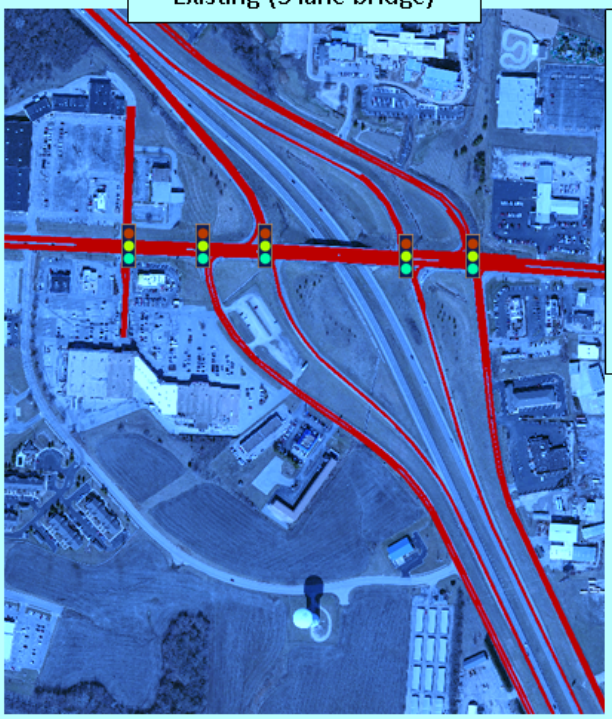
Memo to describe the process for study of I-49 @ MO-58: written September 6, 2018
(Note: These geometrics are preliminary and 5+ years old)

This interchange was previously studied as part of "Amendment 7" and right of way discussions related to development in the southwest quadrant. Here is a handout from a June 1, 2015 meeting:

Comparison of some options tested during the 2015 process

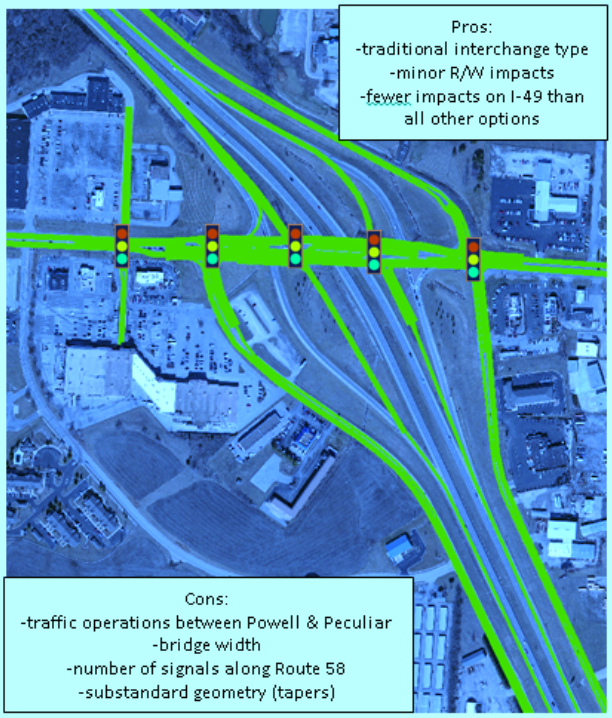
Existing (5 lane bridge)



Existing Conditions:
Congestion is common in the PM peak hour partially due to lack of storage between the signals. In particular the ramps and outer roads are very close. The five signals displayed (from west to east) are:

1. Powell Parkway
2. Peculiar Drive
3. SB ramps
4. NB ramps
5. E Outer Rd

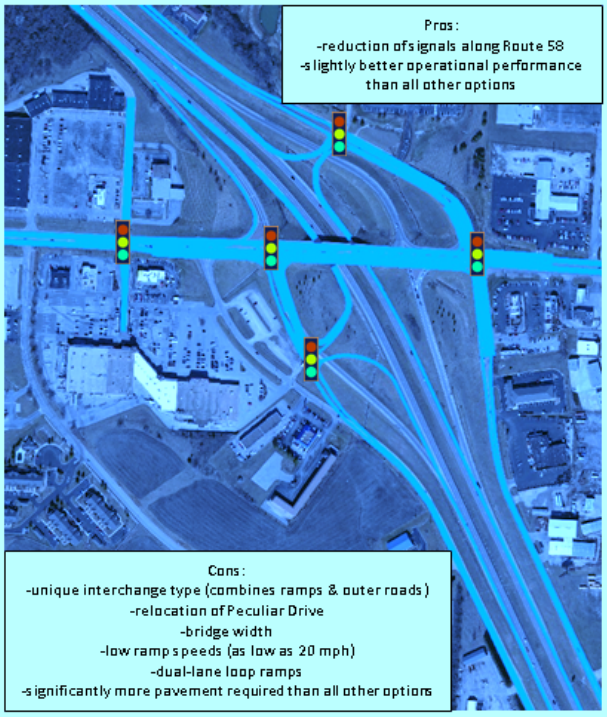
TUDI (10 lane bridge)



Pros:
-traditional interchange type
-minor R/W impacts
-fewer impacts on I-49 than all other options

Cons:
-traffic operations between Powell & Peculiar
-bridge width
-number of signals along Route 58
-substandard geometry (tapers)

"hook ramps" (displayed for amendment 7) (7 lane bridge)

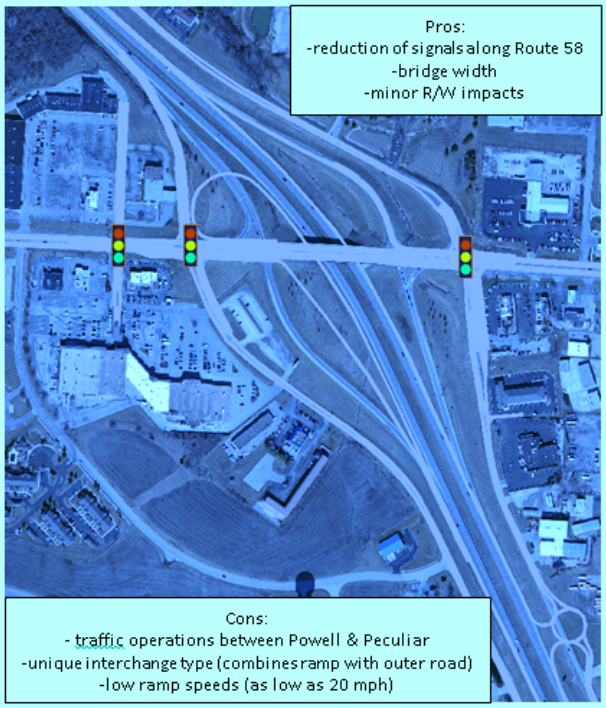


Pros:
-reduction of signals along Route 58
-slightly better operational performance than all other options

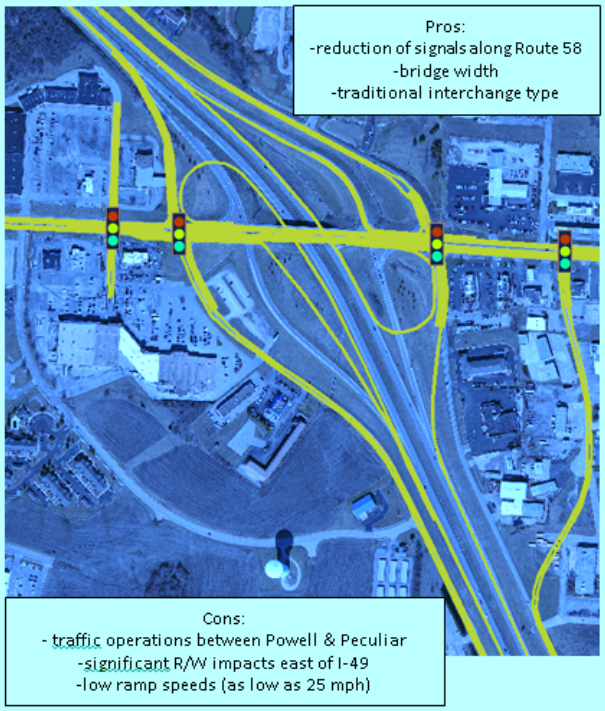
Cons:
-unique interchange type (combines ramps & outer roads)
-relocation of Peculiar Drive
-bridge width
-low ramp speeds (as low as 20 mph)
-dual-lane loop ramps
-significantly more pavement required than all other options

2015 Process Sheet 1 / 2

"Parclo v1" (5 lane bridge)

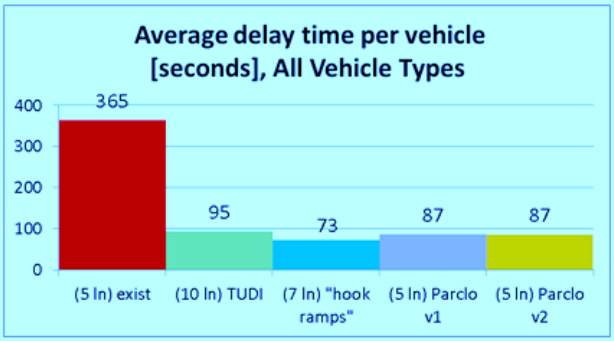


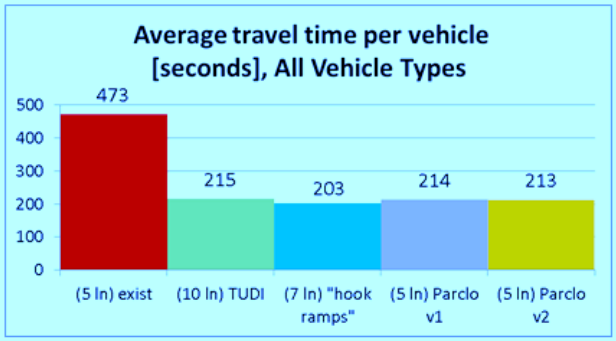
"Parclo v2" (5 lane bridge)



Note that the "Parclo v1" and "Parclo v2" geometries are identical west of I-49.

Alternatives compared (future year PM peak hour):





2015 Process Sheet 2 / 2

Updates for the 2018 work:

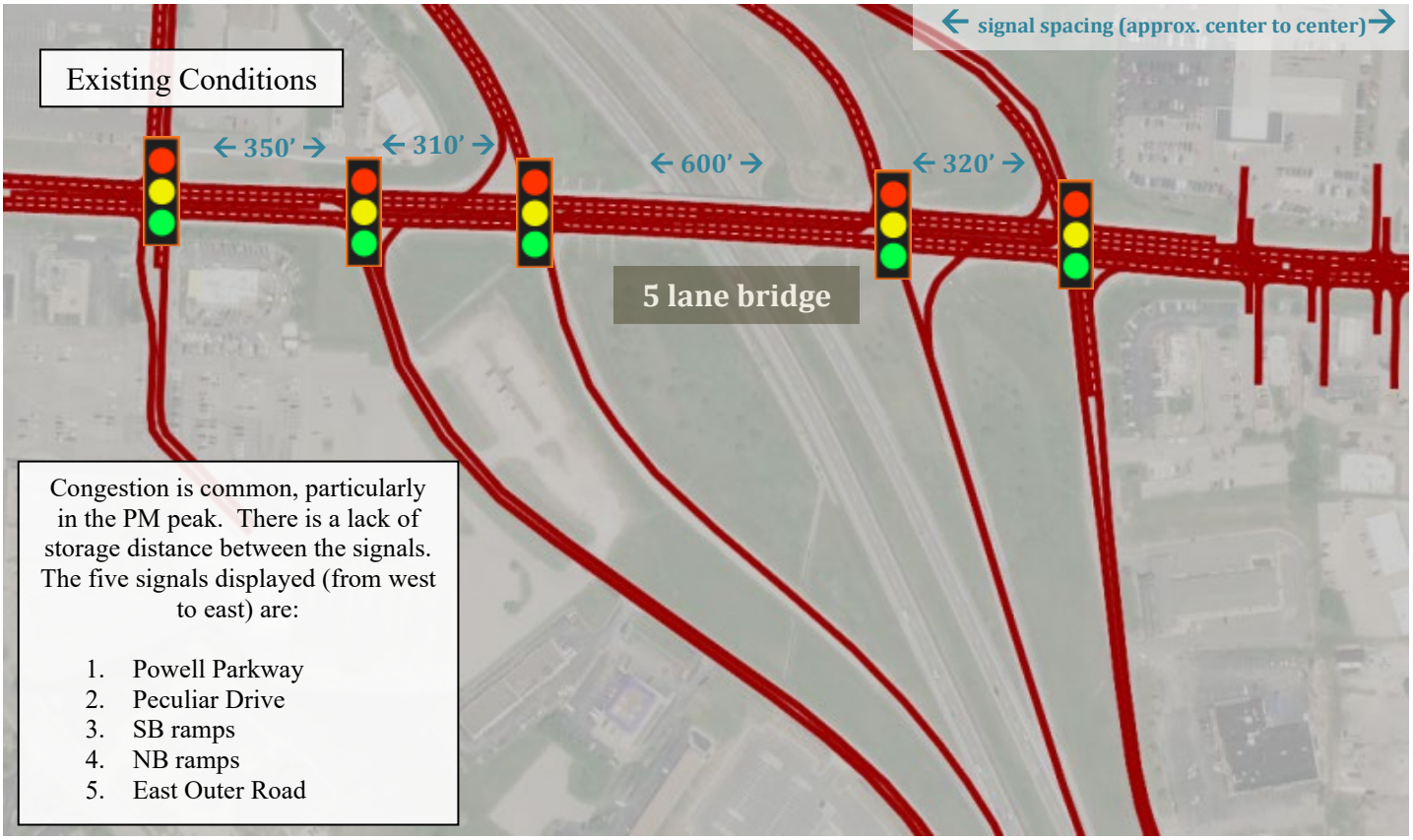
- The traffic model (between signals at Mullen Road on the west and Clint / Dean on the east) includes all the business entrances. Including these entrances and the five-lane section of MO-58 was done to accurately limit the capacity and avoid selecting an over-built interchange.
- The geometries studied included conversion of Peculiar Drive (SW quadrant) access to "RIRO", with a connection to Powell for rerouted traffic. This alteration resulted in no discernible improvement in network measures like travel time and delay: gains at Peculiar are negated at Powell. However, the "RIRO" at Peculiar does mean increased distance from the southbound ramp terminal to the signal to the west, making it less likely that queuing will spill from one signal to another.
- The models assume that connections to I-49 will not throttle traffic (high capacity ramps needed for NB on-ramp to I-49 in AM and SB off-ramp from I-49 in PM.

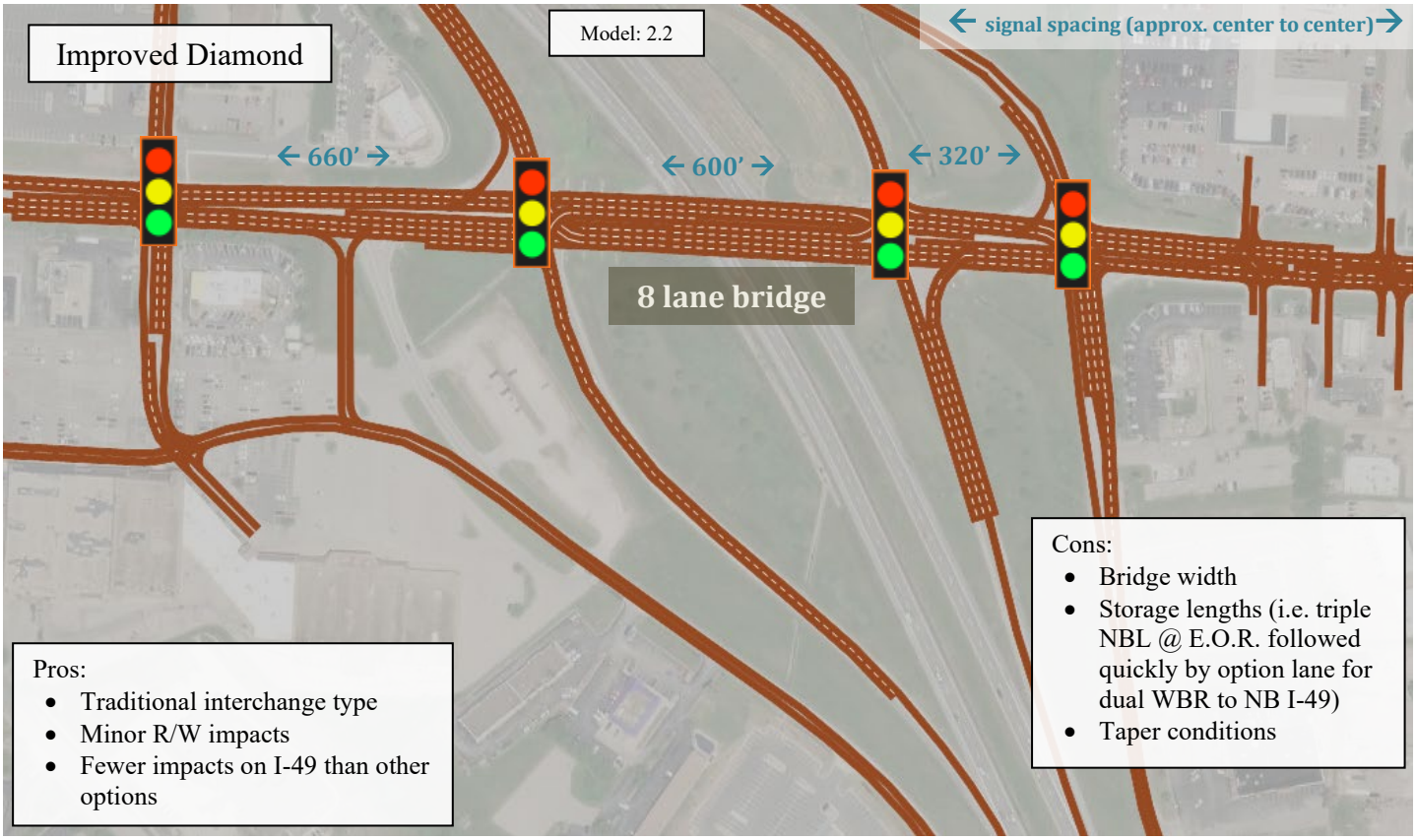
Exploration of previously-studied options:

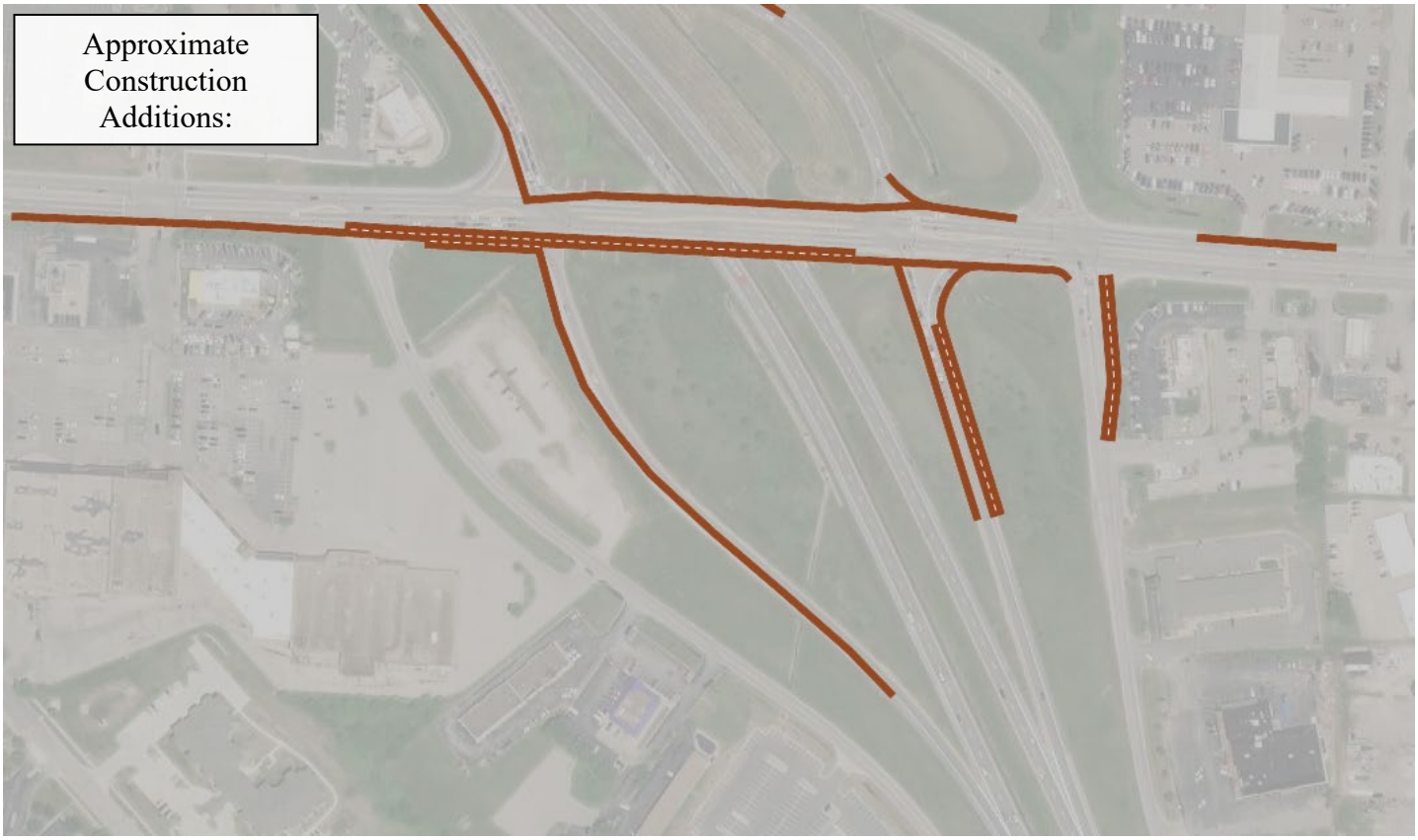
The "hook ramp" option was found to perform poorly in the AM peak compared to the other options tested. Observations of the model indicated this was due to the operation at the east outer road signal, which has a hard time facilitating the high volumes of eastbound left, northbound through, and westbound right traffic (these three movements each require unique signal phases) :

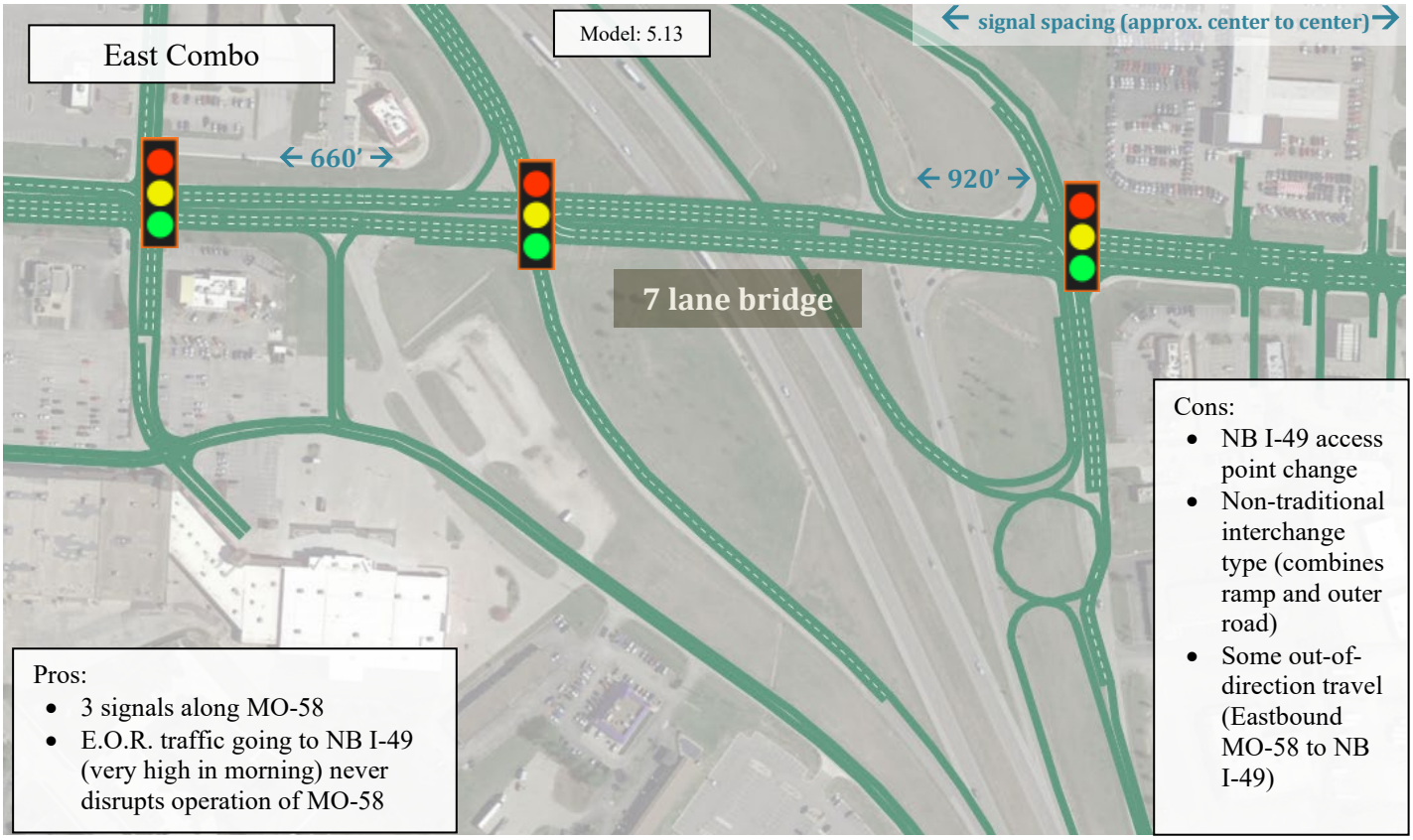
In the AM peak this option had about 30% higher travel times at the interchange than the other studied options, so it wasn't carried forward.

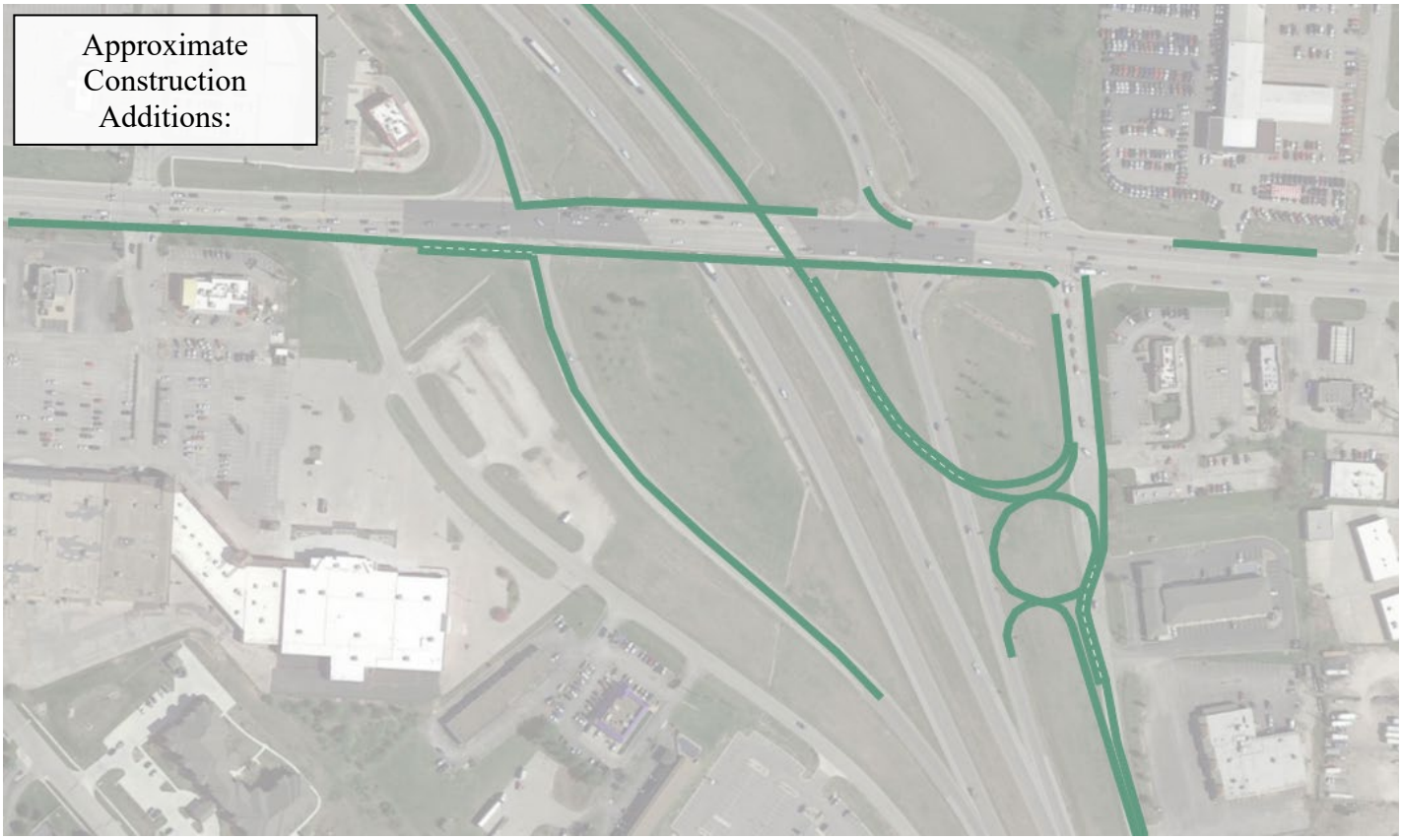
The "Parclo" options, as previously drawn, would not fit due to the addition of "Freddy's" business in the northwest quadrant (NW) of the interchange. The following "Parclo" options include a 15 mph curve (~50' radius). This was laid out horizontally and vertically in MicroStation using old photogrammetry data to ensure it was a viable option.

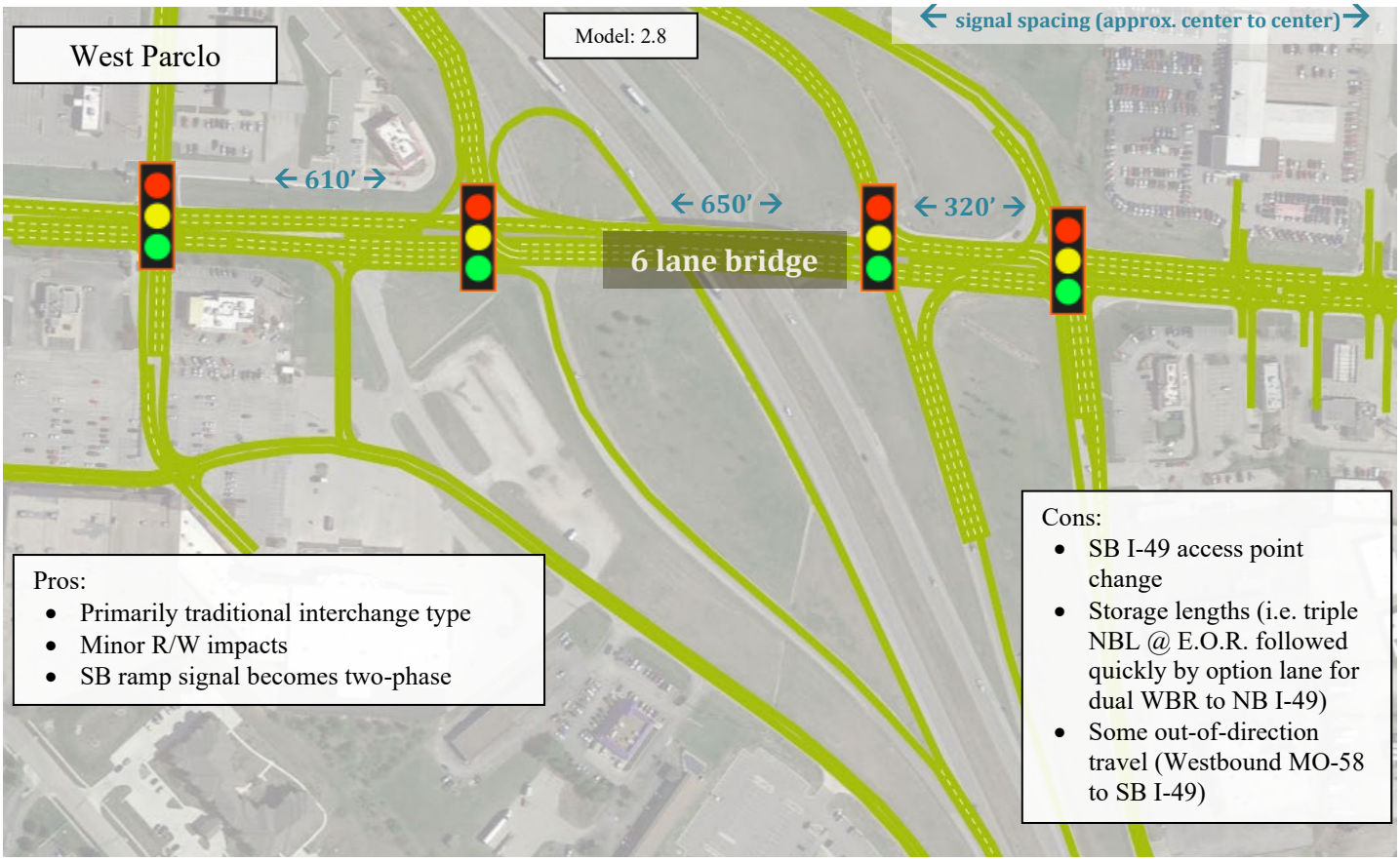

Existing Conditions
← signal spacing (approx. center to center) →
← 350' →
← 310' →
← 600' →
← 320' →
5 lane bridge
Congestion is common, particularly in the PM peak. There is a lack of storage distance between the signals. The five signals displayed (from west to east) are:
1. Powell Parkway
2. Peculiar Drive
3. SB ramps
4. NB ramps
5. East Outer Road

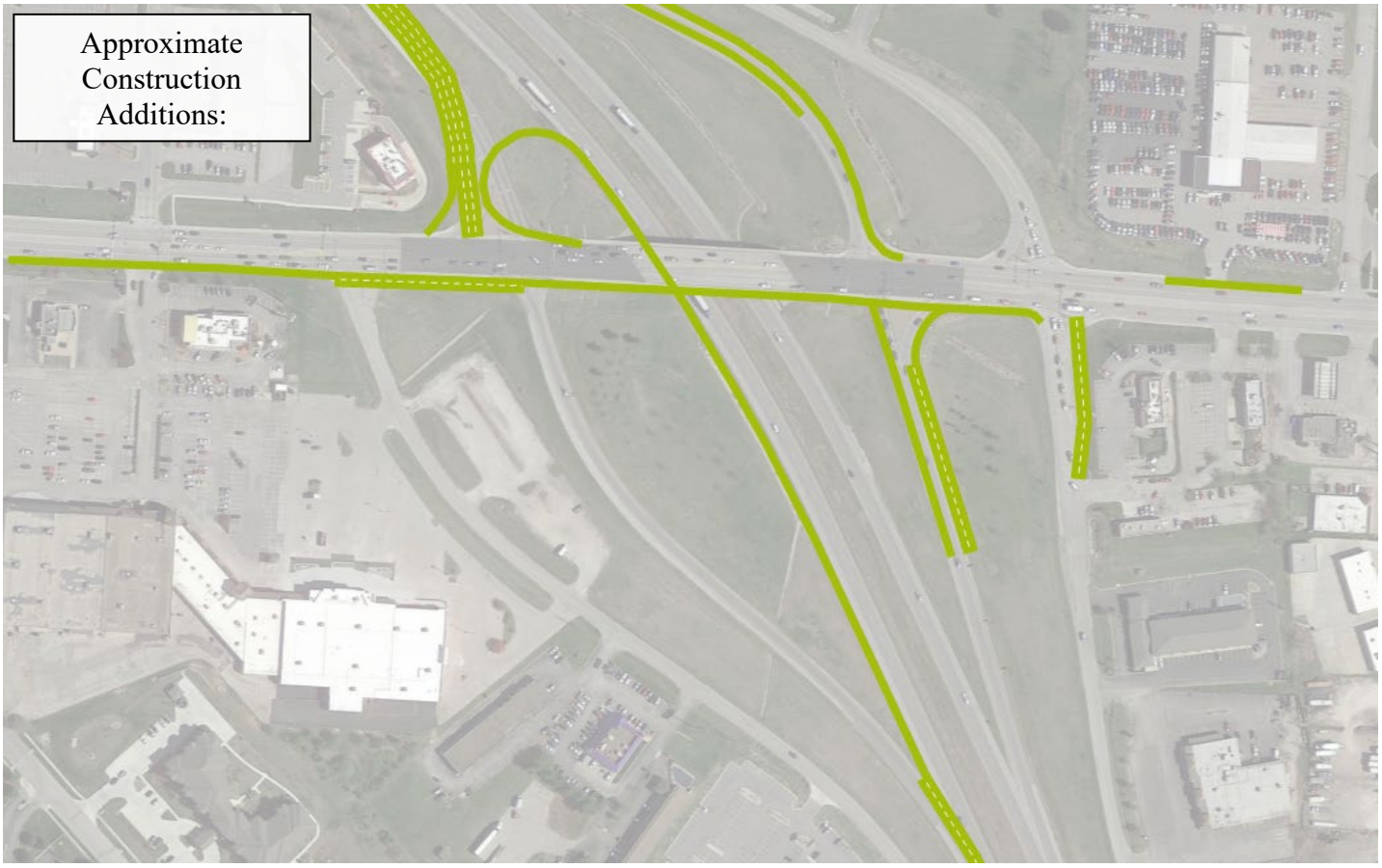

Improved Diamond
Model: 2.2
← signal spacing (approx. center to center) →
← 660' →
← 600' →
← 320' →
8 lane bridge
Pros:
• Traditional interchange type
• Minor R/W impacts
• Fewer impacts on I-49 than other options
Cons:
• Bridge width
• Storage lengths (i.e. triple NBL @ E.O.R. followed quickly by option lane for dual WBR to NB I-49)
• Taper conditions

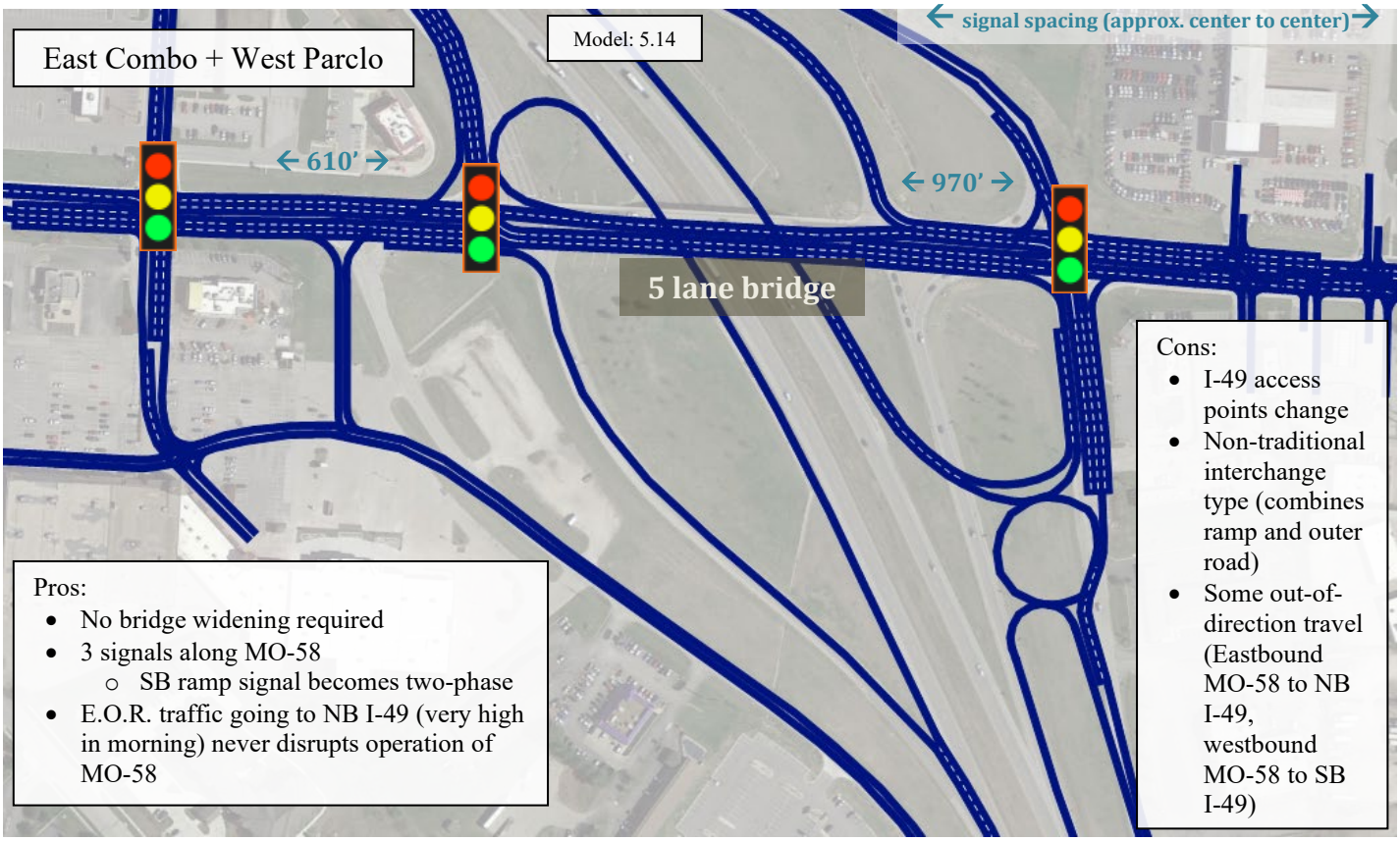

Approximate Construction Additions:

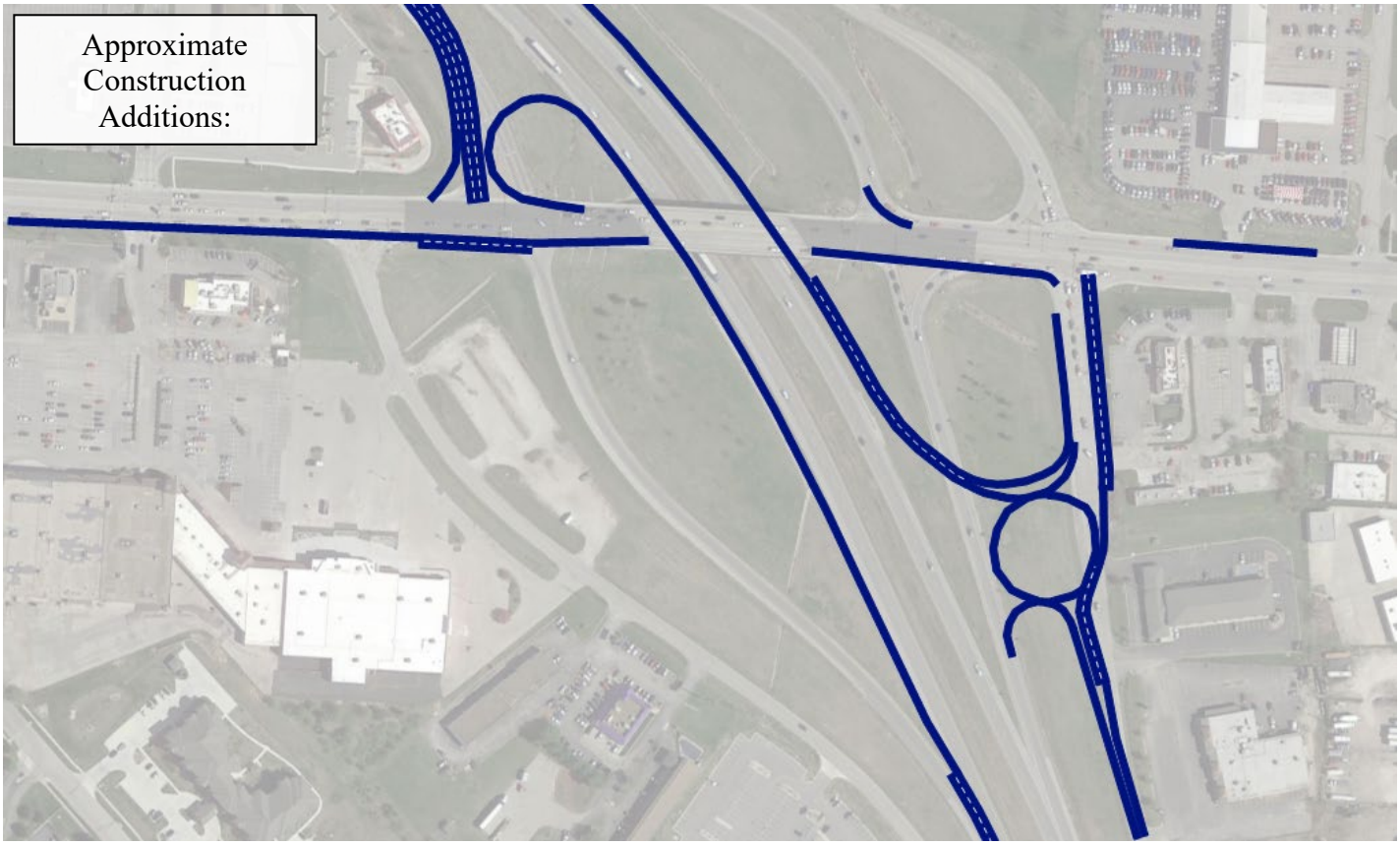

East Combo
Model: 5.13
signal spacing (approx. center to center)
660'
920'
7 lane bridge
Pros:
3 signals along MO-58
E.O.R. traffic going to NB I-49 (very high in morning) never disrupts operation of MO-58
Cons:
NB I-49 access point change
Non-traditional interchange type (combines ramp and outer road)
Some out-of-direction travel (Eastbound MO-58 to NB I-49)

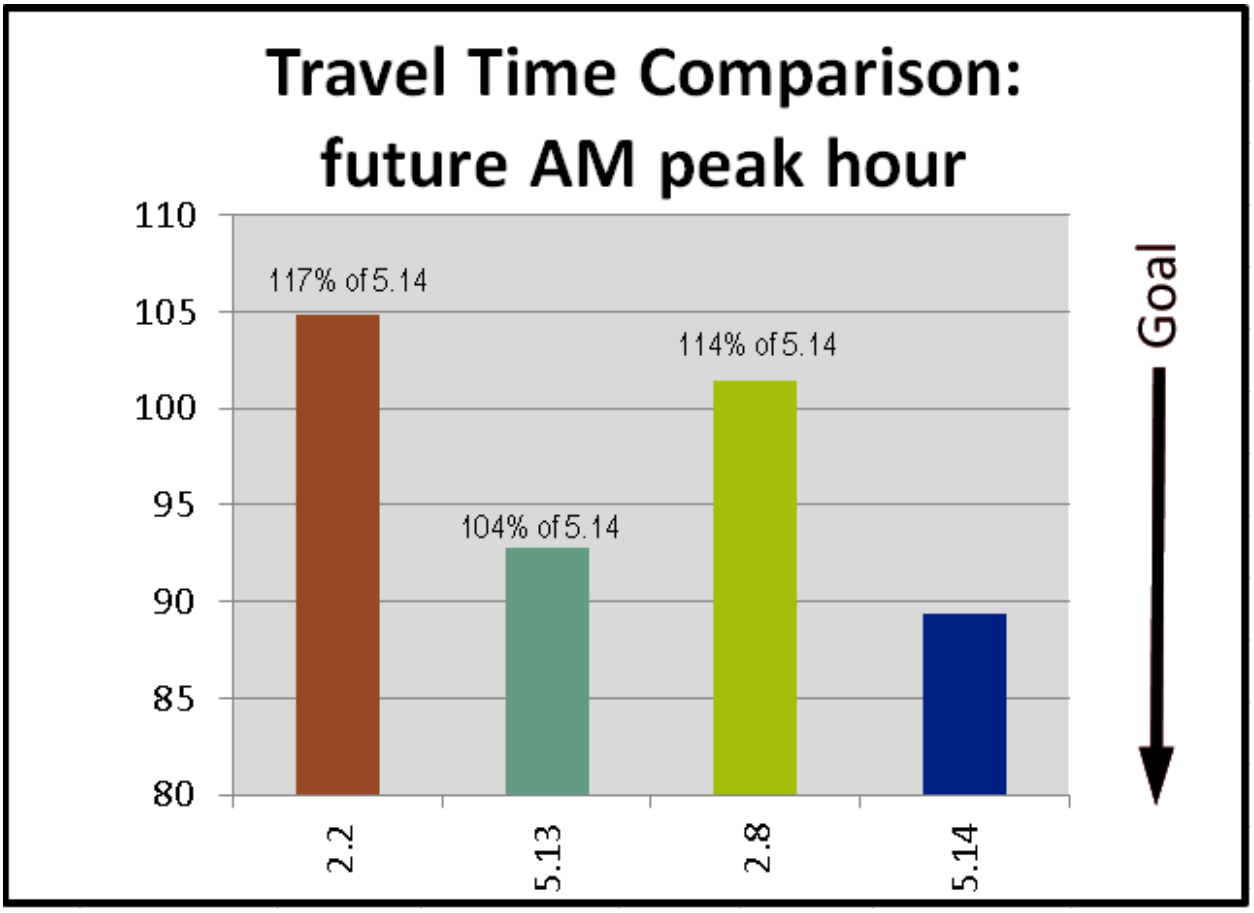

Approximate Construction Additions:

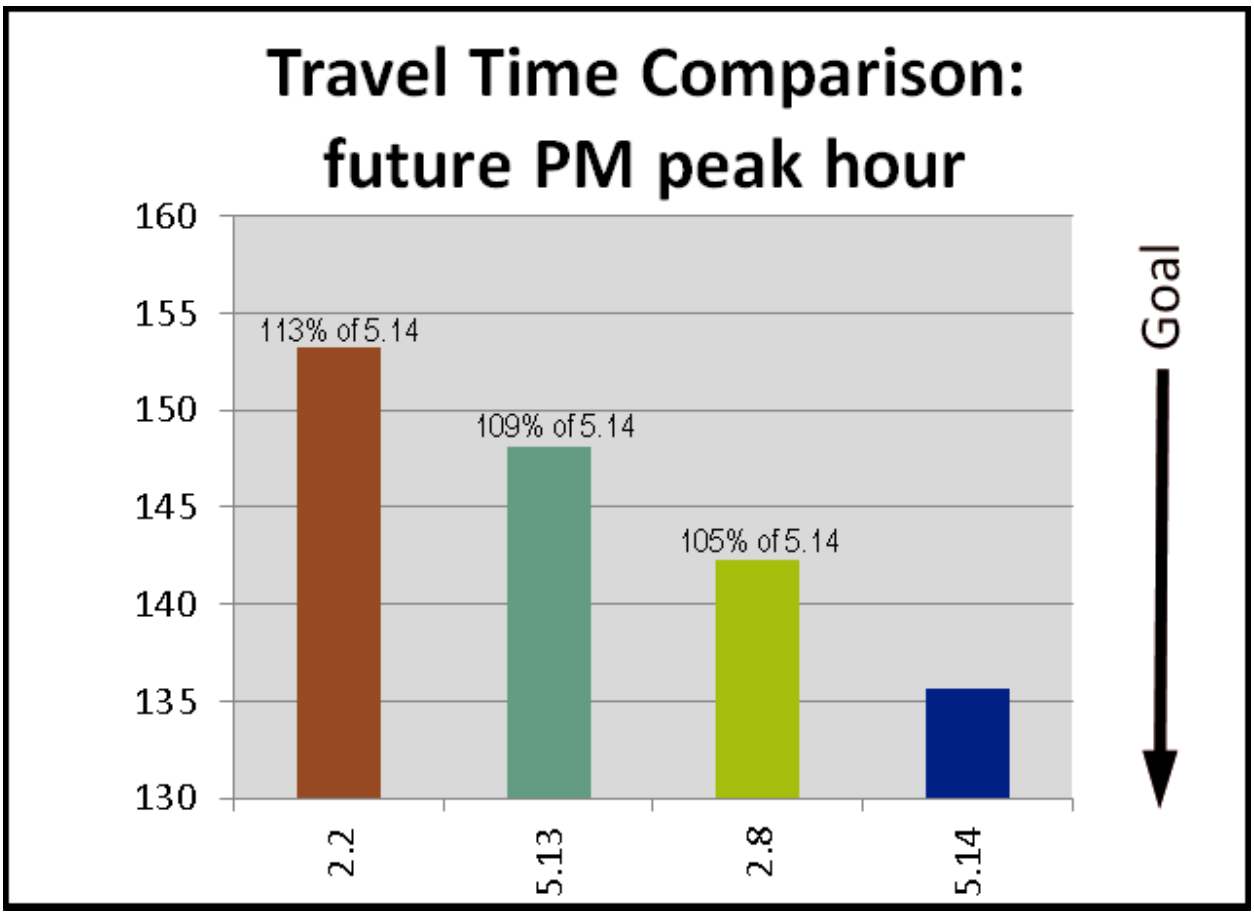

West Parclo
Model: 2.8
← signal spacing (approx. center to center) →
← 610' →
← 650' →
← 320' →
6 lane bridge
Pros:
• Primarily traditional interchange type
• Minor R/W impacts
• SB ramp signal becomes two-phase
Cons:
• SB I-49 access point change
• Storage lengths (i.e. triple NBL @ E.O.R. followed quickly by option lane for dual WBR to NB I-49)
• Some out-of-direction travel (Westbound MO-58 to SB I-49)


Approximate Construction Additions:


East Combo + West Parclo
Model: 5.14
← signal spacing (approx. center to center) →
← 610' →
← 970' →
5 lane bridge
Pros:
• No bridge widening required
• 3 signals along MO-58
◦ SB ramp signal becomes two-phase
• E.O.R. traffic going to NB I-49 (very high in morning) never disrupts operation of MO-58
Cons:
• I-49 access points change
• Non-traditional interchange type (combines ramp and outer road)
• Some out-of-direction travel (Eastbound MO-58 to NB I-49, westbound MO-58 to SB I-49)


Approximate Construction Additions:


Travel Time Comparison:
future AM peak hour
110
105
100
95
90
85
80
117% of 5.14
104% of 5.14
114% of 5.14
2.2
5.13
2.8
5.14
Goal


Travel Time Comparison:
future PM peak hour
160
155
150
145
140
135
130
113% of 5.14
109% of 5.14
105% of 5.14
2.2
5.13
2.8
5.14
Goal