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
Strategic goal of the FAST study

- Institutionalize transit advantage on the state highway system to make transit more attractive, effective, and reliable.
Objectives of the FAST study

• Develop a “FAST” approach and mindset
• Identify investments that will create multimodal freeways, streets
• Advance regional FAST networks
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
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
Example Transit Advantages
Street low-cost transit advantages

- **Transit Signal Priority**
- **Queue Jump Lanes**
- **RED Lanes**
Stop/station low-cost transit advantages

- **Level Boarding**
  - Source: Metropolitan Council

- **Enhanced Bus Stop**
  - Source: KCATA

- **“Floating” Bus Stop**
  - Source: Oran Viriyincy
Freeway low-cost transit advantages

- On-ramp signal bypass
- Bus On Shoulder System (BOSS)
- Yield-to-Bus
Enhanced freeway transit advantages

Direct access ramp

Transit priority shoulder

Freeway transit station

Source: Bing Maps
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
2030 Trip Origins to All Zones
Preliminary Findings

2030 Trip Origins to All Zones

- Freeways
- US Routes (non-Freeway)
- NC Routes (non-Freeway)
- County Boundaries
- Activity Zones

Trip Origins (1 dot = 5 trips)
- to Chapel Hill
- to Duke & Downtown Durham
- to South Durham
- to RTP
- to RDU
- to North Cary
- to Blue Ridge & Crabtree
- to NCSU
- to Downtown Raleigh
- to Wake Med & St. Alban's
- to Crossroads & South Cary
Potential FAST Networks
Preliminary Findings

FAST Network

0 - 5 Years Potential Freeways
Preliminary Findings

US 15/501
Bus On Shoulder System

I-40 & NC 147
Bus On Shoulder Expansion
Increased Service Frequency & Span

RDU
Direct Access Ramps

South Durham
Direct Pedestrian Access

Orange County
Chapel Hill
Carrboro

RTP/Davis Drive
Direct Access Ramps

Wilmington St
Direct Access Ramps

RDU Airport
Raleigh
Cary

FAST Network
0 - 5 Years Potential Freeways

High priority: FAST Freeway
0-5 Years: FAST Freeway
0-5 Years: Direct Access
Future BRT
BRT
**Preliminary Findings**

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

**NC 54/Raleigh Rd**
- Traffic Signal Priority
- Queue Jump Lanes
- Enhanced Access/Stops/Boarding

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

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

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

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

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

**Poole Road**
- 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
- Floating Bus Stops

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

**0 - 5 Years Potential Freeways and Streets**

**FAST Network**
- 0 - 5 Years Potential Freeways and Streets
- poole road
- red bus lanes (portions)
- floating bus stops
Preliminary Findings

10 freeway & street FAST corridors
7 link to proposed BRT
Preliminary Findings

FAST Network

5 - 10 Years Potential FAST Network

[Map of the FAST Network in Durham and Wake County, highlighting potential projects for the next 5-10 years.]
Preliminary Findings

10+ Years Potential FAST Network

- High priority: FAST Street
- High priority: FAST Freeway
- 0-5 Years: FAST Street
- 0-5 Years: FAST Freeway
- 5-10 Years: FAST Street
- 5-10 Years: FAST Freeway
- 10+ Years: FAST Street
- 10+ Years: FAST Freeway
- 0-5 Years: Direct Access
- 5-10 Years: Direct Access
- 10+ Years: Ped Access
- BRT
- Commuter Rail
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

- How to Use this Document
- How the FAST Network was developed
- FAST and Super FAST Projects
- Transit Improvement Matrix
- Improvement Guides
- Funding Opportunities
- Policy Recommendations
Preliminary Findings

For Consideration in Future Freeway/Transit Projects

Under Development in BRT System Design
- Enhanced Bus Stop
- Level Boarding
- Queue Jump Lanes
- Traffic Signal Priority
- RED Bus Lanes

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

Floating Bus Stops
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.
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.
Truth Test – 2 Corridors
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.
Preliminary Findings

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
Preliminary Findings

Install ramp meters as a part of STIP project I-6006 to aid BOSS operations.

- Delay on this stretch
- Widen shoulders where widths are less than 12’ substandard.

Add on-ramp bypass

Add stops on Hopson/Paige

Potential widening and tie into Commuter Rail

RED Dedicated Lane on Page

Regional Transit Center

NC 147
Preliminary Findings

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

- 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

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

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

▪ 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

Signal preemption may be needed to be consistently faster than congestion on 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

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

This would require a contra-flow bus lane on Duke.
Preliminary Findings

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

- 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)

- 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

FAST Network

Study Purpose

- 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

- Contraflow bus lane on Morgan

- Planned Raleigh Union Station Bus Facility

- Floating Bus Stop

- US 70

- Transit Center
Next Steps

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

• Questions to:
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