Regional Transit Framework Plan

A project of the BCD Council of Governments

September 2018

BCDCOG
BERKELEY-CHARLESTON-DORCHESTER COUNCIL OF GOVERNMENTS
PLANNING, PARTNERSHIP & PROSPERITY

Contents


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CARTA

The Berkeley-Charleston-Dorchester Council of Governments is an association of local governments that assists in planning for common needs of the three counties and municipalities within coastal South Carolina for sound regional development. The Regional Transit Framework Plan, was coordinated with association members, key stakeholders and the general public. Participant's particular areas of expertise and local area knowledge helped guide the development of the study to improve mobility in this region. The community and the regional leadership is commended on its efforts to continue to implement the vision crafted from the OurRegion OurPlan. The RTFP is one component of a greater mobility solution for the BCD region that will help the region grow smarter and develop a true multi-modal transportation network.

Introduction

Background

The Berkeley Charleston Dorchester (BCD) region is home to rich history, world-class beaches and attractions, multi-sector firms, military installations, a seaport, and national freight/passenger rail connections. The region's unique geography, rich history, beauty and world-renowned hospitality has enabled the tri-county region to be a destination. The region attracts tourists from around the world, large employers, military installations, students, major medical facilities, manufacturing industry and more. Such attractions coupled with a growing job market have led to an influx of residents to the area, and more are expected to come in the future. This growth will continue to place strain on key travel corridors such as I-26, I-526, US 17, US 78, US 17-Alt, US 52, Dorchester Road, Rivers Avenue, and Ashley River Road.

To address this overall growth, OurRegion OurPlan (OROP), the Vision Plan for the future of the BCD Region, recommended a framework to manage the intense growth and provide a blueprint for a future high capacity transit network focusing on the I-26 corridor. Through the OROP process, the BCD region developed a multi-modal transportation vision, this Regional Transit Framework Plan and the recommended High-Capacity Transit (HCT) network is a critical component of that shared vision.

What is the RTFP?

The Regional Transit Framework Plan (RTFP) sets the stage for how the region begins to establish a true multi-modal transit rich network. The purpose of the RTFP is to identify and prioritize an HCT network that serves wide-ranging trip needs, connects the region, enhances the quality of life, and supports economic growth and development. The RTFP serves as the foundation for future high capacity transit investment in the region through 2040 and the recommendations from the study will be incorporated into the region's Long Range Transportation Plan (LRTP), setting the stage for future premium transit infrastructure. The study considered and evaluated existing transit needs as well as future considerations such as population/ employment growth, land use, funding, local and regional policies and stakeholder needs.

The RTFP is one component of a greater mobility solution for the BCD region. HCT corridors coupled with current and future CARTA and TCL transit services, the Lowcountry Go commuter services program, the potential Lowcountry Lowline corridor, emerging transit technologies and service delivery models, and other multi-modal initiatives will provide residents and visitors with options for traveling throughout the region. In addition, it is equally important to ensure proper land use policies, densities and mobility supportive neighborhood design are in place. The outcomes of this study and future transit-focused studies should be taken into consideration by municipalities in the region and incorporated into plans and ordinances.

What is High Capacity Transit?

- **Express Bus:** Interstate Express bus in dedicated lanes;
- **Bus Rapid Transit (BRT):** A rapid transit system in exclusive bus lanes with off-board fare collection, level boarding, transit signal priority, and other quality of service elements;
- **BRT Lite:** A less capital intensive form of BRT operating in mixed traffic with traffic signal and intersection improvements; and
- **Light Rail Transit (LRT)**: A system of passenger rail cars typically powered electrically with overhead lines operating on fixed rails.

Study Process

The RTFP looked at how individuals travel across the region and where current and future development patterns are favorable to high capacity transit services. Activities that took place throughout the study process included on-going public engagement, interaction with the project's Stakeholder Committee, development of study Goals and Objectives, and detailed analysis.

Project Timeline

FALL 2017

- Stakeholder Committee
- Online Meeting & Comment Mapping
- Data Collection
- Needs Assessment
- Goals, Objectives & Performance Measures

WINTER 2018

- Public Open House
- Stakeholder Committee
- Online Meeting
- Transit Alternatives Analysis and Development

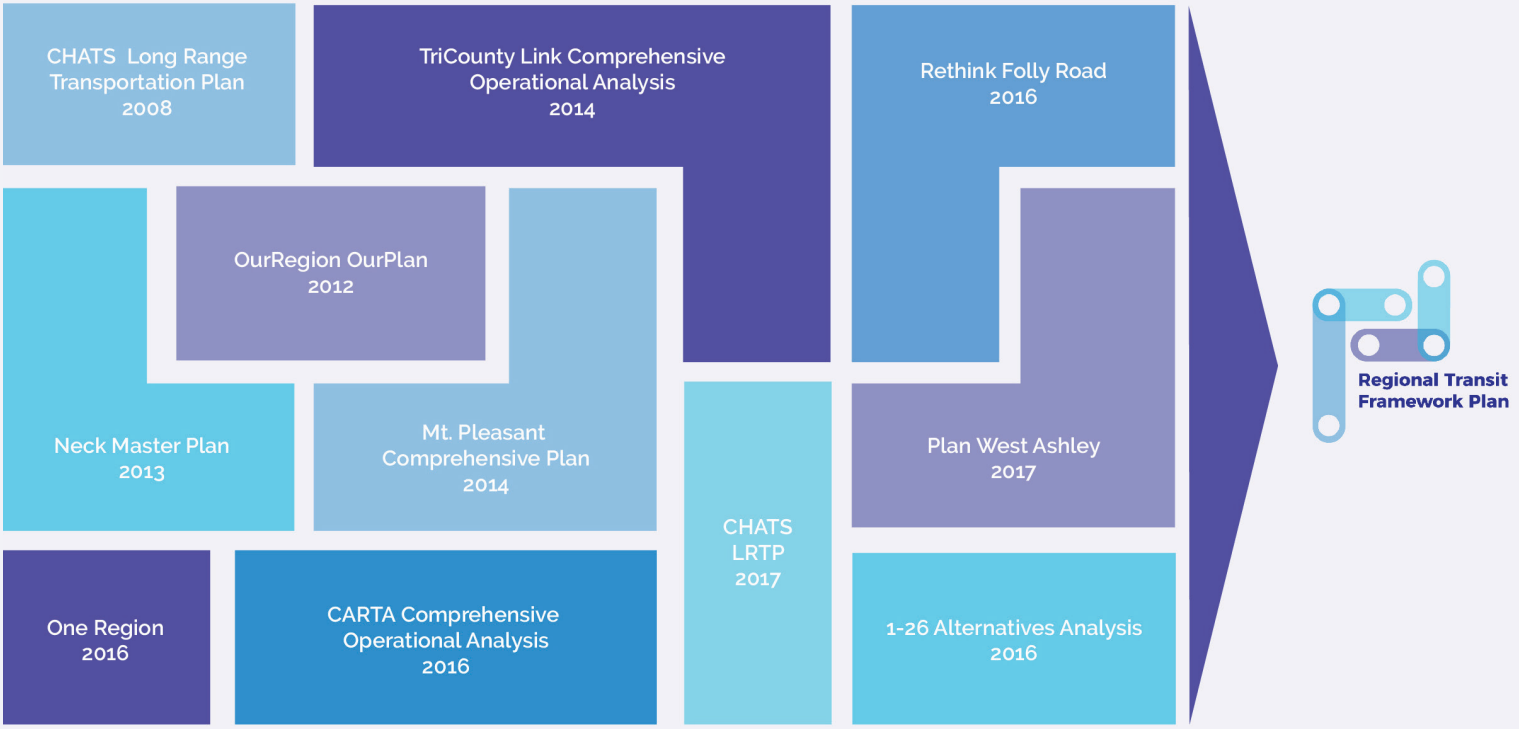
SPRING/ SUMMER 2018

- Alternatives Open House
- Stakeholder Committee
- Online Meeting
- Operating Plans
- Cost Estimation
- Alternatives Refinement

Previous Studies

To ensure consistency with previous efforts and the community's vision, the study team reviewed and synthesized a wide variety of previous and on-going efforts. These studies were reviewed at a high level to understand future projects that could have an impact on the implementation of HCT. These studies included, CHATS Long Range Transportation Plan (2010), OurRegion OurPlan (2012), the Neck Master Plan (2013), TriCounty Link Comprehensive Operational Analysis (2014), Mt. Pleasant Comprehensive Plan (2014), Rethink Folly Road (2016), I-26 ALTS Study (2016), Plan West Ashley (2017), and CHATS Long Range Transportation Plan (2017). These studies served as the foundation for the development of Goals and Objectives of this study.

In addition to these studies, the project team understands that there are on-going discussions about future improvements to the I-26 and I-526 interstate corridors. These two interstates have significant regional impact, carrying thousands of vehicles per day, and transit integration should be part of the discussion moving forward.



Goals and Objectives

With input and guidance from the RTFP Stakeholder Committee, four guiding principles were established to develop the RTFP's Goals and Objectives. The guiding principles were gleaned from an analysis of the overarching goals and objectives in the aforementioned studies. These principles are not separate elements, rather they are collaborative elements working together to meet the region's mobility needs. The principles are:

- **Connectivity:** Provide a multi-modal system that connects the Lowcountry.
- **Reliability:** Provide a multi-modal system that responds to varied trip needs and competes with single occupancy vehicle travel times.
- **Economy:** Provide a multi-modal system that supports the regional economic well-being and development plans.
- **Safety:** Provide a multi-modal system that is attractive and inclusive of all passengers.

In addition to the guiding principles, the Goals and Objectives of the RTFP were built on other previous and on-going BCDCOG local and regional planning efforts and on a review of industry best practices, plans and studies.

Equity

- Increase quality transit options for transit dependent populations, choice riders and area visitors
- Deliver reliable and frequent early morning/late night service

Diverse Community

- Provide a transit network that serves multiple trip purposes
- Provide efficient connectivity to bicycle and pedestrian users
- Provide a transit network that connects to social and community resources
- Provide a transit network that connects to transit supportive land use and affordable housing

Quality of Life

- Provide a seamless high capacity transit network
- Provide a competitive alternative to the automobile
- Provide a performance-based system consistent with local, state and federal requirements

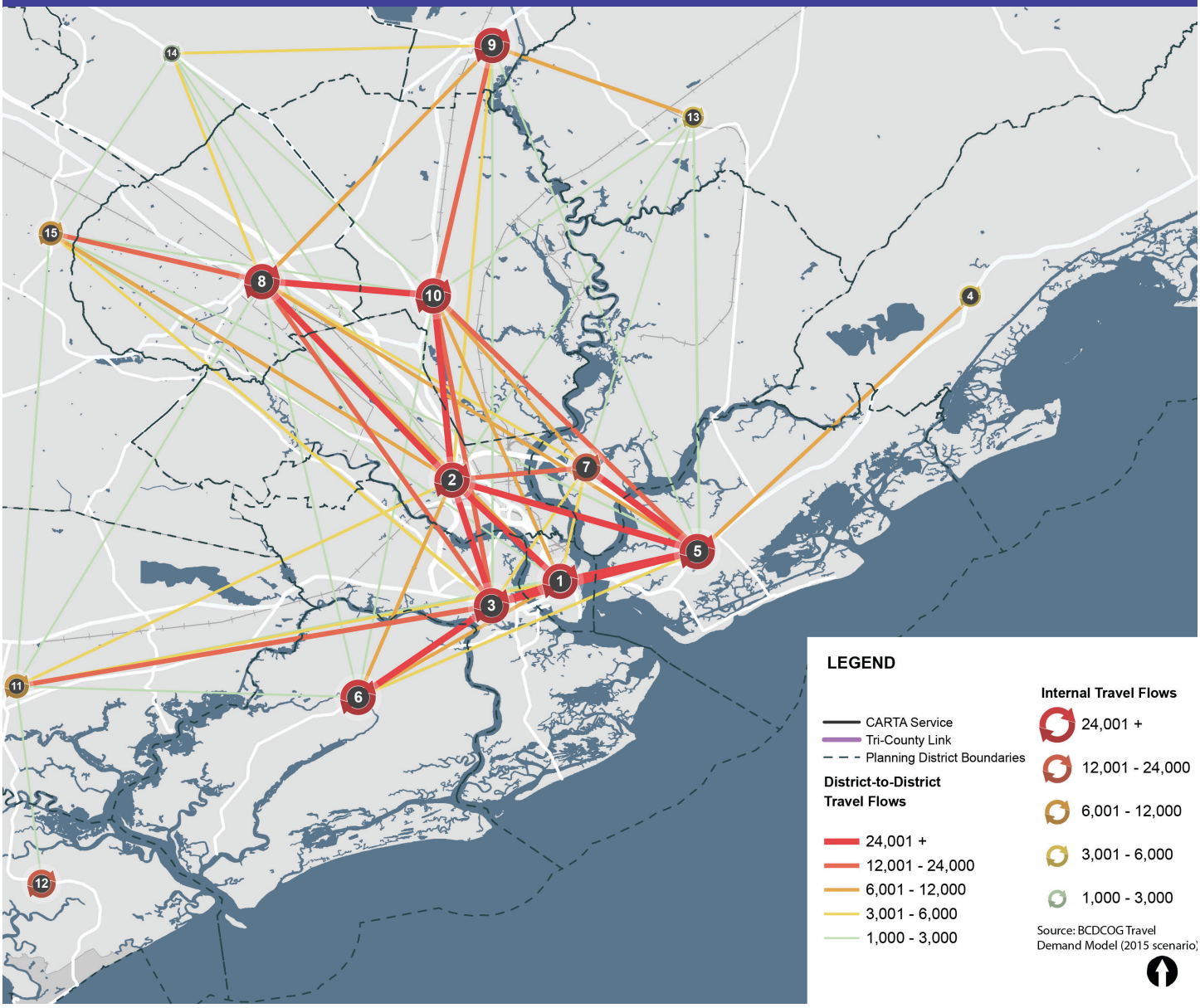
Connectivity

- Provide efficient connectivity to existing and future transit services
- Implement an intelligent transportation system that enhances the riders experience

Economy

- Enhance connectivity to transit supportive districts
- Provide convenient and reliable access to regional employment areas

Regional Travel Flows



Needs Assessment

Market Analysis

The purpose of the Travel Market Analysis was to examine existing conditions in the region, evaluate transit demand trends, and identify the types of transit services that best match the demand.

Travel Patterns

The Regional Travel Market Analysis identified major travel patterns, regardless of the mode of transportation, to assess the effectiveness of the existing transit network.

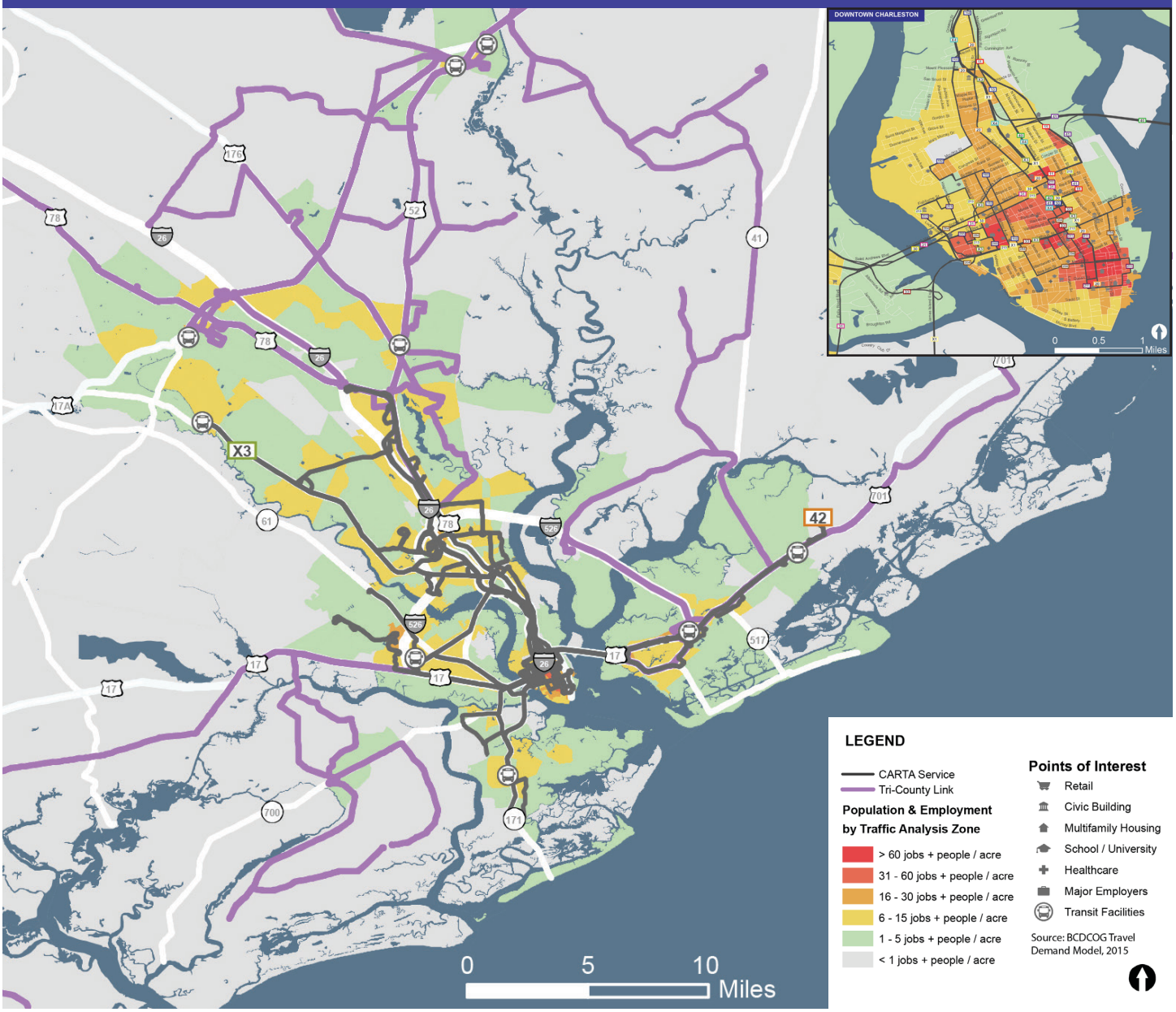
Findings

The top three travel flows include internal trips in North Charleston, Mount Pleasant, and West Ashley.

Other findings:

- CARTA currently provides extensive service in these areas.
- Summerville, which has the fourth-highest travel flow volume, has very limited local transit service provided by Tri-County Link.
- North Charleston is a key hub for district-to-district trips.
- The top three external travel flows are among the North Charleston and Goose Creek, Summerville, and West Ashley areas, respectively.
- The North Charleston/West Ashley connection is well-served by CARTA.
- Goose Creek and Summerville have limited-frequency connections to North Charleston.

Transit Potential



Transit Potential

Transit potential is determined by looking at current and future density in relation to:

- Population
- Employment
- Activity Centers/Land Use

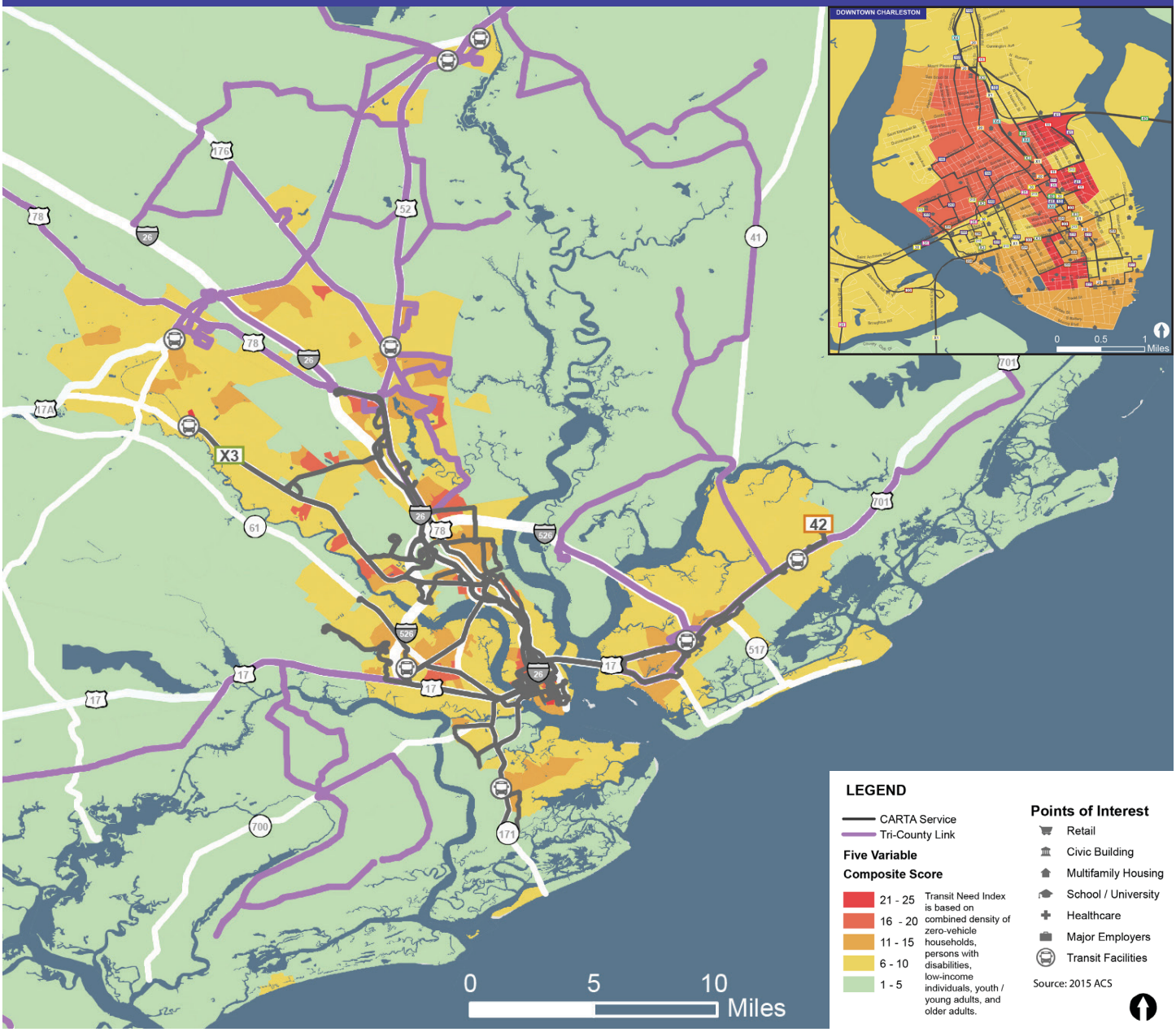
Where there are higher concentrations of residents, jobs, and activity centers such as retail districts, educational institutions and healthcare facilities, transit ridership tends to be higher.

Findings

Downtown Charleston has the highest transit potential in the region, with several blocks having more than 60 residents and/or jobs per acre. Other areas of relatively high transit potential include the following:

- West Ashley between the Ashley River and the Stono River, including the Citadel Mall and Bon Secours St. Francis Hospital
- North Charleston, along the I-26 / US 78 corridor, Leeds Avenue, Dorchester Road, Ashley Phosphate Road, Red Bank Road, Remount Road, and the Naval Brig
- Mt. Pleasant, along Coleman Boulevard and the US 17 corridor
- James Island, along Maybank Highway and along Folly Road

Transit Need



Transit Needs

Transit needs are calculated through the lens of specific socio-economic characteristics. Certain population subgroups are more likely to use transit as their primary means of local and regional transportation. These groups include:

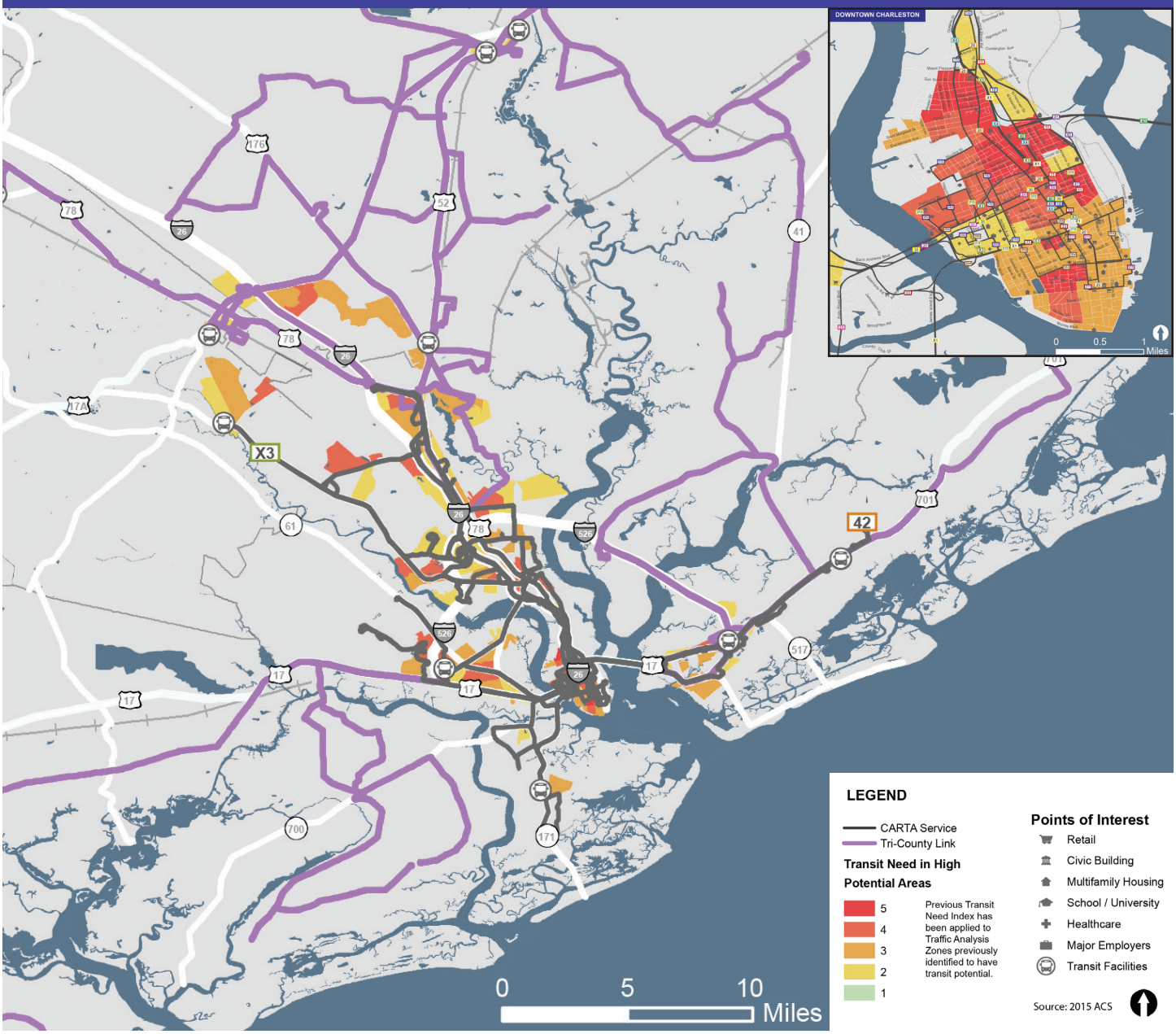
- People without a vehicle
- Persons with disabilities
- Low-income residents
- Young adults
- Older adults

Findings

Transit needs are highest in the Charleston Peninsula, especially near East Bay Street, south of Septima P. Clark Parkway, and near Beaufain Street. Other areas include:

- Ashley River Road in West Ashley, between Old Town Road and Sam Rittenberg Boulevard
- North Charleston, especially along Dorchester Road, Ashley Phosphate Road, and Otranto Road
- Goose Creek, along Harbour Lake Drive
- Hanahan and North Charleston, between I-526 and Yeamans Hall Road

Combined Index of Transit & Transit Potential



Gaps Analysis

The gaps analysis consisted of two components. The **local service gaps** analysis compared the need and potential for transit service to the availability of local transit service. The **commuter service gaps** analysis compared the distribution of workers associated with major employment clusters to the alignment and stop locations of CARTA and TriCounty Link (TCL) commuter services. This was the foundation for identifying areas of potential service enhancements for local and commuter service.

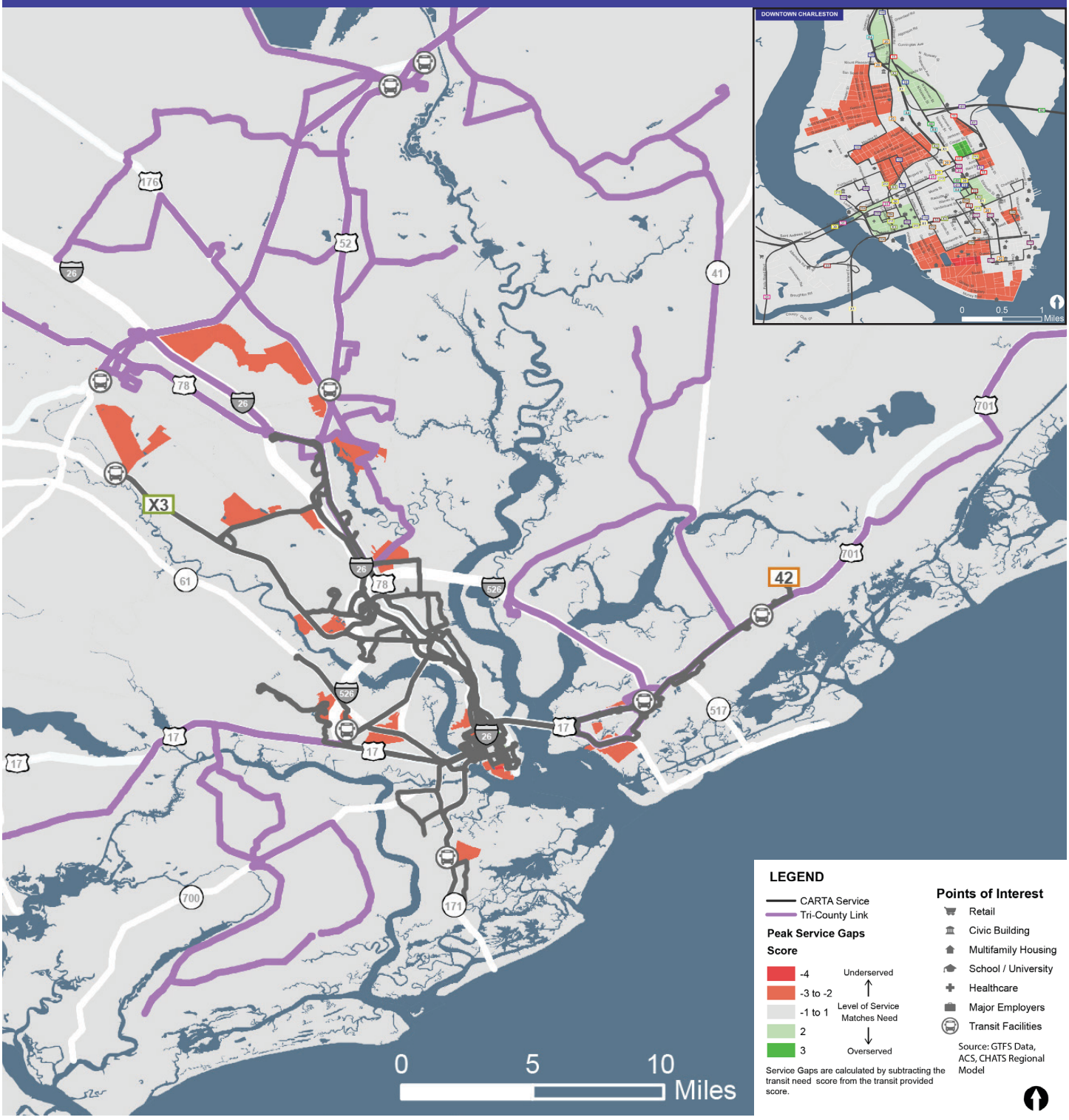
Local Service Gap

The amount of local service provided during peak periods and midday periods was compared geographically to the combined index of Transit Need and Transit Potential. Mismatches in the combined index with service provided were highlighted to illustrate where service increases, including potential high capacity transit could be justified.

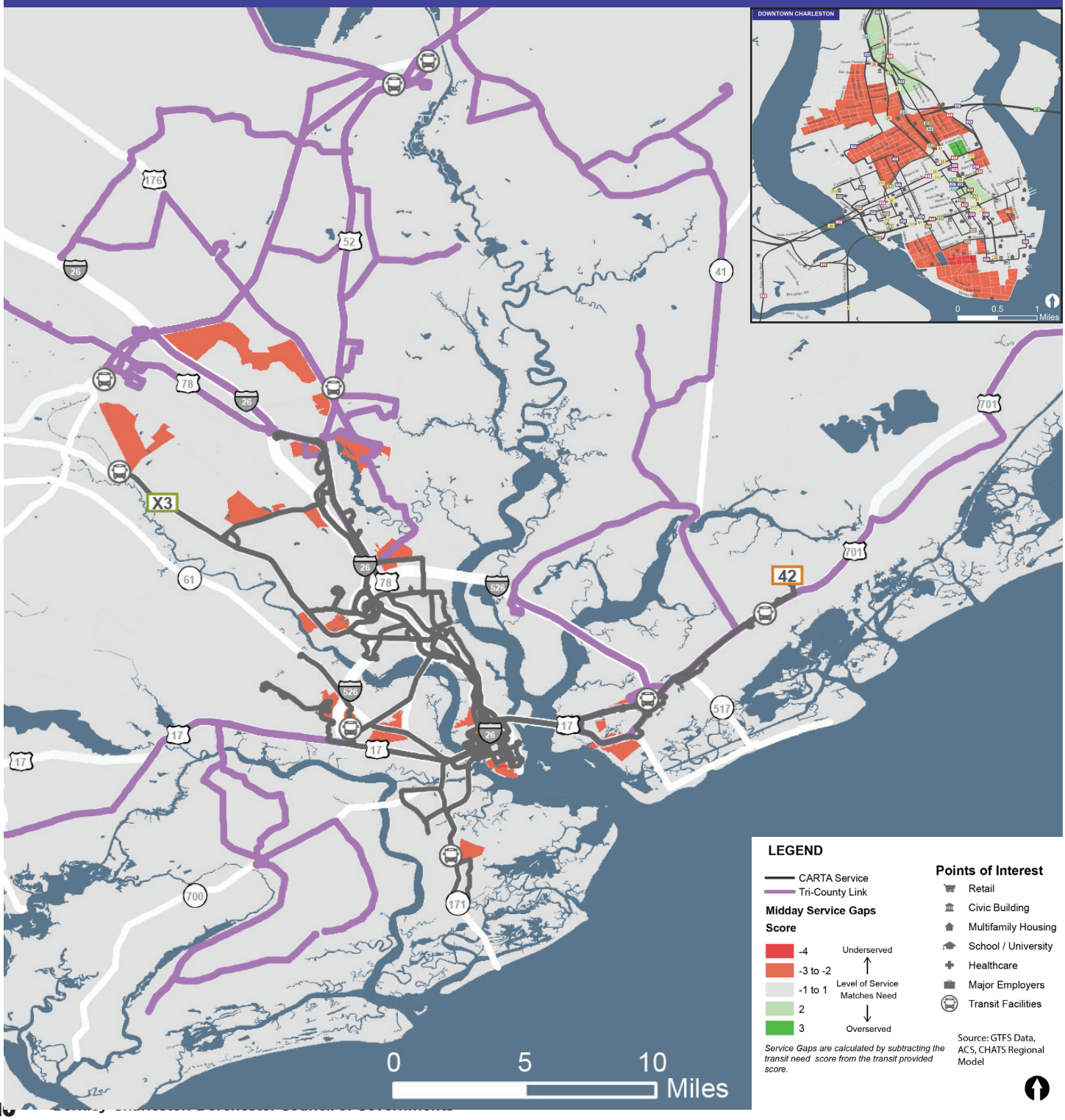
While many of the areas identified as having underserved service needs are scattered around the region, there are several corridors with existing CARTA service that emerge as potential candidates for more robust service than they currently have. These include the following:

- Dorchester Road and Ashley Phosphate Road - CARTA Route 12
- Remount Road - CARTA Route 13
- Ashley River Road/Sam Rittenberg Boulevard – CARTA Routes 32, 33, and 301
- Coleman Boulevard - CARTA Route 41

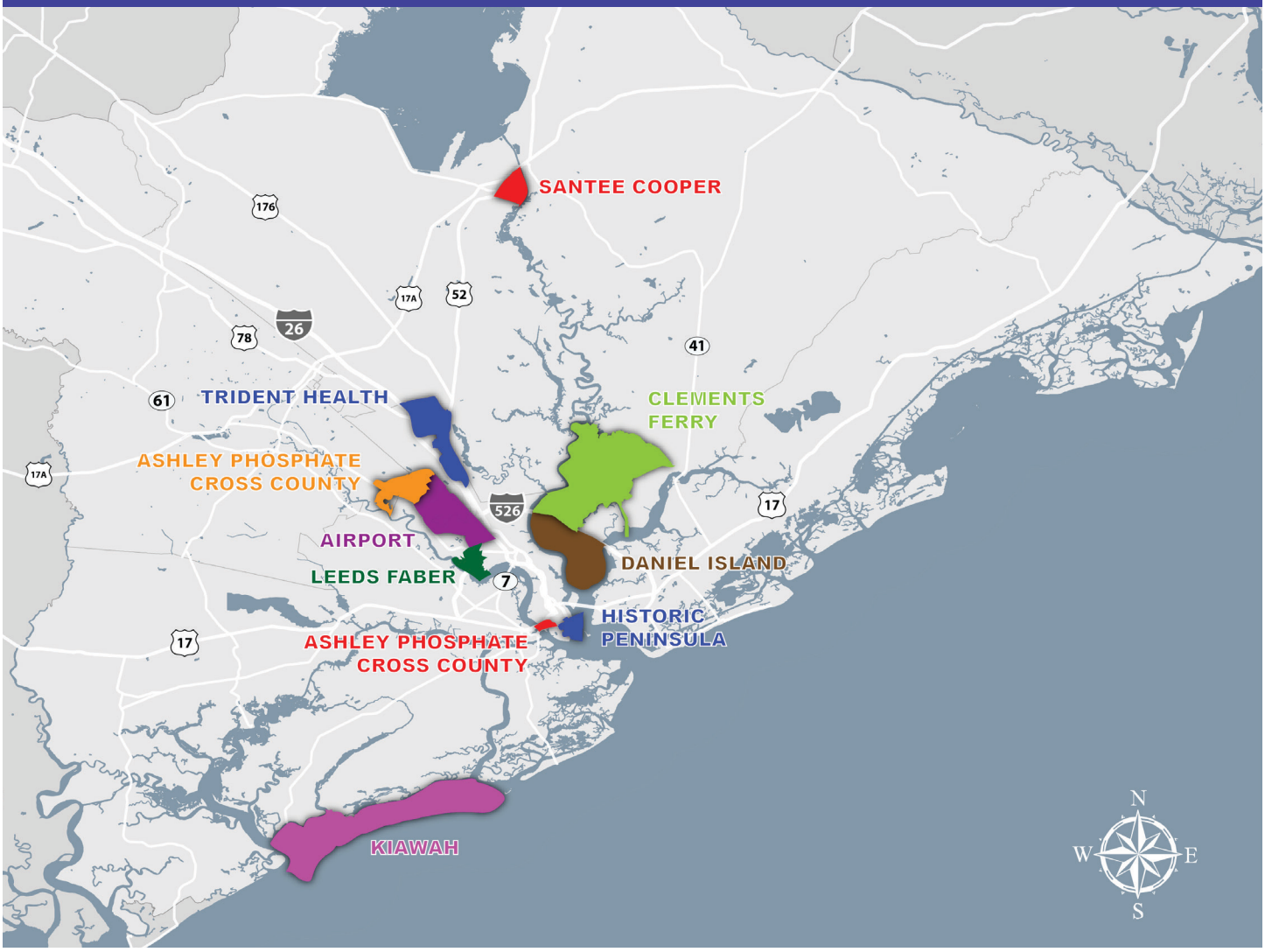
Peak Service Gaps



Midday Service Gaps



Top Employment Clusters in the Region



Commuter Service Gap

To identify gaps in the commuter service network, commuting patterns to the region's top employment clusters were compared to the existing network of commuter routes. This comparison showed how well the commuter network connects workers to jobs. The top major employment clusters in the region were then identified.

After the selection of the top employment clusters, the distribution of employee home addresses associated with each employment cluster was analyzed. The final step was to identify whether or not there is a direct commuter service connection between Census blocks that include large numbers of employees associated with a particular employment cluster, and the cluster itself. For each employment cluster, the top five block groups, in terms of number of residing employees, were identified. The commuter service gaps analysis for each of the ten employment clusters can be reviewed in the ***Travel Market Analysis memo***.

Public & Stakeholder Involvement

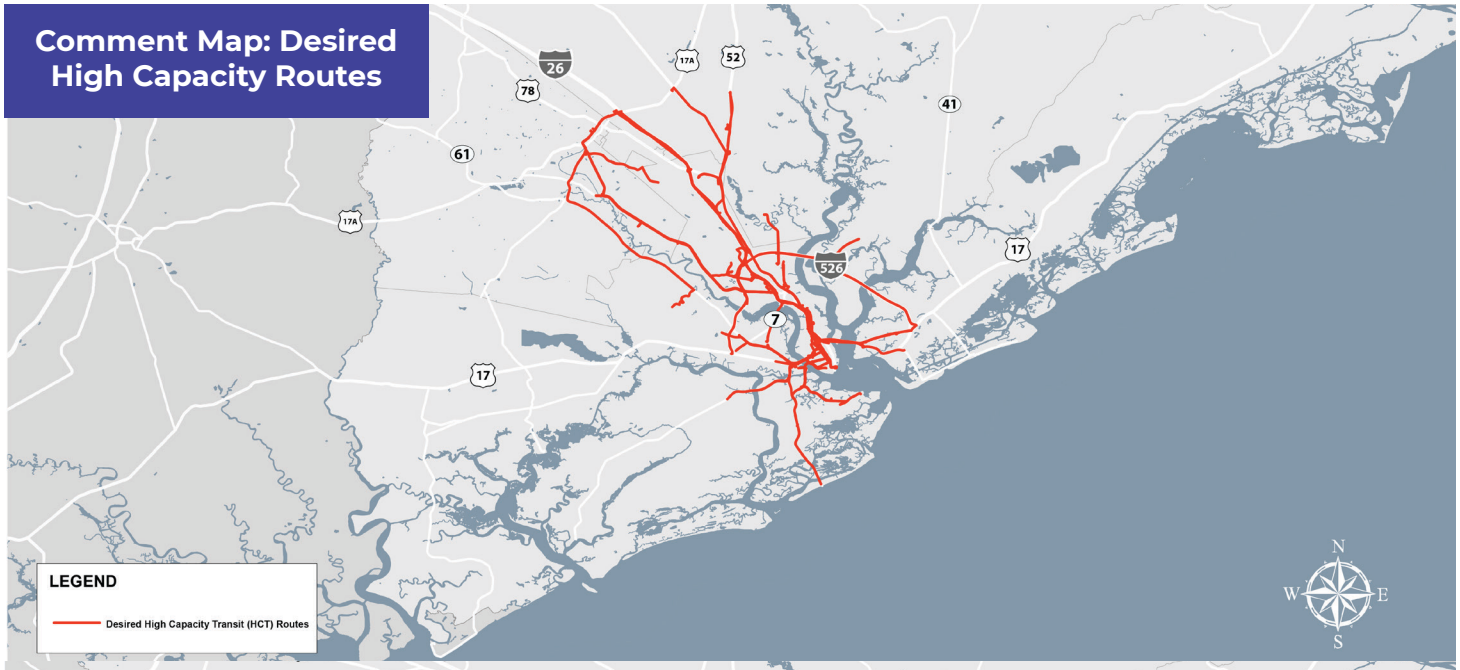
Public Input

Finally, the project team received feedback on the initial HCT corridors from the public and stakeholders through an online Wikimap exercise and an interactive public workshop.

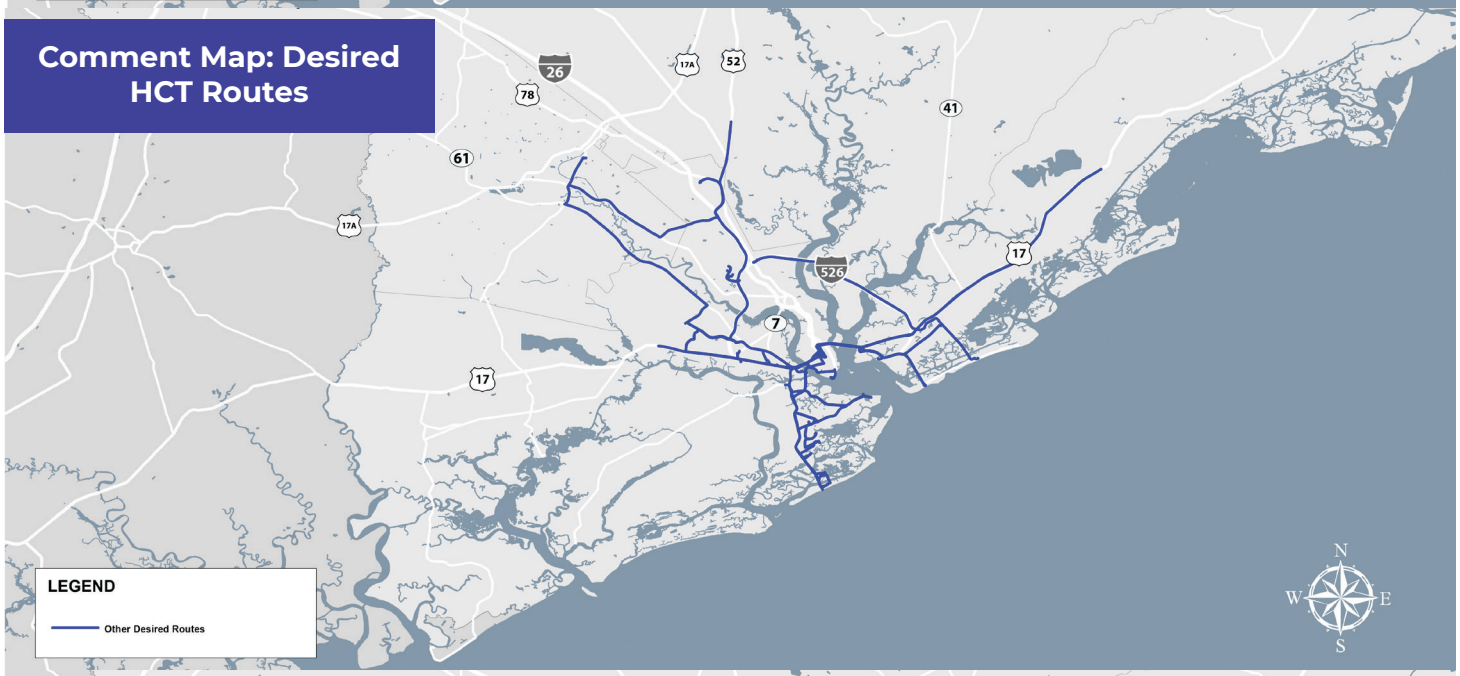
Comment Mapping Tool

An online comment mapping tool called Wikimap was used to allow the public the opportunity to provide specific comments related to points of interest in relation to their current and future travel choices as well as corridors that they considered important for future transit investment. The information obtained through Wikimap mirrored the corridors that were identified in previous studies analyzed for the RTFP.

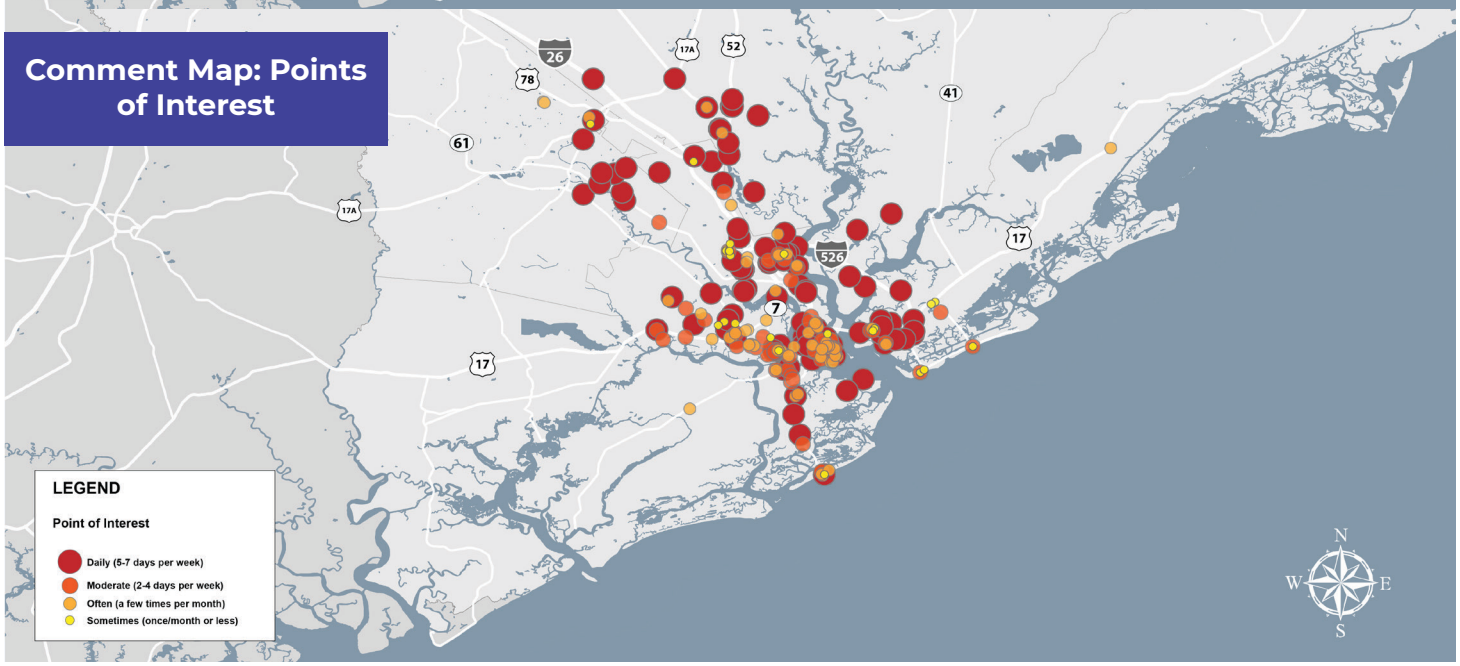
Comment Map: Desired High Capacity Routes



Comment Map: Desired HCT Routes



Comment Map: Points of Interest



Public Workshops

In January 2018, the BCDCOG hosted a stakeholder workshop and an open house public workshop to share the progress on the RTFP and gather feedback on HCT corridors and transit mode selection. SmartScreen TVs were placed around the room for individuals to view and interact with the screens to educate about transit in general and about the draft set of corridors. A voting station was also present that displayed live results as participants voted on up to three HCT corridors they saw as vital for implementation in the immediate future. In addition to the in-person meeting, an online meeting, displaying the same information, was available from January 29 until February 27. A summary of the feedback received from the workshop and the online meeting can be found in the Stakeholder and Meeting Summary.

A second in-person stakeholder meeting and public workshop was hosted by the BCDCOG on July 6, 2018 at the Drew Conference Center at Charleston Southern University in North Charleston. At this meeting attendees were given an update of the plan, including the Goals and Objectives, the results of the technical evaluation of the HCT corridors from the first meeting, and the recommendation of the promising corridors that would advance to more detailed analysis. An online meeting, displaying the same information as the in-person open house, was available from June 6 until July 6, 2018 at bcdcog.com/framework.

41 Stakeholders Committee Members

Three meetings held

654 Public Comments Received

In-person and online

97 Open House Attendees

Two public open houses held

1,959 Online Meeting Visitors

Three online meetings held

Identification of High Capacity Corridors

The project team combined the information from the technical work, coordination with BCDCOG staff, feedback from the stakeholders and the public and identified 14 corridors that showed promise for high capacity transit in the BCD region.

High Capacity Transit Corridors for Evaluation

A	Ridgeville-Airport -Charleston (I-26)	H	Airport-Charleston (Rivers Ave/Meeting St)
B	Moncks Corner -Summerville (Hwy 17A)	I	Airport-Charleston (I-26/King St)
C	Moncks Corner -Charleston (Hwy 52)	J	Airport-West Ashley-Charleston (Cosgrove Ave)
D	Ridgeville-Summerville (Hwy 78)	K	West Ashley-Charleston (Glenn McConnell/Hwy 17)
E	Summerville-Airport -Charleston (Dorchester Rd)	L	West Ashley-Charleston (Hwy 17)
F	Summerville-Charleston (Dorchester Rd)	M	James Island-Charleston (Folly Road)
G	Mt Pleasant-West Ashley (I-526)	N	Mt Pleasant-Charleston (Hwy 17)

Corridor Evaluation Process

Once identified, the 14 corridors were evaluated using a set of evaluation criteria that was developed through a collaborative process with the BCDCOG staff.

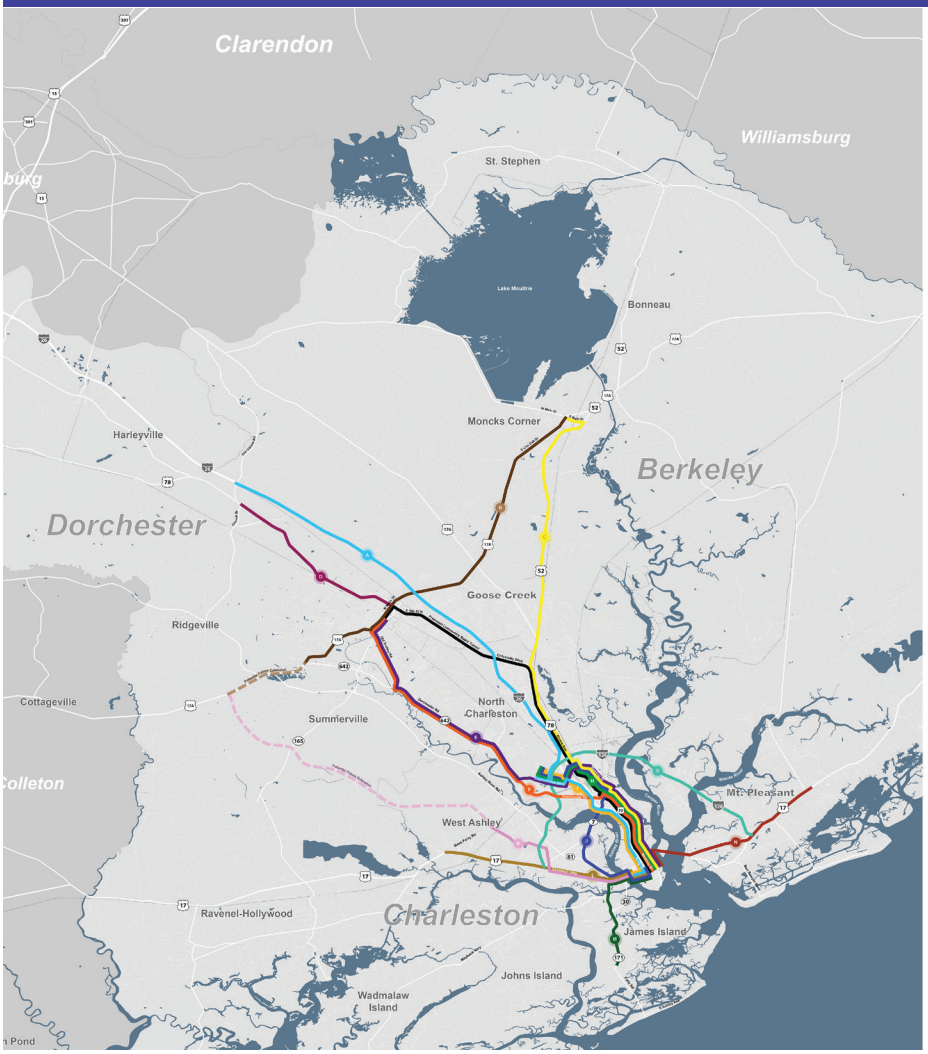
Screening Measures

Screening measures are used to evaluate the competitiveness of regionally significant transit corridors before detailed ridership computer modeling takes place. The screening measures considered many aspects of the built environment, current transit utilization as well as existing and future conditions.

The initial list of screening measures were developed after reviewing previous studies, industry best practices, the Goals and Objectives of this study, as well as collaboration with the BCDCOG staff. Using insight gathered during the study process and data availability, the project team refined, in coordination with BCDCOG staff, the list of screening measures identified in the ***Goals, Objectives, Performance Measures memo*** into a final list of measures. The screening measures had a high, medium, and low rating system. The rating system compared each corridor per the individual measure.

The population and employment density needed to support light rail and justify the cost to build and maintain a light rail system in these corridors has not yet materialized, and as such Express Bus, Bus Rapid Transit (BRT), and BRT Lite were used in the detailed screening. As these corridors continue to grow and mature, they should be reevaluated to consider other modes.

High Capacity Transit Corridors



BCDCOG

Regional Transit Framework Plan

High Capacity Transit Corridors

- A Ridgeville-Airport-Charleston (I-26)
- B Moncks Corner-Summerville (Hwy 17A)
- C Moncks Corner-Charleston (Hwy 52)
- D Ridgeville-Summerville (Hwy 78)
- E Summerville-Airport-Charleston (Dorchester Rd)
- F Summerville-Charleston (Dorchester Rd)
- G Mt. Pleasant-West Ashley (I-526)
- H Airport-Charleston (Meeting St)
- I Airport-Charleston (King St)
- J Airport-West Ashley-Charleston (Cosgrove Ave)
- K West Ashley-Charleston (Glenn McConnell Pkwy)
- L West Ashley-Charleston (Hwy 17)
- M James Island-Charleston (Folly Rd)
- N Mt. Pleasant-Charleston (Hwy 17)

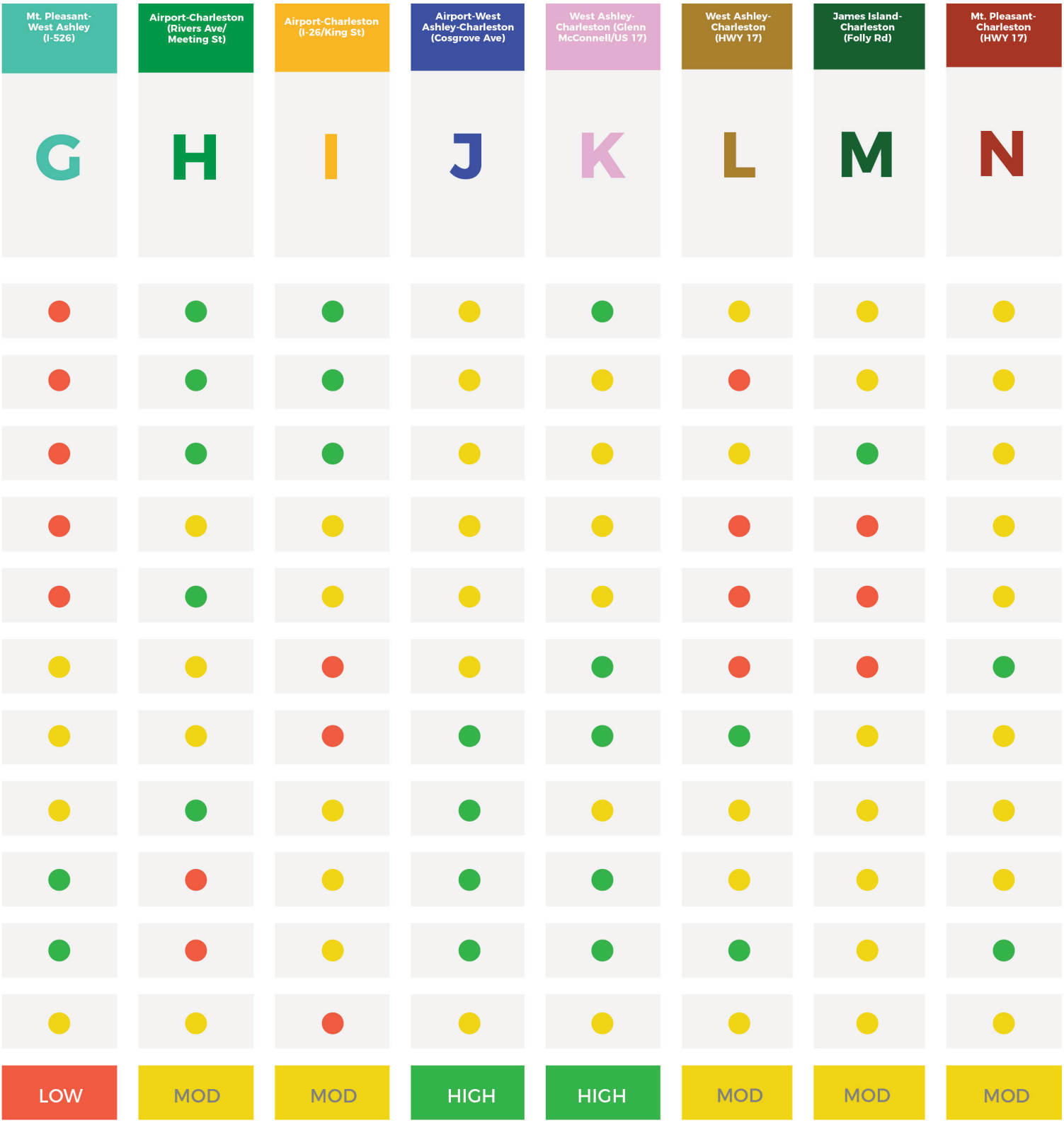
Note: All alignments shown here are conceptual and are subject to change. The alignments represented here are based on previous and on-going studies and analysis completed as part of this study.

Evaluation Summary Matrix

High Capacity Transit Co

Level of Performance	Ridgeville-Airport-Charleston (I-26)	Moncks Corner-Summerville (HWY 17A)	Moncks Corner-Charleston (HWY 52)	Ridgeville-Summerville (HWY 78)	Summerville-Airport-Charleston (Dorchester Rd)	Summerville-Charleston (Dorchester Rd)
● High ● Moderate ● Low × Not Further Analyzed	A	B	C	D	E	F
Current Total Population Density	●	●	●	×	●	●
Density of Transit Reliant Communities	●	●	●	×	●	●
Future Total Population Density	●	●	●	×	●	●
Existing Employment	●	●	●	×	●	●
Future Employment	●	●	●	×	●	●
Major Destinations	●	●	●	×	●	●
Bicycle/Pedestrian Connections	●	●	●	Corridor D was not analyzed further because the purpose of the corridor was to connect to Ridgeville and that connection was accomplished through Corridor A.	●	●
Corridor Connectivity with Existing and Future Transit	●	●	●		●	●
Current Traffic Congestion in the Corridor	●	●	●	×	●	●
Future Traffic Congestion in the Corridor	●	●	●	×	●	●
Right of Way Availability for Constructibility	●	●	●	×	●	●
Overall Rating	MOD	LOW	HIGH	×	HIGH	HIGH

orridors


Mt. Pleasant-West Ashley (I-526)
Airport-Charleston (Rivers Ave/ Meeting St)
Airport-Charleston (I-26/King St)
Airport-West Ashley-Charleston (Cosgrove Ave)
West Ashley-Charleston (Glenn McConnell/US 17)
West Ashley-Charleston (HWY 17)
James Island-Charleston (Folly Rd)
Mt. Pleasant-Charleston (HWY 17)
G
H
I
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LOW
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MOD
HIGH
HIGH
MOD
MOD
MOD

Recommended Priority Corridors

The results of the analysis showed that there were seven promising corridors. Of the seven, two were in the South Carolina Department of Transportation (SCDOT) interstate system right-of-way: Interstate 26 and Interstate 526. These two corridors are recommended for Express Bus in dedicated lanes, HOV lanes, or bus-on-shoulder. Given the level of importance of those two facilities and the ongoing and future studies by SCDOT to improve those facilities, the study team agreed to share the results of this study with SCDOT for consideration in their ongoing and future studies.

Removing the two corridors traveling on the interstate system, it was recommended to advance five corridors for further detailed analysis, including, Corridors C, E, K, M, and N. The recommended transit mode for these corridors ranges from BRT to BRT lite based on the land use and right-of-way characteristics of the corridors. The results of the detailed analysis are summarized on the following pages. The information for each corridor is very preliminary and is subject to change in the future as the corridors progress through implementation.

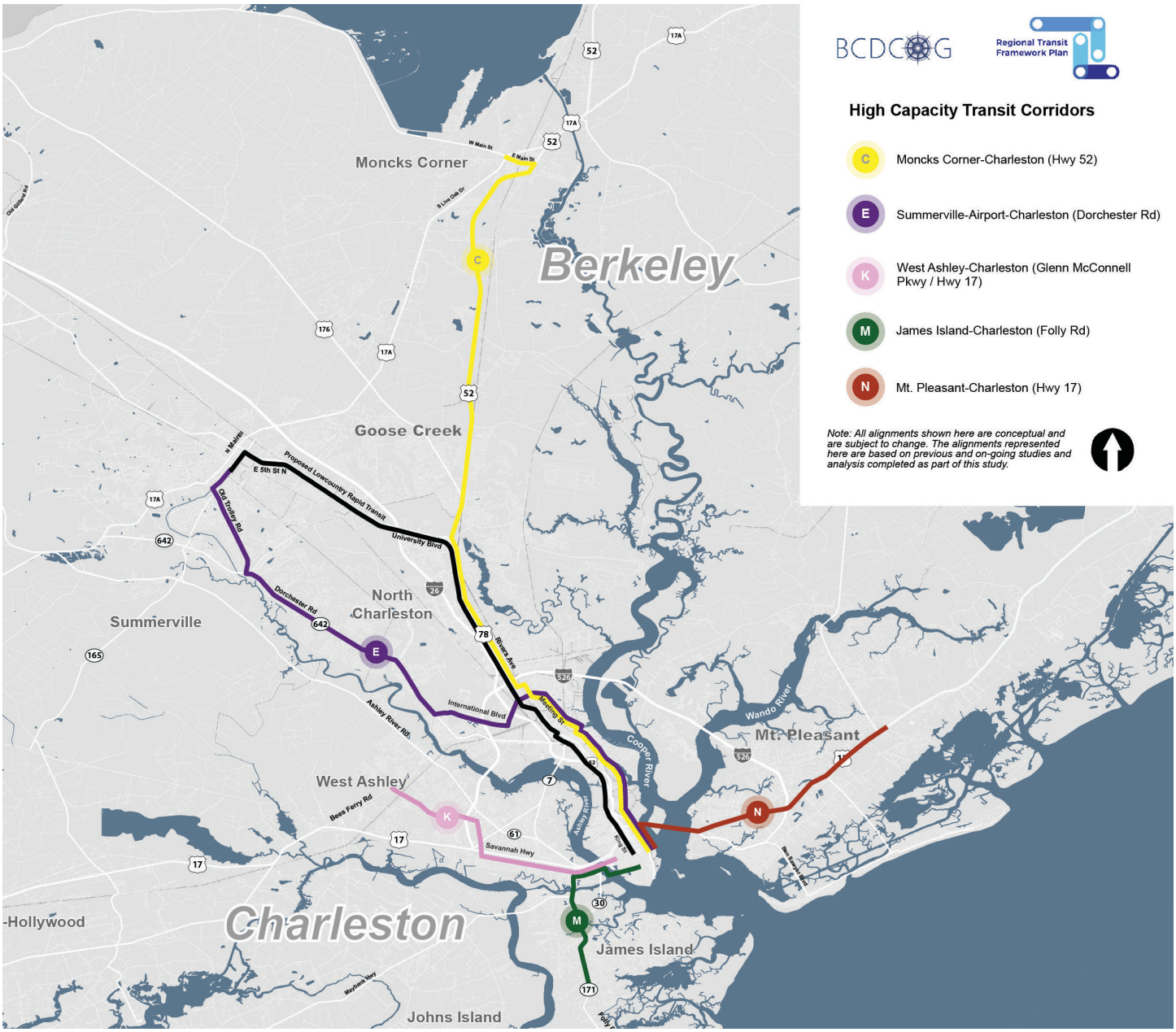
C Monck's Corner-Charleston (Hwy 52) BRT-Lite

K West Ashley-Charleston (Glenn McConnell Pkwy/Hwy 17) BRT

N Mt. Pleasant-Charleston (Hwy 17) BRT

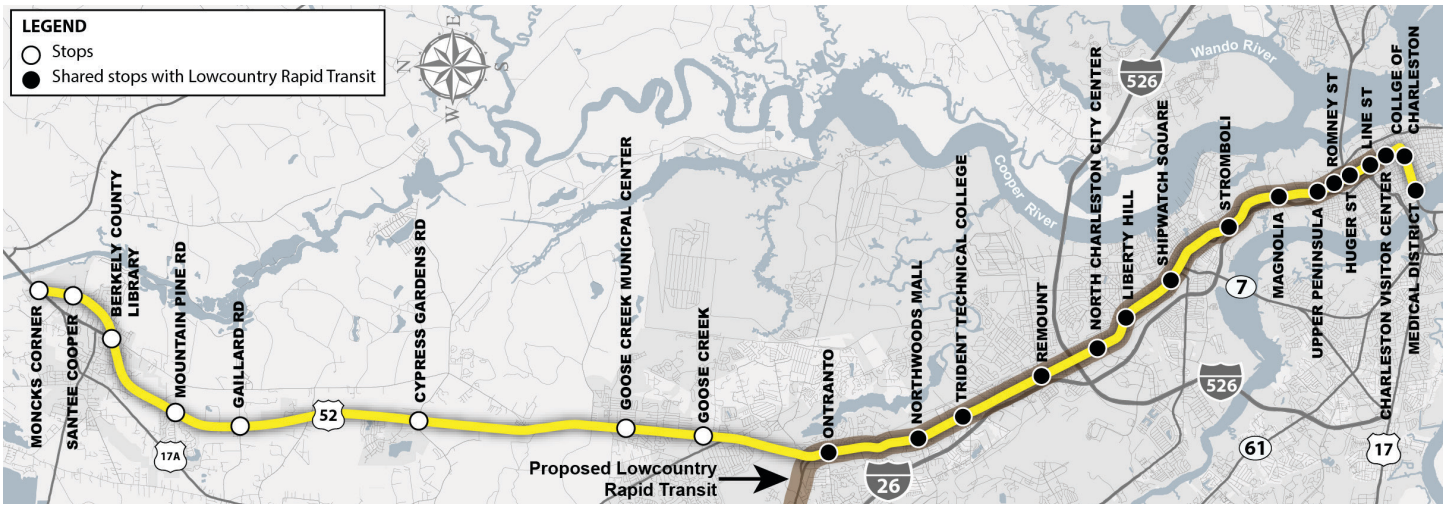
E Summerville-Airport-Charleston (Dorchester Rd) BRT

M James Island-Charleston (Folly Rd) BRT-Lite



C

Moncks Corner- Charleston (HWY 52)



Miles in Length

33.90

Fleet

29

Stops

24

Estimated Capital Cost (2018$, in millions per mile)

$13M

Travel Time One Way (Minutes)

120

Estimated Annual Operating Cost (2018$, in millions)

$5.7M

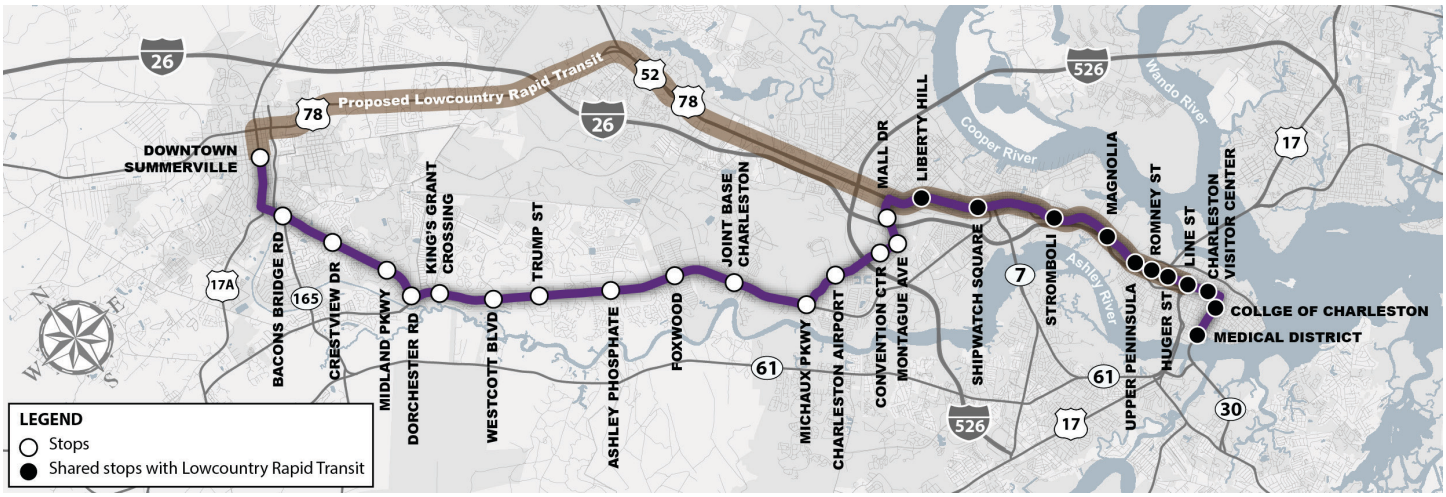
Frequency (min)

10 peak
20 off peak

2040 Project Ridership (daily)

4,328

E Summerville-Airport-Charleston (Dorchester Rd)



Miles in Length
26.50

Fleet
20

Stops
27

Estimated Capital Cost (2018$, in millions per mile)
$26.2M

Travel Time One Way (Minutes)
60

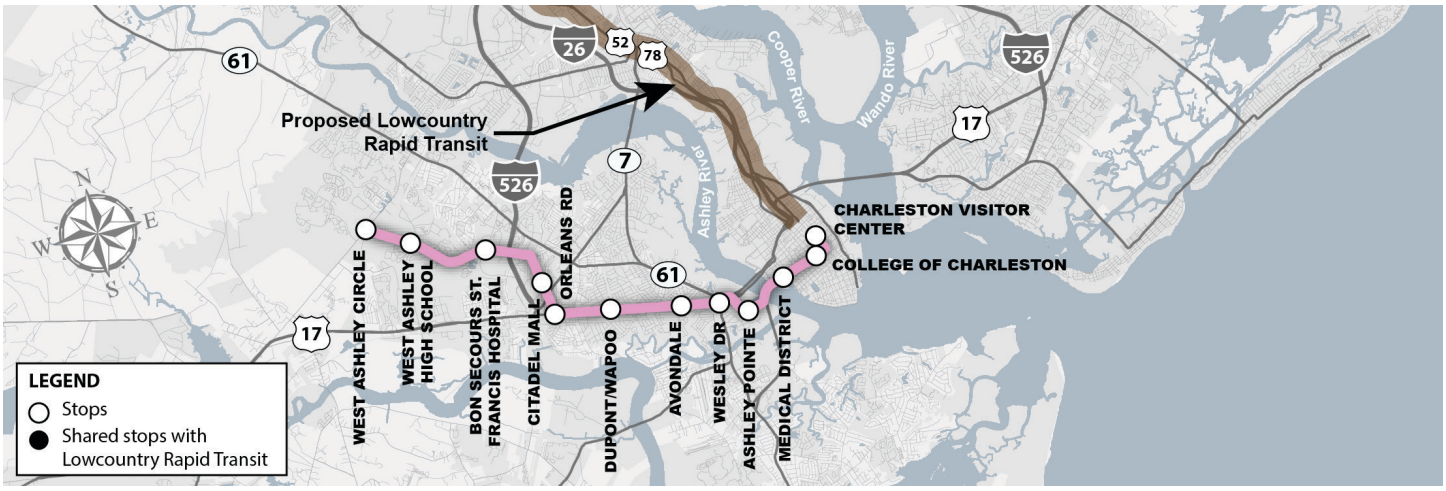
Estimated Annual Operating Cost (2018$, in millions)
$6.5M

Frequency
10 peak
20 off peak

2040 Project Ridership (daily)
11,385

K

West Ashley-Charleston (Glenn McConnell Pkwy/US 17)



Miles in Length
10.83

Fleet
10

Stops
12

Estimated Capital Cost (2018$, in millions per mile)
$24.5M

Travel Time One Way (Minutes)
26

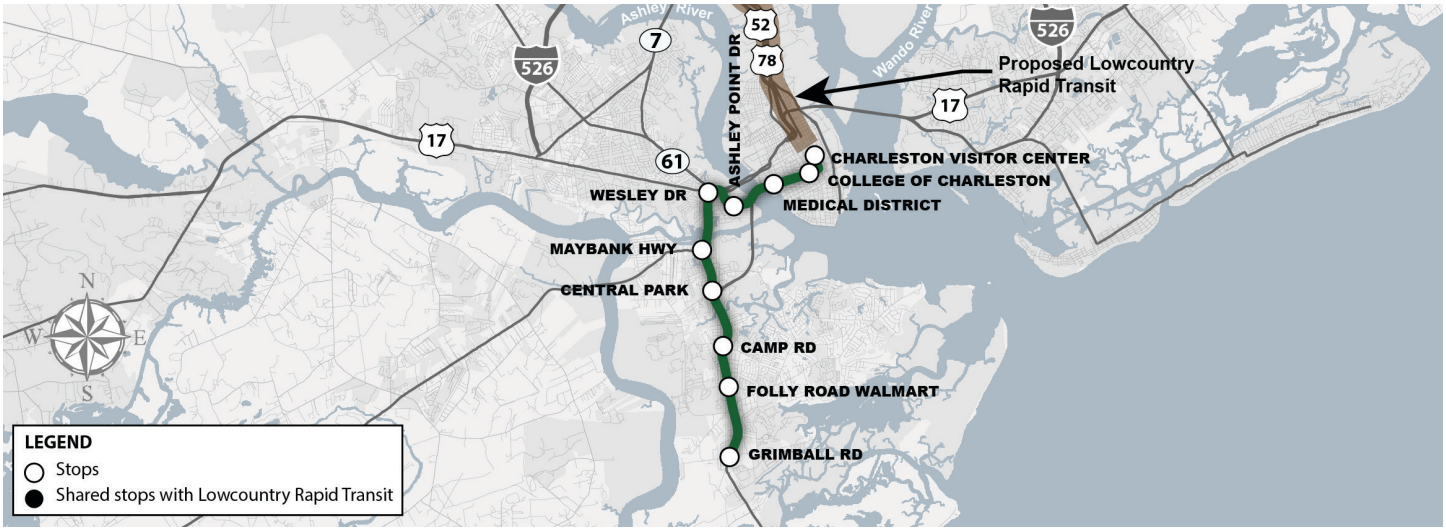
Estimated Annual Operating Cost (2018$, in millions)
$1.9M

Frequency
10 peak
20 off peak

2040 Project Ridership (daily)
3,008

M

James Island-Charleston (Folly Rd)



Miles in Length
8.63

Fleet
10

Stops
10

Estimated Capital Cost (2018$, in millions per mile)
$11.4M

Travel Time One Way (Minutes)
30

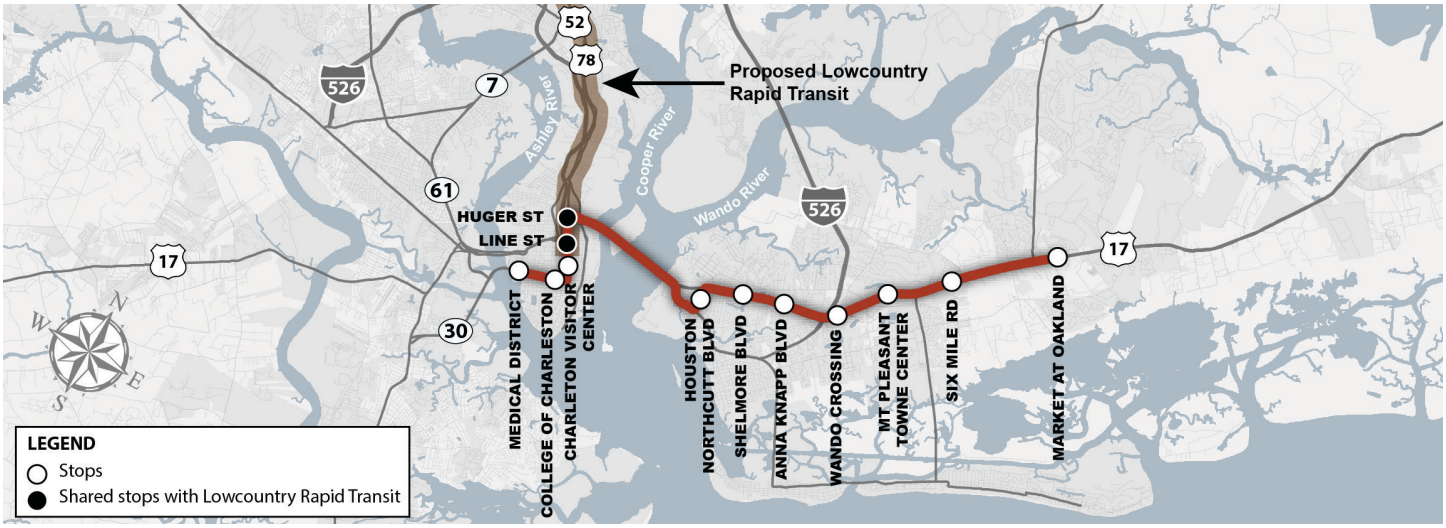
Estimated Annual Operating Cost (2018$, in millions)
$1.8M

Frequency
10 peak
20 off peak

2040 Project Ridership (daily)
1,375

N

Mt Pleasant-Charleston (Hwy 17)



Miles in Length

13.65

Fleet

11

Stops

12

Estimated Capital Cost (2018$, in millions per mile)

25.2M

Travel Time One Way (Minutes)

32

Estimated Annual Operating Cost (2018$, in millions)

$2.6M

Frequency

10 peak
20 off peak

2040 Project Ridership (daily)

3,454

Local Bus Service Planning

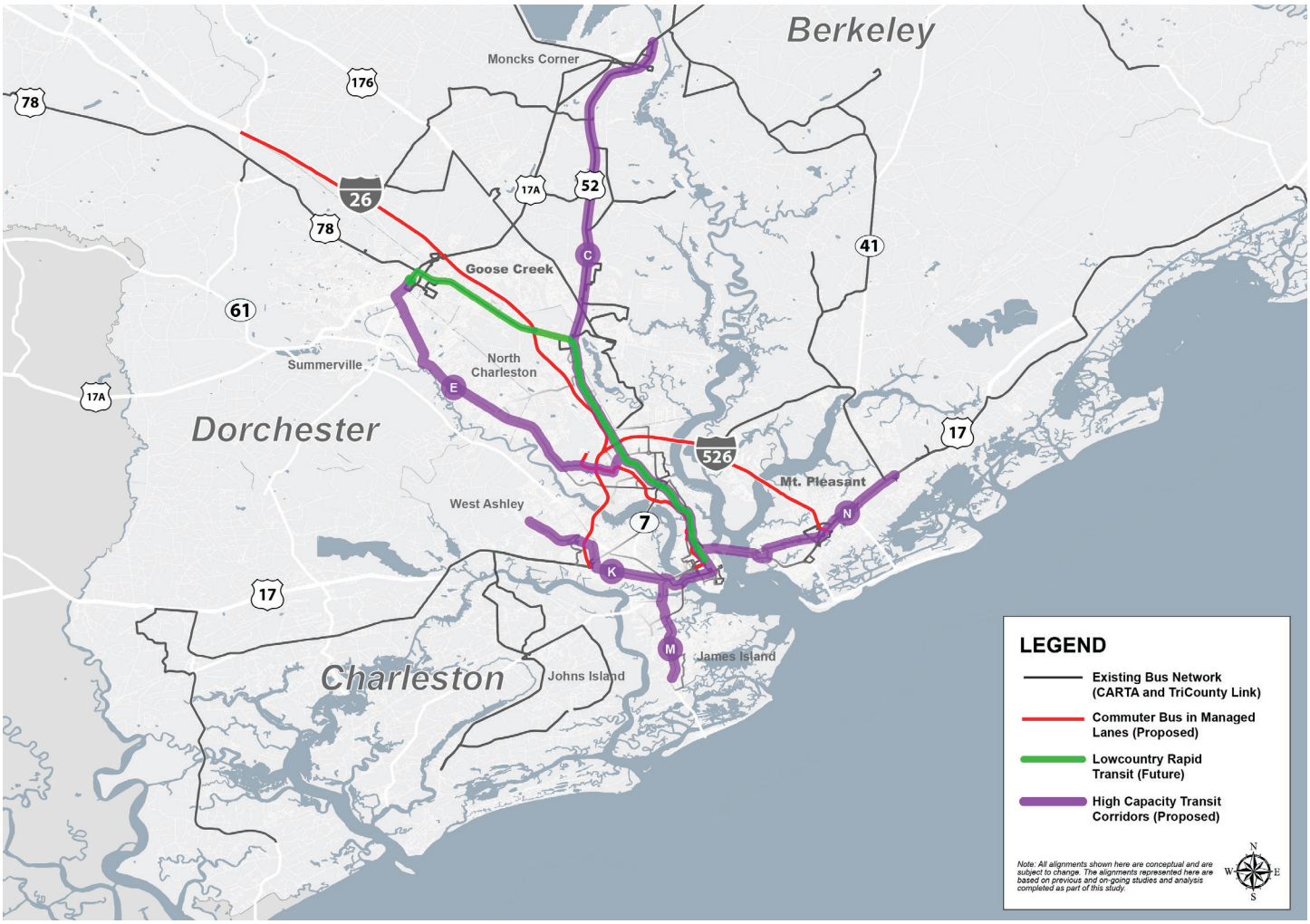
While the recommended corridors will form the core of region's future HCT network, their success will depend on a supporting underlying local network. These supporting services provide critical links; including long-distance, limited-stop, and first/last mile connections, that will work seamlessly with the HCT corridors to form a comprehensive transportation system for the region.

To develop recommendations for supporting services, each existing route was evaluated and a diagnostic route profile was developed. Each route profile examined the route's ridership and identified the route's strengths and weaknesses. The following guiding principles were used to assess each route:

- **Service should be frequent** - In general, people can easily remember repeating patterns, but have difficulty remembering irregular sequences.
- **Routes should be direct** - The fewer directional changes a route makes, the easier it is to understand. Circuitous alignments are disorienting and difficult to remember.
- **Routes should be symmetrical** - Routes should operate along the same alignment in both directions to make it easy for riders to know how to get back to where they came from.
- **Routes should serve well defined markets** - The purpose of a route should be clear, and each should include strong anchors and a mix of origins and destinations.
- **Service should be well coordinated** - At major transfer locations, schedules should be coordinated to the greatest extent possible to minimize connection times for the predominant transfer flows.

Improvements to the local network would occur as each of the HCT corridors is implemented in the future. For instance, when Corridor E is implemented, the routes that serve that corridor today, would be adjusted to better serve the corridor and the surrounding communities. It would also ensure that there is no redundant service in the corridor and that resources are being used in an efficient manner.

Four service types are recommended for the future underlying local network. These include fixed route, express bus, demand response, and seasonal service. Fixed route and commuter express bus service already



exist in the area, however, app-based demand response and seasonal service are new service types that would be introduced in the future as the corridors are implemented. Demand response would be used in lower density areas that lack the population and employment to support fixed route service but have a need for mobility services. This app-based demand response can provide flexible service within these areas, and can eventually evolve into fixed route service where appropriate. The proposed supporting services network makes extensive use of demand-response services, both to provide connections to/from HCT corridors, and to provide local circulation in suburban environments.

In addition to the demand service, seasonal routes would be introduced to serve the beach-front communities of Folly Beach and Isle of Palms. This service will primarily focus on access to employment in the beach communities, with a secondary benefit of leisure trips. Beach service will be centered on park and ride locations off of the islands with fixed route, shuttle, vanpool or other services to bring workers to the beaches.

Lastly, as service types are adjusted in the future, continued coordination with SCDOT and other regional partners is needed to ensure commuter bus service is not precluded along I-26 and I-526 if managed lanes are explored.

	Route Improvements by to support each Corridor				
SERVICE RECOMMENDATIONS	**C**	**E**	**K**	**M**	**N**
Improve service and connectivity for hospitality workers to jobs	X	X	X	X	X
Adjust CARTA and TCL routes to provide parallel and connecting service to HCT corridors, and fill in gaps between proposed stations	X	X	X	X	X
Improve connections between HCT and destinations (i.e. Airport, Tanger Outlets, Convention Center area, North Charleston City Hall, Amtrak Station, Trident Career Center)	X	X			
Complement HCT with local/feeder service along Dorchester Rd and Ashley Phosphate Rd	X	X			
Adjust routes to fill in gaps between HCT stations between Michaux Pkwy and Ashley Phosphate Rd	X	X			
Complement HCT service along Rivers Ave between Hanahan Rd and Otranto Blvd to ensure coverage between HCT stations	X				
Provide feeder service that connects the Northwoods Estates and Deer Park communities to HCT corridors to Trident Medical Center, former K-Mart Park & Ride	X	X			
Complement HCT service with overlapping service along Orleans Rd, Savanah Hwy, and Folly Rd to fill gaps between HCT stations			X	X	
Ensure connections at Meeting St and Huger St	X	X			
Connect HCT corridors to Sam Rittenberg Blvd and Cosgrove Ave with feeder service	X	X	X		
Ensure connectivity between retail and multi-family housing along US 17 in Mt. Pleasant (i.e Six Mile Marketplace, Town Center, and Wando Crossing)					X
Connect HCT service to the North Charleston Superstop	X	X			
Ensure connection at Meeting St, Calhoun St, Courtney Dr and St. Phillip St	X		X	X	X
Ensure connection at Magwood Dr, Glenn McConnell Pkwy, and Citadel Mall			X		
Express service in the I-526 corridor, linking Connect HCT corridors with Wando Crossing, the Airport, and at Citadel Mall	X	X	X		X
Create a seasonal link between Isle of Palms and Corridor N at Mt. Pleasant Town Center					X
Provide seasonal link to Corridor M to Folly Beach at Walmart Park & Ride				X	
Connect low density areas to HCT services and local routes via an app-based demand-response service, areas such as James Island (along Folly Road), Mt. Pleasant (along US-17), Goose Creek (along Rivers Avenue), West Ashley (along Glenn McConnell Parkway) and Summerville (along Dorchester Road, Old Trolley Road and Main Street)	X	X	X	X	X

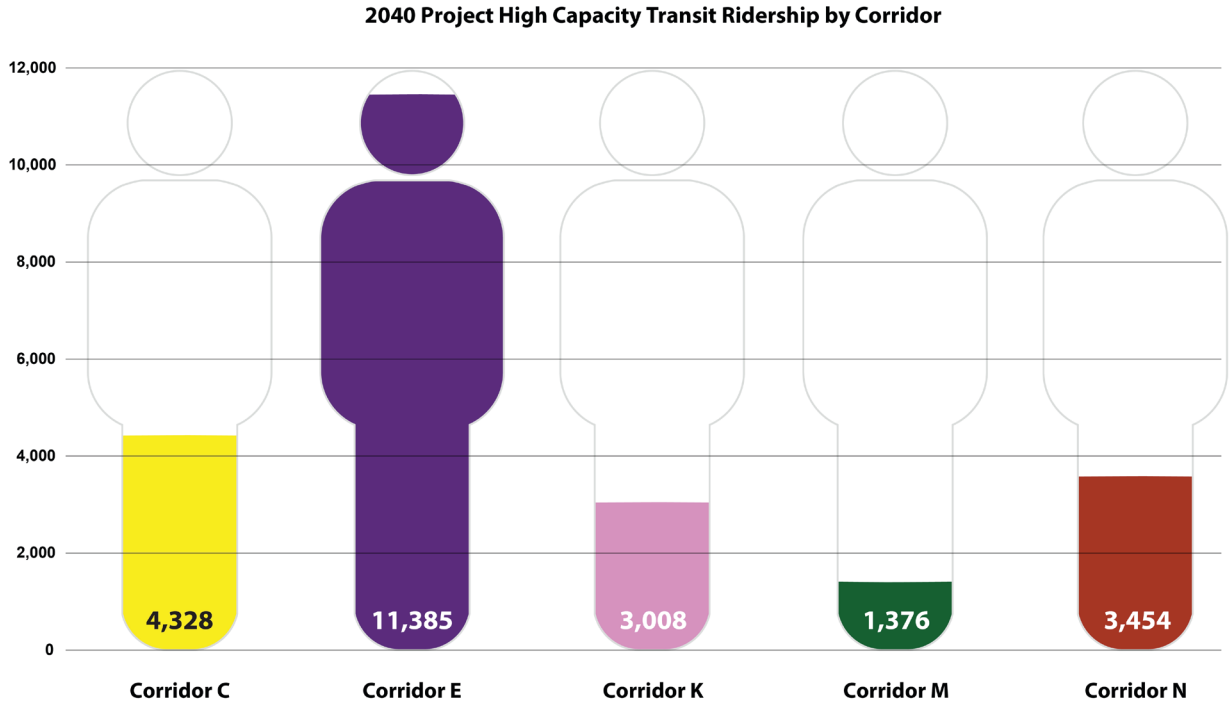
Projected HCT Corridor Ridership

Potential transit ridership for each of the HCT corridors was estimated using travel modeling software developed by the Federal Transit Administration (FTA) called Simplified Trips-on-Project Software (STOPS). The STOPS model is a stand-alone ridership forecasting software package used by agencies to develop their transit network and understand potential ridership.

Several assumptions were made for the model that influenced ridership outputs, including, span of service, hours of operation, frequency, potential stop locations, and speed. Two different speeds were used in the model; one for BRT and one for BRT Lite. BRT uses a dedicated guideway in combination with signal priority and can travel at faster speeds than BRT Lite. BRT Lite utilizes signal priority the same way BRT does, it travels in mixed traffic and can't achieve the same average speeds as BRT.

Therefore, in the STOPS model, BRT was assigned a speed of 25 mph and BRT Lite was assigned a 17 mph average speed. The exception was for Corridor C where it overlaps with the Lowcountry Rapid Transit corridor. In this section of Corridor C the speed was adjusted from 17 mph to 25 mph.

The figure below illustrates the projected 2040 ridership for each of the five HCT corridors. It shows that Corridor E performs very well when compared to the other HCT corridors. There are likely several reasons for this, including the types and mix of land uses as well as densities within that corridor compared to the other corridors. Corridor E is the only corridor that serves both the Airport and the MUSC, which are the top two employment clusters in the region.



Project Costs

Capital Costs

Conceptual capital cost estimates were developed utilizing categories of the FTA New Starts Standard Cost Categories (SCC) workbook. This workbook is used by agencies and the federal government to better understand how much a project might cost.

These estimates do not include any engineering design and as a result should be considered very conceptual and subject to change. Costs are in current year dollars (2018$). HCT corridor costs range from $98.4 million to $458.0 million.

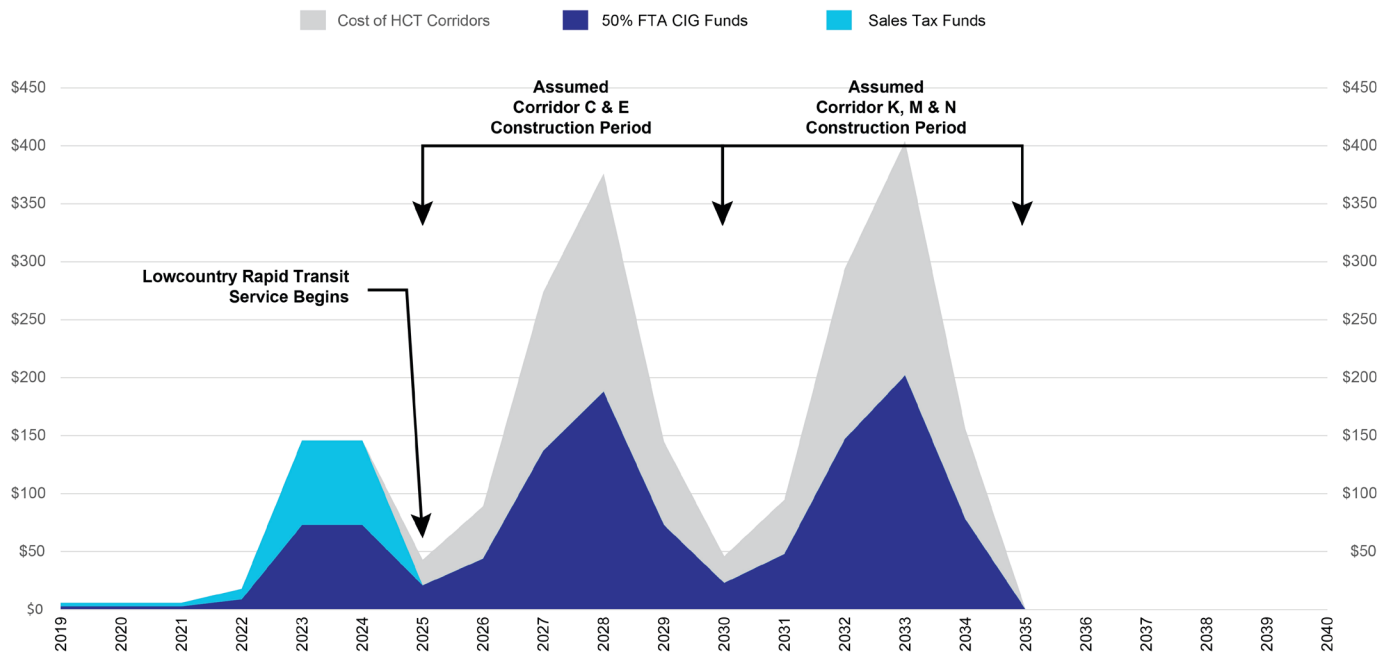
Conceptual Capital Cost Summary by Corridor (2018$, in millions)*

SCC Cost Categories	Corridor C	Corridor E	Corridor K	Corridor M	Corridor N	Program Total Cost
	Moncks Corner-Charleston (Hwy 52)	Summerville-Airport-Charleston (Dorchester Rd)	West Ashley-Charleston (Glenn McConnell Pkwy / Hwy 17)	James Island-Charleston (Folly Rd)	Mt Pleasant-Charleston (Hwy 17)	
Guideway & Track Elements	$11.5	$77.2	$47.6	$5.4	$49.9	**$191.7**
Stations, Stops, Terminals, Intermodal	$9.8	$9.1	$3.8	$3.1	$5.5	**$31.2**
Support Facilities: Yards, Shops, Admin Bldgs	$27.4	$17.9	$8.5	$9.5	$10.4	**$73.8**
Sitework & Special Conditions	$11.6	$33.1	$20.4	$5.4	$21.4	**$91.9**
Systems	$6.3	$11.9	$6.9	$5.1	$6.2	**$36.4**
Construction Subtotal	**$66.9**	**$149.2**	**$87.2**	**$28.5**	**$93.3**	**$425.1**
Row, Land, Existing Improvements	$33.4	$74.6	$43.6	$14.2	$46.6	**$212.5**
Vehicles	$33.5	$21.9	$10.4	$11.5	$12.7	**$90.1**
Professional Services	$26.7	$59.6	$34.9	$11.4	$37.3	**$170.1**
Subtotal	**$160.5**	**$305.3**	**$176.1**	**$65.6**	**$189.9**	**$897.7**
Contingencies	$80.3	$152.7	$88.1	$32.8	$94.9	$448.8
Total Segment Costs	**$240.8**	**$458.0**	**$264.2**	**$98.4**	**$284.9**	**$1,346.6**

Note: Corridor segments that overlap with the Lowcountry Rapid Transit are not included in these costs.

**These estimates do not include any engineering design and as a result should be considered very conceptual and subject to change.*

HCT Corridors Capital Costs - Funding Gap



Operations & Maintenance Costs

Operation & Maintenance (O&M) costs for the HCT corridors were developed using the proposed service levels from the Lowcountry Rapid Transit (LCRT) (e.g. days, hours and frequency of service) and the CARTA fully-allocated O&M cost model included in Appendix A of the Financial Analysis Technical Memo.

At this stage of planning, the BRT and BRT-Lite O&M cost estimates described below do not include expenses that will be new to CARTA's transit operations. More specifically, the cost estimates do not included expenses that are unique to a BRT service which could include operations and maintenance of: passenger stations; the dedicated guideway; ticket vending machines at stations; and intelligent transportation systems / transit signal priority systems, as well as the need for potential additional security staffing and equipment.

Additionally, O&M costs are currently based on an assumption that the BRT and BRT-Lite corridors operate independently from one another to achieve peak frequency needs. As part of future planning phases, a full BRT system operations analysis will be conducted to optimize services that share a common alignment for a portion of their respective route. This optimization analysis will incorporate ridership estimates, passenger seating capacity, and variations of service frequencies among the BRT and BRT-Lite corridors.

Conceptual BRT and BRT-Lite Estimated Annual O&M Costs
(2018$ and YOE$, in millions)

Corridor	Annual O&M Cost (2018$)*	Start Date	Annual O&M Cost (YOE$)*
Lowcountry Rapid Transit (LCRT)	$4.5	2025	$5.5
Corridor C	$5.7	2030	$8.2
Corridor E	$6.5	2030	$9.3
Corridor K	$1.9	2035	$3.1
Corridor M	$1.8	2035	$3.0
Corridor N	$2.6	2035	$4.3

**Conceptual estimates for planning purposes only.*

The estimated annual O&M costs in current year (2018$) and YOE$, with the YOE$ estimated based on the proposed first year of service and escalation rates shown in Table 2 of the Financial Analysis Technical Memo. The table below shows what the estimated annual O&M costs could be for each HCT corridor.

As each HCT corridor is implemented, adjustments will be made to the local bus network. As these changes are made and HCT corridors come online, there will be impacts to the overall cost to operate and maintain the system. By 2040, with all corridors running, and no changes to the bus network, we estimate the following:

- Total 2040 Annual BRT O&M Cost - $44 million
- Total 2040 Annual BRT System Ridership (2040) - 9.6 million
- New Daily Transit Riders - 12,500
- Number of BRT Stations - 44
- Total Number of BRT Vehicles - 96

Funding Shortfall

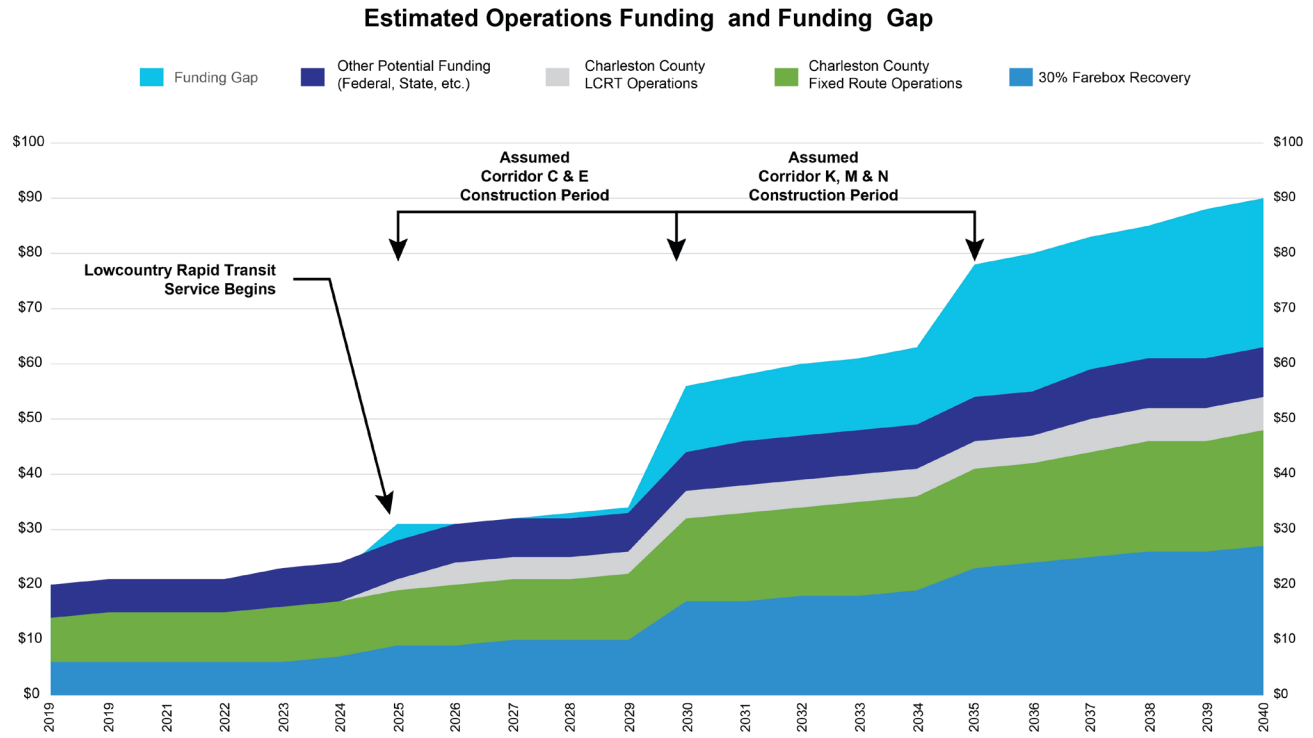
Based on the assumptions related to the timing of the phased HCT corridor implementation, total annual O&M costs are estimated to increase from approximately $16 million in 2018 to approximately $90 million in 2040. Operating costs were developed based on individual lines. There is duplication within the HCT corridors, especially with LCRT, Corridor E, and Corridor C and the actual operating costs will likely be lower in the future.

Assuming the total CARTA base allocation is available for fixed route and the HCT corridors, O&M costs would be fully funded until the year 2030. Beyond 2030, there would be an annual funding gap increasing from $12.0 million to $27 million in 2040. In total, there would be an estimated $216 million operating funding shortfall based on the assumptions in this analysis. This funding gap is represented in the graph below.

Potential Funding

Under current federal transportation legislation, the maximum share of federal funding that can be used to support the capital component of high capacity transit project is 80 percent. With the exception of smaller scale BRT projects (total costs less than $125 million), project sponsors that pursue the 80 percent maximum target must combine a variety of the programs. The remaining 20 percent is provided by local, state or regional funding sources.

More specifically, project sponsors using the approach of maximizing federal participation (80 percent) typically request 50 percent of funding through the FTA Capital Investment Grant (CIG) Program, and the remaining 30 percent is targeted through other FTA or Federal Highway Administration (FHWA) formula funds.



Other Considerations

Each of the corridors that were evaluated throughout this process have challenges and opportunities related to implementability. Several of the corridors that were evaluated utilize bridges, especially those that travel from Mt. Pleasant, West Ashley, and James Island into Downtown Charleston. Bridges can present challenges to providing dedicated transit facilities, such as BRT in an exclusive guideway, but allow for buses to operate in mixed traffic. Transit integration into bridges and other infrastructure should be part of any regional discussion moving forward.

Other challenges that must be addressed include land use and zoning policies. In order for HCT to be successful it must be paired with the right mix, density and pattern of land uses around the transit corridor and stations, similar to the images below. Currently the land use patterns along these corridors are generally low to moderate density suburban development that is not very transit supportive.

Next Steps

The Regional Transit Framework Plan (RTFP) defines the vision for HCT within the region, but where do we go from here? How does the region work together to implement the recommendations outlined in this document? The following are some Short-Mid- and Long-Term steps to advance HCT in the region.

Short Term (1-5 years):

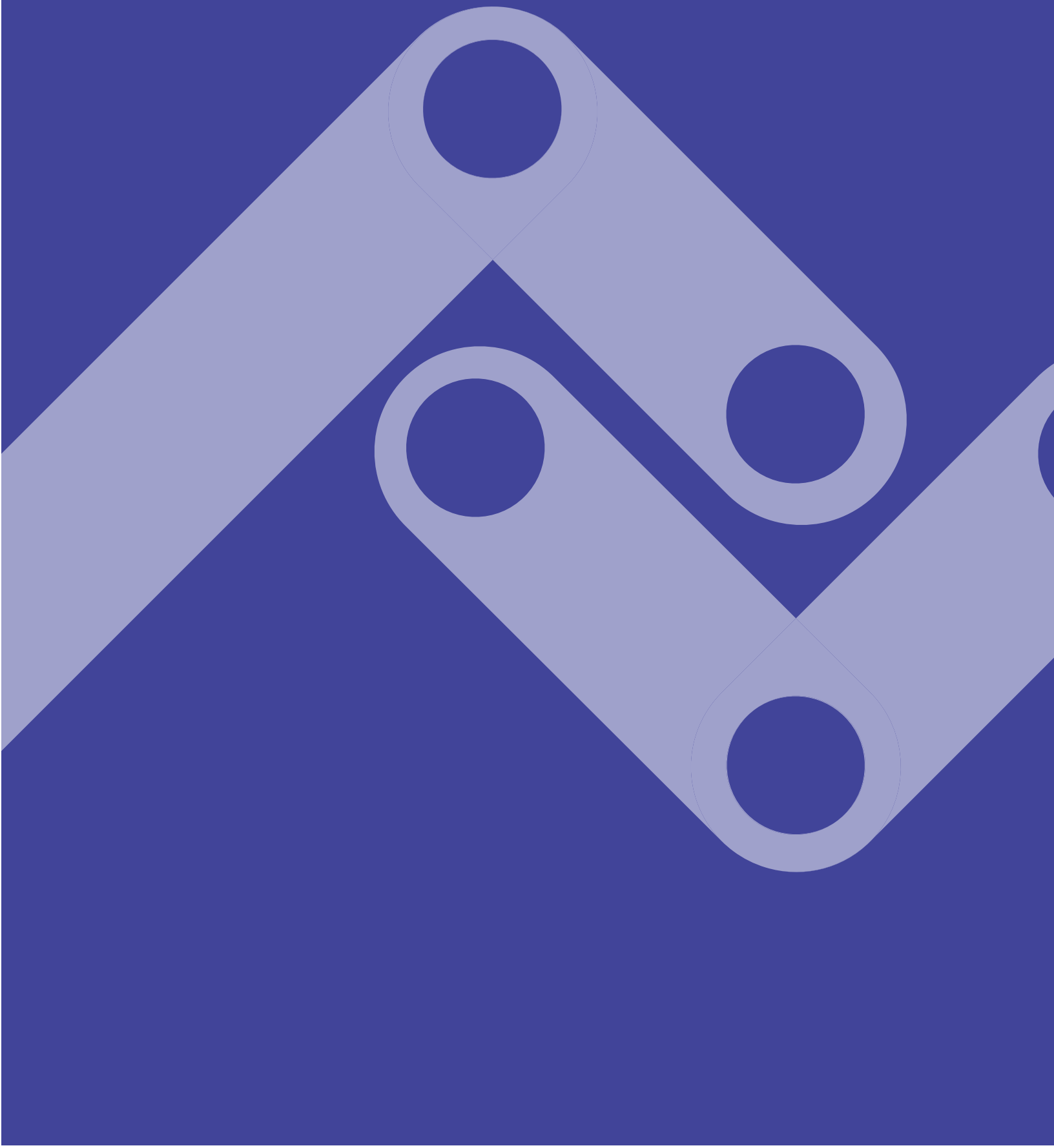
- Progress consolidation of the two existing public transportation providers into one system that covers the tri-county region
- Implement demand response/zone based service
- Implement employment focused shuttle and vanpool services between key travel nodes (i.e. HOP)
- Expand park & ride program
- Continue to monitor and adjust fixed route service to develop transit demand along HCT corridors
- Integrate RTFP recommendations into future corridor and/or area studies
- Advance Interstate Express Bus routes on (I-26/I-526) as part of SCDOT's corridor studies
- Complete Lowcountry Rapid Transit (LCRT) NEPA, Engineering and Construction
- Work with municipalities to develop a TOD vision for the region

Mid Term (5-10 Years)

- Begin LCRT Corridor Service
- Implement fixed route improvements associated with LCRT
- Pursue funding opportunities to advance planning for RTFP corridors
- Update RTFP recommendations with TOD and land use policy recommendations from the LCRT and/or other studies
- Implement HCT supportive improvements on RTFP corridors wherever possible: improvements such as transit signal priority, enhanced stops, off-board fare collection, sidewalk improvements, bicycle to transit connections, etc.

Long Range (10+Years)

- Implement HCT corridors with a phased approach as funding and density permits
- Implement fixed route service improvements as corridors come online
- Update ridership model as the HCT corridors advance through implementation



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