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Advisory Bike Lanes and Shoulders:

Current Status and Future Possibilities

By Michael Williams (M)

The road configuration commonly known as advisory bike lanes or advisory shoulders (referred to collectively as edge lane roads or ELRs in this article) was introduced to North America in 2010. ELRs provide facilities for bicyclists, pedestrians, and other vulnerable road users on lower volume streets. These facilities are not exclusive nor protected but are useful in many situations.

ELRs 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 reserved for one-way use by vulnerable road users. ELRs are not marked with a center line and the edge lanes are delineated by broken lines. Motorists travel in the center lane (as shown in Figure 1a) until they need to pass an approaching vehicle. In order to pass, they merge into the edge lanes after yielding to any users already present as shown in Figure 1b. After completing the passing movement, motorists return to the center lane.

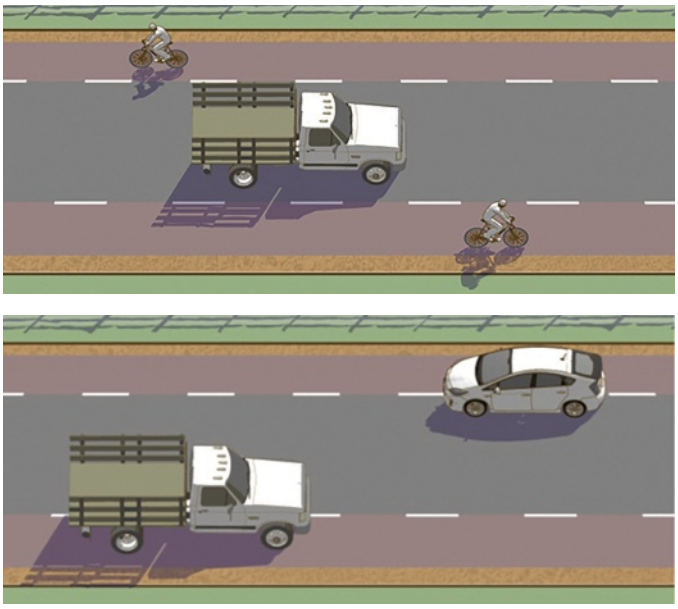

Figure 1a-b. ELR Operation from the FHWA Small Town and Rural Multimodal Networks Guide.

This article looks at the current state of ELRs in North America, states some conclusions from the author about their feasibility, and examines their future prospects. This article does not provide design guidance but does reference existing design guidance sources.

Progress in guidance and regulatory arenas

Advisory bike lanes first appeared in North American guidance in Appendix D of the Portland Bicycle Plan for 2030 titled *Bikeway Facility Design: Survey of Best Practices*, published January 5, 2010. The facility was introduced as advisory shoulders in the December 2016 *Small Town and Rural Multimodal Networks Guide* from the Federal Highway Administration.

The Bicycle Technical Committee of the National Committee for Uniform Traffic Control Devices (NCUTCD) convened a task force in January 2019 to recommend changes to the MUTCD (*Manual on Uniform Traffic Control Devices*) to support Advisory Bike Lanes. When these changes will appear in the MUTCD is unknown.

Advisory bike lanes were included in the February 2019 FHWA *Bikeway Selection Guide*.

The current draft of the next release of the *Bike Guide* from the American Association of State Highway and Transportation Officials (AASHTO) includes both the advisory bike lane and advisory shoulder treatments. These treatments consist of the same road configuration; the first primarily supports bicyclists and the second provides for pedestrians.

Advisory bike lanes are currently classified as an experimental treatment by the FHWA. The FHWA recommends use of the Request to Experiment (RTE) process for new installations.

Overview of Installed ELRs

An inventory of Canadian and American ELR installations provided on www.advisorybikelanes.com/more-info.html documented that at least thirty ELRs had been installed as of September 11, 2019. Because some ELRs were uncovered only by chance, the true number may be higher. This number does not include variants which possess only one edge lane or use non-standard pavement markings.

Two of the ELRs for which data are included below were removed after installation—Wooddale Avenue in Edina, MN, USA and Irving Street in Cambridge, MA, USA. The Edina facility was removed because of public opposition, likely due to the lack of public outreach and education prior to its installation (Mark Nolan, phone interview, 2016). The Cambridge facility was removed due to resident complaints of increased horn use which was assumed to indicate that some motorists believed the street to be one way only and honked at motorists traveling in the opposite direction (Patrick Baxter, e-mail messages, 2019).

The information presented below include data from six ELRs in Minneapolis, MN. This skews data towards that city's approach to ELR design and use. All of these data on installed ELRs presented below has been obtained through interviews with representatives of the responsible agencies.

Installations

Despite widespread use in other countries for decades,[1] ELRs are new to the United States and Canada. The first North American ELR is considered to be East 14th Street in Minneapolis, MN which was installed in September 2011. Figure 2 shows the installation of ELRs over the last few years. Data for 2019 only include the first five months.

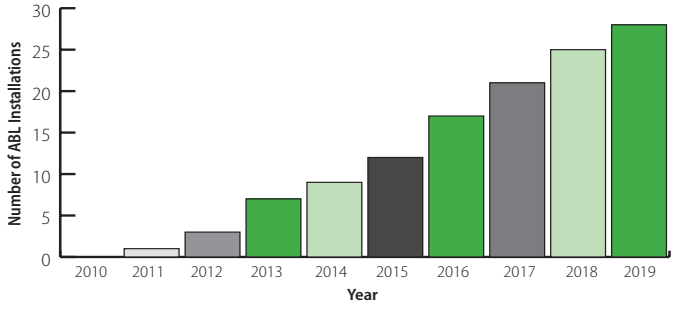

Figure 2. ELR installations over time.

Speed Limits

Most ELRs outside Minnesota are posted at 25 miles per hour (mph) (40 kilometers per hour [km/hr]). All of the 30 mph (48 km/hr) ELRs are located in Minnesota which has statutory speed limits of 30 mph on these types of streets. ELRs with multiple speed limits were included at the highest speed limit allowed. The ELR in Ottawa, Ontario, Canada is posted at 40 km/hr (25 mph) and is included in the data as 25 mph. Guidance allows ELRs to be used on streets with speeds up to 35 mph (56 km/hr), but no ELRs above 30 mph or 40 km/hr are known.[2]

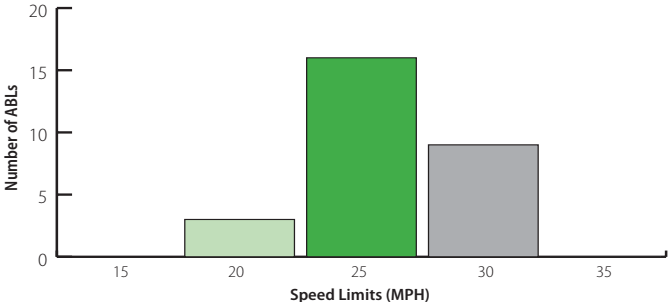

Figure 3. ELR speed limits.

Motor Vehicle Volumes

Vehicular volumes range from approximately 200 average daily traffic (ADT) to more than 5,000 ADT. Some of the following ADT numbers are estimates provided by city staff or calculated by multiplying peak hour volumes by 10. ELRs with multiple counts available were included at the highest measured volume. Guidance allows ELRs to be placed on streets with up to 6,000 ADT.[2]

This graph shows the use of ELRs at vehicular volumes approaching the 6,000 ADT limit.

Lengths

All existing North American ELRs are less than one-mile long. The most frequent role of an ELR is as a short connector between other pedestrian or bicycle facilities within a city's network. This is a result of one of their major advantages—the ability to provide facilities where sidewalks or standard bicycle lanes are not feasible due to lack of width. The short ELR listed for Yarmouth, ME consists of an installation over a bridge, which lacks sidewalks.

Lane Widths

The selection of lane widths for an ELR is an extensive process. The choices for lane widths are significant and will not be explored in detail here. Briefly, Dutch and Danish guidance suggest that some center lane widths can result in a less safe ELR.[3,4] This range of center lane widths is referred to as the "ambiguous zone," because it produces uncertainty in the motorist's mind whether the edge lane is needed when passing an approaching vehicle. The *Small Town and Rural Multimodal Networks* guide recommends center lane widths which fall within this ambiguous zone,[2] but the current draft of the American Association of State Highway and Transportation Officials (AASHTO) *Bike Guide* revises that recommendation. More information on this issue is available in the *ABL Design Guide* available at https://www.advisorybikelanes.com/design-guidance.html.

Figure 4 shows total ELR widths by summing twice the edge lane width and the center lane width. This shows how width was allocated in each installation. Where lane widths varied, the maximum values were used.

Underlying these lane width data are two inaccurate perceptions of ELRs. The first is the street width on which they are applicable and the second is the "Five-Foot-Bike-Lane" practice.

The total width of most ELRs lies at or below 30 feet (ft.) (9.1 meters [m]). The 30-ft. (9.1 m) upper limit results from the belief that standard bike lanes are always preferable to ELRs because they are a largely exclusive facility for bicycles. A road width of thirty feet is the minimum needed for a common configuration of two 10 ft. (3.04 m) travel lanes and two 5 ft. (1.5 m) bicycle lanes.

The accepted practice of providing 5 ft. (1.5 m) bicycle lanes results in ELR designs with 5 ft. (1.5 m)-wide edge lanes and the remainder of the street width allocated to the center lane. Because the entire road remains available to motorists, this approach is misguided. The opposite approach is more suitable, i.e. provide sufficient room for safe travel in the edge lanes first, with the remaining width used for

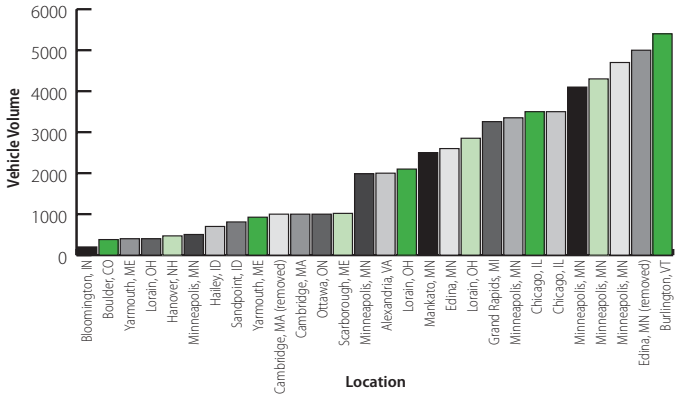

Figure 4. ELR traffic volumes.

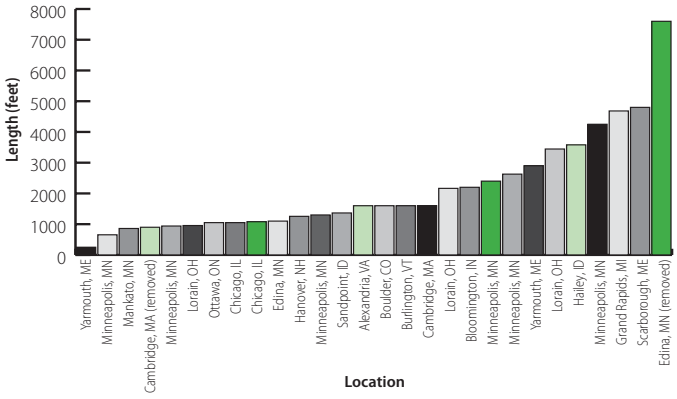

Figure 5. ELR Lengths.

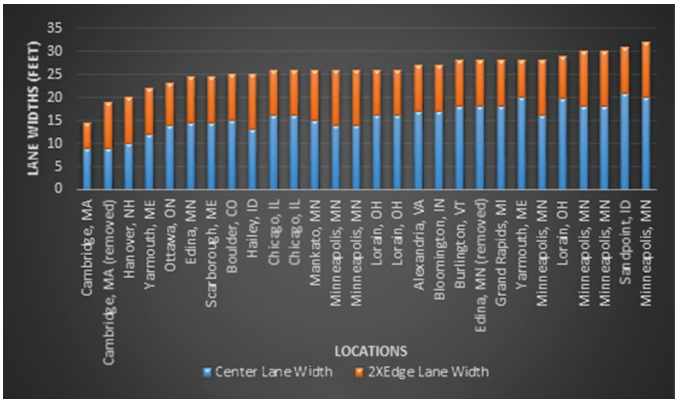

Figure 6. ELR lane widths.

the center lane. This provides the opportunity to create edge lanes wide enough to safely support side-by-side riding, bicycle-bicycle passing, and bicycle-pedestrian passing. Narrow center lanes also have the potential to induce traffic calming.

Use of the FHWA Request to Experiment Process

Of the 16 independent U.S. agencies which have installed ELRs, seven chose not to use the FHWA RTE process. Reasons for not using the RTE process vary. Some states have sovereign immunity laws which protect local agencies from legal attack; this nullifies the greatest benefit of an approved RTE application. Some agencies were unaware of the RTE process or the experimental status of ELRs.

The lack of awareness of the RTE process and ELR's experimental status may point to a need for more education in this area. There are a lack of data from ELRs installed outside this process.

A number of conversations with individuals across the nation have described significant resistance to the ELR concept due to its experimental status. Unfortunately, data is unavailable on the safety costs of facilities which are not installed.

Safety

One of the most common concerns with ELRs is their safety. Because 16 studies are often dismissed, only North American findings are presented here. Six North American installations have been studied and have results which are publicly available. A summary of these studies is shown in Table 1.

Generally, following the installation of an ELR the studies found:

- a reduction or no change in crash rate,
- a reduction or no change in motor vehicle speed,
- a reduction or no change in motor vehicle volume, and
- mixed results with respect to bicycle volume changes.

All of the agencies responsible for these studies concluded that the ELRs were safe and operating as intended. The five studies which evaluated horizontal distance between motor vehicles and bicycles during passing movements saw excellent results. All, or an overwhelming majority of, passing movements showed distances of more than 3 ft.

The most notable result of this collection of studies is the absence of problems which many fear when they consider the use of ELRs. These studies document no head-on vehicle collisions and no safety problems due to a misunderstanding of the road's operation.

Table 1. Summary of ELR evaluation studies.

ELR Study	Post-ELR Changes			
	Vehicle Speed	Vehicle Volume	Bicycle Volume	Crash Rate
Harvard Lane Boulder, CO, USA[5]	None	Decrease ?	Decrease ?	None
Lakeview Avenue Cambridge, MA, USA[6]	None	None	–	–
West 54th Street Edina, MN, USA[7]	1–3 mph (1.6–4.8 km/hr) reduction	–	–	None
Valley Road Hanover, NH, USA[8,9,10]	–	Decrease ?	Increase ?	None
Grant St/14th Street East Minneapolis, MN, USA[11]	None	Mixed ?	Mixed ?	Decrease
Somerset Street East Ottawa, ON, Canada[12]	5.2 percent reduction	–	–	–

? = Unclear if changes were statistically significant
– = Study did not address this issue or complete data was not available

If one multiplies each ELR's number of service days by its ADT and sums over all of the ELRs, we generate an estimate of 87.8 million vehicle trips on ELRs as of October 1, 2019. The lack of safety issues across a base of this size, with 60,500 vehicle trips being added every day, is a credible indicator that this road format works as well in North America as it does elsewhere in the world.

Future Application of ELRs

At this point, ELRs are primarily applied on streets too narrow for standard bike lanes in urban and suburban areas. But ELRs have the potential to provide benefits in other settings.

An Alternative to Door-Zone-Bicycle-Lanes

The view of ELRs as a mechanism for providing bicycle facilities only when road width is insufficient for standard bike lanes is inaccurate. In some situations, ELRs can provide greater horizontal separation between bicyclists and vehicles than standard bicycle lanes.

The accepted practice of placing standard bicycle lanes on roads between on-street parking and vehicle travel lanes provides little margin for error when vehicle doors, pedestrians, garbage cans, etc., occlude the bike lane, and force cyclists into the travel lane. These

are often referred to as door-zone-bicycle-lanes (DZBL) because an opened vehicle door can result in injury or death for bicyclists. In terms of horizontal separation, ELRs provide a superior alternative to DZBLs on two-lane roads with appropriate width, volumes, and speeds.

As an illustration, consider a road with parking lanes on both sides of the street and 32 ft. (9.7 m) of available width between parking lanes. This road would normally be configured with 11 ft. (3.35 m) travel and 5 ft. (1.5 m) bicycle lanes or 10 ft. (3.04 m) travel and 6 ft. (1.8 m) bicycle lanes. Figures 6 and 7 show this road configured with standard bicycle lanes and as an ELR, respectively. Figure 6 demonstrates that avoidance of the door zone puts the recommended AASHTO operating width for a bicyclist partially within the vehicular travel lane. With the road formatted as an ELR, one can provide a 3 ft. (.91 m) wide hatched area next to the parking lanes, 8 ft. (2.4 m) wide edge lanes, and a 10 ft. (3.04 m) center lane. The ELR configuration provides an additional 5 ft. (1.5 m) of clearance between moving motor vehicles and bicyclists, it provides an area reserved for streetside activities (pedestrians accessing parked vehicles, garbage cans, etc.), eliminates the dooring hazard, and provides an edge lane wide enough for side-by-side riding and comfortable bicycle-bicycle passing movements. In this case, an ELR provides greater separation for all road users than do standard bicycle lanes. Greater separation reduces stress, improves safety, and results in lower scores on the Level of Traffic Stress (LTS) scale.[13]

Rural Road Safety Improvements

ELRs have the potential to reduce the crash rate on low-volume rural roads with speeds above 35 mph (56 km/hr) even where bicycle and pedestrian facilities are a low priority. Rural roads are home to more than half of the crash fatalities in the United States.[14] Single-vehicle, roadway departure crashes make up more than half of all rural road crashes.[15] The rate of roadway departure crashes drops significantly when wider shoulders are provided.[16,17,18] Conversion of narrow, two-lane roads to ELRs provides wide shoulders at little cost which may significantly decrease the crash rates on these roads. High-speed, low-volume rural roads configured as ELRs are already successfully used in Great Britain and Australia.[19] The application of ELRs to this domain is being examined in research just begun by the author. More information on this concept is available at www.advisorybikelanes.com/rural-abl-project.html.

Conclusion

ELRs continue to gain acceptance and credibility in North America. All studies to date have shown them to be safe and effective at achieving their goals while maintaining or improving safety. In some situations, ELRs are arguably superior to standard bicycle lanes. With their low cost and ability to provide space for vulnerable road users, their use is likely to grow.

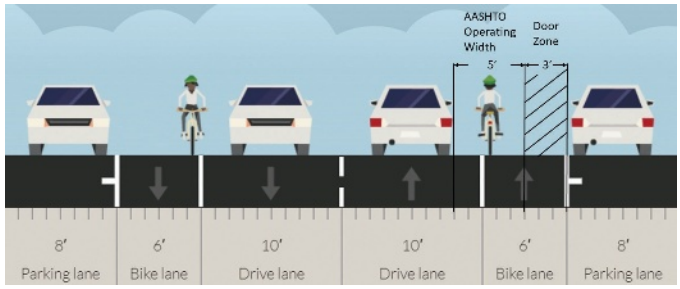

Figure 7. Door-Zone-Bicycle-Lane.

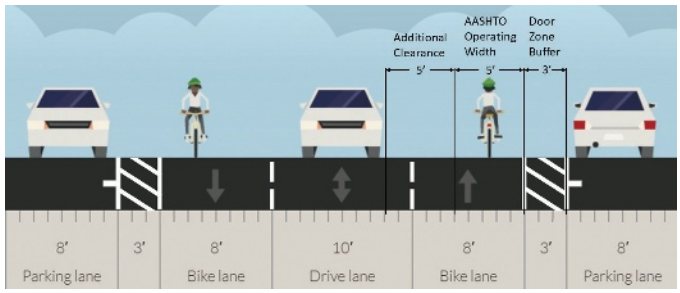

Figure 8. Edge lane road.

Those interested in learning more about ELRs should visit www.advisorybikelanes.com. Subscribing to the ELR email listserv at https://lists.coe.neu.edu/cgi-bin/mailman/listinfo/advisorybikelanes is a good way to keep abreast of new developments. If you know of an ELR that isn't listed in this article, please inform the author at bikepedx@gmail.com. **itej**

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