

**Rappahannock-Rapidan Regional Commission  
2007 Travel Time Survey**



Rappahannock Rapidan  
Regional Commission  
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## Introduction

Travel time, or the time required to traverse a route between any two points, is a fundamental measure in transportation. Elements of a travel time study--operating speed, elapsed travel time and duration and frequency of delays are all performance measures that convey a broader picture of how traffic moves. Beginning with this study, the Rappahannock Rapidan Commission (RRRC) has initiated the travel time process for the Planning District Nine (Culpeper, Fauquier, Madison, Orange, Rappahannock Counties) region.

The primary utility of the travel time study is to compare over time how traffic flows on a corridor. RRRC intends to perform these studies annually, choosing different corridors to review until a period of five years has elapsed. Therefore, data collected during the initial corridor analyses will serve as the base line for the future measurements. Starting in the sixth year of the study, the same corridor segments that were analyzed five years previous will be re-visited, i.e. segments that were driven in 2007 will be revisited in 2012, 2008 in 2013, 2009 in 2014 and so forth.

RRRC will use the travel time studies, in conjunction with other data such as traffic counts and level of service information, to create an overall Congestion Management System for the PD9 region. Congestion Management Systems are mandated by federal law for metropolitan planning areas and are a useful tool to evaluate and monitor traffic congestion.

## Methodology

The “test vehicle” technique was used during this study. This method consists of a vehicle specifically dispatched to drive with the traffic stream for the express purpose of data collection. A stopwatch was started at the beginning of each test run to record the cumulative lapsed time between the starting and end points along each corridor segment. When the test vehicle was stopped or forced to travel slowly (10 miles per hour or below), the stopwatch was used to measure the duration of each stop/delay. In addition, the location of each stop/delay was recorded. One data collection run was made in each direction during the morning (7 to 9 a.m.) and afternoon (4 to 6 p.m.) peak hours for each segment. As much as possible, the test car was driven in the right lane (the study segments were four-lane divided highways) at the legally posted speed limit.

The average travel characteristics are defined below:

*Travel Time* – Number of minutes needed to travel between two points. Travel time is equivalent to the addition of running time and stop/delay time (*see definitions below*).

*Running Time* – The time period when the vehicle is in motion.

*Stop/Delay Time* – The time period when vehicle has stopped moving or has almost stopped moving.

*Average Travel Speed* – The average speed of travel between two control points, including delays. The average travel speed is computed by taking the length of the highway segment under consideration and dividing it by the average travel time of that segment.

*Average Running Speed* – The average speed of travel between two control points only when the vehicle is in motion. The average running speed is computed by taking the length of the highway segment under consideration and dividing it by the average running time of that segment.

### Study Corridor Segments

The initial RRRC travel time study measured speed and delay along three segments of Route 29, including three bypasses sections around the Towns of Culpeper, Madison and Warrenton. The segment lengths corresponded with sections delineated by the VDOT Traffic Engineering Division to perform their annual average daily traffic volume estimates. Adjoining VDOT daily traffic volume sections with higher annual average daily traffic (AADT) volume estimates were combined to form the three segments lengths (see attached map for VDOT AADT volume estimates along the analyzed corridor).

The three Route 29 segments measured were 12.16 miles between Route 15 and Route 673 in Culpeper County (Corridor B), 14.21 miles between Route 17 (Opal) and Route 215 in Fauquier County (Corridor A) and 3.98 miles between Route 230 (west of Route 29) and the intersection of Business/Bypass 29 (north of the Town of Madison) in Madison County (Corridor C). Taken together these segments are approximately thirty miles in length.

The whole length of the segment in Culpeper County was posted at sixty miles per hour (mph), while portions of the segment length in Fauquier County was posted at both 45 and 55 mph. The segment length in Madison County contained a school zone that was in operation during the morning peak run, with a posted limit of 35 mph. Where there were variations in speed limit along the segment length (Fauquier County segment, the Madison County segment during the morning peak run) an average posted speed limit was computed.

### Results

The results of the travel time analysis are summarized in the following tables. Tables 1 and 2 detail the segment analyzed, segment length, travel time, running time, stop/delay time, average posted speed limit, average travel speed, average running speed, difference of average travel speed from posted speed limit during difference of average running speed from posted speed limit and average number of traffic signals per mile of segment analyzed. Tables 3 and 4 specifically delineate the stops/delay in each segment

by cause, location, and time of the stop/delay. The sole cause of stop/delay in the study segments was the result of traffic signals.

**TABLE 1****ROUTE 29  
AM PEAK (7:00 – 9:00 a.m.)**

Freeway Segment	Length (Miles)	Travel Time = Running Time+ Stopped/Delay Time (Minutes/Seconds)	Running Time (Minutes/Seconds)	Stop/Delay Time – 10 MPH or Lower (Minutes/Seconds)	Posted Speed Limit (MPH)	Average Travel Speed (MPH)	Average Running Speed (MPH)	Difference (+/-) of Average Travel Speed from Posted Speed Limit	Difference (+/-) of Average Running Speed from Posted Speed Limit
Route 15 to Route 673	12.16	12:43	12:35	00:08	60	57.37	57.98	-2.63)	(-2.02)
Route 673 to Route 15	12.16	12:24	12:08	00:16	60	58.84	60.14	(-1.16)	(+0.14)
Route 17 (Opal) to Route 215	14.21	17:52	16:48	1:04	53.94 (avg.)	47.72	50.75	(-6.22)	(-3.19)
Route 215 to Route 17 (Opal)	14.21	18:47	16:27	2:20	53.94 (avg.)	45.38	51.82	(-8.56)	(-2.12)
Route 230 (West of Route 29) to Juncture of Business/Bypass 29 (North of Town of Madison)	3.98	6:40	5:05	1:35	53 (avg.)	35.82	46.98	(-17.18)	(-6.02)
Juncture of Business/Bypass 29 (North of Town of Madison) to Route 230 (West of Route 29)	3.98	5:52	4:54	00:58	53 (avg.)	40.70	48.73	(-12.3)	(-4.27)

**TABLE 2****ROUTE 29  
PM PEAK (4:00 – 6:00 p.m.)**

Freeway Segment	Length (Miles)	Travel Time (Minutes/Seconds)	Running Time (Minutes/Seconds)	Stop/Delay Time – 10 MPH or Lower (Minutes/Seconds)	Average Posted Speed Limit (MPH)	Average Travel Speed (MPH)	Average Running Speed (MPH)	Difference (+/-) of Average Travel Speed from Posted Speed Limit	Difference (+/-) of Average Running Speed from Posted Speed Limit
Route 15 to Route 673	12.16	12:38	12:30	00:08	60	57.77	59.66	(-2.23)	(-0.34)
Route 673 to Route 15	12.16	13:57	13:00	00:57	60	52.30	56.11	(-7.70)	(-3.89)
Route 17 (Opal) to Route 215	14.21	18:06	17:19	00:47	53.94 (avg.)	47.10	49.24	(-6.84)	(-4.70)
Route 215 to Route 17 (Opal)	14.21	18:15	16:57	1:18	53.94 (avg.)	46.81	50.30	(-7.13)	(-3.64)
Route 230 (West of Route 29) to Juncture of Business/Bypass 29 (North of Town of Madison)	3.98	5:04	4:47	00:17	55	47.13	49.92	(-7.47)	(-5.08)
Juncture of Business/Bypass 29 (North of Town of Madison) to Route 230 (West of Route 29)	3.98	5:03	4:36	00:27	55	47.74	51.91	(-7.26)	(-4.09)

**TABLE 3**

ROUTE 29  
**STOPS/DELAYS (10 MPH or Below)**  
*AM Peak*

Road Segment	Stop/Delay Cause	Stop/Delay Location (Intersection)	Stopped/Delay Time (Minutes/Seconds)
Route 15 to Route 673	Traffic Signal	Route 663	0:08
Route 673 to Route 15	Traffic Signal	Route 663	0:16
Route 17 (Opal) to Route 215	Traffic Signal	Route 600	0:30
		Route 215	0:34
Route 215 to Route 17 (Opal)	Traffic Signal	Route 600	0:16
		Route 605	0:30
		Business Route 15/29 - Route 880	0:29
			1:05
		Route 17 (Opal)	
Route 230 (West of Route 29) to Juncture of Business/Bypass 29 (North of Town of Madison)	Traffic Signal	Business Route 29 (South of Town of Madison)	1:17
			0:18
		Route 634	


**TABLE 4**

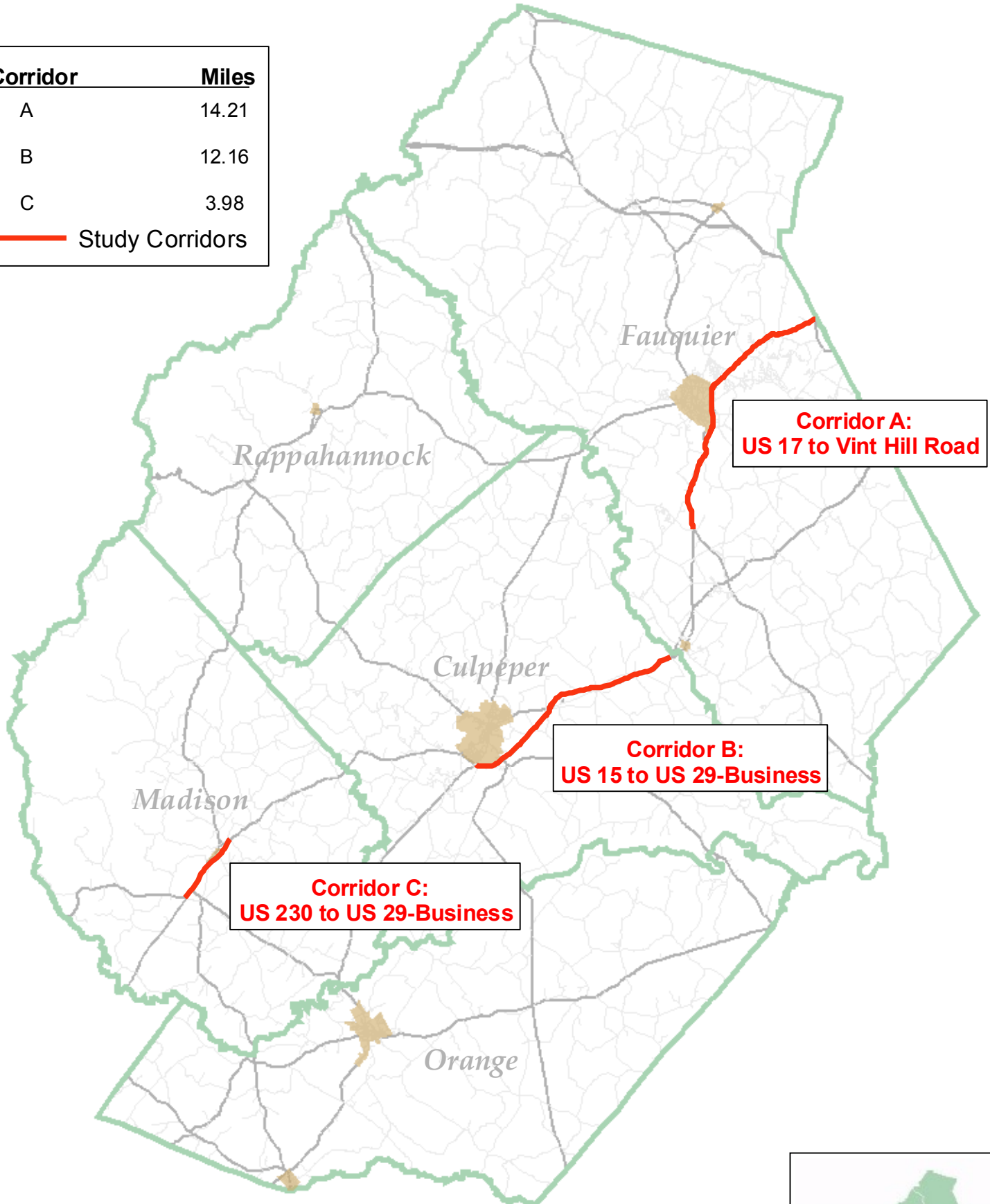
ROUTE 29  
STOPS/DELAYS (10 MPH or Below)

*PM Peak*

Road Segment	Stop/Delay Cause	Stop/Delay Location (Intersection)	Stopped/Delay Time (Minutes/Seconds)
Route 15 to Route 673	Traffic Signal	Route 674	0:08
Route 673 to Route 15	Traffic Signal	Route 666	0:57
Route 17 (Opal) to Route 215	Traffic Signal	Business Route 15/29 Route 880	0:17
		Comfort Inn Drive	0:06
		Route 605	0:14
		Route 215	0:10
Route 215 to Route 17 (Opal)	Traffic Signal	Route 605	0:18
		Nordix Drive – Cedar Run Drive	1:00
Route 230 (West of Route 29) to Juncture of Business/Bypass 29 (North of Town of Madison)	Traffic Signal	Mountaineer Lane	0:17
Juncture of Business/Bypass 29 (North of Town of Madison) to Route 230 (West of Route 29)	Traffic Signal	Business Route 29 (North of Town of Madison)	0:27

# 2007 RRRC Travel Time Study Corridors

Corridor	Miles
A	14.21
B	12.16
C	3.98
 Study Corridors	

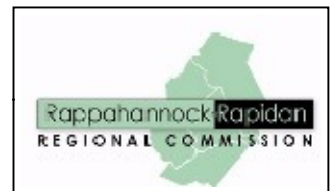
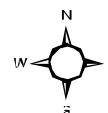
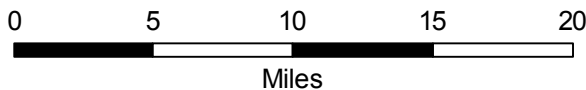


**Corridor A:  
US 17 to Vint Hill Road**

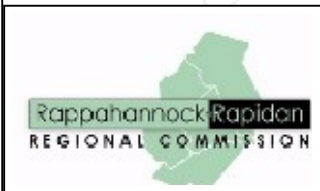
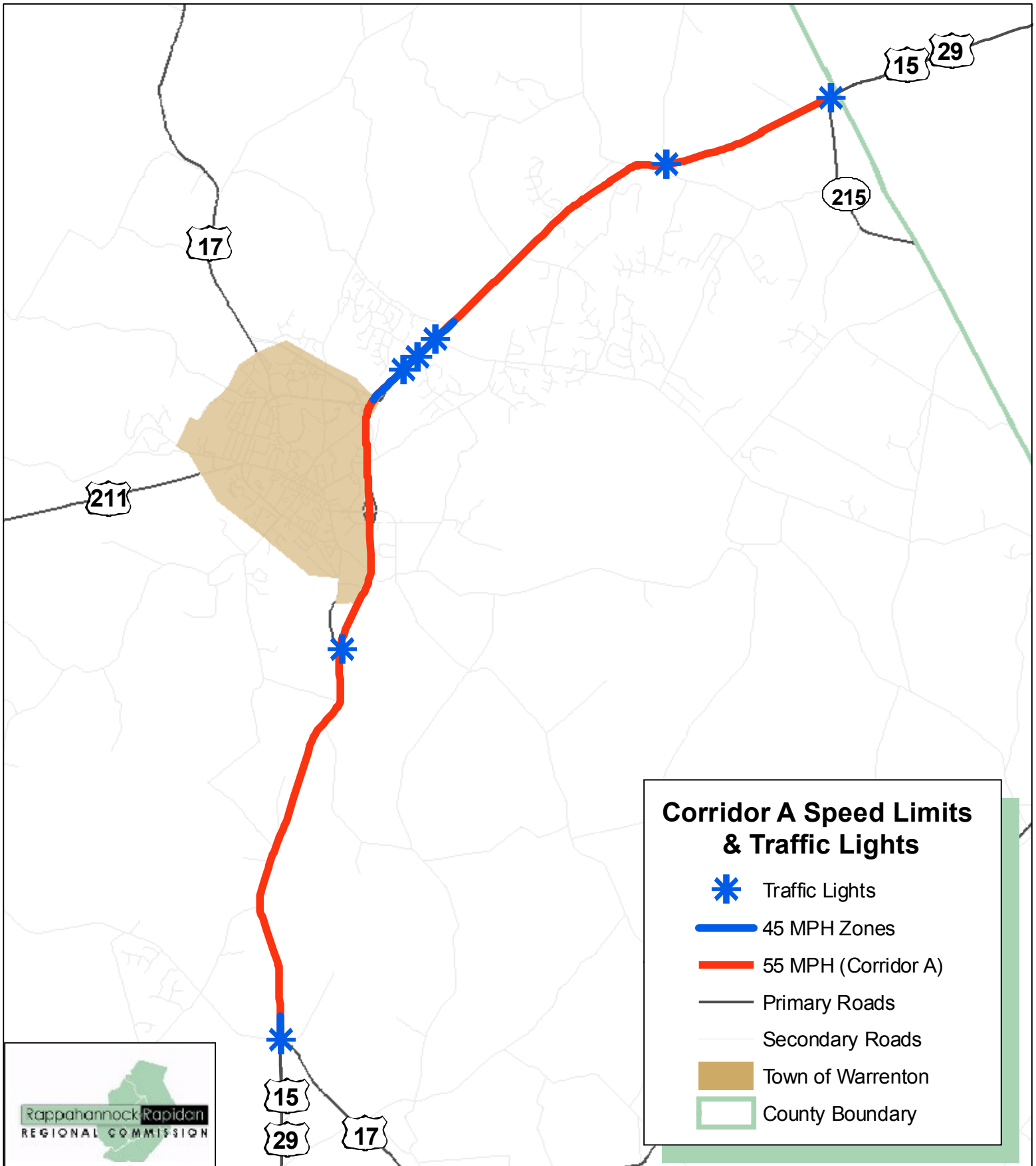
**Corridor B:  
US 15 to US 29-Business**

**Corridor C:  
US 230 to US 29-Business**

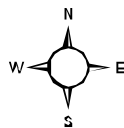
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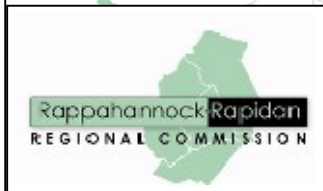
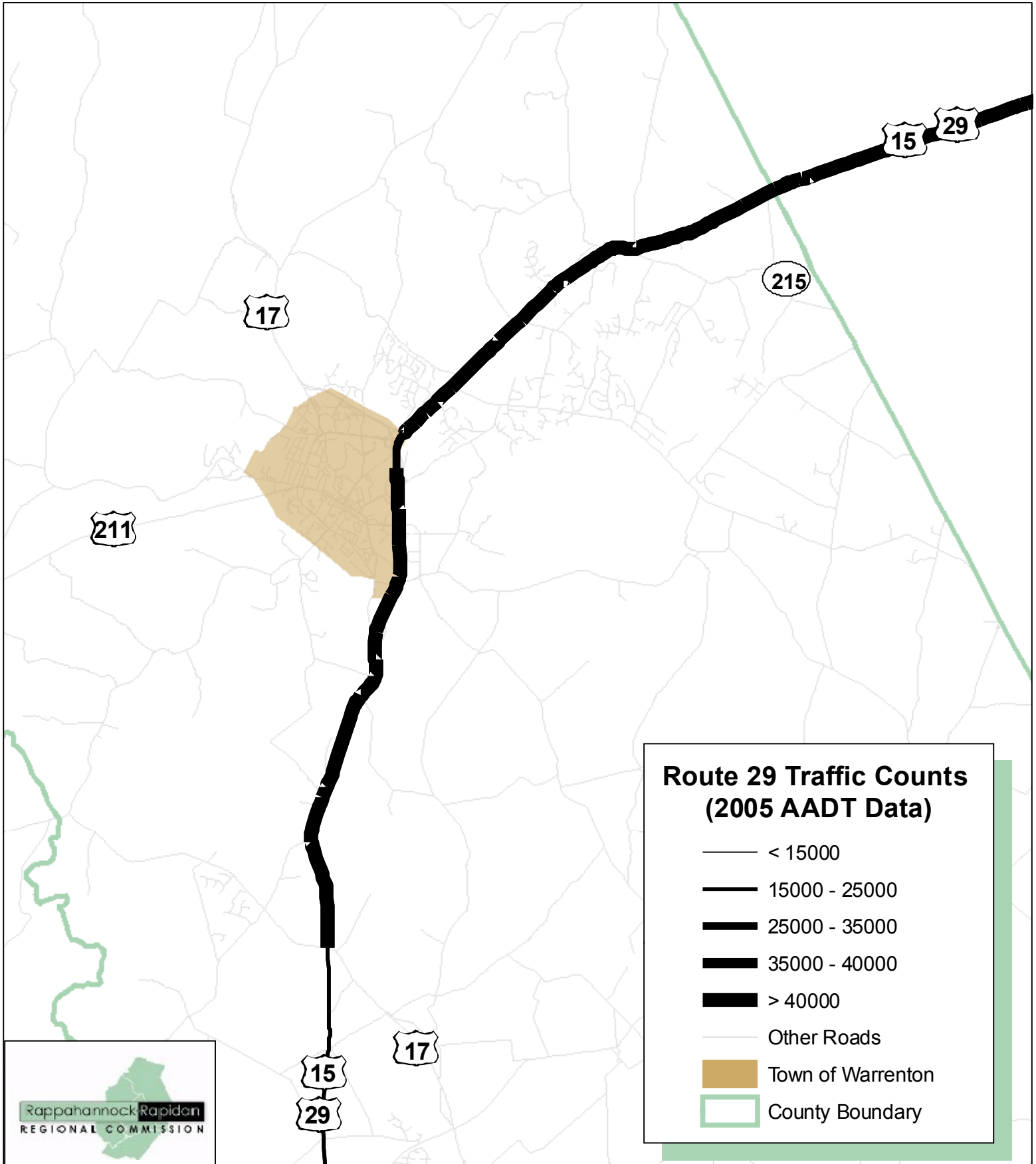
# 2007 RRRC Travel Time Study: Corridor A



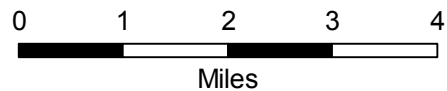
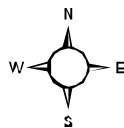
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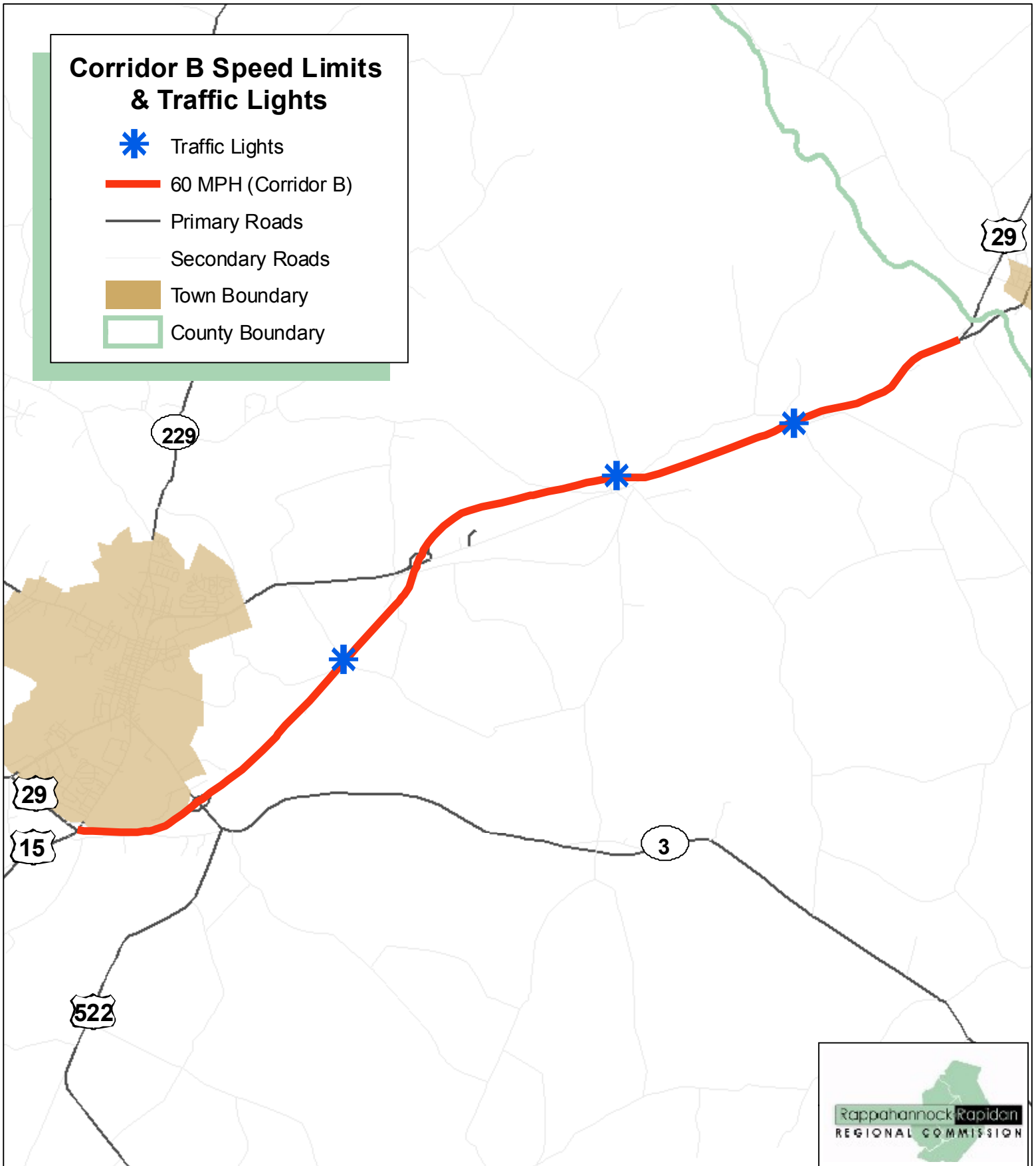
# 2007 RRRRC Travel Time Study: Corridor A Traffic Counts (2005 AADT Data)



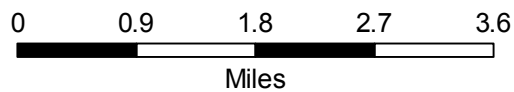
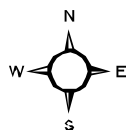
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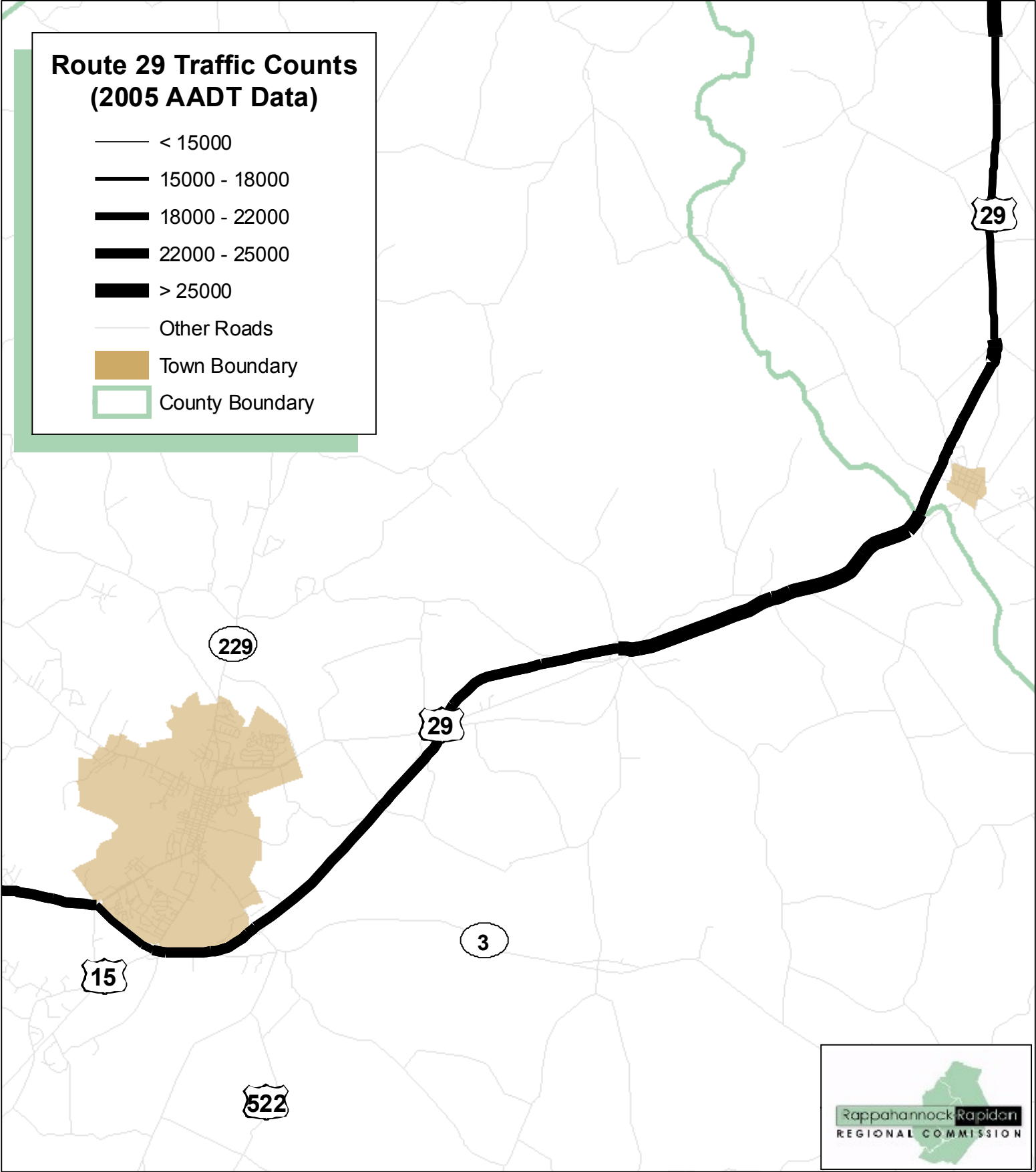
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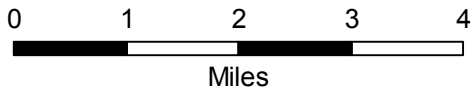
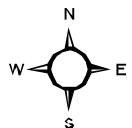
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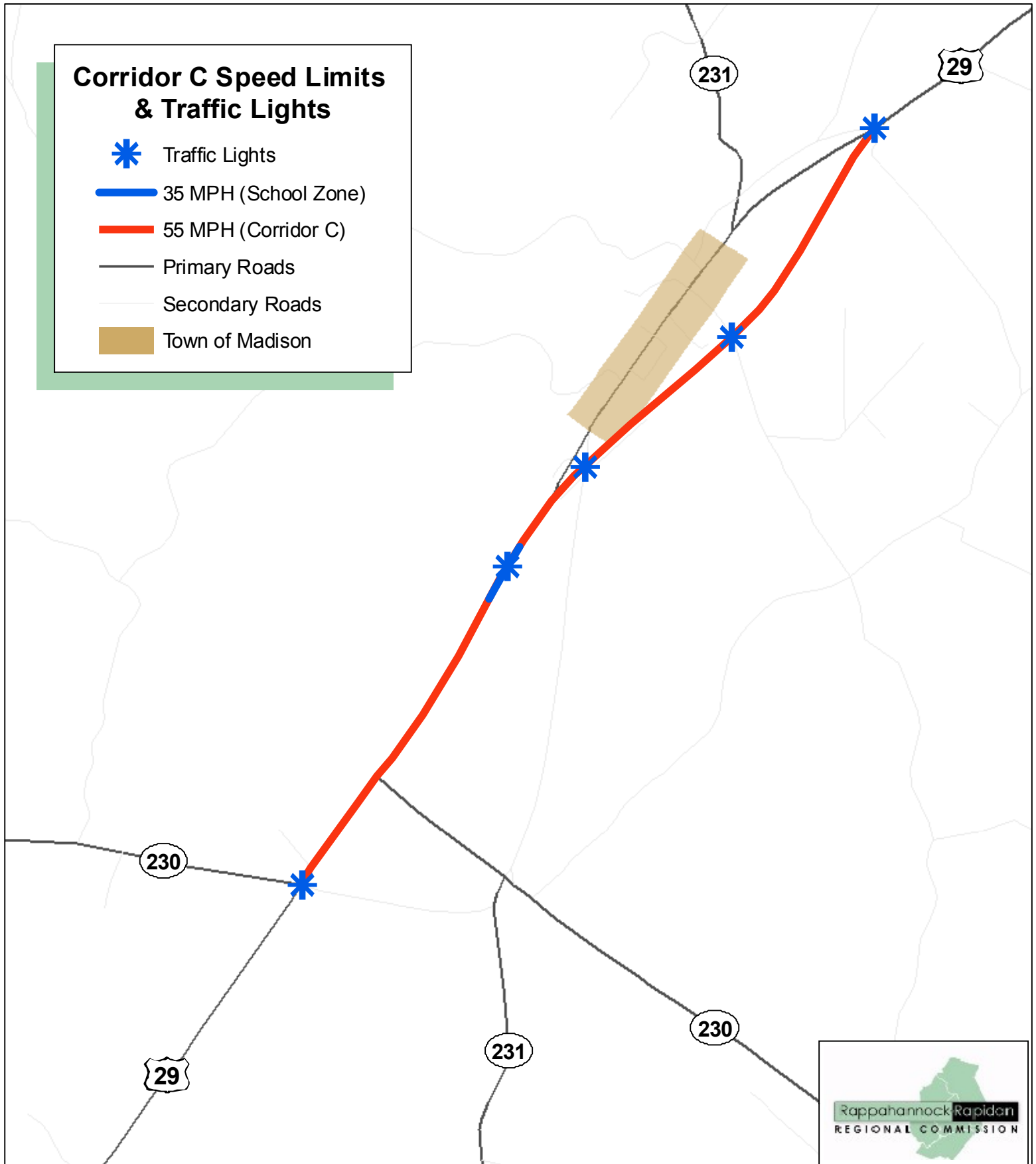
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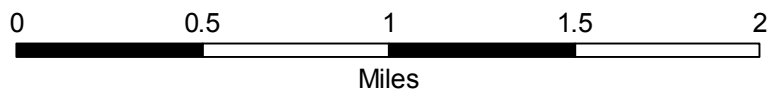
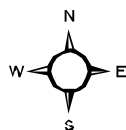
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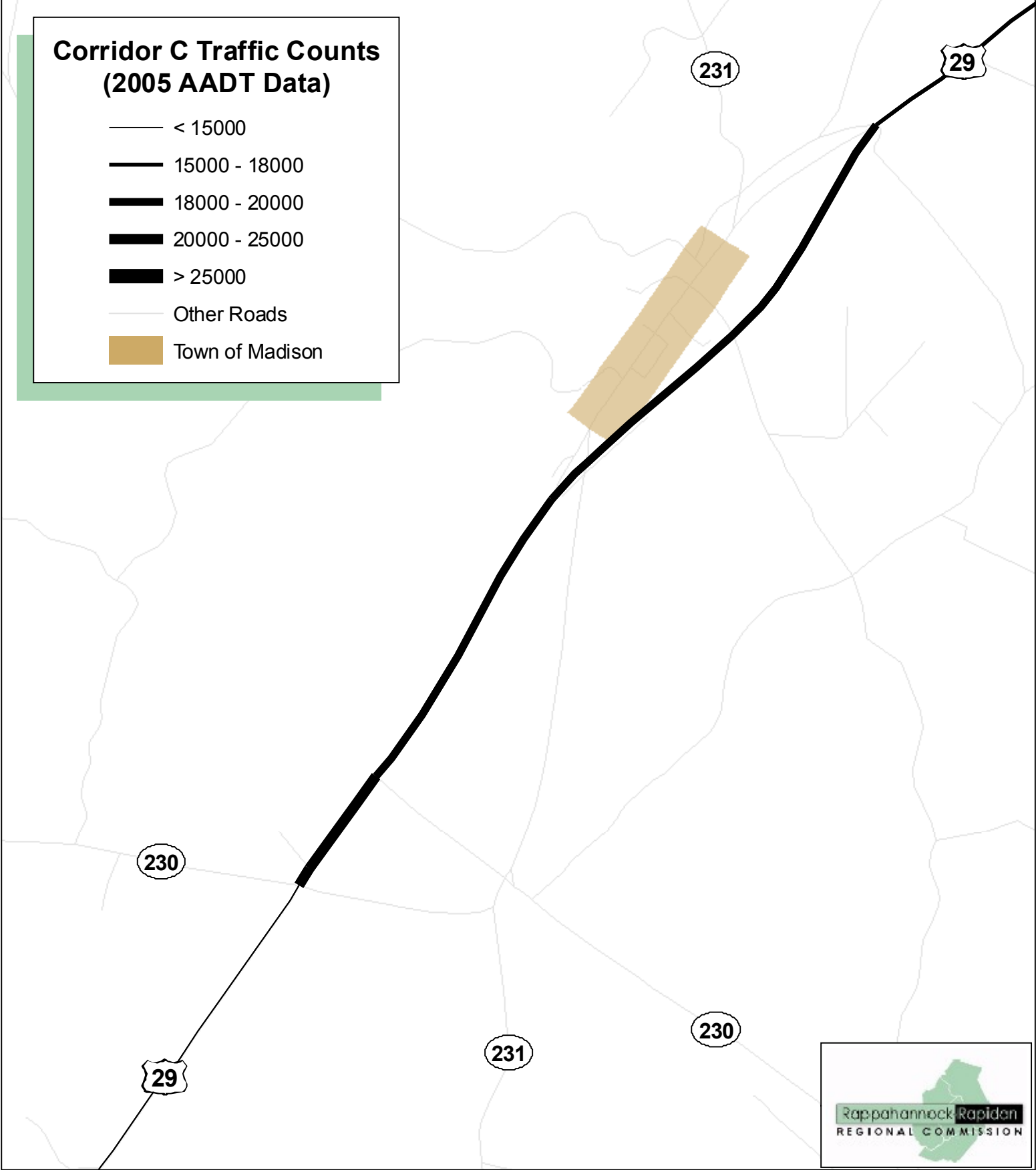
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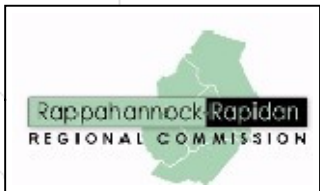
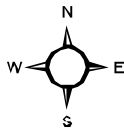
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# 2007 RRRC Travel Time Study: Corridor C Traffic Counts (2005 AADT Data)



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### **DISCLAIMER**

*Prepared in cooperation with the US Department of Transportation, Federal Highway Administration, and the Virginia Department of Transportation*

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