Reimagine METRO

Operational Analysis Report

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Anytime you see a symbol like A or B in this document, look for the same symbol in a nearby map or image.

1 Introduction

About this Report

The Operational Analysis Report is the first step in Reimagine METRO, METRO's effort to develop a detailed service plan and implementation schedule for a redesigned suite of mobility services that meet the goals articulated in METRO's Strategic Plan, adopted in 2020.

This report is the first stage of that process.

This document:

- Describes METRO's service area and market in terms of the challenges and opportunities for transit presented by the development pattern and current network design (Chapter 2).
- Provides an overview of the current state of METRO's fixed route and demand response services. (Chapter 3).
- Identifies key existing network design features for consideration in the design phases of the development of new service planning options (Chapter 3).
- Provides a detailed description of METRO's current demand response programs, and outlines a set of strategies for consideration in demand response realignment planning during this process (Chapter 4).
- Identifies the major planning tradeoffs involved in developing a service plan that changes the current design of the fixed route network (Chapter 5).

About METRO

METRO is the public transportation provider for Summit County, and operates an array of fixed route and demand response services. Its current service offering includes:

- 33 fixed route bus lines.
- ADA paratransit services, providing door-to-door transportation to qualifying individuals with disabilities.
- SCAT, a demand response program providing door-to-door service for seniors and people with disabilities.
- Several other demand response programs available to the general public, including METRO Connect, a pilot serving Cuyahoga Falls, Stow and Tallmadge that allows riders to call ahead for convenient trips from bus stops to destinations in the area.

METRO also coordinates booking for Summit County medical transportation trips funded by Medicare and Medicaid.

Starting from the Strategic Plan

METRO's Strategic Plan is a visionary document that describes the agency's plan to respond to the most important long-term trends facing the transit industry: falling ridership, rising costs and uncertain revenues. The questions these factors raise for the future of transit in Summit County and throughout the country have only intensified during the course of the COVID-19 pandemic.

The Strategic Plan identifies six major goals for METRO over the next decade. These are:

- Improve Service Quality and Cost Effectiveness
- Expand Collaboration with Community Partners
- Implement Innovative Service Approaches
- Create Economic Opportunity
- Develop and Action-Oriented Plan
- Emerge Nationally as a Recognized Mid-Sized Transit Agency

Reimagine METRO will develop a new service plan for METRO centering on three main strategies:

1. Redesigning fixed route services
2. Realigning existing demand response services, and
3. Providing new and innovative mobility strategies to meet the needs that are not easily or cost-effectively addressed either by traditional fixed route or demand response services.

Achieving goals like improved service quality, economic opportunity and cost effectiveness mean building a transit system that is more useful for more people. Cost effectiveness is an outcome of ridership, because running transit service more efficiently means carrying more people on every bus trip. The goals articulated in METRO's Strategic Plan are **ridership goals**. Thus, the network redesign initiated by the Strategic Plan is a **ridership** redesign.

Figure 1: METRO's Strategic Plan was adopted by the agency's Board of Trustees in November 2020.

> "The pandemic brought into focus the concept that drives the Strategic Plan recommendations: that METRO will refocus and rebrand as Summit County's Regional Mobility Provider.
>
> - Focusing METRO's fixed route services on METRO's highest ridership corridors, and on serving markets where (and for whom) transit is essential.
> - Taking advantage of new technologies and service approaches to provide opportunities for innovative services."
>
> METRO 2020 Strategic Plan

Network Design Starts With Goals

Putting Goals into Practice

Transit can serve many different goals. Individual people and communities value these goals differently. Some possible goals for transit include:

- **A Social Safety Net.** Transit can help meet the needs of people in situations of disadvantage, providing access to essential services and jobs, or alleviating social isolation by offering a basic affordable transportation option.
- **Economic Opportunity**. Transit can give workers access to more jobs; businesses access to more workers; and students more access to education and training.
- **Climate & Environmental Benefits**. By reducing car trips, transit use can reduce air pollution and greenhouse gas emissions. Frequent transit can also support compact development and help conserve land.
- **Congestion Mitigation.** Because buses carry more people than cars, transit use can mitigate traffic congestion by reducing Vehicle Miles Travelled (VMT). This is especially important in communities with significant jobs-housing imbalances and a preponderance of long commutes.
- **Health**. Transit can support physical activity. This is partly because most riders walk to their bus stop, but also because riders will tend to walk more in between their transit trips.
- **Personal Liberty**. By providing people the ability to reach more places than they otherwise would, a transit system can be a tool for personal liberty, empowering people to make choices and fulfill their individual goals.

Some of these goals are only served if many people use transit. For example, transit can only mitigate congestion and pollution if many people ride the bus rather than drive. We call such goals "ridership goals" because they are achieved through high ridership. The Strategic Plan's goal to create economic opportunity is one such ridership goal, because for the economic opportunity that affordable, useful public transportation can provide to be widespread in the community, many members of the community must actively use the service.

Other goals are served by the simple presence of transit. A bus route through a neighborhood provides residents insurance against isolation, regardless of whether or not they are able to drive, walk or cycle a long distance. A route may also fulfill political or social goals, for example by getting service close to every taxpayer or into every municipality. We call these types of goals "coverage goals" because they are achieved in large part by covering geographic areas with service and ensuring that transit is widely available, rather than by high ridership.

Figure 2 shows METRO's Existing Network, color-coded by frequency. The existing network generally operates at low frequency, but provides extensive coverage through Akron and its immediate surrounding areas. The Existing Network is discussed in detail in Chapter 3.

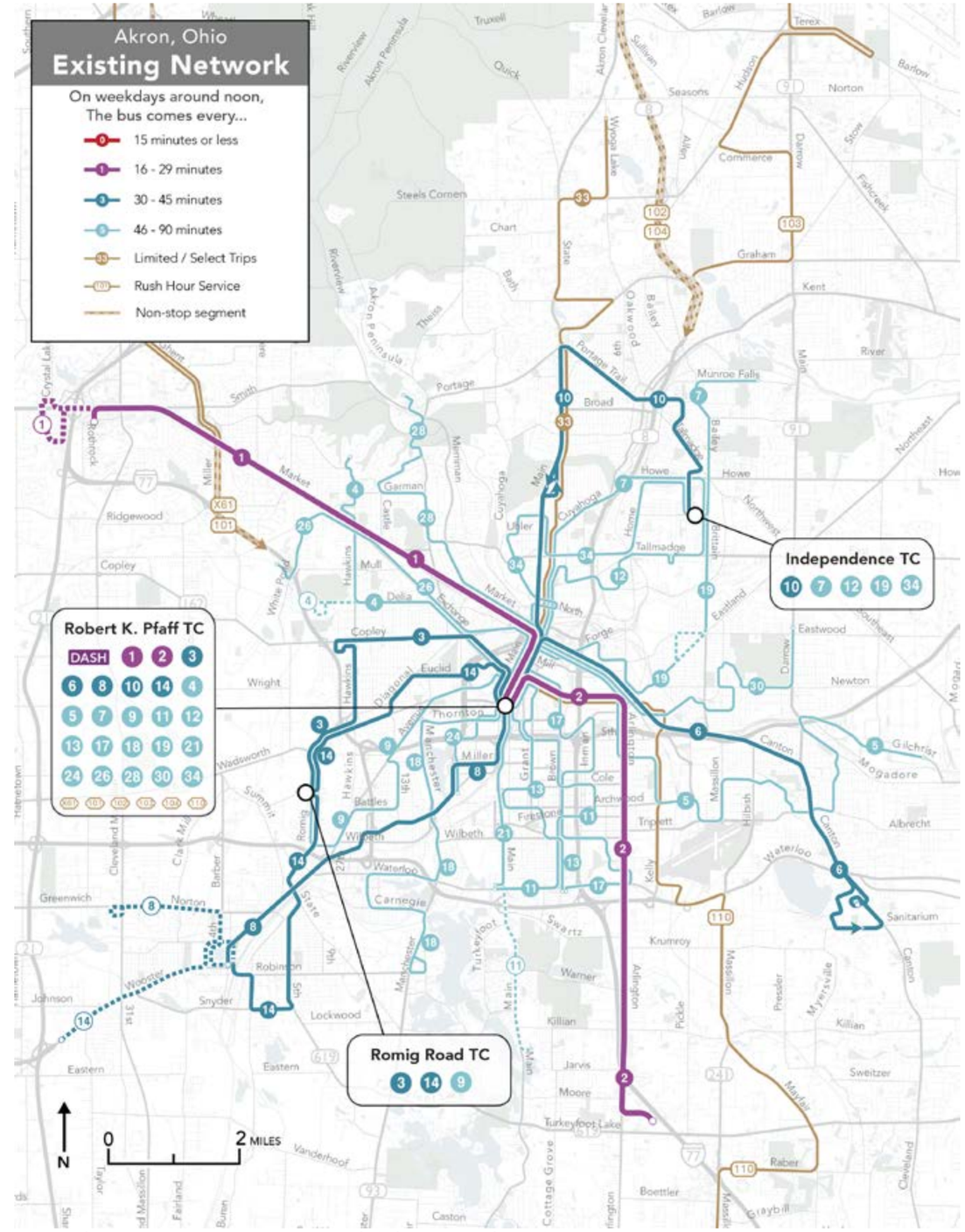


Figure 2: Akron METRO Existing Network (Akron Detail Map)

While the majority of METRO's services operate in Akron and adjacent communities, it also operates express routes that extend throughout the entire county, as shown in Figure 3.

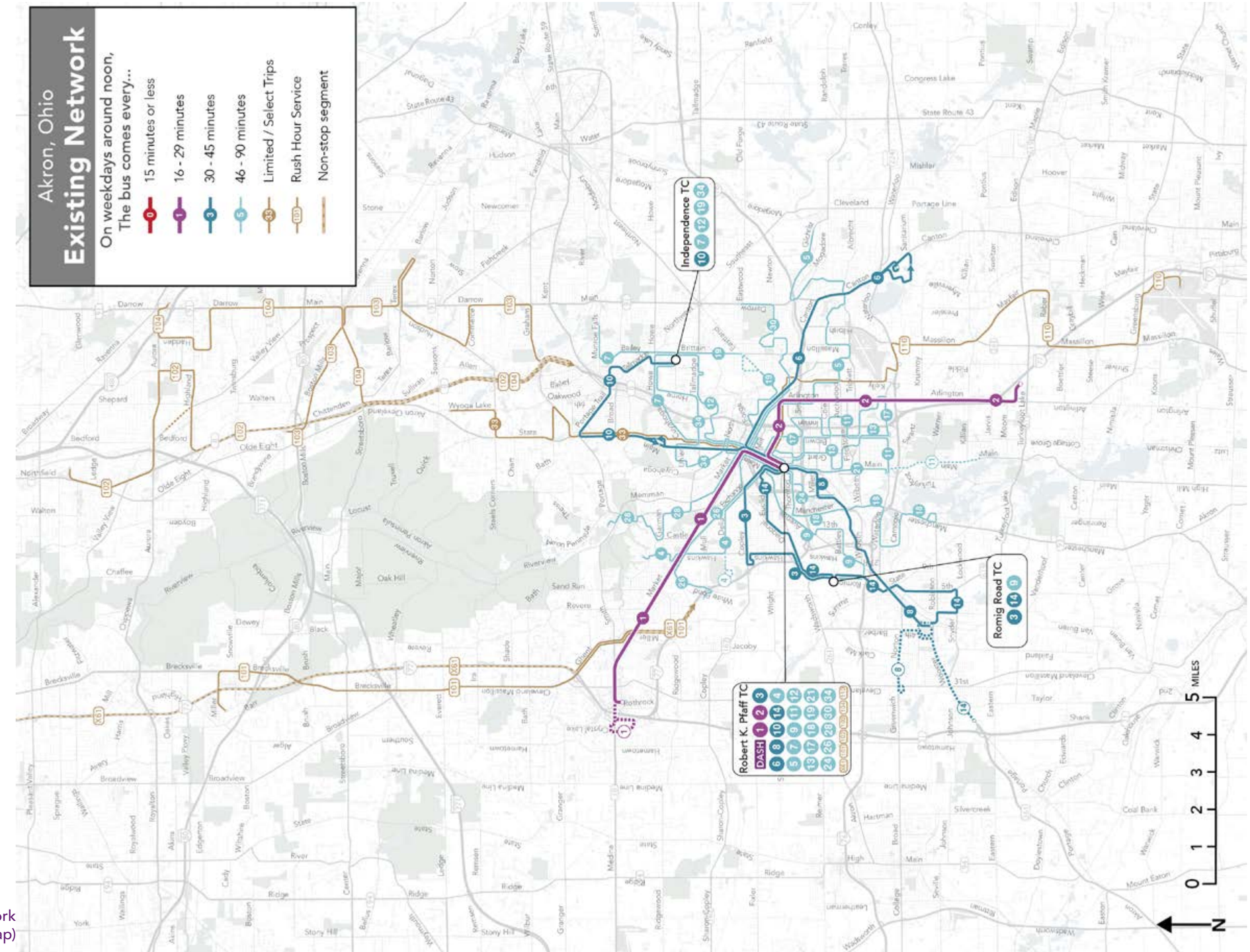


Figure 3: Akron METRO Existing Network (Akron Detail Map)

More Frequency, or More Coverage?

Higher Frequency or More Coverage?

Ridership and coverage goals are both justifiable, but they lead to opposing approaches to network design. **Figure 4** is an illustration of how ridership and coverage goals conflict with one another, due to geometry and geography.

When transit is designed to achieve ridership, it tends to focus on providing high-frequency service to busy places. Transit designed to be widely available and achieve high coverage must spread those resources out to serve a wider area, so less service is available for high frequency in busy places.

In the fictional area at the top of **Figure 4**, the little dots indicate the presence of people and jobs. The lines indicate roads. Most of the activity is concentrated around a few roads.

A transit provider pursuing only a ridership goal would focus service on the streets where there are large numbers of people. Because service is concentrated onto fewer routes, frequency is high and a bus is always coming soon. This would result in a network like the one at bottom-left, with all buses running on only two red routes running on the busiest corridors.

If the city were pursuing only a coverage goal, on the other hand, it would spread out services so that every street had a bus route, as in the network at bottom-right. In this example, only one or two buses serve each of the green routes, so waiting times for each route would be longer.

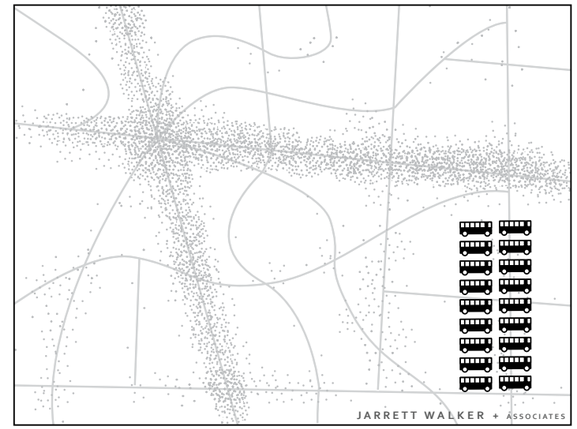
On a fixed budget, designing transit for both ridership and coverage is a zero-sum game. Each bus that the transit provider runs down a main road, to provide more frequent and competitive service in that market, is not running on the neighborhood streets, providing coverage. **While an agency can pursue ridership and provide coverage within the same budget, it cannot do both with the same dollar. The more it does of one, the less it does of the other.**

Striking the Balance

Achieving ridership goals like those laid out in METRO's Strategic Plan means building a network of **high-frequency routes**, where the busiest places and most important destinations are served by bus routes that come often and don't require long waits.

METRO's existing network is generally oriented towards coverage, with most routes operating only every hour. In most parts of the service area, the network looks more like the "Maximum Coverage" example in this illustration than the "Maximum Ridership" network. However, just because those services are not focused on generating ridership does not mean they are not doing something important. Providing widely-available, affordable transportation within a short walk is also an important goal for transit.

One of the most important questions METRO will engage the public on throughout this project is the proper balance between ridership and coverage, given the overall direction from the Strategic Plan to shift the focus on the agency's services in the direction of ridership.



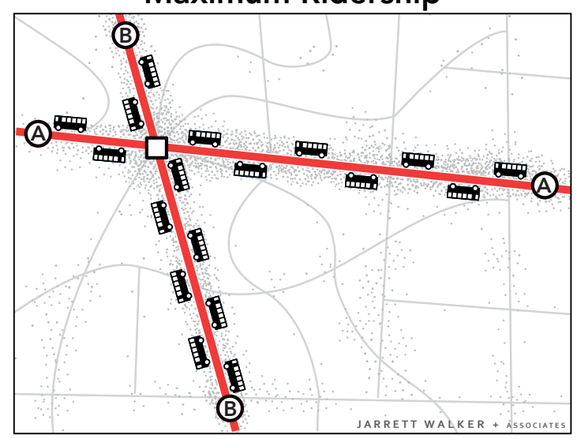
Imagine you are the transit planner for this fictional town.

The dots scattered around the map are people and jobs.

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

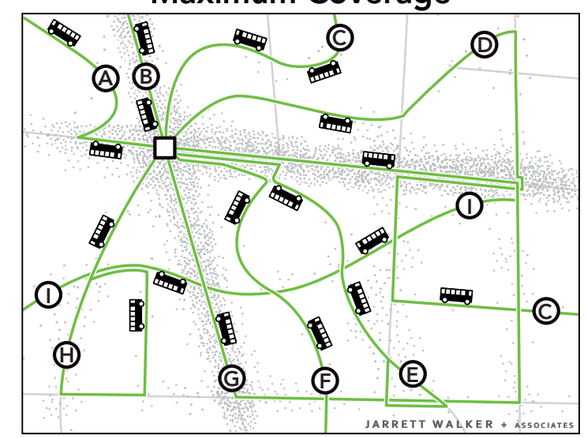
Before you can plan transit routes, you must first decide: What is the purpose of your transit system?

Maximum Ridership



All 18 buses are focused on the busiest area. 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.

Maximum Coverage



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.

Figure 4: Ridership & Coverage Goals

Role of Demand Response in This Process

Role of Demand Response Programs

The Strategic Plan outlines a path of transformation for METRO's demand response services that would complement changes to the fixed route network.

> *Maintaining access to high quality demand response service for METRO's most dependent passengers, while controlling rising costs, will require METRO to reimagine how it provides demand response services, including program eligibility, fare policies, and operations.*
>
> *METRO 2020 Strategic Plan, p. 119*

The Strategic Plan calls for the development of a new service model for demand response service, and complementary processes to encourage a shift in usage among curent customers of the two SCAT programs to the new model.

Any successful shift in METRO's current demand response programs depends on the success of the fixed route network redesign in delivering more useful service. METRO's existing non-ADA demand response programs are popular because for their users, they are filling a set of mobility needs that in its current form, the fixed route network is not meeting.

Changes to demand response can only be addressed after the initial redesign of the fixed route network, because the needs addressed by the future demand response programs will be determined by the gaps or lack thereof created by the future fixed route network and supporting new mobility services. The demand response needs in the context of a fixed route network that is faster, more frequent and more useful are very different than the needs generated by a network that operates at lower frequency and is overwhelmingly focused on the job center of Downtown Akron.

This document contains a detailed analysis of METRO's existing demand response programs, that will serve as a guide throughout the project. It also outlines a set of specific strategies for demand response realignment that will be considered in combination with changes to the fixed route network and identification of new mobility services in the later stages of this process.

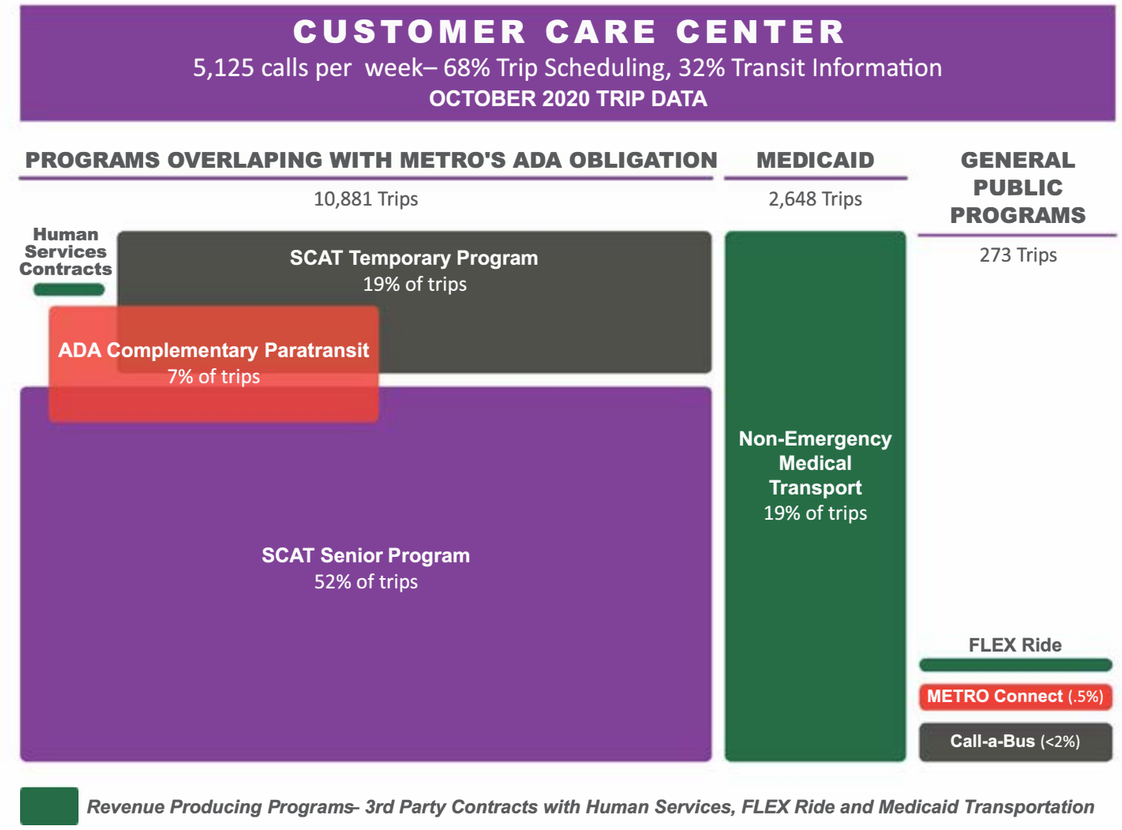


Figure 5: Today, METRO operates an array of demand response programs, including required complementay ADA services, as well as other programs for seniors (SCAT Senior), people with disabilities (SCAT Temporary), and the general public (METRO Connect and Call-a-Bus). METRO also provides booking for Medicaid-funded non-emergency medial transport.

Changes to METRO's current demand response programs depend on the accompanying improvement of the fixed route network to better meet existing customers' mobilty needs. METRO's demand response programs are discussed in detail in Chapter 4.

Project Timeline

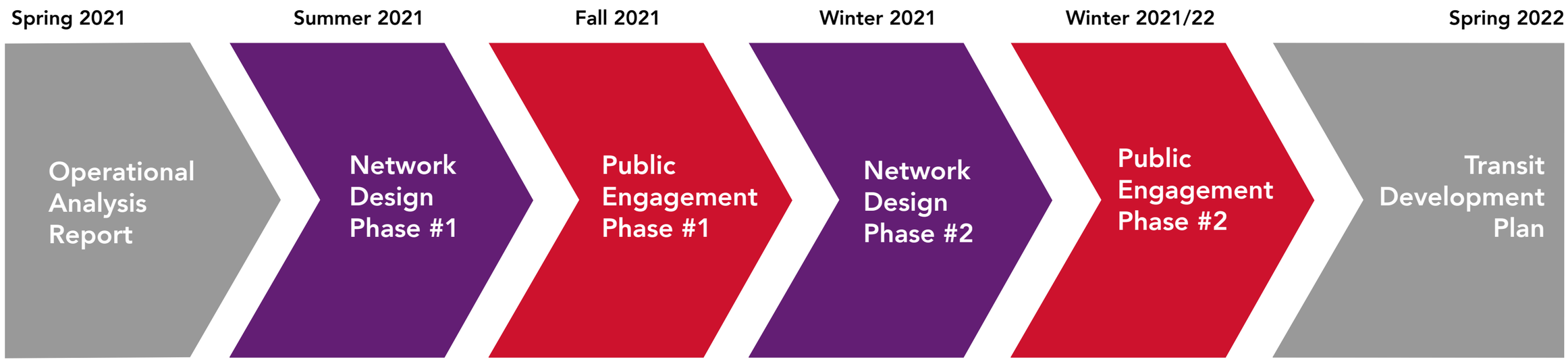
In Summer 2021, METRO will design the first draft of the Stable Resources Scenario showing how the network could look if it were designed to focus more heavily on generating high ridership.

Chapter 5 discusses the key considerations and major tradeoffs for the design of the Stable Resources Scenario.

The first phase of public engagement in this process focused on that alternative will begin in September 2021.

Where Are We Now?

Figure 6 provides an overview of the timeline of Reimagine METRO. This project will proceed across six major phases, beginning with the development of this Operational Analysis Report in Spring 2021, and concluding with the completion of the Transit Development Plan in Spring 2022.



Operational Analysis
Examine current METRO services and transit market conditions.

Identify key considerations for network redesign planning.

Network Design Phase #1
Develop Draft Financially Sustainable Network Redesign Alternative

Public Engagement Phase #1
Outreach on Draft Financially Sustainable Alternative

Outreach on key choices for demand response service.

Network Design Phase #2
Refine Financially Sustainable Network Alternative based on input from public and stakeholders.

Develop +5% and +10% funding alternatives.

Develop Draft Demand Response Program Guidelines.

Network Design Phase #2
Outreach on Financially Sustainable, +5% and +10% resources Alternatives.

Outreach on Draft Demand Response Program Guidelines.

Transit Development Plan
Revise all fixed-route and demand response alternatives based on Phase #2 engagement input.

Document all alternatives in detailed report, including a mapping, cost estimates, implementation timeline and a variety of analysis of the potential outcomes of any changes to the fixed-route network or demand response programs.

Figure 6: Reimagine METRO Process Timeline

2 METRO's Market

The Market & Need for Transit

In this chapter, we present and discuss data that informs two different types of considerations in transit planning:

- **Where are the strongest markets for transit, with potential for high ridership and low operating costs?**
- **Where are there moderate or severe needs for transit, where coverage services may be important even if they do not attract high ridership?**

A "strong transit market" is mostly defined by *where* people are, and how many of them are there, rather than by who people are. We learn about transit needs mostly by examining *who* people are and what life situation they are in.

This chapter is focused on identifying the land use and demographic indicators that are most important to consider in designing service plans with the goal of building transit ridership. It is not meant to provide a comprehensive overview of the demographics and recent changes across METRO's service area. For that analysis, please refer to METRO's 2020 Strategic Plan.

Measuring Demand and Need

On the following pages, these maps and diagrams help us visualize potential transit markets and needs[1]:

- **Residential density**
- **Job density**
- **Activity density** (combined residential and jobs)
- Density of **Residents by Race and Ethnicity.**
- Maps of **walkability**

How to Use These Measures

METRO's Strategic Plan provides direction to develop a new service plan based on service quality and cost effectiveness. This means a service plan capable of generating high ridership. The first step in that process is understanding METRO's markets from the standpoint of ridership potential.

Designing for Ridership

If you asked a transit planner to draw you a very high-ridership bus line, that planner would look mostly at densities of all residents and jobs; at the walkability of streets and neighborhoods; and at the cost of running a bus line long enough to reach them.

Designing for Coverage

If you asked a transit planner to draw a line that helped as many people with severe needs as possible, they would look at where low income people, seniors, youth and people with disabilities live and where they need to go.

The densities at which these people live matters, because at higher densities a single bus stop can be useful to more people in need. However, the transit planner might also try to get the line close to small numbers of people. In fact, the more distant and scattered people are, the more isolated they can be and the more critically they might need access to transit.

Civil Rights and Equity

Another important set of maps in this chapter is not strictly related to *need* but rather to civil rights. These maps show **where members of different racial and ethnic groups live**.

Unequal treatment on the basis of race or ethnicity is prohibited by Civil Rights Act of 1964. (Unequal treatment on the basis of other characteristics, including income and age, is also prohibited by law.)

A person's race or ethnicity alone does not tell us if they need transit, or if they have a propensity to use transit. However, we know that race and ethnicity are correlated with income, and all three factors are correlated by a higher propensity to use transit.

Providing equitable and supportive levels of mobility to people of any race or ethnicity is often an important goal of transit.

In some cases, these aspirations coincide with goals related to high ridership, particularly in situations where minority populations in places with transit-favorable development patterns have been underserved by the existing structure of the network. In other cases, equitable mobility goals coincide with a coverage framework; this is often the case in regions where communities of color have been subject to displacement or are otherwise pushed to locations in places that are hard to serve with transit.

Data Limitations

Detailed Census 2020 data are not yet available at the time of publication of this report.

The majority of the maps shown in this chapter are based on 5-year American Community Survey (ACS) data produced by the U.S. Census Bureau for the 2015-2019 period.

As such, they may not reflect very recent changes in population and job distribution that may have occurred in 2019 and 2020, or changes that started after 2015.

While the larger patterns of population distributions and population change shown in the maps likely reflect current reality, there may be deficiencies in specific locations of high growth (or population loss) in the second half of the 2010s.

1 The maps in this chapter are based on data from the U.S. Census Bureau (2010 Census and 2018 American Community Survey)

The Ridership Recipe

Creating a transit network capable of generating high ridership isn't just about faster or more frequent service. To be useful to many people, fast, frequent service must be available in places where the development pattern supports its use.

The built environment factors shown in **Figure 7** are critical to facilitating a broadly useful transit network:

A. **Density.** Where there are many residents, jobs and activities in an area, there are many places people might want to go.

B. **Walkability.** An area only becomes accessible by transit if most people can safely and comfortably walk to and from the nearest transit stops.

C. **Linearity.** Direct paths between many destinations are faster and cheaper for METRO to operate. Straight lines are also easier to understand and more appealing to most potential riders.

D. **Proximity.** The longer the distance between two places to serve, the more expensive it is to connect them. Areas with continuous development are more cost-effective to serve than areas with big gaps.

E. **Mix of Uses.** When there is a mix of land-uses along a direct path, transit can provide direct access to a broad range of destinations. Mixed-use transit corridors also tend to be very productive, because people ride in both directions at many times of the day.

Regardless of the intricacies of local geography, these five elements determine where transit can be useful for many people, at a relatively low cost.

This chapter provides an overview of the presence of these factors in METRO's service area.

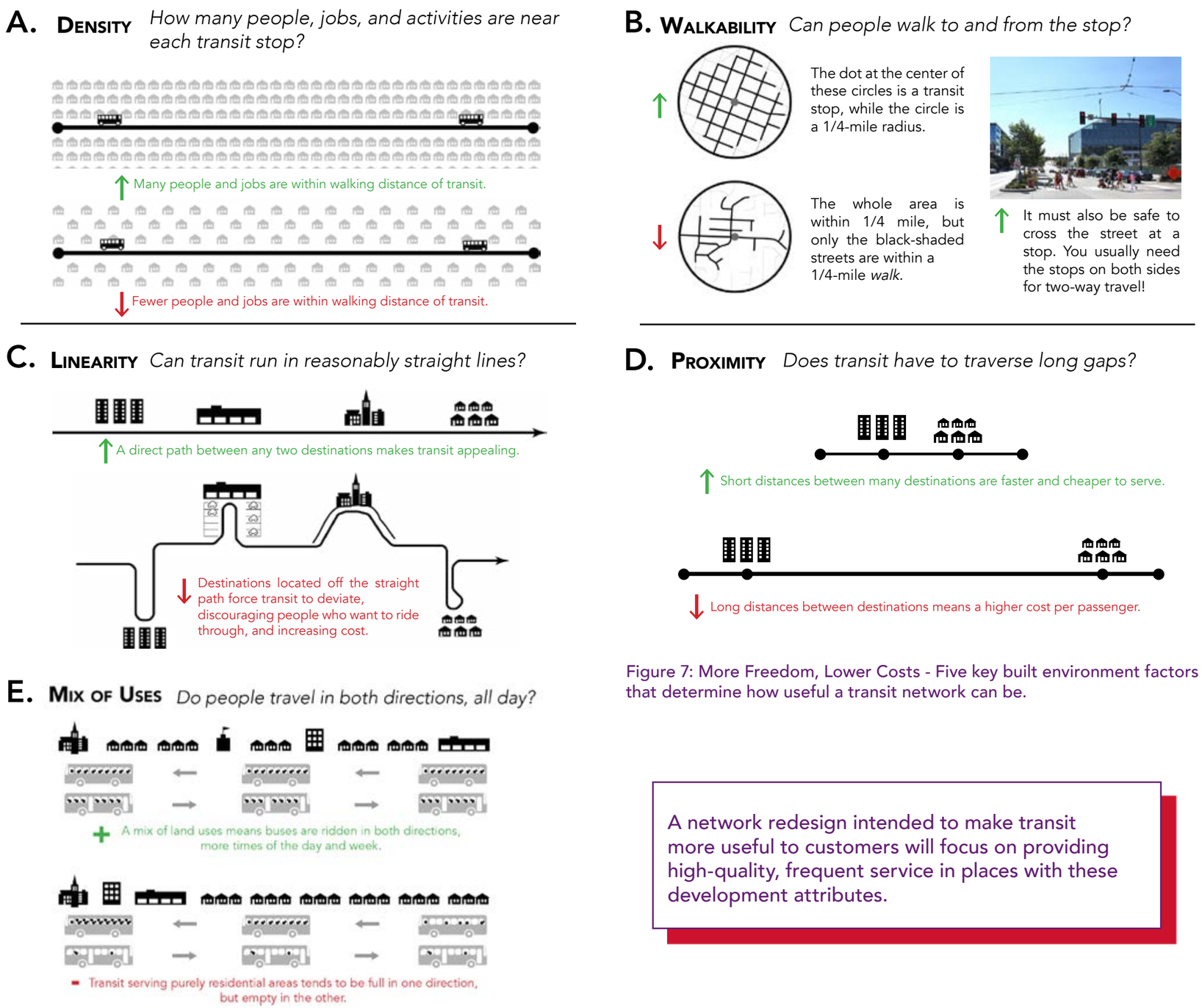


Figure 7: More Freedom, Lower Costs - Five key built environment factors that determine how useful a transit network can be.

A network redesign intended to make transit more useful to customers will focus on providing high-quality, frequent service in places with these development attributes.

Residential Density

The first element of the Ridership Recipe is density. **Figure 9** maps residential density (in terms of residents per square mile) throughout Summit County. The next page includes a zoomed-in view of this map focused on Akron and the core area of METRO's network.

Density determines how many people are near a given transit stop that someone could potentially choose to ride. Residential density measures the number of people at their home locations, where trips to work, to shop or access services often begin.

Summit County

Residential density in Summit County is focused in Akron (A) and the municipalities immediately around it, including Cuyahoga Falls (B), Fairlawn (C), Barberton (D) and Mogadore (E).

Apart from Akron and the inner ring of smaller cities, residential development is widespread throughout county, though typically at low densities or with gaps between subdivisions or neighborhoods. Some of the denser, more continuously developed areas outside of the Akron and the inner suburbs include:

- Throughout Stow, particularly in residential areas north of Highway 59 / Kent Rd (F).
- Portions of the communities of Macedonia (G) and Twinsburg (H) near the Cuyahoga county line.

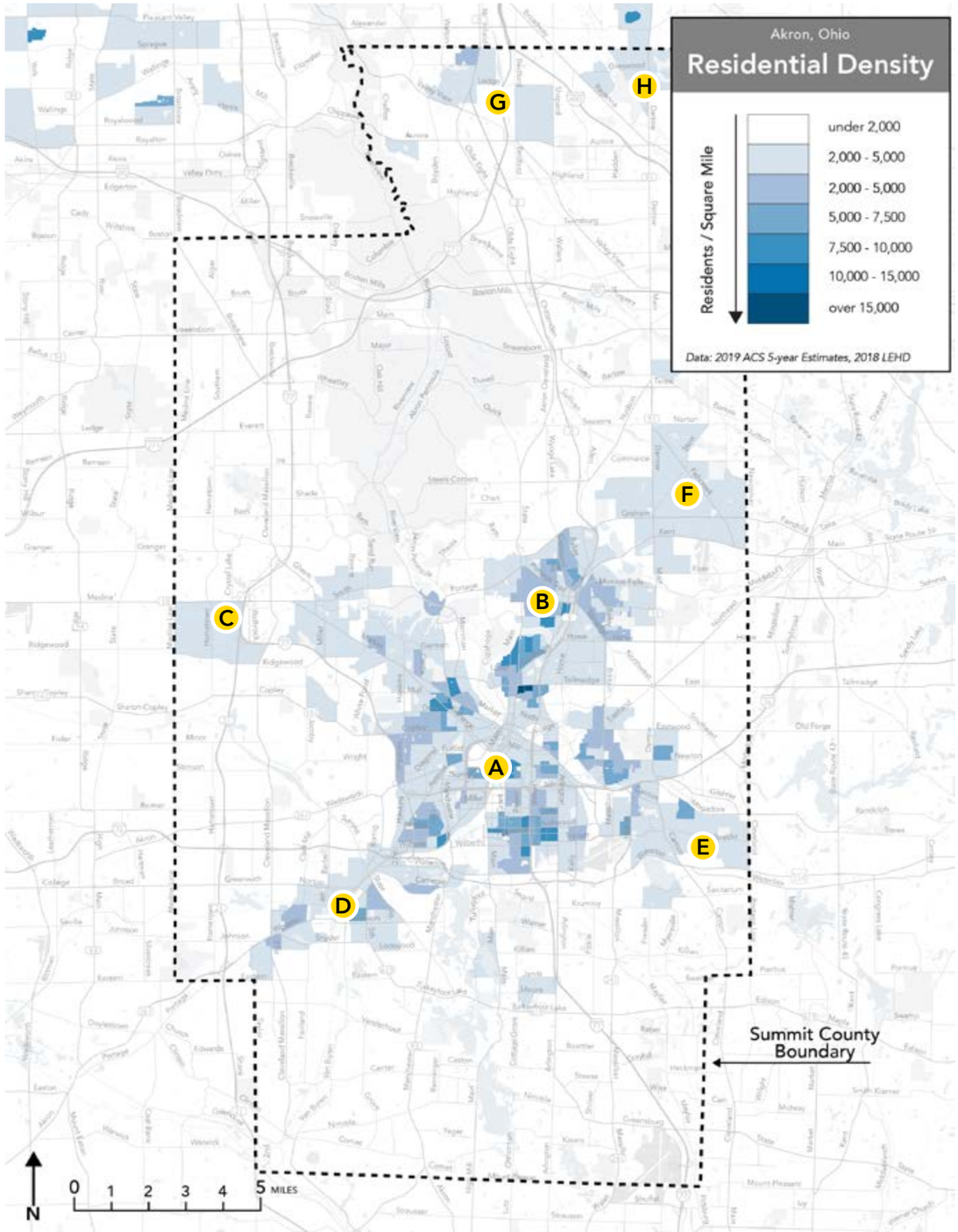


Figure 8: Residential Density - Summit County

Akron and Inner Suburbs

Most of METRO's network, and most of the high-density areas capable of supporting high-ridership transit, are located in Akron and the inner ring suburbs nearby.

In Akron, the areas of greatest residential density are found:

- In South Akron and Firestone Park A, particularly between Arlington and South Main St. This is the area currently served by routes 11, 13, 17 and 21.
- In the North Hill neighborhood B near the triangle formed by Tallmadge Ave, Cuyahoga Falls Ave, and North Main St.
- Near the University of Akron and University Park neighborhood C immediately to the south.
- Around Highland Square D on Akron's west side.
- Throughout the Kenmore neighborhood in the southwest of downtown E.

There are also a few notable areas outside of Akron itself where moderate-to-high residential densities are present. Some examples include:

- Throughout Cuyahoga Falls F. In Summit County, Cuyahoga Falls has the greatest extent of pre-World War II suburban fabric outside of Akron. This development pattern in characterized by mainly single-family residential land use with small lot sizes, a grid street pattern, and presence of sidewalk infrastructure. The Goodyear Heights neighborhood of Akron is another example of this type of transit-favorable development pattern G.
- The cluster of seniors apartments on the east side of Barberton southeast of Robinson Ave and 5th St H.
- Numerous pockets of residential density, typically the result of a single building or cluster of apartments located within an otherwise majority-single family neighborhood I, J, K.

All of the dense residential areas identified on this map are served by METRO routes today. These form the core residential component of the market for public transportation services in Summit County.

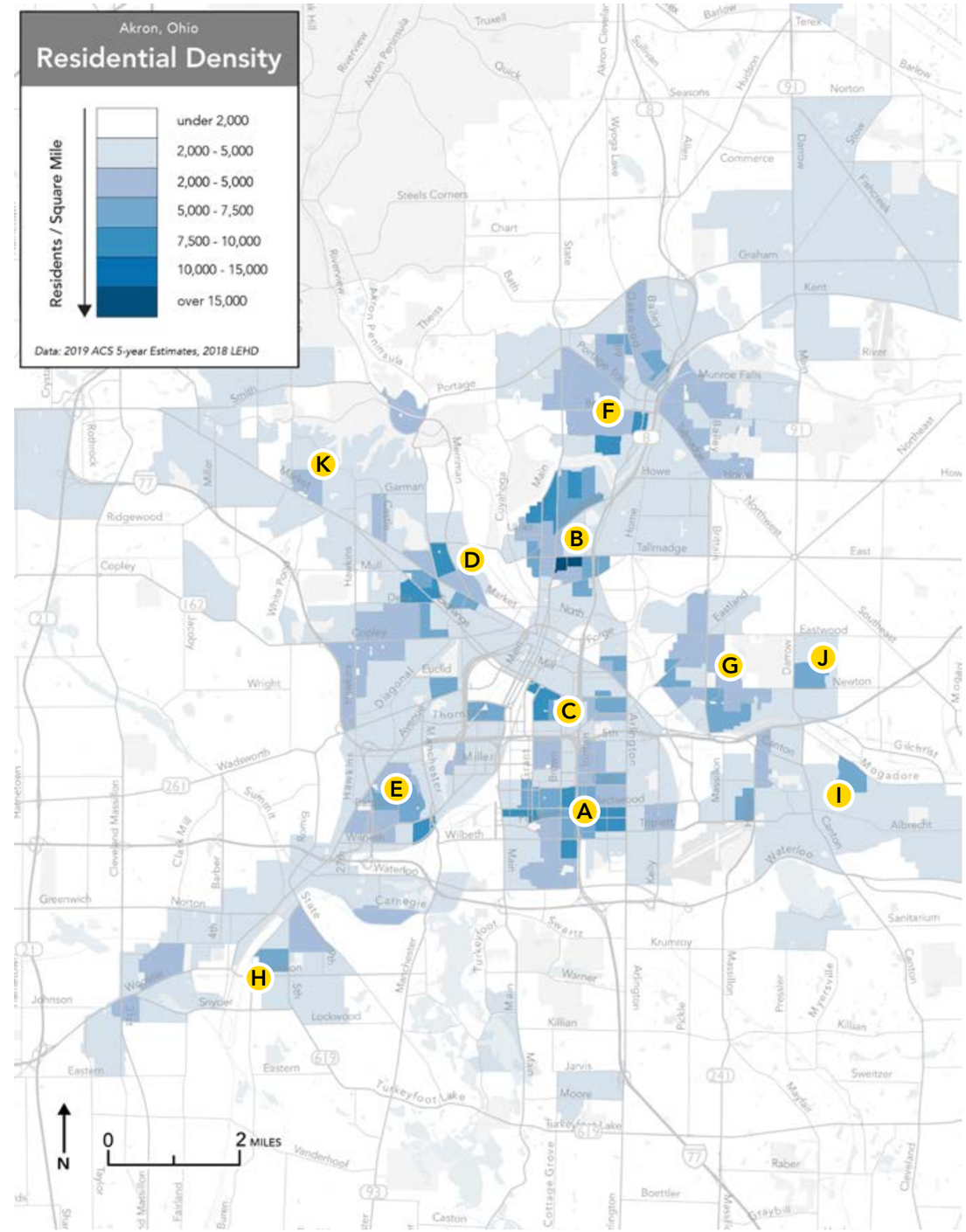


Figure 9: Residential Density

Employment Density

Job density can tell us not just about where people might be going to work, but also about important destinations people travel to: where they go for services, shopping, social life and other activities. Civic and service destinations like hospitals and universities also appear on job density maps due to their high number of employees. **Figure 10** maps job density throughout Summit County.

Summit County

Downtown Akron and the immediate surrounding vicinity A is Summit County's largest job center, and is home to several of the largest individual employers and most important institutions, including the University of Akron and two major hospitals: Akron General Hospital on the west side of Downtown, and Summa Health on the east side. A zoomed-in map on the next page focuses on the specific job centers in the core area around Akron.

There are several important job centers that are not located in Akron and the inner ring suburbs immediately surrounding it. These include:

- The MGM Northfield Park casino and entertainment venue B. This area is also home to a cluster of industrial businesses located immediately north of the casino in Cuyahoga County.
- Near Twinsburg, especially throughout the industrial area along Highland Rd C.
- The town center and shopping areas in Hudson along Highway 303 D.
- The industrial cluster along Terex Rd., including the JOANN Fabrics and Crafts headquarters and Little Tikes factory E.

Most of the employment areas noted here around among Summit County's job hubs, places the County has identified a high concentration of traded-sector jobs or employers, or favorable sites future development. Other job hubs outside of the core areas near Akron include:

- Along I-77 in the vicinity of Green and Akron-Canton Airport F.
- The freight and logistics center in Richfield near the I-77 / I-271 interchange G.

G

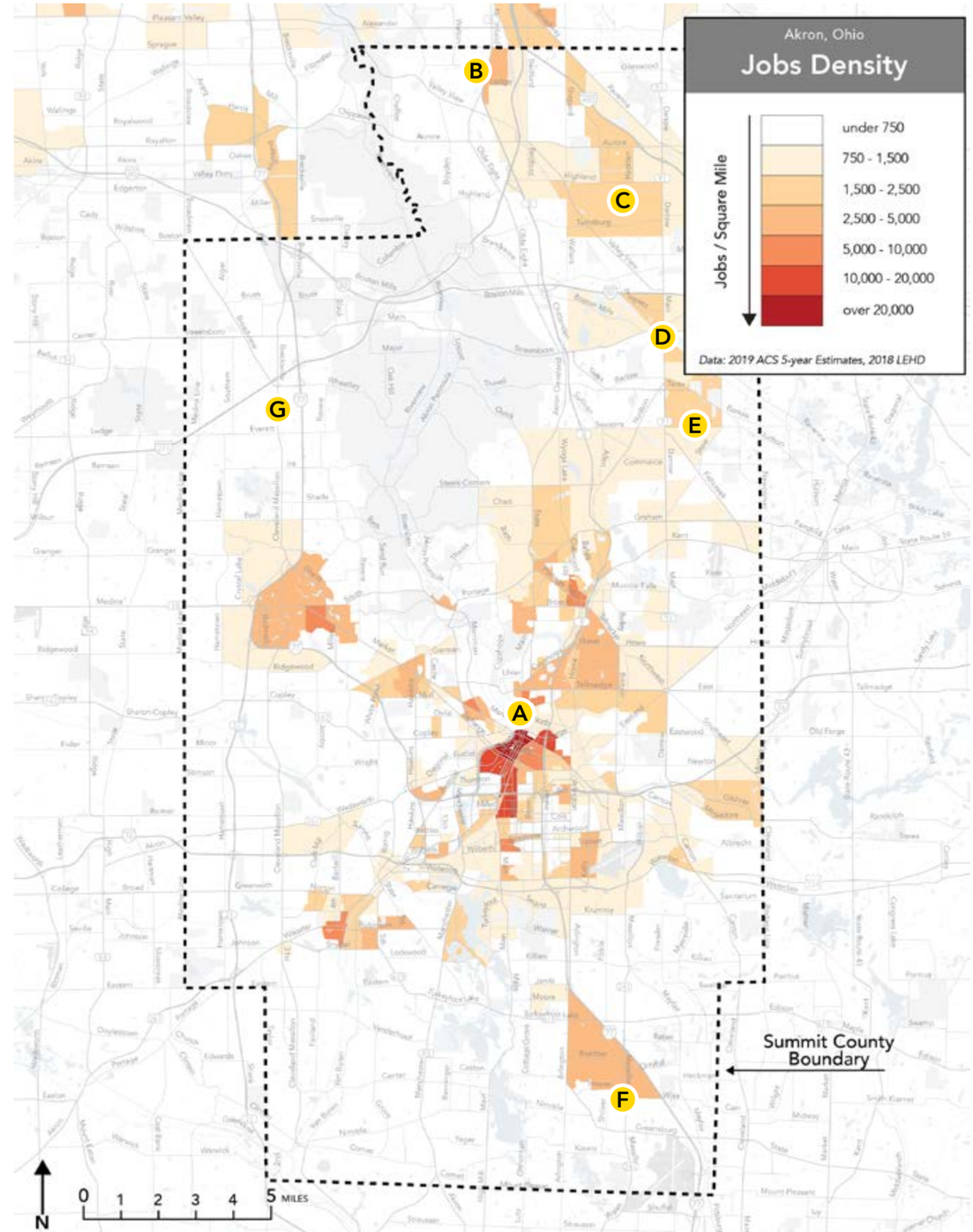


Figure 10: Employment Density - Summit County

Akron and Inner Suburbs

While Downtown Akron is the densest employment area, there are also many other large employment clusters visible on this map located outside of the core. These include:

- Northwest of downtown in Fairlawn and Montrose along West Market St A . This area is home to both a large shopping mall (Summit Mall) and numerous other auto-oriented shopping centers. While West Market is one of METRO's most productive transit corridors, there are several long gaps in employment activity B between the east end of the Fairlawn commercial node and downtown.
- In the southwest, the city of Barberton C is home to a large manufacturing facility (BWXT-NOG Barberton) as well as a surrounding commercial node immediately to the north spanning the historic main street (Tuscarawaras Ave) and more recent development. Barberton is one of Summit County's identified job hubs, and it is also worth noting that a new Amazon distribution center has recently been built north of Barberton along Romig Rd D .
- In the northeast, employment density is moderate throughout Chapel Hill and Cuyahoga Falls, with the most notable centers near the town center of Cuyahoga Falls, its historic main street E , as well as Chapel Hill Mall and nearby shopping centers F . This area is also home to many smaller commercial and industrial employers, located along Tallmadge Ave, Home Ave, Industrial Pkwy and Brittain Rd. This is another of the identified Summit County job hubs.
- North of Chapel Hill, numerous industrial businesses operate off of the State Rd corridor G . However, the urban form in this area is spotty, with large gaps between developed parcels and many buildings fronting roadways that lack pedestrian infrastructure.
- To the east, there is a substantial cluster of industrial and distribution activity H along Gilchrist Rd east of I-76. However, the urban form of this area is extremely challenging for transit due to the total lack of sidewalks or pedestrian crossings along Gilchrist.
- To the south, the triangle formed by Arlington Rd and I-77, particularly in the commercial area near its northern tip I .

The suburban and exurban job centers are important destinations for many people, but transit's ability to serve them depends on more than sheer quantity of workers or customers alone. To efficiently serve employment areas like these, transit must be able to reach them via direct paths that do not require traversing long gaps. Finally, the local pedestrian environment must be conducive to walking.

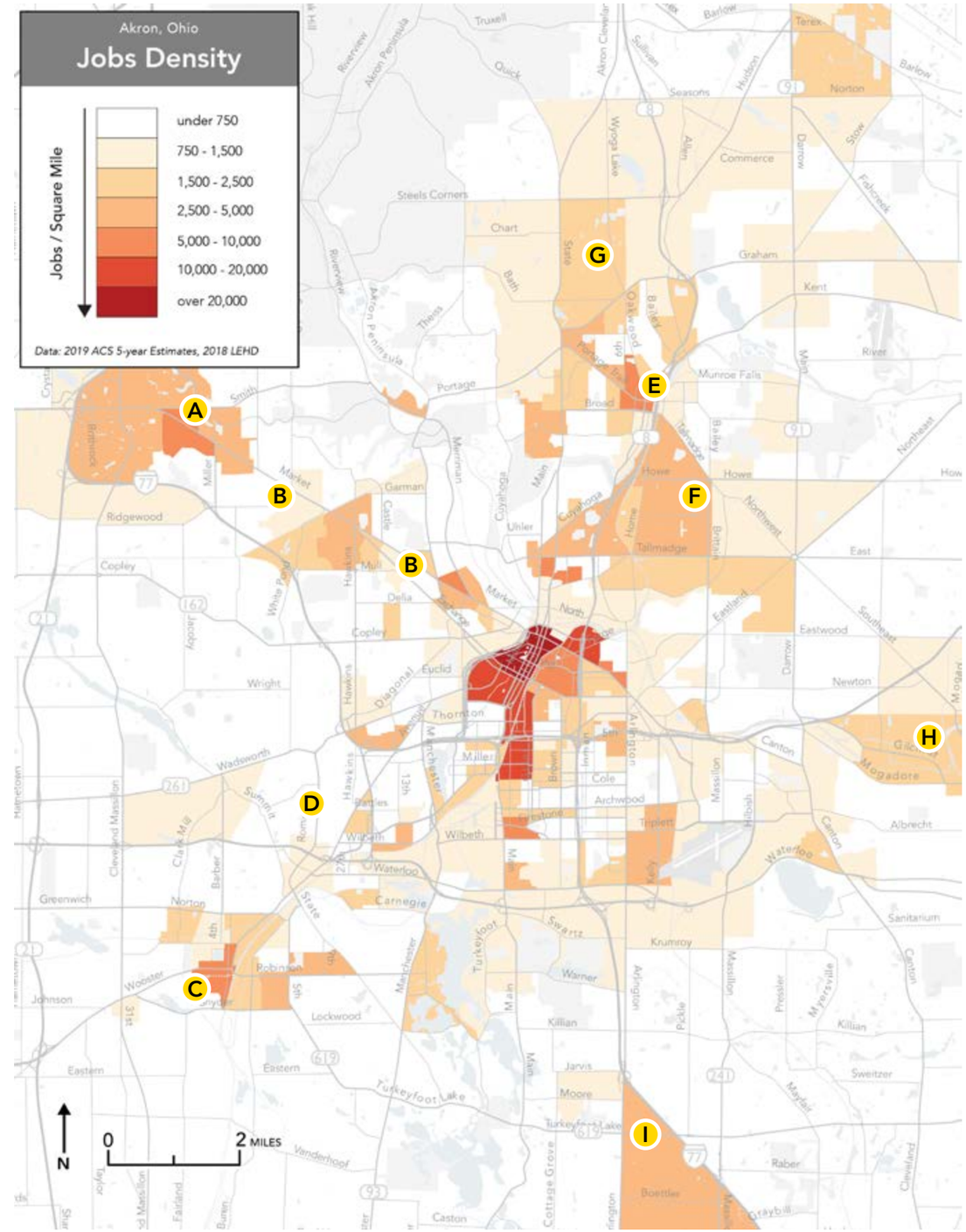


Figure 11: Employment Density

Activity Density

Figure 12 maps the combination of population and employment density using a three-color scale: residential density is shown in shades of blue, job density is shown in shades of yellow, and places where residents and jobs are both present are shown in shades of red. The darker the color, the greater the number of jobs or residents in the area.

This reveals not only high density, but also the mix of activities in an area, which contributes to ridership potential.

Transit lines serving purely residential neighborhoods tend to be predominately used in one direction each morning and evening rush hour. In contrast, on corridors where residential, commercial and other uses are mixed, people are traveling in both directions so buses can be full in both directions. Travel demand also goes beyond the weekday rush hours, and is high throughout the midday, evening and weekends, as people move in all directions for work, socializing, shopping and other activities.

Note that some busy places like malls and hospitals are underrepresented on these maps, because only the workers are counted, and not the many visitors. In addition, data from schools and universities counts only employees, not students, even though many students commute every day.

Density determines the total size of the potential market for transit. How many people are near a bus stop who could make the choice to ride?

Many of the dense residential and employment areas noted on the previous two maps stand out here, but this map also shows us areas of substantial mixture, where different types of demand are more likely to sustain an all-day travel market.

Some of these include:

- Through the southeast portion of Akron, dense residential and employment areas are in close proximity. One example A can be seen east of Arlington St and Waterloo Rd, an area home to a large multifamily residential development, small scale commercial activity along Arlington, and a number of light industrial businesses.
- Each of Chapel Hill, Fairlawn and Barberton display relatively dense and mixed use development. The block groups that stand out of this map are generally places where multifamily buildings are in close proximity to a commercial area. This is visible in both the "historic town center" development pattern of Cuyahoga Falls B and the more auto-oriented form of Fairlawn, where apartment buildings are located on the residential streets immediately behind businesses fronting Market St C.

On the other hand, many important areas of residential and employment density are not mixed-use places. That means that travel demand in these places is less likely to be balanced throughout the day, and more likely to be driven primarily by journeys to home or to an employment center. This is case in many of the more outlying employment areas, such as Northfield D, Gilchrist Rd E, and around Twinsburg F and Hudson G.

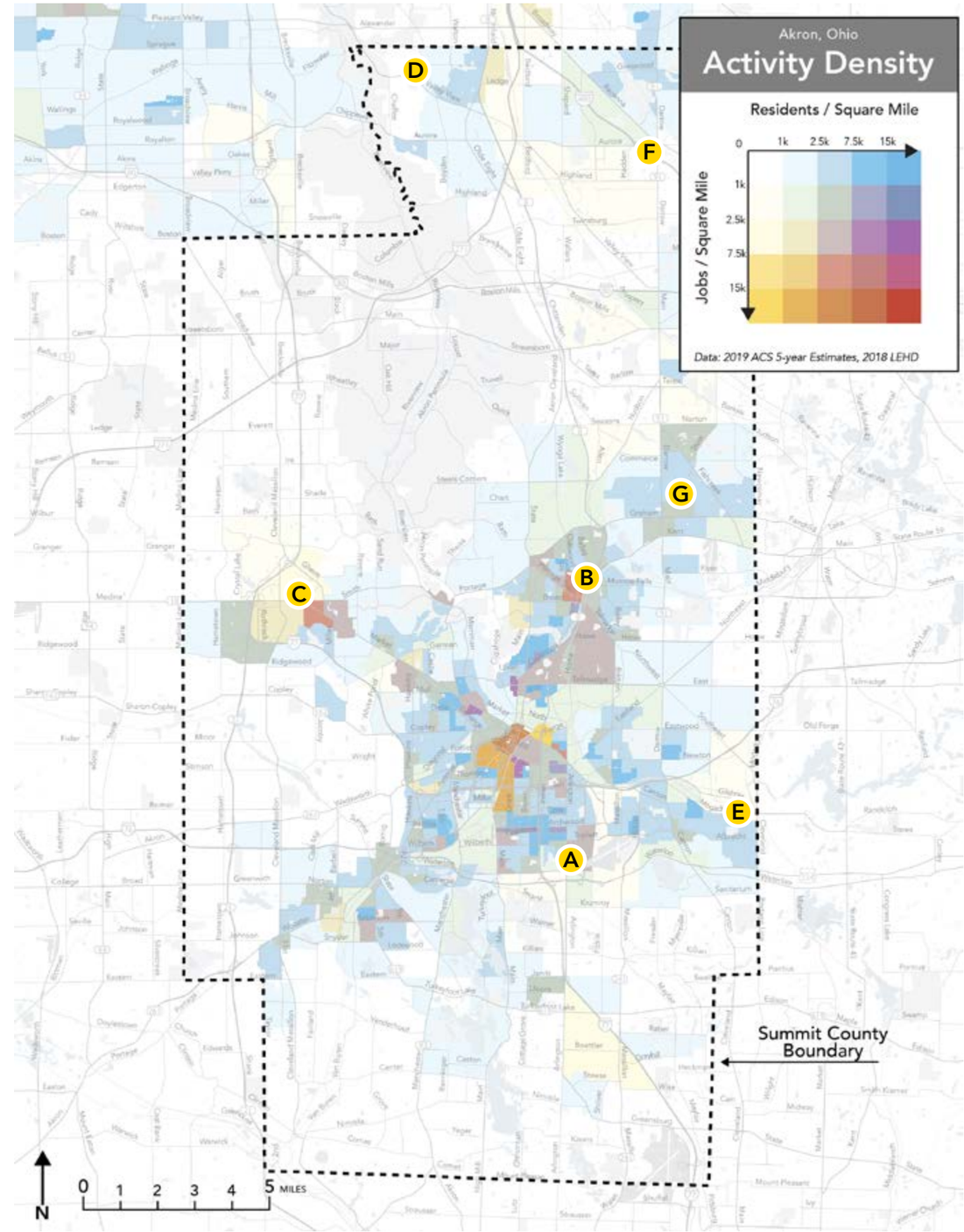


Figure 12: Activity Density - Summit County

Residents by Race & Ethnicity

Information about ethnicity or race do not alone tell us how likely someone is to use transit. However, **avoiding placing disproportionate burdens on minority people, through transportation decisions, is essential to the transit planning process.**

Figure 13 below reports the racial demographics of Summit County's population. In METRO's service area, about 21.7% of the population identified as a race other than white, per the 2019 American Community Survey. About 2.1% of the population identified as Hispanic or Latino. The largest two racial groups were Black or African America residents, who account for 16.4% of the population, and Asian residents who account for 4% of the population.

The map in **Figure 14** shows where people of different races and ethnicities live in Akron and the surrounding areas where most of METRO's network is located. Each dot represents 25 residents. Where many dots are very close together, the overall density of residents is higher. Where dots of a single color predominate, people of a particular race or ethnicity make up most of that area's residents.

The places that **Figure 14** shows as home to many people of a given race or ethnicity are places where changes to the transit network are likely to impact many people within that group.

In Summit County, Black residents (shown as green dots in **Figure 14)** tend to live in higher-density neighborhoods closer to Downtown Akron, particularly on the south and west sides of the city. There are also clusters of Black residents in other areas, including south of Akron in Barberton (A), as well as in the North Hill (B), and Goodyear Heights (C) neighborhoods.

Asian residents make up the second largest nonwhite community in Summit County. Asian residents' distribution is focused in the Bhutanese community around the North Hill neighborhood (B), as well as in Cuyahoga Falls (D), and in East Akron (E).

Race	Population	% of Total Population
White	440,250	81.3%
Black or African American	88,999	16.4%
American Indian and Alaska Native	3,746	0.7%
Asian	21,762	4.0%
Native Hawaiian and Other Pacific Islander	306	0.1%
Some other race	2,917	0.5%
Total Population	**541,334**	**100%**

Figure 13: Summit County Population by Race & Ethnicity

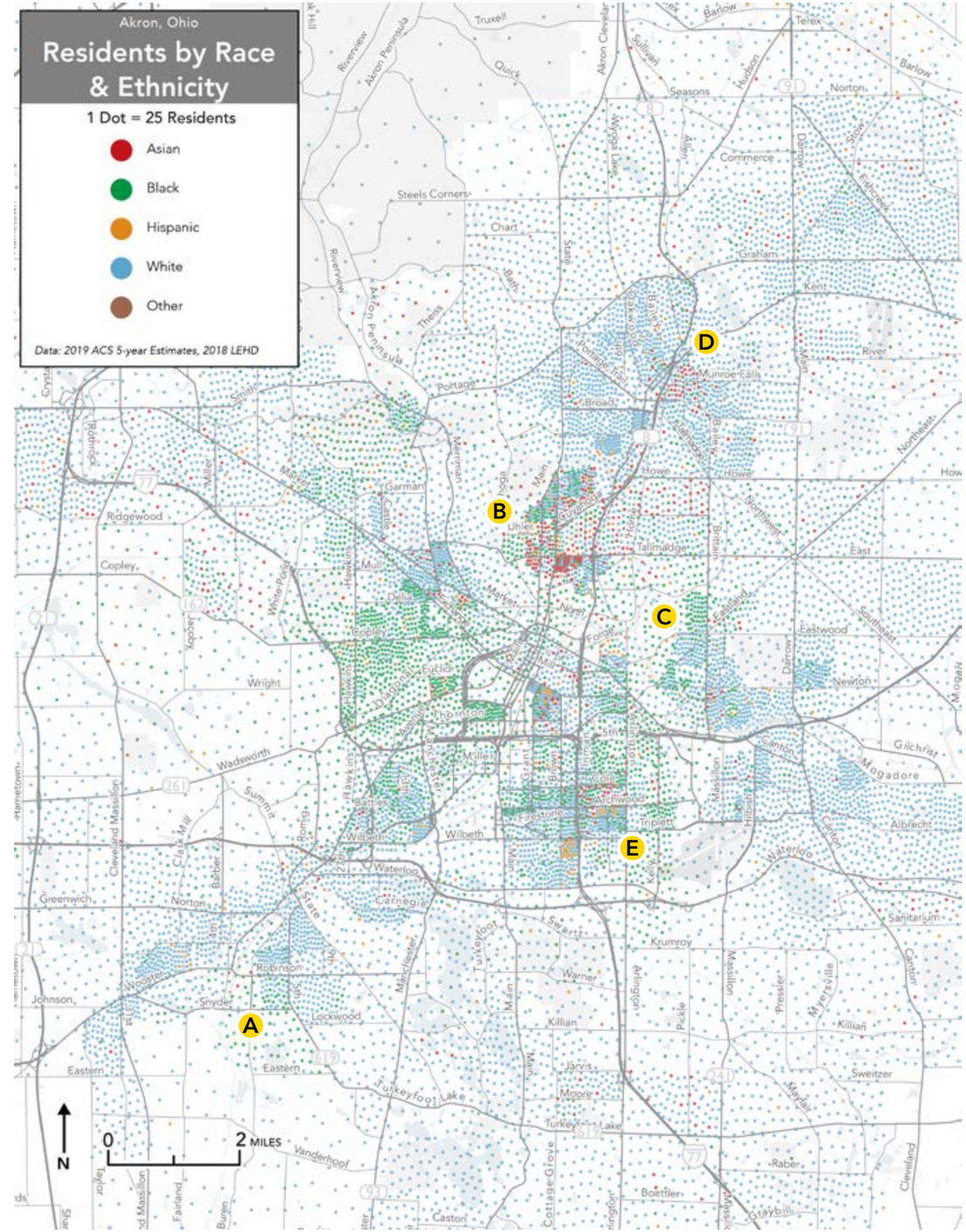


Figure 14: Residents by Race & Ethnicity

Walk Network Connectivity

Walkability is the second ingredient in the Ridership Recipe because it governs whether the people nearby can actually reach the transit stop.

Street connectivity is fundamental to walkability – it governs whether a walking trip is possible at all, and how long it is.

The map in **Figure 16** illustrates how connective the street network is, as a proxy for walkability. Only the street network is considered, so areas lacking in sidewalks, lighting, or safe crossings are generally less walkable than they appear on this map. **Figure 15** provides a simple explanation of how this is measured.

In historic neighborhoods that were laid out before the private car was dominant, nearly all transportation was originally done on foot, by bicycle or by transit. A walkable and well-connected street network was therefore of existential importance to the usefulness and value of land, and so neighborhoods built in those times have very high street connectivity.

From this map, we can see clearly how the connectivity of the walk network varies across METRO's service area. In general, places that were developed along grid street patterns, mainly prior to World War II, display excellent connectivity. These are places where the street network makes walking between transit stops and destinations easier (although the actual quality of pedestrian infrastructure varies). Western A and Southeast Akron B are good examples of this, as well Cuyahoga Falls C.

Walk connectivity is lower in places where there are substantial barriers to walking (as in Barberton D, where the historic street grid is enclosed by large, impassable industrial parcels), and places where later development has been planned in a highly circuitous manner. The Portage Lakes area E is a good example of this, where the already-complex nature of the geography is coupled with a discontinuous, circuitous street layout.

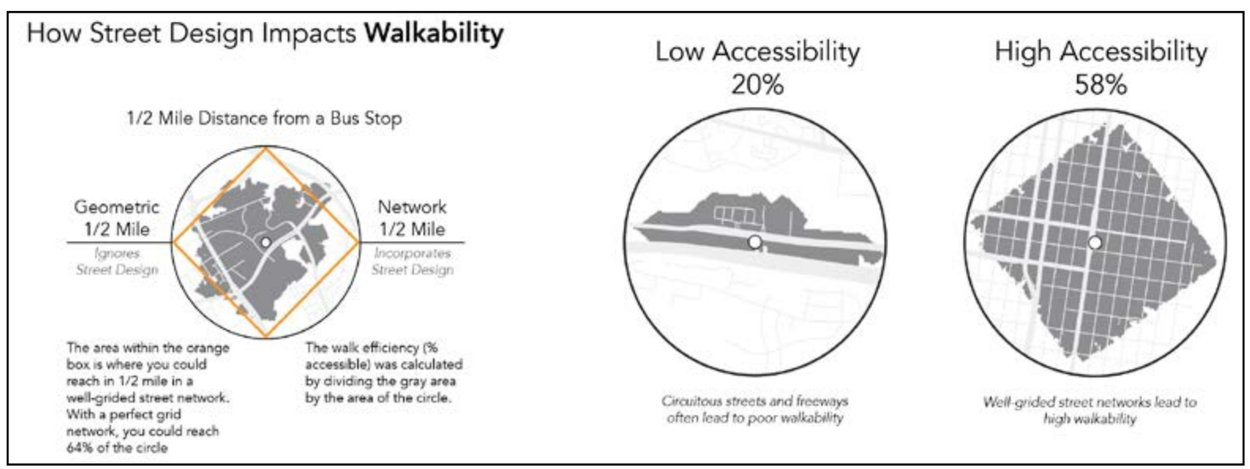


Figure 15: How Street Design Impacts Walkability

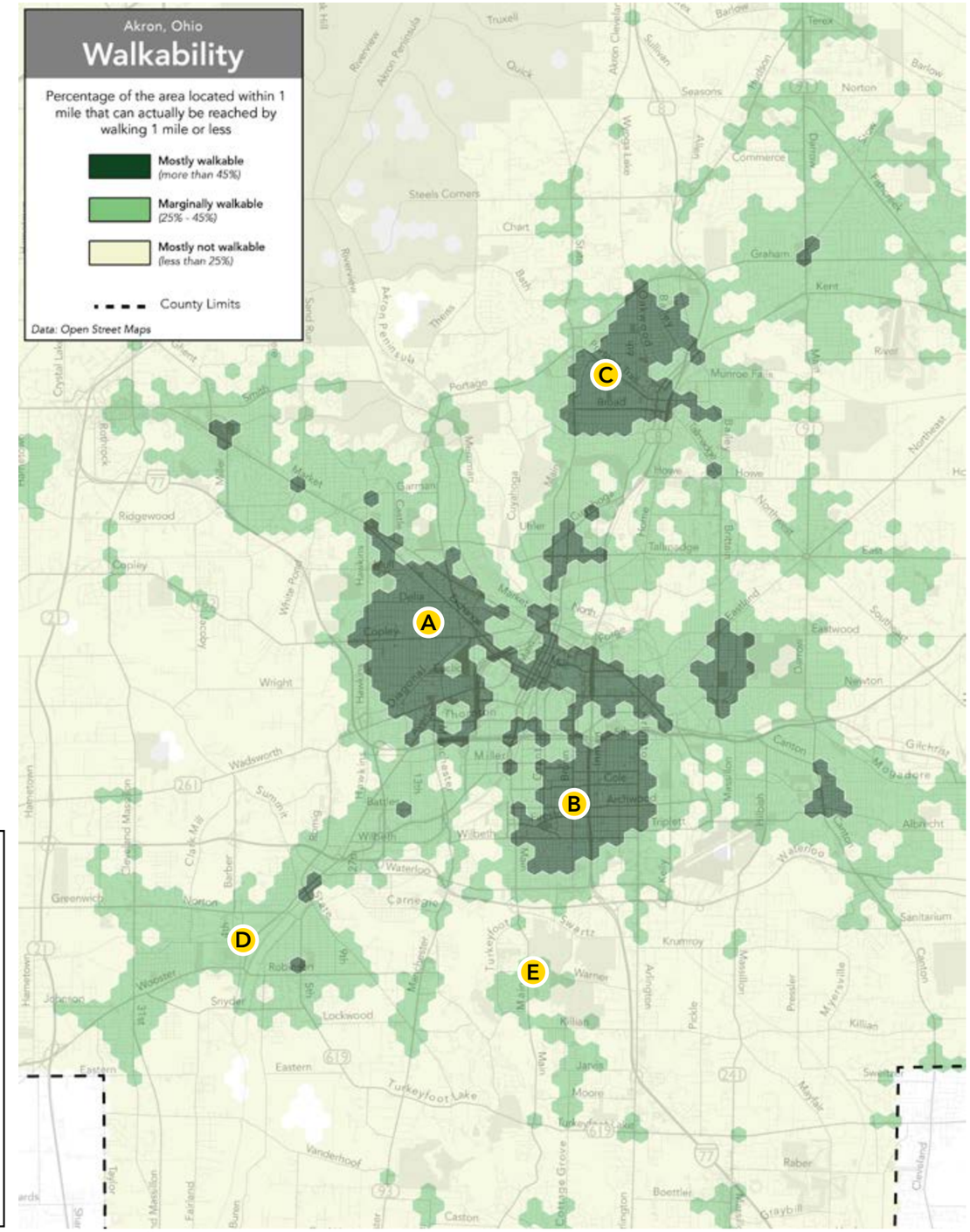


Figure 16: Walk Network Connectivity

Pedestrian Environment and Walkability

Walkability is about more than street connectivity alone. Street connectivity is a baseline prerequisite of urban environments that enable walking, but the question of whether someone is likely to choose to walk, to transit or somewhere else, depends on many other factors such as the availability of sidewalks and safe crossing points, the speed and quantity of auto traffic, the distances between major destinations, and their own sense of personal safety in a particular area.

> Walking access to transit is about more than just street connectivity. Even when streets connect, pedestrian infrastructure must be in place to create a safe environment that many people are likely to choose to walk in.

The purpose of this report is not to conduct a comprehensive walkability audit of METRO's service area, but the network redesign process must pay careful attention to the quality of the pedestrian environment when considering different service options.

For example, in the discussion of employment density, we identified the industrial and distribution employment area east of Akron along Gilchrist Rd, currently served by Route 5. This area is home to a number of large and small industrial employers including a large Rubbermaid factory.

Ordinarily, an employment center located just outside the a city can serve as an anchor point for a highly productive transit route - this is essentially the principle of routes like Route 1 or Route 10, that both end near major commercial nodes. Unfortunately, Gilchrist is a good example of how the pedestrian environment can present serious challenges for transit. Gilchrist is a four-lane roadway with a 35-mph speed limit. Through the entirety of the industrial zone, there are no sidewalks, and no traffic lights or marked crossings. **Figure 17** shows an aerial near the Rubbermaid plant off Gilchrist Rd.

A counterexample of a similar development pattern that is much more amenable to transit is shown in **Figure 18.** This example focuses on the industrial area of northeast Akron located near the intersection of Home Ave and Tallmadge Ave.

In this area, a number of small industrial employers are located along Industrial Pkwy and Moe Dr. This area is acccessible via routes 12 and 34. Unlike the Gilchrist Rd example, Industrial Pkwy has sidewalks, and for people arriving via Route 12, there is a signalized intersection with a marked pedestrian crossing at Tallmadge and Industrial **A**. However, for people arriving via Route 34, access this area requires crossing the unsignalized intersection of Moe and Home **B**, and then walking down Moe Dr, which lacks sidewalks and carries heavy truck traffic serving the industrial businesses nearby.

Figure 17: Route 5 serves the industrial district along Gilchrist Rd. While this area is rich in jobs, and the buildings are situated close to the roadway, the lack of sidewalks or safe crossings present a serious challenge for transit.

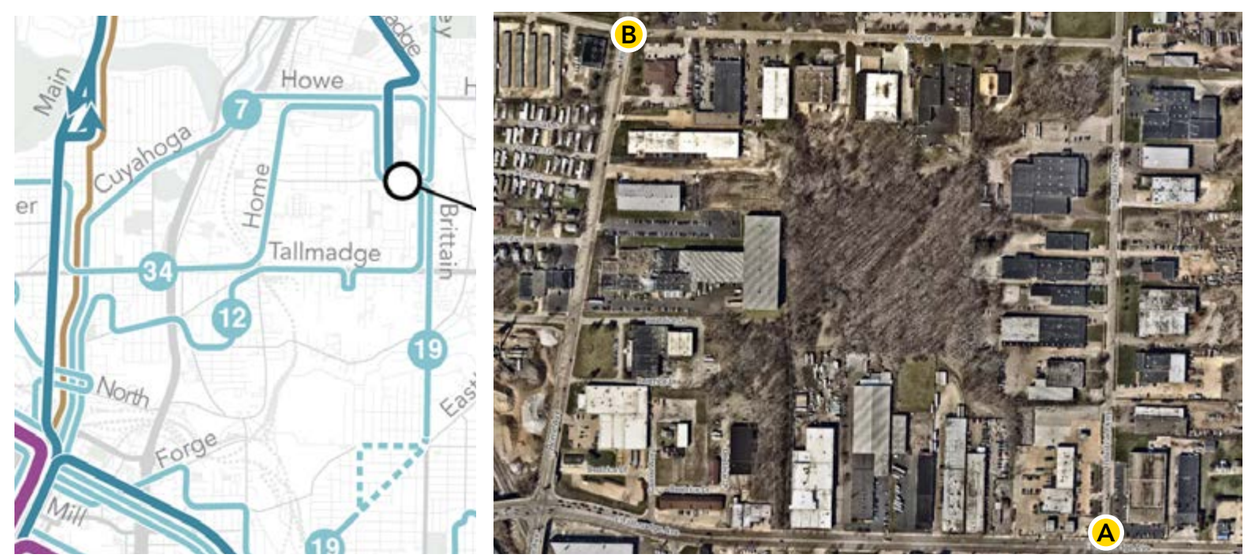


Figure 18: Routes 12 and 34 serve Home Ave and Tallmadge Ave near the cluster of small industrial business along Industrial Pwky and Moe Ave. This similar development pattern is much more amenable to transit due to the presence of sidewalks and a safe crossing at Tallmadge and Industrial.

3 The Fixed Route Network

The Existing Fixed Route Network

METRO's Existing Network is shown in **Figure 19**. This map shows each route color-coded by how frequently it runs in the middle of the day on weekdays.

Frequency is a critical factor in understanding how a transit network works, because frequency determines waiting time, and waiting time is a key element of overall travel time. Routes that require longer waits are less likely to be useful to many people, because accessing them requires accepting either a long wait, or careful planning to make sure you arrive at the stop at the right time.

In this map and all frequency maps in this report:

- **Red** lines come every 15 minutes or better. Currently, METRO operates no routes that meet this standard, although before the Covid-19 pandemic, the DASH downtown circulator ran every 10 minutes.
- **Purple** lines run every 16-29 minutes. Currently, routes 1 and 2 operate every 20 minutes.
- **Dark blue** lines run every 30-45 minutes. All lines shown in this color on this map run every 30 minutes, but other maps of the network prior to the pandemic included in this chapter show routes that operated at headways like 40, 42 or 45 minutes.
- **Light blue** lines run every 46 minutes or less frequently.
- **Brown** lines offer service only during the rush hours or at limited times during the day.

METRO's current fixed route services break down into three main geographic units.

- Local services in Akron and the immediate vicinity generally run every hour or more frequently.
- Town Center routes (100-series routes like 101, 103 and 110) provide rush-hour service from Akron's suburbs into downtown.
- The North Coast Commuter (NCX) services (60, 61) provide direct service to Cleveland the University Circle from downtown Akron. The x60 is currently suspended due to the pandemic.

Prior to the pandemic, METRO also operated several circulators, providing local access in suburban areas like Stow, Tallmadge, Cuyahoga Falls and Montrose. With these routes out of service, all METRO routes currently terminate at the Robert K. Pfaff (RKP) Transit Center in Downtown Akron.

Frequency is one of the most important factors determining transit's usefulness, because frequency controls how long a rider will have to wait for the next bus.

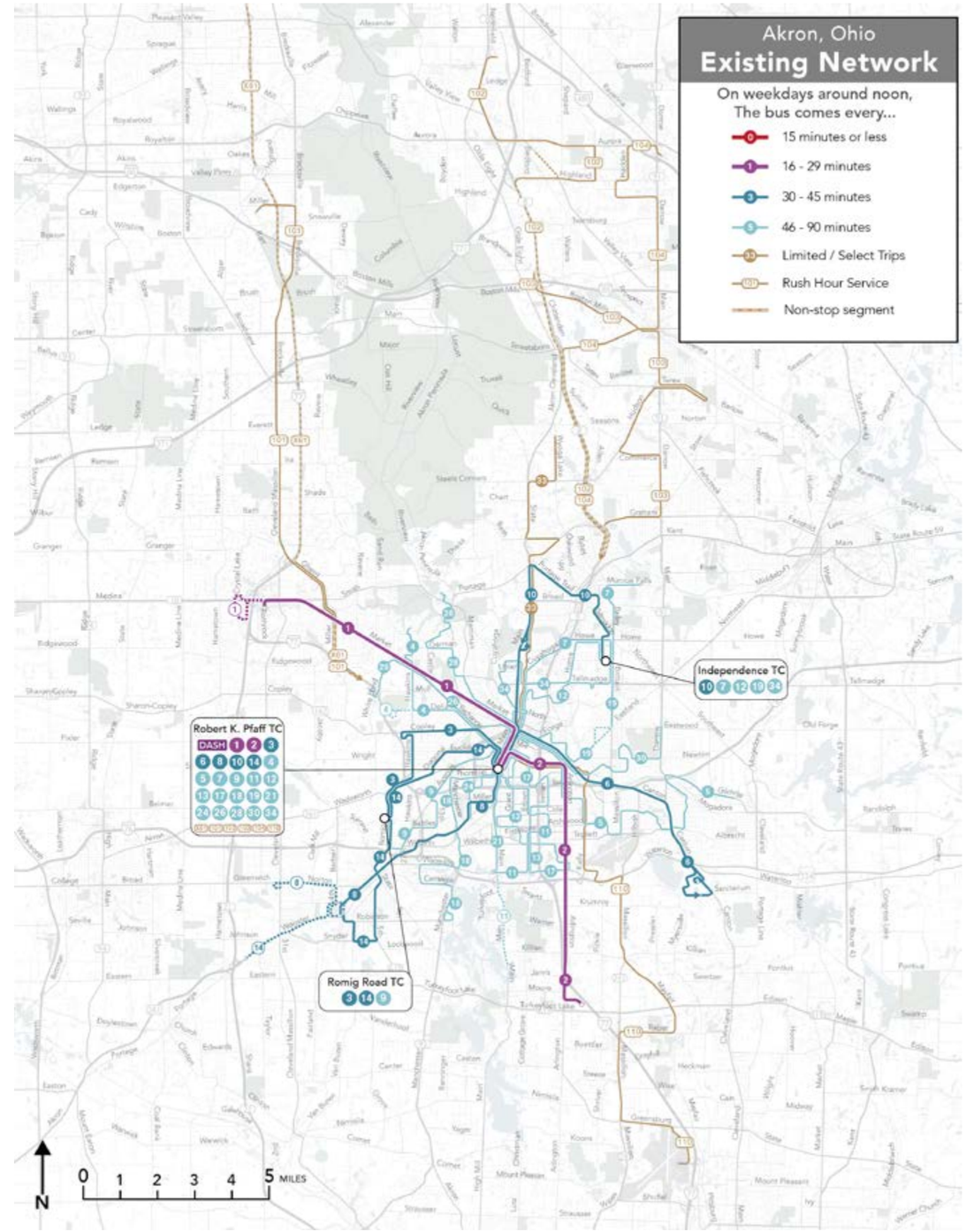


Figure 19: Akron METRO Existing Network (County Overview Map)

The Network in Akron

The majority of METRO's bus routes and ridership are located in the city of Akron. **Figure 20** shows a detailed view of the network in this area. Because Akron is where most of METRO's service is, most of the people who will be impacted by the network redesign are located there.

Radial Network Structure

Today, METRO operates a network in Akron where most routes come only every 30 or 60 minutes. 20-minute service is available on Market (1) and Arlington (2), two of METRO's busiest corridors. Routes run every 30 minutes on Howard/Main (10), Copley (3), Euclid/Romig (14), Kenmore (8) and East Market / Canton (6). This radial structure ensures that a selection of 20 or 30 minute routes make travel in and out of downtown possible from all directions throughout the city along the major commercial, while lower-frequency services are close at hand in residential areas.

Low Frequency

Many areas have access to only hourly service. For instance, South Akron and Firestone Park **A** are served by four hourly routes (11, 13, 17 and 21). This area spans about 2 miles east to west, and more frequent service is available only at the margins. Other areas served mainly at low frequency include northeast Akron **B**, and on the west side of the city in Sherbondy Hill **C** and the areas south of Market St **D**.

As **Figure 21** shows, today, most people that METRO serves have access to only low-frequency service. While 74% of the Summit County population live further than a 1/4-mile walk from transit, of the 26% who do live near a transit stop, over half are near only hourly service. Only 3% of the County's population, or 12% of people served, are near METRO's most frequent lines (1 and 2).

Limited Services

There are also a number of services shown in dashed or brown lines on this map, which are not consistently available throughout the day. These include extensions of all-day routes like Route 14's segment west of Barberton **E**, as well as routes available only during rush hour like routes 101 and 110 **F** that provide express service to downtown Akron from suburban communities. Finally, this map also shows Line X61 **G**, a North Coast Express route designed to carry commuters from Akron to Cleveland.

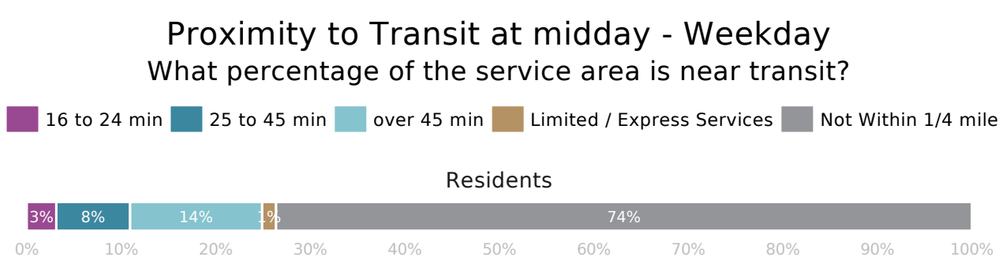


Figure 21: Proximity to Transit (within a 1/4-mile walk)

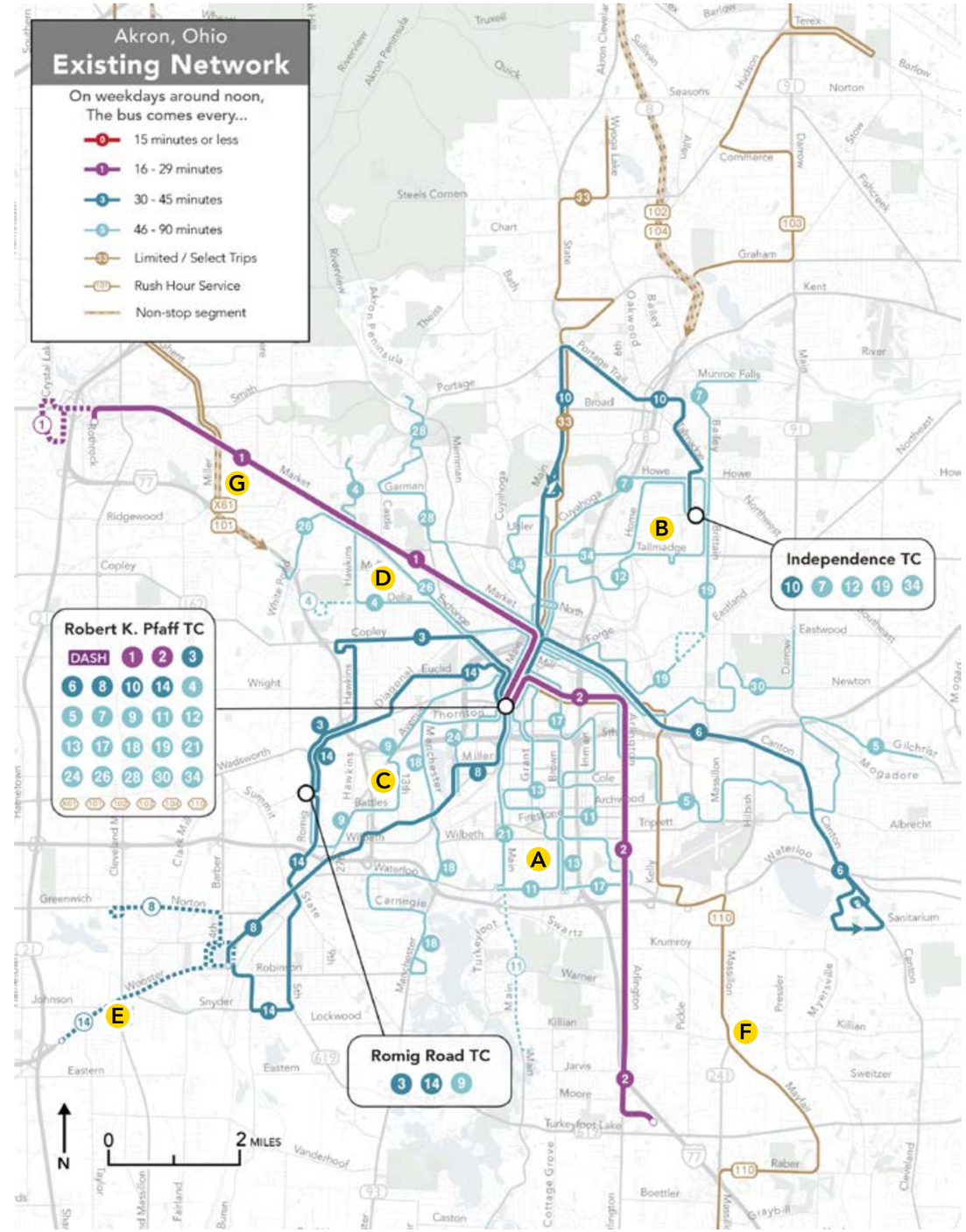


Figure 20: Akron METRO Existing Network (Akron Detail Map)

Route Productivity

Productivity is a measure of how efficient a transit system is at attracting ridership. It is usually expressed as boardings per hour of service: the number of people who get on a bus for every hour that bus is out on the road, service a transit route.

Productivity is a common evaluation measure that is part of many agencies' service standards, but should be understood in terms of the goal it is measuring. High productivity is an indication that a transit route is generating ridership efficiently. When ridership is the explicit goal of service, productivity is a good way of gauging how effectively that goal is being met.

When ridership is not the goal (for instance, in the case of a low-frequency route serving a low-density area where few people are likely to ride compared to busier places), low productivity is to be expected. In such cases, low productivity is not a sign of failure; instead, it is a signal that the route in question has been designed to for a different purpose, typically providing coverage in places with low ridership potential.

When transit agencies invest in high-frequency service on their busiest corridors, frequency and productivity are typically highly correlated. Measured at the line level, METRO's routes display a different relationship between frequency and productivity. **Figure 23** shows productivity on each of METRO's routes in early 2021, in the midst of the pandemic when both ridership and the level of service are low.

The most productive routes during this period were 60-minute services - routes 9, 13, and 18 A. Each of these infrequent services with the exception of Route 4 serve markets that are distinct from nearby more frequent services.

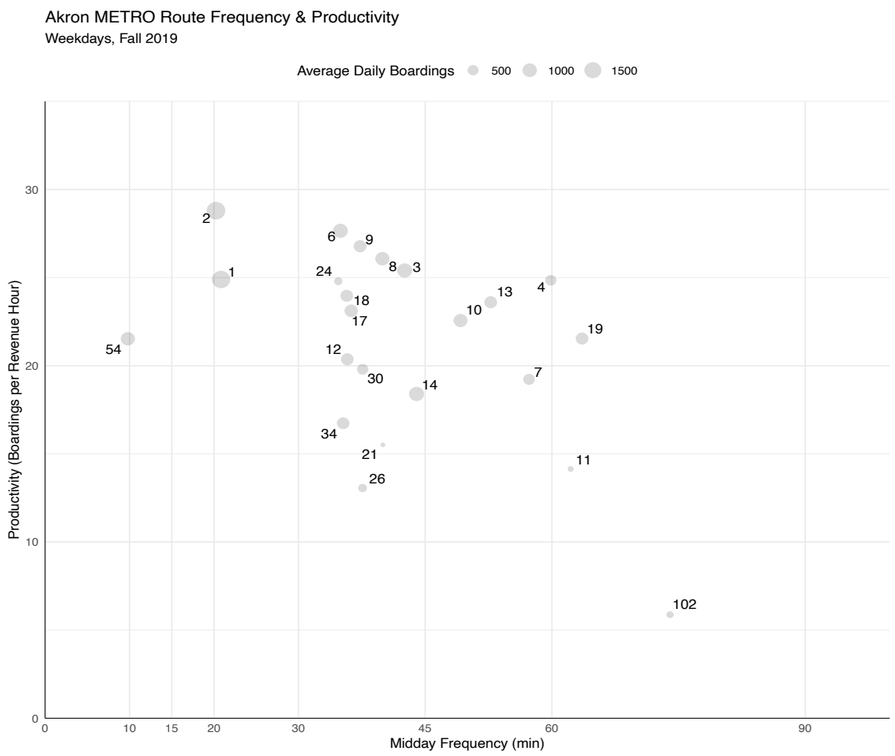


Figure 22: Route Frequency & Productivity (Fall 2019)

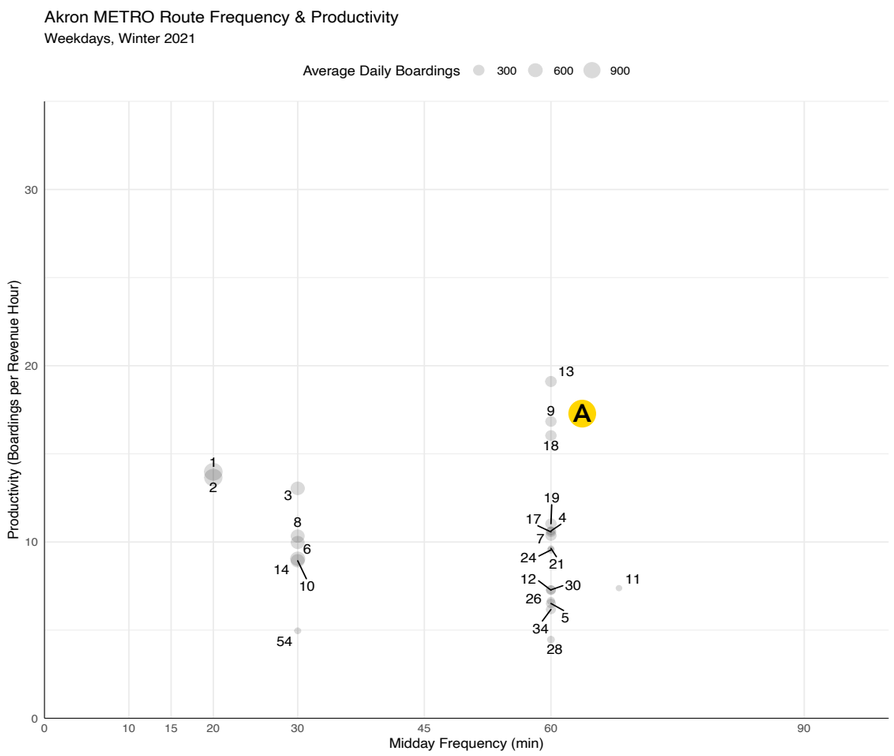


Figure 23: Route Frequency & Productivity (Winter 2021)

High productivity at very low frequency is often a sign of strong ridership potential in a route's local market, because despite the long wait to use service, many people are choosing to do so.

This pattern is not solely a function of the circumstances of the pandemic. **Figure 22** shows the same data from before the pandemic. Because METRO has made substantial changes to many routes' frequencies since 2019, the comparison is not exact, but a group of low-frequency, high-productivity routes is still visible, including many of the same services that are generating high ridership per unit cost today. While METRO's most productive route prior to the pandemic was Route 2 -Arlington, routes 3, 4, 6, 8 9, 17 and 18 all registered ~25 boardings per revenue hour or higher in Fall 2019, extremely productive for service running less than every 30 minutes.

Before and during the COVID-19 pandemic, many of METRO's most productive routes came only every 30 or 60 minutes. High productivity despite service that requires a long wait to use may be a sign of unmet transit demand in some markets.

Timed Transfer

One of the main organizing principles of METRO's network is a timed transfer at the RKP Transit Center in downtown Akron.

A timed transfer (or "pulse") is a scheduling practice where multiple routes arrive at the same place at the same time, facilitating an easy connection between them that reduces waiting time for riders. **Figure 24** illustrates how a timed transfer works.

Without a timed transfer, making a connection between two 60-minute routes could require a wait of 2 minutes, 20 minutes, 30 minutes, or 59 minutes. With a timed transfer, routes are designed to be in the same place, at the same time allowing for consistent short waits.

A person arriving on a route like 12-Tallmadge Hill from Akron's south side can make a transfer to another route like 3-Copley/Hawkins, and expect to spend just about 5 minutes waiting to make the transfer. Without timing, this connection would require an average of 15 minutes of waiting time, but would be unpredictable because neither route would arrive at the connection point at the same time.

Figure 25 shows the network in Downtown Akron. All routes converge at RKP Transit Center, via two main patterns.

- Routes arriving from the west via Market, the Cedar / Exchange couplet and Howard using Main in both directions, and loop in and out of the Transit Center via Rose Parks Dr and Bartes.
- Routes from the south, east and northeast use the High / Broadway couplet to pass through downtown.

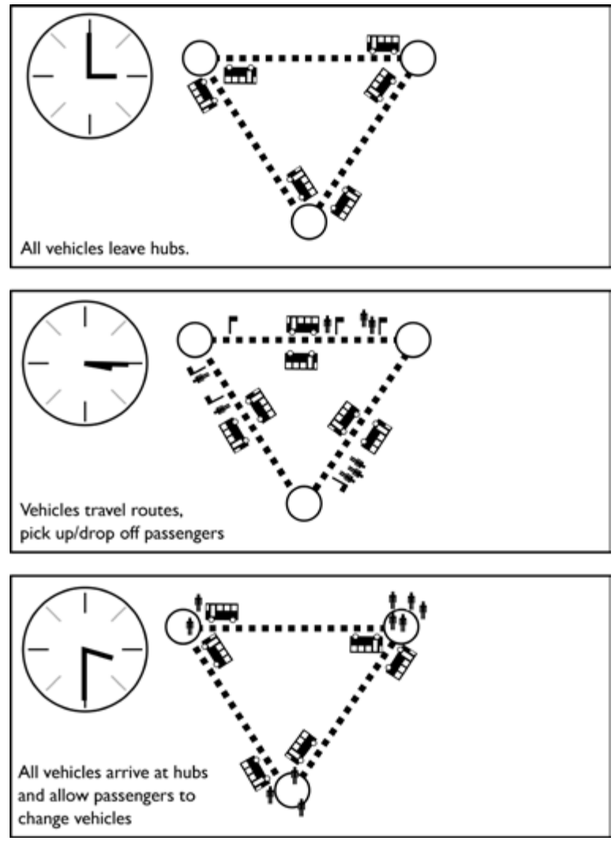


Figure 24: How does a timed transfer work?

The timed transfer has substantial benefits for the usefulness of METRO services for cross-town travel. However, it comes with a few key tradeoffs:

- The integrity of the hourly timed transfer depends on clock-face headways (20,30 or 60 minutes). Establishing clock-face headways required reducing frequency on some routes.
- Bringing every route to the same place in the network creates a lot of overlap and duplication among routes in Downtown Akron. The time spent driving to and from RKP Transit Center has a real cost in terms of revenue time; these are resources that must be spent in order to realize the travel time benefits of the pulse.

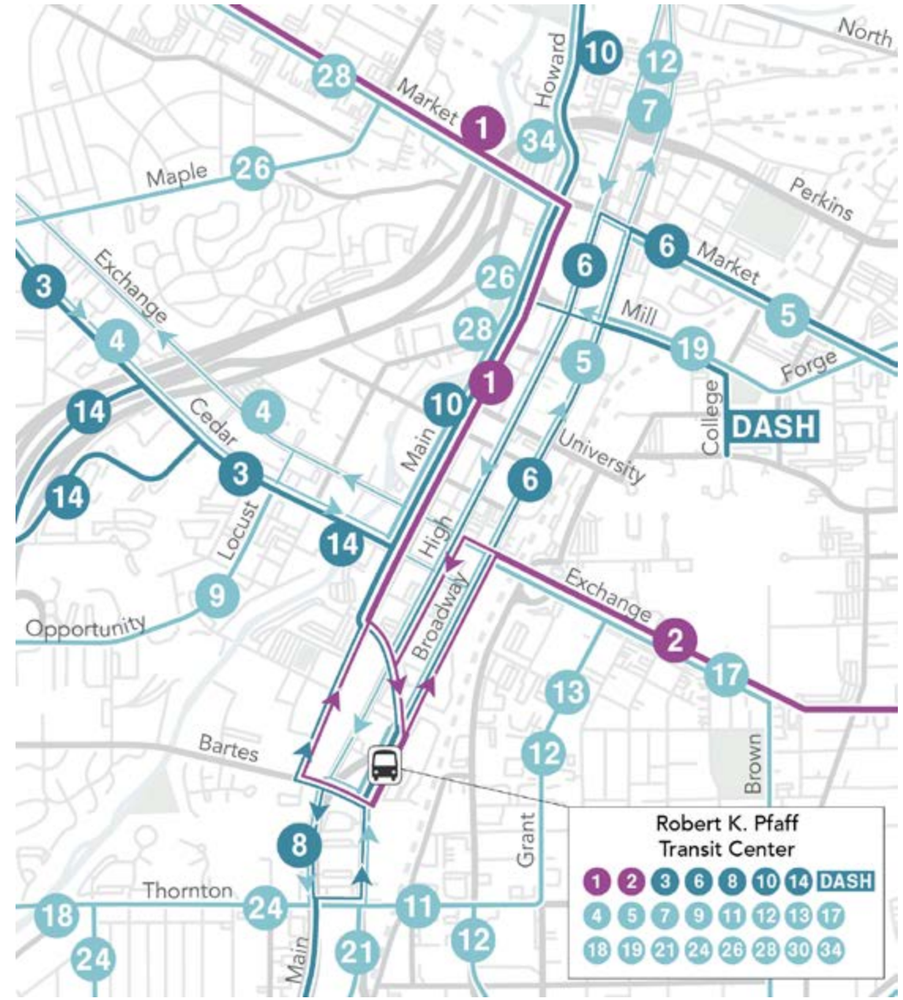


Figure 25: Akron METRO Existing Network (Downtown Detail)

METRO's timed transfer at the Robert K. Pfaff Transit Center expands the range of places people can easily reach using low-frequency routes.

Route Duplication

One of the challenges for improving the usefulness of transit within METRO's current network structure is the level of duplication between different routes. Duplication occurs when multiple routes serve the same area, and can reduce walk distance and put transit stops closer to peoples' homes. It often has the downside of dividing service across multiple routes, reducing the level of frequency that could be offered on each one.

Figure 26 maps duplication by showing the number of unique individual routes within 1/4-mile of the center of each hexagon. Hexagons are colored based on how many routes are available nearby. Some areas of notable duplication include:

- In and around Downtown Akron **A**. As noted earlier, this is a function of the current network design where all routes travel downtown to reach the pulse at RKP.
- Near Independence Transit Center **B**.
- South Akron and Firestone Park, where four infrequent routes zigzag through the area between Waterloo and downtown **C**.
- Southwest of downtown in the Sherbondy Hill, Summit Lake and Kenmore neighborhoods **D**

Downtown Duplication

Duplication is sometimes unavoidable, in situations where many routes converge at a single point or along a bridge or other street segment shared by multiple routes out of necessity. Route convergence onto a few streets approaching downtown is a common attribute of radial networks like METRO's, because every route has to reach downtown and there are a limited number of paths to do so.

Figure 27: Because there are only a few available paths for transit, duplication in Downtown Akron is an outcome of the network's radial structure and focus on RKP Transit Center.

Some areas served by METRO are near two or even three different routes, all going downtown. It may be possible to provide higher frequency and shorter waiting times by consolidating routes where they provide duplicative service.

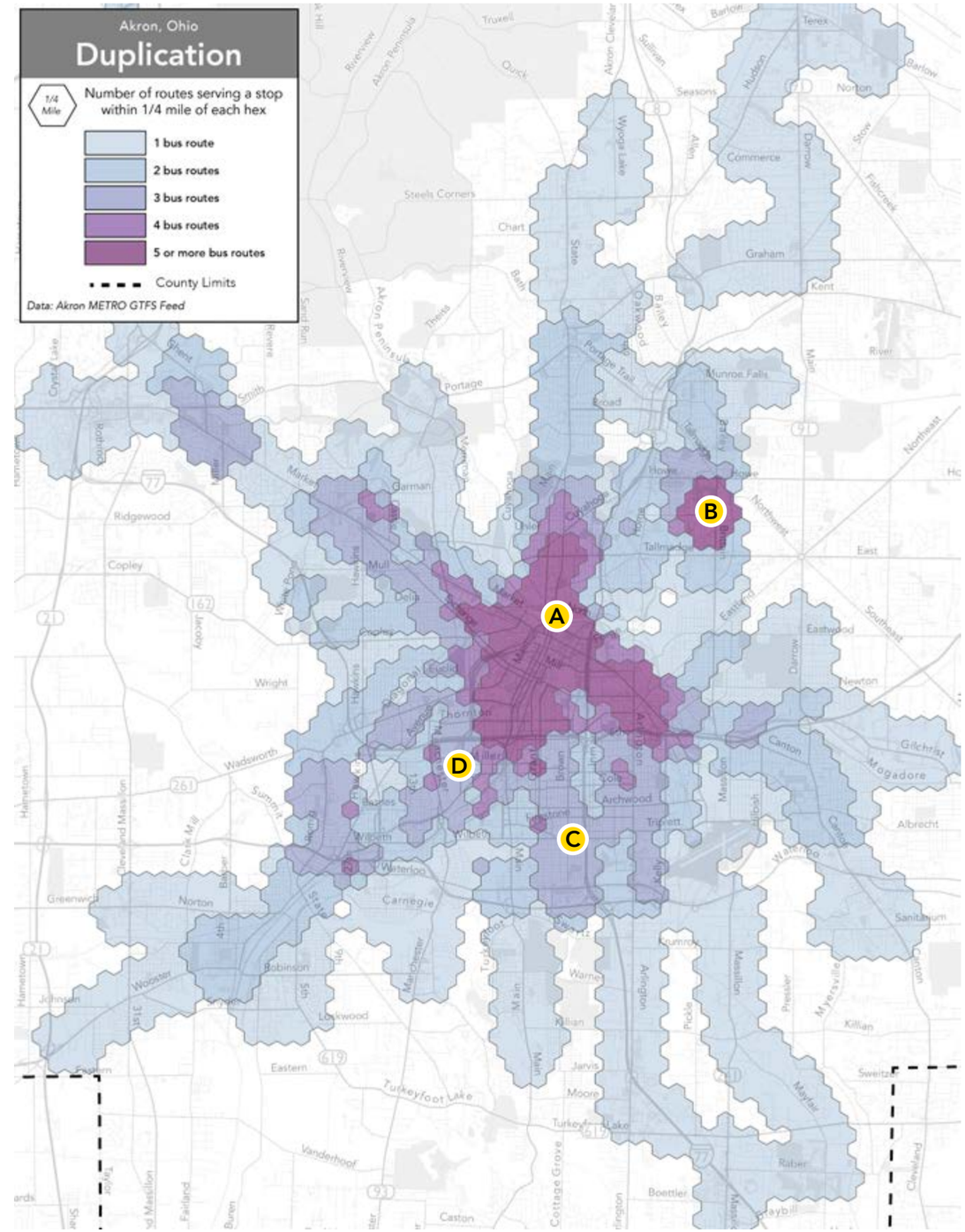


Figure 26: Route Duplication in METRO's Existing Network

Duplication Outside of Downtown

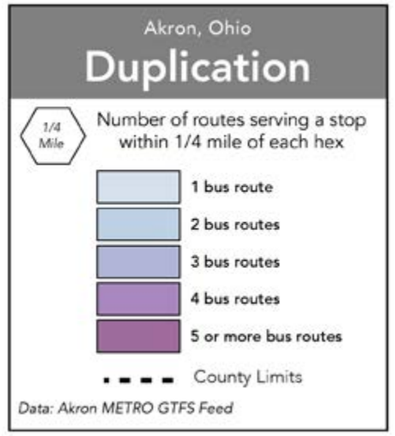
In METRO's network, there are some notable areas of duplication, principally in neighborhoods of Akron south and west of downtown.

Figure 28 shows the network map and duplication maps side by side for South Akron and Firestone Park, where four infrequent routes (11, 13, 17 and 21) zigzag through the area between Waterloo Rd and downtown. Almost the entirety of this part of Akron is within 1/4-mile of two and often three different transit routes, all traveling towards downtown and the transit center. For instance, each of routes 11, 13 and 17 passes through the intersection of Wilbeth & Brown A, and all of Brown from South St just south of I-76 to Waterloo has three routes nearby, even though no single route serves all of Brown in this area.

As discussed in Chapter 2, South Akron is a dense, walkable part of METRO's service area, and a ridership-focused network redesign will likely assess the feasibility of reducing duplication in this area and concentrating service into fewer routes that come far more often.

There are other examples of duplicative service in other parts of the network, particularly along East Market as it approaches downtown, shown in **Figure 29.** This segment of East Market is served by routes 5, 6, 30, and parts of Route 19.

Duplication in this part of the network arises from the need to provide radial paths to downtown from the unique segments of routes like 5 B, 6 C and 30 D. Because there are only a few paths into downtown from the east (East Market and East Exchange, mainly), routes coming from this direction must overlap on these segments. And because all routes are timed to arrive and depart RKP Transit Center at approximately the same time,



this duplication does not produce a service improvement along East Market; all trips pass through the segment within a relatively short time window in order to ensure they are able to arrive and depart at the transit center around the top of each hour.

Role of Duplication in Network Redesign

A ridership-focused network redesign would likely consider establishing a single pattern at higher frequency service the area between Euclid and Kenmore (perhaps via the existing Route 9 pattern, or a combination of the current segments routes 9 and 18), and identifying an alternative path to downtown for Route 18. Reducing duplication in this way may allow METRO to offer more frequent service in this area, although it is possible that some people would have to walk further to reach a transit stop.

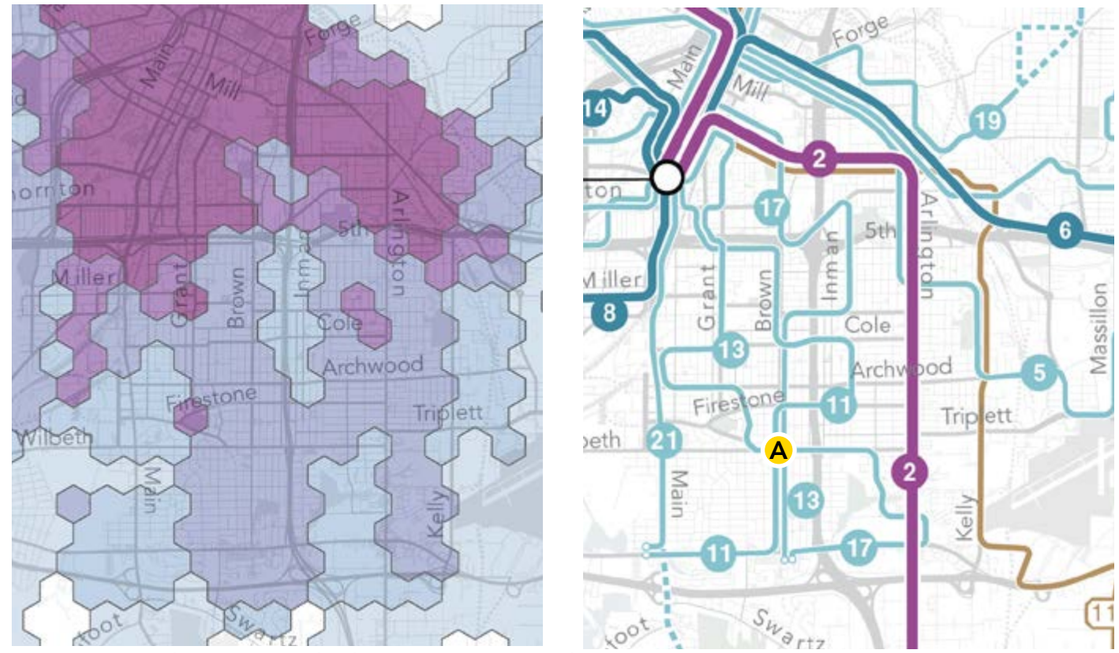


Figure 28: Duplication - South Akron & Firestone Park

Figure 29: Duplication - Southwest Akron

Route Linearity

In Chapter 2, we discussed a "ridership recipe" for the design of high-ridership transit services. One of the most important elements of this is linearity: transit's ability to run in straight paths.

To some degree, linearity is a function of the built environment and range of potential paths available for transit. Linearity is also impacted by network design decisions, like deviating off of a major street to serve the front door of a hospital. This benefits people traveling to that destination, but can create delay for people riding through and increase the overall cost of the route.

Deviation Required by Poor Street Connectivity

Apart from routes 1, 2, 6 and 10, most routes in METRO's network do not operate along a single straight corridor, and most have at least some deviation off the straightest path. In some cases, this is necessitated by the street network - Route 5 is a good example of this shown in **Figure 30**, where the route must deviate south to Triplett because Archwood doesn't continue east of Seiberling St (A).

Deviations to Reach Poorly Connected or Cut-Off Areas

There are also examples in METRO's network of deviations that are seemingly not imposed by the structure of the roadway network, but are justified by the need to serve an important destination or neighborhood located off the shortest path.

Route 12, shown in **Figure 31** has good examples of both types of deviation. From the All American Bridge, it must use a circuitous path through the neighborhood to reach Glenwood (B) because there is not a direct connection between Main and Glenwood.

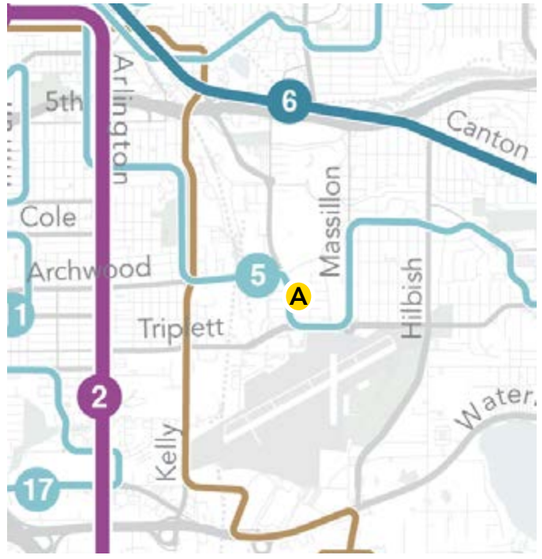


Figure 30: Route 5 must deviate south from Archwood to Triplett because Archwood does not continue east of Seiberling St.

A bit further east in the Forest Hill neighborhood, Route 12 makes a second deviation (C) that is not so easily explained by the street network. From Glenwood, the route turns south via Dan St, then uses Evans and Davis to arrive back at Glenwood. The purpose of this deviation is to be to reach the Summit County Juvenile Court along Dan St south of Evans, achieve slightly wider route spacing from Route 34 on Tallmadge to the north, and put service close to the southern portion of the neighborhood, which does not have access to any transit service to the south.

This is a useful deviation that reaches a moderately dense residential area, but the any routing decision like this means that the 1/2 mile of added routing for each trip can't be spent somewhere else. Adding length to a route always means making a tradeoff between whatever the deviation is serving and the range of other places along the line that could be worth getting closer to.

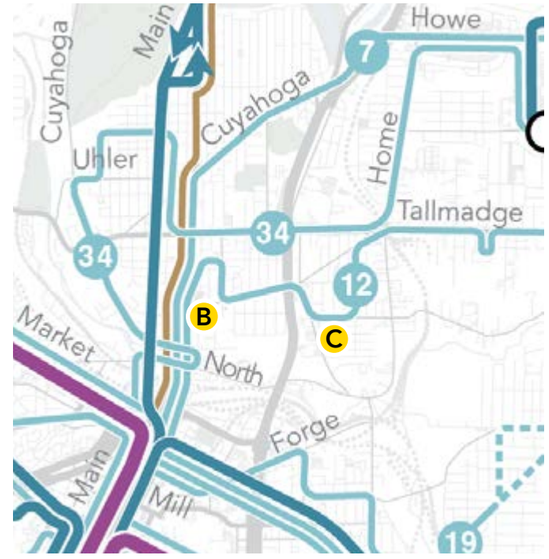


Figure 31: Linearity - Line 12 near Glenwood Ave

Deviations Producing Duplication

There are some deviations in the existing network that seem to have very little added benefit for riders at all. The segment of Route 13 that turns west from Grant to serve Main (D) is one such example, seen in **Figure 32**. Grant and Main are about 1/2-mile apart in this segment, and the street network is a well-connected grid. As a result, nobody located between Grant and Main is more than 1/4-mile from either Route 21 or Route 13, both of which go the Transit Center downtown. This deviation does not expand overall network coverage.

The main purpose of this deviation seems to be to provide additional access to the service and employment cluster near the former Firestone corporate headquarters near Cole and South Main. The Summit County Department of Job and Family Services is also located nearby. While the main Firestone building is no longer in heavy use as offices, there are still some employers nearby that need transit access. The key question a deviation like this raises in a network design process is whether the extra service to this area (which is already on Route 21) is worth the added running time and travel time for passengers riding through.

Figure 32: Linearity - Line 12 near Glenwood Ave

Role of Linearity in Network Redesign

Network redesign is an opportunity to consider all existing duplications, identify the needs being served, and determine whether there is a more effective way to provide transit access to those places that frees up resources currently invested there for other purposes.

Stop Spacing

Most of METRO's routes have very close stop spacing, with many routes stopping over 6 times per mile.

It may be possible to offer faster or more frequent service or extend routes by stopping less often, but this would require some people to walk a bit further to their closest stop.

As **Figure 33** shows, most local routes in the network stop 5-6 times per mile. Stop spacing is also a network planning decision, and comes with its own set of tradeoffs similar to duplication.

Figure 34 summarizes the tradeoff inherent to stop spacing. Stopping more often means that people enjoy shorter walks to and from bus stops, but it also means the bus stop must pull out of and into traffic more times on every trip. For the people riding through, stopping adds to their overall journey time, but for the people boarding or alighting at a stop, that particular stop may be saving them time!

The benefits of close stop spacing diminish the more tightly stops are spaced, because the closer together, the less time savings in terms of walking each stop can provide compared to the next stop.

One of the most controversial things that a transit agency can do is remove a bus stop. The impact is felt directly by those using the stop, but any benefits can be hard to see.

Bus stop placement has an enormous impact on people's ability to get places in a reasonable amount of time. When stops are moved further apart, two things happen to travel time:

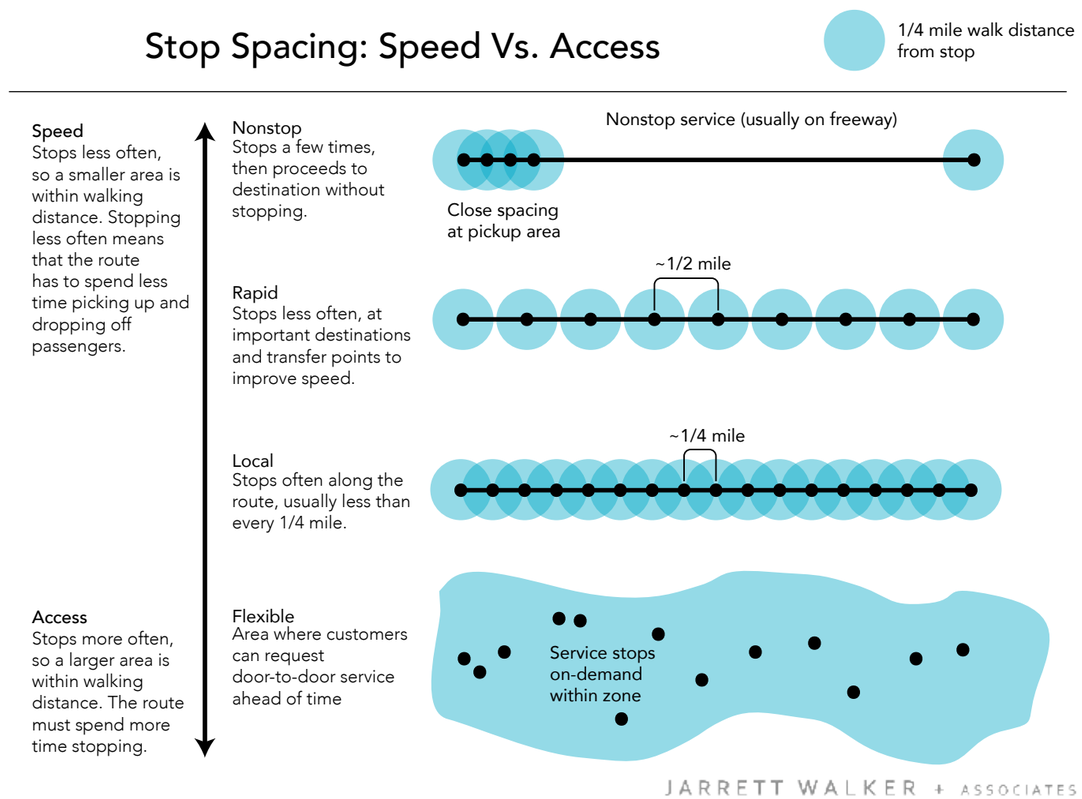


Figure 34: Stop Spacing: Speed Vs. Walk Acces

- Average walking time to a stop goes up,
- The bus moves with less delay, so total riding time on the bus goes down.

When a bus serves a stop, most of the delay is not related to the number of people getting on or off. Even if just one person is waiting, the bus must decelerate, open its doors, close its doors, and accelerate. So if people can be asked to gather at fewer stops, they can all be served with much less delay, not just to themselves but to everyone already on the bus at that point.

Reducing delay is powerful for expanding access because it affects travel time in two ways. Reduced delay means a faster trip, but it can also reduce waiting time.

That's because if it takes less time for a bus to run the whole length of a line and back, the same number of buses and drivers can run a higher frequency.

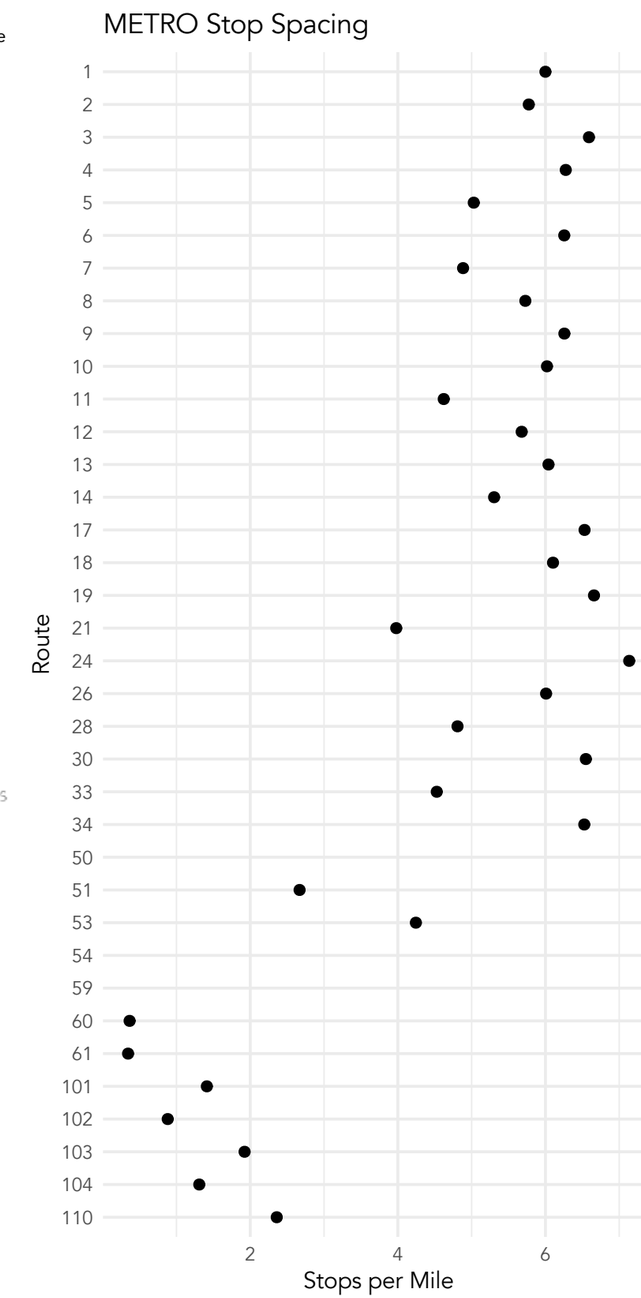


Figure 33: METRO Existing Network Stop Spacing

Stop Productivity

Close stop spacing is only an issue for transit speeds if those stops are actually being used frequently. It may be beneficial to place stops close together in areas with poor walkability where few people are riding, because the benefits to the customers who use those stops come at little cost as most trips won't serve most stops.

Impacts on speed from close stop spacing tend to arise when stops are close together and most stops are served on every trip. Pulling out of traffic into a stop, lowering the bus, opening the doors, boarding passengers and then getting back on the road takes time (usually a minimum of 12 - 30 seconds). Repeating that process more times each mile adds to the time it takes to travel each mile.

Figure 35 maps the "stop productivity" of each of METRO's stops in Fall 2019 - the average number of people that get on and off the bus at each stop in the network for Fall 2019, when ridership was not depleted by the pandemic. At current low levels of ridership, the delay impacts of stop spacing are much more limited.

Stop productivity also shows the likelihood that a stop will be served on a given trip. A stop with 1.0 passengers per trip means that on average, at least one person gets on or off each trip. A stop with 0.5 passengers per trip means that a someone gets on or off every other trip (50% of the time).

When many busy stops are close together, and all or most of those stops see passengers every time they are served, schedules must be written with the expectation of stopping regularly.

Most stops in METRO's network see passenger boardings or alightings on less than 75% of bus trips. There are some examples of segments with closely spaced, high-productivity stops include:

- The segment served by routes 5, 6, 30 and 110 along Market has very closely-spaced stops, most of which are served every trip **A**.
- Along North Main and Cuyahoga on Route 7 **B**, stops are generally spaced every 1/6 mile and are typically served by every trip.
- Along much of Copley Rd east of Hawkins, Route 3 stops at least 6 times per mile,. Many of these stops are served by at least 75% of trips, interspersed with some very closely spaced stops where customers are rarely present **C**.

On the other hand, some of the segments METRO serves have fairly closely spaced stops, but where most stops are not served on each trip. For example, the outer segments of Arlington, where Route 2 typically serves each stop on fewer than half of its trips **D**.

Role of Stop Spacing in Network Redesign

In a network redesign, METRO could consider exploring respacing stops on its busiest corridors. This could enable routes to be scheduled to run faster, increasing the amount of service METRO could provide with current resources.

Going from 1/6-mile spacing to 1/4-mile spacing always comes at the cost of increasing walk distance for at least some people, and it is not a decision to be made without careful consideration of the specific pedestrian network situation and set of destinations along any given corridors.

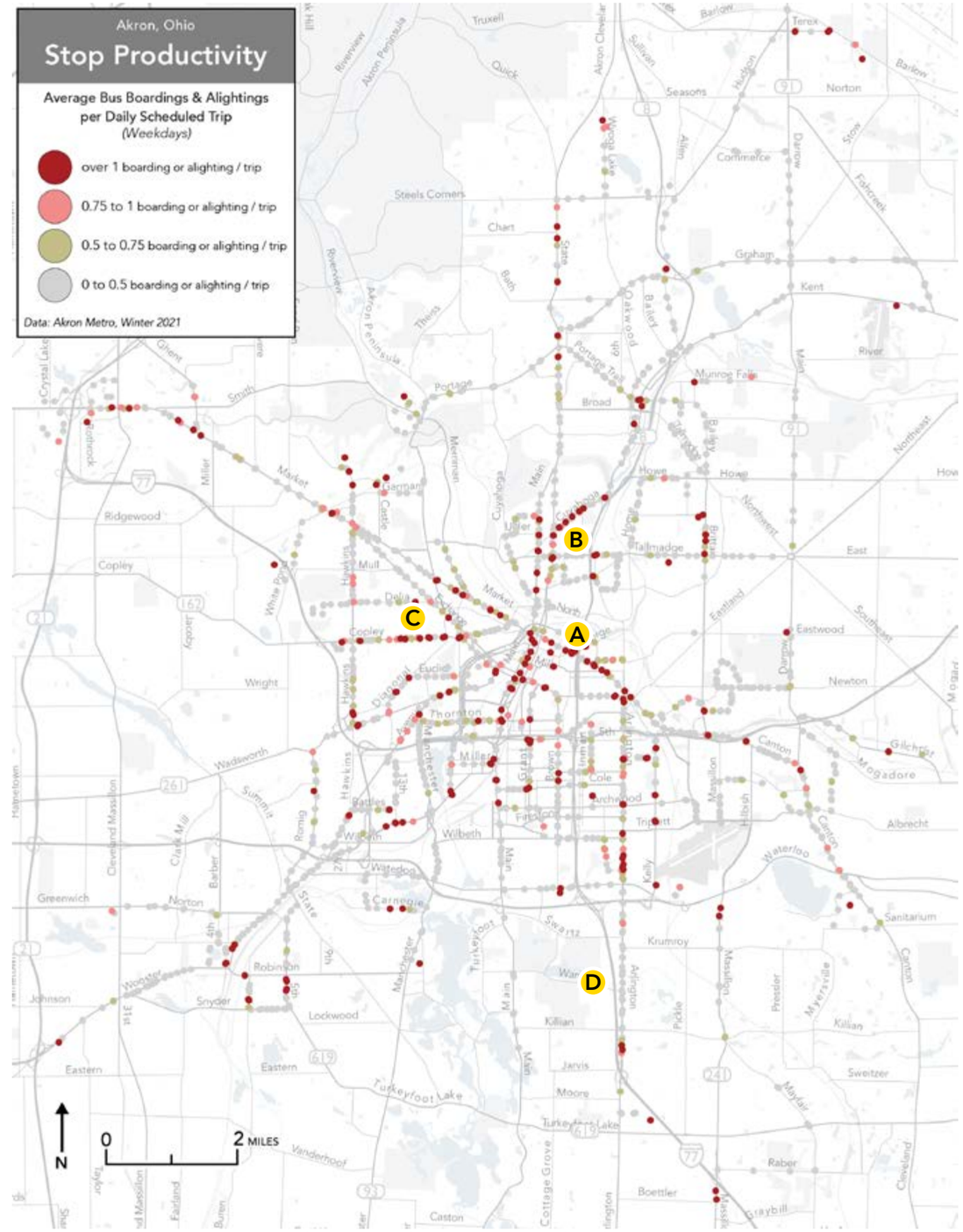


Figure 35: METRO Existing Network Stop Productivity (Akron detail map)

Peak vs. Off-Peak Service & Ridership

METRO's service level is stable throughout the day, displaying only a small rush hour or school peak on weekdays, even prior to the pandemic. Ridership is slightly more peaked, reflecting elevated demand during the rush hours. **Figure 36** charts the percent of daily ridership (in purple) and revenue hours (in red) that occur in each hour on weekdays Saturdays and Sundays for October 2019 and March 2021.

While many other transit agencies design service to accommodate higher demand during the morning and afternoon rush hours, METRO service is balanced throughout the day. In Fall 2019, 7 a.m. - 8 a.m. hour made up about 7.5% of daily service and ridership in 2019, compared to about 6% during the midday. The higher peak service level was mainly the result of added trips on key routes to address capacity needs, as well the range of NCX and Town Center express routes that operated during those periods

The shape of the demand curve in March 2021 was even flatter, with the AM peak gone entirely and ridership increasingly steadily from morning into afternoon in a similar manner to weekend trends. Service was flatter as well, with only a single peak express service in operation.

We can't predict the post-pandemic future. It may be that a significant share of working from home becomes permanent. It is also possible that a great share of what peak demand METRO has served in the past returns rapidly, or over time, as employers continue to benefit from the variety of advantages of proximity concentration inherent to choosing a location in a major downtown core. If some reduction in peak-oriented commuting persists, there may be opportunities to deploy service previously invested in peak capacity in new ways.

Figure 36: METRO Ridership and Service by Hour of Day, 2019 and 2021

Weekend Service

On weekends, METRO operates less service, with many routes running at reduced frequencies or not at all. Saturday service is about 40% lower than weekdays in terms of daily revenue hours, while Sundays are about 65% lower than weekdays.

The Weekend Travel Market

Before the pandemic, more people traveled to work on weekdays than on weekends, and to some extent a lower weekend service level was a natural outcome of travel demand.

While the overall number of workers working on weekends was lower than on weekdays, according the US Bureau of Labor Statistics data shown in **Figure 37**, about 1/3 of the number of people who reported working on weekdays reported working on the weekend. The amount of travel for many other purposes like shopping or leisure was greater on the weekends than on weekdays.

While the overall size of the pre-pandemic weekend commute market was smaller, there were still a substantial number of people who need to move about the region on weekends for the purpose of work alone, and those who were traveling to work on weekends were more likely to work in occupations that already have a higher propensity for transit use, particularly in the service industry. In Summit County, service workers are more than twice as likely to work on weekends as other types of workers, according to American Community Survey data from 2019.

Just as on weekdays, if transit doesn't present a competitive travel option on weekends, or isn't available where or when its needed, its unlikely that many people will choose to use it if they have other more convenient choices available.

Weekend Productivity

The pandemic has disrupted many long-established travel patterns, and until clarity emerges about the "new normal", it is impossible to say with certainty what weekend travel demand will look like in future.

In the past, METRO's weekend services were almost as productive as weekdays. As **Figure 38** shows, in 2019, boardings per revenue hour were actually slightly higher on Saturdays, and about 11% lower on Sundays, despite a more than 50% reduction in service. This means that for each hour of service METRO ran on weekends, about as many people boarded the bus as on weekdays. Before the pandemic, this pattern would be a strong indication of latent weekend demand, given the limited service available.

However, the same data for March 2021 paints a different picture. Weekend service is actually slightly higher than before the pandemic, but productivity compared to weekdays is much lower, declining by around 30% on each day.

Travel Related to Activity	Weekdays	Weekend Days	Difference
Work	47.3	13.9	-71%
Purchasing Goods And Services	42.8	43.5	+2%
Leisure And Sports	29.1	38.4	+32%
Eating And Drinking	20.2	26.8	+33%
Caring For And Helping Household Members	15.6	7.7	-51%
Household Activities	9.2	9.2	0%
Caring For And Helping Nonhousehold Members	7.8	9.4	+21%
Organizational, Civic, And Religious Activities	4.6	14.4	+213%
Education	3.8	0.8	-79%
Personal Care	2.7	2.2	-19%

Figure 37: Travel for various activities by day

US Bureau of Labor Statistics, American Time Use Survey 2017

Day Type	Period	Daily Revenue Hours	Boardings per Revenue Hour	Boardings per Revenue Hour % Difference from Weekday
Weekday	October 2019	1133	23.6	--
	March 2021	899	19.0	--
Saturday	October 2019	454	24.1	+2%
	March 2021	534	13.5	-29%
Sunday	October 2019	311	21.1	-11%
	March 2021	317	12.9	-32%

Figure 38: METRO productivity by day type, October 2019 and March 2021

Figure 39 maps METRO's network on Sundays, when the service level is lowest. On Saturdays, each of the routes that run every 20 or 30 minutes on weekdays run every 30 minutes, but on Sundays, the entire network runs every hour except for routes 1 and 2. A number of routes do not run at all, including routes 11, 21, 24,28 and all of the express routes.

On weekdays, about 12% of Summit County residents are near a 20 or 30-minute route. As shown in **Figure 40,** on Saturday, no 20-minute service is available, but 11% of people are still near a 30-minute route. On Sundays, the reach of that moderately frequent service drops to just 3%; almost everyone has access to only hourly routes.

On weekdays, METRO operates a number of 100-series routes serving surburban areas. While these routes are focused on reaching employment areas, they also do expand the residential coverage of the network. As a result, on weekends, when these routes are out of service, the overall number of people near transit is lower.

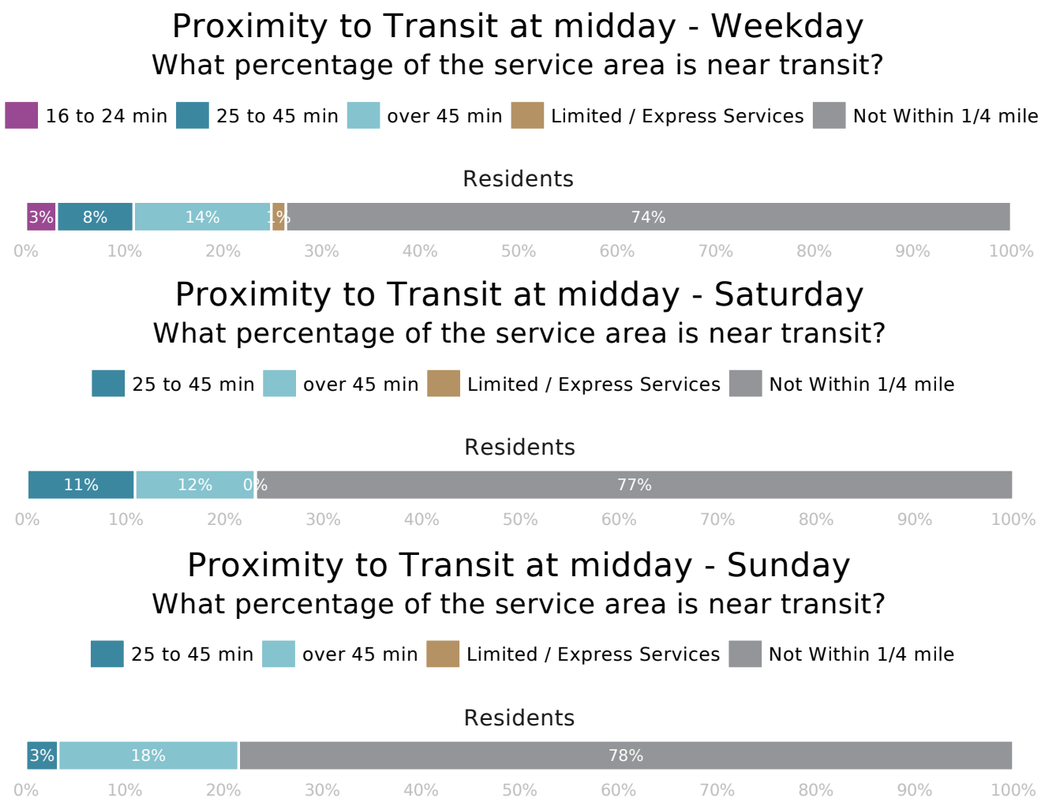


Figure 40: Proximity to Transit by Day Type

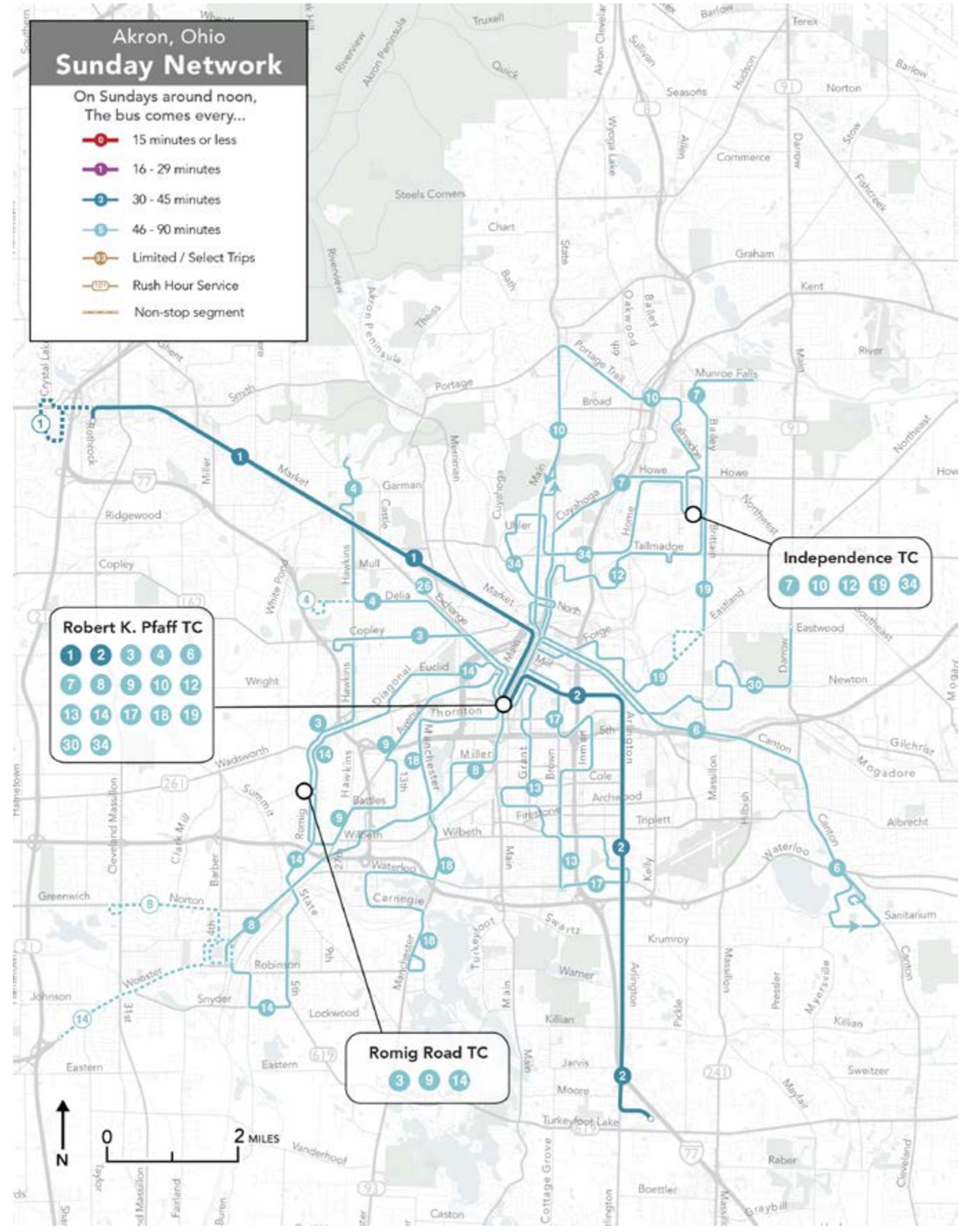


Figure 39: METRO Existing Network - Sunday Service Level

Responding to the Pandemic

Like all transit agencies, METRO has been dealing with a crisis since March 2020. In the early days of the pandemic, ridership crashed as employers shut down or shifted to remote working. Reduced economic activity also meant a reduction in amount of sales tax collected, METRO's single largest funding source. Additionally, the pandemic created new challenges with operator availability, retention and hiring.

Figure 41 shows METRO's network in Akron on the eve of the pandemic, in Fall 2019. This map shows more service than the current network map. The Circulator services (50-series routes) and x60 Northcoast Express from Twinsburg are visible on this map, and are not shown on the maps of current service earlier in this chapter. These routes were suspended during the Covid-19 pandemic to ensure social distancing and respond to a reduced workforce.

Clock-Face Headways

One of the biggest shifts during this period was the change to what are called "clock-face" headways. This means that routes run every 20, 30 or 60 minutes. Clock-face headways produce predictable arrival times that are easier to passengers to understand. **Figure 42** shows how METRO's headways changed from 2019 to 2021. This allowed METRO to establish an hourly timed transfer at the RKP Transit Center all day long. Before clock-face headways, buses converged at the Transit Center only 5 times per day.

Moving to clock-face headways does have a cost. Nonstandard frequencies must be standardized to the next "clock-face" time: 15, 20, 30 or 60 minutes. Reducing frequency reduces the operating cost of the route, but it increases overall customer journey time because the

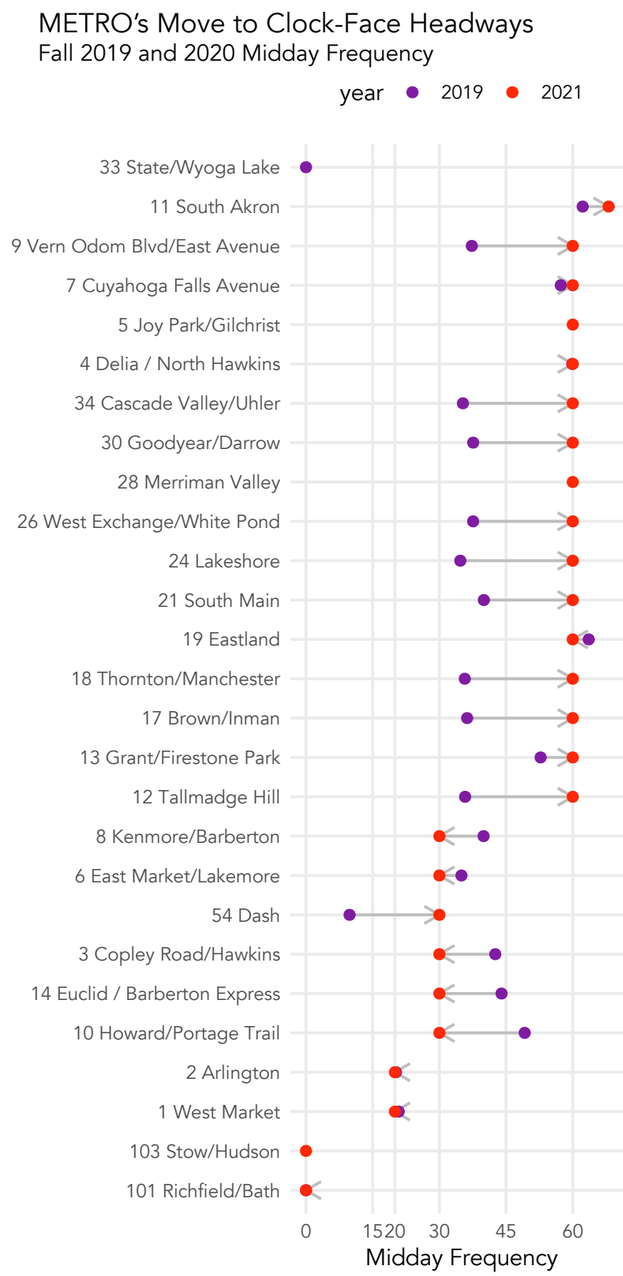


Figure 42: Fall 2019 and Spring 2021 Frequencies

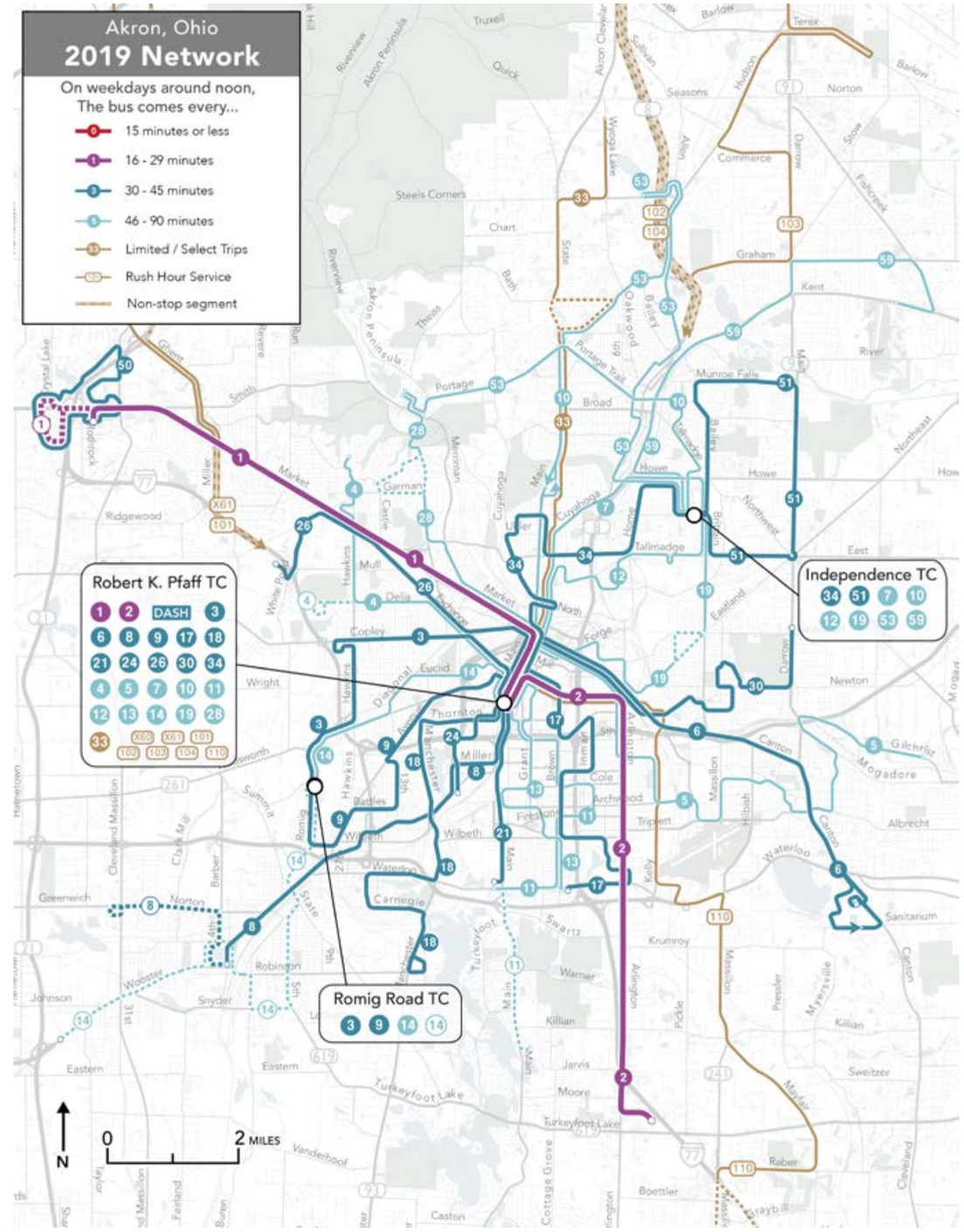


Figure 41: Akron METRO Fall 2019 Network (Akron Detail Map)

Existing Ridership

initial wait to access service is longer.

METRO's ridership has declined during the pandemic. In March 2021, there were about 57% fewer boardings on a typical weekday than in the fall of 2019. But while ridership has dropped due to the ongoing impacts of the pandemic, the system continues to see over 8,000 boardings per day.

Figure 43 charts existing ridership on METRO routes for Fall 2019 and Spring 2021. In 2019, METRO's top 5 highest ridership routes were lines 2, 1, 14, 3 and 6, each with over 1,000 boardings per day. In 2021, these are still METRO's busiest routes, but ridership has declined by 36-52% on each.

This chart also provides another way of looking at METRO's pandemic response. In the face of collapsing ridership, the agency suspended service on some of tits lowest-ridership routes, including x60, and the 50, 51, 53 and 59 circulator routes.

Figure 44 maps the same March 2021 ridership data at the stop level. On this map, stops are scaled by the average number of people who board there. Outside of downtown, a number of high ridership areas stand out, including:

- METRO's transit centers A B.
- Commercial areas along METRO's 20-minute corridors C. Arlington is particularly notable as one stretch where even in March 2021, most stops were consistently seeing at least 10 boardings per day, with many over 25 boardings per day.
- Stops serving commercial and mixed use areas at the end of METRO's long 20 and 30 minute lines, as in Barberton and Montrose D.

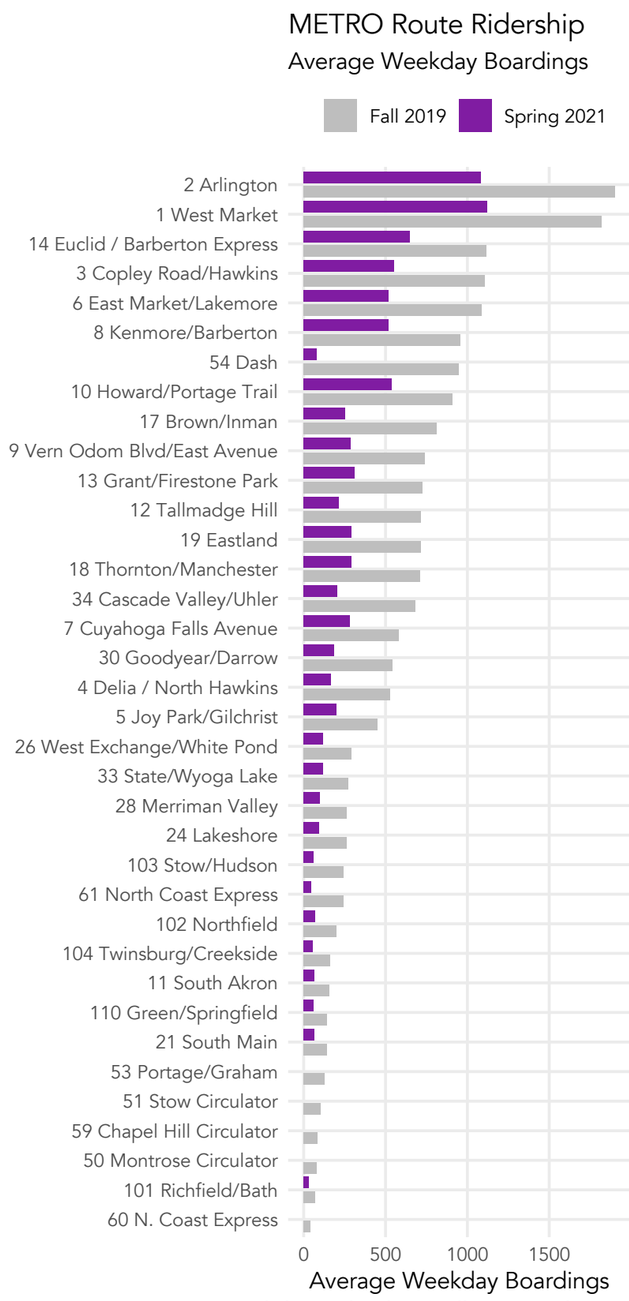


Figure 43: Average Weekday Ridership (Fall 2019 and Spring 2021)

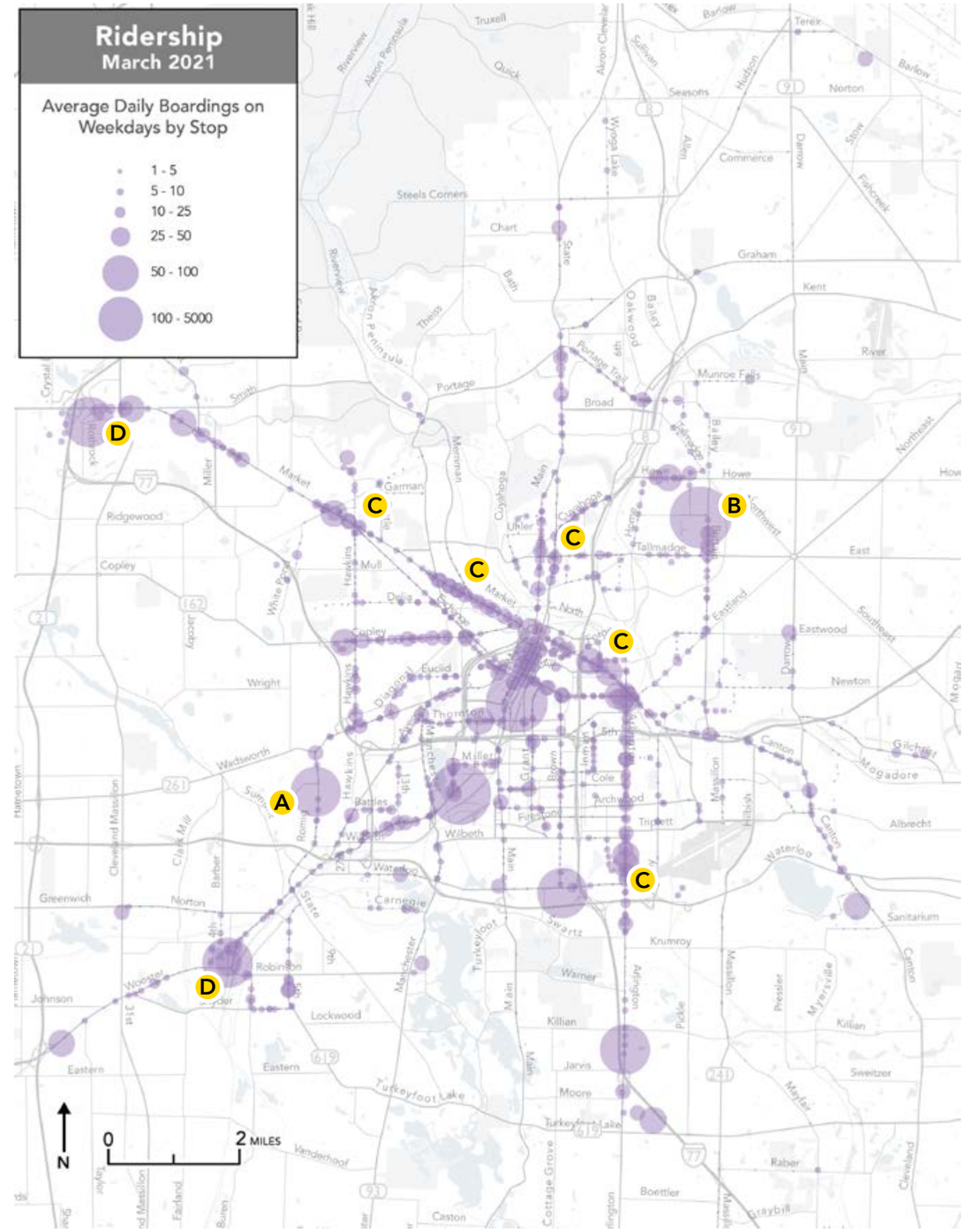


Figure 44: Average Daily Boardings by Stop, March 2021 (Akron detail map)

COVID-19's Impact on Ridership

At the time of this document's drafting, vaccination rates are increasing and unemployment is falling as people come back to work. While these are encouraging signs, it is far from clear that the "new normal" for travel demand that will emerge will be similar to pre- Covid conditions, particularly when it comes to rush hour commuting by white collar workers.

One of the most important pieces of information for planning transit service post-pandemic is a detailed sense of where in the network people continued to ride, and where ridership dropped more dramatically.

Figure 45 maps current March 2021 ridership, but color-codes each stop dot by the change in ridership from 2019 compared to the rest of the network. Stops in red lost at least 10% more ridership than the average stop; stops in blue kept 10% more ridership, and stops in grey lost about as much ridership as the average stop in the network, within +/- 10%.

This map provides a quick view to where the 57% drop in ridership was more and less intense. Some of the largest drops are visible in areas like:

- Along the east side of downtown / west side of the University of Akron **A**, mainly on the downtown High / Broadway couplet. These are stops in downtown that show just how dramatically ridership has been impacted by the decline of travel to downtown office jobs and the university.
- Independence TC near Chapel Hill Mall **B**.

Some areas, shown here in blue, lost less ridership than the system as a whole. These are places where more people continued to ride, compared to the entire network.

Some notable areas include:

- Segments of Route 1 and 2 just outside Downtown Akron **C**.
- Many sections of Route 14 between Downtown Akron and Barberton **D**.
- Many of METRO's busiest stops outside of downtown were also places where ridership declined less than the systemwide average, an indication of the important of these stops and nearby destinations for the people who have continued to ride METRO through the pandemic **E** **F** **G**.

While the decline in ridership particularly in downtown and near the university is evident, it is also clear that many of METRO's busiest markets outside of downtown continued to be important transit destinations for people still traveling during the pandemic.

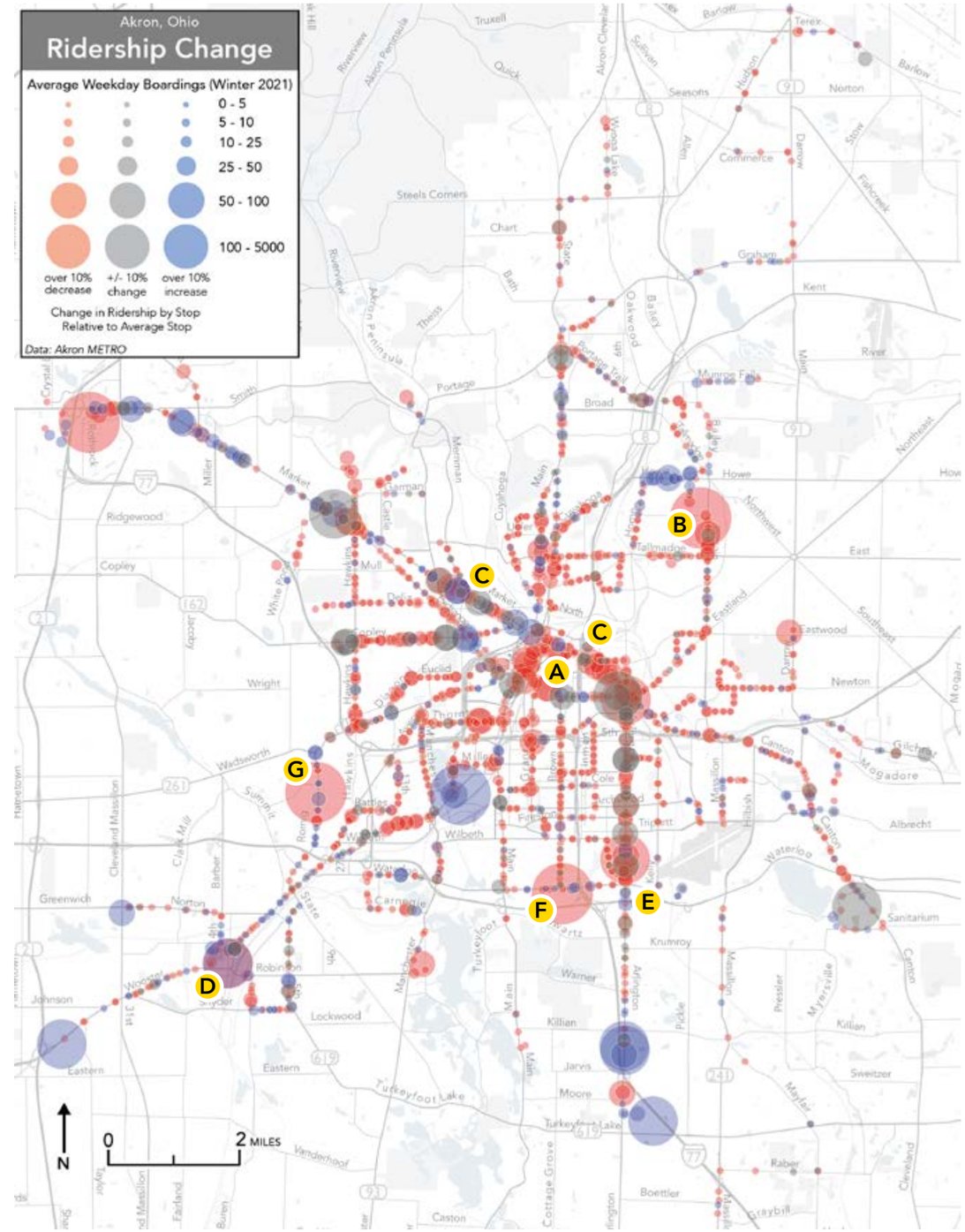


Figure 45: COVID Ridership Impact by Stop

Where Can Transit Take Me?

So far, this report has focused on a description of METRO's network. This section will focus on the outcomes the existing network structure produces, starting with the most fundamental question: how well does it take people to where they need to go?

One of the best tools to approach this question is called an isochrone. An isochrone is a shape on a map that shows the area reachable within a given travel time using transit. **Figure 46** shows an isochrone starting from RKP Transit Center. The area in pink is reachable by walking and transit within 60 minutes, while the smaller light and dark blue areas area reachable with travel time budgets of 45 and 30 minutes, respectively.

In this image, travel time includes:

- Initial walk to transit stops.
- Initial wait, equal to half of the headway.
- Riding time on the vehicle.
- Remaining walk up to the travel time budget, or else additional walk, wait and ride legs for any available transfers.

The example from RKP Transit Center shows how more frequent service can put more places within reach. From the transit center, long stretches of the corridors served by 20 and 30 minute services are each reachable within 45 minutes, including Arlington A, Kenmore B, North Main C, and Market D.

While RKP is also the location of METRO's timed transfer, because timed departures happen every 30 and 60 minutes, a person arriving at a random time at the transit center will still have to wait an average of 15 or 30 minutes for their departure.

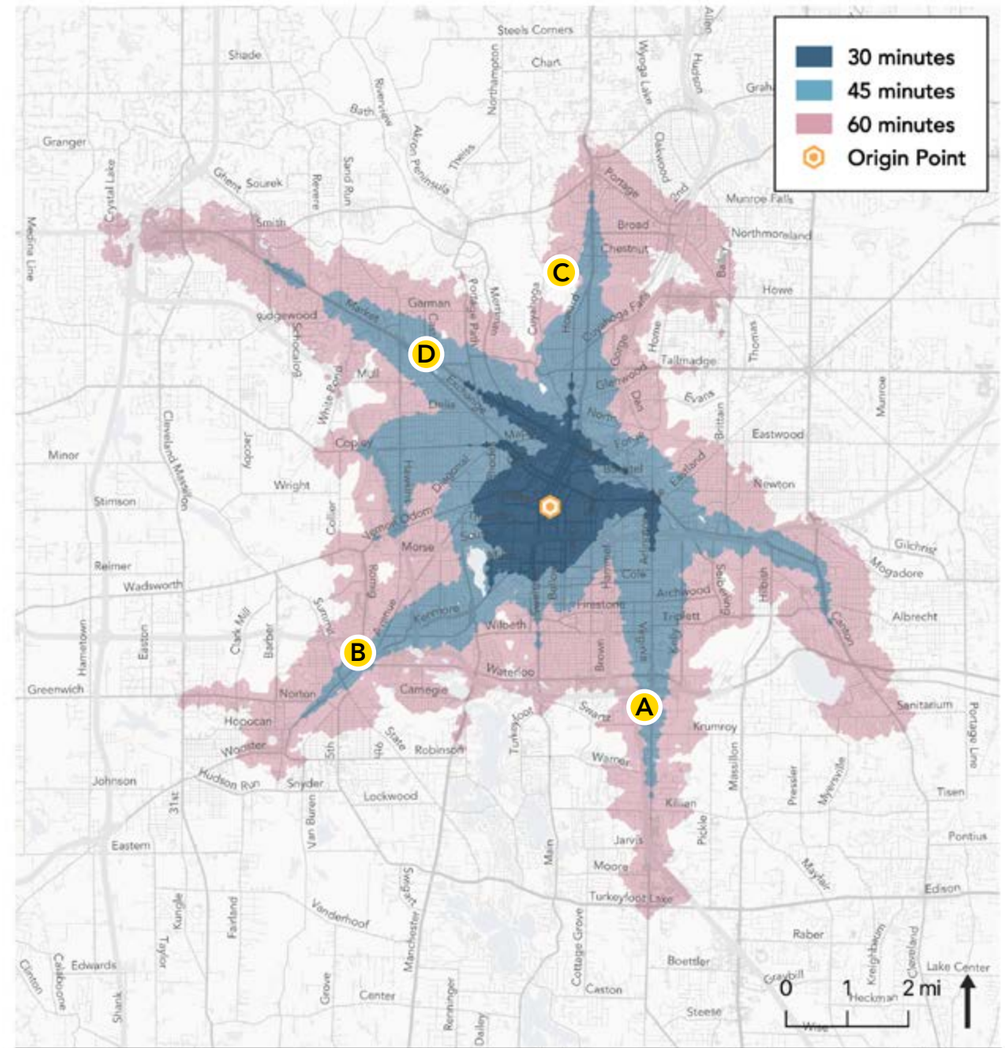
On the other hand, some areas that are a similar distance from the transit center are not reachable, because of the longer initial wait required by less-frequent service. For example, most of Firestone Park falls within the pink "60 minute" isochrone, even though it is the same distance from downtown as the Arlington segments reachable in 45 minutes. This is a visual illustration of how important frequency is to travel time.

Transit is only useful if it takes you to the places where you need to go. The table near the bottom of **Figure 46** also includes an analysis of the number of jobs reachable in each travel time from RKP Transit Center E. A person starting a trip from the transit center has **access** to about 104,800 jobs in one hour, and about 197,000 residents.

How far can I travel in 30, 45, and 60 minutes from

RKP Transit Center

at 12 pm on a weekday?



Travel Time	E Jobs Reachable	Residents Reachable
30 minutes	39,600	19,500
45 minutes	64,800	99,300
60 minutes	113,100	205,500

Figure 46: Where can I travel from RKP Transit Center?

How Does the Pulse Expand Access?

Isochrones can be used to help understand the great value the current network organized around the pulse or timed transfer provides. The timed transfer at RKP Transit Center allows people arrive there on routes from all parts of the city to quickly transfer to another route, and wait no more than about 10 minutes. This greatly reduces waiting time for transfers between low-frequency routes; on average, an untimed connection to a 60-minute route requires a wait of 30 minutes!

Figure 47 shows the benefit of this network design principle, for an isochrone with a 60-minute travel time budget starting north of downtown in North Hill. From this location, downtown is reachable via the 30-minute Route 10 - Howard Portage Trail. This requires a 15 minute average wait, and then a short ride to the transit center, which takes about 30 minutes.

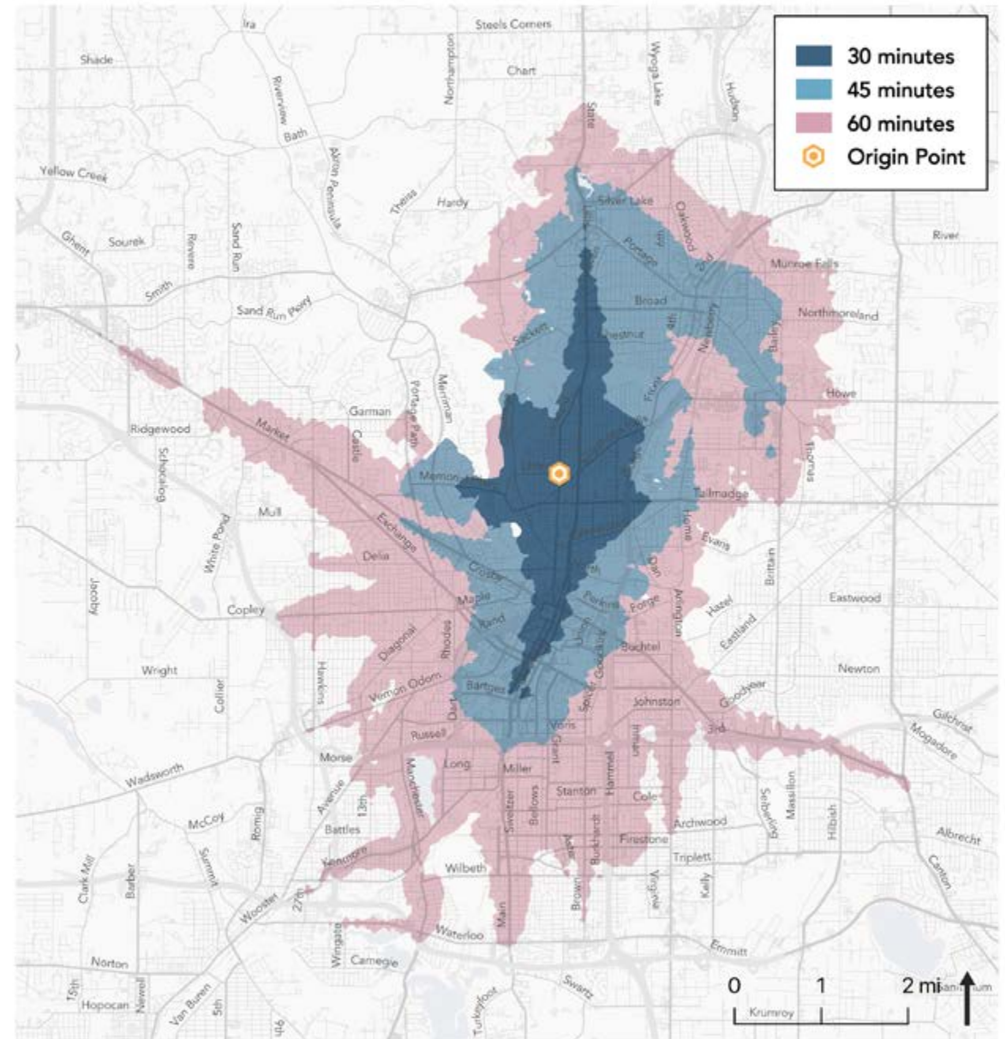
With an untimed connection, there would be no guarantee that any of the hourly services that meeting at the transit center, and a passenger would wait an average of 30 minutes for each one, fully using up their 60-minute travel time budget.

Thanks to METRO's timed transfer downtown, this connection takes just a few minutes, and it is thus possible to continue on to a range of other destinations outside of downtown within the 60-minute travel time budget. Thanks to the pulse, most of METRO's corridors east of Hawkins and north of Waterloo are reachable in an hour from this starting location. Because all hourly and 30 minute routes participate in the pulse, this same effect is available for origin points throughout the city.

How far can I travel in 30, 45, and 60 minutes from

Howard & Uhler

at 12 pm on a weekday?



Travel Time	Jobs Reachable	Residents Reachable
30 minutes	16,600	19,700
45 minutes	52,400	57,300
60 minutes	83,800	137,700

Figure 47: Where can I travel from Howard & Uhler?

Access to Jobs

Access in 45 minutes

Isochrones illustrate the network's usefulness to customers in one location, but it is also helpful to understand how the network is more or less useful throughout the entirety of METRO's service area.

To do this, we use a technique called access analysis, explained in **Figure 48.** Access analysis involves creating isochrones for thousands to locations covering the entire county, and counting the number of jobs reachable from each of those points. It is then possible to create maps like **Figure 49.** On this map, each small hexagon is shaded by the number of jobs reachable from its center; darker orange cells are places where more jobs are within reach.

From this map, the benefits of frequency are immediately visible. Some of the greatest levels of access outside of downtown the transit center itself are found along the major 20 and 30 minute corridors particularly West Market (A Route 1), Arlington (B Route 2), and Main/Howard (C Route 10). Each of these routes runs every 20 or 30 minutes, and passes through the job-rich downtown core on the way to the transit center.

Figure 49 also shows how access drops off away from the 20 and 30 minute corridors. For instance, the area between Independence TC and Downtown D (served by routes 7, 12, 19 and 34) has access to comparatively few jobs within 45 minutes. This is because the routes serving this area come every hour. A similar access gap is visible in South Akron and Firestone Park E , where fewer jobs are accessible than near Arlington even though these neighborhoods are no further from the downtown job center.

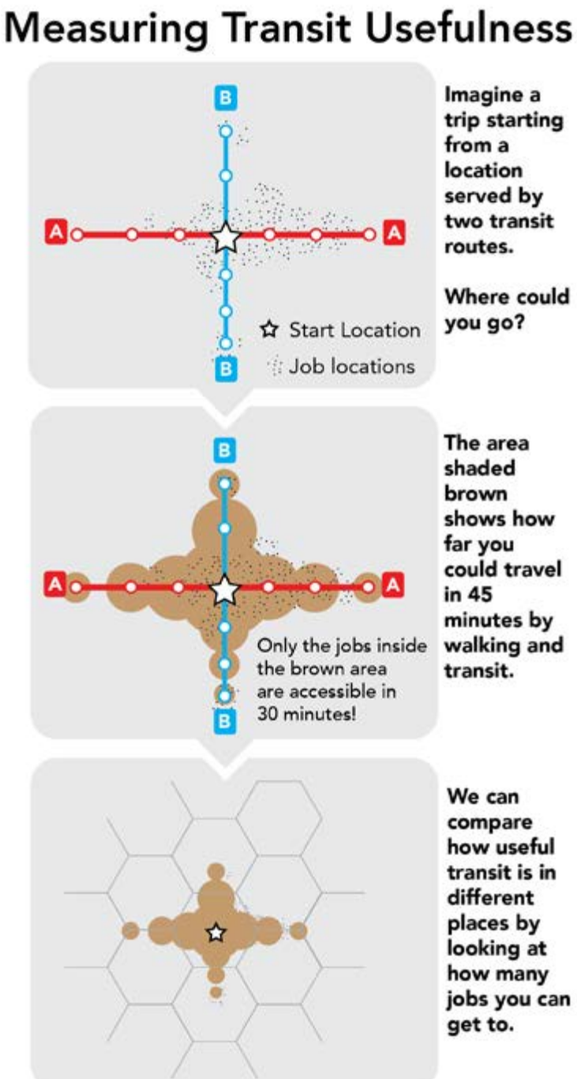


Figure 48: Measuring transit usefulness

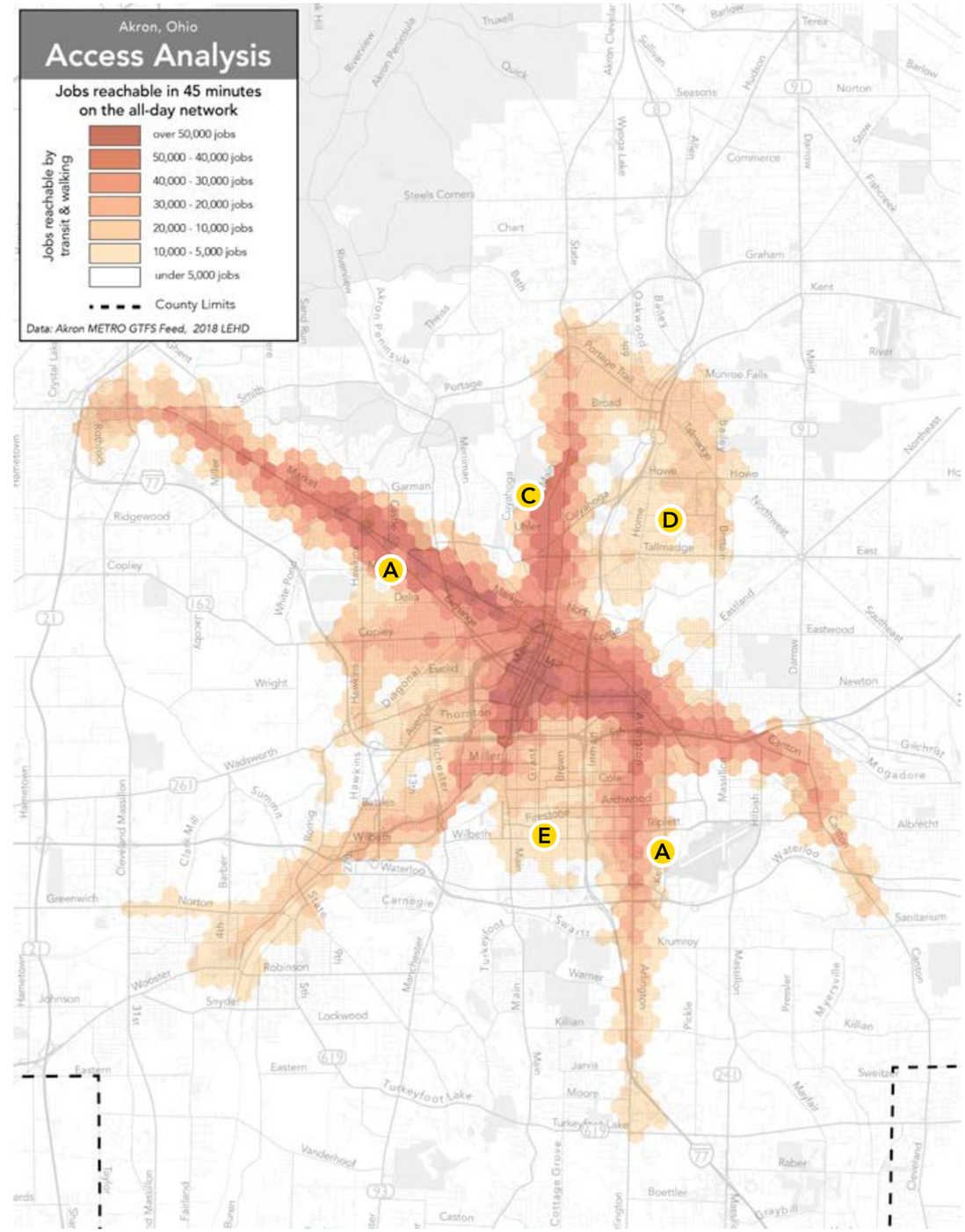


Figure 49: Job Access - 45 minutes

Access in 60 minutes

With a little more travel time, the number of jobs reachable increases everywhere, but the same pattern of areas with high and low access persists. **Figure 50** shows the number of jobs reachable in 60 minutes from the center of each hexagon on the map.

The same 20 and 30 minute corridors jump out here in dark orange, while the same low-frequency areas south, west and north of downtown fade back in lighter shades. On these maps, lighter shades of orange denote few jobs reachable. In general, fewer jobs area reachable from the portions of the network where routes operate at 60-minute frequencies.

While the timed transfer downtown improves the range of destinations reachable with transit, and especially with low-frequency service, it doesn't produce a big improvement in the access numbers for the parts of the network with only low-frequency service. This is because the timed transfer is primarily useful for travel *through* downtown to destinations elsewhere in the service area. Because the job distribution in Akron is so centralized, travel time to downtown is the most important determinant of job access, and the pulse doesn't improve the travel time to downtown from other parts of the city.

Job access is higher near METRO's 20-minute and 30-minute routes, and lower near 60-minute routes.

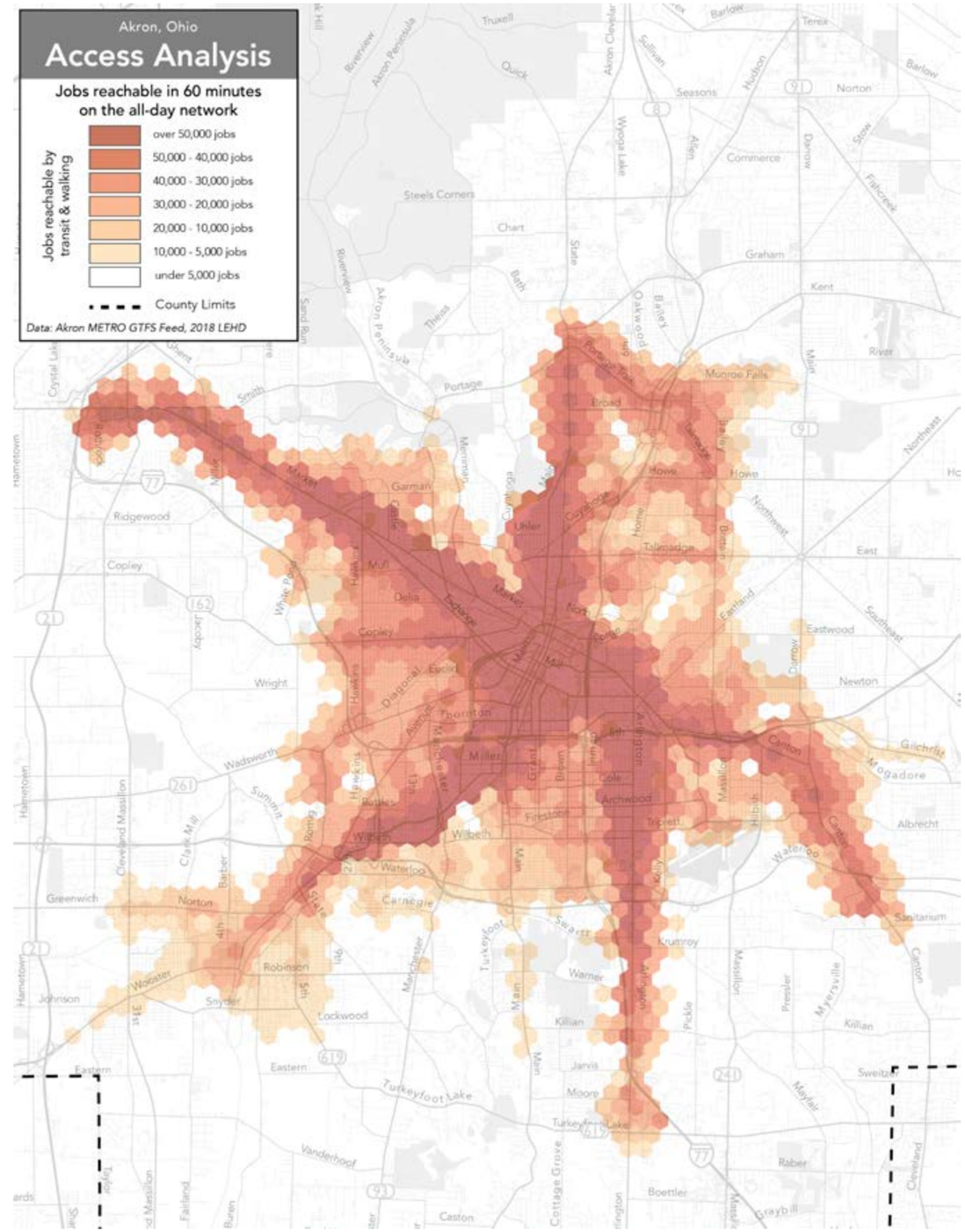


Figure 50: Job Access - 60 minutes

Equity of Transit Access

The maps on the preceding pages show how access is distributed across METRO's service area. But how does that distribution effect the typical outcome for different kinds of people? **Figure 51** reports the median job access by transit for county residents near and far from transit. This analysis evaluates access to all jobs in Summit and Cuyahoga counties, in order to capture the potential usefulness of NCX express services to Cleveland.

METRO's Existing Network provides high levels of access to People of Color and lower-income residents compared to the general population, because these groups are most concentrated within Akron, where METRO service is most useful.

Job access for people near transit is always exponentially greater than for people far from transit, because unless they get in a car, a person far from transit has access to only the jobs they can walk to.

The median resident living near Akron METRO service can reach about 8,500 jobs in 45 minutes, and about 30,000 jobs in an hour. While this measure evaluates access to all jobs in Summit and Cuyahoga counties, for context 8,500 jobs represents fewer than 10% of the 99,000 jobs located in Akron proper reachable by the median resident in 45 minutes of travel time.

Outcomes are better for People of Color, Black residents and lower-income people, because each of these three groups are spatially concentrated in Akron, where transit service is most intense (and most useful for connecting residents to jobs). Black residents have the greatest transit access among the groups analyzed, because their residential distribution in the most focused in central Akron neighborhoods where transit makes reaching jobs centers (particularly Downtown Akron) relatively easy.

The lower outcome for the "All Residents" category reflects the distribution of the 81% of the country residents who are white, and tend to live at lower densities in places further from the METRO service area, and where that service is less useful.

Akron METRO's service produces better outcomes for People of Color and lower-income people because a majority of each group live in places that are easy for Akron METRO to serve: dense, walkable neighborhoods that are strong ridership markets for transit. These are the attributes that a ridership-focused redesign will also seek to capitalize upon, so it is very likely that the network redesign options designed with that goal in mind will continue to produce an access distribution with elevated outcomes for People of Color, Black residents and lower-income residents.

However, the strong performance of the network for these groups does not mean that access to jobs is "good" or even "sufficient". The 36,000 jobs reachable by the median Person of Color in an hour of travel time represents less than 40% of the jobs within Akron city limits alone. The remaining 60% are jobs that take more than an hour to reach, if they are accessible by transit at all.

A ridership-focused network redesign will seek to make transit more useful, and expand these outcomes for all residents.

How many jobs can the median resident access by walking and transit?

		45 minutes	60 minutes
All Residents	**Near Transit**	**8,521**	**30,011**
	Far from Transit	323	331
People of Color	**Near Transit**	**14,466**	**35,672**
	Far from Transit	380	463
Black Residents	**Near Transit**	**15,510**	**37,463**
	Far from Transit	433	452
Lower-Income Residents (150% of poverty line)	**Near Transit**	**12,617**	**37,478**
	Far from Transit	443	393

Figure 51: Job Access by Race and Income

ACS 5-Year Summary File (2014-2019), LEHD 2018.

More About Measuring Transit Access

"Median job access" is a useful measure for summarizing the varying levels of access between different places, or between different groups in the same place. It is derived from the same analysis used to generate the hexagon job access maps on the preceding pages.

A job access value for each hexagon is determined by generating a travel time isochrone from the center of each hexagon, and intersecting with LEHD workplace location data.

A residential population value for each hexagon is determined by intersecting the hexagons with American Community Survey block group data, and interpolating based on the area of each block group shared with each hexagon.

Each estimated hexagon resident is assigned the job access value from the center of the hex. The figures in the table above are calculated by taking the median of all of the job access values assigned to each member of each group throughout the service area.

Proximity to Service

Transit can only be useful to a person if it is available at all. **Figure 52 and Figure 53** reports the fraction of Summit County's population within a 1/4-mile and 1/2-mile walk to fixed route transit. 1/4-mile is an industry-standard evaluation distance that requires 5-10 minutes for a typical able-bodied person walking at a moderate pace. We also present 1/2-mile here because many transit trips in places with poor walkability (street connectivity, lack of safe street crossings or sidewalks, etc) may require longer walks.

Residents

Across the entire county, only about 26% of residents are within 1/4-mile transit by this measure. This is because METRO does not serve many of the suburban areas of the county except with express service within a limited number of stops.

Of the 26% of residents near transit, a little over half (15%) are near only hourly or peak-only service. About 12% of residents are near 20- or 30-minute service.

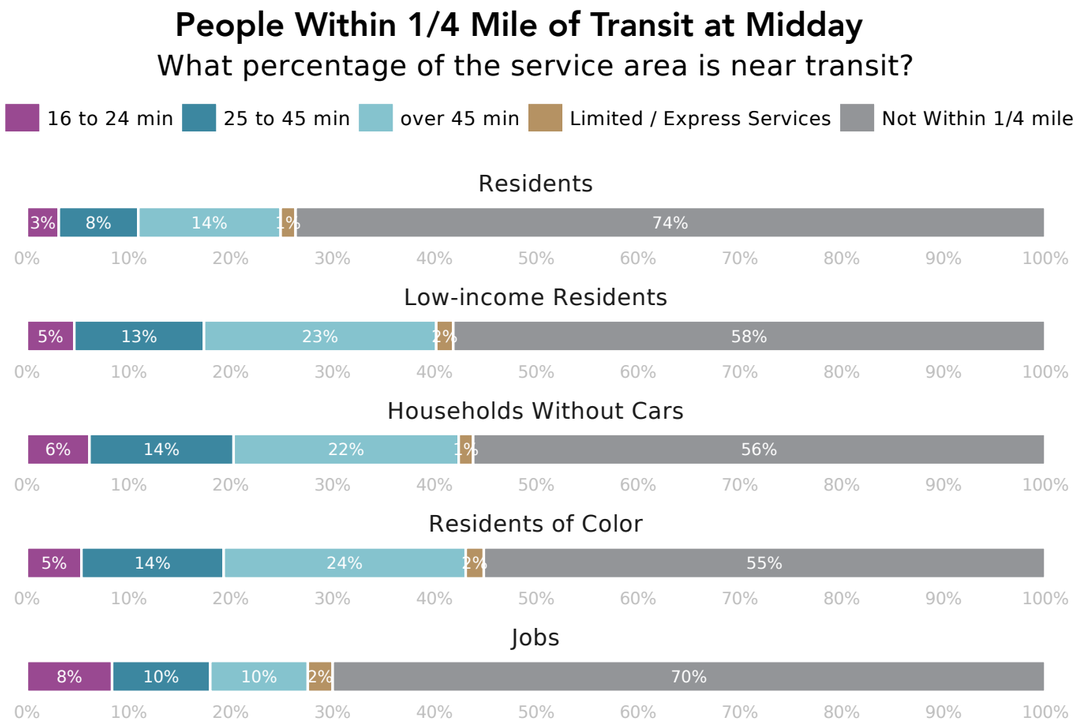
Jobs

A larger share of the County's jobs are near transit, owing to the concentration of jobs in Downtown Akron and in other large employment centers served by METRO. About 30% of jobs are within a 1/4 mile walk to transit, while about 70% are outside of this distance. Over half of the jobs that are near transit (18%) are near 20- or 30-minute service.

Jobs in Summit County are more concentrated in Akron than residents, but there is still a degree of dispersal across suburban employment areas. Over half of jobs further than 1/2-mile from transit service of any kind.

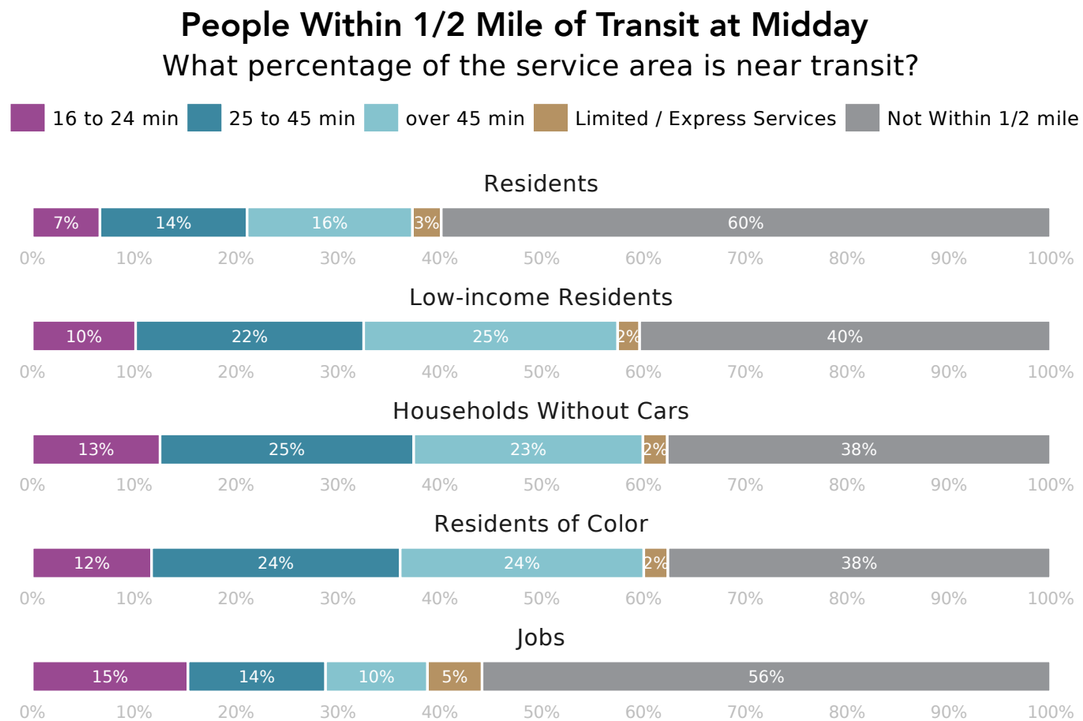
Low-Income Residents, Households Without Cars and People of Color

Transit agencies often design services with the needs of people who may need them most in mind - people with lower incomes, without access to a car, and People of Color. A greater share of all three of these subgroups are near transit, because all three are more concentrated within Akron and the suburban municipalities immediately outside it. However, while 42-45% of each of these three groups are within 1/4-mile transit of some kind, a majority of each have access to only infrequent or peak-only service.



Note: Proximity is measured as being located within 1/4 mile of a bus or rail stop.

Figure 52: Proximity to Transit (1/4 mile)



Note: Proximity is measured as being located within 1/2 mile of a bus or rail stop.

Figure 53: Proximity to Transit (1/2 mile)

4 Demand Response Programs

METRO's Demand Response Programs

The Role of Demand Reponse in the Transit Development Plan

METRO's 2020 Strategic Plan calls for a realignment and reimagining of demand responsive transit (DRT) services, to cost effectively meet the needs of persons with disabilities and older adults and to identify feasible opportunities for New Mobility options to help achieve the Plan's overall goals.

The Strategic Plan's vision for DRT is supported by three critical principals:

1. METRO recognizes the Federal obligation under the Americans with Disabilities Act to Summit County residents and visitors with disabilities.
2. METRO honors its historic commitment to Summit County older adults at a sustainable level.
3. METRO manages an overall financially sustainable DRT program that provides services cost-effectively and with manageable growth.

METRO's demand response expertise and resources also provide an important platform from which to launch new mobility innovations, with several already in place.

METRO's Demand Response Programs

A Long History of Service

For fifty years, since 1973, METRO's SCAT Senior and SCAT Temporary programs have provided shared-ride, mostly curb-to-curb trips for seniors and for persons with disabilities. The Americans with Disabilities Act (ADA) of 1990 established new requirements of public transit operators to provide Complementary Paratransit within ¾ mile of fixed route services, a civil right for individuals who were unable to use fixed route public transit for some or all of their trips, due to their disabilities.

METRO accommodated this regulatory directive by adding a third program, Complementary ADA Paratransit. METRO modified some service standards and practices to reflect the higher levels of service required for ADA certified riders. Each of METRO's DRT services, to varying degrees, provides this higher level of service which is reflected in close to zero trip denial rates

Over these five decades, METRO has developed an impressive mix of services and partnerships, illustrated in **Figure 54,** each targeted to individualized rider or organization needs. METRO's core services (ADA Complementary Paratransit, SCAT Senior and SCAT Temporary) represented 78% of October 2020 trips analyzed.

However, as observed in the Strategic Plan, operating costs for METRO's demand response programs increased significantly over the five-year period between 2015 and 2019. The number of trips those programs delivered increased as well, but as a much more limited rate. **Figure 55** shows that operating costs increased each year. Though this trend is observable over the entire timeframe, it is important to note that the largest year-to-year increase, shown in 2019, is an artifact of a change in METRO's cost allocation that more accurately allocated costs between demand response and fixed route modes.

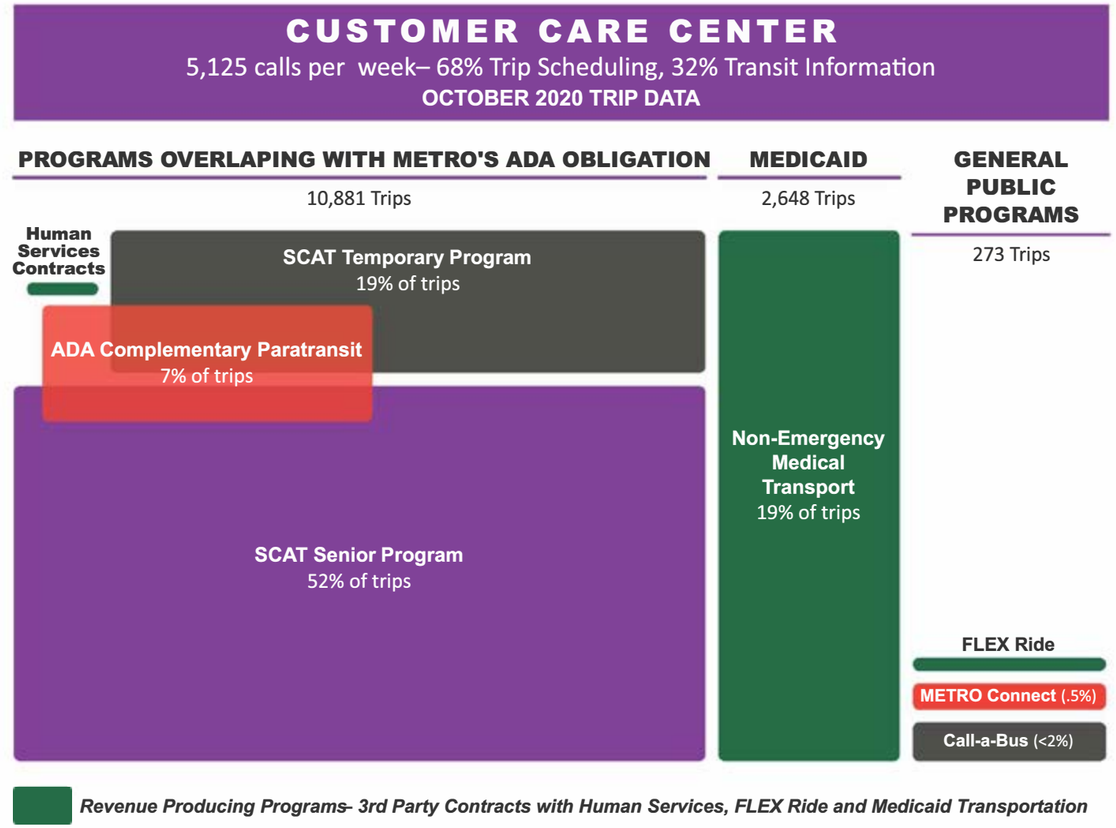


Figure 54: METRO Demand Response Program Summary

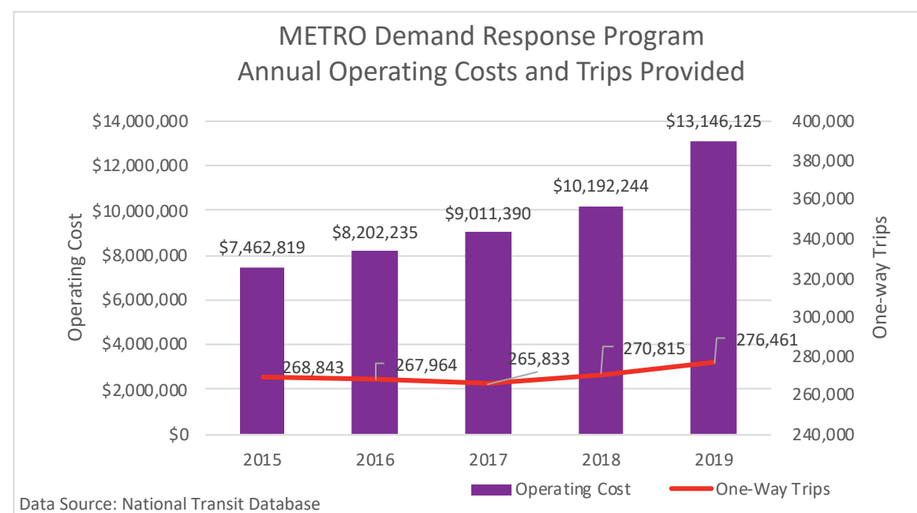


Figure 55: METRO Demand Response Operating Cost and Demand, 2015-2019.

Demand Response Trip Distribution

Figure 56 maps all trip requests for METRO demand response programs in October 2019, presenting a pre-COVID-19 picture of the distribution of rider trip demand. On this map, the black line indicates the 3/4-mile buffer around METRO fixed-route stops within which complementary ADA paratransit services must be provided. Trips include METRO-operated and those provided by its contractor, Thomas Limosine (TL). In 2019, about 95% of all demand response trips began within the 3/4-mile buffer.

Meeting Americans with Disabilities Act Obligations

Within these core programs, the ADA Complementary service is a small piece, 8% of October 2019 trips and 7% of all DRT trips provided in October 2020, during the COVID-19 pandemic. The 2019 trips are shown in blue in **Figure 56.**

The proportion of ADA trips provided is so low because persons have not sought ADA certification to use this service where their trip needs are met by the lower $2 fare SCAT Senior or SCAT Temporary programs, versus the $2.50 one-way fare for ADA trips. Benefits to ADA certification include that they can ride for any trip purpose and on the weekends, when SCAT Senior and SCAT Temporary are not operating.

ADA median trip lengths are between 5 to 6 miles in length, one-way, averaging 23 minutes travel time in 2019 and a shorter median travel time of 20 minutes in 2020.

ADA certified riders have gone through a formalized assessment and review, conducted in-person by METRO, to determine that they are functionally unable to use fixed route services for some or all trips.

Providing Trips to Seniors

SCAT Senior is METRO's largest demand response program, providing trips to older adults over age 62. SCAT Senior provided 47% of trips in October 2019, 52% in October 2020. Trips are limited in number and purpose and provided for $2 fare each way. These trips are shown as red dots in **Figure 56.**

Average trip length in 2019 was 5 miles per trip, with riders traveling, on average, for 21 minutes. As this map shows, almost all SCAT Senior origins are located within the 3/4-mile buffer around METRO fixed-route stops.

Providing Trips to Persons with Disabilities who are Not Seniors

SCAT Temporary is the third leg of METRO's specialized services program. SCAT Temporary is provided to persons who are younger than 62 but have some type of mobility difficulty, as attested to by a medical professional on a straightforward, two-page eligibility determination form. These trips are shown in green dots in **Figure 56**.

Average trip length in 2019 for SCAT Temporary trips averaged 6.3 miles, somewhat longer than for straight ADA or SCAT Senior trips. Riders traveled, on average, for 23 minutes per trip.

Revenue Producing Partnerships

METRO's Demand Response program has three revenue-producing services. In 2019 these generated close to $1 million in outside revenue. One large and two small programs include:

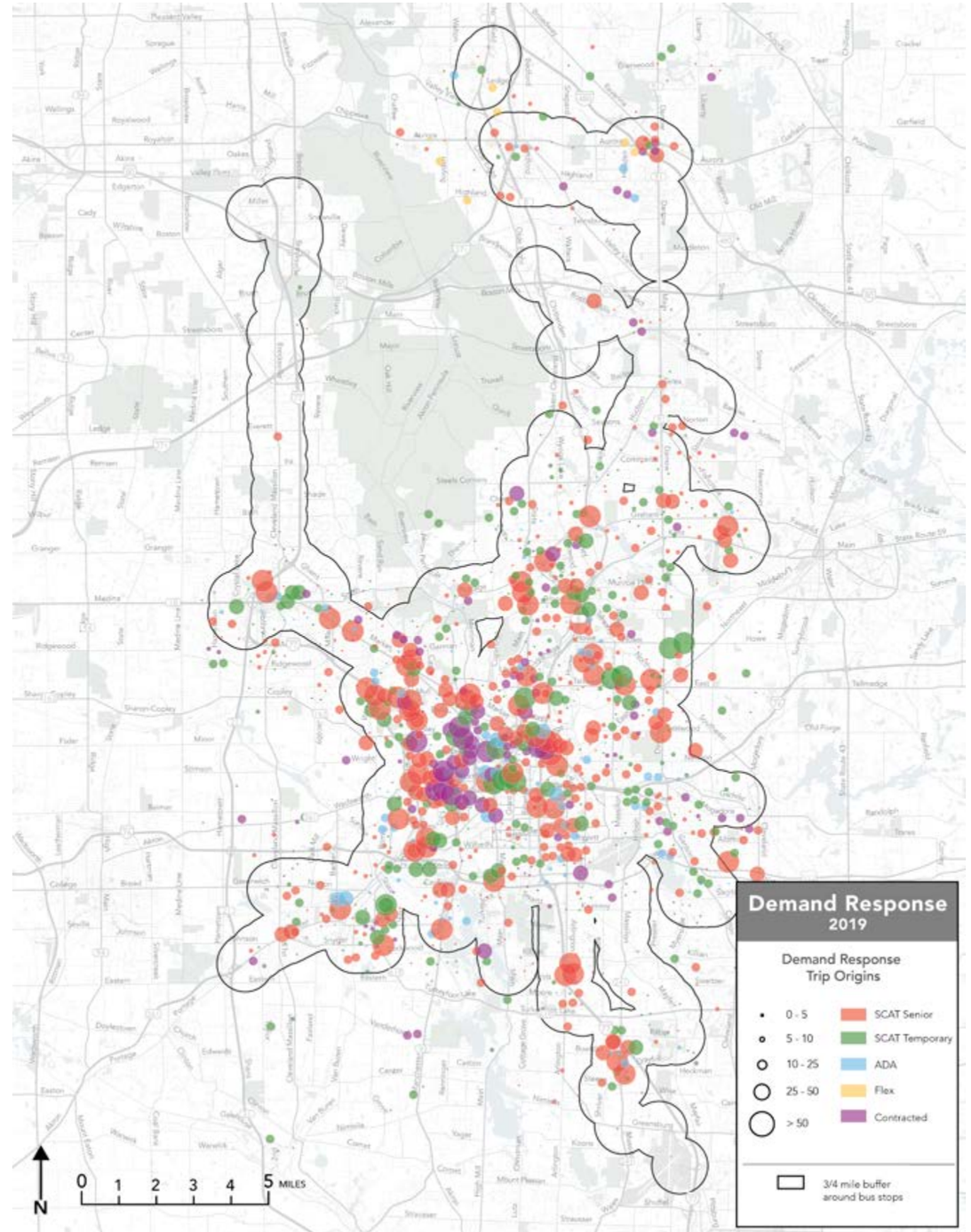


Figure 56: METRO Demand Response Trip Origins (October 2019)

- **Medicaid NET.** METRO's largest partnership is with the Summit County Department of Job and Family Services (DJFS), subsidizing 19% of all trips.

  Trips are provided to Medicaid enrolled persons for non-emergency medical services approved by the County DJFS. METRO is reimbursed for these trips on a mileage-basis at $4.40 per mile (2020). NET trips in 2019 were averaging over 5 miles and 21 minutes in passenger travel time, shortening in 2020 to an average of 4.5 miles and 17 minutes.

- **Human Service Contracts.** These revenue-producing agreements with five (5) human services agency partners provide for trips to service sites for SCAT or ADA eligible consumers. Small programs, these accounted for only 1% of all trips (2019), with most shutting down in 2020 due to the Covid-19 pandemic. Nonetheless, agency fund contributions to trip costs are an important feature of these partnerships which are expected to resume.

  For 2019, contracted services' trips varied greatly in average trip distance and rider travel times:

  - Foster Grandparent - averaged 4.5 miles and 19 minutes per trip.
  - Catholic Charities - averaged 5.7 miles and 25 minutes per trip.
  - Direction Home and Alternative Solutions - averaged 8 miles and 27 to 30 minutes per trip.
  - Project Search - averaged 9.5 miles and 30 minutes per trip.

- **FlexRide.** Revenue from employers subsidizes FlexRide, a commuter assistance, shared-ride program that picks up employees at or near their homes and transports them to work. METRO holds Memoranda of Understanding with employers who pay a fixed monthly cost for full or part-time employees' monthly commute trips. In October 2020 FlexRide was in limited operation as work trips were reduced due to the Covid-19 pandemic, and so represent negligible trip-making in **Figure 56 on page 45.**

Meeting General Public Trip Needs With Demand Response Service

General public demand response service use was still low in October 2020, less than 4% of trips provided. These programs are nonetheless a key facet of METRO's current family of services and its potential future service mix. In addition to FlexRide, general public programs include one existing and one new program:

- **Call-a-Bus** operates in select communits of northern Summit County and in the City of Green. These are shared-ride, advance reservation services to connect general public riders to fixed route or to fill in gaps where fixed route service is scarce. Trip requests must be made one day in advance. For $4 one-way, service is available on weekdays only, between 7 a.m. and 5 p.m in norther areas of the county and 8 a.m. to 4 a.m. in the City of Green. These trips are the shortest METRO provides, averaging 3 miles and 12 minutes per typical trip.

- **METRO Connect** is a new program, a pilot launched in September 2020 to serve areas within Stow, Tallmadge and a portion of Akron. General public passengers call ahead or on the same day, for a trip from designated bus stops to specific areas within the communities, along an identified route. Trips are provided within a 15-minute promised time. For the $1.25 fare, service is available on weekdays only, between 7 a.m. to 5 p.m. Data on travel time and trip distance was not available for this new program.

Demand Response Program Costs

A method of determining service efficiency compares the annual rate of growth or reduction in operating costs to the service demand of one-way trips provided. Operating costs increased by 76.2% between 2015 and 2019 while the volume of trips delivered only increased by 2.8%, as shown in **Figure 57.**

During this same five-year period, revenue hours increased by 11% and revenue miles increased by 24.8%, suggesting that trips are taking longer to serve and travel longer distances. Or there may have been a decrease in scheduling efficiency to maximize shared rides and vehicle capacity. Paired with the increase in operating costs, the metrics for cost per passenger, cost per hour and cost per mile all increased substantially while the productivity rate of passengers per hour decreased by -7.4%.

Rapid cost escalation suggests that the current demand response service model will need to explore what changes can be made to manage costs and service efficiency in the future, and to ensure that dependable demand response service continues to be made available to as many people within Summit County as possible.

Demand Response Service - Annual Service Characteristics

	2015	2016	2017	2018	2019	% Change from 2015 - 2019	5-Year Trend	2020	% Change 2019-2020
One-Way Trips	268,843	267,964	265,833	270,815	276,461	2.8%		171,341	-38.0%
Revenue Hours	120,319	120,964	124,098	128,133	133,550	11.0%		96,729	-27.6%
Revenue Miles	1,593,690	1,665,860	1,751,353	1,938,836	1,988,974	24.8%		1,341,639	-32.5%
Operating Cost	$7,462,819	$8,202,235	$9,011,390	$10,192,244	$13,146,125	76.2%		$12,223,197	-7.0%
Cost per Trip	$27.76	$30.61	$33.90	$37.64	$47.55	71.3%		$71.34	50.0%
Cost per Hour	$62.03	$67.81	$72.62	$79.54	$98.44	58.7%		$126.37	28.4%
Cost per Mile	$4.68	$4.92	$5.15	$5.26	$6.61	41.1%		$9.11	37.8%
Pax per Hour	2.2	2.2	2.1	2.1	2.1	-7.4%		1.8	-14.4%
Pax per Mile	0.17	0.16	0.15	0.14	0.14	-17.6%		0.13	-8.1%

Data Source: National Transit Database

Figure 57: METRO Demand Response Program Costs and Performance

Demand Response Rider Profiles

Profiles of the Riders of DRT Services

Riders by Service

A total of 3,247 unique riders were actively enrolled in one or more of METRO's various demand response programs and had taken trips in the six-month period between December 2020 and May 2021. **Figure 58** shows the percent of these unique riders who used each of the programs. Note that some riders are enrolled in multiple programs, and are included in the tally for each program in which they were enrolled during this period.

Riders with a formal ADA certification and using ADA Paratransit totaled one in ten riders (10%).

Almost seven in ten riders (69%) are enrolled in the SCAT Senior program.

SCAT Temporary registrants represent 24% of all users, but this may be overstated given that their temporary eligibility may have ended and transitioned to a different service while their previous eligibility remains in the rider file.

Summit County Dept. of Job and Family Services holds a contract with METRO and six in ten (62%) of all DRT registered riders are eligible for its Non-Emergency Medical Transportation (NET). These riders' eligible trips can be funded by the County.

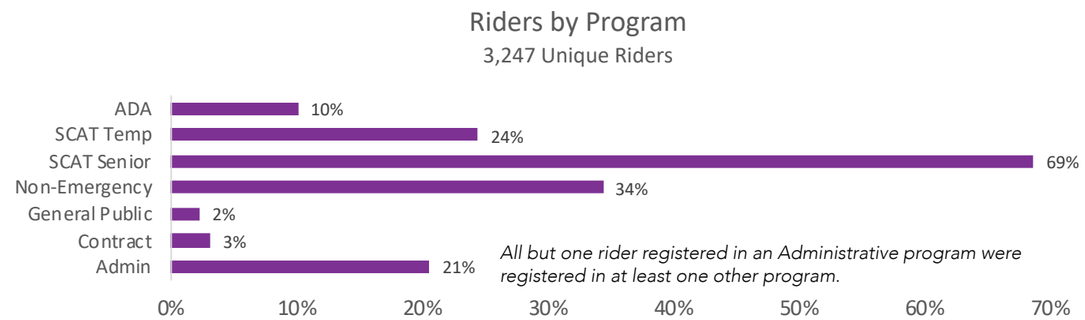
Human service transportation, under contract with five human service agencies, serves 5% of riders with their trips reimbursed by these agencies.

General public demand response programs, including FlexRide, Call-a-Bus and MetroConnect, represent 2% of riders respectively.

"Administrative" riders denotes a group of rider registrations not assigned to a specific service, 21% of all enrolled persons. These include persons taking rides for ADA assessment, vaccines, and free-fare fixed-route disability/senior passes. All but one of these riders are registered in at least one other program.

Client Age by Program

Figure 59 show the number of unique riders enrolled in each program by age. The proportion of riders between the age of 62-70 years old are the largest group, with most trips funded through the SCAT Senior or Non-Emergency Transportation programs. SCAT Senior use, predictably, is most common among older adults, while ADA and SCAT Temporary are generally transporting younger riders. Non-Emergency Transportation trips are most utilized for those under the age of 60. ADA riders represent only about 2% of all riders across all age groups.



Enrollment between December 2020 - May 2021

Figure 58: Demand Response Unique Riders by Service. These bars add up to over 100% because some riders are registered in multiple programs.

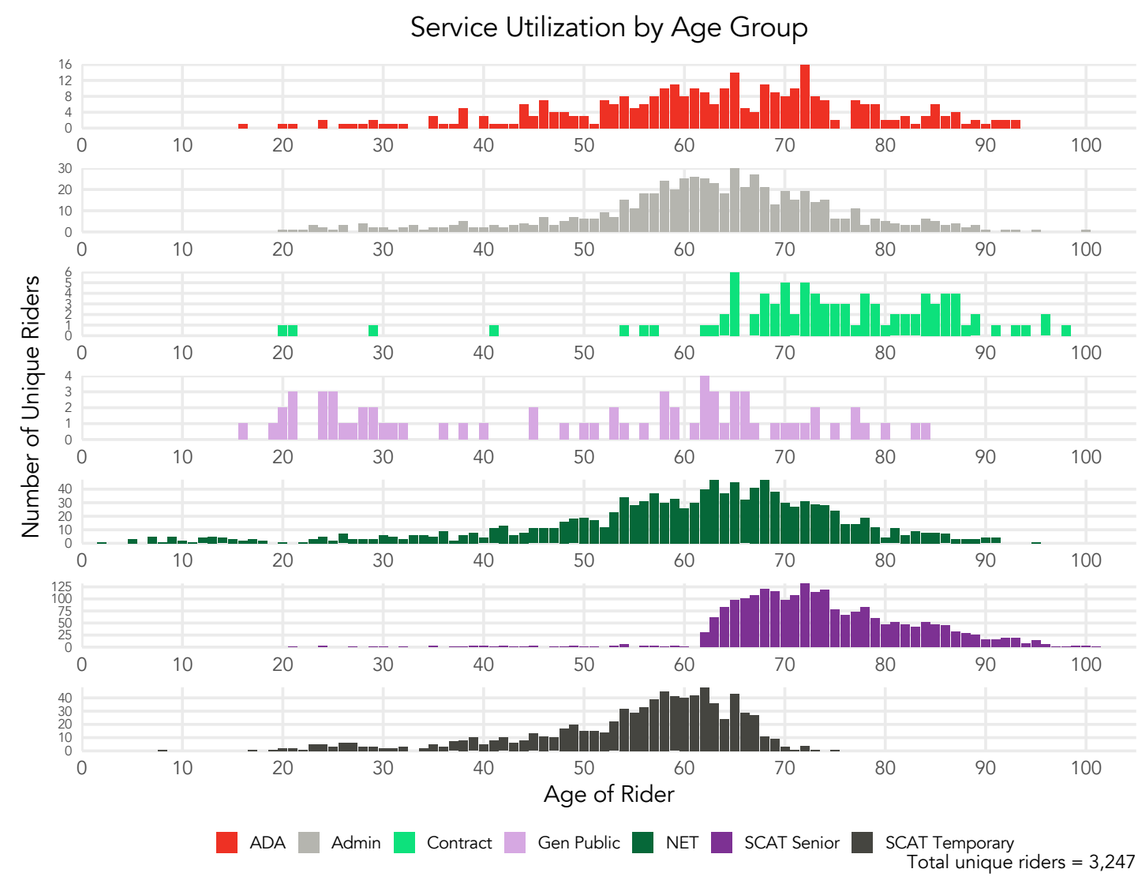


Figure 59: Service Utilization by Age Group and Program Enrollment

Disability and Mobility Characteristics

Disability status is distinguished between those with mental, physical or visual impairment, as presented in **Figure 60** by DRT service. Physical disabilities are the highest reported characteristic across all services, for 59% of ADA clients and 58% of SCAT Temporary. On this chart, SCAT Senior riders are reported to have a lower proportion of disabilities, despite having the largest enrollment. This is because information on disability is not collected for riders who are enrolled only in the SCAT Senior program.

Riders' disability characteristics can impact service delivery, where some require longer dwell times to board the vehicle via the wheelchair lift or need additional assistance getting onto the vehicle. Almost half of all ADA riders are reported to use a wheelchair or scooter when traveling and another 25% of ADA riders using either a walker, cane or crutches. Almost 30% SCAT Temporary riders are reported to be in a wheelchair. This suggests that a sizable portion of this rider group will eventually receive formal enrollment in the ADA program, although they may or may not live within an ADA corridor.

Use of mobility aides increases as riders age, as presented in Figure 58, most notably for adults over the age of 80. Thirty-five percent of riders over age 80 use a wheelchair or scooter, 15% use a walker and 8% use a cane or crutches. Wheelchair use among young adults and seniors younger than age 70 is around 5%. It grows to 12% of those aged 70 to 80.

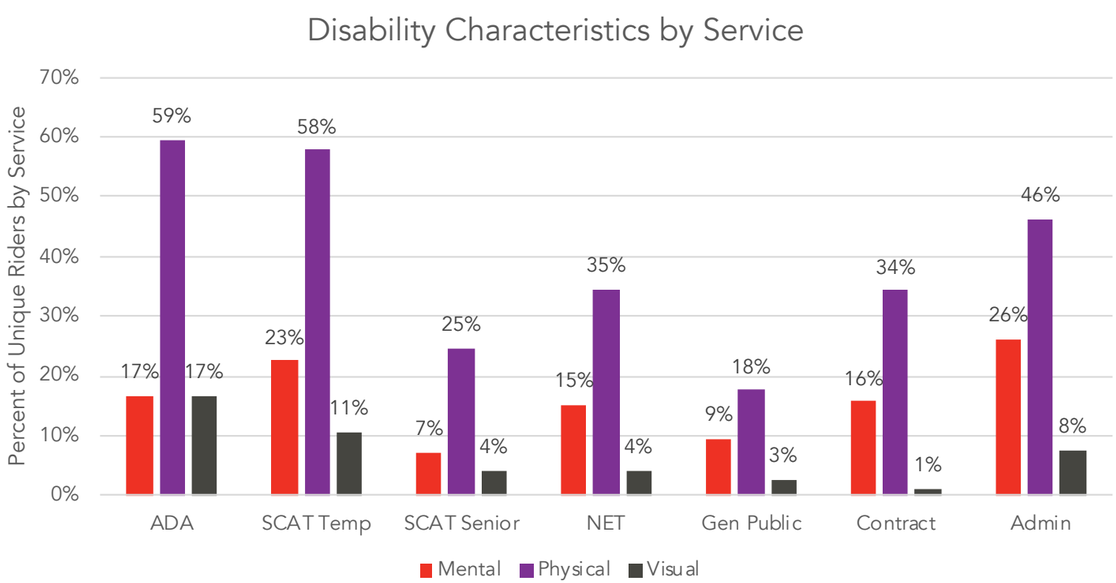


Figure 60: Disability Characteristics by Service

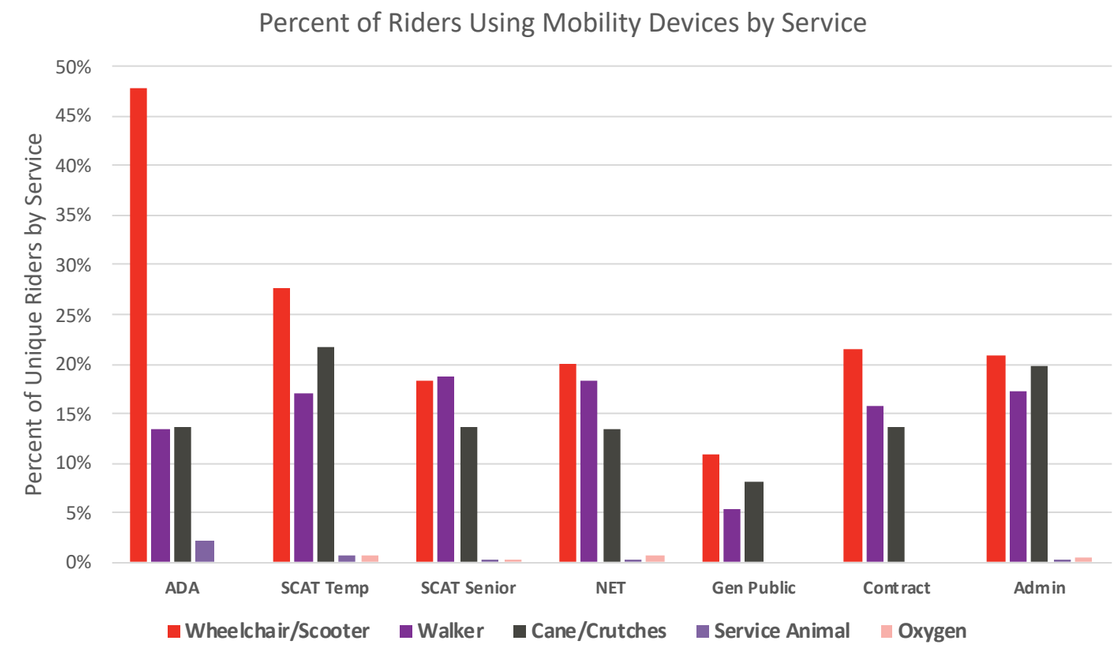


Figure 61: Riders Use of Mobility Devices by Service

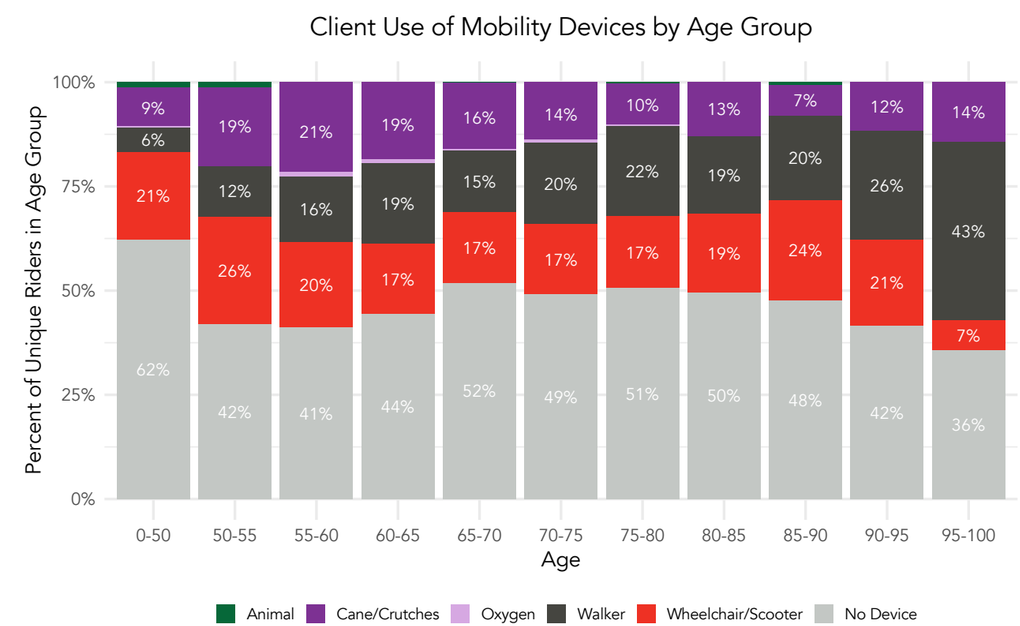


Figure 62: Riders Use of Mobility Devices by Age Group

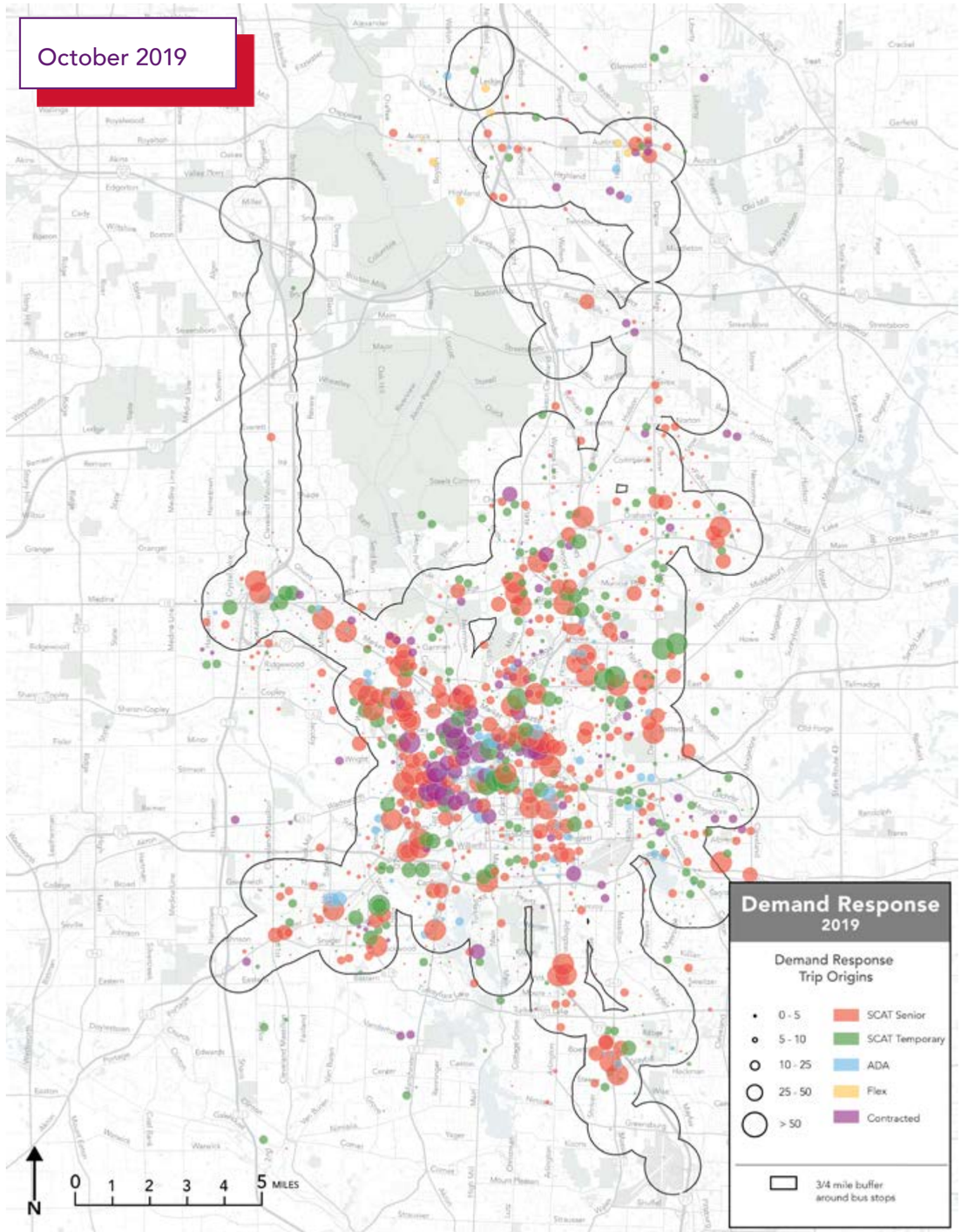


Figure 63: METRO Demand Response Trip Origins by Program, October 2019

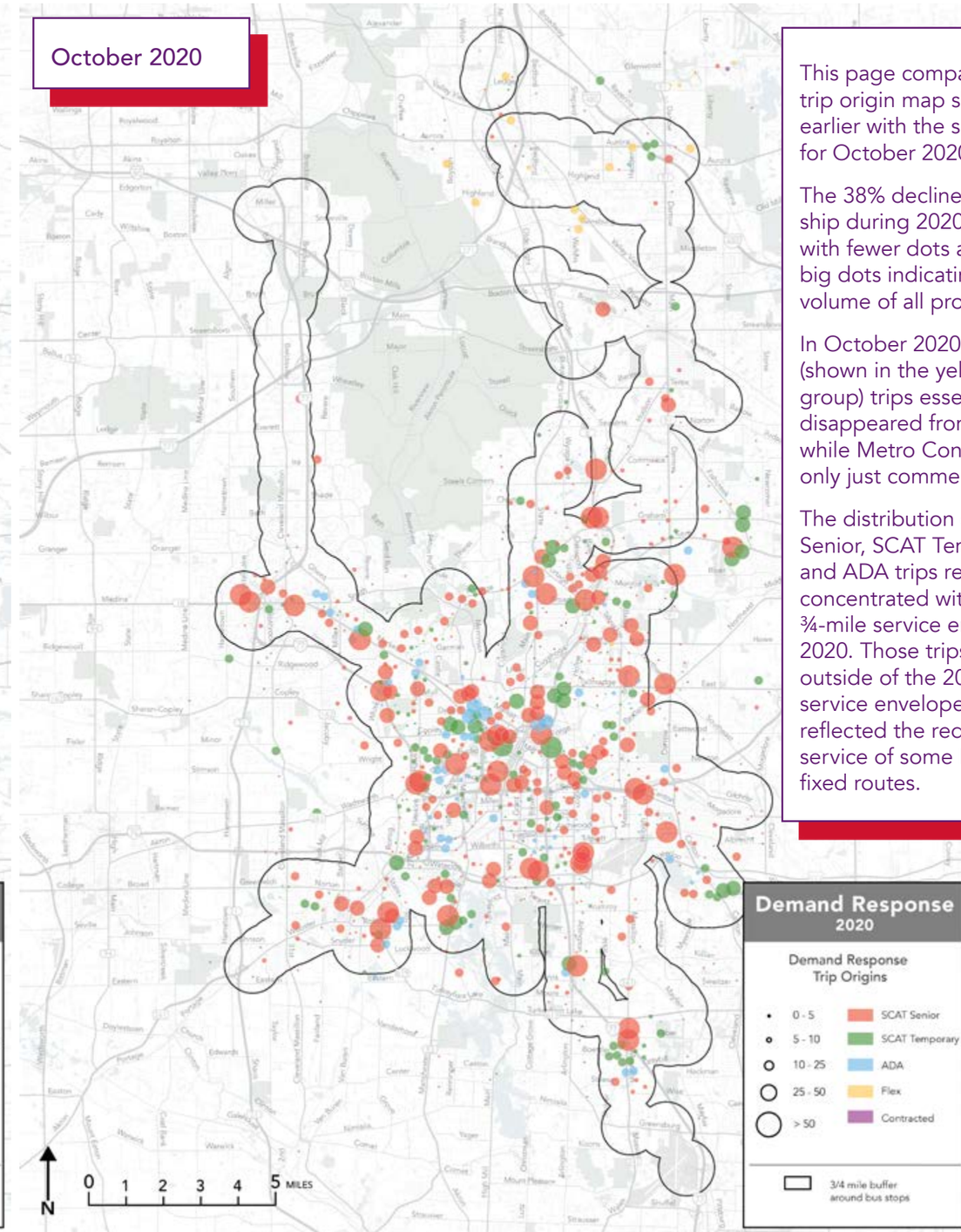


Figure 64: METRO Demand Response Trip Origins by Program, October 2020

This page compares the trip origin map shown earlier with the same data for October 2020.

The 38% decline in ridership during 2020 is visible, with fewer dots and fewer big dots indicating lower volume of all programs.

In October 2020, Call-a-Bus (shown in the yellow "Flex" group) trips essentially disappeared from the map, while Metro Connect had only just commenced.

The distribution of SCAT Senior, SCAT Temporary and ADA trips remained concentrated within the ¾-mile service envelope 2020. Those trips falling outside of the 2020 ¾-mile service envelope generally reflected the reduction in service of some METRO fixed routes.

Demand Response Program Structure and Organization

Provision of demand response services for ADA trips and trips to older adults, as described in *Transit Cooperative Research Program (TCRP) Synthesis 135, ADA Paratransit Service Models (2018)* involves three component areas:

1. The management structure to receive and handle trip requests and dispatch them to vehicles;
2. The division of work to assign trips among multiple carriers; and
3. The service mix of dedicated and non-dedicated vehicles, contractor and directly-operated service to complete the trips.

METRO's service model is termed by *TCRP Synthesis 135* as "Transit Agencies Performing All or Some of the Primary Functions". This model is shared by 38% of the profiled systems who provide ADA transportation and other specialized demand response transportation. Columbus, Ohio Transit Authority's (COTA) Mainstream was among the profiled agencies.

METRO operates its Customer Care Center to receive and organize trip requests and to handle information requests, including for fixed route services. Trips are dispatched through the Customer Care Center, which additionally serves as a broker for the NET non-emergency medical transport program. Trips go to in-house provision on directly-operated vehicles or to contracted transportation.

In what the TCRP report describes as a" Split Structure", METRO directly operates its Call and Control Center through established agreements with third parties for provision of some trips, providing the bulk of demand response trips on its fleet of 92 lift-equipped, or otherwise accessible, vehicles. Another 32 contractor-owned vehicles are operated by Thomas Limousine, to provide almost a quarter of October 2020 trips. Under its agreement with the Summit County, Job and Family Services Department, METRO dispatches NET program trips to additional contractors who hold service agreements directly with the County, as well as to its own drivers.

Comment on METRO's Demand Response Program's Overall Structure

The primary benefit of in-house service provision of "ensuring control over service quality" – whether through the Customer Car Center function or via directly-operated vehicles – was identified by *TCRP Synthesis 135* profiled agencies.

METRO's Customer Care Center and considerable fleet of directly-operated vehicles also enables it to move nimbly and put new services on the street, as with the METRO Connect or provision of general public FlexRide and Call-a-Ride services.

Customer Care Center Operations and Staffing

METRO's Customer Care Center is a multi-faceted call center, staffed by METRO employees. It is responsible for receiving and scheduling trip requests for demand response transportation, responding to "where's my ride" calls, registering new applicants and providing transit information and referrals regarding both fixed route and DRT services. Requests for trips are taken by METRO staff the entire time METRO fixed route serves are in operation. Calls for reservations and information outside of these hours are forwarded to METRO's contractor.

The Care Center has a roster of 10 call specialists for trip reservations that work staggered shifts throughout the day to cover the 10-hour operating window and to provide adequate coverage for call volumes during peak periods of the day. In efforts to best manage call volume and limit abandoned calls, three of the ten specialists are scheduled as extra board, working floating schedules on an as needed basis. Lunch breaks are staggered during the middle of the day beginning at 10:00 am and ending at 2:00 pm.

A roster of three full-time clerks respond to fixed route transit information requests. Clerks do not handle demand response trip requests.

A matrix of typical specialist and clerk wor k schedules for August 23, 2020 through January 16, 2021 is shown in **Figure 65,** although some additional scheduling variation is not captured here, which sometimes produces extra needs on certain days and times.

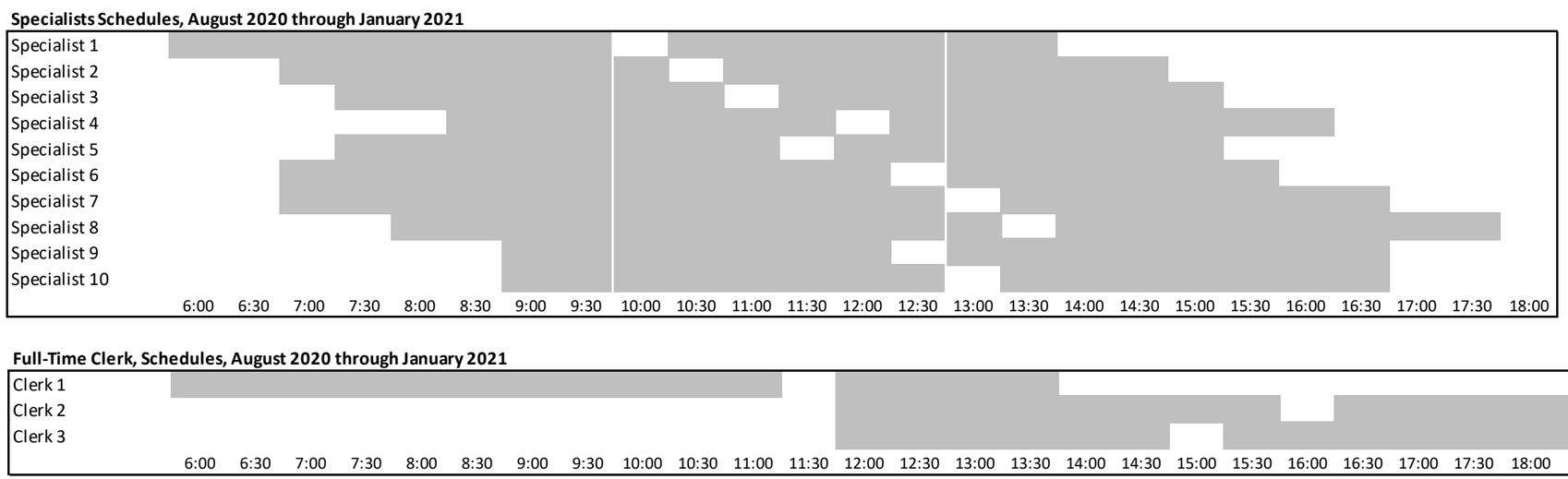


Figure 65: Customer Care Center Staffing Schedules

Customer Care Center Call Patterns

During the month of October 2020, the Customer Care Center responded to an average of 1,277 calls per day for transportation information and demand response trip reservations. Line Info calls for transit information and referrals represented 35% of all calls accepted. These peaked between the hours of 9:00 am and 4:00 pm. **Figure 66** charts the average number of Line Info calls by hour of day.

Line info calls received on a separate extension are reported to have the highest rate of abandoned calls, consistent with giving priority to paratransit trip scheduling calls. During peak call hours, clerks are answering an average of 43 calls Line Info calls per hour with an average of 11.4 calls or 26% abandoned. Clerks also sell transit tickets as assist passengers in person.

Call Specialists fielded an average of 569 calls per day for paratransit trip scheduling requests during the same October 2020 month, 20% of all calls accepted. **Figure 67** shows the average number of paratransit calls throughout the day in October 2020. Paratransit trip request call volume holds steady throughout the day with the greatest demand for trips reservations shown between 10:00 am and 12:00 pm at approximately 67 calls per hour. Calls for this same peak period were abandoned at a rate of 7.7 calls per hour or 11.5% of all calls.

In certain instances, a rider may only schedule the first leg of their desired round trip or be ready to be picked up sooner than expected for the return trip. Riders can put their return trip in "will call"; in these cases, the return trip is booked, but the rider must call in again to actually activate the trip when they are ready to depart. These paratransit return trip calls, presented in **Figure 68**, represent 20% of daily accepted calls. Peak periods are during the 10 and 11 a.m. hours and again around 2 p.m. when an average of more than 30 calls per hour are accepted. Abandoned calls are best managed for paratransit return calls at less than two calls per hour, except during the 11:00 a.m. hour which carried 7% of all Customer Care Center calls per day for this period and calls abandoned exceeds two per hour.

Comment on Customer Care Center

Based upon the abandoned call rates, METRO is giving priority to its Paratransit trip calls over Information calls, and appropriately so as riders may have other means of getting basic information, such as through Google Transit, the Transit app, Moovit and Avail Mystop apps. If "Where's My Ride" calls are falling into the Information calls category, these riders will not have alternative information sources and are likely to continue calling until their call can be picked up.

Staffing generally seems to parallel high demand period but falters, not surprisingly, during periods when staff take required lunch breaks.

Return call requests are minimal for most of a typical day. They do rise in volume in the mid-to-late morning and in the early afternoon and compete with other call types. In many systems, return trip requests are not allowed and passengers are required to book their return trip at the time they place the request for the out-going trip. Within such systems, there is usually accommodation for rider-initiated schedule changes on the return trip time.

TCRP Synthesis 135 also provides some

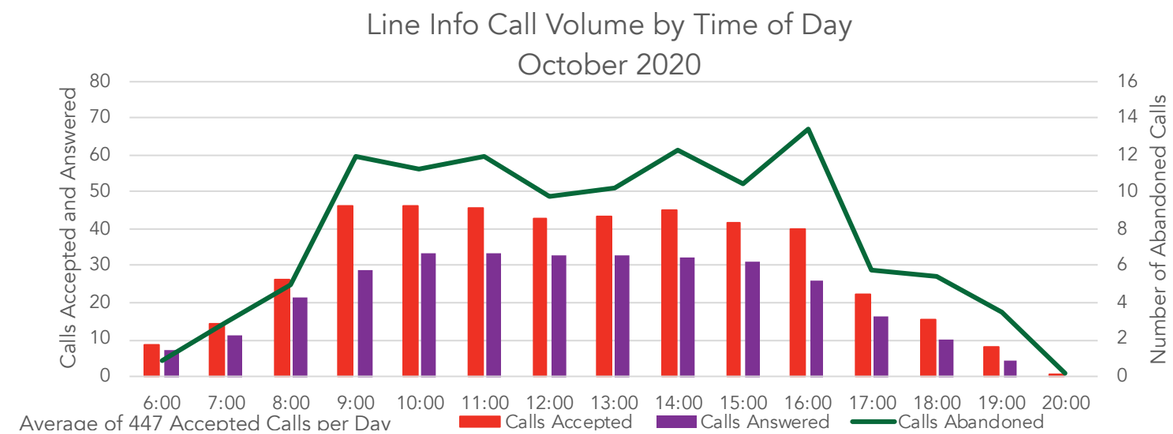


Figure 66: Line Info Call Volume by Time of Day

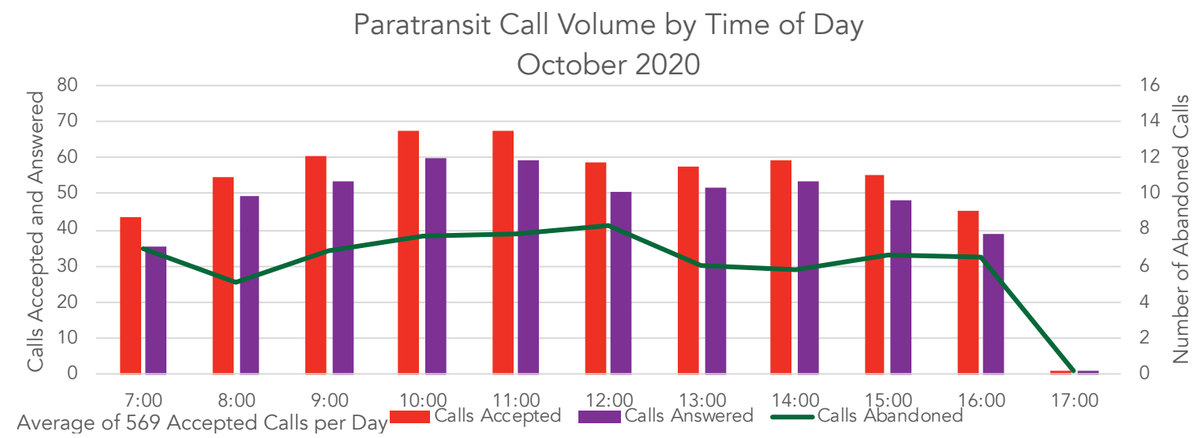


Figure 67: Paratransit Call Volume by Time of Day

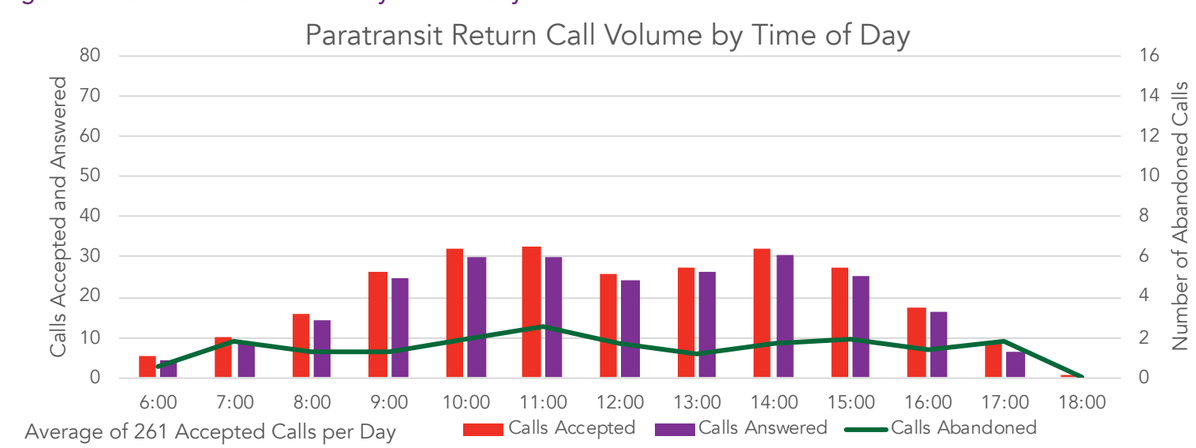


Figure 68: Paratransit Return Call Volume by Time of Day

Comparison with Other Demand Response Programs

basis of comparison for METRO's DRT services. While its cost and performance data was reported in 2018, likely collected in 2017, it still provides a useful frame of reference for selected variables.

METRO's 2019 NTD report identifies a $47.55 cost per demand response trip which is 22% above the median $37.02 cost per trip for the 25 services profiled by TCRP. METRO's DRT cost per hour was almost double at $98.44, 48% above the median of $51.33. METRO's 2019 more favorable productivity of 2.1 is 22% above the median productivity of 1.58 passengers per revenue hour. Unfortunately, cost per revenue mile was not reported for this group of ADA providers, a performance unit of importance to METRO as this is the basis for payment – and reimbursement – for much of its contracted service.

Comment on Cost and Productivity Comparisons

Within range of the *TCRP Synthesis 135* median of 2017 per trip costs and a favorable above-the-median productivity indicator are commendable. These point to both high volumes of trip-making and efficiencies in trip dispatching through METRO's Customer Care Center to keep per-trip costs down and productivity up.

Operating costs, however, are higher than desirable. METRO's high cost per revenue hour of $98.44, is weighted by the 24% contractor-provided revenue hour rate of $47.55 versus METRO's directly-operated DRT revenue hour cost of $101.09, per the agency's 2019 NTD report. METRO directly provides three-out-of-four trips, a proportion that declined slightly during the 2020 COVID year. *TCRP Synthesis 135* notes that services with high proportion of in-house trip provision tend to have higher costs. This is an area important to consider actions for reducing costs in a reimagined demand response program.

During 2020, METRO DRT unit costs and total costs declined, with the exception of the cost per trip which increased 50% from $47.55 to $71.34 and reflected the decreased volume of trips provided.

Comingling of Trips and Fund Sources on Vehicles Boosts Productivity

A key feature of METRO's DRT program is the nature of its shared-ride service. Riders supported by varying fund sources share vehicle trips and ride together, where dispatching efficiency suggests this makes sense. This is reflected in a comparatively high level of DRT productivity – METRO's 2019 2.1 passengers per hour was 22% above the *TCRP Synthesis 135* profiled programs providing ADA and seniors' transportation.

Termed "commingling", this reflects the practice of "routinely transport ADA eligible paratransit riders with other non-ADA paratransit riders on the same vehicles at the same time" This practice was assessed and documented in *TCRP REPORT 134, Resource Guide for Commingling ADA and Non-ADA Paratransit Riders (2011).* Mixing of ADA riders and non-ADA riders is particularly common among communities with robust demand response programs for seniors in place prior to 1990. And it has been important to communities with limited fixed route service, where demand response services help to fill in gaps. Akron has both of these characteristics.

Key DRT Performance Indiators	METRO Demand Response System (NTD 2019)	Mean of 25 Profiled Systems, TCRP Synthesis 135 (2017	% Difference METRO vs 25 Profiles Systems
Cost Per Trip	$47.55	$37.02	+22%
Cost Per Revenue Hour	$98.44	$51.33	+48%
Passengers Per Revenue Hour	2.1	1.6	-22%

Figure 69: METRO Demand Response System Performance vs. Industry Benchmarks

Comingling Requires Operating as an Overall ADA Paratransit Program

There are benefits and costs to co-mingling riders but the overall challenge is that ADA regulatory requirements must be met, as a civil right for ADA certified riders. METRO's fare and operational practices result in small number of persons being formally certified as ADA riders, but the disability characteristics information reported here suggests it is likely that a higher proportion of riders may be ADA eligible among METRO's DRT system users. Operationally, METRO's DRT program must conform with relevant sections of 49 CFR §131 a-f. Given the design of SCAT, SCAT Temporary and the ADA Paratransit program these are together performing largely as an ADA service by:

- providing service across the entire fixed-route service area, plus the remainder of Summit County
- having comparable fares, no more than twice the base, non-discounted base fare
- meeting any trip purpose, with no trip purpose restrictions
- operating on the same days and hours
- operating with no capacity constraints, with almost no trip denials
- providing comparable response time, generally the ability to make a trip request the day before.

Notably, only ADA certified riders are traveling on weekends. And only non-ADA riders are limited by trip purpose and in the number of trips they can take, on SCAT Senior and SCAT Temporary. But the rider characteristics data suggests that many more of these riders are likely ADA eligible and could become ADA certified, if they pursued the certification process. Because SCAT trips are $2 while ADA trips are $2.50, there is little perceived reason for them to do so.

Comingled Trips Contributes to Higher Program Costs

Because ADA paratransit service standards are higher than other program standards, these are generally applied to METRO DRT services across-the board. Reservations are taken for next day service. Trip requests are promptly met. Trips are provided throughout a large service area, with limited restrictions. There are almost no denied trips across any of the program. Additional limitations are necessary and not unreasonable for the non-ADA

services METRO operates.

For the NET program, trips are only provided as approved by the County DJFS and to eligible riders. For the SCAT programs, there are limitations in the number of trips allowable and in trip purposes allowable, although with almost no trip denials recorded, it isn't clear that any SCAT-appropriate or eligible trips are being turned away.

Even with some limitations, the METRO DRT program overall functions in conformity with ADA regulations to ensure METRO's overall compliance. There may be additional capacity and more trips provided than would otherwise be required in a more constrained ADA environment, but this would bear further study.

Demand Response Services Realignment and Reimagining

METRO's demand response programs are providing a large volume of trips – approximately 167,000 in 2020 even during the COVID-19 pandemic. These trips serve a wide range of mobility needs, throughout all parts of METRO's core service area. This suggests that the current programs are mainly serving mobility needs in and around Akron that the fixed route network is unable to address in its current form.

A ridership-focused, fixed route network redesign will seek to make the network more useful and has the potential to satisfy the mobility needs of some portion of current non-ADA demand response riders in a way that the current bus network does not. Because approximately 95% of trips start or end in the fixed-route service area, improvements to the fixed-route network have the potential to improve its potential usefulness for demand response riders able to use it.

Figure 70 summarizes the most important findings from this chapter, and describes the actions METRO could take in considering each topic implementing the direction of the Strategic Plan. At this point, no decisions have been made or plan developed for any changes; this summary is presented to inform riders, the public, stakeholders, and anyone else interested in METRO's demand response programs about the likely set of choices before the agency.

A redesigned fixed-route network may provide a more viable travel option for a portion of existing demand response customers, and create an opportunity to evaluate program changes to limit the ongoing trend of escalating costs.

Area	Key Finding	Actions following strategic plan direction
Rationale for demand response program re-alignment	Pre-COVID 19, five-year DRT increases between 2015 and 2019 saw: • 71% in cost-per-trip • 41% in cost-per-mile • Far exceeding the 3% ridership increase or 20% revenue miles increase METRO meets its ADA civil rights regulatory requirements, with a system-wide ADA program: • Only 7% of 276,00 trips (2019) were ADA • Large discretionary SCAT and SCAT Temporary serving 71% of trips (2019) • Very low trip denial rates reported (<0.25%) across all services ensure compliance with ADA but are among the system-wide policies contributing to higher operating costs.	As the 2020 Strategic Plan notes, METRO's SCAT and ADA demand response programs are vital to Summit County residents with disabilities or who are older. And under contract, METRO provides demand response services to low-income riders through Medicaid NET and to general public riders through Metro Connect and Call-a-Bus. Reimagining how METRO approaches its demand response family of services will support meeting larger mobility goals but in a financially sustainable manner. System-wide ADA compliance contributes to higher costs. Reimagining DRT involves revisiting: • DRT program eligibility and fare policy • Service area definitions • Trip type, purpose, and frequency policies • Built-environment policies, related to curb cuts, sidewalk and crosswalk improvements
Fare policies	Current fare policy of $2.00 for SCAT trips and $2.50 for ADA trips establishes a disincentive for use of ADA service, encouraging heavier utilization of discretionary SCAT services. ADA services are not required to be twice the $1.25 base fixed route fare but cannot exceed that. Contract fare subsidies do bring in important additional funds to the program, upwards of $1 million annually in some years	The 2020 Strategic Plan proposed a Fare Equity assessment to examine fare policy for METRO's, potentially enabling DRT fare policy to: • Better manage trip demand • Address affordability of services critical for those that need it most • Encourage riders to use the least expensive mode possible for their trip This Fare Equity assessment may consider a free fare policy for fixed-route trips by ADA certified riders who make some fixed route trips, at some times. The current policy has a reduced fixed route fare for these trips, however a further reduced or free fare could be considered.
Eligibility rules for specialized transportation	Among SCAT Senior riders: • 38% are between the ages of 60 to 70 • on average SCAT Senior riders take 9 (2020) to 11 (2019) trips per month In the future, some younger seniors who are not disabled could be well served by a re-designed fixed-route network. SCAT DRT trips cost $47 per trip, in contrast with fixed route cost per trip of $7 (2019).	Review METRO DRT guidelines of age and disability towards increasing the eligibility entrance age from 62 and encouraging those with disabilities to apply for ADA status. It could be considered that potential changes would impact new riders only, to grandfather-in existing SCAT and SCAT Temporary riders. New policies would encourage use of the re-designed fixed route network.

Figure 70: Considerations for Future Demand Response Realignment

Area	Key Finding	Actions following strategic plan direction
Demand response program management and vehicle operations	METRO's DRT performance indicators are very good in: • Very low no-show and late cancel rates (<2%); • Almost no denied trips across all services (<0.25%); • Favorable vehicle productivity of over 2 passengers per hour, relatively high for urban demand response services. DRT operating expenses tell a different story, with cost increases disproportionately high, relative to increases in trips provided: • Directly-operated service was 73% of revenue hours (2019) and 90% of expense. • Contracted, purchased transportation was 27% of revenue hours and 10% of expense. • In 2020, purchased transportation expense decreased by 39%. • In 2020, directly operated labor and benefits increased by $1 million, although revenue hours operated declined.	DRT performance indicators point to a well-managed DRT program. That said, operating costs are high and have steadily increased in recent years. Because of the much lower costs of providing trips through METRO's contractor, the allocation of demand response directly-operated revenue hours versus the purchased transportation could be revisited, to determine the benefits and costs of changing the current ratio towards a higher proportion of cheaper purchased transportation revenue hours. Further analysis of internal cost structures may identify additional strategies for saving in operating expense.
DRT technology innovations	METRO's sophisticated schedule and dispatching software is well-managed: • evidenced by higher-than-typical productivity • suggesting efficient vehicle operations among a complex family of DRT services. Other technology of on-board data terminals and communications equipment facilitate this, but with limited customer-facing technology.	DRT technology innovations have been shown to reduce some in-house, call center costs, including: • On-line trip booking • On-line "Where's My Ride" tools The FTA ITS4US program is currently experimenting in multiple projects around the country with the technology-based fare payment options for DRT trips. This bears monitoring for potential application to METRO to maximize their existing software tools or explore new opportunities.
Travel training for fixed route	METRO's travel training program has had limited success in training new riders to METRO's fixed route services, in large part because DRT trips remain more convenient in METRO's current network.	Improvements in fixed route travel speed and frequency of service in a re-designed fixed route network, are likely to make travel training more successful. Re-invigorating METRO's travel training program, coupled with good promotional campaigns directed to current (or future) SCAT users, can reveal where individuals can be well served by the fixed route network re-design and conserve DRT resources.
DRT expertise in implementing and managing New Mobility Solutions	METRO has implemented a number of small scale, general public demand response programs, including Call-a-Bus, METRO Connect and FlexRide. Coupled with their orientation to partnerships, provides a foundation to build upon, in developing future, targeted New Mobility services.	In-house expertise exists in providing next-day and same-day demand response trips for the general public. Building upon "lessons learned" from these services can ensure that METRO successfully implements additional New Mobility solutions.

Figure 71: Considerations for Future Demand Response Realignment (page 2)

5 Key Choices for Network Redesign

How Far To Move Towards The Ridership Goal?

Reimagine METRO is a unique opportunity to rethink the purpose of Summit County's transit system. The most basic choice is the degree to which the transit system should be pursuing ridership or coverage, but there are a number of other very important planning choices to be made. This chapter reviews the high-level network structure decisions that will be addressed in the development of the alternatives during the course of this project.

What is planning for High Ridership?

Designing a network for **high ridership** serves several popular goals, including:

- Enabling people to use transit to easily get to many jobs and services.
- Minimizing pollution and climate impact by replacing car trips with transit trips.
- Limiting the growth of congestion.
- Supporting dense and walkable development.

Prioritizing ridership means buses come more often and are convenient for more trips (higher frequency, longer hours) **but are available only in places where many people, jobs and destinations are located.**

What is planning for High Coverage?

Designing a transit system for **high coverage** serves different popular goals:

- Ensuring that as many people as possible have insurance against isolation through access to some transit service, no matter where they live.
- Ensuring that every community in the county has some service, even if relatively few people live and work there.

Prioritizing coverage means buses serve as many places as possible, but because they are spread out they don't come often (once an hour or less) **and aren't convenient for many trips.**

The Strategic Plan provides the directive to redesign METRO's network with a greater focus on ridership. That means investing more in frequent services in dense, walkable places. However, the Strategic Plan does not tell us how far to move in this direction. A network designed 100% for the purpose of generating ridership looks very different than a network where only 75% of resources are focused on this goal.

Why can't METRO do both?

METRO can pursue high ridership and extensive coverage at the same time, but the more it pursues one, the less it can provide of the other. Every dollar that is spent providing high frequency along a dense corridor is a dollar that cannot be spent bringing transit closer to each person's home.

The next phase of this process will develop a network alternative showing how METRO's network would look if redesigned to focus on ridership goals. The main objective of the first phase of public engagement will be to ask people to tell METRO whether that alternative looks like the right balance, or whether it needs to be refined to offer more frequency or more coverage.

Figure 72: METRO Annual Total Ridership Trend, 2014 - 2019 NTD
Akron METRO 2020 Strategic Plan

Figure 73: METRO Annual Fixed route Ridership Trend, 2014 - 2019 NTD
Akron METRO 2020 Strategic Plan

Why can't we just put back the old system as it was before the pandemic?

Its true that prior to the pandemic, METRO ran more service than it does today. However, that service was not optimized for ridership to a greater degree than today's network. All of the network structure issues related to duplication, stop spacing and low-frequency were present in the old network, with the additional challenge of a network designed around non-clock-face headways, where no reliable hourly timed transfer existed.

Additionally, while COVID has produced an unprecedented drop, ridership had been in decline over the 5 years prior to the pandemic, falling by 10% during that period across all services.. At the same time, METRO's operating expenses have increased by 25% over the past decade, and sales tax receipts have proven highly volatile.

While METRO completed its Strategic Plan during COVID, it was written with these long term trends in mind, not the short term disruption of the pandemic. The upheaval of 2020 and 2021, and particularly its dramatic impacts on ridership make the need to reorient METRO's service around its most reliable customers more pressing than ever.

Should We Ask People To Walk Farther For Better Service?

Earlier in this document, we examined maps evaluating the level of duplication and deviation in METRO's current network. In much of central Akron, especially downtown and the neighborhoods to the south and southwest, most places are within walking distance of two, and often three or four different routes, all running at low frequency and traveling downtown. This duplication arises from two network design principles:

- The downtown timed transfer requires the convergence of all of METRO's routes, so many routes operate on streets leading in and out of downtown.
- The network in inner neighborhoods of Akron is designed in a way that reduces walking through very close route spacing, as in South Akron with routes 21, 13, 11, 17 and 2.

In a no-growth network redesign designed to increase ridership, one of the most important outcomes is building a more extensive network of frequent lines that are always coming soon. One way of doing this is by consolidating duplicative service onto a single corridor. This often means asking people to walk a bit further to service, but can result in much shorter overall journey times. **Figure 75** provides an illustration of this basic principle.

> In a network redesign, it may be possible to create more frequency by consolidating service, but this means asking people to walk further to transit.

There are a number of opportunities to improve frequency by reducing duplication in METRO's network, particularly in the areas shown in **Figure 74.**

Reducing Duplication - A Practical Example

In a network redesign, it could be possible to consolidate services in South Akron into three routes: 30-minute services on South Main and Brown, and then the existing 20-minute Route 2 on Arlington.

Doing so would reduce average waiting times (and overall travel time) by 15 minutes for anyone using the remaining Main and Brown routes, and produce a more legible network where each route served one corridor without deviation.

Some places would be a longer walk from transit. In the worst-case scenarion in this example, Grant would no longer we directly served; a person starting a trip on Grant would have to walk 1/2-mile in either direction to routes on Main or Brown, a distance that takes ~10 minutes to cover at a moderate pace similar to that assumed by Google Maps or similar directions.

From an origin point like Grant & Archwood, a trip to RKP Transit Center would still be faster under this scenario, because the Main route would be running every 30 minutes, reducing the average wait from 30 to 15 minutes. This travel time savings outweighs the added walk, even in the worst-case scenario. (In fact, walking from Grant to Main is already often a faster way to reach downtown because of the more direct path of Route 21).

Figure 74: Route 5 must deviate south from Archwood to Triplett because Archwood does not continue east of Seiberling St.

The Stable Resources Scenario will illustrate this concept.

In the next phase of this process, a Stable Resources Scenario will be developed that shows how METRO's network could look it it were redesigned to focus more on ridership. The purpose of this alternative is to illustrated how tradeoffs like walking vs. waiting would impact the network and real people's trips. Engagement conducted during the Strategic Plan suggested the public strongly values a more frequent network; this alternative will give people a chance to understand the real implications of that direction in their own community, and provide guidance to METRO on how to redesign its future services.

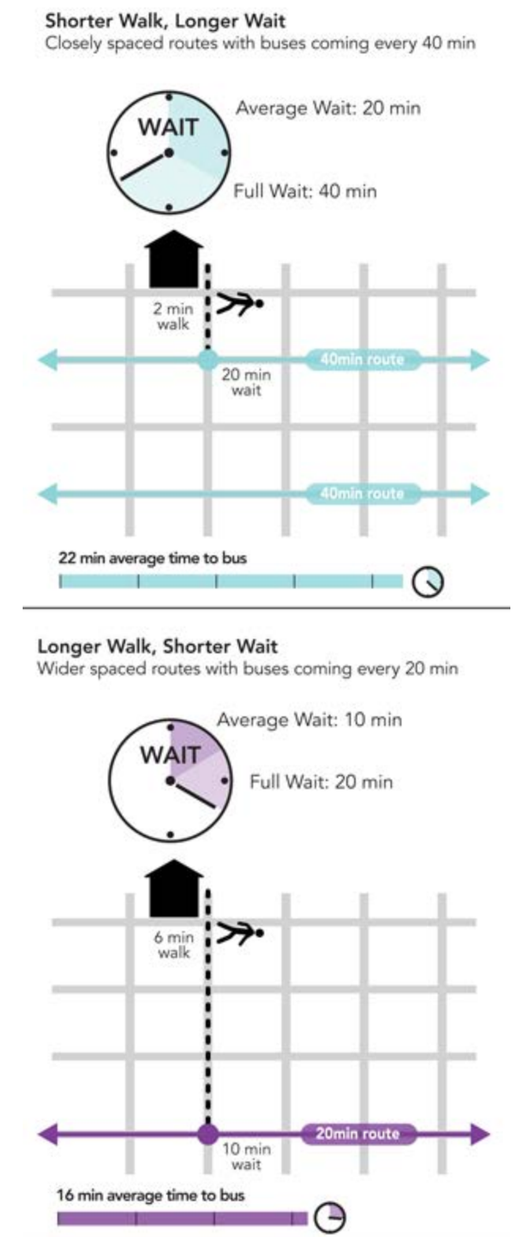


Figure 75: Walking or waiting?

What Role Will The Timed Transfer Play?

Today, every METRO route served the RKP Transit Center in Downtown Akron. This provides an important benefit in that it makes a robust timed transfer possible, reducing travel times for trips across the city. It also comes at a cost - the time spent driving to and form the transit center.

In a network that operates at entirely low frequencies, the timed transfer is one of the best ways to mitigate the long waiting times that 30 and 60-minute headways require. The timed transfer reduces the average wait for a connection between routes like Route 4 and Route 12 from an average of 30 minutes to about 10 minutes.

The more frequently service runs, the less valuable strictly timed connections become, because frequency itself reduces waiting time. As a consequence, the more frequent METRO's future network is, the less critical the timed connection at RKP Transit Center becomes for trips using frequent services.

Figure 76 shows the waiting time saved by timed connections for trips involving a transfer between routes of varying frequencies, assuming a 10 minute waiting and transfer time at the timed transfer point.

For transfers between 60-minute routes, the benefit is very clear: compared to an average wait of 30 minutes with an untimed connection, the timed connection and 10 minute transfer produces a travel time savings of 20 minutes.

For transfers to more frequent routes, the travel time savings are smaller. For this reason, strictly timed connections between frequent services are very uncommon in bus networks that offer mutliple high-frequency routes.

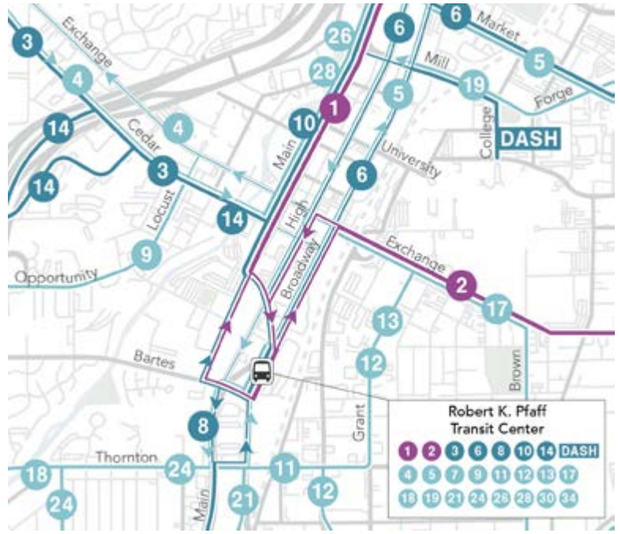


Figure 77: Today, all METRO routes converge at RKP Transit Center.

If METRO's network redesign results in more frequent services serving more of the city, the need for each of those routes to go to RKP is reduced, because timing their connections is less useful. Or, if frequent routes do continue to serve RKP, their schedules may not need to be designed with a 5-10 minute hold at the transit center to ensure enough time to exchange passengers with other routes.

This may have the effect of making some resources available for other purposes like extending routes or spans for running more frequently that is currently invested in travel time to and from the transfer point, or in hold time. However, to the extent that METRO continues to operate 30 and 60-minute routes terminating downtown, the timed transfer will continue to be a powerful tool to make connections between infrequent routes more useful.

	First Route Used In Trip		Transferring Route			
Connection Type	Frequency	Average Waiting Time	Frequency	Average Waiting Time	Total Waiting Time	Time Savings Vs Untimed Connection
Untimed	60	30	60	30	60	
Timed	60	30	60	10	40	20
Untimed	60	30	30	15	45	
Timed	60	30	30	10	40	5
Untimed	60	30	20	10	40	
Timed	60	30	20	10	40	0
Untimed	60	30	15	7.5	37.5	
Timed	60	30	15	10	40	-2.5

Figure 76: Waiting time savings of 10-minute timed transfer by frequency.

With more frequent service, the timed transfer at RKP Transit Center may become less critical to the usefulness of the system. In some cases, resources currently spent running to and from the transit center could potentially be used to improve other aspects of the network, like frequency, span or coverage.

What Role Can "New Mobility" Play?

METRO's Strategic Plan outlines a future role for emerging mobility services, sometimes referred to as "new mobility" or "microtransit". These terms describe a range of transportation service types that generally involve some degree of flexibility in the pickup and dropoff locations available to passengers.

Figure 78 illustrates a range of potential new mobility services from traditional fixed routes with "flag stops" available upon request to anywhere-to-anywhere demand response zones similar to METRO's existing SCAT programs, or private operators like Uber or Lyft.

Typically, new mobility services are differentiated from traditional demand response programs by their integration of an app-based, short-notice booking system and lack of eligibility criteria. There are many different service delivery models currently in operation, from full agency control with staff drivers to fully contracted services operated entirely by third parties. In some cases, new mobility can even mean a fare subsidy paid by a transit agency to a private operate that is available for trips in a given area, which may be totally invisible to the customer.

What role do new mobility services have in a network redesign?

The other distinctive characteristic of new mobility services is their expense. On-demand trips of any kind can be much more expensive to provide than fixed route trips. For instance, a typical trip on METRO's current demand response programs costs over 6 times as much for the agency to deliver as a trip on the fixed route network. This is why transit agencies are careful and thoughtful about where they offer demand response service and how they control its costs.

The cost of a fixed route is steady over time. It does not go up immediately when more people ride it. As a result, when more people ride, it becomes less expensive to provide each ride.

In contrast, the costs of demand response service rise as more people request trips and more drivers and vehicles have to be added to serve them. This is because each vehicle can only provide a few trips per hour of service, as the demand response trip is responible for taking customers to and from their origin and final destination, not just the nearest transit stop.

Because of its high cost-per-trip, new mobility services are not high-ridership tools. One of the goals of METRO's Strategic Plan is to make service more cost effective. For the fixed route network, this means putting more people onto every bus trip. But carrying more people with new mobility services has the opposite effective, because each trip is so expensive.

Even in its most efficient forms, on demand service cannot move as many people per vehicle, or as many people per dollar, as a moderately productive fixed route.

However, on demand service can do something very useful - they can move fewer people, at a lower cost than any fixed route, while still providing a transportation option to those who need it. This can be an effective way to provide service in low-density places that are unlikely to generate much ridership with a fixed route, but where some sort of publicly-supported transportation service is desirable.

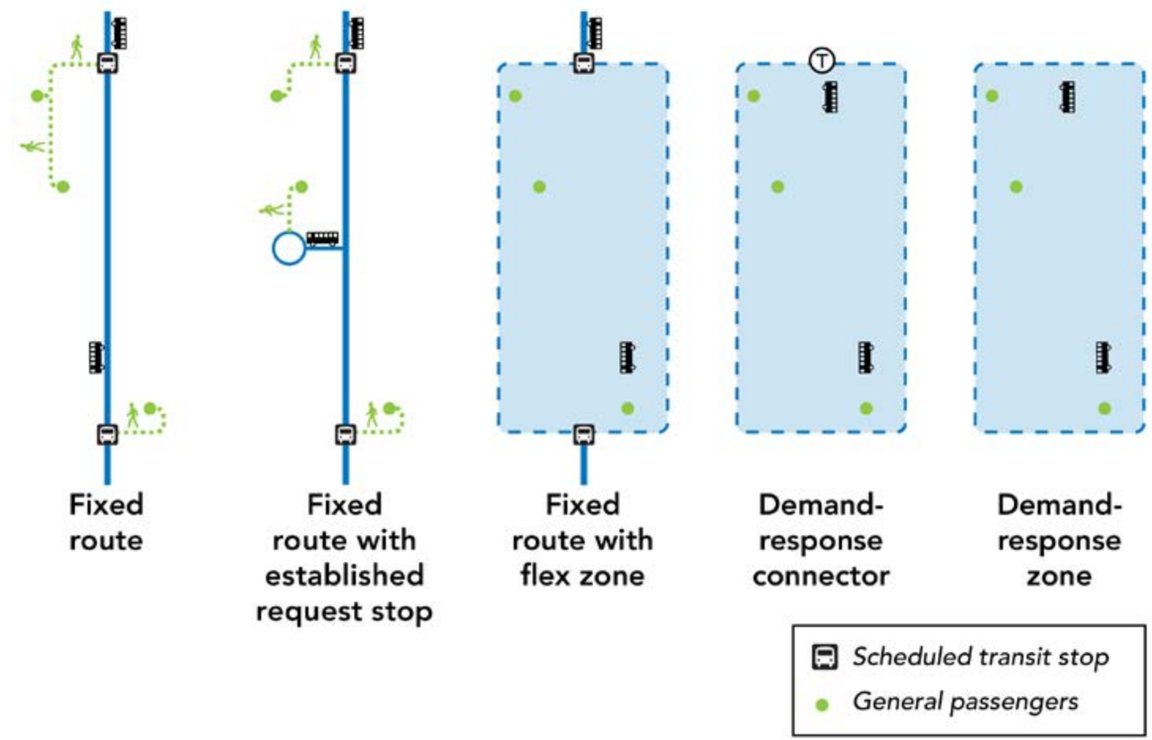


Figure 78: Microtransit service types

New Mobility services offer the potential to provide a coverage option in low-density places that the fixed route network cannot afford to serve when the goal of the network is to generate high ridership.

The Next Step: How Do We Ask The Questions?

In Summer 2021, a Stable Resources Scenario will be developed that illustrates how METRO's network could look with today's operating resources if these design principles were put into practice. In the fall, this alternative will be shared with the public as part of an engagement effort to guide the Transit Development Plan.

This alternative will illustrate the real implications of putting the directives of the service plan into practice. People will be able to see for themselves how the network would change: which corridors would run more frequently, which places would be a longer walk to transit, and which (if any) that METRO goes today wouldn't be served at all. This will be coupled with an analysis that shows how the alternative compares with today's network on measures like job access and the number of people in proximity to service.

This material will be presented online using interactive maps to make it as easy to explore as possible. This will be complemented by engagement in an open house format, as well as a stakeholder process bringing together community leaders from throughout the area METRO serves to weigh in on the key questions.

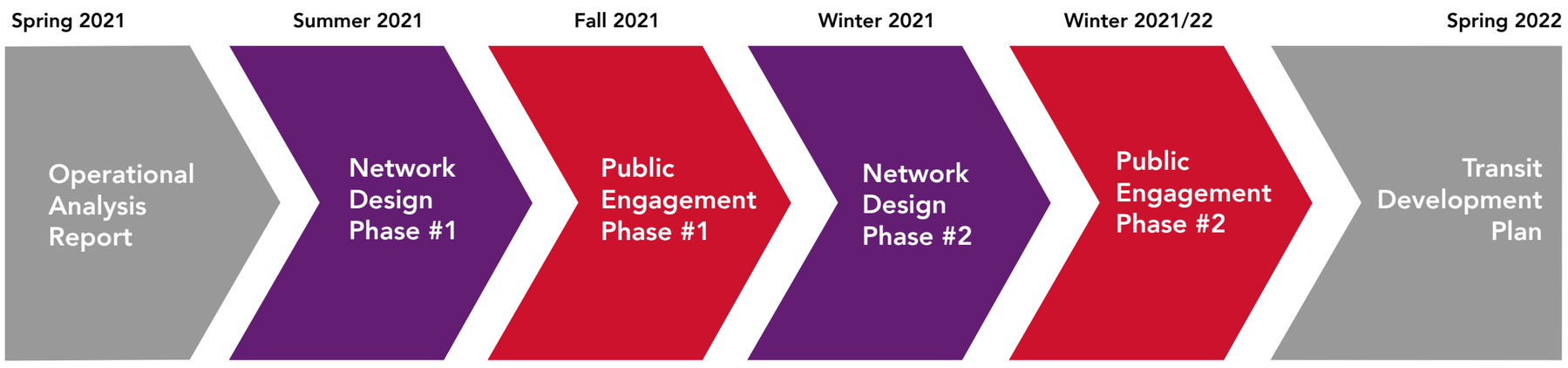


Figure 79: Reimagine METRO Process Timeline