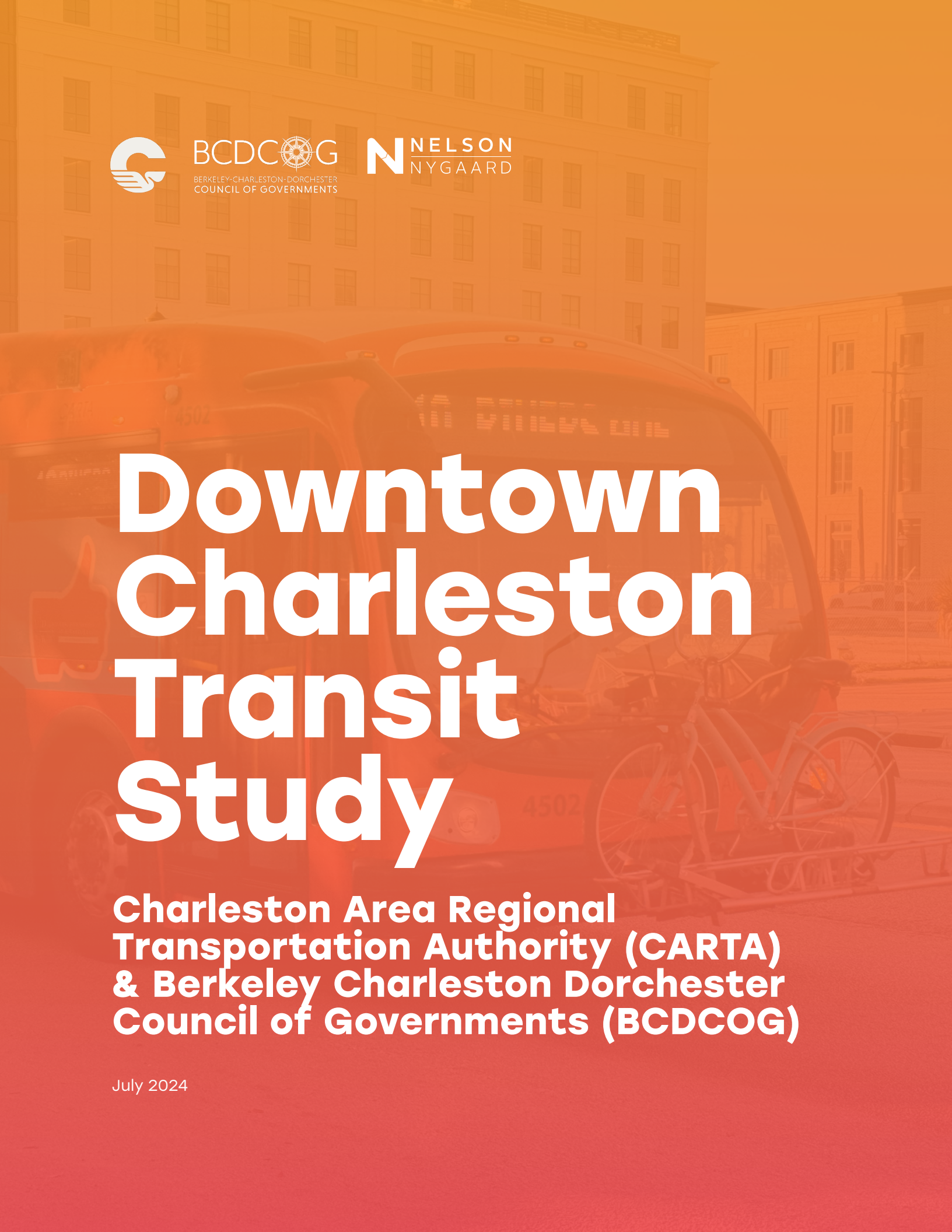

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BERKELEY-CHARLESTON-DORCHESTER COUNCIL OF GOVERNMENTS

NELSON NYGAARD

Downtown Charleston Transit Study

Charleston Area Regional Transportation Authority (CARTA) & Berkeley Charleston Dorchester Council of Governments (BCDCOG)

July 2024


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Downtown Charleston Transit Study

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July 2024


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Introduction

Project Overview

The Berkeley-Charleston-Dorchester Council of Governments (BCDCOG) provides staffing, management, and oversight of Charleston Area Regional Transportation Authority (CARTA) operations. In June 2022, CARTA was awarded Route Planning Restoration Program funding from the Federal Transit Administration (FTA) to develop a downtown restoration plan to improve ridership and service quality post-pandemic.

The resulting Downtown Charleston Transit Study began in January 2023 with a planning process that provided a forum for a year and a half of extensive public and stakeholder input. The study serves as a roadmap for refining the downtown transit network and meeting transit supportive infrastructure needs on the Charleston peninsula.

This report provides an overview of the existing transit system, community outreach and engagement, recommended future transit service for Downtown Charleston, and supporting infrastructure to enhance the experience for CARTA riders. Additional detail on each topic is available in the appendices on the project website.

The maps that follow show the existing local bus and Downtown Area Shuttle (DASH) routes in the Study Area, along with the routes proposed as a result of this study.

Study Purpose

Develop a strategy for improving transit on the Charleston peninsula that will:

1. **Enhance downtown transit service frequency, reliability, access, and coverage**
2. **Modernize transit supportive infrastructure; and**
3. **Regain ridership post-pandemic and build new ridership**

Study Timeline

Spring 2023	Summer 2023	Fall 2023 & Winter 2024	Spring 2024	Summer 2024
Project Kickoff	Data Analysis & Initial Stakeholder Outreach	Downtown Network Concepts & Transit Visions	Development of Study Recommendations	Draft & Final Report

Figure 1 Existing Downtown Transit Network

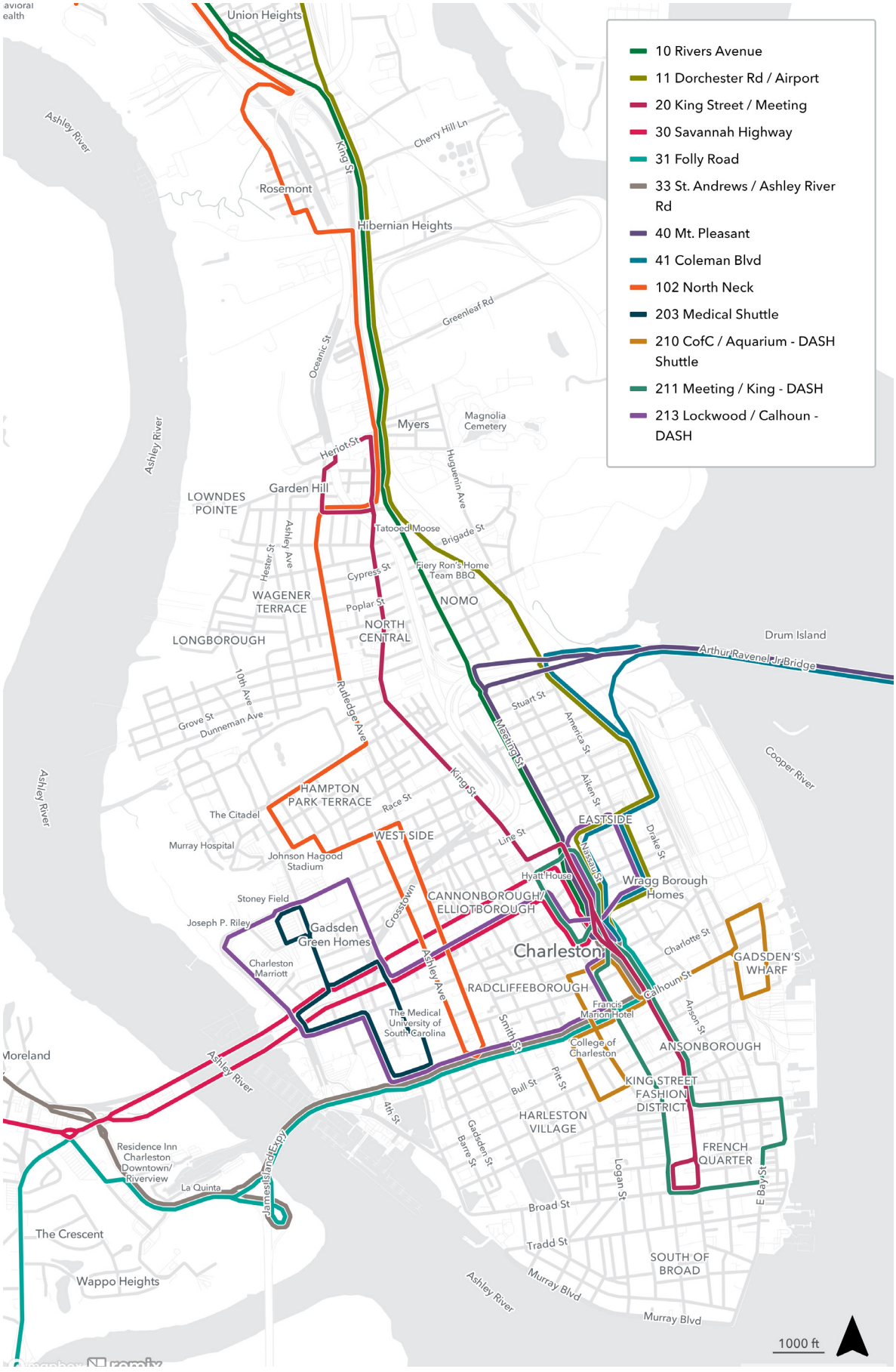


Figure 2 Future Downtown Transit Network (Pre-LCRT)

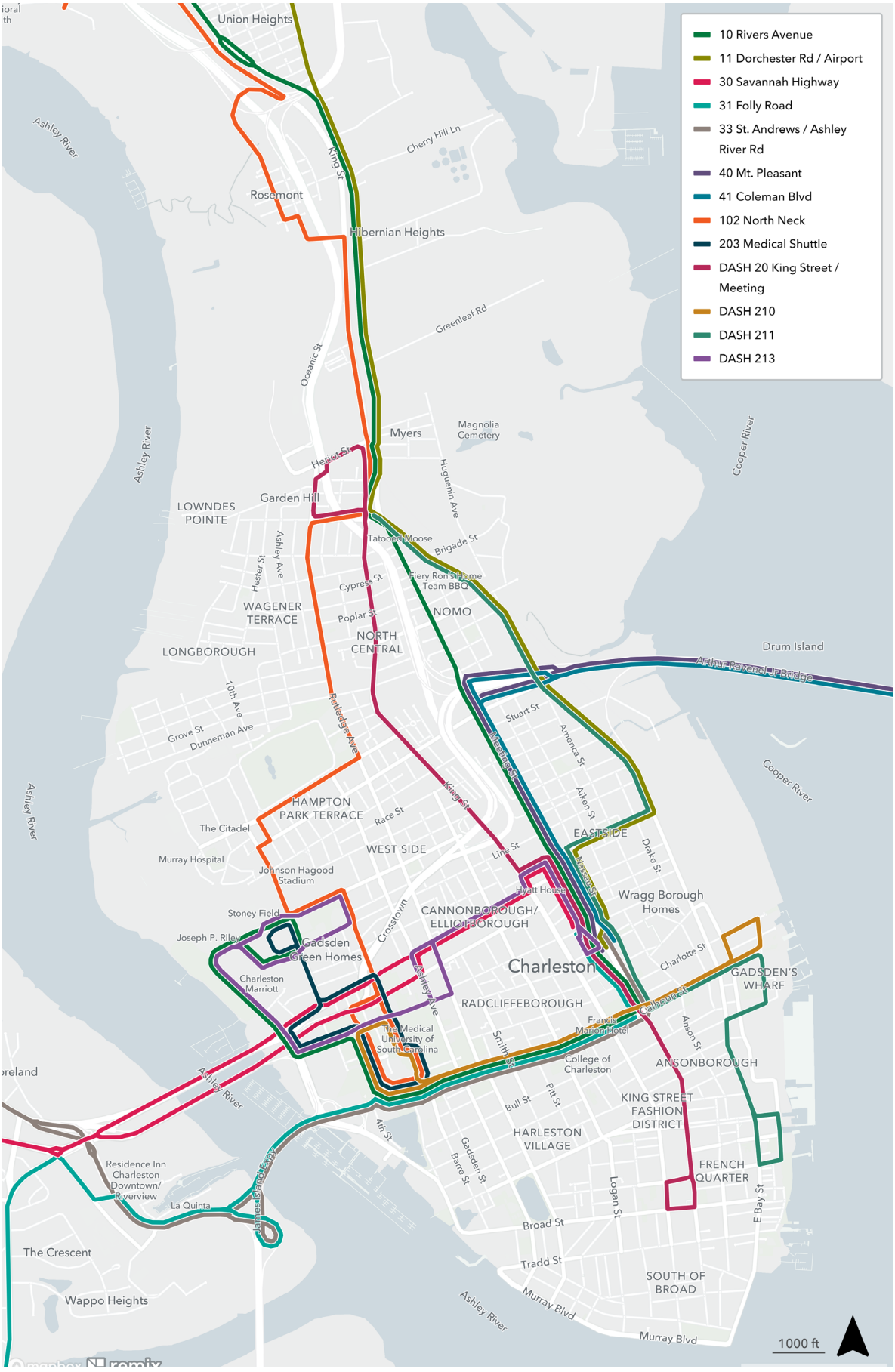
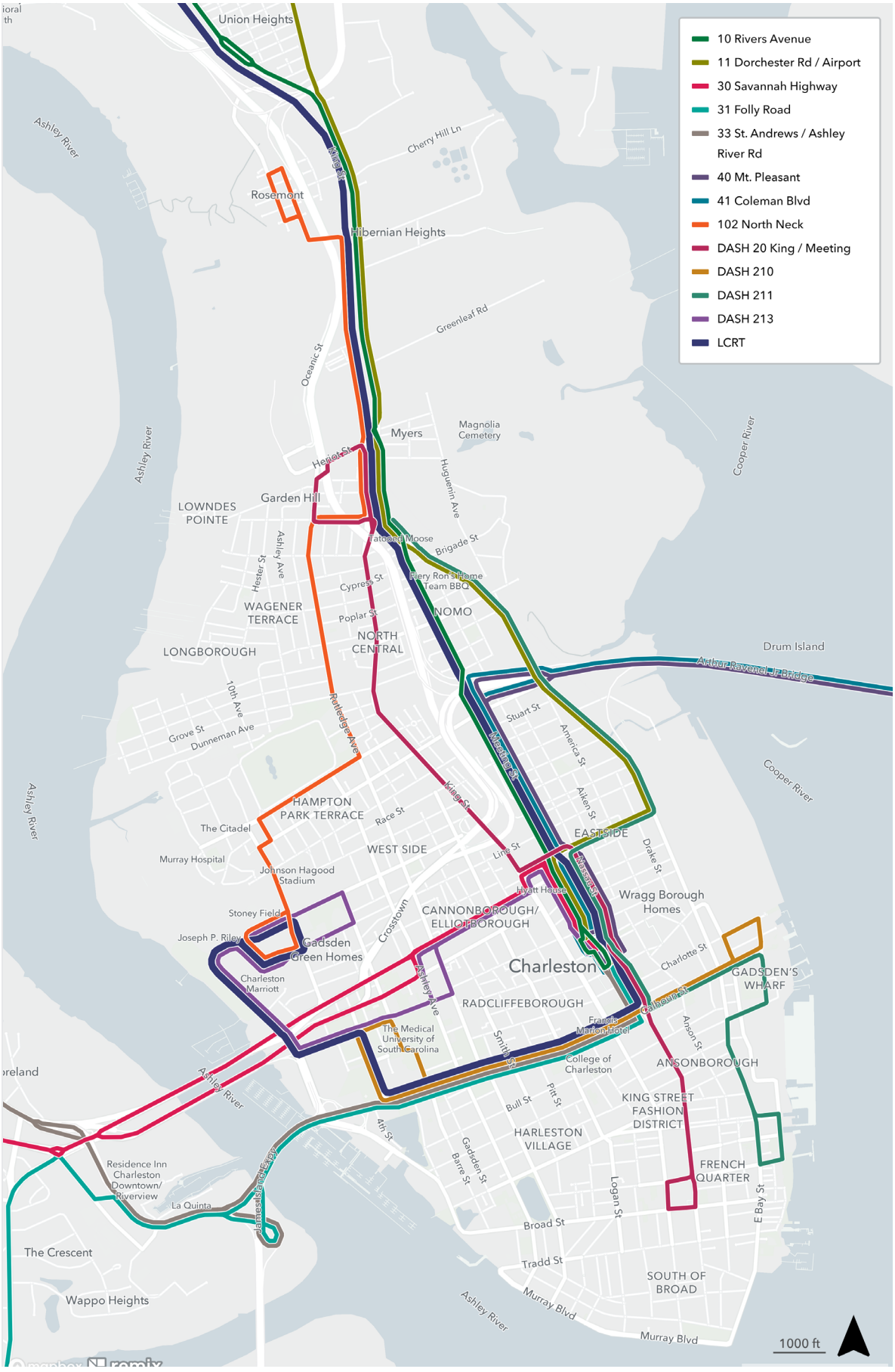


Figure 3 Future Downtown Transit Network (Post-LCRT)

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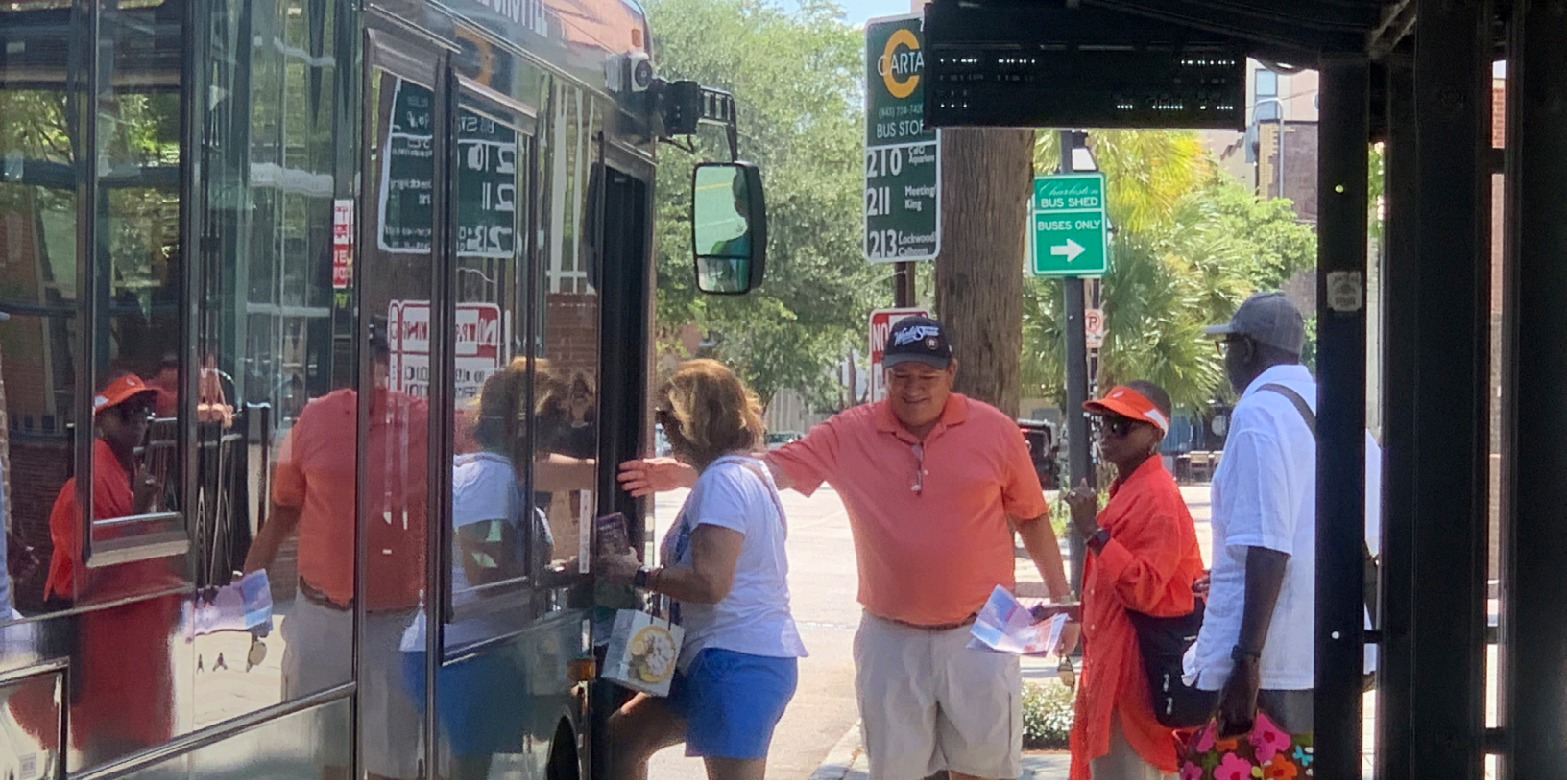
Downtown Transit Today

CARTA provides transit service for the Charleston metropolitan area with the goal of connecting people with economic and social opportunities across the region. The system is the largest in the state of South Carolina. While the CARTA service area spans east to west from Mount Pleasant to West Ashley, and north to south from North Charleston to James Island, this study is focused on how fixed route transit service currently operates within Downtown Charleston; on-demand services and routes that do not serve the downtown area are not part of this analysis.

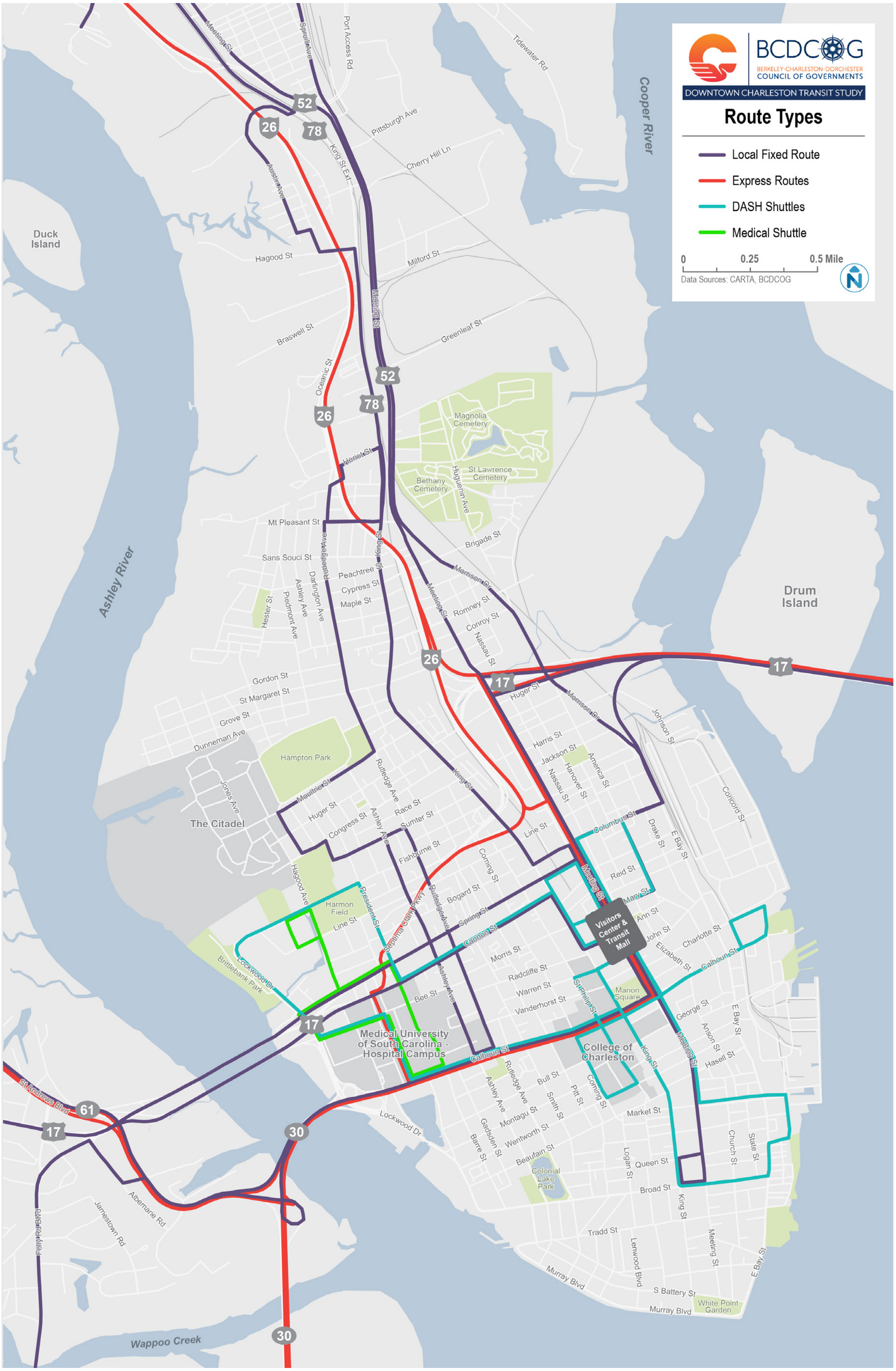


Existing Service Types

CARTA services can be classified within the following service types:

- **Fixed Routes** are local bus routes that operate on a designated route and schedule. CARTA currently operates 17 regular fixed routes, 10 of which serve Downtown Charleston.
- **Express routes** are commuter routes that serve outlying areas of the Charleston region and connect them to downtown. They operate along major corridors, primarily during morning and evening peak periods with limited stops.
- **Downtown Area Shuttles (DASH)** are free circulator routes that operate within the Downtown Charleston peninsula every day of the week.
- **Tel-A-Ride** is CARTA's paratransit service, available to those with a disability that inhibits the use of traditional transit services. Passengers who qualify may be scheduled in advanced for anywhere within ¾ mile of CARTA fixed routes.
- **CARTA OnDemand** is a partnership with rideshare companies Uber and Lyft, which seniors and Tel-A-Ride riders can use to schedule rides at discounted rates.
- **Lowcountry Rapid Transit (LCRT)** is a proposed 21-mile bus rapid transit corridor that would terminate in Downtown Charleston. The route would feature dedicated bus lanes in North Charleston and operate in mixed traffic on the peninsula, with service to new LCRT stations and three park-and-ride lots. The final design for the project is currently underway

Figure 4 CARTA Route Types Map



Market Analysis

Before analyzing how well CARTA services were performing in Downtown Charleston, the project team completed a market analysis to understand the major elements of latent transit demand:

- Transit demand based on existing population and employment density;
- Current and future land uses and activity centers for residents and visitors; and
- Existing travel patterns of both transit users and the general population

According to the 2020 U.S. Census, 65% of Downtown Charleston residents drive alone to work, 9% walk, 8% carpool, 4% bike, 11% work from home, and only 3% take transit. Much of Downtown Charleston is dense and walkable, both supporting the ability to have high frequency transit and making transit an attractive option. This market analysis focuses on understanding where there is demand for public transit, so that improvements can be made in a way that will encourage more people to use transit services.

Population Density

Population density is an important indicator for transit demand, since effective transit systems require people living and working within walking distance to stops and stations. Denser areas tend to be more walkable and less automobile-oriented with limited access to free parking. The population within the peninsula grew more than 20% from 2010 to 2020. With many historic neighborhoods in the southern peninsula, many of these new residents are living within new developments in the middle of downtown.

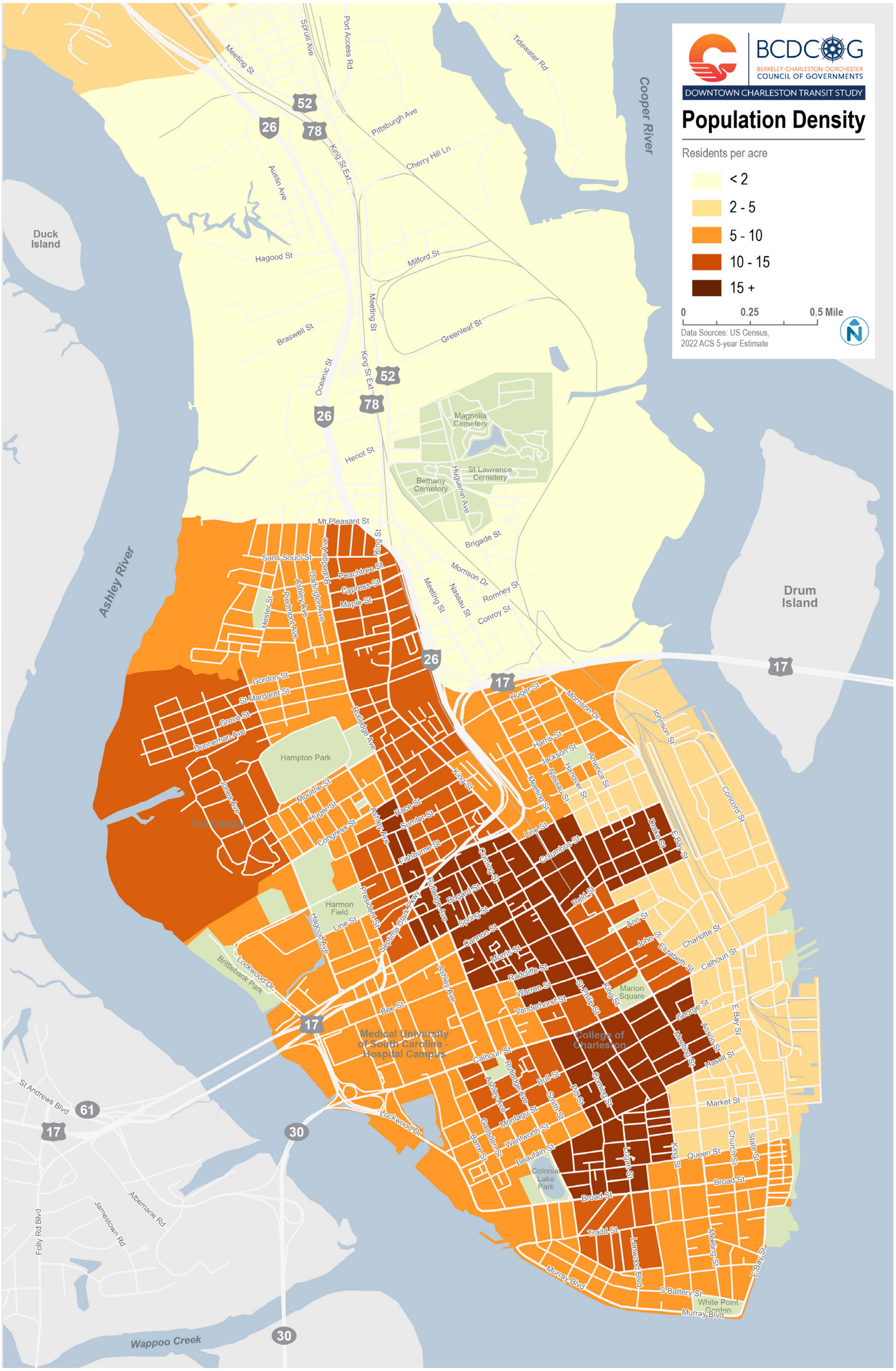
Change in Population

Metric	2010	2020	Percent Change
Total Population	28,409	34,180	20.3%

Source: 2010 & 2020 Decennial Census

Figure 5 shows a map of population density on the peninsula as of 2022. As of 2022, the north end of the peninsula and the east side had the lowest residential densities. However, many of the new residential developments underway are located in these areas, including higher density multifamily housing. As residents move into these new homes, the density in those areas will increase in the next few years.

Figure 5 Population Density Map



Employment Density

Employment density also provides a strong indication of transit demand from people travelling to and from jobs, and to the services these jobs provide. As seen in Figure 7, jobs are concentrated on the east side, south of Line Street, and in the Medical District, with especially dense employment centers around the College of Charleston, the Charleston City Market, the South Carolina Aquarium, and the southern portion of Meeting Street.

Transit Demand

Different levels of residential and employment density are supportive of different levels of transit. Most of the land area of Downtown Charleston is high density or urban mixed-use. When a significant number of people from demographic groups with a high propensity for transit use live in clustered areas, the underlying demand for transit in these areas may be higher than is captured by just looking at population density. Conversely, in areas where transit-supportive groups have lower representation, the transit demand may be lower than what is captured purely by population density. As seen in Figure 8, there is high demand for transit south of Huger Street and along King Street to Mt Pleasant Street.

Figure 6 Transit Demand Based on Local Land Use

LAND USE			TRANSIT	
Land Use Type	Residents per Acre	Jobs per Acre	Appropriate Types of Transit	Frequency of Service
Downtowns & High Density Corridors	>45	>25	Light Rail, BRT, Rapid Bus, Local Bus	10 mins or better
Urban Mixed-Use	30-45	15-25	BRT, Rapid Bus, Local Bus	10-15 minutes
Neighborhood & Surburban Mixed-Use	15-30	10-15	Local Bus	15-30 minutes
Mixed Neighborhoods	10-15	5-10	Local Bus, Micro-transit	30-60 minutes
Low Density	2-10	2-5	Micro-transit, Rideshare, Volunteer Driver Pgm	60 mins or less or On Demand
Rural	<2	<2	Rideshare, Volunteer Driver Pgm	On Demand

Source: Thresholds based on research by Nelson\Nygaard.

Figure 7 Employment Density Map

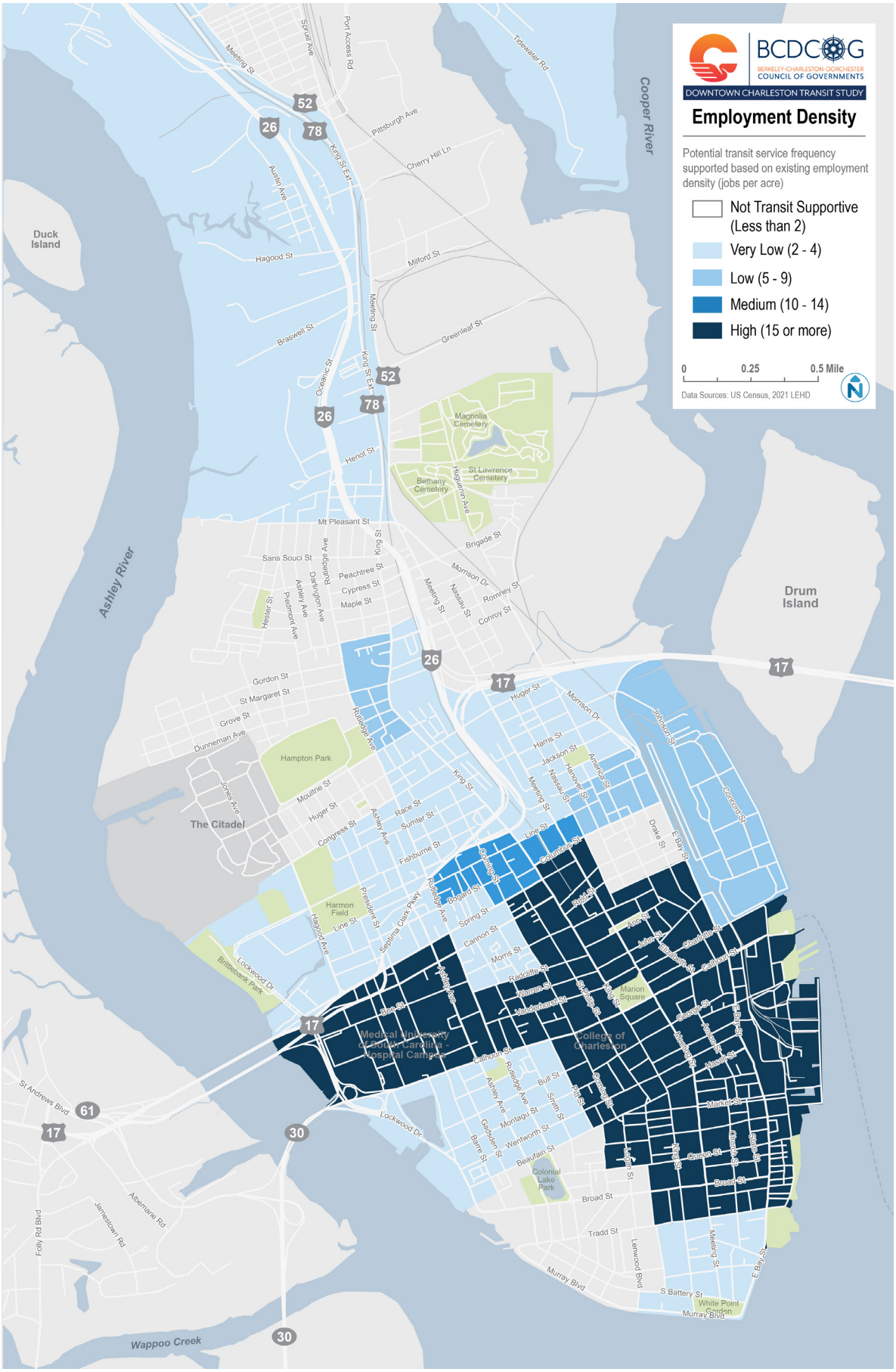
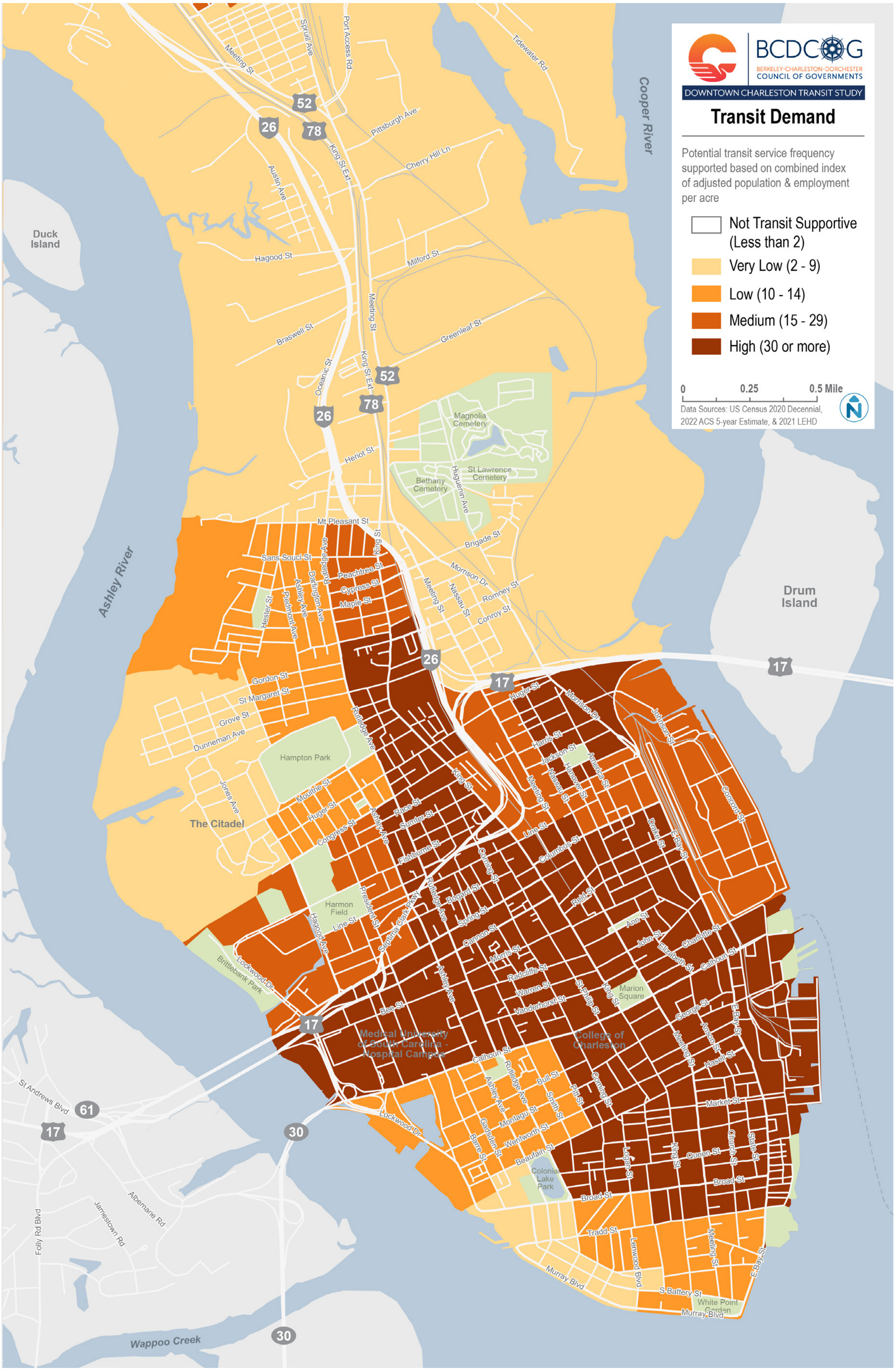


Figure 8 Transit Demand Map



Service Analysis

Service Availability

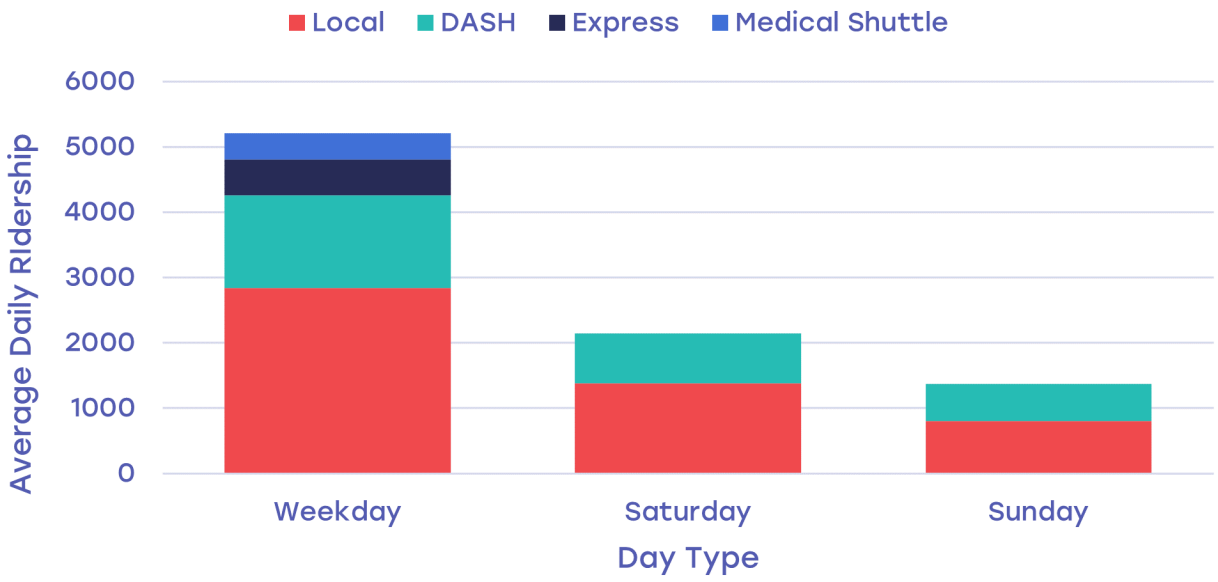
CARTA service through Downtown Charleston varies based on day and time. The table below describes each route's service levels across three-day types – Weekday, Saturday, and Sunday – and provides each route's frequency of service.

The table on the following page shows service availability on Weekdays, Saturdays, and Sundays, illustrating which routes operate each day and how frequently they run. As is typical for transit service, weekday service is the most robust.

Ridership by Service Type

Between September 4, 2022 and January 7, 2022, on average, 5,208 people used the downtown CARTA routes each weekday. Most weekday ridership occurred on regular local fixed routes, which has the most service. DASH routes also made up a large portion of ridership, which may be attributed to the fact that they are free to ride and run frequently. Due to lower service levels on weekends and typical travel patterns, average ridership on Saturdays was less than half of that on weekdays at 2,143. Boardings on DASH routes made up over one third of Saturday ridership. Ridership was lower on Sundays, with 1,373 boardings, most of which were on regular local routes

Figure 9 Average Ridership by Day and Service Type (Fall 2022)



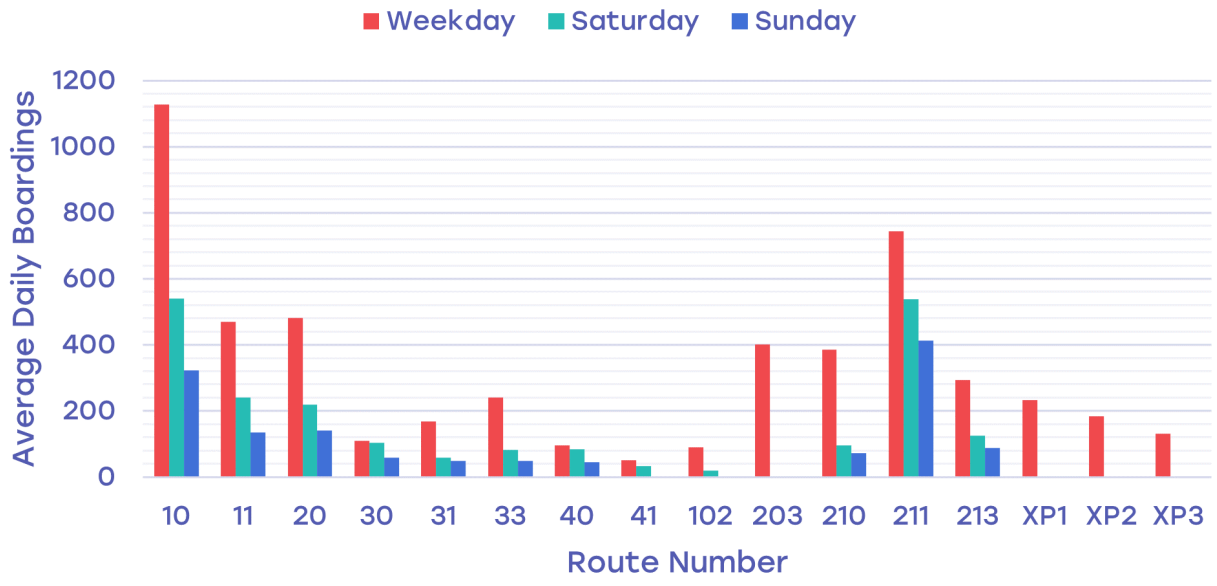
Frequency and Span - Downtown CARTA Routes

	Weekday			Saturday			Sunday		
Route	Peak Freq.	Approx. Off-Peak Freq.	Span	Daytime Freq.	Approx.	Span	Daytime Freq.	Approx.	Span
10	20 min	60 min	5:50AM-12:57AM	35 min	60 min	6:45AM-12:17AM	35 min	60 min	8:32AM-9:32PM
11	40 min	80 min	5:49AM-9:50PM	40 min	80 min	7:08AM-9:19PM	60 min	60 min	8:18AM-7:50PM
20	25 min	50 min	6:02 AM-8:59PM	50 min	50 min	7:02AM-9:09PM	50 min	50 min	9:02AM-7:49PM
30	60 min	60 min	6:00AM-9:24PM	60 min	60 min	6:45AM-12:09AM	60 min	60 min	8:05AM-6:56PM
31	45 min	45 min	5:25AM-9:30PM	45 min	45 min	7:30AM-8:55PM	80 min	80 min	8:25AM-7:00PM
33	60 min	60 min	6:00AM-8:50PM	90 min	90 min	8:16AM-6:38PM	90 min	90 min	9:16AM-6:28PM
40	60 min	60 min	6:20AM-9:45PM	60 min	60 min	7:10AM-11:43PM	60 min	60 min	9:00AM-7:09PM
41	90 min	90 min	6:00AM-8:50PM	90 min	90 min	8:00AM-9:20PM	-	-	-
102	60 min	80 min	6:00AM-8:33PM	60 min	60 min	8:15AM-8:55PM	-	-	-
203	5 min	20 min	5:02AM-8:12AM, 3:07PM-12:34AM	-	-	-	-	-	-
210	10 min	20 min	6:28AM-10:16PM	20 min	20 min	9:00AM-8:16PM	20 min	20 min	9:00AM-7:56PM
211	15 min	45 min	7:16AM-9:19PM	15 min	45 min	8:16AM-9:21PM	15 min	45 min	8:16AM-9:21PM
213	45 min	45 min	6:20AM-9:15PM	45 min	45 min	8:20AM-9:00PM	45 min	45 min	9:20AM-7:00PM
XP1	30 min	-	5:19AM-9:06AM, 3:07PM-8:06PM	-	-	-	-	-	-
XP2	30 min	-	5:35AM-9:09AM, 3:20PM-8:15PM	-	-	-	-	-	-
XP3	30 min	-	5:20AM-9:01AM, 3:07PM-8:36PM	-	-	-	-	-	-

Ridership by Route

Ridership across CARTA routes vary due to different levels of frequency, service span, destinations served, and route length. Routes 10 and 211 showed the highest average ridership on weekdays, Saturdays, and Sundays. Routes 30, 40, and 102 saw the fewest weekday boardings, while Routes 33 and 210 both showed moderate ridership on weekdays and very low ridership on weekends. Routes 30, 40, 41, and 102 had the fewest average boardings across all days.

Figure 10 Average Daily Ridership by Route (Fall 2022)



Ridership by Stop

CARTA maintains nearly 250 bus stops in Downtown Charleston. These stops range in available amenities depending on factors like ridership, available space, and nearby land use. Evaluating ridership patterns at the stop level shows where people want to travel downtown. Figure 12 shows average weekday ridership by stop. Mary Street / Meeting Street, Visitor Center on John Street, Jonathan Lucas Street / MUSC Quad, the Aquarium (Concord Street), and Fishburne Street / Horizon Street Park & Ride are the downtown bus stops with the highest average weekday boardings, each with over 100 average weekday boardings.

Route Productivity

A route's productivity can be determined by comparing its total ridership with its revenue hours, or the amount of time a route is running, excluding extra travel time between garages and the route's start or end points. This measures how many riders board the bus each hour it is in service, providing a way to compare route performance that accounts for their differences in length.

Routes 211, 213, 20, and 203 were the most productive downtown routes on weekdays in fall 2022, while Routes 40 and 41 were the least productive. Routes 211, 20, 213, and 10 had the most boardings per revenue hour on weekends. The three Express routes showed consistent productivity, suggesting that their respective service levels are well matched to their demand. The DASH routes were among the most productive routes each day, which may be because they are free to ride and serve high-activity areas.

Figure 11 Productivity by Route

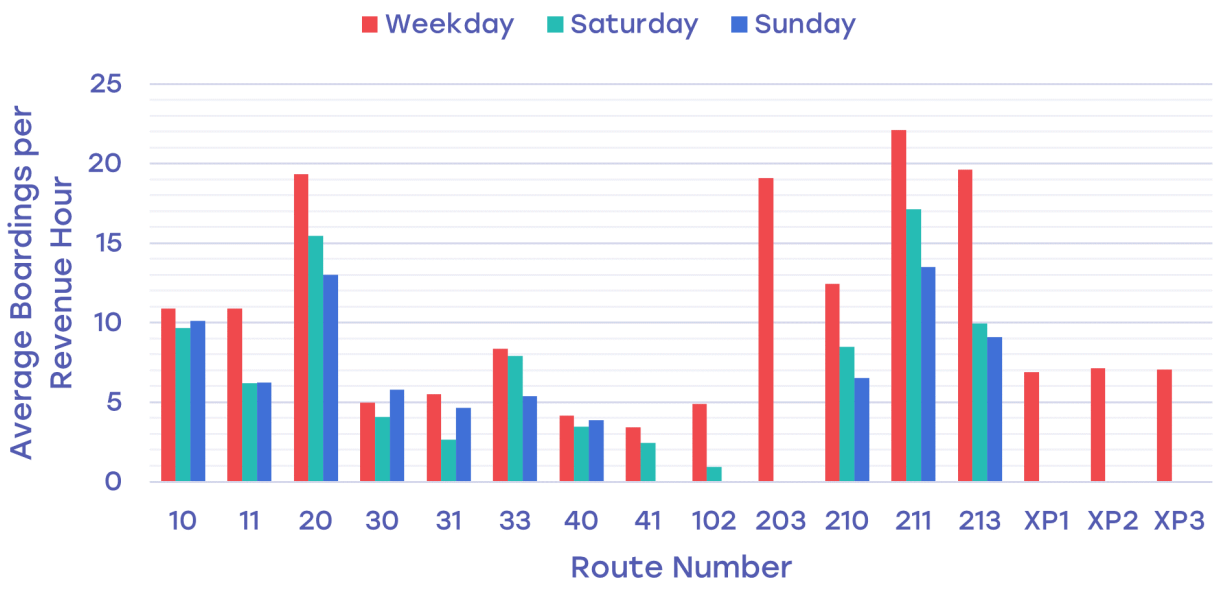
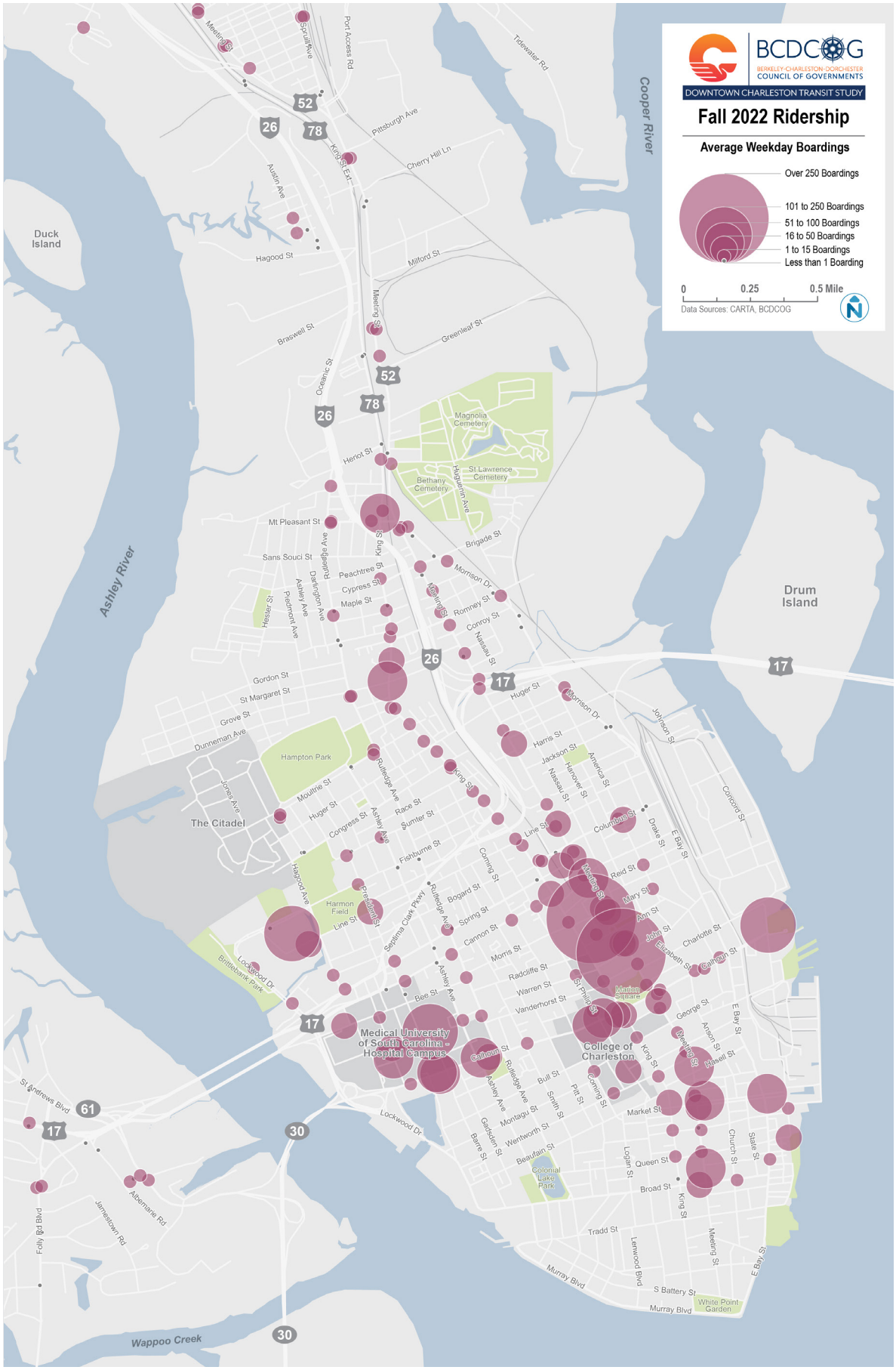


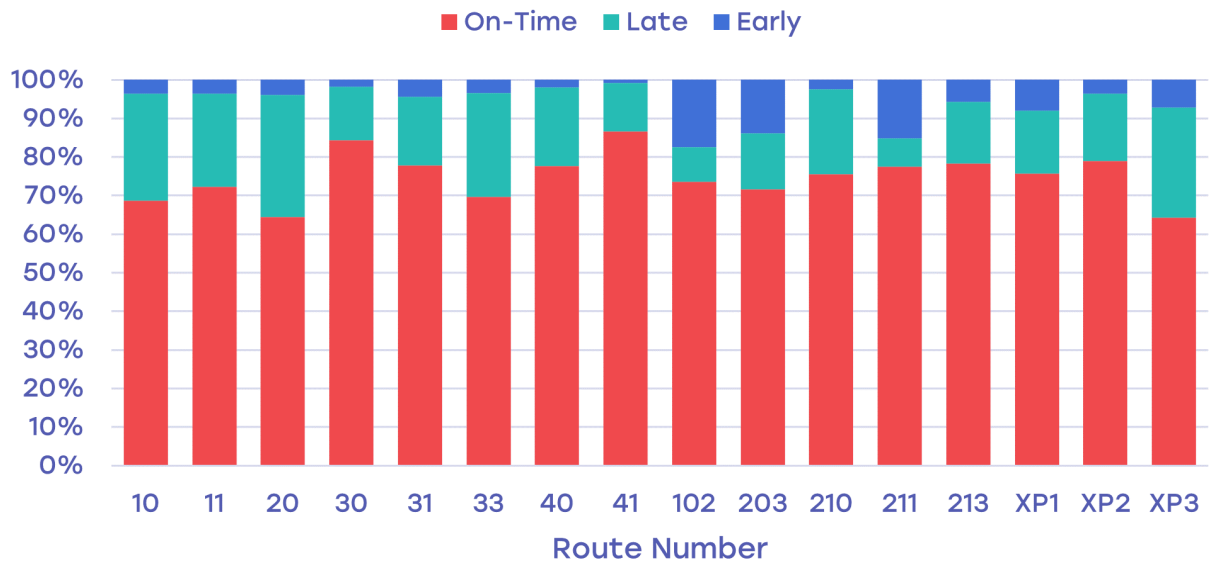
Figure 12 Weekday Average Ridership by Stop Map



On-time Performance

Although some of the factors that cause a bus to be late are beyond the control of the agency, such as traffic congestion or construction along routes, on-time performance is an important metric to ensure a positive rider experience. "Early" trips are defined as any that leave more than one minute before scheduled, and "late" trips are any trips leaving more than 10 minutes after scheduled, consistent with CARTA standards.

Figure 13 Weekday On-Time Performance by Route (Fall 2022)



Routes 30 and 41 were on time the most out of all downtown routes, while Route 20, XP3, 10, and 33 were on time less than 70% of trips. Routes 102, 203, and 211 had significantly more early departures than other routes. Of routes that ran on Saturdays, Routes 10 and 33 had significantly more late trips, and were on time for only about 55% and 45% of trips, respectively. Other routes were generally on time less often than they were on weekdays, but followed similar trends. Route 10 had a much higher percentage of late trips on Sundays, departing on time only about 45% of trips. Most other Sunday routes showed similar performance levels to Saturday on-time performance averages.

To learn more about existing transit service in Downtown Charleston, including a more detailed market analysis and service analysis, check out the State of the System Report.

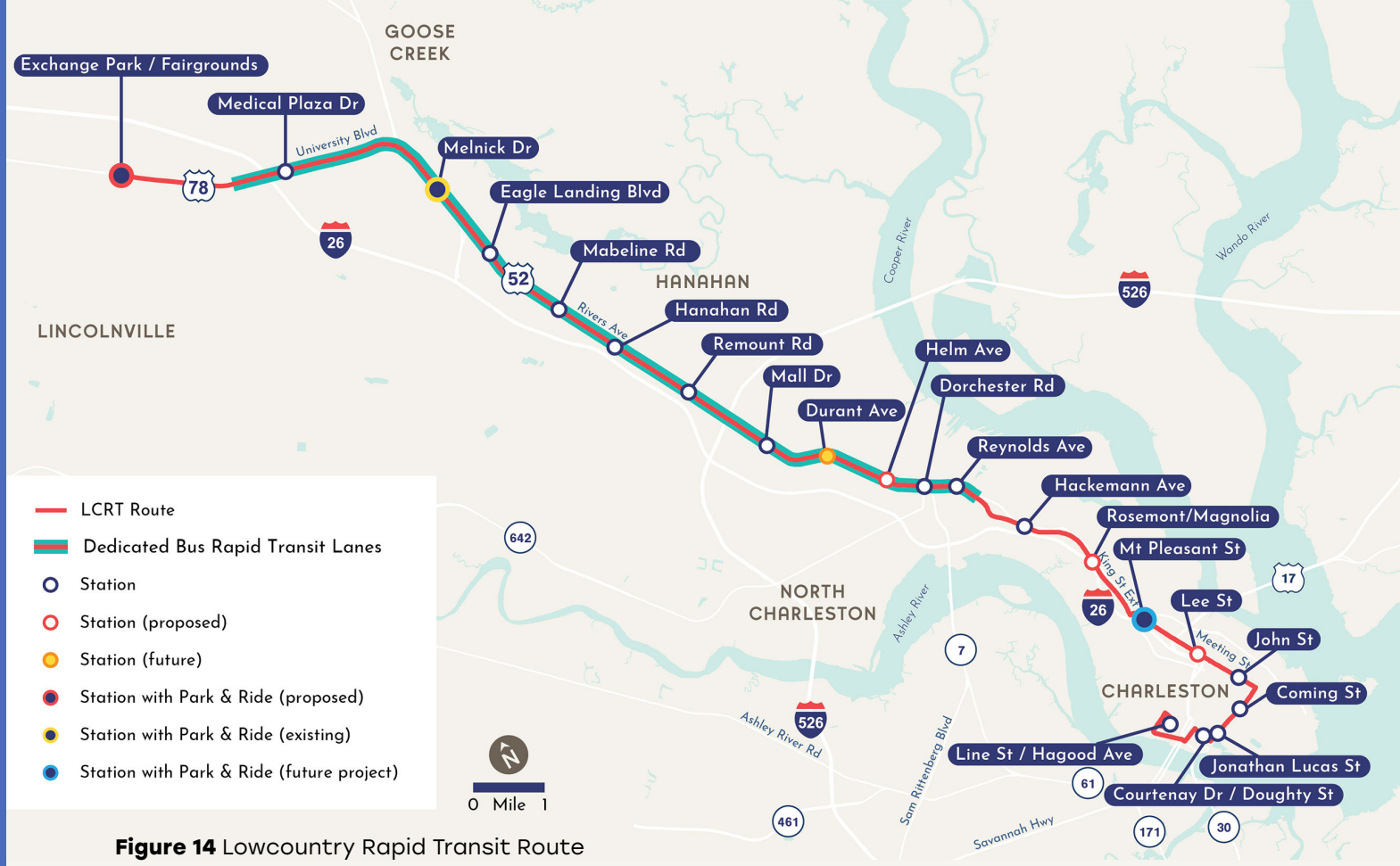


Figure 14 Lowcountry Rapid Transit Route

Preparing for Lowcountry Rapid Transit

BCDCOG is introducing South Carolina's first rapid transit system, Lowcountry Rapid Transit (LCRT). It is currently being designed as a 21.3-mile modern bus rapid transit (BRT) project that will operate mostly in dedicated lanes north of the peninsula, and in mixed traffic in Downtown. It will run from Ladson through North Charleston and Downtown Charleston, ending at the WestEdge development near the Medical District. On the peninsula, LCRT will run primarily on Meeting Street, Calhoun Street, and Lockwood Drive. During peak hours, it will have 10-minute frequencies. BCDCOG anticipates construction of the LCRT will begin in 2026.

In addition to introducing this premium transit service, BCDCOG is working with its partners to support transit-oriented development around the future LCRT stations, with a focus on affordable housing and mixed-use development within an easy walk of transit. It is also improving access to the future stations with reconstructed sidewalks, shared use paths, and new and enhanced pedestrian crossings.

Along with the current state of the transit system, this transformative project is a key factor guiding the recommendations for future transit service in Downtown Charleston. This plan offers near-term recommendations for transit service before the LCRT begins operating ("Pre-LCRT"), and additional modifications once LCRT is up and running ("Post-LCRT") to integrate it into the network and minimize duplicative service.

3

Outreach & Engagement

Engagement Overview and Strategy

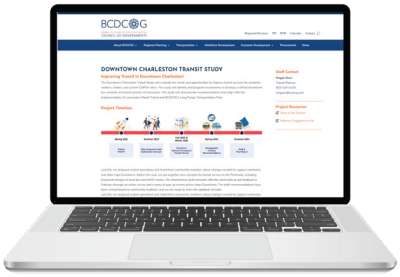
CARTA invited the community to help develop the new proposed transit network for Downtown Charleston through a series of engagement activities. This took place in four phases from June 2023 to June 2024:

Phase 1	Phase 2	Phase 3	Phase 4
Educate and get input on key issues and opportunities	Guide the vision for the future Downtown transit network	Get input on the draft Downtown transit network	Get final feedback on the revised network plan
June 2023	August 2023	February 2024	June 2024

Community members gave input on key Downtown transit needs at the Second Sundays event in August 2023.

Community Engagement Activities

		Phase 1	Phase 2	Phase 3	Phase 4
Community	Project Website	✓	✓	✓	✓
	In-Person Open House		✓		✓
	Virtual Public Meeting				✓
	Pop-up Events		✓	✓	
	Online Survey	✓		✓	
Stakeholders	CARTA Board Meeting	✓	✓	✓	✓
	Technical Advisory Group	✓	✓	✓	✓
	Stakeholder Interviews		✓		✓



Communication and Outreach

A dedicated webpage was created to share project information with the community. For each phase, CARTA announced opportunities to participate in this study through press releases, social media posts, newspaper advertisements, the project mailing list, direct emails to partner organizations, signs at high ridership bus stops, and the BCDCOG website.

Community Engagement Activities

In-Person Open Houses

Open houses were held in August 2023 and June 2024 for community members to review draft material and speak with the project team in person.

Virtual Public Meetings

The draft plan was presented at a virtual public meeting in June 2024, and the recording was posted to the project website.

Pop-up Events

The project team hosted pop-up events at high ridership bus stops in Downtown Charleston in February 2024 to get riders' input on the draft network concepts.

Online Surveys

A total of 1,762 respondents participated in two online surveys to share input on transit needs in Downtown Charleston (1,449 respondents) and give feedback on draft concepts (512 respondents).

In-person open house at the Visitors Center in August 2023

Left: August TAG Meeting. Right: Hospitality industry focus group.

Stakeholder Engagement Activities

CARTA Board Meetings

The project team presented updates to the CARTA Board in May 2023, January 2024, and June 2024. These meetings were open to the public. The CARTA Board also received monthly and quarterly progress reports regarding the project.

Technical Advisory Group

A Technical Advisory Group (TAG) met four times over the course of the planning process to guide the study and network recommendations (May 2023, August 2023, February 2024, and June 2024). Representatives were invited to participate from the City of Charleston, Charleston County, Charleston Moves, Coastal Conservation League, South Carolina Ports Authority, College of Charleston, Explore Charleston, Medical University of South Carolina (MUSC), South Carolina Department of Transportation (SCDOT), and Veterans Affairs Charleston Health Care. Additionally, a subset of the TAG participated in the Downtown Service Design Workshop in December 2023.

Stakeholder Interviews

The project team interviewed several stakeholder groups, including CARTA employees, City of Charleston Public Works, Explore Charleston, and representatives of major employers like the hospitality industry, MUSC, and College of Charleston.

In addition to these activities, community members could share feedback with the project team at any time via email through the project website.

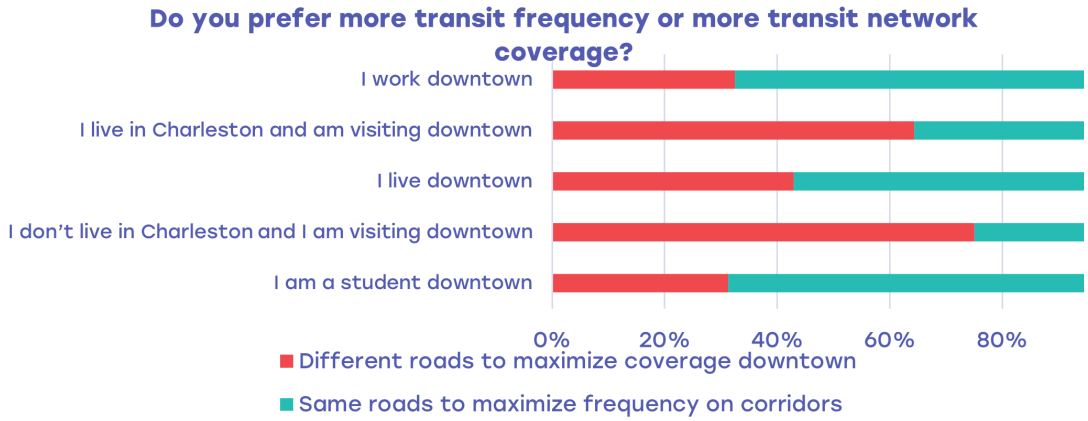
Key Engagement Findings

Transit Needs

In Phase 1, the community shared input on transit needs in Downtown Charleston, which guided the proposed service strategies and solutions for the future downtown transit network. Key themes included:

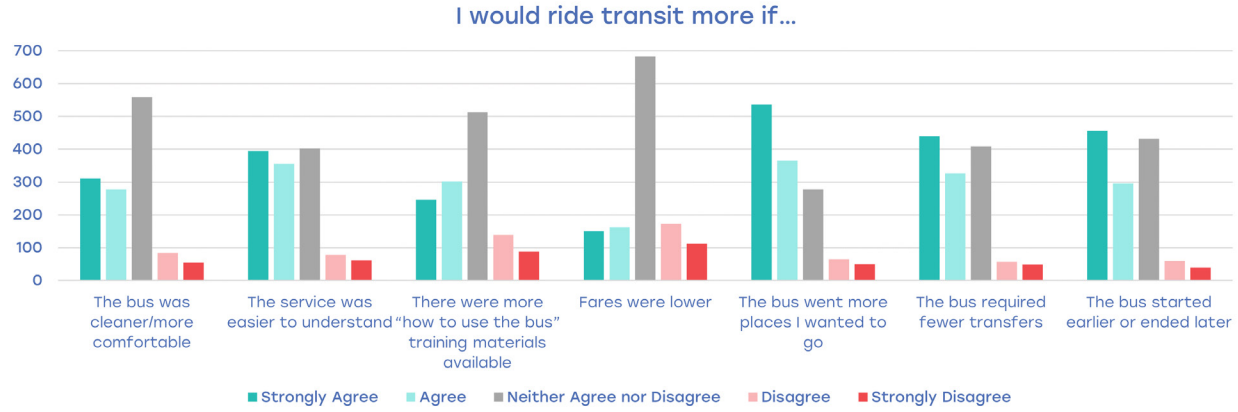
Service Tradeoffs

When asked to prioritize higher frequency transit or providing more coverage across a service area, most survey respondents favored more frequent service on fewer corridors, especially those who live, work, or go to school downtown favor more frequent service. However, people visiting downtown, whether they live in Charleston or not, prefer more service coverage.



Making Transit More Attractive

Overall, survey respondents were satisfied with select elements of CARTA service: safety and security, service coverage, and bus driver courtesy. The largest sources of dissatisfaction include on-time performance, service frequency, and service span.



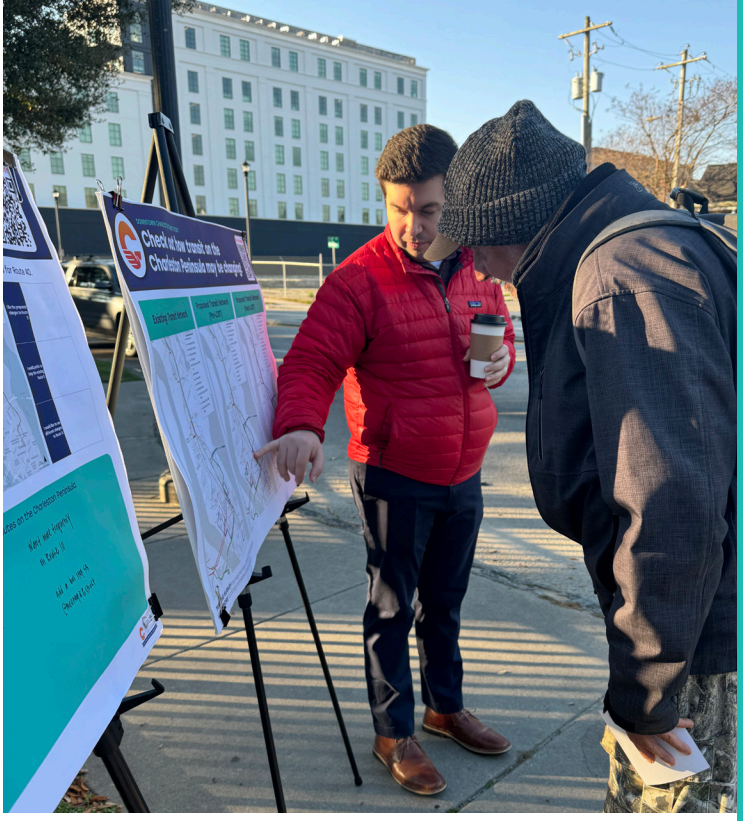
Draft Transit Network Concept Feedback

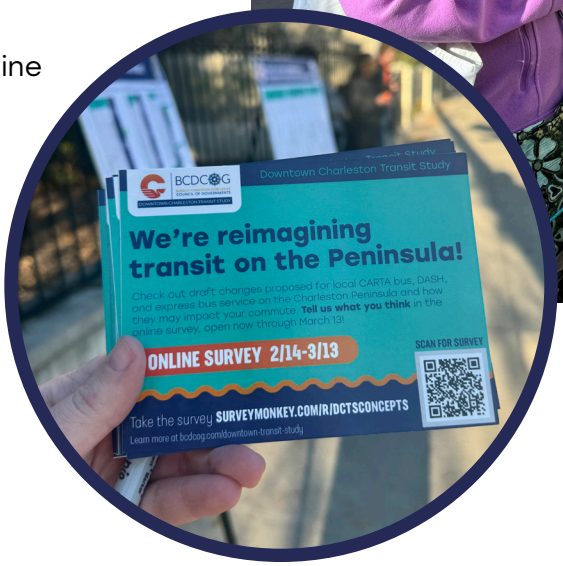
In Phase 3, the community reviewed draft downtown transit network concepts and provided route-by-route feedback on the proposed changes to local bus service, DASH routes, and express bus service. Where the upcoming LCRT route would impact local bus service, concepts were shown for a pre-LCRT scenario and a post-LCRT scenario. Community input was used to revise the draft network concepts. In Phase 4, the community provided final feedback on the revised version. Key themes for comments about the proposed network included:

- Most respondents supported all proposed local bus route changes in the pre-LCRT scenario (Routes 10, 11, 20, 41, and 102) (71% to 85%, depending on the route). Some noted concerns about flooding issues near Fishburne Street and Hagood Avenue.
- Respondents approved of proposed post-LCRT changes to local bus service for three of four routes (Routes 10, 30, and 203) (53% to 65%). Route 102 had a lower approval rating (45%), with respondents noting they prefer the pre-LCRT version of the route with a direct connection to the heart of the Medical District rather than transferring to the new LCRT.
- Respondents favored all proposed changes to DASH routes (68% to 88%), including the highest approval rating (88%) for a proposal to make Route 20 a new DASH route and extend its hours of service.
- Most respondents (63%) supported keeping express bus routes (XP1, XP2, and XP3) as they are today. Many also suggested changes like increasing frequencies during peak periods, adding earlier morning service, adding weekend service, and adjusting several stop locations beyond the peninsula.

- Most respondents (73%) supported keeping Routes 31, 33, and 40 as they are today. Riders of Route 33 desire increased service frequency to address crowding during the PM peak period. Riders of Routes 31 and 40 requested adjustments to those routes beyond the peninsula, which is outside the scope of this study.
- Participants who suggested additional changes addressed themes like:
  - Increase frequency of service
  - Improve reliability
  - Align with the schedules for the medical and hospitality industries
  - Concerns over integration with downtown infrastructure, like flooding and narrow, historic streets
  - Add more stops along existing routes
  - Serve more destinations on the peninsula
  - Service requests beyond the peninsula
  - Make the transit system more user-friendly, with more education
- Feedback was relatively consistent across the online survey, pop-up events, and open houses.

To learn more about community engagement and input for this study, check out the State of the System Report and the Community Engagement Appendix.





Riders shared input on draft network concepts at bus stop pop-up events in February 2024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Future Downtown Transit

The project team created fixed route service concepts based on current transit demand, planned developments on the peninsula, ridership trends, on-time performance, fleet constraints, and community input. Service design was split into two groups based on when service could be implemented and the completion of the Lowcountry Rapid Transit (LCRT) project, a bus rapid transit route that will connect from Ladson to the peninsula. As the LCRT begins operating, it will need to be integrated with existing routes on the peninsula.

In general, the proposed networks attempt to provide as much bi-directional services on corridors as possible and consolidate more services onto Meeting Street and Calhoun Street. These guiding principles are based on public feedback noting the desire for more frequent service and transfer opportunities along a few corridors downtown.

The proposed changes will not affect where buses run beyond the Study Area. When bus frequency (how often the bus comes) or service span (hours of operation) changes are proposed, those would be made for the entire route, including the portion beyond the peninsula. Route frequency and service span changes are noted in the final concepts section.

- **Integrate with future LCRT service**
- **Offer more bi-directional service**
- **Consolidate service onto key streets**
- **Serve growing areas of the peninsula, like the east side**
- **Increase frequency and extend hours for key routes**

Local Routes

The maps here show the proposed local routes before and after the LCRT is operating. Pre-LCRT changes are proposed for Routes 10, 11, 30, 41, and 102. A few local bus routes would change again after the LCRT begins operating, including Routes 10, 102, and Route 203 (Medical Shuttle).

Pre-LCRT Route Changes

- **Route 10** – Extension to the Hagood Lot via the Medical District before LCRT is operational
- **Route 11** – Utilize Columbus Street through Eastside neighborhood
- **Route 30** – Bi-directional service on Spring Street east of Aslhey Avenue
- **Route 41** – Service on Meeting Street on the peninsula
- **Route 102** – Connect to Hagood Lot and loop through Medical District via Jonathan Lucas Street and Courtenay Drive

Post-LCRT Route Changes

- **Route 10** – Revert to ending at the Visitor Center since LCRT makes connections to Medical District and Hagood Lot
- **Route 102** – End of line at the Hagood Lot and the Rosemont neighborhood
- **Route 203** – Discontinue service due to LCRT operating as connection between Medical District and Hagood Lot

Local Route Spans and Frequencies

Routes 10 and 102 would have additional changes to service span and frequency beyond alignment changes. Route 10 would have more frequent service off-peak to more closely match the future LCRT service. After LCRT is operating, the plan proposes scaling back Route 10 service frequencies to all-day 30-minute service making frequent stops. Route 102 would have longer service hours and more frequent service after LCRT is operating. As mentioned earlier, Route 203 would be eliminated once LCRT is operating.

Changes from existing are highlighted in the table below. Most local routes would have similar spans of service and frequencies in both concepts as what exists today, as most local routes operate largely outside the peninsula and only have minor alignment changes. Local route frequencies outside the Study Area (the peninsula) will be further evaluated as part of a separate study.

Figure 15 Future Downtown Transit Network Map - Pre-LCRT Local Routes

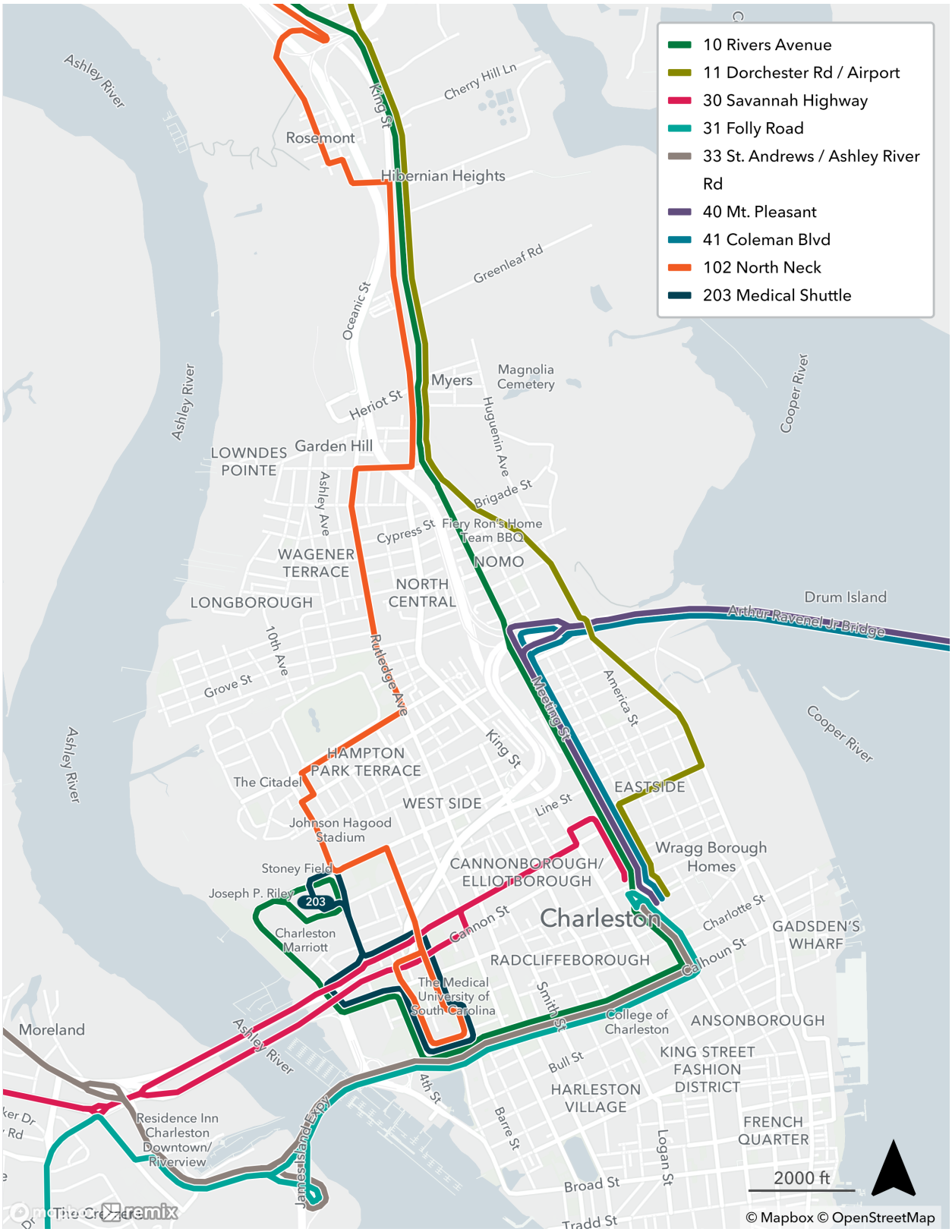
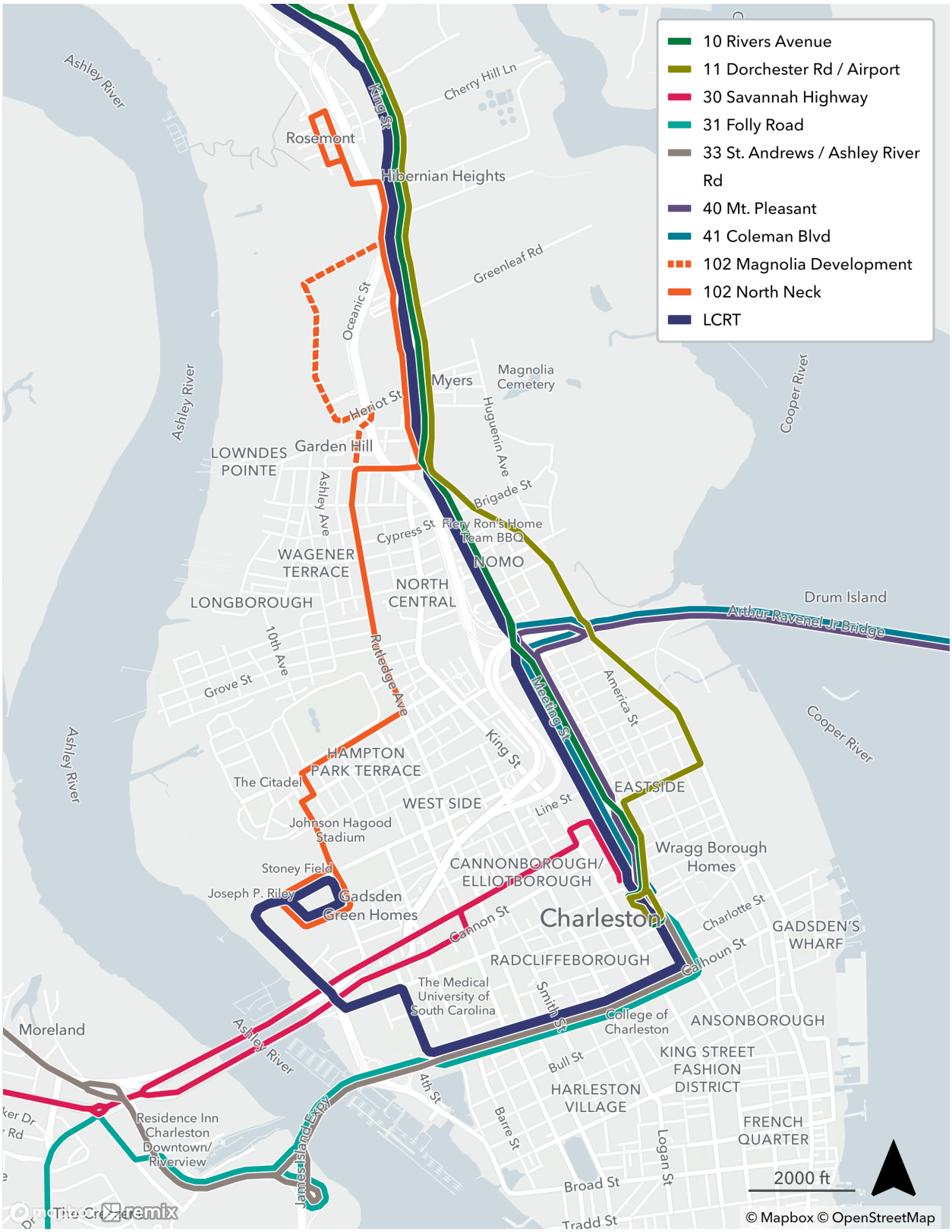


Figure 16 Future Downtown Transit Network Map - Post-LCRT Local Routes



Future Frequency and Span - Local Routes

	Existing		Proposed Pre-LCRT		Proposed Post-LCRT	
Route	**Weekday Span**	**Frequency (Minutes)** (Peak/ Midday/ Evening)	**Weekday Span**	**Frequency (Minutes)** (Peak/ Midday/ Evening)	**Weekday Span**	**Frequency (Minutes)** (Peak/ Midday/ Evening)
10 Rivers Avenue	6:00am – 1:00am	20/30/60	6:00am – 1:00am	20/30	6:00am – 1:00am	30
102 North Neck	6:00am – 8:30pm	60/60/80	6:00am – 8:30pm	60	6:00am – 10:00pm	30
203 Medical Shuttle	5:00 am - 8:00 am 3:00 pm - 12:30 am	5-10/15-20/20	5:00 am - 8:00 am 3:00 pm - 12:30 am	5-10/20	-	-

Downtown Area Shuttles (DASH) Routes

This map shows the proposed DASH routes, with changes proposed for Routes 20, 210, 211, and 213. The DASH routes are proposed to operate the same whether LCRT is operational or not.

DASH Route Changes

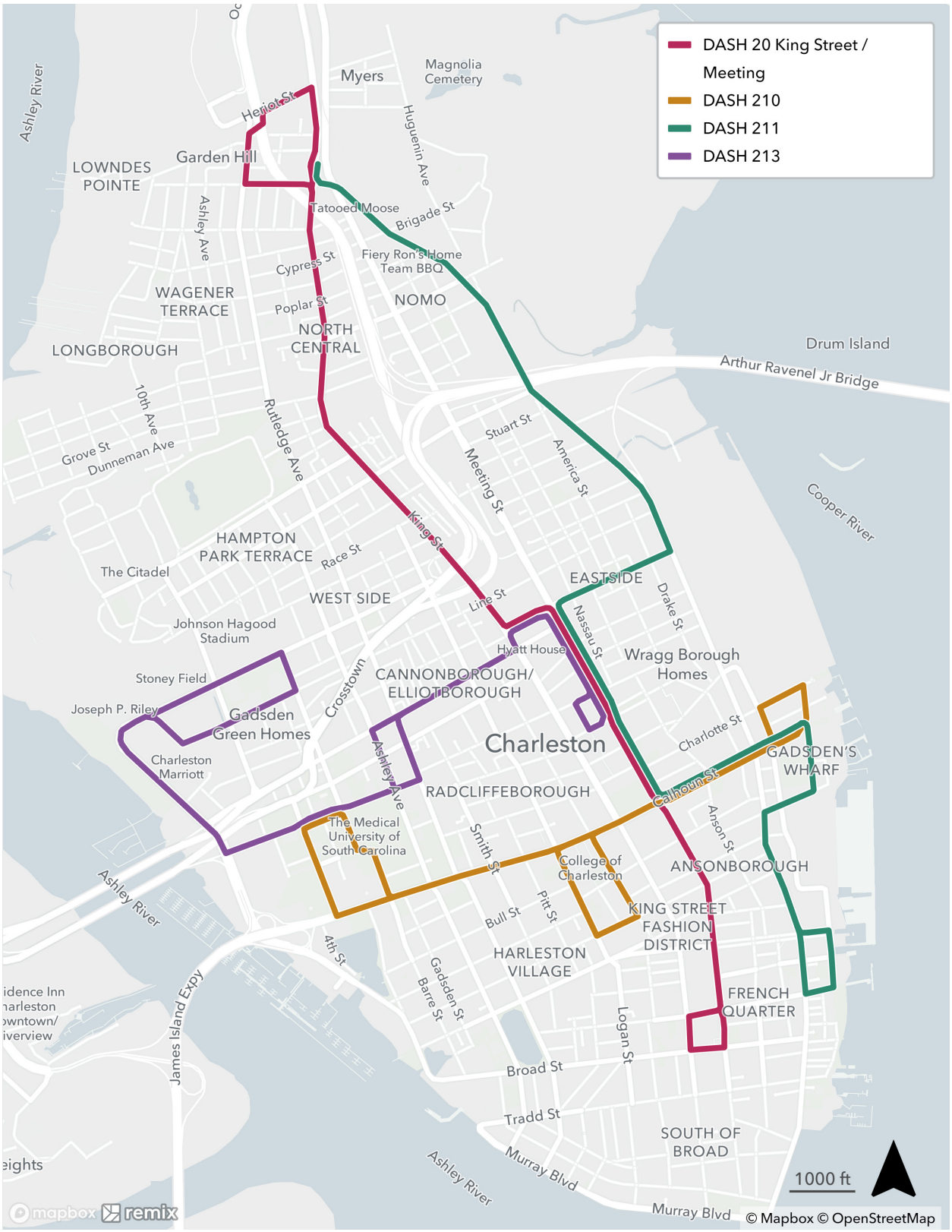
- **Route 20** – Rebranded as a DASH route, but same alignment
- **Route 210** – East-West connector on Calhoun Street from the Medical District, College of Charleston, and the Aquarium
- **Route 211** – North-South connector from future Mt Pleasant Street Park and Ride, the Visitor Center, and Waterfront Park via Morrison Drive, Meeting Street, and East Bay Street
- **Route 213** – Connection from Hagood Lot and Gadsden Green Homes to Visitor Center via Bee and Spring Streets

DASH Spans and Frequencies

All of the DASH routes would have either extended service spans, more frequent service, or both. Route 20 and 211 would have extended hours until 3:00am to provide late-night service in the peninsula and to the future Mt Pleasant Street Park & Ride. Each of these routes would also operate every 20 minutes from 6:00am to 6:00pm and then every 30 minutes from 6:00pm to 3:00am.

Routes 210 and 213 would operate similar service hours as today from 6:00am to 10:00pm. Both routes would operate with 20-minute frequencies for the whole day. Additional service on Route 210 could be provided during the school year from the College of Charleston main campus to the College's Harbor Walk facility to increase service frequency.

Figure 17 Future Downtown Transit Network Map - DASH Routes



Future Frequency and Span - DASH Routes

	Existing		Proposed	
Route	**Weekday Span**	**Frequency (Minutes)** (Peak/Off-peak	**Weekday Span**	**Frequency (Minutes)** (Peak/Off-peak)
20 King Street/ Meeting Street	6:00am – 9:00pm	25/50	6:00am – 3:00am	20/30
210 College of Charleston/ Aquarium	6:30am – 10:30pm	15/30	6:00am – 10:00pm	20
211 Meeting Street/ Bay Street	7:30am – 9:30pm	15/45	6:00am – 3:00am	20/30
213 Lockwood/ Calhoun	6:30am – 9:30pm	45	6:00am – 10:00pm	20

Express Routes

Three express routes serve the peninsula from the north, west, and east. No changes are proposed to the alignments of the express routes in Downtown Charleston, but a full system analysis is needed to determine the alignments of these routes outside of the peninsula.

Figure 18 Future Downtown Transit Network Map - Express Routes

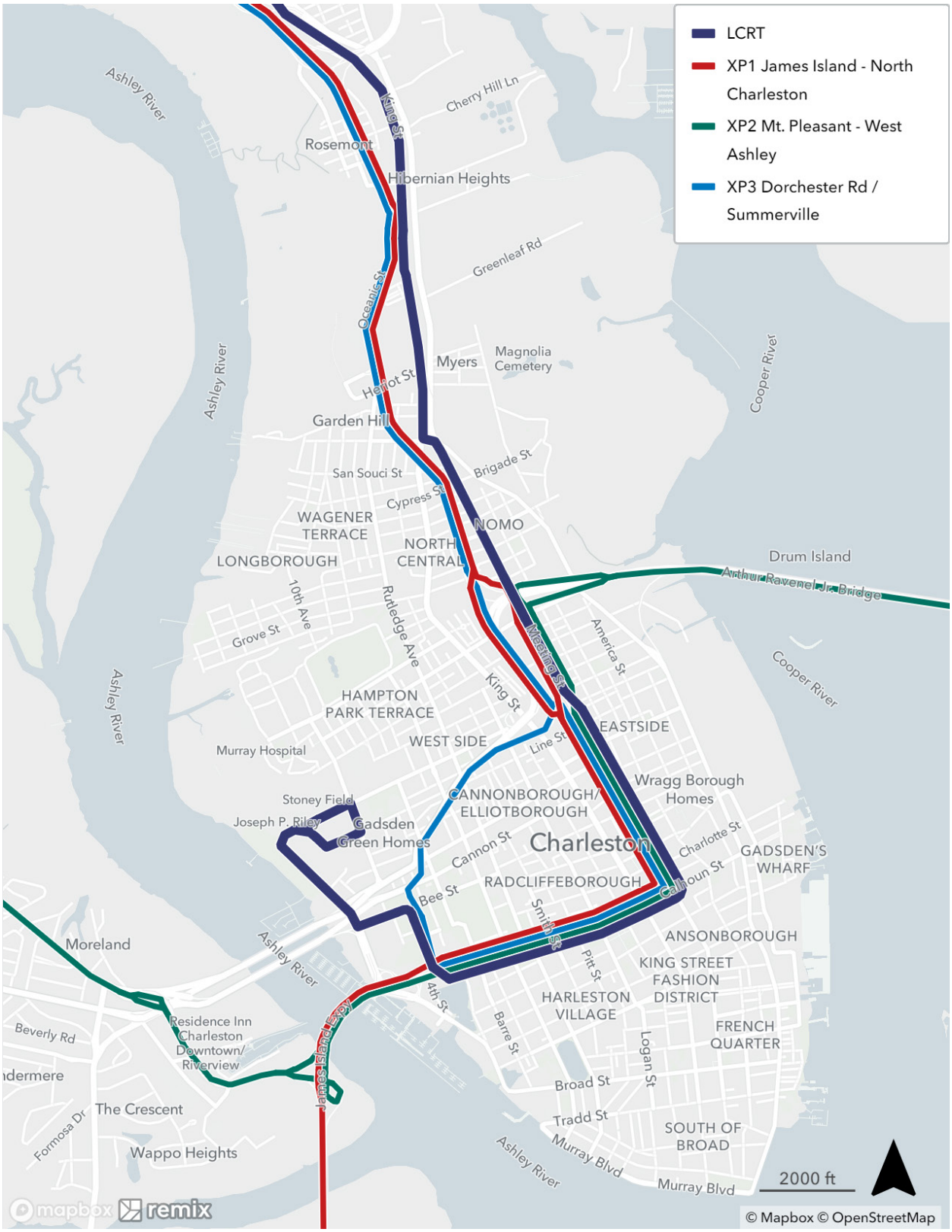


Figure 19 Future Downtown Transit Network (Pre-LCRT)

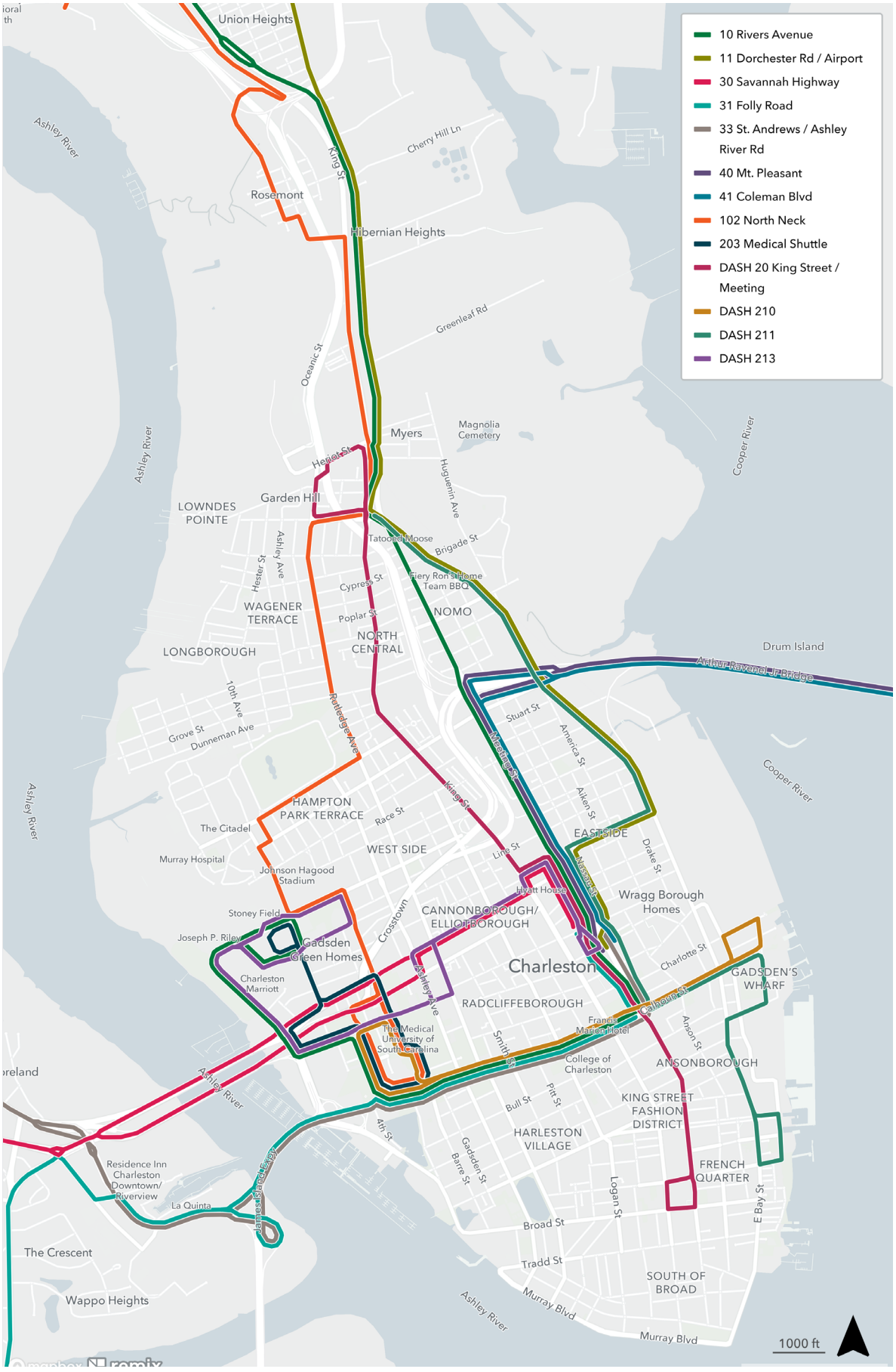
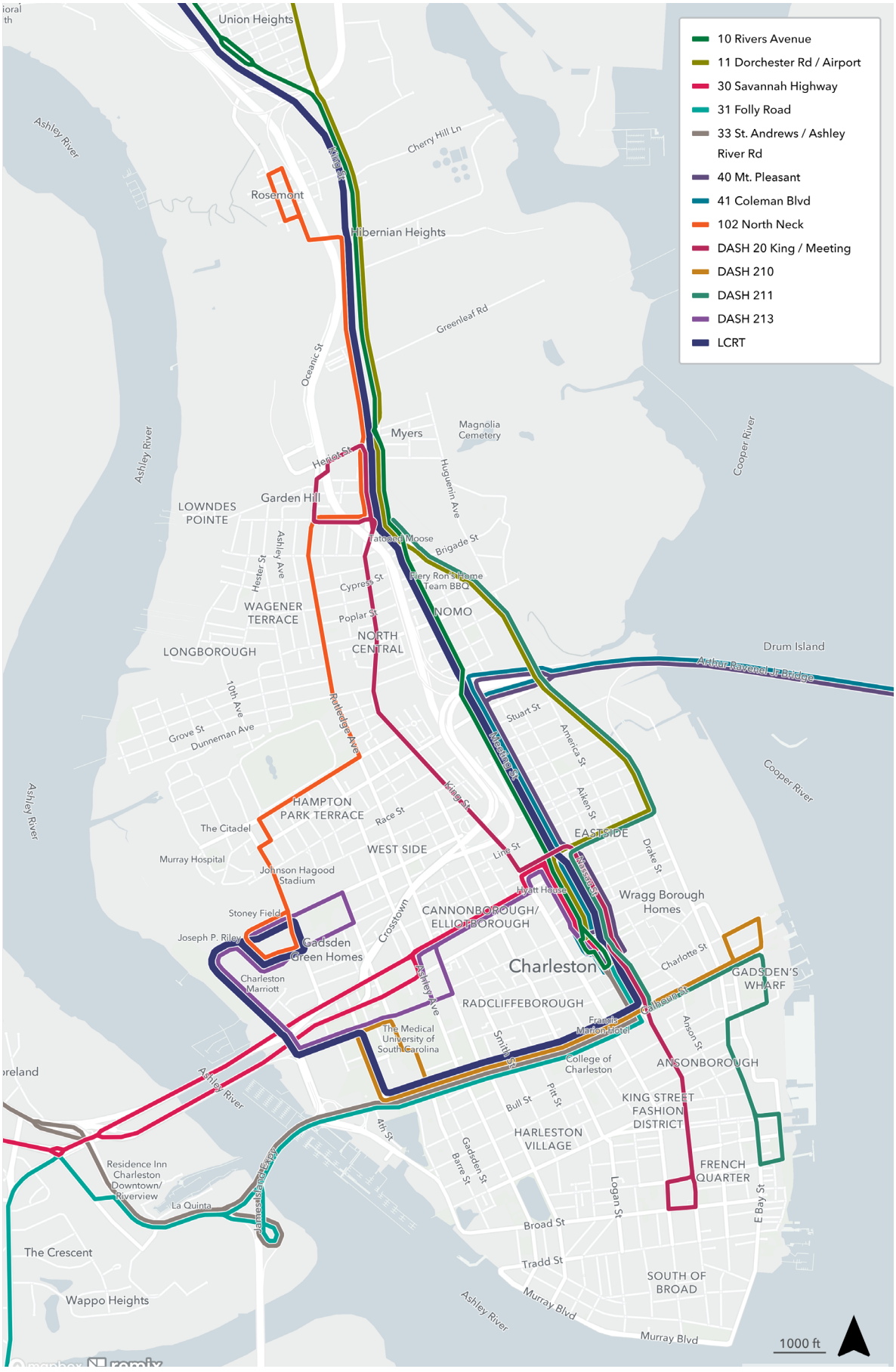


Figure 20 Future Downtown Transit Network (Post-LCRT)



Estimated Service Costs

While most local routes only have alignment changes, the routes with proposed service span and/or frequency changes also have a change in operating costs. Operating costs can vary based on the milage, hours, and vehicles required to operate transit. For non-express services, the number of annual operating hours multiplied by an hourly rate provide a good estimate for annual operating costs. CARTA generally spends just under $100 per revenue hour to operate services, which is fairly typical for a small to medium size transit agency. To simplify the estimates, this analysis assumes a cost of $100 per revenue hour.

The table below shows the existing and proposed annual costs for each route that have span or frequency changes. While the HOP is not currently operating, the funds are being considered as part of the cost considerations for the proposed changes. The total change in costs compared to existing are shown below the pre-LCRT and post-LCRT columns. In general, it is expected to cost about $2.25 to $2.5 million more per year to operate the extended routes and expanded spans and frequencies proposed in the previous tables.

To learn more about proposed transit service for Downtown Charleston, check out the report appendices.

Estimated Service Costs

	Existing		Proposed Pre-LCRT		Proposed Post-LCRT	
	Existing Annual Revenue Hours	Existing Annual Cost	Pre-LCRT Annual Revenue Hours	Pre-LCRT Annual Cost	Post-LCRT Annual Revenue Hours	Post-LCRT Annual Cost
10 Rivers Avenue	30,720	$3,072,000	36,669	$3,666,900	33,810	$3,381,000
102 North Neck	5,776	$577,600	6,878	$687,800	11,364	$1,136,400
20 King Street/ Meeting Street	7,666	$766,600	19,548	$1,954,800	19,548	$1,954,800
210 College of Charleston/ Aquarium	7,736	$773,600	11,144	$1,114,400	11,144	$1,114,400
211 Meeting/Bay Street	11,907	$1,190,700	19,548	$1,954,800	19,548	$1,954,800
213 Lockwood/ Calhoun	5,036	$503,600	11,144	$1,114,400	11,144	$1,114,400
HOP (Not Operating)	13,536	$1,353,600	-	-	-	-
Total	**82,377**	**$8,237,700**	**104,931**	**$10,493,100**	**106,558**	**$10,655,800**

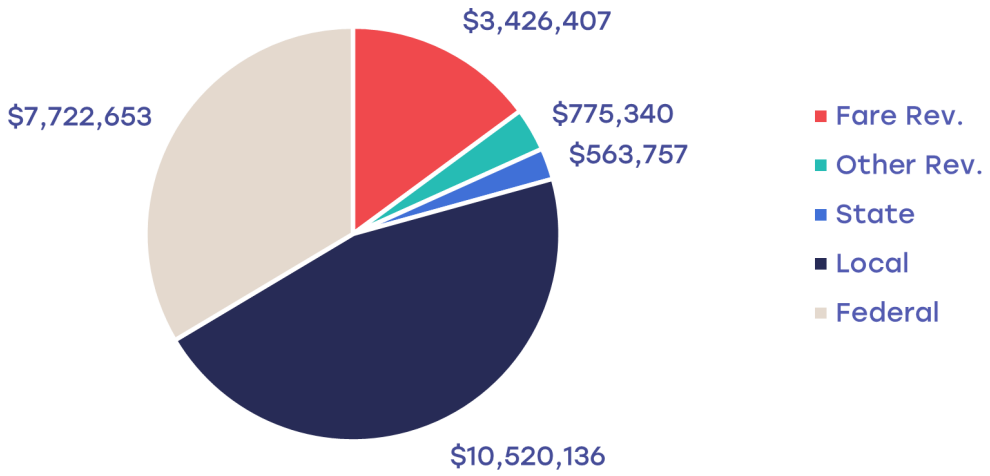
Funding Considerations

Current Revenue Sources

Funding for CARTA's transit operations comes from a combination of federal, state, and local revenue sources, as well as from fare revenues and other miscellaneous sources. In 2022, funds expended on CARTA operations totaled slightly more than $23 million. It is important to note that this amount covered all of CARTA's operations, not just its operations in Downtown Charleston.

CARTA's primary sources of operating revenue are from Charleston County's local sales taxes at $10.5 million (45.7%) followed by federal funds at $7.7 million (33.6%). Nearly all of the federal funds in 2022 were from FTA's Section 5307 Urbanized Area Formula Program. SCDOT provided State Mass Transit Funds amounting to approximately $0.6 million (2.5%).

Figure 21 CARTA Operating Funding Sources (2022)



The remainder of funding comes from directly generated revenues, with fares accounting for 3.4 million (14.9%) of operating revenue. Two other sources include advertising revenue at nearly $0.7 million and miscellaneous revenue derived from private business contributions at $0.1 million.

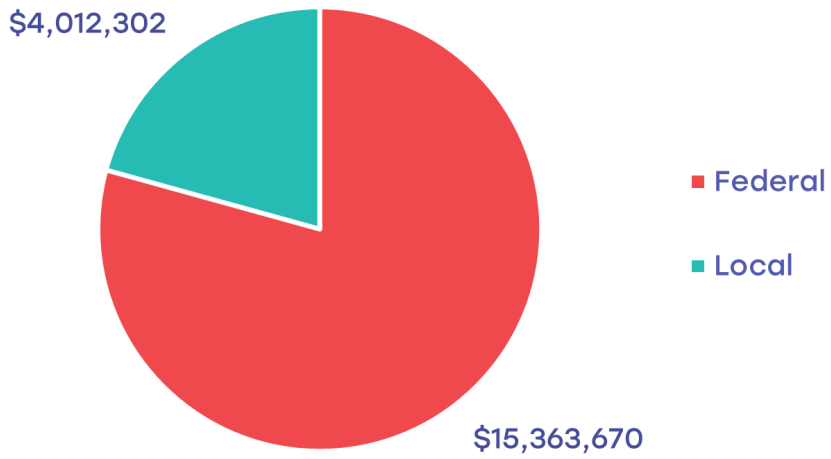
These private business contributions go towards CARTA's free routes downtown, including the DASH routes and Route 20. Some of the funding partners include the Charleston Area Convention and Visitors Bureau, downtown hotels participating in the Charleston Area Lodging Cooperative, the College of Charleston, and the Medical Center of South Carolina. With the proposed changes to the DASH route system and associated increases in operating costs, private business contributions will become

more critical for implementation of the proposed alignment, span of service, and frequency improvements. CARTA will need to work closely with its current partners and potentially identify new partners to ensure sufficient funding is made available.

Turning to capital revenue sources, CARTA's funding in 2022 came primarily from a combination of federal sources covering just under 80% of capital costs, matched with local funds covering the remaining 20%. In 2022, funds expended on CARTA's capital expenses totaled approximately $19.4 million. It is important to note that this amount covered all of CARTA's capital expenses, not just those for Downtown Charleston.

In 2022, nearly 55% of CARTA's capital revenue was from FTA's Section 5339 Bus and Bus Facilities Program. Another 22% was from FTA's emergency CARES Act Urbanized Area Program funds issued during the COVID-19 pandemic.

Figure 22 CARTA Capital Revenue Sources (2022)



Future Funding Opportunities

The Bipartisan Infrastructure Law (BIL), as enacted in the Infrastructure Investment and Jobs Act (IIJA) in November 2021, is a game-changer for the Charleston region. Nationally, the law provides an additional $274 billion in federal transportation funding between 2022 and 2026, effectively doubling total federal funding for transportation over that period to $567.5 billion. It focuses on improving safety, modernizing bus and rail facilities, climate change, and equity.

For public transportation, it reauthorizes federal funding programs and provides advance appropriations for certain programs. CARTA is already reaping the benefits of this additional funding through a number of competitive, discretionary programs. The potential funding opportunities for CARTA in the BIL include both operating and capital programs that could be a source to support implementation of the proposed recommendations.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Transit Supportive Infrastructure

Downtown Transit Center Assessment

Transit Centers are transit stops that experience very high ridership and a high number of transfers. They usually serve the system's most frequent bus routes. Since these stops have the region's highest level of ridership and service, they should provide a wide range of information and passenger amenities.

The project team assessed downtown transit center needs in parallel with the development of the Downtown Transit Network Concepts. Details of the assessment may be found in the Downtown Transit Center Assessment deliverable.

Existing Downtown Transit Center

Of the three official transit centers CARTA maintains today, the Downtown Transit Center serves as the major hub for passengers making connections to access all parts of Charleston County. Thirteen of CARTA's 23 routes serve the Downtown Transit Center. The center consists of four stops within a few blocks of each other:

Mary Street/Meeting Street

Visitor Center on John Street

Visitor Center/Charleston Museum on Meeting Street (Both Sides)

Transit Mall (Alightings Only)

Based on the proposed final Downtown Transit Network Concepts, existing and future routes serving each location were identified.

Mary Street/Meeting Street

In 2022, the stop at Mary Street/Meeting Street served nearly 420 weekday passenger boardings, the highest number of all stops in the downtown Study Area. It is located on Mary Street adjacent to the Visitor Center Parking Garage entrance. While this is the end-of-line location for eight routes, its capacity is severely constrained and can efficiently accommodate only two standard-size buses at a time. As a result, other layover locations in the vicinity are required, reducing the efficiency of CARTA operations.

The proposed post-LCRT network would keep the number of routes serving this location constant at eight routes, though the number of buses arriving at the stop during weekday peak periods would increase slightly. No additional frequency improvements beyond what is proposed should be considered given the limited capacity of this stop.

Figure 23 Downtown Transit Center Map

Visitor Center on John Street

In 2022, this stop, adjacent to the Charleston Visitor Center on John Street, served more than 360 weekday passenger boardings, the second highest number of all stops in the downtown Study Area. This stop serves three DASH routes today, two of which layover at this location. Under the post-LCRT downtown network concept, this stop would remain part of the multi-stop transit center, but with only one of the three DASH routes continuing to serve this stop. The two routes that currently layover at this stop would be rerouted with their layover locations moved to their proposed end-of-line locations.

Visitor Center/Charleston Museum on Meeting Street

Two stops are located on Meeting Street adjacent to the Visitor Center and Charleston Museum, one on each side of the street. The northbound stop (Visitor Center side) currently serves six through routes, while the southbound stop (Charleston Museum side) serves four through routes. The southbound stop features a bus pull-out lane with brick paving.

The LCRT plans call for station platforms to be located essentially where these stops are today. Due to different platform heights for LCRT vehicles, the existing stops would be shifted. This study recommends they be relocated to just south of Ann Street on the same block as the LCRT stations. Between the proposed post-LCRT downtown network changes and the LCRT service, the stops on this block would see a significant increase in bus volumes.

Layover Location Considerations

The Downtown Transit Center currently serves as the location for the 10 routes ending there to layover. With the proposed post-LCRT changes to the DASH routes, this number would be reduced to the eight routes serving the Mary Street/Meeting Street stop. Layover is the time scheduled at the end of a route before the departure time of the next trip and is scheduled for two reasons:

- To provide time for the vehicle operator to take a break
- To provide time to get back on schedule before the next trip departs

An identified need is for CARTA to have a consistent layover location at the Downtown Transit Center, rather than layovers spread out at several stops around the Visitor Center. This consolidated layover location should accommodate seven to eight buses at a time in a location near facilities / restrooms for operator breaks, ideally in the same location as passenger transfers. Conceptually, two possible locations would be the Bus Shed at the Visitor Center or in the Transit Mall. Other possible locations would likely require the removal of parking or a travel lane.

The Visitor Center and Bus Shed first opened to the public in 1991 after renovations to the historic buildings. The Bus Shed was built to house CARTA's downtown transit center bus operations, including passenger boardings and alightings, as well as bus layovers. The southern portion of the Visitor Center building housed CARTA offices and restrooms for use by CARTA vehicle operators. The Bus Shed is approximately 400 feet long and could accommodate the bus line-up needs.

The Transit Mall, while long enough to accommodate bus line-up needs, is too narrow for standard buses to pass one another. Some reconstruction would be required to widen the pavement to 23 or 24 feet. Use of the Transit Mall as a layover location may also conflict with its envisioned reuse as part of the Lowcounty Lowline trail.

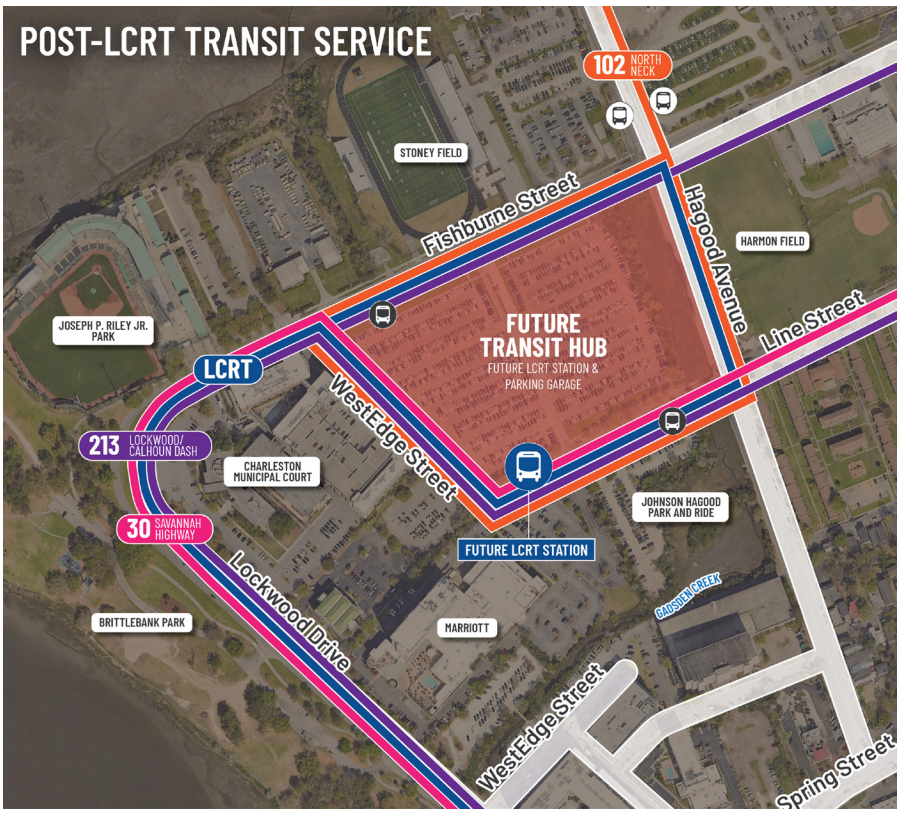
Future WestEdge/Medical District Transit Hub

In addition to the Downtown Transit Center at the Visitor Center, it is envisioned there will be a need for a future transit hub in the WestEdge/Medical District at the current location of the Medical University of South Carolina (MUSC) surface parking lot in the area bounded by Fishburne Street, Hagood Avenue, Line Street and WestEdge Street.

Today, this park & ride lot is designated for use by MUSC students and employees and is served by internal MUSC shuttle routes and two CARTA routes. In the future, the proposed LCRT bus rapid transit project is proposed to terminate at the Hagood Park & Ride Lot with a station at Line Street near WestEdge Street. Additionally, the Regional Transit Framework Plan (RTFP) recommended five high-capacity transit (HCT) corridors, some of which were specifically envisioned to terminate in the Medical District. Finally, the proposed Downtown Network Concepts would also focus service at the LCRT end-of-line at the location of the Hagood Park & Ride Lot.

In the short-term, the Hagood Park & Ride would be maintained until such time as its redevelopment as a multi-modal hub is supported by transit volumes serving the site. The surface parking lot may ultimately be replaced by a parking garage with passenger facilities and transfer connections between HCT, CARTA, and MUSC routes, as well as an active transportation connection to the Ashley River Bicycle & Pedestrian Bridge. Planning and feasibility studies would be required to advance this location as a transit hub, dependent on advancement of solutions to the current tidal flooding issues associated with Gadsden Creek hampering bus operations in the area.

Figure 24 Post-LCRT Service at Future Transit Hub in WestEdge



First- and Last-Mile Transit Access

Every transit trip involves walking or biking to a stop or station. Accessible walking and bicycling infrastructure connecting bus stops to nearby destinations helps make transit safe and functional for everyone. Changes to the proposed transit network in Downtown Charleston will impact where safe, accessible routes will be most needed in the future.

This study reviewed the existing and proposed pedestrian and bicycle networks in Downtown Charleston and identified key gaps in the networks, focused on walking access within ½-mile of bus stops and bicycle access within 1 mile of bus stops. Almost the entire peninsula is within ½-mile of a bus stop, both today and in the proposed plan. Factors like the locations of future bus stops, transfer locations, and how future bus routes and bicycle facilities will jointly fit into the street network are key considerations.

Previous plans have recommended new or enhanced pedestrian and bicycle facilities Downtown, including the LCRT Transit-Oriented Development (TOD) Plan, LCRT Walking and Bicycling Access to Stations Memo, Lowcountry Lowline Plan, People Pedal Plan, and Walk Bike BCD. Recommendations from these plans will support access to future bus stops.

In addition to supporting the implementation of these previously proposed recommendations, first- and last-mile connections to support the proposed downtown transit network include:

- Add bus stops in locations to minimize walking distances to stops for neighborhoods where bus routes have been shifted to nearby main streets.
- Work with the City of Charleston to resolve competing needs for space where dedicated bicycle facilities are planned on narrow streets that will also serve future bus routes.
- As new bicycle facilities are designed, ensure the selected designs can accommodate 40' bus movements.
- Add new sidewalks identified as part of the LCRT TOD Plan, along with additional sidewalks to support access to bus stops beyond the LCRT corridor.
- Add or enhance crosswalks (all directions) and sidewalk ramps where needed at new bus stops (stop locations to be refined) and evaluate potential Rectangular Rapid Flashing Beacons (RRFB) or flooding solutions as needed.
- Consider adding more frequent mid-block pedestrian crossings on streets with long distances between marked crossings, especially near bus stops.
- Work with CSX to install ADA accessible pedestrian crossings over the railroad to improve access to transit for Bridgeview Village and a growing number of developments on the east side of Morrison Drive.

See the State of the System Report and the First/Last Mile Transit Access Analysis for more detailed information.

Figure 25 Proposed Sidewalks and Shared Use Paths (LCRT TOD Plan and Additional)

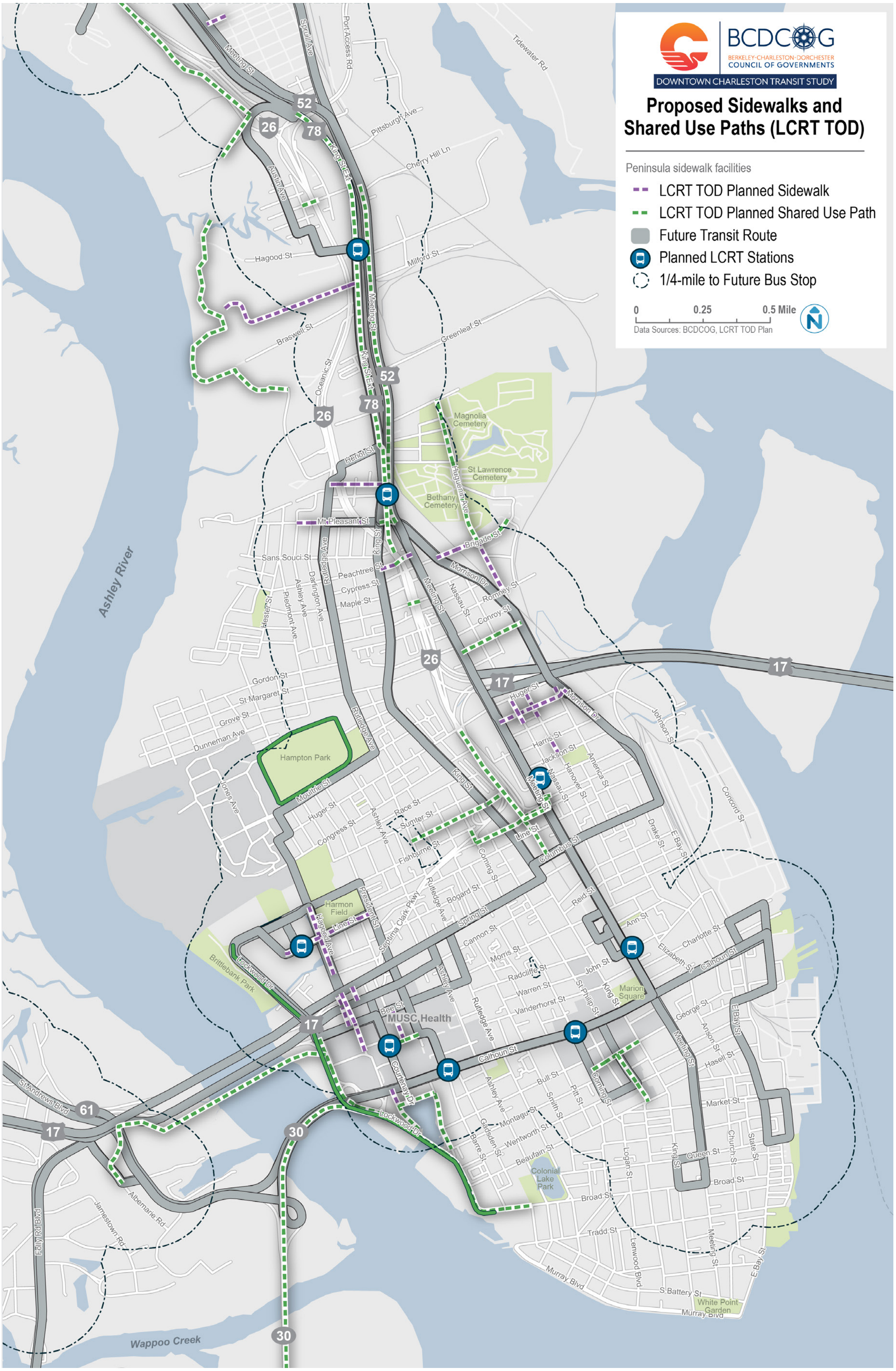


Figure 26 Potential Conflicts with Future Bus Routes and Future Bicycle Facilities

Bus Rapid Transit Running Ways Feasibility

LCRT is being designed as a 21.3-mile modern bus rapid transit (BRT) project designed to operate mostly in dedicated lanes, from Ladson, serving North Charleston, and connecting to the WestEdge development in Downtown Charleston. The RTFP identified additional priorities for high-capacity transit routes sharing at least a portion of the LCRT alignment on the peninsula. Thus, there will be needs for additional transit capacity on the peninsula as BRT expands.

Example of signed peak hour bus lanes

On the peninsula from the proposed Mt. Pleasant Street station to the southern end-of-line, LCRT planning and preliminary design stages evaluated center-running reversible transit lanes and side-running peak hour reversible lanes for LCRT. This alignment proposal was eliminated due to complexities in infrastructure and right-of-way (ROW) constraints. The current proposal for LCRT running ways on the peninsula is side-running BRT in mixed traffic, with Transit Signal Priority (TSP) at all signalized intersections.

The project team was asked to take a fresh look at options for BRT running ways on the peninsula that would deliver faster, more reliable, high quality, safe, and cost-effective services. Details of the assessment may be found in the Future BRT Running Ways deliverable. The team completed a high-level assessment of the prior LCRT alignment concept of dynamic reversible lanes, found significant potential operational issues, and proposed an alternative concept requiring less infrastructure investment. The alternative concept is signed peak hour bus lanes, also known as Business Access and Transit (BAT) lanes.

Following a preliminary traffic evaluation, the team identified certain segments on Meeting Street and Calhoun Street where signed peak hour bus lanes may be feasible to increase bus speed and reliability. A pilot project of signed peak hour bus lanes could be tested where traffic volumes are lower, using a minimal amount of roadway signage, striping, and proposed curbside station infrastructure

Pilot studies should be accompanied with before/after evaluations of bus travel time/ reliability and the effect on vehicle delay. Additional traffic and bus operational analyses should be conducted to better understand the benefits of signed peak hour bus lanes on a future BRT network that includes additional routes.

Figure 27 Potential Signed Peak Hour Bus Lane Locations

Dynamic Reversible Lanes vs. Peak Hour Bus Lanes Considerations

	Dynamic Reversible Lanes	Peak Hour Bus Lanes
Costs	• High upfront, unknown maintenance • Rollout must be done for larger segment	• Low, signage/striping • Rollout in partial segments is possible
Signage Required	• Interconnected overhead gantries (by block), plus potential signage	• Single sign on each block, plus optional pavement markings
Adaptability: Time of Day	• High: Instantaneous	• Medium: Signal decals
Adaptability: Infrastructure	• Medium: Can change block-by-block, but with increased complexity/safety risks • Bus lanes in future would require eliminating changeable lanes	• High: Can begin/end priority segments as needed, with signage • Could implement off-peak bus lanes in future
Safety Considerations	• Head on collisions: Driver and visitor familiarity with complex operations • Left turns in dedicated lanes	• Left turns in shared lane as existing
Sidewalk/ Overhead Clutter	• High: Gantries to be designed to wind load	• Medium: Additional signage


Z10 AQUARIUM
FREE SHUTTLE
FREE
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DASH
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Next Steps

The Downtown Charleston Transit Study provides a suite of recommendations will require administrative efforts, expanding partnerships, capital procurement, infrastructure development, community engagement and education, and operational service changes to successfully implement the study. In order to position CARTA for success, the next steps section provides several key implementation strategies for improving Downtown Charleston transit services.

Financial Planning

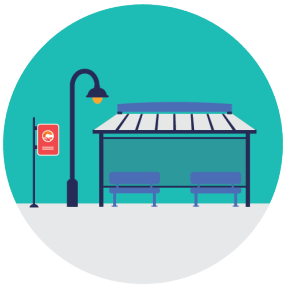
This Future Downtown Transit section report details the additional operating costs associated with the implementation of both the Pre-LCRT and Post-LCRT service recommendations. CARTA will need to identify and secure federal and local funding for the improvements and incorporate it into its annual budget. Additionally, funding must be incorporated into the Charleston Area Transportation Study (CHATS) Long-Range Transportation Plan (LRTP) and Transportation Improvement Program (TIP).

As noted in the Future Downtown Transit section, the existing fare-free routes rely heavily on funding contributions from partnerships with organizations such as colleges

and universities, downtown hotels, and other businesses/ organizations. The proposed changes to the DASH system present opportunities to strengthen existing partnerships and initiate new partnerships in Downtown Charleston.

Vehicle & Equipment Procurement

In addition to increases in operating costs, the proposed Pre-LCRT and Post-LCRT downtown service changes would require additional buses and associated equipment, including induction charging units for battery-electric buses. Adequate lead time would be critical for procurement of the vehicles and equipment. Typically, the time period required for the procurement, manufacture, and delivery of the buses ranges from 12 to 18 months.



Transit Supportive Infrastructure Development

The Transit Supportive Infrastructure section presents a high-level discussion of needs associated with downtown transit center facilities the existing Downtown Transit Center at the Visitor Center and for a future transit hub in the WestEdge/ Medical District. The process of development of major transit facilities will likely require the longest lead times of anywhere from three to five years including design, right-of-way acquisition (if required), and construction.

First- and last-mile connections to support the proposed downtown transit network would require extensive coordination efforts amongst multiple agencies and property owners. CARTA, the City of Charleston, SCDOT, and others would be involved with advancing active transportation improvements for pedestrians and bicyclists. A critical element will be bus stop siting and amenities directly associated with the service changes, as bus stops will need to be added, removed and in some cases, relocated. Bus shelter locations along modified routes will also need to be identified using the agency's Transit and Bus Stop Design Guidelines.

Service Planning & Scheduling

CARTA service planners, working with the contract operator, will need to refine the service plan recommendations based on input from the CARTA Board, stakeholders, and the public. While some of the proposed changes are limited to the immediate Study Area, other route recommendations extend well beyond the peninsula and will need to be examined wholistically. Ideally, these route changes would take place following a comprehensive operational analysis (COA) of the entire CARTA system.

Upon final approval of service plan recommendations through the required public involvement process for service changes and by the CARTA Board, scheduling and run cutting activities will need to be completed. These activities will take place shortly prior to the implementation of each service change.

Service Launch

A community-oriented service launch would focus on community education, with an emphasis on promoting planned changes through advertising and public meetings or rider training events.

Another key component of implementing transit service improvements is to complete transit wayfinding, a ride guide, website, and mobile app updates leading up to launching changes to service. Each of these components can build on each other for a successful implementation strategy.


PLEASE EXIT THROUGH BACK DOOR
EXIT DOOR
ARTA

Appendix

The following documents were created as part of the Downtown Charleston Transit Study and offer more information about the existing service conditions, community input, alternatives considered, and final recommendations. They are available on the project webpage at bcdcog.com/downtown-transit-study.

- State of the System Report
- Community Engagement Materials and Findings
- Transit Network Concepts
- Downtown Transfer Location Assessment
- First/Last Mile Transit Access Analysis
- Future BRT Running Ways

Additionally, individual maps of the proposed changes for each route in Downtown Charleston are shown on the following pages. No changes are proposed for Routes 31, 33, or 40. More detailed information about each proposed change is available in the Transit Network Concepts document.

Figure 28 Route 10 (Pre-LCRT)

Figure 29 Route 10 (Post-LCRT)

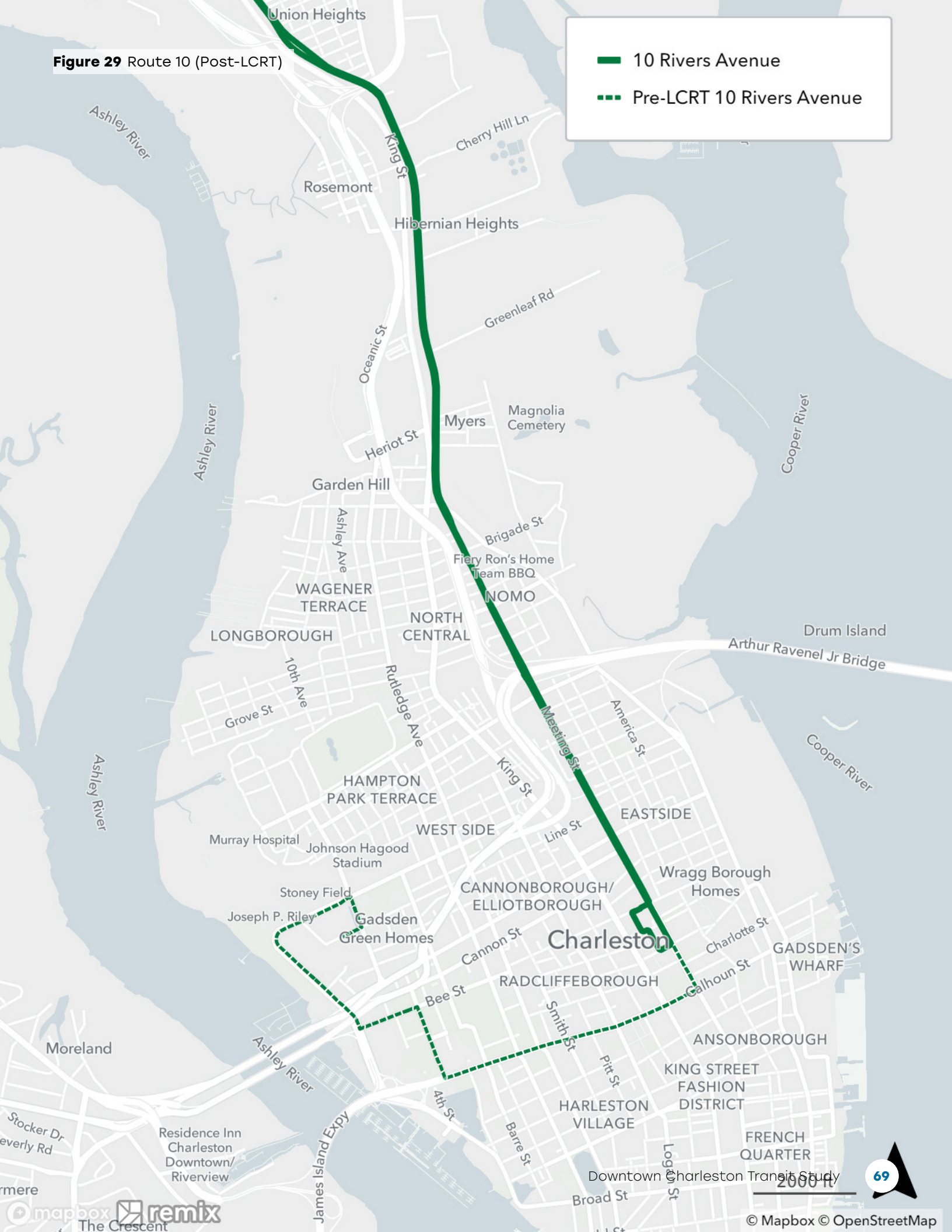


Figure 30 Route 11 (Pre-LCRT)

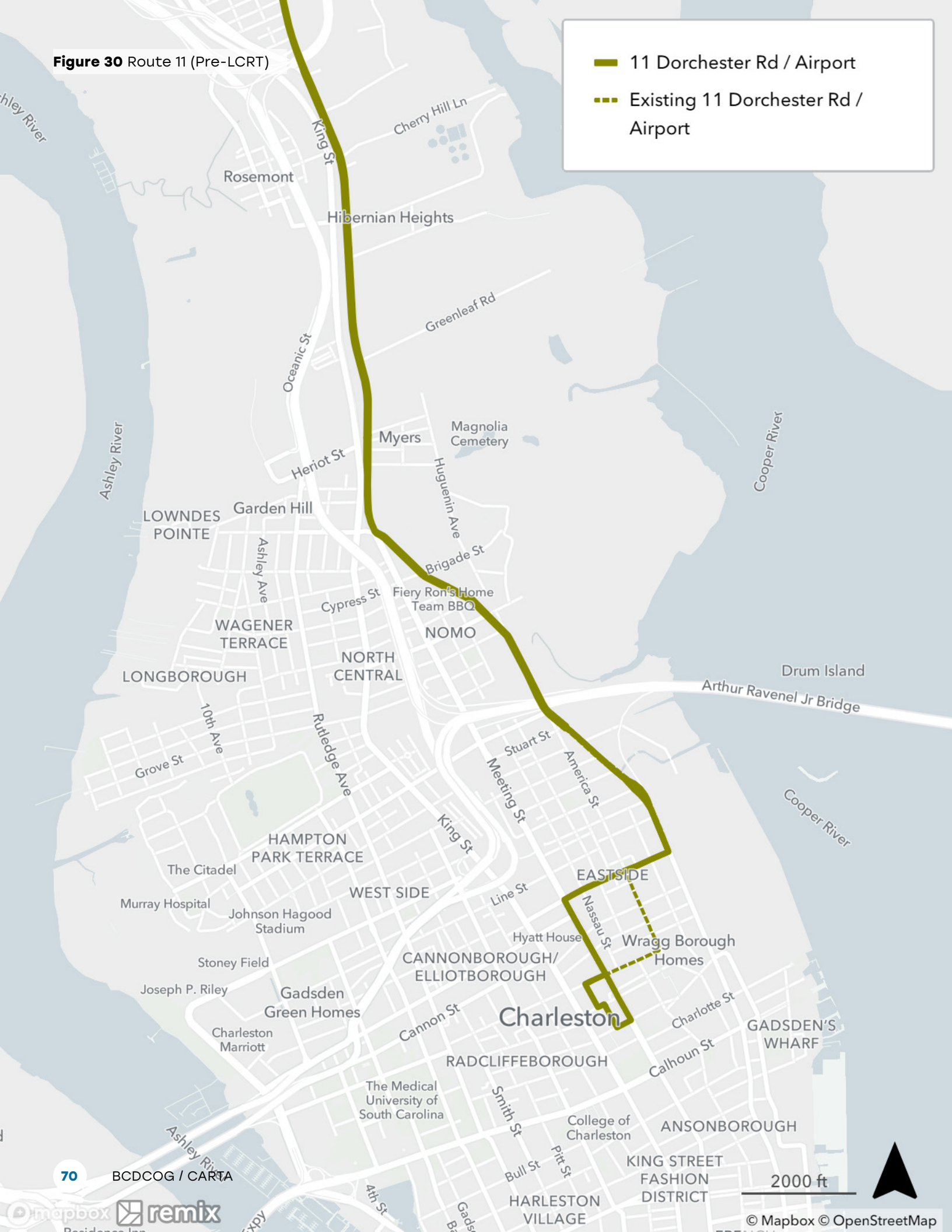


Figure 31 Route 30 (Pre-LCRT)

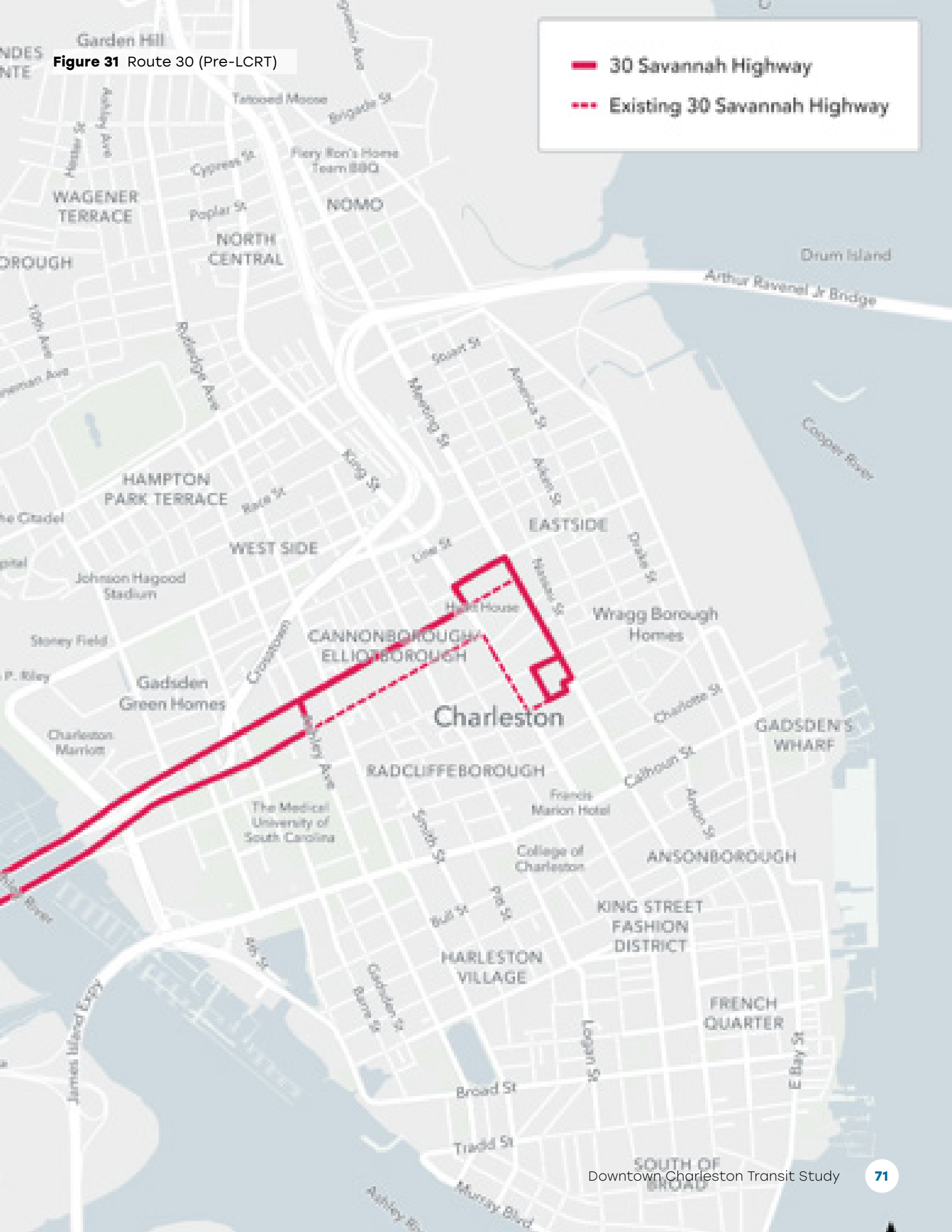


Figure 32 Route 41 (Pre-LCRT)

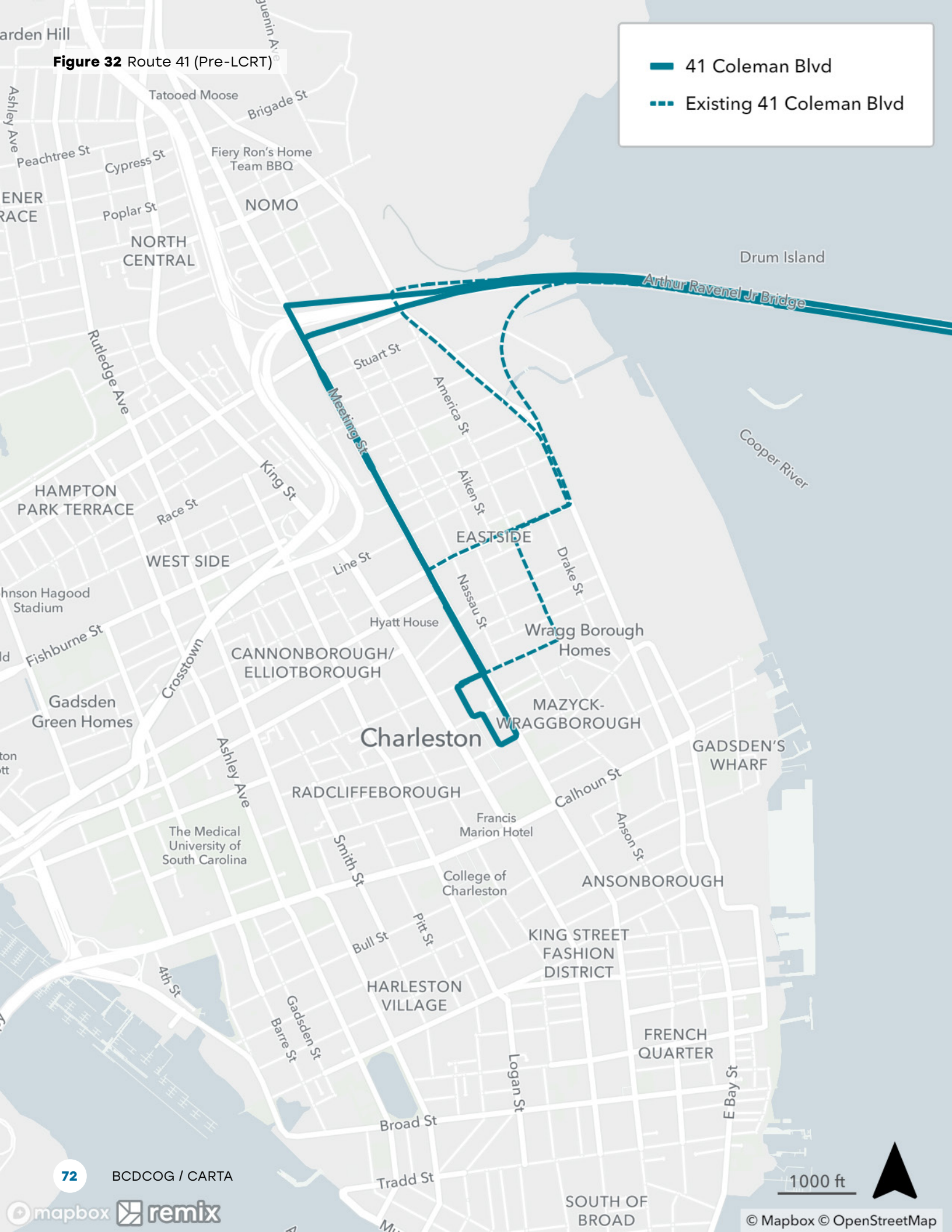


Figure 33 Route 102 (Pre-LCRT)

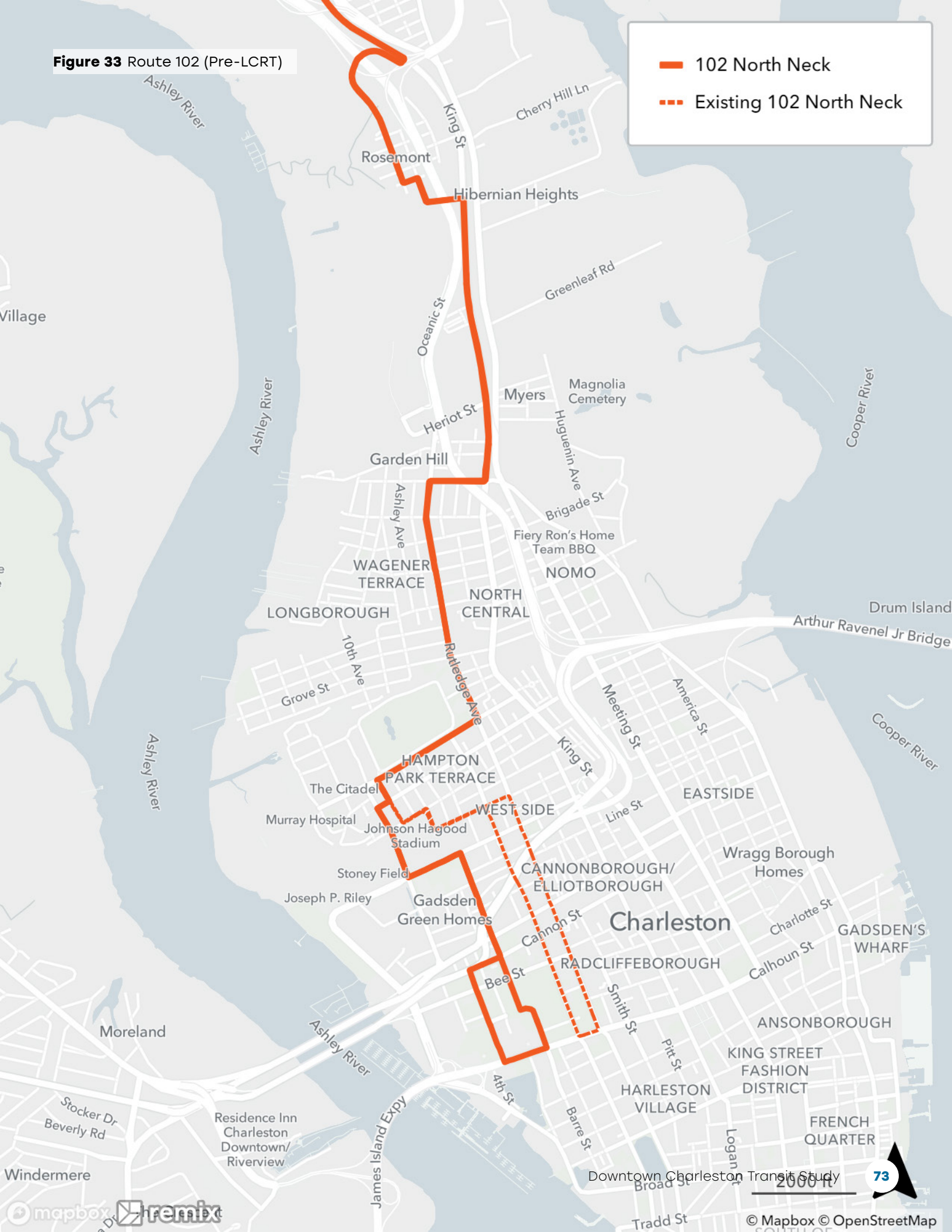


Figure 34 Route 102 (Post-LCRT)

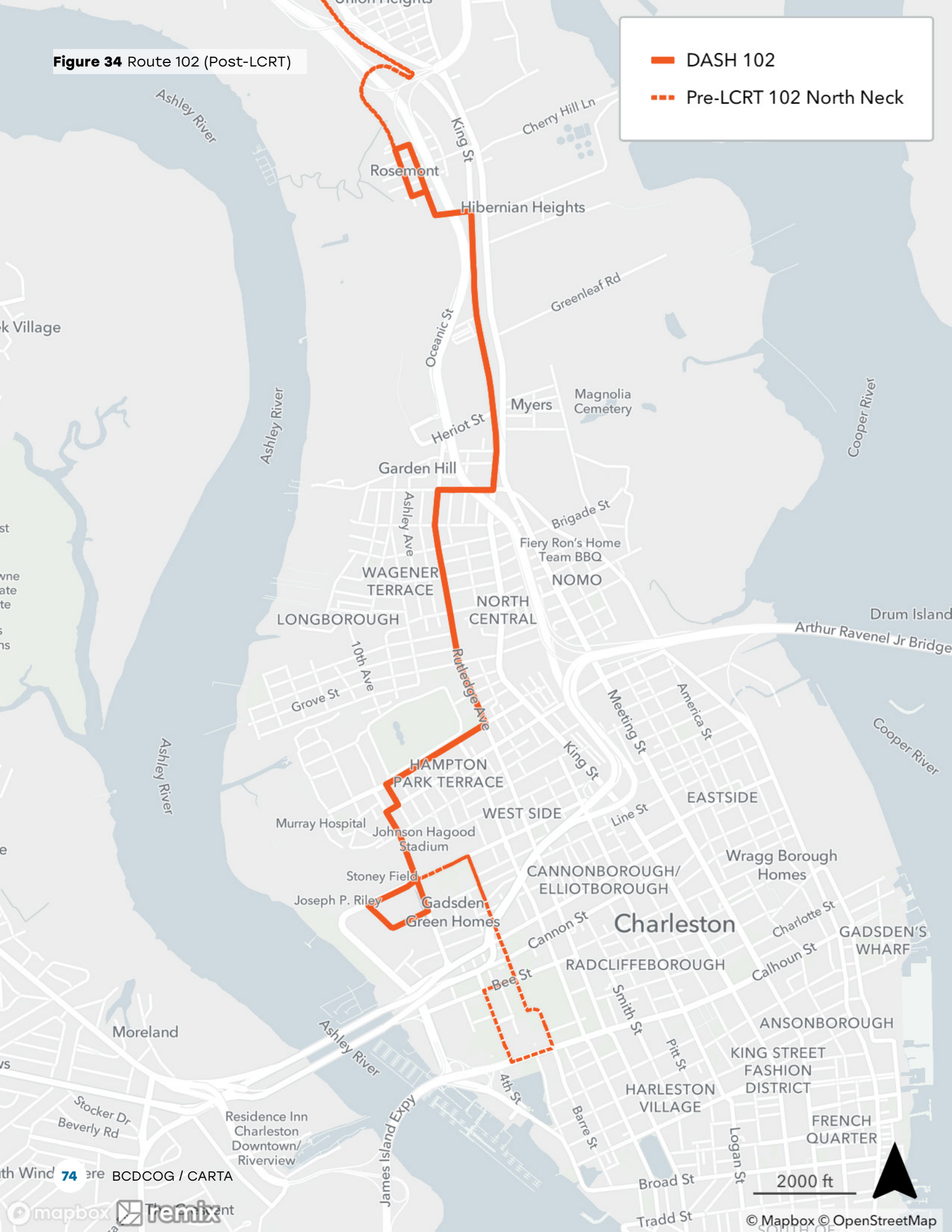


Figure 35 Route 203 (Post-LCRT)

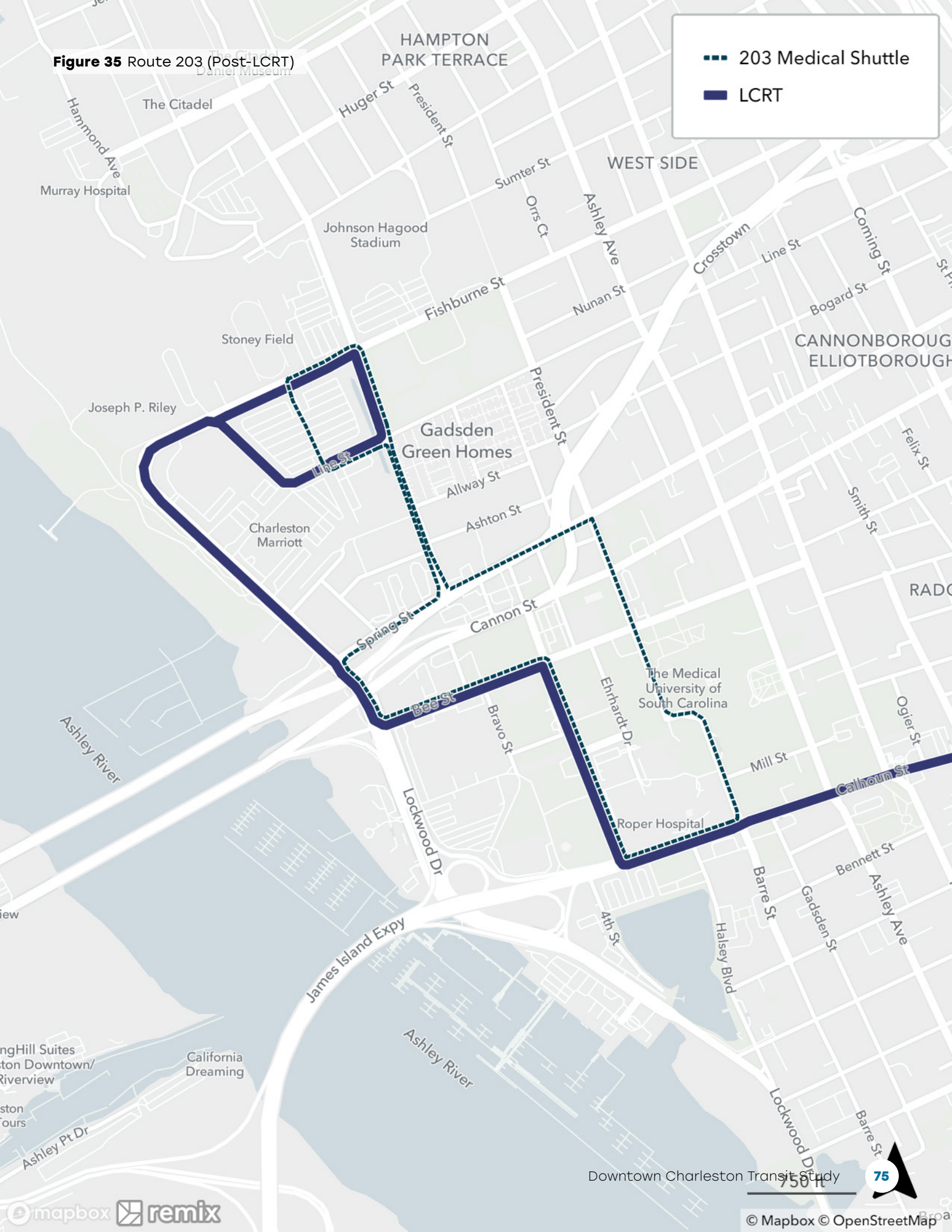


Figure 36 DASH 20 (Pre-LCRT)

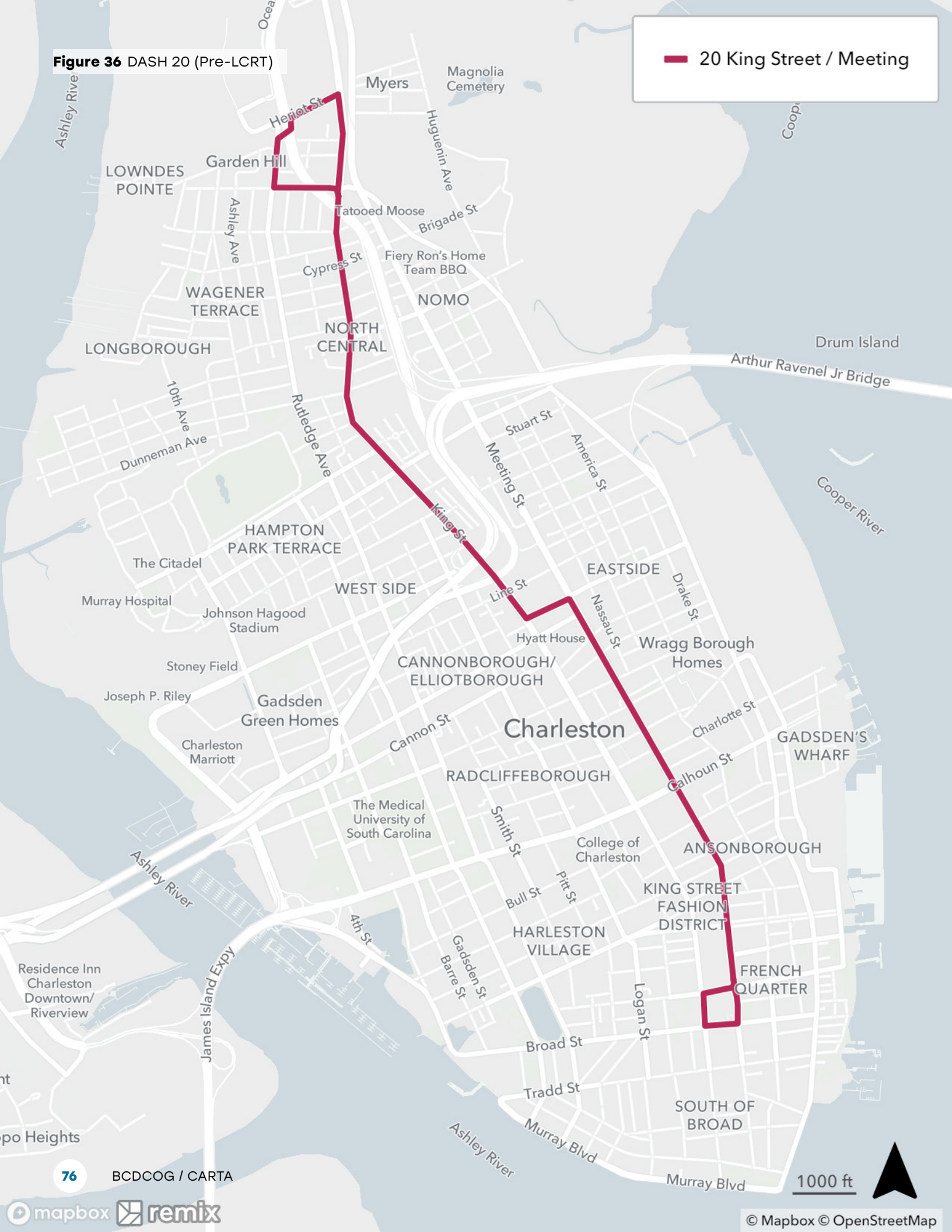


Figure 37 DASH 210 (Pre-LCRT)

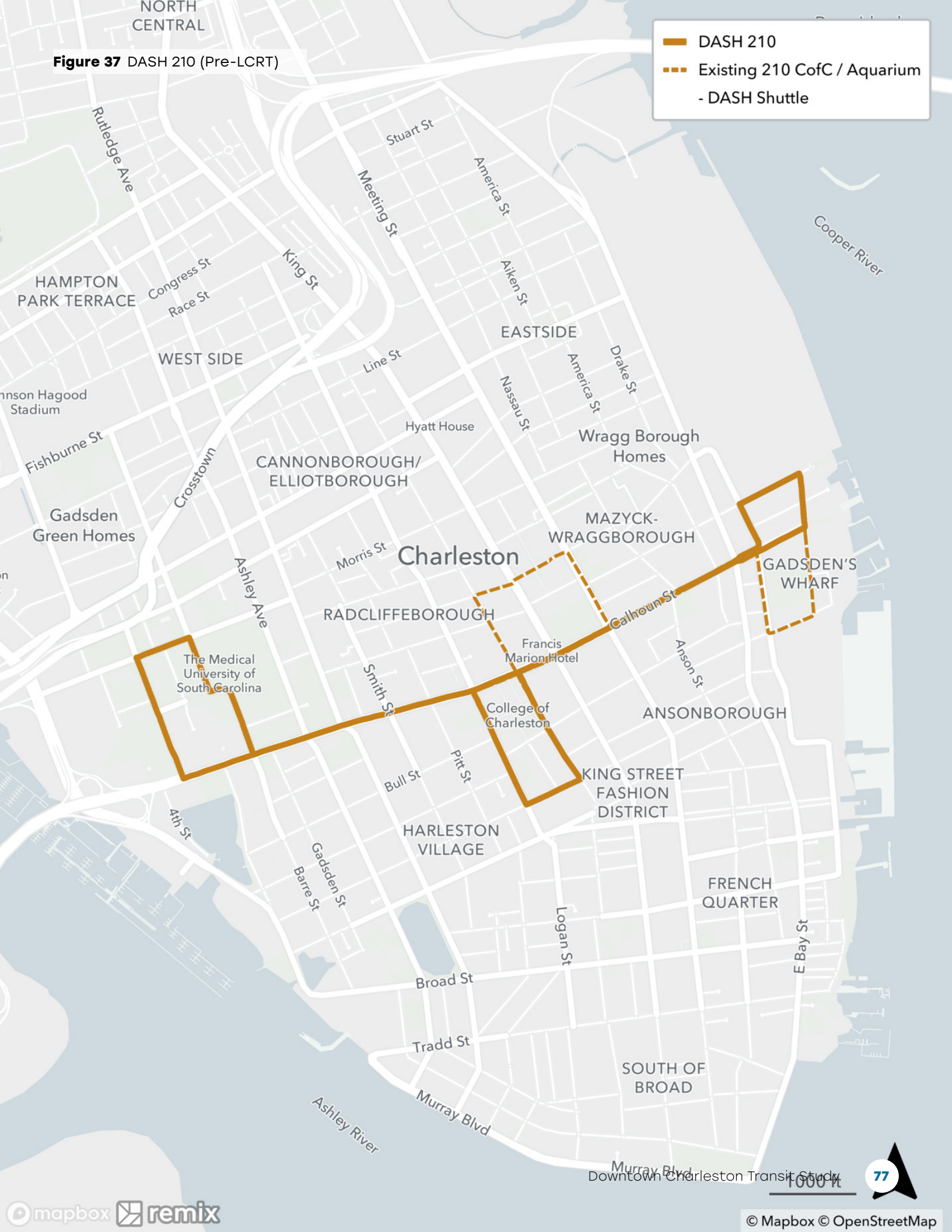


Figure 38 DASH 211 (Pre-LCRT)

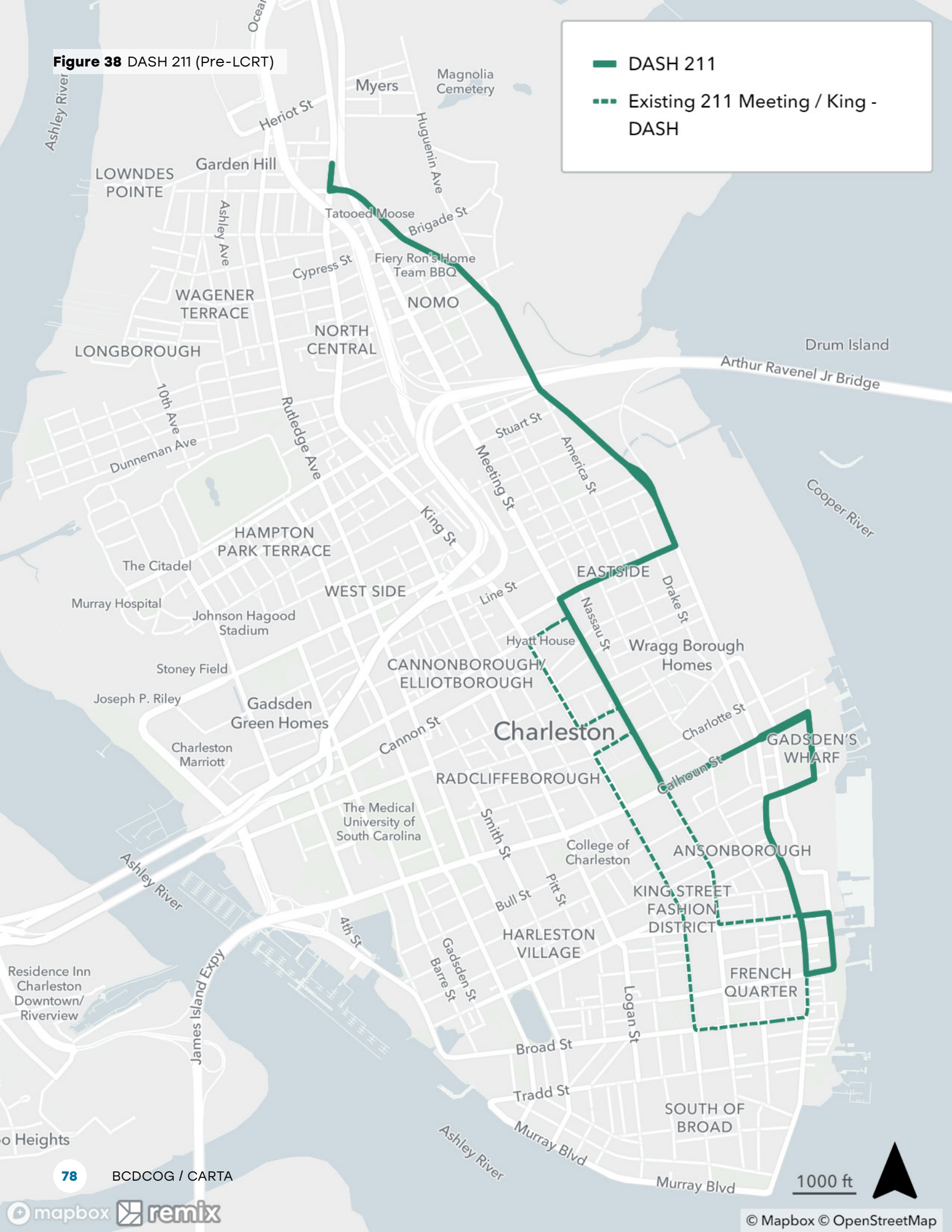


Figure 39 DASH 213 (Pre-LCRT)

Figure 40 VisitorsCenter(Post-LCRT)

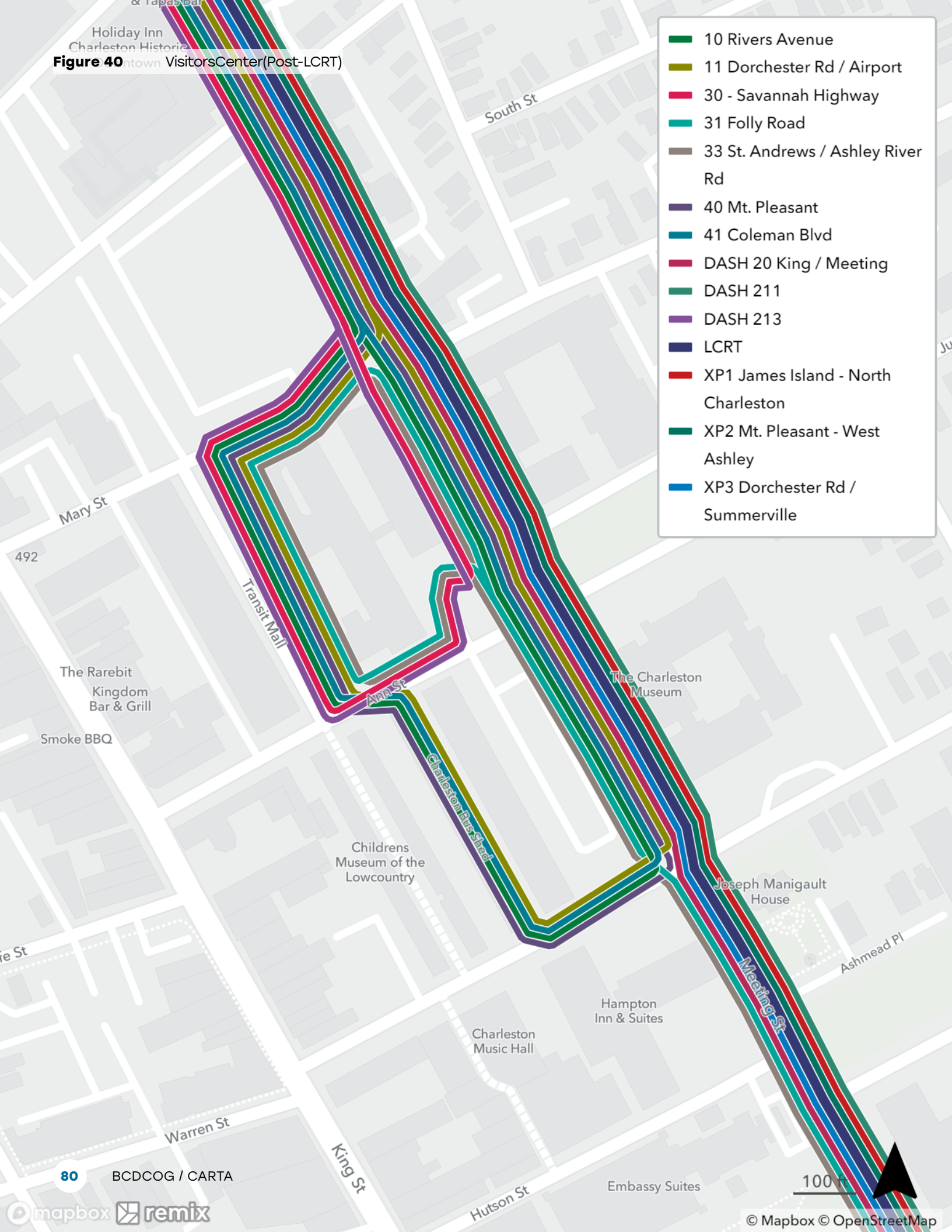
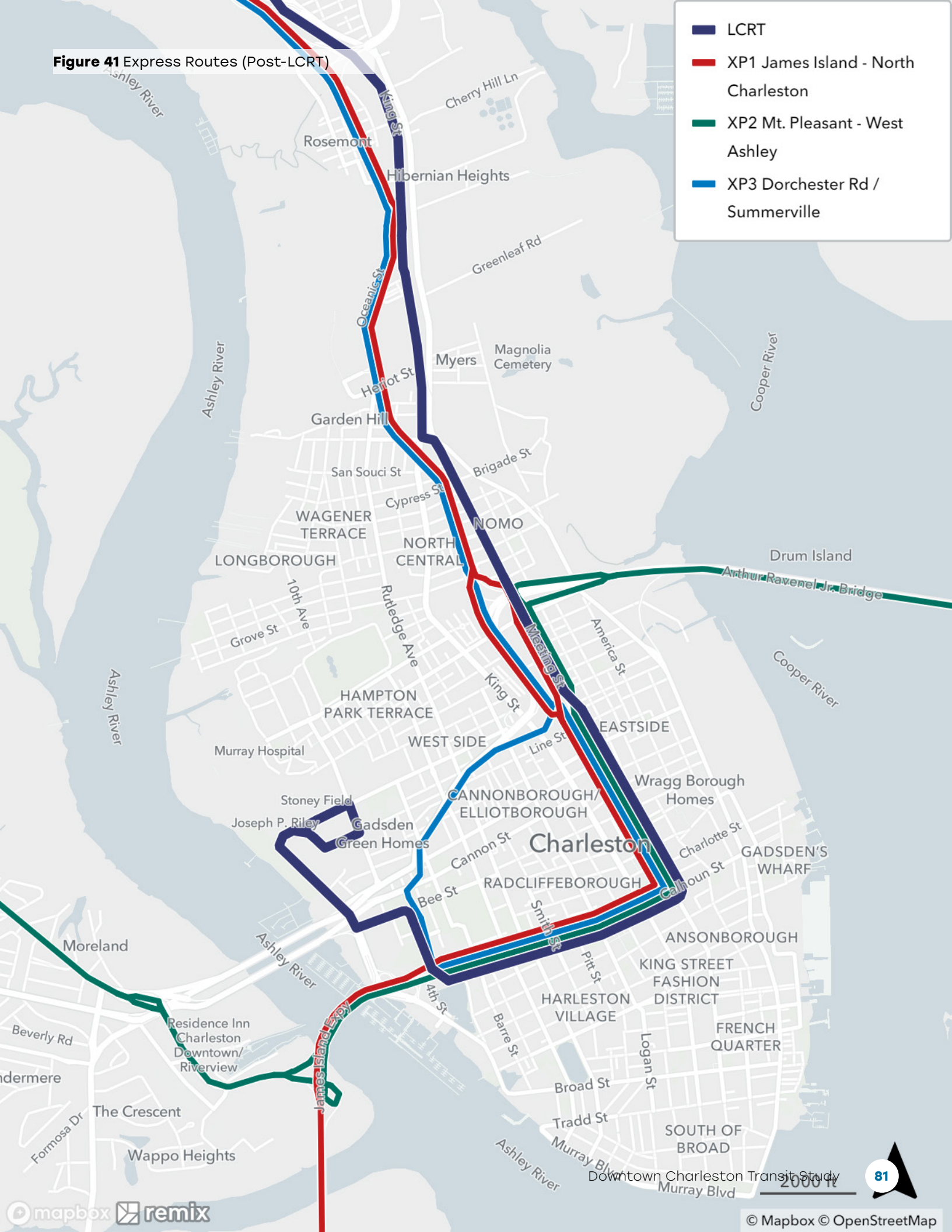


Figure 41 Express Routes (Post-LCRT)



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