Turn Lanes (1 of 2)

DESCRIPTION AND DEFINITION
A turn lane is an auxiliary lane designed to separate turning vehicles from through vehicles. Turn lanes serve two purposes: provide for deceleration of vehicles making turning movements, and provide storage for turning vehicles.

Bypass lanes on the right side are provided at unsignalized intersections on two-lane roadways to allow through moving vehicles to go around a stopped or turning vehicle. They are often considered for implementation instead of a left turn lane because of the reduced cost.

Turn Lane Types

- Example of Right Turn Lane

TYPICAL COSTS
Implementation Costs:
- Left turn lane = $100,000 to $300,000
- Right turn lane = $50,000 to $70,000
- Bypass lane = $65,000 to $75,000

SAFETY CHARACTERISTICS

Turn Lanes
Turn lanes are mitigation for rear end crashes. Left turn lanes, which provide shelter for turning vehicles, may encourage drivers to be more selective and wait for a gap in opposing traffic at unsignalized intersections.

INTERSECTIONS

INTERSECTIONS

DESCRIPTION AND DEFINITION
As discussed in the Intersection Treatments Practice Summary, the most severe type of crash is the right-angle crash at intersections. Because the turn lane does not address the most severe type of crashes, it should be considered a minor safety improvement or as only a mitigation for rear end crashes.

Bypass Lanes
A 1999 study of bypass lanes in Minnesota could not conclude that the use of the turn lane provided any greater degree of safety when compared to intersections without a bypass lane or left turn lane. However, studies completed in other states have found a decrease in rear end and left turn injury crashes with the implementation of bypass lanes.

PROVEN, TRIED, INEFFECTIVE, OR EXPERIMENTAL
- All studies in the FHWA Crash Reduction Clearinghouse documented crash reductions of 10 to 50 percent after installation of left and right turn lanes.
- NCHRP considers providing left and right turn lanes PROVEN safety strategies for reducing the frequency and severity of conflicts at unsignalized intersections.
- Bypass lanes are considered a TRIED strategy.

TYPICAL CHARACTERISTICS OF CANDIDATE LOCATIONS

Turn Lanes
Turn lanes are usually not appropriate on rural roadways with low volumes unless at an access to a high traffic generator site such as a commercial development. Turn lanes are mostly appropriate on urban or suburban city/county roadways.

Bypass Lanes
The difference in cost between the implementation of a left turn lane and a bypass lane makes the bypass lane more likely to be implemented on rural roadways with lower volumes. The 1999 study of bypass lanes in Minnesota cautioned the use of bypass lanes at four-legged intersections, citing the following findings:
- No overall crash frequency reduction (did not address rear end crashes)
- Use of the bypass lane impairs the visibility of left-turning vehicles to opposing through traffic.
Vehicles approaching on the cross street may be confused by use of the bypass lane for someone using it as a turn lane. MnDOT’s *Access Management Manual* now recommends that bypass lanes be used only on T-intersections. For bypass lane implementation purposes, intersections that have a private access as one approach are considered four-legged intersections.

**Example of an Off-Set Left Turn Design**

A new type of turn lane design on divided roadways is the Off-Set Left and Right Turn Lane. Advantages of this innovative design include the following:
- Improves left turn leaving gap acceptance
- Improves opposing traffic’s ability to observe left turn traffic
- Buffers left-turning traffic from through traffic, thus reducing conflicts

**DESIGN FEATURES**

The basic objective of a turn lane is to reasonably accommodate decelerating vehicles while providing storage. The design process involves first computing the expected demand, which is based on vehicle speeds and volume, and then determining the design side of the equation—how to distribute the available space in the corridor between the tapered and full-width parts of the turn lane.

**SOURCES**

- MnDOT Road Design Manual.

**BEST PRACTICE**

Turn lanes should be provided at all major intersections. Bypass lanes, if used, should be limited to T-intersections.
**POLICY PURPOSE/INTRODUCTION**

The purpose of this policy is to establish uniformity and consistency in the application, installation, and maintenance of turn lanes on <Insert Agency>'s roadway system.

**DEFINITIONS**

Turn Lane: A lane designated for slowing down and making a turn on a roadway so as to reduce disruption to through traffic.

**POLICY**

It is the policy of <Insert Agency> to provide turn lanes at all major traffic generators on two-lane, two-way roadways and divided highways when warranted under the terms in this policy. Turn lanes will be implemented as part of reconstruction projects and as part of traffic impact mitigation for commercial developments. Bypass lanes will only be considered at T-intersections when cost or right-of-way constraints limit the ability to implement turn lanes.

**POLICY CRITERIA**

Turn lane implementation will be determined based on two approaches: functional classification and operations analysis.

**Functional Classification**—One way to determine the need for turn lanes is based on the functional classification of the major street and the cross street or access. Higher functional classification connections (such as principal arterial to minor arterial) should have turn lanes with lower functional classification connections (for instance, local streets with private driveways) and would use a paved shoulder. The table below provides guidance for turn lane needs based on the functional classification of the intersecting roadways.

<table>
<thead>
<tr>
<th>Major Street Functional Classification</th>
<th>Cross Street Functional Classification</th>
<th>Private Driveway</th>
</tr>
</thead>
<tbody>
<tr>
<td>Principal Arterial</td>
<td>Principal Arterial</td>
<td>LTL (N.R)</td>
</tr>
<tr>
<td>Minor Arterial</td>
<td>Min LTL</td>
<td>Min LTL</td>
</tr>
<tr>
<td>Collector</td>
<td>Min LTL</td>
<td>Min LTL</td>
</tr>
<tr>
<td>Local Street</td>
<td>Min LTL</td>
<td>Min LTL</td>
</tr>
</tbody>
</table>

**Definitions:**

LTL = Left Turn Lane

Min LTL = Minimum Length Left Turn Lane (480 feet = 180 feet of taper + 300 feet of storage)

N.A. = Not Allowed

(N.R.) = Intersections of local streets with Principal Arterials are not recommended
**Operations Analysis**—Another way to determine the need for turn lanes is based on a traffic impact operational analysis. New development or redevelopment projects would complete an impact analysis to determine traffic operations on all adjacent roadways and assess the need for turn lanes based on operational impacts.

Some considerations when analyzing the need for turn lanes based on new development or redevelopment adjacent to <Insert Agency>’s roadway include:

- A developer should install right turn lanes on the <Insert Agency>’s roadways at its expense at all subdivisions and public roads, or at any entrance serving commercial or industrial property that is estimated to generate over 100 right turns per day.
- A left turn bypass lane may be required if warranted in MnDOT’s *Road Design Manual*.
- Turn lanes and/or bypass lanes may be required if other similar accesses along the same segment of the roadway already have turn lanes and/or bypass lanes.
- Turn lane lengths should be consistent with guidance provided in MnDOT’s *Design of Turn Lanes Guidelines* (July 2010), which includes length for both deceleration and necessary storage of queued vehicles.
- Turn lanes and bypass lanes shall be designed and constructed to <Insert Agency> standards.
- If turn lanes or bypass lanes cannot be constructed due to limitations in right-of-way, the developer will be required to pay an amount determined by the <Insert Agency> engineer, pursuant to state standards, to be adequate to cover the cost of such items.