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INTEGRATED TRANSPORTATION PLANNING

Muskegon Area Transit System Route Study and Comprehensive Operational Analysis

FINAL REPORT

January 2020

Submitted to:

MATS Wherever life takes you.

MUSKEGON COUNTY MICHIGAN

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FIGURES

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1. EXECUTIVE SUMMARY

The Muskegon Area Transit System (MATS) provides public transit throughout Muskegon County, with two distinct services. Fixed-route service is provided primarily in Muskegon, Muskegon Heights, and Roosevelt Park, as well as portions of Norton Shores, Muskegon Township, Montague, Whitehall, and Dalton Township. GoBus demand-response service is provided countywide for persons with disabilities, as well as those over the age of 65.

In the last decade, MATS ridership has followed a similar trajectory to national trends. Fixed-route ridership peaked in 2011 but has declined in recent years as an improving economy has coincided with a changing mobility landscape. Factors such as an increase in teleworking, online shopping, and home delivery, as well as the emergence of new technologies such as app-based ride-hailing services have all contributed to the decline in fixed-route bus ridership nationally and in the Muskegon region (**Figure 1**). At the same time, demographic trends including the aging of baby boomers have resulted in a growing demand for GoBus demand-response service and similar services nationally. Although **Figure 2** shows that GoBus ridership has been fairly flat over the past five years, actual ridership is not indicative of demand as GoBus trip requests can be denied, due to capacity constraints, for passengers who are not certified as disabled according to the Americans with Disabilities Act (ADA).

In recent years, MATS has faced considerable funding challenges, which has necessitated cuts to both fixed-route and GoBus service. Even with these cuts, MATS had an operating deficit of nearly $400,000 in FY2019. Due to financial constraints, the denial rate for GoBus was approximately 30 percent in October 2018.

Figure 1 | MATS Fixed-Route Passenger Trips

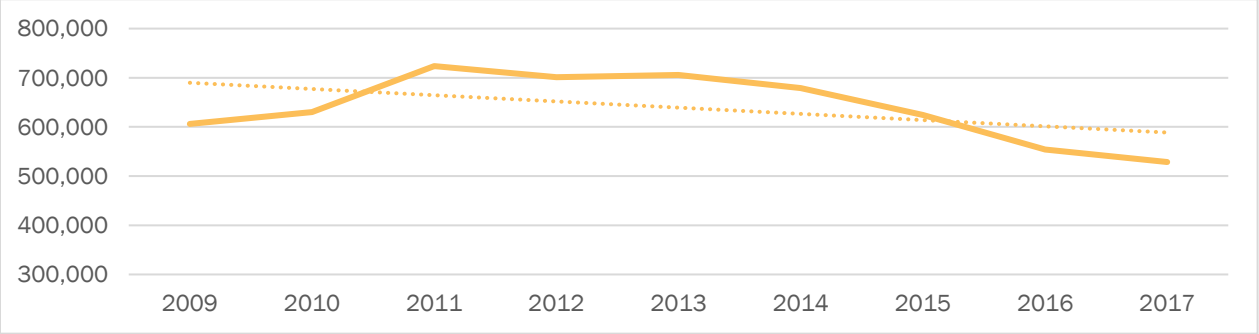
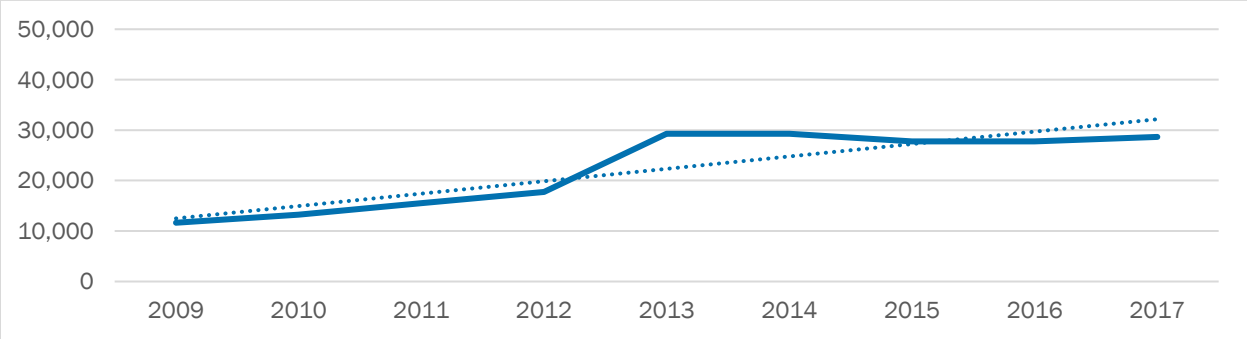


Figure 2 | MATS GoBus Passenger Trips



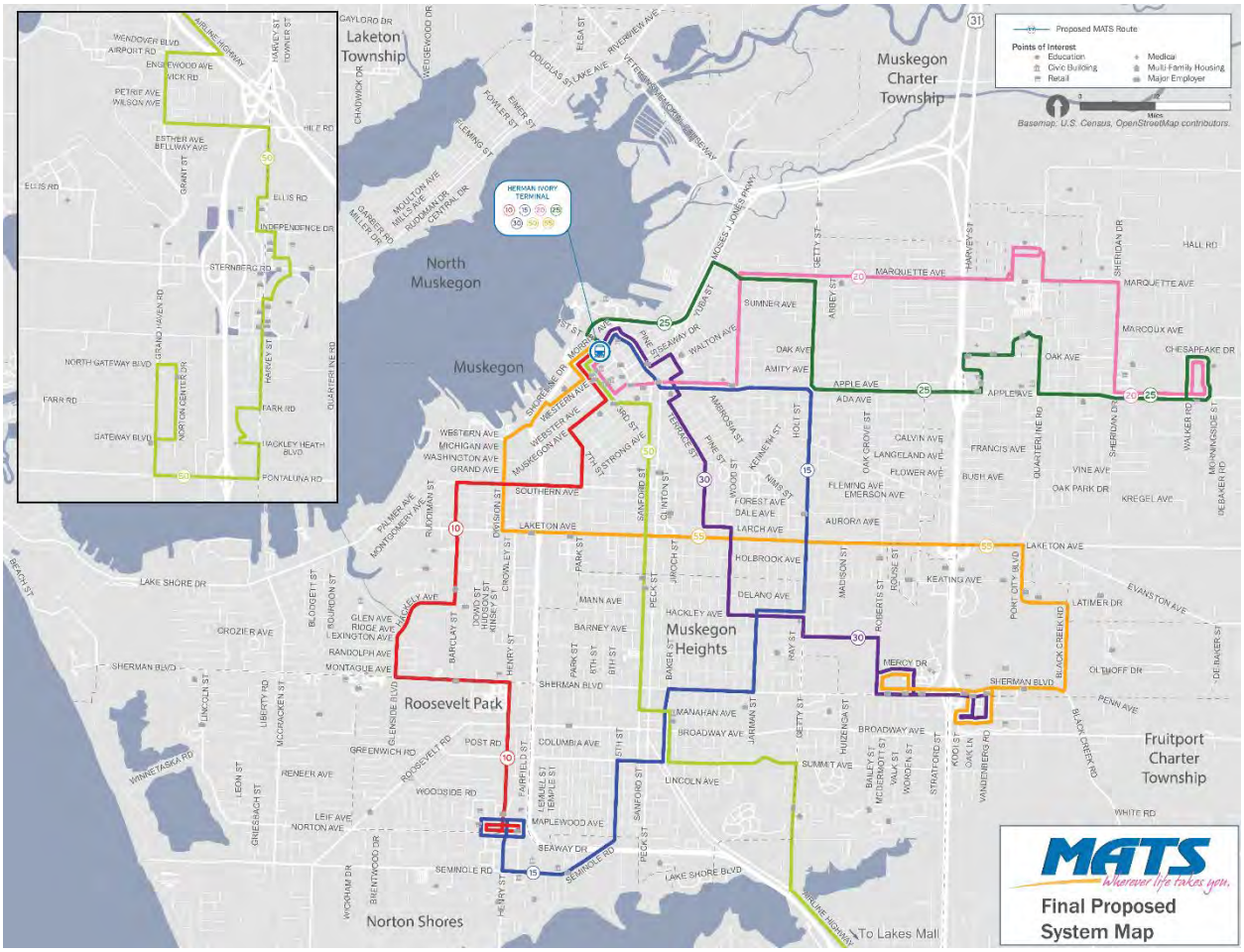
The Route Study and Comprehensive Operational Analysis provided an opportunity to take a fresh look at all aspects of MATS services and operations, and to develop recommendations for a more efficient, effective, and financially sustainable transit system for the Muskegon region.

This document consists of ten chapters that follow this executive summary. Each corresponds to the major phases of the study:

- **Chapter 2 – Existing Services.** An overview of existing transit services in the study area, including operating characteristics and supporting amenities.
- **Chapter 3 – Fares and Finances.** A projection of the transit system's costs and revenues, along with an inventory of available funding sources.
- **Chapter 4 – Market Analysis**. An assessment of the market for transit services throughout Muskegon County, based on population and employment density, as well as socio-economic and demographic characteristics.
- **Chapter 5 – System Performance and Peer Comparison.** A system-level comparison of service policies and performance metrics in relation to a set of comparable peer systems.
- **Chapter 6 – Stakeholder Outreach.** A summary of public and stakeholder input, collected in meetings and surveys over the course of the study, and used to inform the development of preliminary recommendations.
- **Chapter 7 – Identification of Service Issues and Opportunities.** A diagnostic assessment of the existing systems' strengths, weaknesses, and opportunities, as identified through the combination of technical analyses, stakeholder outreach, and industry best practices.
- **Chapter 8 – Preliminary Service Scenarios and Stakeholder Reactions.** A review of the two preliminary service redesign scenarios each for fixed-route and GoBus service, and the feedback received from stakeholders in response to each scenario.
- **Chapter 9 – Final Recommendations.** A detailed set of recommendations designed to better align transit service with ridership potential, and to improve the ridership, productivity, and financial sustainability of the transit system.
- **Chapter 10 – Financial Plan.** Cost estimates for the operating and capital expenditures required to implement the final recommendations.

Figure 3 shows a system map of the recommended fixed-route network. This network is intended to be the core of a multi-modal system that also includes ADA paratransit service and innovative demand response service known as microtransit. A summary of the key recommendations of the Route Study and Comprehensive Operational Analysis is provided immediately after the fixed-route system map.

Figure 3 | Recommended Fixed-Route Network



Summary of Key Recommendations

Fixed-Route Service

- Simplified and streamlined network featuring bi-directional service on every route.
- Extensive use of interlines to ensure that all most riders have a one-seat ride to key destinations such as grocery stores and healthcare facilities.
- Direct service from Herman Ivory Terminal to the Lakes Mall area.
- Hourly pulse at Herman Ivory Terminal to facilitate seamless connections between any two routes.
- Reduced service coverage (picked up by microtransit), focusing on corridors with the highest ridership potential.
- Reduced service hours (picked up by microtransit), focusing on period with the greatest ridership demand.

ADA Paratransit Service

- Adherence to ADA coverage requirements (¾ mile buffer around fixed-route service) to manage demand.
- Adherence to ADA eligibility requirements (verified disability), to encourage use of more cost-effective fixed-route and microtransit services among those able to use these services.
- Establish process for suspending the eligibility of riders who abuse the system with frequent no-shows.

Microtransit Service

- App-based demand-response service (with phone-in option available for those without access to a smart device).
- Maximum 30-minute wait time from trip request to pick-up.
- Jurisdiction-wide service coverage for every participating (local funding partner) jurisdiction.
- Weekday service from 5:00 am to midnight, to facilitate job access for 2nd and 3rd shift workers.
- Weekend service including both Saturdays and Sundays.
- Corner-to-corner service model (with exceptions for age and disability considerations) to minimize deviations and maximize operational productivity.
- Turn-key contract service provided by a vendor based on favorable rates and ease of implementation.

Fleet and Facilities

- Eight vehicles needed for fixed-route service recommendations (not including spares).
- 35-foot transit coaches needed to accommodate anticipated fixed-route ridership demands.
- One vehicle needed for ADA paratransit service (not including spare).
- Six to nine microtransit vehicles in operation on weekdays; five on Saturdays; and four on Sundays.
- Eight-passenger vehicles used for microtransit service, with at least 50 percent of microtransit fleet wheelchair accessible.
- Shift focus and resources to deploying passenger shelters throughout the fixed-route service area instead of building a second transit hub in downtown Muskegon Heights.

Fares and Funding

- Significantly reduced local share contribution increases compared to the status quo. Additional operating revenues of approximately $385,000 required in 2020 to implement the final recommendations, increasing to $464,500 by 2024.
- Reduced capital needs compared to the status quo through the use of third-party contractor to provide turn-key microtransit service (i.e., contractor provides both capital and operating components of new service).
- No recommended changes to fixed-route or GoBus fares; implementation of moderately priced microtransit service.

2. EXISTING SERVICES

Fixed-Route Bus Service

MATS Local Service

MATS local service consists of ten fixed routes (**Figure 4**). **Table 1** shows the frequency and span of service of each route (plus one former route – Route 70) for weekdays and Saturdays (when applicable). Route 70, which operated express service between Herman Ivory Terminal and Muskegon Community College, was discontinued at the end of the 2018-19 school year. However, it is included in the maps and figures presented in this document because its past performance can help inform future recommendations.

The ridership and productivity of each route is presented in **Figure 5** and **Figure 6** respectively. Ridership is an important metric of service performance but doesn't tell a complete story, as it does not reflect the level of investment required to achieve the resulting ridership. Productivity, as measured by passengers per revenue hour, is a measure of a route's return on investment and thus provides additional context to evaluate a route's performance.

Figure 4 | Muskegon Area Transit System Map (Source: MATS, May 2019)

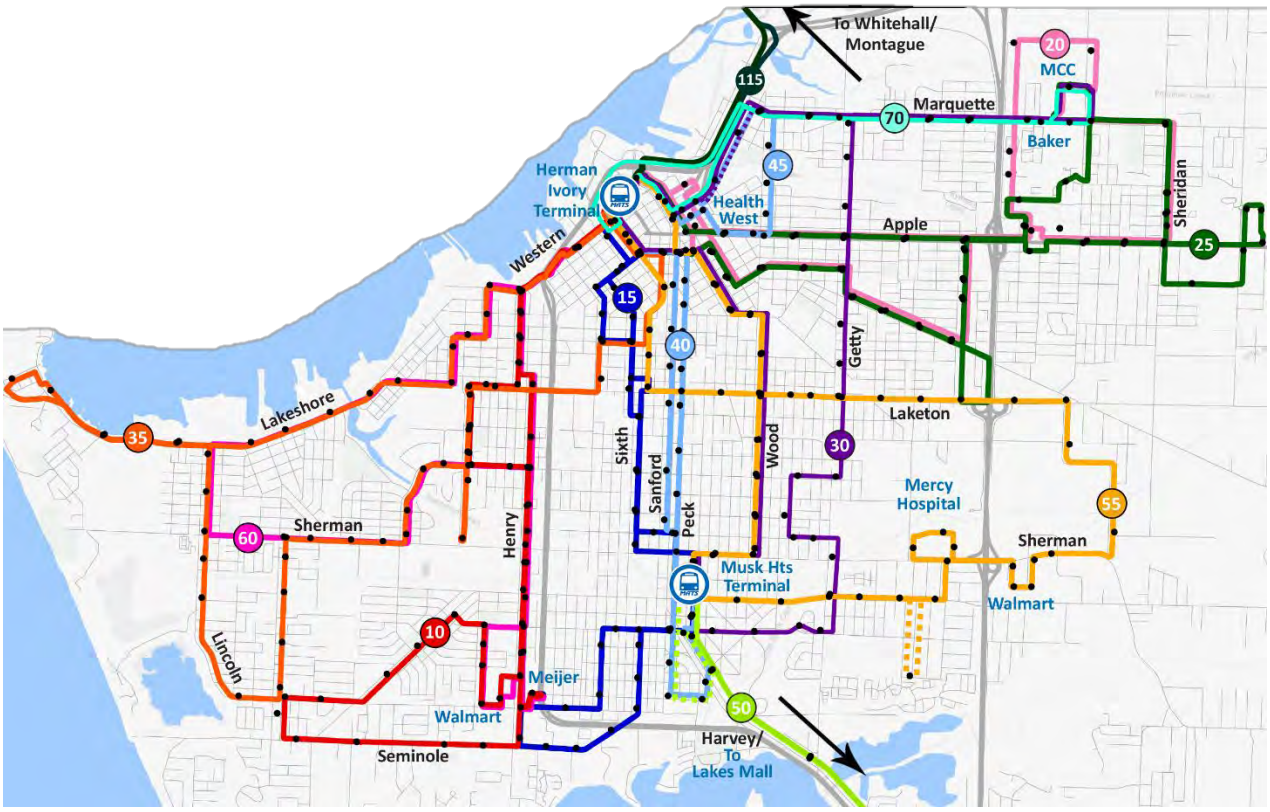


Table 1 | Muskegon Area Transit Fixed Route Services Characteristics

Route	Name	Service Description	Service Span	Average Service Frequency (hh:mm)
10	Henry	Local service between Meijer and downtown Muskegon via Roosevelt Park	**Monday – Friday:** 6:55 AM - 5:52 PM	1:00
15	Sixth	Local service between Meijer and downtown Muskegon via Muskegon Heights	**Monday – Friday:** 6:28 AM - 10:40 PM	1:00
			Saturday 9:50 AM - 5:40 PM	1:00
20	Apple 1	Local service operating between Herman Ivory Terminal and Muskegon Community College	**Monday – Friday:** 6:35 AM - 5:54 PM	1:00
25	Apple 2	Local service operating between Herman Ivory Terminal and Orchard View Adult Education	**Monday – Friday:** 6:50 AM - 10:40 PM	1:00
			Saturday 9:50 AM - 5:40 PM	1:00
30	Getty – Wood	Local service operating between Herman Ivory Terminal and Muskegon Heights Transfer Points	**Monday – Friday:** 6:28 AM - 10:40 PM	1:00
			Saturday 9:50 AM - 5:40 PM	1:00
35	Lakeshore - Sherman	Local service operating between Herman Ivory Terminal and SW Corner Parson/Edgewater	**Monday – Friday:** 6:50 AM - 5:38 PM	1:00
40/45	Peck - Sanford	Local service operating between Herman Ivory Terminal and Muskegon Heights Transfer Point.	**Monday – Friday:** 6:43 AM - 6:01 PM	0:30
50	Harvey	Local service operating between Muskegon Heights Transfer Point and Mercy Health at the Lakes.	**Monday – Friday:** 6:37 AM - 10:36 PM	1:00
			Saturday 9:37 AM - 5:18 PM	1:00
55	East Sherman	Local service operating between Herman Ivory Terminal and Sam's Club.	**Monday – Friday:** 6:34 AM - 10:48 PM	1:00
			Saturday 9:34 AM - 5:31 PM	1:00
60	Lakeshore - Henry	Local service operating between Herman Ivory Terminal and Meijer on Henry Street. **Note: This route replaces Routes 10 and 35 during evening hours**	**Monday – Friday:** 5:50 PM - 10:39 PM	1:00
			Saturday 9:50 AM - 5:39 PM	1:00
70	Marquette Express	Express service operating between Herman Ivory Terminal and Muskegon Community College. **Note: This route was discontinued in May 2019.**	**Monday – Thursday:** 6:28 AM - 7:41 PM	0:30

Service does not operate on New Year's Day, Memorial Day, Fourth of July, Labor Day, Thanksgiving Day, and Christmas Day. A reduced service schedule is operated on the day after Thanksgiving, Christmas Eve and New Year's Eve.

Figure 5 | Average Weekday Ridership by Route

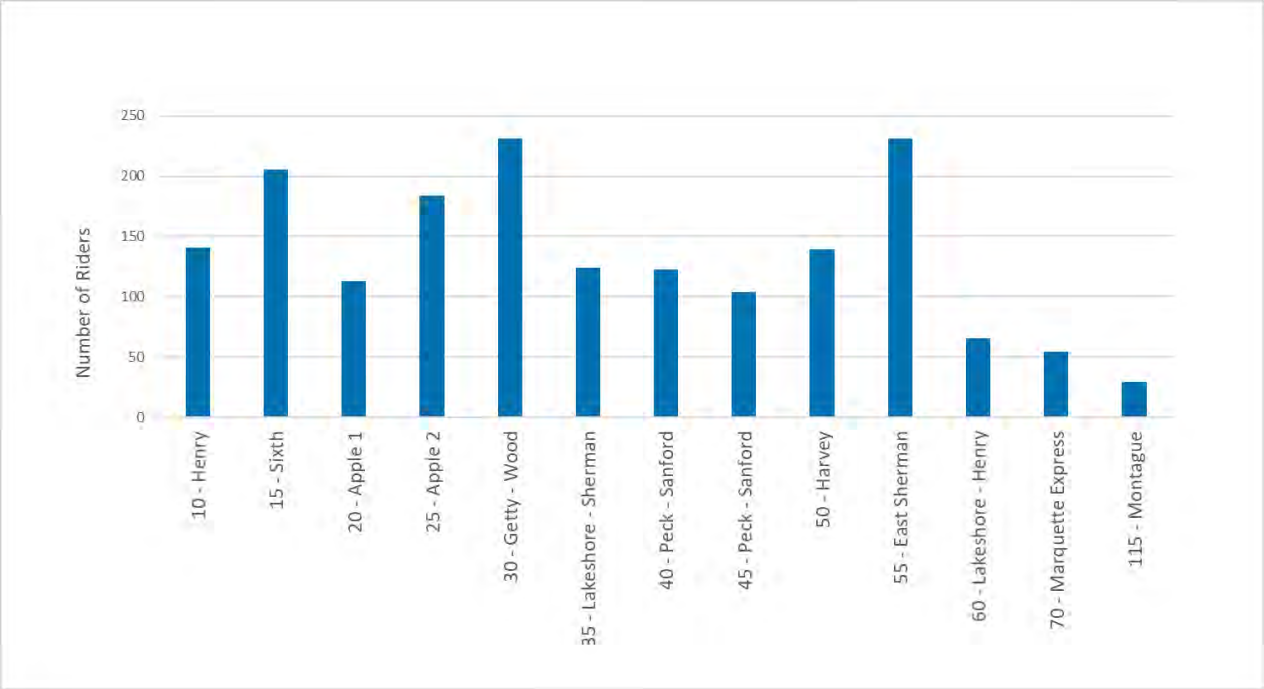
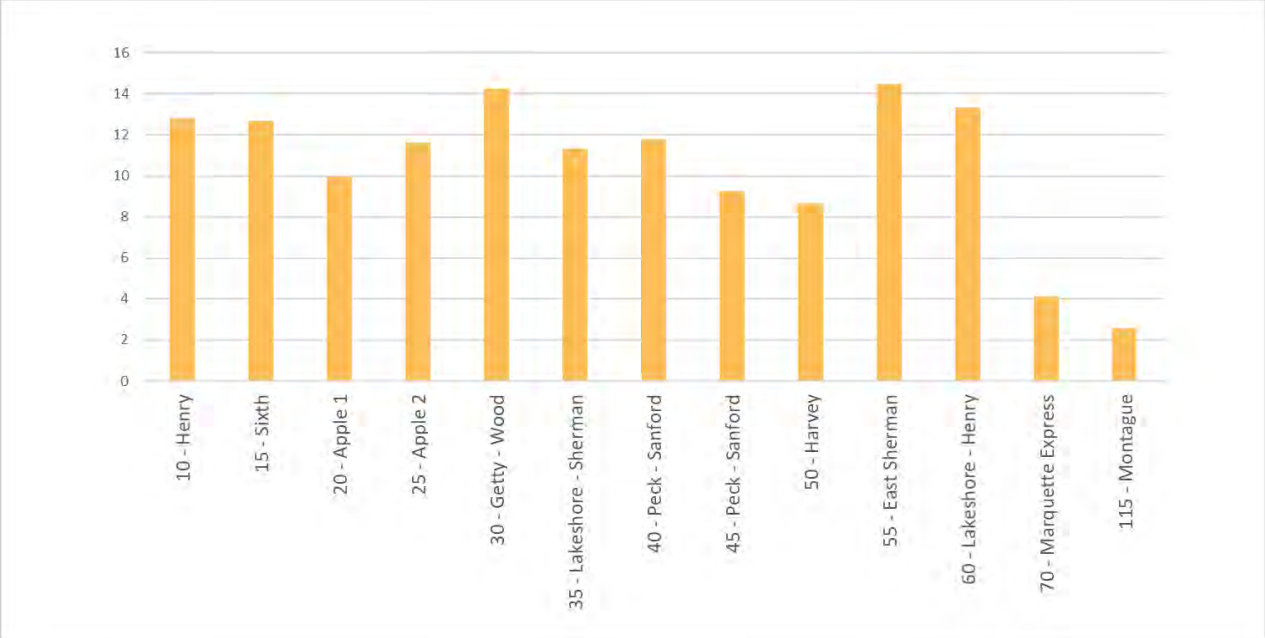


Figure 6 | Weekday Passengers per Revenue Hour



Muskegon Area Regional Connections (MARC) Service

On weekdays, MATS also operates one regional route to Montague and Whitehall. **Figure 7** shows a route map of the current MARC service. **Table 2** summarizes the basic service characteristics for the route. **Figure 5** and **Figure 6** above provide information regarding the ridership and productivity of the route.

Figure 7 | Muskegon Area Regional Connections Map (Source: MATS, May 2019)

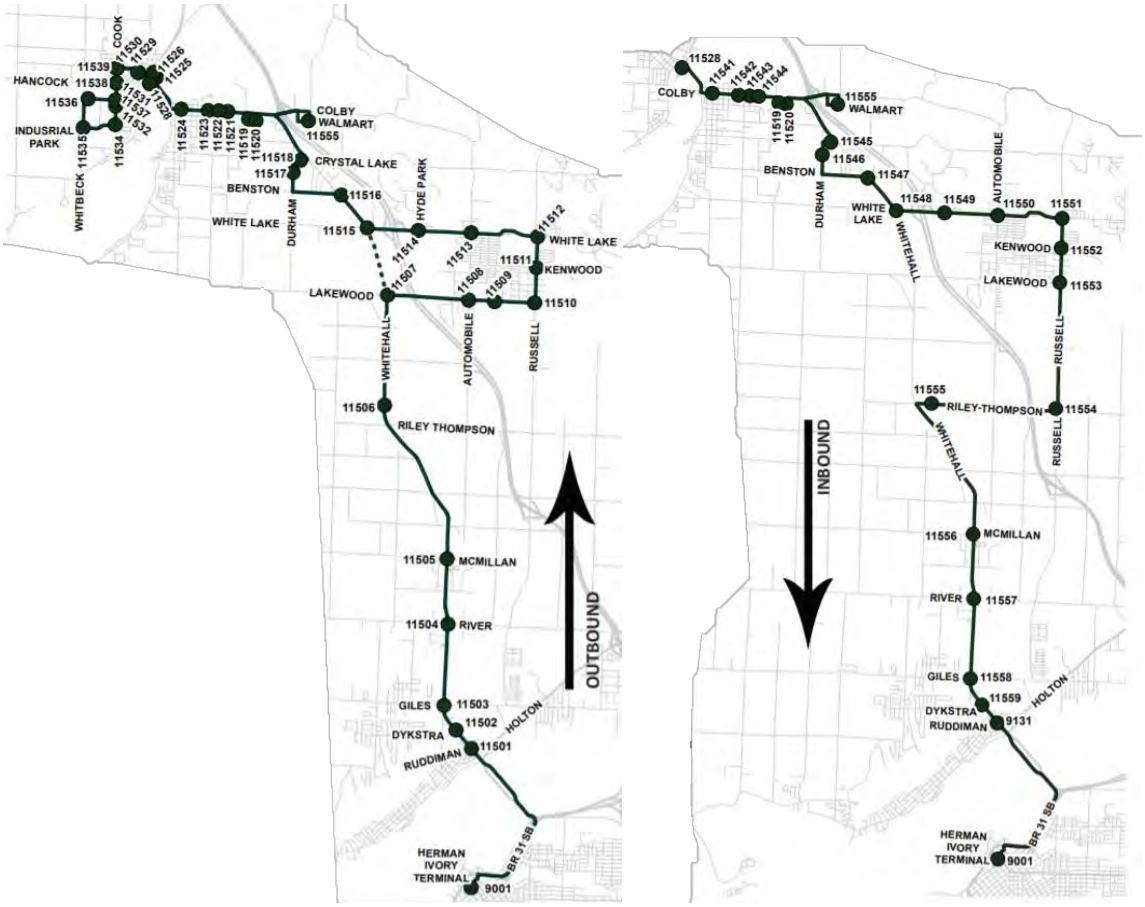


Table 2 | Muskegon Area Regional Connections Fixed Route Services Characteristics

Route	Name	Service Description	Service Span	Average Service Frequency (hh:mm)
115	Montague	Local service operating between Herman Ivory Terminal and SE Corner Water. Two outbound express trips run daily.	**Monday – Friday:** 6:45 AM - 5:35 PM	2:00

MARC service does not operate on Saturdays, Sundays, New Year's Day, Memorial Day, Fourth of July, Labor Day, Thanksgiving Day, the day after Thanksgiving, Christmas Eve, Christmas Day and New Year's Eve.

Demand-Response Service

Figure 8 | GoBus (Source: MATS)

GoBus is the Muskegon Area Transit System's demand-response service. Only persons with disabilities (including their companions) and persons 65 and over are eligible to ride. All GoBus vehicles are equipped with wheelchair lifts and operate curb-to-curb service based on rider origins and destinations. Reservations are made over the phone and can be scheduled up to 14 days in advance. Same-day reservations can also be scheduled but are subject to availability. Riders are picked up in the 15-minute window following their scheduled pick-up time. Once a GoBus vehicle arrives at a scheduled pick-up location, drivers will wait no more than five minutes for a passenger. **Table 3** details the GoBus service characteristics.

Table 3 | Muskegon Area Transit GoBus Service Characteristics

Riders	Service Span	Service Area
ADA eligible riders	**Monday – Friday:** 6:28 am – 10:49 pm **Saturday:** 9:30 am – 5:40 pm	All of Muskegon County
ADA eligible riders and persons age 65 and older	**Monday-Friday:** 7:00 am – 10:30 pm **Saturday:** 9:30am – 5:30pm	All of Muskegon County

Passenger Amenities and Transit Facilities

Transit Centers

Herman Ivory Terminal is Muskegon's primary transit hub located on Morris Ave in the city's downtown (**Figure 9**). The terminal building includes seating for 60 people, public restrooms, vending machines, and a ticket counter. Additional benches, as well as bike racks, are available outside the building. Muskegon Heights Transfer Point (**Figure 10**) currently acts as the system's secondary hub. This facility is co-located with the Muskegon Heights Farmers Market on Baker Street in downtown Muskegon Heights.

Bus Stops and Amenities

MATS has 469 bus stops with varied amenities. All stops include stop signposts, with only some containing customer information. Approximately 15-20 bus stops have a bus shelter.

Passenger Information

MATS passenger schedules and system maps are available at the Transit Center and online through the agency's website, https://matsbus.com/.

Figure 9 | Image of the Herman Ivory Terminal (Source: MATS)

Figure 10 | Image of Muskegon Heights Transfer Point (Source: MATS)

3. FARES AND FINANCES

Fares

Cash fareboxes are located at the front entrance of every MATS bus. Since neither the farebox nor driver can make change, exact fares are required. Ten-ride and monthly passes can be purchased from drivers or at the Herman Ivory Terminal. Reduced fares are available for seniors and persons with disabilities. A MATS reduced-fare card must be obtained and shown when paying this fare.

Fixed Routes

A series of passes are offered for fixed-route service, as summarized in **Table 4** and **Table 5**. If customers need to transfer between MATS fixed routes to complete a one-way trip they can request a transfer slip from the driver as they board. Transfer slips are valid for 30 minutes and should be presented to the driver upon boarding. Transfer from a MARC route to a MATS route is free of charge. Customers who require a transfer from a MATS to a MARC route are charged an additional $1.25, or $0.60 with a reduced-fare card.

Table 4 | MATS Fare and Pass Prices

	Standard	Senior	Disabled
One-Way	$ 1.25	$0.60	$0.60
Ten-Ride	$12.50	$6.00	$6.00
Monthly Pass	$50.00	$30.00	$30.00

Table 5 | MARC Fare

	Standard	Senior	Disabled
One-Way	$2.50	$1.25	$1.25
Ten-Ride	$25.00	$12.50	$12.50

Demand-Response

GoBus fares vary based on rider origins and destinations. The county is divided into three zones (**Figure 11**), with a pricing structure as summarized in **Table 6.**

Figure 11 | GoBus Zones (Source: MATS, July 2019)

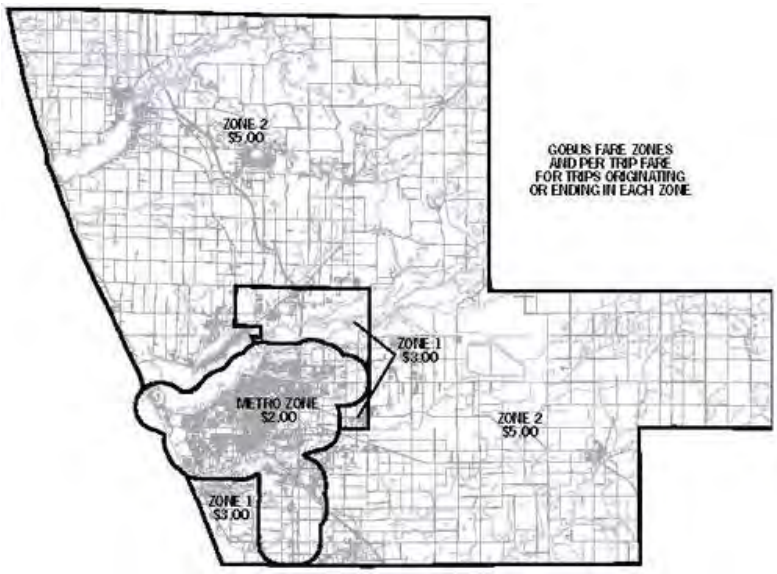


Table 6 | GoBus Fares

	Metro Zone	Zone 1	Zone 2
One-Way	$ 2.00	$3.00	$5.00
Ten-Ride	$20.00	$30.00	$50.00

Finances

MATS Public Transportation Commission

Operating Revenues

Muskegon Area Transit's finances include revenue and expenses for local fixed-route, regional fixed-route, and demand-response (GoBus) services. While MATS functions as an independent business unit, the Muskegon County Board of Commissioners provides oversight. The board is responsible for determining what transit service will be delivered and accessing additional funds. In 2018, MATS released a report outlining its financial projections through FY2023 (**Table 7**). According to the report, management projected a reduction in MATS' total transit program size and operating revenue over the next five years. The projected operating revenues presented in **Table 4** reflect this situation.

Table 7 | MATS Projected[1] Operating Revenue

Funding Source	FY2019	FY2020	FY2021	FY2022	FY2023
Federal 5307	$1,678,771	$1,712,346	$1,746,593	$1,741,525	$1,777,156
Federal 5311	$16,000	$16,000	$16,000	$16,000	$16,000
State LBO	$1,474,000	$1,363,625	$1,253,450	$1,253,450	$1,253,450
Local	$280,506	$265,506	$265,506	$265,506	$265,506
Fares	$360,000	$360,000	$360,000	$360,000	$360,000
Other	$265,000[2]	$65,000	$65,000	$65,000	$65,000
Reserves/County/New	$445,723	$398,523	$135,451	$135,451	$135,451
Total Operating Expenses	$4,520,000	$4,181,000	$3,842,000	$3,842,000	$3,842,000

Operating Expenses

FY2018 MATS operating expenses totaled approximately $4.3 million. A breakdown of operating expenses for the year is presented in **Figure 12**. Employee salaries and benefits make up 70 percent of MATS operating expenses. Projected operating expenses through FY2023 (**Table 8**) reflect the County's need, due to budgetary limitations, to reduce total transit program size. By FY2021, MATS will operate with a 15 percent reduction in service compared to 2018 figures. The agency is projected to spend less on nearly every budget line item.

[1] Source: Muskegon Area Transit System Short-Range Financial Plan FY2019-FY2023
[2] Includes IRS Alternative Fuel Rebate and some prior-year carryover 5307 federal funding

Figure 12 | MATS Operating Expenses FY2018[3]

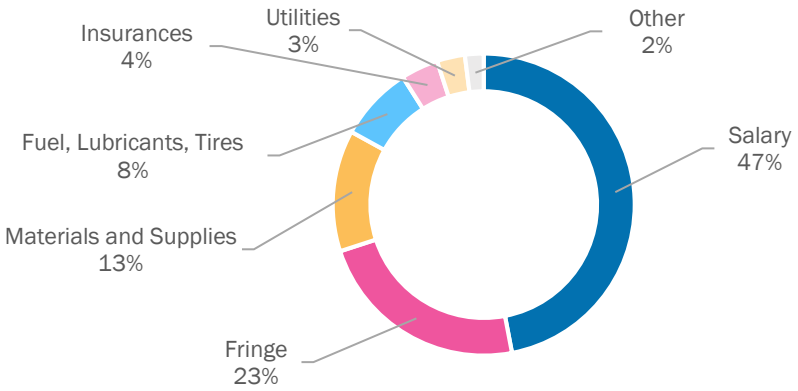


Table 8 | MATS Current and Projected Operating Expenses[4]

Funding Source	FY2018	FY2019	FY2020	FY2021	FY2022	FY2023
Salary	$2,034,644	$2,050,000	$1,896,250	$1,742,500	$1,742,500	$1,742,500
Fringe	$995,627	$990,000	$915,750	$841,500	$841,500	$841,500
Material and Supplies	$562,774	$740,000	$684,500	$629,000	$629,000	$629,000
Fuel, Lubricants, Tires	$346,322	$380,000	$684,500	$323,000	$323,000	$323,000
Insurances	$173,161	$175,000	$161,875	$148,750	$148,750	$148,750
Utilities	$129,870	$110,000	$101,750	$93,500	$93,500	$93,500
Other	$86,580	$75,000	$69,375	$63,750	$63,750	$63,750
Total Operating Expenses	$4,329029	$4,520,000	$4,181,000	$3,842,000	$3,842,000	$3,842,000

Table 9 | Historical Operating Expenses[5]

Funding Source	FY2013	FY2014	FY2015	FY2016	FY2017
Fixed-Route	$2,920,070	$3,215,481	$3,224,457	$3,347,676	$3,584,845
GoBus	$891,516	$941,877	$1,072,622	$1,020,707	$1,157,260
Total Operating Expenses	**$3,811,586**	**$4,157,358**	**$4,297,079**	**$4,368,383**	**$4,742,105**

Capital Funds

The operating revenue and expenses budgets exclude transactions reimbursed by special capital grants. Grant funds are the main source of revenue used to address MATS capital needs. Eighty percent of capital funds typically come from the federal government and the remaining twenty percent are matched by the State of Michigan. In FY2019, MATS expected to receive $974,694 in capital funds. The agency has already identified projects in need of capital funding over the next five years.

[3] Source: Muskegon Area Transit System Short-Range Financial Plan FY2019-FY2023
[4] Source: Muskegon Area Transit System Short-Range Financial Plan FY2019-FY2023
[5] http://www.ftis.org/iNTD-Urban/Reports.aspx

4. MARKET ANALYSIS

More than any other factor, the effectiveness, and efficiency of public transportation is determined by density. Where there are higher concentrations of people and/or jobs, transit ridership tends to be higher. At the same time, most transit agencies have a mandate to provide comprehensive service in the communities they serve and to provide mobility for residents with no other means of transportation. The purpose of this Market Analysis is to identify the strongest transit corridors in the Muskegon area and to highlight areas with relatively high transit need. Thus, the Market Analysis consists of two key components: Transit Potential and Transit Need.

While Transit Potential is an analysis of population and employment density, Transit Need focuses on socio-economic characteristics such as income, automobile availability, age, and disability status that are indicative of a higher propensity to use transit. Transit use is also influenced by the built environment. In particular, there are certain land uses – such as retail centers, civic buildings, multifamily housing, educational institutions, medical facilities, and major employment centers – that tend to generate transit trips at a higher rate. As such, these ridership generators are included in the maps describing Transit Potential and Transit Need.

Transit Potential

Transit service is generally most effective in areas with high concentrations of residents and/or jobs. The following Transit Potential analysis uses Traffic Analysis Zone (TAZ) level population and employment data for 2015 provided by the Michigan Department of Transportation.

Population Density

Public transportation is most efficient when it connects population and employment centers where people can easily walk to and from bus stops. The reach of transit is generally limited to within one-quarter mile to one-half mile of the transit line, or a 10-minute walk. For this reason, the size of a transit market is directly related to an area's population density. Typically, a density greater than five people per acre is needed to support base-level (hourly) fixed-route transit service. **Figure 13** and **Figure 14** show the population density of the Muskegon area. Yellow areas indicate places that have the minimum recommended density for fixed-route service; areas with darker colors have a stronger potential to support fixed-route service.

Much of Muskegon, Muskegon Heights and Roosevelt Park have the population to support fixed-route transit service. The highest densities can be found in Roosevelt Park and Marquette along South Getty Street. It appears that most areas with the residential density to support fixed-route service are currently served by at least one MATS route. It should be noted that in the maps below, the Muskegon Correctional Facility shows up as an area with moderate-to-high residential density, but no direct bus service. While residents of this facility are not likely transit users themselves, family members and other visitors may benefit from service.

Figure 13 | MATS Area Population Density

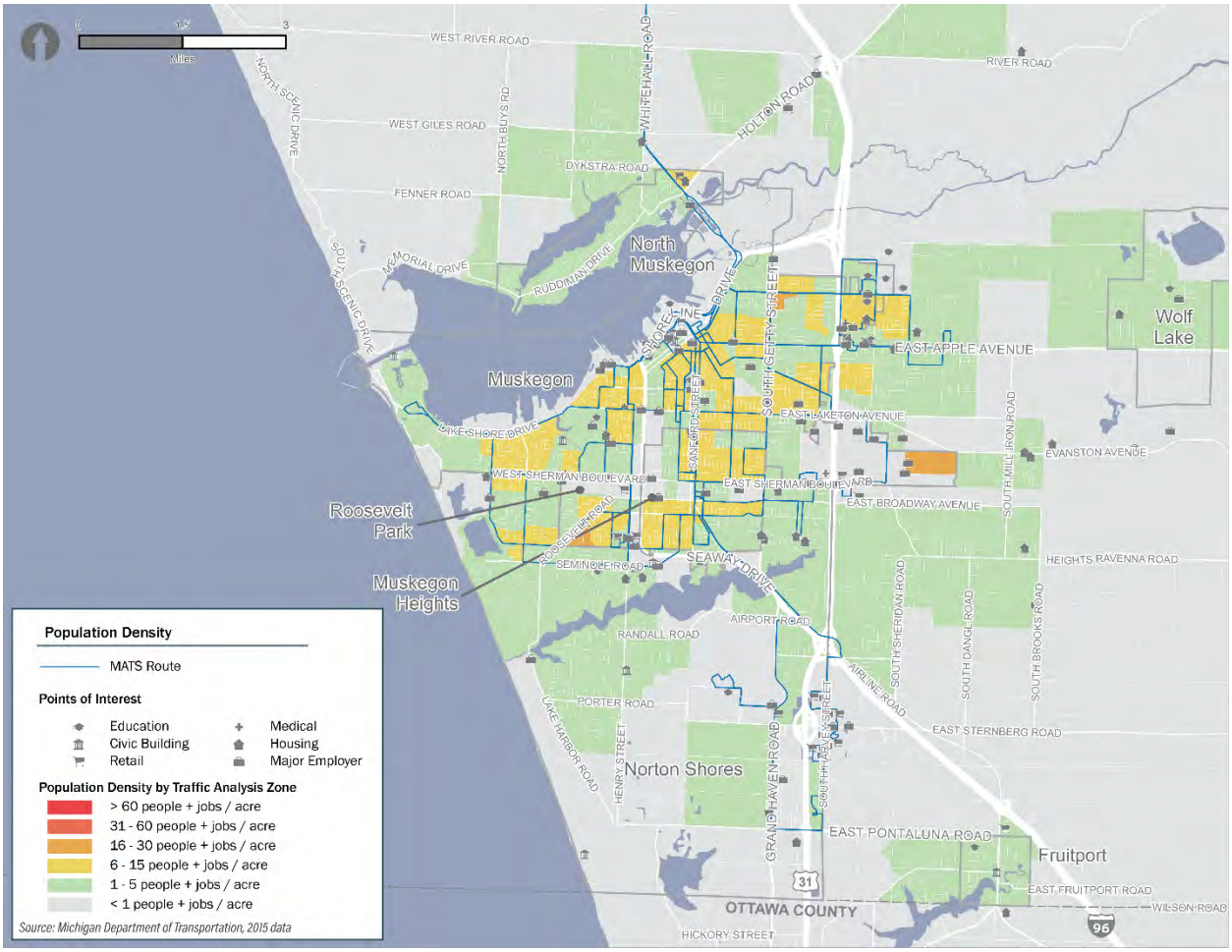
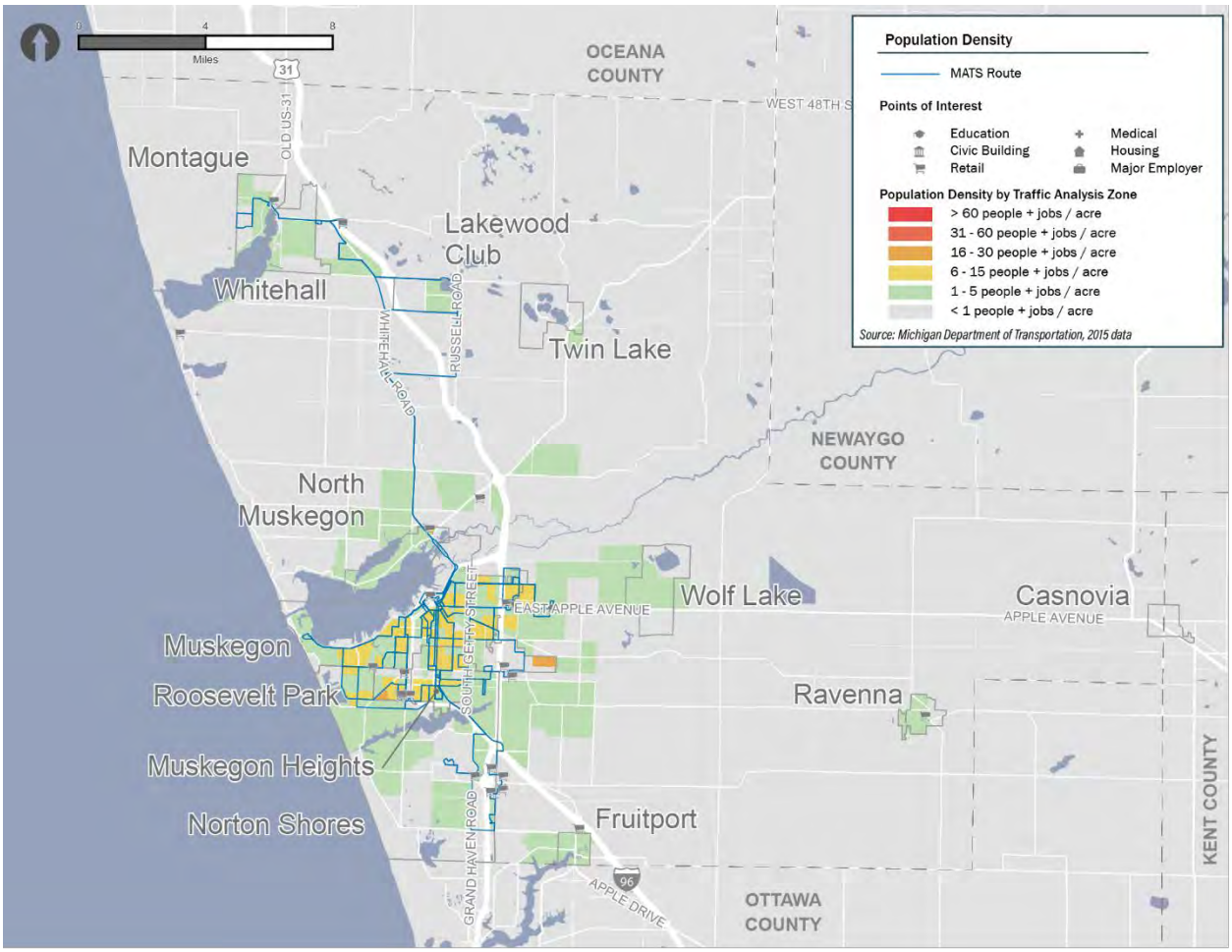


Figure 14 | Muskegon County Population Density



Employment Density

Given that traveling to and from work accounts for the largest single segment of transit trips in most markets, the location and number of jobs in a region are also strong indicators of transit demand. Transit that serves areas of high employment density also provides key connections to job opportunities. Like population density, an employment density greater than five jobs per acre can typically support base-level fixed-route service. This density corresponds with yellow areas in **Figure 15** and **Figure 16**.

Employment in the Muskegon area is relatively diffuse. There are larger concentrations in downtown Muskegon, as well as the shopping centers near Norton Avenue and Henry Street. Mercy Health General Campus has a concentration of employment, as does the industrial areas along East Laketon Ave and Latimer Drive. When examining employment county-wide, Whitehall also provides limited employment opportunities.

Figure 15 | MATS Area Employment Density

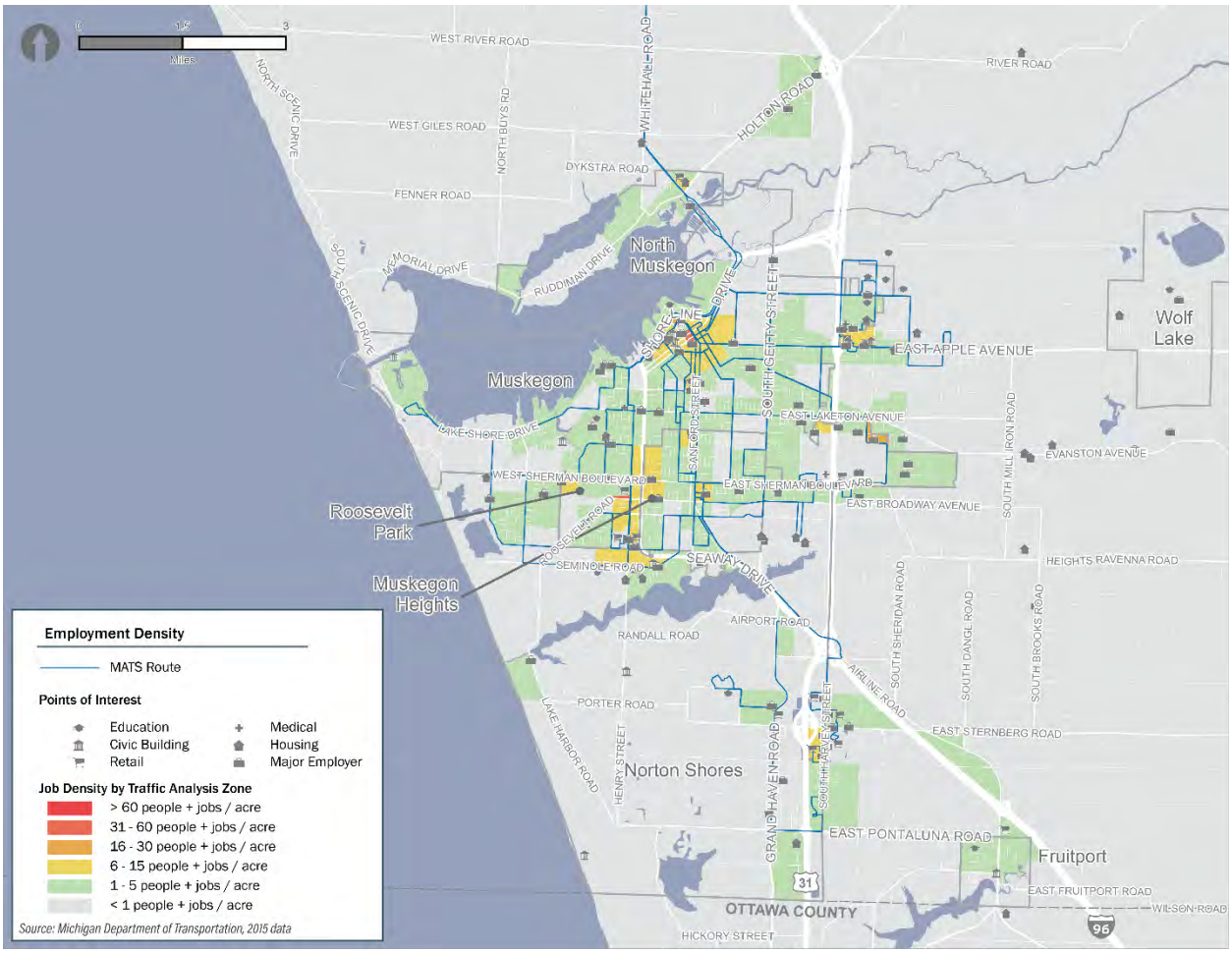
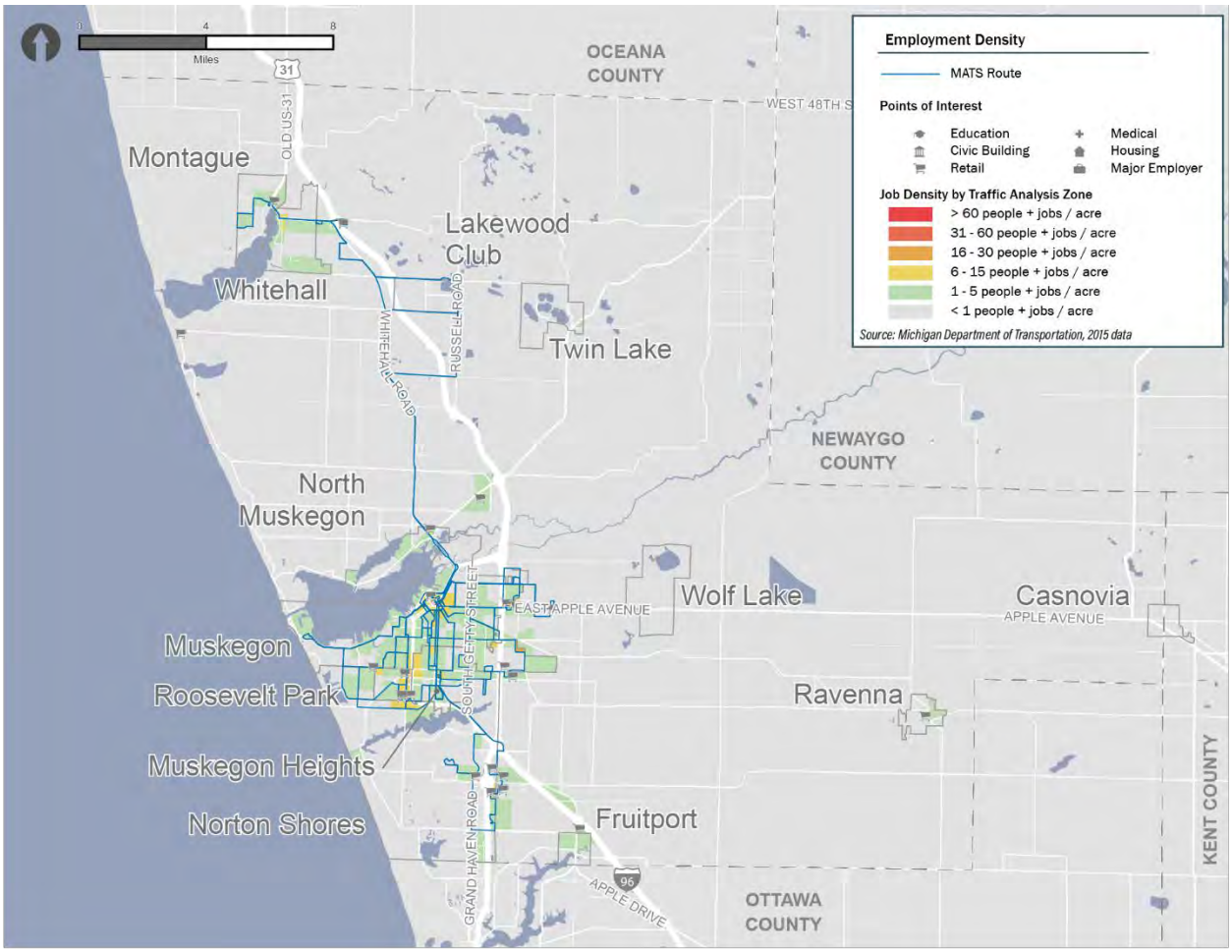


Figure 16 | Muskegon County Employment Density



Transit Potential

Transit Potential, shown in **Figure 17** and **Figure 18**, combines the population and employment densities for each TAZ to indicate the viability of fixed-route service in an area. The highest potential for transit service exists in downtown Muskegon (Angell, McLaughlin, and Nelson neighborhoods), Roosevelt Park north of Seminole Road, along Whitehall Road at Ruddiman Drive in North Muskegon, and east of Muskegon near the Muskegon Correctional Facility. Regionally, the centers of Montague and Whitehall also indicate limited transit potential.

Figure 17 | MATS Area Transit Potential

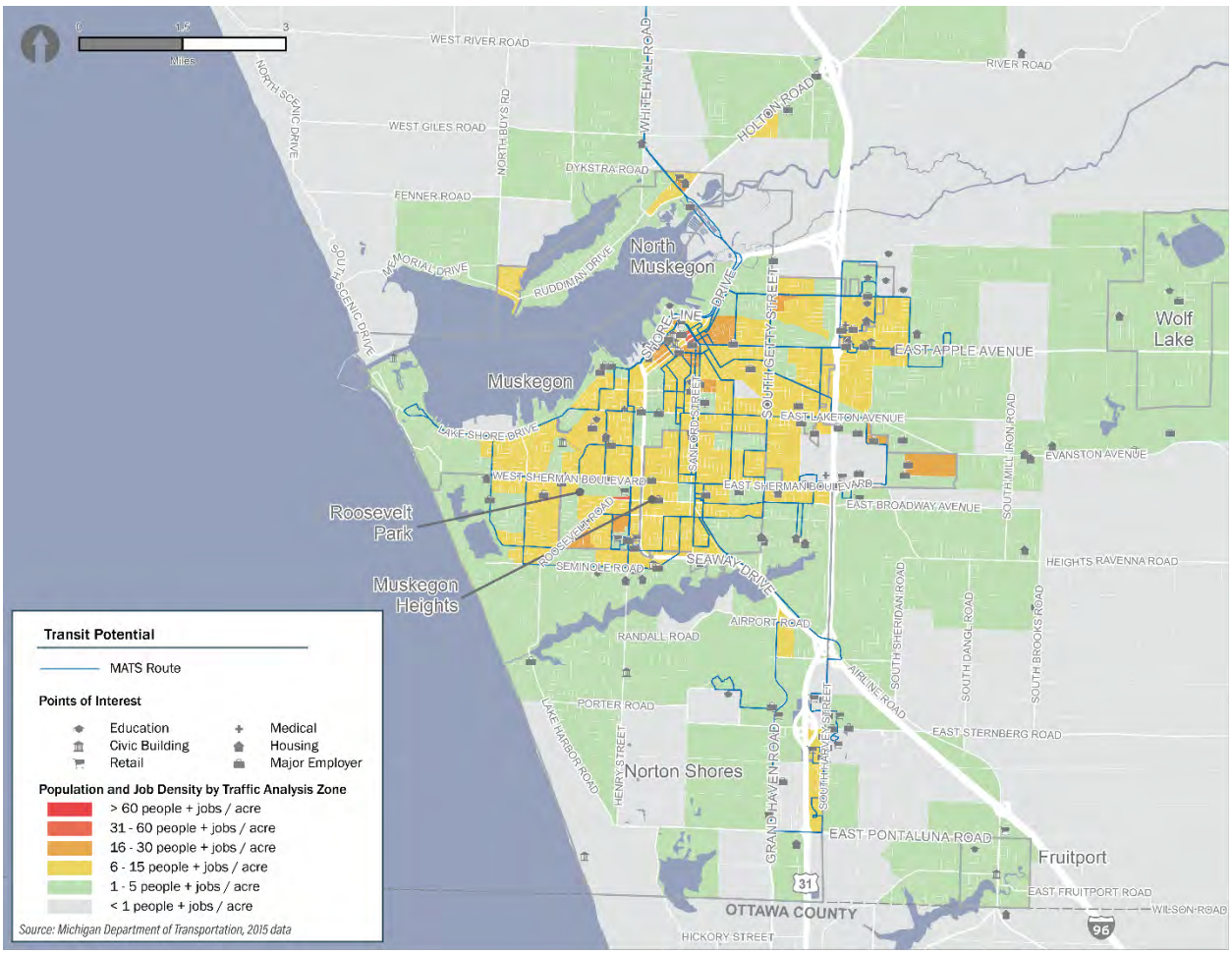
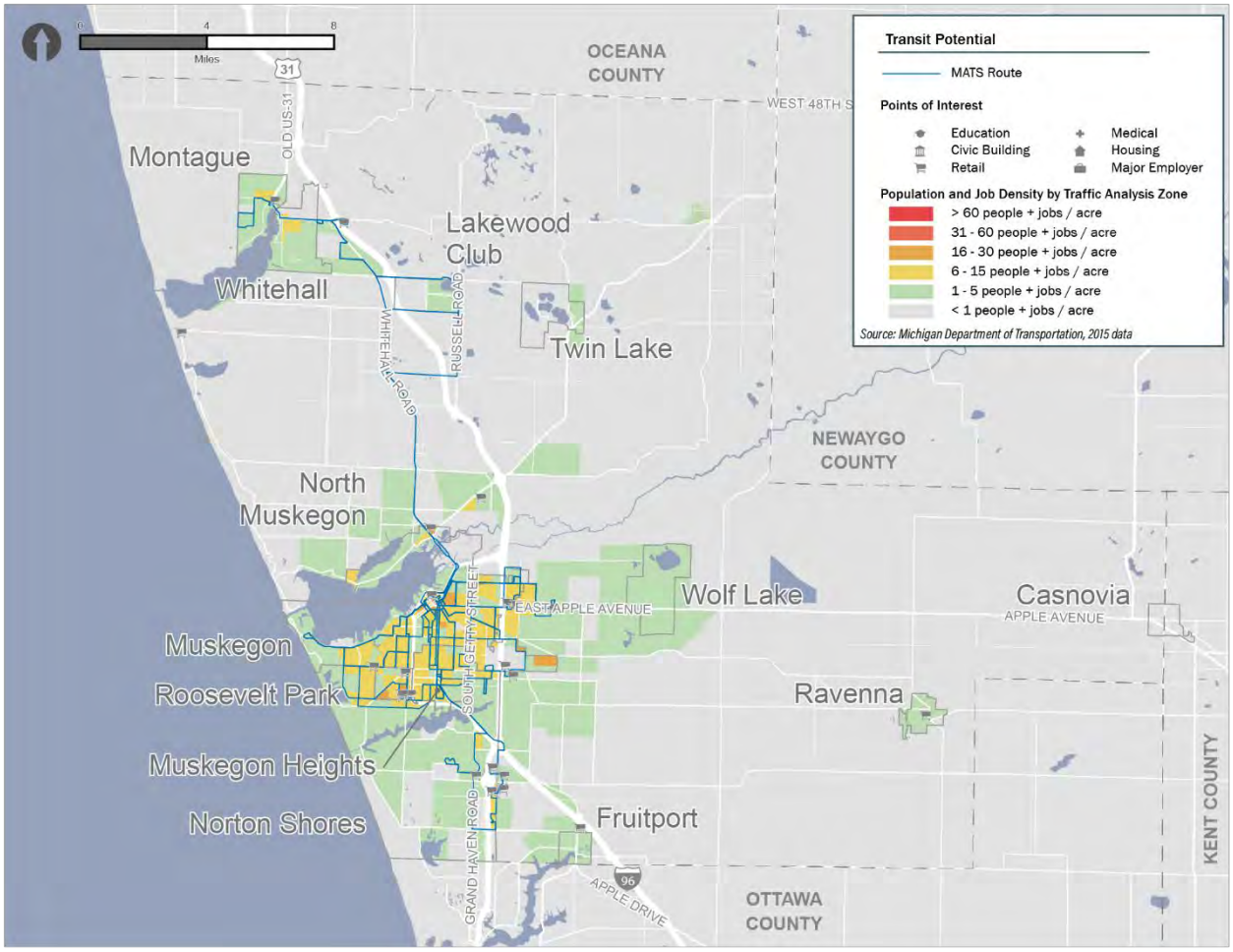


Figure 18 | Muskegon County Transit Potential



Transit Need

Above all, public transportation is a mobility tool. Certain population subgroups have a relatively higher propensity to use transit as their primary means of local and regional transportation. These groups include:

- **People without access to an automobile**, whether it be by choice or due to financial or legal reasons, often have no other transportation options besides using transit;
- **Persons with disabilities**, many of whom can't drive and/or have difficulty driving;
- **Low-income individuals**, typically because transit is less expensive than owning and operating a car;
- **Youth / young adults** who are either too young to drive, or have in recent years shown a greater interest in transit, walking, and biking than in driving; and
- **Older adults**, who as they age, often become less comfortable or less able to operate a vehicle.

The maps that follow (**Figure 19** through **Figure 30**) show the densities of each of these five high-transit-propensity population subgroups by Census block group to help determine where the need for transit service in the study area is greatest.

With density ranges differing for each demographic analysis, the maps utilize a Jenks Natural Breaks Classification Method to assign each block group to one of five density categories. For each analysis, depending on the natural break category into which it falls, a score from 1 (lowest density) to 5 (highest density) is assigned. Following the analysis of each individual factor, the Transit Need Index maps (**Figure 29** and **Figure 30**) show the composite Transit Need score for each block group based on the sum of its scores in each preceding analysis. For example, if a block group falls in the highest density category for each of the five demographic analyses, it will end up with a Transit Need Index value of 25 (5+5+5+5+5). The lowest possible Transit Need Index score is 5 (1+1+1+1+1).

While the Transit Potential analysis highlights parts of the Muskegon area with actual densities to support fixed-route service, Transit Need is a relative measure that estimates the need for transit compared to other block groups. There is not, however, a specific Transit Need Index score or value that represents a threshold for supporting fixed-route service. Instead, Transit Need should be considered alongside Transit Potential. If two areas have similar and enough Transit Potential, the area with higher Transit Need should be prioritized for service. Conversely, in some locations, while the density of transit-dependent population groups may be relatively high, if the total population and/or employment density are still quite low, the potential to generate substantial fixed-route transit ridership will also remain low.

Zero-Vehicle Household Density

Figure 19 and **Figure 20** show the density of zero-vehicle households in the Muskegon area. The highest densities (4 and 5) can be found in Downtown Muskegon (Mclaughlin, Nelson, Nims), near East Laketon Ave and South Getty Street (Marsh Field), around Mercy Health General Campus and Baker College, and in Muskegon Heights south of West Broadway Ave. County-wide, there are few households without access to vehicles although, some exist in Whitehall and Montague which are served by existing MATS bus service.

Figure 19 | MATS Area Zero-Vehicle Household-Density

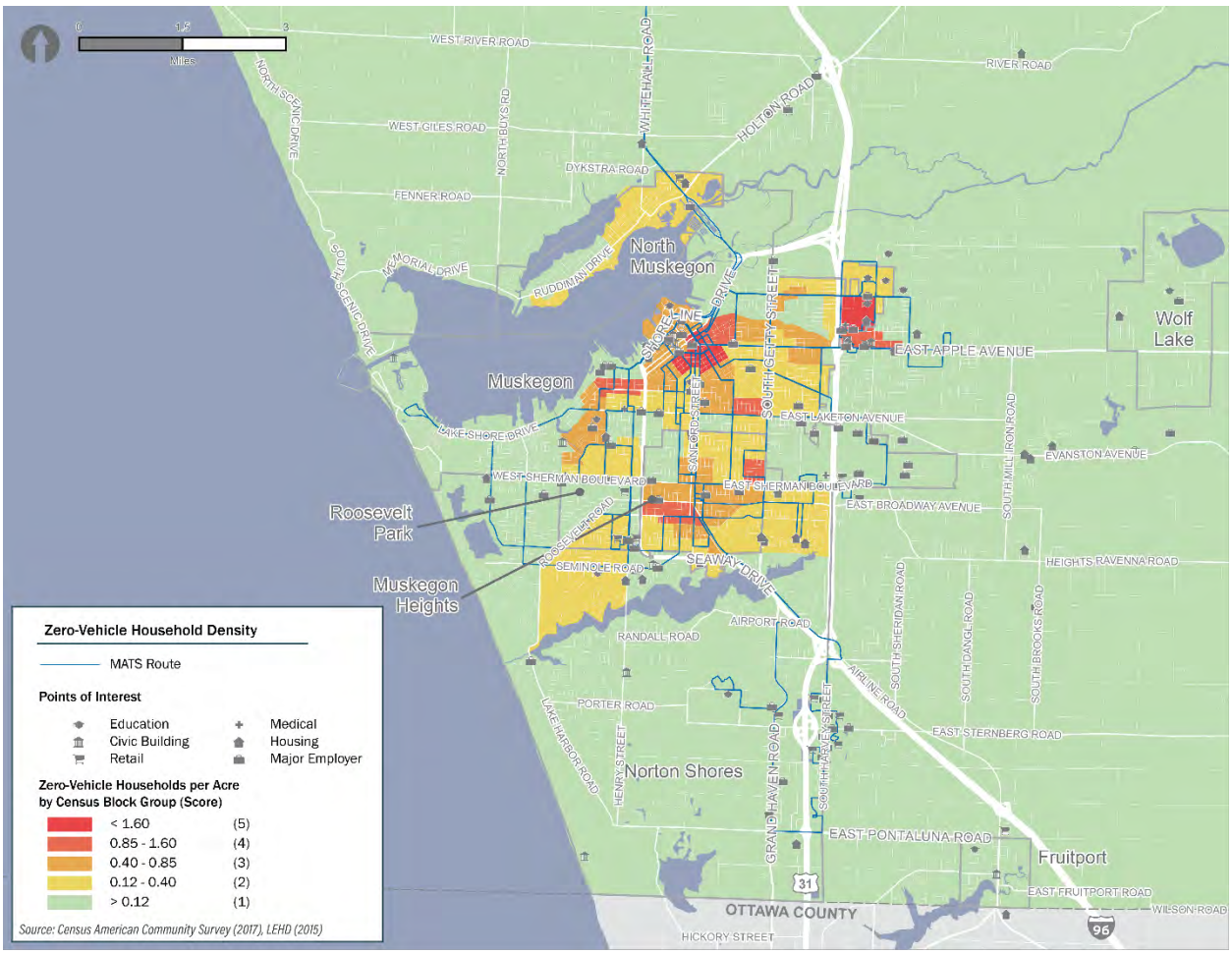
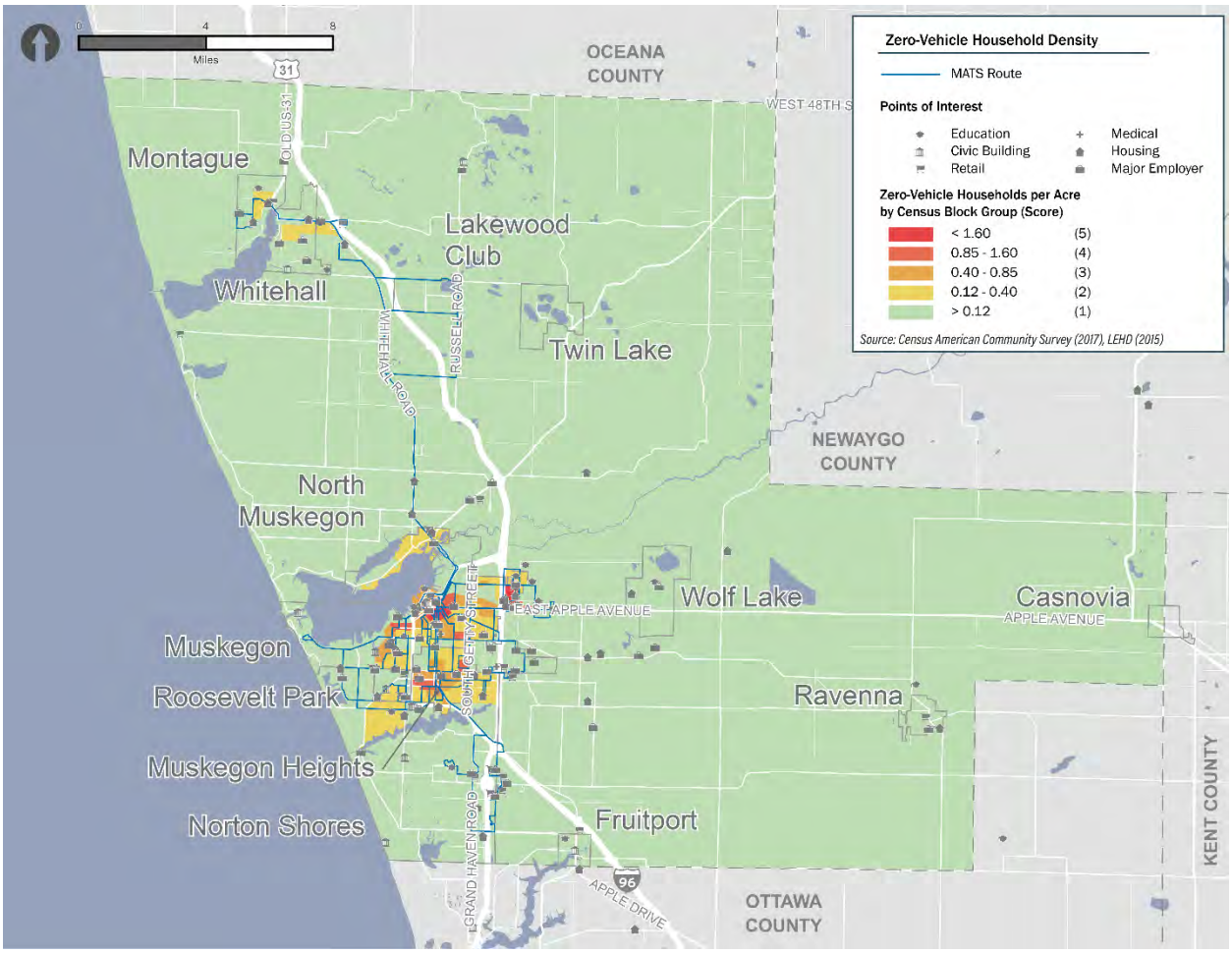


Figure 20 | Muskegon County Zero-Vehicle Household-Density



Density of Persons with Disabilities

Figure 21 and **Figure 22** show the density of persons with disabilities in the Muskegon area. Persons with disabilities are most concentrated in Muskegon (Angell, Nims, Marquette, McLaughlin, Oakview) and Muskegon Heights, as well as around Mercy Health General Campus and Baker College. County-wide, there are also a limited number of persons with disabilities in living in Montague, Whitehall, near the intersection of Mill Iron and Evanston, and around Wolf Lake.

Figure 21 | MATS Area Density of Persons with Disabilities

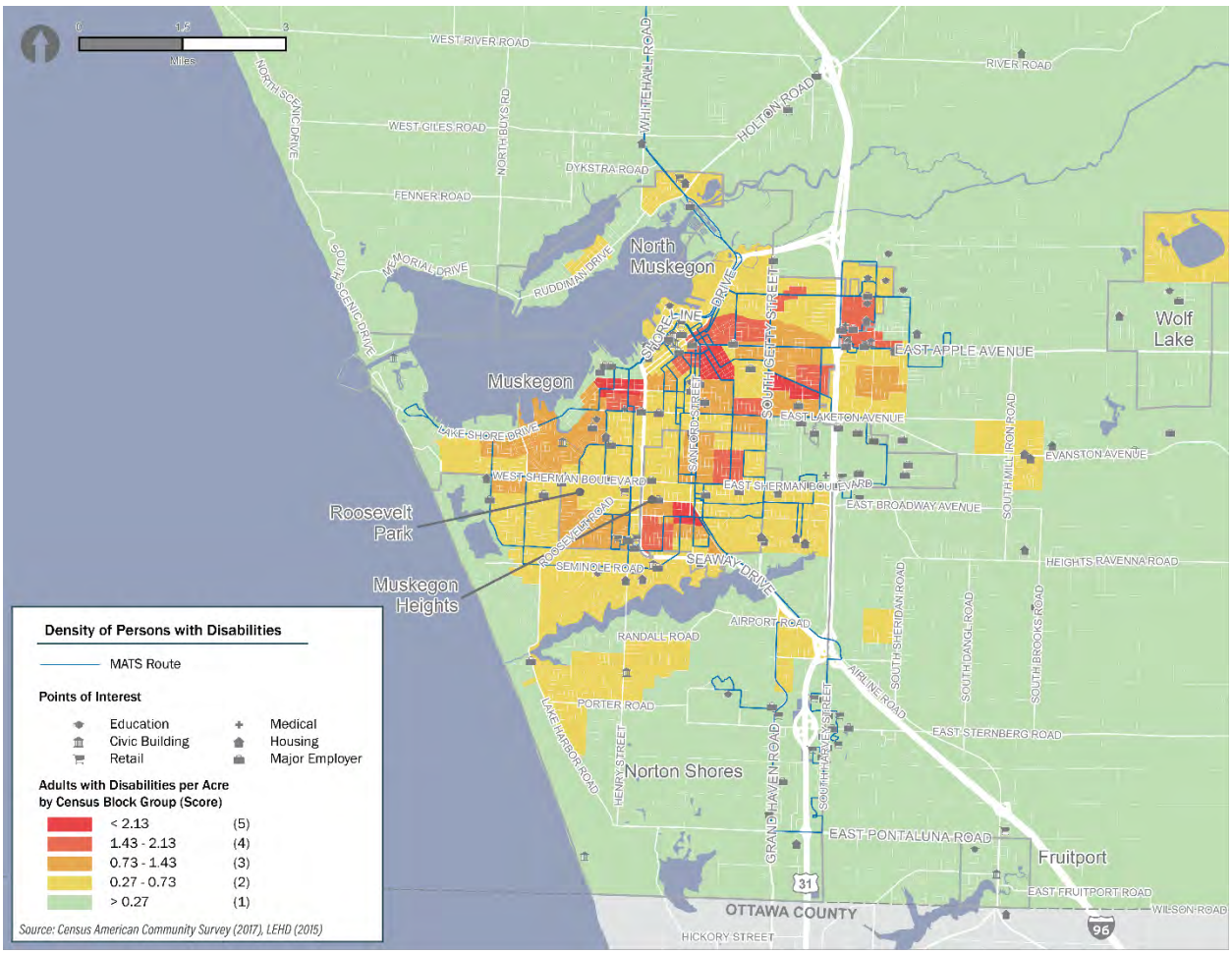
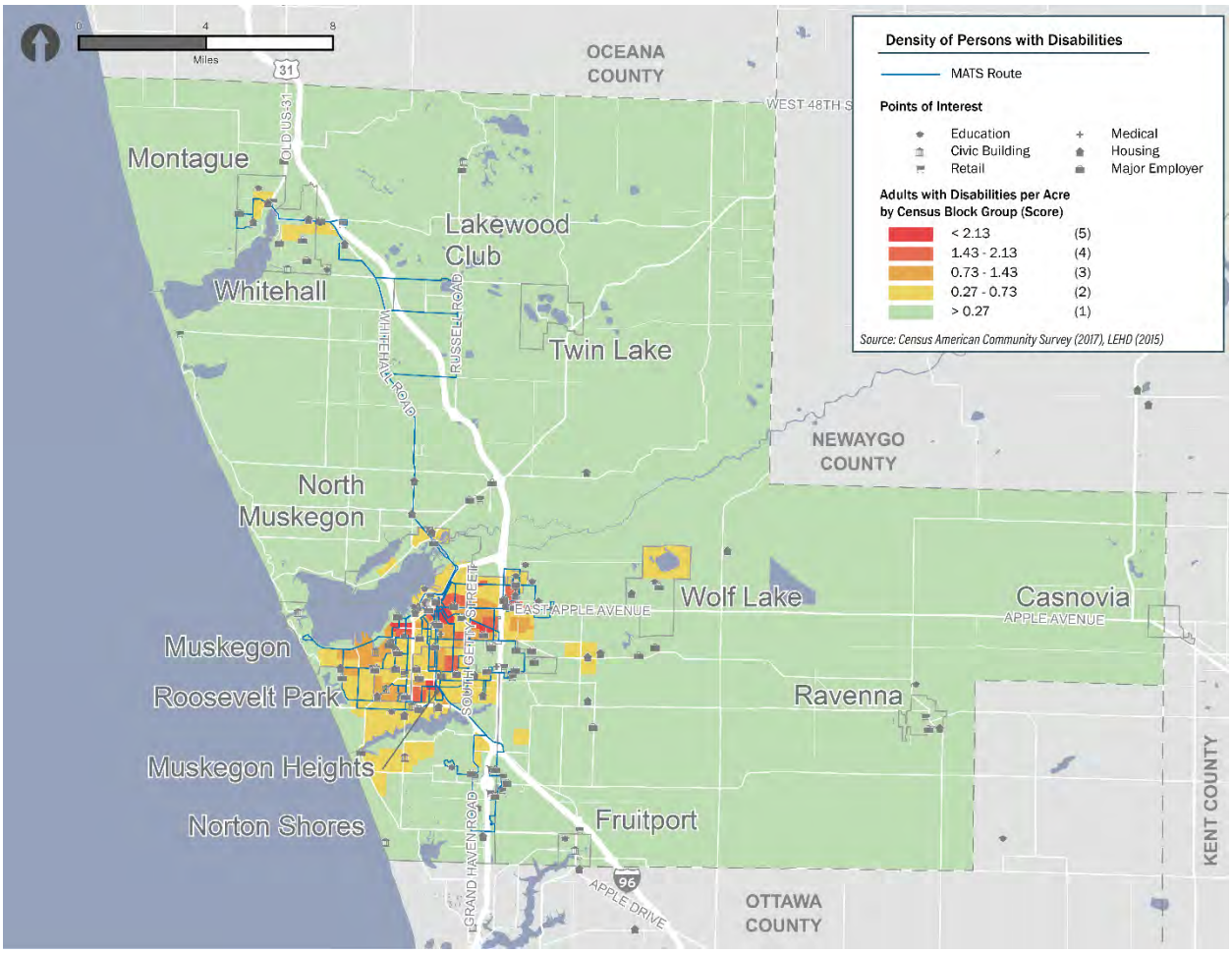


Figure 22 | Muskegon County Density of Persons with Disabilities



Low-Income Population Density

Figure 23 and **Figure 24** show the density of persons living in low-income households (households with an annual income of less than 150 percent of the poverty line) in the Muskegon area. Poverty is generally concentrated in Muskegon (Angell, Nelson, Nims, Mash Field Mclaughlin, Oakview), as well as in Muskegon Heights and around Mercy Health General Campus and Baker College of Muskegon, all of which receive MATS service. County-wide, some poverty also exists in Wolf Lake, Montague and Whitehall.

Figure 23 | MATS Area Low-Income Population Density

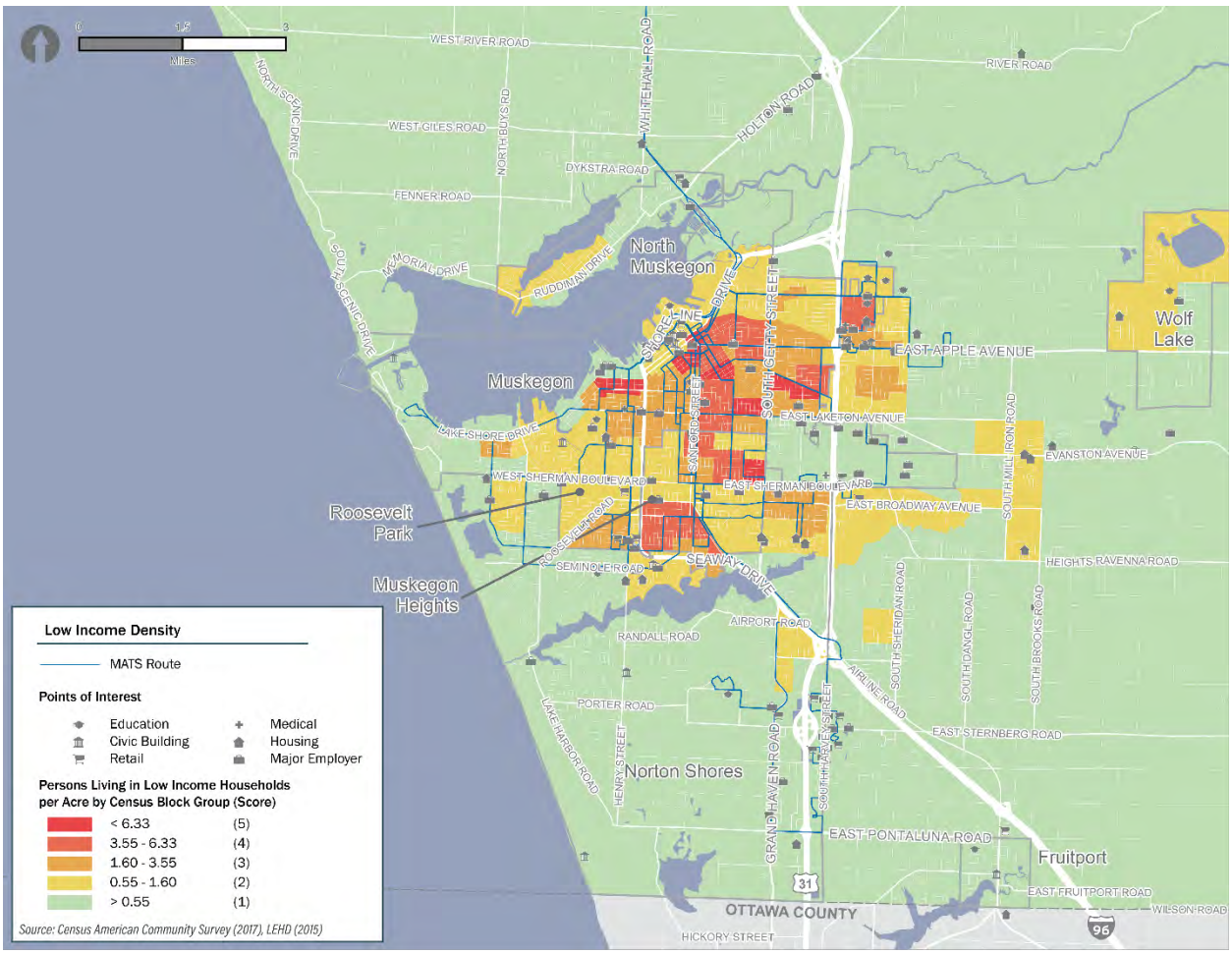
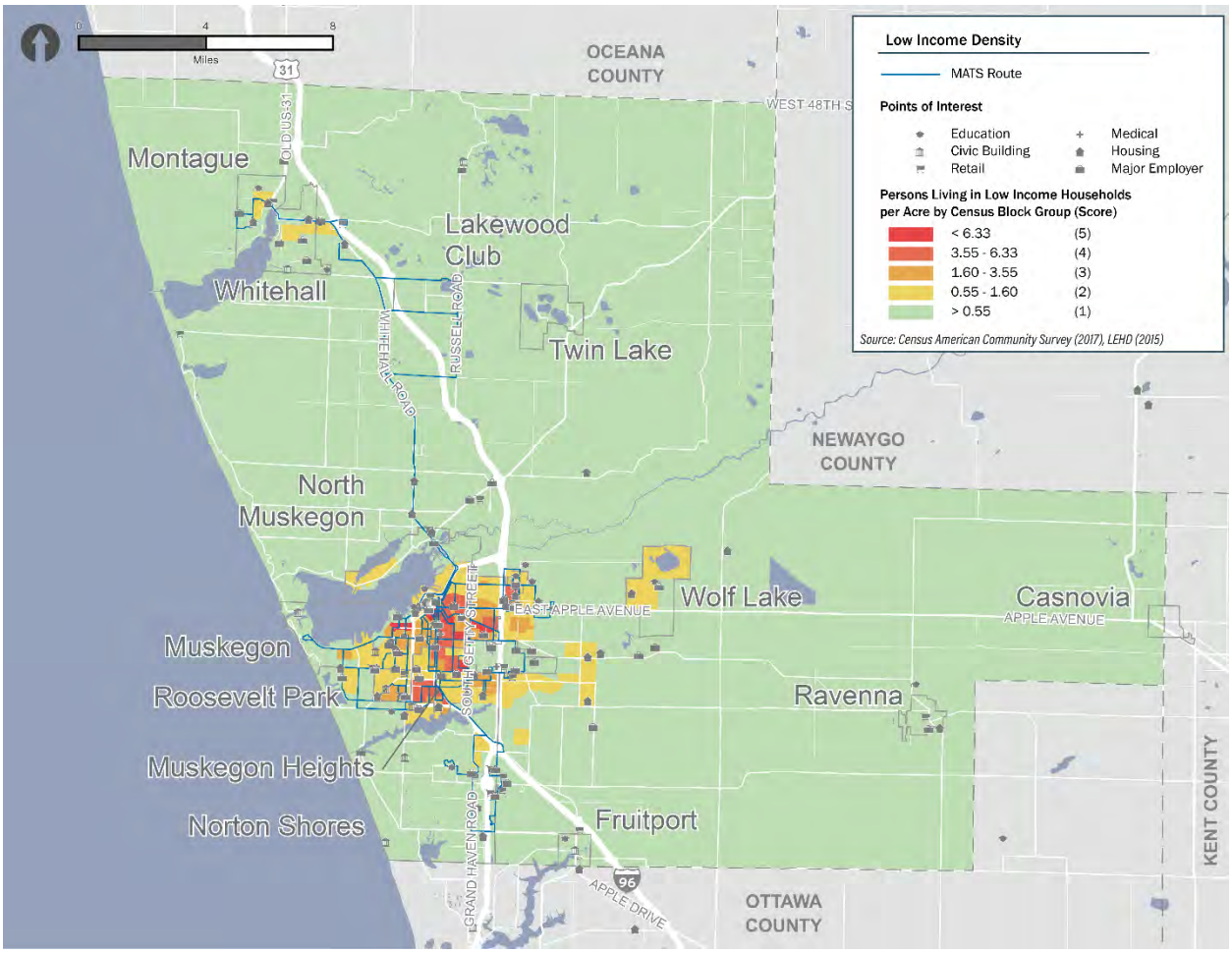


Figure 24 | Muskegon County Low-Income Population Density



Youth/Young Adult Population Density

Figure 25 and **Figure 26** show the population density of youths and young adults (persons under 18 years of age) in the Muskegon area. This demographic is most concentrated in Muskegon (Angell, Lakeside, Nelson, Nims, Marsh Field, Marquette, Mclaughlin and Steele), Muskegon Heights, Norton Shores, and Roosevelt Park. All of these areas receive MATS bus service. There is also a significant concentration of youths and young adults living east of Muskegon off Quarterline Road (South of East Apply Avenue) which does not receive service.

Figure 25 | MATS Area Youth/Young Adult Population Density

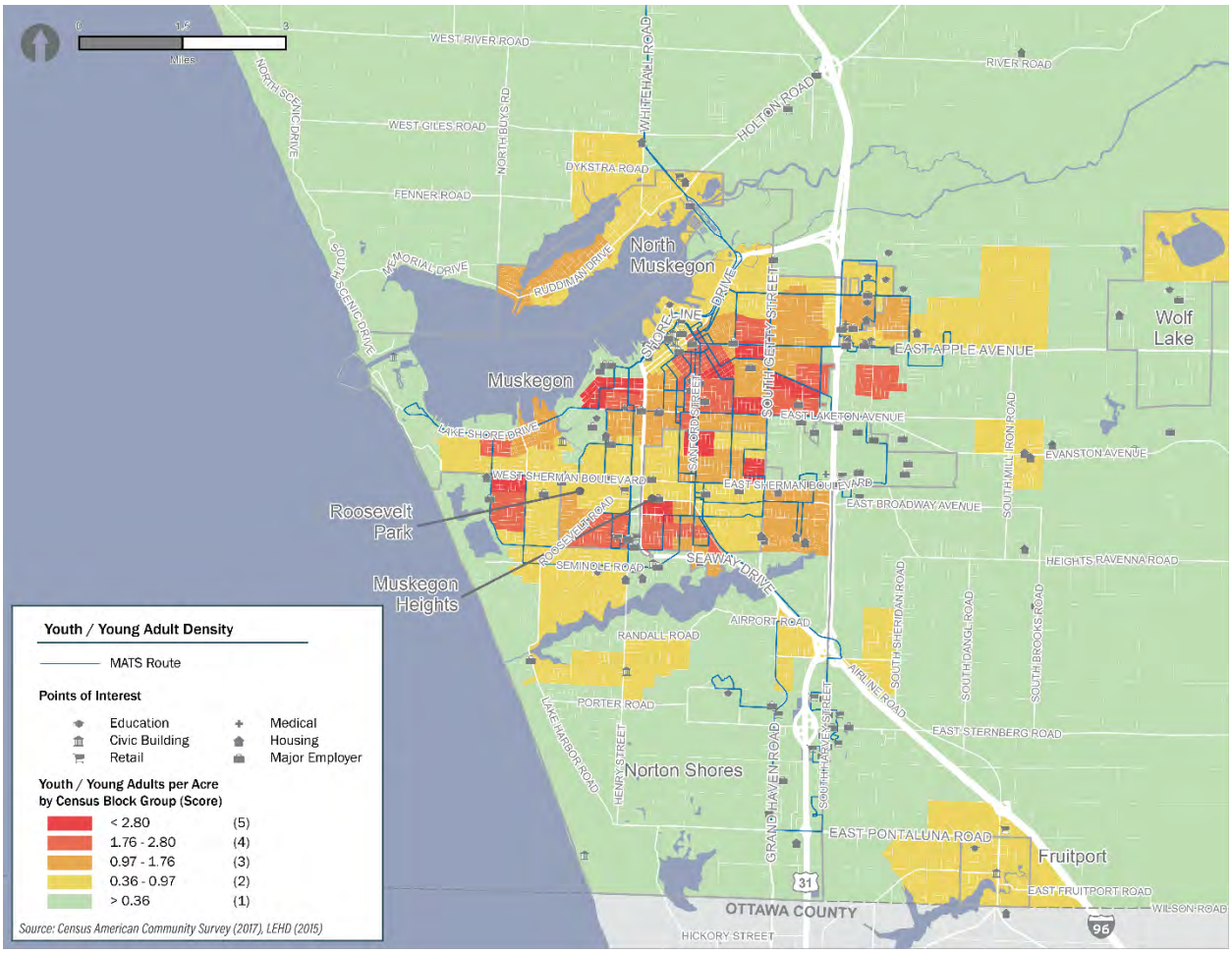
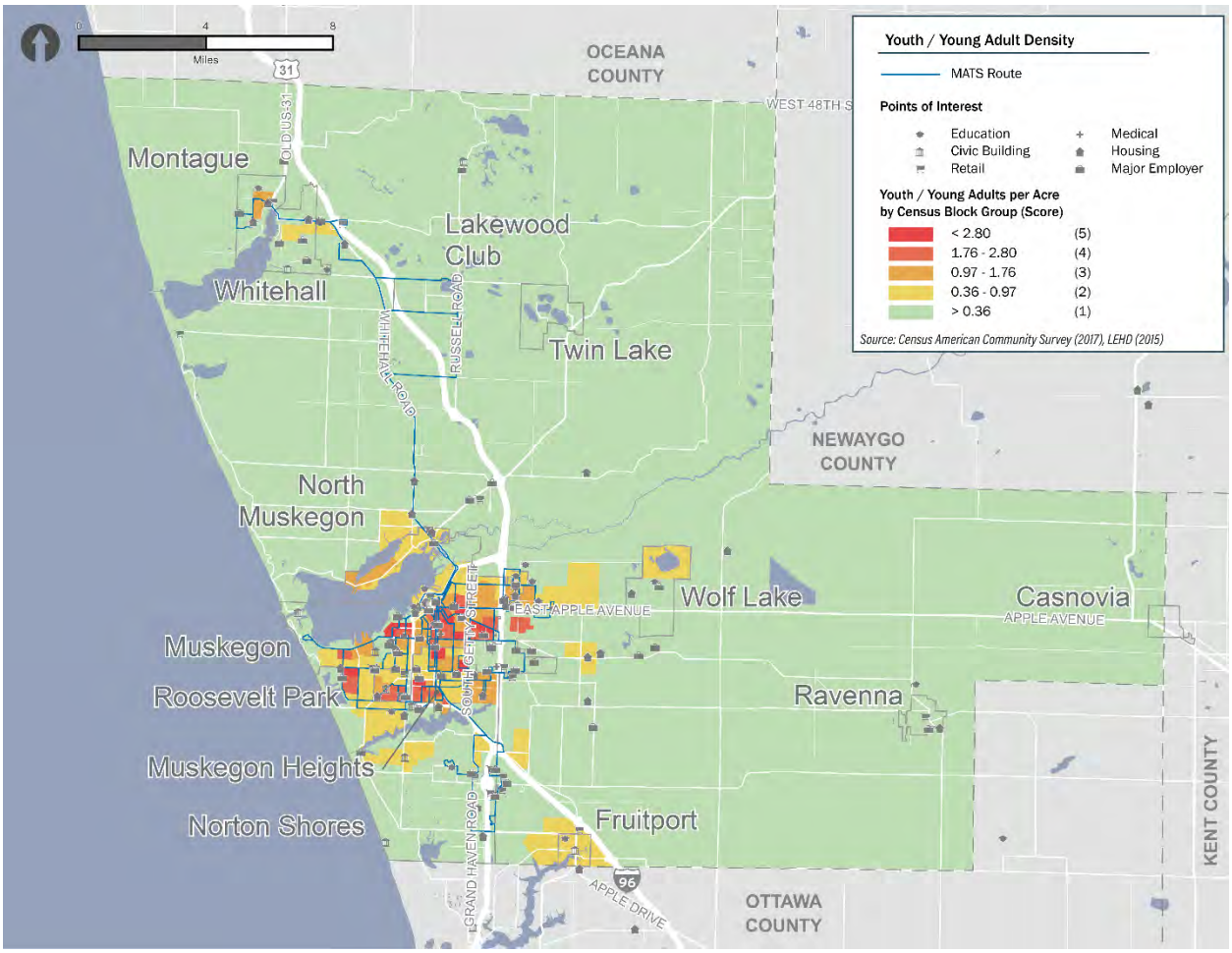


Figure 26 | Muskegon County Youth/Young Adult Population Density



Older Adult Population Density

Figure 27 and **Figure 28** show the density of older adults (persons 65 years or older) in the Muskegon area. This population is somewhat more dispersed as compared to other populations with significant concentrations throughout Muskegon, North Muskegon, Roosevelt Park, Muskegon Heights, Norton Shores, Montague, and Whitehall. The highest concentrations are in Campbell Field, Lakeside, and around Mercy Health General Campus. While many of these areas are served by MATS buses, areas without service include large parts of Norton Shores, North Muskegon, and the area near Shettler Elementary School. County-wide, moderate concentrations of older adults also exist in Montague and Whitehall.

Figure 27 | MATS Area Older Adult Population Density

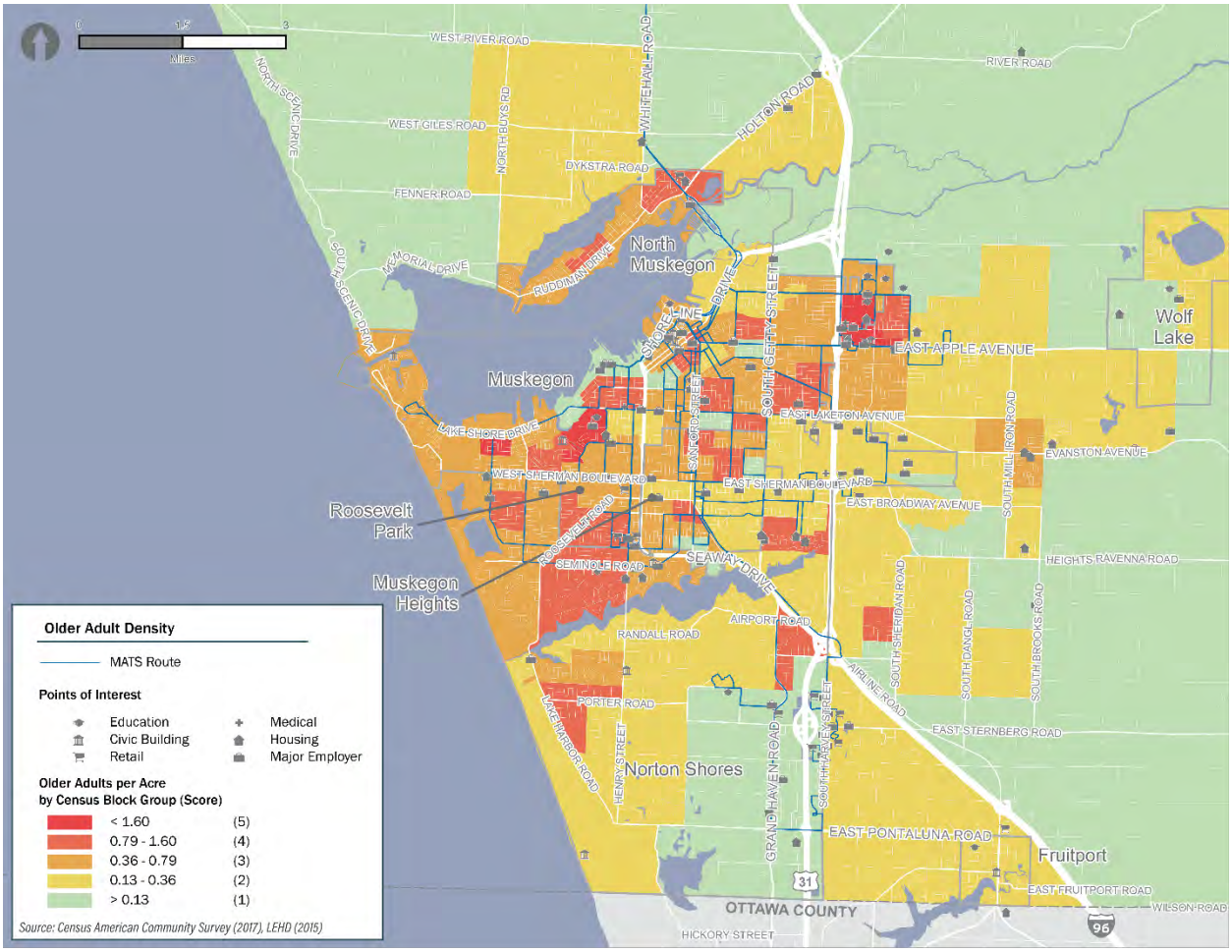
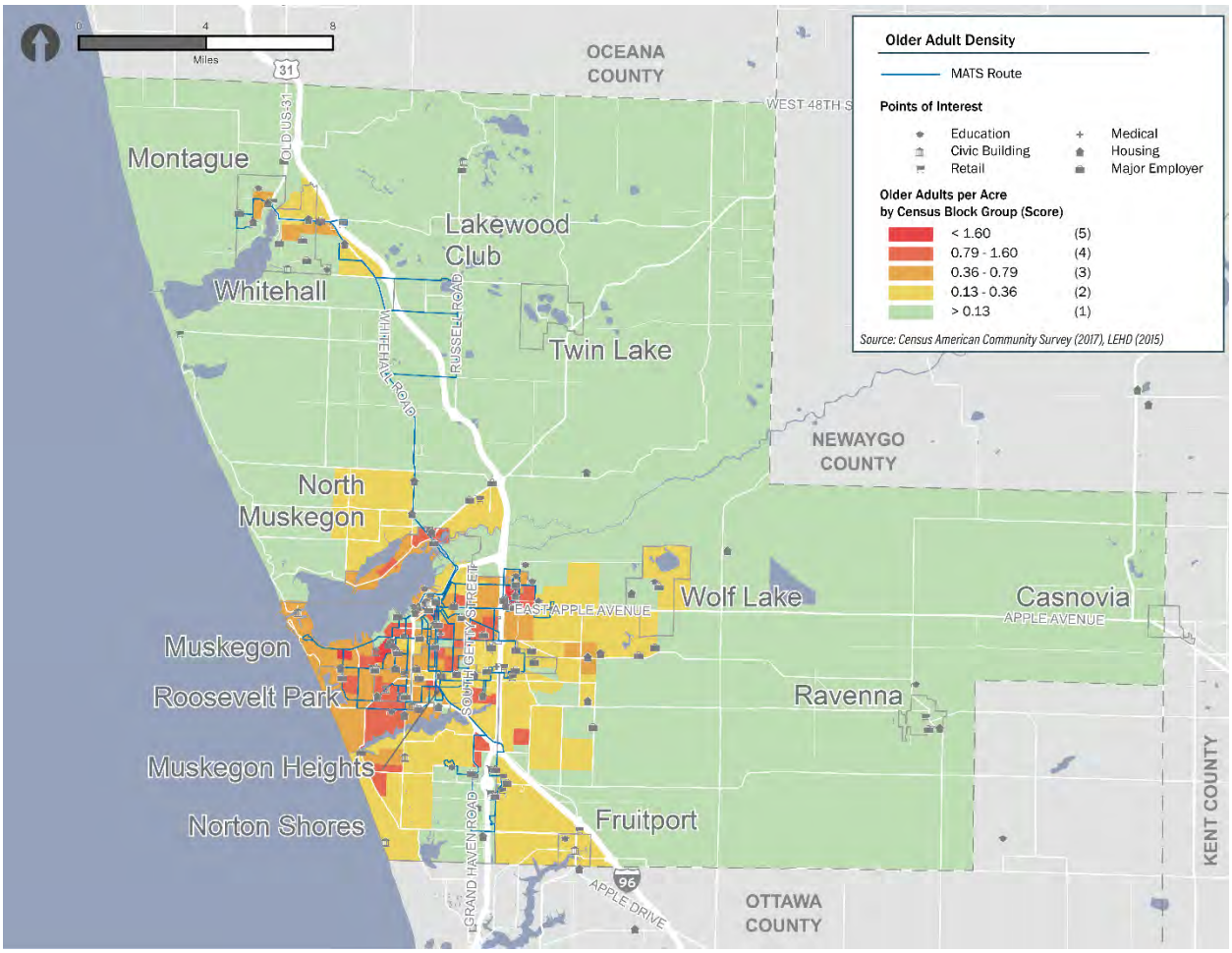


Figure 28 | Muskegon County Older Adult Population Density



Transit Need

Figure 29 and **Figure 30** combine the five density maps into one composite Transit Need Index. The majority of Muskegon indicates transit need. Transit Need Index values are highest in central Muskegon (Marsh Field, Nims and Oakview) and near Mercy Health General Campus, all of which are currently served by MATS. Outside of Muskegon, significant concentrations of Transit Need exist in southern Roosevelt Park, and southwestern and northeastern Muskegon Heights. Outside of Muskegon, moderate Transit Need also exists in North Muskegon, northern Norton Shores, Whitehall, Montague, and the area around Shettler Elementary School.

Figure 29 | MATS Area Transit Need Index

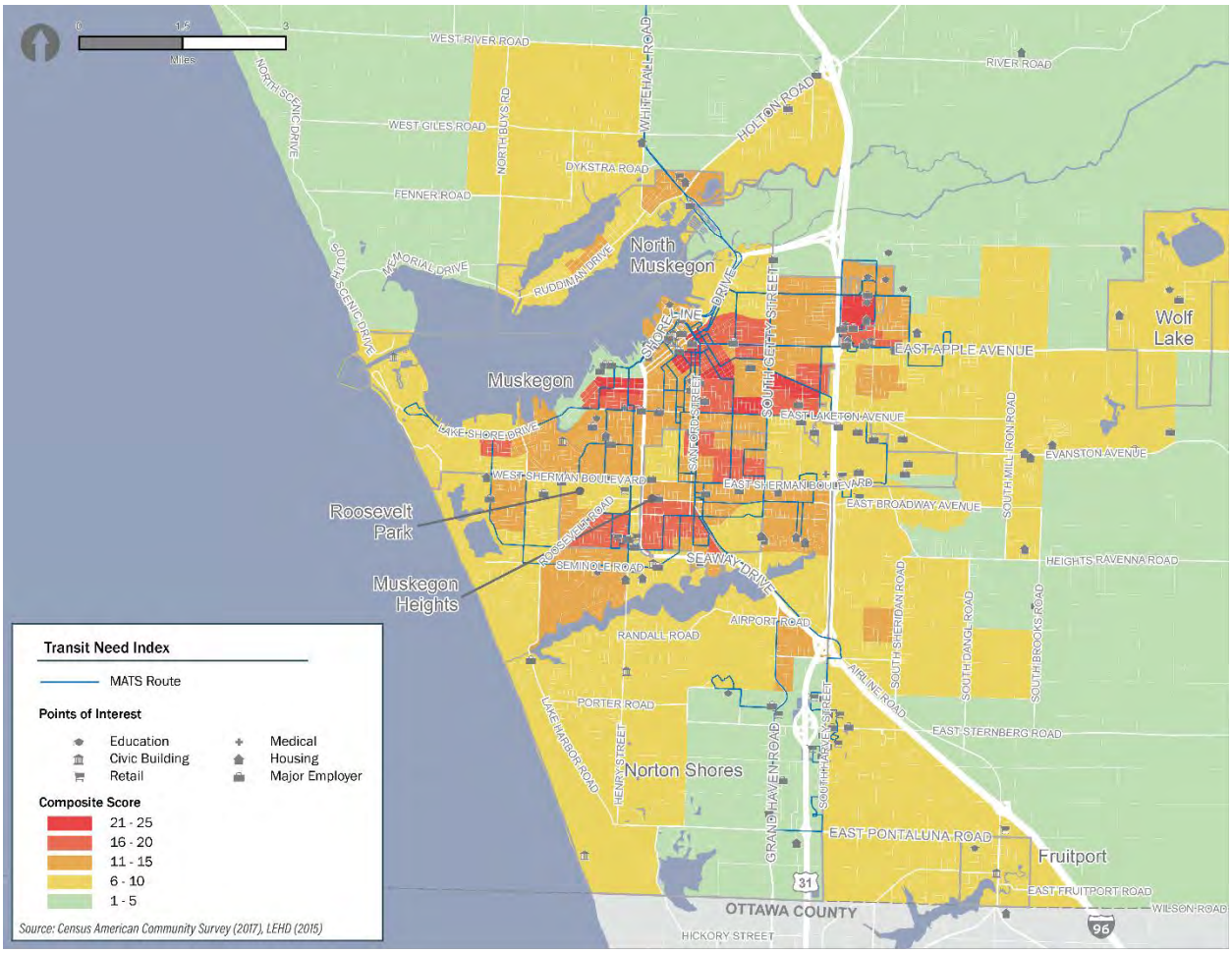
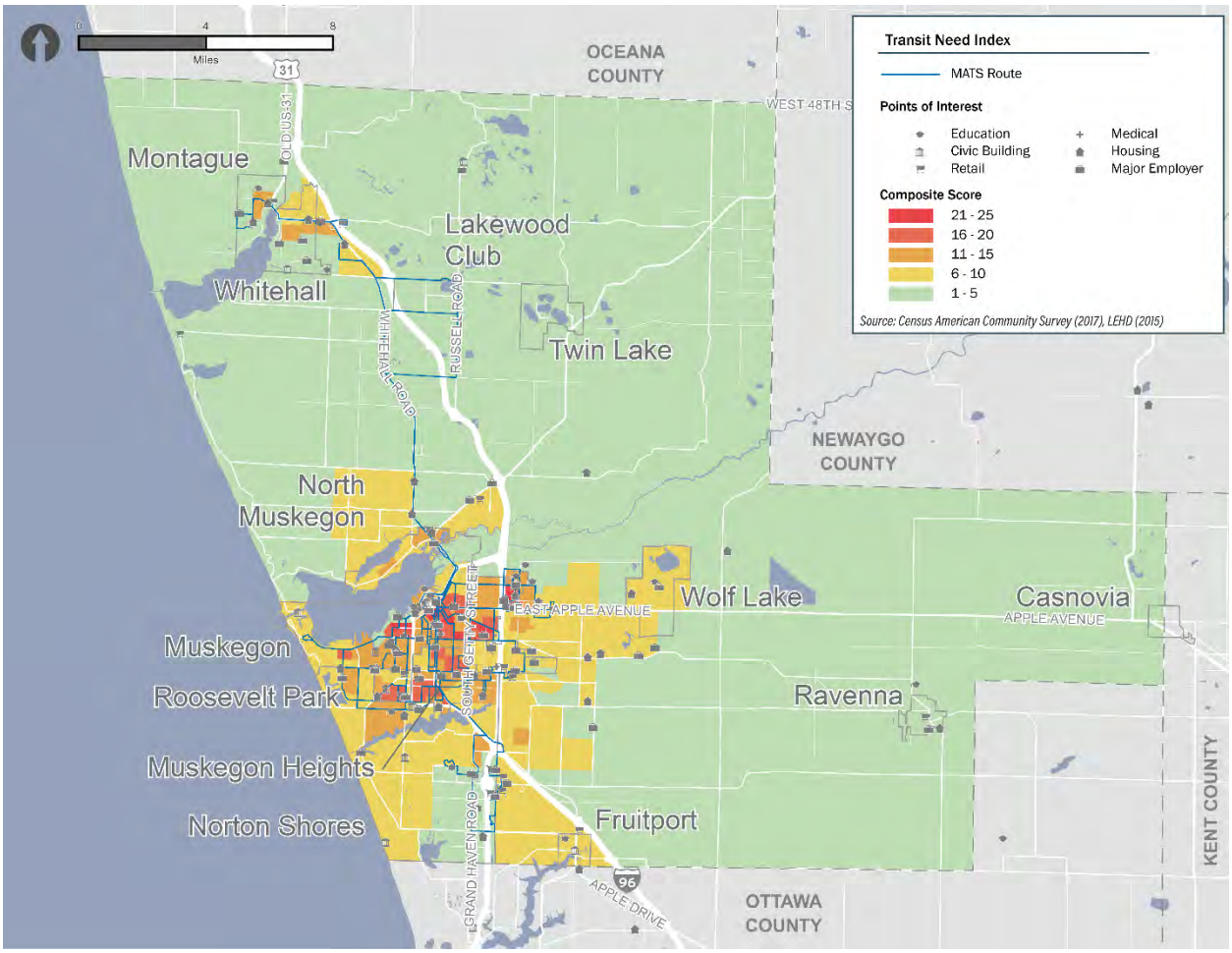


Figure 30 | Muskegon County Transit Need Index



5. SYSTEM PERFORMANCE AND PEER COMPARISON

To put MATS service into perspective, the system's productivity and performance were compared to a set of peer agencies. Peer transit systems were selected from metropolitan areas of comparable size and character to Muskegon. **Table 10** presents the selected peers, along with key service and service area characteristics for each system. Like MATS, all peers operate their services directly.

The data presented in the following tables is from 2017. While newer data is available for MATS, and is presented elsewhere in this document, 2017 is the most recent year for which data is available in the National Transit Database (NTD) (Federal Transit Administration, 2019) for all peer agencies. Thus, for the purpose of the peer comparison, 2017 data was used in most cases for MATS as well.

Table 10 | Peer Systems Overview

Service Provider (City)	Service Area Population	Service Area (sq. mi.)	Service Area Population Density (pop./sq. mi.)	Bus		Demand-Response	
				Total Operating Expenses	Peak Vehicles	Total Operating Expenses	Peak Vehicles
Muskegon Area Transit System (MATS) (Muskegon, MI)	**172,188**	**499**	**345**	**$3,584,845**	**15**	**$1,157,260**	**8**
Jackson Area Transportation Authority (JATA) (Jackson, MI)	159,494	702	227	$2,532,274	11	$1,544,801	10
Bay Metropolitan Transit Authority (Bay Metro) (Bay City, MI)	106,832	442	242	$5,573,295	38	$2,713,027	14
Battle Creek Transit (BCT) (Battle Creek, MI)	87,735	73	1,202	$3,152,495	13	$964,678	7
Macatawa Area Express Transportation Authority (MAX) (Holland, MI)	71,572	42	1,704	$1,994,035	8	$1,949,864	14
Shoreline Metro (Sheboygan, WI)	59,490	23	2,587	$3,163,112	15	$759,770	6
Bay Area Transportation Authority (BATA) (Traverse City, MI)[6]	112,786	812	139	$4,648,400	42	$2,328,163	20

[6] Because Bay Area Transportation Authority of Traverse City, MI is classified as "rural" and not "urban", it does not report Service Area Population or Service Area Size to the National Transit Database. Data presented here

Livingston Essential Transportation Service (LETS) (Howell, MI)	189,985	568	334	N/A	N/A	$2,372,456	23
Harbor Transit Multi-Modal Transportation System (Harbor Transit) (Grand Haven, MI) [7]	45,357	54	840	N/A	N/A*	$3,078,678	21
Peer Average	***104,156***	***339***	***909***	***$3,510,602***	***21***		

Service Comparison Metrics

To identify how MATS compares to peer agencies, the following primary metrics were compared at the annual level for both fixed-route bus and demand-response services:

- Passenger trips
- Operating expenses
- Revenue hours
- Revenue miles

These characteristics are compared across peer bus services in **Table 11**, and across demand-response services in **Table 12**. With regard to bus service, MATS has the second highest number of passenger trips, and third highest for all other primary metrics. When looking at demand-response service, MATS has the second to least passenger trips, and the seventh highest operating expense, revenue hours, and revenue miles.

Table 11 | Primary Service Metrics Comparison: Fixed-Route Bus Service

Service Provider (City)	Passenger Trips	Operating Expenses	Revenue Hours	Revenue Miles
MATS	**528,635**	**$3,584,845**	**45,245**	**663,432**
JATA	486,263	$2,532,274	25,951	347,630
Bay Metro	487,472	$5,573,295	48,832	1,008,331
BCT	448,495	$3,152,495	27,662	409,113
MAX	340,161	$1,994,035	33,046	412,389
Shoreline Metro	529,726	$3,163,112	37,679	543,561
BATA	378,077	$4,648,400	92,346	1,366,566
Peer Average	***445,032***	***$3,510,602***	***44,253***	***681,265***

is 2017 data for Grand Traverse and Leelanau Counties from the U.S. Census American Community Survey, 2017 (population), and U.S. Census TIGER/Line Shapefiles (land area).

[7] Harbor Transit runs seasonal fixed-route service, but it is not reported to the National Transit Database.

Table 12 | Primary Service Metrics Comparison: Demand-Response Service

Service Provider (City)	Passenger Trips	Operating Expenses	Revenue Hours	Revenue Miles
MATS	**28,645**	**$1,157,260**	**12,871**	**197,547**
JATA	36,449	$1,544,801	15,550	205,020
Bay Metro	48,161	$2,713,027	25,829	427,580
BCT	24,305	$964,678	10,941	113,431
MAX	77,759	$1,949,864	29,839	387,269
Shoreline Metro	35,589	$759,770	12,539	155,464
BATA	127,949	$2,328,163	44,174	677,260
LETS	142,228	$2,372,456	40,012	726,704
Harbor Transit	255,210	$3,078,678	47,138	709,471
Peer Average	***93,456***	***$1,963,930***	***28,253***	***425,275***

Productivity Metrics Comparison

Productivity metrics highlight the service efficiency of transit systems on a per-unit (generally, hours, miles, or passenger trips) basis. Normalizing larger metrics by units allows for an accurate comparison across different services. For example, while high operating costs coupled with a high number of passenger trips may indicate an efficient service, high operating costs coupled with a low number of passenger trips may indicate that per-passenger movement is relatively expensive and inefficient. The productivity metrics, analyzed for fixed-route service in **Table 13** and demand-response service in **Table 14**, are listed below:

- Operating expense per passenger trip
- Operating expense per revenue hour
- Passenger trips per revenue hour
- Passenger trips per revenue mile

MATS' fixed-route service is somewhat more efficient than the peer average for all of these productivity metrics, and represents the median for all metrics except operating expense per revenue hour, where it is the third most efficient.

When looking at demand-response service, MATS is less efficient than peer systems. Operating expense per passenger trip, operating expense per revenue hour, and passenger trips per revenue hour all rank seventh among the nine peers, while passenger trips per revenue mile ranks eighth.

Table 13 | Productivity Metrics Comparison: Fixed-Route Bus Service

Service Provider (City)	Operating Expense Per Passenger Trip	Operating Expense Per Revenue Hour	Passenger Trips Per Revenue Hour	Passenger Trips Per Revenue Mile
MATS	**$6.78**	**$79.23**	**11.68**	**0.8**
JATA	$5.21	$97.58	18.74	1.4
Bay Metro	$11.43	$114.13	9.98	0.48
BCT	$7.03	$113.96	16.21	1.1
MAX	$5.86	$60.34	10.29	0.82
Shoreline Metro	$5.97	$83.95	14.06	0.97
BATA	$12.29	$50.33	4.09	0.27
Peer Average	***$7.97***	***$86.72***	***12.23***	***0.84***

Table 14 | Productivity Metrics Comparison: Demand-Response Service

Service Provider (City)	Operating Expense Per Passenger Trip	Operating Expense Per Revenue Hour	Passenger Trips Per Revenue Hour	Passenger Trips Per Revenue Mile
MATS	**$40.40**	**$89.91**	**2.23**	**0.15**
JATA	$42.38	$99.34	2.34	0.18
Bay Metro	$56.33	$105.04	1.86	0.11
BCT	$39.69	$88.17	2.22	0.21
MAX	$25.08	$65.35	2.61	0.2
Shoreline Metro	$21.35	$60.59	2.84	0.23
BATA	$18.19	$52.70	2.89	0.18
LETS	$16.68	$59.29	3.55	0.2
Harbor Transit	$12.06	$65.31	5.41	0.36
Peer Average	***$28.97***	***$74.47***	***2.97***	***0.21***

Additional Peer Information

The National Transit Database does not have all information about transit providers. In order to present a more detailed overview, addition information was collected through open source research and by directly contacting the peer transit providers. Each peer was asked to provide data in response to questions related to governance, staffing (number of full-time equivalent (FTE) positions, by labor category), software program(s) used, university partnerships or pass programs (if applicable), funding allocation formulas, local funding sources, and prioritization policies for demand-response service. MATS is thankful to each agency for providing this information. This section provides additional information on these topics for each of the peer agencies.

Governance Structure

MATS is structured as a County Department. Peers are structured as transit/ transportation authorities (5), city departments (2), or county departments (1), as listed below.

- Transit or Transportation Authorities:
  - JATA
  - Bay Metro
  - MAX
  - BATA
  - Harbor Transit
- City Departments:
  - BCT
  - Shoreline Metro
- County Department:
  - LETS

Funding

Transit operators fund themselves in a variety of ways. Two that are of interest when looking at peers are how local communities contribute to the service, and whether there are any millages in place.

MATS is not funded by any millages. Harbor Transit, BATA, MAX, and Bay Metro all have transit millages in place, while JATA, Battle Creek, and LETS do not.

MATS local share contribution is based on a per capita charge for the population residing within ¼ mile of the MATS bus routes in these communities. Shoreline Metro is funded by municipalities on the basis of the percentage of revenue hours of service in that each municipality. BCT, which is a City Department, is funded by the City's general fund to cover any differences between other revenues and costs. Finally, one township in the LETS service area contributes the local match for a grant to run a dedicated senior center bus. Other systems either do not have local contributions or did not share data on them.

Staffing

There are several categories of staff at a transit provider, including mechanical, operator, custodial, dispatching, as well as supervisors, administrative, and other staff, as shown in **Table 15**. Providers that offer different amounts of service have different staffing needs, so this data was divided by revenue hours to gather comparable data in **Table 16**. All of the data was provided by the various transit operators; some are estimates, especially when one person's time is split among different categories, and/or when another agency provides some of the service, as happens in some cases for custodial and "other" staffing needs.

Table 15 | MATS Staffing Compared to Peers (FTEs)

Service Provider (City)	Mechanics	Operators	Custodial Staff	Dispatchers	Supervisors, Administrative, and all Other Staff	Total	Total Revenue Hours
MATS	**2**	**29**	**1.75**	**2.5**	**8**	**43.25**	**58,116**
JATA	11	25	1	2	9	48	41,501
Bay Metro	7	54	1	3	18	83	74,661
BCT	4	25	2	4	5	40	38,603
MAX	2	52	4	4	23.5	85.5	62,885
Shoreline Metro	4	30	2.75	3	4.7	44.45	50,218
BATA	5	84	2	13	23	127	136,520
LETS	2	30	0.25	4	6	42.25	40,012
Harbor Transit	1	35	1	4	8	49	47,138
Peer Average	***4.5***	***41.9***	***1.8***	***4.6***	***12.2***	***64.9***	***61,442***

Table 16 | MATS Staffing per 100,000 Revenue Hours Compared to Peers

Service Provider (City)	Mechanics	Operators	Custodial Staff	Dispatchers	Supervisors, Administrative, and all Other Staff	Total	Total (Non-Operator)
MATS	**3.4**	**49.9**	**3.0**	**4.3**	**3.4**	**74.4**	**24.5**
JATA	26.5	60.2	2.4	4.8	2.4	115.7	55.4
Bay Metro	9.4	72.3	1.3	4.0	1.3	111.2	38.8
BCT	10.4	64.8	5.2	10.4	7.8	103.6	38.9
MAX	3.2	82.7	6.4	6.4	5.6	136.0	53.3
Shoreline Metro	8.0	59.7	5.5	6.0	3.4	88.5	28.8
BATA	3.7	61.5	1.5	9.5	13.2	93.0	31.5
LETS	5.0	75.0	0.6	10.0	2.5	105.6	30.6
Harbor Transit	2.1	74.3	2.1	8.5	4.2	104.0	29.7
Peer Average	***8.5***	***68.8***	***3.1***	***7.4***	***5.0***	***107.2***	***38.4***

MATS has below average staffing per revenue hour across all categories, with the least staffing time of all peers per revenue hour for operators as well as for total staffing. Even when looking at non-operator staff, MATS has the least staffing time per revenue hour among peers. Custodial Staffing levels are quite close to the peer average.

Demand-Response Software

Transit provider peers use a variety of software tools to book demand-response service, as shown in **Table 17**. Like MATS, Battle Creek Transit uses Trapeze for demand-response trip scheduling (although they are currently evaluating other options). Three providers use RouteMatch software for this function, and one provider each uses Mobilitat and Ecolane software. Livingston Essential Transportation Service is currently transitioning from PCTrans to DoubleMap software.

Table 17 | Demand-Response Software Comparison

Software	Service Providers (Cities)
Trapeze	• **MATS** • BCT
RouteMatch	• JATA • MAX • Harbor Transit
Mobilitat	• BATA
Ecolane	• Shoreline Metro
PCTrans	• Bay Metro
DoubleMap	• LETS

Demand-Response Prioritization and Certification Practices

Peer demand-response services vary greatly. Harbor Transit and LETS have no regular fixed-route service, and only provide demand-response service. The other peers all provide fixed-route service, and must therefore provide complementary paratransit service, as required by the Americans with Disabilities Act (ADA). Notably, however, none of the peer services offer ADA-only demand-response service: all offer service to at least some additional populations, and all offer demand-response service in areas beyond ¾ mile of the fixed route system.

MATS GoBus service is for people with disabilities and seniors (age 65 or older) throughout Muskegon County. There is a formal process through which individuals with a disability can apply to MATS to have their ADA status assessed and certified; however, MATS does not undertake a formal process to verify the disability status of individuals who do not request ADA-certification; therefore, eligibility for GoBus service among individuals who are not age 65 or older is currently determined by the individual user. ADA-certified individuals seeking service within the fixed-route service area (FRSA) are always provided service, in compliance with ADA requirements. Individuals who have been granted “subscriptions” (automatically-reserved trips for recurring appointments) are prioritized as well (after the ADA-certified trips within the FRSA). All other riders are provided service on a first-come, first-served basis. Requests can be made up to two weeks in advance, and, given currently budgetary limitations, other riders generally need to book many days in advance.

Some peer systems are open to the general public, without any prioritization: Harbor Transit, BATA, and JATA. JATA will find a way to accommodate anyone with ADA certification, but has not had to remove any non-ADA demand-response trips. Meanwhile, some systems are open to all, but have prioritization for some populations. MAX prioritizes ADA-certified customers; LETS prioritizes ADA-certified and senior rides; while BCT prioritizes ADA-certified customers, followed by seniors and rides for non-ADA-certified persons with disabilities. Shoreline Metro, meanwhile, has two services: standard ADA service within ¾ mile of fixed route service, and a service that serves much of Sheboygan County for seniors and persons with disabilities. Finally, Bay Metro demand-response service only serves those with disabilities and seniors, with those with disabilities having priority.

Systems vary in how they certify disability. MAX, JATA, BCT, Shoreline Metro, and Bay Metro all require certification. Harbor Transit and BATA, as they do not prioritize riders with disabilities, do not require certification. LETS does not currently require certification but plans to do so in the future.

Services differ in what age they consider for "senior" services and fares. Most systems define senior as 60 years or older, with the only exceptions being MATS (65) and MAX (70).

U-Pass Programs

U-Pass programs are a general term commonly used for agreements between a transit provider and a college or university that allows affiliates of the institution to ride transit service fare-free or for a discounted rate, in exchange for the funding agreement between the school and the transit provider. MATS does not have a U-Pass program at this time, though Muskegon Community College previously contributed to fund operation of the Marquette Express route. None of the peer agencies have a U-Pass program per se with a negotiated rate. MAX offers student passes that are timed with school trimesters, but without a negotiated rate. BCT offers a discounted rate for students, which is to be used only on school-related trips, and requires school identification. All other peers have no U-Pass program of any kind.

While these peers do not have U-Pass programs, there are many systems around the country that do. Some of these are in larger metropolitan areas, with extensive transit systems, such as Washington, DC; Chicago, IL; Los Angeles, CA; and Seattle, WA.

Several smaller systems have U-Pass programs. As shown in **Table 18**, Kalamazoo Metro (KMetro) in Kalamazoo, MI; La Crosse Municipal Transit (MTU) in La Cross, WI; Duluth Transit Authority (DTU) in Duluth, MN, and Superior, WI; and Chatham Area Transit (CAT) in Savannah, GA all have U-Pass programs in which local university students are not able to opt-out of the cost (City of La Crosse, n.d.) (Regents of the University of Minnesota, 2019) (Savannah State University, 2019). Ferris State University, one of the colleges served by The Rapid in Grand Rapids, MI, contracts a route with the operator. This route is opt-in for students, who have to pay a fee to use the route (Ferris State University, n.d.). The Greater Richmond Transit Company (GRTC) in Richmond, VA has a U-Pass program with two local universities, one of which, Virginia Commonwealth University, signed a three-year agreement to pay GRTC an annual fee for free transportation for all students and staff (Virginia Commonwealth University, 2019). In 2019, the University of Washington – Tacoma established a U-Pass program that allows free access to many transit systems in the Seattle-Tacoma area. Students were polled to see whether they would accept a change from opt-in to mandatory, and with 67 percent approval, the program was enacted (University of Washington - Tacoma, 2019). Finally, the State of Connecticut established the U-Pass CT program, which is available to all state universities. Each university that opts-in pays $20 per student, and those students can ride most transit in the state for free (Connecticut Department of Transportation, 2019).

Table 18 | Selected U-Pass Programs

Service Provider (City)	Universities	Student Fee	Notes
Central County Transportation Authority / Kalamazoo County Transportation Authority (KMetro) (Kalamazoo, MI)	Western Michigan University (WMU)	Enrollment fee includes transportation fee, covering several transit services. KMetro accounts for this as "prepaid fares".	Student, staff, and faculty IDs work as a bus pass. KMetro and WMU have a five-year contract wherein KMetro has agreed to consult with university should they make changes to certain routes.
Interurban Transit Partnership (The Rapid) (Grand Rapids, MI)	Grand Valley State University (GVSU) Ferris State University Aquinas College Calvin University Kendall College	No opt-in or opt-out for most students. Ferris State University students can purchase a pass on a per-month or per-semester basis.	The Rapid operates three contract routes for GVSU. The University is billed based on service hours for these routes and not based on ridership. Ferris State contracts a route to serve their campus. University pays an annual fee plus a bill based on the number of student passes. Aquinas, Calvin and Kendall subsidize trips, paying some percentage of student fares on The Rapid. The Rapid charges the colleges monthly based on ridership.
La Crosse Municipal Transit (MTU) (La Cross, WI)	University of Wisconsin – La Crosse Western Technical University Viterbo University	Mandatory 18.74 per semester (for University of Wisconsin – La Crosse)	
Duluth Transit Authority (DTU) (Duluth, MN, Superior, WI))	University of Wisconsin – Superior College of St. Scholastica University of Minnesota – Duluth Lake Superior College	Mandatory $16 per semester (for University of Minnesota – Duluth)	UMD is mandatory for undergraduates only; graduate students can opt-in.
Chatham Area Transit (CAT) (Savannah, GA)	Savannah State University	Mandatory $45 per semester	
GRTC Transit (Richmond, VA)	Virginia Commonwealth University University of Richmond	N/A	Virginia Commonwealth University pays an annual fee for free transportation services for all students and staff. In 2019, this was $1.42 million. With 31,076 students and 23,401 employees, this averages to $26.07 per year.
Many transit agencies in the Seattle-Tacoma Area, WA	University of Washington - Tacoma	Mandatory $45 per quarter	Program was changed from opt-in to mandatory in 2019, after students were polled to see whether they would accept a mandatory fee. 67 percent approved.

Transit agencies throughout state of Connecticut	Many state universities throughout Connecticut	Mandatory $20 per semester	

Sources: (Central County Transportation Authority, 2017); City of La Crosse (n.d.); Connecticut Department of Transportation (2019); Regents of the University of Minnesota (2019); Savannah State University (2019); University of Washington - Tacoma (2019); University of Wisconsin - La Crosse (2019); Virginia Commonwealth University (2019).

Case Study: Duluth Transit Authority and the College of St. Scholastica

DTA recently renegotiated its U-Pass agreement with one of the local colleges, the College of St. Scholastica (CSS), for the school years from August 2019 to July 2022. All students and employees with a validated student or employee pass will be able to ride DTA. In exchange, CSS will pay DTA $25,500 (19-20), $26,000 (20-21), and $27,000 (21-22) (College of St. Scholastica; Duluth Transit Authority, 2019).

This contract contains several sections that allow renegotiation, allowing both parties to manage their risk in starting this partnership.

- If DTA increases fares for the general public, the payment from the fees owed by CSS will increase by a similar percentage, though they will be permitted to renegotiate and/or terminate the contract.
- If CSS ridership increases by 5 percent or more in Year 2 from Year 1, fees for Year 3 will increase in a similar percentage, though CSS will be permitted to renegotiate and/or terminate the contract. Likewise, if ridership subsequently decreases, the fares would decrease to the contract levels.
- If DTA Operating Cost per Hour increases by more than 10 percent in any academic year, the contract will be reopened for renegotiation.
- If the monthly average cost of diesel fuel rises above $4.50 per gallon for more than three consecutive months, the contract will be reopened for renegotiation.
- The contract identifies routes that serve CSS, and states that CSS must have advanced notice and give consent for any significant reductions to the schedule for these routes

These kinds of contracts can help provide certainty to both parties.

6. STAKEHOLDER OUTREACH

Among the best ways to understand how well a transit system is serving its community, is to ask the people who interact with it the most. This includes riders, who in many cases experience the system daily, and non-riders who may still be considered stakeholders in their capacity as prospective riders, employers, advocates, service providers, or simply tax-payers.

In the summer of 2019, public and stakeholder outreach targeting MATS riders, non-riders, community leaders, and members of the general public was conducted in the MATS service area. The aim of the outreach efforts was to inform the study team's understanding of how and why area residents currently use (or don't use) the MATS system, and to identify the types of system improvements that they would most like to see. The outreach included in-person engagement consisting of formal meetings and informal "pop-up" events, and transit surveys conducted both onboard buses and online.

In-Person Engagement

A series of public and stakeholder meetings were held on July 22nd and 23rd 2019. This outreach included four roundtable discussions with invited stakeholders representing various interest groups. Participants were largely grouped in the following ways (with a few exceptions):

- Mayors and city managers of MATS funding-partner communities;
- Representatives of regional planning bodies, municipalities, and transportation providers;
- Education, healthcare and business representatives; and
- Healthcare providers and disability advocates.

In addition, formal presentations were made at a County Board of Commissioners work session and a specially scheduled public meeting. These presentations were followed by question and answer periods. Finally, pop-up events were held at Herman Ivory Terminal and at the MATS operations facility in Muskegon Heights in order to engage in discussions with MATS riders and front-line staff, respectively.

With the exception of the pop-up events, which were informal discussions, each meeting began with a presentation to review the project background, goals, and study approach. Participants were briefed on the results of the recently completed Market Analysis, and on the study's next steps. At the conclusion of the presentation, attendees were posed a series of questions to elicit discussion. A summary of responses to each question is summarized, by meeting, in **Appendix B**. Pop-up meeting comments are also included in the same appendix. The list below highlights key themes and comments that emerged from the public and stakeholder meetings:

- MATS drivers generally have a good rapport with riders, although some wheelchair-bound passengers reported some negative experiences.
- Service should adapt to align with demand; both spatially and time-wise.
- Getting students and employees to work and classes is an issue. Accommodating different shift times is difficult, and some students live beyond the reach of fixed routes.
- Routes need to be more direct.
- There is a need for more GoBus vehicles to be available to meet the demand.
- GoBus trips could be grouped more efficiently.
- Areas that receive service should pay for it. There are no repercussions if a community does not provide transit funding.

- There should be a simple connection to Grand Haven.
- Bus stops lack service information.

Survey of Riders and Non-Riders

To complement the public and stakeholder meetings, an onboard rider survey was conducted on MATS buses on May 20th and 21st, 2019. The survey was designed to document where passengers are traveling to and from, who they are, how and why they currently use the system, and the types of system improvements that they would most like to see. In addition, an online version of the survey was launched on July 22nd and ran until August 19th, 2019. The contents of the online survey were similar to the onboard survey but included additional questions aimed at non-riders. Thus, the online survey provided an opportunity for input for riders who did not participate in the onboard survey, while also documenting the travel patterns and mobility needs of the community at large.

A total of 623 surveys were completed onboard and online. 349 surveys were collected onboard MATS buses, with an additional 274 submitted online. 26 percent of survey takers were non-riders. The remaining 74 percent of survey participants were riders who either completed the survey online or onboard.

Key Survey Findings

Several key themes and findings emerged from the summary and analysis of survey responses, including the following:

- Survey results revealed that there appears to be a relatively low percentage of “choice riders” using MATS services. Fifty-four percent of MATS fixed-route riders indicated that they do not own a car and 52 percent of fixed-route riders reported having an annual household income of less than $10,000 a year. Many GoBus riders are also depended on the service. Forty-three percent of GoBus riders “cannot drive for legal or health reasons” while 22 percent “do not own a car”.
- MATS fixed-route riders are generally pleased with the quality of service, particularly with respect to service dependability, coverage, and fares.
- While GoBus Riders are pleased with some aspects of service, many respondents indicated that call wait times are not reasonable and rides are not available when they need them.
- An analysis of open-ended comments revealed that among riders and non-riders, requests for more new destinations and services was the most common topic mentioned. Among riders in particular, an expansion of weekend service hours was mentioned most frequently.

A full summary of the online survey responses is included in **Appendix B**.

7. IDENTIFICATION OF SERVICE ISSUES AND OPPORTUNITIES

The market analysis and assessment of existing conditions, together with stakeholder input, provide context for the route-by-route analysis of MATS transit service. Using these analyses as a starting point, the study team developed detailed, diagnostic profiles of each MATS route, as well for GoBus service. The route profiles, found in **Appendix A**, describe each route's service characteristics, ridership patterns, productivity, and on-time performance. At the conclusion of each route profile is a list of potential service improvement options for the route. The service improvement options are based on the technical findings of the route profiles (such as low ridership, poor on-time performance, or inadequate connections), and, for the fixed-routes, a set of guiding principles representing industry best practices.

Fixed-Route Guiding Principles

Fixed-route service is most successful when it is easy to use and intuitive to understand. The following principles describe the characteristics of a such a transit system:

Service Should Operate at Regular Intervals

In general, people can easily remember repeating patterns, but have difficulty remembering irregular sequences. Transit riders therefore may find transit routes that operate at different times each hour cumbersome to use. Irregular schedules increase the likelihood a rider will miss a trip or a transfer, thus decreasing the utility of the service. In many cases, operating a service at regular intervals provides a better transit experience for riders, even if doing so results in slightly decreased service frequency.

Ideally, transit routes that operate less frequently than every 15 minutes should utilize clockface scheduling. With a clockface schedule, each bus arrives at the same time or times each hour. For example, a bus route with 20-minute frequency might arrive at :00, :20, and :40 each hour throughout a service period.

Clockface scheduling significantly enhances transit service usability, especially in systems with relatively low frequency service, as it allows passengers to easily remember when their bus will come without having to rely on paper or online schedules. Regular clockface schedules can also help simplify transfers between routes. Even if two routes do not arrive at a stop at the same time, clockface frequencies ensure that wait times between buses are consistent and predictable.

All MATS routes do currently operate with clockface frequencies of every 60 minutes, although some are scheduled to depart Herman Ivory Terminal at 20 past the hour, and others are scheduled to depart 50 minutes past the hour.

Routes Should Operate Along a Direct Path

The fewer directional changes a route makes, the easier it is to understand. Circuitous alignments are disorienting and difficult to remember. Some deviations from the most direct path of travel are necessary and justifiable given that major destinations are sometimes located off of major arterial roadways. However, frequent deviations from the most direct path of travel will increase travel times for the majority of passengers, and thus should be avoided unless there is a strong justification.

Figure 31 highlights two examples of circuitous alignment in the MATS transit network (other examples are described in the route profiles in **Appendix A**). These examples are described below:

- **Route 30**. From Herman Ivory Terminal, Route 30 travels east on Marquette Avenue to MCC, before returning west to Getty Street and traveling south to Summit Avenue via East Park Manor. The route returns to downtown Muskegon via downtown Muskegon Heights, Wood Street, and Terrace Street. A passenger traveling on the route to the Muskegon Heights Transfer Point would first have to take a long deviation to MCC. Similarly, a passenger traveling from East Park Manor to MCC, would first be forced to travel to downtown Muskegon Heights and downtown Muskegon.
- **Route 35**. From Herman Ivory Terminal, Route 35 travels west on Lakesore Drive to Waterworks Road, before returning east to Lincoln Street and traveling south to Norton Avenue. The route then begins its northboud service toward downtown Muskegon via McCracken Street, Sherman Boulevard, and Hackley Avenue, but deviates south along Barclay Street to serve Bio-Blood Components, before continuing north again toward downtown.

Figure 31 | Examples of Circuitous Alignments

Routes Should be Symmetrical

Routes should operate along the same alignment in both directions to make it easy for riders to know where to catch the bus for their return trip. Providing service on different streets, depending on direction, is sometimes unavoidable due to one-way traffic patterns, but to the extent possible, bus stops for service in opposite directions should be across from one another on opposite sides of the same street.

Large one-way loops can also frustrate riders by forcing out-of-direction travel on either the outbound or return leg of their trip. In most circumstances, transit riders prefer bi-directional services that they have to walk somewhat further to access, over a closer but one-way route.

One-way service is a prominent feature of the MATS transit network. Route 55, for example, is nearly entirely one-way (**Figure 32**), meaning that passengers traveling to the industrial parks along Laketon Avenue and Port City Boulevard are forced to ride as far south as Broadway (and sometimes Cleveland Avenue) before returning to downtown Muskegon.

Another example of non-symmetrical service is Route 10. This route has long stretches of bi-directional service, but key activity centers such as the large apartment complexes near Barclay Street and Hackley Avenue are served in the southbound direction only. Similarly, the Roosevelt Park neighborhood is served via a large counter-clockwise loop only. Other examples on non-symmetrical service are described in the route profiles in **Appendix A.**

Figure 32 | Examples of Non-Symmetrical Service

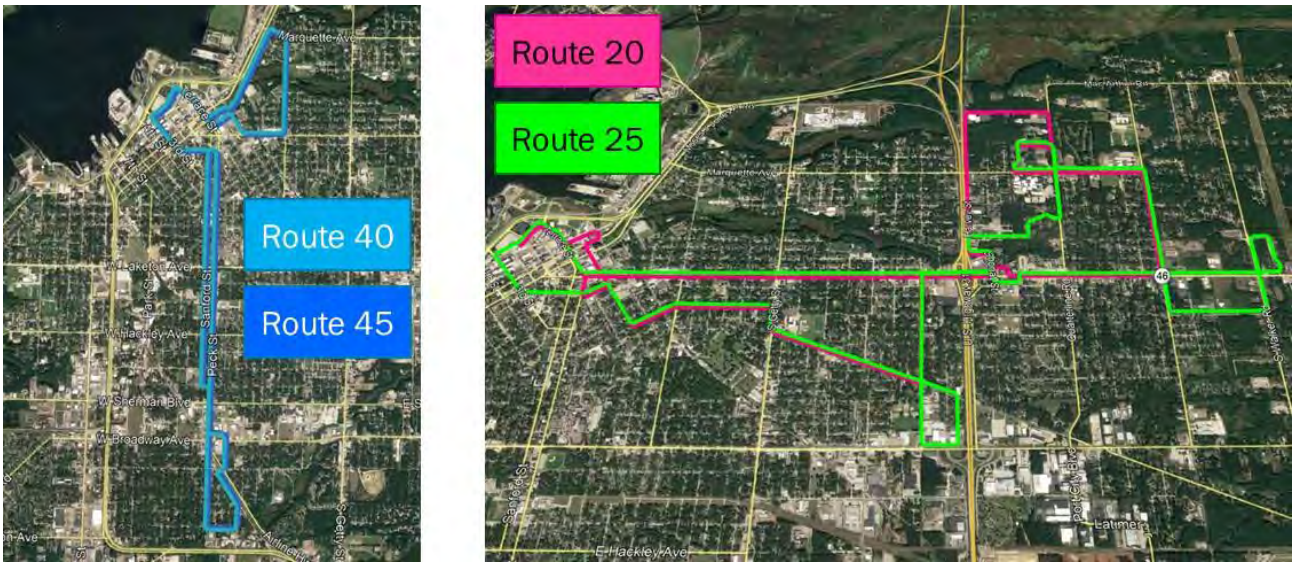
Routes Should Serve Well-Defined Markets

The purpose of a transit route should be clear. Each route should include strong anchors and a mix of origins and destinations. Service duplication should be avoided unless it is for a specific purpose such as to increase effective frequency in a high ridership "trunk" corridor, before two routes diverge. In addition, to avoid confusion at major transfer locations, routes should not display the same route number when serving different corridors or display different route numbers when serving the same corridor.

Figure 33 highlights two examples of MATS routes that operate under different route numbers in the same corridor. These examples are described below:

- **Routes 40 and 45**. Both Route 40 and Route 45 operate between downtown Muskegon and Maplewood Avenue via the Peck/Sanford Corridor and he Muskegon Heights Transfer Point. While the two routes follow identical alignments, their schedules are off-set by 30 minutes to facilitate 30-minute service frequency. As these two routes are identical, they could be presented as a single route with 30-minute frequency.
- **Routes 20 and 25**. Routes 20 and 25 both serve Apple Avenue, MCC, and Evenston Avenue, but in opposite directions: Route 20 operates clockwise, while Route 25 operates counter-clockwise. The two routes have some additional differences, such as service to Orchard View Adult Education by Route 25 only, but most passengers likely use the two routes interchangeably due to their broad similarities.

Figure 33 | Examples of Routes Serving Unrelated Markets



Service Should be Well Coordinated

At major transfer locations, schedules should be coordinated to the greatest extent possible to minimize connection times between services. In general, there are two approaches to coordinating transit service. The first approach is to establish clockface service frequencies on all routes. This ensures a certain predictability for transfers as passengers know when to expect each route regardless of the hour of the day. Clockface schedules can also facilitate pulsing, which is when several routes are designed to arrive at a particular transfer location at the same time. Pulsing is usually used when a transit network has a single primary hub.

The second approach to coordinating transit service is simply to maximize service frequencies on all routes. High frequencies reduce the need to pulse services at a particular location because passengers who miss a connection anywhere in the system can catch the next bus in a relatively short time. If service frequencies cannot be increased at all times due to budget constraints, it is best to increase frequencies during peak-periods when the majority of transfers between services occur.

MATS service is currently designed around two pulses at the Herman Ivory Terminal, where most routes meet up at either 20 or 50 minutes past the hour.

GoBus Service Assessment

Demand-response services like GoBus should not be evaluated by the same standards or principles as fixed-route services, as they are designed to prioritize coverage and accessibility over productivity. In other words, demand-response services are expected to be inefficient compared to fixed-route service, since they are meant to serve low-density areas that do not effectively support fixed-route service and/or sensitive population groups that require more time and assistance with their travel than can be provided with fixed-route service.

The assessment of demand-response service typically focuses on finding the right balance between accessibility and operating cost. In 2018, GoBus service had an operating cost of nearly $50 per passenger trip, which far exceeds the fixed-route weekday average of less than $10 per passenger trip, and is also among the highest per-passenger operating costs among peer demand-response services (see GoBus Profile in **Appendix A**). The comparative inefficiency of GoBus service can be attributed to its low ridership per hour, which is a function of the very large (500-square mile) service area, as well as a relatively undynamic scheduling system and financial constraints that allow having only 1-3 vehicles in service at any given time,

which makes grouping trips more difficult. In other words, GoBus service is stretched far too thin in terms of geography and resources to meet the demand.

Federal law requires that complementary paratransit service be provided to individuals within ¾ mile of a fixed route whose disability prevents them from accessing the fixed-route service. GoBus service far exceeds these requirements by offering service county-wide and to any county resident with a self-declared disability or age 65 or over. In practice, approximately 80 percent of GoBus trips are within the fixed-route service area, but 30 percent of trip requests are denied. MATS is within its rights to deny trip requests to individuals who are not certified as disabled according to the ADA. Given that GoBus is advertised to a broader audience, its high denial rate results in considerable frustration among prospective riders.

8. PRELIMINARY SERVICE SCENARIOS AND STAKEHOLDER REACTIONS

To address the service issues and opportunities identified through the market analysis, service analysis, and stakeholder input, the study team developed two preliminary service redesign scenarios each, for both the MATS fixed-route and GoBus services. Both scenarios for each service incorporate service improvement ideas that emerged from the route profiles presented in **Appendix A**.

Overview of Fixed-Route Scenarios

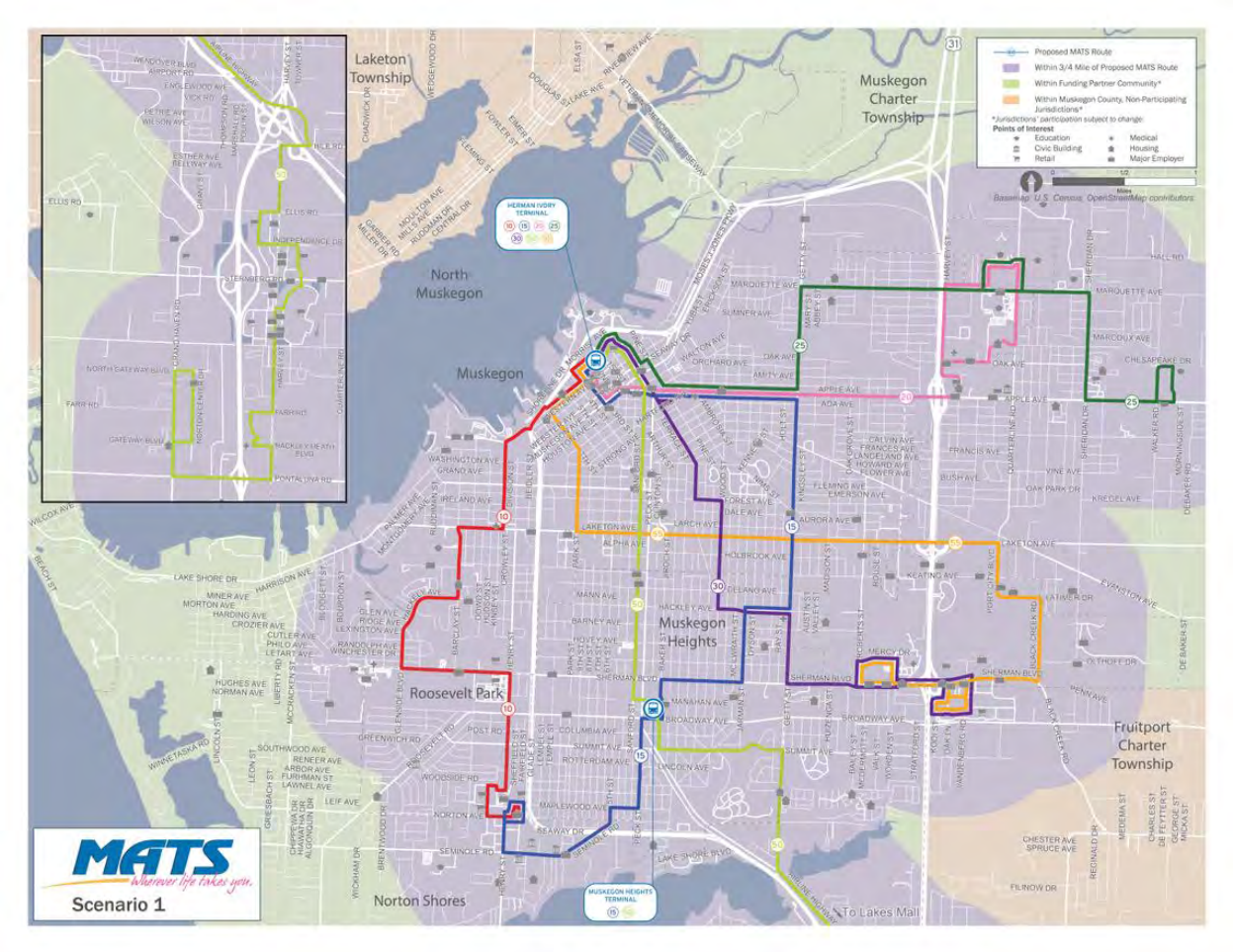
The two potential scenarios for MATS fixed-route service were similar in their overall service coverage, but different in the specific alignments of each route. Both scenarios were designed to be cost-neutral, meaning that they could be implemented with existing fleet resources and within the current budget for MATS fixed-route service. In both fixed-route scenarios, each proposed route is bi-directional, meaning buses operate along the same alignment in the outbound and inbound directions (with the exception of end-of-line turn-around loops). Each route is also designed to operate hourly, over the entire course of the service day.

Scenario 1

Scenario 1 is shown in **Figure 34**, followed by a route-by-route description of how each route differs from current service. Five current route numbers are not used in Scenario 1. The coverage provided by these routes is mostly picked up by other routes as follows:

- **Route 35** – coverage picked up by proposed Routes 10 and 55, and proposed GoBus redesign.
- **Route 40/45** – coverage picked up by proposed Routes 15 and 50.
- **Route 60** – coverage picked up by proposed Route 10 and proposed GoBus redesign.
- **Route 115** – coverage picked up by proposed GoBus redesign.

Figure 34 | MATS Fixed-Route Service Scenario 1



Route 10 – Simplified to operate along a consistent alignment in both directions and focused on areas with strongest ridership potential. Key destinations served include: **downtown Muskegon, Muskegon Catholic Central High School, several apartment complexes near Hackley Avenue and Barclay Street, Bio-Blood Components, Save-A-Lot, Aldi, Walmart (Henry Street), and Meijer (Henry Street)**. Coverage in Roosevelt Park and Norton Shores picked up by proposed GoBus redesign.

Route 15 – Continues to connect downtown Muskegon to Meijer on Henry Street, but alignment is shifted from 6th Street corridor to higher ridership segments of Apple Avenue and Getty Street. Key destinations served include: **downtown Muskegon, HealthWest, Muskegon Family Care, East Park Manor, Day Spring Independent Living, and Meijer (Henry Street)**. Coverage along 6th Street corridor partially picked-up by proposed Routes 50 and 55.

Route 20 – Simplified to provide bi-directional service between downtown and MCC via Apple Avenue. Key destinations served include: **downtown Muskegon, HealthWest, Walgreens, Cherry Health, Mercy Health (Oak Avenue), several apartment complexes near Harvey Street and Marquette Avenue, MCC, Baker College, and several apartment complexes near Carriage Road.** Coverage along Sheridan Drive picked up by proposed Route 25. Coverage south of Apple Avenue partially picked up by proposed Routes 15 and 30.

Route 25 – Simplified to provide bi-directional service along Apple Avenue, Getty Street, Marquette Avenue, and Sheridan Street. Key destinations served include: **downtown Muskegon, HealthWest, Walgreens, several**

apartment complexes near Getty Street and Marquette Avenue, Baker College, MCC, several apartment complexes along Sheridan Drive, Save-A-Lot, and Orchard View Adult Education. Coverage along Carriage Road picked up by proposed Route 20. Coverage south of Apple Avenue partially picked up by proposed Routes 15, 30, and 55.

Route 30 – Restructured as a bi-directional route connecting downtown Muskegon with Mercy Health (Sherman Boulevard) via Wood Street and Hackley Avenue. Route 30 would be "interlined" with Route 55, meaning the same bus would continue on from Mercy Health to Walmart, after changing its headsign to Route 55, in order to provide a one-seat ride for Route 30 riders traveling to Walmart (Sherman Boulevard). Key destinations served include: **downtown Muskegon, Hartford Terrace Apartments, Muskegon Family Care, East Park Manor, Mercy Health (Sherman Boulevard), and Walmart (Sherman Boulevard).** Coverage to MCC picked up by proposed Routes 20. Coverage along Getty Street picked up by proposed Route 15.

Route 50 – Restructured route would begin at Herman Ivory Terminal, operate along Sanford Street to downtown Muskegon Heights and then continue south to serve retail and medical destinations along the Harvey Street corridor and employment and residential destinations along the Grand Haven Road corridor. Key destinations served include: **downtown Muskegon, Muskegon High School, Mercy Health (Hackley Campus), downtown Muskegon Heights, Target, Meijer (Harvey Street), Lakes Mall, Mercy Health (Lakes Village), and several apartment complexes along Grand Haven Road.** Coverage to Muskegon County Airport and VA Clinic picked up by proposed GoBus redesign.

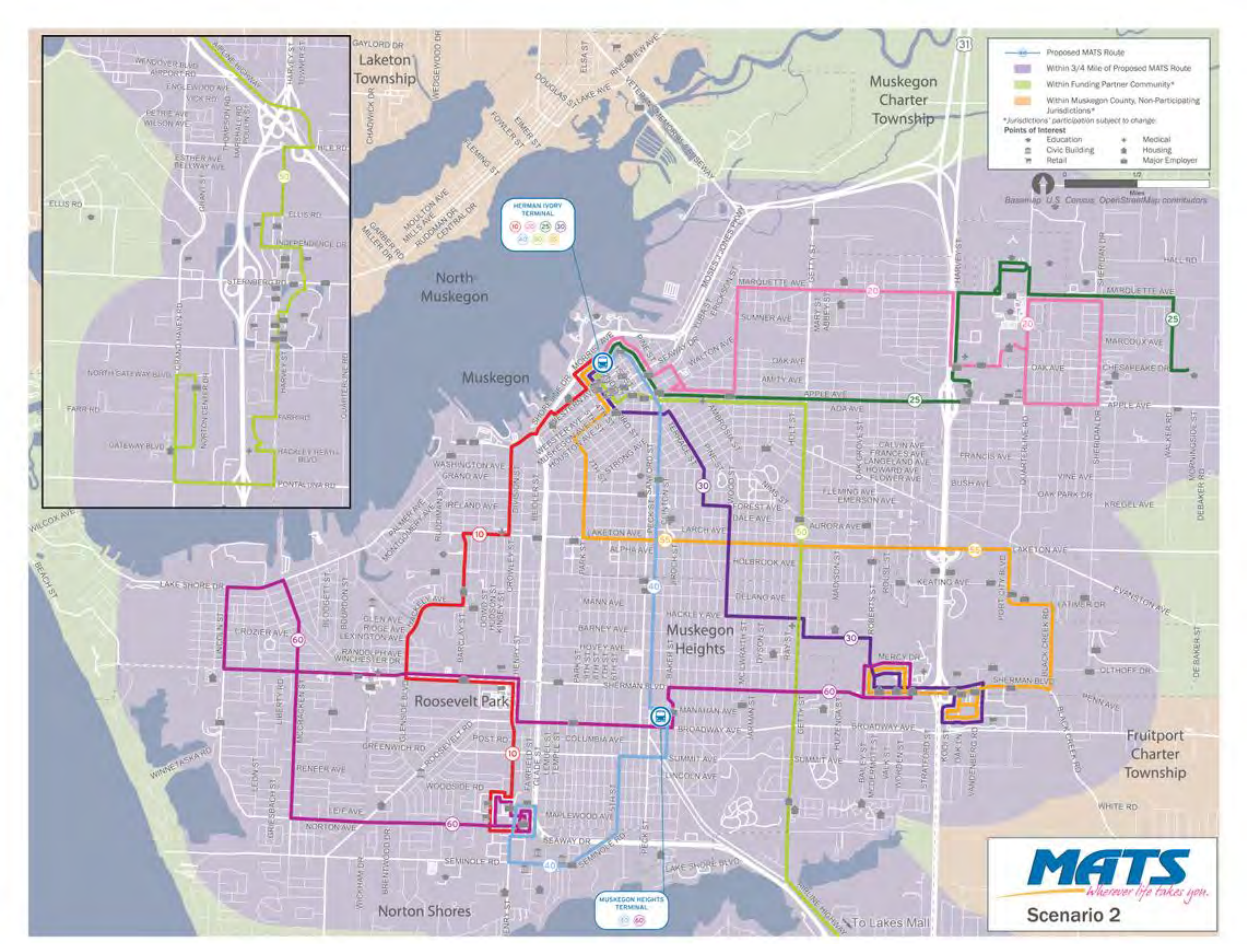
Route 55 – Simplified to provide bi-directional service between downtown Muskegon and Walmart (Sherman Boulevard) via Laketon Avenue. Route 55 would be "interlined" with Route 30, meaning the same bus would continue on from Walmart to Mercy Health (Sherman Boulevard), after changing its headsign to Route 55, in order to provide a one-seat ride for Route 55 riders traveling to Mercy Health. Key destinations served include: **downtown Muskegon, former Craig School, Muskegon Rescue Mission, industrial parks near Laketon Avenue and Port City Boulevard, Walmart (Sherman Boulevard), and Mercy Health (Sherman Boulevard).** Coverage along Wood Street picked up by proposed Routes 30. Coverage to downtown Muskegon Heights picked up by proposed Route 15.

Scenario 2

Figure 35 shows the proposed Scenario 2 system map and is followed by a route-by-route description of how each route differs from current service. Four current route numbers are not used in Scenario 2. The coverage provided by these routes is mostly picked up by other routes as follows:

- **Route 15** – coverage picked up by proposed Routes 40 and 55.
- **Route 45** – coverage picked up by proposed Routes 40 and 50, and proposed GoBus redesign.
- **Route 60** – coverage picked up by proposed Routes 10 and 60, and proposed GoBus redesign.
- **Route 115** – coverage picked up by proposed GoBus redesign.

Figure 35 | MATS Fixed-Route Service Scenario 2



Route 10 – Simplified to operate along a consistent alignment in both directions and focused on areas with strongest ridership potential. Key destinations served include: **downtown Muskegon, Muskegon Catholic Central High School, several apartment complexes near Hackley Avenue and Barclay Street, Bio-Blood Components, Save-A-Lot, Aldi, Walmart (Henry Street), and Meijer (Henry Street)**. Coverage in Roosevelt Park and Norton Shores picked up by proposed Route 60.

Route 20 – Restructured as a mostly bi-directional route between downtown and Sheridan Drive via Wood Street and Marquette Avenue. Key destinations served include: **downtown Muskegon, HealthWest, several apartment complexes along Marquette Avenue, Harvey Street, Carriage Road, and Sheridan Drive, Save-A-Lot, MCC, and Baker College.** Coverage to Orchard View Adult Education picked up by proposed Route 25. Coverage south of Apple Avenue partially picked up by proposed Routes 30 and 50.

Route 25 – Simplified to provide bi-directional service along Apple Avenue, Getty Street, Marquette Avenue, and Sheridan Street. Key destinations served include: **downtown Muskegon, HealthWest, Walgreens, several apartment complexes near Getty Street and Marquette Avenue, Baker College, MCC, several apartment complexes along Sheridan Drive, Save-A-Lot, and Orchard View Adult Education.** Coverage along Harvey Street and Carriage Road picked up by proposed Route 20. Coverage south of Apple Avenue partially picked up by proposed Routes 30 and 55.

Route 30 – Restructured as a bi-directional route connecting downtown Muskegon with Mercy Health (Sherman Boulevard) via Wood Street, Hackley Avenue, and Barney Avenue. Route 30 would be "interlined" with Route 55, meaning the same bus would continue on from Mercy Health to Walmart, after changing its headsign to Route 55, in order to provide a one-seat ride for Route 30 riders traveling to Walmart (Sherman Boulevard). Key destinations served include: **downtown Muskegon, Jefferson Towers Apartments, Hartford Terrace Apartments, Muskegon Family Care, East Park Manor, Trinity Village Apartments, Mercy Health (Sherman Boulevard), and Walmart (Sherman Boulevard).** Coverage to MCC picked up by proposed Routes 25. Coverage along Getty Street picked up by proposed Route 50.

Route 40 – Continues to connect downtown Muskegon with downtown Muskegon Heights via Peak Street corridor, but also extended to Meijer on Henry Street to provide access to retail. Key destinations served include: **downtown Muskegon, Muskegon High School, Mercy Health (Hackley Campus), downtown Muskegon Heights, Day Spring Independent Living, and Meijer (Henry Street)**. Coverage to HealthWest picked up by proposed Routes 20 and 25. Coverage to Jackson Hills picked up by proposed GoBus redesign.

Route 50 – Restructured route would begin at Herman Ivory Terminal, operate along Apple Avenue and Getty Street to Airline Highway, and then continue south to serve retail and medical destinations along the Harvey Street corridor and employment and residential destinations along the Grand Haven Road corridor. Key destinations served include: **downtown Muskegon, Health West, Muskegon Family Care, East Park Manor, Target, Meijer (Harvey Street), Lakes Mall, Mercy Health (Lakes Village), and several apartment complexes along Grand Haven Road.** Coverage to downtown Muskegon Heights picked up by proposed Route 40. Coverage to Muskegon County Airport and VA Clinic picked up by proposed GoBus redesign.

Route 55 – Simplified to provide bi-directional service between downtown Muskegon and Walmart (Sherman Boulevard) via Laketon Avenue. Route 55 would be "interlined" with Route 30, meaning the same bus would continue on from Walmart to Mercy Health (Sherman Boulevard), after changing its headsign to Route 55, in order to provide a one-seat ride for Route 55 riders traveling to Mercy Health. Key destinations served include: **downtown Muskegon, Nelson Place Apartments, former Craig School, Muskegon Rescue Mission, industrial parks near Laketon Avenue and Port City Boulevard, Walmart (Sherman Boulevard), and Mercy Health (Sherman Boulevard).** Coverage along Wood Street picked up by proposed Routes 30. Coverage to downtown Muskegon Heights picked up by proposed Route 60.

Route 60 – Restructured route would operate as a cross-town service between Walmart on Sherman Boulevard and the Lakeside neighborhood of Muskegon. The proposed route would also link Lakeside with retail destinations at Henry Street and Norton Avenue. Service would operate all day, rather than in the evenings only as the current Route 60 does. Key destinations served include: **Walmart (Sherman Boulevard), Mercy Health (Sherman Boulevard), downtown Muskegon Heights, Aldi, Save-A-Lot, Bio-Blood Components, Tiffany Woods Apartments, Walmart (Henry Street), and Meijer (Henry Street)**. Coverage to downtown Muskegon Heights picked up by proposed Route 40. Coverage to downtown Muskegon and several apartment complexes near Hackley Avenue and Barclay Street picked up by proposed Route 10.

Overview of GoBus Scenarios

The proposed GoBus scenarios divide Muskegon County into three zones:

- Areas within the Fixed-Route service area (FRSA), defined by a ¾ mile buffer around fixed-route service;
- Areas outside the FRSA, but in participating jurisdictions (i.e., MATS funding partners); and
- Areas outside the FRSA in non-participating jurisdictions

The two potential scenarios differ primarily with respect to who would receive service, and at what cost. Both scenarios are illustrated in (**Figure 36**).

Under Scenario A, the following groups of people would be able to use GoBus service at the listed fares:

- In the FRSA:
  - ADA-certified individuals ($2.50 per one-way trip)
  - Seniors and people with disabilities ($5 per trip)
  - All other residents ($10 per trip)
- In participating jurisdictions outside the FRSA:
  - Seniors and people with disabilities ($3 per trip)
  - All other residents ($6 per trip)
- In non-participating jurisdictions outside the FRSA:
  - Seniors and people with disabilities ($30 per trip)

Under Scenario B, the following groups of people would be able to use GoBus service at the listed fares:

- In the FRSA:
  - ADA-certified individuals ($2.50 per one-way trip)
- In participating jurisdictions outside the FRSA:
  - Seniors and people with disabilities ($3 per trip)
  - All other residents ($6 per trip)
- In non-participating jurisdictions outside the FRSA:
  - Seniors and people with disabilities who take the Muskegon Shuttle ($10 per trip)

The Muskegon Shuttle would be a new service available to seniors and residents with disabilities in non-participating jurisdictions on a designated day each week (depending on their pick-up location), and would require riders to book in advance. Riders would be given a pick-up window in the morning, be taken to their choice of a handful of key locations in central Muskegon County (such as Mercy Health Campus, downtown, the mall area, etc.) and be picked up and returned home in the afternoon.

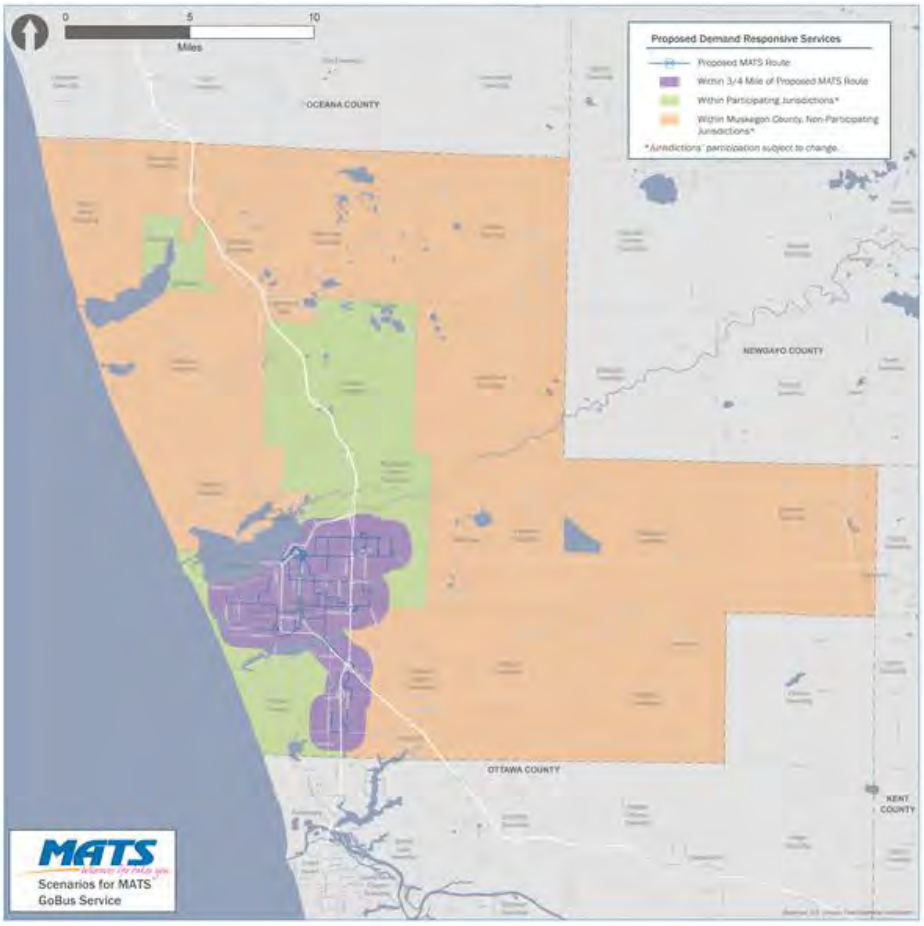
Some recommendations for changes to MATS GoBus are the same under both scenarios:

- Consider new scheduling and dispatch system with the technology features to support microtransit service, including the ability for riders to book a ride on the day they want to travel via mobile application (as well as by calling MATS); track their vehicle's location and estimated arrival time and; if they choose, pay for their ride using the app as well.
- ADA-certified riders would be required to book no later than the previous day in order to be *guaranteed* a ride within one hour of their preferred time. All other riders (including ADA-certified riders who do not book on the previous day) could book on the same day on which they want to receive service and be served on a first-come, first-served basis.
- Service hours would match those of the fixed-route system.
- Consider introduction and enforcement of a Late Cancellation and No-Show Policy to reduce late cancellations and no-shows.
- Consider implementing call holding to address current call system limitations.

Figure 36 | GoBus Service Scenarios

Eligible Riders and Proposed Fares for Demand Responsive (GoBus) Service

	Within the FRSA (¾ mile of Proposed MATS Route)	Outside the FRSA in Participating Jurisdictions	Outside the FRSA in Non-Participating Jurisdictions
Scenario A	• ADA-certified riders ($2.50) • Seniors and people with disabilities ($5) • The general public ($10)	• Seniors and people with disabilities ($3) • The general public ($6)	• Seniors and people with disabilities ($30)
Scenario B	• ADA-certified riders ($2.50)	• Seniors and people with disabilities ($3) • The general public ($6)	• Seniors and people with disabilities on the new Muskegon Shuttle (designated days and time periods only) ($10)



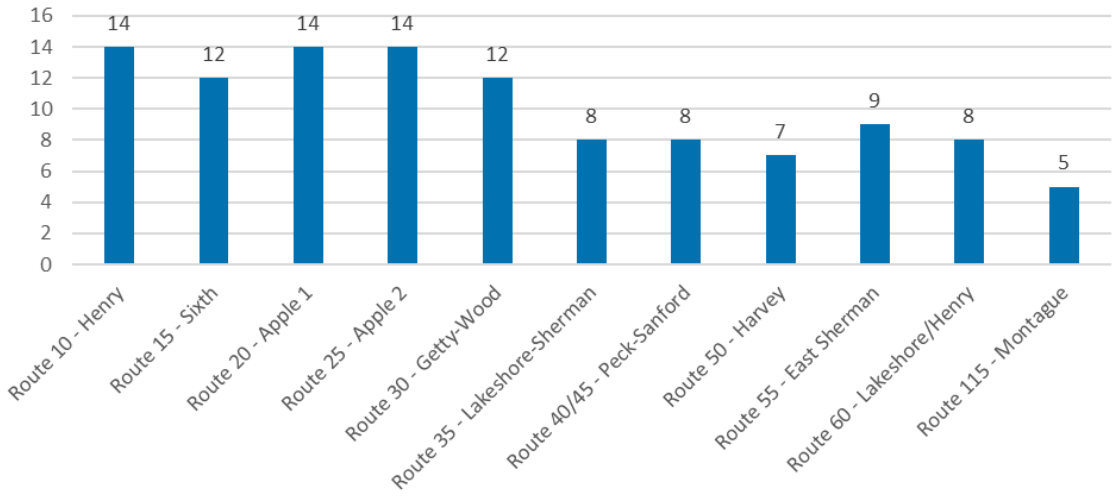
Public and Stakeholder Reactions

On September 23rd and 24th, 2019, a series of public and stakeholder meetings were held in Muskegon to present the potential service scenarios for both fixed-route and GoBus service. A survey was developed to allow meeting attendees, and others, to provide feedback on the presented scenarios. A paper version of the survey was available at the public meetings. An online version was posted, along with scenario maps and descriptions, online at www.MATSbus.com.

For context, survey participants were asked to identify the services they currently use (if any), and to select the scenario they most prefer for fixed-route and GoBus service, respectively, including the option of "current service." The survey also provided space for open-ended comments about each scenario, and about MATS in general. Finally, survey participants were asked to choose from a list of general service improvements, such as more frequent service or longer service hours, that they find important for fixed-route and/or GoBus service.

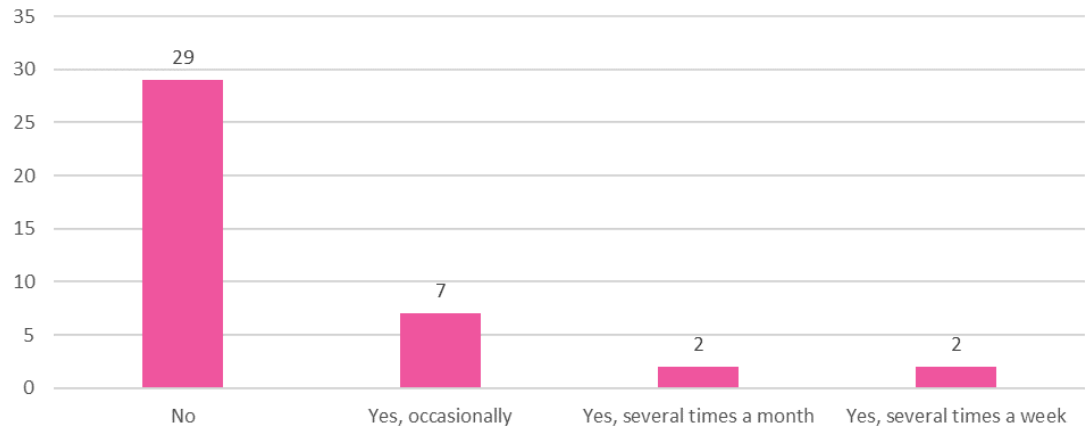
In total, 75 surveys were collected online and at public meetings. For survey takers who ride fixed-route service, the greatest number ride routes 10, 20, and 25 (**Figure 37**), followed closely by Route 15 and 30.

Figure 37 | Routes Utilized by Survey Respondents



Survey participants were asked whether they currently use GoBus service, and if so, how often. Of 40 responses, 29 (73 percent) identified as non-riders (**Figure 38**), while 11 (28 percent) ride with various frequencies.

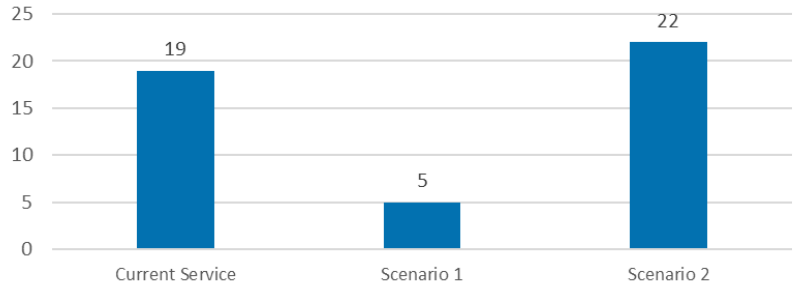
Figure 38 | GoBus Ridership Among Survey Respondents



Fixed-Route Scenario Preferences and Feedback

Figure 39 shows that Scenario 2 was preferred by 22 of the 46 survey participants (48 percent) who indicated a preference among the fixed-route scenarios. Nineteen participants (41 percent) preferred the current service design, while five (11 percent) preferred Scenario 1.

Figure 39 | MATS Fixed-Route Scenario Preference



Many survey participants provided additional feedback in the form of open-ended comments in reference to Scenario 1 and Scenario 2. These comments are included in their entirety in **Appendix C**. Below is a summary of the key themes (positive and negative) that emerged from the open-ended comments, relative to each scenario, followed by a summary of general comments, independent of the two potential scenarios.

Positive Comments Regarding Scenario 1

- Connections provided to "life sustaining destinations" including grocery stores and medical facilities
- Bi-directional service is easier to understand
- Improved access to colleges
- Addresses poorly-utilized Lakeside service

Negative Comments Regarding Scenario 1

- Lack of fixed-route service to Norton Shores and the southern end of the County
- No beach access
- Elimination of the Lakeshore/Lakeside service
- Limited access to industrial /manufacturing sites
- May increase demand for GoBus service
- Elimination of service along 6th street
- Lack of coverage along Southern Avenue
- Service on Sanford Street, rather than Peck Street

Positive Comments Regarding Scenario 2

- Service to more people, compared to Scenario 1
- Improved service to Lakeside, compared to Scenario 1
- Improved access to employment opportunities
- Direct mall access without transfer at Heights terminal

Negative Comments Regarding Scenario 2

- Lack of fixed-route service to Norton Shores and the southern end of the County
- No beach access
- Elimination of the Lakeshore service
- Lack of coverage along Southern Avenue

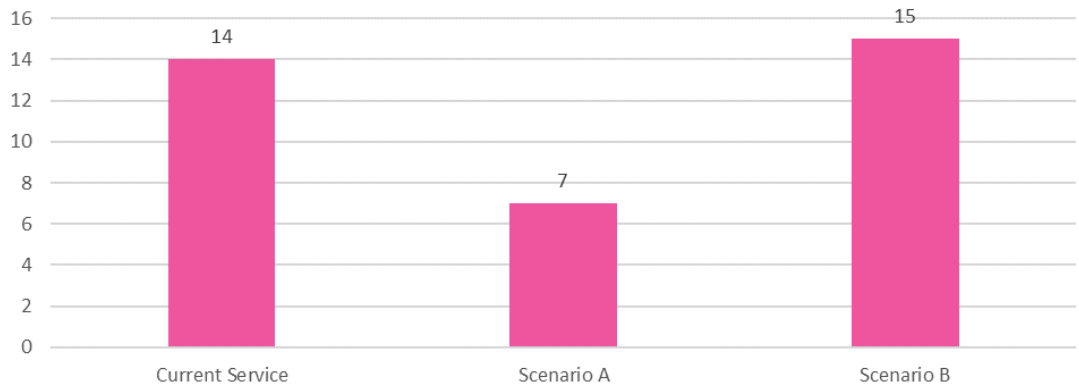
Additional General Comments Regarding Fixed-Route Service

- Interest in Sunday service
- Interest in express service to Grand Rapids airport
- Would like stops near Blue Lake Residences
- Difficult to reach Pioneer Resources, especially in poor weather
- Overall concerns about equity and social justice

GoBus Scenario Preferences and Feedback

Figure 40 shows that a slight plurality of respondents preferred GoBus Scenario B over the current service (42 percent and 39 percent, respectively). 19 percent of survey respondents preferred Scenario A.

Figure 40 | Scenario Preference: GoBus



As with fixed-route service, a number of survey participants provided additional feedback in the form of open-ended comments in reference to GoBus Scenario A and Scenario B. Key themes from these comments are provided below, and the full comments are included in **Appendix C**.

Positive Comments Regarding Scenario A

- Improves coverage for Asset Limited, Income Constrained, Employed (ALICE) population
- It is more fair

Negative Comments Regarding Scenario A

- $30 per trip is very expensive
- Much of county would have very limited service

Positive Comments Regarding Scenario B

- Would benefit ADA-certified riders
- $10 Muskegon Shuttle is more affordable, compared to Scenario A

Negative Comments Regarding Scenario B

- Service on designated days doesn't help commuters

Additional General Comments Regarding GoBus Service

- Daybreak/Dayspring riders limit service availability for other riders
- Calling two weeks in advance to make a reservation is not reasonable
- More focus is needed on Norton Shores ridership and the south end of the County
- Concerns about affordability for those on Social Security
- Personal smartphone ownership should not be a prerequisite to riding the bus

Service Improvement Priorities

Given that the provision of transit service involves trade-offs due to resource constraints, survey participants were asked to identify the types of transit service improvements that they find most important (more than one improvement could be selected). Forty-seven responses were received regarding MATS fixed-route service (**Figure 41**), and 38 were received regarding GoBus service (**Figure 42**).

For fixed-route service, the most frequently selected service improvements were More Direct Service, More Weekend Service, and Longer Service Hours. County-wide transit service was ranked last among the selected choices.

For GoBus service, Same-Day Service was the most frequently selected service improvement that survey participants would like to see. This was followed closely by Online Scheduling and More Weekend Service Hours. Longer Service Hours was the least frequently selected service improvement choice.

Figure 41 | MATS Fixed-Route Improvement Priorities

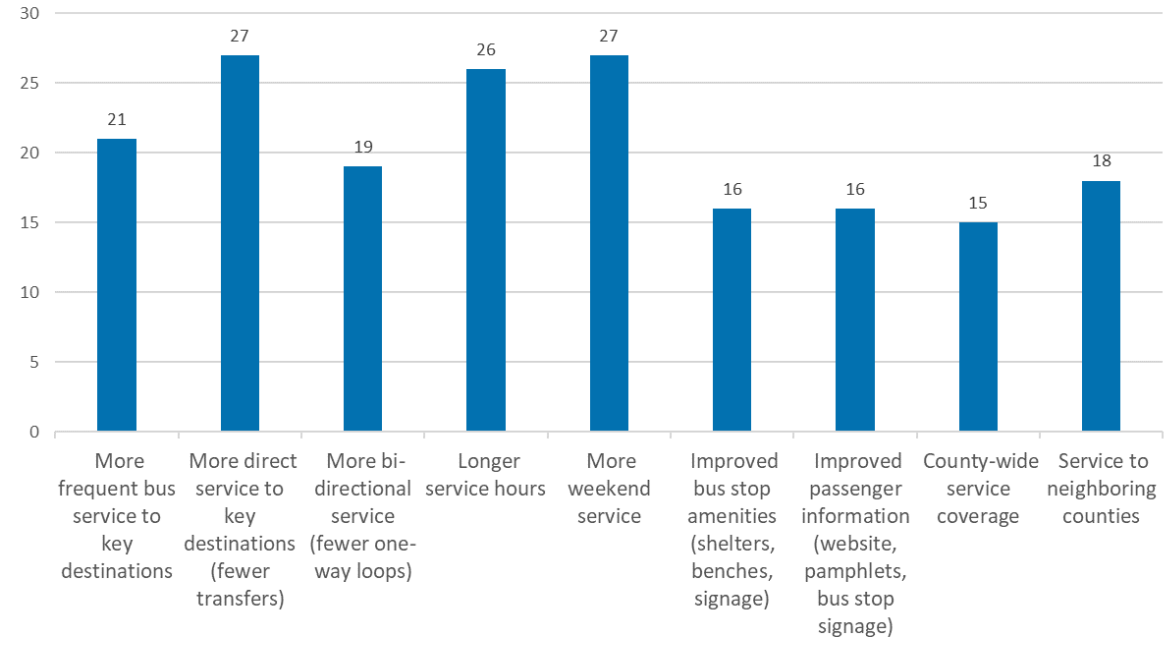
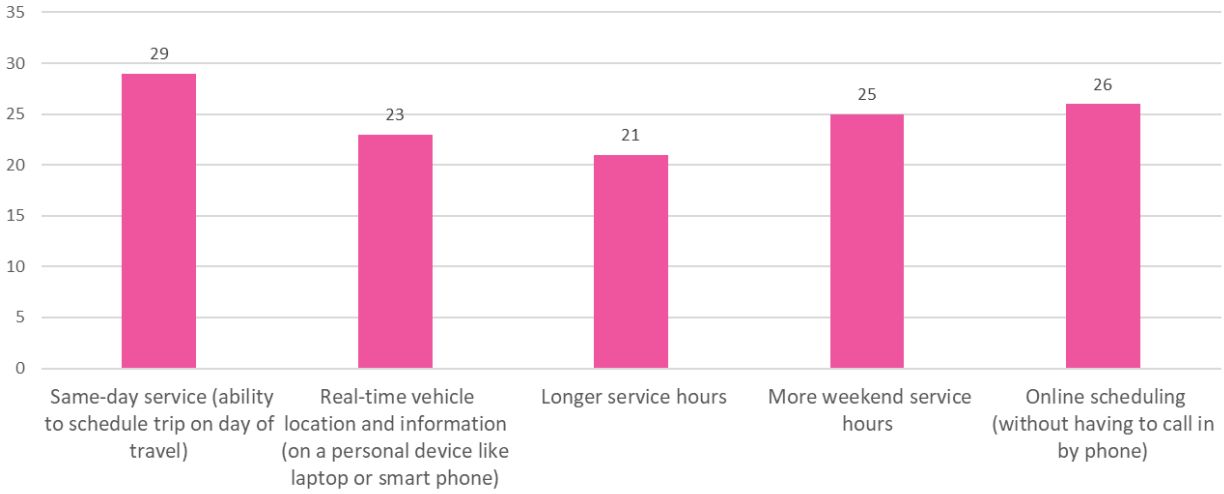


Figure 42 | GoBus Improvement Priorities



9. FINAL RECOMMENDATIONS

Based on the feedback received online and at the September 2019 stakeholder meetings, the study team developed a set of final recommendations for improving transit service in the Muskegon region. The recommendations incorporate some elements from all of the previous service scenarios, and also include new concepts that are meant to address public and stakeholder reactions to the preliminary service scenarios.

Overall, the recommendations aim to create a more efficient, effective, and financially sustainable transit system that is able to serve existing riders better, while also attracting new customers. The recommendations consist of three key components:

- **A streamlined fixed-route network** designed to serve areas and time periods with the highest existing ridership and greatest potential to attract new riders.
- **An ADA paratransit service** aimed at meeting federal requirements to provide complementary curb-to-curb service for eligible individuals within a ¾ mile buffer of the proposed fixed-route network.
- **An innovative microtransit service** intended to provide broad service coverage in participating jurisdictions, using an app-based demand-response service model and smaller, more flexible vehicles.

Additional recommendations, related to capital and staffing needs, are presented following the detailed discussion of the fixed-route, paratransit, and microtransit service recommendations below.

Fixed-Route Service Recommendations

While MATS fixed-route ridership has been falling in recent years, the service and market analyses conducted for this study identified key corridors and time periods where both ridership and ridership potential remain high. **Figure 43** shows that 87% of weekday fixed-route ridership is concentrated between the hours 7:00 am and 6:00 pm. Similarly, the majority of current fixed-route ridership activity is geographically concentrated in, or directly adjacent to, portions of Muskegon, Muskegon Heights, and Norton Shores, as shown in **Figure 44.**

During the hours of 7:00 am to 6:00 pm, an average of 149 passenger trips are provided every hour on weekdays. Currently, that ridership is distributed over 10 to 12 fixed-route transit buses, depending on the hour of the day. To carry the same passenger volumes using demand-response service, at least 30 vehicles would be required. In other words, fixed-route service has a critical role in meeting the demand for transit service in the MATS service area, at least during peak periods.

Figure 43 | Fixed-Route Weekday Boardings, Per Hour (May 2019 Ridecheck)

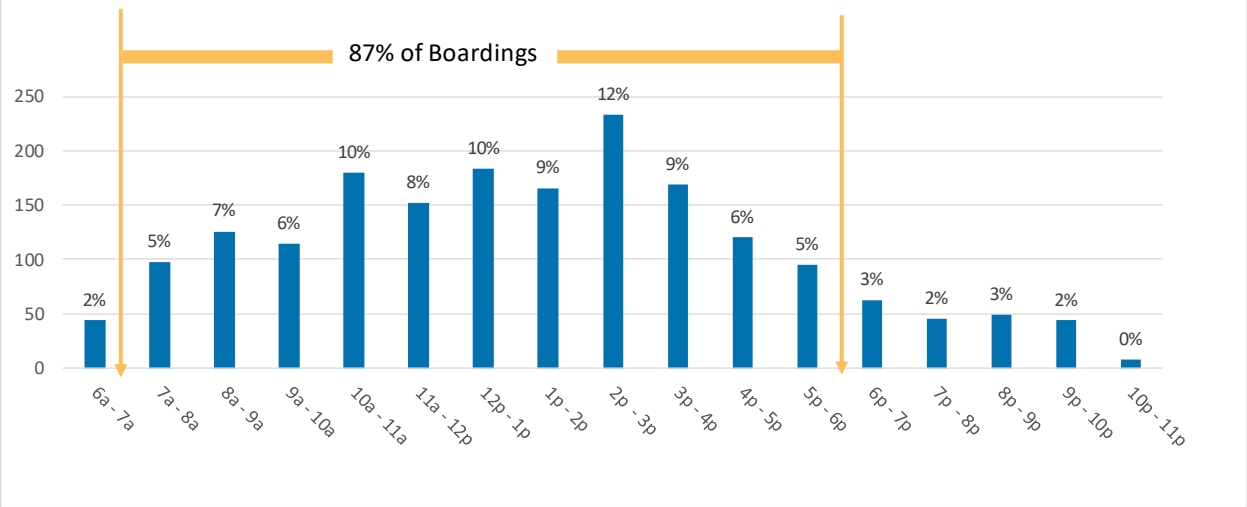
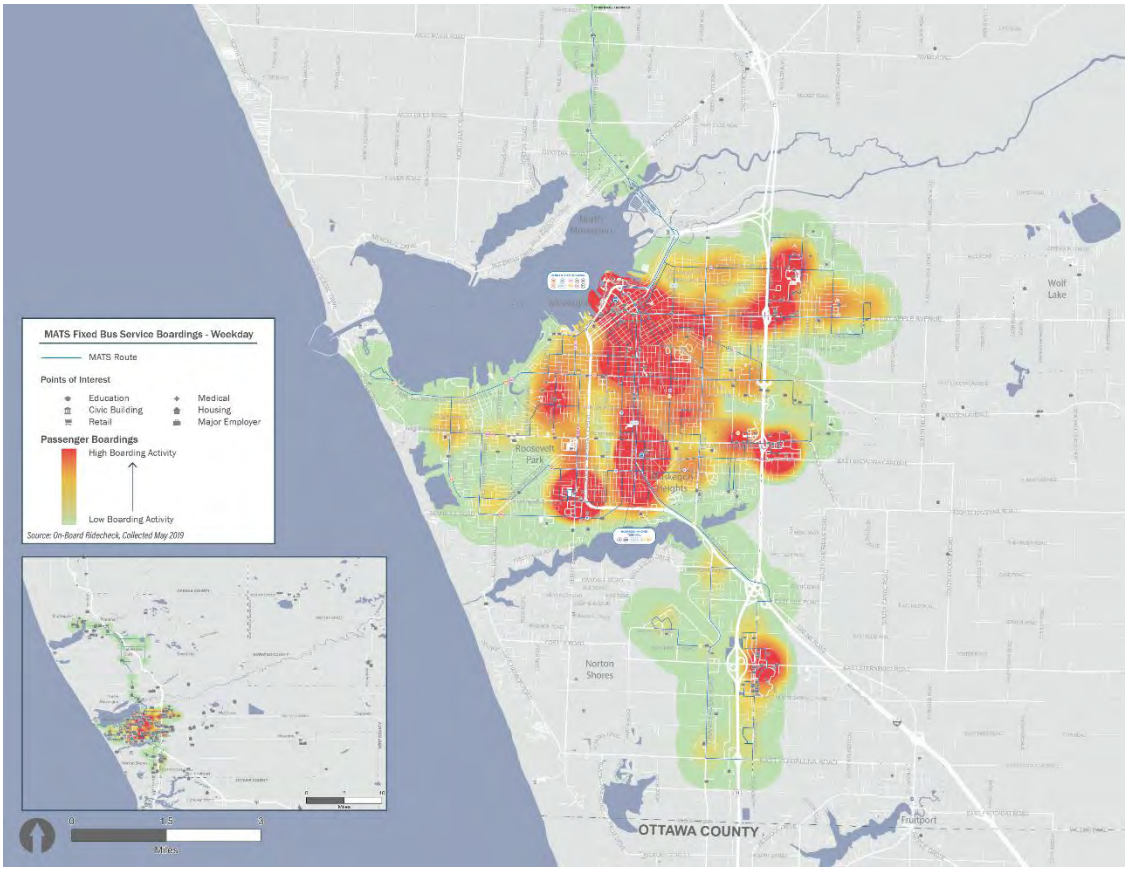


Figure 44 | Fixed-Route Ridership Activity (May 2019 Ridecheck)



Fixed-Route Service Characteristics

The recommended fixed-route network consists of eight buses operating on seven routes. The network is simplified and focused on the high-ridership areas shown in **Figure 44**. All routes would operate bi-directionally to allow for more direct service to and from key destinations. All routes would also operate hourly and meet up for seamless connections at the Herman Ivory Terminal.

The proposed network makes extensive use of "interlining" to optimize cycle times and ensure one-seat rides to key destinations. Interlining is the practice of operating a single bus or group of buses on multiple routes. As shown in **Figure 19**, Routes 10 and 15 are interlined, which gives riders from both routes a one-seat ride to both the Meijer and Walmart on Henry Street (see **Figure 45**). Similarly, Routes 30 and 55 are interlined to allow passengers of both routes to access the Mercy Health campus and Walmart Supercenter near Sherman Boulevard without having to change buses along the way.

Table 19 | Proposed MATS Fixed-Route Service Characteristics[8]

Proposed Route	Avg Round Trip Miles	Est. Avg. Speed	Run Time	Min. Recovery Time	Min Cycle Time	Even Cycle Time	Actual Recovery Time	Actual % Recovery	Frequency	Service Hours	Daily Trips	Vehicles Needed	Daily Service Hours	Daily Revenue Hours	Daily Revenue Miles
10+15	26.4	15	1:45	0:10	1:56	2:00	0:14	12%	1:00	11:00	11	2.0	11:00	22:00	290.4
20+25	26.7	15	1:46	0:10	1:57	2:00	0:13	11%	1:00	11:00	11	2.0	11:00	22:00	293.7
50	25.3	15	1:41	0:10	1:51	2:00	0:18	16%	1:00	11:00	11	2.0	11:00	22:00	278.3
30+55	26.2	15	1:44	0:10	1:55	2:00	0:15	13%	1:00	11:00	11	2.0	11:00	22:00	288.2

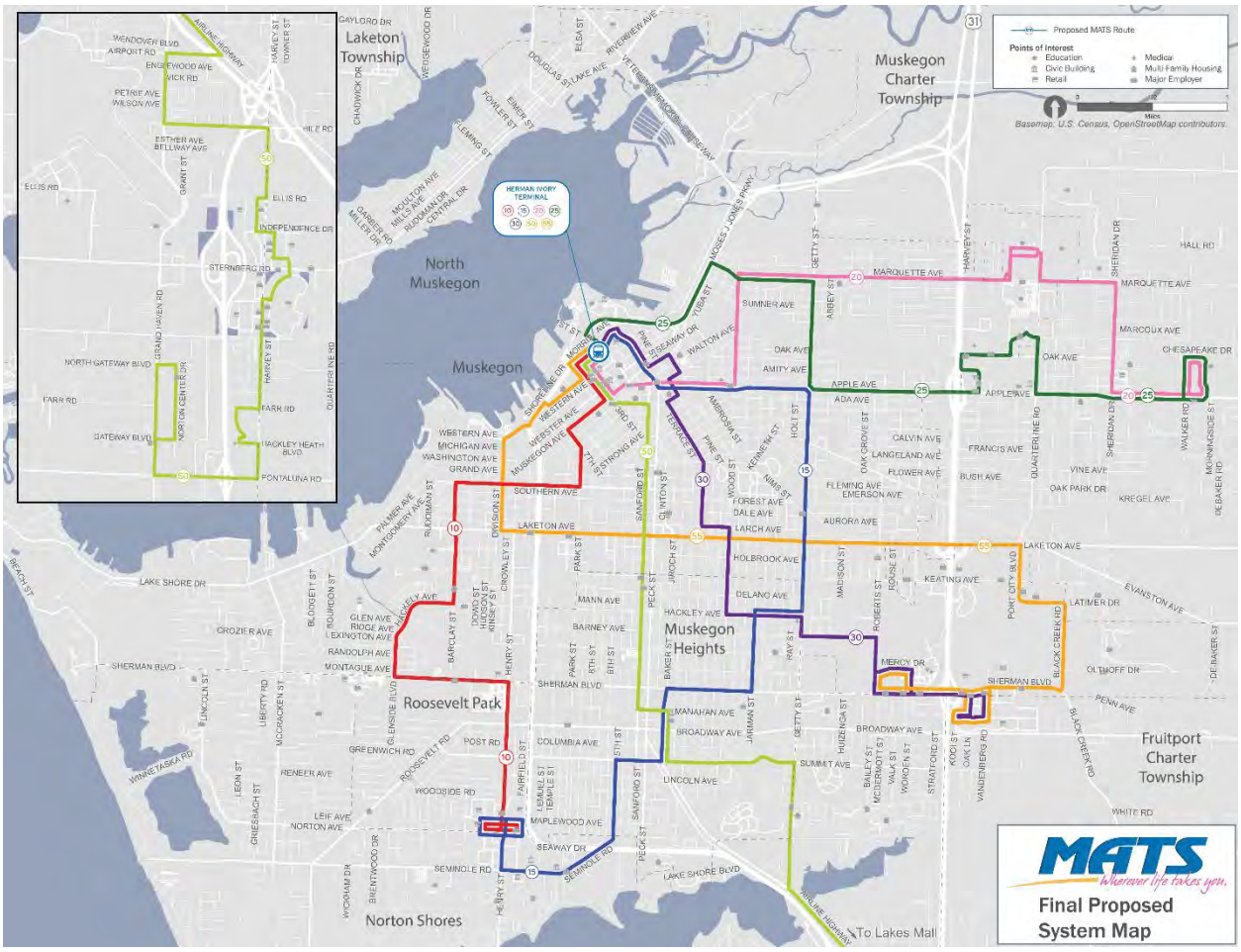
The proposed routes are designed to operate with average speeds of 15 miles per hour. To ensure reliable on-time performance, each proposed schedule includes sufficient recovery time (between 10 and 20 percent of total cycle time). Recovery times below 10 percent could lead to poor on-time performance, as one late trip could result in late service on subsequent trips. Recovery times above 19 percent indicate that resources are not being used efficiently, and vehicles are out of service for excessively long periods of time.

Service during low-ridership periods such as early mornings, evenings, and weekends is recommended to be served by the proposed microtransit service (see Microtransit Service Recommendations below).

The proposed fixed-route system map is show below (**Figure 45**), followed by a detailed description of each proposed route.

[8] Routes separated by a "+" sign indicate interlining, meaning that the same vehicle would serve trips on two routes.

Figure 45 | Proposed Fixed-Route System Map



Route 10

Figure 46 | Proposed Route 10

The proposed Route 10 (**Figure 46**) would provide hourly weekday service between the Herman Ivory Terminal and retail destinations along Henry Street, via Southern Avenue. The route would also serve a large concentration of multi-family housing near Barcley Street and Hackley Avenue. The proposed routing would provide a consistent alignment in both directions and focus on areas with the strongest ridership potential. Coverage in Roosevelt Park and Norton Shores would no longer be provided by Route 10, and would instead be served by a proposed microtransit service (see Microtransit Service Recommendations).

Key destinations along the proposed alignment include:

- Downtown Muskegon
- Muskegon Catholic Central High School
- Apartment complexes near Hackley Avenue and Barclay Street
- Bio-Blood Components
- Save-A-Lot
- Aldi
- Former Craig School
- Walmart (Henry Street)
- Meijer (Henry Street)

Table 20 shows the proposed service levels for Route 10. The Route would provide hourly service over 11 weekday service hours.

Table 20 | Route 10 Proposed Service Levels

Service Day		Approximate Span of Service	Frequency (minutes)
Weekday	AM Early Morning	5:00 am – 7:00 am	On-Demand*
	AM Peak	7:00 am – 9:00 am	60
	Midday	9:00 am – 3:00 pm	60
	PM Peak	3:00 pm – 6:00 pm	60
	PM Evening	6:00 pm – 12:00 am	On-Demand*
Saturday		8:00 am – 5:00 pm	On-Demand*
Sunday		9:00 am – 4:00 pm	On-Demand*

*Note: on-demand service provided by proposed microtransit vehicles

Route 15

The proposed Route 15 (**Figure 47**) would provide hourly weekday service between the Herman Ivory Terminal and both Meijer and Walmart along Henry Street. The route would also connect the large East Park Manor housing development to downtown Muskegon and a number of medical and retail destinations along the route. The route's alignment is shifted from 6th Street, where the current service operates, to the higher ridership segments of Apple Avenue and Getty Street. Coverage along the 6th Street corridor would be partially provided by proposed Route 50 and 55.

Key destinations along the proposed alignment include:

- Downtown Muskegon
- HealthWest
- Muskegon Family Care
- East Park Manor
- Day Spring Independent Living
- Meijer (Henry Street)
- Walmart (Henry Street)

Figure 47 | Proposed Route 15

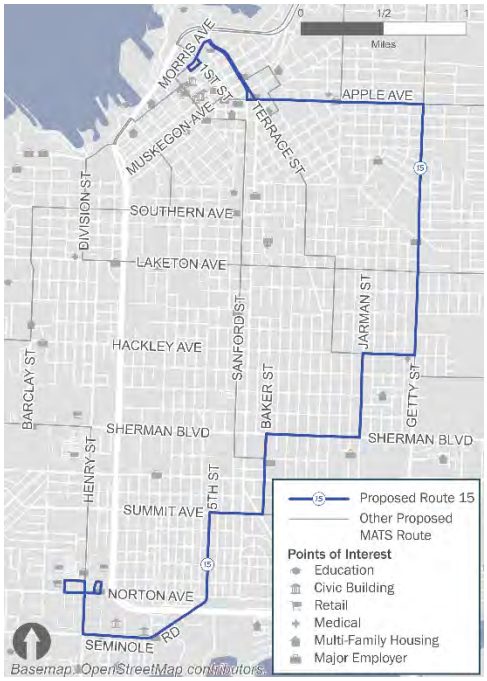


Table 21 shows the proposed service levels for Route 15. The Route would provide hourly service over 11 weekday service hours.

Table 21 | Route 15 Proposed Service Levels

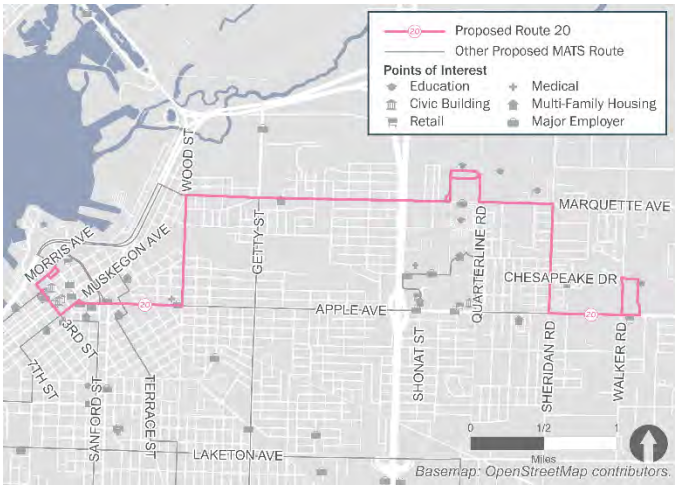
Service Day		Approximate Span of Service	Frequency (minutes)
Weekday	AM Early Morning	5:00 am – 7:00 am	On-Demand*
	AM Peak	7:00 am – 9:00 am	60
	Midday	9:00 am – 3:00 pm	60
	PM Peak	3:00 pm – 6:00 pm	60
	PM Evening	6:00 pm – 12:00 am	On-Demand*
Saturday		8:00 am – 5:00 pm	On-Demand*
Sunday		9:00 am – 4:00 pm	On-Demand*

*Note: on-demand service provided by proposed microtransit vehicles

Route 20

The proposed Route 20 (**Figure 48**) would provide hourly weekday service between the Herman Ivory Terminal and both Muskegon Community College and Orchard View Adult Education, via Marquette Avenue. The proposed routing would provide a consistent alignment in both directions and focus on areas with the strongest ridership potential. Segments of the current Route 20 that would no longer be served by fixed-route service, including Stebbins Road, Creston Street, Evanston Avenue, and Catharine Avenue are generally low-ridership segments that are both within walking distance of proposed fixed-route service or accessible via the proposed microtransit service (see Microtransit Service Recommendations).

Figure 48 | Proposed Route 20



Key destinations along the proposed alignment include:

- Downtown Muskegon
- HealthWest
- Apartment complexes along Marquette Avenue
- Muskegon Community College
- Baker College
- Apartment complexes along Sheridan Drive
- Save-A-Lot
- E&A Grocery
- Orchard View Adult Education

Table 22 shows the proposed service levels for Route 20. The Route would provide hourly service over 11 weekday service hours.

Table 22 | Route 20 Proposed Service Levels

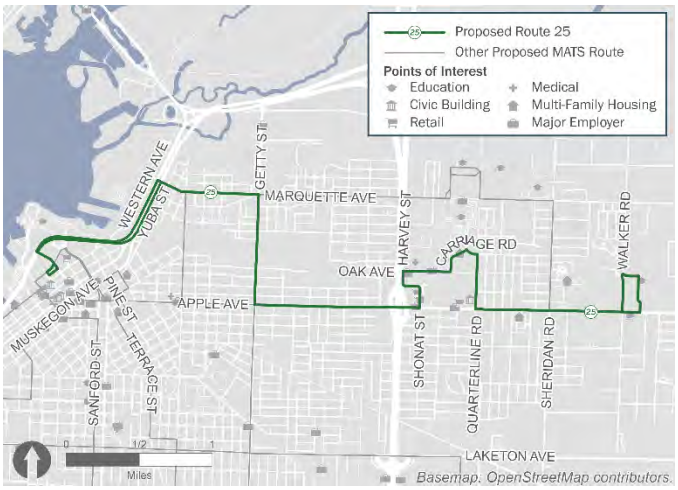
Service Day		Approximate Span of Service	Frequency (minutes)
Weekday	AM Early Morning	5:00 am – 7:00 am	On-Demand*
	AM Peak	7:00 am – 9:00 am	60
	Midday	9:00 am – 3:00 pm	60
	PM Peak	3:00 pm – 6:00 pm	60
	PM Evening	6:00 pm – 12:00 am	On-Demand*
Saturday		8:00 am – 5:00 pm	On-Demand*
Sunday		9:00 am – 4:00 pm	On-Demand*

*Note: on-demand service provided by proposed microtransit vehicles

Route 25

The proposed Route 25 (**Figure 49**) would provide hourly weekday service between the Herman Ivory Terminal and Orchard View Adult Education, via Shoreline Drive, Getty Street, and Apple Avenue. The proposed routing would provide a consistent alignment in both directions and focus on areas with the strongest ridership potential. In addition to Orchard View Adult Education, the proposed alignment would include service within walking distance of Pioneer Resources on Wesley Avenue. The route would also connect the Jackson Hills neighborhood of Muskegon to downtown Muskegon and a number of medical and retail destinations along the route.

Figure 49 | Proposed Route 25



Key destinations along the proposed alignment include:

- Downtown Muskegon
- Apartment complexes near Getty Street
- Pioneer Resources (via Wesley Avenue)
- Walgreens (Apple Avenue)
- Cherry Health
- Mercy Health (Oak Avenue)
- Apartment complexes near Carriage Road
- E&A Grocery
- Orchard View Adult Education

Table 23 shows the proposed service levels for Route 25. The Route would provide hourly service over 11 weekday service hours.

Table 23 | Route 25 Proposed Service Levels

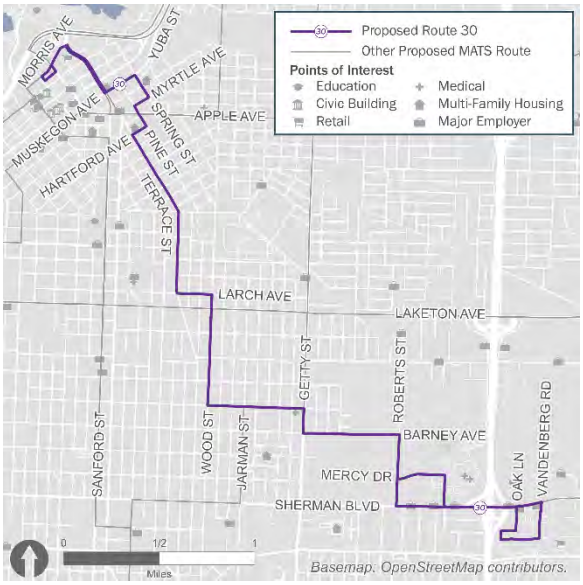
Service Day		Approximate Span of Service	Frequency (minutes)
Weekday	AM Early Morning	5:00 am – 7:00 am	On-Demand*
	AM Peak	7:00 am – 9:00 am	60
	Midday	9:00 am – 3:00 pm	60
	PM Peak	3:00 pm – 6:00 pm	60
	PM Evening	6:00 pm – 12:00 am	On-Demand*
Saturday		8:00 am – 5:00 pm	On-Demand*
Sunday		9:00 am – 4:00 pm	On-Demand*

*Note: on-demand service provided by proposed microtransit vehicles

Route 30

The proposed Route 30 (**Figure 50**) would provide hourly weekday service between the Herman Ivory Terminal and both the Mercy Health campus and Walmart Supercenter along Sherman Boulevard, via an interline with proposed Route 55. At Mercy Health, Route 30 vehicles would change their headsigns to "Route 55" before continuing on to Walmart. Similarly, Route 55 vehicles would change their headsigns to "Route 30" at Walmart before continuing on to Mercy Heath and downtown Muskegon. This interlined structure would provide Route 30 and Route 55 passengers a one-seat ride to either the Mercy Health Campus or Walmart, without the need to transfer between buses.

Figure 50 | Proposed Route 30



Key destinations along the proposed alignment include:

- Downtown Muskegon
- Bayview Tower Apartments
- Hartford Terrace Apartments
- Muskegon Family Care
- East Park Manor
- Mercy Health (Sherman Boulevard)
- Walmart (Sherman Boulevard).

Table 24 shows the proposed service levels for Route 30. The Route would provide hourly service over 11 weekday service hours.

Table 24 | Route 30 Proposed Service Levels

Service Day		Approximate Span of Service	Frequency (minutes)
Weekday	AM Early Morning	5:00 am – 7:00 am	On-Demand*
	AM Peak	7:00 am – 9:00 am	60
	Midday	9:00 am – 3:00 pm	60
	PM Peak	3:00 pm – 6:00 pm	60
	PM Evening	6:00 pm – 12:00 am	On-Demand*
Saturday		8:00 am – 5:00 pm	On-Demand*
Sunday		9:00 am – 4:00 pm	On-Demand*

*Note: on-demand service provided by proposed microtransit vehicles

Route 50

The proposed Route 50 (**Figure 51**) would provide hourly weekday service between the Herman Ivory Terminal and the Grand Haven Road corridor, via Sanford Street and the Lakes Mall. The restructured route would provide bi-directional service and offer a one-seat ride to several retail destinations along Harvey Street, without the need to transfer between buses at the Muskegon Heights Transfer Hub, as is currently required. To streamline the route, service to Muskegon County Airport and the VA clinic would no longer be provided by the proposed Route 50. These are both low-ridership destinations and would instead be served by a proposed microtransit service (see Microtransit Service Recommendations). Finally, with direct service to Lakes Mall, Route 50 could potentially facilitate convenient connections with Harbor Transit at the mall in the future. Due to the length of the proposed route (two hours roundtrip), it will require two buses in order to provide hourly service.

Figure 51 | Proposed Route 50

Key destinations along the proposed alignment include:

- Downtown Muskegon
- Jefferson Towers Apartments
- Muskegon High School
- Mercy Health (Hackley Campus)
- Downtown Muskegon Heights
- Cinema Carousel
- Target
- Meijer (Harvey Street)
- Lakes Mall
- Mercy Health (Lakes Village)
- Apartment complexes along Grand Haven Road

Table 25 shows the proposed service levels for Route 50. The Route would provide hourly service over 11 weekday service hours.

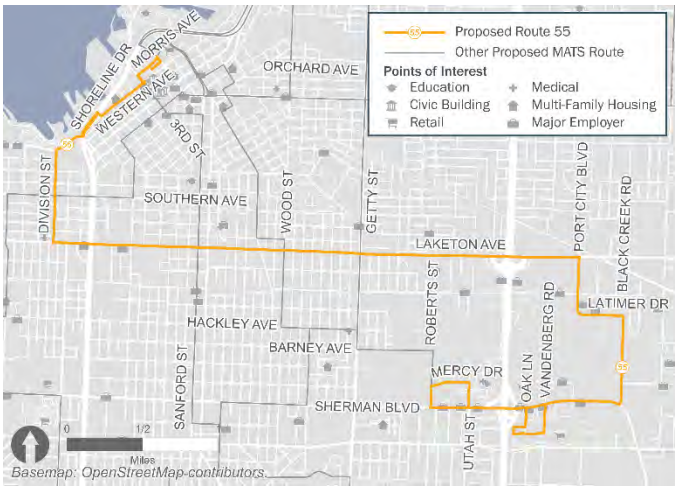
Table 25 | Route 50 Proposed Service Levels

Service Day		Approximate Span of Service	Frequency (minutes)
Weekday	AM Early Morning	5:00 am – 7:00 am	On-Demand*
	AM Peak	7:00 am – 9:00 am	60
	Midday	9:00 am – 3:00 pm	60
	PM Peak	3:00 pm – 6:00 pm	60
	PM Evening	6:00 pm – 12:00 am	On-Demand*
Saturday		8:00 am – 5:00 pm	On-Demand*
Sunday		9:00 am – 4:00 pm	On-Demand*

*Note: on-demand service provided by proposed microtransit vehicles.

Route 55

Figure 52 | Proposed Route 55



The proposed Route 55 (**Table 26**) would provide hourly weekday service between the Herman Ivory Terminal and both the Walmart Supercenter and Mercy Health campus along Sherman Boulevard, via an interline with proposed Route 30. At Walmart, Route 55 vehicles would change their headsigns to "Route 30" and continue on to the Mercy Health campus and downtown Muskegon Heights. Similarly, at Mercy Health, Route 30 vehicles would change their headsigns to "Route 55" before continuing on to Walmart. This interlined structure would provide Route 55 and Route 30 passengers a one-seat ride to either the Mercy Health Campus or Walmart, without the need to transfer between buses. The on-call service to Cleveland Avenue and near-by mobile home parks would be eliminated and would instead be served by a proposed microtransit service (see Microtransit Service Recommendations).

Key destinations along the proposed alignment include:

- Downtown Muskegon
- Muskegon Rescue Mission
- Industrial parks near Laketon Avenue and Port City Boulevard
- Walmart (Sherman Boulevard)
- Mercy Health (Sherman Boulevard)

Table 26 shows the proposed service levels for Route 55. The Route would provide hourly service over 11 weekday service hours.

Table 26 | Route 55 Proposed Service Levels

Service Day		Approximate Span of Service	Frequency (minutes)
Weekday	AM Early Morning	5:00 am – 7:00 am	On-Demand*
	AM Peak	7:00 am – 9:00 am	60
	Midday	9:00 am – 3:00 pm	60
	PM Peak	3:00 pm – 6:00 pm	60
	PM Evening	6:00 pm – 12:00 am	On-Demand*
Saturday		8:00 am – 5:00 pm	On-Demand*
Sunday		9:00 am – 4:00 pm	On-Demand*

*Note: on-demand service provided by proposed microtransit vehicles

Fixed-Route Ridership Estimates

To estimate the ridership impact of the proposed fixed-route service changes described above, a three-step process was used. First, current system ridership was redistributed among the proposed routes based on geographic coverage. If the service area of an existing route was proposed to be picked up by one or more new routes, the current ridership from that route was reassigned proportionally to the new route or routes that will cover the service area. Some ridership was assumed lost if a current route segment was not covered at all in the proposed redesign. If new service had been added to an area that is not currently served, an estimate of the resulting new ridership would have been made in this step. However, that was not necessary, given that no substantial new service coverage is being proposed.

In the second step, the "carry-over" ridership from Step 1 (i.e. the total ridership that was not lost due to the reduction in geographic coverage) was distributed by hour using the distribution curve of current MATS ridership. In other words, if 10 percent of current weekday ridership occurs in the 10:00 hour, then 10 percent of the carry-over ridership from Step 1 was also assigned to the 10:00 hour. However, while MATS current weekday ridership is distributed over approximately 17 hours, the recommended fixed-route network would operate for only 11 hours each weekday. Thus, some ridership was assumed to be lost. Specifically, half of the ridership assigned to the 6:00 am hour and the 6:00 pm hour was transferred to 7:00 am hour and 5:00 pm hour, respectively to represent the likelihood that some riders would shift their commutes to the next closest trip time if the trip they currently used were eliminated. The remaining half of the ridership assigned to the 6:00 am and 6:00 pm hours are assumed lost, along with all ridership after 7:00 pm. All Saturday ridership was assumed to be lost, as the fixed-route service recommendations do not include weekend service. However, weekend ridership estimates are included in the microtransit service recommendations found later in this chapter.

The third step of the process estimated the ridership impact of service characteristics such as schedule changes and directness of service. Each service characteristic was assigned an associated impact factor based on TCRP research and experience with past service redesigns.[9] For example, increased service frequency is expected to correlate with an increase in ridership, while decreased service could reduce ridership. Baseline impact factor multipliers were assigned as shown below. However, upon review of the recommended routes, only the factors reflecting bi-directional service and straightening routes were actually applied to the proposed network.

- Increase frequency: multiplier of 0.5
- Simplify route/bi-directional service: multiplier of 0.1
- Straighten route or make more direct: multiplier of 0.1
- Establish repeating headways: multiplier of 0.02
- Establish clockface headways: multiplier of 0.03
- Decrease frequency: multiple of -0.5

The estimated impact of the proposed service characteristics was multiplied by the system-wide ridership estimate calculated in Step 2 to arrive at a value representing the expected new weekday ridership resulting from the proposed service characteristics. This value was then added to the ridership baseline established at the end of Step 2 to arrive at a final projected ridership that reflects the changes in geographic and service span coverage, as well as the service characteristics proposed for the network.

[9] Elasticity from TCRP 66 Fixed-Route Transit Ridership Forecasting and Service Planning Methods, as well as FITP experience.

The process described above is shown in full detail in **Appendix D**. Based on this process, the estimated weekday ridership for the recommended fixed-route network is 1,762 boarding per day. This is slightly higher than the weekday average of 1,742 boardings in 2018.

A redesigned transit network can take a year or more to reach its full ridership potential as changes tend to be disruptive, no matter how well-designed. In fact, ridership often falls in the initial months after a major service change while riders familiarize themselves with the new route network. Over time, however, this trend will likely reverse itself and ridership growth will accelerate. In the case of MATS fixed-route service, weekday ridership is expected to rise to 1,762 boardings per day within a year, but with the proposed loss of all Saturday fixed-route ridership, the total annual weekday ridership for fixed-route service is estimated to fall to 447,640, or four percent less than the 465,481 boardings recorded in 2018. The 17,841 passenger-trip decline in fixed-route ridership is expected to be more than made up for with an estimated annual microtransit ridership of nearly 200,000 passenger trips (see Microtransit Ridership Estimates).

ADA Paratransit Service Recommendations

The Americans with Disabilities Act (ADA) of 1990 and related regulations, which are enforced by the Federal Transit Administration (FTA), identify actions that transit providers must take to ensure that people with disabilities have access to public transportation services, vehicles, and facilities.[10] Because MATS operates fixed-route service for the general public, it must also continue to provide its GoBus paratransit service for individuals who are found to be unable to use accessible fixed-route service due to a disability. ADA paratransit service must be comparable to fixed-route service with respect to key service characteristics, as defined in ADA regulations, including:

- **Service area** - Service must be provided in corridors that measure ¾ of a mile on each side of all non-commuter fixed routes. Small areas that are not within corridors, but are completely surrounded by them, must also be served. Individuals do not need to live inside of the ADA service area to be served, but they must be making trips within that area.
- **Days and hours of service** - ADA paratransit service must be available on the same days, and during the same hours, as fixed-route service.
- **Response time** - "Next day" service must be provided. Reservations must be taken until close of normal business hours for trips that will be provided on the following day, no matter how early the requested pickup time is. Customers must also be allowed to make reservations up to 14 days in advance of their desired travel date. Pick-up and drop-off times may be negotiated with customers but may not be more than one hour before or after the individual's desired pick-up/drop-off time.

MATS' current GoBus service is unable to both (1) meet the requirements of the ADA and (2) serve all requests for paratransit service in Muskegon County among the population age 65 and older and all adults with self-identified disabilities. This plan recommends that the GoBus service be brought in line with the requirements of the ADA in a way that complements the fixed-route service recommendations. Additional demand for demand-response service is recommended to be met by microtransit service, as described below in the Microtransit Service Recommendations section.

The following changes are recommended to MATS' current GoBus service.

[10] FTA's ADA Circular 4710.1, Americans with Disabilities Act Guidance, provides additional information and guidance regarding ADA requirements: https://www.transit.dot.gov/regulations-and-guidance/fta-circulars/americans-disabilities-act-guidance-pdf.

Paratransit Service Characteristics

GoBus service is recommended to be offered during the same span of service as the fixed-route system, 7:00 a.m. to 6:00 p.m., on weekdays. GoBus service will be offered exclusively to travelers who are making trips within ¾ mile of the fixed-route system. In order for trips to be guaranteed, they must be booked on the previous day; however, same-day requests may be accommodated if and as GoBus capacity allows.

Paratransit Eligibility

MATS GoBus service is recommended to be offered exclusively to individuals who qualify for the service under the requirements of the ADA. This will help ensure that GoBus service is consistently available to those in greatest need of the service. Eligibility for ADA paratransit service is defined in federal regulations as follows:

1. Individuals who, because of a disability, are unable to independently board, ride, or disembark from accessible fixed route vehicles (i.e., the person cannot "navigate" the system).
2. Individuals with disabilities who cannot use the fixed route service because the route that they need to use for a particular trip is not accessible (to be considered an "accessible route," all vehicles operated on the route must be accessible).
3. Individuals with disabilities who have specific impairment-related conditions that prevent them from getting to or from fixed route stops/stations.[11]

Temporary as well as permanent disabilities and needs must be considered. ADA paratransit eligibility is based on functional abilities, not on a type of disability or mobility aid used. Also, eligibility can be trip-specific (a person can use fixed route under some conditions and needs paratransit under other conditions). Eligibility decisions are therefore either: unconditionally eligible, conditionally eligible, temporarily eligible (either conditional or unconditional), or not eligible.

To implement this change in eligibility requirements for GoBus, MATS must follow an established process to determine, within 21 days of the receipt of each completed application, whether an individual is eligible to receive GoBus service. Upon determination of eligibility, MATS must provide a letter or ID or both to the individual determined to be eligible. An appeals process must also be available for persons who are determined ineligible or only eligible under certain circumstances ("conditional eligibility"). A separation of authority must be maintained between those involved in the initial determination and those hearing appeals.

MATS will be required to follow all regulations related to the provision of ADA paratransit service, including those related to transportation provided for companions, caretakers, and service animals.

Rider Notifications

MATS GoBus service would benefit from a more streamlined scheduling process. Currently, only one phone line is available for scheduling, and incoming calls placed while another call is in progress simply receive a voicemail or busy signal. In addition, there is currently no system for riders to receive confirmations or notifications regarding vehicle arrival times, schedule changes or interruptions, etc. As soon as MATS' finances and staff capacity allow, MATS should implement a call holding capability and a scheduling and notification system. The notification system should enable riders to receive confirmations (via text or email) of trips once they are booked, and receive reminders about upcoming trips and/or when their driver arrives via text, email,

[11] For more information, see: https://www.transit.dot.gov/regulations-and-guidance/civil-rights-ada/part-37-transportation-services-individuals-disabilities.

or automated phone call. MATS could make an online or app-based scheduling and/or cancellation option available to GoBus riders as well.

Agency Fares

It is recommended that MATS GoBus service implement a policy under which trips booked and paid for by a third party (health care provider, social services organization) on behalf of a client are subject to a higher per-trip fare. Such fares are to be negotiated between MATS and the third-party.

No-Show Policy

MATS is recommended to establish a process for suspending the eligibility of riders who abuse the system with frequent no-shows. The no-show policy would not apply to rides that are missed because of issues outside of the person's control; the suspension must be for a reasonable period of time; and the proposed suspension must be able to be appealed.

Paratransit Ridership Estimates

Today, fewer than a dozen individuals are certified by MATS as ADA-eligible. This low level of utilization of ADA certification makes it difficult to predict the future level of demand for the GoBus service, once the recommended eligibility changes are made, with a high level of certainty. It is likely that many people who use the GoBus service today will switch to the microtransit service, which would also be wheelchair-accessible and could be more attractive to riders in some cases due to the same-day nature of trip requests. It is expected that riders with disabilities and senior citizens would be able to use the microtransit service at the same fare as the GoBus system.

Today, MATS is able to put between one and three GoBus vehicles in service at any given time. Because the GoBus service area would decrease considerably under the recommended service characteristics and fewer individuals would be eligible to receive GoBus service compared to today, it is estimated that one vehicle would be adequate to meet the anticipated GoBus demand. However, MATS will be responsible for monitoring the GoBus system capacity and performance to ensure that all federal requirements related to providing a comparable level of service to people with disabilities are met.

Microtransit Service Recommendations

Historically, transit providers like MATS have had two service models at their disposal: fixed-route service operating with set schedules along designated routes; and dial-a-ride services like GoBus, providing curb-to-curb demand-response service in low density environments and/or to population groups requiring additional assistance than what can be provided with fixed-route service. However, in recent years, a new approach to demand-response service, called microtransit, has emerged.

Microtransit is a technology-driven demand-response service model that allows riders to directly dispatch vehicles through a smartphone app (call-in options are available as well, for users without smartphones). The technology and user-interface used in microtransit is similar to services like Uber and Lyft that some study areas residents are already familiar with. However, unlike Uber and Lyft, microtransit service relies on a set fleet of vehicles with a consistent set of drivers and is governed by a public entity. These small but significant differences allow communities that have implemented microtransit services to brand the service and to set their own standards for driver vetting and training.

Microtransit service can provide more coverage than fixed-route service, as vehicles are not tied to specific routes or corridors. Microtransit service is also more flexible than traditional dial-a-ride services as trips can be scheduled on very short notice. However, to attract choice riders, microtransit service must offer reasonable pick-up times (i.e., the time between a trip request and a trip pick-up) and trip times (the amount of time spent on the vehicle). These metrics are a function of several variables including the following:

- The number of vehicles in operation – the more vehicles available for service, the shorter the typical wait time for a pick up.
- Service area – the larger the service area, the higher the likelihood of long trips that can make a vehicle unavailable to other user for extended periods of time.
- Pick-up requirements – microtransit service can be provided curb-to-curb or corner-to-corner. Corner-to-corner service means that a passenger could be asked to walk to the nearest street corner to meet an approaching vehicle. This allows vehicles to serve more passenger per hour by reducing timely deviations onto small streets and driveways.
- In addition to their impact on pick-up and trip times, these variables affect the cost of microtransit service. Microtransit operators generally offer one or both of the following service models:
- Turn-key service model, also known as Transportation as a Service (TaaS) – this is a service model in which a contracted provider is responsible for providing and maintaining all elements of the service, including vehicles, drivers, and supporting technology.
- Technology deployment model, also known as Software as a Service (SaaS) – this is a service model where a vendor provides just the technology platform to support app-based direct dispatching, but not the service vehicles or drivers.

In the United States, there is currently only one known vendor that provides both the turn-key and technology deployment microtransit service (but many that provide SaaS only). Via, as the vendor is called, offers two pricing formulas depending on the service model. For Via's turn-key service, the price is currently $45 - $50 per vehicle hour (depending on market), as long as the total annual contract amount is at least $800,000. At that contract amount, dispatchers to handle trip requests made by phone for users who do not have smartphones or do not want to use an app are also provided by Via.

Figure 53 | Example Microtransit Vehicle

For the technology only deployment model, Via charges a one-time set-up fee of approximately $50,000 - $100,000 (depending on fleet size) and then a recurring annual fee of $45,000, which includes technology services for up to five vehicles. Via charges $500 - $1,000 per month for each additional vehicle used to provide the service (depending on fleet size). In the technology deployment option, dispatching for those who do not use the app to request trips could be handled by Via for an additional cost, or it could be handled by MATS staff.

Both of the microtransit service models have their own benefits and drawbacks, and both were carefully considered in the development of final recommendations. Under a technology deployment model, MATS would retain significantly more control over its entire microtransit service operation, but would ultimately be paying for the cost of the technology features in addition to its regular operating costs for each vehicle revenue hour of service. Because MATS' operating cost per revenue hour for demand-response service in FY 2019 was nearly $100, implementing the service using the technology deployment model within the agency's financial constraints would not allow MATS to put enough microtransit vehicles in service to ensure reasonable pick-up times and travel times for riders. Because the turn-key service can be offered at a rate of $50 per vehicle hour, MATS would be able to offer nearly twice as many vehicle hours of service for a given operating costs as it would be able to through technology deployment.

Microtransit Service Characteristics

The relatively lower cost of turn-key microtransit service, compared to both fixed-route and GoBus service operated by MATS, creates an opportunity to provide service coverage during time periods that are not currently served. **Figure 54** shows a sample operating plan that illustrates how nine microtransit vehicles could be utilized on weekdays to complement fixed-route service by providing early morning and evening coverage, additional capacity during peak ridership periods, and expanded geographic coverage.

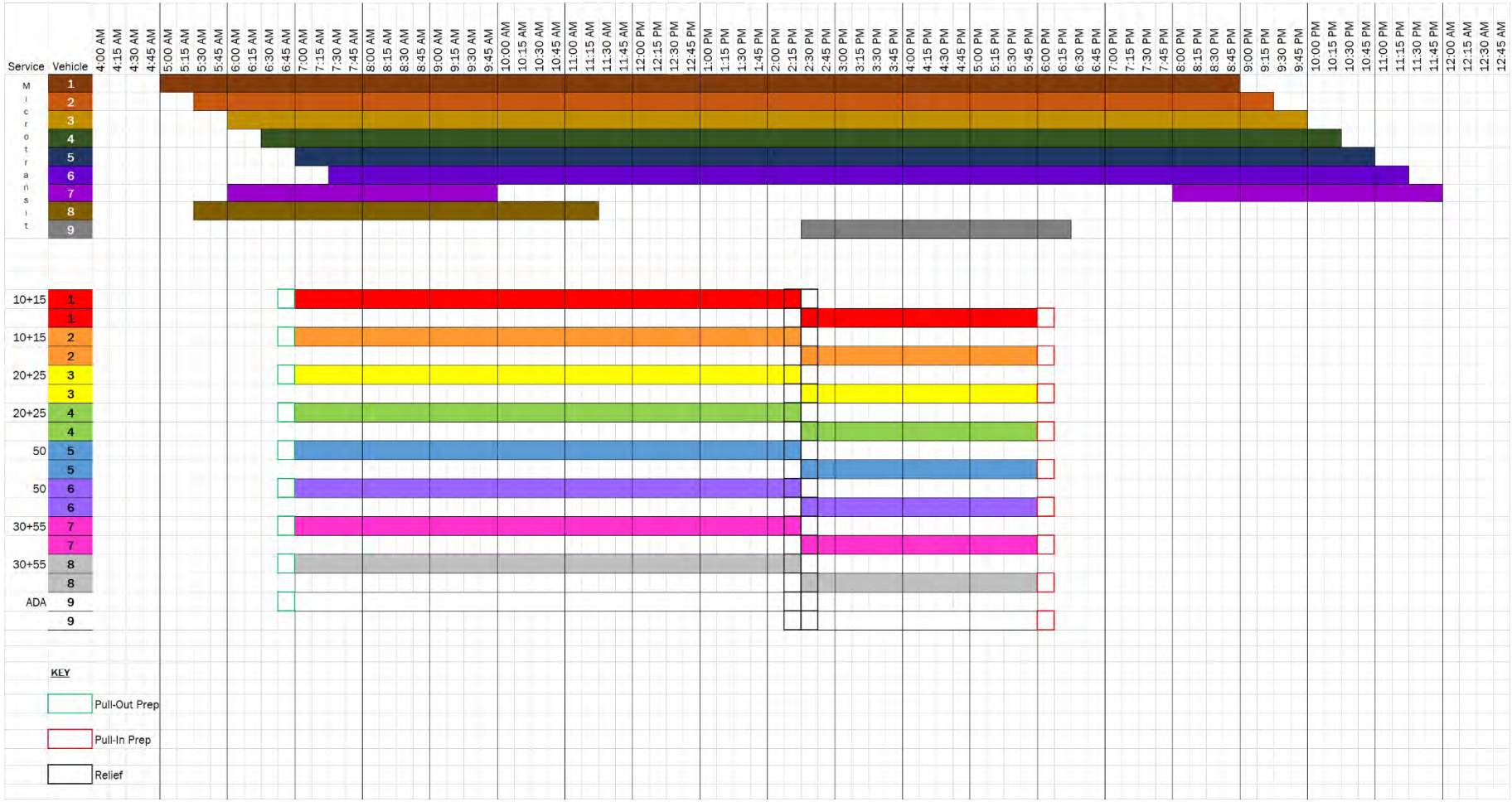
The expanded early morning and late night service coverage would help facilitate job access for 2nd and 3rd shift workers. During those time periods when fixed-route service is available, the flexibility of microtransit service would primarily benefit service area residents who live or work beyond the reach of the recommended fixed-route network (although residents who do live near a fixed route could choose to use microtransit as well). The recommendations for microtransit service also include Saturday and Sunday service. Five vehicles would be available on Saturdays for eight hours each, and four vehicles would be available on Sundays for six hours each.

A turn-key microtransit operation would give MATS flexibility in allocating service hours to meet ridership demand. For example, all four vehicles operating on Sunday could operate between the hours of 9:00 am and 3:00 pm, or vehicle schedules could be staggered to maximize the total span of service over the course of the day. These decisions can be made and changed with fairly short notice once ridership patterns become clear. With a turn-key operation, service metrics that would inform where and when vehicles are deployed would be collected by the contractor and shared with MATS staff (typically using a cloud-based dashboard or query tool). Typical metrics would include ridership per vehicle hour, ridership per jurisdiction, average trip length, and average wait time from reservation request to pick-up. Based on these metrics, MATS could choose to reallocate resources by time of day or even day of the week. For example, if ridership is low and/or wait times are short on weekdays but unacceptably long on Saturdays when there is no fixed-route service, resources could be reallocated from weekdays to weekends.

The recommendations for microtransit service assume that the maximum targeted wait time between a trip request and a passenger pick up is 30 minutes, with an average wait time of approximately 15 minutes. This relatively short wait time reflects several key service characteristics:

- A smaller service area – unlike the current GoBus service that operates county-wide, the proposed microtransit service would only operate within the boundaries of those jurisdictions that provide local funding to the service (see Financial Plan chapter of this document).
- Sufficient vehicles – microtransit service is designed around a technology platform and algorithm that determines which vehicle to match with each service request in order to minimize deviations and maximize ridership per hour. The more vehicles there are in service, the shorter the wait time, and the more direct the service is. To meet the expected ridership demand for microtransit service, and maintain wait times of no more than 30 minutes, it is estimated that six to nine vehicles will be required during peak hours for weekday service, and four to five vehicles will be required on weekends.
- App-based reservations – microtransit wait times are kept short, in part, through the use of technology in service scheduling. Users are able to book their own trip through a mobile app, and eliminate the time needed to call a reservation agent (including hold time and communication time between an agent and driver). For prospective riders who do not have a smart phone or tablet, a call-in number is available, but the experience of other microtransit operations around the country shows that the number of phone-based reservations tends to diminish over time, in favor or app-based reservations.
- Corner-to-corner service – the key to maximizing service efficiency and minimizing wait times is reducing deviations on every trip. Asking passengers to meet a microtransit vehicle at the end of their

Figure 54 | Sample Weekday Operating Plan for Fixed-Route and Microtransit Service



block, rather than having the vehicle meet them at their home, can significantly speed up service and improve productivity. Passengers receive instructions on where to meet their requested vehicle through the mobile app. If passengers are unable to walk one block to meet their requested vehicle (due to age, disability, etc.), that information is added to their rider profile and curb-side pickup is provided instead.

Microtransit Ridership Estimates

Microtransit is a fairly new service model, but a number of microtransit pilot programs are currently in operation around the United States. These programs provide valuable insight into the ridership patterns that could be expected in Muskegon. A review of other microtransit services that have been operating for at least one year, show that ridership ranges from three to nine passengers per vehicle revenue hour. The lower end of the productivity scale is typically found in cases when microtransit service was implemented to replace unproductive fixed-route service. The higher end of the scale is generally associated with high-density and fare-free environments like college campuses. Muskegon's use case is somewhere between these extremes because the microtransit service would be used both to replace unproductive fixed-route service in some geographic areas and to expand service hours in areas where fixed-route service has proven to be fairly productive.

The microtransit recommendations include 56,414 annual vehicle revenue hours. Using a conservative estimate of 3.5 passengers per vehicle revenue hour, the recommended microtransit service would result in an annual ridership of 197,449 passenger trips.

Capital Needs

MATS staff face two key decisions regarding capital investments in the immediate future: First, the size and composition of MATS transit fleet must be determined, as many vehicles in the fleet have already reached their maximum useful life. Secondly, MATS must determine the future of its Muskegon Heights Transfer Point passenger facility, which is currently housed in a temporarily weather-proofed shelter at the Muskegon Heights Farmers Market. Both the fleet and facility decision have been put off until the conclusion of this study.

Transit Fleet

MATS currently operates a mix of 35-foot transit coaches and smaller body-on-chassis cutaway buses, used primarily for GoBus service. Thirty-five-foot transit coaches typically have a seating capacity of 32 passengers. Based on the analysis of ridership data included in the diagnostic route profiles found in **Appendix A**, maximum fixed-route passenger loads currently do not exceed 20 passengers on any trip on a typical weekday). While 20 passengers is below the seating capacity of a 35-foot transit coach, it is above the 16-passenger seating capacity of MATS' cutaway buses. When wheelchairs are carried on the cutaway buses, seating capacity drops to as little as six passengers (if three wheelchairs are carried). Currently, maximum loads of 16 passengers or greater occur at various times on a typical weekday.

The recommend fixed-route network is designed to service the region's highest ridership-potential corridors and is expected to result in a higher average ridership per trip than the current network, even if total annual fixed-route ridership drops slightly (due to the reduced span of service and coverage area). Vehicle loads of 20 or more passengers are likely to occur during peak ridership periods on a fairly regular basis, meaning that cutaway buses would not provide sufficient seating capacity to meet expected maximum loads. In addition, 35-foot vehicles are most appropriate for fixed-route service because they are able to accommodate boarding by passengers in wheelchairs much more quickly than cutaways. They also have longer useful lives.

The recommended fixed-route service plan requires eight vehicles, and industry best practices would require three additional vehicles as spares. To ensure sufficient capacity to support the expected fixed-route ridership demand, MATS should maintain a fleet of at least eleven 35-foot transit coaches, with eight vehicles for daily operations and three spares. In the most rare circumstances, one of MATS' cutaway vehicles could be used as a spare for fixed-route service as well.

MATS currently has sixteen 35-foot transit coaches in its possession. Four of these vehicles have already reached their maximum useful life by age and/or mileage (see **Appendix E**). Five additional buses will reach this point by 2021, leaving seven transit coaches with a useful life of at least three more years, so four 35-foot vehicles would need to be replaced in 2021 to bring MATS to its target total count of 11 heavy duty (35-foot) fixed-route buses. Additional heavy duty buses will need to be replaced in 2023 (three) and 2024 (one) as well. MATS' fleet of cutaway buses currently includes 18 vehicles. Of these, seven have reached their maximum useful life (by age), four will reach this point in 2021, and one more will reach this point in 2022. This leaves six cutaway buses with at least three years of useful life remaining, which is sufficient to cover the recommended paratransit and fixed-route service plans if two vehicles are assigned to paratransit (one for daily service and one spare). Of the remaining four cut-away vehicles, one could be kept for potential future paratransit service expansion, and two could be kept for contingency or transferred to another Michigan transit agency. A fleet replacement schedule is included in the Financial Plan Chapter of this document.

Passenger Facilities

The recommended fixed-route transit network is built around a single hub at Herman Ivory Terminal. Downtown Muskegon Heights would continue to be served by two routes (Route 15 and Route 50), but Baker Street would not be the end of the line for either of them. Instead, downtown Muskegon Heights would serve as a mid-route destination where buses would stop but not lay over for extended periods of time.

Given the number of key ridership generators along Baker Street in downtown Muskegon Heights, including Family Dollar, Muskegon Heights City Hall, and the Department of Social Services, passenger activity at this location is expected to remain high enough to justify passenger amenities such as benches and shelters. However, in place of the current off-street passenger shelter at the Muskegon Heights Transfer Point, or a new off-street passenger facility in the immediate area, two more traditional passenger shelters with benches should be placed along Baker Street to serve both northbound and southbound buses.

Any funds being earmarked for a second off-street transit hub should instead be invested in adding passenger shelters at high-ridership stops throughout the MATS service area. MATS should develop a passenger amenities deployment plan that includes periodic ridership surveys to identify high-ridership stops and the establishment of stop-level ridership thresholds that trigger the installation of a shelter. The establishment of clear thresholds, such as a minimum of 20 passenger boardings per day at a stop before a shelter is considered, would allow MATS staff to provide transparency in its passenger amenities deployment decisions.

Besides ridership volumes, other factors can also be considered when a shelter request is made by MATS stakeholders. These include whether there is a sponsoring partner who is willing to share the costs of installing and/or maintaining a shelter, and whether there are sensitive population groups such as senior citizens or people with disabilities who are likely to use the shelter if it is installed. If, for example, a stop serves a senior center, the decision to install a shelter may be justified even if the stop does not quite reach the minimum ridership threshold. The Financial Plan assumes that MATS will deploy five new shelters per year for the next five years (see Financial Plan chapter).

Estimated Staffing Needs

The recommendations in this plan involve reducing the number of vehicle revenue hours (VRH) of MATS' directly-operated (fixed-route and ADA) services by more than half. This would seem to necessitate staffing reductions in order for MATS to continue to provide a comparable level of value to the public for every dollar spent. However, there are two primary reasons why MATS' staffing needs are not expected to be reduced by half:

- MATS currently has below-average staffing levels for all labor categories; in some cases, MATS' staffing is *significantly* below staffing levels at peer agencies (even after taking each agency's size and

amount of service operated into account). For example, if the existing MATS system were to be staffed in line with the average staffing levels of the eight peer agencies included in the analyses in Chapter 5 (System Performance and Peer Comparison), it would have a total staff of approximately 62.3, compared to the 43.25 it has today.

- As MATS decreases the amount of services it operates, economies of scale that MATS achieves today may also be reduced. This is because there are certain functions that an agency like MATS must carry out regardless of its size, and the level of effort associated with those functions is not directly proportional to the amount of service the agency offers.

MATS' future staffing needs based on the proposed level of directly-operated service and peer agency staffing levels, are *estimated* as shown in **Table 27**. It is important to note that different transit agencies have different titles, organizational structures, and position responsibilities. It cannot necessarily be assumed that an administrative assistant at one agency has the exact same responsibilities as one at another agency, for example. A staffing analysis of this type, which relies primarily on peer agency data to identify appropriate staffing levels, is best looked at from an agency level; it is not necessarily problematic if one agency has significantly more staff in a particular labor category relative to its peers, particularly if the agency's overall staffing level relative to the amount of service provided is comparable.

It is also important to note that there are a few labor categories for which adjustments to the staffing need estimates for MATS have been made such that they are not based just upon the future level of directly-operated service and peer staffing levels. These are described below and indicated with an asterisk (*) in **Table 27**.

- Custodial staffing is not proposed to change, as building facilities are not expected to change in the short term. Because this plan also recommends installation of new passenger shelters, the workload on the current custodial staff will likely increase.
- MATS is currently able to operate and maintain its fleet with a staff of 2 mechanics. While peer data indicate that MATS would need 2.25 mechanics, it is likely that the current staff can continue to manage maintenance, given the reduction in the number of MATS vehicles in direct operation.
- Peer averages would indicate that MATS needs 17.25 bus operator FTEs. However, a national report (National Center for Transit Research, 2007) on operator staffing indicates that small agencies like MATS require more operators to cover time otherwise dedicated to vacation, FMLA, training, and other tasks, and recommends one operator for every 4.7 weekday revenue hours, which calculates to 21 operator FTEs. Therefore, this plan recommends that MATS maintain 21 operator FTEs. It is also recommended that MATS management review fixed-route scheduling and supplement that information with recent data related to staff leave and leave-related components of in-place labor agreements to determine the final level of operator needs.
- Peer averages relative to revenue hours would indicate that MATS needs between 4.5 and 4.75 supervisor, administrative, and other staff; this number has been rounded up to 5 to account for the additional responsibilities associated with overseeing the third-party contractor responsible for providing the microtransit service.

Table 27 | MATS Directly Operated Staffing Hour Compared to Peer Average

Staffing Category	Existing Service (VRH)	Existing Service Staffing (FTEs)	Existing Staff per 100,000 Revenue Hours	Peer Average Staff per 100,000 Revenue Hours	Proposed Service (VRH)	Proposed Staffing based on Peer Averages and Adjustments (FTEs)	Net Change Staffing (FTEs)
Directly Operated VRH (Fixed route & ADA service)	58,116				25,146	-	-
Mechanics	-	2	3.4	8.5	-	**2***	**0**
Operators	-	29	49.9	68.8	-	**21***	**- 8**
Custodial Staff	-	1.75	3.0	3.1	-	**1.75***	**0**
Dispatchers	-	2.5	4.3	7.4	-	**1.75**	**-0.75**
Supervisors, Administrative and all Other Staff	-	8	13.8	19.3		**5***	**-3**
Total	-	43.25	74.4	107.2	-	**31.5**	**-11.75**

The total number of operator, dispatcher, and supervisor/administrative/other positions are all proposed to be reduced. Overall, staff FTEs are proposed to be reduced by 11.75 from 43.25 to 31.5.

A full assessment of MATS' staffing needs based on the recommendations in this plan, and the need to continue to offer high quality service to the public in a cost efficient manner, would involve a more thorough study of the responsibilities of each position and an evaluation of how those responsibilities would change under the recommendations, as well as whether any technology solutions are available to reduce staff workloads. Because the third-party contractor proposed to provide the microtransit service would need to hire vehicle operators, it is likely that some individuals in eliminated operator positions, which account for a majority of the eliminated positions, could seek employment with the new contractor. In addition, there may be opportunities for MATS to employ some of its current staff in different roles instead of using external staff support.

MATS should seek to achieve these reductions through attrition to the greatest extent possible. It is also recommended that severance packages and/or adjustments to benefits (such as making employees nearing key milestone employment dates fully vested in their retirement plans) be considered to minimize the negative impact these changes will have on current MATS staff.

10. FINANCIAL PLAN

Implementation of the service recommendations has significant financial implications for MATS, particularly with respect to the agency's operating expenses. In FY 2019, MATS faced an operating budget deficit of nearly $400,000, and setting MATS on a more sustainable financial path was identified as a key objective for this study. This financial plan identifies operating revenue sources, operating budget estimates for implementing the plan recommendations, and documentation of the assumptions used to develop the operating budget estimate. It also includes a capital budget estimate for MATS.

Operating Revenue Sources

Federal Operating Assistance

Federal funding is made available to MATS each year under the federal program provisions of 49 USC Section 5307. These funds are available to be programmed by MATS for either capital or operating uses. When used toward operating expenses, these funds can reimburse up to 50 percent of eligible operating expenses (not including fares). In the past, MATS has also received Federal Section 5311 funds, which are distributed based on eligible operating expenses for service to *non-urban areas*. These funds can reimburse 18 percent of eligible operating expenses but are not likely to be used unless microtransit service is offered in the non-urban portions of Muskegon County.

State of Michigan Local Bus Operating Assistance

The State of Michigan provides funding for operations to public transit agencies. In recent years, state reimbursement for operating expenses is approximately 32.5 percent of eligible urban expenses and 38 percent of eligible non-urban operating expenses. Reimbursement rates are estimated, and funds distributed throughout the year, with reconciliations and adjustments made in future periods. Final reimbursement amounts are a function of the annual appropriation process and the level of eligible expenditures of all transit agencies statewide.

Other Operating Revenue Sources

Many federal and state funding programs, due to fund matching requirements, can only be leveraged if agencies like MATS are able to find supplemental local revenue sources. While fares and other sources such as advertising can make up a portion of this need, local government funding is nearly always also required (and in some cases, there are limitations on how much of matching funds can be made up by fare revenues). Nationally, local funding makes up an average of 25 percent of all transit operating expenses; by comparison, the local share contributions received by MATS in FY 2019 made up only about 4 percent of operating revenues. Local funding can come from a wide variety of sources and mechanisms including general fund revenues, sales tax revenues, millage/property tax revenues, or gas tax revenues (among others). MATS' other current and potential revenue sources are described below.

Local Share Contributions

Throughout the years, local contributions have been received on an annual basis from the Cities of Muskegon, Muskegon Heights, Norton Shores, and Roosevelt Park, and from Muskegon Charter Township. In addition, the Cities of Montague and Whitehall, and Dalton Township, as well as other partners such as Muskegon Community College and Baker College, have contributed to the service in recent years. The local share contribution is currently based on a per capita charge for the population residing within ¼ mile of the MATS bus routes in these communities, with adjustments as necessary. For FY 2019, the per capita charge for the population residing within ¼ mile of MATS bus routes was $3.00, resulting in just under $190,000 in revenues.

A challenge associated with the current local share contribution structure is that it does not fully reflect where service is being received; there are currently many municipalities in the County that receive GoBus service today but do not provide any financial contribution in exchange.

Fares

Passengers are charged a fare when they board the bus, or purchase tickets and passes in advance. These farebox revenues are used primarily to offset operating expenses. In FY 2019, fare revenues were approximately $372,000.

Other Revenues

MATS' has two potential sources of non-transportation revenues: (1) fees charged for the placement of advertising on buses and (2) revenues from the commission earned on the sale of intercity (Greyhound) tickets, for which MATS serves as a contracted ticket agent. Other minor revenues include interest earned, sale of scrap, vending machine concessions, and small fees charged for various office services.

Operating Expenses

Due to changes in MATS' service delivery model, the recommendations in this plan are expected to reduce MATS' operating expenses while increasing the number of total vehicle hours of service (across all modes) provided to the public. This section includes an estimated operating budget for MATS to implement the recommendations.

Assumptions

The following assumptions were used in the development of this operating budget:

- Federal 5307 funding will continue to fund 50 percent of eligible operating expenses up to the maximum amount (based on the federal urbanized area cap and Michigan DOT funding allocation decisions).
- State local bus operating assistance for service in the urban area will cover 31 percent of eligible operating expenses.
- Current special operating grant funding of $177,000 per year was assumed to stay consistent and was not included in estimating the portion of operating expenses eligible for federal or state reimbursement.
- The cost per vehicle revenue hour for microtransit service used to develop the budget is based on existing contract information provided by Via in December 2019.
- MATS' operating costs per revenue hour of $88.73 for fixed-route service and $98.20 in FY 2019, which were used in development of the operating cost estimates, are assumed to increase at a rate of 3 percent per year. This escalation will account for raises and inflation.
- The microtransit operating expenses were assumed to escalate at a rate of 2 percent per year.
- For the purposes of developing fare revenue estimates, average fares were assumed to be $2.00 for GoBus service and $3.00 for microtransit service (however, microtransit fares would depend upon the rider's age and/or disability status). The average fare revenue per fixed-route trip was assumed to be 65 cents (compared to 71 cents today).
- The GoBus system, with its reduced service area size, was assumed to be able to serve an average of 2.5 passengers per vehicle revenue hour. The microtransit system is assumed to serve an average of 3.5 passengers per vehicle revenue hour.
- The demand (ridership) for fixed-route service was estimated based upon benefits of improving service quality as documented in national research, and also takes into account the reduction in span of service from today, as described in the Fixed-Route Service Recommendations section.

- The amount of microtransit service recommended is based on preliminary demand modeling conducted by Via, which used publicly available local demographic data. Via's modeling assumed that service would continue to be provided in all eight local jurisdictions in the county that provided local share contributions in 2019. If some jurisdictions decide to opt in or opt out of the service, the amount of service (in terms of vehicle hours) provided would be adjusted accordingly.

Operating Budget

The operating budget estimate shown in **Table 28** has been developed based on the recommended fixed-route, ADA paratransit, and microtransit services described in Chapter 9.

Table 28 | Operating Budget (FY 2020-2024)

	2020	2021	2022	2023	2024
Operating Expenses					
Operating Expenses - Fixed-Route service	$1,983,293	$2,042,792	$2,104,076	$2,167,198	$2,232,214
Operating Expenses - ADA-only demand-response service	$274,371	$282,602	$291,080	$299,812	$308,807
Operating Expenses - Microtransit service	$1,614,200	$1,646,484	$1,679,414	$1,713,002	$1,747,262
Total Operating Expenses	**$3,871,864**	**$3,971,878**	**$4,074,569**	**$4,180,012**	**$4,288,282**
Operating Revenues					
Federal funding	$1,530,807	$1,580,814	$1,632,160	$1,684,881	$1,739,016
State local bus operating assistance	$1,145,408	$1,176,412	$1,208,246	$1,240,934	$1,274,498
Special operating grants	$177,000	$177,000	$177,000	$177,000	$177,000
Fare revenues	$633,250	$633,250	$633,250	$633,250	$633,250
Total anticipated revenues	**$3,486,465**	**$3,567,476**	**$3,650,656**	**$3,736,065**	**$3,823,764**
Additional Need (Local share contributions or other revenues)	**$385,399**	**$404,402**	**$423,913**	**$443,947**	**$464,519**

Operating Budget Implications

If MATS were to continue to operate its services today at current levels, the local share contribution rate would need to be *at least* five times higher than it is today and would need to continue to increase annually to account for rising costs and inflation. The recommendations in this plan result in a significant reduction in total operating expenses for the agency, thereby also reducing the total local share contributions required.

Based on available federal and state funding sources and expected fare revenues, it is anticipated that MATS would need approximately $385,400 to operate the recommended program. This would be a combination of local share contributions and other revenues in FY 2020 (compared to well over $700,000 under the status quo). This amount, due to anticipated cost increases and inflation, is expected to increase to around $464,500 by 2024.

There are a couple of ways that local revenues could be raised to fund the proposed service:

- Local partners could contribute to fund MATS' services using per capita formulas based on the population within a certain distance of each of MATS' (new fixed routes) and the population receiving microtransit service. Under this approach, service would only be provided in local jurisdictions that contribute to fund the service, and that the amount contributed would be commensurate with the level of service received. In order to provide opportunities to minimize the hardship created for some through the reduction in MATS' service area size, it is recommended that each jurisdiction in Muskegon County be provided an opportunity to become a local funding partner of MATS.
- Jurisdictions within Muskegon County, or the entire County, could implement a millage that would provide the required local share contributions to fund MATS services. A millage would have the benefit of being a dedicated revenue source for MATS, although it would need to be reauthorized at regular intervals.

It is strongly recommended that modest annual escalations (e.g., 3 percent) to local share contributions be incorporated into funding agreements to account for anticipated inflation and preclude the need to renegotiate contribution rates annually.

Amounts in the estimated operating budget could change based on participation decisions; for example, if some local jurisdictions decide not to become or continue to be local partners of MATS, the amount of microtransit service required would be reduced to be commensurate with the service area size and population to be served. Microtransit will only be a viable option, however, if a minimum amount of service (currently estimated at about $800,000, or about half the amount of service recommended) is purchased. There may also be opportunities for MATS to pursue additional revenue sources such as advertising, grants, and contracting agreements; however, such revenue sources can fluctuate from year to year and should not be assumed to be available more than a year or two into the future.

Finally, regulatory changes and funding decisions at the federal and state level could result in changes to the types of operating expenses that can be reimbursed and the rates at which they can be reimbursed. There may be an opportunity in future years for MATS to leverage more federal dollars to fund some of its operations; however, policies related to this are evolving and would need to be approved by the FTA's regional office.

Capital Expenses

For small and mid-size transit agencies like MATS, vehicle purchases generally make up the agency's largest capital expenses in most years. As described in the Capital Needs section above, seven of MATS' 35-foot buses, which are required to fixed-route service, have useful lives of at least three more years. Because MATS is anticipated to reduce the amount of fixed-route service it offers relative to today, no expansion-related vehicle purchases are estimated in the capital budget; all vehicle purchases are vehicle replacements timed to ensure that MATS has an adequate fleet, including spare vehicles, to provide the recommended service.

Assumptions

The following assumptions were used to develop the capital budget.

- Vehicle costs were assumed to escalate at 3 percent per year.
- Shelter costs were assumed to escalate at 2 percent per year
- Other capital expense amounts reflect MATS' FY2019-FY2023 Financial Plan.
- Recurring amounts for capital expenses in MATS' FY2019-FY2023 Financial Plan (e.g., mobility management, outreach and marketing) were assumed to continue in 2024.

Capital Budget

The capital budget estimate shown in **Table 29** has been developed based on the recommended fixed-route, ADA paratransit, and microtransit services and associated capital needs as described in Chapter 9. The capital

budget assumes that federal funding will support 80 percent of capital purchases, and state funding will provide the other 20 percent, consistent with today's trends.

Table 29 | Capital Budget (FY 2020-2024)

	2020	2021	2022	2023	2024
Capital Expenses					
Heavy duty (35-foot) bus replacements	$0 (0)	$2,068,750 (4)	$0 (0)	$1,646,057 (3)	$565,146 (1)
Cutaway bus replacements	$0	$0	$0	$0	$0
Support vehicle replacements	$60,000	$0	$264,978	$0	$0
New passenger shelters (five per year)	$75,000	$76,500	$78,030	$79,591	$81,183
Transit technology	$249,694	$0	$0	$126,528	$0
Phone and notification system upgrade	$100,000	$0	$0	$0	$0
Support equipment	$0	$0	$50,000	$50,000	$50,000
Mobility management	$125,000	$125,000	$125,000	$125,000	$125,000
Outreach and marketing	$150,000	$150,000	$150,000	$150,000	$150,000
Total Capital Needs	**$759,694**	**$2,420,250**	**$668,008**	**$2,177,176**	**$971,329**
Capital Revenues					
Federal Funds (80 percent)	$607,755	$1,936,200	$534,406	$1,741,741	$777,063
State Funds (20 percent)	$151,939	$484,050	$133,602	$435,435	$194,266

11. CLOSING STATEMENT

As a department of Muskegon County, MATS has historically prioritized service coverage over productivity. In practice, however, MATS' efforts to serve all County residents, combined with budgetary limitations, have resulted in a service that serves very few residents well.

In the urbanized area of the County, MATS' current fixed-route network is characterized by circuitous alignments and large one-way loops. This service design succeeds in casting a wide net, but fails to provide the type of direct service that would appeal to a broad range of area residents. Both inside and outside of the urbanized area, MATS' GoBus service offers a lifeline to seniors and residents with disabilities in need of mobility assistance, but in practice, the large service area and lack of resources results in frustration among prospective riders who are often unable to book a reservation.

At the root of many of MATS' challenges is an unsustainable funding situation. While federal and state funding cover the majority of MATS' operating and capital expenses, these funding sources come with local matching requirements for operating expenses. Over the past several years, the amount of local match funding provided by the local funding partners has not kept pace with the rise in costs associated with operating MATS' service. In addition, many jurisdictions in the County that currently receive GoBus service do not provide any local match funding, creating an inequitable local funding structure.

While MATS faces a number of daunting challenges, the recommendations laid out in this document provide a viable path forward to ensuring the long-term productivity and financial sustainability of the system. These recommendations include a rationalized fixed-route network, stricter adherence to ADA requirements, and an innovative approach to demand-response service that creates the potential for MATS to serve existing riders better and attract new customers. However, realizing the full potential of the recommended services depends upon the financial support of individual jurisdictions throughout Muskegon County.