

Kendra Nelson
February 2025

Delaware County Trail Crossings Toolkit

Transportation Planning Division Exhibition



Project Goal

1

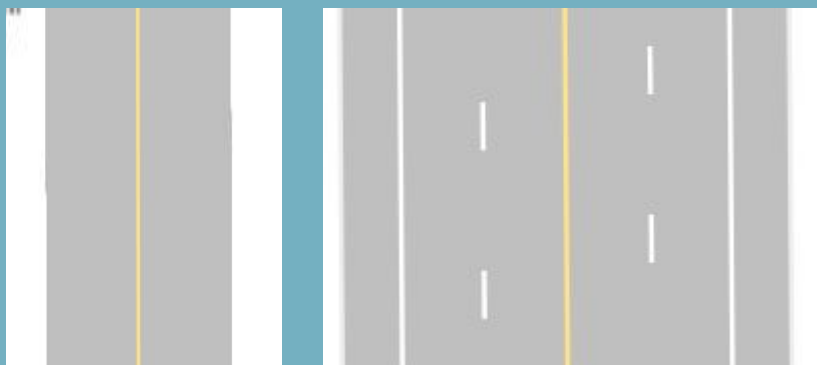
To develop recommendations for 5 distinct trail crossing types

2

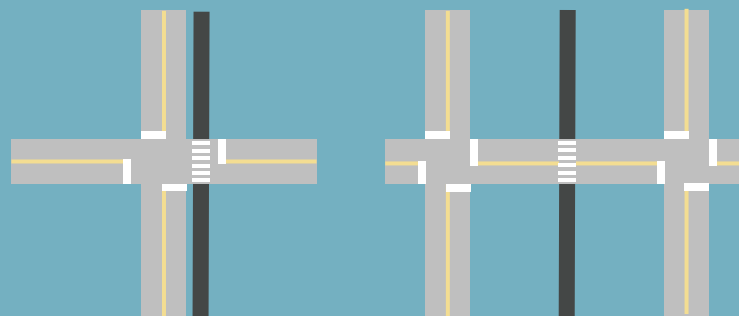
To develop a concept plan or identify a case study for each crossing type

Trail crossing categories determined by:

Minor Vs Major Road



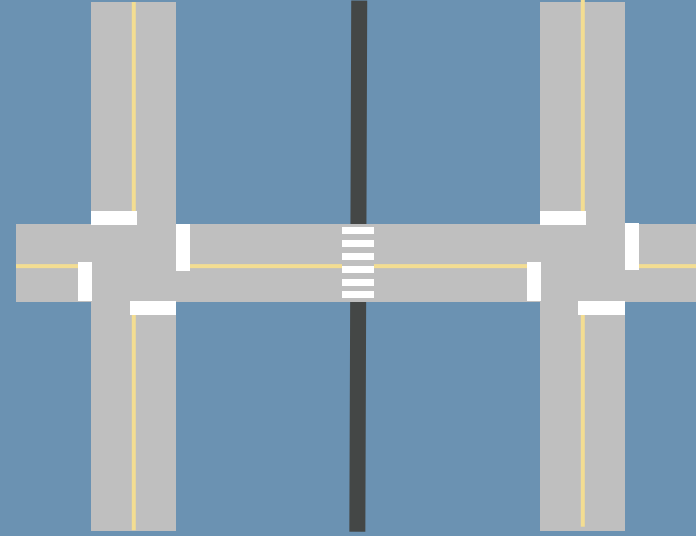
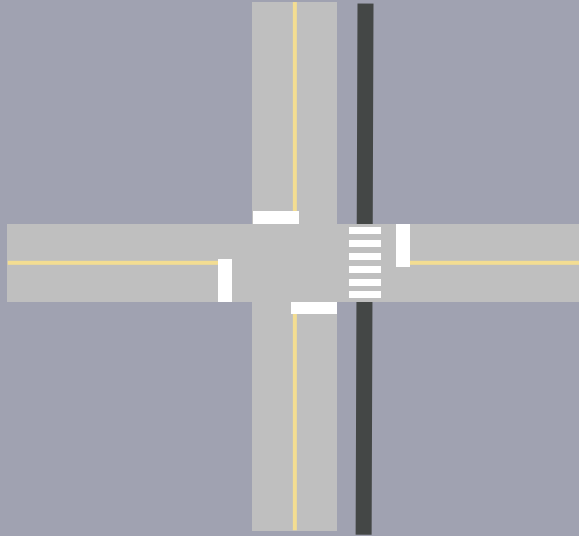
Intersection or Mid-block



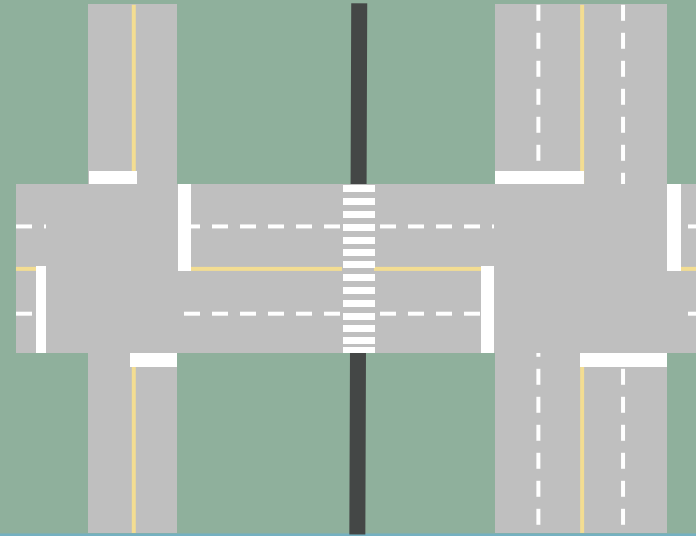
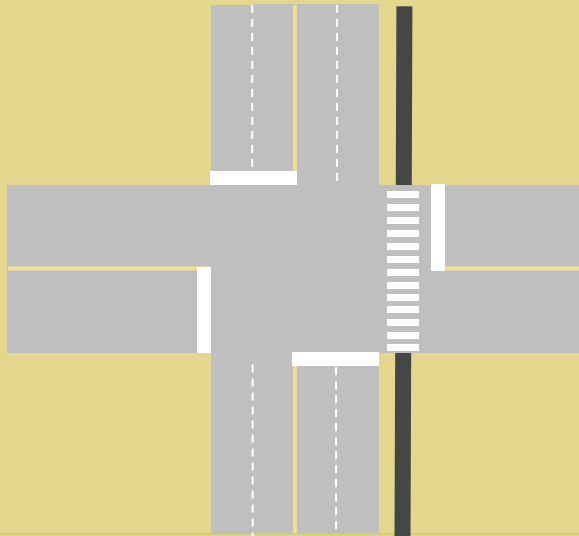
Intersection

Mid-Block

Minor



Major



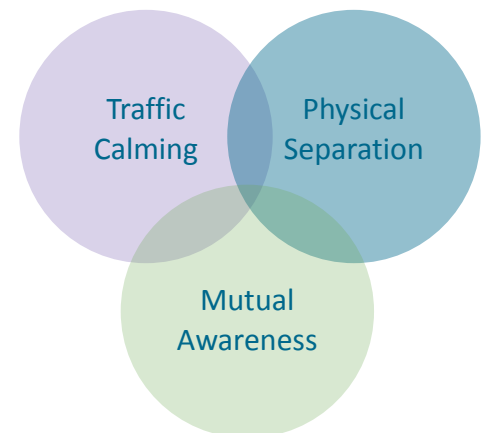
Trail Crossing Categories

	Trail Meets Major Roadway at an Intersection	Trail Meets Major Roadway at the Mid-Block	Trail Meets Minor Roadway at an Intersection	Trail Meets Minor Roadway at the Mid-Block	Trail Meets a Transit ROW
LTS	3 or 4	1 or 2	3 or 4	1 or 2	n/a
ROW type	Roadway	Roadway	Roadway	Roadway	Railroad/Bus
Functional Class	Arterial/Major collector	Minor collector/local/parking	Arterial/Major collector	Minor collector/local/parking	n/a
Roadway volumes	High/Med	Low	High/Med	Low	Any
Crossing location	intersection	mid-block	intersection	mid-block	railroad
Roadway speed	high	low	high	low	any
Roadway width	>2 lanes	2 lanes	>2 lanes	2 lanes	any
	Major roadways		Minor roadways		

Identifying Trail Crossing Recommendations

INTERVENTION	BENEFITS			
	Traffic Calming: Through Lane	Traffic Calming: Turning	Physical Separation	Increase Visibility/ Mutual Awareness
GENERAL TREATMENTS				
Lighting				
Detectable Warning Surfaces				
Perpendicular Crossing/ Realign Trail Approach				
Set Back Stop Bar				
Physically Narrow Lanes				
Reduce Curb Radii				
Curb Extensions				
Refuge Island				
Hardened Centerline				
Vertical Deflection				
Raised Crosswalk				
Crossing Material				
Street Trees				
Trim Vegetation				
Parking Restrictions				
At-Grade Crossing Facility				

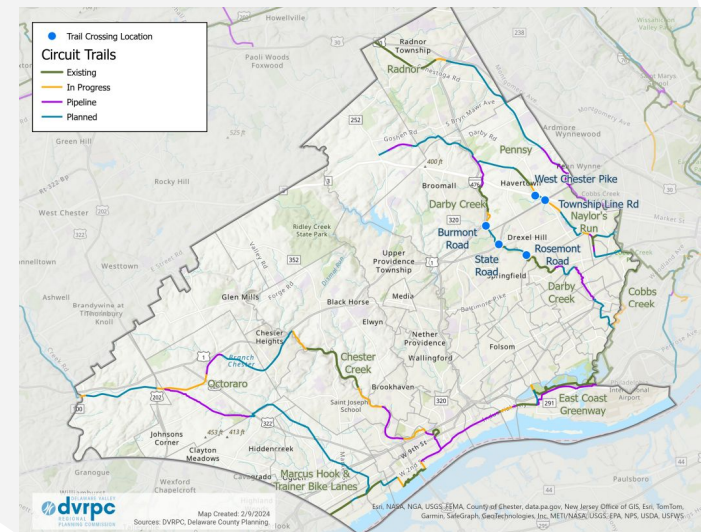
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*Adapted from FHWA STEP guidance

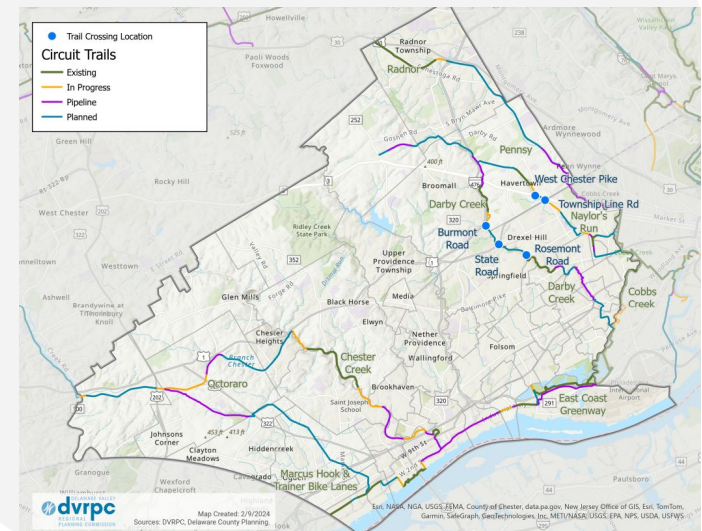
Five Concept Areas

Trail Meets Major Roadway at an Intersection			Trail Meets Major Roadway at the Mid-Block	Trail Meets Minor Roadway at an Intersection	Trail Meets Minor Roadway at the Mid-Block	Trail Meets a Transit ROW
Township Line Rd & Darby Rd	State Rd & Township Line Rd	West Chester Pk & Gilmore Rd		Rosemont Rd & Bloomfield Ave	Burmound Rd & Warrior Rd	



Five Concept Areas

Trail Meets Major Roadway at an Intersection			Trail Meets Major Roadway at the Mid-Block	Trail Meets Minor Roadway at an Intersection	Trail Meets Minor Roadway at the Mid-Block	Trail Meets a Transit ROW
Township Line Rd & Darby Rd	State Rd & Township Line Rd	West Chester Pk & Gilmore Rd	<i>Horsham Powerline Trail</i>	Rosemont Rd & Bloomfield Ave	Burmott Rd & Warrior Rd	<i>Saulin Blvd & Chester Valley Trail</i>
						<i>Darby Creek Trail</i>



GENERAL TREATMENTS	Traffic Calming: Through Lane	Traffic Calming: Turning	Physical Separation	Increase Visibility/ Mutual Awareness	Trail Meets Major Roadway at an Intersection			Trail Meets Major Roadway at the Mid-Block	Trail Meets Minor Roadway at an Intersection		Trail Meets Minor Roadway at the Mid-Block	Trail Meets a Transit ROW
					Township Line Road & Darby Road	State Road & Township Line Road	West Chester Pike & Gilmore Road	Horsham Powerline Trail	Rosemont Road & Bloomfield Avenue	Burmont Road & Warrior Road	Saulin Blvd & Chester Valley Trail	Darby Creek Trail
Lighting												
Detectable Warning Surfaces												
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Parking Restrictions												
At-Grade Crossing Facility												

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Trail Type 1: Trail Meets Major Roadway at an Intersection



Criteria	Criteria
LTS	3 or 4
ROW Type	Roadway
Functional Class	Arterial/Major Collector
Road Volume	High/Med
Crossing Location	Intersection
Speed	High
# of Lanes	> 2 Lanes

Major roadways pose higher safety concerns for crossing trail users due to high vehicle travel speeds, the higher volume of vehicles, and wide crossing distances across multiple lanes. Drivers are more likely to anticipate a potential pedestrian at an intersection compared to a mid-block crossing because they are often accompanied by crosswalk markings and drivers are forced to stop at traffic signals. Major roadways are often maintained by PennDOT and consistent with roadway infrastructure standards. The toolkit below recommends specific interventions to increase driver awareness and trail user safety.

Treatment	Benefit	Specific Considerations
Lighting <small>Source: Dan Barlow, PedBikeMag</small>	<ul style="list-style-type: none"> Ensure roadway lighting is working and appropriately spaced. Recommend pedestrian-scale lighting to illuminate the trail and potential users. FHWA recommends 10-15 lumens/m² for recommended lighting levels. Ensure lighting is consistent with roadway standards. 	<ul style="list-style-type: none"> Ensure roadway lighting is working and appropriately spaced. Recommend pedestrian-scale lighting to illuminate the trail and potential users. FHWA recommends 10-15 lumens/m² for recommended lighting levels. Ensure lighting is consistent with roadway standards.
Detectable Warning Surfaces/ Curb Ramps <small>Source: Wikimedia Commons</small>	<ul style="list-style-type: none"> Ensure ramps are detectable to visually impaired users. Ensure curb ramps are flush with the sidewalk. 	<ul style="list-style-type: none"> Ensure ramps are detectable to visually impaired users. Ensure curb ramps are flush with the sidewalk.
Perpendicular Crossing/ Realign Trail Approach <small>Source: FHWA</small>	<ul style="list-style-type: none"> Ensure trail crossings are perpendicular to the roadway. May include other treatments to improve visibility. 	<ul style="list-style-type: none"> Ensure trail crossings are perpendicular to the roadway. May include other treatments to improve visibility.

Trail Type 1 Concept Design | Township Line Road and Darby Road

Location | Havertown and Haverford Township
 Trail(s) | Naylor's Run Trail and Penny Trail

Concept Area Background

In anticipation of the extension of the Naylor's Run and Penny Trails, the project team was asked to explore a northern connection. The intersection of Township Line Road and Darby Road/Lansdowne Avenue is located just north of the proposed connection. Delaware County and Haverford Township will need to identify the boundary between the West Chester Pike concept area and this crossing. The recommendations involve increasing driver awareness of, and shortening crossing distances for, potential trail users. Recommendations on the impact signal timing (5, 7, 8, and 9) should be further evaluated to estimate the impact on vehicle delay.

Recommendations

1. Set back stop bars to allow crosswalks to be perpendicular, shortening the crossing distance.
2. Move curb ramps to align with crosswalks and avoid dumping users into the middle of the intersection.
3. Reduce curb radii on the southern corners to slow turning vehicles.
4. Trim vegetation near trail entrance at intersection to improve visibility.
5. Add sign for No Right Turn on Red in all directions to ensure bicyclists and pedestrians have protected signal phase to cross.
6. Add crossbike markings to two crosswalks to encourage trail users to cross in a desired direction. This direction was chosen because there appears to be room to expand the sidewalk area for trail users to wait to cross at the intersection at three corners. The southwest corner has high fencing next to the sidewalk to protect electrical equipment and is not recommended as a preferred place to wait to cross.
7. Add pedestrian signals and ensure they have their own phase; consider restricting left turns from Township Line Road to only when they have a green arrow, which will help to avoid bike and pedestrian conflicts. There is also the potential for pedestrian scramble to allow trail users to cross at all directions.
8. Consider increasing pedestrian phase times and implementing a leading pedestrian interval.
9. Consider implementing a bicycle actuated signal.
10. Add the following signage to increase driver awareness of vehicles: trail crossing signs, yield signs, RRFB, and 'bikes use pedestrian signal' signs.
11. Add overhead lighting along the crosswalks and at each trailhead to improve visibility.

Figure 7: Township Line Road & Darby Road Concept Design



Source: DVRPC & Bemis

Trail Meets Major Roadway at an Intersection

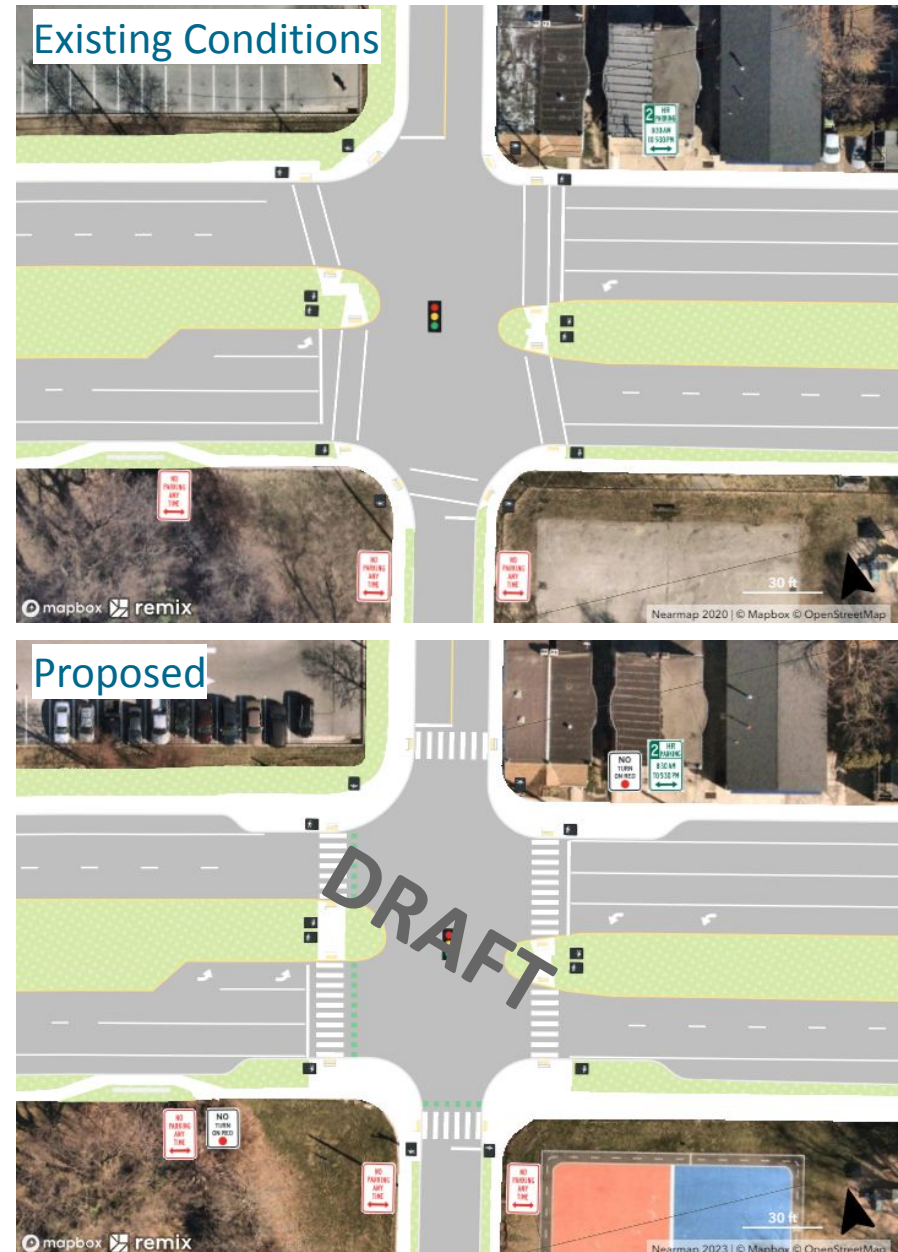
West Chester Pike & Gilmore Road

Haverford Township, Pennsy Trail Extension

Context | Connects planned trails

Recommendations

- Straighten crossings & pedestrian paths
- Reduce turning radii
- Add bump outs
- Warning Signage
- Emphasize safest crossings with tracks



Trail Meets Minor Roadway at an Intersection

Burmont Road & Warrior Road

Haverford Township, Darby
Creek Trail Extension

Context | Connects existing and planned trails

Recommendations

- Straighten crossing
- Add bump outs
- Add rumble strips
- Emphasize safest crossing with trail
- Warning Signage



Trail Meets Rail ROW

Fox Chase SEPTA station and under construction Fox Chase Lorimer Trail

Philadelphia

Context | Connects existing trails

Recommendations

- Perpendicular crossing
- Flush ramp
- Detectable warning strips
- Warning Signage



Trail Meets Rail ROW

Fox Chase SEPTA station and under construction Fox Chase Lorimer Trail

Philadelphia

Context | Connects existing trails

Recommendations

- Perpendicular crossing
- Flush ramp
- Detectable warning strips
- Warning Signage



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Questions?

Thank You!



Questions?

Contact: knelson@dvrpc.org