

2017 Transportation Engineering and Safety Conference  
State College, Pennsylvania



## Guidance on DDIs and Other Innovative Intersections in Pennsylvania

- DDIs are HERE!!!
- Innovative Intersections have been here for a long time too!!!



US 11/15 New Buffalo  
Continuous-T Intersection

© 2017 Google

Imagery Date: 4/15/2016



SR 145 Whitehall  
Jughandles

© 2017 Google



US 1/13 Philadelphia  
Signalized Traffic Circle

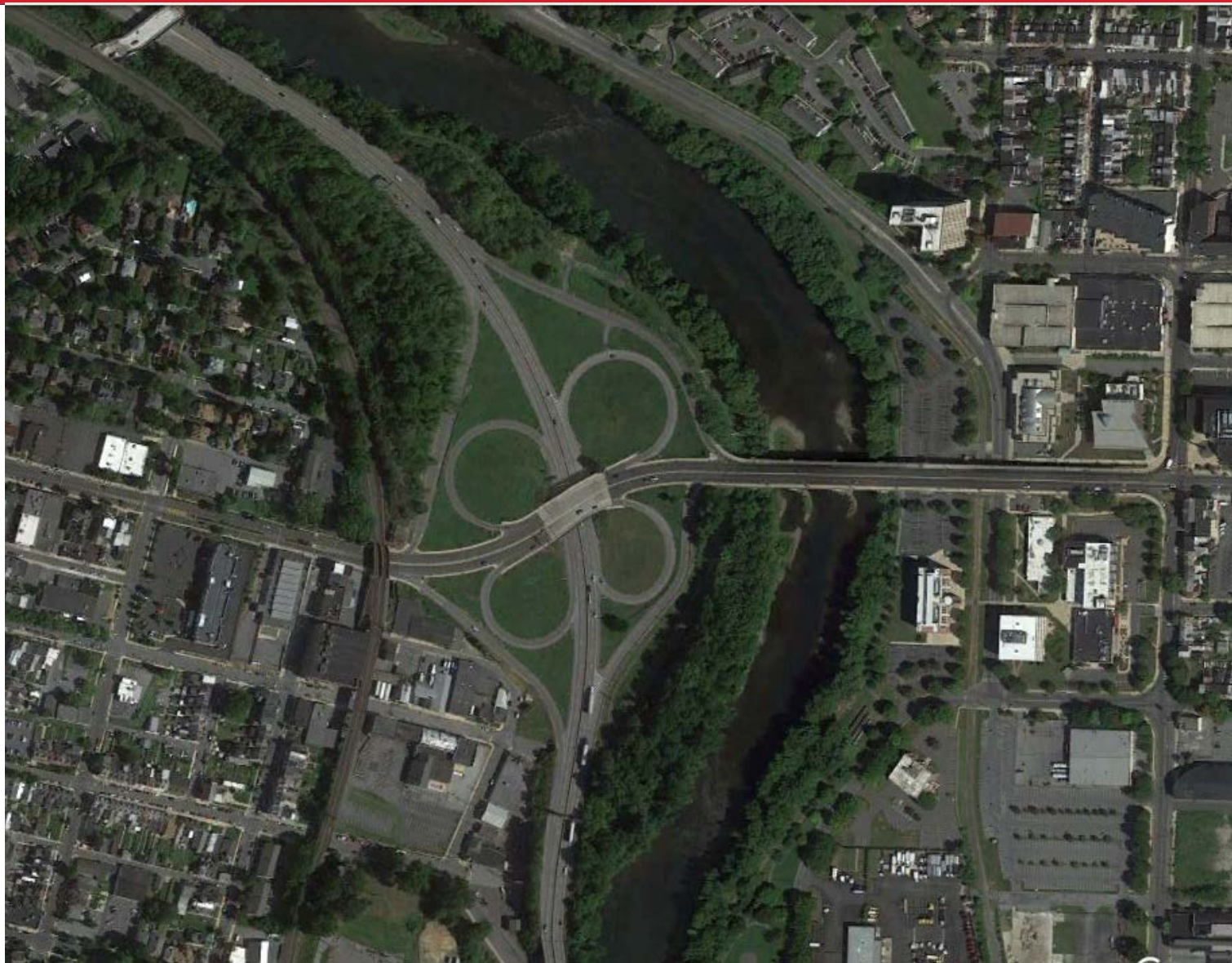
© 2017 Google

Imagery Date: 5/24/2016 40°01'54.19" N

- DDIs are HERE!!!
- Innovative Intersections have been here for a long time too!!!
- WHY ARE THEY NEEDED IN PENNSYLVANIA?
  - Constrained Right-of-Way
  - Improving Congestion
  - Reducing Crashes
  - SAVE \$\$\$\$\$\$\$\$\$\$\$\$\$!!!!!!!
  - Developers want them!!!



- PennDOT Innovative Intersection Peer Review Contract
  - ATS is a sub to Urban Engineers
- We have reviewed four DDI related projects in District 5 (Allentown)
  - US 422/Penn Street, Reading
  - SR 33/William Penn Highway, Bethlehem
  - US 222/Broadcasting Road, Reading
  - US 22/SR 145 (MacArthur Road),  
Whitehall (north of Allentown)



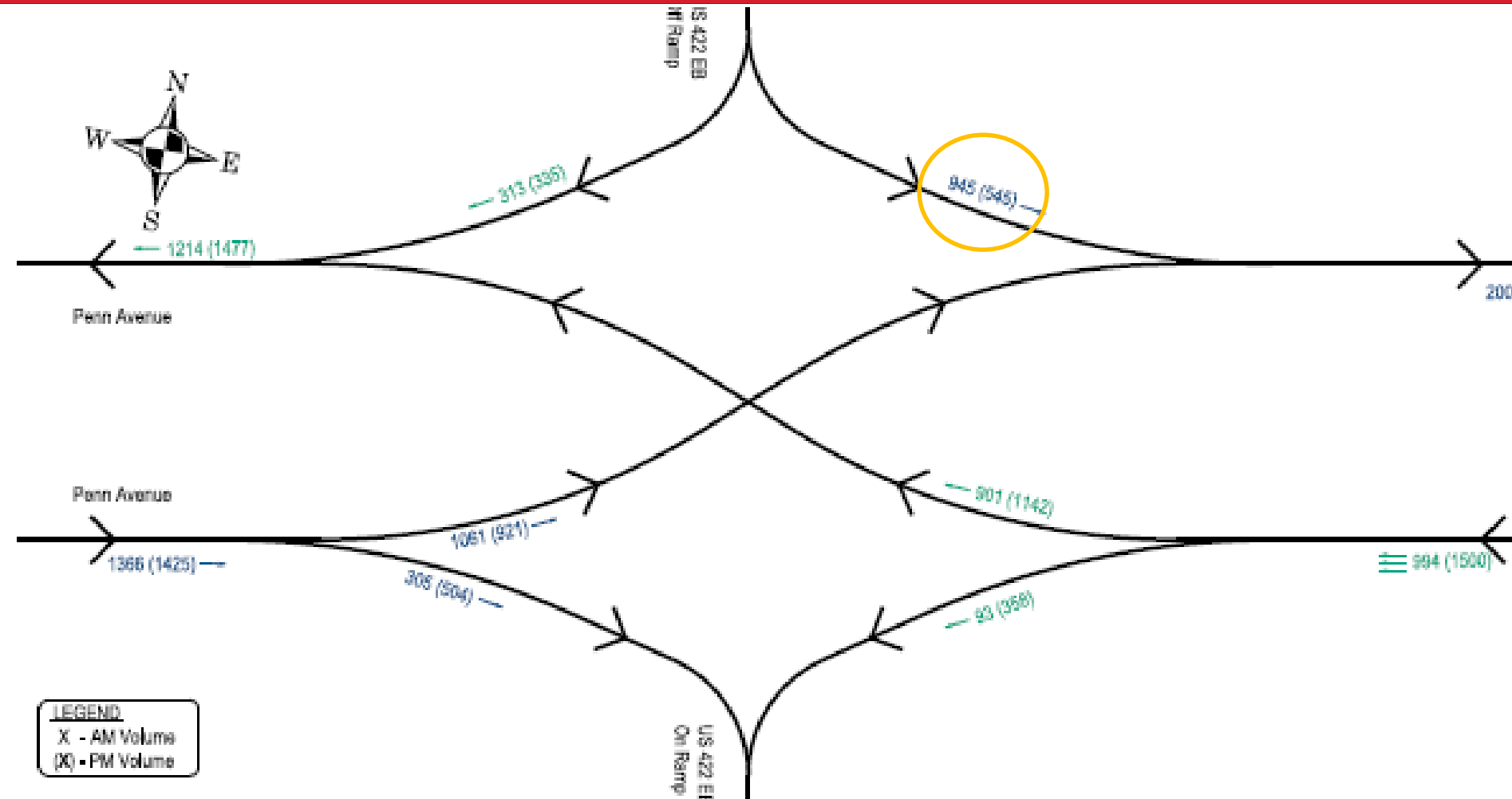




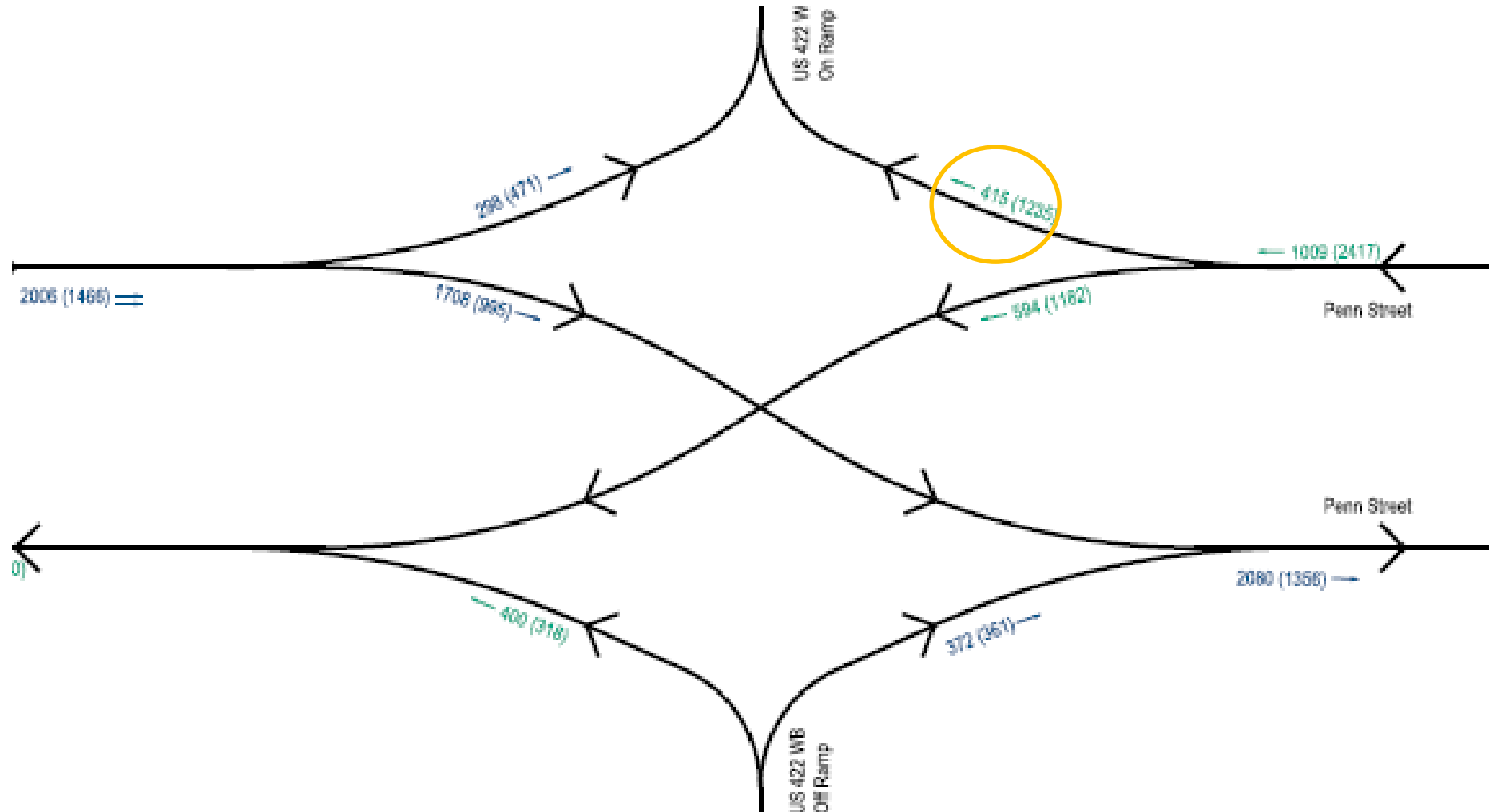








WEST CROSSOVER 2046 PEAK VOLUMES



EAST CROSSOVER 2046 PEAK VOLUMES



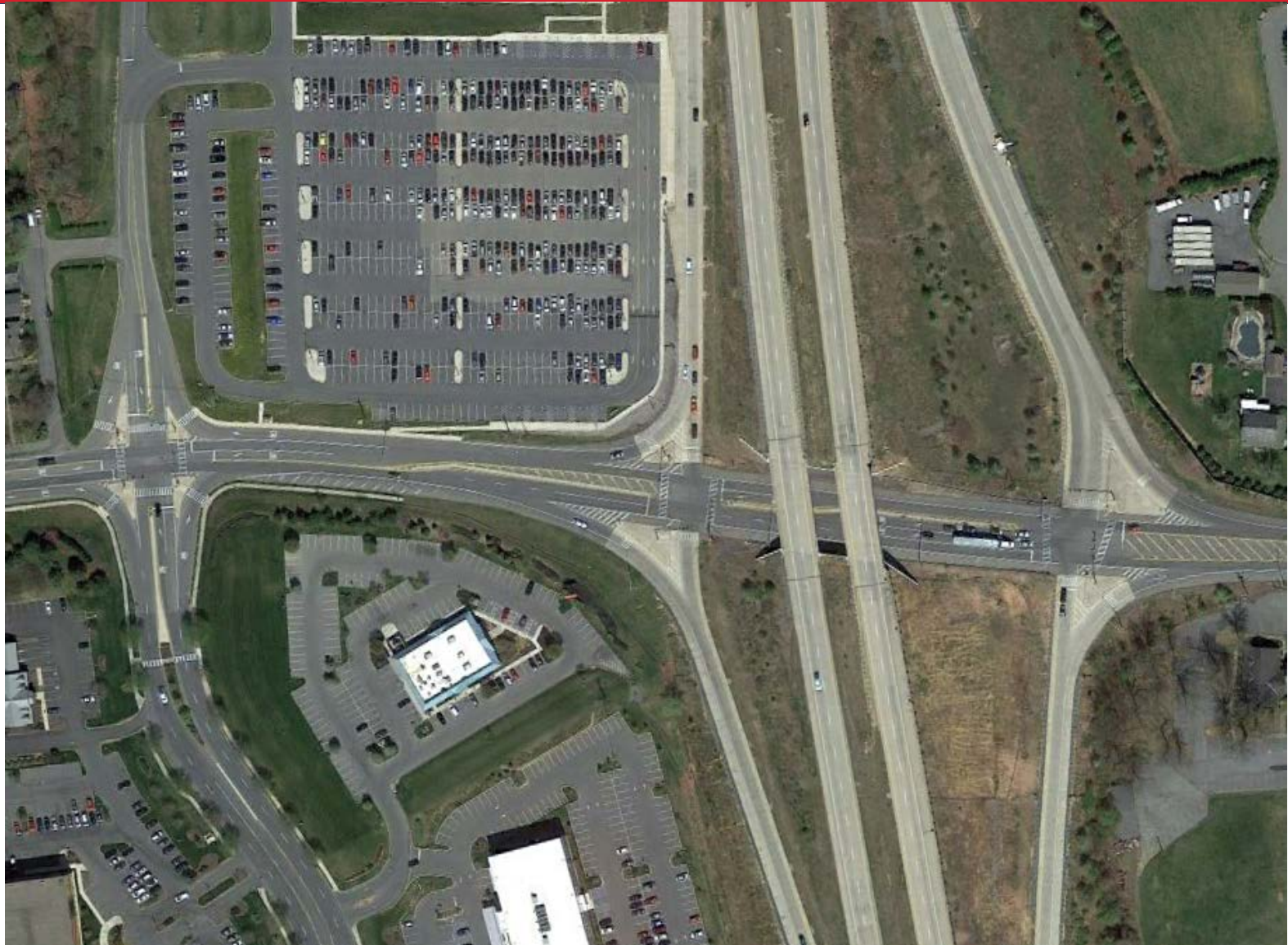


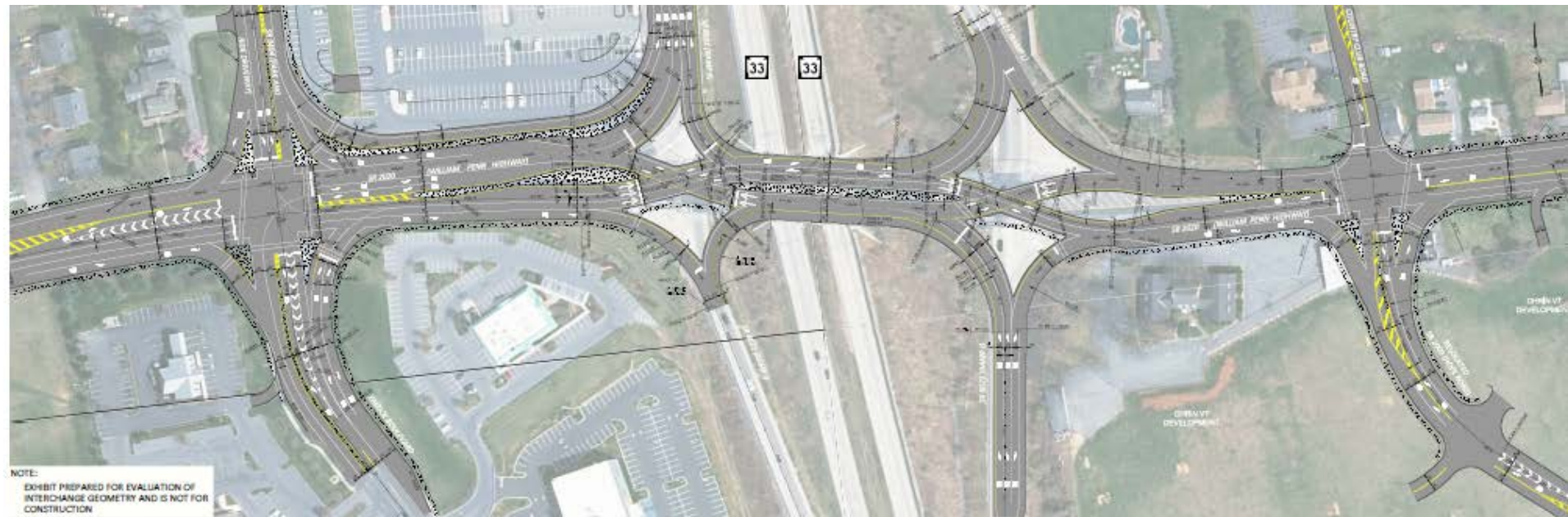
## Peer Review Items:

- Constructability
- WB weave lane
- Lane balancing
- Pedestrian Accommodations
- Queue Management
- On-Ramp sight distance
- Lane Widths

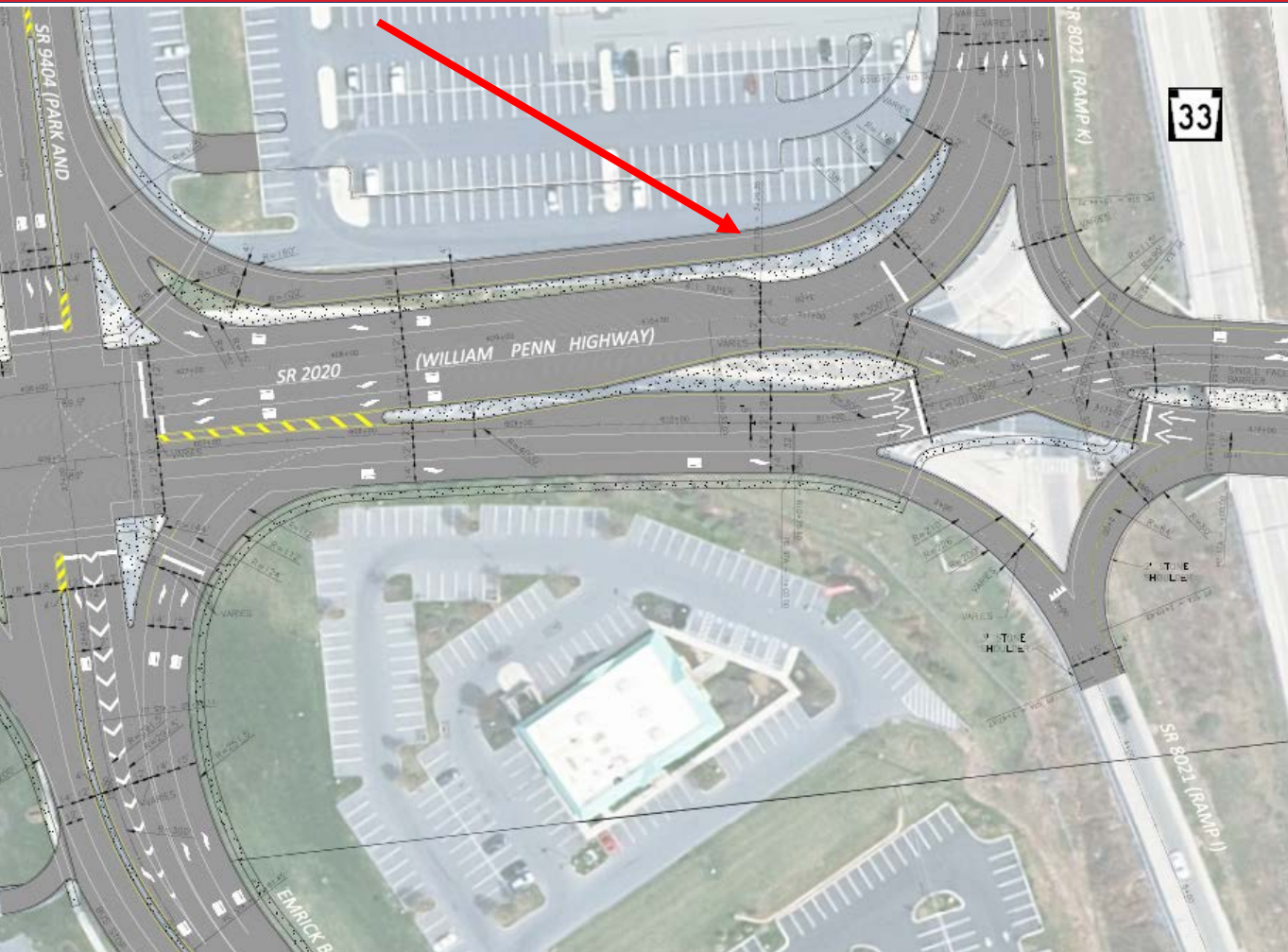








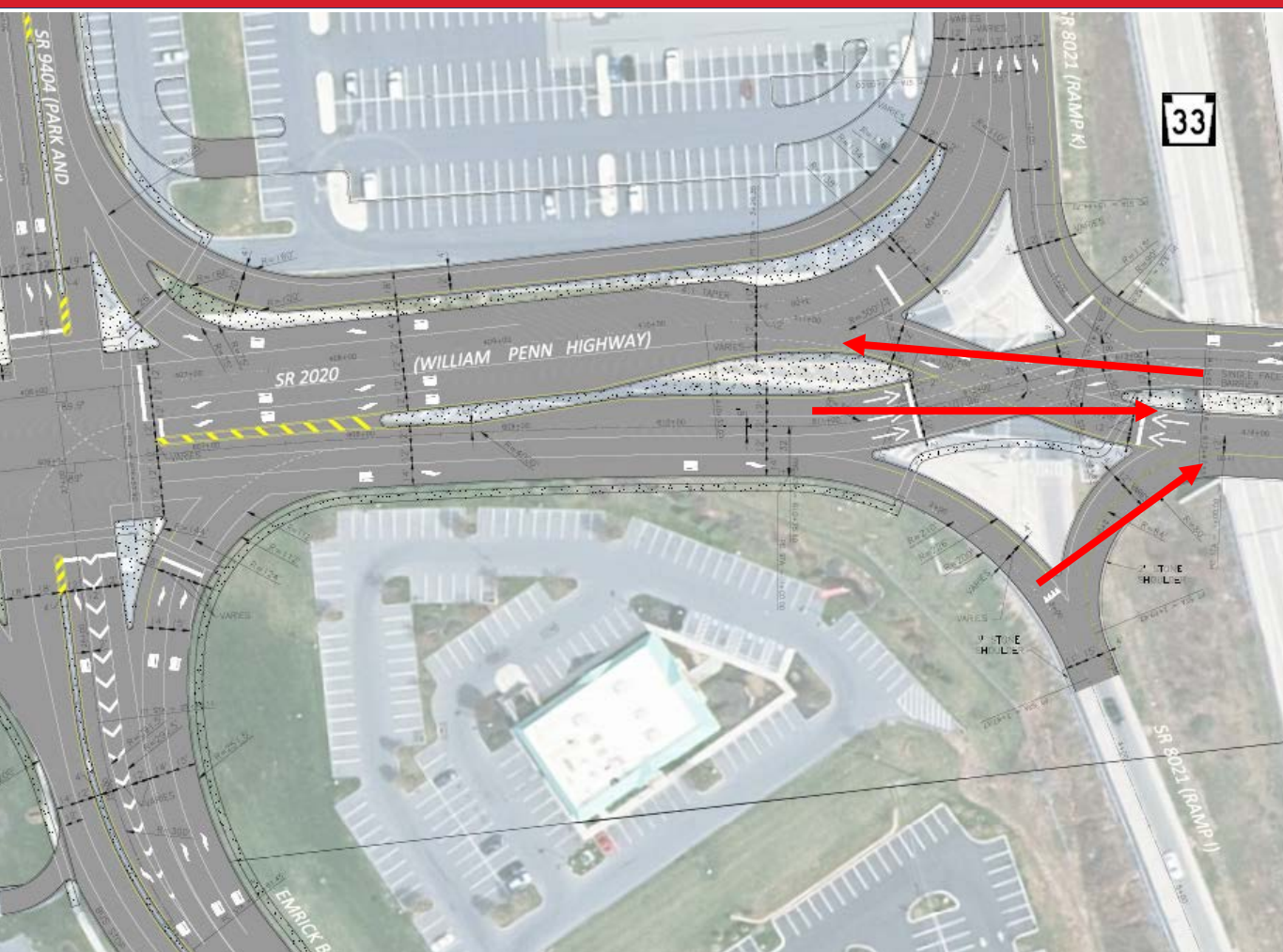




- Peer Review Items:
- Right Turn Bypass Lane







### Peer Review Items:

- Right Turn Bypass Lane
- SB Left Turn Lane Reduction
- EB Thru Lanes
- On-Ramp Sight Distance
- Direct Path Test

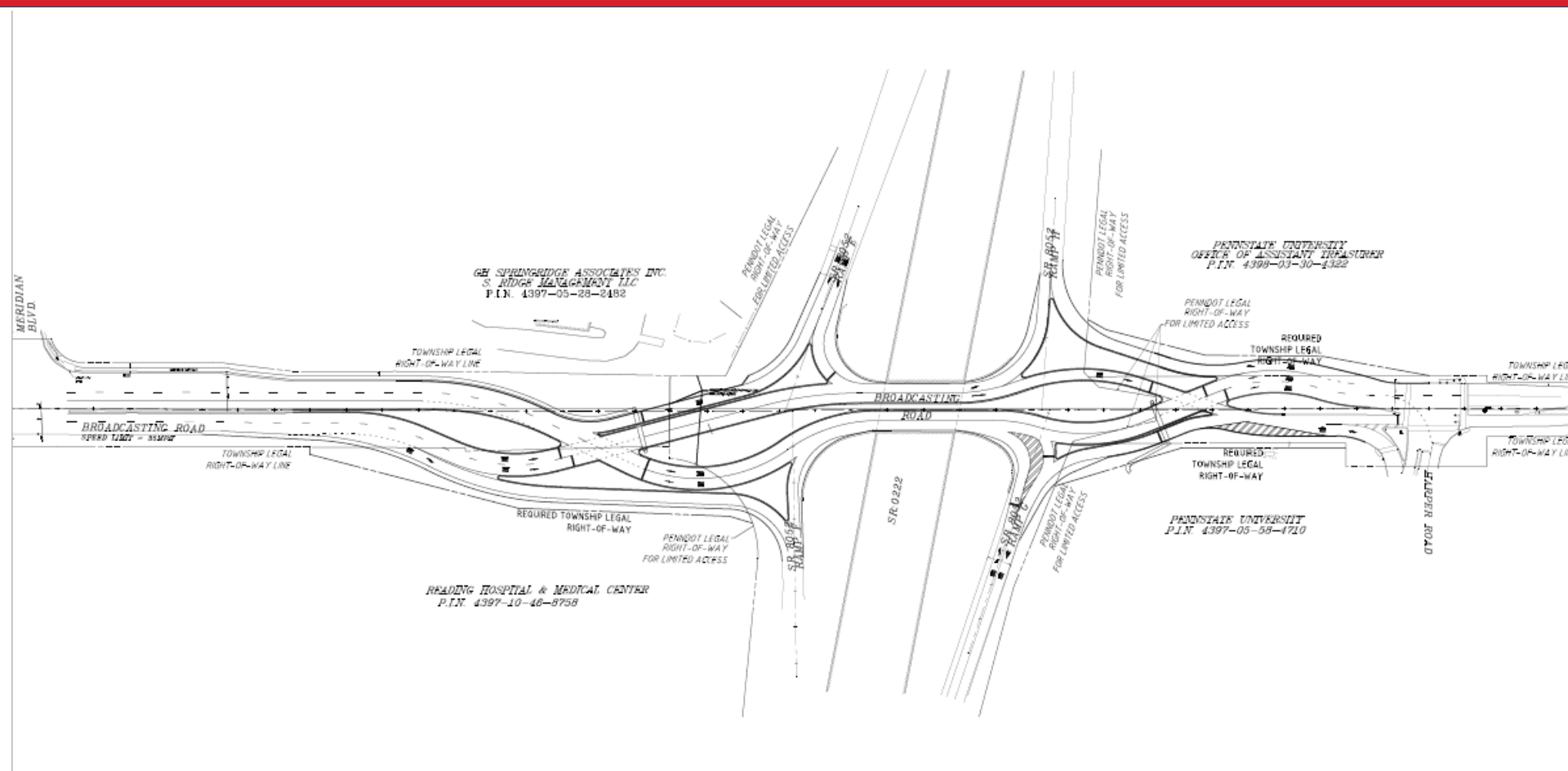


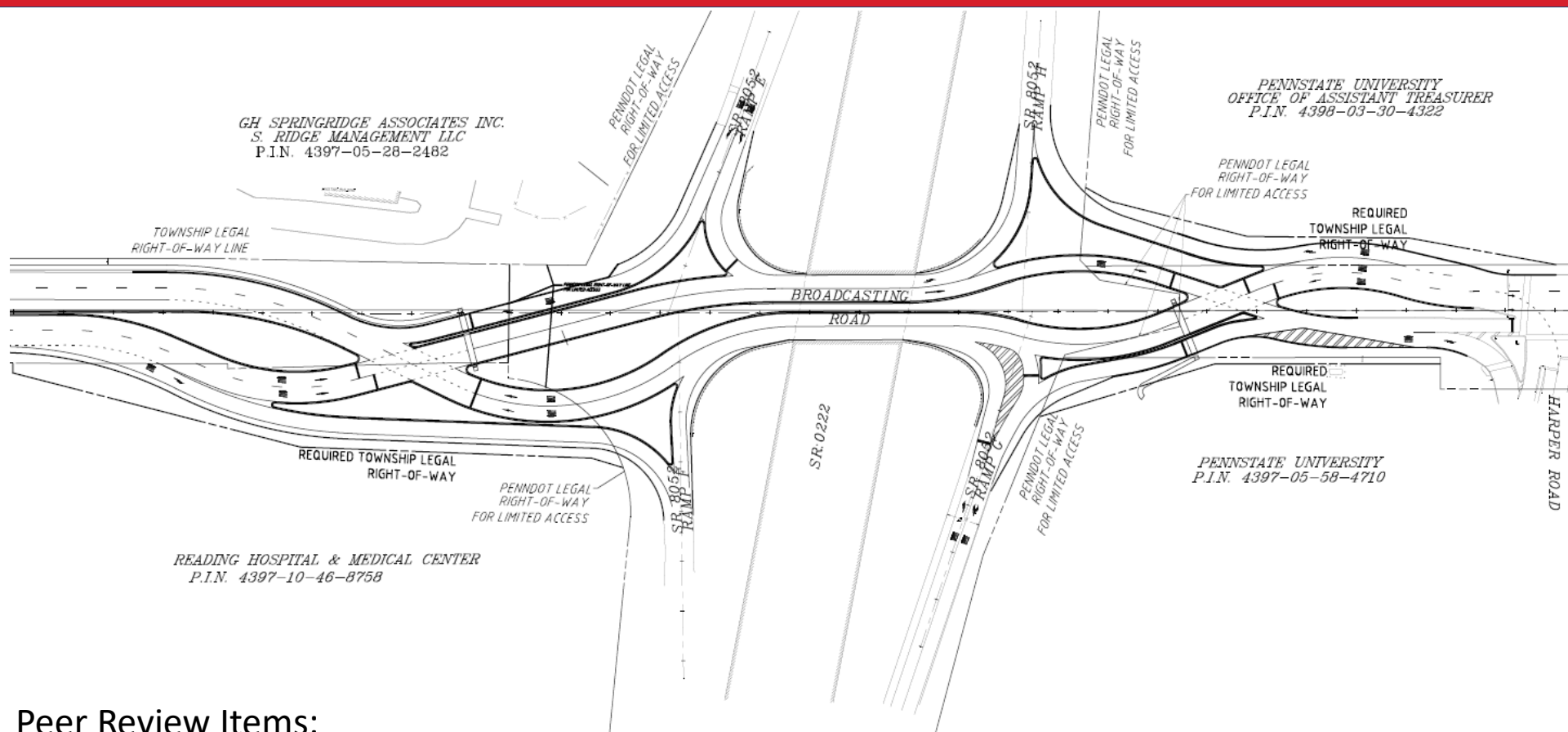










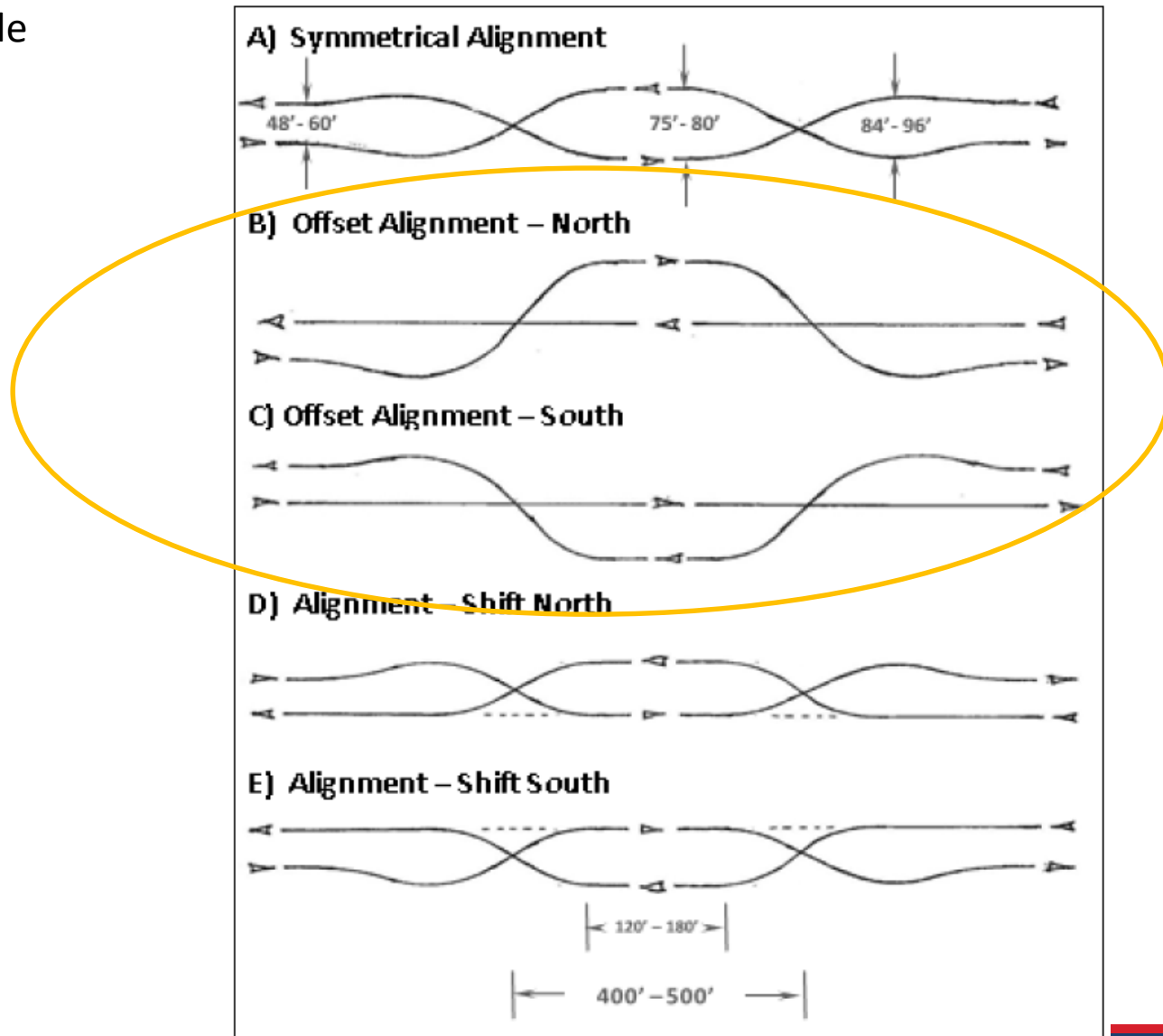


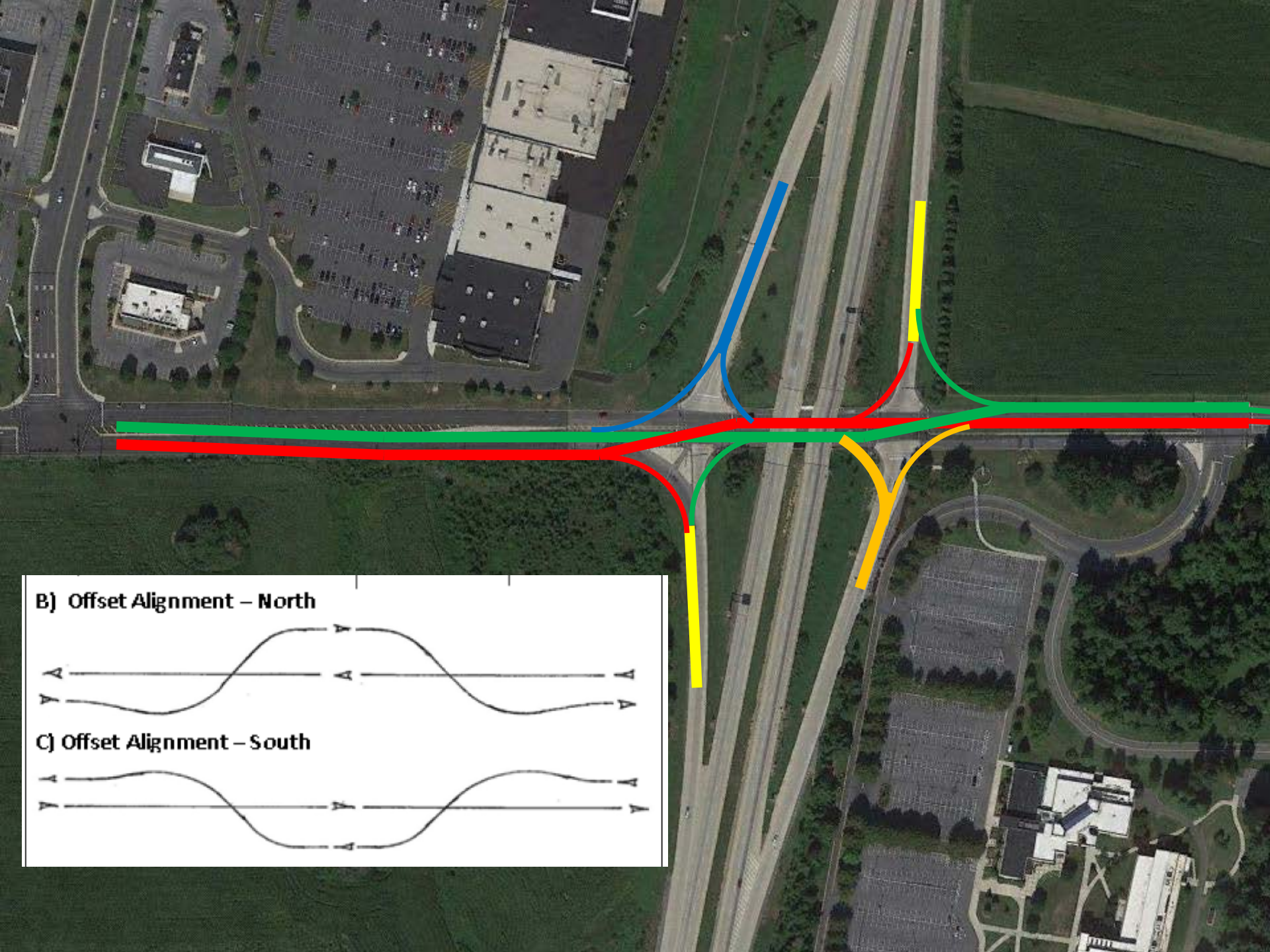
### Peer Review Items:

- Off-Ramp Right Turn Sight Distance
- Spacing of Off-Ramp Left Turns
- NB Off-Ramp Queueing from Choice Lane
- Alternative Alignment?

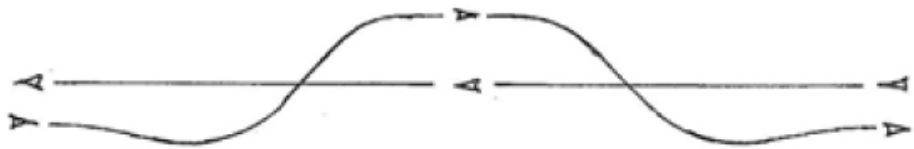


## FHWA DDI Informational Guide Exhibit 7-8

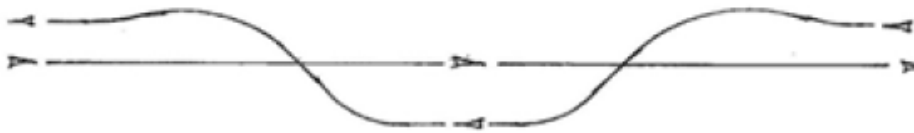




**B) Offset Alignment – North**



**C) Offset Alignment – South**























**AECOM**



**US-22 WIDENING  
SR 0145 ALTERNATIVE 1**

OCTOBER 8, 2015  
WHITEHALL TOWNSHIP, LEHIGH COUNTY





**US-22 WIDENING  
SR 0145 ALTERNATIVE 3**



pennsylvania  
DEPARTMENT OF TRANSPORTATION  
DISTRICT 50

JUNE 2016  
LEHIGH COUNTY

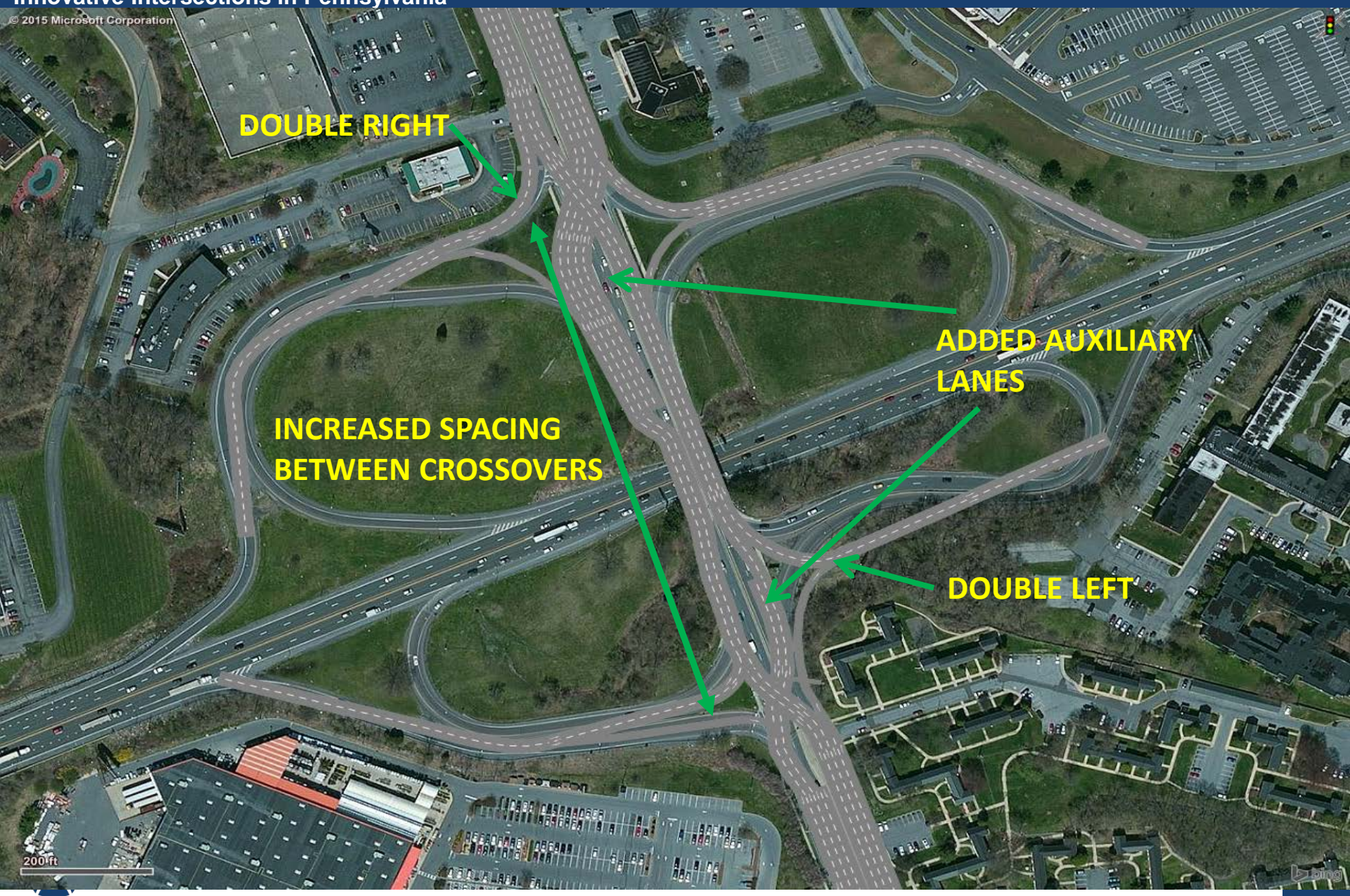








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**DOUBLE RIGHT**

**INCREASED SPACING  
BETWEEN CROSSOVERS**

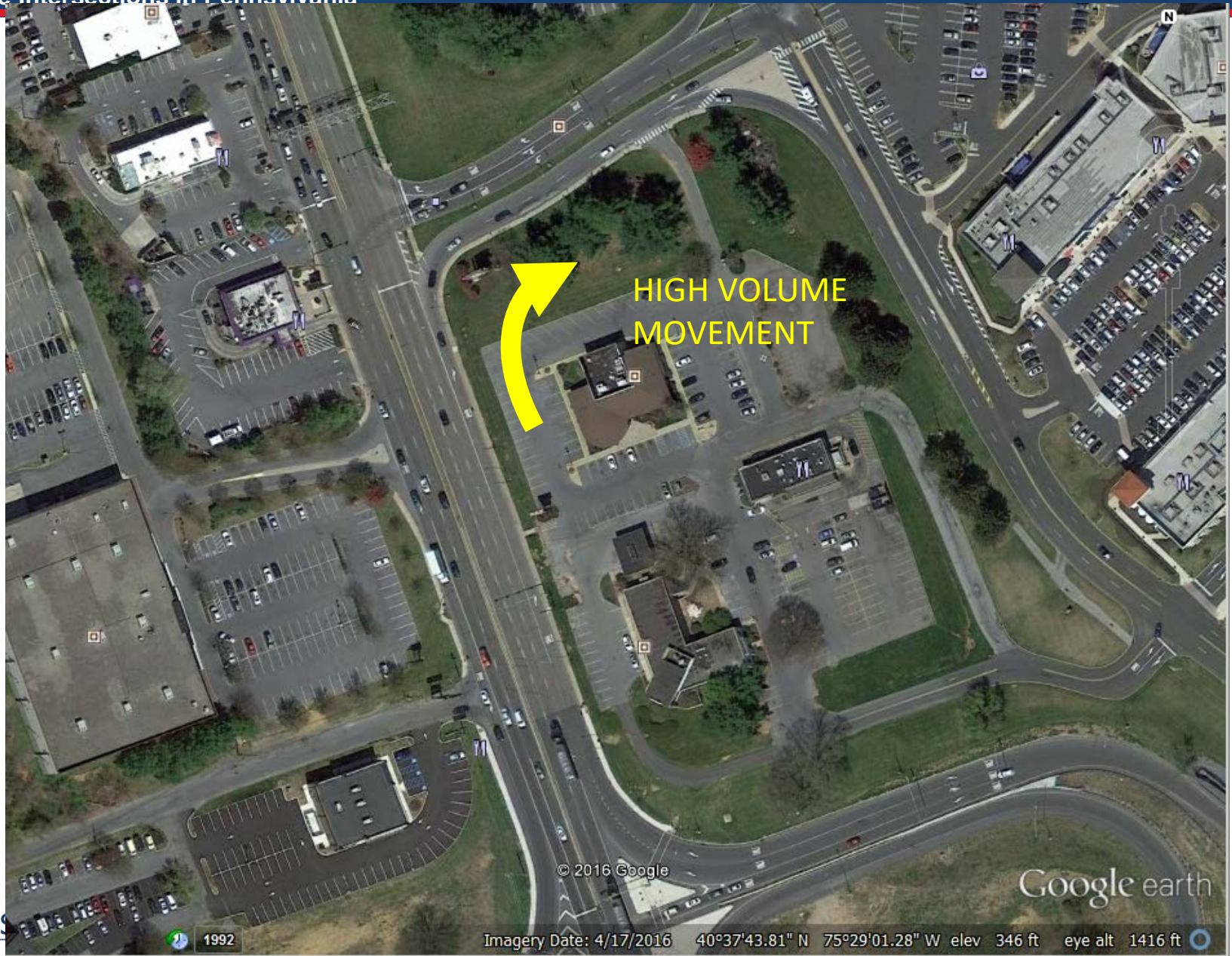
**ADDED AUXILIARY  
LANES**

**DOUBLE LEFT**

200ft







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Google earth

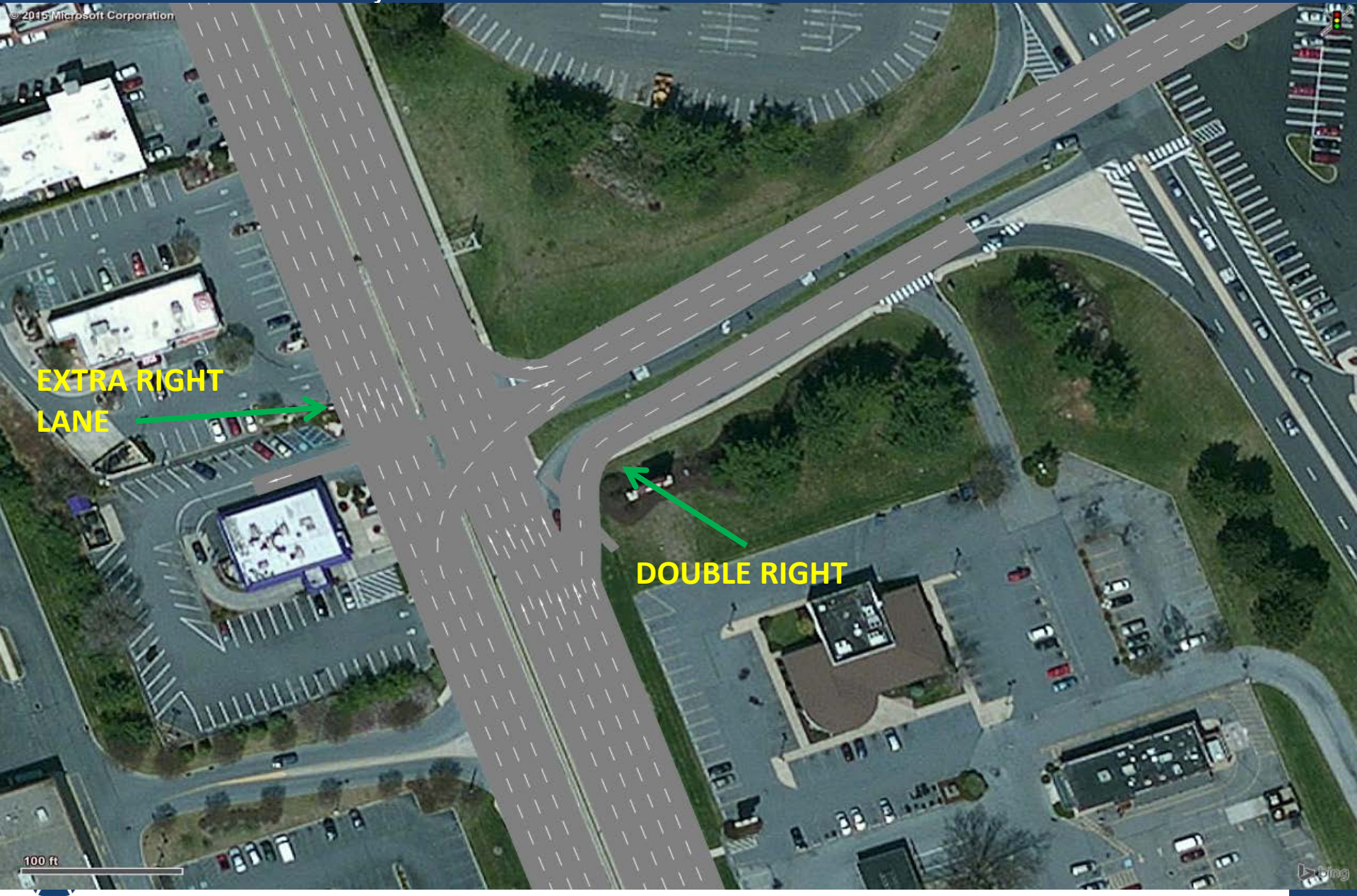


1992

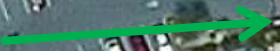
Imagery Date: 4/17/2016 40°37'43.81" N 75°29'01.28" W elev 346 ft eye alt 1416 ft



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**EXTRA RIGHT  
LANE**



**DOUBLE RIGHT**



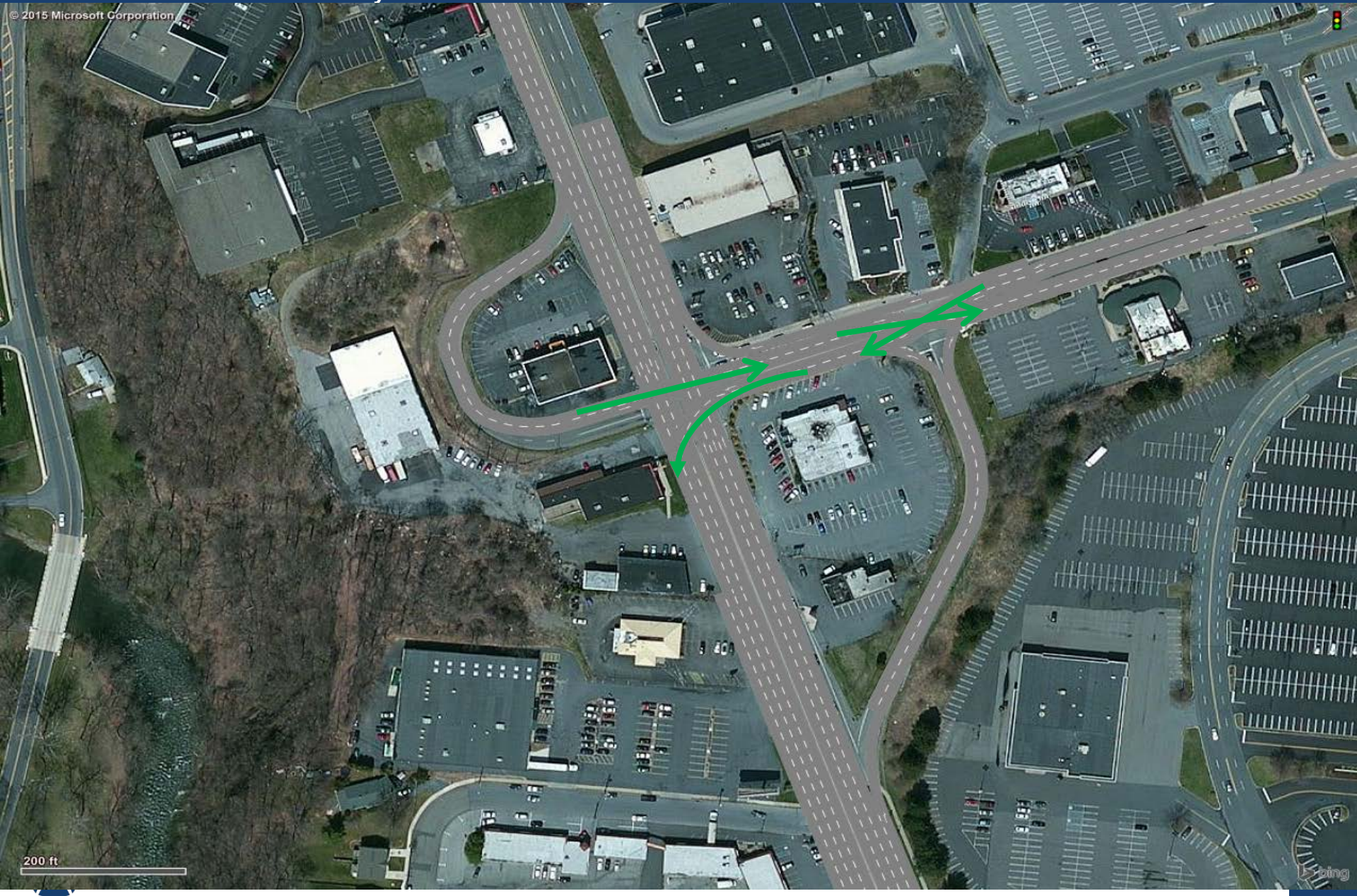
100 ft







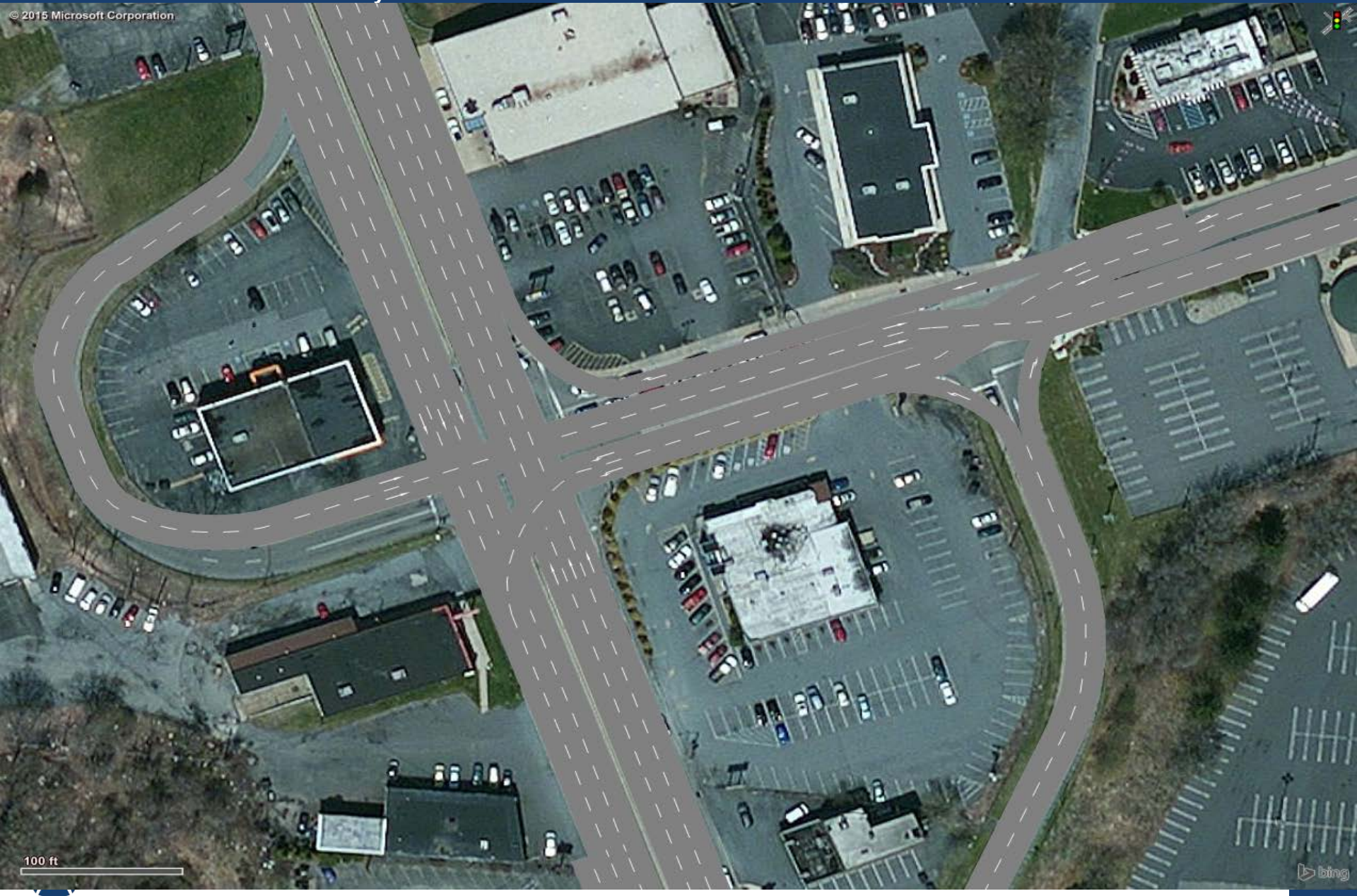
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200 ft

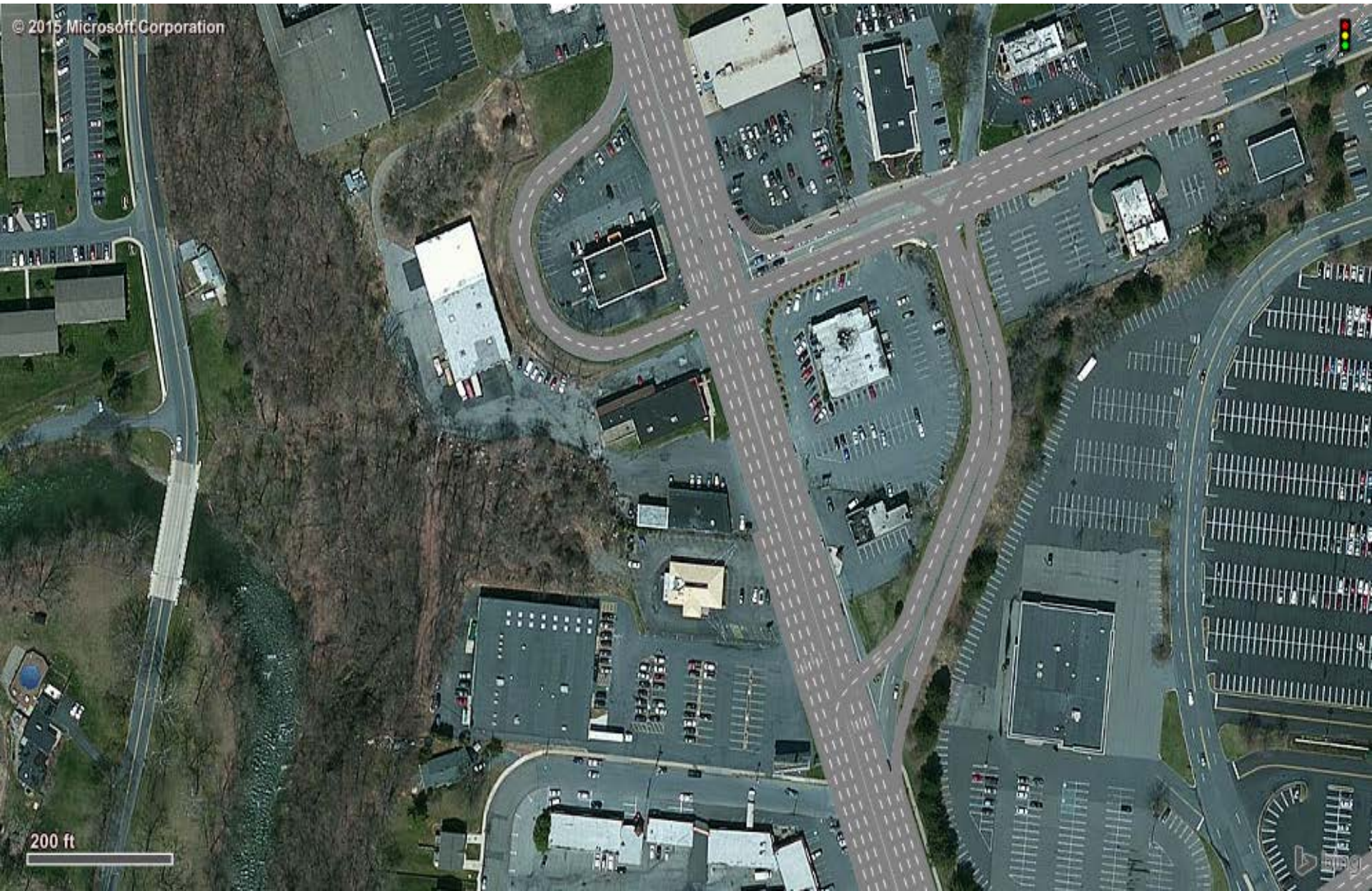


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100 ft

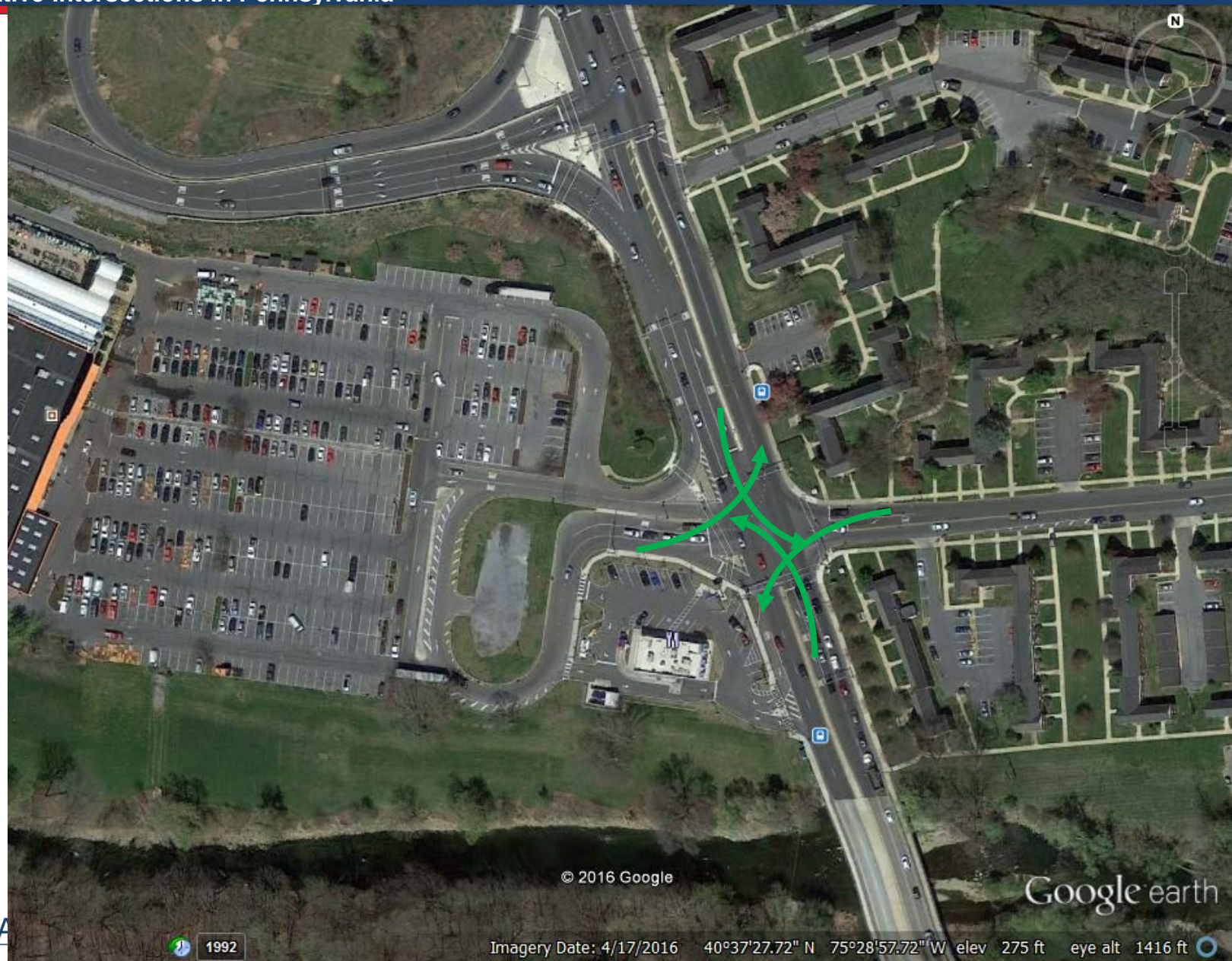




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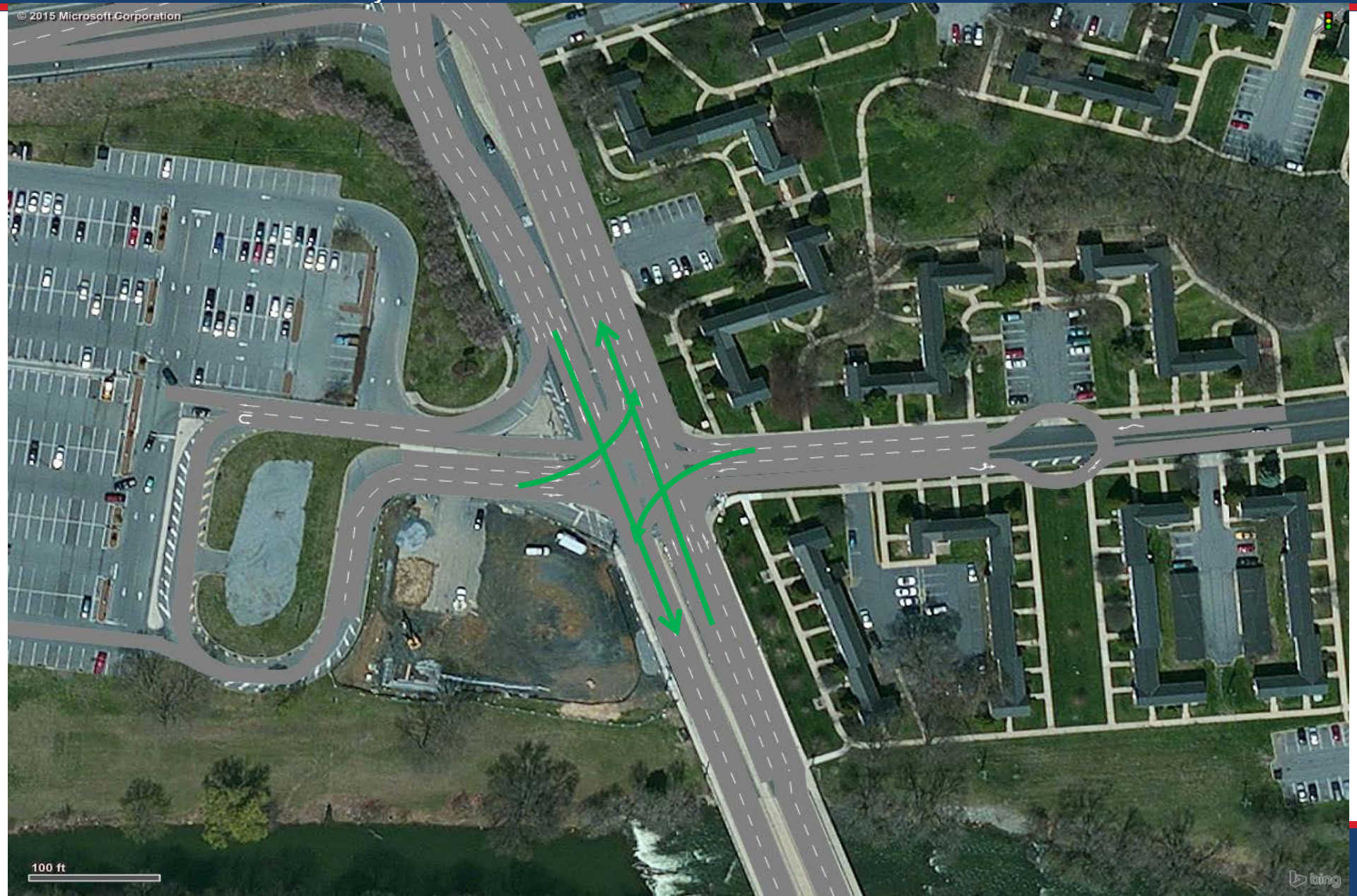
200 ft







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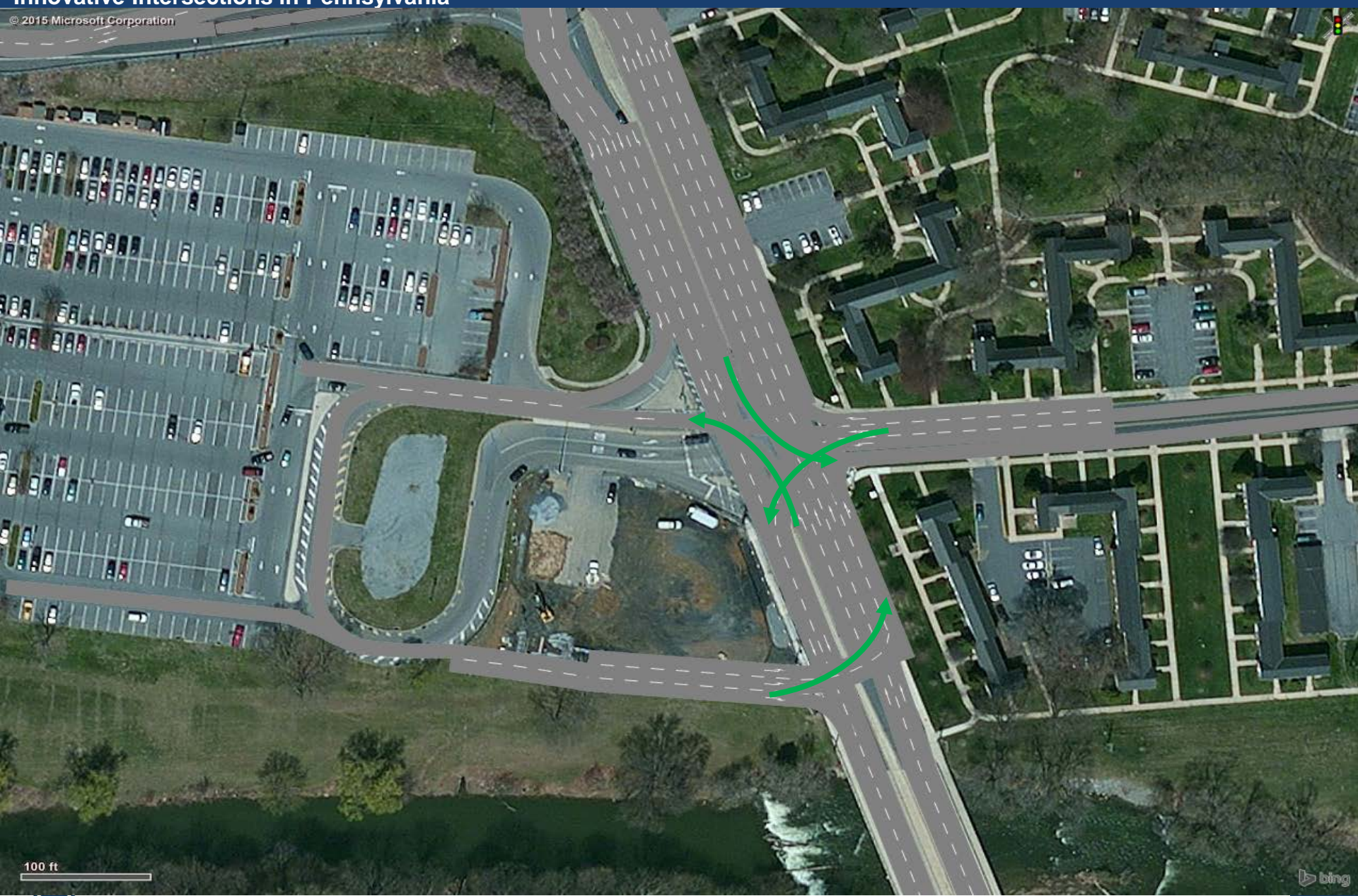


100 ft

bing



© 2015 Microsoft Corporation



100 ft





<b>DDI</b>	<b>2042</b>	<b>2047</b>	<b>2052</b>	<b>2057*</b>	<b>2062**</b>
<b>1 North Crossover</b>	27.50 LOS C	26.38 LOS C	26.84 LOS C	23.41 LOS C	28.53 LOS C
<b>2 South Crossover</b>	22.01 LOS C	16.36 LOS B	16.83 LOS B	13.62 LOS B	20.18 LOS C
<b>3 Grape</b>	21.30 LOS C	23.56 LOS C	23.58 LOS C	25.95 LOS C	30.29 LOS C
<b>4 Lehigh Mall</b>	12.60 LOS B	14.17 LOS B	14.56 LOS B	17.65 LOS B	20.70 LOS C
<b>5 Fairmont</b>	26.68 LOS C	27.64 LOS C	28.16 LOS C	26.05 LOS C	28.72 LOS C

- DDIs and Other Innovative Intersections are HERE!!!
- Every DDI has unique issues that need to be considered based on the operational and signing needs
- FHWA DDI Informational Guide does not have all the answers and is not perfect with the answers it does have
- PennDOT now has resources to guide safe and efficient innovative designs
- Every PennDOT district has the potential for DDIs and other innovative designs



# Questions???

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Solutions

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