Chapel Hill North-South BRT

Technical Memorandum:

Assessing the Feasibility of Extending North-South BRT Service to Hillsborough

FINAL

August 2018

NORTH SOUTH BUS RAPID TRANSIT

Chapel Hill transit

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1. Introduction and Overview

The Chapel Hill BRT Planning Study (2013-2016) was a 30-month study to identify and evaluate a series of transit investment alternatives for implementation within the study corridor, which runs along the Martin Luther King, Jr. Boulevard, South Columbia Street, and US 15-501 South. This corridor, which is approximately 8.2 miles long, has its northern terminus at Eubanks Road park-and-ride lot and its southern terminus at US 15-501 at the Southern Village park-and-ride lot.

Based on feedback from the public, three versions of the same alternative have been identified as the Locally Preferred Alternative (LPA) (Figure 1-1). The variations are related to dedicated lane configuration north of the Martin Luther King, Jr. Boulevard and North Columbia Street intersection.

Carrying these variations into the engineering and environmental clearance process will enable the community to better understand the benefits and impacts of each, and will help to inform the detailed design and decision-making process.

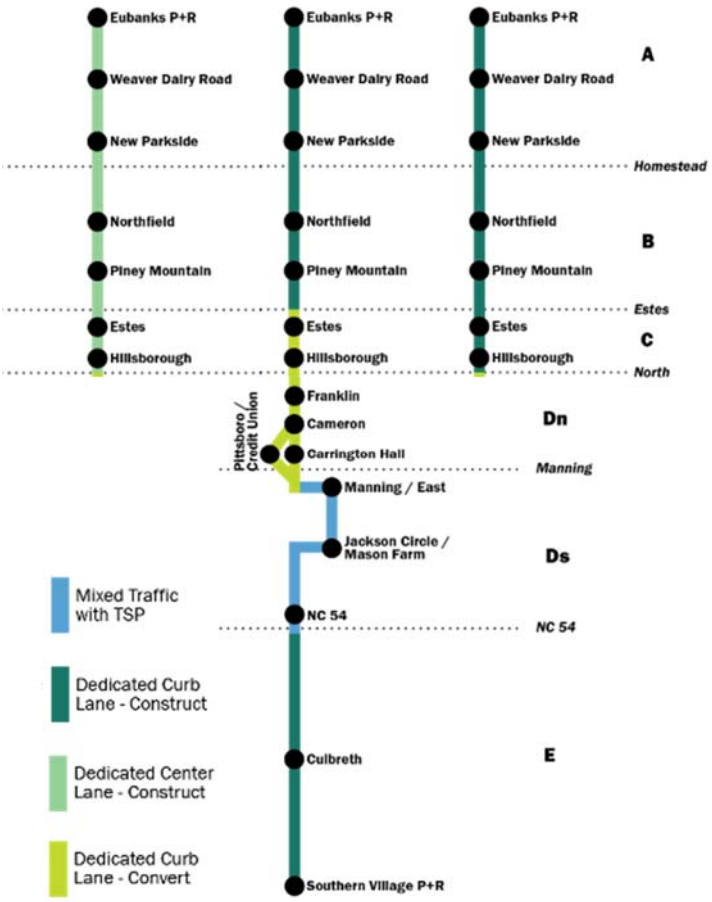
The BRT Planning Study concluded with the identification of the LPA, which was approved by the Chapel Hill Town Council in April 2016.

The 30% Design Project (2018-2019) is ongoing, and will:

- Advance the engineering and design of the LPA to 30%,
- Complete the environmental review, and
- Advance the project financial planning.

Based on feedback from local partners following the Town Council's adoption of the LPA, consideration of an extension north of the Eubanks Road P&R station to Durham Technical Community College (DTCC) in Hillsborough was added to the 30% Design Project scope of work.

Figure 1-1: The North-South BRT LPA



This technical memorandum assesses the feasibility of extending North-South BRT from the Eubanks Park-and-Ride station to DTCC by generating a series of key metrics using the methodology developed for the North-South Planning Study. The metrics include:

- Traffic Operations
- Bicycle and Pedestrian Impacts

- Parking Impacts
- Ridership
- Capital Costs
- Operating and Maintenance (O&M) Costs

The analysis relied on the same methodology and inputs/unit costs at the 2016 Planning study to ensure an apples-to-apples comparison between the BRT DTCC Extension alternatives and the 2016 LPA.

1.1 Definition of the BRT DTCC Extension Alternatives

The Chapel Hill North-South BRT DTCC Extension would be a 6.7-mile BRT extension from the Eubanks Park-and-Ride to the DTCC Hillsborough campus (Figure 1-2). This extension would introduce two new BRT stops: one at the University of North Carolina (UNC) Healthcare – Hillsborough Campus (two platforms), and one at the existing DTCC Park-and-Ride (one platform). GoTriangle Route 420 and Orange Public Transportation (OPT) Route OCH currently operate along this route.

The section of NC 86 on which the BRT DTCC Extension would operate is a two-lane highway. There would be no special technology infrastructure or guideway treatments, such as Transit Signal Priority (TSP) or dedicated lanes, for the BRT DTCC Extension; it would run in mixed traffic.

Five alternatives were developed as part of this feasibility assessment. The proposed service plans for each of the alternatives, including modifications to the existing Route 420 service, are shown in Table 1-1.

Table 1-1: The BRT DTCC Extension Alternatives

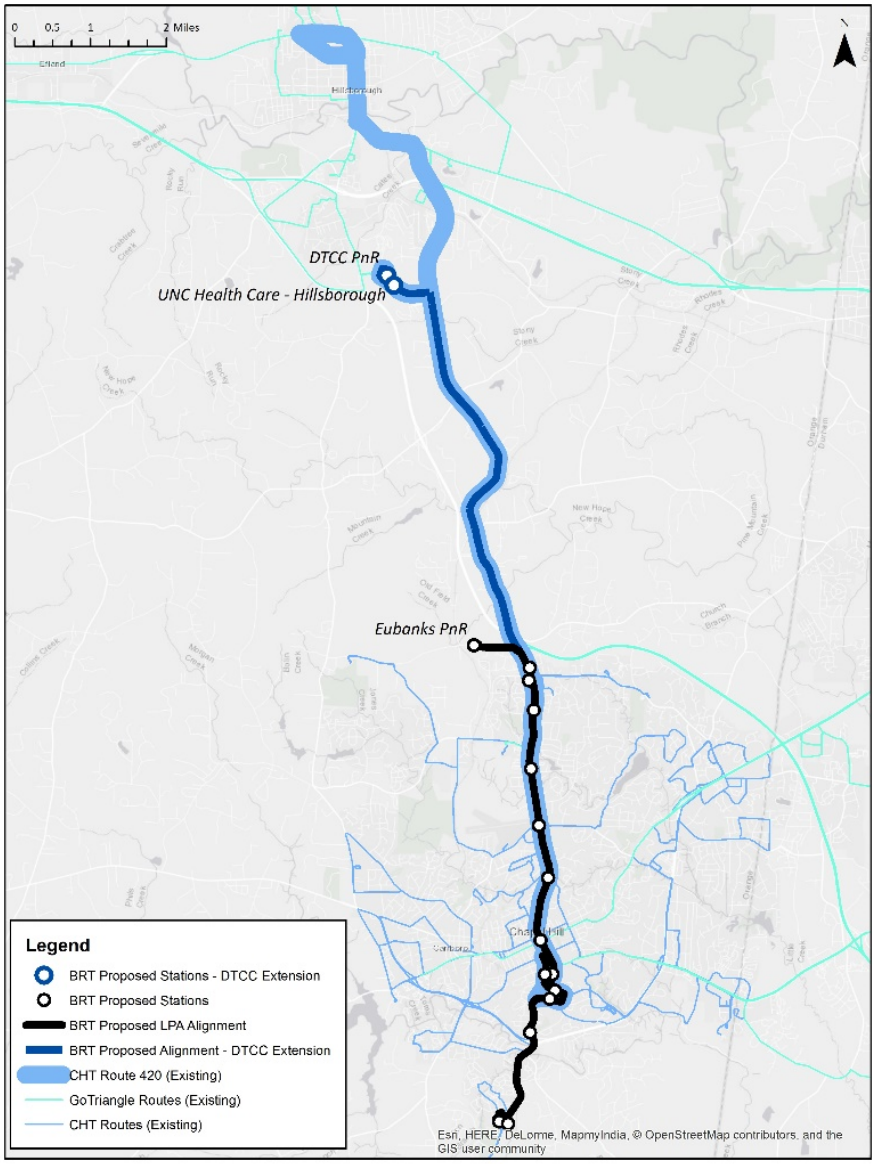
	DTCC 1	DTCC 2	DTCC 3	DTCC 4	DTCC 5A and 5B
BRT Service Description	Full BRT service to DTCC during all time periods.	Reduced service to DTCC past Eubanks P&R during all time periods.	Reduced service to DTCC past Eubanks P&R weekdays only.	30-minutes peak & mid-day service to DTCC past Eubanks P&R weekdays only.	LPA alignment only. No BRT service to DTCC.
Route 420 Modifications	Service routed directly from Hillsborough to Chapel Hill with no stop at DTCC (stops at Storey Lane and Mt. Sinai retained). Service levels reduced from nine peak period trips to four peak period trips.				Route split into long (DTCC 5A)-short patterns (DTCC 5B) at DTCC. Maintains existing 30-minute peak weekday service between downtown Hillsborough and Chapel Hill. Sixty-minute mid-day service provided between DTCC and Chapel Hill with no service to Hillsborough in mid-day.

The number of vehicles required for each alternative is shown in Table 1-2. The baseline alternative is the LPA from the 2016 Planning study. The LPA requires 10 BRT buses in the peak period. The DTCC 1 alternative would require 15 peak period buses, or five more buses than the baseline LPA. The DTCC 2 and DTCC 3 alternatives would require 13 peak period buses. The DTCC 4 alternative would require 12 peak period buses, and the DTCC 5A/B alternative would require 10 peak period buses (the same the LPA).

Table 1-2: Peak Period Buses by BRT DTCC Extension Alternative

	2016 LPA	DTCC 1	DTCC 2	DTCC 3	DTCC 4	DTCC 5A/B
Peak Buses	10	15	13	13	12	10

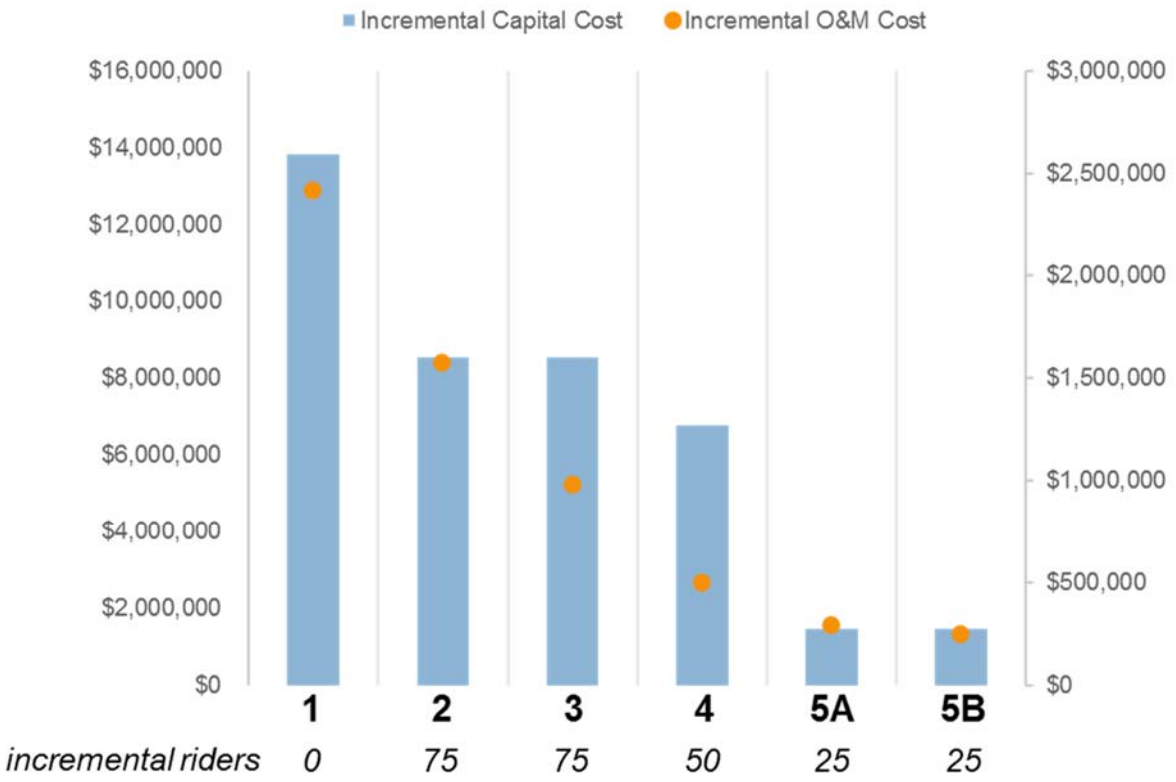
Figure 1-2: Potential Chapel Hill BRT DTCC Extension



2. Summary of Results and Recommendations

The results of the assessment (incremental ridership, incremental capital cost, and incremental O&M cost) are shown in Figure 2-1. As discussed in Sections 3, 4, and 5 of this memo, there are not anticipated to be traffic, parking, or bicycle/pedestrian impacts resulting from any of the BRT DTCC Extension alternatives, so those metrics were excluded from Figure 2-1.

Figure 2-1: BRT DTCC Extension Alternatives: Incremental Ridership and Costs



The analysis demonstrates that the incremental gain in ridership does not justify the incremental increases in capital and O&M costs.

The recommendation is to maintain the 2016 LPA service plan (which does not include the BRT DTCC Extension), and pursue opportunities to improve Route 420 as local funding becomes available.

3. Traffic Operations

3.1 Methodology

The 2016 Planning study assessed the potential traffic impacts of the North-South BRT alternatives through a capacity analysis that incorporated existing turning movements at key intersections along the corridor and future traffic growth, as forecast by the Triangle Regional Model. Because the BRT DTCC Extension alternatives would not require changes to existing roadway conditions and would result in a minimal number of new buses on the roadway, it was determined that this level of analysis was unnecessary for this feasibility assessment.

3.2 Results

None of the BRT DTCC Extension alternatives are anticipated to adversely impact existing or future traffic because they would require a minimal change from existing conditions in the corridor.

4. Parking impacts

4.1 Methodology

The 2016 Planning study assessed the potential parking impacts of the North-South BRT alternatives through a desktop review. Google Earth and Google Street View were used to verify and analyze potential parking impacts along the corridor. Because the BRT DTCC Extension alternatives would operate along an alignment that does not currently allow on-street parking, it was determined that this analysis was unnecessary for this feasibility assessment.

4.2 Results

None of the BRT DTCC Extension alternatives are anticipated to adversely impact parking because there is no on-street parking along the route.

5. Bicycle and Pedestrian Impacts

5.1 Methodology

The 2016 Planning study assessed the potential bicycle and pedestrian impacts of the North-South BRT alternatives based on impacts to existing facilities and compliance with bicycle and pedestrian plans. A similar analysis was performed for the BRT DTCC Extension alternatives.

5.2 Results

The assessment found that there are currently no existing bicycle or pedestrian facilities in the BRT DTCC Extension corridor. A high-level review of existing plans for the area shows that there are also no planned bicycle or pedestrian improvements in this corridor. Therefore, no negative impacts to bicycles or pedestrians are anticipated.

6. Capital Costs

6.1 Methodology

Capital costs for the BRT DTCC Extension alternatives were calculated using the same methodology and inputs as the 2016 Planning study: FTA's Standard Cost Categories (SCC) format and 2015 Master Unit Costs reported in $2015.

6.2 Results

The majority of the capital costs (summarized in Table 6-1) are associated with purchasing vehicles and constructing the three platforms/shelters. DTCC 1 requires the most new vehicles (due to the greatest increase in BRT service levels), which results in the greatest increase in capital costs. The capital costs drop among the alternatives as the BRT service levels decrease; the costs associated with Alternatives 5A/B are almost entirely related to the three new platforms/shelters.

Table 6-1: Incremental Capital Costs ($2015)

Option		Total Capital Cost
DTCC 1	Full Service to DTCC, All Time Periods	**$13,827,000**
DTCC 2	Reduced Service to DTCC, All Time Periods	**$8,532,000**
DTCC 3	Reduced Service to DTCC, Weekdays Only	**$8,532,000**
DTCC 4	30-Minute Peak & Mid-Day Service to DTCC, Weekdays Only	**$6,767,000**
DTCC 5A	LPA Alignment + Enhanced Route 420 Service Levels (full OCH alignment)	**$1,472,000**
DTCC 5B	LPA Alignment + Enhanced Route 420 Service Levels (truncated OCH alignment)	**$1,472,000**

7. O&M Costs

7.1 Methodology

O&M costs for the BRT DTCC Extension alternatives were calculated using the same methodology and inputs as the 2016 Planning study.

The annual cost to operate, maintain and administer the BRT DTCC Extension alternatives was estimated and expressed as the annual total of employee earnings and fringe benefits, contract services, materials and supplies, utilities and other day-to-day expenses incurred for operation and maintenance of the BRT service. The methodology used to calculate these estimates is consistent with FTA guidelines. The approach used a fully-allocated spreadsheet cost model format to identify differences in costs by mode and service type. Each expense incurred is "driven" by a key supply variable such as revenue hours, revenue miles or the number of peak vehicles. O&M cost data was combined with service supply statistics to establish unit costs and productivity ratios.

7.2 Results

The results of the analysis are shown in Table 7-1. DTCC 1, which has the greatest increase in BRT service levels, results in the highest O&M cost increment increase over the LPA. The cost declines as the level of service declines; the O&M costs associated with DTCC 5A/B are related to increased levels on Route 420.

Table 7-1: O&M Costs ($2015)

Option		Total Annual O&M Cost*	Cost Increment over LPA	BRT Fleet Vehicle Increment over LPA
LPA	LPA Alignment	$3,364,000	**--**	--
DTCC 1	Full Service to DTCC, All Time Periods	$5,783,000	**$2,418,000**	7
DTCC 2	Reduced Service to DTCC, All Time Periods	$4,935,000	**$1,571,000**	4
DTCC 3	Reduced Service to DTCC, Weekdays Only	$4,346,000	**$981,000**	4
DTCC 4	30-Minute Peak & Mid-Day Service to DTCC, Weekdays Only	$3,861,000	**$497,000**	3
DTCC 5A	LPA Alignment + Enhanced Route 420 Service Levels (full OCH alignment)	$3,655,000	**$291,000**	n/a
DTCC 5B	LPA Alignment + Enhanced Route 420 Service Levels (truncated OCH alignment)	$3,614,000	**$250,000**	n/a

8. Ridership

8.1 Methodology

Ridership for the BRT DTCC Extension alternatives were calculated using the same methodology and inputs as the 2016 Planning study.

To estimate trips on the proposed BRT system, the project team utilized the FTA national model, Simplified Trips-on-Project Software (STOPS). The STOPS model is designed to estimate transit project ridership using a streamlined set of procedures. STOPS includes many of the same computations of transit level-of-service and market share found in regional travel demand models. STOPS produces all of the reporting needed by project sponsors to review ridership forecasts in detail and to support grant applications to the FTA New and Small Starts program. Ridership forecasts are for 2013, which is consistent with the forecasts produced for the Planning study.

8.2 Results

The results of the ridership forecasting are shown in Table 8-1. The BRT DTCC Extension alternatives are not very productive in terms of ridership, adding roughly 125 weekday BRT DTCC

Extension riders In DTCC 1, 2, 3, and 4. Some of the riders appear to result from a shift in their boarding stations, rather than the attraction of new riders. While DTCC 1 includes the greatest increase in BRT service, more weekday riders are lost by reductions in the early morning frequency in the core service area than are gained with BRT DTCC Extension, leading to lower forecast weekday riders. Route 420 ridership tends to increase with greater core BRT service.

Table 8-1: DTCC BRT Extension and Total BRT Ridership Estimates (2013)

	Base	Alternatives				
	LPA	**DTCC 1**	**DTCC 2**	**DTCC 3**	**DTCC 4**	**DTCC 5**
RT 420	400	330	360	360	490	760
Added to RT 420	*N/A*	*-70*	*-40*	*-40*	*+90*	*+360*
BRT Boardings Eubanks to Southern Village	8,575	8,425	8,525	8,525	8,525	8,600
BRT Extension	N/A	150	125	125	100	N/A
BRT Total	**8,575**	**8,575**	**8,650**	**8,650**	**8,625**	**8,600**

Following a request by Orange County in October 2017 to evaluate an extension of the NSBRT from Eubanks Park and Ride to the Durham Technical Community College in Hillsborough, CHT staff contracted AECOM to complete the evaluation. A working staff group guided the evaluation, with members from Orange County/Orange Public Transportation, Go Triangle, Town of Hillsborough, Chapel Hill Transit, and the NSBRT project's Technical and Policy Committees consisting of:

- Theo Letman, Orange County
- Travis Myren, Orange County
- John Tallmadge, Go Triangle
- Erik Landfried, Go Triangle
- Geoff Green, Go Triangle
- Felix Nwoko, DCHCMPO
- Margaret Hauth, Town of Hillsborough
- Matt Cecil, Chapel Hill Transit

The recommendation to maintain the 2016 LPA service plan (which does not include the BRT DTCC Extension), is consistent with the guidance from the Extension Study staff working group and the endorsement of the NSBRT Technical and Policy Committees and the Chapel Hill Transit Partners Committee..