MOBILITY REPORT CARD

2023

DURHAM- CHAPEL HILL - CARRBORO MPO

DURHAM · CHAPEL HILL · CARRBORO
DCHC
METROPOLITAN PLANNING ORGANIZATION
PLANNING TOMORROW'S TRANSPORTATION

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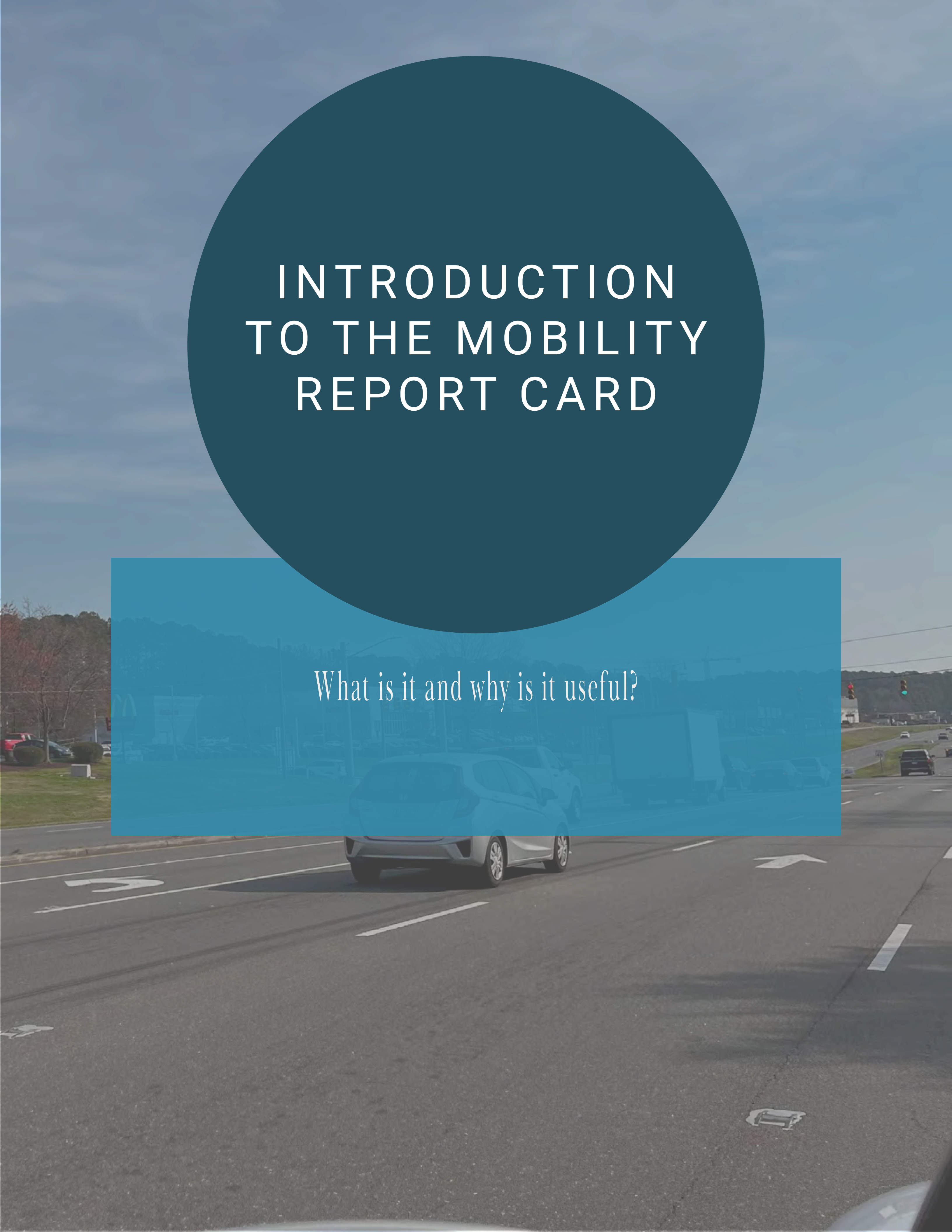

INTRODUCTION TO THE MOBILITY REPORT CARD

What is it and why is it useful?

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WHAT IS THE MOBILITY REPORT CARD?

The Mobility Report Card monitors the performance of the multimodal transportation system throughout the Durham-Chapel Hill-Carrboro Metropolitan Planning Organization (DCHC MPO, or the MPO) area by analyzing a variety of key transportation supply, demand, and safety indicators. These metrics provide a snapshot of the transportation system's performance and its ability to safely and efficiently connect people, places, and goods throughout the MPO area. Understanding the system's performance and calling attention to key trends, such as where traffic is increasing, enable the MPO to strategically plan for and invest in system enhancements where mobility needs and opportunities are greatest.

CONGESTION MANAGEMENT PROCESS

The Congestion Management Process (CMP) is a federal requirement (for all metropolitan areas in the country with population exceeding 200,000) to systematically manage traffic congestion for a region's transportation system by tracking performance with data-driven measures, identifying effective mitigation strategies that meet the region's policy goals and objectives, and implementing CMP projects as integral part of the region's Metropolitan Transportation Plan (MTP) development. To meet this requirement, MPOs are directed to conduct eight actions:

1. Develop regional objectives
2. Define CMP Networks
3. Develop multimodal performance measures
4. Collect data/monitor system performance
5. Analyze congestion problems and needs
6. Identify and assess strategies
7. Program and implementaion strategies
8. Evaluate strategy effectiveness

The Mobility Report Card provides a snapshot of existing conditions and trends on the region's multimodal transportation system (actions 2-5 of the CMP process). It does this by analyzing data (action 4) using key performance measures (action 3). The metrics and findings contained in this report card, therefore, directly support the CMP process to ensure the region meets and exceeds its mobility goals.

WHY IS THE MOBILITY REPORT CARD USEFUL?

By identifying areas of system under-performance and areas that need to be recalibrated to adjust to growth trends, the Mobility Report Card guides DCHC's transportation improvement planning. For example, if the data show that an intersection is congested, the MPO can study it and identify improvement solutions. The study may determine that congestion is generated by an abundance of left-turn traffic in a lane serving both thru-traffic and turning traffic. The study might recommend the addition of a dedicated turn lane, which the MPO could then incorporate into its planned improvements. If the turn lane is constructed, congestion might be decreased, and traffic flow might improve at the intersection.

Relieving congested roadways is just one example of how the Mobility Report Card is used to support planning; its usefulness extends beyond this context, by examining multimodal travel trends. As the DCHC area grows, it is important to understand the performance of the entire transportation system in meeting travel demand. Multimodal analyses include automobile traffic, bicycle and pedestrian facilities and usage, and transit service and ridership. Bicycle safety or level of stress data might suggest the incorporation of dedicated bike lanes, and enhancing cyclist safety while reducing cyclist traffic stress by creating a network of low-stress roadways. If pedestrian safety data indicate a particularly dangerous intersection, the MPO and the appropriate partner agencies (e.g., NCDOT, Cities, Towns, Counties, Universities, and Transit Agencies) can consider interventions such as adding a signalized crosswalk to that intersection. Multimodal data helps the MPO and its partner agencies plan and maintain a system that functions better and serves all users throughout the region.

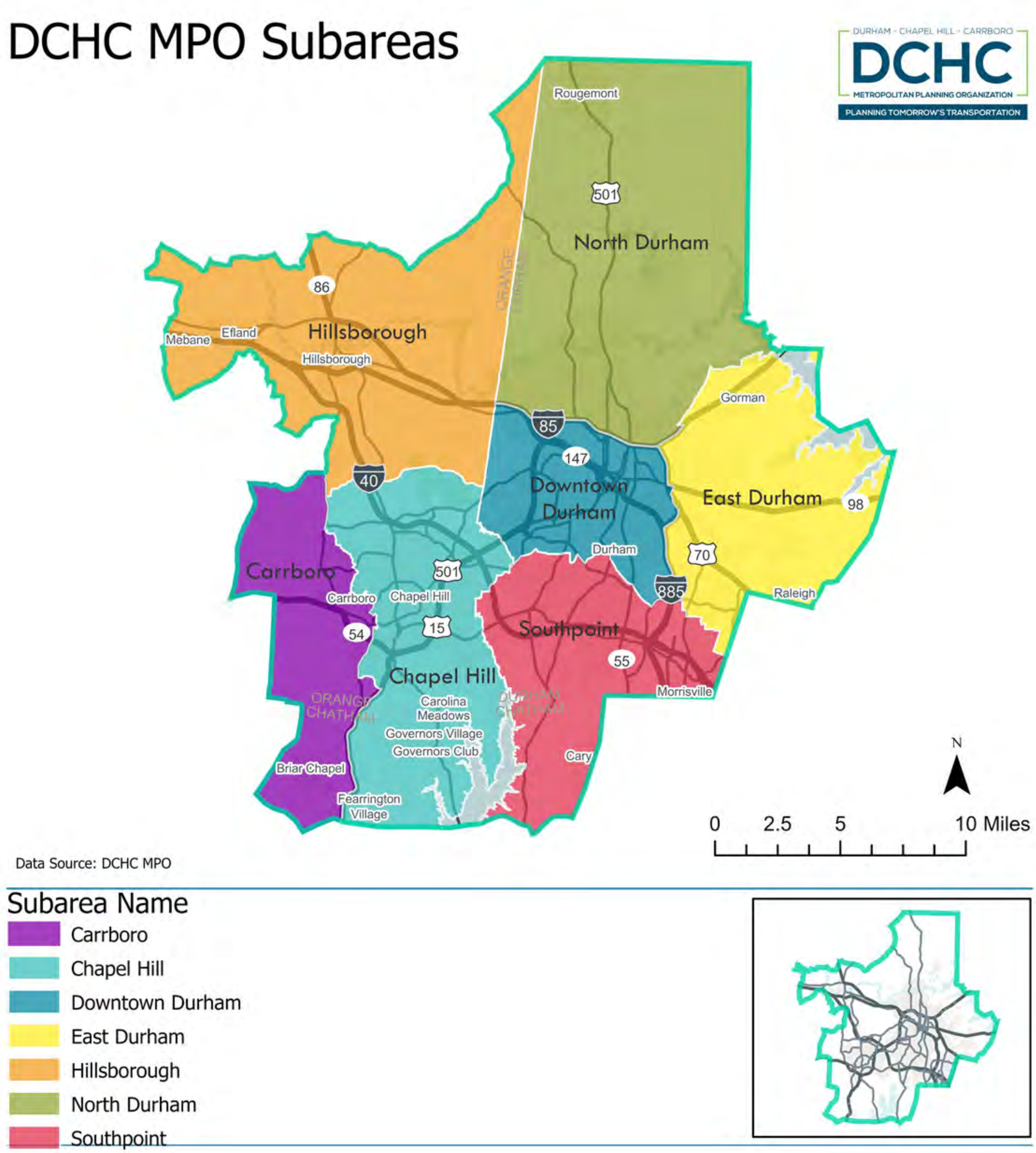
Overall, the regional snapshot generated by including performance measures for diverse modes of transportation throughout the network provides the MPO with a holistic understanding of travel trends and the ability to better plan for local and regional mobility

WHAT ARE SUBAREAS?

The DCHC MPO area includes the entirety of Durham County and parts of Orange and Chatham Counties. Given this large geographical area, there are meaningful differences in mobility on a local level. Pedestrian activity in downtown Durham is not the same as pedestrian activity in Southpoint; differences like these reveal important insights about the transportation landscape of each area. To extract and emphasize these finer-grained insights, some of the data in this report are reported by subarea. Subareas include:

- North Durham
- Downtown Durham
- East Durham
- Southpoint
- Hillsborough
- Carrboro
- Chapel Hill

Figure i-1. Geographic Subarea Boundaries



KEY CONCEPTS

PEAK TRAVEL PERIODS

Data for many performance measures in the Mobility Report Card are collected at "peak periods." Peak periods are two-hour time frames throughout the day when transportation facilities tend to be the busiest. Colloquially, these times are known as "rush hour." Peak periods times are standard throughout the report as follows:

AM Peak Period	7:00 AM	to	9:00 AM
Noon Peak Period	11:00 AM	to	1:00 PM
PM Peak Period	4:00 PM	to	6:00 PM

Traffic volume counts for all modes are often broken down into peak period volumes (PPV), which refer to the total volume counted within these peak periods. For example, a pedestrian AM PPV of 20 means that 20 pedestrians were observed at count stations in the area in question from 7:00 AM to 9:00 AM.

LEVEL OF SERVICE

Level of service (LOS) is a way to quantify the performance of roadways and intersections. It is expressed on a grading scale from A-F and is calculated differently for roads than it is for intersections. Chapter 1 discusses the factors considered for roadway segment LOS and Chapter 2 discusses those considered for intersection LOS.

CMP CORRIDORS

Congestion Management Process (CMP) corridors are the roadways that are evaluated under the DCHC MPO's congestion management process. Performance measures in some chapters of this report are only available for CMP corridors. CMP corridors include a range of road types and thus are considered to be representative of the DCHC transportation network as a whole.

KEY CONCEPTS

BICYCLE LEVEL OF STRESS (LTS)

Bike LTS is a user-centric measure based on a hierarchy of roadway characteristics, including traffic speed, traffic volume, presence and type of bicycle facility, roadway cross-section, and land use context. Bike LTS evaluates the quality of the roadway network on a 5-point scale for its comfort with various bicycle users, where a score of 1 reflects “very low” stress, and a score of 5 reflects “high” stress. Facilities with scores 1, 2 and 3 are suited for many adults, and with scores 4 and 5 are for experienced bicyclists.

LEVEL OF TRAVEL TIME RELIABILITY (L0TTR)

How much longer is an abnormal delay (80th percentile) than the average (median) time? If these numbers are close, the travel time on the facility is generally consistent, even if the delay is significant.

READING THE MOBILITY REPORT CARD

Each of the following chapters evaluates the transportation network in the DCHC MPO area using different performance measures. These performance measures apply to multiple modes of transportation: some chapters pertain to vehicle traffic, some pertain to pedestrian or bike travel. Each chapter begins with an introduction to the performance measure being evaluated and a description of the methodology used in the analysis for that chapter, including data sources. The analysis is then presented first in terms of a regional context - using data from all seven subareas to discern any possible trends - and then is broken down by subarea. In cases where there are noteworthy variations among the subareas, the subarea data is then evaluated in a comparative analysis.

This organization highlights trends affecting the area as a whole as well as any notable variations from one subarea to the next. In this approach, the Mobility Report Card better enables the DCHC MPO to plan mitigation strategies and improvements that impact overall system performance and the day-to-day lives of residents.

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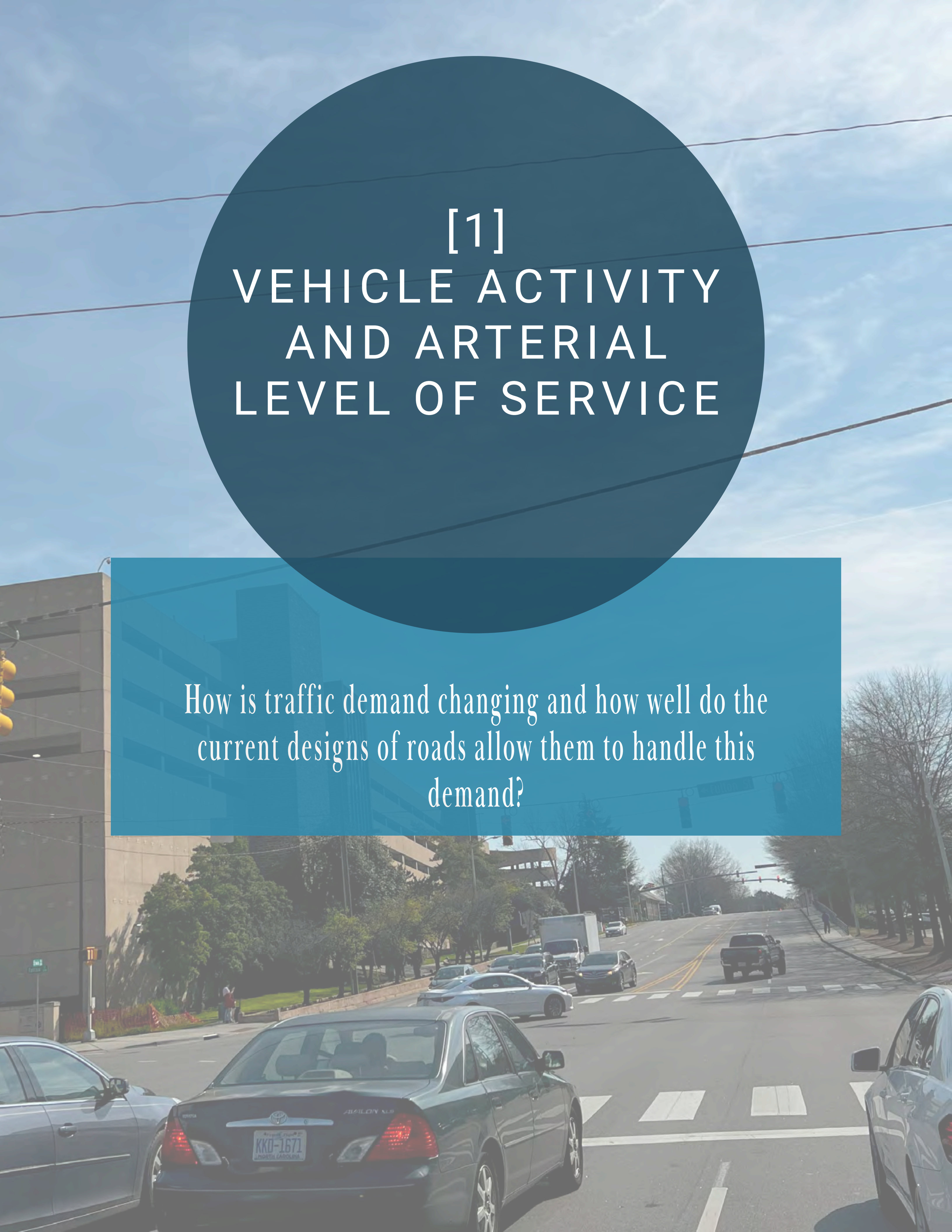

[1] VEHICLE ACTIVITY AND ARTERIAL LEVEL OF SERVICE

How is traffic demand changing and how well do the current designs of roads allow them to handle this demand?

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KEY TAKEAWAYS

Traffic volume data was collected at 1,087 total locations

Traffic volume increased by 5.7% between 2017 and 2019, and decreased by 14.2% between 2019 and 2021 (due to Pandemic effects)

In 2019, LOS declined on 3.2% of roads measured within DCHC jurisdiction. In Durham County, 2.4% of roads measured showed declining LOS

Overall, LOS in the DCHC area remains adequate:

- 82% of roads operate at LOS A
- 13% of roads operate at LOS C or B
- 0.7% of roads operate at LOS F

Major corridors experiencing a downward trend in LOS include:

- SR 2220 (OLD CHAPEL HILL RD)
- NC-86
- NC-55
- NC-54
- I-85

INTRODUCTION

This chapter assesses roadways in the DCHC area by accounting for two basic roadway characteristics: 1) the number of vehicles that travel on it regularly; and 2) the number of vehicles the roadway design can accommodate at any given time. These two factors, when examined relative to one another, indicate if a roadway is experiencing congestion. Roadway congestion can be relieved by expanding capacity or by reducing travel demand.

Two metrics evaluating these characteristics are (1) Annual Average Daily Traffic (AADT); and (2) Level of Service (LOS).

METHODOLOGY

TRAFFIC VOLUME

Traffic volume refers to the number of vehicles passing a specific point during a given time period.

Traffic volume counts are typically collected using pneumatic tube units placed on roadways to detect traffic moving at or near posted speeds. Acceleration and deceleration can result in inaccurate data, so pneumatic tubes were placed away from intersections, corners, hills, and commercial or public driveways.

Traffic volume data are collected by MPO at selected locations over 48 consecutive hours and an average volume are calculated for the two-day period. This average is called Average Daily Traffic (ADT) and includes traffic traveling in all directions. ADT is converted to AADT, a figure representative of the entire year, using appropriate seasonal and adjustment factors developed by the North Carolina Department of Transportation (NCDOT).

NCDOT collects statewide traffic volume counts at many locations on a yearly basis for the busiest roadways and every other year for all others. NCDOT averages the collected volume data, which is representative of the whole year, and this figure is known as Annual Average Daily Traffic (AADT).

LEVEL OF SERVICE - ROADWAY SEGMENTS

Traffic volume is one metric used to understand roadway functionality. When compared with the road's capacity (the amount of traffic that the roadway is designed to handle), the resulting measure is the volume-to-capacity (v/c) ratio. This ratio determines a road's level of service (LOS), indicating how effectively the roadway handles the motorized daily traffic demands. Roadways are assigned a letter grade based on LOS analyses using an A through F scale, which includes the letter E. A is the highest LOS and F is the lowest.

Although LOS is measured as a graded scale, the context of supply and demand must also be considered when evaluating these scores. For example, a LOS grade of "A" may seem desirable, indicating that roadway supply is optimized. But it often suggests that roadways are underutilized, with supply exceeding demand. Conversely, a LOS E or F on a downtown roadway can indicate that conversion to a multimodal network may be beneficial. Factors like roadway location and characteristics should be considered when interpreting LOS metric.

Additional conditions to consider when evaluating highways and freeways are travel speed and the ability for cars to enter, exit, and change lanes. LOS for urban and suburban streets should be evaluated by the amount of delay incurred at intersections (a metric investigated in this report's second chapter) and can be thought of as an indicator of travel time. In all cases, it is important to remember that LOS only evaluates of the ability of roadway supply to meet vehicular demand.

The current study reviewed available AADT data for years 2019 and 2021 and decided to use the 2019 data, as the 2021 values were 14.2% below the 2019 AADT counts on average due to Pandemic effects.

The current study developed new capacity estimates for each roadway segment where AADT traffic data were available. These capacity estimates were developed using FDOT's 2023 Multimodal Quality/Level of Service Handbook and the and the FHWA's Simplified Highway Capacity Calculation Method for the Highway Performance Monitoring System (October 2017). The new roadway capacity estimates are different from the old capacity estimates utilized in previous mobility report reports which were taken from the 2017 version of the Triangle Regional Model (TRM).

Table 1-1. Roadway Level of Service Grades

	A	B	C	D	E	F
Arterial Volume to Capacity Ratio	0-0.6	0.6-0.69	0.7-0.79	0.8-0.89	0.9-0.99	1.00 or >
Maneuverability	Almost completely unimpeded	Only slightly impeded	Noticeably restricted	Severely limited	Extremely unstable	Almost none
Driver Comfort	High	High	Some tension	Poor	Extremely poor	The lowest
Average Traveling Speed	At speed limit	Close to limit	Close to limit	Some slowing	Significantly slower than limit	Significantly slower than limit

Figure 1-1. Region-wide Current LOS Scores

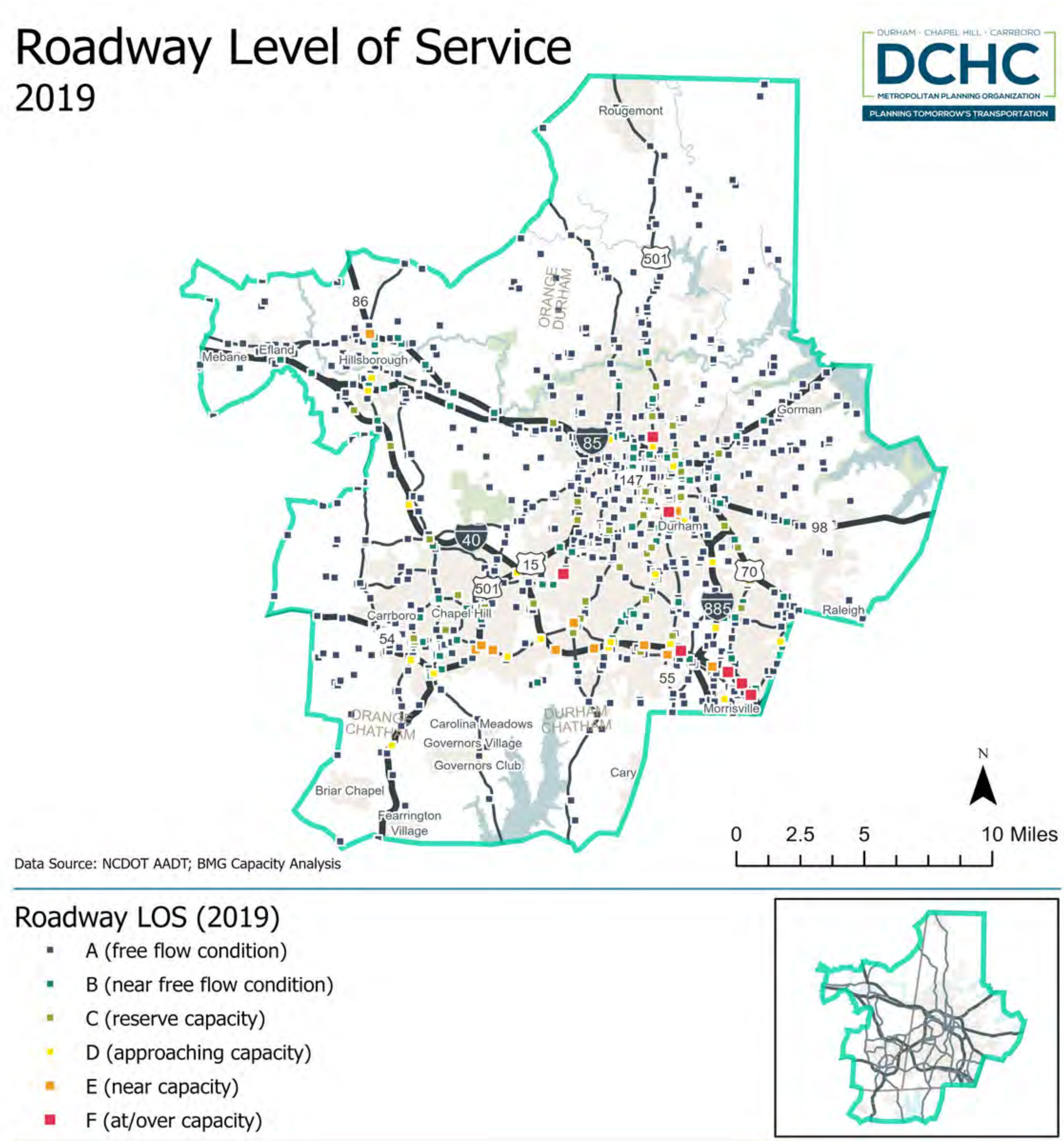
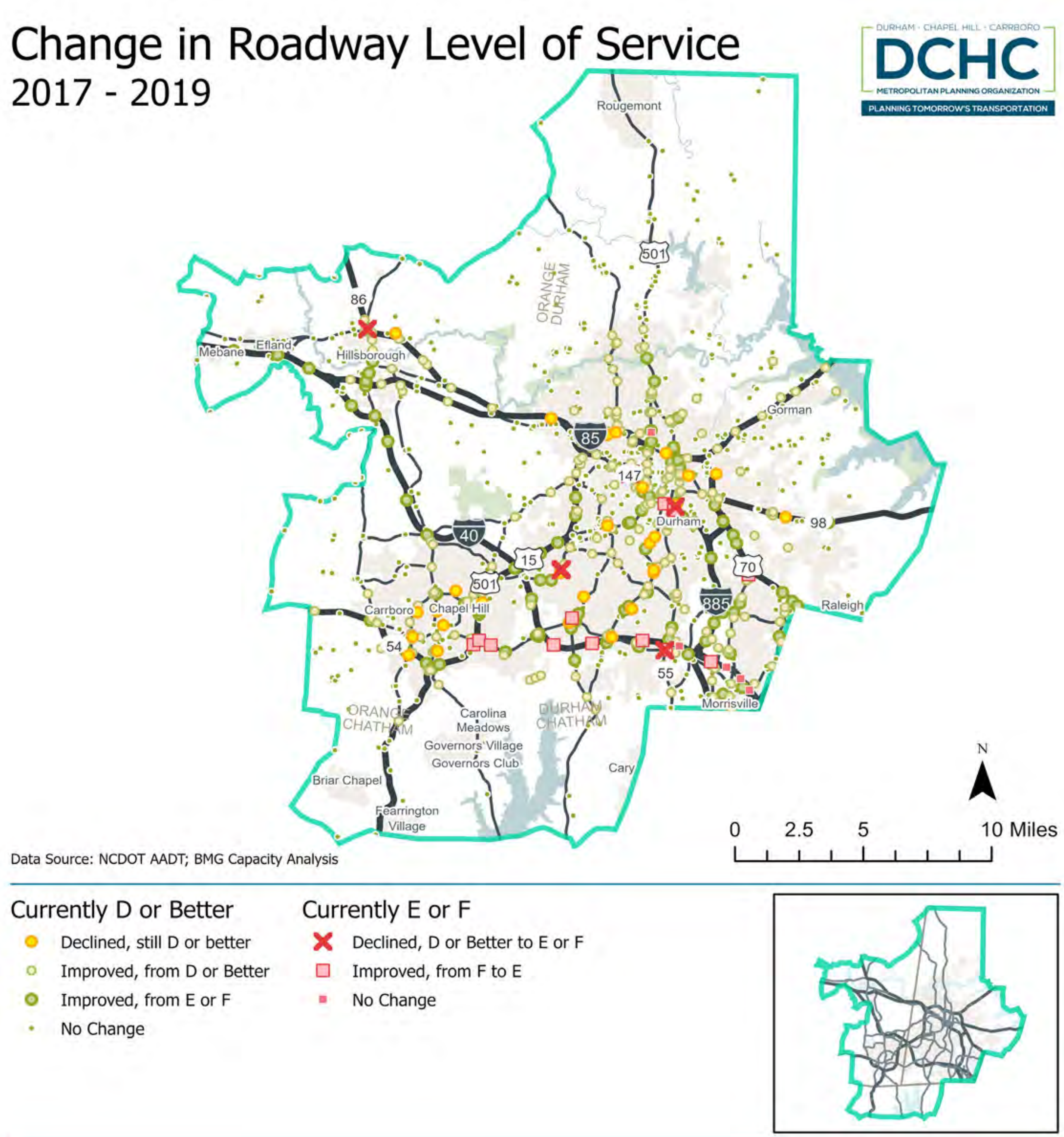


Figure 1-2. Region-wide LOS Change



REGIONAL OVERVIEW

Roadway LOS is generally adequate to serve regional travel needs, but conditions are worsening. Since 2017, vehicular activity has increased, and arterial LOS has declined in some segments.

While there are several notable pockets of congestion in the DCHC area, more than 90% of the region's roads are operating at LOS D or better. Seventy-four percent of the roads operate at LOS A.

Figure 1-1 shows the current LOS grade for roadway segments in the area and Figure 1-2 shows recent changes in LOS (time periods vary depending on available data).

INCREASED VOLUME

Traffic volume increased by 5.7% across the MPO jurisdiction between 2017 and 2019. Total traffic volume also increased in all of the seven subareas. Downtown Durham saw the largest overall increase (7.7%), followed by East Durham (7.2%), Chapel Hill (6.1%), Southpoint (5.1%), Carrboro(4.0%), North Durham (2.8%), and Hillsborough (2.2%).

Figure 1-3 shows the locations in the DCHC area where traffic volume was counted.

CONGESTED CORRIDORS

The most congested corridors are those providing access to the DCHC area's major employment centers. Such centers include Research Triangle Park, downtown Durham, Duke University and the University of North Carolina – Chapel Hill (UNC). Several highways providing access to these locations have segments with **LOS F** including:

- **Interstate 40 (from exit 278 to exit 283)**
  - » Key junction connecting the Triangle Region, in the Southpoint subarea.
- **US 501 BUS (N Duke St)**
  - » Connects Downtown Durham and North Durham
- **NC-147 (from exit 11 to exit 12A)**
  - » Gateway to the Duke Hospital/ University, North Carolina Central University and Downtown Durham.

Several urban roads providing access to these major employment centers are also congested and operating at **LOS F**, including:

- **Old Chapel Hill Rd (between Garret Rd and Scottish Ln)**
  - » Connecting the Hope Valley residential area to the retail areas located to the north and south.

Figure 1-4 to 1-15 shows the LOS changes by each of the seven subareas individually.

5.7%

Traffic volume increased 5.7% overall in the area from 2017 to 2019.

Traffic volume decreased 14.2% from 2019 to 2021 due to pandemic effects.

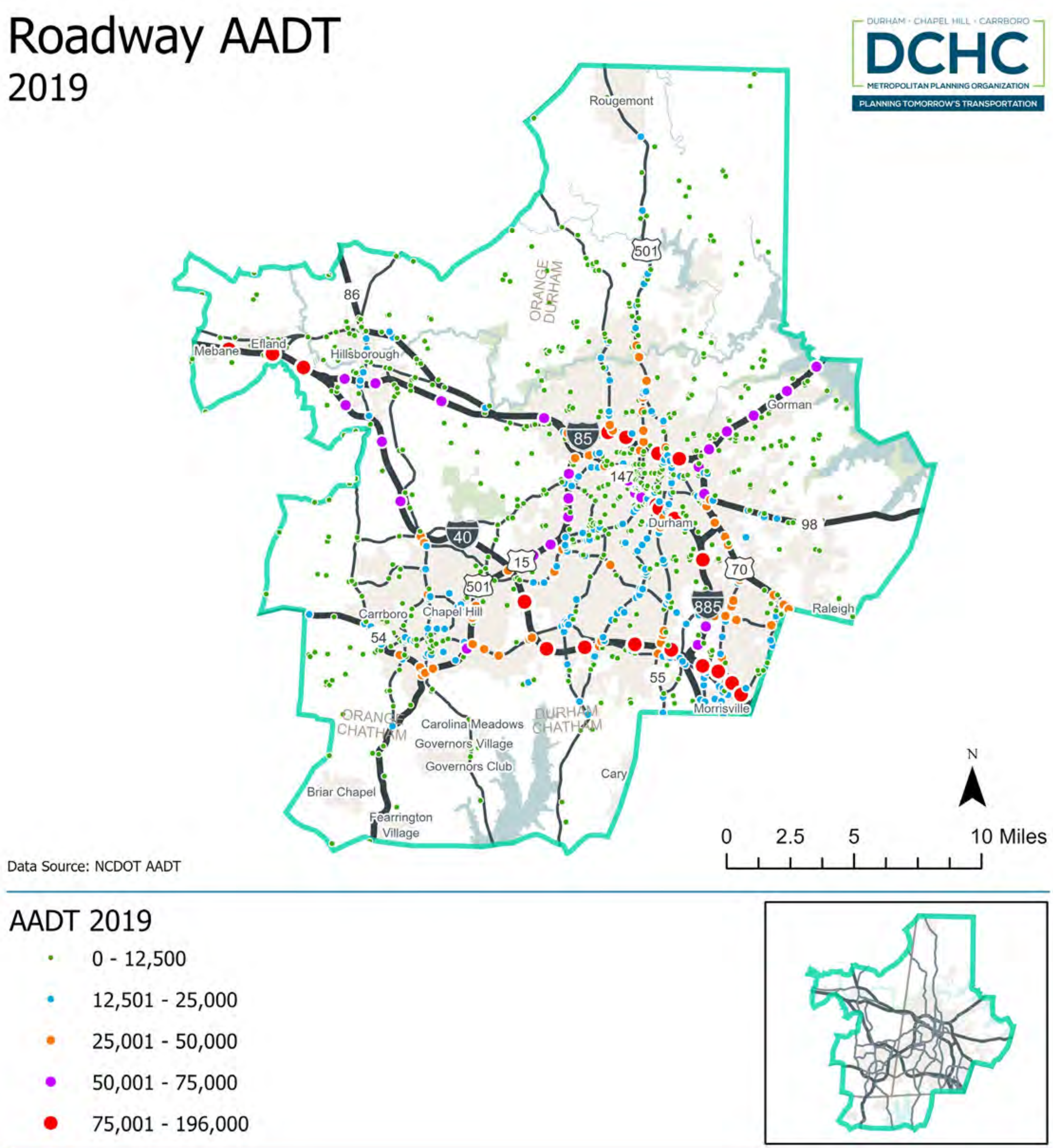
Highways with road segments operating at LOS F:

- I-40
- US-501 BUS
- NC 147

Urban roads with segments operating at LOS F:

- Old Chapel Hill Rd

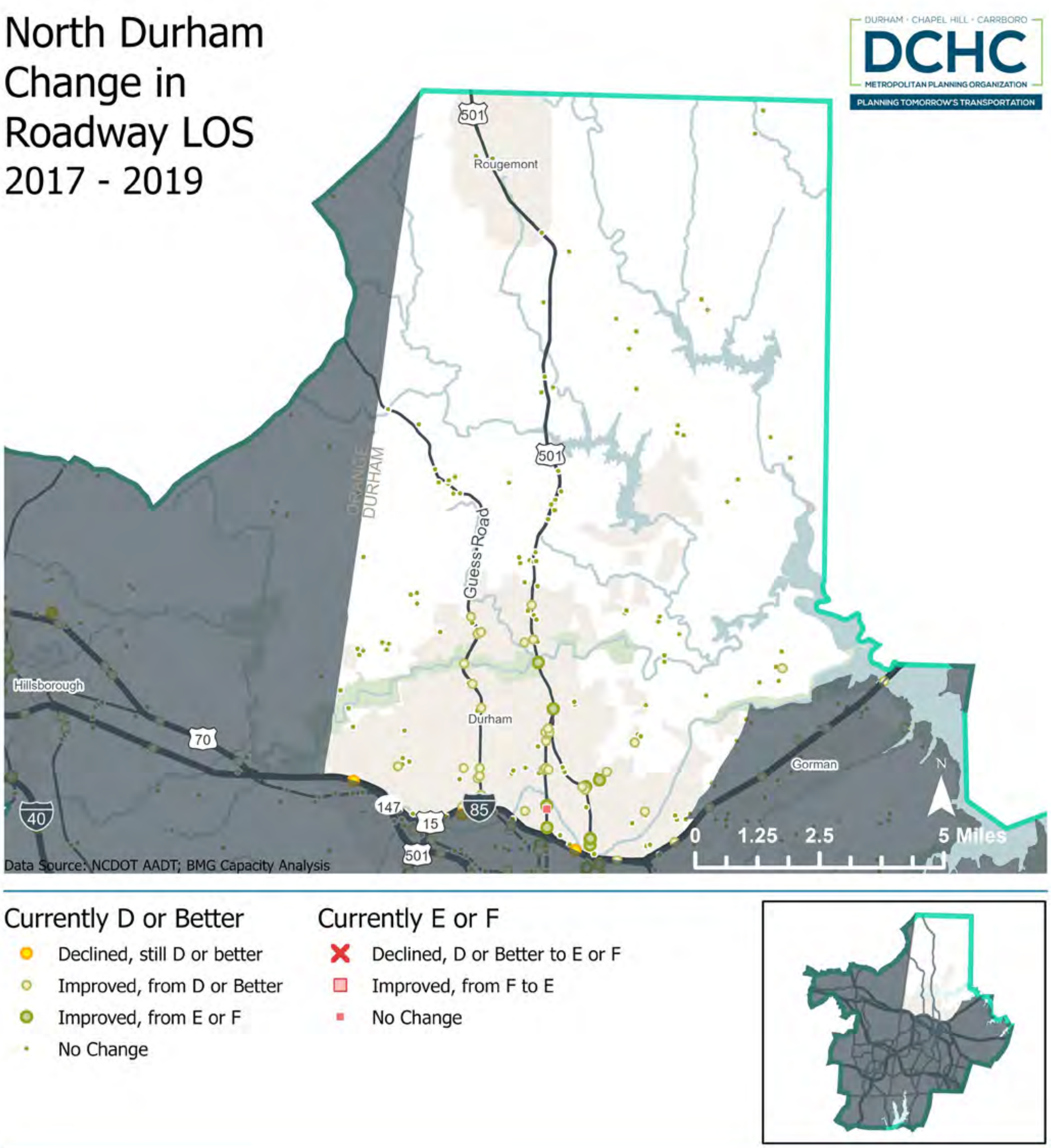
Figure 1-3. Traffic Volume Count Locations



RESULTS BY GEOGRAPHIC SUBAREA

NORTH DURHAM

Figure 1-4. North Durham LOS Change



RESULTS BY GEOGRAPHIC SUBAREA

NORTH DURHAM

key takeaway

2019 average daily traffic demand in the North Durham subarea is 11,922. This is a 2.8% increase from 11,591 in 2017.

2.8%

key takeaway

Of the roadways in the area that declined to LOS B from A between 2017 and 2019, 2.8% were in the North Durham subarea. None of the roadways declined to LOS E or F.

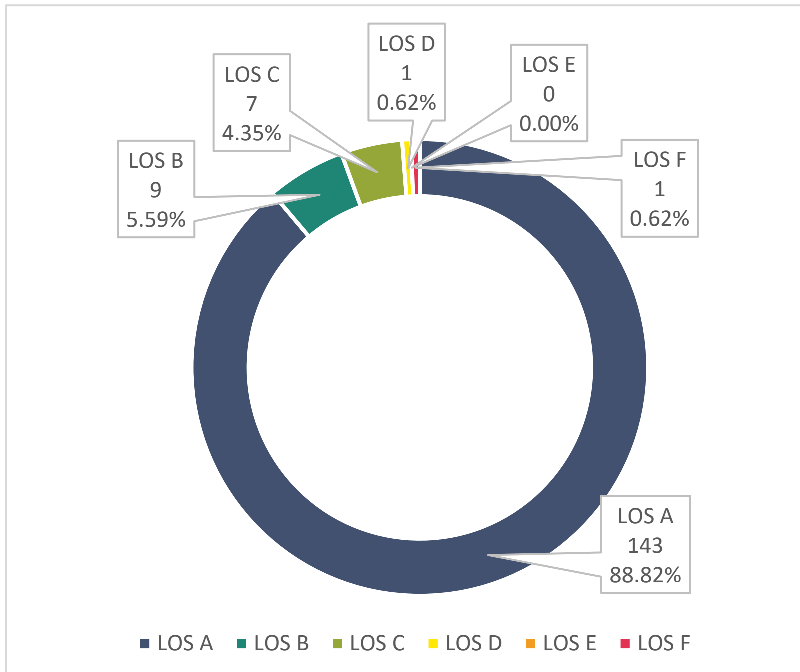
key takeaway

No roadway segment in the North Durham subarea declined to LOS E or F between 2017 and 2019. Only one declined but are still operating at D or better.

key takeaway

The only segment that declined,LOS A to LOS B is the one on I-85 from exit 176 to exit 177.

Figure 1-5. Count Stations by LOS Grade (2019)

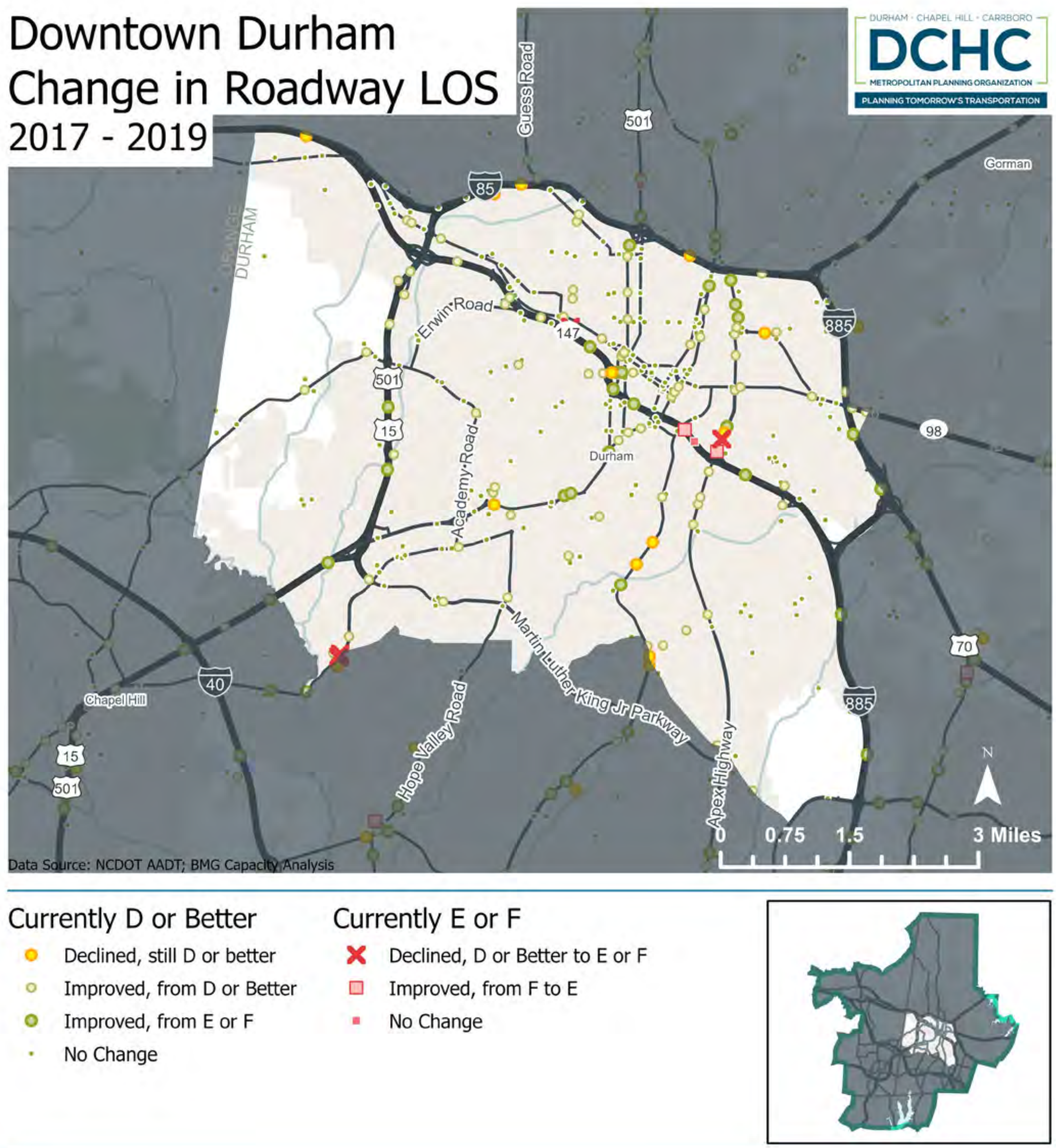


Of the **161 count stations** in the North Durham subarea, **0.6% operate at LOS E or F**

RESULTS BY GEOGRAPHIC SUBAREA

DOWNTOWN DURHAM

Figure 1-6. Downtown Durham LOS Change



RESULTS BY GEOGRAPHIC SUBAREA

DOWNTOWN DURHAM

key takeaway

2019 average daily traffic demand in the Downtown Durham subarea is 15,129. This is a 7.7% increase from 13,620 in 2017.

5.6**%**

key takeaway

Of the roadways in the area that declined to LOS E or F between 2017 and 2019, 5.6% were in the Downtown Durham subarea.

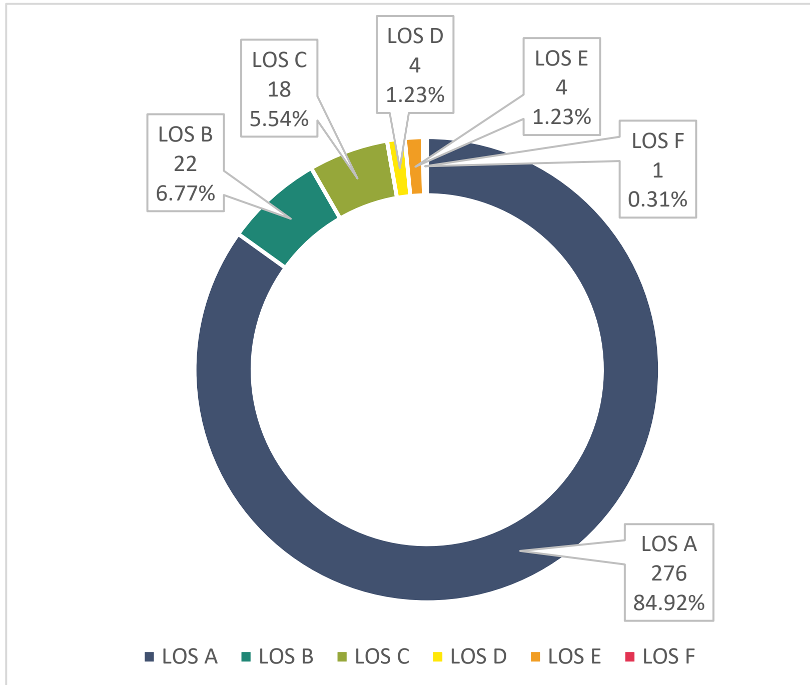
key takeaway

Two roadway segments in the Downtown Durham subarea declined to LOS E or F between 2017 and 2019. 10 declined but are still operating at D or better.

key takeaway

The two segments that declined to LOS E or F are on Swift Ave and S Alston Ave.

Figure 1-7. Count Stations by Los Grade (2019)

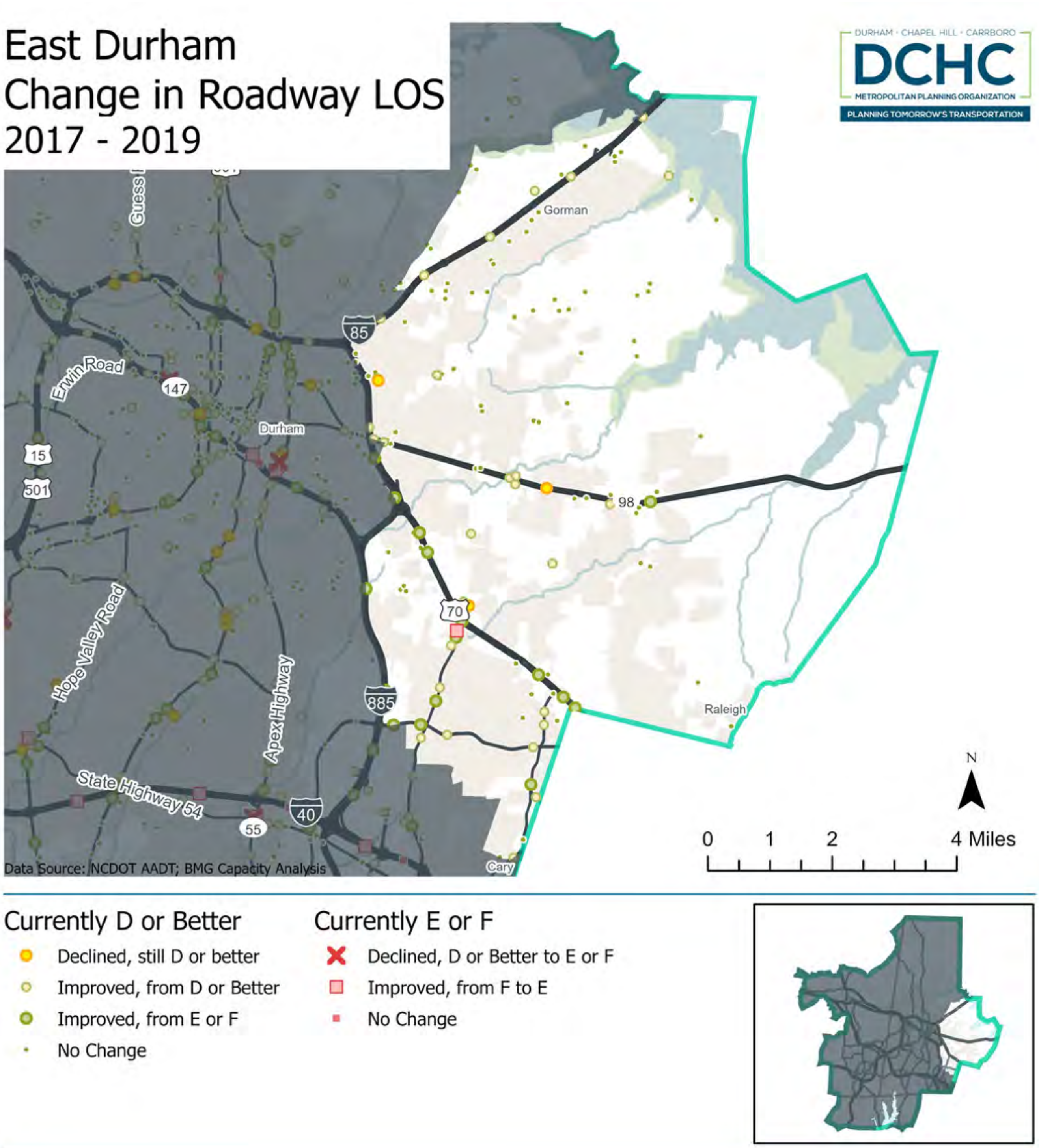


Of the ***325 count stations*** in the Downtown Durham subarea***, 1.5% operate at LOS E or F***

RESULTS BY GEOGRAPHIC SUBAREA

EAST DURHAM

Figure 1-8. East Durham LOS Change



RESULTS BY GEOGRAPHIC SUBAREA

EAST DURHAM

key takeaway

2019 average daily traffic demand in the East Durham subarea is 14,602. This is a 7.2% increase from 13,620 in 2017.

8.3%

key takeaway

Of the roadways in the area that declined to LOS D or better between 2017 and 2019, 8.3% were in the East Durham subarea. No segment declined to LOS E or F

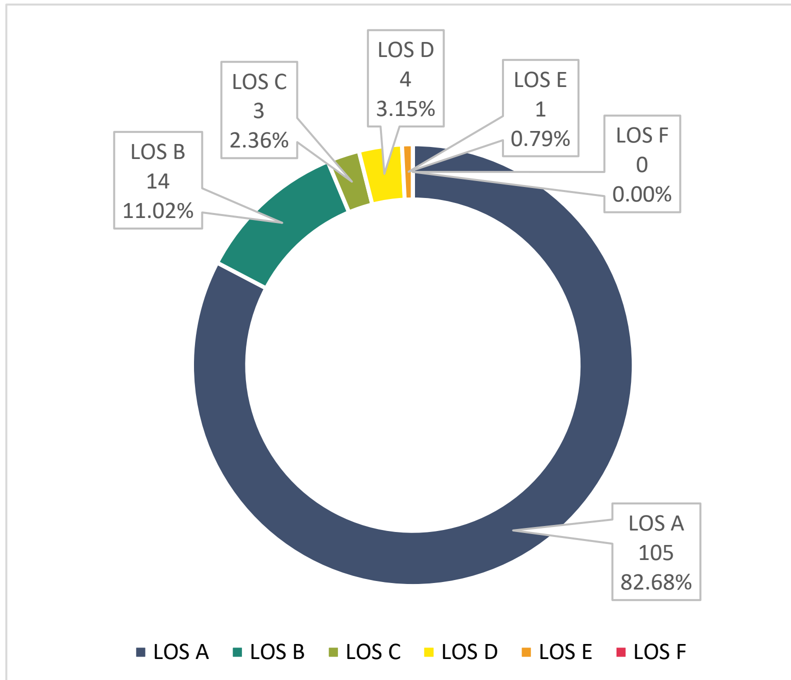
key takeaway

Three roadway segments in the East Durham subarea slightly worsened from 2017, but still operates at LOS B in 2019.

key takeaway

Major roads experiencing a decline in LOS in this area are NC 98 (Wake Forest Hwy), Hoover Rd and Sherron Rd.

Figure 1-9. Count Stations by Los Grade (2019)

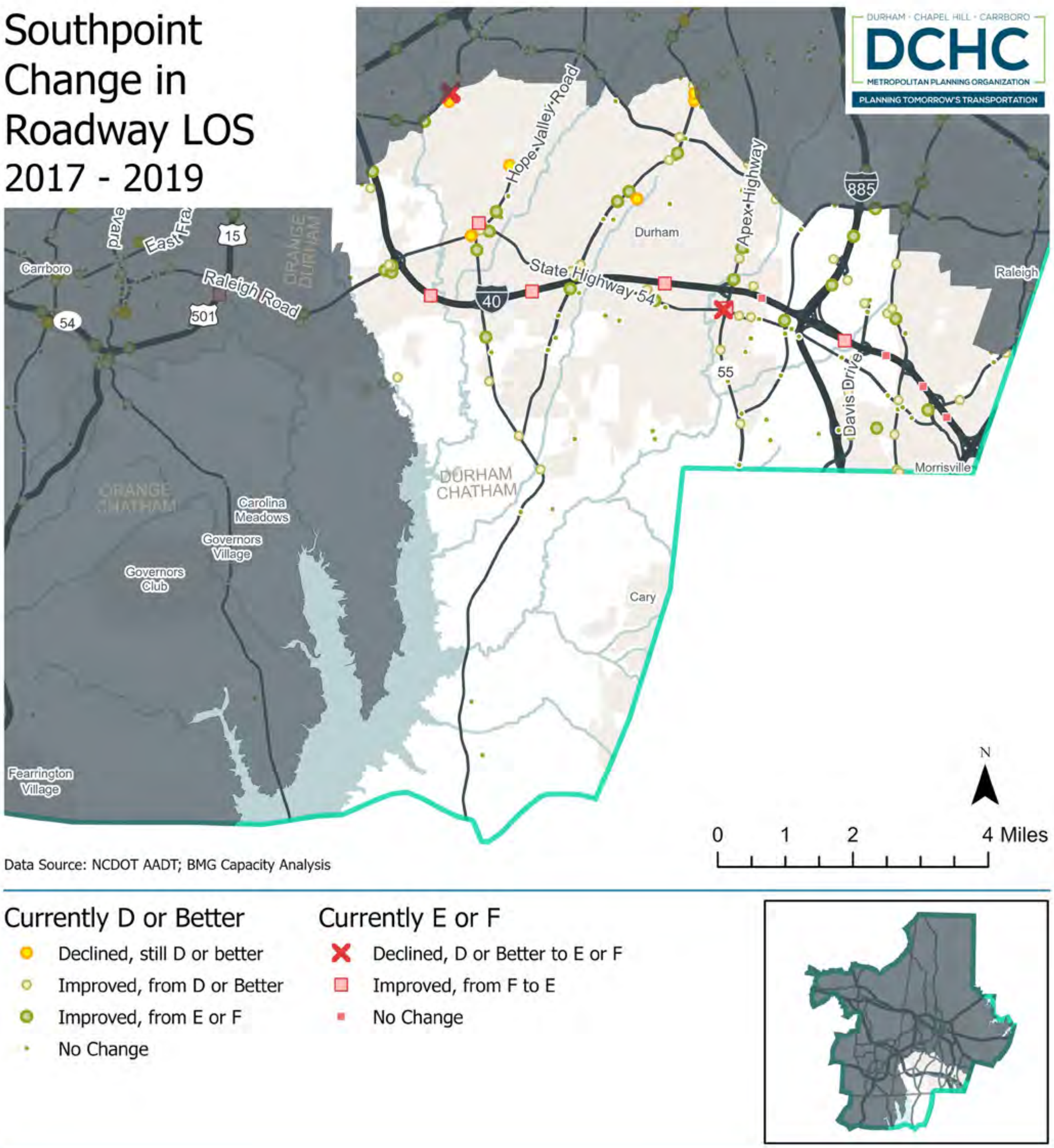


Of the **127 count stations** in the East Durham subarea, ***0.8% operate at LOS E or F***

RESULTS BY GEOGRAPHIC SUBAREA

SOUTHPOINT

Figure 1-10. Southpoint LOS Change



RESULTS BY GEOGRAPHIC SUBAREA

SOUTHPOINT

key takeaway

2019 average daily traffic demand in the Southpoint subarea is 26,192. This is a 5.1% increase from 24,924 in 2017.

8.3%

key takeaway

Of the roadways in the area that declined to LOS E or F between 2017 and 2019, 8.3% were in the Southpoint subarea.

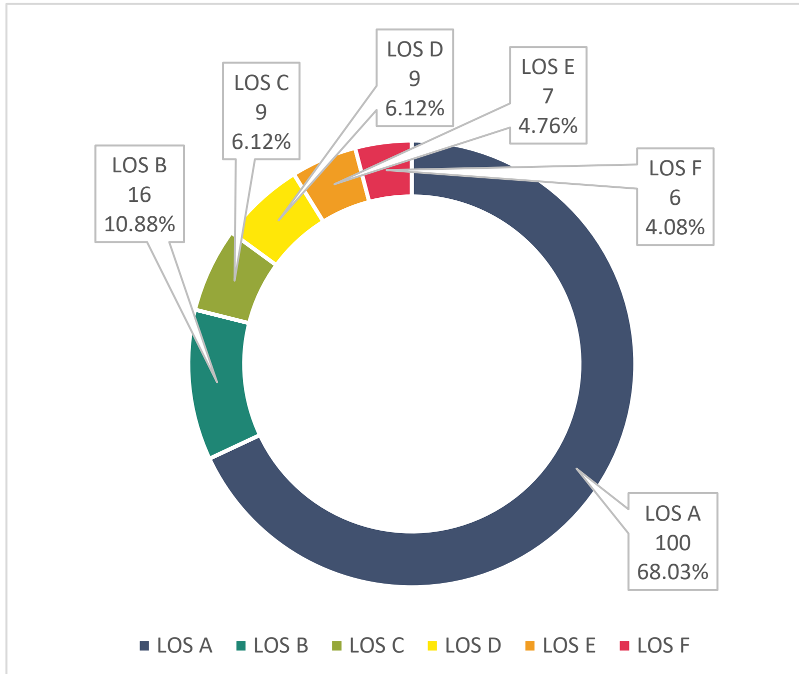
key takeaway

Three roadway segments in the Southpoint subarea declined to LOS E or F between 2017 and 2019. Eight declined but are still operating at D or better.

key takeaway

Many of the roadway segments experiencing a decline in LOS in this area are along NC-54, Fayetteville Rd and Old Chapel Hill Rd.

Figure 1-11. Count Stations by LOS Grade (2019)

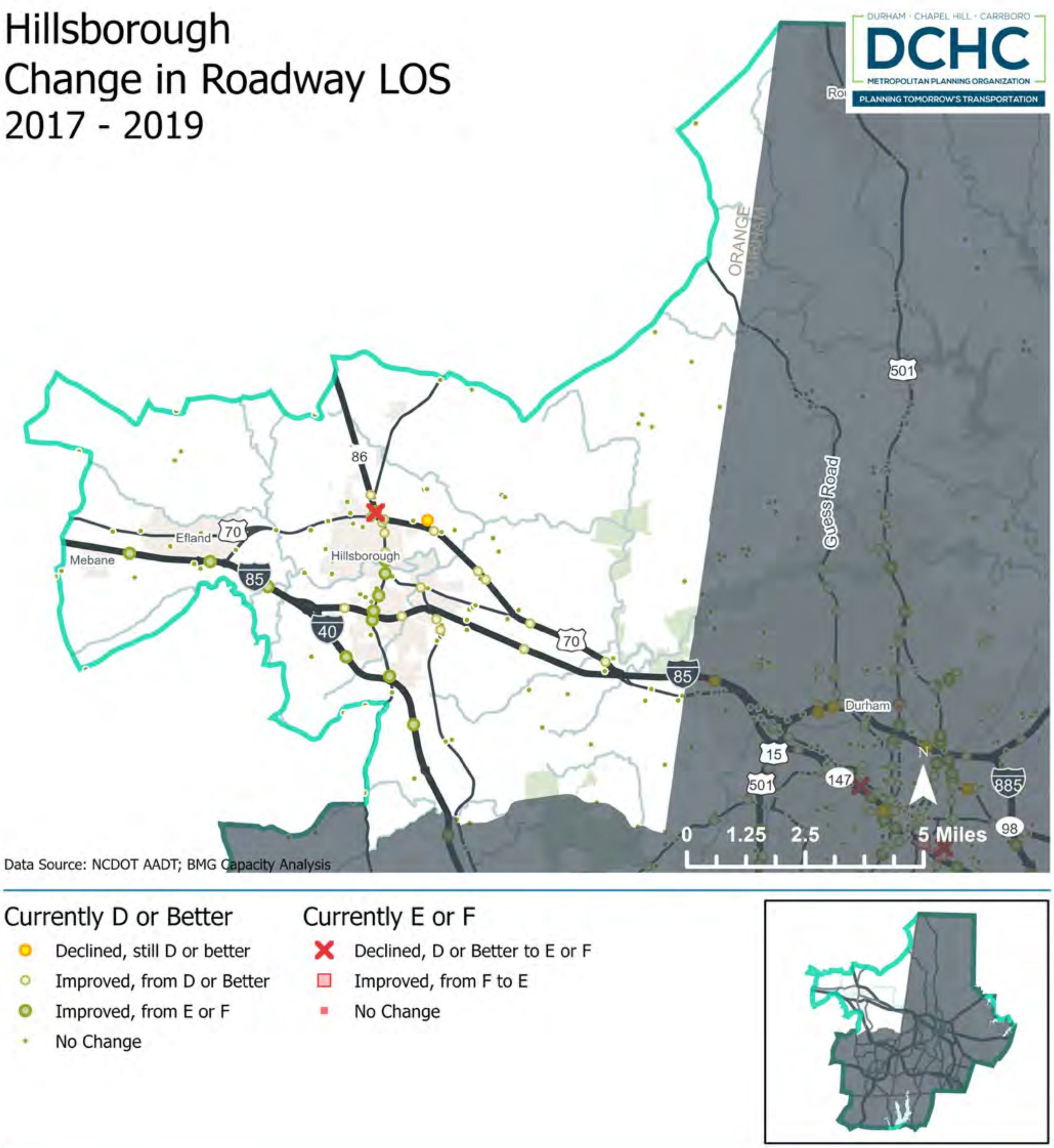


Of the ***147 count stations*** in the Southpoint subarea, **6.1% operate at LOS D** and ***8.8% operate at LOS E or F***

RESULTS BY GEOGRAPHIC SUBAREA

HILLSBOROUGH

Figure 1-12. Hillsborough LOS Change



RESULTS BY GEOGRAPHIC SUBAREA

HILLSBOROUGH

key takeaway

2019 average daily traffic demand in the Hillsborough subarea is 10,497. This is a 2.2% increase from 10,268 in 2017.

2.8**%**

key takeaway

Of the roadways in the area that declined to LOS E or F between 2017 and 2019, 2.8% were in the Hillsborough subarea.

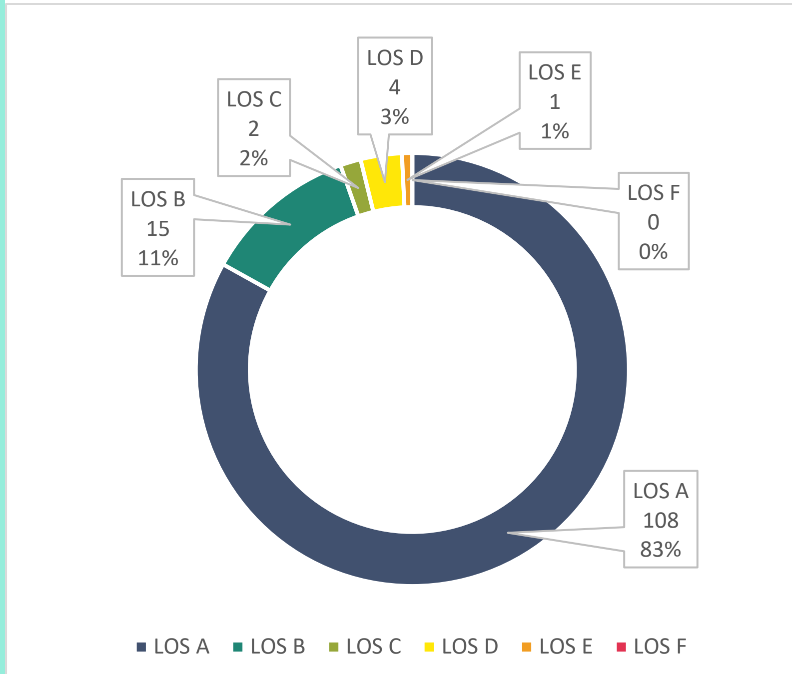
key takeaway

One roadway segment in the Hillsborough subarea declined to LOS E or F between 2017 and 2019. One other declined but are still operating at D or better.

key takeaway

Major roads experiencing a decline in LOS in this area are NC 86 and SR 1555 (Miller Rd).

Figure 1-13. Count Stations by LOS Grade (2019)

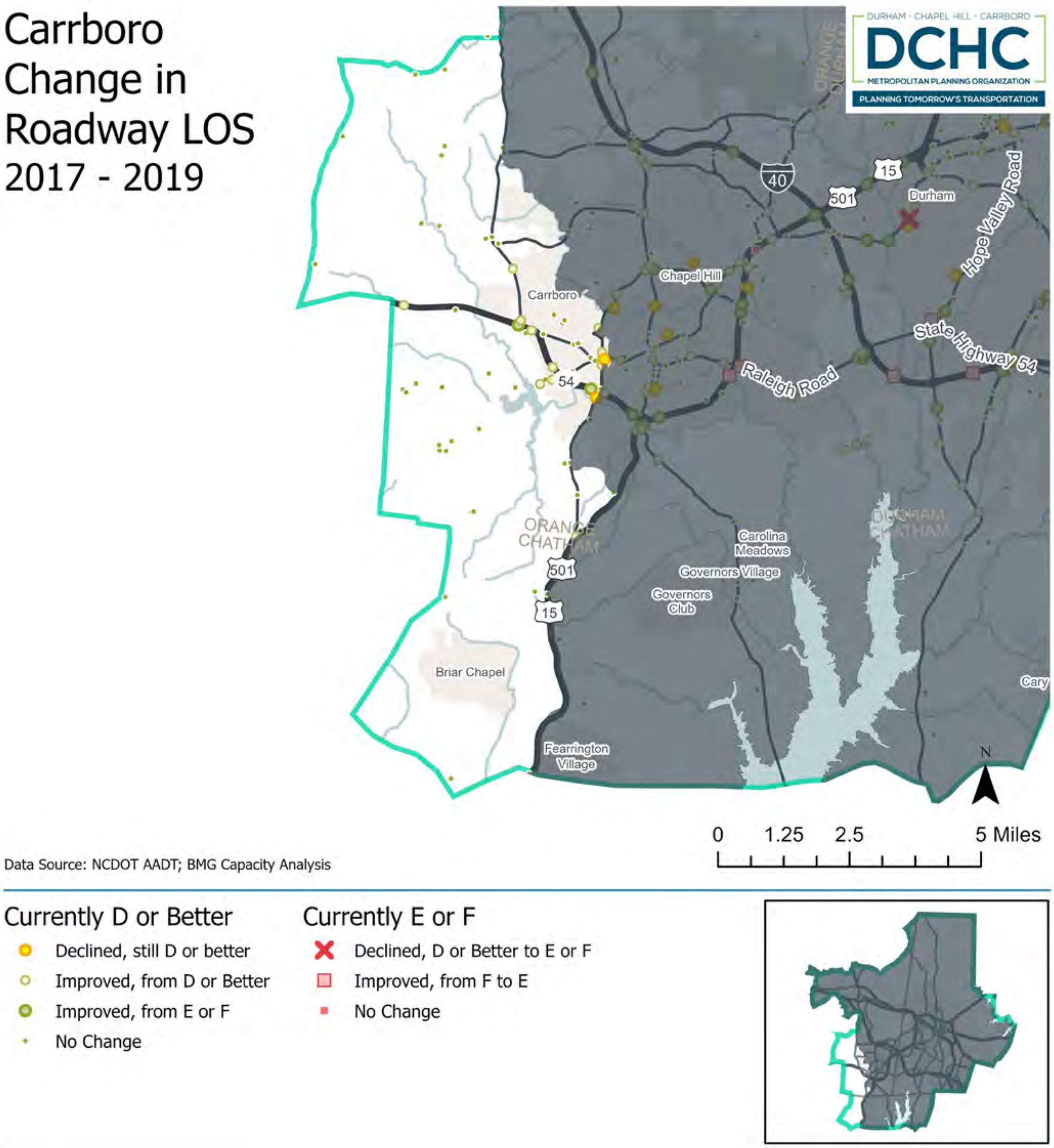


Of the ***130 count stations*** in the Hillsborough subarea***, 0.8% operate at LOS E or F***

RESULTS BY GEOGRAPHIC SUBAREA

CARRBORO

Figure 1-14. Carrboro LOS Change



RESULTS BY GEOGRAPHIC SUBAREA

CARRBORO

key takeaway

2019 average daily traffic demand in the Carrboro subarea is 8,705. This is a 4.0% increase from 8,369 in 2017.

5.6**%**

key takeaway

Of the roadways in the area that declined to LOS E or F between 2017 and 2019, 5.6% were in the Carrboro subarea.

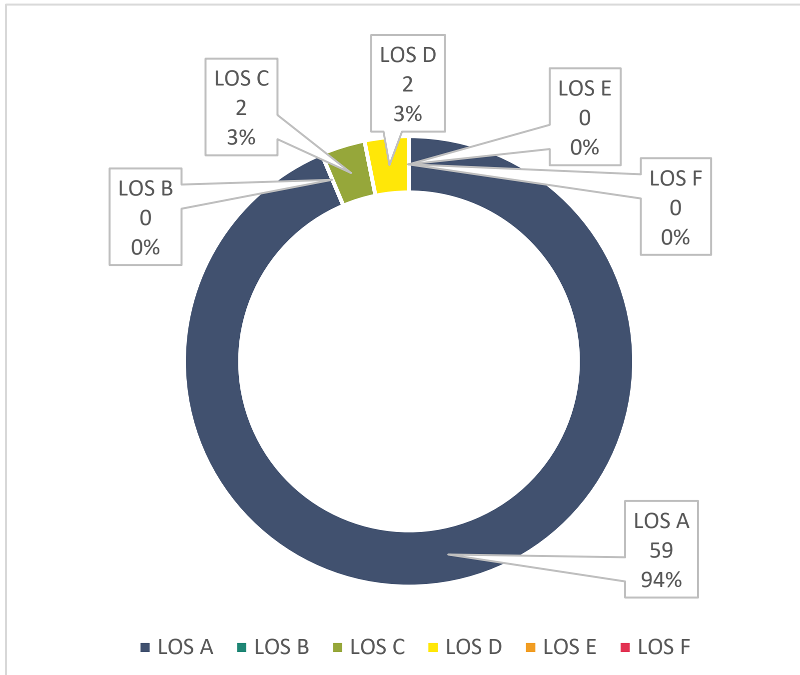
key takeaway

Two roadway segments in the Carrboro subarea declined to LOS D or better between 2017 and 2019. None of the segments declined to LOS E or F.

key takeaway

The corridors in this subarea, Smith Level Rd and E Main St declined from LOS A to D and C respectively.

Figure 1-15. Count Stations by LOS Grade (2019)

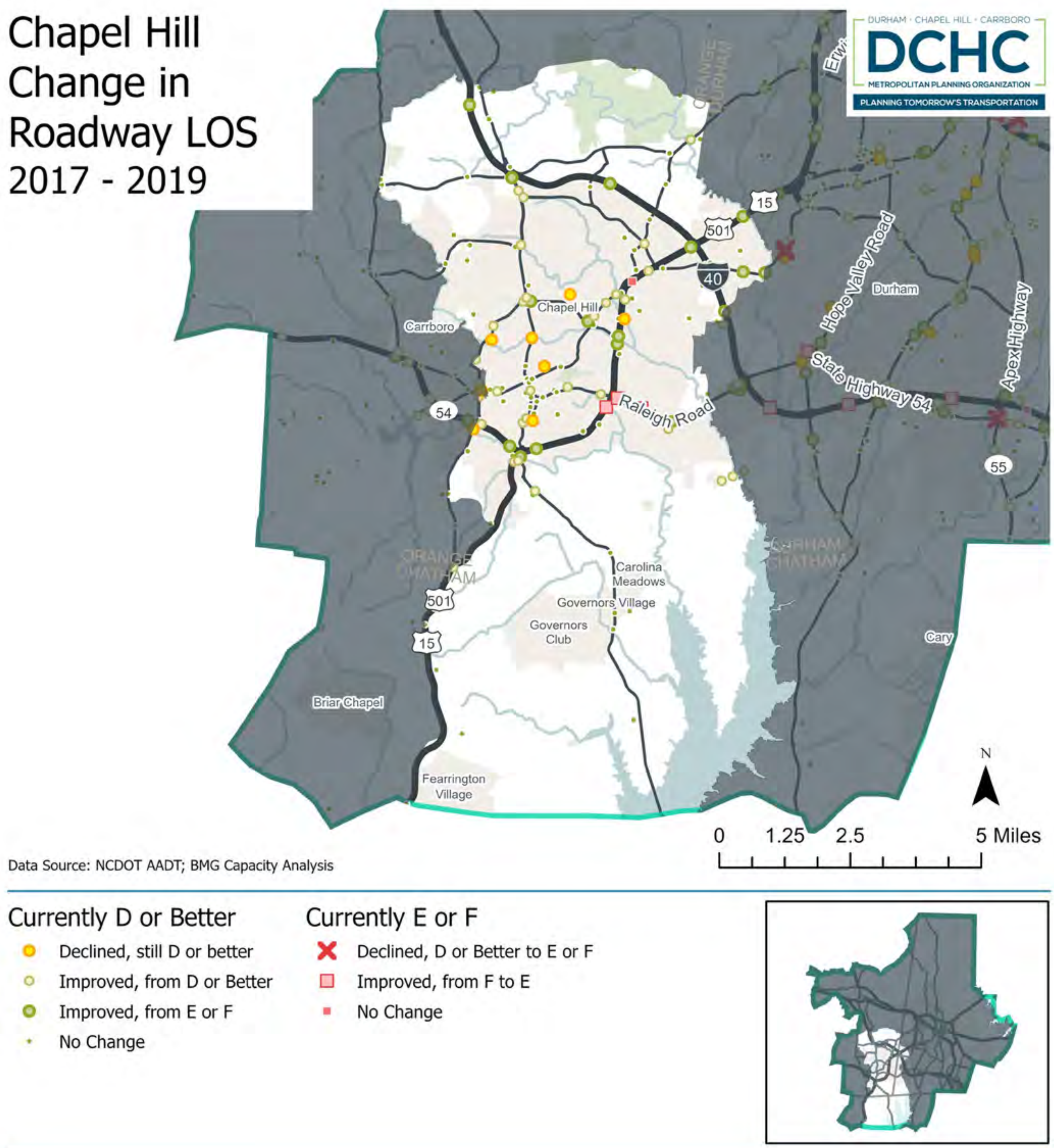


Of the ***68 count stations*** in the Carrboro subarea, ***0% operate at LOS E or F***

RESULTS BY GEOGRAPHIC SUBAREA

CHAPEL HILL

Figure 1-16. Chapel Hill LOS Change



RESULTS BY GEOGRAPHIC SUBAREA

CHAPEL HILL

key takeaway

2019 average daily traffic demand in the Chapel Hill subarea is 15,933. This is a 6.1% increase from 15,017 in 2017.

19.4%

key takeaway

Of the roadways in the area that declined to LOS D or better between 2017 and 2019, 19.4% were in the Chapel Hill subarea. No segment declined to LOS E or F.

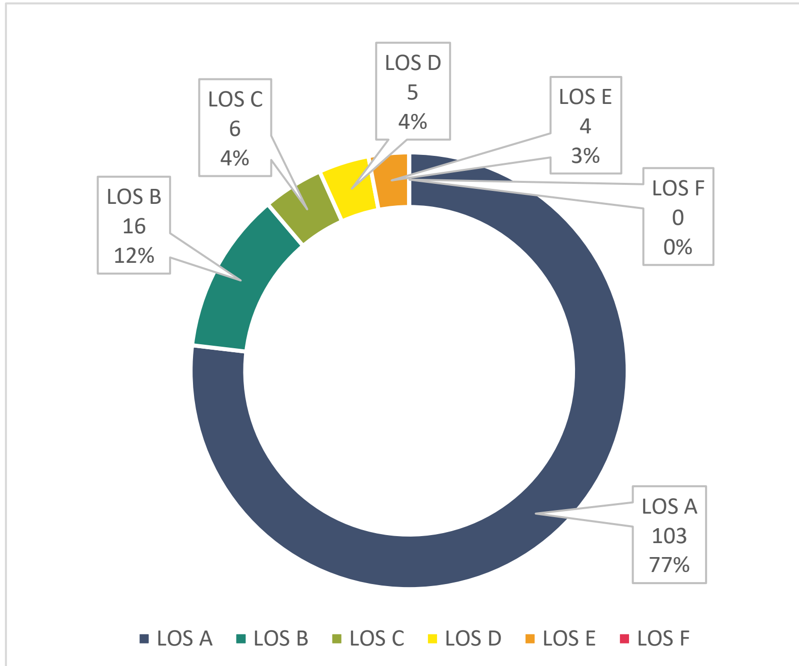
key takeaway

Seven roadway segments in the Chapel Hill subarea declined to LOS B or C from LOS A between 2017 and 2019.

key takeaway

Major roads experiencing a decline in LOS in this area are Hillsborough St, Curtis Rd and Willow Dr.

Figure 1-17. Count Stations by LOS Grade (2019)



Of the **134 count stations** in the Chapel Hill subarea, **3% operate at LOS E or F**

RESULTS BY GEOGRAPHIC SUBAREA

COMPARATIVE ANALYSIS

Downtown Durham saw the largest overall increase (7.7%) in average daily traffic demand from 2017 to 2019, followed by East Durham (7.2%), Chapel Hill (6.1%), Southpoint (5.1%), Carrboro(4.0%), North Durham (2.8%), and Hillsborough (2.2%).

The Southpoint subarea had the third-highest number of roadway segments for which data was available, but the highest number of segments operating at LOS F (3). This is more than twice the second-highest number of two and one respectively for Downtown Durham and Hillsborough.

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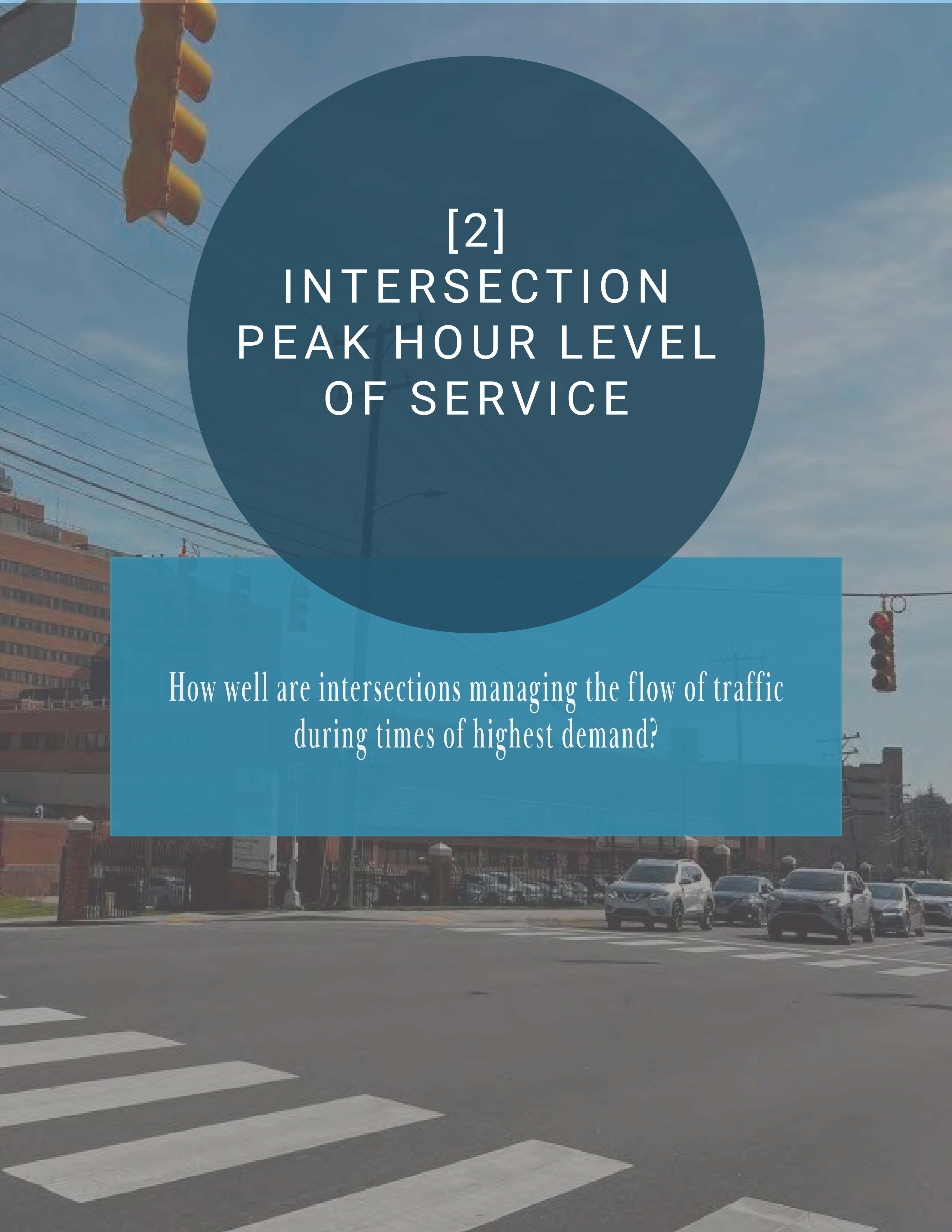

[2] INTERSECTION PEAK HOUR LEVEL OF SERVICE

How well are intersections managing the flow of traffic during times of highest demand?

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KEY TAKEAWAYS

During morning peak hours, 198 intersections (96.6%) operate at LOS D or better.

During evening peak hours, 192 intersections (93.7%) operate at LOS D or better.

There is more delay at intersections during afternoon peak hours than morning peak hours, suggesting higher traffic demand in the afternoon.

For both morning and afternoon peak hours, the Chapel Hill subarea has the highest number of intersections operating at LOS E or F.

34 intersections (16.5%) experienced a decline in LOS during morning peak hours and 36 (17.5%) experienced a decline during afternoon peak hours. 2 declined to E or F in the morning and 6 declined to E or F in the afternoon. In total, 2 operate at E or F in the morning and 8 operate at E or F in the afternoon.

INTRODUCTION

Like highway or street segments, level of service can be used to describe the performance of an intersection. One key difference is that delay, rather than traffic volume, is the key factor in determining an intersection's LOS. The intersection LOS reported in this chapter pertain to automobiles only; quality scores for pedestrian and bicycle modes at signalized intersections are not analyzed.

METHODOLOGY

Although delay is not the only metric used when evaluating intersections, it is typically the most heavily weighted because it effectively reveals intersection inefficiencies. Table 2-1 outlines the Highway Capacity Manual (HCM) standards for signalized intersection LOS.

Vehicle movement data were analyzed using Synchro, a macroscopic transportation analysis software that uses HCM-recommended methodologies. For each intersection approach, average intersection delays were calculated using the following factors:

- Peak hour volumes - the volume of all modes of traffic at the most congested hour;
- Peak hour factors - a metric used to represent the busiest 15-minute period of rush hour. Calculated as the ratio of peak hour volume to four times the volume of its most congested quarter;
- Lane arrangements; and
- Signal timings.

An LOS grade of A through F was assigned based on calculated intersection delays.

To calculate signalized intersection delay, vehicle turning movement counts (TMC) are collected by the MPO as they travel through the intersection (through, left turn, right turn). TMC were collected Tuesdays, Wednesdays, and Thursdays during three motor vehicle traffic peak periods: 7:00 to 9:00 A.M. (also known as AM peak); 11:00 A.M. to 1:00 P.M. (noon peak); and 4:00 P.M. to 6:00 P.M (PM peak).

TMC data were collected by the MPO for each peak period over a multi-year timeframe (2018-2022) at 205 intersections throughout the DCHC area. Depending on the availability of data, a comparison of intersection level of service was made between previous years (2017 or older) and current years (2018-2022).

Table 2-1. Highway Capacity Manual Standards for Signalized Intersection Level of Service (2016)

MODE		A	B	C	D	E	F
Automobile	Control Delay (s/vehicle)	≤ 10	>10-20	>20-35	>35-55	>55-80	>80
	Manueverability	Most vehicles travel through the intersection without stopping	More vehicles stop than with LOS A	Many vehicles still pass through the intersection without stopping	Many vehicles stop and individual cycle failures are noticeable	Individual cycle failures are frequent	Most cycles fail to clear the queue
Non-automobile	Service Quality Score*	≤ 1.50	>1.50-2.50	>2.50-3.50	>3.50-4.50	>4.50-5.50	>5.50
	Travelers' perception of service quality and traveling experience	Best	Very Good	Good	Fair	Poor	Very Poor

*Highway Capacity Manual 2016 Exhibit 19-8 and 19-9

Figure 2-1. Intersection Level of Service 2018-2022 - AM Peak Period

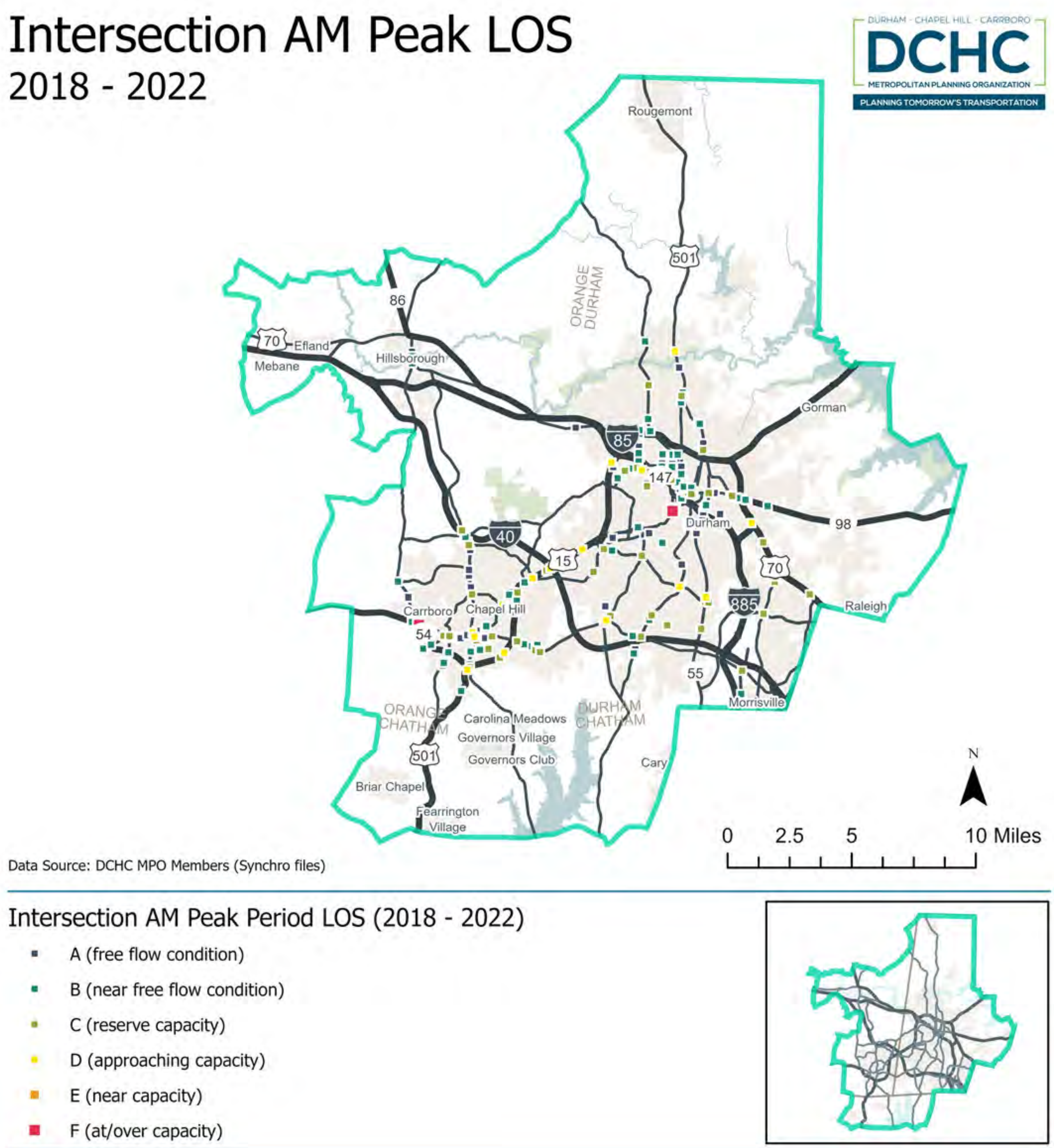


Figure 2-2. Intersection Level of Service 2018-2022 - PM Peak Period

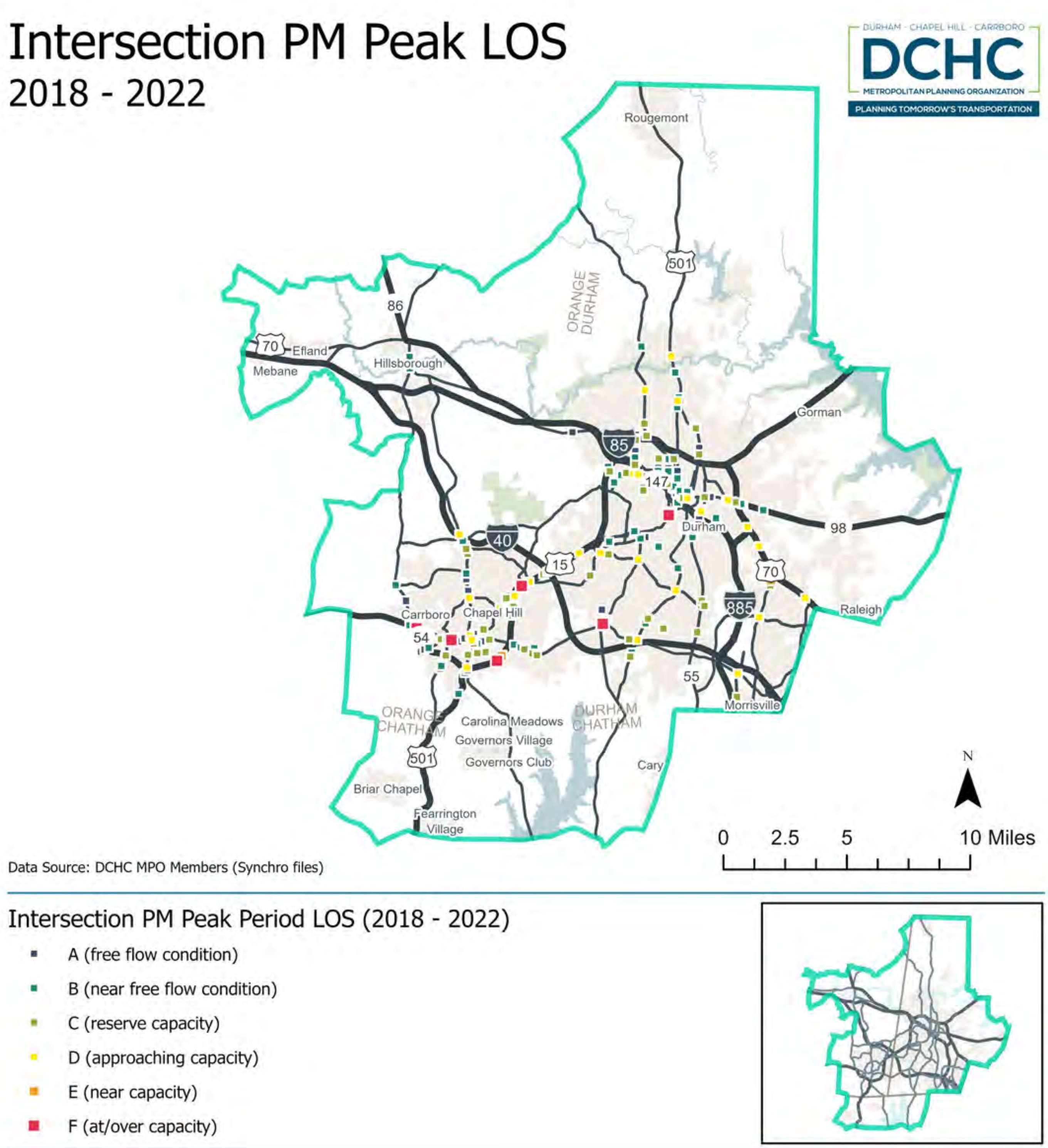


Figure 2-3. Intersection Level of Service 2018-2022 - PM Peak Period

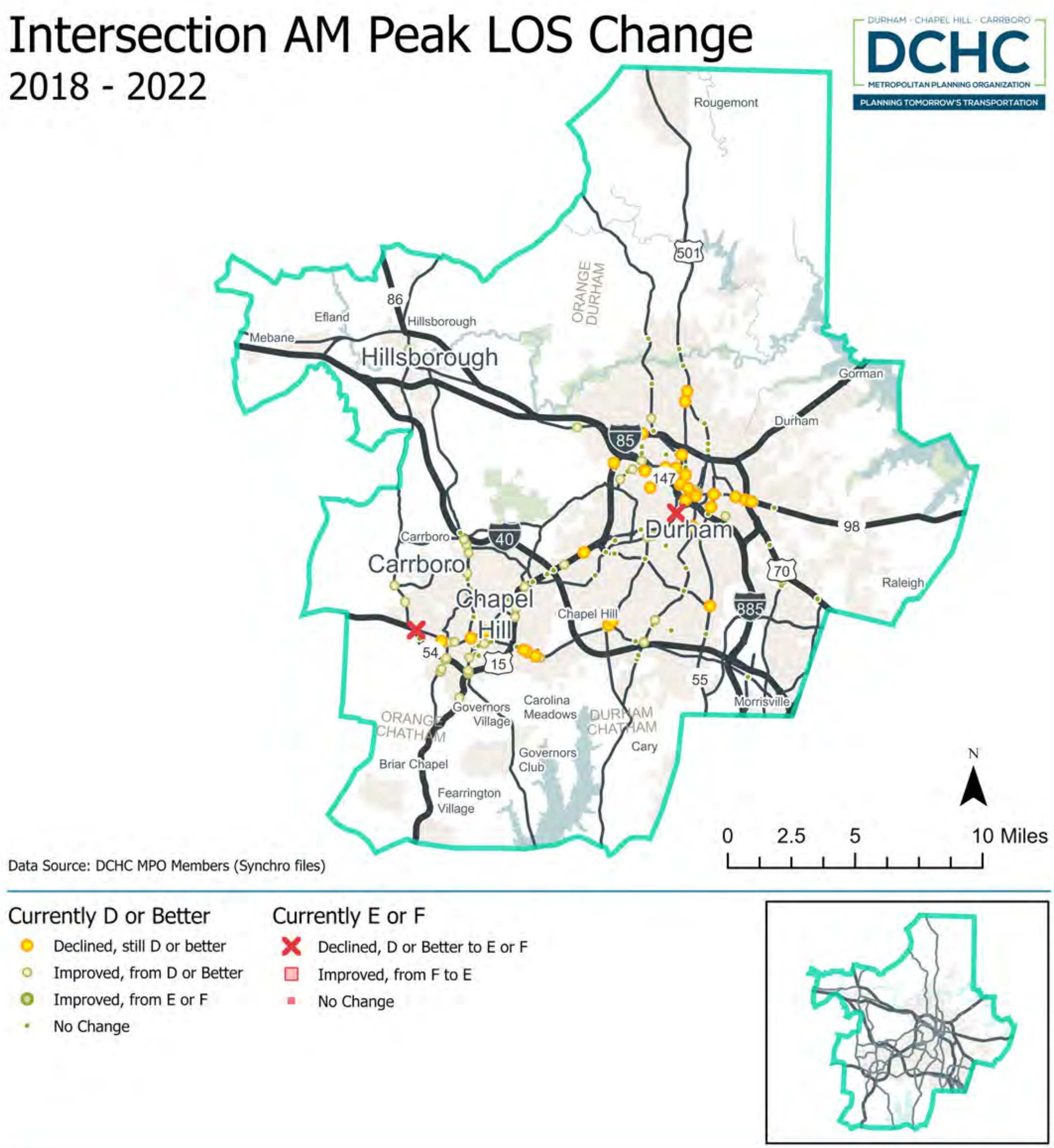
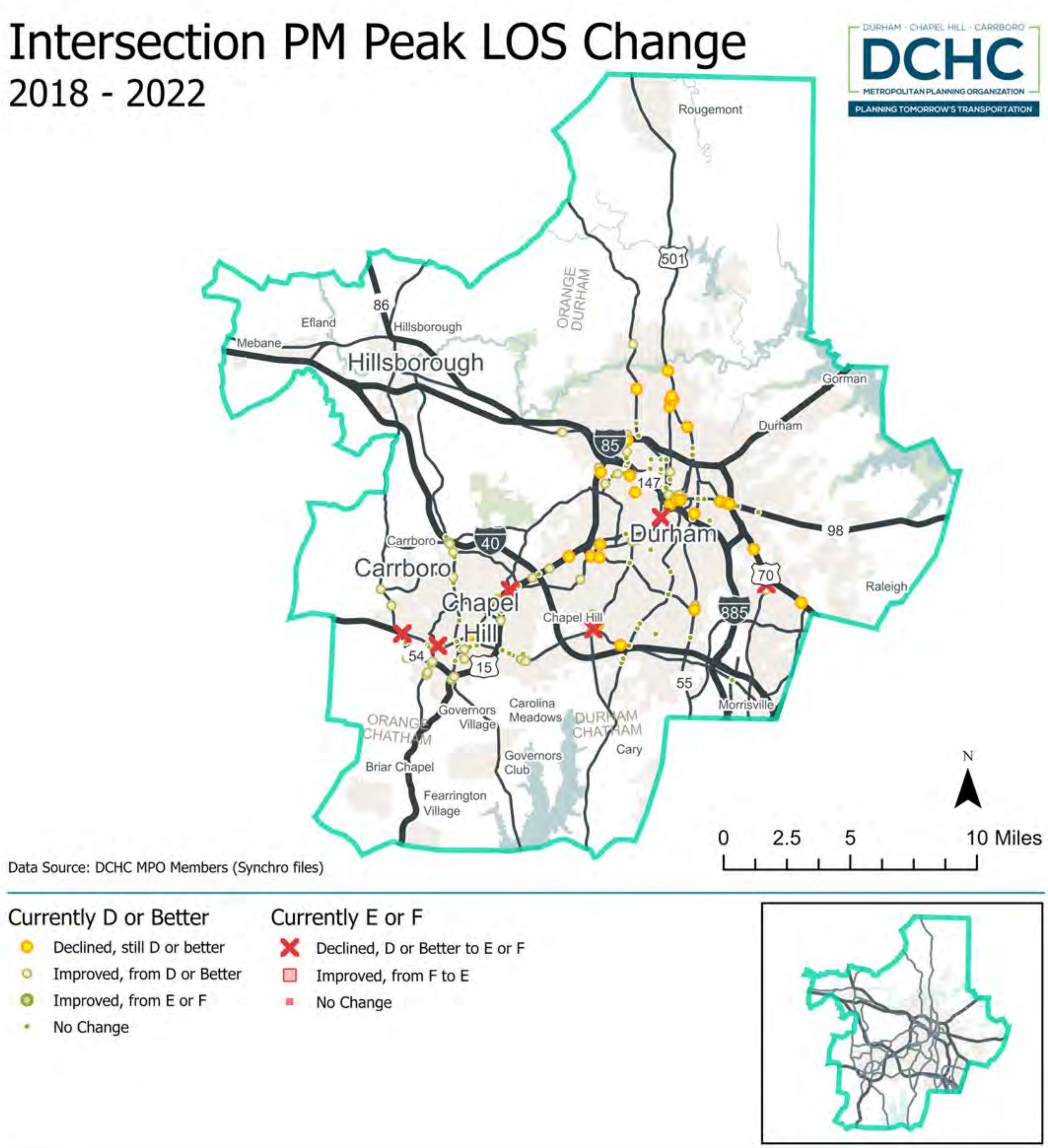


Figure 2-4. Intersection Level of Service 2018-2022 - PM Peak Period



REGIONAL OVERVIEW

Most observed intersections operate at LOS C or higher during both morning and afternoon peak hours. During morning peak hours, 89% of the observed intersections are operating at LOS C or higher. During afternoon peak hours, 80% are operating at LOS C or higher.

This suggests that most intersections within the DCHC MPO area provide an acceptable level of service. Trends suggest that intersections are slightly more congested during afternoon peak hours than during the morning peak hours.

Approximately, half of the observed intersections show either LOS improvemnt or a decline. The remaining half show no change in LOS.

During the morning peak, LOS declined at 34 intersections, improved at 56, and did not change at 106 intersections. Nine had insufficient data to calculate a recent change.

In the afternoon peak hours, the level of service declined for 36 intersections, improved for 57, and did not change at 103 intersections. Nine intersections did not provide enough data to make a comparison.

Figure 2-1 and Figure 2-2 show the peak period LOS for signalized intersections throughout the DCHC area (morning and afternoon, respectively).

Figure 2-5 and 2-6 represents the intersection

Figure 2-5. Region-wide AM Peak Period LOS (2021)

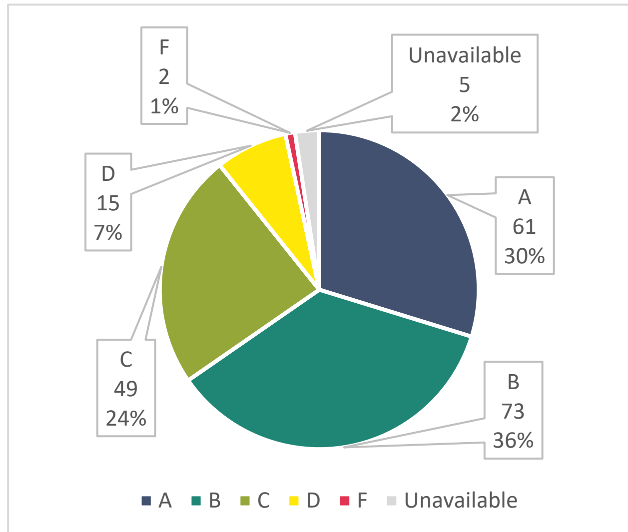
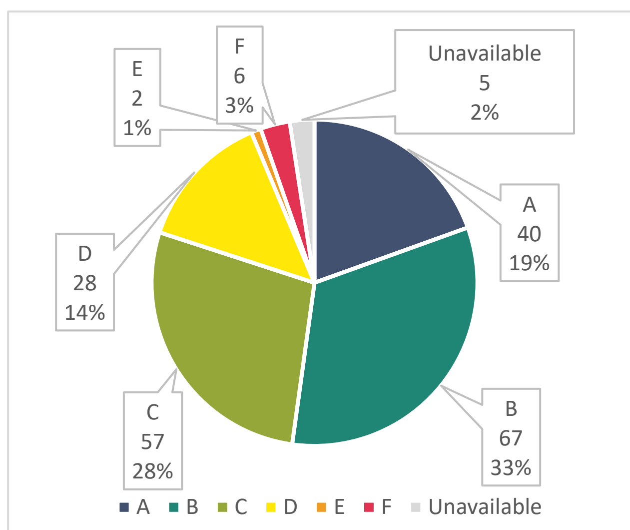


Figure 2-6. Region-wide PM Peak Period LOS (2021)



for the whole region (morning and afternoon, respectively).

Figure 2-3 and 2-4 show the peak period LOS Change for observed intersections throughout the DCHC area (morning and afternoon, respectively).

Figure 2-7 and 2-8 represents the intersection performance by their operating LOS Change between now and then and percentage/ share of the LOS Change (improved/ declined) for the whole region (morning and afternoon, respectively).

Table 2-2 and Table 2-3 show the number of intersections operating at LOS E or F in each subarea (morning and afternoon, respectively).

Figure 2-7. Region-wide AM Peak Period LOS Change

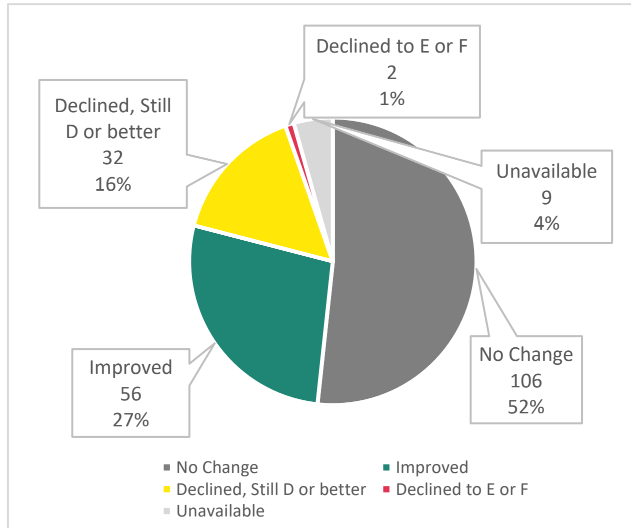


Figure 2-8. Region-wide PM Peak Period LOS Change

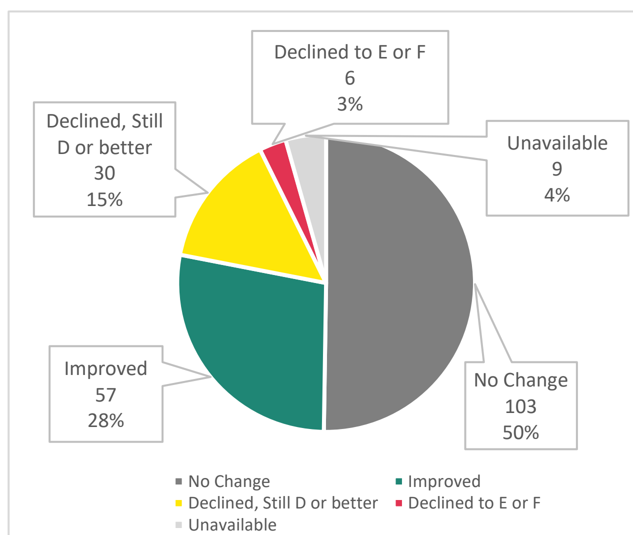


Table 2-2. Number of Intersections Operating at LOS E or F - AM Peak Period

Subarea	2017 and Older			2018 - 2022		
	Total # of Intersections Observed	Intersections at LOS E or F		Total # of Intersections Observed	Intersections at LOS E or F	
		#	%		#	%
Carrboro	18	2	11.1%	18	1	5.5%
Chapel Hill	77	6	7.8%	60	0	0%
Downtown Durham	78	2	2.6%	77	1	1.3%
East Durham	11	1	9.1%	11	0	0%
Hillsborough	5	0	0%	5	0	0%
North Durham	16	0	0%	16	0	0%
Southpoint	19	0	0%	18	0	0%
Total	**224**	**11**	**4.9%**	**205**	**2**	**0.98%**

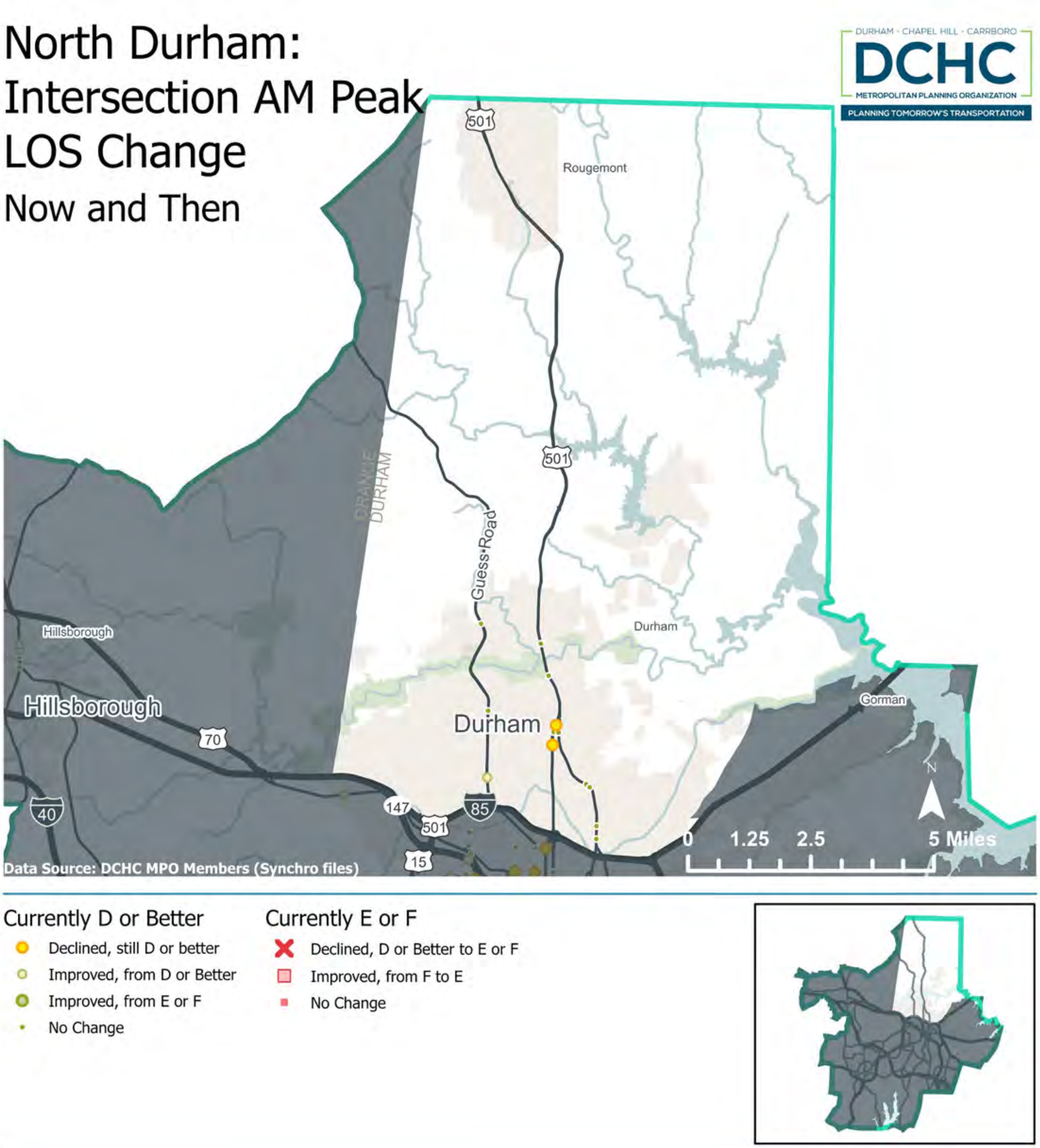
Table 2-3. Number of Intersections Operating at LOS E or F - PM Peak Period

Subarea	2017 and older			2018 - 2022		
	Total # of Intersections Observed	Intersections at LOS E or F		Total # of Intersections Observed	Intersections at LOS E or F	
		#	%		#	%
Carrboro	18	1	5.6%	18	1	5.5%
Chapel Hill	77	10	13%	60	4	6.7%
Downtown Durham	78	1	1.3%	77	1	1.3%
East Durham	11	1	9.1%	11	1	9.1%
Hillsborough	19	0	0%	5	0	0%
North Durham	16	1	6.3%	16	0	0%
Southpoint	19	0	0%	18	1	5.5%
Total	**238**	**14**	**5.9%**	**205**	**8**	**3.9%**

RESULTS BY GEOGRAPHIC SUBAREA

NORTH DURHAM

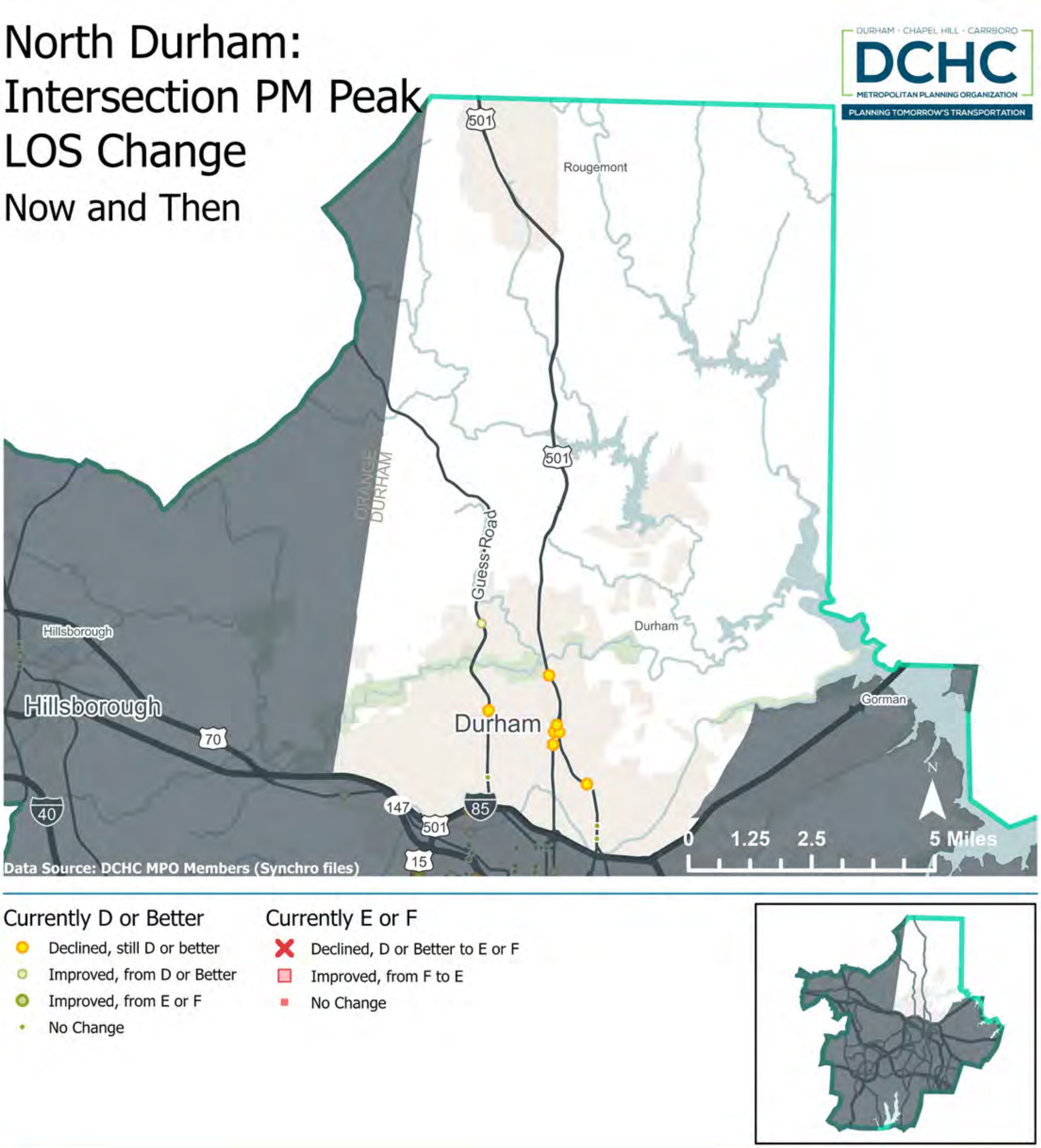
Figure 2-9. North Durham Change in Intersection LOS - AM Peak



RESULTS BY GEOGRAPHIC SUBAREA

NORTH DURHAM

Figure 2-10. North Durham Change in Intersection LOS - PM Peak



RESULTS BY GEOGRAPHIC SUBAREA

NORTH DURHAM

16

Intersections observed in this subarea

AM PEAK

No intersections operate at LOS E or F and only one operates at LOS D during the morning peak.

LOS D	North Roxboro Street and Latta Road
LOS E	[None]
LOS F	[None]

PM PEAK

No intersections operate at LOS E or F and 3 operate at LOS D during the morning peak.

LOS D	North Roxboro Street and Latta Road Guess Road and Horton Road North Duke Street and Horton Road
LOS E	[None]
LOS F	[None]

RESULTS BY GEOGRAPHIC SUBAREA

NORTH DURHAM

AM PEAK

Figure 2-11. Intersection LOS 2018-2022

Data available for 16 Intersections

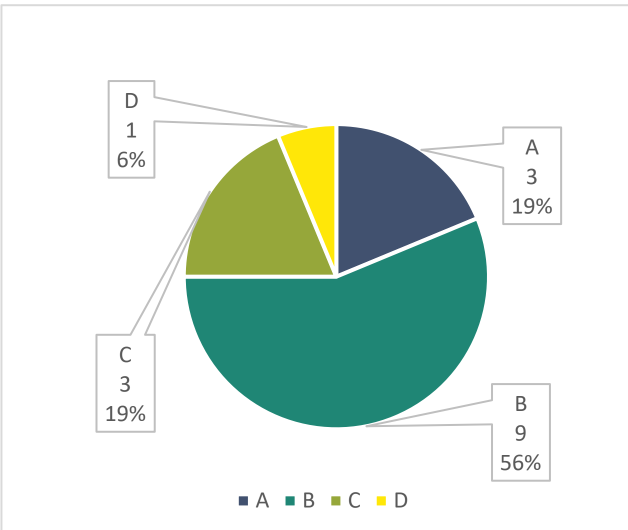
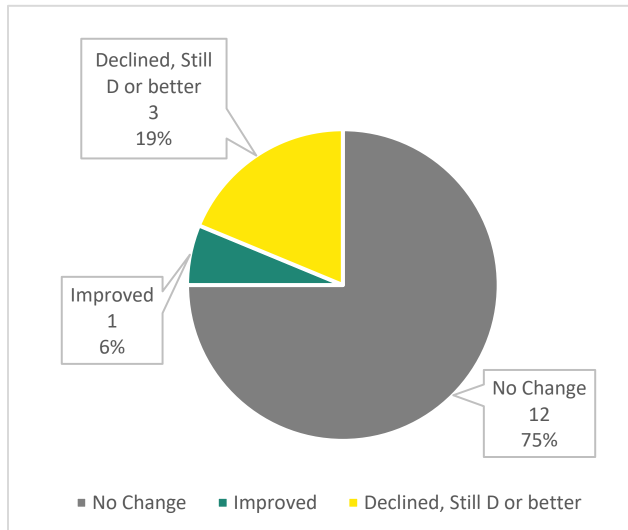


Figure 2-12. Intersection LOS Change

Data available for 16 Intersections



PM PEAK

Figure 2-13. Intersection LOS 2018-2022

Data available for 16 Intersections

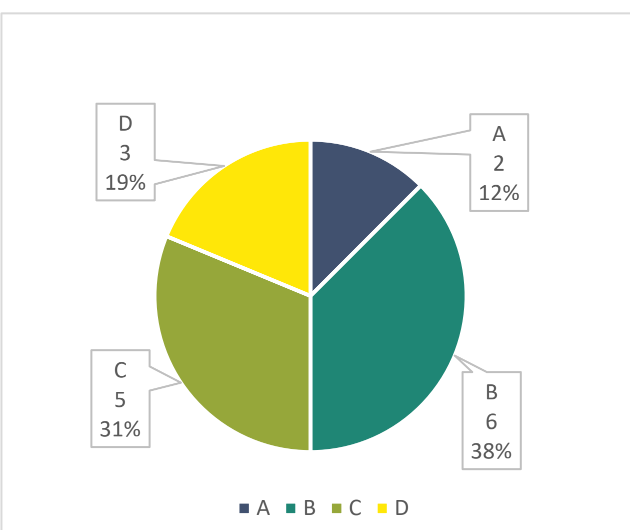
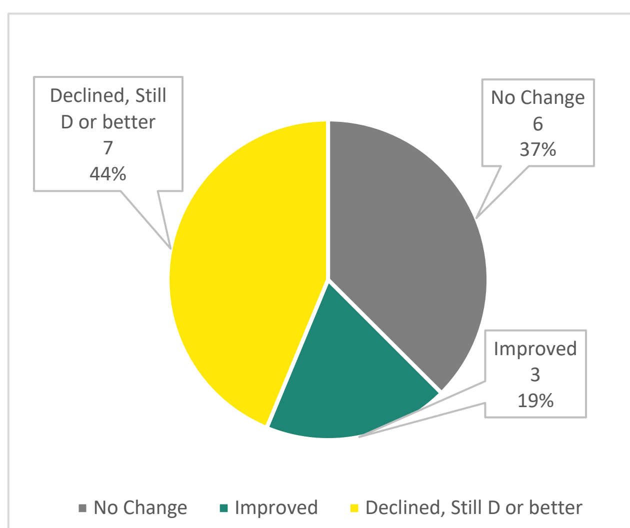


Figure 2-14. Intersection LOS Change

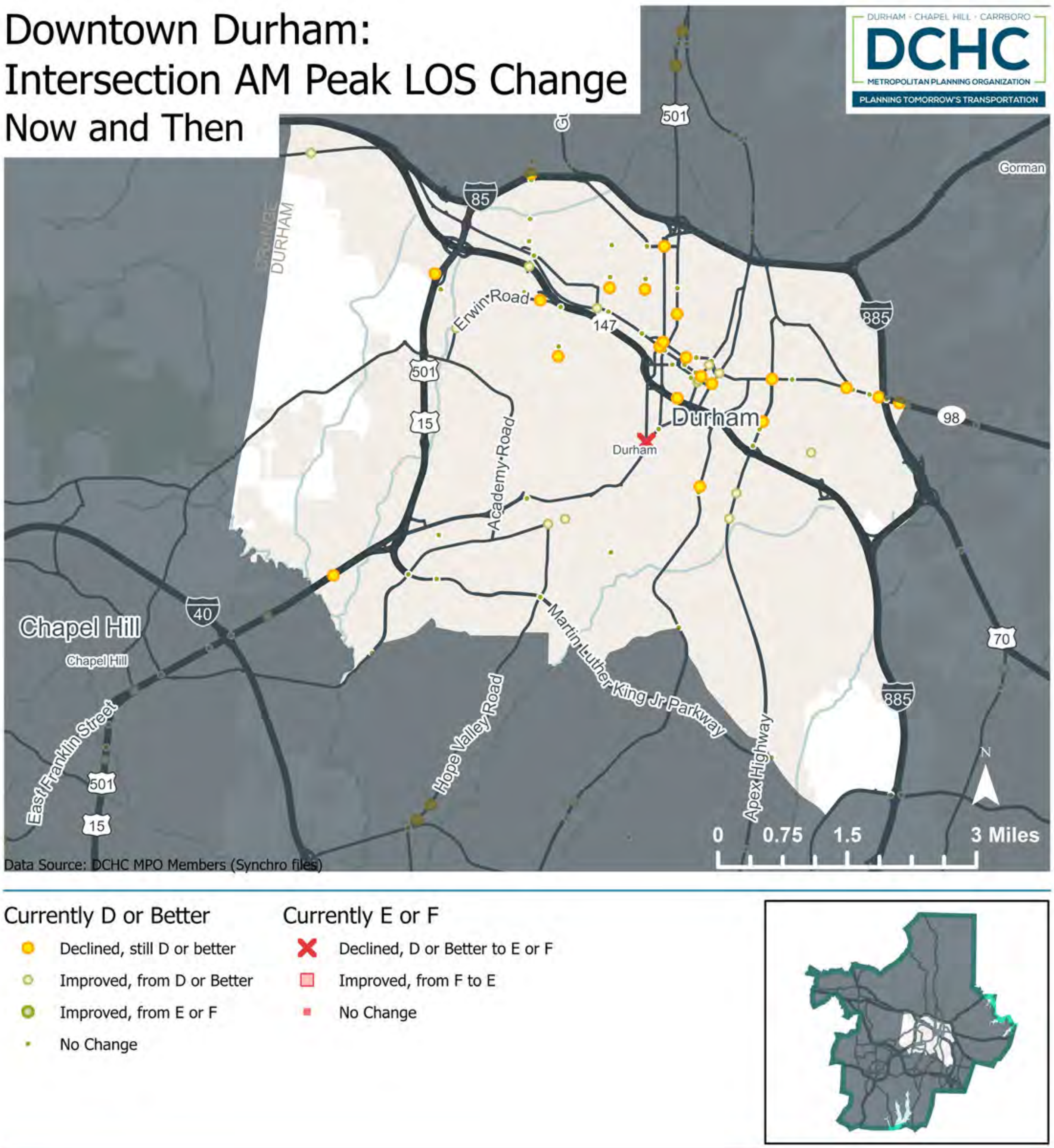
Data available for 16 Intersections



RESULTS BY GEOGRAPHIC SUBAREA

DOWNTOWN DURHAM

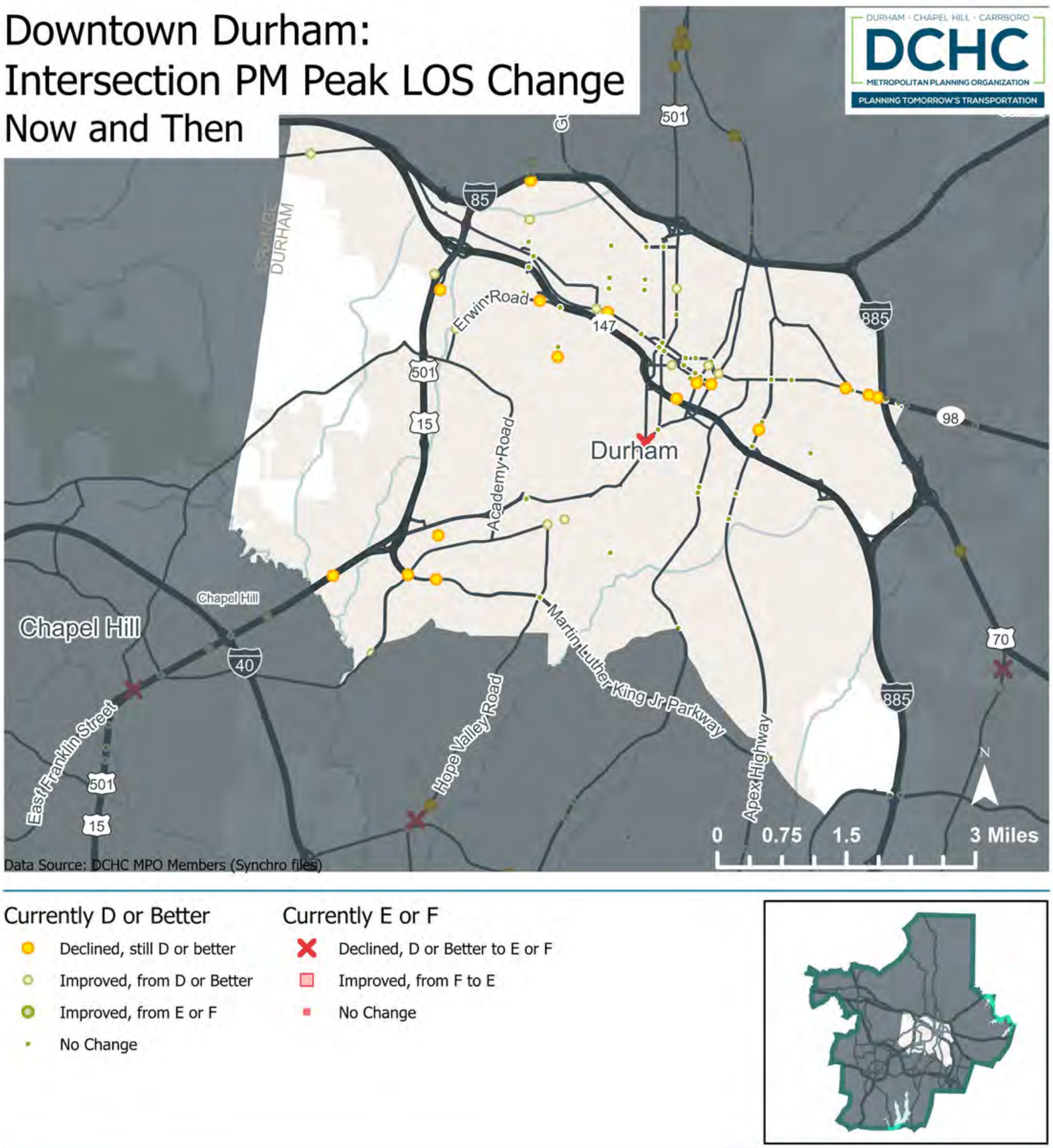
Figure 2-15. Downtown Durham Change in Intersection LOS - AM Peak



RESULTS BY GEOGRAPHIC SUBAREA

DOWNTOWN DURHAM

Figure 2-16. Downtown Durham Change in Intersection LOS - PM Peak



RESULTS BY GEOGRAPHIC SUBAREA

DOWNTOWN DURHAM

77

Intersections observed in this subarea

AM PEAK

All intersections except for one operate at LOS D or higher during morning peak hours.

LOS D	Durham Chapel Hill Boulevard (US 15-501) and Garrett Road
	Morreenne Road and US-15-501 SB Ramps
	Erwin Road and Trent Drive
	Apex Highway (NC-55) and East Cornwallis Road
	South Miami Boulevard and East End Avenue
LOS E	[None]
LOS F	University Drive and Vickers Avenue

PM PEAK

The same numbers are reported for afternoon peak hours.

LOS D	Durham Chapel Hill Boulevard (US 15-501) and Garrett Road
	Martin Luther King, Jr. Parkway and University Drive
	Martin Luther King, Jr. Parkway and Hope Valley Road
	Erwin Road and Fulton Street
	Erwin Road and Trent Drive
	West Main Street and Swift Avenue
	South Miami Boulevard and East End Avenue
	South Alston Avenue and Angier Avenue
	Holloway Street and North Miami Boulevard
	North Roxoboro Street and East Main Street
LOS E	[None]
LOS F	University Drive and Vickers Avenue

RESULTS BY GEOGRAPHIC SUBAREA

DOWNTOWN DURHAM

AM PEAK

Figure 2-17. Intersection LOS 2018-2022

Data available for 78 Intersections

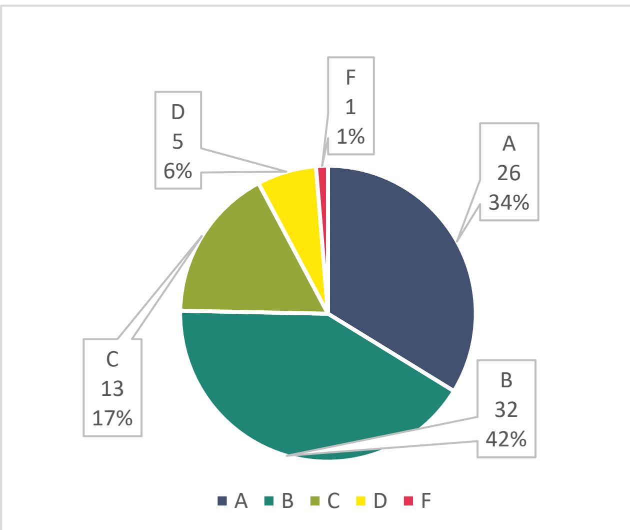
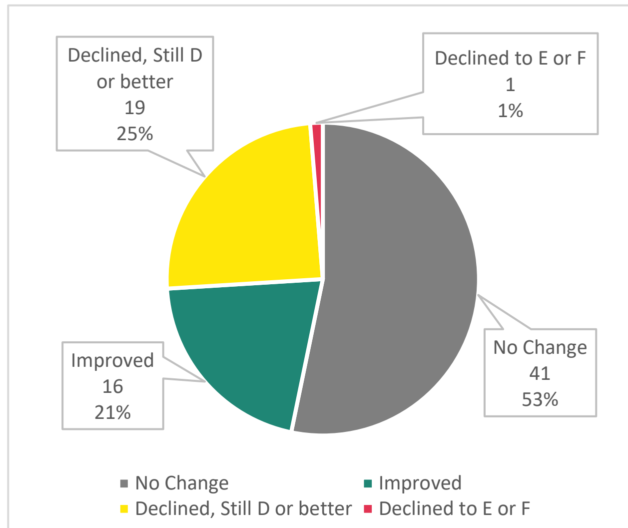


Figure 2-18. Intersection LOS Change

Data available for 77 Intersections



PM PEAK

Figure 2-19. Intersection LOS 2018-2022

Data available for 76 Intersections

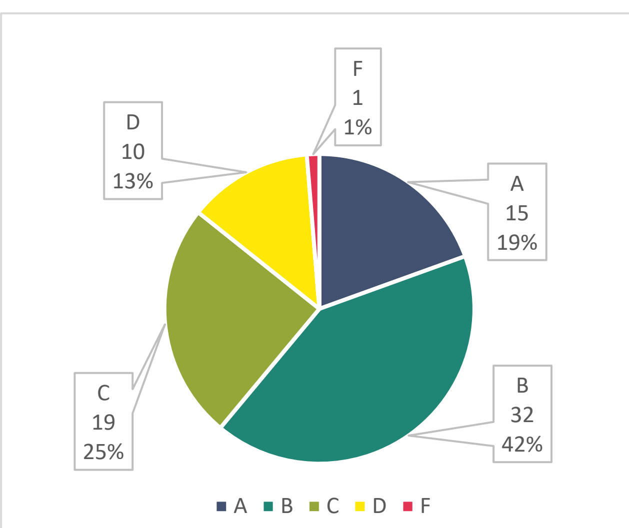
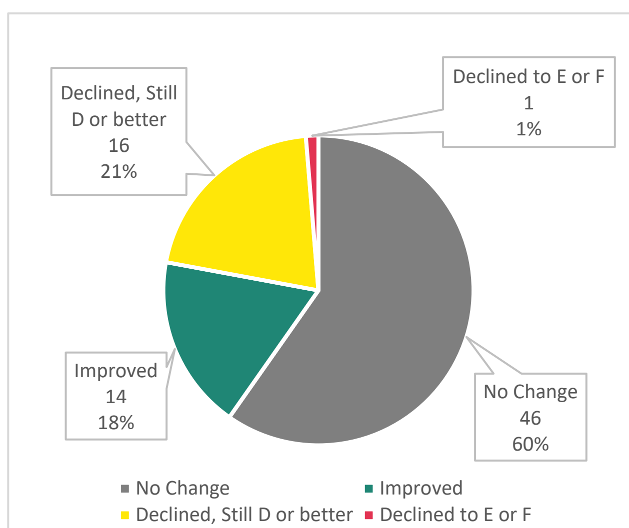


Figure 2-20. Intersection LOS Change

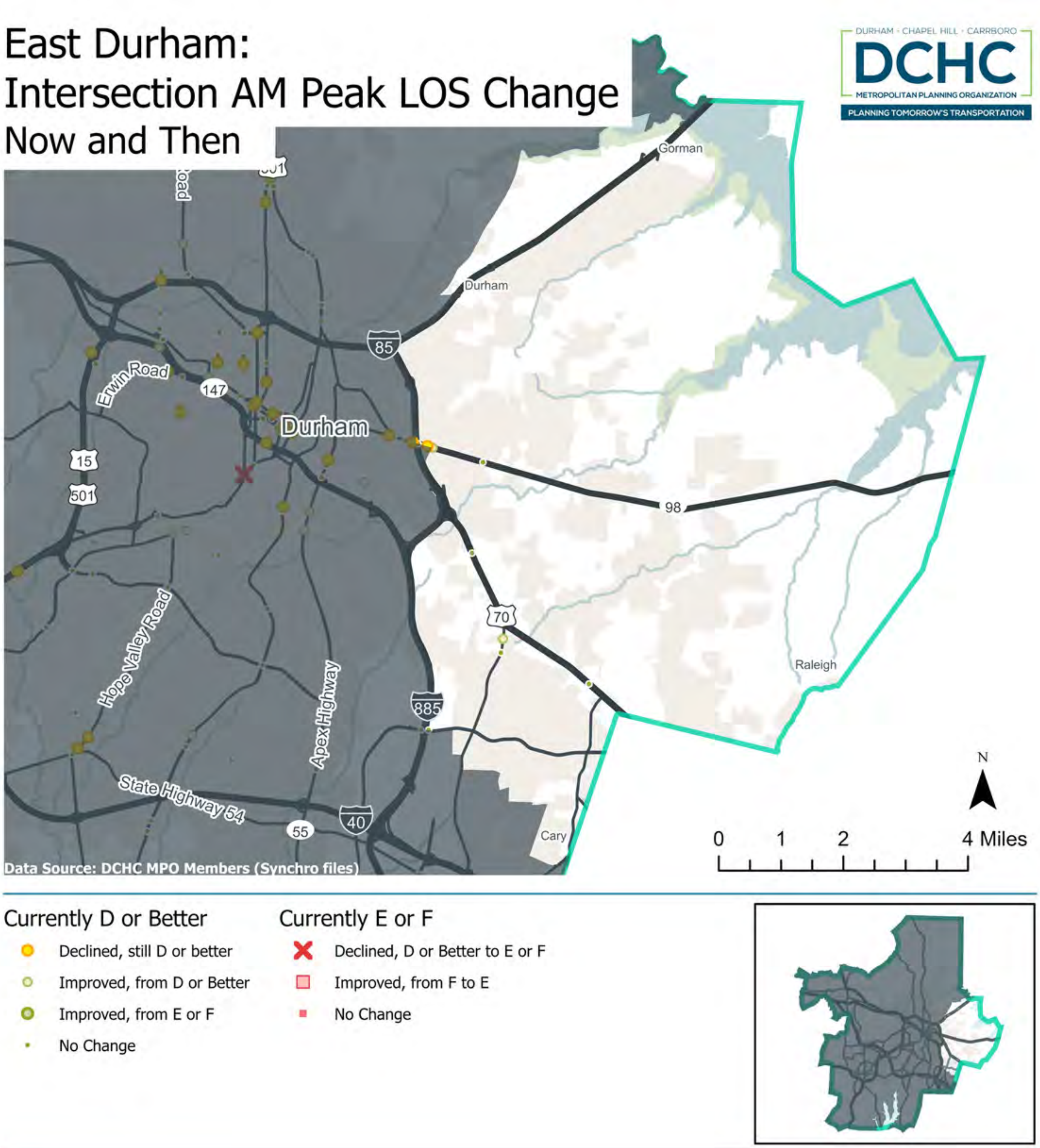
Data available for 78 Intersections



RESULTS BY GEOGRAPHIC SUBAREA

EAST DURHAM

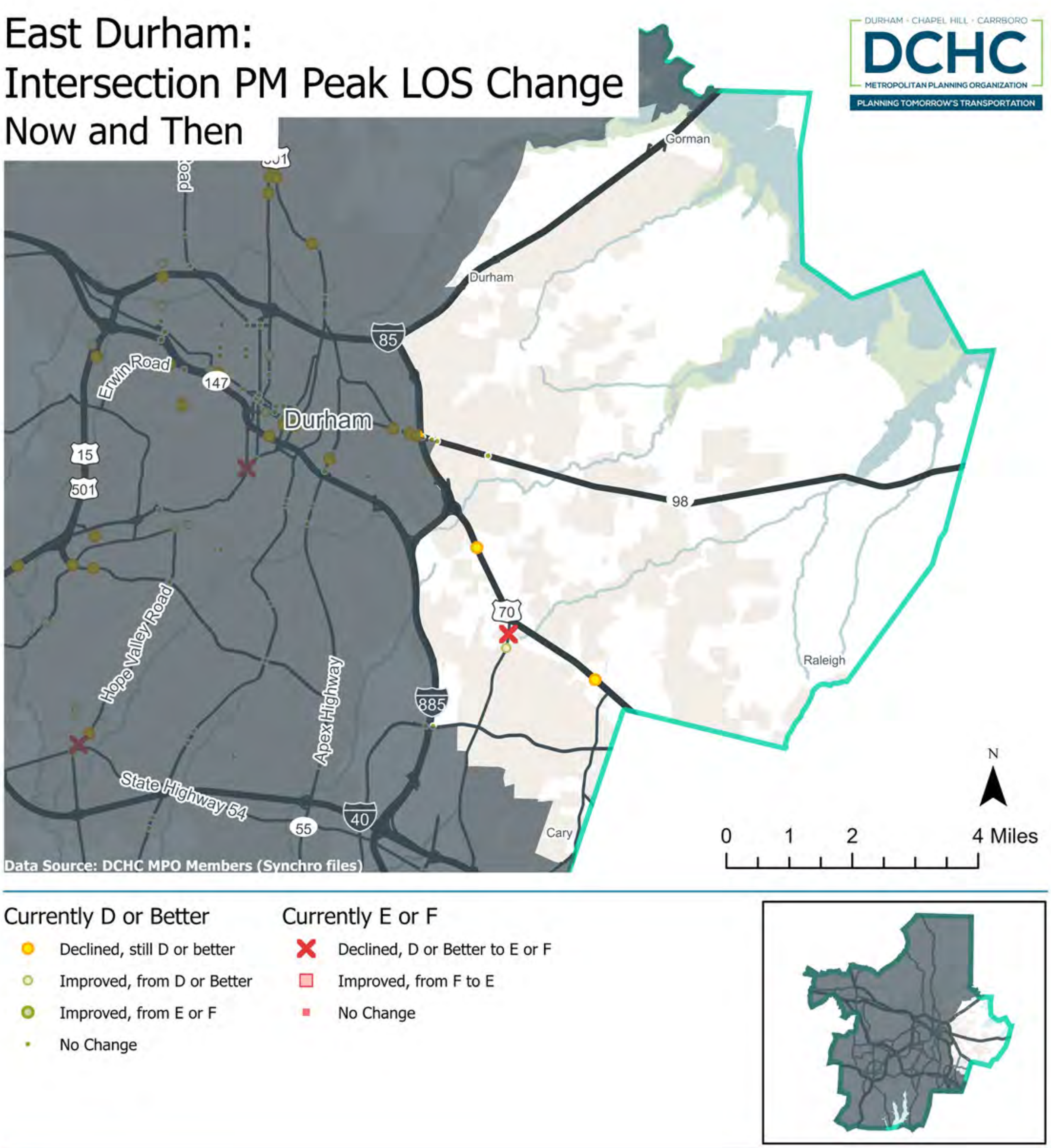
Figure 2-21. East Durham Change in Intersection LOS - AM Peak



RESULTS BY GEOGRAPHIC SUBAREA

EAST DURHAM

Figure 2-22. East Durham Change in Intersection LOS - PM Peak



RESULTS BY GEOGRAPHIC SUBAREA

EAST DURHAM

11

Intersections observed in this subarea

AM PEAK

Ten intersections operate at LOS C or higher during morning peak hours.

LOS D	[None]
LOS E	[None]
LOS F	[None]

PM PEAK

Nine intersections operate at LOS D or higher during afternoon peak hours. One intersection failing or near failing are on South Miami Boulevard.

LOS D	South Miami Boulevard and TW Alexander Drive
	South Miami Boulevard and Pleasant Drive
	New Raleigh Highway (US-70) and Lessville Road
LOS E	South Miami Boulevard and Angier Avenue
LOS F	[None]

Available data for the intersection of South Miami Boulevard and Lynn Road were not recent enough to calculate a current LOS for either peak period.

RESULTS BY GEOGRAPHIC SUBAREA

EAST DURHAM

AM PEAK

Figure 2-23. Intersection LOS 2018-2022

(Data available for 12 Intersections)

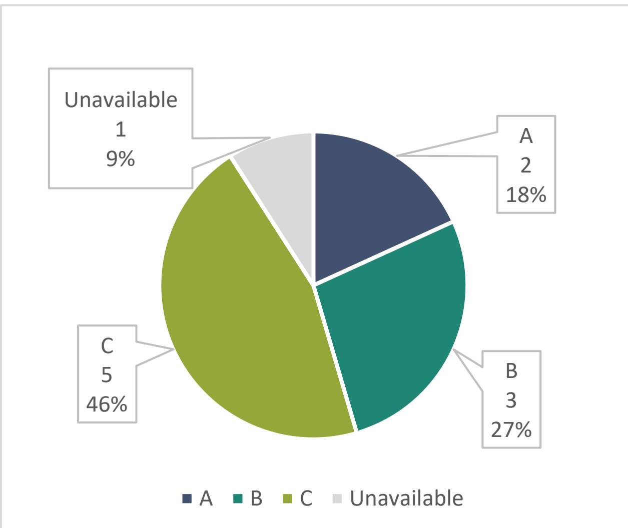
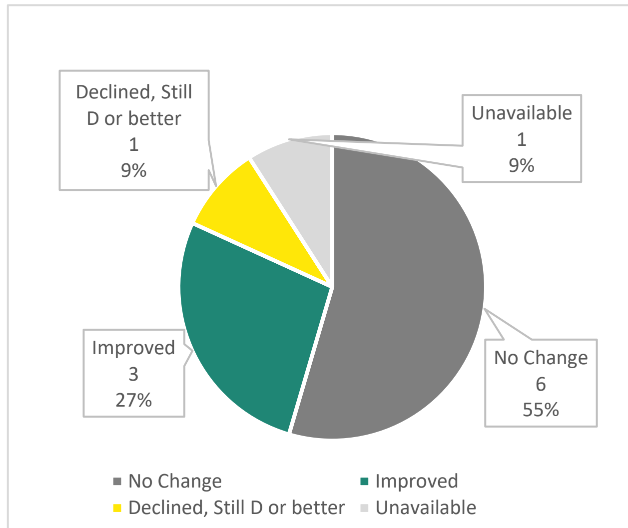


Figure 2-24. Intersection LOS Change

(Data available for 11 Intersections)



PM PEAK

Figure 2-25. Intersection LOS 2018-2022

(Data available for 11 Intersections)

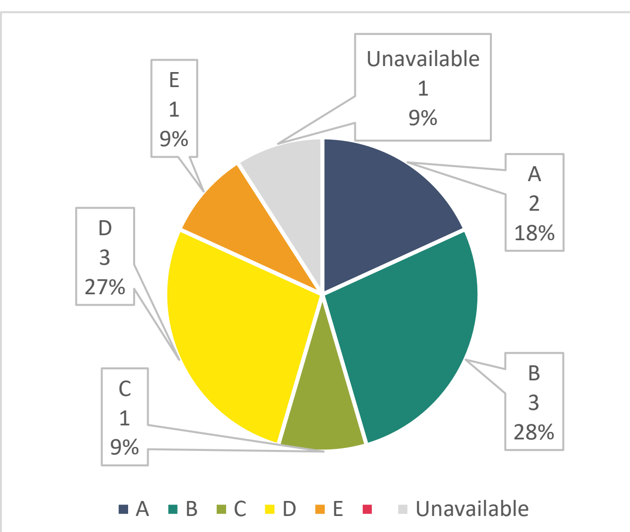
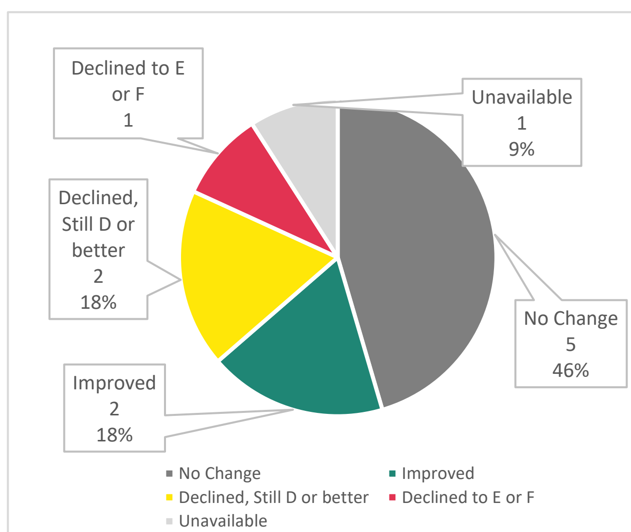


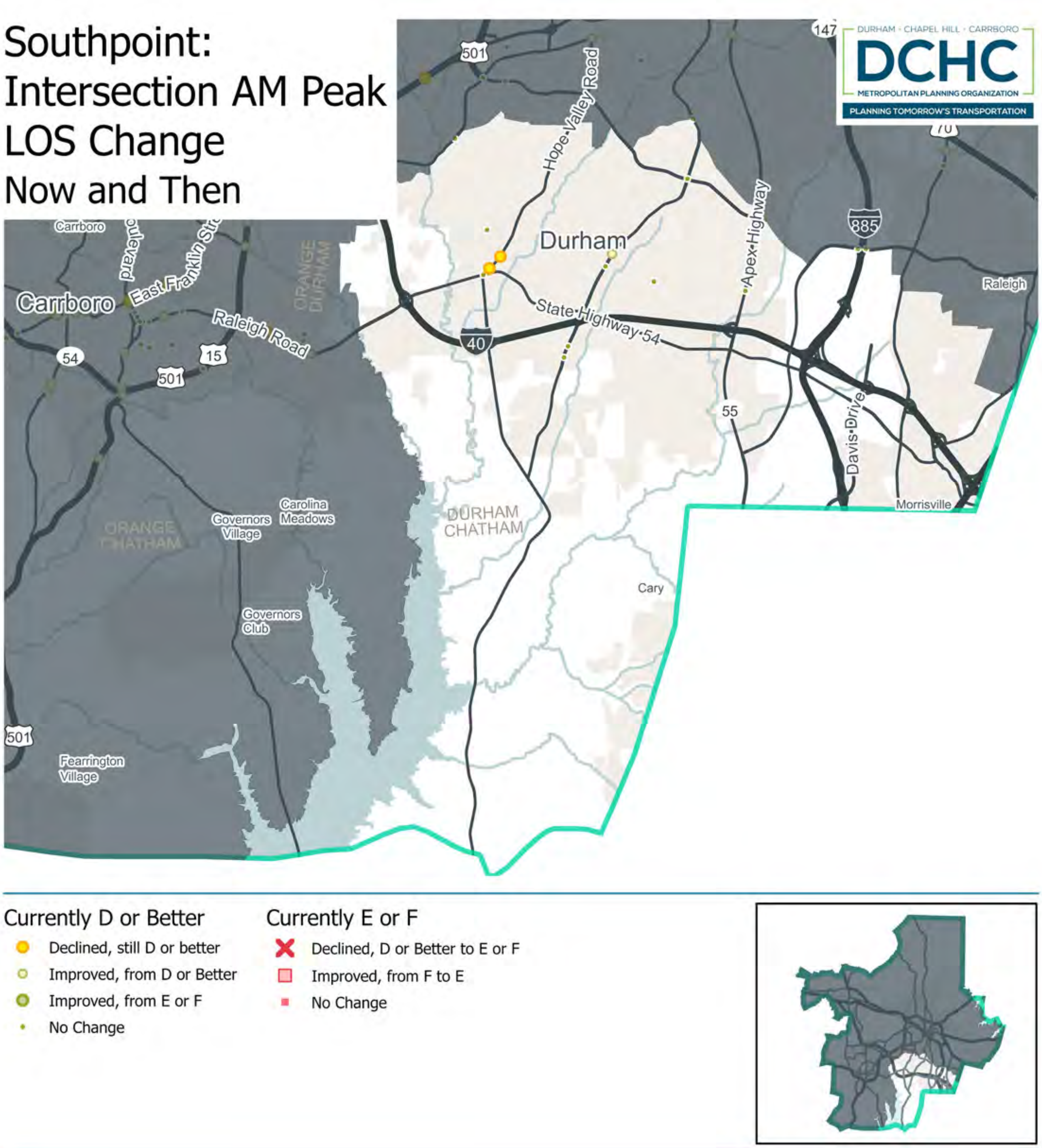
Figure 2-26. Intersection LOS Change

(Data available for 12 Intersections)



SOUTHPOINT

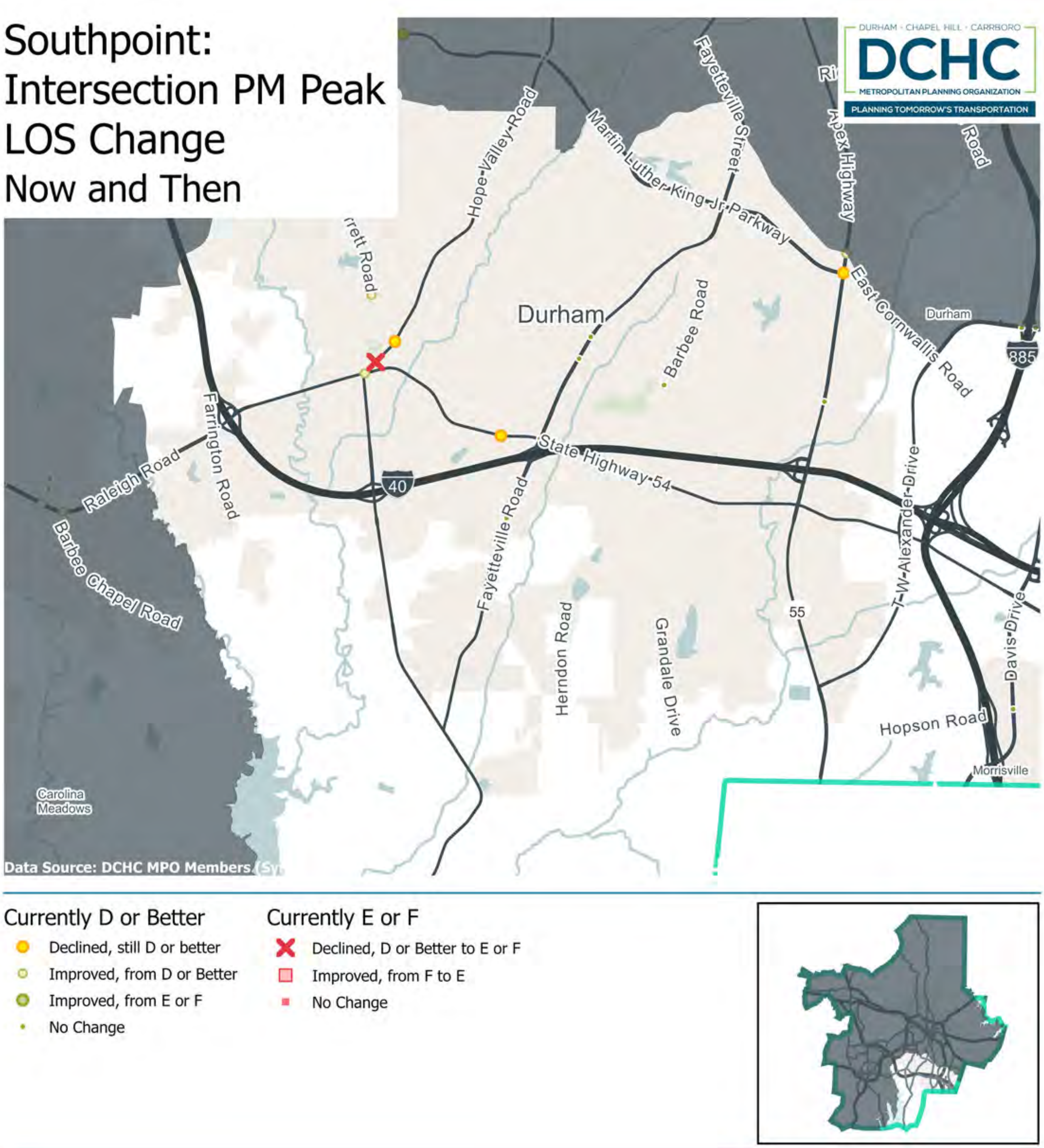
Figure 2-27. Southpoint Change in Intersection LOS - AM Peak



RESULTS BY GEOGRAPHIC SUBAREA

SOUTHPOINT

Figure 2-28. Southpoint Change in Intersection LOS - PM Peak



RESULTS BY GEOGRAPHIC SUBAREA

SOUTHPOINT

18

Intersections observed in this subarea

AM PEAK

Eighteen intersections operate at LOS D or higher during morning peak hours.

LOS D	Hope Valley Road and Garrett Road
	Martin Luther King, Jr. Parkway and Fayetteville Road
LOS E	[None]
LOS F	[None]

PM PEAK

Twelve intersections operate at LOS B or C during afternoon peak hours. Three operate at LOS D and one operates at LOS F.

LOS D	Martin Luther King, Jr. Parkway and Fayetteville Road
	NC-54 and Fayetteville Road
	NC-54 and Davis Drive
LOS E	[None]
LOS F	Hope Valley Road and Garrett Road

RESULTS BY GEOGRAPHIC SUBAREA

SOUTHPOINT

AM PEAK

Figure 2-29. Intersection LOS 2018-2022

Data available for 20 Intersections

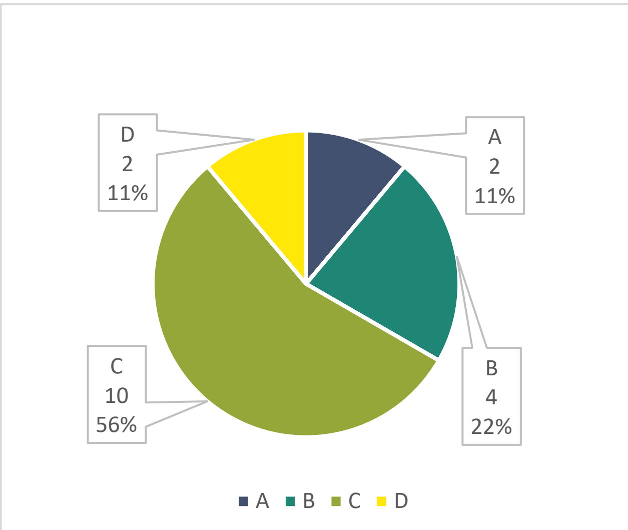
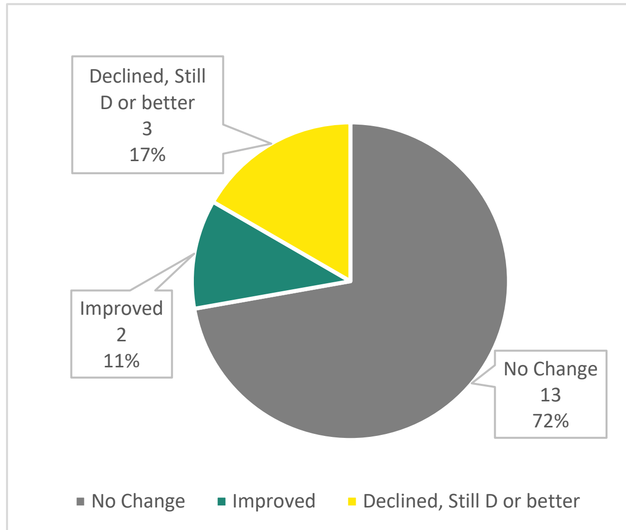


Figure 2-30. Intersection LOS Change

Data available for 17 Intersections



PM PEAK

Figure 2-31. Intersection LOS 2018-2022

Data available for 17 Intersections

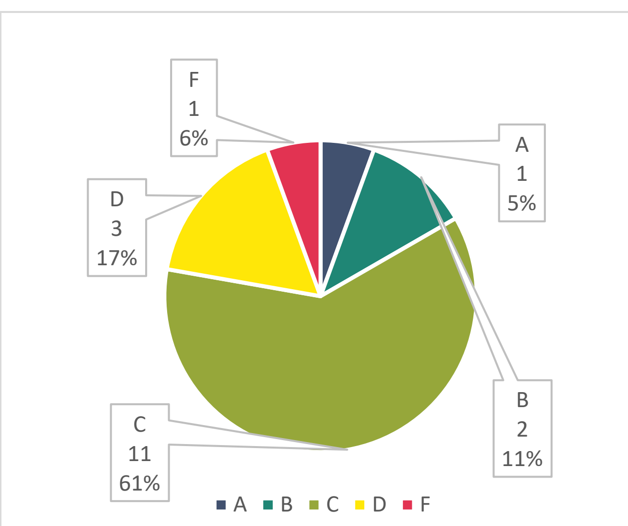
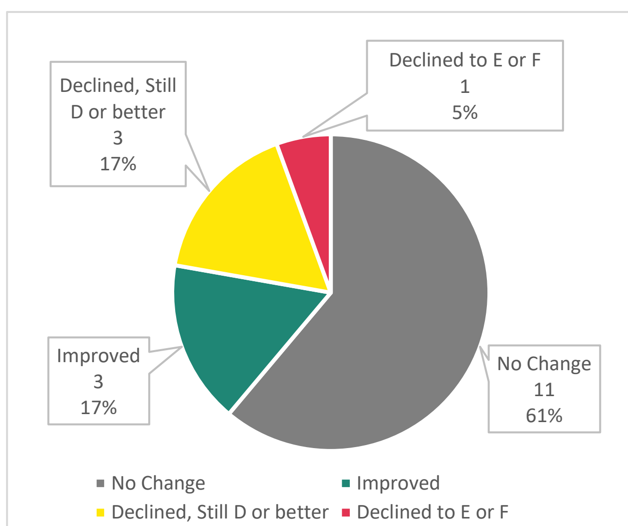


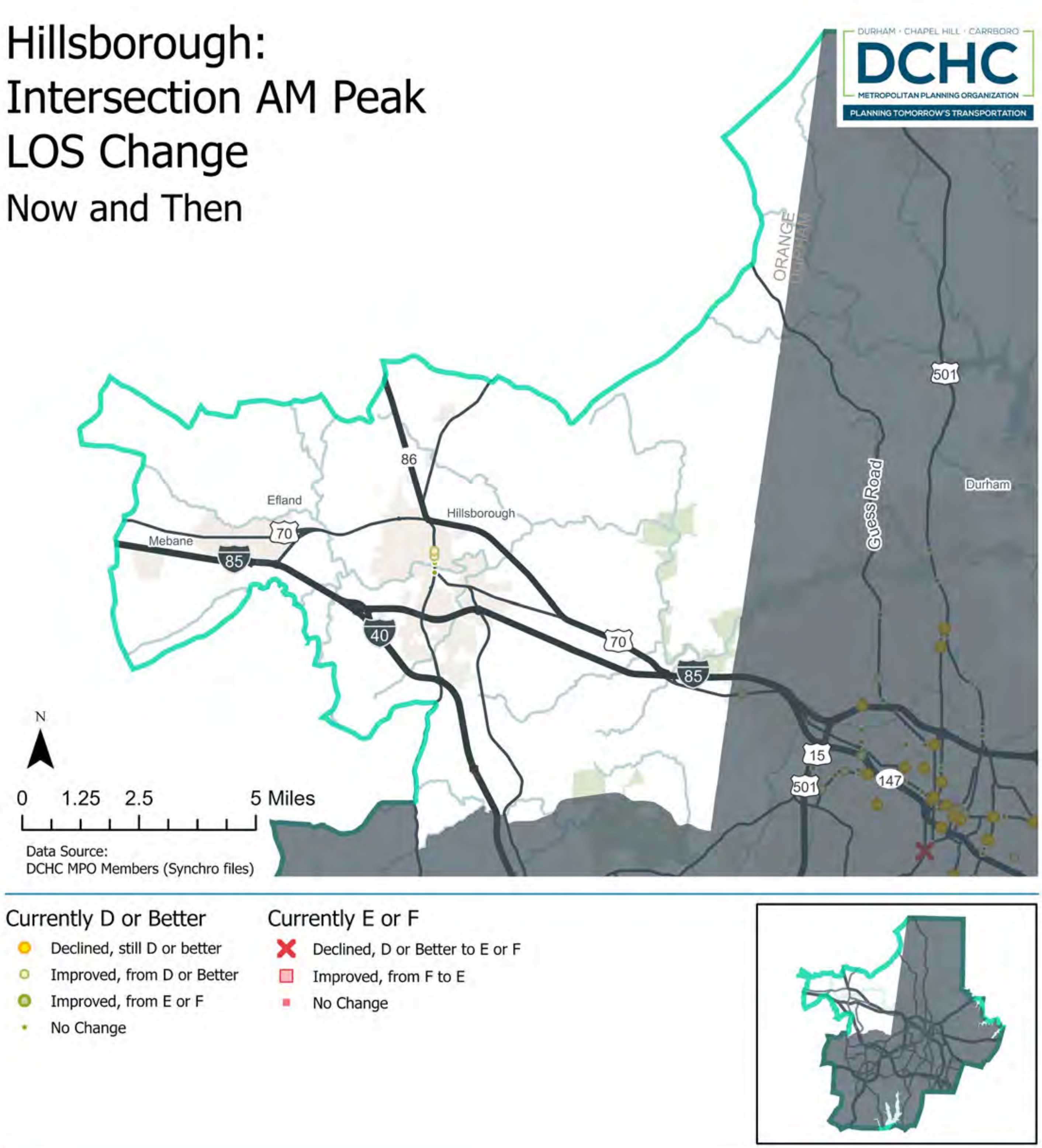
Figure 2-32. Intersection LOS Change

Data available for 20 Intersections



HILLSBOROUGH

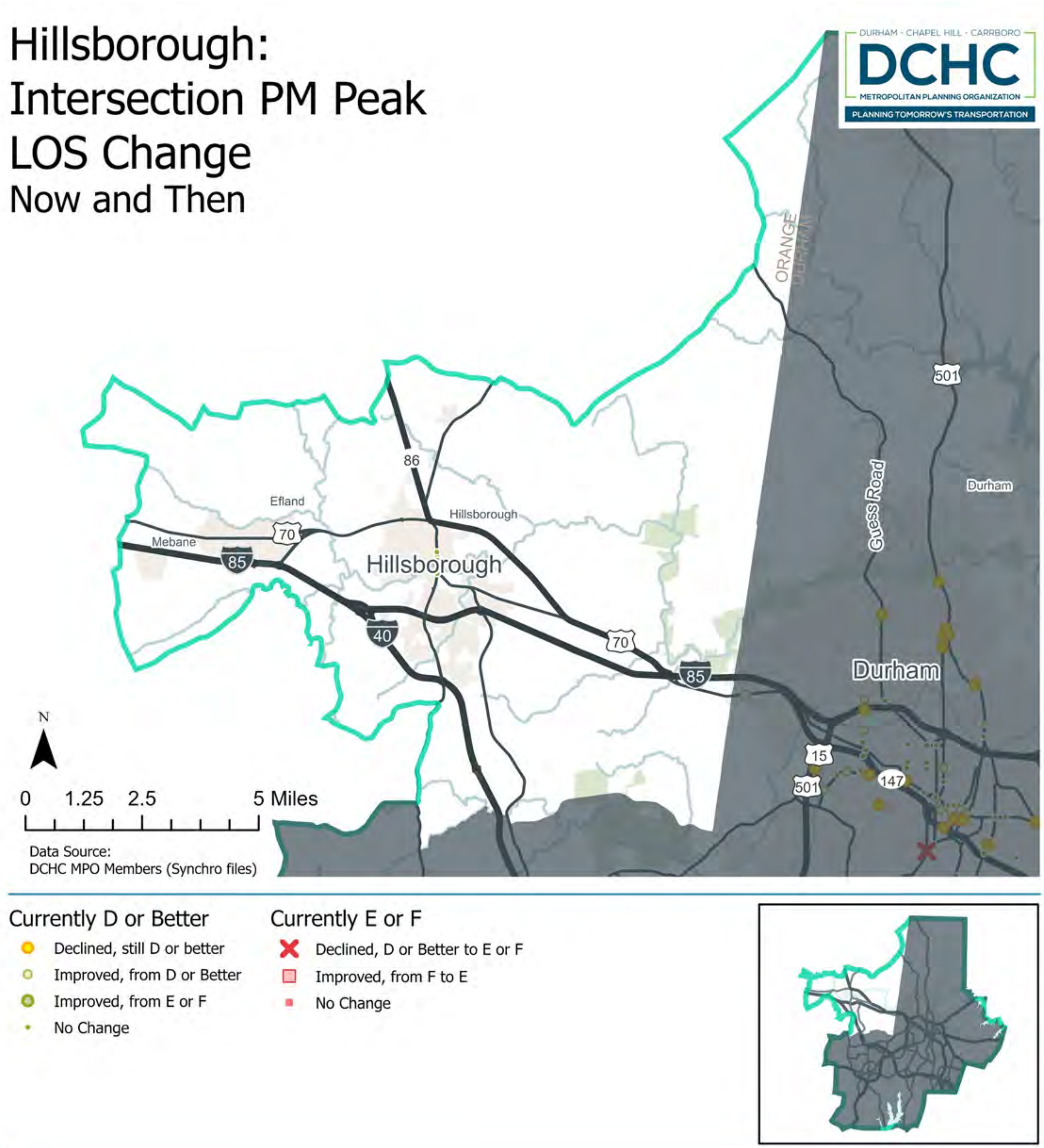
Figure 2-33. Hillsborough Change in Intersection LOS - AM Peak



RESULTS BY GEOGRAPHIC SUBAREA

HILLSBOROUGH

Figure 2-34. Hillsborough Change in Intersection LOS - PM Peak



RESULTS BY GEOGRAPHIC SUBAREA

HILLSBOROUGH

5

Intersections observed in this subarea

AM PEAK

There are no failing intersections in the Hillsborough subarea during the morning peak.

LOS D	[None]
LOS E	[None]
LOS F	[None]

PM PEAK

There are no failing intersections in the Hillsborough subarea during the afternoon peak.

LOS D	[None]
LOS E	[None]
LOS F	[None]

RESULTS BY GEOGRAPHIC SUBAREA

HILLSBOROUGH

AM PEAK

Figure 2-35. Intersection LOS 2018-2022

Data available for 19 Intersections

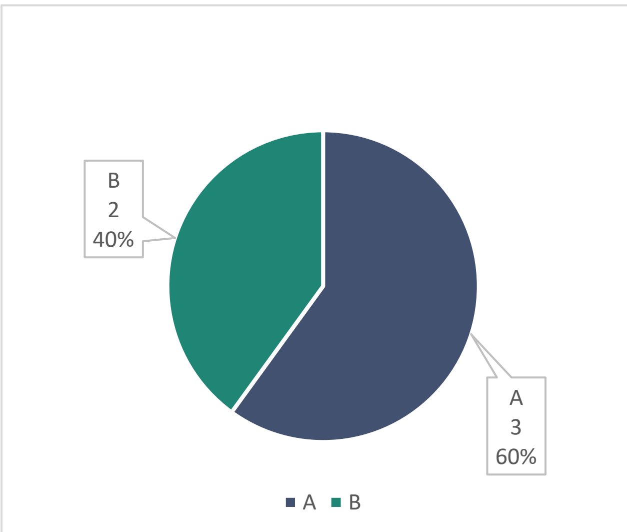
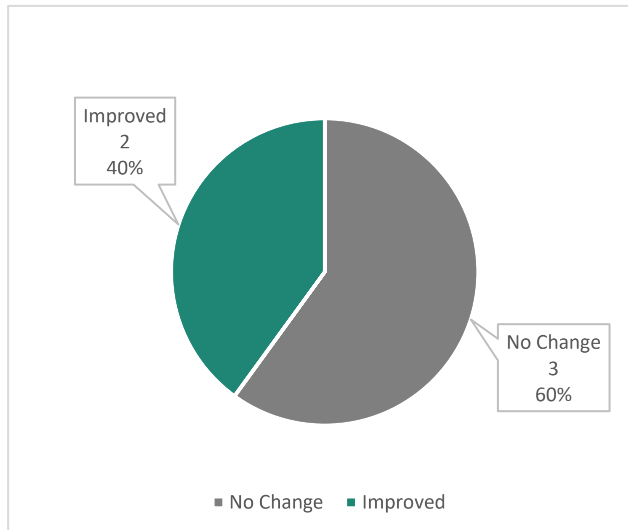


Figure 2-36. Intersection LOS Change

Data available for 5 Intersections



PM PEAK

Figure 2-37. Intersection LOS 2018-2022

Data available for 5 Intersections

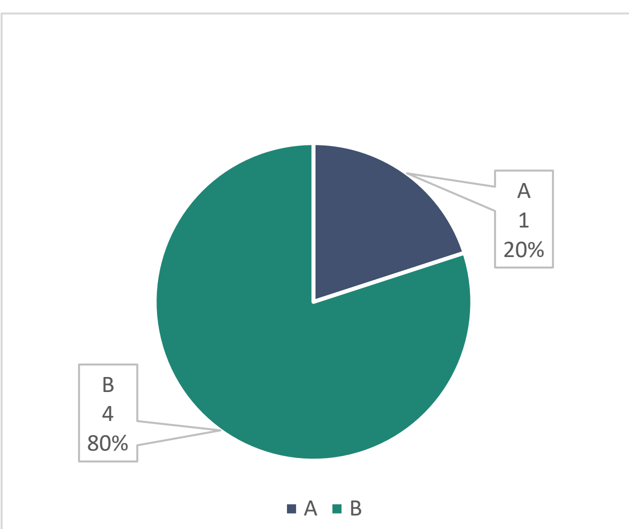
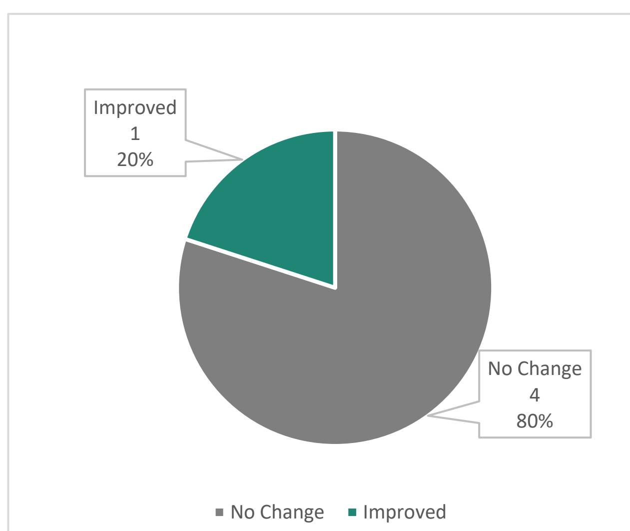


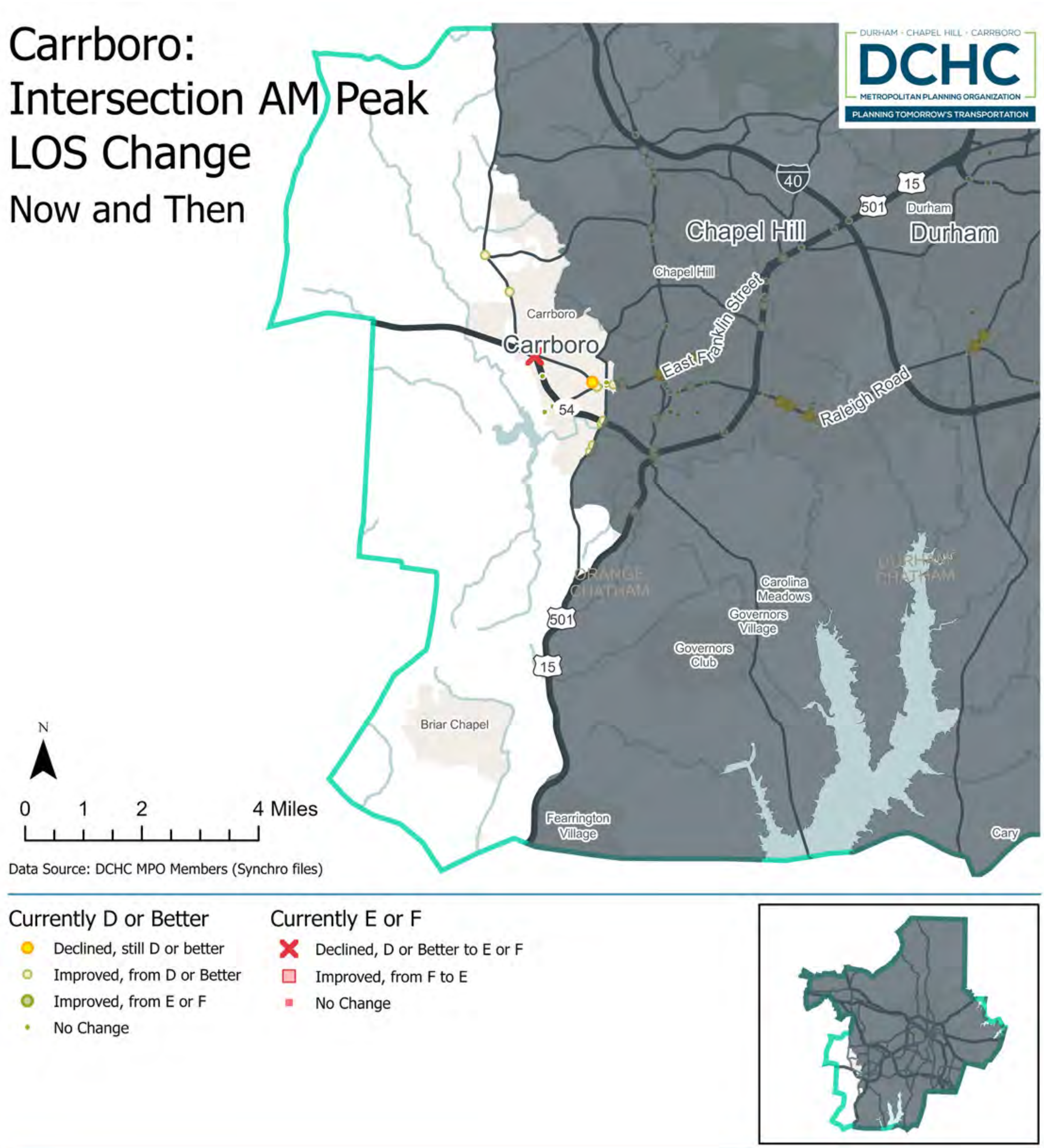
Figure 2-38. Intersection LOS Change

Data available for 19 Intersections



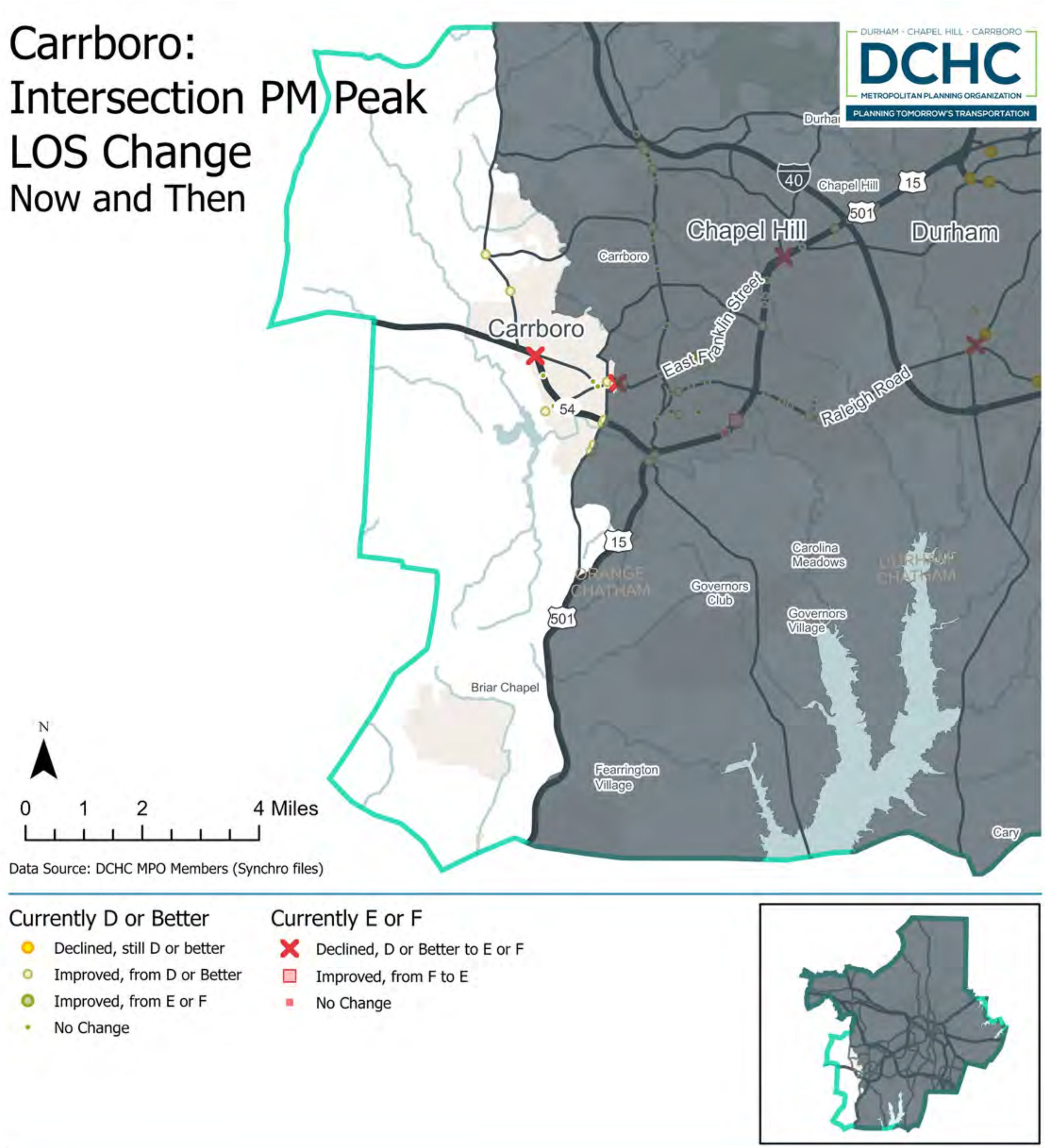
CARRBORO

Figure 2-39. Carrboro Change in Intersection LOS - AM Peak



CARRBORO

Figure 2-40. Carrboro Change in Intersection LOS - PM Peak



RESULTS BY GEOGRAPHIC SUBAREA

CARRBORO

18

Intersections observed in this subarea

AM PEAK

Fifteen intersections operate at LOS D or higher during morning peak hours and one intersection is failing.

LOS D	[None]
LOS E	[None]
LOS F	NC 54 and West Main Street

PM PEAK

Only one intersection in the Carrboro subarea is failing during evening peak hours.

LOS D	[None]
LOS E	[None]
LOS F	NC 54 and West Main Street

Available data for 2 intersections of Smith Level Road and Public Works Drive; North Greensboro Street and Estes Drive were not recent enough to calculate a current LOS for either peak period.

RESULTS BY GEOGRAPHIC SUBAREA

CARRBORO

AM PEAK

Figure 2-41. Intersection LOS 2018-2022

Data available for 18 Intersections

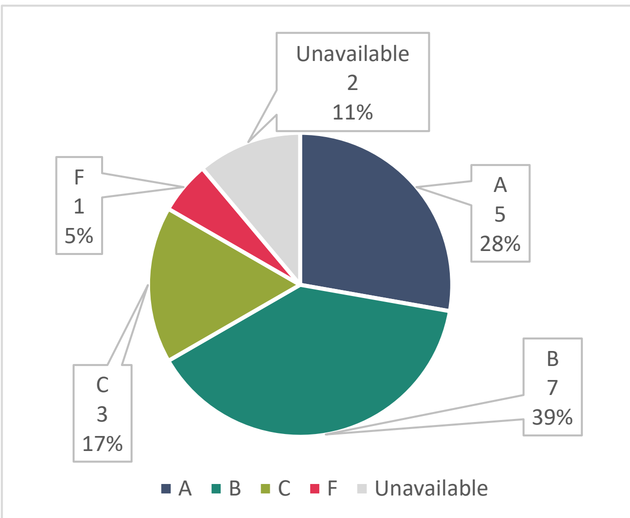
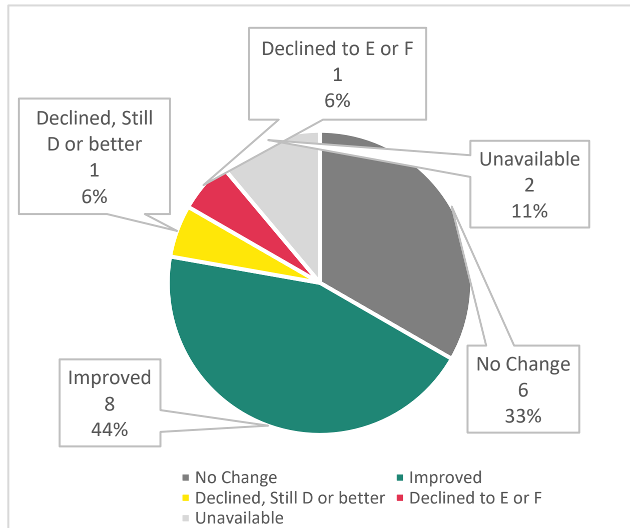


Figure 2-42. Intersection LOS Change

Data available for 18 Intersections



PM PEAK

Figure 2-43. Intersection LOS 2018-2022

Data available for 18 Intersections

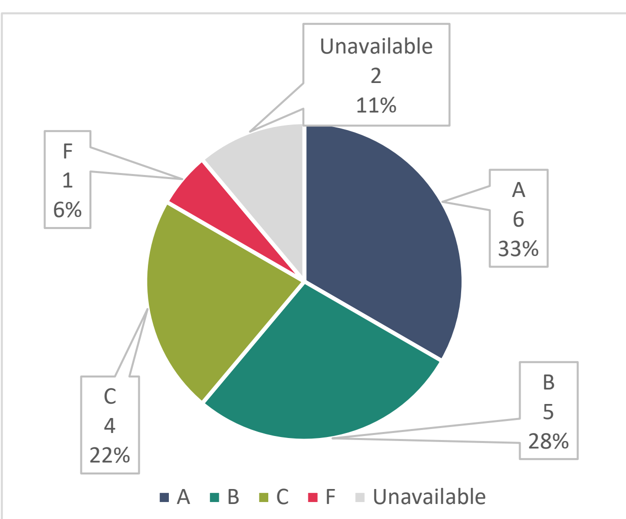
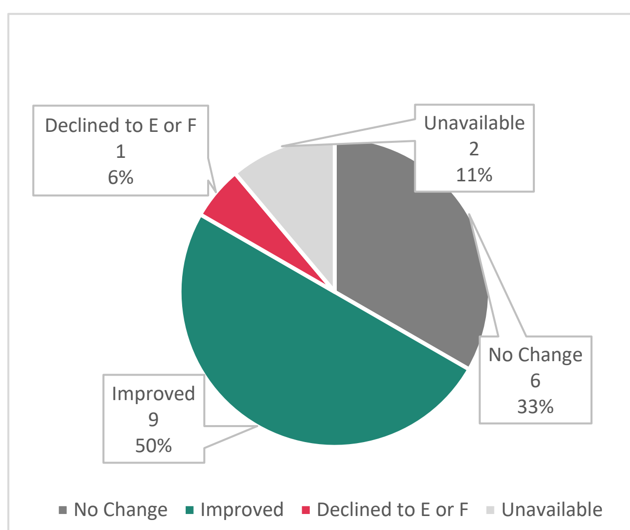


Figure 2-44. Intersection LOS Change

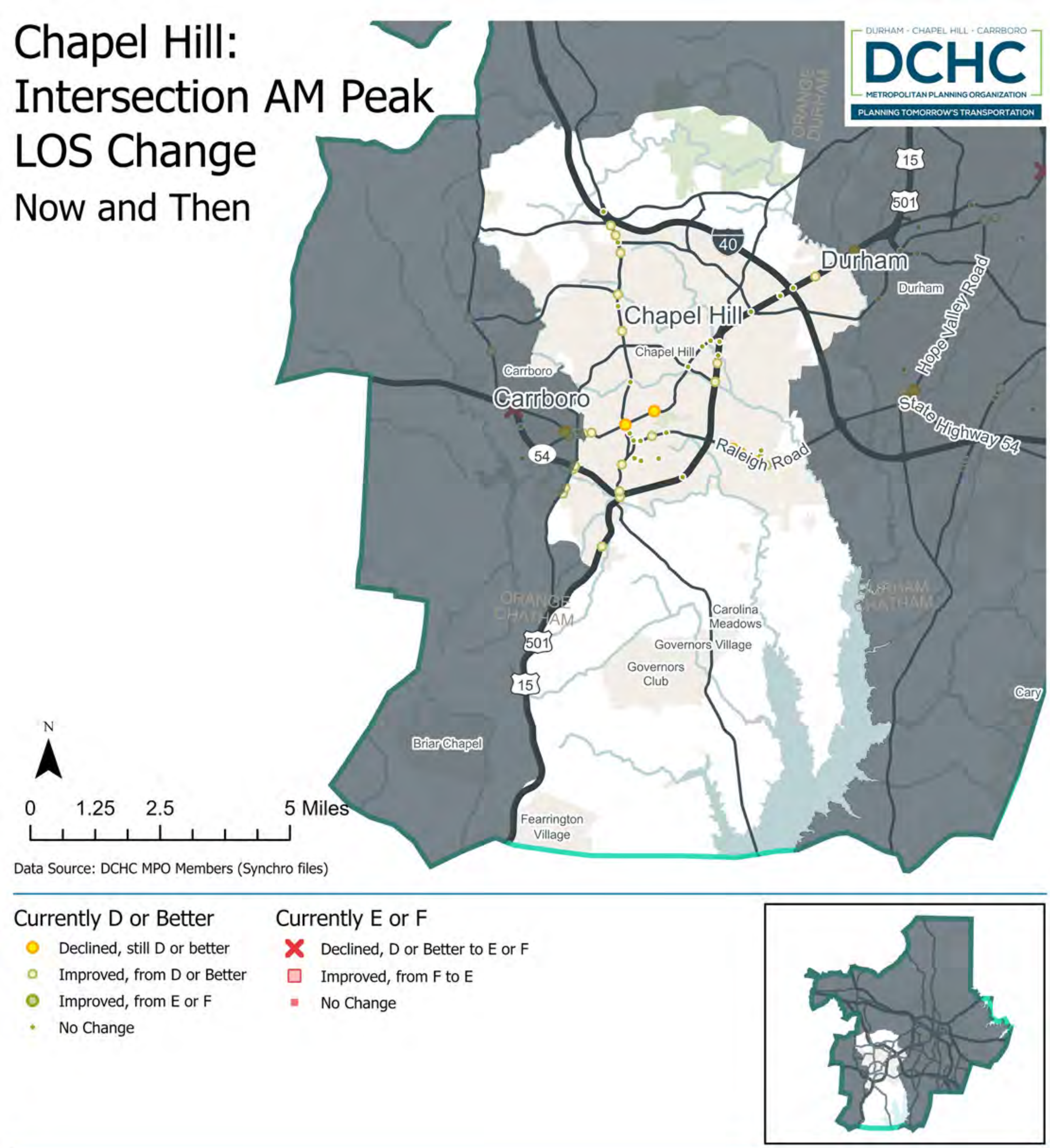
Data available for 18 Intersections



RESULTS BY GEOGRAPHIC SUBAREA

CHAPEL HILL

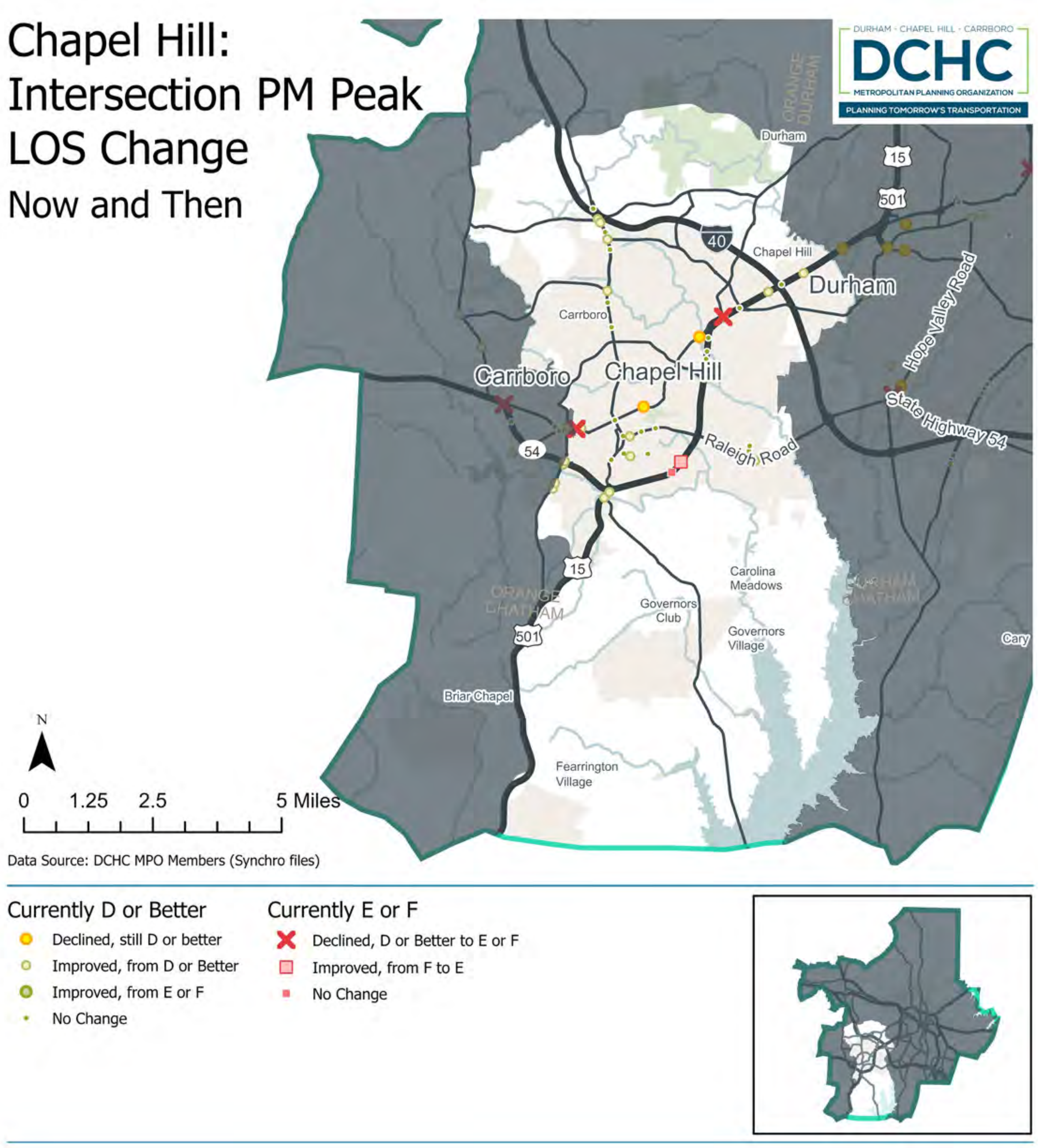
Figure 2-45. Chapel Hill Change in Intersection LOS - AM Peak



RESULTS BY GEOGRAPHIC SUBAREA

CHAPEL HILL

Figure 2-46. Chapel Hill Change in Intersection LOS - PM Peak



CHAPEL HILL

60

Intersections observed in this subarea

AM PEAK

Fifty-one intersections operate at LOS C or higher during morning peak hours. Seven operate at LOS D.

LOS D	US 15 and Culbreth Road/ Mt. Carmel Church Road
	North Columbia Street and West Franklin Street
	South Columbia Street and West Cameron Avenue
	Durham-Chapel Hill Boulevard/Fordham Boulevard and Old Mason Farm Road
	East Franklin Street and North Estes Drive
	Durham-Chapel Hill Boulevard/Fordham Boulevard (US-15/501) and Sage Road
	Durham-Chapel Hill Boulevard and I-40 Eastbound Ramps
LOS E	[None]
LOS F	[None]

RESULTS BY GEOGRAPHIC SUBAREA

CHAPEL HILL

PM PEAK

Fourty-five intersections operate at LOS C or higher during afternoon peak hours. Nine operate at LOS D, one operates at LOS E and three operate at LOS F.

LOS D	South Columbia Street and NC-54 Westbound Ramps
	North Columbia Street and East Franklin Street
	South Columbia Street and West Cameron Avenue
	Martin Luther King, Jr. Boulevard and North Estes Drive
	NC-86 and I-40 Westbound Ramps
	East Franklin Street and North Estes Drive
	Fordham Boulevard (US-15/501) and Ephesus Church Road
	Durham-Chapel Hill Boulevard/Fordham Boulevard (US-15/501) and Sage Road
	Durham-Chapel Hill Boulevard (US-15/501) and Mount Moriah Road
LOS E	Durham-Chapel Hill Boulevard/Fordham Boulevard and Old Mason Farm Road
LOS F	East Main Street and Lloyd Street
	Fordham Boulevard and Manning Drive
	Durham-Chapel Hill Boulevard/Fordham Boulevard and Erwin Road

Available data for 2 intersections of South Merritt Mill Road and West Cameron Avenue; Homestead Road and High School Road were not recent enough to calculate a current LOS for either peak period.

RESULTS BY GEOGRAPHIC SUBAREA

CHAPEL HILL

AM PEAK

Figure 2-47. Intersection LOS 2018-2022

Data available for 98 Intersections

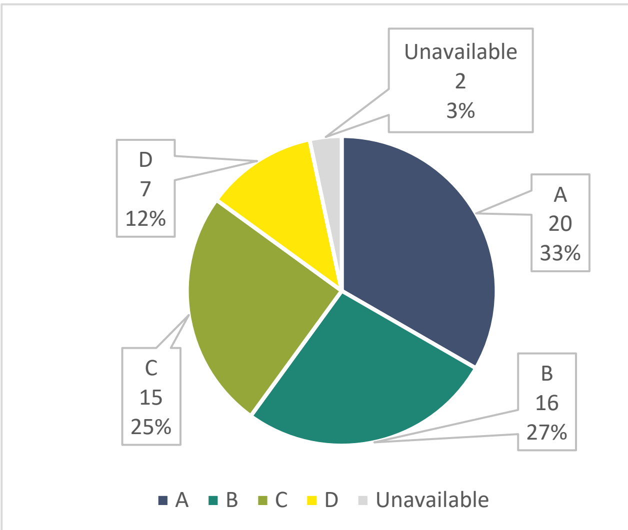
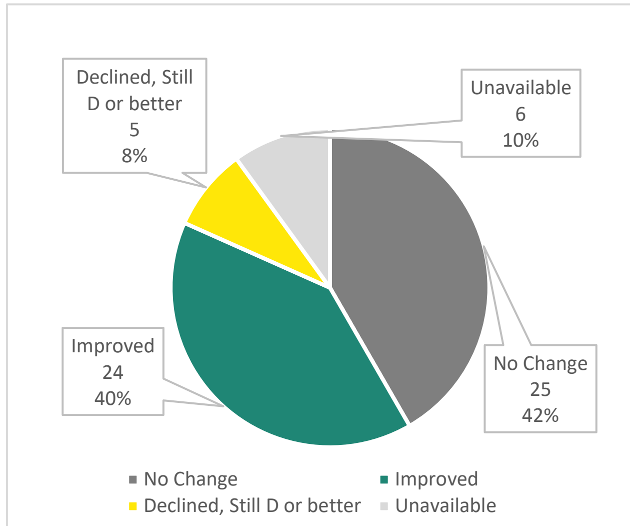


Figure 2-48. Intersection LOS Change

Data available for 60 Intersections



PM PEAK

Figure 2-49. Intersection LOS 2018-2022

Data available for 60 Intersections

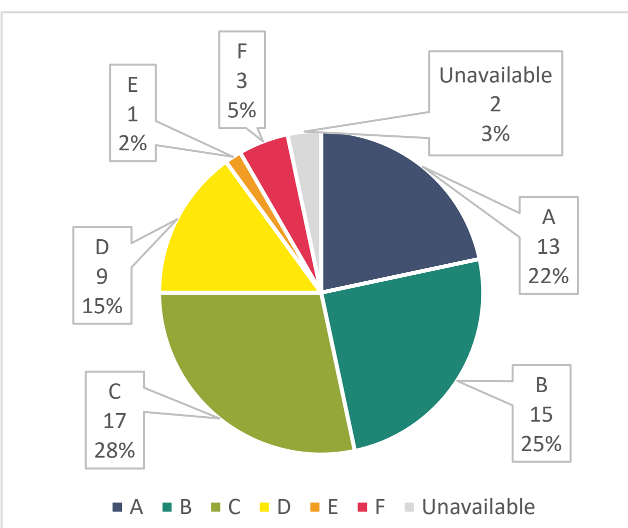
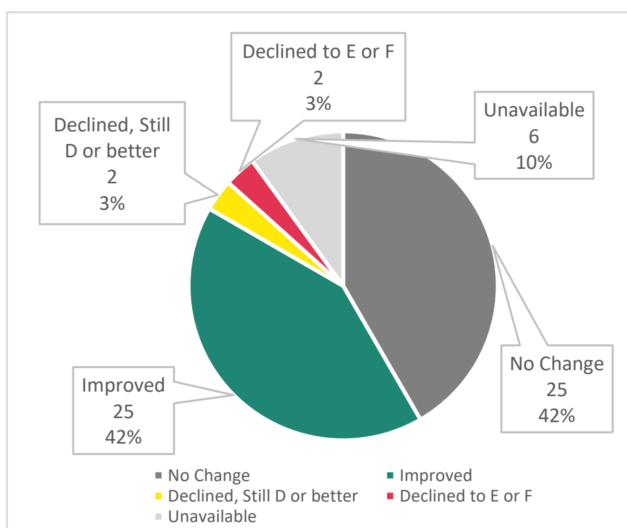


Figure 2-50. Intersection LOS Change

Data available for 98 Intersections



RESULTS BY GEOGRAPHIC SUBAREA

COMPARATIVE ANALYSIS

During the morning peak period, the Carrboro and Downtown Durham subareas have the highest percentage of intersections at LOS E or F, which is 5% (1 at LOS F) in Carrboro and 1% (1 at F) in Downtown Durham. However, Chapel Hill and Downtown Durham have highest percentage of intersections operating at LOS D in the morning peak, that is 12% (7 at LOS D) in Chapel Hill and 6% (5 at LOS D) in Downtown Durham. Southpoint and North Durham have 2 and 1 intersections respectively which make up to 11% and 6% of intersections failing in each respective subarea during the morning peak. The Hillsborough and East Durham subareas have no failing intersections during the 7-9 AM peak. Carrboro and Downtown Durham are the only subareas with intersections at LOS F during this period.

As for decline, Downtown Durham and North Durham have the greatest share of intersections for which data were available to calculate change over time that are in decline during the morning peak. This includes 25% (19 out of 77) of the intersections in Downtown Durham and 19% (3 out of 16) in North Durham that declined but are still operating at LOS D or better and 6% (1) of the intersections in Carrboro that declined to E or F.

During the evening peak, the Chapel Hill subarea has the highest percentage of intersections at LOS E or F with 6.67% (1 at E and 3 at F). The second highest is a tie between Carrboro and Southpoint with 6% (1 at F in each area). Carrboro has the highest percent (50%) of intersections that improved during the comparison periods of 2017-2022. Like the morning peak, there are no failing intersections in the Hillsborough subarea during the afternoon peak. In the East Durham subarea, the intersection of South Miami Boulevard and Angier Avenue, which operates at LOS E during the afternoon peak.

The trend of decline for the afternoon peak is similar to the trend for the morning peak. 44% (7 out of 16) of the intersections in North Durham and 21% (16 out of 77) of the intersections in Downtown Durham for which change over time could be calculated were in decline but still operate at LOS D or better. In the East Durham subarea, a significantly higher share of intersections was in decline during the afternoon peak than during the morning peak (27% compared to 9% in the morning), all of these intersections operate at LOS D or better, except one at LOS F in the afternoon peak.

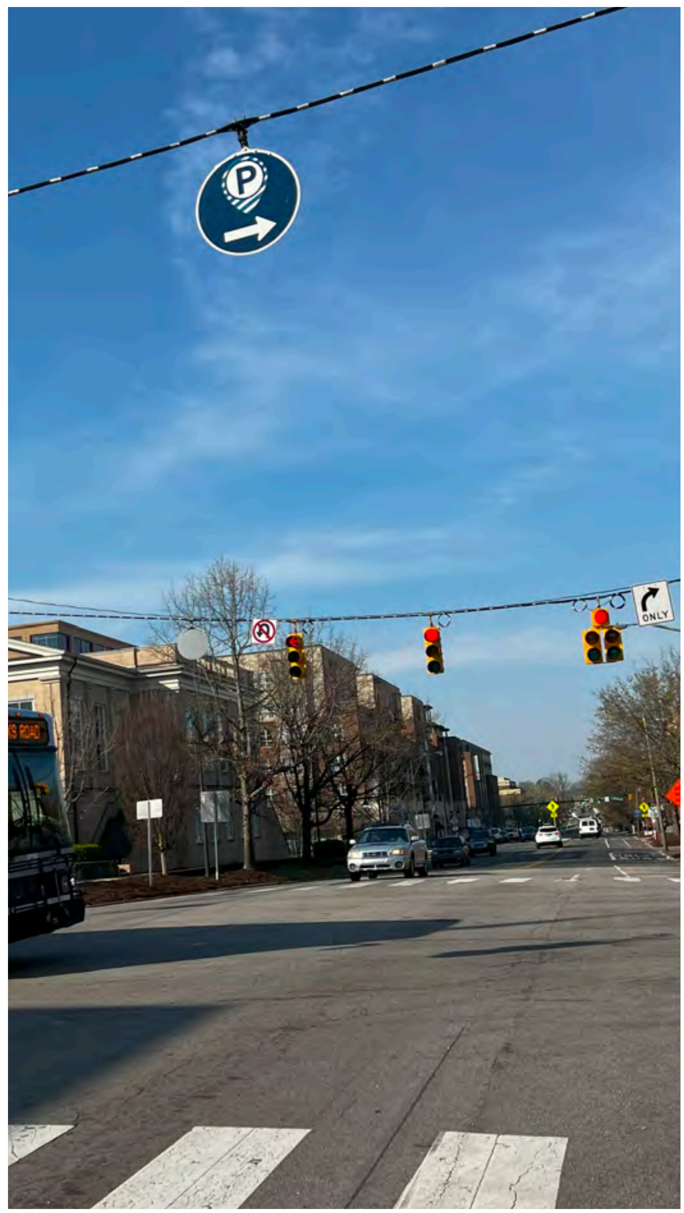
For four of the seven subareas, during both morning and afternoon peaks, either a majority of intersections for which a change trend could be calculated experienced no change at all. These subareas and the percentage of intersections that experienced no change as a share of all intersections in that subarea for which a change could be calculated is as follows:

- Southpoint
  - AM no change: 72%
  - PM no change: 61%
- Hillsborough
  - AM no change: 60%
  - PM no change: 80%
- Downtown Durham
  - AM no change: 53%
  - PM no change: 60%
- East Durham
  - AM no change: 55%
  - PM no change: 46%

Where there is a discrepancy of more than 5 percentage points between the percentage of intersections in a given subarea with improved LOS during the morning peak and the percentage of intersections with improved LOS during the afternoon peak, the percent improved is much higher in the morning for Hillsborough and East Durham; (27% improved in AM peak, 18% improved in PM peak), Hillsborough (40% improved in AM peak, 20% improved in PM peak).

The rest 5 subareas, the difference is either less than 5 percentage point or the afternoon peak is higher than the morning, i.e.- Downtown Durham (21% improved in AM peak, 18% improved in PM peak), North Durham (6% improved in AM peak, 19% improved in PM peak), Southpoint (11% improved in AM peak, 17% improved in PM peak), Carrboro (44% improved in AM peak, 50% improved in PM peak), and Chapel Hill (40% improved in AM peak, 42% improved in PM peak).

Regionally for the whole MPO area, 34 out of 205 intersections' performance declined on the AM peak and 36 of 205 intersections' performance declined on the PM peak. In the morning peak only 2 intersections declined to LOS E or F whereas 6 intersections declined to LOS E or F in the afternoon peak, which shows the higher demand during the afternoon peak period in certain areas and intersections of Chapel Hill, Carrboro, Downtown Durham and Southpoint.



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[3] VEHICLE TRAVEL TIME

How much unexpected delay are travelers facing on the road?

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KEY TAKEAWAYS

Key measure of travel time includes level of travel time reliability (LOTTR) that provides insight into the reliability of the highway system.

The amount of person-miles traveled on reliable Interstate and NHS networks were at 81.5% and 81.3% respectively in 2019. This had improved to 99.5% for Interstates and 95.2% for NHS network in 2021, but has dipped since then to 89.5% and 89% in 2023.

Truck travel time reliability index on Interstate network was at 1.93 in 2019. The index improved to 1.33 in 2021, but has dipped since then to 1.63 in 2023.

Travel time reliability issues exist along I-40 near RDU airport, NC 147 near downtown Durham, several US 15-501 segments between UNC Hospitals and Patterson Place shopping, and South Miami Blvd in the RTP.

INTRODUCTION

Vehicle travel time is another way to measure and understand how traffic congestion and incidents limit mobility and affect the performance of a transportation network. Rather than evaluating a road segment or intersection based on a ratio between capacity and demand, travel time measures focus on how long it takes to get from point A to point B as well as how reliable that time estimate is.

Level of Travel Time Reliability (LOTTR) – is a performance metric, computed for each Traffic Message Channel (TMC) roadway segment, by comparing the 80th percentile travel time with corresponding 50th percentile travel time for the same segment. In this chapter, TMC segment LOTTR values equal to or exceeding 1.5 were deemed unreliable.

METHODOLOGY

Two data years, 2019 and 2021, were used for the analysis of travel time reliability. These reliability data were downloaded from the archived speed and travel time data from the National Performance Management Research Data Set (NPMRDS) that are available on the Regional Integrated Travel Information System (RITIS) online portal. The data were available for two networks covering the DCHC MPO study area: the National Highway System (NHS) network, and the Interstate network.

Travel time data are based on aggregate, anonymized cruise-travel time data recorded from location-enabled devices, such as GPS receivers and cell phones. Travel speeds and times are recorded on a segment-by-segment basis throughout the day, with observations available over an extended period, such as a month, a quarter, or a whole year. These observations can then be sorted and compared to determine how travel times vary from day-to-day.

LEVEL OF TRAVEL TIME RELIABILITY

Travelers may be able to tolerate delay if they can reliably schedule trips within a consistent span. If, however, the delay varies substantially, such that trips are frequently longer than the average time, this can affect daily scheduling and have a degrading impact on time management, efficiency, and productivity. For this reason, this chapter examines the segment level LOTTR, which is defined as the 80th percentile travel time divided by the median travel time. Since the 80th percentile travel time cannot be lower than the median travel time, LOTTR values start at 1.0 and rise. Higher values mean that there is substantial variability in travel time on this segment with some regularity (the 80th percentile indicating that travelers would experience these slower conditions one out of five days).

For instance, say that the 50th percentile travel time for a stretch of roadway is 20 minutes, meaning that it takes 20 minutes to get from point A to point B on a typical day. Then, say that the 80th percentile travel time is 40 minutes, which is twice that time. A traveler who commutes to work on this roadway may usually make it on time when they budget for 20 minutes of travel time, but they frequently will be 20 minutes late due to unexpected delays that make the commute 40 minutes instead. LOTTR is an important enhancement of the vehicle travel time analysis because being able to rely on a planned travel time is an important part of day-to-day life for many area residents and businesses.

REGIONAL OVERVIEW

LEVEL OF TRAVEL TIME RELIABILITY

Figure 3-1 (AM Peak) and 3-2 (PM Peak) show that higher LOTTR values, which indicate less reliability of travel time, are concentrated in activity centers in the area. Notable segments where travelers can regularly face significant unexpected delays are I-40 East from US 15-501 (Exit 270) to MPO Boundary near Airport (Exit 283), US 15-501 North from US 15-501 Business (Exit 105) to NC 86 in Chapel Hill, US 70 East from I-885 (Exit 288) to MPO Boundary at Durham-Wake County Line, NC 54 East from US 15-501 in Chapel Hill to MPO Boundary at Durham-Wake County Line and NC 147 from I-885 to I-85.

SEGMENTS WITH RECURRING CONGESTION

Figure 3-3 shows the segments which are unreliable (LOTTR is greater than 1.5) in any of the peak out of AM, Midday and PM. I-40, I-885, NC 70, US 15/501, NC 147 and NC 86 are some major corridors which are unreliable in any of the 3 peak periods. Figure 3-4 shows the segments with recurring congestion. Segments with recurring congestion are those that have an AM, Midday and PM Peak LOTTR greater than 1.5. Recurring congestion was calculated using this definition for the years of 2019 and 2021. As the 2019 reliability values show worse than year 2021 values, this report only presented the 2019 results for brevity.

Segments with recurring congestion are concentrated on major commuting corridors, including US 15-501 Bus, NC 98, NC 147 in Downtown Durham; , US 70, and Miami Boulevard in East Durham; US 15-501, NC 86 and NC 54 in Chapel Hill; N Roxboro St in North Durham; NC 54 in Carrboro, and NC 54, NC 55, Slater Rd, Fayetteville Rd, S Miami Blvd in Southpoint.

Figure 3-1. Segment LOTTR for AM Peak in 2019

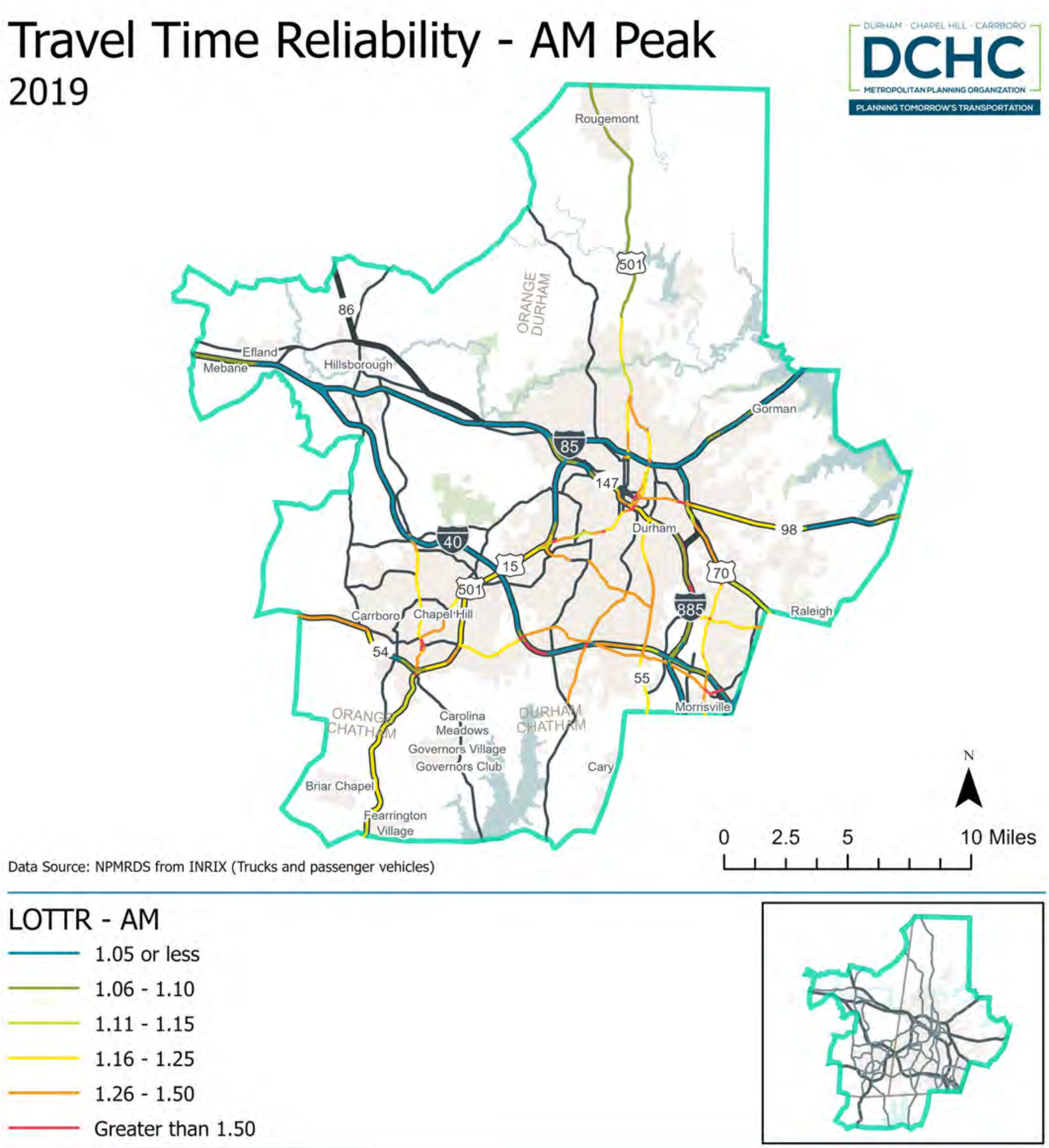


Figure 3-2. Segment LOTTR for PM Peak in 2019

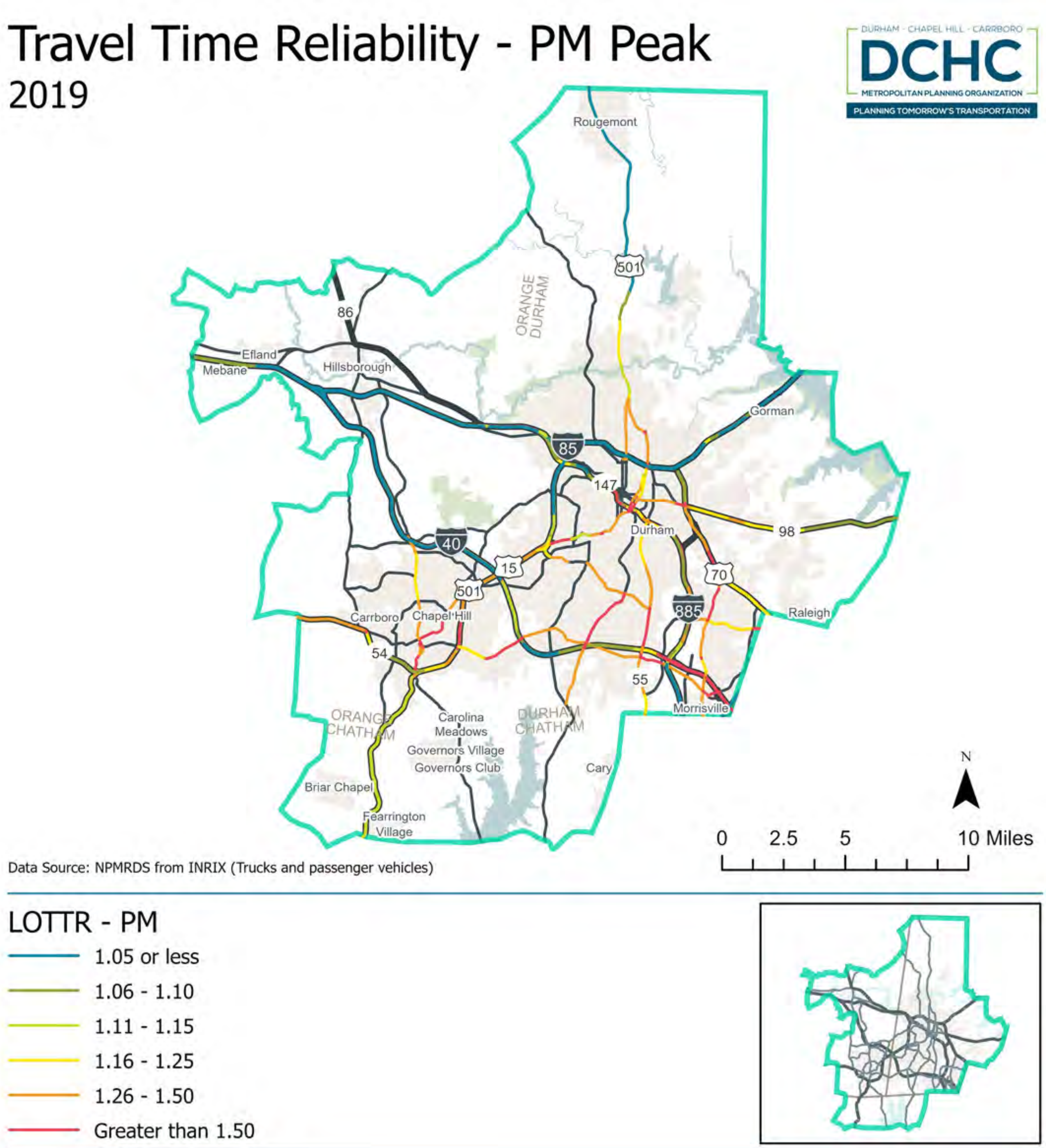


Figure 3-3. Segments with Recurring Congestion

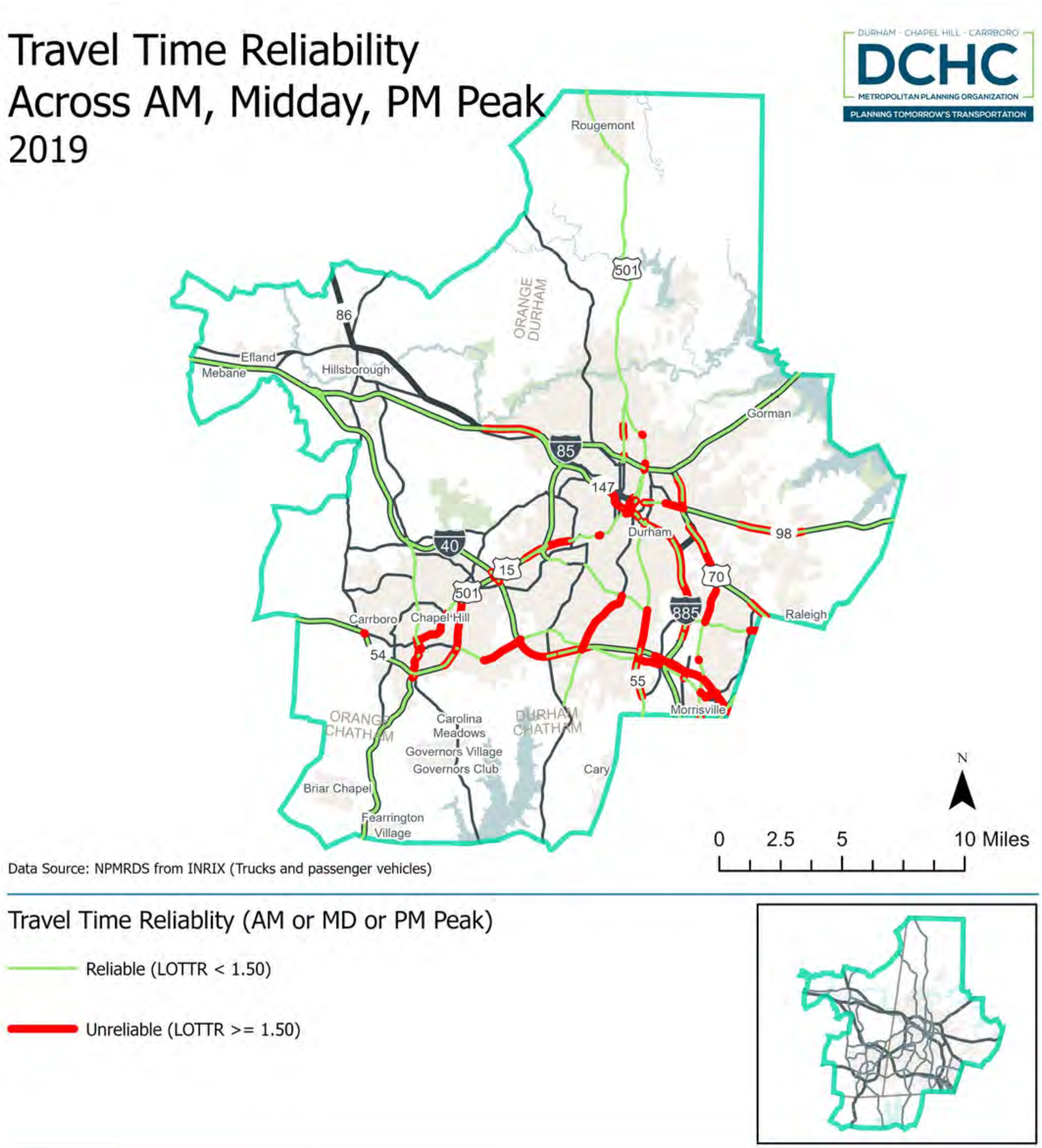
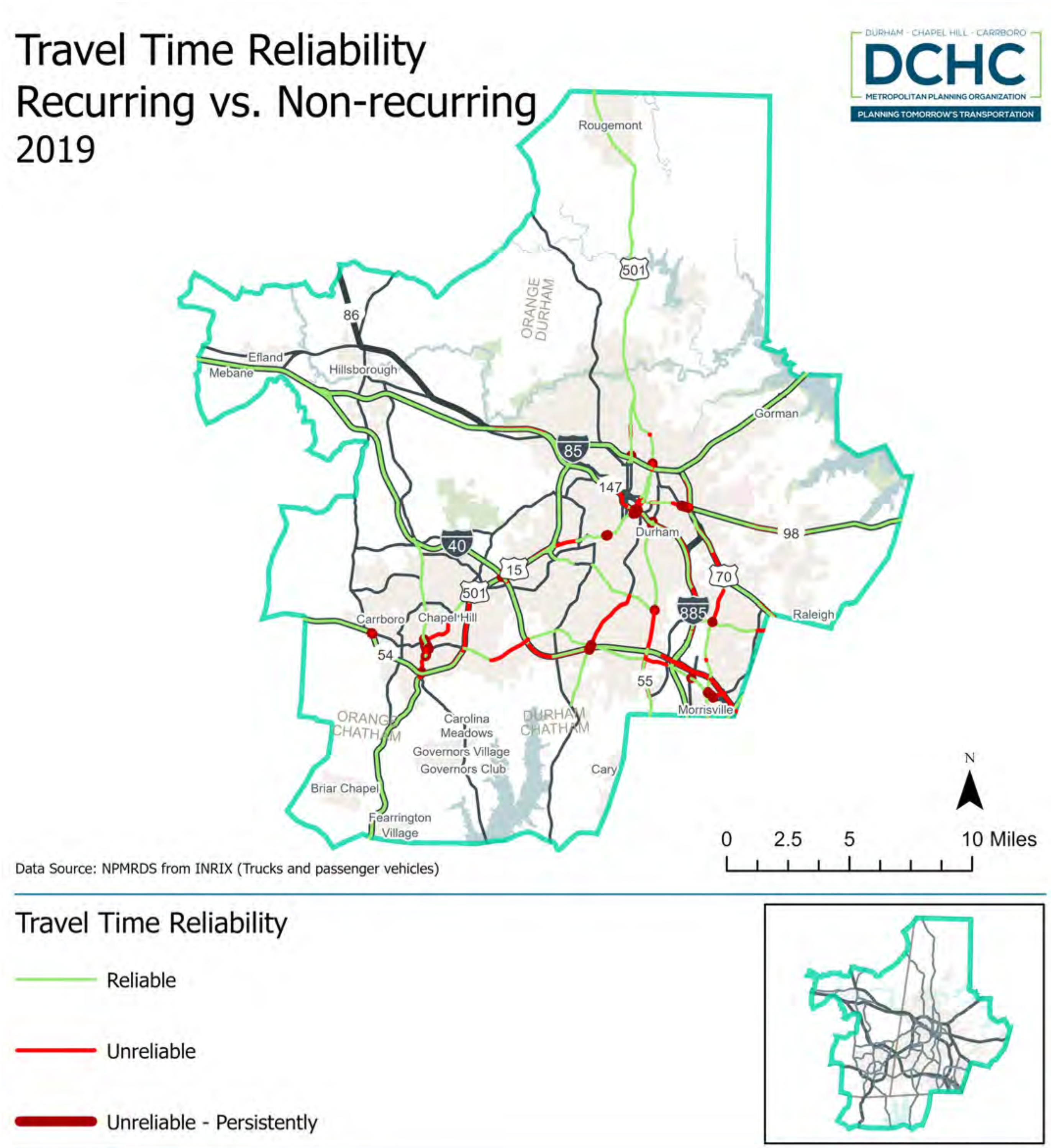


Figure 3-4. Segments with Recurring Congestion (persistently)



Note: Segments with recurring(unreliable-persistently) congestion are those that have an AM, Midday and PM Peak LOTTR greater than 1.5.

Table 3-1. Top Ten Unreliable Segments

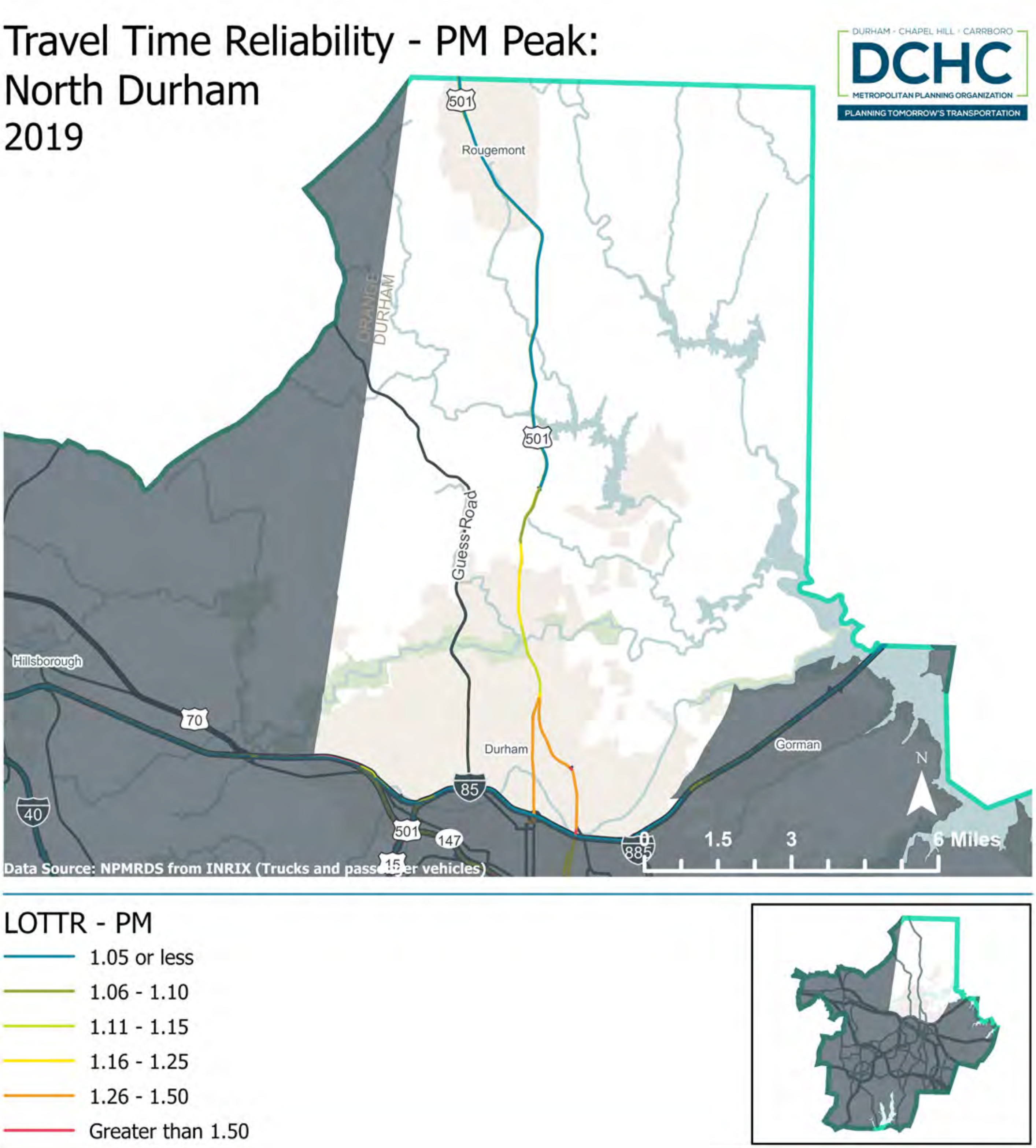
Rank	Name	Segment LOTTR (Highest value in any peak/weekend)	Length of the Segment (miles)
1	NC 55/Martin Luther King Jr Pkwy (Intersection at MLK Jr Pkwy/Apex Highway)	5.67	0.0079
2	NC 147 (Intersection at S Vickers Ave/Durham Freeway)	4.55	0.0523
3	NC 147 (Chapel Hill/Exit 13)	4.04	0.3506
4	NC 147 (Duke St/Exit 12)	3.94	0.1323
5	I-40 (US 15-501/Exit 270)	3.60	0.5068
6	I-40 (I-540/Exit 283)	3.27	0.6856
7	I-40 (Davis Dr/Exit 280)	3.23	0.2633
8	NC 147 (US 15-501 BUS/Exit 12)	3.18	0.2154
9	Slater Rd (NC 54/S Miami Blvd)	2.86	0.0331
10	NC 54 (Davis Dr)	2.83	0.0092


EXIT 273 A
54 WEST
Chapel Hill
1/4 MILE
EXIT 273 B
54 EAST
Durham
FedEx

RESULTS BY GEOGRAPHIC SUBAREA

NORTH DURHAM

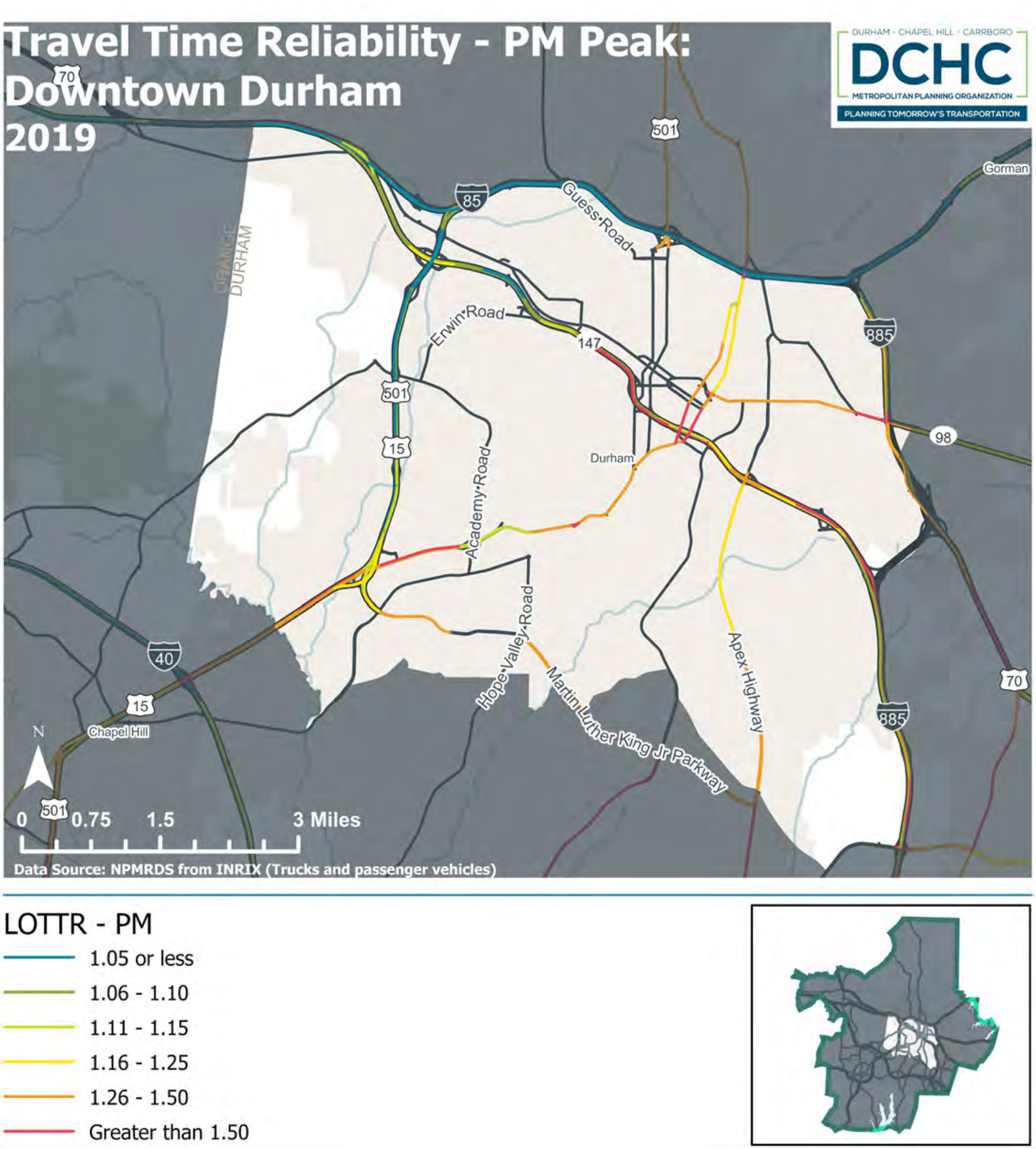
Figure 3-5. North Durham Segment LOTTR



RESULTS BY GEOGRAPHIC SUBAREA

DOWNTOWN DURHAM

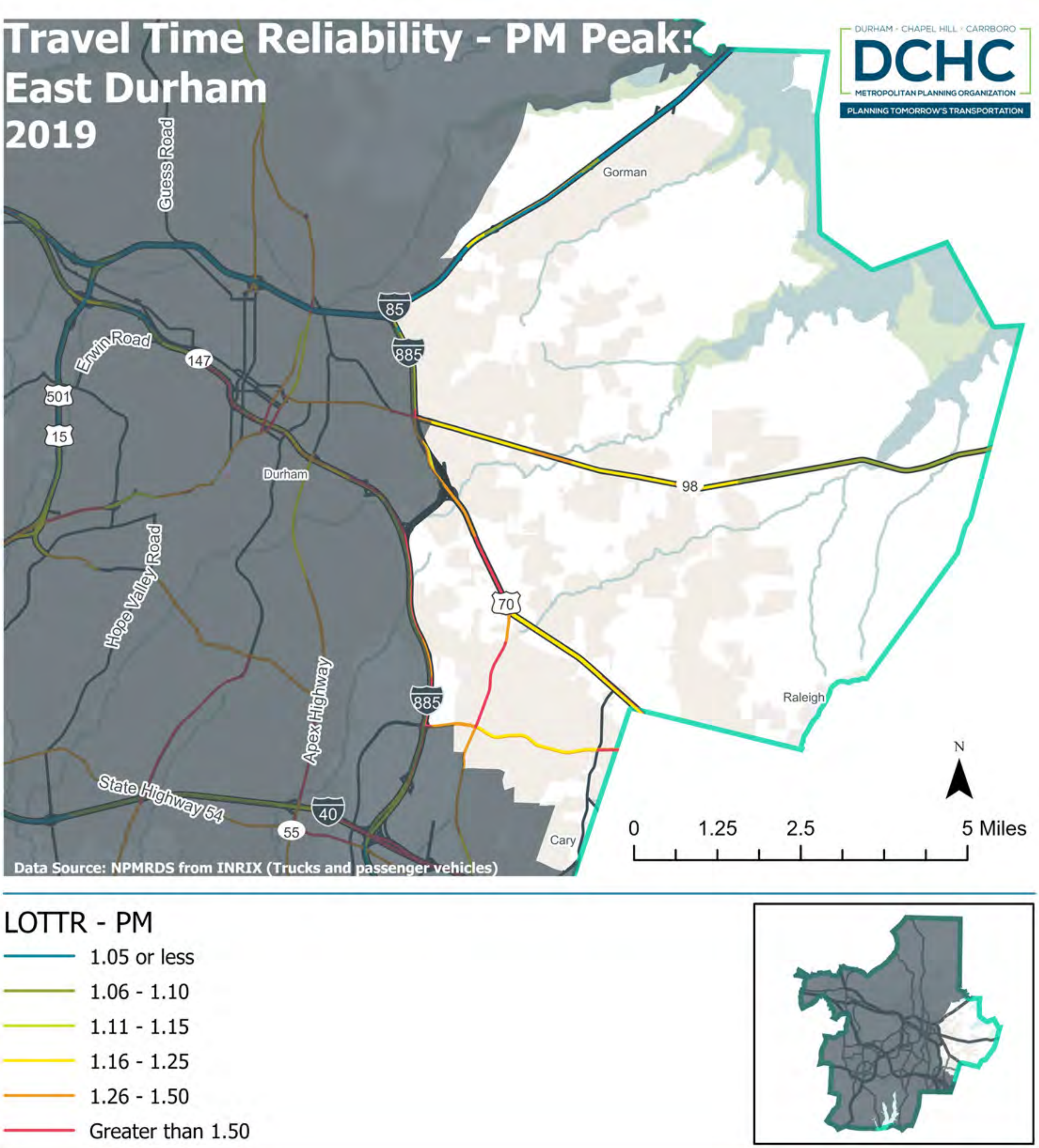
Figure 3-6. Downtown Durham Segment LOTTR



RESULTS BY GEOGRAPHIC SUBAREA

EAST DURHAM

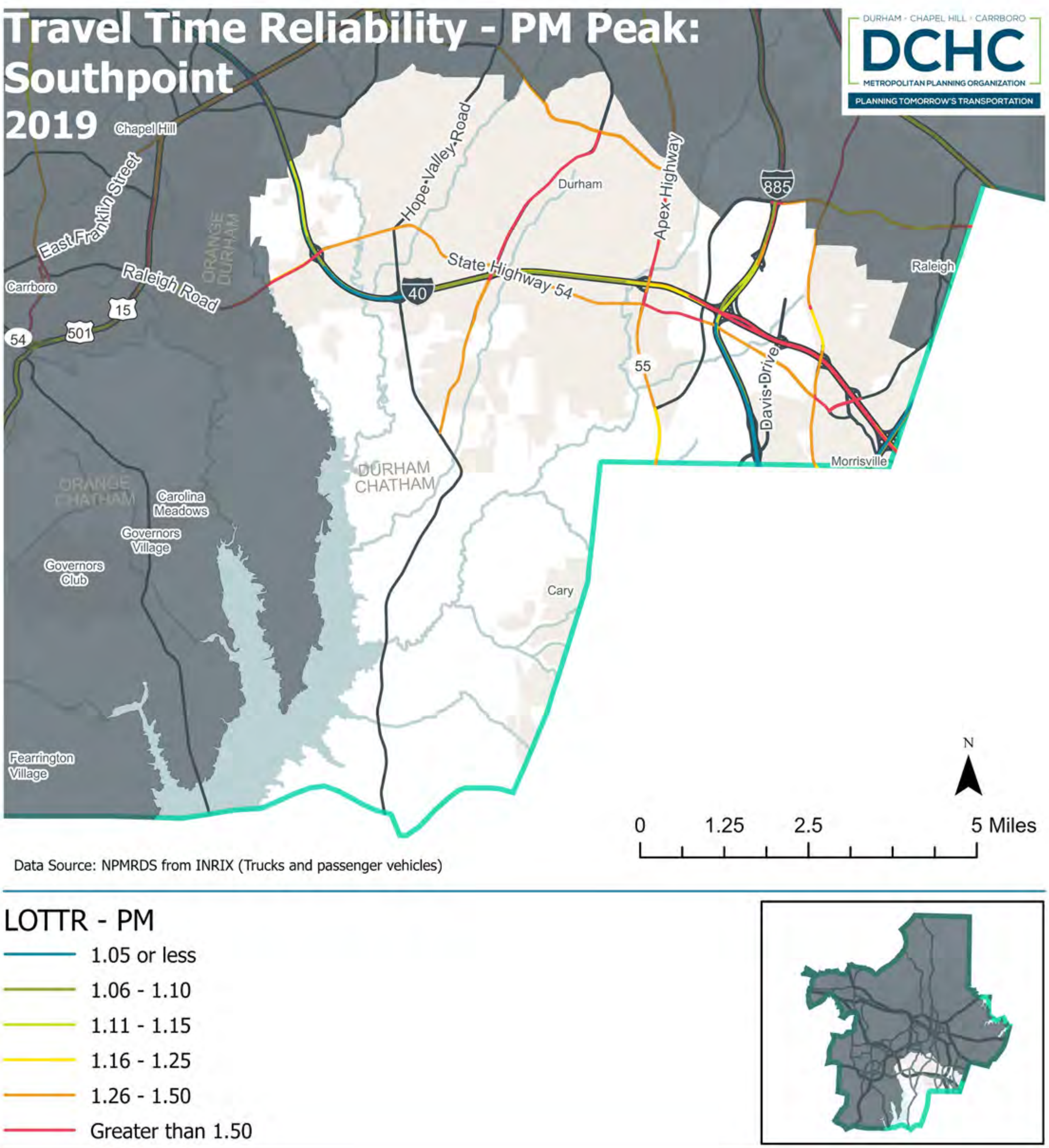
Figure 3-7. East Durham Segment LOTTR



RESULTS BY GEOGRAPHIC SUBAREA

SOUTHPOINT

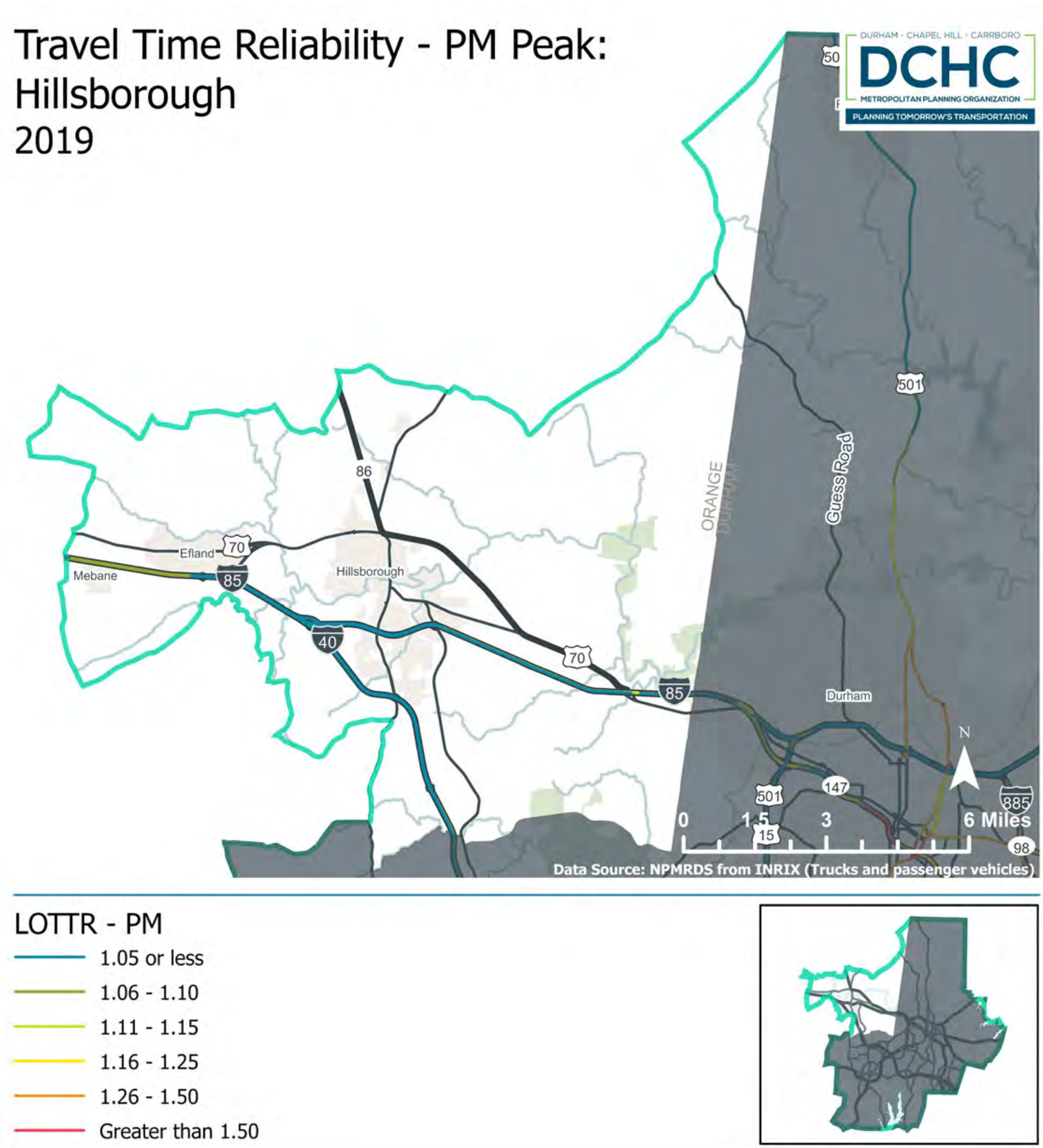
Figure 3-8. Southpoint Segment LOTTR



RESULTS BY GEOGRAPHIC SUBAREA

HILLSBOROUGH

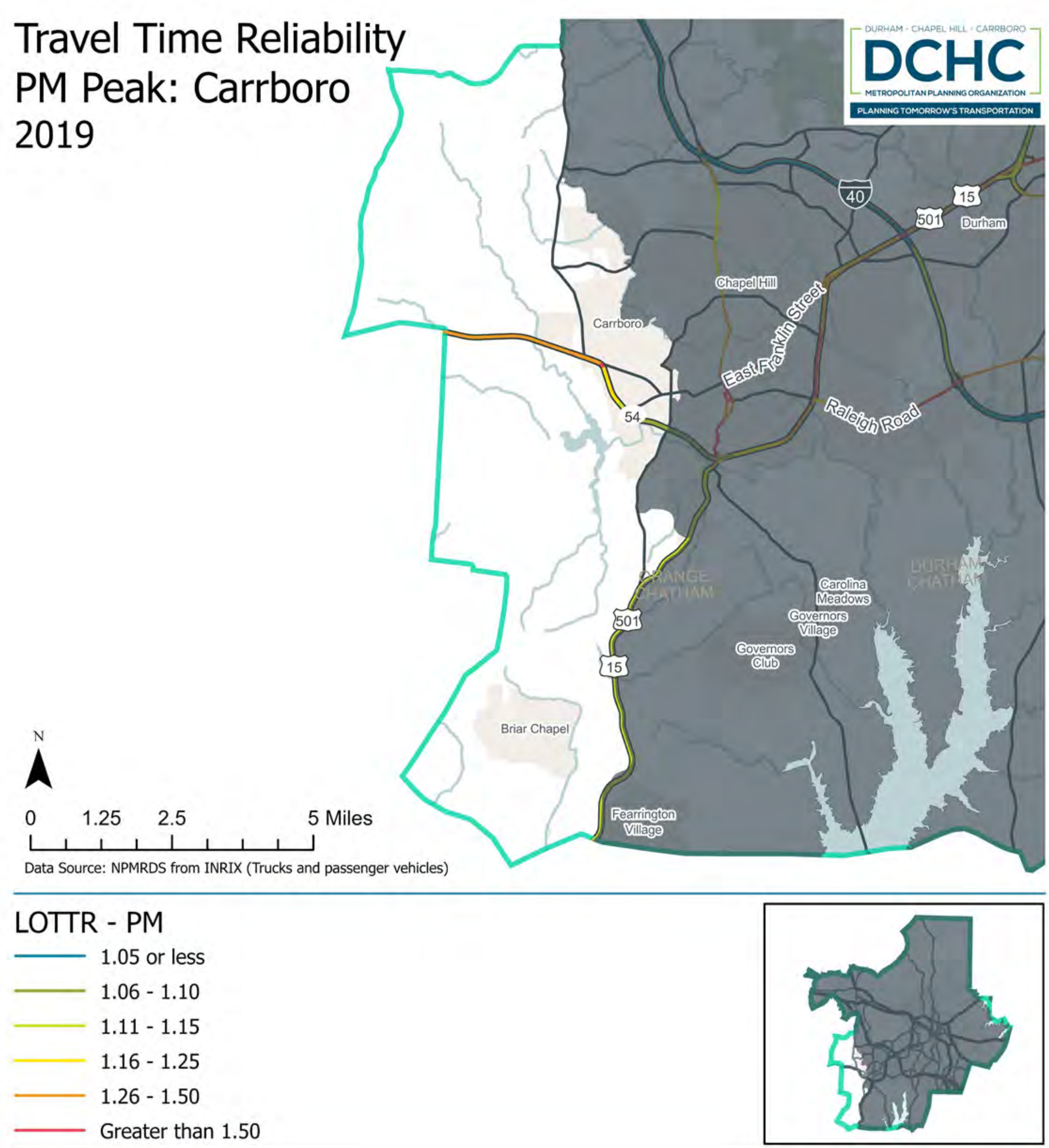
Figure 3-9. Hillsborough Segment LOTTR



RESULTS BY GEOGRAPHIC SUBAREA

CARRBORO

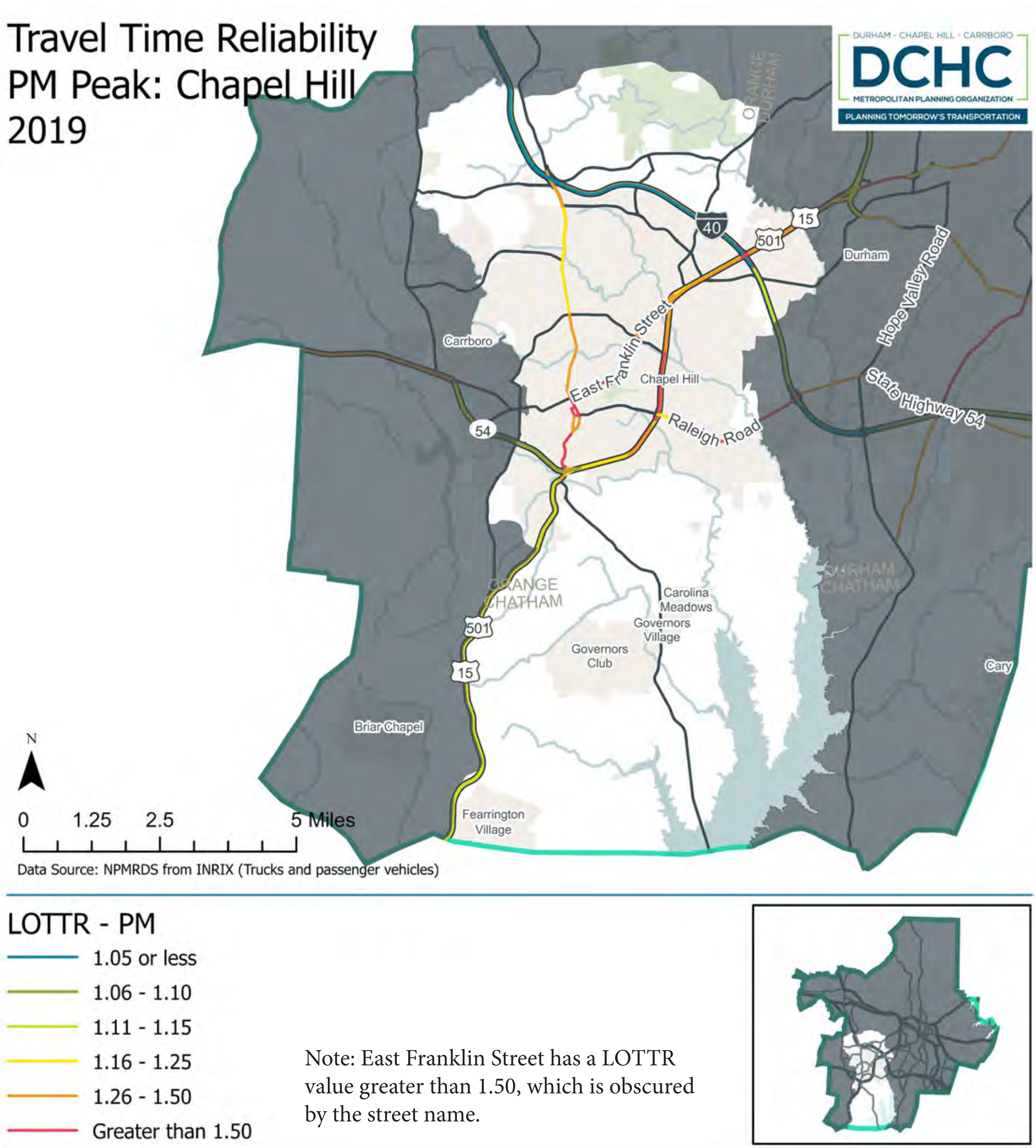
Figure 3-10. Carrboro Segment LOTTR



RESULTS BY GEOGRAPHIC SUBAREA

CHAPEL HILL

Figure 3-11. Chapel Hill Segment LOTTR

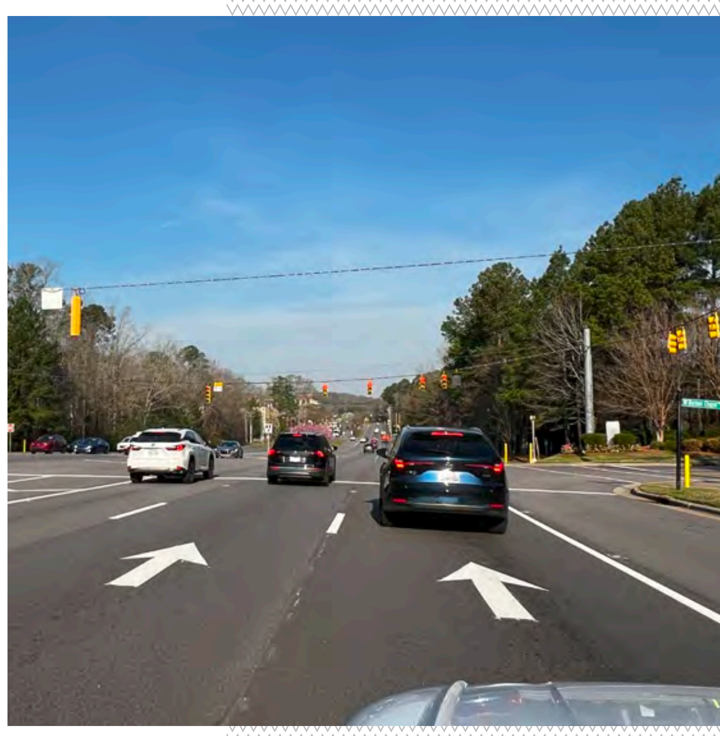


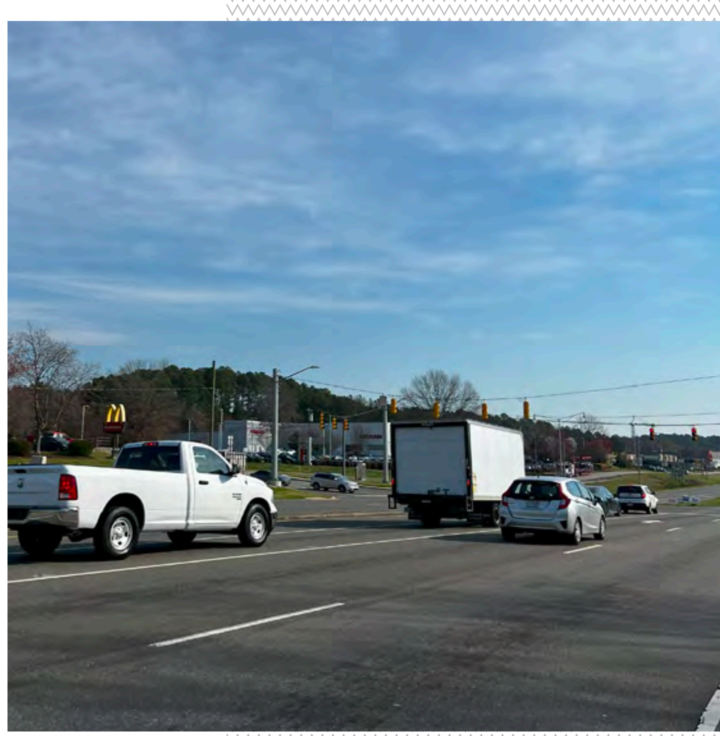
Note: East Franklin Street has a LOTTR value greater than 1.50, which is obscured by the street name.

COMPARATIVE ANALYSIS

Recurring congestion in each subarea was identified using the same formula as at the regional level: roadways with a AM, Midday and PM Peak LOTTR greater than 1.5 are considered to be experiencing recurring congestion.

The Chapel Hill subarea had the highest (41%) and Southpoint had the second highest (29%) share of roadway mileage with recurring congestion in 2019. Downtown Durham had 26% mileage of recurring congestion. East Durham (0.7%) and Carrboro (1.4%) had lowest mileage of recurring congestion.





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[4] VEHICLE SAFETY

Are people on the roads getting to their destinations safely?

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KEY TAKEAWAYS

10,869 crashes occurred in the DCHC MPO region in 2021:

- Nearly 75% resulted in no or unknown injuries
- Crashes resulting in disabling injuries or death made up to 1.4%
- The roads in the Downtown Durham subarea had the highest crash rates per 1,000 vehicle miles traveled (VMT)

In every year since 2017, the largest share of crashes has occurred in the Downtown Durham subarea, which has maintained a relatively constant share of overall crashes in the MPO area over the last 5 years.

In 2017, crashes in the Hillsborough subarea accounted for 8.98% of the regional total; by 2021 that share rose to 10.43%.

In every year since 2017, “rear-end” collisions have been the most common collision type by a significant margin.

INTRODUCTION

Performance measures examined up to this point have focused on how quickly and efficiently a transportation network moves users from one place to another, but the ability to get users to their destination safely is equally important.

This study analyzed crash data and statistics for the MPO study area roadways that were obtained from the NCDOT's Traffic Safety Division. This safety assessment is based on latest 5-year crash data for years 2017 through 2021. Crash data for year 2022 became available late in the study and consequently could not be analyzed for this report.

METHODOLOGY

The safety assessment was performed based on 2017-2021 crash data using several performance measures to explore different aspects of safety concerns in the MPO:

1. Crash severity (deaths & disabling injuries vs. no injuries)
2. Crash influence factors such as distracted driving, speeding, older/teen drivers, etc.
3. Pedestrian and Bicycle related crashes
4. Pre-pandemic and pandemic year crash trend
5. Crash rate by roadway segment (crashes per 1,000 daily vehicle-miles traveled)
6. Fatal crash percent by roadway segment

REGIONAL OVERVIEW

In 2021, a total of 10,869 collisions were reported in the DCHC area. Of these collisions, 157 (1.4%) were fatal or severe; 2,565(23.6%) caused minor or non-severe injuries; and 8,147 (75%) caused no or unknown injuries.

Looking at the previous five years of data, a total of 184 fatal crashes occurred between 2017 and 2021, with the number per year ranging from a low of 33 (2017) to a high of 42 (2020, first full year of the pandemic). The average number of fatal (killed) crashes per year is 37. As shown in Table 4-1, fatal incidents were highest in the years 2020 (42) and 2018 (40) and lowest in 2017 (33) and 2021 (34). The average annual incidence of fatal (killed) collisions has remained relatively steady over the five-year period examined; in 2021, there were 34 fatal crashes, slightly lower than the annual average.

The majority of accidents in the last five years have been rear-end collisions. In 2021, rear-end crashes constituted nearly 36% of all crashes in the area, down from 44% in 2017. The second-highest crash type, by proportion, is "angle" crashes (18%). Sideswipe crashes steadily increased from 12% of all crashes in 2017 to 15% in 2021. Crashes related to stationary object or parked car, have increased from 7.8% in 2017 to 11.8% in 2020 and came down to 10.6% in 2021 Crashes resulting from vehicles running off the road have increased from 5.6% in 2017 to 6% in 2021. Other types of crashes, including animal-involved, non-vehicle commuter, turning, and general "other," each make up less than 10% of overall crashes and have remained fairly constant over the last five years.

Figure 4-1 shows the location of crashes throughout the DCHC MPO area from 2017-2021. As seen on the map, crashes can occur on any road regardless of traffic levels or facility type, and fatalities and serious injuries have occurred throughout the region. However, crashes occur most frequently on heavily-traveled facilities and in the region's most densely-developed areas. See the "Results by Geographic Subarea" section below (Figures 4-6 to 4-12) for more detail. Figures 4-3 and 4-4 show the fatal crash and disabling/serious injury crash locations respectively. Most of the fatal crashes are clustered in

Table 4-1. Crash Severity by Year

	2017	2018	2019	2020	2021
Fatality	33	40	35	42	34
Severe/Disabling Injury	89	82	74	112	123
Other Injury	2,765	2,791	2,708	2,118	2,565
No/Unknown	8,774	8,991	8,533	6,383	8,147
Total	11,661	11,904	11,350	8,655	10,869

downtown and east Durham subareas along NC 55 and NC 98 highways. In Southpoint subarea along I-40, several disabling/ serious injury crashes are noticeable.

Figure 4-4 shows the relationship between the number of crashes on a roadway segment and the volume of traffic on that segment. Although a higher number of cars utilizing a road might suggest higher crash totals, other factors, such as facility design and traffic operations, can influence crash rates as well. Hence, while the region's freeways carry lots of traffic, the number of crashes relative to this high volume is low. Surface streets in the Downtown Durham subarea, however, have high rates of incidents relative to the traffic volume that they regularly serve. Relatively high proportions of crashes that occurred on those roads resulted in fatalities. Crashes tend to be more fatal on road segments in more sparsely developed areas of the region, where travel speeds are generally likely to be higher than in densely developed areas. So, although these segments have relatively low traffic volumes and crash rates, the crashes that do occur tend to be more severe.

NCDOT's Traffic Engineering Accident Analysis System (TEAAS) categorizes crashes into six levels of severity:

Killed/ Fatal (K)	deaths that occur within twelve months of the crash
Disabling (A)	injuries serious enough to prevent normal activity for at least one day, such as massive loss of blood, broken bones, etc.
Evident (B)	non-fatal or disabling injuries that are evident at the scene such as bruises, swelling, limping, etc.
Possible (C)	no visible injury but there are complaints of pain or momentary unconsciousness
None (O)	no injury
Unknown (U)	unknown if any injury occurred

Figure 4-1. Crash Locations 2017-2021

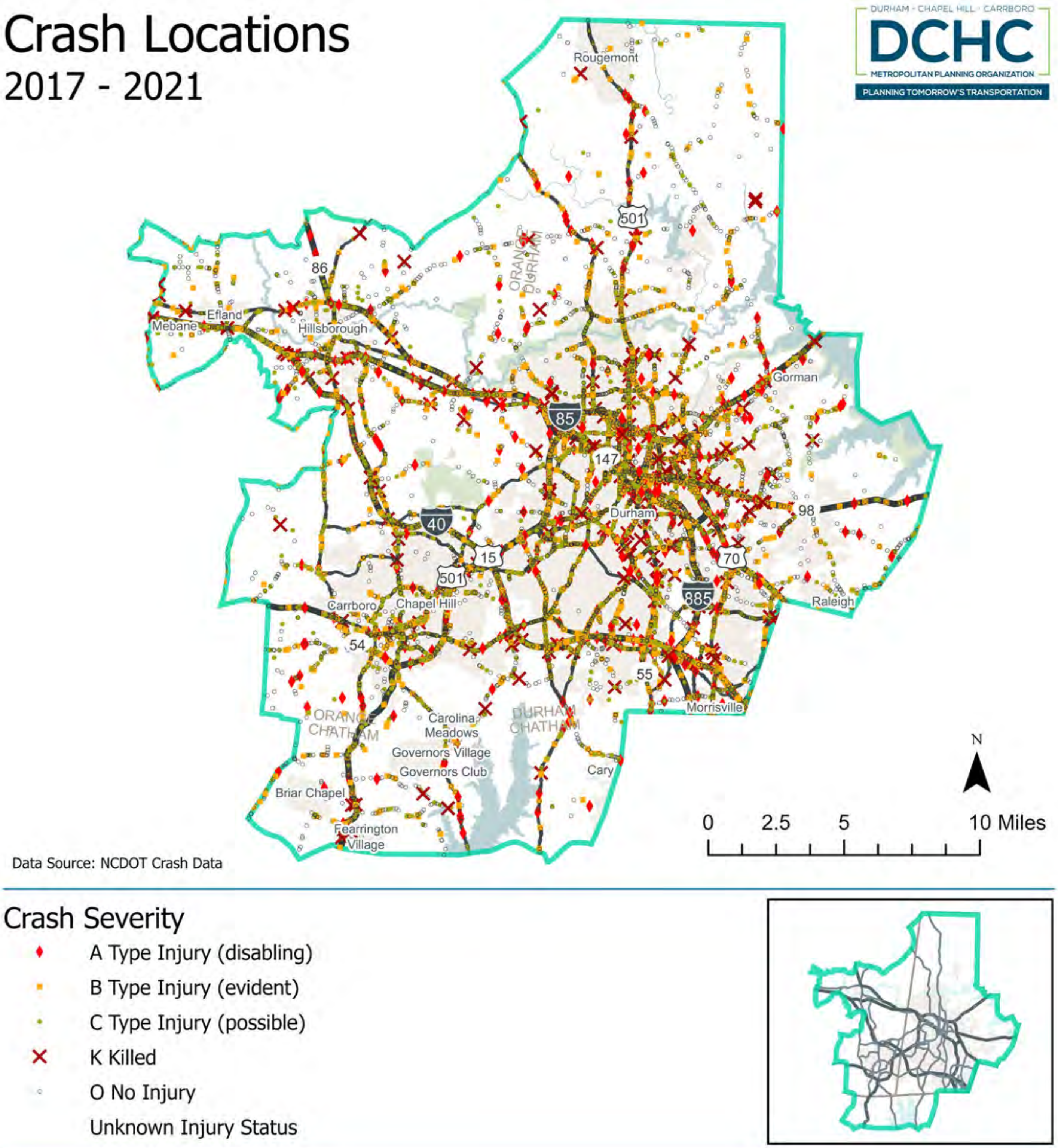


Figure 4-2. Killed/Fatal Crash Locations 2017-2021

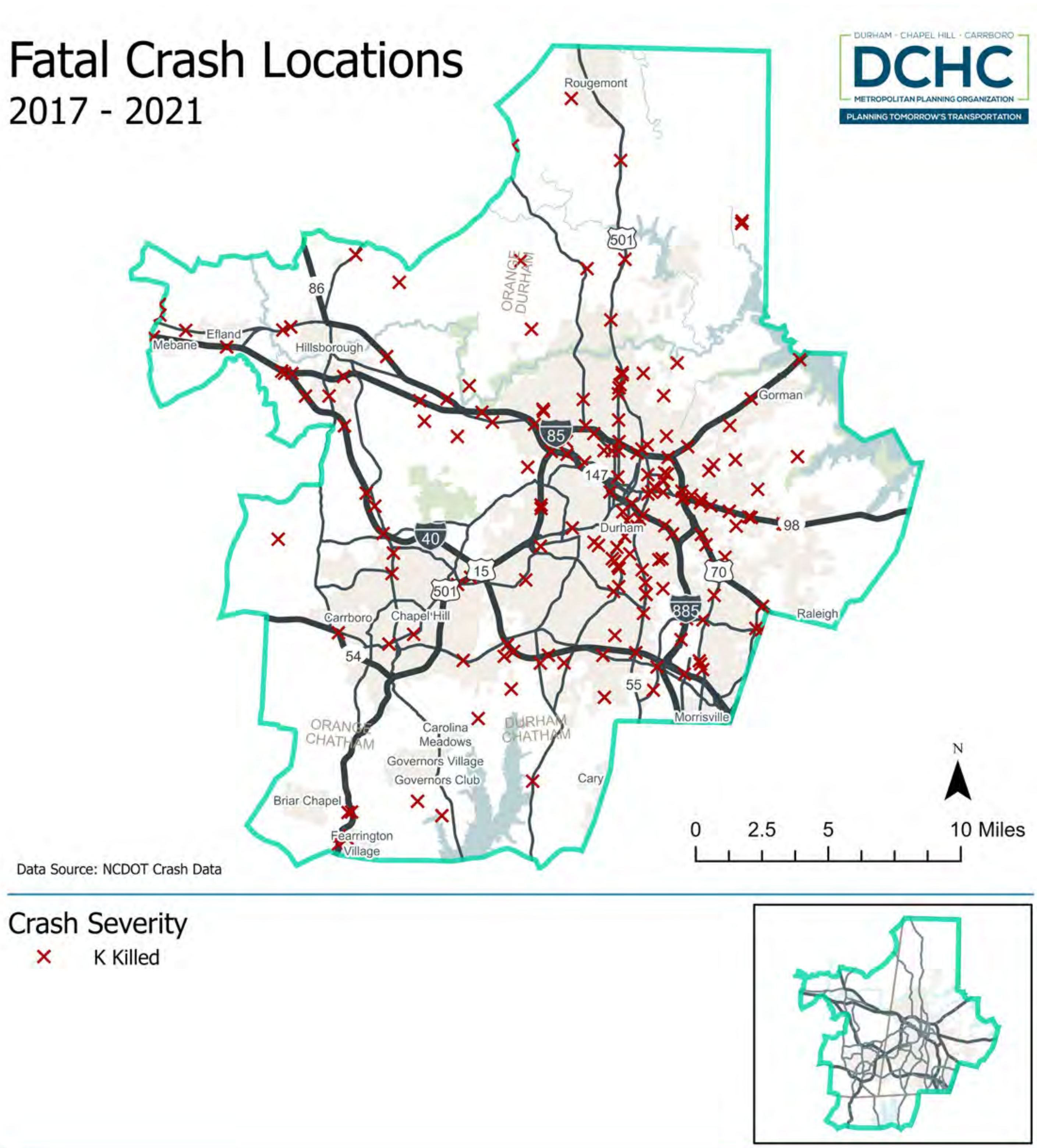


Figure 4-3. Disabling/Serious Injury Crash Locations 2017-2021

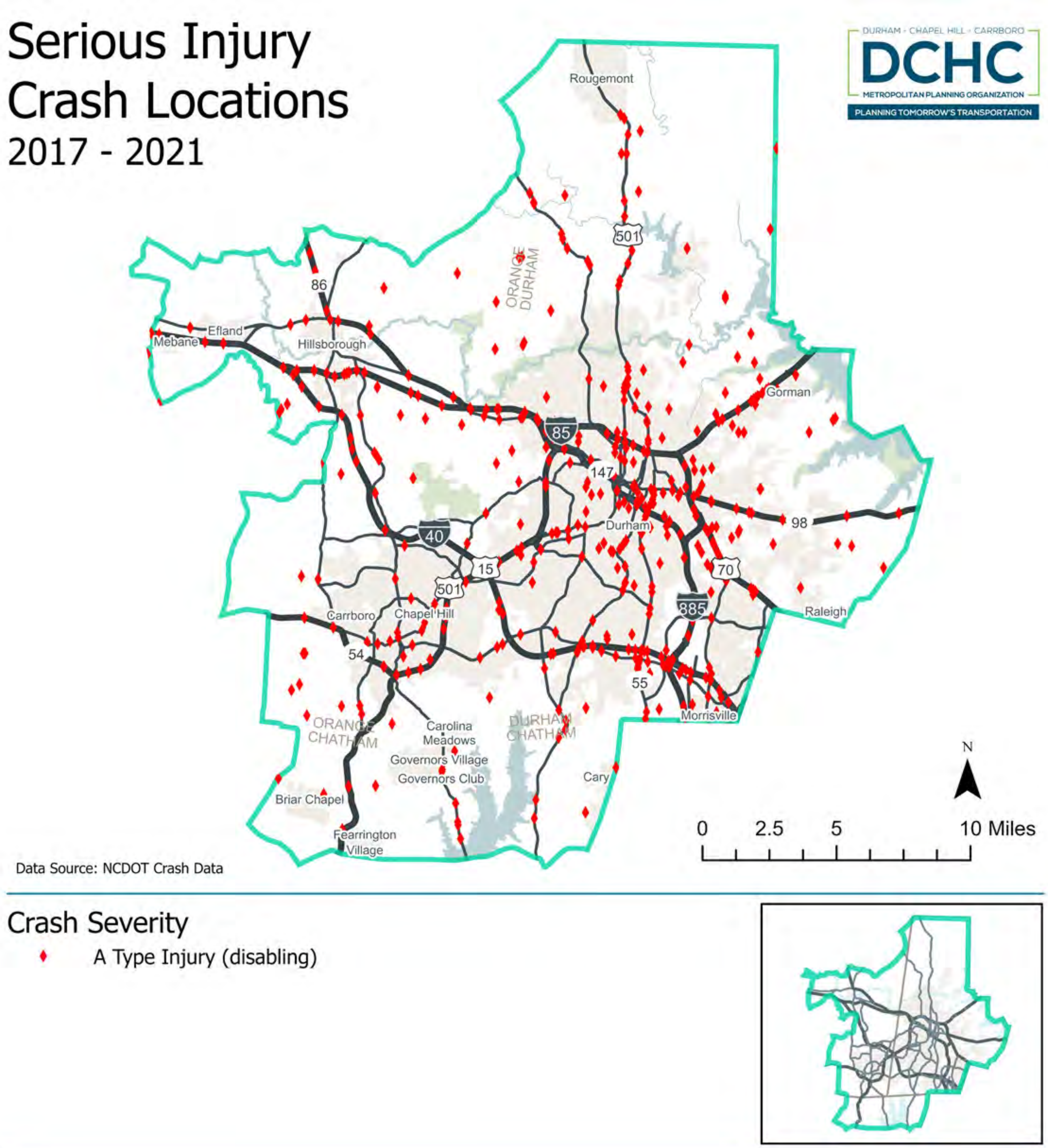


Figure 4-4. Crash Rate by Road Segment 2017-2021

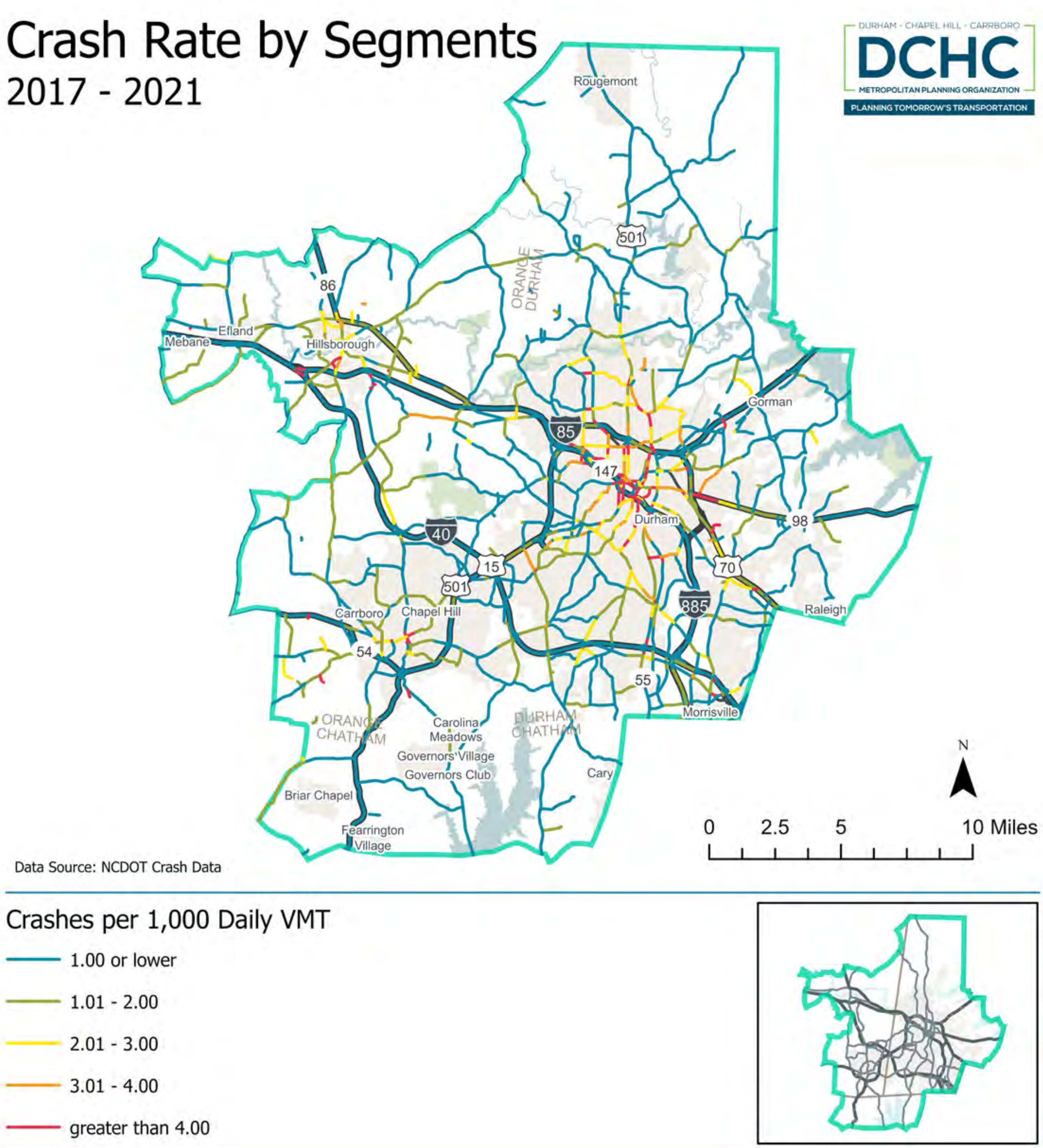
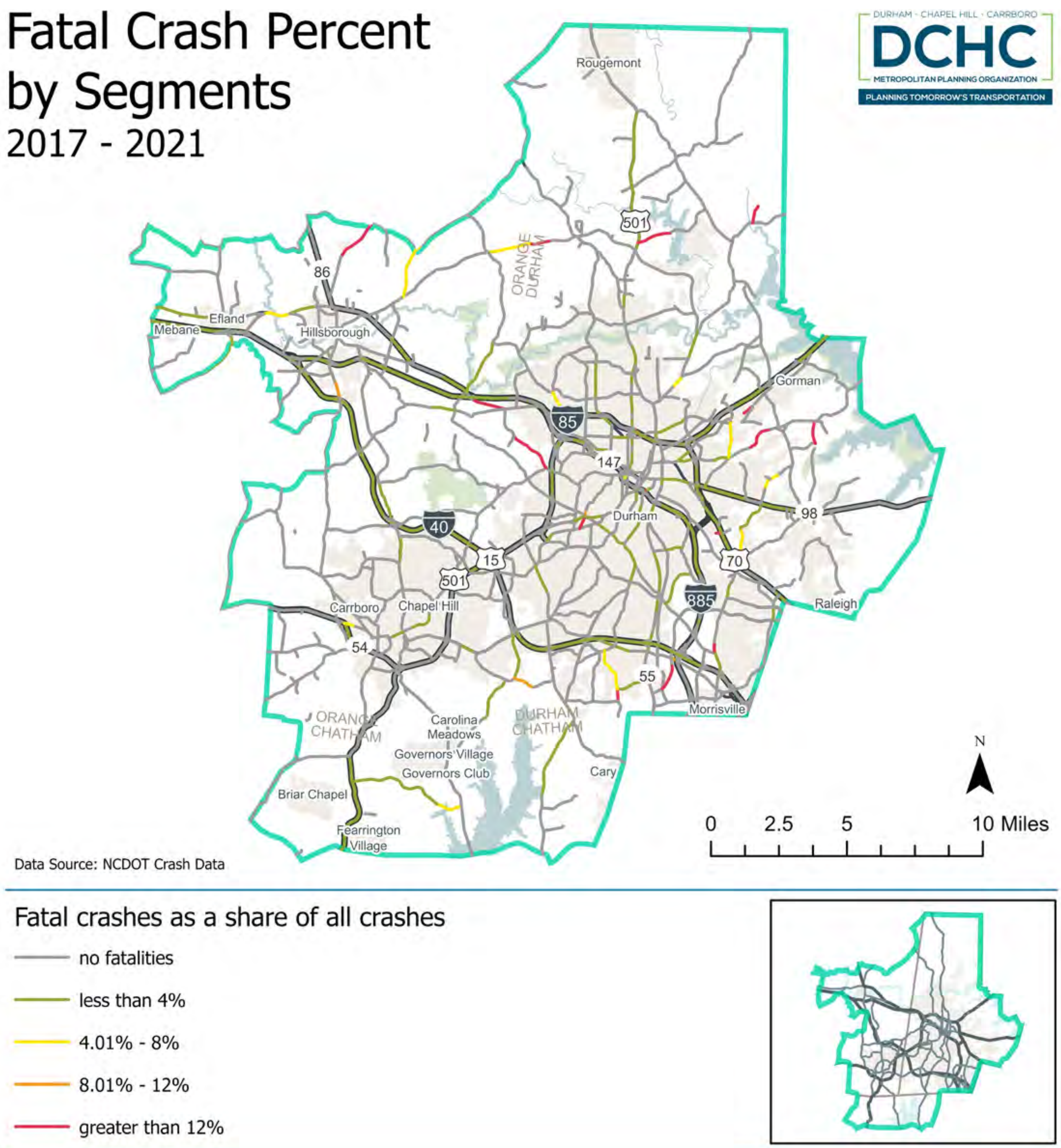


Figure 4-5. Fatality Ratio by Road Segment 2017-2021



SUBAREA OVERVIEW

Table 4-2 to 4-7shows crash summaries by subarea, year, crash severity and likely causes of the crashes. Tables 4-2 and 4-3 illustrate each subarea's share of total crashes in the DCHC MPO area by number and percentage. Downtown Durham shares the highest crashes by both number and percentage, followed by Southpoint and North Durham.

Table 4-4 summarizes the crash severity by subarea. After Downtown Durham (55), East Durham (33) has the second highest number of fatal/killed crashes.

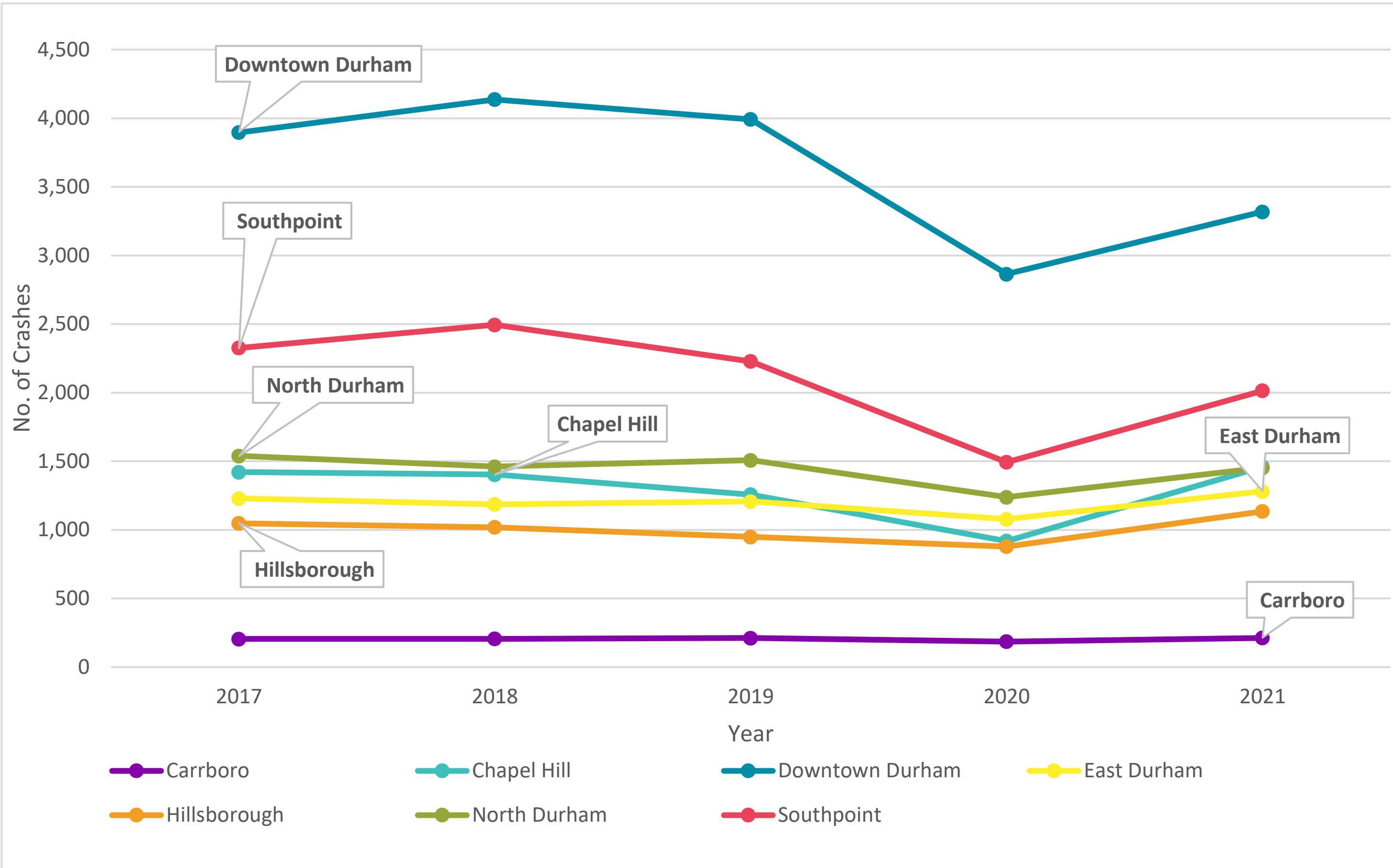
While comparing the pre-pandemic and pandemic averages in Table 4-5, it is noticeable that the average of fatal crashes is same but the average of disabling/serious injury crashes went up in pandemic years. However, the total crash average went down in the pandemic years.

Table 4-6 and 4-7 shows the summaries of the likely causes of the crashes by crash severity. Distracted driving, older and teen drivers are the top 3 causes of the most crashes over the five-year period (2017- 2021). But majority of the killed/fatal crashes were caused by speeding and drunk driving/driving under influence of alcohol. These two reasons make up to 33% and 26% of the total crashes in the five-year period respectively.

60 people lost their lives and 87 people became disable because of speeding

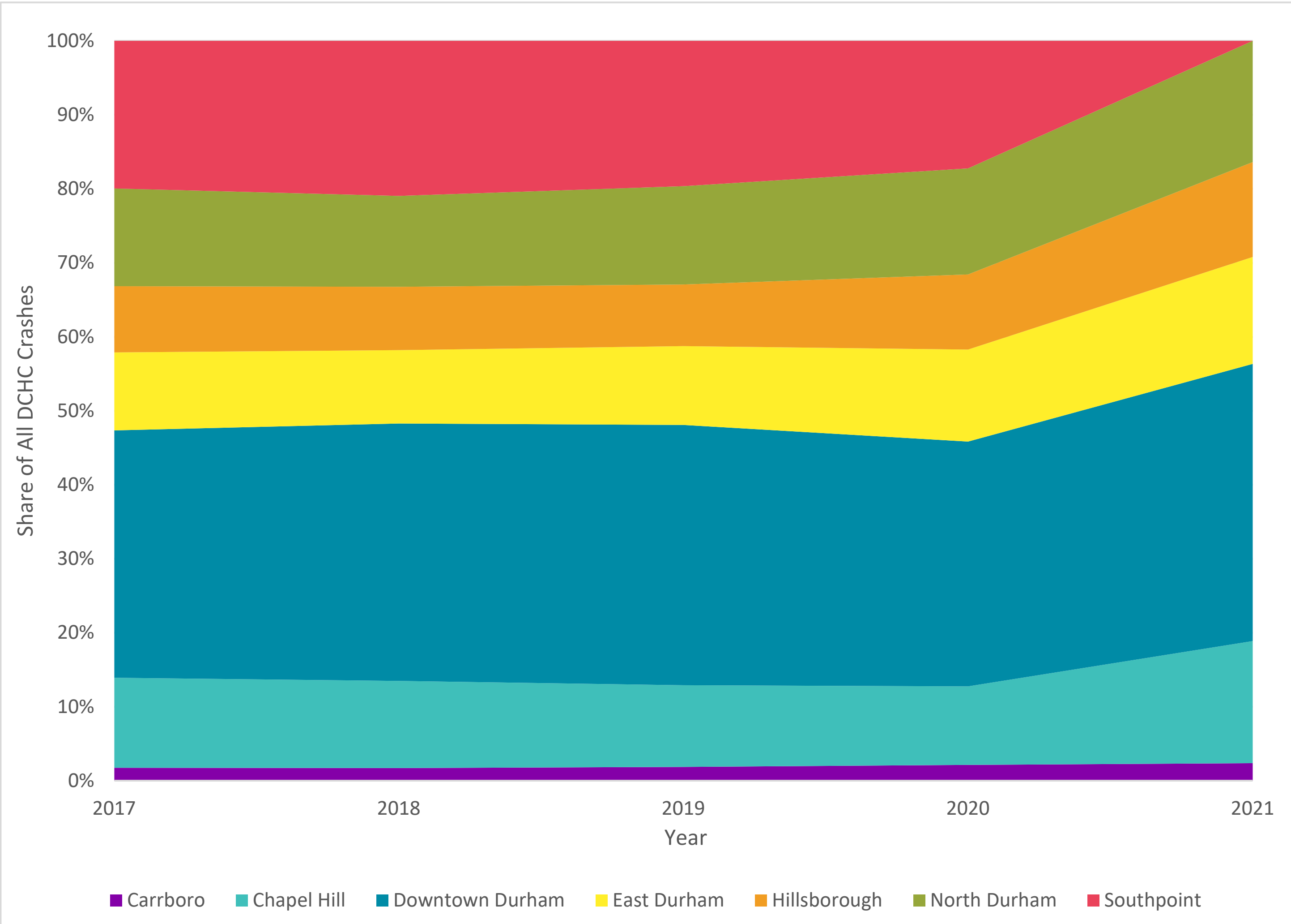
48 people lost their lives and 84 became disable because of drunk driving

Table 4-2. Total Crashes by Subarea 2017-2021



	2017	2018	2019	2020	2021
Carrboro	204	206	211	186	212
Chapel Hill	1,421	1,403	1,257	918	1,459
Downtown Durham	3,896	4,137	3,992	2,864	3,318
East Durham	1,229	1,185	1,207	1,078	1,280
Hillsborough	1,047	1,018	948	878	1,134
North Durham	1,538	1,461	1,507	1,238	1,452
Southpoint	2,326	2,494	2,228	1,493	2,014

Table 4-3. Subarea Share of All DCHC Crashes 2017-2021



	2017	2018	2019	2020	2021
Carrboro	1.75%	1.73%	1.86%	2.15%	1.95%
Chapel Hill	12.19%	11.79%	11.07%	10.61%	13.42%
Downtown Durham	33.41%	34.75%	35.17%	33.09%	30.53%
East Durham	10.54%	9.95%	10.63%	12.46%	11.78%
Hillsborough	8.98%	8.55%	8.35%	10.14%	10.43%
North Durham	13.19%	12.27%	13.28%	14.30%	13.36%
Southpoint	19.95%	20.95%	19.63%	17.25%	18.53%

Table 4-4. Crash Summary by Subarea and Crash Severity 2017-2021

	A Type Injury (disabling)	B Type Injury (evident)	C Type Injury (possible)	K Killed (fatal)	O No Injury	U Unknown Injury
Carrboro	17	86	167	3	717	29
Chapel Hill	46	372	1,340	18	4,577	105
Downtown Durham	105	1,083	3,259	55	13,140	565
East Durham	84	460	947	33	4,347	108
Hillsborough	73	315	884	26	3,645	82
North Durham	64	484	1,314	26	5,175	133
Southpoint	91	655	1,581	23	8,071	134
Total	480	3,455	9,492	184	39,672	1,156

Table 4-5. Pre-pandemic vs. Pandemic Average

	A Type Injury (disabling)	B Type Injury (evident)	C Type Injury (possible)	K Killed (fatal)	O No Injury	U Unknown Injury	Total
2018	82	725	2,066	40	8,771	220	11,904
2019	74	724	1,984	35	8,316	217	11,350
Pre-pandemic Average	***78***	***725***	***2,025***	***38***	***8,544***	***219***	***11,627***
2020	112	581	1,537	42	6,141	242	8,655
2021	123	763	1,802	34	7,883	264	10,869
Pandemic Average	***118***	***672***	***1,670***	***38***	***7,012***	***253***	***9,762***

Table 4-6. Likely Causes of Crashes by Severity

	Alcohol	Drug	Speeding	Distracted Driving	Older Driver	Teen Driver	Other	Total
A Type Injury	84	23	87	65	66	43	112	480
B Type Injury	296	85	349	522	531	381	1,291	3,455
C Type Injury	368	120	548	1,935	1,618	1,179	3,724	9,492
K Killed	48	13	60	25	26	19		184
O No Injury	776	153	1,454	7,052	5,893	4,385	19,959	39,672
U Unknown Injury	28	5	139	216	45	32	691	1,156
Total	1,600	399	2,637	9,815	8,179	6,039	25,770	54,439

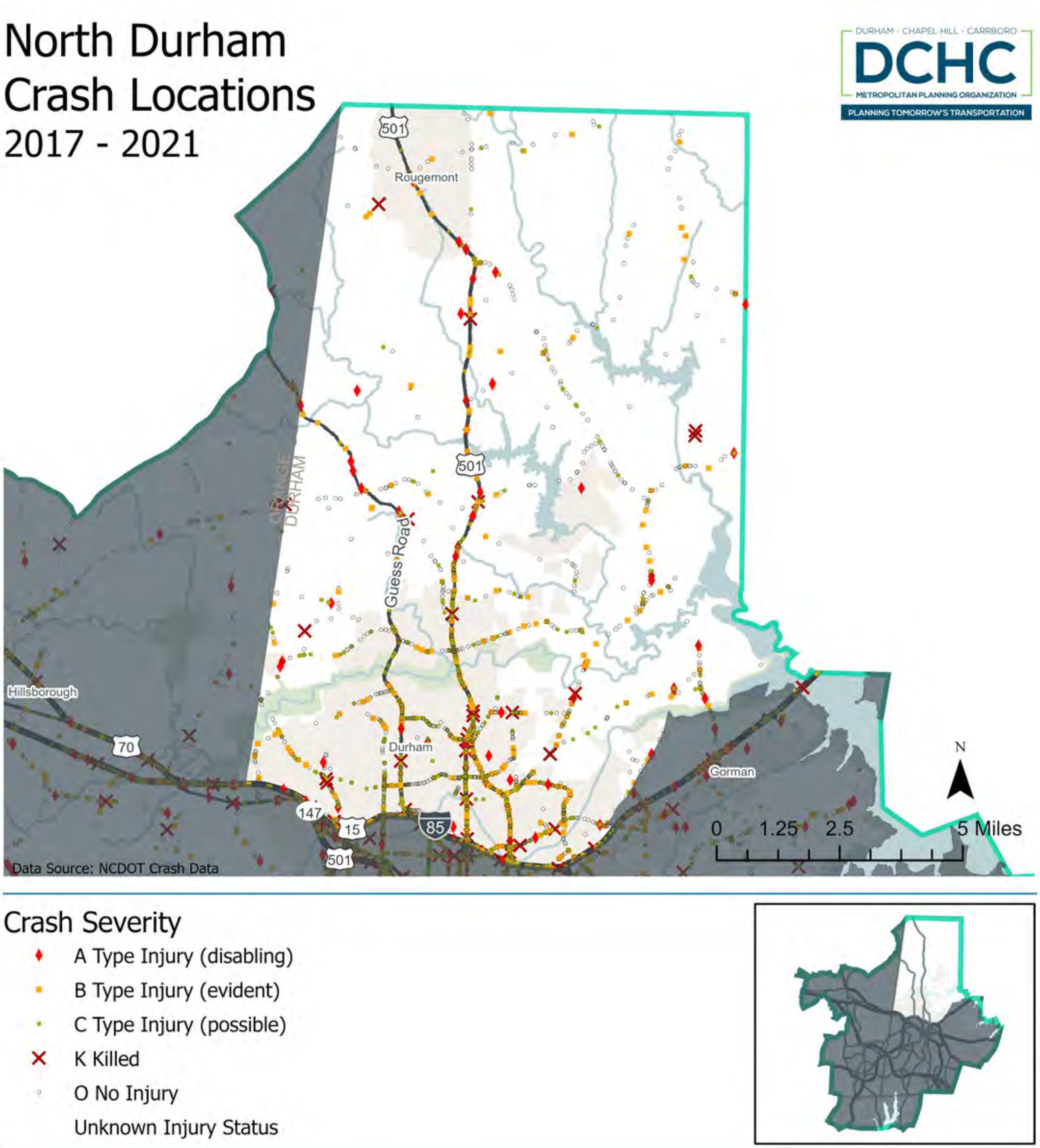
Table 4-7. Likely Causes of Crashes by Severity (in Percentage)

	Alcohol	Drug	Speeding	Distracted Driving	Older Driver	Teen Driver	Other	Total
A Type Injury	18%	5%	18%	14%	14%	9%	23%	100%
B Type Injury	9%	2%	10%	15%	15%	11%	37%	100%
C Type Injury	4%	1%	6%	20%	17%	12%	39%	100%
K Killed	26%	7%	33%	14%	14%	10%	0%	100%
O No Injury	2%	0%	4%	18%	15%	11%	50%	100%
Unknown Injury	2%	0%	12%	19%	4%	3%	60%	100%
Total	3%	1%	5%	18%	15%	11%	47%	100%

RESULTS BY GEOGRAPHIC SUBAREA

NORTH DURHAM

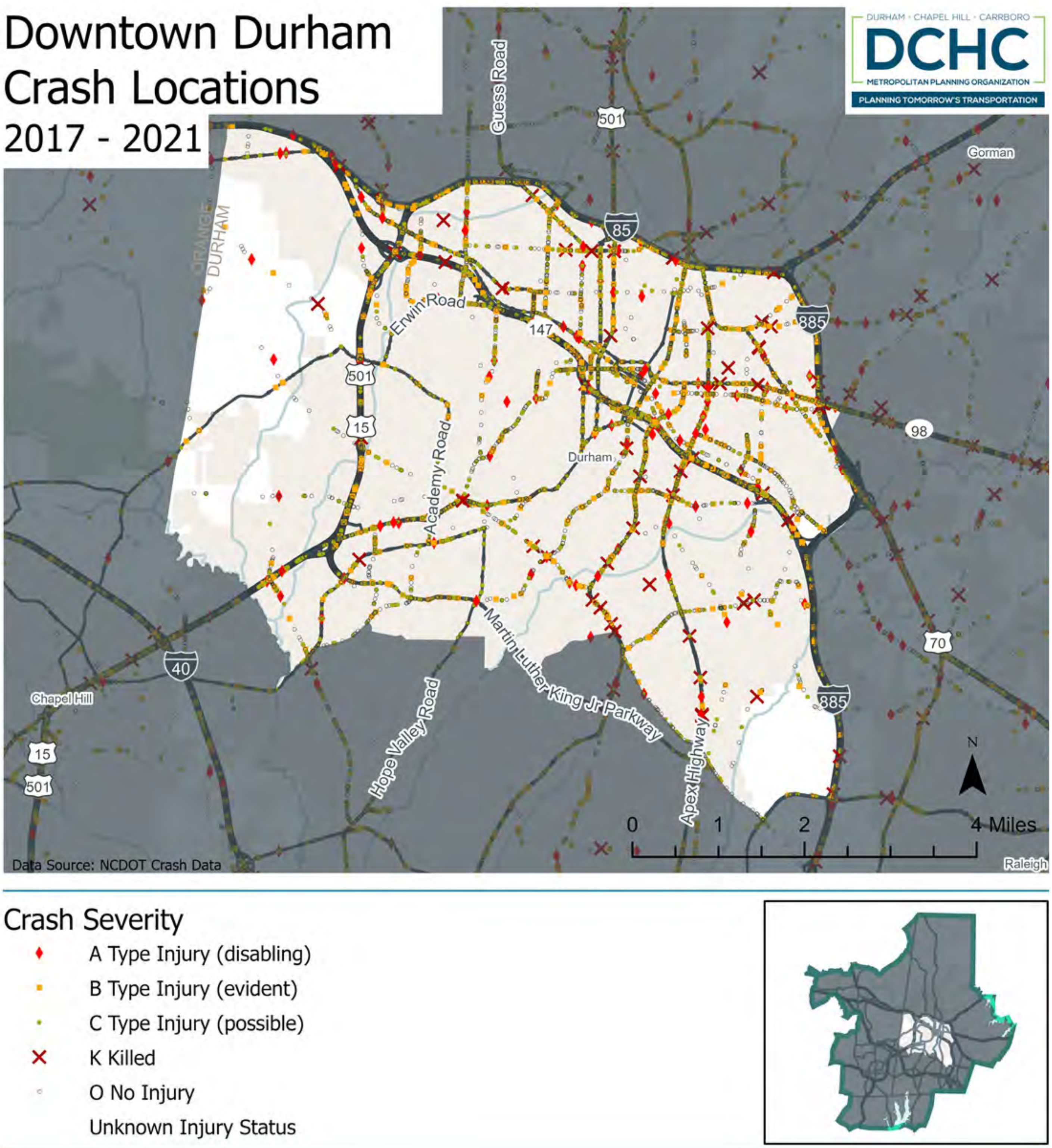
Figure 4-6. Crash Locations in North Durham Subarea 2017-2021



RESULTS BY GEOGRAPHIC SUBAREA

DOWNTOWN DURHAM

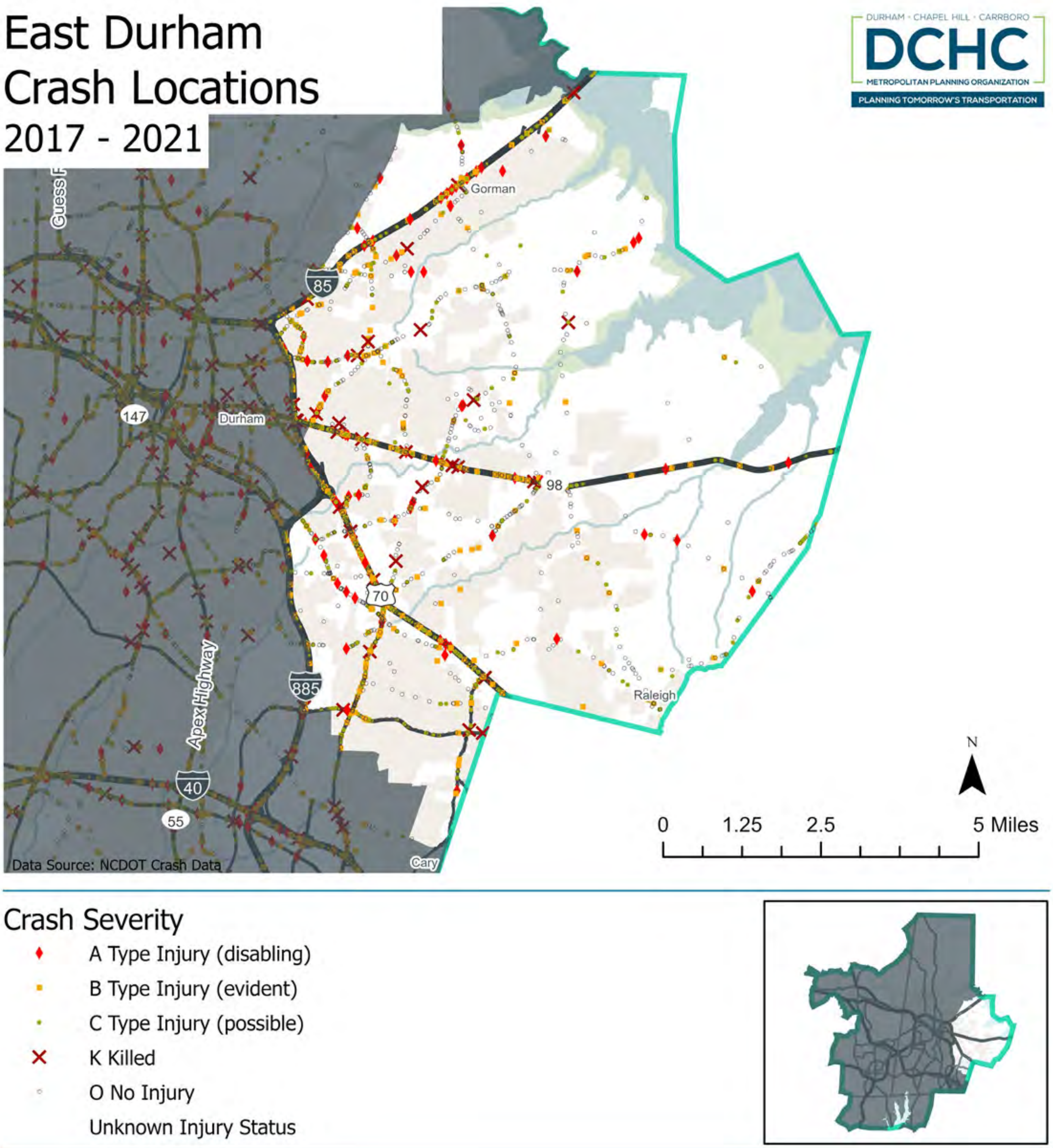
Figure 4-7. Crash Locations in Downtown Durham Subarea 2017-2021



RESULTS BY GEOGRAPHIC SUBAREA

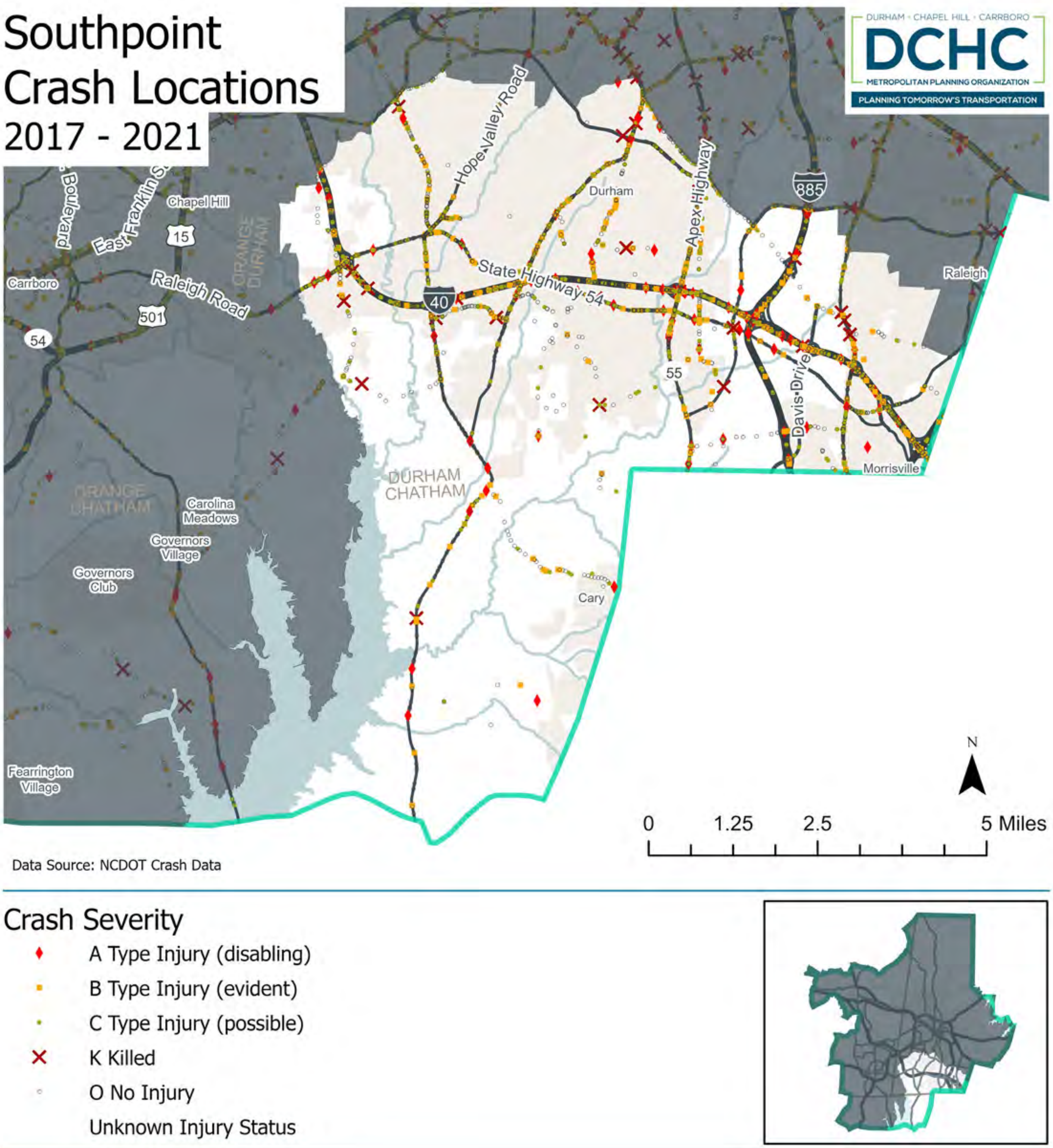
EAST DURHAM

Figure 4-8. Crash Locations in East Durham Subarea 2017-2021



SOUTHPOINT

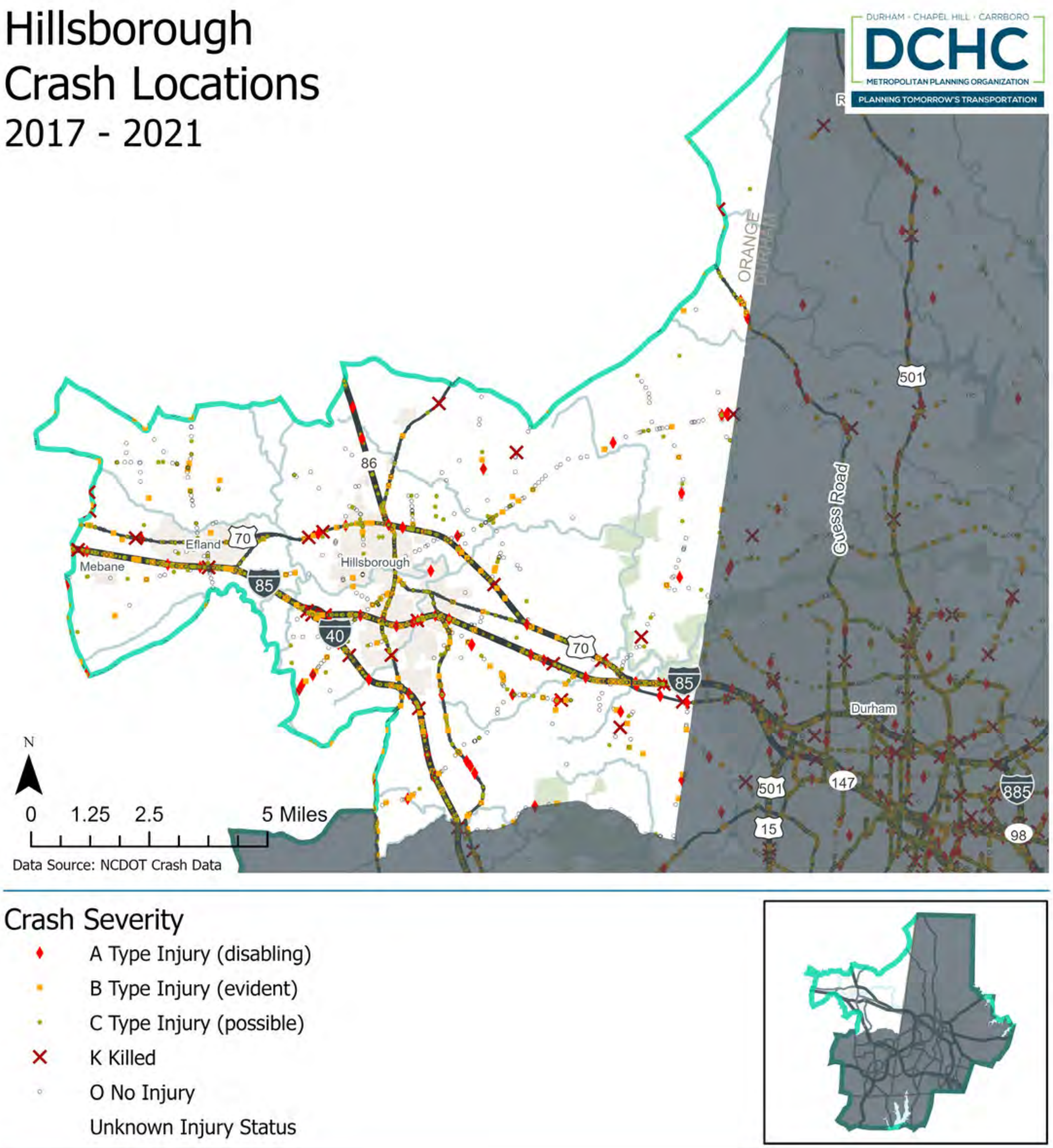
Figure 4-9. Crash Locations in Southpoint Subarea 2017-2021



RESULTS BY GEOGRAPHIC SUBAREA

HILLSBOROUGH

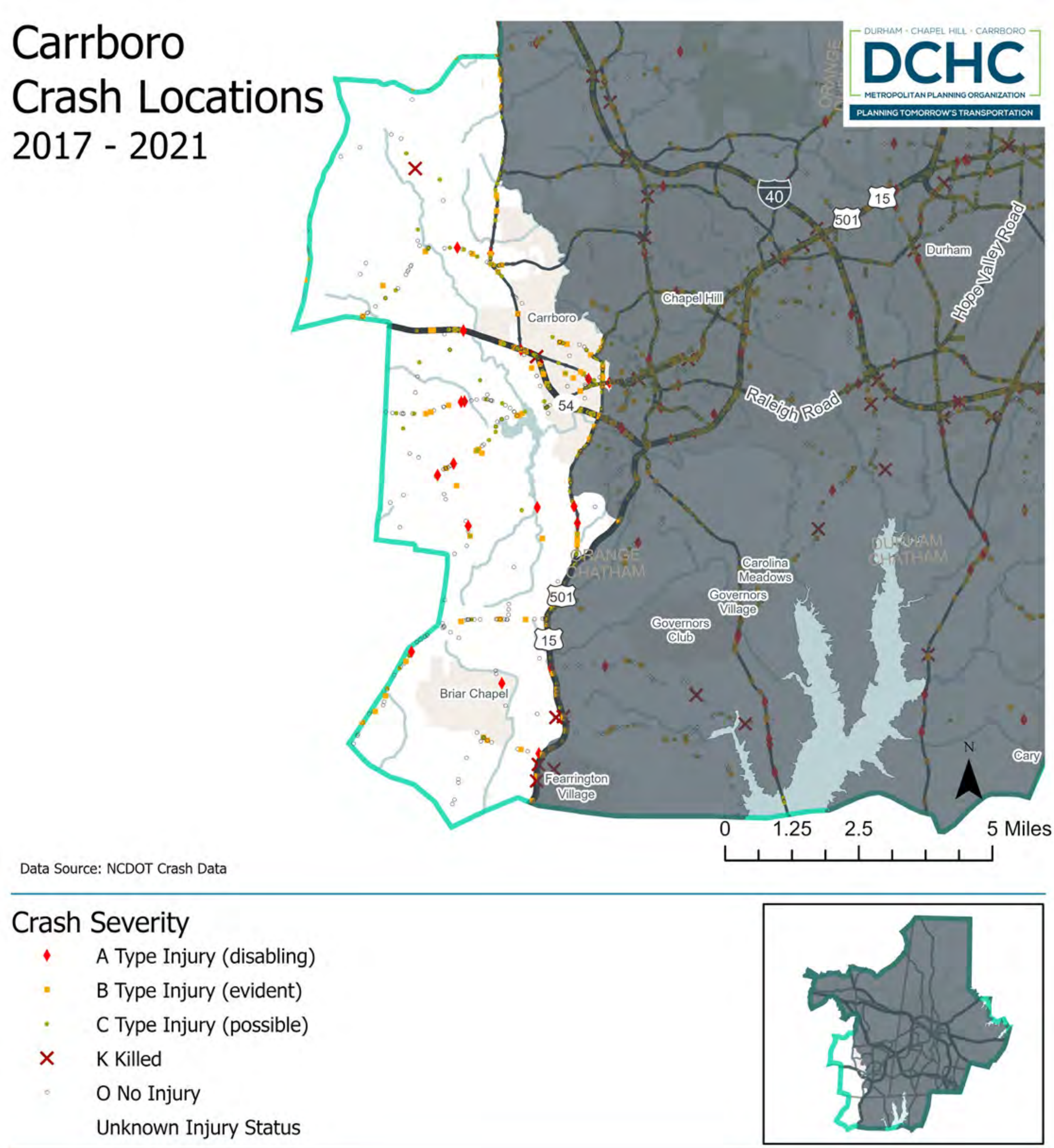
Figure 4-10. Crash Locations in Hillsborough Subarea 2017-2021



RESULTS BY GEOGRAPHIC SUBAREA

CARRBORO

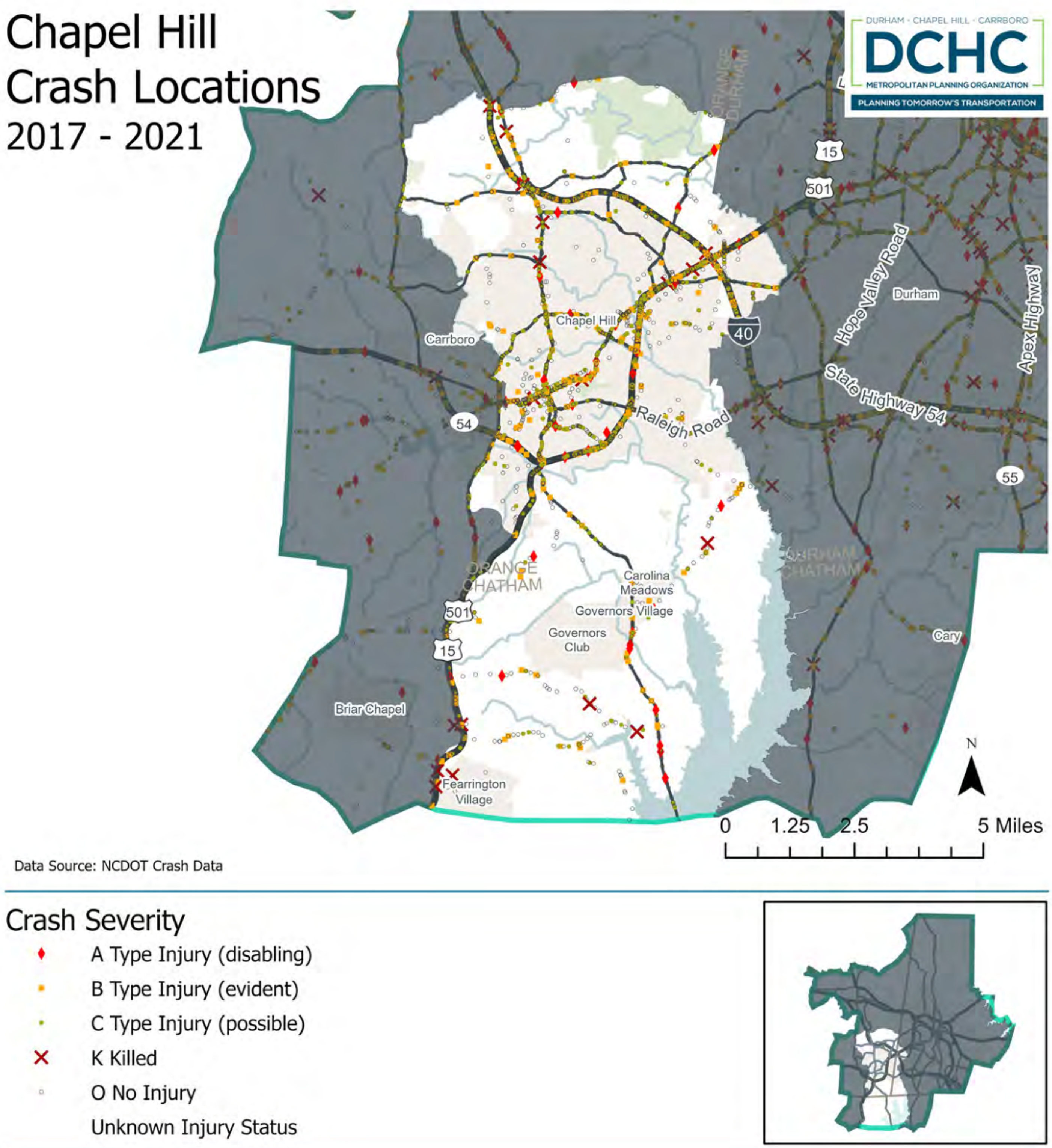
Figure 4-11. Crash Locations in Carrboro Subarea 2017-2021



RESULTS BY GEOGRAPHIC SUBAREA

CHAPEL HILL

Figure 4-12. Crash Locations in Chapel Hill Subarea 2017-2021



COMPARATIVE ANALYSIS

Geographically, Downtown Durham has accounted for the greatest share of crashes among the subareas for the last five years, representing up to 30-35% of annual crashes in the DCHC MPO area. Around 8% of crashes in the DCHC MPO area occurred in Hillsborough in 2017, but that subarea's share of crashes has increased steadily over the last five years to 10%. The North Durham (13.2%) and Chapel Hill (12.2%) subareas accounted for roughly equal shares of DCHC crashes in 2017, but North Durham's share remained roughly same (13.4%) in 2021 while Chapel Hill's share rose to 13.4% in five years. The shares of crashes occurring in East Durham and Hillsborough have risen slightly from 10% and 8% in 2017 to 12% and 10% in 2021. The Carrboro subarea has consistently accounted for around 2% of DCHC area crashes since 2017. Tables 4-2, 4-3 and 4-4 provide counts, regional shares and severity of crashes by subarea for comparison purposes. Table 4-5 highlights the pre-pandemic and pandemic averages of the crashes. Tables 4-6 and 4-7 summarize the likely causes of the crashes. Figures 4-6 through 4-12 provide detailed maps of crash locations by subarea.

[5] PEDESTRIAN FACILITIES

How are paths designed with pedestrian travel in mind distributed throughout the area?

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KEY TAKEAWAYS

In the DCHC MPO study area, Downtown Durham has the largest share of pedestrian facilities (403.6 miles), followed by Chapel Hill (344.7 miles) and Southpoint (280.6 miles) subareas.

Currently, there are 1,585 miles of pedestrian network in the DCHC MPO area.

Nearly 65% of the region's pedestrian facilities are in the urbanized areas located in Downtown Durham, Chapel Hill and Southpoint.

INTRODUCTION

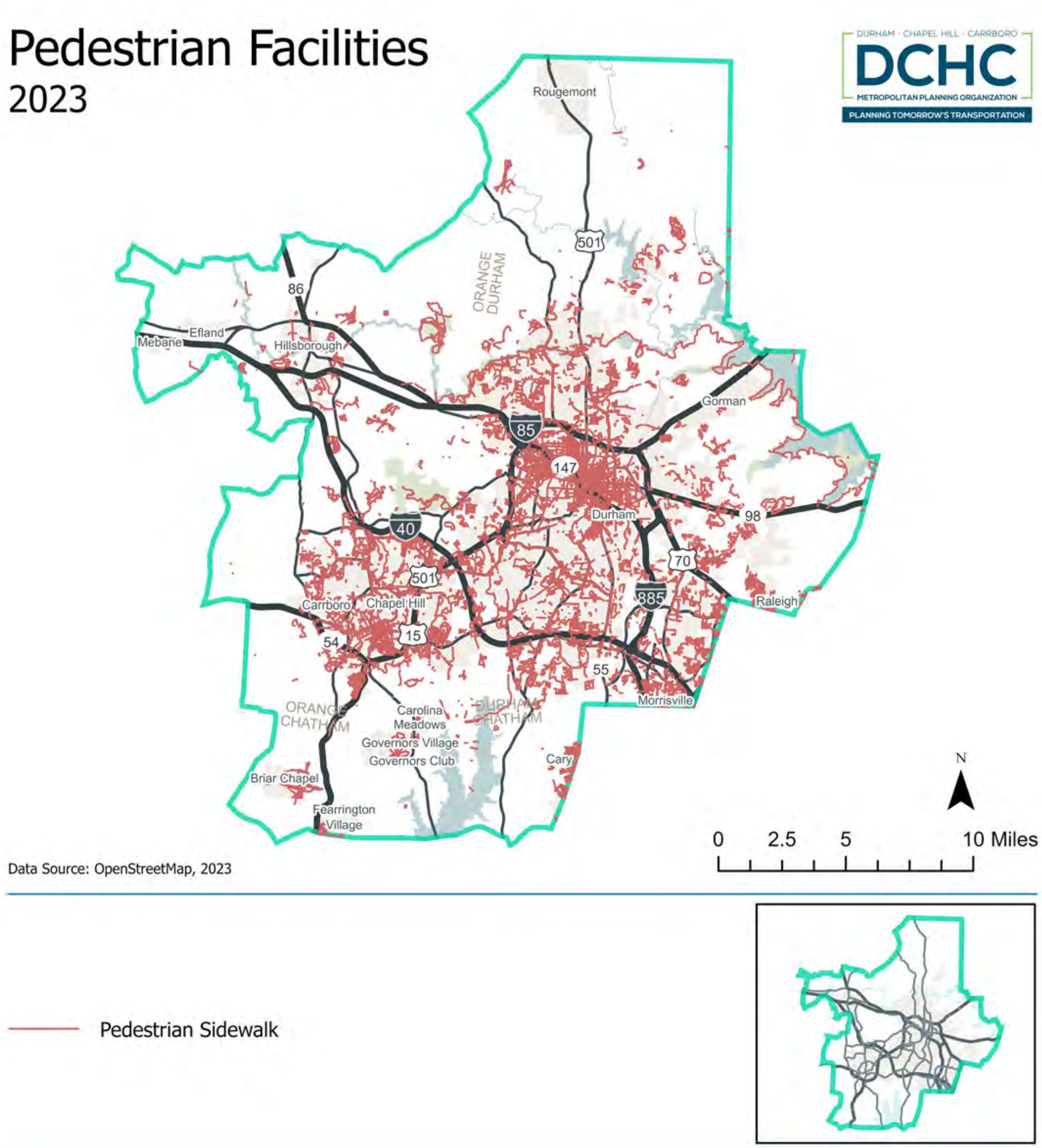
Pedestrian facilities are spaces designed specifically for pedestrian travel and include sidewalks, trails, and crosswalks. The more pedestrian facilities an area has, the better people are able to travel within that area without using a vehicle. These facilities are also critical to people with disabilities who rely upon wheelchairs or other devices for mobility. The pedestrian facility network supports other modes of transportation by providing access to bus stops or a safe and clear route from a parking space to a store, office, school, or house.

As demand is changing to favor more walkable neighborhoods and communities, and as safe routes to school are becoming commonplace initiatives for transportation planning entities throughout the country, pedestrian facilities have garnered increasing attention as critical components of a complete multimodal transportation system. This paradigm shift has been accompanied by an increase in public investment from all levels of government for pedestrian infrastructure; a clear picture of the current layout of pedestrian facilities is crucial to strategically allocating these resources.

METHODOLOGY

The inventories of bikeable facilities used in chapter was collected from OpenStreetMap for year 2023. The non-motorized roads were extracted from the whole state's road database. The pedestrian facilities were separated from that road database.

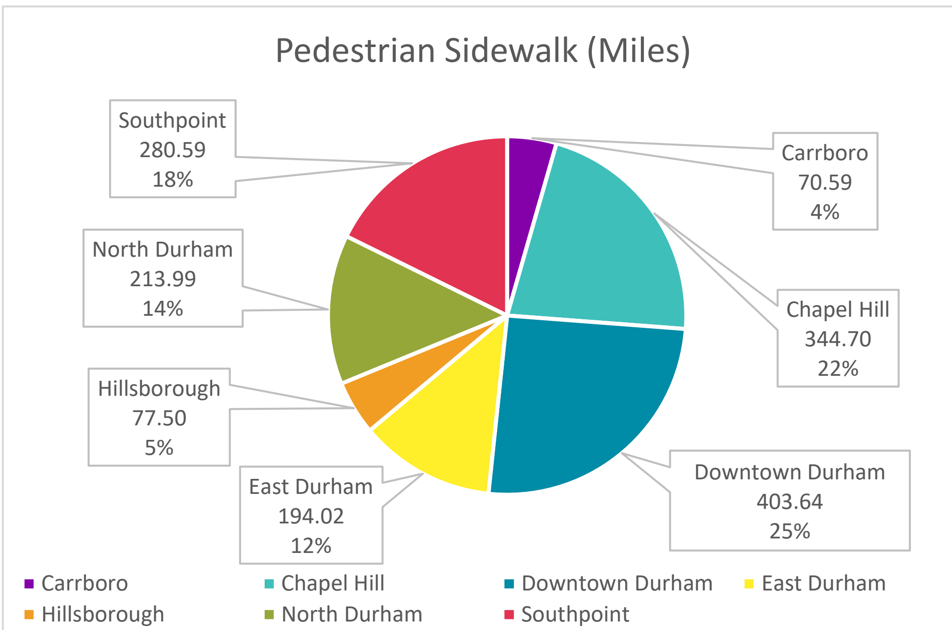
Figure 5-1. Location of Pedestrian Facilities



BREAKDOWN BY SUBAREA

Around 65% of pedestrian facilities are concentrated in the subareas of Downtown Durham, Chapel Hill, and Southpoint. Due to the presence of University of North Carolina (UNC) in Chapel Hill, Duke University and other commercial and service facilities in Durham, pedestrian facilities are highest in these areas. Downtown Durham has 25% and Chapel Hill has 22% of total pedestrian facilities in the DCHC MPO region. Carrboro has the lowest mileage, only 4% of the region's pedestrian facilities. It is worth noting that, due to data unavailability some of the pedestrian facilities were not possible to show and compare with the previous mobility report card statistics. Table 5-1 provides the total miles of pedestrian facilities by subarea. Figures 5-2 to Figure 5-8 show the pedestrian facilities in each subarea.

Table 5-1. Pedestrian Facility Share by Subarea 2023



	Pedestrian Facilities (in Miles)
North Durham	213.99
Downtown Durham	403.64
East Durham	194.02
Southpoint	280.59
Hillsborough	77.50
Carrboro	70.59
Chapel Hill	344.70

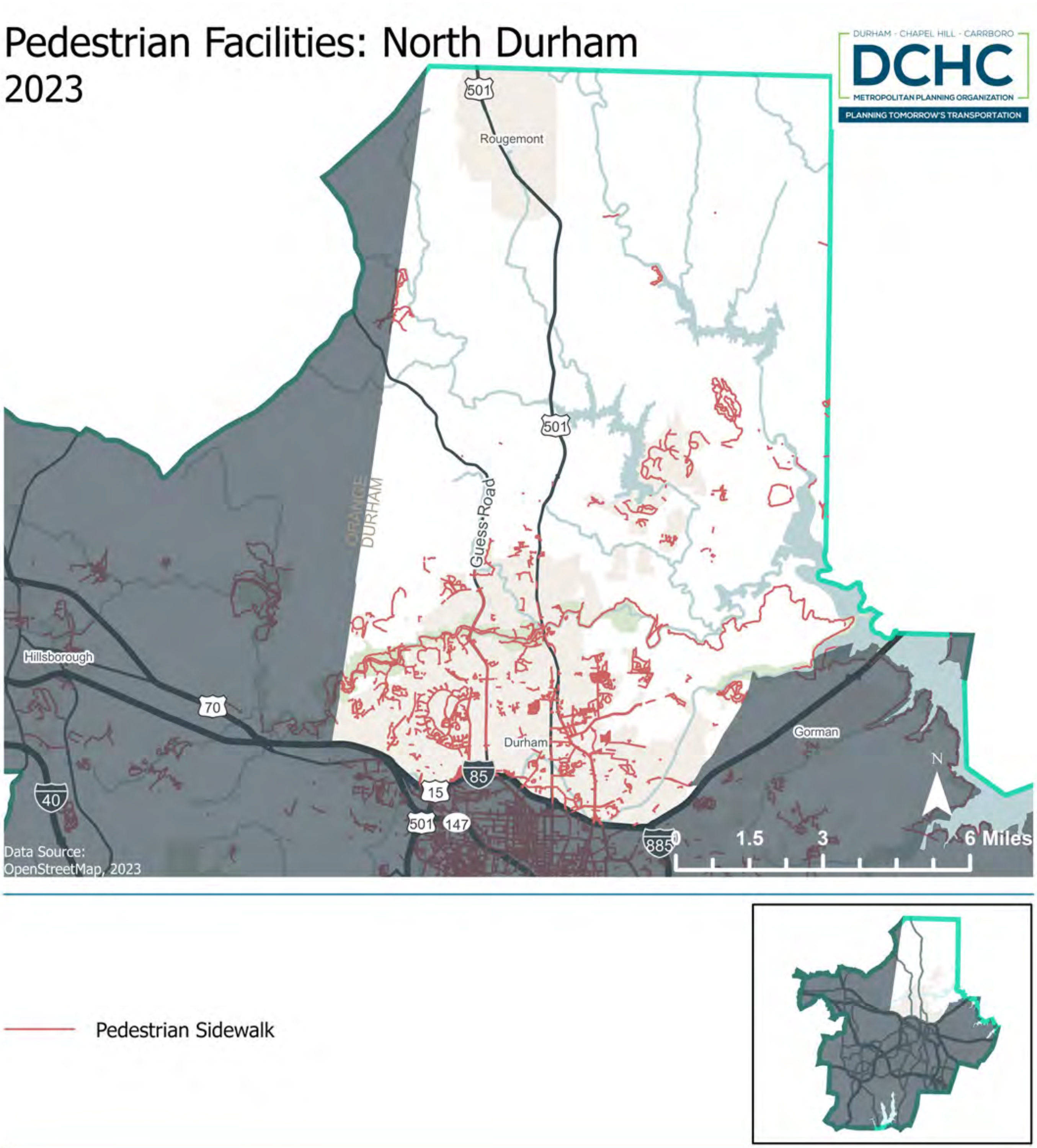
RESULTS BY GEOGRAPHIC SUBAREA

NORTH DURHAM

Total Sidewalk Mileage

213.9 Miles

Figure 5-2. North Durham Subarea Pedestrian Facilities

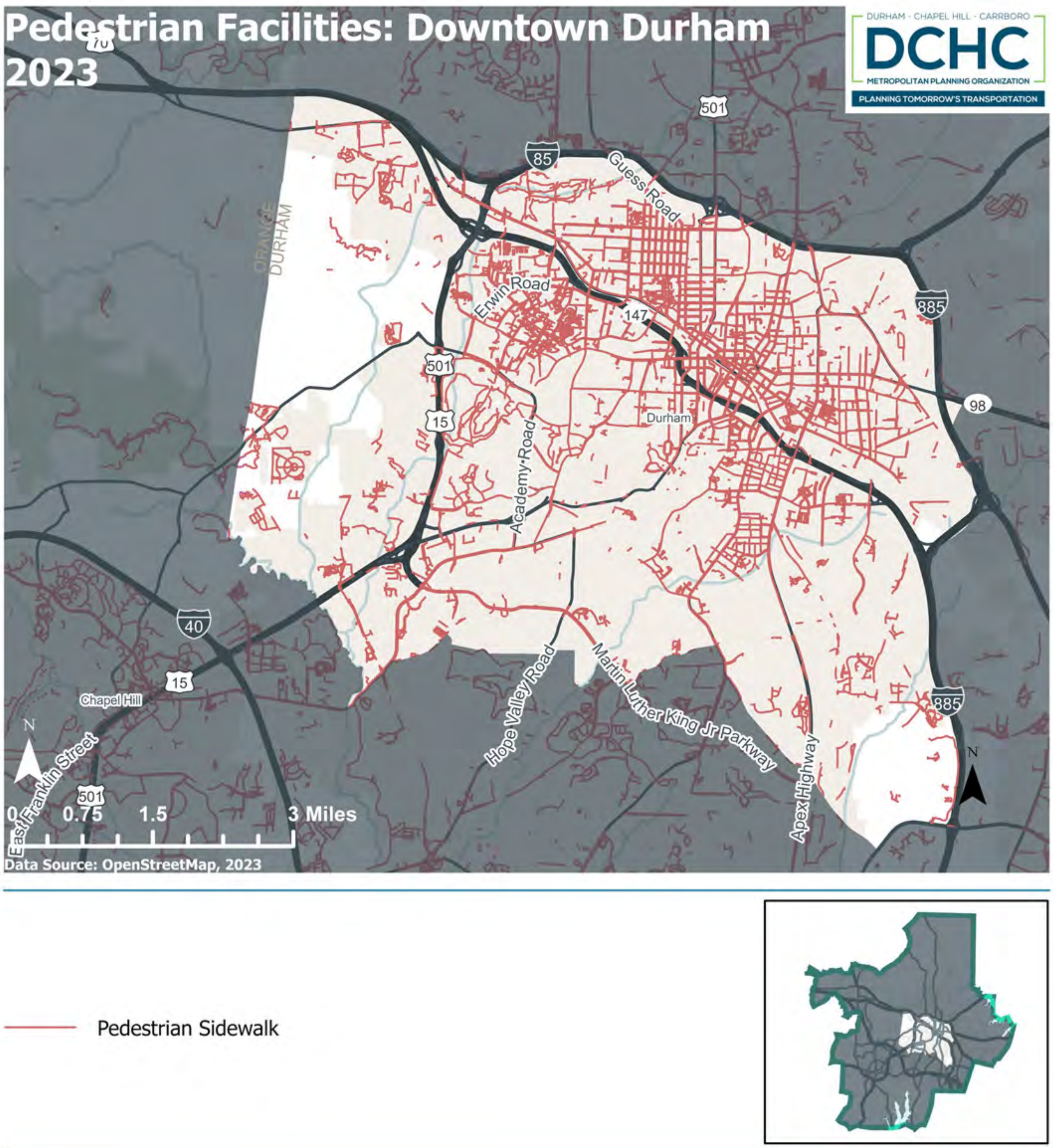


DOWNTOWN DURHAM

TOTAL SIDEWALK MILEAGE

403.6 MILES

Figure 5-3. Downtown Durham Subarea Pedestrian Facilities



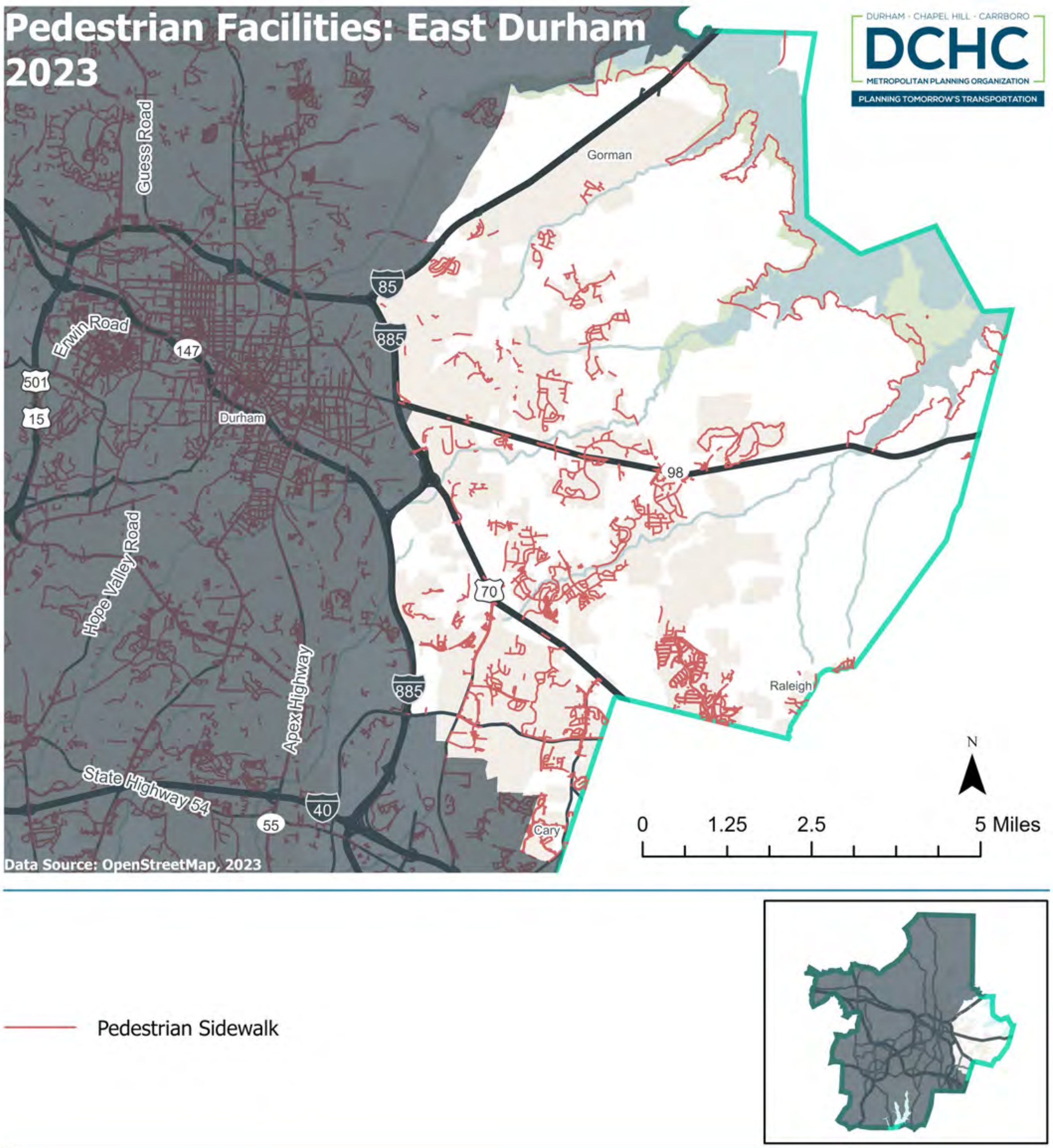
RESULTS BY GEOGRAPHIC SUBAREA

EAST DURHAM

TOTAL SIDEWALK MILEAGE

194.1 MILES

Figure 5-4. East Durham Subarea Pedestrian Facilities



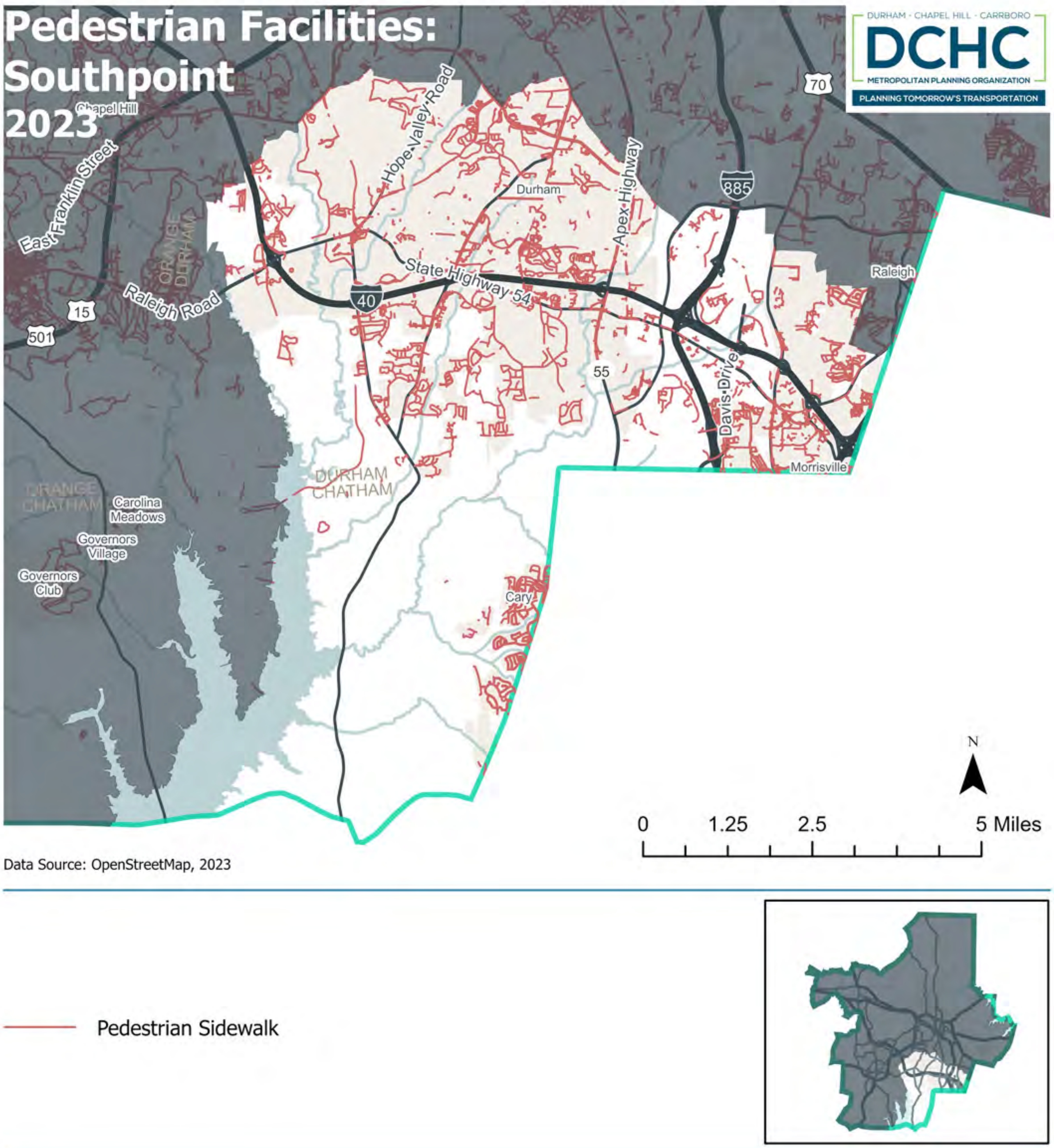
RESULTS BY GEOGRAPHIC SUBAREA

SOUTHPOINT

TOTAL SIDEWALK MILEAGE

280.6 MILES

Figure 5-5. Southpoint Subarea Pedestrian Facilities

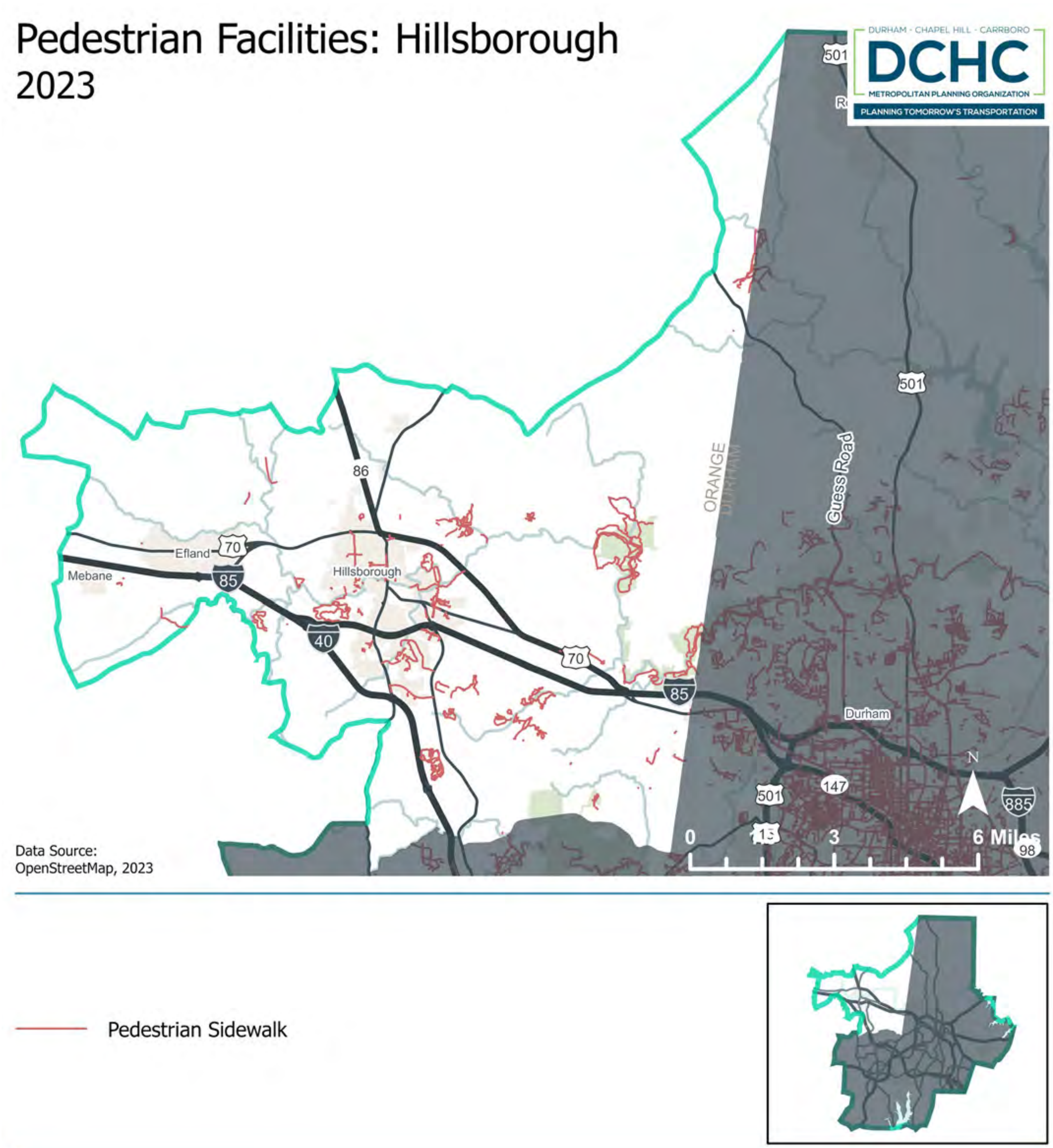


HILLSBOROUGH

TOTAL SIDEWALK MILEAGE

77.5 MILES

Figure 5-6. Hillsborough Subarea Pedestrian Facilities

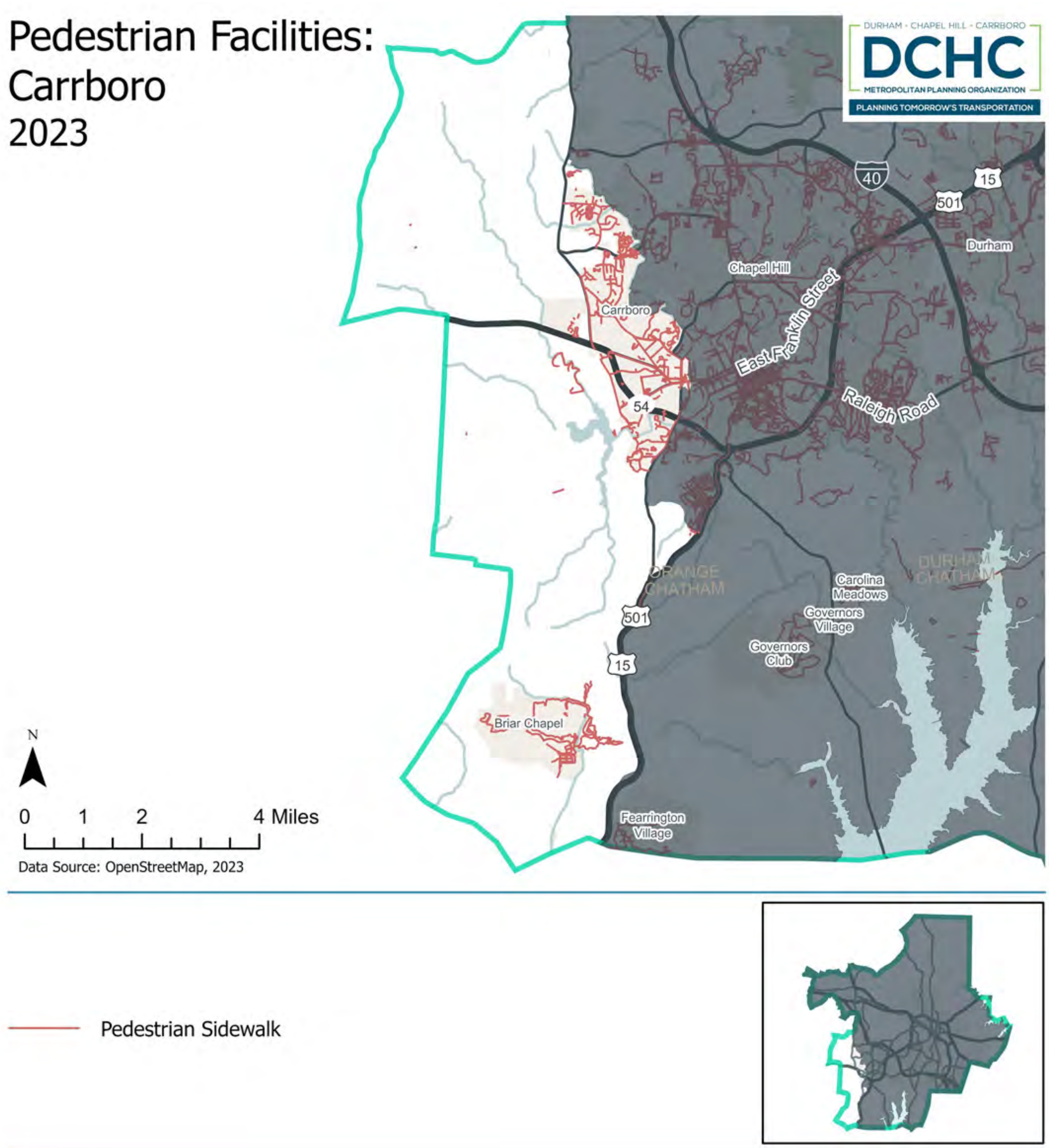


CARRBORO

Total Sidewalk Mileage

70.6 Miles

Figure 5-7. Carrboro Subarea Pedestrian Facilities



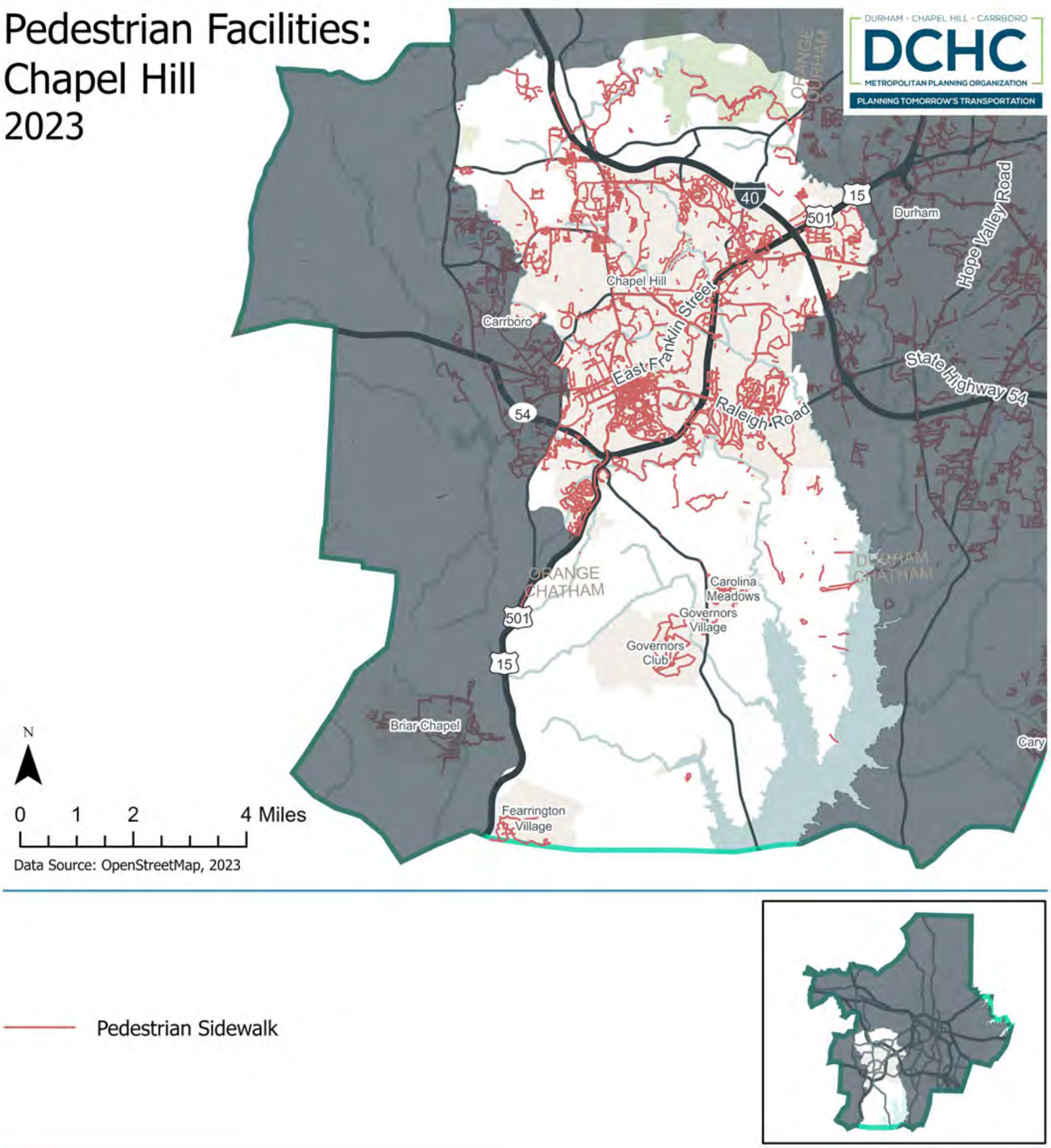
RESULTS BY GEOGRAPHIC SUBAREA

CHAPEL HILL

Total Sidewalk Mileage

344.7 Miles

Figure 5-8. Chapel Hill Subarea Pedestrian Facilities



COMPARATIVE ANALYSIS

In the DCHC MPO study area, Downtown Durham has the largest share of pedestrian facilities, at 26%, followed by Chapel Hill at 22% and Southpoint at 18%.

[6] PEDESTRIAN ACTIVITY

Where is pedestrian activity occurring in the area and how is it changing?

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KEY TAKEAWAYS

In 2021, around 36,353 pedestrians were observed at 106 mid-block locations and 57,877 pedestrians were observed at 69 intersections in the DCHC MPO area during an average weekday (counted for a 13-hour period from 6 AM to 7 PM).

Locations near City centers and college campuses show high pedestrian activity, as expected.

During weekdays, afternoon peak hours reflected the largest share of observed pedestrian traffic and morning peak hours had relatively lower shares

In 2021, the Chapel Hill and Carrboro subareas had the highest median pedestrian count (149) for all peak hours for mid-block count locations. Downtown Durham had the highest median pedestrian count (405) for the intersection count locations.

INTRODUCTION

This chapter offers a summarization of pedestrian activity levels to help the MPO understand where pedestrian activity is high and at what times of day. Pedestrian counts can potentially be related to the quantity and quality of pedestrian facilities, such as sidewalks and trails; the intensity of development and diversity of land uses in an area; and pedestrian-related safety issues (bicycle and pedestrian crashes are the subject of Chapter 9). The pedestrian count data developed for this chapter provides the MPO with information to guide investments in new or improved pedestrian facilities to promote safe active transportation and support local development and place-making visions. Two examples of the utilization of pedestrian count data are offered below:

- Pedestrian activity levels may indicate how well pedestrian facilities in the DCHC area are performing: a high level of pedestrian activity can indicate that the pedestrians in an area find the design of pedestrian facilities to be useful for getting from one destination to the next. Low levels of pedestrian activity may result from a less walkable pattern of development and thus do not inherently indicate poorly designed facilities.
- Changes over time in pedestrian activity can help the MPO target investments in new or improved pedestrian facilities. For example, increased pedestrian activity over time may result from the addition of denser development or a new walkable destination in the area. The change in pedestrian activity would identify the area as a suitable candidate for improved pedestrian facilities to accommodate this new level of pedestrian traffic.

METHODOLOGY

Unlike vehicle traffic volume counts, pedestrian volume counts are based on human observation or a video system rather than mechanical data recorded by pneumatic tubes. Pedestrian traffic volume was observed over a 13-hour period (6:00 AM to 7:00 PM) at 106 midblock and 69 intersection locations throughout the DCHC area. Counts were conducted from March to June of 2021. Counts were taken only on Tuesdays, Wednesdays and Thursdays and do not represent weekend or holiday pedestrian traffic.

Figure 6-1. Pedestrian Counts at Mid-block Count Locations

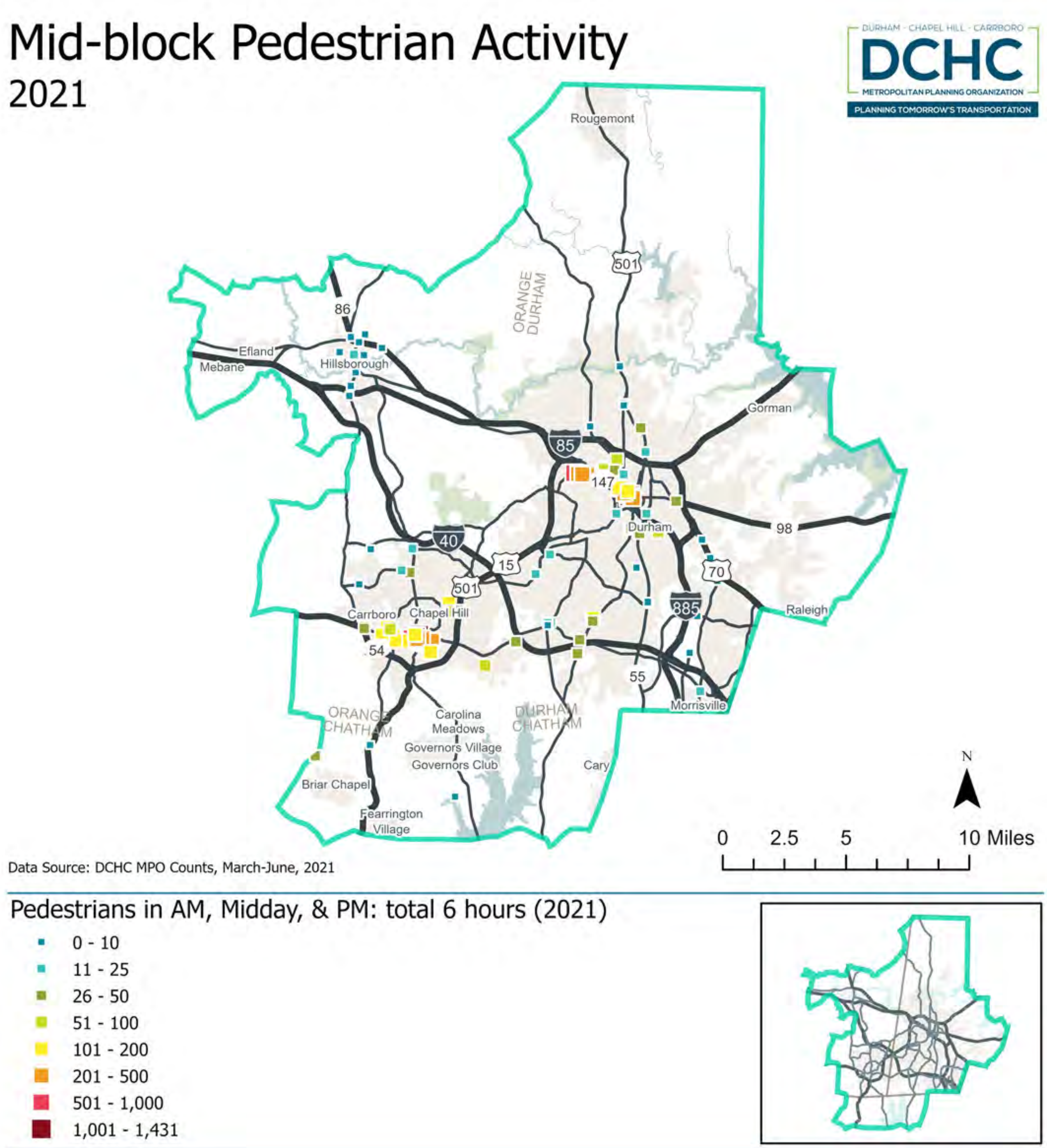
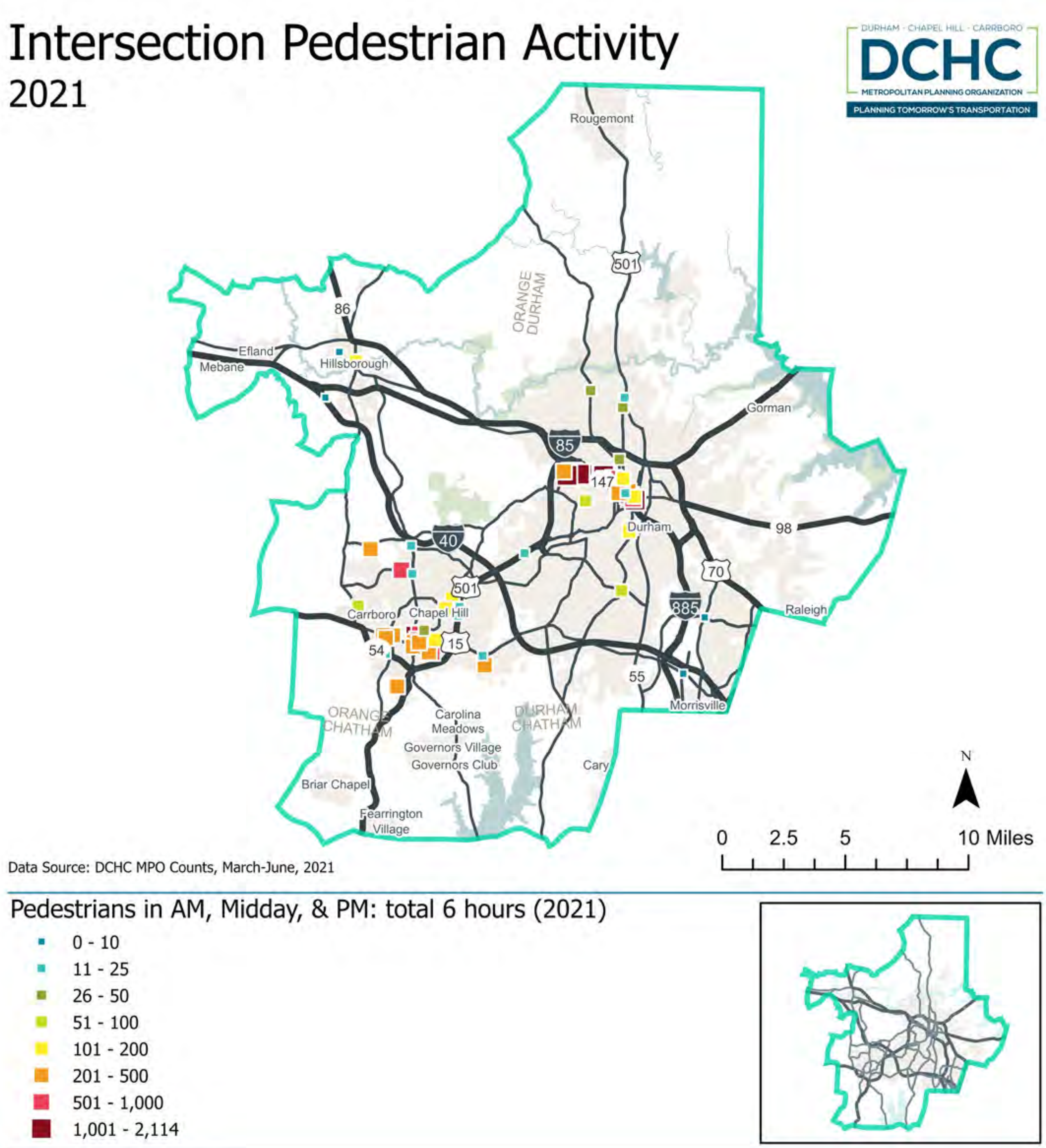


Figure 6-2. Pedestrian Counts at Intersection Count Locations



A total of 36,353 pedestrians were observed at 106 mid-block locations and 57,877 pedestrians were observed at 69 intersections in the DCHC MPO area during a 13-hour time period (6 AM to 7 PM) on average weekdays in 2021. Figure 6-1 and 6-2 show the mid-block and intersection count locations respectively and visualize pedestrian volumes throughout the MPO area. Pedestrian volume can be analyzed by peak periods, which are two-hour spans that tend to be the busiest times in the morning, noon, and evening.

The evening peak period had the highest total volume of pedestrians (7,289 at mid-block and 12,241 at intersection count locations, total 19,530), accounting for 42% of the total pedestrian volume across the region. The noon peak had the second highest (6,512 at mid-block and 10,044 at intersection count locations, total 16,556), making up 36% of the total, and the morning peak period had the lowest total volume of all (3,697 at mid-block and 6,722 at intersection count locations, total 10,419) or 22% of the total count.

Across the region, the average (mean) peak period volume (PPV) pedestrian count at a mid-block count location in 2021 was 35 in the morning peak, 62 in the noon peak, and 69 in the afternoon peak. The average peak period volume (PPV) pedestrian count at an intersection count location in 2021 was 98 in the morning peak, 146 in the noon peak, and 178 in the evening peak. However, there is a high degree of variation in pedestrian activity by subarea and on a station-by-station basis. In the urban centers of Durham and Chapel Hill, these average numbers may be as much as twice as high in each period, especially near the Duke University, UNC Chapel Hill, and North Carolina Central University campuses. Other clusters of pedestrian activity are visible at lower-intensity regional centers such as Southpoint, the Blue Hill District (Eastgate Shopping Center-Village Plaza-Rams Plaza in Chapel Hill), and in smaller historic downtown areas such as Carrboro and Hillsborough.

Table 6-1 and 6-2 below presents the median pedestrian count at mid-block and intersection locations in each subarea of the MPO. The median value is presented in the table since mean averages are sometimes skewed by very small or very large outlier values. The remainder of this chapter presents pedestrian count summaries by subarea for both mid-block and intersection count locations separately. The sub area maps show the count locations and the charts show the pedestrian count by the time of the day.

Table 6-1. Median Pedestrian Count in MPO Mid-Block Locations

	Median AM (2-Hour) PPV	Median Noon (2-Hour) PPV	Median PM (2-Hour) PPV	6-Hour Total Median PPV
North Durham	2	4	5	11
Downtown Durham	27	37	34	95
East Durham	0	0	1	2
Southpoint	3	6	4	23
Hillsborough	1	0	0	2
Carrboro	43	32	68	149
Chapel Hill	35	47	60	149

Table 6-2. Median Pedestrian Count in MPO Intersection Locations

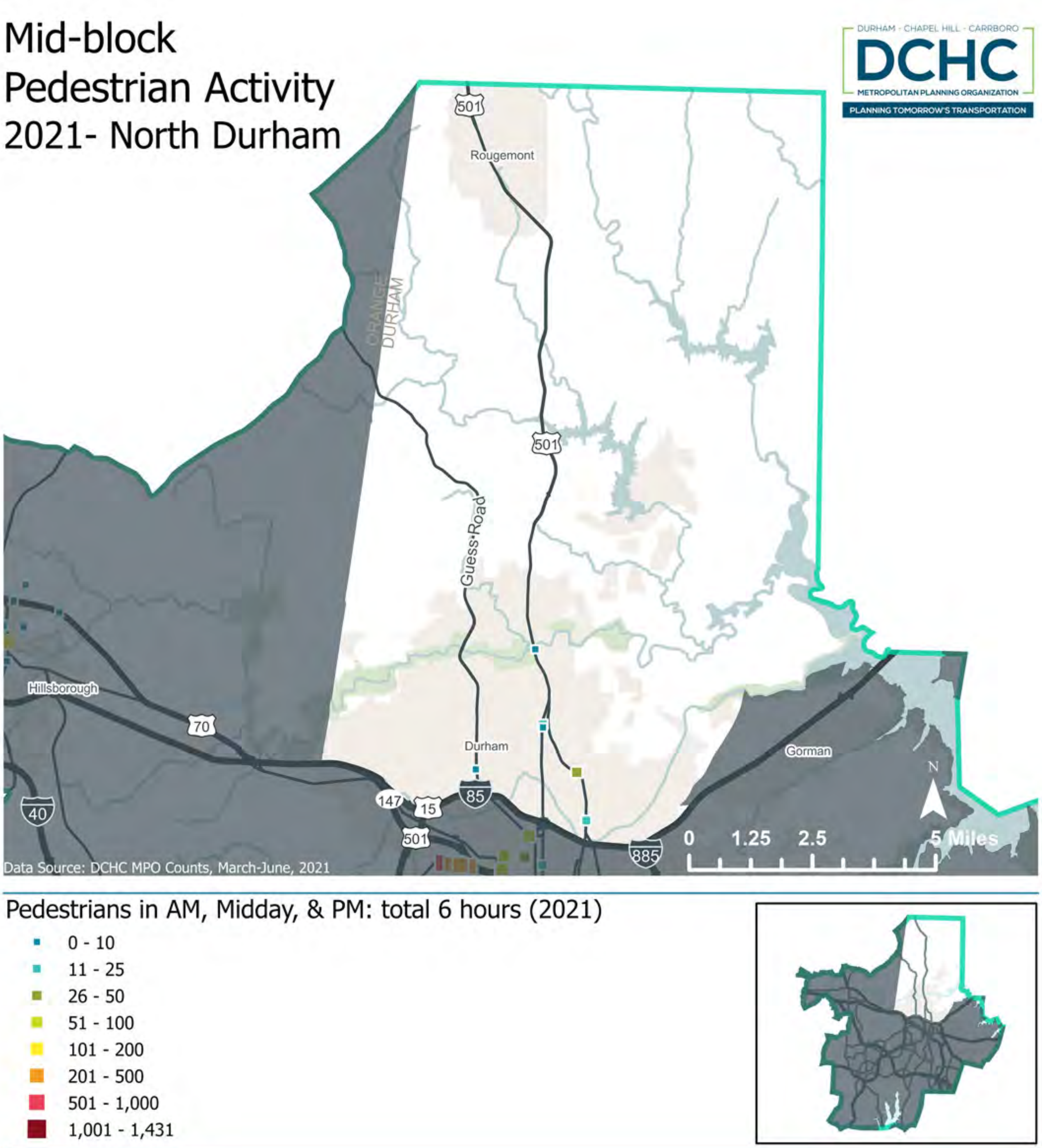
	Median AM (2-Hour) PPV	Median Noon (2-Hour) PPV	Median PM (2-Hour) PPV	6-Hour Total Median PPV
North Durham	3	10	11	29
Downtown Durham	96	119	164	405
East Durham	1	0	0	1
Southpoint	12	7	16	35
Hillsborough	2	2	6	10
Carrboro	77	30	51	157
Chapel Hill	52	94	162	321

RESULTS BY GEOGRAPHIC SUBAREA

NORTH DURHAM

TOTAL PEDESTRIANS COUNTED: 79

Figure 6-3. North Durham Mid-Block Pedestrian Counts

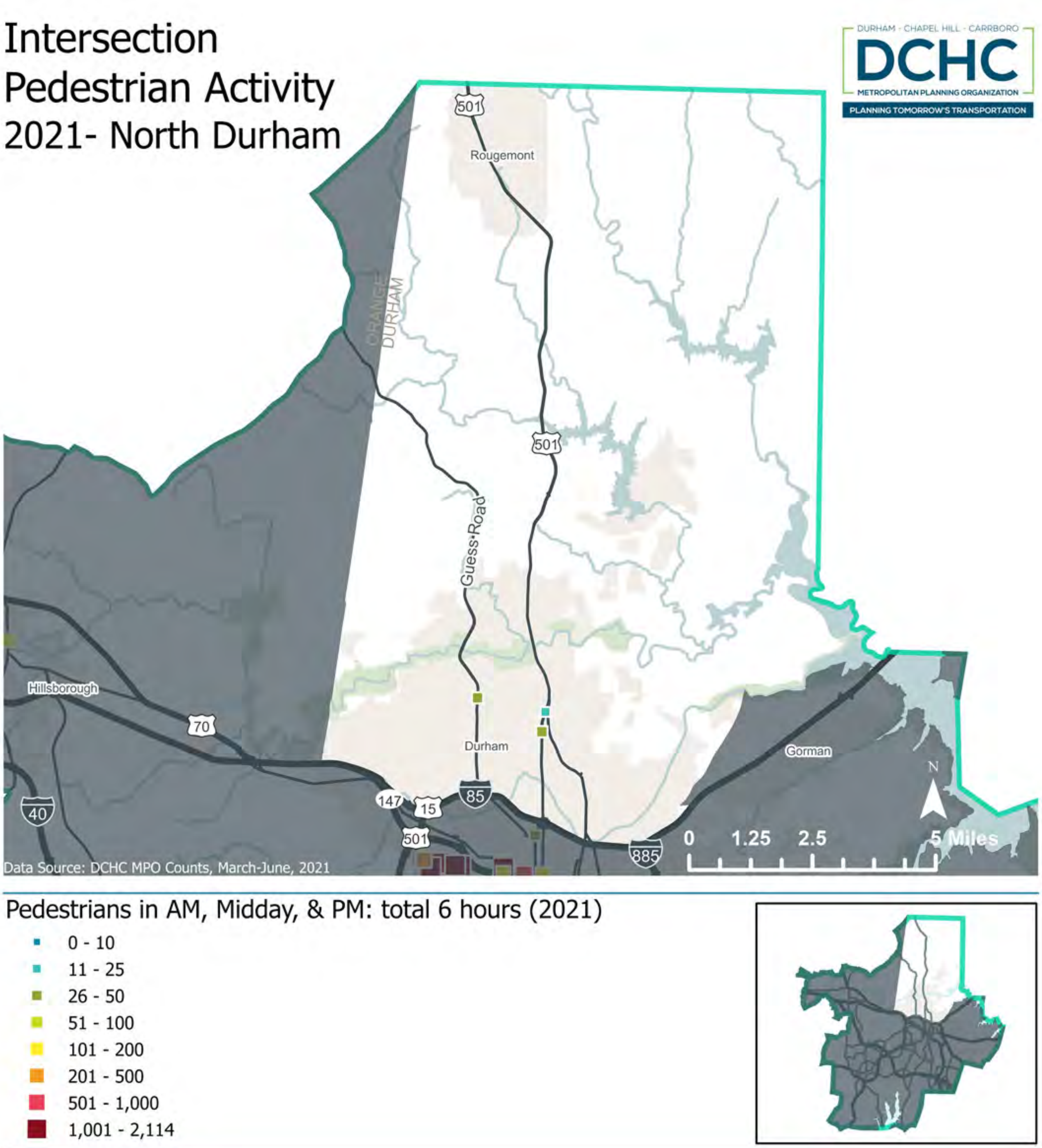


RESULTS BY GEOGRAPHIC SUBAREA

NORTH DURHAM

TOTAL PEDESTRIANS COUNTED: 82

Figure 6-4. North Durham Intersection Pedestrian Counts



RESULTS BY GEOGRAPHIC SUBAREA

NORTH DURHAM

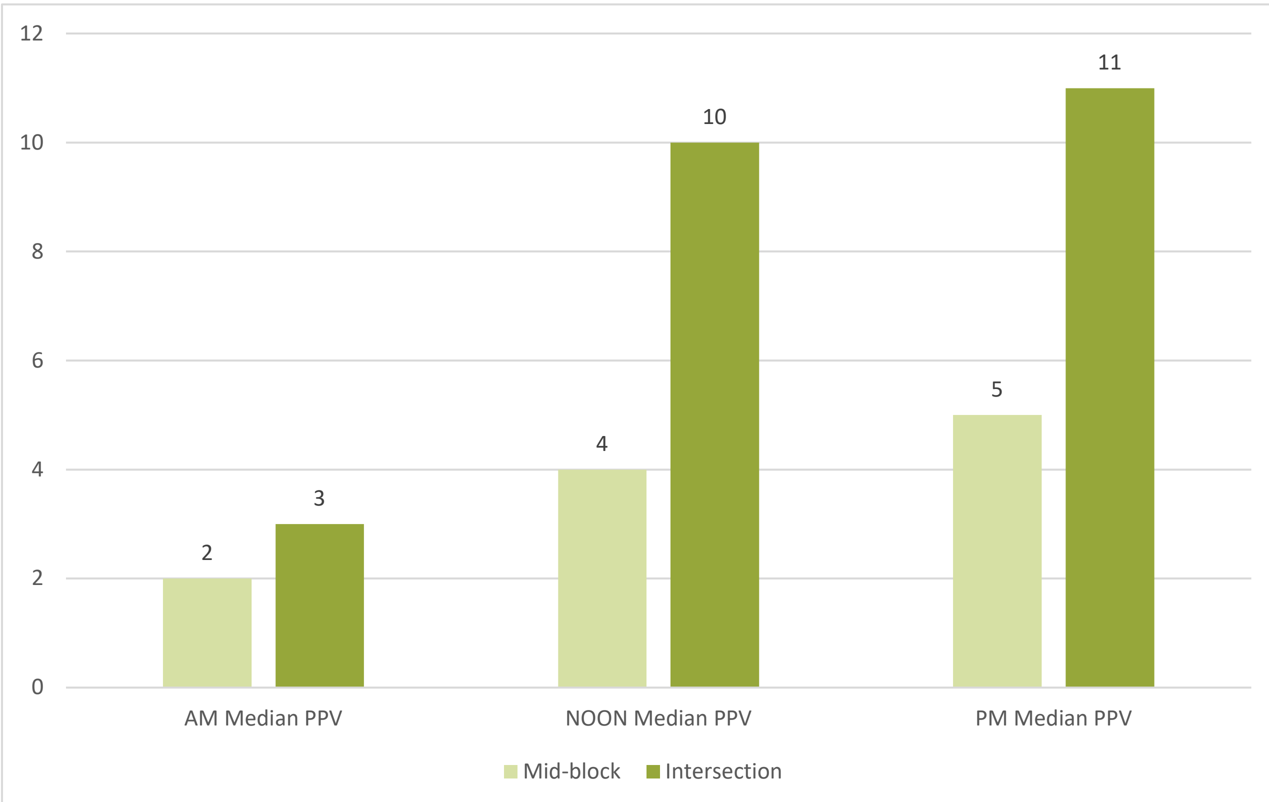
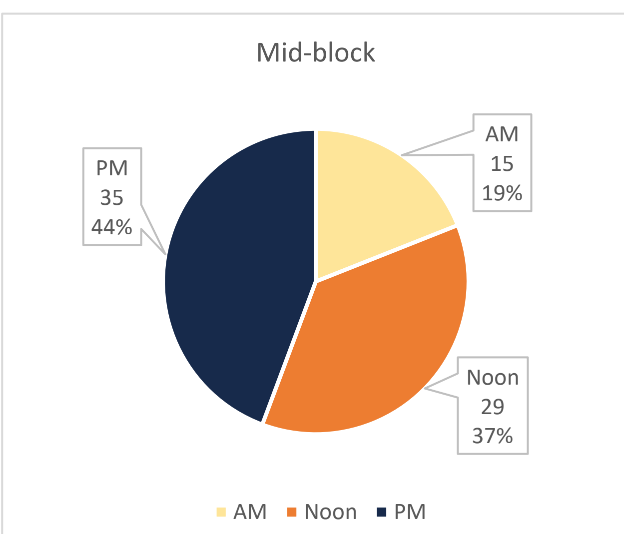
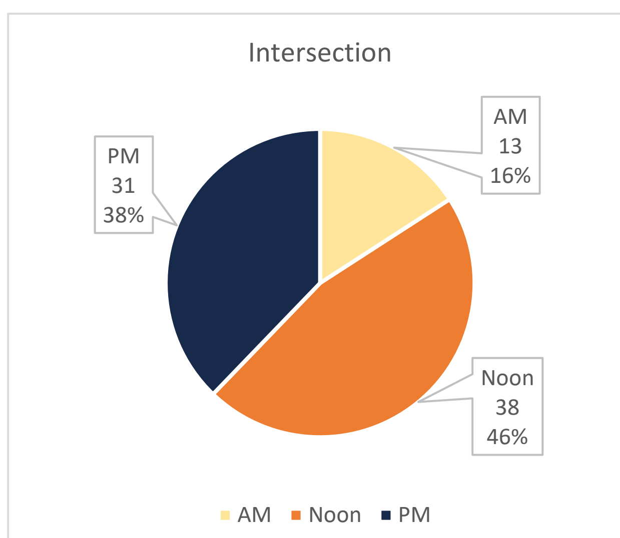


Figure 6-5. Pedestrians by Time of Day, 2021
Top bar chart shows 'median' peak period volume(PPV)
Bottom pie chart shows 'total' peak period pedestrians



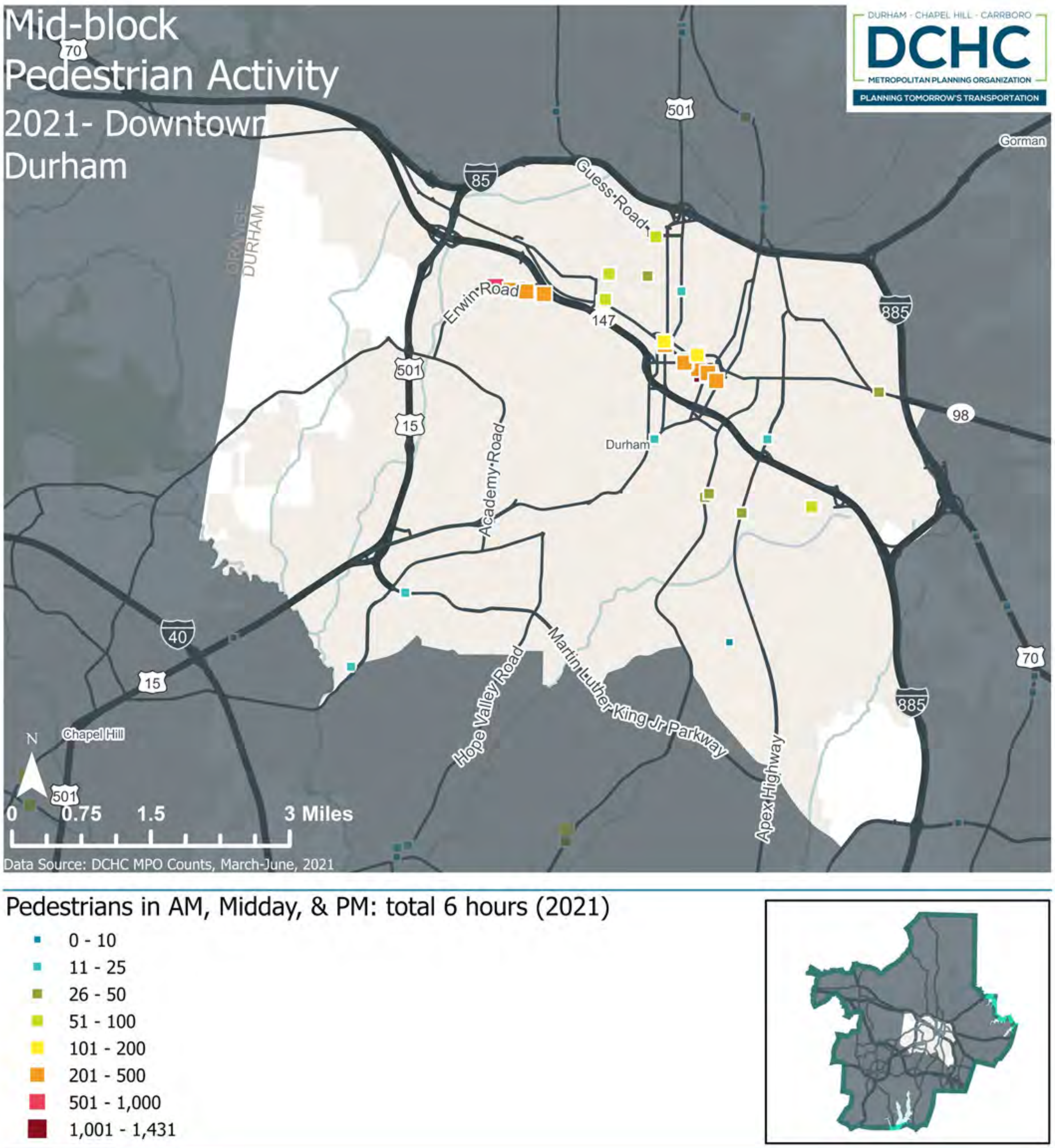


RESULTS BY GEOGRAPHIC SUBAREA

DOWNTOWN DURHAM

TOTAL PEDESTRIANS COUNTED: 7,312

Figure 6-6. Downtown Durham Mid-Block Pedestrian Counts

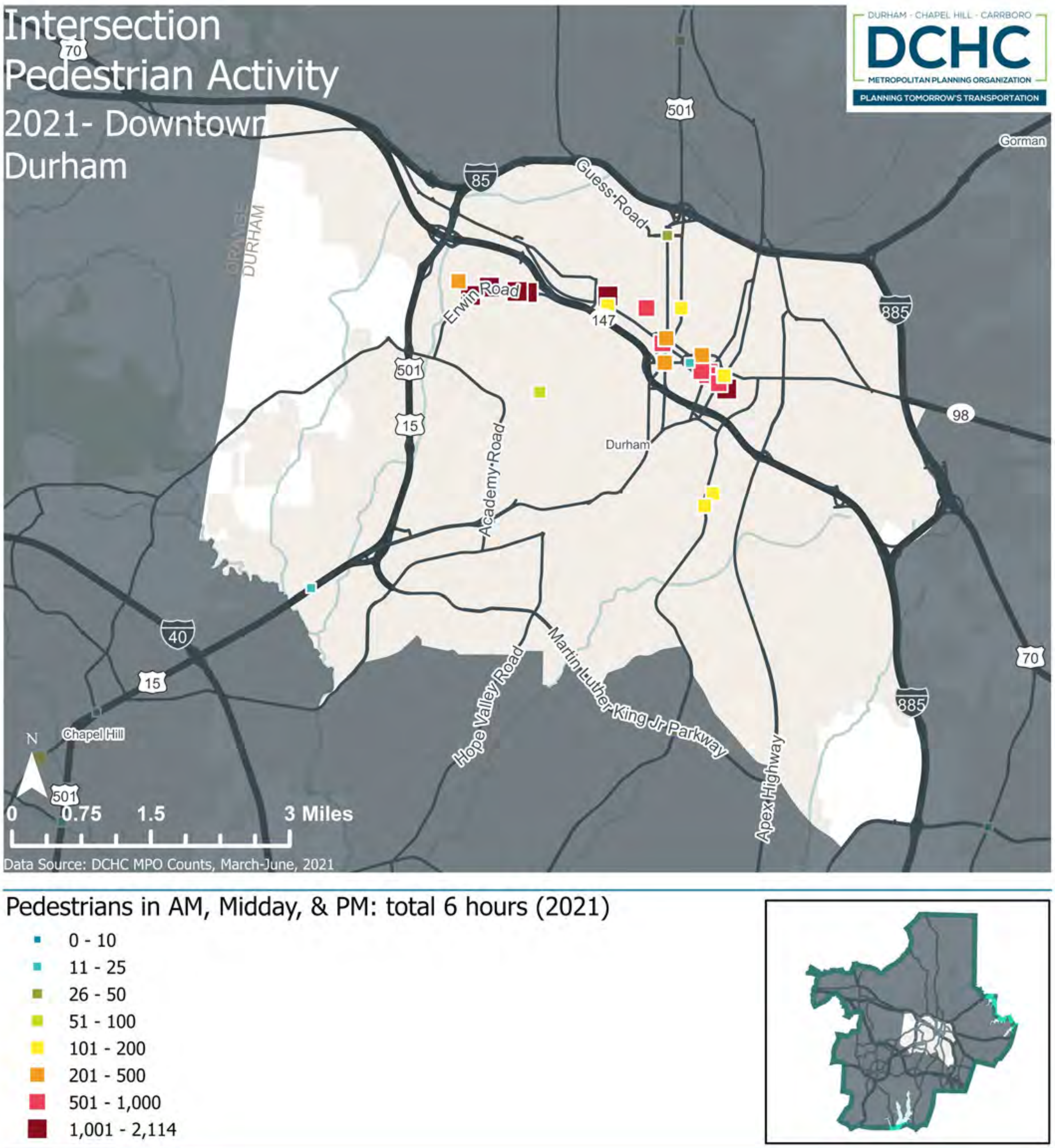


RESULTS BY GEOGRAPHIC SUBAREA

DOWNTOWN DURHAM

TOTAL PEDESTRIANS COUNTED: 15,554

Figure 6-7. Downtown Durham Intersection Pedestrian Counts



RESULTS BY GEOGRAPHIC SUBAREA

DOWNTOWN DURHAM

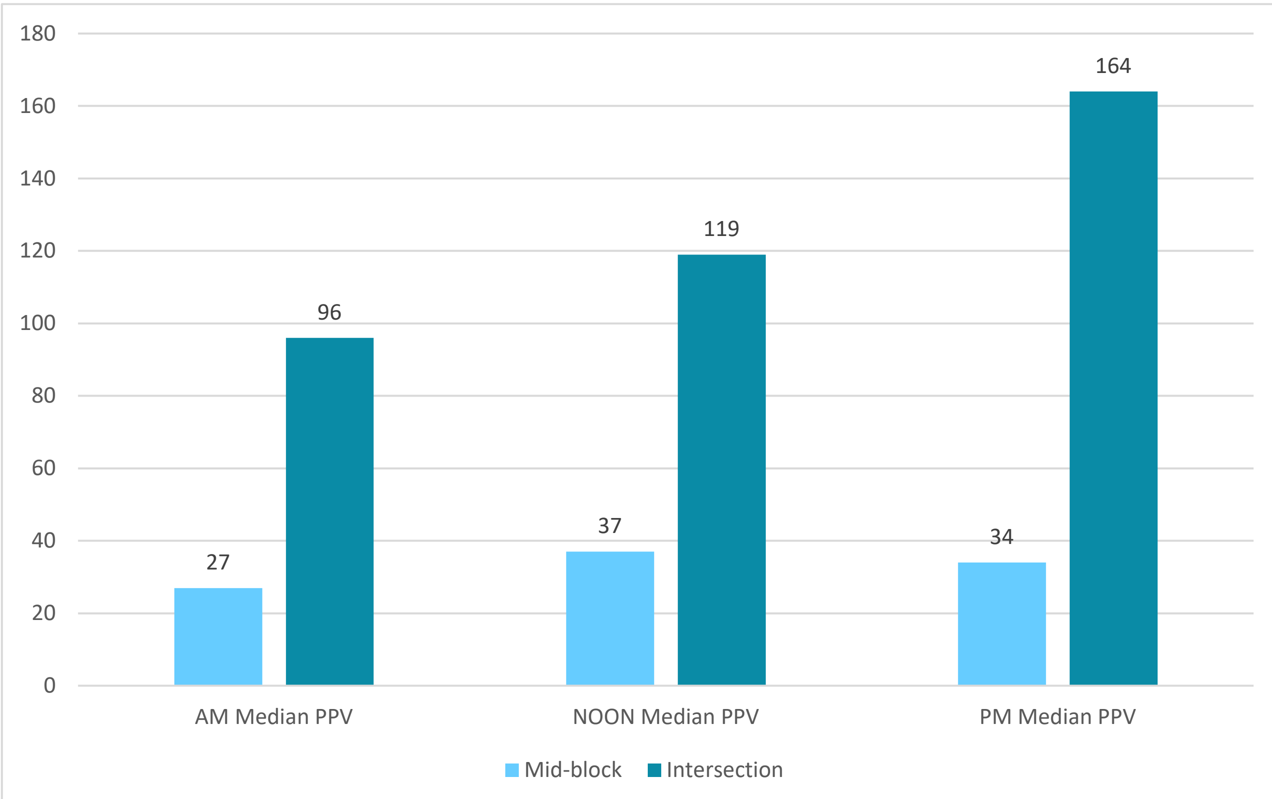
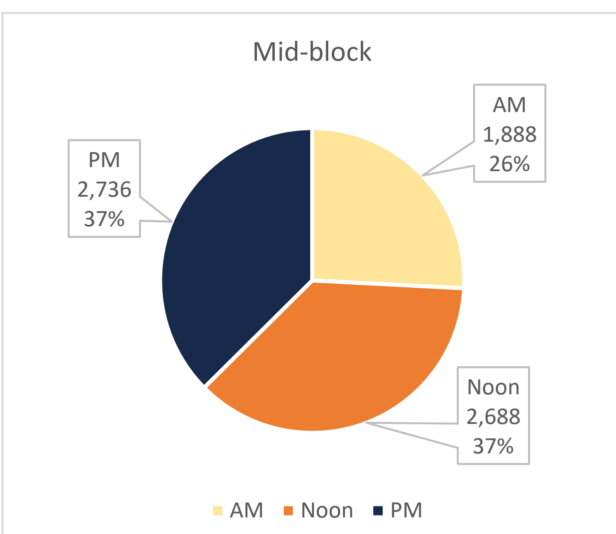
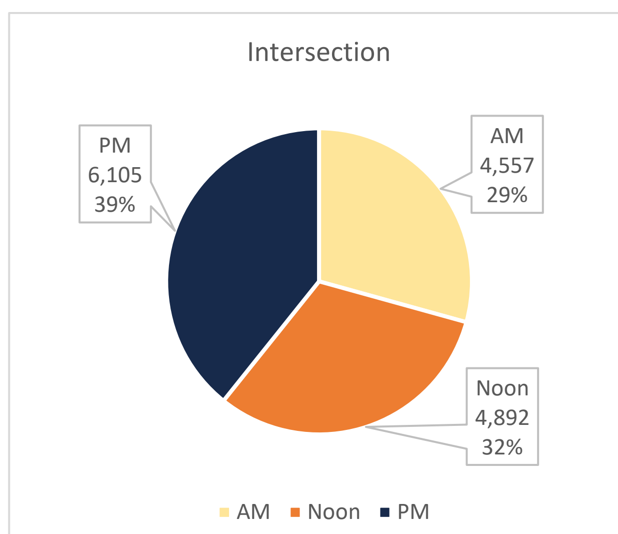


Figure 6-8. Pedestrians by Time of Day, 2021
Top bar chart shows 'median' peak period volume(PPV)
Bottom pie chart shows 'total' peak period pedestrians



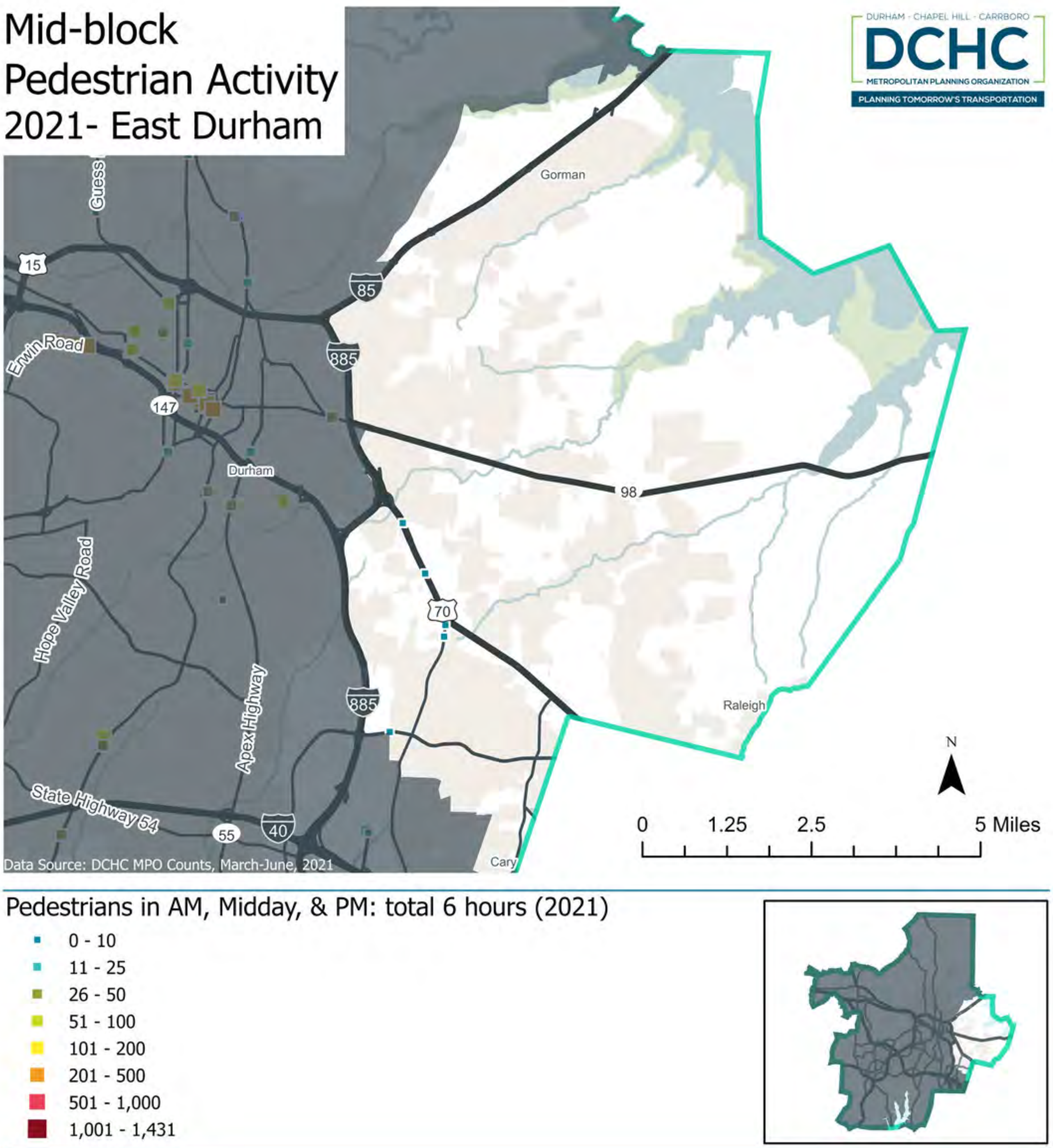


RESULTS BY GEOGRAPHIC SUBAREA

EAST DURHAM

TOTAL PEDESTRIANS COUNTED: 10

Figure 6-9. East Durham Mid-Block Pedestrian Counts

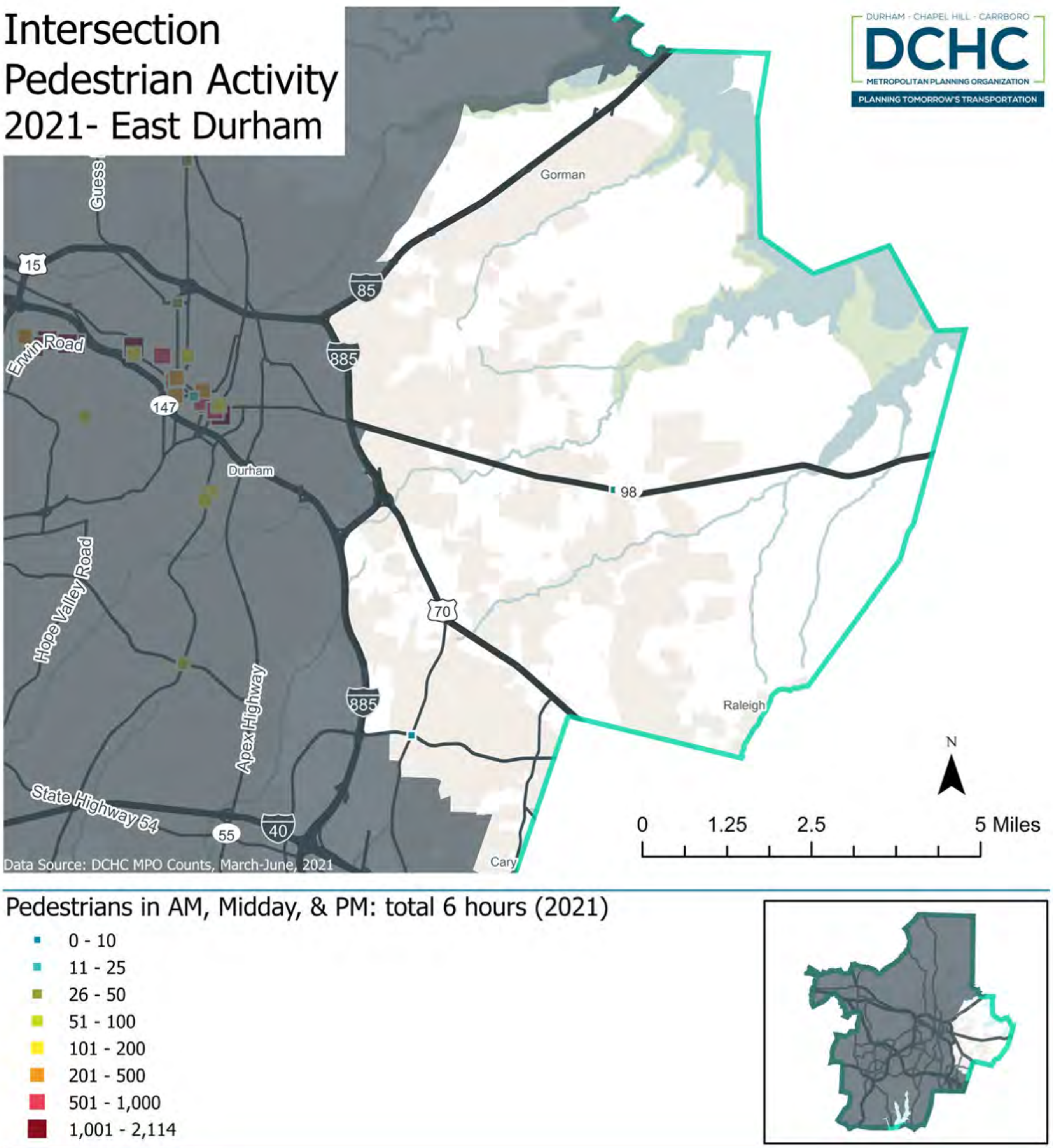


RESULTS BY GEOGRAPHIC SUBAREA

EAST DURHAM

TOTAL PEDESTRIANS COUNTED: 1

Figure 6-10. East Durham Intersection Pedestrian Counts



RESULTS BY GEOGRAPHIC SUBAREA

EAST DURHAM

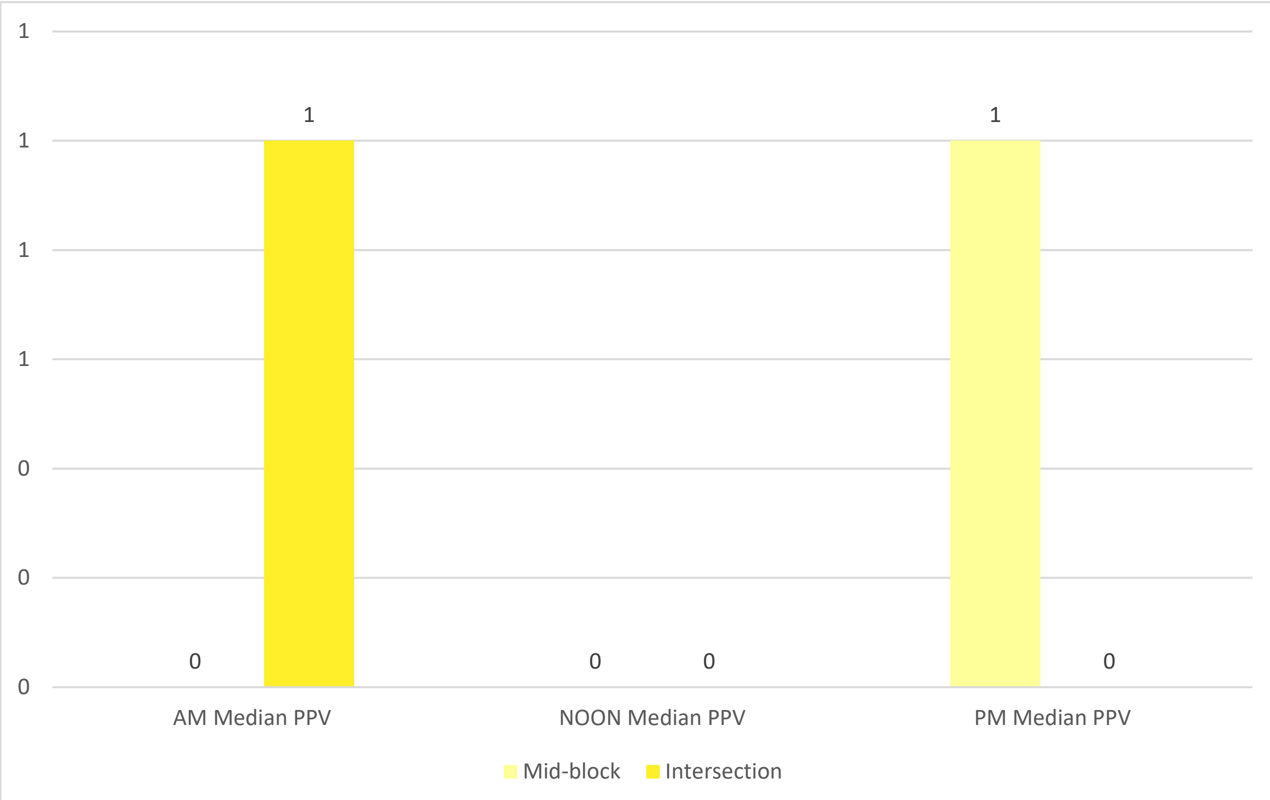
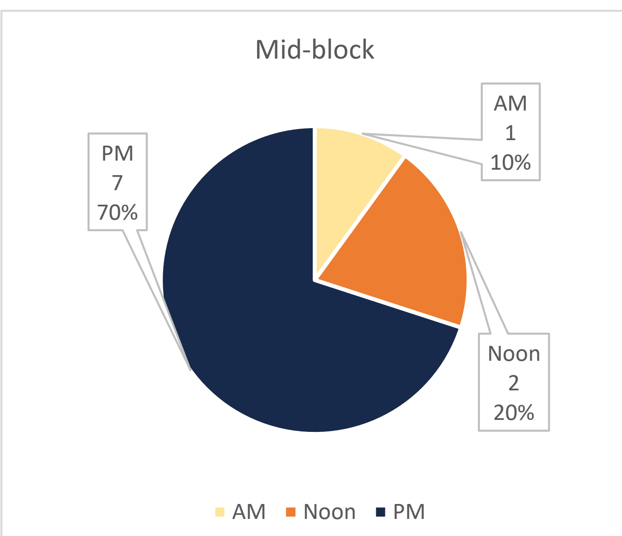
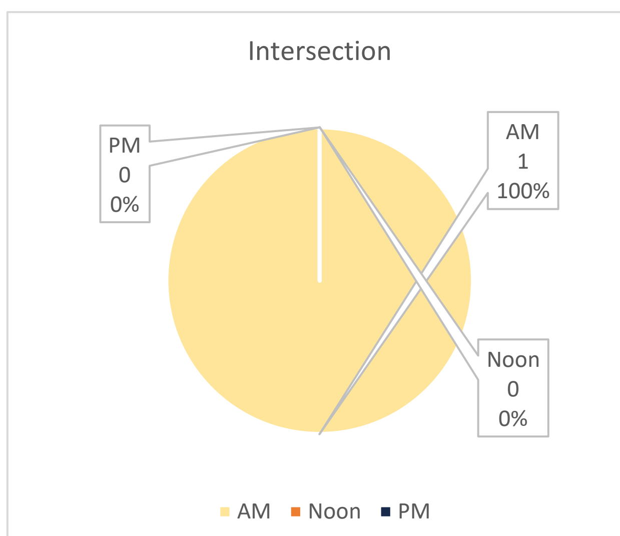


Figure 6-11. Pedestrians by Time of Day, 2021
Top bar chart shows 'median' peak period volume(PPV)
Bottom pie chart shows 'total' peak period pedestrians



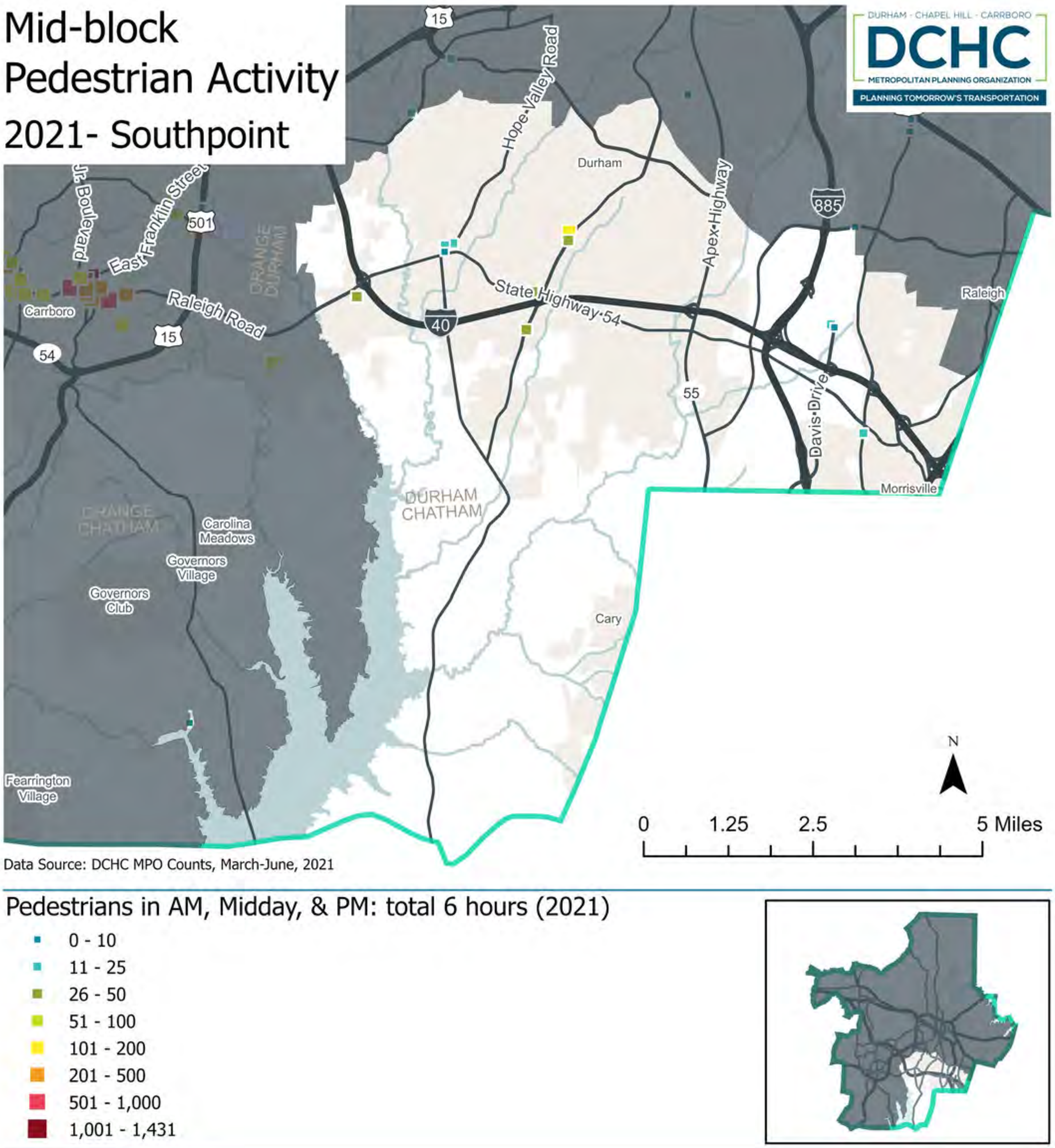


RESULTS BY GEOGRAPHIC SUBAREA

SOUTHPOINT

TOTAL PEDESTRIANS COUNTED: 330

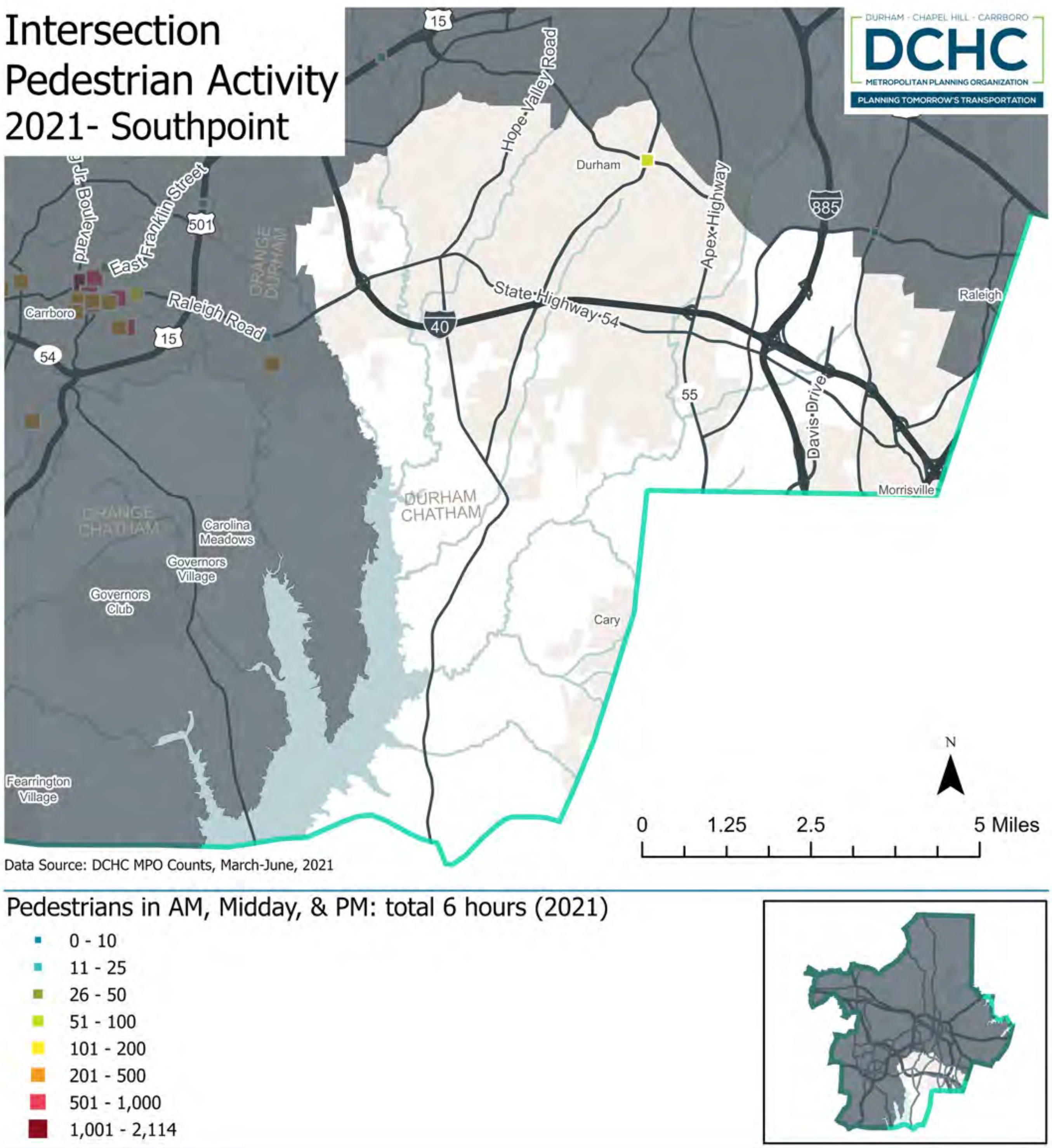
Figure 6-12. Southpoint Mid-Block Pedestrian Counts



SOUTHPOINT

TOTAL PEDESTRIANS COUNTED: 70

Figure 6-13. Southpoint Intersection Pedestrian Counts



RESULTS BY GEOGRAPHIC SUBAREA

SOUTHPOINT

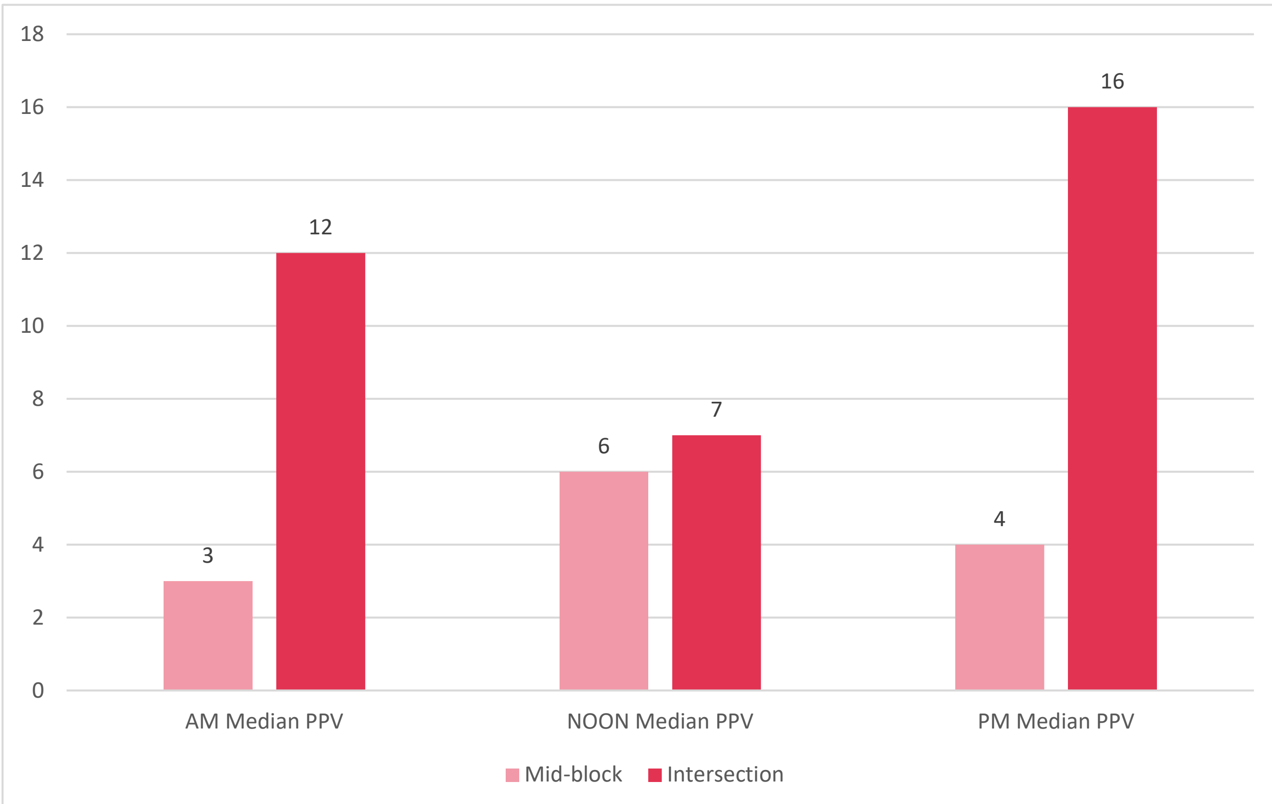
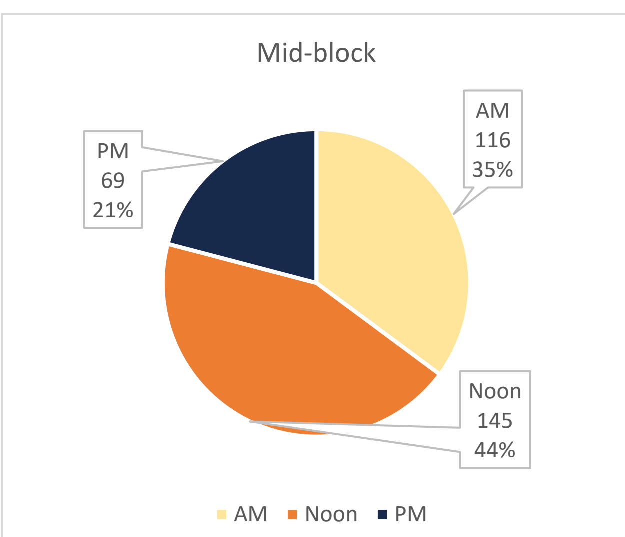
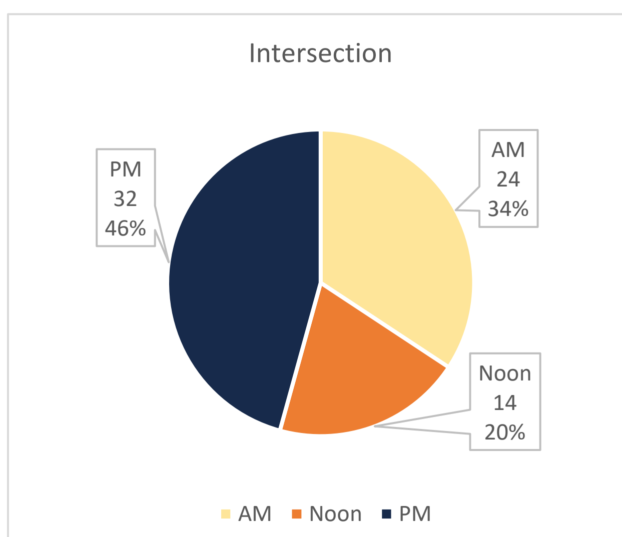


Figure 6-14. Pedestrians by Time of Day, 2021
Top bar chart shows 'median' peak period volume(PPV)
Bottom pie chart shows 'total' peak period pedestrians



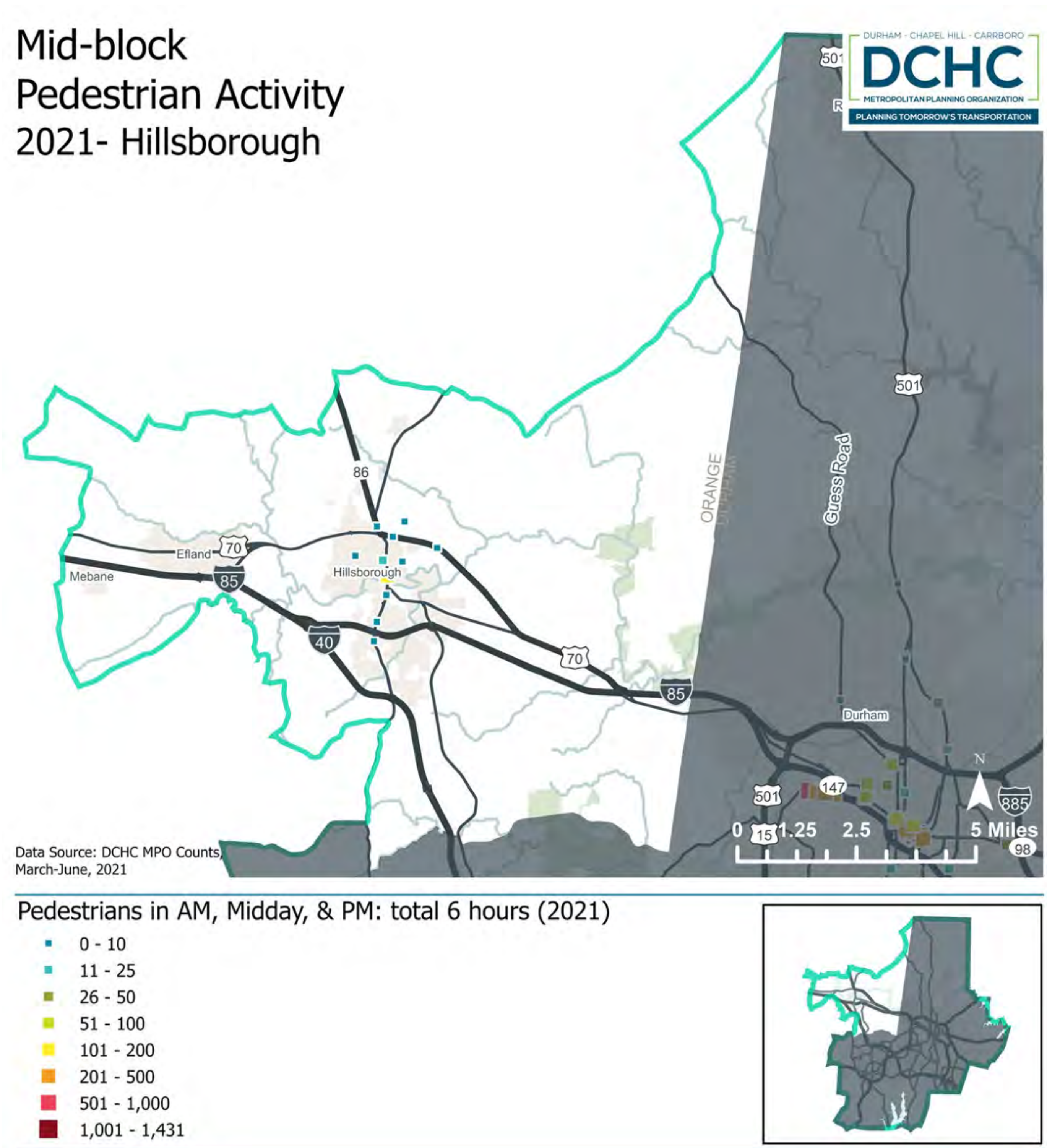


RESULTS BY GEOGRAPHIC SUBAREA

HILLSBOROUGH

TOTAL PEDESTRIANS COUNTED: 181

Figure 6-15. Hillsborough Mid-Block Pedestrian Counts

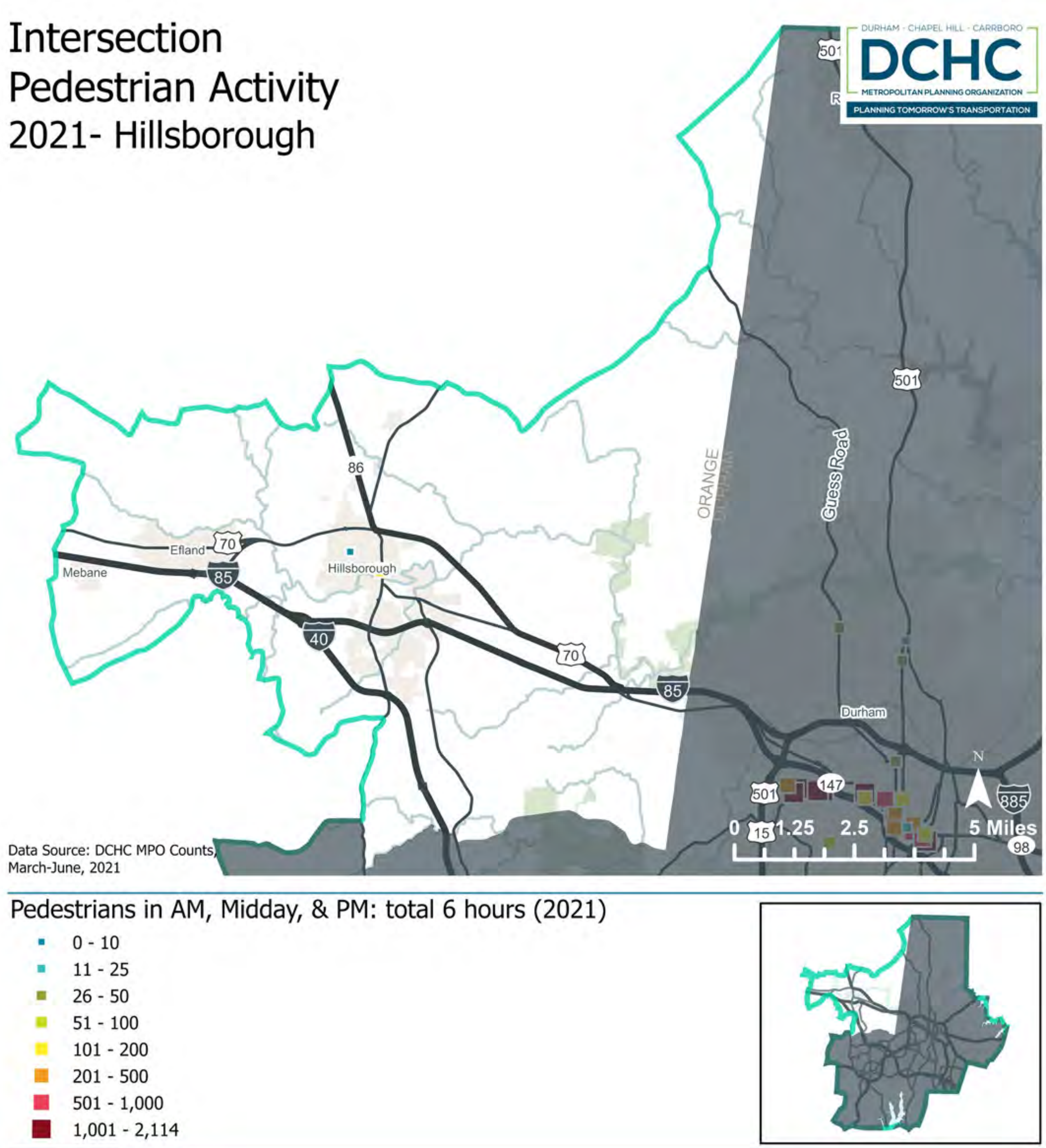


RESULTS BY GEOGRAPHIC SUBAREA

HILLSBOROUGH

TOTAL PEDESTRIANS COUNTED: 144

Figure 6-16. Hillsborough Intersection Pedestrian Counts



RESULTS BY GEOGRAPHIC SUBAREA

HILLSBOROUGH

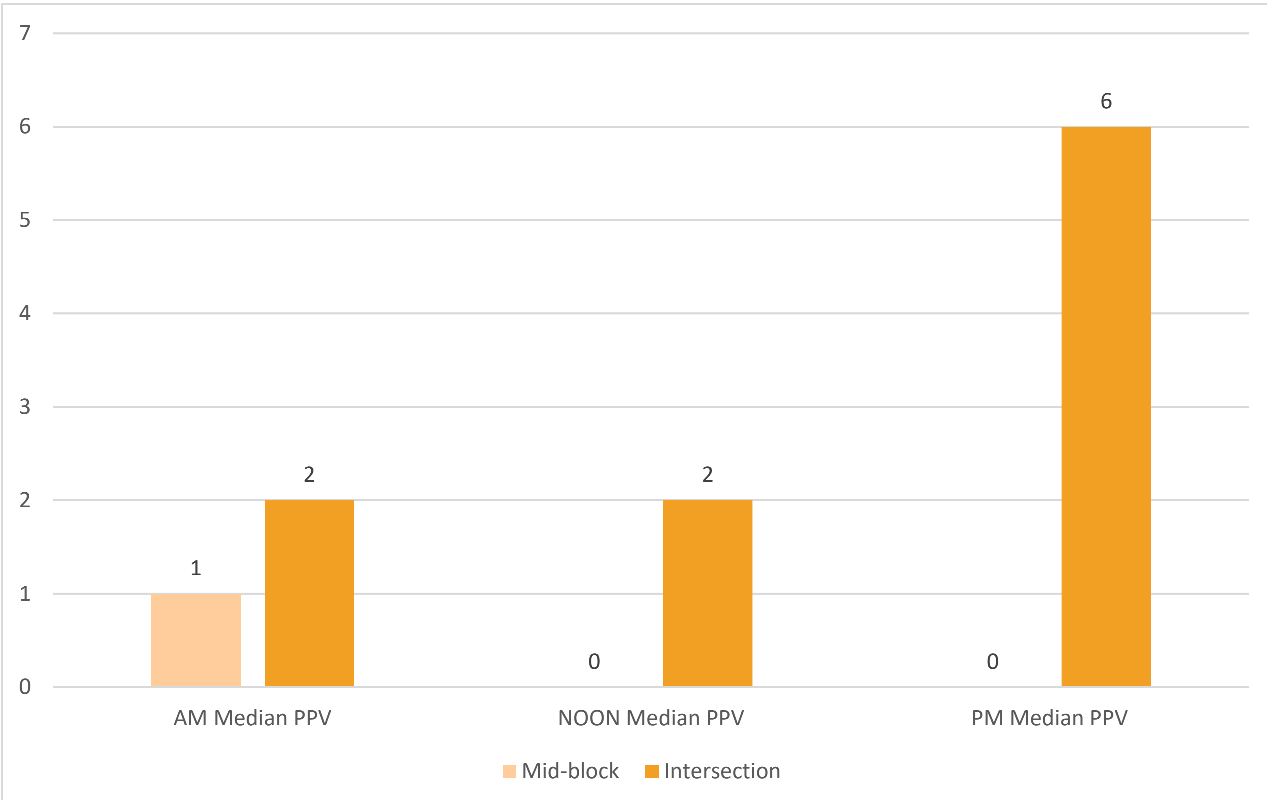
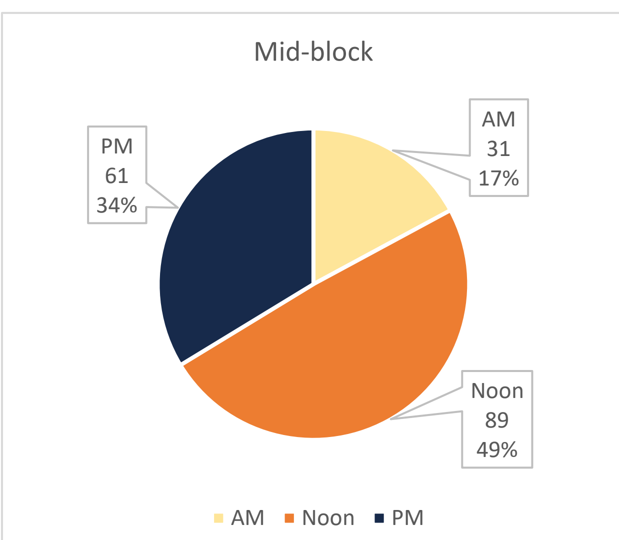
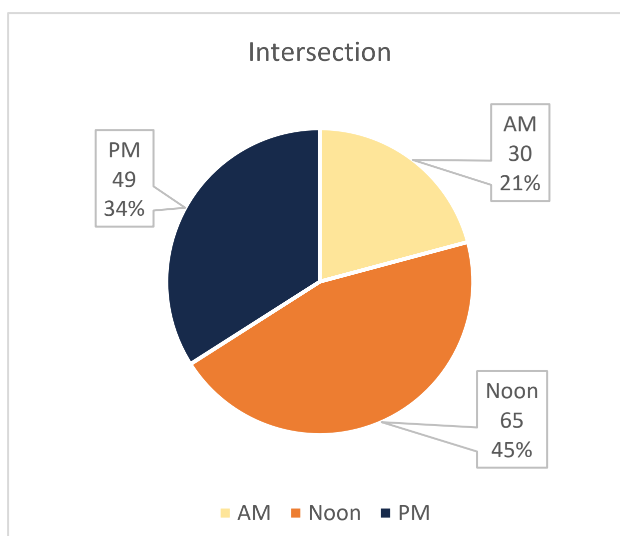


Figure 6-17. Pedestrians by Time of Day, 2021
Top bar chart shows 'median' peak period volume(PPV)
Bottom pie chart shows 'total' peak period pedestrians



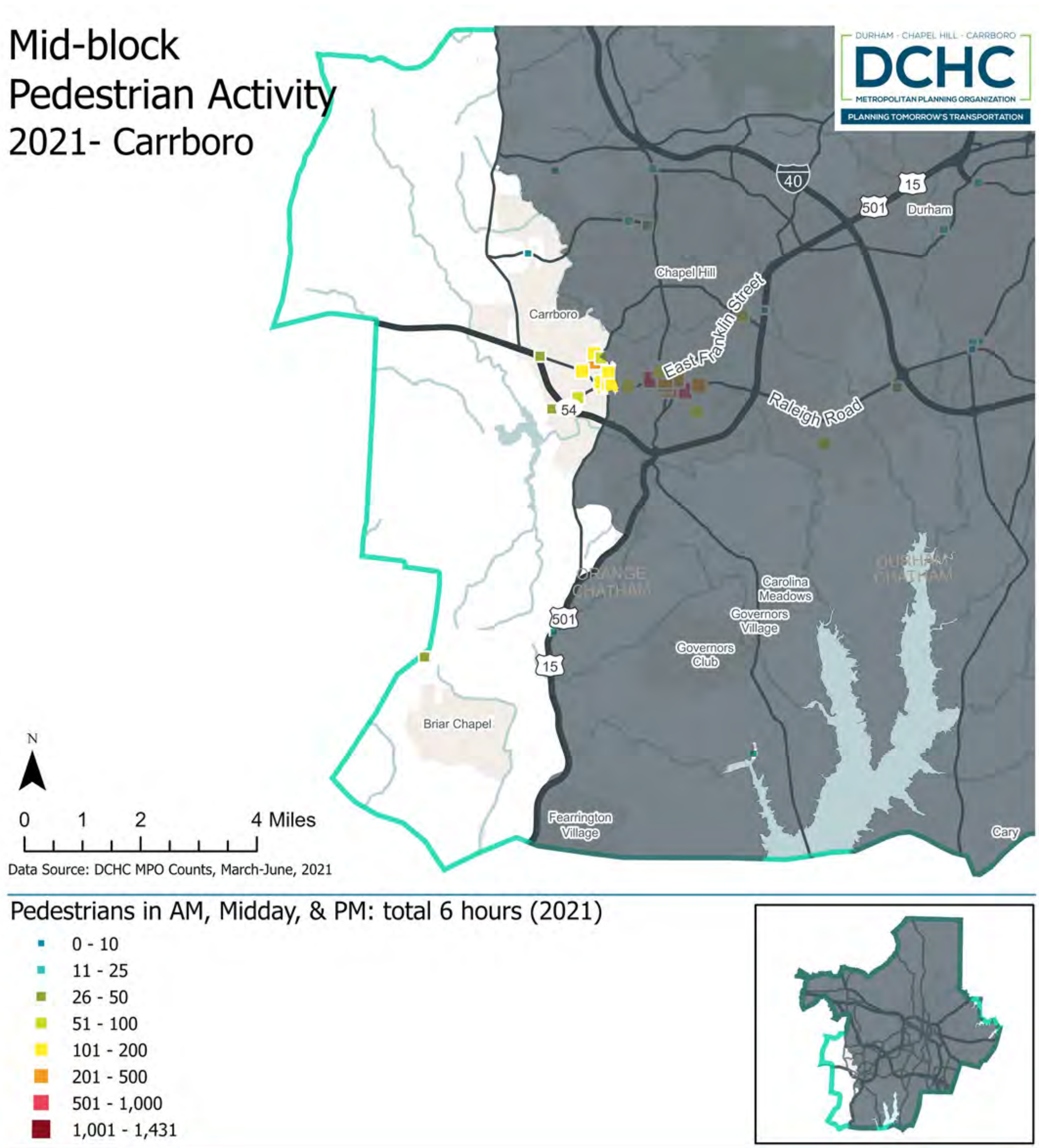


RESULTS BY GEOGRAPHIC SUBAREA

CARRBORO

TOTAL PEDESTRIANS COUNTED: 1,890

Figure 6-18. Carrboro Mid-Block Pedestrian Counts

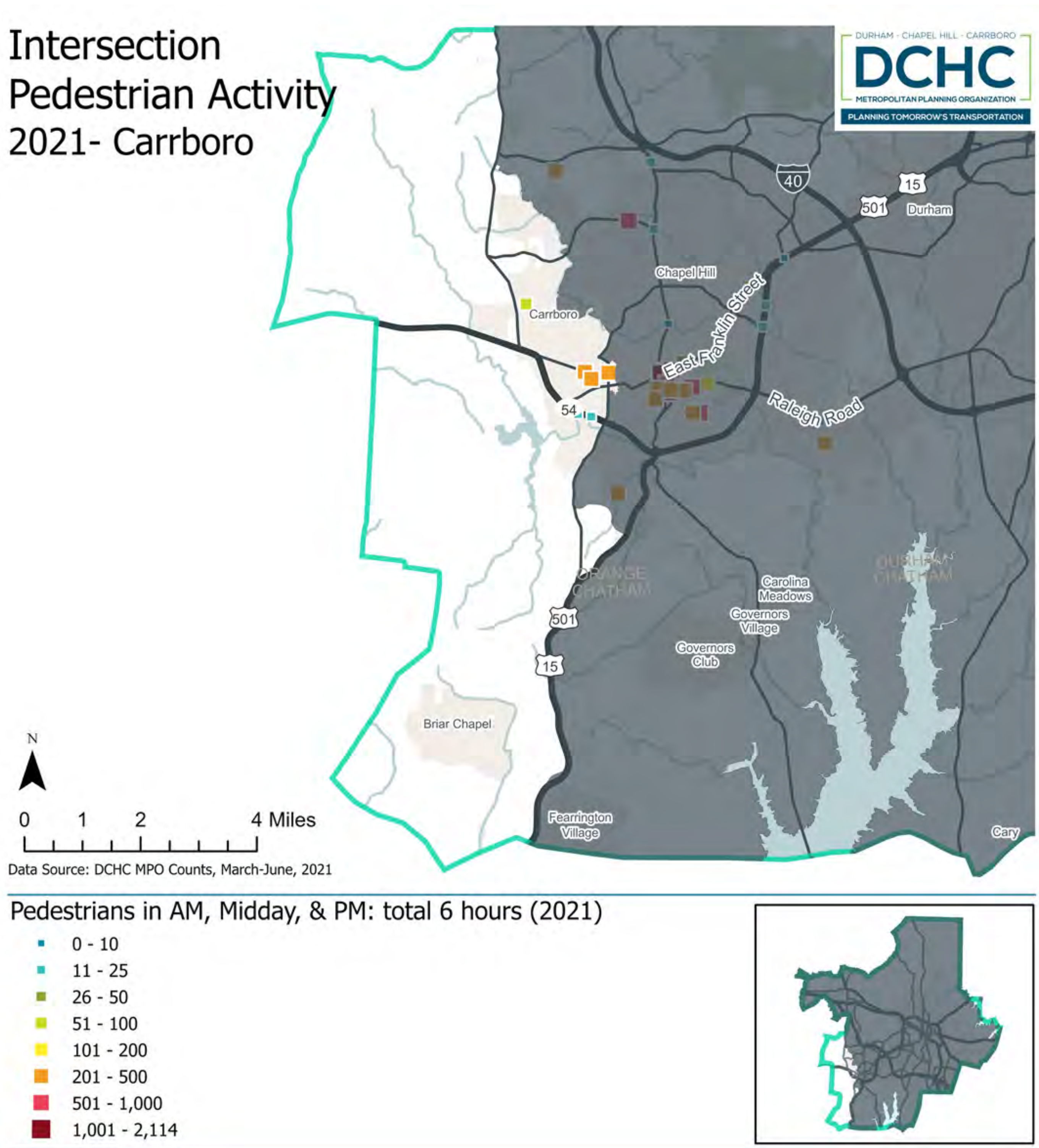


RESULTS BY GEOGRAPHIC SUBAREA

CARRBORO

TOTAL PEDESTRIANS COUNTED: 1,093

Figure 6-19. Carrboro Intersection Pedestrian Counts



RESULTS BY GEOGRAPHIC SUBAREA

CARRBORO

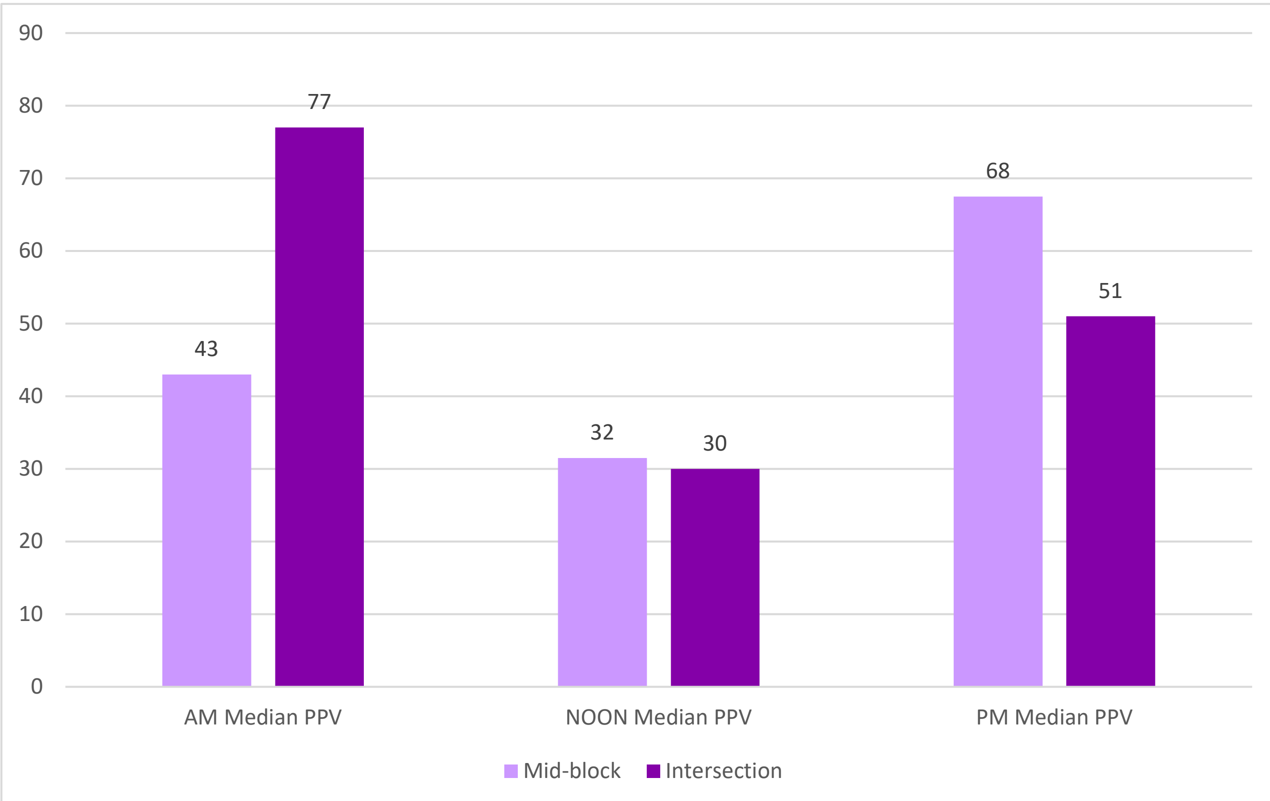
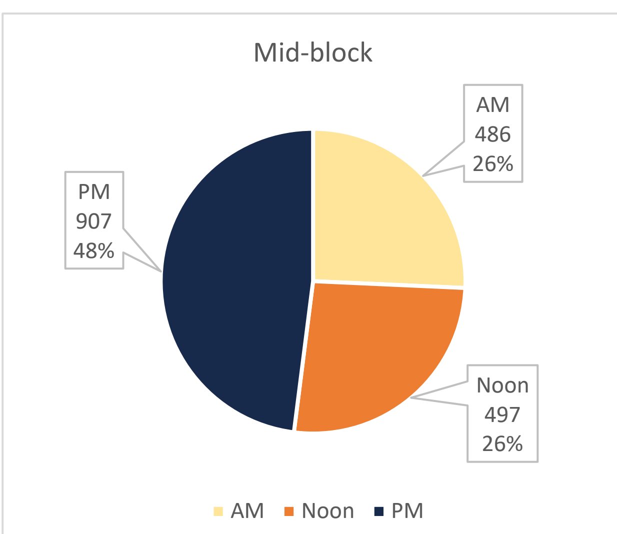
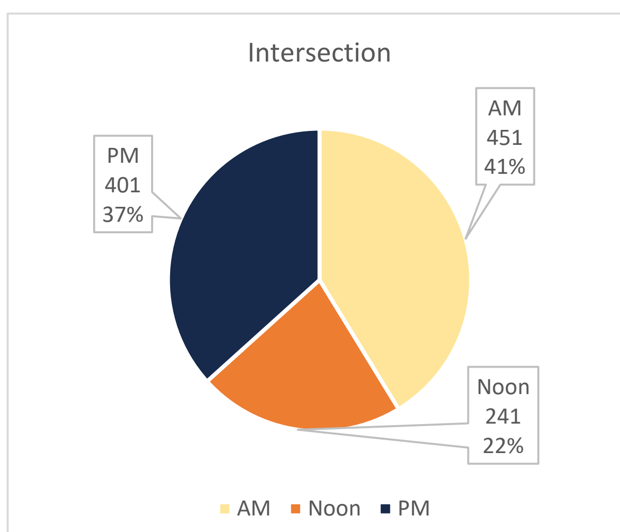


Figure 6-20. Pedestrians by Time of Day, 2021
Top bar chart shows 'median' peak period volume(PPV)
Bottom pie chart shows 'total' peak period pedestrians



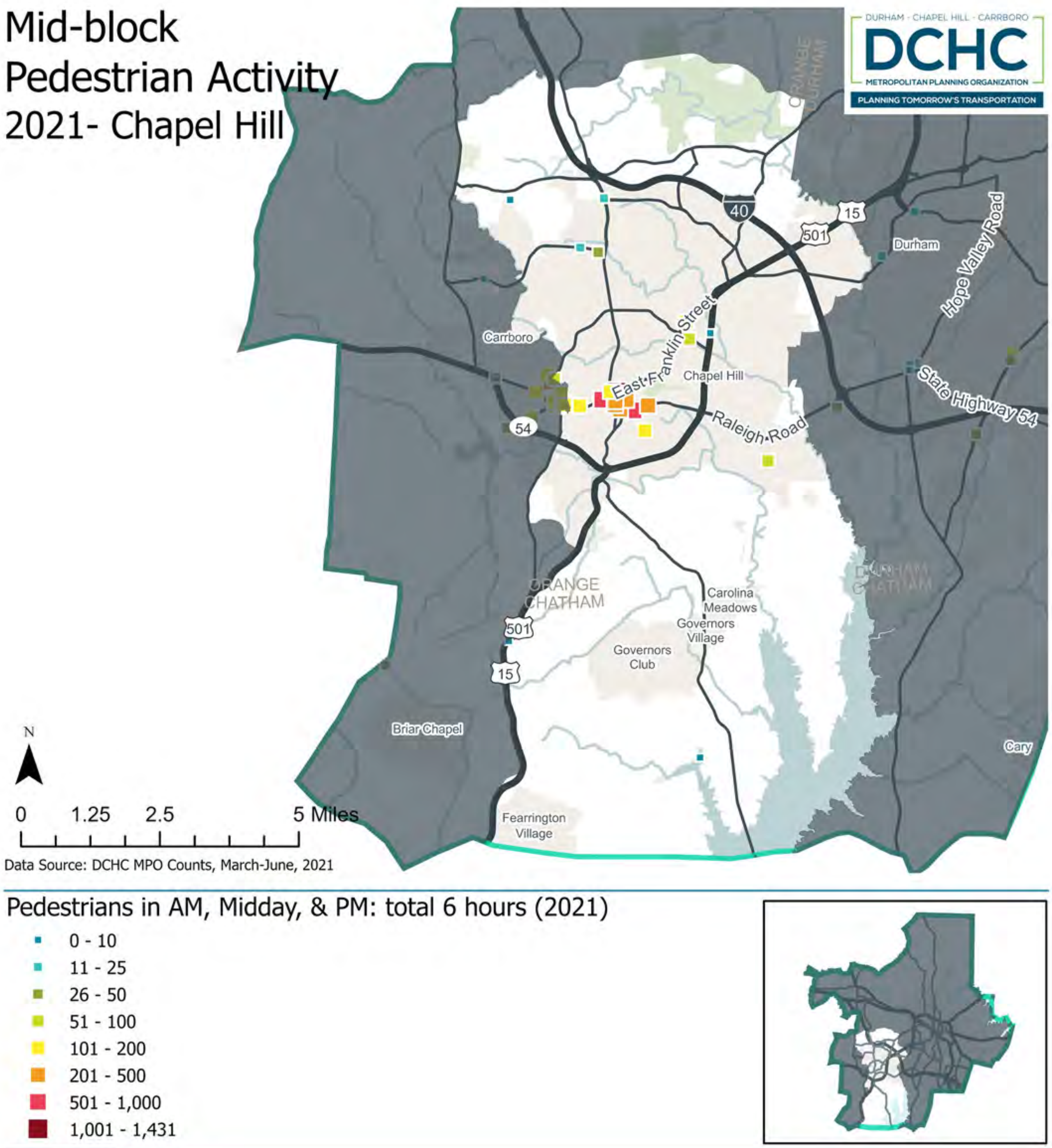


RESULTS BY GEOGRAPHIC SUBAREA

CHAPEL HILL

TOTAL PEDESTRIANS COUNTED: 7,696

Figure 6-21. Chapel Hill Mid-Block Pedestrian Counts

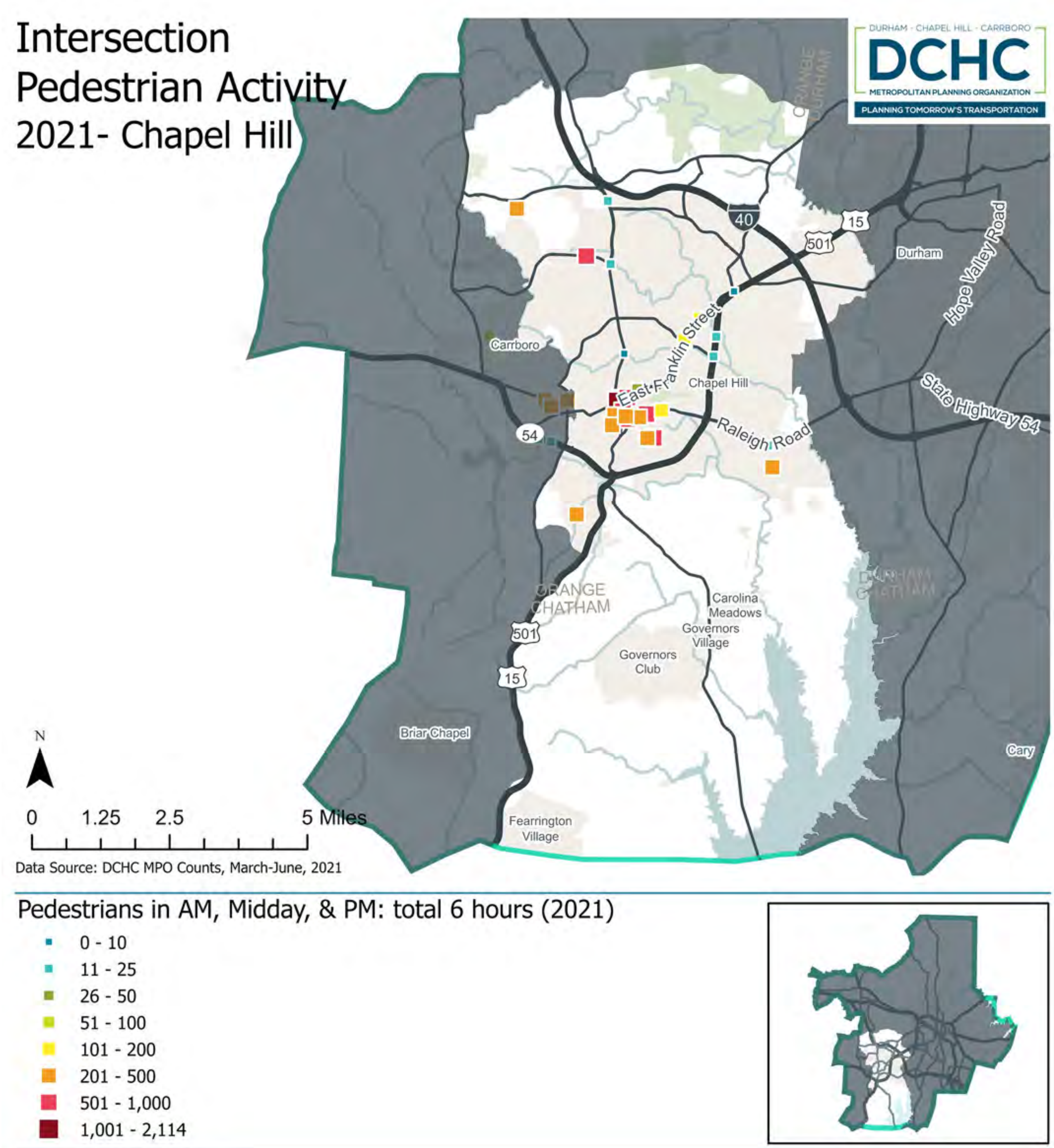


RESULTS BY GEOGRAPHIC SUBAREA

CHAPEL HILL

TOTAL PEDESTRIANS COUNTED: 12,063

Figure 6-22. Chapel Hill Intersection Pedestrian Counts



RESULTS BY GEOGRAPHIC SUBAREA

CHAPEL HILL

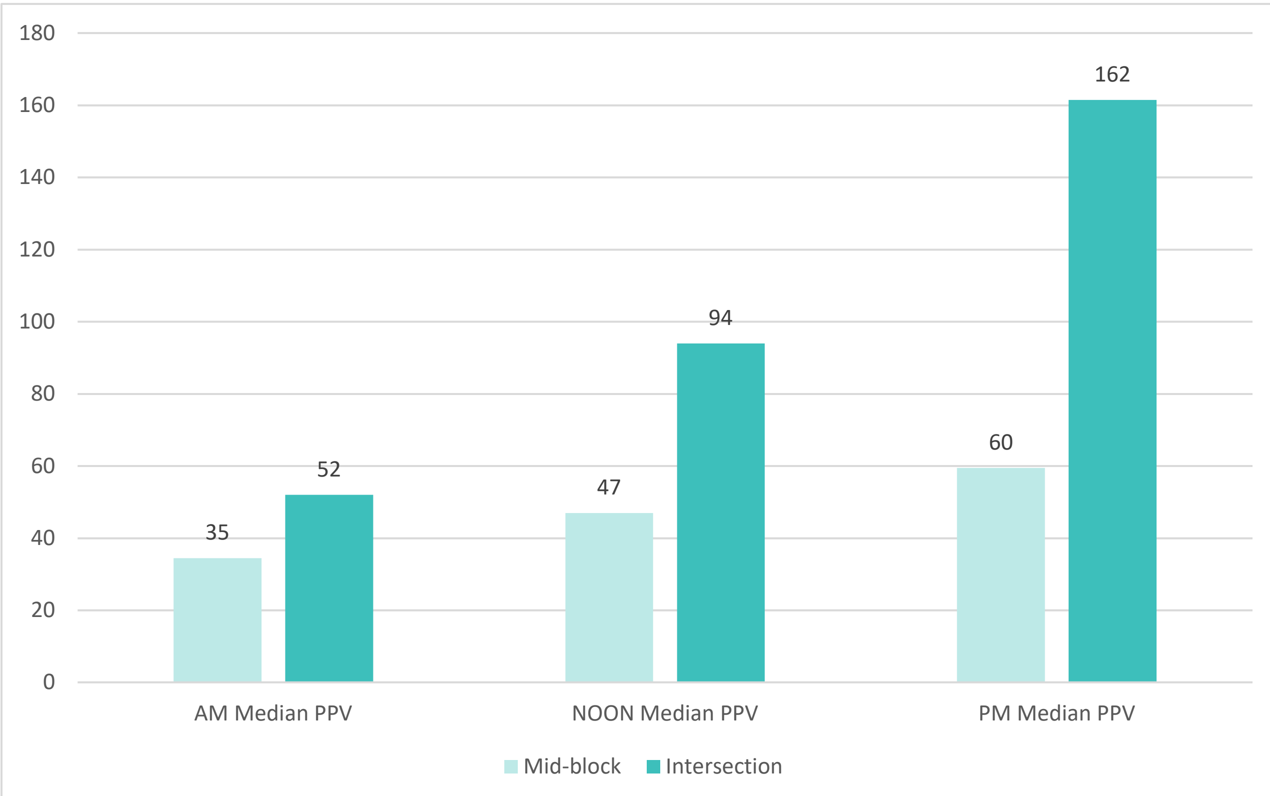
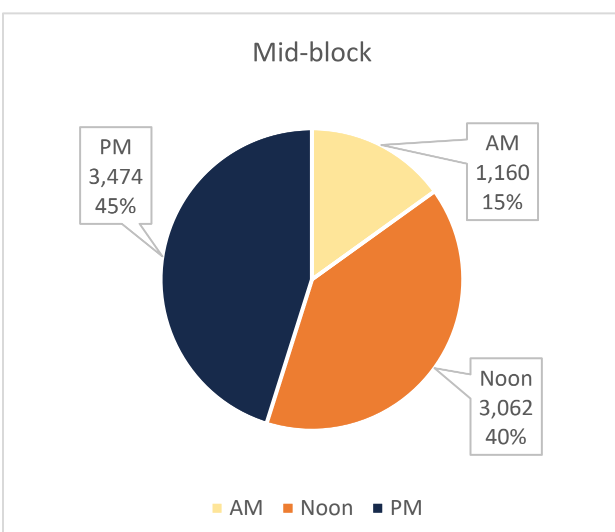
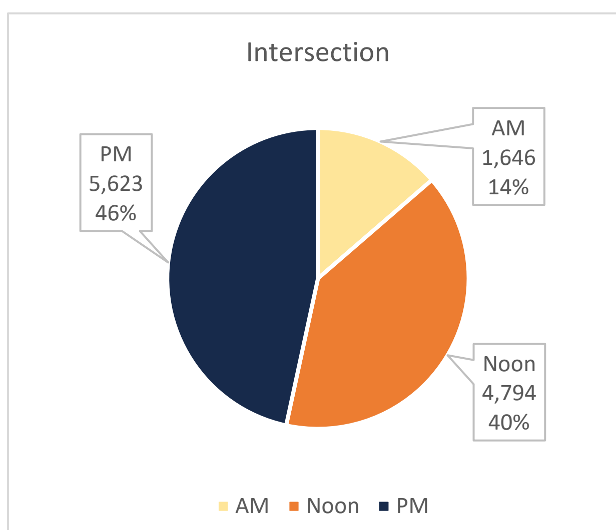


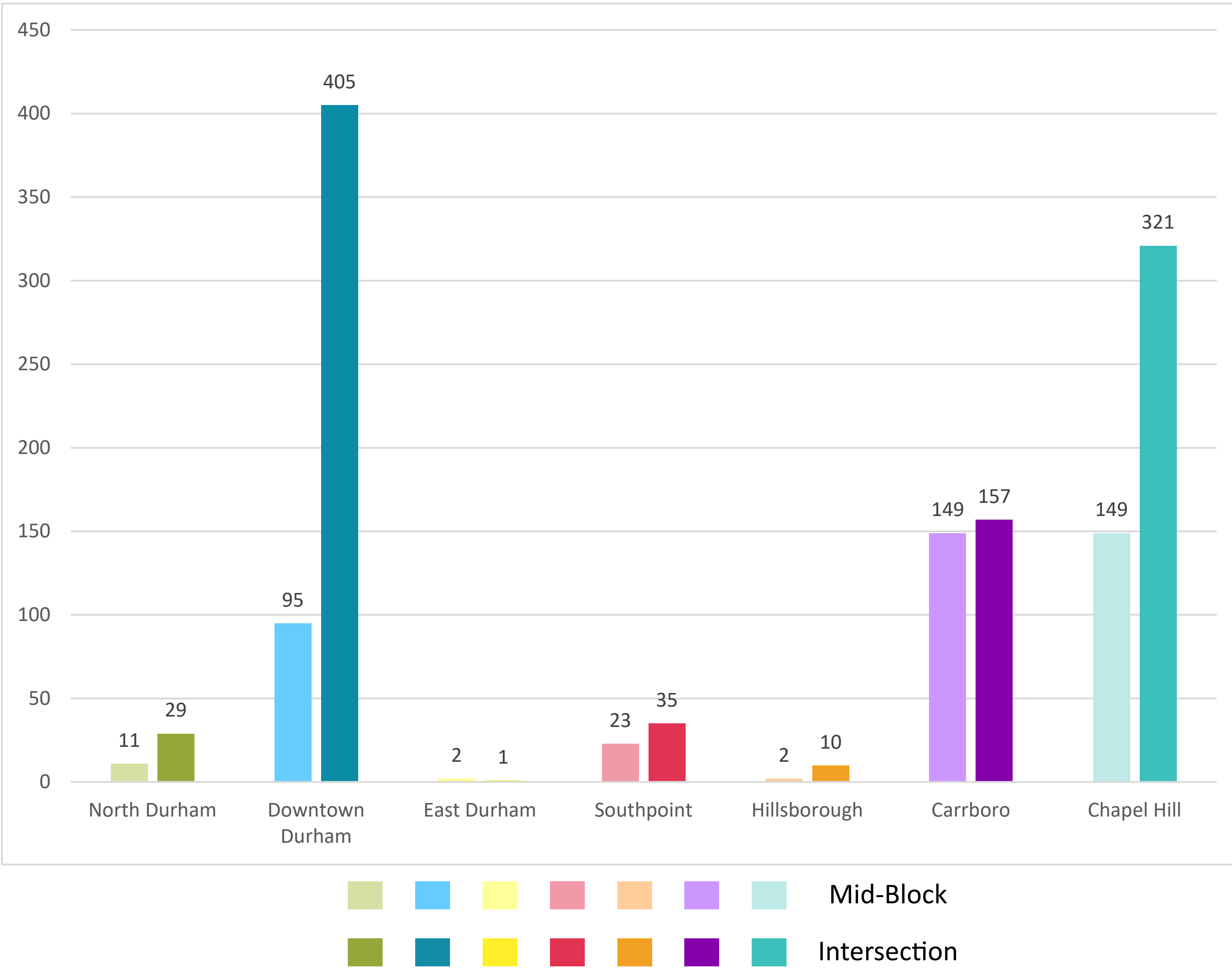
Figure 6-23. Pedestrians by Time of Day, 2021
Top bar chart shows 'median' peak period volume(PPV)
Bottom pie chart shows 'total' peak period pedestrians





RESULTS BY GEOGRAPHIC SUBAREA

Figure 6-24. 6 Hour Total Median PPV



COMPARATIVE ANALYSIS

While comparing between the 6-hour (AM, Noon and PM peak) median PPV of mid-block and intersection count locations, Downtown Durham had a dramatic difference followed by Chapel Hill subarea. East Durham had the lowest count among all the subareas at both mid-block and intersection counts, followed by the second lowest subarea, Hillsborough. However, in all the subareas except East Durham, the intersection pedestrian counts are much higher than the mid-block pedestrian counts. While comparing the total of PPV, Downtown Durham, Chapel Hill and Carrboro were the top three subareas with the highest pedestrian counts at both mid-block and intersection count locations.

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[7]
BICYCLE FACILITIES

How are paths designed with bicycle travel in mind distributed throughout the area?

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KEY TAKEAWAYS

In the DCHC MPO study area, Chapel Hill (76.7 miles) has the largest share of bicycle/bikeable facilities, followed by Southpoint (43.1 miles) and Hillsborough (17.8 miles) subareas.

Currently, there are 180.9 miles of bicycle/bikeable facilities in the DCHC MPO area.

More than three-fourths of the bicycle facilities in the study area are found within the Chapel Hill, Southpoint and Hillsborough subareas.

INTRODUCTION

This chapter provides an inventory of bicycle facilities throughout the DCHC MPO area. The availability of bicycle facilities in the DCHC area is an indicator of how accessible biking is as a mode of travel to residents of and visitors to the area. Bicycle facilities may be used for different purposes, which have different benefits. An abundance of bicycle facilities makes it possible for more people to commute to work on bicycles, reducing transportation costs and carbon emissions in the area. The availability of bicycle lanes and greenways for exercise and recreation purposes can improve quality of life and public health.

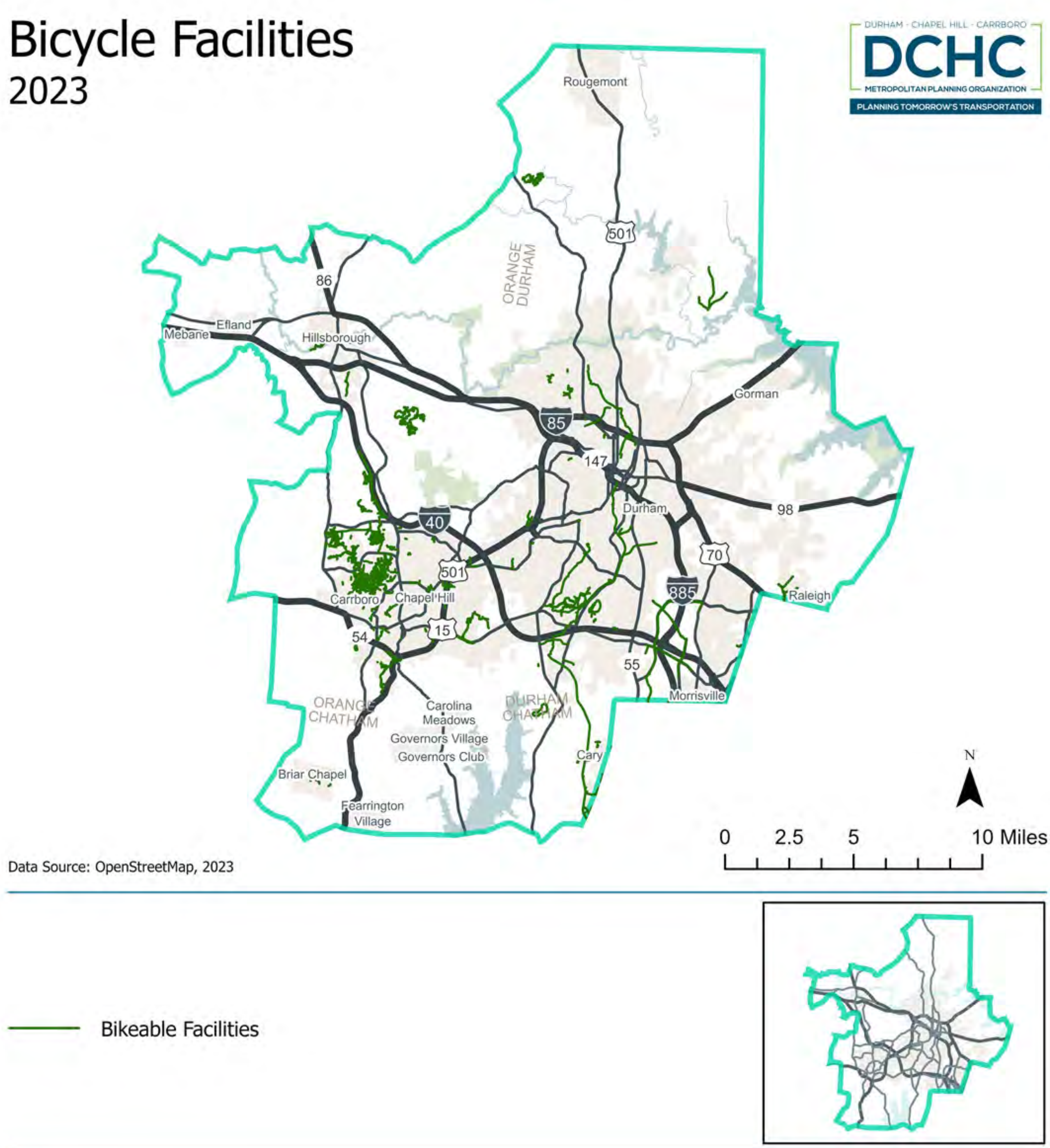
METHODOLOGY

The inventory of bicycle facilities used in this chapter was collected from OpenStreetMap (OSM) for year 2023. The non-motorized roads were extracted from the whole state's road database. The bicycle facilities were separated from the OSM's road database. It should be mentioned that this OSM data on bicycle facilities were not validated against any local GIS data that may be maintained by municipalities and counties in the DCHC MPO area. So, it is plausible that local inventories are more up to date than the OSM data. However, OSM provides GIS data in one uniform format for the entire MPO region that was suitable for this planning level analysis.

Bicycle Facilities

180.9 Miles

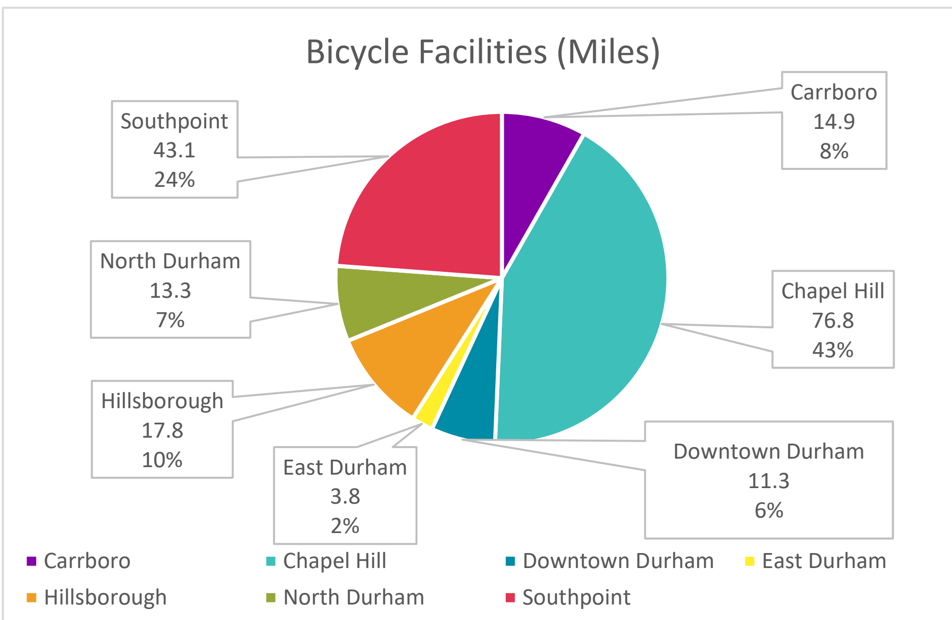
Figure 7-2. Location of Bicycle Facilities



BREAKDOWN BY SUBAREA

Bicycle facilities are concentrated in the subareas of Chapel Hill, Southpoint and Hillsborough. Due to the presence of University of North Carolina (UNC) in Chapel Hill, biking facilities are highest in this area. Chapel Hill has 42% and Southpoint has 24% of the total bicycle facilities of the whole MPO region. East Durham has the lowest mileage for biking, only 2% of the whole area's facilities. It is worth noting that, due to data unavailability some of the biking facilities were not possible to show and compare with the previous MRC report's statistics. Table 7-1 provides the total miles of bicycle facilities by subarea. Figures 7-2 to Figure 7-8 show the bicycle facilities in each of the seven subareas.

Table 7-1. Bicycle Facilities by Subarea 2023



	Bicycle/Bikeable Facilities (in Miles)
North Durham	13.3
Downtown Durham	11.3
East Durham	3.8
Southpoint	43.1
Hillsborough	17.8
Carrboro	14.9
Chapel Hill	76.8

ON-ROAD FACILITY TYPES

There are different types of on-road facilities: bicycle lanes, paved shoulders, and sharrows. A breakdown of on-road facility types for the DCHC region is provided below.

Bicycle Lanes

Bicycle lanes are whole travel lanes on a road designed for and intended to be used exclusively by bicyclists.

Paved Shoulders

Paved shoulders are smaller spaces on the side of the road that may or may not be dedicated to bicyclist use.

Sharrows

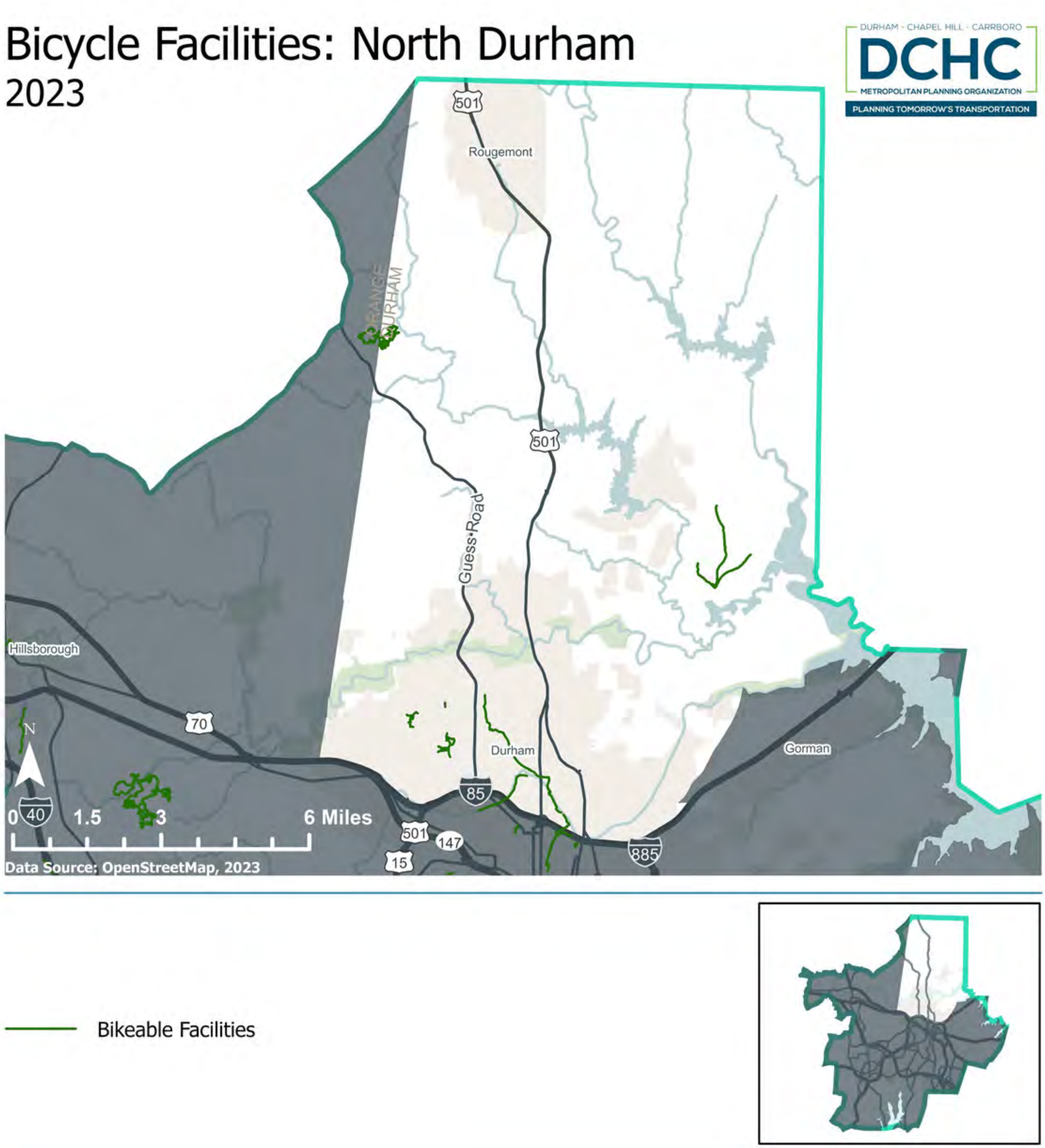
Sharrows are travel lanes where vehicular and bicycle traffic share the right-of-way.

NORTH DURHAM

Bicycle Facilities

13.3 Miles

Figure 7-3. North Durham Subarea Bicycle Facilities

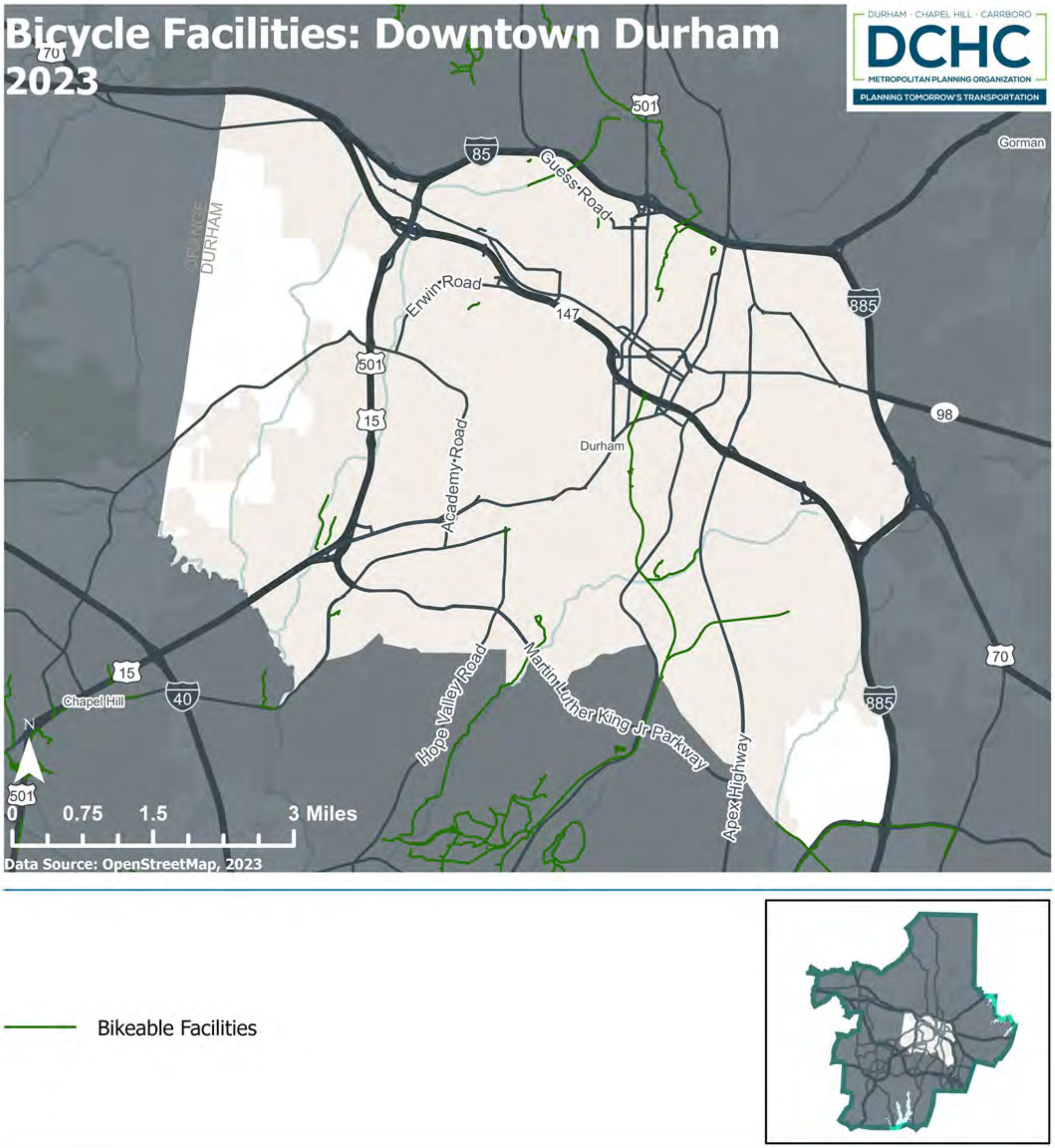


DOWNTOWN DURHAM

Bicycle Facilities

11.3 Miles

Figure 7-4. Downtown Durham Subarea Bicycle Facilities



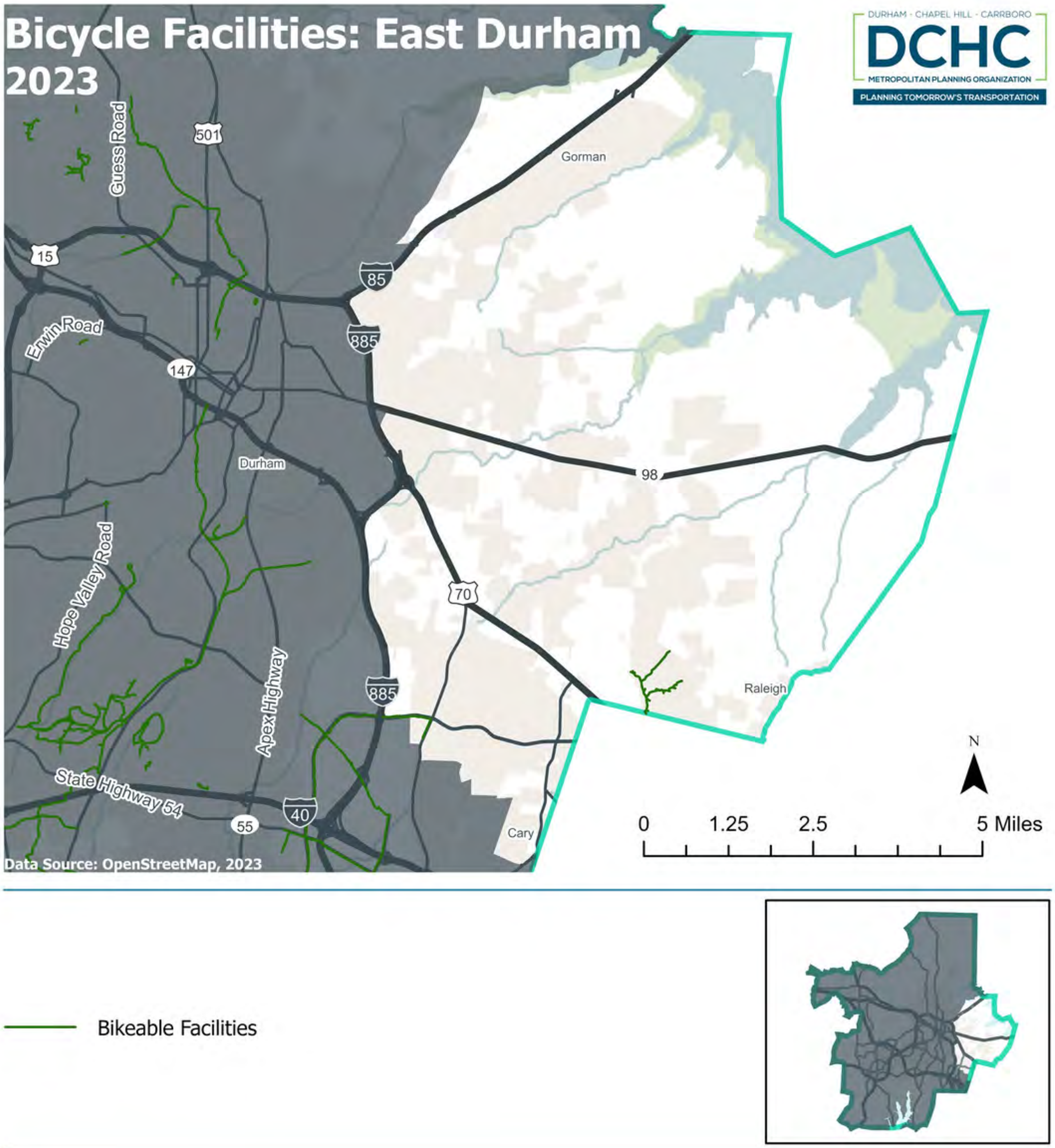
RESULTS BY GEOGRAPHIC SUBAREA

EAST DURHAM

Bicycle Facilities

3.8 Miles

Figure 7-5. East Durham Subarea Bicycle Facilities

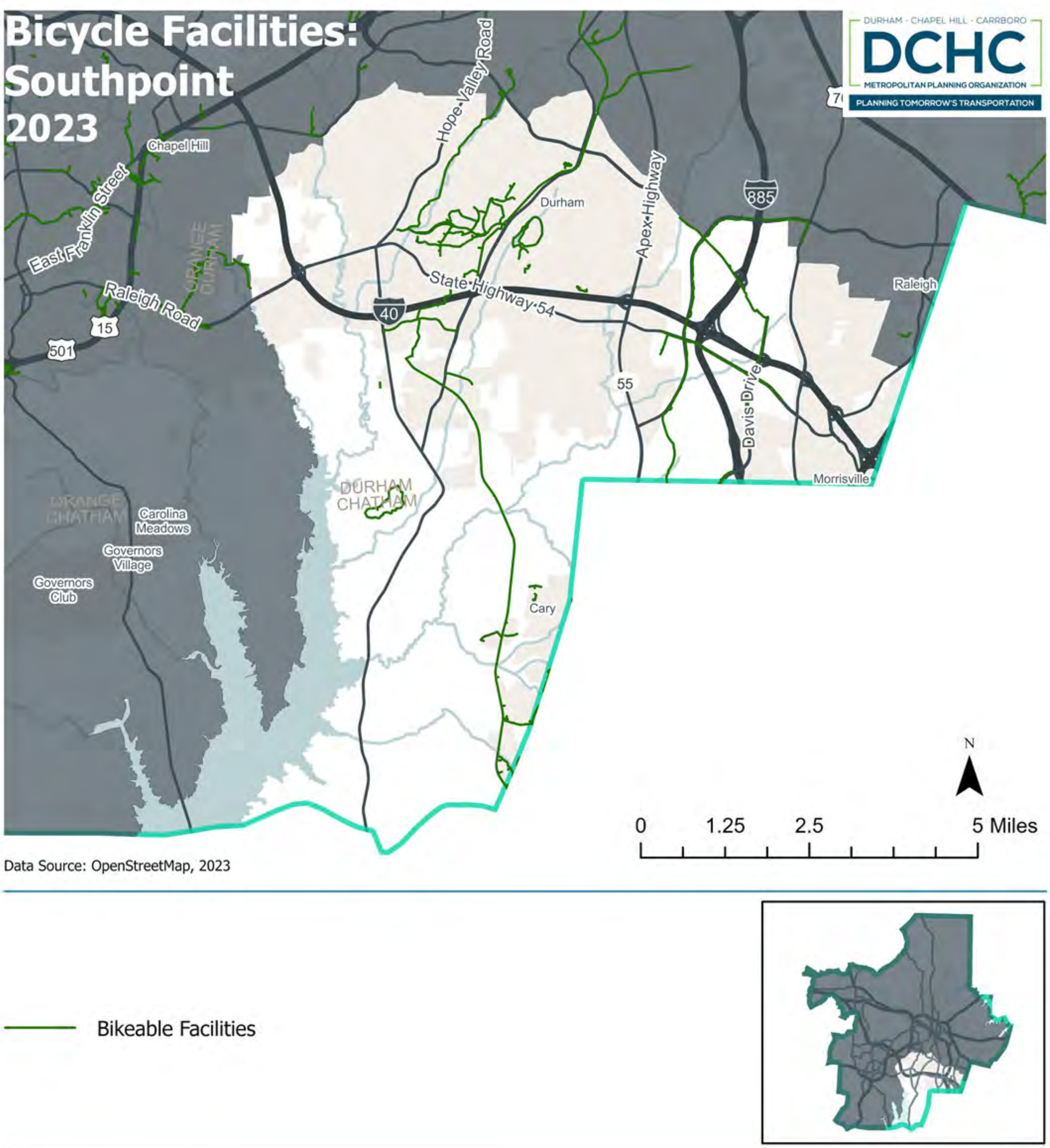


SOUTHPOINT

BICYCLE FACILITIES

43.1 MILES

Figure 7-6. Southpoint Subarea Bicycle Facilities



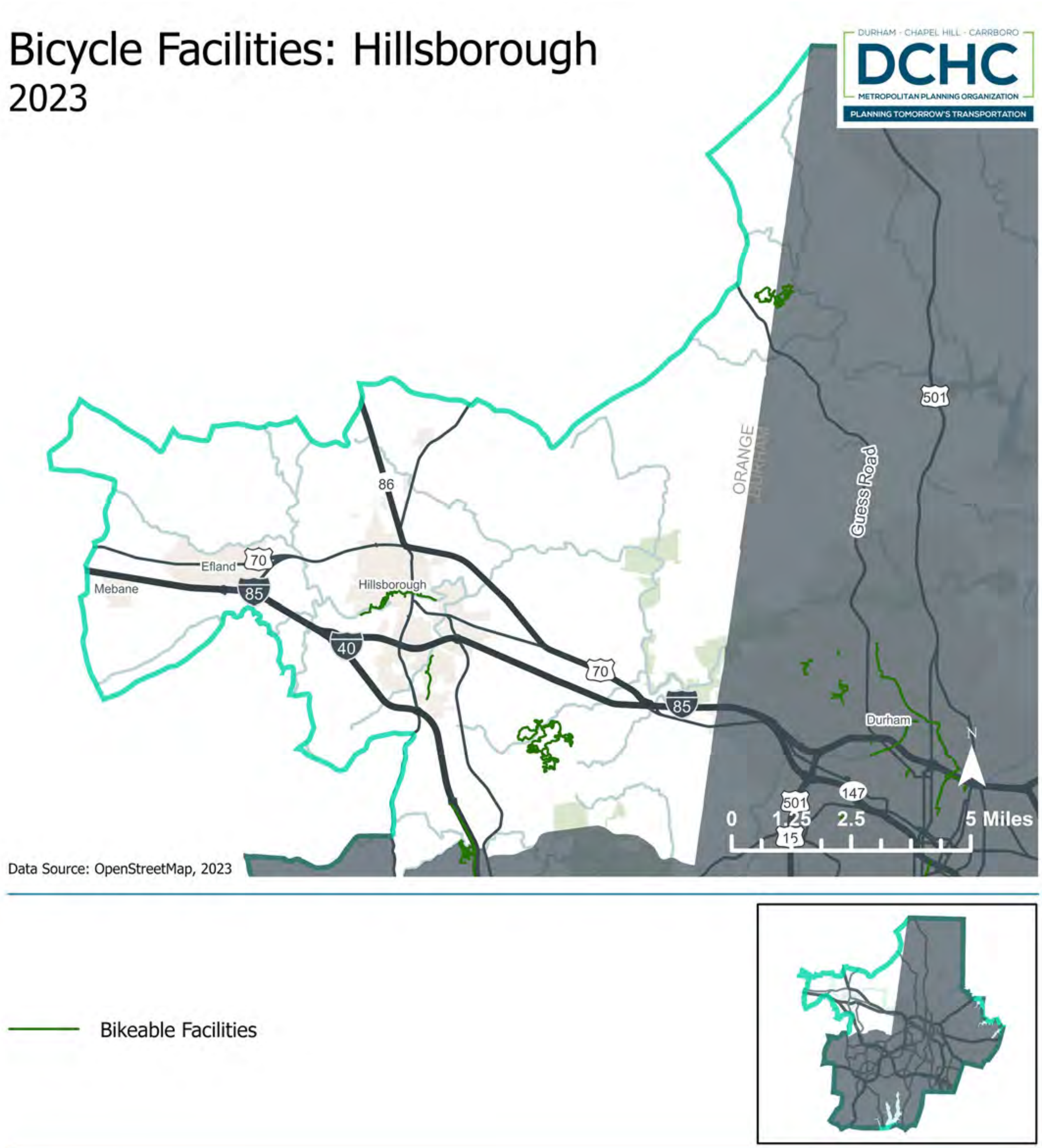
RESULTS BY GEOGRAPHIC SUBAREA

HILLSBOROUGH

Bicycle Facilities

17.8 Miles

Figure 7-7. Hillsborough Subarea Bicycle Facilities



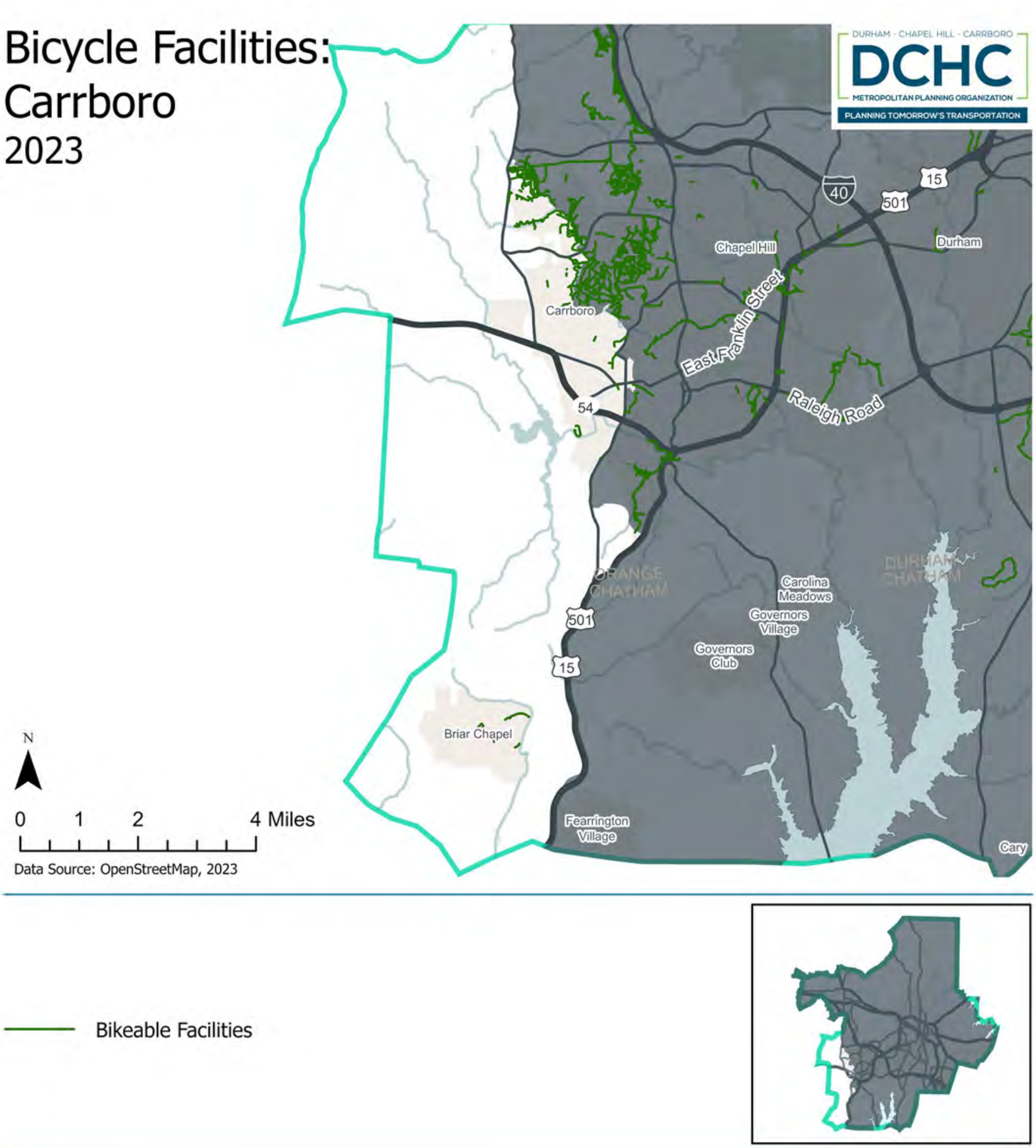
RESULTS BY GEOGRAPHIC SUBAREA

CARRBORO

Bicycle Facilities

14.9 Miles

Figure 7-8. Carrboro Subarea Bicycle Facilities



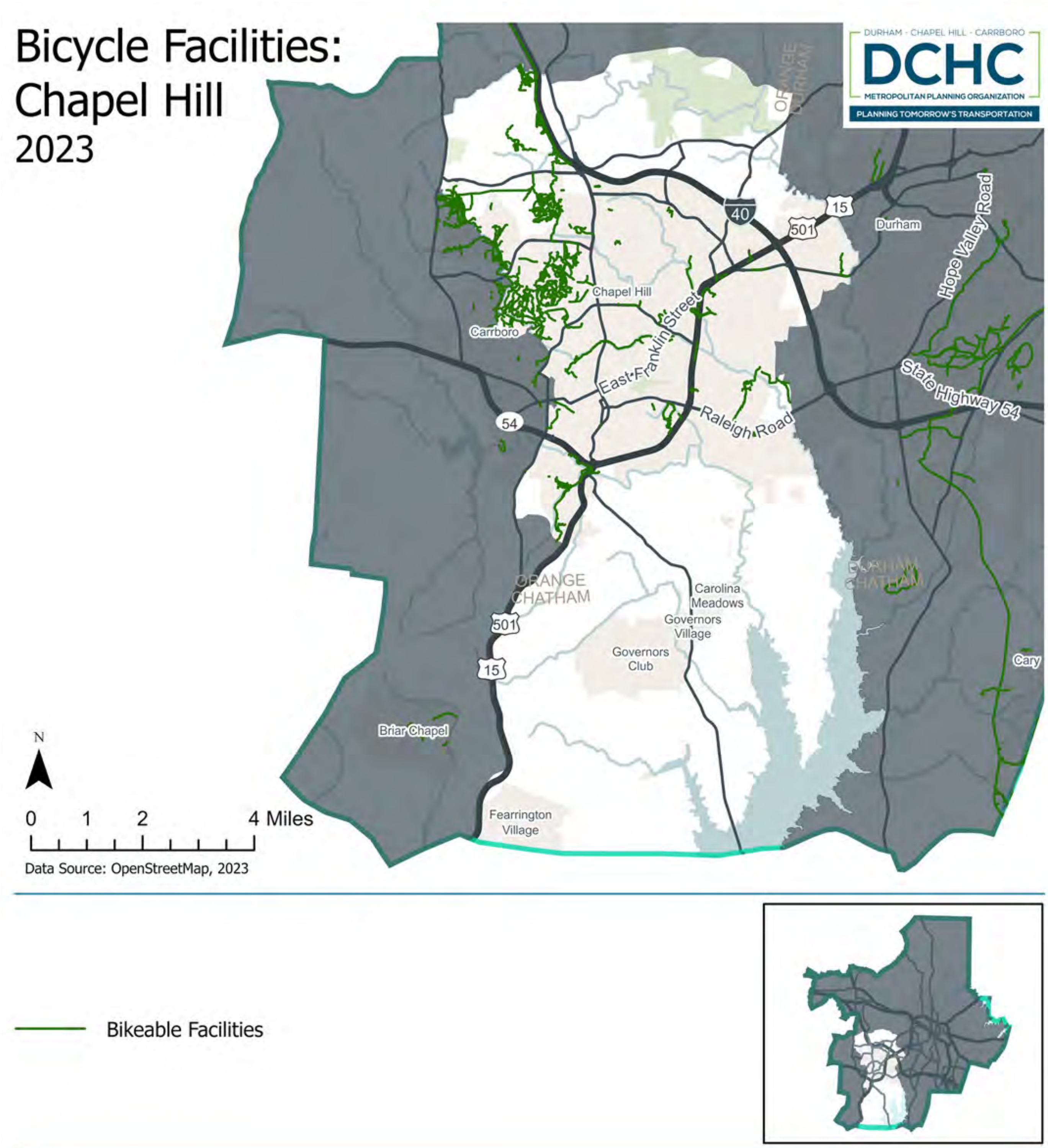
RESULTS BY GEOGRAPHIC SUBAREA

CHAPEL HILL

Bicycle Facilities

76.8 Miles

Figure 7-9. Chapel Hill Subarea Bicycle Facilities



COMPARATIVE ANALYSIS

In the DCHC MPO study area, Chapel Hill has the largest share of bicycle/bikeable facilities, at 42%, followed by Southpoint at 24% and Hillsborough at 10%.

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[8] BICYCLE ACTIVITY

Where is bicycle activity occurring in the area and how is it changing?

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KEY TAKEAWAYS

In 2021, 4,508 cyclists were observed at 106 mid-block locations and 7,148 cyclists were observed at 69 intersections in the DCHC MPO area during an average weekday (counted for a 13-hour period from 6 AM to 7 PM).

Three subareas, namely Chapel Hill, Downtown Durham and Carrboro, have the highest number of bicycle activity for both mid-block and intersection locations.

The largest proportion of cyclists was observed in the afternoon and the highest peak hour volumes tend to be during afternoon peak hours for both mid-block and intersection locations.

There is a more even balance of high morning and afternoon peak hour volumes in the Chapel Hill, Carrboro and Downtown Durham subareas, indicating that morning bike travel is more common in these areas than elsewhere.

As expected, bicycling is a popular mode around the UNC campus and the Duke University campus. In contrast, very few cyclists were observed around the NC Central campus.

INTRODUCTION

This chapter offers a summarization of bicycle activity levels to help the MPO understand where bicycle activity is high and at what times of day. Like pedestrian counts, bicycle counts can potentially be related to the quantity and quality of available facilities, such as shared lanes, dedicated bike lanes, and trails (these are covered in Chapter 7); the intensity of development and diversity of land uses in an area; and bicycle-related safety issues (bicycle and pedestrian crashes are the subject of Chapter 9). The bicycle count data developed for this chapter provides the MPO with information to guide investments in new or improved bicycle facilities to promote safe active transportation and support local development and place-making visions.

METHODOLOGY

Like pedestrian volume counts, bicycle counts are based on human or video observation. Bicycle traffic volume was observed over a 13-hour period (6:00 AM to 7:00 PM) at 106 mid-block and 69 intersection locations throughout the DCHC MPO area. Counts were conducted from March to June of 2021.


FVIA DOWNTOWN
0509

Figure 8-1. Mid-Block Cyclist Counts

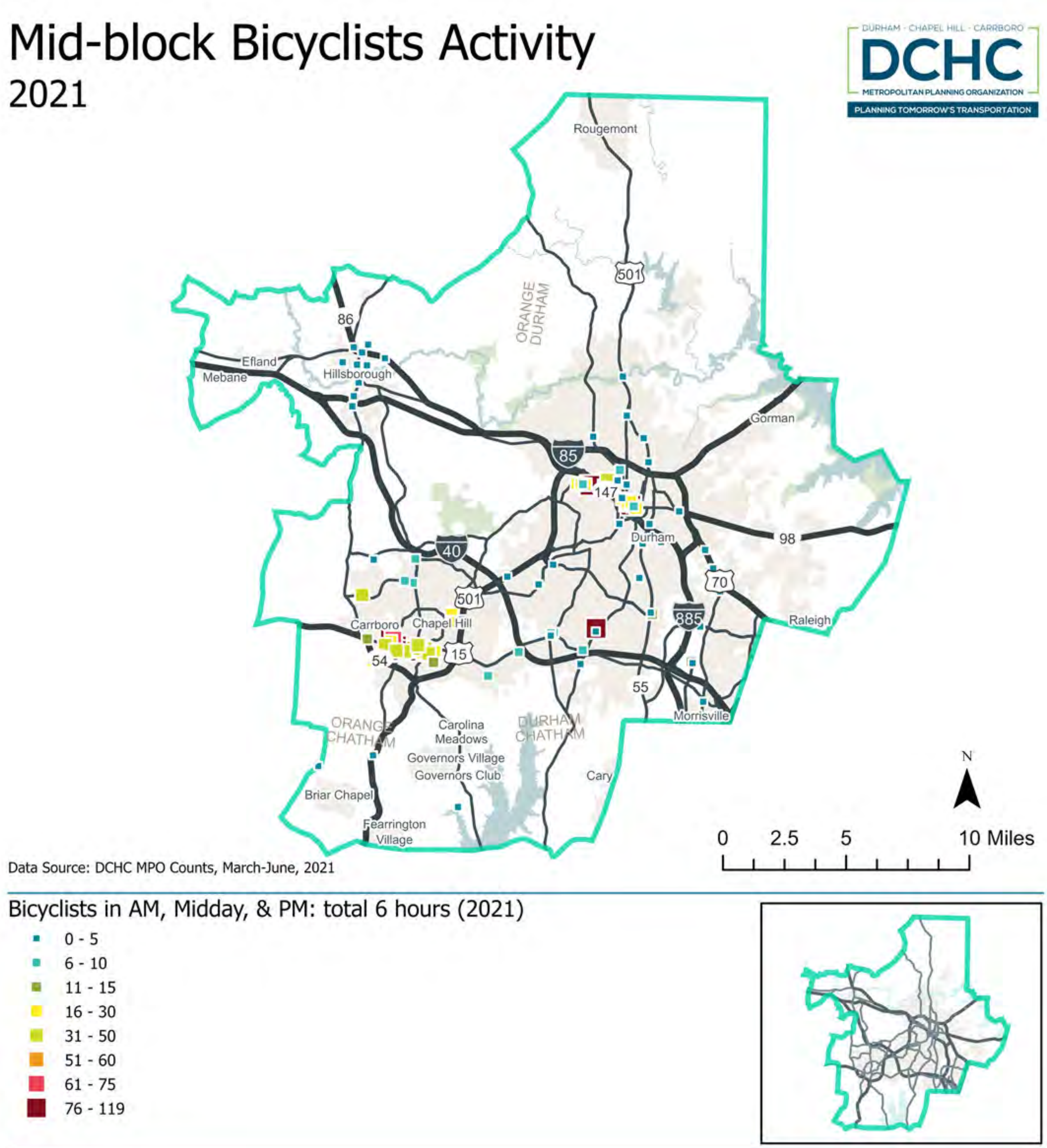
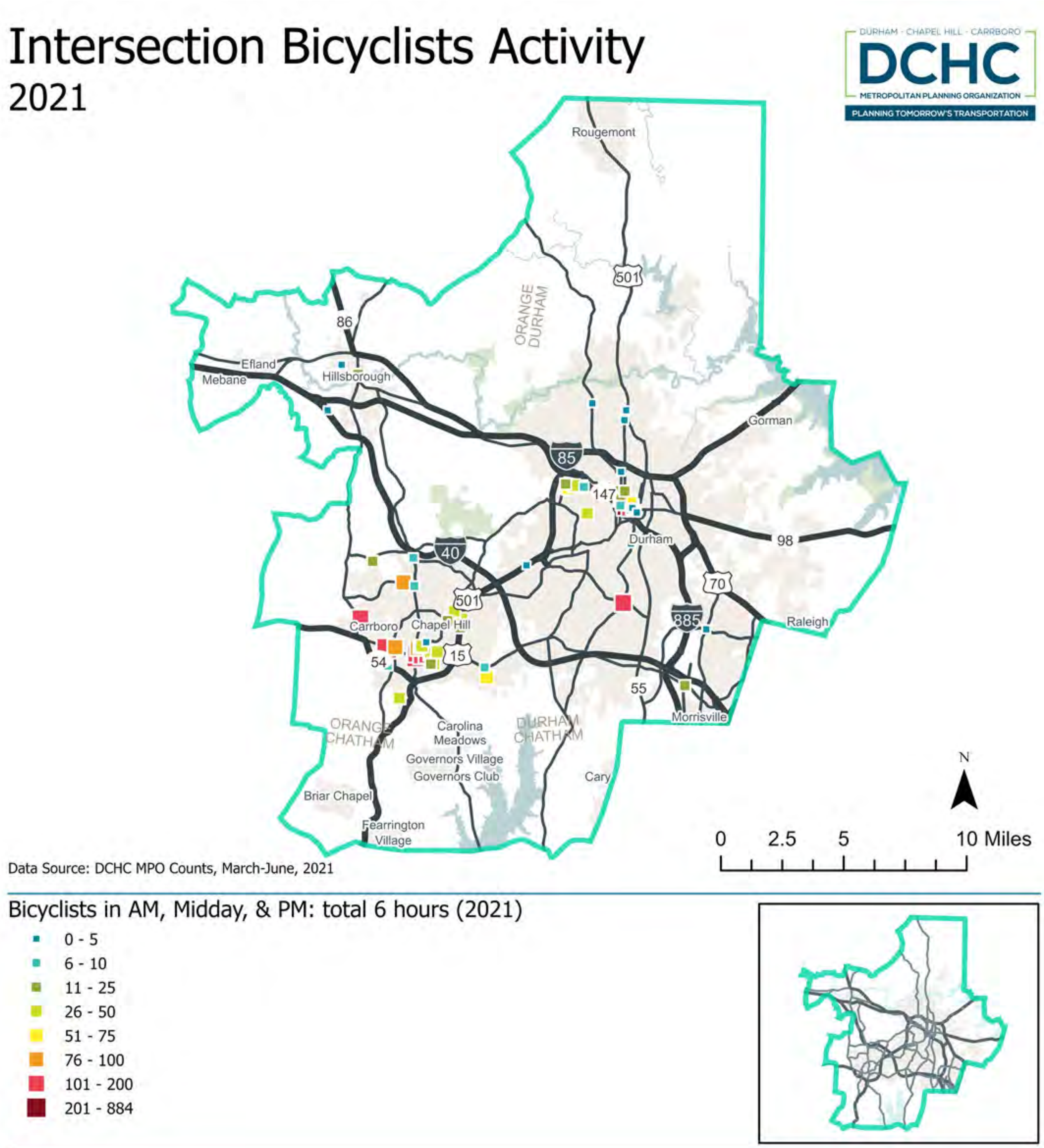


Figure 8-2. Intersection Cyclist Counts



A total of 4,508 cyclists were observed at 106 mid-block locations and a total of 7,148 cyclists were observed at 69 intersections in the DCHC MPO area during a 13-hour time period (6 AM to 7 PM) on average weekdays in 2021. Figure 8-1 and 8-2 show the mid-block and intersection count locations respectively and visualize Cyclist volumes throughout the MPO area. Cyclist volume can be analyzed by peak periods, which are two-hour spans that tend to be the busiest times in the morning, noon, and afternoon.

The afternoon peak period had the highest total volume of cyclists (1,147 at mid-block and 1,670 at intersection count locations, total 2,817), accounting for 48% of the total cyclists volume across the region. The Noon peak had the second highest (680 at mid-block and 1,130 at intersection count locations, total 1,810), making up 30% of the total, and the morning peak period had the lowest total volume of all (543 at mid-block and 765 at intersection count locations, total 1,308) or 22% of the total count.

Across the region, the average peak period volume (PPV) cyclist count at a mid-block count location in 2021 was 5 in the morning peak, 7 in the noon peak, and 11 in the afternoon peak. The average peak period volume (PPV) cyclist count at an intersection count location in 2021 was 11 in the morning peak, 17 in the noon peak, and 24 in the afternoon peak.

While the median afternoon PPV for mid-block and intersection count stations in the Chapel Hill subarea is 12 and 17 respectively, afternoon bike traffic at mid-block and intersection count stations around the UNC campus was much higher than elsewhere. At the Columbia St and Cameron Ave for instance, 246 (mid- block) and 298 (intersection) cyclists were observed in the afternoon peak period. However, there is a high degree of variation in pedestrian activity by subarea and on a station-by-station basis. In the urban centers of Durham and Carrboro the afternoon peak cyclist counts were high; especially near the Duke Hospital, and. along Main St in Durham city center; along Greensboro St and Main St in Carrboro town center. The cyclist activity around the Hillsborough's downtown area was low.

Table 8-1 and 8-2 below presents the median cyclist count at mid-block and intersection locations in each subarea in the MPO. The median value is presented in the table since mean averages are sometimes skewed by very small or very large outlier values. The remainder of this chapter presents cyclist count summaries by subarea for both mid-block and intersection count locations separately. The sub area maps show the count locations and the charts show the cyclist count by the time of the day.

Table 8-1. Median Mid-Block Cyclist Counts by Subarea

	Median AM (2-Hour) PPV	Median Noon (2-Hour) PPV	Median PM (2-Hour) PPV	6-Hour Total Median PPV
North Durham	0	0	1	1
Downtown Durham	3	2	5	7
East Durham	0	0	0	0
Southpoint	1	1	2	6
Hillsborough	0	0	0	1
Carrboro	10	13	19	40
Chapel Hill	5	6	12	25

Table 8-2. Median Intersection Cyclist Counts by Subarea

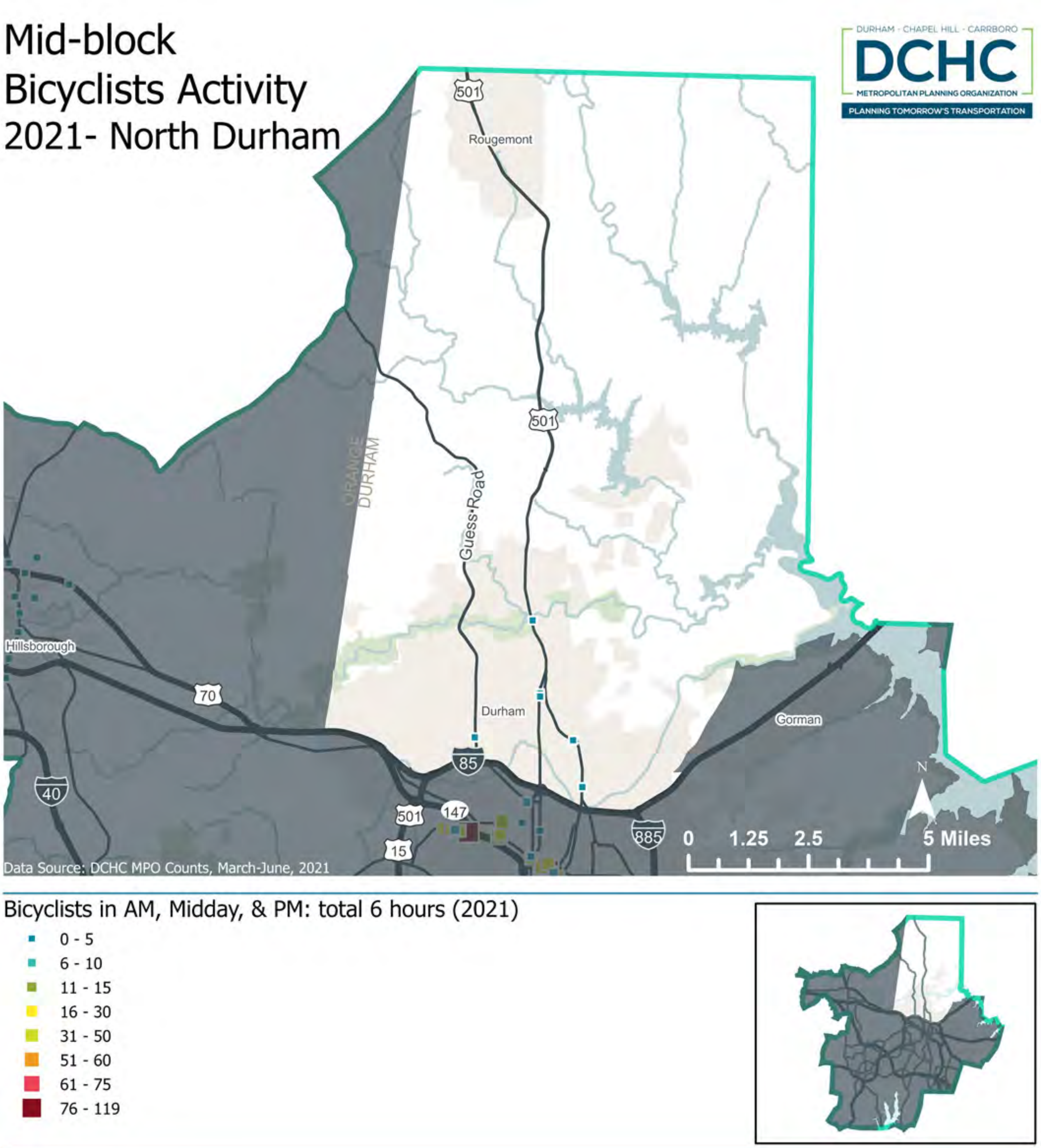
	Median AM (2-Hour) PPV	Median Noon (2-Hour) PPV	Median PM (2-Hour) PPV	6-Hour Total Median PPV
North Durham	0	0	0	0
Downtown Durham	7	3	5	13
East Durham	1	3	1	5
Southpoint	11	19	27	57
Hillsborough	1	2	2	5
Carrboro	18	25	54	107
Chapel Hill	6	8	17	32

RESULTS BY GEOGRAPHIC SUBAREA

NORTH DURHAM

TOTAL CYCLISTS COUNTED: 9

Figure 8-3. North Durham Mid-Block Cyclist Counts

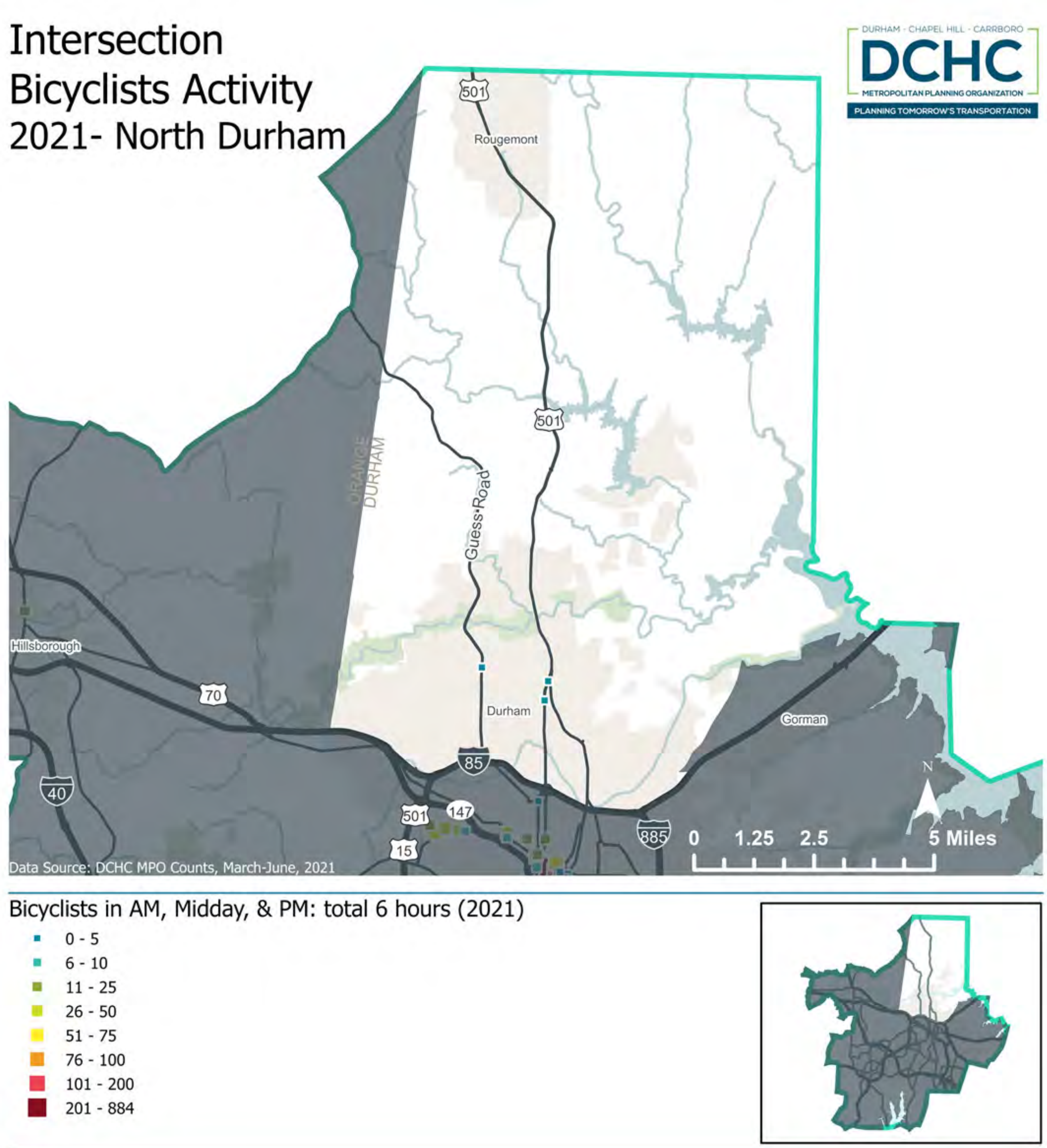


RESULTS BY GEOGRAPHIC SUBAREA

NORTH DURHAM

TOTAL CYCLISTS COUNTED: 1

Figure 8-4. North Durham Intersection Cyclist Counts



RESULTS BY GEOGRAPHIC SUBAREA

NORTH DURHAM

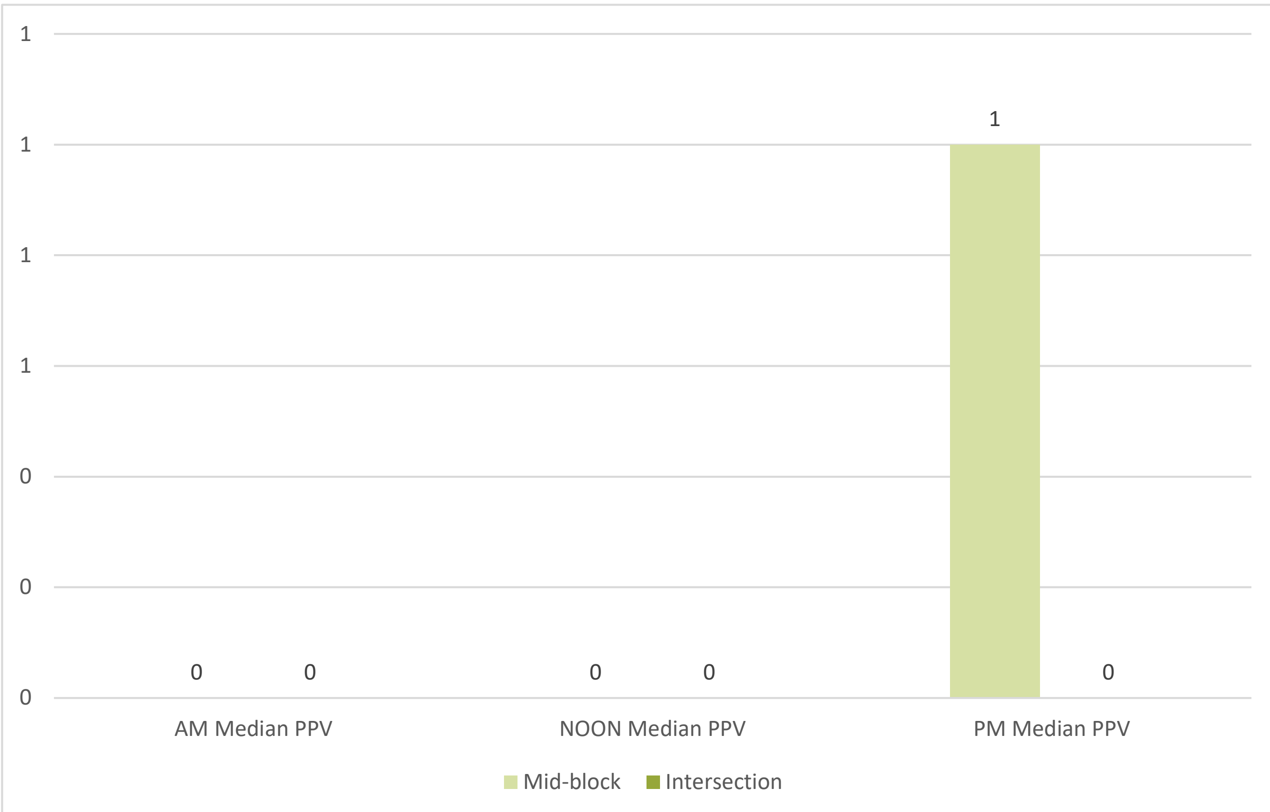
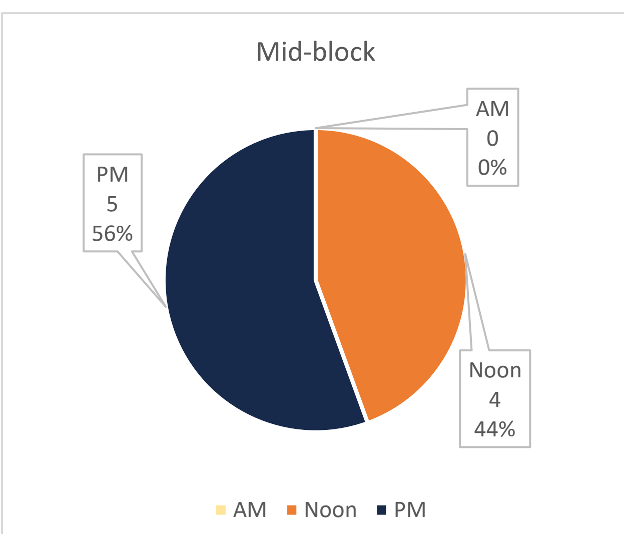
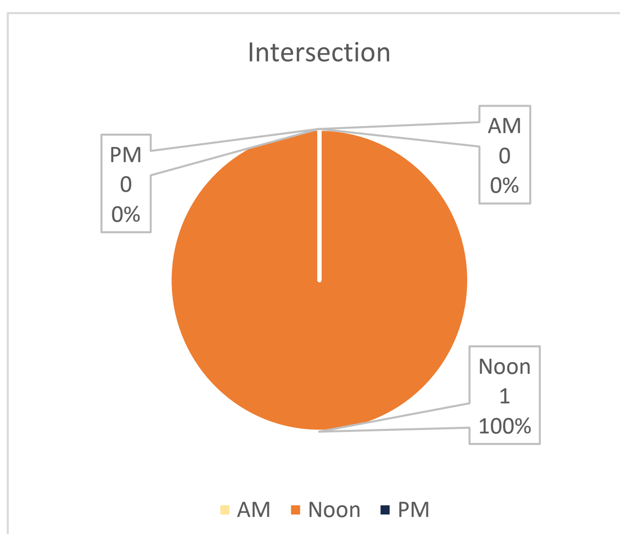


Figure 8-5. Bicyclists by Time of Day, 2021
Top bar chart shows 'median' peak period volume(PPV)
Bottom pie chart shows 'total' peak period bicyclists



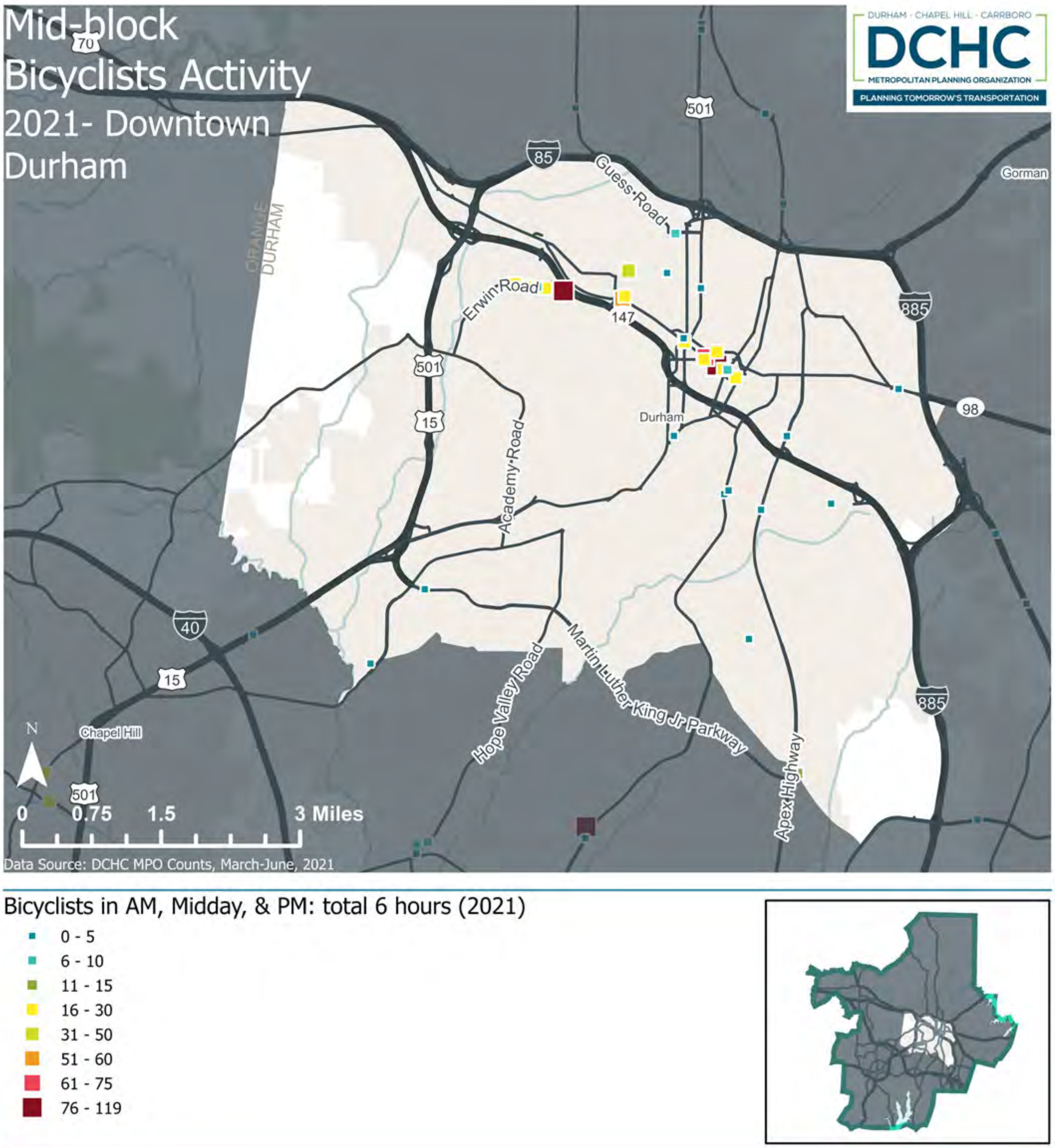


RESULTS BY GEOGRAPHIC SUBAREA

DOWNTOWN DURHAM

TOTAL CYCLISTS COUNTED: 660

Figure 8-6. Downtown Durham Mid-Block Cyclist Counts

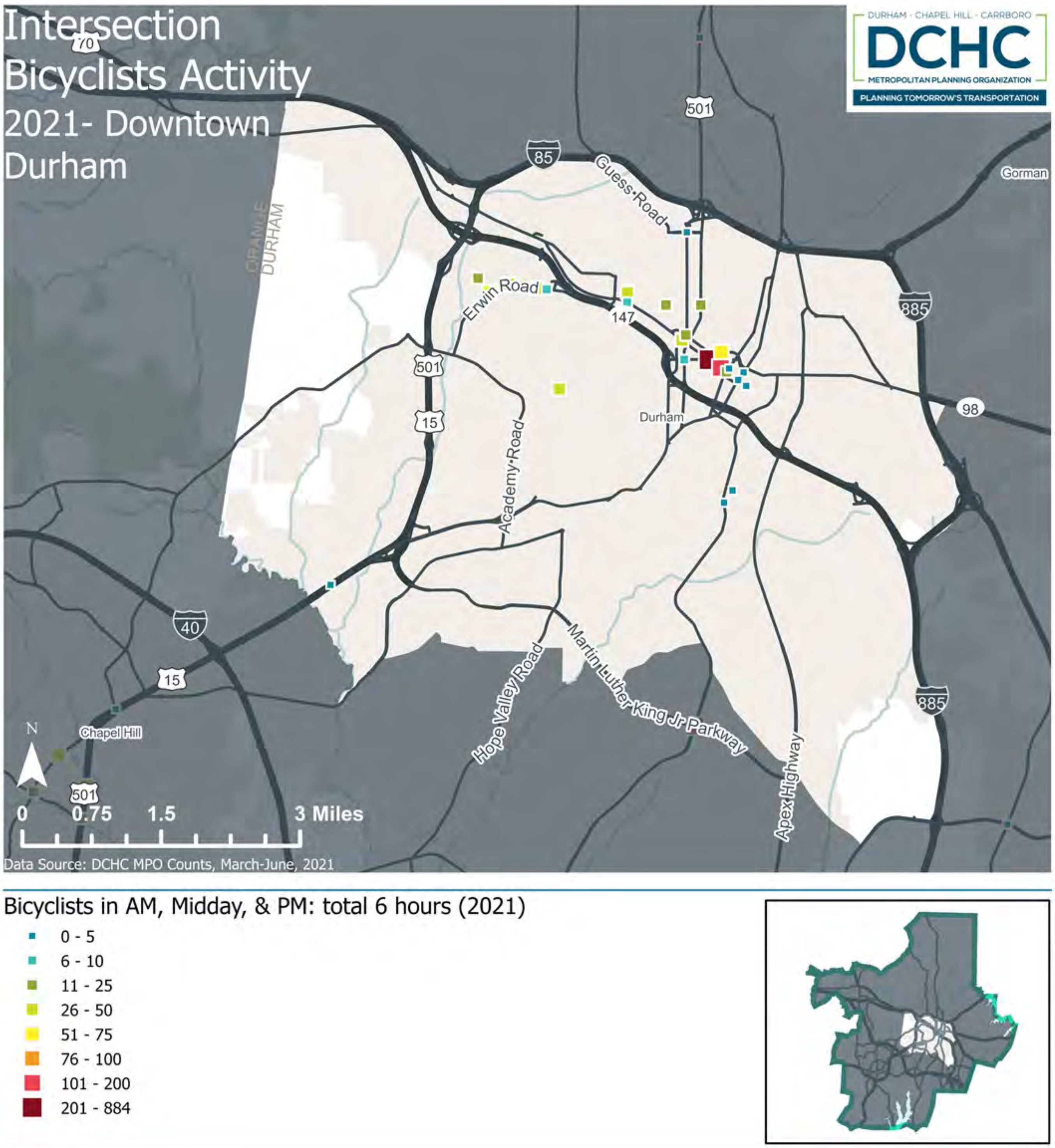


RESULTS BY GEOGRAPHIC SUBAREA

DOWNTOWN DURHAM

TOTAL CYCLISTS COUNTED: 1,464

Figure 8-7. Downtown Durham Intersection Cyclist Counts



RESULTS BY GEOGRAPHIC SUBAREA

DOWNTOWN DURHAM

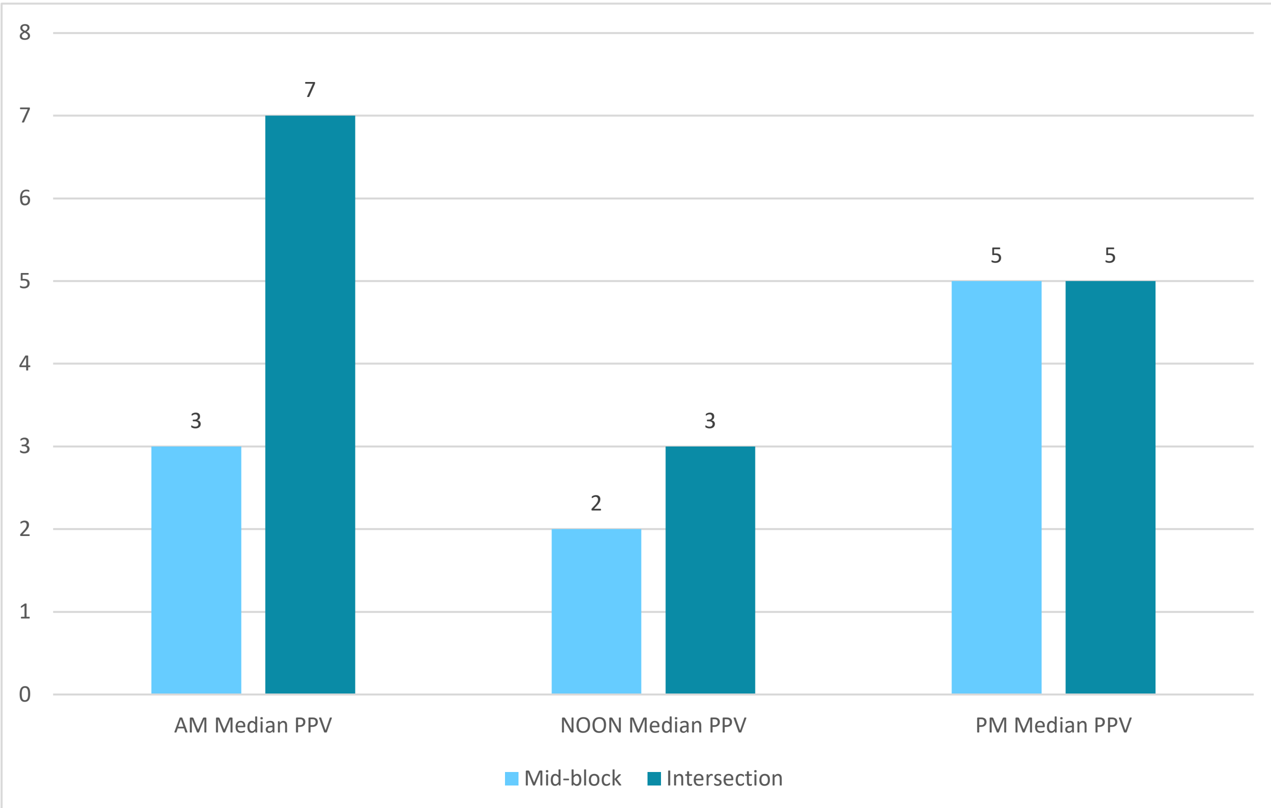
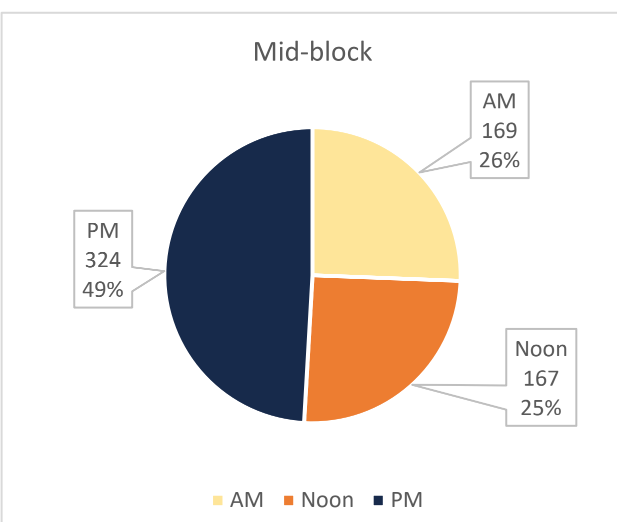
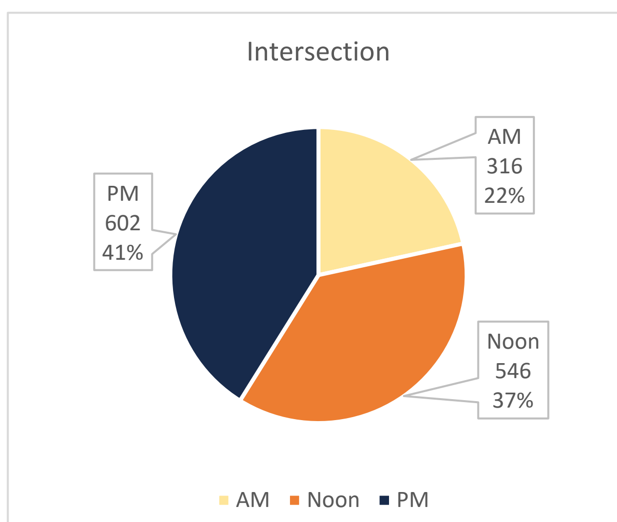


Figure 8-8. Bicyclists by Time of Day, 2021
Top bar chart shows 'median' peak period volume(PPV)
Bottom pie chart shows 'total' peak period bicyclists



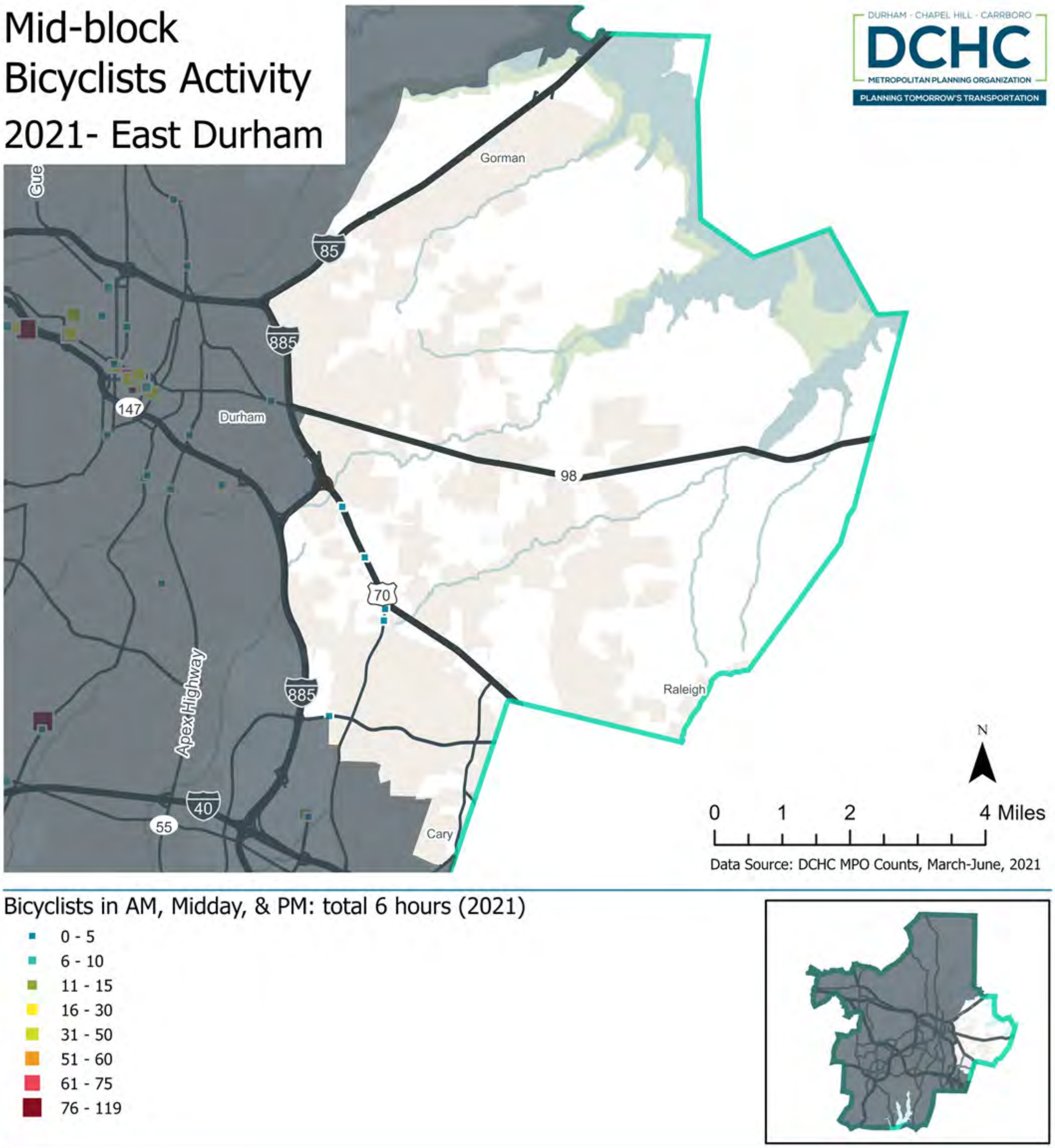


RESULTS BY GEOGRAPHIC SUBAREA

EAST DURHAM

TOTAL CYCLISTS COUNTED: 0

Figure 8-9. East Durham Mid-Block Cyclist Counts

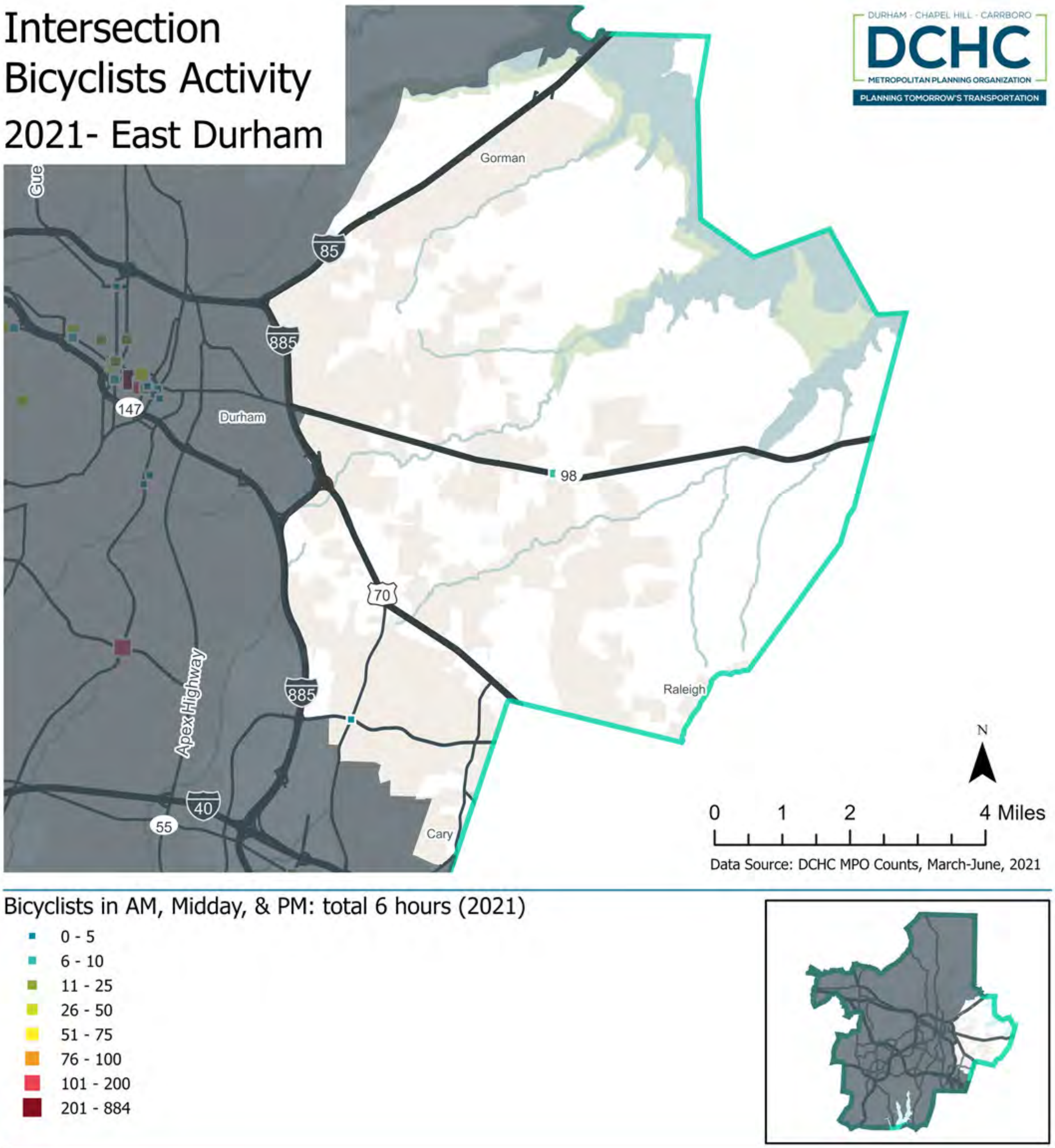


RESULTS BY GEOGRAPHIC SUBAREA

EAST DURHAM

TOTAL CYCLISTS COUNTED: 9

Figure 8-10. East Durham Intersection Cyclist Counts



RESULTS BY GEOGRAPHIC SUBAREA

EAST DURHAM

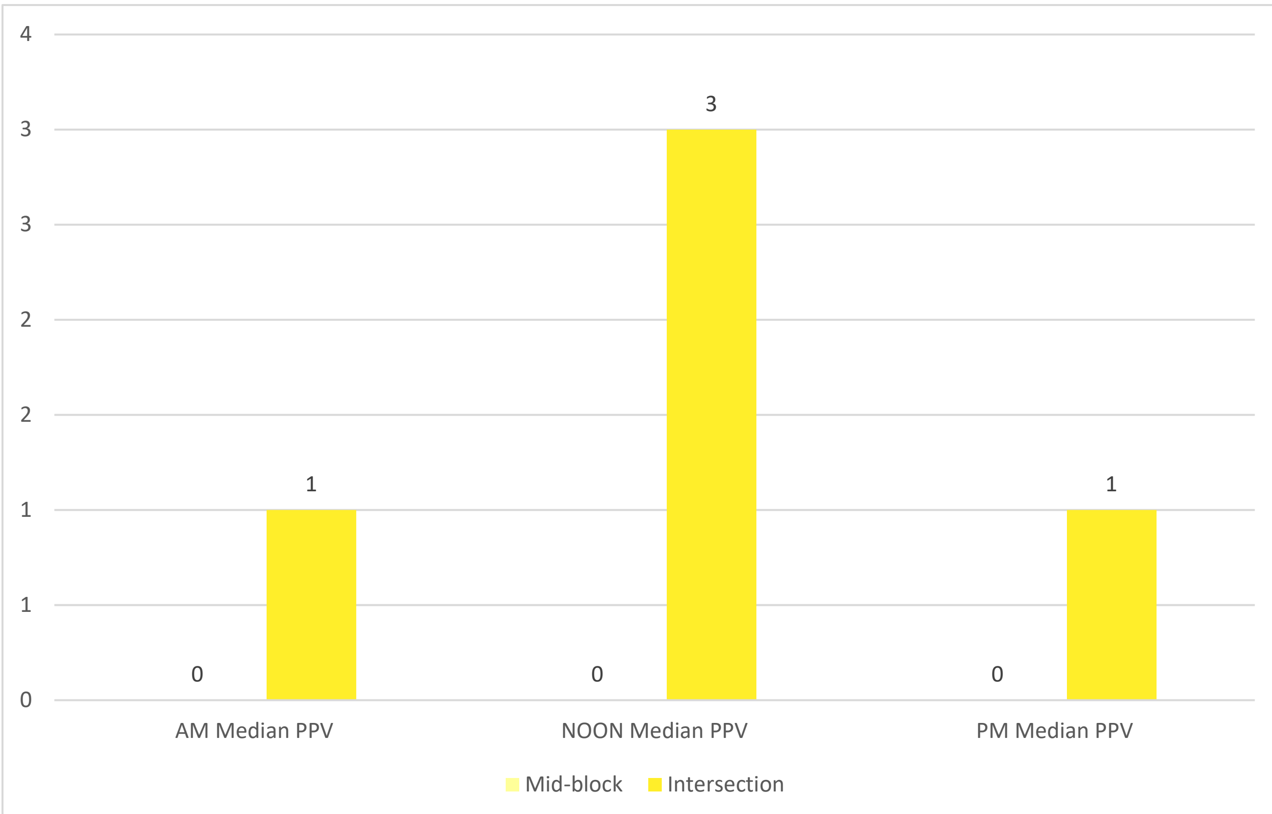
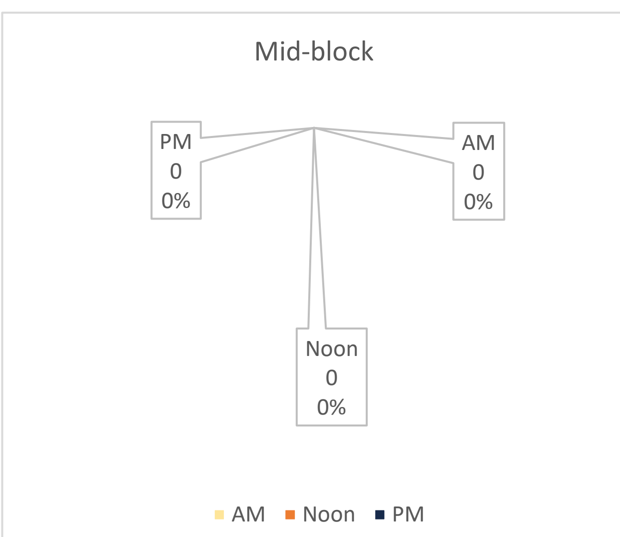
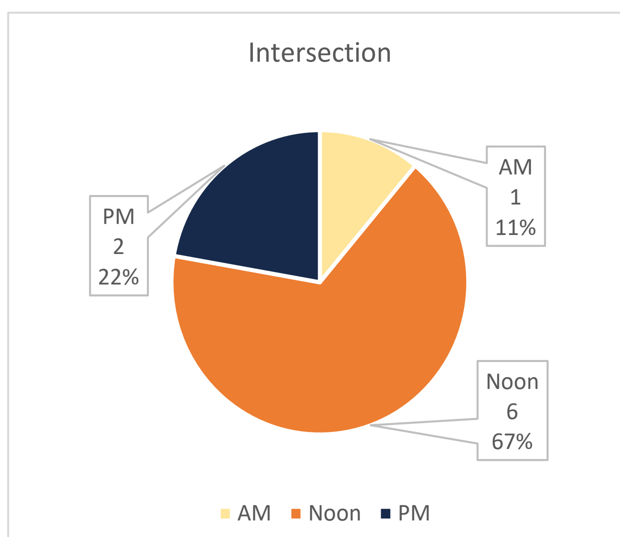


Figure 8-11. Bicyclists by Time of Day, 2021
Top bar chart shows 'median' peak period volume(PPV)
Bottom pie chart shows 'total' peak period bicyclists



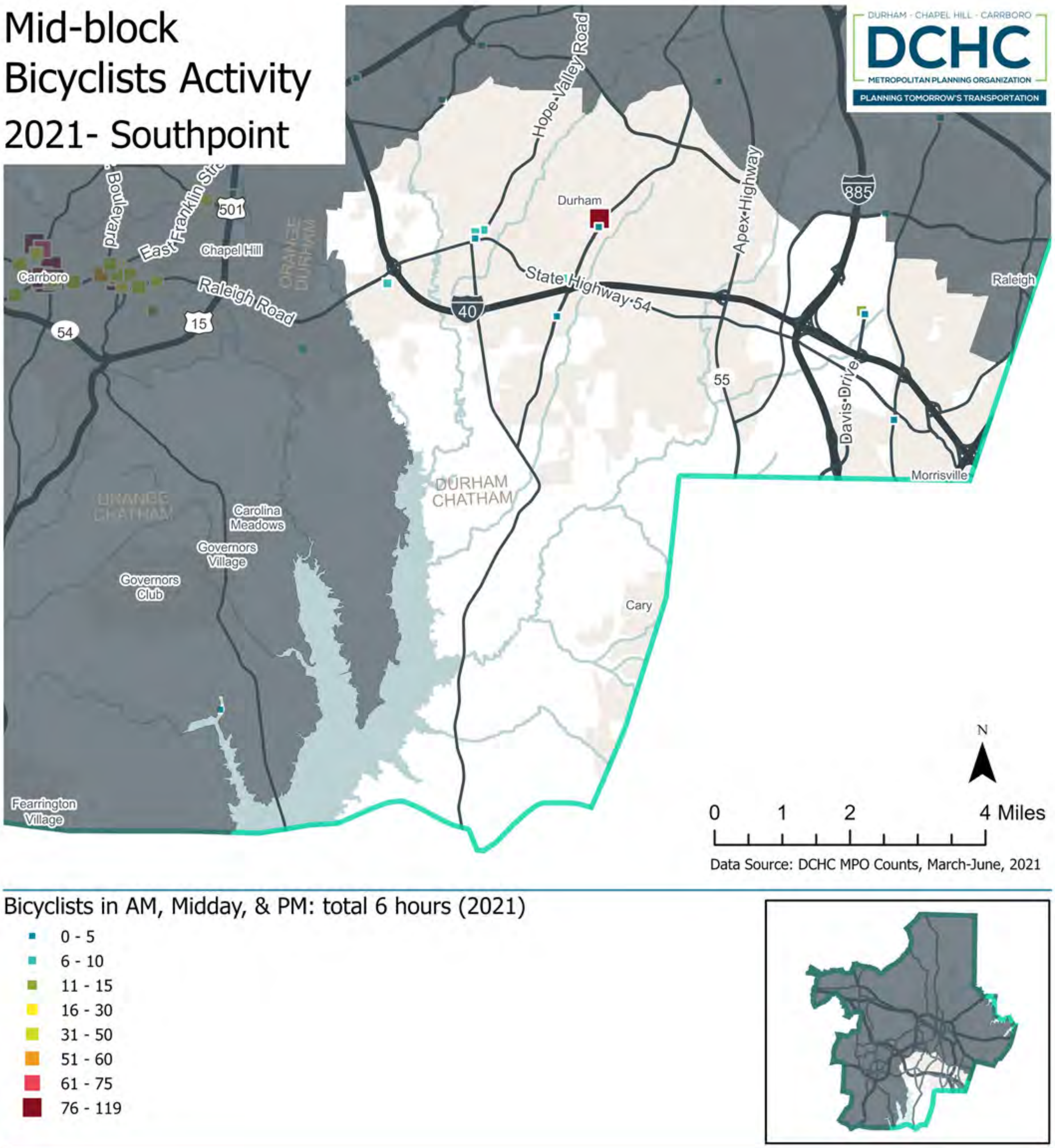


RESULTS BY GEOGRAPHIC SUBAREA

SOUTHPOINT

TOTAL CYCLISTS COUNTED: 182

Figure 8-12. Southpoint Mid-Block Cyclist Counts

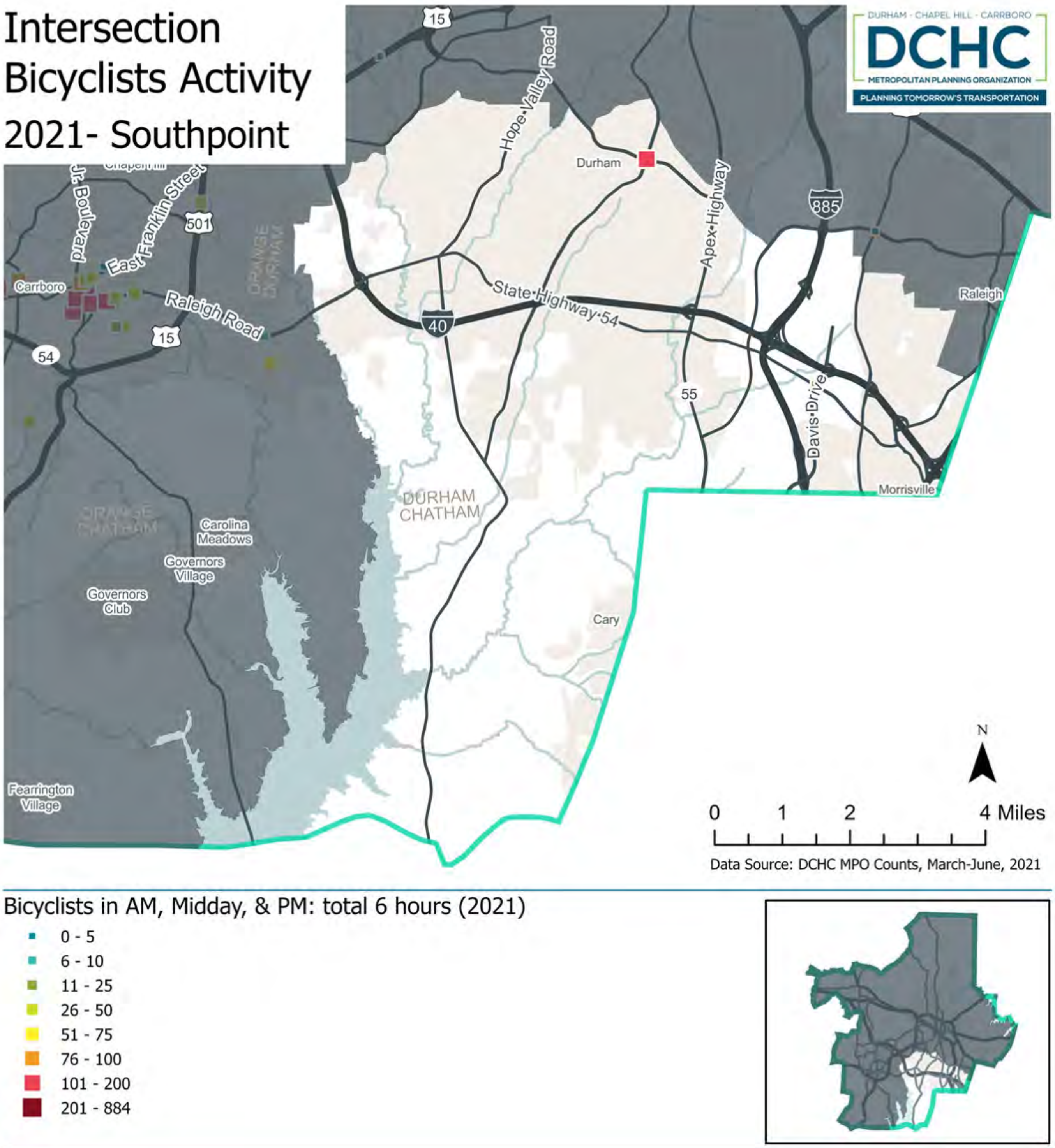


RESULTS BY GEOGRAPHIC SUBAREA

SOUTHPOINT

TOTAL CYCLISTS COUNTED: 113

Figure 8-13. Southpoint Intersection Cyclist Counts



RESULTS BY GEOGRAPHIC SUBAREA

SOUTHPOINT

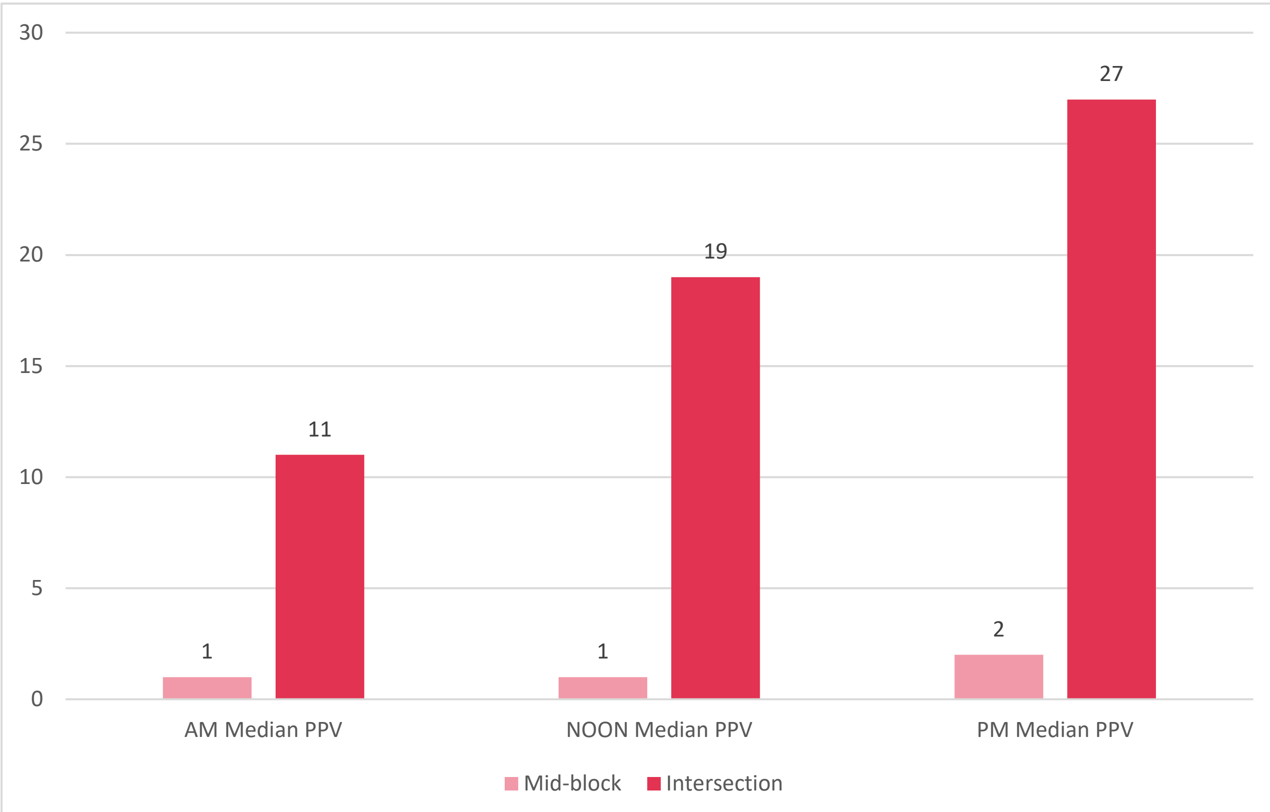
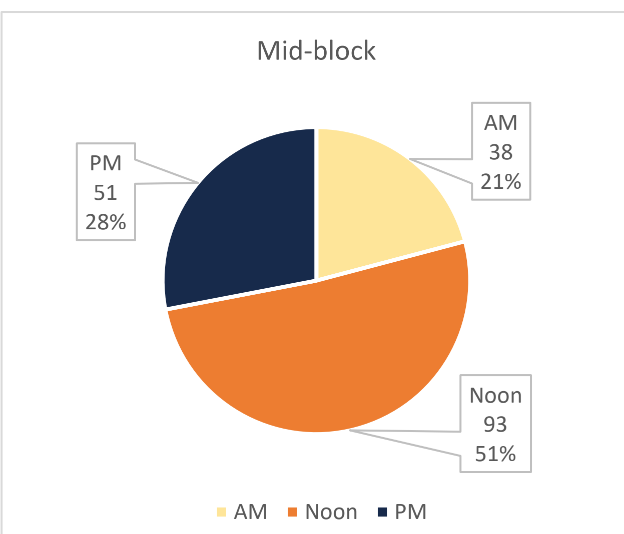
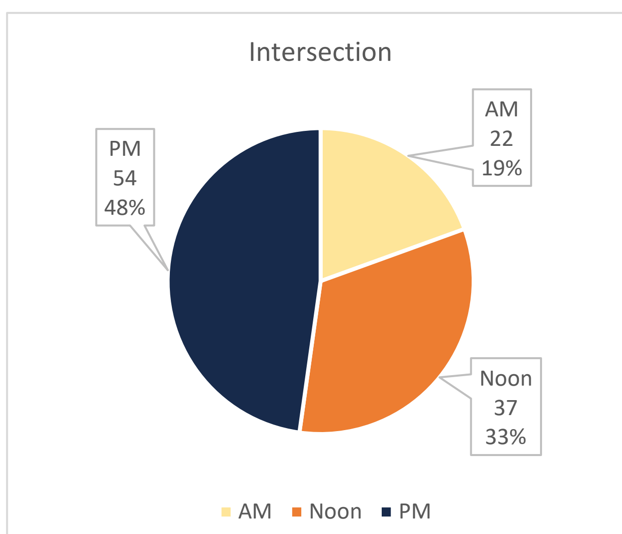


Figure 8-14. Bicyclists by Time of Day, 2021
Top bar chart shows 'median' peak period volume(PPV)
Bottom pie chart shows 'total' peak period bicyclists



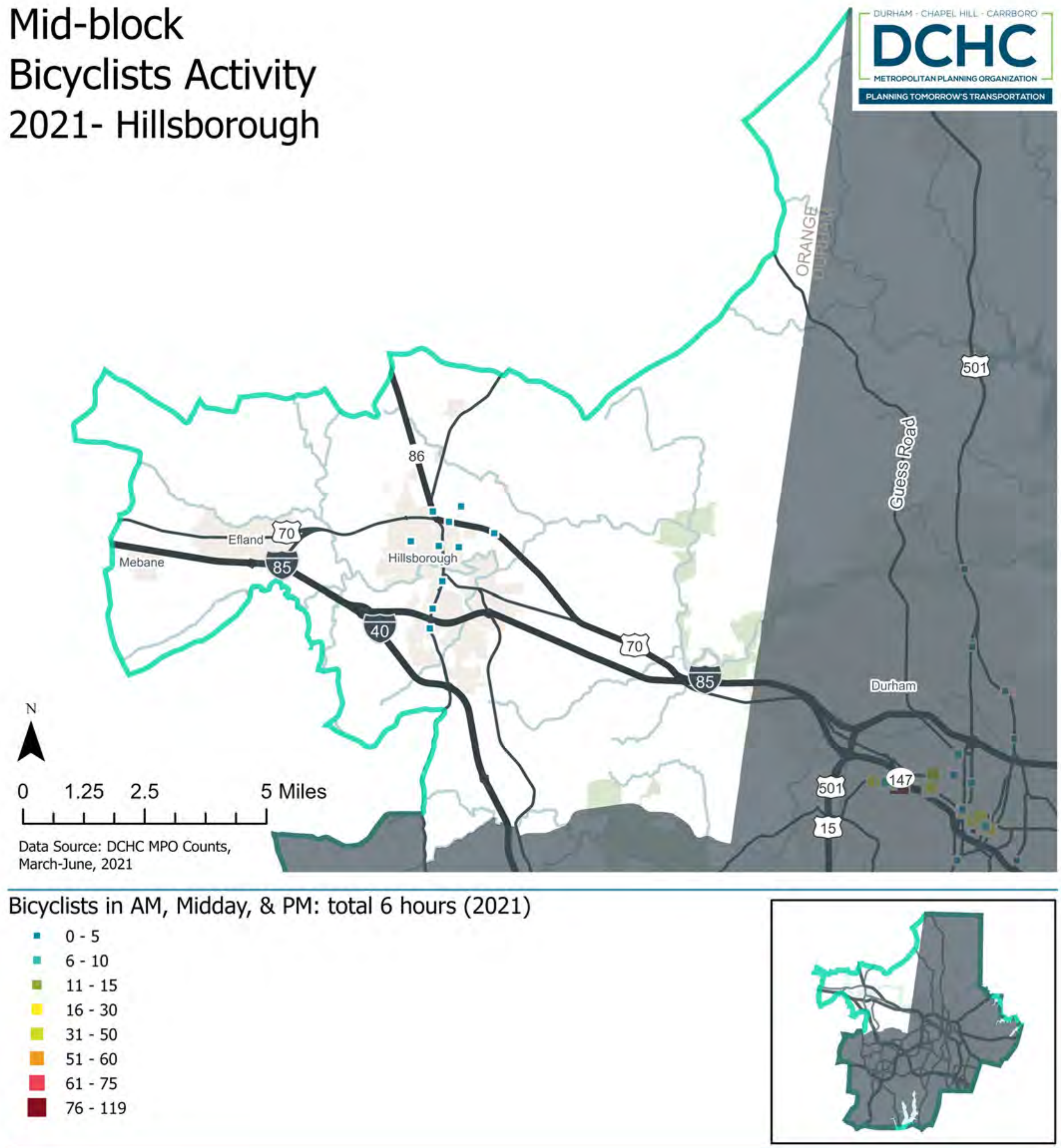


RESULTS BY GEOGRAPHIC SUBAREA

HILLSBOROUGH

TOTAL CYCLISTS COUNTED: 12

Figure 8-15. Hillsborough Mid-Block Cyclist Counts

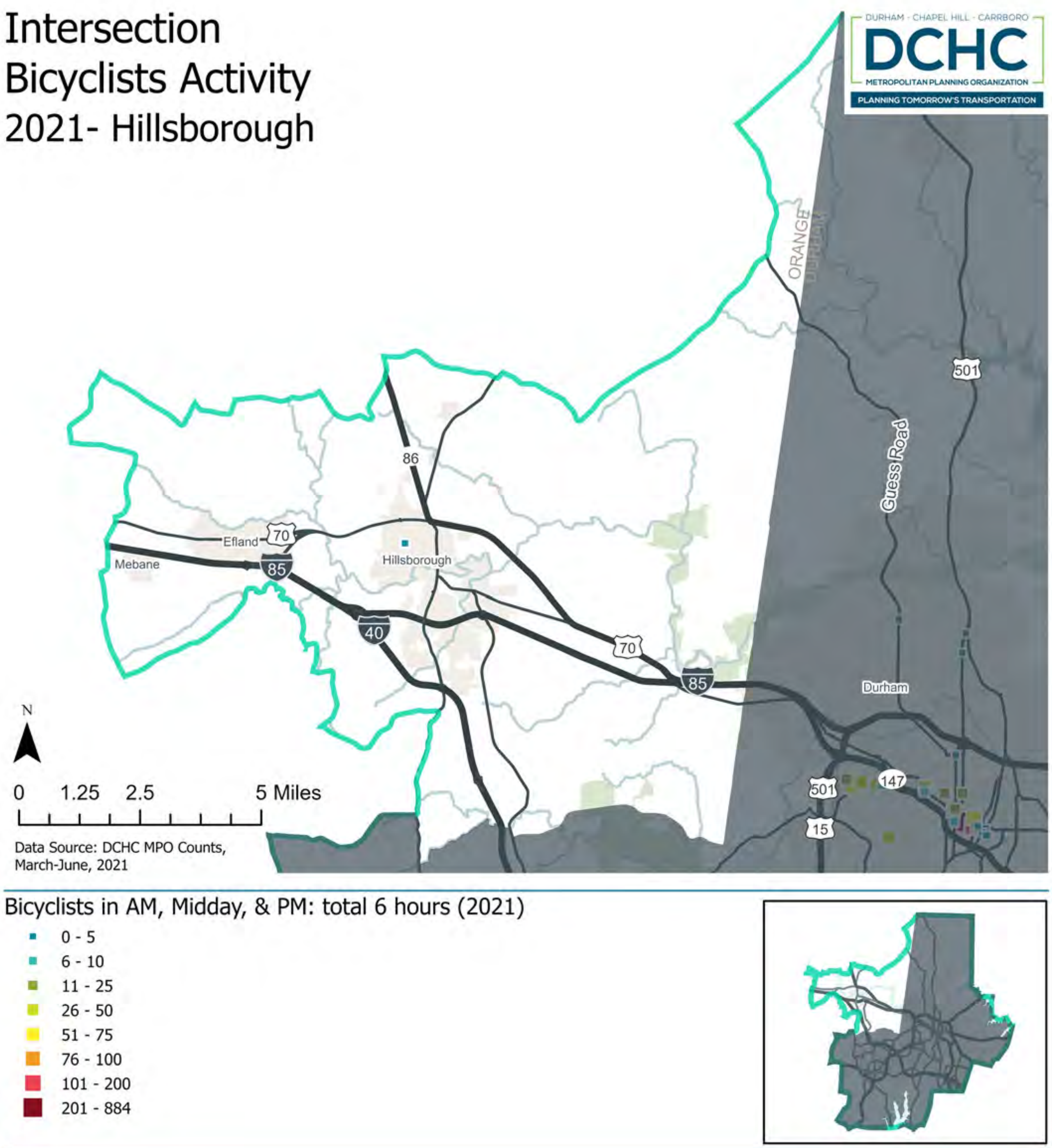


RESULTS BY GEOGRAPHIC SUBAREA

HILLSBOROUGH

TOTAL CYCLISTS COUNTED: 16

Figure 8-16. Hillsborough Intersection Cyclist Counts



RESULTS BY GEOGRAPHIC SUBAREA

HILLSBOROUGH

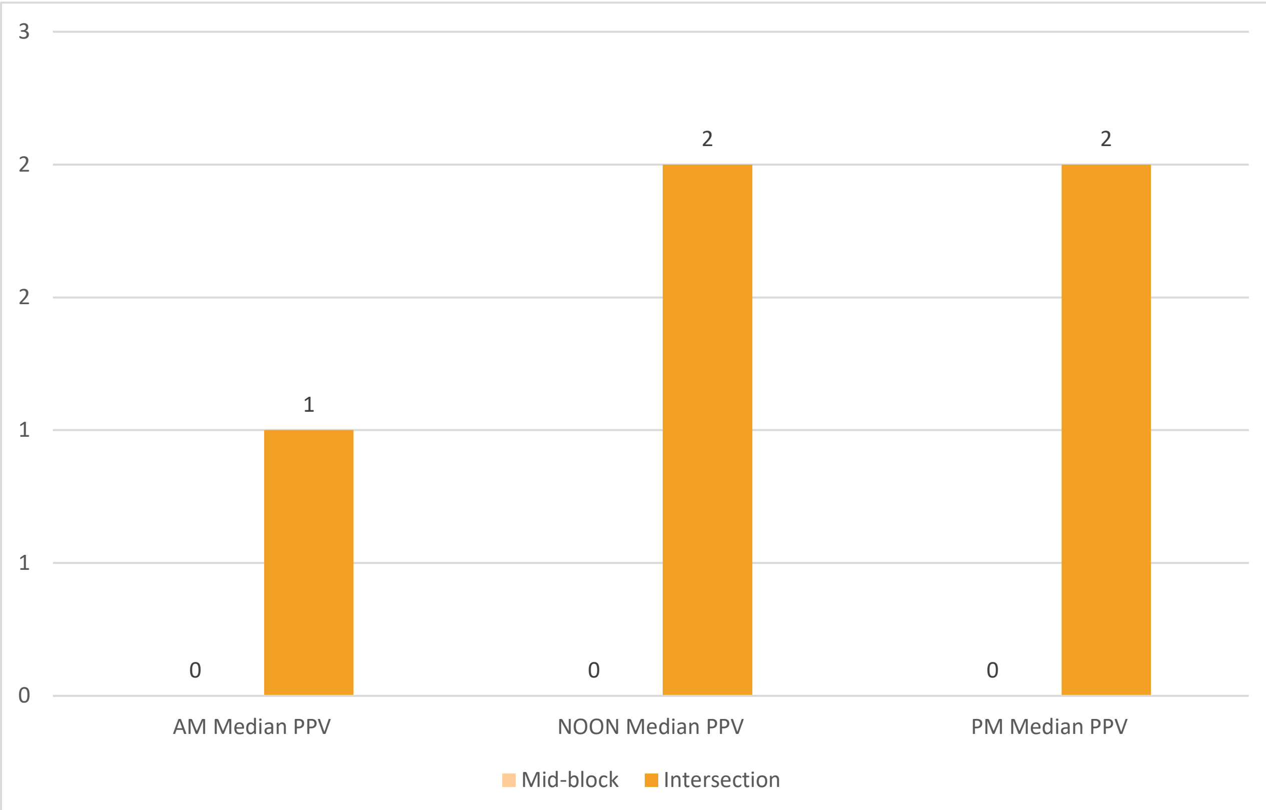
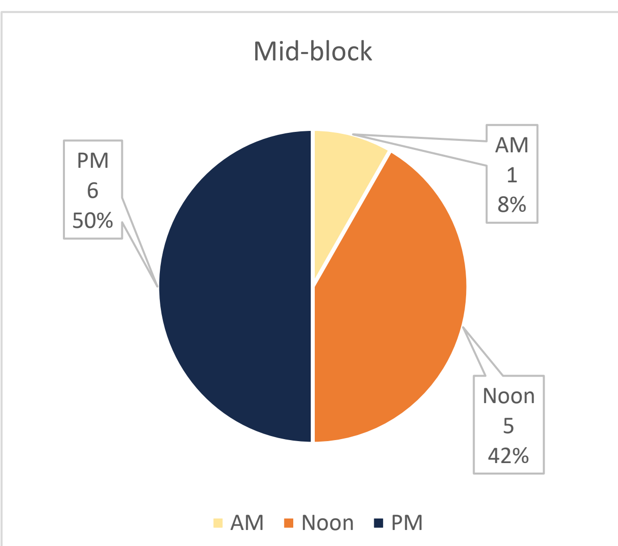
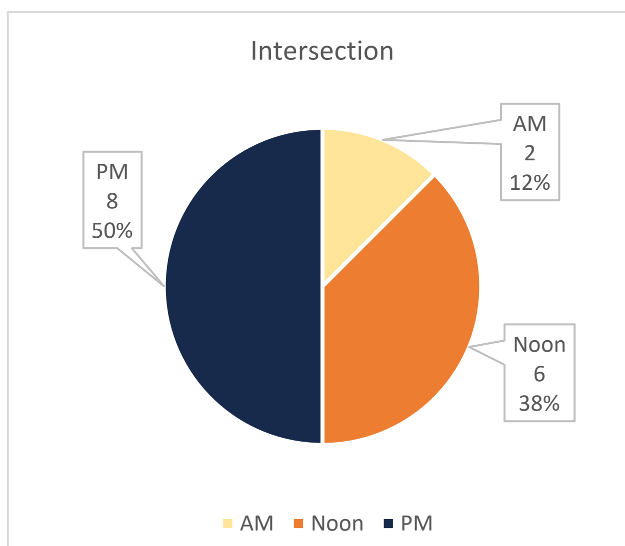


Figure 8-17. Bicyclists by Time of Day, 2021
Top bar chart shows 'median' peak period volume(PPV)
Bottom pie chart shows 'total' peak period bicyclists



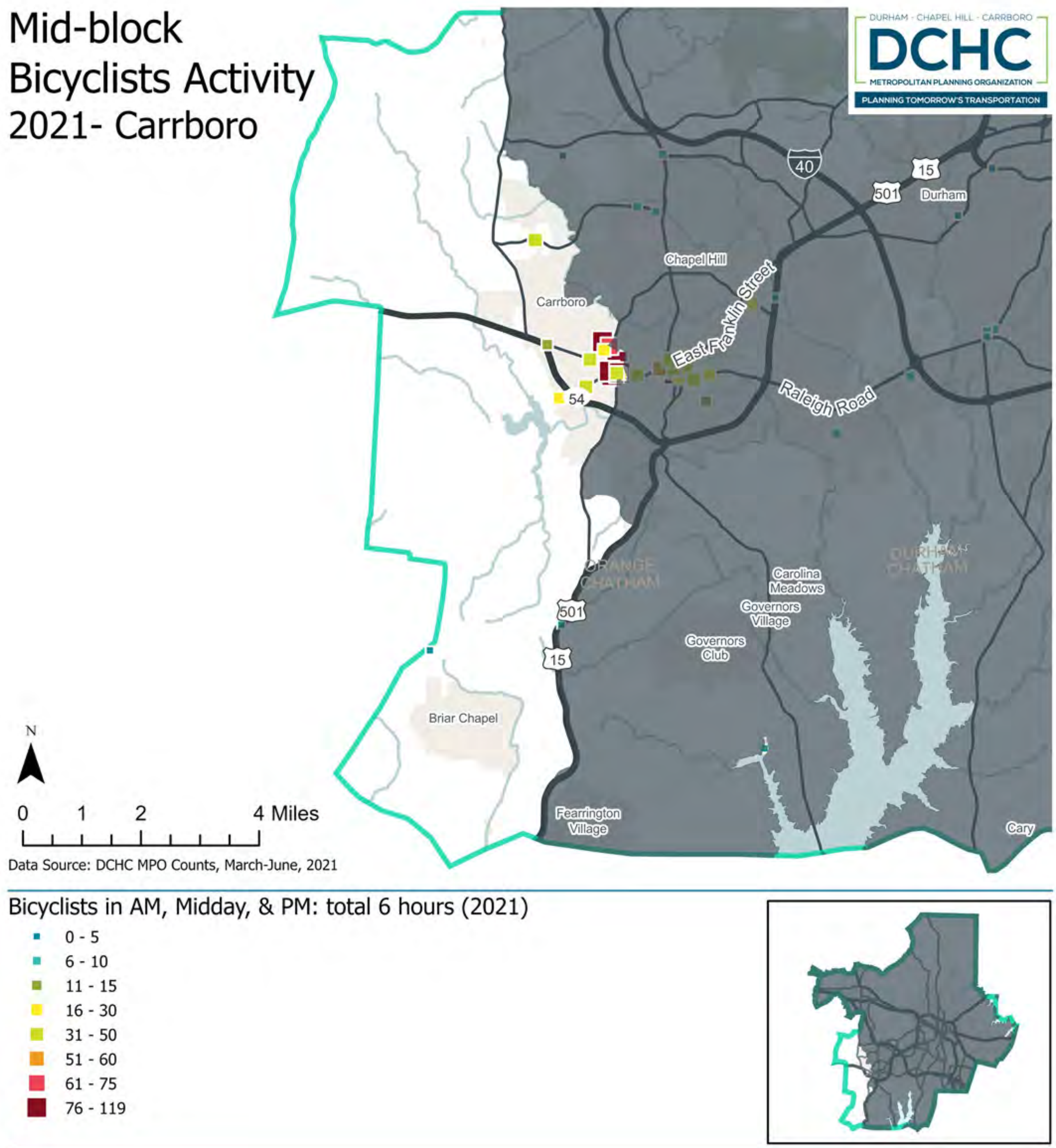


RESULTS BY GEOGRAPHIC SUBAREA

CARRBORO

TOTAL CYCLISTS COUNTED: 761

Figure 8-18. Carrboro Mid-Block Cyclist Counts

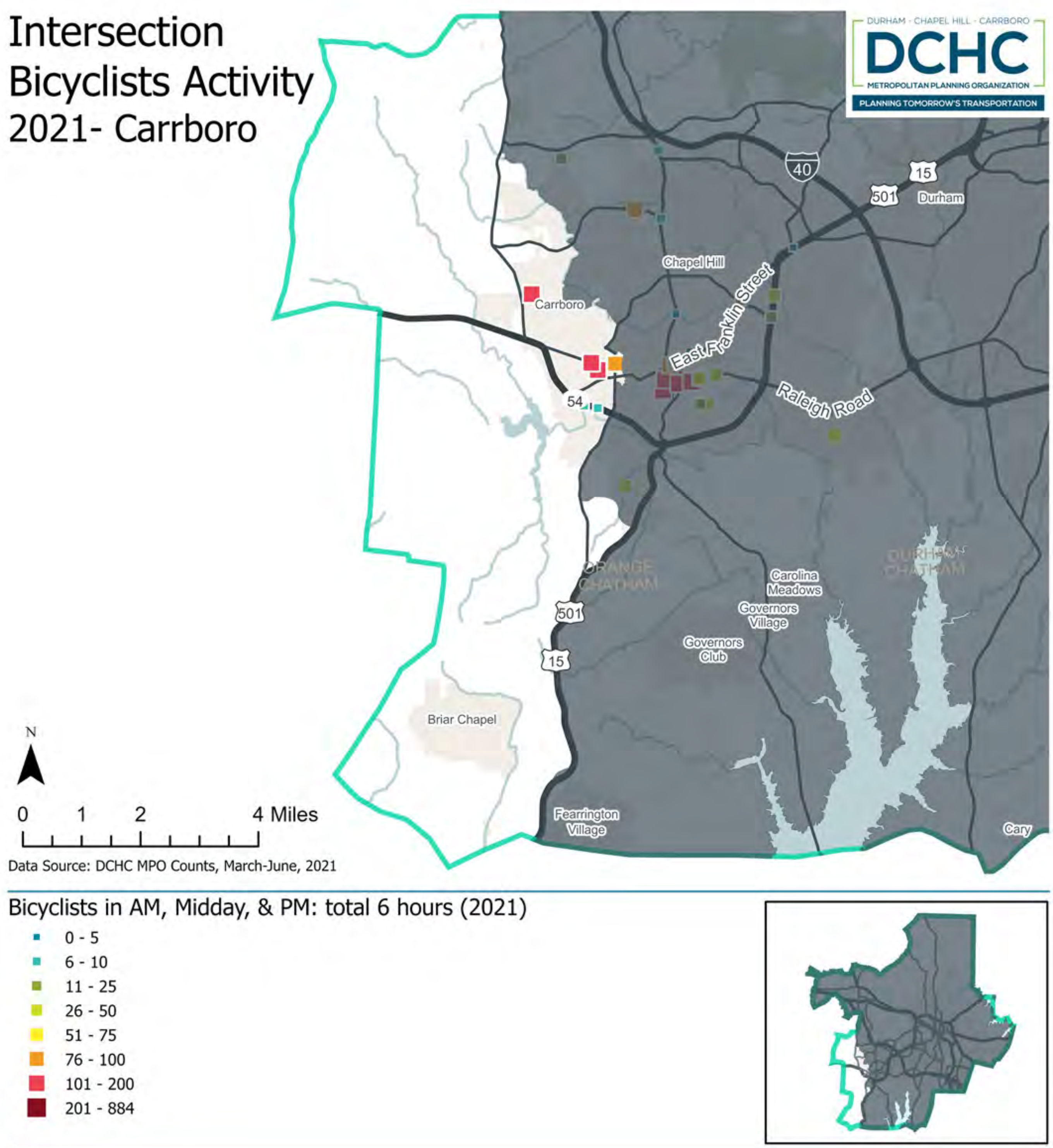


RESULTS BY GEOGRAPHIC SUBAREA

CARRBORO

TOTAL CYCLISTS COUNTED: 539

Figure 8-19. Carrboro Intersection Cyclist Counts



RESULTS BY GEOGRAPHIC SUBAREA

CARRBORO

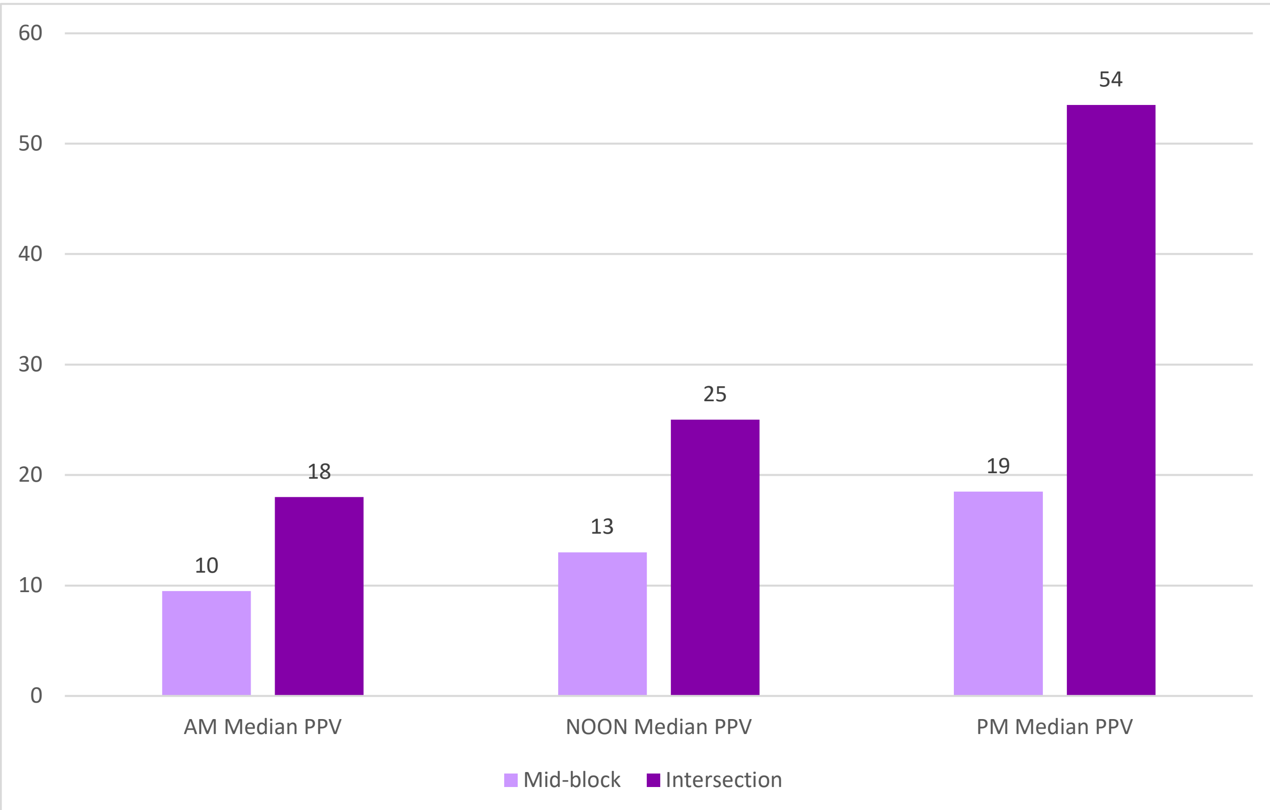
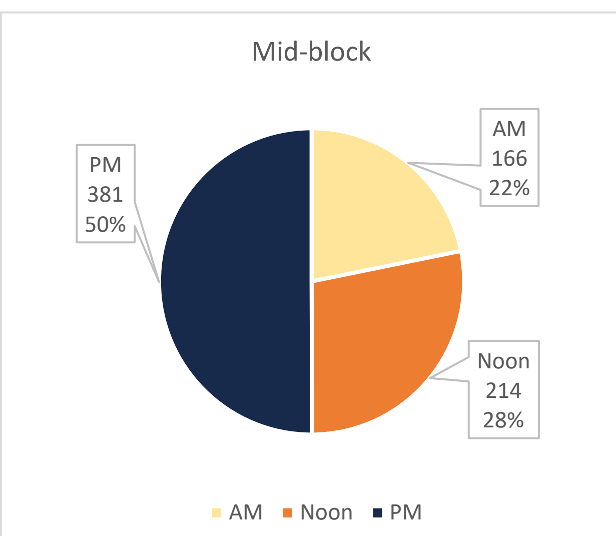
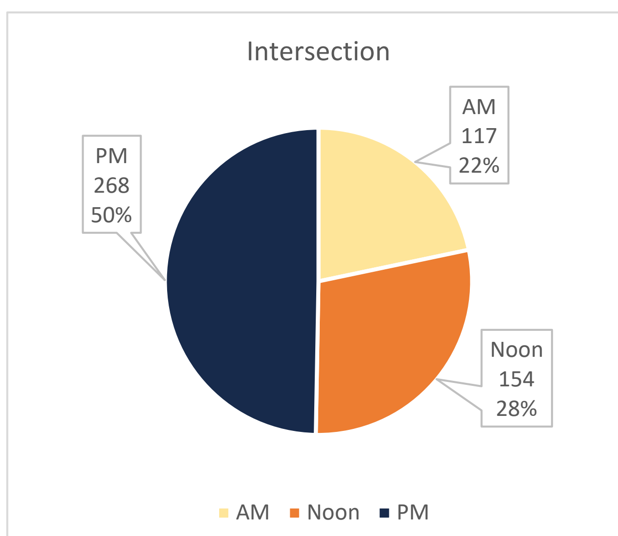


Figure 8-20. Bicyclists by Time of Day, 2021
Top bar chart shows 'median' peak period volume(PPV)
Bottom pie chart shows 'total' peak period bicyclists



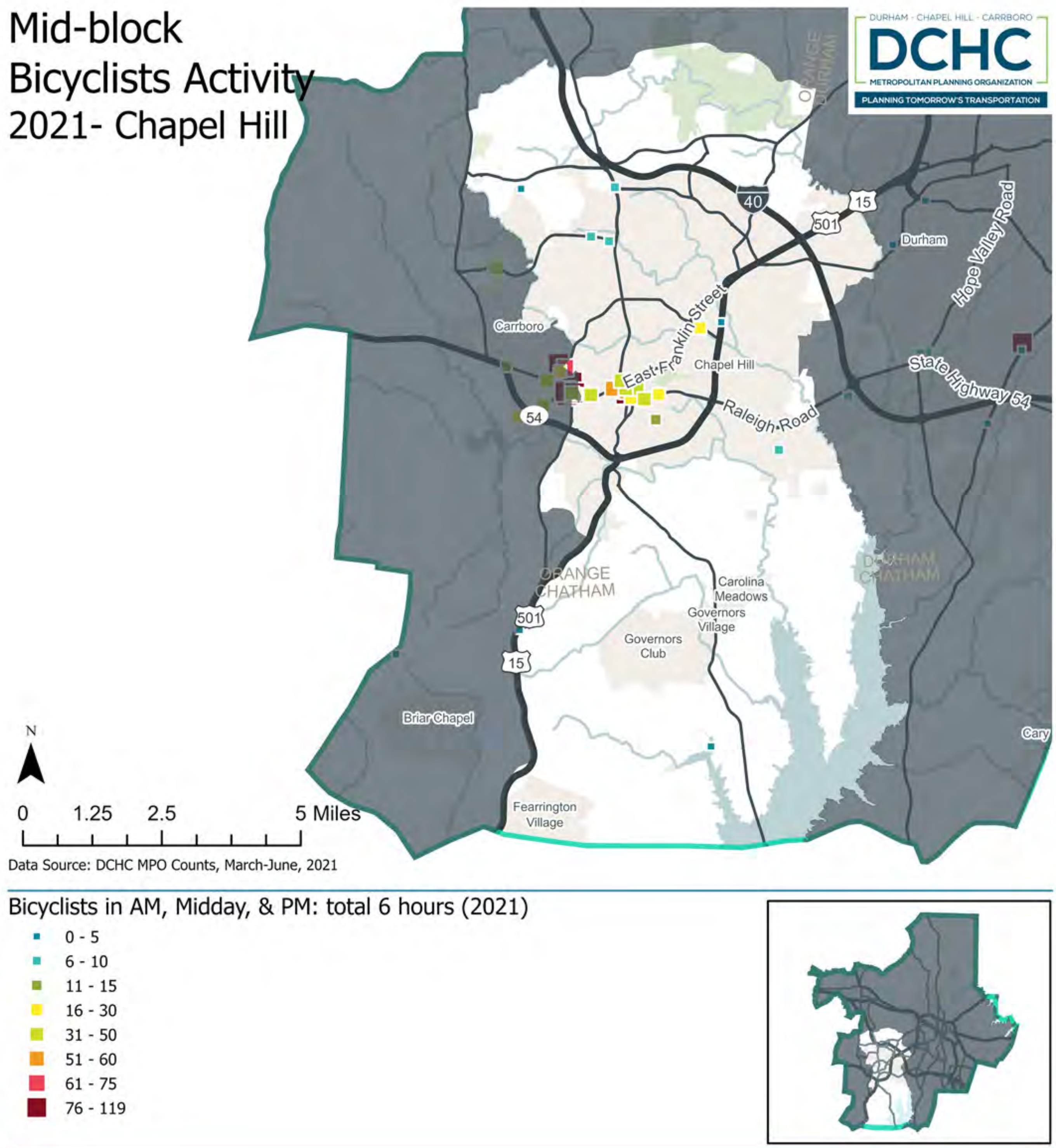


RESULTS BY GEOGRAPHIC SUBAREA

CHAPEL HILL

TOTAL CYCLISTS COUNTED: 746

Figure 8-21. Chapel Hill Mid-Block Cyclist Counts

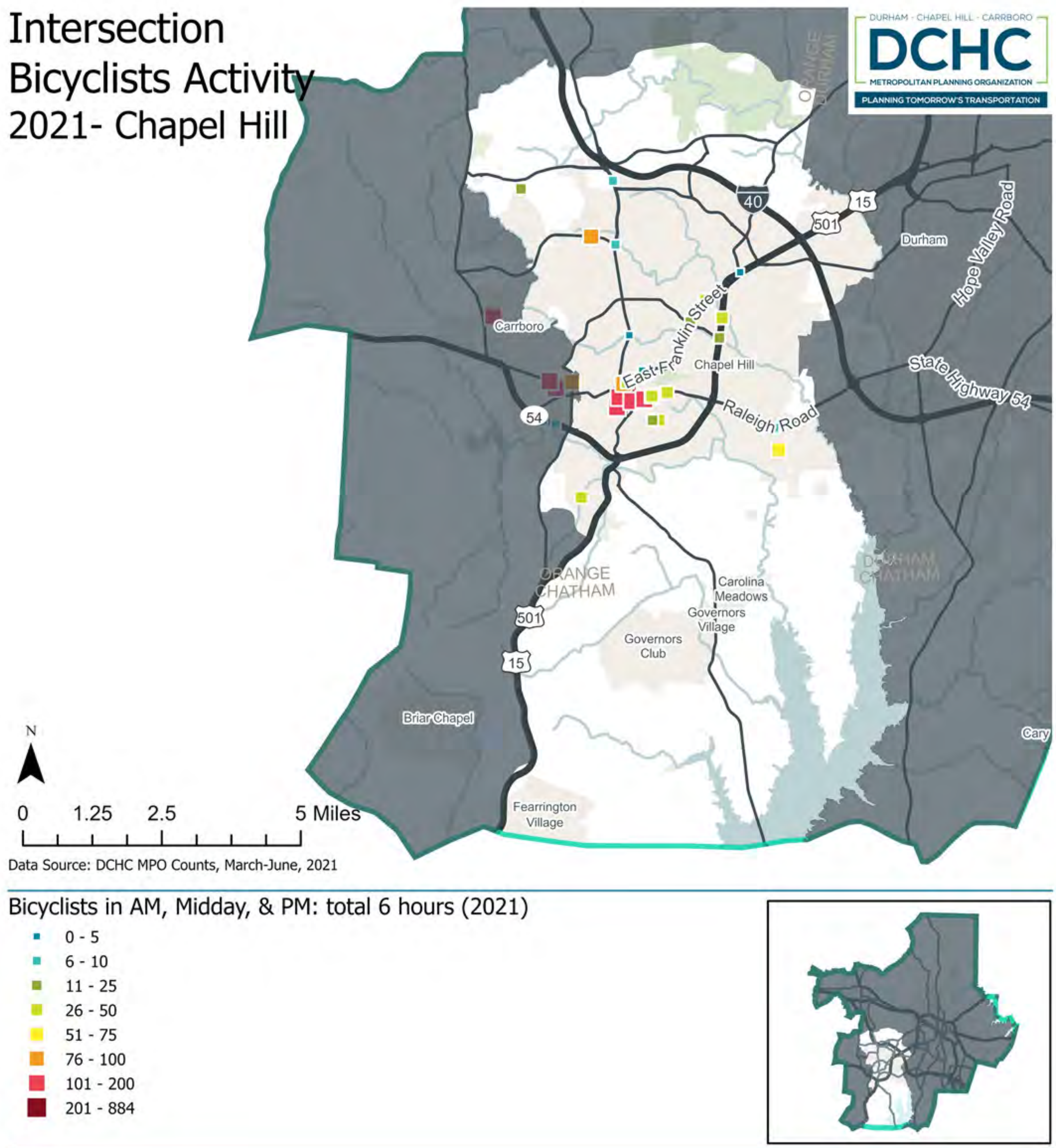


RESULTS BY GEOGRAPHIC SUBAREA

CHAPEL HILL

TOTAL CYCLISTS COUNTED: 1,423

Figure 8-22. Chapel Hill Intersection Cyclist Counts



RESULTS BY GEOGRAPHIC SUBAREA

CHAPEL HILL

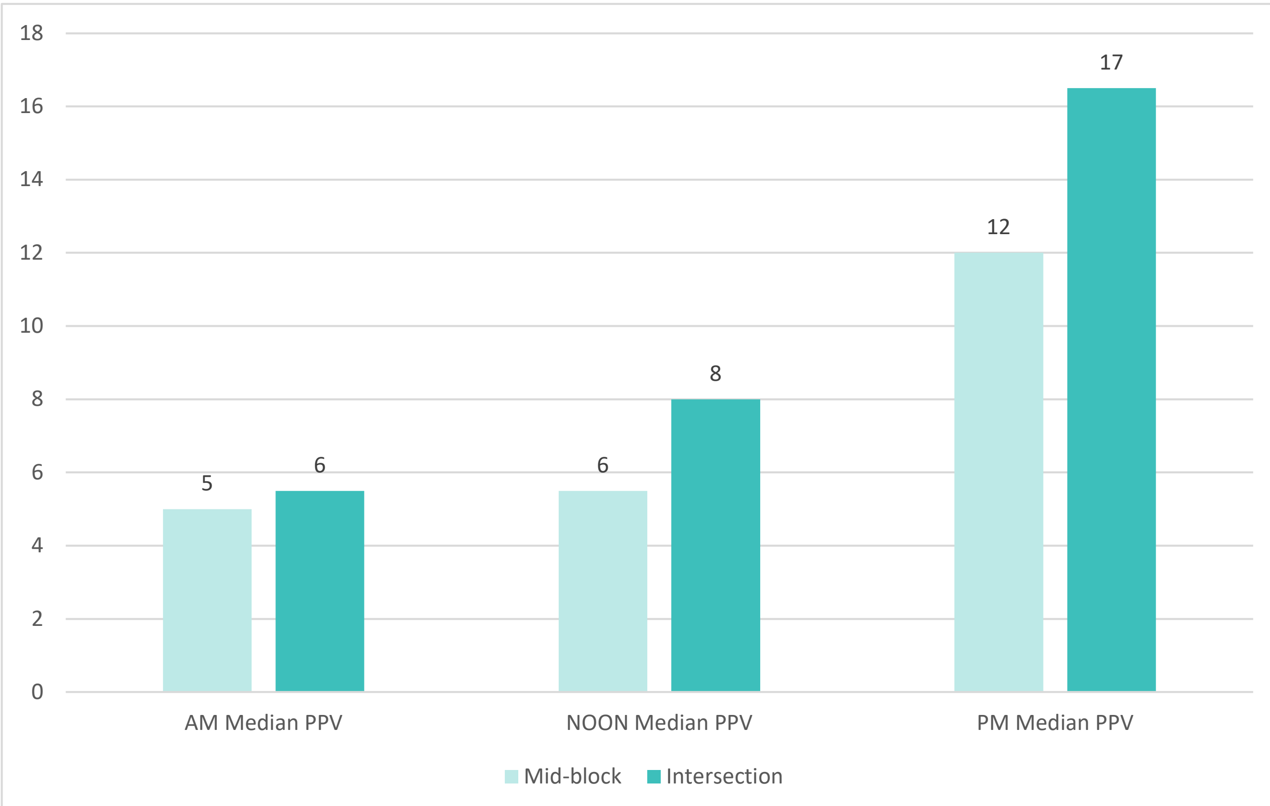
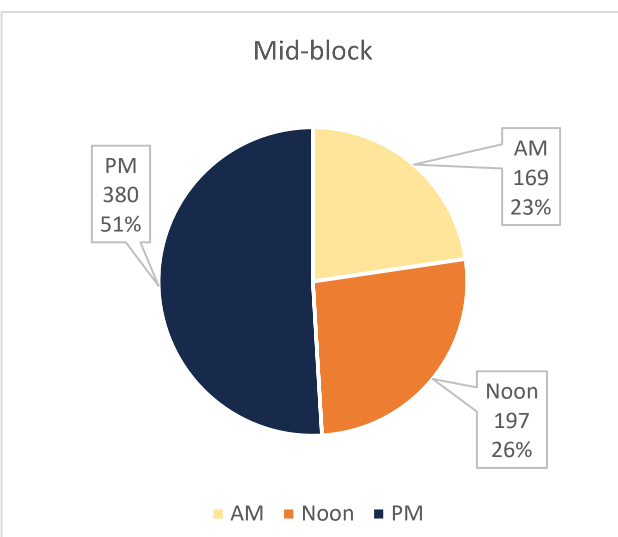
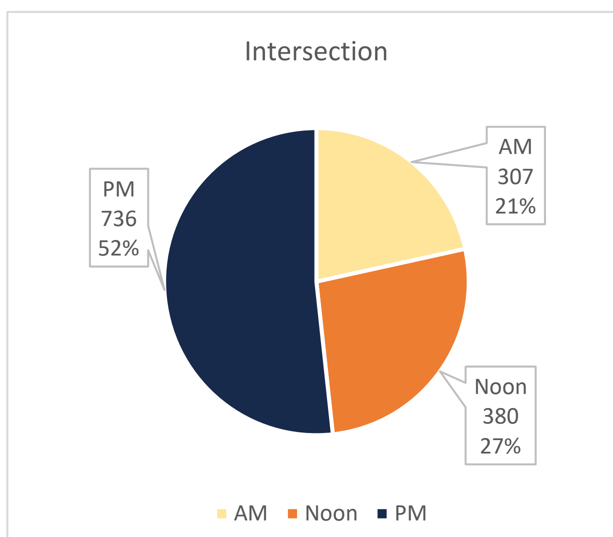


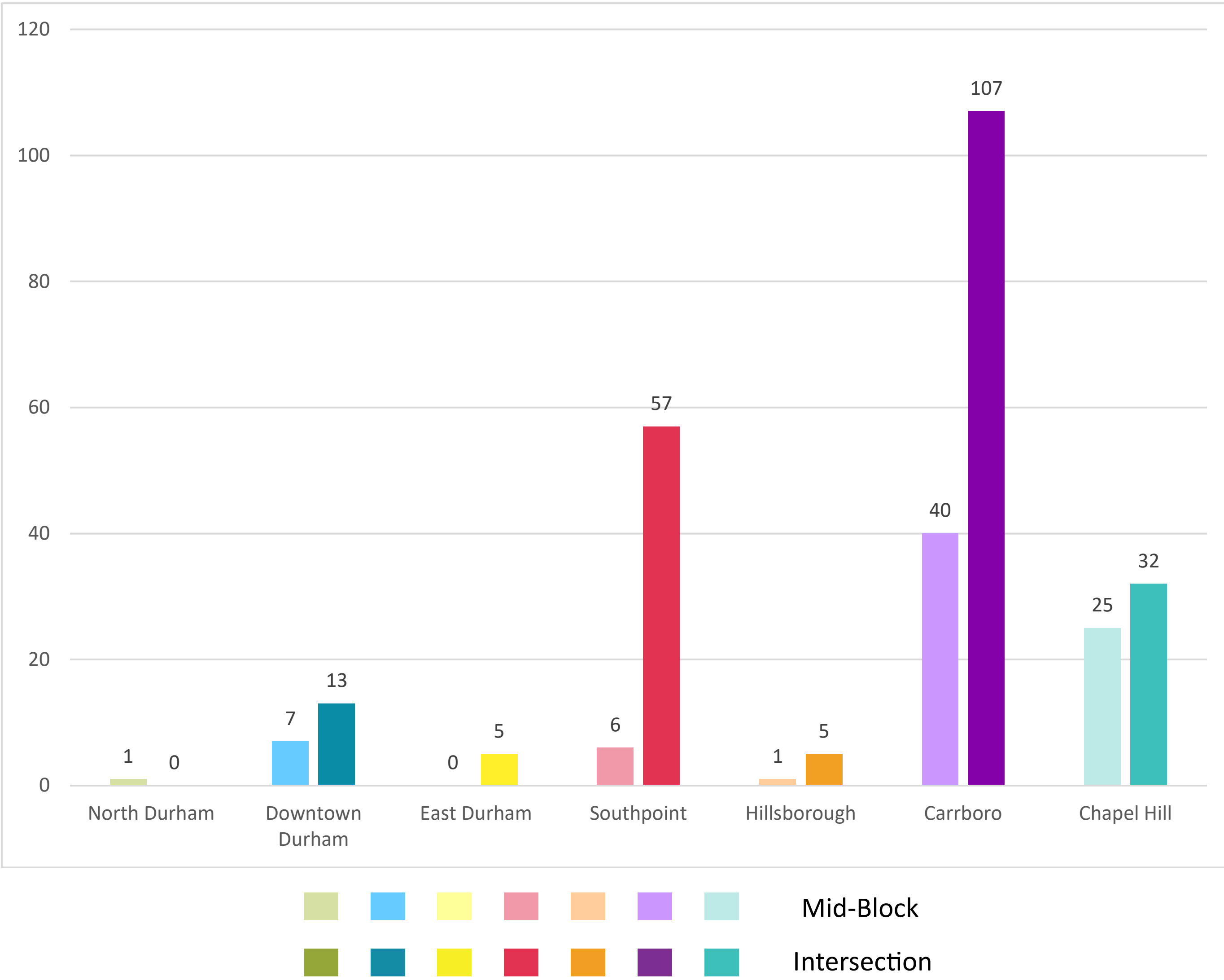
Figure 8-23. Bicyclists by Time of Day, 2021
Top bar chart shows 'median' peak period volume(PPV)
Bottom pie chart shows 'total' peak period bicyclists





RESULTS BY GEOGRAPHIC SUBAREA

Figure 8-24. 6 Hour Total Median PPV



COMPARATIVE ANALYSIS

While comparing between the 6-hour (AM, Noon and PM peak) median PPV of mid-block and intersection count locations, Carrboro had a dramatic difference followed by Southpoint subarea. North Durham has the lowest count among all the subareas at both mid-block and intersection counts, followed by the second lowest subareas, East Durham and Hillsborough. However, in all the subareas except North Durham, the intersection bicycle counts are much higher than the mid-block bicycle counts. While comparing the total of median PPV, Carrboro, Chapel Hill and Southpoint were the top three subareas with the highest bicycle counts at both mid-block and intersection count locations.

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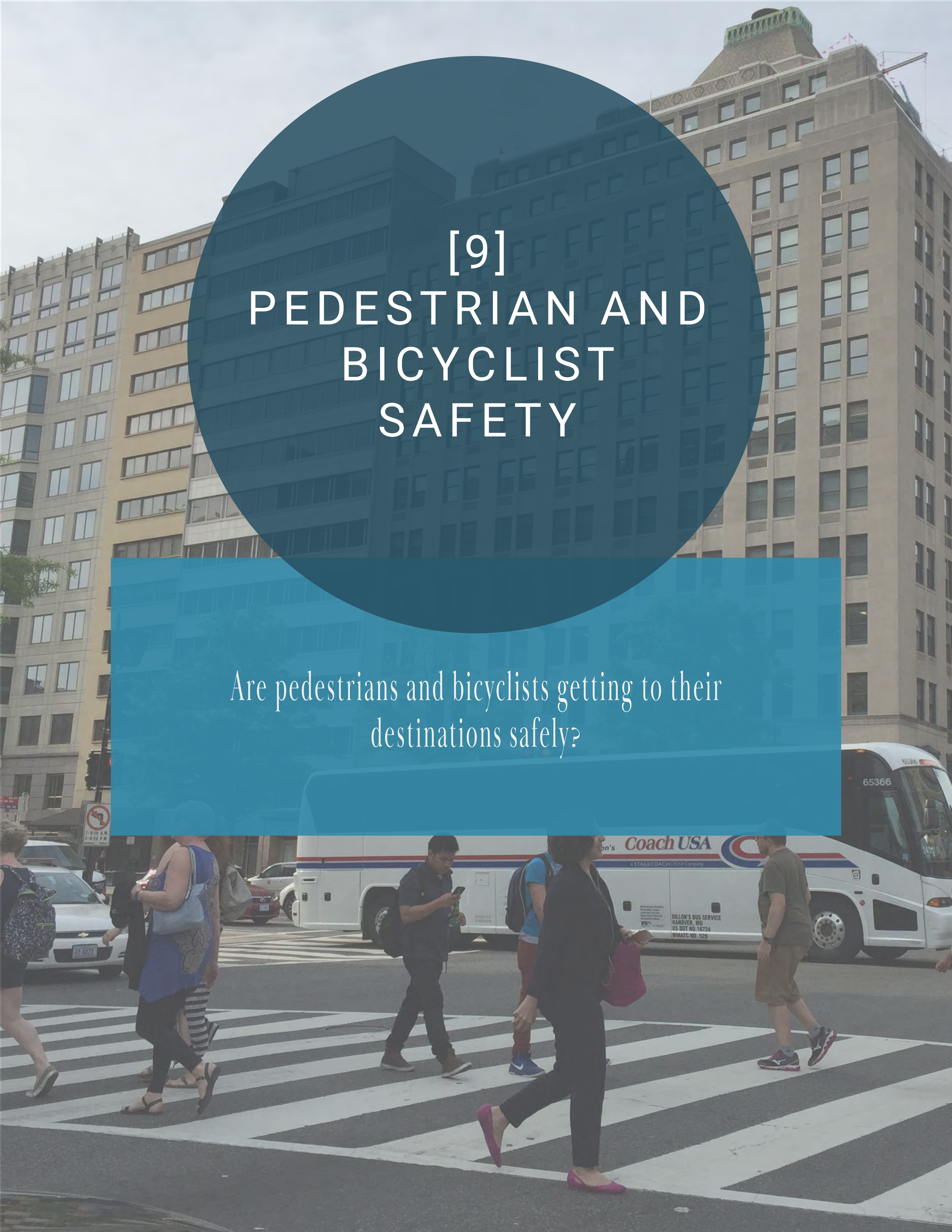

[9]
PEDESTRIAN AND BICYCLIST SAFETY

Are pedestrians and bicyclists getting to their destinations safely?

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KEY TAKEAWAYS

616 pedestrian crashes occurred between 2017 and 2021:

- 573 crashes (86%) resulted in injuries
- 43 crashes (7%) resulted in fatalities
- Pedestrian crashes have decrease since 2017;but the number resulting in fatalities or disabling injuries has increased since 2020.

113 bicycle crashes occurred between 2017 and 2021:

- 102 crashes (90%) resulted in injuries; 5 (4%) resulted in disabling injuries
- No crash resulted in fatalities
- Bicycle crashes have decreased since 2017 (except for an increase in 2021 by 2 crashes from 2020); the number resulting in disabling injuries has stayed about the same over 5 years.

Pedestrian and bicycle crashes are concentrated in Durham and Chapel Hill; this may be due to higher pedestrian and bicycle volumes in those areas.

49% of pedestrian and 38% of bicycle crashes occurred in Downtown Durham, that subarea has the highest share of crashes resulting in disabling injuries and fatalities

For both bicyclists and pedestrians, crashes tend to be less severe during the day than at night.
Undesirable weather didn’t impact the crash numbers, more than half of the crashes happened in clear weather.

INTRODUCTION

Pedestrian and bicycle crashes are a special subset of total crashes (reported in Chapter 4), as they involve vulnerable users of the transportation system. Collisions involving pedestrians and cyclists often result in injuries since these travelers are relatively unprotected. In fact, while 75% of all crashes reported by NCDOT in the DCHC area between 2017 and 2021 result in property damage only (no injuries), only 7.4% of those involving bicyclists and pedestrians result in no injury. These high rates of injury highlight the importance of safe bicycle and pedestrian networks to the overall success of a transportation network.

Identifying areas with high bicycle and pedestrian crash rates allows the MPO to strategically plan safety improvements and enhance bicycle and pedestrian facilities to reduce crashes, injuries, and fatalities.

METHODOLOGY

NCDOT's Traffic Engineering Accident Analysis System (TEAAS) generates data on crashes involving bicycles and pedestrians. The TEAAS database categorizes crashes into six levels of severity:

- **Killed/Fatal:** deaths that occur within twelve months of the crash
- **Disabling:** injuries serious enough to prevent normal activity for at least one day, such as massive loss of blood, broken bones, etc.
- **Evident:** non-fatal or disabling injuries that are evident at the scene such as bruises, swelling, limping, etc.
- **Possible:** no visible injury but there are complaints of pain or momentary unconsciousness
- **None:** no injury
- **Unknown:** unknown if any injury occurred

Data used for this analysis is from the NCDOT Traffic Engineering Accident Analysis System (TEAAS) for the five-year period from 2017 to 2021, same as the vehicle safety analysis in Chapter 4.

In addition to considering total number of crashes and severity, correlations between severity level and some factors were explored. These include time-of-day, specific factors or reason for the crashes. Due to data availability limitations speed limit, lane type, facility type and traffic orientation factors were not possible to include in this analysis.

REGIONAL OVERVIEW

PEDESTRIAN AND BICYCLE CRASH RATES

There were 616 pedestrian crashes from 2017 to 2021. Among these, 111 (18%) resulted in severe injuries or fatalities, 462 (75%) resulted in minor or non-severe injuries, and 43 (7%) resulted in no or unknown injuries.

Pedestrian crashes occurred most frequently in Durham and Chapel Hill (Figure 9-1 and 9-3). This may be attributed to higher volumes of pedestrians in those areas (see Chapter 6). Most fatal pedestrian crashes occurred in the Durham area.

From 2017 to 2021, there were 113 crashes involving bicyclists. Among these, 5 (4%) resulted in severe injuries(no fatalities), 97 (86%) resulted in minor or non-severe injuries, and 11 (10%) resulted in no or unknown injuries.

Bicycle crashes also occur most frequently in Durham and Chapel Hill (Figure 9-2). Pedestrian crashes occur throughout the region, but bicycle crashes are comparatively rare outside of city centers.

The total number of combined pedestrian and bicycle crashes (729) between 2017 and 2021 decreased by 35% over the previous five-year period (1,128 crashes during 2013-2017).

In DCHC, 93% of pedestrian crashes and 90% of bicycle crashes resulted in injury or death for the 2017 to 2021 timeframe.

FACTORS IN PEDESTRIAN AND BICYCLE CRASHES

Summarizing crash details for pedestrian and bicycle crashes provides insight into common factors that lead to crashes, which can in turn help identify potential safety improvements to minimize injuries and fatalities on the transportation system. This section quantifies pedestrian and bicycle crashes by severity and looks for general correlations between severity level and spatial and temporal factors. Factors considered include:

- Time of day – Distribution of crash severity in daylight and night conditions. Daylight/ night conditions were determined based on date and time data associated with each crash.

- Special factors involved in Crash: Driving under Influence (drug/alcohol), distracted driving, speeding, elderly or teenage driver were considered to find a specific pattern for the causes of crashes.

Fatal (killed)/severe pedestrian crashes are more likely to occur at night than during daylight hours. For example, 10 of the 43 fatal pedestrian crashes (24%) occurred during the day; 33 of 43 (76%) fatal pedestrian crashes occurred at night. But for bicycle crashes, majority of the severe crashes (3 out of 5) occurred at daytime

While analyzing the statistics of the special factors involved in crash, 15% of fatal and 40% of the disabling pedestrian crashes occurred while the driver was under influence of drug/alcohol. Distracted driving caused 16% of the fatal and 20% of disabling pedestrian crashes. Out of 93 crashes that had a driver involved under influence of alcohol or drug, 50 were found in Downtown Durham subarea. Out of 132 cases of distracted driving, 57 occurred in Downtown Durham. Carrboro had the lowest number of crashes that involved driver under influence or distracted one (1 and 5 respectively).

A similar pattern was observed for the bicycle crashes too. There was no fatal bicycle crash, but 40% of the severe/disabling crashes occurred due to the involvement of a driver under influence of alcohol/drug and distracted. In Downtown Durham 4 out 6 crashes occurred due to the involvement of a driver under influence of alcohol; 8 out of 23 crashes occurred due to distracted driving. Carrboro had no incident involving driving under influence but 3 out of 23 occurred due to distracted driving.

Figure 9-1. Pedestrian Crash Locations (2017-2021)

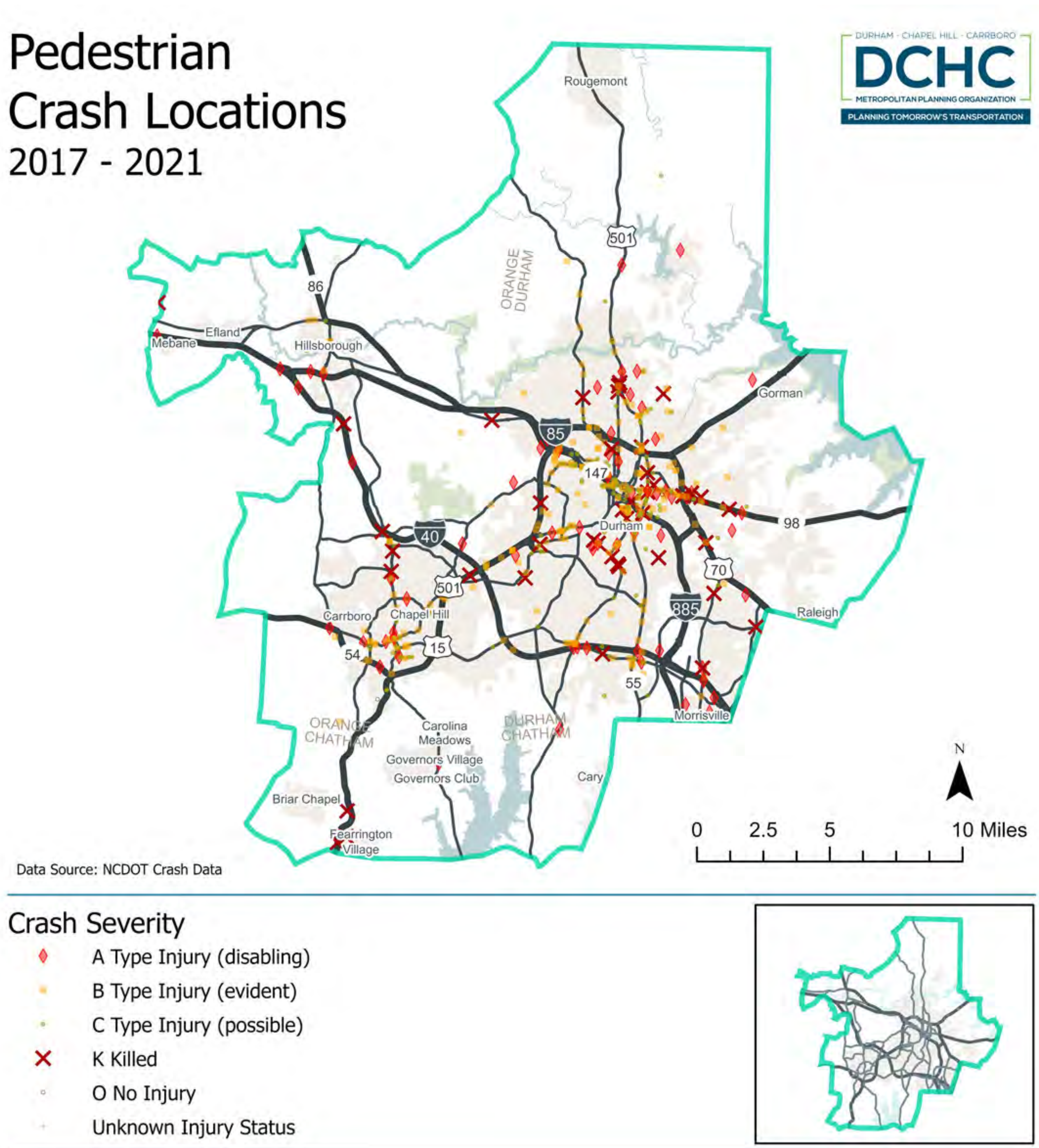


Figure 9-2. Bicycle Crash Locations (2017-2021)

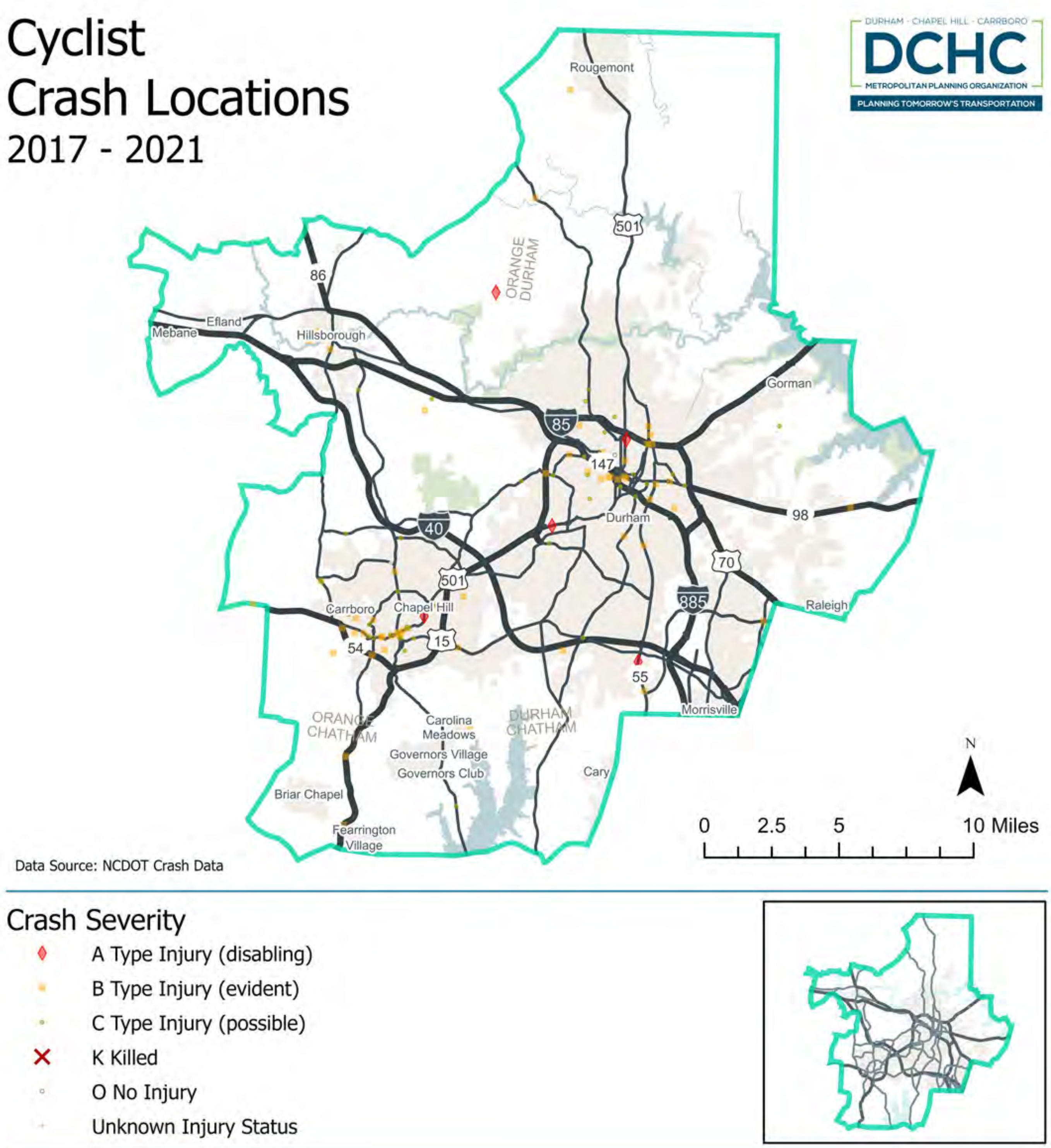


Figure 9-3. Pedestrian Fatal/Severe Crash Locations (2017-2021)

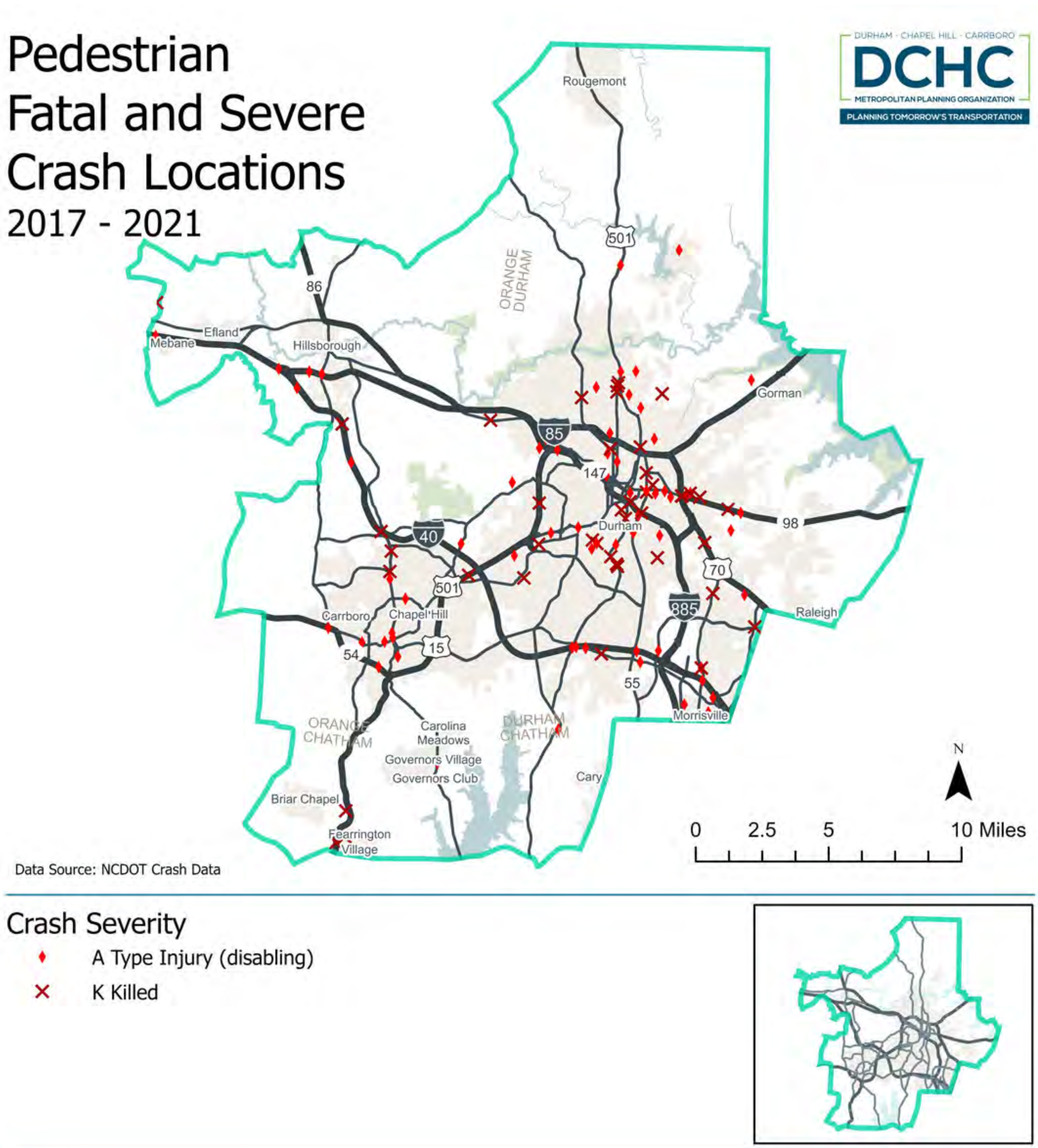


Figure 9-4. Severity of Pedestrian Crashes by Time of Day (2017-2021)

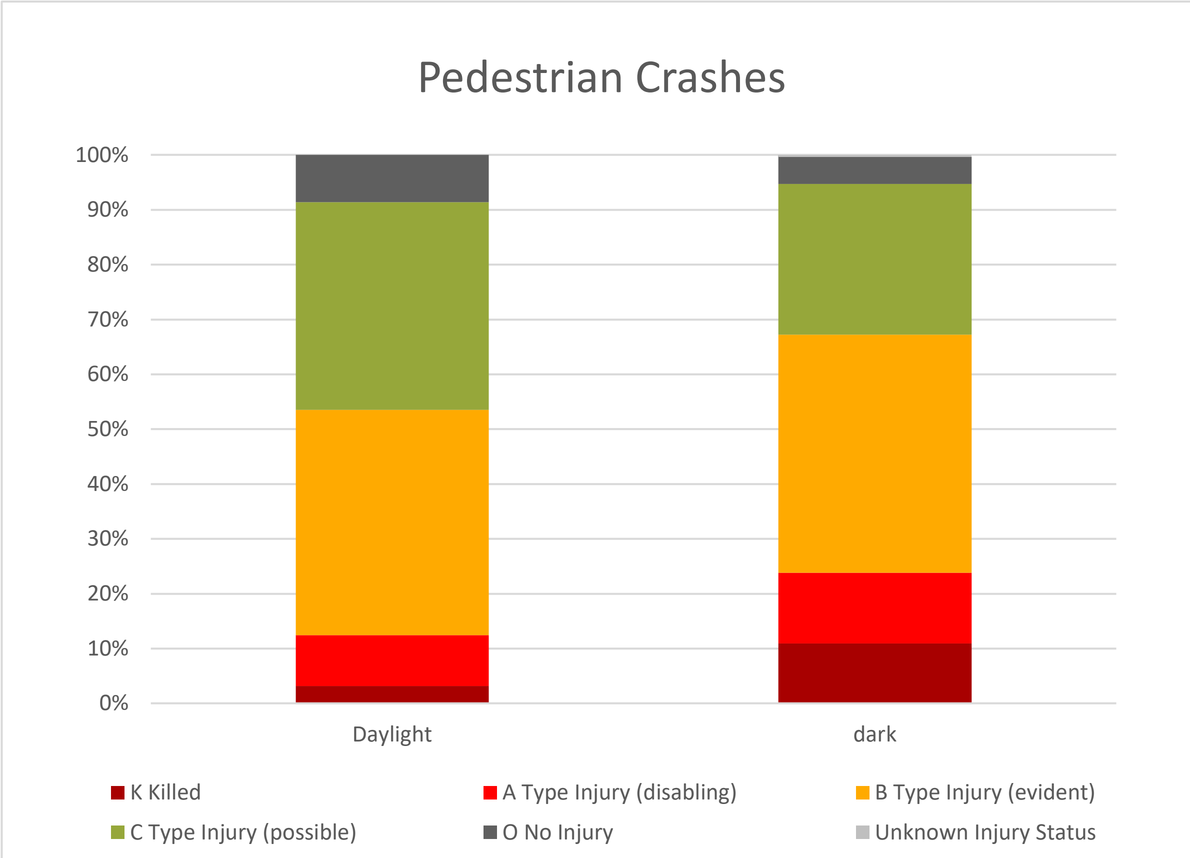
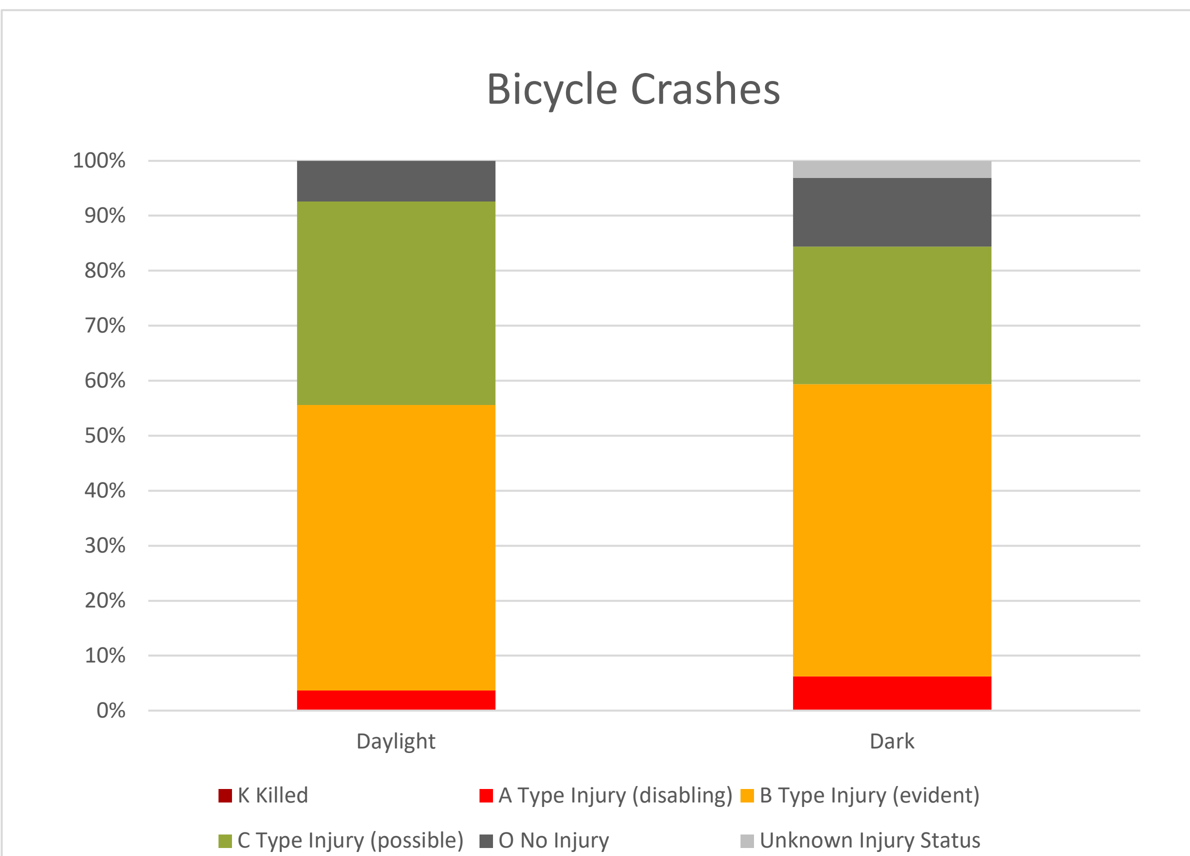


Figure 9-5. Severity of Bicycle Crashes by Time of Day (2017-2021)



TRENDS OVER TIME

Figure 9-6. Pedestrian Crashes 2017-2021

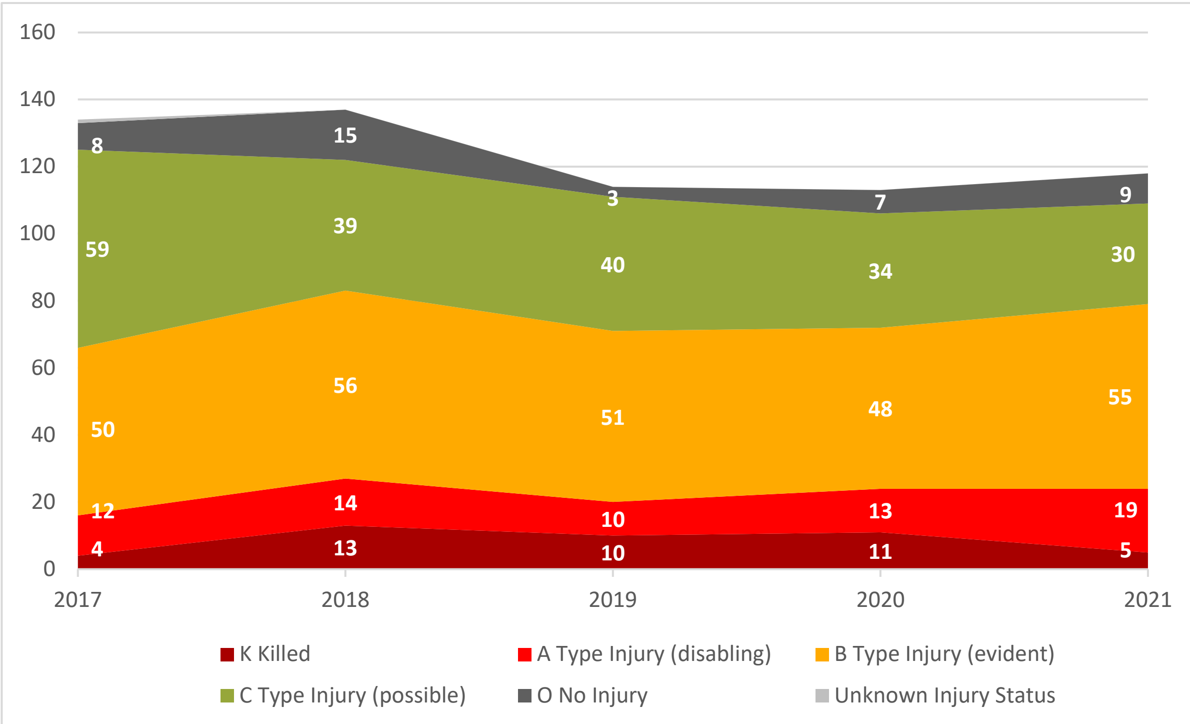


Figure 9-7. Bicycle Crashes 2017-2021

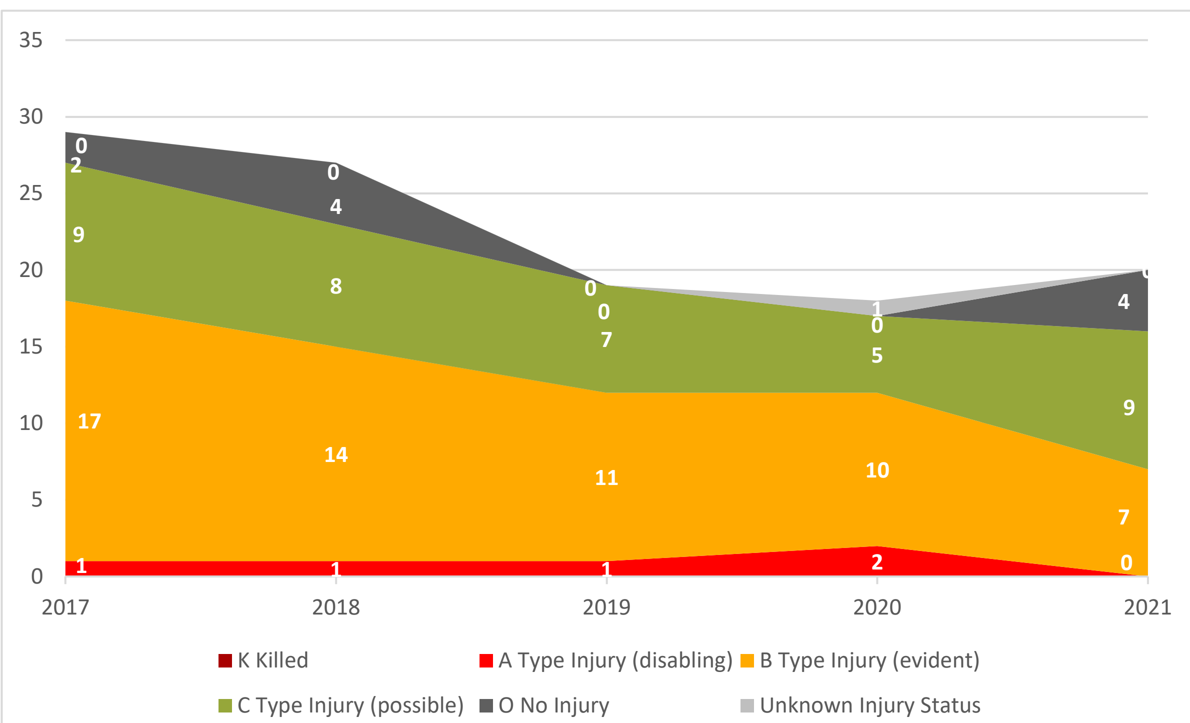


Table 9-1. Likely Causes of Pedestrian Crashes by Severity 2017-2021

	Alcohol Influence	Drug Influence	Distracted Driving	Teen Driver	Elderly Driver	Speeding	Other	Total
K Killed	10	0	11	5	7	2	33	68
A Type Injury (disabling)	33	7	53	8	14	6	139	260
B Type Injury (evident)	20	3	52	9	17	2	99	202
C Type Injury (possible)	11	2	7	2	4	7	10	43
O No Injury	5	2	9	1	7	0	18	42
Unknown Injury Status	0	0	0	0	0	0	1	1
Grand Total	79	14	132	25	49	17	300	616

Table 9-2. Likely Causes of Bicycle Crashes by Severity 2017-2021

	Alcohol Influence	Drug Influence	Distracted Driving	Teen Driver	Elderly Driver	Speeding	Other	Total
K Killed	0	0	0	0	0	0	0	0
A Type Injury (disabling)	1	0	1	0	0	0	3	5
B Type Injury (evident)	4	0	11	3	14	0	27	59
C Type Injury (possible)	1	0	9	2	6	0	20	38
O No Injury	0	0	2	0	1	0	7	10
Unknown Injury Status	0	0	0	0	0	0	1	1
Grand Total	6	0	23	5	21	0	58	113

RESULTS BY GEOGRAPHIC SUBAREA

Table 9-3. Pedestrian Crash Summary by Subarea and Crash Severity 2017-2021

	North Durham	Downtown Durham	East Durham	Southpoint	Hillsborough	Carrboro	Chapel Hill	Total
Alcohol Influence	5	42	6	8	5	1	12	79
Drug Influence	1	8	1	3	0	0	1	14
Distracted Driving	13	57	5	8	7	5	37	132
Teen Driver	1	10	1	1	2	0	10	25
Elderly Driver	7	22	2	7	2	1	8	49
Speeding	0	9	2	1	0	0	2	17
Other	43	155	22	37	7	8	31	300
Grand Total	70	303	39	65	23	15	101	616

Table 9-4. Bicycle Crash Summary by Subarea and Crash Severity 2017-2021

	North Durham	Downtown Durham	East Durham	Southpoint	Hillsborough	Carrboro	Chapel Hill	Total
Alcohol Influence	0	4	0	0	1	0	1	6
Drug Influence	0	0	0	0	0	0	0	0
Distracted Driving	0	8	1	1	1	3	9	23
Teen Driver	0	2		0	0	2	1	5
Elderly Driver	1	6	1	1	3	1	8	21
Speeding	1	0	0	0	0	0	0	1
Other	6	23	1	2	2	9	14	57
Grand Total	8	43	3	4	7	15	33	113

RESULTS BY GEOGRAPHIC SUBAREA

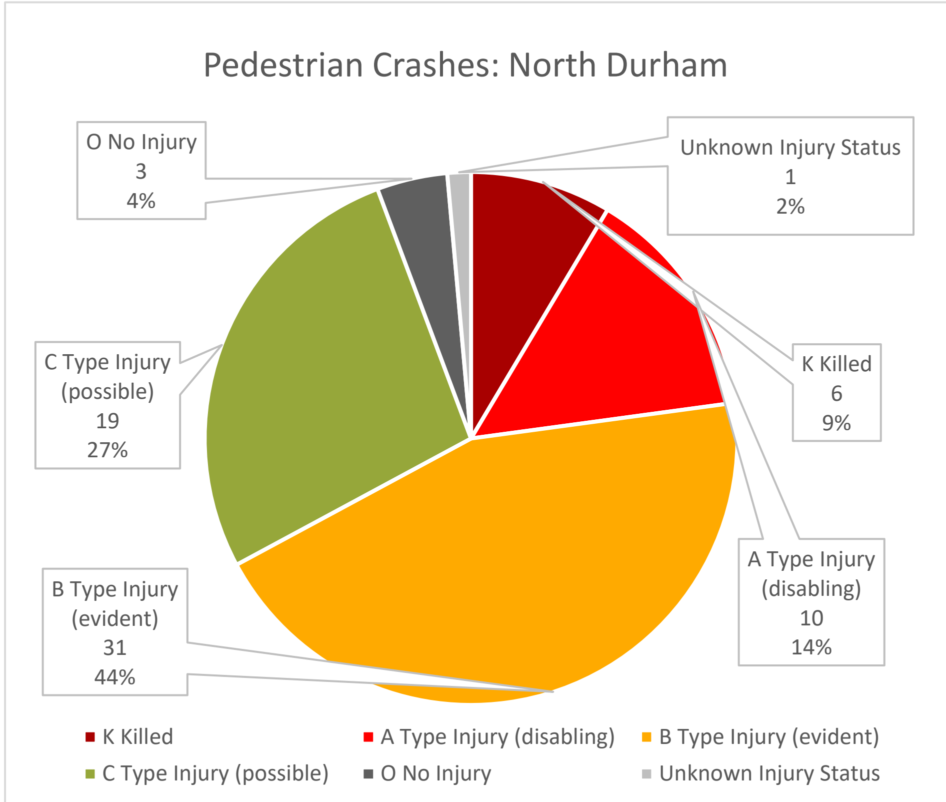
NORTH DURHAM

KEY TAKEAWAY

From 2017 to 2021, in 5 years, 70 pedestrian crashes occurred in North Durham.

KEY TAKEAWAY

Several fatal (killed) crashes occurred along N Duke St (US 501) and Roxboro Rd in North Durham.

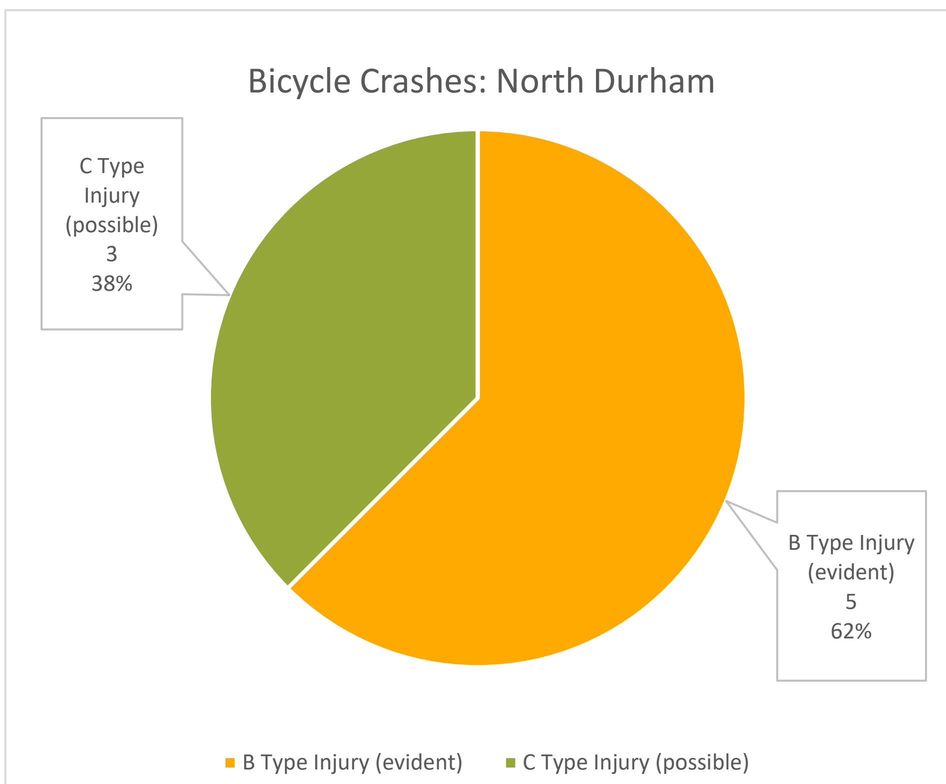


KEY TAKEAWAY

From 2017 to 2021, in 5 years, 8 bicycle crashes occurred in North Durham.

KEY TAKEAWAY

Severe crashes occurred along Roxboro Rd in North Durham



RESULTS BY GEOGRAPHIC SUBAREA

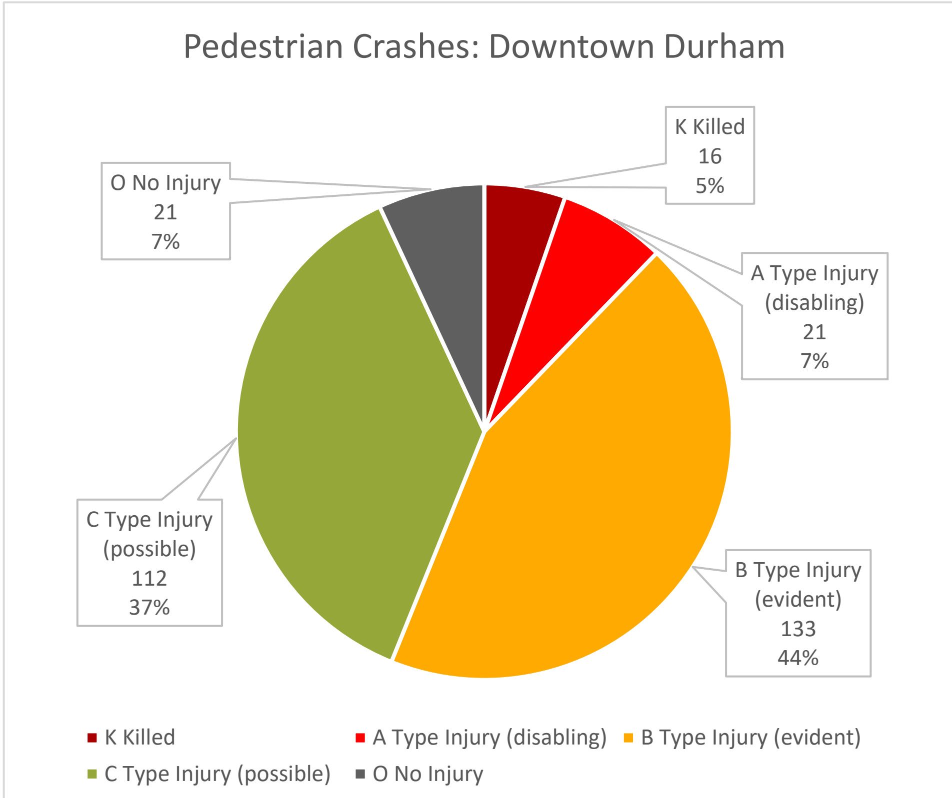
DOWNTOWN DURHAM

KEY TAKEAWAY

FFrom 2017 to 2021, in 5 years, 303 pedestrian crashes occurred in Downtown Durham.

KEY TAKEAWAY

Fayetteville St had 5 fatal (killed) crashes and Holloway St (NC 98) had several severe crashes in Downtown Durham.

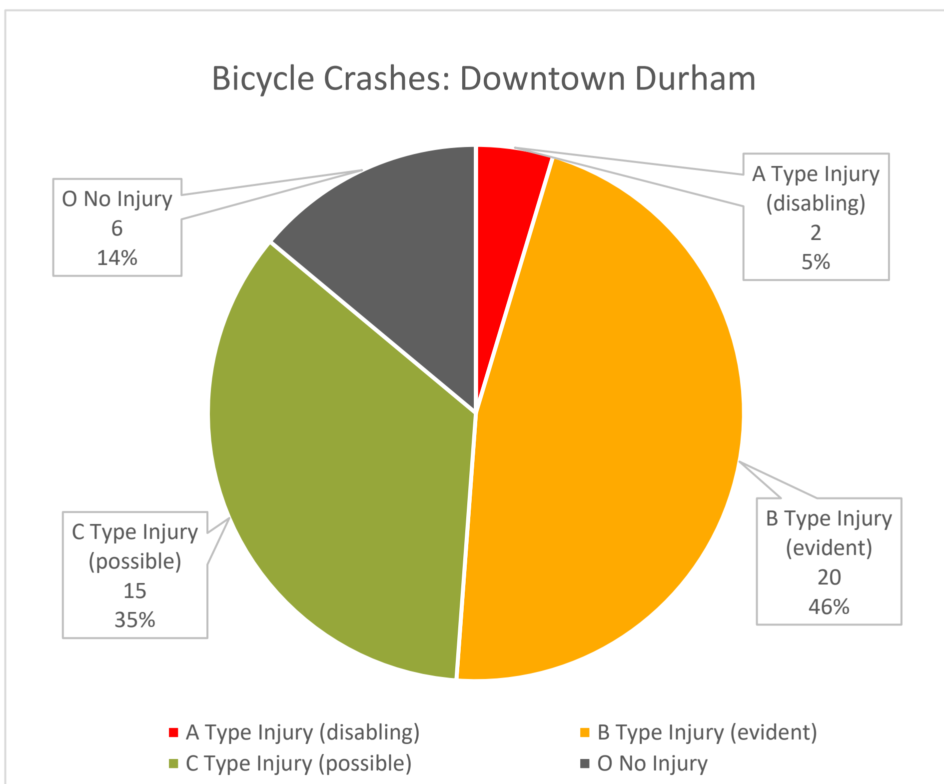


KEY TAKEAWAY

From 2017 to 2021, in 5 years, 43 bicycle crashes occurred in Downtown Durham.

KEY TAKEAWAY

Two severe crashes occurred along N Duke St (US 501) and Chapel Hill Blvd (US 15-501 Bus) in Downtown Durham.



RESULTS BY GEOGRAPHIC SUBAREA

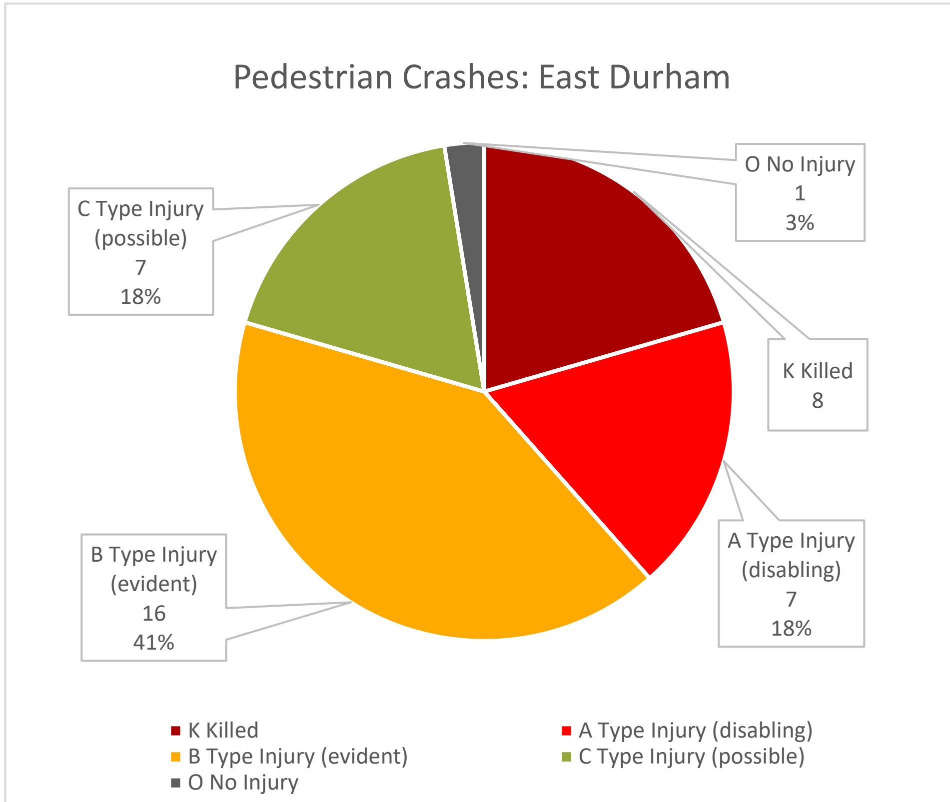
EAST DURHAM

KEY TAKEAWAY

From 2017 to 2021, in 5 years, 39 pedestrian crashes occurred in East Durham.

KEY TAKEAWAY

Several fatal (killed) crashes occurred on South Miami Blvd (US 70) in East Durham.

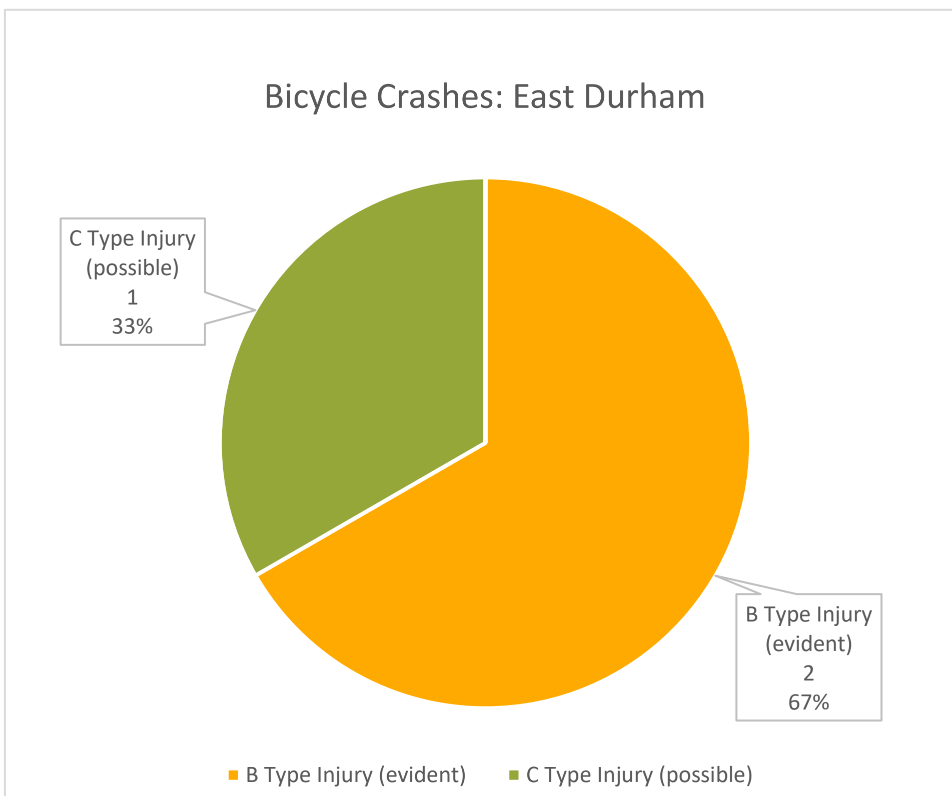


KEY TAKEAWAY

From 2017 to 2021, in 5 years, 3 bicycle crashes occurred in East Durham.

KEY TAKEAWAY

The crashes occurred on TW Alexander Dr, Cheek Rd and NC 98 in East Durham.



RESULTS BY GEOGRAPHIC SUBAREA

SOUTHPOINT

KEY TAKEAWAY

From 2017 to 2021, in 5 years, 65 pedestrian crashes occurred in Southpoint.

KEY TAKEAWAY

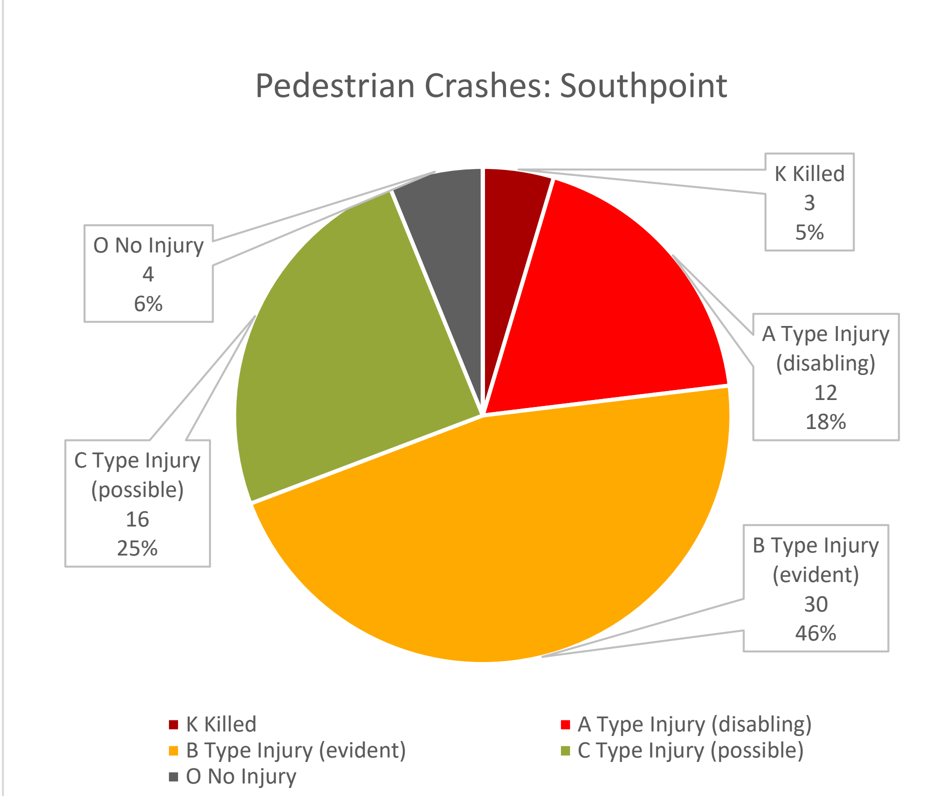
Several fatal (killed) and severe crashes occurred along I-40 and NC 54 in Southpoint.

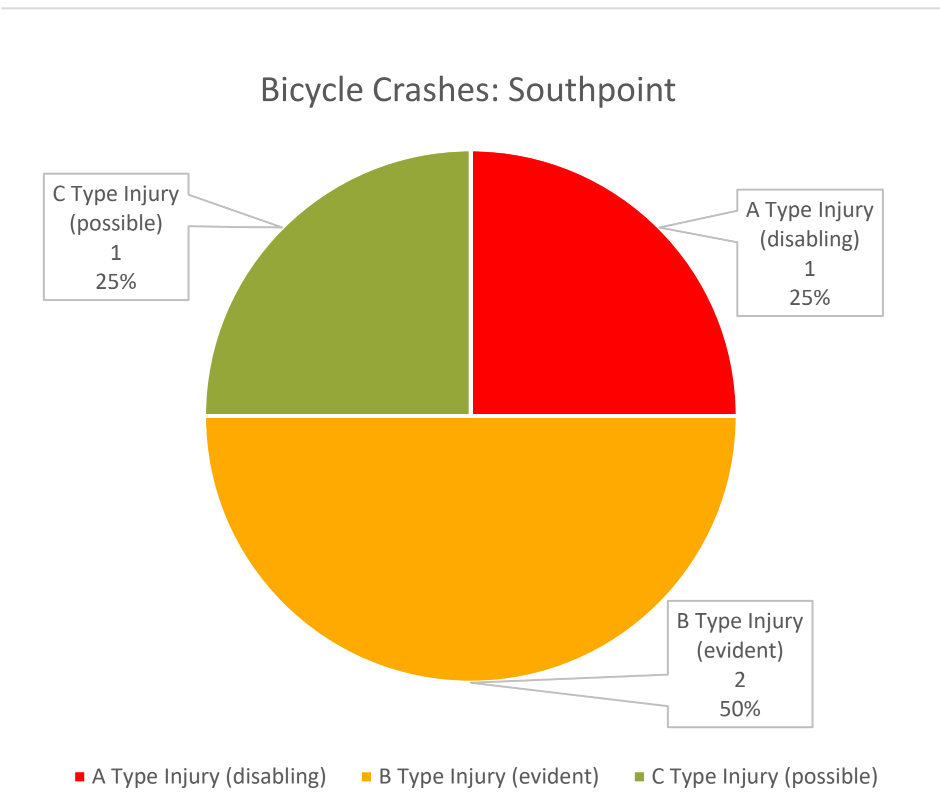
KEY TAKEAWAY

From 2017 to 2021, in 5 years, 4 bicycle crashes occurred in Southpoint.

KEY TAKEAWAY

Severe crash occurred along NC 55 in Southpoint.





RESULTS BY GEOGRAPHIC SUBAREA

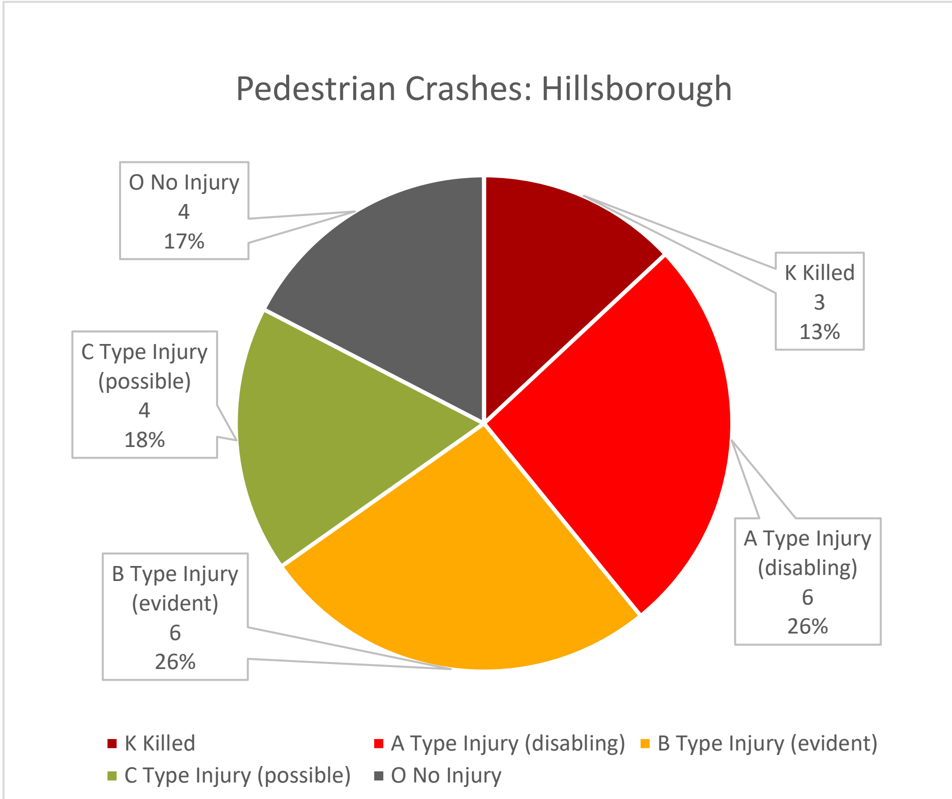
HILLSBOROUGH

KEY TAKEAWAY

From 2017 to 2021, in 5 years, 23 pedestrian crashes occurred in Hillsborough.

KEY TAKEAWAY

Several fatal (killed) and severe crashes occurred along I-40 and I-85 in Hillsborough.

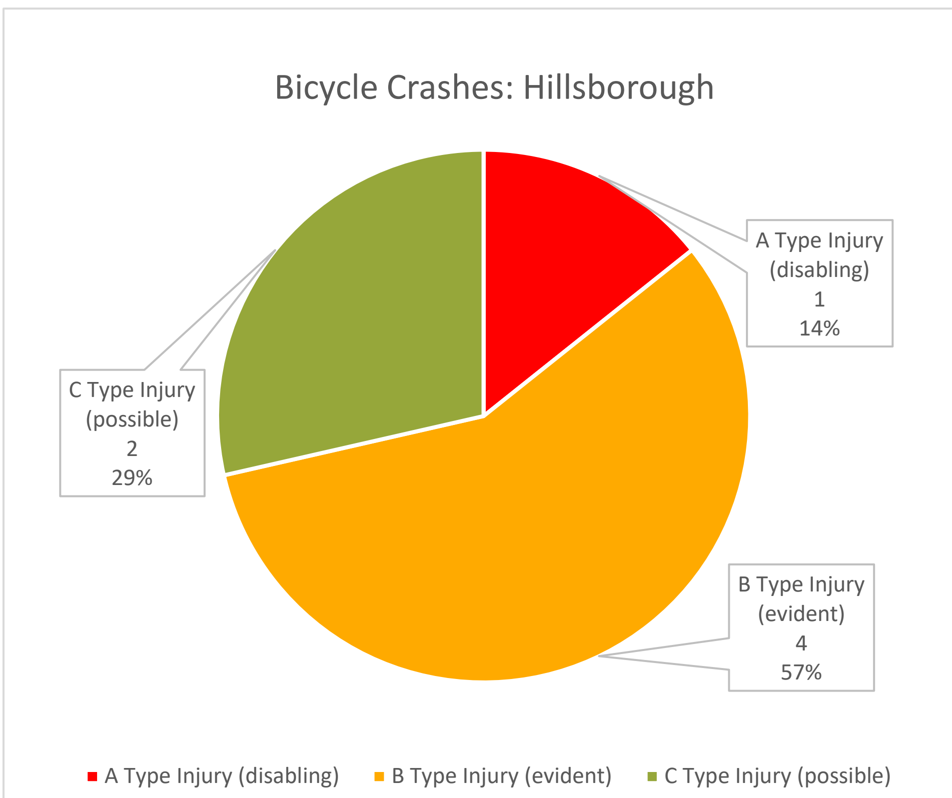


KEY TAKEAWAY

From 2017 to 2021, in 5 years, 43 bicycle crashes occurred in Hillsborough.

KEY TAKEAWAY

The severe crash occurred along Pleasant Green Rd in Hillsborough.



RESULTS BY GEOGRAPHIC SUBAREA

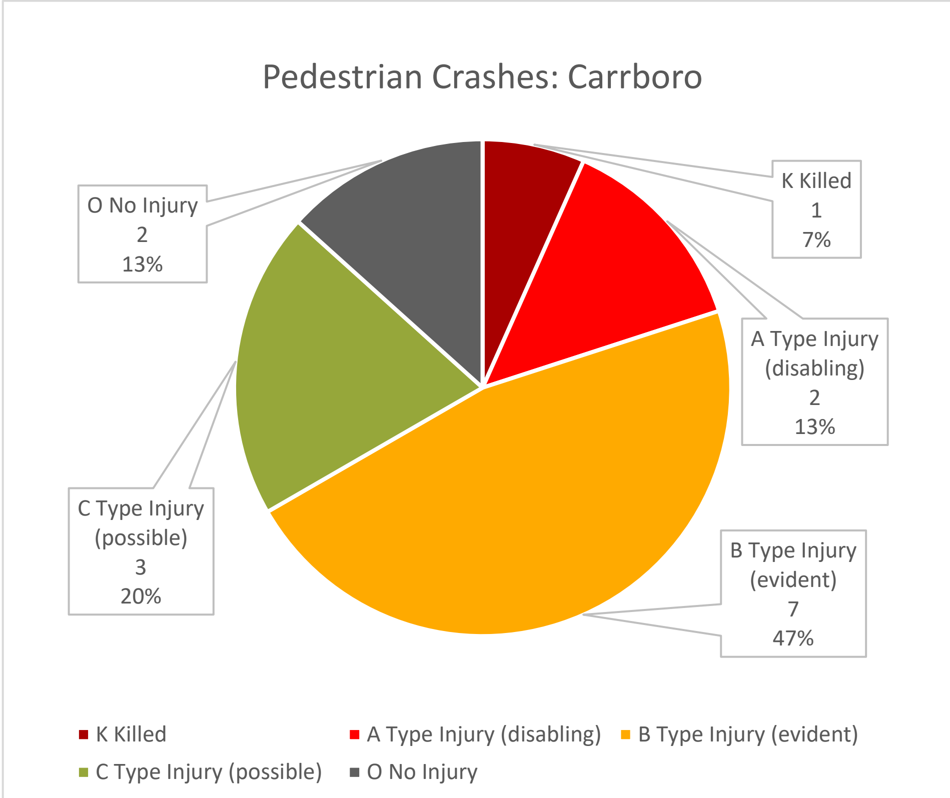
CARRBORO

KEY TAKEAWAY

From 2017 to 2021, in 5 years, 15 pedestrian crashes occurred in Carrboro..

KEY TAKEAWAY

The fatal (killed) crash occurred along Briar Chapel Pkwy and severe crash occurred on NC 54 and W Main St in Carrboro..

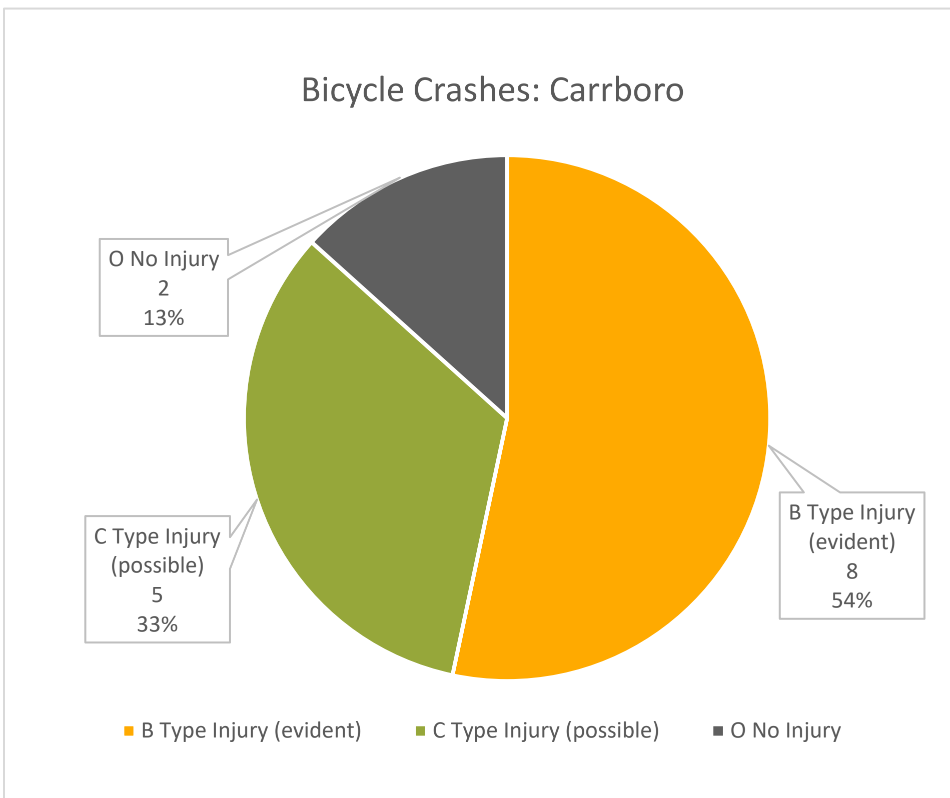


KEY TAKEAWAY

From 2017 to 2021, in 5 years, 15 bicycle crashes occurred in Carrboro..

KEY TAKEAWAY

Several crashes occurred along W Main St and N Greensboro St in Carrboro.



RESULTS BY GEOGRAPHIC SUBAREA

CHAPEL HILL

KEY TAKEAWAY

From 2017 to 2021, in 5 years, 101 pedestrian crashes occurred in Chapel Hill.

KEY TAKEAWAY

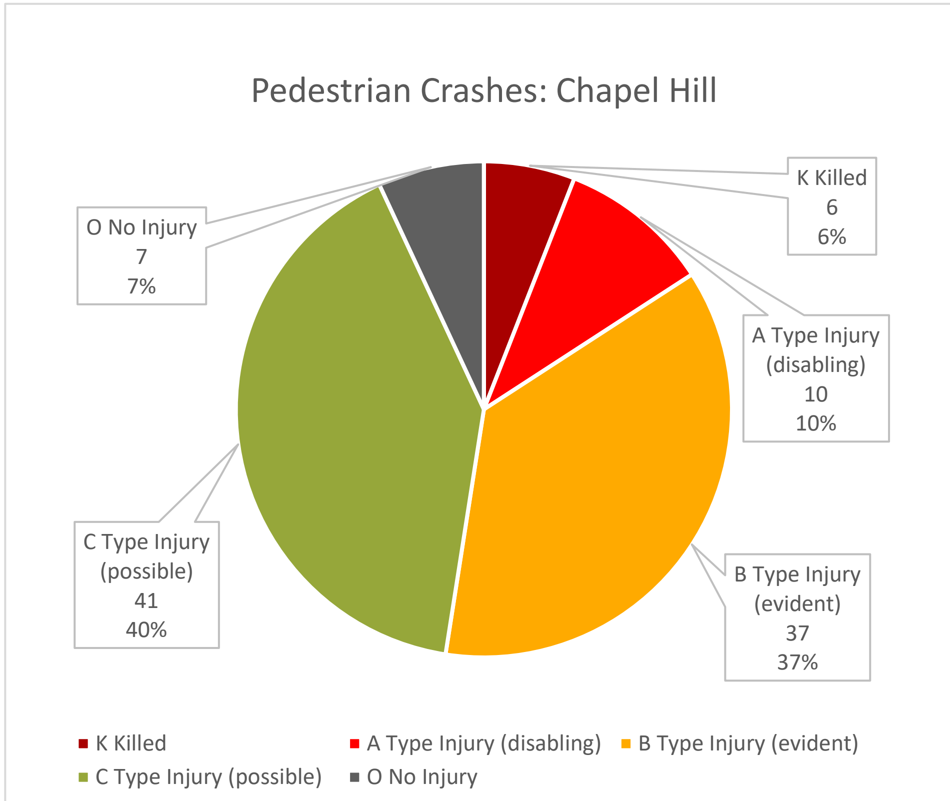
Fatal (killed) crashes occurred along US 15-501, MLK Jr. Blvd and I-40 in Chapel Hill. Several disabling and other crashes occurred on Manning Dr and MLK Jr. Blvd.

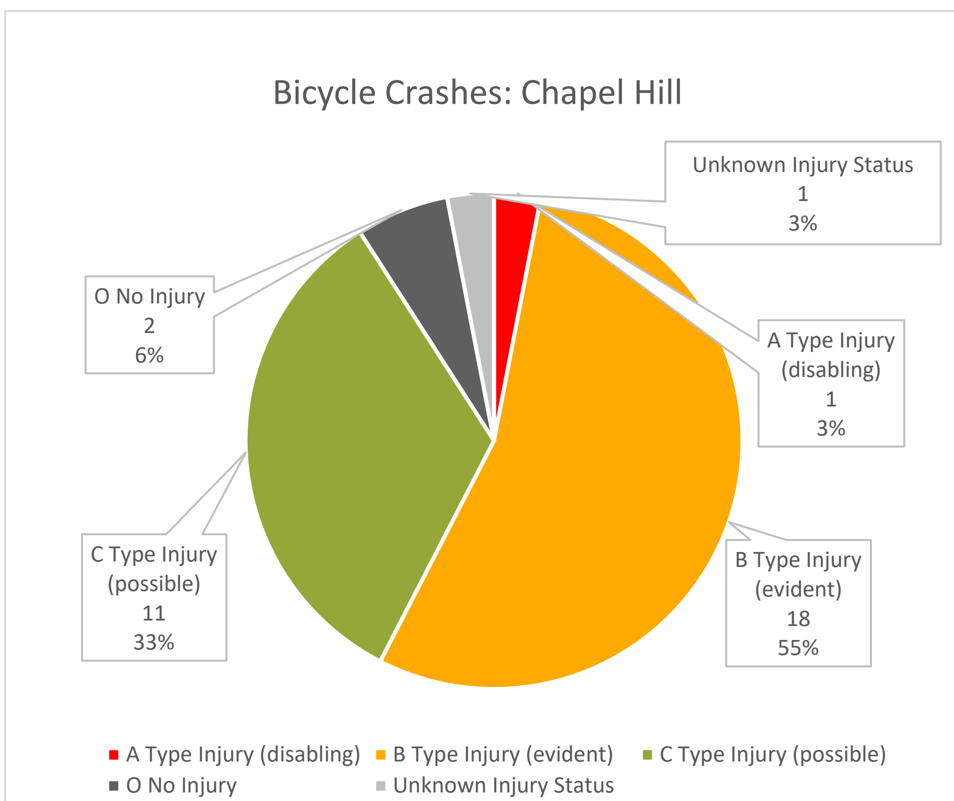
KEY TAKEAWAY

From 2017 to 2021, in 5 years, 33 bicycle crashes occurred in Chapel Hill.

KEY TAKEAWAY

Several crashes occurred along MLK Jr. Blvd and Franklin St in Chapel Hill.





COMPARATIVE ANALYSIS

In 5 years period (2017 to 2021), 83% of pedestrian crashes occurred in the Chapel Hill subarea and the three Durham subareas, with 49% occurring in Downtown Durham alone. For bicycle crashes these two subareas has the highest share too (29% and 38% respectively).

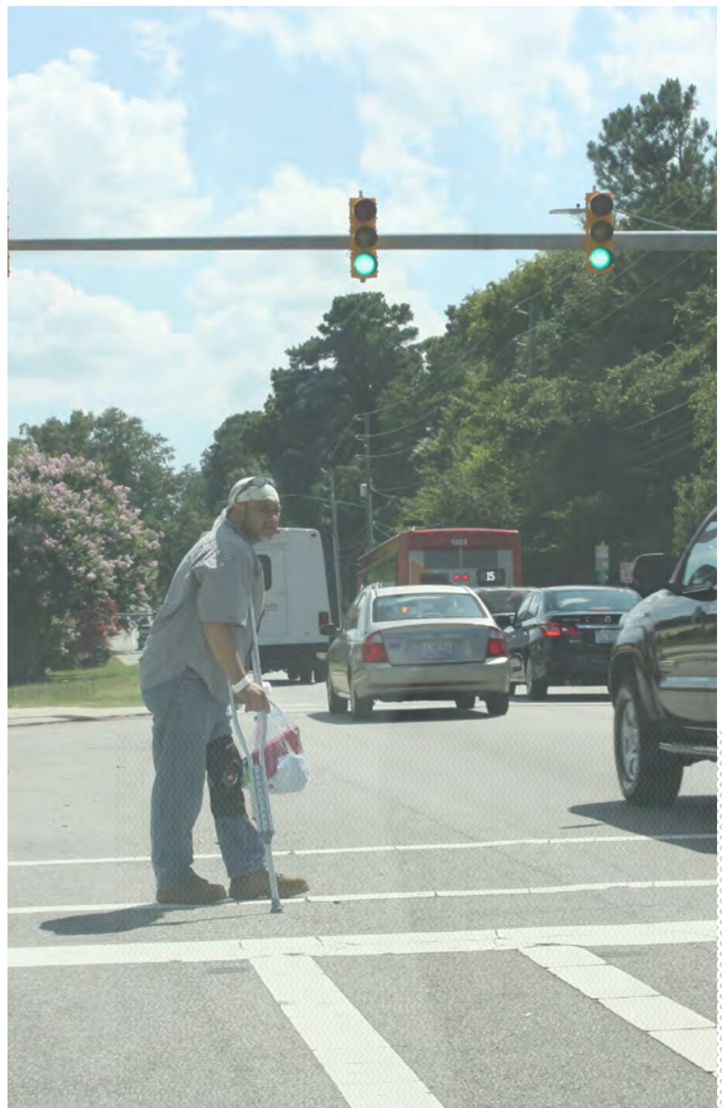
The Downtown Durham subarea also makes up about half of all bicycle (43 out of 113) and pedestrian crashes (303 out of 616) in the region. It accounts for 40% of severe bicycle crashes (resulting in disabling injury or death) and over 33% of fatal (killed)/ severe pedestrian crashes.

The Carrboro and Hillsborough subareas had the lowest numbers of pedestrian crashes (15 and 23, respectively), also has lower shares of severe crashes resulting in disabling injury or death (3% and 8%, respectively).

Similarly, the East Durham and Southpoint subareas saw relatively few bicycle crashes overall (3 and 4, respectively). There was a total of 5 severe (killed)/disabling bicycle crashes in the whole MPO, of which Southpoint had one of those 5 (20% share) severe crashes.

Although North Durham shares only 11% of all pedestrian crashes occurred in the MPO area, 14% of fatal/killed crashes and 15% of severe/ disabling crashes occurred here. This trend is also similar for East Durham area, which has only 6% share of total crashes whereas 14% of fatal/killed crashes and 10% of severe/disabling crashes occurred here.

Fayetteville St and N Duke St (US 501) had 5 and 3 fatal pedestrian crashes over different locations. The severe bicycle crashes didn't have any specific concentration or pattern in any subarea.



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[10] TRANSIT SERVICE

Where do transit routes exist in the area and what is the magnitude of service they provide?

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KEY TAKEAWAYS

GoDurham provided 199,125 vehicle revenue miles (VRM) and 14,858 vehicle revenue hours (VRH) per month in 2023. Similarly, Chapel Hill Transit provided 133,506 VRM and 10,365 VRH and GoTriangle provided 132,532 VRM and 6,868 VRH per month in 2023.

Chapel Hill Transit operates the most number of vehicles during maximum service hours (74), followed by GoDurham (34) and GoTriangle (28).

Fixed-route bus services are generally reliable at a systemwide level. GoDurham routes show 83% and GoTriangle routes show 84% on-time performance (OTP). However, Chapel Hill Transit show only 65% OTP.

Vehicle revenue miles for all agencies have still remained below the pre-pandemic service levels, 12% below for GoDurham, 14% below for CHT, and 37% below for GoTriangle.

INTRODUCTION

Public transit services contribute to an equitable and sustainable transportation network, providing local and regional mobility options. Transit is essential to making daily needs more accessible to households without cars, seniors, and persons with disabilities. The regional transit system also helps decrease the number of cars on the road, reducing carbon emissions and relieving congestion.

There are two primary types of transit service: fixed-route and demand-responsive. Fixed-route services operate along established routes with designated stops at scheduled times. Demand-responsive services can be scheduled in advance for a specific time and pick-up/ drop-off destination. This chapter analyzes the quantity and quality of fixed-route transit service provided by the three major transit operators in the DCHC region: Chapel Hill Transit and GoDurham are municipal transit providers for the region's principal jurisdictions; and GoTriangle offers regional and express services connecting the DCHC region to other parts of the Triangle region (notably Wake County destinations). Several other smaller transit operators in the region also provide important mobility options for the residents, including Orange County Public Transportation (OCPT) that provides service in and around Hillsborough, and Duke Transit that serves the Duke University campuses, hospital area, and nearby communities. Chatham Transit provides on-demand services in Chatham County. These smaller transit operators were not included in the current study.

METHODOLOGY

REVENUE SERVICE

The Federal Transit Administration defines "Revenue Service" as "the time when a vehicle is available to the general public and there is an expectation of carrying passengers." In other words, the amount of time that the transit system is conducting normal operations. This excludes vehicle maintenance and charter operations. Revenue service can be measured in revenue miles, hours, or trips.

Revenue miles are the number of miles a transit vehicle travels while in operation, which provides a measure of transit service in distance. Revenue hours, by contrast, are the number of hours for which a transit vehicle is in revenue operation, which provides a measure of transit service in time.

The relationship between revenue miles and revenue hours provides a point of comparison between different services. For instance, if two services have similar amounts of revenue hours, but one has a lower amount of revenue miles, the service with lower revenue miles may have more stops along each route, meaning it travels a shorter overall distance in an equal amount of time than a service with fewer stops; it could also have more vehicles covering a smaller geographic area. Conversely, if two services have a similar amount of revenue miles, but one has a lower amount of revenue hours, that service must cover a longer distance in a shorter amount of time, which could mean it makes less stops or maybe travels on roads that have higher posted speeds.

Revenue miles and hours are analyzed in this chapter and the numbers presented are the sum of all vehicles for each transit service per month. For example, the total revenue miles for Chapel Hill Transit in 2023 were 133,506 per month, which is the sum of revenue miles for all of its vehicles combined for a month.

REGIONAL OVERVIEW

Figure 10-1. Fixed Route Transit Services in the MPO Region (2019)

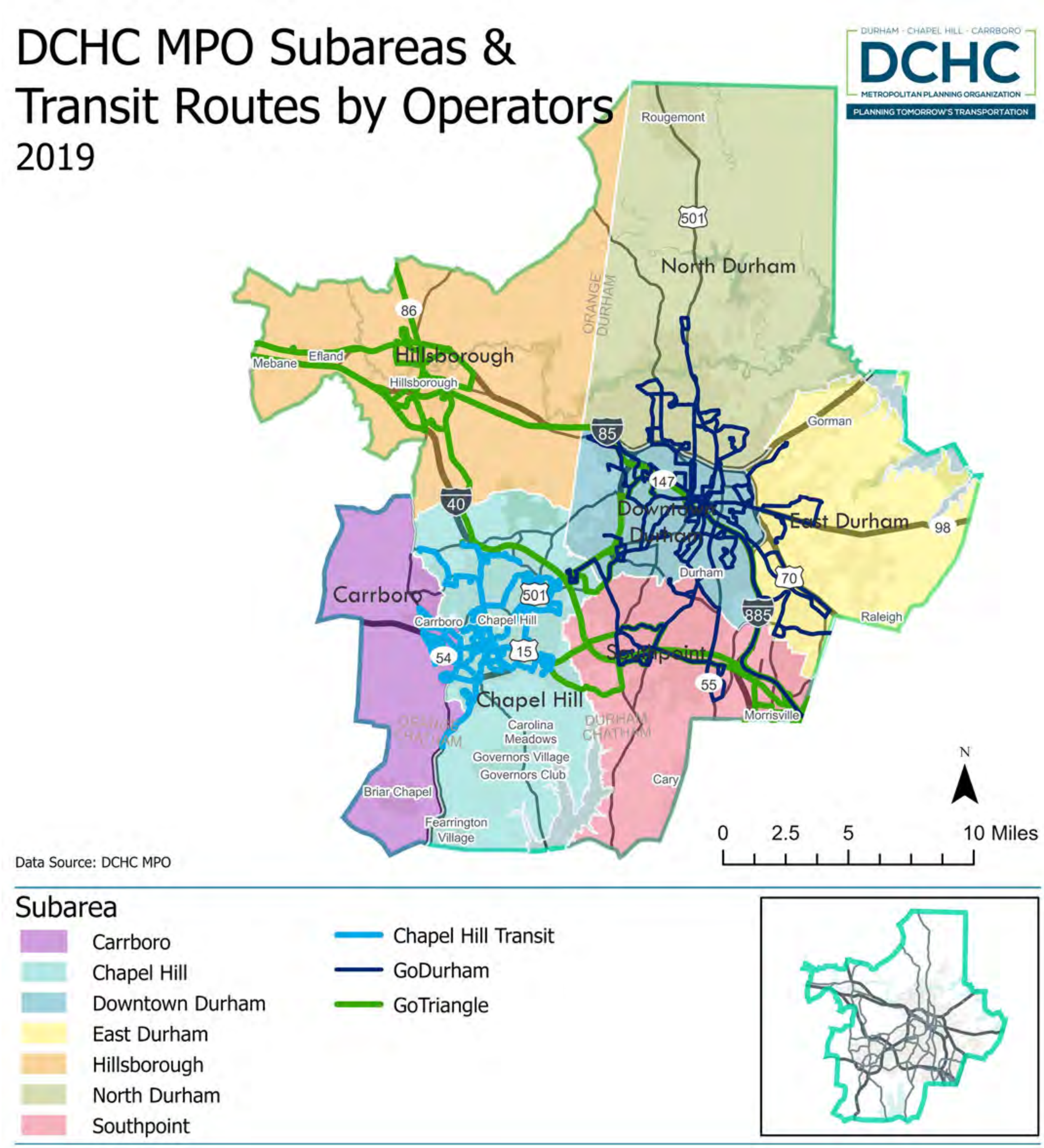


Figure 10-2. Vehicle Revenue Hours (VRH)

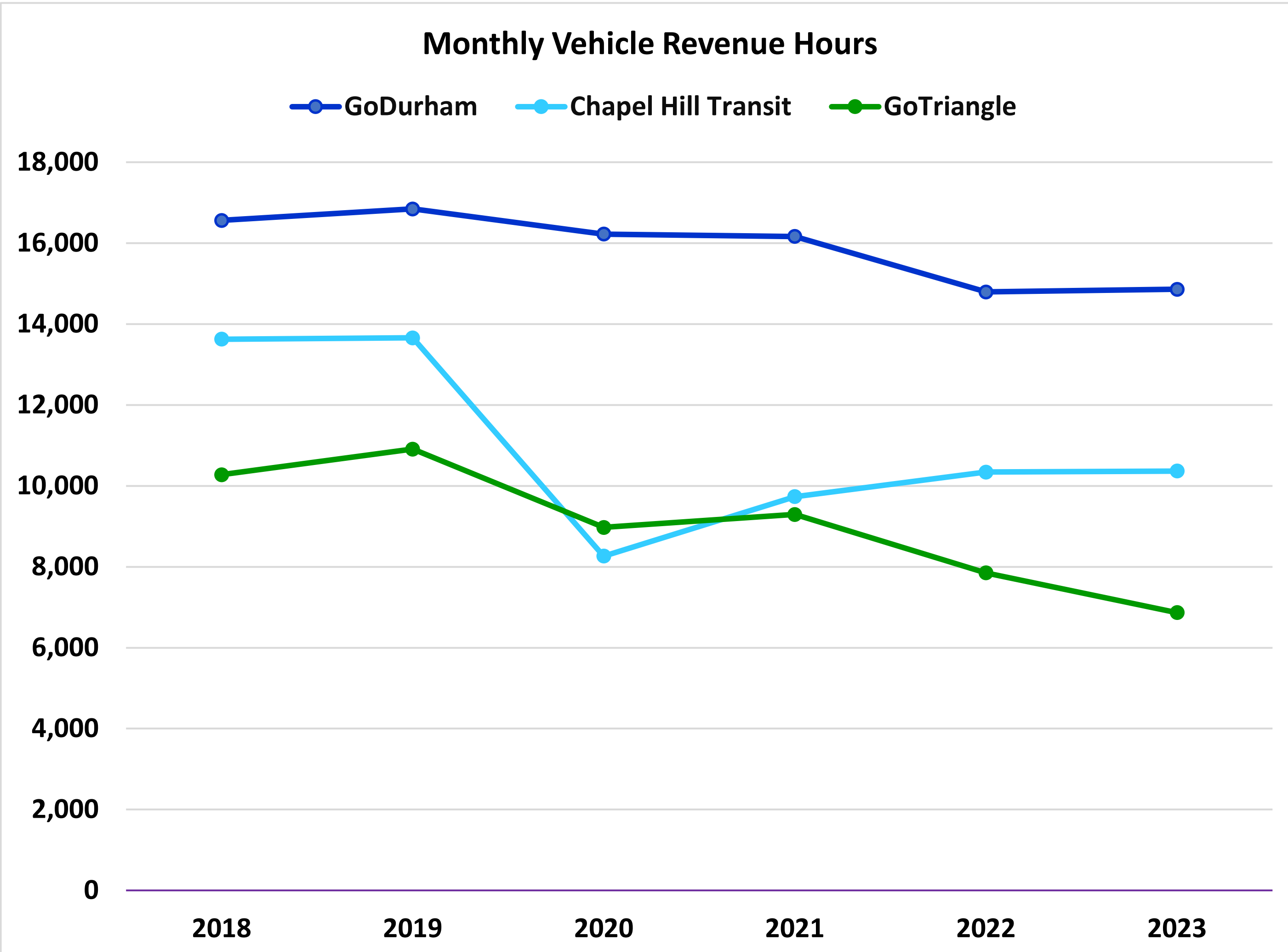


Table 10-1. Monthly Vehicle Revenue Hours 2018-2023

	2018	2019	2020	2021	2022	2023
GODURHAM	16,561	16,845	16,222	16,164	14,793	14,858
CHAPEL HILL TRANSIT	13,625	13,659	8,266	9,733	10,341	10,365
GOTRIANGLE	10,277	10,910	8,973	9,293	7,850	6,868

Figure 10-3. Vehicle Revenue Miles (VRM)

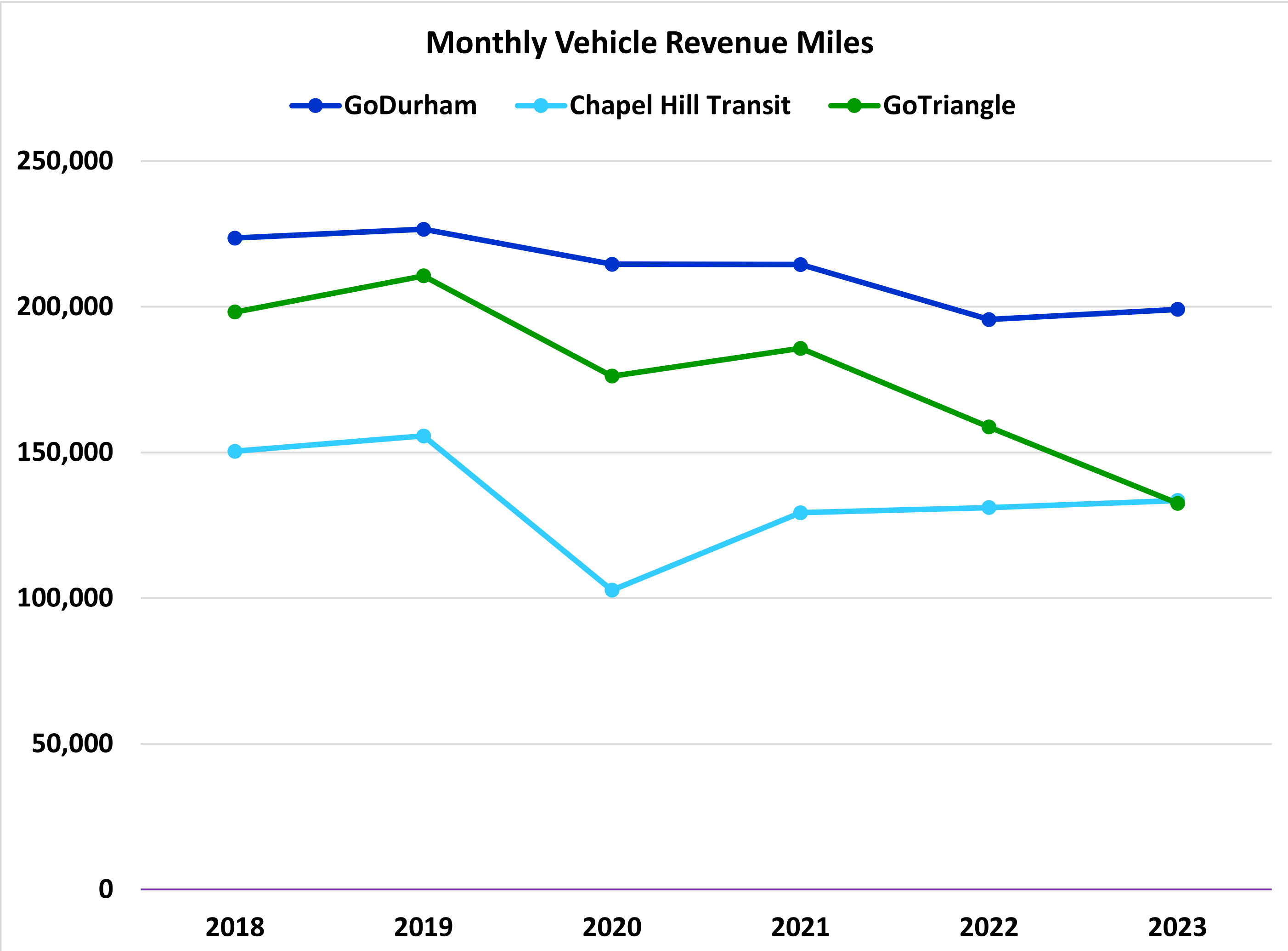


Table 10-2. Monthly Vehicle Revenue Miles 2018-2023

	2018	2019	2020	2021	2022	2023
GODURHAM	223,564	226,590	214,626	214,507	195,623	199,125
CHAPEL HILL TRANSIT	150,413	155,680	102,759	129,323	131,093	133,506
GOTRIANGLE	198,227	210,599	176,189	185,758	158,769	132,532

REVENUE MILES AND HOURS

GoDurham provide the highest level of service in the region in terms of revenue miles and revenue hours, followed by Chapel Hill Transit (CHT) and GoTriangle. However, GoTriangle serve substantially larger coverage areas than the other providers.

In terms of vehicle revenue miles (VRM), GoDurham routes provide 43% of the region's fixed route transit services, CHT provides 29%, and GoTriangle provides the remaining 28%.

In terms of vehicle revenue hours (VRH), GoDurham routes provide 46% of the region's fixed route transit services, CHT provides 32%, and GoTriangle provides the remaining 21%.

Vehicle revenue miles (VRM) for all agencies have still remained below the pre-pandemic service levels. More specifically, GoDurham's services in 2023 is 12% below the 2019 service levels, CHT's service is 14% below, and GoTriangle's service is 37% below the 2019 VRMs. The VRH and VRM for the three transit agencies are shown in Figure 10-2, Table 10-1 and Figure 10-3, Table 10-2 respectively.

UNLINKED PASSENGER TRIPS

Unlinked passenger trips refer to transit ridership for fixed route services. GoDurham observed the highest level of ridership in the region in terms of unlinked passenger trips (UPT), followed by Chapel Hill Transit (CHT) and GoTriangle. Based on the UPT measure, GoDurham attracted 49% of the region's transit ridership, CHT attracted 38%, and GoTriangle attracted the remaining 13%. The monthly UPT for the three transit agencies are shown in Figure 10-4 and Table 10-3.

Figure 10-4. Unlinked Passenger Trips (UPT)

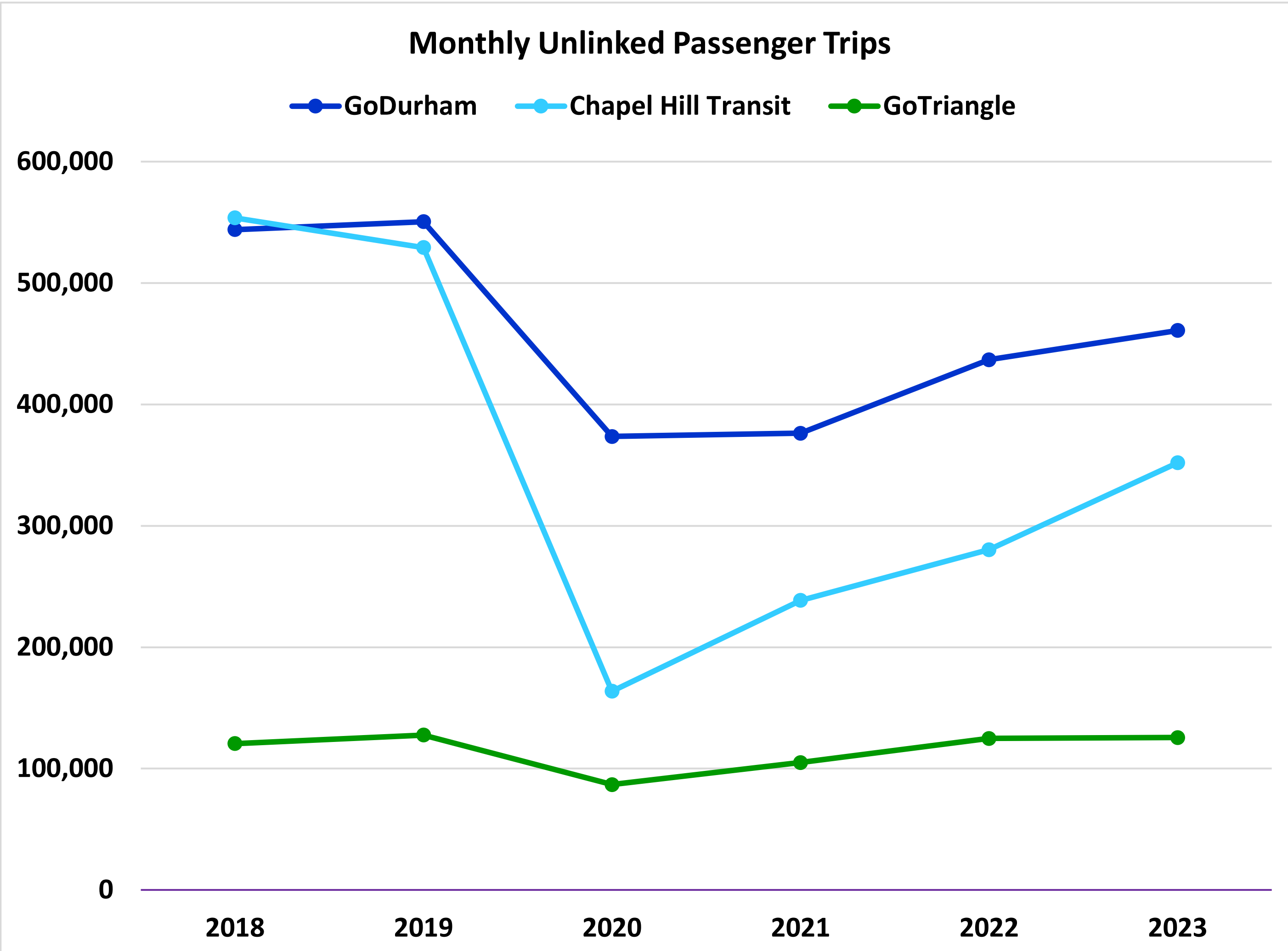


Table 10-3. Monthly Unlinked Passenger Trips (UPT) 2018-2023

	2018	2019	2020	2021	2022	2023
GODURHAM	543,952	550,500	373,547	376,233	436,822	460,954
CHAPEL HILL TRANSIT	553,645	529,265	163,791	238,620	280,299	351,939
GOTRIANGLE	120,575	127,691	86,839	104,954	124,911	125,540

ON-TIME PERFORMANCE (OTP)

65%

CHAPEL HILL TRANSIT

83%

GODURHAM

84%

GOTRIANGLE

On-time performance (OTP) is measured by monitoring transit vehicles and comparing the times at which they serve particular stops to the time at which they are scheduled to serve those stops. Buses arriving at a stop location at or near the scheduled time are considered "on-time." In most cases, buses arriving no more than one minute early and no more than five minutes late are on-time. These on-time arrival percentages are tracked over a period of time (a month, a quarter, a year, e.g.) and summarized by route to identify needed schedule changes and/or operational improvements to ensure transit riders receive reliable service. Generally, fixed-route bus services that are on-time less than 80% of the time are subject to review for operational tweaks, but each agency adopts its own standard and addresses on-time performance issues on a case-by-case basis. On-time performance data for fiscal year 2023 were provided by GoTriangle. CHT provided their OTP for a reporting period from July 2023 to February 2024. The OTP data for GoDurham were provided for fiscal year 2022.

On a route-by-route basis, on-time performance varies. CHT's on-time performance (OTP) data from November 2023 to February 2024 show that they achieved 65% OTP systemwide. Several CHT routes' OTP were below the systemwide average, Those below-average routes were CL, HS, RU, S, Safe G and T routes.

GoDurham's FY 2022 OTP data show that they achieved 83% OTP systemwide. Four routes, namely route 12,5K, 11B, and 10B performed below 80% OTP

GoTriangle's FY 2023 on-time performance data show that they achieved 84% OTP systemwide. Their remaining bus routes showed over 80% OTP. Two routes, namely route 305 and route 310 had the lowest OTP of 67% and 74% respectively. Their remaining bus routes showed over 80% OTP.

Figure 10-5. On-Time Performance (OTP) of GoDurham Routes in FY 2022

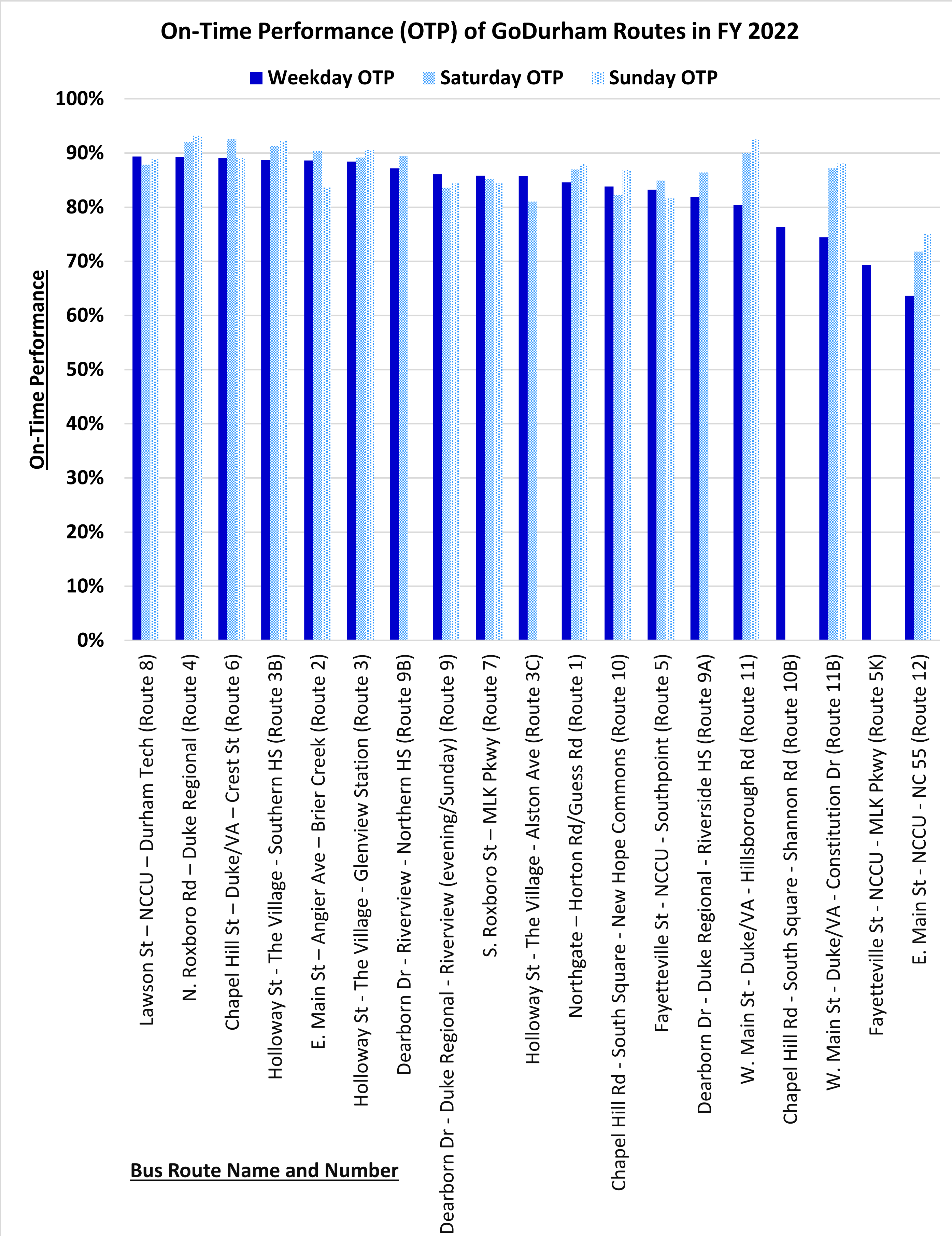


Figure 10-6. On-Time Performance (OTP) of Chapel Hill Transit Routes in FY 2024

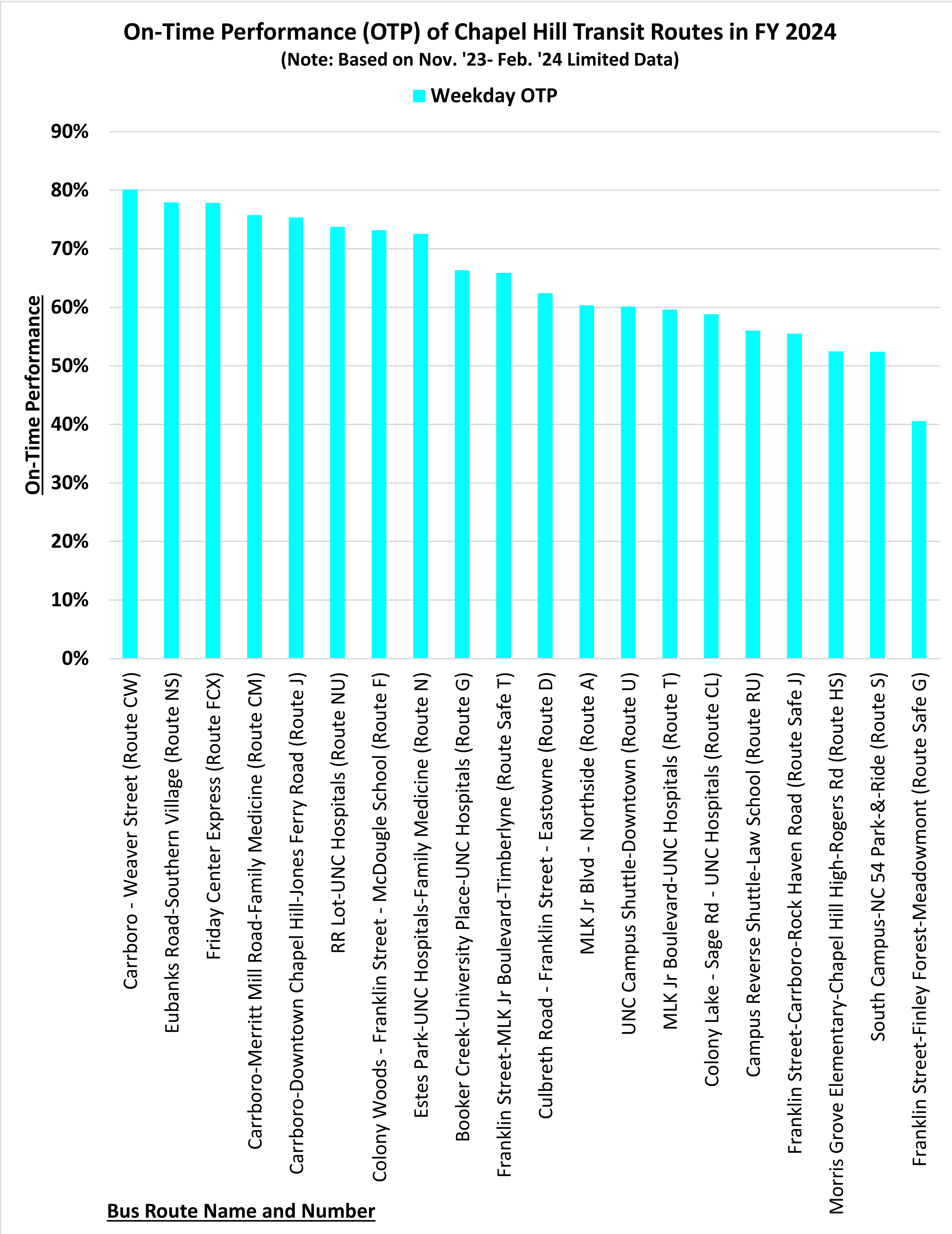
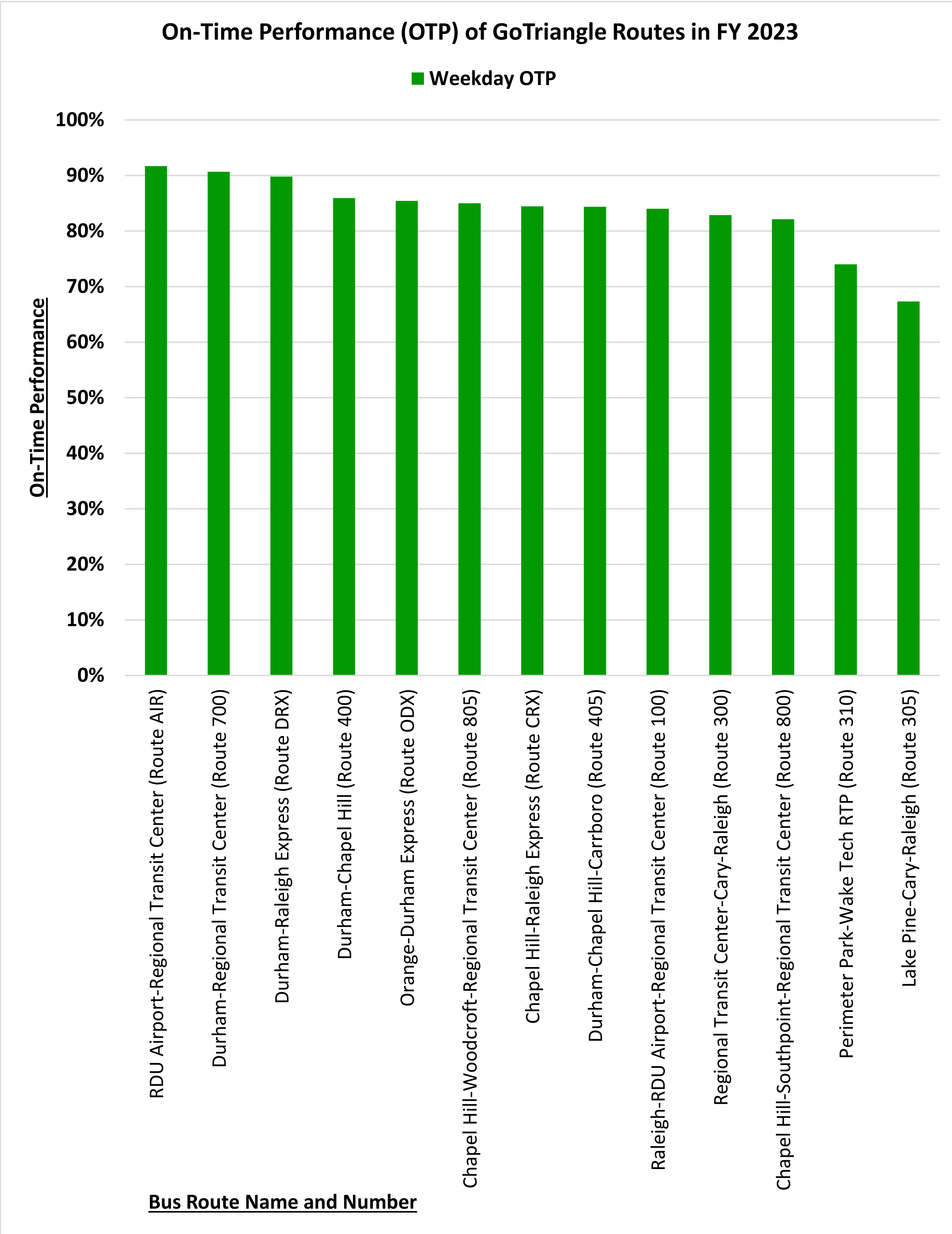


Figure 10-7. On-Time Performance (OTP) of GoTriangle Routes in FY 2023



VEHICLES OPERATED IN MAXIMUM SERVICE

This measure tracks the number of vehicles during maximum service, or the times at which the highest number of routes are being operated by a transit service.

In 2023, Chapel Hill Transit used 74 buses during maximum service. In contrast, GoDurham used 34 buses and GoTriangle used 28 buses during maximum service in 2023.

The number of peak vehicles for all agencies have still remained below the pre-pandemic usage levels. More specifically, GoDurham's maximum services in 2023 required 24% lower number of vehicles compared to the peak 2019 usage level. CHT's maximum service vehicle use is only 4% below the 2018 level, and GoTriangle's maximum service vehicle usage is 53% below their peak 2019 usage. The number of vehicles operated in maximum service for the three transit agencies are shown in Figure 10-8 and Table 10-4.

Figure 10-8. Vehicles Operated in Maximum Service

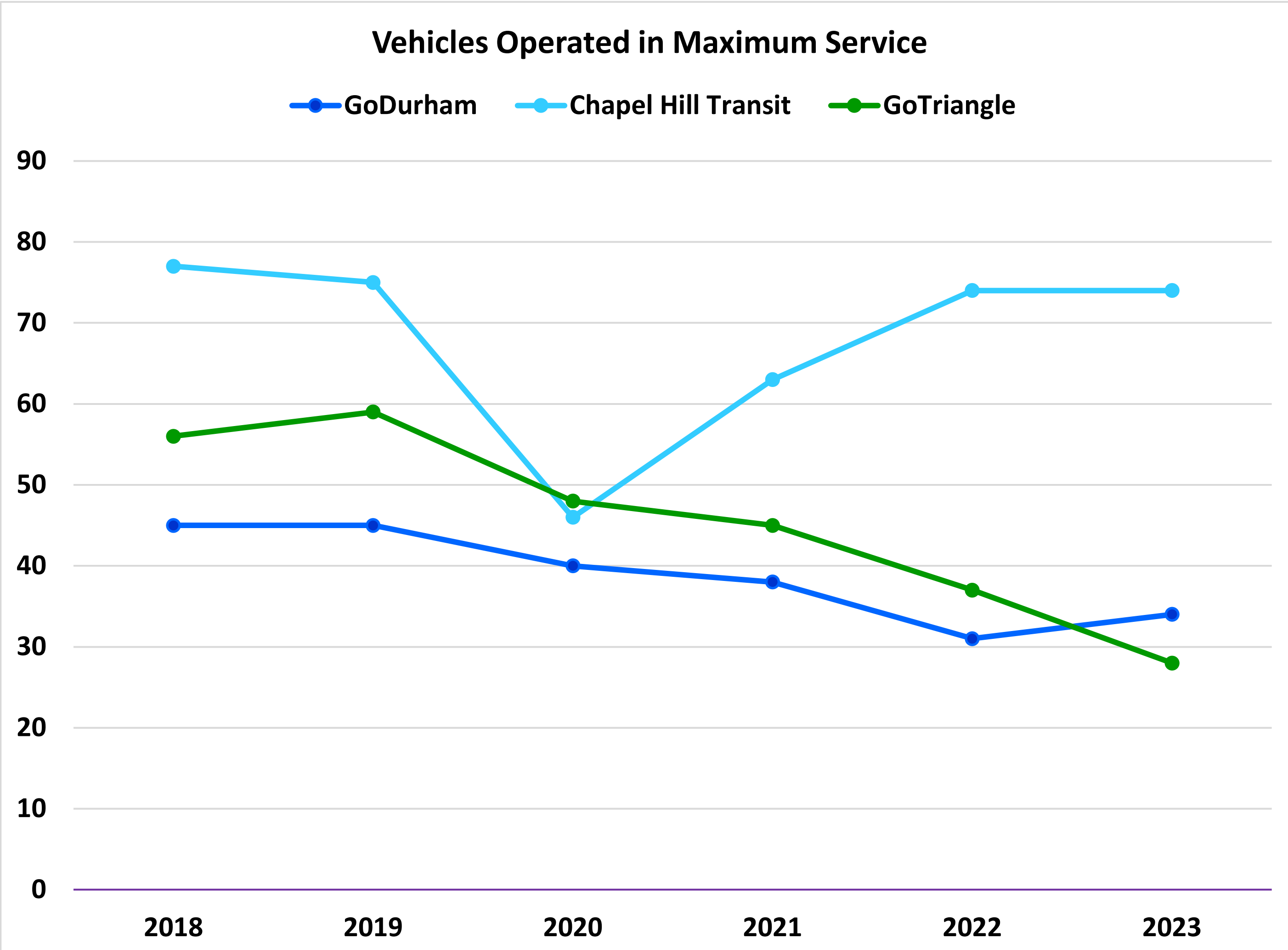


Table 10-4. Vehicles Operated in Maximum Service 2018-2023

	2018	2019	2020	2021	2022	2023
GODURHAM	45	45	40	38	31	34
CHAPEL HILL TRANSIT	77	75	46	63	74	74
GOTRIANGLE	56	59	48	45	37	28

COMPARATIVE ANALYSIS

GoDurham observed 460,954 monthly riders in 2023, which was the highest level of ridership in the region in terms of unlinked passenger trips (UPT). In contrast, Chapel Hill Transit (CHT) observed 351,939 monthly riders and GoTriangle observed 125,540 monthly riders. In essence, GoDurham attracted 49% of the region's transit ridership, CHT attracted 38%, and GoTriangle attracted the remaining 13%.

GoDurham provided 199,125 vehicle revenue miles (VRM) and 14,858 vehicle revenue hours (VRH) per month in 2023. Similarly, Chapel Hill Transit provided 133,506 VRM and 10,365 VRH and GoTriangle provided 132,532 VRM and 6,868 VRH per month in 2023

As shown on the map in Figure 10-1, GoTriangle covers a larger geographic area than any other service, but some routes operate on high-speed roads, which partially accounts for why it has a high number of revenue miles and a relatively lower number of revenue hours.

Vehicle revenue miles for all agencies have still remained below the pre-pandemic service levels: 12% below for GoDurham, 14% below for CHT, and 37% below for GoTriangle.

Fixed-route bus services are generally reliable at a systemwide level. GoDurham routes show 83% and GoTriangle routes show 84% on-time performance (OTP). However, Chapel Hill Transit show only 65% OTP.

Chapel Hill Transit operates the greatest number of vehicles during maximum service hours (74), followed by GoDurham (34) and GoTriangle (28).

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[11] TRANSIT RIDERSHIP

How many people are using existing transit services?

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KEY TAKEAWAYS

Some of the fixed bus routes in the area offer both weekday and weekend service.
Weekday boarding and alighting activity is 6 times higher than weekend activity for GoDurham bus routes, 13 times higher for GoTriangle routes and 8 times higher for Chapel Hill Transit routes.

GoDurham had the highest boarding and alighting activity, followed by Chapel Hill Transit and GoTriangle.

GoDurham Station is the most busy stop for GoDurham, with 3.09 million boardings and alightings. For GoTriangle, the Regional Transit Center (RTC) had the highest use with 334,262 boardings and alightings. For Chapel Hill Transit, the S Columbia St at Health Sciences Library stop had the highest boarding and alighting of 509,205.

The Downtown Durham and Chapel Hill subareas have the highest number of stops (664 and 549, respectively), followed by Southpoint, with 212 stops.

INTRODUCTION

This chapter analyzes annual boarding and alighting data of the three major transit operators in the DCHC region: GoDurham, GoTriangle and Chapel Hill Transit.

METHODOLOGY

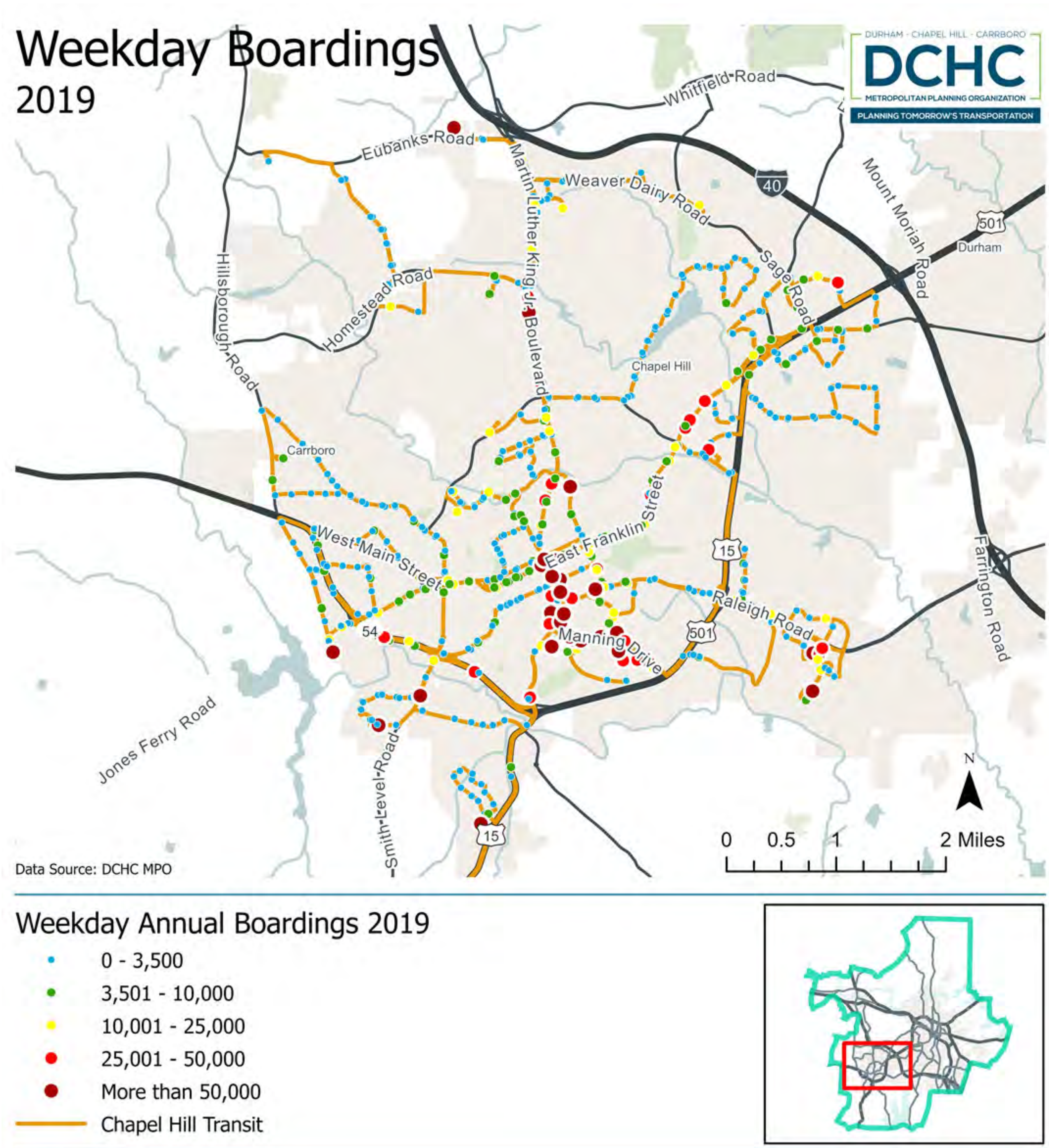
The DCHC MPO compiled transit service data from all three local transit agencies that operate fixed routes in the area. The boarding and alighting data collected from GoDurham and GoTriangle were from Automatic Passenger Counts (APC) data that were provided for each month in years 2019 and 2020. These monthly data for year 2019 were aggregated to estimate annual boardings and alightings. In contrast, the boarding and alighting data for Chapel Hill Transit was for year 2019 and reflected average daily boarding and alighting. Due to this difference of data format, the Chapel Hill Transit data were converted to annual estimates.

BOARDINGS AND ALIGHTINGS

Boardings and alightings refer to the movements of passengers getting on and off buses. A boarding is when a passenger gets on (or "boards") a bus and an alighting is when a passenger gets off the bus.

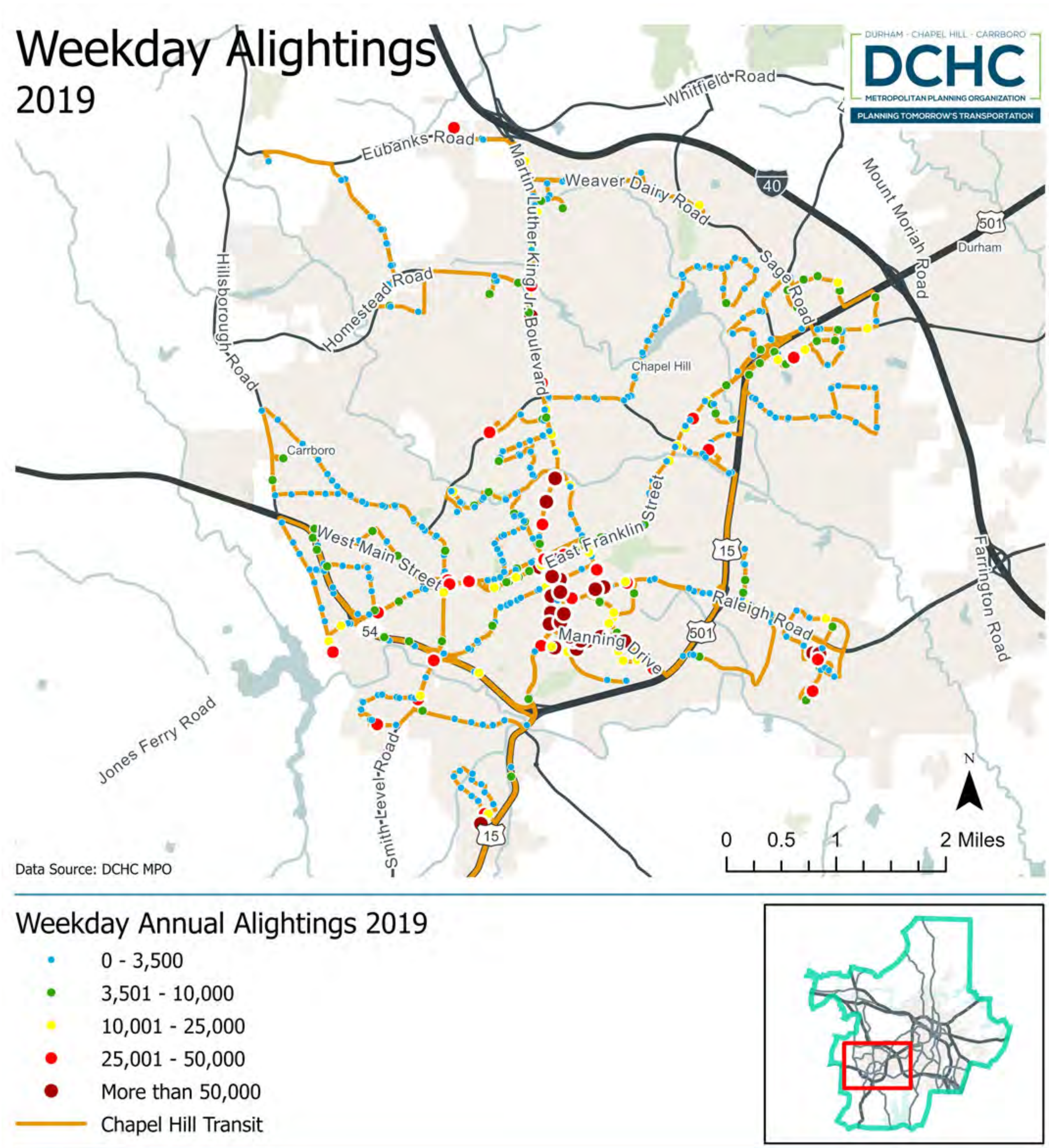
CHAPELL HILL TRANSIT OVERVIEW

Figure 11-1. Chapel Hill Transit Annual Boardings (Weekday)



CHAPELL HILL TRANSIT OVERVIEW

Figure 11-2. Chapel Hill Transit Annual Alightings (Weekday)



CHAPELL HILL TRANSIT OVERVIEW

Figure 11-3. Chapel Hill Transit Annual Boardings (Weekend/Saturday)

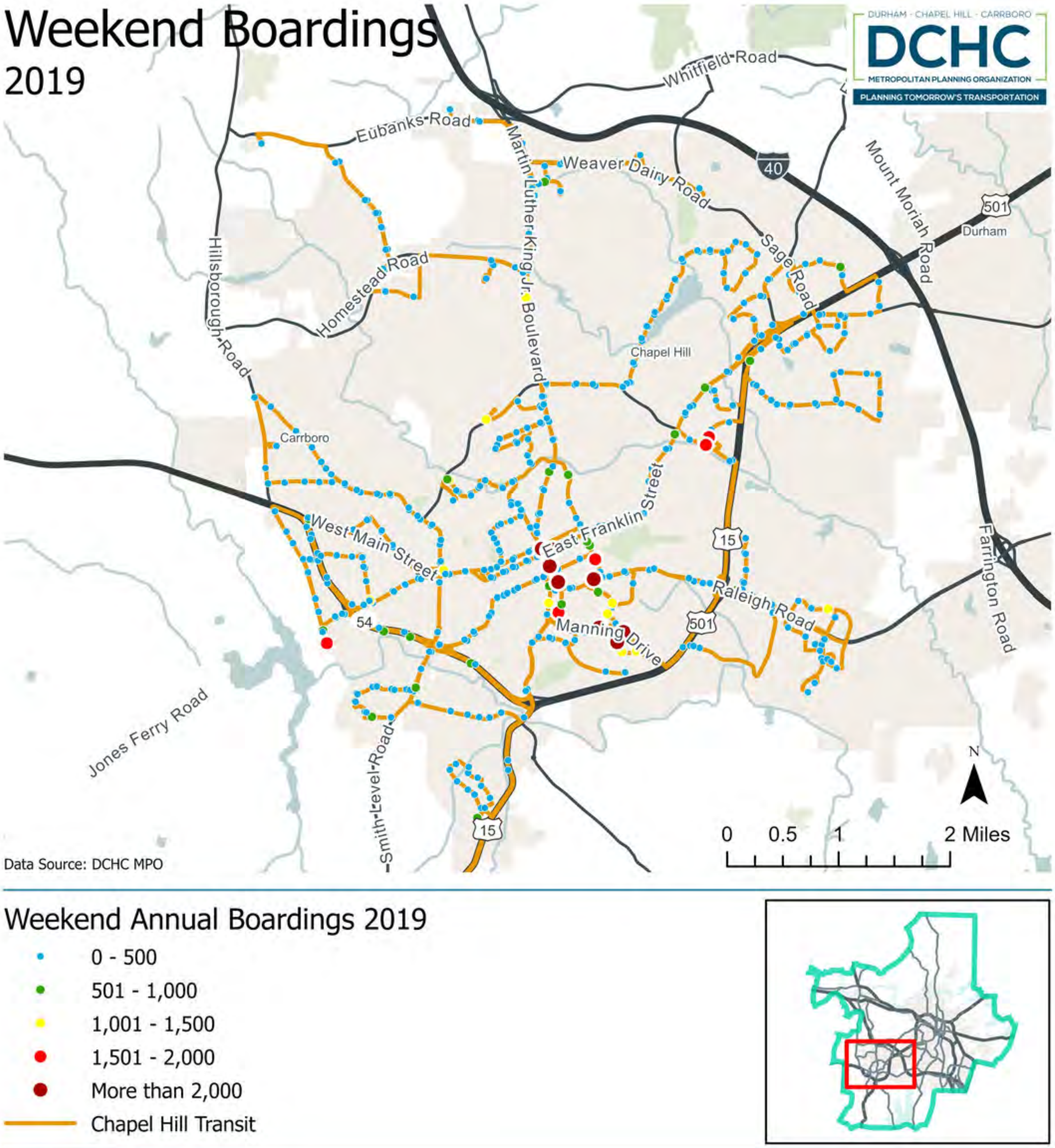
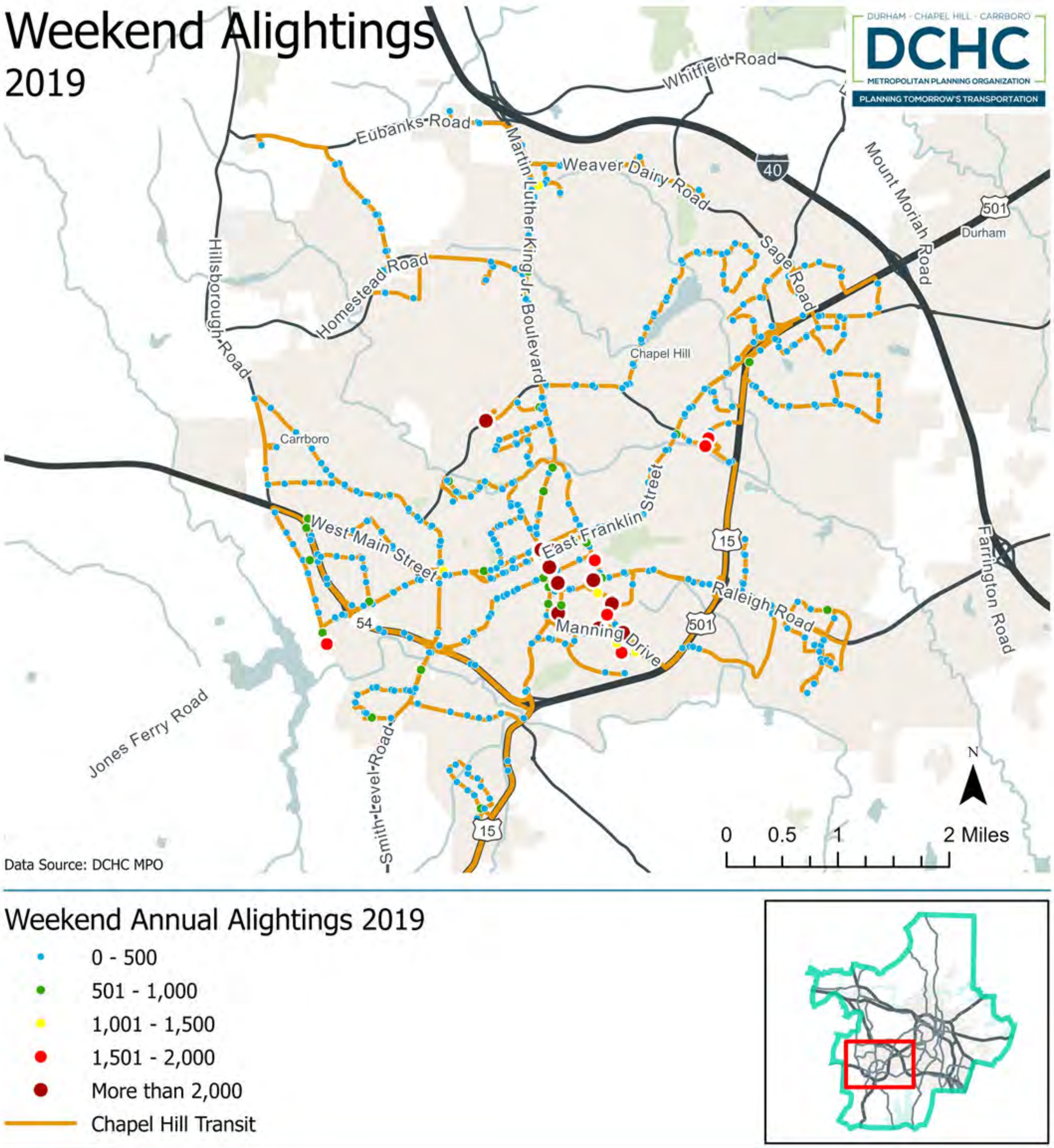


Figure 11-4. Chapel Hill Transit Annual Alightings (Weekend/Saturday)



10 MOST BOARDED CHAPEL HILL TRANSIT STOPS (WEEKDAY)

Stop	ANNUAL BOARDINGS
S Columbia St at Health Sciences Library	277,137
S Columbia St at Sitterson Hall & ROTC	244,269
South Rd at Student Stores	239,040
S Columbia St at Carrington Hall	196,461
Manning Dr at UNC Hospitals (CG Lot)	162,348
Bowles Dr at Hinton James Tennis Courts	160,605
Southern Village Park-and-Ride Lot	159.360
N Columbia St at Rosemary St	152,886
Manning Dr at Public Safety	141,930
E Franklin St at Carolina Coffee Shop	140,685

10 MOST ALIGHTED CHAPEL HILL TRANSIT STOPS (WEEKDAY)

Stop	ANNUAL ALIGHTINGS
S Columbia St at Health Sciences Library	232,068
S Columbia St at Frat Ct	198,951
Pittsboro St at Vance St (Credit Union)	193,224
S Columbia St at Sitterson Hall & ROTC	169,320
Friday Center Dr at NC 54 (SB)	146,163
N Columbia St at W Franklin St	139,689
Manning Dr at UNC Hospitals (CG Lot)	124,251
South Rd at Raleigh St	118,524
South Rd at Student Stores	111,303
Mason Farm Rd at Ambulatory Care Center (EB)	96,362

10 MOST BOARDED CHAPEL HILL TRANSIT STOPS (SATURDAY)

Stop	ANNUAL BOARDINGS
Manning Dr at Public Safety	13,000
South Rd at Student Stores	11,492
E Franklin St at Carolina Coffee Shop	9,620
Manning Dr at Hinton James	9,464
Bowles Dr at Hinton James Tennis Courts	6,448
E Franklin St at Varsity Theatre	5,148
N Columbia St at Rosemary St	4,940
S Columbia St at Sitterson Hall & ROTC	3,068
S Columbia St at Abernethy Hall	2,808
S Columbia St at Health Sciences Library; Raleigh St at Mangum Hall	1,976

10 MOST ALIGHTED CHAPEL HILL TRANSIT STOPS (SATURDAY)

Stop	ANNUAL ALIGHTINGS
S Columbia St at Abernethy Hall	12,168
Manning Dr at Hinton James	11,648
E Franklin St at Varsity Theatre	9,620
E Franklin St at Carolina Coffee Shop	5,772
S Columbia St at Sitterson Hall & ROTC	5,408
Manning Dr at Public Safety	4,160
South Rd at Student Stores	3,692
N Columbia St at Rosemary St	3,588
N Columbia St at W Franklin St	3,536
S Columbia St at Health Sciences Library; Stadium Dr at Ridge Rd; RR Lot	2,184

CHAPEL HILL TRANSIT OVERVIEW:

Chapel Hill Transit (CHT) has a total annual boardings of 5,531,255 and alightings of 5,362,654 in 2019. It has a total of 498 bus stops. CHT serves two subareas out of 7 in the DCHC MPO area on both weekdays and weekend (Saturday).

SUBAREA RANKING

Chapel Hill Transit only serves in Chapel Hill and Carrboro subareas and Chapel Hill has the highest boardings and alightings on both weekday and weekend (Saturday). The UNC campus had a positive impact on the number of boardings and alightings in Chapel Hill.

Table 11-1. Annual 2019 Boardings and Alightings by Subarea - Weekday (Chapel Hill Transit)

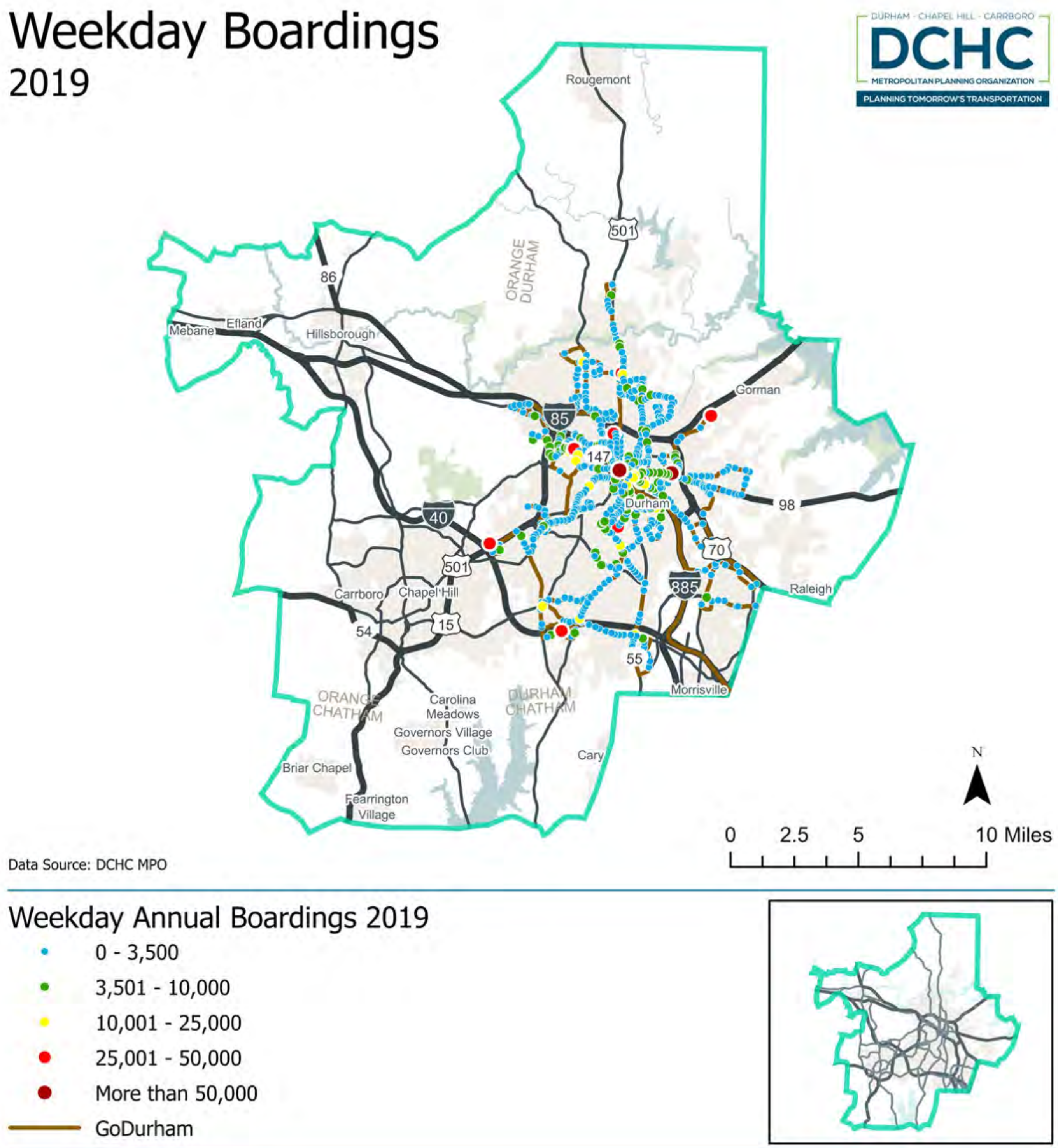
	Number of Bus Stops	2019 Average Weekday Boardings	2019 Average Weekday Alightings	2019 Average Weekday Activity	Rank
Chapel Hill	401	5,406,039	5,240,454	10,646,493	1
Carrboro	97	480,321	477,831	958,152	2

Table 11-2. Annual 2019 Boardings and Alightings by Subarea - Saturday (Chapel Hill Transit)

	Number of Bus Stops	2019 Average Saturday Boardings	2019 Average Saturday Alightings	2019 Average Saturday Activity	Rank
Chapel Hill	285	125,216	122,200	247,416	1
Carrboro	112	16,224	13,728	29,952	2

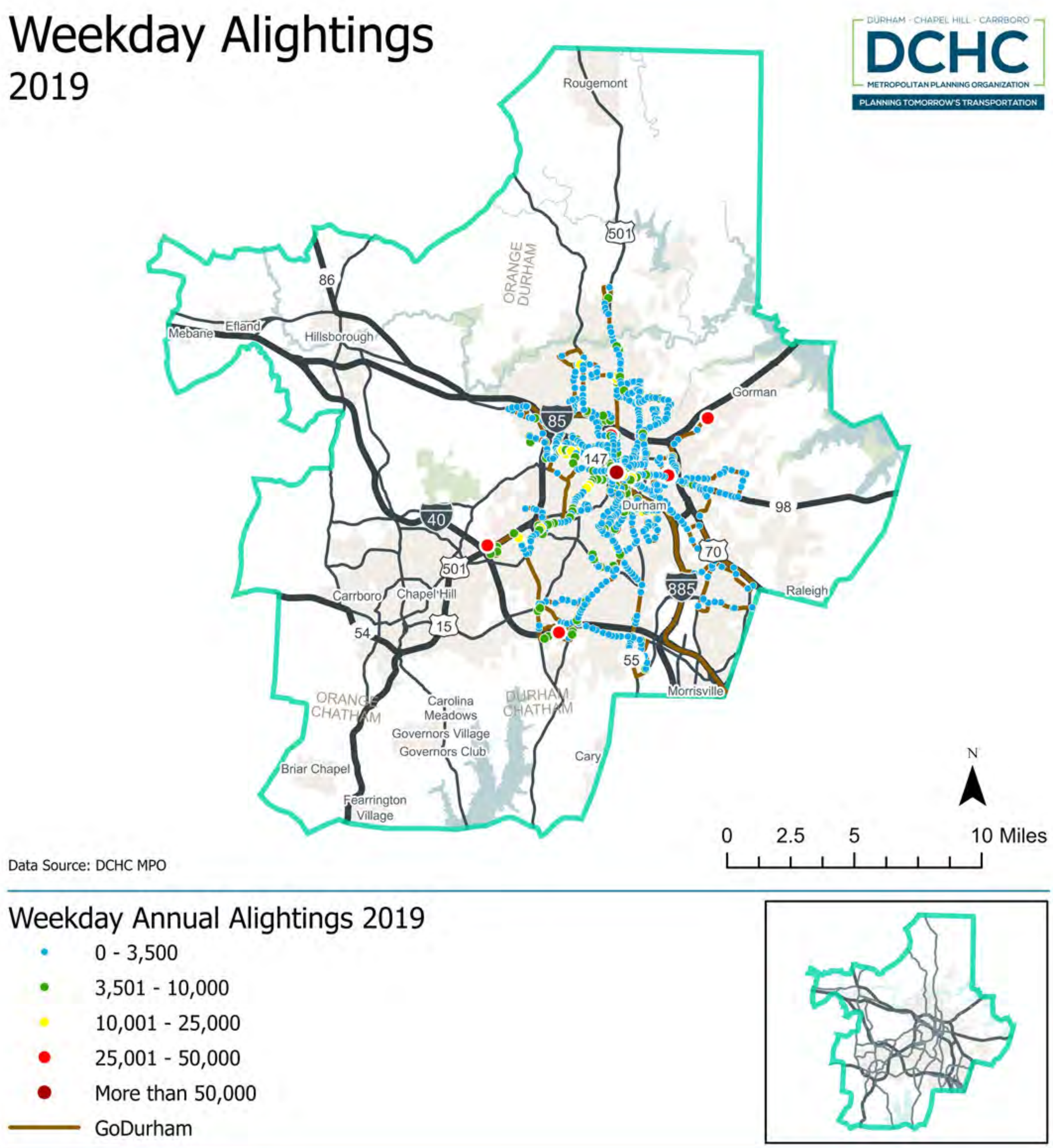
GO-DURHAM TRANSIT OVERVIEW

Figure 11-5. GoDurham Transit Annual Boardings (Weekday)



GO-DURHAM TRANSIT OVERVIEW

Figure 11-6. GoDurham Transit Annual Alightings (Weekday)



GO-DURHAM TRANSIT OVERVIEW

Figure 11-7. GoDurham Transit Annual Boardings (Weekend/Saturday)

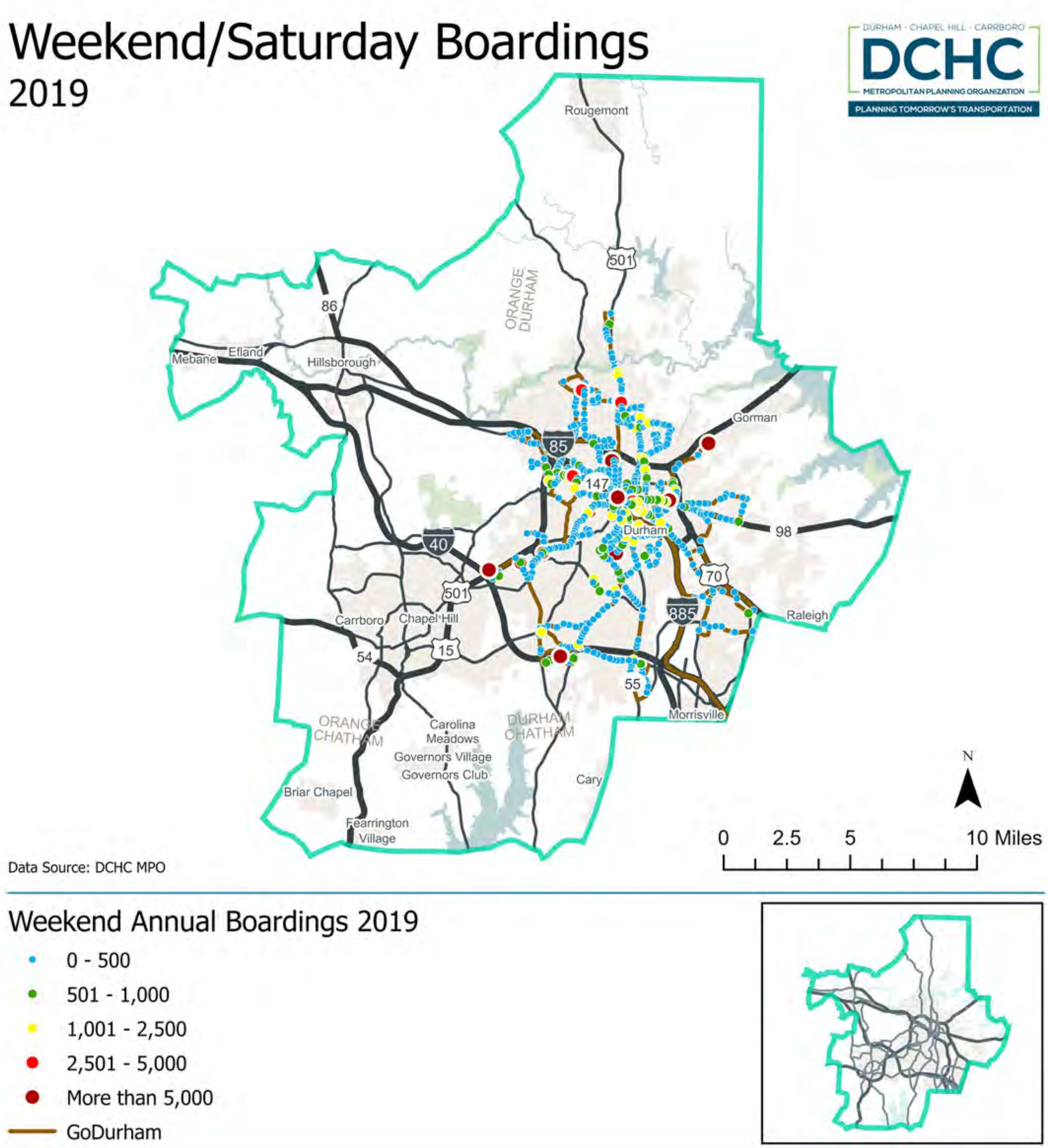
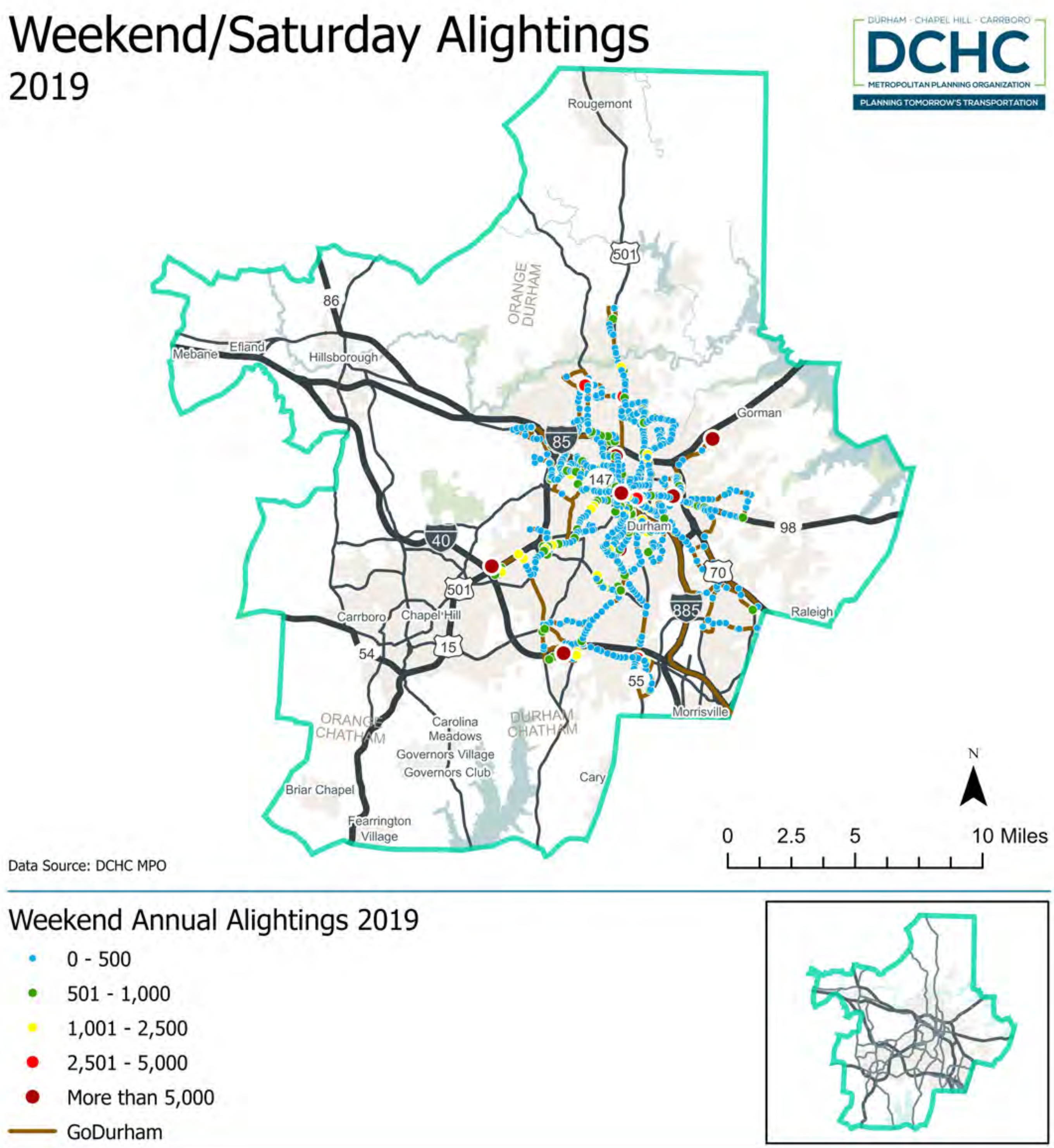


Figure 11-8. GoDurham Transit Annual Alightings (Weekend/Saturday)



10 MOST BOARDED GO DURHAM STOPS (WEEKDAY)

Stop	ANNUAL BOARDINGS
GoDurham Station	1,353,432
Raynor St at The Village (WB)	70,188
Erwin Rd at Fulton St (Duke University Hospital)	39,447
E Geer St at Glenview Station	38,925
Fayetteville St at Pilot St (NB)	31,319
E Main St at Morning Glory Ave (Golden Belt)	30,389
The Streets at Southpoint	30,357
Raynor St at The Village (EB)	30,109
New Hope Commons	28,035
Horton Rd at Roxboro Rd	27,208

10 MOST ALIGHTED GO DURHAM STOPS (WEEKDAY)

Stop	ANNUAL ALIGHTINGS
GoDurham Station	1,326,290
Raynor St at The Village (EB)	68,420
E Geer St at Glenview Station	41,679
The Streets at Southpoint	33,228
Fayetteville St at Pilot St (SB)	31,856
New Hope Commons	29,054
E Main St at Dillard St (EB)	28,144
Raynor St at The Village (WB)	26,086
Club Blvd at Northgate Mall	25,467
Horton Rd at Roxboro Rd	24,554

10 MOST BOARDED GO DURHAM STOPS (SATURDAY)

Stop	ANNUAL BOARDINGS
GoDurham Station	213,244
Raynor St at The Village (WB)	13,792
E Geer St at Glenview Station	8,686
The Streets at Southpoint	8,466
Raynor St at The Village (EB)	6,052
Club Blvd at Dollar Ave (Northgate Mall)	5,810
New Hope Commons	5,738
Fayetteville St at Pilot St (NB)	5,230
Horton Rd at Roxboro Rd	4,689
Erwin Rd at Fulton St (Duke University Hospital)	3,660

10 MOST ALIGHTED GO DURHAM STOPS (SATURDAY)

Stop	ANNUAL ALIGHTINGS
GoDurham Station	211,550
Raynor St at The Village (EB)	12,373
The Streets at Southpoint	9,800
E Geer St at Glenview Station	9,313
New Hope Commons	6,135
Raynor St at The Village (WB)	5,770
Club Blvd at Northgate Mall	5,522
Fayetteville St at Pilot St (SB)	5,102
Horton Rd at Roxboro Rd	4,429
Liberty St at Queen St	4,122

GODURHAM TRANSIT OVERVIEW:

GoDurham has a total annual boardings of 4,317,283 and alightings of 4,437,516 in 2019. It has a total of 1045 bus stops. GoDurham serves 5 subareas out of 7 in the DCHC MPO area on both weekdays and weekend (Saturday).

SUBAREA RANKING

Downtown Durham has the highest number of boardings and alightings in both weekday and Saturday. Most of the routes are concentrated in downtown Durham with some in North and East Durham. Concentration of services and commercial area in Downtown Durham makes it a high transit traffic area.

Table 11-3. Annual 2019 Boardings and Alightings by Subarea - Weekday (GoDurham)

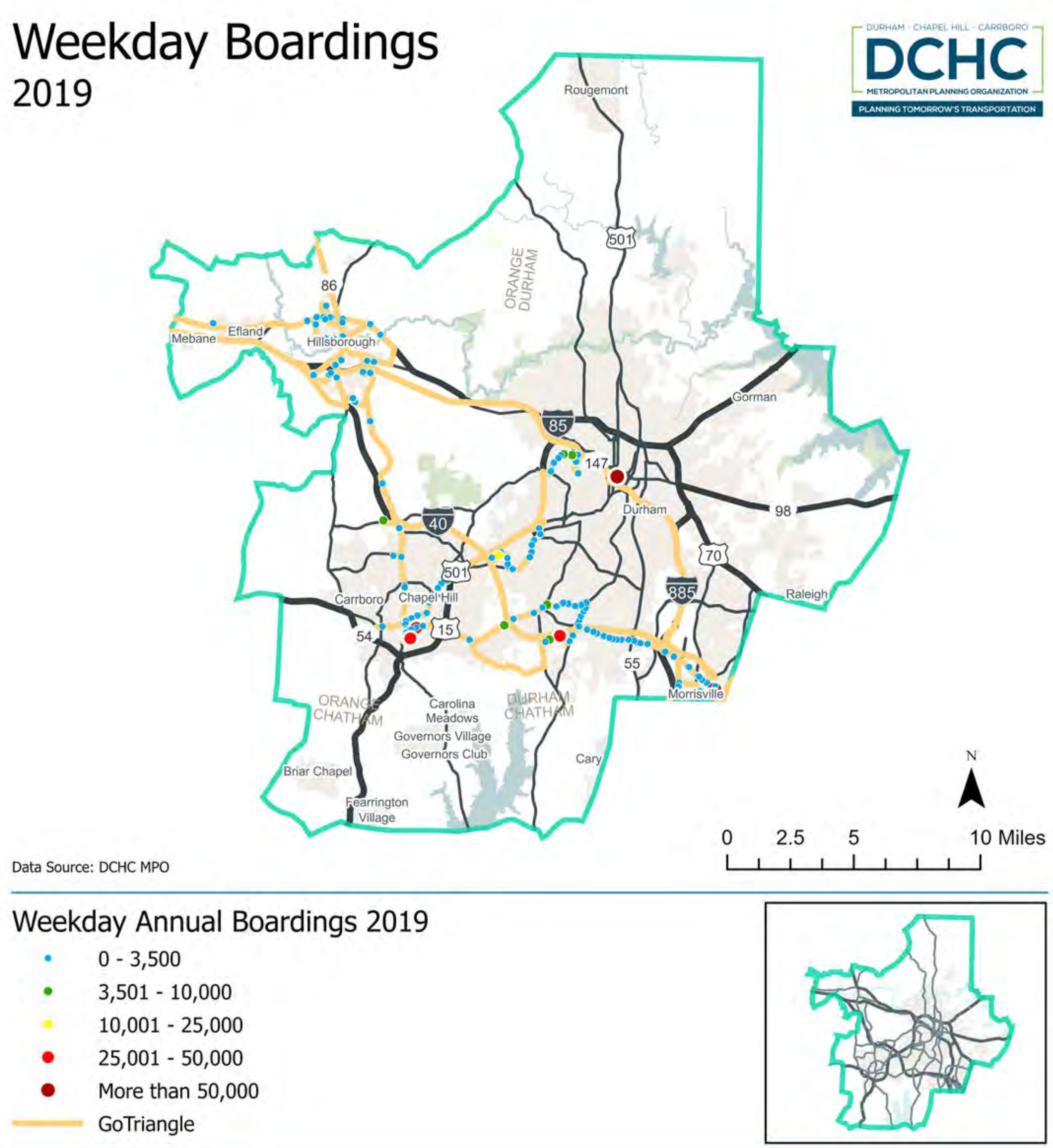
	Number of Bus Stops	2019 Total Weekday Boardings	2019 Total Weekday Alightings	2019 Total Weekday Activity	Rank
Downtown Durham	628	3,049,668	3,116,618	6,166,286	1
North Durham	199	331,791	344,577	676,368	2
Southpoint	129	210,941	230,035	440,976	3
East Durham	83	118,101	118,962	237,063	4
Chapel Hill	6	44,234	47,363	91,597	5

Table 11-4. Annual 2019 Boardings and Alightings by Subarea - Saturday (GoDurham)

	Number of Bus Stops	2019 Total Saturday Boardings	2019 Total Saturday Alightings	2019 Total Saturday Activity	Rank
Downtown Durham	628	444,340	453,448	897,788	1
North Durham	199	53,621	56,109	109,730	2
Southpoint	129	36,521	41,942	78,463	3
East Durham	83	19,324	19,111	38,435	4
Chapel Hill	6	8,742	9,351	18,093	5

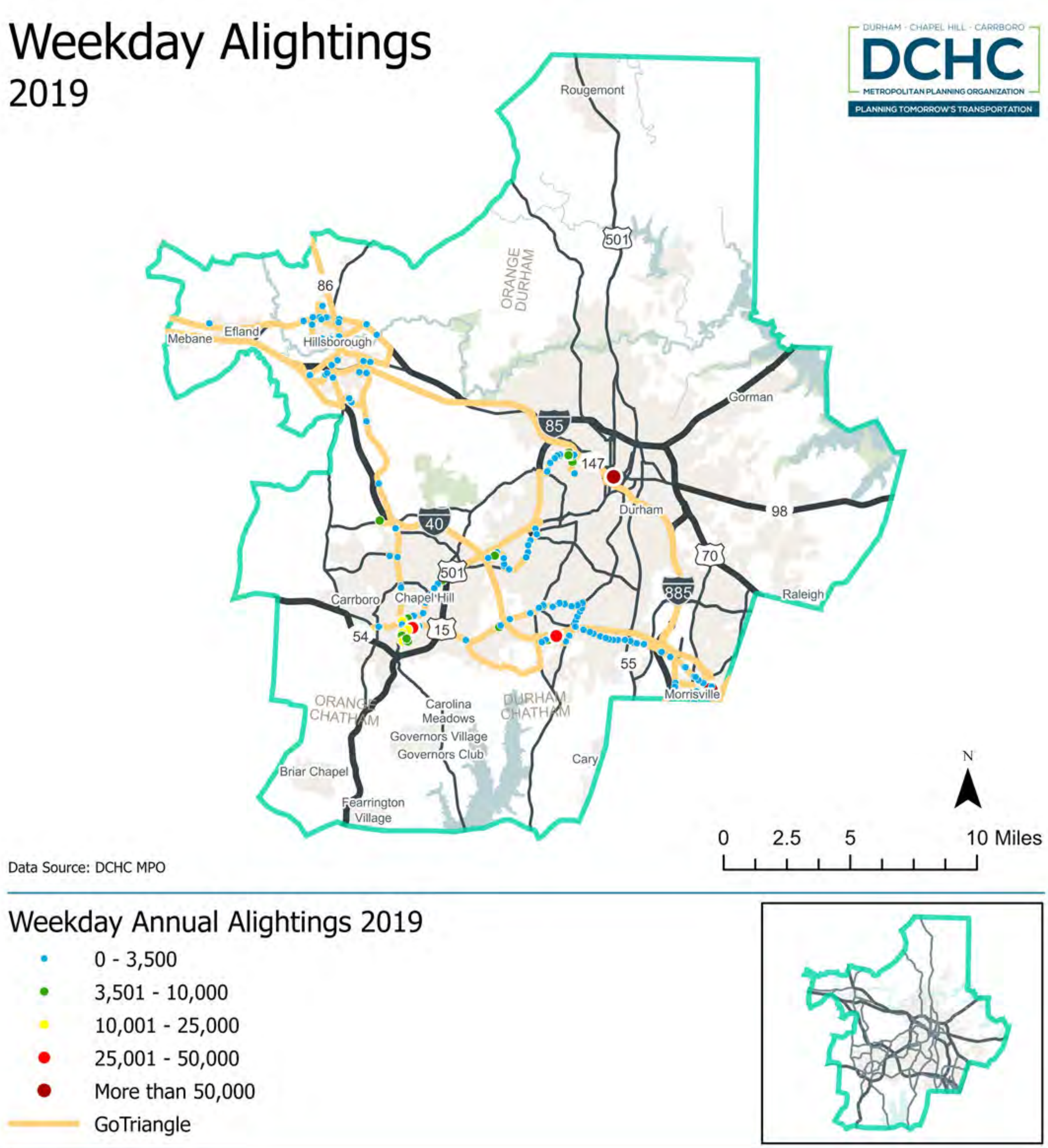
GO-TRIANGLE TRANSIT OVERVIEW

Figure 11-9. GoTriangle Transit Annual Boardings (Weekday)



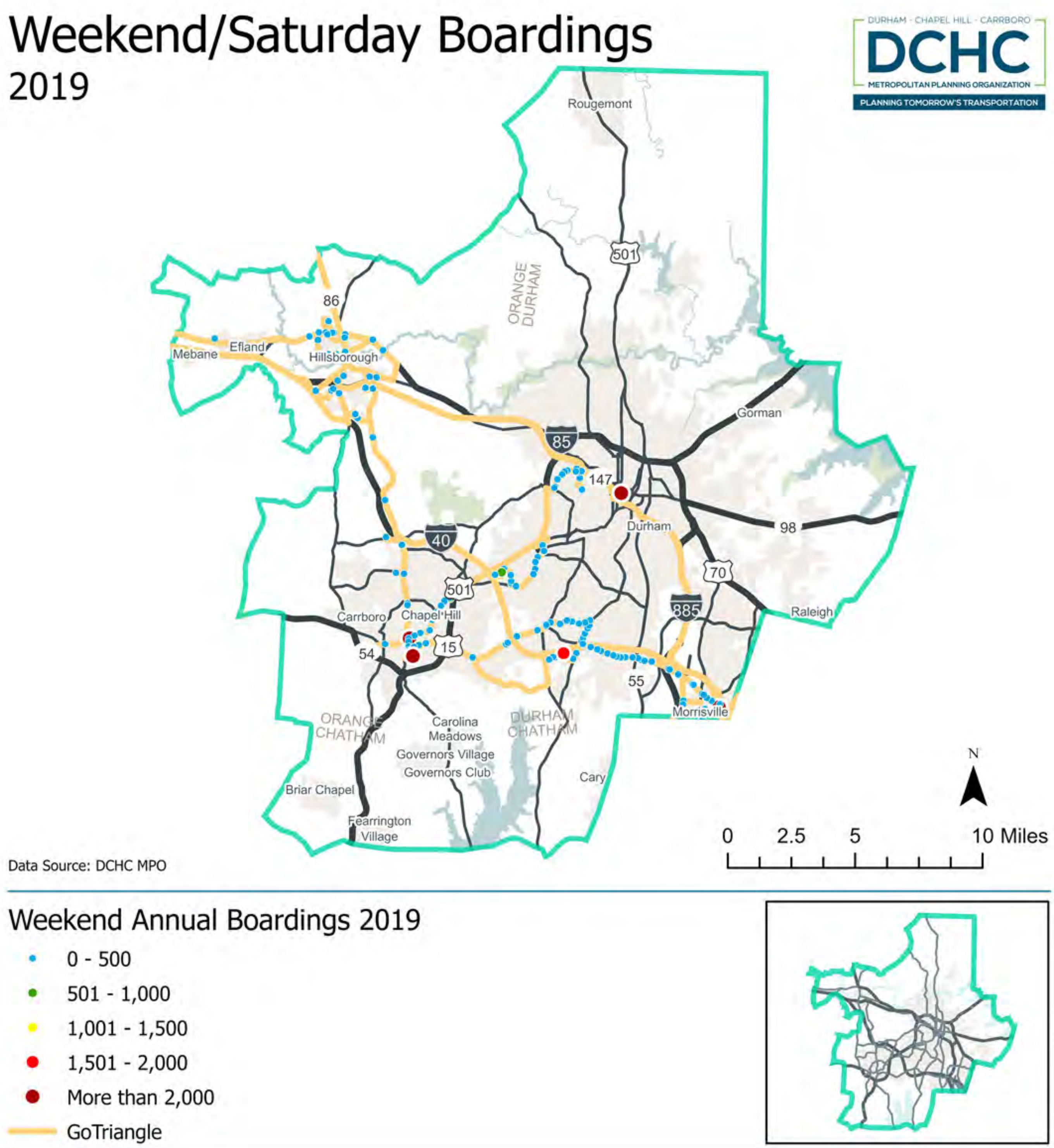
GO-TRIANGLE TRANSIT OVERVIEW

Figure 11-10. GoTriangle Transit Annual Alightings (Weekday)



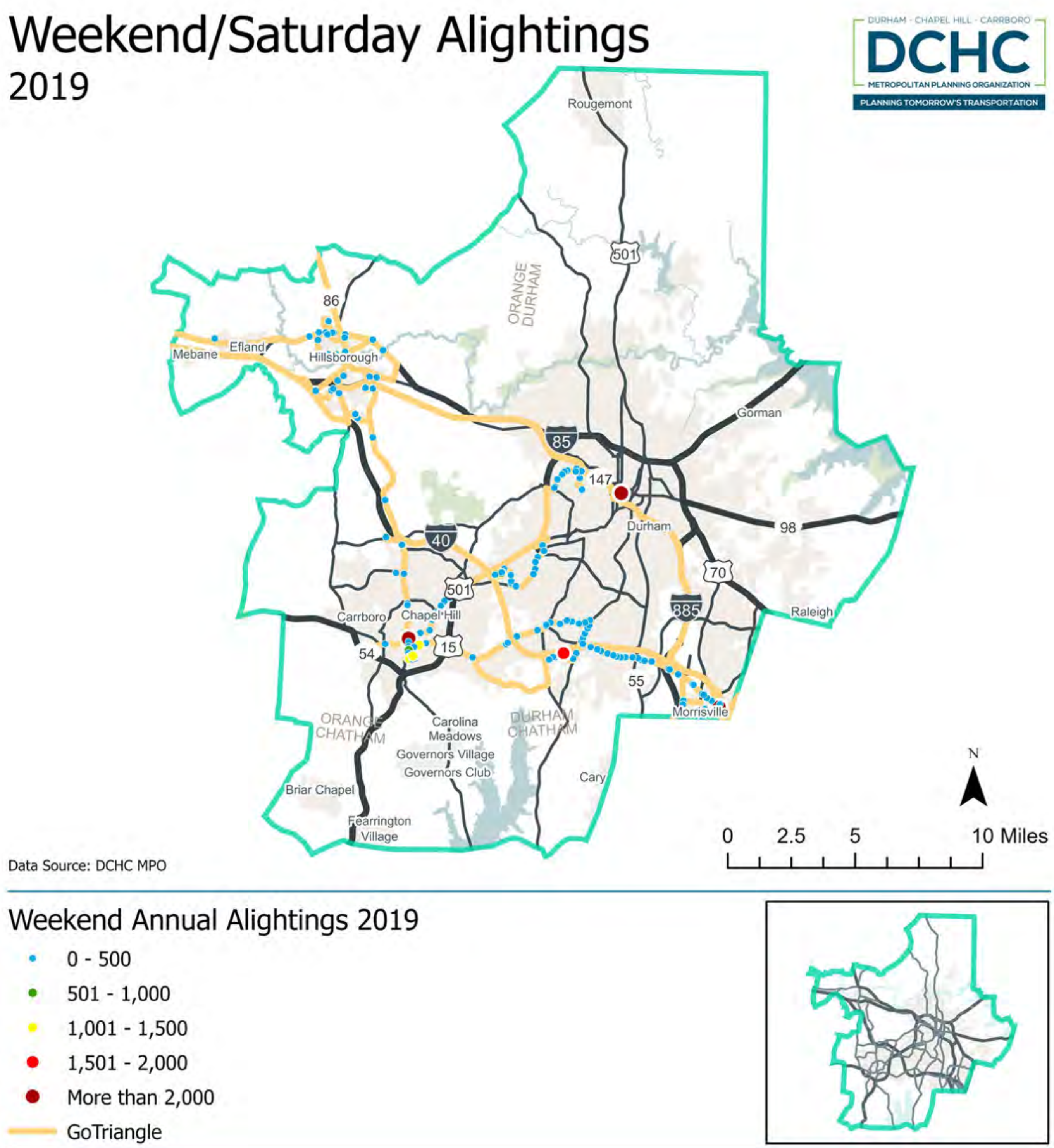
GO-TRIANGLE TRANSIT OVERVIEW

Figure 11-11. GoTriangle Transit Annual Boardings (Weekend/Saturday)



GO-TRIANGLE TRANSIT OVERVIEW

Figure 11-12. GoTriangle Transit Annual Alightings (Weekend/Saturday)



10 MOST BOARDED GOTRIANGLE STOPS (WEEKDAY)

Stop	ANNUAL BOARDINGS
GoTriangle Regional Transit Center (RTC) & RTP Connect	149,716
GoDurham Station	115,060
The Streets at Southpoint	35,568
Manning Dr at UNC Hospitals (CG Lot)	32,465
South Rd at Fetzer Gym	27,906
S Columbia St at Health Sciences Library	26,763
E Franklin St at Carolina Coffee Shop	19,332
Witherspoon Blvd at McFarland Dr	14,411
S Columbia St at Carrington Hall	11,202
Fulton St at Erwin Rd (Duke Hospital Parking Garage)	11,076

10 MOST ALIGHTED GOTRIANGLE STOPS (WEEKDAY)

Stop	ANNUAL ALIGHTINGS
GoTriangle Regional Transit Center (RTC) & RTP Connect	148,924
GoDurham Station	108,938
The Streets at Southpoint	35,886
South Rd at Student Stores	28,200
Mason Farm Rd at Ambulatory Care Center (EB)	22,562
E Franklin St at Varsity Theatre	20,032
Pittsboro St at Vance St (Credit Union)	20,028
McFarland Dr at Witherspoon Blvd	15,197
South Rd at Bell Tower Dr (Kenan Labs)	11,307
Erwin Rd at Fulton St (Duke University Hospital)	10,345

10 MOST BOARDED GOTRIANGLE STOPS (SATURDAY)

Stop	ANNUAL BOARDINGS
GoTriangle Regional Transit Center (RTC) & RTP Connect	17,657
GoDurham Station	12,045
E Franklin St at Carolina Coffee Shop	2,387
Manning Dr at UNC Hospitals (CG Lot)	2,074
The Streets at Southpoint	1,678
South Rd at Fetzer Gym	1,329
Mason Farm Rd at Ambulatory Care Center (EB)	930
Witherspoon Blvd at McFarland Dr	719
S Columbia St at Health Sciences Library	547
McFarland Dr at Witherspoon Blvd	503

10 MOST ALIGHTED GOTRIANGLE STOPS (SATURDAY)

Stop	ANNUAL ALIGHTINGS
GoTriangle Regional Transit Center (RTC) & RTP Connect	17,965
GoDurham Station	11,058
E Franklin St at Varsity Theatre	2,630
The Streets at Southpoint	1,884
South Rd at Student Stores	1,412
Mason Farm Rd at Ambulatory Care Center (EB)	1,298
Manning Dr at UNC Hospitals (CG Lot)	1,250
McFarland Dr at Witherspoon Blvd	986
Pittsboro St at Vance St (Credit Union)	562
E Franklin St at Booker Creek Greenway	470

GOTRIANGLE TRANSIT OVERVIEW:

GoTriangle has a total annual boardings of 691,818 and alightings of 692,291 in 2019. It has a total of 227 bus stops. GoTriangle serves 5 subareas out of 7 in the DCHC MPO area on weekdays and 3 subareas out of 7 on weekend (Saturday).

SUBAREA RANKING

Southpoint has the highest number of boardings and alightings in both weekday and Saturday. Most of the routes are concentrated in Southpoint area. Only GoTriangle serves the Hillsborough subarea out of the three transit operators.

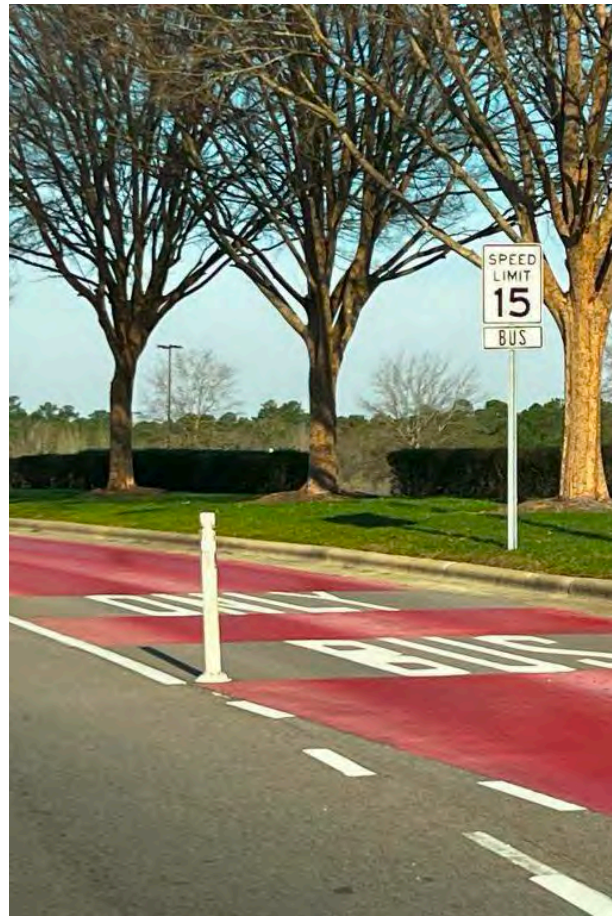
Table 11-5. Annual 2019 Boardings and Alightings by Subarea - Weekday (GoTriangle)

	Number of Bus Stops	2019 Total Weekday Boardings	2019 Total Weekday Alightings	2019 Total Weekday Activity	Rank
Southpoint	83	241,186	243,800	484,986	1
Chapel Hill	68	212,752	208,737	421,489	2
Downtown Durham	36	180,971	183,442	364,413	3
Hillsborough	36	3,596	3,560	7,156	4
Carrboro	4	3,634	2,441	6,075	5

Table 11-6. Annual 2019 Boardings and Alightings by Subarea - Saturday (GoTriangle)

	Number of Bus Stops	2019 Total Saturday Boardings	2019 Total Saturday Alightings	2019 Total Weekday Saturday	Rank
Southpoint	83	22,243	23,039	45,282	1
Downtown Durham	36	14,070	13,665	27,735	2
Chapel Hill	68	13,366	13,607	26,973	3

	Number of Routes
ALL DAYS OF THE WEEK	0
WEEKDAYS ONLY	72
WEEKDAYS AND SATURDAY	1
SATURDAYS ONLY	45
TOTAL	80



ROUTES OPERATION BY DAY OF THE WEEK

A summary was prepared by reviewing the fixed route bus operations by day of the week in 2019 for GoDurham, Chapel Hill Transit, and GoTriangle.. This summary shows that there are 80 bus routes operated by the three main transit operators in the DCHC MPO region. Of these bus routes, 72 were operating during weekdays, and 45 routes were operating for Saturdays. None of the bus routes were operating for all seven days in the week.

COMPARATIVE ANALYSIS

Figure 11-13. Total Annual Boardings by Subarea for All Transit Operators

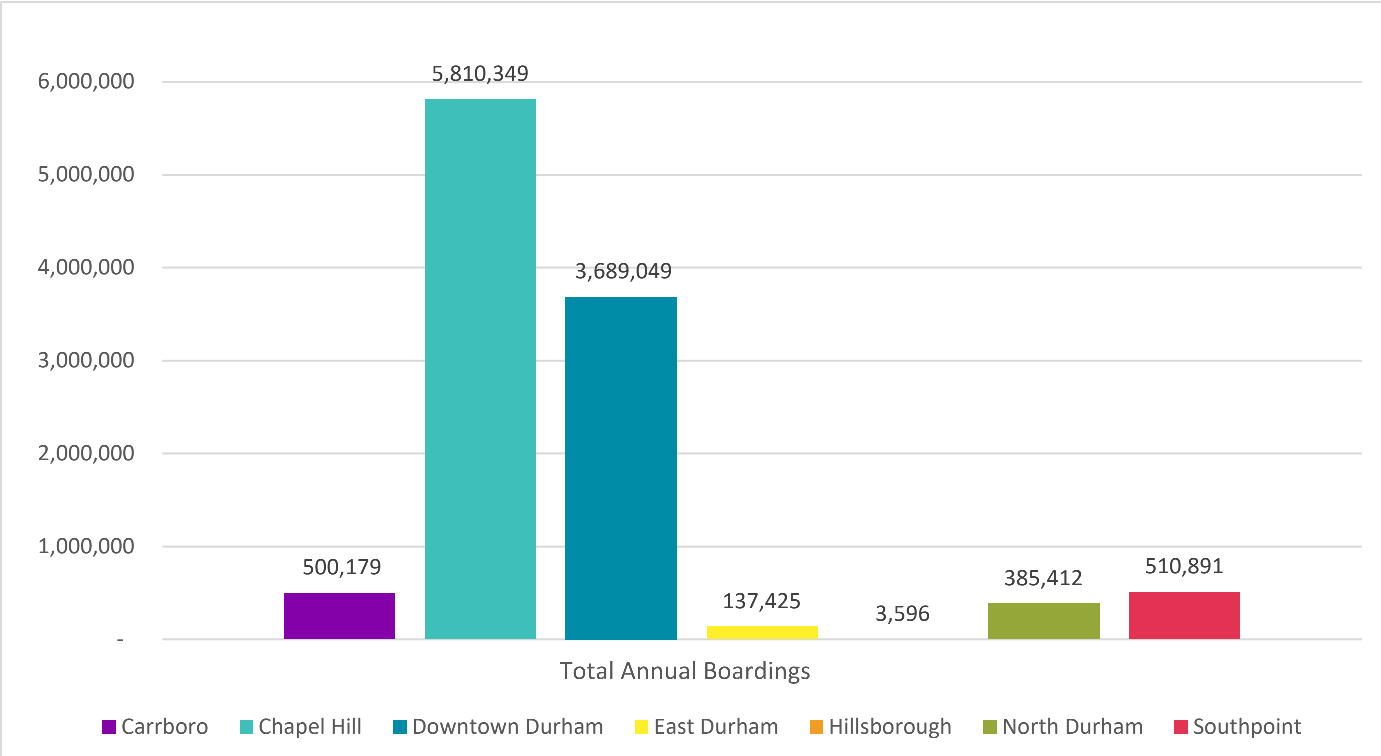


Figure 11-14. Total Annual Alightings by Subarea for All Transit Operators

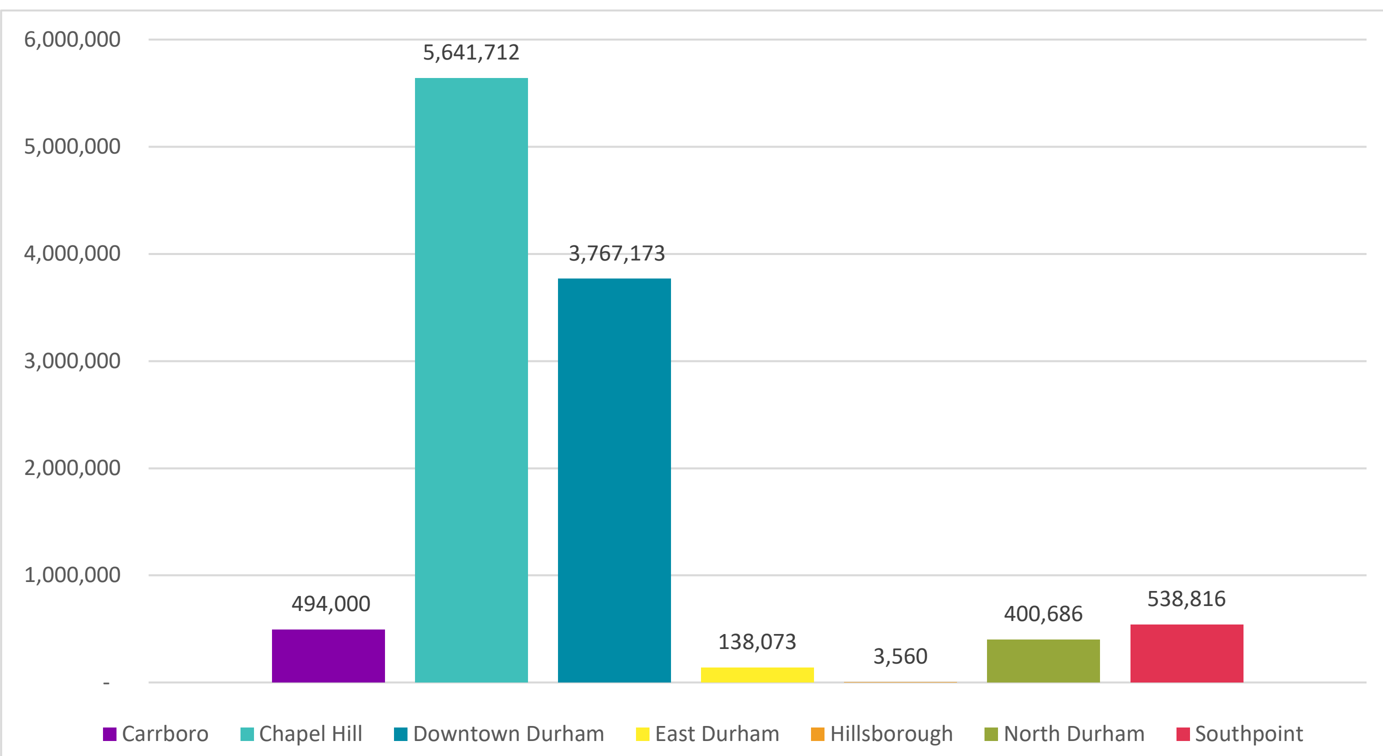
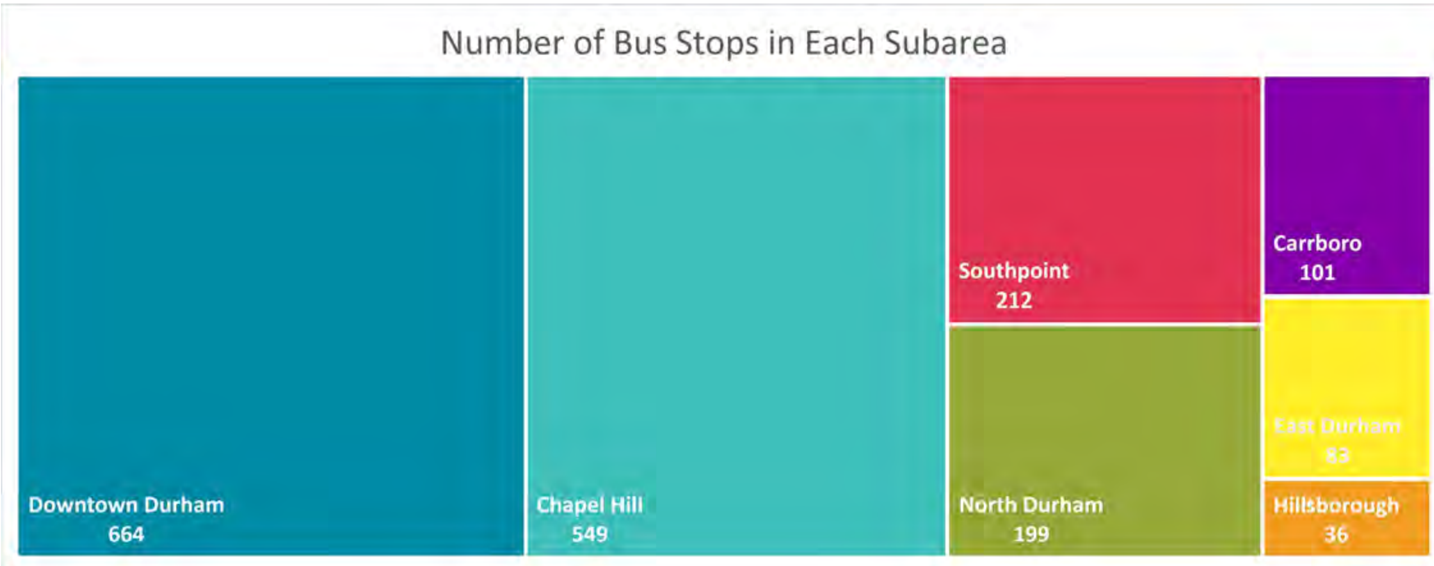


Figure 11-15. Number of Stops by Subarea



The Downtown Durham and Chapel Hill subareas have the highest number of stops (664 and 549, respectively), followed by Southpoint with 212. There are more stops in the Downtown Durham subarea than all of the other subareas (except for Chapel Hill) combined.

It should be noted that ridership data are not available at the route level. Consequently, the number of boardings and alighitngs at all stops in each subarea were totaled. Although the Downtown Durham and Chapel Hill subareas have comparable numbers of bus stops, the Chapel Hill subarea has more than 1.5 times as many total boardings and alightings among those stops as does Downtown Durham.

Similarly, although the Southpoint has only 13 more stops than North Durham, there are 100,000 more boardings and alightings in Southpoint than North Durham. The lower the number of bus stops, the lower are the number of boarding and alightings in the subareas.

[12] BICYCLE LEVEL OF TRAFFIC STRESS (LTS)

How good are the roads in the region for bicycle travel?

KEY TAKEAWAYS

Bicycling is prohibited on around 4% of the region's roadway network that includes Interstates and other freeways. Around 74.4% of the region's road network consist of neighborhood streets that were deemed as "very low" stress for bicycle travel.

Around 7.6% of the road network was assessed to have "low" and "moderately low" traffic stress to bicylists. The remaining 14% of the network was considered "moderate" to "high" for bicycle travel due to prevailing traffic and roadway conditions.

Roadway segments with no bike lanes, high posted speeds, high traffic volumes, and located in central business districts were deemed to have "moderate" to "high" stress for bicycle travel.

Roadway segments with exclusive or shared bike lanes, low posted speeds, low traffic volumes, and located in low-density areas were deemed to have "low" or "moderately low" stress for bicycle travel

INTRODUCTION

The earlier chapters in the report focused on a particular mode of travel (automobiles, pedestrians, bicycles, and transit). This chapter presents a new performance measure to assess the quality of the DCHC MPO region's roadway network from the perspectives of different types of bicycle riders. This new measure is called the Bicycle Level of Traffic Stress, or Bike LTS that was originally developed by the Mineta Transportation Institute in 2012. Since then, Bike LTS has emerged as a widely-used framework for identifying streets that are low-stress for bicyclists.

METHODOLOGY

There are different ways of making the Bike LTS assessment, but the current CMP study adapted from the FDOT's Bike LTS methodology. The FDOT's Bike LTS method is suited for planning applications. In the DCHC MPO application, we have expanded assessment scale from a 4-point scale to a 5-point scale to fit the roadway network in the DCHC region. We have also applied professional judgment where data were not readily available, such as the width of the bicycle lane, on-street parking, separation from the travel lanes, etc. Consequently, with additional data and analysis effort in the future, the LTS scores could be updated.

Overall, Bike LTS framework is based on a hierarchy of roadway characteristics, including traffic speed, traffic volume, presence and type of bicycle facility, roadway cross-section, and land use context. In the DCHC application, quality of the roadway network was assessed on a 5-point scale for its comfort with various bicycle users:

1 - Very Low Stress; reflecting that the facility is more inviting to more types of bicyclists including most children

2 - Low Stress; reflecting that the facility is suited for most adults as it has marked bicycle lane

3 - Moderately Low Stress; reflecting that the facility is suited for many adults

4 - Moderate Stress; reflecting that the facility is suited for some adults

5 - High Stress; reflecting that the facility is suited only for experienced bicyclists

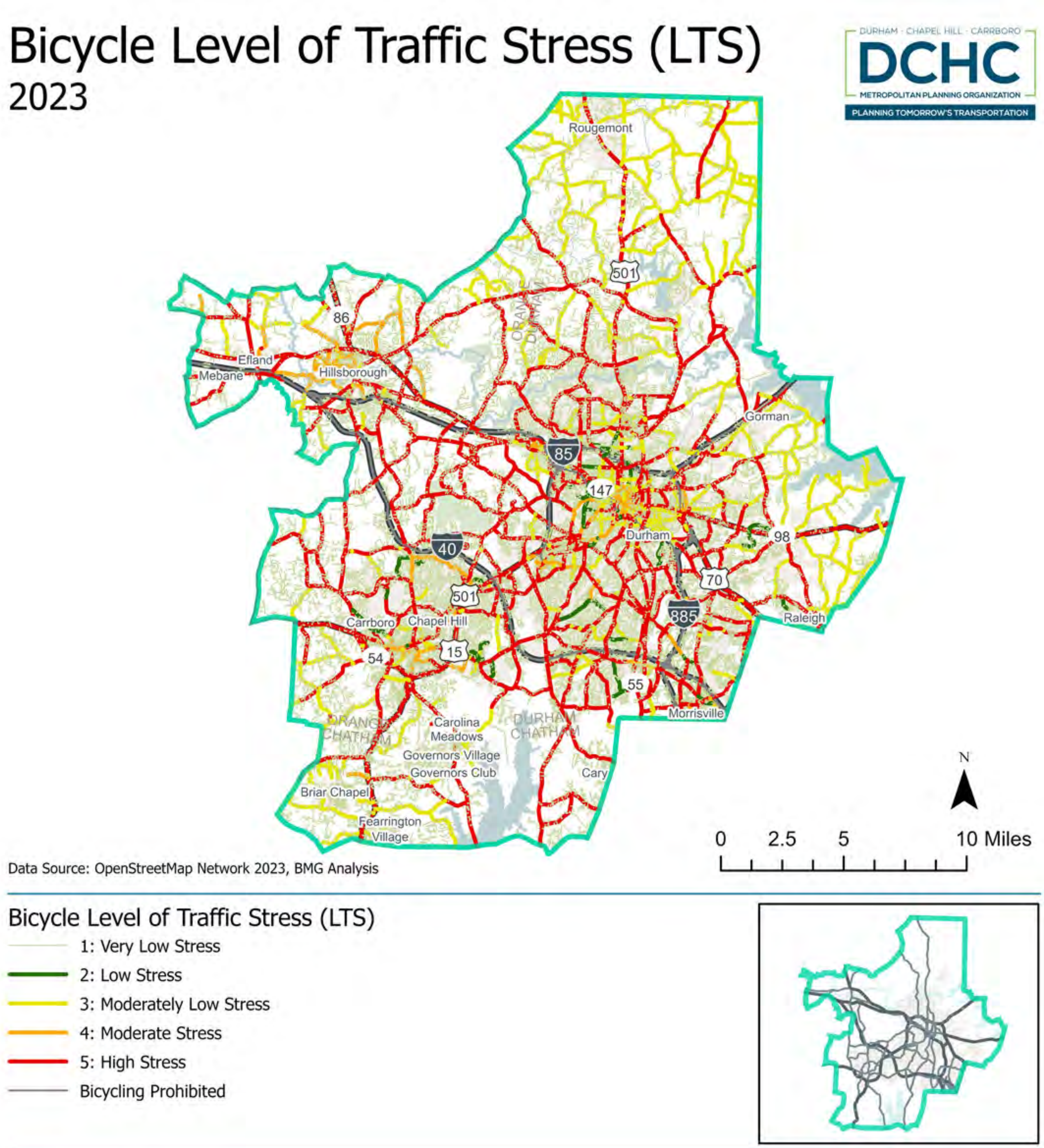
The results of Bike LTS assessment is presented in Figure 12-1 for the full MPO region. In addition, the resulting allocation of the Bike LTS score is summarized in Table 12-1.

The detailed Bike LTS maps by subarea are shown in several subsequent Figures: Figure 12-2 for North Durham subarea, Figure 12-3 for Downtown Durham subarea,

Figure 12-4 for East Durham subarea, Figure 12-5 for Southpoint subarea, Figure 12-6 for Hillsborough subarea, Figure 12-7 for Carrboro subarea, and Figure 12-6 for Chapel Hill subarea.

REGIONAL OVERVIEW

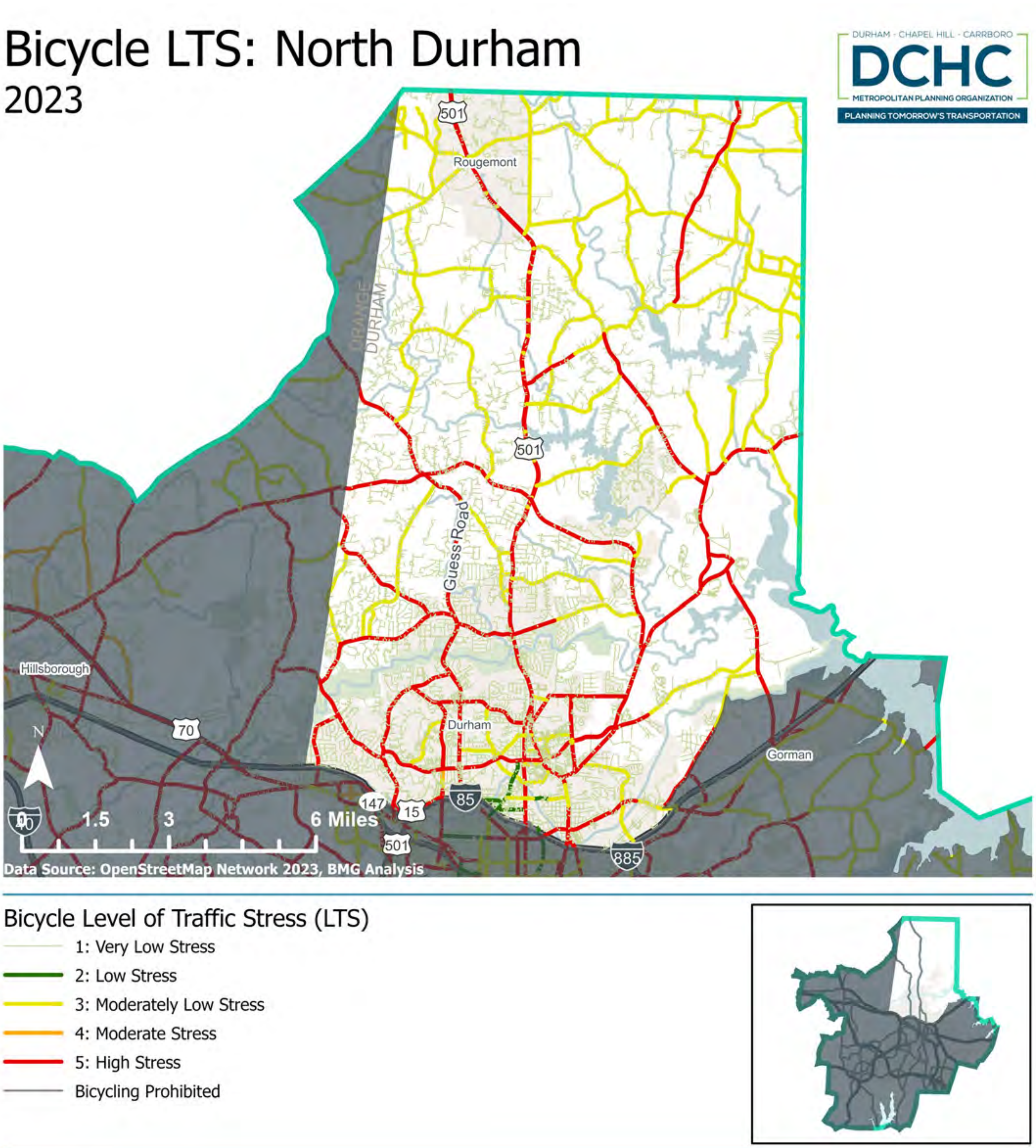
Figure 12-1. Bicycle LTS for the DCHC MPO Roadway Network (2023)



RESULTS BY GEOGRAPHIC SUBAREA

NORTH DURHAM

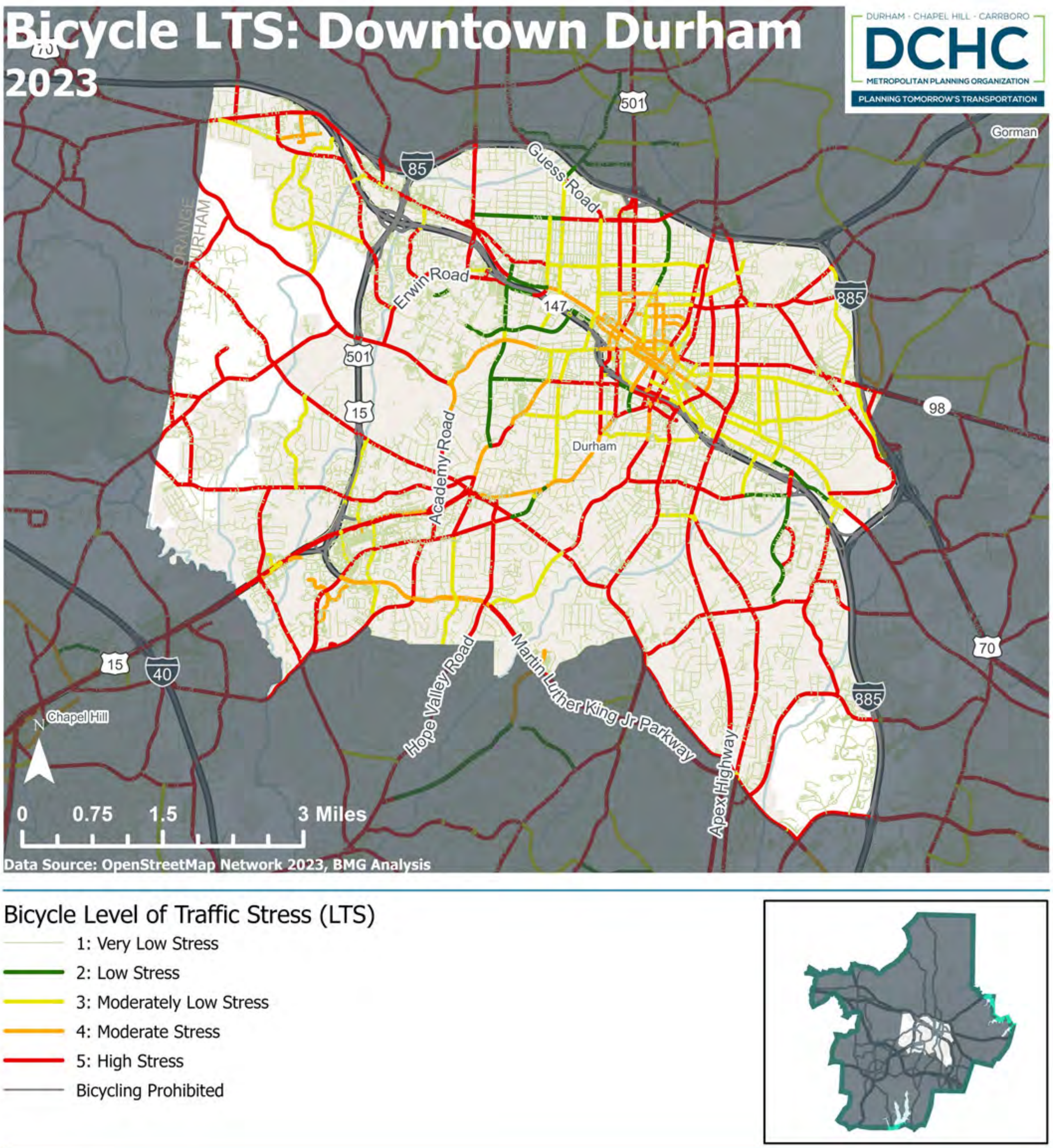
Figure 12-2. North Durham Bike LTS (2023)



RESULTS BY GEOGRAPHIC SUBAREA

DOWNTOWN DURHAM

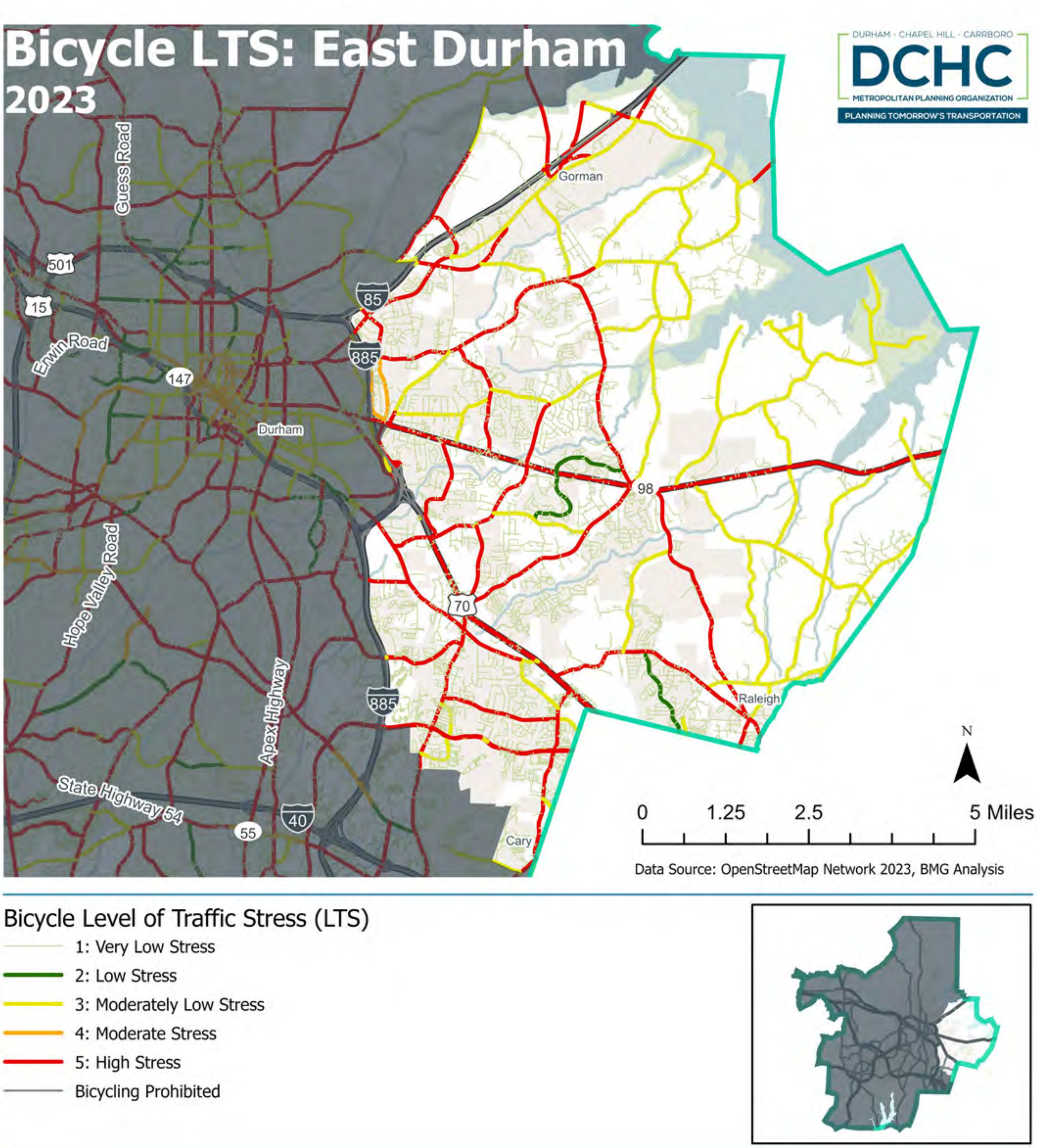
Figure 12-3. Downtown Durham Bike LTS (2023)



RESULTS BY GEOGRAPHIC SUBAREA

EAST DURHAM

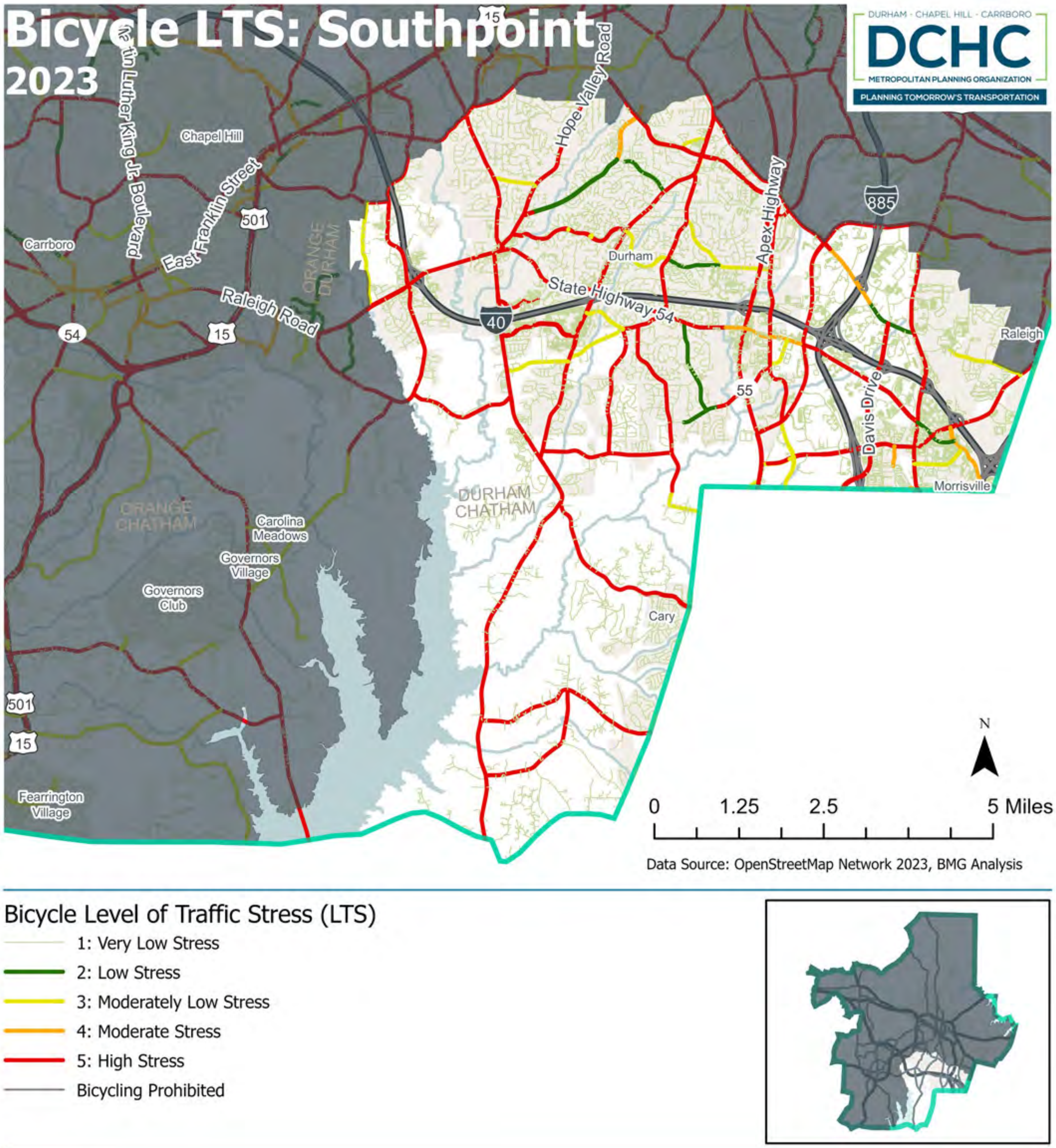
Figure 12-4. East Durham Bike LTS (2023)



RESULTS BY GEOGRAPHIC SUBAREA

SOUTHPOINT

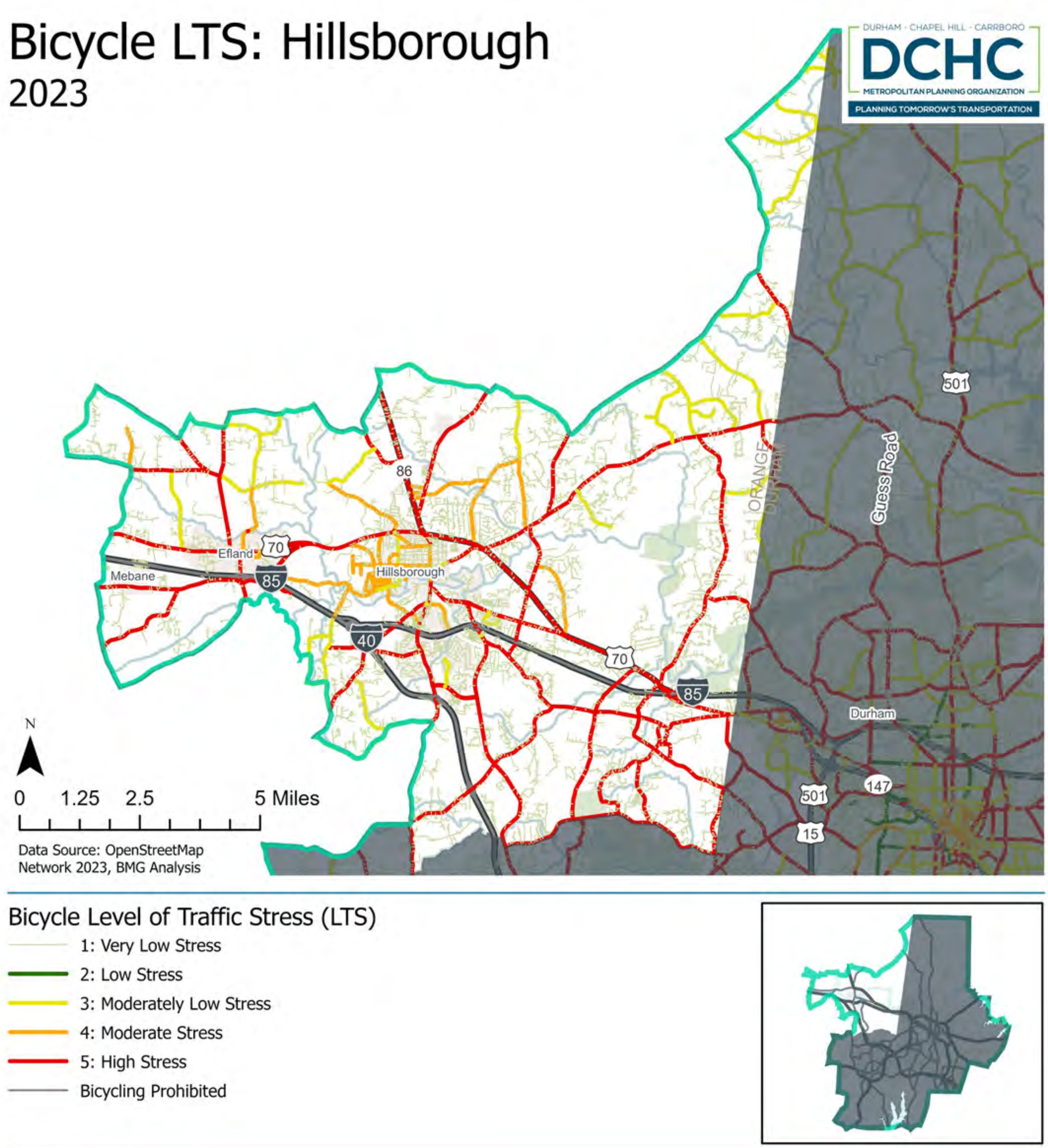
Figure 12-5. Southpoint Bike LTS (2023)



RESULTS BY GEOGRAPHIC SUBAREA

HILLSBOROUGH

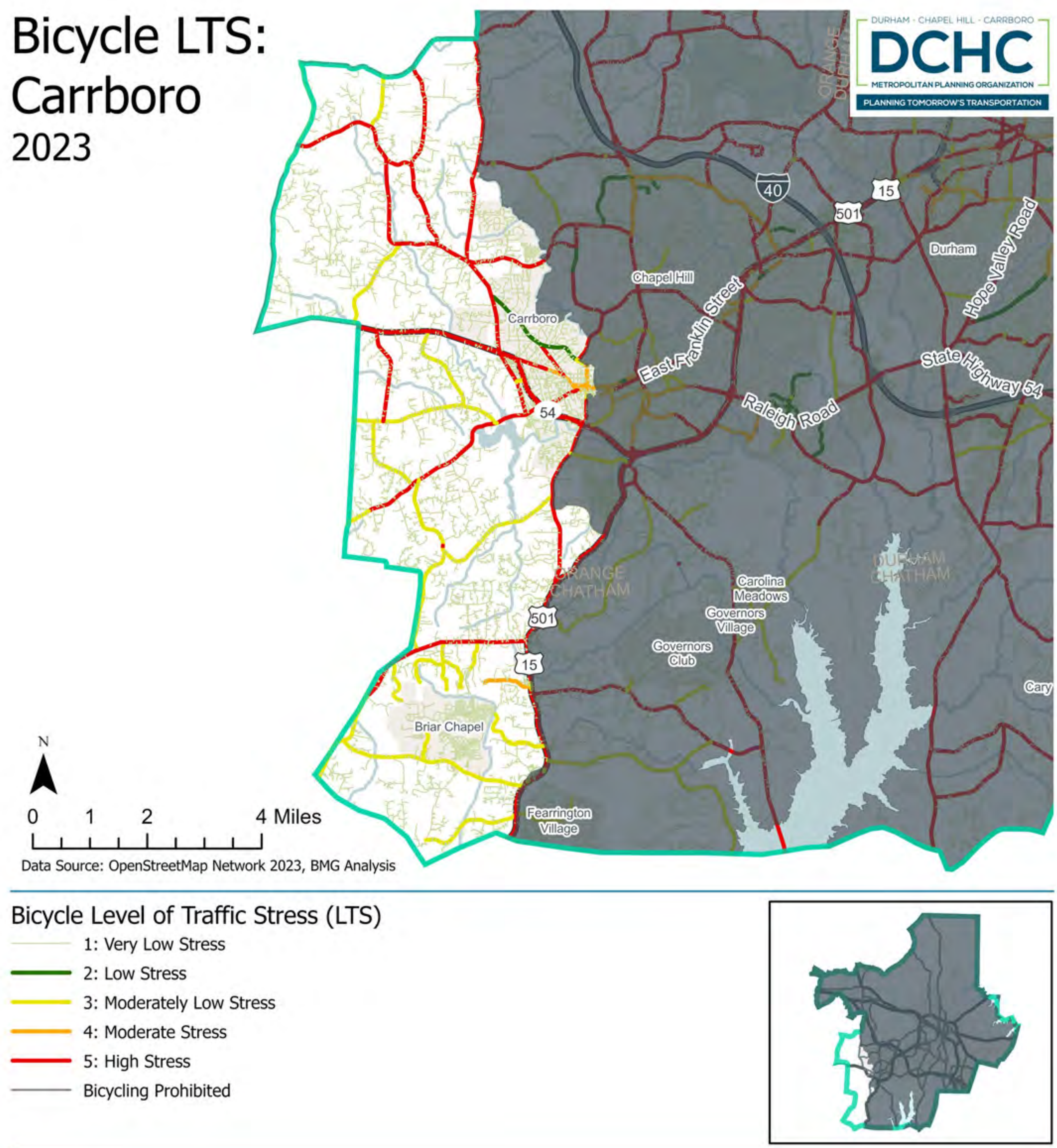
Figure 12-6. Hillsborough Bike LTS (2023)



RESULTS BY GEOGRAPHIC SUBAREA

CARRBORO

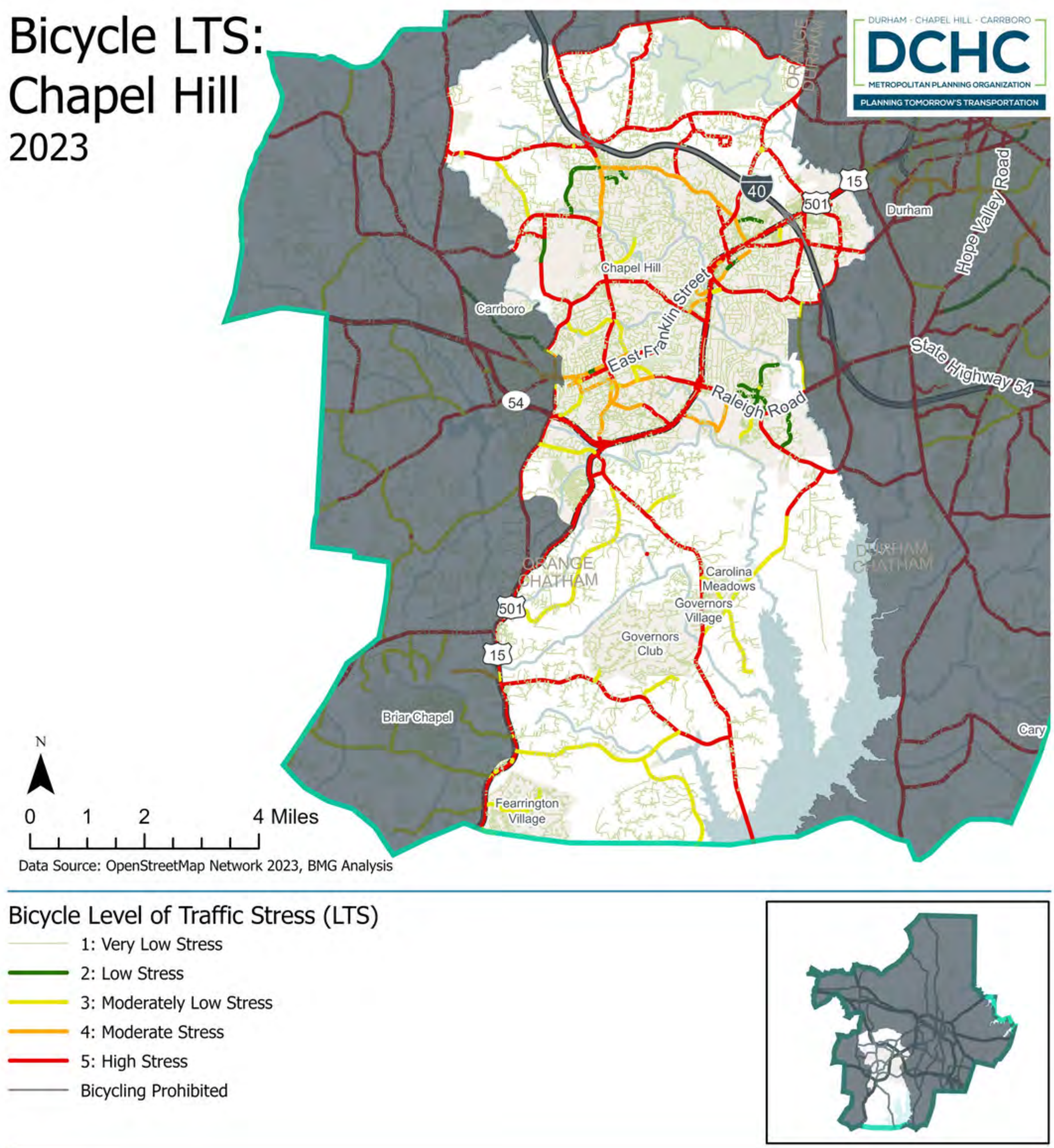
Figure 12-7. Carrboro Bike LTS (2023)



RESULTS BY GEOGRAPHIC SUBAREA

CHAPEL HILL

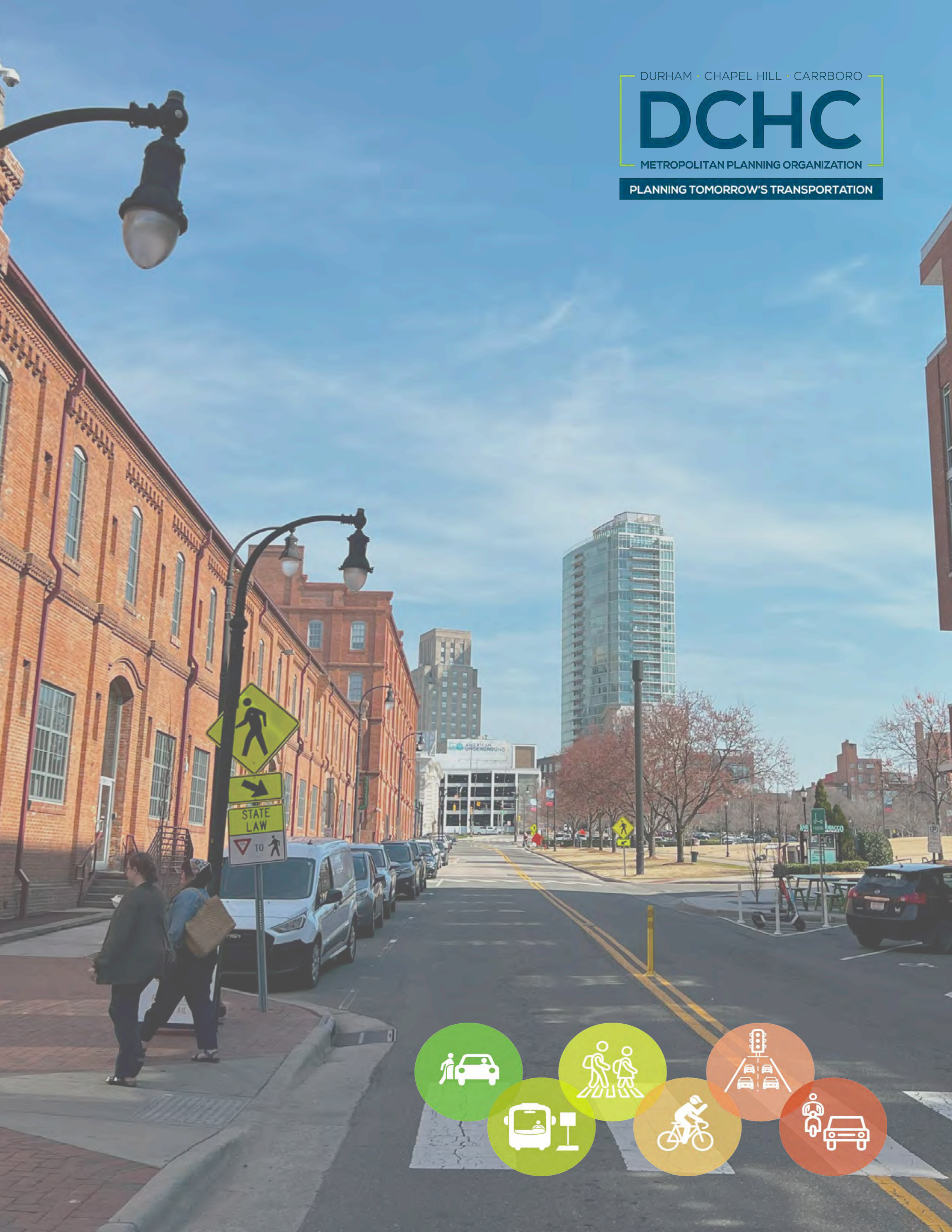
Figure 12-8. Chapel Hill Bike LTS (2023)



COMPARATIVE ANALYSIS

A significant portion of the road network was assessed to have "very low" traffic stress for bicycle riders (74.4%). This assessment reflected more or less a default condition as this street network consists mostly of neighborhood and residential streets. For the other non-freeway arterial network where bicyclists can utilize for commuting or recreational needs, only 7.6% received scores of "low" or "moderately low" traffic stress scores. The remaining 14% of the network received "moderate" to "high" stress scores.

As follow up, it is desirable to create a bicycle network of connected streets where stress level is relatively low. In essence, it is necessary to identify the barriers to low-stress connectivity between communities and to reach key destinations in the DCHC MPO region. These barriers to low-stress connectivity could be natural or man-made barriers that require grade-separated crossings such as freeways, railroads, and creeks, Arterial streets that lack a safe and simpler crossing can also be barriers to low-stress bicycle connectivity. Subdivisions with breaks in the street grid can also pose as barriers to low-stress connectivity. This low-stress connectivity assessment can be made in the future by evaluating the percent of trips that are connected without exceeding the specified level of stress. In general, this assessment will need to be made for trips within a certain distance range because bicycling tends be a valid alternative mode only for short-distance trips. In other words, the goal of this follow up assessment is to evaluate the ability of the DCHC MPO region's roadway network to connect travelers' origins to their destinations without subjecting them to unacceptably stressful roadway segments or unacceptably long detours.


DURHAM · CHAPEL HILL · CARRBORO
DCHC
METROPOLITAN PLANNING ORGANIZATION
PLANNING TOMORROW'S TRANSPORTATION
STATE LAW
TO