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Department Memorandum

Idaho Transportation Department

ITD 0500 (Rev. 07-17)
itd.idaho.gov

DATE: January 15, 2020

Program Number(s)

TO: District Traffic Engineers

Key Number(s)

FROM: Kevin Sablan
Design/Traffic Services

Program ID, County, Etc.

RE: Left-Turn Signal Phasing Guidance

The attached Left-Turn Phasing Guidelines flowchart developed for immediate use was recommended for adoption by the Traffic Discipline Team (November 21st Boise meeting) and presented to the Highway Leadership Team on January 8th.

After much literature review, ITD will adopt Exhibit 4-16 Left-Turn Phasing Guidelines (NCHRP Report 812 - Signal Timing Manual, Second Edition) in part. The flowchart provides a consistent evaluation procedure for left-turn signal phasing throughout the state highway system.

When implementing permitted left-turn phasing in conjunction with the pedestrian phase of the same movement, consider the use of a leading pedestrian interval (see MUTCD Section 4E.06) or inhibit the permitted left-turn phase during such time.

If crash and volume data indicate a particular left-turn phasing for a certain time of day, consider using only such left-turn phasing during that time.

The flowchart will be incorporated into the April 2020 Traffic Manual.

cc: COO, CE/HDA, HCOA, DEs, FHWA, HDMs, HCOMs, GARVEE, DEM2s, DTMs, DCMs, DOMs

ITD Left-Turn Phasing Guidelines

Has the critical number of protected left-turn-related crashes (C_{pt}) been equaled or exceed? See Table 1 below	YES	NO																		
Is the left-turn sight distance less than the minimum sight distance to oncoming vehicles (SD)? See Table 2 below.			YES	NO																
Can the sight restriction be removed by offsetting the opposing left-turn lanes?			NO	YES																
How many left-turn lanes are on the subject approach?			TWO OR MORE		LESS THAN TWO															
How many through lanes are on the opposing approach?			FOUR OR MORE		LESS THAN FOUR															
Are there fewer than three left-turning vehicles per cycle during the peak hour?					YES					NO										
How many through lanes are on the opposing approach?							ONE			TWO OR THREE										* DELAY DATA AVAILABLE
Is $V_{lt} \times V_o > 50,000$ during the peak hour?							YES	NO												
Is $V_{lt} \times V_o > 100,000$ during the peak hour?										YES	NO									
Is left-turn delay equal to: a) 2 vehicle hours or more and b) greater than 35 seconds per vehicle during the peak hour?													YES	NO						
Has the critical number of protected-permitted-left-turn-related crashes (C_{pp}) been equaled or exceed?					YES	NO	YES	NO	YES	NO	YES	NO	YES	NO						
Suggested Left-Turn Phasing	PROTECTED	PROTECTED	PROTECTED	PROTECTED	PROT-PERM	PERMITTED	PROT-PERM	PROT-PERM	PERMITTED	PROT-PERM	PROT-PERM	PERMITTED	PROT-PERM	PROT-PERM	PERMITTED	PROT-PERM	PROT-PERM	PERMITTED		

V_{lt} = Left-turn volume on subject approach (vehicles per hour)

V_o = Through plus right-turn volume on approach opposing subject left-turn movement (veh per hour)

Table 1: Left-Turn Related Crash Frequency

Number of Left-Turn Movements on Subject Road	Period during which Crashes Are Considered (Years)	Critical Left-Turn-Related Crash Count (Crashes Per Period)	
		When Considering Protected-Only (C_{pt})	When Considering Protected-Permitted (C_{pp})
One	1	6	4
	2	11	6
	3	14	7
Two	1	11	6
	2	18	9
	3	26	13

Table 2: Minimum Sight Distance

Oncoming Traffic Speed Limit (Miles Per Hour)	Minimum Sight Distance to Oncoming Vehicles (SD) (Feet)
25	200
30	240
35	280
40	320
45	360
50	400
55	440
60	480

Source: Adapted from the NCHRP Report 812, Signal Timing Manual 2nd Edition

* The left-turn delay referred to in the flowchart is the delay incurred when no left-turn phase is provided (i.e., the left-turn movement operates in the permitted mode).