BIRMINGHAM REGIONAL QUARTERLY CONGESTION UPDATE June 2015

Prepared for:

The Regional Planning Commission of Greater Birmingham

By:

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1. Overview

The Birmingham Region devotes significant resources to maintaining and improving its transportation system. The Regional Planning Commission of Greater Birmingham (RPCGB) has developed a comprehensive process for planning, allocating, and monitoring transportation resources to ensure continued mobility for the region. One component of that is the Congestion Management Process (CMP), which monitors transportation system performance, serves as a planning tool to help manage traffic congestion, and offers a set of multi-modal solutions for addressing the growing problem of traffic congestion in our region. Primarily, the CMP is a way to:

- Monitor, measure and diagnose the causes of congestion on the region's transportation system;
- Evaluate and recommend alternative strategies to manage or improve regional congestion; and
- Evaluate the performance of strategies put in practice to manage or improve congestion.

Every 3 months, the RPCGB, in conjunction with the Birmingham Regional Transportation Data Center, collects regional performance data and develops measures to assess the state of the transportation system. This report is the first of the 2015 series. It is intended to identify areas of significant congestion and monitor changes in congestion over time.

2. Measuring Mobility

2.1 The Congestion Monitoring Network

The roadway network selected for this report consists of the primary access routes to the Birmingham region and is shown in Figure 1. It includes the following routes:

- I-65 from south Shelby County to north Jefferson County
- I-20/59 from west Jefferson County to the I-20/59 split
- I-20 from I-20/59 to St. Clair County
- I-59 from I-20/59 to Clair County
- U.S. 78 from the Walker County Line to I-20/59
- U.S. 280 from Shelby County the Red Mountain Expressway
- U.S. 31 from south Shelby County to north Jefferson County
- U.S. 11 from Bessemer to St. Clair County

Figure 1. Congestion Monitoring Primary Network

2.2 Mobility Measures

This report uses two primary measures of mobility:

- Travel Time Index (TTI)
- Duration of congestion

The travel time index is used to identify roadway segments that currently experience congestion and will serve as a baseline against which to compare future congestion levels. The duration of congestion is a measure of how long the congestion persists on those segments. Spot speed profiles allow the RPC to monitor how traffic and congestion vary at key points in the network and track how they change over time.

Travel Time Index (TTI)

The Travel Time Index is a measure that allows RPC to identify and quantify congestion on major roadway segments. The TTI for a given roadway segment is defined as follows:

$$TTI = \frac{\text{travel time during peak period}}{\text{travel time under free flow conditions}}$$

The TTI is simply a comparison of the time it takes to travel a given segment during the peak period with the time it takes to travel that same segment under free flow conditions. For example, if a roadway segment has a travel time index of 2.0, it means that it takes twice as long to travel that segment during the peak period as it does during non-congested times. Simply put, the higher the TTI value the worse the congestion is. Threshold values were chosen to reflect when congestion was moderate, significant, or severe and are summarized below. These threshold values were chosen to reflect user perceptions of congestion and its impact on their travel times.

For freeway segments:

- TTI > 1.10 indicates moderate congestion
- TTI > 1.5 indicates significant congestion
- TTI > 2.0 indicates severe congestion
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For US highways and arterials, travel times are typically slower due to traffic lights and the numerous driveway access points so the TTI thresholds are proportionally higher:

- TTI > 1.5 indicates moderate congestion
- TTI > 2.0 indicates significant congestion
- TTI > 2.5 indicates severe congestion

Peak period travel times were measured on the study routes using the HERE vehicle probe data set. From these archived data, we can compute average travel times for all roadway segments in the network at 5 and 15 minute intervals. Four weeks of speed data collected in June 2015 were used to compute average travel time values during the peak periods of 6:00 – 10:00 AM and 3:00 – 7:00 PM. TTI values are summarized for the study network in Table 1. 2015 TTI values are shown graphically for the AM and PM peak periods in Figures 2 and 3. It should be noted that the values shown in the figures as well as Tables 1 and 2 reflect peak travel time indices for one 15 minute period

between 6:00 – 10:00 AM and one 15 minute period between 3:00 – 7:00 PM. Individual roadway segments may have different peak periods within that time range.

Table 1. Summary of Peak TTI Values – June 2015

ROUTE	SEGMENT	DIRECTION	MAX TTI AM	MAX TTI PM
I-20	I20/59 to I459(I_20)	Eastbound	1.05	1.10
	I459 to St. Clair County(I_20)	Eastbound	0.96	0.95
	I20/59 to I459(I_20)	Westbound	1.38	1.07
	I459 to St. Clair County(I_20)	Westbound	0.96	0.97
I-20/I-59	I459 to Valley Road	Eastbound	1.02	1.00
	I65 to RME(I_20/59)	Eastbound	2.01	1.52
	RME to I20/59 Split	Eastbound	1.00	1.23
	Tuscaloosa Co.Line to I459	Eastbound	0.95	1.10
	Valley Road to I65	Eastbound	2.30	1.10
	I459 to Valley Road	Westbound	1.02	1.03
	I65 to RME(I_20/59)	Westbound	1.51	2.71
	RME to I20/59 Split	Westbound	2.17	1.19
	Tuscaloosa Co.Line to I459	Westbound	0.94	0.98
	Valley Road to I65	Westbound	1.11	1.31
I-22	SR5 (Bankhead Hwy) to Coalburg Rd	Eastbound	1.15	1.16
	Walker Co.Line to SR5 (Bankhead Hwy)	Eastbound	1.01	1.00
	SR5 (Bankhead Hwy) to Coalburg Rd	Westbound	1.14	1.12
	Walker Co.Line to SR5 (Bankhead Hwy)	Westbound	1.00	0.99
I-459	I20 to I59	Northbound	1.04	1.57
	I20/59 South to I65	Northbound	1.07	1.05
	I65 to I20	Northbound	1.14	1.10
	I20 to I59	Southbound	1.02	1.07
	I20/59 South to I65	Southbound	1.05	1.17
	I65 to I20	Southbound	1.09	1.10
I-59	I20/59 to I459(I_59)	Northbound	1.19	1.31
	I459 to St. Clair County(I_59)	Northbound	0.95	1.06
	I20/59 to I459(I_59)	Southbound	1.24	1.09
	I459 to St. Clair County(I_59)	Southbound	1.08	0.98
I-65	Chilton County Line to US31 in Alabaster	Northbound	1.34	1.07
	I20/59 to US31/Mary Buckelew	Northbound	1.20	1.16
	I459 to I20/59	Northbound	1.93	1.38
	US31 (Exit 275) to Cullman County Line	Northbound	1.00	0.98
	US31 in Alabaster to I459	Northbound	1.26	0.98
	Chilton County Line to US31 in Alabaster	Southbound	0.94	1.04
	I20/59 to US31/Mary Buckelew	Southbound	1.37	1.12
	I459 to I20/59	Southbound	1.09	2.02
	US31 (Exit 275) to Cullman County Line	Southbound	0.99	0.99
	US31 in Alabaster to I459	Southbound	0.99	1.64

Table 1. Summary of Peak TTI Values – April 2015 (continued)

ROUTE	SEGMENT	DIRECTION	MAX TTI AM	MAX TTI PM
US-11/AL-7	Academy Drive to Aranov Dr	Northbound	1.67	1.87
	Aranov Dr to I65	Northbound	2.26	2.26
	I20 to I459	Northbound	3.10	2.32
	I65 to RME(US_11)	Northbound	2.78	2.65
	RME to I20	Northbound	1.72	1.66
	Academy Drive to Aranov Dr	Southbound	1.69	1.80
	Aranov Dr to I65	Southbound	2.55	2.24
	I20 to I459	Southbound	2.94	2.58
	I65 to RME(US_11)	Southbound	2.44	2.41
	RME to I20	Southbound	1.91	2.01
US-280	I459 to SR119	Eastbound	1.85	2.78
	RME to Rocky Ridge Road	Eastbound	1.23	2.34
	Rocky Ridge Road to I459	Eastbound	1.94	2.66
	SR119 to SR47	Eastbound	1.47	2.02
	SR47 to Talladega County Line	Eastbound	1.05	1.13
	I459 to SR119	Westbound	2.66	3.46
	RME to Rocky Ridge Road	Westbound	1.58	1.27
	Rocky Ridge Road to I459	Westbound	3.18	2.20
	SR119 to SR47	Westbound	1.46	1.44
	SR47 to Talladega County Line	Westbound	1.12	1.06
US-31	Chilton County Line to I65 in Alabaster	Northbound	2.33	2.20
	I20/59 to I65	Northbound	3.71	1.74
	I459 to US280	Northbound	1.85	2.03
	I65 in Alabaster to I459	Northbound	1.85	2.05
	US280 to I20/59	Northbound	1.34	1.78
	Chilton County Line to I65 in Alabaster	Southbound	1.84	2.03
	I20/59 to I65	Southbound	1.91	2.02
	I459 to US280	Southbound	2.03	2.36
	I65 in Alabaster to I459	Southbound	1.80	2.33
	US280 to I20/59	Southbound	1.37	2.00
US-78	I20/59 to US11	Eastbound	2.10	3.05
	Minor Pkwy to I20/59	Eastbound	1.69	1.52
	Minor Pkwy to I20/59	Westbound	1.45	1.57

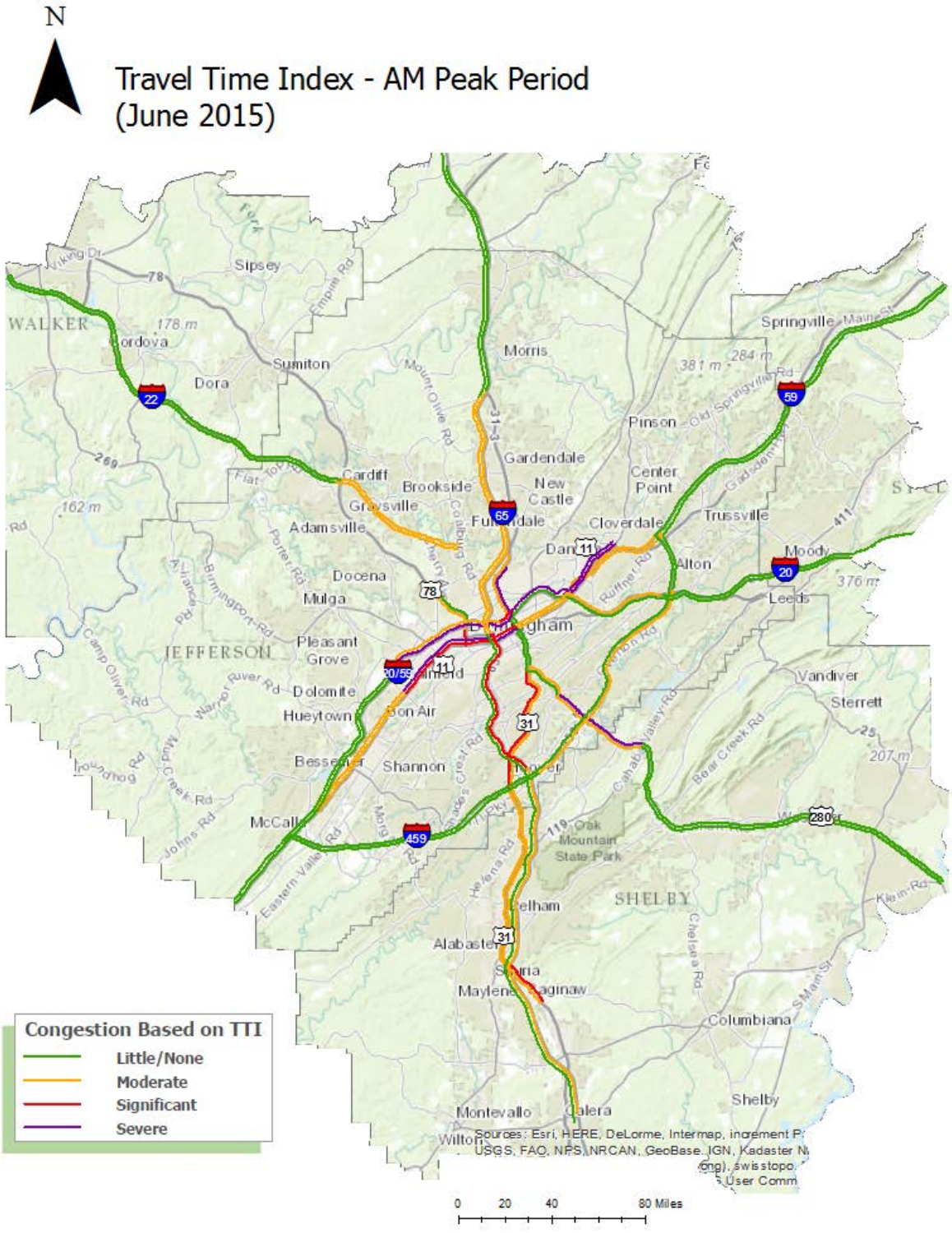

Figure 2. Travel Time Index – AM Peak

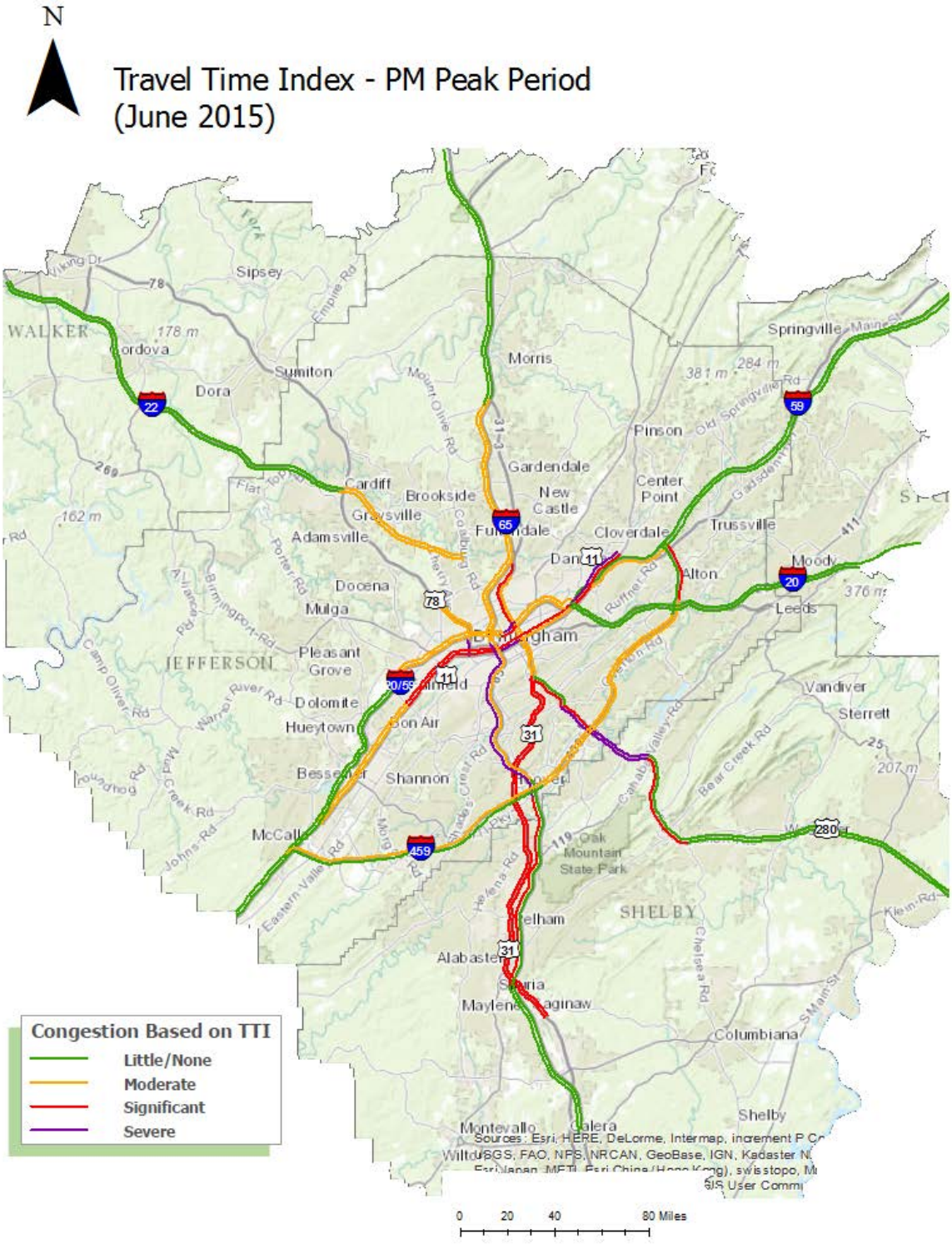

Figure 3. Travel Time Index – PM Peak

It can be seen in Figures 2 and 3 that congestion is most significant on the following route segments:

- I-65 from I-459 to I-20/59
- US 280 from the Red Mountain Expressway to AL 119
- I-20/59 from I-459 to the I-20/I-59 split
- I-20 from the 20/59 split to I-459

Duration of Congestion

Where congestion was found to exist, we used the travel time data to measure its duration. Figures 4 and 5 show the duration of congestion on the study routes during the AM and PM peak periods. These figures show that congestion is not only significant on I-65 and US 280 but also persistent, continuing for more than 1 hour during the peaks. Congestion was also found to be persistent on segments of I-20/59, I-20, and I-59 in downtown Birmingham and on I-459.

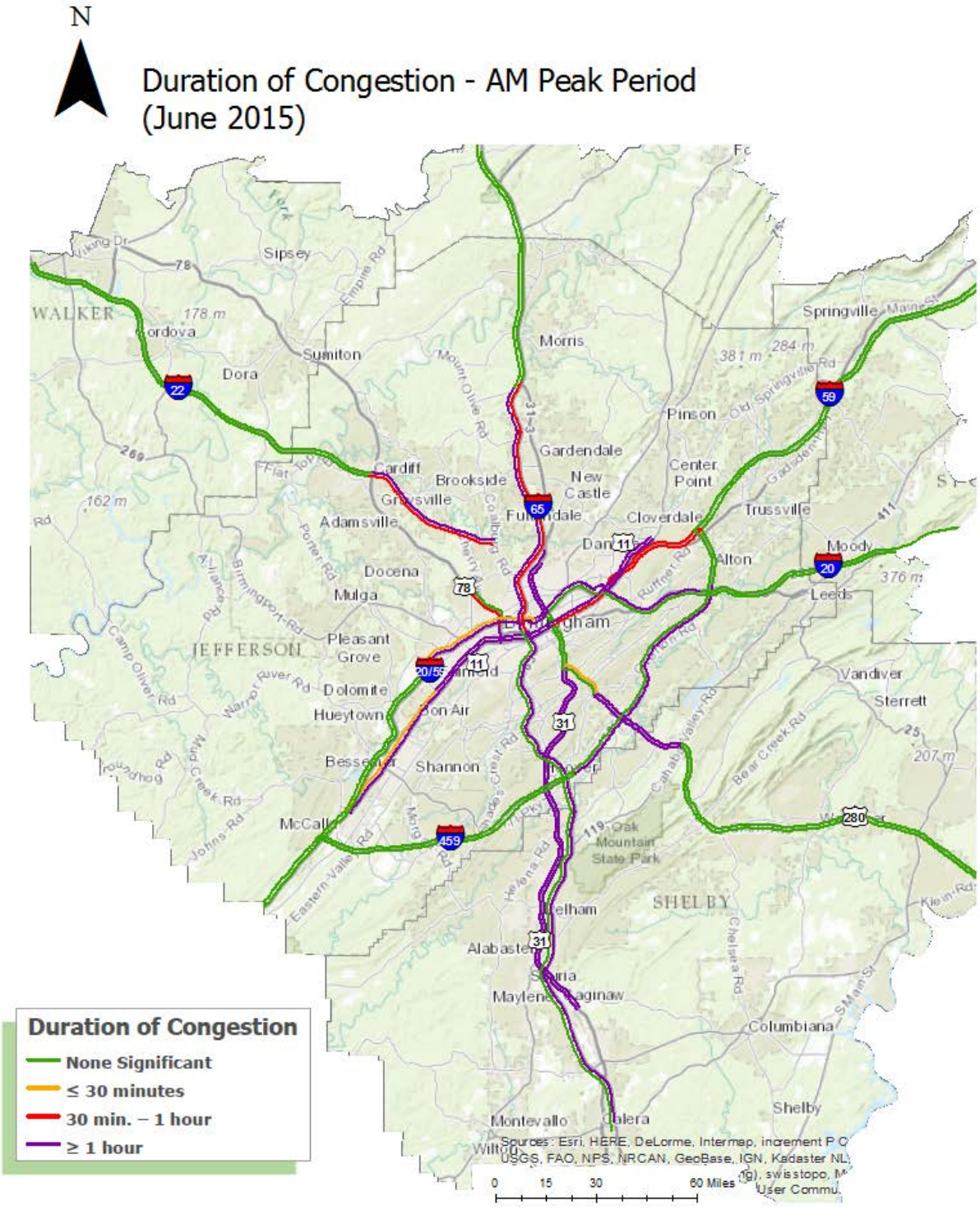

Figure 4. Duration of Congestion – AM Peak

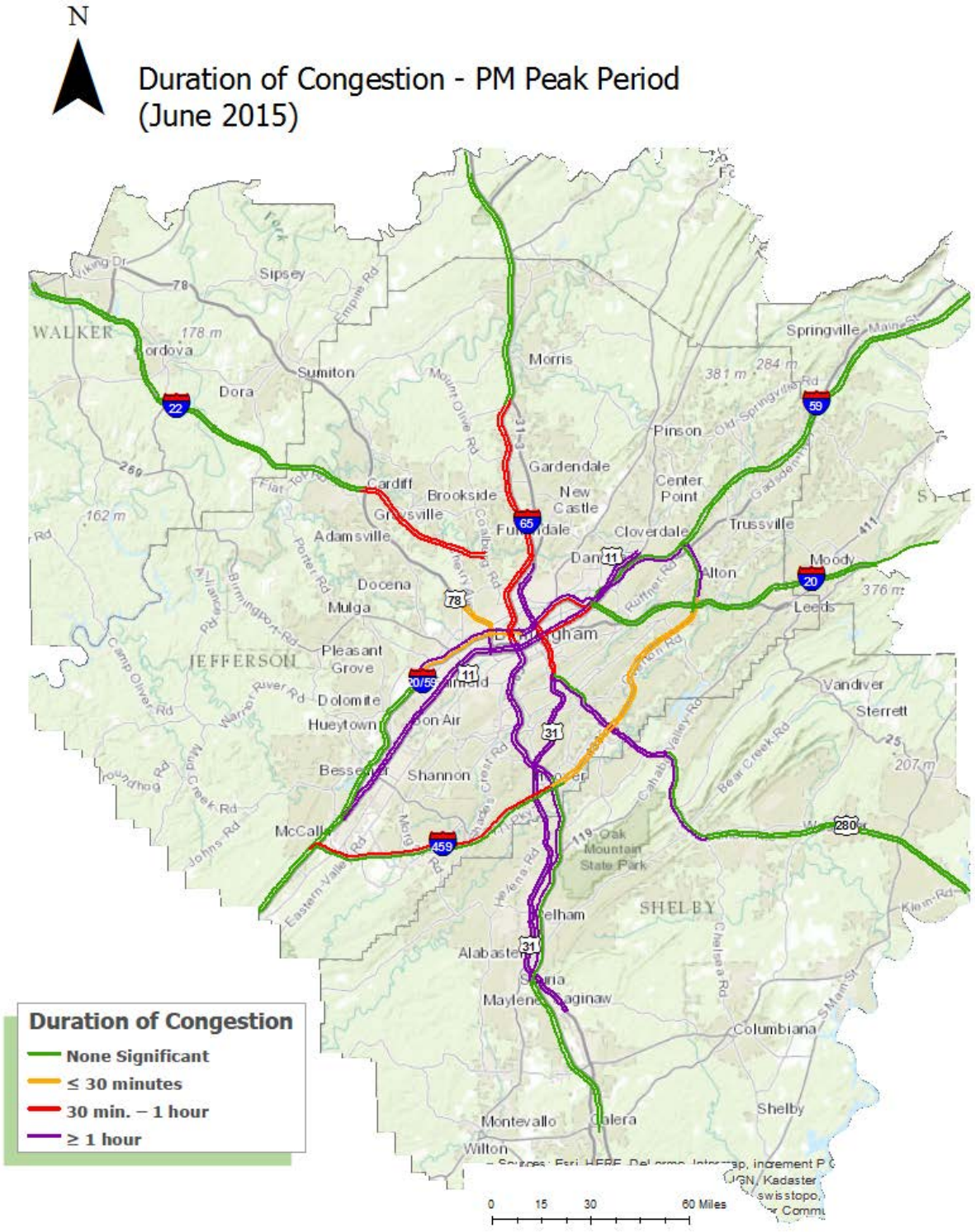

Figure 5. Duration of Congestion – PM Peak

Summary

Significant congestion occurs on several important routes in the Birmingham region. The most serious congestion occurs on:

- I-65 between I-459 and downtown Birmingham
- U.S. 280 from Shelby County to the Red Mountain Expressway
- I-20/59 between I-65 and the I-20/I-59 split (downtown Birmingham)

The speed and travel time data indicate that congestion on these routes is not only significant but persistent, occurring for more than 1 hour during both the AM and PM peak periods. Congestion also occurs on other primary routes, such as I-20, I-59, and US 78, though it is less severe and persists for shorter periods.