



December 14, 2016

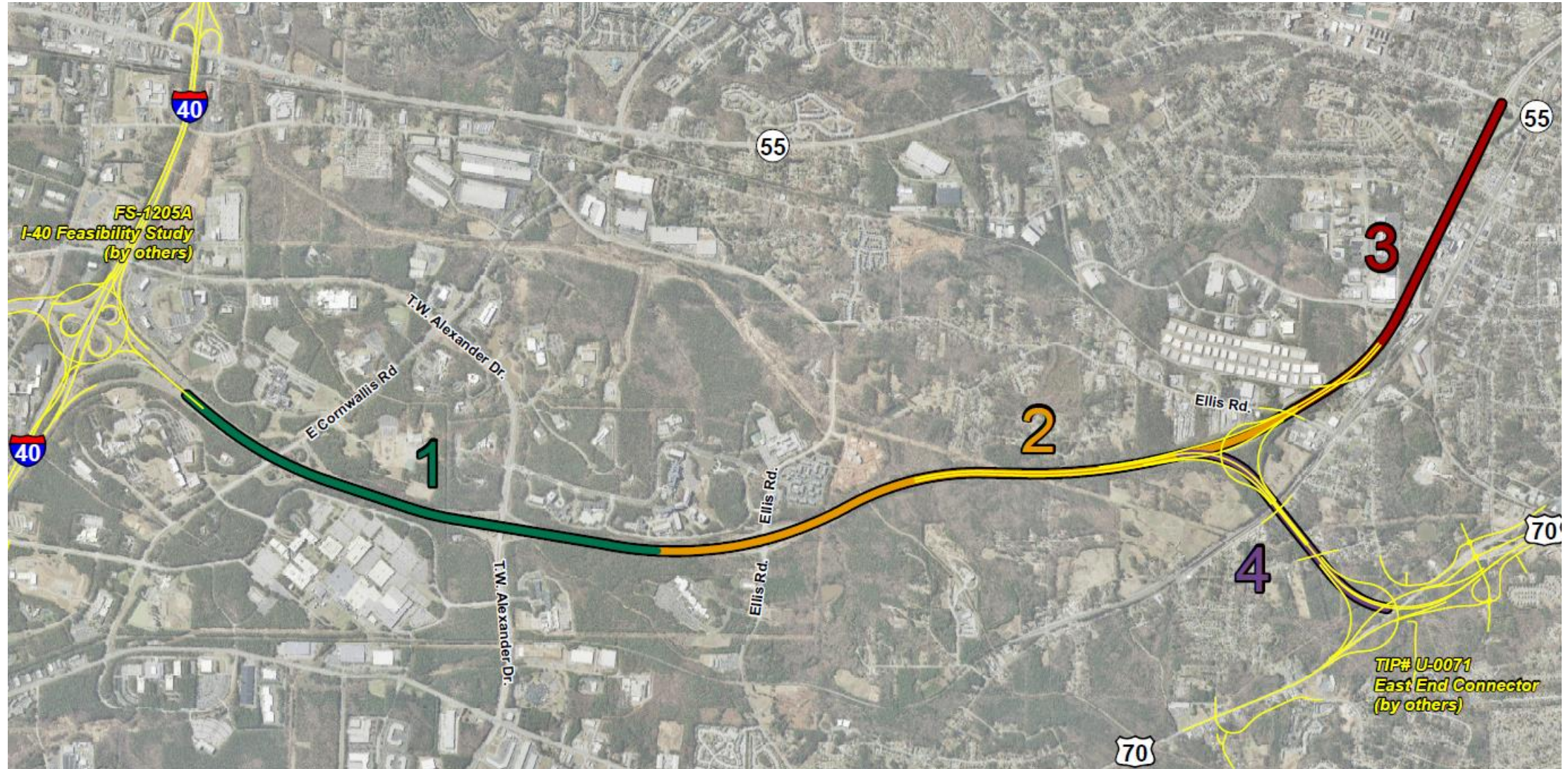
*FS-1205C Improvements to NC 147  
(Durham Freeway)*

Matthew Potter



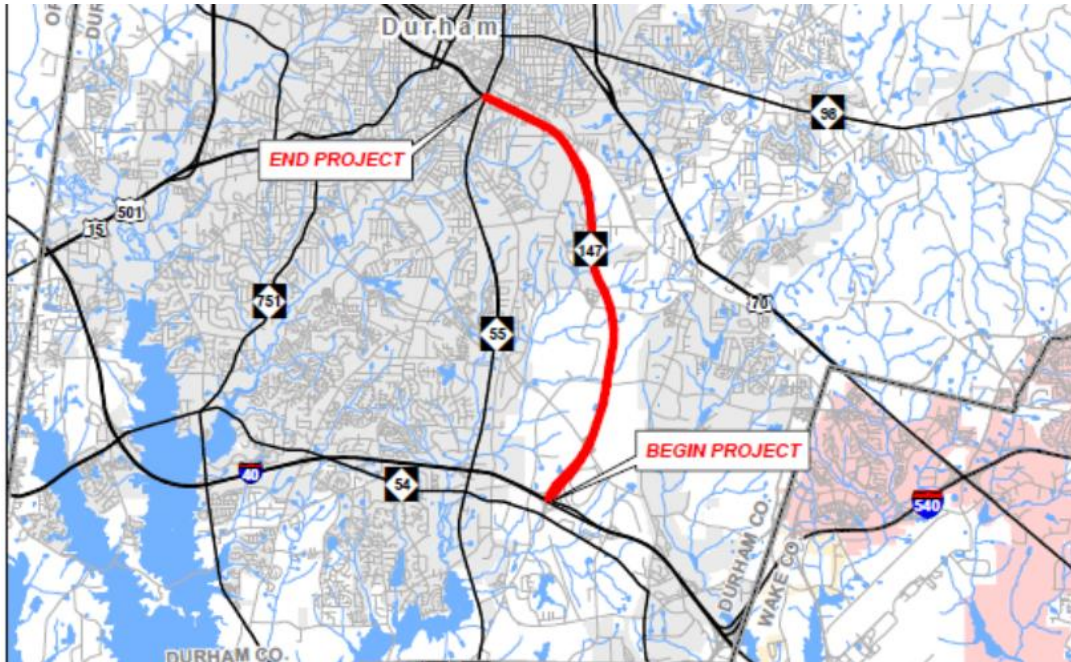


# NC 147 & East End Connector





# Project Limits / Location



- NC 147 (Durham Freeway) from I-40 to NC 55 (Alston Ave)
- Approximately 7 miles
- Potential Improvements to East End Connector (Managed Lane Alts.)
- Improvements are segmented for funding purposes

# *Existing Conditions*

- Full control of access
- Primarily four-lane divided facility with 60-foot grass median
- Functional Classification = Freeway
- Posted Speed Limit = 65 mph
- AADT between 58,000 and 80,000 vpd



# Purpose and Need Discussion

- Current heavy congestion during peak-hour traffic
- Predicted population growth in the vicinity necessitates additional traffic capacity
- Poor levels of service for existing and predicted future no-build conditions
- NC 147 South of East End Connector is Future Interstate 885

2013 Existing Conditions						
Analysis Type	Level of Service					
	A	B	C	D	E	F
Basic Freeway Segments	0	1	2	7	6	5
Freeway Merges and Diverges	0	1	5	9	4	5
Freeway Weaving Segments	0	0	1	0	3	6
Signalized Intersections	0	6	6	1	0	0
Unsignalized Intersections	0	0	0	1	0	3
<b>Total</b>	<b>0</b>	<b>8</b>	<b>14</b>	<b>18</b>	<b>13</b>	<b>19</b>

# Build Alternatives Studied

Alternative	Current Typical (No. of Lanes Each Direction)	New Typical (No. of Lanes Each Direction)	Added (Lanes Each Direction)	General Purpose (Added)	Managed Lanes (Added)
1A	2-2	3-3	1	●	○
1B	2-2	4-4	2	●	○
2A	2-2	(2 - 1   1 - 2)	1	○	●
2B	2-2	(2 - 2   2 - 2)	2	○	●
2C	2-2	(3 - 1   1 - 3)	2	○	●
3A	2-2	(2 - 1   1 - 2)	1	○	●
3B	2-2	(2 - 2   2 - 2)	2	○	●
3C	2-2	(3 - 1   1 - 3)	2	○	●
● Yes      ○ No      Managed Lane					



# *Potential Major Issues*

- Construction phasing
- Potential Right of Way impacts on northern end
- Ingress and egress points for managed lanes
- Connection to Interstate 40
- Bottleneck – Highest traffic volume on northern end
- Multiple bridge replacements
- Public involvement
- Auxiliary Lanes
- Social justice issues of toll lanes





# Northern End of the Project



<b>Legend</b> <ul style="list-style-type: none"> <li><span style="color: green;">█</span> Proposed Roadway</li> <li><span style="color: red;">█</span> Prop Roadway Bridge</li> <li><span style="color: orange;">█</span> Proposed Managed Lanes</li> <li><span style="color: brown;">█</span> Existing Mainline Bridges</li> <li><span style="color: yellow;">█</span> Other NCDOT Project</li> <li><span style="color: black;">—</span> Railroad</li> <li><span style="color: green;">█</span> Trails</li> <li><span style="color: green;">█</span> Parks</li> <li><span style="color: orange;">●</span> National Register of Historic Places</li> <li><span style="color: blue;">█</span> NCDWR named streams</li> <li><span style="color: blue;">█</span> 303d-listed streams</li> <li><span style="color: lightblue;">█</span> USGS NHD flowlines</li> <li><span style="color: green;">█</span> NWI mapped wetlands</li> <li><span style="color: lightblue;">█</span> 0.1% annual flood chance</li> <li><span style="color: lightgreen;">█</span> 0.2% annual flood chance</li> <li><span style="color: lightblue;">█</span> Water Supply Watershed</li> </ul>				<b>NC 147 Managed Lanes Feasibility Study</b>	
				<b>Figure 2-8</b> Conceptual Improvements	July 2016

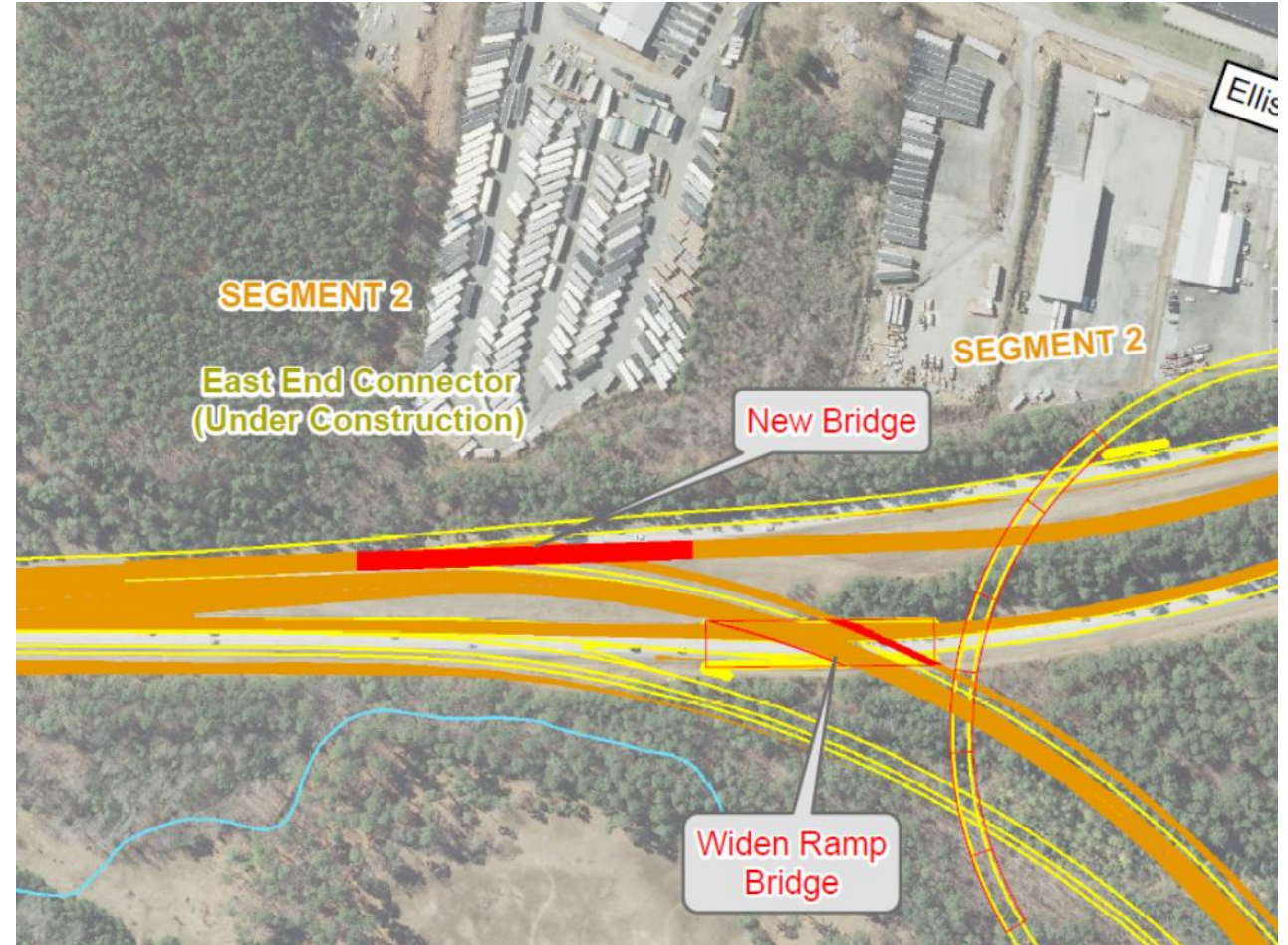


# Ingress/Egress Points

## T.W. Alexander Drive



## East End Connector



# Comparison of Alternatives

Alternative	Alternative Type	Total # of Lanes (GP/ML)	Total Construction Cost*	Unacceptable LOS E or F (analysis pts)
1A	General Purpose	6 (6/0)	\$112,698,000	35%
1B	General Purpose	8 (8/0)	\$112,806,000	18%
2A	Managed Lanes	6 (4/2)	\$153,148,000	45%
2B	Managed Lanes	8 (4/4)	\$149,248,000	45%
2C	Managed Lanes	8 (3/1)	\$149,248,000	-
3A	Managed Lanes	6 (4/2)	\$132,548,000	55%
3B	Managed Lanes	8 (4/4)	\$126,148,000	55%
3C	Managed Lanes	8 (3/1)	\$126,148,000	-

Costs for the six- and eight-lane alternatives are nearly the same



# Conclusion and Recommendations

- Alternative 1B (eight general purpose lanes), 2C and 3C (six general purpose and two managed lane) recommended for further study and development
- Alternative 1B costs are anticipated to be lower than 2C or 3C due to managed lane tie-ins
- Insufficient median to accommodate construction phasing increases cost of all 6-lane Alternatives
- 8-lane alternatives may be phased similar to 6-lane alternatives, but utilizes full depth final pavement instead of temporary pavement

