KENT COUNTY TRANSIT NEEDS ASSESSMENT

TECHNICAL MEMORANDUM #3

TRANSIT SERVICE ALTERNATIVES

JANUARY 14, 2011

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INTRODUCTION

Introduction

The Kent Count Transit Needs Assessment is being conducted in an eight step process. After the initial project "kick-off' meeting with GVMC staff and the Study/Technical Team, a review of recent transportation studies in the Kent County vicinity was conducted. Following this, an assessment of the existing transportation services in Kent County was performed. This assessment included information about the existing transportation services, costs, and ridership. The core task in this study is a transportation needs assessment and latent demand estimation. The findings of this task are summarized in Technical Memorandum #2. Potential transit services options have been developed and are summarized in Technical Memorandum #3. A range of implementable service options are presented. Based on an analysis of the transit service options, a feasibility analysis of the proposed services will be conducted. Public and community input will be sought when this analysis is completed.

This is the third in a series of reports that will comprise the Kent County Transit Needs Assessment. As mentioned above, Technical Memorandum #3 includes service alternatives with accompanying demand estimates and organizational alternatives.

SERVICE ALTERNATIVES

Several transit service improvements were defined for the study area. A major source for the fixed route portion of the service alternatives is The Rapid's *Transit Master Plan* that was completed in July 2010. Other sources for these alternatives include ideas and suggestions made at Steering Committee meetings and public forums, as well as an analysis of services provided in peer cities.

COMMUTER EXPRESS

Park and ride lots throughout the county provide support for express service to downtown Grand Rapids. Express bus routes from park and ride locations to downtown Grand Rapids also provide the opportunity to connect with other Rapid routes at its downtown transit center.

Several potential express routes have been identified. These would utilize park and ride lots to provide peak hour trips to and from downtown Grand Rapids. Initially, a minimum of three morning inbound trips and three afternoon outbound trips would be provided for each express route. Inbound trips would be scheduled to serve shift times that begin at 8:00 a.m., 8:30 a.m., and 9:00 a.m. Outbound afternoon trips would serve work times ending at 4:30 p.m., 5:00 p.m., and 5:30 p.m. Potential locations are described below.

Cedar Springs/Rockford

This route would operate mostly along US 131 from an existing park and ride lot located at 17-Mile Road and US 131 in Cedar Springs. It would also stop at a new park and ride lot at 10-Mile Road and US 131 near Rockford before arriving in downtown Grand Rapids.

Ada/Lowell

These express trips to downtown Grand Rapids would run along Fulton Street (M 21), I-96, and I-196. It would serve an existing park and ride lot in Lowell and a new park and ride lot in Ada in the vicinity of Fulton Street and Ada Drive.

Byron/Gaines

This route would run between a stop in the vicinity of US 131 and 68th Street and downtown Grand Rapids mostly along US 131. A park and ride lot in this vicinity would need to be provided.

Caledonia/Cascade

An express route serving two park and ride lots in Caledonia and Cascade Townships would operate mostly along I-96 and I-196 to and from downtown Grand Rapids.

Exhibit II-1 shows the location of possible park and ride lots serving these commuter express routes. A 2.5 mile distance from the park and ride locations was used to estimate the population within its service area. This is the assumed distance that passengers would be willing to travel to access an express bus route, which is about a five minute drive. The park and ride lots located in Gains and Byron Townships have nearby block groups with the highest population, 2,497 people and over. The remaining park and ride lots have nearby block groups with 1,470 to 2,496 individuals. Only the park and ride lot located in Caledonia Township does not contain a block group with over 1,469 people.

Exhibit II-2 depicts a potential alignment for the downtown Grand Rapids portion of these express routes. This alignment is designed to serve medical facilities from Michigan Avenue, Grand Valley Community College, as well as the core of downtown Grand Rapids.

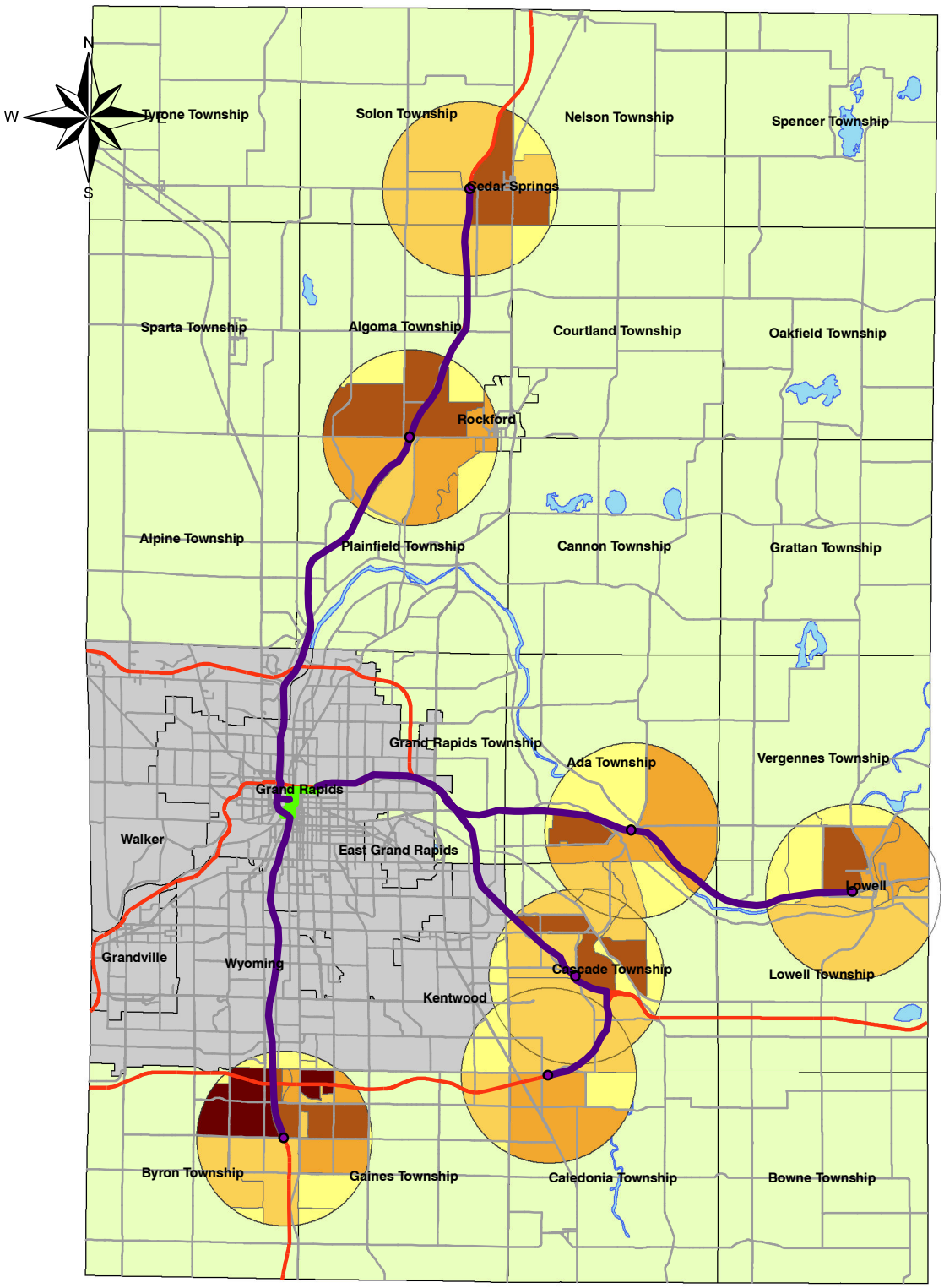
Exhibit II-3 includes a profile of the four proposed commuter express routes. Each would operate during the weekday peak hours with three morning inbound trips and three afternoon return trips. Estimated vehicle requirements, revenue hours, and revenue miles are included for each route.

Exhibit II-4 summarizes the estimated population that currently live within 2.5 miles of the current or proposed park and ride location. The table shows that the park and ride located in Byron and Gains Townships is estimated to have the largest population, with 19,196. The second largest population is at the Cascade Township park and ride, with 8,021. This is paired with the Caledonia park and ride which together have a route total of 12,355. The Ada Township park and ride serves an estimated population of 7,511, and Lowell serves an estimated 6,332 individuals for a route total of 13,843. The third highest population is in the vicinity of the Rockford park and ride lot, with 7,980. With the Cedar Springs park and ride serving a population of 5,457, the Rockford/Cedar Springs route totals 13,437 persons within its service area.

Exhibit II-4
Population Served by Express Bus Service

Commuter Express Park and Ride	
Location	**Population Within 2.5 Miles**
Cedar Springs	5,457
Rockford	7,980
Route Total	*13,437*
Ada Townships	7,511
Lowell	6,332
Route Total	*13,843*
Byron/Gaines Townships	19,196
Route Total	*19,196*
Caledonia Township	4,334
Cascade Township	8,021
Route Total	*12,355*

Exhibit II-1
Proposed Park and Ride Locations



Total Population

- Park and Ride Lot
- Downtown Alingment
- Express Routes
- 10 - 400
- 401 - 923
- 924 - 1469
- 1470 - 2496
- 2497 - and over

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Exhibit II-2
Express Downtown Alignment

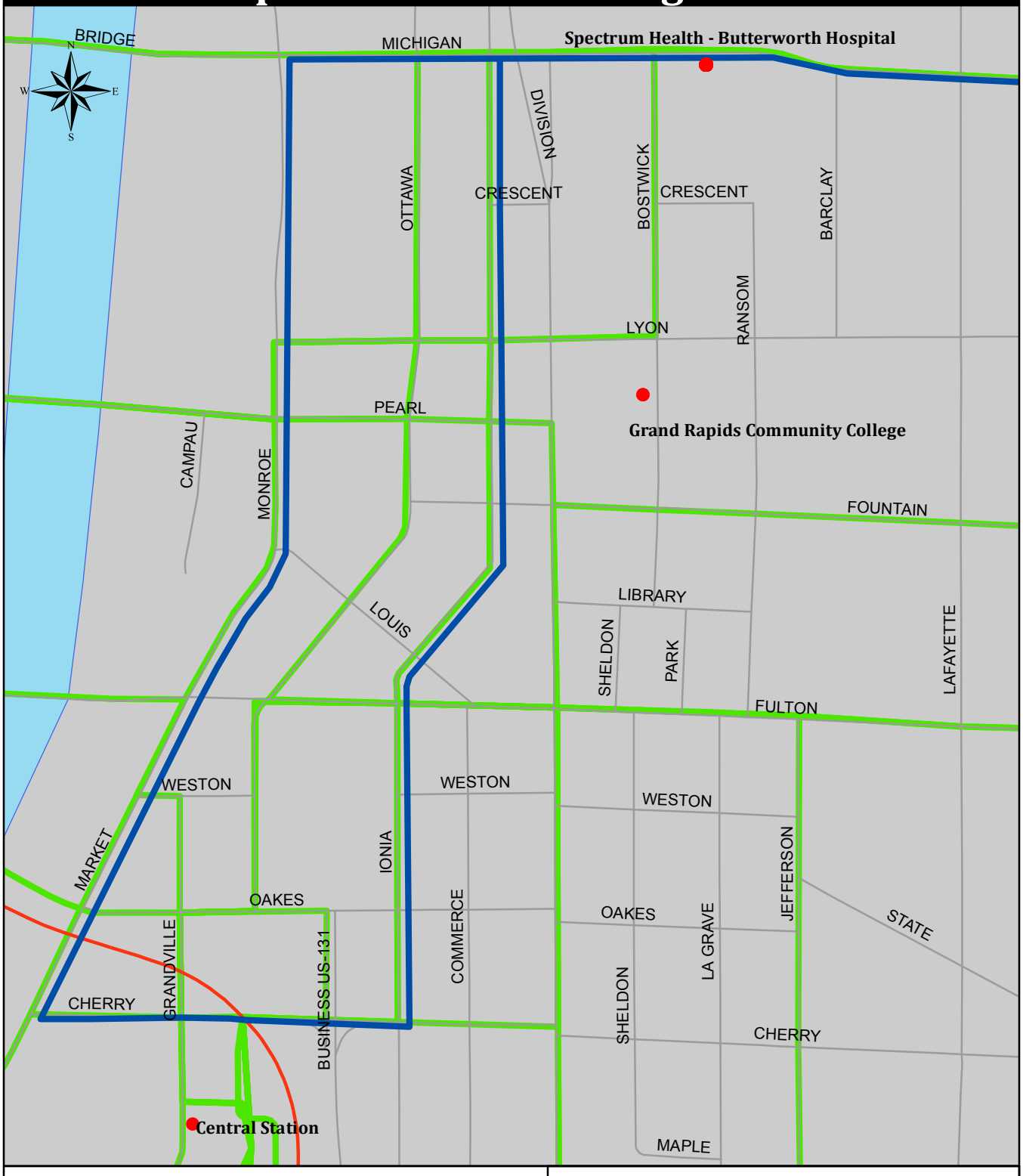

Exhibit II-3
Proposed Express Route Profile

Route	Service Span			Vehicle Required					Frequency					Revenue Hours			Revenue Miles		
	Weekday	Sat.	Sun.	PK	MD	Eve.	Sat.	Sun.	PK	MD	Eve.	Sat.	Sun.	Wday	Sat.	Sun.	Wday	Sat.	Sun.
Cedar Springs/Rockford	7:15a-8:45a 4:45p-6:15p	--	--	2	--	--	--	--	30	--	--	--	--	4.2	--	--	127.2	--	--
Ada/Lowell	7:15a-8:45a 4:45p-6:15p	--	--	2	--	--	--	--	30	--	--	--	--	3.8	--	--	114.0	--	--
Byron/Gaines	7:15a-8:45a 4:45p-6:15p	--	--	2	--	--	--	--	30	--	--	--	--	3.6	--	--	108.0	--	--
Caledonia/Cascade	7:15a-8:45a 4:45p-6:15p	--	--	2	--	--	--	--	30	--	--	--	--	2.3	--	--	69.0	--	--

ROUTE EXTENSIONS AND NEW ROUTES

Route extensions and new routes are designed to meet the needs of individuals outside of the existing service area. A number of proposed new routes and route extensions were identified in the *Rapid Master Plan*. It is assumed that a basic level of service be provided on these extensions mostly consisting of 30 minute frequencies from 5:00 a.m. to 6:00 p.m. on weekdays and Saturdays.

Route 16 - Metro Health to Byron Center

This is a three mile extension of Rapid Route 16 from its current terminus at the Metro Health Center along Byron Center Avenue to the vicinity of 84th Street.

Route 10 - Clyde Park to 76th Street

This extension is 2.5 miles in length extending from the current Route 10 terminus at the Meijer Shopping Center at Clyde Park Avenue and 52nd Street to 76th Street.

Route 1 - Division to 76th Street

This route would be extended from 68th Street along Division Avenue to 76th Street in Gaines Township. This extension is 0.9 miles.

Route 4 - Eastern to 76th Street

This is a two mile extension along Eastern Avenue from 60th Street to 76th Street into Gaines Township.

Route 2 - Kalamazoo to Gaines Marketplace

This is a three mile extension from 44th Street to Gaines Marketplace in Gaines Township north of 68th Street.

Route 9 – Alpine Avenue/Belmont/Rockford

Route 9 currently ends at Alpine and Lamoreaux Drive. This extension would run along Lamoreaux Drive to Comstock Park, continue north on West River Road to Belmont, and continue north on Belmont Avenue and 10-Mile Road to Rockford. Overall, this would add 12.6 miles to this route.

Route 11 – Plainfield Avenue

This extension would restore the part of the Route 11 that used to operate in Plainfield. This proposal would extend this route to Northland Drive.

Route 28 – 28th Street/Cascade

Route 28 is an east-west crosstown route. This is a 3.5 extension of Route 28 west into Cascade Township.

East Fulton Street/Ada

Local service along Fulton Street to Ada is not contemplated to be an extension of any Rapid route. Instead, this would be a new route that would run between Ada and Downtown Grand Rapids.

Rockford/East Beltline

This route would run between Rockford and a proposed satellite transfer center in the vicinity of East Beltline and Knapp.

60th Street/68th Street Circulator

This route would serve the northern portion of Gaines Township. It would operate mostly along 60th and 68th Streets between Division and Kraft Avenues.

Exhibit II-5 is a profile of the proposed route extensions and new routes. With the exception of the Route 28 extension, these route extensions and routes would operate generally between 5:00 a.m. and 6:00 p.m. on weekdays, and between 5:30 a.m. and 6:00 p.m. on Saturdays, depending on the current schedule. During other times, routes with proposed extensions would operate its current alignment. Frequencies would mostly be 30 minutes on weekdays and 60 minutes on Saturdays. On routes that have 15 minute or other frequencies, short turns will be necessary.

Traffic Analysis Zone (TAZ) data were used to show the population density within ¾ mile of these route extensions. Exhibit II-6 shows this information. Alpine, Gains and Byron Townships have TAZs with the highest population density, with over 4,561 persons per square mile. The City of Rockford and Plainfield Township had the second highest density, with areas of the population ranging from 2,560 to 4,561 persons per square mile. Cascade Township had TAZs in the third highest population range of 1,508 to 2,559 persons per square mile.

Exhibit II-7 shows the 65 and over population density by block group within ¾ mile of the proposed route extensions. Gains, Plainfield, and Alpine Townships show the highest densities of individuals 65 and over. Block groups in these areas have densities of 828 to 1,709 persons per square mile. Block groups in Gains Township have 65 and older densities greater than 1,709. The majority of areas along route extension corridors have densities ranging from 14 to 500.

The density of zero vehicle households along the route extension corridors is shown in Exhibit II-8. The areas with the highest densities, over 163 zero vehicle households per square mile, are located in Alpine, Plainfield, and Gains Townships. Areas in the city of Rockford, Alpine, and Gains Townships have block groups with the second heights densities, of 94 to 163. Several areas with densities between 42 and 93 are found in Rockford.

Exhibit II-5
Proposed Route Extension Profile

Route	Service Span			Vehicle Required					Frequency					Revenue Hours			Revenue Miles		
	Weekday	Sat.	Sun.	PK	MD	Eve.	Sat.	Sun.	PK	MD	Eve.	Sat.	Sun.	Wday	Sat.	Sun.	Wday	Sat.	Sun.
Route 16 - Byron Center	5:17a-6:00p	5:32a-6:00p	--	1	1	--	1	--	30	30	--	60	--	12.7	12.5	--	157.5	155.0	--
Rooute 10 - 76th Street	5:11a-6:00p	5:41a-6:00p	--	1	1	--	1	--	30	30	--	60	--	12.8	12.3	--	102.4	98.4	--
Route 1 - 76th Street	5:00a-6:00p	5:23a-6:00p	--	1	1	--	1	--	30	30	--	60	--	13.0	12.6	--	52.0	50.4	--
Route 4 - 76th Street	4:35a-6:00p	5:20a-6:00p	--	1	1	--	1	--	30	30	--	60	--	13.4	12.6	--	107.2	100.8	--
Route 2 - Gaines Marketplace	4:48a-6:00p	6:53a-6:00p	--	1	1	--	1	--	30	30	--	60	--	13.2	11.1	--	52.8	44.4	--
Route 9 - Rockford	4:33a-6:00p	5:06a-6:00p	--	4	4	--	2	--	30	30	--	60	--	50.0	23.8	--	1200.0	571.2	--
Route 11 - Plainfield Avenue	5:13a-6:00p	5:31a-6:00p	--	1	1	--	0.5	--	30	30	--	60	--	12.8	12.5	--	99.8	97.5	--
Route 28 - Cascade	5:30a-11:31p	7:07a-10:37p	--	1	1	0.5	0.5	--	30	30	60	60	--	18.0	15.5	--	144.0	124.0	--
New Route - East Fulton/Ada	6:00a-6:00p	6:30a-6:00p	--	4	4	--	2	--	30	30	--	60	--	44.0	21.0	--	352.0	168.0	--
New Route - Rockford/East Beltline	6:00a-6:00p	6:30a-6:00p	--	1	1	--	1	--	60	60	--	60	--	12.0	11.5	--	96.0	92.0	--
New Route - 60th/68th Street	6:00a-6:00p	--	--	1	1	--	--	--	60	60	--	--	--	12.0	--	--	96.0	--	--

Exhibit II-6
Route Extension Corridors - Population Density

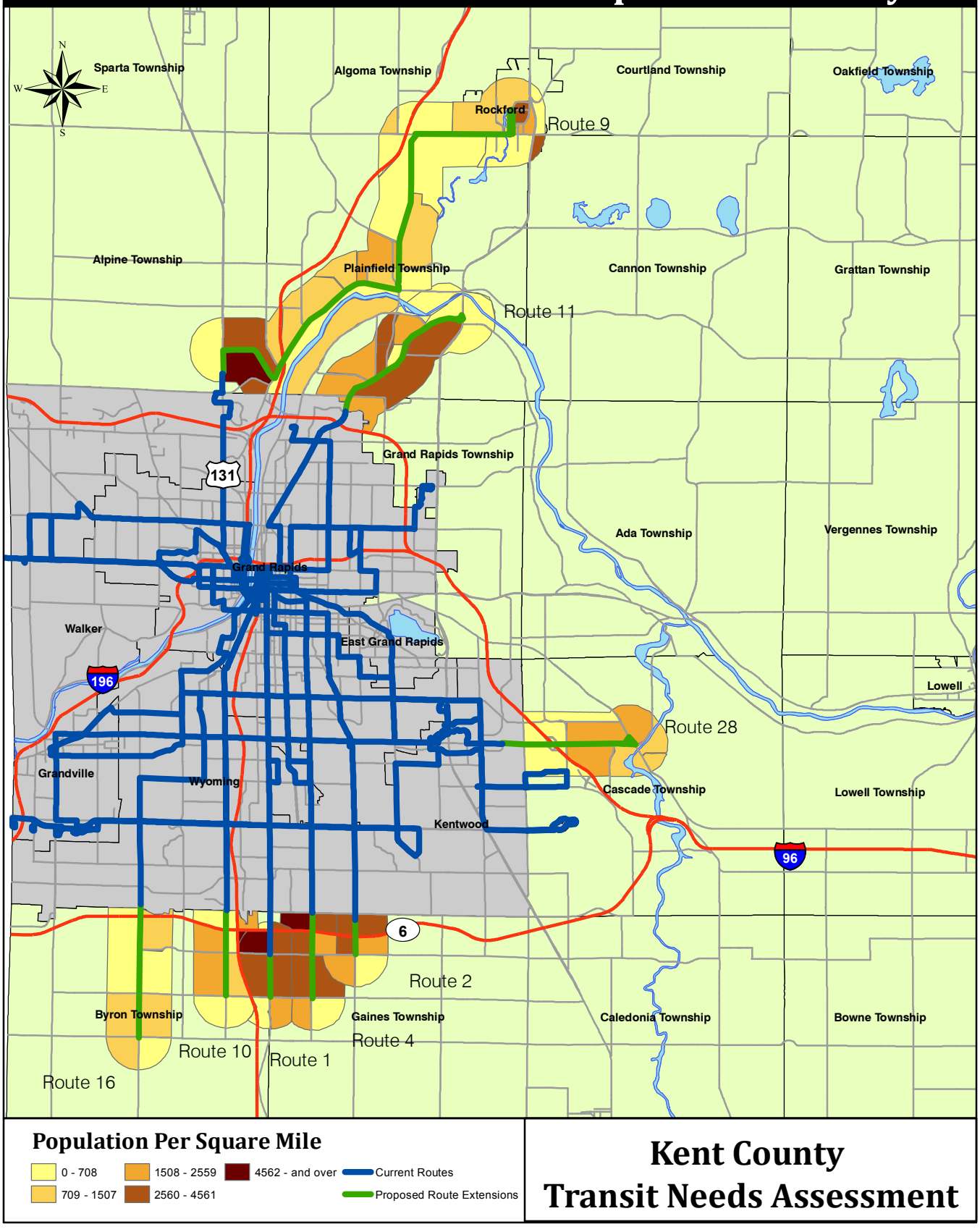

Exhibit II-7
Route Extension Corridors - 65 and Over Population

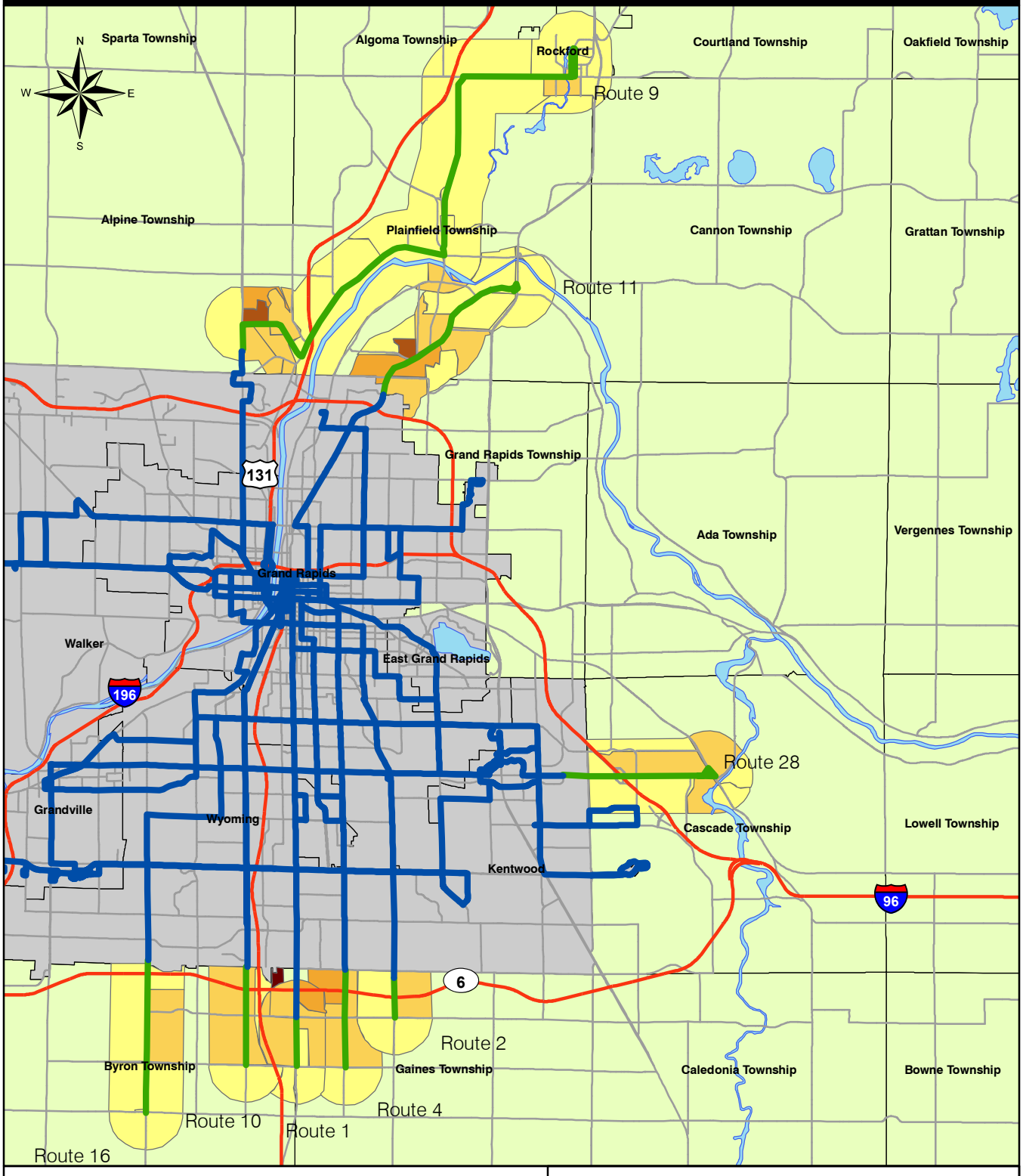

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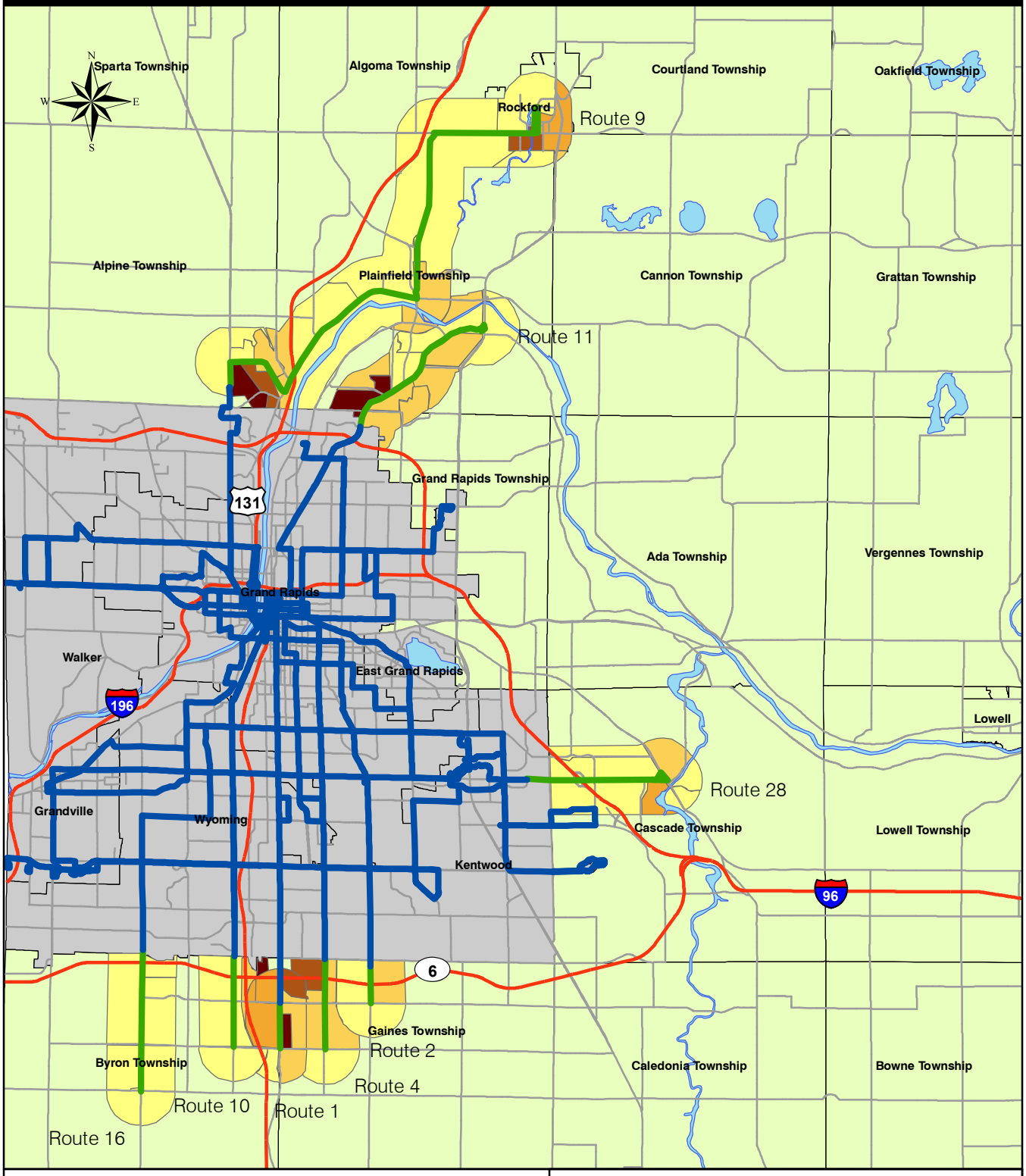
Exhibit II-8
Route Extension Corridors - Zero Vehicle Households



Zero Vehicle Households Per Square Mile

0 - 13 | 14 - 41 | 42 - 93 | 94 - 163 | 164 - and over

Curent Routes

Proposed Route Extensions

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The map in exhibit II-9 shows the households below poverty densities in the area of the proposed route extensions. The areas with the greatest densities are located in Alpine, Bryon, Plainfield, and Gaines Townships. These townships have block groups with over 156 households below the poverty line per square mile. The second highest densities are located in the City of Rockford and in Plainfield Township. These block groups have a density between 556 and 156 poverty level households per square mile.

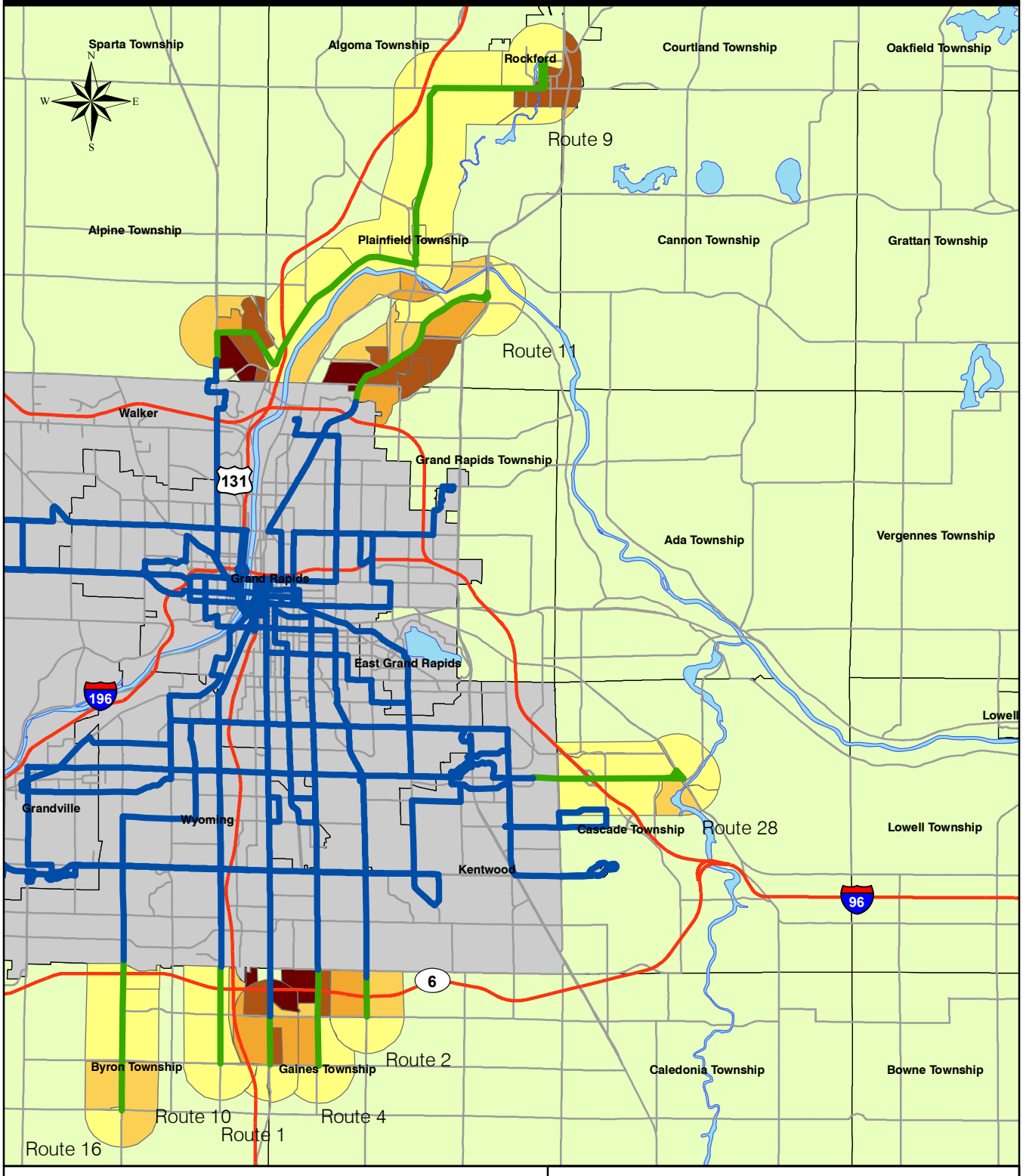
Exhibit II-10 shows the population density for the portions of the TAZ that are within ¾ mile of these proposed routes. The Plainfield Route has the highest population density, with TAZs containing over 4,561 people. Both routes have zones with densities between 2,560 and 4,561 and zones with between 1,508 and 2,559. These zones are distributed throughout the routes with no one area of concentration.

The map in exhibit II-11 shows the population density of individuals 65 and older within the proposed routes. The map shows a concentration in the area surrounding Rockford. There are block groups in Rockford with densities over 1,709 individuals 65 and older, as well as several block groups with densities ranging from 828 to 1,709. The proposed route along East Beltline has areas of slightly lower densities. However there are still block groups with densities ranging from 828 to 1,709 and between 213 and 500 on that route.

Exhibit II-12 shows the densities of zero vehicle households within ¾ mile of the proposed routes. The proposed route to Ada Township has the highest concentrations of zero vehicle households located just outside of the existing Rapid service area. Most block groups in this area have a density between 94 and 163, with the mostly densely populated block group having over 163 households per square mile with no vehicle. The proposed route to Rockford has the highest concentration of zero vehicle households in the Rockford area. These block groups have between 37 and 58 households and between 59 and 156 0-vehicle households.

Exhibit II-13 shows the densities of households below the poverty line for the proposed routes. These routes all contain block groups with 31 to 58 households below the poverty level. The proposed route through Plainfield contain block groups of higher densities, ranging from 59 to 156 households per square mile under the poverty level.

Exhibit II-9
Route Extension Corridors - Households Below Poverty Level



Households Under The Poverty Level Per Square Mile

0 - 12 | 13 - 30 | 31 - 58 | 59 - 156 | 157 - and over

Current Routes

Proposed Routes

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Exhibit II-10
Proposed Route - Population Density

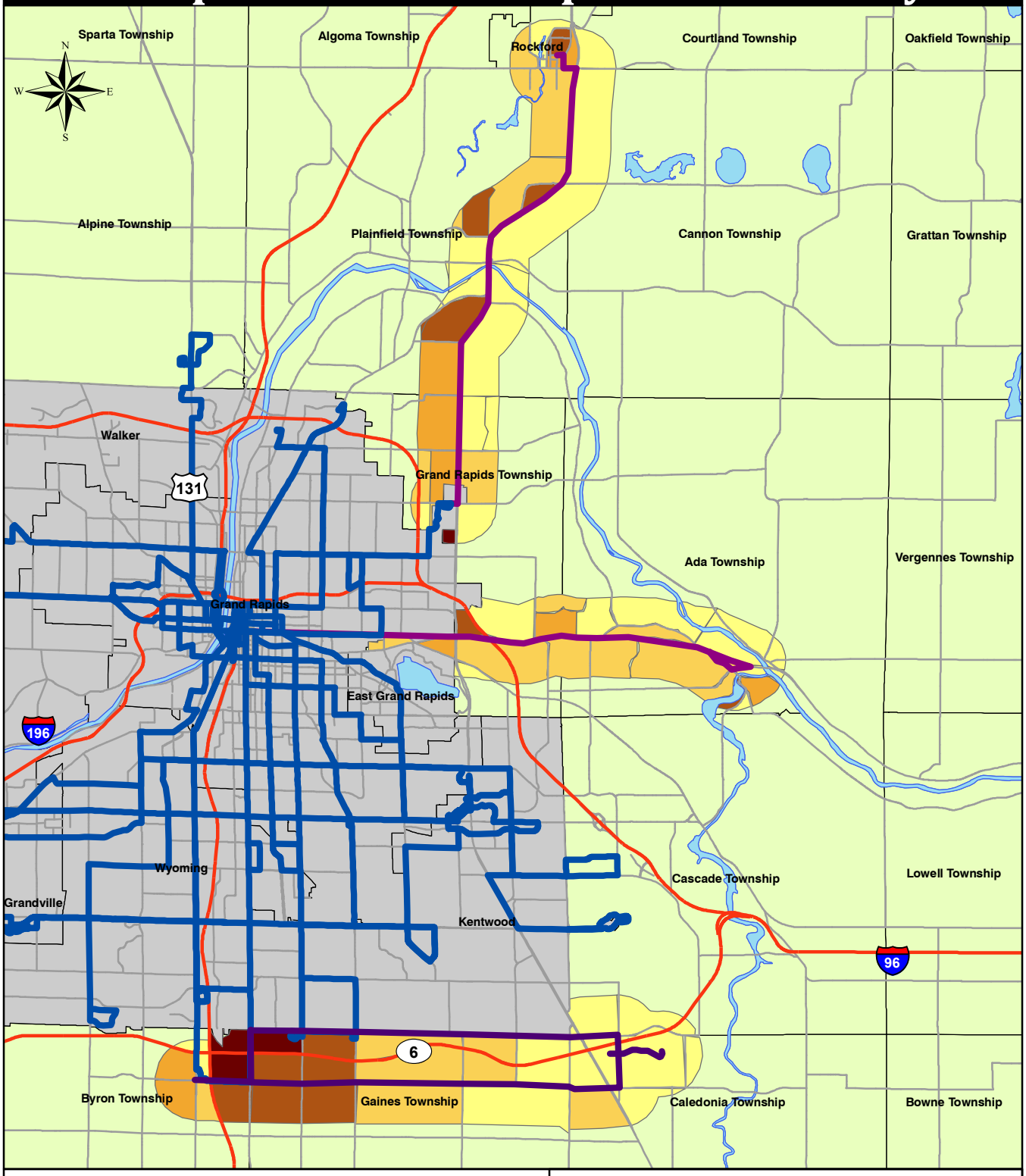

Exhibit II-7
Route Extension Corridors - 65 and Over Population

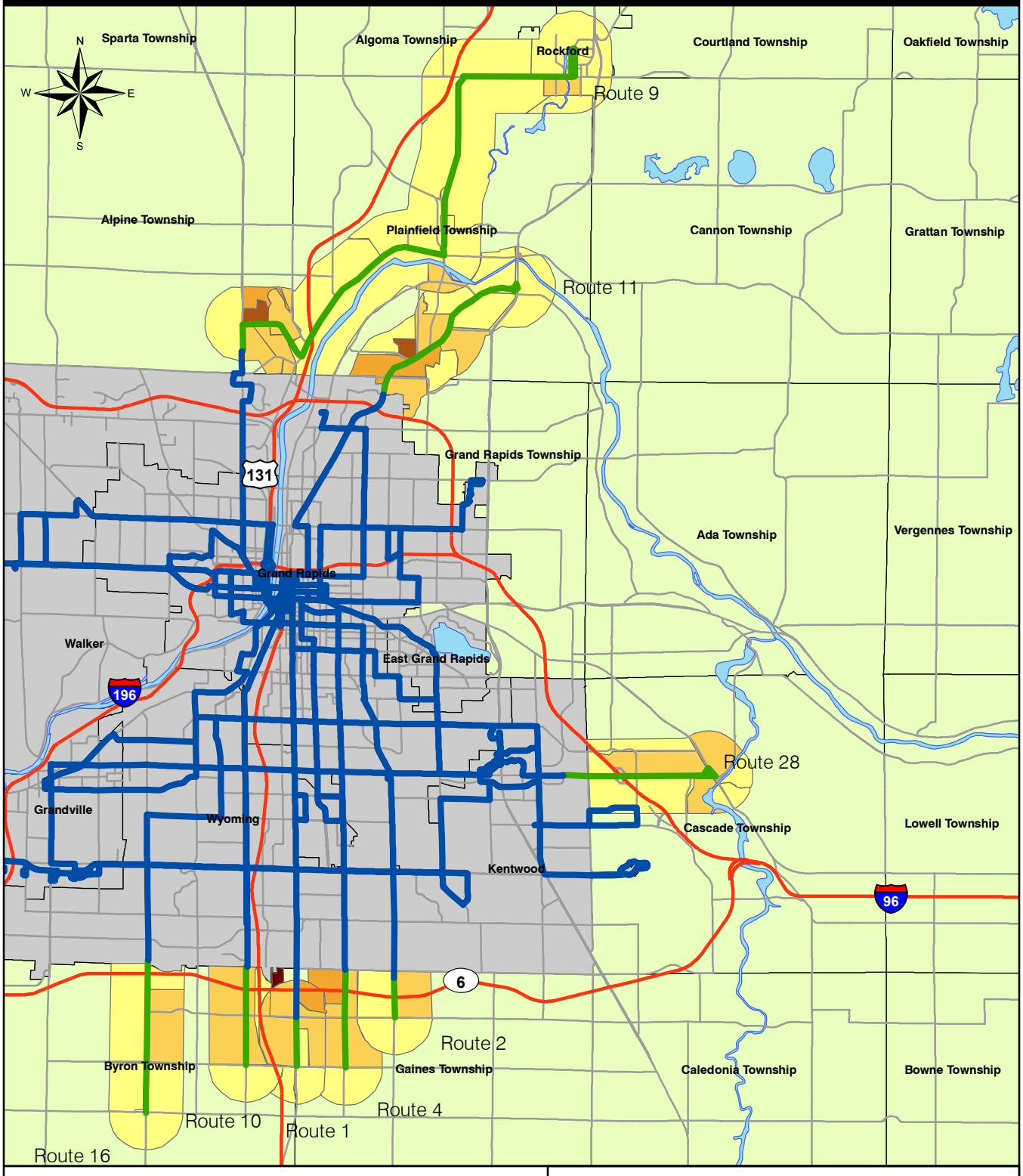

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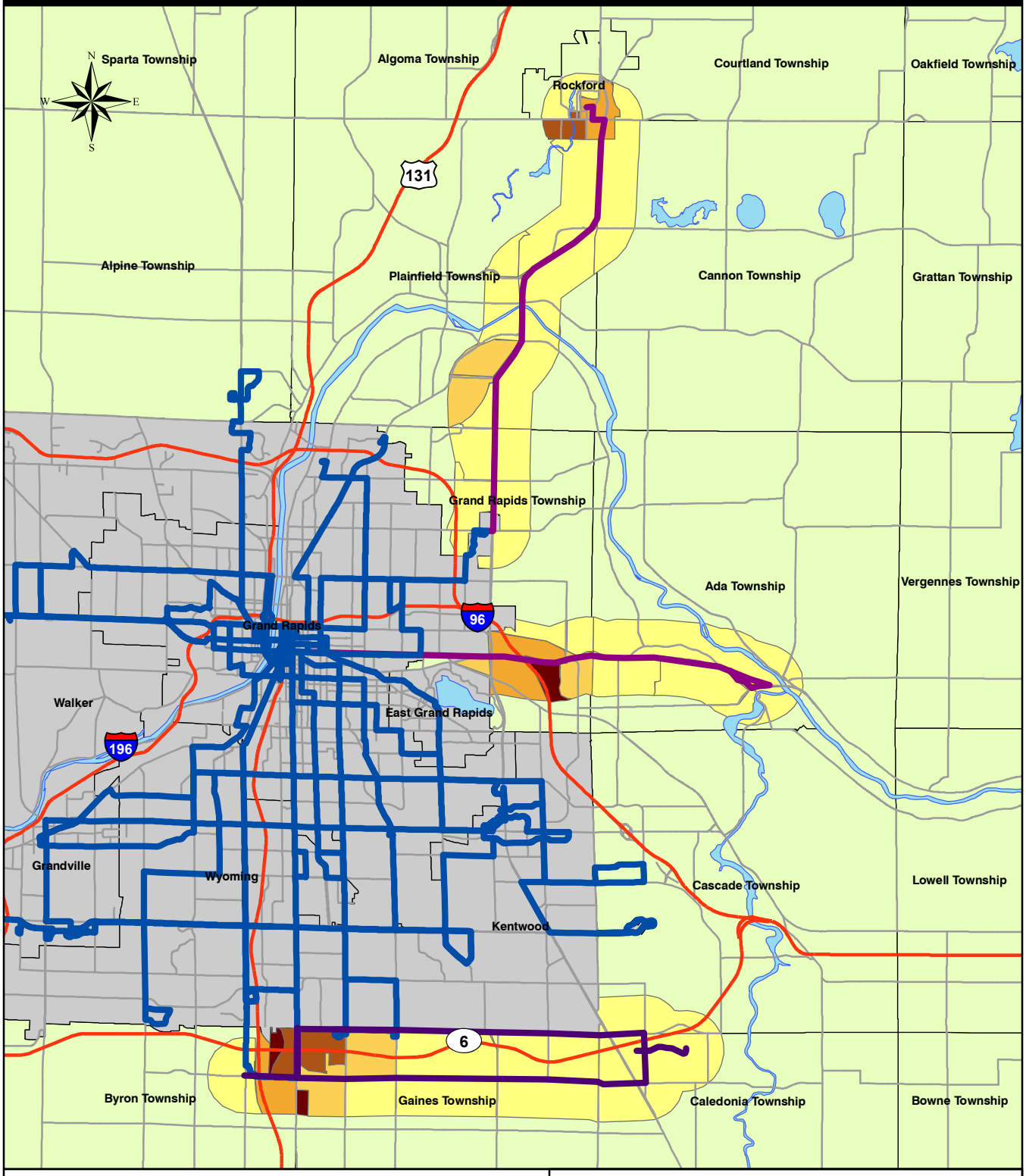
Exhibit II-12
Proposed Routes - Zero Vehicle Households



0V Households Per Square Mile

0 - 13 | 14 - 41 | 42 - 93 | 94 - 163 | 164 - and over

Current Routes

Proposed Routes

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Exhibit II-13
Proposed Routes - Poverity Level Hosueholds

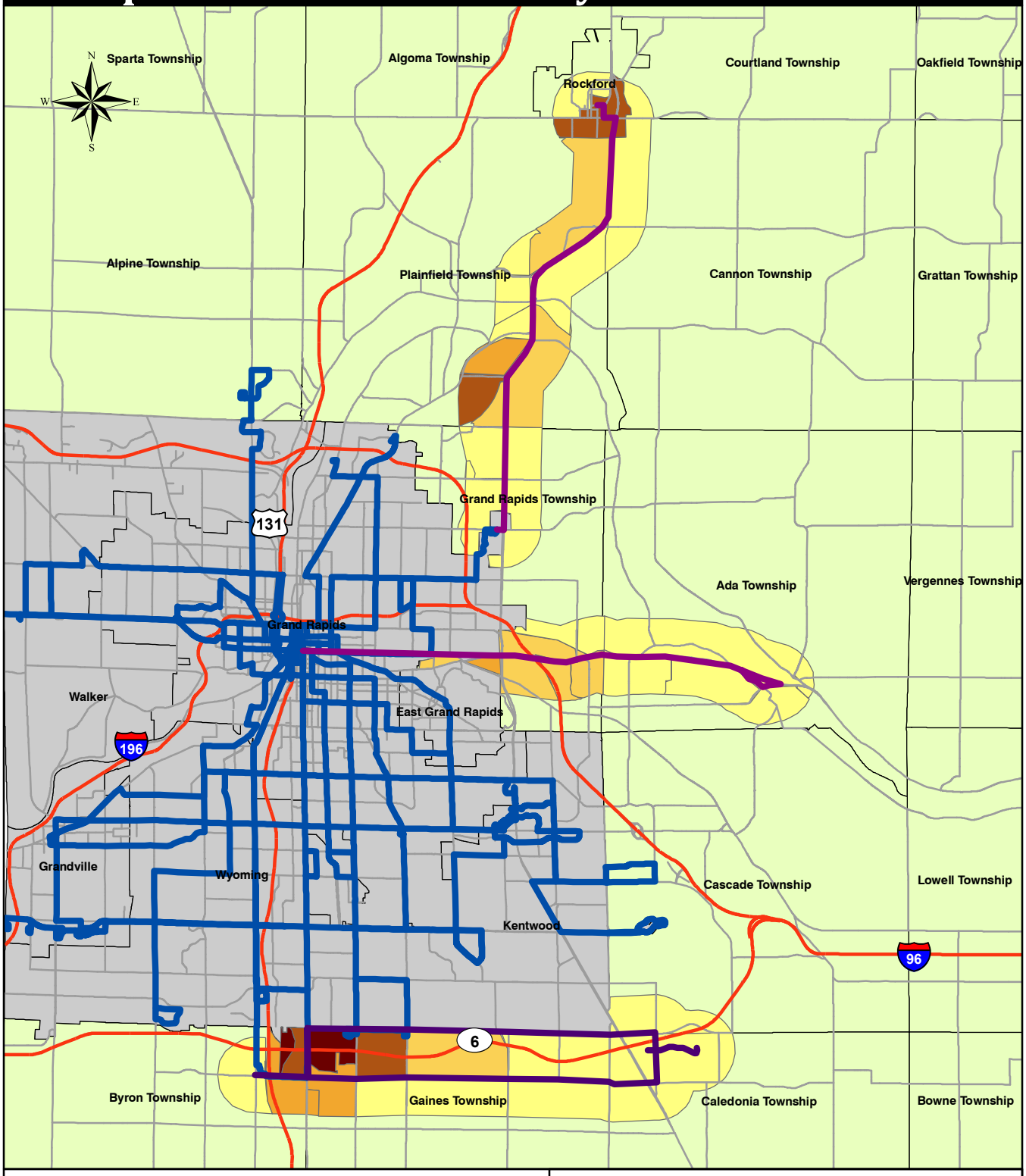


Exhibit II-14 summarizes the demographic data within 3/4th mile of the three new routes and eight route extensions. The 60th/68th Street circulator would serve the greatest population, over 65 population, and zero vehicle households; the Route 4 extension would serve the greatest average population density; and the Route 9 extension would serve the greatest number of poverty level households.

Exhibit II-14
Demographic Data for Proposed New Routes and Route Extensions

Proposed Route Extension	Population	Population Density	Over 65	0-Vehicle Households	Poverty Level Households
Route 16	4,008	760	561	34	45
Route 10	4,235	609	818	29	37
Route 1	7,149	2,770	723	160	180
Route 4	8,442	3,047	785	95	147
Route 2	4,888	2,153	499	24	61
Route 9	23,448	1,284	2,349	321	485
Route 11	13,641	1,963	1,464	198	319
Route 28	4,945	1,050	967	64	35
Rockford/E. Beltline	20,258	1,167	1,863	237	323
East Fulton/Ada	8,730	925	1,462	241	66
60th/68th Street	25,961	1,485	2,937	333	447

DEMAND RESPONSE SERVICE IMPROVEMENTS

A countywide demand response service would provide a door to door service from any point in the county to any destination in the county. This service would operate during normal service hours and offer the flexibility of door to door service. Two types of demand response service are described. One would be open to the general public similar to the current County Connection service. The other would be limited to seniors and disabled persons.

Countywide General Public

Countywide general public service is currently open to all residents of Kent County under the County Connection program. People who are eligible for GO!BUS complimentary paratransit service under the Americans With Disabilities Act (ADA) would also eligible for County Connection service. The service area for ADA paratransit service is limited to ¾ of a mile from the fixed routes. The service area for County Connection encompasses all of Kent County.

Under this alternative, the County Connection policies and procedures would be modified and the service expanded. This would include service hours, fares, eligibility, and access policies.

Service Hours

Service hours would be the same as The Rapid's fixed route hours. These will vary by route but are generally provided weekdays from 5:00 a.m. to 11:00 p.m., Saturdays from 5:00 a.m. to 10:00 p.m., and Sundays from 6:00 a.m. to 7:00 p.m.

Eligibility

All residents of Kent County would continue to be eligible for countywide service. However, special discounts for seniors and disabled persons would be implemented.

Fare Structure

The following fare structure is assumed for this alternative.

$5.00 Adult Cash Fare: The fare paid by an individual who is not registered as a senior or passenger with a disability.

$4.00 Reduced Fare Demand Response: The fare paid by a certified senior citizen or person with a disability for a demand response trip.

$3.00 ADA GO!BUS Fare: The fare paid by an individual certified as ADA eligible within the Rapid fixed route service area.

Children who are accompanied by an adult would ride for free.

Operating Policies

For most riders the service would be curb-to-curb, the same as the current County Connection service. However, a door-to-door option would be offered. Passengers who need additional assistance due to their disability can request door-to-door service. Drivers will assist door-to-door certified passengers from the first entry door of the passenger's pick-up address into the vehicle and from the vehicle to the first entry door of the passenger's destination address when requested. To receive door-to-door service, passengers must be certified by The Rapid.

Countywide Service for Seniors and Disabled Persons

This would be a new program designed to serve seniors and persons with disabilities. It would incorporate the policies and fares of the expanded County Connection service described above, with the exception that it would only be open to persons over 60 years of age and those with a disability.

DEMAND ESTIMATES

A number of techniques were used to estimate the demand for the various service alternatives presented in this section. These are described below.

Commuter Express Service

Peer Analysis

Information on other commuter express services were collected to help estimate potential ridership. This includes in cities similar in size and population to Grand Rapids as well as one larger city. The peer group includes express routes in Lansing, Toledo, Cincinnati, Dayton, and Indianapolis.

The map in Exhibit II-15 depicts the CATA Route 48. This route provides service from Williamston and Webberville to downtown Lansing. It is estimated that 8,538 people live within a 2.5 mile radius of a park and ride along the route. The ridership on this route is 8,992 trips annually.

Exhibit II-16 shows the park and ride lot in the Toledo area along TARTA Route 29X. There is an estimated population of 5,997 people living with a 2.5 mile radius of this park and ride lot. The annual ridership of the route is 36,370 passenger trips.

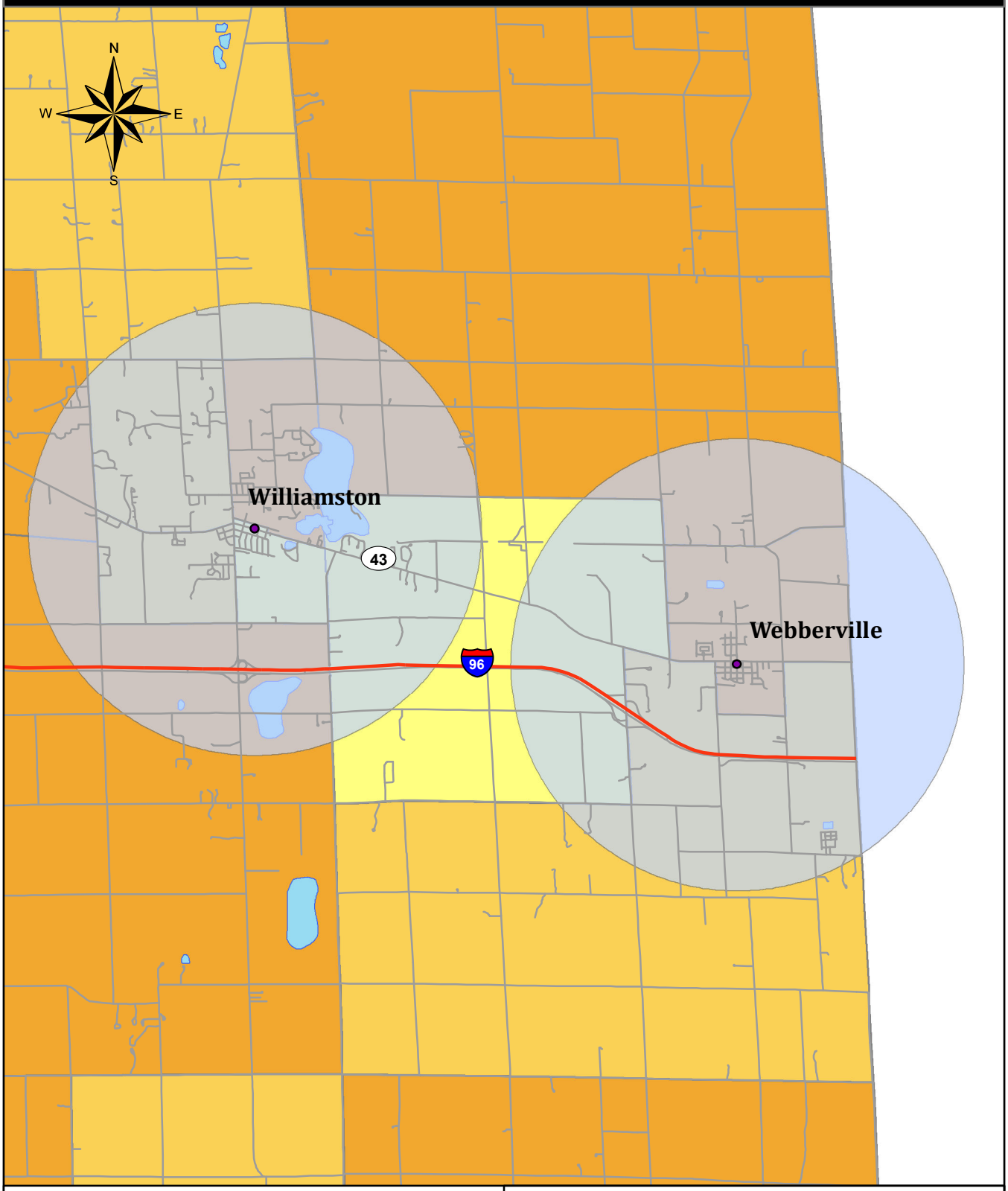
The map in Exhibit II-17 depicts the Cincinnati Anderson Express, Route 75X. This route provides service to downtown Cincinnati. It is estimated that 28,465 people live within a 2.5 mile radius of a park and ride along the route. The annual ridership of this route is 80,012.

Exhibit II-18 shows the Dayton park and ride along RTA Route 5X. There is an estimated population of 23,594 people living with a 2.5 mile radius of this park and ride lot.

The CIRTA park and ride lot served by the Carmel Express is depicted in Exhibit II-19. An estimated 20,447 live within a 2.5 mile radius of the route, which provides commuter service between Carmel and Indianapolis. The annual ridership for this route is 53,909.

Exhibit II-20 includes a summary of relevant data for each of the peer cities including the examples of commuter express routes. As shown, there is some correlation between commuter express bus ridership and the population served, the size of the area population, the cost of parking, and the relative attraction of its downtown for employment. Based on these data, annual ridership of about 15,000 for each route, or 60,000 total, is a reasonable expectation.

Exhibit II-15
CATA Williamston - Webberville Limited



Total Population

- Park & Ride
- Express Buffer
- 0 - 969
- 970 - 1508
- 1509 - 2399
- 2400 - 4107
- 4108 - 5934

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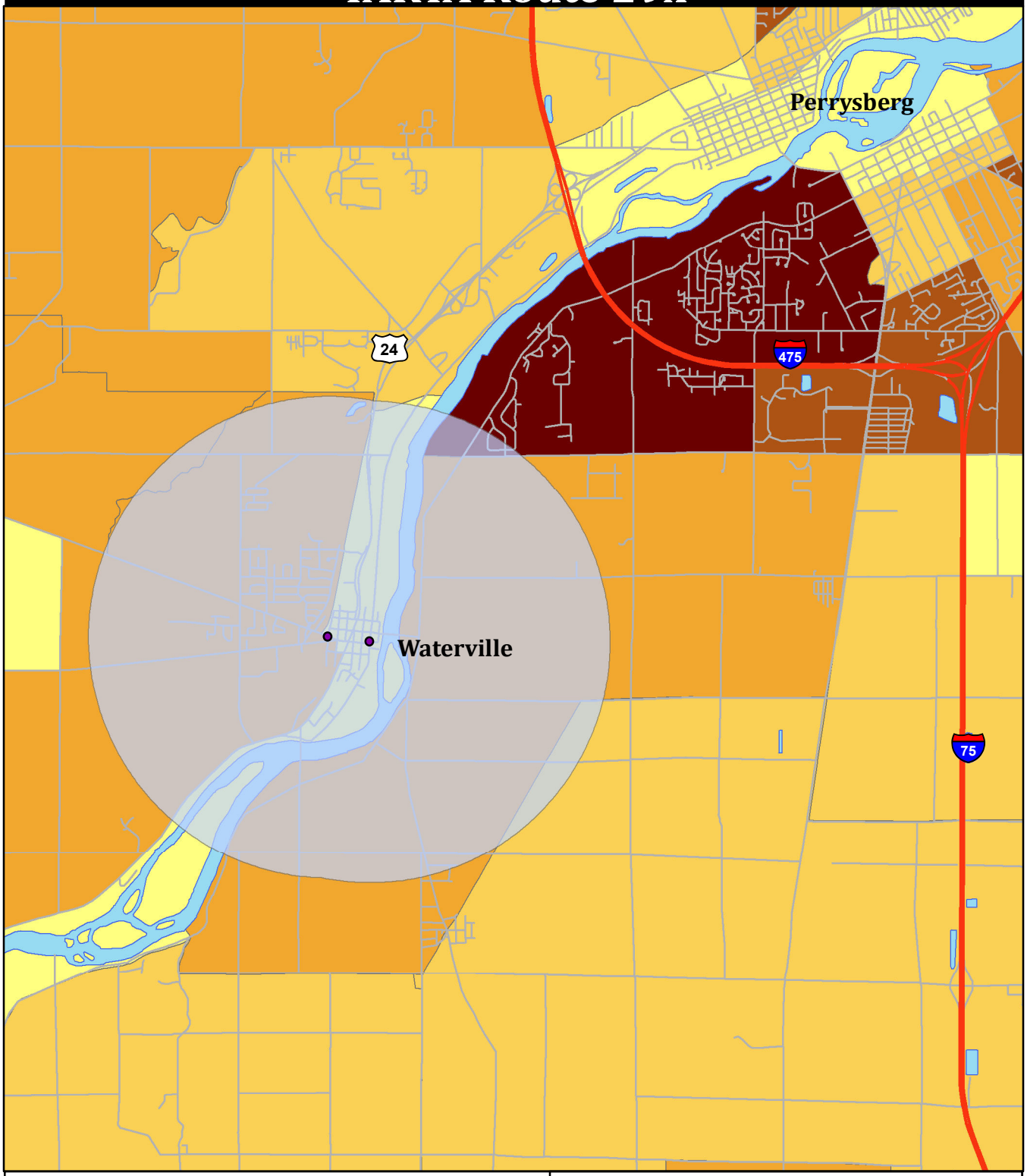
Exhibit II-16
TARTA Route 29x



Total Population

- Park & Rides
- Express Buffer
- Ohio streets
- 0 - 978
- 979 - 1555
- 1556 - 2488
- 2489 - 4316
- 4317 - 8839

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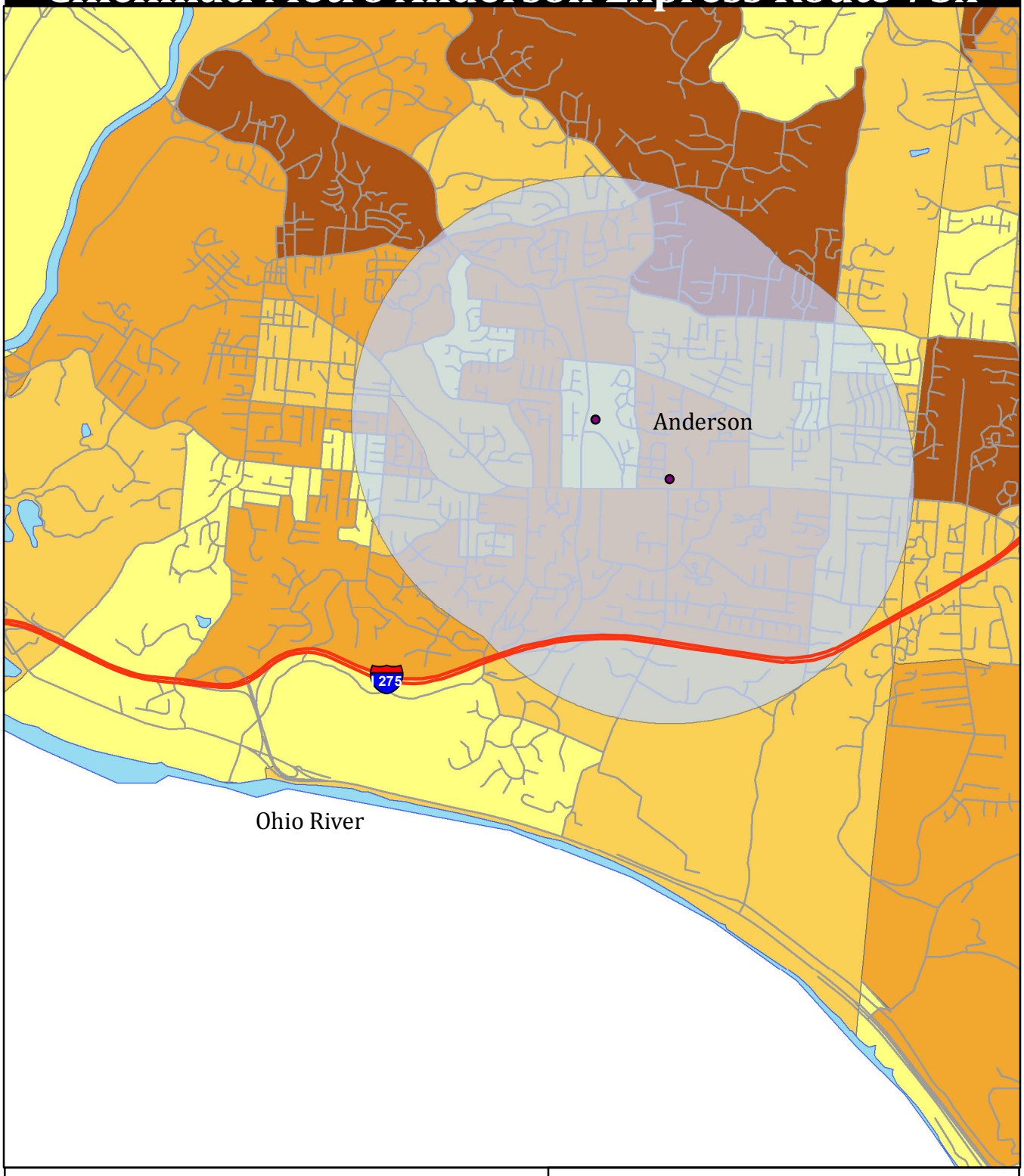
Exhibit II-17
Cincinnati Metro Anderson Express Route 75x



Total Population

- Park & Rides
- Ohio streets
- Express Buffer
- 0 - 978
- 979 - 1555
- 1556 - 2488
- 2489 - 4316
- 4317 - 8839

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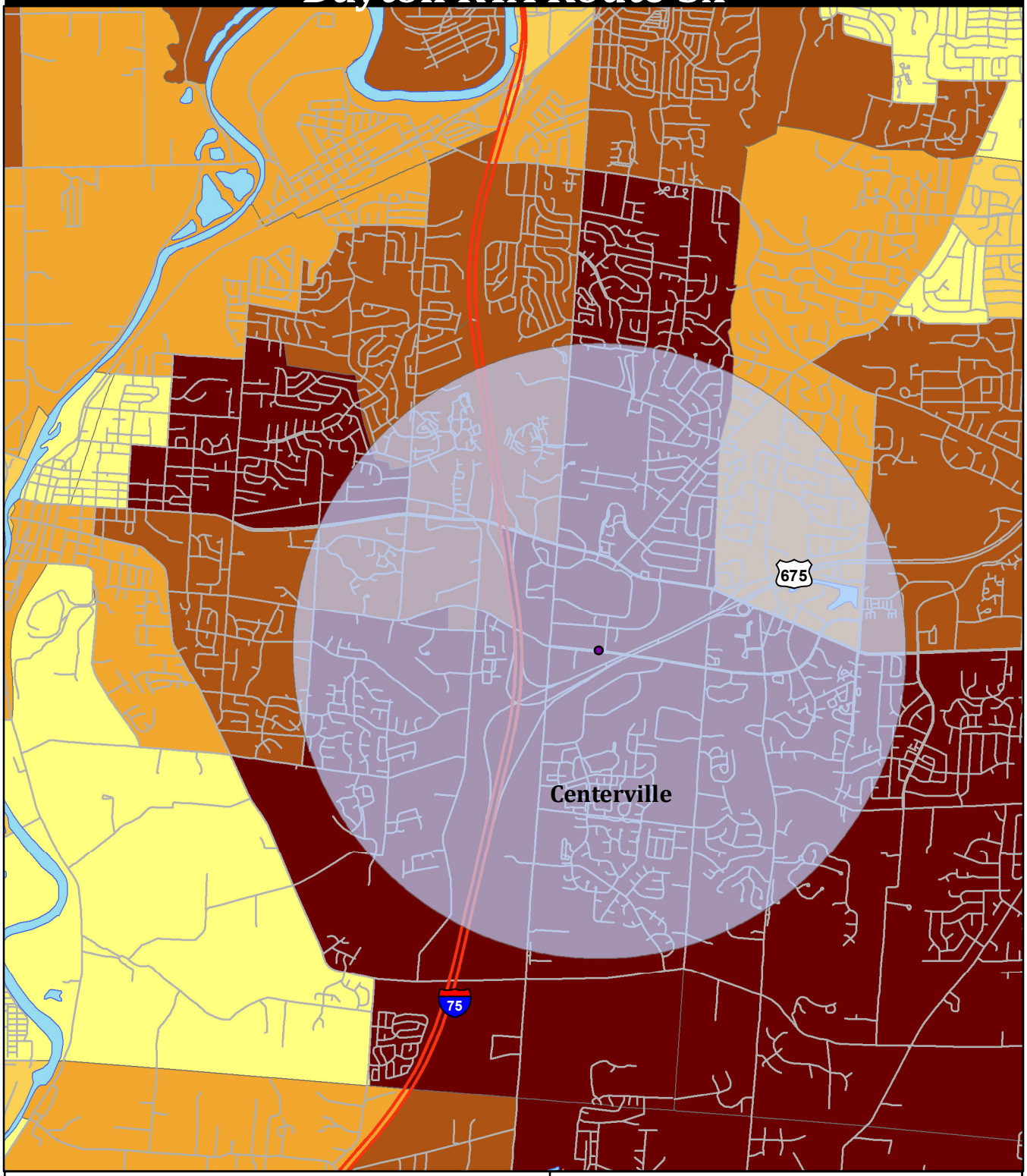
Exhibit II-18
Dayton RTA Route 5x

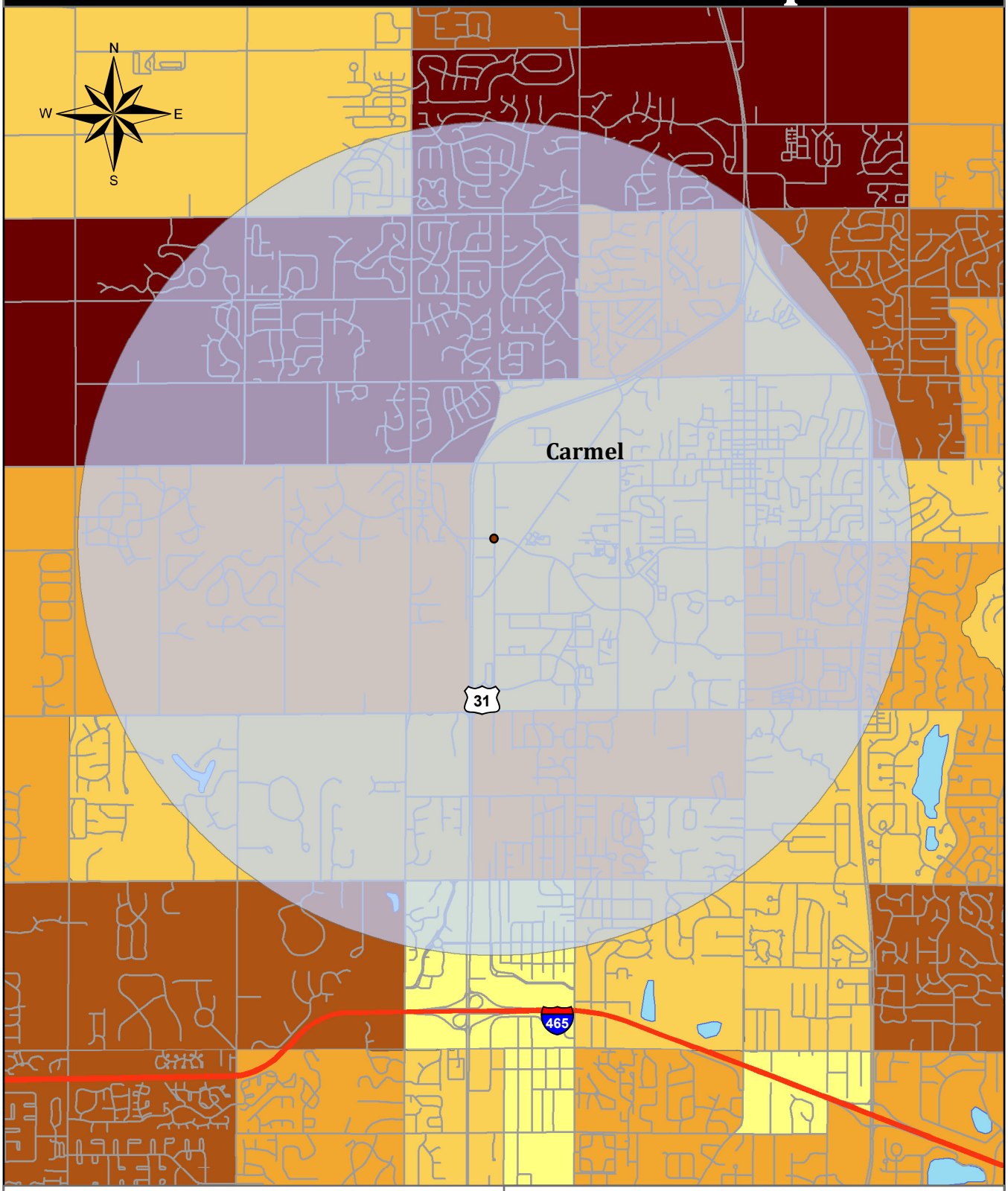


Total Population

- Park & Rides
- Express Buffer
- 0 - 978
- 979 - 1555
- 1556 - 2488
- 2489 - 4316
- 4317 - 8839

Kent County
Transit Needs Assessment

Exhibit II-19
Central Indiana Carmel Express



Total Population

- Park & Ride
- Express Buffer
- 0 - 1041
- 1042 - 1759
- 1760 - 2994
- 2995 - 5362
- 5363 - 13737

Kent County
Transit Needs Assessment

Exhibit II-20
Peer Commuter Express

City	Population within 2.5 Miles of Park and Ride	Annual Ridership	Urban Area Population	Downtown Daily Parking Cost	Downtown Office Space
Lansing	8,538	8,992	299,938	$10.00	n/a
Toledo	5,997	36,370	503,158	$7.00	n/a
Cincinnati	28,465	80,012	1,502,688	$15.00	27,051,320
Dayton	23,594	--	703,255	$5.00	4,900,000
Indianapolis	20,447	53,909	1,219,952	$17.00	26,150,395
Grand Rapids			**539,913**	**$7.00**	**18,449,005**
Cedar Springs/Rockford	13,437				
Ada/Lowell	13,843				
Byron/Gaines	19,196				
Caledonia/Cascade	12,355				

Household Survey

Results of the Kent County household survey were also used to estimate potential ridership on the proposed commuter express routes. Assumptions on the relative likelihood of actual usage were made, coupled with the stated frequency of use, to arrive at an estimated number of trips.

The projections are approximations based on survey respondents' intent and understanding of the nature of transit service at the time of the survey. However, many things can intervene in determining the final actual usage, including the ability of respondents to accurately forecast their own behavior. Other factors include at least the following:

- The expansion or contraction of opportunities for work, shopping, and other activities at the destinations served.
- The nature of the transit service provided, including routes, timing, and quality.
- The price of the service provided.
- Ease of access to the service provided, including shelters, sidewalks, park and ride, etc.
- The cumulative pricing and availability of alternatives (i.e. a vehicle, gasoline and parking costs).
- The size of the population in the target areas at the time service is offered.

These estimates of latent demand for express service were arrived at as follows:

- Respondents living in the townships to be served by the express routes were asked how likely they were to use an express route serving their specific township. Also, because such services are commuter oriented (, only those who also said they commute to work in the City of Grand Rapids were included.

- Those meeting these criteria and expressing interest constitute a "Likely Market" in the sense that this is the group of people who would seriously consider using the service both because their points of origin would be served, their commuting destination is City of Grand Rapids, and because of their their expressed interest.
- Because these are commuters, they may face particular barriers to using transit to commute. Two of the primary barriers are having to drop off or pick up children from school or child care, and/or having to use one's own vehicle for work-related purposes during the work day. Those indicating they had to do so were dropped from the computation.
- It is also known that between the level of positive intent to use a service expressed in a survey and real-world consumer behavior there are substantial losses. The reason is that for the consumer to fully imagine his or herself using a specific service is very different from confronting the actual use of the service, in spite of the realistic description of the service used in the survey. For example, most of these people have never used the bus, and becoming a regular user is always a major step.
- For this reason we have to reduce the pool of relatively likely users. We do this by assigning a probability factor reflecting how responsive the market will prove to be based on the strength of their positive response. For those who said they would "definitely" use such a service, we assume initially that all of them would use the service. Thus we assign an initial value of 100%. For those saying they were "very likely" to use demand response service, we assign a value of 50%, meaning that we believe that approximately half of them would eventually use the service. For those who said they were somewhat likely, the factor is .02%. This gives us an "Upper Bound" for the estimate – i.e. the maximum probable use. A lower bound of the estimate can be set at half those rates.

Exhibit II-21 includes the results of this estimate.

Exhibit II-21
Estimated Commuter Express Market in Number of Persons

	Total Likely Market	Upper Bound Likelihood	Lower Bound Liklihood
Definitely use it	614	614	307
Be very likely to use it	765	383	191
Be somewhat likely to use it	872	17	9
Total	2,251	1014	507

Finally, to compute the likely frequency of use, respondents were asked how many days a week they would be likely to use the service. Using the means for those who were very likely to use it (2.47 days) and those somewhat likely to do so (1.05 days), and assuming round trips in all cases, total weekly and annual trips are computed. Results of this estimate are summarized in Exhibit II-22. The estimated range of annual ridership is between 82,801 and 165,601.

Exhibit II-22
Estimated Commuter Express Passenger Trips

	Upper Bound		Lower Bound	
	Trips/Week	Annual Trips	Trips/Week	Annual Trips
Definitely use it	2063		1032	
Be very likely to use it	1209		604	
Be somewhat likely to use it	40		20	
Total	3312	165,601	1656	82,801

Route Extensions and New Routes

The population and ridership was collected for existing The Rapid route segments with similar population densities and demographics as the proposed new routes and route extensions. These targeted segments include portions of routes 16, 10, 4, 28, 9, and 11.

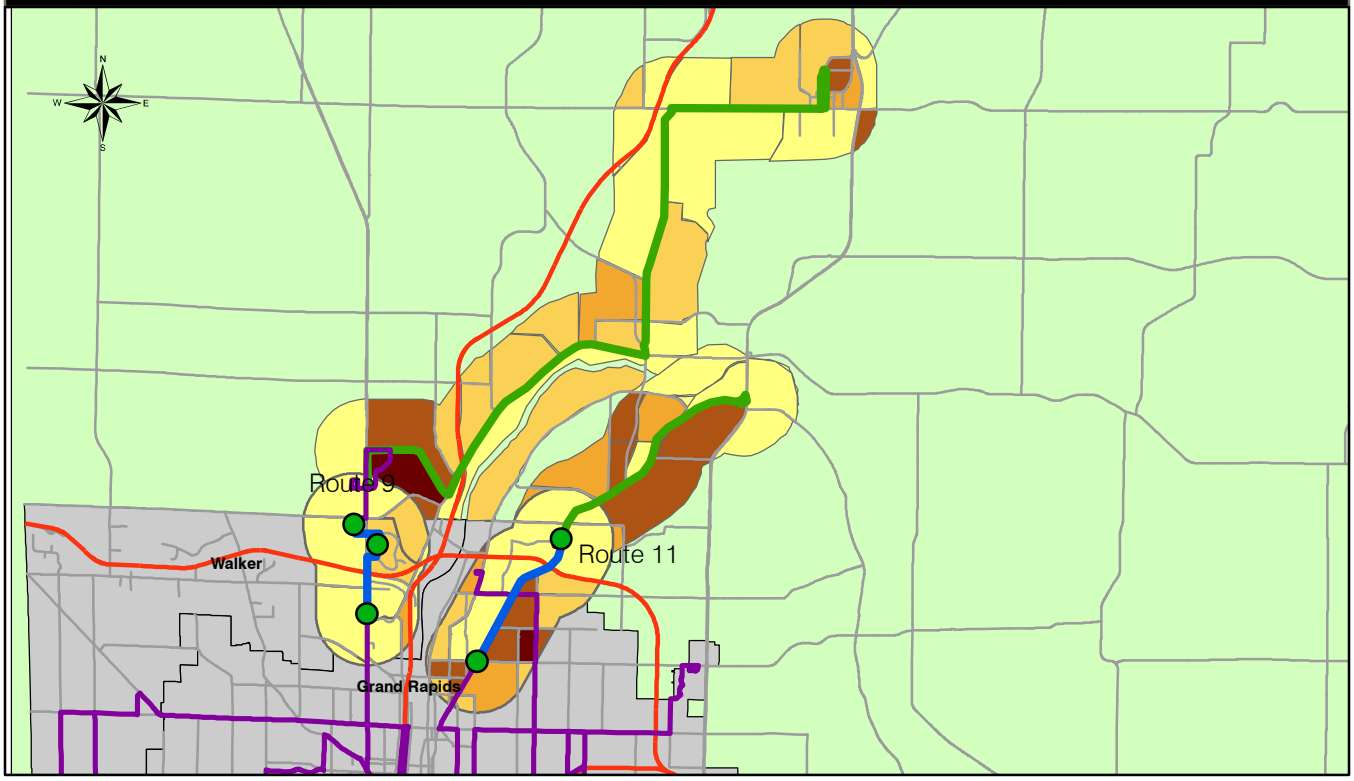
First, the number of bus stops between each time point was identified. With information from The Rapid boarding and alighting counts, the total number of passengers for each bus stop was calculated. The resulting total provided the average daily number of passenger boardings. To estimate the hours of service for each segment the total time between points was multiplied by the daily frequency of the trip. This yielded the average hours of service between the time segments. From the average number of daily passengers and the average hours of service, the number of passengers per hour was calculated. Also, using the total population served by each route, an average number of trips per 1000 people was calculated. This information is summarized in Exhibit II-23.

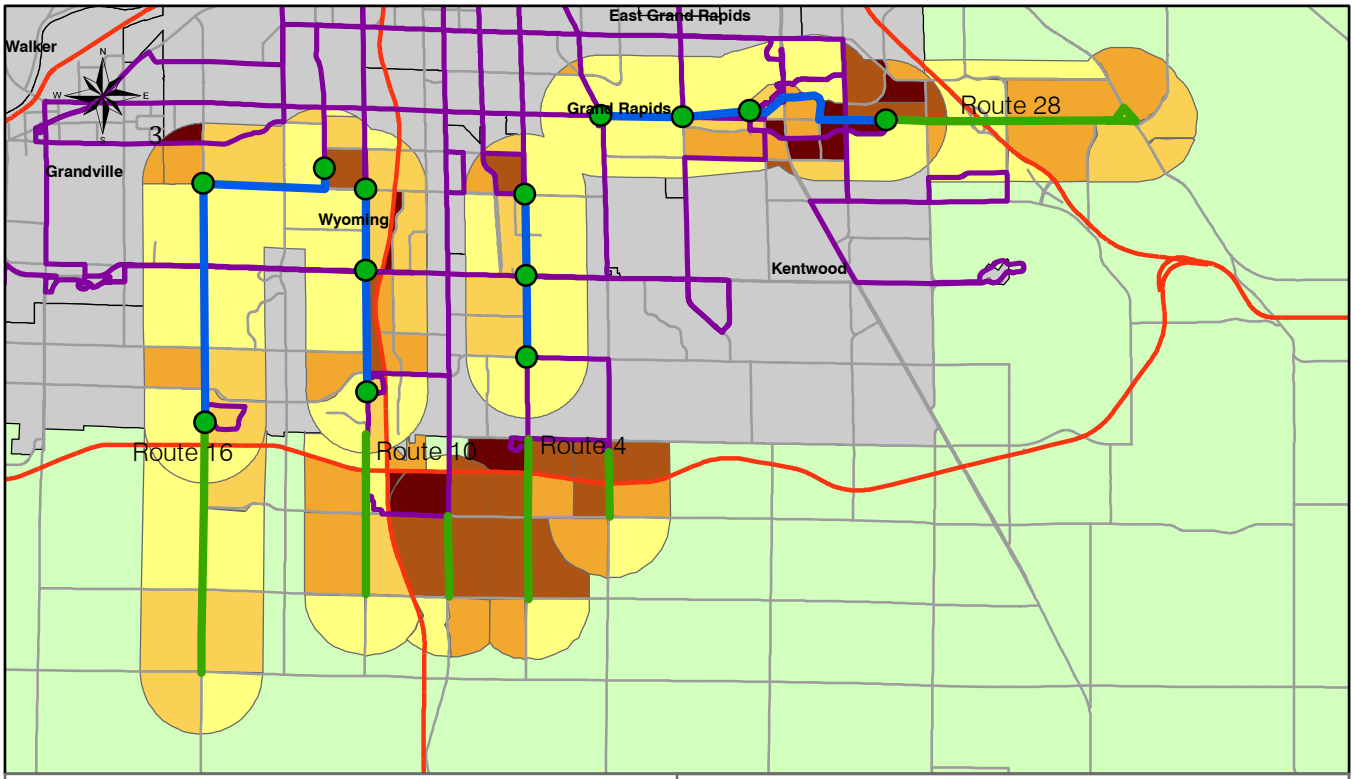
Exhibit II-23
Peer Route Segment Population

	Segment	Total Population	Riders	Revenue Hours	Pass./ Hour	Trips/1 000
Route 16	Wyoming Library- Metro Health	5,766	99	10.7	9.3	17.2
Route 10	Clyde Park & 36th – 54th St. Meijer	5,377	204	8.0	25.5	37.9
Route 4	Easter & 36th – 52nd & Eastern	2,778	275	6.4	43.0	99.0
Route 28	28th St. Meijer – 28th & Acquest	11,088	604	27.7	21.8	54.5
Route 9	Alpine Meijer – Old Orchard Apts	1,983	218	8.2	26.6	109.9
Route 11	Plainfield & Knapp – Plainfield & Elmdale	7,415	224	7.0	32.0	30.2

The map in Exhibit II-24 depicts the population density based on 2009 TAZ population estimates and the targeted segments used in the peer analysis. The maps identify the segment of the existing fixed route which was sampled. The collected sample yielded an average ridership of 58.1 per 1000 persons or a productivity of 26.3 passengers per hour.

Exhibit II-23
Peer Route Extensions





Time Points
Rapid Routes
Proposed Route Extensions
Peer Segment

45 - 708
709 - 1507
1508 - 2559
2560 - 4561
4562 - 190000

Population Per Square Mile

Kent County
Transit Needs Assessment

The average number of daily trips per 1000 persons for these route segments was then applied to the proposed route extensions and new routes. The result is predicted ridership for each. Exhibit II-25 displays these estimates.

Exhibit II-25
Route Segment/New Route Ridership Estimate

Route Extension	Population Served	Avg. trips/capita for existing segments*	Estimated Ridership for Route Extension
Route 16	4,008	58.1	233
Route 10	4,235		246
Route 1	7,149		415
Route 4	8,442		490
Route 2	4,888		284
Route 9	23,448		1,362
Route 11	13,641		793
Route 28	4,945		287
Rockford/E. Beltline	20,258		1,177
East Fulton/Ada	8,730		507
60th/68th Street	25,961		1,508

*Daily trips per 1,000 people

The estimated total ridership for all of these is 5,795 passengers per weekday. The 60th/68th Street route was not included in this estimate since the population it serves is the same population as some proposed route extensions. This translates to approximately 1,657,406 trips annually.

Household Survey

Results of the Kent County household survey were also used to estimate potential ridership on the proposed route extension and new routes. Assumptions on the relative likelihood of actual usage were made and, coupled with the stated frequency of use, an estimated number of trips was made. These estimates of latent demand for route extension service were arrived at as follows:

- Respondents living in the townships to be served by the route extensions were asked how likely they were to use a service extending a specific route to their specific township. Further, only those who also said they travel into Grand Rapids weekly were included.
- Those expressing interest constitute a "Likely Market" in the sense that this is the group of people who would seriously consider using the service both because their points of

origin would be served, their destination set includes the City of Grand Rapids, and because of their their expressed interest.

- We know also that between the level of positive intent to use a service expressed in a survey and real-world consumer behavior there are substantial losses. The reason is that for the consumer to fully imagine his or herself using a specific service is very different from confronting the actual use of the service, in spite of the realistic description of the service used in the survey. For example, most of these people have never used the bus, and becoming a regular user is always a major step. Moreover, although their township would be served, and the route was specified in the question, the actual service might not be nearby, or their might be a lack of sidewalks, And so forth.
- For this reason we have to reduce the pool of relatively likely users. We do this by assigning a probability factor reflecting how responsive the market will prove to be based on the strength of their positive response. For those who said they would "definitely" use such a service, we assume initially that all of them would use the service. Thus we assign an initial value of 100%. For those saying they were "very likely" to use demand response service, we assign a value of 50%, meaning that we believe that approximately half of them would eventually use the service. For those who said they were somewhat likely, the factor is .02%. This gives us an "Upper Bound" for the estimate – i.e. the maximum probable use. A lower bound of the estimate can be set at half those rates.

Exhibit II-26 includes the estimate of the market for route extensions and new routes.

Exhibit II-26
Estimated Route Extensions/New Routes Market in Number of Persons

	Total Likely Market	Upper Bound Likelihood	Lower Bound Liklihood
Definitely use it	4,295	4,295	2148
Be very likely to use it	9,249	4,625	2312
Be somewhat likely to use it	14,005	280	140
Total	27,459	9,200	4600

To compute the likely frequency of use, respondents were asked how many days a week they would be likely to use the service. Using the simple average number of days means for those who were "definite" (1.64 days), very likely to use it (1.31 days) and those somewhat likely to do so (1.28 days), and assuming round trips in all cases, weekly and annual trips were computed. Exhibit II-27 summarized the results of this analysis. As shown, the estimated annual trips range from 679,751 to 1,359,503.

Exhibit II-27
Estimated Route Extensions/New Routes Passenger Trips

	Upper Bound		Lower Bound	
	Trips/Week	Annual Trips	Trips/Week	Annual Trips
Definitely use it	14,088		7044	
Be very likely to use it	12,116		6058	
Be somewhat likely to use it	717		359	
Total	26,921	1,359,503	13460	679,751

Demand Response Service

Peer Analysis

These peer services were also chosen based on similarities to suburban/rural Kent County in size, population, or geographic composition.

Capital Area Transportation Authority

Lansing's Capital Area Transportation Authority (CATA) offers several different types of demand response services. This includes Spec-Tran Service, and Curb-to-Curb Services that includes Redi-Ride and CATA Rural Services (CRS). Spec-Tran is Americans with Disabilities Act (ADA) complementary paratransit service. Redi-Ride and CRS are paratransit services provided in addition to the required ADA service. In total, these demand response services provided 514,382 annual trips using 95 vehicles during the peak periods.

Redi-Ride service is a curb-to-curb service that provides local trips in Mason, Williamston, Delhi and Meridian Townships. The service operates as a deviated fixed route and facilitates the transfer of riders to the fixed route service. Fares are $1.25 one-way and include free transfers to the fixed-route service. Seniors receive a reduced fare. Transferring to the CRS services is possible but requires the difference in fare to be paid.

The CATA CRS service is a rural curb-to-curb service offered in the outlying areas of Ingham County. Fares range from $2.25 to $3.25 based on the length of trip. This service provides transportation from any location in the county to any destination in the county. According to CATA, the CRS service had a ridership of 77,947 in 2007.

Metro Transit

Metro Transit in Kalamazoo provides fixed route service and complementary paratransit service included as part of its County Connect service. County Connect provides an estimated 99,530 trips per year and operates 33 vehicles during the peak hour.

County Connect is a county wide service that is open to the general public. Reduced fares are offered to seniors and disabled persons. County Connect is a curb-to-curb service that provides transportation from any location in the county to any destination in the county.

METRO Regional Transit Authority

METRO Regional Transit Authority is the public transportation provider in Akron, Ohio. METRO operates 30 fixed routes and one express route. The demand response service comprised of ADA paratransit and Summit County Area Transit (SCAT) provide 104,796 trips per year.

SCAT also provides a countywide service available to individuals over 62 or individuals with disabilities. The service will pickup and drop off anywhere in Summit County Fares are $2.00 each way. SCAT provides door-to-door services and drivers will assist with parcels and accessibility.

Capital Area Transit

Capital Area Transit (CAT), located in Harrisburg, Pennsylvania, has a Fixed Route Division and a Share-A-Ride Division consisting of ADA paratransit and countywide demand response. The demand response services provide 193,174 trips per year. During peak hours the demand response services operate 55 vehicles.

CAT's Share-A-Ride service is operated in Dauphin County, the urbanized area of Cumberland County, and occasionally into adjacent counties. The service is opened to the general public. Fares are $13.00 to the general public and $1.95 for seniors up to 3.9 miles. After 3.9 miles fares are charged on a zone structure. Share-A-Ride provides door-to-door services to those individual who are in need of assistance.

Toledo Area Regional Transit Authority

The Toledo Area Regional Transit Authority (TARTA) operates fixed route service and TARPS, the ADA complementary paratransit service. In addition TARTA provides Call-A-Ride, a curb-to-curb service. The demand response services provide an estimate of 134,696 rides per year and use 94 vehicles during peak operation according to the NTD.

The TARTA Call-A-Ride is a curb-to-curb service available to select townships in the Toledo area. Call-A-Ride is available in Maumee, Perrysburg, Rossford, Spencer Township, Sylvania, Sylvania Township and Waterville. Fares are $1.00 one way for the general public and $.50 for seniors and people with disabilities.

The table in Exhibit II-28 identifies various countywide transportation options that are used in this peer group. Each of the services are identified by the type of service: Americans with Disabilities (ADA), service for seniors and disabled persons (E&D), and General Public (GP). They are further identified by the area in which they provide service. This includes countywide

providers and providers who serve portions of the county. The fare structure of each service is identified. Ridership and service miles are provided for each service, and the ridership per capita is calculated. Overall, demand response services provided by The Rapid are comparable to the peer group. However, these are for services that are provided both inside and outside of urban areas.

Exhibit II-28
Countywide Demand Response Services

Location	Service	Type	Service Area	Fare	Total Ridership	Total Revenue Miles	Trips per Capita
Grand Rapids	Go!Bus	ADA	¾ of Fixed Route	$3.00	263,769*	2,534,546	0.55
		ADA	¾ of Fixed Route	$7.00			
		E&D	Ada, Cascade, Alpine, Byron, and Gaines Townships	$7.00			
	County Connection	GP	Kent County	$14.00			
	PASS	GP	Area Outside of Fixed Route	$3.00			
	Ride Link	E	Kent County	Donation			
Lansing	Spec-Tran	ADA	¾ of Fixed Route	$2.50-$5.00	514,382	2,753,812	1.86
	Redi-Ride	GP	Mason, Williamston, Delhi, and Meridan Townships	$1.25			
	CRS	GP	Ingham County	$2.25 to $3.50			
Kalamazoo	County Connect	ADA	¾ of Fixed Route	$3.00	123,026	526,229	0.54
		GP	Kalamazoo County	$12.00			
		E&D	Kalamazoo County	$4.00			
Akron, OH	METRO ADA	ADA	¾ of Fixed Route	$2.50	214,000	1,368,414	0.39
	SCAT	E&D	Summit County	$2.00			
Harrisburg, PA	SET	ADA	¾ of Fixed Route	$3.50-5.90	193,174	1,371,817	0.47
	Share-A-Ride	GP	Dauphin and Cumberland County	$13.00			
		E	Dauphin and Cumberland County	$1.95 (+ zone charge)			
		D	Dauphin and Cumberland County	$2.60 (+ zone charge)			
Toledo, OH	TARPS	ADA	¾ of Fixed Route	$2.00	134,696	1,178,667	0.32
	Call-a-Ride	GP	Maumee, Perrysburg, Rossford, Spencer Township, Sylvania, Sylvania Township and Waterville	$1.00			
		E&D	Maumee, Perrysburg, Rossford, Spencer Township, Sylvania, Sylvania Township and Waterville	$0.50			
Peer Average					235,856	1,439,788	0.72

* Does not include CMH trips.

Exhibit II-29 provides a comparison with services provided in rural areas in Michigan. As shown, Kent County provides a much lower level of service than these locations.

Exhibit II-29
Rural Demand Response Transportation Services

County	Total Ridership	Vehicle Hours	Population
Clinton	59,999	28,628	64,753
Barry	74,030	15,545	56,755
Eaton	149,082	43,232	103,655
Ingham	90,570	23,043	37,021
Kent*	48,263	n/a	246,777

*includes township contracts, North Kent Transit and County Connection

Demand Models

TCRP Report #3 – Estimating Rural Transit Demand

The estimation of rural demand utilizes a methodology of specific populations, the size of the service area, and the level of service available. This methodology is designed to be utilized in rural areas with a population density less than 1,000 people per square mile. This model is designed to estimate the demand, defined as the expected ridership under an estimated level of service. The information provided is not representative of the total transportation need, but the expected demand.

This estimation demand was created for planning, operation, and funding agencies involved in public transportation service. The model was developed after reviewing previous estimation methods and conducting estimates for 39 rural counties across the United States[1]. The final methodology was designed encompassing the following factors:

- Persons aged 60 and over;
- Persons aged 15 to 64 with mobility limitations;
- Persons aged 64 or less residing in households having incomes below the poverty level;
- Service area size; and
- Annual vehicle-miles.

[1] SG Associates, inc., Leigh, Scott & Cleary, inc., C.M. Research, inc., TCRP Report 3: Workbook for Estimating Demand for Rural Passenger Transportation. Transportation Research Board, National Academies, Washington, DC., 1995.

The area used to estimate rural demand is the study area of Kent County located outside of The Rapid's taxing district where there is an estimated population of 228,210. Of that population, it is estimated that 30,640 are over age 60. The population of people with disabilities is estimated at 24,193. The population of individuals under the poverty level and under age 65 is estimated to be 6,332.

The population of individuals over age 60 was obtained through block group census information. The total population of individuals over 60 in block groups located outside of The Rapid's service area were calculated, resulting in a population of 30,640 individuals. This population was then entered into to the estimation formula to predict the increase in ridership demand of individuals over 60.

By using information gathered from the SIPP Survey it was possible estimate the population of individuals 15 to 64 with mobility limitations. The survey indicates that 4.8 percent of individuals between the ages of 15 and 24 have a mobility limitation, and 3.1 percent of individuals between 25 to 64 have a mobility limitation. By using these percentages an estimate of 6,281 individuals with mobility limitations was calculated for 2010 within the study area. This information was then entered into the model to predict the ridership demand of individual with mobility limitations.

The population of individuals under 65 years of age who live below the poverty level was compiled using U.S. census information. The resulting population of 6,332 individuals was used as another factor in the TCRB model.

The result is an estimate of demand based on the availability of additional 10 and 20 vehicles for public transportation services. The estimates both use an area of 743 square miles for the study area and an estimated 16,870 annual miles per vehicle.

Exhibit II-30 reflects the TCRB rural demand estimate with the addition of 10 vehicles countywide . The result is an estimated increase in demand of 53,370 trips annually. Of these, 35,176 are from persons over 60 years of age, 10,175 are from persons with mobility limitations between 15 and 64 years of age, and 8,020 are from persons under 65 living below the poverty level.

Exhibit II-30
Demand for Rural Passenger Transportation TCRB Model
Kent Count with the Addition of 10 Countywide Vehicles

County Size		
	Size (Square Miles)	743
Population 60 and over		
	Number of Persons 60 and Over	30,640
	Vehicle-Miles Available	160,870
	Vehicle-Miles Available Per Square Mile	216.5
Persons with Mobility Limitations		
	Persons with Mobility Limitations Age 15-64	6,281
	Vehicle-Miles Available	160,870
	Vehicle-Miles Available Per Square Mile	216.5
Persons in Families with Incomes Below the Poverty Level		
	Number of individuals below the poverty level under 65	6,332
	Vehicle-Miles Available	160,870
	Vehicle-Miles Available Per Square Mile	216.5
Estimation of Non-Program Demand Service Factors		
	60 and Over Service Factors	956.69090
	60 and Over Service Factor	0.00096
Estimation of Non-Program Demand Service Factors		
	Mobility Limitation Service Factors	1,349.9
	Mobility Limitation Service Factor	0.00135
Estimation of Persons in Families in Poverty		
	Poverty Level Service Factors	1,055.5
	Poverty Level Service Factor	0.00106
Persons 60 and Over		35,176
Persons 15-64 with Mobility Limitations		10,175
Persons Under 65 Below the Poverty Level		8,020
Total		53,370

Exhibit II-31 reflects the TCRB rural demand estimate with the addition of 20 vehicles countywide. The result was an estimated increase in demand of 81,314 person trips annually. Of these, 56,526 are from persons over 60 years of age, 12,737 are from persons with mobility limitations between 15 and 64 years of age, and 12,050 are from persons under 65 living below the poverty level.

Exhibit II-31
Demand for Rural Passenger Transportation TRB Model
Kent Count with the Addition of 20 Countywide Vehicles

County Size		
	Size (Square Miles)	743
Population 60 and over		
	Number of Persons 60 and Over	30,640
	Vehicle-Miles Available	321,740
	Vehicle-Miles Available Per Square Mile	433.0
Persons with Mobility Limitations		
	Persons with Mobility Limitations Age 15-64	6,281
	Vehicle-Miles Available	321,740
	Vehicle-Miles Available Per Square Mile	433.02826
Persons in Families with Incomes Below the Poverty Level		
	Number of individuals below the poverty level under 65	6,332
	Vehicle-Miles Available	321,740
	Vehicle-Miles Available Per Square Mile	433.0
Estimation of Non-Program Demand Service Factors		
	60 and Over Service Factors	1,537.38180
	60 and Over Service Factor	0.00154
Estimation of Non-Program Demand Service Factors		
	Mobility Limitation Service Factors	1,689.9
	Mobility Limitation Service Factor	0.00169
Estimation of Persons in Families in Poverty		
	Poverty Level Service Factors	1,585.9
	Poverty Level Service Factor	0.00159
Persons 60 and Over		56,526
Persons 15-64 with Mobility Limitations		12,737
Persons Under 65 Below the Poverty Level		12,050
Total		81,314

TCRP Project B-36

A methodology was developed to estimated demand for public transportation in rural area. It is described in *TCRP Document 49*. This model estimates the potential demand for public transportation based on a combination of demographic factors and the following service factors. These include:

- annual vehicle miles
- annual vehicle hours,
- service area size,
- vehicle miles for individuals with mobility limitations, and
- taxi/non-taxi vehicle miles available to the general public.

The TCRP report defines demand as the estimated number of trips generated within the study area in a given year[2]. Using this methodology, an estimate of trips within the study area was made.

Estimates for the service factors were developed based on existing service provided in Kent County. These include transportation service provided by The Rapid, Hope Network, and other agencies. The total estimated general public rural vehicle miles currently provided are 517,571, which is the level of service for County Connection. Annual vehicle hours are estimated at 34,918, and the study area is approxmately743 square miles. The total annual vehicle-miles available to persons over 60 include all programs provided by The Rapid and Hope Network. The total vehicle-miles available to persons with mobility limitations age 16 to 64 is estimated at 1,827,461 and is based on services provided by Hope Network. This information is outlined in Exhibit II-32.

Exhibit II-32
Available Service Inputs

General Public Rural Demand	
Study Area Current Vehicle-Miles	517,571 Annual Vehicle-Miles
Study Area Vehicle-Hours	34,918 Annual-Vehicle Hours
Service Availability Inputs	
Size of Service Area	743 Square Miles
Vehicle-Miles Available to Persons Age 60 and Above	522,143 Annual Vehicle-Miles
Taxi Vehicle-Miles Available to General Public	0 Annual Vehicle-Miles
Non-Taxi Vehicle-Miles Available to General Public	517,571 Annual Vehicle-Miles

This TCRP model utilizes demographic information from the 2008 American Community Survey (ACS) to identify portions of the population likely to use available public transportation. The demand estimation is comprised of demographic data relating to the following groups:

- Total population;
- Total population and persons age 60 and over;
- Total population of individuals with mobility limitations age 16 to 64; and
- Total population of individuals under 64 living under the poverty level.

Exhibit II-33 contains this information for the study area.

[2] Spielberg, Frank, Stoddard, A.T., Erickson, Jeanne, TCRP Project B-36: Methods for Forecasting Demand and Quantifying Need for Rural Passenger Transportation. Transportation Research Board, National Academies, Washington, D.C., December 2009.

Exhibit II-33
Study Area Demographics

Demographic Inputs	
Total Population	247,571
Persons Age 60 and Over	35,898
Mobility Limited Age 60 to 64	10,438
Persons Age 64 or Less Living Below Poverty	30,996

The number of estimated individuals between 16 and 64 with mobility limitations was obtained through the ACS. This number was generated by multiplying the number of individuals with disabilities in the study area by the percent of the population who indicated a "go-outside-the-home disability." The analysis resulted in an estimated 10,438 individual with mobility limitations living within the study area.

To estimate the population of individual under 65 living below the poverty level, ACS estimates of male and female populations under the poverty level were obtained. The resulting analysis of the study indicated approximately 30,996 individuals age 64 and less are living under the poverty level.

This information was then entered into the demand estimate model to predict the transportation demand for the study area. Exhibit II-34 summarizes the results.

Exhibit II-34
Rural Transportation Demand

General Public Rural Non-Program Demand	
Estimate of Rural Transit Trips Based on Vehicle-Miles	103,514 Annual Passenger Trips
Estimate of Rural Transit Trips Based on Vehicle-Hours	129,197 Annual Passenger Trips
Non-Program Demand Based on TCRP Methodology	
Demand for Persons 60 and Above	104,200 Annual Passenger Trips
Demand for Persons With Mobility Limitations Age 16 to 64	54,900 Annual Passenger Trips
Demand for General Public	69,000 Annual Passenger Trips
Total Demand	228,100 Annual Passenger Trips

The result was a projected 104,200 annual trips for individuals over 60. There was an estimated demand of 54,900 annual trips from persons with mobility limitations. The number of persons living below the poverty level was used to estimate demand from general public riders. The resulting analysis estimates the general public demand to be 69,000 annual trips. Therefore, the estimated total demand for the portion of Kent County within the study area is 228,100 annual trips.

Household Survey

Results of the Kent County household survey were also used to estimate potential ridership on a general public demand response service. Assumptions on the relative likelihood of actual usage were made and, coupled with the stated frequency of use, an estimated number of trips was made. These estimates of latent demand for door to door service were arrived at as follows:

- Respondents indicating any interest in using door-to-door service were filtered on the basis of age (65+), disability (yes or no), and income (<$35,00 household income), thus providing a market, which, experience shows, are relatively more likely to actually use demand response service. This provides a "Likely Market" in the sense that this is the group of people who would seriously consider using the service both because of their demographics and their expressed interest.
- We know also that between the level of positive intent to use a service expressed in a survey and real-world consumer behavior there are substantial losses. The reason is that for the consumer to fully imagine his or herself using a specific service is very different from confronting the actual use of the service, in spite of the realistic description of the service used in the survey. This is especially true of demand response service with the initial appeal of inexpensive door to door service offset by its requirements for calling ahead, holding open a time-window for pickup, and spending time while others are taken to their destinations.
- For this reason we have to reduce the pool of relatively likely users. We do this by assigning a probability factor reflecting how responsive the market will prove to be based on the strength of their positive response. For those who said they were very likely to use demand response service, we assign a value of 50%, meaning that we believe that approximately half of them would eventually use the service and use it as often as they said in the survey. For those who said they were somewhat likely, the factor is 25%. This gives us an "Upper Bound" for the estimate – i.e. the maximum probably use. A lower bound of the estimate can be set at half those rates.

Exhibit II-35 includes the results of this estimate.

Exhibit II-35
Estimated Demand Response Service Market in Number of Persons

	Total Likely Market	Upper Bound Likelihood	Lower Bound Liklihood
Be very likely to use it	5,075	2,538	1269
Be somewhat likely to use it	9,723	2,431	1215
Total	14,798	4,968	2484

To compute the likely frequency of use, respondents were asked how many days a week they would be likely to use the service. Using the means for those who were very likely to use it (2.47 days) and those somewhat likely to do so (1.05 days), and assuming round trips in all cases, the

weekly and annual trips were computed. Exhibit II-36 summarized the results of this analysis. As shown, the estimated annual trips range from 220,498 to 440,996.

Exhibit II-36
Estimated Demand Response Service Passenger Trips

	Upper Bound		Lower Bound	
	Trips/Week	Annual Trips	Trips/Week	Annual Trips
Be very likely to use it	6,268		3134	
Be somewhat likely to use it	2,552		1276	
Total	8,820	440,996	4410	220,498

SUMMARY

Exhibit II-37 provides a summary of predicted ridership and levels of service for the described demand response services, route extensions/new routes, and commuter express routes. It also includes an estimate of total operating costs for each group.

Exhibit II-37
Summary of Proposed Service Improvements

	Ridership	Vehicle Hours	Vehicle Miles	Cost
Demand Response Service				
Peer Goup	235,856			
TCRP #4	81,314*			
TCRP B-36	228,100			
Household Survey	220,498-440,996*			
Consensus	150,000	75,000	1,650,000	$ 3,547,344
Route Extensions/New Routes				
Peer Group	1,657,406			
Household Survey	679,751-1,359,503			
Consensus	1,200,000	62,105	705,317	$ 4,858,102
Commuter Express				
Peer Group	65,000			
Household Survey	82,801-165,601			
Consensus	80,000	3,555	106,641	$ 278,062

The predicted demand for demand response service is 150,000 trips annually. This would require an estimated 75,000 vehicle hours and 1.6 million vehicle miles and a total annual cost of $3.5 million. The cost for the group of route extensions and new routes is $4.9 million annually. About 1.2 million annual passenger trips would be generated. The commuter express routes have an estimated ridership of about 80,000 trips annually and cost $278,062 in its initial year.