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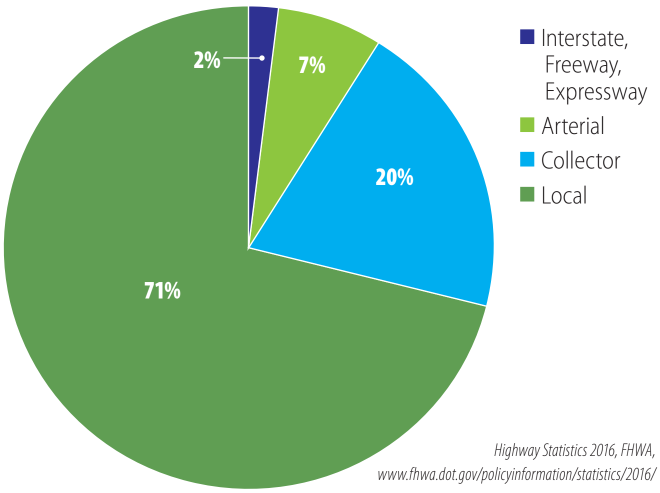
A New Type of Road for North America: Solving the Challenge of Non-Motorized Infrastructure with Advisory Bike Lanes

By Michael Williams

The North American road system is undergoing important changes, with one of the most significant being the move from designing streets primarily to support motor vehicle use to designing them to comfortably and safely support non-motorized modes as well. Collector and local roads make up approximately 90 percent of the U.S. road system. These are the roads that most people use every day. They are often good candidates for the addition of on-street pedestrian and bicycle infrastructure because they generally support lower volumes and speeds.

The Challenge

Bushell estimates the 2013 average cost of adding painted bike lanes at USD $133,170/mile and the addition of concrete sidewalk with curbs at $792,000/mile.[1] It isn't clear if the bike lane cost is for one or both sides of a road. The sidewalk cost is almost certainly for one side only and should be doubled for both sides of a road. Multiplying even a conservative portion of the 3,671,224 miles of collector and local roads in the United States with either or both of those figures yields a tremendous cost and implies decades of work.



The Federal Highway Administration's U.S. Road Miles by Functional Class pie chart shows that collector and local roads make up approximately 90 percent of the U.S. road system.

In addition to the usual obstacle of cost, many of these roads possess right-of-way or pavement width constraints that make the addition of non-motorized infrastructure physically difficult or prohibitively expensive. Political issues, such as the unwillingness to remove on-street parking, may also act as de-facto width constraints.

The Solution: A New Roadway Configuration

A new type of road is being seen in North America that addresses these issues of width and cost for non-motorized facilities. Despite it consisting of an entire roadway, this type of facility is commonly called an Advisory Bike Lane (ABL). ABLs allow the addition of bicycle and pedestrian infrastructure to roads that are too narrow for standard facilities or to roads unlikely to receive near-term funding for improvements. ABLs are applicable only to lower-speed, lower-volume, two-lane roads.

ABLs are defined as a road consisting of a single center lane which supports two-way motor vehicle travel and an edge lane on either side, preferentially intended for one-way bicycle and pedestrian use. ABLs do not possess a centerline, and the edge lanes are delimited by broken lines indicating a permissive condition. Motorists travel in the center lane until they need to pass an approaching vehicle. In order to pass, they merge into the edge lanes, after yielding to any non-motorized users there. After completing the passing movement, motorists return to the center lane.

This behavior may appear risky until one realizes that motorists regularly handle similar situations in their day-to-day driving. Slowing and/or negotiating for an opportunity to pass is common on residential streets narrowed by on-street parking, tight parking lots, roads narrowly plowed after a snowstorm, one-lane roads, and one-lane bridges, etc.

Experience in other countries has shown this type of road to be safe and effective. ABLs have been used for decades on thousands of road-kilometers in other countries such as Denmark and the Netherlands. A report presented at the 2013 International Transport Forum documented the presence of ABLs in 9 countries, with at least 3 countries using them since before 1970.[2]

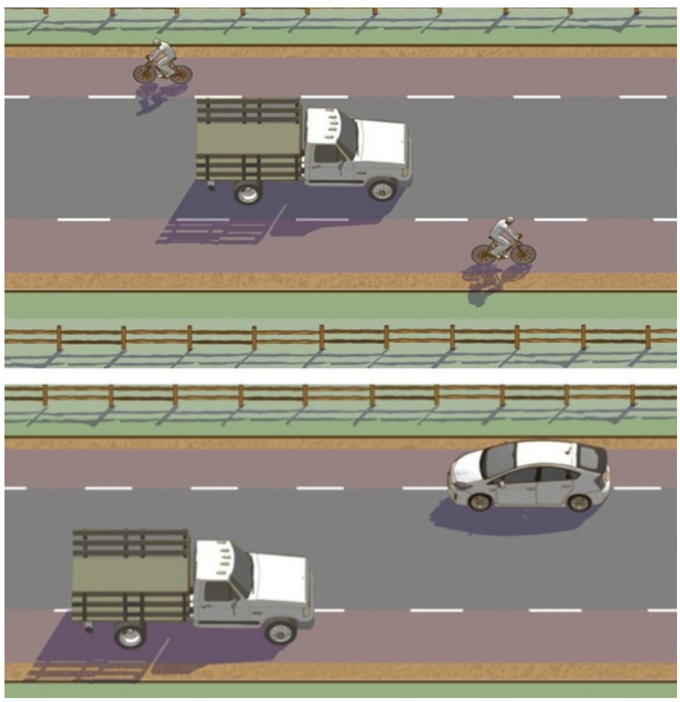
Advantages and Disadvantages of ABLs

ABLs offer significant benefits, such as:

ABLs provide facilities for cyclists and pedestrians on roads that may not receive them otherwise.

ABLs have a calming effect on vehicular speeds. The extent of this effect varies across studies.

ABLs allow flexible use of edge lanes. By allowing vehicular use of the edge lanes, the traditional zero-sum game wherein any road width allotted to non-motorized infrastructure is subtracted from vehicular space no longer applies. Within some limits, edge lanes



FHWA Small Town and Rural Multimodal Networks Guide

ABL Operation Example

can be as wide as desired. Edge lanes can be made wide enough to allow side-by-side travel for non-motorized users and allow safe passing by cyclists.

ABLs are cheap! Because ABLs consist almost entirely of pavement markings, their cost can be extremely low, especially if performed after surface work requiring re-striping.

ABLs reduce the maintenance costs of asphalt roads in two ways. First, by keeping vehicles away from the vulnerable edge, deterioration of that edge is reduced. Second, by allowing vehicles to take different routes as they travel down the road, rutting caused by vehicles traveling in constrained lanes is also reduced.

ABLs allow snow to be removed from both motorized and non-motorized facilities with a standard clearing of the road.

ABLs have been shown to be safe in the United States and throughout the world.

ABLs can provide space for alternate road users. A two-lane road without shoulders or sidewalks can be a threatening environment for a wheelchair user. ABLs can create a welcoming facility to wheelchair users as well as other users, e.g. personal mobility devices, skateboarders, etc. ABLs can address a little-known problem in Mennonite and Amish areas, where frequently used horse-drawn buggies are about six feet in width. A properly designed ABL would likely reduce the number of rear-end collisions these populations suffer.

There are also disadvantages to ABLs that can provide challenges, such as:

ABLs can be deceptive. They appear simple at first or even second glance but they are a unique road configuration with unique design needs. This can be, and has been, overlooked to the detriment of their users.

Some aspects of ABLs are legally ambiguous. While Figure 9C-6 of the *Manual on Uniform Traffic Control Devices* (MUTCD) includes details of a bike lane demarcated with a broken line as it approaches an intersection, it isn't clear what status the continuous edge lanes of an ABL occupy. Because they are part of the traveled way, they are not shoulders. Because vehicles can move into them as needed, they are not standard bike lanes. Despite providing a facility for pedestrians and other sidewalk-using populations, they are not sidewalks. Because non-motorized users have the right-of-way, they are not standard travel lanes. Despite sharing attributes of various facilities, they appear to be a unique entity.

ABLs are unknown to most road users. This creates a number of issues. First, it requires public outreach before installation. Of the installations the author surveyed, no ABL that prioritized public engagement before deployment encountered an adverse reaction.[3] And the only ABL to be removed was installed on a locally significant road with almost no prior public engagement. From the author's research, the rule of thumb was drawn that the amount of effort devoted to public education beforehand was inversely related to the extent of negative reaction after. Second, despite drivers being unfamiliar with the road, drivers were consistently observed behaving as needed across the range of installations. The design appears to be self-enforcing or, at least, self-encouraging. Third, public safety officials such as police, medical responders, and firemen need to be educated if an ABL is installed in their jurisdiction.

ABLs are largely unknown by transportation professionals. It is difficult to reap the benefits of a facility if practitioners are unaware of its existence.

Americans with Disabilities Act (ADA)/PROWAG guidance with respect to edge lanes is unclear. One problematic area is use of tactile walking surface indicators (TWSI). If one considers the edge lane to be a pedestrian facility, then a mechanism should be available to warn low-vision users if they attempt to move from the edge lane to the center lane. If the edge lanes are not considered pedestrian facilities, then nothing need be done. Some guidance strikes a compromise and recommends TWSI on the edge lanes at intersections. What normally occurs is that agencies choose not to designate the edge lanes as pedestrian facilities and avoid the issue altogether.

Domestic design guidance is, of necessity, based on little experience and takes few cues from international guidance. American guidance is less conservative in terms of vehicular volume and widths than international guidance based on decades of experience. This may indicate that future guidance will scale back current parameters. A more detailed discussion of the differences between international and domestic guidance is available at www.advisorybikelanes.com/design-guidance.html.

Design Guidance

The only existing piece of U.S. design guidance is the Advisory Shoulder treatment described in the Federal Highway Administration (FHWA) *Small Town and Rural Multimodal Networks* guide.[4] This document recommends siting ABLs on two-lane roads with less than 6,000 average daily traffic (ADT) and posted speeds of 35 miles per hour (mph) or less. While this guide was intended to provide solutions to the challenges of providing bicycle and pedestrian infrastructure in the rural environment, the bulk of North American ABL installations are in urban areas.

Domestic Examples

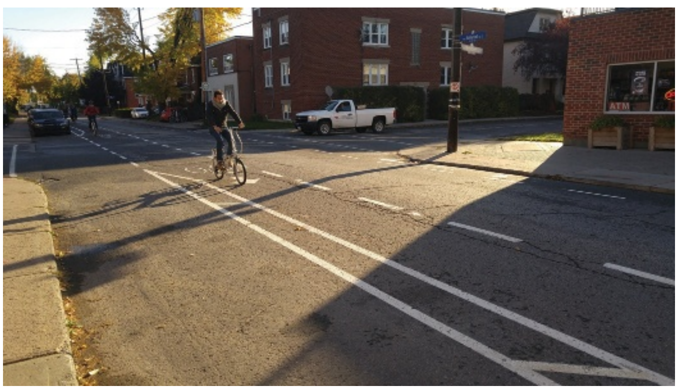
Depending on the exact definition of ABL used, there are at least 16 to 18 ABLs in the United States and two in Canada. Of these, at least five have conducted engineering-based studies and all have found their facilities to be safe. The eleven public agencies the author surveyed in "Lessons Learned: Advisory Bike Lanes in North America" were unanimous in their support for ABLs and would install another.[5]

Minneapolis, MN, USA lays claim to the first ABL in North America. Depending on the definition used, Minneapolis boasts three ABLs, the most of any North American city. Their ABLs are located in urban neighborhoods and experience some of the highest vehicular volumes in all of North America. One segment of the East 14th Street ABL was measured at 4,700 ADT. Simon Blenski, Transportation Planner for the City of Minneapolis, says "Advisory bike lanes allow us to provide a bikeway on corridors where conventional bike lanes do not fit. Compared to a shared lane design, advisory bike lanes more clearly give operational preference to people bicycling versus driving and greatly improves the cyclist's experience."

BIKEWALKMOVE.ORG

East 14th Street ABL in Minneapolis

Ottawa, ON, Canada is the home of the only full ABL in Canada. Somerset Street sees approximately 1,900 cyclists/day and 1,000 vehicles/day. The ABL on Somerset Street provides cycling facilities without removing on-street parking. The ABL is being used as an interim facility until the street is reconstructed. Ottawa plans to install more ABLs soon.



JUSTIN SWAN CITY OF OTTAWA

Somerset Street ABL in Ottawa, ON

An ABL installed in Hanover, NH, USA is the only facility in North America that acknowledges the edge lanes as a pedestrian facility. Hanover's Valley Road provides access to a neighborhood of single family homes on large lots. The road was used by a not-in-significant number of pedestrians and cyclists but lacked sidewalks and had problems with speeding vehicles. Residents opposed sidewalks believing their look was adverse to the rural character of their neighborhood. After striping the ABL, pedestrian and cyclist volumes went up, vehicular volume went down, and speeding issues decreased.

ERICA WYGONIK

Valley Road ABL in Hanover, NH

Lessons Learned

Some important points can be drawn from the ABLs that already exist. They are:

ABLs work in urban and rural environments. Unsurprisingly, what is true for other countries is also true here, i.e. ABLs work in both urban and rural environments. Despite being introduced as a rural solution, most current North American ABLs are located in urban environments.

Public outreach is important. ABLs are novel and unfamiliar. Neighbors and road users should be involved and educated before deployment to help ensure a successful project.

ABLs are intuitive. Even where ABLs have been installed with little or no public education, drivers are consistently observed using the road correctly.

On-street parking plays a role. If on-street parking exists, it should be well-used. Empty parking lanes can present an unfamiliar configuration of markings which may confuse some drivers. Additionally, the presence of parked vehicles confirms the two-way nature of the road.

Narrow center lanes work. Current FHWA guidance recommends a minimum center lane width of 10 feet and a preferred minimum width of 13.5 feet.[6] Two ABLs in Cambridge, MA have center lanes nine feet in width and Hanover, NH has a center lane of ten feet. These ABLs work well. The Netherlands, with more than forty years of experience with this road configuration, allows center lane widths down to 2.2 meters (7.2 feet).[7]

ABLs are safe. Five of the twelve facilities surveyed had professional engineering studies performed which found these installations safe. All agencies considered their ABLs safe and would consider using them again.

More research is needed. Dutch guidance addresses issues not yet raised in American guidance, such as the impact of bicycle volumes. And international guidance is markedly more conservative than our first effort. Research is needed to learn what is safe and comfortable in the North American context. A research needs statement was adopted by the Transportation Research Board in 2018, but funding has not yet been allocated.

Legal and Regulatory Issues

All of the components used to create an ABL exist in the MUTCD, but their combination as an ABL is regarded as an experimental treatment by FHWA. As such, FHWA recommends an agency follow the Request to Experiment (RTE) process. The RTE process provides greater liability protection to a jurisdiction should legal problems arise and it allows experience gained by jurisdictions on experimental treatments to be communicated to the federal level via the evaluative study required by the process. A short primer is available at advisorybikelanes.com, and a full explanation is documented at https://mutcd.fhwa.dot.gov/condexper.htm. Section 1A.10 of the MUTCD is also a good reference on this subject. The RTE process refers to them as dashed bike lanes, and specific information can be found at www.fhwa.dot.gov/environment/bicycle_pedestrian/guidance/mutcd/dashed_bike_lanes.cfm.

The ABL's legal status may be ambiguous, but this has not prevented their installation, and interest in this new facility is growing quickly. The passage of ABL-supportive laws would aid their acceptance and reduce ambiguity. A discussion of the legal issues surrounding ABLs isn't possible here but an analysis based on Oregon state law suggests areas which should be addressed.[8]

Learn More

ABLs have the potential to create pedestrian and bicycle infrastructure quickly and cheaply. They are applicable to hundreds of thousands, if not millions, of road-miles in North America. As it was for roundabouts in their early years, awareness and acceptance are likely the largest, near-term hurdles for ABLs. Training and education are critical to wider adoption. ABL-supportive legislation and ADA guidance would reduce uncertainty. Further study will support the development of future design guidance.

Those interested in learning more about ABLs and following their progress are encouraged to join the ABL email listserve at https://lists.coe.neu.edu/cgi-bin/mailman/listinfo/advisorybikelanes. The most complete source of material on ABLs is available at advisorybikelanes.com.

A two-part webinar series on ABLs is being produced by the Association of Pedestrian and Bicycle Professionals (APBP) and ITE. Part 1 is an hour-long APBP webinar that took place in August 2018 that touched on the major aspects of ABLs. Part 2 is a ninety-minute long ITE webinar scheduled for October 25, 2018. Part 2 will provide the opportunity to delve more deeply into the siting, design, and legal issues surrounding ABLs. Visit the ITE Learning Hub to register. Look for a follow-up article on ABLs in a 2019 issue of *ITE Journal*. **itej**

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Michael Williams *is principal of Michael Williams Company, a transportation consulting firm. He specializes in active transportation, roundabouts, road diets and traffic calming strategies. Michael has been involved both with the planning and design of active transportation facilities and public works construction management for more than 25 years. Michael advocates for, researches, and presents on Advisory Bike Lanes (ABLs) in an effort to increase awareness of this new facility. Michael's website, advisorybikelanes.com, is the most complete source of information on ABLs. In addition to fifteen years as a licensed public works general contractor, he holds three degrees and has been awarded more than ten patents. Michael is a member of the Association of Pedestrian and Bicycle Professionals and ITE.*