

Driver Behaviors and Street Design Improvements

March 18, 2026

Dickinson College Meeting Venue
Stern Great Room, 208 West Louther Street



CARLISLE
PENNSYLVANIA EST.
1751



Stakeholder Meeting Objectives

1. Introduce Vision Zero & Active Transportation Goals for Carlisle
2. Stakeholder Meeting Recap and Updates (March 11, 2026)
3. Explain Vision Zero Strategies and Historical Context
4. Gather Stakeholder Feedback on Design and Behaviors

Strategic Framework

CARLISLE
PENNSYLVANIA EST. 1751

Vision

In Carlisle, our history inspires innovative ideas that create a safe, inclusive, and welcoming community where every individual can thrive and make a difference.

Mission

In Carlisle, we **CARE**. Our team is dedicated to providing quality public services that support a safe, diverse, and dynamic community.

Values

In Carlisle, we **CARE**. We are...

Committed
Accountable
Resilient
Ethical

Outcome Areas



Caring & Professional

Ensuring responsive, quality services by our knowledgeable and committed staff.



Vibrant & Thriving

Building an inclusive and engaged community by fostering creative opportunities, community connections, and a diverse economic base attractive to residents, businesses, and visitors.



Dynamic & Responsible

Responsibly managing the financial resources necessary to advance innovative initiatives, provide essential services, and build a stronger community.



Healthy & Sustainable

Growing a healthy community, supported by thoughtful neighborhood spaces, that is socially and environmentally sustainable, improves quality of life, protects ecosystems, and conserves natural resources.



Welcoming & Livable

Building and maintaining inviting and safe neighborhoods through affordable housing and engaging recreational opportunities where residents and businesses flourish.



Accessible & Connected

Investing in safe pedestrian-, bike-, and transit-friendly options that connect people to the places they need to go, with convenient, accessible infrastructure that reduces car dependency.



Vision Zero
Resolution:
Active
transportation
plan by 2027

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Strategic Plan
2023



Goals for Carlisle in 2027 & 2033:

- **Active Comprehensive Transportation Plan** adoption no later than 2027 that takes input from cyclists, pedestrians, and multimodal street users.
- **Vision Zero Action Plan** implementation to eliminate traffic fatalities and severe injuries on all public streets in Carlisle by 2033.

The Planning Process Timeline

- Establish Vision Zero subcommittee (Monthly meetings - Done)
 - Core group: Councilor, GIS analyst, transportation engineer, police, DPW, parks and recreation, public information coordinator, planner
- Desktop analysis and draft template (September-December 2025)
- Stakeholder meetings (January-March)
- Analyze data and field check (April-June)
- Refine goals and action items (July-September)
- Borough Council workshops (October-November)
- Plan adoption (December)



Stakeholder Meetings

March 11, 18, 25

- Borough Council set the goal of adopting a plan (public policy)
- Staff is charged with preparing a plan that can be adopted
 - Desktop analysis and internal working group
 - Ask public for initial thoughts and to identify missing pieces

CARLISLE BOROUGH ACTIVE TRANSPORTATION PLAN

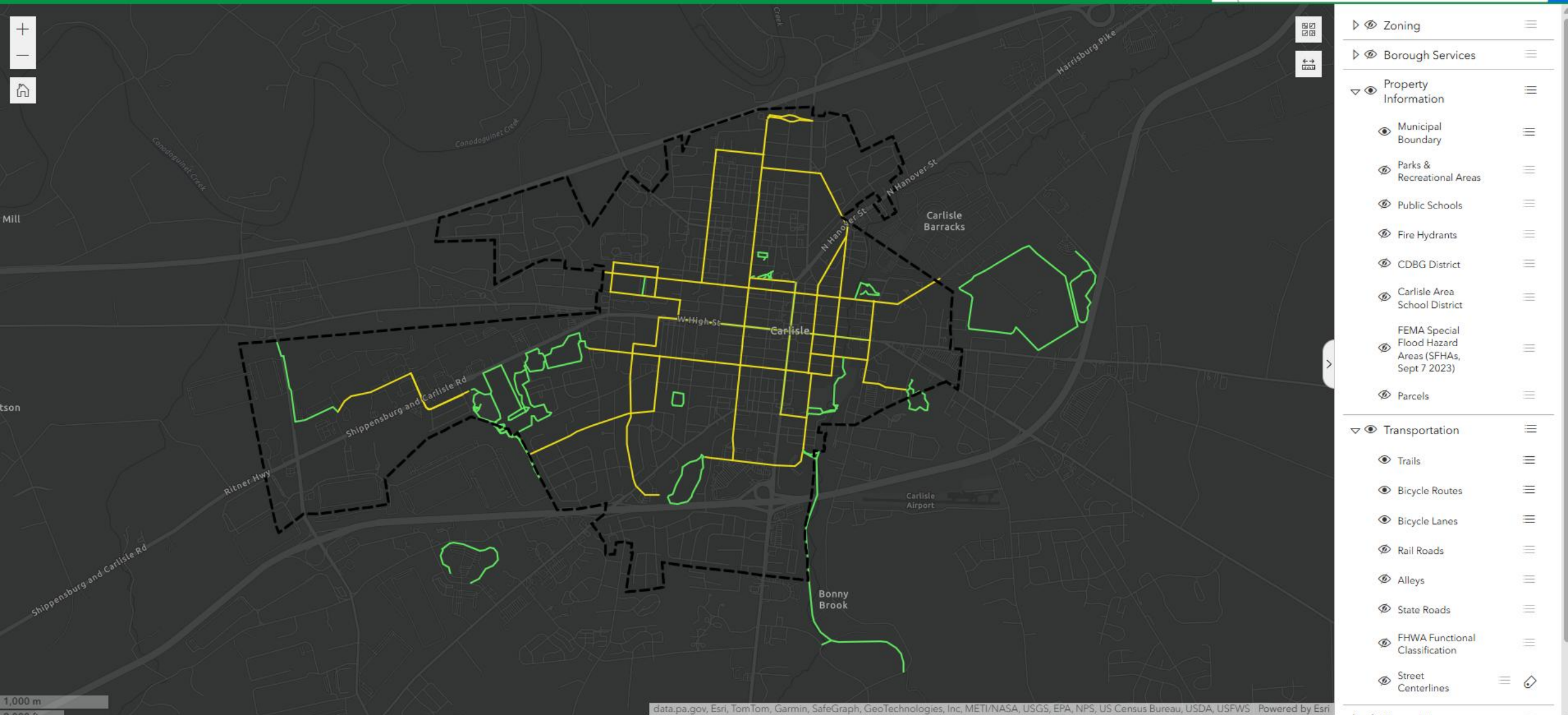


BE PART OF THE CONVERSATION

MEETING 1 CRASH DATA ANALYSIS	MEETING 2 DRIVER BEHAVIOR & STREET DESIGN
March 11, 6:00 p.m. 237 E. North St.	March 18, 6:00 p.m. 208 W. Louther St.
MEETING 3 INTERACTIVE WORKSHOP	
March 25, 6:00 p.m. 53 W. South St.	

[Link: Borough of Carlisle Interactive GIS Map](#)

Borough of Carlisle, Pennsylvania



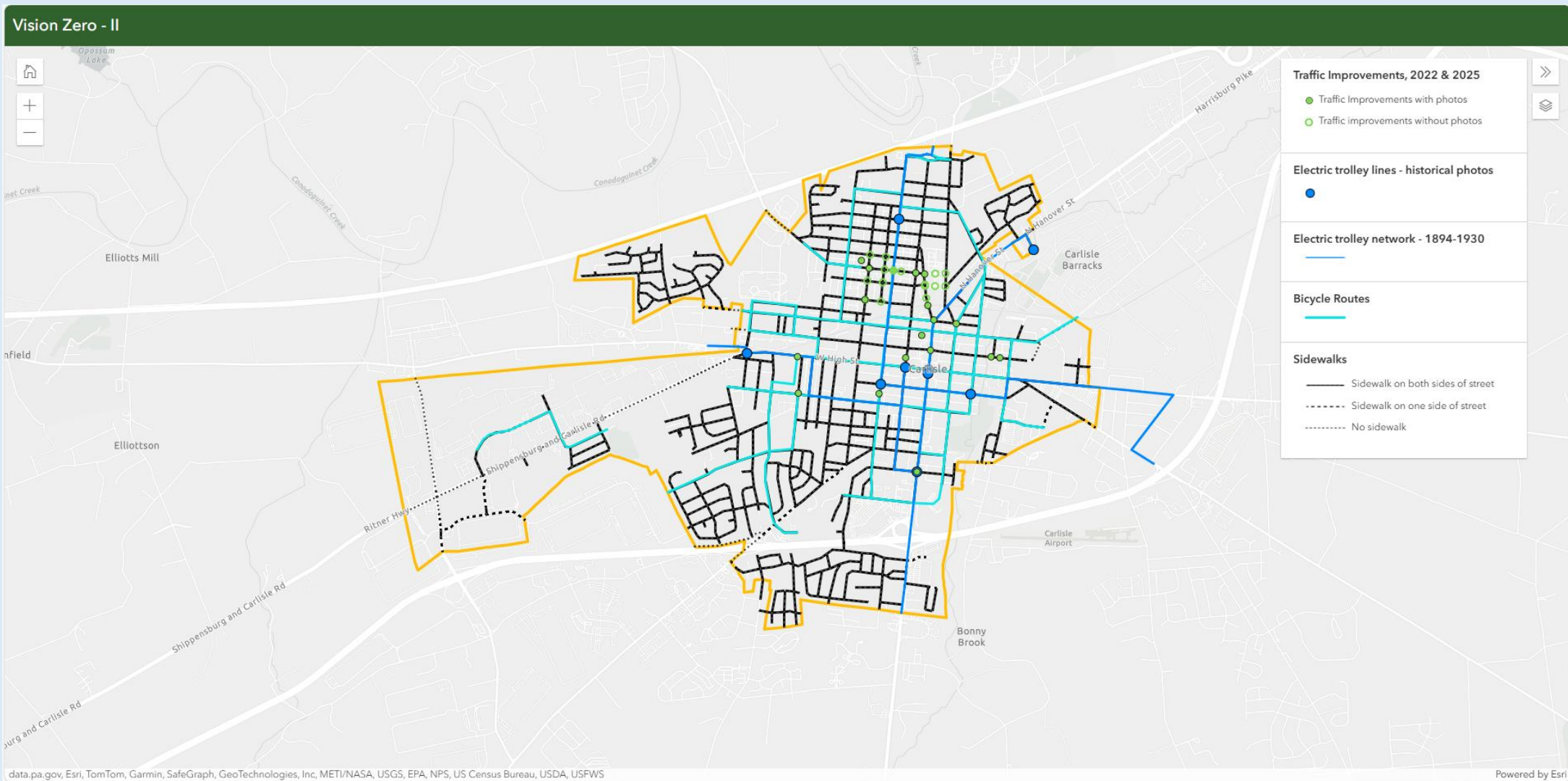
Crash Analysis Recap

- Most of the crashes involving bicyclists and pedestrians
 - took place at or within **intersections (signalized, stop controlled, alley)**
 - were caused by **aggressive driving**
- **Low street illumination** and **left turns** were identified as the predominant causes of crashes involving pedestrians and bicyclists.

Updates Encouraged by Stakeholders

- Highest crash intersections identified to supplement crash rate analysis
- Borough-wide sidewalk layer created to add focus on pedestrian planning
- Historical trolley map created to link active transportation to transit
 - Placeholder for future transportation planning
- Clarify terms:
 - “bike route” Carlisle’s signed bicycle route created in 2010
 - “bicycle lane” On-street bicycle lane (painted on High and Hanover Streets)

Vision Zero II



Vision Zero Strategies

- Improve roadway design by incorporating safety improvements
- Reduce speeds to safe levels with traffic calming measures
- Encourage safer road-user behavior

Extra stuff. The Conestoga wagon is not just the fancy trophy for the Dickinson College, Franklin and Marshall Football games. Lancaster's Conestoga wagon riders established driving on the right side of roads around 1750. Pennsylvania adopted the first rule of the road - in the USA - to drive on the right side of the turnpike from Lancaster to Philadelphia in 1792.



Conestoga Wagon
in Carlisle

Historical Perspective for Carlisle's Streets

- Central “gridiron-based” or grid system (curvilinear streets later)
- Streets designed for horses, pedestrians, and slow vehicles.



↑
**1861 Horses
and dirt roads**



↑
1904

Electric Trolley Service
1894-1930



↑
**1920 Cars
and brick roads**



↑
1936

Interstate Highways in Carlisle

USGS Maps*

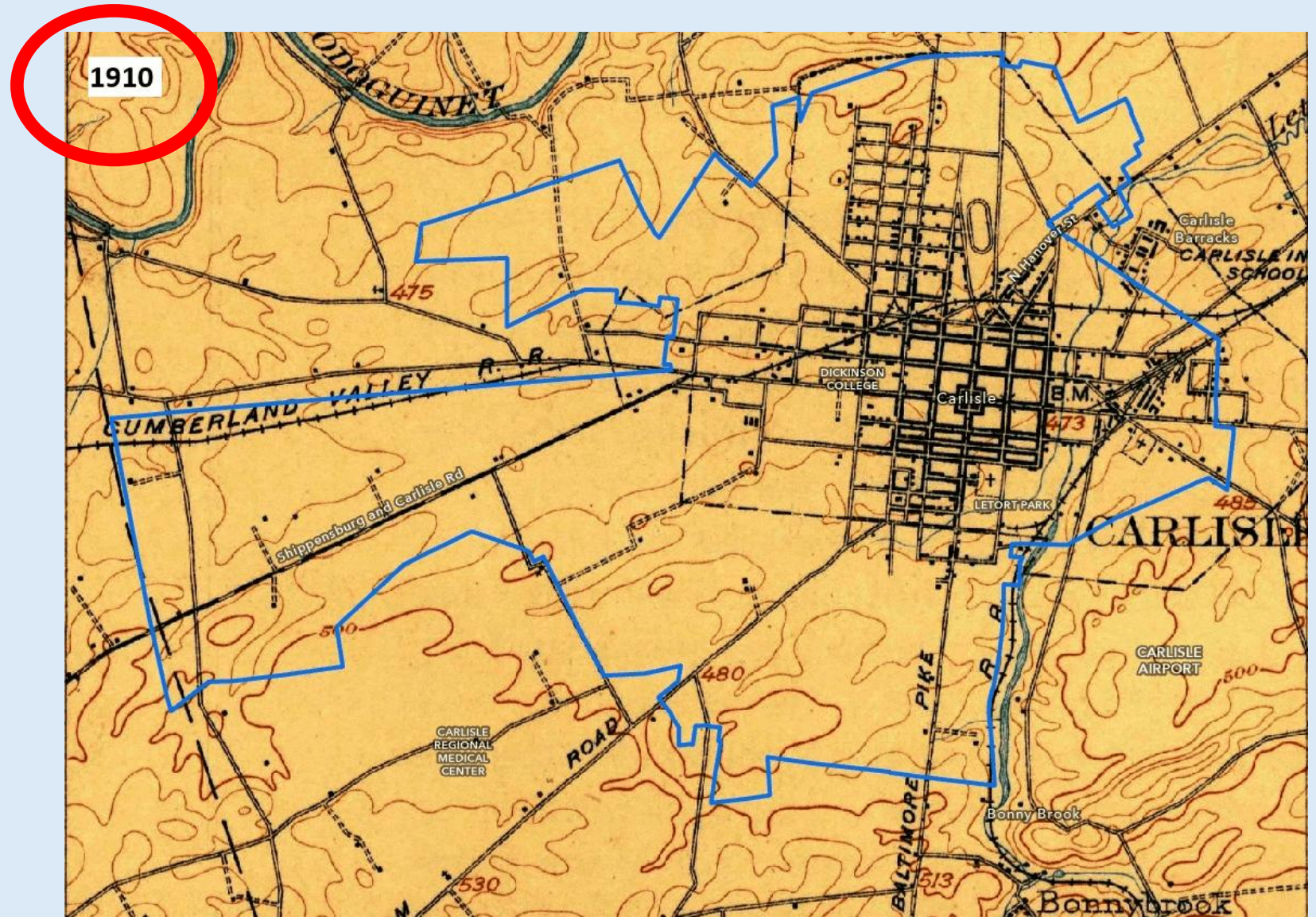
- 1910
- 1943 PA Turnpike, I-76
- 1969 I-81

Extra stuff.

I-76.....[New Deal funds](#)

I-81.....[Federal Aid Highway Act of 1956](#)
[National Interstate and Defense Highways Act of 1956](#)

* Correction! These are historical USGS Maps. These are →
not Sanborn insurance maps as described at the stakeholder meeting.



Streets redesigned for faster vehicles.



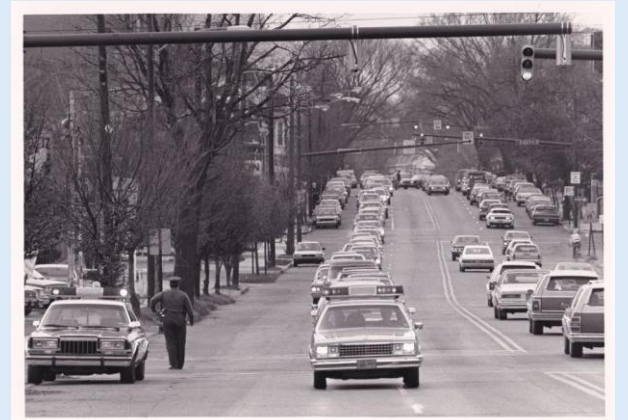
1951



1968



1978



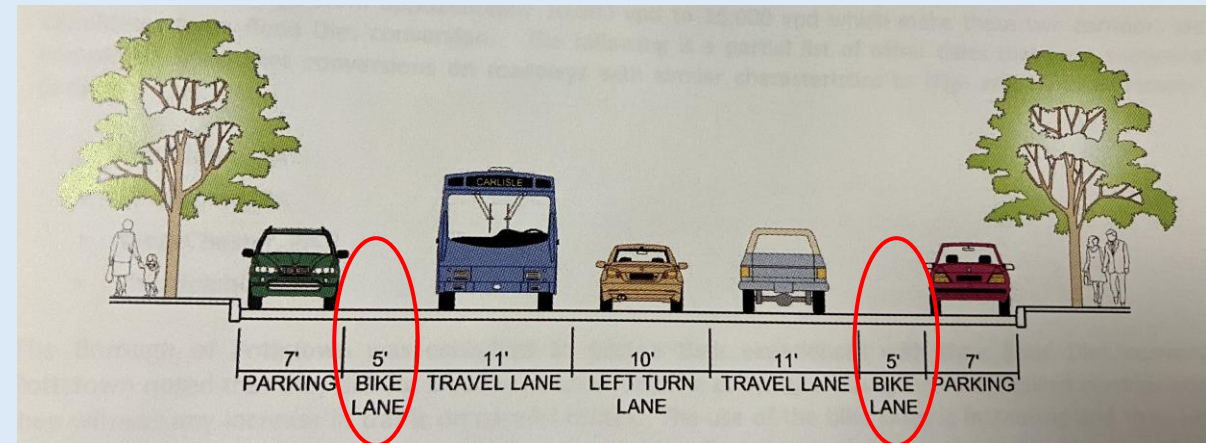
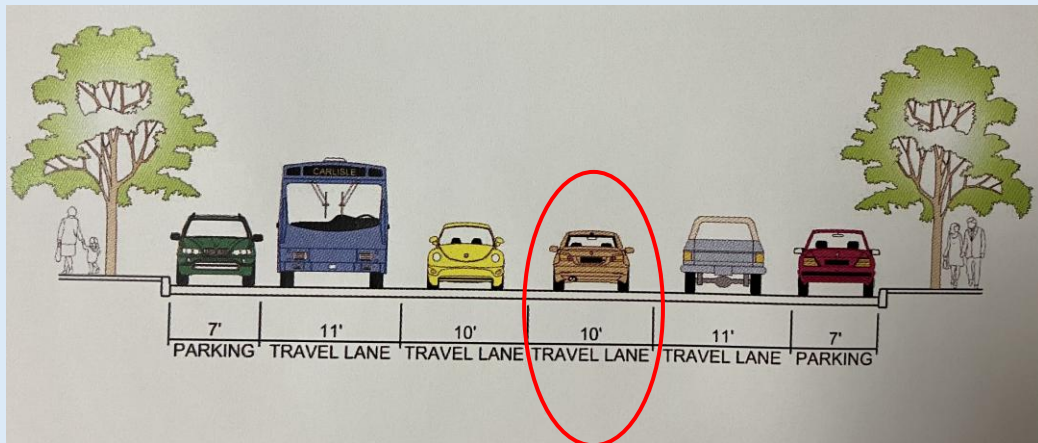
1983

**Cars, paved roads,
and lane markings**

**Downtown Sidewalk
Redevelopment**

2008-2010 Street Improvements

- 2008 Transportation Study
- 2010 Implemented Plan Downtown:
 - physical improvements to pedestrian crossings
 - reconfigured travel lane paint and signage for bike route, shared lane markings, and bicycle lanes (*typical profile of bike lane configuration on High Street and Hanover Street depicted below*)



Street Infrastructure: maintenance and repair

Underground

- Water, sewer, stormwater, gas, phone, data
- Road base material
- Water and gas valves (access above and below)

Aboveground

- Curbing, storm inlets, manholes
- Street sweeping
- Leaf vacuuming
- Snow plowing
- Paint markings and other signage
- Hydrants
- Streetlights
- Parking meters/kiosks
- Traffic control lights and boxes
- Pavement



120 in sweeping path
10 feet wide



All-season cab

The cab has been redesigned for easy attachment and removal for all-season use.

Cab options

- Rear Worklight
- Rear View Mirror
- Heater
- Beacon Light



Cab shown with optional rear LED work lights that improve rear visibility. And an optional flashing LED beacon is also available.



Rotary sweeper



Front blade



Snow blower

~5 feet wide



Newer plow truck blades can extend **11.5 feet wide** but normally angled to dump truck width (**~8 ½ feet**)

Vision Zero Design Improvements: the basics

Safety Action Priorities

- Speed
- Left turns
- Right turns
- Visibility
- Crossings (bicycles and pedestrians)
- Mixing zones
- ADA access
- Sidewalks
- Bicycle paths

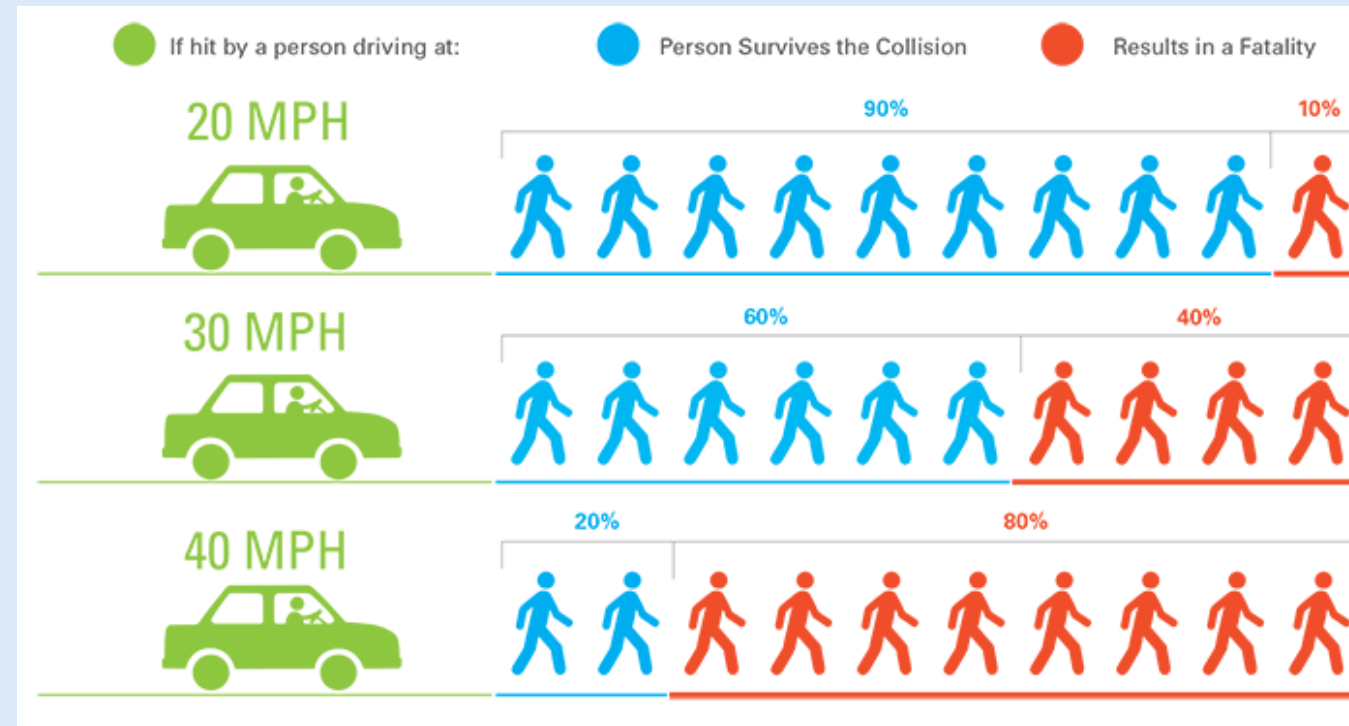
Speed

- Wide lanes correlate to higher speed
 - 10-foot lanes recommended for most urban streets
 - 11-foot lanes only for urban transit and truck routes



"As the width of the lane increased, the speed on the roadway increased... When lane widths are 1 m (3.3 ft) greater, speeds are predicted to be 15 km/h (9.4 mph) faster."

Chart source: Fitzpatrick, Kay, Paul Carlson, Marcus Brewer, and Mark Wooldridge. 2000. "Design Factors That Affect Driver Speed on Suburban Streets." Transportation Research Record 1751: 18–25.



Traffic Control Devices

- The provision of the MUTCD 11th Edition were adopted in PA.
- “... to establish uniform national criteria for the use of traffic control devices that meet the needs and expectancy of road users on all streets, highways, pedestrian and bicycle facilities, and site roadways open to public travel.”

[Link: MUTCD Adopted in PA](#)

Adopted 56 Pa.B. 453

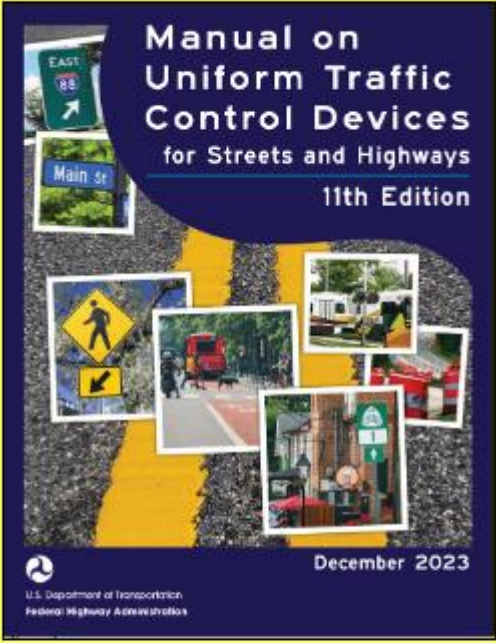
January 17, 2026

[Link: MUTCD 11th Edition,](#)

FHWA Final Rule

Effective January 18, 2024

Current MUTCD Edition



The PDF of the 11th Edition of the MUTCD with Revision 1, dated December 2025, is the **current edition** of the official FHWA publication.

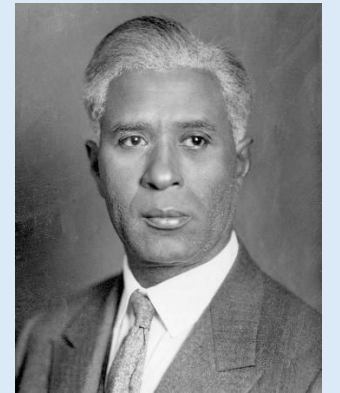
Stop signs for traffic calming? Nope.

- Stop signs assign right-of-way at intersections
 - Stop signs are not intended to control speed
 - Assigning ROW manages conflicting movements
- Speed reduction strategies can include:
 - Signage and pavement markings
 - Targeted enforcement (PA is the only state that disallows local PD use of radar)
 - Speed feedback signs
 - Narrowed lanes
 - Curb extensions
 - Traffic circles
 - Speed humps
 - Speed tables
 - Speed cushions

“...where the block system is in use and cars have been held up at an intersection by the adverse signal, when these cars are released, the starting speed is often excessive and consequently dangerous to pedestrians.” Fundamentals of Highway Traffic Regulation, William Phelps Eno, 1926

Traffic signal

- Replaced traffic officers and manual 2-position “stop and go” signals in the 1920s
- Today’s traffic signals can:
 - Time traffic volume to avoid conflict and reduce congestion
 - Signal phase for pedestrian crossings (and advanced signal phase)
 - Bicycle phase for bicycle movements



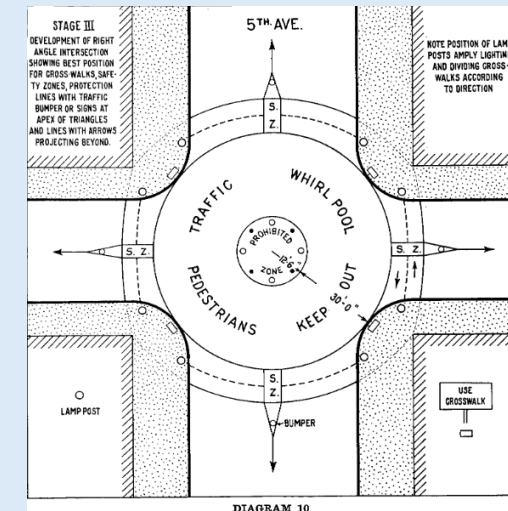
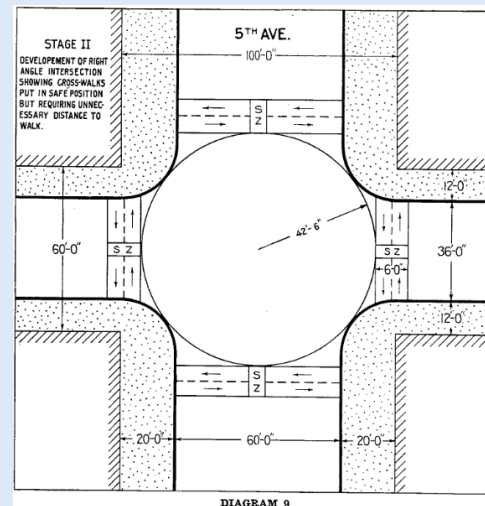
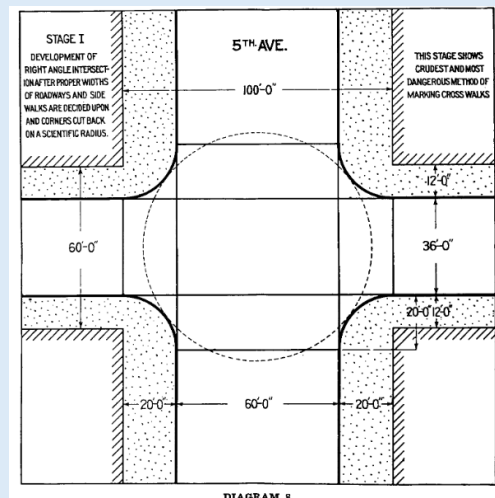
Garrett Augustus Morgan, Sr.,
patented the first three
position traffic signal in 1923

Roundabout history and use

- Traffic control that functions without traffic signals
- Traffic calming (sometimes)
- Mitigates conflicting movements
- Improves pedestrian crossings



William Phelps Eno's rotary system for counterclockwise traffic circles was first tried at Columbus Circle in New York in 1905.

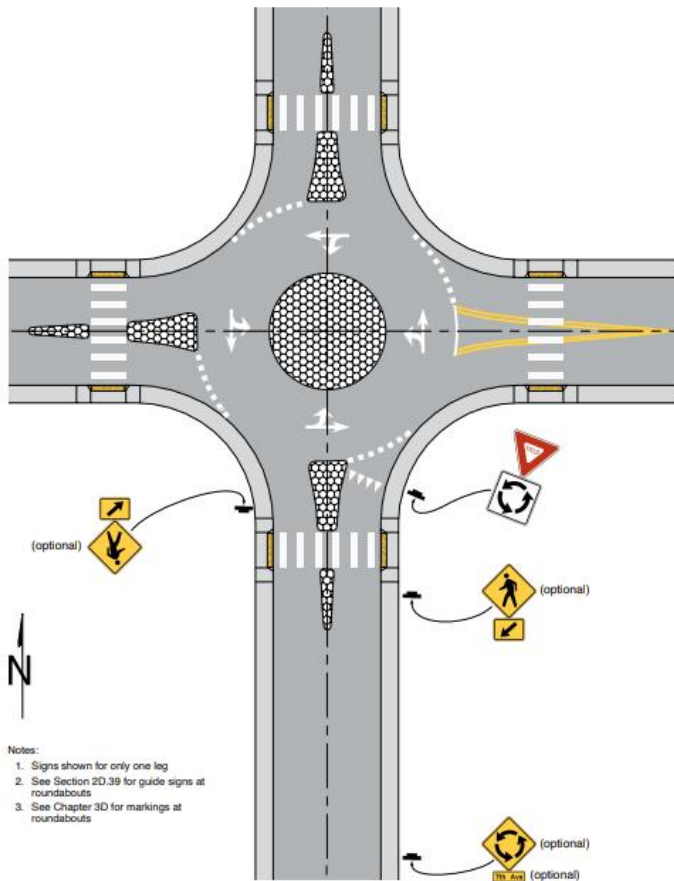


Roundabouts in the MUTCD & FHWA

MUTCD 11th Edition

Page 119 Page 122

Figure 2B-21. Example of Regulatory and Warning Signs for a Mini-Roundabout

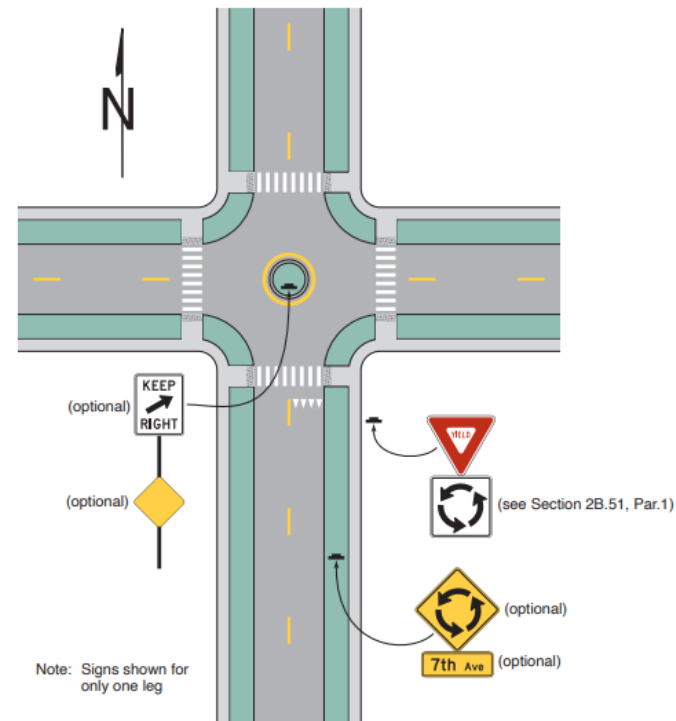


December 2023

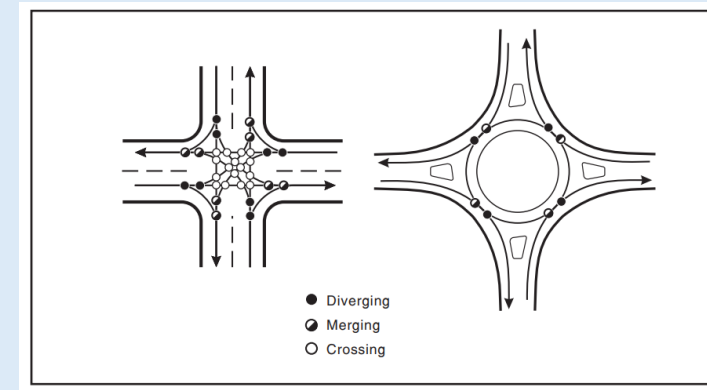
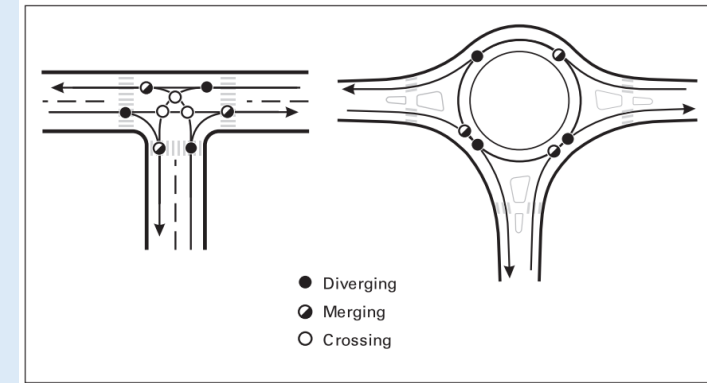
Sect. 2B.51

MUTCD 11th Edition – Revision 1

Figure 2B-24. Example of Regulatory and Warning Signs for a Neighborhood Traffic Circle



Link: [MUTCD Adopted in PA](#)
Adopted 56 Pa.B. 453
January 17, 2026



Link: [FHWA Roundabouts an Informational Guide, Chapter 5 "Safety"](#)

FHWA Proven Safety Countermeasures initiative (PSCi)

- FHWA's 28 countermeasures and strategies for
 - reducing roadway fatalities and serious injuries.

Speed Management



[Appropriate Speed Limits for All Road Users](#)



[Speed Safety Cameras](#)



[Variable Speed Limits](#)

Pedestrian/Bicyclist



[Bicycle Lanes](#)



[Crosswalk Visibility Enhancements](#)



[Leading Pedestrian Interval](#)



[Medians and Pedestrian Refuge Islands in Urban and Suburban Areas](#)



[Pedestrian Hybrid Beacons](#)



[Rectangular Rapid Flashing Beacons \(RRFB\)](#)



[Road Diets \(Roadway Reconfiguration\)](#)



[Walkways](#)

Roadway Departure



[Enhanced Delineation for Horizontal Curves](#)



[Longitudinal Rumble Strips and Stripes on Two-Lane Roads](#)



[Roadside Design Improvements at Curves](#)



[SafetyEdge™](#)



[Median Barriers](#)



[Wider Edge Lines](#)



[Yellow Change Intervals](#)

Intersections



[Backplates with Retroreflective Borders](#)



[Corridor Access Management](#)



[Reduced Left-Turn Conflict Intersections](#)



[Roundabouts](#)



[Dedicated Left- and Right-Turn Lanes at Intersections](#)



[Systemic Application of Multiple Low-Cost Countermeasures at Stop-Controlled Intersections](#)

Crosscutting



[Lighting](#)



[Local Road Safety Plans](#)



[Pavement Friction Management](#)



[Road Safety Audit](#)

FHWA has links to each PSC with their description, safety effectiveness, context, application, cost, and considerations for implementation.

Noteworthy Case Studies Outside PA

- Basalt, CO Midland Streetscape
 - Removed curbs, installed bollards, and pocket parks for accessibility
 - <https://letstalk.basalt.net/midland-avenue-streetscape>
- Cambridge, MA, Vassar Street Safety Improvement Project:
 - Dedicated bicycle path in sidewalk by MIT campus
 - <https://www.cambridgema.gov/streetsandtransportation/projectsandprograms/vassarstreetsafetyimprovementproject>
- Seattle, WA, USDOT Safe System Approach
 - Applied the federal safe system approach to Vision Zero safety action plans
 - https://www.seattle.gov/documents/Departments/SDOT/VisionZero/VZ_Action_Plan.pdf
- San Francisco, CA Valencia Bikeway Improvements
 - Quick build project installed, studied, and reconfigured for downtown businesses
 - <https://www.sfmta.com/projects/valencia-bikeway-improvements>
- New York City, Turn Calming Program
 - <https://www.nyc.gov/html/dot/html/pedestrians/turn-calming.shtml>

Basalt Colorado

Midland Avenue Streetscape (curbless)

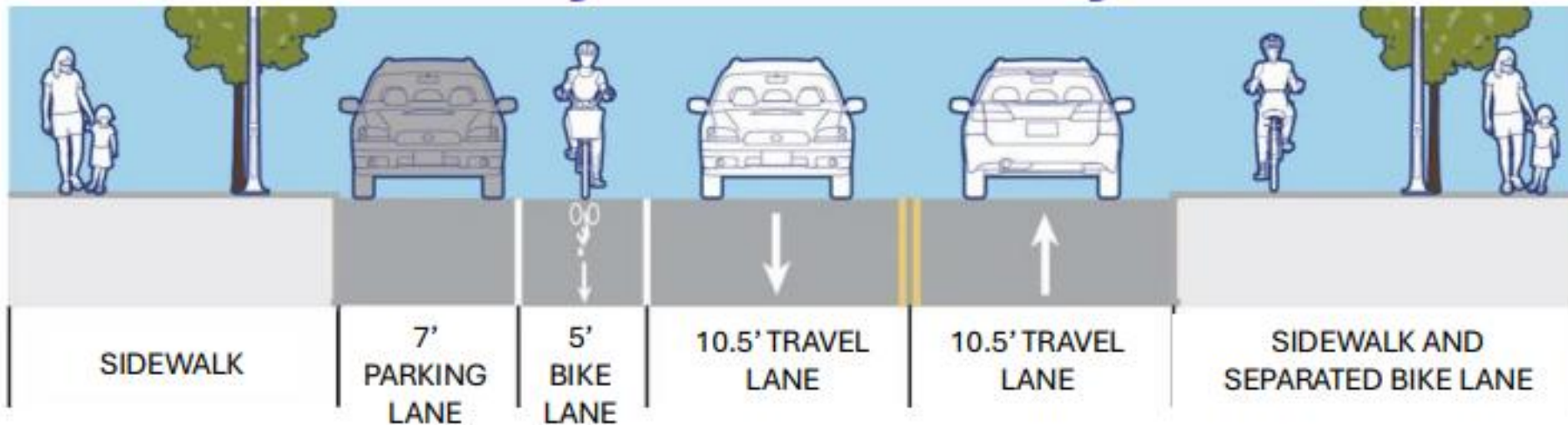


Photos: Town of Basalt [webpage](#)

Cambridge Massachusetts

Vassar Street (dedicated asphalt bicycle path)

Amherst Alley to Amesbury St – Street View



Existing Conditions

- Bike lane between parked and moving cars
- Smallest dimensions possible for all lanes

Seattle Washington, Vision Zero Plan (nonprofit idea applied to federal policy)



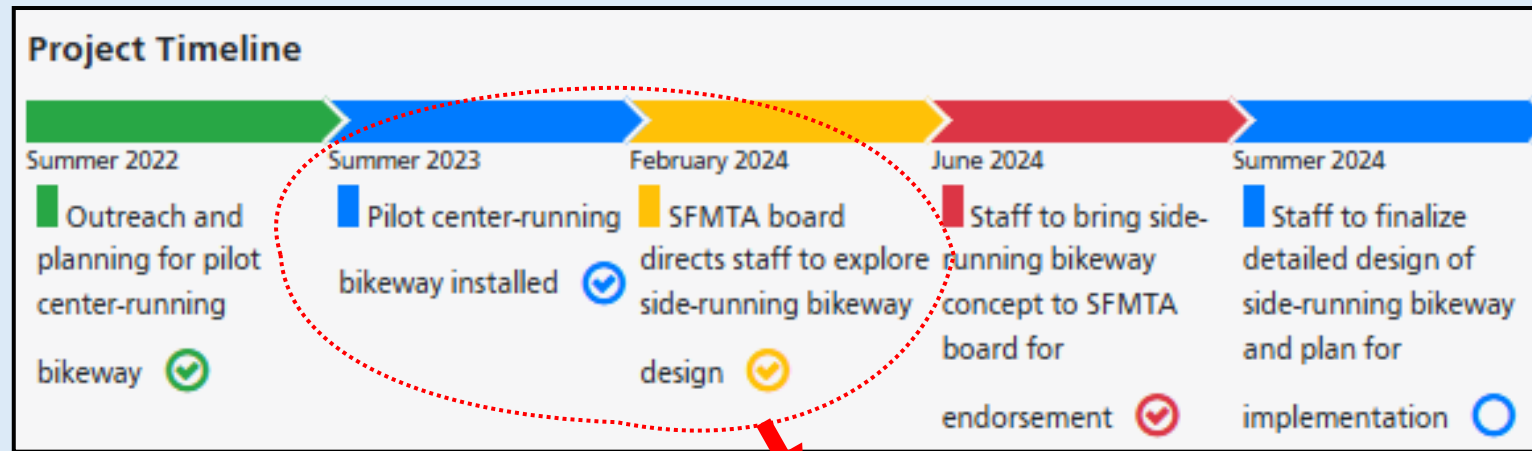
[Link: Vision Zero Safety Network](#)



[Link: FHWA Safe System Approach](#)

San Francisco

Valencia Street (quick build replaced)



Sample block of Side-Running Bike Lane

Ejemplo de una cuadra con el carril de bicicletas lateral

Curbside Parklets

Parklets en la acera

Some parklets will remain at the curb because it is a more convenient location for that business. In those cases, the bike lane will go around the parklet. People on bikes will still be protected from vehicle traffic.

Algunos parklets permanecerán en la acera cuando esta sea la ubicación más conveniente para el negocio. En esos casos, el carril para bicicletas pasará alrededor del parklet. Los ciclistas seguirán estando protegidos del tráfico vehicular.

Floating Parklets

Parklets flotantes

Some parklets will "float" away from the curb to allow for the bike lane to run between the curb and the parklet. This design has been successful in Oakland and New York City. Design and safety elements will be put into place to make sure that people can cross safely between the parklet and the sidewalk.

Algunos parklets "flotarán" alejados de la acera para permitir que el carril para bicicletas pase entre la acera y el parklet. Este diseño ha tenido éxito en Oakland y Nueva York. Se instalarán elementos de diseño y seguridad para garantizar que las personas puedan cruzar de manera segura entre el parklet y la acera.

Parking spots will "float" away from the curb. This design already exists on Valencia between Market and 15th streets. This helps preserve parking, while separating people on bikes from vehicle traffic.

Los espacios para el estacionamiento "flotarán" alejados de la acera. Este diseño ya existe en Valencia entre las calles Market y la 15th. Esto ayuda a preservar el estacionamiento, y a la vez se separa a los ciclistas del tráfico vehicular.

Floating Parking Spots

Espacios de estacionamiento flotantes

New York City DOT Tools for Safer Streets (turn calming treatments)

NYC

NEW YORK CITY

DOT

NYC Resources311Office of the Mayor

Home

About NYC DOT

Pedestrians

Car-Free Earth Day

Dining Out NYC

Mobility Management

NYC DOT Art

Open Streets

Pedestrian Mobility Plan

Pedestrian Ramps

Plazas

Safe Streets for Seniors

Summer Streets

WalkNYC

Bicyclists

Ferries & Buses

Motorists & Parking

Infrastructure

Contact NYC DOT

Search

Licenses,
Permits &
Registrations

Apply 申請

PEDESTRIANS

Turn Calming Program

The Turn Calming program is a citywide effort to reduce left and right turn speeds and enforce safe turning behavior. This program is part of the Vision Zero initiative to eliminate traffic fatalities and reduce severe injuries.

[Turn Calming Treatments](#)

[Definition of Materials](#)

[Turn Calming Safety Results](#)

[Program Planning](#)

Tools For Safer Streets: Left Turn Calming Treatments

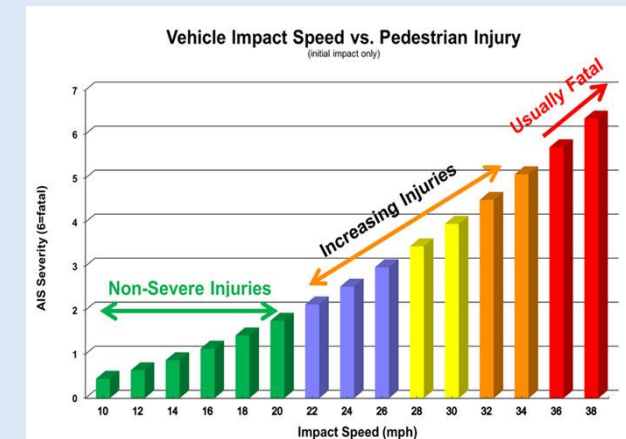


Watch on  YouTube

NYC DOT began the program as part of the [Left Turn Study Action Plan](#) to address failure to yield crashes caused by left turning vehicles. The program has improved 1,236

Reference materials (representative list)

- [PennDOT Design, as amended](#)
- [FHWA Highway Safety Programs](#)
- [NCHRP Research Report 1043](#)
- [ADA Standards for Accessible Design](#)
- Institute of Transportation Engineers
 - ITE Urban Street geometric design handbook
- American Association of State Highway and Transportation Officials
 - AASHTO, A Policy on Geometric Design of Highways & Streets (green book)
 - AASHTO, Guide for Planning, Design, and Operation of Pedestrian Facilities
 - AASHTO, Guide for the Development of Bicycle Facilities
- National Association of City Transportation Officials
 - NACTO, Urban Street Design Guide
 - NACTO, Urban Bikeway Design Guide
 - NACTO, Transit Street Design Guide



Questions and comments?

All historical photos are courtesy of the Cumberland County Historical Society, Carlisle, PA