

Commuter Transit Service Options

West Michigan Transit Linkages Study



Submitted to: Ottawa County,
Michigan

Submitted by:
MP2PLANNING, LLC

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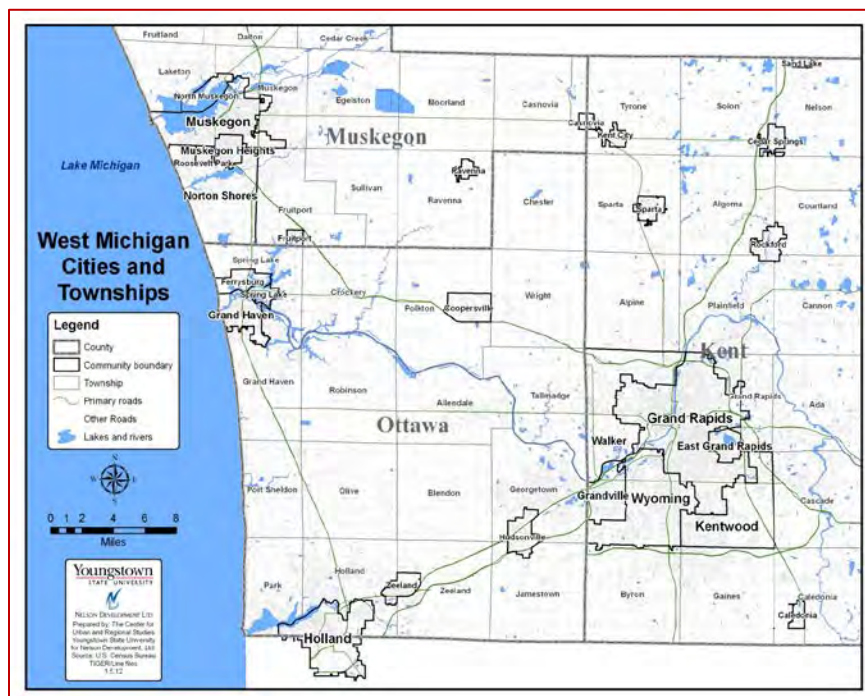
APPENDIX A: RIDERSHIP PROJECTIONS

1. Introduction

The potential for new intercity and inter-county public transit service exists in West Michigan. The purpose of the West Michigan Transit Linkages Study is to determine whether such a service would be feasible (based on needs, costs, available funding, capacity of service providers, etc.) and if so, to provide operating and administrative alternatives and recommendations for the implementation of a new service.

West Michigan, comprised of Kent, Muskegon, and Ottawa Counties (Figure 1-1) has been referred to as a triangle with Grand Rapids, the largest regional center, as the eastern point; the Muskegon/Muskegon Heights/Grand Haven area as the northwestern point; and Holland/Zeeland as the southwestern point. A number of smaller cities and townships fall within this area, including Allendale Township, home to the primary Grand Valley State University (GVSU) campus, which is effectively in the middle of this triangle and is the only community served by regional public transit via a link to Grand Rapids via The Rapid.

Figure 1-1 West Michigan Cities and Townships



This is the third in a series of four task reports for the study. The focus of this report is defining commuter transit services options that could be operated in the region. These have been designed as express transit services that meet the Federal Transit Administration (FTA) definition of express commuter transit service.

2. Commuter Bus Routes/Bus Stops

This Report provides an assessment of five different route options for commuter transit linkages in West Michigan that address the potential markets identified through the planning process. Each option includes a sample route alignment, hypothetical schedule, stop and parking locations, and estimates of ridership. The service options identified have been structured to meet the requirements of the FTA's definition of commuter bus service. Figure 2-1 illustrates the proposed options and proposed major transfer centers

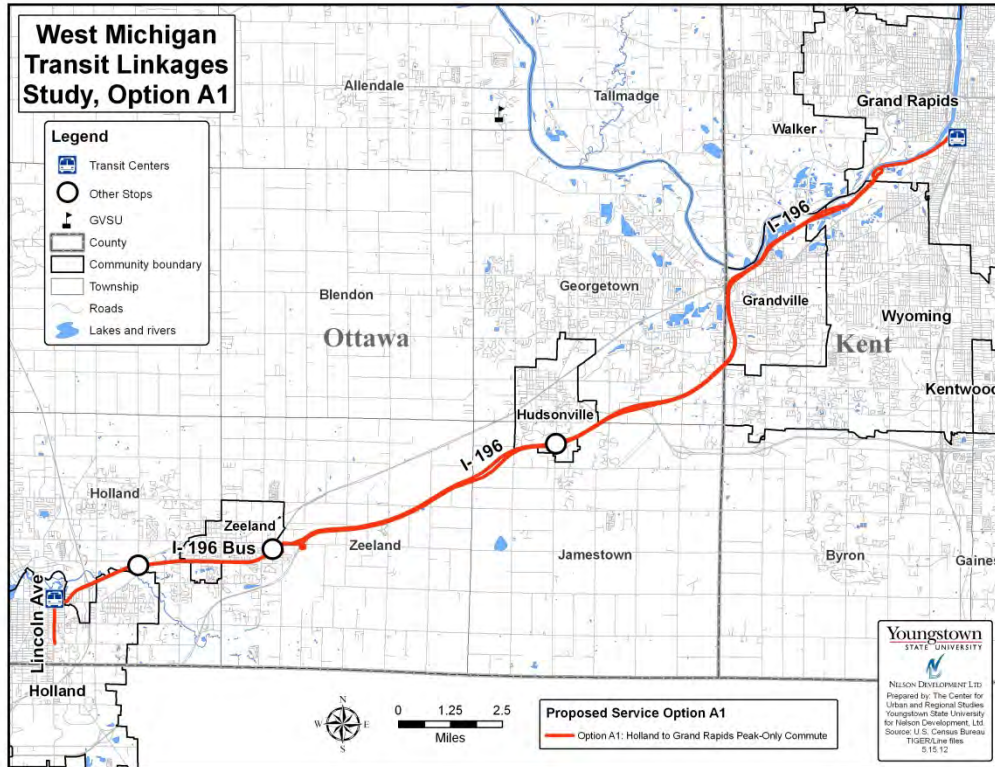


FTA Definition of commuter express service

Commuter bus service means fixed route bus service, characterized by service predominantly in one direction during peak periods, limited stops, use of multi-ride tickets, and routes of extended length, usually between the central business district and outlying suburbs. Commuter bus service may also include other service, characterized by a limited route structure, limited stops, and a coordinated relationship to another mode of transportation.

Street, Chicago Drive and Business I-196) where the route will serve an existing park-and-ride facilities at 112th Street and at Homestead Drive (Zeeland). Buses will then continue via Business I-196 and onto I-96. From here, buses will continue non-stop to 32nd Avenue in Hudsonville to serve a park-and-ride lot. The last stop(s) will be in downtown Grand Rapids where the route follows I196 to Market Avenue SW and Cherry Street SW before turning into Central Station. The reverse trip will follow the same general alignment. A proposed route alignment is shown in Figure 2-2.

Figure 2-2 Option A1 – Holland to Grand Rapids Alignment



2.1.2 Schedule and Service Hours

Option A1 will operate Monday through Friday during the peak commute periods from 5:50 AM to 6:20 AM and again in the afternoon from 4:10 PM to 6:20 PM (Table 2-1, page 7). Buses will depart Holland for Grand Rapids every 30 minutes beginning at 5:50 AM, and again at 6:20 AM. Buses will depart Grand Rapids at 30-minute intervals beginning at 7:00 AM, with the last departure at 7:30 AM. In the evening, the first bus will depart Grand Rapids for Holland at 5:20 PM, and 30 minutes later at 5:50 PM. A final trip would depart Grand Rapids at 7:30 p.m. This option provides a total of 5 trips to Grand Rapids and 5 return trips to Holland (Table 2-2, page 8). This is partly because of low projected demand and to control overall costs and to provide a higher level of service to the more significant demand – the Holland to Grand Rapids commute. An option would be to operate a final catch-all trip, which would essentially leave Holland at 6:15 and depart Grand Rapids again at 7:25. This should only be considered if demand warrants.

Table 2-1 Option A1 – Proposed Weekday Schedule

Bus Trip Assignment	Leave Holland	Arrive Grand Rapids	Leave Grand Rapids	Arrive Holland
Bus 1	5:50 a	6:36 a	7:00 a	7:46 a
Bus 2	7:20 a	8:06 a	8:30 a	9:16 a
Bus 1	4:10 p	4:56 p	5:20 p	6:06 p
Bus 2	4:40 p	5:26 p	5:50 p	6:36 p
Bus 1	6:20 p	7:06 p	7:30 p	8:16 p

Table 2-2 Option A1 – Proposed Trips

	Span of Service	One-Way Trips		Frequency (minutes)
		To Grand Rapids	To Holland	
Weekdays				
AM Peak	5:50 AM – 8:16 AM	2	2	30
PM Peak All Day	3:15 PM – 8:16 PM	3	3	30
		5	5	

Option A1 will operate about twelve hours 2,988 annual weekday service hours assuming two hours for deadhead and or breaks and calculated for 249 service days (annual weekdays minus major holiday).

2.1.3 Ridership

Annual ridership on this route is projected to be approximately 26,700 unlinked passenger trips.¹ In terms of productivity, the route can be expected to average about 9 passengers per revenue service hour.² Appendix A presents the methodology used to calculate ridership. This projected ridership number is 60 percent of the ridership projected for the corridor. It is anticipated that this route will be more productive than Option A2 because of the faster travel time. It should be noted that very little demand is projected for westbound trips in the morning and eastbound trips in the evening. Appendix A also includes ridership projections over 20 years based on data provided by Grand Valley Metro Council, West Michigan Shoreline Regional Development Commission, and Macatawa Area Coordinating Council.

2.1.4 Service Design Considerations

Average speeds

Buses travelling along the entire 27 mile route should average about 36 mph. The route runs mostly along Interstate 196, where buses should be able to average 45 mph. The 6.4-mile section between

¹ An “unlinked passenger trip” is a one-way trip on a mode of transportation. A person that transfers and makes another trip to get to their destination actually has made two unlinked trips.

² “Revenue service hours” refers to the time a bus is being operated when passengers are able to board.

Byron and Chicago on M21 will be covered at 30 mph. Grand Rapids streets are planned for an average speed of 18 mph. This limited number of stops in combination with the freeway travel speeds means that this service will be “travel time competitive” with private autos for the duration of the trip but not when a person’s access and egress trips to use the service are included. Approximate travel times for each option are shown in the chart below. As can be seen, for Option A1 the automobile travel time is 33 minutes while the commuter bus travel time is estimated to be about 46 minutes. Adding another 15 minutes to get to the bus makes the one way trip about twice as long in terms of travel time, not including time spent waiting for the bus or getting to the final destination.

Route Option	Automobile Travel Time	Automobile travel time to stop	Commuter Bus travel time	Total Commuter Bus Travel Time
A-1	:33	:10-:15	:46	1:01

Bus Stops

There will be stops at:

- Downtown Holland (Padnos Transportation Center)
- The existing park-and-ride lot near the intersection of Business I-196 and I-96
- The M-121 Interchange on I-196
- The 32nd Avenue Interchange on I-196
- The Rapid Central Station



Perceived Duplication

Amtrak service physically duplicates portions of this route, but the Amtrak schedule is very different from Option A1’s proposed schedule. Amtrak trains leave Grand Rapids for Holland (and then travel on to Chicago) at 7:35 AM, reaching Holland at 8:21 AM. Return service leaves Holland at 9:21 PM. arriving in Grand Rapids at 10:20 PM. The one-way fare is \$5. This service does not offer a reasonable alternative to travel by auto or bus. Indian Trails Motor Coach (<http://www.indiantrails.com/>) provides two daily trips in each direction on its Chicago-Flint service. The table below summarizes the schedule for these buses. The one-way fare is \$8.80 and a round-trip fare is \$16.75. It is very unlikely that either Amtrak or Indian Trails would be attractive as commuter express bus service.

Table 2-3 Indian Trails Motor Coach Daily Trips

ITMC	Depart Grand Rapids	Arrive Holland	Depart Holland	Arrive Grand Rapids
Trip 1	10:30 AM	11:10 AM		
Trip 2			2:55 PM	3:40 PM
Trip 3	4:30 PM	5:10 PM		
Trip 4			10:10 PM	10:50 PM

Recommended Park-and-Ride Facilities

Long term (full day parking) suitable for park-and-ride patrons is available at the Padnos Transportation Center in Holland. Adequate park-and-ride parking along the route will be a key to the success of this service because most passengers are expected to be park-and-ride patrons as opposed to “walk-up” patrons. How much park-and-ride capacity is needed for this route? Ridership is expected to be about 36 one-way trips per day originating traveling east for this Option. Assuming most trips will be park-and-ride users a maximum of 40 new parking spaces would be required (several additional spaces are included to allow for expansion).

- **10 spaces in Holland** – There appears to be adequate space available at Padnos Transportation Center for commuter parking.
- **10 spaces in Holland** – The existing MDOT Park-and-ride lot on Chicago Drive at 112th Ave just north of I-196 has about 20 unused spaces.
- **10 spaces in Zeeland** – There’s an existing MDOT Park-and-ride lot in Zeeland on Homestead Drive just south of I-196 that appears to be at capacity. There appears to be enough land to increase the lot by another 10 spaces. The cost to add 10 surface parking spaces will be \$50,000.
- **10 spaces in Hudsonville** – There’s an existing MDOT Park-and-ride facility on 32nd Avenue just north of I-196. It appears to also be at or near capacity. The cost to build 10 additional surface stalls is \$50,000.
- **0 spaces in Grand Rapids** -The reverse commute (Grand Rapids to Holland) market is expected to be very small and thus the consultant does not believe there is any need to provide any park-and-ride capacity in Grand Rapids.

Impacts on Local Services

Schedule coordination between A1 and the local transit routes both in Holland and Grand Rapids should be workable. Most routes in Grand Rapids leave the Central Station at :15 and :45 after the hour. Arriving commuter service schedules would be coordinated to connect with local services, but this could reduce schedule flexibility in Holland.

2.2 Option A2: Holland to Grand Rapids via Chicago Drive: Peak only Commute

This route provides another commuter option between Holland and Grand Rapids. It would run in addition to Option A1. As noted earlier, these routes could operate simultaneously or it may be that the operating entity elects to implement only one of the options (in which case that option would have more service than is shown here). The projected ridership numbers shown in this section are estimates of the percent each route would have from the total projected ridership in the corridor Option A2 service would offer more opportunities for accessing the route but be somewhat slower. Its departure times would also be staggered from Option A1 to provide a broader span of opportunity for commuters. Communities served along this route include Holland, Zeeland, Zeeland Township, Hudsonville, Georgetown Township, Grandville and Grand Rapids. Key activity centers and major destinations along the route include downtown Holland, downtown Zeeland, Hudsonville, downtown Grandville (where connections to The Rapid routes can be made) and the Rapid Central Station.

2.2.1 Route Alignment

Buses departing the Padnos Transportation Center in Holland will turn south on Lincoln Avenue, left on 9th Street and will then continue via Chicago Drive to Zeeland. Buses will then stay on Chicago Drive through Zeeland, Zeeland Township, Hudsonville, Georgetown Township, and Grandville. In Grandville, buses will travel south on Prairie Street SW, left on Wilson Avenue SW, and left on Maple Street SW where connections can be made to Rapid Routes 8, 24 and 28. Leaving Maple/Wilson, buses travel via I-196 for the trip to Central Station. A proposed alignment is shown in Figure 2-3.

2.2.2 Schedule and Service Hours

As shown in Table 2-4, Option A2 will operate in the peak hours five days per week. This option provides a total of 5 trips to Grand Rapids and 5 return trips to Holland on weekdays (Table 2-5).

Table 2-4 Option A2– Proposed Weekday Schedule

Bus Trip Assignment	Leave Holland	Arrive Grand Rapids	Leave Grand Rapids	Arrive Holland
Bus 1	6:10 a.m.	7:02 a.m.	7:20 a.m.	8:12 a.m.
Bus 2	6:40 a.m.	7:32 a.m.	7:50 a.m.	8:42 a.m.
Bus 1	4:00 p.m.	4:52 p.m.	5:00 p.m.	5:52 p.m.
Bus 2	4:30 p.m.	5:22 p.m.	5:40 p.m.	6:32 pm
Bus 1	6:10 p.m.	7:02 p.m.	7:20 p.m.	8:12 p.m.

Figure 2-3 Option A2 – Holland to Grand Rapids Alignment

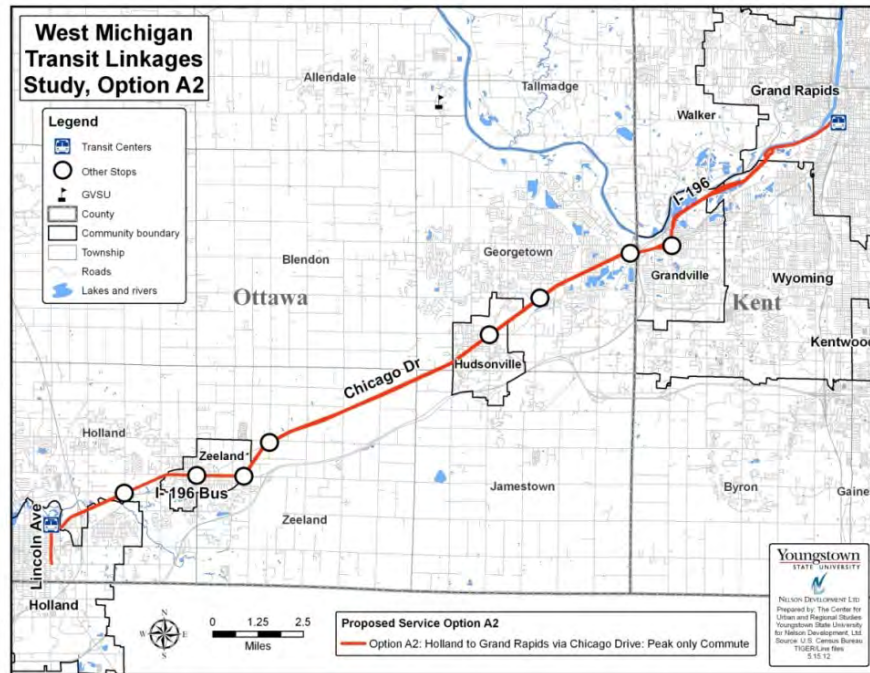


Table 2-5 Option A2 – Proposed Trips

	Span of Service	One-Way Trips		Frequency (minutes)
		To Grand Rapids	To Holland	
Weekdays				
AM Peak	5:50 AM – 9:16 AM	2	2	30
PM Peak All Day	3:15 PM – 8:12 PM	3	3	30
		5	5	

Option A2 will operate about thirteen hours or 3,237 annual weekday service hours assuming two hours for deadhead and or breaks and calculated for 249 service days (annual weekdays minus major holiday).

2.2.3 Ridership

Annual ridership on this route is projected to be approximately 17,800 unlinked passenger trips.³ In terms of productivity, the route can be expected to average about five passengers per revenue service hour. Appendix A presents the methodology used to calculate ridership. This projected ridership number is 40 percent of the ridership projected for the corridor in Appendix A. It should be noted that very little demand is projected for westbound trips in the morning and eastbound trips in the evening. Appendix A includes ridership projections over 20 years based on data provided by Grand Valley Metro

³ Ibid.

Council, West Michigan Shoreline Regional Development Commission, and Macatawa Area Coordinating Council.

2.2.4 Service Design Considerations

Average speeds

Buses will average about 30 mph over the length of the route. This is somewhat slower than the speeds expected in Option A1, and this means that buses have travel times that are less competitive with the auto when compared to Option A1. As can be seen below, for Option A2 the automobile travel time is 35 minutes while the commuter bus travel time is estimated to be about 52 minutes. Adding another 15 minutes to get to the bus makes the one way trip about twice as long in terms of travel time, not including time spent waiting for the bus or getting to the final destination.

<i>Route Option</i>	<i>Automobile Travel Time</i>	<i>Automobile travel time to stop</i>	<i>Commuter Bus travel time</i>	<i>Total Commuter Bus Travel Time</i>
<i>A-2</i>	<i>:35</i>	<i>:10-:15</i>	<i>:52</i>	<i>1:07</i>

Bus Stops

Buses will stop at or near:

- Downtown Holland at the Padnos Transportation Center (Existing transfer station)
- Park-and-ride lot near the intersection of Business I-196 and Chicago Drive
- Two stop locations along Chicago Drive in Zeeland (New Stops)
- One stop along Chicago Drive in Hudsonville (New Stop)
- One stop in Grandville on Prairie Pkwy (New Stop)
- Downtown Grand Rapids at the Central Station (Existing transfer station)



One of the potential issues on this route is most of the stops would likely need to be located on the south (eastbound) side of Chicago Drive. As there is little or no commercial development along the westbound side (north) of Chicago Drive primarily due to the railroad, stop locations are more problematic. Due to the divided highway, a 'Michigan U-turn' would need to be used wherever stops are located on the westbound trip to accommodate safe passenger deboarding.

Perceived Duplication (Please refer to this discussion in Section 2.1.4.)

Recommended Park-and-Ride Facilities

Providing adequate park-and-ride capacity isn't as critical to the success of this Option as it is to Option A1, simply because this route may have more walk-up patrons. As noted in the discussion for Option A1, there appears to be adequate capacity at the existing park-and-ride locations for additional users generated by these options. There will need to be signs installed at the local stops identified along Chicago Drive and there may be a need to develop parking arrangements with local businesses near those stops.

Impacts on Local Services

Schedule coordination between local and commuter services is difficult to achieve simply because of the vast differences in the very nature of each service. This will be true more in Holland than Grand Rapids. Most routes in Grand Rapids leave the Central Station at :15 and :45 after the hour. Arriving commuter service schedules would be coordinated to connect with local services. This would greatly reduce schedule flexibility in Holland. Most local routes currently arrive at :50 minutes past the hour, departing on the hour, meaning that the AM bus on this route would have a long connection time, while the PM bus would allow for a quick transfer time.

2.3 Option B1: Muskegon/Norton Shores to Holland Peak Only Commute

This route will provide bi-directional regional service between The Lakes Mall in Muskegon County and Holland. Residents will also be able to access this route from the MATS transit center. Communities served include Muskegon, Norton Shores, Ferrysburg, Grand Haven, Grand Haven Township, Holland Township and Holland. Key activity centers and major destinations along the route include The Lakes Mall, downtown Grand Haven, the Wal-Mart and Meijer in Grand Haven Township, the numerous commercial centers in Holland Township along US 31, and downtown Holland. Assuming regional transit connections are in place between Holland and Grand Rapids, this option could fully connect the major lakeshore cities with Grand Rapids

2.3.1 Route Alignment

This route would commence at The Lakes Mall in Norton Shores and head to Holland on US-31 with stops at Harbor Transit, Meijer in Grand Haven, a stop at the M-45/US-31 intersection, and a final stop in Holland at the Padnos Transportation Center. The return route would follow the same route and stops. Harbor Transit has limited parking for commuters who would access this route. It is likely an agreement could be worked out with a local nearby business (e.g., Home Depot) to provide parking. A stop at Meijer is proposed as Meijer has been cooperative with both MDOT and local transit agencies in providing park-and-ride spaces in their lots for commuters. The route would essentially follow the same

alignment in the other direction, except in Holland where it will travel through downtown Holland via 7th Street, S. River Avenue, and 9th Street before continuing onto Chicago Drive and US 31 northbound. In Norton Shores, the route will exit US 31 at E. Pontaluna Road and S. Harvey Street to The Lakes Mall. A proposed alignment is shown in Figure 2-4.

Figure 2-1 Option B1 – Muskegon/Norton Shores to Holland Alignment



2.3.2 Schedule and Service Hours

Option B1 will operate an AM and PM peak service, five days a week. Weekday services will operate between 5:45 AM-8:50 AM, and 4:30 p.m. to 7:10 PM. Bus 1 would originate in Muskegon, and Bus 2 would originate in Holland. Tables 2-6 and 2-7 illustrate this option’s proposed service characteristics. This route has the most service of any proposed. The primary reason is this route could have comparable ridership in both directions and provides a unique linkage opportunity for West Michigan residents.

Table 2-6 Option B1 – Proposed Weekday Schedule

Bus Assignment	Trip	Leave Holland	Arrive Lakes Mall	Leave Lakes Mall	Arrive Holland
Bus 1				5:45 a	6:50 a
Bus 2		6:30 a.m.	7:35 a	7:45 a	8:50 a
Bus 1		7:00 a.m.	8:05 a		
Bus 2					
Bus 1				4:45 p	5:50 p
Bus 2		4:30 p	4:35 p	5:45 p	6:50 p
Bus 1		6:05 p	7:10 p		

Table 2-7 Option B1 – Proposed Trips

	Span of Service	One-Way Trips		Headways (minutes)
		To Holland	To The Lakes Mall	
Weekdays		4	4	60
AM Peak	5:45 AM-8:50 AM	4	4	60
PM Peak	3:45 PM – 6:10 PM	4	4	60

Option B1 will operate 3,486 annual service hours.

2.3.3 Ridership

Annual ridership on this route is estimated to be approximately 24,618 passenger trips. Productivity is estimated to be about 7 riders per hour. Appendix A presents the methodology to estimate the ridership. Appendix A also includes ridership projections over 20 years based on data extracted from Traffic Analysis Zone data provided by the employment and population projections provided by Grand Valley Metro Council, West Michigan Shoreline Regional Development Commission, and Macatawa Area Coordinating Council.

2.3.4 Service Design Considerations

Some service design characteristics of this route include the following:

Average Speeds

Route B1 is approximately 30 miles in each direction. Most of the route operates along US 31, where traffic averages about 35 miles per hour. Services operating on city streets will average between 12 and 18 miles per hour depending on traffic, signalization, and whether passenger stops are provided.

As can be seen in the chart on page 16, for Option B1 the automobile travel time is 42 minutes while the commuter bus travel time is estimated to be about 65 minutes. Adding another 15 minutes to get to the bus makes the one way trip slightly less than twice as long in terms of travel time, not including time spent waiting for the bus or getting to the final destination.

<i>Route Option</i>	<i>Automobile Travel Time</i>	<i>Automobile travel time to stop</i>	<i>Commuter Bus travel time</i>	<i>Total Commuter Bus Travel Time</i>
B-1	:48	:10-:15	1:05	1:20

Bus Stops

Buses will stop at the following locations:

- Downtown Holland at the Holland Transit Center (existing transfer station)
- Harbor Transit facility (existing transfer station)
- Meijer and Wal-Mart in Grand Haven Township (new stops)
- The Lakes Mall in Norton Shores (existing stops)



Perceived Duplication

Because multiple stops can be made inside both the MAX and Grand Haven service areas, some people making local trips within those communities might opt to use Route B1 as an alternative to the local transit service, which in turn might have slightly negative impact on ridership on those local systems. This negative impact is likely to be very minimal.

This would be the only service (bus or rail) linking Holland with Grand Haven and Norton Shores (connections to MATS).

Recommended Park-and-Ride Facilities

New locations may be needed for park-and-ride. The Lakes Mall may set aside spaces for commuters, and Meijer in Grand Haven may be willing to designate spaces for park-and-ride as it has done in other locations. A stop (coordinated with the Grand Haven-Allendale route) would need to be developed at M-45/US-31. A maximum of 64 people potentially wanting to park their car and access the bus can be expected on a daily basis. Since these will likely be dispersed along the route, it is unlikely new facilities with the exception of the stop at M-45/US-31 will be required. Parking will also be available at the transit centers in Grand Haven and Holland.

Impacts on Local Services

Schedule coordination, both at the north and south ends of the route, may prove difficult. Route 1, MATS' service to The Lakes Mall, passes the mall at 51 minutes past the hour. In Holland, most routes currently arrive at 50 minutes past the hour, departing on the hour. The illustrative schedule attempts to optimize transfer connections in Holland. As a result, waiting times when transferring in Muskegon could be long. Because both MATS and MAX would provide collector/distributor service for Route B1, its operation would likely enhance local ridership. The first MAX buses in Holland arrive back at the terminal at 6:50 AM, accommodating a 7:00 AM service start on Route B1. The last southbound bus would reach Holland at about 5:50 PM. This service might have a longer span of service than local services in Grand Haven. This could possibly lead to requests for expanded local service.

2.4 Option C1: Muskegon to Grand Rapids Peak-Only Commute

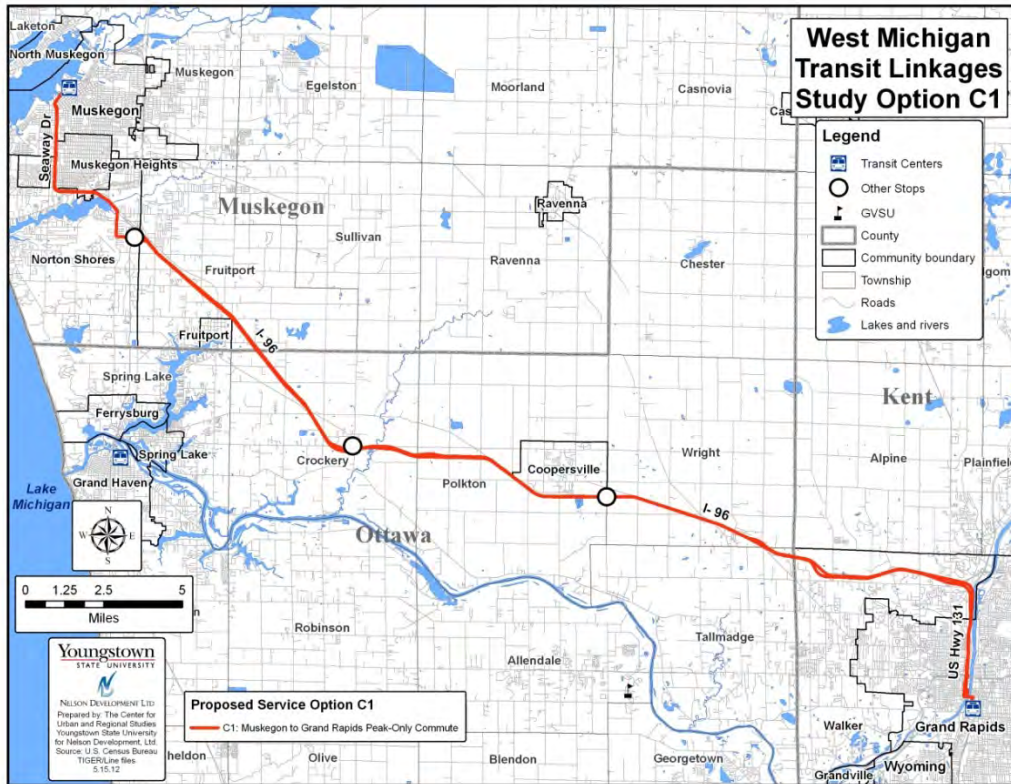
This route will provide bi-directional commuter hour service between Muskegon and Grand Rapids. Communities served include Muskegon, Norton Shores, Coopersville, and Grand Rapids. As a commuter route, the focus is on service that is competitive with driving, and thus there are very few stops along the alignment. The only key activity centers served by this route are downtown Muskegon, Coopersville, and downtown Grand Rapids.

2.4.1 Route Alignment

Buses will depart from the MATS Terminal (Morris Avenue between 1st and 3rd Street) in downtown Muskegon where connections to/from all other MATS routes can be made. Buses will then travel via Morris Avenue, 3rd Street, Shoreline Drive, Seaway Drive/US-31, Grand Haven Road, E. Hile Road on the way to serving the park-and-ride at S. Harvey Street. From there buses will continue via E. Hile Road, I-96 and 48th Avenue with stops at the Nunica and Coopersville park-and-ride lots. Buses will then continue via I-96, I-296/US-131, Fulton Street, Market Avenue SW and Cherry Street SW to the Central Station. From Central Station, riders can either take the free DASH service to get to downtown destination, or transfer to The Rapid routes. Alternatively, the route could make a loop through downtown Grand

Rapids before terminating at Central Station. A proposed alignment is shown in Figure 2-5.

Figure 2-5 Option C1 – Muskegon to Grand Rapids Alignment



2.4.2 Schedule and Service Hours

Option C1 will provide commute hour service linking Muskegon with Grand Rapids. Two trips will operate in the morning and three trips in evening hours on weekdays only. Each trip will take about 57 minutes one way. Trips will depart Muskegon beginning at 6:10 AM and would reach Grand Rapids at about 7:07 AM. Option C1 will operate 3,237 annual weekday service hours. Tables 2-8 and 2-9 illustrate possible service characteristics for the proposed route.

Table 2-8 Option C1 – Proposed Weekday Schedule

Bus Assignment	Trip	Leave Muskegon	Arrive Grand Rapids	Leave Grand Rapids	Arrive Muskegon
Bus 1		6:10 a	7:07 a	7:20 a	8:17 a
Bus 2		6:40 a	8:37 a	8:55 a	9:02 a
Bus 1		4:00 p	4:57 p	5:15 p	6:12 p
Bus 2		4:30 p	5:27 p	5:40 p	6:37 p
Bus 1		6:30 p	7:27 p	7:40 p	8:37 p

Table 2-9 Option C1 – Proposed Trips

	Span of Service	One-Way Trips		Headways (minutes) N/A
		To Grand Rapids	To Muskegon	
Weekdays				
AM Peak	6:10 AM – 9:02 AM	2	2	
PM Peak	4:00 PM – 8:37 PM	3	3	
All Day		5	5	

2.4.3 Ridership

Ridership on this route is estimated to be slightly less than 10,000 passenger trips annually. Productivity is estimated to be about 4 passengers per hour. Appendix A presents the methodology used to calculate this ridership estimate as well as projections for future ridership levels.

2.4.4 Service Design Considerations

Average speeds

Each one-way trip is about 42 miles long and will take about 57 minutes. Between the Muskegon terminal and I-96, service would average about 35 miles per hour. This would increase to about 50 mph on I-96 and about 18 mph within Grand Rapids. The bus should compare favorably with travel times in private autos because much of the route is on I-96. This option is more competitive with the auto in terms of total travel time than the other options as shown on the chart on the following page.

<i>Route Option</i>	<i>Automobile Travel Time</i>	<i>Automobile travel time to stop</i>	<i>Commuter Bus travel time</i>	<i>Total Commuter Bus Travel Time</i>
C-1	:42	:10-:15	:57	1:12

Bus Stops

Buses would stop at the following locations:

- Downtown Muskegon (existing transfer station)
- Existing park-and-ride at the intersection of US-31 and I-96 (on E. Hile Road)
- Park-and-ride lot on I-96 at Nunica and Coopersville
- Downtown Grand Rapids (Fulton Street and Central Station)



Perceived Duplication

Greyhound operates a private bus service between Muskegon and Grand Rapids. The schedule is noted below in Table 2-10.

Table 2-10 Greyhound Service between Muskegon and Grand Rapids

	Depart Muskegon	Arrive Grand Rapids	Depart Grand Rapids	Arrive Muskegon
Trip 1	7:05 AM	7:55 AM		
Trip 2			11:40 AM	12:30 PM
Trip 3	3:15 PM	4:05 PM		
Trip 4			4:20 PM	5:10 PM

The fare is \$13 one way and \$24 round trip.

Option C1 would significantly duplicate this existing service and this could create some issues for local decision-makers (i.e. public vs. private services). A possibility would be to contract with Greyhound to provide the service via route subsidy to reduce the fare to be more attractive to commuters. This may be a more cost effective option for this route.

Recommended Park-and-Ride Facilities

Route C1 could have about 20 park-and-ride patrons per day. Assuming 8 of these board in Muskegon or Grand Rapids, there may be need for additional capacity at the existing park-and-ride lots. The existing park-and-ride near the intersection of US-31 and I-96 is currently at capacity and would likely need to be expanded to accommodate additional demand. There appears to be sufficient land adjacent to the current lot that could be used for expansion. Up to 4 surface stalls at a cost of \$10,000/stall for a

total of \$40,000 may be needed. This excludes any land acquisition costs. Park-and-ride lots at Nunica and Coopersville (which appear² to be at capacity) would need expansion by 4 spaces at each location (\$80,000 total excluding land acquisition costs) should provide adequate capacity.

Impacts on Local Services

In Muskegon, most MATS routes begin service at either 6:50 AM or 7:20 AM, ending about 5:00 PM. Route C1 would fall outside that service window. This would create pressure on MATS to expand service hours, increasing the service span.

Schedule coordination, both in Muskegon and Grand Rapids, may prove difficult. Both communities have pulsed operations from their central transit facility.

2.5 Option D1: Muskegon to Allendale (GVSU)/Grand Rapids: Peak Only Commute

This route will provide bi-directional peak only commuter service from Muskegon/Grand Haven to Allendale and Grand Rapids. Communities served include Allendale Township, Robinson Township, Grand Haven Township, Grand Haven, Spring Lake, Norton Shores, Muskegon Heights, and Muskegon.. Key activity centers along this route include Grand Valley State University (GVSU), the Wal-Mart and Meijer in Grand Haven Township, and the variety of retail and institutional uses in downtown Grand Haven (including the Ottawa County Courthouse) and in the Muskegon area. The route would originate at the MATS transfer center and terminate at GVSU, where passengers wanting to go into Grand Rapids could transfer to Route 50.

2.5.1 Route Alignment

Departing from the Muskegon transit center, buses will travel south through Grand Haven on U.S. 31 and to GVSU via, Lake Michigan Drive, N. Campus Drive, and W. Campus Drive. A proposed alignment is shown in Figure 2-6.

2.5.2 Schedule and Service Hours

Option D1 will operate two AM and two PM round trip routes. Weekday services will operate between 6:30 AM and 8:32 PM. This option will provide 2 trips in each direction on weekdays (Tables 2-11 and 2-12 on pages 20 and 21).

Figure 2-6 Option D1 – Muskegon to Allendale Township Alignment

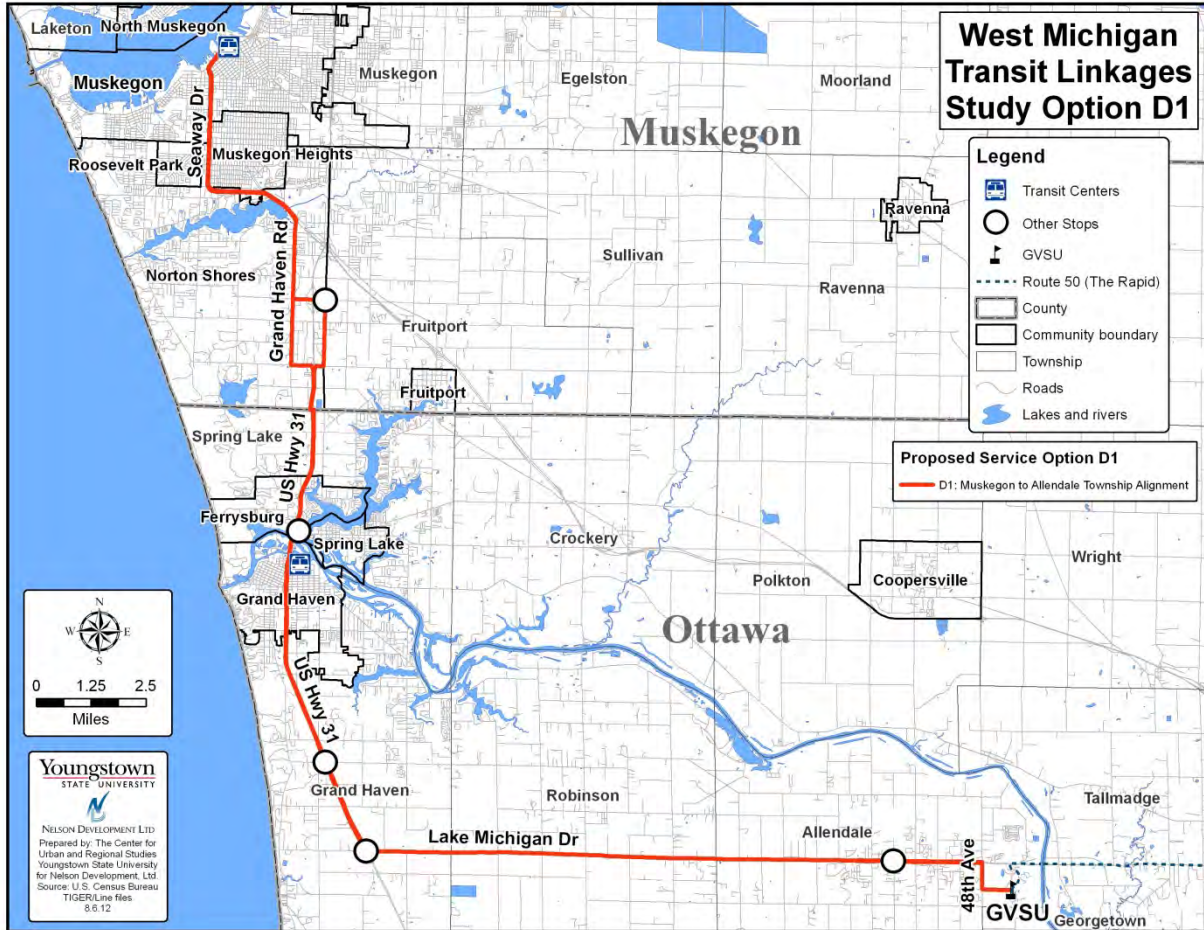


Table 2-11 Option D1– Proposed Weekday Schedule

Bus	Leave Muskegon	Arrive Allendale	Leave Allendale	Arrive Muskegon
1	5:30 a	6:52 a	7:10 a	8:32 a
2	6:30 a	7:52 a	8:10 a	9:32 a
1	3:30 p	4:52 p	5:10 p	6:32 p
2	5:30 p	6:52 p	7:10 p	8:32 p

Table 2-12 Option D1 – Proposed Trips

	Span of Service	One-Way Trips		Headways (minutes)
		To Allendale Twp.	To Muskegon	
Weekdays AM Peak	5:30 AM – 9:32 AM	2	2	60
PM Peak	3:30 PM – 8:32 PM	2	2	60

Option D1 would operate 3,486 annual weekday service hours. The service is staggered in the afternoon to give feasible options for workers in Allendale and Muskegon and also to accommodate school schedules.

2.5.3 Ridership

Annual ridership on this route is estimated to be approximately 4,400 annually with a productivity of about one to two passengers per hour. Appendix A presents the methodology used to calculate this ridership estimate as well as projections for future ridership levels.

2.5.4 Service Design Considerations

Average Speeds

Route D1 is about 23 miles long one way. When operating along M-45 (Lake Michigan Drive) and US-31, service would average about 34 miles per hour. This would slow to 12 mph along city streets in Grand Haven and 18 mph in Allendale. A travel time comparison is shown in the chart on the next page.

<i>Route Option</i>	<i>Automobile Travel Time</i>	<i>Automobile travel time to stop</i>	<i>Commuter Bus travel time</i>	<i>Total Commuter Bus Travel Time</i>
<i>D-1</i>	:45	:10-:15	1:15	1:30

As can be seen, the travel time for the bus along with the time to get to the stop is more than double that of the automobile.

Bus Stops

Bus stops are assumed at the following locations:

- Muskegon Transit Center
- The Lakes Mall
- Harbor Transit Bus Station
- Wal Mart or Meijer's in Grand Haven Charter Township
- New park-and-ride lot at the intersection of US 31 and Lake Michigan Drive
- Grand Valley State University



Perceived Duplication

There is no duplication of service. This would be the only service Grand Haven and Allendale. Neither intercity bus nor rail service operates in this corridor.

Recommended Park-and-Ride Facilities

Because of the low projected ridership on this route, no park-and-ride facilities are proposed. If there were a surge of ridership, additional park-and-ride capacity may be required.

Impacts on Local Services

No significant impacts on local services are foreseen.

2.6 Option E1: Holland to Allendale (GVSU)/Grand Rapids: Peak Only Commute

This route will provide bi-directional peak only commuter service from Holland to Allendale and Grand Rapids. Communities served include Allendale Township, Robinson Township, West Olive, Holland Township, and Holland. Key activity centers along this route include Grand Valley State University (GVSU), West Shore Mall, and a variety of retail and institutional uses in downtown Holland.

2.6.1 Route Alignment

Departing from the Padnos Transportation Center, buses will travel via Chicago Drive to US-31, Lake Michigan Drive, N. Campus Drive, and W. Campus Drive. A proposed alignment is shown in Figure 2-7 on page 27. In the event the route is implemented, there may be consideration of a route alignment refinement, with the route linking to the Ottawa County Complex and also providing access to M-Tec in Port Sheldon Township. Another caveat may be that the route originates at Padnos but then travels to the GVSU campus on Waverly before heading north.

2.6.2 Schedule and Service Hours

Option E1 will operate two AM and two PM round trip routes (Tables 2-13 and 2-14). Weekday services will operate between 6:30 AM and 5:52 PM. It should be possible to adjust schedule times to maximize coordination with work shifts or with local transit services. This option will provide 2 trips in each direction on weekdays.

Figure 2-7 Option E1 – Holland to GVSU

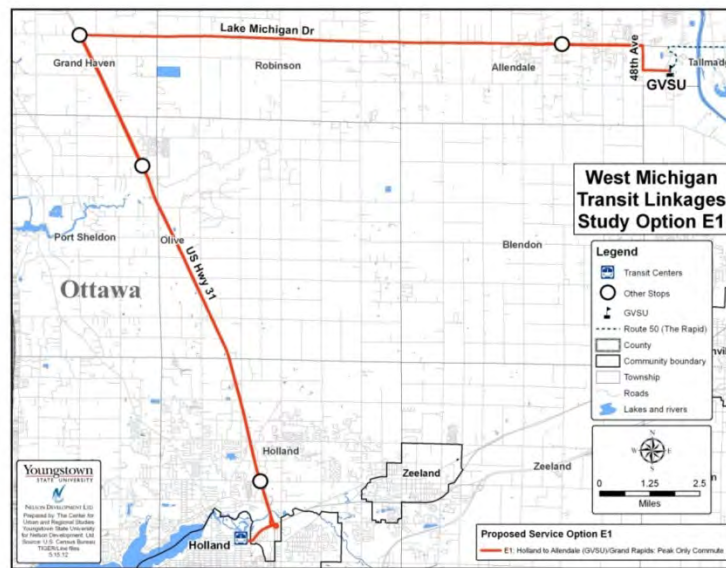


Table 2-13 Option E1– Proposed Weekday Schedule

Bus	Leave Holland	Arrive Allendale	Leave Allendale	Arrive Holland
1	6:00 a	6:52 a	7:00 a	7:52 a
2	7:00 a	7:52 a	8:00 a	8:52 a
1	4:00 p	4:52 p	5:00 p	5:52 p
2	5:15 p	6:07 p	6:15 p	7:07 p

Table 2-14 Option E1 – Proposed Trips

	Span of Service	One-Way Trips		Headways (minutes)
		To Allendale Twp.	To Grand Haven	
Weekdays AM Peak	6:00 AM – 8:52 AM	2	2	60
PM Peak	4:00 PM – 7:07 PM	2	2	60

2.6.3 Ridership

Annual ridership on this route is estimated to be approximately 8,000 with a productivity of about three passengers per hour. Appendix A presents the methodology used to calculate this ridership estimate as well as projections for future ridership levels.

2.6.4 Service Design Considerations

Some service design characteristics of this route include the following:

Average Speeds

Route D1 is about 23 mile long one way. When operating along M-45 (Lake Michigan Drive) and US-31, service would average about 34 miles per hour. This would slow to 12 mph along city streets in Grand Haven and 18 mph in Allendale. Reviewing the chart on page 27 indicates that as with the other options the travel time between getting to the bus stop and the commuter bus trip would be about double the auto travel time.

<i>Route Option</i>	<i>Automobile Travel Time</i>	<i>Automobile travel time to stop</i>	<i>Commuter Bus travel time</i>	<i>Total Commuter Bus Travel Time</i>
<i>E-1</i>	<i>:33</i>	<i>:10-:15</i>	<i>:52</i>	<i>1:07</i>

Bus Stops

Bus stops are assumed at the following locations:

- Padnos Transportation Center (existing transfer facility)
- New park-and-ride lot at US 31 and Lake Michigan Drive
- GVSU



Perceived Duplication

There is no duplication of service. This would be the only service linking Holland and Allendale. Neither intercity bus nor rail service operates in this corridor.

Recommended Park-and-Ride Facilities

Park-and-ride facilities near Allendale and the intersection of M-45 and US 31 would be appropriate.

Impacts on Local Services

- This service might duplicate some local service in Holland, but likely would not have a significant impact.

3. Transfer Stations

3.1 Options for Total Number and Location of Transfer Stations

3.1.1 Meets Requirements of Commuter Bus Service

The proposed service options were designed to meet the FTA definition of commuter bus service. All of the proposed services are peak hour only, have a minimum number of stops, are of extended length, and will require the use of a multi-ride pass. All of the services will require traveling outside of existing service areas, and will also require inter-local agreements to allow for such service to take place.

3.1.2 Includes Existing Main Transfer Stations

The existing transit agencies' main transfer stations would be utilized for this service:

- 1) Harbor Transit – Transfer Station
- 2) MAX- Padnos Transportation Center
- 3) MATS-Herman Ivory Transfer Terminal
- 4) The Rapid-Central Station

3.1.3 Options for New Buildings/Facilities

No new major transfer facilities are proposed based on the proposed routes and estimated ridership numbers. Existing shelters and waiting areas should be sufficient for projected ridership. In addition, stops will be utilized at existing shopping malls (The Lakes Mall in Norton Shores, and the Westshore Mall in Holland).

As most of the commuter stops will take place at park-and-ride lots or existing facilities, no new buildings are proposed at this time. The need for 12 new spaces in the Option C1 corridor has been identified. As mentioned earlier, Meijer has a history of providing spaces for commuter bus parking in its lots, and it is recommended they be approached to provide the same option at the Grand Haven location.

3.2 Station Utilization

If all routes were put in place the number of trips each day would be approximately 350. Assuming most trips would have return trips approximately 175 people would be accessing the system at one of the transit centers or one of the proposed stops. The major stops in the network are anticipated to be:

- Padnos Transportation Center
- Meijer or Walmart in Grand Haven
- MATS Transit Center
- The Rapid Transit Center
- Park-and-Ride Lot at M31 and M45
- GVSU
- Smaller park-and-ride lots

These individuals should easily be assimilated into the existing stations with no requirement for new facilities.

3.3 Transfer Station Infrastructure Needs

3.3.1 Parking Lot Size, Bicycle Parking

Based on ridership projections, parking for new commuter transit riders should be sufficient. If there is a surge in demand because of unforeseen circumstances, this may need to be revisited. Bicycle parking would need to be installed at MATS.

3.3.2 Rain Shelters

The current transit facilities provide inside shelter for passengers waiting for buses. It is assumed that commuters at park-and-ride lots would wait for the bus inside their vehicles. Rain/snow shelters are currently installed at GVSU's campus.

3.3.3 Lighting, Emergency Telephones, and other Safety Measures

Lighting and emergency telephones are available at existing transit stations.

3.3.4 Accessibility Requirements

The existing transit facilities that will be utilized to provide the service are ADA accessible. No additional transfer centers are proposed.

3.3.4 Visual Aids

Visual aids are in place at the existing transit centers. No additional transfer centers are proposed.

3.4 Options for Hours of Operation and Staffing Requirements

The system would operate from approximately 5:30 am to 7:00 pm, M-F. If all the options were implemented, staffing projections call for a minimum of 12 vehicle operators and a minimum of 3 maintenance personnel (one each at MATS, Harbor Transit, and the MAX). Dedicated dispatch personnel would not be required due to the designated stops involved with the service. Depending on the administrative option identified for the service, one full-time equivalent position would be required to handle administrative, planning, and marketing functions.

3.5 Traffic Impacts of Transfer Station(s)

Though a formal traffic study was not conducted, the impacts on increased traffic demands around the current facilities is projected to be minimal.

4. Vehicle Fleet(s)

The minimum size bus recommended is a medium heavy duty low floor bus, with a passenger capacity of up to 32 passengers depending on the model. A low floor bus will negate the need for a lift, and will meet all ADA requirements. The bus would ideally be equipped with Wi-Fi for internet access. If all service options are implemented, 14 vehicles would be required. Twelve buses are required for the routes, and two backup vehicles would be available for use during times of preventative maintenance and/or vehicle breakdowns. The backups can be interchanged among the routes/possible providers. If fewer options are selected, fewer vehicles would be required. It may not be necessary to obtain back-up vehicles if the service is developed incrementally. Arrangements could be made with the transit agencies for back-up.



2012 ElDorado EZ Rider II Low Floor Bus

While the buses could be extra vehicles on hand at one of the local transit systems a fleet of the same vehicles is recommended so that a distinct look and brand can be given to the service. There are a variety of ways that the buses could be acquired, which will be explored in greater detail in the next task. The following discussion gives an overview of how capital programs (vehicles, facilities, equipment, etc.) are acquired by transit systems in Michigan.

Capital funding for public transit in Michigan has historically been provided via federal and state funds at 100% (80% federal, 20% state). Capital funding includes buses, facilities, and equipment. MDOT is statutorily required to provide 13.3% of the capital match, but has provided the full 20% match. This could change in the future depending on state funding priorities, which would result in a local capital match. For non-urban systems, funding has been provided through the federal Sections 5309 and 5311 programs. However, the new federal transportation program, MAP-21 changes the capital funding for non-urban transit programs to a new program, Section 5339. For FY 2013 funding programs will remain the same, but the switch to the new programs will take place in FY 2014. The capital process usually is a two to three year cycle, from application, to approval, procurement, and receipt of items (buses, equipment, and facilities). For some costly items such as facilities, the time frame may be longer and phased through several grant programs.

Capital Funding Timeline Example

Buses	Application	Federal Approval	Procurement process begins	Receipt of buses
Date	January 2012	June 2013	November 2013	July 2014

5. Multi-Ride Tickets

At this time, a multi-ride ticket and/or monthly pass is proposed for this service. As electronic fare collection devices are extremely costly, it is suggested that a monthly paper pass specific to the proposed service should be developed that is acceptable to any and all service providers.



Assuming all options are implemented, the tickets should be available for sale at the transit centers for The Rapid, MATS, Harbor Transit, and MAX and should also be available at local outlets where the systems sell tickets.

6. Service Providers

6.1 Administrative Option A: Form Commuter Bus Service Through Contract with Existing Transit Agencies

An entity would contract with one or more of the existing public service providers (MATS, MAX, Harbor Transit, and The Rapid) to provide the proposed service. The providers could use their own buses or used or new buses procured specifically for the service. Through inter-local agreement, a multi-ride pass would be used to allow access to buses in the system and in case a transfer is required to local bus service. The major investments would be capital to provide buses and some commuter lot improvements. A local share for the cost of the service (which would include fare revenue and some local contribution) would have to be provided. At least one full-time equivalent administrative position hired by the entity would be needed to handle various administrative, planning, and marketing functions assuming the entire network is implemented. If only one or two options are implemented, there would be some administrative requirement but probably not full time.

6.2 Administrative Option B: Form Commuter Bus Service Through Contract with Private Provider and Area Transit Agencies or Through an RFP Process

An entity could contract with Indian Trails to provide the proposed service from Holland to Grand Rapids and Muskegon to Grand Rapids. An entity could contract with the MAX, Harbor Transit, and The Rapid for the proposed Norton Shores to Holland and the Holland/Grand Haven to Allendale routes and on to Grand Rapids. This option could offer significantly less cost from a capital perspective, as Indian Trails would provide the buses used on the two contracted routes, though the operational cost would likely be higher to reduce the fare to a more desirable level for commuters. No additional staff would be required for those routes, and Indian Trails is able to travel across jurisdictions without requiring any approvals. A variation of this option is the entity would issue a Request for Proposals for the service. This RFP could be structured so that the service is “turnkey” with the provider providing equipment, operators, etc. The entity would need at least one full-time administrative person to handle various administrative, planning, and marketing functions.

6.3 Administrative Option C: Form Transit Authority to Provide Commuter Bus Service

An Act 196 Transit Authority similar to the authority recently created in Grand Haven could be created that would operate the service. While there are several Acts enabling authorities, Act 196 is the most suited to transit entities. Act 196 authorizes the formation of public transportation authorities with certain general powers and duties; to provide for the withdrawal of certain local entities from public transportation authorities; to authorize certain local entities to levy property taxes for public transportation service and public transportation purposes; to protect the rights of employees of existing public transportation systems; to provide for the issuance of bonds and notes; to provide for the pledge of taxes, revenues, assessments, tax levies, and other funds for bond or note payment; to provide for the powers and duties of certain state agencies; to validate taxes authorized before July 10, 1986, elections held before July 10, 1986, and bonds and notes issued before July 10, 1986; to provide for transfer of certain tax revenue and certain powers, rights, duties, and obligations; to authorize

condemnation proceedings; to grant certain powers to certain local entities; to validate and ratify the organization, existence, and membership of public transportation authorities created before July 10, 1986 and the actions taken by those public transportation authorities and by the members of those public transportation authorities; and to prescribe penalties and provide remedies.

An entity would form an Authority that would then have the power to issue bonds or place a millage proposal on the ballot to provide funding for the operation of the transit system. This option provides the most flexibility for a transit authority and moves the costs away from the entity. Most transit authorities formed in the past 20 years in Michigan have been formed as an Act 196 Authority.

As an option, the entity could set up an Act 7 authority, which is the Urban Cooperation Act of 1967. Formation of this type of authority is via an interlocal agreement between existing units of government. Funding can be drawn through a millage voted on by residents or an appropriation from the entity's general fund. The employees of such a system are normally employees of the Authority, not the entity, and the financial responsibilities fall upon the system. This would allow for an agreement between the entity and the existing local transit providers in (Harbor Transit and the MAX). All of the parties' boards would be required to approve such an agreement. Though an option, it is less preferable than a 196 Authority.

6.5 Funding

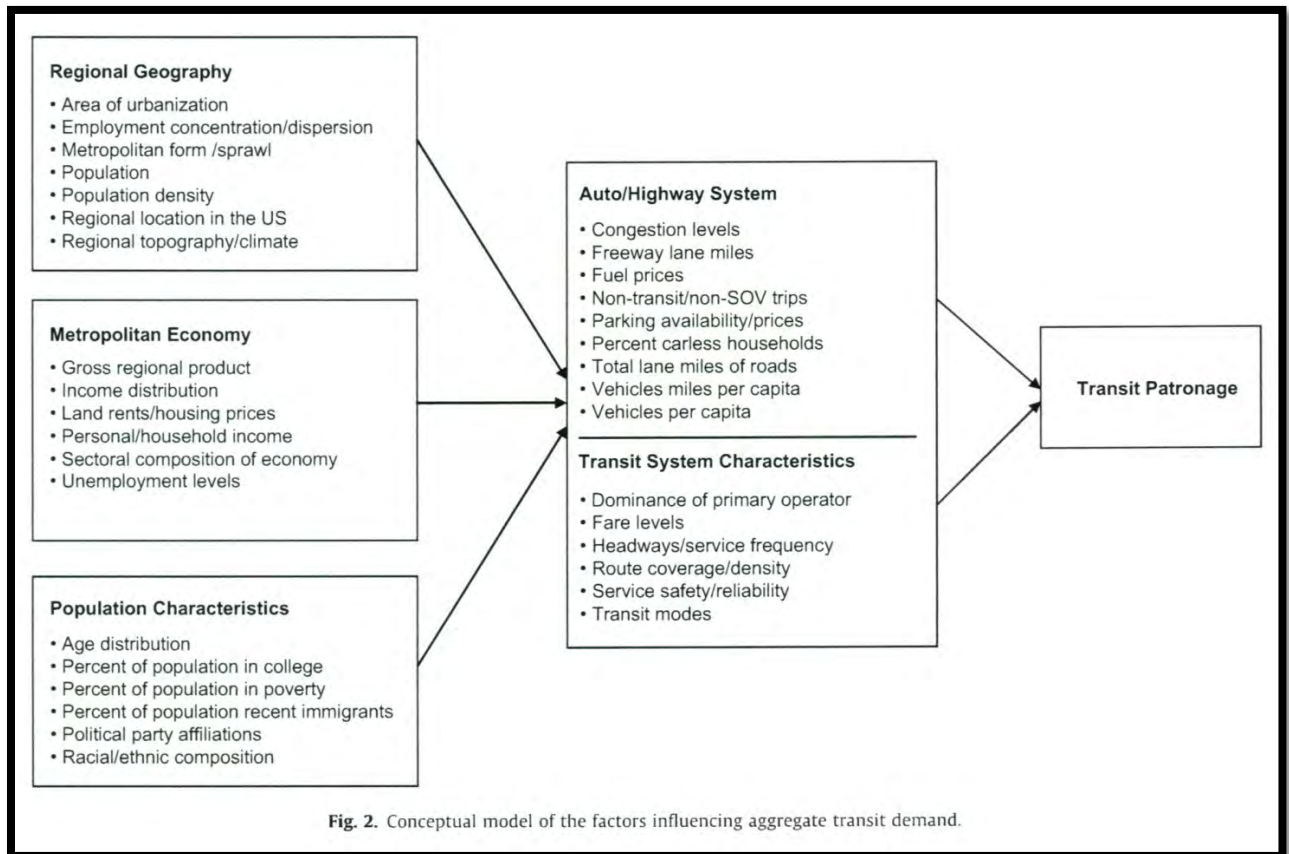
Under any service option, the operational funding is essentially the same. Once a public entity makes application to the Michigan Department of Transportation (MDOT) for funding and can assert that a local match will be met, MDOT will provide operating funds at a percent of budgeted expenses (currently at 37.37% for non-urban systems, but subject to change yearly, up to a maximum of 60%). Federal Section 5311 operating funds are also available (currently at 16%, and traditionally more stable in percentage than state funds). Local funds at approximately 50% are needed to balance. Local funding must be defined prior to receiving state and federal funding. Local funds can come from fares generated by the service, and either local appropriation or dedicated millage funds.

APPENDIX A: RIDERSHIP ESTIMATES

APPENDIX A: RIDERSHIP ESTIMATES

The determination of ridership for public transportation services is complex, whether the type of public transit is traditional fixed route, dial-a-ride or commuter express bus service. Figure A-1 below presents a conceptual view of this complexity. There are no simple models that incorporate all of the variables and their subtle or not-so subtle influences. Even sophisticated and very expensive computer modeling efforts have a wide range of success or lack thereof in providing accurate forecasts. In this section, the methodology used to develop ridership estimates for the potential commuter express bus service options identified in the study is presented.

Figure A-1 Factors Influencing Demand for Transit Service



Source: Taylor, B.D. et al, Nature and/or nurture? Analyzing the Determinants of Transit Ridership across U.S. Urbanized Areas, Transportation Research, Part A (2008).

Figure A-1 is an example of the many factors that may impact demand and ultimately ridership of a transit service. The analysis of transit demand presented in the Needs Assessment conducted for this study addresses several of these factors

- Grand Rapids is the urban center of the region with a population density of over 4,000 persons per square mile;

- None of the other cities and towns in the study area have population densities of more than 2,000 people per square mile;
- Much of the region is rural and farmland;
- Outside of Grand Rapids, commercial and manufacturing are primarily located in Holland and, to a lesser extent, Muskegon;
- The general public survey conducted as part of this West Michigan Transit Linkages Study indicated that most respondents had a travel time to work of between 15 and 25 minutes; and,
- There are few households with no automobiles.

In summary, the demand analysis in the Needs Assessment Report indicates there will be limited demand for regional commuter express transit service. Commuter express service differs from local fixed route service in the following manner:

- Routes are considerably longer.
- Riders access service at the beginning of a route, and at selected intermediate points, followed by a considerable travel distance without stopping for additional riders.
- The destination of most commuter express service is the downtown of a metropolitan area. Other destinations are not served.
- Fares are higher.
- Service is usually limited to peak hours, usually defined as 6 a.m. to 9 a.m. and 3 p.m. to 6 p.m.

Given the lack of empirical research specifically targeted to commuter express service ridership, it is the consultant's professional opinion that the best method to estimate ridership is to examine the 2010 Journey-to-Work data presented in the Needs Assessment Report, the transit mode split in the communities being served,⁴ and the results from the general public survey documented in the Needs Assessment. These findings would then be compared and possibly adjusted with the experience in comparable communities for reasonableness and for the initial level of service proposed. Support for this type of qualitative/judgment based methodology can be found in the Transit Cooperative Research Program (TCRP) Synthesis 66: Fixed-Route Ridership Forecasting and Service Planning methods, which states "...Qualitative forecasting techniques relying on professional judgment and experience continue to be widely used by transit agencies. " Examples cited throughout this synthesis demonstrate that qualitative procedures can involve consideration of a wide variety of factors, often directed toward identifying similar circumstances elsewhere in the transit system that can provide guidance for likely ridership response. Six corridors are being evaluated for possible commuter express transit services in West Michigan. The corridors under consideration, as presented here are:

- A1 - Holland to Grand Rapids via IS 196
- A2 - Holland to Grand Rapids via Chicago Drive
- B1 – Muskegon/Norton Shores/Grand Haven to Holland
- C1 - Muskegon to Grand Rapids
- D1 - Grand Haven to GVSU
- E1 - Holland to GVSU

2010 data on work trip flows for each of the options are presented in Tables A-1 through A-5 (pages 4 through 6).

⁴ Transit mode split refers to the percentage of all trips in an area made by transit.

Table A-1: Options A1 and A2 - Holland/Zeeland to/from Grand Rapids – Major Work Flows

Work Flows	To	To
	Grand Rapids Area	Holland/Zeeland Area
<u>From</u>		
Holland/Zeeland Area	4,847	
Georgetown Area	7,125	
Total	11,972	
<u>From</u>		
Grand Rapids Area		3,691
Georgetown Area		2,292
Total		5,983

Source: U.S. Census Bureau, OnTheMap Application and LEHD Origin-Destination Employment Statistics (Beginning of Quarter Employment, 2nd Quarter of 2010).

Table A-2: Option B1 - Norton Shores/Grand Haven to/from Holland/Zeeland – Major Work Flows

Work Flows	To	To
	Holland/Zeeland & Grand Haven Areas	Muskegon & Grand Haven Areas
<u>From</u>		
Muskegon Area	947	
Grand Haven Area	1,727	
Western Ottawa County	5,610	
Total	8,284	
<u>From</u>		
Holland/Zeeland Area		2,577
Western Ottawa County		1,819
Grand Haven Area		2,320
Total		6,716

Source: U.S. Census Bureau, OnTheMap Application and LEHD Origin-Destination Employment Statistics (Beginning of Quarter Employment, 2nd Quarter of 2010).

**Table A-3: Option C1-Muskegon Area to/from Grand Rapids
– Major Work Flows**

Work Flows	To	To
	Grand Rapids Area	Muskegon Area
<u>From</u>		
Muskegon Area	2,687	
Coopersville	550	
Total	3,237	
<u>From</u>		
Grand Rapids Area		1,164
Coopersville		88
Total		1,252

Source: U.S. Census Bureau, OnTheMap Application and LEHD Origin-Destination Employment Statistics (Beginning of Quarter Employment, 2nd Quarter of 2010).

**Table A-4: Option D1-Muskegon/Grand Haven Area to/from
GVSU – Major Work Flows**

Work Flows	To	To	To
	Allendale	Grand Haven Area	Muskegon Area
<u>From</u>			
Grand Haven Area	253		
Muskegon Area	84		
Total	337		
<u>From</u>			
Allendale		190	151
Total		190	151

Source: U.S. Census Bureau, OnTheMap Application and LEHD Origin-Destination Employment Statistics (Beginning of Quarter Employment, 2nd Quarter of 2010).

Table A-5: Option E1-Holland/Zeeland Area to/from GVSU – Major Work Flows

Work Flows	To	To
	Allendale	Holland/Zeeland Area
<u>From</u>		
Holland/Zeeland Area	240	
Total	240	
<u>From</u>		
Allendale		451
Total		451

Source: U.S. Census Bureau, OnTheMap Application and LEHD Origin-Destination Employment Statistics (Beginning of Quarter Employment, 2nd Quarter of 2010).

The largest commuter trip flows are from Holland/Zeeland to Grand Rapids including the Georgetown area. The second single largest flow is from the Muskegon, Grand Haven, and Western Ottawa County area into the Holland/Zeeland area. There is some work flow from Muskegon area to Grand Rapids (3,237 including Coopersville). The lowest work flows are between Grand Haven area and the Holland/Zeeland area to Allendale.

The second factor to be considered is transit mode split. This is the percentage of all trips served by public transportation. The transit mode split percentage for the areas being considered for service is presented in Table A-6 (below). It should be noted that the mode split number is reflective of use of local transit in these communities. Nevertheless, it provides a reasonable estimate of the actual likelihood of residents to use any kind of transit service. As indicated below, the mode split in the study area communities is less than two percent for every area except Grand Rapids, which is at 3.3 percent.

Table A-6 Mode Split for Transportation Trips in Study Area

Mode of Transportation to Work, 2010 Estimates	Drove Alone		Car Pooled		Public Transportation ²				Other ³	Total
		%		%		%	%			
Muskegon	8,953	78.1%	1,526	13.3%	184	1.6%	802	7.0%	11,465	
Grand Haven	4,109	82.8%	408	8.2%	37	0.7%	409	8.2%	4,963	
Remainder of Metro Muskegon (UZA) ¹	25,768	83.6%	3,096	10.0%	123	0.4%	1,851	6.0%	30,838	
Metro Muskegon (UZA)¹ Total	38,830	82.2%	5,030	10.6%	344	0.7%	3,062	6.5%	47,266	
Holland	11,662	76.4%	1,287	8.4%	171	1.1%	2,137	14.0%	15,257	
Remainder of Metro Holland (UZA) ¹	19,897	84.4%	2,202	9.3%	176	0.7%	1,296	5.5%	23,571	
Metro Holland (UZA)¹ Total	31,559	81.3%	3,489	9.0%	347	0.9%	3,433	8.8%	38,828	
Grand Rapids	65,212	76.7%	8,853	10.4%	2,777	3.3%	8,163	9.6%	85,005	
Allendale Charter Township, total	6,940	80.8%	658	7.7%	183	2.1%	808	9.4%	8,589	
Allendale, inside Metro Grand Rapids (UZA) ¹	3,556	76.1%	356	7.6%	163	3.5%	596	12.8%	4,671	
Allendale, outside Metro Grand Rapids (UZA) ¹	3,384	86.4%	302	7.7%	20	0.5%	212	5.4%	3,918	
Remainder of Metro Grand Rapids (UZA) ¹	131,415	85.2%	12,192	7.9%	1,431	0.9%	9,239	6.0%	154,277	
Metro Grand Rapids (UZA)¹ Total	200,183	82.1%	21,401	8.8%	4,371	1.8%	17,998	7.4%	243,953	
Michigan	3,527,070	82.9%	380,844	8.9%	53,244	1.3%	294,399	6.9%	4,255,557	
¹ The Metro area boundary is the same as the 2010 Urbanized Area (UZA), defined by the U.S. Census Bureau										
² Includes bus or trolley bus, streetcar or trolley car, subway or elevated, railroad, or ferryboat										
³ Includes taxicab, motorcycle, bicycle, walked, other means, or worked at home										
Source: U.S. Census Bureau, 2006-2010 American Community Survey Estimates										

The third factor considered is the results of the general public survey documented in the Needs Assessment which asked respondents their likelihood to use commuter transit service. This information is provided in Table A-7. This information reflects the responses to the question which queried about the likelihood of respondents to use commuter express service during peak hours. There were five possible responses (very likely, likely, neutral, not likely, not at all). The table shows the percent “very likely” to use commuter transit service during peak hours. This should reflect as best as possible that percentage of the “very likely” and “likely” responses which would actually use the service on a regular basis.

Table A-7 Likelihood to Use Commuter Express Service in Peak Hours

Cluster	Answered	Very Likely to use commuter express transit service	Very Likely to use commuter express transit service (percent response)
Grand Haven/Muskegon	381	49	12.9%
Holland	373	27	7.2%
Eastern Ottawa/Grand Rapids	510	34	6.7%
	1264	110	8.7%
No cluster	32	4	12.5%
Total	1296	114	8.8%

Source: Mp2planning; Needs Assessment, West Michigan Transit Linkages Study

The fourth factor in this analysis is the resident location of Grand Valley State University students who live in the study area. As shown in Table A-8 most students live in the Grand Rapids/Allendale area. Slightly over 1,200 students reside in Western Ottawa County, including those in the cities, towns, and villages in the area. It should be noted that there are a number of other colleges in the study area such as Hope College, Grand Rapids Community College Lakeshore Campus, GVSU Meijer Campus, and Davenport University in Holland; Muskegon Community College and Baker College in Muskegon; and several colleges/university extensions in Grand Rapids. Most of the students at these schools are likely commuter students (who usually have outside part-time jobs) or live on or near campus and would not be inclined to use peak hour commuter express transit service.

Table A-8 Resident Location of GVSU Students

GVSU Students by Study Areas	
Allendale Township	5,878
<i>Allendale Township (%)</i>	34.4%
Holland/Zeeland Area	610
<i>Holland/Zeeland Area (%)</i>	3.6%
Grand Rapids Area	5,183
<i>Grand Rapids Area (%)</i>	30.3%
Grand Haven Area	415
<i>Grand Haven Area (%)</i>	2.4%
Coopersville	50
<i>Coopersville (%)</i>	0.3%
Georgetown Township Area	1,819
<i>Georgetown Township Area (%)</i>	10.6%
Muskegon Area	315
<i>Muskegon Area (%)</i>	1.8%
Eastern Ottawa County	340
<i>Eastern Ottawa County (%)</i>	2.0%
Western Ottawa County	322
<i>Western Ottawa County (%)</i>	1.9%
Other Areas in the Study Area	2,176
<i>Other Areas in the Study Area (%)</i>	12.7%
TOTAL (STUDY AREA)	17,108

Source: Grand Valley State University Registrar's Office, Students in Study area registered for Fall, 2012.

Table A-9 presents ridership estimates for transit service based on known quantitative information and judgments concerning the use of the survey data (including only “very likely” as the adjusting factor for the survey results) and the estimated number of Grand Valley State University students living in the origin communities for the potential routes focused on GVSU (Option E).

Table A-9 Ridership Estimates for West Michigan Commuter Transit Service Options

Service Option	Workflow numbers (One-way)	Mode Split Based on U.S. Census Data	Anticipated One-way Passenger Trips per day based on Mode Split	Survey Results Factor	Anticipated One-way Trips per day Adjusted for Survey Results	Annual One-way Passenger Trips based on 249 Weekdays	Annual Two-Way Trips
Route A1 and A2							
From Holland/Zeeland	11,972	0.005	54	1.07	58	14,354	28,707
From Grand Rapids	5,983	0.005	30	1.06	32	7,896	15,792
Subtotal					89		44,499
Route B1							
From Muskegon/Grand Haven to Holland	5479	0.004	19	1.12	21	5,348	10,696
From Holland/ Zeeland	5806	0.005	26	1.07	28	6,961	13,922
Subtotal					49		24,618
Route C1							
From Muskegon area	3,237	0.004	11	1.12	13	3,160	6,319
From Grand Rapids	1,252	0.005	6	1.06	7	1,652	3,305
Subtotal					19		9,624
Route D1							
From Muskegon/Grand Haven	337	0.004	1	1.12	1	329	658
From GVSU/Allendale	190	0.005	1	1.06	1	251	501
From Muskegon/Grand Haven GVSU Students	891	0.004	3	1.12	3	870	1,739
From GVSU/Allendale GVSU Students	576	0.005	3	1.06	3	760	1,520
Subtotal					9		4,419
Route E1							
From Holland	240	0.009	2	1.07	2	575	1,151
From Allendale	451	0.005	2	1.06	2	595	1,190
From Holland GVSU Students	771	0.009	7	1.07	7	1,849	3,698
From Allendale GVSU Students	771	0.005	4	1.06	4	1,017	2,035
Subtotal					16		8,074
Total			170		350	45,617	91,234

Notes

249 weekdays based on 256 weekdays less regular holidays

Mode splits for Western Ottawa cities for commuter express service estimated to be 1/2 local transit mode split.

Mode split for commuter express trips from Grand Rapids area estimated to be one-fourth the Grand Rapids Metro mode split.

Muskegon/Grand Haven and Holland GVSU students based on information in Table A-3 with Western Ottawa County divided between the two.

Work flow numbers for Route B1 assume 50% of Western Ottawa County work trips because the route passes through only two of the four townships that comprise that dataset.

Source: Mp2planning

The estimates of annual ridership, as presented in Table A-8, are as follows:

- A1/A2 – Holland to Grand Rapids – 44,499
- B1-Norton Shores/Grand Haven to Holland – 24,618
- C1-Muskegon to Grand Rapids – 9,624
- D1-Muskegon/Grand Haven to GVSU – 4,419
- E1-Holland to GVSU – 8,074

As noted above, the factors used for this analysis were used so that a systematic approach could be used for each option.

Table A-10 below presents experience of comparable communities having express routes coming from outside the metro area. Generally, the productivity of the service ranges from 5 to 24 passengers per hour.

Table A-10 Experience of Comparable Communities

		City Population	City Population Density	CBD Employment	Commuter Express Riders Per Hour
	Bay City (Rt #1)	33,780	3,537	4,235	5
	Canton to Akron				
	SARTA Rt #81				24
	Akron	199,110	3,208		
	Canton	73,007	3,932		
	Grand Rapids	188,040	4,343	21,944	NA
	Madison WI	233,309	3,396		
	Rt. #48 Fitchburg Commuter				12
	Louisville, KY (TARC)				12, 22
	Lansing MI	233,209	3,037		
	Rt #46 Mason				16
	Rt #48 Williamson				10

Source: Mp2planning

Table A-11 below presents an assessment of the productivity of the proposed routes in terms of passengers per hour. These fall in the range of the peer communities and, in the consultant’s professional judgment, are considered reasonable.

Table A-11 Productivity Estimates for Each Commuter Express Option

Routes	Annual Vehicle Hours	Ridership Estimates and Productivity	
		Estimated Riders	Productivity
A1- Holland to Grand Rapids via I-196	2,988	26,700	9
A-2-Holland to Grand Rapids via Chicago Drive	3,237	17,800	5
B1-Muskegon/Grand Haven to Holland	3,486	24,618	7
C1-Muskegon to Grand Rapids	3,237	9,624	3
D1-Muskegon/Grand Haven to GVSU	3,486	4,419	1
E1-Holland to GVSU	2,490	8,074	3
Total	18,924	91,235	5

Note: Productivity is measured in terms of passenger trips divided by annual vehicle hours.

Source: Mp2planning

Table A-12 provides extended forecasts for potential ridership for the proposed routes. These are based on population growth projections for the origin areas of each option based on projections from the West Michigan Regional Planning Commission, the West Michigan Regional Shoreline Development Commission, and the Macatawa Area Coordinating Council.

Table A-12 Long Range Ridership Estimates

	2013	2018	2023	2033
		Projected Ridership		
Option	Base Year Ridership	Base+5	Base+10	Base+20
A1/A2 from Holland	28,707	29,273	29,839	30,972
A1/A2 from Grand Rapids	15,792	16,900	18,007	20,223
A1/A2 Total	44,499	46,173	47,847	51,195
B1 from Muskegon + Grand Haven	24,618	24,926	25,241	25,880
C1 from Muskegon	9,624	9,681	9,737	9,967
D1 from Muskegon + Grand Haven	4,419	4,474	4,531	4,646
E1 from Holland	8,074	8,233	8,392	8,711
Total All Options	91,234	93,487	95,749	100,398
Percentage Growth		2.5%	2.4%	10.0%

Source: Mp2planning, using population projections extracted from Traffic Analysis Zone data from the West Michigan Regional Planning Commission, the West Michigan Regional Shoreline Development Commission, and the Macatawa Area Coordinating Council.