MOBILITY REPORT CARD

2019

DURHAM . CHAPEL HILL . CARRBORO



DCHC MOBILITY REPORT CARD **SUMMARY** 2019 Prepared by: RENAISSANCE PLANNING

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INTRODUCTION

MOBILITY REPORT CARD 2019



THE DCHC REGION INCLUDES ALL OF DURHAM COUNTY AND PARTS OF ORANGE AND CHATHAM COUNTIES

INTRODUCTION



WHAT IS THE MOBILITY REPORT CARD?

- Evaluates multimodal transportation system performance throughout the DCHC region.
- Twelve chapters addressing supply, demand, and safety across multiple modes.
 - Highlight key findings
 - Presentation of diverse metrics
 - Geographic summarizations and comparisons

CONGESTION MANAGEMENT PROCESS



- The Fixing America's Surface Transportation (FAST) Act is the current federal legislation guiding MPO planning nationwide.
- The FAST Act requires MPOs to have a Congestion Management Process (CMP).
- The Mobility Report Card's role in the CMP:
 - Develops multimodal performance measures (step 1)
 - Analyzes data (step 2)
 - Summarizes existing conditions and trends for the regional multimodal transportation system (step 4)

KEY TERMS AND CONCEPTS

Peak travel periods – when does most travel occur?

- 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

• Level of service (LOS) – grading performance of roads and intersections

- Grades of A (best performing) to F (worst performing) are assigned
- Congestion and delay are primary drivers of poor or declining LOS.

• CMP Corridors

- DCHC tracks data for 95 roadways as part of the CMP.
- Some performance metrics in the Mobility Report Card are only available for the CMP corridors.
- The 95 corridors include all major highways and a range of arterial and collector roads, providing a representative cross-section of facilities throughout the region.

CHAPTERS

<u>Chapters</u>

- **1**. Vehicle Activity and Arterial Level of Service
- 2. Intersection Peak Hour Level of Service
- 3. Vehicle Travel Time
- 4. Vehicle Safety
- 5. Pedestrian Facilities
- 6. Pedestrian Activity
- 7. Bicycle Facilities
- 8. Bicycle Activity
- 9. Pedestrian and Bicyclist Safety

- **10. Transit Service**
- 11. Transit Ridership
- 12. Multimodal Mobility and Throughput

Detailed Appendices

- A. Average Annual Daily Traffic (AADT) and Level of Service (LOS) by segment
- B. Intersection Level of Service (LOS)
- C. Travel Time Reliability by Segment
- D. Multimodal Travel by Segment

GEOGRAPHIC REPORTING BY SUBAREA



- Subareas reflect major travel markets
- Comparisons reveal differences in the way the transportation system is used and its performance in different parts of the region.



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CHAPTER SUMMARIES

MOBILITY REPORT CARD 2019

1 VEHICLE ACTIVITY AND ARTERIAL LEVEL OF SERVICE Technical Committee 9/23/2020 Item 9



- 1,275 count stations
- Regional traffic volume increased by 28% from 2009 to 2017.
- In 2017, fewer than 10% of stations were failing (LOS E or F)

1 VEHICLE ACTIVITY AND ARTERIAL LEVEL OF SERVICE echnical Committee 9/23/2020 Item 9



1 VEHICLE ACTIVITY AND ARTERIAL LEVEL OF SERVICE Technical Committee 9/23/2020 Item 9

Average 2017 AADT by Subarea



LOS Decline in 2017 by Subarea



- Traffic volumes are highest in the Southpoint subarea
- About half of LOS declines are concentrated in the Downtown Durham and Southpoint subareas

2 INTERSECTION PEAK HOUR LEVEL OF SERVICE chnical Committee 9/23/2020 Item 9



KEY FINDINGS

A

70

27%

80

30%

- 95% of intersections operate at LOS D or better in the AM peak (2017)
- 12 Intersections operate at LOS E or F in the AM peak (2017)

2 INTERSECTION PEAK HOUR LEVEL OF SERVICE Committee 9/23/2020 Item 9





- 94% of intersections operate at LOS D or better in the PM peak (2017)
- 15 Intersections operate at LOS E or F in the PM peak (2017)

	2013			2017		
Subarea	TOTAL # OF	INTERSECTIONS AT		TOTAL # OF	INTERSECTIONS AT LOS E OR F	
	INTERSECTIONS OBSERVED	#	%	INTERSECTIONS - OBSERVED	#	%
Carrboro	18	1	5.6%	18	2	11.1%
Chapel Hill	60	10	16.7%	77	6	7.8%
Downtown Durham	77	2	2.6%	78	2	2.6%
East Durham	11	2	18.2%	11	1	9.1%
Hillsborough	5	0	0%	5	0	0%
North Durham	16	0	0%	16	0	0%
Southpoint	17	2	11.8%	19	0	0%
TOTAL	204	17	8.3%	224	11	4.9%

KEY FINDINGS (AM)

- 69 intersections (23%) experienced a decline in LOS from 2013 to 2017
- 10 intersections declined to LOS E or F from 2013 to 2017
- Fewer intersections operates at LOS E or F in 2017 than 2013.
- The Chapel Hill subarea has the most intersections at LOS E or F in 2017.

	2013			2017		
Subarea	TOTAL # OF	INTERSECTIONS AT LOS E OR F		TOTAL # OF	INTERSECTIONS AT LOS E OR F	
	INTERSECTIONS OBSERVED	#	%	INTERSECTIONS OBSERVED	#	%
Carrboro	18	0	0%	18	1	5.6%
Chapel Hill	59	11	18.6%	77	10	13%
Downtown Durham	76	6	7.8%	78	1	1.3%
East Durham	10	0	0%	11	1	9.1%
Hillsborough	5	0	0%	19	0	0%
North Durham	16	0	0%	16	1	6.3%
Southpoint	17	2	11.8%	19	0	0%
TOTAL	201	19	9.5%	238	14	5.9%

KEY FINDINGS (PM)

- 66 intersections (25%) experienced a decline in LOS from 2013 to 2017
- 12 intersections declined to LOS E or F from 2013 to 2017
- Fewer intersections operates at LOS E or F in 2017 than 2013.
- The Chapel Hill subarea has the most intersections at LOS E or F in 2017.

TRAVEL TIME METRICS

• All metrics are ratios of observed or assumed travel times.

Metric	Ratio	What does it mean?
Travel Time Index	50 th percentile travel time free flow travel time	How much longer is the average travel time than the free-flow travel time? What is "normal" delay?
Planning Time Index	<u>95th percentile travel time</u> free-flow travel time	How much longer is the worst-case travel time than the free-flow travel time? How do potential "extreme" delays influence travel time budgets?
Level of Travel Time Reliability	<u>80th percentile travel time</u> 50 th percentile travel time	How much longer is "abnormal" delay than "normal" delay. Are travel times generally consistent (even if they are slower then free- flow)?





Figure 3-1. Interstate Travel Time Reliability Measure

- Person miles traveled (PMT) on "reliable" interstate segments has decreased since 2014. Today, about 80% of all PMT on interstates is reliable.
- Interstate reliability meets the MPO's current target.

Percent of Person Miles Traveled on Reliable Roads



- Person miles traveled (PMT) on "reliable" noninterstate segments has decreased since 2014.
- Apparent improvement in 2017 likely due to a change in data sources.
- Non-interstate reliability is near the MPO target, but not meet it.



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- Reliability for trucks is near, but slightly below the MPO target.
- Worst-case truck travel times are between 50% and 80% longer than typical truck travel times.



KEY FINDINGS

- Normal delays (travel time index) are worst in the Chapel Hill, Carrboro, and Downtown Durham subareas.
- Worst-case travel times (planning time index) are worst in the Chapel Hill, East Durham, and Southpoint subareas.



 TRAVEL TIME RELIABILITY IN 2017

 Planning time index (5:00-6:00 PM)

 Free flow time

 1.1 - 1.5

 1.6 - 2.0

 -2.1 - 3.0

 -3.1 - 4.0

 Greater than 4.0



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Free flow time

-----2.01 - 2.50

-Greater than 2.5

Travel time index (5:00-6:00 PM)







KEY FINDINGS

- Travel times are most unreliable in the Downtown Durham, Chapel Hill, East Durham, and Southpoint subareas.
- Recurring congestion results in persistent delays along...
 - US 15-501
 - NC-54
 - I-40
 - NC-147
 - US-70
 - NC-98.



TRAVEL TIME RELIABILITY IN 2017 Congestion regularity Recurring congestion Non-recurring congestion Usually uncongested

----Insufficient data



4 VEHICLE SAFETY



SAFETY Crash Locations 2013 to 2017 Severity

- × Fotolity
- Serious Injury
- Evident Injury

Possible Injury Property Damage Only or Unknown

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

- 15,310 crashes occurred in the DCHC area in 2017
 - About 80% result in no evident injury
 - Crashes resulting in disabling injuries or death made up less than 1%.
- Rear-end collisions are the most common crash type.

4 | VEHICLE SAFETY



KEY FINDINGS

 When crashes are normalized by daily traffic, the highest crash rates are observed in the Downtown Durham subarea.

4 VEHICLE SAFETY



- Fatalities occur for a small proportion of crashes.
- Fatalities as a share of total crashes are most common outside of urban areas, probably reflecting higher average travel speeds.

4 | VEHICLE SAFETY



Table 4-3. Total Crashes by Subarea 2008-2017

- Crashes are increasing across all subareas, except Carrboro.
- The Downtown Durham subarea has the highest number of crashes.
- The Southpoint subarea has experienced a significant increase in crashes since 2008.

5 | PEDESTRIAN FACILITIES



KEY FINDINGS

• Sidewalk mileage increased by 133.7 miles (18.5%) from 2012 to 2019.



5 | PEDESTRIAN FACILITIES



- Sidewalks are concentrated in the cities/towns of Durham, Chapel Hill, Carrboro, and Hillsborough.
- The shares of sidewalk miles in Chapel Hill, Carrboro, and Hillsborough have increased since 2012.
- Greenways are evenly distributed across the region's municipalities and unincorporated areas.

5 | PEDESTRIAN FACILITIES



KEY FINDINGS

- The greatest proportionate changes in sidewalk mileage since 2012 have occurred in the Hillsborough and East Durham subareas.
- Downtown Durham has the most sidewalk miles, but the lowest rate of change since 2012.

SUBAREA	2005-2012	2012-2019
North Durham	39.70%	12.31%
DOWNTOWN DURHAM	18.50%	5.99%
EAST DURHAM	98.95%	83.92%
SOUTHPOINT	33.76%	12.49%
HILLSBORDUGH	40.26%	114.59%
CARRBORO	23.95%	21.58%
Chapel Hill	8.30%	15.17%

Table 5-2. Percent change in sidewalk mileage 2005-2019

6 PEDESTRIAN ACTIVITY



- 189 pedestrian count locations over 16 non-consecutive days in 2017 throughout the DCHC region.
- 45,034 pedestrians observed. Highest single count station at UNC.
- 6-hour peak-period volumes reported:
 - AM peak period
 - Noon peak period
 - PM peak period

6 PEDESTRIAN ACTIVITY



Figure 6-16. 6 Hour Total Median PPV

- Median pedestrian counts are highest in the Downtown Durham, Carrboro, and Chapel Hill subareas.
- Pedestrian counts have increased everywhere since 2014, except in Chapel Hill.
- Variability in count locations, seasons, and days can influence year-to-year changes.



KEY FINDINGS

• Bicycle lanes are the most common type of on-road bicycle facility



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

7 BICYCLE FACILITIES



KEY FINDINGS

- On-road bicycle facilities have increased by 106 miles (150%) since 2012.
- Greenway mileage has increased by 7 miles (15% since 2012)



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7 BICYCLE FACILITIES



- Bicycle facilities are concentrated in the cities/towns of Durham, Chapel Hill, and Carrboro
- The shares of sidewalk miles in Downtown Durham, Carrboro, and unincorporated areas have increased since 2012.
- Greenways are mostly located in Durham and Chapel Hill.
- Greenways in unincorporated areas have increased since 2012.





KEY FINDINGS

- The greatest proportionate changes in on-road bicycle facility miles since 2012 have occurred in the North Durham, East Durham, and Chapel Hill subareas.
- Chapel Hill has the most on-road bicycle facilities, surpassing Carrboro and Downtown Durham.

SUBAREA	2005-2012	2012-2019	
North Durham	NA*	1145.27%	
Downtown Durham	206.22%	147.51%	
EAST DURHAM	NA*	637.97%	
Southpoint	32.69%	165.01%	
Hillsborough	0.00%	0.00%	
Carrboro	10.80%	68.84%	
Chapel Hill	97.00%	227.74%	

Table 7-3. Percent change in miles of on-road bicycle facilties 2005-2019

8 BICYCLE ACTIVITY



- 189 bicycle count locations over 16 non-consecutive days in 2017 throughout the DCHC region.
- 3,728 cyclists observed. About twothirds of cyclists were counted in Chapel Hill or Carrboro.
- 6-hour peak-period volumes reported:
 - AM peak period
 - Noon peak period
 - PM peak period



Figure 8-16. 6 Hour Total Median PPV

- Median bicycle counts are highest in the Carrboro subarea. The Downtown Durham and Chapel Hill subareas also have high bicycle counts.
- Bicycle counts have decreased everywhere since 2014, except in North Durham and East Durham.
- Variability in count locations, seasons, and days can influence year-to-year changes.



SAFETY Pedestrian crashes (2013 - 2017) Severity

- × Fatality
- Serious Injury
 Other Injury

No Injury



- 841 crashes occurred in the DCHC area in 2017
 - About 87% resulted in disabling injuries
 - 4% resulted in fatalities



SAFETY Bicycle crashes (2013 - 2017) Severity X Fatality

Serious Injury
 Other Injury

No Injury

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

- 287 bicycle crashes occurred in the DCHC area in 2017
 - About 85% resulted in disabling injuries
 - 3% resulted in fatalities



- Pedestrian crashes have increased in recent years.
- Bicycle crashes have remained stable over time.
- The shares of bicycle and pedestrian crashes resulting in death or injury are consistent over time.





- Injuries and fatalities are more likely at night.
- Injuries and fatalities are more likely on highspeed roads.
- Injuries and fatalities are less common on facilities that separate pedestrians and cyclists from vehicular traffic.



- Five transit operators in the region
 - GoDurham
 - Chapel Hill Transit
 - GoTriangle
 - Orange County Public Transit
 - Duke Transit



- Vehicle Revenue Hours: cumulative hours of transit vehicles offering revenue service.
- GoDurham provides the most vehicle revenue hours in the region.
- GoTriangle and Chapel Hill Transit provide similar levels of revenue hours.
- Revenue hours have remained steady over time.
- Insufficient data to track trends for Duke Transit or Orange County Public Transit.



- Vehicle Revenue Miles: cumulative miles of revenue service operated by transit vehicles.
- GoDurham and GoTriangle provide the most vehicle revenue miles in the region.
- Revenue miles have remained steady over time, with slight increases for GoDurham.
- Insufficient data to track trends for Duke Transit or Orange County Public Transit.



- On-time performance: how often do buses serve stops at scheduled times versus being late or early.
- Systemwide, regional operators provide reliable service.
- Route-level reliability varies. Routes with poor on-time performance were observed in
 - Southpoint
 - Downtown Durham
 - Chapel Hill





KEY FINDINGS

Demand response/ paratransit service is highest in the GoDurham service area and has increased in recent years.

11 TRANSIT RIDERSHIP



- Five transit operators in the region
 - GoDurham
 - Chapel Hill Transit
 - GoTriangle
 - Orange County Public Transit
 - Duke Transit

11 | TRANSIT RIDERSHIP



- Transit ridership regionally has been consistent over time.
- Increase in GoDurham riderhsip
- Reduction in CHT ridership

11 | TRANSIT RIDERSHIP



- Transit boardings are highest in the Downtown Durham subarea.
- The Chapel Hill, Southpoint, and North Durham subareas have similar numbers of transit boardings.

11 | TRANSIT RIDERSHIP



- Demand response utilization is highest in Durham.
- Demand response utilization has been increasing for GoTriangle.

12 MULTIMODAL MOBILITY AND THROUGHPUT



- Estimated person throughput: How many trips use a facility, regardless of mode?
- Indicates the region's most productive facilities.
- Interstates and limitedaccess highways have the highest throughput.
- Non-interstates with high throughput: US 15-501, NC-54, US 70.

12 MULTIMODAL MOBILITY AND THROUGHPUT



- Modal diversity score: which facilities serve trips by all modes?
 - Complete diversity: all modes are highly utilized
 - High diversity: more than one mode is highly utilized or all modes are moderately utilized
 - Moderate diversity: One non-auto mode is highly utilized.
 - Low diversity: Almost all travel is by car.

12 MULTIMODAL MOBILITY AND THROUGHPUT



Figure 12-11. Person Throughput by Non-Auto Modes by Subarea

- Pedestrians account for most non-auto travel
- The Downtown Durham and Chapel Hill subareas have the highest levels of non-auto person throughput.

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2019

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THANK YOU

