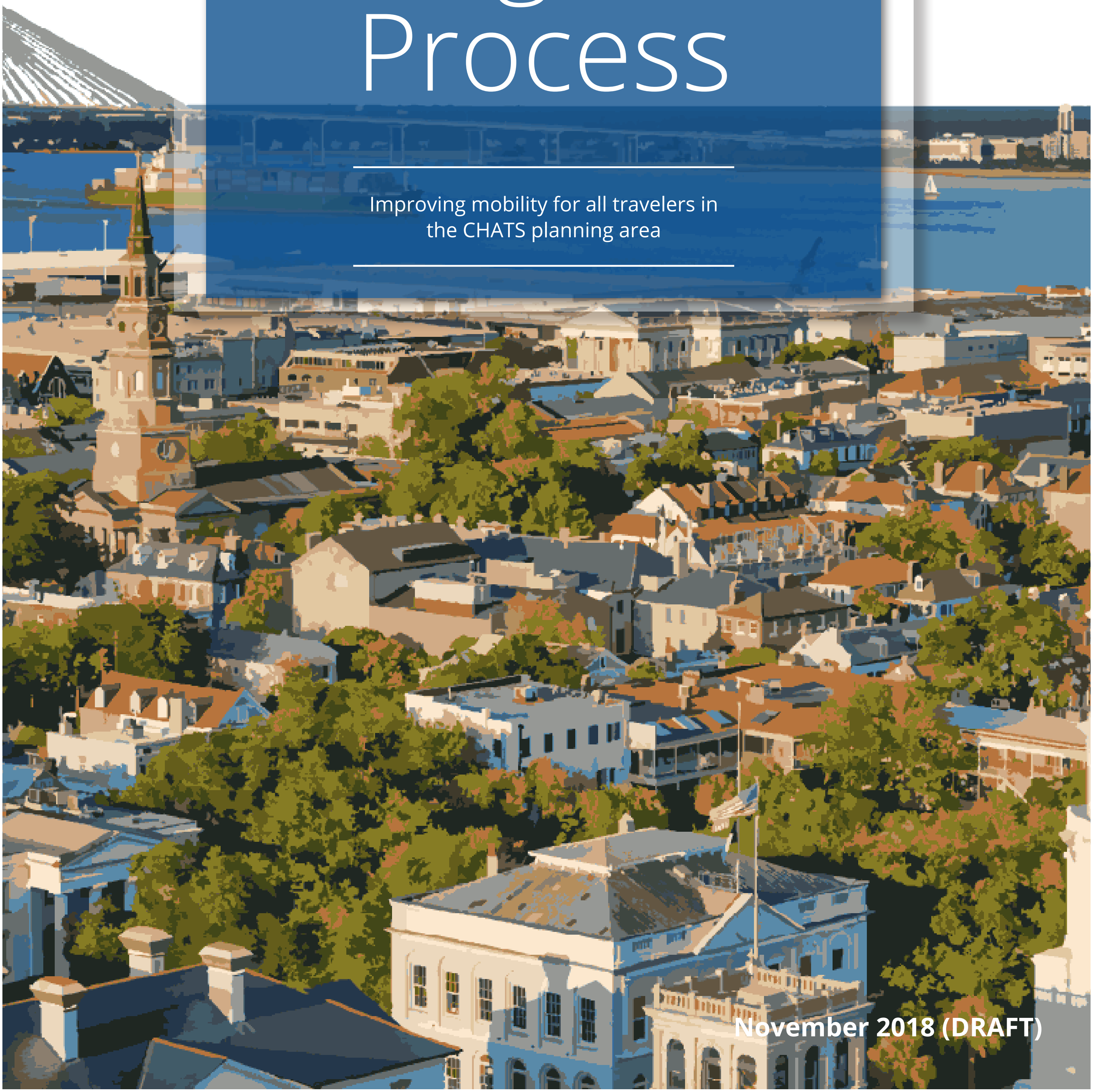
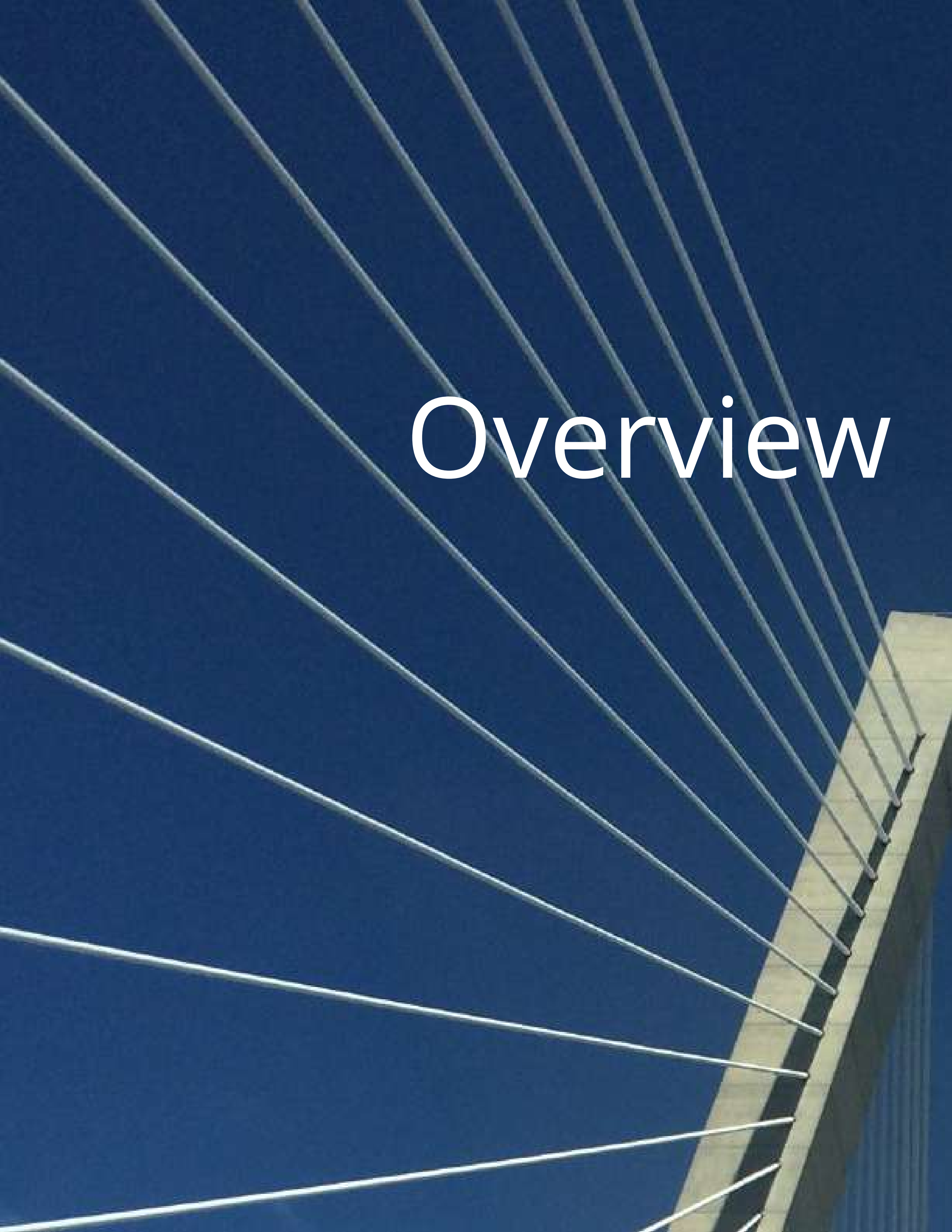
Congestion Management Process

Improving mobility for all travelers in the CHATS planning area



November 2018 (DRAFT)



Overview

The Quick Pitch

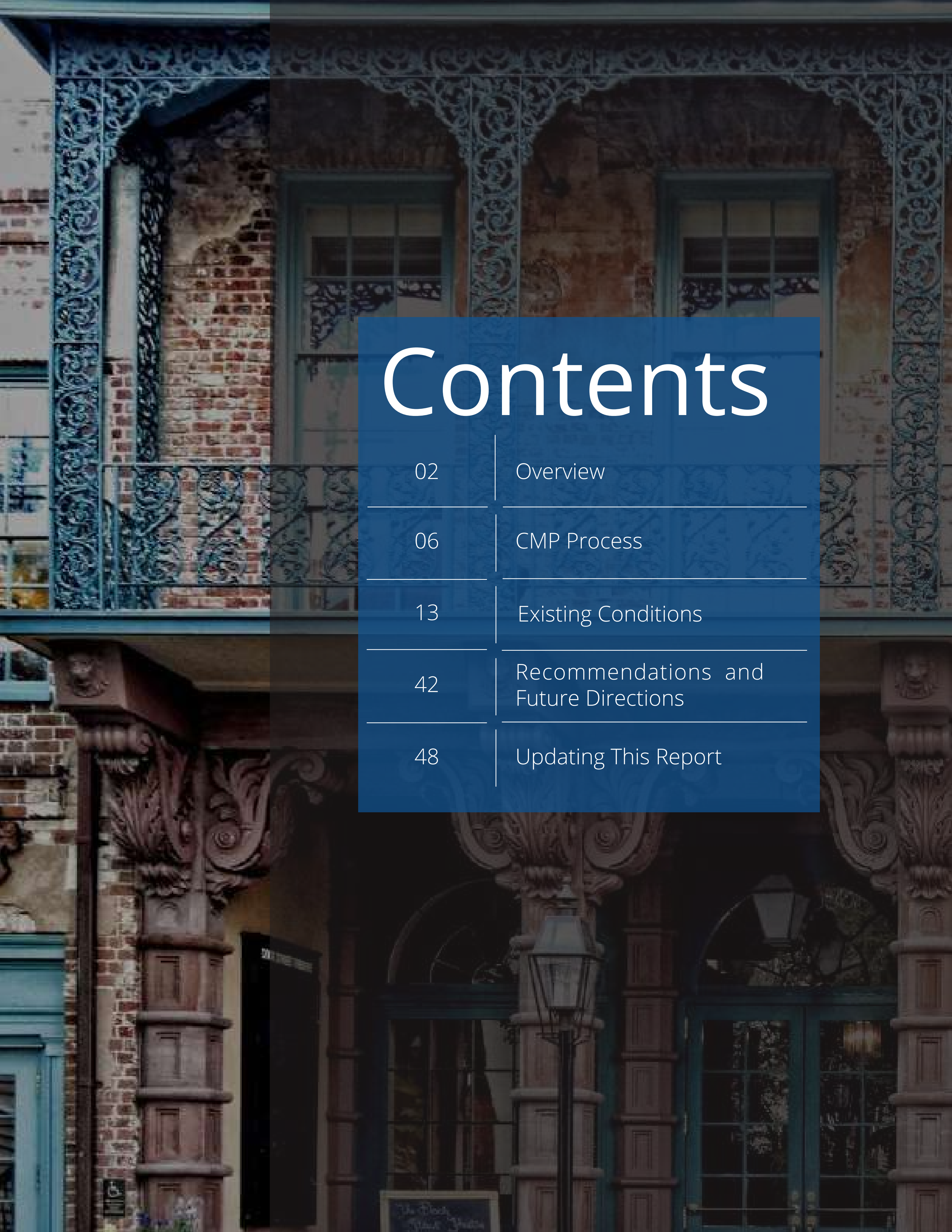
The Congestion Management Process, or CMP, is a federally required element of the long-range planning practice for the Charleston Area Transportation Study (CHATS) MPO area. It assesses conditions, identifies deficiencies, and suggests both actions and a monitoring schedule to evaluate the effectiveness of those actions.

Longer Description

The Berkeley-Charleston-Dorchester Council of Governments (BCDCOG), which serves as the Charleston Area Transportation Study Metropolitan Planning Organization (CHATS MPO), has created this report to help its citizens, elected officials, business partners, and other constituents gain access to an array of transportation performance information that otherwise would require many hours of sifting through detailed technical memoranda, databases, and other sources of information.

This report comprises the documentation for the CMP that large MPOs use to identify, evaluate, and monitor congestion-related issues. The importance of understanding the scope, duration and impact of transportation issues is hard to overstate, since these conditions impact business operations, daily travel, personal safety, availability of mobility options, and the delivery of goods and services in the region.

The major body of work necessary to produce this report comprised collecting, analyzing, and summarizing a tremendous amount of data from a variety of sources, some of which are created only through this planning process. Although it is a federal mandate to create and update the CMP, this process and product also accomplishes very practical objectives for the region, as addressed within this document.



Contents

Primary Purposes

Knowing the Current Conditions

The report helps decision makers and interested citizens understand what the data is saying about current and expected levels of congestion, crashes, transit performance, and quality of the biking and walking environments.

Balance of Clarity and Federal Compliance

While it's true that this document is being done to satisfy federal transportation requirements under 23 USC 134 (k) (3), this report is intentionally formatted in a way that lends itself to easy understanding.

Identifying Deficiencies

The Long-Range Transportation Plan (LRTP) builds on the CMP by recommending specific improvements intended to address system deficiencies.

Making Certain of Progress

The monitoring requirement of a CMP is crucial to understanding trends and effectiveness of solutions that have been applied to congestion, safety, and other transportation concerns.

cmp process

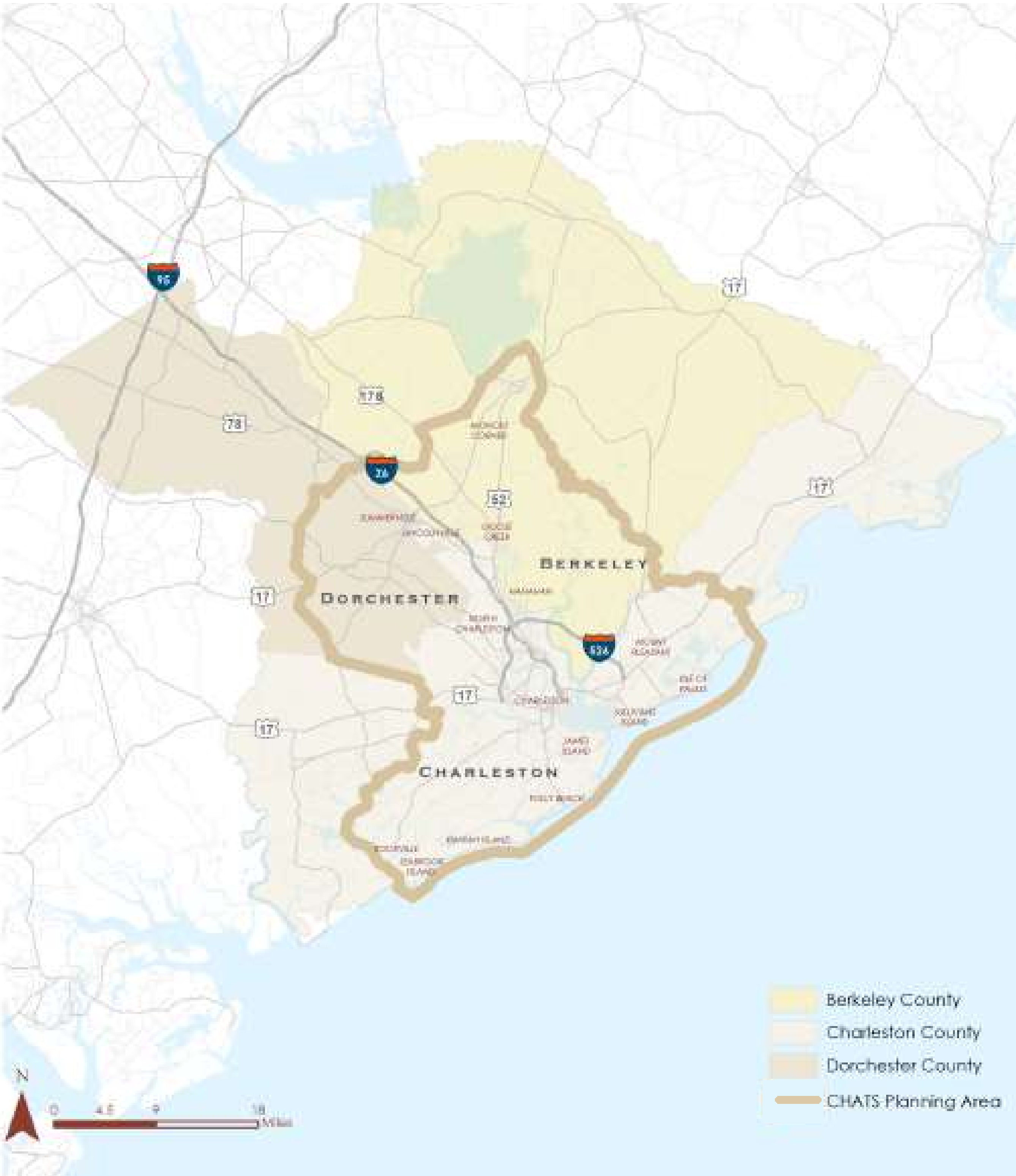
The CMP has been defined by the Federal Highway Administration (FHWA) of the US Department of Transportation (USDOT) as a systematic and regionally accepted approach for managing congestion. It provides accurate, up-to-date information on transportation system performance and assesses alternative strategies for congestion management that meet state and local needs, and is intended to advance the strategies towards implementation. This report is a companion to the long-range transportation plan, which goes into more detail on the choice of projects, financing, and public / stakeholder engagement.

FHWA updated its Congestion Management Guidebook in 2011 organized around eight steps that comprise a valid and useful congestion management process, with the evaluation stage feeding back into the assessment of performance in subsequent updates (see Figure 1).

Federal guidance recommends that a variety of transportation characteristics be taken into account in the CMP. Best practices indicate a CMP should consider factors such as partnerships, community livability, individual corridor conditions, and multimodal measures. The CMP is required to consider "reasonable" demand management and operations strategies for a corridor in which single-occupant vehicle (SOV) capacity increases are projected. In these regards, the CMP is not effective if it becomes a stand-alone process and document; it has to be a part of the decision-making process.

Figure 1: Congestion Management Process and Relationship to the Long-Range Transportation Plan (LRTP)

Charleston Area Transportation Study (CHATS) Planning Area



The Berkeley-Charleston-Dorchester Council of Governments (BCDCOG) serves as the Charleston Area Transportation Study (CHATS) Metropolitan Planning Organization (MPO) and is responsible for creating a comprehensive plan for the CHATS planning area. The 640,280 acre region includes cities, towns, suburban communities, and rural areas across three counties.

CMP STEPS

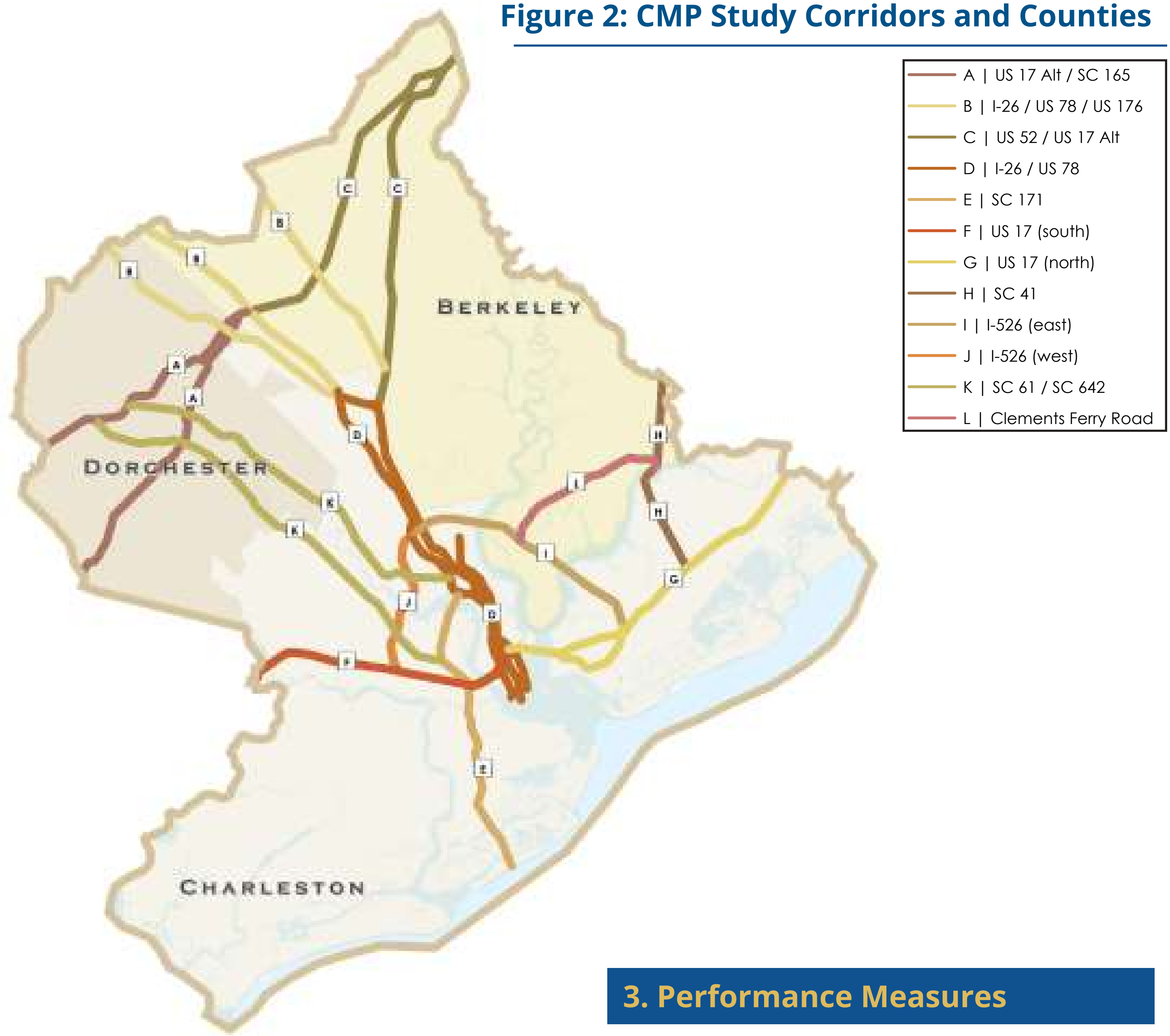
1. Develop Objectives

As with any performance-based process, the best objectives are those that are easy to understand, realistic to achieve in a selected time period, and whose progress is easily measured.

The list of objectives used in the CMP is derived from the CHATS long-range transportation plan. These objectives deal with congestion-related measures organized into overarching goals to increase clarity and strengthen the vision of the community. Partnering organizations and the public helped to shape the goals and objectives of both the LRTP and the CMP through the engagement process.

- Step 1. Develop Objectives
- Step 2. Define Study Areas
- Step 3. Performance Measures
- Step 4. Collect and Monitor Data
- Step 5. Evaluation of Problems
- Step 6. Selection of Strategies
- Step 7. Program & Implement
- Step 8. Evaluate Strategies

Figure 2: CMP Study Corridors and Counties



2. Define Study Areas

The CHATS planning area encompasses portions of three counties; 1,027 square miles; and 4,574 miles of roadway, comprising approximately 35% of the land area in the tri-county region. By honing the focus of the CMP to more refined areas like counties and corridors, the relevancy and precision of the CMP are greatly increased.

Figure 2 illustrates the corridors (which may include more than one road) and counties defined for special study in the CMP.

3. Performance Measures

Performance measures have to be relevant to the objectives of the community and replicable for future updates of the CMP. Measures should use data that is readily available or easily acquired, and provide meaningful descriptions of how well the area is meeting its goals.

The next page illustrates all of the goals and measures defined by the MPO. Additional data explored later in this document provides further descriptions of the area's performance, but the following measures are the ones used to describe how well the region progresses towards meeting its transportation objectives.

goals & performance measures

The CMP objectives are aligned with and advance the goals of the LRTP as it relates to improving the efficiency and operation of the transportation system. Performance measures have to be relevant to the objectives of the community and replicable for future updates of the CMP. Measures should use data that is readily available or easily acquired, and provide meaningful descriptions of how well the area is meeting its goals as it relates to congestion. Performance measures identified in the CMP are consistent with the CHATS 2040 LRTP and are aligned with MAP-21/FAST Act national transportation goal areas and associated state and federally-designated performance measures required for system monitoring where applicable.

Although the CMP explores and describes the performance of the area's transportation system through multiple data sources and measures, the following provides a summary of the major goal areas, objectives and select performance measures proposed for use to quantify, monitor and evaluate the performance of CMP strategies on implementation of LRTP projects, and the overall advancement of the CHATS area goals.

Goal 1: Improve the safety of the current transportation network for all users.

Objectives:

- Identify the top 10 locations that have an unacceptably high crash rate, and propose countermeasures to mitigate them.
- Reduce the number and rate of crashes, fatalities, and serious injuries on the system.

Performance measures and anticipated outcomes:

- Reduce the number of crashes.
- Reduce the number and rate of fatalities (per million VMT).
- Reduce the number and rate of serious injuries (per million VMT).
- Reduce the number of non-motorized fatalities and serious injuries.

Goal 2: Improve travel mobility by addressing congestion in primary commuter corridors.

Objectives:

- Reduce travel times on major corridors.
- Maintain and/or expand the distance to areas accessible to employment centers with a typical 30-minute commute.
- Support multi-modal accessibility and travel mobility for system users.
- Adopt and apply access management strategies along congested corridors to improve safety and increase capacity.

Performance measures and anticipated outcomes:

- Reduce vehicular delay on auto and transit priority corridors.
- Decrease the ratio of transit-to-auto travel times in priority transit corridors.
- Increase the linear miles of pedestrian/bicycle infrastructure within ½ mile of transit.
- Increase the miles of major roadways/corridors designed to employ access management strategies.

Goal 3: Improve the reliability of the regional transportation network and promote efficient system management and operations.

Objectives:

- Reduce delays from reoccurring congestion on corridors.
- Improve transit reliability.
- Improve reliability of the freight network.

1. SAFETY

Safety impacts not only health and quality of life, but it deeply impacts congestion on many roadways.

2. MOBILITY

Mobility is at the core of transportation viability, impacting the livability of regions, cities, towns, and neighborhoods.

3. RELIABILITY

People and freight movers value the reliability of their trips very highly, and unexpected delays cost time and money.

4. COMMUNITY

The CHATS planning area has a wealth of historic and natural resources that make it unique. Transportation construction, operations, and maintenance have to respect these unique areas that contribute to a sense of place.

5. COORDINATION/ BEST PRACTICES

Program actions and policies may have the biggest long-term impact on how well the transportation system performs.

Performance measures and anticipated outcomes:

- Decrease the percent of system operating at or below a LOS 'D'.
- Maintain or improve transit on-time performance.
- Increase the percent of reliable person-miles traveled on the Interstate and non-Interstate NHS.
- Decrease travel time on primary freight corridors.
- Reduce the Buffer Time Index.

Goal 4: Promote more livable and economically vibrant communities through application of congestion management strategies that encourage alternative travel options and connectivity between modes, and improve access to employment centers.

Objectives:

- Enhance transit services, amenities, and facilities.
- Increase population and job/employment access to transit.
- Improve the walkability and bikeability of the area.
- Implement a Complete Street policy where appropriate.

Performance measures and anticipated outcomes:

- Increase the mode share for non-auto commuters.
- Increase the population and jobs/employment density within ½ mile of transit services.
- Increase the number of transit trips per vehicle revenue hour.
- Increase the number of transit trips per vehicle revenue mile.
- Implement improvements/increase linear miles in the area's pedestrian and bicycle network.
- Increase the proportion of system miles improved in accord with adopted Complete Streets policy.

Goal 5: Ensure that the transportation planning process contemplates local land use plans, engages partner agencies, and employs best practices where possible.

Objectives:

- Engage typically under-engaged groups such as emergency response and freight movement stakeholders during development of the LRTP and other planning processes.
- Plan for and address transportation system impacts when considering new developments.
- Partner with and/or provide funding to at least one safety, education, enforcement or encouragement program to improve bicycling and walking skills, safety, and/or the number of non-motorized users.

4. Collect & Monitor Data

BCDCOG / CHATS, SCDOT, and third-party providers like the Texas Transportation Institute and Google/INRIX provided the bulk of the data used in this report. Specialized data sets, such as crashes and forecasted travel demand, were also obtained specifically for this report.

5. Evaluation of Problems

Using the data collected as well as public input provided during the early stages of the long-range transportation plan update process (surveys, public meetings, and focus group discussions), specific concerns were identified in each of the study areas (counties) and corridors.

6. Selection of Strategies

Potential strategies were identified in each of the transportation corridors that fit both the physical context of the roadway (e.g., freeway, arterial, or minor) and its function. Broader strategies as well as strategies that emphasize local "hot spots" were identified to allow for programming solutions at a variety of costs and time frames.

7. Program and Implement

The CHATS Metropolitan Planning Organization, like other MPOs, is responsible for producing a financially constrained, long-range transportation plan every five years. The CMP "feeds" into this long-term process, and also identifies shorter-term (e.g., five years or less) solutions that can be undertaken by local governments and their partners in the public and private sectors.

8. Evaluate Strategies

Future iterations of this report will need to compare the data contained in this version with any data sets that have been updated. The content of the report will have to be modified to accommodate comparisons across time to help relay an understanding of how the measures are being implemented and if they are effective in addressing the concerns expressed by the community and contained in this report.

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existing conditions

This section of the report provides a snapshot of transportation conditions and performance in the planning area, which covers the urbanized portions of Berkeley, Charleston, and Dorchester Counties. Throughout the CMP planning process, data has been collected and analyzed to assess transportation conditions for automobile, public transportation, and bicycle-pedestrian modes. The purpose of the existing conditions analysis is to summarize and present this data, which is used to inform CMP strategies and program recommendations, through a series of graphics and maps that will help visualize system performance. More detailed information on the methods and sources used in this section can be found in the "Updating This Report" section at the end of this report.

What do the numbers say?

While we each have a unique personal experience of our transportation system, larger scale data collected by third-party sources can be a useful tool for understanding the bigger picture. In this section, data from a variety of sources is used to better examine transportation in the CHATS planning area in terms of travel delay, congestion costs, mobility, and walkability.

What do the people say?

An important part of this study was understanding how people living and working in the region perceive and use the transportation system. This section uses the results of extensive public outreach efforts, including public meetings, surveys, and online mapping, to see how the people of the CHATS planning area think the transportation system is doing.

Roadway Conditions

Roadways serve as the principal arteries for transportation in the region. This section takes a closer look at congestion and delay on the region's roadways, focusing primarily on 12 key corridors in the region.

Bicycle, Pedestrian, and Transit Conditions

Alternatives to the automobile provide accessibility and mobility options for people throughout the CHATS planning area. This section describes transit, bicycle, and pedestrian systems' performance in terms of coverage, travel times, and connectivity.

Map Book

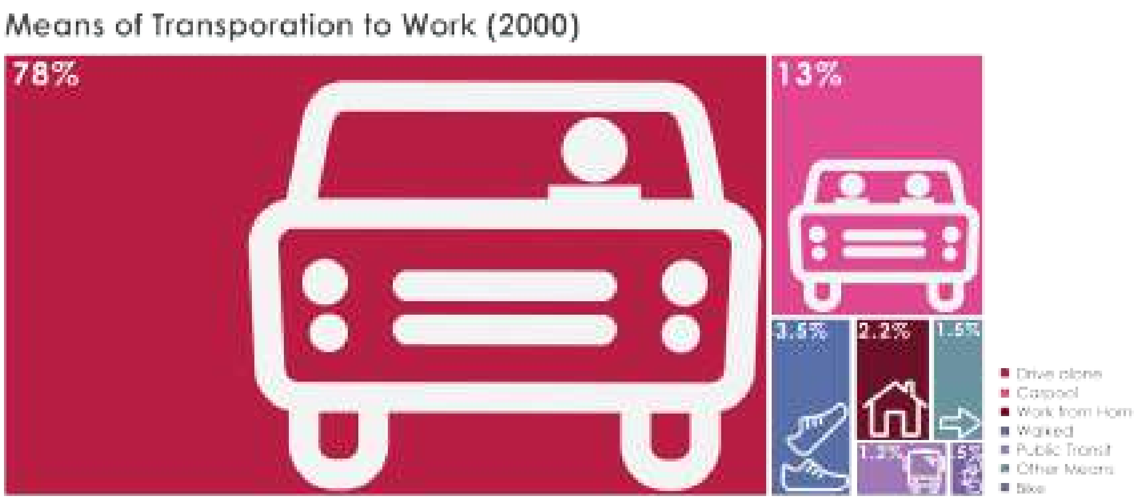
The map book included at the end of the section provides in-depth spatial analysis of transportation considerations, including congestion, safety, and environmental justice. These maps make use of different scales of geography, including the region, sub-areas, and corridors to identify hot-spots and areas of focus for the plan.

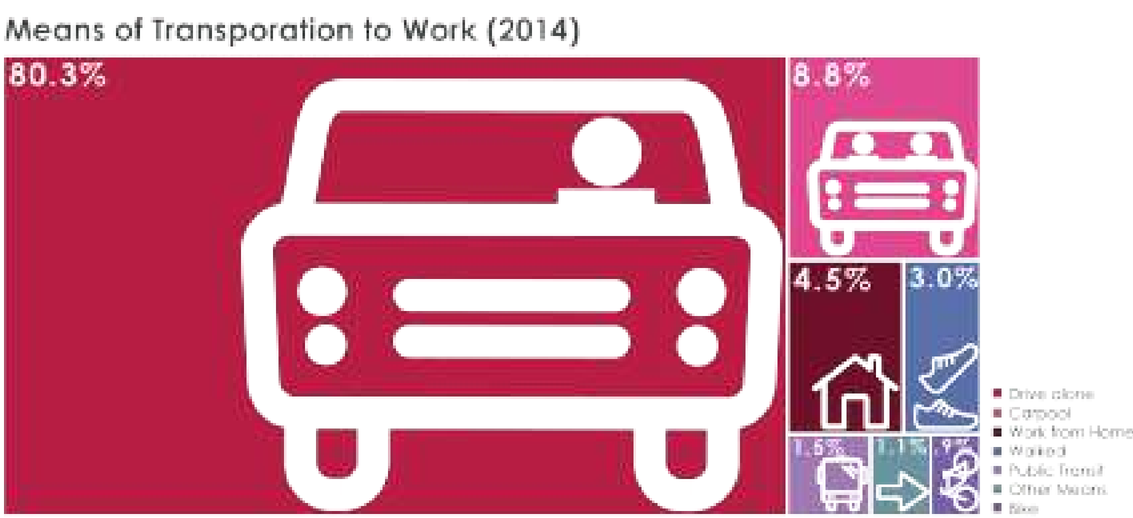
WHAT DO THE NUMBERS SAY?

There are numerous data sources that provide insight into travel patterns and trends in the CHATS planning area. This section of the report highlights what the data says about transportation in the CHATS area.

How do we move? Data from the American Community Survey (ACS) paints a picture of travel in the region: the CHATS area is very car-dependent, and has become even more so over time. In 2014, over 80% of commuters drove alone to work, a little more than the 77% found across the United States. However, commuting patterns in the region are changing. From 2000 to 2014, there was a drop in the percentage of commuters carpooling to work, but a noticeable increase in the percentage of commuters working from home or telecommuting.

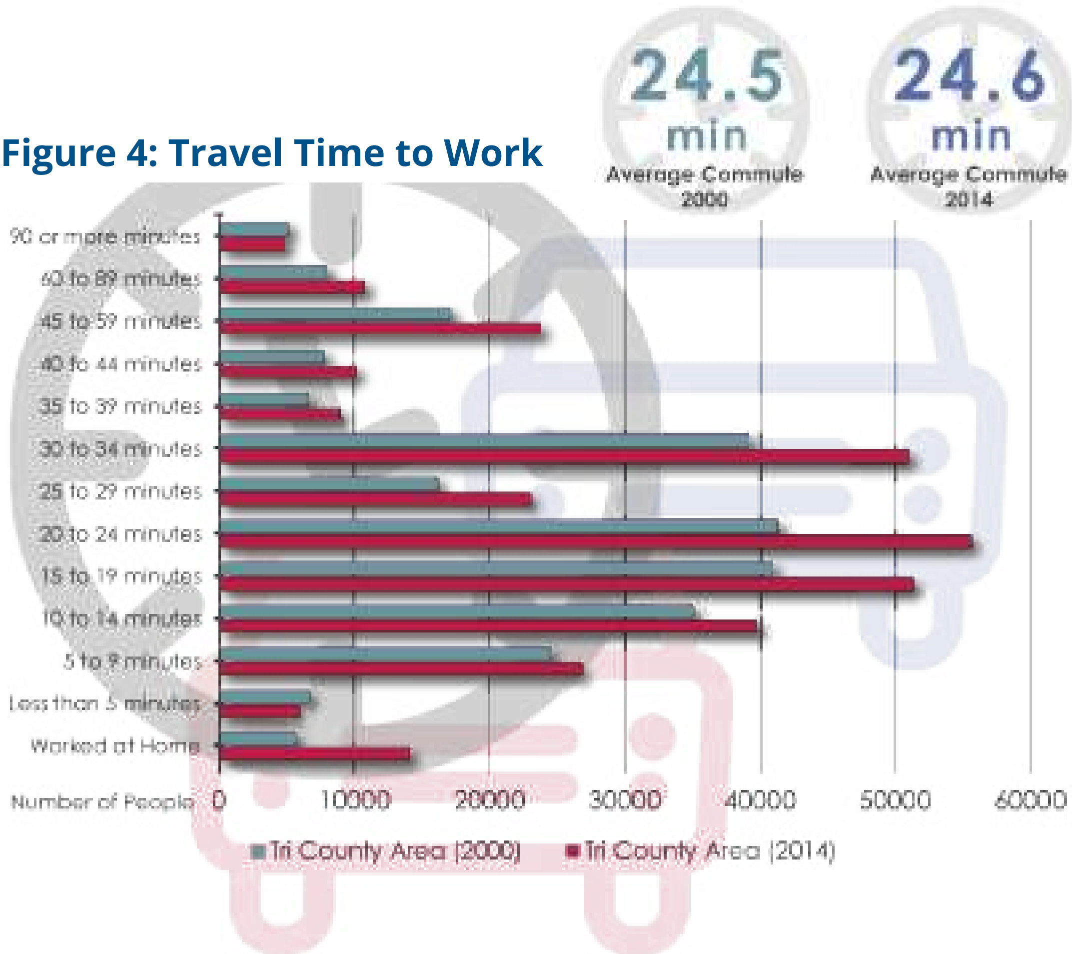
Figure 3: Means of Transportation to Work 2000 and 2014 Comparison





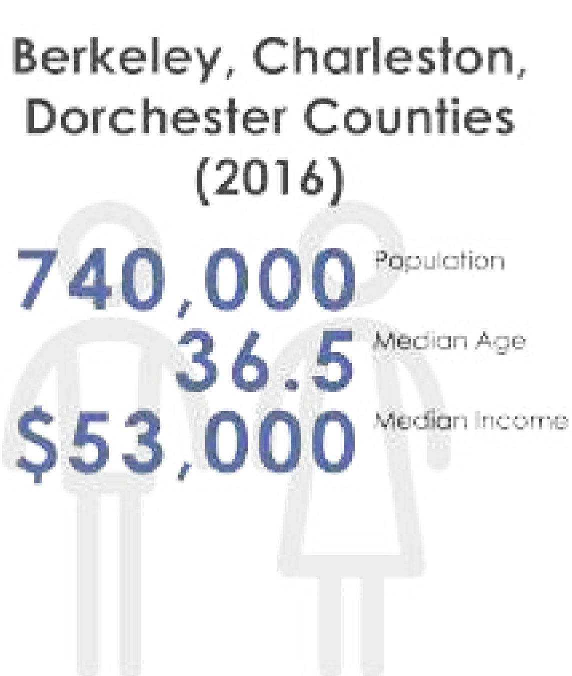
How long does it take? According to ACS data, average commute times in the CHATS planning area have risen slightly from 2000 to 2014. Again, we can see that working from home is becoming a more prevalent employment option for many in the area. The only trip length where the real number of commuters trended downward was the shortest, less than five minutes.

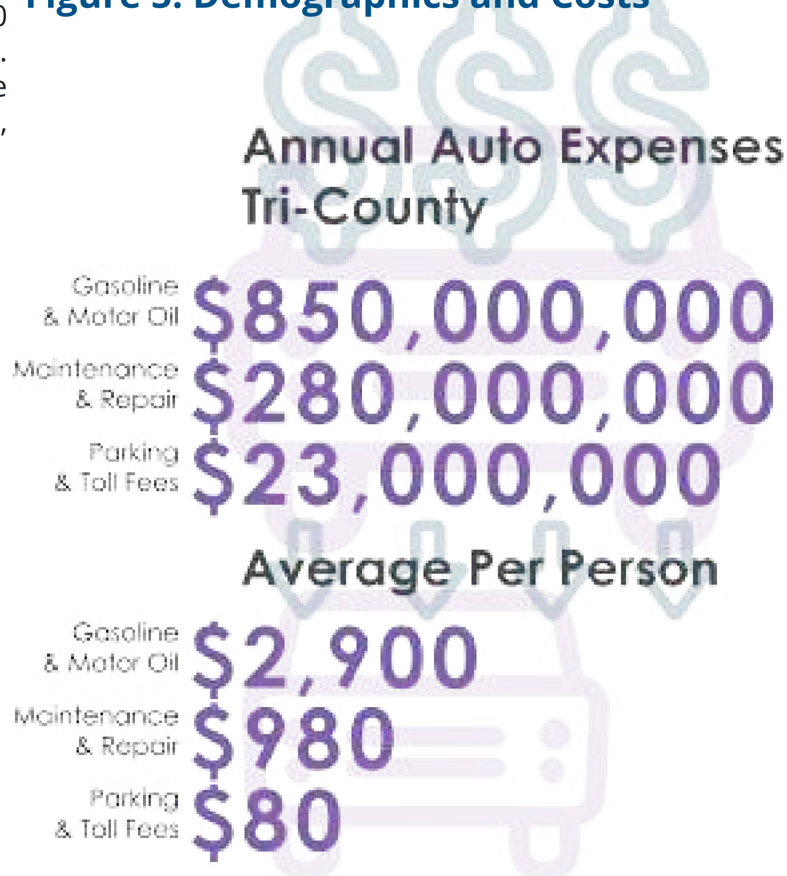
Figure 4: Travel Time to Work



How much does it cost? In 2016, residents of the region were on average spending $3,960 per person per year on automobile expenses. That represents approximately 7.5% of the median income of $53,000 in Charleston, Dorchester, and Berkeley Counties.

Figure 5: Demographics and Costs





HOW DO WE COMPARE?

Table 1 on the following page shows several metrics on the performance of the CHATS area transportation network, which provide a baseline understanding of regional transportation performance. These figures are derived from the most recent Texas A&M Transportation Institute (TTI) Annual Urban Mobility Scorecard, a study of over 400 metropolitan regions in the U.S. The table also includes metrics for thirty-three peer metropolitan regions throughout the country; these regions are all categorized as "medium-sized" metropolitan areas in TTI's analysis. The list of the peer cities and their yearly delay can be found in the box at right.

Looking specifically at the 2014 data, it is notable that, while the CHATS planning area has a lower number of commuters and freeway and arterial vehicle miles traveled (VMT) than the average of its peer metros, the percentage of time spent in congested conditions and the percentage of congested lane-miles are higher in the CHATS planning area than the peer-metro average. This translates into a relatively high number of hours of delay per commuter in the region. The cost of this congestion was approximately $470 million in 2014.

The final three columns of the table present how the CHATS planning area's transportation system has performed over time, showing the change from 2009 to 2014. For many of the indicators in this table, the region did not improve from 2009 to 2014 in absolute terms; however, when controlling for the region's population growth (last column), transportation performance in the area has actually done a relatively good job of keeping pace with the increased traffic caused by population growth of 17% over the five-year period.

The two metrics at the bottom of the table illustrate the relatively static nature of congestion. The Travel Time Index compares peak travel delay to free-flow speeds; the Commuter Stress Index uses the same comparison, but only looks at peak direction travel. Both of these metrics show little to no change from 2009 to 2014, which indicates that congestion in the CHATS planning area has remained relatively stable in spite of rapid population growth.

Urban Area	Hours of Delay per Commuter
Honolulu, HI	**50**
Bridgeport-Stamford, CT-NY	**49**
Baton Rouge, LA	**47**
Tucson, AZ	**47**
Hartford, CT	**45**
New Orleans, LA	**45**
Tulsa, OK	**44**
Albany, NY	**42**
Charleston-North Charleston, SC	**41**
Buffalo, NY	**40**
New Haven, CT	**40**
Grand Rapids, MI	**39**
Rochester, NY	**39**
Columbia, SC	**38**
Springfield, MA-CT	**38**
Toledo, OH-MI	**38**
Albuquerque, NM	**36**
Colorado Springs, CO	**35**
Knoxville, TN	**35**
Wichita, KS	**35**
Birmingham, AL	**34**
Raleigh, NC	**34**
El Paso, TX-NM	**33**
Omaha, NE-IA	**32**
Allentown, PA-NJ	**30**
Cape Coral, FL	**30**
McAllen, TX	**30**
Akron, OH	**27**
Sarasota-Bradenton, FL	**26**
Dayton, OH	**25**
Fresno, CA	**23**
Provo-Orem, UT	**21**
Bakersfield, CA	**19**

Note: Medium-sized urban areas are defined as having populations over 500,000 and less than 1 million at the time of the study (2015)

Table 1: Regional and Peer Region Performance, 2009 - 2014

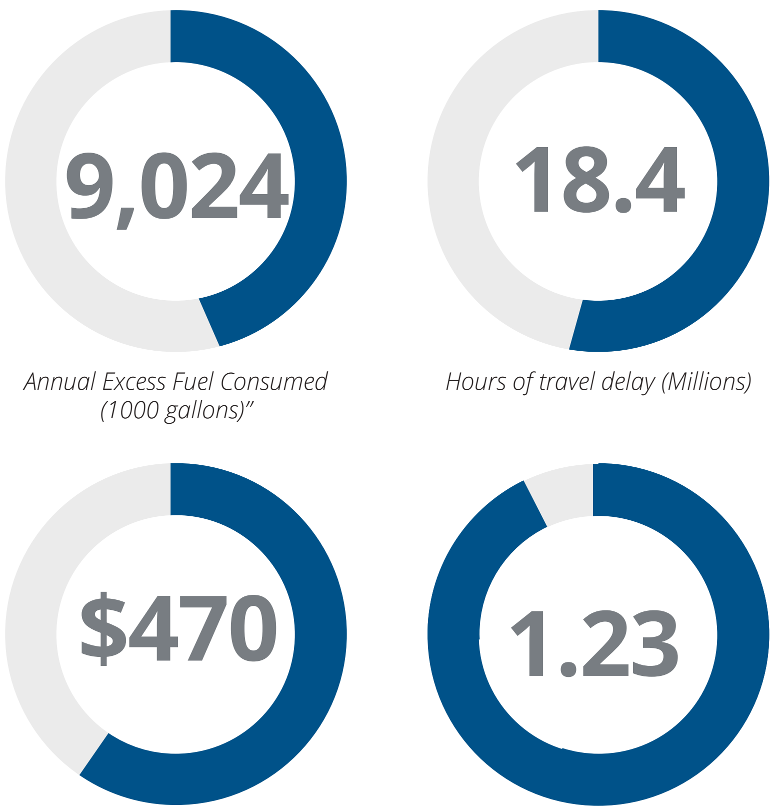
Metric	Average of Metro Peers		Charleston Metro		Charleston Metro Difference (2009-2014)	Charleston Metro Change Better from 2009-2014?	
	2009	2014	2009	2014		Absolute Change	Relative to Population Change
Population (1,000)	669	704	515	600	17%	N/A	N/A
Commuters (1,000)	336	355	258	298	16%	No	Yes
Freeway Vehicle Miles Traveled (1,000)	5,456	5,663	3,610	3,971	10%	No	Yes
Arterial Vehicle Miles Traveled (1,000)	6,330	6,417	5,900	6,141	4%	No	Yes
Gasoline ($ per gal)	2.29	3.34	2.12	3.00	42%	No	N/A
Diesel ($ per gal)	2.64	3.68	2.39	3.43	44%	No	N/A
Percent of Time Spent in Congested Conditions	Data Not Available	24	Data Not Available	33	Data Not Available	Data Not Available	Data Not Available
Percent of Lane Miles Congested	Data Not Available	22	Data Not Available	27	Data Not Available	Data Not Available	Data Not Available
Number of Rush Hours	Data Not Available	2	Data Not Available	3.8	Data Not Available	Data Not Available	Data Not Available
Excess Gallons Fuel (1,000)	8.926	9,813	8.092	9,024	12%	No	Yes
Gallons per Commuter	16	18	18	20	11%	No	N/A
Total Hours of Delay (1,000)	18,194	20,001	16,519	18,422	12%	No	Yes
Hours of Delay Per Commuter	35	36	43	41	-5%	Yes	N/A
Congestion Cost ($mil)	475	474	466	470	1%	No	Yes
Congestion Cost ($ per commuter)	856	854	1,037	1,047	1%	No	N/A
Travel Time Index	1.17	1.18	1.23	1.23	0%	Neutral	Yes
Commuter Stress Index	1.21	1.22	1.27	1.27	0%	Neutral	Yes

Source: 2015 Annual Urban Mobility Scorecard, Texas A&M Transportation Insitute (TTI)

HOW DOES THE NATION SEE US?

There are a few readily available data sources that people and businesses use to understand transportation in a region. These sources, which admittedly have some limitations, are nevertheless the face of the region as people and businesses decide to relocate. The following graphics provide a snapshot of what the world sees when it uses commonly accessed information to learn about the CHATS planning area's transportation system. (Source: Texas A&M Transportation Institute (TTI) 2015 Annual Urban Mobility Scorecard)

Figure 6: The Cost of Congestion



Annual Excess Fuel Consumed (1000 gallons)" — *Hours of travel delay (Millions)*

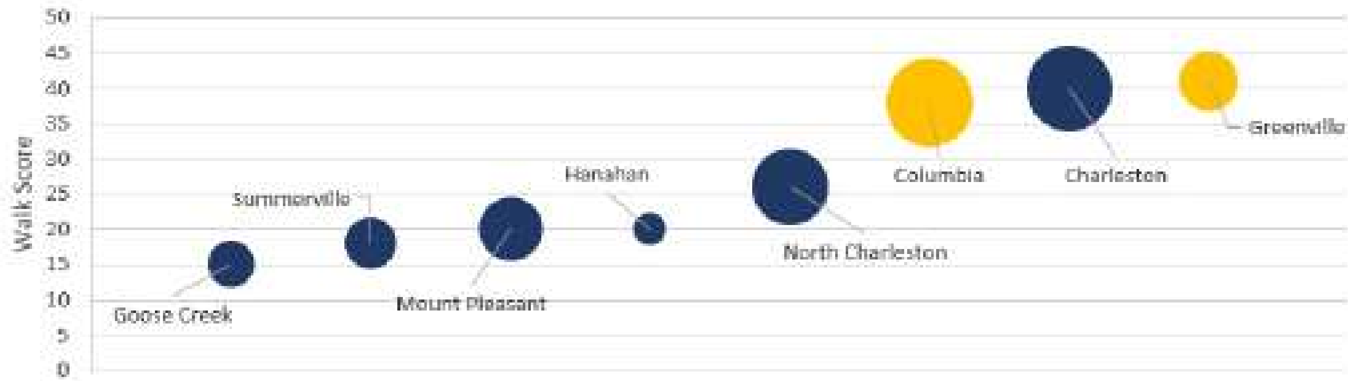
Congestion cost (Millions) — *Travel Time Index*

Cost of Congestion: The CHATS metro region is in the "middle-of-the-pack" compared to similarly sized peer regions in excess fuel consumption, travel delay, and congestion cost. However, the region's travel time index, which is a measure of reliability of the system, is worse than many of its peers. (Source: Texas A&M Transportation Institute (TTI) 2015 Annual Urban Mobility Scorecard)

Commuter Stress Index (2014): Congested conditions in the region can lead to commuter stress. Charleston has a higher stress index than the majority of its peers, at 1.27. The Columbia, SC metro outperforms our region with a commuter stress index of only 1.18, one of the best in the peer group of medium-sized cities as defined by the TTI annual congestion report.

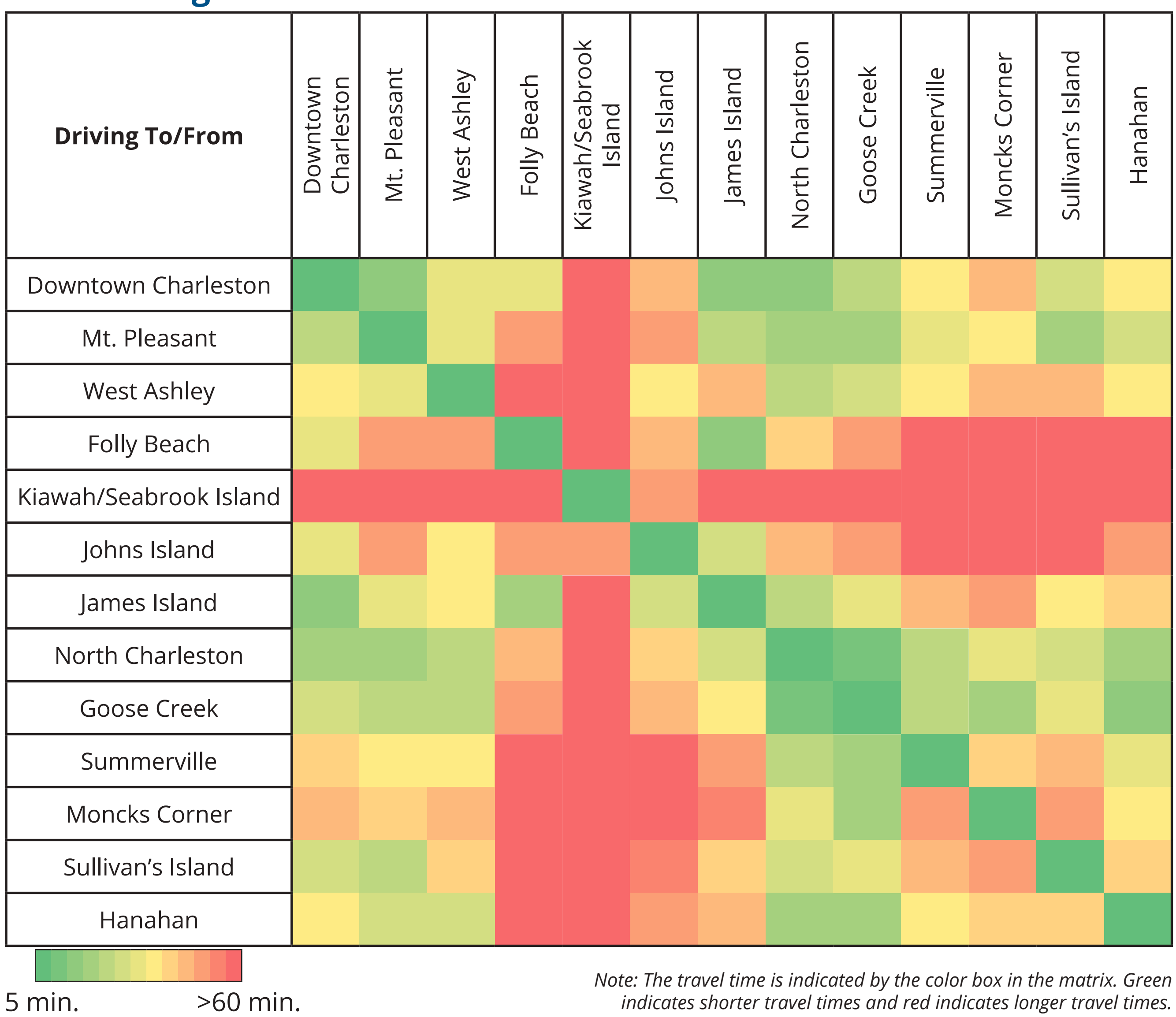
Getting to Work: Commuting in the metro area varies greatly depending on where you are going and how you are getting there. Data from the real estate website trulia.com show that more centrally located destinations, such as North Charleston, are located within a relatively short driving commute from most other urbanized places in the region. With the exception of Downtown Charleston, most locations are nearly inaccessible within an hour of travel on public transit.

Figure 7: Municipality Walk Score Comparison



Walk Score: The City of Charleston has the highest "Walk Score" (a measure of proximity of various origins and destinations) in the region, with Goose Creek lagging behind other municipalities. Charleston barely beats out its peer city of Columbia, but is outperformed by Greenville, perhaps due to that city's more compact size – a key factor in the destination-drive Walk Score methodology. In this chart, the size of the bubble represents the city's population.

Table 2: Getting to Work



Note: The travel time is indicated by the color box in the matrix. Green indicates shorter travel times and red indicates longer travel times.

WHAT DO THE PEOPLE SAY?

Throughout the CMP planning process, the public has had numerous opportunities to provide feedback on the current state of transportation in the region. Here are some of their thoughts.

Survey Infographics (right): Beginning in June 2017, BCDCOG asked citizens in the region their thoughts on the transportation system today. Over 2,100 online and paper surveys were received. The responses are summarized in the graphic on the following page. Major themes from the survey responses include dissatisfaction with congestion, safety, and access to alternative modes of transportation in the region.

Project Symposium (below): In July 2017, three public symposiums were held throughout the region, in the City of Charleston, the Town of Summerville, and the City of North Charleston. The goal of the symposiums was to learn more about transportation issues that matter to people living in the region. Attendees were asked to prioritize their transportation concerns in the region. The top three priorities were: 1) Mobility and Congestion, 2) Transit Alternatives, and 3) Infrastructure Condition.

Figure 8: Priorities Identified for the CHATS Planning Region

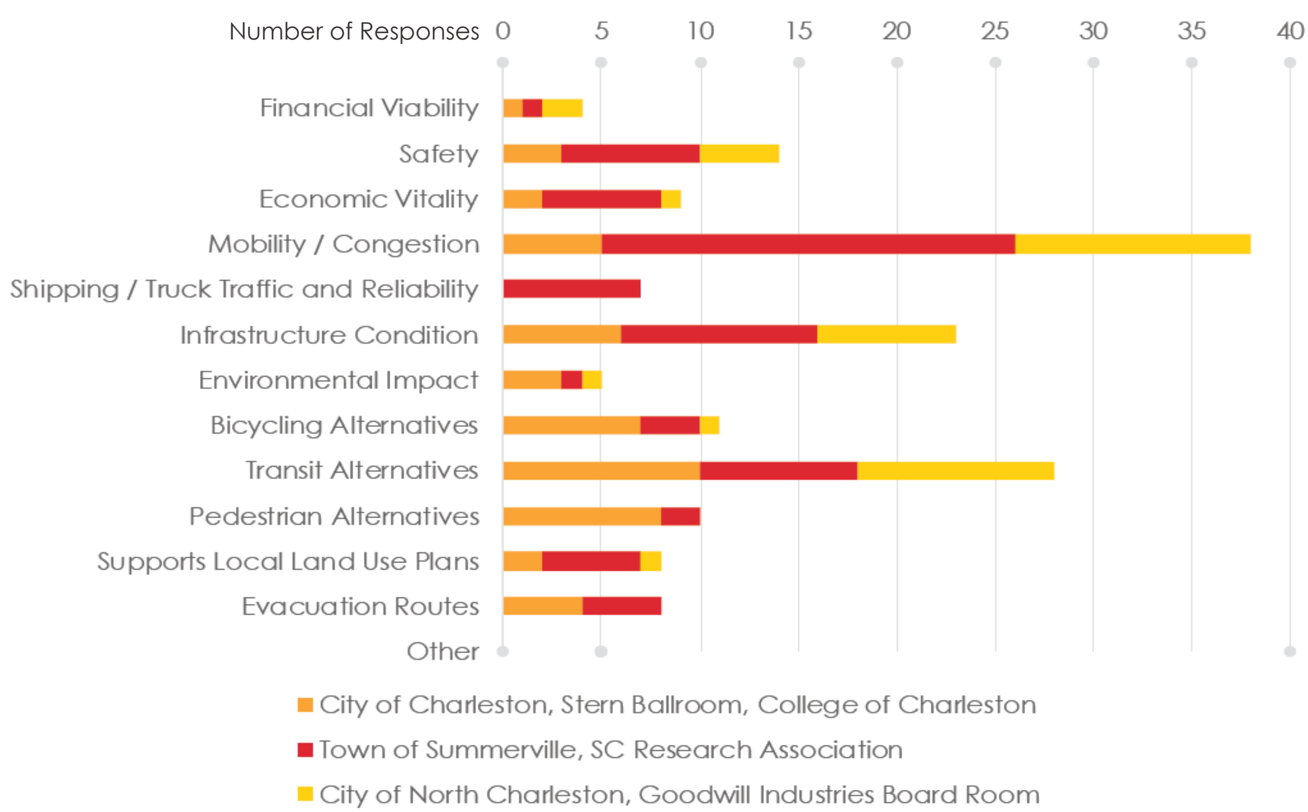
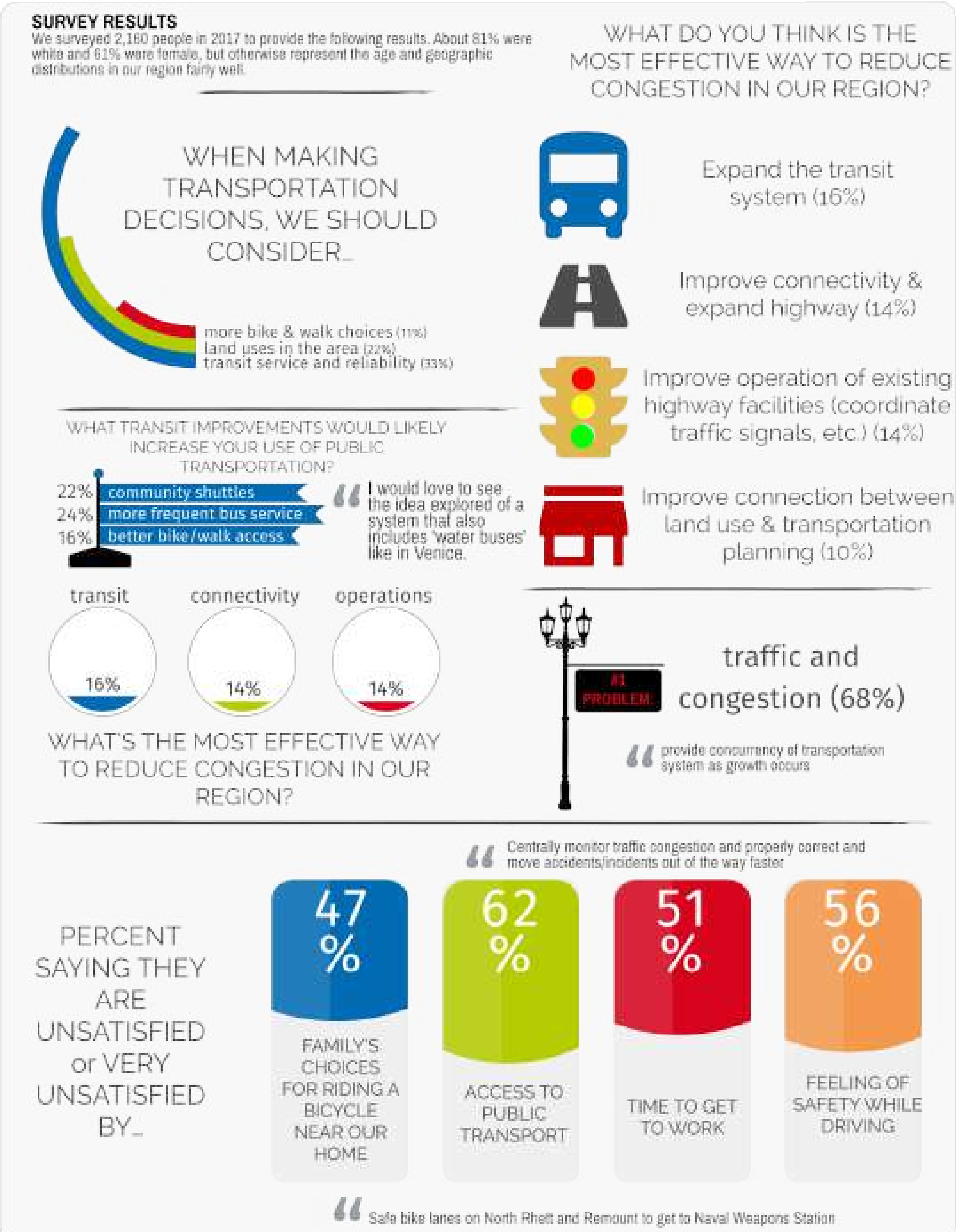
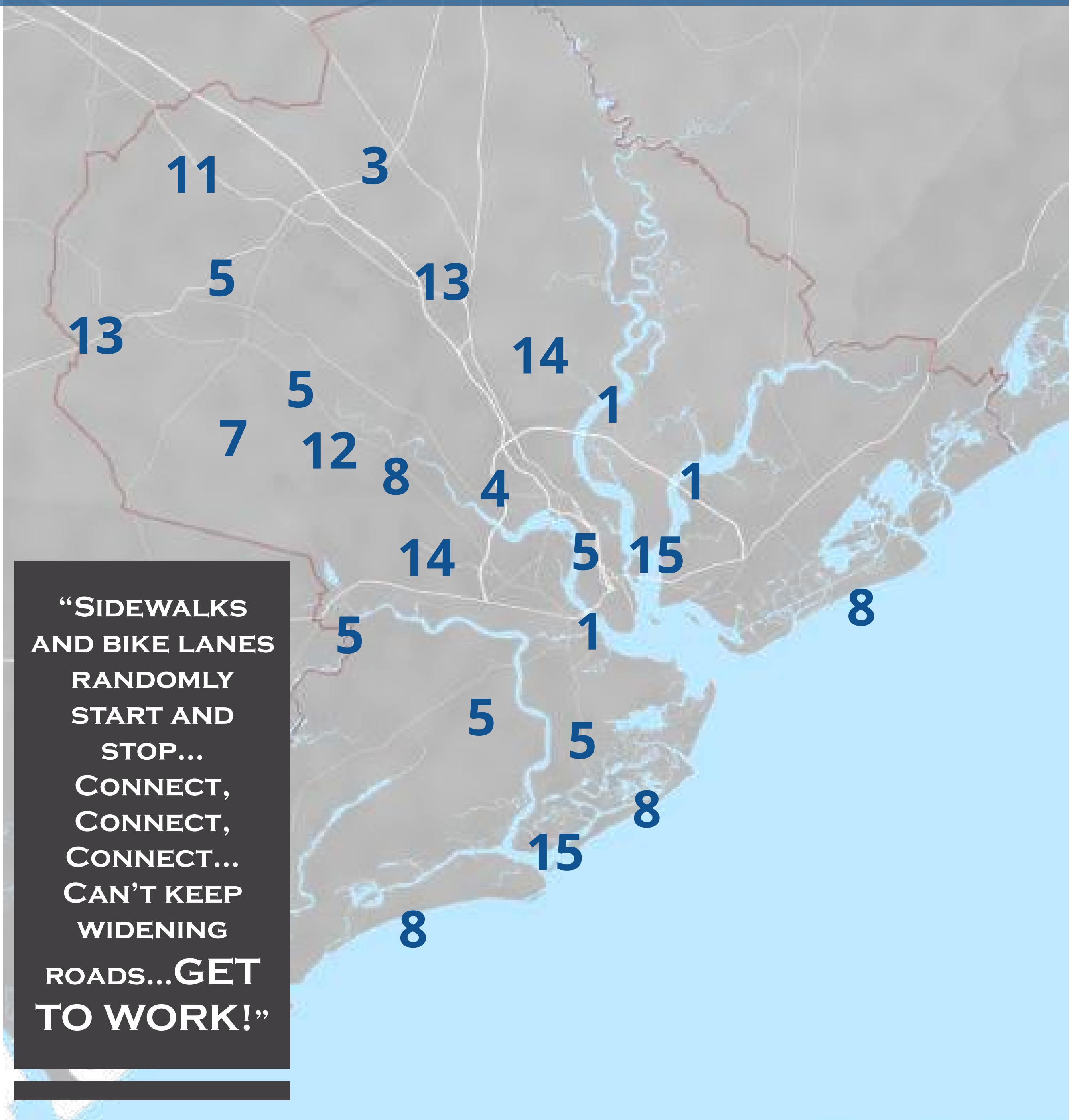


Figure 9: Survey Results Infographics



Symposium participants were also asked to mark up maps to identify problem areas and/or share ideas for improving transportation specifics. Here are some of the most-often cited comments from that exercise.



"SIDEWALKS AND BIKE LANES RANDOMLY START AND STOP... CONNECT, CONNECT, CONNECT... CAN'T KEEP WIDENING ROADS...GET TO WORK!"

1. Congested bridges, including dangerous pedestrian crossings and a need for bicycle lanes on bridges
2. Better bus stop facilities, like benches, buffers, trash cans, and lighting needed (Not Shown)
3. Light rail, HOV, or bus rapid transit (BRT) needed in crowded northwest routes from Summerville & Goose Creek to Charleston
4. Incorporate transit into potential I-526 widening design
5. Numerous intersections require signal re-timing or improvements to turn lanes, channelization, and other geometric elements
6. Need transit technology, more frequent bus service, and to operate for longer periods and on weekends (Not Shown)
7. Need west-side connector route to provide connectivity in developing area and relieve existing, congested roadways
8. BRT and better bus service generally needed to beaches, hospitals, and the airport
9. Flooding, smart signal technology, and access management need to be emphasized on roadway system (Not Shown)
10. Invest in “Smart City” programs to improve technology, information systems, and enhance mobility options (Not Shown)
11. Increase trail (greenway) connectivity; fill in gaps in trails and sidewalks in core, high-activity areas
12. Improve Ashley Phosphate Road and other connector roads between major arterials (e.g., interchanges, widenings, signal coordination)
13. Widen Highway 78, 52, 17A and others to accommodate current and future traffic demands
14. Need better connectivity across waterways and railroads, even though it is costly to do so
15. Implement waterborne public transportation services along major waterways

ROADWAY CONDITIONS

Roadways serve as the principal mobility arteries in the region, carrying the majority of the transportation system users on any given day. Twelve (12) of the most important highway corridors in the region were selected for analysis, based on travel data, such as traffic counts and congestion times, as well as regional stakeholder input.

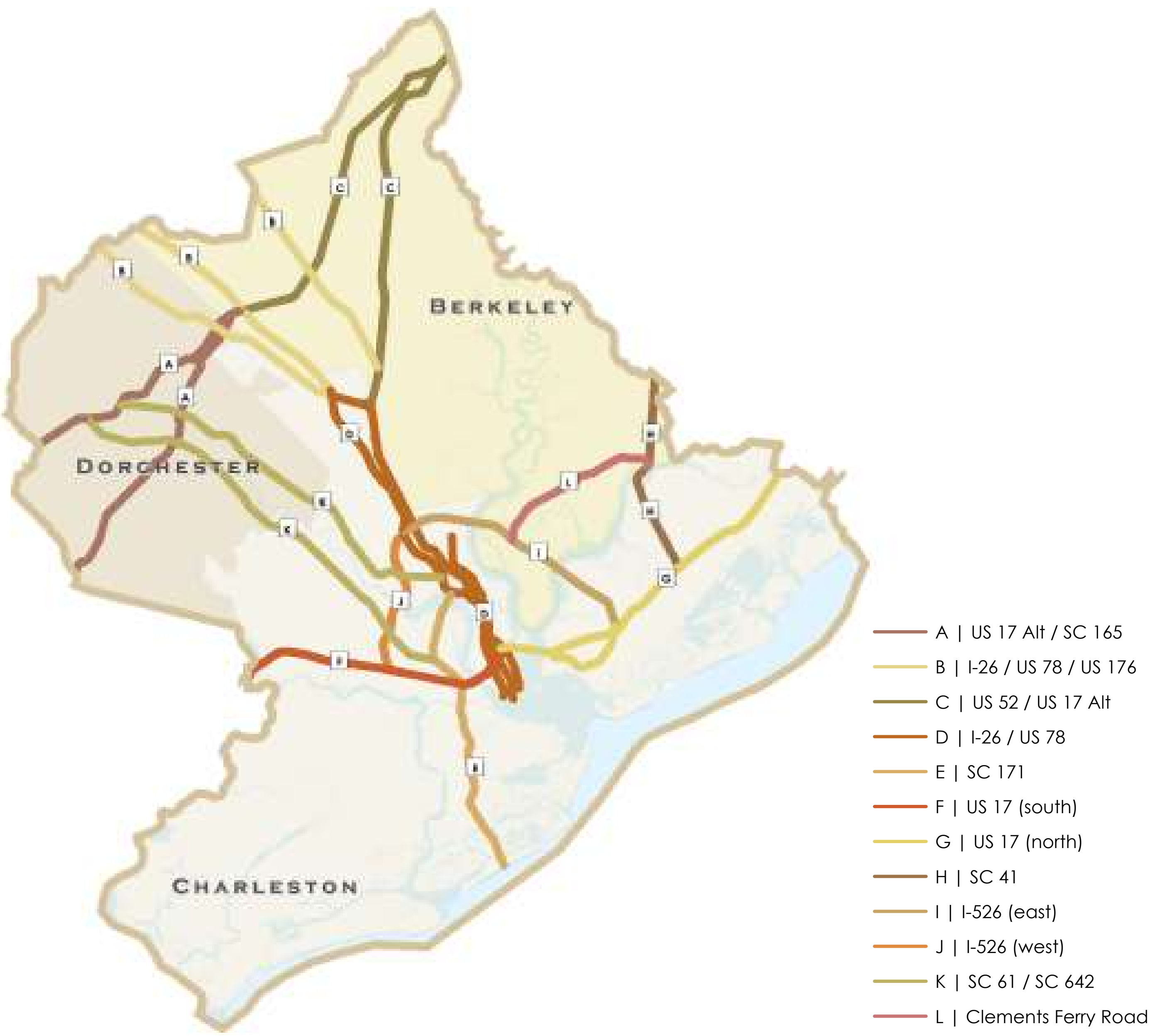
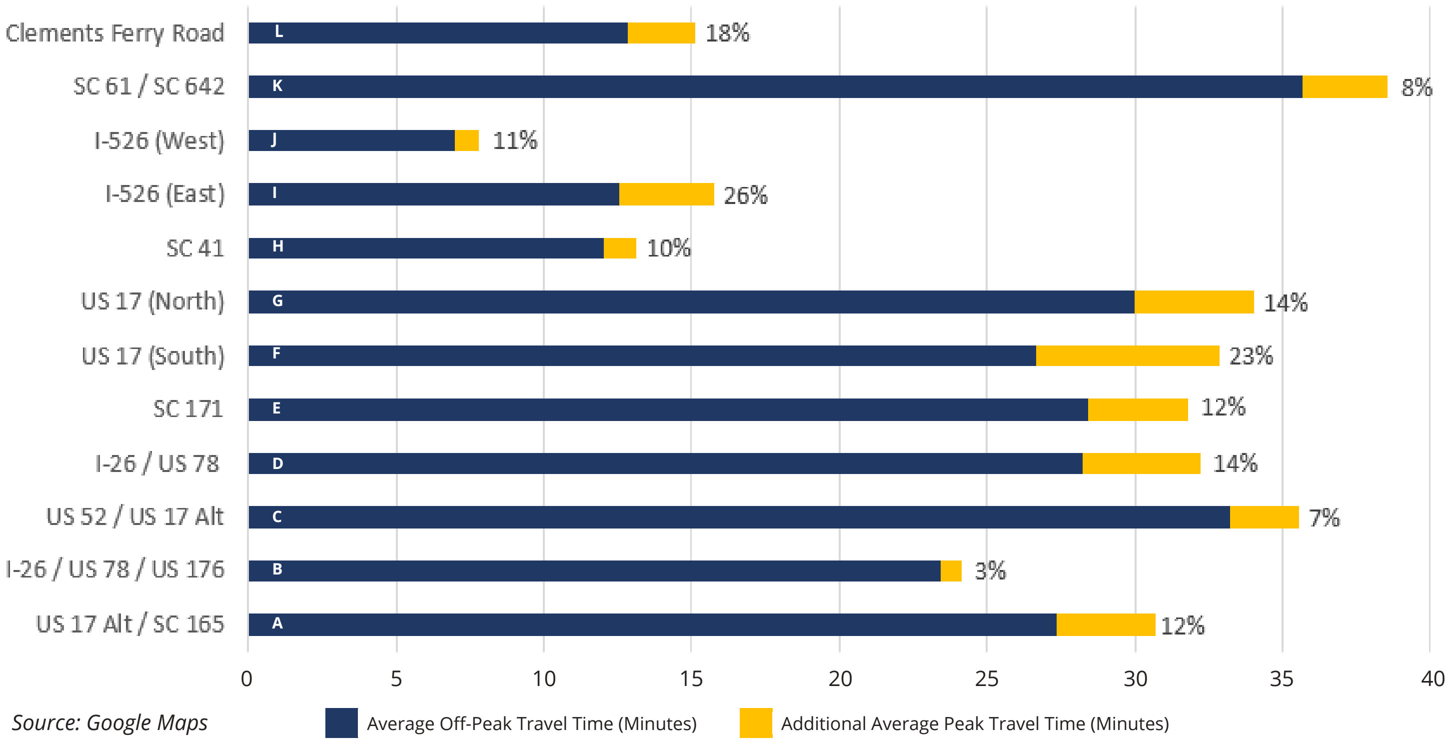


Figure 10: CMP Study Corridors and Counties

Figure 11: Peak Hour Travel

Using travel time data collected from satellite, GPS, and cellular carriers, the typical time required to traverse the 12 CMP study corridors, during both the peak and off-peak periods, was calculated in an effort to better understand the effects that congestion is having on mobility in the region. The chart below shows not only the additional increase in absolute time that it takes to traverse a corridor during the peak hours, but also the percentage difference between the typical peak and off-peak travel times. Some corridors saw very little difference between peak and off-peak travel times (e.g., I-26 / US 78 / US 176, which saw a 3% increase in travel time during peak from off-peak), while others, including I-526 (East) and US 17 (South), have close to a 25% increase in typical travel times during peak hours.

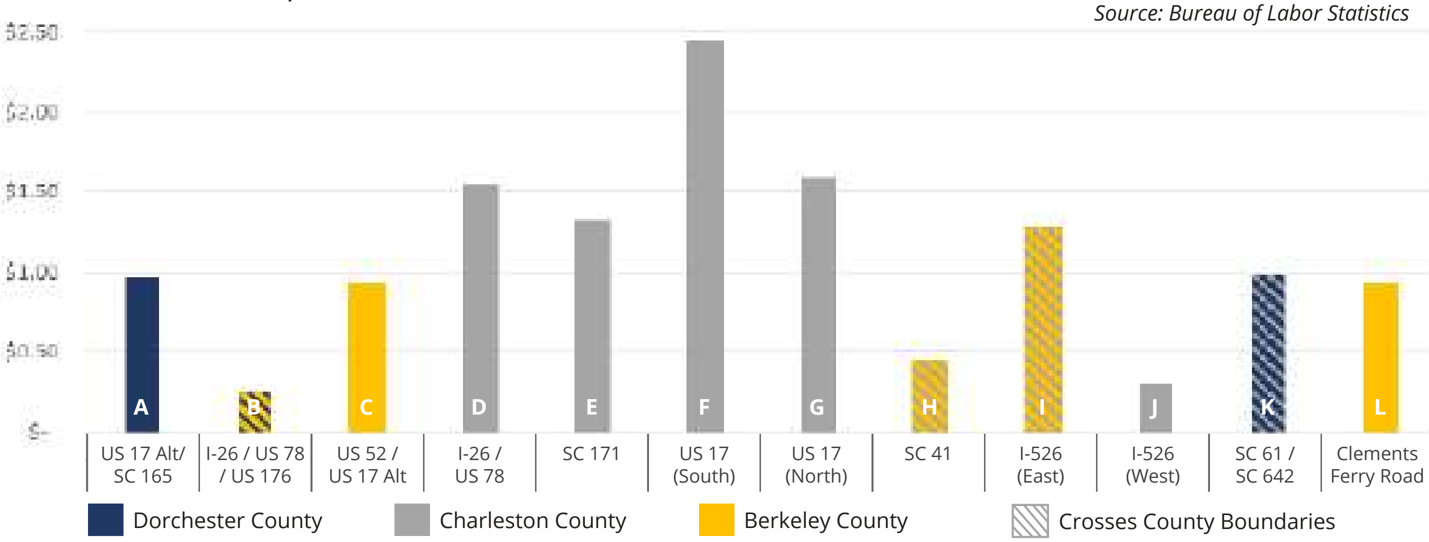


Source: Google Maps

Figure 12: Cost of Congestion County Comparisons

For every trip along a corridor during congested conditions, the extra time spent driving is associated with a cost to the driver. The average wage rates for each county were used to determine the cost of congestion based on time lost. (Note: for corridors that cross county boundaries, indicated by hatched bars, the additional time was split between the counties to generally determine overall cost). In Charleston County, where the wage rate is relatively high, the average cost of congestion is over $1.00 per trip in a number of CMP study corridors.

Source: Bureau of Labor Statistics



BICYCLE, PEDESTRIAN, AND TRANSIT CONDITIONS

While the vast majority of trips in the region are still being made by automobile, the way we move is changing. The following pages take a closer look at how bicycling, walking, and transit use are performing in the region. Data and methods used can be found on page 48.

Connectivity Index (right): The connectivity index compares the number of streets (links) to the number of intersections (nodes) in the transportation system. The higher the value, the better the connectivity. The connectivity index is uniformly relatively low throughout the region; a perfect grid has a connectivity index of 2.5; but the CHATS planning area has a connectivity index of only 0.55.

Connectivity is an important consideration for walking and bicycling in the region because lower connectivity often mean longer distances must be traveled to get from Point A to Point B, thus potentially discouraging people from choosing an active mode of transportation.

0.55 *CHATS AREA*	**0.56** *CHARLESTON COUNTY*
0.56 *BERKELEY COUNTY*	**0.56** *DORCHESTER COUNTY*

Two transit providers operate in the CHATS planning area: the Charleston Area Regional Transportation Authority (CARTA) and TriCounty Link. CARTA operates in the Charleston metro area and provides fixed-route bus service, express service, and paratransit service throughout the urban area, and Downtown Area Shuttle (DASH) service in the historic peninsula. TriCounty Link operates in Berkeley, Charleston, and Dorchester Counties, providing deviated fixed route and commuter route service for rural residents.

Using data (past years of financial data are adjusted for inflation to 2015 dollars) from the Federal Transit Administration's National Transit Database, information on the two regional transit systems is presented below. It is important to note that these two systems provide service for very different markets and should not be compared against one another. Additionally, due to data availability constraints, the time periods presented here are different: a ten-year period is shown for CARTA (2005 to 2015) but only a three-year period for TriCounty Link (2012-2015). Note: Passenger Mile data was not readily available for TriCounty Link.

Figure 13: Area Bus Service Performance

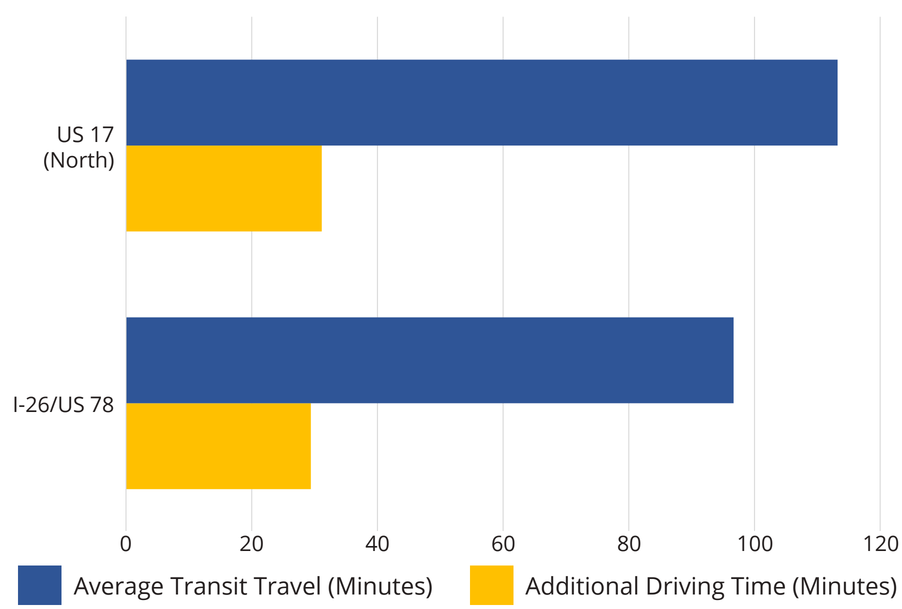
Performance for Bus Service	2005	2015	% Change
Operating Expense per Vehicle Revenue Mile	$6.99	$5.36	-23%
Operating Expense per Vehicle Revenue Hour	$91.52	$73.94	-19%
Operating Expense per Passenger Mile	$0.72	$0.76	6%
Operating Expense per Unlinked Passenger Trip	$7.57	$3.81	-50%
Unlinked Passenger Trips per Vehicle Revenue Mile	0.92	1.41	52%
Unlinked Passenger Trips per Vehicle Revenue Hour	12.08	19.41	61%

Performance for Bus Service	2012	2015	% Change
Operating Expense per Vehicle Revenue Mile	$2.04	$2.17	6%
Operating Expense per Vehicle Revenue Hour	$28.22	$51.70	83%
Operating Expense per Passenger Mile	--	--	--
Operating Expense per Unlinked Passenger Trip	$18.91	$20.01	6%
Unlinked Passenger Trips per Vehicle Revenue Mile	0.11	0.11	0.4%
Unlinked Passenger Trips per Vehicle Revenue Hour	1.49	2.58	73%

(red: worse, green: improved)

Corridor Travel Time (right): Travel times for buses are usually longer than for cars when they are sharing the same congested travelways. These times can differ greatly depending on starting and stopping points. In several of the CMP study corridors in the Charleston region, it is not actually possible to traverse the entire corridor via transit. The chart to the right compares bus and automobile travel times on the few corridors on which a transit journey through the entire corridor is possible.

Figure 14: Transit Travel Time



Map Book

This collection of maps provides an illustrated description of the information used to form the recommendations of this document. They feature the 12 CMP study corridors and important arterials in the context of transportation and demographic data.

- Map 1: Charleston Metropolitan Planning Area
- Maps 2-4: Level of Service (LOS) Rating based on Volume to Capacity Ratio
- Map 5: Crash Rates
- Map 6: Congestion and Crash Clusters
- Map 7: Bottleneck Locations: Recurring and Non-Recurring Congestion
- Map 8: Bicycle and Pedestrian Crashes
- Map 9: Transit Stops Analysis
- Map 10: Transit and Environmental Justice: High Poverty Populations
- Map 11: Transit and Environmental Justice: Large Minority Populations

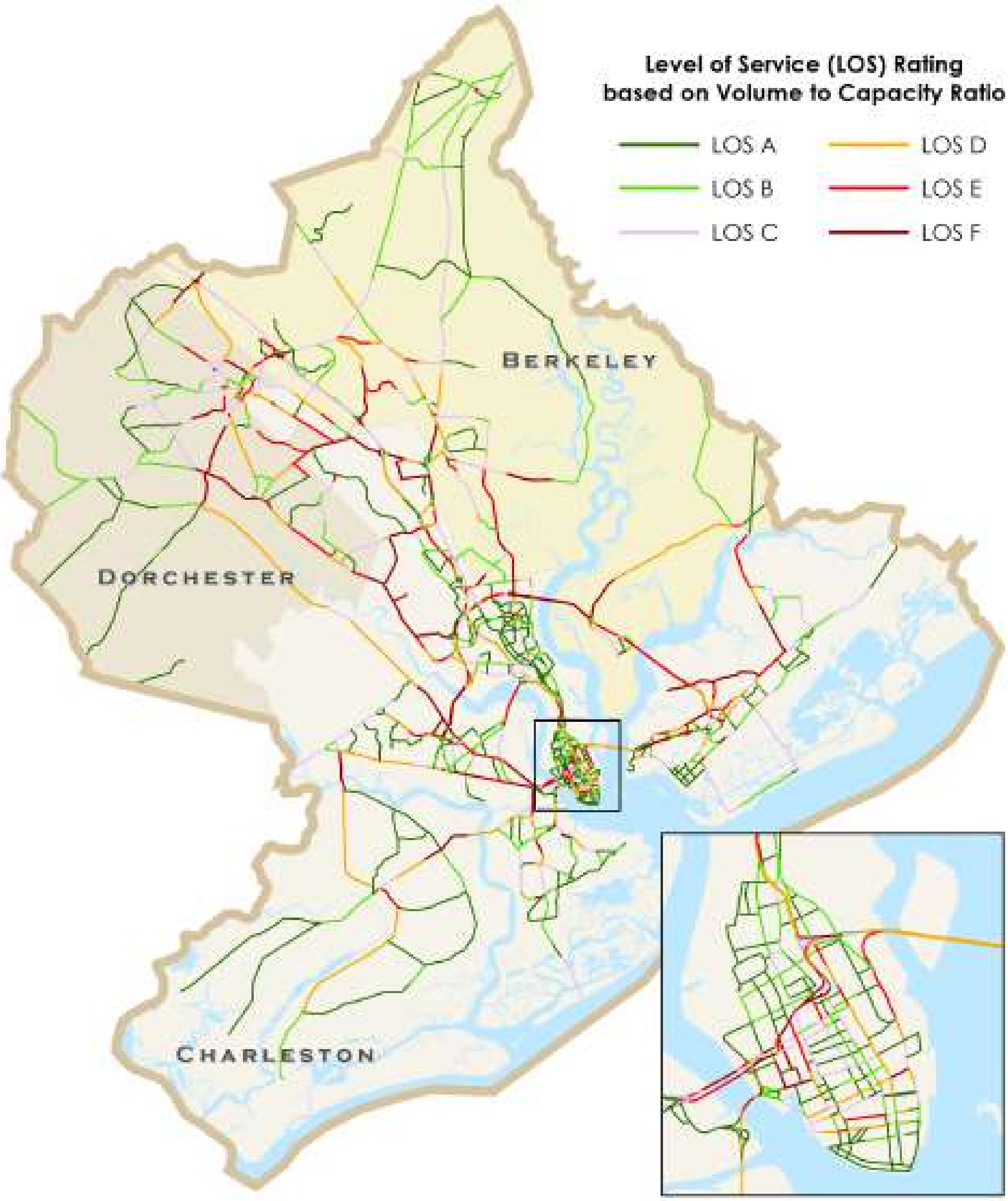
Map in forefront: Plat of Charles Town (1671) . Map in background: Carte Particulare de la Caroline centered on the city of Charleston (1690)

Map 1: Charleston Metropolitan Planning Area

The Charleston Area Transportation Study (CHATS) planning boundary includes over 800 square miles of urbanized land area of Berkeley, Dorchester, and Charleston County. The “CMP Corridors” are roadways that were selected based on the important level of mobility they provide to the region .

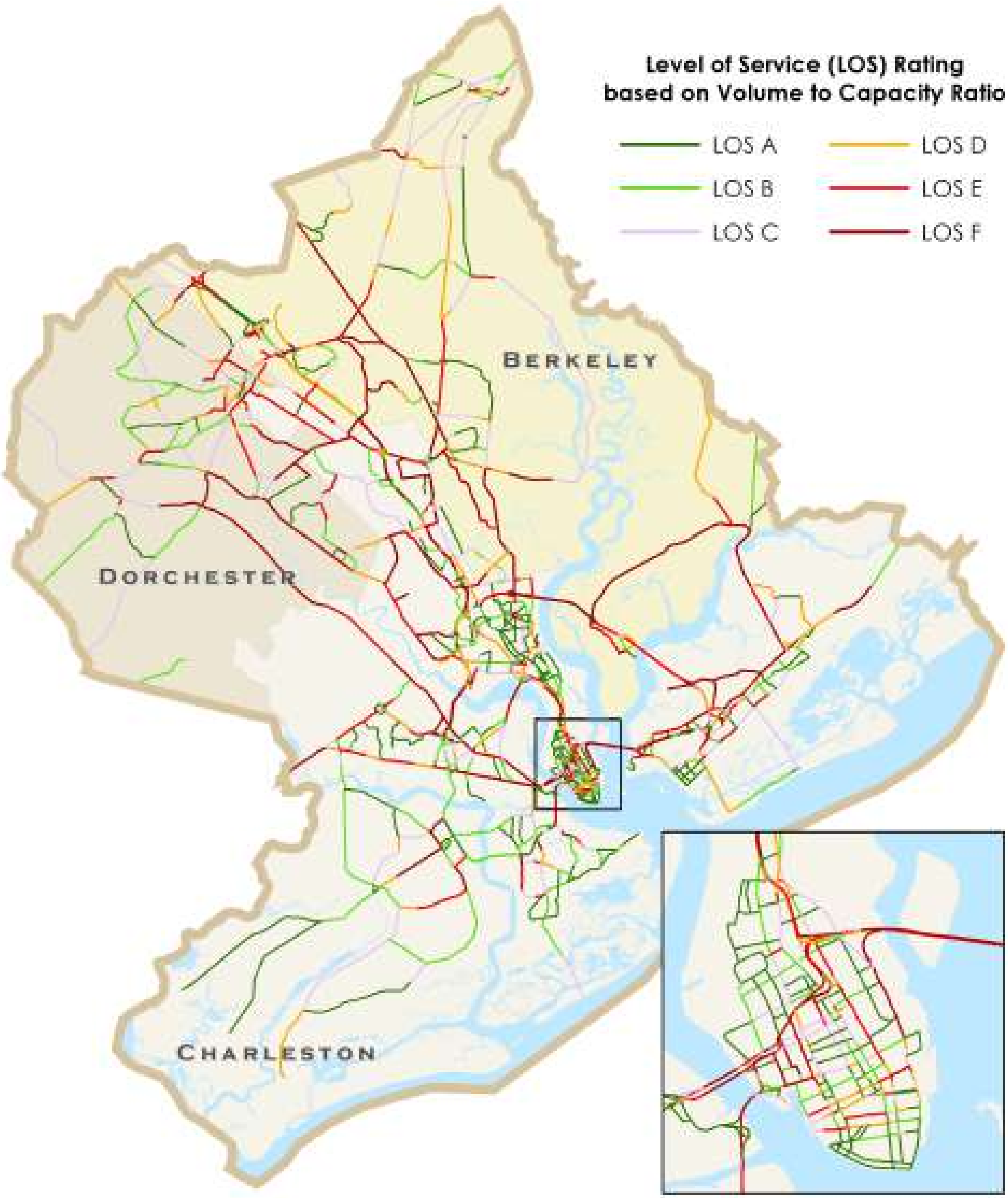
Map 2: 2015 Level of Service (LOS) Rating based on Volume to Capacity Ratio

Level of service (LOS) is a qualitative measure used to relate the quality of traffic service. Volume-to-Capacity Ratio (V/C) is a measure that reflects mobility and quality of travel by comparing roadway demand (vehicle volumes) with roadway supply (carrying capacity). The LOS rating describes the flow of traffic, where an A is free flow, B is reasonably free flow, C is stable flow, D is approaching unstable flow, E is unstable flow signifying the roadway is operating at capacity, and F is forced or breakdown flow.



Map 3: 2040 Existing Conditions + Committed Projects

Using predicted population estimates and allowing for changes in capacity from "committed" future transportation projects, both fully and partially funded, the regional demand model provides new LOS calculations. The map shows that if no additional projects are undertaken beyond those future committed projects identified there will be a significant increase, nearly 70%, in the number of road miles with a LOS of D, E, and F (when compared to 2015 existing conditions).



Map 4: 2040 Vision Projects

When the model was adjusted to include the completion of all recommended Vision projects the intensity of congestion remained stable or improved on more roads than in the existing conditions scenario.

A few areas of significant improvement are identified on the map.

A. Mallard Rd & Jedburg Rd at US 78

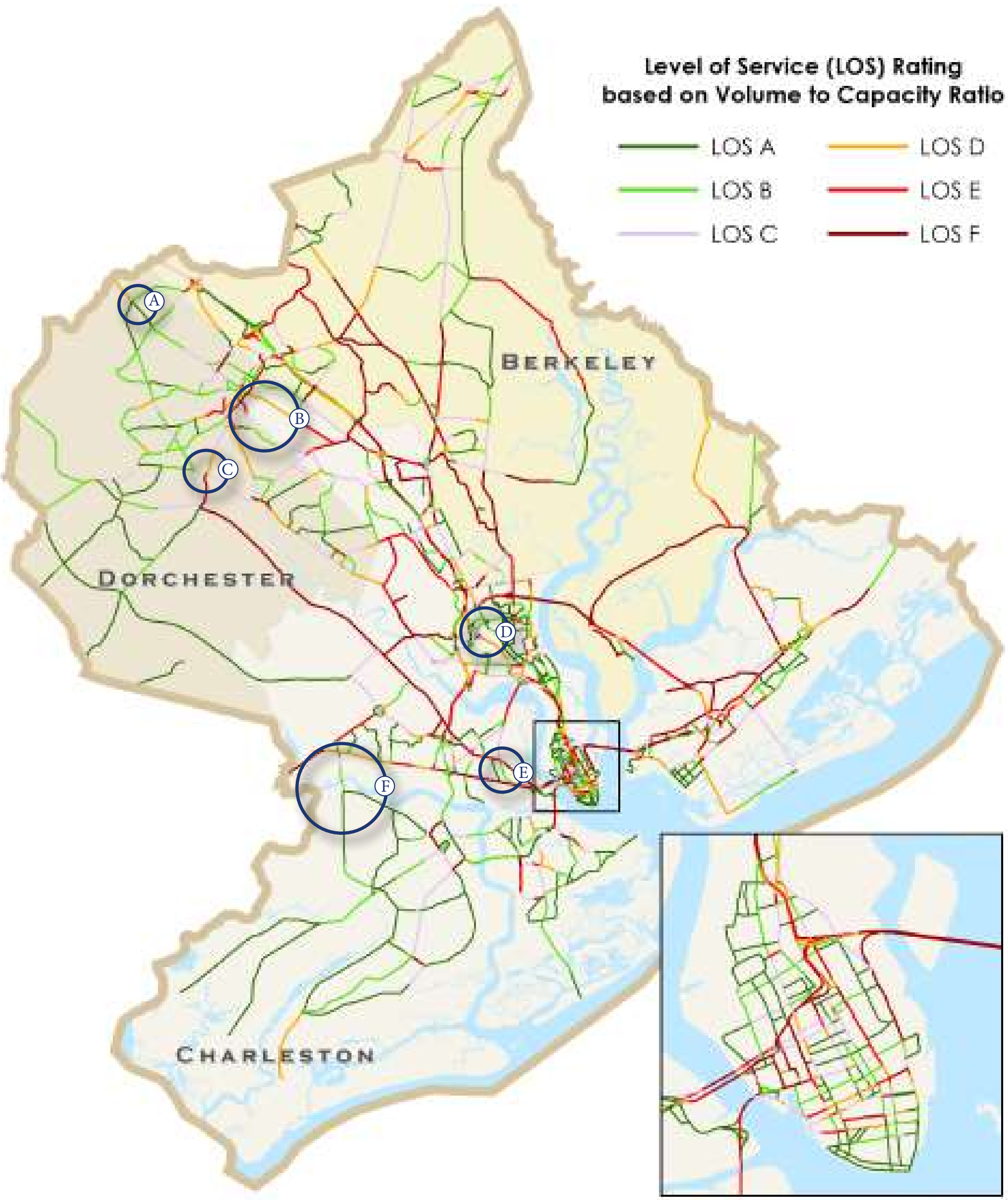
B. Miles-Jamison Rd & US 78

C. Bacons Bridge Rd & Dorchester Rd

D. I-26

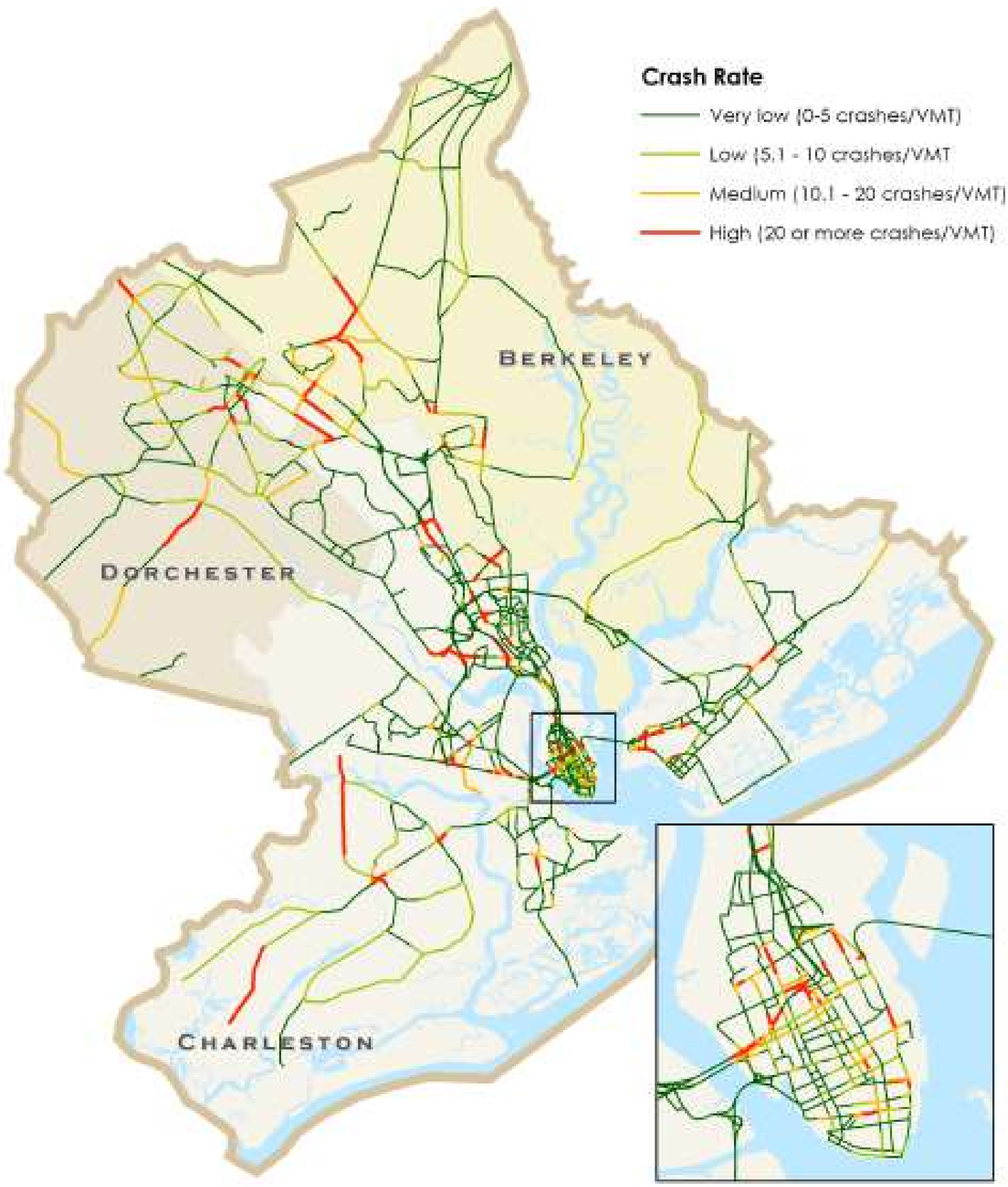
E. St. Andrews Blvd, Magnolia Rd & Savannah Hwy

F. Main Rd and River Rd



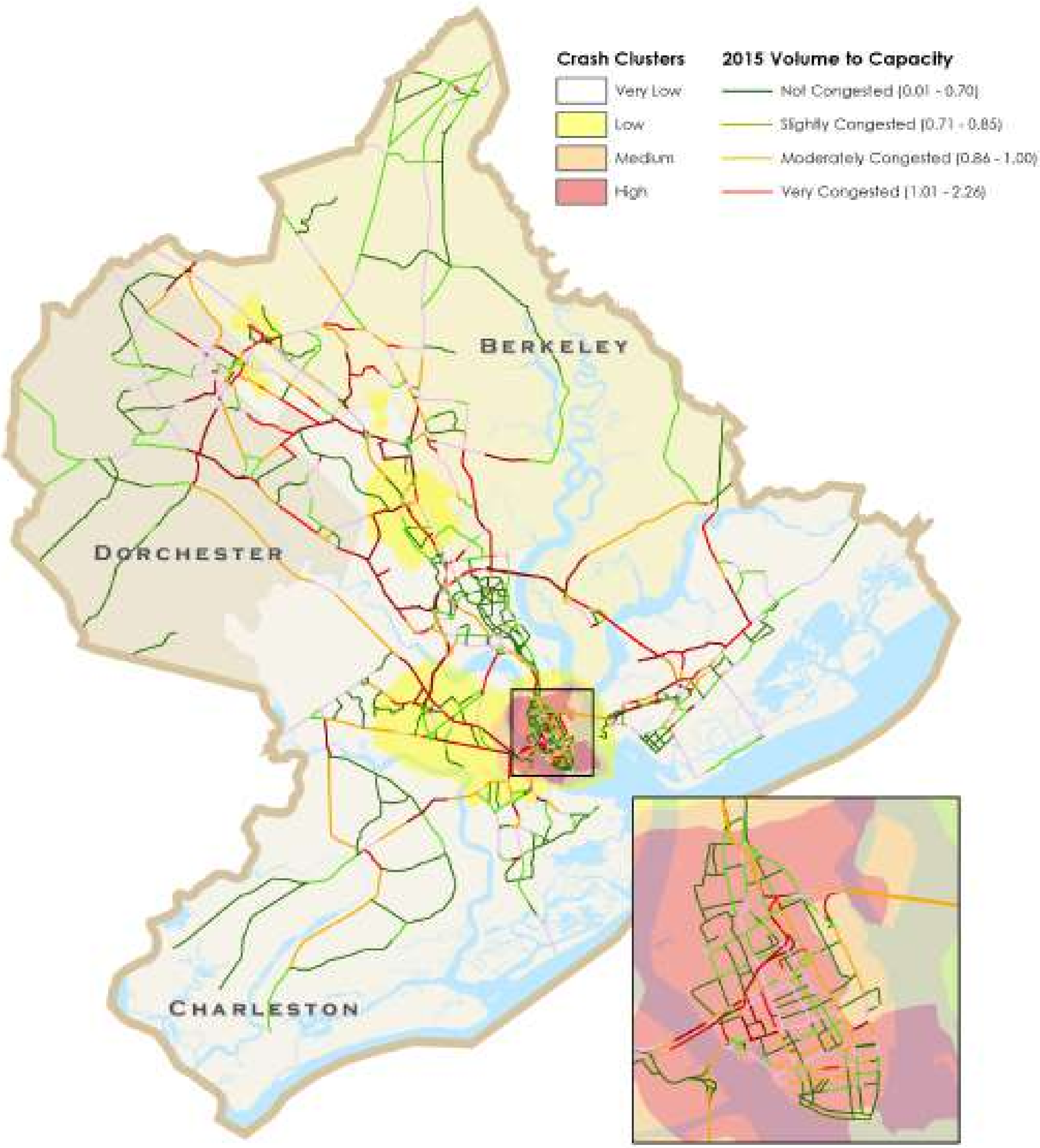
Map 5: Crash Rates

Over 60,000 crashes were reported by the City of Charleston and SCDOT for 2014-2016 and approximately 57,000 of those were successfully mapped. A crash rate per vehicle miles traveled ($R = \frac{C \times 100{,}000{,}000}{V \times 365 \times N \times L}$) was calculated for each roadway segment.



Map 6: Crash Clusters and Congestion

Compared to the crash rate from Map 5, a crash cluster is a result of a spatial analysis that identifies statistically significant clusters known as hot spots. As discussed in Maps 2-4, V-C ratios are measurements that reflect the quality of transportation in a network. In addition to being used to report LOS they can also be used to describe expected patterns of congestion. The V/C reflects 2015 average daily peak.



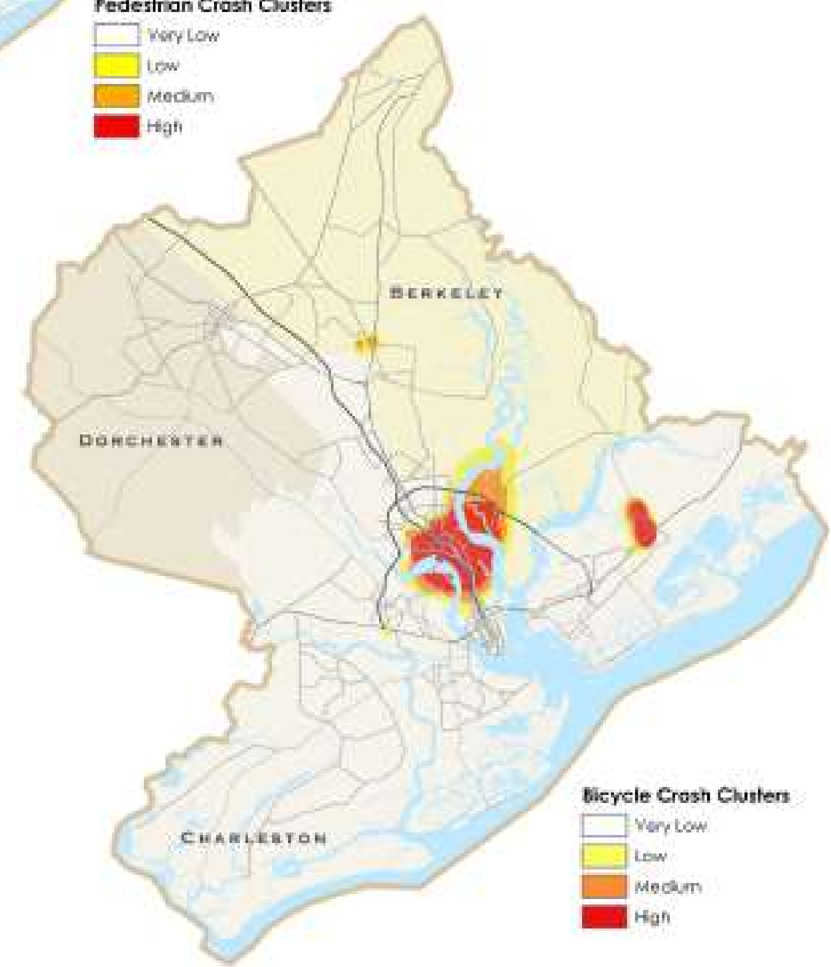
Map 7: Bottleneck Locations: Recurring and Non-Recurring Congestion

Congestion is roughly split between recurring and non-recurring incidents. Recurring congestion typically falls within peak travel periods and occur in the same locations. Non-recurring congestion only happens under certain circumstances, such as crashes, disabled vehicles, work zones, or adverse weather events. Using information from Maps 2-6 the locations below describe where each type of congestion occurs and incidences where both occur at the same time.

Map 8: Bicycle and Pedestrian Crashes (2015 & 2016)

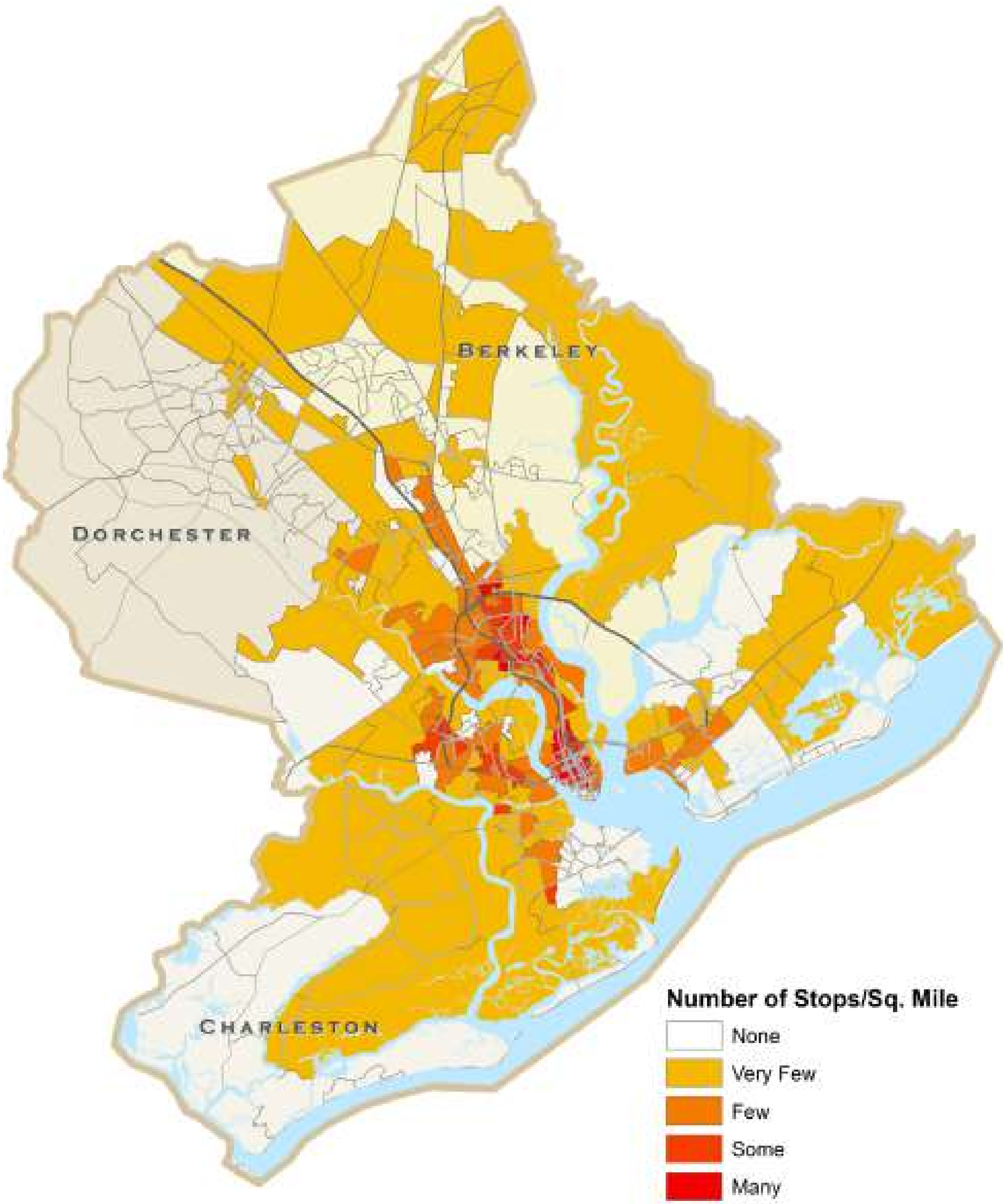
There was a slight decrease in reported pedestrian accidents from 191 incidents in 2015 down to 133 incidents in 2016. Of the 324 reported incidents 250 were able to be mapped using GPS coordinates.

Crashes involving cyclists also saw a decrease from 2015 to 2016 with 119 accidents and 62 accidents respectively. This was a decrease of almost 50 percent. Of the 181 incidents, 127 were able to be mapped using GPS coordinates.



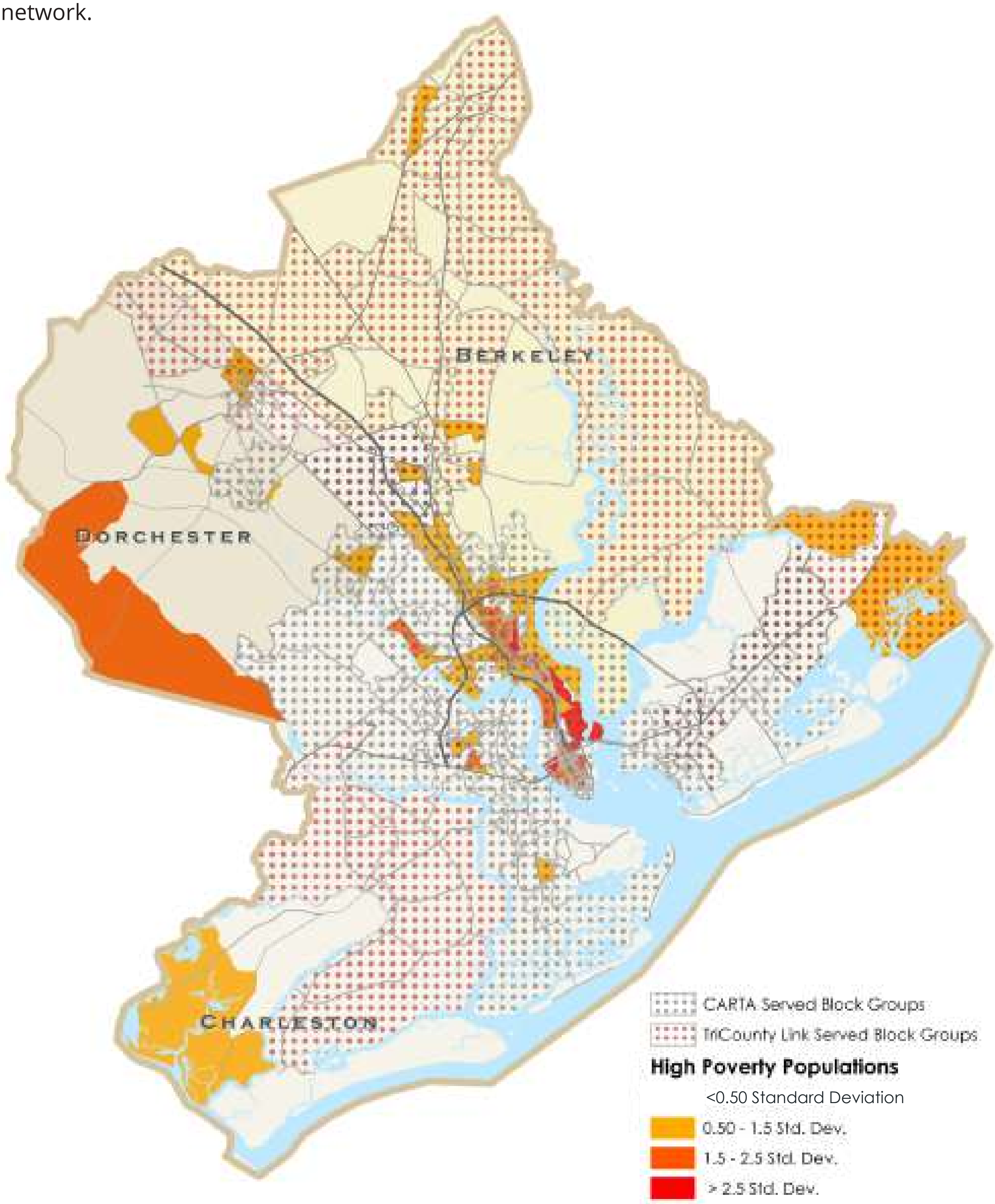
Map 9: Transit Stop Analysis

The majority of block groups served by Charleston Regional Transportation Authority (CARTA) fall within Charleston County, leaving significant portions of Dorchester County without service. Rural areas are served somewhat by TriCounty Link, which includes a limited number of fixed routes. As noted in Maps 9 and 10 this has left areas on the western periphery of the region without access to transit stops or routes.



Map 10: Transit and High Poverty Populations

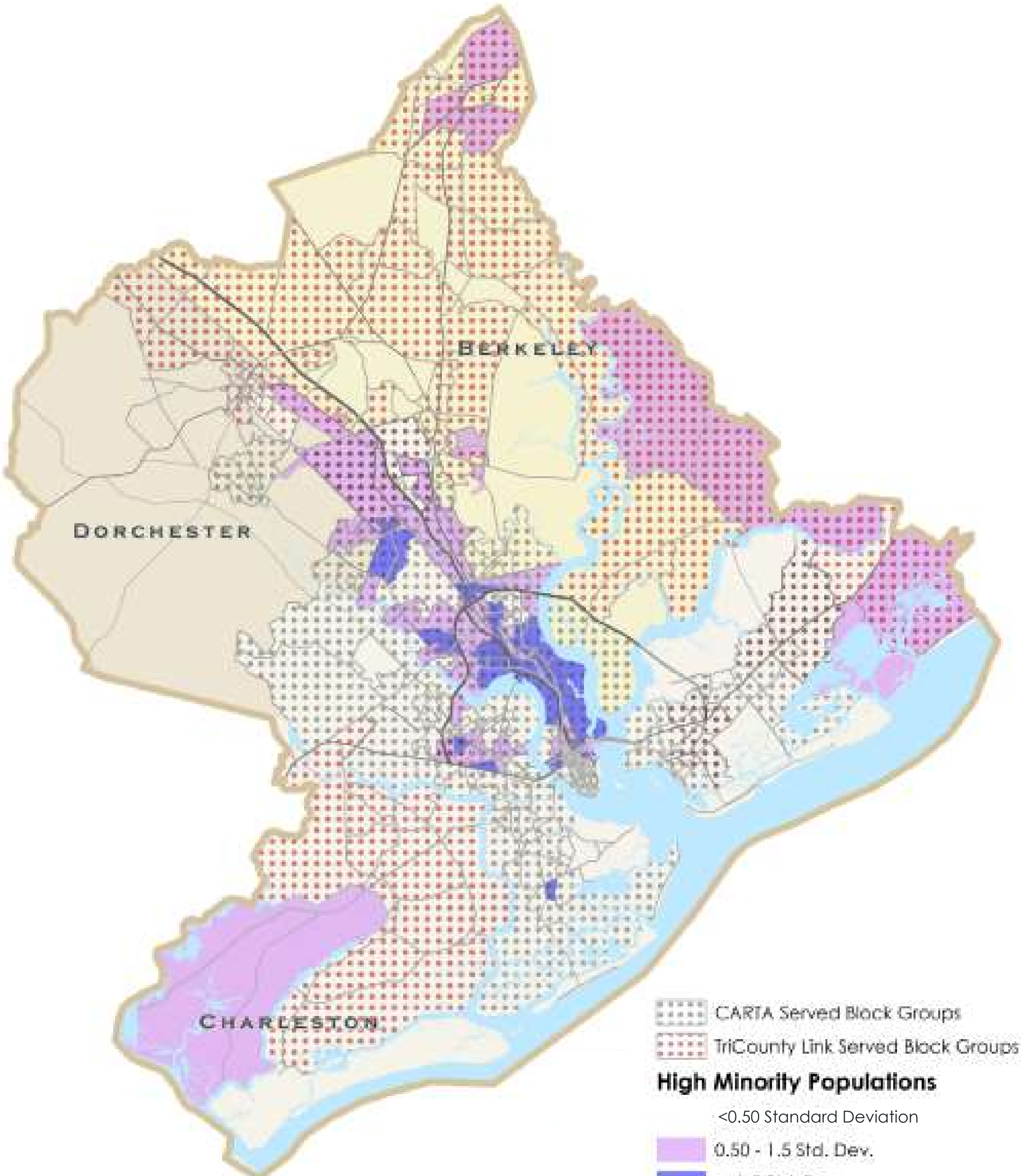
It is important to consider populations below or at the poverty level since many are reliant on the transit system as their main mode of transportation. The dotted block groups are those within a quarter-mile of a transit stop. High poverty populations were based on standard deviation of the average percentage of households below poverty for all block groups in the metropolitan planning area (the measure of the disperson of the data around the mean). The block groups in the central area are well served by the transit system while those on the outside perimeter have less access to the network.



Source: 2012-2016 American Community Survey

Map 11: Transit and High Minority Populations

The higher concentrations of minority populations in the central planning area are well-served by transit but a few block groups on the perimeter with higher concentrations of minority populations do not currently have access to the transit network.



Source: 2012-2016 American Community Survey

What does it mean?

This section of the report has presented a great deal of information on the current state of the transportation system in the CHATS planning area. Here are some of the key points and takeaways:

- The vast majority (over 80%) of people in Charleston, Dorchester, and Berkeley Counties commute by **personal automobile.**
- The CHATS planning area is in the **"middle-of-the-pack"** versus other medium-sized metropolitan area in terms of **excess fuel consumption due to congestion, hours of travel delay due to congestion, and cost of congestion**. However, both the Travel Time Index and the Commuter Stress Index are worse than many of its peer metropolitan regions.
- The **City of Charleston** has the highest **walkability** rating of all the BCDCOG communities, followed by North Charleston.
- Major themes from the survey responses include dissatisfaction with **congestion, safety, and access to alternative modes** of transportation. These correspond with the top priorities participants voted for at the public symposiums: **mobility and congestion; transit alternatives; and infrastructure condition**.
- The **highest delay, a 26% increase in travel time** (relative to off-peak conditions) of the 12 CMP study corridors occurs on the eastern portion of **I-526**.
- The **cost of congestion** is highest in **Charleston County**, with delays on the southern portion of **US 17** reaching almost $2.50 per trip.
- For those corridors where travel by transit is possible, **average transit time** can be up to **4 to 5 times greater** than the average driving time.
- The **connectivity ratios** in each county are **relatively low.**
- **Indexed to population growth**, the region is **performing better than before** on many travel metrics, including vehicle miles traveled, excess fuel consumption, hours of delay, and congestion cost.
- Segments of several corridors, including **SC 61/SC 642, I-526, and I-26/US 78**, are likely to experience **severe recurring congestion** in the future.
- **Crashes** in the region are clustered in **downtown Charleston**; however the **highest crash rates** occur on **Dorchester Road, US-17 Alt., and US 78**.
- Corridors that experience bottlenecks from **both recurring and non-recurring congestion** include: **I-26/US 78, the western portion of I-526, SC 61/SC 642, SC 171, and the southern portion of US 17**.
- **Transit service** is concentrated in the central portion of the region. In many cases, this also corresponds with the location of **high poverty and/or high minority populations.**
- The **peripheral areas** of the region have **poor or no fixed route transit service**.
- The most significant clustering of both **bicycle and pedestrian crashes** occurs in the vicinity of **Dorchester Rd, Cosgrove Ave,** and **River Avenue intersections**.

recommendations and future directions

The following section identifies the overall corridor strategies and directions that can be applied to the transportation network to address congestion based upon the performance measures presented in the previous sections of this report. Committed roadway improvement projects identified within the CHATS planning area provide the baseline condition of the area's transportation network and the region's approach to address congestion and mobility needs if no new projects are undertaken. This baseline condition serves to identify network deficiencies, inform future needs of the network and also evaluate future recommended improvements to the system.

Committed Roadway Improvement Projects

Committed roadway improvement projects are identified as any roadway project located within the CHATS planning area that is under construction, completely programmed or partially funded. The committed roadway projects provided in Table 2 and Map 12, are used to establish the baseline Existing plus Committed (E+C) condition of the region's transportation network.

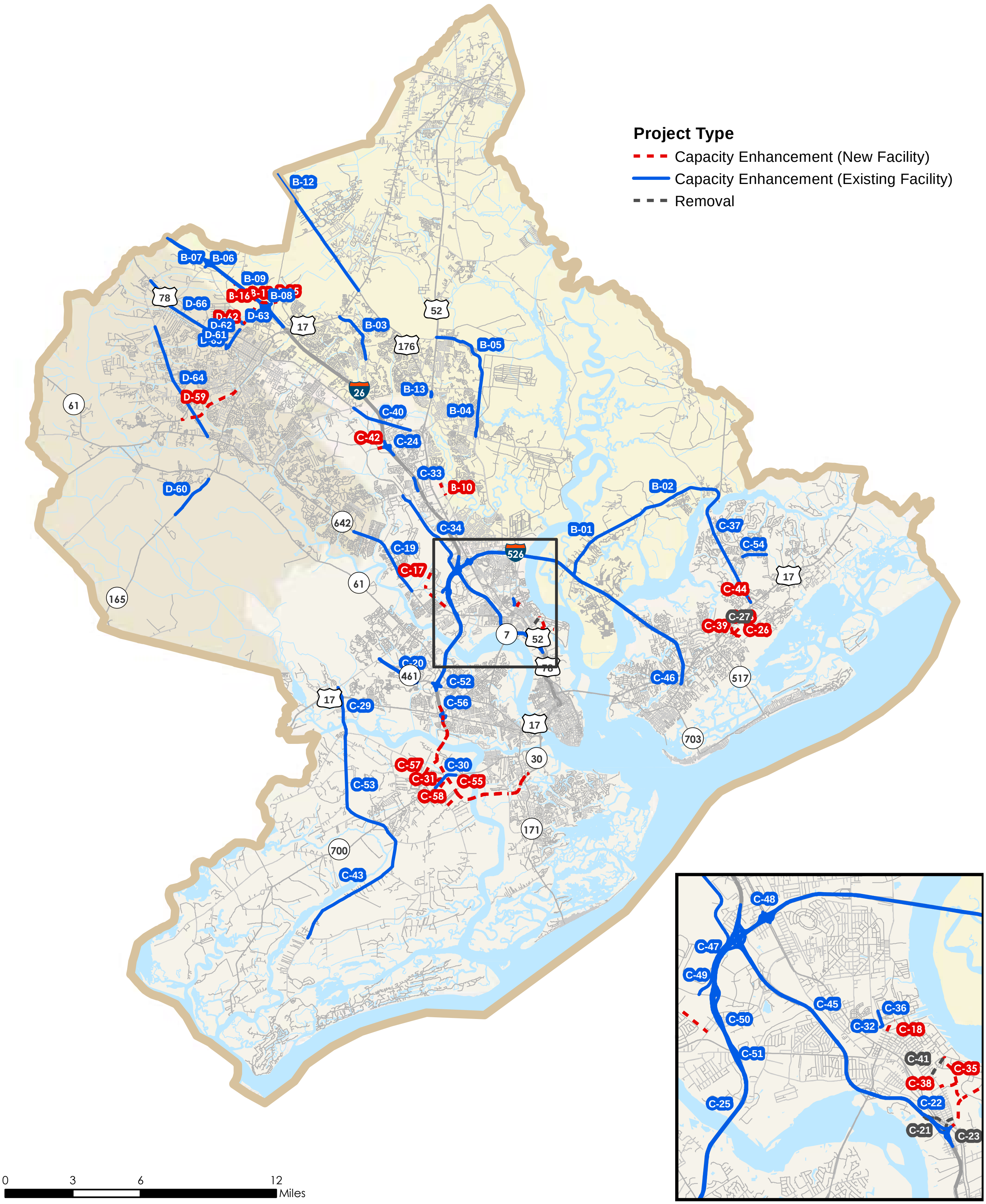
ID	Location	Improvement	Potential Laneage	Limits
BERKELEY COUNTY				
B-01	Clements Ferry Rd (Phase I)	Widening	4-Lane Divided	I-526 Interchange to Jack Primus Rd
B-02	Clements Ferry Rd (Phase II)	Widening	4-Lane Divided	Jack Primus Rd to SC-41
B-03	College Park Rd	Widening	4-Lane Divided	US-17A to Corporate Prkwy
B-04	Henry Brown Blvd (Phase I)	Widening	4-Lane Divided	Red Bank Rd to Liberty Hall Rd
B-05	Henry Brown Blvd (Phase II)	Widening	2-Lane Divided	Liberty Hall Rd to US-52 (Old Mt. Holly Rd)
B-06	I-26 - Jedburg Rd X'change	Redesign X'change	1-Lane Ramps	-
B-07	Jedburg Rd	Widening	4-Lane Divided	Drop Off Dr to Old Dairy Rd
B-08	I-26 - North Maple St / Nexton Pkwy X'change	New X'Change	1-Lane Ramps	-
B-09	Interstate - 26	Widening	6-Lane Divided	US-17A to jedburg Rd Interchange
B-10	Railroad Ave Extension	New Roadway	2-Lane Divided	Mabeline Rd to Eagle Landing Dr
B-11	Nexton Pkwy	New Roadway	4-Lane Divided	N. Maple St to Nexton Elementary School
B-12	US-176 / State Rd	Widening	4-Lane Divided	US-17A to Volvo Car Dr
B-13	US-176 - US-52 X'change	New X'change	1-Lane Ramps	-
B-14	Interstate-26	Widening	6-Lane Divided	Jedburg Rd to Ridgeville Rd (SC-27)
B-15	Drop Off Dr Extension	New Roadway	2-Lane Undivided	Drop Off Dr to Nexton Pkwy
B-16	Red Bay Rd Extension	New Roadway	2-Lane Undivided	Red Bay Rd to N. Maple St Extension
CHARLESTON COUNTY				
C-17	Airport Connector Rd	New Roadway	4- Lane Divided	W. Montague Ave to Michaux Pkway to Terminal
C-18	Cosgrove Ave Overpass	New Roadway	2-Lane Undivided	Spruill Ave to McMillan Ave
C-19	Dorchester Rd	Widening	6-Lane Divided	Michaux Pkwy to County Line (Patriot Blvd)
C-20	Glenn McConnell Pkwy	Widening	6-Lane Divided	Bees Ferry Rd to Rutherford Way
C-21	I-26 - Meeting St X'change	Removal	*Not Applicable*	-
C-22	I-26 Port Access Rd X'change	New X'change	1-Lane Ramps	-
C-23	I-26 - Spruill Ave X'change	Removal	*Not Applicable*	-
C-24	I-26 - PCP (Weber Dr) X'change	New X'change	1-Lane Ramps	-
C-25	Interstate-526	Widening	6/8-Lane Divided	Paul Cantrell Blvd to Rivers Ave
C-26	Johnie E. Brown Rd	New Roadway	4-Lane Divided	US-17 to Rifle Range Rd
C-27	Long Point Rd	Removal	*Not Applicable*	-
C-28	Long Point Rd	Realign Roadway	2-Lane Divided	US-17 to Silent Harbor Court
C-29	Main Rd (Phase I)	Widening/New X'change	4-Lane Divided/1-Lane Ramps	Bees Ferry Rd to River Rd / US-17 and Main Rd Intersection
C-30	Maybank Highway	Widening	3-Lane Undivided	River Rd to Stono River Bridge

TABLE 2 . Committed Roadway Improvement Projects

TABLE 2 . Committed Roadway Improvement Projects *(cont.)*

ID	Location	Improvement	Potential Laneage	Limits
C-31	Maybank Highway Pitchfork	New Roadway	2-Lane Divided	Maybank Higway to River Rd
C-32	McMillan Ave	Removal	*Not Applicable*	-
C-33	Northside Dr	Realign Roadway	4-Lane Divided	-
C-34	Palmetto Commerce Pkwy (Phase III)	New Roadway	4-Lane Divided	Ashley Phosphate Rd to International Blvd
C-35	Port Access Rd	New Roadway	2-Lane Divided	I-26 Interchange to Naval Base ICTF
C-36	St. Johns Ave	Realign Roadway	2-Lane Undivided	-
C-37	SC-41	Widening	*To Be Determined*	Clements Ferry Rd to US-17
C-38	Stromboli Ave Extension	New Roadway	4-Lane Divided	Spruill Ave to Port Access Rd
C-39	Sweetgrass Basket Pkwy	New Roadway	2-Lane Divided	Six Mile Rd to Hamlin Rd
C-40	US-78 / University Blvd	Widening	6-Lane Divided	County Line (Ladson Rd) to US-52
C-41	Viaduct Rd	Removal	*Not Applicable*	-
C-42	Weber Dr (PCP) Extension	New Roadway	2-Lane Divided	Ingleside Blvd to I-26 Interchange
C-43	Bohicket Rd.(Phase III)	Widening	4-Lane Divided	Maybank Highway to River Rd
C-44	Gregorie Ferry Connector	New Roadway	2-Lane Divided	Winnowing Way to SC-41
C-45	Interstate-26	Widening	8/10-Lane Divided	Port Access Rd X'change to I-526 X'change
C-46	Interstate-526	Widening	6/8-Lane Divided	Rivers Ave to US-17 / Bowman Rd
C-47	I-26 - I-526 X'change	Redesign X'change	*To Be Determined*	-
C-48	I-526 - Rivers Ave X'change	Redesign X'change	*To Be Determined*	-
C-49	I-526 - International Blvd X'change	Redesign X'change	*To Be Determined*	-
C-50	I-526 - Montague Ave X'change	Redesign X'change	*To Be Determined*	-
C-51	I-526 - Dorchester Rd / Paramount Dr X'change	Redesign X'change	*To Be Determined*	-
C-52	I-526 - Paul Cantrell Blvd X'change	Redesign X'change	*To Be Determined*	-
C-53	Main Rd (Phase II)	Widening	4-Lane Divided	River Rd to Maybank Highway
C-54	Park West Blvd	Widening	4-Lane Divided	Town Rec. Complex to Bessemer Rd
C-55	Mark Clark Expressway Extension	New Roadway	4-Lane Divided	-
C-56	Mark Clark Expressway Ext. - US-17 X'change	Redesign X'change	*To Be Determined*	-
C-57	Mark Clark Expressway Connector Rd (N)	New Roadway	2-Lane Divided	-
C-58	Mark Clark Expressway Connector Rd (S)	New Roadway	2-Lane Divided	-
DORCHESTER COUNTY				
D-59	Berlin Myers Pkwy Extension	New Roadway	4-Lane Divided	-
D-60	Delemar Highway / SC-165	Widening	4-Lane Divided	-
D-61	North Maple St	Widening	2-Lane Divided	-
D-62	North Maple St	Widening	4-Lane Divided	-
D-63	Old Dairy Rd	Realign Roadway	2-Lane Divided	Intersection with Maple St
D-64	Old Orangeburg Rd	Widening	4-Lane Divided	Dorchester Rd to Mallard Rd
D-65	Parsons Rd	Realign Roadway	2-Lane Undivided	US-78 to Linning Rd
D-66	US-78	Widening	4-Lane Divided	Old Orangeburg Rd to W. Richardson Ave

Map 12: Committed Roadway Improvement Projects



Corridor Strategies

The 12 CMP study corridors have been paired with strategies that are likely to create a positive benefit in the mobility of the corridor, as shown in the matrix on the following page (Table 3). Each strategy is designed to address one or more of the goals laid out at the beginning of this report. It should be noted that the performance metrics identified for Goal 5 are each actionable strategies in and of themselves, and therefore are not included in this matrix. The strategies highlighted in the matrix are defined in the Corridor Strategy Glossary below.

The Congestion Management Process recognizes that additional evaluation, planning, public engagement, and preliminary design work will need to occur before any particular strategy is selected, but these strategies have been selected to provide general direction for each corridor moving forward. In a number of cases, detailed studies have been conducted in these corridors, with specific recommendations concerning additional transportation infrastructure and services. The recommendations herein are not intended to supersede the outcome of those studies, but are intended as a guide to formulating a range of countermeasures to alleviate existing and forecasted congestion.

Corridor Strategy Glossary

Intersection Improvements: Geometric and signal improvements to existing intersections and interchange locations.

Safety Countermeasures: Spot measures that respond to specific crash types that may include driveway closures, signal modifications, pavement markings/signage, and geometric modifications.

Access Management: Retrofitting driveway and street entrances as well as application of overlay design districts to reduce the number and severity of conflict points along a corridor.

Improved Crash Response: Improvements to the detection, response, coordination, and removal of impaired vehicles from the travelway.

Parallel Pedestrian Facilities/Greenways: Creation or enhancement of greenway trails, sidewalks, pedestrian/bicycle intersection crossings, and encouragement programs to create modal shifts away from motorized transportation to biking and walking modes.

Education/Enforcement: Working with partners to address issues of speeding /dangerous traffic behaviors and improved safety behaviors.

Enhanced Operations: A range of operational management strategies such as improved traffic detection/response, ramp metering, traffic signal prioritization, and other technology-based improvements.

Improve Connectivity: Increasing the network density to allow for multiple routes, preferably serving different types of traffic (local, freight, through).

Traveler Information: Improvements to the collection, distribution and comprehension of traffic conditions, bus services, and parking availability in downtown or commercial districts.

Private Provider Services: Support, including financial, for peer-to-peer, sharing, or collaborative shuttle systems partially or wholly operated by private entities.

Parking Fees/Structuring: Addressing parking design, location, quantity and other aspects (e.g., sharing, remote parking) to support businesses, minimize "seeking" behaviors, and increase transit ridership.

Improve Transit Service/Headways: Improvements to traditional, fixed-route bus services, including enhancing frequencies, deviated route/response, security, reduction of dwell times, transfers, transit signal priority, and amenities to increase transit ridership.

Bus on Shoulder/BRT: Creating a corridor or network of bus routes using at least partially separated rights-of-way, signal prioritization, and enhanced stop amenities (with fewer stop locations)

Congestion Pricing/Tolling: Creating a HOV/HOT lane corridor or network that reflects the price of improved mobility on congested roads where built capacity is going to increase (e.g., road widening).

Development & Design Policies: Any policy that supports biking, walking and public transportation including ordinance revisions to modify parking, architectural features, sidewalk requirements, intersection/driveway requirements, and transit-supportive densities in key areas.

	GOAL				CORRIDOR											
	1	2	3	4	A	B	C	D	E	F	G	H	I	J	K	L
STRATEGIES	Safety	Mobility	Reliability	Community	US 17 Alt / SC 165	I-26 / US 78 / US 176	US 52 / US 17 Alt	I-26 / US 78	SC 171	US 17 (south)	US 17 (north)	SC 41	I-526 (east)	I-526 (west)	SC 61 / SC 642	Clements Ferry Road
Intersection Improvements	●	●		●	◆			◆	◆						◆	
Safety Countermeasures	●		●	●	◆	◆		◆			◆				◆	
Access Management	●	●		●	◆		◆		◆	◆	◆	◆			◆	◆
Improved Crash Response	●	●	●		◆	◆		◆			◆				◆	
Parallel Pedestrian Facilities/ Greenways	●	●		●		◆	◆	◆	◆	◆	◆	◆	◆	◆	◆	◆
Education/ Enforcement	●	●		●				◆	◆				◆	◆		
Enhanced Operations		●			◆	◆		◆	◆				◆	◆	◆	
Improve Connectivity		●	●	●	◆										◆	◆
Traveler Information		●	●					◆	◆	◆	◆				◆	
Private Provider Services		●			◆	◆	◆					◆				◆
Parking Fess/ Structuring		●						◆		◆					◆	
Improve Transit Service/Headways		●		●				◆	◆	◆	◆				◆	
Bus on Shoulder/BRT	●	●	●	●		◆	◆	◆					◆	◆		
Congestion Pricing/ Tolling		●	●			◆							◆	◆		
Development & Design Policies		●		●	◆	◆	◆								◆	

Table 3: Suggested Corridor-Level Strategies Matrix

Lowcountry Go Commuter Services Program

The Lowcountry Go Commuter Services Program implements a select set of Transportation Demand Management (TDM) stategies in an effort to shift commuter demands to alternative transportation options. This program has the potential to impact system-wide commute patterns and traffic congestion.

The Lowcountry Go Commuter Services Program, founded in 2018, has accomplished a tremendous amount in a short timeframe. Managed by the Berkeley-Charleston-Dorchester Council of Governments in partnership with the South Carolina Department of Transportation, the Federal Highway Administration, and employers and stakeholders in the Tri-County Region, this pilot program is focused on reducing traffic congestion and improving quality of life.

The Lowcountry Go Commuter Program is a strategic approach to managing transportation resources. Because the program serves as a centralized system for transportation options and coordinates requests for transportation services, the BCDCOG staff is positioned to provide residents, commuters, and employers with a menu of transportation services and coordination options. The Lowcountry Go Program directs BCDCOG and consultant resources to implement the recommended TDM strategies for employees and employers through education, promotion and marketing projects and programs that focus on the following:

- Moving people instead of moving vehicles;
- Identifying the travel needs of individual consumers;
- Assisting with the entire trip, even if the trip involves more than one mode of travel;
- Promoting vanpool, carpool, and rideshare matching initiatives;
- Emphasizing opportunities to expand traditional business practices to include programs such as flex time, telecommuting, compressed work week, and staggered work hours; and
- Promoting transit-oriented developments.

Employee TDM Strategies. The selected TDM strategies recommended to reduce traffic congestion include commuter-based TDM programs focused on the travel of employees to and from work. Implementation of these strategies includes promoting, marketing and educating employees on the benefits of carpools, vanpools, rideshare matching, and guaranteed ride home programs.

Employer TDM Strategies. The recommended employer-based TDM programs are focused on coordination of the hours and operations of employees in the workplace. Implementation of these strategies includes the promotion of projects and programs to incentivize work flextime, staggered shifts, compressed work weeks, telecommuting, transit passes, and other financial incentives to encourage off-peak employee travel.

Outreach. This commuter services program relies heavily on engagement and input from community stakeholders, regional large employers, and their respective employees to recognize commuter needs and to establish a baseline of commuter behavior and program awareness in the Tri-County Region. Outreach is achieved through contact through the BCDCOG mobility manager and other agency contacts; the *www.LowCountryGo.com* website; Facebook, Instagram, and other social media.

updating this report

In order to satisfy the ongoing monitoring element of the Congestion Management Process, this report has to be updated periodically and the results compared over time. This section describes the key data sources and actions needed to make updates to the CMP.

Collecting New Data

New data will need to be collected in order to update the report. It is recommended that updated travel time data be collected on approximately the same schedule as the long-range transportation plan (about every four years). Daily traffic counts and the travel demand model are updated on a similar cycle, or are maintained even more frequently.

Creating New Graphics

In addition to new data, the next iteration of this report will require the development of new graphics that show how the transportation system is changing over time. The BCDCOG should prepare its staff and/or budget line items appropriately in the 2019 (data collection) and 2020 (report production) work program.

The following pages provide an overview of the data sources and analysis methods used to create this report so that future updates can be conducted with greater ease and consistency.

Methods and Data Sources

The next update of this report will be conducted most effectively if the following notes regarding data sources and methodology are reviewed prior to initiating report development. These notes are arranged according to the subsections of the Existing Conditions section of the CMP report.

I. What do the numbers say?

This first part of this section relies on American Community Survey data, available from the US Census Bureau, for Charleston, Berkeley, and Dorchester Counties.

How do we compare? The data is from the TTI Congestion Report, which is updated annually. The report includes peer regions classified as medium-sized metros.

- *Annual Delay per Commuter* – A yearly sum of all the per-trip delays for those persons who travel in the peak period (6 to 10 a.m. and 3 to 7 p.m.). This measure illustrates the effect of traffic slowdowns as well as the length of each trip.
- *Congestion Cost* – Value of travel delay for 2014 (estimated at $17.67 per hour of person travel and $94.04 per hour of truck time) and excess fuel consumption estimated using state average cost per gallon.
- *Excess Fuel Consumed* – Increased fuel consumption due to travel in congested conditions rather than free-flow conditions.
- *Free-Flow Speeds* – These values are derived from overnight speeds in the INRIX speed database. They are used as the national comparison thresholds. Other speed thresholds may be appropriate for urban project evaluations or sub-region studies.
- *Peak Commuters* – Number of travelers who begin a trip during the morning or evening peak travel periods (6 to 10 a.m. and 3 to 7 p.m.). "Commuters" are private vehicle users unless specifically noted.
- *Number of Rush Hours* – Time when the road system might have congestion.
- *Planning Time Index* – A travel time reliability measure that represents the total travel time that should be planned for a trip. Computed with the 95th percentile travel time it represents the amount of time that should be planned for a commute trip to be late for only 1 day a month. If it is computed with the 80th percentile travel time it represents the amount of time that should be planned for a trip to be late for only 1 day a week. A PTI of 2.00 means that for a 20-minute trip in light traffic, 40 minutes should be planned.
- *Total Delay* – The overall size of the congestion problem. Measured by the total travel time above that needed to complete a trip at free-flow speeds. The ranking of total delay usually follows the population ranking (larger regions usually have more delay).
- *Travel Time Index* – A measure of congestion that focuses on each trip and each mile of travel. It is calculated as the ratio of travel time in the peak period to travel time in free-flow. A value of 1.30 indicates that a 20-minute free-flow trip takes 26 minutes in the peak.
- *Urban Area* – The developed area (population density more than 1,000 persons per square mile) within a metropolitan region. The urban area boundaries change frequently (every year for most growing areas), so increases include both new growth and development that was previously in areas designated as rural.

How does the nation see us? This section relies on third-party data sources that are readily available to the public. While key to understanding how business leaders, visitors, and others view our community, some data sources may have some variation in quality.

- *Gauging Our Impacts and Commuter Stress Index:* Sourced from the TTI Congestion Report (updated annually). Peer regions include 33 medium-sized metropolitan areas.
- *Getting to Work:* Sourced from www.trulia.com. Created spreadsheet of origin/destination pairs with travel times between each.
- *Walk Score:* Sourced from www.walkscore.com, 2017.

II. What do the people say?

This section relies on data collected through public outreach efforts during the CMP planning process.

Survey: The survey was administered electronically and using hard copies. Participants in the survey included attendees at public meetings and events, as well as other members of the general public who may have reached the survey online via the project website or other advertising and outreach efforts. The results of the survey were collected and analyzed in aggregate to produce the graphics presented in this section of the report.

Public Symposium: From June 19 to June 21, 2017, three public symposiums were held in the CHATS planning area. Participants at the symposiums participated in several exercises, including a prioritization voting exercise, and an interactive issues identification mapping exercise. The results of the prioritization exercise were summarized by symposium location. The results of the mapping exercise were aggregated and summarized by issue and location. The resulting map has been included in this report.

III. Roadway Conditions

Conditions were calculated from several data sources.

- *Peak Hour Travel:* Travel time data was collected from Google Maps, which provides typical travel times throughout the day. Typical travel times were pulled for each hour, and averaged in the peak and off-peak hours to find typical travel times for each corridor.
- *Cost of Congestion:* Average wage rates for each county were obtained from the Bureau of Labor Statistics. These wage rates were multiplied by the additional time needed to traverse a corridor during peak hours to determine the cost of congestion on that corridor. For corridors that traverse more than one county, the costs were split between the two counties to give a general determination of overall cost traveling through the entire corridor.

IV. Bicycle, Pedestrian, and Transit Conditions

This section uses a variety of data sources to provide a better understanding of alternative modes of transportation in the region.

- *Connectivity Index:* The connectivity index is calculated using the road network shapefiles for the region to calculate the number of links and nodes, where a link is defined as a segment of roadway, either from intersection to intersection or intersection to endpoint, and a node is an intersection.
- *Performance for Bus Service:* The bus service performance metrics were derived from data published annually in the National Transit Database by the Federal Transit Administration (FTA).
- *Corridor Travel Time:* Typical travel times from Google maps were used to find the average time it takes to traverse a corridor via transit or driving. For several corridors, routes that traverse the entire corridor are not available; these routes are excluded from this chart.