

City of Concord
Technical Standards Manual

Article VIII
Traffic Impact Analysis (TIA)
Appendix C

Turn Lane Warrants



Dedication and construction of turn lanes may be needed to serve traffic from a proposed development.

Turn lanes must be provided for conditional uses, special uses, driveway permits, or subdivision approvals for developments proposing direct or indirect (i.e. adding accesses to existing dead end or limited access neighborhood/development street networks) access to two-lane public streets with average daily traffic (ADT) exceeding four thousand (4000) vehicles per day, or four-lane or larger public streets with ADT exceeding eight thousand (8,000) vehicles per day, if any one of the following conditions are also present:

1. Fifty (50) or more off-street parking spaces are required;
2. More than (100) trips during the peak hours of 7:00 a.m. and 9:00 a.m., 11:00 a.m. and 1:00 p.m., and 4:00 p.m. and 6:00 p.m. are generated. Data shall be based on the Institute of Transportation Engineers Manual titled “Trip Generation” and based upon the highest land use permitted by the zoning classification considering any restriction imposed by any conditional use permit, special use permit, or other legally enforceable restriction;
3. More than twenty-five (25) truck (more than 13,000 G.V.W.) trips per day through a single driveway are expected;
4. Special safety or traffic conditions exist due to limited sight distance, street grade, horizontal and vertical curvature, and/or crash history; or
5. At least fifty (50) residential dwelling units are served by the access point.

In addition to the criteria listed above, Tables C-1 and C-2 offer further guidance to warrant the installation of dedicated left or right turn lanes on streets throughout Concord. The NCDOT chart “Warrant Left and Right Turn Lanes” (pg. 80) in the NCDOT Policy On Street and Driveway Access recommends storage lengths for left and right turn lanes based on the number of turns versus the opposing volume of traffic. This chart should also be considered when determining if turn lanes are warranted and should be used as a basis for determining the storage length required for turn lanes into a site. The chart is included below. When warranted, the minimum storage and taper lengths for turn lanes is 100’, shorter lengths will only be considered for exceptional cases.

Turn lanes should be designed per NCDOT recommendations. Two charts (pages 78 and 79) outlining NCDOT recommended treatments for turn lanes included in the NCDOT Driveway Permit Manual are provided below for reference.

Note: Dual right- or left-turn lanes should be considered when the turning volume exceeds 300 vehicles per hour.

Right-Turn Lane Warrants					
Peak Hour Traffic Volume on the Roadway in Advancing Direction	Minimum Peak Hour Right-Turn Traffic Volume				
	# of thru lanes per direction				
	1		2		3
	< 45 MPH Posted Speed	≥ 45 MPH Posted Speed	< 45 MPH Posted Speed	≥ 45 MPH Posted Speed	All Speeds
≤ 200	-	-	-	-	-
201 - 300	-	30	-	-	-
301 - 400	-	19	-	55	-
401 - 500	85	14	-	30	-
501 - 600	58	12	140	25	-
601 - 700	27	9	80	18	-
701 - 800	20	8	53	15	-
801 - 900	12	7	40	12	-
901 - 1000	9	6	30	11	-
1001 - 1100	8	5	23	9	18
1101 - 1200	7	5	18	8	16
1201 - 1300	6	4	14	8	15
1301 - 1400	6	4	11	6	12
1400 +	5	3	8	6	10

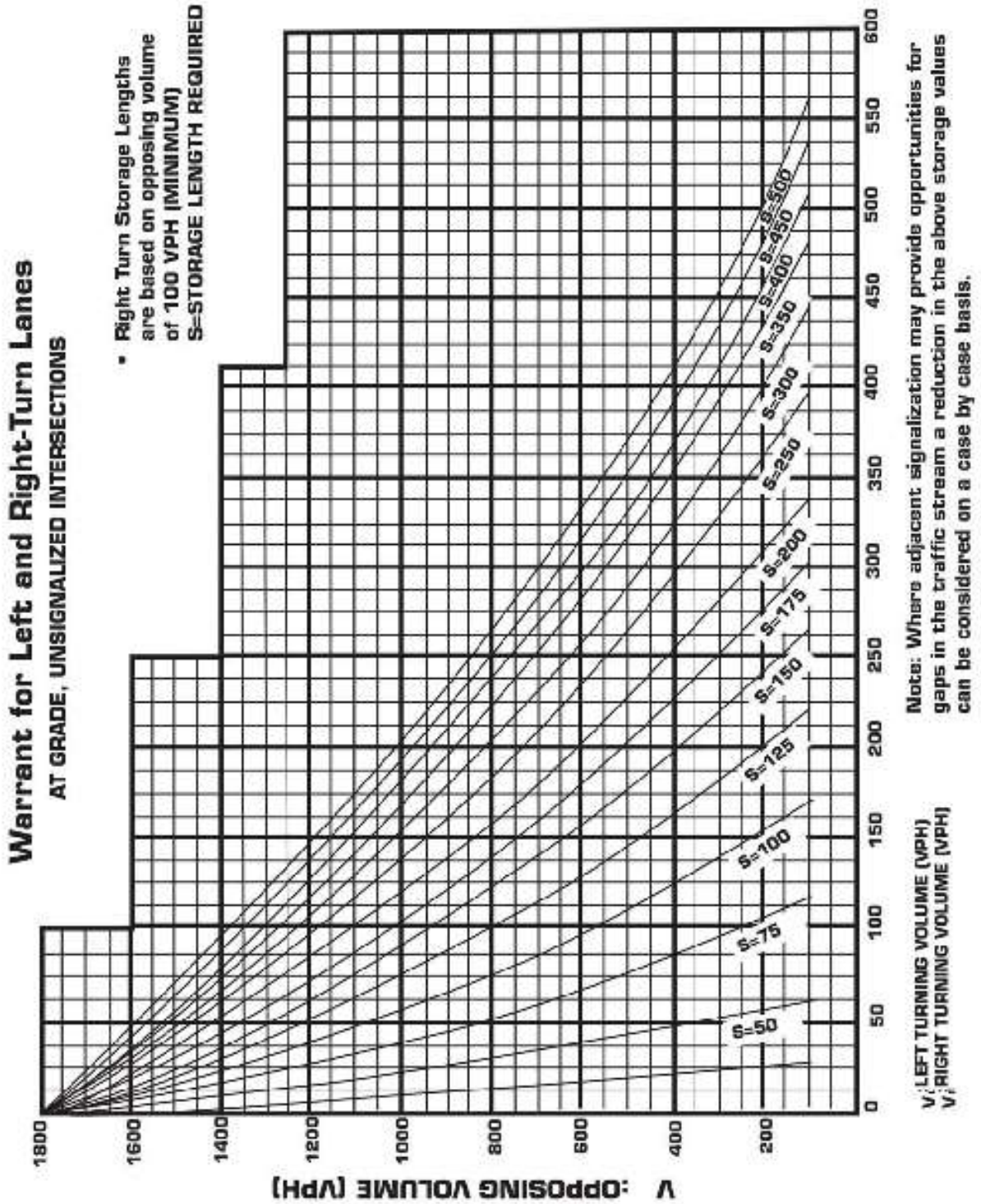
Table C-1

Left-Turn Lane Warrants				
Peak Hour Traffic Volume on the Roadway in Advancing Direction	Minimum Peak Hour Left-Turn Traffic Volume			
	# of thru lanes per direction			
	1		2 (Undivided)*	
	< 45 MPH Posted Speed	≥ 45 MPH Posted Speed	< 45 MPH Posted Speed	≥ 45 MPH Posted Speed
≤ 200	30	15	-	-
201 - 300	12	12	40	30
301 - 400	12	12	30	25
401 - 500	12	12	25	18
501 - 600	12	12	15	12
601 - 1000	12	12	10	8
1000 +	12	8	10	8

*On non-freeway divided highways, left-turn or U-turn lanes should be provided at median breaks.

Table C-2

Policy On Street And Driveway Access to North Carolina Highways



Policy On Street And Driveway Access to North Carolina Highways

Recommended Treatment for Turn Lanes	
Symmetrical Widening	
Design Speed (mph)	Approach / Departure Taper (A)
30	A = $WS^2/60$ (IF $S \leq 40$ MPH)
35	A = WS (IF $S > 40$ MPH)
40	S = Design Speed
45	W = Width of Lateral Shift
50	* Storage length for waiting vehicles should be calculated based on the latest version of the Highway Capacity Manual or Policy on Street and Driveway Access to North Carolina Highways.
55	
60	
Posted Speed (mph)	Bay Taper Length (T)
≤ 25	75'
30	75'
35	100'
40	100'
45	150'
50	150'
55	200'
60	200'
Minimum Deceleration Length (D)	Desirable Deceleration Length (D)
100'	150'
100'	150'
150'	200'
150'	250'
150'	300'
200'	500'
250'	575'

Policy On Street And Driveway Access to North Carolina Highways

