

## Appendix C—Evaluation of On-Road Design Treatments

### Introduction

As part of the initial East-West Trail alignment (see Appendix B), on-road facilities were proposed for the following roadway segments in East Brandywine Township:

- Batten Drive
- Echo Dell Road and Pancoast Lane
- Wildbrier Drive and Firethorn Drive

Examples of on-road facilities include bicycle lanes or shared lanes designated with signage and pavement markings. The scope of work for the East-West Bicycle and Pedestrian Facilities Plan included identifying and evaluating options for on-road treatments that are appropriate to the context of these low-volume residential neighborhood streets.

### Existing Conditions

The following characteristics are common for the segments of Batten Drive, Echo Dell Road, Pancoast Lane, Wildbrier Drive, and Firethorn Drive originally proposed for the East-West Trail.

- Township owned roadways
- Low volume roadways serving only residential developments with no through traffic
- 25' cartway width, which is too narrow for dedicated shoulders for walking/biking
- No pavement markings
- 25 mph speed limit
- Numerous driveways with mailboxes and landscaping adjacent to the roadway
- On-street parking permitted
- East-West Trail route will utilize short roadway segments



### Purpose of Proposed On-Road Treatments

1. Provide wayfinding for trail users that is appropriate for the context of the residential neighborhoods and requires minimal maintenance.
2. Alert motorists to the potential presence of trail users, particularly pedestrians.

### Development of On-Road Options for Public Comment

Several design standards for on-road bicycle and pedestrian facilities were reviewed, including:

- *Design Manual Part 2 (DM-2): Highway Design*, Publication 13M, PennDOT, 2015
- *Smart Transportation Guidebook*, PennDOT and NJDOT, 2008
- *Guide for the Development of Bicycle Facilities, 4th Edition*, American Association of State Highway Officials (AASHTO), 2012
- *Guide for the Planning, Design, and Operation of Pedestrian Facilities*, American Association of State Highway Officials (AASHTO), 2004
- *Manual on Uniform Traffic Control Devices*, Federal Highway Administration, 2009
- *Small Town and Rural Multimodal Networks*, Federal Highway Administration, 2016

The design guidelines and options for on-road bicycle and pedestrian facilities are somewhat limited, particularly given narrow cartway widths on these very low-volume roadways (with no through traffic), the residential neighborhood context, and the purpose of the treatments.

The following three options for on-road treatments were developed and presented at the first Community Workshop on June 22, 2017. Using “dot voting” meeting attendees were asked to vote for their preferred option.

### Option 1: Wayfinding with Custom Logo/Trail Blaze Pavement Markings

#### Purpose

- Provide wayfinding for trail users.

#### Application

- Use custom trail logo or simple trail blaze with arrows for direction.
- Place at the beginning and end of on-road segments, as well as immediately after intersections and at turns or changes in direction for the East-West Trail route.
- Install adjacent to the edge of pavement in both directions, in the area where a trail user will walk or bike.

#### Additional Considerations

- Pavement markings can incorporate mileage.
- Medallions on or embedded in the pavement are an alternative to painted markings.
- Can be used in combination with posted wayfinding signs.

### Examples of Custom Wayfinding Pavement Markings



## Option 2: Pedestrian Pavement Marking

### Purpose

- Alert motorists to the potential presence of pedestrians.
- Provide wayfinding for trail users.

### Application

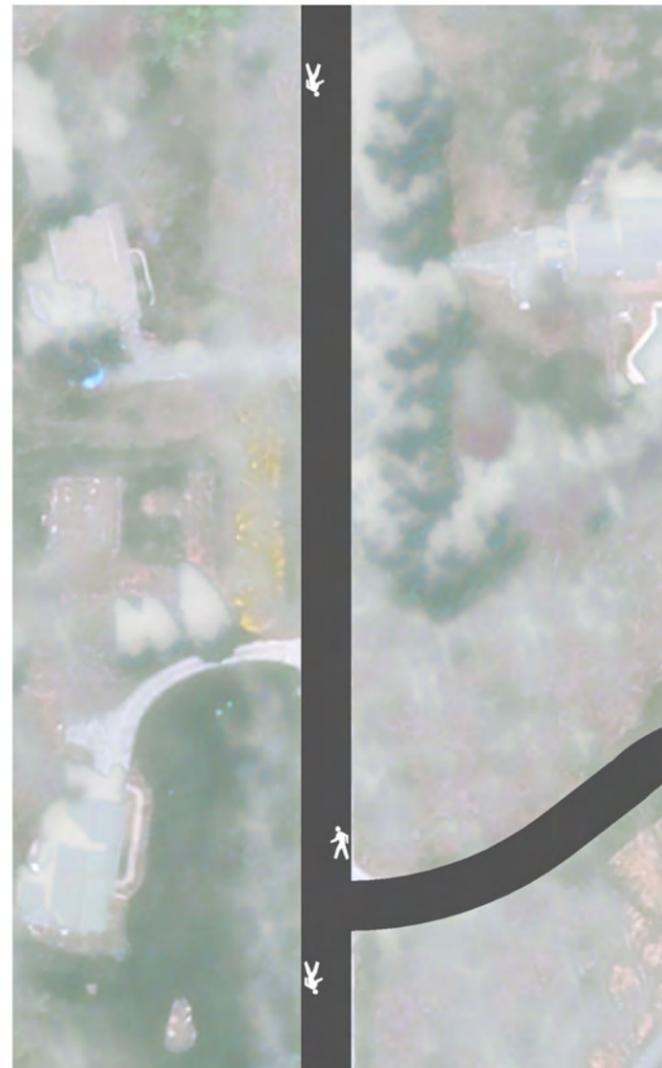
- Install pedestrian symbol pavement marking in white paint with centers at least 5 feet from the edge of pavement.
- Place at the beginning and end of on-road segments, as well as immediately after intersections and at turns or changes in direction for the East-West Trail route.

### Additional Considerations

- Can be used in combination with posted wayfinding signs.

### Source and Additional Information:

- <http://ruraldesignguide.com/visually-separated/pedestrian-lane>



TYPICAL PLACEMENT EXHIBIT

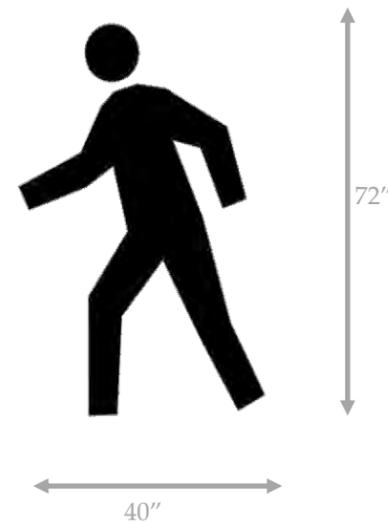


Image of Pedestrian Only Shoulder depicts use of Pedestrian Symbol Pavement Marking on right

## Option 3: Advisory Shoulder

### Purpose

- Provides a delineated but nonexclusive space that is available for walking and biking on a roadway otherwise too narrow for dedicated shoulders.
- Clarifies desired location for people walking and biking in a narrow roadway.
- Minimizes potential impacts to visual or natural resources through efficient use of existing space.

### Application

- Install dashed white lines 5 feet from the edge of the pavement on both sides of the roadway.

### Additional Considerations

- Can be used in combination with trail wayfinding pavement markings or posted signs.

### Source, Photo Credits, and Additional Information:

- <http://ruraldesignguide.com/mixed-traffic/advisory-shoulder>



TYPICAL PLACEMENT EXHIBIT



Public Input

The feedback received at the first Community Workshop for the dot voting exercise is summarized below. Overall, there was no clear preference from the public input for any of the three options presented.

**Summary of “votes” from Community Workshop**

Option 1—Wayfinding Pavement Markings	6
Option 2—Pedestrian Pavement Marking	8
Option 3—Advisory Shoulder	4
None of the options presented and/or Do not support the trail	7

Additionally several participants voiced overall opposition to some segments of the East-West Trail or did not support any of the on-road options presented. In addition to the dot voting, several comments and questions regarding the on-road options were received at or after the meeting. Two main questions were:

- Why are pavement markings needed on both sides of the roadway?
- Where are other locations these treatments have been used locally?

Based on this feedback, other options were identified and evaluated. First, other alignment options for the trail were considered. (See Appendix B for further information on the alignment evaluation process and removal of Batten Drive from the preferred East-West Trail alignment.)

Images from Hideaway Farms Development

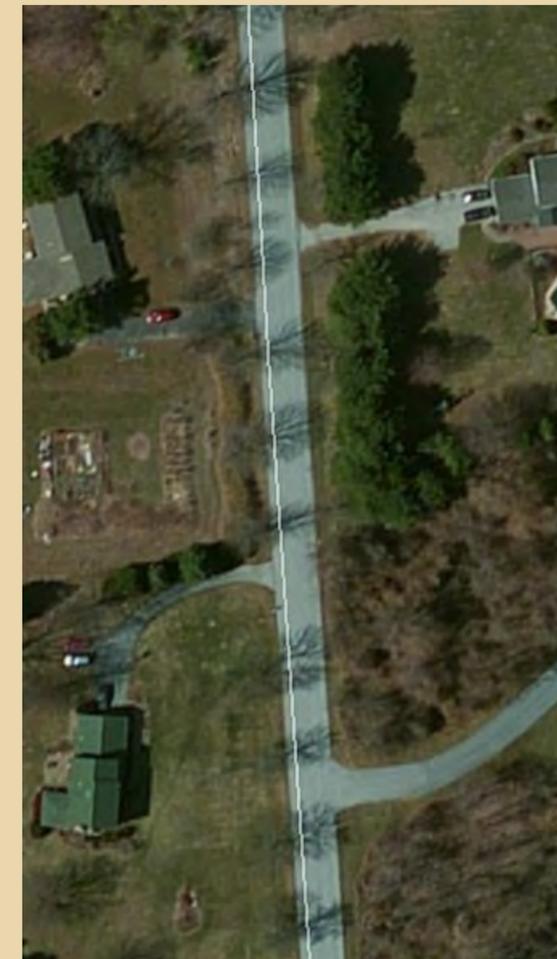


Additionally, different types of treatments were identified based on local examples. The Hideaway Farms development in East Brandywine Township has striped shoulders for walking on one side of select roadways within the development. These low-volume residential roadways are very similar to the context and character of the roadways proposed for the East-West Trail on-road options. Providing a facility on one side of the roadway was preferred by some residents because it is less obtrusive and limits conflicts with residential driveways. Additionally, the striped shoulder provides a dedicated space for trail users. Unlike the advisory shoulder (Option 3), which is a newer and experimental treatment, a striped shoulder is more easily recognizable by drivers and trail users. Additionally, custom wayfinding (Option 1) and the pedestrian pavement marking (Option 2) can be used in combination with the striped shoulder.

Based on input from the Study Advisory Committee, the one sided striped shoulder was selected as the preferred treatment for Echo Dell Road, Pancoast Lane, Wildbrier Drive and Firethorn Drive. See Chapters 2 and 3 for more information about the proposed improvements for each roadway segment, particularly E-CP-2 and E-GV-1.

**Preferred Option: Striped Shoulder on One Side**  
Echo Dell Road, Pancoast Lane, Wildbrier Drive and Firethorn Drive

- 5’ wide striped shoulder on one side of the roadway.
- Pedestrian symbol pavement marking along with wayfinding pavement markings or signs can be used to designate the shoulder for walking and aid in navigation.



TYPICAL PLACEMENT EXHIBIT

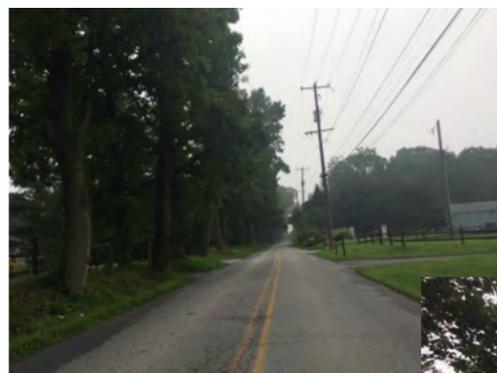
Other On-Road Treatments

During the alignment evaluation process (See Appendix B), additional on-road segments of the East-West Trail were identified for Lafayette Road and Hibernia Road.

These two roadway segments in West Brandywine Township have very different characteristics compared to the residential neighborhood roadways in East Brandywine Township. Lafayette Road and Hibernia Road have higher traffic volumes and speeds and support both access and mobility. Additionally, Hibernia Road is a state-owned roadway. Given the different context and existing conditions, additional on-road treatment options were identified and evaluated. The one-sided striped shoulder is not an appropriate or feasible design option for these two roadways.

Both Lafayette Road and Hibernia Road have limited width and narrow existing shoulders. Widening the cartway or providing an off-road trail would be difficult due steep slopes and thick vegetation adjacent to the roadway. Dedicated bike lanes were considered and dismissed since it would require roadway widening. The shared lane treatment with sharrow markings and signage was selected as the preferred option for both Hibernia Road and Lafayette Road. See Chapters 2 and 3 for more information about the proposed improvements for these roadway segments, particularly W-BC-5 and W-HT-3.

Existing Conditions Images



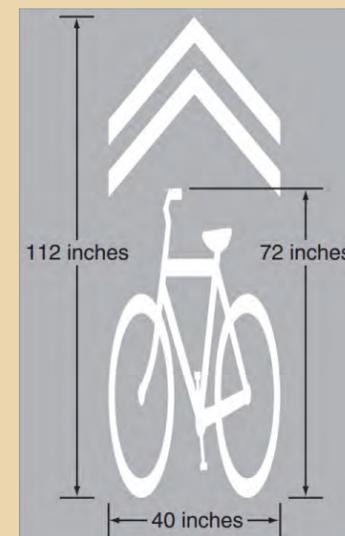
Lafayette Road



Hibernia Road

Preferred Option: Shared Lane with Sharrow Pavement Markings and Signage  
Lafayette Road and Hibernia Road

- Shared lane pavement markings (sharrows) with centers at least 4' from edge of the pavement and placed immediately after intersections and every 250' thereafter
- Post-mounted Bicycle May Use Full Lane Signs (R4-11, 30"x30") aligned (approximately) with shared lane markings



Shared Lane Pavement Marking (Sharrow)



R4-11 Sign

