians and other users of the roads. The primary function of a Regional Arterial outside the urban core or urban center of a city is to move large numbers of vehicles at high speeds. Pedestrians and bicyclists may even be prohibited from using the road because the high vehicle speeds pose a danger to them. Most other road types, however, are used and often heavily used, by pedestrians, bicyclists, transit users, the elderly and youth. For these, flexibility

*(below left) Existing and (below right) proposed conditions from **Complete Streets Chicago** which highlight elements which contribute to an improved street zone for the neighborhood.*



in the design standards for lane width, speed limit and inclusion of sidewalks, crosswalks, bike lanes and other infrastructure enables the road to be enjoyed by all users while contributing to quality of life, environmental, social equity and other goals of the community. The Complete Streets concept embraces this multi-functional role of streets and supports the introduction of some flexibility in street design standards.

The Complete Streets concept recognizes that design standards may need to change along

the length of a corridor, based on the land use context, even though the street classification remains the same. This concept challenges the conventional design process used by many state and municipal agencies, which applies a single roadway cross-section, based on functional classification, to a road regardless of the context.

- **Reduced number of lanes through right sizing.** Right sizing generally refers to a reduction in the number of motor vehicle lanes, and may also include reduced lane width,

on a street to help slow traffic and create space for a bike lane, median, on-street parking or other infrastructure. Right sizing typically involves converting a four lane arterial or collector into three lanes made up of two through lanes and a center turn lane, and may include the addition of a bicycle lane. Right sizing has particular benefits for pedestrians and bicyclists by reducing the street width to be crossed. Motorists also benefit by having to slow their travel speed in a congested urban area, reducing the likelihood of an accident with a vehicle



CH2M Hill and City of Lancaster

(left) An early concept of proposed changes to Mulberry Street, Lancaster. Additions include a northbound bike lane and sharrow on the southbound lane, intersection bumpouts with green infrastructure for stormwater management, and defined parking lane.

waiting to make a left turn or with a bicyclist or pedestrian.

Parking Lanes

On-street parking supports local businesses in the urban zones by providing a convenient location for customers to park near the business they wish to visit. It also provides a buffer between moving traffic and pedestrians on the sidewalk, which enhances their safety. On-street parking provides a visual cue to

motorists to slow down because they are in a busy urban area. On-street parking is appropriate for all zones except the agricultural zone or along a busy suburban corridor.

- **Parallel parking.** A parallel parking space is typically 7'–8' wide and 22'–24' in length. The wider dimension is recommended on streets with heavy traffic volumes while the 7' width is acceptable on neighborhood streets and commercial streets with lower traffic volumes.

- **Angled parking.** Angled parking has gained popularity in recent years because it provides more parking spaces in a given area than parallel parking. Angled spaces are usually 8.5' wide. Angled parking can be used on one or both sides of the street and may be used on Community Arterials and community and Neighborhood Collectors that have lower traffic volumes and speeds. Some communities have implemented back-in angled parking that allows



(left) Head-out angled parking on College Avenue, Lancaster.

(right) Head-in angled parking in Ephrata.



the driver easily exit the space and to have the trunk of the car facing the sidewalk for easy loading of packages.

Shoulders

The shoulder is the part of the road adjacent to the outer lane. It provides space for vehicles to stop or park when they experience mechanical problems, for emergency vehicles to get around traffic and other purposes. In the urban core zone, streets often have no shoulders. On-street parking or a bike lane may be provided and serve as a buffer between moving traffic and pedestrians. Wide shoulders of 8'–10' width are typical on high-speed, high volume roads such as Regional Arterials and Community Arterials in rural centers and agricultural zones. In the urban core and urban center, a narrower shoulder width of 4'–6' on Regional Arterials and Community Arterials is recommended if

no on-street parking or bike lane exists. For collectors and local roads, no shoulder standard is recommended.

In Lancaster County, with its sizable Amish and Mennonite communities, a wide shoulder provides space for the slow-moving horse and buggies to proceed safely without slowing the motorized vehicle traffic stream. A shoulder width of 8' or more is recommended where there is frequent buggy traffic, particularly on

Community Arterials and Community Collectors. These wide shoulders also provide a safe space for bicyclists.

Bicycle Lanes

Encouraging “active transportation” such as bicycling is fundamental to the Complete Streets concept. Consideration of striping a road for a bike lane or installing signage for a share the road bike route should be a routine part of street projects except on roads where bicyclists are

(right) A wide shoulder provides space for the slow-moving horse and buggies to proceed safely without slowing the motorized vehicle traffic stream.



prohibited by law. Bike lanes can be included in projects ranging from new construction to simple resurfacing maintenance projects. The recommended width for a bike lane on all road types is 5'–6'. The 5' width is standard while the wider width is recommended where a significant number of trucks make up part of the traffic. In Lancaster County there is growing recognition of the role bicycles can play in reducing short vehicle trips. Lancaster County adopted a Bicycle and Pedestrian Plan in 2000, which will be updated in 2015–2016. The county also has a Lancaster County Bicycle Map.

Three types of bicycle facilities are generally recognized: Shared Roadway routes, Bicycle lanes and Bicycle paths.

- **Shared roadway.** There are no markings on the pavement to indicate the presence of bicyclists but there may be signs indicating that the road is designated as a bicycle route. The suitability of a road for bicycling depends on a number of factors including the volume and speed of vehicle traffic, width of the shoulder and amount of truck traffic. Most bicycle trips

take place on roads where bicyclists share the travel lane with motor vehicles or ride on the shoulder. Lancaster County Bicycle Map helps bicyclists because it rates the county's roads for suitability for bicycling. Shared Roadways can be categorized into two types:

1. **Paved shoulder.** Similar to a bicycle lane. The minimum width is 4'. For roads with higher volumes of traffic and higher speeds, a wider shoulder is recommended.



(right) Striped bike lane on Fruitville Pike bridge.

(far right) Designated bike route in West Hempfield Township.



2. **Wide outer (curb) lane.** Wide curb lanes offer a practical way to provide a bicycle facility where right-of-way is limited. They have less potential for encouraging bicycling than a paved shoulder or a striped bicycle lane but are used and often preferred by experienced bicyclists. The recommended width for the outer travel lane or curb lane on most streets is 14'. For roads with speeds above 40 mph, a 15' width is recommended. For lower speed, lower volume urban roads, a 12' outer travel lane can accommodate bicyclists safely.

- **Bike lane.** A bike lane is a striped lane on the road to indicate an area of the road designated bike lane in West Hempfield Township dedicated primarily or solely for use by bicyclists. On busy streets, the striped bike lane provides safety for bicyclists and may

(right) Bicycle trail in Warwick Township at Clay Road.

(far right) Several bicycle riders on the Manor Township portion of the Enola Low Grade Trail.

help to encourage many users to try bicycling for commuting or other purposes who otherwise would be too concerned about riding in the motor vehicle travel lane. Bike lanes also provide notice to vehicle drivers to expect the presence of bicyclists on the road. Bike lanes accommodate bicycle travel in one direction only and are located on the outside of the travel lane. Bike lanes should not be installed between the parking lane and the sidewalk because it obstructs the visibility of the bicyclists to motorists at approaches to intersections. Also, bicyclists needing to make a left turn would be starting at the right curb which



is not an ideal place to start.

- **Off-road bicycle path.** Off-road bicycle paths are just that—they are paths located off the main road for use by bicyclists, pedestrians and other users. They are often referred to as multi-use trails or greenways.



Many have been constructed along abandoned rail rights-of-way such as Junction Trail in East Hempfield Township and the Enola Low Grade Railroad Trail that is under development across the southern end of Lancaster County. Many multi-use trails primarily serve a recreational function because they are limited in the number of access points they have. The Enola Low Grade Trail and the Lancaster County Northwest River Trail, however, connect several boroughs and townships and will serve as potential routes

for bicycle commuters and those traveling for shopping or other purposes.

Medians

The primary function of a center median is to provide a separation between opposing lanes of traffic. Medians can be traversable or non-traversable. The recommended width of a median to serve as a refuge for pedestrians ranges from 6'–8'. A median width of 12'–18' can accommodate a left turn lane as well as the pedestrian refuge area, depending on the road

type. For specifications, see Chapter 4.

- **Non-traversable median.** These are the safest types of medians as they permit left turns only at an intersection or other opening in the median. On a busy arterial, the non-traversable median may be simply a concrete barrier, as you see on PA 283. Non-traversable medians can be raised above the road surface with curbing.
- **Traversable median.** A traversable medi-



(far left) Proposed Lincoln Highway / US 30 planted triangle median, East Lampeter Township.

(left) Traversable median turning lane on Fruitville Pike in Manheim Township.

an is a painted median lane that permits vehicles to make left turns along its length. While less expensive to construct than a non-traversable median, it can be less safe because vehicles are turning at locations all along the road, but it is still safer than busy roads that don't offer any median at all. The traversable median also doesn't offer the aesthetic and pedestrian benefits that non-traversable medians do.

Curb Return

On major roads such as Regional Arterials where motor vehicles are of primary importance, the radius of a corner at an intersection should be large enough to safely allow both cars and trucks to turn without encroaching on the adjacent lane or sidewalk, if one is provided. However, the turning radius shouldn't be too large because it increases the crossing distance for pedestrians and allows vehicles to turn more rapidly, adding to the exposure of pedestrians to vehicles. Engineers recommend that the turning radius be

designed to accommodate the largest vehicle type that will "frequently" turn at the intersection. By similar logic, the curb return should not be too small as to cause vehicles,

particularly trucks that use the road, to regularly encroach on the adjacent lane or go up on the curb and sidewalk where pedestrians may be present.



(right) Sidewalks are the single most important infrastructure element to support pedestrians. Sidewalks should be required along all roads with developed land use.

PEDESTRIAN-RELATED ELEMENTS

Sidewalks

Sidewalks are the single most important infrastructure element to support pedestrians. Research has shown that sidewalks reduce pedestrian crashes with motor vehicles. In

Lancaster County, there were 646 crashes from 2006–2010 that involved pedestrians. The vast majority did not result in fatalities, but measures to improve pedestrian safety such as sidewalks and street lighting will reduce the incidence of all accidents involving pedestrians. Given the concentration of

people in urban areas, it is not surprising that most pedestrian accidents occur in urban areas: 85 percent according to one nationwide study. In suburban and rural areas, approximately 15 percent of pedestrian accidents occur when a pedestrian is struck while walking along a road.



The best strategy to encourage walkable communities is to require sidewalks along all roads with developed land uses. At the state level, PennDOT’s **Smart Transportation Guidebook** states that “sidewalks should be considered very early in the planning process to ensure that adequate funding is programmed.” At the municipal level, the installation of sidewalks falls within the municipality’s authority to regulate new land development and associated infrastructure. A review of the SALDOs of Lancaster County municipalities reveals that the vast majority

(left) Proposed Lincoln Highway / US. 30 improvements. Top of image: before. Bottom of image: after.

AECOM

Municipalities should deny requests for waivers from sidewalk requirement in suburban areas. As a network of sidewalks becomes available, more and more people are likely to walk for some of their trips.

require construction of sidewalks on both sides of the street in residential areas and to provide access to and within commercial and industrial areas and community facilities. They also require sidewalks to continue an existing sidewalk network. Developers in suburban areas frequently seek waivers from the sidewalk requirement on the grounds that people rely on driving and don't walk in these areas. Municipalities should deny these exemptions. As a network of sidewalks becomes available, more and more people are likely to walk for some of their trips. An essential way for municipalities to improve walkability, therefore, is to make improvements, where needed, to their SALDOs and then enforce the requirements.

The recommended clear sidewalk width (the

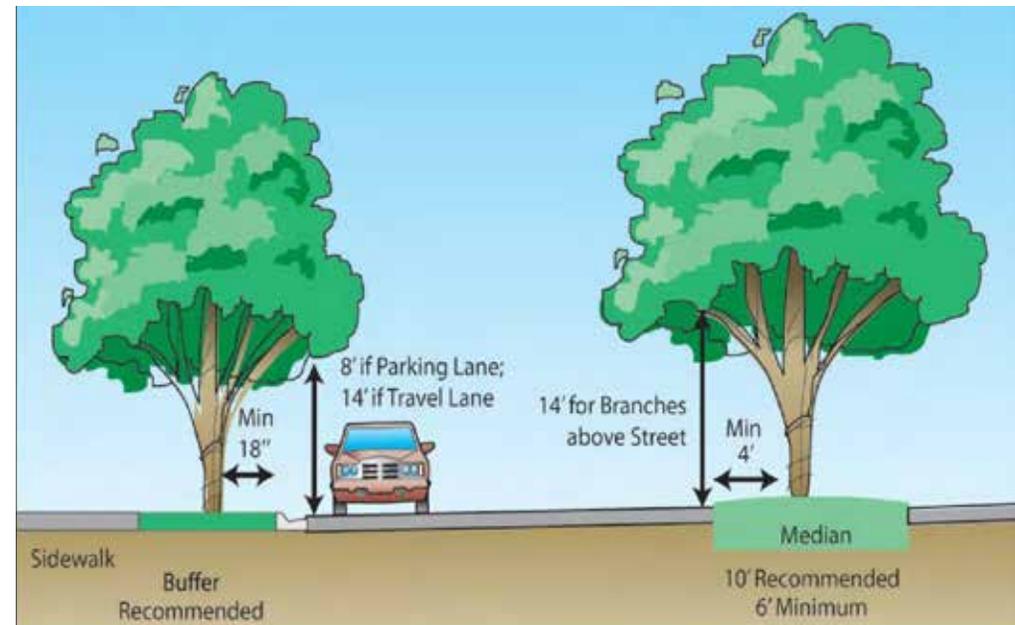
area of the sidewalk that is unencumbered by benches, trees, and other street furniture and not directly next to the buildings) ranges from 6'–14' depending on the road type and land use zone. For a complete listing of recommended standards for each zone and road type, see the descriptions of the various road types in Chapter 4. The **Americans with Disabilities Act Accessibility Guidelines** and the **Public Rights of Way Accessibility Guidelines** are critical to follow in the

design of sidewalk widths and curb cuts at intersections. Because of the requirement for “periodic passing spaces” of 5 feet in width, local governments are increasingly requiring 5 feet as the recommended minimum width for sidewalks. In significantly constrained areas, a sidewalk width of 4 feet can be considered.

Buffer or Green Zone

The presence of a buffer or green zone adds to the comfort and amenity of the pedestrian

(right) Typical buffer or “green zone” widths and tree canopy minimum overhead clearances.



zone by providing shade trees and other forms of landscaping as well as benches and safe places for transit patrons to wait for the bus. Landscaping is important because it integrates the street into the surrounding environment. In addition, trees provide a sustainable way of absorbing rainfall and reducing storm water runoff. They filter runoff from the roads before it enters the water collection pipes or nearby streams. Street trees planted in the right-of-way between the curb and sidewalk are another effective green street measure. It is estimated that trees absorb the first 30 percent of most precipitation through their leaves which then evaporates back into the atmosphere. This moisture never reaches the ground. Up to another 30 percent of precipitation is absorbed into the ground and taken in and retained by the root structure of the trees. This is later transpired back to the air.

In the urban core and urban center, a buffer zone of 4'–6' is recommended for all road types except Local Streets in an urban center

(right and far right) Acorn-style street lamps enhance community character and safety in Ephrata and Millersville.



where a narrower buffer is acceptable. For recommended standards, refer to the road type descriptions in Chapter 4. For curbed roads in urban and suburban contexts, the trees should be planted next to the street. At maturity, the trunks of the trees should be at least 18" from the curb. This provides space for car doors to open without interference from the trees. In rural centers, agricultural and natural land use areas, a buffer zone is probably not applicable. The minimum recommended spacing between trees is 15' though spacing typically ranges from 30' to 50'. On downtown retail streets, the spacing should not exceed 30'–40' in order to create

shade and comfort for pedestrians.

Other landscaping options in the buffer zone include planting of shrubs, flowers, ornamental trees and ground cover plants. The cost of maintenance should be a consideration in the selection of landscaping plants. Commercial areas typically desire plantings that don't require a lot of maintenance or water. A larger budget for landscaping allows for more variety and more attractive plantings.

Lighting

Lighting along the sidewalk is important for the safety of pedestrians and bicyclists

as well as for drivers of motor vehicles to ensure that they can clearly see the pedestrians and other non-motorized users. Without good lighting, pedestrians will not feel safe walking around a downtown commercial area at night to the detriment of the economic vitality of the downtown. The selection of lighting style should complement the character of the area in which it is installed. Historic lighting fixtures enhance and call attention to the historic nature of a downtown street or area. Street lighting should not be glaring but bright enough to make pedestrians feel safe.

Crosswalks

Pedestrian crossings are any location where the pedestrian leaves the sidewalk and enters the road. It is where the pedestrian's and the motorist's paths of travel cross. Pedestrian crossings include mid-block crossings and street intersections. In addition to the geometric design of the intersection, pedestrian safety also relies heavily on the information that is provided to pedestrians (e.g., signs or signals). All pedestrians, including people with vision impairments, need the same information at an intersection. Providing vital information in multiple, accessible formats (e.g., visual,

auditory, tactile) also benefits all pedestrians since information is better recognized and remembered if it is understood by multiple senses. Designing an effective pedestrian crossing involves the correct layout of a variety of elements including:

- Crosswalks
- Information/signs, signals and markings
- Turning radius
- Signal timing
- Curb ramps
- Sight lines
- Traffic patterns



(far left) Crosswalks on George and Frederick Streets, Millersville, visually define the pedestrian area of the street.

(left) Speed table on College Avenue, Lancaster City.

Each of these elements should be factored into the design of an effective pedestrian crossing.

Traffic Calming Measures

Traffic calming is the term used to describe a range of physical design and other measures that are used on streets to slow down or “calm” motor vehicle traffic and improve safety for pedestrians, bicyclists and transit users. Some traffic calming measures involve altering the visual look of the street to signal to motorists to reduce their speed and drive more cautiously. These measures include lane width reductions

(9–10'), right-sizing (reduction in the number of lanes), use of trees next to streets and on-street parking. Other traffic calming measures involve the installation of physical devices on the road to slow traffic speeds and typically slow cars to between 10 and 25 miles per hour. Most of the devices are constructed of asphalt or concrete but rubber products are also an effective alternative. Examples of these measures are:

- Speed bumps: elevated devices in the road surface to slow vehicles; they are generally

raised higher but not as broad as speed humps;

- Speed humps: elevated devices in the road surface that are less aggressive (flatter but wider) than speed bumps and used on residential streets;
- Curb extensions or “bulb outs”: devices that narrow the width of the road at pedestrian crossings;
- Raised pedestrian crossings at intersections serve to slow traffic; and,
- Medians for pedestrians in the middle of busy streets where they can wait safely.



(right) Bioswale on median.

(far right) Porous or permeable pavement sidewalk.



The U.S. EPA estimates that Lancaster City's Green Infrastructure Plan could cut capital costs for grey infrastructure by \$120 million and reduce wastewater pumping and treatment costs by \$661,000 per year. In addition, approximately \$4.2 million in annual energy, air quality, and climate-related benefits are projected for the Lancaster community once the plan is fully implemented.

An important non-physical traffic calming measure is to reduce the speed limit on a street and to enforce the lower speed limit.

Green Infrastructure

Urban areas contain significant areas of impervious surface such as streets, alleys, parking lots and sidewalks. Of these, the miles of street impervious surface have the largest impact on water runoff but offer a great opportunity for change. Lancaster County's definition of Complete Streets includes incorporating green infrastructure into the design of the roads and surrounding infrastructure.

Green infrastructure reduces the amount

of water that is piped directly into streams and rivers and is also designed to add to the aesthetics of the community through landscaping, natural processes and the use of innovative construction materials. Green infrastructure measures include permeable pavement, swales (vegetated open channels), street trees, and bioretention curb extensions and sidewalk planters.

- **Permeable pavement.** Permeable pavement is an effective measure for reducing stormwater runoff. It is well-suited for driveways, sidewalks, plazas, some parking lots, access roads and alleys. Permeable pavement is generally implemented on streets

(right) The Lancaster Brewing Company parklet includes a cistern for storing rainwater for plants in the raised sidewalk planters and bioswales (with crushed stone base) to allow rainwater to seep back into the ground rather than be channeled into the city sewer system.



that don't carry high traffic volumes or large numbers of heavy trucks because it has a lower load-bearing capacity than conventional pavement. The Pennsylvania Stormwater Management Manual includes Porous Pavement (BMP #6) as one of its best management practices. The manual describes the different types of porous pavements, their relative costs, installation and maintenance issues. Permeable pavement comes in four forms: 1) permeable interlocking concrete pavers; 2) grid pavers; 3) permeable concrete and 4) permeable asphalt. The City of Lancaster adopted an ambitious Green Infrastructure plan in 2011 which calls for approximately 468 blocks of green streets to be developed over 25 years. Included in the plan is porous pavement on six parking lots located on S. Plum Street, Rockland Street, S. Lime Street, Dauphin Street, Penn Avenue and Mifflin Street.

- **Bioswales and other buffer landscaping.** Bioswales are another measure that help control stormwater runoff while contributing to the aesthetics of a communi-

ty. Swales are vegetated open channels designed to receive street flow runoff and improve water quality through infiltration of the water into the soil. Grass buffer strips between the curb and sidewalk have been a common part of street development. In recent years, more complex forms of swales have been implemented that include bio-retention soils, gravel storage areas and a variety of attractive vegetation.

- **Bioretention curb extensions and sidewalk planters.** Curb extensions are one type of traffic calming measures that reduces the distance pedestrians have to walk to cross a busy street help to “calm” traffic speeds by narrowing the street. Curb extensions also help control stormwater flow. A planted curb extension was installed on Charlotte Street at the intersection with Chestnut Street.

Sidewalk planters are areas adjacent to the sidewalk that are planted with flowers and other vegetation that provide aesthetic value and a stormwater benefit. There are examples

of sidewalk planters on Chestnut Street, east of its intersection with Queen Street in the City of Lancaster.

BUILT ENVIRONMENT FEATURES THAT CREATE “CONTEXT”

The design of a Complete Street must consider not only the land use zone and street type, but other features of a site such as building height, setback and architecture, contours of the land and other unique qualities of the site that play a vital role in determining the elements and dimensions of those elements that will work best at a particular location. Thus, a clear focus on context is a critical first step in designing a Complete Streets project, followed by detailed project planning. Specific elements of site design that contribute to defining urban context include the following:

Building Orientation and Setback

In suburban and agricultural zones where walking is not a priority, buildings usually are less oriented to the street. They have large setbacks and paved parking areas between the building and the street which discourages

Generally, a block length of 200–400 feet is recommended in an urban setting and block length should not exceed 600 feet.

walking. In urban zones, particularly urban centers and urban cores, context is created by buildings that have a cohesive architectural style with consistent setbacks close to and oriented toward the street. Off-street parking, where it is provided, is located behind or to

the side of the building, providing pedestrians and transit users with direct and easy entry to the buildings. The windows on retail and commercial buildings are also close to the sidewalk to provide visual interest for pedestrians. Thus, a traditional walkable neighborhood is distinguished by a direct pedestrian connection to the building entrance from the street and a building site that is well connected to the street through streetside amenities such as arcades and café tables. As

suburban areas and early suburban shopping malls are updated, they can be retrofit and revitalized by including the qualities that invite pedestrian activity.

Building Height and Density

Buildings are the primary features of urban contexts that create a sense of enclosure and the experience of being in a city. Building height, density and floor area ratio and relationship to adjacent buildings and the street and



the ground floor uses are qualities that help determine the appropriate dimensions and design of sidewalks and other Complete Street elements so that they will be harmonious with the surrounding built environment. According to the Institute for Transportation Engineers (ITE),

“The threshold when pedestrians first perceive enclosure is a 1:4 ratio of building height to thoroughfare width—typical of low-density environments. In denser urban contexts, height-to-width ratios between 1:3 and 1:2 create an appropriate enclosure on a street.”

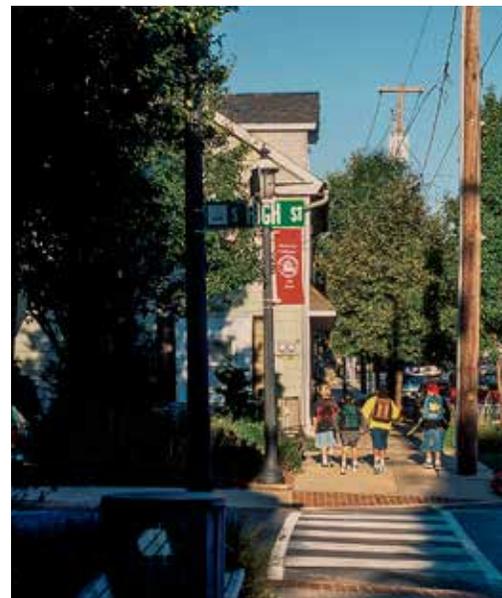
In areas with buildings of lower height and less density, street trees may be used to provide a similar sense of definition and enclosure.

Block Length

A system of highly connected streets with short block lengths encourages a walkable urban context. Vehicle-dominated contexts have longer block lengths and less Complete Street connectivity which makes walking distances longer. Fewer are likely to want to walk between

destinations in such a context. Generally, a block length of 200–400 feet is recommended in an urban setting and block length should not exceed 600 feet.

*(right and far right)
Complete Streets creates safe, convenient and comfortable travel and access for users of all ages and abilities.*



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