

# Metro Transit Network Redesign Alternatives Report

AUGUST 2, 2021

**Extraction of Key Pages**



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# Existing Network

Figure 5, at right, is a map of Metro Transit's existing network as of early 2021. Line colors indicate how often the bus comes, on weekdays at midday. There is very little frequent service outside the UW Campus. Nearly all bus routes in Madison run every 30 to 60 minutes on weekdays, while a few run only at peak times or on week-ends. In peripheral areas of Madison, the network is organized around four timed Transfer Points.

## Access to jobs

The median Madison resident can reach **24,000 jobs** within 45 minutes by transit and walking.

The median person of color can reach **21,000 jobs** within 45 minutes by transit and walking.

The median low-income person can reach **80,500 jobs** within 45 minutes by transit and walking.

## People near transit

**78%** of Madison's residents are within 1/4 mile of all-day service.

**11%** of Madison's residents are within 1/4 mile of service every 15 minutes or better.

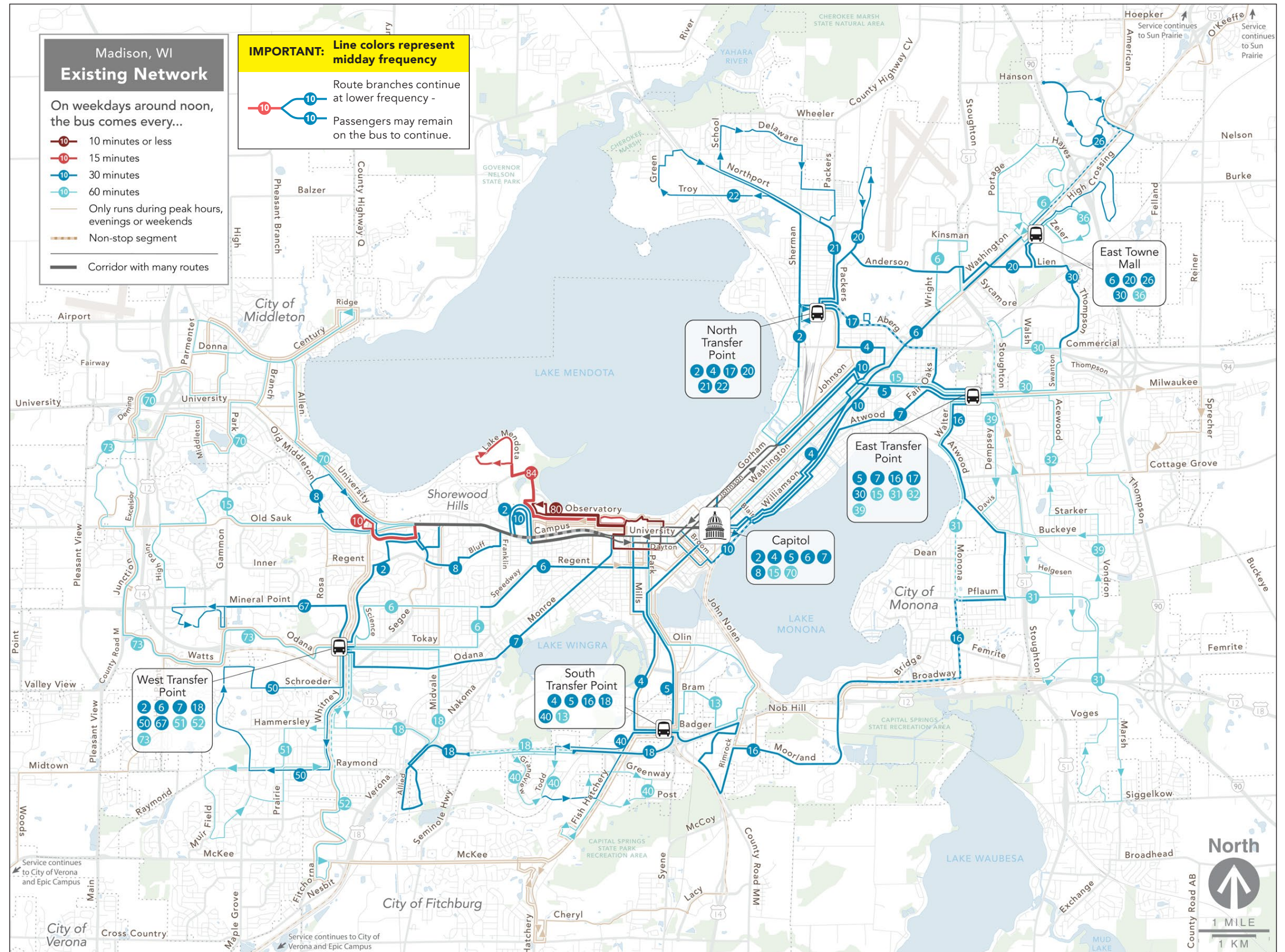


Figure 5: Metro Transit network of bus routes, as of early 2021. The network is centered around Downtown Madison, where many routes converge. Most outlying areas are served by routes that connect to a local transfer point, where passengers can transfer to routes going Downtown or across town.

# Ridership Alternative

Figure 6, at right, is a map of the Ridership Alternative. This network would consolidate most of bus service in Madison onto just seven routes, and eliminate the need for Transfer Points. Four routes would run every 15 minutes or better on weekdays. These changes would reduce wait times and allow for more direct travel. However, some people would have to walk farther to service, and some neighborhoods would not receive all-day service.

## Access to jobs

The median Madison resident could reach **51,000 jobs** within 45 minutes by transit and walking, a **112% increase** over the Existing Network.

The median person of color could reach **47,000 jobs** within 45 minutes by transit and walking, a **120% increase**.

The median low-income person could reach **103,000 jobs** within 45 minutes by transit and walking, a **28% increase**.

## People near transit

**67%** of Madison's residents would be within 1/4 mile of **all-day service**, compared to 78% today.

**43%** of Madison's residents would be within 1/4 mile of **service every 15 minutes or better**, compared to 11% today.

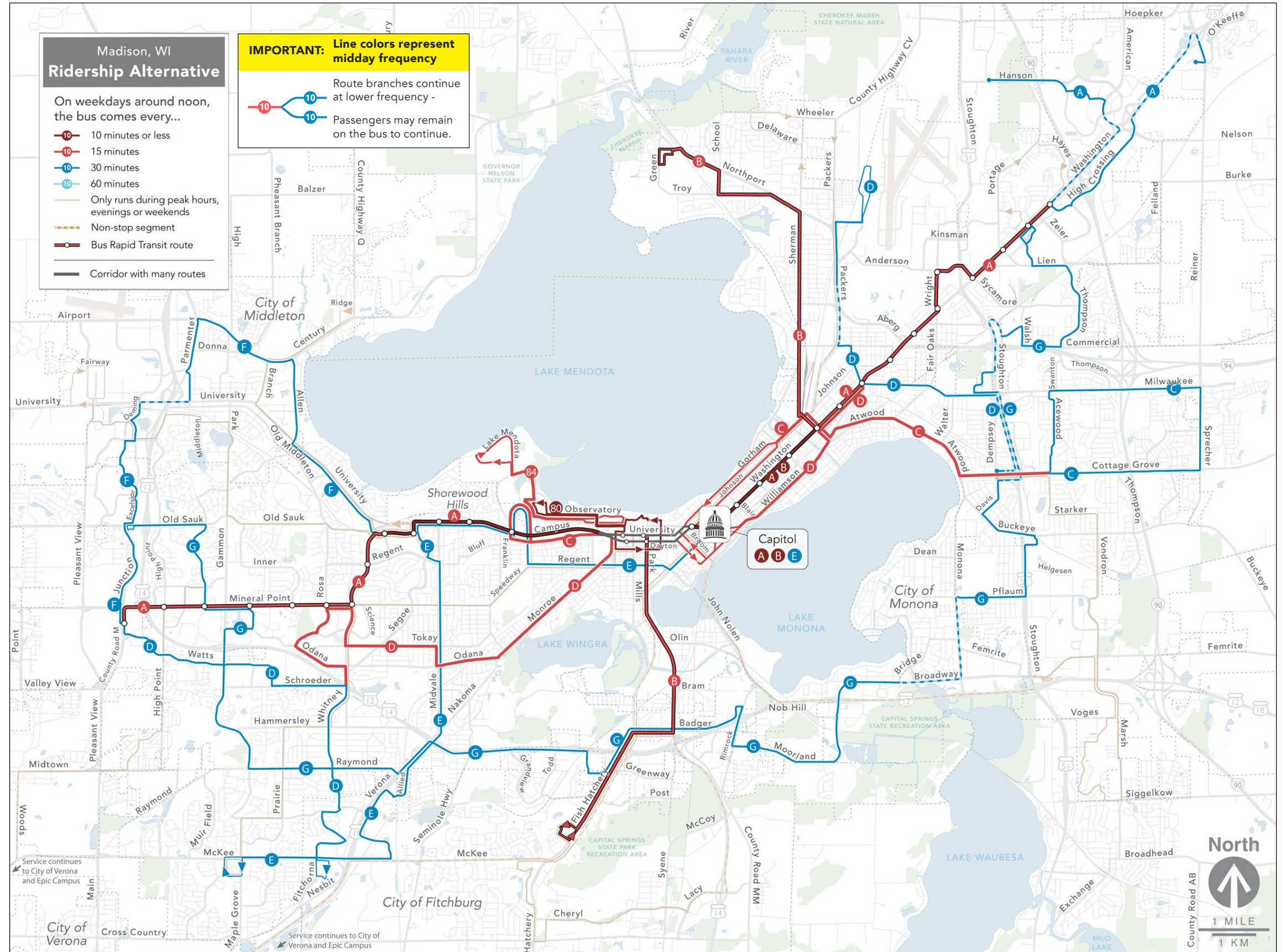


Figure 6: In the Ridership Alternative, service would be concentrated at higher frequencies and on direct paths along major corridors where many people live and work. This would allow for shorter waits and faster travel for many people. Areas with lower densities would have service reduced to rush-hour only.

# Coverage Alternative

Figure 7, at right, is a map of the Coverage Alternative. The Coverage Alternative retains the Existing Network's focus on providing all-day service within 1/4 mile of as many people and jobs as possible, throughout Madison. However, most bus routes would still change in response to the BRT lines (A and B). There would also be some emphasis on providing two-way service wherever possible and reducing unnecessary transfers.

## Access to jobs

The median Madison resident could reach **33,000 jobs** within 45 minutes by transit and walking, a **38% increase** over the Existing Network.

The median person of color could reach **30,000 jobs** within 45 minutes by transit and walking, a **40% increase**.

The median low-income person could reach **87,000 jobs** within 45 minutes by transit and walking, an **8% increase**.

## People near transit

81% of Madison's residents would be within 1/4 mile of **all-day service**, compared to 78% today.

28% of Madison's residents would be within 1/4 mile of **service every 15 minutes or better**, compared to 11% today.

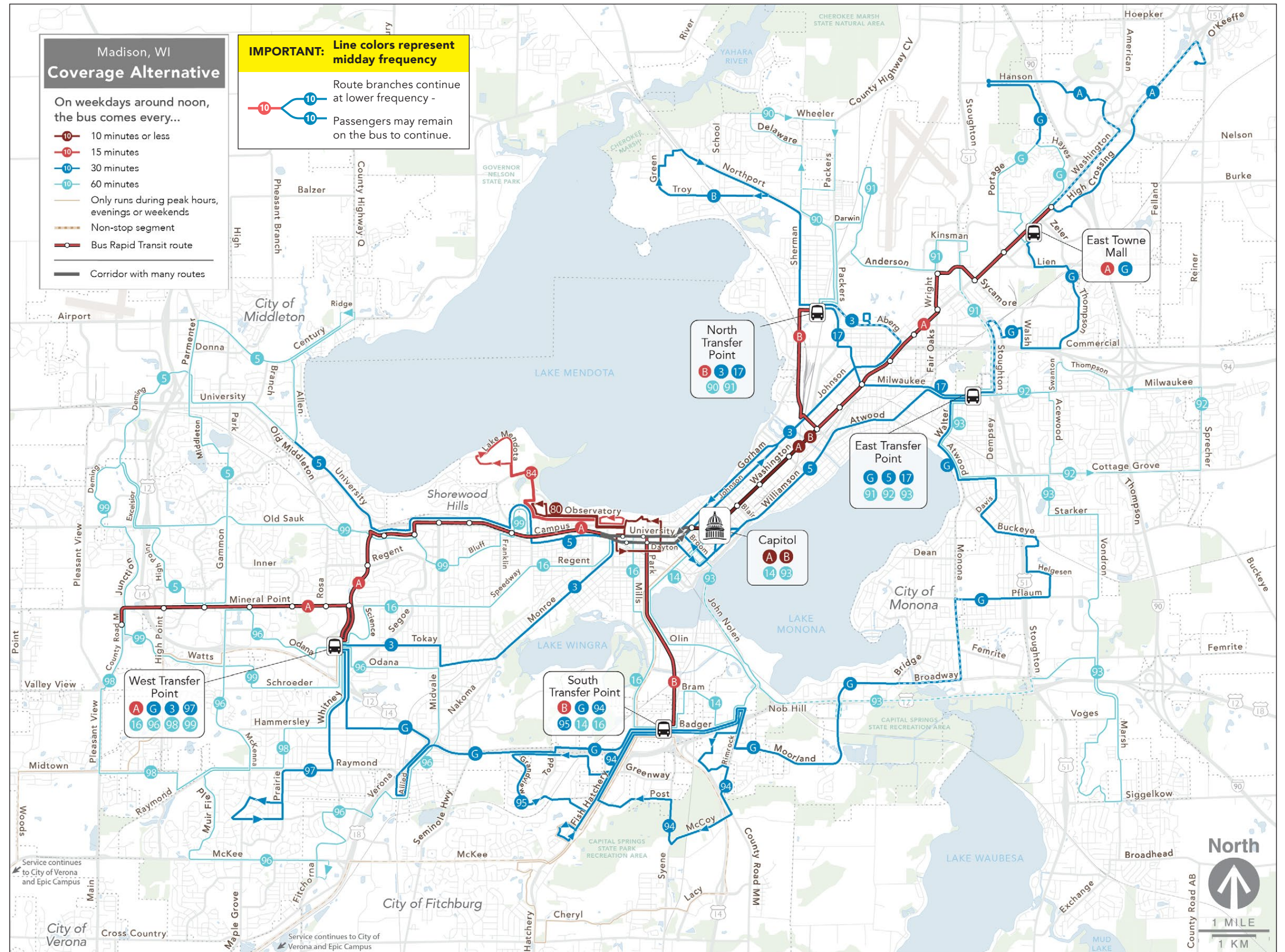


Figure 7: In the Coverage Alternative, service would be reorganized to connect with BRT, while slightly expanding the coverage area. Spreading service out means spreading it thin, so frequencies are low and wait times are long.

# Proximity to Transit Service

The number or percentage of people near available transit service is called *proximity*.

**Proximity to service of any type is a good measure of an agency's success towards a Coverage goal.** Proximity does not tell us if service is useful, only that it is nearby. In pursuit of a Coverage goal an agency will spread service thinly, to cover as many people as possible. This means routes have low frequencies and circuitous routing. A route that is near many people is helping an agency meet a Coverage goal, even if it is not useful to most people, most of the time.

**Proximity to frequent service speaks more to a Ridership Goal.** Frequent service can be useful for more trips and tends to attract higher ridership.

## Residents near Transit

The bar chart at top right shows the percentage of City of Madison residents who would be within a 1/4 mile walk of any service, or frequent service.

- In the Ridership Alternative, only 67% of Madison residents would be near all-day service (compared to 79% today). But the number of residents near frequent service would nearly quadruple, from 11% to 43%.
- In the Coverage Alternative, 81% of Madison residents would be near all-day service. The number of residents near frequent service would also increase, but less than in the Ridership Alternative: from 11% to 27%.

## Jobs near Transit

The lower bar chart at top right show how many jobs in the City of Madison would be within a 1/4 mile walk of any service, or frequent service.

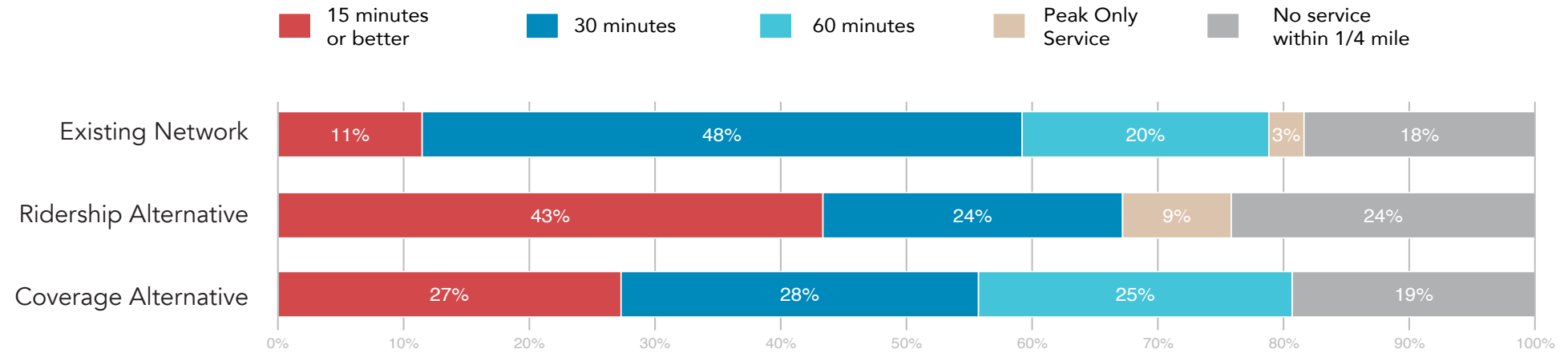
- In the Ridership Alternative, only 76% of jobs in Madison would be near all-day service (compared to 88% today). But the number of jobs

near frequent service would more than triple, from 17% to 56%.

- In the Coverage Alternative, 86% of jobs in Madison would be near all-day service. The number of jobs near frequent service would increase almost as much as in the Ridership Alternative, from 17% to 47%.
- The number of people near frequent service would increase in both alternatives because of BRT. **The resources required to operate BRT frequently explain why the Coverage Alternative would not increase the number of residents and jobs near transit, compared to existing service.**

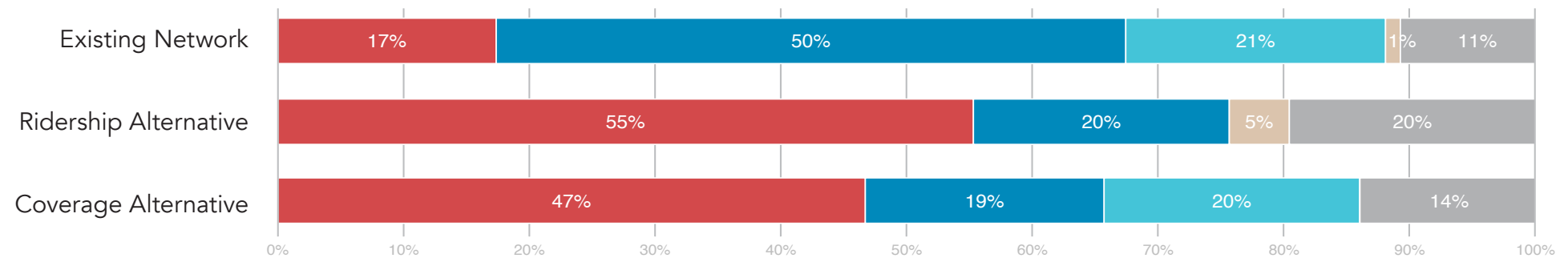
### Residents near Transit

Percentage of the Residents of Madison within 1/4 mi of a bus stop with service every...



### Jobs near Transit

Percentage of jobs in Madison within 1/4 mi of a bus stop with service every...



The Coverage Alternative would mostly maintain the existing number of people and jobs near all-day service. The number of people who live near frequent service would more than double.

The Ridership Alternative would reduce the number of people and jobs near all-day service by about 15%, but it would nearly quadruple the number of people who live near frequent service.

# Proximity to Transit - People of Color and People with Low Incomes

Transit is often tasked with providing affordable transportation for low-income residents. This is one of the reasons agencies provide service to some people and areas, regardless of ridership potential.

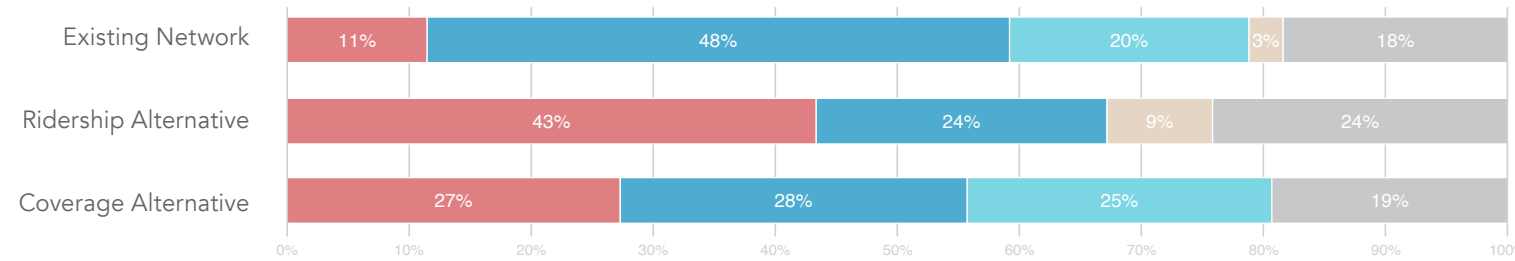
Federal laws also protect non-White people from disparate transportation impacts. This is one of the reasons agencies sometimes provide transit service in places where there are equity needs, even if this does not maximize ridership.

## People of Color

In the Existing Network, proximity to transit is relatively equitable by race. 79% of all residents and the same percentage of people of color in Madison are within 1/4-mile of all-day transit service. Furthermore, 15% of people-of-color live near frequent service, compared to 11% of all residents.

- In the Ridership Alternative, the number of people of color near all-day service would decrease from 79% to 66%. The number of people of color near frequent service would increase from 15% to 41%.
- In the Coverage Alternative, the number of people of color near all-day service would increase from 79% to 81%. The number of people of color near frequent service would increase from 15% to 29%.
- Note that people of color might benefit slightly less from the expansion of frequent service in the Ridership Alternative, compared to all residents. But the number of people near frequent service would still be much higher in the Ridership Alternative than in the Coverage Alternative.

### Residents near Transit



### People of Color near Transit

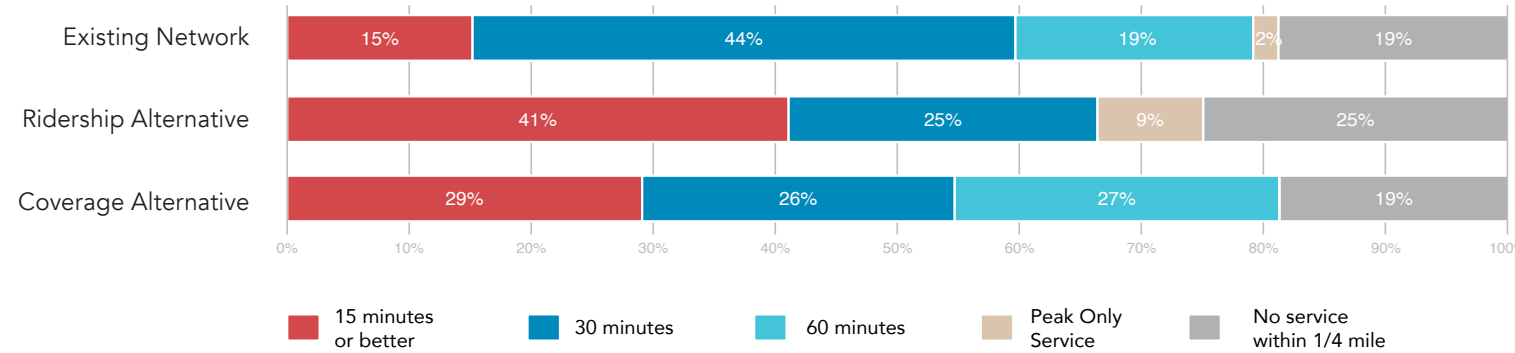


Figure 26: Proximity of All Residents, and People of Color, to transit. This chart shows percentage of people near service of different frequencies.

**In proximity terms, people of color would experience the same type and a similar level of change as all Madison residents, in both the Ridership and Coverage Alternatives.**

# Proximity to Transit - People with Low Incomes

## People with Low Incomes

In the Existing Network, 79% of all Madison residents and 91% of people with low incomes in Madison are within 1/4-mile of all-day transit service. Furthermore, 32% of Madison residents with low incomes<sup>1</sup> live near frequent service, compared to just 11% of all residents.

The higher proportion of low-income people near transit service reflects the high density of low-income residents in Central Madison. In other words, this measure may tell us more about the experience of temporarily low-income students, and less about the experience of people experiencing generational poverty.

- In the Ridership Alternative, the number of people with low incomes near any all-day service would decrease from 91% to 82%. The number of people with low incomes near frequent service would increase from 32% to 66%.
- In the Coverage Alternative, the number of people with low incomes near any all-day service would remain at 91%. The number of people with low incomes near frequent service would increase from 32% to 49%.

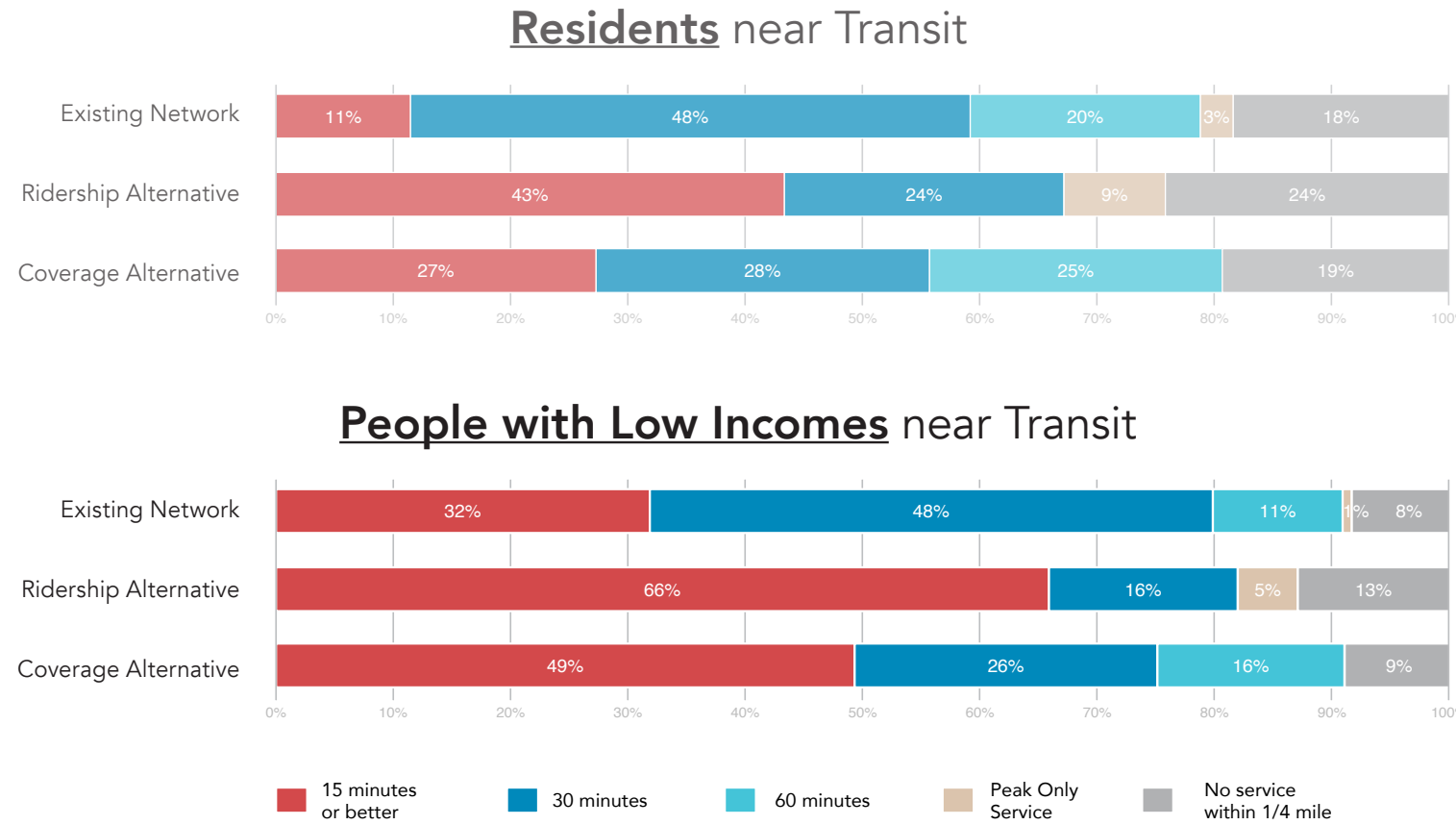


Figure 27: Proximity of All Residents, and People with Low Incomes, to transit. This chart shows percentage of people near service of different frequencies.

**In both the Ridership and Coverage Alternatives, a higher percentage of people with low incomes would be near transit service than the general population.**

<sup>1</sup> For the purposes of this analysis, we define “low income” as people from households below 100% of the federal poverty level.

# Proximity to Transit - Seniors and Youth

Some people over age 65 and most people under age 18 cannot drive. As a result, people in these age groups may be more likely to depend on transit, either regularly or occasionally. This page looks at how the Ridership and Coverage Alternatives would change Proximity to Transit for City of Madison residents over the age of 65 (seniors), and those under age 18.

## Senior Residents

Seniors in Madison are spread out throughout the city at relatively low densities; on average, they tend to live farther from the city center than other age groups.

As a result, senior residents are less likely to live near transit service than the average Madisonian. Only 73% of seniors live within 1/4 mile of all-day service, compared to 79% of all Madison residents. Furthermore, only 3% of seniors live near frequent service, compared to 11% of all residents.

- In the Ridership Alternative, the number of seniors near all-day service would decrease from 73% to 57%. The number of seniors near frequent service would increase from 3% to 29%.
- In the Coverage Alternative, the number of seniors near all-day service would remain at 73%. The number of seniors near frequent service would increase from 3% to 16%.

## Residents under 18

Youths tend to have a similar population distribution between different areas of Madison, compared to the population as a whole, with one important exception: residents under 18 are the least likely to live in the Downtown or UW areas, compared to other age groups.

As a result, residents under 18 are also less likely to live near transit service than the average Madisonian. Only 72% of residents under 18 live within 1/4 mile of all-day service, compared to 79% of all Madison residents. Furthermore, only 4% of residents under 18 live near frequent service, compared to 11% of all residents.

- In the Ridership Alternative, the number of residents under 18 near all-day service would decrease from 72% to 57%. The number of residents under 18 near frequent service would increase from 4% to 28%.
- In the Coverage Alternative, the number of residents under 18 near all-day service would increase from 72% to 74%. The number of residents under 18 near frequent service would increase from 4% to 15%.

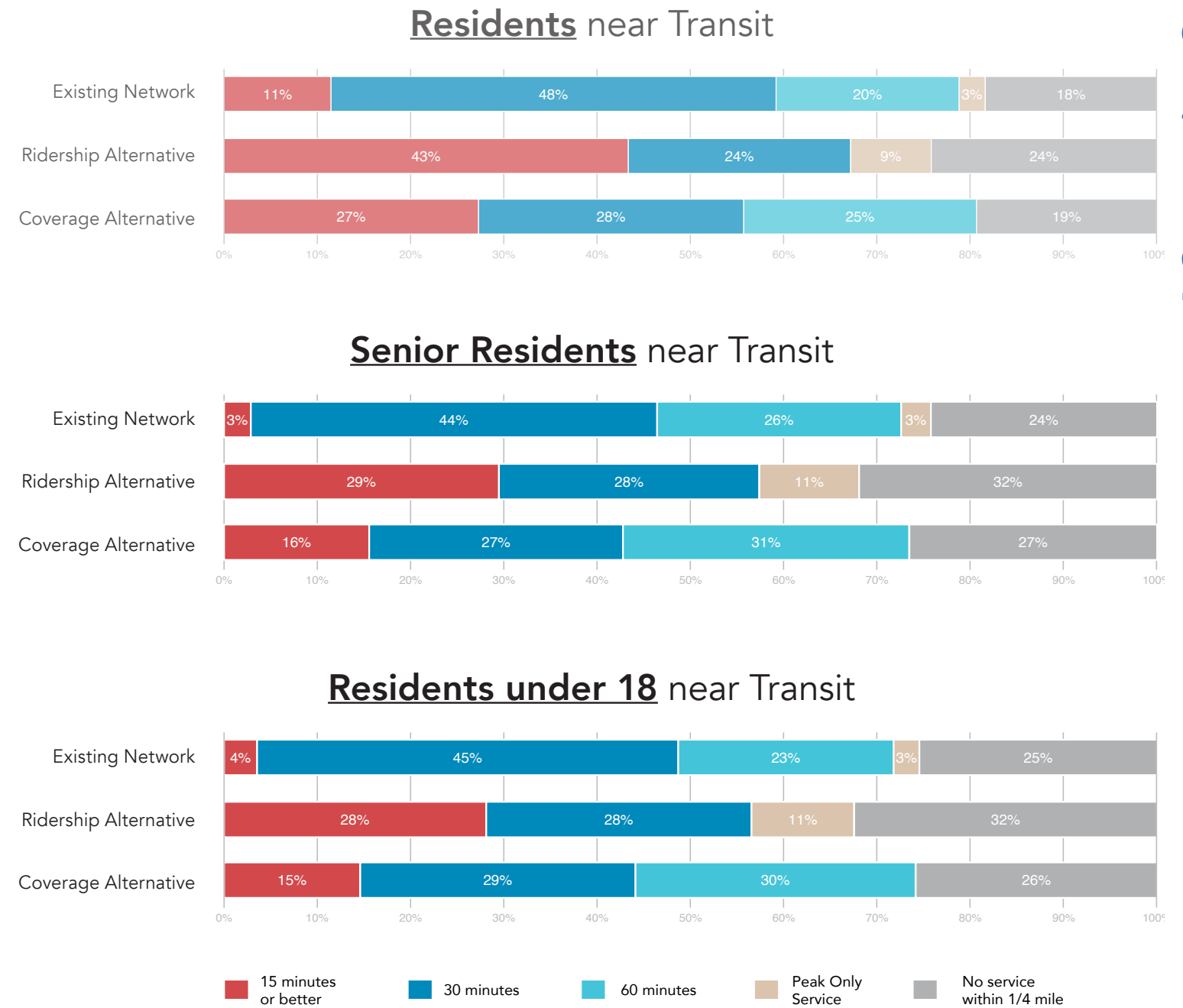


Figure 28: Proximity of Residents of all ages, Senior Residents, and Youth, to transit. This chart shows percentage of people near service of different frequencies.

**In proximity terms, seniors and youth would experience the same type and a similar level of change as Madison residents of all ages, in both the Ridership and Coverage Alternatives.**



# Proximity to Transit Summarized by Alternative

## Proximity to Transit Service compared by Alternative

The table below compares the number of people and jobs near all-day transit between the Existing Network and the two Alternatives.

The Ridership Alternative would reduce the number of people near transit. The Coverage Alternative would maintain and slightly increase the number of people near transit service.

	Existing Network	Ridership Alternative	Coverage Alternative
All Residents	79%	67%	81%
People of Color	79%	66%	81%
People with Low Incomes	91%	82%	91%
Senior Residents	73%	57%	73%
Youth	72%	57%	74%
Jobs	88%	76%	86%

## Proximity to Frequent Transit Service compared by Alternative

The Ridership Alternative would nearly quadruple the number of people near frequent transit (service every 15 minutes or better). The Coverage Alternative, would increase the number of people near frequent transit as well, but by a more modest amount.

	Existing Network	Ridership Alternative	Coverage Alternative
All Residents	11%	43%	27%
People of Color	15%	41%	29%
People with Low Incomes	32%	66%	49%
Senior Residents	3%	29%	16%
Youth	4%	28%	15%
Jobs	17%	55%	47%

# Change in Access - Ridership Alternative

The vast majority of people in Madison would live in areas where job access would increase substantially in the Ridership Alternative. This is because many more people would be near frequent service, fewer transfers would be required from outlying areas to reach Downtown, and bus routes would generally follow more direct routes.

In the map at right, each dot represents five residents. The color of the dot indicates whether residents in a particular area would experience an increase or a decrease in job access.

- **Green** show places where people's access to jobs by transit would increase compared to the Existing Network.
- **Gray** areas show places where people's access to jobs by transit would not change much.
- **Pink** areas show where people's access to jobs by transit would decrease.

## Access to jobs

The median Madison resident could reach **51,000 jobs** within 45 minutes by transit and walking, a **112% increase** over the Existing Network.

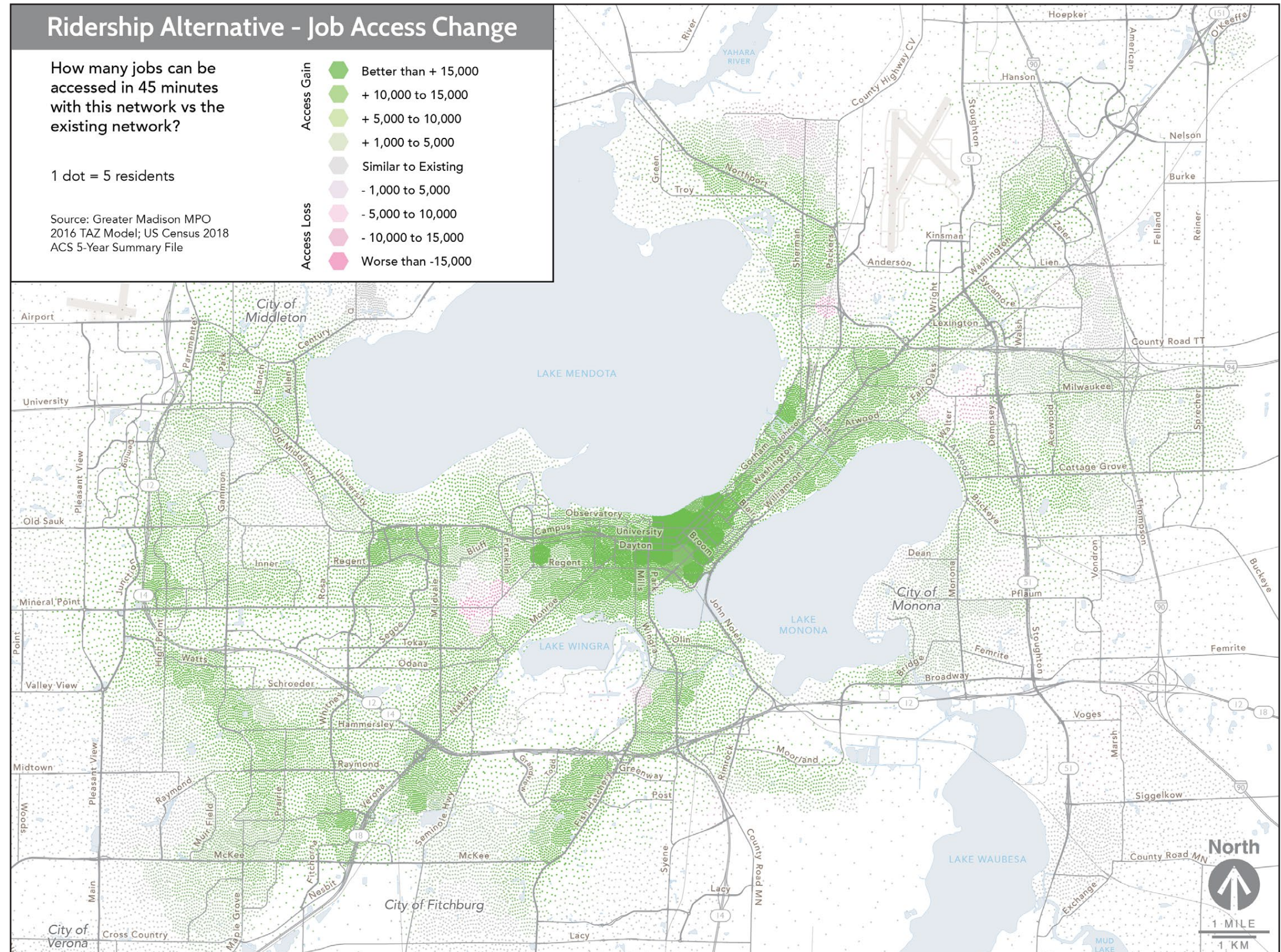
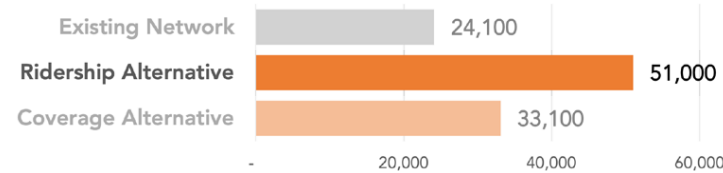


Figure 32: Ridership Alternative 45-minute Job Access Change Dot Density Map

# Change in Access - Coverage Alternative

The Coverage Alternative would spread service out more thinly across the city in to cover more area, but because frequencies would be low, you wouldn't be able to reach as many places within 45 minutes as in the Ridership Alternative.

Generally, access gains in the Coverage Alternative would be less dramatic than in the Ridership Alternative, although areas served by the BRT, and the redesigned Orbital route near the Beltline Freeway, would still have significant access gains.

In the map at right, each dot represents five residents. The color of the dot indicates whether residents in a particular area would experience an increase or a decrease in job access.

- **Green** show places where people's access to jobs by transit would increase compared to the Existing Network.
- **Gray** areas show places where people's access to jobs by transit would not change much.
- **Pink** areas show where people's access to jobs by transit would decrease.

## Access to jobs

The median Madison resident could reach **33,000 jobs** within 45 minutes by transit and walking, a **38% increase** over the Existing Network.

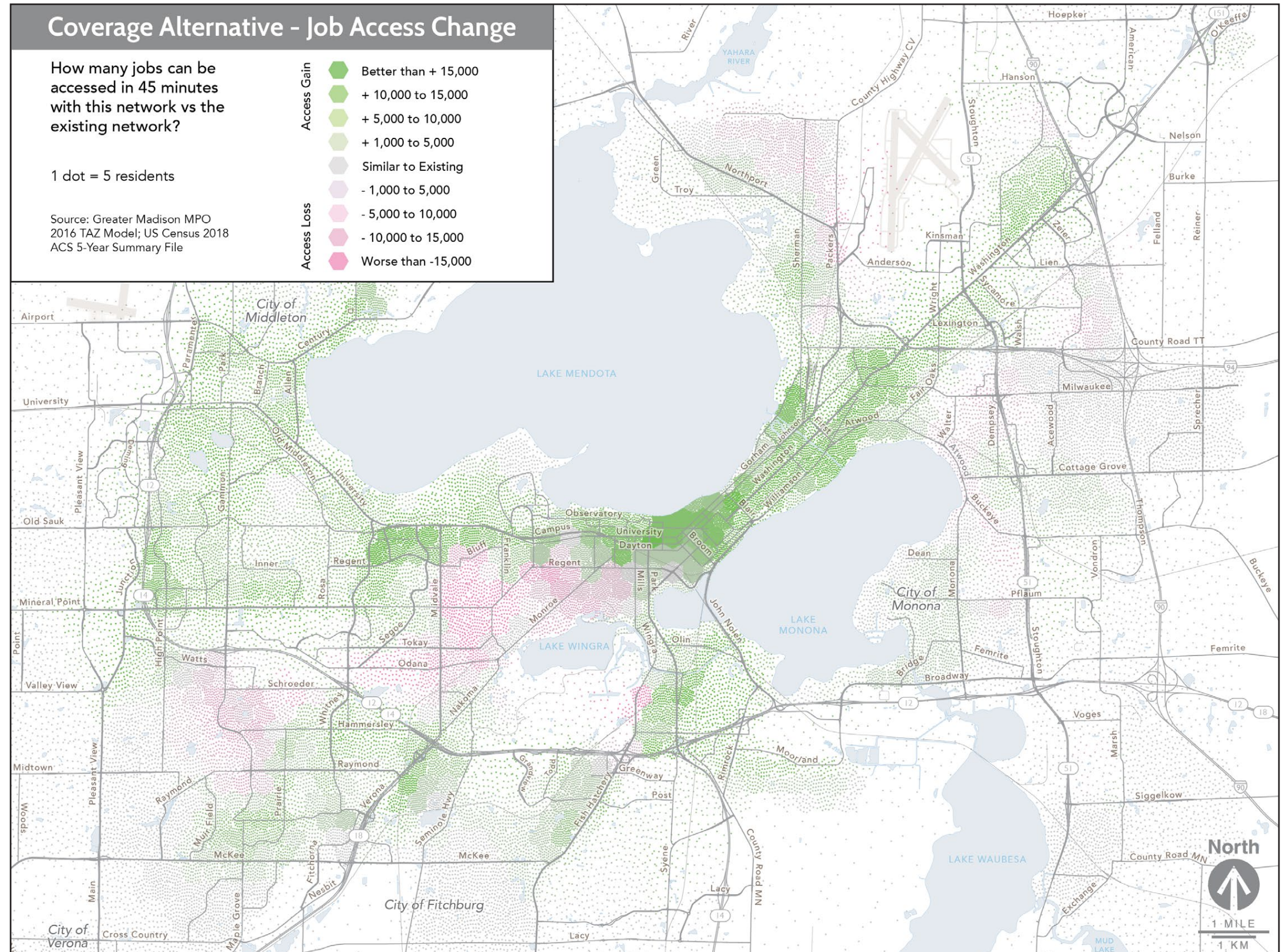
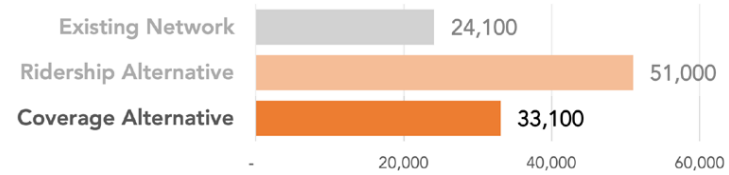


Figure 33: Coverage Alternative 45-minute Job Access Change Dot Density Map

# Change in Access - People of Color

Both Alternatives would have positive impacts on job access for the average Madisonian. But how can we know whether those benefits reach marginalized populations?

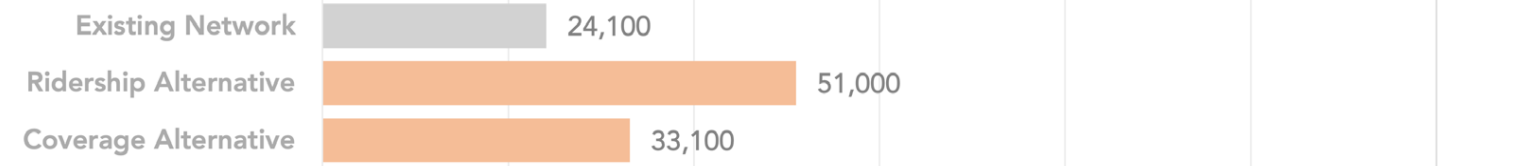
In the maps below, each dot represents one person of color. The colors of each dot represent the change in the number of jobs accessible from each location within 45 minutes by transit. As in prior maps, **green** represents increased access and **pink** represents losses in job access.

**In both Alternatives, people of color would benefit from improvements in job access by transit at similar rates to the general population.**

In the Ridership Alternative, the median person of color could reach 48,000 jobs within 45 minutes by transit and walking, a 120% increase. As can be seen by the color distribution on the map, this improvement would be experienced by the vast majority of people of color in Madison.

In the Coverage Alternative, the median person of color could reach 31,000 jobs within 45 minutes by transit and walking, a more modest 40% increase. This increase would also be experienced by a majority of people of color, although certain areas where many people of color live would also experience a decrease in access, and many areas would experience almost no change.

Jobs Reachable within 45 minutes by the Median Resident of Madison



Jobs Reachable within 45 minutes by the Median Person of Color

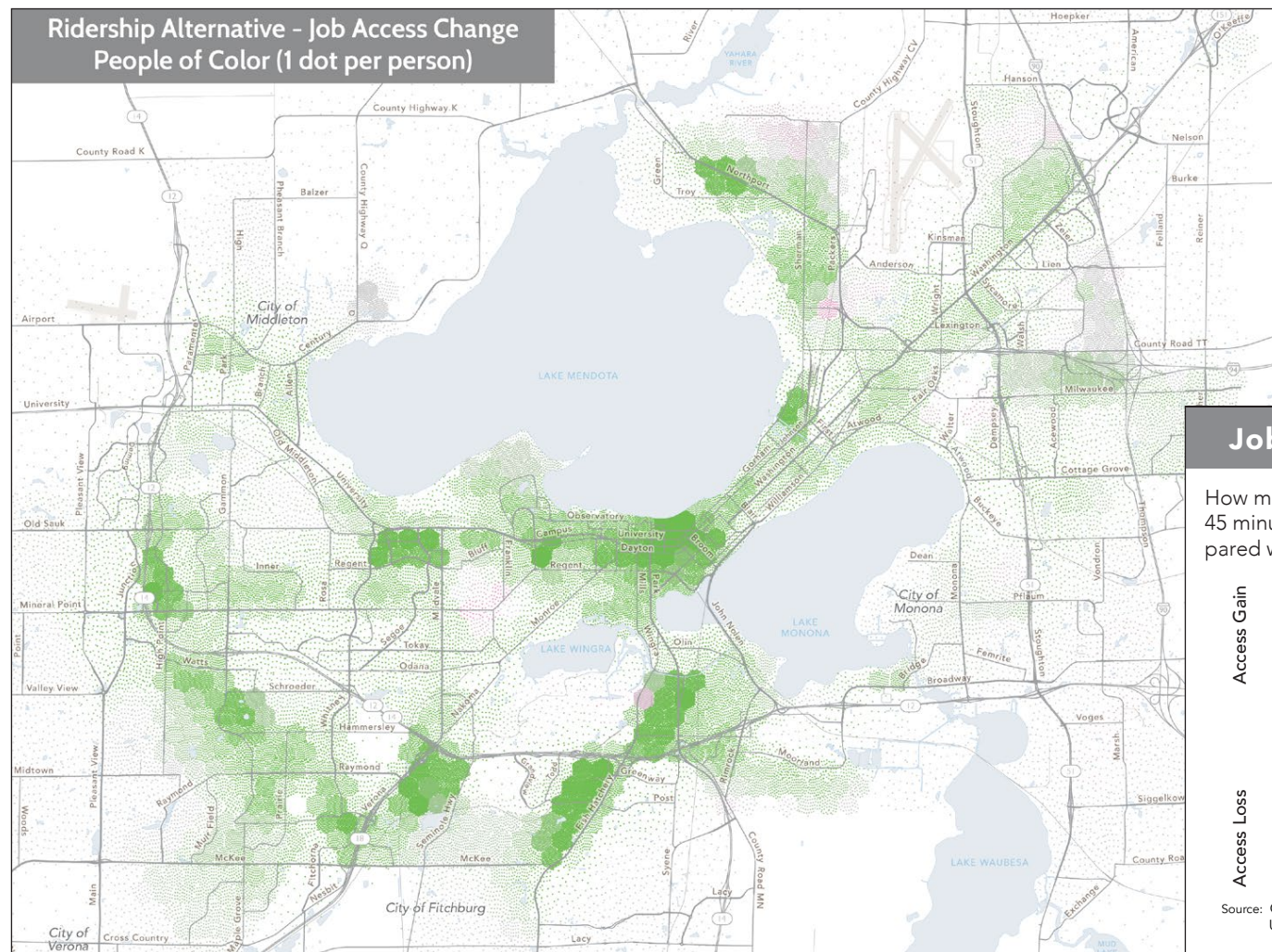
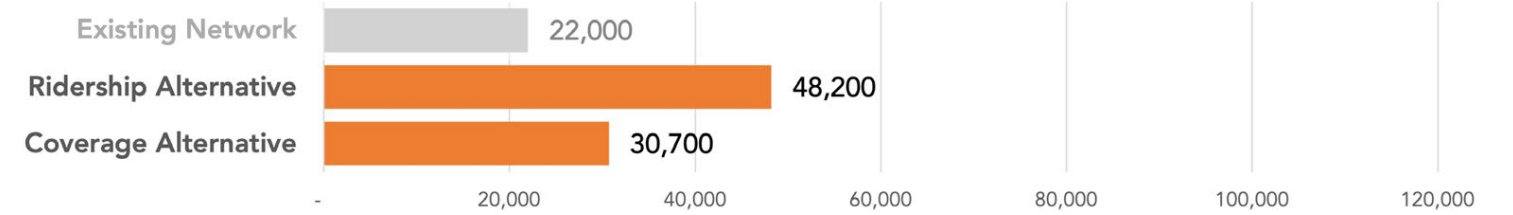


Figure 34: Ridership Alternative 45-minute Job Access Change by Residents with Low Income

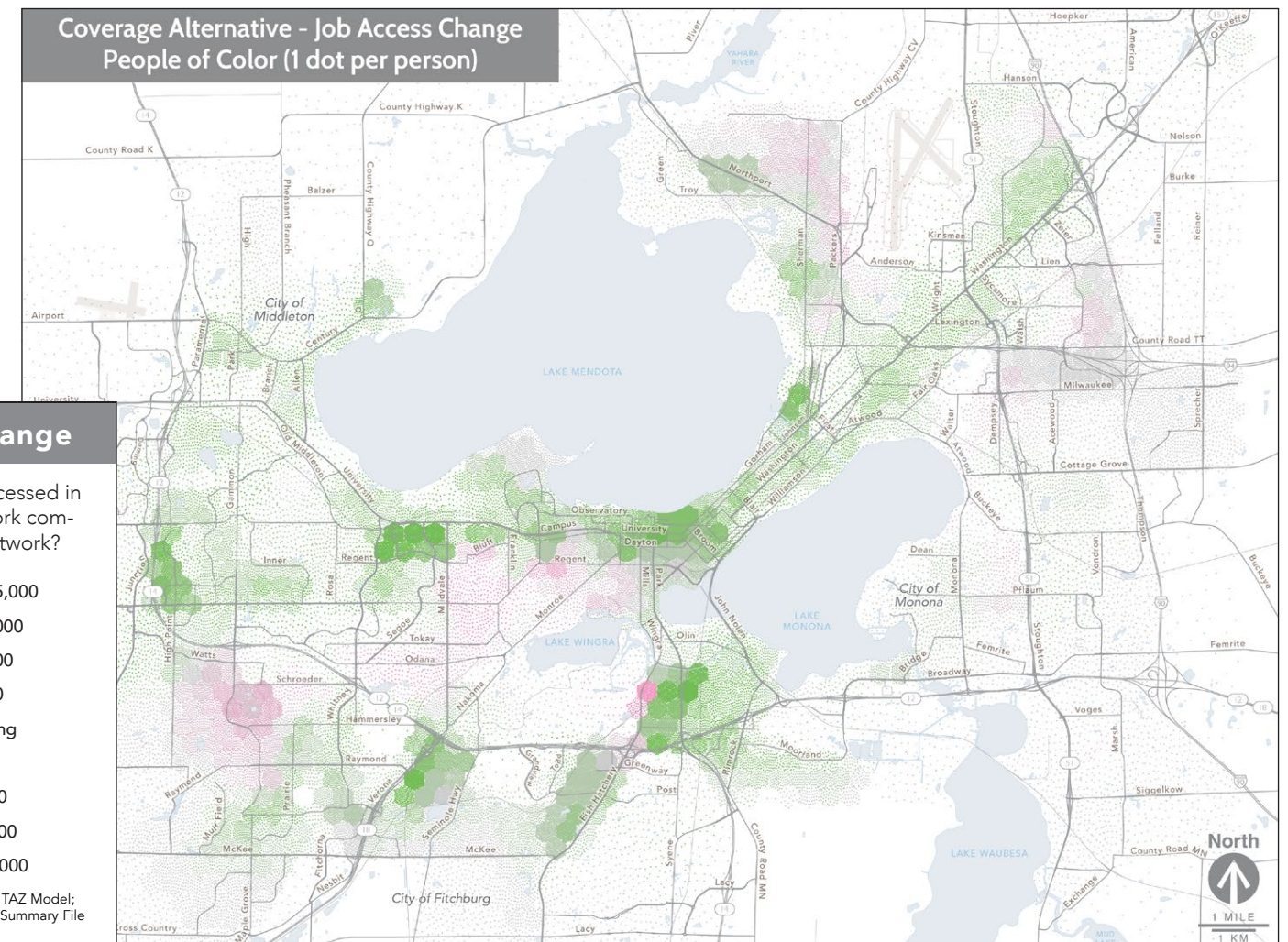


Figure 35: Coverage Alternative 45-minute Job Access Change by Residents with Low Income

# Change in Access - People with Low Incomes

In the maps below, each dot represents one person of color. The colors of each dot represent the change in the number of jobs accessible from each location within 45 minutes by transit. As in prior maps, **green** represents increased access and **pink** represents losses in job access.

Many low-income people live in Central Madison. For this population, job access is already high on average, so in percentage terms they would benefit less from any changes to the transit network. But **in absolute terms, people with low incomes would benefit from improvements in job access by transit at nearly similar rates to the population as a whole in both Alternatives.**

In the Ridership alternative, the median low-income person could reach 103,000 jobs within 45 minutes by transit and walking, a 28% increase, (or +23,000 jobs vs. +27,000 jobs for all Madison residents). As can be seen by the color distribution on the map, this improvement would be near-universal among low-income people.

In the Coverage Alternative, the median low-income person could reach 87,000 jobs within 45 minutes by transit and walking, a more modest 8% increase (or +7,000 jobs vs. +9,000 jobs for all Madison residents).

Jobs Reachable within 45 minutes by the Median Resident of Madison

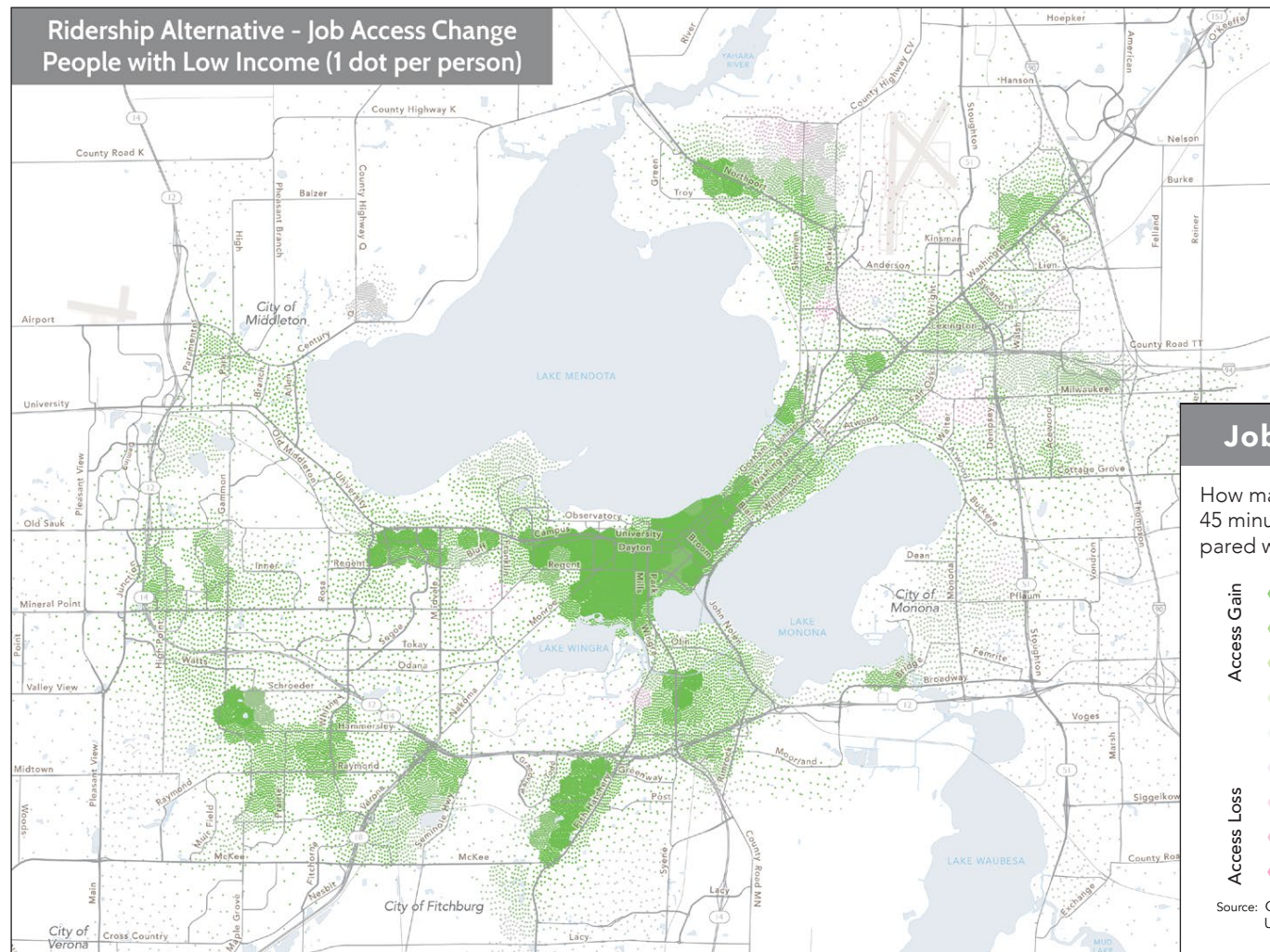
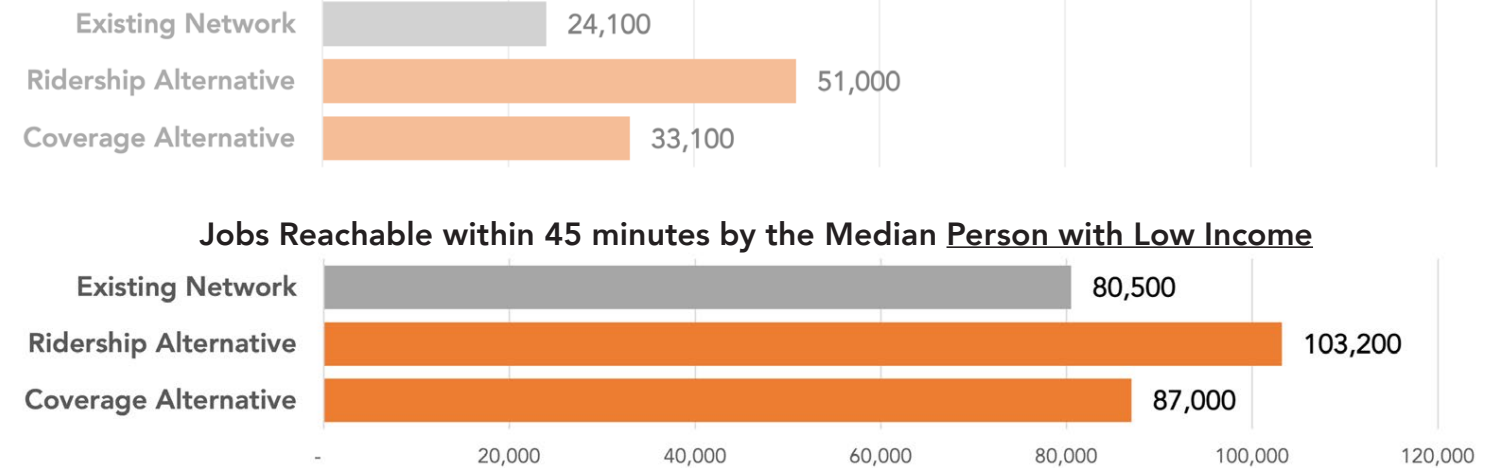


Figure 36: Ridership Alternative 45-minute Job Access Change by Residents with Low Income

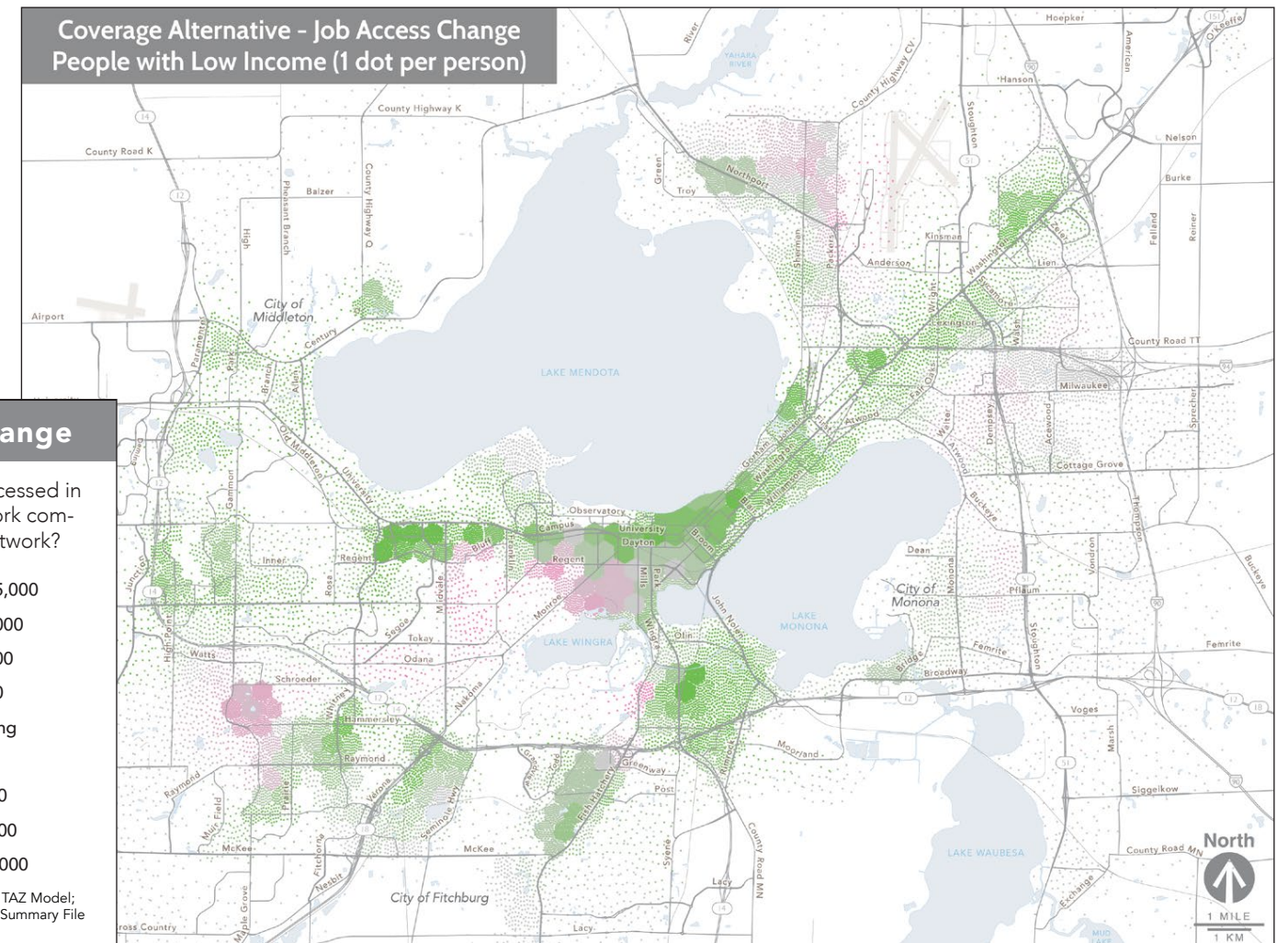


Figure 37: Coverage Alternative 45-minute Job Access Change by Residents with Low Income

# Summary of Key Outcomes

The Alternatives would likely have these effects on transit outcomes:

**1. Transit service would become slightly more useful to the average Madisonian in the Coverage Alternative; it would become much more useful in the Ridership Alternative.**

- The number of people living near frequent service would more than double in the Coverage Alternative, and it would nearly quadruple in the Ridership Alternative. Frequency correlates strongly with high ridership, especially when frequent services are combined into a connected network.
- As a result, more people would be able to reach more opportunities in a given amount of time. *In the Ridership Alternative, the average Madisonian could reach more than twice as many jobs (+112%) in 45 minutes by transit than they could today. In the Coverage Alternative, this measure would increase by +38%.*
- Other factors would affect whether or not people choose to ride, such as fares, parking prices, gas prices, employment levels, the lingering effects of the pandemic etc. Holding these factors constant, however, when more people can make more of their trips faster, by transit, more people will choose to ride and fewer will travel by car.

**2. Some areas would be farther from all-day transit service in the Ridership Alternative than in the Coverage Alternative.** This is very obvious when you compare the network maps.

- However, because the unserved areas in the Ridership alternative are populated at low densities, the number of residents and jobs who lose coverage would be lower than one might expect from the visual impression given by the maps.
- The Coverage Alternative would slightly increase the number of residents near any all-day service. The number of people near any service at all would remain similar (-1%) to what it is today.

**3. In both Alternatives, people of color and people with low incomes would benefit from network changes at similar rates to the population in general.**

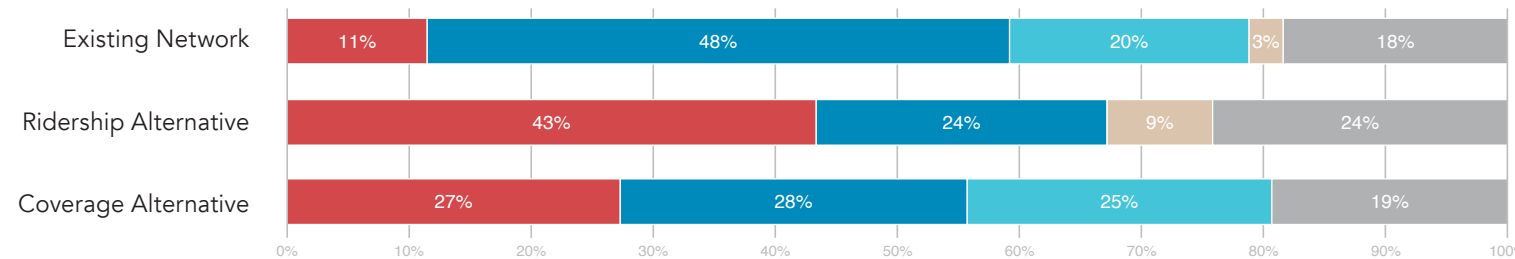
- In the Ridership Alternative, nearly all people of color and people with low income would benefit from improvements to job access by transit within 45 minutes. In the Coverage Alternative, there would be much more variation from one area to another.
- While there would be higher frequencies and shorter waits, Ridership Alternative would result in some people being farther from transit service, so these job access benefits are somewhat contingent on physical ability.

**4. The Coverage Alternative is somewhat simpler than the Existing Network. The Ridership Alternative is radically simpler.**

Simplicity can help attract spontaneous and new riders. The number of lines goes from 47 in the Existing Network, to 25 in the Coverage Alternative, to 14 in the Ridership Alternative. Fewer lines mean a network is easier to remember, and more frequent lines with more consistent spans make trip-planning easier.

**5. The number of places where the City of Madison could justify encouraging transit-oriented development, including affordable housing, would be higher in the Ridership Alternative.** Dense developments and the neighborhoods around them benefit from frequent transit service, and some cities have policies allowing more density, less parking, and greater affordability around frequent bus lines.

## Residents near Transit



## Jobs Reachable within 45 minutes by the Median Resident of Madison

