

Figures 3-5 through 3-22 provide warrants for left-turn storage lanes on two-lane highways based on 5 to 30 percent left-turn volumes and design speeds of 40, 50, and 60 MPH. Additional storage length is required for 10 to 50 percent truck volumes. (Source: Highway Research Report, Number 211)*

NOTE: There are circumstances where a left turn lane may be needed even if the warrants are not met.

For example, intersections and entrances with poor visibility and/or a bad accident record may require the Engineer to use engineering judgment when volume conditions alone do not warrant a storage lane.

Additionally, the functional classification of the highway shall be considered so that the impact of turning movements on highways intended to serve through traffic is minimized.

Taper Lengths (L) - Lane/Pavement Transitions and Merging Tapers

Lane/pavement transitions and merging tapers typically occur where new or reconstructed roadways tie-in to existing roadways. Lane/pavement transitions and merging tapers shall meet the minimum length (L) provided by the following equations:

For 40 mph or less

$$L = S^2W \div 60$$

For 45 mph or greater

$$L = W \times S$$

L = length of transition

S = Design Speed

W = Width of offset on each side

Source: 2011 AASHTO Green Book, Page 3-134, Equations 3-37 & 3-38

Pavement transition is separate from the length of need for guardrail. Length of need and shoulder prep for guardrail shall be in accordance with the VDOT RDM Appendix A and the [Road & Bridge Standards](#).