



MULTIMODAL **NORFOLK**

TRANSIT SYSTEM REDESIGN

Draft New Network Report

NOVEMBER 2020

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For
NORFOLK THE CITY OF

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1 Introduction & Executive Summary

A Redesigned Network Through Community Conversation

What is Multimodal Norfolk

Beginning in February 2020, The City of Norfolk began a conversation with stakeholders, transit riders, community members and elected officials about whether and how to revise the city’s transportation system in the short and long-term. The City is developing a Multimodal Transportation Master Plan to help define the direction that the City’s transportation system will take over the coming years. This Plan will provide the framework for both large and small transportation decisions about projects, priorities, coordinated planning with respect to land use decisions, public/private initiatives, other infrastructure projects, and more.

What is the Transit System Redesign?

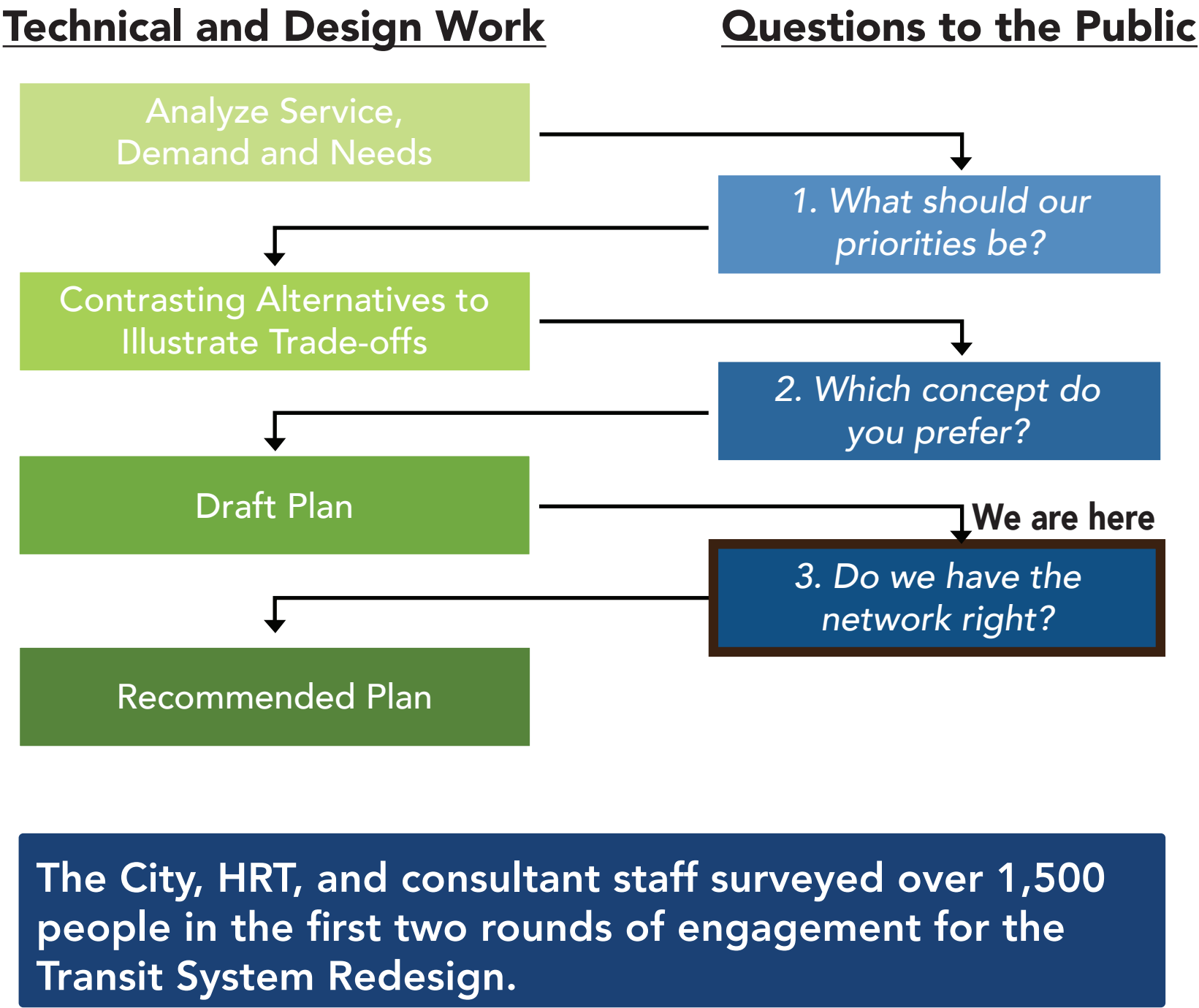
As part of Multimodal Norfolk, the City is studying a full redesign of the public transportation system. This study will evaluate and recommend important policies related to transit funding and stop spacing, and particularly recommend how and where transit services should be provided in the city.

The city’s bus network makes up about 90% of its weekday transit service and serves about 80% of the typical weekday riders. While The Tide is a key part of the city’s transit network, buses are the most flexible component of a transit system and have the highest potential for immediate improvement. **If Norfolk wants to improve access to opportunity by transit quickly, changing the bus network is the fastest way to make a significant difference.**

This report presents **the Draft New Network**: the recommended network design that arose from the year-long planning and two rounds of public conversation. This network could be implemented by October 2021.

This project is not just a technical analysis. The plan has been forged through an extensive public discussion (see Figure 1). In each cycle we asked people to think about what they would do if they were in the transit agency’s shoes. What would their priorities be, if they had to make the decisions that the City has to make? With this report, we have now reach the third and final stage of public engagement, and **we are asking you: “Do we have it right?”**

Figure 1: The study process was a conversation between technical work and public input.



Buses Are Essential for Norfolk

Why Redesign the Bus Network?

After losing population for 30 years, the City of Norfolk has been growing since 2000 and continues to increase in population and employment. Adding people and jobs means increasing density. That makes public transit essential because there is simply not room for everyone's car. While not all of Norfolk is dense, large parts of it are, and like all places with high density, Norfolk presents features that make transit essential, and require that it be highly efficient:

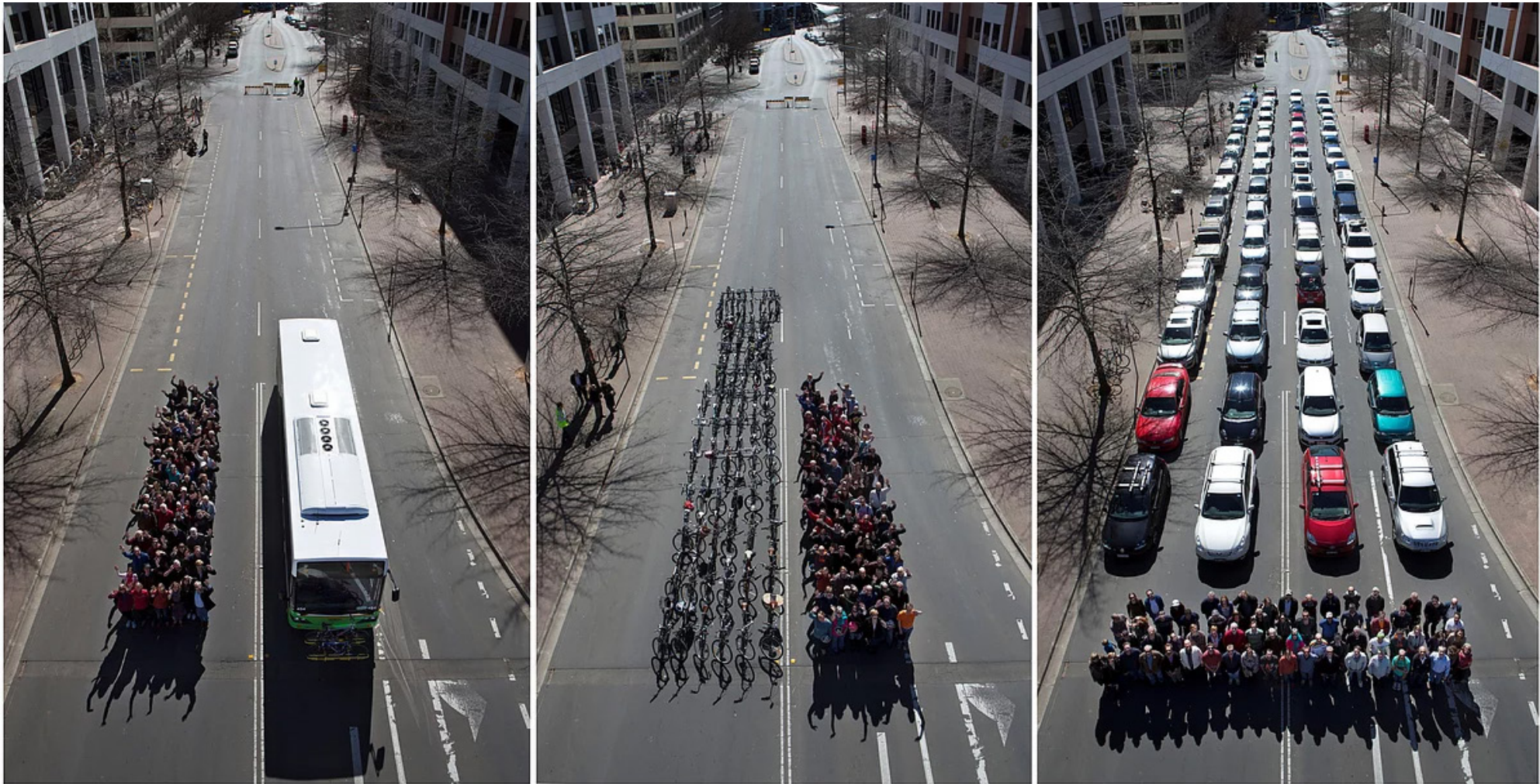
- **Severe road space limitations.** Across many parts of Norfolk, the road-width is fixed and will never be wider. Efforts at widening roads in built-up areas are extremely costly, frequently destructive, and actually counterproductive—research shows that, in the long term, widening roads does not reduce congestion due to induced demand. Curb space is also limited and cannot be readily expanded.
- **Intensification of land use.** In response to growing demands for housing and commercial space, both central and outlying areas are growing more dense. More and more people are living within the same limited area.

These two factors combined mean that more and more people are trying to use a fixed amount of road space. If they are all in cars, they simply will not fit in the space available. The result is congestion, which cuts people off from opportunity and strangles economic growth.

Figure 2 shows how much space the same number of people take in cars, bikes, and buses. *In a growing city that is getting more dense, relying on bikes and transit as major modes of transportation is the only way to have room for everyone.*

The only alternative to congestion is for a larger share of the population to rely on public transit and other modes that carry many people in few vehicles, or that take far less space per person than cars (i.e. bicycles). This requires services that most efficiently respond to the city's changing needs, as well as corridor improvements to give buses a level of priority over cars that reflect the vastly larger numbers of people on each bus.

Figure 2: The road space required to move the same number of people using public transit, bicycles, and cars.
Photo copyright We Ride Australia



Transit and bikes are two of the most space-efficient modes and are essential in dense places, where there is very little road space per person.

Transit's Product: Access to Opportunity

What is Access?

Based on public and stakeholder input, a core goal of the Draft New Network is to help more people get to more places, in the limited amount of time that they have. Figure 3 shows how we calculate this.

What Access Achieves

When we expand access for as many people as possible, we achieve many important things:

- We **make service more useful** for the trips people are already making and for many other trips that people might want to make by transit. When transit is more useful, more people use it.
- We **increase ridership potential**, as a result of service being more useful.
- We increase transit's potential to help with reducing **pollution** and **congestion**. Ridership is the key to how transit achieves these things, and improving access is the path to ridership.
- We **expand access to opportunity** (jobs, education, shopping, services) for people who need transit for that purpose.
- We **increase the economic attractiveness** of the urban area. Connecting people with opportunities is the whole point of cities, so improving those connections makes any city more effective.

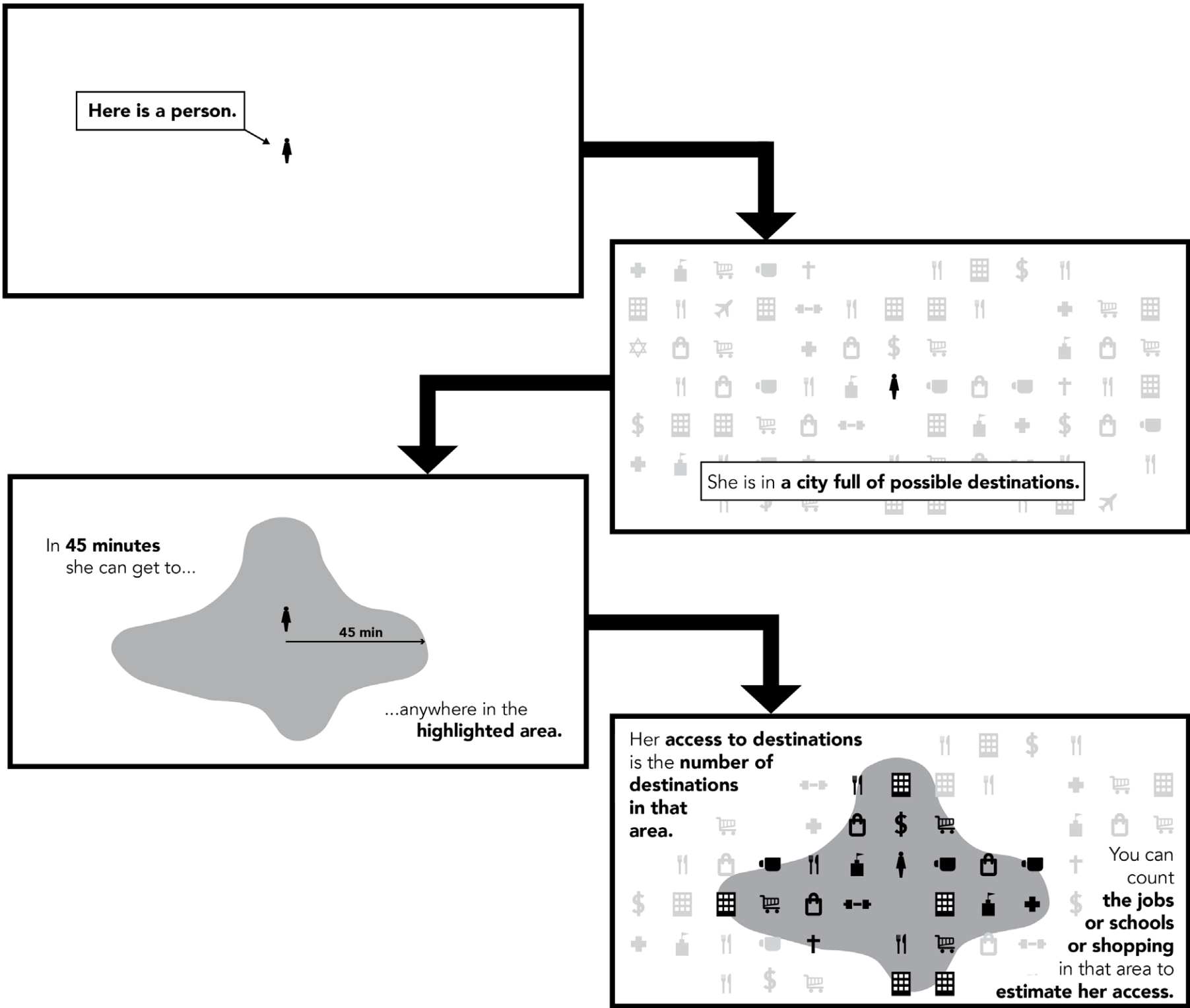
That's why the Draft New Network looks as it does.

The Draft New Network increases access to jobs and opportunities for most people and places in Norfolk. It allows the average person in Norfolk to reach an additional 10,000 jobs within 45 minutes by walking and taking transit—**31% more jobs than are reachable with the Existing Network.**

For the average person in poverty, the number of jobs accessible by transit within 45 minutes would increase by 32%. For the average resident of color, jobs accessible in 45 minutes would increase by 32%, as well.

Figure 3: How transit service creates access to opportunity.

WHAT IS ACCESS?



The Ridership-Coverage Trade-off

Within a limited budget, Norfolk must make difficult choices between competing goals that people care about. These kinds of decisions should not be the result of a consultant’s recommendation. Instead, our role has been to lay out the choices and encourage public discussion of them. Figure 4 illustrates the problem.

A network designed to a goal of **ridership** will maximize access to destinations for the average resident, as this maximizes the chance that transit will be useful for any particular trips. It does this by providing high frequency service in areas where there are many people and jobs to benefit from it. But it does not go everywhere or serve everyone. Some people who need transit will not be served, because they live in places that are too hard for efficient transit to reach. These problems are typically:

- Low Density. There are few people to benefit from each transit stop.
- Low Walkability. It’s too hard for many people to walk to the transit stop, which further limits who finds it useful.
- Poor Linearity. The street pattern doesn’t let the bus run in an efficient straight line.
- Poor Proximity. Service must cross a large, low-demand gap to reach a destination.

So should transit go to those places anyway even though they are providing access to few people, and low ridership will be the result?

If so, you want a **coverage** goal. A coverage goal starts with a commitment to going almost everywhere, so that almost everyone has a little service.

Some transit goals are served by focusing on high ridership. For example, the environmental benefits of transit only arise from many people riding the bus rather than driving. Subsidy per rider is lower when ridership is maximized. We call such goals “ridership goals” because they are achieved through high ridership.

Other goals are served by the mere presence of transit. A bus route may provide important lifeline service, even if few people ride it. A route may fulfill political or social obligations, for example by getting service close to every taxpayer or into every political district. We call these types of goals “coverage goals” because they are achieved by covering geographic areas with service, regardless of ridership.

How should we balance these competing goals? Which should be more important? That’s the most important question we asked in our extensive public conversation.

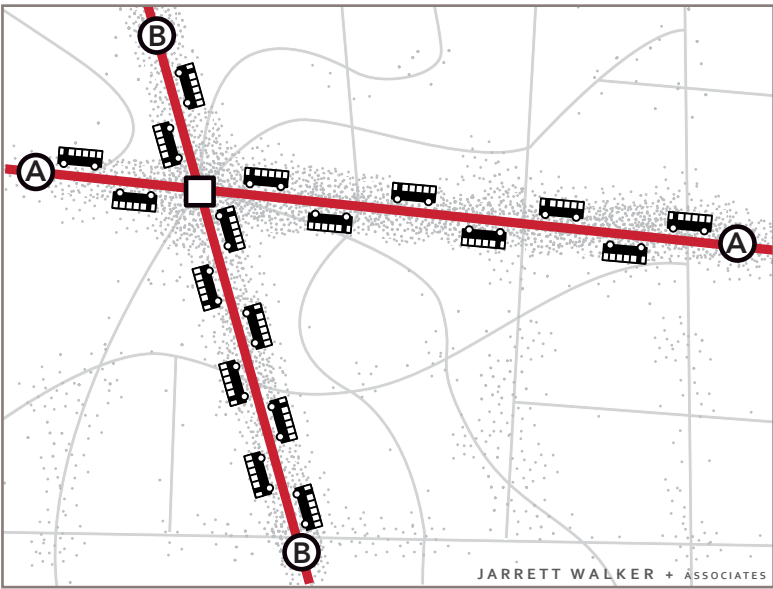
Figure 4: Ridership and coverage goals, both laudable, are in direct conflict within a fixed budget.

Imagine you are the transit planner for this fictional neighborhood.

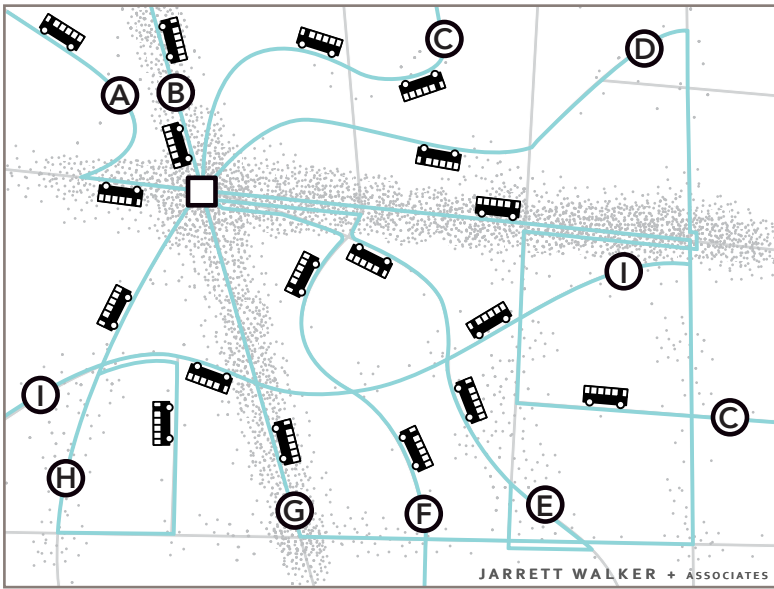
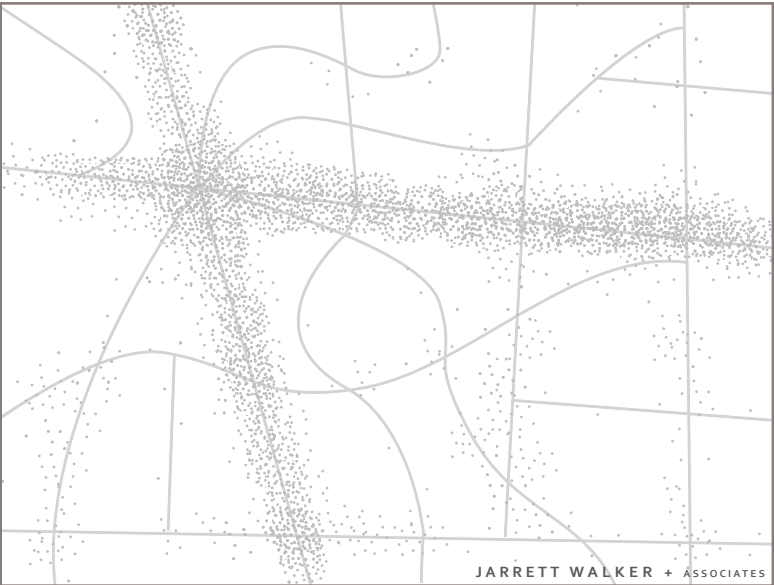
The dots scattered around the map are people and jobs.

The 18 buses are the resources the town has to run transit.

Before you can plan transit routes, you must first decide: What is the purpose of your transit system?



All 18 buses are focused on the busiest streets. Waits for service are short but walks to service are longer for people in less populated areas. Frequency and ridership are high but some places have no service.



The 18 buses are spread around so that there is a route on every street. Everyone lives near a stop but every route is infrequent, so waits for service are long. Only a few people can bear to wait so long, so ridership is low.

How Was this Plan Developed?

A network redesign must fuse knowledge with values. Knowledge includes data about the community and the expertise of transit professionals. Values come only from the community. The Norfolk Transit System Redesign has been engaging with and surveying the community and decision-makers about the values and goals that transit should prioritize. This engagement has been organized into three rounds: Choices, Concepts, and Draft New Network, where we are now.

Round 1: Choices

In Round 1 of the Transit System Redesign, we released the [Choices Report](#) that laid out relevant facts about transit and development in Norfolk, and drew the reader’s attention to difficult choices that these facts force us to consider.

During this first of three phases of engagement, the study team:

- held a Stakeholder Workshop with over 40 representatives;
- presented to the City Council;
- produced a series of online videos explaining key trade-offs; and
- surveyed the public and riders online and in person.

During the survey effort, we asked about three key trade-offs:

- **Walking versus Waiting:** Would you rather have a short walk to a bus stop and a longer wait for service, or would you rather walk farther to a stop and wait less?
- **Ridership versus Coverage:** Using the same fictional example on page 7, we asked people if they preferred a network that focused on Ridership goals or Coverage goals.
- **Peak versus All-Day:** Within a fixed budget, more service at rush hours means less service at other times of the day, so we asked people whether they preferred that Norfolk focus more on peak times or put more service on middays, evenings, and weekends.

Among the 262 survey respondents, most people said they preferred

- Less waiting, even if it meant a longer walk (about 75% preferred less waiting;
- Ridership over Coverage by 56% to 31% margin; and
- More midday and evening service over peak service by 50% to 33% margin.

Figure 5: Round 1 Survey Respondents preferred less waiting even with a longer walk.

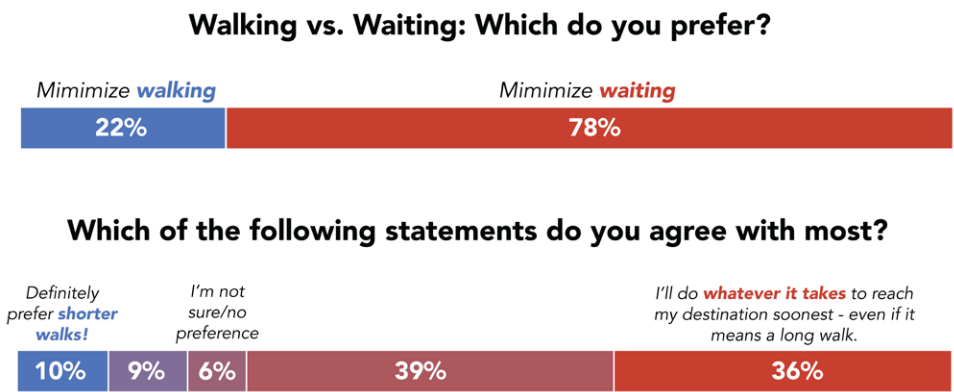


Figure 6: Round 1 Survey Respondents preferred a high ridership network.

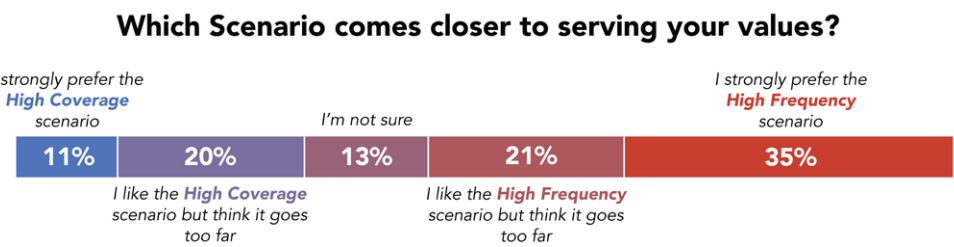


Figure 7: Round 1 Survey Respondents preferred more service at all day, instead of focusing on peak times.

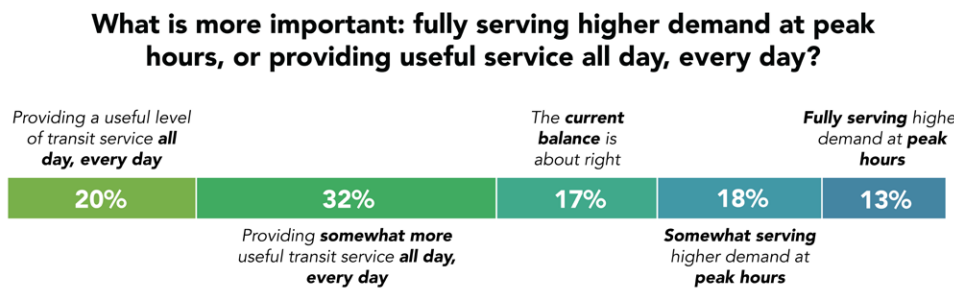


Figure 8: Stakeholders design a transit network for a fictional town (above) and discuss their different designs (below) during the February 2020 Stakeholder Workshop.



Engagement on Concepts

In Round 2, we released the [Concepts Report](#). This report raised four key questions for the public to consider and showed two contrasting concepts, the Ridership and Coverage Concepts, to help people understand the outcomes of different choices.

We asked the public and riders about these two concepts, and specifically about two key value choices and design solutions:

- Should the network emphasize Ridership or Coverage Goals?
- How far apart should bus stops be?

During the Concepts Round of engagement, the study team held a number of meetings and engagement opportunities from June to September, 2020. These events and activities were generally held virtually, given the Covid-19 pandemic, though some in-person surveying was done by staff and volunteers to ensure we heard from existing transit riders. The events and activities included the following engagement opportunities:

- posted flyers about the project with the online survey link at all bus shelters in the city;
- posted regularly on the City and HRT social media platforms to encourage people to learn more and participate in the online survey;
- held a Virtual Stakeholder Workshop with over 40 representatives;
- held 2 Virtual Public Meetings;
- produced a series of online videos explaining the concepts; and
- surveyed riders on the bus and at key transit centers.

In all, the study team received over 1,000 responses from online and paper survey responses, plus we reached many others via social media, virtual meetings, and other activities.

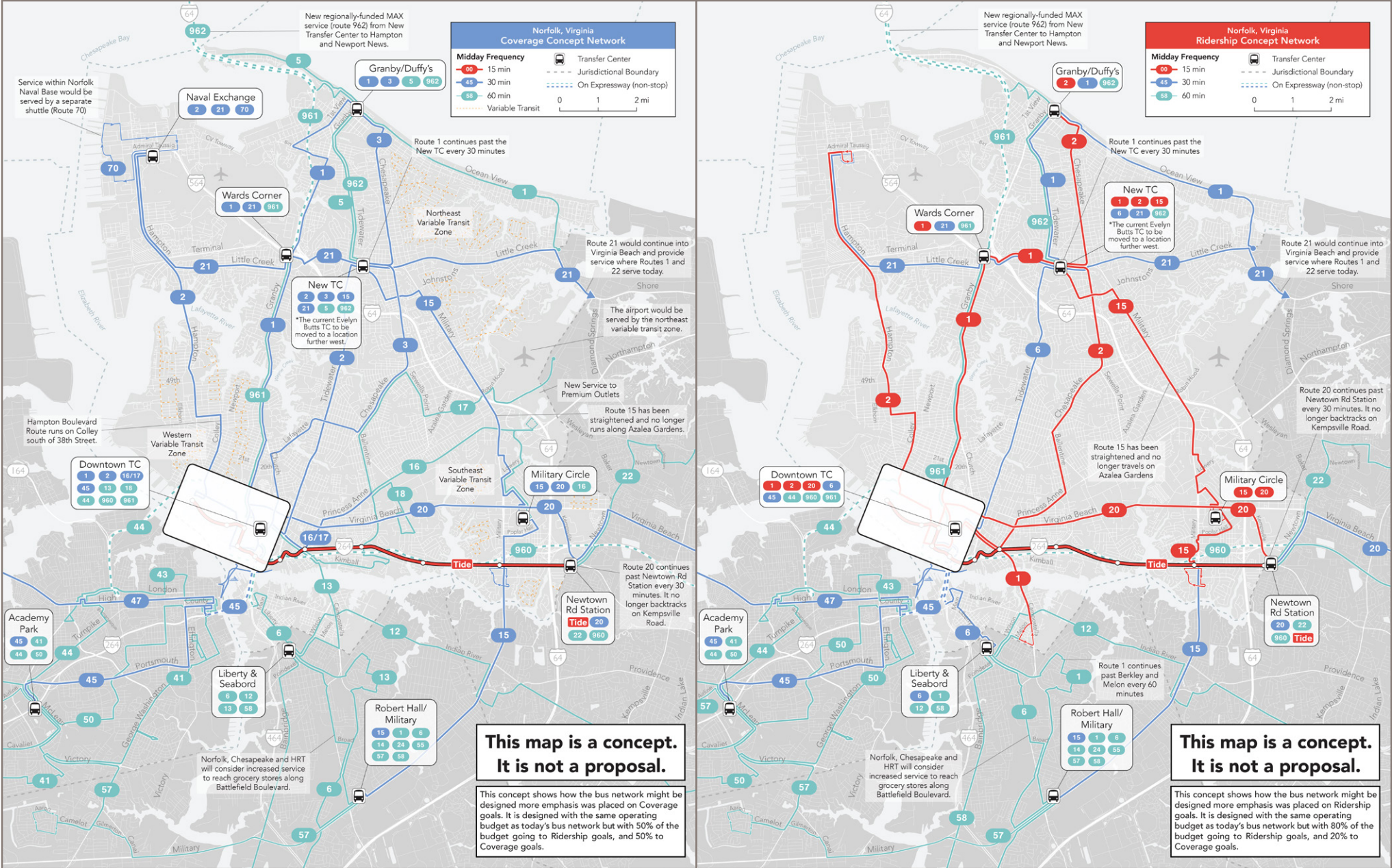
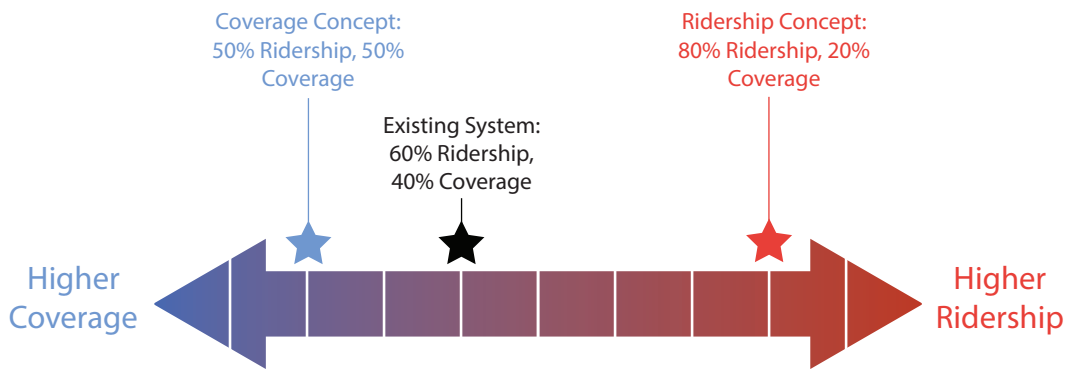


Figure 9: The Coverage and Ridership Concepts represented the ends of a spectrum of possibility for the Norfolk transit network.



A Preference for Ridership

The Round 2 engagement process was focused on getting riders and the public to respond to a survey about the two transit concepts. Through the online and paper surveying efforts, 1,085 survey responses were collected between June 25 and September 15, 2020. The largest share of responses (71 percent) were collected on paper. The remaining portion (29 percent) of responses were collected online.

Demographics of Respondents

Survey respondents were largely African-American/Black, mostly transit riders, largely of working age, mostly low-income, and almost entirely from Norfolk.

- 69% of respondents identified as African-American/Black, 21% as white, 5% some other race or ethnicity, and 6% did not provide a racial or ethnic identity.
- 24% of respondents were 45 to 54 years old, 21% were 35 to 44 years old, and 19% were 25 to 34 years old. Seniors (65+ years old) were 9% of respondents.
- 60% of respondents reported a household income of less than \$35,000 per year, about 25% reported their household income was between \$35,000 and \$100,000, while only 5% reported an income higher than \$100,000. Eleven percent of respondents did not indicate their income.
- The home ZIP code of 94% of respondents was fully or partially within the City of Norfolk.
- 74% of respondents said they ride transit 15 or more days per month, while 16% of respondents reported not using transit in the last month.

Response to Concepts

Respondents were asked to indicate their preference for the Ridership or Coverage Concepts. Nearly two-thirds (64%) of all respondents preferred the Ridership and about one-quarter (27%) preferred the Coverage Concept. Eight percent of respondents indicated that they were “halfway in between” both options and 1% of respondents did not answer the question. Preference for the Ridership Concept was consistent across demographic groups.

African-America/Black respondents preferred the Ridership concept slightly more than the average respondent, with 66% of this group preferring Ridership. White respondents preferred the Ridership Concept at similar, but at a slightly lower rate (64%) while a similar percentage (28%) preferred the Coverage Concept.

Preference for the Ridership concept was stronger among younger respondents (71% of those under 35 preferred Ridership). Just over half (51%) of respondents 35 and older preferred the Ridership concept.

The Ridership concept has strong support from respondents of all income groups: 68% of those with annual incomes under \$35,000 preferred the Ridership concept. Both men and women prefer the Ridership concept. The Ridership concept also had high support from frequent transit riders: 68% of those who indicated that “in a typical month”, they rode local transit more than 15 times per month preferred the Ridership concept.

This consistent preference for the Ridership Concept has guided City staff to recommend that the Draft New Network should be closer to the Ridership Concept than to the Coverage Concept.

Stop Spacing

There is a geometric trade-off between closer stop spacing and faster bus speeds. Respondents were asked to indicate their ideal bus stop spacing distance.

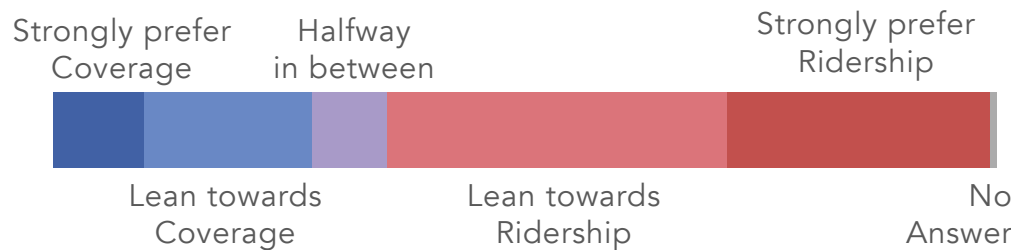
- More than half of respondents (57%) preferred stops spaced every fourth block, or roughly 1,600 feet apart.
- More than a quarter (28%) preferred stops every third block, or roughly 1,200 feet apart.
- Just 13% preferred stops every other block, or roughly 800 feet apart.
- Two percent of respondents did not answer this question.

African-American/Black respondents preferred the widest stop-spacing most strongly (62% preferred 1,600 foot spacing). More than half of White respondents (52%) prefer the widest stop spacing and 39% of white respondents preferred the closest stop spacing.

The widest stop-spacing (1,600 feet) was the plurality preference for all age groups. Yet, it had the lowest relative support among respondents aged 65 or older (44%). The widest stop spacing was also popular across income groups, including 52% support among respondents with annual incomes under \$35,000.

More than half of both male and female respondents preferred the widest stop spacing but a slightly higher share of men (64%) than women (55%). By transit ridership, the group that most strongly preferred the widest stop spacing (64%) was regular transit riders.

Figure 10: Survey respondents heavily favored the Ridership Concept.



Nearly two-thirds of survey respondents preferred the Ridership Concept.

The Existing Network

The map on the right (Figure 11) shows Norfolk’s existing bus network. The map on the following page shows the Draft New Network.

In both maps, every route is color-coded based on its frequency during the midday on a weekday. In the network maps, colors make all the difference:

- **Bright red** lines represent routes that operate every 15 minutes.
- **Dark blue** lines every 30 minutes; and
- **Light blue** lines every 60 minutes.

Every bus route in Norfolk operates either every 30 minutes or every 60 minutes at midday.

In this map, the prominent red line is The Tide, the region’s only service operating every 15 minutes or better throughout the rush hours and at midday. The network is dominated by blue lines, which run every 30 minutes and light blue lines, which run every 60.

The network in Norfolk covers most major streets, so that most of the population and jobs are near some kind of transit service, but the low frequency of service means that most people are waiting a long time for a bus.

The Existing Network uses 60% of resources towards service that can achieve high ridership and the remaining 40% is spent on coverage goals.

Today, only one transit line in Norfolk, The Tide, offers frequent service (every 15-minutes or better) all day, so only 22% of residents and 31% of jobs are near (within 1/4 mile of) frequent service.

Policy Direction

Based on the public feedback described on page 10, the Draft New Network has been designed to follow these guidelines:

- 70% of resources are devoted to service that is expected to get higher ridership relative to cost.
- The other 30% of resources are going to service that is not likely to get high ridership, but will provide service in areas where it is needed the most.
- Stop spacing will be every 1,200 to 1,600 feet, on average, to increase the average speed of bus service. Actual stop spacing will vary and will consider the location of major activity centers including senior centers.

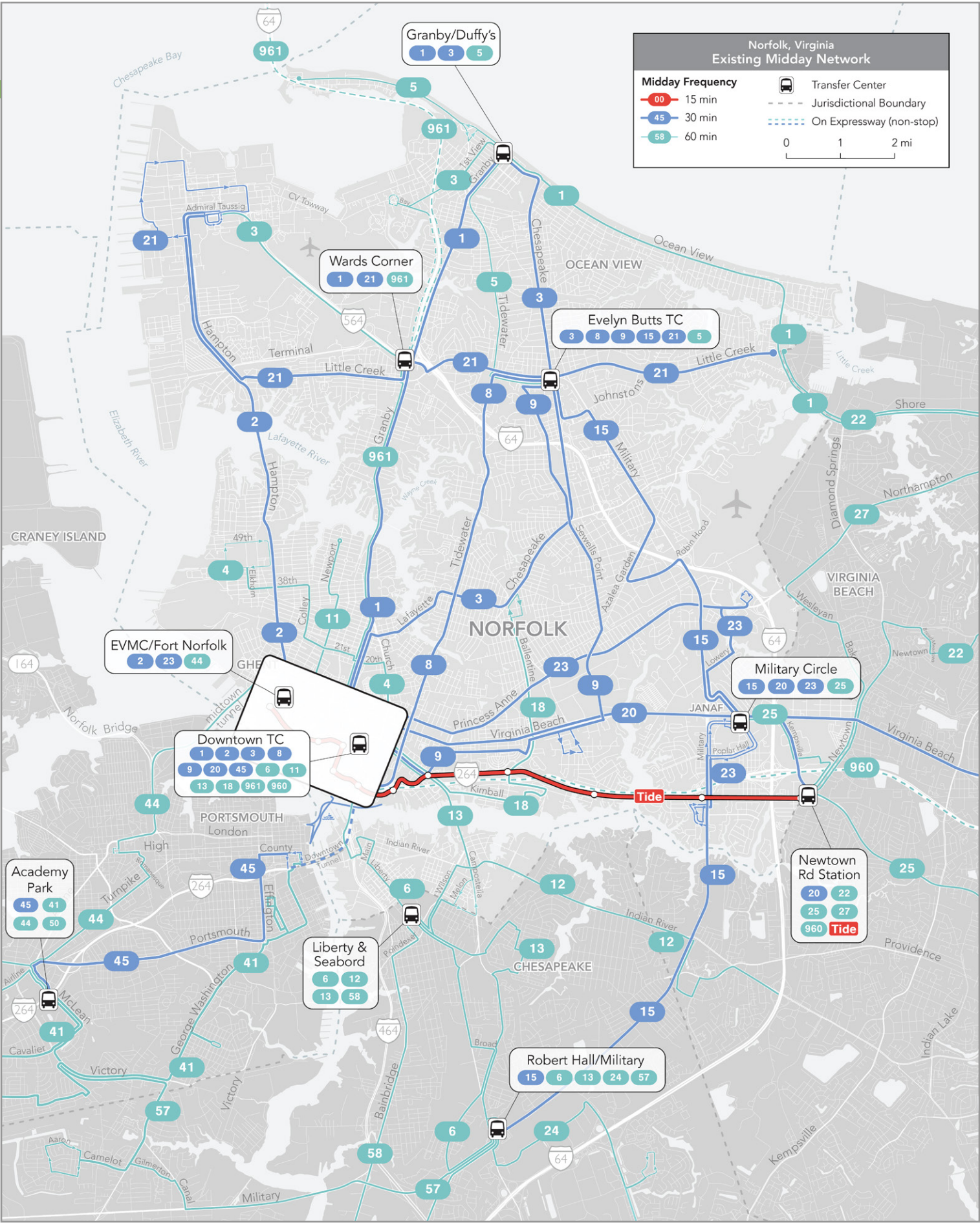


Figure 11: Existing Network in Norfolk

The Draft New Network

The Draft New Network assigns 70% of resources to goals that can achieve high ridership and 30% to provide service in areas where transit is important but is unlikely to yield many riders. This is done by consolidating duplicative resources and moving some resources from coverage service to ridership (or high frequency) service. These changes are described in more detail for each of five geographic sections of the city (west, near north, east, far north, and south) starting on page 19.

For most people and places in Norfolk, the Draft New Network substantially improves access to jobs, people and opportunities by transit. It does this by providing more frequent service along the busiest and densest corridors.

Change in Job Access

The Draft New Network allows the average person in Norfolk to reach 41,700 jobs within 45 minutes by walking and taking transit, **31% more jobs than are reachable within the existing network.**

For the average person in poverty and the average person of color, the Draft New Network increases the number of jobs reachable by transit within 45 minutes by 32%.

This analysis measures jobs, but it reflects a wide range of opportunities that a person can reach. This mean a person can get to more shopping, education, recreational areas, social events, places of worship, and any other opportunities that Norfolk can offer.

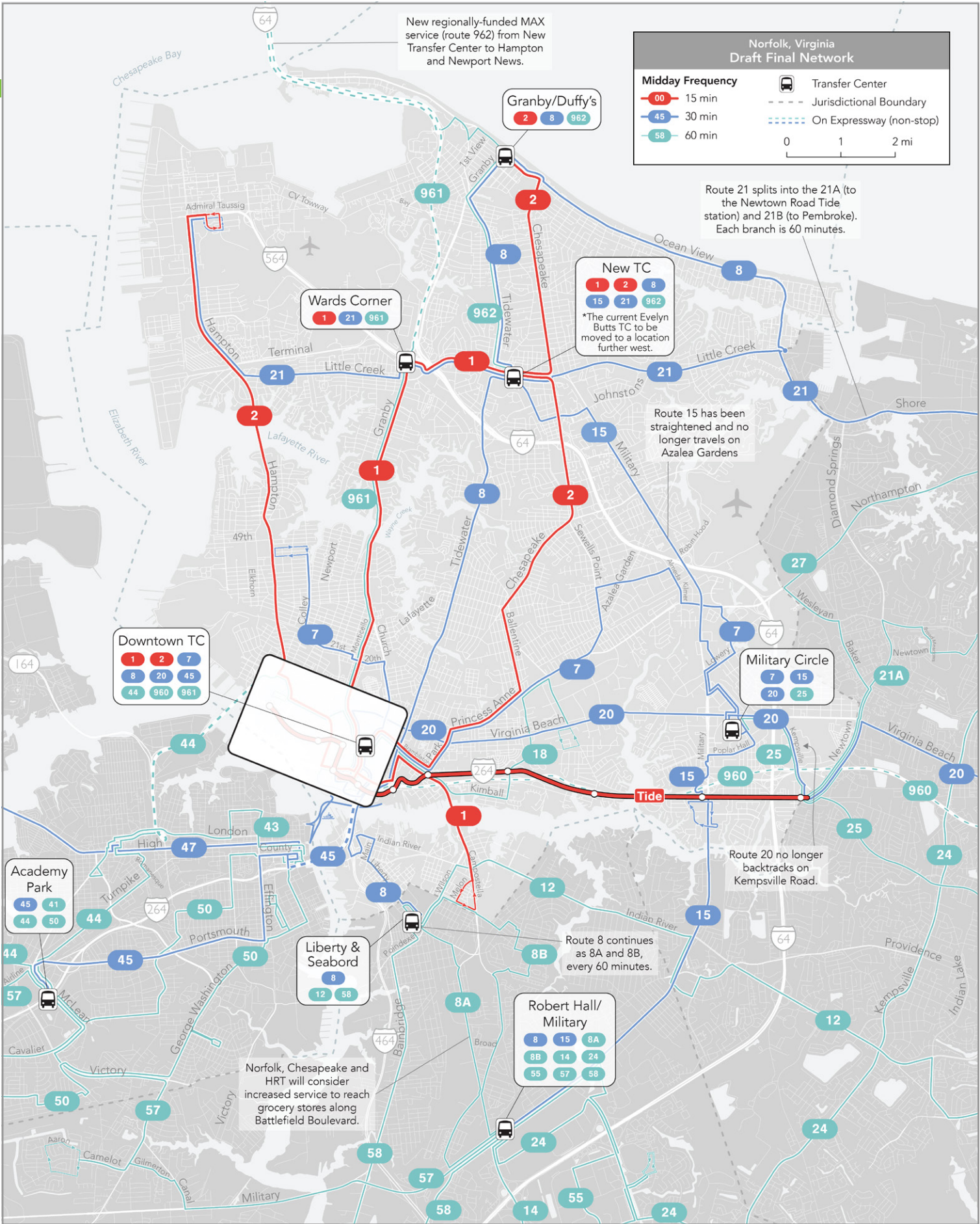
Proximity to Frequent Service

The Draft New Network provides frequent transit (15 minutes or better) near (within 1/4 mile of) 79% of residents and 76% of jobs. This is a significant increase from today, where only 22% of residents and 31% of jobs are near frequent transit.

The Draft New Network also provides frequent transit near 83% of residents in poverty and 81% of residents of color. Today only 19% of residents in these groups are near frequent service.

The Draft New Network extends frequent service to 79% of residents and 76% of jobs.

Figure 12: Draft New Network in Norfolk



Draft New Network Increases Job Access

Freedom, Access, Usefulness

Wherever you are, there is a limited number of places you could reach in a given amount of time. These places can be viewed on a map as a blob around your location. Figure 13 shows an example of this type of visualization of transit access for the Five Points area (Chesapeake and Norview) comparing the Draft New Network to the Existing Network.

Think of this blob as “the wall around your life.” Beyond this limit are jobs you can not hold, places you can not shop, and a whole range of things you can not do because it simply takes too long to get there. The technical term for this is accessibility, but it’s also fair to call it freedom, in the physical sense of that word. The extent of this blob determines what your options are in life: for employment, school, shopping, or whatever places you want to reach. If you have a bigger blob, you have more choices, so in an important sense you are more free.

The real measure of usefulness is not just how much geographic area we can reach, but how many useful destinations are in that area. **For the area around Five Points, residents can reach 78% more jobs in the Draft New Network.**

Change in Job Access

By calculating this kind of access blob for the many points in the city, it is possible to estimate how access changes for everyone in Norfolk. The Draft New Network allows the average person in Norfolk to reach 41,700 jobs within 45 minutes by walking and taking transit—**31% more jobs than are reachable with the existing network.**

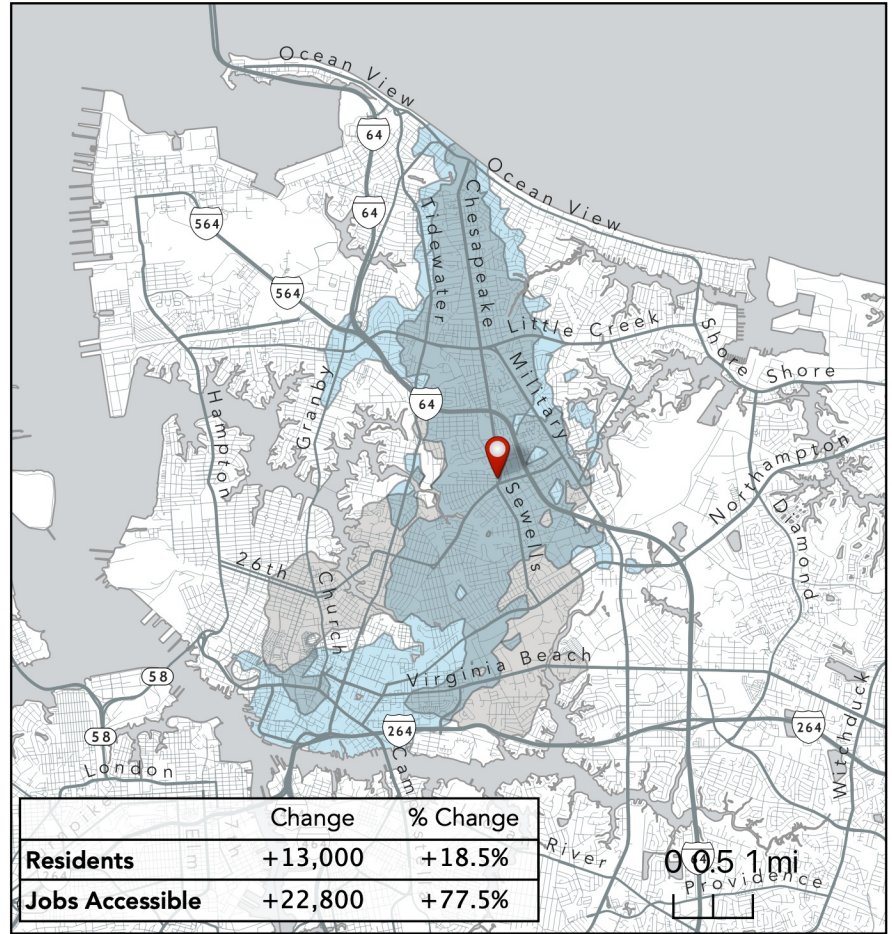
For the average person in poverty, the number of jobs accessible by transit within 45 minutes would increase by 39%. For the average resident of color, jobs accessible would increase by 32%.

This analysis measures jobs, but it reflects a wide range of opportunities that a person can reach. Access to more jobs means a person can get to more shopping, education, recreational areas, social events, places of worship, and any other opportunities that Norfolk, and the region, can offer.

With the Draft New Network, residents near Five Points can reach 22,800 more jobs in 45 minutes.

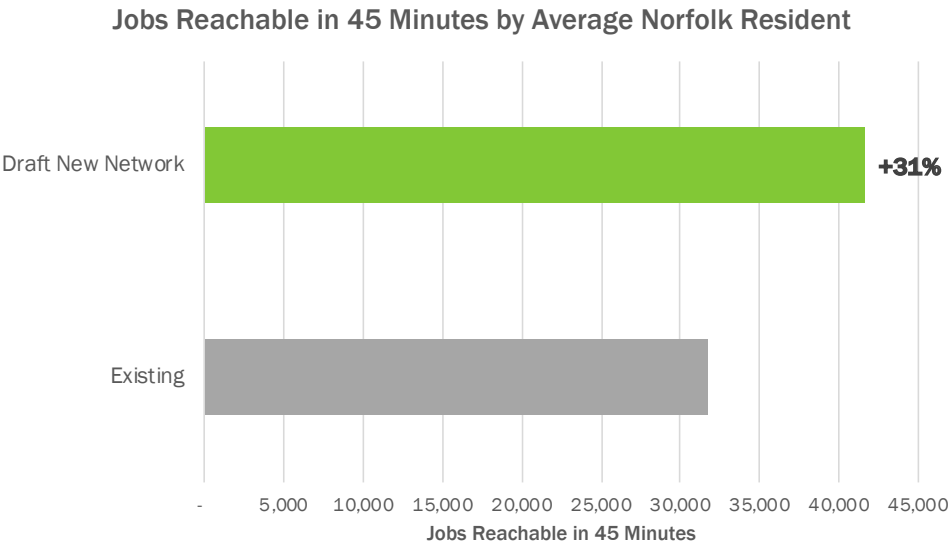
Figure 13: Example of change in places reachable in 45 minutes from Five Points (Chesapeake and Norview) in the Draft New Network, compared to the Existing Network

How far can I travel in 45 minutes from Chesapeake at Norview on weekdays at noon using the: 2021 Network?*



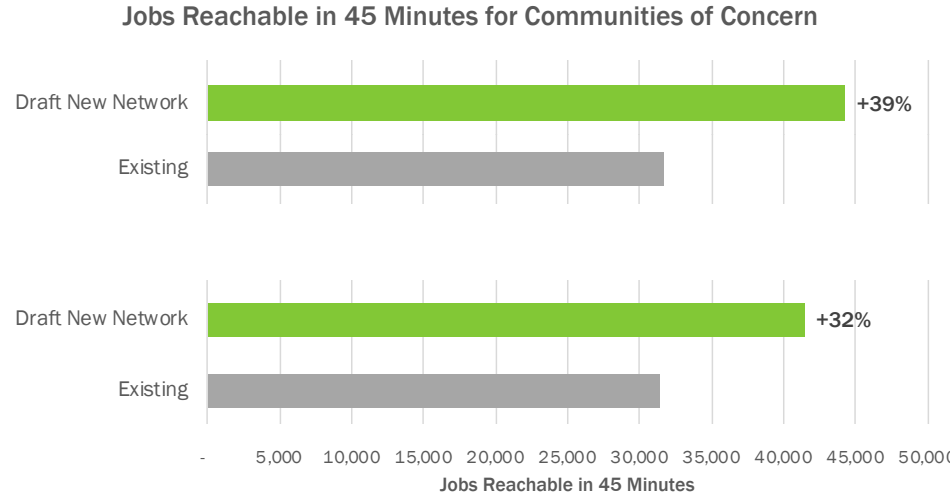
*compared with the HRT network as of February 2020.

Figure 14: Jobs Reachable Within 45 Minutes for the Average Norfolk Resident



The Draft New Network allows the average Norfolk resident to reach 31% more jobs in 45 minutes.

Figure 15: Jobs Reachable Within 45 Minutes for the Average Resident in Poverty and Resident of Color



Draft New Network Increases People and Jobs Near Frequent Service

Proximity to Transit Service

The number of people and jobs within a certain distance from transit is the simplest measure of transit outcomes. In this report we call this measure “proximity to transit” and the charts to the right show the proximity to any transit service and to frequent service.

The bar charts in Figure 16 show how many residents, jobs, people of color, people in poverty, and seniors would be “close enough” to any service for the Existing Network and the Draft New Network.

The Draft New Network would significantly increase the number of people and jobs near frequent service, as more routes would be running every 15 minutes or better. Compared to Existing, the Draft New Network would

- increase residents near frequent service from 22% to 79%.
- increase jobs near frequent service from 31% to 76%.
- increase people of color near frequent service from 19% to 81%.
- increase people in poverty near frequent service from 19% to 83%.
- increase percent of seniors near frequent service from 19% to 76%.

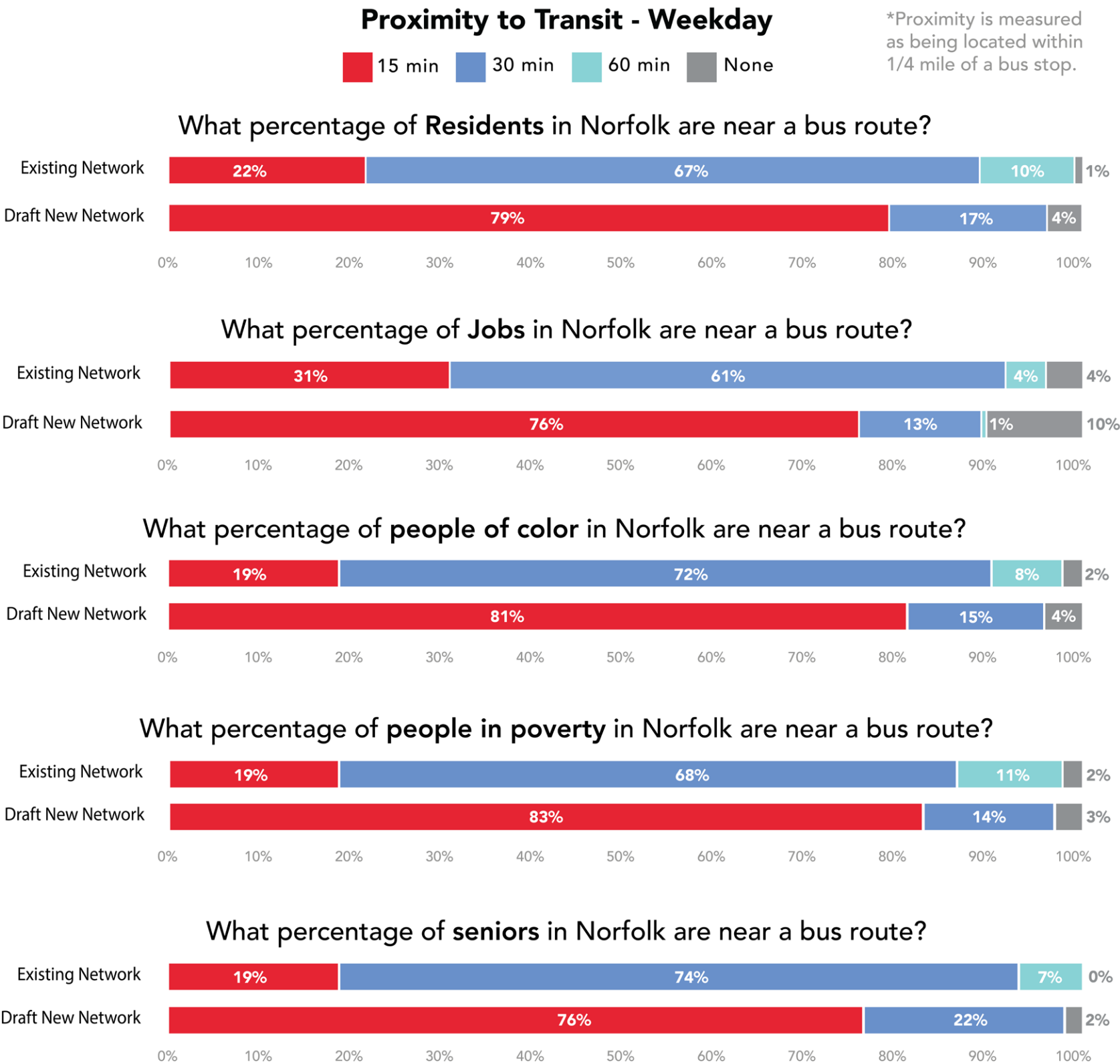
These increases in proximity to frequent service do come with a trade-off. A small percentage of residents and jobs would now be more than 1/4 mile from any service:

- An additional 3% of residents and 6% of jobs would be more than 1/4 mile from service in the Draft New Network.
- An additional 2% of people of color, 1% of people in poverty, and 2% of seniors would be more than 1/4 mile from service in the Draft New Network.

A key feature of the Draft New Network is that it expands the proportion of people of color and people in poverty near frequent service more so than it does for residents overall, while reducing coverage of these two groups less than it does for the overall population.

By putting more high frequency service near people of color and people in poverty, the Draft New Network is more equitably distributing service across the city.

Figure 16: The Draft New Network increases the percent of residents and jobs near frequent service with a relatively small increase in those not near service.



What can I do?

How to use this Report?

This report shows the new Norfolk bus network in detail. To assess this Draft New Network and how it fits your goals for transit, we suggest you:

- Look at the maps starting on page 18, find the places you care about and note the nearby routes and their frequencies (as indicated by the color). Route numbers in the Draft New Network may not match existing route numbers.
- Consider how all the routes connect various parts of the whole city. Remember that no bus network can provide direct service to and from every origin and destination, so look at how routes connect with each other. Remember, where two red routes cross, that means frequency is high, so the connection will be easy.
- Frequencies (how often) and spans (how long) of every route in the Draft New Network can be found in the tables starting on page 28. This tells you when the route(s) you care about run and at what frequencies.
- If you care about proximity to transit, look at the charts beginning on page 39, which show how many people and jobs are near any transit service and near frequent service.
- For travel times, look at the maps of travel time change starting on page 34.
- For more information about how the Draft New Network would affect access to jobs, look at the job access maps starting on page 36.

What is in the rest of this report?

In Chapter 2, we describe the Draft New Network compared to the Existing Network.

In Chapter 3, we review the outcomes of the Draft New Network, including the number of people and jobs near transit, the amount of jobs and opportunities residents can reach by transit, and other outcomes.

In Chapter 4, we describe the next steps and engagement opportunities.

Appendix A provides additional maps that show travel time change for multiple locations around the city.

What's next?

This Report is meant to help you, the general public, existing transit riders, stakeholders, and elected officials understand the Draft New Network for Norfolk. The City and consultant team will be conducting surveys and other engagement efforts to help explain the Draft New Network and get your feedback. That engagement process will ask you what you think about this new bus network. Responses from the public and stakeholders will be used to finalize the details of the network.

The outreach process around the Draft New Network will run from November 30 through January 8, and a survey will be available for public input both online and via paper at the Downtown Norfolk Transit Center and via staff riding buses.

If you agree this Draft New Network would be an improvement for Norfolk, it's important to speak up. And if you don't like the plan, please let us know how it can be improved.

For more information and to stay involved in the project, go to multimodalnorfolk.com and:

- take the Round 3 survey about this Draft New Network;
- register to attend one, or both, of the two virtual public meetings scheduled for December 10 and December 15, 2020.
- sign up for email updates about the project;
- watch videos that summarize key choices and the redesign process;
- request a community presentation, or communicate with the project team;
- sign up to volunteer or work with the City to spread the word and support engagement efforts for Multimodal Norfolk; and
- generally stay up-to-date on the latest happenings with the network redesign process!

The City of Norfolk Council will review this Draft New Network and ultimately decide if and when it will be implemented, and how it might be changed. **Your opinion matters in determining the final recommendations.** The City Council is expected to take action of the Transit System Redesign Final Recommendations in January 2021. Once approved, it is expected that the Final New Network would be implemented in October 2021.

Your voice matters! Contact the project team and take the Draft New Network Survey at multimodalnorfolk.com.

2 Draft New Network

Existing Network

The map on the right (Figure 17) shows Norfolk’s existing bus network. The map on the following page shows the Draft New Network.

In both maps, every route is color-coded based on its frequency during the midday on a weekday. In the network maps, colors make all the difference:

- **Bright red** lines represent routes that operate every 15 minutes.
- **Dark blue** lines every 30 minutes; and
- **Light blue** lines every 60 minutes.

Every bus route in Norfolk operates either every 30 minutes or every 60 minutes at midday.

In this map, the prominent red line is The Tide, the region’s only service operating every 15 minutes or better throughout the rush hours and at midday. The network is dominated by blue lines, which run every 30 minutes and light blue lines, which run every 60.

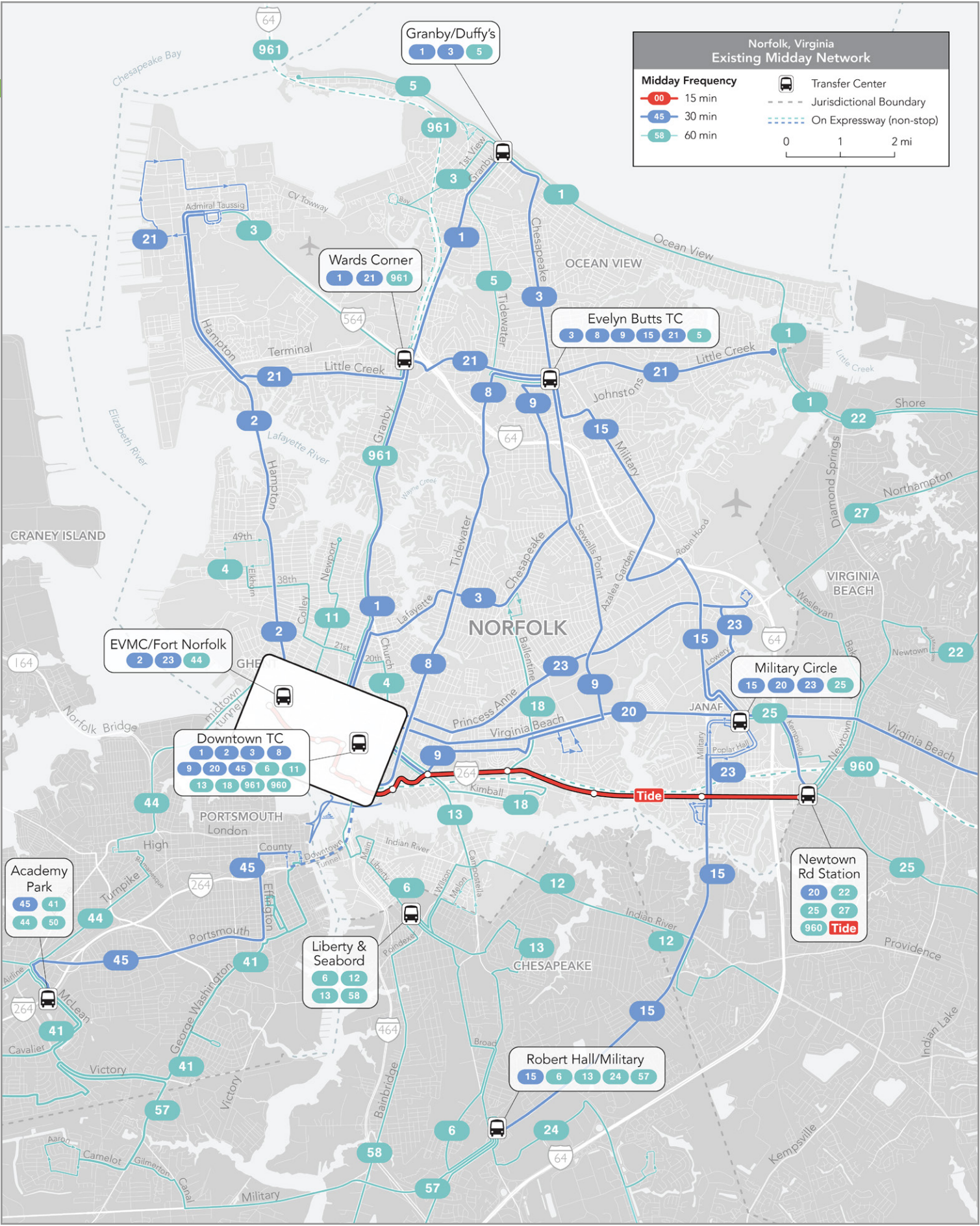
The network in Norfolk covers most major streets, so that most of the population and jobs are near some kind of transit service, but the low frequency of service means that most people are waiting a long time for a bus.

The Existing Network uses 60% of resources towards service that can achieve high ridership and the remaining 40% is spent on coverage goals.

Low frequency service makes it very hard for people to transfer, limiting the access and freedom to move throughout Norfolk.

Figure 17: The Existing Network in Norfolk

Reminder: This map shows midday frequency of service. Some routes run at higher frequencies at peak times and additional routes operate at peak times that are not shown here. For more details on peak service, see the Span and Frequency charts beginning on page 27.



Draft New Network

The Draft New Network assigns 70% of resources to goals that can achieve high ridership and 30% to provide service in areas where transit is important but is unlikely to yield many riders. This is done by consolidating duplicative resources and moving some resources from coverage service to ridership (or high frequency) service. This balance is the outcome of listening to the results from the public engagement and the input of stakeholders and elected officials.

The Draft New Network brings frequent service to four key corridors:

- Hampton Boulevard from Downtown to the Naval Base
- Granby/Monticello Street from Downtown to Little Creek Road
- Chesapeake Boulevard in the eastern part of Norfolk, including connecting to Downtown via portions of Ballentine and Princess Anne Road.
- Campostella Road from Downtown via Brambleton to South Norfolk

This new high frequency bus network brings frequent transit service to 79% of residents and 76% of jobs in the City of Norfolk. This high frequency network is supplemented by lower frequency routes across most of the city and a few 60 minutes routes to provide key coverage and regional connections. This new network does ask people in some areas to walk farther, but often rewards that longer walk with more frequent service, or connections to more frequent service across much of the city. These changes mean that the average person in Norfolk could reach 41,700 jobs within 45 minutes by walking and taking transit—**31% more jobs than are reachable with the existing network.**

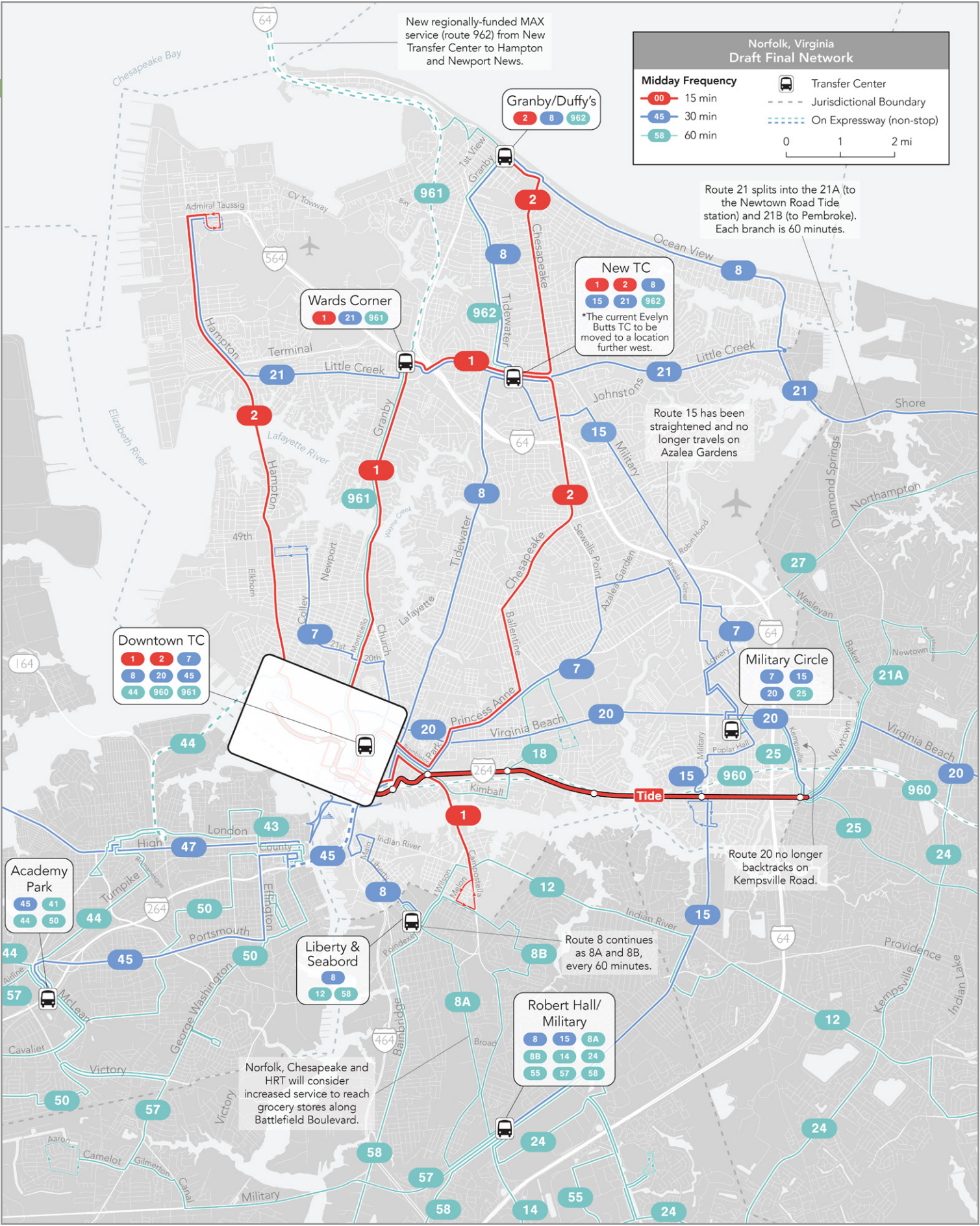
For the average person in poverty, the number of jobs accessible by transit within 45 minutes would increase by 32%. For the average resident of color, jobs accessible in 45 minutes would increase by 32%, as well.

More detailed descriptions of the route network is provided starting on the following pages.

The Draft New Network provides a much larger frequent network for faster travel across much of Norfolk.

Figure 18: The Draft New Network in Norfolk

Reminder: This map shows midday frequency of service. Some routes run at higher frequencies at peak times and additional routes operate at peak times that are not shown here. For more details on peak service, see the Span and Frequency charts beginning on page 28.



Draft New Network in Western Norfolk

West of Downtown to Norfolk Naval Station

In the **Existing Network**, the western part of the city is served by five routes:

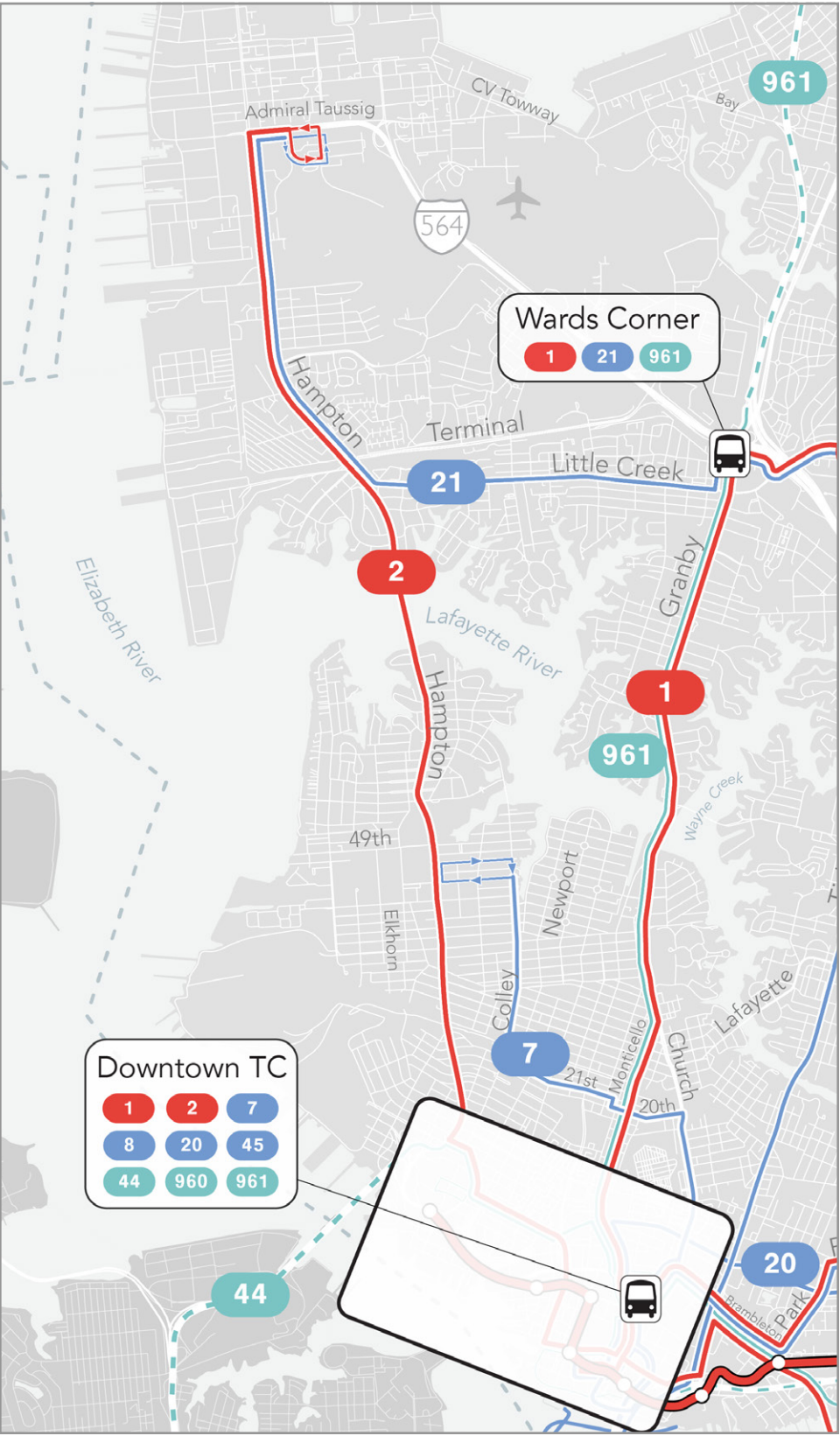
- **Route 2** on Hampton Boulevard every 30 minutes.
- **Route 21** from Naval Base Norfolk to JEB Little Creek via Hampton Boulevard and Little Creek Road, every 30 minutes. Within Naval Station Norfolk, this route currently makes a large one-way loop.
- **Route 4** on 21st Street, Colley Avenue and Old Dominion University every 60 minutes.
- **Route 11** on Colonial Avenue and Newport Avenue every 60 minutes.
- **Route 3**, which serves the Navy Exchange every 60 minutes.

The **Draft New Network** simplifies the network in this part of the city and increases the frequency on the densest and most active corridors:

- **Route 2** continues to serve Hampton Boulevard and the frequency is improved to every 15 minutes.
- **Route 21** on Little Creek Road and Hampton Boulevard still runs every 30 minutes, but the route no longer makes the large one-way loop through Naval Station Norfolk. Seven existing bus stops within the Naval Station Norfolk secure area would no longer be within ¼ mile of bus service and these stops see a total of 35 boardings on an average weekday.
- **Route 4** is mostly replaced by Route 7, which runs every 30 minutes from the Downtown Norfolk Transit Center via Church Street, 21st Street, and Colley Avenue to Hampton Boulevard and 47th Street, next to ODU. Portions of Route 4 on Elkhorn, Powhatan, 43rd, and 49th would no longer be served. Most of these areas would be within walking distance of Route 2 or Route 7. Five existing bus stops would be more than ¼ mile from service and these stops total 15 boardings on an average weekday.
- **Route 11** would no longer serve Colonial and Newport Avenues, but most people and jobs would be near a more frequent service on Colley Avenue, 21st Street, Olney Road, or Monticello Avenue. A total of 17 existing stops would be more than ¼ mile from service. These 17 stops have a total of 64 boardings on an average weekday. In most cases these stops are less than ½ mile from service, so most people using these stops would still have nearby service.

- **Route 3** service to the Navy Exchange would be discontinued as more frequent service would now be available via Route 2. For more details on Route 3 changes, see page 21.

Figure 19: Draft New Network West of Downtown to Norfolk Naval Station



Draft New Network North of Downtown

North of Downtown to Little Creek Road

In the **Existing Network**, the areas north of Downtown toward Little Creek Road are served in part by six routes:

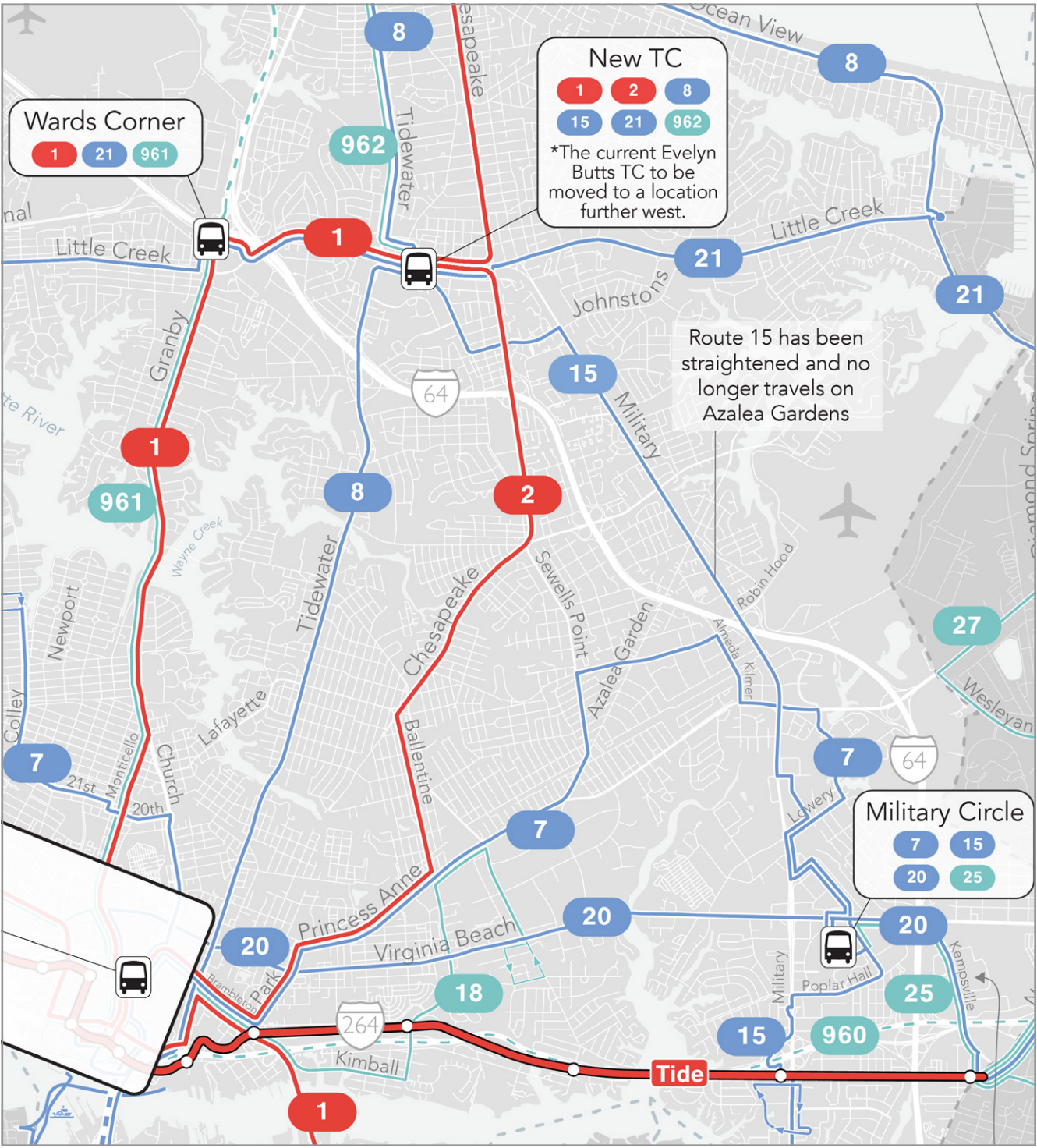
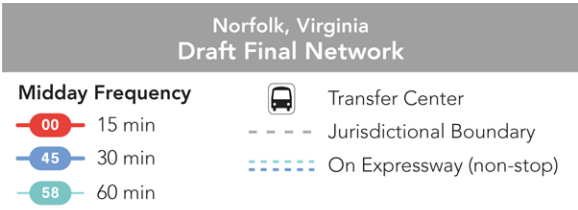
- **Route 1** from Downtown to Wards Corner and on northward via Monticello Avenue and Granby Street, every 30 minutes.
- **Route 3** from Downtown to Evelyn Butts Transit Center and on northward via Monticello Avenue, 26th/27th Streets, and Lafayette Boulevard every 30 minutes.
- **Route 4** from Downtown to ODU via Church Street and 20th/21st Street, every 60 minutes.
- **Route 961** from Downtown to the Peninsula via Monticello Avenue and Granby Street to I-64, every 60 minutes.
- **Route 21** from Naval Base Norfolk to JEB Little Creek on Little Creek Road, every 30 minutes.
- **Route 8** from Downtown to Evelyn Butts Transit Center via Tidewater Drive, every 30 minutes.

The **Draft New Network** reduces the duplication of service and consolidates service to increase the frequency on key corridors. What this means for the area north of Downtown to Little Creek Road:

- **Route 1** continues to serve Monticello Avenue and Granby Street and the frequency is improved to every 15 minutes. This route now goes through Downtown and to Campostella Road in South Norfolk for easier one-seat rides to that corridor from Granby Street.
- **Route 7** replaces Route 4 service on Church Street and 20th/21st Street and the frequency is improved to every 30 minutes.
- **Route 961** continues to serve Monticello Avenue and Granby Street every 60 minutes.
- **Route 8** continues to serve Tidewater Drive every 30 minutes.
- **Route 21** continues to serve Little Creek Road every 30 minutes.

- **Route 3** is discontinued and no longer serves this area, but most people served by this route are near other services:
 - More frequent service on Route 1 near Granby Street or Monticello Avenue;
 - More frequent service on Route 2 on Chesapeake Boulevard (see page 21 for more detail); or
 - Equivalent frequency of service on Route 8 on Tidewater Drive.
- Two stops on 26th Street would be more than ¼ mile from service. These two stops see 17 boardings on an average weekday.

Figure 20: Draft New Network North of Downtown to Little Creek Road



Draft New Network East of Downtown

East of Downtown

In the **Existing Network**, the areas east of Downtown toward Military Circle and Evelyn Butts Transit Center are served in part by seven routes:

- **Route 13** on Brambleton Avenue from Downtown to South Norfolk, every 60 minutes.
- **Route 18** from Downtown to the east via Brambleton Avenue, Kimball Terrace, and Ballentine Boulevard to Ballentine and Chesapeake Boulevards, every 60 minutes.
- **Route 9** from Downtown east and northeast on Brambleton Avenue, Corprew Avenue, Virginia Beach Boulevard, Azalea Garden Road, and Sewells Point Road to Evelyn Butts Transit Center, every 30 minutes.
- **Route 20** from Downtown to the east on Virginia Beach Boulevard, every 30 minutes.
- **Route 23** from the Eastern Virginia Medical Center to the east via Princess Anne Road, Kempsville Road, through Military Circle to the Military Highway Tide Station, every 30 minutes. Note that this service does not connect to the Downtown Norfolk Transit Center, and so misses some key connections from South Norfolk.
- **Route 3** from Downtown to the northeast via Monticello, 26th/27th Streets, Lafayette Boulevard, Chesapeake Boulevard to Evelyn Butts Transit Center and beyond, every 30 minutes.
- **Route 15** in an orbital pattern from Evelyn Butts Transit Center to Military Circle and Military Highway Tide Station via Military Highway, Azalea Garden Road, Robin Hood Road, and then Military Highway, every 30 minutes. This route continues south into Virginia Beach and Chesapeake to Robert Hall Boulevard.

The **Draft New Network** reduces the duplication of service and consolidates service to increase the frequency on key corridors. What this means for the area east of Downtown:

- **Route 1** on Brambleton Avenue from Downtown to South Norfolk with increased frequency to every 15 minutes. Note that this service now goes through Downtown and up Granby Street for easier one-seat rides to that corridor from Brambleton Avenue and South Norfolk.
- **Route 18** from Downtown to the east via Brambleton Avenue, Kimball Terrace, Ballentine Boulevard, Princess Anne Road, and

Ingleside Road to Ingleside Square Apartments every 60 minutes.

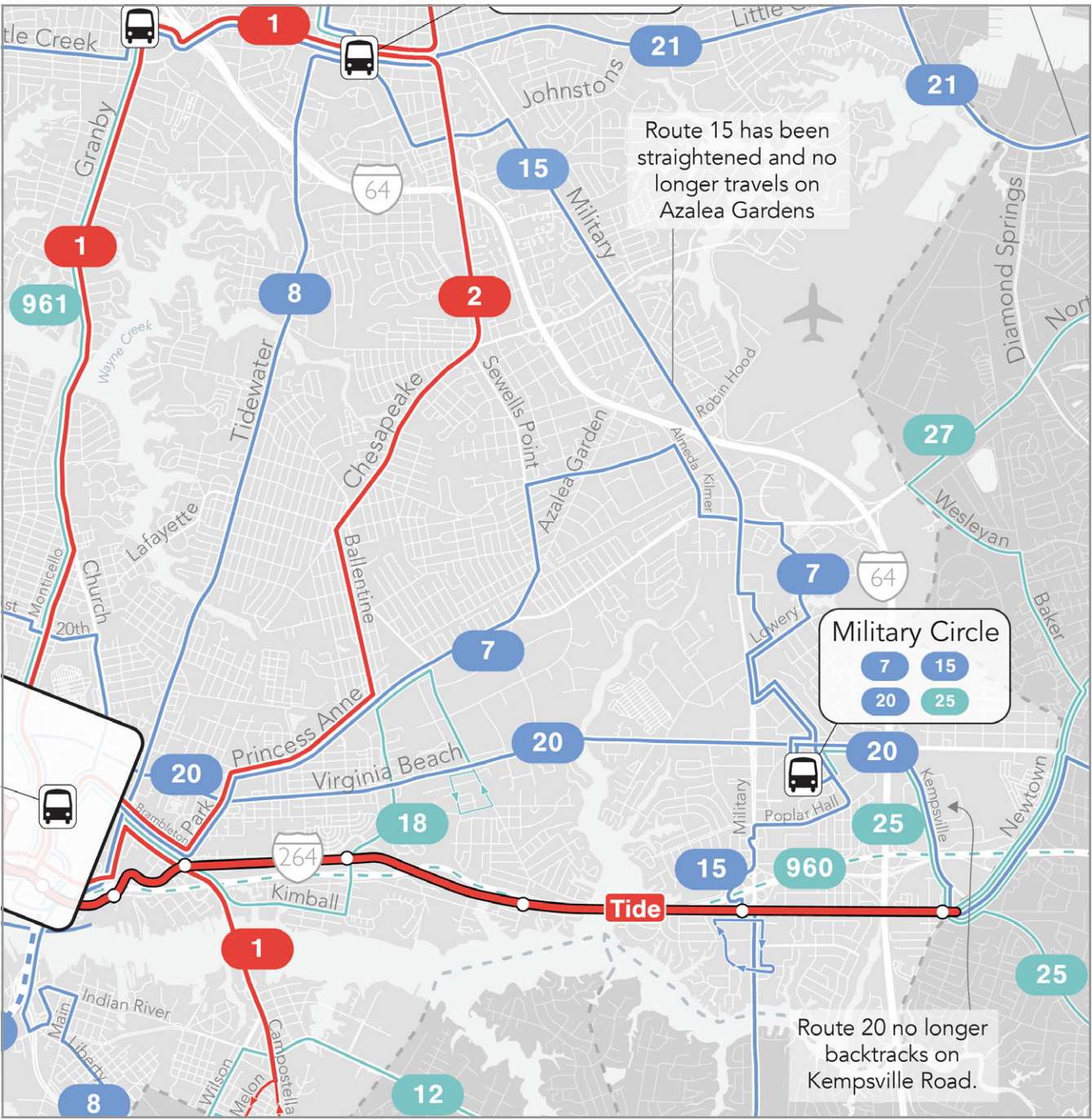
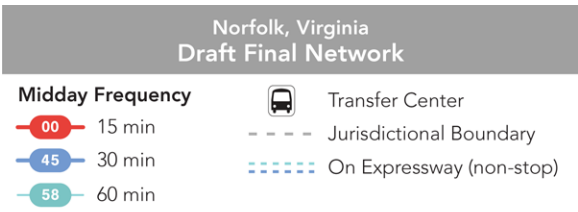
- **Route 20** from Downtown to the east on Virginia Beach Boulevard, every 30 minutes.

- The only change to **Route 20** is that it no longer serves Virginia Beach Boulevard between Kempsville Road and Newtown Road. Most destinations in this section would be within ½ mile of service west of Kempsville Road or east of Newtown Road. Two stops in this area would be more than ¼ mile from service in the new network and these stops see 6 boardings on an average weekday.

- **Route 7**, which largely replaces Route 23, from the Downtown to the east via Brambleton Avenue, Park Avenue, Princess Anne Road, Azalea Garden Road, Sewells Point Road, Robin Hood Road, Alameda Avenue, Kilmer Lane, Princess Anne Road, Kempsville Road, to Military Highway and Military Circle, every 30 minutes.

- No service would be provided on Princess Anne Road from Azalea Garden Road to Kilmer Lane. Six existing stops would be more than ¼ mile from alternative service on Route 7. These stops have a total of 37 boardings on an average weekday.
- Service would no longer be provided to IKEA. This stop averages 8 boardings on an average weekday.

Figure 21: Draft New Network East of Downtown



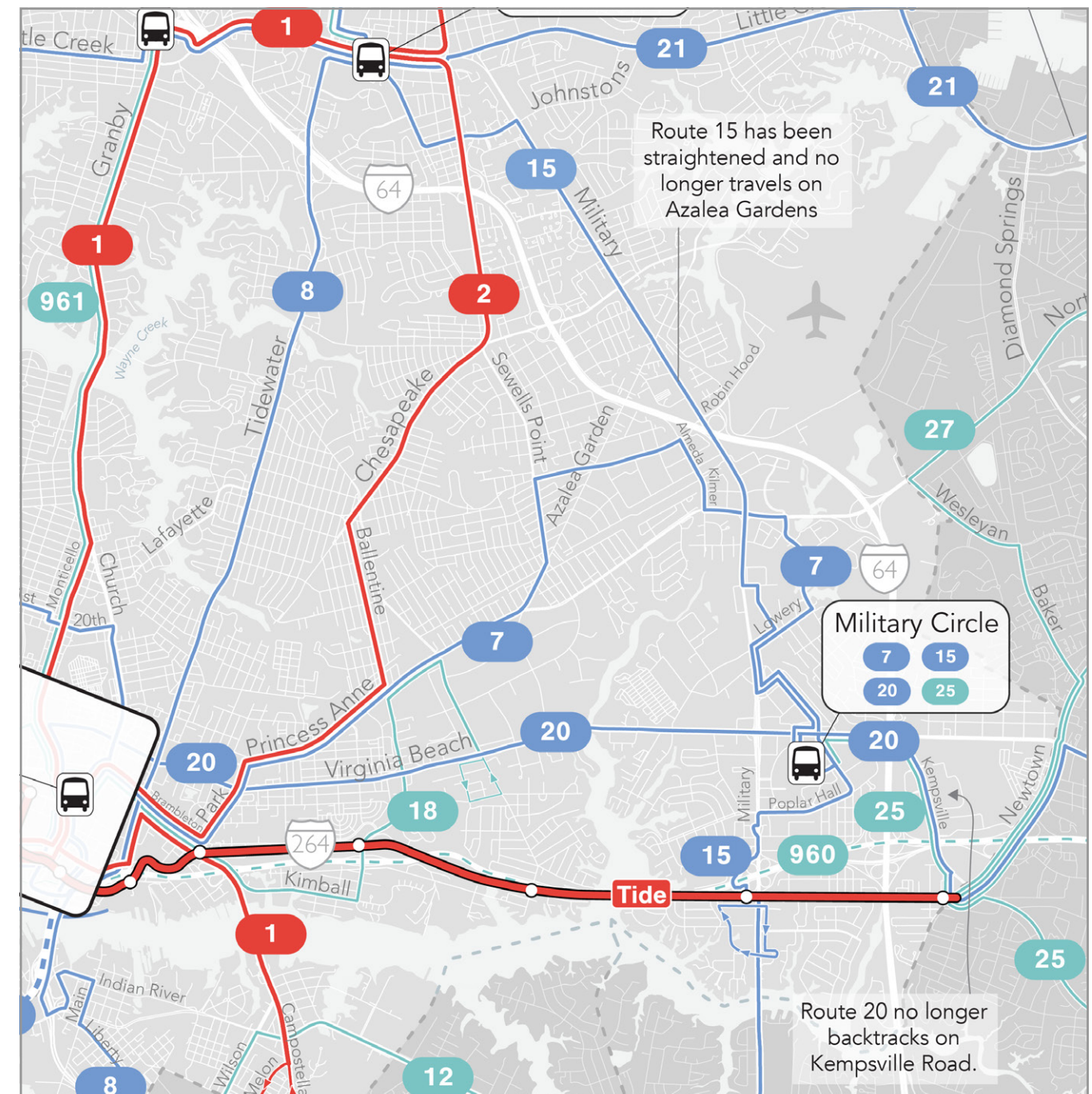
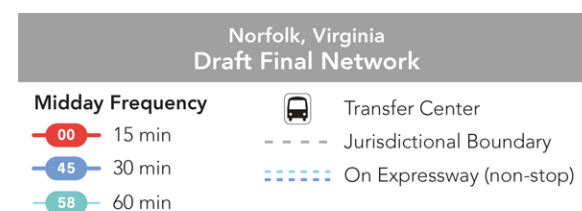
East of Downtown (continued)

- **Route 2** from Downtown to the northeast via Brambleton Avenue, Park Avenue, Princess Anne Road, Ballentine Boulevard, and Chesapeake Boulevard to Evelyn Butts Transit Center, with increased frequency to every 15 minutes.
 - This route would go through Downtown to the western parts of Norfolk, including ODU and Naval Station Norfolk.
 - This route replaces much of existing Route 3, with higher frequency service.
 - The current portion of Route 3 on Lafayette Boulevard from Chesapeake Boulevard to Tidewater Drive and the Lafayette River would no longer be served. Most people and destinations in this area would be near service on Route 2 or Route 8. Four stops in this section would be more than ¼ mile from alternative service and these stops have a total of 12 boardings on an average weekday.
- **Route 15** will continue to serve an orbital pattern from Evelyn Butts Transit Center to Military Circle and Military Highway Tide Station via Military Highway, every 30 minutes. This route will continue to go south through Virginia Beach and into Chesapeake to Robert Hall Boulevard.
 - The existing deviation onto Azalea Garden and Robin Hood Roads would no longer be served. Service on these streets is partially replaced with Route 7 and all existing stops would be within ¼ mile of alternative service.
- **Route 9** is discontinued in this area, but most people and destinations would still be served by other routes:
 - Brambleton Avenue would be served with more frequent service on Routes 1 and 2, and by 30 minute service on Route 7.
 - Park Avenue would be served with more frequent service on Route 2, and by 30 minute service on Route 7.
 - For Corprew Avenue, service would still be available on nearby Route 20 and Tide Light Rail.
 - Service to Ingleside Square Apartments with Route 18, every hour.
 - Azalea Garden from Virginia Beach Boulevard to Princess Anne Road would no longer be served. Today, only two stops on this

stretch would be more than ¼ mile from alternative service on Routes 7 or 20, and these stops have a total of 8 boardings, on an average weekday.

- Azalea Garden Road and Sewells Point Road from Princess Anne Road to Robin Hood Road would be served by Route 7.
- Sewells Point Road from Robin Hood to Chesapeake Boulevard would no longer be served, but only six existing stops along this stretch would be more than ¼ mile from service on the new Route 7 or the more frequent Route 2. These six stops have a total of 10 daily boardings.
- Sewells Point Road from Chesapeake Boulevard to Johnston Road would no longer be served, but alternative service would be available on nearby Chesapeake Boulevard with every 15-minute service. Only two bus stops would be more than ¼ mile from alternative service, and these stops see seven boardings on an average weekday.
- Sewells Point Road north of Johnston Road would be served by Route 15.

Figure 22: Draft New Network East of Downtown



Draft New Network in Northern Norfolk

Northern Norfolk: Little Creek Road to Ocean View

In the **Existing Network**, the areas in the northern part of the city, north of Little Creek Road, are served by four routes:

- **Route 1** from Downtown to Ocean View via Granby Street to Pretlow Library, every 30 minutes. This route continues every 60 minutes along Ocean View Avenue to JEB Little Creek. This route continues most of the day to Pembroke in Virginia Beach.
- **Route 5** from Evelyn Butts Transit Center to Willoughby Spit via Tidewater Drive and Granby Street to Pretlow Library, then via Ocean View Avenue to 15th View Street, every 60 minutes.
- **Route 3** from Downtown to Pretlow Library via Chesapeake Boulevard, every 30 minutes. It continues every 60 minutes via 1st View Street, Bay Avenue, I-64 and I-564 to Naval Station Norfolk.
- **Route 21** from Naval Base Norfolk to JEB Little Creek on Little Creek Road, every 30 minutes.

The **Draft New Network** reduces the duplication of service and consolidates service to increase the frequency on key corridors across the city. What this means for northern Norfolk:

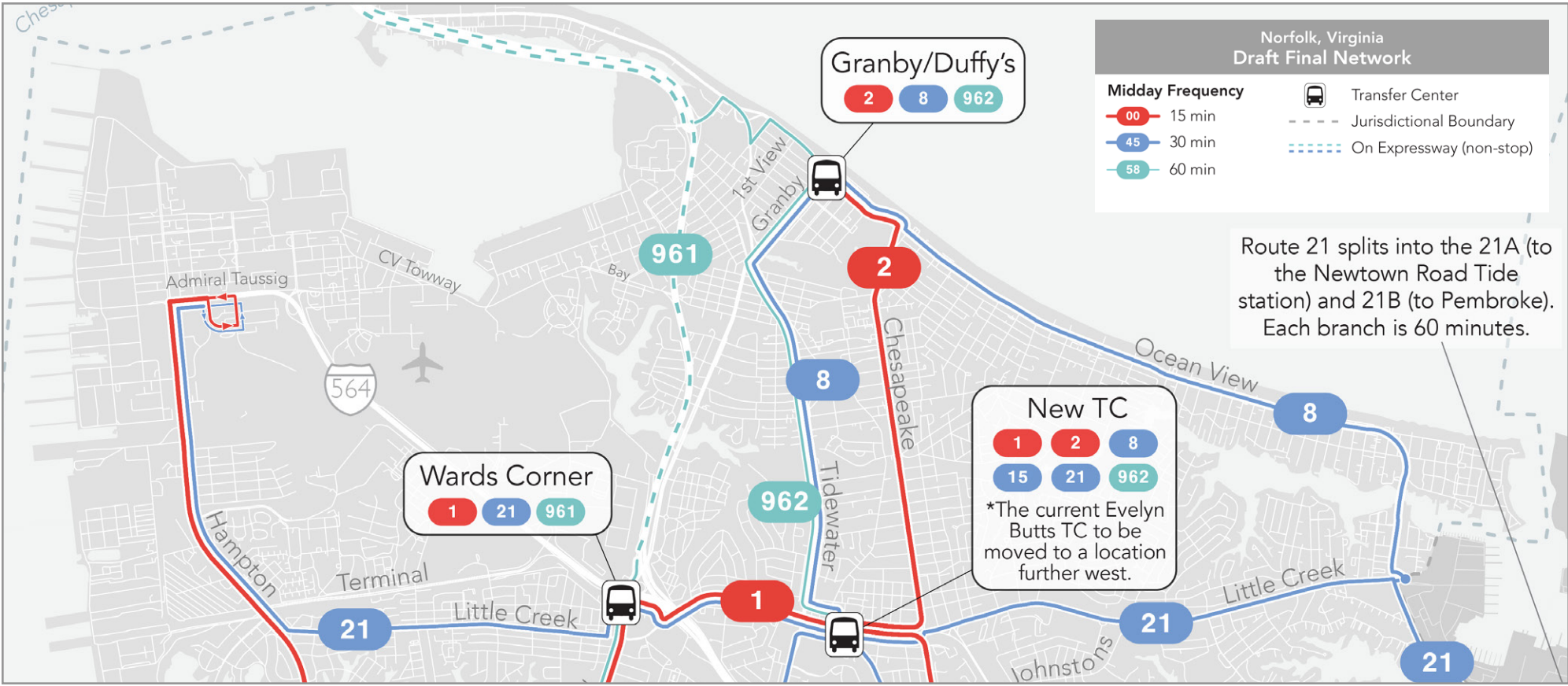
- **Route 8** from Downtown to Pretlow Library via Tidewater Drive (and Evelyn Butts Transit Center) and Granby Street to Pretlow Library, and continuing down Ocean View Avenue to JEB Little Creek, every 30 minutes.
 - This provides higher frequency service on the section of Tidewater Drive north of Little Creek Road and on Ocean View Avenue.
 - At the southern end, this route goes through Downtown, providing a one-seat ride to destinations in South Norfolk and Chesapeake.
- **Route 2** from Downtown to Pretlow Library via Chesapeake Boulevard, every 15 minutes.
 - This provides higher frequency service on Chesapeake Boulevard from Downtown to Pretlow Library.
 - This route would go through Downtown to Hampton Boulevard, providing a one-seat ride to Eastern Virginia Medical Center and ODU.

- A new **MAX Route 962** from Evelyn Butts Transit Center to Hampton and Newport News via Tidewater Drive and Granby Street to Pretlow Library, and continuing down Ocean View Avenue to 4th View Street to I-64 to the Peninsula, with service every 60 minutes.
- **Route 21** from Naval Base Norfolk to JEB Little Creek on Little Creek Road, every 30 minutes. This route would continue into Virginia Beach as Routes 21A and 21B.
 - **Route 21A** would follow Shore Drive to Pleasure House Road to Independence Boulevard to Pembroke, similar to how Route 1 currently serves Virginia Beach.
 - **Route 21B** would follow Shore Drive to Pleasure House Road to Independence Boulevard to Haygood Road to Newtown Road and eventually to Newtown Road Tide Station following the pattern of today's Route 22.

With these changes, a few areas in this part of the city would no longer be served:

- Granby Street from Wards Corner to Tidewater Drive would no longer be directly served. The nearest service would be on Tidewater Drive. Most destinations would still be within ½ mile of a stop in the new network. Five existing stops along Granby would be more than ¼ mile from service and these stops see 25 total boardings on an average weekday.
- The portions of 1st View Street and Bay Avenue currently served by Route 3 would no longer be served directly. The northern portion of 1st View Street would still be near service on Routes 2, 8, and 962. A total of nine bus stops would now be more than ¼ mile from service and these stops have a total of 39 boardings on an average weekday.
- The portions of Ocean View Avenue west of 4th View Street that are today served by Route 5 would no longer be served by transit. Along this stretch are 19 bus stops served today that see a total of 62 boardings on an average weekday.

Figure 23: Draft New Network North of Little Creek Road



Draft New Network in South Norfolk

South of Downtown

In the **Existing Network**, the areas south of Downtown are served primarily by two routes:

- **Route 6** from Downtown to Chesapeake via the Berkley Bridge, State Street, Indian River Road, Main Street, and Liberty Street, every 60 minutes. This route connects to Routes 12, 13, and 58 at the transfer center at Liberty and Seaboard in Chesapeake. Today this route continues to Robert Hall Boulevard via Atlantic Avenue on weekdays and Saturdays.
- **Route 13** from the Downtown Norfolk Transit Center to Chesapeake via Brambleton Avenue, Campostella Road, Berkley Avenue, Wilson Road to the Liberty and Seaboard transfer center, every 60 minutes.

The **Draft New Network** would improve frequency of service in this area and partially redesign how routes connect:

- **Route 8** from Downtown to Chesapeake via the Berkley Bridge, State Street, Indian River Road, Main Street, and Liberty Street, every 30 minutes. This is an increase in the frequency of service on this corridor.
 - This route connects to **Routes 12** and **58** at the transfer center at Liberty and Seaboard in Chesapeake. At Liberty and Seaboard, this route would branch on weekdays and Saturdays:
 - **Route 8A** would continue via Liberty Street and Atlantic Avenue to Robert Hall Boulevard, following the same path as today's Route 6 in Chesapeake.
 - **Route 8B** would continue via Wilson Road, Berkley Avenue, Bethel Road, and Campostella Avenue to Robert Hall Boulevard following a similar path as today's Route 13 in Chesapeake.
 - On the north end, this route continues through Downtown to Tidewater Drive and to northern parts of the city.
- **Route 1** from the Downtown Norfolk Transit Center to a loop at Melon/Berkley/Campostella via Brambleton Avenue and Campostella Road, every 15 minutes.
 - This route would not continue to Liberty and Seaboard, and instead would end at Berkley Avenue and Campostella Road. Stops currently served by Route 13 in this area would have alternative service with Route 8B.
 - On the north end, this route continues through Downtown to Granby Street and to northern parts of the city.

Existing Boardings

As noted in the previous six pages, there are about 13 portions of existing routes that would be more than ¼ mile from service in the Draft New Network. The bus stops in these corridors see a total of 345 boardings per day. If we assume that these boardings represent round-trips, that would total up to 690 daily boardings and alightings that would be more than ¼ mile from service. That equals about 3% of total daily boardings in Norfolk.

As discussed above, in most cases the catchment area around these stops is still within ¼ mile of service from another route, so not all of the people that use service today would be without service. Some areas, however, would be very far from any service, and effectively no longer served by transit, such as Willoughby Spit, 1st View Street, and Bay Street.

This is the trade-off of shifting the focus of transit service in the city more towards ridership goals, and consequently less on coverage goals.

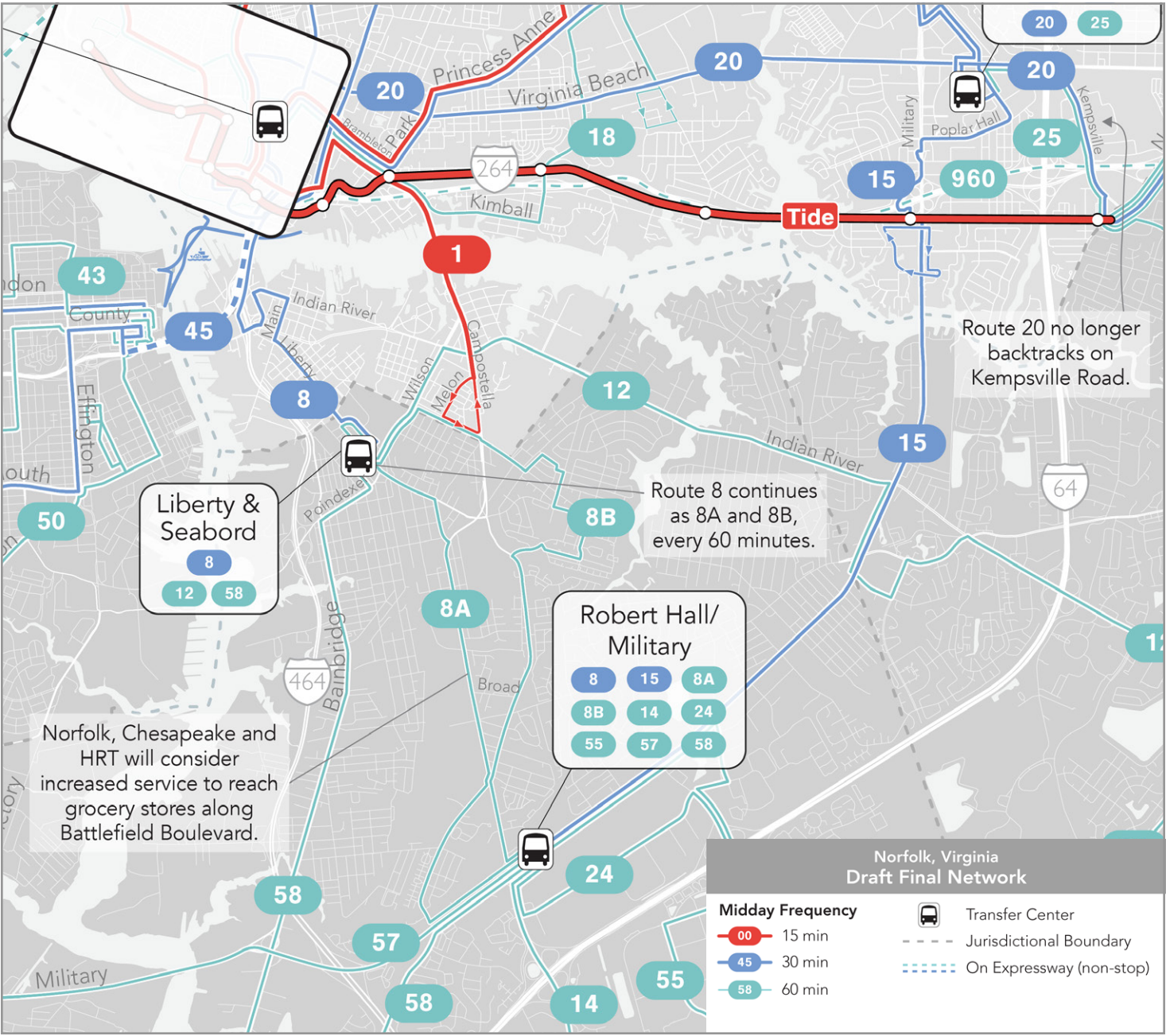


Figure 24: Draft New Network in South Norfolk and Chesapeake

Downtown Network

Currently, only a few routes reach the core of Downtown, which is roughly south of Charlotte Street to Waterside Drive and west of St. Pauls Boulevard to Boush Street. Today, only Routes 6, 8, 45, and 961 get inside this core of Downtown. Without direct access to the core, riders on key routes like 1, 2, 3, or 23, have to transfer or take a long walk, and cross wide streets with high traffic speeds, to get to key destinations like the MacArthur Center, Tidewater Community College, the large offices and hotels in Downtown, and the Elizabeth River Ferry. This adds significant travel time to reach major destinations with many jobs and opportunities.

The Draft New Network proposes to change Downtown routing significantly so that more people can reach more jobs and opportunities more quickly. The new network includes three key features:

Through-routing: In the Existing network, all routes serving Downtown terminate there. In the Draft New Network, several routes (1, 2, 7, and 8) flow through Downtown and out the other side as the same or as different routes. Through-routing means reduced transfers, facility needs Downtown, “end of line” costs and vehicles needed to provide the same service.

More Buses Reaching Central Downtown: rather than terminating at the Downtown transfer center, which is nearly half a mile from many Downtown destinations.

More Frequency in Central Downtown: Today, only 5 buses per hour serve central Downtown. The Draft New Network brings two frequent bus routes through MacArthur Square Station, plus two 30-minute routes and an hourly MAX route. This would bring 13 buses per hour through the core of the city, drastically increasing access into the core of Downtown for people from all parts of the city and in particular for people along Campostella Road, Liberty Avenue, Brambleton Street, Hampton Boulevard, Granby Street, and Chesapeake Boulevard.

Figure 25: The Existing Network in Downtown Norfolk

Reminder: This map shows midday frequency of service. Some routes run at higher frequencies at peak times and additional routes operate at peak times that are not shown here. For more details on peak service, see the Span and Frequency charts beginning on page 27.

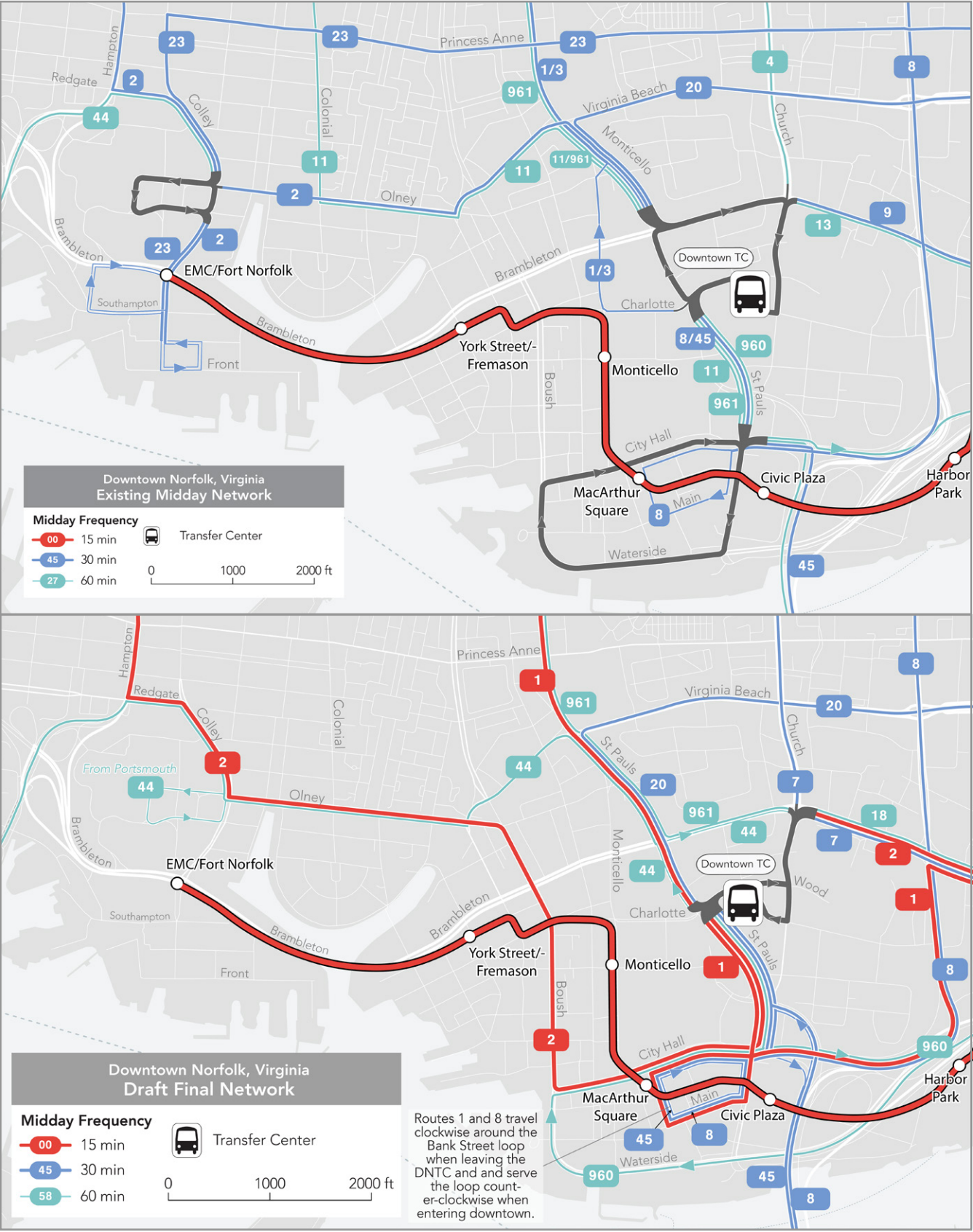


Figure 26: The Draft New Network in Downtown Norfolk

Reminder: This map shows midday frequency of service. Some routes run at higher frequencies at peak times and additional routes operate at peak times that are not shown here. For more details on peak service, see the Span and Frequency charts beginning on page 28.

Downtown New Network

Some routing changes do require longer walks to reach service, but these are rewarded with better access and more frequent service. For example, Route 2 would no longer loop through Fort Norfolk or the EVMC complex. This is to save time so that the frequency of service can be increased.

Route 2 would travel from Naval Station Norfolk and ODU along Hampton Boulevard to EVMC via Redgate Avenue and Colley Avenue. It would then turn onto Olney Road and then Boush Street to enter the core of Downtown. It would then travel City Hall Avenue and St. Pauls Boulevard to reach the Downtown Norfolk Transit Center. From the Transit Center, the route would travel via Brambleton Avenue to Norfolk State University and then onward to the northeastern parts of the city.

To reach the core of Norfolk, a number of routes would now loop through Downtown via St. Pauls, Main Street, Bank Street, and City Hall Avenue. For example, Route 1 from Granby Street and Monticello, would continue down St. Pauls to the Downtown Transit Center. From there it would continue down St. Pauls, turn right on Main Street, right on Bank Street, stop at MacArthur Square, connecting to The Tide. Next it would turn right on City Hall Avenue and then proceed through the City Hall Avenue interchange to Tidewater Drive to Brambleton Avenue to head to the Campostella Bridge. Buses coming from South Norfolk would go the opposite way around the loop: City Hall Avenue, left onto Bank Street, left onto Main Street, left onto St. Pauls Boulevard and on to the Transit Center.

Route 8 would make the same loop. Buses coming into Downtown from Tidewater Drive and points north, would travel through the loop via City Hall, Bank, Main, and then St. Pauls before going to the Transit Center. After the Transit Center, buses would turn south on St. Pauls to reach the Berkley Bridge via the Market Street ramps. Buses from Liberty Avenue in South Norfolk would make the reverse movements, going from the Market Street ramps to the Transit Center. Then going south on St. Pauls, right on Main, right on Bank and stopping at MacArthur Square. Then right on City Hall Avenue and through the ramps to Tidewater Drive and points north.

Route 20 would continue to travel the same path as today: Virginia Beach Boulevard to St. Pauls to the Transit Center. With the Granby Street service on Route 1 traveling on St. Pauls along with Route 20, it would be easier to transfer between these two routes at common stops north of the Transit Center.

Route 7 would not go through Downtown. It would travel via 20th/21st Streets to Church Street, to the Transit Center. It would then leave the Transit Center and use Brambleton to Park to Princess Anne Road.

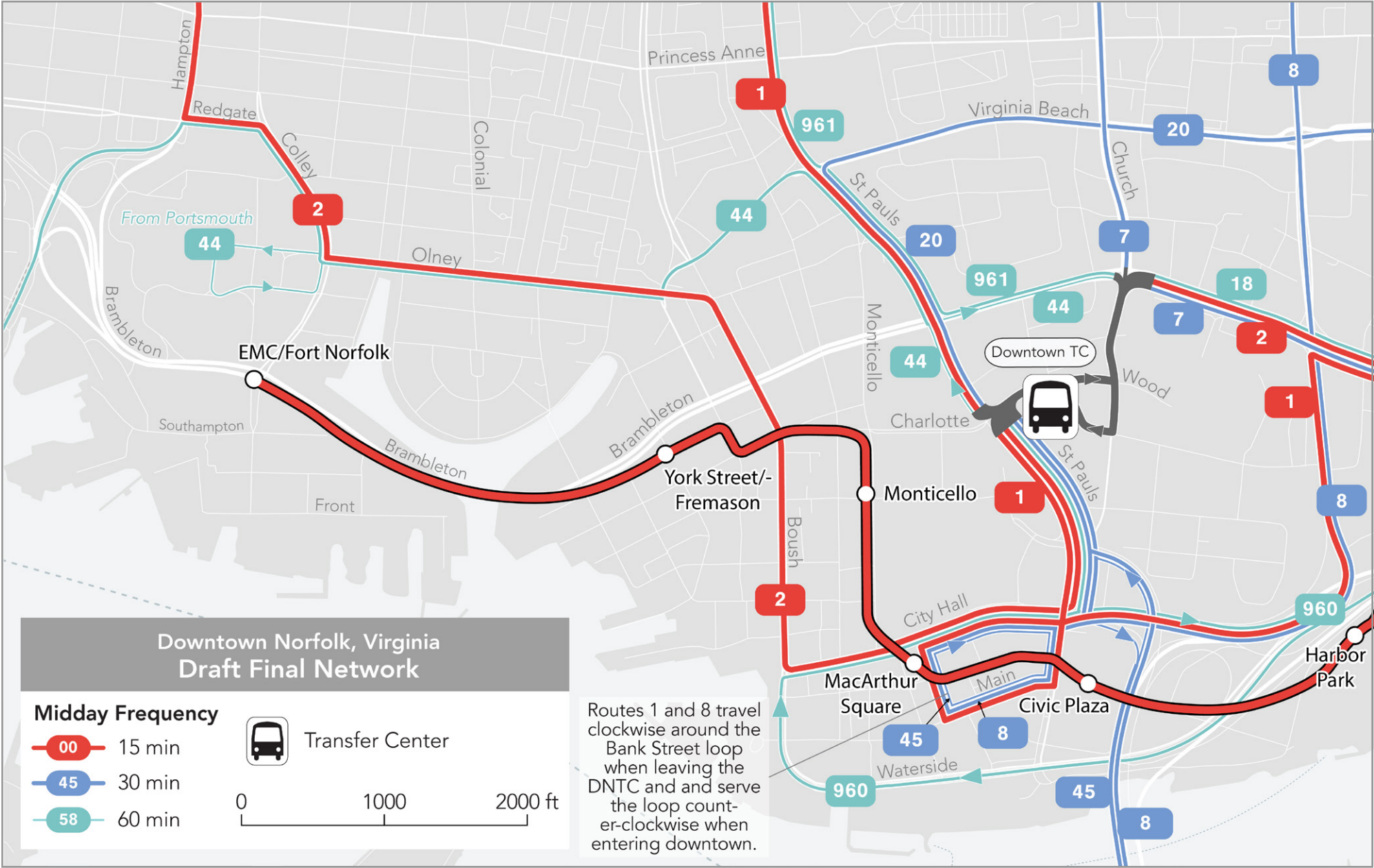


Figure 27: The Draft New Network in Downtown Norfolk

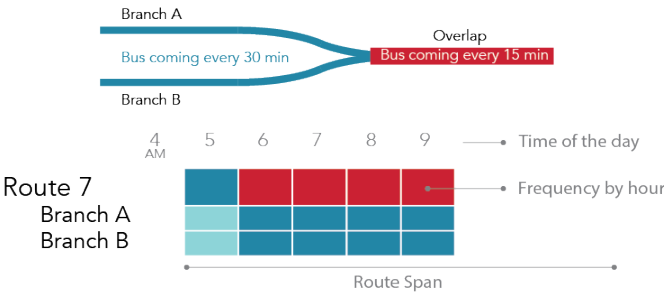
Reminder: This map shows midday frequency of service. Some routes run at higher frequencies at peak times and additional routes operate at peak times that are not shown here. For more details on peak service, see the Span and Frequency charts beginning on page 28.

Route 45 would follow the same loop as Routes 1 and 8, but would always travel the loop counter-clockwise, similar to the current loop it does in Downtown. The paths for Routes 44, 960, and 961 would be unchanged from today.

Existing Network Spans of Service

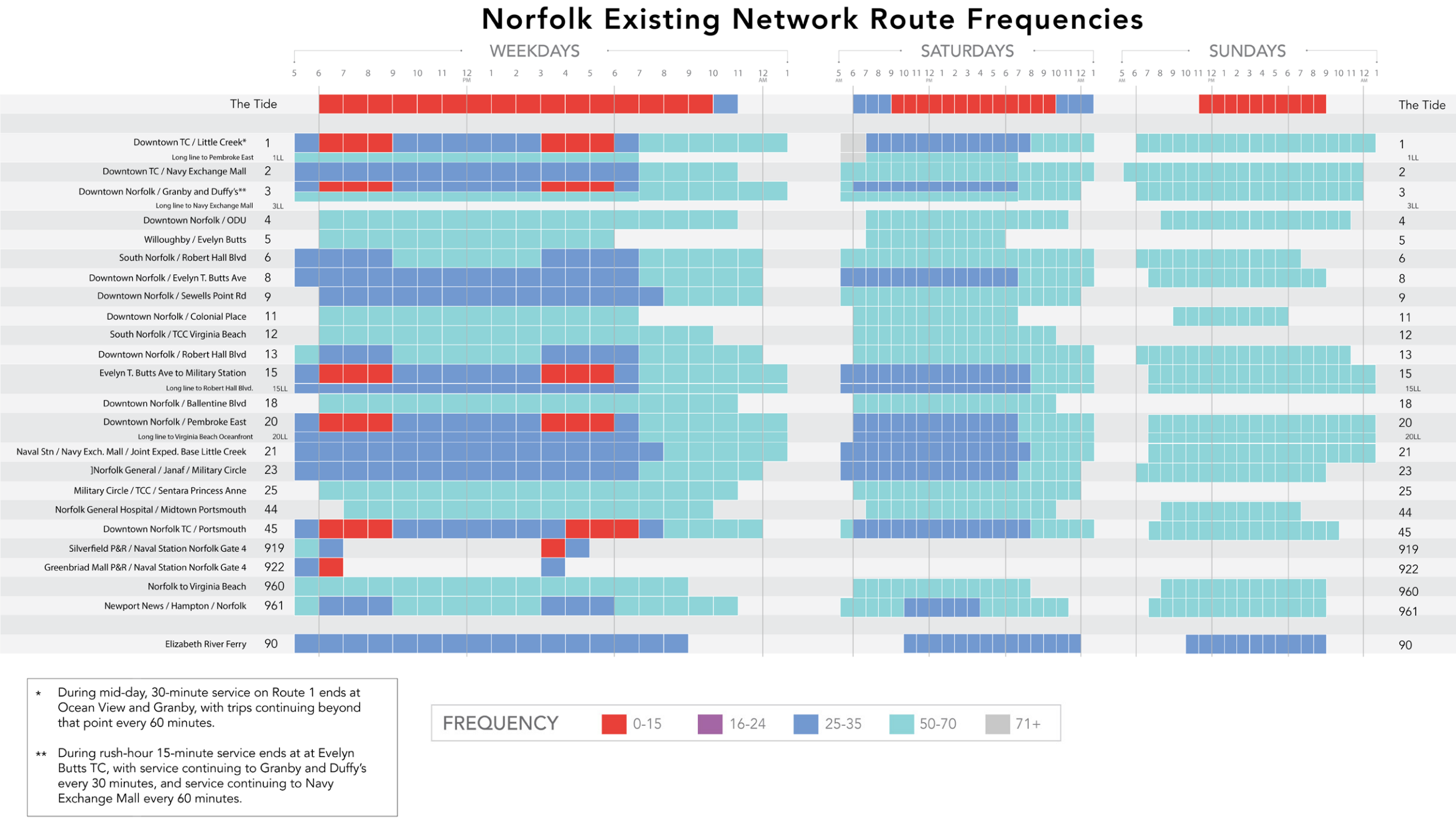
Figure 28 shows the frequency by time of day for the routes in the existing Norfolk transit network.

The example below shows a route with a bus every 15 minutes on the red “Overlap” portion and a bus every 30 minutes on “Branch A” and “Branch B”. In this example, Route 7 starts operating at 5am, with service every 30 minutes on the “Overlap”—the dark blue square under 5am. Each branch operates hourly during this time. At 6am the branches are every 30 minutes and the “Overlap” is every 15 minutes.



For transit to be useful, it must be there at the times of day you need it. The times of day transit operates is called “Span of service”. Most Norfolk routes start running at 5am or 6am. For several routes, service is provided until 1am but most service stops running at 10pm or 11pm.

Figure 28: Existing Network Frequency



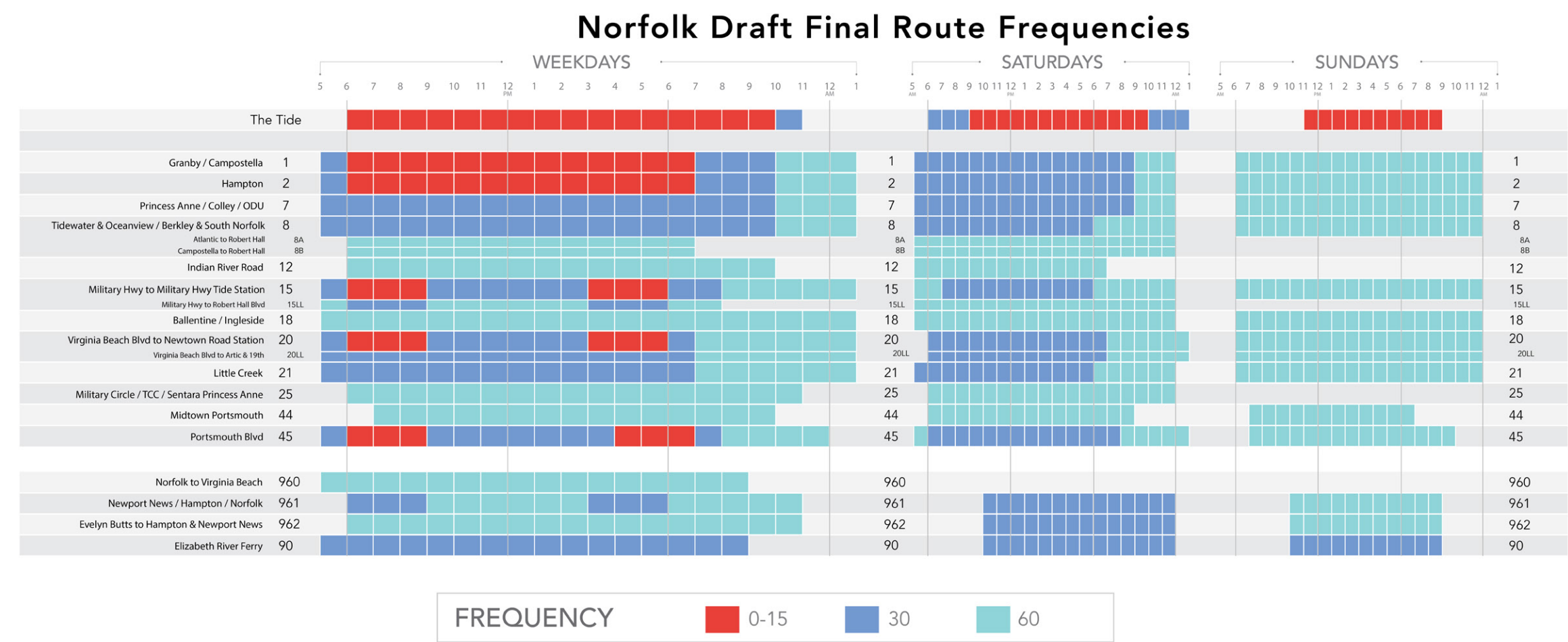
Draft New Network Spans of Service

Figure 29 shows the frequency by time of day for the routes in the Draft New Network. In general, most routes in Norfolk would have a more consistent service pattern across the network, so that riders would know that their routes would be there all day, every day.

For example, today Routes 5, 9, and 18 do not run on Sundays, leaving gaps in the network relative to weekday service. In the Draft New Network, all regular local routes run seven days a week.

Some route branches or extensions into surrounding jurisdictions would not run in the evening or weekends because each local jurisdiction is responsible for funding the service within its boundaries. So while Norfolk would like to see the Route 8 branches in Chesapeake run in the evening and on Sundays to improve access to grocery shopping and jobs, the City of Chesapeake would have to decide to fund that service.

Figure 29: Draft New Network Frequency and Span of Service



The Draft New Network provides a more consistent network where all Norfolk local routes run seven days a week.

Evening & Weekend Service Comparison

Figure 30 compares the Existing and Draft New Networks at three different times to show how the frequency of service and extent of the networks vary.

The first column compares service on weekday evenings at 8pm. At this time, the frequency of service on the Existing Network has largely dropped to hourly on nearly every route. That is a substantial drop in frequency so early in the evening. Also, some routes are no longer running, like Routes 5 and 11.

In the Draft New Network, all local routes are still operating and most routes are still operating at every 30 minutes, providing much more useful service for those who work later shifts, those who want to take evening classes at the community college, or people who want to use transit to socialize or dine in the evening.

The second column compares noon on Saturday. The Existing Network has a mixture of 30-minute and hourly services. In the Draft New Network, nearly every route in the city runs every 30 minutes even on Saturday.

The third column compares noon on Sundays. In both networks, most routes are running every 60 minutes. In the Existing Network, however, a few routes are no longer running, specifically Routes 5, 9, and 18. In the Draft New Network, all City of Norfolk routes run seven days a week.

The Draft New Network provides a more frequent network weekday evenings and Saturdays, and a more consistent network on Sundays.

Norfolk, Virginia
Existing Midday Network

Peak Frequency

15 min

30 min

60 min

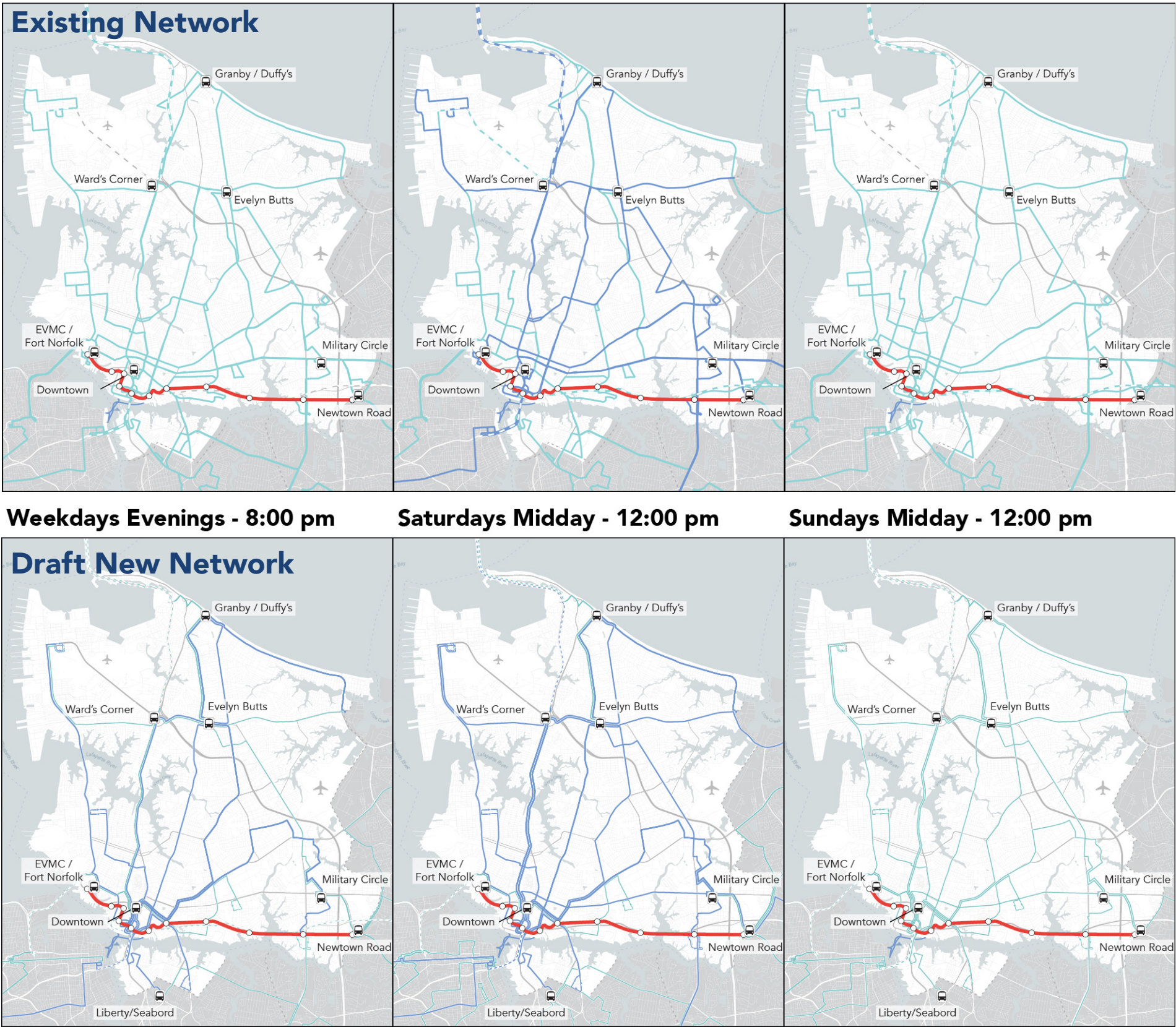
Transfer Center

Limited peak service

Limited hourly service

Limited 30-min service

Figure 30: Comparison of Frequency between Existing and Draft New Network at weekday evenings, noon on Saturdays and noon on Sundays.



New Transfer Facilities

Evelyn T. Butts Transit Center

The relocation of the current Evelyn T. Butts Transit Center is critical to improving access in the northern parts of Norfolk. Figure 31 shows the new location of the transit center, the routes that would serve it, and the existing transfer center, indicated with a star.

The new center location would be:

- **More central** by being further west and closer to more routes.
- **Closer to commercial and retail** activity in the area.
- **More useful for connections** in the northern part of Norfolk, particularly now that Route 1 from Granby Street connects to this center, as there are many people and jobs along Granby.
- **Larger** with more space and bays for enough buses and better amenities for riders. More space would be needed at this transfer center to accommodate the additional service provided to this area.
- **A potential location** for a regional park-and-ride for new MAX service and future light rail.

Finding space and building a new transit center can take years, so this new facility may not be available when a new bus network is implemented in Norfolk. If the existing Evelyn Butts facility must be used on an interim basis, then it will be necessary to temporarily increase capacity by creating overflow space on Avenue J. On the northside of Avenue J, in the westbound direction, it is possible to fit two or three temporary bus bays to provide the necessary capacity for all routes in either of these concepts to function adequately.

In the Draft New Network, the transit center is served by Routes 1 and 2 (both frequent), Routes 8, 15, and 21 (each 30 minutes) and the new MAX Route 962.

Pretlow Library

Another key connection point in the northern edge of Norfolk is around Pretlow Library, where in the Draft New Network Routes 2, 8, and 962 will connect. Today, the existing bus shelters and bus pull-off is behind the library, and in a relatively unsafe location for crossing nearby streets.

To improve conditions in the area, and make some connections easier, the Draft New Network would move the connection point for these routes to the front of the Library, along Ocean View Avenue. Figure 32 shows the existing stops and the relocated stops that would be served in the Draft New Network.

Figure 31: The Existing Evelyn Butts Transit Center and Future New Transit Center Site in the Draft New Network

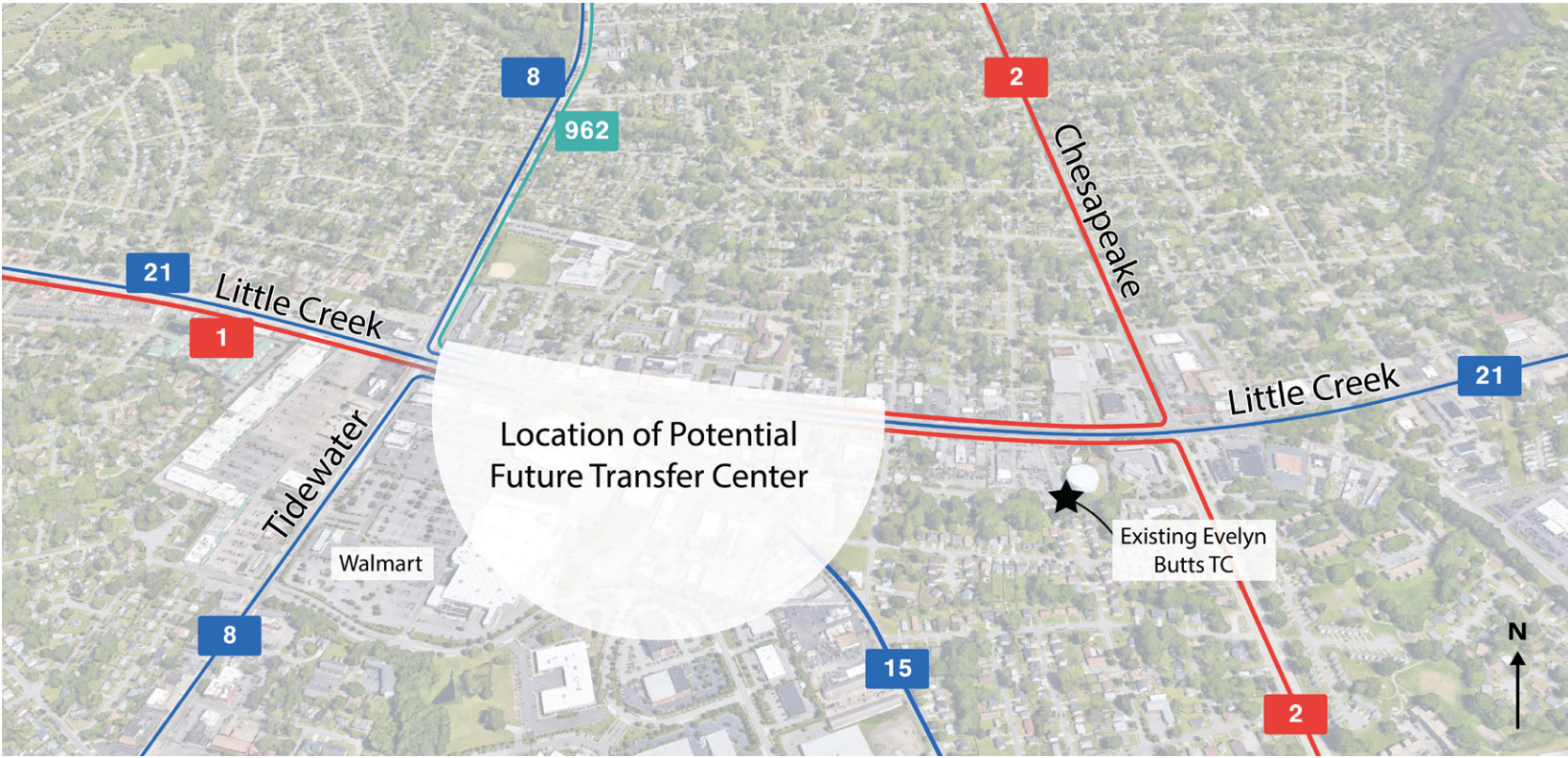
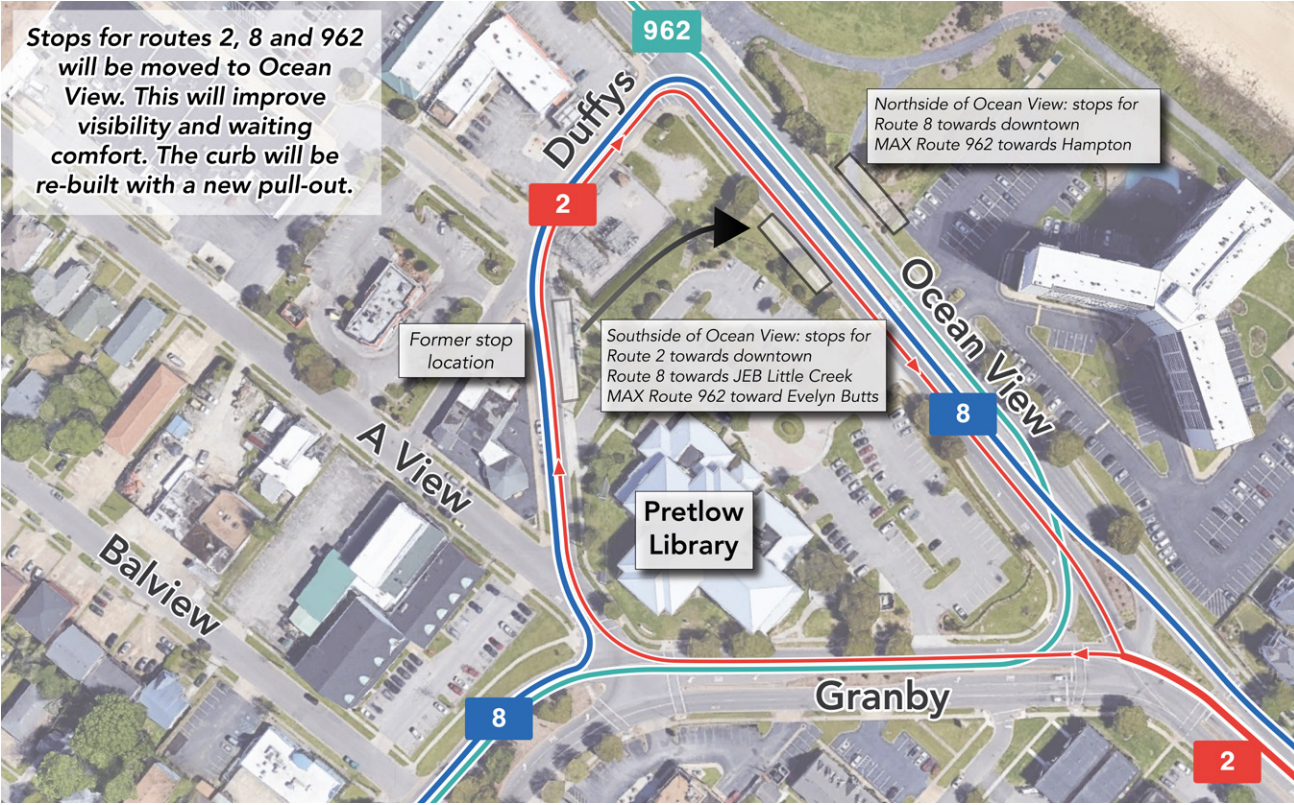


Figure 32: The relocated Pretlow Library Transfer Stops



Fixed Route or Variable Transit

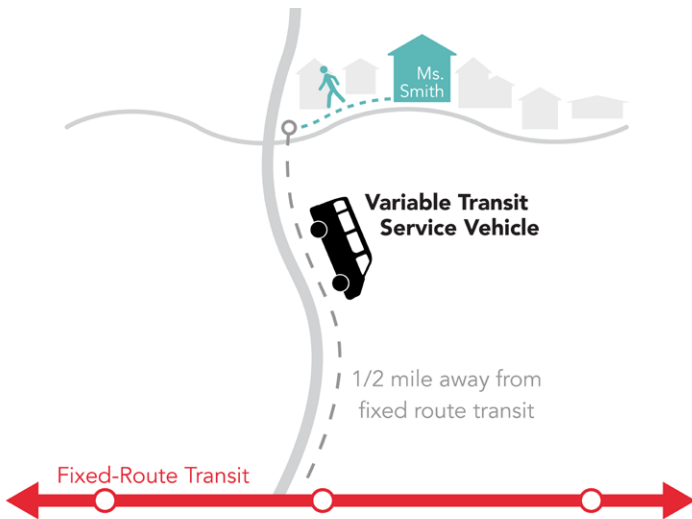
What is Variable Transit?

The neighborhoods of Chesterfield Heights, Grandy Village, and Ingleside are particularly hard to serve with useful transit as these neighborhoods are relatively isolated by water barriers and I-264. Both are almost within walking distance of The Tide, but still cut-off from it by highways and other barriers. Today, these areas are served by the hourly Route 18, or a deviation on the every 30-minute Route 9. In the Draft New Network they would both be served by the redesigned, hourly Route 18.

These areas could be served differently, however, with a “Variable Transit Zone” as a replacement for the hourly Route 18. Variable transit, also known as on-demand transit or microtransit, uses technology to route a fleet of vans based on real-time passengers demand. It is similar to a bus in that passengers are asked to walk to meet a vehicle at a ‘virtual bus stop’ that may be up to ¼ of a mile from their requested location (see Figure 33). However, it is different from a bus in that there are no schedules or route maps. Instead, trips must start and end within zones that fill gaps in the bus network. Figure 34 illustrates the potential zone. In this zone, passengers could be taken to the NSU, Ballentine Broad Creek, or Ingleside Road Tide Stations or to other destinations within the zone.

Advantages of the Variable Transit Service are shorter waits for service and faster trips, particularly for trips within the zone. The disadvantages are the lack of a one-seat ride to downtown, additional transfers required to go to destinations farther across the region, and the complexity for passengers unfamiliar with such a service. While this service

Figure 33: Illustration of possible neighborhood walk to access variable route transit from a corner



could, on balance, better serve this part of Norfolk, it is recommended for implementation at a later date because the ongoing Covid-19 pandemic means that service in small vehicles is less safe.

How would you take a trip?

To use Variable Transit, riders could book a trip using a smartphone application (“app”), a website, or through a call center. To book a ride, a passenger starts by indicating the number of passengers in their party and their desired pickup and drop-off locations. When booking using the app, passengers will clearly see the zone in which service is offered on a map on their phone. If a passenger requested a trip beyond the zone, the app would tell them that the trip would have to connect with fixed route transit or some other service to go beyond the zone.

Once the passenger submits a trip request, they are given a proposal telling them when the vehicle will arrive and where to meet it. Typically, passengers must wait between 10–20 minutes for a trip, although this varies depending on the level of demand and the number of vehicles available. Passengers can track the vehicle in real-time using the app. Passengers can usually cancel a ride at any time before pickup, but as cancellations may negatively affect other passengers, a small fee is often charged to discourage cancellations.

Passengers can pay using credit and debit cards, transit passes, cash, vouchers, and more. Most transit providers include payment options for people without credit cards or bank accounts to ensure that the service is accessible to all. Details of payment and fare integration with existing HRT fare media would need to be coordinated to ensure seamless connections.

The passenger is then taken to their destination. Along the way, the vehicle will pick up and drop off other passengers heading in the same direction, but care is taken to avoid lengthy detours for passengers already on board.

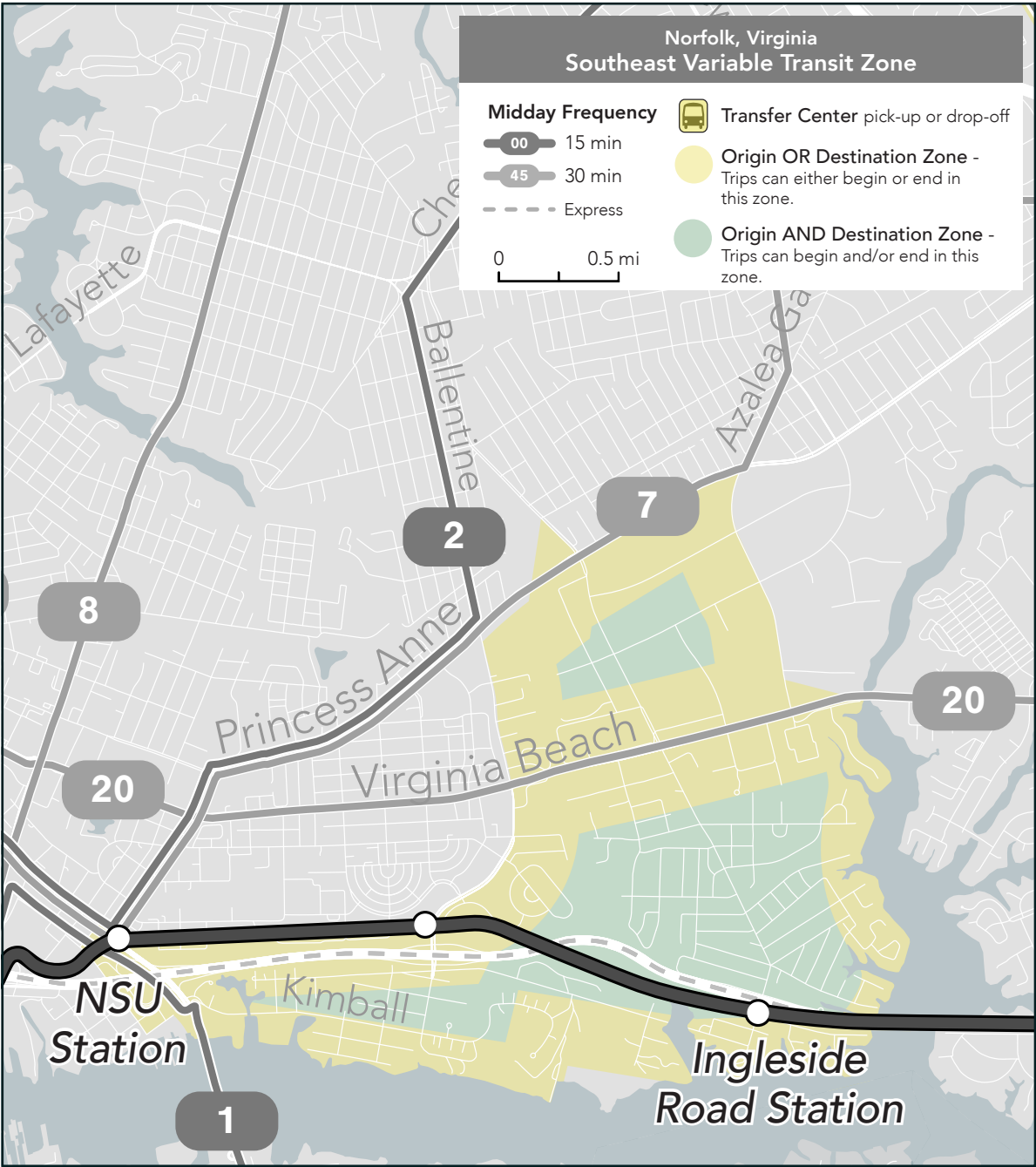


Figure 34: The Variable Transit Zone That Could Replace Route 18

3 Comparing Outcomes

Freedom = Access = Usefulness

Public transit can be described from many points of view, but there are some basic geometric facts about how transit works and how it interacts with the layout of a city. Public transit ridership arises from the combination of three things:

- **Access (or Freedom):** Where can you get to on public transit in a reasonable amount of time, compared to your alternatives?
- **Pricing:** What does transit cost given its alternatives?
- **Preferences:** These include everything else, all the subjective factors that govern decisions about how to travel, as well as reactions to other aspects of the transit experience.

Network design and planning mostly determine access, and access is central to the usefulness of service for any given trip.

Access

Wherever you are, there is a limited number of places you could reach in a given amount of time. These places can be viewed on a map as a blob around your location. Figure 35 shows an example of this type of visualization of transit access for Five Points (Chesapeake and Norview), in the Existing Network.

Think of this blob as “the wall around your life.” Beyond this limit are jobs you can not hold, places you can not shop, and a whole range of things you can not do because it simply takes too long to get there. The technical term for this is accessibility, but it’s also fair to call it freedom, in the physical sense of that word. The extent of this blob determines what your options are in life: for employment, school, shopping, or whatever places you want to reach. If you have a bigger blob, you have more choices, so in an important sense you are more free.

Access is a Matter of Geometry

Freedom is about what you could do, not what we predict you will do. Access is how network design generates ridership, because it measures how likely it is that any particular trip will be viable on transit. Yet, it also represents something that many people will see as a worthy goal in itself. For example:

- **Access to jobs** is a key concern for keeping people employed.
- **Access from a particular location** gives a location value. Real estate firms routinely study where you can get to by car from a particular parcel, and this is the same analysis for transit. In dense cities, transit access can be an important factor in land value.

- Access describes an outcome in terms that many people will care about. **If you are deciding where to live based on whether you’ll be able to get to your job, school, or relatives, you are asking a question about access.**
- The whole reason people live in urban areas is to have access to the opportunities that arise from being near other people. **So access is a fundamental measure of whether a city is functional.**

How Transit Expands Access

On transit, the extent of access is determined by:

- **A network**, including transit lines with their frequency, speed, and duration. These features determine how long it takes to get from any point on the network to any other point.
- **The layout of the city.** For each transit stop on the network, this determines how many useful destinations are located there or within easy walking distance.¹ For example, if density is higher, that means there are more people or useful destinations at a given stop, which means that good access from that point is of more value to more people.

Building Access: The Network and Frequency

A transit network is a pattern of routes and services, in which each line has:

- a path;
- a duration, or span—what hours and days it runs;
- an average speed; and
- a frequency—how often a transit vehicle serves a stop, which determines how long a riders waits for a vehicle.

Of these, frequency is the one that is often invisible and easy to forget. Yet frequency is usually the dominant element of travel time, and therefore significantly affects access in a given amount of time.

To maximize liberty and opportunity for the greatest possible number of people requires a network of routes that optimizes (in order) Frequency, Span, Connections, Speed, Reliability, Capacity, and that follows favorable patterns in the built environment.

¹ There are other ways to get to transit other than walking, but walking is by far the most common, so we use it here for simplicity as we explain the basic concepts.

Figure 35: The blob on this map effectively shows the liberty and opportunity available to someone living near Five Points (Chesapeake and Norview) if they rely on walking and transit.



Measuring Access to Opportunities

Frequency Comes First

Ridership responds to many features of a service, including speed and reliability, but the dominant factor is frequency. Frequency is the elapsed time between consecutive buses (or trains, or ferries) on a line, which determines the maximum waiting time.

People who are accustomed to traveling by private vehicle often underestimate the importance of frequency, because there isn't an equivalent in their experience. A private vehicle is ready to go when you are, but public transit isn't available until it comes.

High frequency means public transit is coming soon, which means that it approximates the feeling of liberty you have with a private vehicle—namely that you can go anytime. Frequency has three independent benefits for the passenger.

- **Frequency reduces waiting**, which is everyone's least favorite part of a trip. Being able to go when you want to go is the essence of frequency. A smartphone can tell you when the bus is coming, but still does not reduce the wait or get you where you want to be.
- **Frequency makes connections easy**, which makes it possible for a cluster of transit lines to become a network. A transit line without good connections is useful for travelling only along that line. A network of frequent lines can make it easy to travel all over the city. This massively expands the usefulness of each line.
- **Frequency is a backup for problems of reliability**. If a vehicle breaks down or is late, frequency means another will be along soon.

Measuring Access and Freedom

To measure freedom and access outcomes, we measure the change in access to jobs. Since retail and services also account for jobs, access to jobs is a good indicator of the usefulness of transit for many other opportunities that the region offers. So we ask the question: **Could more people access more jobs (and other opportunities) by transit, in less time?**

To answer this question, we explore how a transit network changes people's freedom to travel and access more jobs and opportunities. We measure how far one could go in 45 minutes on transit (door-to-door, including walking, waiting, and riding) from anywhere in the region, and calculate how many jobs are located in the area that is reachable.

Not Just the Area – Also What is Inside the Area

The real measure of usefulness is not just how much geographic area we can reach, but how many useful destinations are in that area.

Ridership arises from service being useful, for more people, to get to more busy places. That's why predictive models of ridership do this very same analysis behind-the-scenes.

The example in Figure 36 shows how access changes for the Five Points Area (Chesapeake and Norview) with the Draft New Network compared to the Existing. Areas reachable with both networks in dark blue, newly reachable areas in light blue, and areas no longer reachable in grey. The table below reports the change in jobs and people reachable. The technical term for this map is an isochrone, from Greek for "iso" meaning same and "chrone" meaning time.

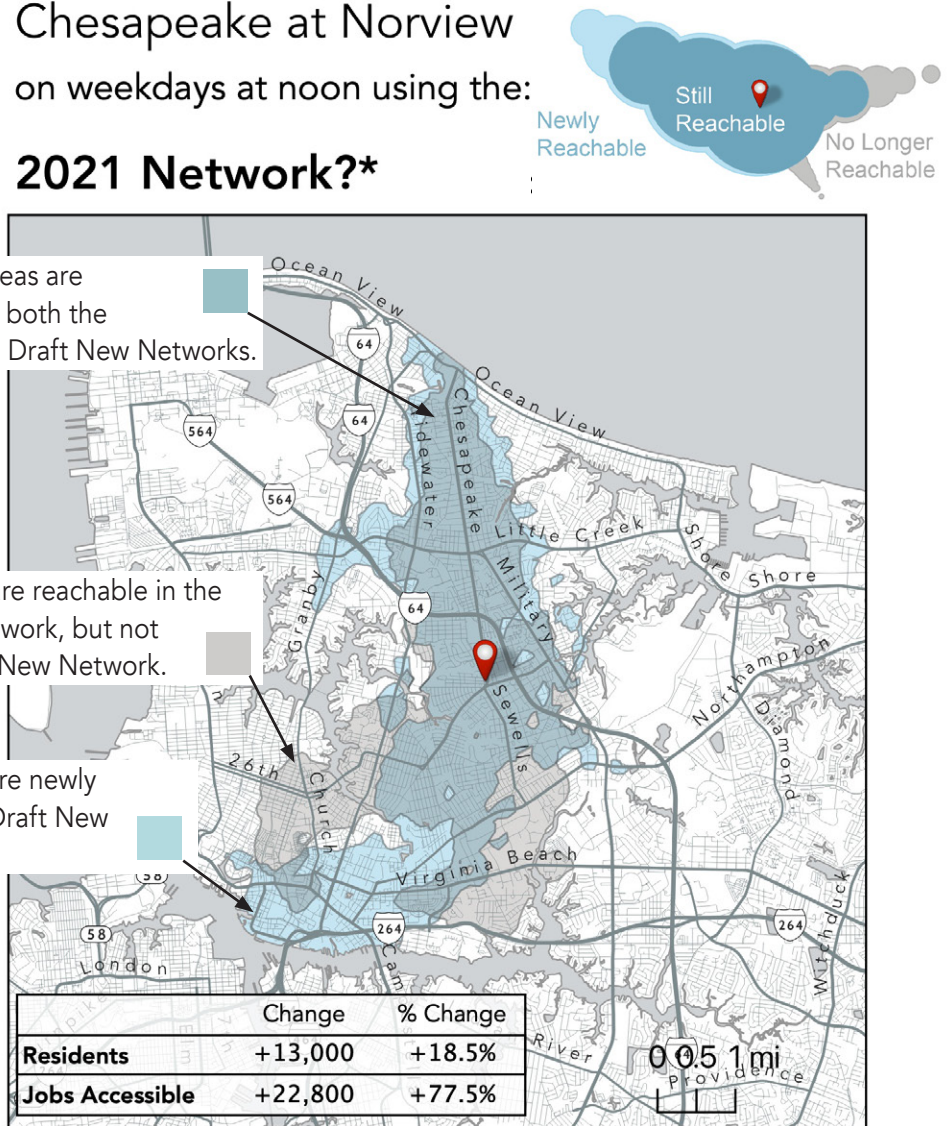
The maps on page 35 show the same comparison of isochrones for three other example locations around Norfolk. Many more isochrone examples are in Appendix A, showing how different parts of the city are affected by the Draft New Network.

When reviewing these maps remember that **waiting time counts, and in most cases, a longer walk to a high-frequency route can get people farther and faster**, than a shorter walk to an infrequent route. Also remember that some of the access shown in these maps isn't reached on a single route, but requires a transfer.

With the Draft New Network residents near Five Points could reach 22,800 additional jobs in 45 minutes, 78% more than today.

Figure 36: Places reachable in 45 minutes from Five Points (Chesapeake and Norview) in the Draft New Network, compared to the Existing Network

How far can I travel in **45 minutes** from Chesapeake at Norview on weekdays at noon using the: **2021 Network?***

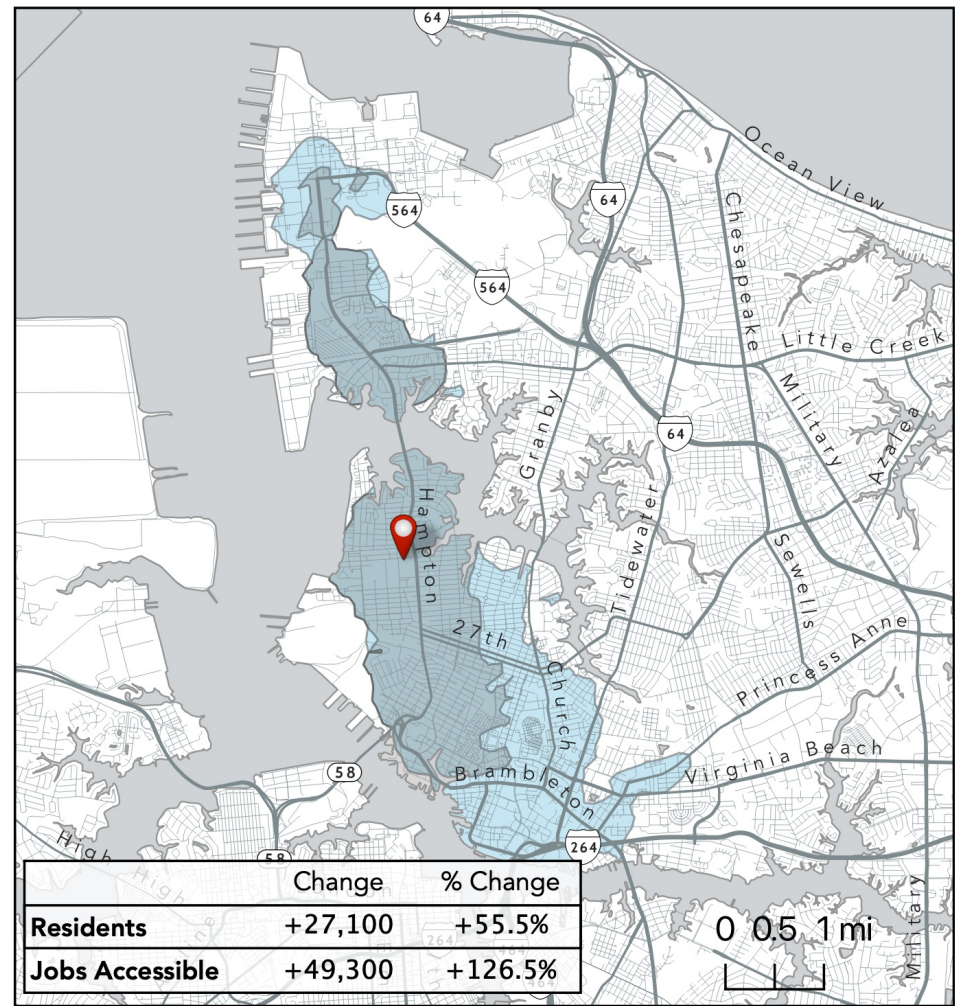


*compared with the HRT network as of February 2020.

Sample Isochrones

Figure 37: Places reachable in 45 minutes from Old Dominion University in the Draft New Network, compared to the Existing Network.

How far can I travel in **45 minutes** from Old Dominion University on weekdays at noon using the: **2021 Network?***

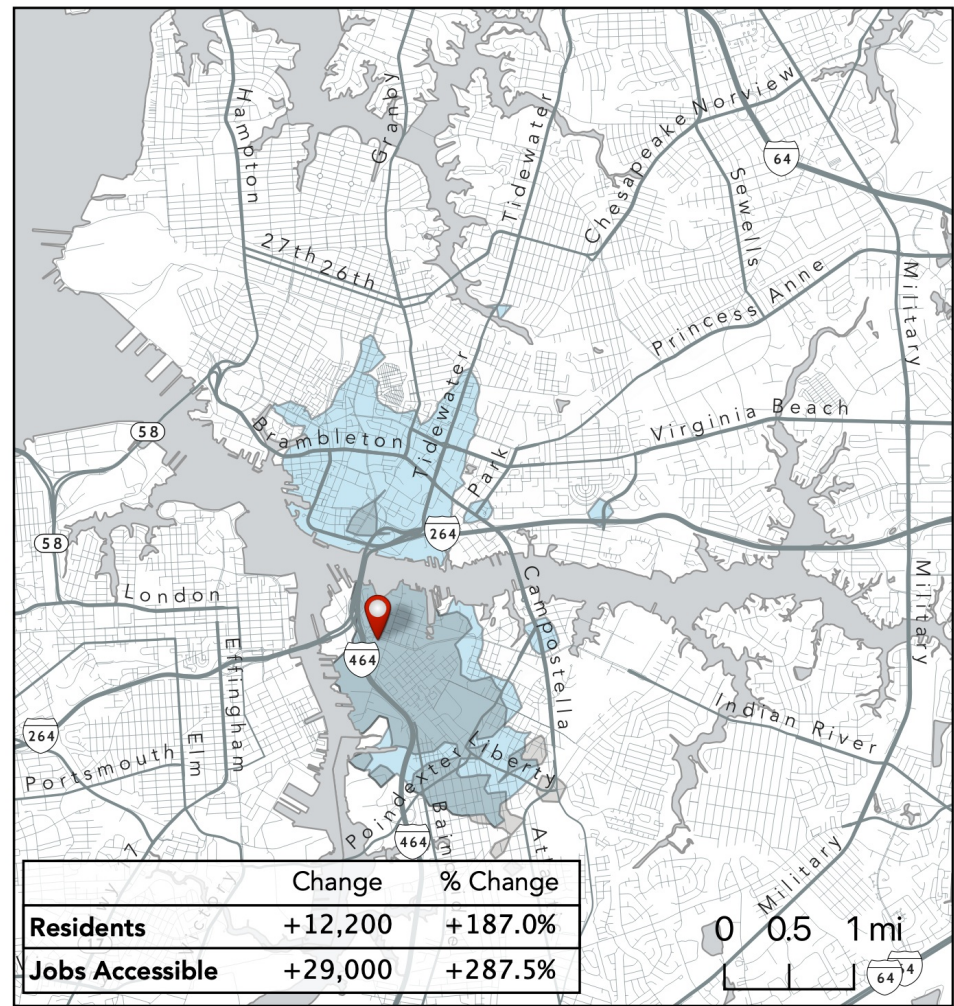


*compared with the HRT network as of February 2020.

With the Draft New Network an additional 27,100 residents could reach ODU in 45 minutes, 56% more than today.

Figure 38: Places reachable in 45 minutes from Berkley Community Center in the Draft New Network, compared to the Existing Network.

How far can I travel in **45 minutes** from Berkley Community Center on weekdays at noon using the: **2021 Network?***

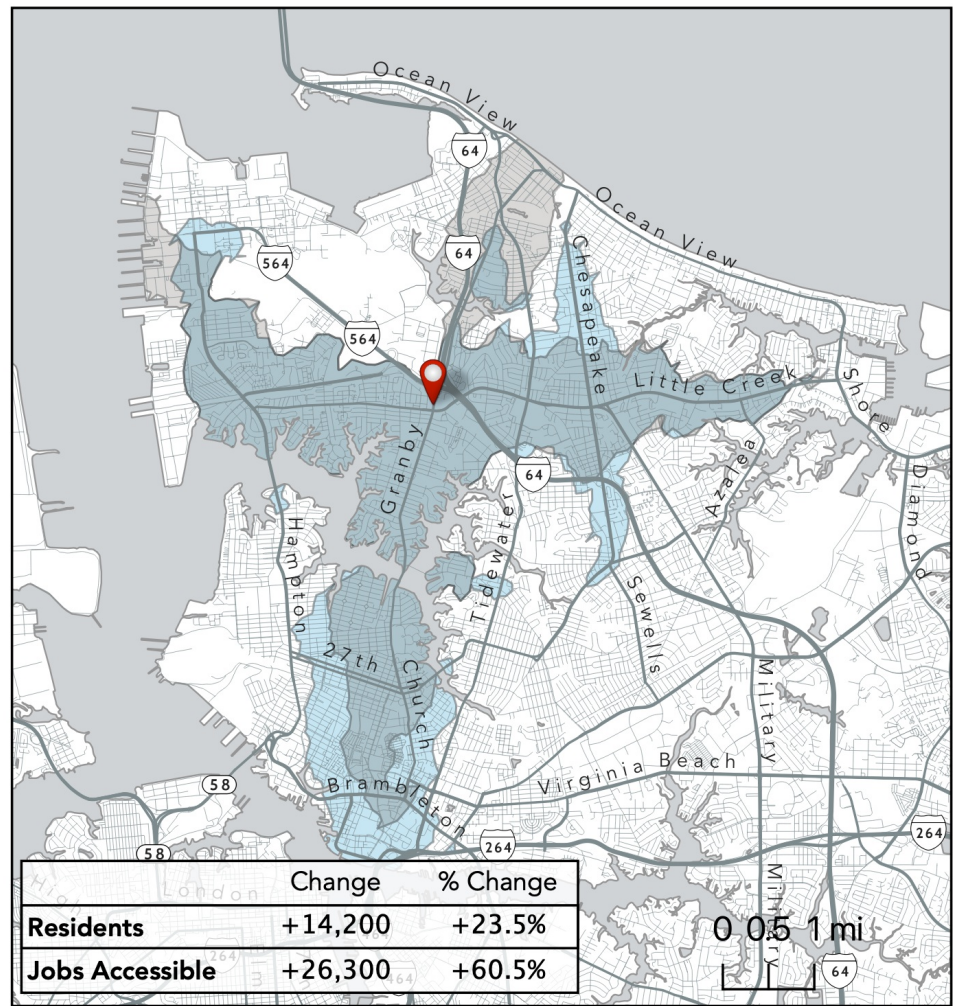


*compared with the HRT network as of February 2020.



Figure 39: Places reachable in 45 minutes from Wards Corner in the Draft New Network, compared to the Existing Network.

How far can I travel in **45 minutes** from Wards Corner on weekdays at noon using the: **2021 Network?***



*compared with the HRT network as of February 2020.

Residents near Wards Corner could reach 26,300 more jobs in 45 minutes, 61% more than today, with the New Network.

Change in Access to Opportunities

The previous maps show how the Draft New Network changes where people could go in a given time, from certain places. We can run the same analysis on a grid of locations throughout the city to estimate the access impacts of the Draft New Network on jobs access for different areas of the city.

The map on this page summarizes the change in jobs reachable for every part in the city. In this map, every hexagon represents the number of jobs that can be reached in 45 minutes as compared to the Existing Network. Green hexes represent more jobs accessible and pink hexes represent fewer jobs available. Hexes are also sized by the number of people who live in each hexagon.

In general, the Draft New Network significantly increases access to jobs for the most dense parts of the city, which is clear because the largest hexagons tend to be dark shades of green. Also, most parts of the city are green, indicating that most areas of the city are benefiting from the increased frequency of service on major corridors.

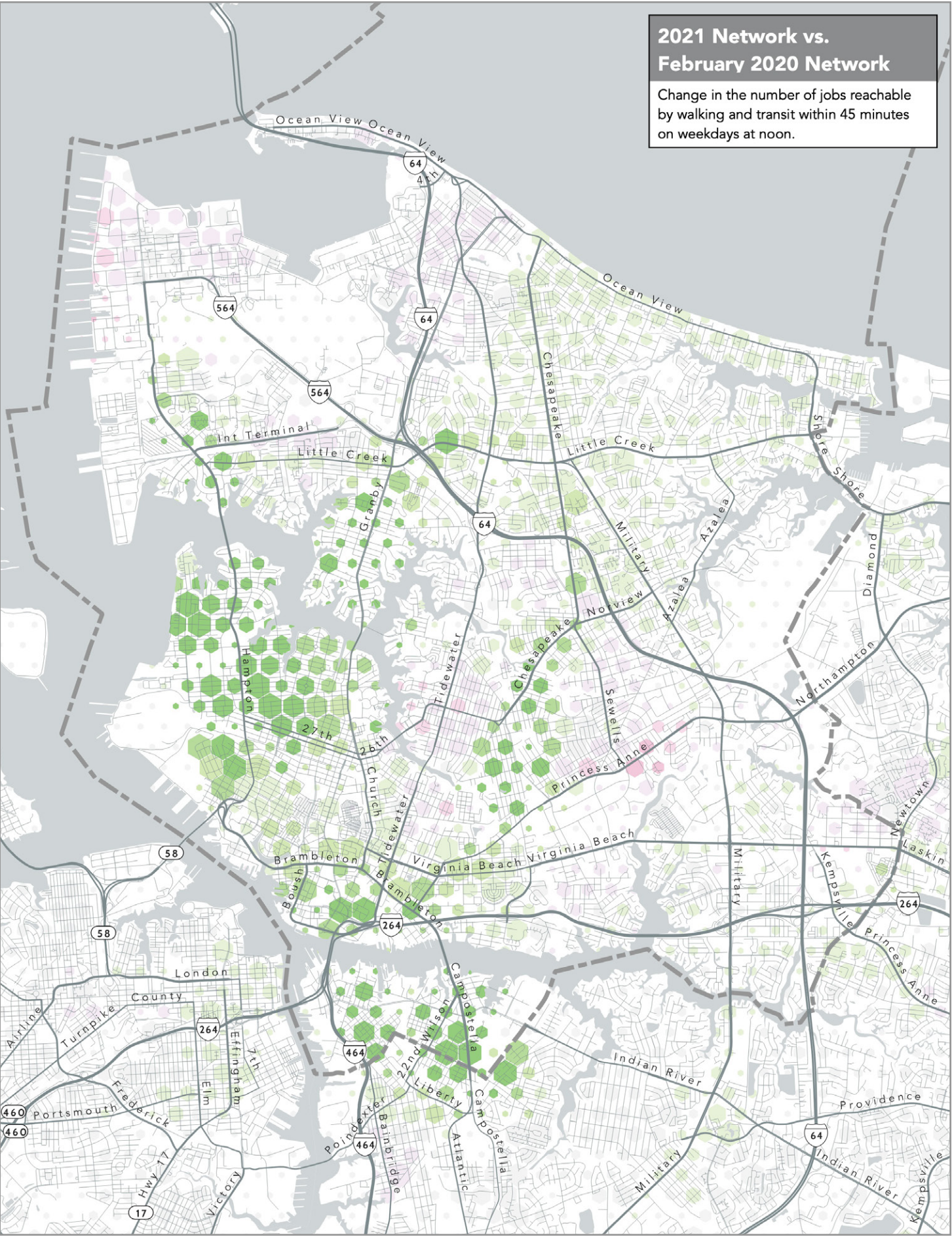
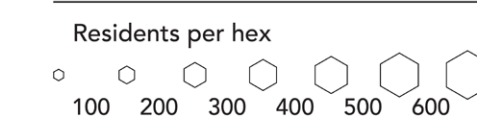
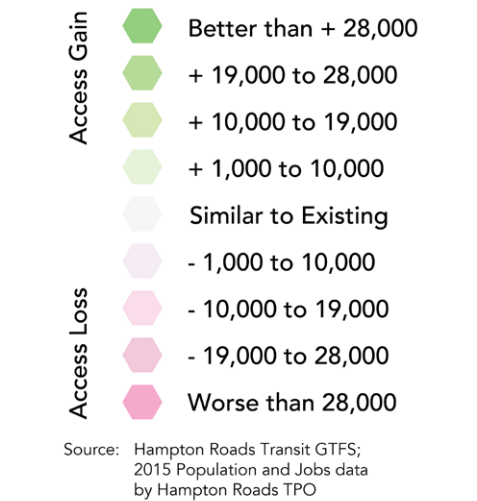
Traveling across large parts of the city, particularly in the most dense areas, would be much faster, because waiting times would be much shorter, both for the initial wait for a bus and for a connection. The Draft Network would require people to walk longer distances in some places, like around Norfolk State University, but it will get most people farther and faster to their destinations, primarily due to shorter waits and easier connections.

Areas like Berkley, Broad Creek, Campostella, Ghent, Glenwood Park, Wards Corner and Downtown would see large access benefits due increases in frequency. Increased frequency on corridors such as Hampton, Granby, Chesapeake, Ballentine, Campostella, and Brambleton would drastically improve access for these areas. Even residents in farther out places like East Ocean View, Camellia Shores, and Poplar Halls see job access benefits from the Draft New Network.

Not all parts of the city benefit, as some areas see a decrease in frequency or a loss of service. The most substantial decrease in access would be experienced along Princess Anne Road east of Sewells Point. The areas along Tidewater Drive near Lafayette Boulevard also see a decrease with the changes to the Chesapeake Boulevard service. Also, areas along northern Granby Street, within the Naval Base, and on Willoughby Spit see a decrease in access in the Draft New Network. These losses are the trade-off of shifting service toward a higher ridership emphasis.

Figure 40: Change in Jobs Reachable in 45 Minutes for the Draft New Network Compared to Existing Network.

How many jobs can be accessed in 45 minutes with this network compared with the existing network?



Change in Access Summarized

Using the data in the map on the previous page, we can estimate the change in access for the average person in Norfolk and for different subgroups. Figure 41 compares the jobs reachable for the average resident and Figure 42 compares the jobs reachable for the average person of color and person in poverty.

By multiplying the change in access in each hexagon by the population and then dividing by the total population, we can calculate that the Draft New Network allows the average person in Norfolk to reach 41,700 jobs within 45 minutes by walking and taking transit—**31% more jobs than are reachable with the existing network.**

By applying the same calculations to people of color and people in poverty we can see that for **the average person in poverty, the number of jobs accessible by transit within 45 minutes would increase by 39%. For the average resident of color, jobs accessible in 45 minutes would increase by 32%.**

Access isn't just about getting places from home. For businesses and destinations of all kinds, access analysis shows how many customers can get to you. Therefore, it is also useful to consider how many residents can reach each jobs location in Norfolk. Figure 43 shows that the average job location would have access to 33% more residents. That 33% more potential employees, or customers, or clients.

This analysis measures jobs, but it reflects a wide range of opportunities that a person can reach. This means a person can get to more shopping, education, recreational areas, social events, places of worship, and any other opportunities that Norfolk, and the region, can offer.

Figure 41: Jobs Reachable Within 45 Minutes for the Average Norfolk Resident

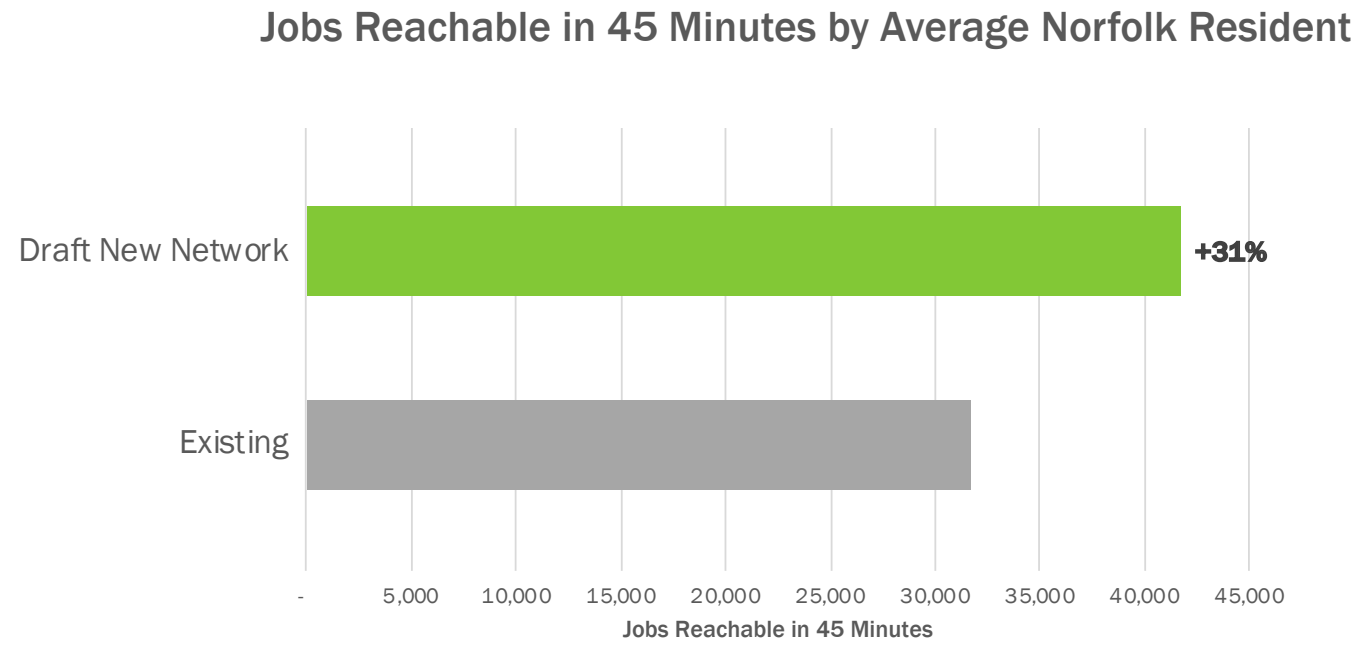


Figure 42: Jobs Reachable Within 45 Minutes for the Average Resident of Color and Resident in Poverty

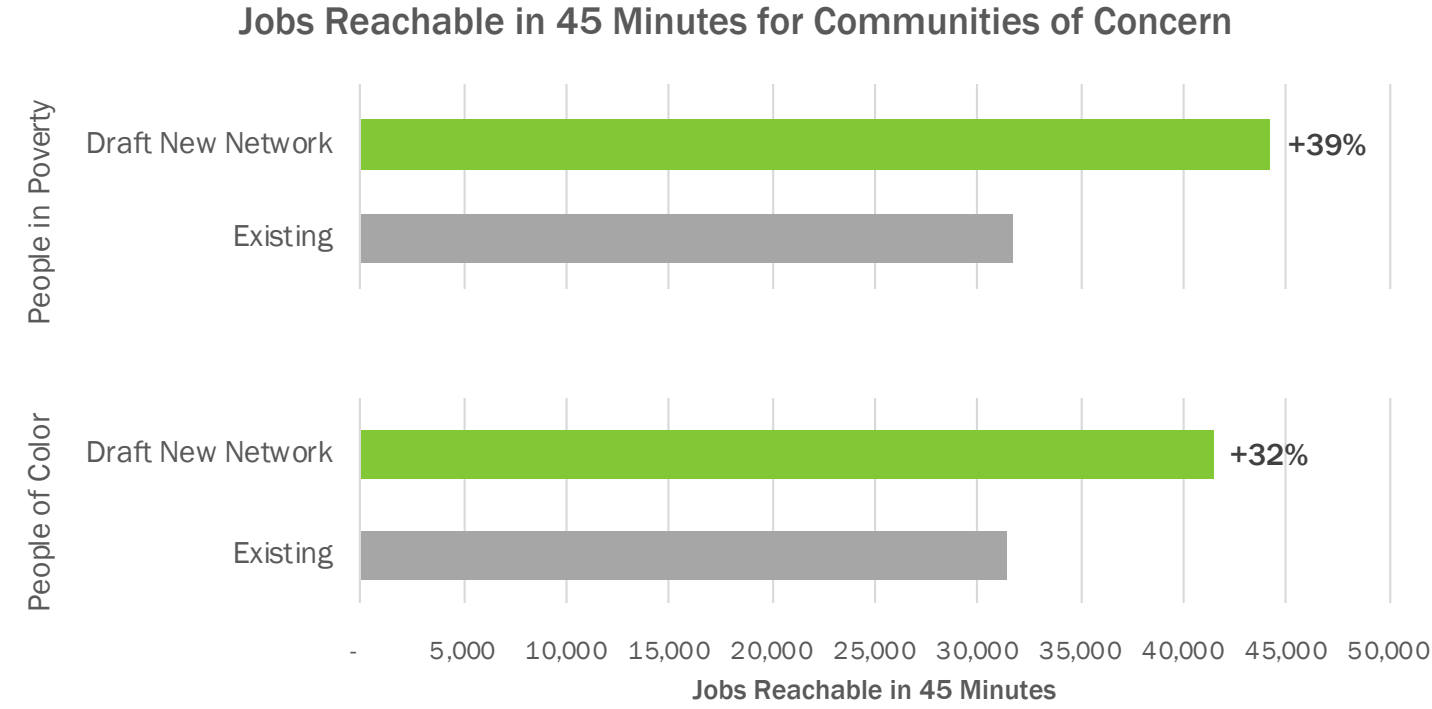
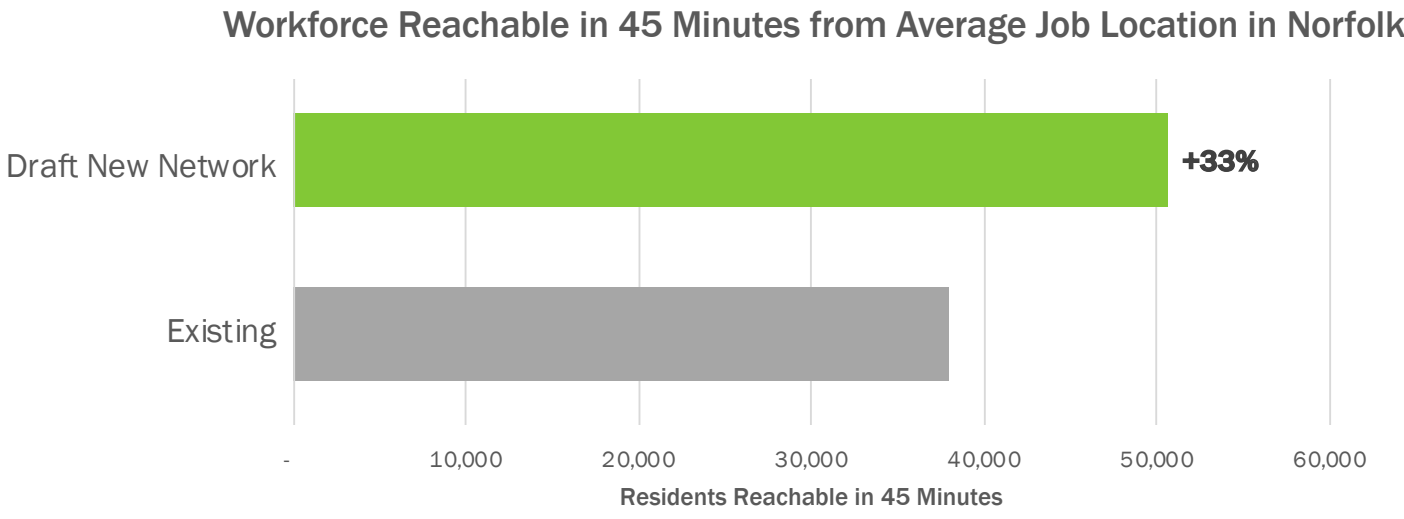


Figure 43: Residents Reachable Within 45 Minutes for the Average Job Location, i.e. Workforce Access



Change in Access by Superward

If job access seems distributed equitably for people of color and people in poverty, is it distributed equitably across the geography of the city? As previously discussed, it is not possible to treat every neighborhood and activity center equally when distributing transit service, but it is important to consider how equitable access is distributed across the city.

One way to assess that is to look at the change in access to jobs across the two Superwards of the city, that roughly divide the city into two equal parts. Each Superward contains a diverse array of city neighborhoods and activity centers.

The map in Figure 44 shows the same job access change results as Figure 41 on page 37, but now the Superward boundaries are shown. Both Superwards have areas with large access gains and also areas with access declines.

Figure 45 summarized the change in jobs reachable for the average resident citywide and within each Superward. In the Existing Network, Superward 7 residents have greater job access, with the average resident able to reach about 35,000 jobs, while the average resident of Superward 6 can reach fewer than 30,000 jobs. The average resident of each Superward benefits greatly from the Draft New Network: Superward 6 residents could reach 10,000 more jobs on average, and Superward 7 residents could reach 9,600 more jobs on average.

Figure 45: Jobs Reachable Within 45 Minutes for the Average Norfolk Resident and Resident of Superwards 6 and 7.

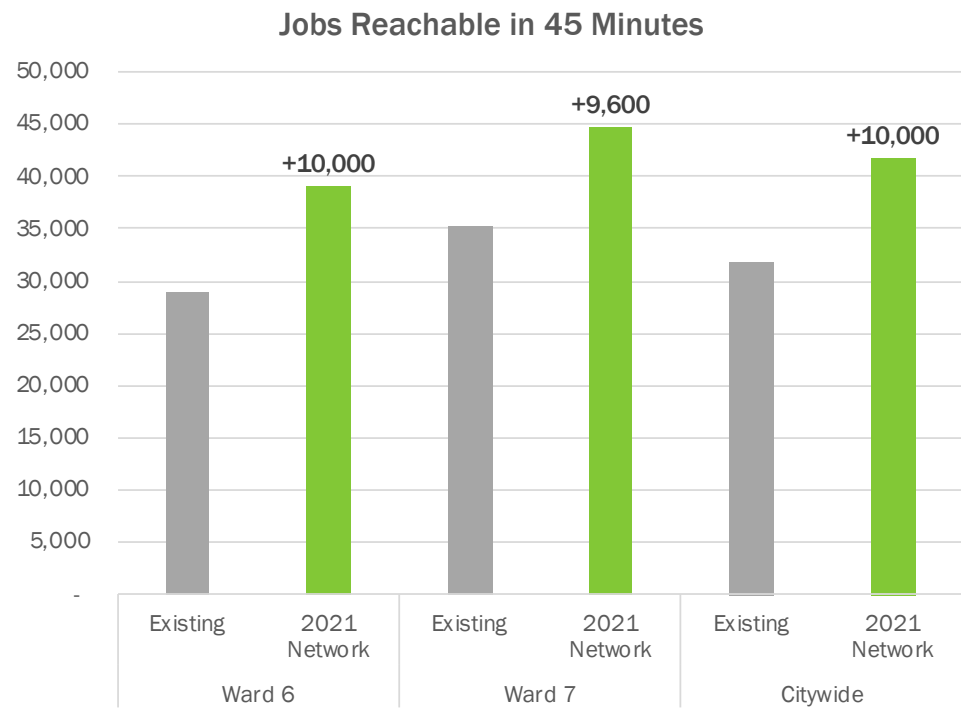
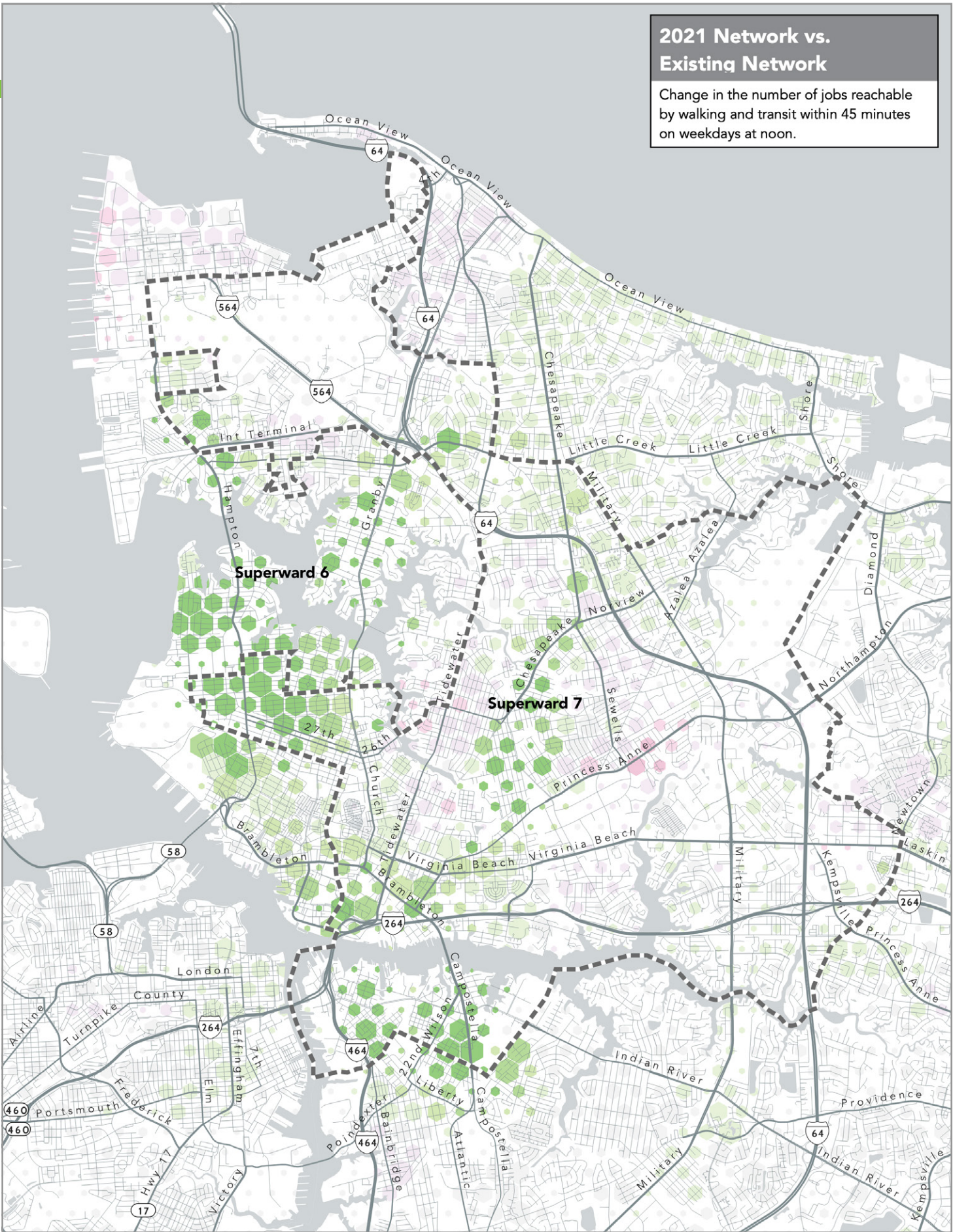


Figure 44: Change in Jobs Reachable in 45 Minutes for the Draft New Network Compared to Existing Network with Superward Boundaries.

How many jobs can be accessed in 45 minutes with this network compared with the existing network?



Proximity to Transit

The number of people and jobs within a certain distance from transit is the simplest measure of transit outcomes. In this report we call this measure “proximity to transit”.

The bar charts in Figure 46 show how many residents (at top) and jobs (at bottom) would be “close enough” to any service for the Existing Network and the Draft New Network. These charts assume that someone is near transit service if they are within ¼ mile of a bus stop as the crow flies. Walking ¼ mile over flat ground takes the average person about 5 minutes.

Overall, the Existing Network reaches most people and most jobs, with 99% of people and 96% of jobs within ¼ mile of a transit stop. Yet because service is spread so thinly, only 22% of people (53,100) are near a frequent route. Since jobs are more concentrated in the core, they are more likely to be close to frequent service, with 31% of jobs (64,900) near a frequent bus or train.

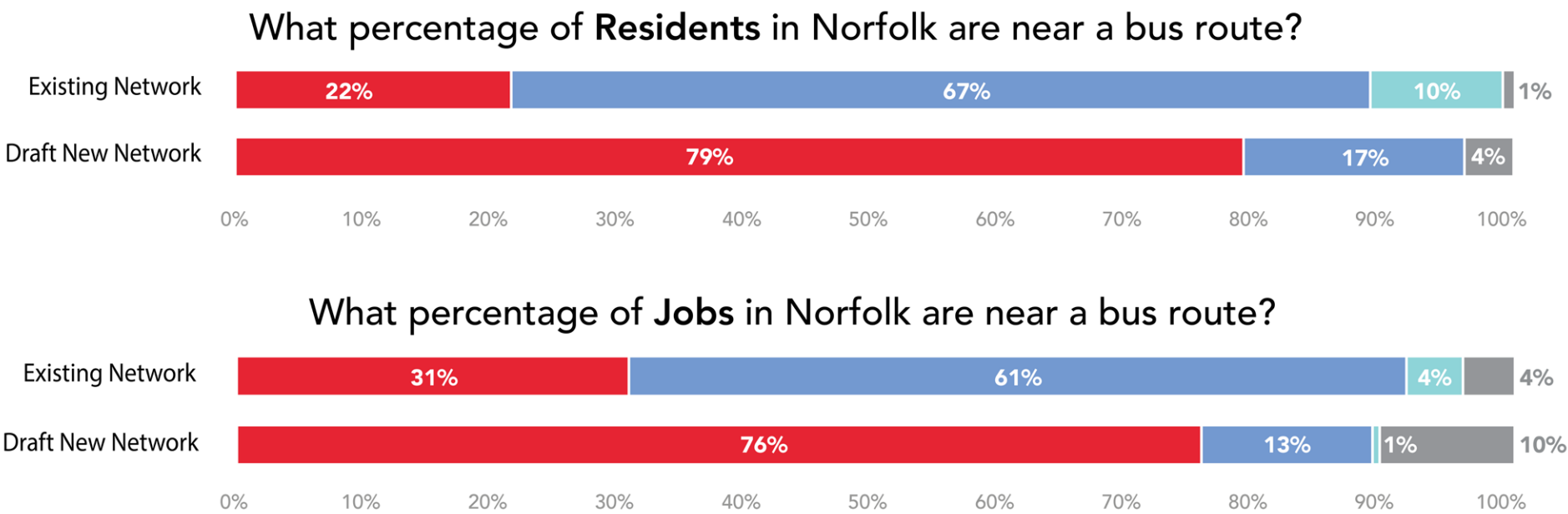
The Draft New Network would significantly increase the number of people and jobs near frequent service, as more routes would be running every 15 minutes or better.

Compared to Existing, the Draft New Network would

- increase the number of residents near frequent service from 22% to 79%, bringing frequent service to 140,900 more residents, for a total of 194,000 residents near frequent service.
- increase the number of jobs near frequent service from 31% to 76%, bringing frequent service to 95,100 more jobs, for a total of 160,000 jobs near frequent service.
- reduce the percent of residents that are within ¼ of any transit service from 99% to 96%, putting about 6,500 more residents over ¼ mile from service.
- reduce the percent of jobs that are within a ¼ mile of any transit from 96% to 90%, putting about 13,800 more jobs over ¼ mile from service.

Proximity does not tell us how useful the service is to people—only that it is nearby. Proximity to frequent service is a key measure of ridership potential. Frequent service is more expensive relative to the area it covers, but it is more useful and therefore tends to attract higher ridership. Thus, the more people and jobs near frequent service, the more a network is achieving a ridership goal.

Figure 46: The Draft New Network drastically increases the percent of residents and jobs near frequent service with a relatively small increase in those not near service.



The Draft New Network brings frequent service near an additional 140,900 residents and 95,100 jobs service, vastly expanding access to useful service.

Proximity to Transit: Disadvantaged Populations

Proximity to service of any type is a good measure of an agency’s success toward a coverage goal, though more specific investigations are essential to determine whether vulnerable people and important destinations are covered. Transit is often tasked with providing affordable transportation for low-income residents, which is why agencies provide service to some people and areas, regardless of ridership potential. Federal laws also protect those with low incomes from disparate transportation impacts, which is why agencies sometimes provide transit service in places where poverty is high, even if this does not maximize ridership. Similarly, federal civil right laws require that transit agencies assess the impacts of changes to service on racial and ethnic minority residents to ensure there are no disproportionate negative impacts.

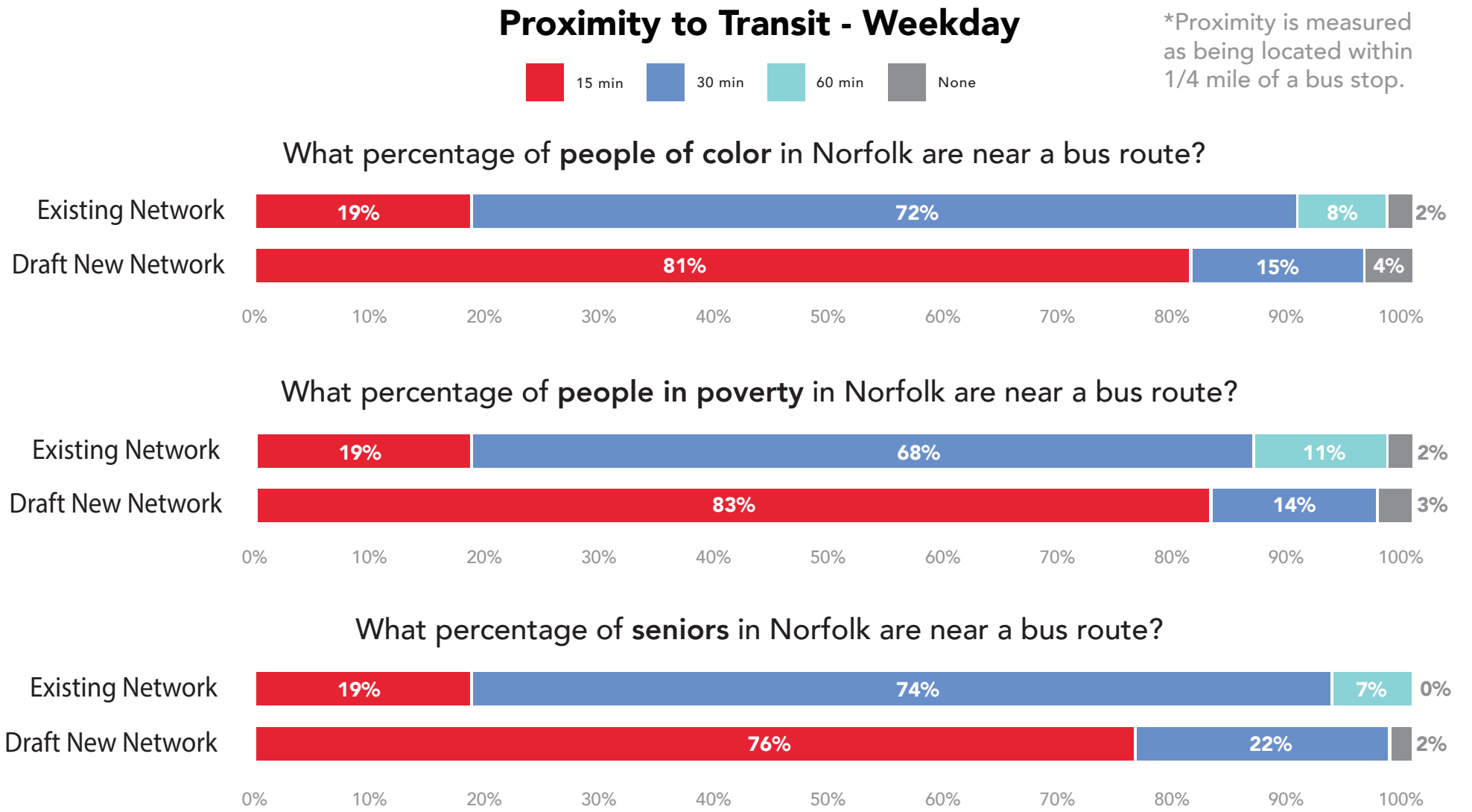
The charts in Figure 47 show the differences in proximity to service for residents of color, residents in poverty, and seniors. The most important takeaway from these charts, is that the changes in proximity to any service from the existing network to the Draft New Network appears to have a similar effect on people of color, people in poverty and seniors as on the general population. For all residents, the Draft New Network slightly reduces the percent of people near any service from 99% to 96%. For residents of color, the reduction is from 98% to 96%. For residents in poverty, the reduction from 98% to 97%. For seniors the reduction is from 100% to 98%.

Many more people of color, people in poverty and seniors have access to frequent service in the Draft New Network.

- For people of color, access to frequent service goes up from 19% to 81%, bringing frequent service to 82,800 more people of color.
- For people in poverty, access to frequent service goes up from 19% to 83%, brining frequent service to 28,400 more people in poverty.
- For seniors, access to frequent service goes up from 19% to 76%, bringing frequent service to 13,800 more seniors.

This analysis and the job access change results suggest that the Draft New Network is, at least, not disproportionately burdensome to protected groups, like minority residents and people in poverty. Moreover, **the Draft New Network brings frequent service to people in poverty and people of color at a higher rate than for residents overall.** Also, people in poverty and people of color see larger gains in job access than the average resident. Thus, the Draft New Network might be considered more equitable than the Existing Network.

Figure 47: As with all residents, more people of color and people in poverty have access to any service in the Existing Network, but far more have access to frequent service with the Draft New Network



By putting more high frequency service near people of color and people in poverty, the Draft New Network is more equitably distributing service across the city.

4 Next Steps

Next Steps

What happens next?

This Draft New Network Report will inform public and stakeholder outreach as part of Round 3 Engagement of the Multimodal Norfolk: Transit System Redesign effort. The City, consultant staff, and volunteers will be conducting surveys and other outreach efforts from November 30, 2020 to January 8, 2021. That outreach process will include the key questions:

- Is the Draft New Network better for you, your neighborhood or community, and for the City as a whole?
- If you don't like something, how would you change the network? Remember, this is a cost-neutral redesign. So if you want more service on your street, that must be paid for by cutting something else!

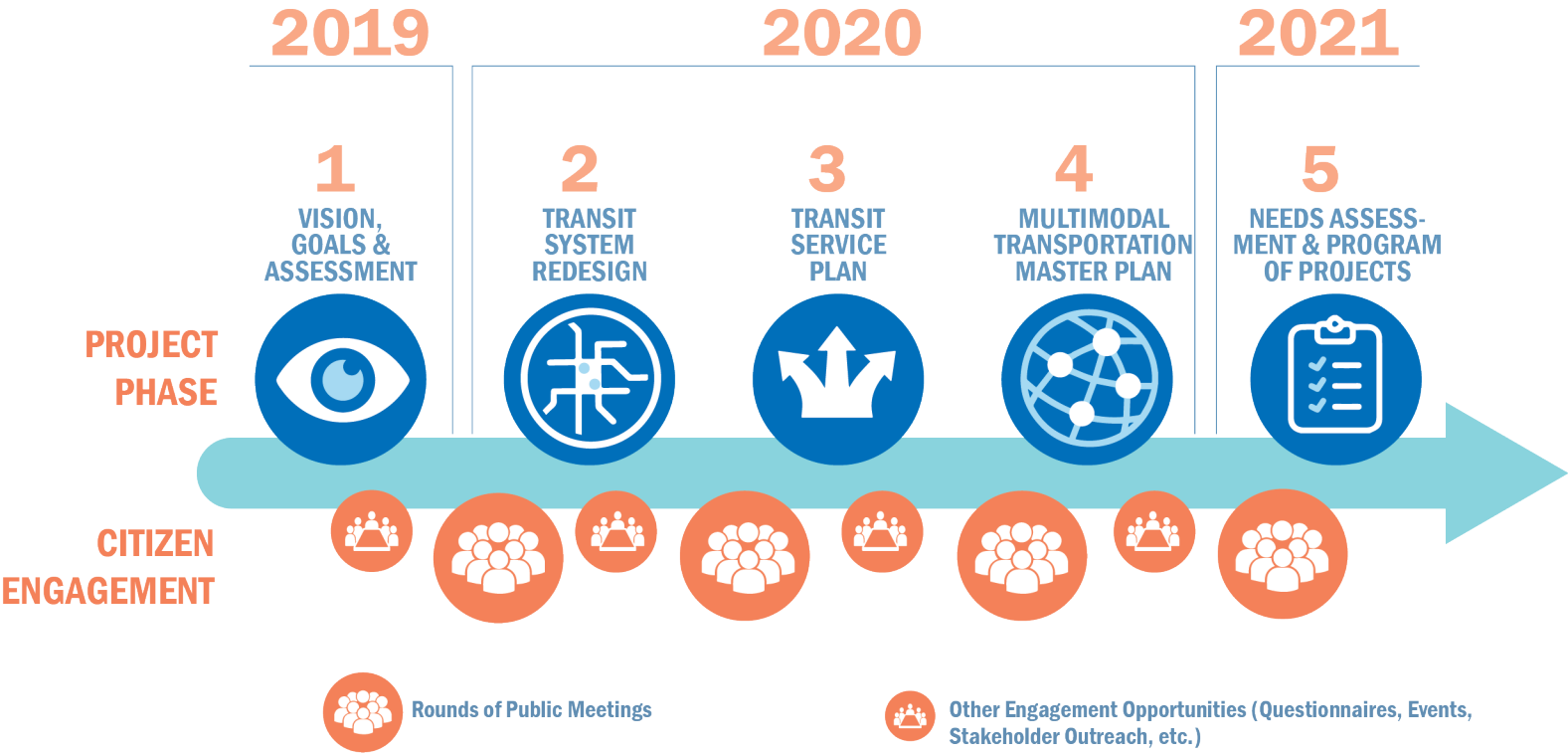
If you agree this would be an improvement for Norfolk, it's important to speak up. And if you don't like the plan, please let us know how it can be improved.

For more information and to stay involved in the project, go to multimodalnorfolk.com and:

- take the Round 3 survey about this Draft New Network;
- register to attend one, or both, of the two virtual public meetings scheduled for December 10 and December 15, 2020.
- sign up for email updates about the project;
- watch videos that summarize key choices and the redesign process;
- request a community presentation, or communicate with the project team;
- sign up to volunteer or work with the City to spread the word and support engagement efforts for Multimodal Norfolk; and
- generally stay up-to-date on the latest happenings with the network redesign process!

The City of Norfolk Council will review this Draft New Network and ultimately decide if and when it will be implemented, and how it might be changed. **Your opinion matters in determining the final recommendations.** The City Council is expected to take action of the Transit System Redesign Final Recommendations in January 2021. Once approved, it is expected that the Final New Network would be implemented in October 2021.

Figure 48: Timeline of the Multimodal Norfolk Plan.



Your voice matters! Contact the project team and take the Draft New Network Survey at multimodalnorfolk.com.

Appendix A: Isochrones

Isochrone Key

The map to the right shows the location of the 27 isochrone examples provided in this Appendix. Click on the name in the list below to go directly to an example isochrone.

When reviewing these maps remember that **waiting time counts, and in most cases, a longer walk to a high-frequency route can get people farther and faster**, than a shorter walk to an infrequent route. Also remember that some of the access shown in these maps isn't reached on a single route, but requires a transfer.

Not Just the Area – Also What is Inside the Area

The real measure of usefulness is not just how much geographic area we can reach, but how many useful destinations are in that area. Each map includes a table showing the change in the number of jobs and residents within each isochrone, relative to the existing network.

Ridership arises from service being useful, for more people, to get to more busy places. That's why predictive models of ridership do this very same analysis behind-the-scenes.

Locations	
Azalea Garden at Little Creek	Military Hwy at Princess Anne Rd
Azalea Garden at Robin Hood	Naval Exchange at NNS
Berkley Community Center	Norfolk State University
Chesapeake at Cromwell	Norview at Military
Chesapeake at Norview	East Ocean View
Downtown: MacArthur Square	Old Dominion University
Downtown Norfolk Transit Center	Princess Anne at Ingleside
Fort Norfolk and EVMC	Princess Anne at Sewells Point
Ghent	Southside Campostella Housing
Pretlow Library	Tidewater at Lafayette
JEB Little Creek Gate 1	Virginia Beach Blvd at Raby
Liberty and Seaboard	Wards Corner
Little Creek at Sewells Point	Willoughby Spit
Military Circle	



Isochrones 1-3

How far can I travel in **45 minutes** from
Azalea Garden at Little Creek
on weekdays at noon using the:

2021 Network?*

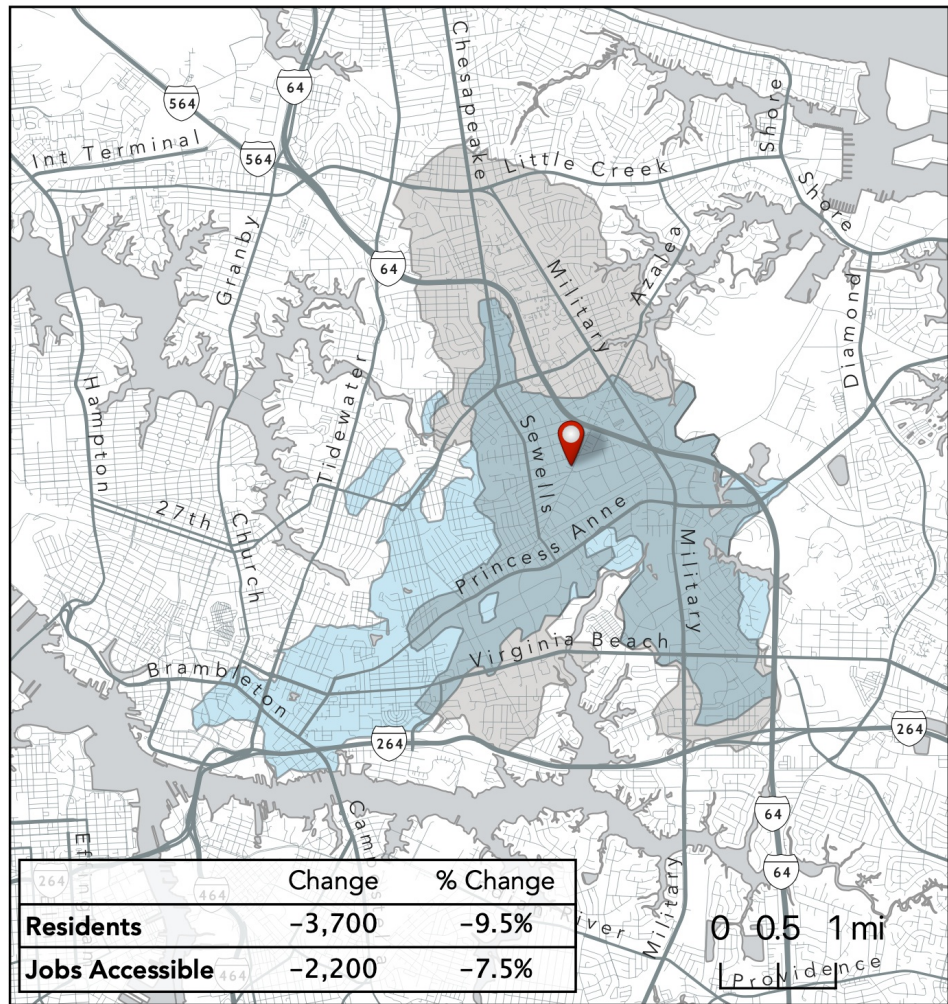


*compared with the HRT network as of February 2020.



How far can I travel in **45 minutes** from
Azalea Garden at Robin Hood
on weekdays at noon using the:

2021 Network?*

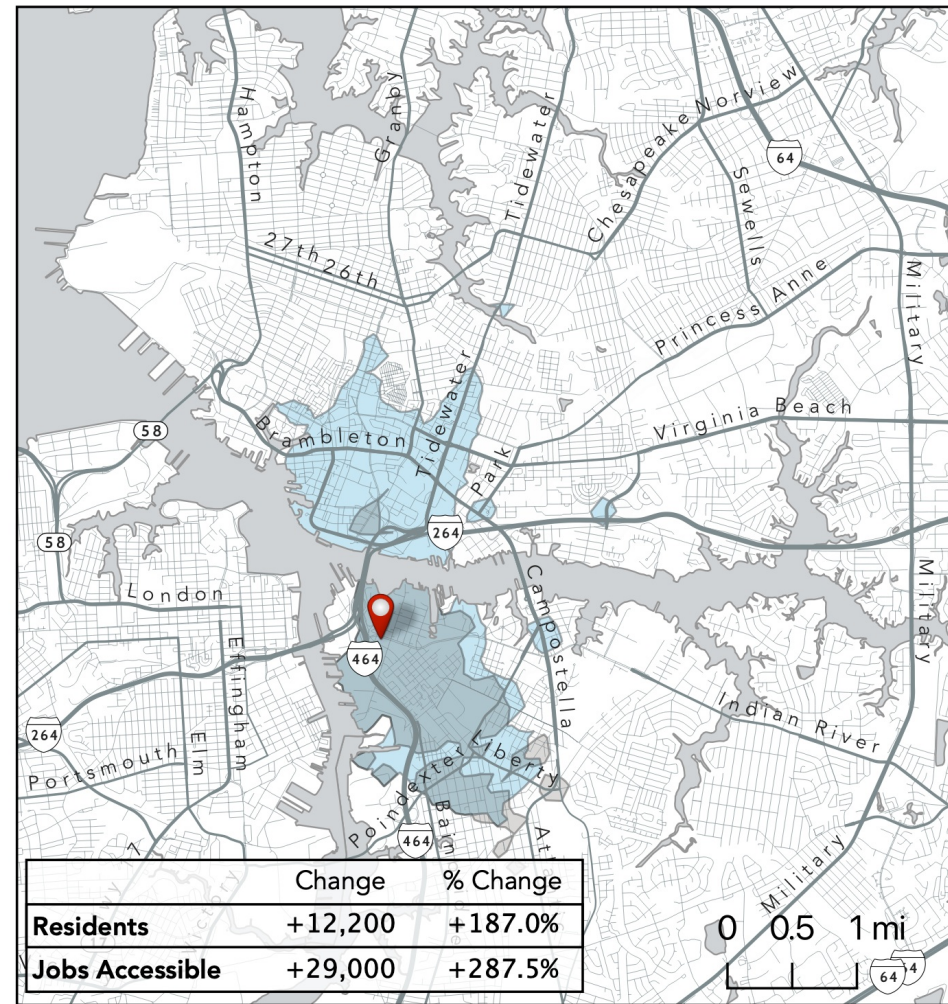


*compared with the HRT network as of February 2020.



How far can I travel in **45 minutes** from
Berkley Community Center
on weekdays at noon using the:

2021 Network?*



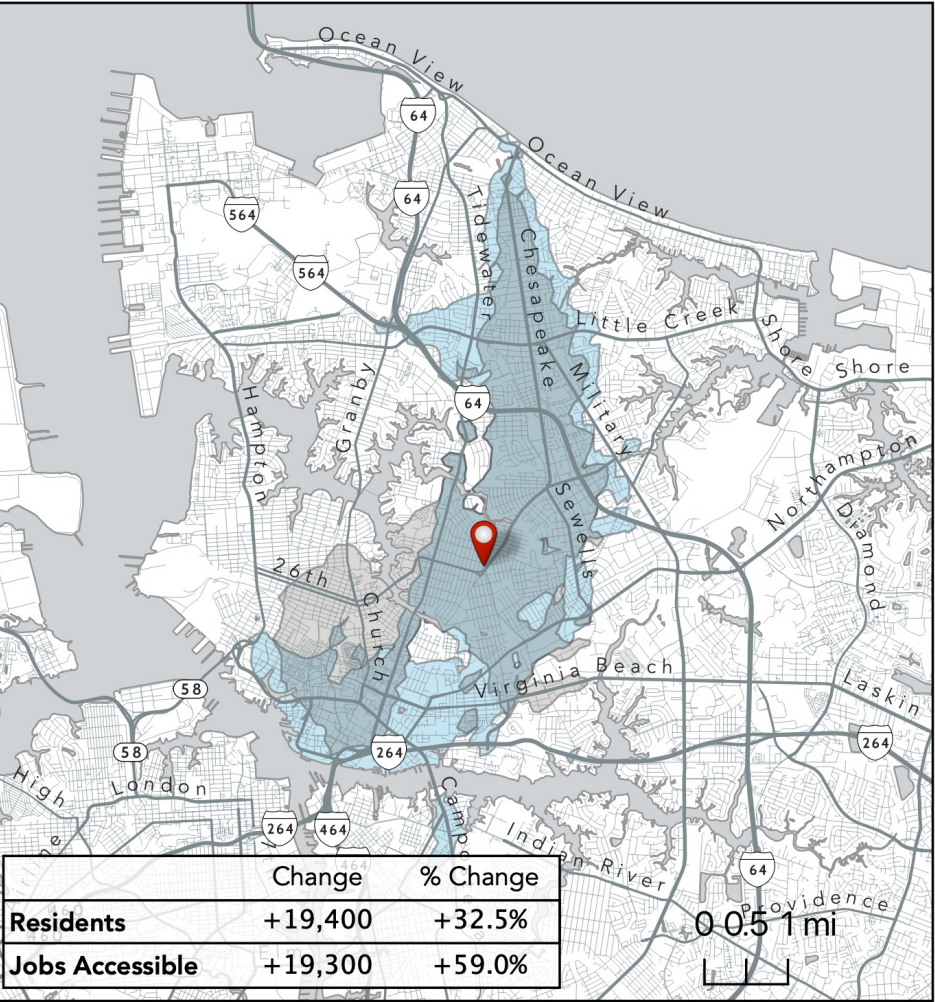
*compared with the HRT network as of February 2020.



Isochrones 4-6

How far can I travel in **45 minutes** from
Chesapeake at Cromwell
on weekdays at noon using the:

2021 Network?*

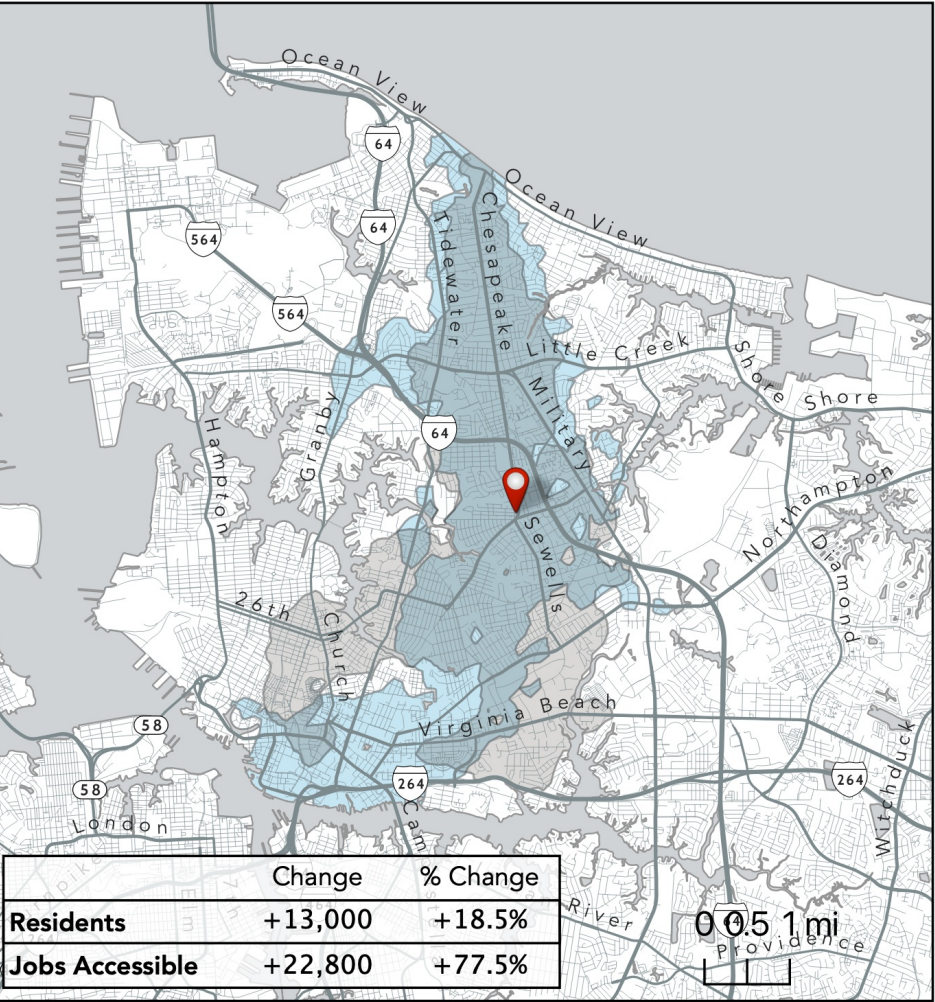


*compared with the HRT network as of February 2020.



How far can I travel in **45 minutes** from
Chesapeake at Norview
on weekdays at noon using the:

2021 Network?*

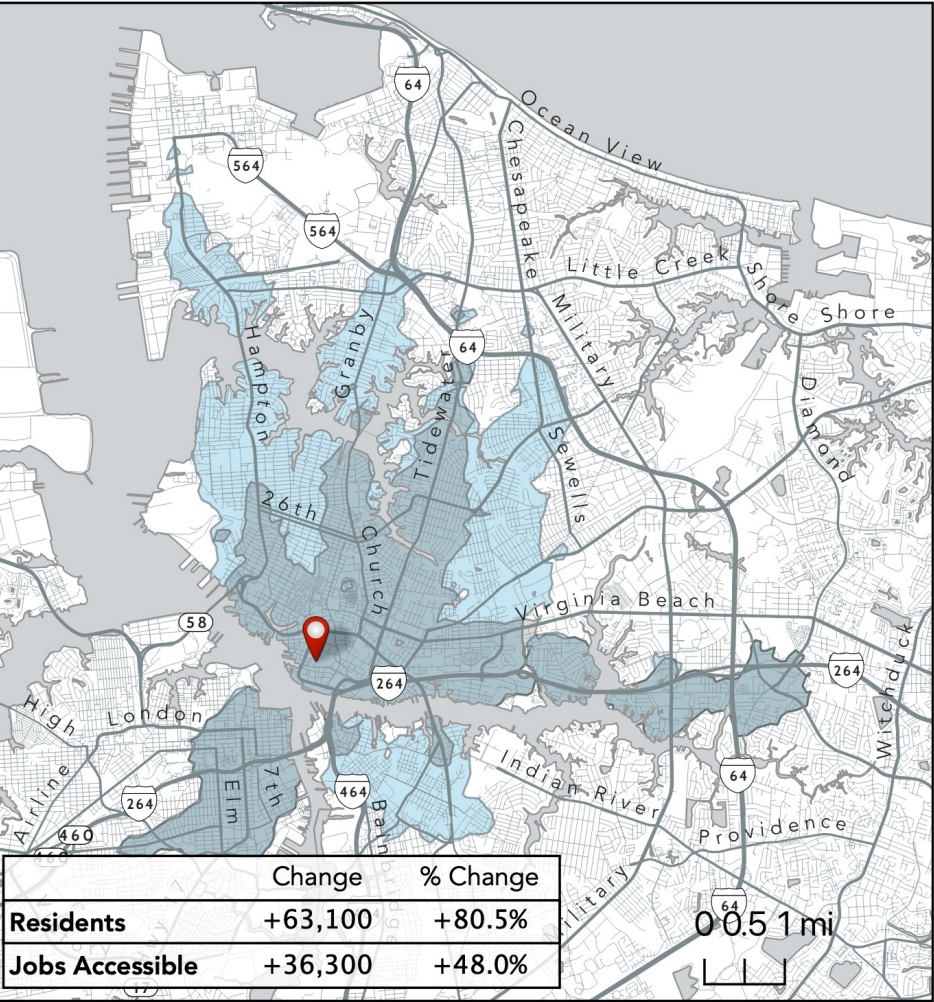


*compared with the HRT network as of February 2020.



How far can I travel in **45 minutes** from
Downtown Norfolk - MacArthur Square
on weekdays at noon using the:

2021 Network?*



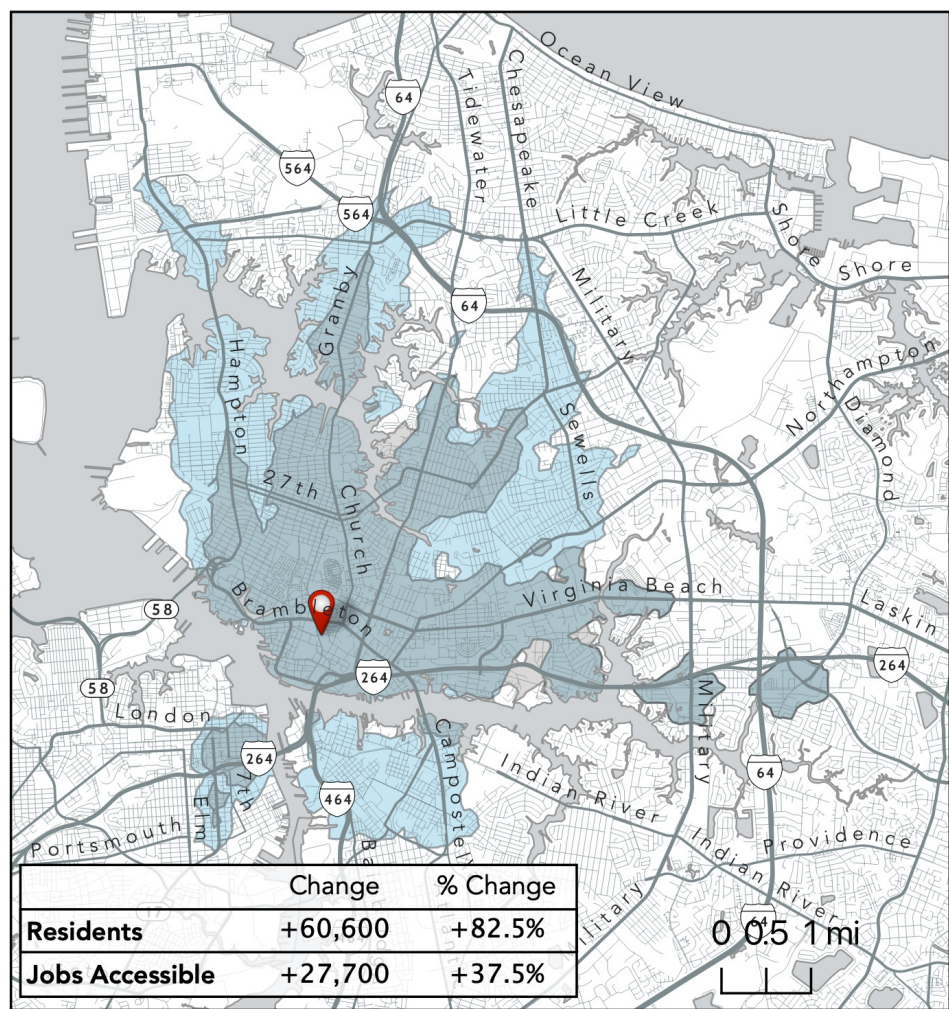
*compared with the HRT network as of February 2020.



Isochrones 7-9

How far can I travel in **45 minutes** from
Downtown Norfolk Bus Transfer Center
on weekdays at noon using the:

2021 Network?*

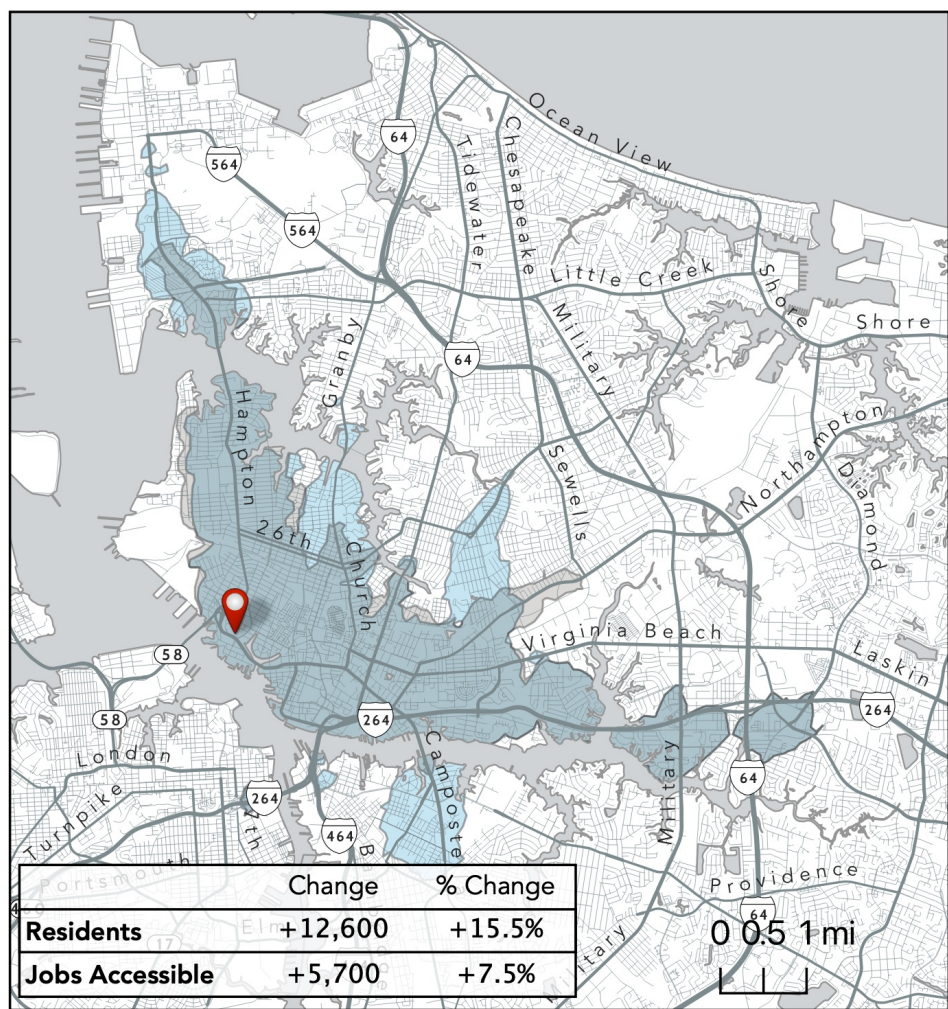


*compared with the HRT network as of February 2020.



How far can I travel in **45 minutes** from
Fort Norfolk
on weekdays at noon using the:

2021 Network?*

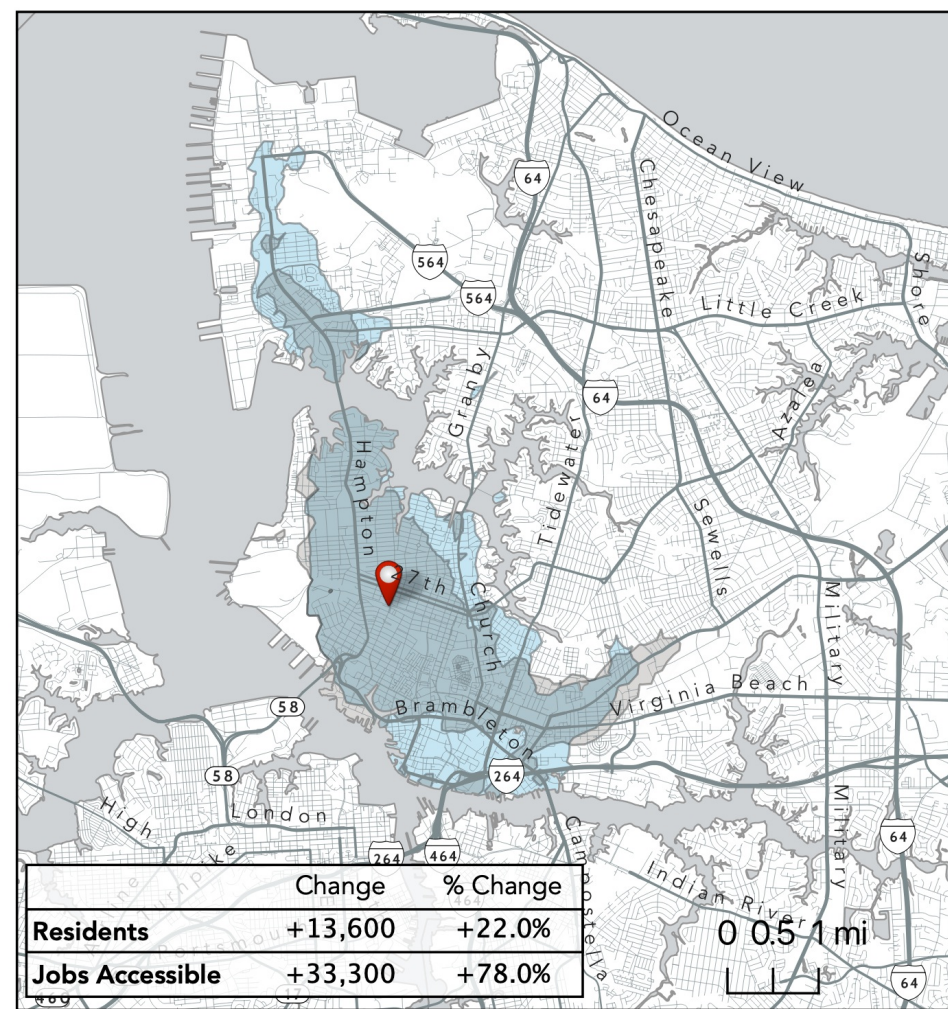


*compared with the HRT network as of February 2020.



How far can I travel in **45 minutes** from
Ghent
on weekdays at noon using the:

2021 Network?*



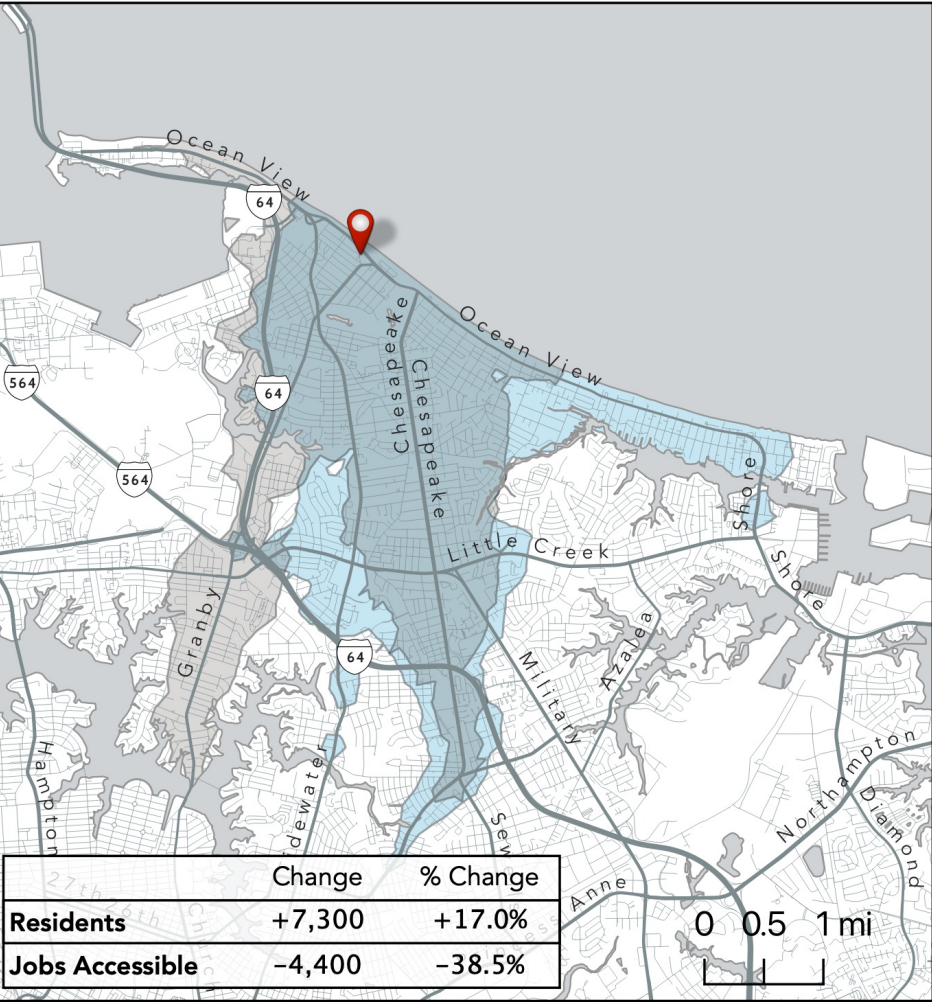
*compared with the HRT network as of February 2020.



Isochrones 10-12

How far can I travel in **45 minutes** from Granby and Duffys - Pretlow Library on weekdays at noon using the:

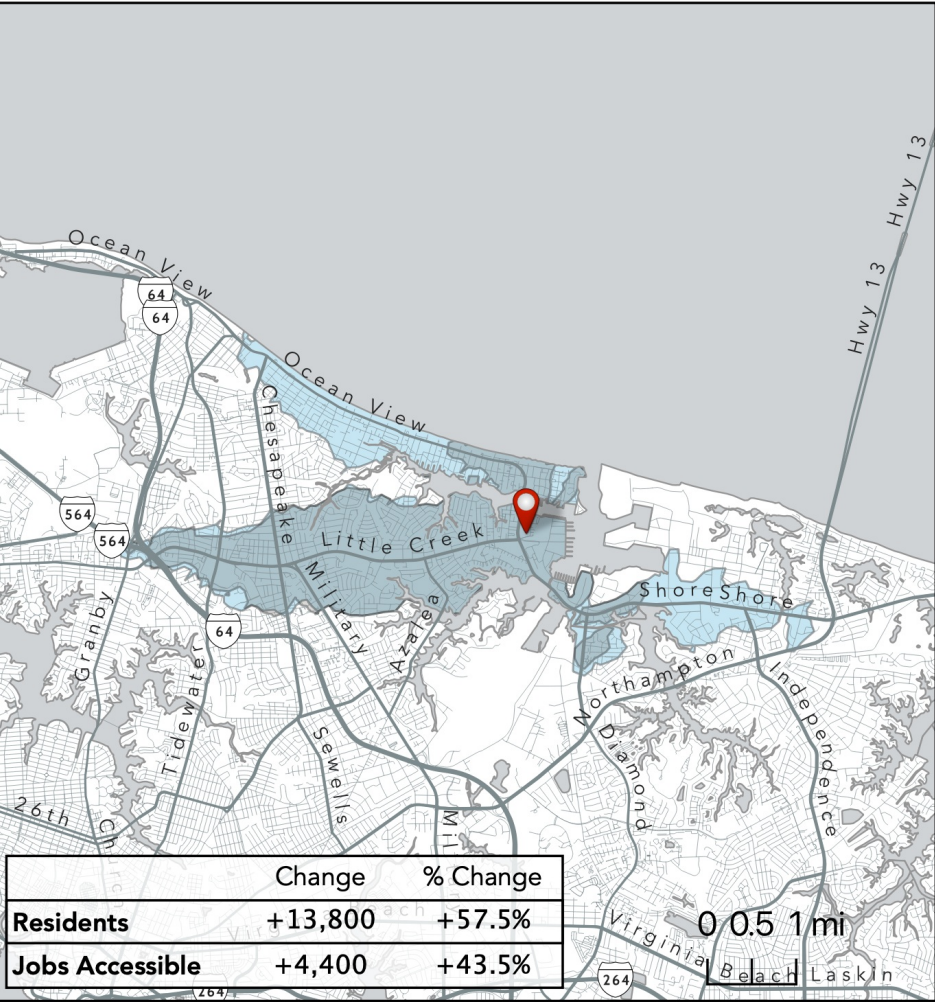
2021 Network?*



*compared with the HRT network as of February 2020.

How far can I travel in **45 minutes** from Joint Expeditionary Base Little Creek on weekdays at noon using the:

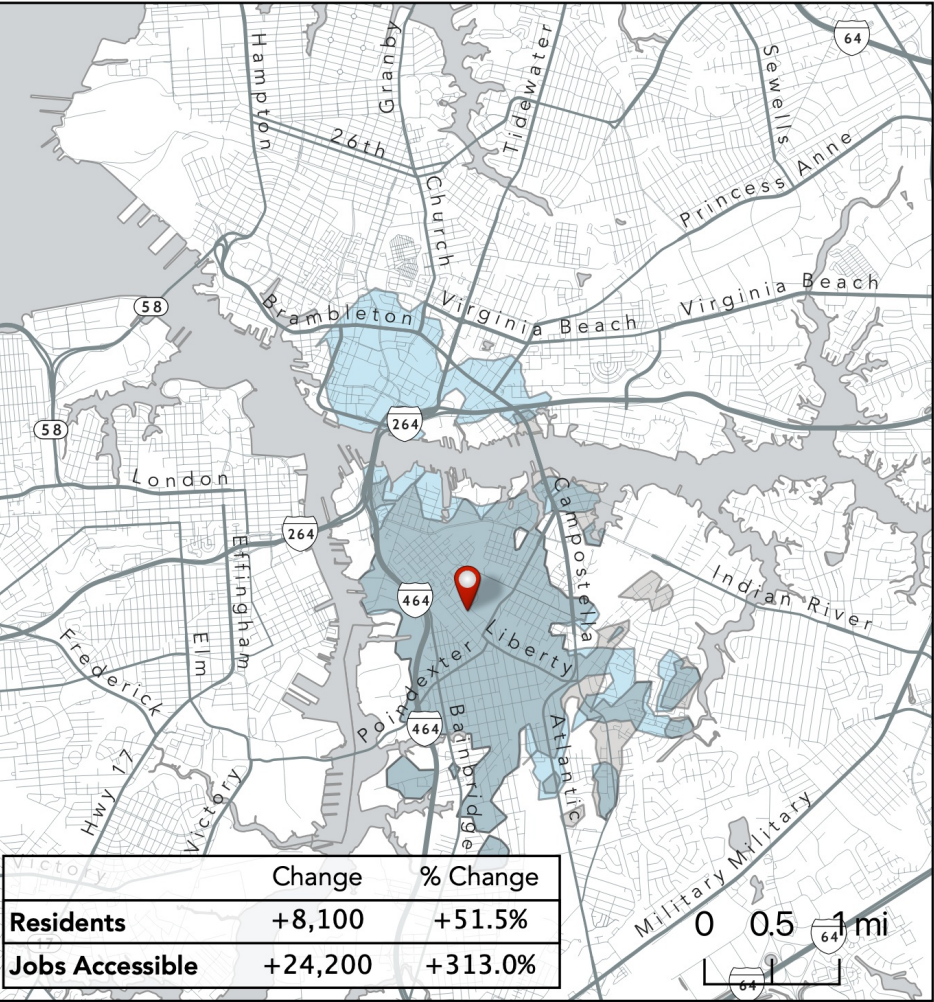
2021 Network?*



*compared with the HRT network as of February 2020.

How far can I travel in **45 minutes** from Liberty and Seaboard on weekdays at noon using the:

2021 Network?*



*compared with the HRT network as of February 2020.



Isochrones 13-15

How far can I travel in **45 minutes** from
Little Creek at Sewells Point
on weekdays at noon using the:

2021 Network?*

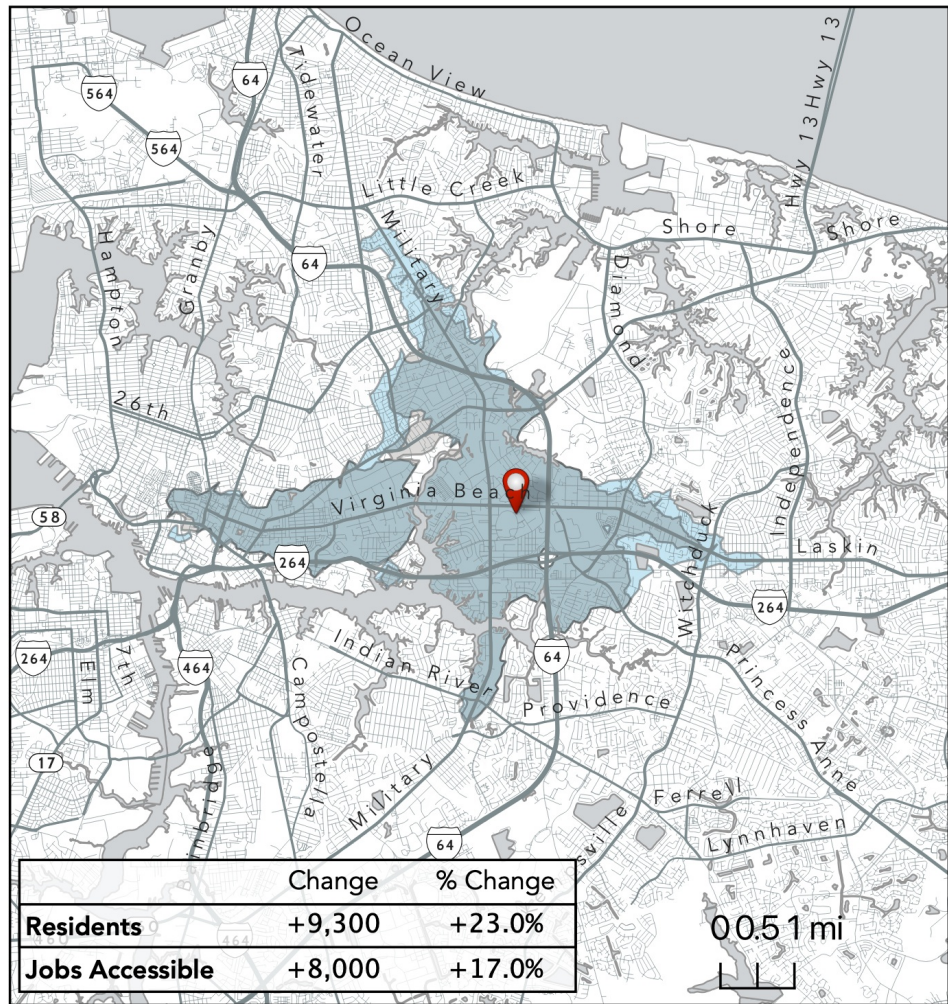


*compared with the HRT network as of February 2020.



How far can I travel in **45 minutes** from
Military Circle
on weekdays at noon using the:

2021 Network?*

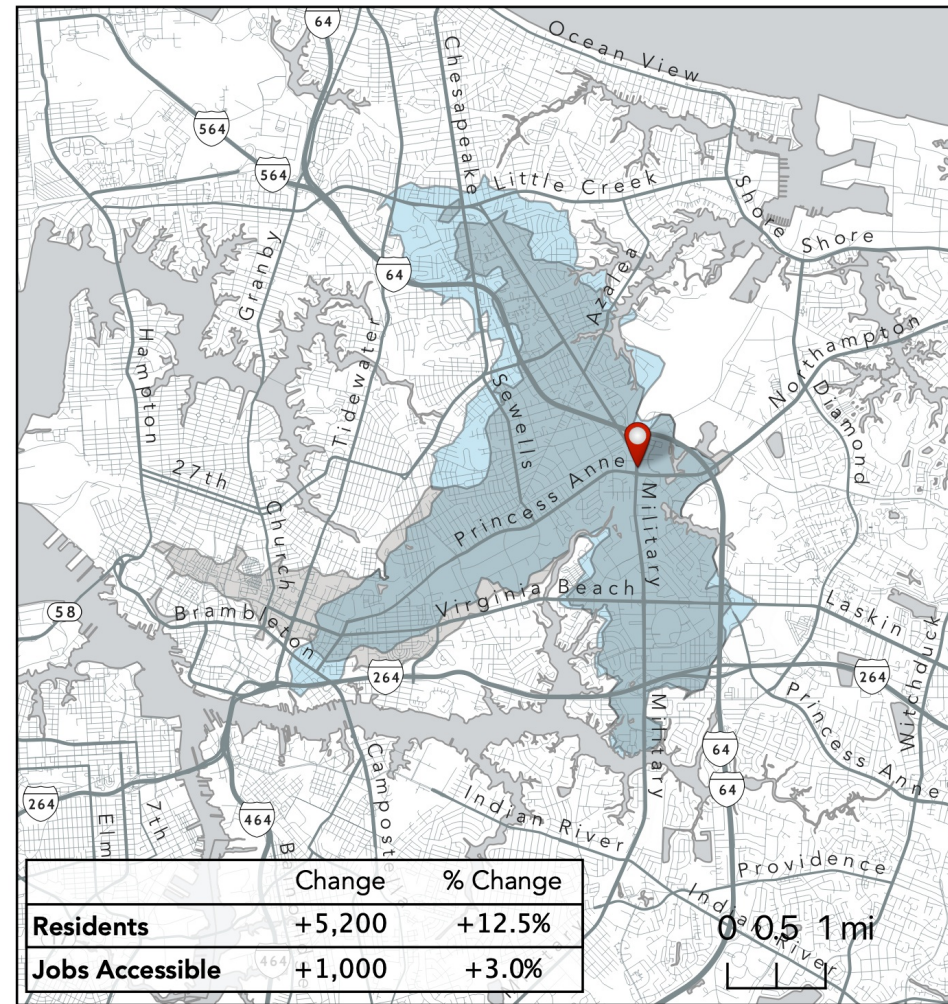


*compared with the HRT network as of February 2020.



How far can I travel in **45 minutes** from
Military Hwy at Princess Anne
on weekdays at noon using the:

2021 Network?*



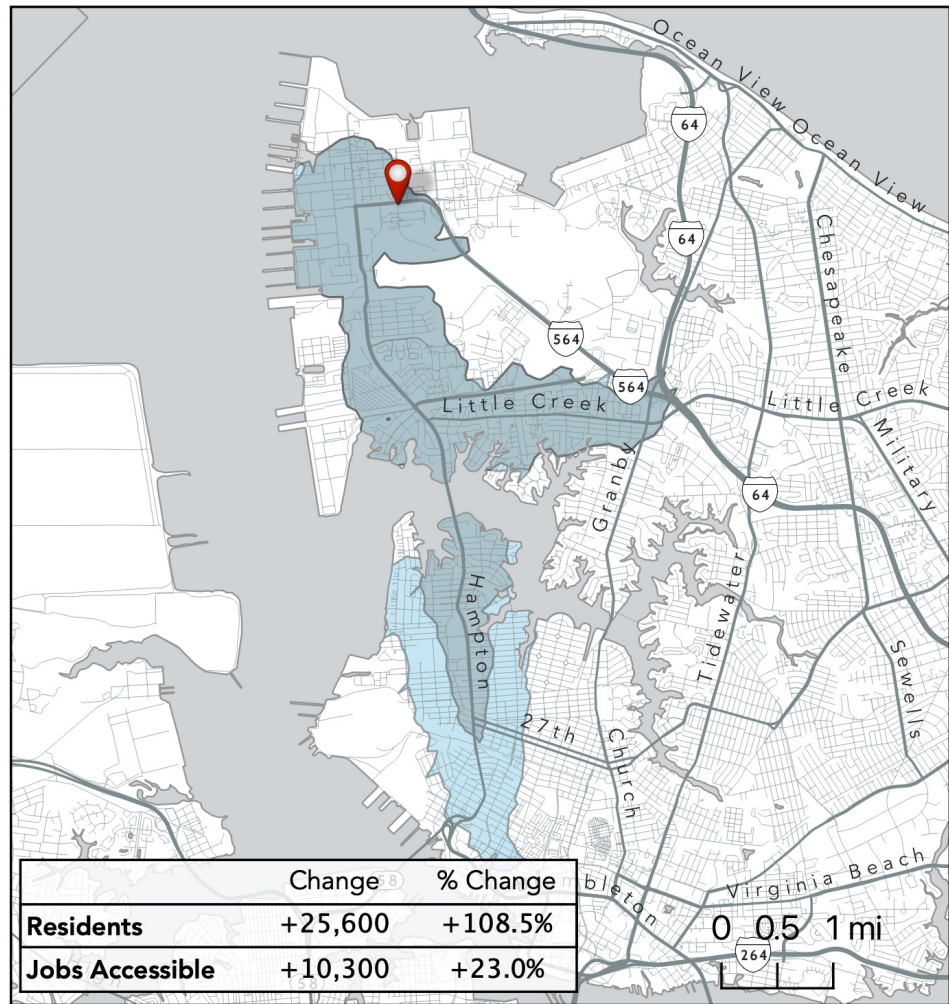
*compared with the HRT network as of February 2020.



Isochrones 16-18

How far can I travel in **45 minutes** from
Norfolk Naval Station - Naval Exchange
on weekdays at noon using the:

2021 Network?*



*compared with the HRT network as of February 2020.



How far can I travel in **45 minutes** from
Norfolk State University
on weekdays at noon using the:

2021 Network?*

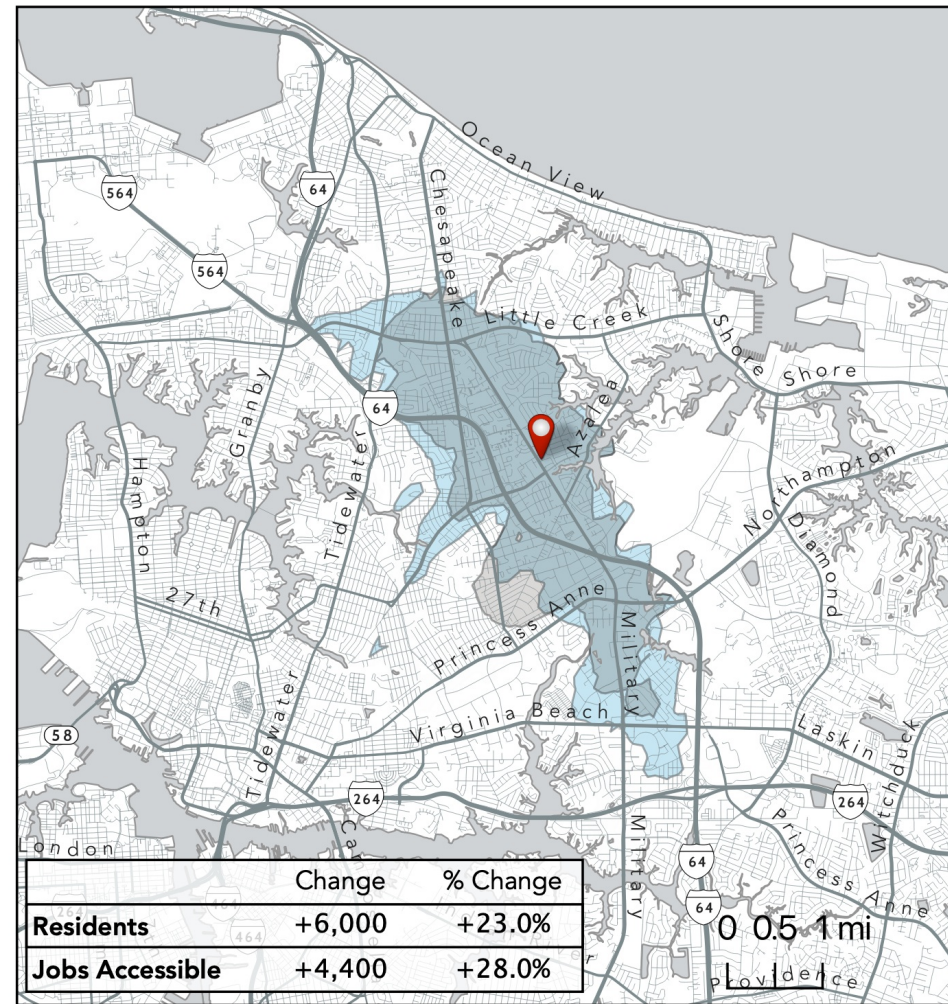


*compared with the HRT network as of February 2020.



How far can I travel in **45 minutes** from
Norview and Military
on weekdays at noon using the:

2021 Network?*



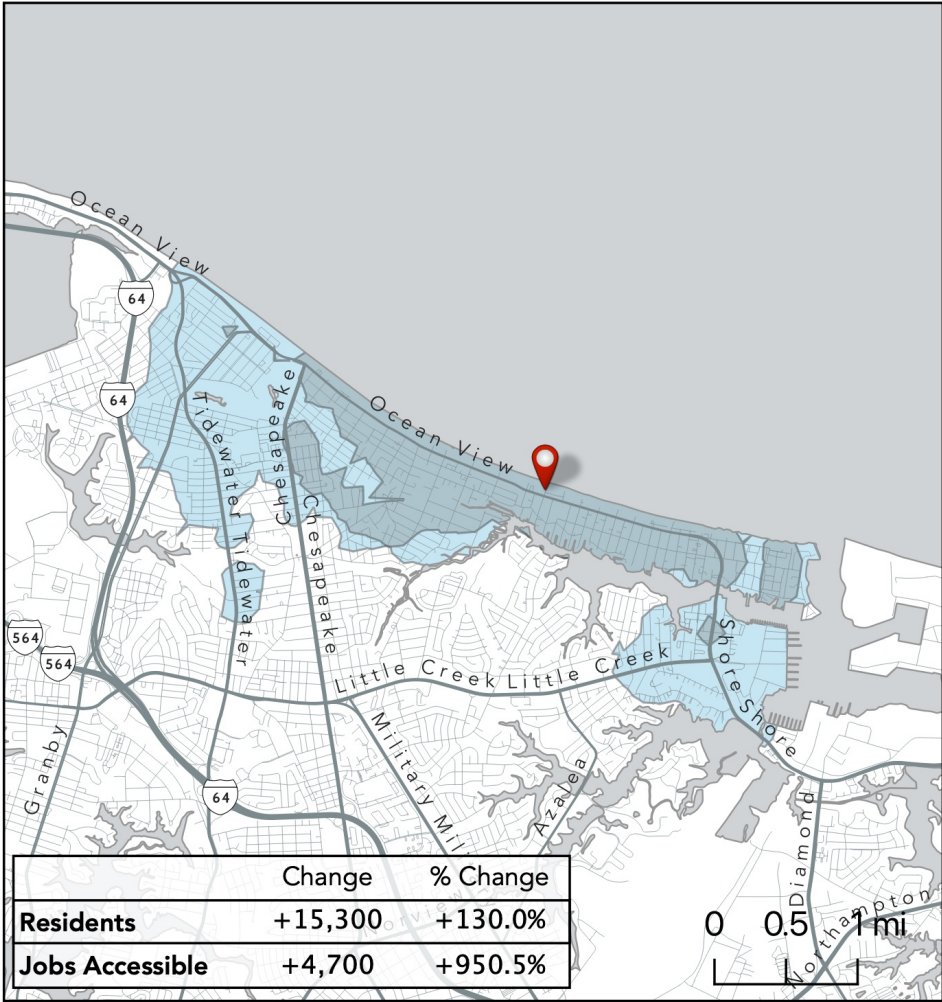
*compared with the HRT network as of February 2020.



Isochrones 19-21

How far can I travel in **45 minutes** from
Ocean View
on weekdays at noon using the:

2021 Network?*

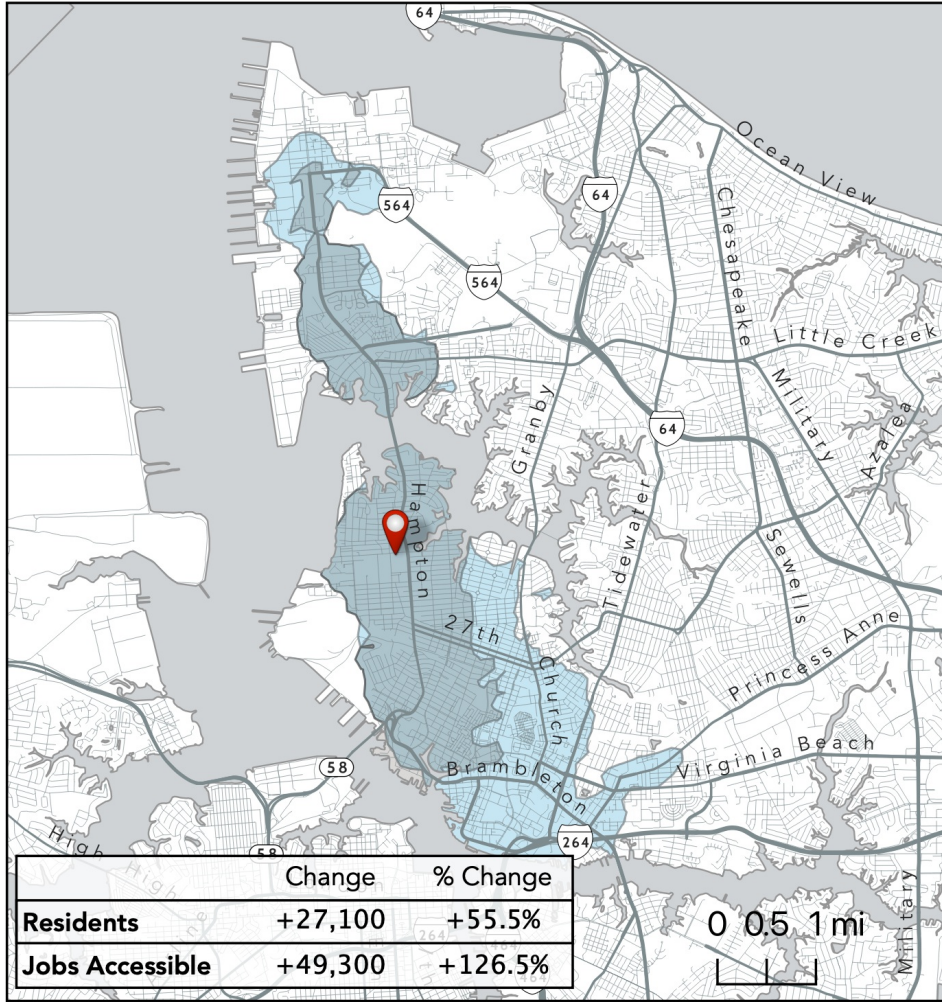


*compared with the HRT network as of February 2020.



How far can I travel in **45 minutes** from
Old Dominion University
on weekdays at noon using the:

2021 Network?*



*compared with the HRT network as of February 2020.



How far can I travel in **45 minutes** from
Princess Anne at Ingleside
on weekdays at noon using the:

2021 Network?*



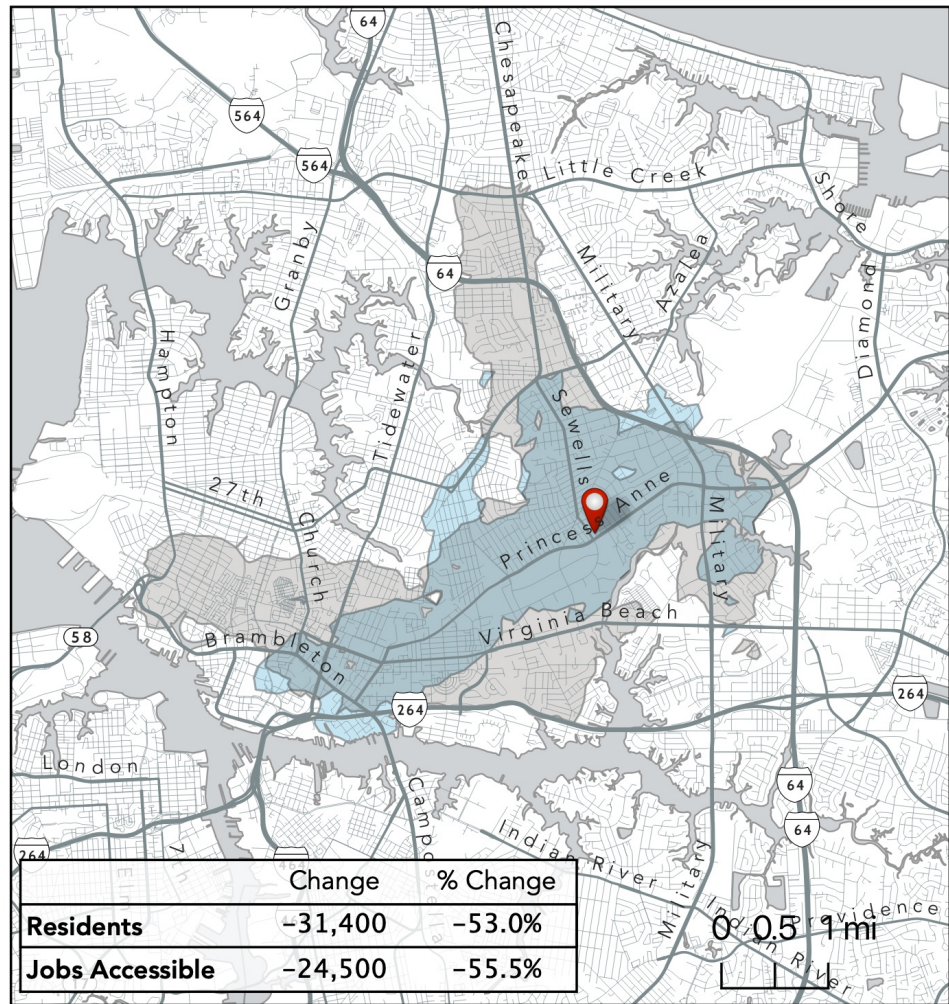
*compared with the HRT network as of February 2020.



Isochrones 22-24

How far can I travel in **45 minutes** from
Princess Anne at Sewells
on weekdays at noon using the:

2021 Network?*

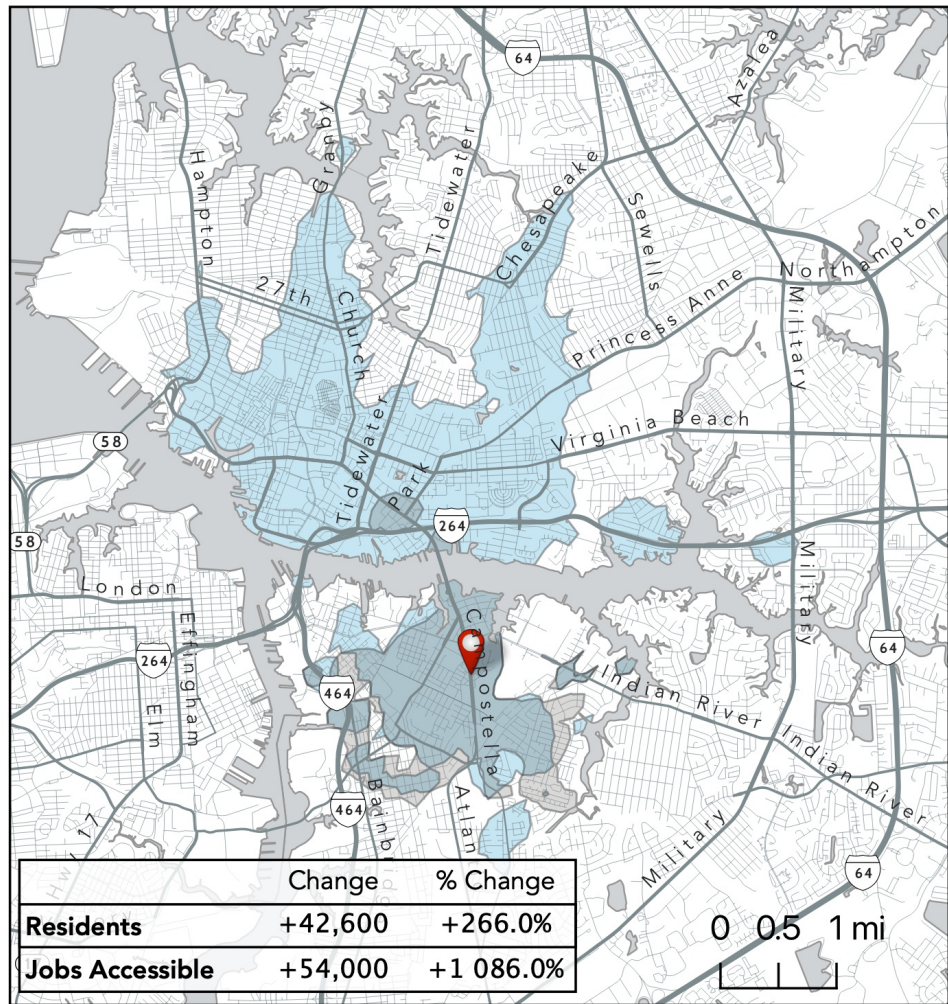


*compared with the HRT network as of February 2020.



How far can I travel in **45 minutes** from
Southside Campostella
on weekdays at noon using the:

2021 Network?*

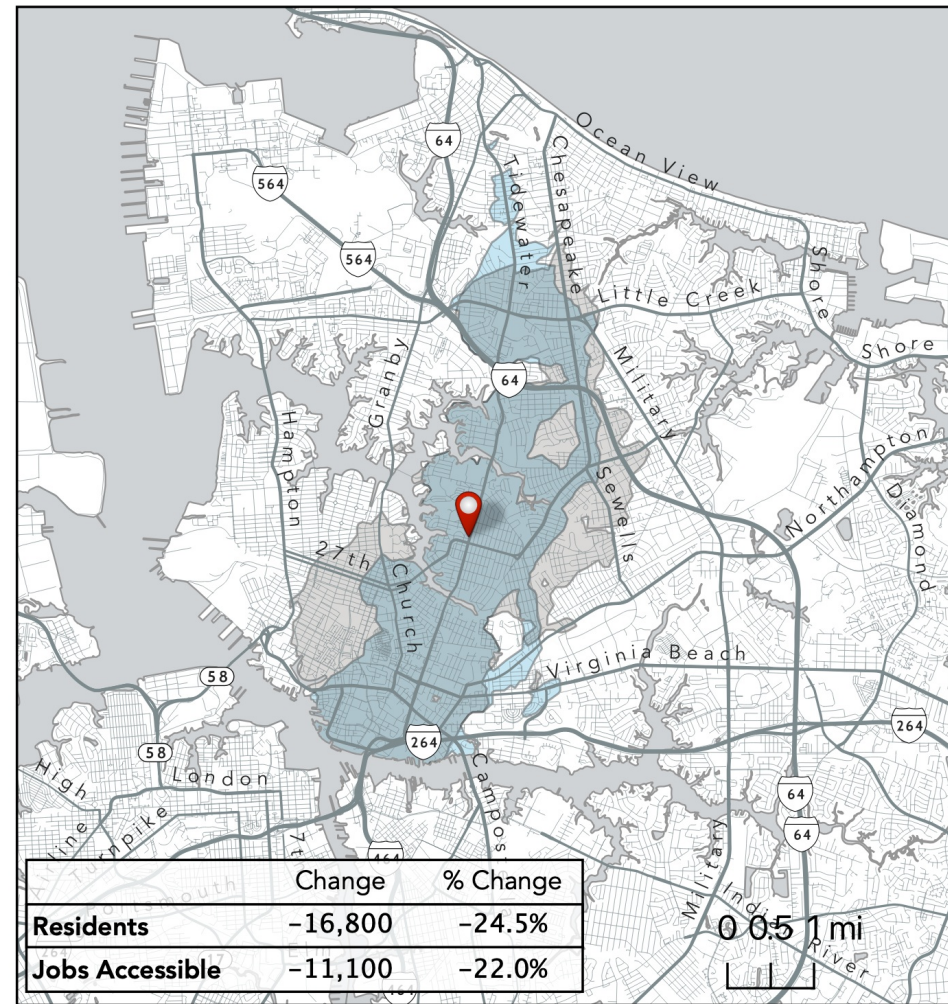


*compared with the HRT network as of February 2020.



How far can I travel in **45 minutes** from
Tidewater at Lafayette
on weekdays at noon using the:

2021 Network?*



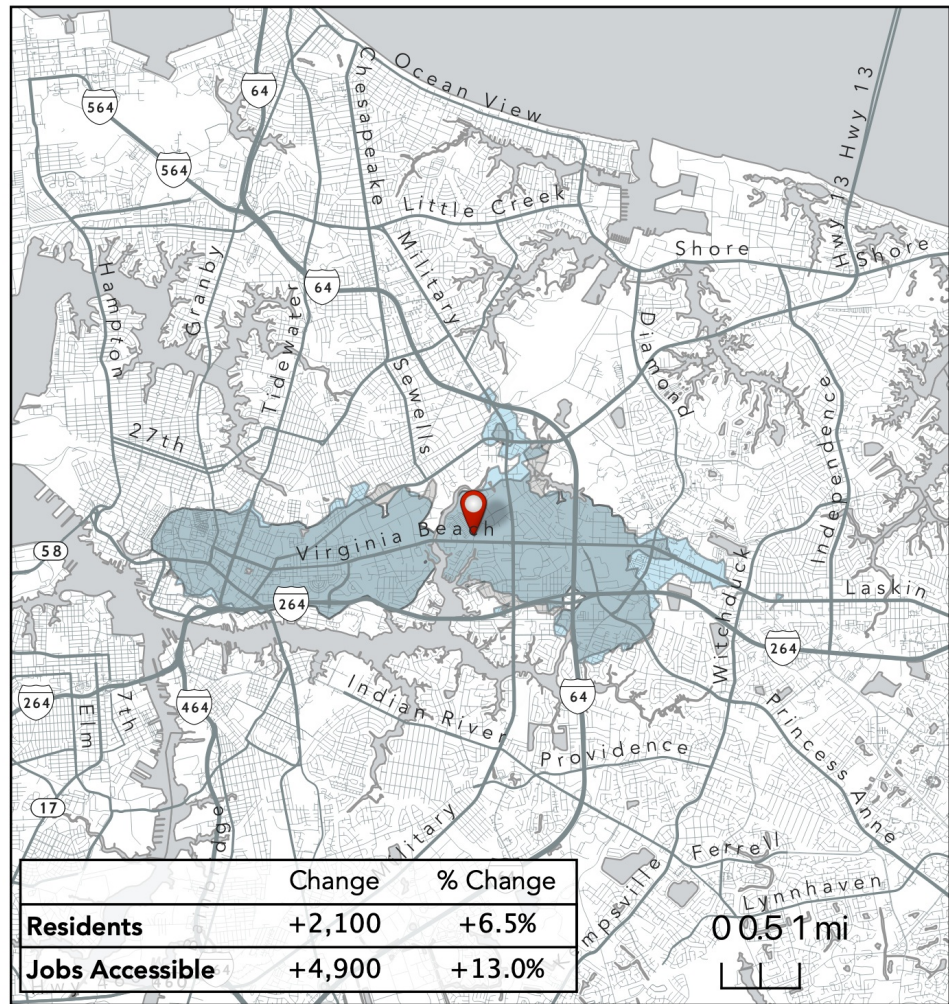
*compared with the HRT network as of February 2020.



Isochrones 25-27

How far can I travel in **45 minutes** from
Virginia Beach Blvd at Raby
on weekdays at noon using the:

2021 Network?*

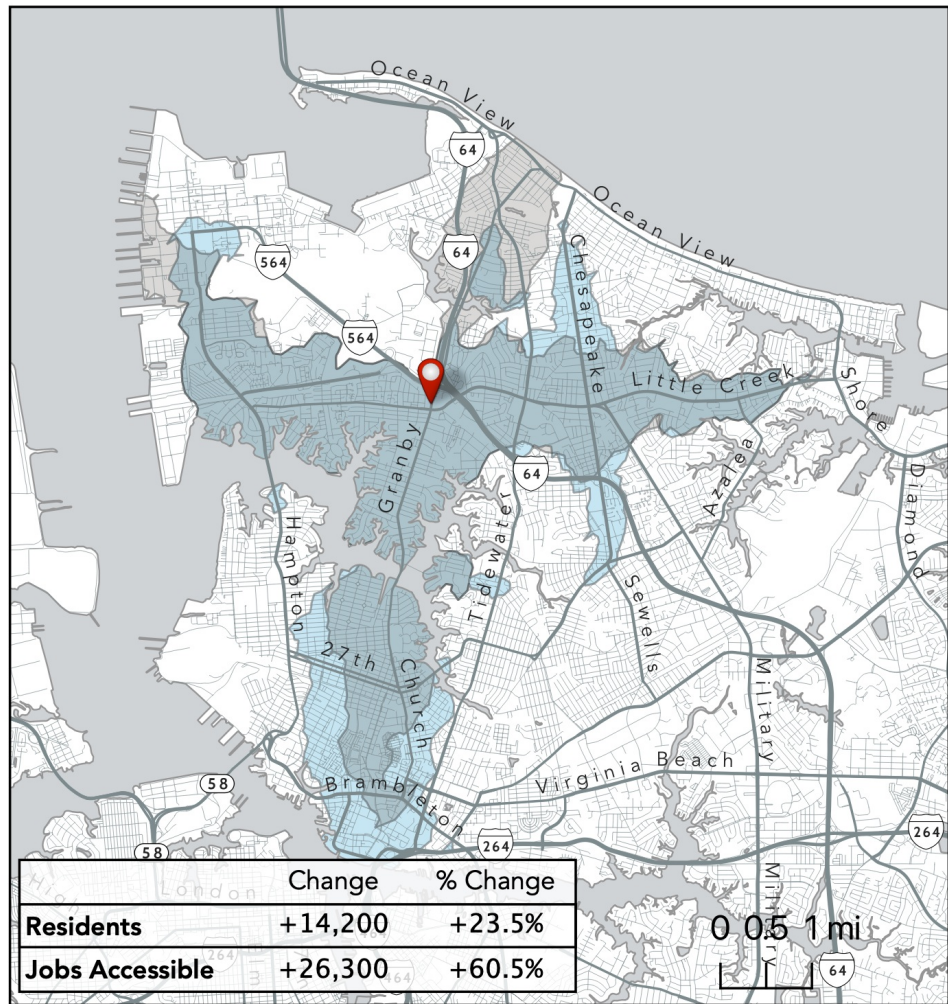


*compared with the HRT network as of February 2020.



How far can I travel in **45 minutes** from
Wards Corner
on weekdays at noon using the:

2021 Network?*



*compared with the HRT network as of February 2020.



How far can I travel in **45 minutes** from
Willoughby Spit
on weekdays at noon using the:

2021 Network?*



*compared with the HRT network as of February 2020.

