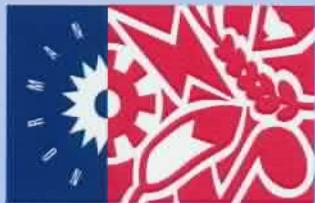


## Citizen Concern

The City of Norman takes the role of solving traffic problems very seriously, yet the ultimate burden of safety rests with you, the motorist in Norman. Since we receive numerous requests from citizens every year, we cannot always investigate your request as quickly as we would like. However, we will respond after carefully evaluating your request, typically within 45 to 60 days.

*We appreciate your patience and understanding.*



## Why Not Use Protected/Permissive Phasing Everywhere?

The City will use protected/permissive left-turn signals where drivers can turn left safely because there are gaps in approaching traffic and drivers can clearly see oncoming vehicles.

In order to provide for good signal coordination, protected/permissive signals will not be available at all intersections. Special left-turn sequencing is used to improve signal coordination and provide smooth through traffic flow at selected intersections.

At these locations, one left-turn arrow comes up at the beginning of green and the opposing left-turn arrow comes up at the end of the green. Therefore, protected/permissive operation would be dangerous for drivers.

There are some intersections where the City could install protected/permissive left-turns. However, this might require a longer mast arm and installation of new traffic signal heads which may not be in the current budget. The City may use protected/permissive signals wherever possible as traffic signals are modernized and new signals are installed at locations meeting the recommended criteria in the future.

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## TRAFFIC SIGNAL PHASING OPTIONS FOR LEFT-TURNS



OR



**CITY OF NORMAN  
PUBLIC WORKS  
DEPARTMENT  
TRAFFIC CONTROL DIVISION**

## Protected Left-Turns

### What is it?

A protected left-turn signal provides the motorists a period of time where left-turns can be made without encountering conflicting vehicular and pedestrian movements.

### When are they used?

- When left-turns are permitted from two lanes on one approach and there is an opposing through movement
- When the left-turn traffic queue frequently extends beyond the left-turn lane, thus blocking the through movement
- When a significant left-turn volume is present during peak traffic hours
- When intersection geometry creates a visibility problem which may be alleviated by a left-turn phase
- Where the speed of approaching traffic is sufficiently high to make driver judgment of gaps difficult

### What are the issues?

Motorists naturally feel a higher degree of safety making a left-turn with an arrow. However, in many cases, the turning capacity provided by gaps in oncoming traffic plus the yellow signal phase can safely accommodate left-turns at an intersection.

The careful design of a phasing plan for a signalized intersection is essential to its safe and efficient operation. Unwarranted signal phases create undesirable effects in terms of stops, vehicular delay, and increased fuel consumption.

## Protected/Permissive Left-Turns

### How does it work?

The preferred method for accommodating protected/permissive left-turns is with the use of a four-section signal head with a flashing yellow arrow. The protected portion of the left-turn is executed on a solid green arrow with the permitted portion of the left-turn executed on a flashing yellow arrow. Nationwide research efforts suggest that the flashing yellow arrow is more clearly understood for left-turn movements than is the solid green ball. The use of the flashing yellow arrow is reserved for those locations where exclusive left-turn lanes exist. At those locations where left-turn movements are executed from lanes share with through movements, the more traditional five-section left-turn head, capable of displaying a solid green arrow, a solid green ball, or both will continue to be used for protected/permissive left-turn phasing at these types of intersections. Clearance indications continue to be displayed with a combination of solid yellow arrows, solid yellow balls, and red indications.

### What are the advantages?

The advantages of this operation when compared to protected only phasing are:

- Reduces delays, as left-turn drivers may have an opportunity to make their left-turns during the green interval
- Allows the use of shorter cycle lengths in coordinated systems by reducing the time of the fully protected green interval for the left-turn movement
- Less chance of disturbing traffic in adjacent lane as left-turn queues are less likely to exceed the length of the left-turn lane

## What is the Best Alternative for Left-Turn Signal Phasing?

Either signal phasing option can accommodate left-turn movements, and both has its place. The objective is to delay the usually heavier through traffic as little as possible while serving left-turn movements promptly and safely. The phasing of left-turn movements will always require engineering judgment because the provision for left-turn signal green time detracts from through traffic green time, and this requires balancing between signal phases for the total intersection.

Typical data, which will help determine the best option for left-turn phasing, are:

- Left-turn volumes (hourly during the peak hour)
- Cycle length (total of all phases)
- Opposing through traffic during the peak hour of highest left-turn demand
- Number of opposing traffic lanes
- Speed of opposing traffic
- Available sight distance
- Crash history, including left-turn crashes

Additionally, a time-space diagram showing progression for adjacent signal installations should be reviewed.



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