FAST

Freeway And Street-based Transit network

Overview

November 2020

FAST
Freeway And Street-based Transit network

Freeway And Street-based Transit (FAST) network

Joint study by the RTA business coalition, GoTriangle, NCDOT

to inspire, inform, and advance ideas for improving regional connectivity

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Strategic goal of the FAST study

- **Institutionalize transit advantage on the state highway system** to make transit more attractive, effective, and reliable

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Objectives of the FAST study

- Develop a "FAST" approach and mindset
- Identify investments that will create multimodal freeways, streets
- Advance regional FAST networks

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What is a FAST corridor?

- **Enhances existing roadway system**
  via lower-cost, scalable, transit advantage opportunities
- **Prioritizes transit while serving all users**
  e.g. priority transit lanes, transit signal priority, queue jumps
- **Leverages major roadway investments**
  e.g. 540 turnpike
- **Links and optimizes transit corridor investments**
  e.g. 5 approved BRT lines in the Research Triangle area

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Benefits of the FAST network concept for users and agencies

- Improve transit travel time and reliability
- Reduce transit operating costs
- Increase transit ridership
- Prepare roadways for potential future transit service

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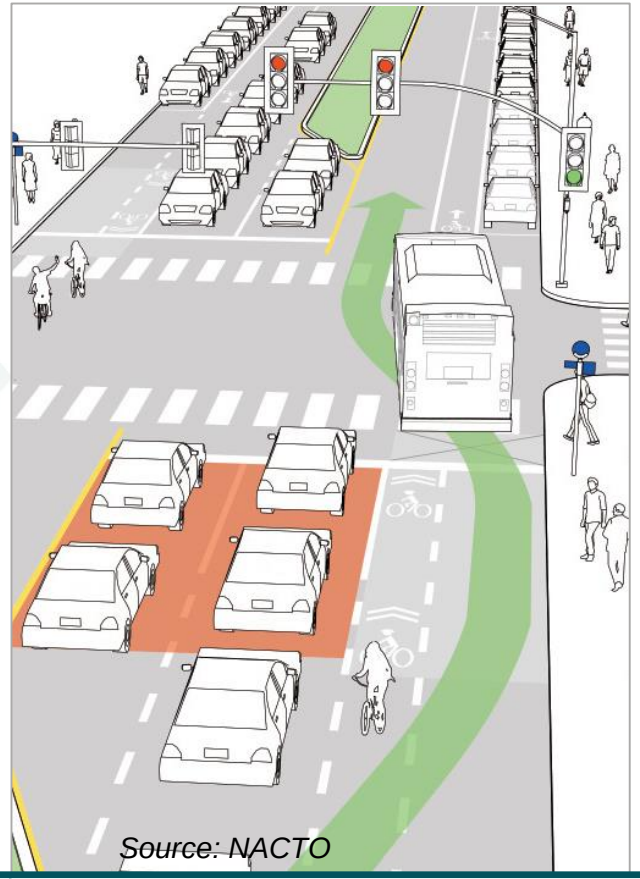
Example Transit Advantages

Street low-cost transit advantages

Transit Signal Priority



Source: NACTO

Queue Jump Lanes

RED Lanes

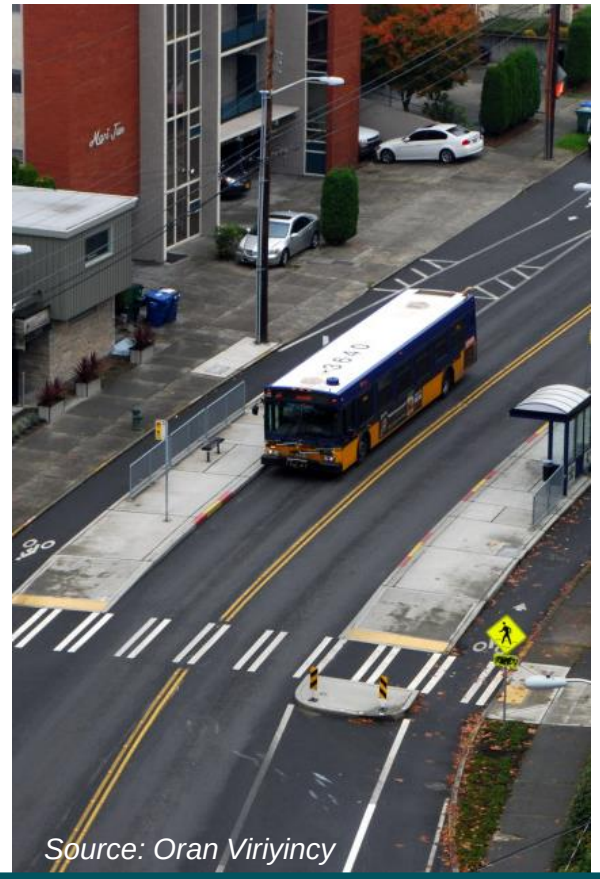
Stop/station low-cost transit advantages

Source: Metropolitan Council

Level Boarding

Source: KCATA

Enhanced Bus Stop



Source: Oran Viriyincy

“Floating” Bus Stop

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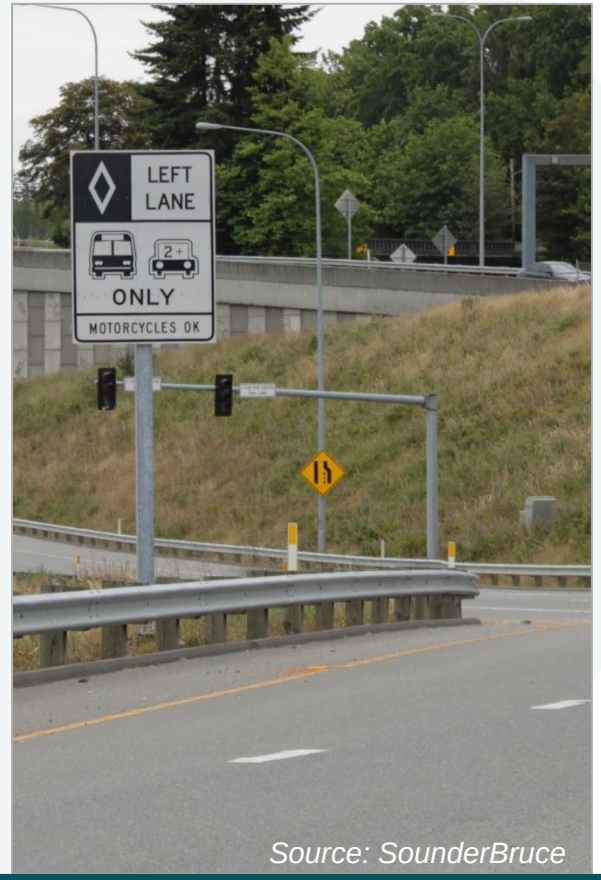
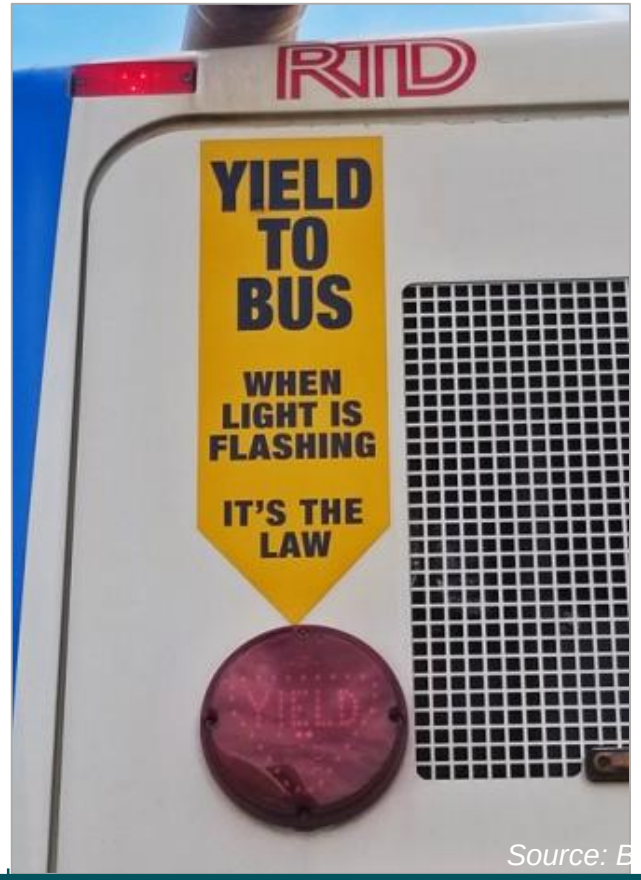
Freeway low-cost transit advantages



Source: SounderBruce

On-ramp signal bypass

Bus On Shoulder System (BOSS)



Source: B

Yield-to-Bus

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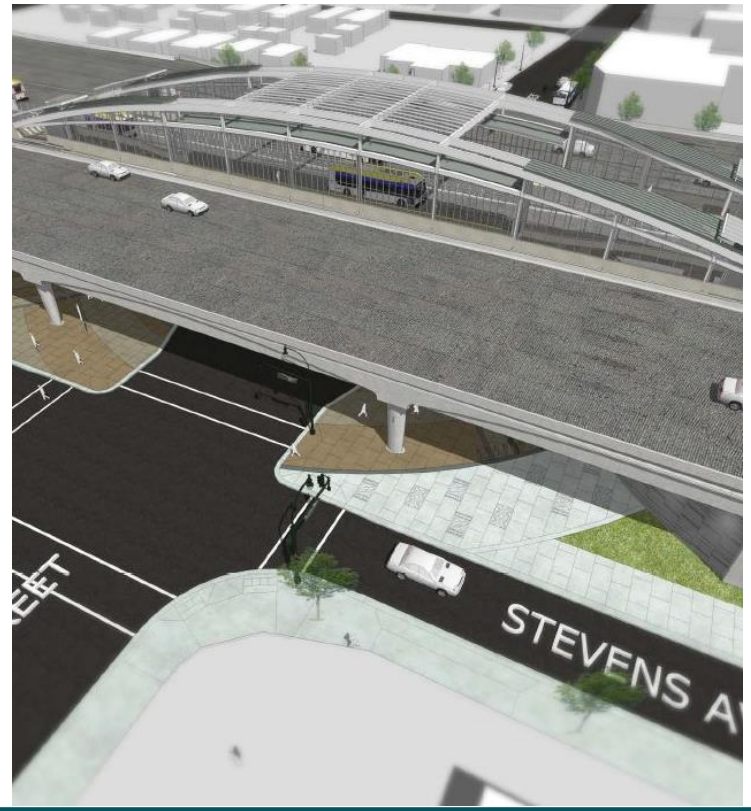
Enhanced freeway transit advantages

Direct access ramp

Transit priority shoulder



Freeway transit station

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Study Methods and Preliminary Findings

FAST study analysis for Research Triangle region

- Trip origins and destinations – projections for 2030
- Traffic volume and delay – actual and projected
- Transit ridership, speed and frequency – actual and planned
- Review existing and proposed freeway and transit network
- Identify connections and missing links

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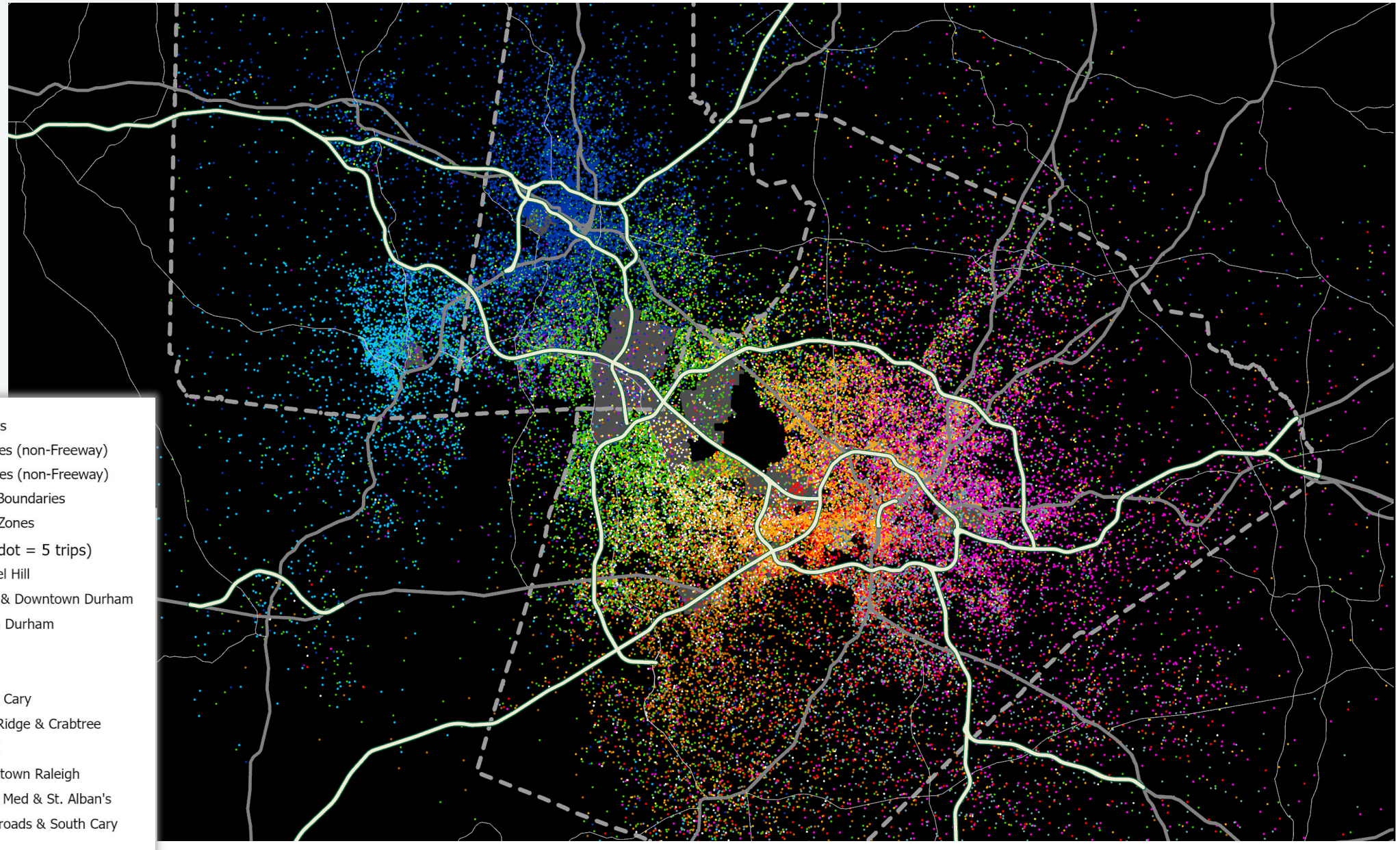
2030 Trip Origins to All Zones



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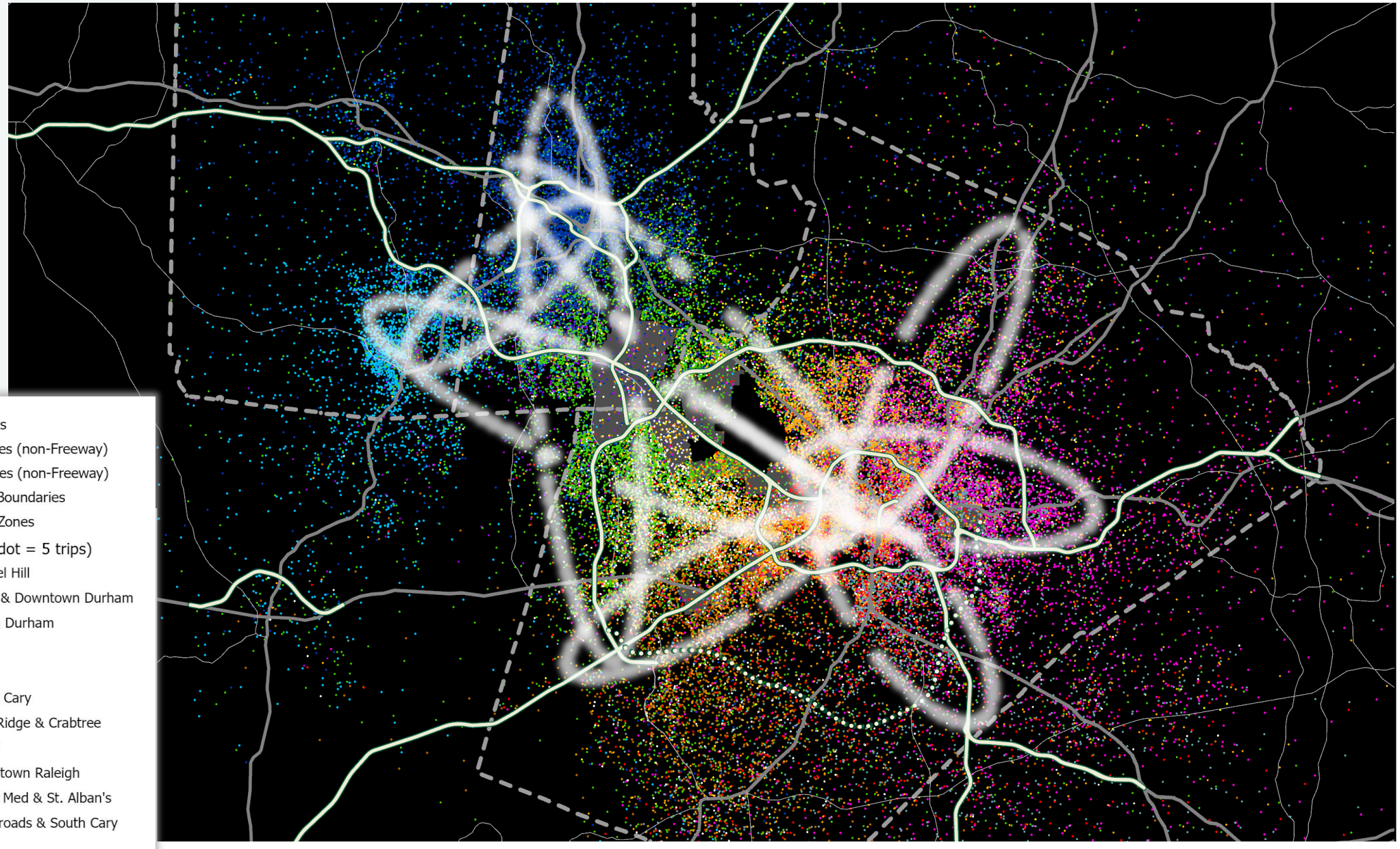
2030 Trip Origins to All Zones



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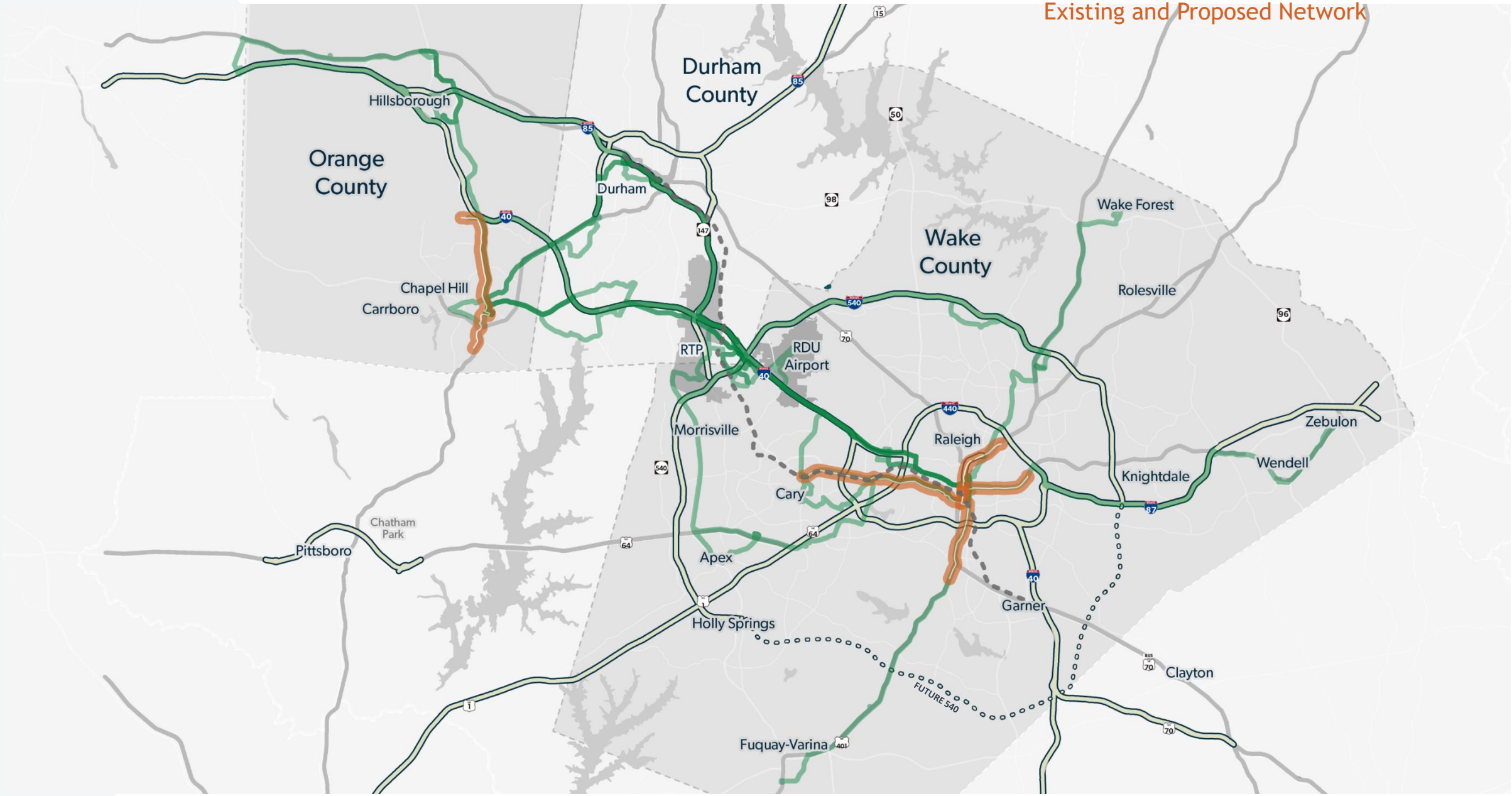
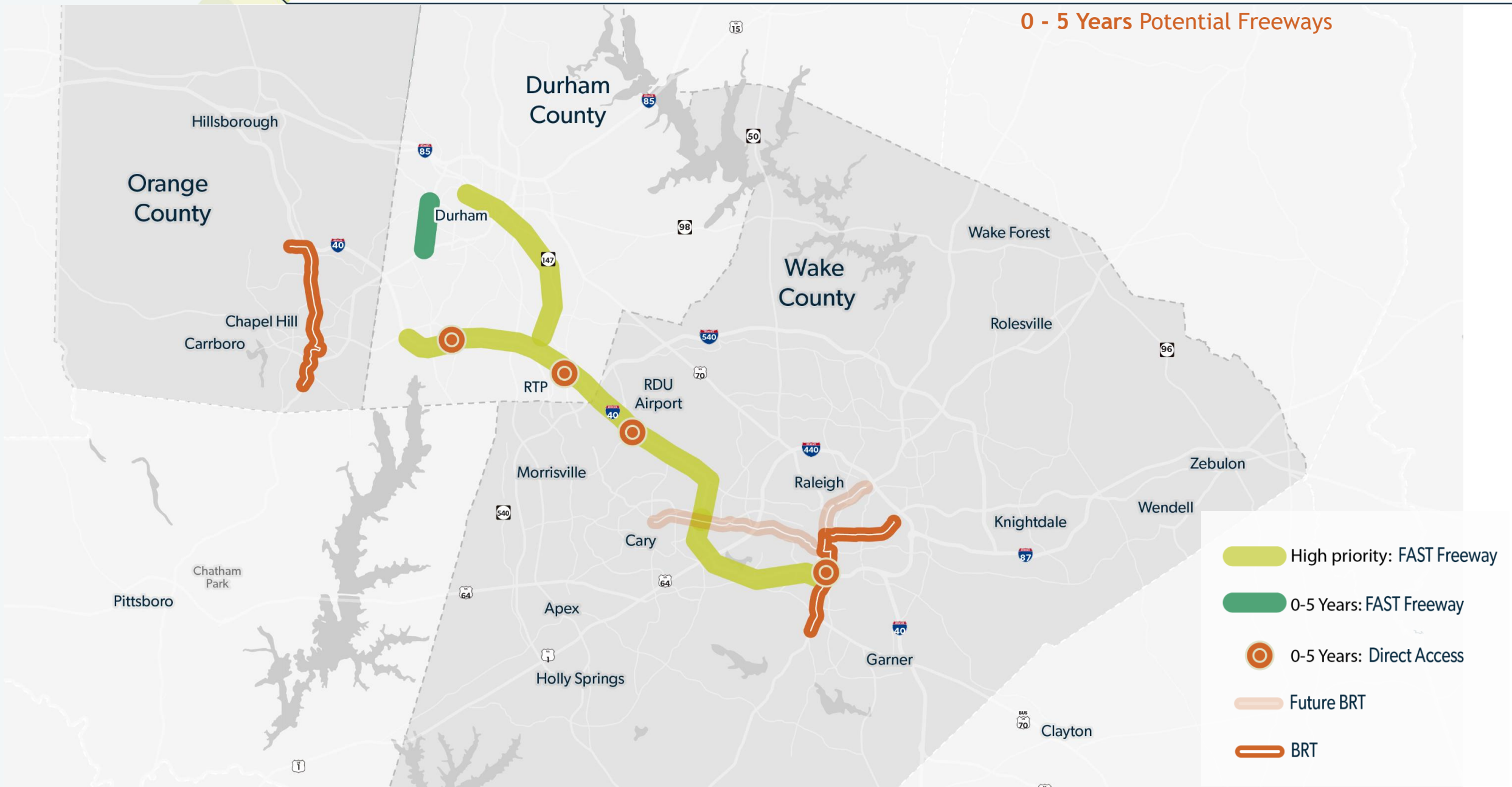
Potential FAST Networks

Existing and Proposed Network



0 - 5 Years Potential Freeways



0 - 5 Years Potential Freeways

South Durham
Direct Pedestrian Access

US 15/501
Bus On Shoulder System

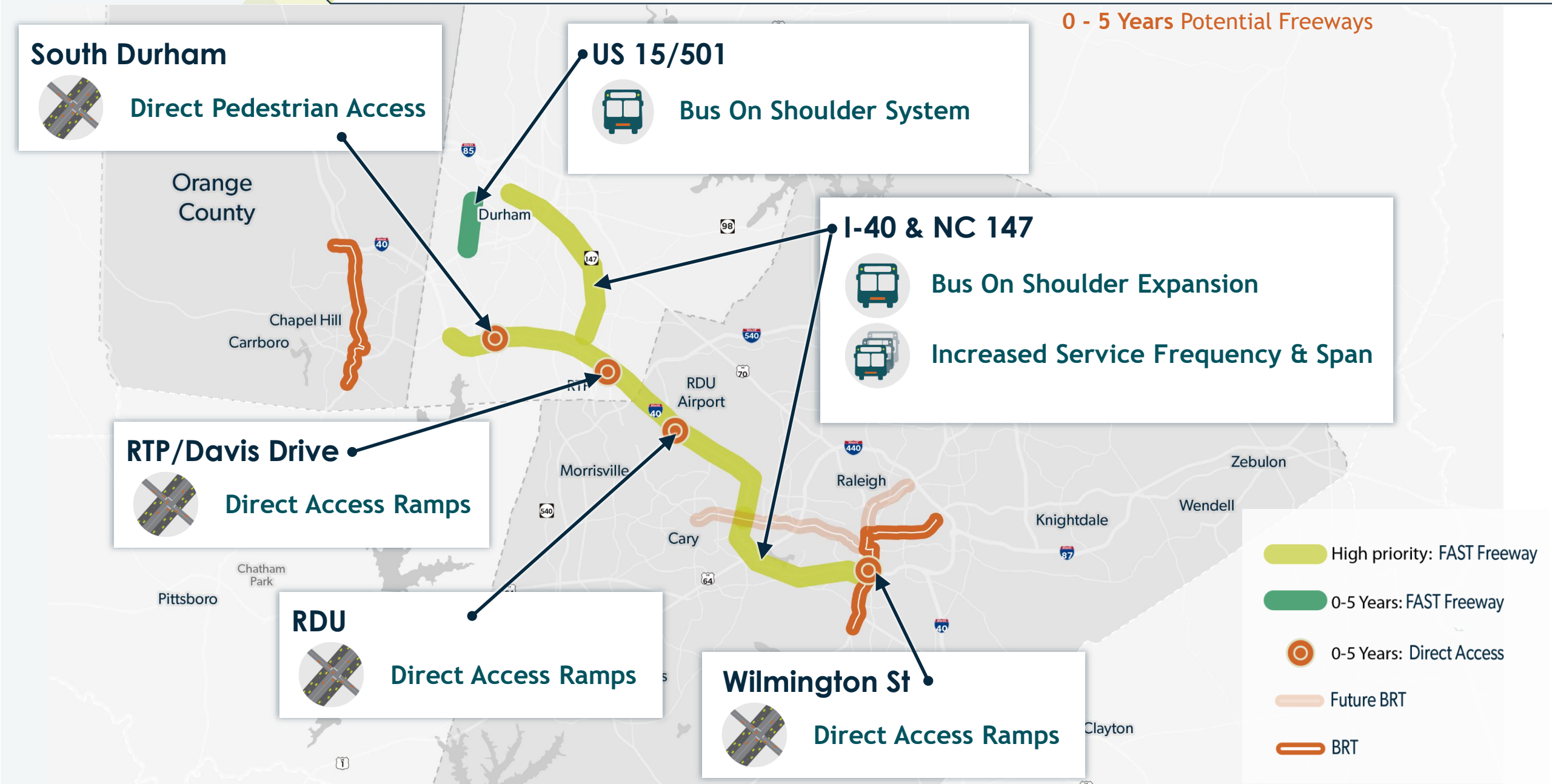
I-40 & NC 147
Bus On Shoulder Expansion

Increased Service Frequency & Span

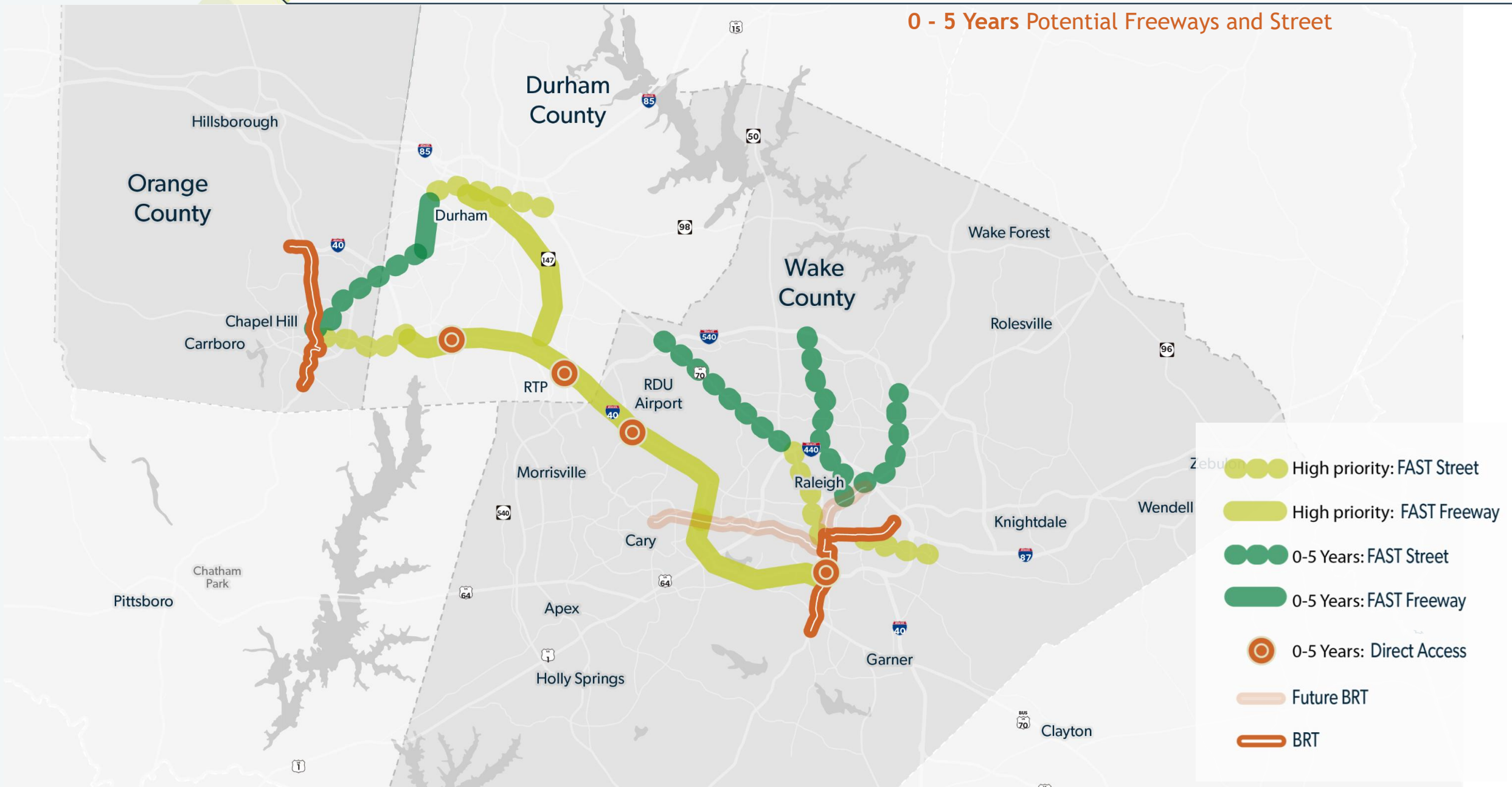
RTP/Davis Drive
Direct Access Ramps

RDU
Direct Access Ramps

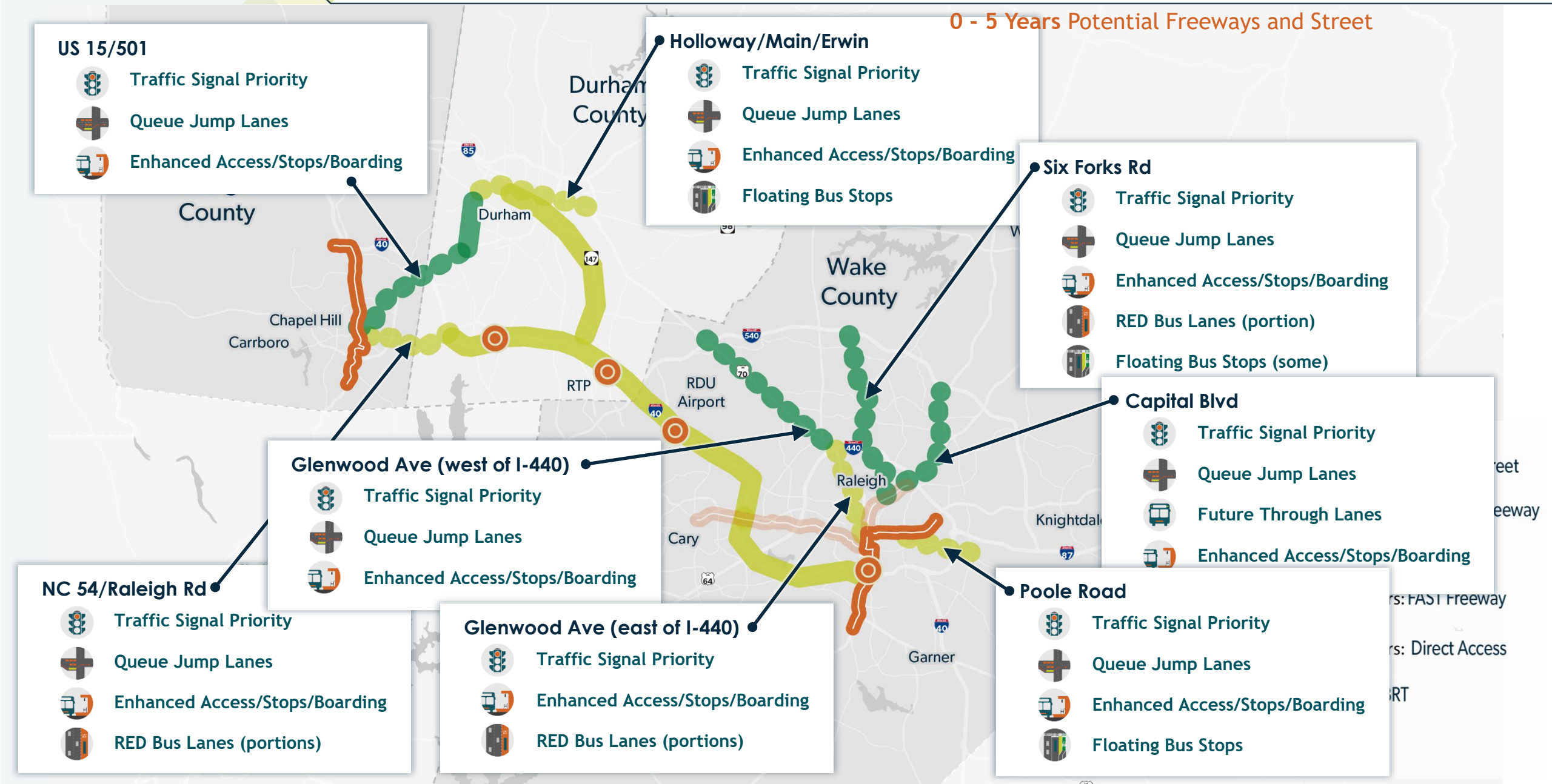
Wilmington St
Direct Access Ramps



0 - 5 Years Potential Freeways and Street



0 - 5 Years Potential Freeways and Street



US 15/501
- Traffic Signal Priority
- Queue Jump Lanes
- Enhanced Access/Stops/Boarding

Holloway/Main/Erwin
- Traffic Signal Priority
- Queue Jump Lanes
- Enhanced Access/Stops/Boarding
- Floating Bus Stops

Six Forks Rd
- Traffic Signal Priority
- Queue Jump Lanes
- Enhanced Access/Stops/Boarding
- RED Bus Lanes (portion)
- Floating Bus Stops (some)

Capital Blvd
- Traffic Signal Priority
- Queue Jump Lanes
- Future Through Lanes
- Enhanced Access/Stops/Boarding

Glenwood Ave (west of I-440)
- Traffic Signal Priority
- Queue Jump Lanes
- Enhanced Access/Stops/Boarding

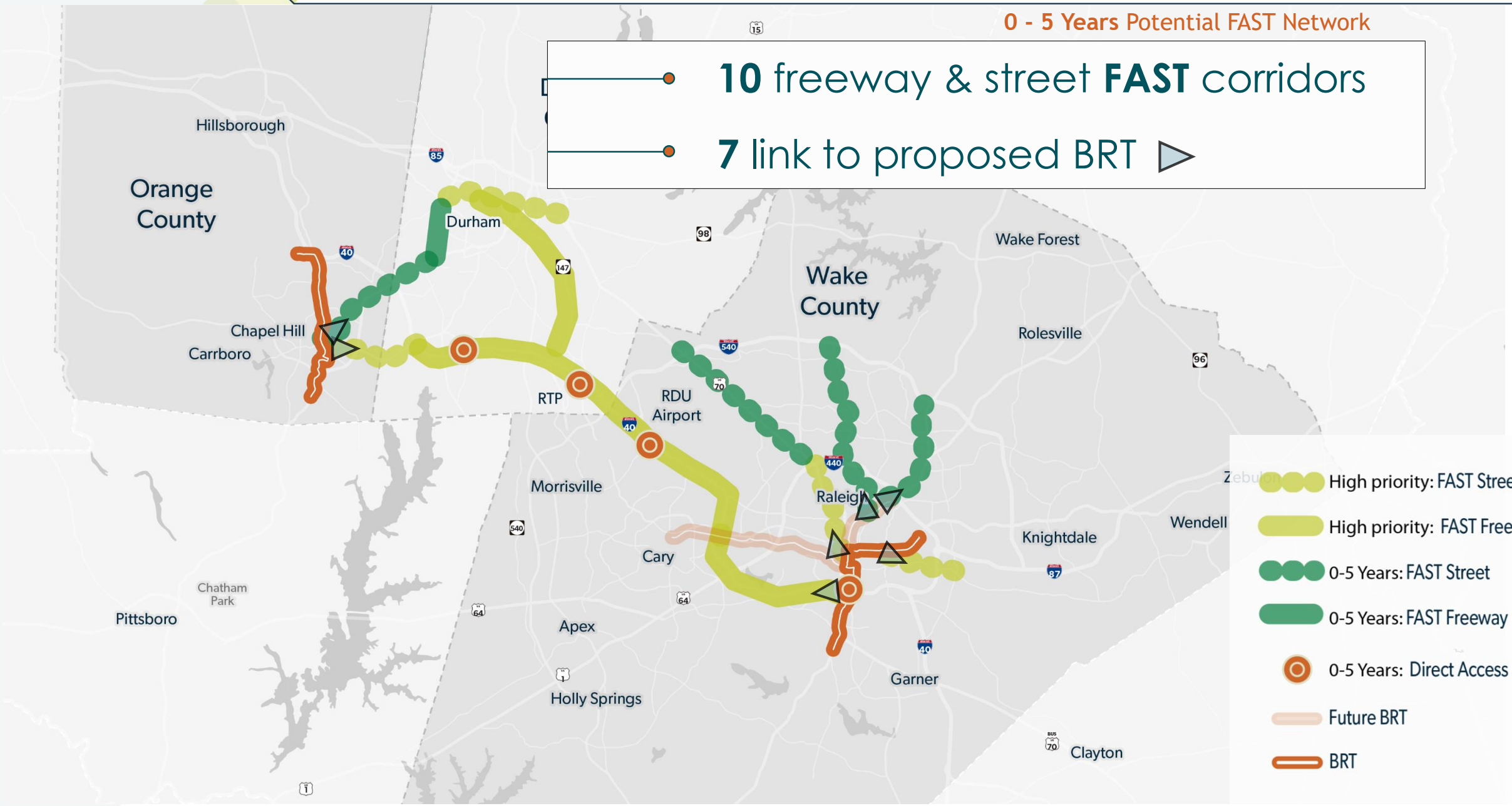
NC 54/Raleigh Rd
- Traffic Signal Priority
- Queue Jump Lanes
- Enhanced Access/Stops/Boarding
- RED Bus Lanes (portions)

Glenwood Ave (east of I-440)
- Traffic Signal Priority
- Enhanced Access/Stops/Boarding
- RED Bus Lanes (portions)

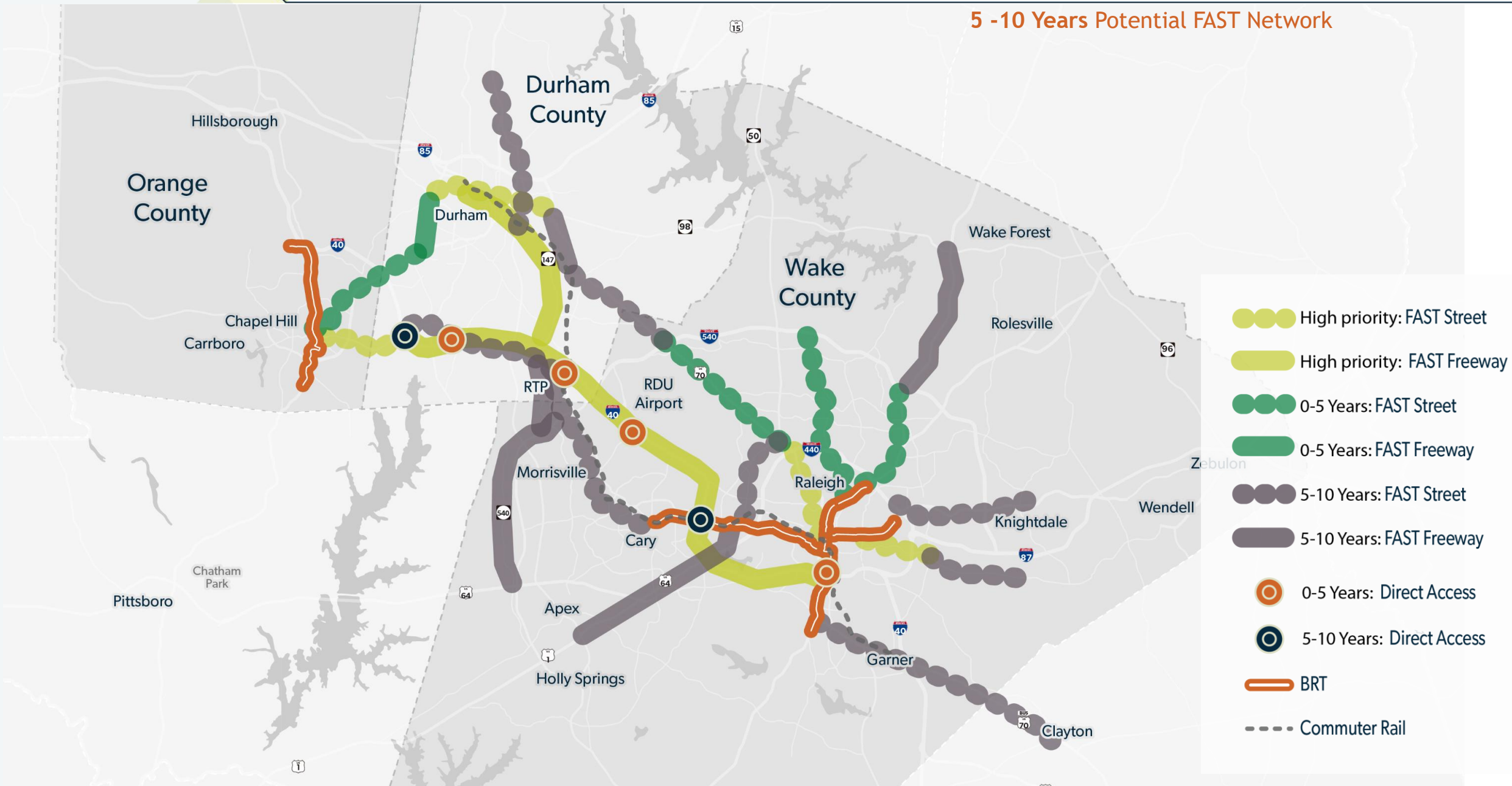
Poole Road
- Traffic Signal Priority
- Queue Jump Lanes
- Enhanced Access/Stops/Boarding
- Floating Bus Stops

0 - 5 Years Potential FAST Network

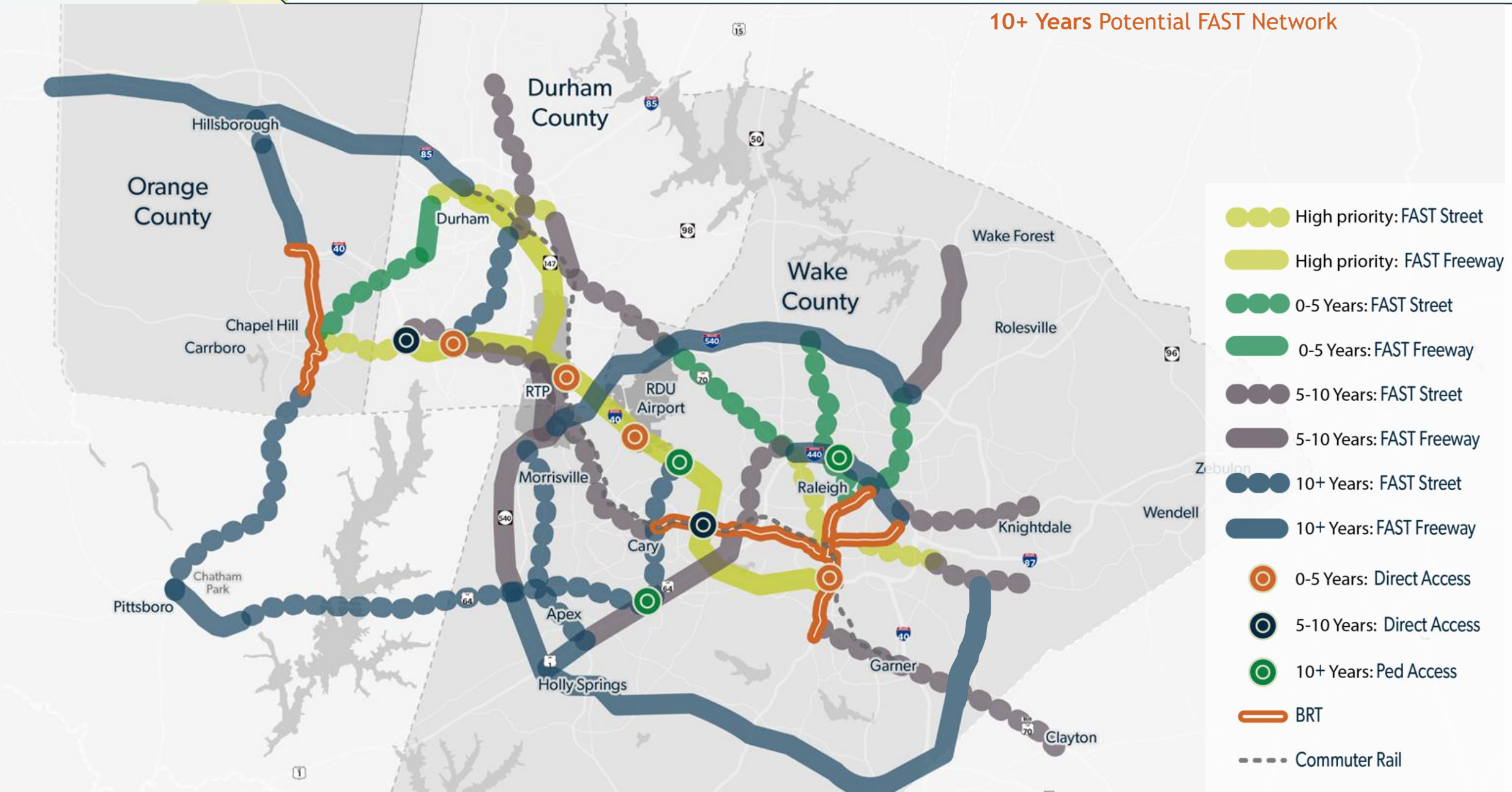
- **10** freeway & street **FAST** corridors
- **7** link to proposed BRT ▷



5 -10 Years Potential FAST Network



10+ Years Potential FAST Network



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Implementation Playbook Approach

The Implementation Guide is intended to:

- Educate the **Public** on the benefits of designing for transit
- Inform **Elected Officials** on feasible options to enhance projects
- Assist **Stakeholders** in incorporating FAST principles

Outline Table of Contents

Preliminary Findings

Link Projects for Maximum Benefits

Under Development in BRT System Design


Enhanced Bus Stop


Level Boarding


Queue Jump Lanes


Traffic Signal Priority


RED Bus Lanes

Floating Bus Stops

Under Development in Freeway/Highway Expansion Projects


Express Lanes


Bus on Shoulder System (BOSS)


RED Bus Lanes

For Consideration in Future Freeway/ Transit Projects


Direct Connect Lanes

Direct Access Station

Queue Jump Lanes

A queue jump lane is a short stretch of bus lane combined with traffic signal priority. The idea is to enable buses to by-pass waiting queues of traffic and to cut out in front by getting an early green signal. A special bus-only signal may be required. The queue jump lane can be created through the use of a turn lane, allowing bus-only straight-through operations, and/or adding a signal phase or transit signal priority – all low-cost solutions.

Queue Jump Lanes

Transit Advantage	Implementation Speed	Cost	Where to Use	Outcome	Sponsor	Urban Design Considerations
2/5		$$	Arterial	Speed + Reliability	Municipal-led Capital Project	Requires coordination with private development and bike infrastructure

Policy Recommendations

- Evaluate existing projects in planning and design to determine feasibility of adding FAST features
- Identify opportunities for future FAST projects by proactively planning select corridors
- Strengthen Complete Streets Policies at the State and Local Levels to encourage multimodal features that promote bus transit advantages in all future street projects
- Expand Complete Streets Policies at the State Level to incorporate transit advantage features in freeway projects

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Question?

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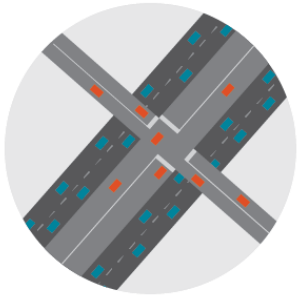
Truth Test – 2 Corridors

Truth Test Purpose

- Examine the information (V/C, Congestion, etc.) presented on corridor operations in the FAST NC study
- Use the transit implementation tools described in the playbook
- Focus on implementation that can be achieved in the short/mid-term without full reconstruction
- Look at existing service, but treat each corridor as if a new FAST service would be implemented
- Recognize current opportunities and constraints relative to land use, roadway operations, station access
- Complete segment by segment recommendations of potential improvements

Recommended Improvements

Bus on Shoulder System (BOSS)

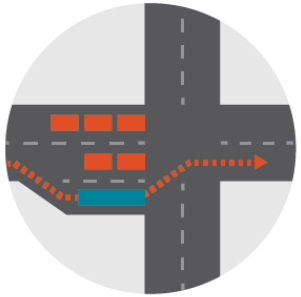


Direct Connect Lanes

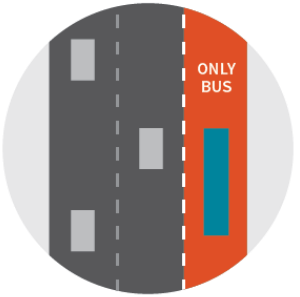
Enhanced Bus Stop

Express Lanes

Level Boarding

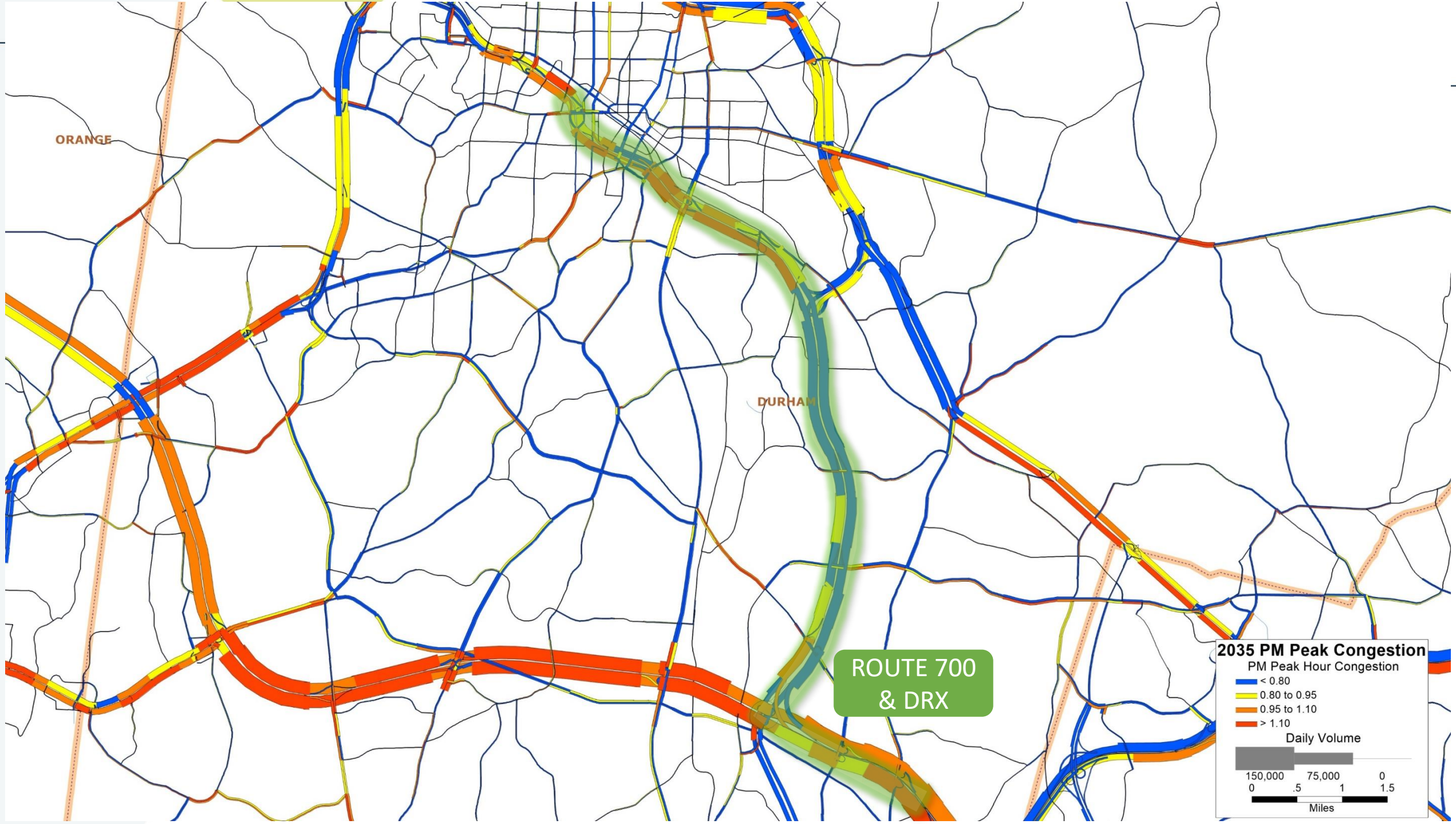


Queue Jump Lanes



RED Bus Lanes

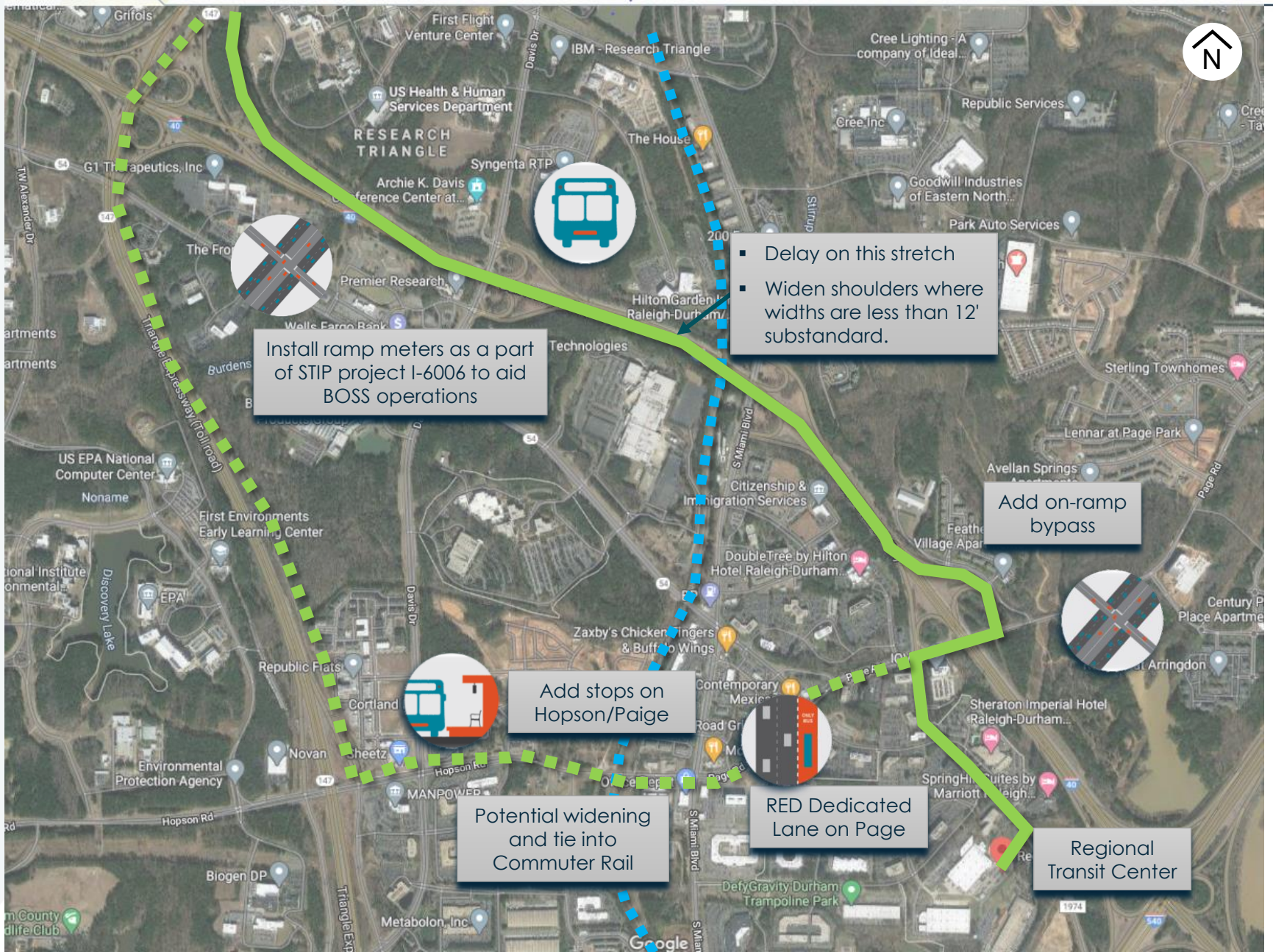
Traffic Signal Priority


ORANGE
DURHAM
ROUTE 700
& DRX
2035 PM Peak Congestion
PM Peak Hour Congestion
< 0.80
0.80 to 0.95
0.95 to 1.10
> 1.10
Daily Volume
150,000
75,000
0
0
.5
1
1.5
Miles

Preliminary Findings

FAST Network

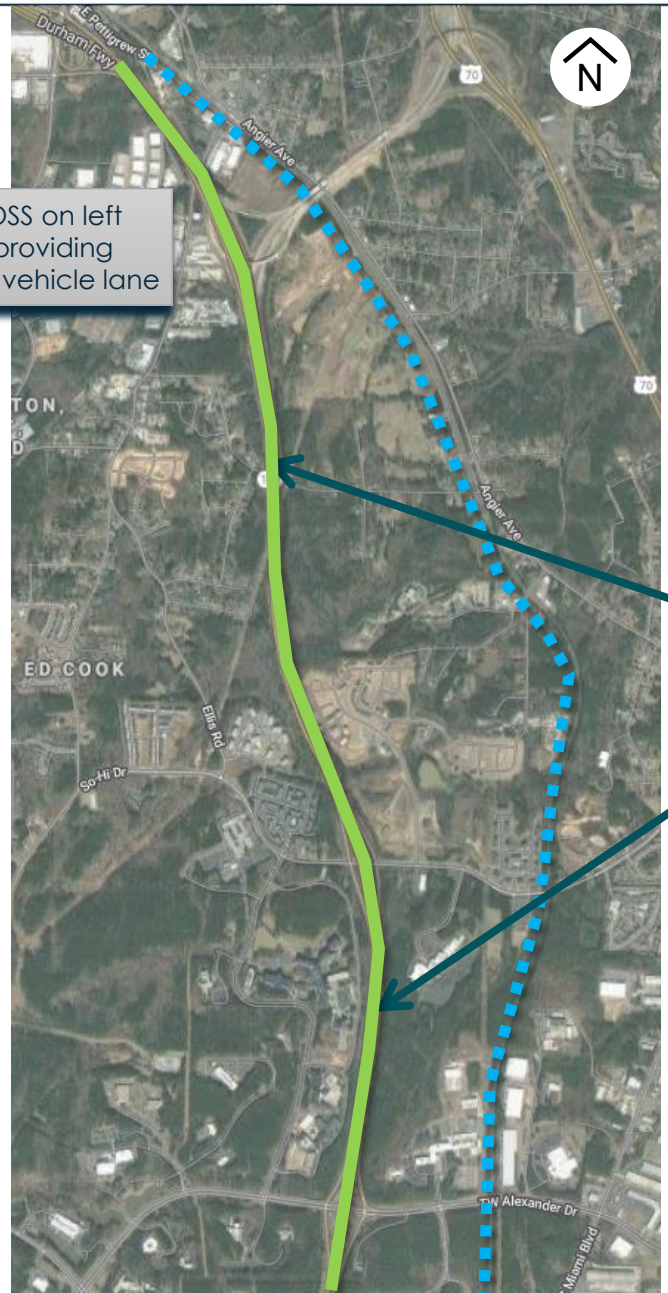
NC 147



Preliminary Findings

Re-stripe roadway to allow BOSS on left shoulder as a part of U-5934 providing transition between Bus lane and vehicle lane

- Significant AM and PM congestion NB from Alexander Drive north
- Delay/Congestion begins North of New Interchange with East End Connector



- When NC 147 is widened as a part of project U-5934
- Include a transit priority lane on left side highway in both directions

- Shoulder is not sufficient width for bus travel on shoulder, esp. at pinch points, bridges, etc.
- Left shoulder is minimal

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Preliminary Findings

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FAST Network

NC 147

Downtown Durham
OPTION 1

Evaluate potential time savings associated with routing on Jackie Robinson w/ RED Lane, Peak Hour Restrictions, Signal Priority, Bus Stops

Shoulder is not sufficient width for bus travel on shoulder, esp. at pinch points, bridges, etc.

Include BOSS as a part NC 147 operational improvements project STIP (U-5937)

Implement Transit Signal Priority

- Use Jackie Robinson Drive
- Use RED lane or Peak Hour Restrictions, Signal Priority, Add Bus Stops
- Avoids congestion on NC 147

- Return on Morehead/Service Road
- Can add transit priority lane (Remove parking) and take advantage of existing bus only merge
- Signal Priority and Queue Jumps

This would require a contra-flow bus lane on Duke.
Signal preemption may be needed to be consistently faster than congestion on NC 147

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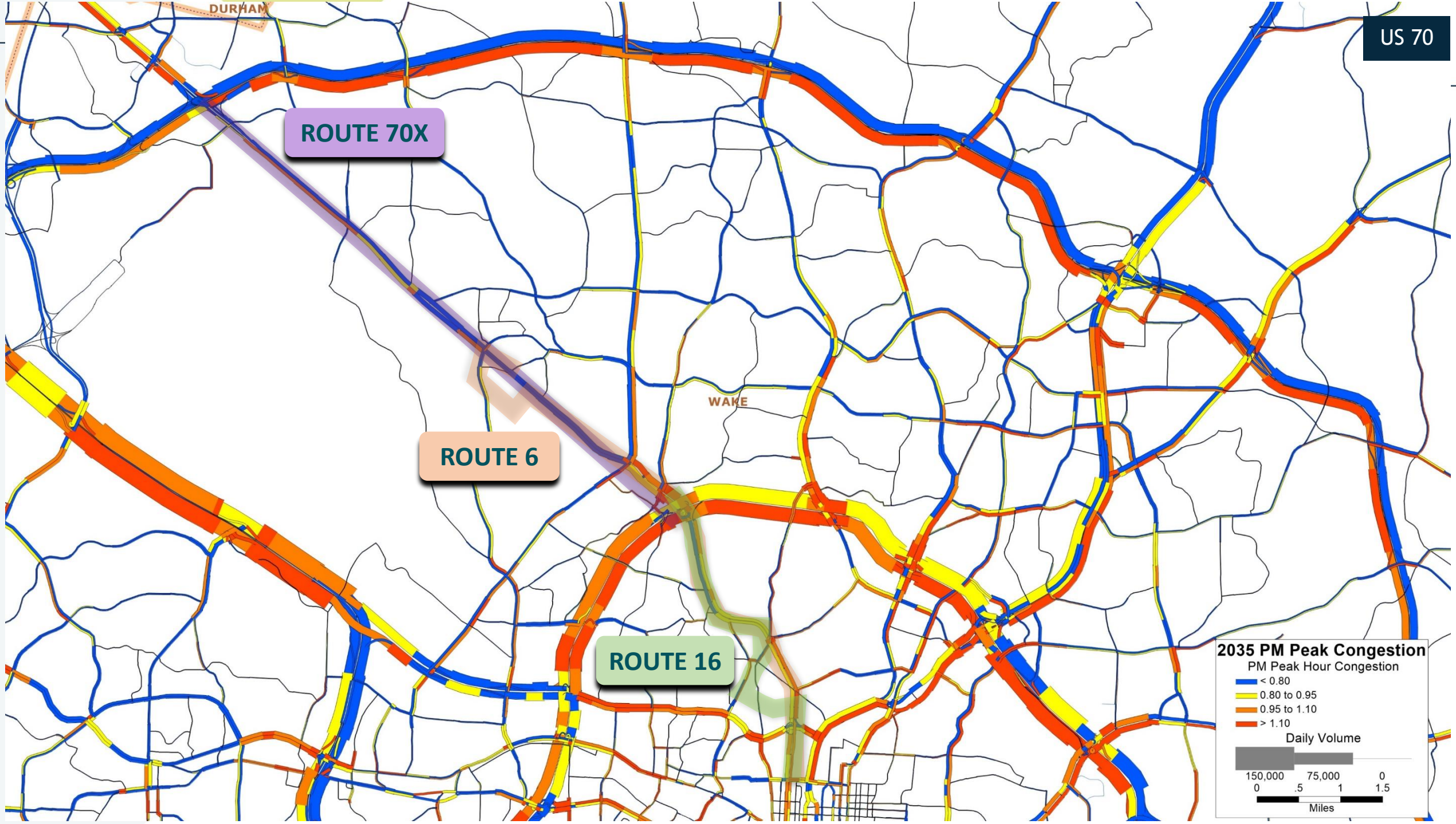
Question?


US 70
ROUTE 70X
ROUTE 6
ROUTE 16
DURHAM
WAKE
2035 PM Peak Congestion
PM Peak Hour Congestion
< 0.80
0.80 to 0.95
0.95 to 1.10
> 1.10
Daily Volume
150,000
75,000
0
0
.5
1
1.5
Miles

Preliminary Findings

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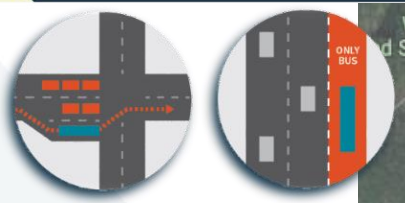
US 70



- Use ROW (no shoulder) to widen road for shoulder/transit priority lane on side or in median.
- Roadway delay likely minor here, so focus intersection improvements like Queue Jumps to improve bus speed and reliability
- Improve peak queue lengths through Queue Jumps (1/3 m + Queue Jump Lanes)

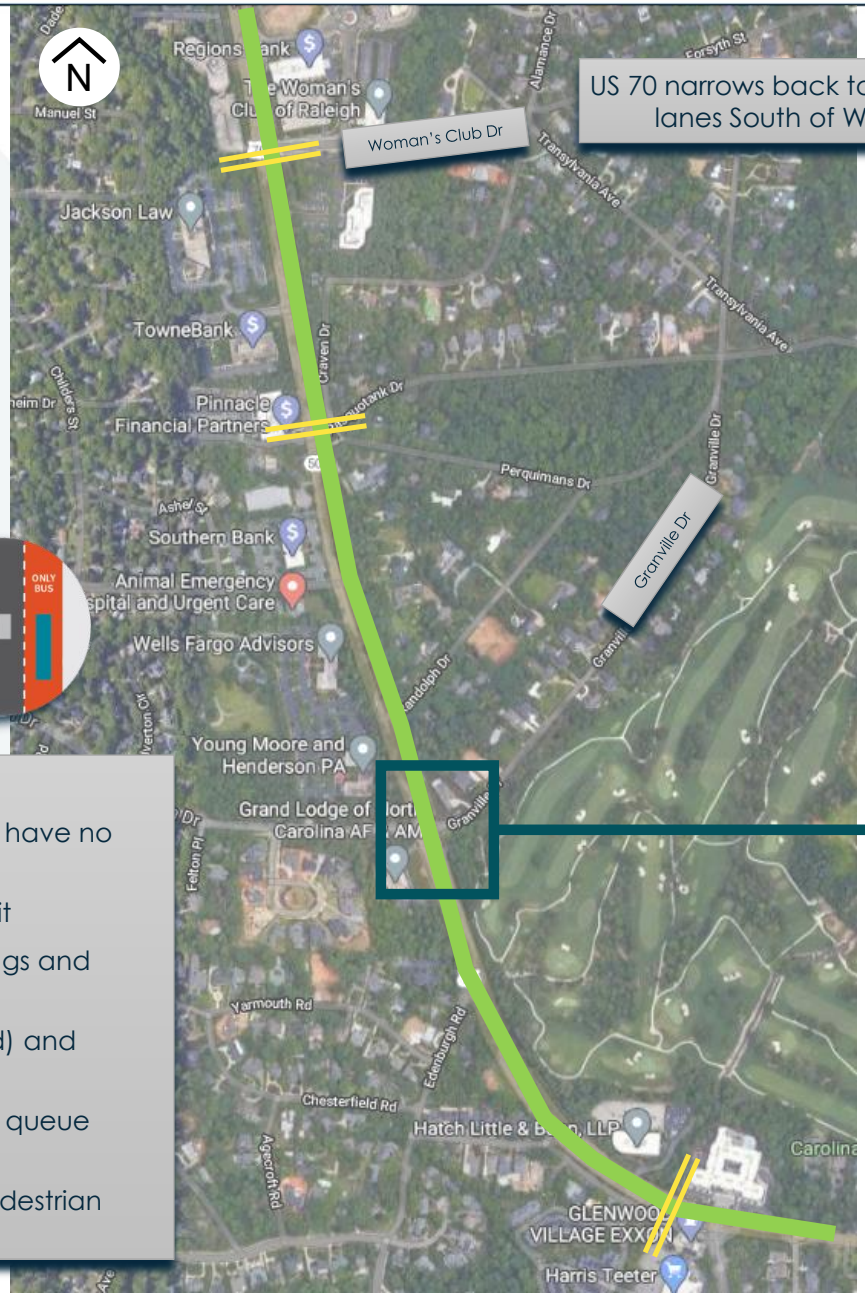
Queue jumps at signals – consider using Right Lane, or even Queue Jump/Left Turn lane if can be done safely or with timing adjustments

- This route could serve more stops and riders, as Route 70X does not stop on US 70. There is high activity and density in this corridor, yet it is difficult to serve with transit due to accessibility across US 70.
- No Crosswalks or Ped Accommodation at likely Stop
- Would need signal upgrade or significant modification
- Could add stop w/queue jump

Preliminary Findings

Service on US 70

- Identified Stops on Route (on Google) have no sidewalks or signage
- Abutting Land Use is walkable to transit
- Use Existing Crossings &/or Add Crossings and Signal Modifications
- Right Turn – Dedicated Transit (marked) and limited Right Turns/Driveway Access
- Stops should be far-side of signals with queue jump/RT lanes
- Significant Stop Improvements with Pedestrian Connections from US 70



US 70 narrows back to 2 travel lanes + turning lanes South of Women's Club Drive

Preliminary Findings

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FAST Network

US 70

- Address Bus Speed & Reliability by implementing:
- Peak hour, peak direction bus lanes
- Removes existing parking
- Can be implemented in short/immediate-term and then made permanent
- Signal improvements/priority

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Question?

Next Steps

- Finalize
  - Implementation Playbook
  - Deep Dive concepts for two corridors

- Questions to:

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www.vhb.com

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Catalyst Design
moving people and things

Stantec