

Appendix G

Ann Arbor

Lower Town Mobility Study

Travel Demand Analysis



MEMO

TO: Luke Liu (City of Ann Arbor)
Cc: Steve Loveland (OHM)
FROM: Matt Hill, Jason Pittenger, Charles Gorugantula (WSP)
SUBJECT: Lower Town Travel Demand Analysis – Base Conditions
DATE: September 28, 2020

INTRODUCTION

WSP in coordination with OHM, the City of Ann Arbor, and the Southeast Michigan Council of Governments (SEMCOG) reviewed the travel demand model (TDM) maintained by SEMCOG to provide a planning level summary of the vehicle origin-destination trends to and from the Lower Town study area for the base year of 2020. The purpose of this review was to answer the following questions:

- Where are trips originating from that are using the transportation network of Lower Town?
- How much of this traffic is destined to Lower Town versus using the network to pass-through Lower Town to another destination?
- Where are trips going that originate in Lower Town?

Additionally, the City of Ann Arbor requested that an example be provided of how the TDM could be used to trace travel patterns in a future year scenario to assist the development of transportation network improvement strategies at locations identified as “hot spots,” or bottleneck locations within the Lower Town transportation network.

The following summarizes the methodology and results of the 2020 base year analysis, as well as a requested example of tracing the travel patterns for a “hot spot.”

METHODOLOGY & RESULTS

The SEMCOG TDM was used for this analysis as noted in *the Lower Town Multimodal MOE Analysis Methodology Memo* (original submittal May 6, 2020). The TDM estimates current and forecast motorized vehicle travel volumes, speed, and patterns in Southeast Michigan. The model looks at demographic and socioeconomic data to generate the anticipated number of trips between origins and destinations and uses household trip surveys and transit rider survey information to calibrate and validate the model. Additionally, the metrics can be summarized for different time periods of the day, including the AM peak, Midday peak, PM peak, Evening, Night, and Daily. The geographic limits of the model include the counties of Livingston, Washtenaw, Wayne, Oakland, Macomb, St. Clair, and Monroe.



DISTRICTING

A series of geographic zones were developed in a process known as districting. This process creates geographic zones by aggregating adjacent traffic analysis zones (TAZs) into larger geographic groupings (districts) that aid in the visualization of the travel patterns between geographic areas of interest. Districts are typically smaller in size close to the primary area of interest (Lower Town) and increase in size further from the study area. A total of 16 districts were developed for this analysis and can be seen in Figures 1 & 2 and are listed below.

- | | |
|------------------------|------------------------|
| 1. Lower Town | 9. Washtenaw Southwest |
| 2. Ann Arbor Northeast | 10. Livingston County |
| 3. Ann Arbor Northwest | 11. Macomb County |
| 4. Ann Arbor Southeast | 12. Monroe County |
| 5. Ann Arbor Southwest | 13. Oakland County |
| 6. Washtenaw Northeast | 14. St. Clair County |
| 7. Washtenaw Northwest | 15. Wayne County |
| 8. Washtenaw Southeast | 16. City of Detroit |

SELECT ZONE ANALYSIS

A select zone analysis was conducted on the TAZs that compose the Lower Town district (red zones in Figure 1). This analysis tracks and captures all trips either originating in or destined to the Lower Town district and quantifies the distribution between the various districts. Table 1 displays the proportion of trips in relation to each individual district. In Figure 3, the roadways traveled by the Lower Town district traffic is scaled in relation to volume. The Barton, Main, Plymouth, and Washtenaw Avenue interchanges are the primary access points from the freeway network to Lower Town with the University of Michigan Hospital campus being the major trip producer in Lower Town.

The TDM model indicates that of the traffic specifically traveling to and from Lower Town, approximately 60% are Ann Arbor based and 40% are from outside Ann Arbor.

It should be noted, this is **NOT** saying 60% of the traffic on the roadway network in Lower Town is Ann Arbor based. It is simply stating that of the traffic that is specifically going to Lower Town as a destination or originating in Lower Town and destined somewhere else, 60% is Ann Arbor based. The transportation network in Lower Town is used for these trips as well as vehicles that are passing through Lower Town ultimately destined for somewhere outside of Lower Town. Estimating how much of the traffic on the transportation network in Lower Town is pass-through traffic is discussed in the next section

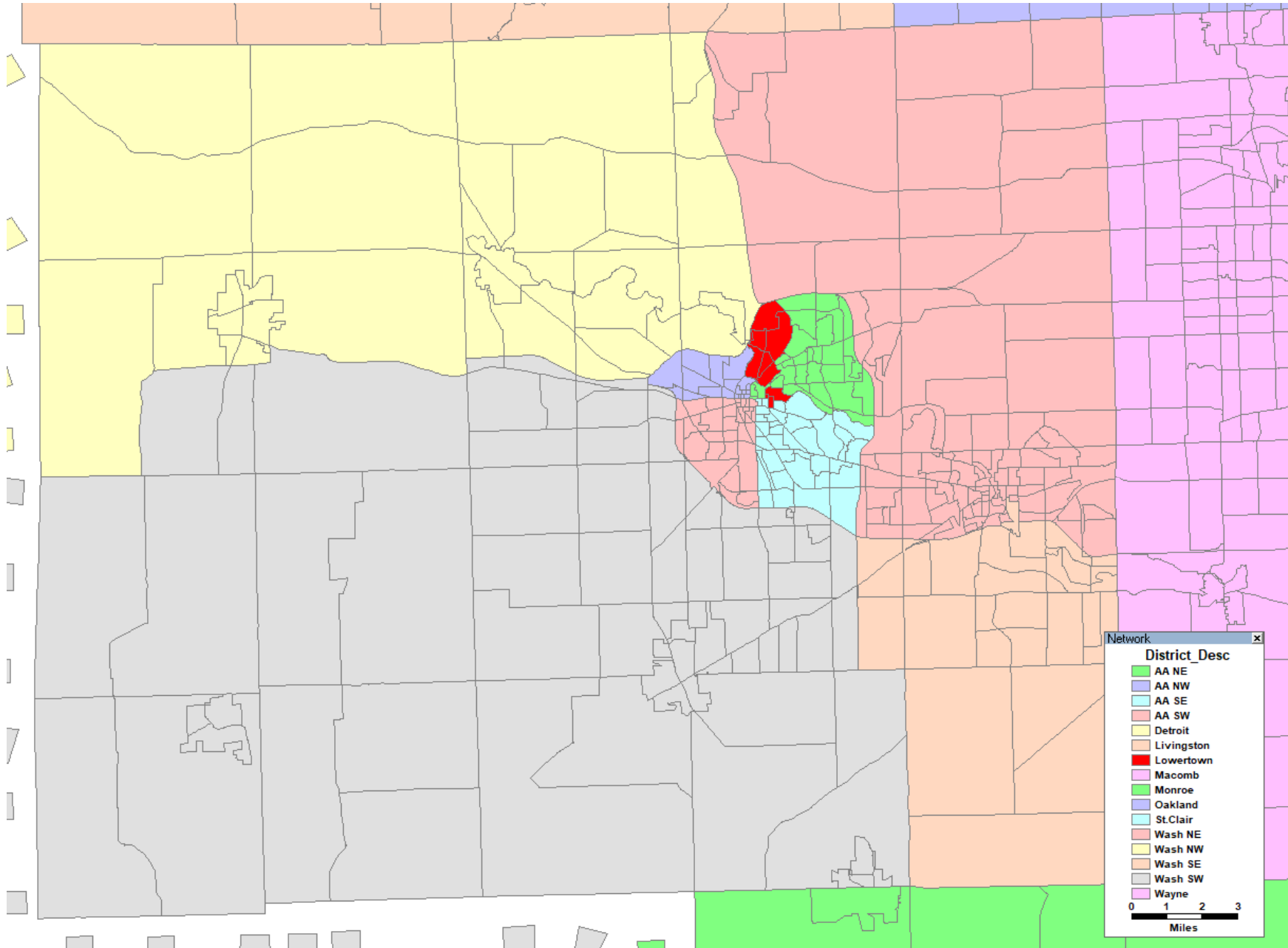


Figure 1: Washtenaw and Ann Arbor Districting

Figure 2: Metro Detroit Districting

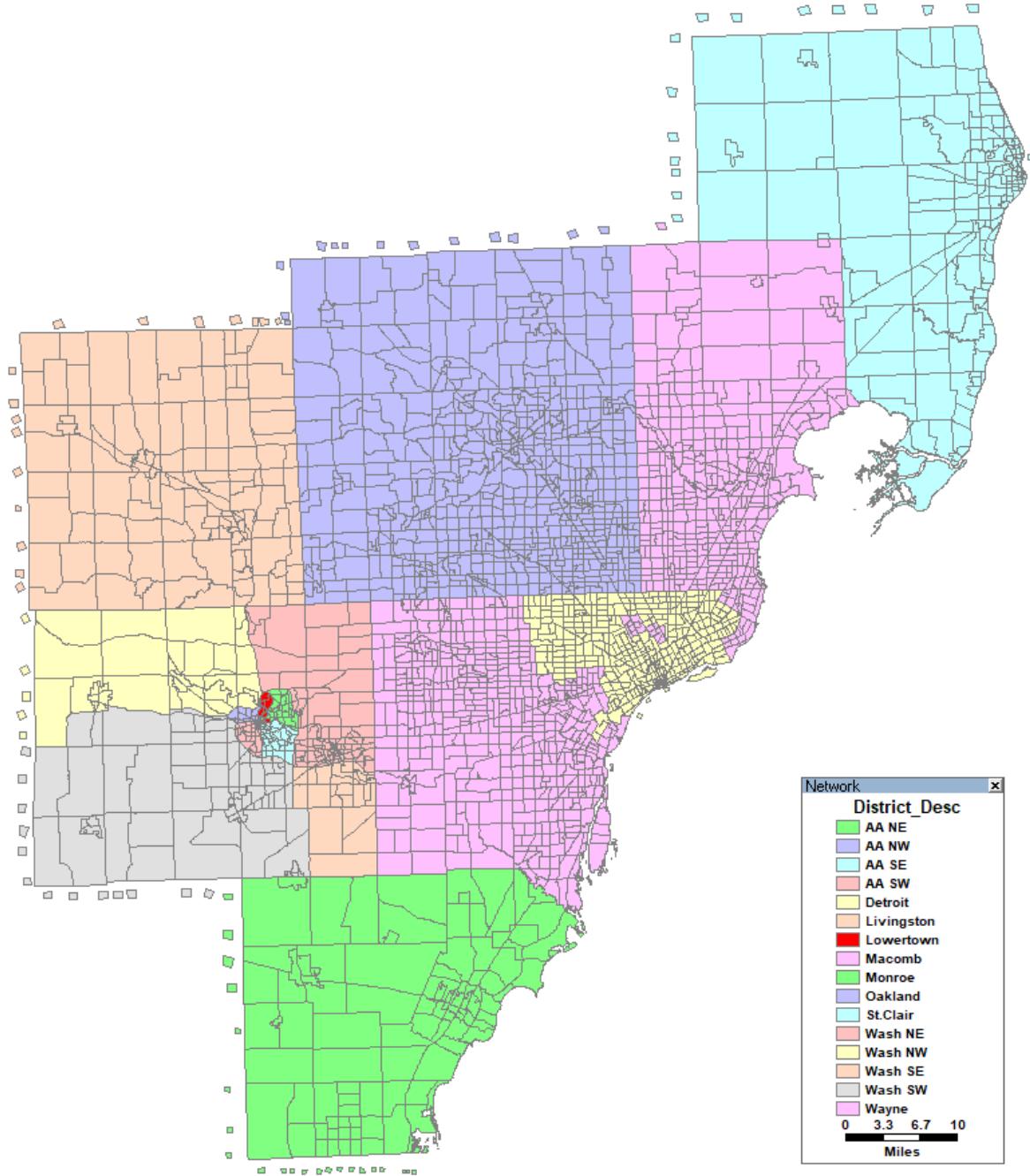
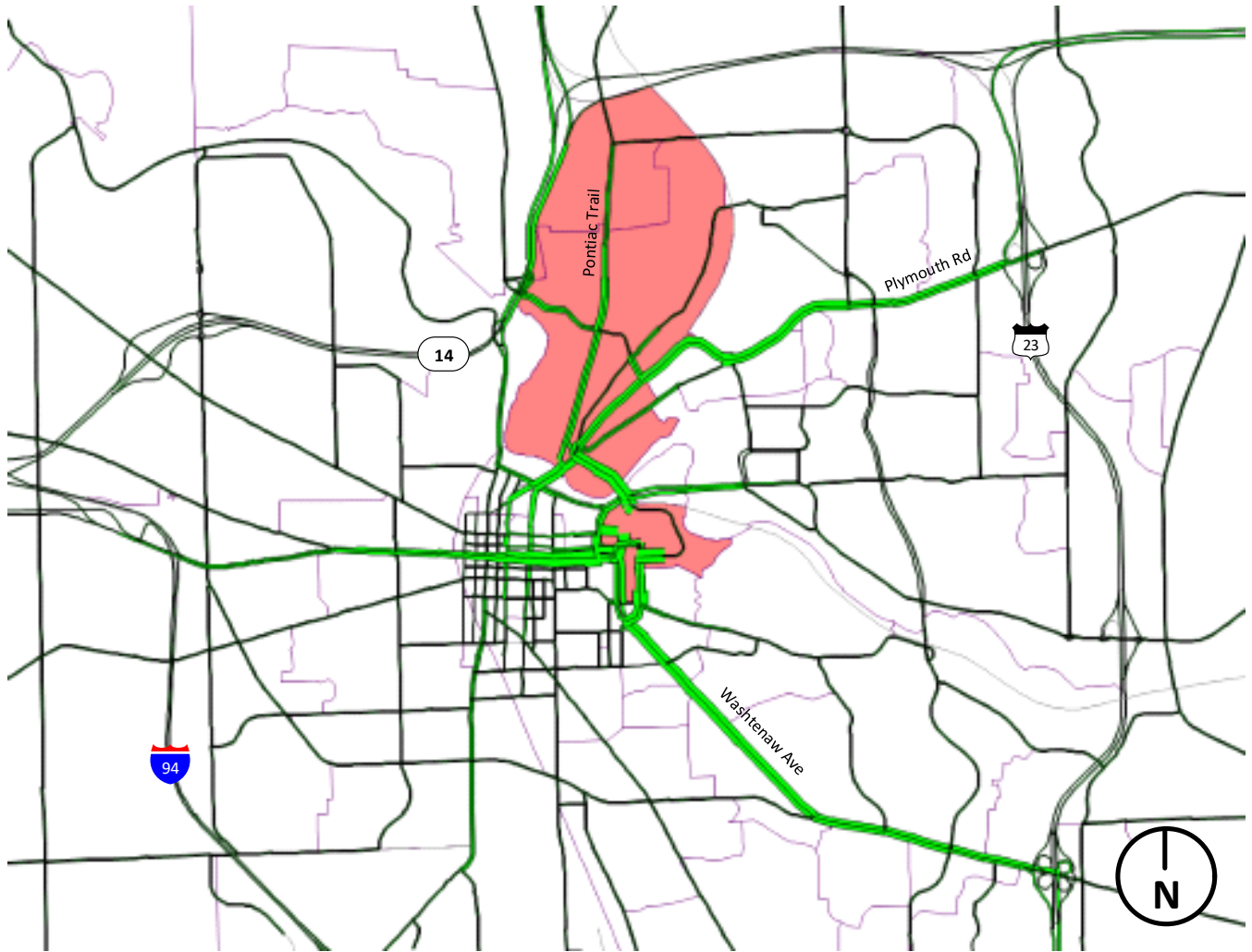




Table 1: Daily Select Zone Analysis Results

Select Zone Analysis									
District	Distribution of Trip Origins to Lower Town		Distribution of Trip Destinations from Lower Town		Geographic Area	Distribution of Trip Origins to Lower Town		Distribution of Trip Destinations from Lower Town	
	Trips	%	Trips	%		Trips	%	Trips	%
Lower Town	3,101	7%	3,101	7%	Lower town	3,101	7%	3,101	7%
Ann Arbor NE	7,469	16%	7,120	16%	Ann Arbor	25,118	53%	24,198	54%
Ann Arbor NW	2,394	5%	2,338	5%					
Ann Arbor SE	8,615	18%	8,428	19%					
Ann Arbor SW	6,641	14%	6,312	14%					
Washtenaw NE	3,748	8%	3,508	8%	Washtenaw County	11,484	25%	10,404	24%
Washtenaw NW	2,744	6%	2,406	5%					
Washtenaw SE	782	2%	705	2%					
Washtenaw SW	4,209	9%	3,785	9%					
Detroit	266	1%	269	1%	Other SE Michigan	7,472	15%	6,724	15%
Livingston	2,127	4%	1,813	4%					
Macomb	109	0%	101	0%					
Monroe	749	1%	635	1%					
Oakland	1,412	3%	1,309	3%					
St.Clair	6	0%	5	0%					
Wayne	2,804	6%	2,592	6%					
TOTAL	47,175	100%	44,427	100%	TOTAL	47,175	100%	44,427	100%

Figure 3: Lower Town Zone Analysis: Scaled Traffic Volumes



SELECT LINK ANALYSIS

A select link analysis was conducted in the TDM on the Lower Town links (blue links in Figure 4). This analysis tracks and captures all trips traveling on the selected (blue) roadways, including pass-through trips, which are trips passing through Lower Town on the way to a destination outside of Lower Town.

Figure 4: Lower Town Select Links

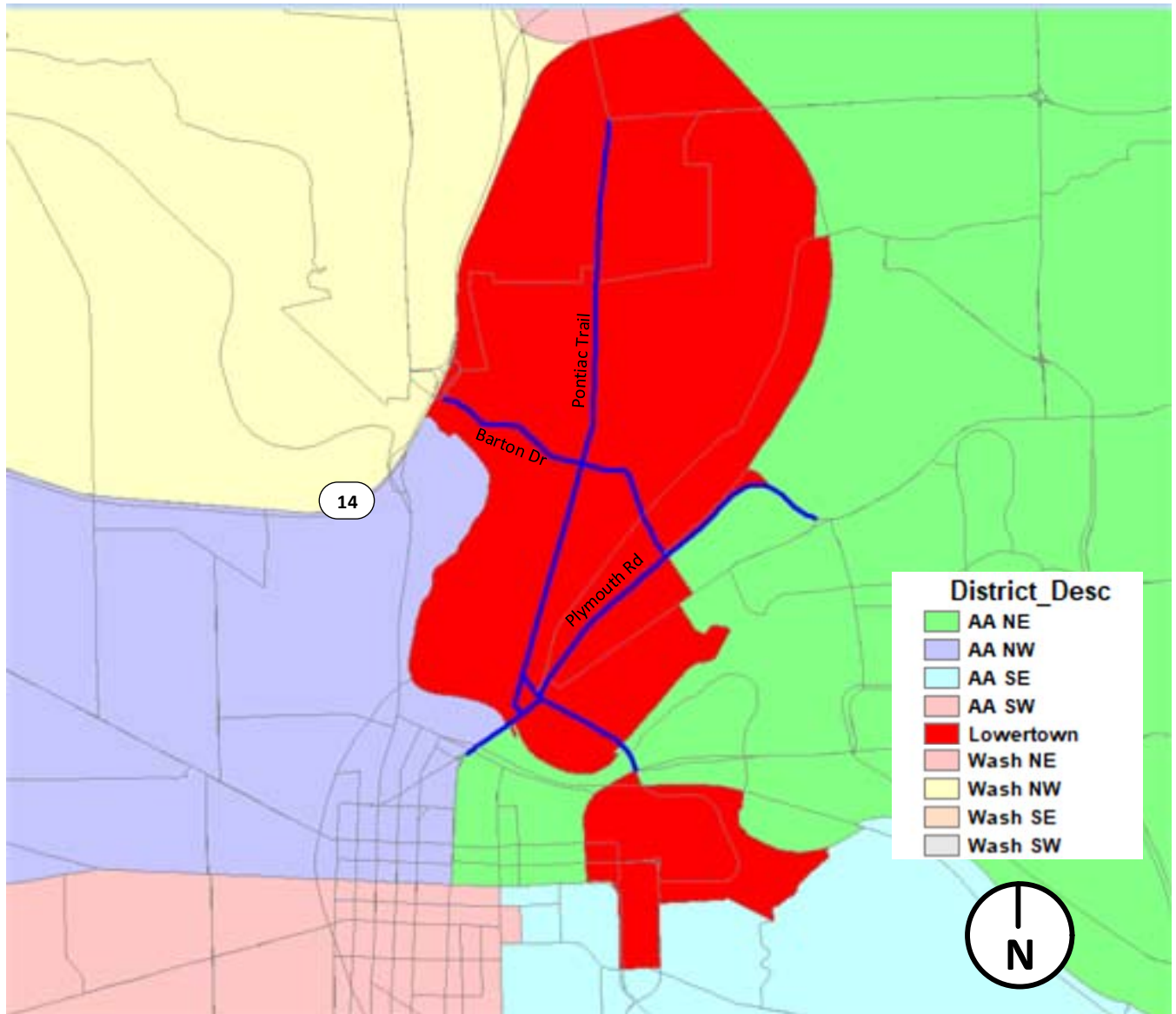


Table 2 shows that of the trips using the transportation network in Lower Town, 45% are trips destined to or from Lower Town and 55% of the trips are using the transportation network to pass-through Lower Town to other destinations. The pass-through trips primarily are traveling through Lower Town to reach downtown Ann Arbor per the TDM estimate. See Figure 5 for a scaled volume of the select link trips.

Table 2: Daily Select Link Analysis Results

Daily Metric	Select Link Analysis				
	To Lower Town from Other Districts	From Lower Town to Other Districts	Lower Town to Lower Town	Pass-Through	Total
Trips	14,247	13,970	2,600	37,454	68,271
% of Trips	21%	20%	4%	55%	100%

Figure 5: Lower Town Select Link Analysis: Scaled Traffic Volumes

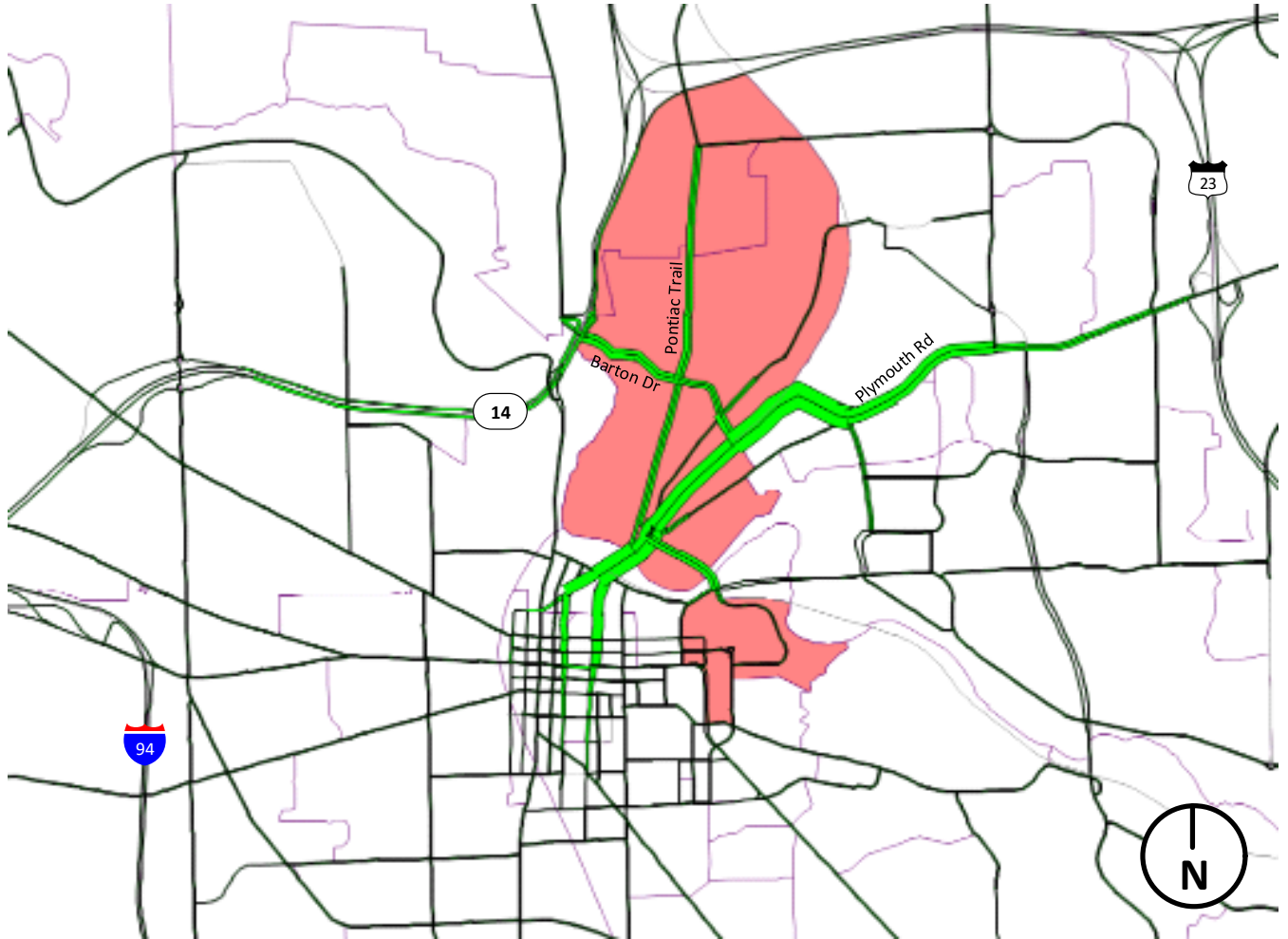


Table 3 shows the daily origin and destination proportions of the 55% of pass-through traffic using the Lower Town transportation network. **Of those pass-through trips, approximately 79% are Ann Arbor based (trips originating outside of Lower Town traveling on the Lower Town transportation network to or from areas of Ann Arbor outside of Lower Town) and 21% are based outside of Ann Arbor (trips originating outside of Ann Arbor traveling on the Lower Town transportation network to destinations outside of Ann Arbor).**

Table 3: Lower Town Daily Pass-Through Trips Distribution

Geographic Area	Pass-Through Trips		
	Origin	Destination	Trips
Ann Arbor	79%	79%	29,589
Washtenaw County	17%	17%	6,367
Other SE Michigan	4%	4%	1,498
Total	100%	100%	37,454

ADDITIONAL GRAPHICS

The following graphics color code the districts based on the percent of total origins or total destinations for both the select zone and select link analyses.

Figure 6: Select Zone Analysis – Daily Distribution of Trip Origins to Lower Town

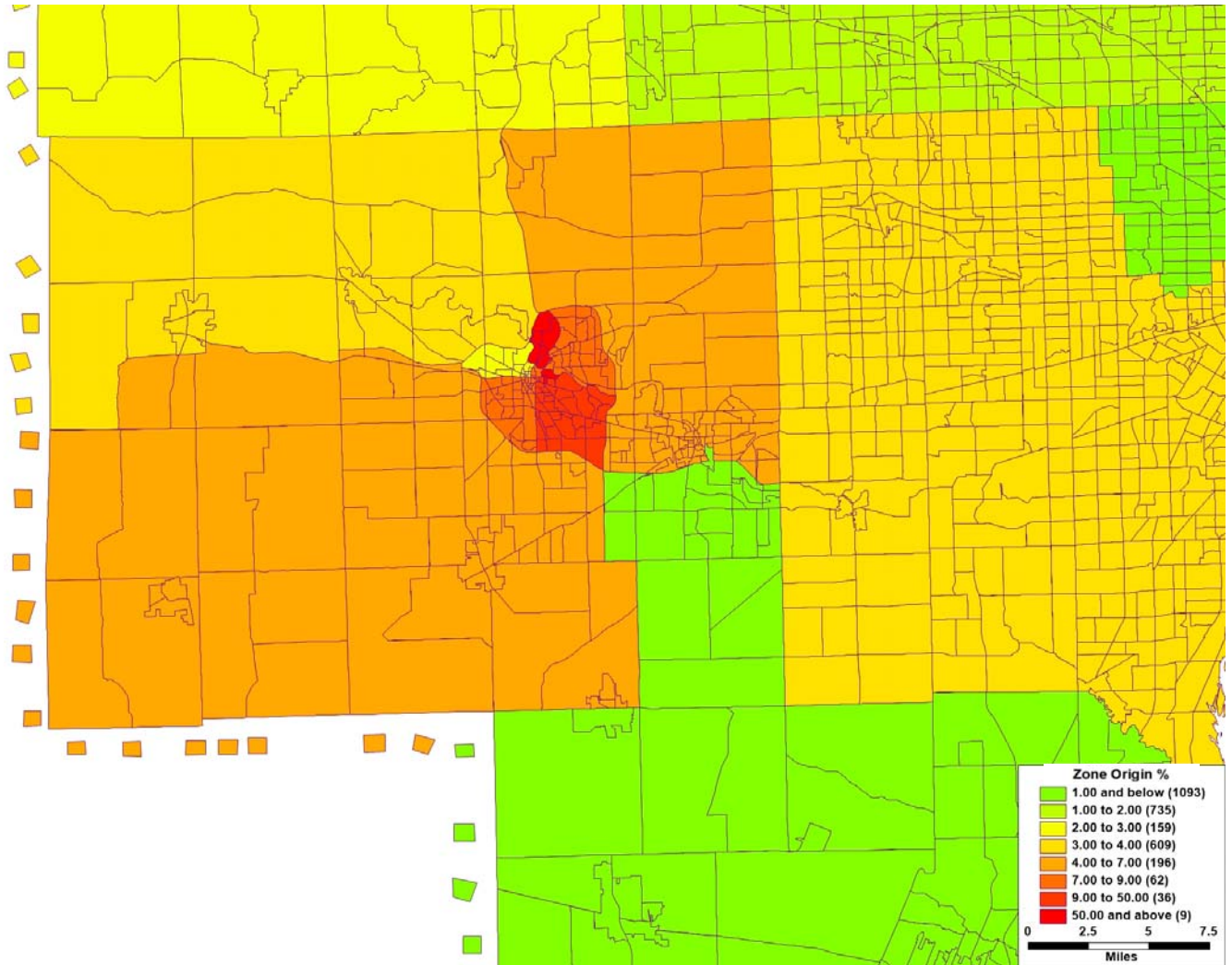


Figure 7: Select Zone Analysis – Daily Distribution of Trip Destinations from Lower Town

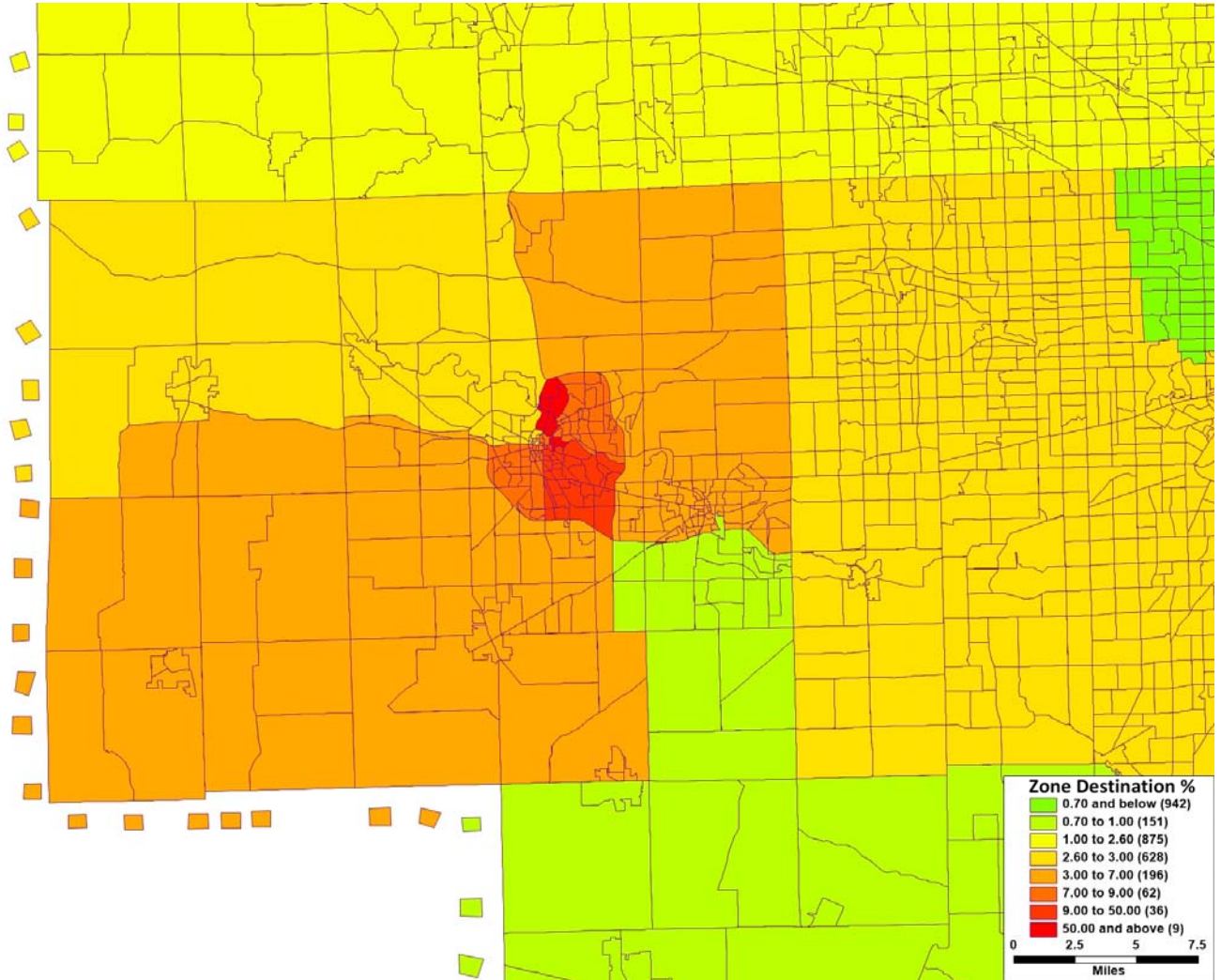


Figure 8: Select Link Analysis – Daily Distribution of Trip Origins Utilizing Lower Town Transportation Network

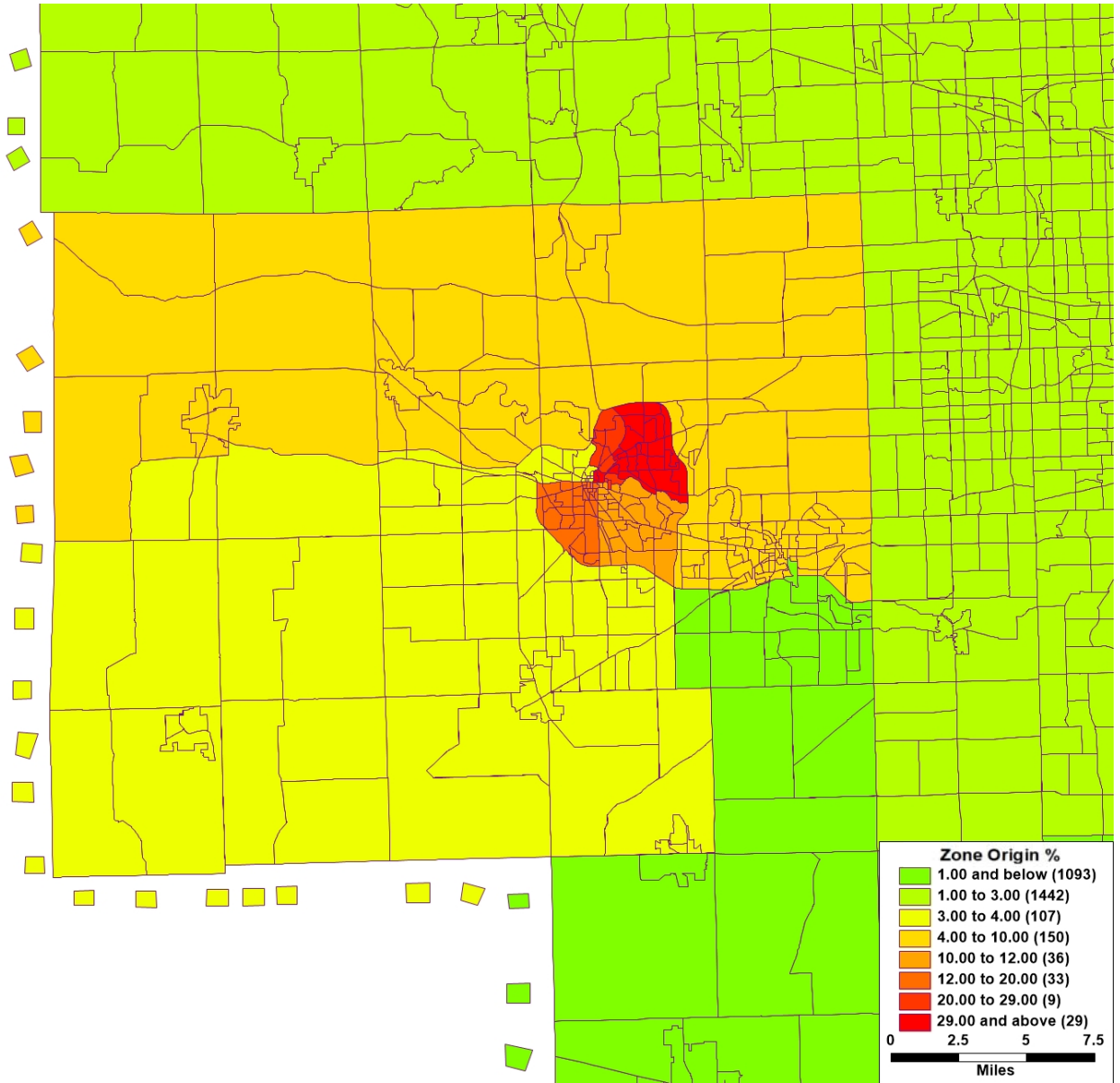
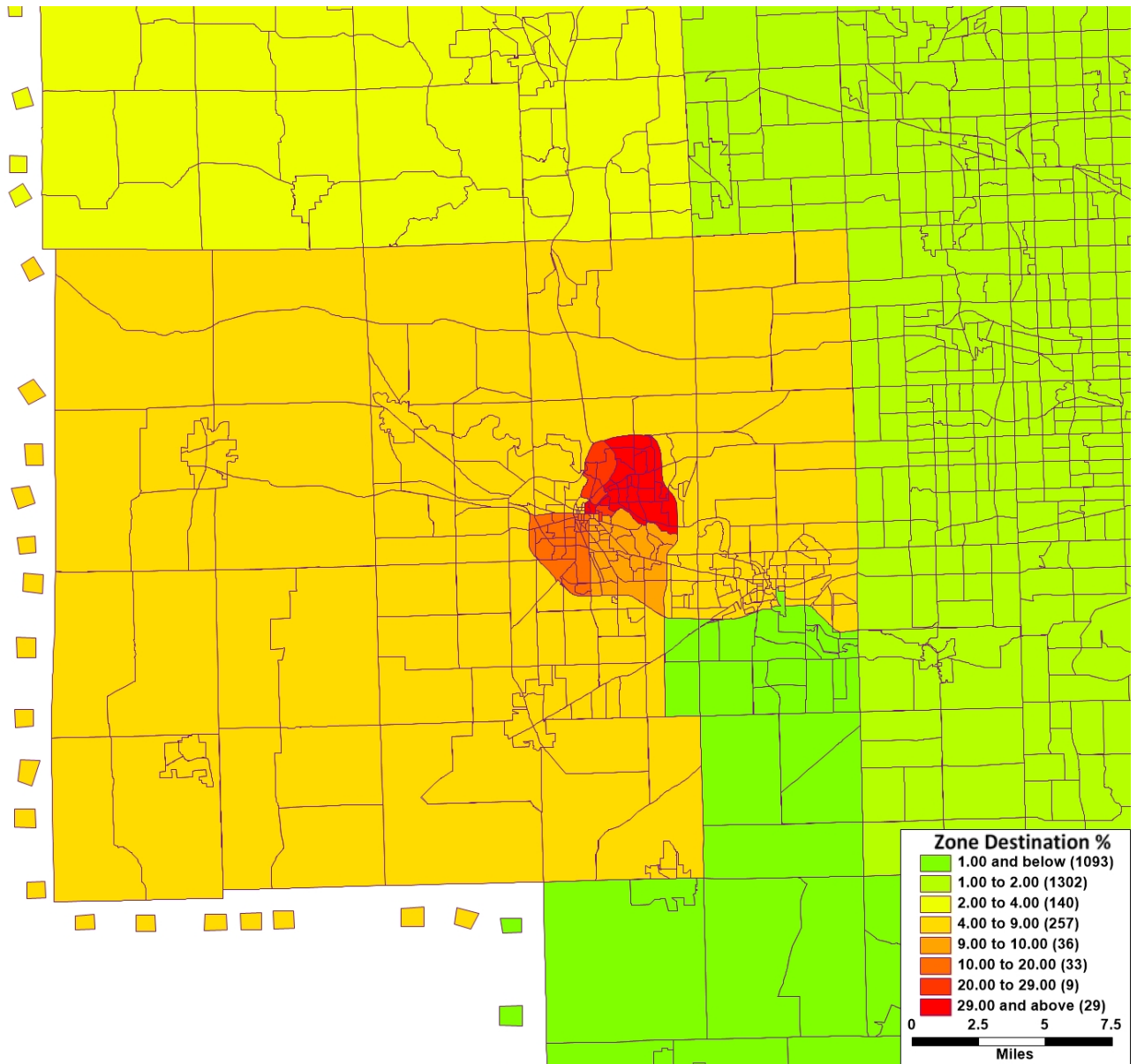


Figure 9: Select Link Analysis – Daily Distribution of Trip Destinations Utilizing Lower Town Transportation Network





EXAMPLE HOT SPOT TRACE ANALYSIS (EB BARTON DRIVE & PONTIAC TRAIL)

As indicated earlier, the City of Ann Arbor requested that an example be provided of how the TDM could be used to trace travel patterns in a future year scenario to assist the development of transportation network improvement strategies at locations identified as “hot spots,” or bottleneck locations within the Lower Town transportation network.

The City identified the eastbound Barton Drive approach at the Pontiac Trail intersection during the AM peak period for the theoretical bottleneck location for the example. The analysis performed to trace the traffic origins arriving on the eastbound Barton Drive approach and ultimately where this eastbound approach traffic goes after going through the Pontiac Trail intersection is done via a directional select link analysis.

For this example, results for only the eastbound approach during the AM peak period were summarized using the 2020 base year TDM. In practice, if there were multiple approaches contributing to the bottleneck or of particular interest, each approach would have a directional select link analysis performed. Also, if evaluating a future year scenario, the 2040 TDM model would be used instead of the 2020 base year, but the same analysis mechanics apply. The directional select link results were aggregated to the same districting as indicated in Figures 1 and 2 of this memorandum.

Table 4 indicates that only 24% of the traffic traveling on EB Barton at Pontiac Trail are traveling to the Lower Town district. Most of these trips have destinations outside Lower Town. In fact, of 95% of the pass-through trips are traveling to parts of Ann Arbor other than Lower Town as indicated in Table 5.

Table 4: AM Peak Select Link Analysis Results

AM Peak Period Metrics	EB Barton Drive Select Link Analysis				
	To Lower Town from Other Districts	From Lower Town to Other Districts	Lower Town to Lower Town	Pass-Through	Total
Trips	329	0	0	1,048	1,377
% of Trips	24%	0%	0%	76%	100%

Table 5: Lower Town Pass-Through Trips Traveling on EB Barton Road

Geographic Area	Pass-Through Trips	
	Origin	Destination
Ann Arbor	8%	95%
Washtenaw County	64%	4%
Other SE Michigan	28%	1%
Total	100%	100%

The primary origins are from Washtenaw County and the greater SE Michigan area. To break these results down further, 72% of the Washtenaw County trips are from the northwest area of the county and 88% of the Other SE Michigan trips are from Livingston County. These results can be seen visually in Figure 10. Figure 11 shows the scaled volumes of the select link analysis for EB Barton Drive.

Figure 10: EB Barton AM Peak: Select Link Percent Origins

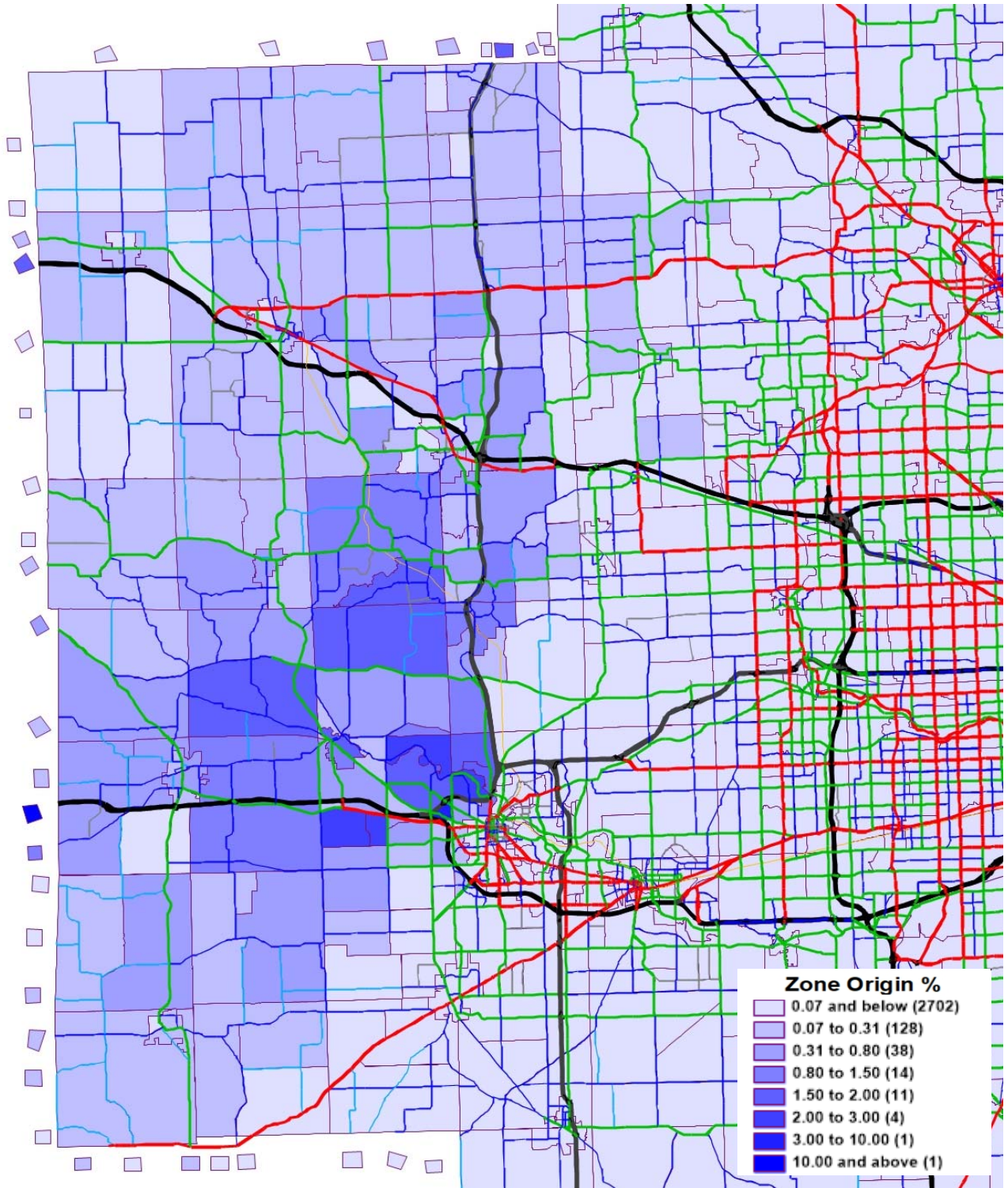


Figure 11: EB Barton AM Peak: Select Link Analysis Volumes

