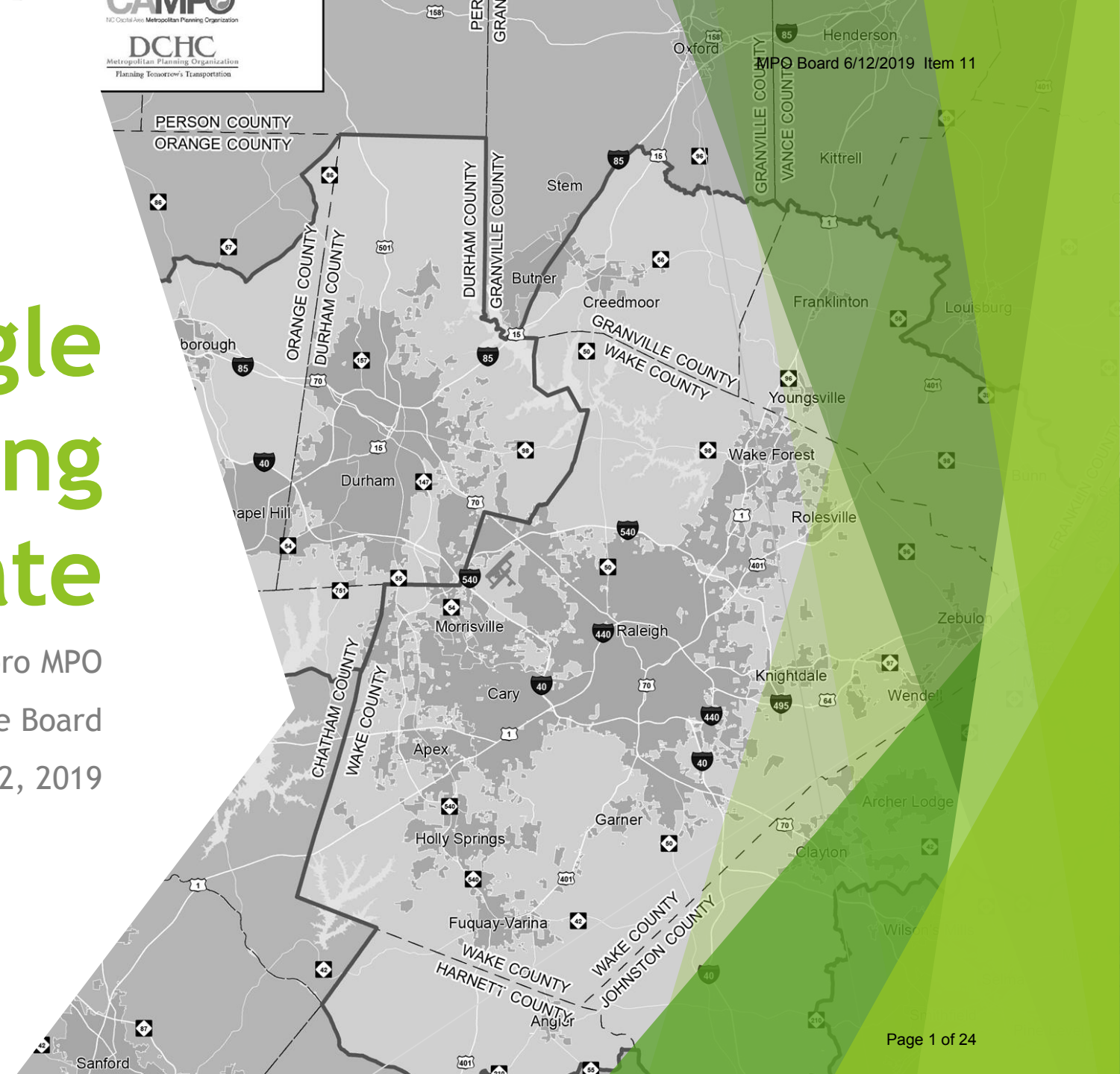
Triangle Strategic Tolling Study Update

Durham-Chapel Hill-Carrboro MPO

Executive Board

June 12, 2019



Study Background

- The Triangle Region is growing rapidly and to stay competitive with other regions, a study was conducted to:

Evaluate the regional transportation network

Determine if express toll lanes may be beneficial to the Triangle Region

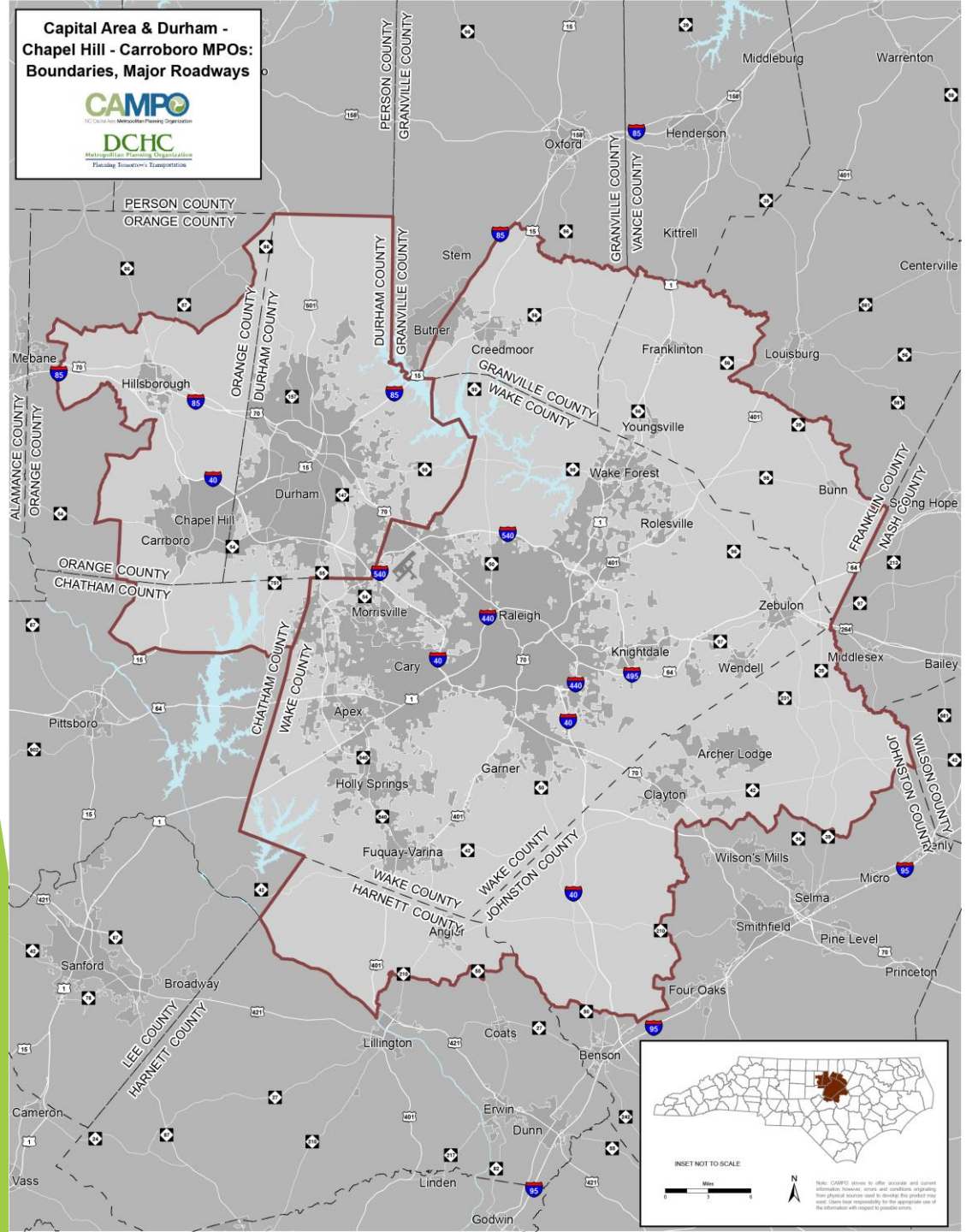
Use study findings in project development process for MTP updates

Study Overview

- The study began in June 2017
- Stakeholder engagement has included:

Four Core Technical Team (CTT) Meetings	23 Stakeholders Interviewed	Three Stakeholder Oversight Team (SOT) Meetings

- DCHC MPO staff attended CTT & SOT meetings
- Study briefings at joint DCHC MPO & CAMPO Board meetings in October 2018 and May 2019



Study Sponsors

- This study was a collaborative effort of:

Capital Area MPO

Durham-Chapel Hill-Carrboro MPO

NCDOT

Toll Road vs. Express Toll Lanes

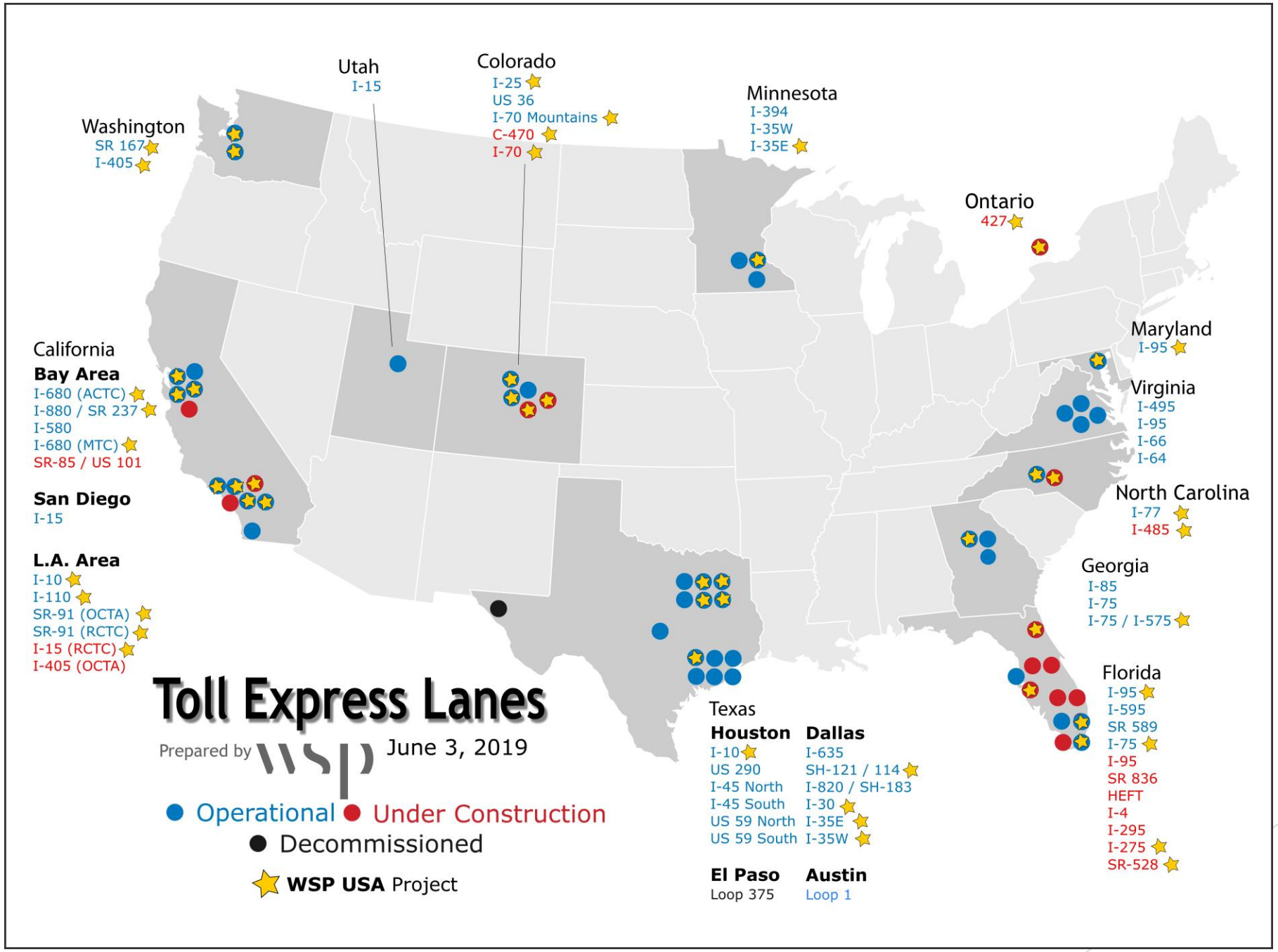
- Everyone pays a toll to use the facility
- **Route-based Choice:** option to use the Toll Road or use a different non-toll facility

- Only Express Toll Lane users pay a toll
- **Lane-based Choice:** option to use the Express Toll Lanes or use the toll-free general purpose lanes

Benefits of Tolling & Express Lanes

Toll Roads and **Express Toll Lanes** provide higher travel speeds, lower and consistent travel times, and a higher quality of trip than toll-free general purpose lanes …

… as evidenced by 44 variably priced facilities in operation and 14 under construction in 11 states & Canada



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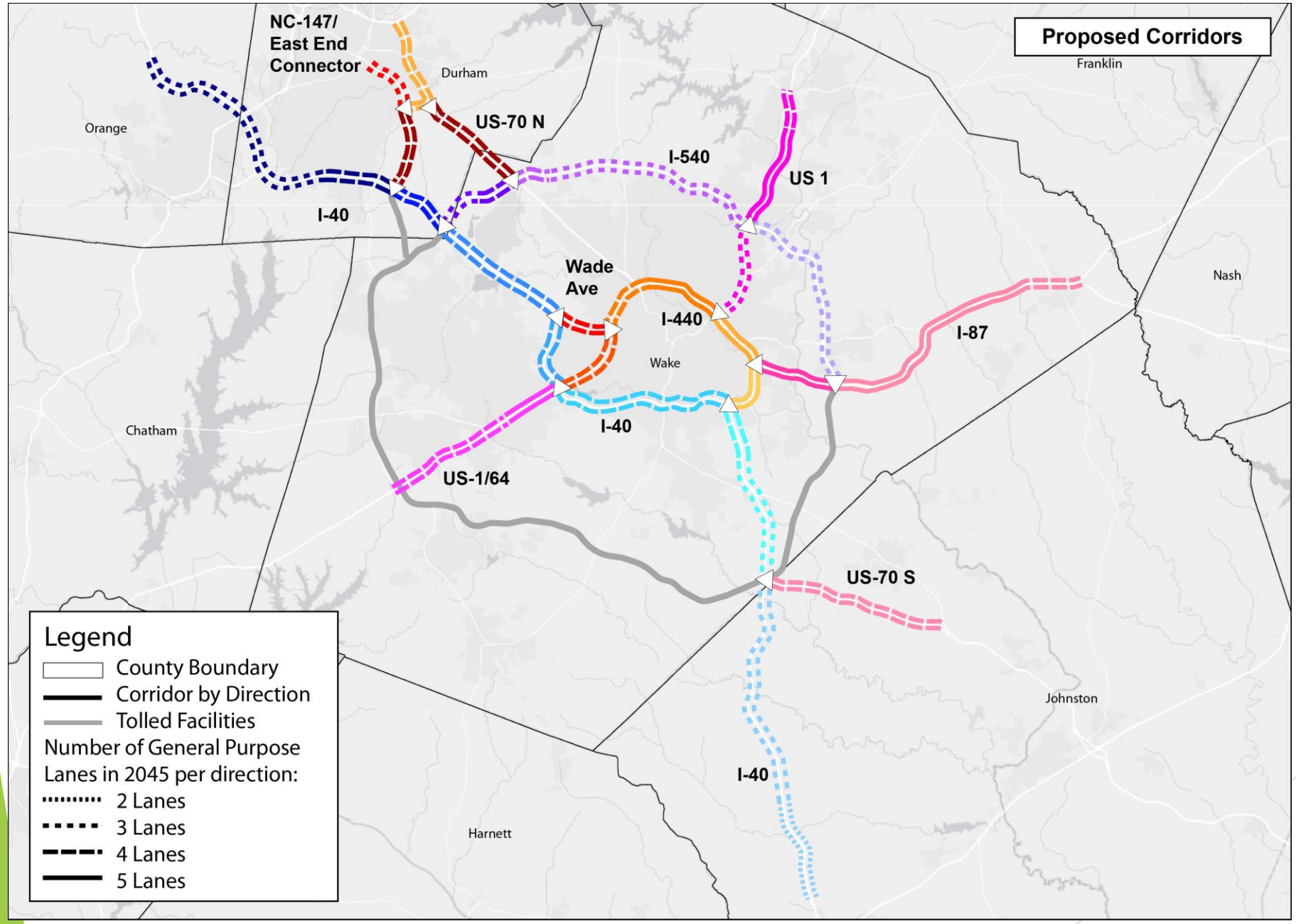
TRIANGLE STRATEGIC TOLLING STUDY

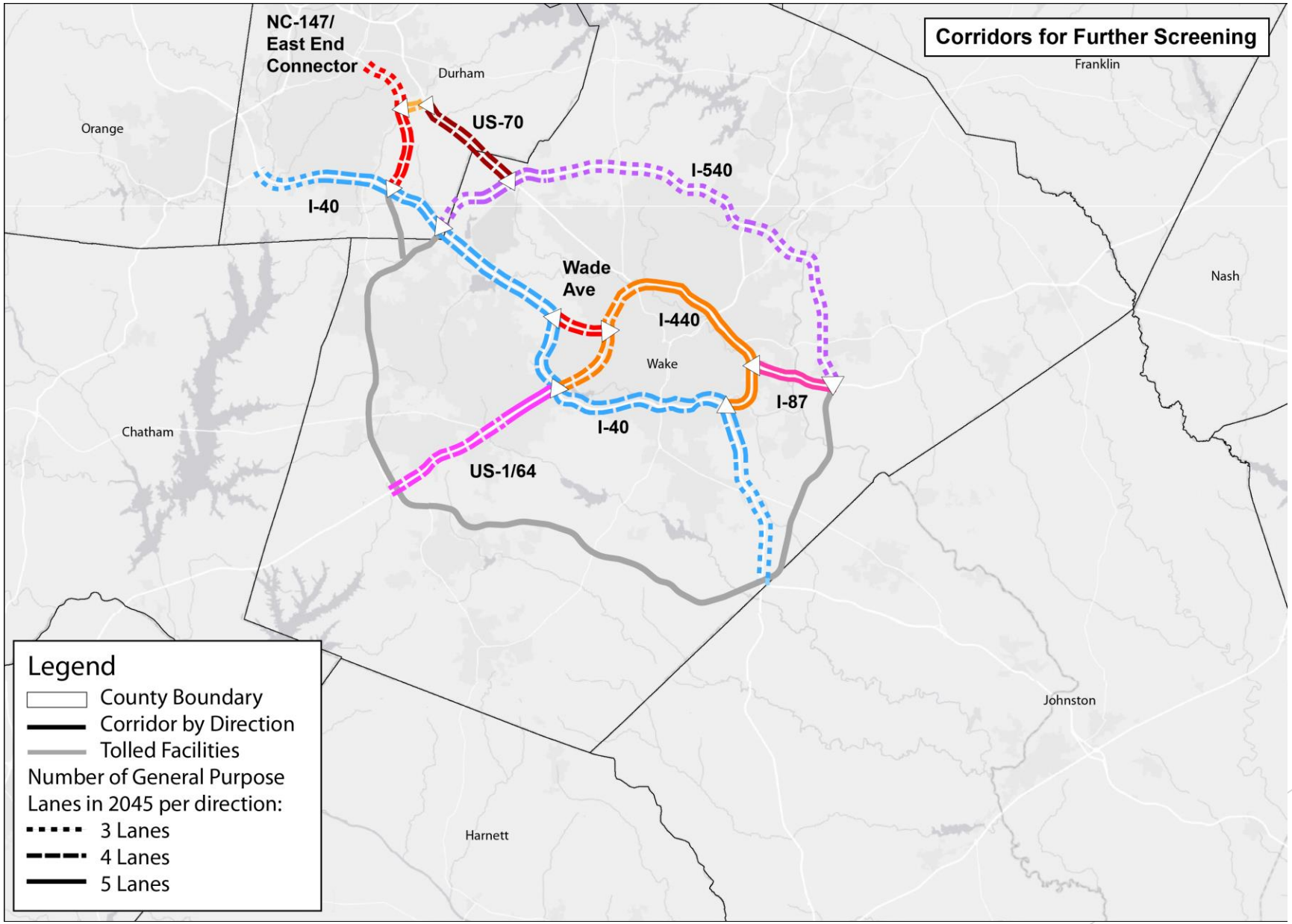
Corridor Screening

- Estimated 2045 peak-period congestion levels and speeds using Triangle Regional Model
- Examined current PM peak hour congestion using Google
- Used Triangle Regional Model to generate demand volumes for projected express toll lane network (assuming 2045 Metropolitan Transportation Plan build-out)
- Applied ECONorthwest's Toll Optimization Model© using regional model outputs to test future performance of express toll lane facilities

Initial Corridors



Corridors for Detailed Evaluation



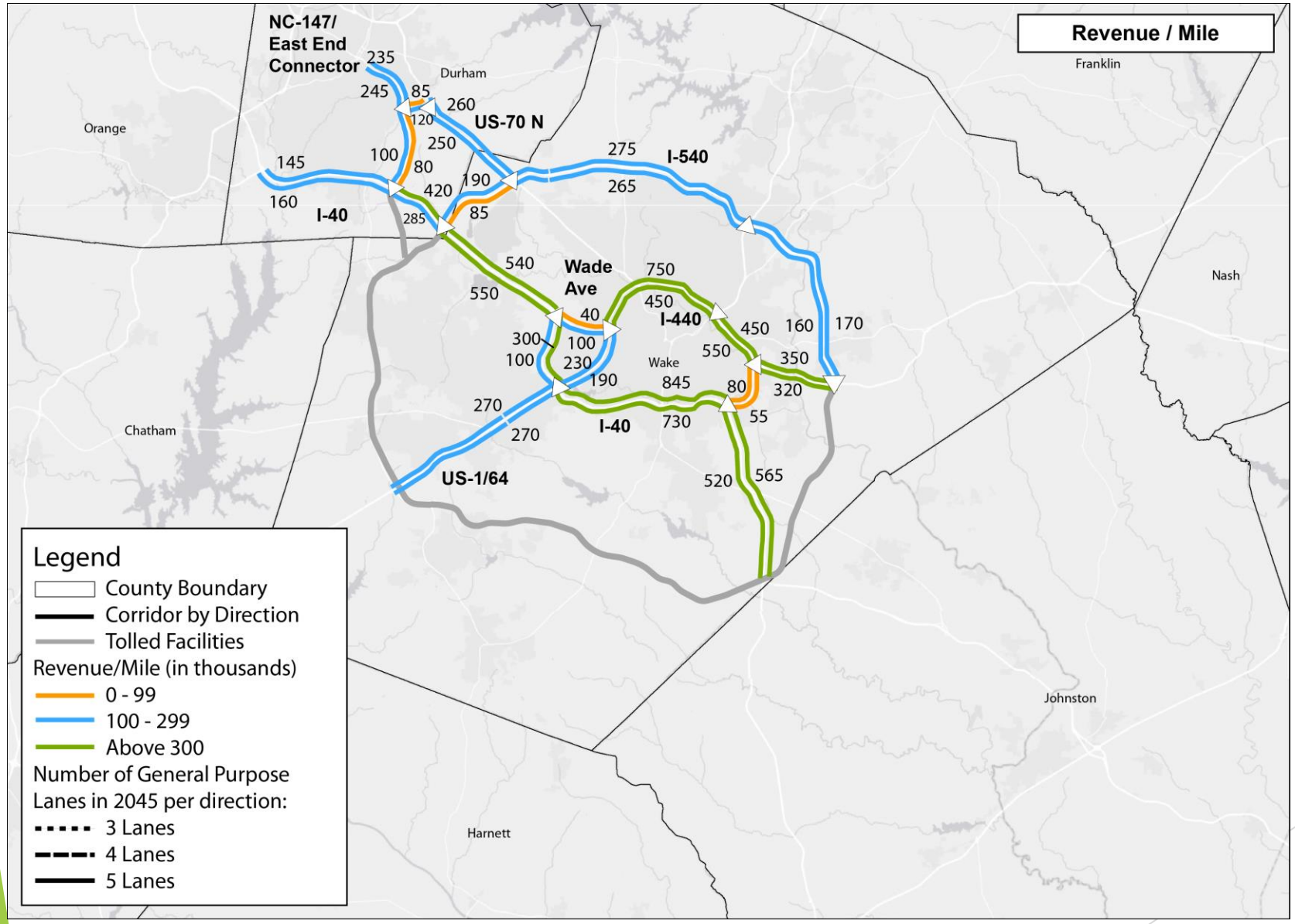
Detailed Corridor Evaluation

- Evaluated seven corridors & divided I-40 into 3 segments
- Analyzed express lane performance using seven factors:
  - Projected revenue collection
  - Travel time savings
  - Trip dependability
  - Construction costs
  - Transit supportive
  - Impacts on low income residents
  - Access to jobs

Projected Revenue Collection

- Forecasted by ECONorthwest's Toll Optimization Model©
  - Has been in use for over 20 years
  - Reflect prices at various times & under different circumstances
- Supplied with TRM demand forecasts to test future performance of toll facilities
- Revenue assumptions are:
  - Future year of 2045
  - All express lane users pay
  - Buses & vanpools use the express lane for free

2045 Projected Annual Revenue Collection/Mile



Projected Travel Time Savings

- Difference between travel times in the general purpose & express lanes along the same corridor
- Estimated by Toll Optimization Model© using Triangle Regional Model inputs
- Projected travel time savings of half-minute per mile along longer corridors for express lanes

Trip Dependability

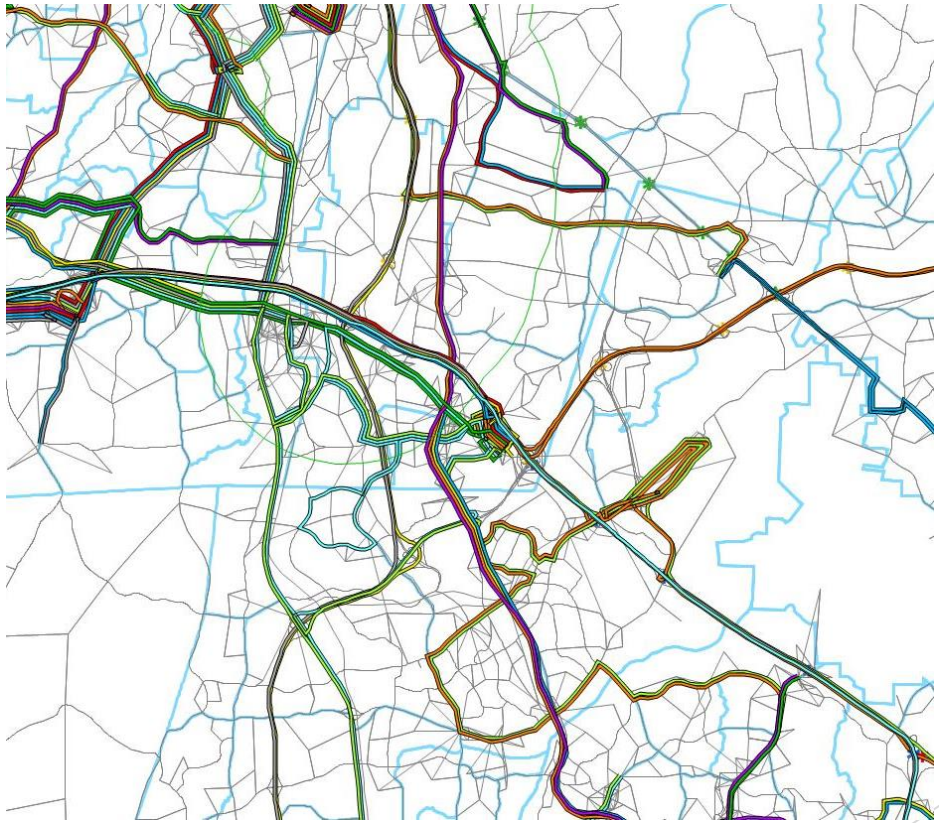
- Used FHWA's Buffer Time measure
- Buffer time is extra time allowed to ensure on-time arrival during times of high traffic.
  - Trip to work when being late could mean job loss
  - Trip to airport when being late means a missed flight
  - Trip to daycare when being late incurs a penalty
- Express lanes have lower buffer times than general purpose lanes (more travel time certainty)

Cost Estimate Assumptions

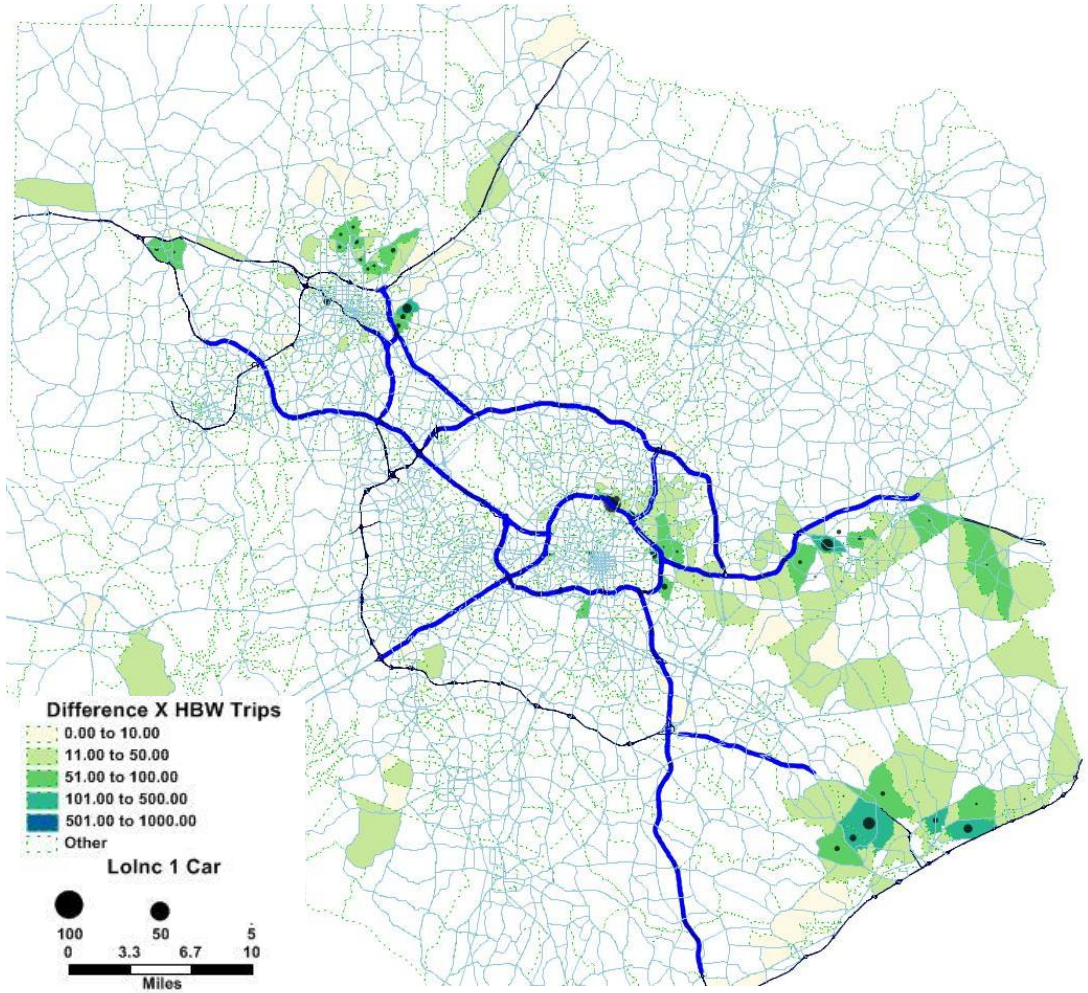
- "Constrained" Typical Section (lower cost)
  - Fit within existing typical section
  - May include Design Exceptions for lane and shoulder width and sight distance
  - Minimal buffer area
  - Shoulder use (if applicable)
- "Full Feature" Typical Section (higher cost)
  - Preferred dimensions with minimal Design Exceptions
  - Increases footprint of roadway
  - Higher likelihood of bridge and interchange reconstruction
- Estimates exclude Direct Connects

Transit Supportive

- Used Triangle Regional Model 2045 transit routes
- Identified transit routes using a significant portion of the corridor
- Identified peak and off-peak hours of operation and frequency
- Calculated number of buses in peak, off-peak, and daily

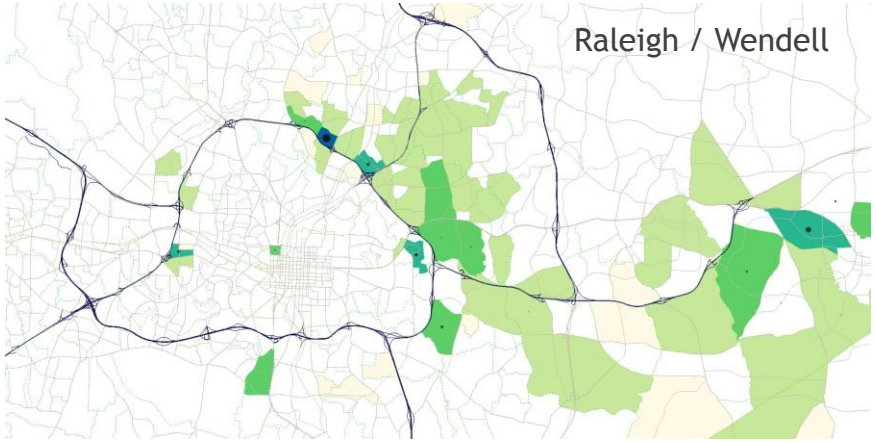


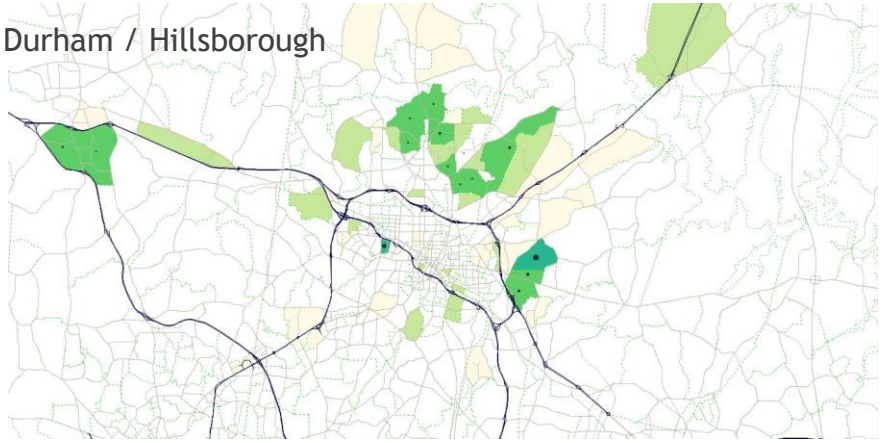
Estimating Impact of Travel Time Change on Low Income Populations

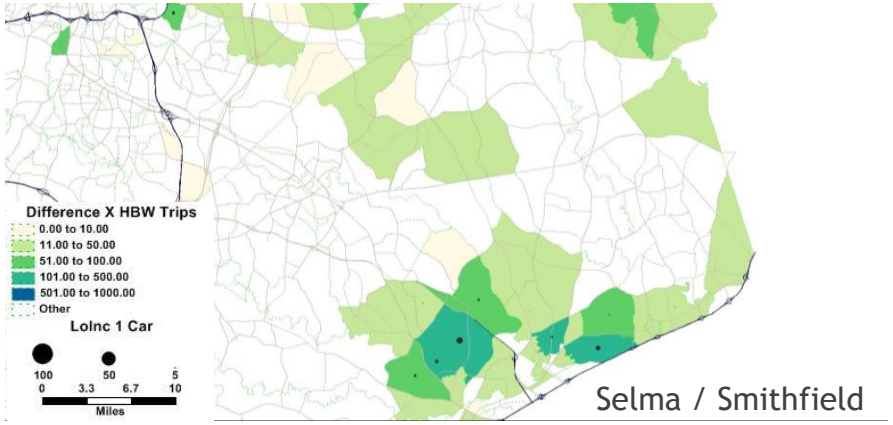


- Travel time differences of less than five minutes were ignored
- Effective magnitude was calculated by multiplying travel time impact by low income work trips
- Results were grouped by origin locations to get the total low income work trips affected and the aggregated travel time impact per zone
- The areas with highest aggregated travel time impact are shown in green with lighter shades denoting lesser impact

Estimating Impact of Travel Time Change on Low Income Populations



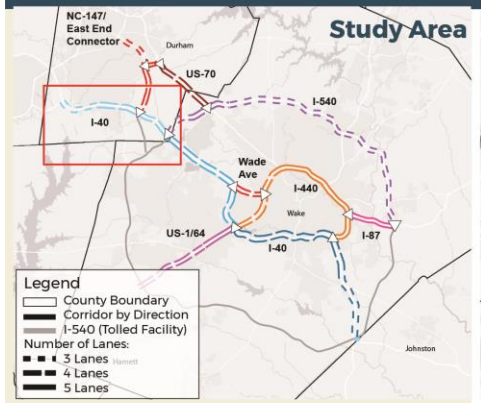


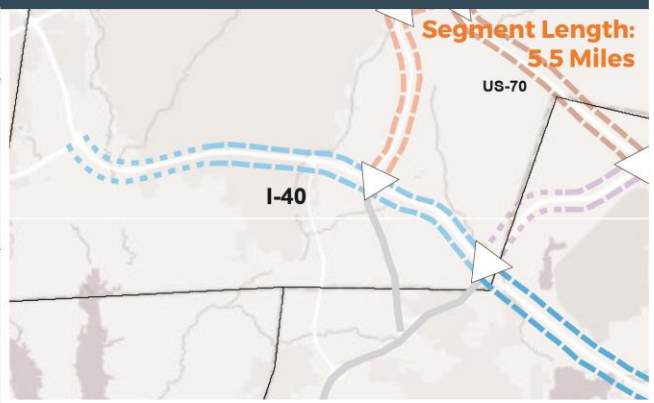


- Approximately 1000 out of 96,000 (~1%) low income home-based work trips had greater than 5 minute travel time impact daily
- Average impact per trip is about 8 minutes
- The TAZs with the highest travel time impact are concentrated around NE Raleigh, North and East Durham, South Hillsborough and Selma-Smithfield area.

TRIANGLE STRATEGIC TOLLING STUDY

I-40: NC 54- NC 147





2045 Peak Travel Time Savings General Purpose vs Express Lanes

	AM Peak	PM Peak
East Bound	0.4 Min/Mile	0.2 Min/Mile
West Bound	0.2 Min/Mile	0.4 Min/Mile

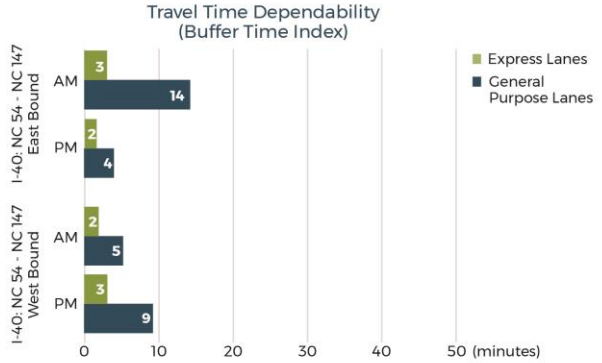
2045 Annual Toll Revenues

East Bound	$235,000/mile
West Bound	$175,000/mile

Estimated Construction Cost

$8 - $14 million/mile

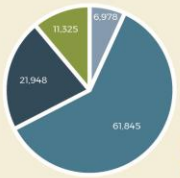
Travel Time Dependability (Buffer Time Index)



Buffer time is the extra time you must plan for when traveling during times of high traffic to make sure you arrive on time. This could be a trip to work, the airport for a flight, or picking up your child from daycare to avoid the penalty for arriving late. If a trip would take 20 minutes with no traffic, and the buffer time is 30 minutes, you should leave 50 minutes before needing to arrive. Using buffer time, you may arrive early, but it is a way of making sure bad traffic won't make you late.

Routes with high buffer times are less predictable than routes with lower buffer times. The fact that express lanes usually have less buffer time than general purpose lanes shows that express lanes have greater certainty in how it will perform from day to day. This is one of the key features of express lanes.

2045 Employees by Employment Type*



100,000 TOTAL EMPLOYEES

Industry · Service · Office · Retail

Percent of the Population Below the Poverty Level*

10%

Future Year Daily Buses**

72

* Within a 2 mile buffer from selected corridor based off the Triangle Regional Model

** Routes that are along some segment of the corridor

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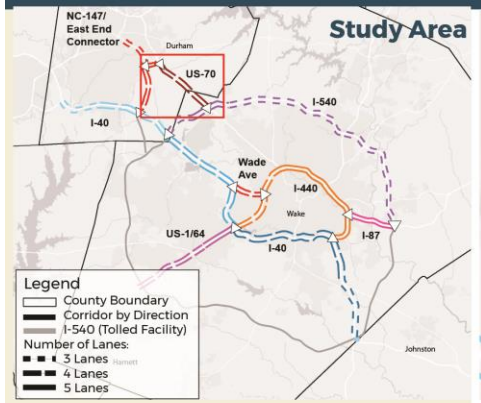
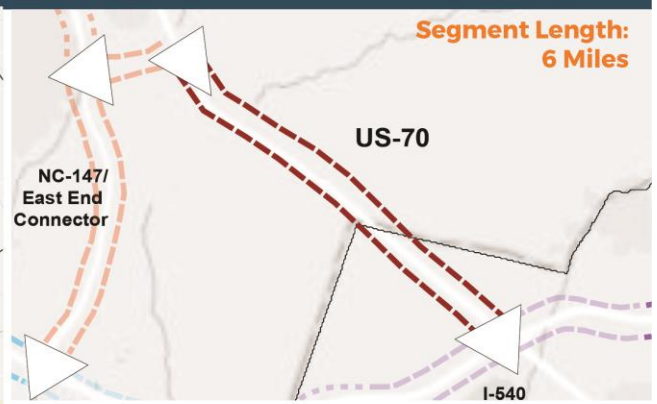
CAMPO NC Capital Area Metropolitan Planning Organization

TRIANGLE STRATEGIC TOLLING STUDY

US-70





2045 Peak Travel Time Savings General Purpose vs Express Lanes

	AM Peak	PM Peak
East Bound	1.7 Min/Mile	0.7 Min/Mile
West Bound	0.7 Min/Mile	2.2 Min/Mile

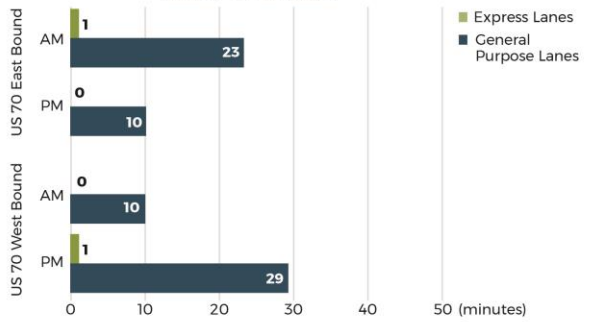
2045 Annual Toll Revenues

East Bound	$265,000/mile
West Bound	$255,000/mile

Estimated Construction Cost

$10 - $21 million/mile

Travel Time Dependability (Buffer Time Index)



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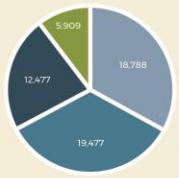
2045 Employees by Employment Type*



60,000 TOTAL EMPLOYEES

Industry · Service · Office · Retail

Percent of the Population Below the Poverty Level*

17%

Future Year Daily Buses**

48

* Within a 2 mile buffer from selected corridor based off the Triangle Regional Model

** Routes that are along some segment of the corridor

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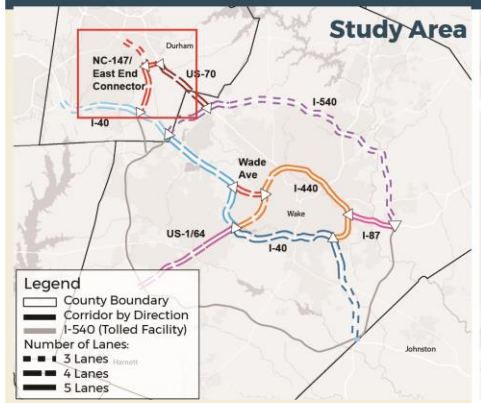
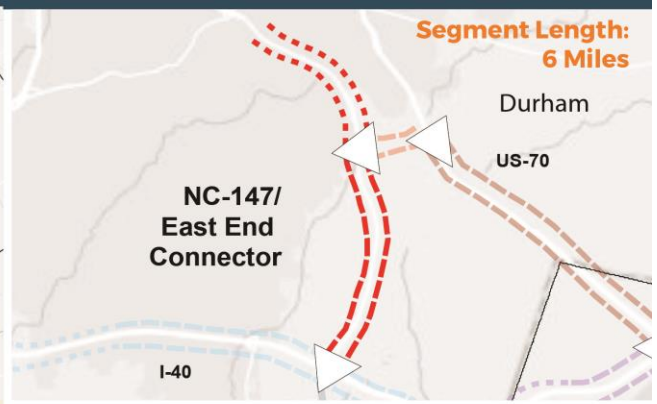
CAMPO NC Capital Area Metropolitan Planning Organization

TRIANGLE STRATEGIC TOLLING STUDY

NC 147





2045 Peak Travel Time Savings General Purpose vs Express Lanes

	AM Peak	PM Peak
East Bound	0.2 Min/Mile	0.2 Min/Mile
West Bound	0.2 Min/Mile	0.3 Min/Mile

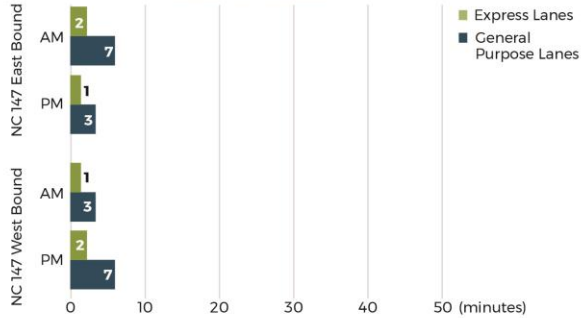
2045 Annual Toll Revenues

East Bound	$140,000/mile
West Bound	$145,000/mile

Estimated Construction Cost

$10 - $15 million/mile

Travel Time Dependability (Buffer Time Index)



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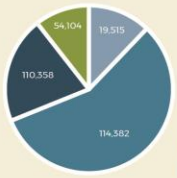

165,000 TOTAL EMPLOYEES

Percent of the Population Below the Poverty Level*

28%

Future Year Daily Buses**

80

* Within a 2 mile buffer from selected corridor based off the Triangle Regional Model
** Routes that are along some segment of the corridor

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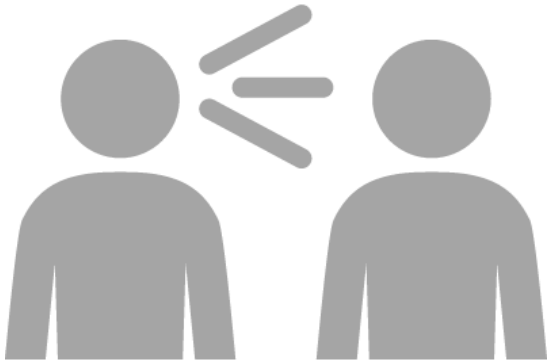
CAMPO NC Capital Area Metropolitan Planning Organization

Updating Partners & Stakeholder Groups

- Closing the Loop on Study Outcomes (May & June)
- Presentations to date:
  - NCTA Board of Directors (May 2nd)
  - NCDOT/NCTA/FHWA Staff Leadership (May 16th)
  - MPO Boards – Joint CAMPO & DCHC MPO Meeting (May 29th)
- Upcoming Presentations:
  - CAMPO Executive Board (June 19th)
  - NCDOT Board of Transportation (Local Members)
  - NCDOT Local Divisions Staff & Others
  - WakeUP Wake County
  - Regional Transportation Alliance

More Information?



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