



Left-Turn Hardening



DESCRIPTION

- Left-turn hardening refers to the use of modular curbs, vertical delineators, and striping at intersections to reduce left-turning speeds and to prevent “corner cutting.”
- Common left-turn hardening strategies include:
 - Centerline hardening, which refers to the placement of modular curbs where the centerline meets the intersection, and
 - Slow turn wedges, which use striping and delineators at intersection corners to slow left-turning vehicles at intersections between two one-way streets.
- Left-turn hardening emphasizes the separation between travel directions, guides vehicles into the receiving lane, and reduces turning speeds, reducing the conflict zone between turning vehicles and people biking and walking.

CONTEXT

- Left-turn hardening is often installed at intersections where a minor street intersects with a major street, with the elements addressing left-turns from the minor street onto the major street.
- Slow turn wedges are often installed at intersections of two one-way streets.
- Left-turn hardening is especially useful at intersections with high volumes of pedestrians and where speeds of left-turning vehicles are an issue.

BENEFITS

- ✓ Improved safety
- ✓ Safer speeds



POLICY AND DESIGN GUIDANCE

- Hardened centerlines are installed in line with the centerline approaching an intersection and typically include modular curbs and vertical delineators. These elements may extend to the stop bar, to the crosswalk, or farther into the intersection.
- Slow turn wedges are installed at the corners of intersections in line with on-street parking and on the far side of crosswalks. They typically include pavement markings and vertical delineators.
- Left-turn hardening elements may be installed without vertical elements or with adjusted vertical elements to accommodate larger vehicles and/or sight lines.

RESOURCES

Treatment applications and general design guidance:

[NACTO](#)

Geometric design guidance for Virginia:

[VDOT Road Design Manual](#)

Pavement markings, signage, and spacing:

[VDOT 2016 Road and Bridge Standards](#)

Examples from other states and districts:

[NYC DOT](#)

[DDOT](#)

Guidelines are provided for informational purposes only. For detailed design guidance, please refer directly to design manuals and standards.

For more information on **Left-Turn Hardening** and other bicycle and pedestrian treatments, visit virginiadot.org/programs/bikeped/bicycle_and_pedestrian_treatments.asp

