M E M O R A N D U M

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To: Shelby Powell, (CAMPO) Deputy Director

From: Thomas Wittmann & Jimi Mitchell (Nelson\Nygaard)

Subject: Locally Preferred Alternatives (LPA) and Next Steps

INTRODUCTION

The Wake BRT Rapid Bus Extension Study's Alternatives Analysis (AA) identifies, evaluates, and recommends potential rapid bus extension alternatives for two corridors in the Wake Transit Plan Bus Rapid Transit program. The rapid bus service would connect Cary to Research Triangle Park (RTP) in the Western rapid bus extension (Western Extension) and the Towns of Garner to Clayton in the Southern rapid bus extension (Southern Extension).

The AA process included two analysis phases. Both phases of the analysis aligned data-oriented criterion and metrics with the study's goals and objectives to inform decision making.

- **Phase 1 Screening** primarily utilized existing conditions and adopted plans/projects along individual roadway segments within the extensions to identify those with the highest potential to support rapid bus service. These segments were then combined into end-to-end alignments for further development and evaluation.
- Capital infrastructure and operating assumptions for each alignment were refined into final alternatives for **Phase 2 Evaluation** using detailed criteria. The comparative performance benefits and impacts of alternatives in the planning horizon were considered.

LPA RECOMMENDATIONS

The LPA for rapid bus extensions includes preferred alignment, mode, transit priority treatments, and operations for service between the study area limits. Preliminary LPA component recommendations will be refined with completion of subsequent studies and analyses.

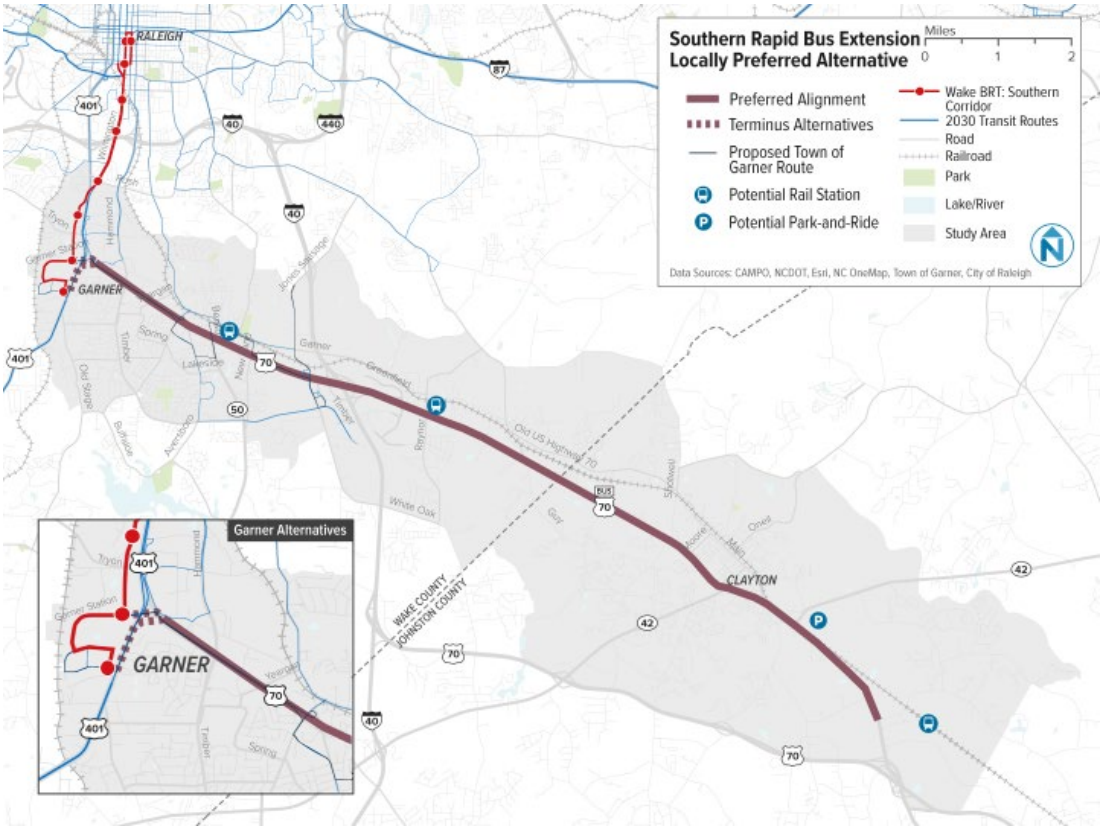
Southern Extension

Screening results from phase I of the route evaluation process identified US 70/US 70 Business as the most appropriate route alignment between Timber Drive in Garner and NC 42 in Clayton. Phase II evaluation used ten (10) detailed criteria to determine the preferred alignment and routing options at Garner Station and consider extension of the southern terminus to the East Clayton Industrial Area (ECIA) near Powhatan Rd.

Given future and planned conditions in the corridor, the evaluation of alignment options led to **recommendation of extending Rapid Bus service to Powhatan but concluded that the exact routing at Garner station will depend on the way service connects to Core BRT service and operates between Garner and Raleigh** (see Figure 1)**.**

The Garner to Clayton route features approximately 8 to 10 stations depending on the alternative selected, with average spacing varying based on surrounding land uses. Alternatives would operate every 30 minutes during peak periods and 60 minutes during off peak periods between approximately 5am to 12am on weekdays. Saturday and Sunday service would operate every 60 minutes for 18 hours and 13 hours, respectively.

Figure 1 Southern Extension LPA Alignment

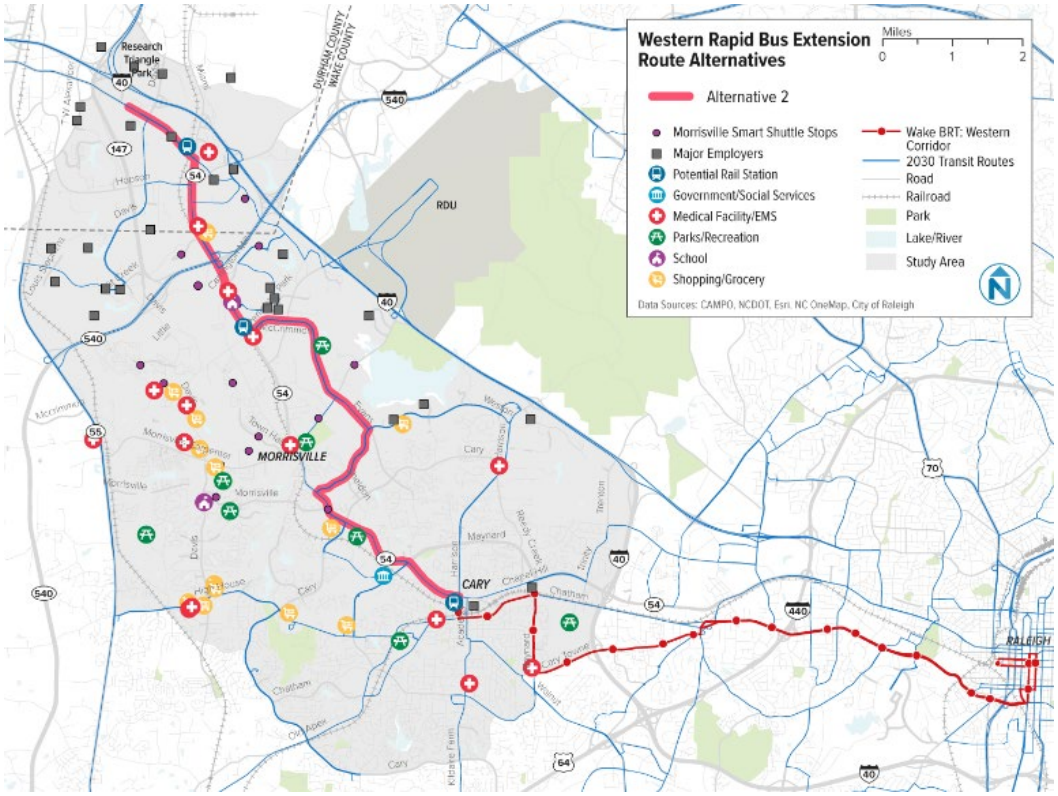


Western Extension

Screening results from phase I of the route evaluation process identified three (3) alignments that could support rapid bus service from Cary to the (future) Regional Transit Center and The Hub at RTP. Phase II evaluation used ten (10) detailed criteria to determine the preferred alignment and routing option. Each alternative featured approximately 10 to 15 stations, with average spacing varying based on surrounding land uses, and offers different potential benefits and tradeoffs to operating rapid bus service. Alternatives would operate every 20 minutes during peak periods and 40 minutes during off peak periods between approximately 5am to 12am on weekdays. Saturday and Sunday service would operate every 40 minutes for 18 hours and 13 hours, respectively.

Given future and planned conditions in the corridor, the evaluation of alignment options led to **recommendation of Alternative 2** is the top performing alignment (from Cary to RTP), due to better long-term redevelopment opportunity and potential for transit speed and reliability.

Figure 2 Western Extension LPA Alignment



The Southern BRT corridor (Raleigh to Clayton) and Western BRT corridor (Raleigh to Cary) are proposed to begin revenue operation after 2026. The anticipated opening year of revenue service for rapid bus alternatives is beyond the 2030 planning horizon of typical transit network short range planning efforts.

NEXT STEPS

The local and regional transportation network between Wake, Durham and Johnston counties continues to evolve with growing markets. Conceptual solutions for rapid bus extensions are envisioned to go through additional planning and development to refine the best methods of extending the Southern and Western BRTs, respectively.

The Operating Plans developed for proposed rapid bus alternatives identified several key operating parameters and conditions where assumptions were made to assess potential performance. The considerations below will be further refined and analyzed following LPA adoption.

GoRaleigh and GoTriangle will coordinate with CAMPO and regional stakeholders to further develop Wake BRT program and Rapid Bus Extension details through:

- Updating Wake BRT standards (2023-24)
- Performing Concept of Operations (Con-Ops) and Analyses (2025-26)
- Updating regional demand-modeling forecasts (2025-26)
- Determining Project Sponsorship and ownership (2025-26)
- Identifying funding source eligibility and competitiveness (2026-27)

Additional improvements to the fixed route bus network are under development through the Wake Bus Plan as well as plans by stakeholders like the Towns of Garner and Clayton to invest in transit supportive land uses and infrastructure in advance of the projected implementation of rapid bus service (beyond 2035).

Wake BRT Standards

Alternatives developed for the "rapid bus extension" were deliberately branded with this naming convention to distinguish them from core Wake BRT Corridor projects when discussing the planning process and development of potential high-capacity transit solutions. However, the potential of rapid bus service in the extensions operating as a seamless extension of the core BRT would require a high degree of continuity between the capital components at stations and onboard vehicles.

To that end, the development of rapid bus alternatives and their evaluation took place concurrently with (and was informed by) the preliminary stages of detailed engineering and

architectural design of the Southern and Western BRT Corridors. The rapid bus station area amenities and infrastructure improvements assumed for capital cost estimates were based on final design (90%) architectural plans for the New Bern Avenue BRT.

This rapid bus study recommends formalizing Wake BRT program design guidelines following construction Contractor selection of the New Bern BRT project, to include considerations for potential rapid bus extensions as well. BRT design guidelines would cover project development and design considerations such as, but not limited to:

- The standard and directive drawings related to BRT and rapid bus station platform, canopy, and amenity components, including the minimum conditions and/or thresholds for installation of Wake BRT station typologies.
- Wake BRT ITS components including but not limited to transit signal priority (TSP), real time passenger information and vehicle arrival information, off-board ticket vending and fare collection equipment.
- Vehicle specifications for operation within transitways, at speed and reliability infrastructure, and at station platforms, as well as compatible onboard ITS components.
- Operating standards for BRT, rapid bus, and local fixed route buses operating within dedicated transitways or other speed and reliability infrastructure.
- BRT, rapid bus, and local bus stop spacing standards and policy related to desired co-locating of rapid bus or local bus stops with Wake BRT stations.
- Connectivity, scheduling, and transfer guidelines between BRT, rapid bus, and local fixed route buses.

Design guidelines should be periodically updated through the construction and project delivery of New Bern BRT as well as any issues encountered during advanced planning, Preliminary Engineering (PE), or Final Design of subsequent Wake BRT Corridor and Extension projects.

Concept of Operations

This rapid bus AA recommends conducting a Concept of Operations (CONOPS) analysis for recommended LPA of both the Southern and Western Extensions. A CONOP is a document that describes a proposed system concept and how that concept would be operated in an intended environment. This includes the perspectives of the Operator and User, as well as others potentially using the right of way.

High-level assumptions regarding the independent utility of rapid bus service in the study area were considered within this Alternatives Analysis process. However, this process was

unable to determine the feasibility of operating both core BRT and one-seat ride rapid bus service using a single fleet of vehicles. Appropriate rapid bus service frequencies should be determined in concert with the decision of operating service as an overlay to or an extension of the core BRT at the opening year of service (beyond 2030). A detailed analysis of the comparative benefits, impacts, and tradeoffs of these operating strategies versus a seamless, 1-seat ride extension of core BRT service is recommended.

Several key capital and operational assumptions of the rapid bus LPA recommendations are subject to refinement and adjustment based on the final operating profile of service deployed within each extension including but not limited to:

- Final turn-by-turn alignments and service tie-ins at the termini are also important to refine in the case of the Garner Station alternative alignments, where both are found to be viable routing options to connect with the Southern Corridor BRT terminus. There may be potential tradeoffs regarding routing efficiency for continued one-seat ride service to Raleigh along Garner Station Boulevard due to the out of direction travel and potential traffic queuing issues at the US 70 westbound to US 401 (Fayetteville Road) southbound turn movement.
- Examination of scheduling challenges and/or opportunities for interlining core BRT and 1-seat ride to extensions using the same mixed fleet of buses. There are incremental financial and operational capacity constraints on the additional resources required to maintain BRT frequency on rapid bus extensions with longer route lengths and travel times.
    - Requiring rapid bus passengers to transfer to Wake BRT service in Cary or Garner to travel to points closer to Raleigh would increase travel times and impact ridership potential.
- The operation of 1-seat service to downtown Raleigh would involve the use of planned median bus lanes within segments of the core BRT, where BRT stations require more expensive vehicles that can accommodate left-side boarding.
- The operation of 1-seat service to downtown Raleigh may involve the use of articulated (60-foot) buses, requiring longer rapid bus station platforms and concrete bus stop pads in the roadway.
- What are the impacts if rapid bus 1-seat ride service to downtown Raleigh is asked to operate as an overlay to the core BRT? And what is the optimal stop pattern for 1-seat ride rapid bus service?

A detailed concept of operations (CONOPS) involving scheduling analyses is recommended to identify and test potential BRT and rapid bus operating strategies, as well as assess station

stop-spacing and compatibility with BRT transitway and station platform infrastructure configurations within the core segments in detail.

Update Regional Plans and Travel Demand Forecasts

The planned Western and Southern BRT Corridors were identified in the Capital Area Metropolitan Planning Organization's (CAMPO) *2045 Metropolitan Transportation Plan (MTP)* and established in the 2020 – 2029 Transportation Improvement Program (TIP) as project TO-6166 to bus operate rapid transit service between Morrisville and Clayton. However, In the 2024-2033 STIP, neither of these sections of the project are funded for right-of-way or construction.

The Capital Area MPO intends to use the results of this study to submit these projects to compete for funding in future versions of the STIP. Section B (Cary to Raleigh) and Section C (Raleigh to Garner) of TO-6166 continue to move toward project delivery through the GoRaleigh Wake Transit Bus Rapid Transit program. CAMPO and regional MPOs will undergo the local TIP planning process of updating priorities and funding appropriations for inclusion in the STIP throughout the 2024 fiscal year (FY).

Assuming the extensions are successfully included within the updated TIP/STIP, CAMPO will perform regular update of the Triangle Region Travel Demand Model (horizon year 2050) to incorporate rapid bus projects along with:

- The latest Wake Bus Plan and Bus Rapid Transit (BRT) Plan transit network recommendations,
- The latest transit ridership (including effects of New Bern BRT implementation)
- Future commuter rail network assumptions,
- Adopted land use plans and recent growth trends, as well as
- Travel market data (considering post-pandemic trip patterns)

Once calibrated, the regional model can be used to provide a more accurate forecast of potential transit ridership demand and utilization within the BRT Corridors and Extension. Preferred scenarios resulting from CONOPS analyses may be simulated and refined to inform final operational plans for rapid bus extensions as well as potential competitiveness for federal (CIG) funding sources.

Project Sponsor and Operator Considerations

Currently, no agency has been specifically identified as the Project Sponsor and eventual operator of rapid bus services on the Western and Southern Extensions. However, likely operators would be either GoRaleigh or GoTriangle due to their transit service operations

experience and current provision of service in the metro Raleigh area. For the purposes of this analysis, costing will be conducted using service unit costs for both operators.

The determination of a Project Sponsor will consider the current and planned Maintenance and Storage Facility (MSF) capacity of candidate agencies, as well as compatibility with Wake BRT Program vehicle specifications. As a Project Sponsor was undetermined at the time of this analysis, the rapid bus MSF needs are assumed to be met by existing and planned facility investments. No siting or costing of a new or modified MSF was undertaken for this analysis.

Facilities and Services Provided by Others

This Alternatives Analysis assumes the continued development and land use changes associated with population and employment growth in the region will catalyze transit supportive infrastructure projects, mobility services, and/or policy implementation by third parties. Interagency coordination opportunities include, but are not limited to:

- Bus on Shoulder System (BOSS) implementation on US 70 Business is dependent upon the (proposed) NCDOT project widening and reconstruction of the facility. The final design package of the facility is recommended to include specifications to accommodate BOSS. The project is not currently funded in the TIP/STIP.
- Potential rapid bus travel times and overall corridor ridership will be affected by the presence of Commuter Rail (CRT). Horizon year (2050) ridership demand forecasts for rapid bus alternatives assume CRT between Cary and Clayton are in operation. The implementation and operating profile of commuter rail service in the Triangle Region will have an indirect effect on the travel market and future of rapid bus service.
- Transit connectivity, as well as pedestrian safety and circulation improvements included within planned and programmed capital projects (e.g., US 70 at Vandora Springs Road interchange reconstruction; future park and ride at US 70 and NC 42).
- First/last mile shuttle and local circulator services would be needed to link the preferred rapid bus alignments to major activity centers and employment and residential concentrations offset from the primary alignment and unable to be directly served by rapid bus. Since the customer market and operating needs of these services may not align with traditional fixed route transit, they were assumed to be operated or sponsored by third-party stakeholders. The implementation costs and recurring O&M costs of first/last mile circulators was not included in rapid bus alternative cost estimates.

Potential Funding Sources and Incremental Implementation Opportunities

The Project Sponsor, affected agencies, and stakeholders are recommended to pursue the programming of local funding as well as supplemental funding appropriations from other state and federal sources for the advanced design and construction of locally preferred alternative (LPA) recommendations. See *Federal Funding Eligibility and Feasibility Memorandum (June 2023)*.

One of the immediate steps to securing potential local, state, and federal funding is through TIP/STIP programming local funds to independently advance planning or design activities, as well as potential local funding match contributions for future grant funding pursuits. Should rapid bus service prove ineligible for FTA CIG program funding for project development and construction, the Project Sponsor may elect to seek capital funding for strategic implementation of specific rapid bus components, based on grant eligibility requirements.

Deployment of Transit Priority Treatments

While observing the condition of the built and natural environment within the extensions, several opportunities for transit speed and reliability improvements such as TSP and queue jump lanes were identified within LPA extension study limits (see *Evaluation of Alternatives Report, May 2023)*. While TSP is recommended corridor-wide at each signalized intersection, only the general conditions conducive for implementing a transit queue jump were identified, along with candidate site locations within each corridor meeting the basic criterion. Site-specific analyses of potential queue jump locations is required to determine feasibility and appropriate infrastructure and signalization solutions.