

*Flashing Yellow Arrow  
for Permissive Left  
Turn Movements*

Jeff Green

Senior Traffic Engineer

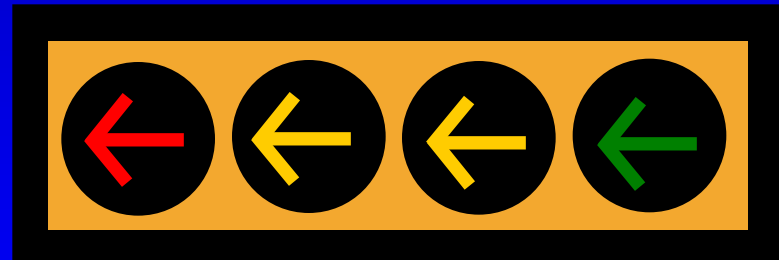
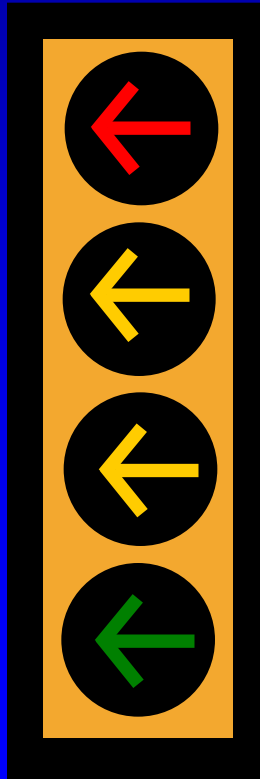
City of Plano, Texas



What is this flashing  
yellow arrow concept?

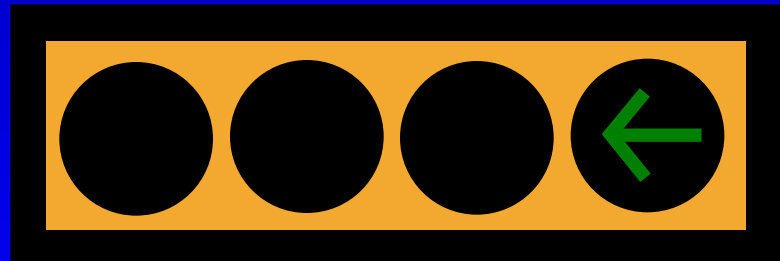
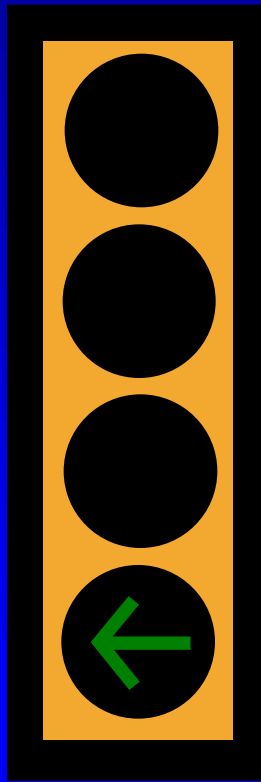
The use of a flashing yellow arrow (FYA) instead of a circular green signal display for a permissive left turn movement

# 4-section protected/permissive separate left turn signal head examples

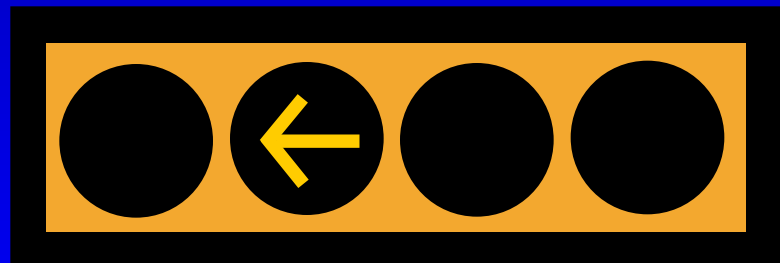
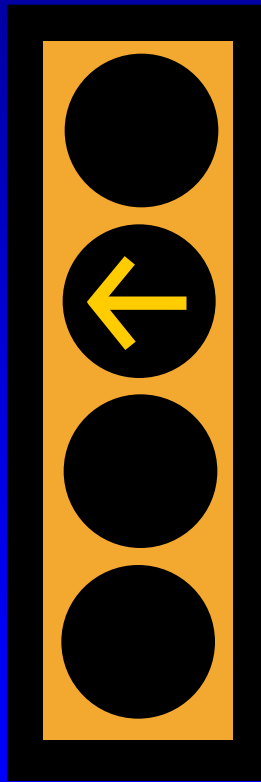


Following is a typical  
sequence for a leading  
protected/permissive  
left turn

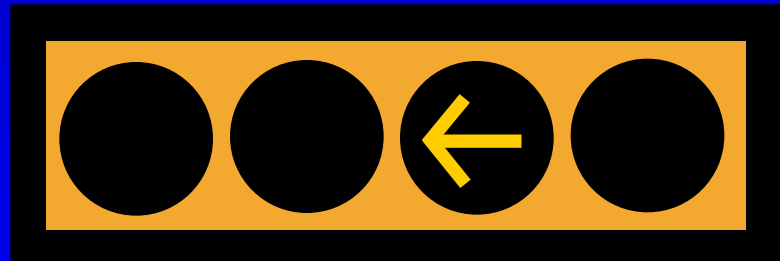
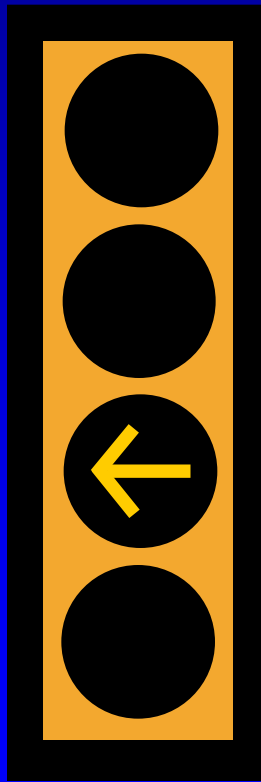
# Protected left turn movement



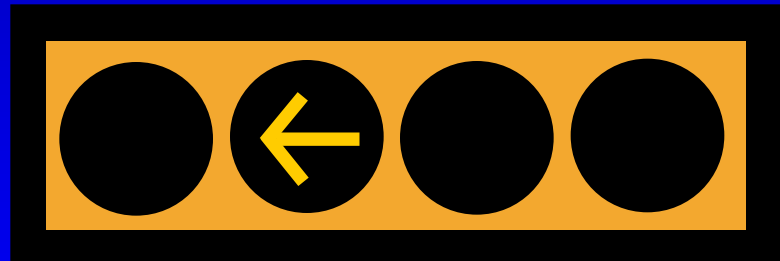
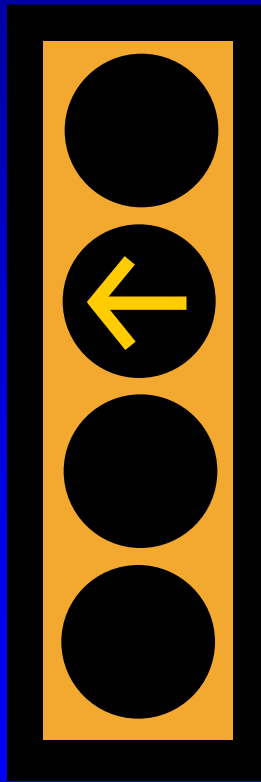
# Protected left turn clearance



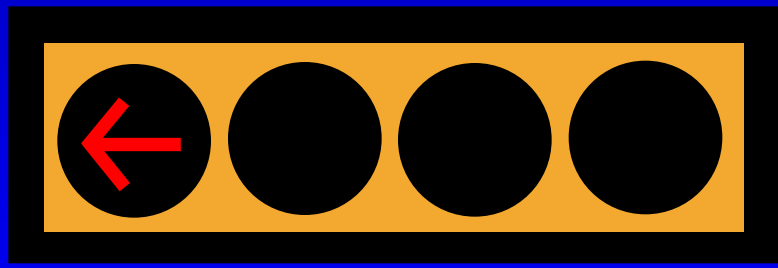
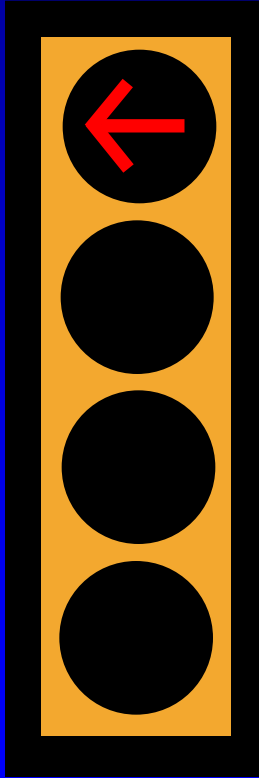
# Permissive left turn movement



# Permissive left turn clearance



# Red interval



# How does the FYA relate to "Dallas phasing" and the yellow trap?

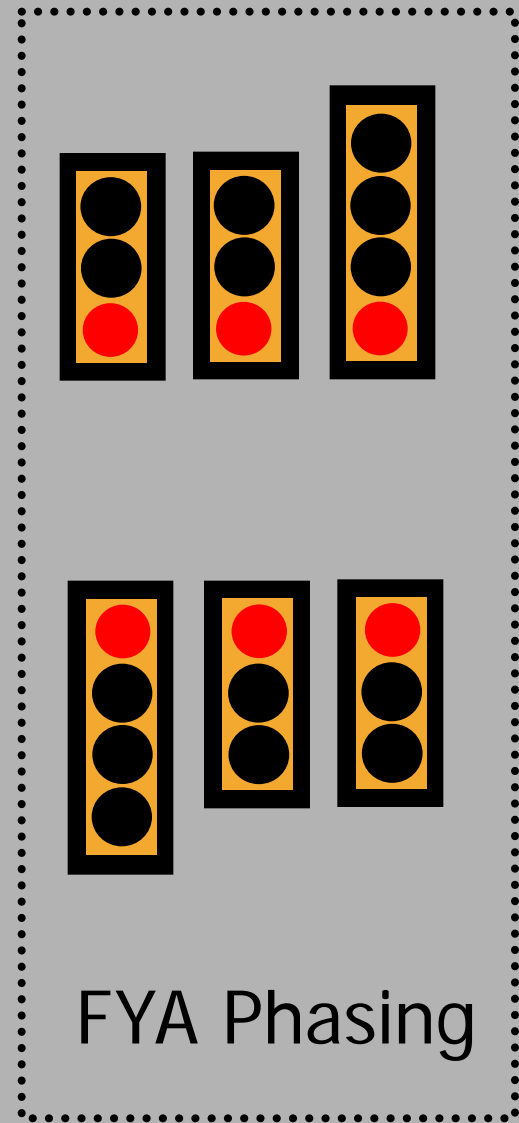
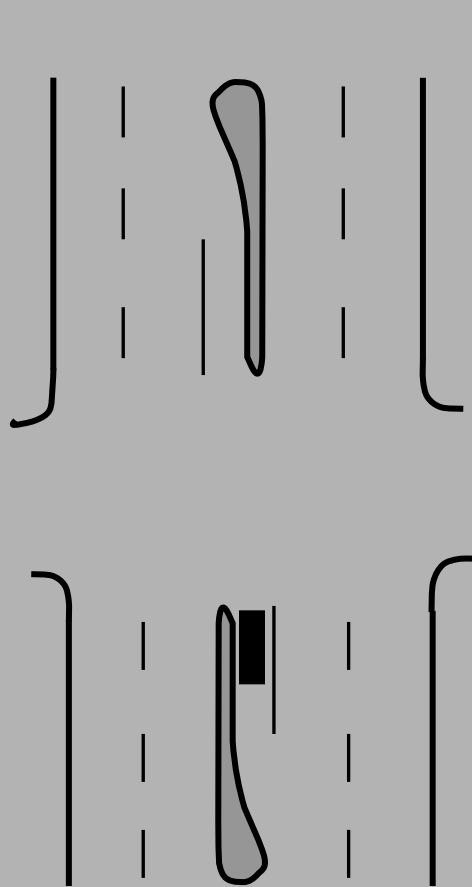
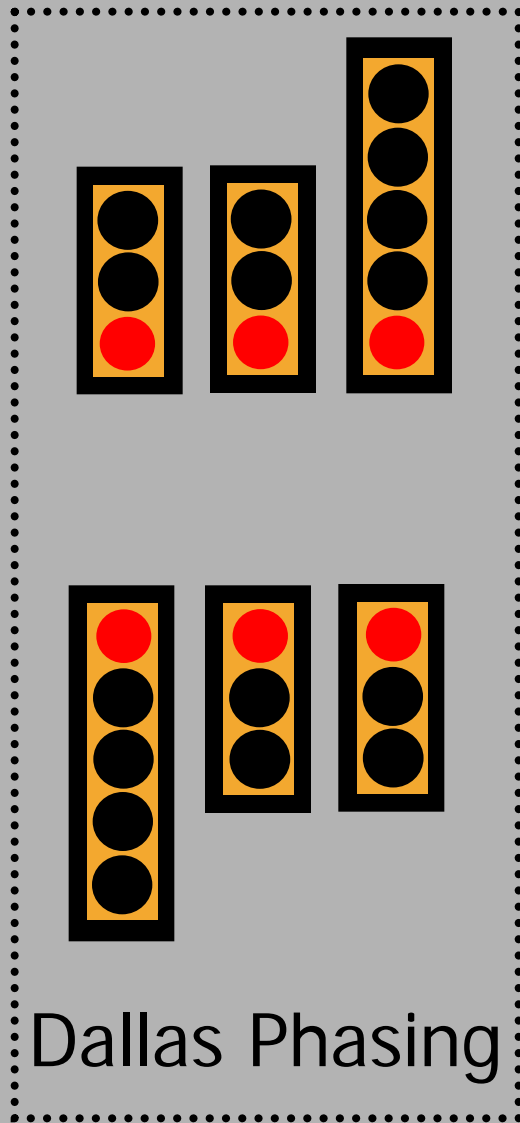
- Can be used to provide lead/lag protected/permissive left turns without displaying a yellow trap

# Note -

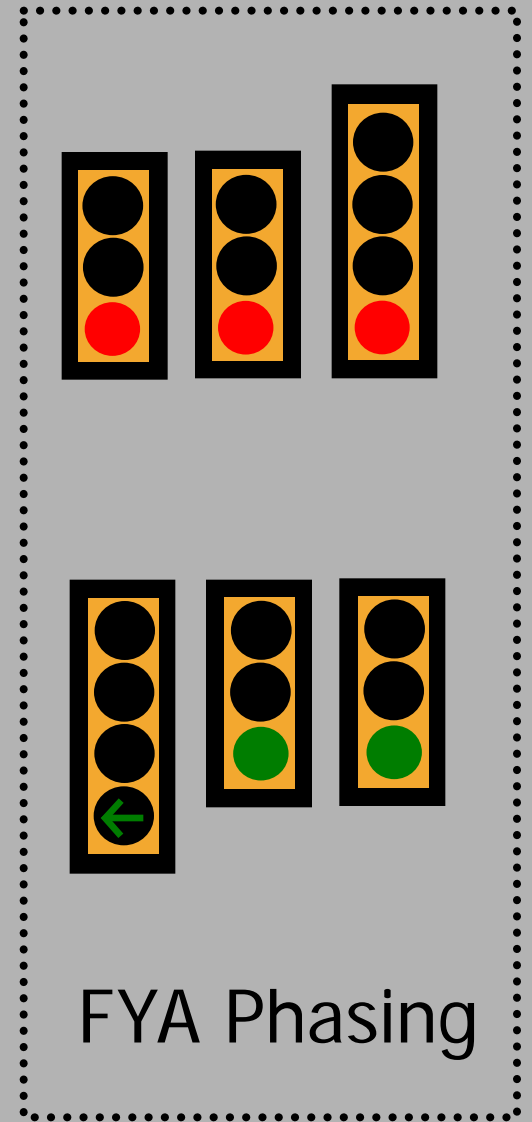
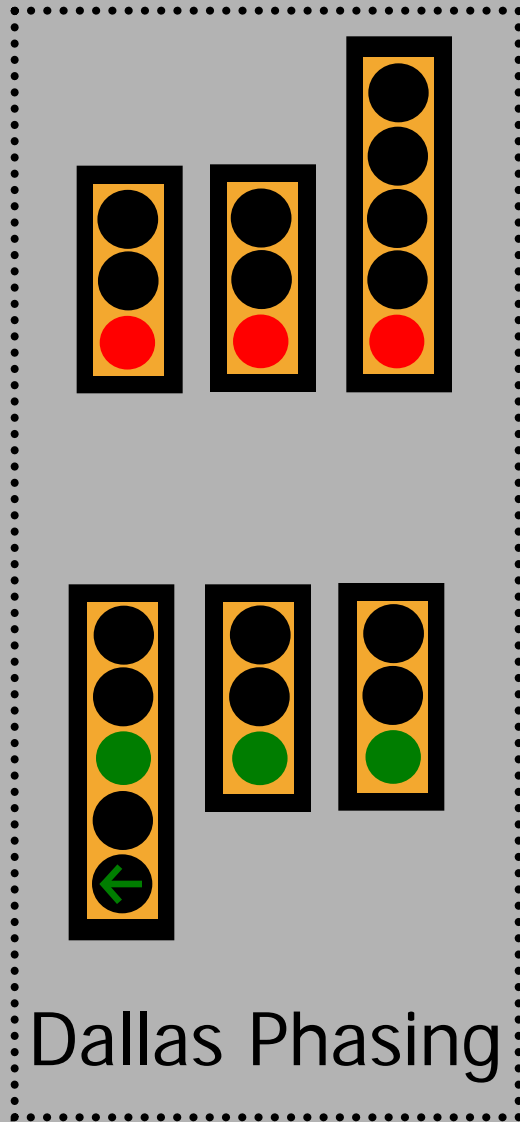
- The display of a yellow trap is not prohibited by the MUTCD nor is there guidance recommending against the display
- New text was included in the 2003 MUTCD requiring a warning sign if a yellow trap is displayed either on a cycle-by-cycle basis or only occasionally (Section 2C.39)

*Let's look at one  
lead/lag protected/permissive  
signal sequence  
Using a flashing yellow arrow  
versus Dallas phasing*

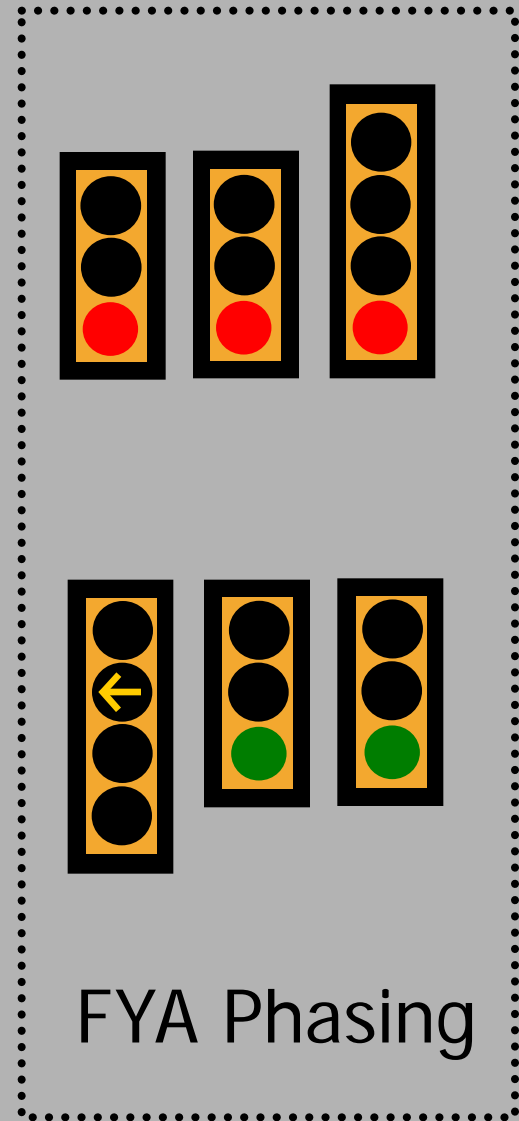
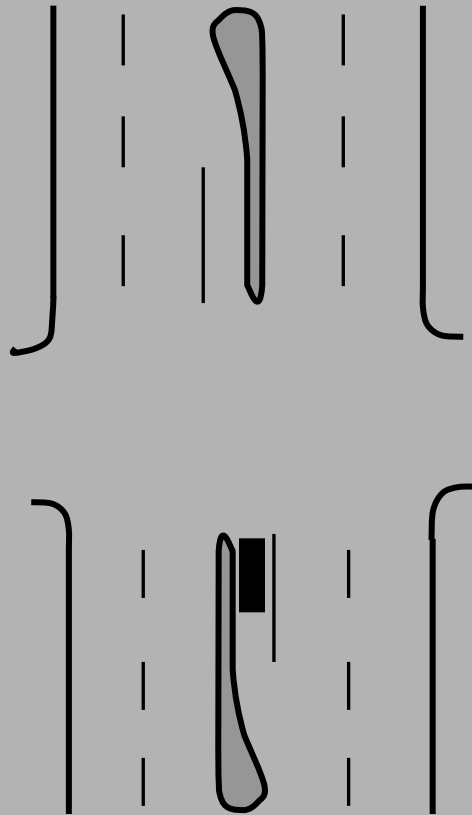
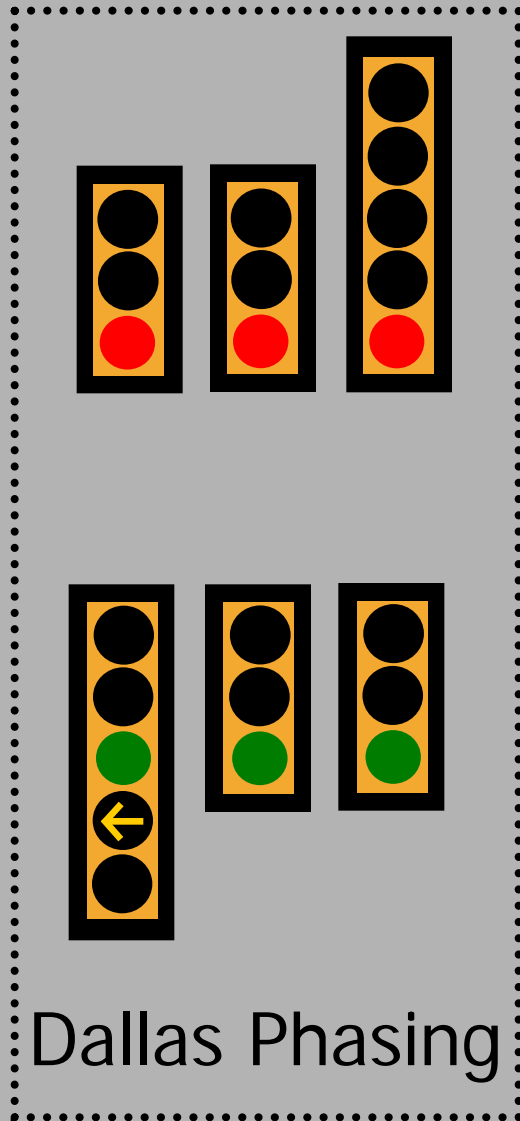
# Cross street phases – red on major street



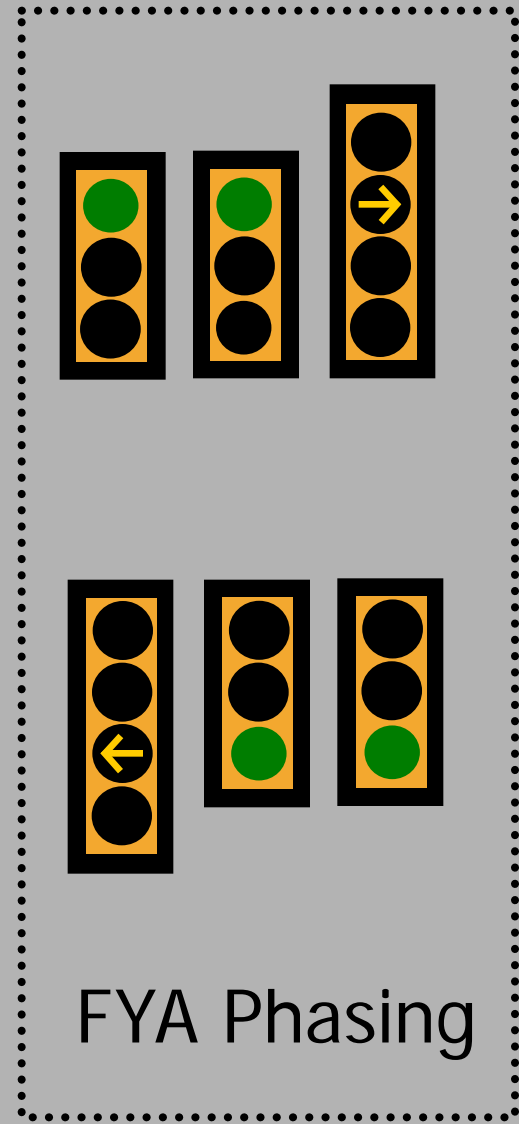
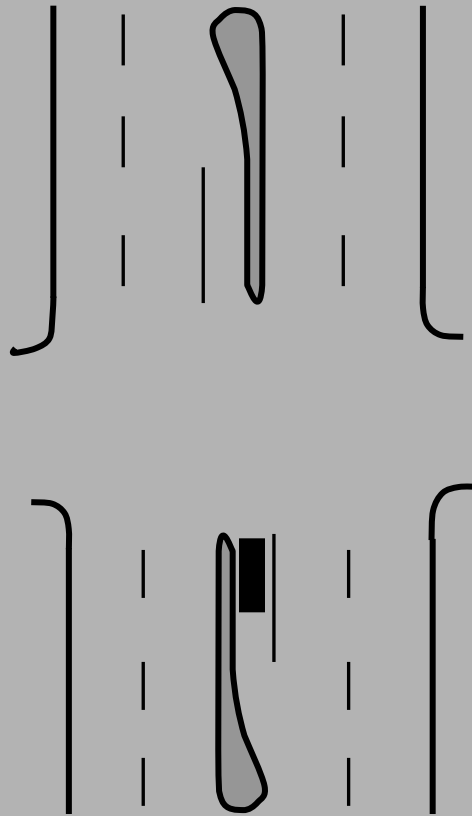
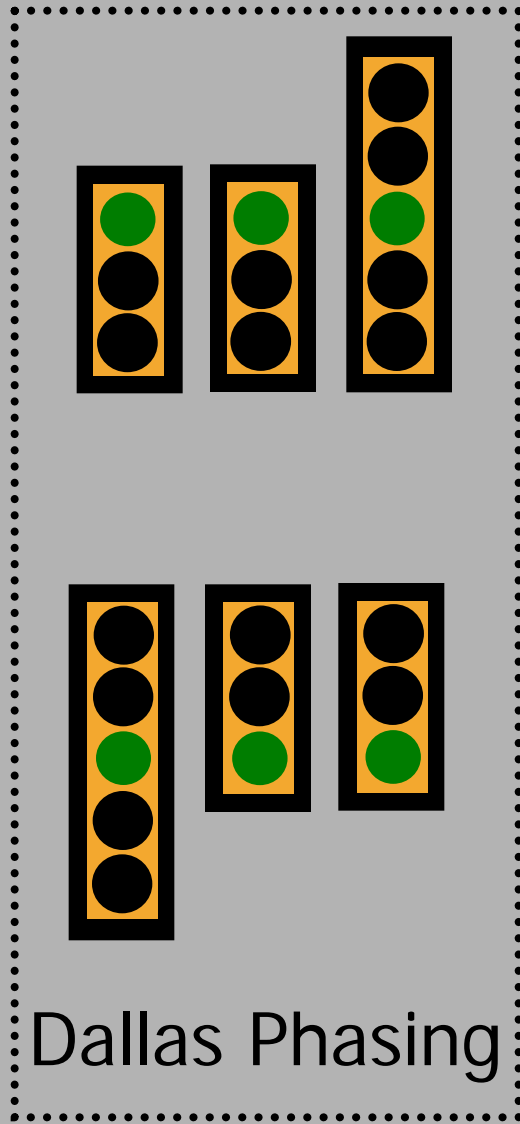
# Leading left turn GREEN ARROW and thru CIRCULAR GREEN



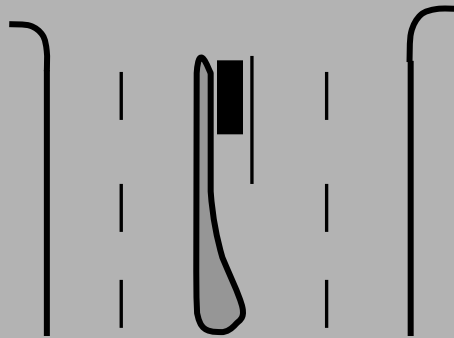
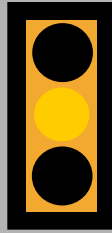
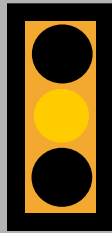
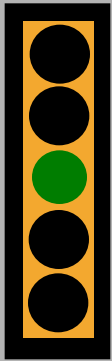
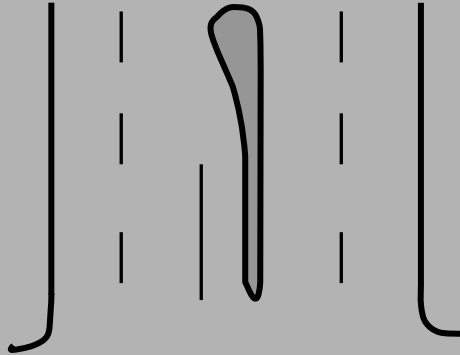
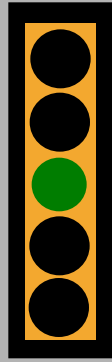
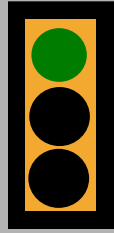
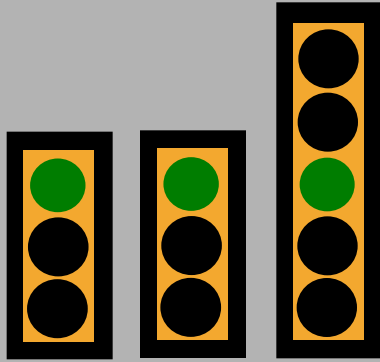
# Leading left turn YELLOW ARROW and thru CIRCULAR GREEN



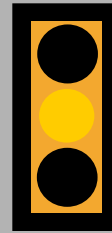
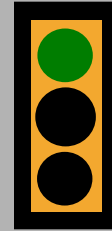
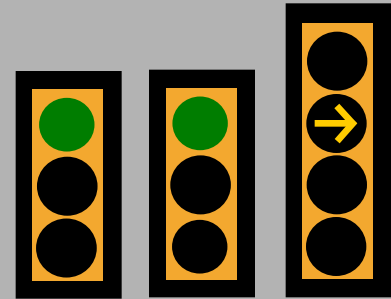
# Permissive left turns for both directions



Circular yellow for leading side through movement.  
Opposing lagging left turn to follow.

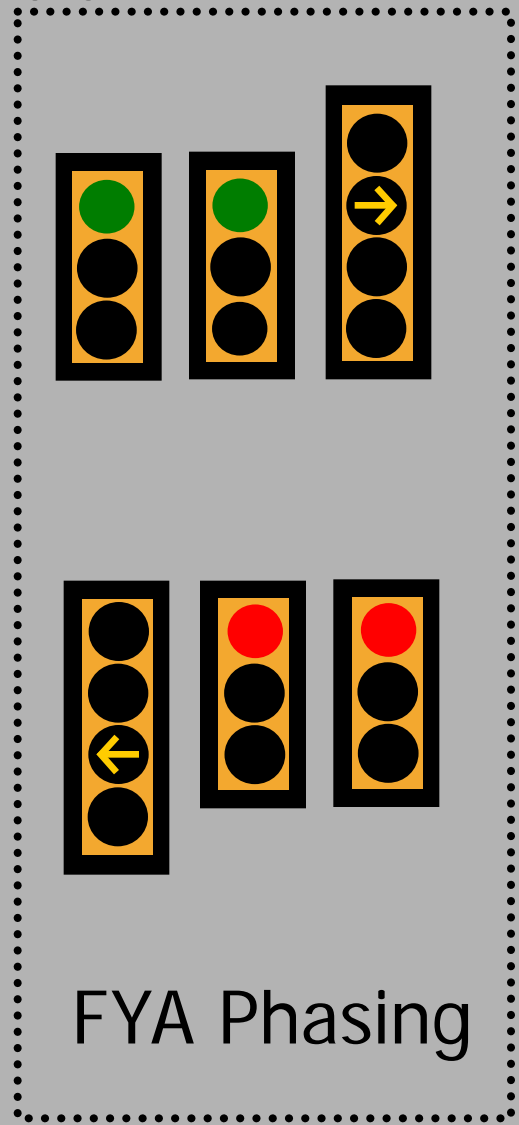
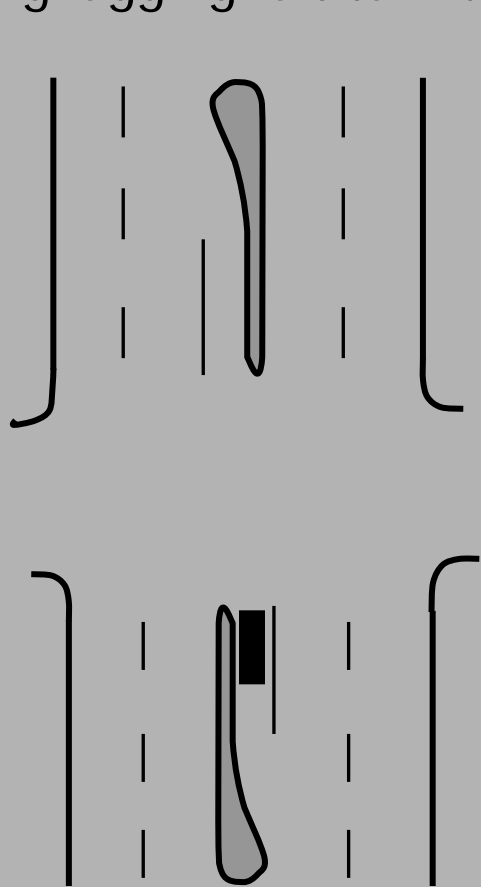
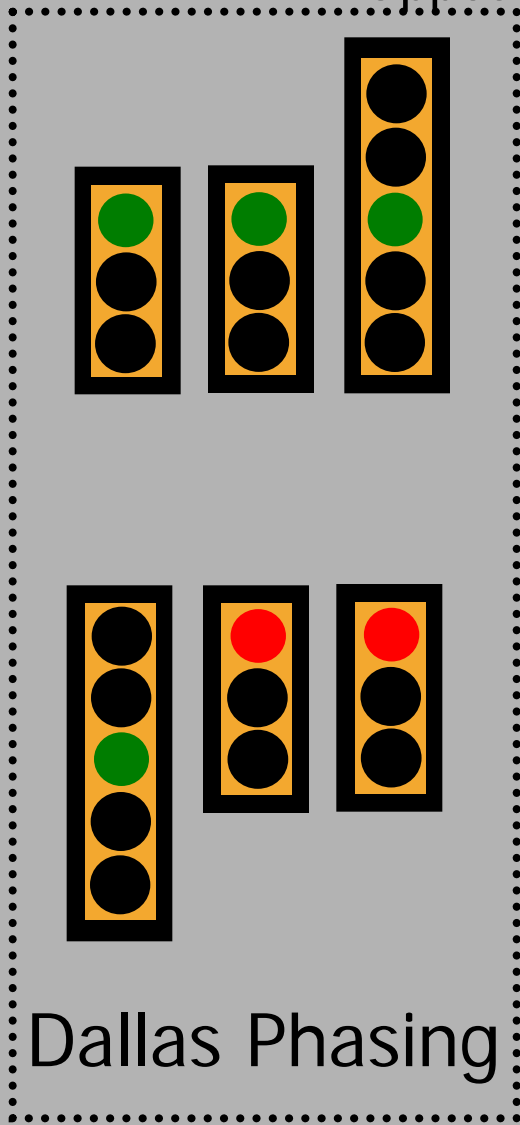


Dallas Phasing

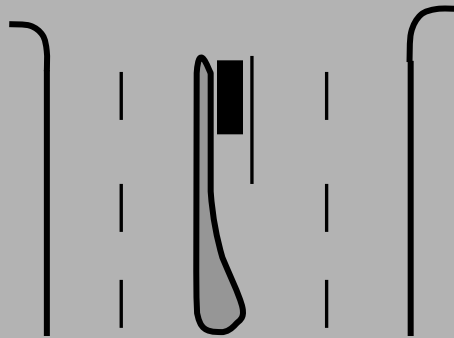
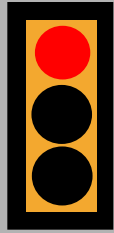
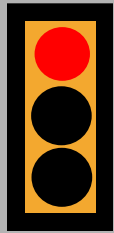
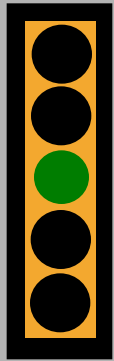
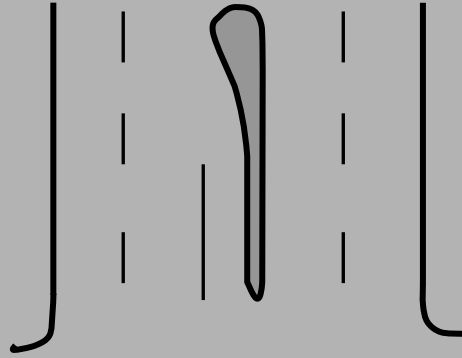
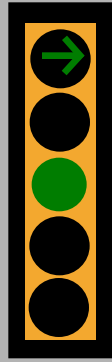
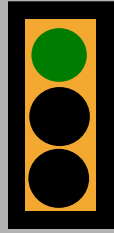
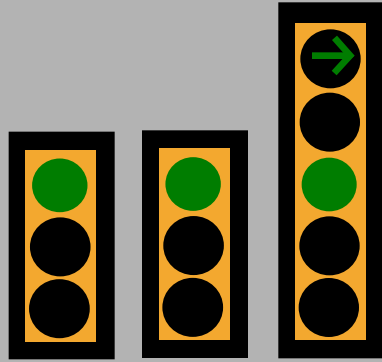


FYA Phasing

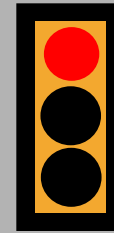
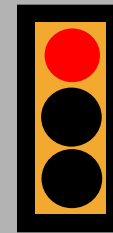
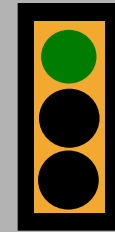
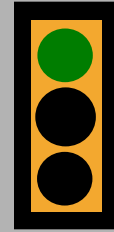
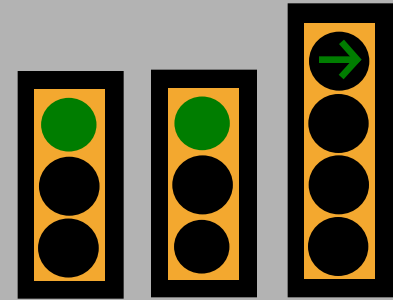
Red clearance interval for leading side through movement.  
Opposing lagging left turn to follow.



Lagging protected left turn one direction. Continuing permissive left turn in the leading direction.

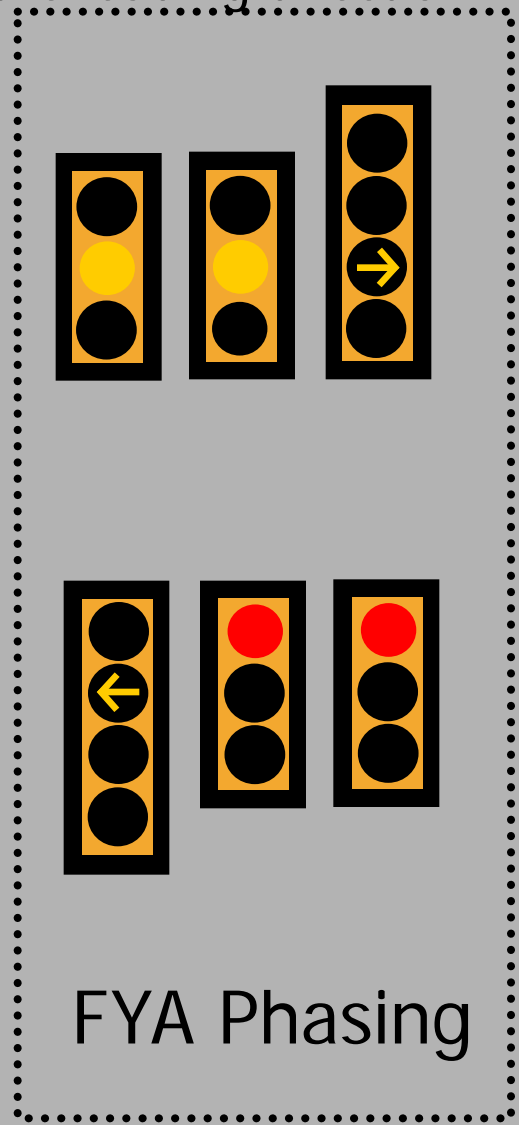
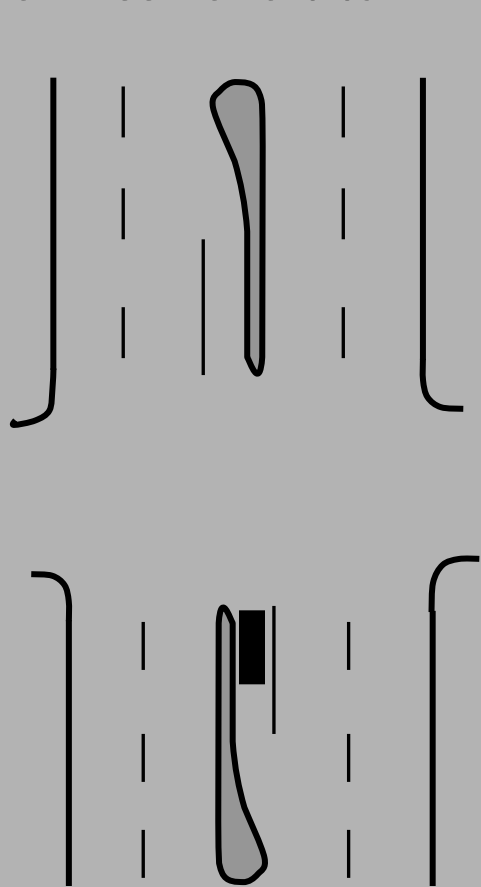
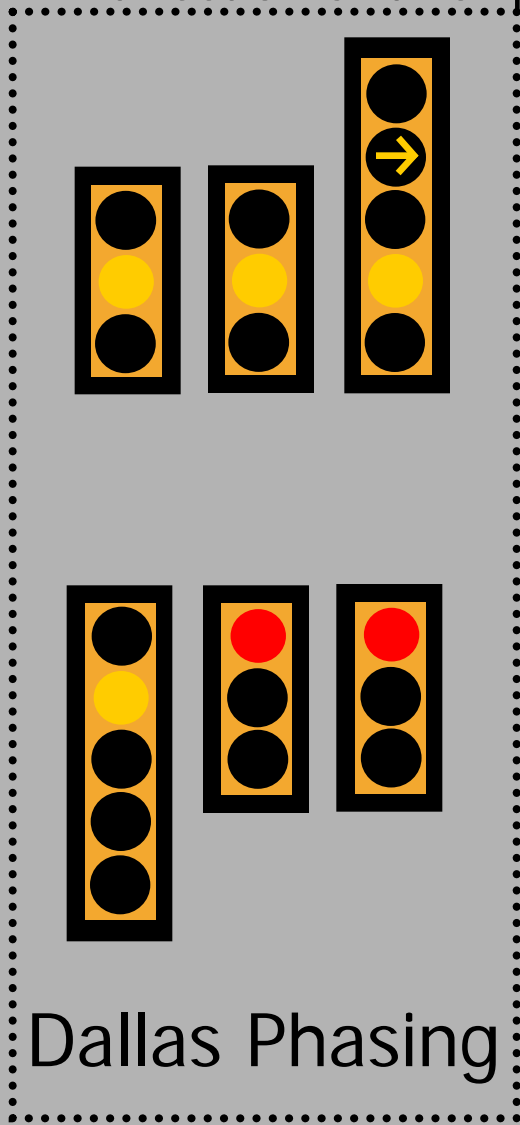


Dallas Phasing

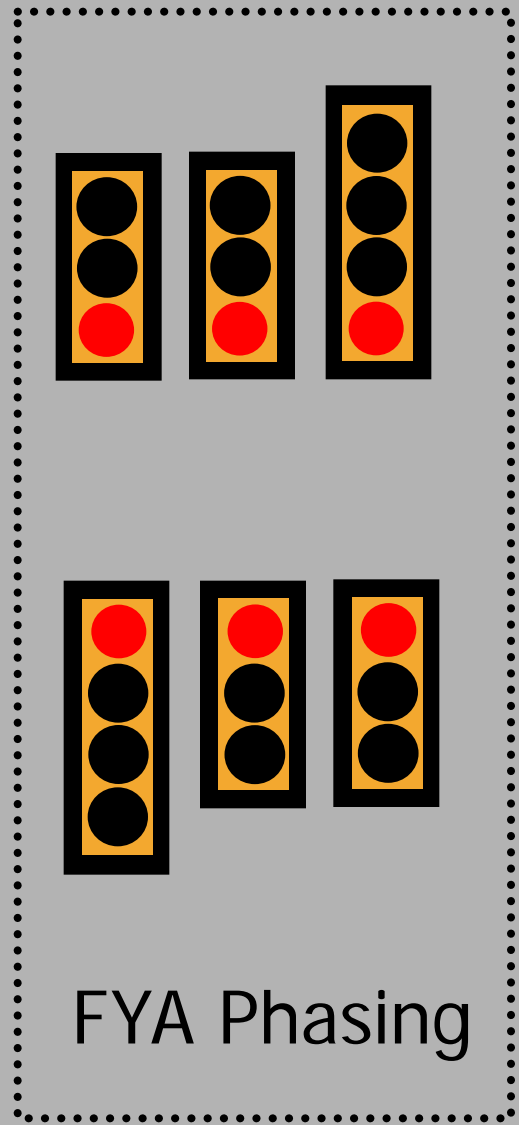
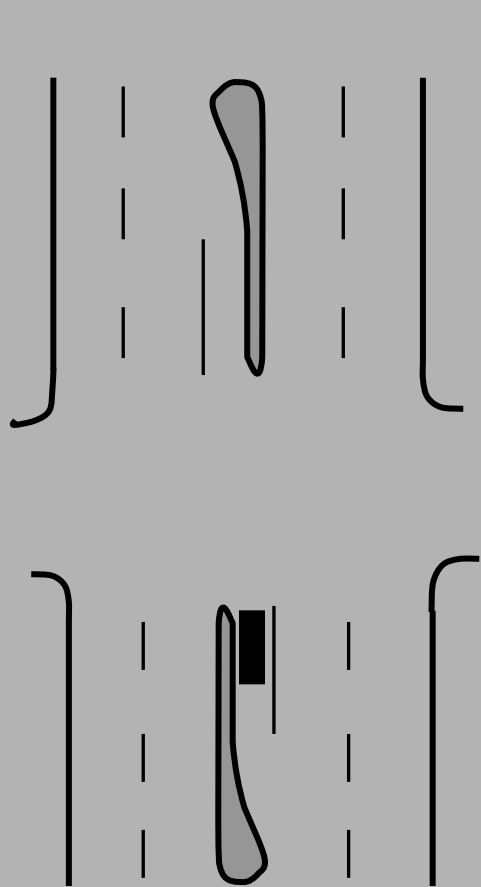
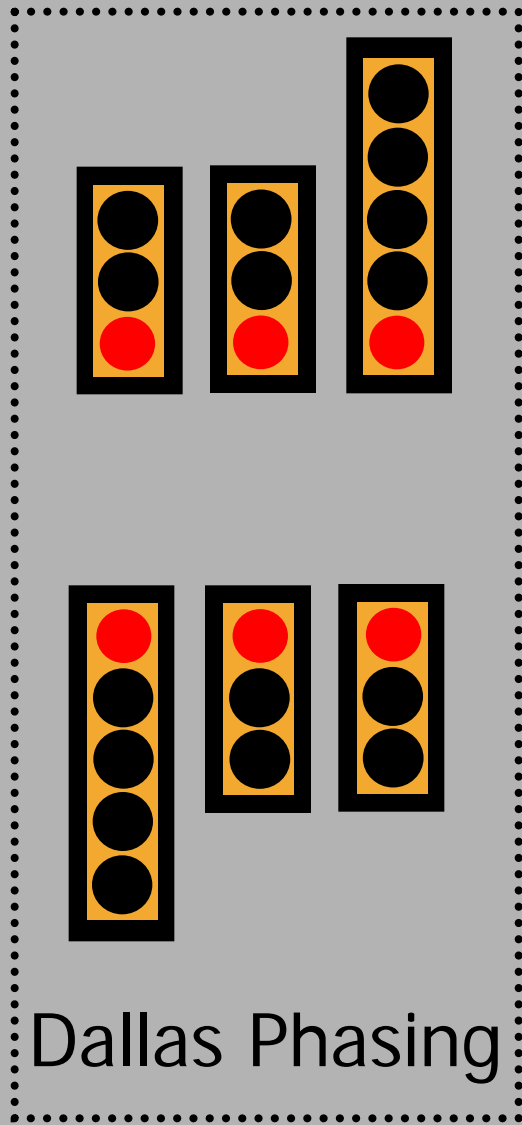


FYA Phasing

Clearance for through movement and lagging protected left turn in one direction and for permissive left turn in the leading direction.



# Cross street phases – red on major street



Where did this idea come from?

# Where did this idea come from?

- “Dallas phasing” was permitted in the 1978 MUTCD until Change IV-58 was issued modifying left turn display requirements
- Was not permitted in the 1988 MUTCD
- Efforts to return “Dallas phasing” to the MUTCD led to research on the appropriate indication for permissive left turns

Where did this idea come from?

*Research from NCHRP Project 3-54*

*Results included in NCHRP Report 493*

# Why would we want to use this?

- Research indicates increased driver understanding versus circular green
- Can eliminate the need for louvers
- Can use 4-section rather than 5-section head for separate left turn signal head

# OK – what's the downside to this?

- Getting the information to drivers
- Implementation issues concerning the display sequence
- Retrofits will require mods to lenses at least and probably signal heads also
- Some controllers and MMU's may not be able to provide this operation without modifications or upgrades

# Education efforts -

- Hopefully will be minimal based on the degree of subject understanding during the research project

# Display sequence issues -

- Current MUTCD does not permit conflict during steady yellow arrow display
  - The yellow arrow following the green arrow complies with this
  - The yellow arrow following the flashing yellow arrow does not comply with this

# Two phases to resolving this issue -

- MUTCD text revisions to permit the steady yellow arrow (following the FYA) versus an opposing steady circular yellow
- Controller and/or MMU modifications to recognize a conflict when following the green arrow but permit the display when following the flashing yellow arrow

# Signal head modifications -

- When used in place of "Dallas phasing", a 4-section arrow only signal head would likely be used (RA, YA, FYA, GA)
- 5-section heads would require change unless MUTCD text permits an unused section or a repeated indication

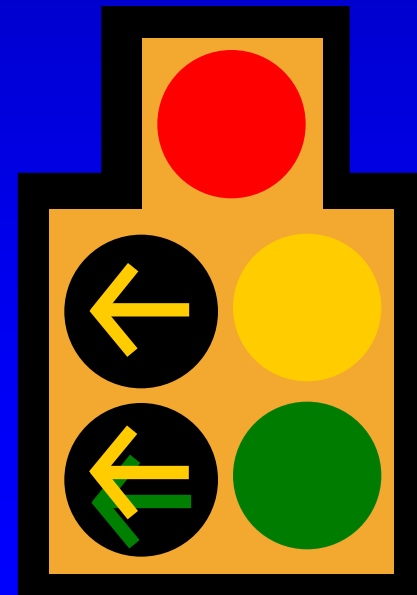
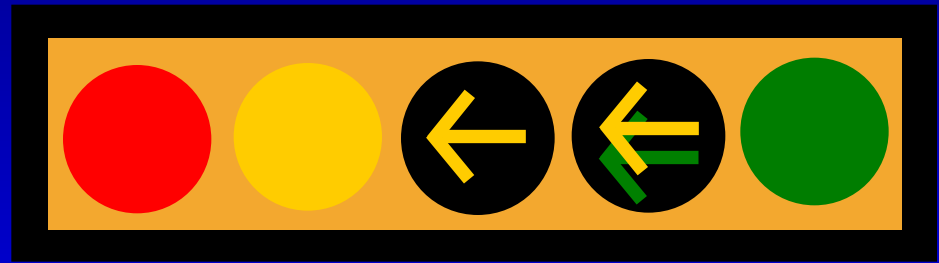
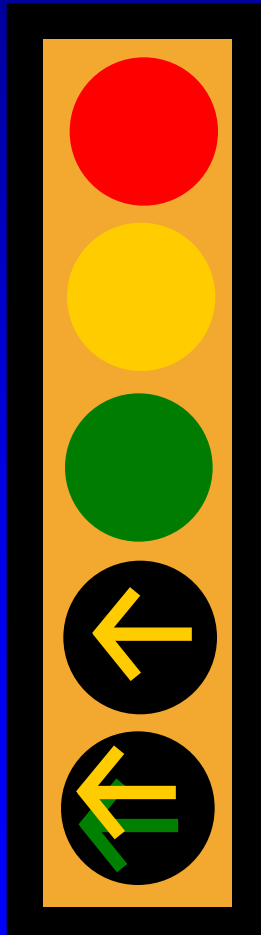
# Questions to be addressed

- Will a FYA be required for approaches where no protected left turn movement exists?
- Can a FYA be used in shared signal heads or only in separate signal heads?

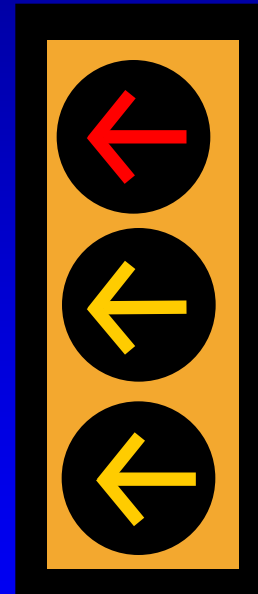
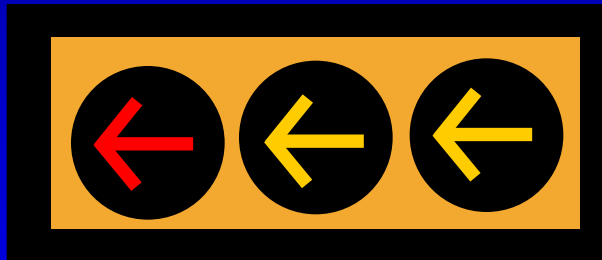
# Existing hardware and displays must be considered

- Some intersections have only a 5-section and a 3-section head for both the left turn and through movements
- Permissive only left turns at intersections often are controlled by the through indication

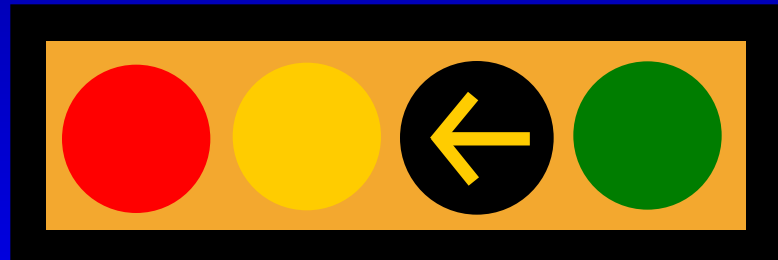
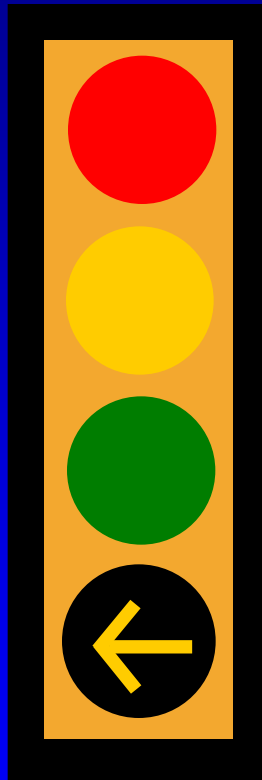
# Possible 5-section protected/permissive shared head examples



# 3-section permissive only head examples



# Possible 4-section permissive only shared head examples

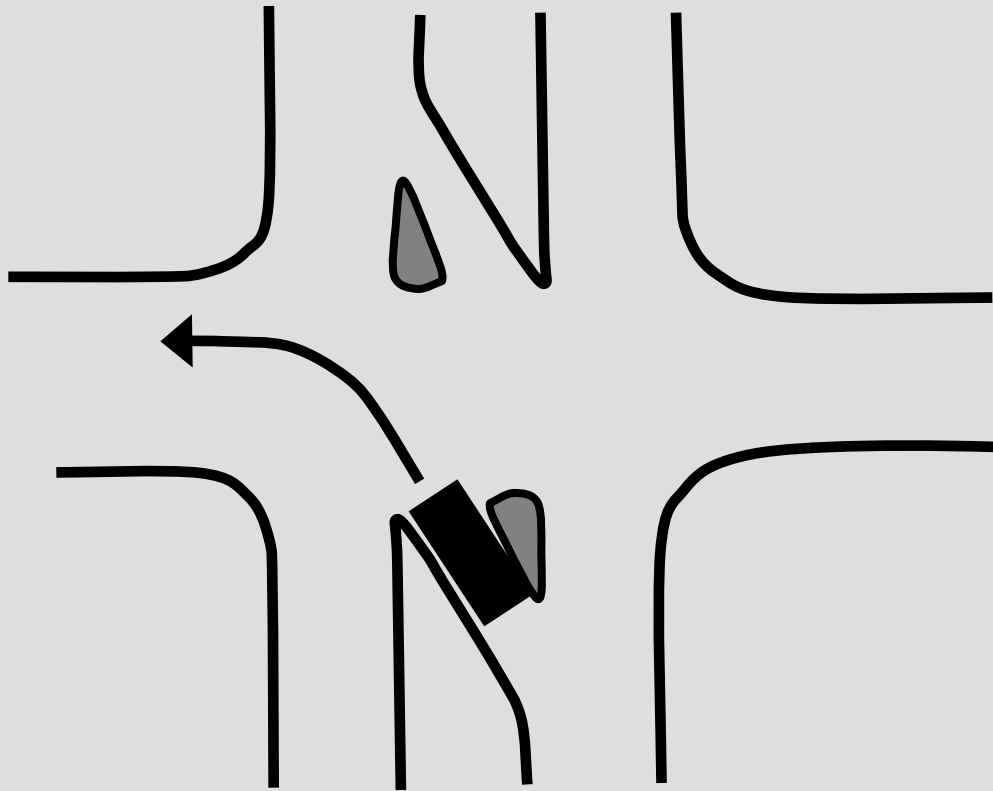


This signal head display would likely require that the green & FYA terminate simultaneously

**Should a flashing red arrow ever be used to indicate a permissive left turn movement?**

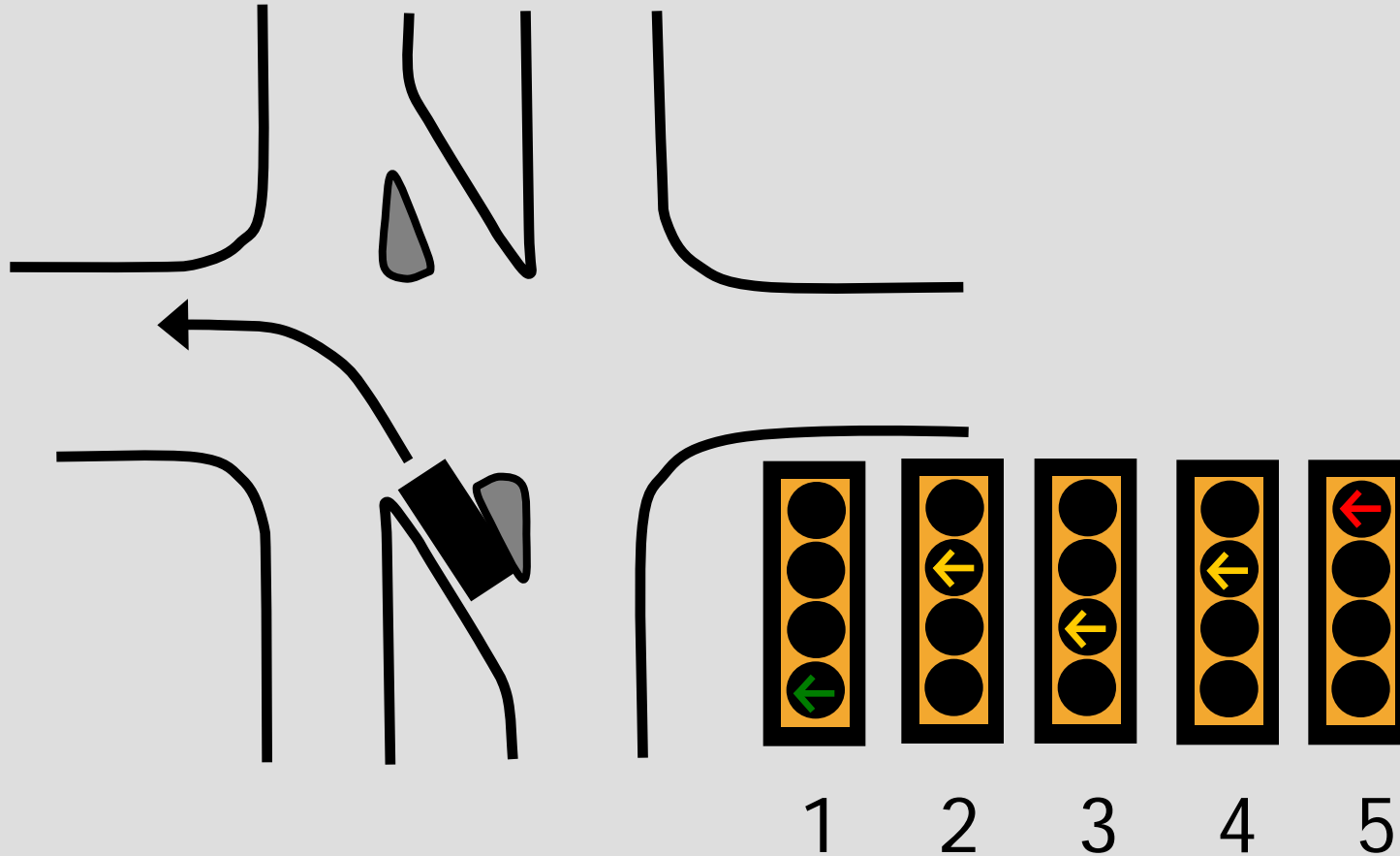
**Consider the following situation -**

There are many different circumstances to be addressed in different areas.



What if, instead of left turn lanes as typically seen in this area, the left turns were angled into the median?

# Protected/permissive sequence with flashing yellow arrow



# Protected/permissive sequence with flashing red arrow

