



pennsylvania
DEPARTMENT OF TRANSPORTATION
LOCAL TECHNICAL ASSISTANCE PROGRAM

Active Transportation



Roads Scholar II Course

Pennsylvania Local Technical Assistance Program (LTAP)

Pennsylvania Department of Transportation

Bureau of Planning and Research

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The Pennsylvania Local Technical Assistance Program (LTAP) shares transportation knowledge, improves road maintenance and safety skills, and puts research and new technology into practice at the local level through:

Training: Workshops are scheduled throughout the state and can be requested as a road show.

Technical Assistance: LTAP technical experts are available by phone, by email, and in person to help municipalities troubleshoot specific issues on their roadways.

Newsletter: LTAP distributes a quarterly newsletter, *Moving Forward*, which features the latest news and new practices and technologies.

Technical Information Sheets: Tech sheets provide useful, technical information on such topics as effective stop sign placement, how to use the MUTCD, paving roads, and other safety and maintenance issues related to local roads.

Website: LTAP's website, <https://gis.penndot.gov/ltap/>, is a valuable tool that provides up-to-date information on workshops, news items, LTAP Advisory Committee members, tech sheets, newsletters, and other resources.

All LTAP services are offered at NO Cost to Municipalities!!!

Roads Scholar Programs I and II

- Professional certification program
- Must complete 10 (I) and 8 (II) approved workshops within a three-year period
- Pass (70%) an in-class quiz taken at the end of each workshop which consists of 12 questions
- Successful completion of the American Red Cross CPR training also earns you one workshop credit.

You MUST include your name/contact information on the answer sheet for credit.

COURSE OBJECTIVES

The course objectives are:

- Review the concepts for active transportation.
- Discuss visioning and planning for active transportation at the local levels.
- Study examples of community connections and implementations.

PART 1: ACTIVE TRANSPORTATION CONCEPTS

Sections

- 1) What is Active Transportation?
- 2) Why Focus on Active Transportation?
- 3) Who is it for?
- 4) How can we do it?

SECTION 1: WHAT IS ACTIVE TRANSPORTATION

Also known as “non-motorized transportation,” but the term “active transportation” is preferred due to its positivity through its key connections between active living and transportation choices.

Active transportation also supports transit use since most people reach transit stops on foot or by bike and often make other walking and biking trips during the course of their day.



Complete Streets – Streets for Everyone

They are designed and operated to enable safe access for all users, including pedestrians, bicyclists, motorists, and transit riders of all ages and abilities. Complete Streets make it easy to cross the street, walk to shops, and bicycle to work. They allow buses to run on time and make it safe for people to walk to and from train stations.

Creating Complete Streets means transportation agencies must change their approach to community roads. By adopting a Complete Streets policy, communities direct their transportation planners and engineers to routinely design and operate the entire right-of-way to enable safe access for all users, regardless of age, ability, or mode of transportation.

Adoption of Complete Streets in PA:

- Elizabethtown Borough, Lancaster Co. – 2014
- City of Lancaster, Lancaster Co. – 2014
- Lancaster Township, Lancaster Co. – 2014
- Borough of Etna, Allegheny Co. – 2018
- Borough of Millvale, Allegheny Co. – 2018
- City of Pittsburgh, Allegheny Co. – 2016
- Sharpsburg Borough, Allegheny Co. – 2017
- Wilkins Township, Allegheny Co. – 2019
- City of Franklin, Venango Co. – 2010
- City of Philadelphia, Philadelphia Co. – 2009
- City of Reading, Berks Co. – 2015
- Borough of State College, Centre Co. – 2017



An ideal Complete Streets policy includes the following:

1. Includes an equitable **vision** for how and why the community wants to complete its streets. Specifies the need to create complete and connected network. Specifies at least four modes, two of which must be biking or walking.
2. Benefits **all users** equitably, particularly vulnerable users and the most underinvested and underserved communities.
3. Applies to **new, retrofit/reconstruction, maintenance, and ongoing projects**.
4. Makes any exceptions specific and sets a **clear procedure** that requires high-level approval and public notice prior to exceptions being granted.
5. Requires **interagency coordination** between government departments and partner agencies on Complete Streets.
6. Directs the use of the **latest and best design criteria** and guidelines and sets a time frame for their implementation.
7. Considers the surrounding community's current and expected **land use and transportation needs**.
8. Establishes **performance standards** that are specific, equitable, and available to the public.
9. Provides **specific criteria** to encourage funding prioritization for Complete Streets implementation.
10. Includes specific next **steps for implementation** of the policy.

Resource: <https://smartgrowthamerica.org/program/national-complete-streets-coalition/>

Road diet example on High Street in the Borough of Carlisle. Prior to the road diet, High Street had four lanes. Currently, there are two lanes with added bike lanes, median, in road pedestrian crossing signs, and overhead pedestrian crossing signs with flashing beacons.



“State DOTs are no longer just held accountable for the transportation system; they are also held accountable for how the system supports and improves quality of life for communities.”

The new approach to project planning and development expands the department’s requirements for engaging local and planning partners by requiring collaboration with stakeholders before project scopes are developed.

Requirement: to meet with local governments, MPOs, and RPOs prior to project planning and implementation.

“We are broadening the benefits we deliver and taking a more holistic approach to planning. We are tasking PennDOT staff and our planning partners to consider community needs at the beginning of the planning process to ensure the best allocation of our resources.

This new approach, PennDOT Connects, will make our planning processes more efficient and cost effective to the benefit of all Pennsylvanians.”

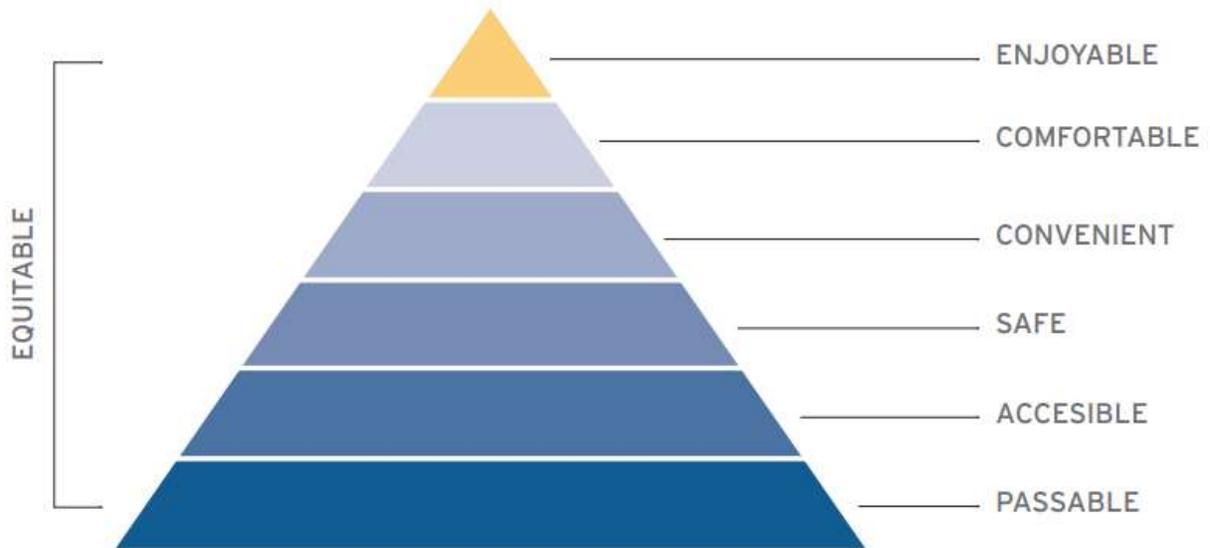
*Leslie S. Richards, Secretary
Pennsylvania Department of Transportation*

Resource: <https://www.penndot.gov/ProjectAndPrograms/Planning/Pages/PennDOT-Connects.aspx>

Walkability

Improving walkability means that communities are created or enhanced to make it safe and easy to walk and that pedestrian activity is encouraged for people of all ages and abilities.

The Walkability Hierarchy of Needs Pyramid provides the basis for developing and prioritizing walkability metrics at all three levels: metropolitan, neighborhood, and street.



WalkScore

Walk Score
73 Harrisburg is Very Walkable
Most errands can be accomplished on foot.

The map shows Harrisburg, Pennsylvania, with a color-coded walkability score. The city center is highlighted in green, indicating a score of 73. Surrounding areas are shown in yellow and orange, indicating lower scores. The map includes major roads and landmarks.

United States > Pennsylvania > Harrisburg

Walk Score
73

Transit Score
39

Bike Score
52

Harrisburg has an average Walk Score of 73 with 49,528 residents.

Harrisburg has some public transportation and is somewhat bikeable.

The most walkable Harrisburg neighborhoods are [Downtown](#), [Capital District](#) and [Hardscrabble](#).

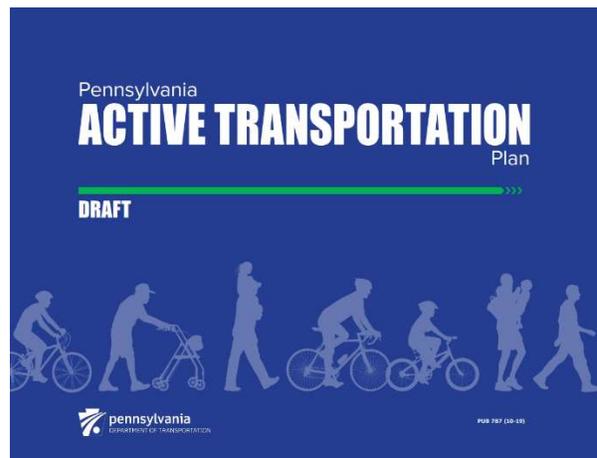
References/Links:

<https://www.walkscore.com/>

PennDOT's Core Policy Statement

PennDOT **SHALL** make accommodations for active transportation a routine and integral element of planning, project development, design, construction, operations, and maintenance.

Some local municipalities have already developed or are developing their own active transportation plan. PennDOT also recently released a draft active transportation plan for PA (Pub. 787).



Resource: <https://www.penndot.gov/TravelInPA/RideaBike/Pages/Master-Plan.aspx>

PART 1: ACTIVE TRANSPORTATION CONCEPTS SECTION 2: WHY FOCUS ON ACTIVE TRANSPORTATION?

Active Transportation Benefits Everyone!

Mobility for all – Near-universal reliance on the automobile for transportation leaves many people out of the equation, stuck with no way to get around. Children, the elderly, the visually impaired or otherwise physically challenged, those with lower incomes, or those who simply choose to not have access to a car, are among the groups that benefit most when opportunities to safely walk or bicycle are improved.

Healthy People – America faces an obesity crisis, with more than two-thirds of American adults either overweight or obese. By making walking and biking safe and convenient, we can make it much easier for people to build routine physical activity into their daily lives. According to the U.S. Department of Transportation, almost 1 in 4 adults in the U.S. report that they don't engage in any physical activity outside of their jobs. Sedentary lifestyles are a major factor in the current obesity rates.

Healthy Economy – Active transportation systems also foster economic health by creating dynamic, connected communities with a high quality of life that catalyzes small business development, increases property values, sparks tourism, and encourages corporate investment

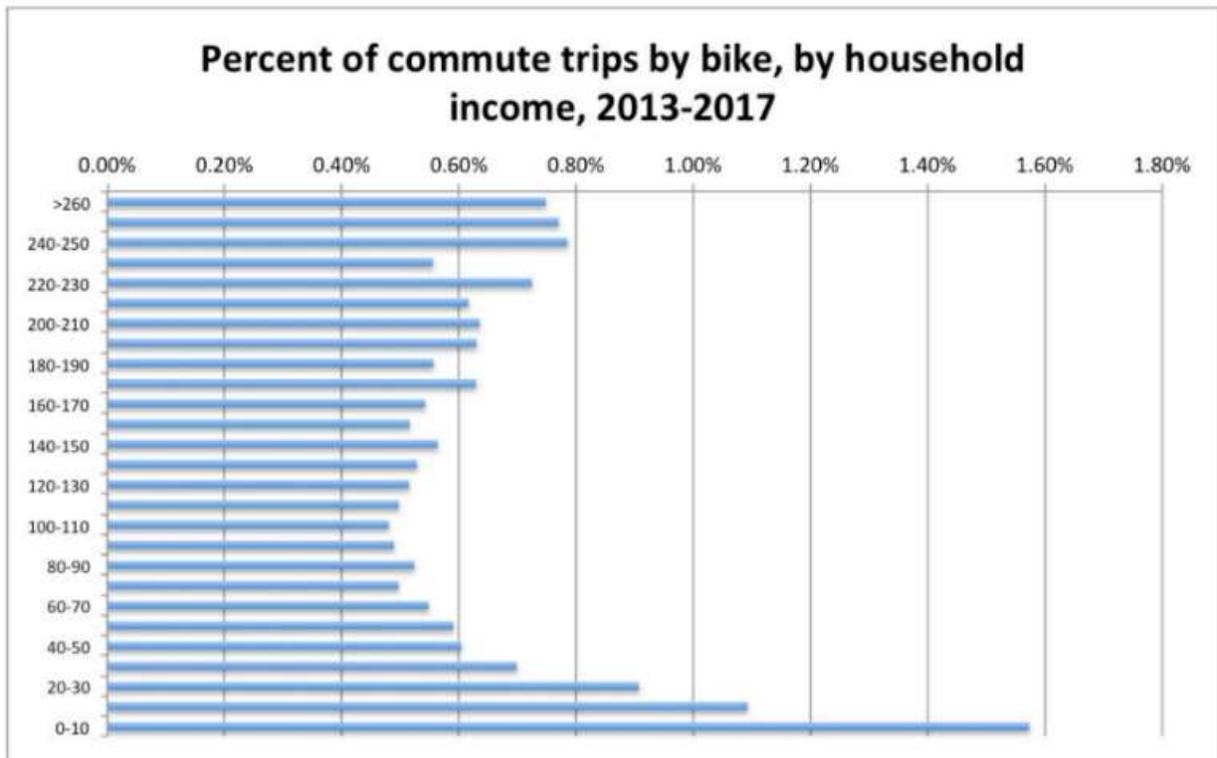
that attracts a talented, highly educated workforce. Active transportation also offers economic benefits to families by providing transportation options that don't require consuming gasoline.



Equity

Walkable places can decrease combined household and transportation costs and mitigate the impact of rising housing costs. For equity to be a benefit, facilities need to reach the people who need them the most. FHWA research found that 90% of streets have sidewalks in high income communities compared to sidewalks on only 50% of streets in lower income communities. Research also showed that land use laws and development regulations in lower- and middle-income communities are less likely to include requirements that would promote walking and bicycling.

Improving bicycle facilities assists historically economically disadvantaged communities. Commuters earning less than \$10,000 are nearly 3x as likely to ride a bike. People on a bicycle spend 24% more on food, goods, and services on a monthly basis compared to vehicles.



Accessibility

Building roads so that they can accommodate people from 8-80 means that the roads will work better for everyone.

Accessibility vs. mobility: U.S. roads are currently primarily designed for vehicles. By improving facilities and awareness for walking and bicycling, we can fill an unmet demand for those who are unable to or choose not to drive a car. Therefore, we need to focus both on mobility and accessibility.

Vulnerable populations: Adding or enhancing facilities can more evenly distribute space for different road users, especially for the children, elderly, low-income, or disabled, which is crucial for quality of life and sense of freedom.

Different road users have different needs and comfort levels: Some people use sidewalks for recreational purposes while others must use sidewalks for commuting.

Individual Health

Walking at a rate of 3 MPH burns 250 calories per hour and bicycling at 10-12 MPH burns 475 calories per hour. Public transit users also take 30% more steps and spend approximately 8 more minutes walking each day than drivers according to the FHWA.

Diabetes and prediabetes cost an estimated \$13.4 billion in PA each year. Physical activity helps prevent or delay diabetes, arthritis, and osteoporosis, while helping maintain balance, mental cognition, and independence.



24% of all deaths in Pennsylvania are caused by heart disease and cases are expected to increase by **344%** by 2030.

(The State of Obesity, 2018; Pennsylvania Department of Health, 2016)



Walking or biking for **20 minutes** each day can lower the risk of heart failure by **21%** for men and by **29%** for women.

(Rahman, I., et al. 2014; Rahman, I., et al. 2015)



Almost **12%** of all schoolchildren in Pennsylvania suffer from asthma.

(Pennsylvania Department of Health, 2016)

Statewide, **25.9%** of PA residents were physically inactive and reported no physical activity beyond that required in their job.



Approximately **32%** of Pennsylvania's population is considered obese.

(The State of Obesity, 2018)



For every 0.6 miles walked daily, there is a **5%** reduction in the likelihood of obesity.

(Frank, L.D., et al. 2004)

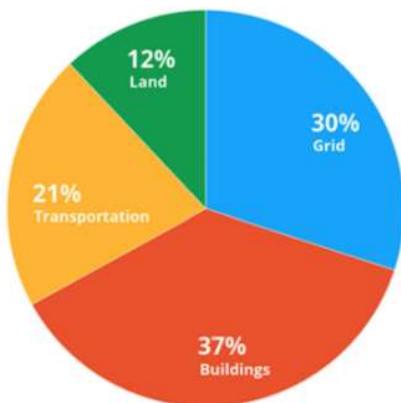
Community Health

Quality of life can be improved by creating more chances for social interaction, which can be done through walking, bicycling, and taking transit. Personal vehicles limit opportunities for social contact with others. Active transportation promotes and enables social interaction and engagement, which can lead to a happier and more connected community.

Trail and pedestrian/bicycle projects offer opportunities for stormwater management, improved air quality, reduced noise pollution, and creation of recreational open space. Complete Streets solutions use less pavement through road conversions, road diets, and other treatments.

In a lot of communities, the level of walking or WalkScore is an indicator of a community's livability, which affects businesses, workers, and tourism. Other benefits include increased real estate value, increased customer access, less demand for customer parking, more frequent visits, and more money spent.

Although air pollution in PA is decreasing, it remains consistently higher than the US average. In summary, investment in active transportation is key to strengthening PA's sustainable growth. The safety, health, and economic benefits will span across the Commonwealth and have favorable impacts on the well-being of residents and the overall quality of life within their communities.



**Transportation
contributes 21%
of PA Greenhouse
Gas emissions**



If **8%** more children living within **2** miles of a school were to walk or bike to school, the air pollution reduced from not taking a car would be equivalent to removing **60,000** cars from the road for one year.

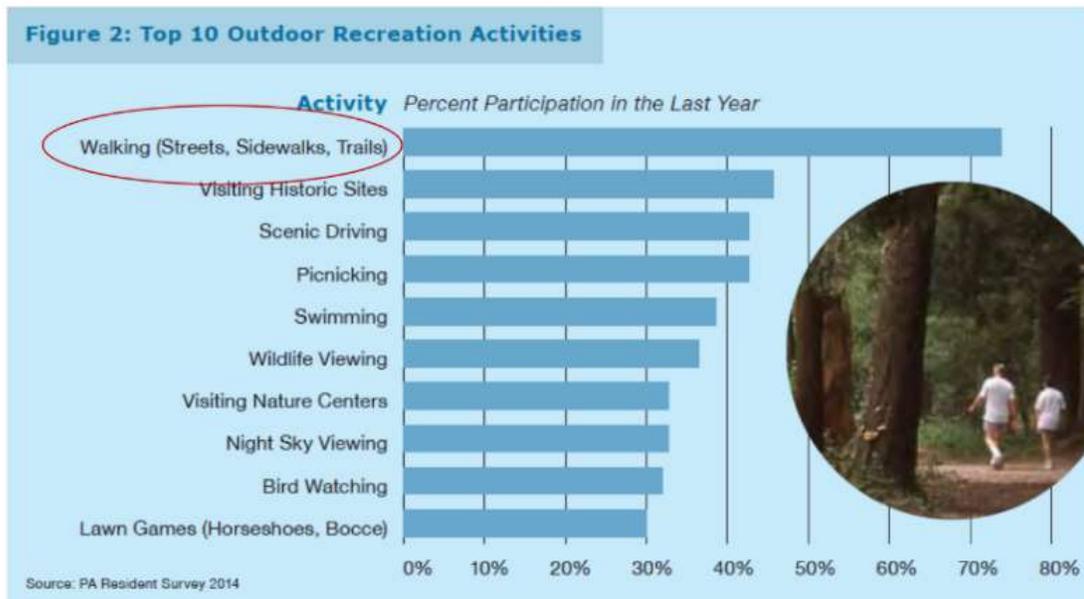
(Pedroso, MS, 2008; Safe Routes to School, 2008)



Biking 2 miles, rather than driving, avoids emitting **2 lbs** of pollutants, which would take **1.5 months** for one tree to sequester.

(EPA, 2000; NC State, 2001)

Statewide survey conducted by the Department of Health.



Statewide study conducted by PennDOT for walking

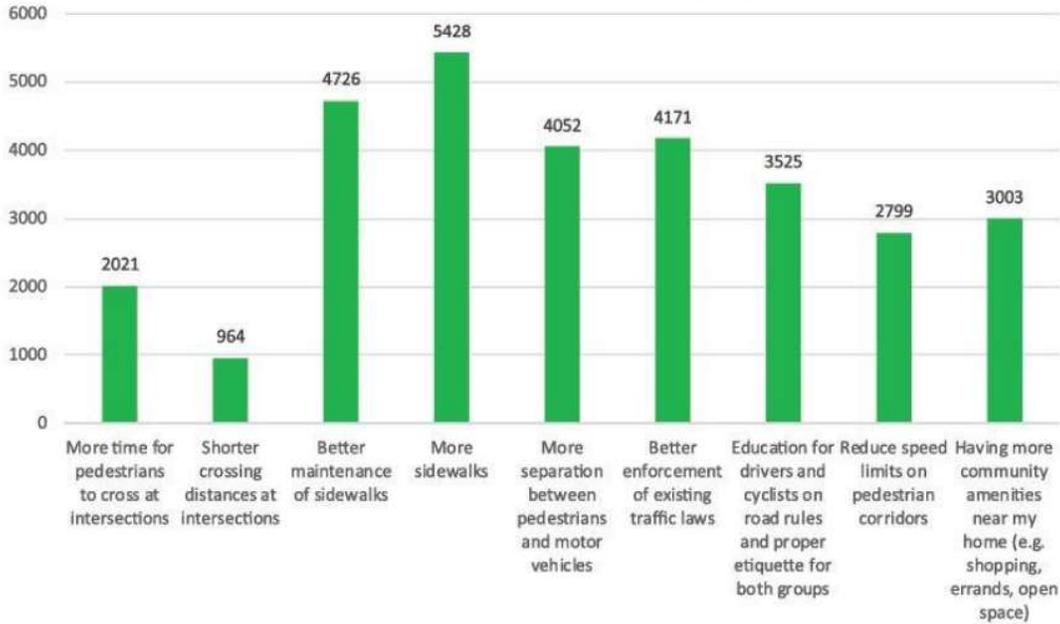
How easy or challenging is it to walk in your community?

Answered: 12,780 Skipped: 1,039



Which of these changes would most improve your walking experience?

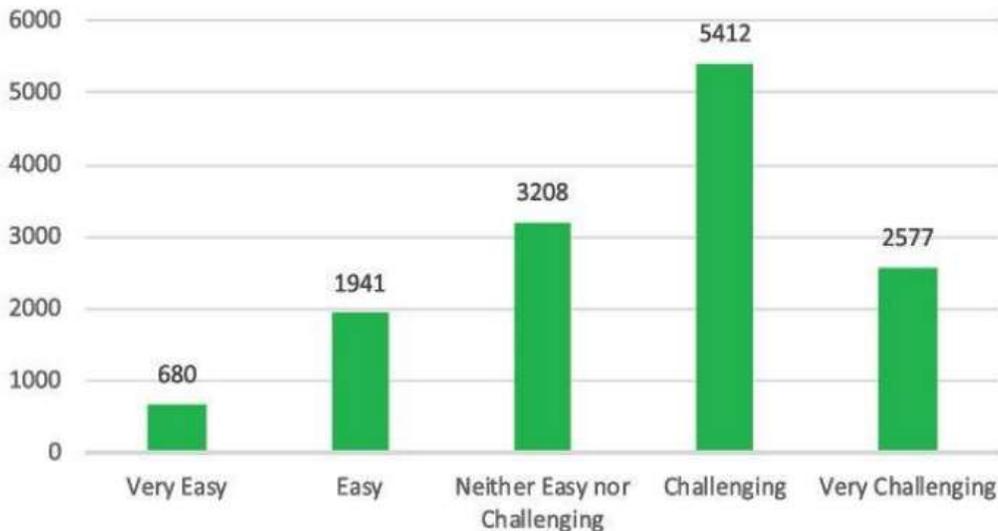
Answered: 12,780 Skipped: 1,039



Statewide study conducted by PennDOT for biking.

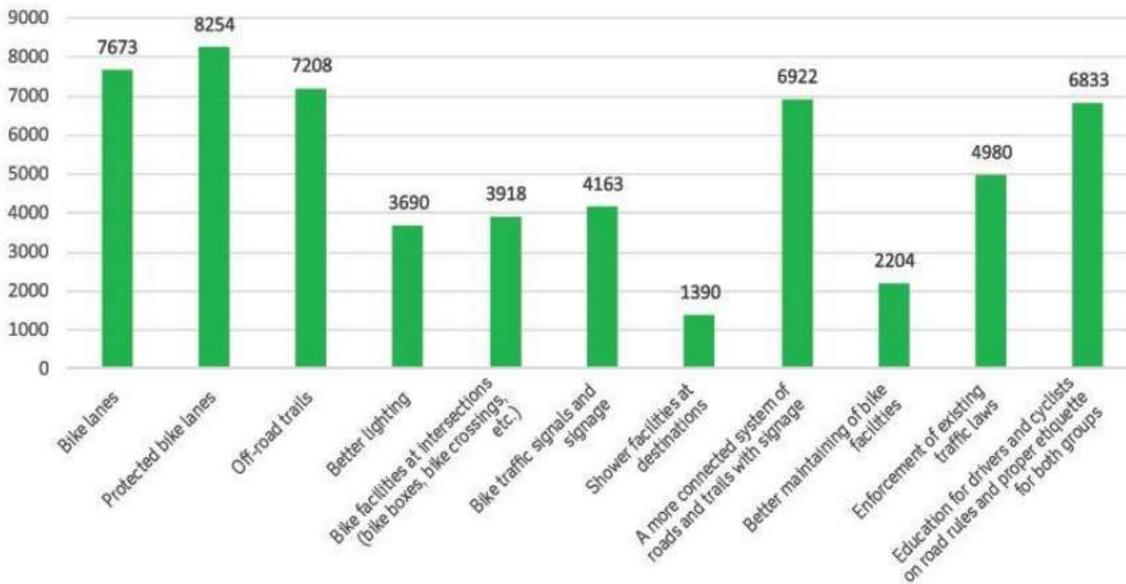
How easy or challenging is it to bike in your community?

Answered: 13,819 Skipped: 0

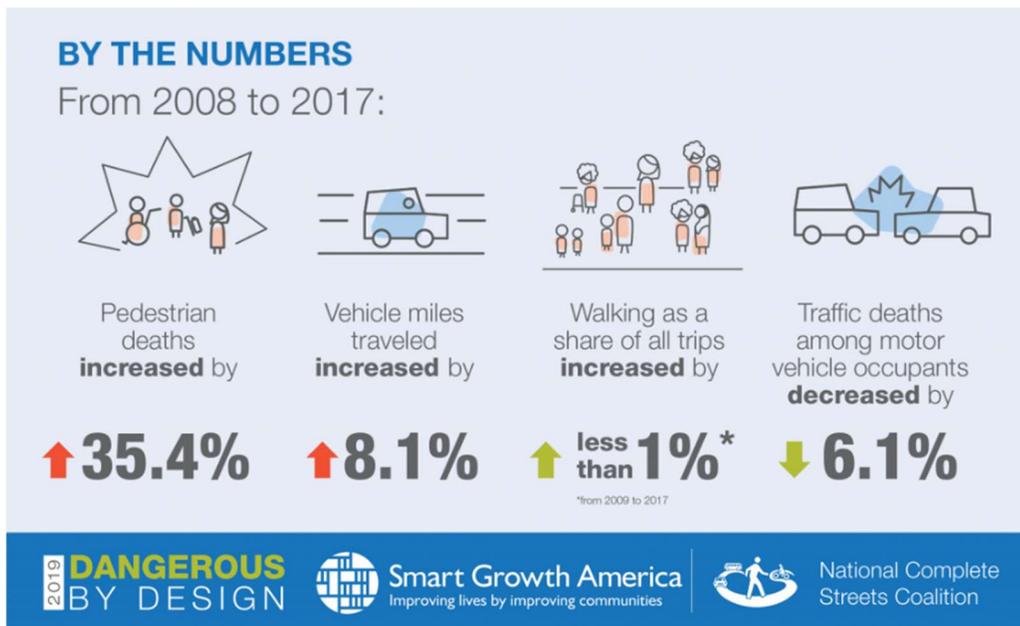


Which of the following would make you want to bike more frequently?

Answered: 12,006 Skipped: 1,813



These are national statistics from 2008-2017. Nearly 40,000 traffic fatalities in 2018.



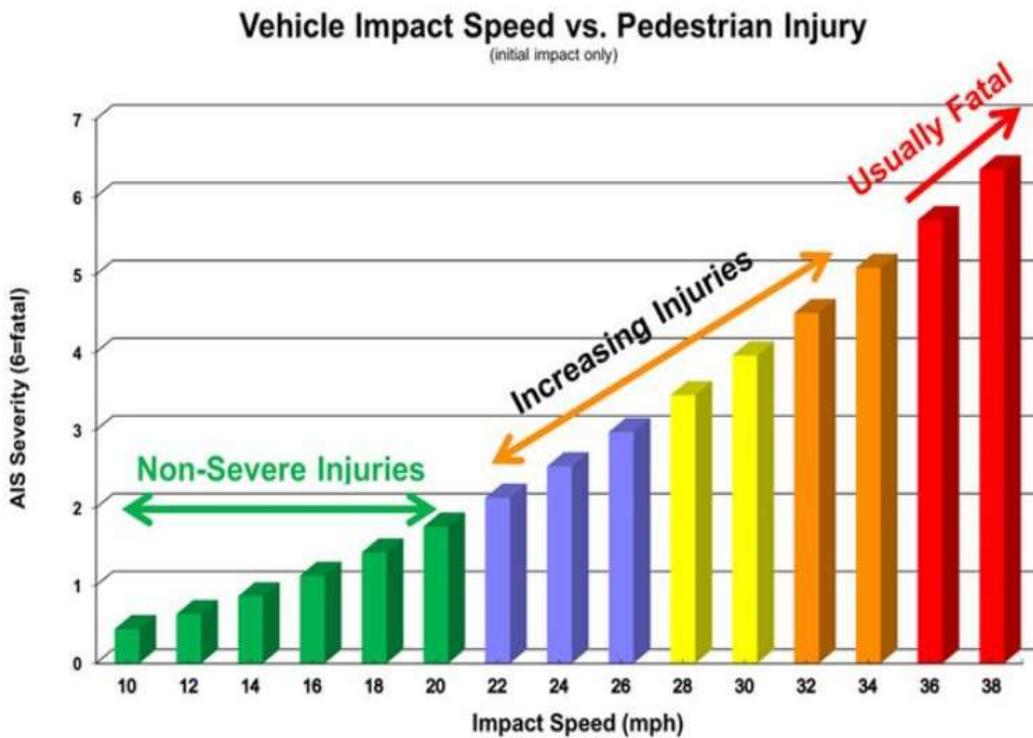
This table shows the fatality comparison for Pennsylvania from 2017 to 2018. The statistics are from PennDOT’s 2018 Crash Facts & Statistics. Pedestrian-related crashes represent 3.2% of the total reported traffic crashes, but they account for 16.9% of all traffic crash fatalities. Bicycle crashes represent 0.8% of the total reported crashes and 1.5% of all traffic fatalities. According to PennDOT, the motor vehicle fatalities in 2018 represent the 3rd lowest number over the last 91 years.

Fatalities	2017	2018	Change
Motorists	966	971	0.52%
Pedestrians	150	201	34%
Bicyclists	21	18	-14%

Resource: https://www.penndot.gov/TravelInPA/Safety/Documents/2018_CFB_linked.pdf

Top Fatal Pedestrian Actions

Entering Crossing/Specified Location 48.8%



FHWA Graphic

“Traffic – PEDESTRIANS, ridden or herded animals, vehicles, streetcars, and other conveyances, whether singly or together, using any highway for purposes of travel.” – (PA Vehicle Code, Title 75)

PART 1: ACTIVE TRANSPORTATION CONCEPTS

SECTION 3: WHO IS IT FOR?

Pedestrians – The transportation network should accommodate a variety of needs, abilities, and possible impairments. Age is a big factor affecting physical characteristics, walking speed, and environmental perception.



Users of Mobility Devices – Maneuvering around a turn requires additional space for wheelchair devices. Providing adequate space for 180 degree turns at appropriate locations is a required element for accessible design.



Stroller Users – Strollers have small pivoting front wheels that may limit their use on unpaved surfaces/rough pavement. Curb ramps are valuable for these users, and lateral overturning is one main safety concern for users.



Bicyclists – Bicyclists and bicycles have a variety of sizes and configurations which occur in the types of bicycles and the bicyclist comfort level.



Vulnerability can stem from perceived or objective

- Lack of mobility or access
- Exposure to unsafe travel conditions
- Exposure to unsecure travel conditions

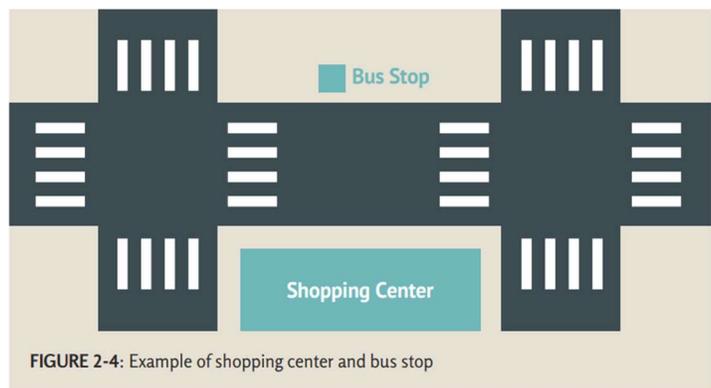
Walking is the most prevalent mode especially among vulnerable populations.

The Pedestrian Behavior

Convenience – Crossing midblock provides a more direct route to the bus stop. People coming from the shopping center are likely carrying shopping bags, which can be difficult to carry long distances.

Previous experience – It is likely that people have successfully crossed similar streets (or even the same street) in this manner other times, so their limited previous experience suggests this is a safe option.

Time pressure – Buses run on a schedule, and people may want to cross as quickly as possible to be sure they catch the next bus.



Bicyclist Behavior

Bicyclists have a wide range of capabilities including:

- Bike handling and agility
- Familiarity with laws, location, infrastructure, and behavior of other road users
- Decision making ability
- Physical attributes
- Speed and distance
- Confidence and comfort

<i>Type of Cyclist</i>	<i>Abilities / Comfort Level</i>
STRONG AND FEARLESS <1%	This group is willing to ride a bike on any roadway regardless of traffic conditions. Comfortable taking the lane and riding in a vehicular manner on major streets without designated bike facilities.
ENTHUSIASTIC AND CONFIDENT 5%	This group consists of people riding bikes who are confident riding in most roadway situations but prefer to have a designated facility. Comfortable riding on major streets with a bike lane.
INTERESTED BUT CONCERNED 60%	This group is more cautious and has some inclination towards biking but are held back by concern over sharing the road with cars. Not very comfortable on major streets, even with a striped bike lane, and prefer separated pathways or low traffic neighborhood streets.
NO WAY NO HOW 35%	This group comprises residents who simply aren't interested at all in biking, may be physically unable or don't know how to ride a bike, and are unlikely to adopt biking.

PART 1: ACTIVE TRANSPORTATION CONCEPTS

SECTION 4: HOW CAN WE DO IT?

The key to a thriving and attractive place is the street and trail design. Cities should be seen as a living body with the street networks as the arteries pumping lifeblood throughout the communities. This is a nice reminder that cities need healthy and active streets in order to stay alive and thrive. Plan should also build on or improve existing plans/policies.

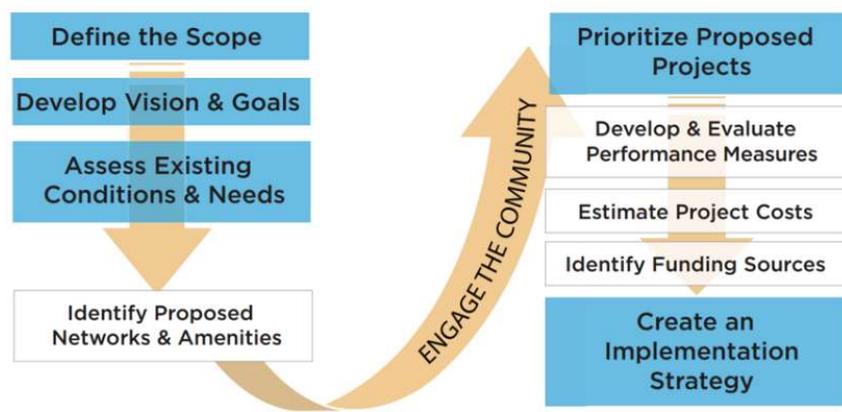
This requires some thinking about where people live and work, how people move around, and even how heritage/culture can still be maintained. Walking, bicycling, and using transit should be safe accessible options for everyone.

Planning Context:

- Emphasizing a strong focus on safe and reliable multimodal transportation
- Adequately maintaining transportation infrastructure
- Growing our regional economy
- Developing sustainable active communities

Challenges:

- Funding
- Staff time
- Changing attitudes/bias for different transportation modes
- Agricultural use
- Public land access
- Auto-centric roadways
- Lack of transportation options
- Constrained terrain
- Safety
- Accessibility
- Highway as a main street
- Climate and maintenance



The Planning Process

- Before the plan
- Developing the plan
 - Vision, goals, and objectives
 - Building information base
 - Plan recommendations
- Implementing the plan

Success Factors

Having a **champion** and developing a vision are the two key factors that will lead to a successful active transportation plan. A champion will advocate for the success of the active transportation plan and will ensure that the plan progresses. The champion paired with the developed vision will help to drive the development of the plan.

Developing a vision, mission statement, and goals:

- A **vision** is a description of the desired outcome. It's narrow and future-oriented.
- A **mission** statement supports the overall vision and should provide direction.
- Goals are set to achieve the mission and vision. They should be linked to the mission statement and be measurable and realistic. They will push initiatives forward and should be S.M.A.R.T. (Specific, Measurable, Achievable, Realistic, and Timely).

PART 2: VISION AND PLANNING

- 1) Creating a Vision
- 2) Creating a Plan
- 3) Cooperation and Involvement



CREATING A VISION

PennDOT's Vision Statement

Biking and walking are integral elements of Pennsylvania's transportation system that contribute to community health, economic mobility, and quality of life.

PennDOT's 6 Themes

- 1) **Enhance Safety** – Improve safety for non-motorized users.
- 2) **Provide Transportation Equity** – Provide opportunities for people of all ages, abilities, races, ethnicities, and incomes in urban, suburban, and rural areas across PA to bike or walk.
- 3) **Connect Walking and Biking Networks** – Provide a complete pedestrian and bicycling network that reliably and easily connects users of all ages and abilities to destinations and other transportation modes.
- 4) **Leverage Partnerships** – Work actively and collaboratively with federal, state, regional, local, and private partners to support walking and biking.
- 5) **Improve Public Health** – Provide active living environments with safe, connected, accessible facilities along with programs that influence public health by encouraging walking and bicycling.
- 6) **Increase Economic Mobility** – Maximize economic competitiveness through walking and biking networks that improve people's abilities to access jobs, businesses, and other destinations, and to attract visitors and tourists, new residents, and new businesses to PA.

THEME 1: ENHANCE SAFETY



THEME 2: PROVIDE TRANSPORTATION EQUITY



THEME 3: CONNECT WALKING & BICYCLING NETWORKS



THEME 4: LEVERAGE PARTNERSHIPS



THEME 5: IMPROVE PUBLIC HEALTH



THEME 6: INCREASE ECONOMIC MOBILITY



Vision Zero

The concept of zero deaths was conceived in Sweden in 1994 and was titled Vision Zero. Vision Zero is a roadway safety initiative based on the idea that no loss of life is acceptable. The core concept behind Vision Zero is the fact that humans make mistakes and that the road system should be designed to account for those mistakes to prevent loss of life. In 1997, Vision Zero was approved by Swedish Parliament. Since its implementation, Vision Zero has been extremely successful in Sweden continuing to improve roadway safety while traffic volumes continue to increase.

Pennsylvania's Vision, Mission, and Goal

Vision

Proactively work toward zero deaths on our roads while fostering an environment that encourages safe behavior.

Mission

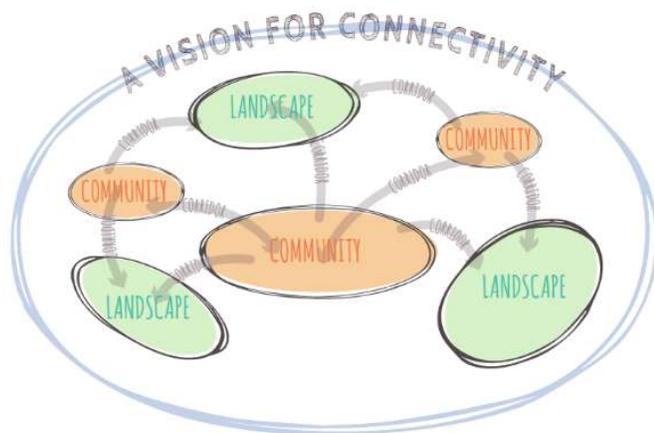
Our mission is to improve highway safety by developing and implementing education, enforcement, engineering and emergency medical service strategies.

Goal

Reduce average fatalities and serious injuries to support the national effort of ending fatalities on our nation's roads within the next 30 years.

A Vision for Connectivity

Improving access by connecting communities to communities and communities to landscapes with bicycling and pedestrian facilities benefits human health, environmental health, and local economies. Improving access to greenway trails and multimodal pathways means improving the connections between people and businesses, schools, parks, and community resources through bicycles, pedestrians, and transit facilities.



PART 2: VISION

SECTION 2: CREATING A PLAN

- 1) Organizing and Start-up
- 2) Collect Data
- 3) Develop a Vision and Goals
- 4) Create Connections, Policies, and Safety Projects
- 5) Identify and Prioritize Projects
- 6) Implementation Strategies

Step 1: Organizing and Start-Up

Identify the purpose and focus:

- Why create a plan?
- What areas?
- Who for?
- What is the connection to other plans?
- What is the timing/budget?

Get a committee together

- Municipal administration, planners/engineers
- Residents and bike/hiking/walking groups
- Schools and elected officials
- Maintenance personnel and emergency responders (police, EMS, firefighters, etc.)

Step 2: Collect Data

- Crash and safety data
- Existing facilities
- Origins and destinations
- Community input

Resources: <https://crashinfo.penndot.gov/PCIT/welcome.html>
<https://gis.penndot.gov/TIRe>

Step 3: Develop a Vision and Goals

- Active Transportation
- Complete Streets
- Vision Zero

Step 4: Create Connections, Policies, and Safety Projects

- Trails, paths, sidewalks, bike facilities
- Roadways
- Amenities
- Ordinances/policies to foster active transportation
- Safety projects

Step 5: Identify and Prioritize Projects

- Project costs
- Project benefits
- Coordination efforts

Step 6: Implementation Strategies

- Funding sources
- Collaboration
- Performance measurement
- Plan updates

PART 2: VISION

SECTION 3: COOPERATION AND INVOLVEMENT

Advisory Committee

A successful active transportation plan requires a diverse committee with different perspectives.

Requires cooperation and involvement from:

- Federal – Congress and USDOT
- State – PennDOT
- MPO/RPO – 23 Planning Partners
- Local – 67 Counties and 2,560 Municipalities

Federal – Congress is responsible for passing relevant acts while USDOT is responsible for issuing guidance, providing technical assistance, and ensuring compliance with the federal laws and regulations.

State – PennDOT is responsible for statewide policy-making and planning.

MPO/RPO – MPOs/RPOs are responsible for developing long range plans as well as involving stakeholders in its Public Participation Plan process, developing performance measures and targets, and exercising project selection authority for portions of select federal funding program funds.

Local – Counties are responsible for developing a county comprehensive plan identifying bicycle and pedestrian projects and priorities. Local municipalities are responsible for identifying bicycle and pedestrian project needs, conducting detailed bicycle and pedestrian corridor or sub-area planning, incorporating active transportation projects into greenway, trail, parks and recreation, schools, and other plans, passing ordinances that support desired infrastructure improvements such as sidewalk maintenance requirements, funding maintenance for priority bicycle facility in the municipality borders, and implementing program activities such as Safe Routes to School and other local awareness campaigns.

PART 3: CONNECTIONS AND IMPLEMENTATIONS

- 1) Network Opportunities
- 2) Creating Connections
- 3) Planning Policies and Ordinances
- 4) Funding

SECTION 1: NETWORK OPPORTUNITIES

Assess existing conditions and needs such as miles of routes:

- Bike routes (local, PA, and US)
- Bike lanes (protected, unprotected, shared)
- Trails (including water trails)
- Sidewalks as well as crosswalks



Review existing programs and policies:

- Bicycle Friendly Communities/ Walk Friendly Communities
- Complete Streets Policies
- Trail Towns/ River Towns
- WalkWorks Programs



Determine community needs through public meetings and online surveys (use Walkability Checklist). Be sure that Active Transportation Plan doesn't conflict with current or future policies/plans.

Resource: <https://www.nhtsa.gov/sites/nhtsa.dot.gov/files/walkingchecklist.pdf>

Connections

After assessing the existing conditions, the next step would be to identify key locations/destinations/access sheds where people may want connections to and from.



WHERE PEOPLE PLAY

Trails and parks are attractors and generators of walking and biking activity.



WHERE PEOPLE WORK

Higher densities of workers translates to higher propensity for people to walk or bike.



WHERE PEOPLE SHOP

Retail shopping areas are attractors for walking and biking. Places where people can complete errands, such as banks, are also generators of walking and bicycling trips.



WHERE PEOPLE LEARN

Schools are a significant source of walking and biking by populations that either cannot drive because they are not old enough or are more likely to walk or bike for economic reasons.



WHERE PEOPLE LIVE

People are likely to walk near their homes for recreation or to visit nearby friends and family.

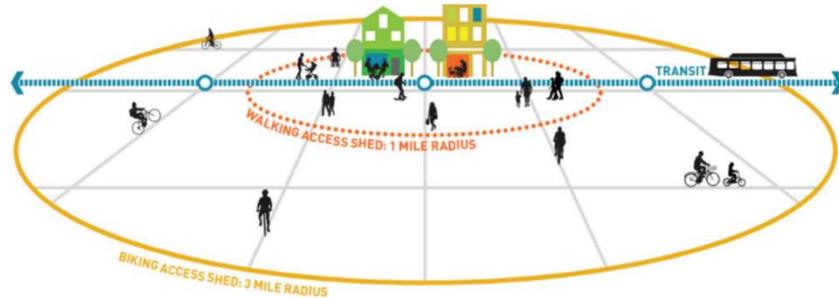


WHERE PEOPLE ACCESS TRANSIT

All transit trips start or end with a walking or biking trip.

Access sheds

Access sheds can be defined as the area around a focal point to which a person would reasonably travel. They are critical when considering transit because they are integral to understanding the number of people that could access a transit line and whether people can reach their desired destination once they exit the transit system.



Created networks

Created networks should be cohesive and allow for uninterrupted travel to and from destinations.

Cohesion – How connected is the network in terms of its concentration of destinations and routes?

Directness – Does the network provide direct and convenient access to destinations?

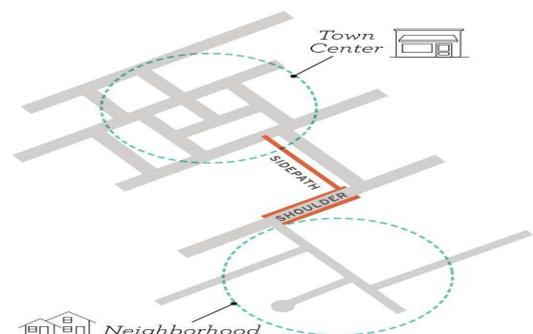
Accessibility – How well does the network accommodate travel for all users, regardless of age, income level, or ability?

Alternatives – Are there a number of different route choices available within the network?

Safety and Security – Does the network provide routes that minimize risk of injury, danger, and crime?

Comfort – Does the network appeal to a broad range of age and ability levels and is consideration given to user amenities?

The Department of Conservation and Natural Resources (DCNR) developed the Pennsylvania Land and Water Trail Network Strategic Plan in an effort to fill trail gaps. The state's goal is to have a trail within 15 minutes of every PA resident.



Speed management can play an important part of creating multimodal networks. Speed reduction measures are common as part of Bicycle Boulevards to create and enforce desired operating speeds. Speed management can also enhance pedestrian safety in main street areas.

There are three types of speed reduction measures:

- Physical measures (vertical deflections, horizontal shifts, and roadway narrowings) intended to reduce speed and enhance the street environment
- Nonphysical measures (signs and pavement markings) intended to raise awareness and reduce speed through visual indications
- Diversion treatments intended to reduce cut-through traffic by obstructing or otherwise preventing traffic movements in one or more directions



Pedestrian lanes provide temporary pedestrian accommodation on roadways lacking sidewalks. They are not intended to be an alternative to sidewalks. As part of the planning process, agencies should explore issues and the potential challenges a pedestrian lane may face:

- Detectability by people with vision disabilities
- Undesired use by bicyclists
- Accessible cross-slope requirements
- Maintenance strategies such as sweeping and snow removal



Schools are key destinations in communities of all sizes. Since children will be present each day, it's important to provide both vertical and horizontal separation from motorized traffic, controlled crossings, and wayfinding to and throughout the school campus. Children have a wide range of skills and abilities when navigating traffic. Therefore, the planning and design of routes that serve schools should consider that children tend to:

- React slowly
- Have a narrow field of vision
- Have difficulties judging speed and distance of approaching vehicles
- Have difficulty concentrating on more than one thing at once
- Have difficulty determining direction of auditory input

Also, consideration should be given to not just the school site but the bus stop locations as well. Developing walking and bicycle facilities that serve school bus stops or drop-off locations

should be considered too. Keep in mind schools can serve as community centers as well. Therefore, having safe walking and biking access to schools can benefit the community as a whole and not just the students and their families.

Multimodal main streets are designed with street-fronting land uses, slow travel speeds, and pedestrian oriented design features with six components:

- Flexible design – Main streets can be constrained spaces with more demand for roadway design features than there is space. Design should reflect the community vision.
- Multimodal design – Multimodal networks provide mobility and access for all users and modes of travel. Main streets become connections between modes.
- Placemaking – Main streets can strengthen community identity by creating enhanced aesthetics, spaces for civic activities, and creating conditions to attract and retain business, which helps with improved community cohesion and participation in public life.
- Incrementalism – Small projects can make a big difference. Opportunities such as roadway resurfacing, or enhancements associated with individual development projects can be the first step in a gradual transformation.
- Environmental sustainability – Street trees and other vegetation can support a pleasant environment and are a key component of stormwater management strategies by intercepting rainfall and helping to regulate the flow of stormwater.
- Compactness – Providing compact, well delineated zones for each user of the main street creates a sense of belonging rather than a dominating presence.



Bridges are critical connections in any transportation network. Rehabilitation of existing bridges or construction of new bridges present opportunities for reconfiguring bridge decks and structures to better accommodate all the modes that need to use the connection in the network. There are six components for bridge connections in the network:

- Separation – Bridges are constrained areas where pedestrians and bicyclists have less flexibility to operate, so separation becomes very important.
- Prioritize – A single major barrier such as a narrow bridge can render an otherwise attractive bikeway or pedestrian route undesirable.
- Awareness – Signing, marking, and active warnings can alert all users to a change in condition or of an active condition needing more attention.

- Continuity – Facilities should maintain a consistent alignment across the bridge. Solutions that require users to transition from one side of the road to the other are unlikely to be embraced.
- Future proof – People biking and walking should be assumed users of any new or replacement bridge structure.
- Flexibility – Retrofitting pedestrian and bicycle facilities on bridges presents special challenges because it may be impractical to widen an existing bridge. Evaluate options to provide space for pedestrians and bicyclists without widening.



Access to public lands are often scenic places where people may be more motivated to walk and bike. They may draw many visitors from other places, which creates more support and opportunities for partnerships. Plus, they offer opportunities for different funding sources such as the Federal Lands Access Program.



<i>Opportunities for Implementation</i>	<i>Pedestrian Projects</i>	<i>Bicycle Projects</i>	<i>Multi-Use Projects</i>
Development or redevelopment	x	x	x
Retrofit existing roadways	x	x	
Repaving	x	x	
Restriping	x	x	
Removing parking		x	
Bridge replacement	x	x	x
Roadway construction/reconstruction	x	x	
Developer dedication - ROW/trails			x
Utility and sewer easements and provision of public access within ROW			x
Rail to trails			x
Rail with trails			x

PART 3: CONNECTIONS AND IMPLEMENTATIONS

SECTION 2: CREATING CONNECTIONS

Mixed Traffic Facilities

Yield Roadway

Designed to serve pedestrians, bicyclists, and motor vehicle traffic in the same slow-speed travel area. Yield roadways serve bidirectional motor vehicle traffic without lane markings in the roadway travel area. Benefits:

- Less costly to build and/or maintain than fully paved cross sections
- Connects local residential areas to destinations on the network
- Limits impermeable surface area and minimizes stormwater runoff
- Maintains aesthetic of narrow roads and uncurbed road edges
- Encourages slow travel speed when narrower than 20 ft.
- Can support a larger tree canopy when located within wide unpaved roadside areas
- Supports on-street or shoulder parking for property access
- Low maintenance needs over time



Can effectively serve local travel needs, maintain aesthetic preferences, and is a common form for low-volume local rural roads. When operating at very-low volumes and at low speeds, pedestrians and bicyclists are comfortable walking within the travel area of the roadway. Yield roadways are designed with narrow roadway dimensions to prioritize local access and community livability.

Design Basics:

- The paved two-way travel lane should be narrow to encourage slow travel speeds and require courtesy yielding when vehicles traveling in opposite directions meet. Minimum roadway width is 9 ft. according to PennDOT's Pub. 13M.

<http://www.dot.state.pa.us/public/pubsforms/Publications/PUB%2013M/December%202019%20Change%20No.%204.pdf>

- If desired, parking may be located on the paved roadway surface or on gravel or soil shoulders outside of the paved roadway. The parking lane may also serve as a pull-out area while yielding.
- No markings are necessary to implement a yield roadway.
- Use signs to warn road users of the special characteristics of the street.
- At uncontrolled crossings of local streets, no special treatment is necessary. The additional space within the intersection area offers queuing opportunities when vehicles traveling in opposite directions meet.
- If this facility is intended for use by pedestrians, it must meet accessibility guidelines for walkways.

Bicycle Boulevard

A low-stress shared roadway bicycle facility designed to offer priority for bicyclists operating within a roadway shared with motor vehicle traffic.

Benefits:

- Increases comfort for people bicycling by reducing motor vehicle operating speeds and volumes if diversion is included
- Connects local residential roads to commercial corridors and community services such as schools
- Improves conditions for pedestrians when implemented with sidewalks and enhanced pedestrian crossings
- May reduce the incidence of serious injuries through reduced travel speeds
- Improves the quality of life for residents through calmer traffic and safer crossings
- Less visually impactful than separated facilities



Provides a bicycle-priority route designed to offer convenient, low-stress access to local destinations and through neighborhoods. Combinations of access management, traffic calming, and crossing treatments work in concert to enhance the bicycling experience.

Bicycle Boulevard Cont.

Design Basics:

- In cases where speeds and volumes do not meet preferred values, traffic calming techniques may be used to improve conditions.
- Use markings to encourage motorists to pass bicyclists at a safe distance.
- Route wayfinding is critical on bicycle boulevards when located along local routes with circuitous network connections.
- Roundabouts are an FHWA proven safety countermeasure.
- Design treatments at minor roadway intersections to offer priority for bicyclists over cross-street traffic.
- Design treatments at major roadway intersections to enhance safety and comfort for crossing users.
- Bicycle boulevards are designed to prioritize use by bicyclists and are not intended for use by pedestrians. If the bicycle boulevard is intended for pedestrian travel within the roadway, it must be accessible.



Advisory Shoulder

Creates usable shoulders for bicyclists on a roadway that is otherwise too narrow to accommodate one. The shoulder is delineated by pavement marking and optional pavement color. Motorists may only enter the shoulder when no bicyclists are present and must overtake these users with caution due to potential oncoming traffic.

Benefits:

- Provides a delineated but nonexclusive space available for biking on a roadway otherwise too narrow for dedicated shoulders
- May reduce some types of crashes due to reduced motor vehicle travel speeds
- Minimizes potential impacts to visual or natural resources through efficient use of existing space
- Functions well within a rural and small town traffic and land use context
- Increases predictability and clarifies desired lateral positioning between people bicycling or walking and people driving in a narrow roadway
- May function as an interim measure where plans include shoulder widening in a narrow roadway



- Supports the natural environment through reduced paved surface requirements
- Accommodates low to moderate volumes of two-way motor vehicle traffic and provides a prioritized space for bicyclists with little or no widening of the paved roadway surface.

Design Basics:

- The advisory shoulder space is a visually distinct area on the edge of the roadway offering a prioritized space for people to bicycle and walk.
- The two-way center travel lane is created from the remaining paved roadway space after the advisory shoulder has been accounted for.
- Use signs to warn road users of the special characteristics of the street.
- Advisory shoulder designs work best on road segments without frequent stop or signal controlled intersections that require vehicles to stop within the roadway.
- Advisory shoulders are not intended for pedestrian use. If they are intended for pedestrians, they must meet accessibility guidelines.



Visually Separated Facilities

Paved Shoulder

Can be enhanced to serve as a functional space for bicyclists and pedestrians to travel in the absence of other facilities with more separation.

Benefits:

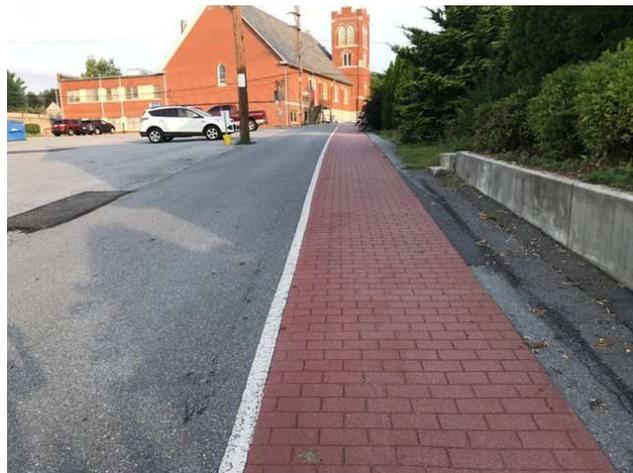
- Improves bicyclist experience on roadways with higher speeds or traffic volumes
- Provides a stable surface off the roadway for pedestrians and bicyclists to use when sidewalks are not provided
- Reduces pedestrian “walking along roadway” crashes
- Can reduce “bicyclist struck from behind” crashes, which represent a significant portion of rural road crashes
- Provides advantages for all roadway users by providing space for bicyclists, pedestrians, and motor vehicles



Shoulders can improve bicyclist comfort and safety when traveling in higher speed and/or volume situations but only when adequate width is provided. If used, locate rumble strips on the edge line or within a buffer area that will not reduce usable space for bicyclists. Rumble strips are an FHWA proven safety countermeasure, but they may negatively impact bicycle travel if poorly constructed.

Design Basics:

- The paved shoulder area should be wide enough to accommodate the horizontal operating envelope of pedestrians and bicyclists.
- Widths can range between 2-8 ft.
- Contrasting or colored pavement materials may be used to differentiate the shoulder from the adjacent travel lanes.
- Rumble strips may be used for reducing roadway departure crashes.
- If rumble strips are desired on bicycle network routes, use a minimum of 12-foot breaks to make it more tolerable for bicyclists.
- On shoulders designed for bicycle and pedestrian accessibility, the edge should be clearly delineated and defined to discourage unnecessary encroachment by motor vehicles.
- No signs are required on paved shoulders, but signs may be used to identify a road as a bicycle route.
- At intersections with heavy left-turn volumes, an auxiliary bypass lane, or center turn lane, may be provided for motor vehicles.
- Paved shoulders are an FHWA proven safety countermeasure.



- At intersections with right turn only lanes, bicycle accessible shoulders should be classified as bike lanes or separated bike lanes. The right turn lane should be added to the right of the bike lane with dotted line extensions to define the tapered entrance into the turning lane. Signs should direct motorists to yield to bicyclists.
- Where a high degree of user comfort is desired, the shoulder may transition into a one-way separated bike lane or shared use path in advance of intersections.
- Include or upgrade shoulders during roadway resurfacing, rehabilitation, and reconstruction in new construction projects.
- When shoulders are intended for use by pedestrians, they must meet accessibility guidelines.



Bike Lane

Designates an exclusive space for bicyclists through the use of pavement markings and optional signs. A bike lane is located directly adjacent to motor vehicle travel lanes and follows the same direction as motor vehicle traffic.

Benefits:

- Provides additional separation distance between the sidewalk and motor vehicle travel area if a sidewalk is present
- Connects and completes bikeway networks through built-up areas
- Provides a designated space on the roadway suitable for many skilled bicyclists within built-up areas of small communities
- Can support school access by bicycle when configured as a wide bike lane on lower-speed, lower-volume streets
- Provides additional visual cues to drivers that they should expect bicyclists on the roadway. This can be particularly useful when transitioning to a built-up area from a highway context



Provides a consistent area for bicyclists to travel outside the path of motor vehicles.

Design Basics:

- Bike lanes may be enhanced with a longitudinal marked buffer area for more separation distance, which is appropriate for bike lanes on roadways with high motor vehicle traffic volumes and speed.
- Design bike lanes to separate road users and reduce the stress of motor vehicle passing events. Minimum bike lane width is 5 ft. per PennDOT's Pub. 13M.
- Mark a bike lane line with a normal solid white line and a standard bike lane symbol marking.
- Lane markings should remain solid and not dotted at driveway crossing.
- An optional bike lane sign may be used to supplement the bike lane pavement markings.
- Where special emphasis is desired, green pavement color may be used within bike lanes and at merging or weaving areas where motor vehicles may cross bike lanes.



Physically Separated Facilities

Shared Use Path

Provides a travel area separate from motorized traffic for bicyclists, pedestrians, skaters, wheelchair users, joggers, and other users. Shared use paths can provide a low-stress experience for a variety of users using the network for transportation or recreation.

Benefits:

- Provides a dedicated facility for users of all ages and abilities
- Provides, in some cases, a short-cut between cities or neighborhoods
- Provides, in some cases, access to areas that are otherwise served only by limited-access roadways
- Supports tourism through convenient access to natural areas or as an enjoyable recreational opportunity itself
- Provides nonmotorized transportation access to natural and recreational areas, which can especially help low-income people obtain access to recreation
- Paths have a small footprint and can display a distinctly rural character



Offers network connectivity opportunities beyond that of the roadway network. These facilities are often located in parks, along rivers, beaches, and in greenbelts or utility corridors where there are few conflicts with motorized vehicles.

Design Basics:

- The geometric design of shared use paths should support the speed and volume of expected user types. Minimum width is 8 ft.
- Under most conditions, center line markings are not necessary, and path users will naturally keep right except to pass.
- On shared use paths with heavy peak hour and/or seasonal volumes, the use of a center line stripe may help organize pathway traffic.
- In a mixed user environment, Yield etiquette signs may be used.
- Motorists should yield right-of-way to pedestrians within crosswalks.
- Depending on state or local laws, motorists may also yield to bicyclists within crosswalks.
- A basic marked shared use path crossing consists of a marked crosswalk plus signs and other markings to slow or stop traffic.
- Median islands are beneficial on roadways with high volumes and/or high speeds and on roadways with three or more travel lanes. They particularly benefit people who may travel slower such as children, older adults, and disabled people. These are an FHWA proven safety countermeasure.
- Where greater visibility or traffic control is desired, a rectangular rapid flashing beacon (RRFB) may be used.
- Asphalt is the most common surface for shared use paths, but the use of concrete has proven to be more durable and significantly reduces maintenance costs over the long term.
- A shared use path is a separated facility intended for use by pedestrians and must meet accessibility guidelines for walkways and curb transitions. Shared use paths are required to be accessible by all users, including those with mobility devices and vision disabilities.



Sidepath

A bidirectional shared use path located immediately adjacent and parallel to a roadway. Sidepaths can offer a high-quality experience for users of all ages and abilities as compared to on-roadway facilities in heavy traffic environments, allow for reduced roadway crossing distances, and maintain rural and small-town community character.

Benefits:

- Completes networks where high-speed roads provide the only corridors available
- Fills gaps in networks of low-stress local routes such as shared use paths and bicycle boulevards
- Provides a more appropriate facility for users of all ages and abilities than shoulders or mixed traffic facilities on roads with moderate or high traffic intensity
- Encourages bicycling and walking in areas where high-volume and high-speed motor vehicle traffic would otherwise discourage it
- Maintains rural character through reduced paved roadway width compared to a visually separated facility
- Very supportive of rural character when combined with vegetation to visually and physically separate the sidepath from the roadway



Offers a low-stress experience for bicyclists and pedestrians on network routes otherwise inhospitable to walking and bicycling due to high-speed or high-volume traffic.

Design Basics:

- Sidepath width impacts user comfort and path capacity. Therefore, with increasing user volumes, the path width may need to be increased too. The minimum width is 8 ft.
- Separation from the roadway should be informed by the speed and configuration of the adjacent roadway and by available right-of-way. The minimum separation width is 5 ft.
- Trees and landscaping can be used to maintain community character and add value to the experience of using a sidepath. They provide shade for users during hot weather and help to absorb stormwater runoff.
- Sidepaths may include edge lines or centerlines or be unmarked.
- Sidepaths are bidirectional facilities, and signs should be posted for path users traveling in both directions. It's important for sidepath signs to not be confused with roadway signs.
- Maintain physical separation of the sidepath through crossings at driveways and intersections.
- The roadway and path approaches to an intersection should always provide enough stopping sight distance to obey the established traffic control.
- Where possible, include a raised median island on the cross street to provide additional safety and speed management benefits.
- At minor street crossings, give sidepaths the same priority as the parallel roadway at all crossings.

- For connections with on-street bikeways, it may be necessary for path users to transition to a facility on the opposite side of the road in the case if a sidepath terminates.
- Sidepaths are required to be accessible by all users, including those with mobility devices and visually-impaired pedestrians.
- If there is sufficient roadway width or right-of-way, designers should consider the simultaneous provision of both sidepaths and bicycle accessible shoulders to serve a diverse range of user types.

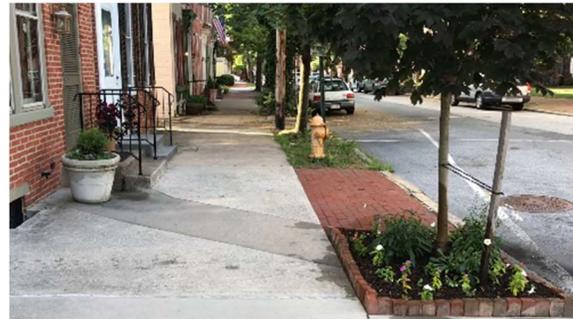


Sidewalk

Provides dedicated space intended for use by pedestrians that is safe, comfortable, and accessible to all. Sidewalks are physically separated from the roadway by a curb or unpaved buffer space.

Benefits:

- Provides a dedicated place within the public right-of-way for pedestrians to safely travel and reduces pedestrian collisions in rural areas
- Reduces “walking along roadway” crashes
- May notably increase levels of walking in areas with high traffic speeds and/or volumes



Desirable to support pedestrian safety and comfort in areas with a mix of land uses and in areas of the community where the roadway network connections have generally high traffic volumes or speeds.



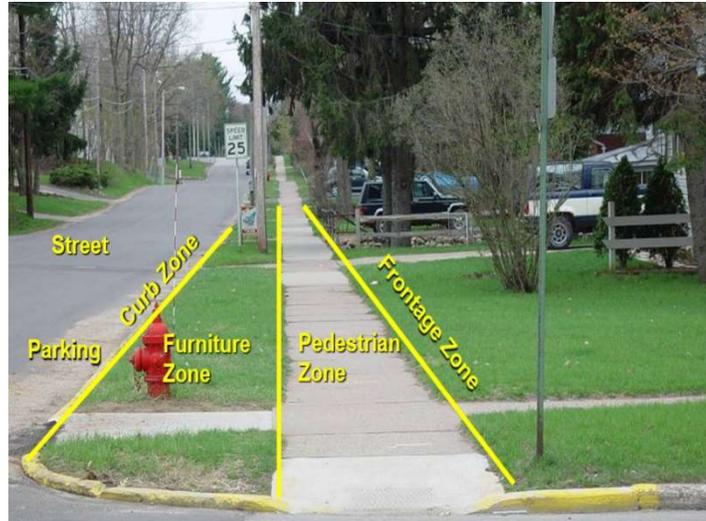
Design Basics:

- Sidewalks serve multiple important functions and should be designed with three distinct zones to accommodate these uses.

- Frontage Zone – A shy zone adjacent to the property line that provides space for people to enter and exit buildings.

- Pedestrian Zone – The clear width needed for pedestrian travel activity and should be wide enough for two people to walk side-by-side.

- Furniture Zone – The furnishing zone is closest to the street and provides space for mailboxes, signs, street lighting, and other



- utilities. This area serves as snow storage areas in winter climates and protects pedestrians from splash during rain events. It is often configured as an open ditch for stormwater catchment and infiltration. Ditches can be retrofitted into bioswales or raingardens for filtration and water purification.
- Legal crosswalks, whether marked or not, exist at all intersections defined by the extension of the sidewalk across the intersection (Title 75, Section 102).
<https://www.legis.state.pa.us/cfdocs/legis/LI/consCheck.cfm?txtType=HTM&ttl=75&div=0&chpt=1&sctn=2&subsctn=0>
- No roadway markings are required, but at intersections, stop lines, yield lines, and crosswalks may be used to clarify pedestrian crosswalk area.
- No signs are required, but they may be used to enhance the awareness of crosswalk locations to remind drivers of the obligation to yield to pedestrians crossing.
- Sidewalks are usually constructed with concrete, but asphalt, crushed stone, or other stabilized surfaces may be appropriate. Ensure accessibility and properly maintain all surfaces regularly.
- A sidewalk is a separated facility intended for use by pedestrians and must meet accessibility guidelines for walkways and curb transitions. Sidewalks are required to be accessible by all users. Minimum width is 4 ft. per PennDOT's Pub. 13M.

Recommended Guidelines for Sidewalk/Walkway Installation from the FHWA

This table helps to address sidewalk gaps, which is a common problem in PA municipalities.

Roadway Classification and Land Use	Sidewalk/Walkway	Future Phasing Requirements
Rural Highways (< 400 ADT)	Shoulders preferred, with minimum of 0.9 m (3 ft).	Secure/preserve right-of-way (ROW) for future sidewalks.
Rural Highways (400 to 2,000 ADT)	1.5-m (5-ft) shoulders preferred, minimum of 1.2 m (4 ft) required.	Secure/preserve ROW for future sidewalks.
Rural/Suburban Highway (ADT > 2,000 and less than 1 dwelling unit (d.u.) / .4 hectares (ha) [1 d.u. / acre])	Sidewalks or side paths preferred. Minimum of 1.8-m (6-ft) shoulders required.	Secure/preserve ROW for future sidewalks.
Suburban Highway (1 to 4 d.u. / .4 ha [1 to 4 d.u. / acre])	Sidewalks on both sides required.	
Major Arterial (residential)	Sidewalks on both sides required.	
Urban Collector and Minor Arterial (residential)	Sidewalks on both sides required.	
Urban Local Street (residential – less than 1 d.u. / .4 ha [1 d.u. / acre])	Sidewalks on both sides preferred. Minimum of 1.5-m (5-ft) shoulders required.	Secure/preserve ROW for future sidewalks.
Urban Local Street (residential – 1 to 4 d.u. / .4 ha [1 to 4 d.u. / acre])	Both sides preferred.	Second side required if density becomes greater than 4 d.u. / .4 ha (4 d.u. / acre) or if schools, bus stops, etc. are added.
Local Street (residential – more than 4 d.u. / .4 ha [4 d.u. / acre])	Sidewalks on both sides required.	
All Commercial Urban Streets	Sidewalks on both sides required.	
All Streets in Industrial Areas	Sidewalks on both sides preferred. Minimum of 1.5-m (5-ft) shoulders required.	

1 acre=0.4 hectares (ha)

Resource: http://www.pedbikesafe.org/pedsafe/resources_guidelines_sidewalkwalkways.cfm

Sidewalks are an FHWA proven safety countermeasure.

U.S. Department of Transportation
Federal Highway Administration

PROVEN SAFETY COUNTERMEASURES

Walkways

SAFETY BENEFITS:

SIDEWALKS
65-89%
Reduction in crashes involving pedestrians walking along roadways

PAVED SHOULDERS
71%
Reduction in crashes involving pedestrians walking along roadways

A walkway is any type of defined space or pathway for use by a person traveling by foot or using a wheelchair. These may be pedestrian walkways, shared use paths, sidewalks, or roadway shoulders.¹

With more than 5,000 pedestrian fatalities and 70,000 pedestrian injuries occurring in roadway crashes annually, it is important for transportation agencies to improve conditions and safety for pedestrians and to integrate walkways more fully into the transportation system.²

Well-designed pedestrian walkways, shared use paths, and sidewalks improve the safety and mobility of pedestrians. In some rural or suburban areas, where these types of walkways are not feasible, roadway shoulders provide an area for pedestrians to walk next to the roadway.

Example of a sidewalk in a residential area.
Source: pedbikemages.org / Burden

Paved shoulder used as a walkway.
Source: pedbikemages.org / Burden

Separated Bike Lane

A facility for exclusive use by bicyclists that is located within or directly adjacent to the roadway and is physically separated from motor vehicle traffic with a vertical element.

Benefits:

- Provides a more comfortable experience on high-speed and high-volume roadways than on-road shoulders
- Offers bicyclists a similar riding experience to sidepaths but with fewer operational and safety concerns over bidirectional sidepath facilities
- Offers an increased level of service over sidepaths in areas with high-volumes of pedestrians when paired with sidewalks
- Can reduce the incidence of sidewalk riding and potential user conflicts



- Increases the degree of connectivity over a sidepath when configured as a one-way directional facility on both sides of the street

Can offer a similar experience as sidepaths for bicyclists and pedestrians but with increased functionality and safety where increased numbers of pedestrians and potential conflicts with motor vehicles are present.

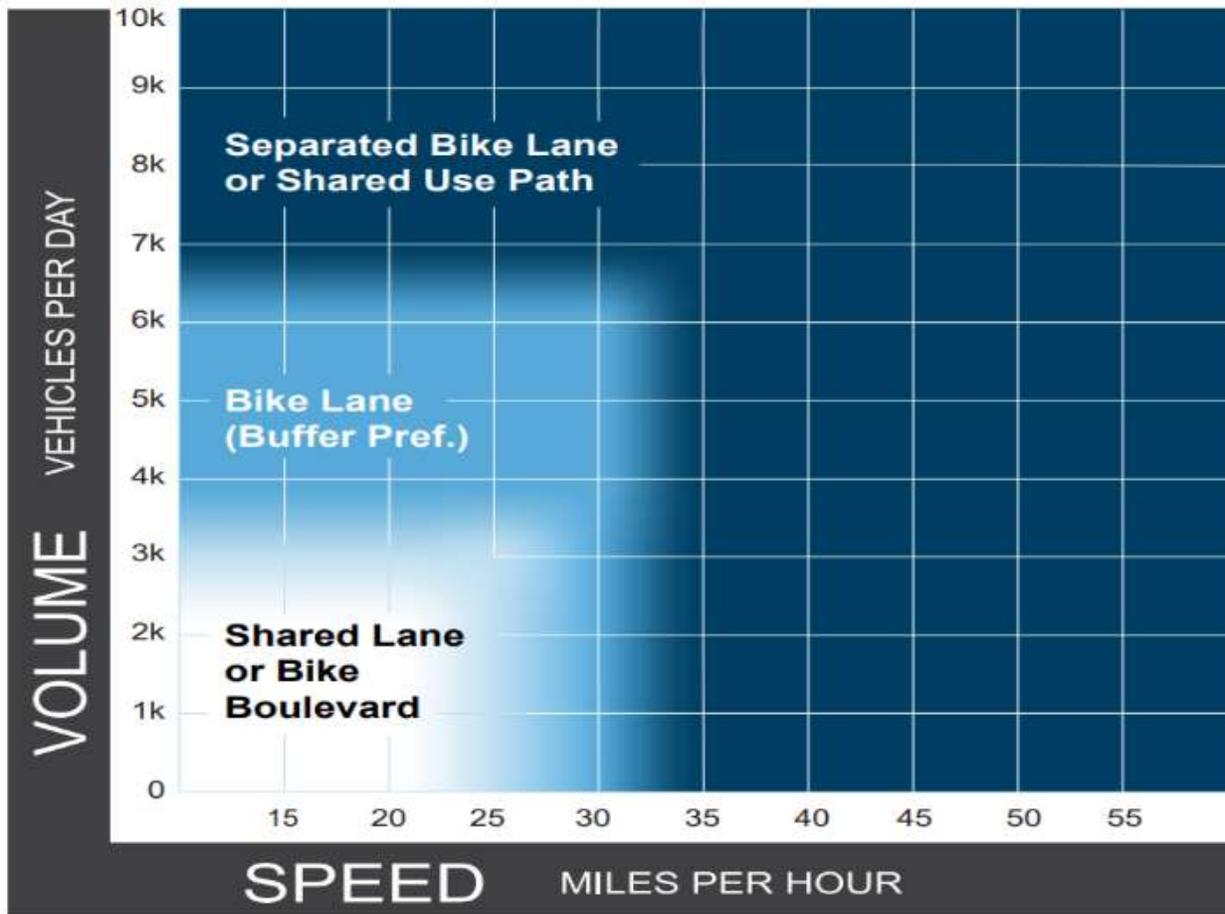
Design Basics:

- Separated bike lanes are comprised of three interrelated zones: pedestrian separation, separated bike lane, and roadway separation.
- The separated bike lane zone should offer a clear operating area for bicyclist travel through physical separation between the bike lane and the adjacent travel lanes.
- There should also be a roadway separation, which is the vertical element between the bike lane and the adjacent roadway.
- Separation from pedestrians is important too especially when the separated bike lane is located immediately adjacent and at the same level as the sidewalk. Therefore, clearly distinguish between the bike lanes and sidewalk through the use of a curb, separation buffer space, different pavement/other surface treatments, or detectible tactile guidance strips.
- Separated bike lanes will use markings to clarify intended users and travel direction.
- Optional bike lane signs (R3-17) may be used to supplement the bike lane pavement markings.
- Separated bike lanes may operate similar to sidepaths at intersections, but the one-way directional alignment of the facility allows for additional design treatments and mitigates some of the operational and safety concerns associated with sidepath facilities. Therefore, the proper intersection treatments should be used: bend-in, bend-out, mixing zone, and protected signal phase.
- They reflect a more urban visual atmosphere than a sidepath, so use of a wide landscaped buffer may lessen visual impact concerns.
- They require a wide roadside environment to provide for separation, sidewalks, and bike lane areas.
- On streets with existing curb and gutter, it may be possible to implement a protected bike lane outside of the curb between the curb and the sidewalk



- Separated bike lanes may be implemented during roadway resurfacing, rehabilitation, and reconstruction or new construction projects to save money.
- Separated bike lanes are not intended for pedestrian use. On roadways with separated bike lanes, the appropriate pedestrian facility is a sidewalk.
- The design of separated bike lanes must consider driveway conflicts, accessible parking and parking access aisles, transit stop access and egress, and loading zone accommodations.

FHWA Bikeway Selection Guide



Resource: https://safety.fhwa.dot.gov/ped_bike/tools_solve/docs/fhwasa18077.pdf

This table is from Lancaster County’s Active Transportation Plan and is adapted from the FHWA graph above.

Bikeway Facility Type	Street Type/Speed/Volume	Design Specifications	Implementation Strategies
 <p>BICYCLE BOULEVARD</p>	<ul style="list-style-type: none"> Local Residential collector 	<ul style="list-style-type: none"> Identification signage and pavement markings 85th percentile speed <25 MPH ADT <3000 Crossing treatments at local streets, avenues and boulevards 	<ul style="list-style-type: none"> Use access management and speed reduction tools to achieve desired motor vehicle volumes and speeds.
 <p>SHARED ROADWAY</p>	<ul style="list-style-type: none"> Local Commercial Main Street 	<ul style="list-style-type: none"> Works best on streets with speeds of 30 MPH or lower. May be used on streets up to 35 MPH Minimum placement of shared lane marking is 11 feet from curb where on-street parking is present (4 feet from edge of curb with no parking) 	<ul style="list-style-type: none"> Shared lane markings pair well with Bikes May Use Full Lane (R4-11) signs. Modifications to signal timing help induce a bicycle-friendly travel speed for all users
 <p>ON-STREET BIKE LANE</p>	<ul style="list-style-type: none"> Local Collector Commercial Main Street 	<ul style="list-style-type: none"> 6'- 7' preferred bike lane width 5' minimum bike lane width (when adjacent to parking) 	<ul style="list-style-type: none"> Lane narrowing Travel lane reconfiguration Parking lane reconfiguration
 <p>BUFFERED BIKE LANE</p>	<ul style="list-style-type: none"> Collector Commercial Main Street Arterial 	<ul style="list-style-type: none"> 5' minimum bicycle travel area 18" minimum buffer area 	<ul style="list-style-type: none"> Lane narrowing Travel lane reconfiguration Parking lane reconfiguration
 <p>ONE-WAY SEPARATED BIKE LANE</p>	<ul style="list-style-type: none"> Collector Commercial Main Street Arterial 	<ul style="list-style-type: none"> 7' travel area 3' or wider buffer 18" minimum buffer adjacent to travel lanes 3' minimum buffer adjacent to parking lanes 	<ul style="list-style-type: none"> Lane narrowing Travel lane reconfiguration Parking lane reconfiguration Curb reconstruction
 <p>TWO-WAY SEPARATED BIKE LANE</p>	<ul style="list-style-type: none"> Collector Commercial Main Street Arterial 	<ul style="list-style-type: none"> 12' preferred operating width 10' minimum travel width (8' width in constrained conditions) 3' minimum buffer adjacent to parking lanes 	<ul style="list-style-type: none"> Lane narrowing Travel lane reconfiguration Parking lane reconfiguration Curb reconstruction

Bikeway Selection Activity:
 Speed limit – 25 MPH
 ADT – 3,769 vehicles per day (vpd)

Amenities

Design elements that help to support a pedestrian-friendly environment include amenities such as functional street furniture (benches and trash cans), pedestrian-scale lighting, and landscaping. Street trees can help to calm traffic as well and promote walking by creating a visual narrowing of the roadway as well as providing shade. Amenities should also comply with ADA requirements and include items such as ramps and detectable warning surfaces (DWSs).



Other user amenities can include shelter for transit stops, info booths, food trucks, restrooms, water fountains, bicycle racks, bicycle repair stations, and bicycle sharing stations.

PART 3: CONNECTIONS AND IMPLEMENTATIONS

SECTION 3: PLANNING POLICIES AND ORDINANCES

Resource: <https://boroughs.org/ordfiles.php>

Performance measures should relate back to the vision and mission of a plan. They help agencies understand how well a plan is being implemented.



Transportation planning is critical to creating multimodal networks for all road users. Steps in the transportation planning process include:

- **Engaging** the public and stakeholders to establish shared goals and visions for the community.
- **Monitoring** existing conditions and comparing them against transportation performance goals.
- **Forecasting** future population and employment growth including assessing projected land uses in the region and identifying major corridors of growth or redevelopment.
- **Identifying** current and projected transportation needs by developing performance measures and targets.
- **Analyzing** various transportation improvement strategies and their related tradeoffs using detailed planning studies.
- **Developing long-range plans and short-range programs** of alternative capital improvement, management, and operational strategies for moving people and goods.

- **Estimating** how recommended improvements to the transportation system will impact achievement of performance goals as well as impacts on the economy and environmental quality including air quality.
- **Developing a financial plan** to secure sufficient revenues that cover the costs of implementing strategies and ensure ongoing maintenance and operation.

It is also important to ensure that municipalities understand their current local, regional, and state policies and ordinances. Active transportation plans will need to comply with these existing policies and ordinances, or the local policies and ordinances will need to be changed to be consistent with the active transportation plan. Example relevant planning and policy documents include municipal codes, existing transportation plans, Complete Streets policies, existing short-term and long-term plans, state regulations, etc.

PART 3: CONNECTIONS AND IMPLEMENTATIONS

SECTION 4: FUNDING

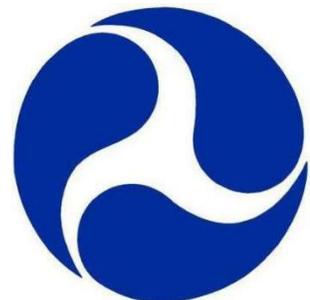
Federal

Through the **Fixing America’s Surface Transportation (FAST) Act**, Congress authorizes federal funding programs and defines the activities and implementing entities that are eligible for the funds. Pedestrian and bicycling projects are broadly eligible for federal transportation funds. The primary funding programs are the Surface Transportation Block Grant Program (STBG), the Transportation Alternatives Set-Aside Program, and Congestion Mitigation and Air Quality Improvement Program (CMAQ).



The Highway Safety Improvement Program (HSIP) may also fund walking and bicycling projects. Typically, STBG and HSIP don’t fund standalone bicycle and pedestrian projects. They are usually built into larger projects that use these sources.

Two safety programs administered by **NHTSA, Section 402 State Highway Safety Grant Program and Section 405(h) National Priority Safety Program (Non-motorized Safety)** may be used for walking and bicycling non-infrastructure safety programs. Funds from these programs are distributed to the states and generally administered at the state level.



State

State Bicycle Pedestrian Coordinator – The Commonwealth’s Bicycle and Pedestrian Coordinator is responsible for managing PennDOT’s bicycle and pedestrian program. The coordinator serves on statewide, regional, and national committees and task forces. A large part of the job is to encourage interagency cooperation. The coordinator works closely with municipal officials, legislators, transit agencies, and professional and advocacy bicycle and pedestrian organizations.

PennDOT Connects Initiative – PennDOT Connects is a new approach to project planning and development announced by PennDOT in 2017. It expands the department’s requirements for engaging local governments and planning partners. This initiative requires collaboration with stakeholders before project scopes are developed and before funds are programmed onto the Transportation Improvement Program (TIP)

1. PennDOT
 - Multimodal Transportation Fund
2. Department of Community and Economic Development (DCED)
 - Multimodal Transportation Fund
 - Greenways, Trails, and Recreation Program
3. Department of Conservation & Natural Resources (DCNR)
 - Community Conservation Partnerships Program (C2P2)
4. Department of Health
 - WalkWorks

https://www.health.pa.gov/topics/Documents/Programs/Walk%20Works/WalkWorks_Resource_Guide_2017.pdf

1. PennDOT Transportation Alternatives Program (TAP)
2. DCED Community Development Block Grant
3. DCNR Peer Program
4. PennDOT Multimodal Transportation Fund (MTF)
5. DCED Multimodal Transportation Fund
6. PennDOT Green Light-Go Program
7. Automated Red Light Enforcement (ARLE)
8. Pennsylvania Municipal Liquid Fuels Program

* The numbers for each funding program correspond to the descriptions below:

1. Bicycle and pedestrian facilities are eligible. Eligible agencies include local governments, regional transportation authorities, school districts, and local education agencies or schools. Construction projects must have a construction cost of at least \$50,000. Applicants pay all pre-construction costs. **TAP funds all construction phase costs at 100%.**
2. Grants and technical assistance are made available for federal designated municipalities for eligible types of community development in low-moderate income communities. This can be used for housing rehabilitation, public services, community facilities, infrastructure improvement, development, and planning. There are two tiers: an entitlement program providing annual funding to designated municipalities and a competitive program available to non-federal entitlement municipalities and Act 179 entitlement municipalities with a population of less than 10,000. Proposed projects must meet the Department of Housing and Urban Development's (HUD) established eligibility requirements and benefit low-moderate income individuals or communities or assist in the elimination of slums and blight. **The entitlement program is set by formula, and the competitive program is \$750,000 maximum.**
3. This grant is a consulting service coordinated by DCNR to solve an existing issue or improve services in a specific area. DCNR has not specifically defined all types of eligible projects. Municipalities and municipal agencies are eligible. **A 10% match is required.**
4. Projects eligible include: work to enhance bus stops, park and ride facilities, sidewalk/crosswalk safety improvements, bicycle lanes/route designations, etc; sidewalk connections, crosswalks, pedestrian and traffic signals, pedestrian signs and lighting; improving signage access roads, port upgrades, bicycle/shared lane markings, and bicycle parking at transit stops; neighborhood scale transit-oriented development. Municipalities, councils of governments, business/non-profits, economic development organizations, and public transportation agencies are eligible for funding. This funding is for projects totaling at least \$100,000 but no more than \$3,000,000. **A minimum match of 30% is required.**
5. This is funding to further economic development and ensure a safe and reliable system of transportation, rehabilitation, and enhancement of transportation assets to existing communities, streetscapes, lighting, sidewalk enhancements, pedestrian safety, connectivity of transportation assets, and transit-oriented development. Municipalities, councils of governments, businesses, economic development organizations, public transportation agencies, and ports-rail/freight are eligible for funding. **Grants are available for projects with a cost of \$100,000 but no more than \$3,000,000.**

6. The program goal is to improve safety and mobility by reducing congestion and improving efficiency of existing traffic signals on state and local highways. Examples include modernization upgrades, traffic signal maintenance and operations, LED replacement, signal retiming, and other activities that will enhance and modernize the safety and mobility of the traffic signal. Projects will be locally managed unless otherwise specified by PennDOT. This funding can only be used for traffic signals, and municipalities, counties, and planning organizations are eligible for funding. **A 20% municipal match is required.**
7. This funds pedestrian safety improvements at traffic signals, such as countdown timers, easily accessible pushbuttons, crosswalk striping, pedestrian signing, pedestrian mobility improvements, particularly projects with a combination of eligible features, upgrading, modernization or improvements to traffic control signals, roadway or intersection signing, and pavement striping. Local authorities, metropolitan planning organizations, regional planning organizations, county planning organizations, and commonwealth agencies are eligible for funding. Funding varies by account balance of Motor License Fund of the Philadelphia Parking Authority. **No match is required.**
8. The Municipal and County Liquid Fuels Programs fund a range of projects to support municipalities' and counties' construction, reconstruction, maintenance, and repair of public roads or streets. Eligible activities include: construction, reconstruction, maintenance, and repair of public roads/streets or bridges for which the county or municipality is legally responsible; acquisition, maintenance, repair, electrification and operation of traffic signs, and traffic signal control systems at intersections and/or railroad crossings; erection of street name signs, traffic directing signs, and traffic signal control systems; lane and crosswalk painting and markings; and ADA compliant sidewalk construction. This program is intended for municipalities that are already enrolled in the Municipal Liquid Fuels Program. **Municipalities enrolled in the program receive an annual amount.** A portion of the funds can be used for walking infrastructure improvements.

WalkWorks

- Identifies and promotes safe walking routes
- Offers social support through guided, community-based walking groups
- Helps schools develop walk-to-school programs
- Addresses local polices to increase safe walking route



Resource: <https://www.health.pa.gov/topics/programs/WalkWorks/Pages/WalkWorks.aspx>

Funding

WalkWorks provides financial assistance to communities to develop plans that will, when implemented, improve walking, bicycling, and transit connections to everyday destinations. The adopted Active Transportation Plan or Policy must include:

- The number of potential linear miles of multi-use paths, sidewalks, bike lanes, and public transit routes connecting everyday destinations that will be addressed during the initial 12 months following adoption of the plan or policy.
- The number of potential new or enhanced sites, identified in the plan or policy, that will be connected by activity-friendly routes within the initial 12 months following adoption of the plan or policy.
- The number of people potentially impacted by the plan or policy.

The development of a **transportation plan**, which will identify and prioritize projects related to modes of active transportation with an emphasis on walking and biking (\$10,000 - \$20,000)

The development of **policies (Complete Streets or Vision Zero)** that include language in support of environmental changes for enhancing places for physical activity with an emphasis on walking (\$3,000 - \$5,000)

SUMMARY

The course objectives are:

- Review the concepts for active transportation.
- Discuss visioning and planning for active transportation at the local level.
- Study examples of community connections and implementations.

PennDOT has 6 themes for Active Transportation:

1. Enhance Safety
2. Provide Transportation Equity
3. Connect Walking & Bicycling Networks
4. Leverage Partnerships
5. Improve Public Health
6. Increase Economic Mobility

Vision is the driving force of your Active Transportation Plan. Your goals may change along the way but not the vision.

Mixed Traffic Facilities – shared space between all road users. Examples include yield roadways, bicycle boulevards, and advisory shoulders.

Visually Separated Facilities – separation of road users through nonphysical features such as pavement markings. Examples include paved shoulders and bike lanes.

Physically Separated Facilities – separation of road users through physical vertical elements. Examples include shared use paths, sidepaths, sidewalks, and separated bike lanes.

Resources:

Most of this information came from: *Small Town and Rural Multimodal Networks*:

https://www.fhwa.dot.gov/environment/bicycle_pedestrian/publications/small_towns/

FHWA Pedestrian and Bicycle Transportation University Courses:

http://www.pedbikeinfo.org/resources/resources_details.cfm?id=5174



pennsylvania
DEPARTMENT OF TRANSPORTATION
LOCAL TECHNICAL ASSISTANCE PROGRAM

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