

**LESSONS LEARNED**

# Advisory Bike Lanes in North America

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Advancing the transportation field,  
pushing forward innovative ideas.

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Alta's mission is to **create  
active communities.**

Founded in 1996, Alta Planning + Design is North America's leading multimodal transportation firm that specializes in the planning, design, and implementation of bicycle, trail, pedestrian, park, and transit corridors and systems.

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Disclaimer: The dimensions, design details, recommendations, and findings in this document are based on a survey of existing installations, theoretical ideas, conceptual analysis and design. In developing the document's recommendations, the authors utilized prior experience, professional judgment, and industry standards where available. While construction of Advisory Bicycle Lanes has occurred in the U.S., substantial empirical data on this facility type is not yet available. Engineering judgment should always be used in roadway design decisions.

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Bloomington, IN

PHOTO COURTESY OF SCOTT ROBINSON, CITY OF BLOOMINGTON



# 01 INTRODUCTION

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This white paper describes the existing North American installations of Advisory Bike Lanes, a comparatively new bicycling facility, and street configuration. Through the use of case study examples and design illustrations, this work builds upon the guidance for Advisory Shoulders highlighted in the 2016 FHWA *Small Town and Rural Multimodal Networks* document.

While the FHWA uses the terms “Advisory Shoulder” and “Dashed Bicycle Lane” to refer to this facility type, this report refers to the treatment by the common name Advisory Bike Lane.

This white paper intends to:

- » Review and assess existing installations of Advisory Bike Lanes in the US and Canada
- » Provide experience-based evidence that Advisory Bike Lanes function safely
- » Provide the basis for a sound engineering decision to install an Advisory Bike Lane, along with the FHWA *Small Town and Rural Multimodal Networks* document and FHWA experimentation guidance on Dashed Bicycle Lanes

## Description

An Advisory Bike Lane defines a preferred space for bicyclists and motorists to operate on narrow streets that would otherwise be a shared roadway environment. Roads with Advisory Bike Lanes accommodate low to moderate volumes of two-way motor vehicle traffic and provide a prioritized space for bicyclists with little or no widening of the paved roadway surface. Because of their reduced cross section requirements, Advisory Bike Lanes have the potential to open up more roadways to more comfortable bicycle travel.

Accommodating two-way motor vehicle traffic operation within a single lane is unconventional, but not uncommon. The 2011 AASHTO *A Policy on Geometric Design of Highways and Streets* describes this scenario as it applies commonly to low volume residential roadways.

On the provision of a single moving lane for two-way traffic, the guide states that, “the level of user inconvenience occasioned by the lack of two moving lanes is remarkably low ...” and continues, “Opposing conflicting traffic will yield and pause on the parking lane area until there is sufficient width to pass.” (2011, Sec. 5.3.2). This maneuver is commonplace for drivers in restricted operating conditions such as narrow residential roads lined with parked cars. This yield-based negotiation between oncoming vehicles in the presence of bicyclists is also expected on streets with Advisory Bike Lanes.

Unlike dedicated bicycle lanes, which prohibit motor vehicle use, an Advisory Bike Lane overlaps with the motor vehicle travel area and it is expected that motorists will regularly encounter meeting or passing situations where driving in the bike lane is necessary and safe.

At low volumes, conflicting bicyclist/motorist interactions are limited, and the design can maintain a comfortable environment for bicyclists.



# North American Adoption

While this list may not reflect every community with installed Advisory Bike Lanes, this White Paper provides case studies and lessons learned on projects installed in the following communities:

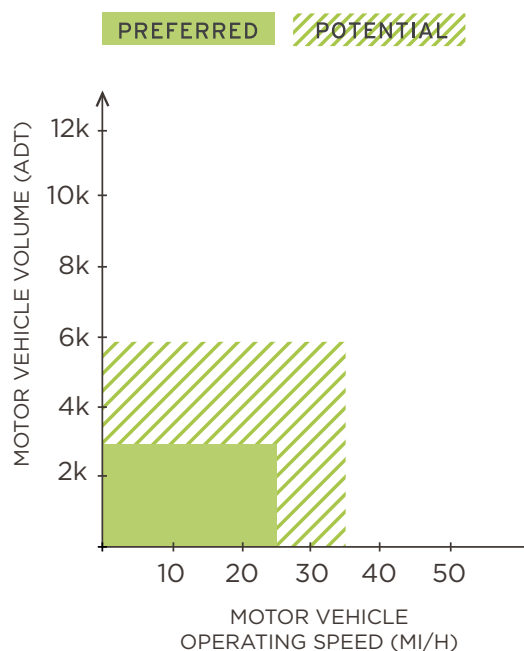
- |                   |                  |                   |
|-------------------|------------------|-------------------|
| » Minneapolis, MN | » Boulder, CO    | » Bloomington, IN |
| » Hanover, NH     | » Edina, MN      | » Ottawa, ON      |
| » Cambridge, MA   | » Alexandria, VA | » Burlington, VT  |
| » Sandpoint, ID   |                  |                   |

## Application Context

North American jurisdictions have installed Advisory Bike Lanes across a wide range of community character types (small town vs. urban), land use contexts (commercial and residential), and roadway classifications (local, collector). All installations share some common characteristics:

- » Low-to-moderate traffic volume ( $\leq 5,000$  ADT)
- » Low-to-moderate motor vehicle speed ( $\leq 30$  mph)
- » A roadway width too narrow to support dedicated bicycle lanes without roadway widening or removal of other high-demand street elements

While more research is needed, these installations fall in line with the contextual guidance provided for the Advisory Shoulder treatment featured in the FHWA *Small Town and Rural Multimodal Networks* document as shown in **Exhibit 1**. This range of volume and speed should be used to guide decision making around future Advisory Bike Lane installation.



**Exhibit 1.** The speed and volume chart in the FHWA *Small Town and Rural Multimodal Networks* document presents a range of preferred and potential speed and volumes where Advisory Bike Lanes (referred to as Advisory Shoulders in the report) may be most applicable.



# Design Elements

## Components of an Advisory Bike Lane Facility

The case studies that follow refer to the various elements of Advisory Bike Lanes as described below:

### ① BIKE LANE

Bike lanes are the bicycle-priority travel area within a shared roadway environment. A broken lane line delineates the lane from the two-way travel lane, indicating permissive access by motor vehicles when necessary. The outside edge is defined with an edge line, parking lane line, or unmarked road edge. Some jurisdictions mark the Advisory Bike Lane with bike lane markings or shared lane markings. Others use no markings within the Advisory Bike Lane space.

### ② TWO-WAY TRAVEL LANE

The two-way travel lane is where motor vehicles operate in the absence of other vehicles approaching in the opposite direction. The two-way travel lane width is narrower than two conventional travel lanes, and may be as narrow as a single travel lane.

### ③ REGULATORY/WARNING SIGNING (OPTIONAL)

Early experiences indicate that Advisory Bike Lanes are an intuitive, self-explaining design. However, as a new and uncommon facility type, signing may be used to clarify conditions, such as two-way operation (MUTCD W6-3), or to indicate yield priority. Some communities have created custom signs for this purpose.

### ④ PARKING LANE (OPTIONAL)

On-street parking may be allowed on Advisory Bike Lane streets if a separate parking lane is provided. Parking lanes should be highly utilized and clearly delineated from the travel area through the use of curb extensions, contrasting paving materials, or edge striping. Where on-street parking is provided, consider providing additional bike lane width or marked buffer area to minimize conflicts between bicycles and vehicle doors.

### ⑤ CHANNELIZING ISLAND (OPTIONAL)

To discourage motor vehicle encroachment within the Advisory Bike Lane for long distances, an island can be used to help motorists to return to the two-way travel lane. Found on some European installations as of 2017, this feature has not yet been applied in North America.

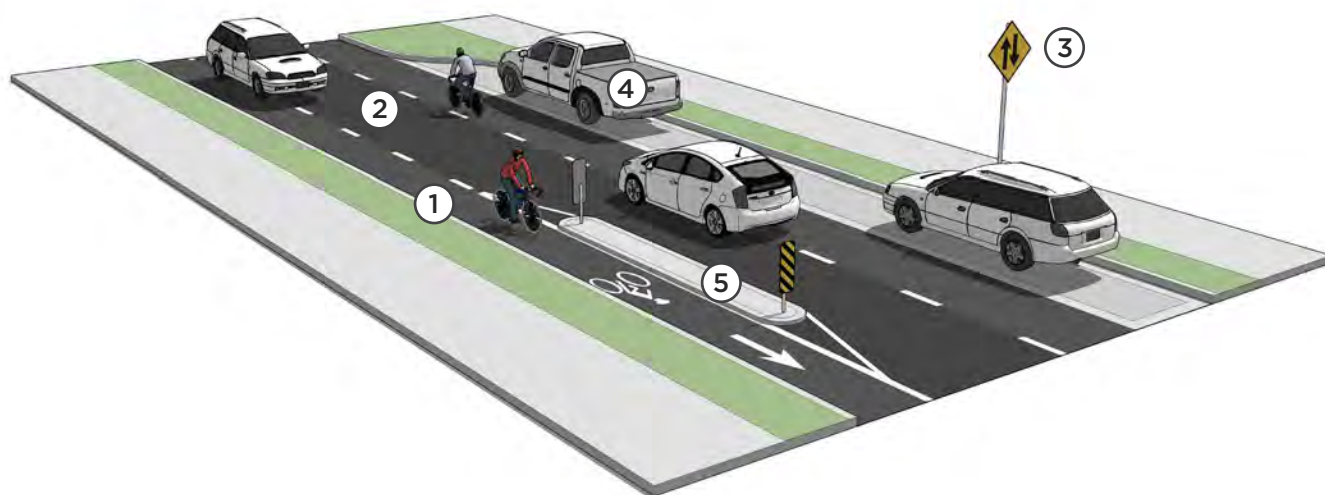


Exhibit 2. Components of an Advisory Bike Lane.

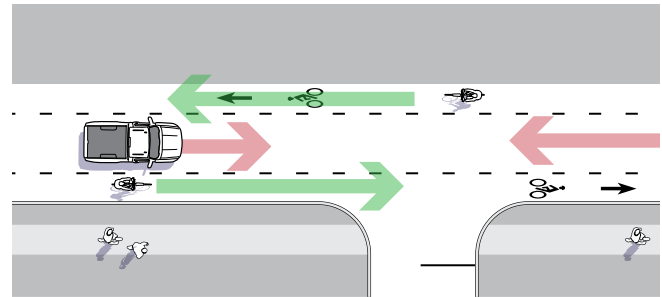


# Operations

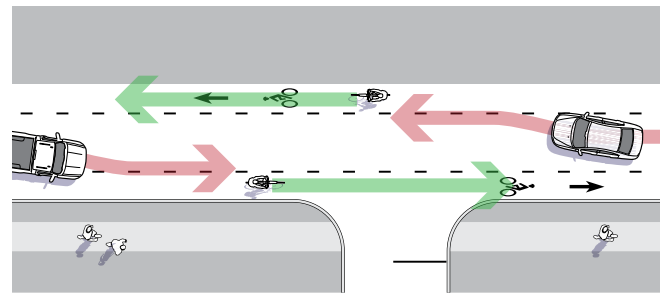
## Operations of an Advisory Bike Lane

Streets with Advisory Bike Lanes operate as a type of shared-roadway environment where mixing, merging, and yielding is required and should be expected. The degree of mixing depends on the volume of bicyclists and motor vehicles, the directional flow of those volumes, and the width of various geometric design elements.

Diagrams of typical user interactions on Advisory Bike Lane installations are illustrated in **Exhibit 3** and **Exhibit 4**.



**Exhibit 3:** On a street with Advisory Bike Lanes during regular operations, motorists travel within the two-way travel lane and do not need to change lanes when approaching or passing bicyclists.



**Exhibit 4:** When approaching oncoming motor vehicles, motorists must merge into the Advisory Bike Lane. If a bicyclist is present, motorists must slow and yield to bicyclist traffic prior to entering the Advisory Bike Lane.

## VIDEO EXPLANATION

Advisory Bike Lane interactions negotiate space over time and at varying speeds. The unconventional design creates unfamiliar interactions and video or animation media may be a successful way to illustrate expected use to road users.



The City of Ottawa created an educational video to communicate to community members how the new Advisory Bike Lane installation operates (<https://youtu.be/OzdDivKXMxY>)

# FHWA Experimentation

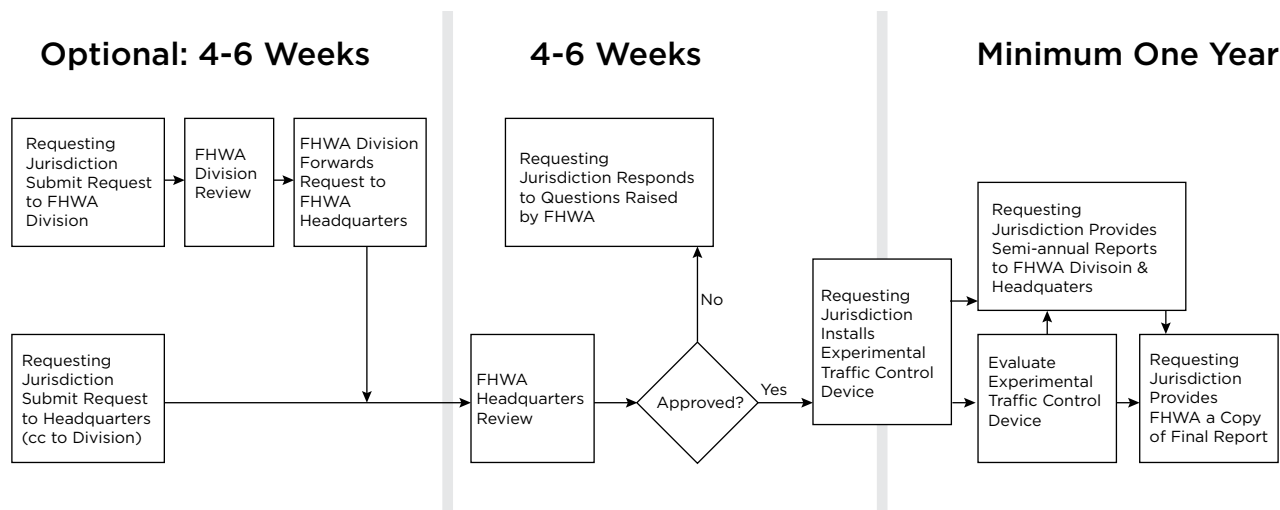
Advisory Bike Lanes are an emerging treatment in the US and Canada. While all required traffic control device elements are included in the MUTCD in some capacity, the manual does not fully address the particular combination of traffic control devices which make up the treatment.

The FHWA report *Small Town and Rural Multimodal Networks* includes guidance on the design, which it refers to as “Advisory Shoulders”. This document includes design guidelines and implementation recommendations, while also stating the need for continued experimentation with the facility.

FHWA also provides experimentation guidance on Advisory Bike Lanes, referred to as “Dashed Bicycle Lanes” on their bicycle and pedestrian program [website](#).

As more communities implement Advisory Bike Lanes, it is recommended that they do so within the experimentation process established by the FHWA. The experimentation process has monitoring and reporting requirements, but offers benefits to communities and agencies in the form of stronger liability protection, FHWA technical support, and makes a positive contribution to the body of knowledge regarding this facility type.

The experimentation process illustrated in **Exhibit 5** involves writing a letter to the FHWA with the details of the existing circumstances, a proposed plan, and answering questions that may arise.



**Exhibit 5:** The FHWA experimentation process requires regular communication and reporting to FHWA.



# Design Considerations

Designers implementing Advisory Bike Lanes should consult guidance from recognized national sources and local experiences to understand the potential range of design dimensions, details, and contexts. Design considerations from published guidelines are summarized below.

In order to install Advisory Bike Lanes, an approved request to experiment is required as detailed in Section 1A.10 of the MUTCD.

## Advisory Bike Lane Width

The Advisory Bike Lane width should meet or exceed standard dimensions for conventional bike lanes. The FHWA *Small Town and Rural Multimodal Networks* document recommends an Advisory Bike Lane width of 6 ft (1.8 m), and a minimum width of 4 ft (1.2 m) when no curb and gutter is present.

Eleven of the twelve surveyed installations to date mark the Advisory Bike Lane at 5 ft (1.5 m) wide.

## Two-way travel Lane Width

The FHWA *Dashed Bike Lane Experimentation Guidance* suggests a minimum width of 16 ft (4.9 m) for the two-way travel lane. Installations participating in experimentation have used narrower widths for the

two-way travel lane. Two installations in Cambridge, MA mark the two-way travel lane at 9 ft (2.8 m) wide.

The FHWA *Small Town and Rural Multimodal Networks* document recommends a two-way travel lane width of 13.5–16 ft (4.1–4.9 m), and notes that the design may function with widths of 10–18 ft (3.0–5.5 m).

**Exhibit 6** identifies the influence two-way travel lane width has on operations and user interactions.

## Signs

The FHWA *Dashed Bike Lane Experimentation Guidance* requires Bike Lane signs (R3-17), and both it and the FHWA *Small Town and Rural Multimodal Networks* recommends using an unmodified two-way traffic warning sign (W6-3) to indicate two-way operations. Some communities (Burlington, VT, Cambridge, MA, Hanover, NH), use a custom graphic sign to indicate desired yield behavior.

	Two-Way Travel Lane Width	Impact on Advisory Shoulder Encroachment When Vehicles Traveling in Opposite Directions Meet
Practical minimum width	10 ft (3.0 m)	Requires vehicle encroachment into the Advisory Shoulder space when vehicles traveling in opposite directions meet.
Preferred minimum width	13.5 ft (4.5 m)	Two passenger cars are physically able to meet each other within the center lane at very low speed. In practice, vehicles will encroach into the Advisory Shoulder.
Preferred maximum width	16 ft (4.9 m)	Permits two passenger cars to pass within the center lane at slower speeds without encroaching into the Advisory Shoulder.
Absolute maximum width	18 ft (5.5 m)	This width is equivalent to two 9 ft (2.7 m) travel lanes and regular encroachment into the Advisory Shoulder space may not be necessary.

**Exhibit 6:** Two-way travel lane width influence on roadway operations and user interactions. (FHWA *Small Town and Rural Multimodal Networks* 2016)

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## Lane Line Markings

No center line should be marked on streets with Advisory Bike Lanes. The FHWA *Small Town and Rural Multimodal Networks* document notes that “short sections may be marked with center line pavement markings to separate opposing traffic flows at specific locations, such as around curves, over hills, on approaches to at-grade crossings, and at bridges” (2016, p. 2-20). The roadway should be widened in these locations to provide conventional bike lanes.

The bike lane edge line should be created with a single wide broken white longitudinal line defining a preferential lane as described in MUTCD section 3D.02.

## Pavement Markings

The FHWA *Dashed Bike Lane Experimentation Guidance* requires the use of bicycle lane pavement markings per MUTCD Section 3D.01. Two installations in the US have marked Advisory Bike Lanes with shared lane markings and two have used no markings.

The FHWA *Dashed Bike Lane Experimentation Guidance* allows the limited use of green-colored pavement within Advisory Bike Lanes. The guidance recommends use of color only within mixing/weaving locations and/or as a background conspicuity enhancement to the bicycle lane markings.

The FHWA *Small Town and Rural Multimodal Networks* document encourages the use of contrasting pavement materials to differentiate the Advisory Shoulder from the two-way travel lane in order to minimize unnecessary encroachment.

Refer to the FHWA *Interim Approval 14: Optional Use of Green Colored Pavement for Bike Lanes* for additional requirements on green color application.

## Sight Distance Considerations

Advisory Bike Lanes may operate best on streets that are straight with few bends, inclines, or sightline obstructions. Motorists must have a clear sight distance of oncoming vehicles.

## Intersections and crossings

At crossings of minor intersections where the Advisory Bike Lane street has priority, the FHWA *Small Town and Rural Multimodal Networks* document recommends extending the broken white lane lines through the crossing.

In advance of an intersection controlled by a stop sign or traffic signal, the FHWA *Small Town and Rural Multimodal Networks* document recommends discontinuing the Advisory Bike Lanes 50 feet from the intersection, establishing a centerline to clarify vehicle placement, and widening the roadway to provide standard width shoulders. This treatment may not be necessary on low volume roads.





Boulder, CO

PHOTO COURTESY OF CITY OF BOULDER



## 02 CASE STUDIES

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To support this white paper, authors conducted a survey on 12 Advisory Bike Lane installations. Those installations are:

- |  |  |                                 |   |
|--|--|---------------------------------|---|
| » Alexandria, VA<br>Potomac Greens Drive | » Burlington, VT<br>Flynn Avenue               | » Edina, MN<br>West 54th Street | » Minneapolis, MN<br>East 14th Street   |
| » Bloomington, IN<br>East 7th Street     | » Cambridge, MA<br>Irving and Scott<br>Streets | » Edina, MN<br>Wooddale Avenue  | » Ottawa, ON<br>Somerset Street East    |
| » Boulder, CO<br>Harvard Lane            | » Cambridge, MA<br>Lakeview Avenue             | » Hanover, NH<br>Valley Road    | » Sandpoint, ID<br>Oak and Main Streets |

*Authors contacted a representative of the local agency responsible for each facility and interviewed staff about the installation. Areas of interest were public outreach, geometric design, and evaluation of the facility.*





# ALEXANDRIA, VA

## Potomac Greens Drive

POPULATION: 150,000

### Context

Alexandria, VA is a city which is heavily influenced by its proximity to Washington, D.C. Potomac Greens is one of two roads accessing a dense neighborhood of three-story townhomes. The neighborhood is tucked between a set of railroad tracks and George Washington Memorial Parkway and experiences no through traffic. The street is fully built-out with curb, gutter, and sidewalk on both sides.

### Problem Solved

Prior to installation, the road was completely unmarked and some residents felt that it promoted speeding. A bikeshare station exists near the entry to the neighborhood (at Slaters Lane), so bicycle use was expected.

An Advisory Bike Lane was preferred by the city for two reasons: staff hoped to experiment with the facility and installation of standard bike lanes would have required removal of a parking lane, which was not an option due to heavy use.

### Public Outreach and Response

The neighborhood came to the city with a request for speed bumps to address a perceived speeding problem. After a traffic survey showed little speeding, the city chose Advisory Bike Lanes as a good alternative for traffic calming.

Most public response occurred prior to implementation. The city held two meetings with the neighborhood association to educate residents and receive input. These meetings yielded positive and negative reaction to the facility. After implementation, the city distributed an explanatory flyer and a webpage. Little reaction occurred after the facility was installed.

### Outcomes

The facility is working as intended and an evaluation of the facility is in progress.



FOR MORE INFORMATION: [WWW.ALEXANDRIAVA.GOV/LOCALMOTION/INFO/DEFAULT.ASPX?ID=84177](http://WWW.ALEXANDRIAVA.GOV/LOCALMOTION/INFO/DEFAULT.ASPX?ID=84177)

### Key Takeaways

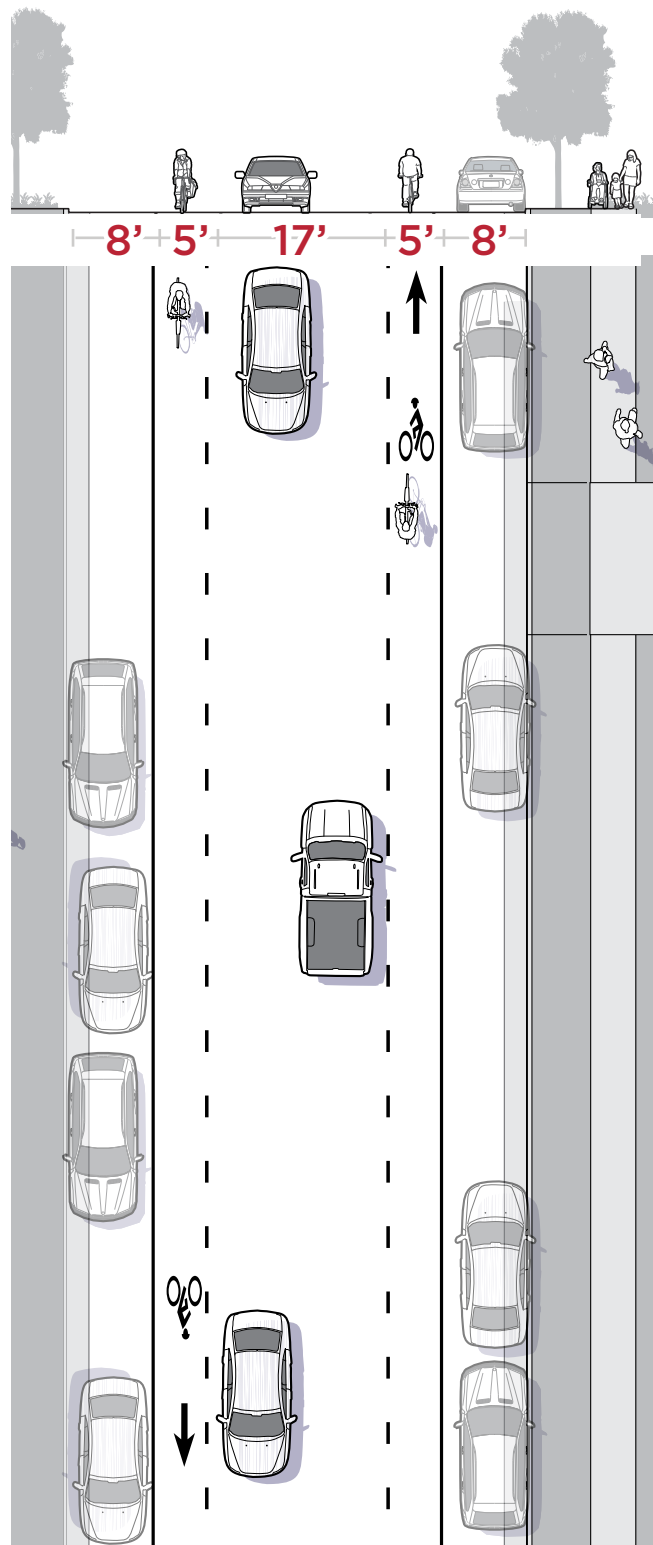
**1** Advisory Bike Lanes work well on streets with low volumes and low speeds such as this one.

**2** The city hopes the treatment becomes a standard one.

# Alexandria, VA - Potomac Greens Drive

## DIMENSIONS

Length: 1600 ft

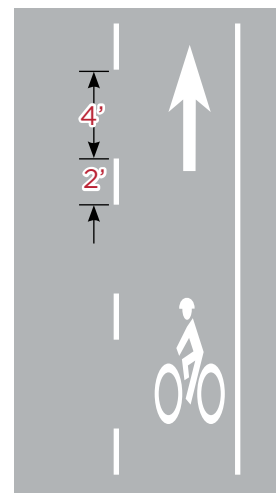


## SPEED AND VOLUME

Speed: 25 MPH

Motor Vehicle Volume:  
2,000 ADT

## MARKINGS



## SIGNS



R3-17



W6-3





# BLOOMINGTON, IN

## East 7<sup>th</sup> Street

POPULATION: 83,000

### Context

East 7th Street runs through a residential neighborhood with a large student population and provides access to Indiana University. The road ends for motorists at State Route 45/46, but a bicycle and pedestrian underpass connects the neighborhood and Indiana University to a shopping center on the other side. Some sections of the street have a curb and/or sidewalk on one side, while others have no separate pedestrian accommodation.

### Problem Solved

Bloomington has poor east/west connectivity in their transportation network and East 7th Street is a good east and west connection to the university. It is an important piece of their active transportation network. The street was not wide enough for standard bike lanes. The State Route 45/46 underpass was constructed concurrently with the Advisory Bike Lanes, enabling the connection.

### Public Outreach and Response

No public outreach was done prior to implementation. There was little public response and no negative response at all. The neighborhood residents are primarily students or university employees, many of whom leave every summer. Striping occurred in the summer and residents had no problems adjusting to the new design upon their return. The Bloomington Bicycle and Pedestrian Safety Commission and bicycle advocate groups expressed appreciation.

### Outcomes

The facility is working as intended, and formal experimentation is in progress under FHWA RTE 9(O9)-71(E).



FOR MORE INFORMATION:  
[WWW.BLOOMINGTON.IN.GOV/BIKE](http://WWW.BLOOMINGTON.IN.GOV/BIKE)

### Key Takeaways

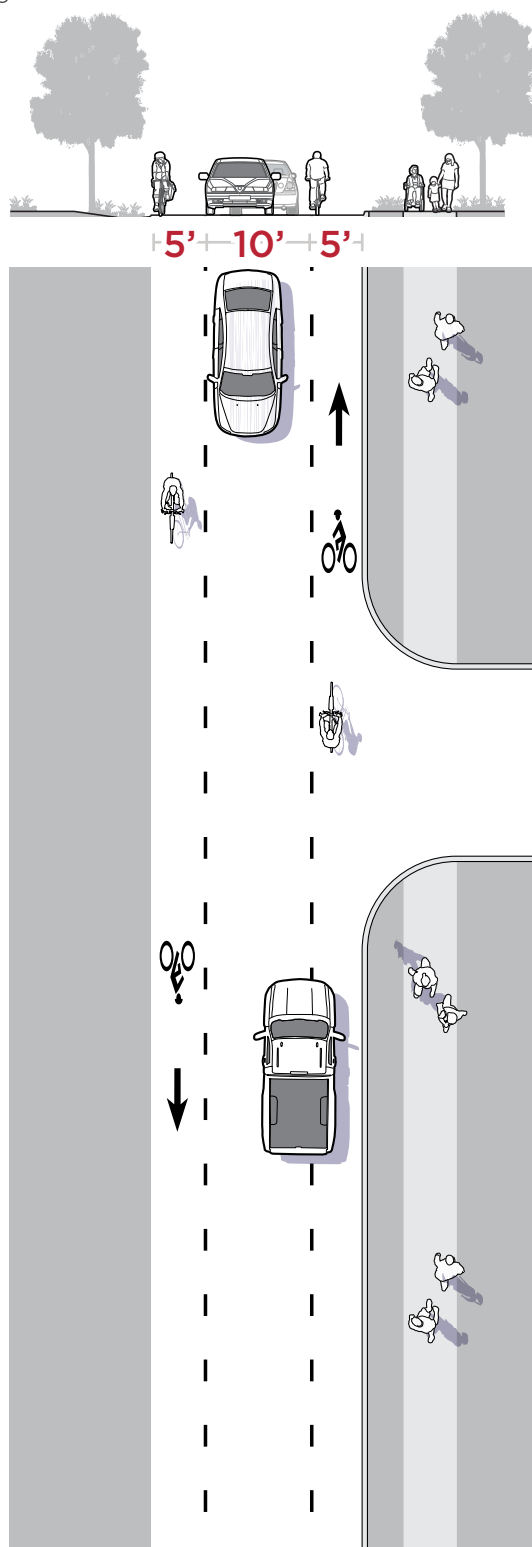
**1** Network connectivity is key. A facility needs to connect to other bikeways and form a useful part of a network.

**2** While bike lanes were preferred, they were not possible here. This facility functions well on a low-volume road or a short connector between facilities.

# Bloomington, IN - East 7<sup>th</sup> Street

## DIMENSIONS

Length: 2200 ft



## SPEED AND VOLUME

Posted Speed: 25 MPH

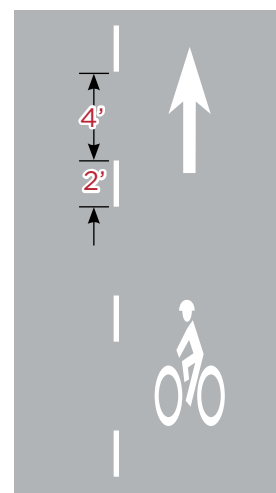
Motor Vehicle Volume:  
200-500 ADT

## SIGNS



D11-1

## MARKINGS



# BOULDER, CO

POPULATION: 103,000

## Harvard Lane

### Context

Harvard Lane lies between a six-lane arterial and a mixed-density residential neighborhood. It has long served as an alternative to the arterial for pedestrians and bicyclists traveling between residential neighborhoods and important destinations such as the University of Colorado and downtown Boulder.

Harvard Lane is a critical link in the city's bicycle network. Bicyclists outnumber motorists by more than four to one on this short stretch of road. It was previously an unmarked road and there were problems with bicyclists riding on the wrong side of the road.

### Problem Solved

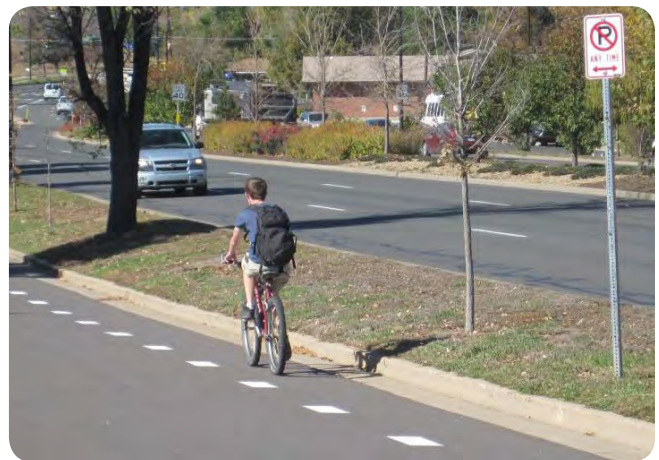
No significant problem existed on this street. The city wanted to experiment with Advisory Bike Lanes and chose this street as a location for the test.

### Public Outreach and Response

This installation was part of the City's Living Lab program which tested new bicycle and pedestrian facilities. As part of the Living Lab program, there were meetings with the neighborhood, pop-up events, and other outreach before installation. The number of post-installation comments was small. Some bicyclists questioned the need for the facility given that the unmarked street was already working well.

### Outcomes

The City's evaluation concluded the facility was safe and operating as intended. There was no appreciable change in collision rate, bicyclist demographics, bicyclist speeds, or vehicular speeds. The only significant change was that more bicyclists rode in the bike lane than in the travel lane after the Advisory Bike Lane was installed. The evaluation recommended keeping the Advisory Bike Lane treatment and using it elsewhere when applicable.



FOR MORE INFORMATION: [BOULDERCOLORADO.GOV/PHOTO-GALLERY/PHOTOSHOW/?PHOTO\\_ID=9451502783&SET\\_ID=72157634952580327](http://BOULDERCOLORADO.GOV/PHOTO-GALLERY/PHOTOSHOW/?PHOTO_ID=9451502783&SET_ID=72157634952580327)

### Key Takeaways

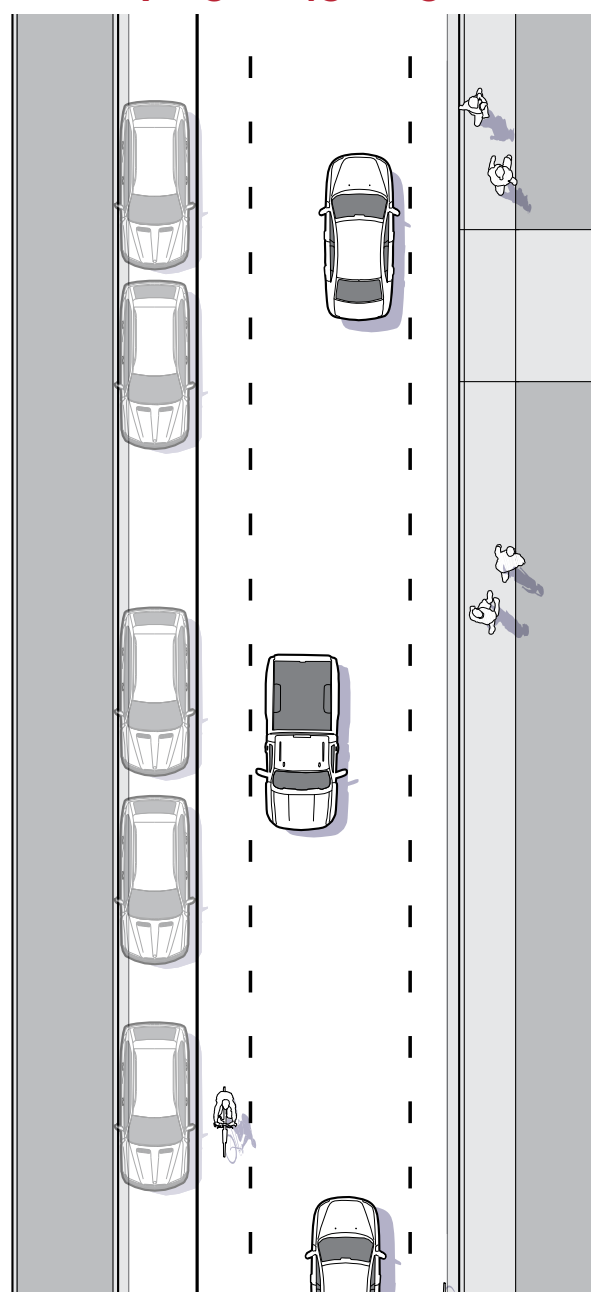
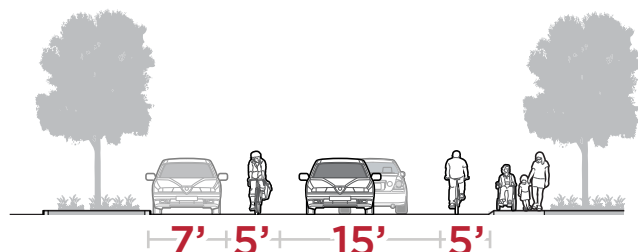
- 1 The city considers Advisory Bike Lanes to be most useful in situations with financial or physical constraints.



# Boulder, CO - Harvard Lane

## DIMENSIONS

Length: 1600 ft



## SPEED AND VOLUME

Speed: 25 MPH

Motor Vehicle Volume:  
380 ADT

## SIGNS



D11-1

## MARKINGS

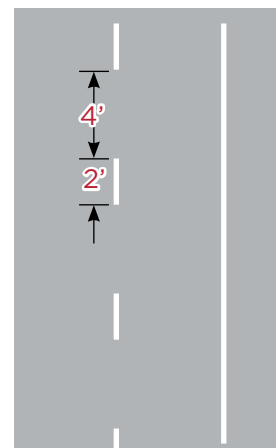


Photo courtesy of Google Earth

# BURLINGTON, VT

POPULATION: 42,000

## Flynn Avenue

### Context

Flynn Avenue terminates at the entrance to Oakledge Park, a well-used regional park, after passing a mix of residential, commercial, and industrial uses. It experiences no through traffic. The street has curb, gutter, and sidewalk on one side and grass on the other. Data doesn't exist but heavy vehicle use is likely higher here than in other Advisory Bike Lane installations. At the west end of the street, at the park entrance, the roadway narrows to approximately 20-foot-wide. This facility was installed in May 2017, so little experience with this installation exists.

### Problem Solved

Oakledge Park is heavily used at times. The city wanted bike facilities on Flynn Avenue to provide access to the park and to address safety issues with park-goers parking on Flynn Avenue. Widening the road to install standard bike lanes was not an option.

After parking was improved in the park, the parking lanes were removed and the Advisory Bike Lanes were installed.

### Public Outreach and Response

Public outreach regarding the parking problem lasted over two years. The development of a bicycle and pedestrian master plan included discussion of Advisory Bike Lanes. The City used an email-based platform for neighborhood discussion ([www.frontporchforum.com](http://www.frontporchforum.com)) to distribute information on the project. No discussions were held with the businesses on the street.

Prior to implementation, two people expressed confusion about the facility. Following installation, some cyclists expressed concern over lane widths. The wide center lane combined with the 5-foot-wide bike lanes encouraged motorists to squeeze by while cyclists were riding in the bike lanes. This was considered dangerous.

### Outcomes

This facility is very new, but appears to be working as intended.



Photo courtesy of Street Plans Collaborative



FOR MORE INFORMATION: [WWW.BURLINGTONVT.GOV/DPW/ADVISORYLANES](http://WWW.BURLINGTONVT.GOV/DPW/ADVISORYLANES)

### Key Takeaways

**1** Feedback indicates that the center lane is too wide, or the bike lanes are too narrow, for comfortable use by all bicyclists.

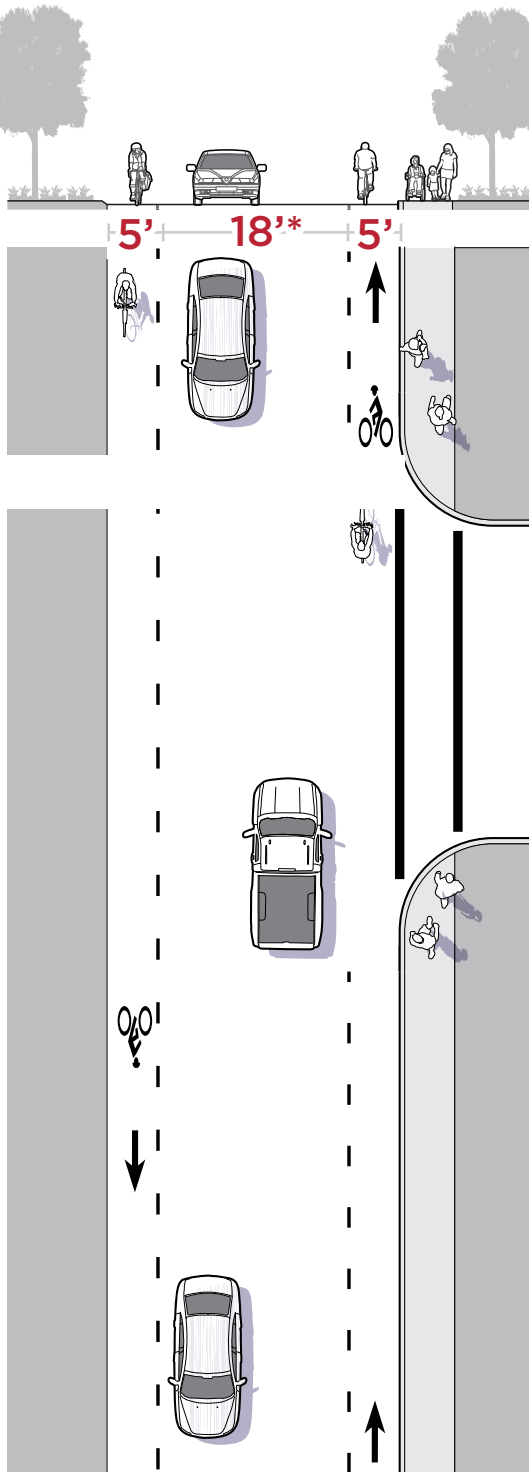
**2** "Why not try it? It's only paint. If it fails, you can remove it and try something else."

-Nicole Losch,  
Senior Transportation Planner

# Burlington, VT - Flynn Avenue

## DIMENSIONS

Length: 1600 ft



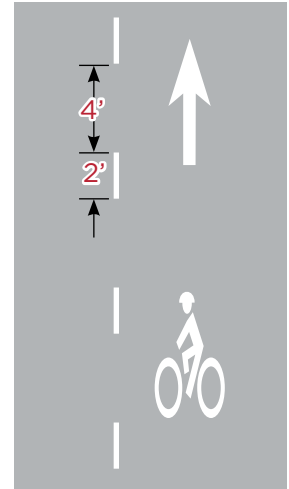
\* 10-feet in some portions

## SPEED AND VOLUME

Speed: 15/25 MPH

Motor Vehicle Volume:  
5,000 ADT

## MARKINGS



## SIGNS



Custom Sign



R7-13





# CAMBRIDGE, MA

## Irving and Scott Streets

POPULATION: 107,000

### Context

Cambridge is a city in the Boston metropolitan area which hosts Harvard University and MIT. Irving and Scott are quiet streets in a single family residential neighborhood, used only for local traffic. Both streets are fully built-out with curb, gutter, and sidewalk, and both experience low traffic volumes and low speeds. Irving Street has a slightly curved alignment and turns abruptly where it becomes Scott Street.

### Problem Solved

The city wished to create a bikeway connection between Beacon Street, a major street, the public library, and Harvard University. Because removal of on-street parking was not considered feasible, there was not sufficient width for standard bike lanes.

### Public Outreach and Response

The city discussed the facility with their bicycle advisory committee, held neighborhood public meetings, and distributed flyers along the corridor.

Post-installation reaction from bicyclists was positive. Some concerns were received from drivers who wondered if the street had been converted to one-way travel. Complaints were also received about drivers stopped at intersections in the center of the street, which prevented other cars from entering. The City subsequently added a double yellow line on approaches to intersections to address both concerns.

### Outcomes

The facility appears to be working as intended. An evaluation is scheduled for spring of 2017. A decision on further use of Advisory Bike Lanes will occur after the evaluation is complete. Despite the lack of evaluation, the city considers Advisory Bike Lanes a viable tool in their toolbox.



FOR MORE INFORMATION: [WWW.CAMBRIDGEMA.GOV/CDD/TRANSPORTATION/BIKESINCAMBRIDGE/BIKETOOLBOX](http://WWW.CAMBRIDGEMA.GOV/CDD/TRANSPORTATION/BIKESINCAMBRIDGE/BIKETOOLBOX)

### Key Takeaways

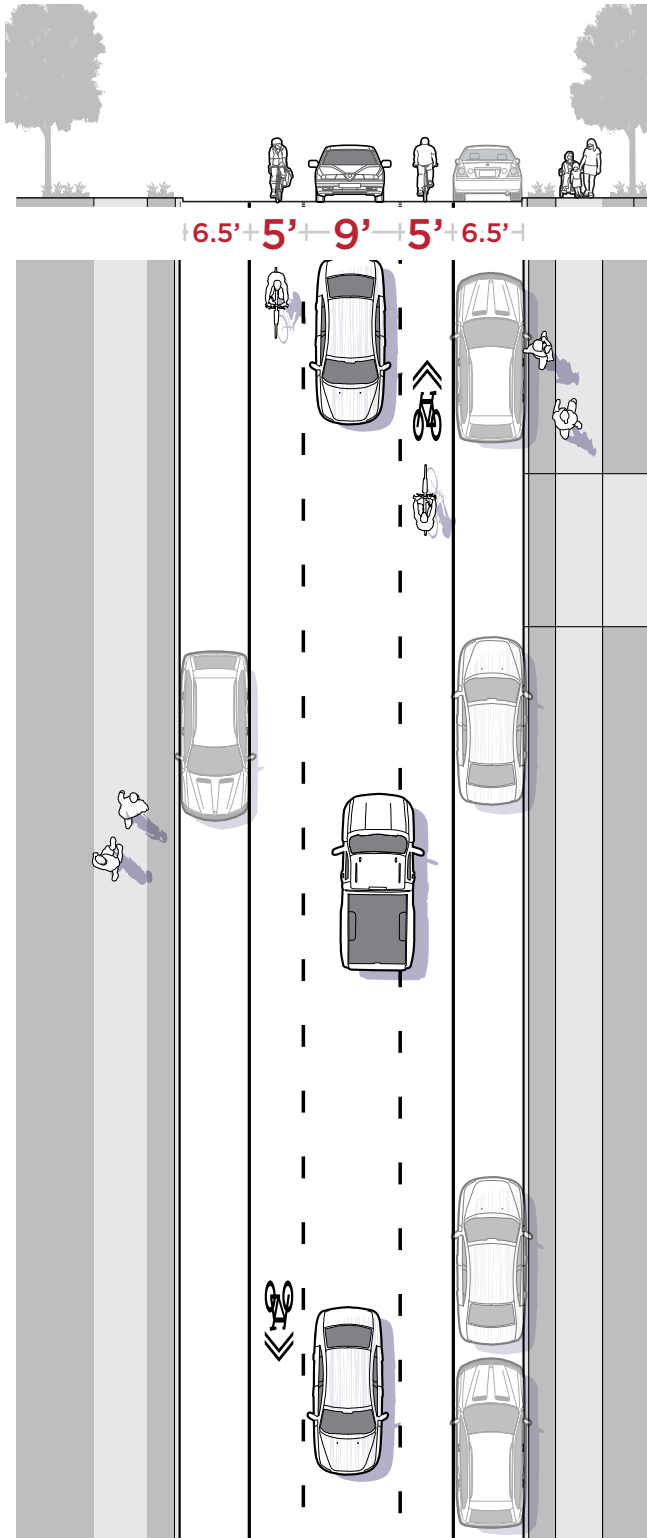
**1** Installation of a double yellow centerline at intersections is important to convey the two-way character of the street and position cars correctly at the stop line.

**2** Communication and education with neighbors before installation is important.

# Cambridge, MA - Irving and Scott Streets

## DIMENSIONS

Length: 900 ft

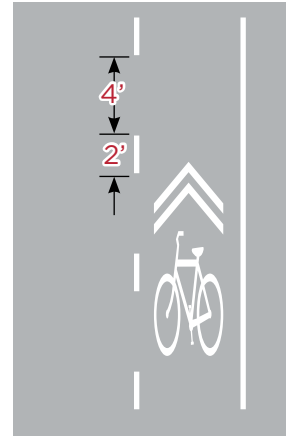


## SPEED AND VOLUME

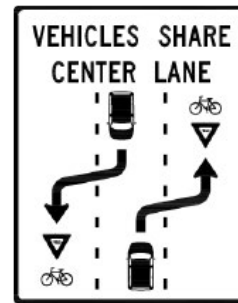
Speed: 30 MPH

Motor Vehicle Volume:  
1,000 ADT

## MARKINGS



## SIGNS



YIELD TO BIKES  
WHEN PASSING

Custom Sign



# CAMBRIDGE, MA

## Lakeview Avenue

POPULATION: 107,000

### Context

Cambridge is a city in the Boston metropolitan area which hosts Harvard University and MIT. Lakeview Avenue is a quiet street in a single family residential neighborhood, used only for local traffic. Lakeview is fully built-out with curb, gutter, and sidewalk, and experiences low traffic volumes and low speeds. The street is straight and features some curb extensions for traffic calming.

### Problem Solved

The city wished to create a low-stress cycling connection paralleling Fresh Pond Parkway, a high-speed, high-volume arterial. Because removal of on-street parking was not considered feasible, sufficient width was not available for standard bike lanes.

### Public Outreach and Response

The city discussed the facility with their bicycle advisory committee, held neighborhood public meetings, and distributed flyers along the corridor.

Post-installation reaction from bicyclists was positive. No other response was received.

### Outcomes

The facility appears to be working as intended. An evaluation is scheduled for spring of 2017. A decision on further use of Advisory Bike Lanes will occur after the evaluation is complete. Despite the lack of evaluation, they consider Advisory Bike Lanes another viable tool in their toolbox.



FOR MORE INFORMATION: [WWW.CAMBRIDGEMA.GOV/CDD/TRANSPORTATION/BIKESINCAMBRIDGE/BIKETOOLBOX](http://WWW.CAMBRIDGEMA.GOV/CDD/TRANSPORTATION/BIKESINCAMBRIDGE/BIKETOOLBOX)

### Key Takeaways

**1** Installation of double yellow line on centerline at intersections is important to convey the two way character of the street and position cars correctly at stop line.

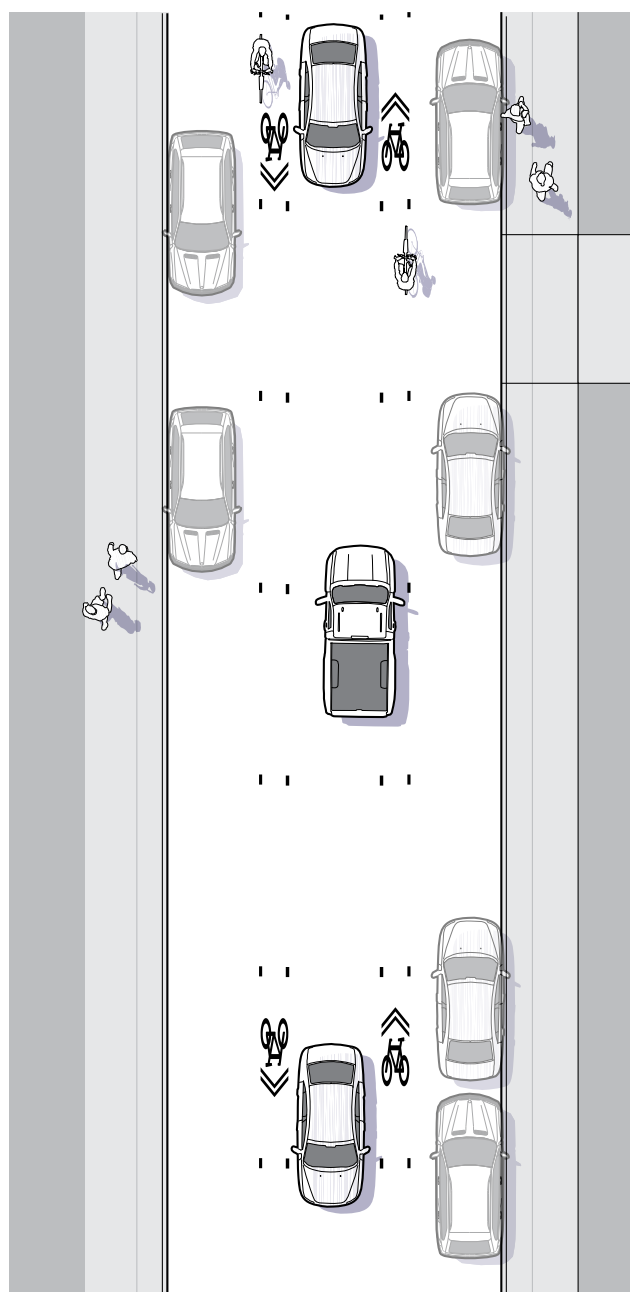
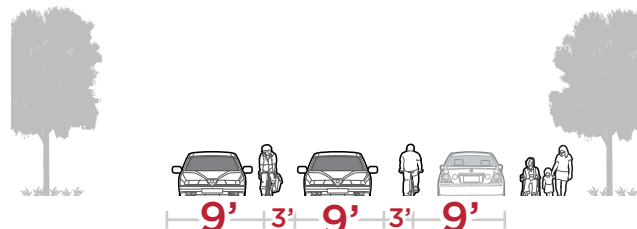
**2** Communication and education with neighbors before installation is important.



# Cambridge, MA - Lakeview Avenue

## DIMENSIONS

Length: 1600 ft



## SPEED AND VOLUME

Speed: 30 MPH

Motor Vehicle Volume:  
1,000 ADT

## SIGNS

No Signs Used

## MARKINGS

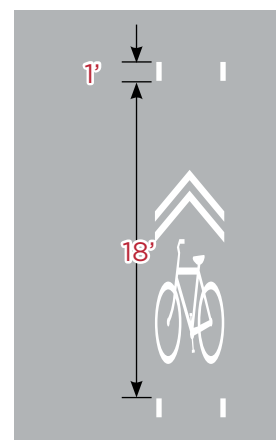


Photo courtesy of Google Earth

# EDINA, MN

## West 54<sup>th</sup> Street

POPULATION: 49,600

### Context

Edina is a suburb of Minneapolis. West 54th Street is a low-volume, single-family residential road with curb and gutter on both sides, and a sidewalk on only one side. Parking lanes exist on both sides. The street has a church and a strip mall at its eastern end.

### Problem Solved

The city wanted to add bicycle facilities to West 54th but did not have the width to add standard bike lanes. Removal of parking was not an option. Edina was aware of Advisory Bike Lanes because of Minneapolis' successful experimentation and wanted to try them.

### Public Outreach and Response

Edina installed two Advisory Bike Lanes on separate streets simultaneously. In hindsight, the city felt that public outreach was not as extensive as it should have been. The city held two meetings with the public before installation and created a video on how to use the street for their website.

There was virtually no response to this facility, aside from favorable input from bicyclists.

### Outcomes

The evaluation report concluded that the facility was functioning as intended and continuing to improve. The evaluation found that users became more comfortable (i.e. acted appropriately) with the Advisory Bike Lanes over time. Further, it found that the Advisory Bike Lane street achieved a 1-3 MPH reduction in the 85th percentile speed compared to shared lane markings or no bike lane markings.



FOR MORE INFORMATION: [EDINAMN.GOV/EDINAFILES/FILES/CITY\\_OFFICES/ENGINEERING/EDINA\\_ADVISORY\\_BIKE\\_LANES.PDF](https://edinamn.gov/edinafiles/files/city_offices/engineering/edina_advisory_bike_lanes.pdf)

### Key Takeaways

**1** Public acceptance may have been improved with increased levels of public outreach and education before installation.

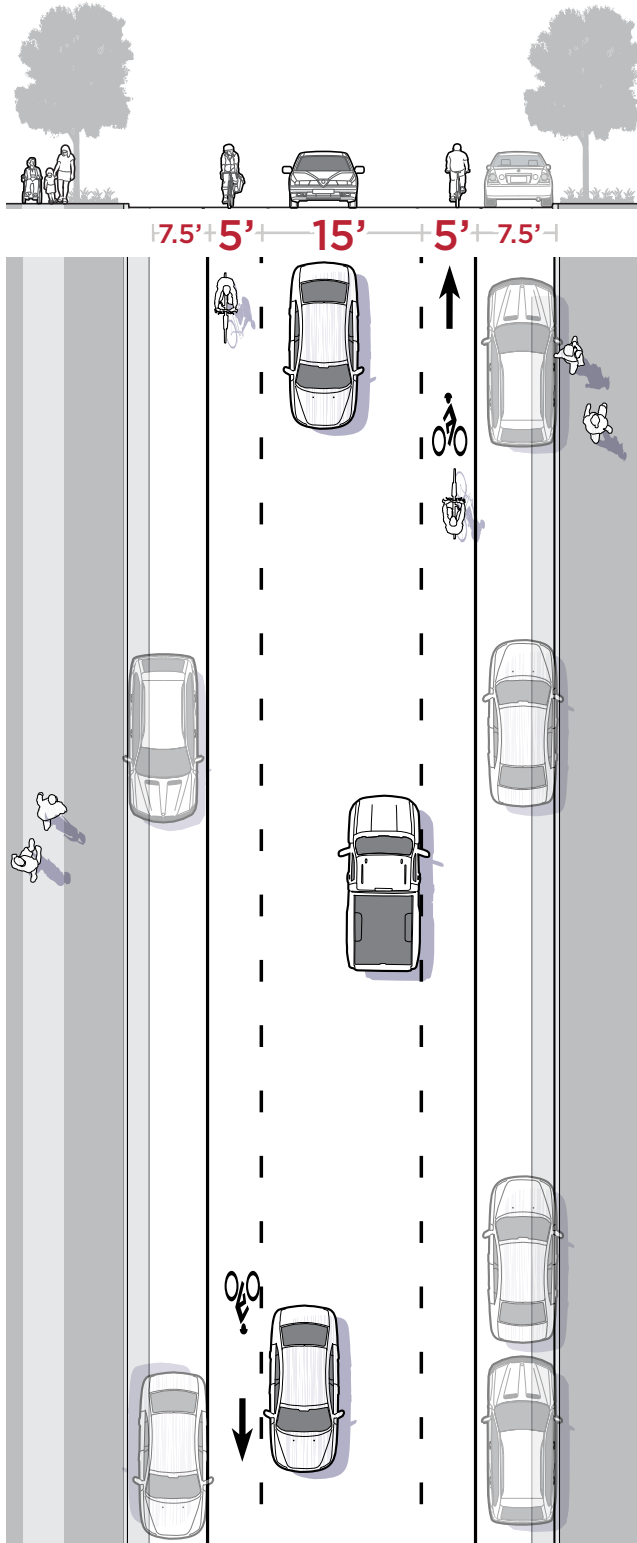
**2** The city now uses portable, changeable message signs to announce traffic changes before they are implemented.

**3** The evaluation report shows a trend over time of vehicles encroaching more on bike lanes when they are not occupied.

# Edina, MN - West 54<sup>th</sup> Street

## DIMENSIONS

Length: 1100 ft



## SPEED AND VOLUME

Speed: 30 MPH

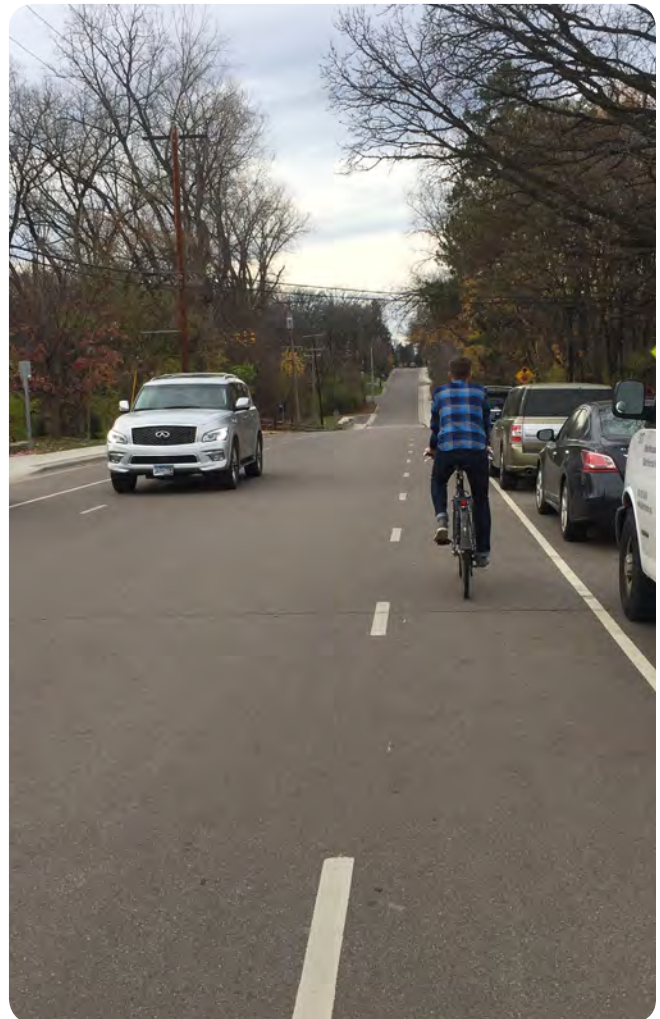
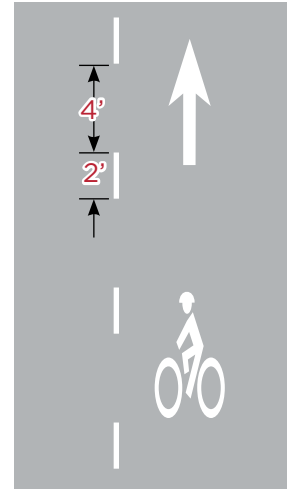
Motor Vehicle Volume:  
2,450 ADT

## SIGNS



R3-17

## MARKINGS





# EDINA, MN

## Wooddale Avenue

POPULATION: 49,600

### Context

Wooddale Avenue is a high profile street for the community of Edina, MN. It accesses a country club and is the venue for local parades. Residents have a strong connection to this street. Wooddale is a medium volume road with curb and gutter on both sides, but a sidewalk on only one side. It is primarily residential but has some commercial activities. A parking lane exists on one side only. Wooddale Avenue is noteworthy because the Advisory Bike Lane was removed as a result of public opposition.

### Problem Solved

Wooddale is an important piece of Edina's cycling network – it connects to the Minneapolis network and is one of the longer north-south links. The city wanted to add bicycle facilities to Wooddale but did not have the width to add standard bike lanes. Despite low utilization, removal of parking was not an option.

An Advisory Bike Lane was preferred by the city for two reasons: staff wanted to experiment with the facility and installation of an Advisory Bike Lane would allow the parking lane to remain.

### Public Outreach and Response

Edina installed two Advisory Bike Lanes at the same time. The city held two meetings with the public before installation and created a video for their website on how to use the street.

Significant public opposition following installation convinced the city council to remove the facility shortly after installation. In hindsight, the decision to implement the facility type was made rather quickly and public outreach was not as extensive as it probably should have been.

### Key Takeaways

**1** The city concluded it needed to do more public outreach and education beforehand.

**2** The asymmetric street layout, low bike volumes, and low parking lane utilization was viewed as the cause of driver confusion.

**3** The city considers 5,000 ADT too high to be appropriate for Advisory Bike Lane application based on this experience.



PHOTO COURTESY OF MARK NOLAN, CITY OF EDINA

FOR MORE INFORMATION: [EDINAMN.GOV/EDINAFILES/FILES/CITY\\_OFFICES/ENGINEERING/EDINA\\_ADVISORY\\_BIKE\\_LANES.PDF](http://EDINAMN.GOV/EDINAFILES/FILES/CITY_OFFICES/ENGINEERING/EDINA_ADVISORY_BIKE_LANES.PDF)

### Outcomes

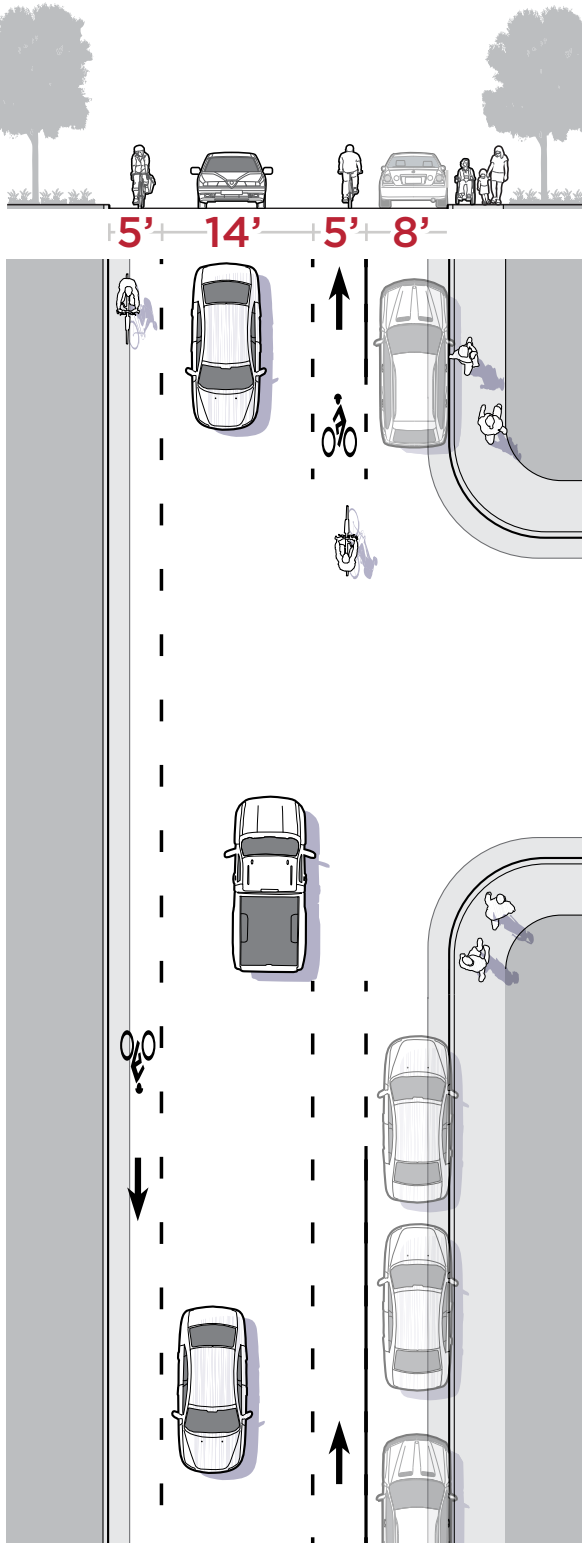
The 2014 evaluation report contained little data on this installation due to its short, nine-month life but deemed the facility safe. The report authors felt the asymmetry of the street layout (parking lane on one side only) combined with low bike volume and low parking lane utilization created a wide open space with unfamiliar markings that caused confusion for some drivers.

In a 2013 report from City staff, one crash was attributed to this facility. In a section of road striped 5'-17'-5'-8' (bike/travel/bike/parking), a northbound driver facing oncoming traffic drove through the unoccupied bike lane and crashed into an unoccupied, legally parked vehicle in the northbound parking lane. Per the police report, the driver "stated that he was a little confused with the newly painted bike lanes", though his maneuver suggests proper intentions for the use of the road.

# Edina, MN - Wooddale Avenue

## DIMENSIONS

Length: 7600 ft



## SPEED AND VOLUME

Speed: 30 MPH

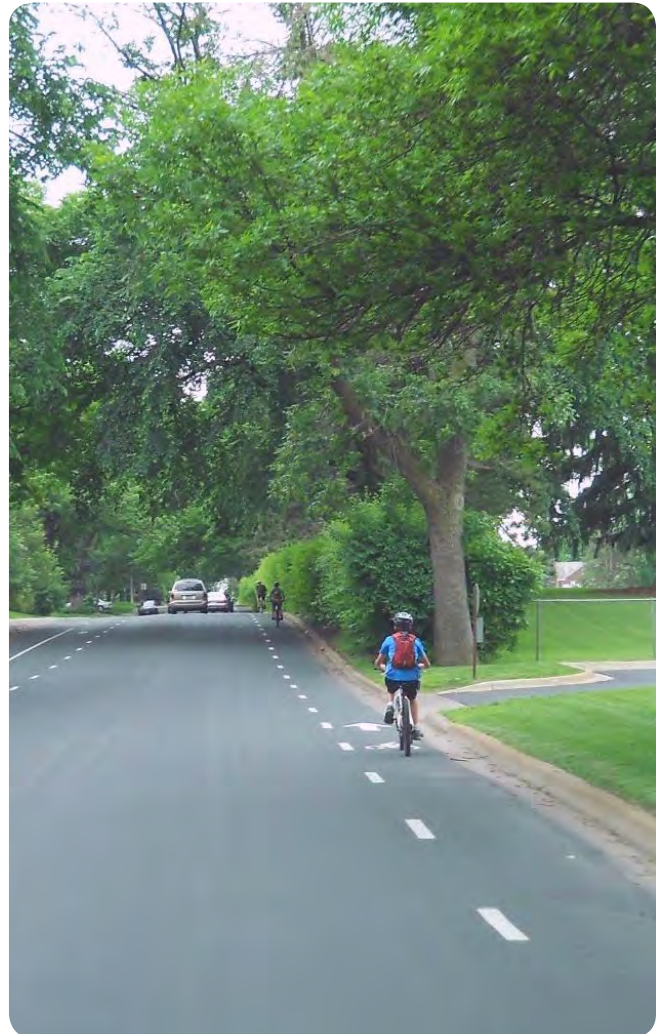
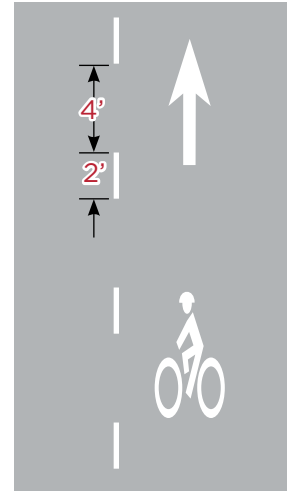
Motor Vehicle Volume:  
5,000 ADT

## SIGNS



R3-17

## MARKINGS



# HANOVER, NH

## Valley Road

POPULATION: 11,000

### Context

Hanover, NH is home to Dartmouth College and a large medical center. Valley Road connects two busier streets and runs through a residential neighborhood of single family homes on large lots. Valley Road is an unmarked, 20-foot wide paved road. No curbs, gutters, or sidewalks exist. No on-street parking is allowed. Users of this road are primarily local and familiar with the area.

### Problem Solved

The Town of Hanover was seeking a way to support cycling on Valley Road while implementing some traffic calming. They wanted to test this treatment on a quiet street before installing it on a busier road nearby. Installation of sidewalks and road widening were not considered feasible.

### Public Outreach and Response

The Town held two public hearings before installation. Supportive neighbors held discussion parties with the neighborhood. The bicycle and pedestrian committee took a lead role performing public outreach and education tasks. The town continued a dialogue with the community after installation.

Pedestrians and bicyclists called it the “best thing the city could ever do”. Initial opposition focused on perceived safety hazards. Safety concerns have not materialized as of summer 2017.

### Outcomes

The town feels that the facility is working as an evaluation study concluded the facility was safe. Twelve-hour counts conducted before and after installation found the Advisory Bike Lane increased



PHOTO COURTESY OF ERICA WYGONIK, RSG



FOR MORE INFORMATION: [WWW.HANOVERNH.ORG/BIKE-PEDESTRIAN-COMMITTEE](http://WWW.HANOVERNH.ORG/BIKE-PEDESTRIAN-COMMITTEE)

bicycle and pedestrian usage and decreased vehicle use. The police reported fewer problems with speeding vehicles after installation.

Hanover is considering installing Advisory Bike Lanes in other locations.

### Key Takeaways

**1** Experience with the facility changed the minds of initially doubtful staff, including City Police.

**2** Prior public outreach contributed to the successful operation of the facility.

**3** The bike lanes are commonly used by pedestrians due to lack of sidewalks, and appears to operate well in this fashion.

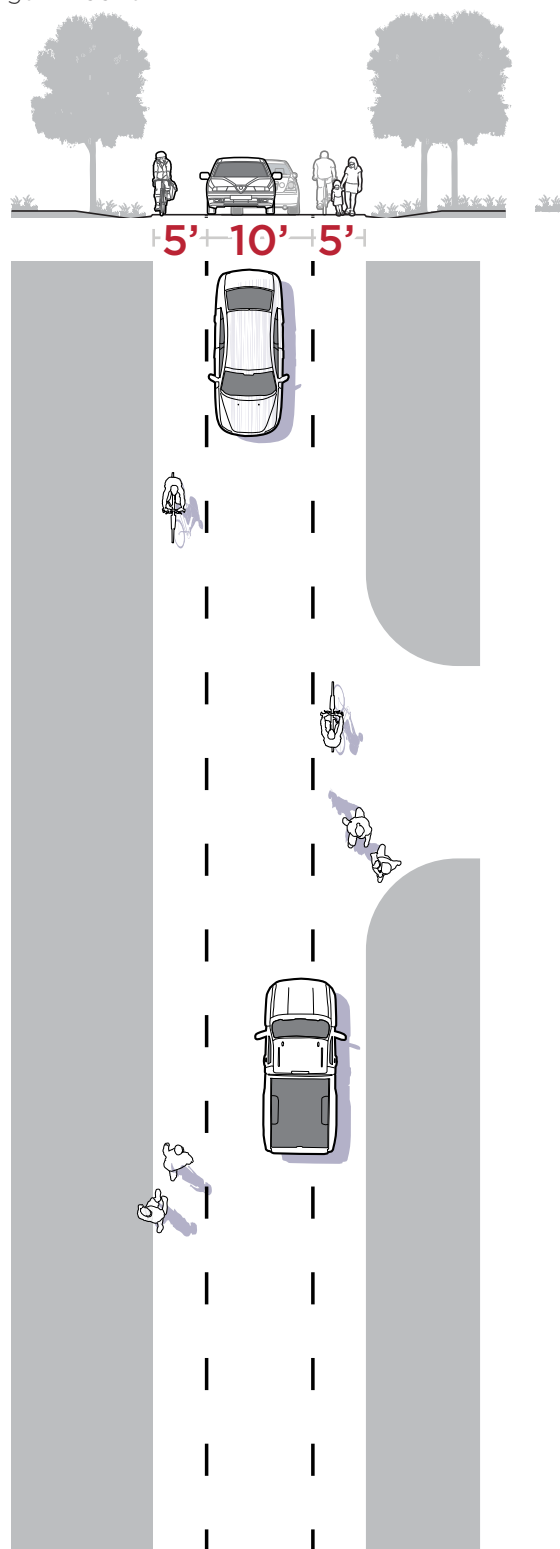
**4** Police reported fewer problems with speeding vehicles after installation.



# Hanover, NH - Valley Road

## DIMENSIONS

Length: 1255 ft

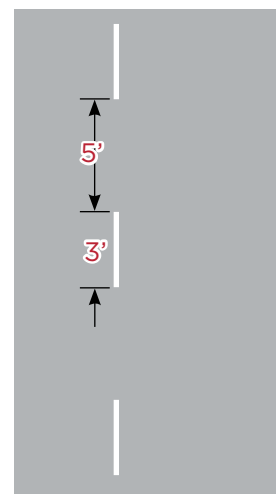


## SPEED AND VOLUME

Speed: 25 MPH

Motor Vehicle Volume:  
470 ADT

## MARKINGS



## SIGNS



Custom Sign



PHOTO COURTESY OF DR. YOUNG

# MINNEAPOLIS, MN

POPULATION: 400,000

## East 14<sup>th</sup> Street

### Context

Minneapolis is a city that is dedicated to supporting walking and cycling. East 14th Street supports a mix of commercial and dense residential use, including a hospital, churches, grocery stores, and apartment buildings. The road skirts the downtown area and is fully built-out, with parking lanes on both sides. The parking lanes experience heavy use. Although East 14th Street is not a through street, it does host important destinations and provides connection to other major streets and bike facilities.

### Problem Solved

The city wanted a bike facility on this street to connect three north/south bike lane-equipped streets. East 14th is an important travel corridor, where the removal of parking lanes was not possible. The street width cannot accommodate two parking lanes, two travel lanes, and two dedicated bike lanes.

### Public Outreach and Response

The city met with neighborhood organizations, North Central University, and political leaders. After the city chose the Advisory Bike Lane as their solution, they reported back to these key stakeholders. After installation, the city published a video and educational materials. Public concerns declined significantly one month after installation.

Little response was received from bicyclists. During a survey, some wondered why they were being surveyed about what they thought was a regular bike lane.

### Outcomes

The facility is operating as intended. While some users expressed confusion about the narrow lane



PHOTO COURTESY OF SIMON BLENISKI, CITY OF MINN.

FOR MORE INFORMATION: [WWW.MINNEAPOLISMN.GOV/BICYCLES/ADVISORY-BIKE-LANE](http://WWW.MINNEAPOLISMN.GOV/BICYCLES/ADVISORY-BIKE-LANE)

configuration and the lack of a marked center line, this confusion was not reflected in reported crashes or observed user behavior.

### Key Takeaways

**1** Some confusion can be expected following installation. Allow time for familiarization.

**2** Minneapolis city staff believes there is value in a symmetrical cross section. Parking lanes on both sides provide cues to two-way operation.

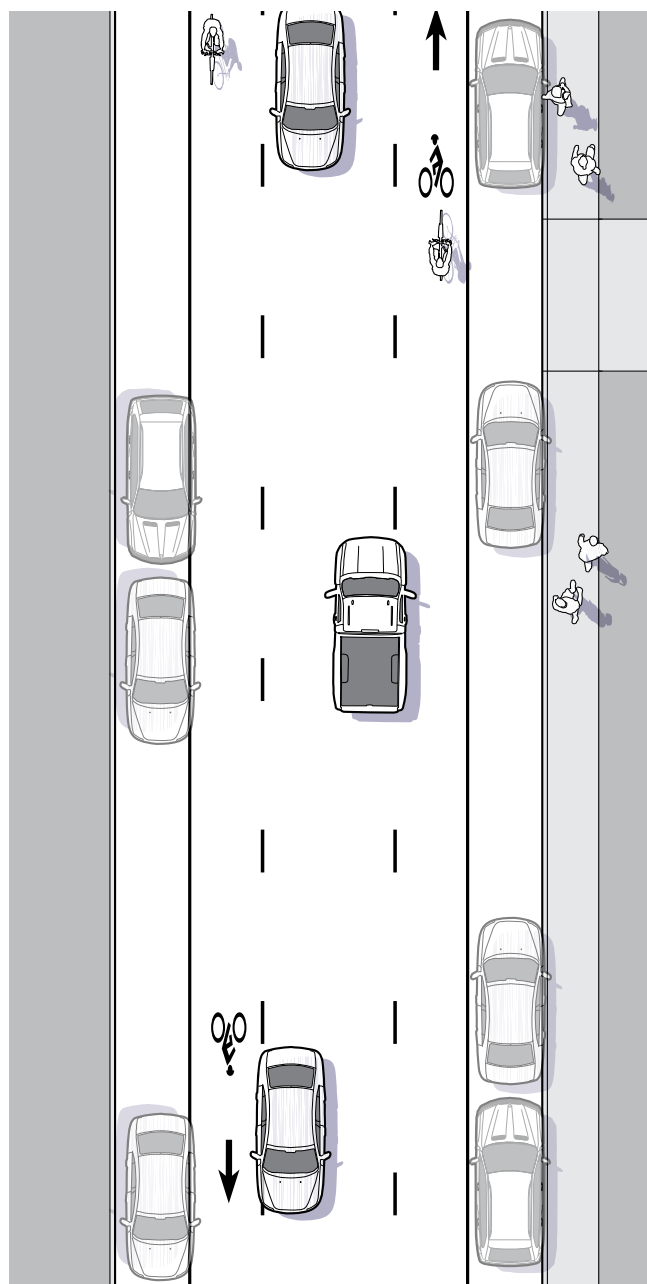
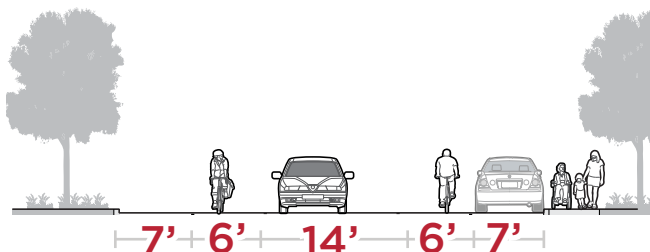
**3** Facility entrances and intersections are important to sign and mark for clarity.

**4** Context is important. Limited width, two-way travel, and well-used parking lanes provide cues that negotiation for space between vehicles is expected.

# Minneapolis, MN - East 14<sup>th</sup> Street

## DIMENSIONS

Length: 2400 ft



## SPEED AND VOLUME

Speed: 30 MPH

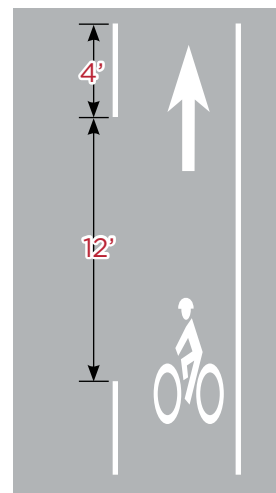
Motor Vehicle Volume:  
4,700 ADT

## SIGNS



W6-3

## MARKINGS





# OTTAWA, ON

## Somerset Street East

POPULATION: 883,000

### Context

Somerset Street is a fully built-out street with on-street parking on both sides. It serves residential and commercial neighborhoods. Somerset links downtown and the University of Ottawa with student-dominated neighborhoods to the east. Somerset Street connects to a new bike/pedestrian bridge spanning the Rideau River. The street experiences low volume.

### Problem Solved

The traffic ratio on this street is approximately 65% bicyclists and 35% motorists. The city wanted to support cycling but didn't want to change the two-way nature of the road or eliminate either parking lane.

Somerset is a key connection in the city's cycling network and it met their criteria for consideration of Advisory Bike Lanes. The Advisory Bike Lane design was a more affordable option than re-building the road and works well as an interim facility until the road is rebuilt.

### Public Outreach and Response

Public outreach occurred in two phases. The first phase included soliciting public input on preferred facility type (sharrows, bike lanes, or Advisory Bike Lanes). This phase consisted of an online survey as well as consultation with the neighborhood and the cycling advisory committee.

After the Advisory Bike Lane was chosen, a second phase of public education was instituted. The city employed a range of outreach methods including delivered flyers, a video on the city's website, public service announcements, an online media campaign, a print media campaign, and interviews on local news programs. Extensive media attention was paid to this project. Temporary signs diagramming its operation were placed at entries to the facility when it was first installed.

Some concerns around safety were expressed prior to installation but only one negative comment was received after installation.



FOR MORE INFORMATION: [OTTAWA.CA/EN/ADVISORYBIKELANES](http://OTTAWA.CA/EN/ADVISORYBIKELANES)

### Outcomes

No evaluation report was conducted but the city is encouraged by their positive experience so far. Because the new bridge makes bicycle trips to the university and downtown quicker than driving trips, they expect non-motorized volume to increase beyond the already-high levels. The city is planning to install another Advisory Bike Lane soon.

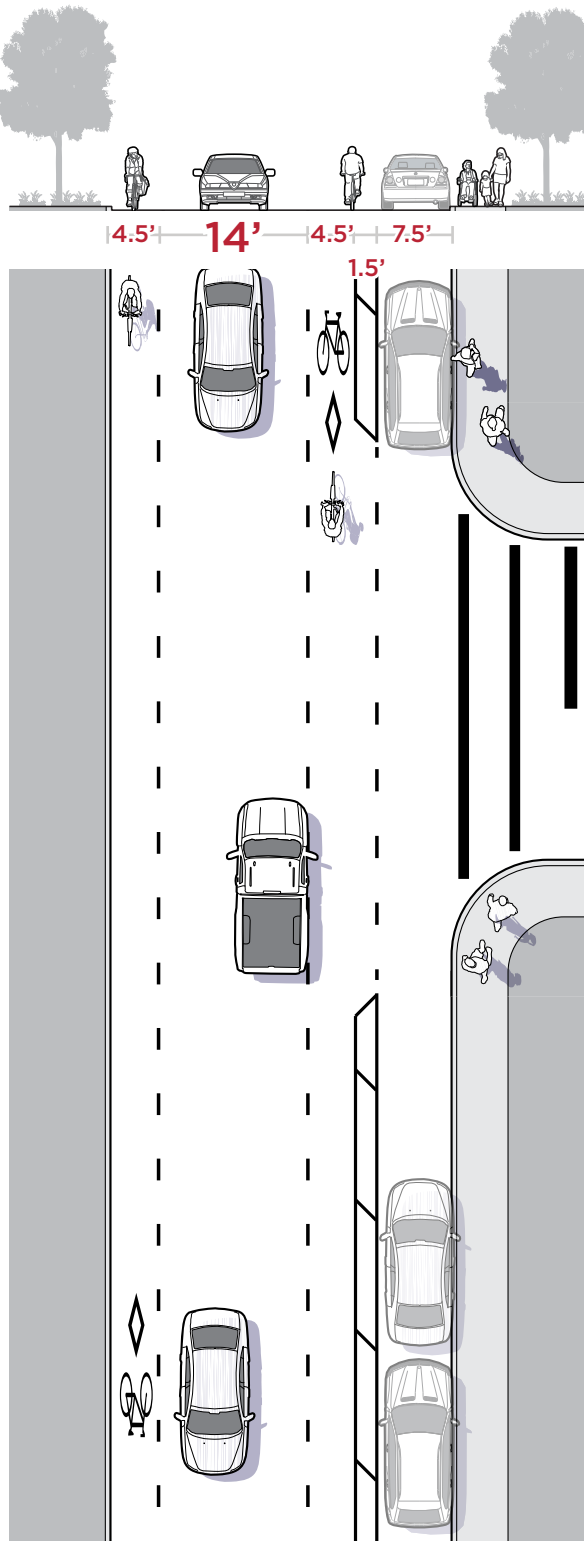
### Key Takeaways

- 1 The Advisory Bike Lane is working well as an interim solution until dedicated facilities are built.
- 2 Extensive outreach was considered critical for public acceptance.

# Ottawa, ON - Somerset Street East

## DIMENSIONS

Length: 1050 ft



## SPEED AND VOLUME

Speed: 25 MPH (40 kph)

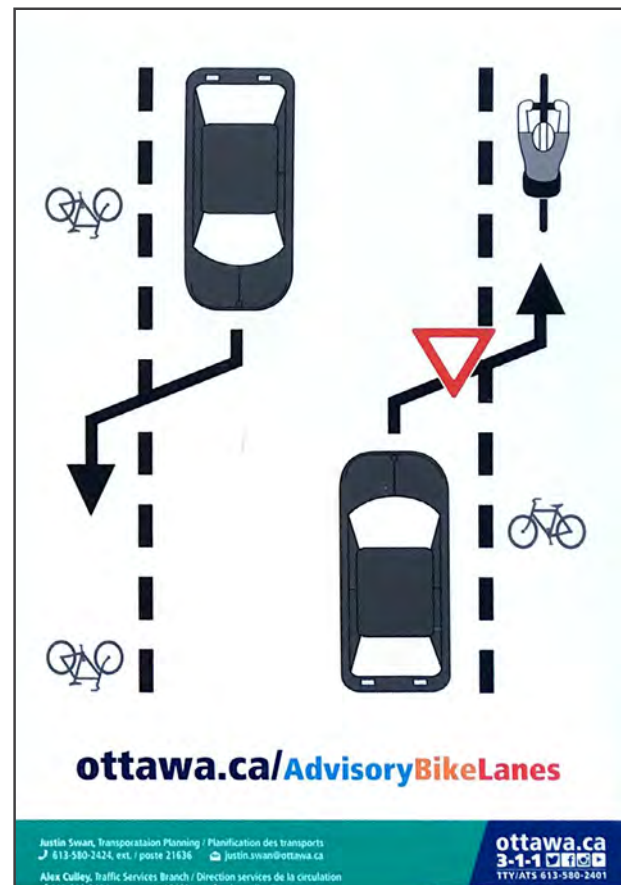
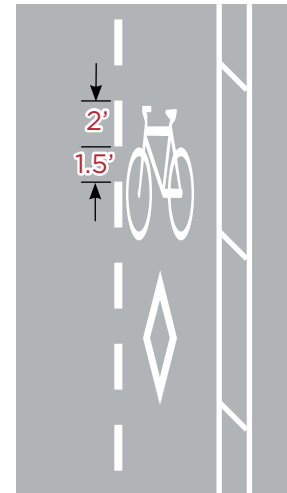
Motor Vehicle Volume:  
1,000 ADT

## SIGNS



Rb-69/Rb-169  
Bicycle Route (Ontario  
Traffic Manual)

## MARKINGS



EDUCATIONAL INFORMATION BOARD

# SANDPOINT, ID

POPULATION: 7,600

## Oak Street and Main Street

### Context

Sandpoint, ID sits on the western shore of Lake Pend Oreille. Oak Street merges with Main Street in the downtown area but they function as one street. Oak and Main is an east-west road which connects residential neighborhoods to the lake through a low-density commercial and retail area. The street is fully built-out with curb, gutter, and sidewalk on both sides. On-street parking exists on both sides.

### Problem Solved

The city wanted to create a safe route for a ten year old to travel from their home to the lake via bike. The final design for the street includes a separated bike lane. The Advisory Bike Lane is an interim treatment. Curb extensions and other traffic calming efforts have been installed on this street. In the downtown area, on-street parking is diagonal in two sections. In these segments, the Advisory Bike Lane is discontinued and replaced with conventional shared lane markings.

The city selected an Advisory Bike Lane treatment because it was considered infeasible to go below 11-foot-wide travel lanes and nine-foot-wide parking lanes, making dedicated bike lanes infeasible within the 48-foot curb-to-curb width.

### Public Outreach and Response

The only public involvement occurred during creation of the city's Downtown Streets Plan and Design Guide which showed the Advisory Bike Lane as an interim treatment on this street. No other public outreach or education took place.

Residents expressed some concern around safety before implementation. Most responses after installation consisted of complaints or confusion around whether the street had been converted to one-way travel or not.

### Outcomes

No evaluation of the facility is planned. After a two-to-three month period, there were no issues. The city considers the facility to be working as intended.



FOR MORE INFORMATION: [WWW.CITYOFSANDPOINT.COM/HOME/SHOWDOCUMENT?ID=414](http://WWW.CITYOFSANDPOINT.COM/HOME/SHOWDOCUMENT?ID=414)

### Key Takeaways

1

"It worked great; we'd do it again in a heartbeat."

-Bruce Robertson,  
Director of Public Works

2

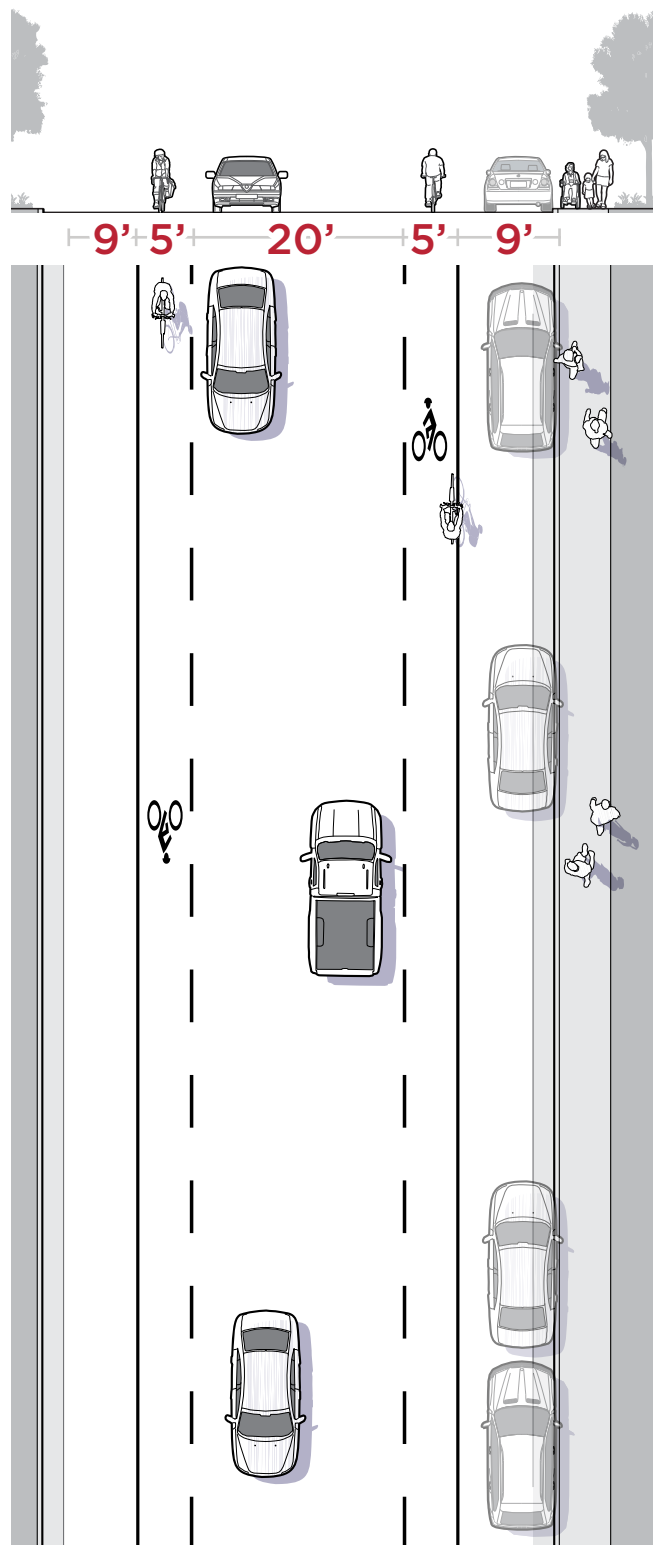
Allows installation of bike lanes on a street perceived as too narrow to support conventional bike lanes.



# Sandpoint, ID - Oak/Main streets

## DIMENSIONS

Length: 1365 ft



## SPEED AND VOLUME

Speed: 25 MPH

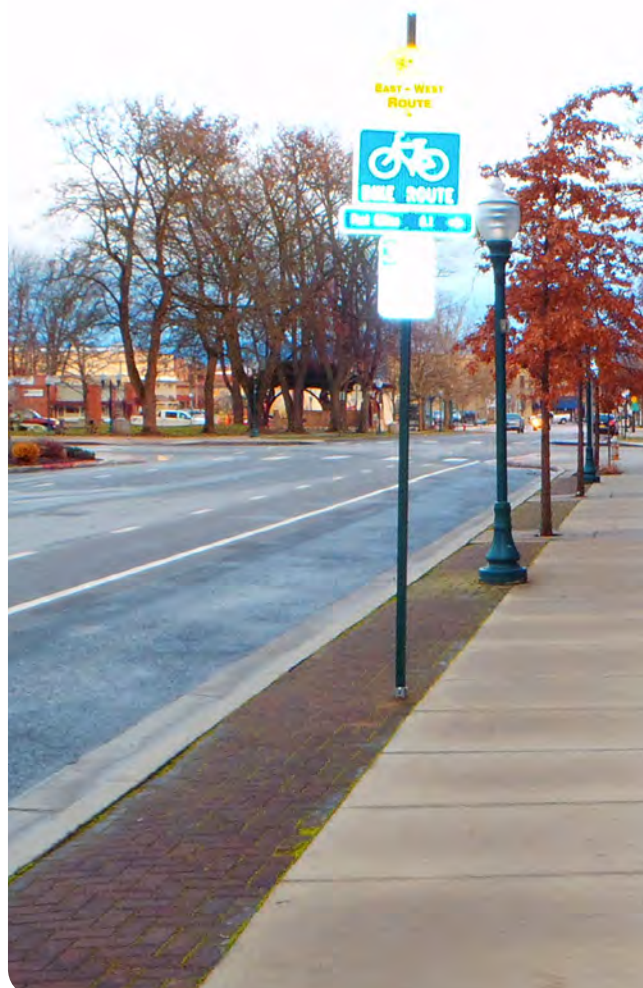
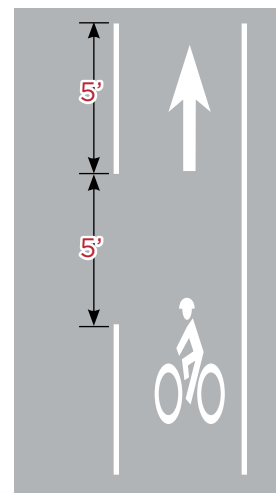
Motor Vehicle Volume:  
810 ADT

## SIGNS



D11-1

## MARKINGS







Ottawa, ON

PHOTO COURTESY OF JUSTIN SWAN, CITY OF OTTAWA



## 03 CONCLUSIONS

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Experience across North America has shown that Advisory Bike Lanes are a viable tool to provide for more comfortable bicycle-friendly travel streets while meeting appropriate criteria. Early-adopter cities have found the facility type to increase rates of bicycling, slow motor vehicle speeds, and help complete bikeway networks.

With at least 12 formal installations in North America (as of July 2017), engineers, planners, and designers are beginning to learn about important implementation considerations, geometric design implications, and unexpected challenges. It is the hope of this white paper that the consolidated information presented herein can better inform design decisions and that local jurisdictions can learn from these experiences as they plan for future implementations.

Based on informational interviews identified in these case studies, a few themes emerge:

### **Education can be important.**

As a new facility type, education efforts in the form of public outreach or signs may be important to clarify roadway operation. Some installations incurred a degree of confusion which hampered public acceptance.

### **Most installations are intuitive and self-explanatory.**

Some jurisdictions have installed Advisory Bike Lanes without any outreach, explanatory signage, or other specific public notification. These installations are reported to perform well, and observations of users indicate proper use of the facility.

### **On-street parking lanes, if present, should be highly utilized.**

Installation on streets with unoccupied and undefined parking lanes have a wide-open appearance, which creates ambiguity for users, and may create confusion. If parking is underutilized, consider reallocation of this space to establish dedicated bike lanes.

### **Narrow two-way travel lanes appear to function well.**

Two installations feature nine-foot wide two-way travel lanes and are functioning well. Wider bike lanes should be prioritized over wider two-way travel lanes. Designers should only widen the two-way travel lane after bicycle lanes have reached 6.5-feet in width, which allows for more comfortable bicycle travel.

### **The influence of colored pavement within Advisory Bike Lanes on user operations is uncertain.**

While one installation applied green intersection crossing markings, no installations to date include colored or contrasting pavement in the bike lane along the length of the corridor. Colored or contrasting pavement is a design feature found in many European installations, and it is unclear how effective or influential this effect might be for compliance, speed reduction, and user comfort.

### **Roadways which might make good candidates for Advisory Bike Lane facilities include those for which:**

- » Insufficient width is available for dedicated bike lanes due to on-street parking or narrow pavement cross-sections.
- » More extensive facilities are planned but not yet implementable.
- » Volumes and speeds span a range from conditions within which a bike boulevard is an option to those where volumes and speeds are too high for a comfortable shared lane experience.

### **Additional research will be helpful in expanding the body of knowledge and to inform future guidance from FHWA and other guiding agencies.**

Communities are encouraged to embrace the Advisory Bike Lane, conduct experiments, and contribute to the North American body of knowledge.



# Additional Case Study Take Aways

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## Overall

- » Advisory Bike Lanes are relatively new in the United States and Canada - all installations are less than six years old as of early 2017.
- » All facilities were deemed safe by their governing agencies.
- » All agencies either plan to install another Advisory Bike Lane or consider it a treatment available to them in the right circumstances.
- » Only six of twelve American facilities chose to participate in the FHWA experimentation process.
- » Snow removal, street sweeping, and maintenance activities are straightforward.

## Safety Experience

- » Only one crash is known to be explicitly associated with the Advisory Bike Lane treatment to date. This crash occurred on Wooddale Avenue in Edina, Minnesota. While moving aside for oncoming traffic, a driver struck a car legally parked in the parking lane. Per the police report, the driver “stated he was a little confused with the newly painted bike lanes”, though his maneuver suggests proper use of the road. Refer to the Edina, MN case study for details.

## Public Interaction

- » Public outreach and education can be crucial, especially if a street has a high community profile. Conversely, some projects have shown that drivers can use the facility safely without prior education. Some facilities generated little feedback despite low levels of public outreach.
- » In most cases, public concern peaks before the facility is installed. Most public concern disappears after a couple months.

## Planning and Design

- » All Advisory Bike Lanes are installed on streets with posted speed limits of 25 or 30 MPH.
- » All Advisory Bike Lanes have estimated or observed motor vehicle volumes ranging from 200 to 5,000 ADT.

- » All Advisory Bike Lanes are relatively short in length. Existing facilities range from 900-feet to 2,400-feet long.
- » Two-way travel lane widths ranged from nine-feet to 22-feet.
- » Neighboring land use tended to be residential. Two notable exceptions are East 14th in Minneapolis, MN which is heavily commercial, with up to 4,700 ADT and Oak and Main Streets in Sandpoint, ID which is entirely commercial.
- » Whether bike lane striping is dropped at, or continues through intersections varies between and within facilities. Little uniformity is exhibited with no observed performance difference.
- » Advisory Bike Lanes are used on streets with a wide-range of bike volume, but bike volume data was not available for many facilities.
- » Visual clues to street use are important. A common question among drivers new to the facility was whether the street was intended for one-way or two-way travel.
- » Signs do not appear to be critical to the success of a facility. Only three of twelve installations use a sign graphically diagramming operation of the road. Users appear able to use the road safely without custom signage.
- » Only one facility uses color in an intersection to delineate a conflict area.
- » Many agencies chose to implement Advisory Bike Lanes when available street width was insufficient for dedicated bike lanes and removal of parking lanes was not considered feasible.
- » Advisory Bike Lanes may have a speed reduction effect on motor vehicles. The City of Edina Final Evaluation Report 2014 showed an 85th percentile speed reduction of one to three MPH over traditional shared lane markings or no bike lane markings. Other evaluations included only small numbers of vehicles or short time periods.
- » No installed Advisory Bike Lanes address issues related to sight distance.

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# Acknowledgments

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## SPECIAL THANKS

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City of Cambridge, MA

Mark Nolan  
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Dave Kemp  
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## PHOTO CREDITS

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Edina, MN