



April 10, 2026

# **Lone Star Non-Stop Left**

## **A Better Way to Operate A Diamond Intersection**

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# Lone Star NSL Presentation Outline

- Credits and thank you
- What is a Lone Star NSL
- Where can you find a Lone Star NSL
- Why you need a Lone Star NSL
- How to design signal timing for a Lone Star NSL



# Lone Star Non-Stop Left Thank You

- Inventors: Justin Clark and Jorge Ramos
- Technical Advisors to Frisco: Ronnie Bell, Matt Best, Dave Carter, Brian Craig, Gerry DeCamp, John Denholm, Tom Hartmann, Manu Isaac, Marc Jacobson, Kent Kacir, Karan Khosla, Scott Nelson, David Noyce, Brian Moen, Yang Ouyang, Dale Picha, Brain Shamburger, Dharmesh Shaw, Matt Sneed, Byron Stephens, and Mike Wobken
- Supporters: TxDOT Dallas District, TxDOT Denton County, Denton County, City of Prosper, & Town of Little Elm



What Is It?



# Lone Star Non-Stop Left Traffic Signals

## FRONTAGE ROAD SIGNAL



## ARTERIAL ROAD SIGNAL





# Lone Star Non-Stop Left Traffic Signals

ARTERIAL – DUAL THRU



ARTERIAL – LEFT + THRU



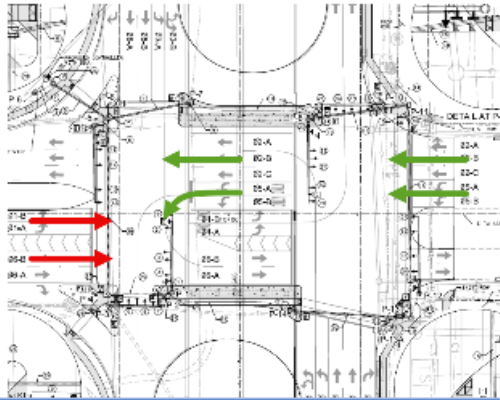


# Lone Star Non-Stop Left Sequence

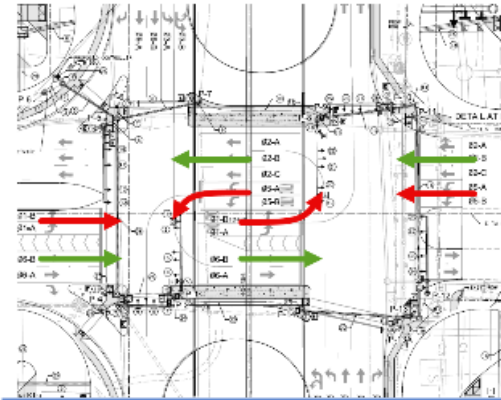
- Non-Stop Left Turn. Inside Signals are Green
- All Approaches have a Separate Signals for Left Turn Traffic
- Left Turn Traffic is Stored on the Outside the Diamond
- Last Vehicle to Enter can Exit Inside. Inside Stays Clear
- Left Turns are Incompatible. Must Lead One, Lag Other



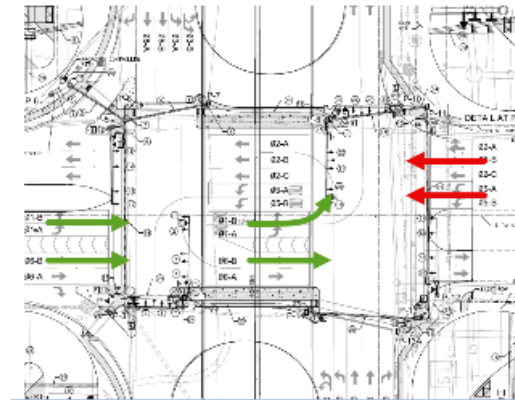
# LSNSL Sequence



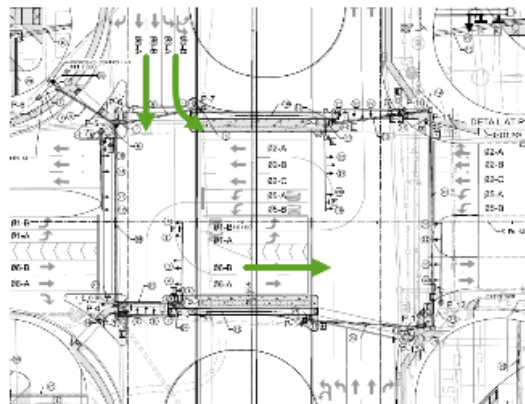
1 - Through + Left Turn (Leading)



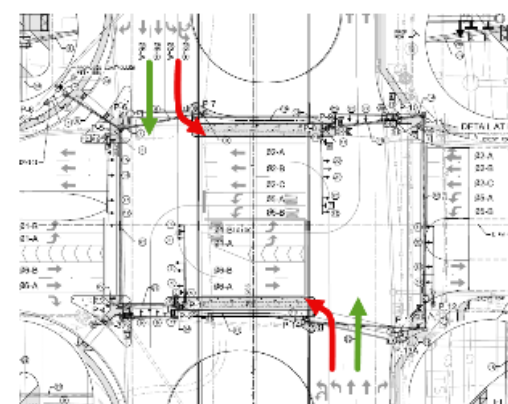
2 - Throughs



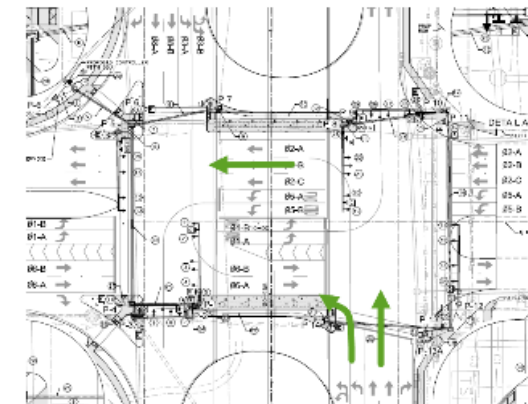
3 - Through + Left Turn (Lagging)



4 - FR Through + Left Turn (Leading)



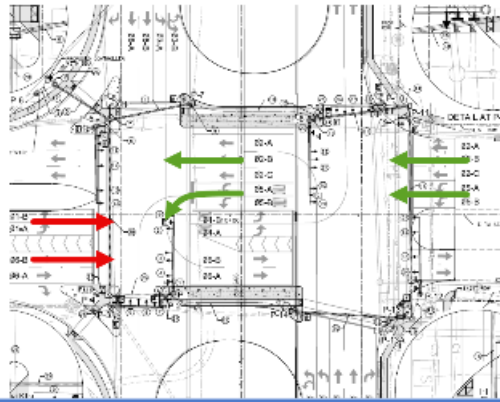
5 - Frontage Road (FR) Throughs



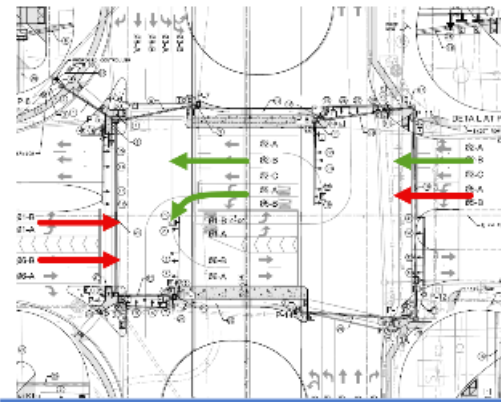
6 - FR Through + Left Turn (Lagging)



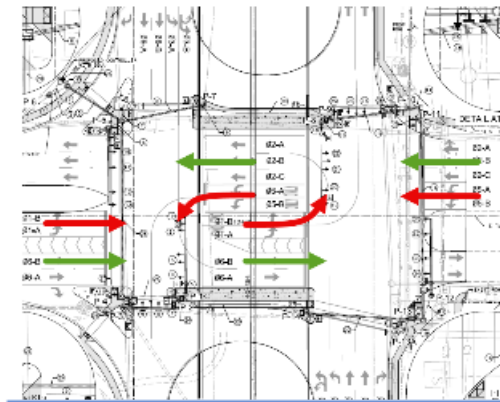
# LSNSL Sequence – Arterial Street Detail



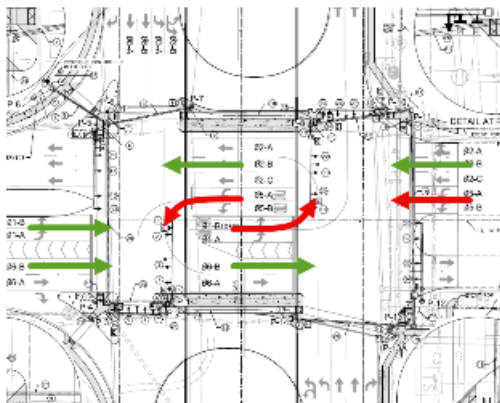
1A - Through + Left Turn (Leading)



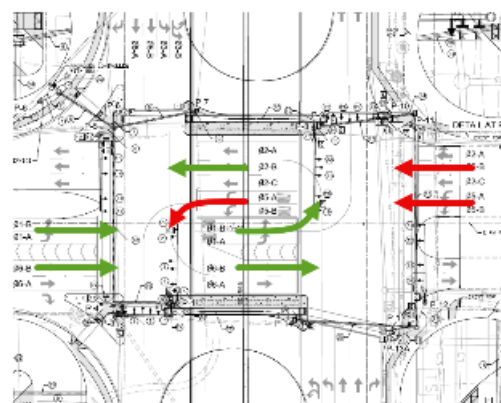
1B - Left Turn (Leading) Green Clear



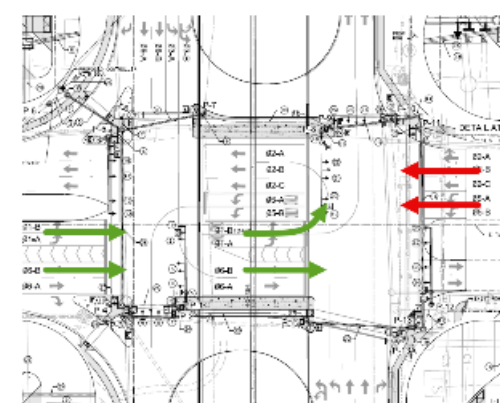
2 - Throughs



3A - Left Turn (Lagging) Advance



3B - Inside Through Green Clear



3C - Through + Left Turn (Lagging)



# Requirements

- Dedicated Left Turns Lanes on Frontage Road
- Advance Left Turns Lanes on Arterial Road
- Long Mast Arms. Signal Heads in Front of Left Lanes
- At Least 16 Channels in the Signal Cabinet. 32 Better
- Desired Controller Software Features
  - Multiple [Trailing] Green Extensions
  - Green Extension Inhibit by Next Phase



Where Is It?



# Locations

- IH 35 and FM 306 (E-Bnd)
- FM 423 and US 380 (All Directions)
- Championship/Teel and US 380 (All Directions)
- Legacy and US 380 (All Directions)





Why Try It?





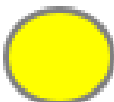

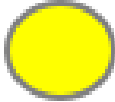

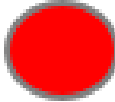


# Lone Star Non-Stop Left Advantages

- Works for Traditional Diamonds
  - Great for Narrow Diamonds. Queues Don't Block Intersections
- More Efficient than 4-Phase
  - Throughs can be Green Simultaneously. More Outside Green
- Safer than Lead/Lag.
  - Less Red Light Running. The Second Signal is Green for Left Turns



# Diamond Sequence Comparisons

	Safety	Delay	Keep Middle Clear
4 Phase			
Lone Star NSL			
Lead Lag			

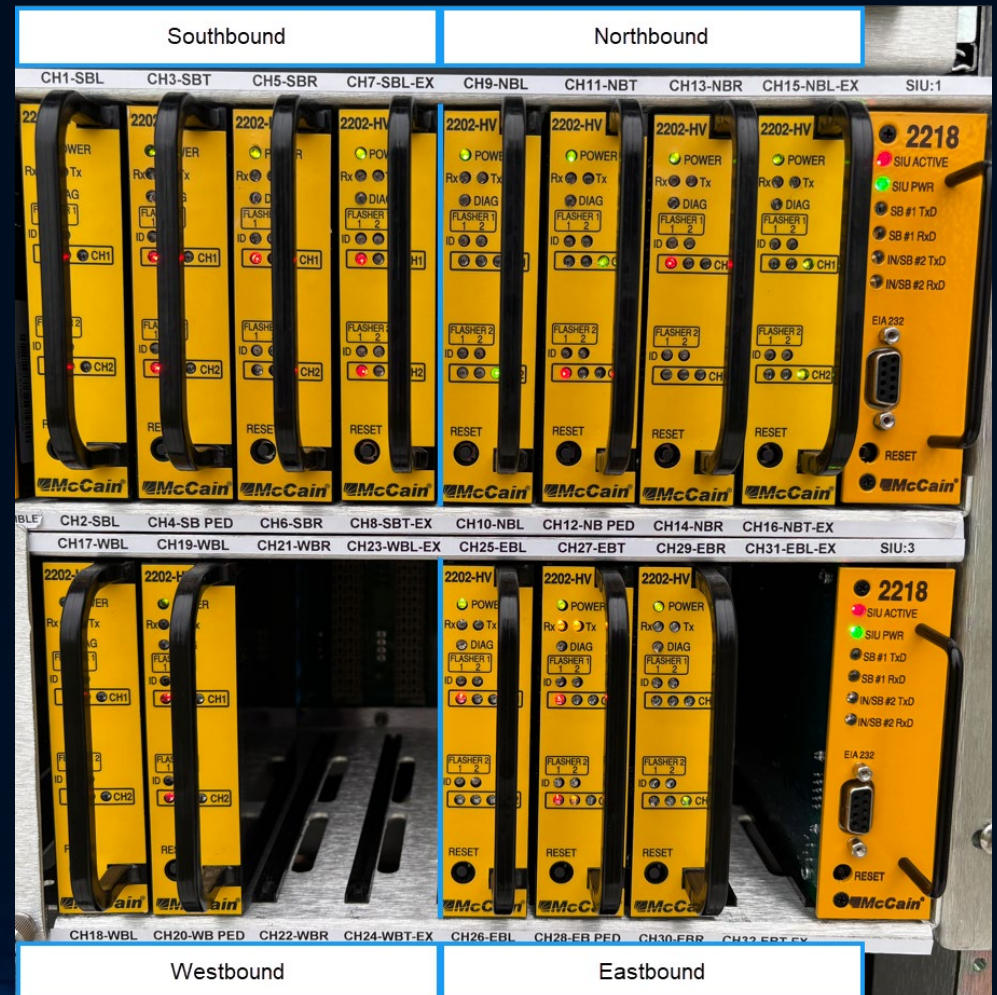


# How To Design It?



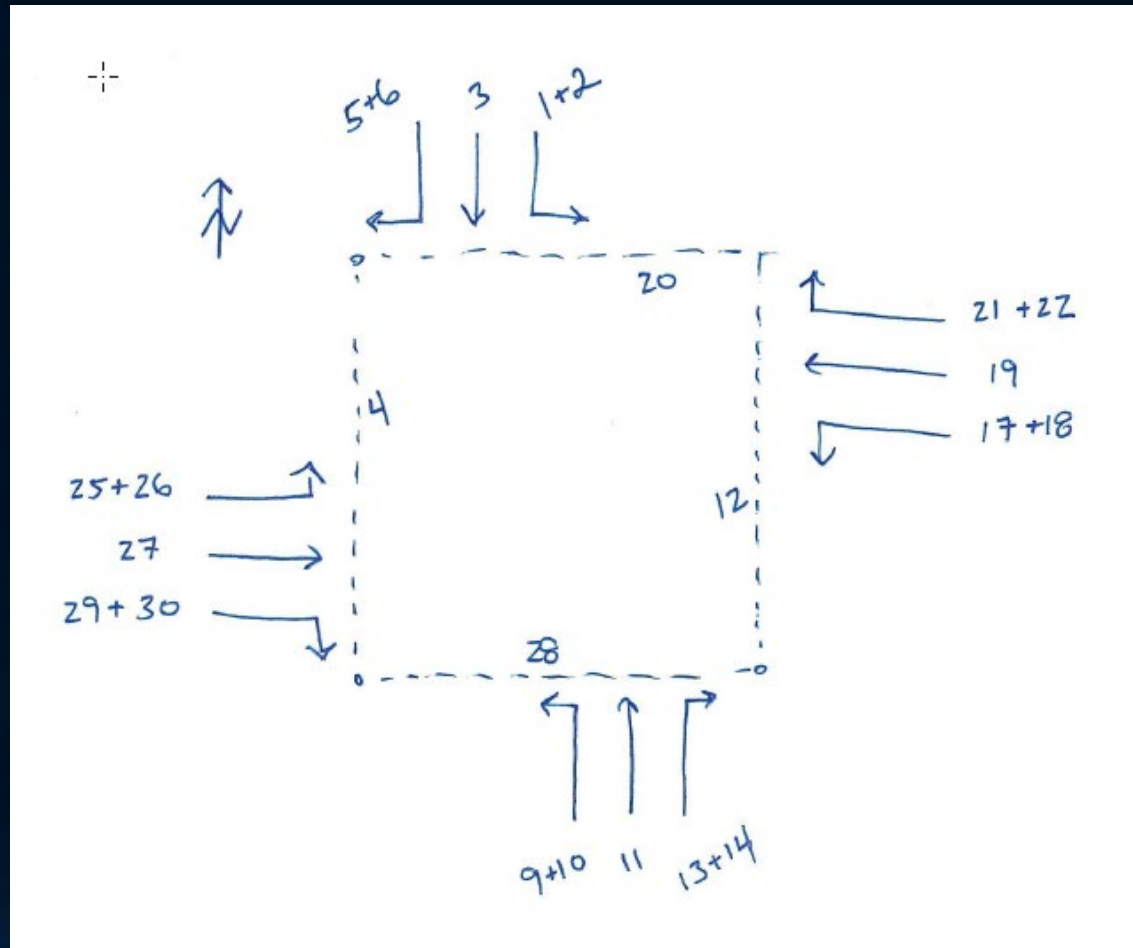
# ATC Cabinet Channels

- 32 Channels, 8 per Direction
- S-Bnd Channels 1 – 8
- N-Bnd Channels 9 – 16
- W-Bnd Channels 17 – 24
- E-Bnd Channels 25 – 32



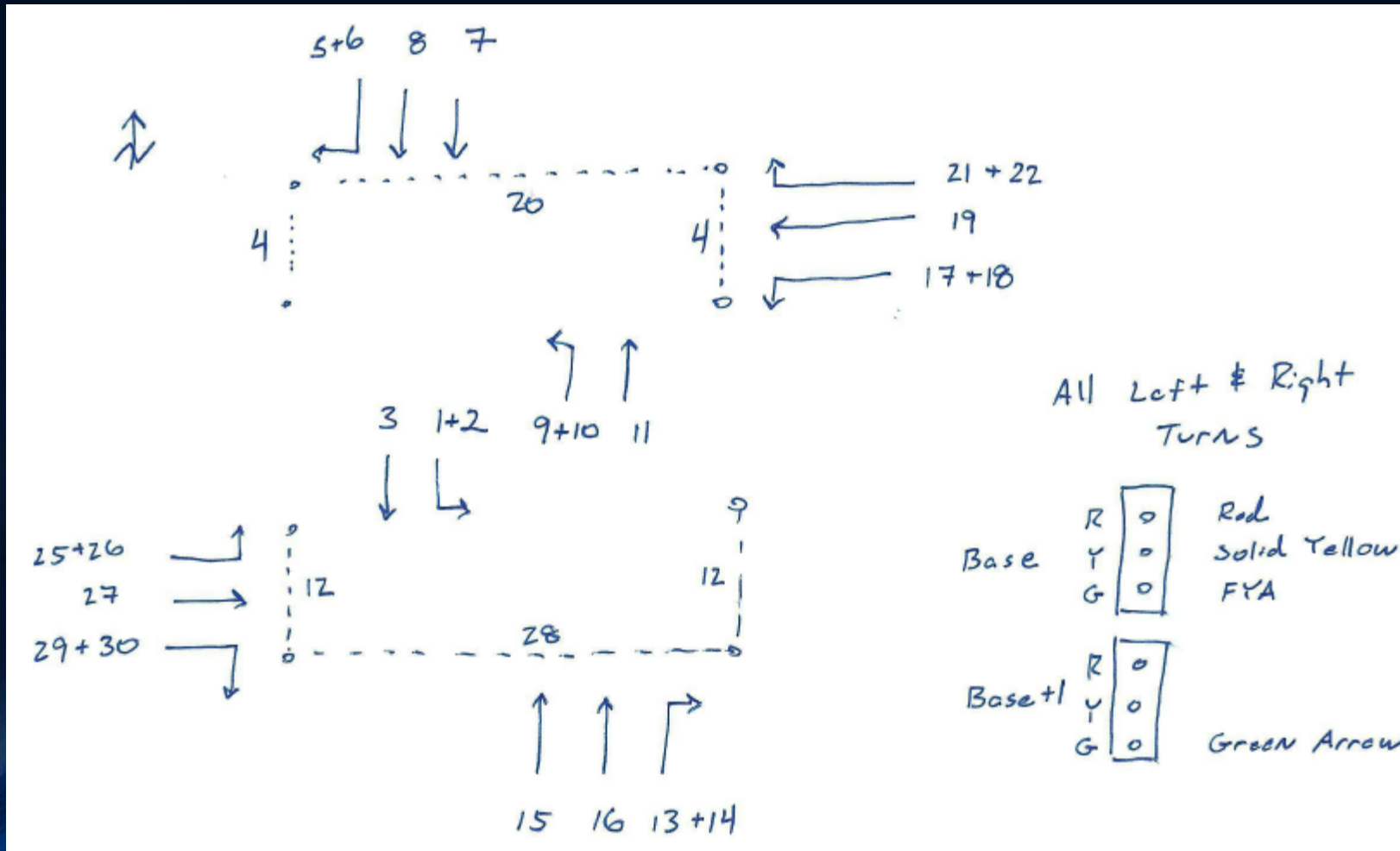


# ATC Cabinet Channels – Standard 8





# ATC Cabinet Channels – N/S Diamond







# Lone Star NSL Phasing

- Three Phases for Each Movement
  - Phase 1 to 8. Standard Phases Match Your Standard
  - Phase 11 to 18. Second Instance of Each Phase
  - Phase 21 to 28. Third Instance of Each Phase
- Different Instances of Each Phase Offer Different Trailing Greens
  - Many Desired Trailing Greens were Similar and Grouped Together
  - Multiple Trailing Green Extensions Desired
  - Trailing Green Inhibit by Next Phase



# Lone Star NSL - Sequences

N/S Direct Left Diamonds

INTERVALS

SA10

1+6

A. SB Adv +  
NBL LAST NBL

B. LAST NBL

22+ +

-1.6

C. LAST NBT

22+

5

D. LAST SBL

4

1+7

E. LAST WBL

F. LAST WBL

4

+18

G. EBL Adv

NB lead, WBL lead

H

x

3+18

H. NBL Adv

SA16

1+6

A. LAST NBL +  
SBT Adv

B. LAST NBL

22

1+6

C. LAST NBL

22

5

D. LAST SBT

E. LAST SBL

F. LAST SBT +  
EBL Adv

3+

G

x

G. LAST EBL

H. LAST EBL

went to use 14

14+18

I. WBL Adv

went to use 14+17

NB lead, EBL lead

14+7

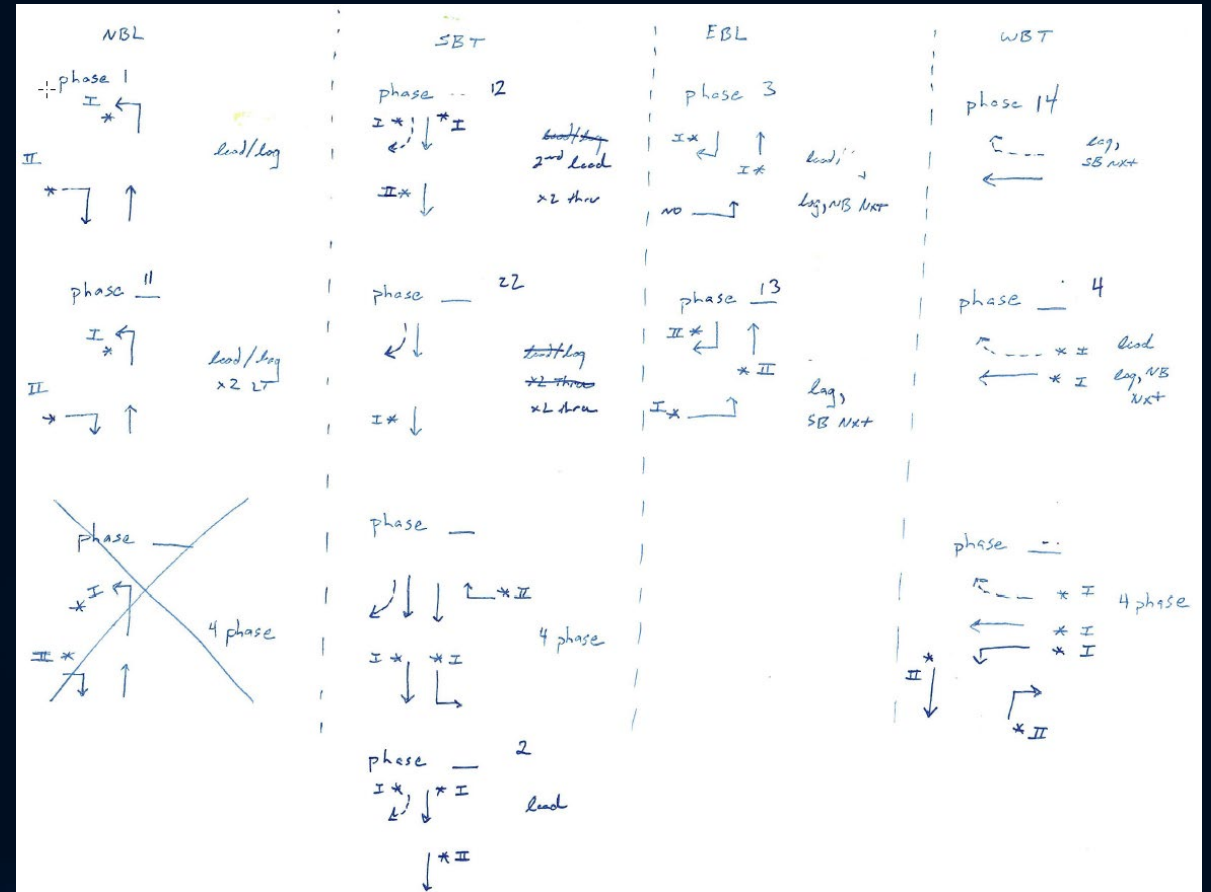
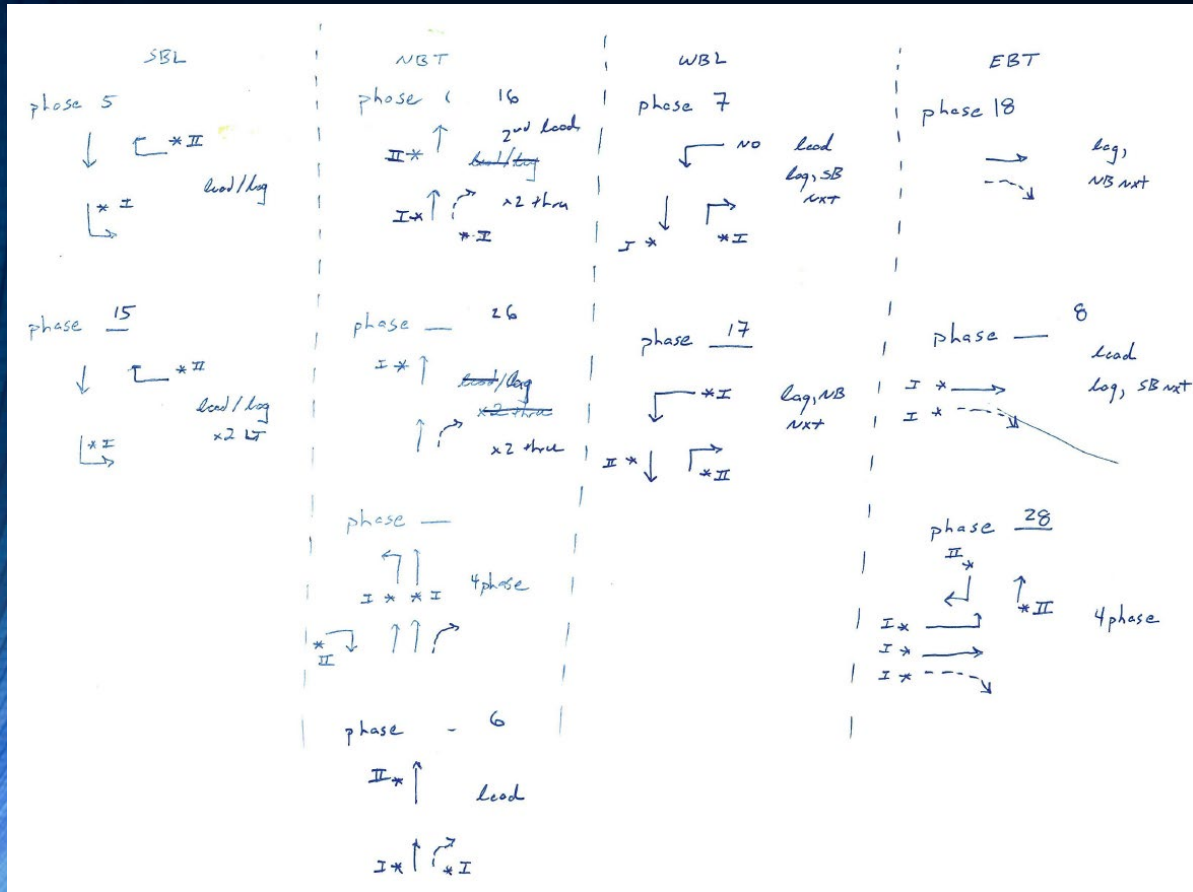
J. NB Adv +  
LAST WBL

K. NB Adv

L. NB Adv



# Lone Star Left Phasing





# Lone Star Left Education and Outreach

**FRISCO**

## LONE STAR LEFT TURN

A SAFER, SMOOTHER WAY TO TURN

To help improve traffic flow on busy corridors with high left-turn volumes, the City of Frisco traffic engineers designed a new type of left turn. It's called a **Lone Star Left**. A city capital improvement project at U.S. 380 will add Lone Star Left turn lanes between Teel Parkway and Champions Way.

### HOW IT WORKS

- Move into the dedicated left-turn lanes located at the far left of the roadway.
- If the left-turn signal is red, stop and wait.
- The left-turn signal may be red even when the through-lane signal is green.
- When the left-turn signal turns green, continue through the intersection to complete your left turn.

- Created a One Pager for Drivers (Joyce Warren)
- Frisco Police
- City of Prosper (Hulon Webb & Robert Gey)
- Message Boards
- Potentially a Frisco “Progress in Motion Video”



# Thank You

**Curtis Jarecki, P.E.**

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