Section 1:

Bicycle and Pedestrian Planning

Section 1A:

Bicycle and Pedestrian Safety

MEMORANDUM

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To: Richard Caudle, Skipper Consulting, Inc
From: Collin Chesston and Brian Ruscher, Alta Planning + Design
Date: May 25, 2018

Re: Auburn, AL Citywide Traffic Study: Pedestrian and Bicycle Safety Analysis

Purpose

This memo summarizes the process and findings of a pedestrian and bicycle safety analysis conducted by Alta as part of the 2017 Citywide Traffic Study. The analysis included three primary components:

1. An analysis of reported crashes involving people walking and bicycling in the City of Auburn between 2012 and 2016
2. A comparative analysis of reported crashes involving people walking and bicycling in Auburn relative to reported crashes involving people walking and bicycling in 6 other Alabama cities
3. An assessment of systemic risk factors for people walking and bicycling along 2017 Citywide Traffic Study corridors

The primary purpose of the analysis is to inform recommendations in 2017 Citywide Traffic Study. Secondary purposes include using the findings as benchmarking data to assess pedestrian and bicyclist safety outcomes relative to other Alabama cities, and to monitor pedestrian and bicyclist safety within the City of Auburn moving forward.

Process and Data Sources

Citywide Analysis of Crashes Involving Pedestrians and Bicyclists

Alta used a combination of tabular and Geographic Information Systems (GIS) data provided by the City of Auburn, and population and commute mode share data available from the US Census Bureau, to analyze the following:

- crash trends over time
- crash rates normalized by population and commute mode share
- crash severity
- crash patterns associated with geographic subareas and roadway functional classifications

Comparative Analysis of Crashes Involving Pedestrians and Bicyclists in Other Alabama Cities

Alta downloaded tabular data from the University of Alabama's Center for Advanced Public Safety CARE Online Analysis site (https://safety.aladata.com/) to conduct a comparative analysis of pedestrian and bicycle crashes over time, normalized by population and commute mode share, for selected Alabama cities.

Systemic Risk Analysis of 2017 Citywide Traffic Study Corridors

In addition to analyzing factors associated with reported crashes, Alta also conducted systemic safety risk analyses for 2017 Citywide Traffic Study corridors. The purpose of these analyses is to provide additional information on **where crashes involving people walking and bicycling are likely to occur based on known risk factors**. The systemic risk analyses consider the influence that individual roadway characteristics are likely to have on safety outcomes for people walking and bicycling. Data sources used to conduct this analysis includes GIS data provided by the City of Auburn and aerial and street-view imagery available through Google Earth.

PEDESTRIAN SAFETY RISK

The pedestrian safety risk analysis measures exposure to traffic hazards based on four factors:

- the posted speed limit
- the presence or absence of sidewalks or multi-use paths along the roadway
- vehicle traffic volumes
- the number of standard travel lanes

Table 1 outlines the specific method used to score individual roadway segments based on the above factors. The scores follow a seven-point scale, with 1 representing the lowest risk and 4 representing the highest risk.

Table 1: Pedestrian Safety Risk Scoring

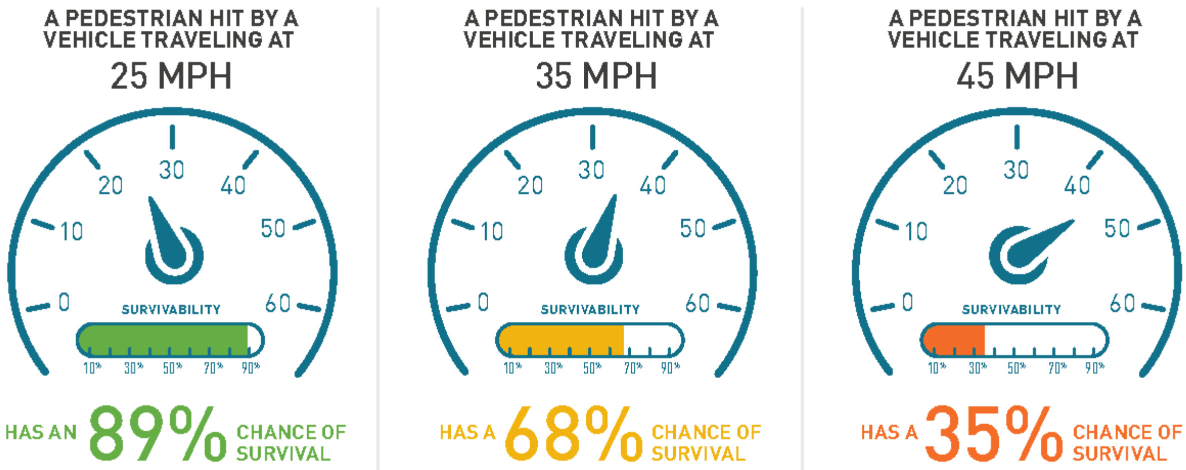
		PEDESTRIAN FACILITY & POSTED SPEED LIMIT								
		Both sides of the street			One side of the street			No Dedicated Walkway		
# OF LANES	VEHICLE VOLUMES	≤30 mph	30-35 mph	>35 mph	≤30 mph	30-35 mph	>35 mph	≤30 mph	30-35 mph	>35 mph
2-3 lanes	≤3k	1.0	1.5	2.0	1.5	2.0	2.5	2.0	3.0	3.5
	3k - 10k	1.0	1.5	2.0	1.5	2.0	2.5	2.5	3.5	3.5
	11k - 20k	1.0	1.5	2.0	2.0	2.5	3.0	3.0	3.5	3.5
	>20k	1.0	1.5	2.0	2.0	2.5	3.0	3.0	3.5	3.5
4-5 lanes	≤3k	1.5	2.0	2.5	2.0	2.5	3.0	2.0	3.0	4.0
	3k - 10k	1.5	2.0	2.5	2.0	2.5	3.0	2.5	3.5	4.0
	11k - 20k	1.5	2.0	2.5	2.5	3.0	3.5	3.0	3.5	4.0
	>20k	1.5	2.0	2.5	2.5	3.0	3.5	3.0	4.0	4.0
6+ lanes	All volumes	1.5	2.0	2.5	2.5	3.0	3.5	3.0	4.0	4.0

The pedestrian safety risk analysis methodology is rooted in the finding that a **doubling of traffic speed results in a four-fold increase in stopping time and resulting crash severity**. According to one study, speed has the following impact on pedestrian fatalities[1].

- At 25 mph the odds of pedestrian fatality are 11%
- At 35 mph the odds of pedestrian fatality are 32%
- At 45 mph the odds of pedestrian fatality are 65%

While other studies have found some variation, the relationship between vehicle impact speed and rates of pedestrian survival have been reported consistently across the literature. Vehicle speeds are therefore a critical factor used to assess pedestrian safety risk. Alta used a GIS layer file provided by the City of Auburn as the basis for this input, supplemented by Google street-view imagery.

[1] Tefft, B. C. Impact speed and a pedestrian's risk of severe injury or death. Accident Analysis & Prevention 50 (2013)



Tefft, B. C. *Impact speed and a pedestrian's risk of severe injury or death*. Accident Analysis & Prevention 50 (2013) 871-878.

Vehicle speed plays a critical role in crash severity for all modes, but particularly for vulnerable roadway users like pedestrians and bicyclists.

The second input — the presence of a sidewalk or a multi-use path along a roadway — decreases traffic safety risk by reducing conflicts between pedestrians and vehicles operating in a shared space. [2] As vehicle speeds and volumes increase, the safety benefits of providing a dedicated space for walking increases. [3] Where sidewalks or multi-use paths are only provided on one side of the roadway, pedestrians are likely to cross at uncontrolled locations to access destinations on the side of the street where a dedicated walkway is not present, increasing potential for vehicle-pedestrian crashes.

The third and fourth factors — vehicle traffic volumes and the number of vehicle travel lanes along a roadway — also have an impact on safety risk due to increased exposure to traffic. While not as impactful as traffic speed or the presence/absence of dedicated walkways in terms of safety outcomes, even slow speed multi-lane roadways with high traffic volumes present challenging crossing conditions for people walking.[4]

BICYCLIST SAFETY RISK

The approach for assessing bicyclist safety risk is based on the Mineta Transportation Institute's (MTI) 2012 report *11-19: Low-Stress Bicycling and Network Connectivity*. The report established what has become the industry standard methodology for assessing "Bicycle Level of Traffic Stress", or "BLTS". The factors included in the BLTS methodology are intended to measure the traffic stress, or perceived danger from vehicles, experienced by current and potential bicyclists. Because the inputs used to assess BLTS — posted speed limits, the number of standard travel lanes, and the presence and type of bicycle facility — were found to be correlated with the safety risks of bicycling, the MTI methodology was adapted to assess the relative risk of bicycling along each 2017 Citywide Traffic Study corridor.

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[2] Desktop Reference for Crash Reduction Factors, FHWA-SA-08-011, Table 11

[3] Mead, J., Zegeer, C. and M. Bushell. Evaluation of Pedestrian-Related Roadway Measures: A Summary of Available Research. April 2014. <https://bit.ly/2sbeW2w>

[4] Eun, P. and F. Ranck. Designing for Pedestrian Safety: Sidewalk Design. Federal Hgihway Administration, Pedestrian and Bicycle Information Center. Presentation. August 2010. <http://www.pedbikeinfo.org/pdf/Webinar_DPS_080310_2.pdf>

The bicyclist safety risk analysis completed for the City of Auburn builds on the MTI approach, expanding it to incorporate the impact of traffic volumes on risk exposure. Scoring is based off of the four "Level of Traffic Stress" categories defined in the MTI report, but allows half points between each category to represent a more nuanced continuum of bicycle safety risk. Using the criteria shown in Table 2, each block of the 2017 Auburn Citywide Traffic Study corridors were assigned a bicyclist safety risk score.

Table 2: Bicyclist Safety Risk Scoring

		BICYCLE FACILITY TYPE & POSTED SPEED LIMIT					
		Shared Street (No bicycle facility)		Bike Lanes			Off-street Path
# OF LANES	VEHICLE VOLUMES	≤30 mph	>30 mph	≤30 mph	30-35 mph	≥35 mph	All speeds
2-3 lanes	≤3k	1.5	3.0	1.0	2.5	3.0	1 or 1.5*
	3k - 10k	2.5	4.0	1.5	3.0	3.0	1 or 1.5*
	11k - 20k	3.5	4.0	2.0	3.0	3.5	1 or 1.5*
	>20k	4.0	4.0	2.5	3.0	3.5	1 or 1.5*
4-5 lanes	≤3k	3.0	3.5	2.0	2.5	3.5	1 or 1.5*
	3k - 10k	3.5	4.0	2.5	3.0	3.5	1 or 1.5*
	11k - 20k	4.0	4.0	3.0	3.5	4.0	1 or 1.5*
	>20k	4.0	4.0	3.5	4.0	4.0	1 or 1.5*
6+ lanes	All volumes	4.0	4.0	4.0	4.0	4.0	1 or 1.5*

*Streets with an off-street path on both sides of the street receive a score of "1". Streets with off-street paths on one side of the street receive a score of "1.5".

Findings

Citywide Analysis of Crashes Involving Pedestrians and Bicyclists

The following bullets provide a summary of findings associated with crashes involving people walking and bicycling between 2012 and 2016.

The good news:

- Pedestrians and bicyclists are underrepresented in the crash data relative to census-reported commute mode share[5], indicating that walking and bicycling have been relatively safe ways to travel in Auburn.
- A minority of crashes involving pedestrians resulted in a serious injury or fatality.
- A minority of crashes involving bicyclists resulted in a serious injury during the study period none resulted in a fatality.
- There were no fatal crashes involving people bicycling during the study period.
- Seasonal crash patterns indicate a strong opportunity to use programmatic initiatives to improve safety outcomes for all modes of transportation, including for walking and bicycling.

The bad news:

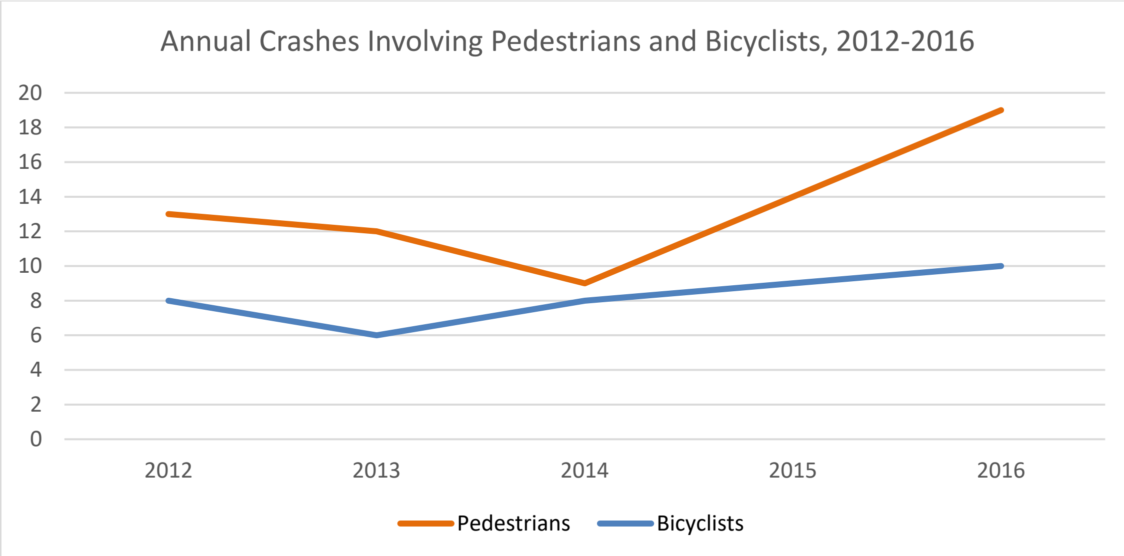
- Crashes involving people walking and bicycling are on the rise, even after controlling for population growth.
- The crash rate for bicyclists, when normalized by commute mode share, rose rapidly between 2014 and 2016.
- About a quarter of crashes involving people walking or bicycling result in a serious injury.

Other relevant findings:

- Crashes involving people walking and bicycling, and in particular serious injuries and fatalities, are occurring disproportionately on roadways classified as arterials.
- All fatal pedestrian crashes occurred, without exception, on high-speed multi-lane arterials.
- Most crashes involving people walking and bicycling occurred either on campus or in downtown Auburn, where rates of active transportation are highest.
- Pedestrian crashes occur more frequently at intersections, but more than half of bicycle-involved crashes occurred at mid-block locations.

The charts, tables, maps, and associated narrative in this section provide more detailed information related to crash trends over time, crash rates normalized by population and commute mode share, crash severity, and crash patterns associated with geographic subareas and roadway functional classifications.

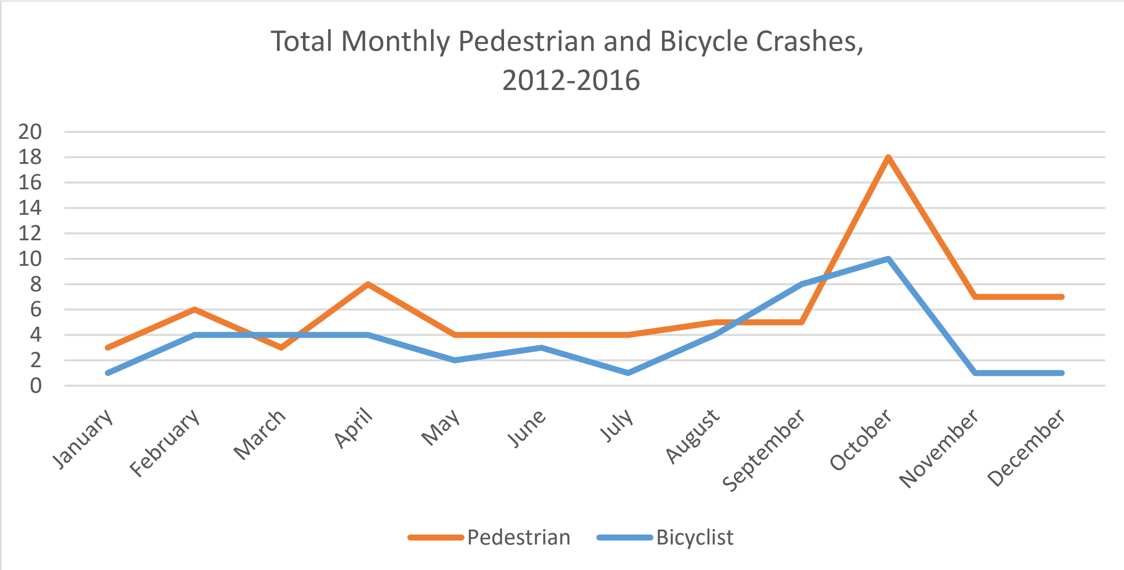
[5] Note: The US Census Bureau only tracks morning commutes trips and does not include other trip purposes such as school, shopping, and recreation. Because of this, it likely underrepresents the percent of all trips that are taken by walking or bicycling.



Annual Crashes Involving Pedestrians, Bicyclists, and Motor Vehicles, 2012-2016

	2012	2013	2014	2015	2016
Crashes Involving Pedestrians	13 (0.9%)	12 (0.8%)	9 (0.5%)	14 (0.7%)	19 (0.9%)
Crashes Involving Bicyclists	8 (0.5%)	6 (0.4%)	8 (0.5%)	9 (0.5%)	10 (0.5%)
Crashes Involving Motor Vehicles	1,449 (98.6%)	1,564 (98.9%)	1,699 (99.0%)	1,975 (98.8%)	2,068 (98.6%)
Total Crashes	1,470	1,582	1,716	1,998	2,097

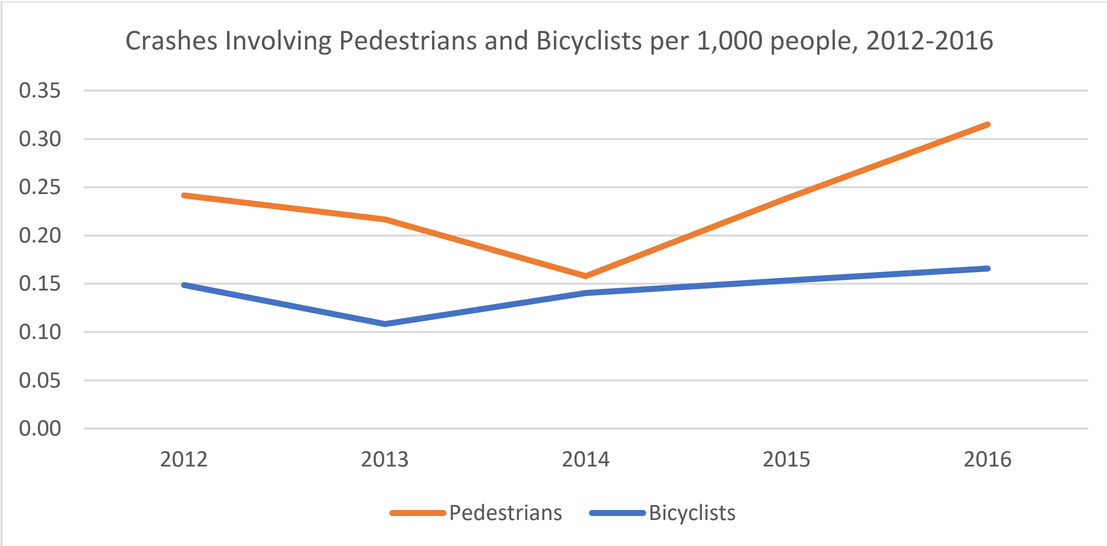
Between 2012 and 2016, **pedestrian- and bicyclist-involved collisions fluctuated**, but the overall trends between the beginning and end of the study area was an increase. **Crashes involving pedestrians increased by 46%, while crashes involving bicyclists increased by 25%.** Crashes involving pedestrians decreased between 2012 - 2014 but increased at a consistent rate between 2014 and 2016. Crashes involving bicyclists also decreased between 2012 -2014, then increased between 2013 -2016**. Crashes involving vehicles also increased by roughly 43% between 2012-2016, indicating that increases in crash rates may be partially explained by increases in total trips, either as a result of population growth, economic conditions, or both.**



Total Monthly Pedestrian, Bicycle, and Motor Vehicle Crashes, 2012-2016

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
Crashes Involving Pedestrians	3	6	3	8	4	4	4	5	5	18	7	7
Crashes Involving Bicyclists	1	4	4	4	2	3	1	4	8	10	1	1
Crashes Involving Motor Vehicles	658	716	703	824	562	550	546	777	836	992	893	698
Total Crashes	662	726	710	836	568	557	551	786	849	1020	901	706

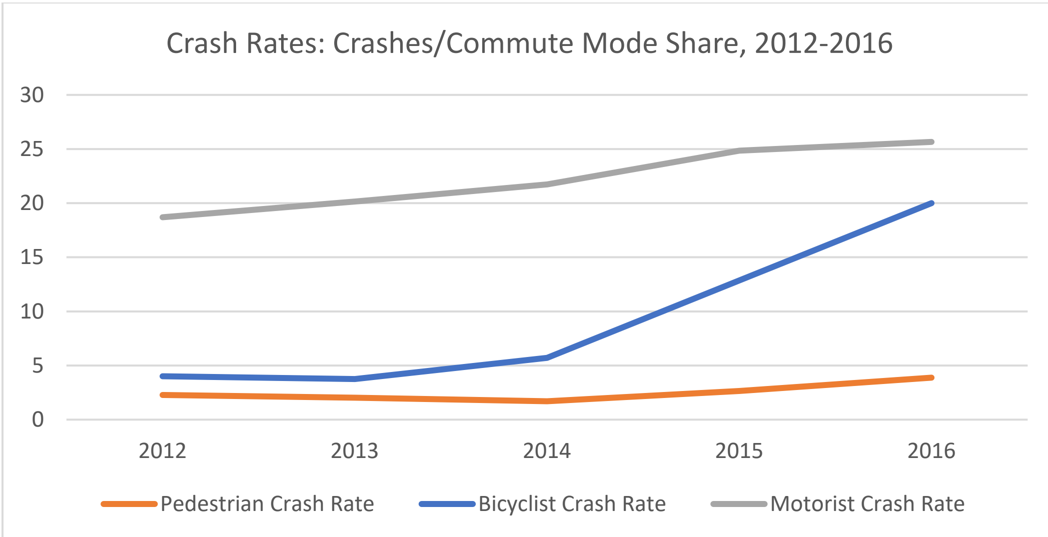
Crashes for all modes exhibit a similar seasonal pattern in Auburn: crashes were relatively stable from January through July, but surge in August, September, and October before tapering off in November and December. This may have been the combined result of thousands of new residents attending Auburn University each year who were unfamiliar with the city and additional walking, bicycling, and vehicle trips by visitors during football season.



Pedestrian, Bicycle, and Motor Vehicle Crashes per 1,000 people, 2012-2016

	2012	2013	2014	2015	2016
Crashes Involving Pedestrians	0.24	0.22	0.16	0.24	0.31
Crashes Involving Bicyclists	0.15	0.11	0.14	0.15	0.17
Crashes Involving Motor Vehicles	26.92	28.23	29.82	33.65	34.28
Total Crashes	27.31	28.56	30.12	34.04	34.76

The crash rate for people walking and bicycling per 1,000 people exhibits a very similar pattern to annual crashes involving people walking and bicycling. This is true despite population increases, indicating that **growth in crashes outpaced population growth.** Between 2012 and 2016, the population of the City of Auburn grew by about 12%. During that same period, crashes involving pedestrians grew by 45% and crashes involving bicyclists grew by about 25%, indicating that **population growth alone may not fully explain increases in crashes that involve pedestrians and bicyclists.** While the increases in crashes in 2016 may be an outlier, the data demonstrates that pedestrian- and bicycle-involved collisions are a persistent problem, even when accounting for population increases.



Calculating modal crash rates as a ratio of total crashes per mode to the modal share of trips (for example, pedestrian crashes/pedestrian mode share) provides a sense of the relative crash risk associated with walking, bicycling, and driving. **Note that because mode share data for all trips is not available, this rate uses commute mode share data available from the US Census as a proxy and is thus an imperfect measure.** According to the 2017 National Household Travel Survey, people are more likely to walk or bicycle for non-work trips than they are for work trips. Because of this, using commute trips to derive a crash rate is an imperfect measure as it likely undercounts the total number of walk and bicycle trips relative to the total number of drive alone motor vehicle trips." The two main takeaways from this analysis are:

1. When normalized by commute mode share, crashes involving pedestrians occur at a significantly lower rate than crashes involving only motor vehicles. **This indicates that relative to driving, walking in Auburn is relatively lower risk than driving.**

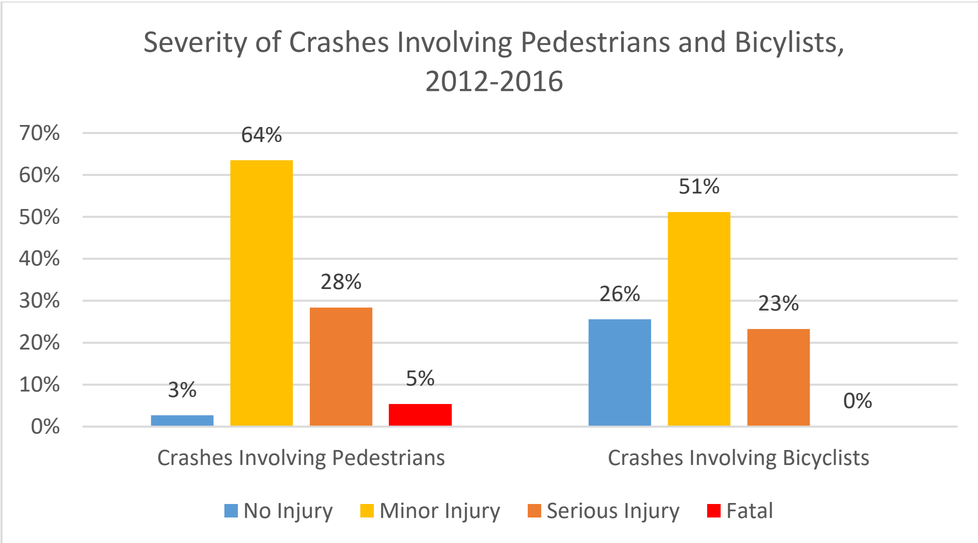
2. **The rate of crashes involving bicyclists using this metric has increased rapidly between 2013 and 2016.** This increase is mostly the effect of fewer people reporting that they biked to work during this period (there was a 200% decrease in bicycle mode share during this period) than the result of a rapid increase in bicycle crashes (see the table on the following page for more detailed information on crashes and commute mode share).

Crashes, Crash Rates, and Commute Mode Share, 2012-2016

	2012	2013	2014	2015	2016	Average, 2012-2016
Crashes Involving Pedestrians	13	12	9	14	19	**13**
Pedestrian Commute Mode Share	5.70%	5.90%	5.30%	5.30%	4.90%	**5.4%**
% of Total Crashes that involved Pedestrians	0.9%	0.8%	0.5%	0.7%	0.9%	**0.8%**
Pedestrian Crash Rate (Crashes Involving Pedestrians /Pedestrian Commute Mode Share)	2.3	2.0	1.7	2.6	3.9	**2.5**
Crashes Involving Bicyclists	8	6	8	9	10	**8**
Bicycling Commute Mode Share	2.00%	1.60%	1.40%	0.07%	0.05%	**1.2%**
% of Total Crashes that involved Bicyclists	0.5%	0.4%	0.5%	0.5%	0.5%	**0.5%**
Bicyclist Crash Rate (Bicyclist Crashes/Bicycling Commute Mode Share)	4.0	3.8	5.7	12.9	20.0	**9.3**
Crashes Involving Motor Vehicles	1449	1564	1699	1975	2068	**1751**
Driving Mode Share (Drove alone)	78%	78%	78%	80%	81%	**78.7%**
% of Total Crashes that involved Motorists	98.6%	98.9%	99.0%	98.8%	98.6%	**98.8%**
Motorist Crash Rate (Motorist Crashes/Motorist [drove alone] Commute Mode Share)	18.7	20.2	21.7	24.8	25.7	**22.2**

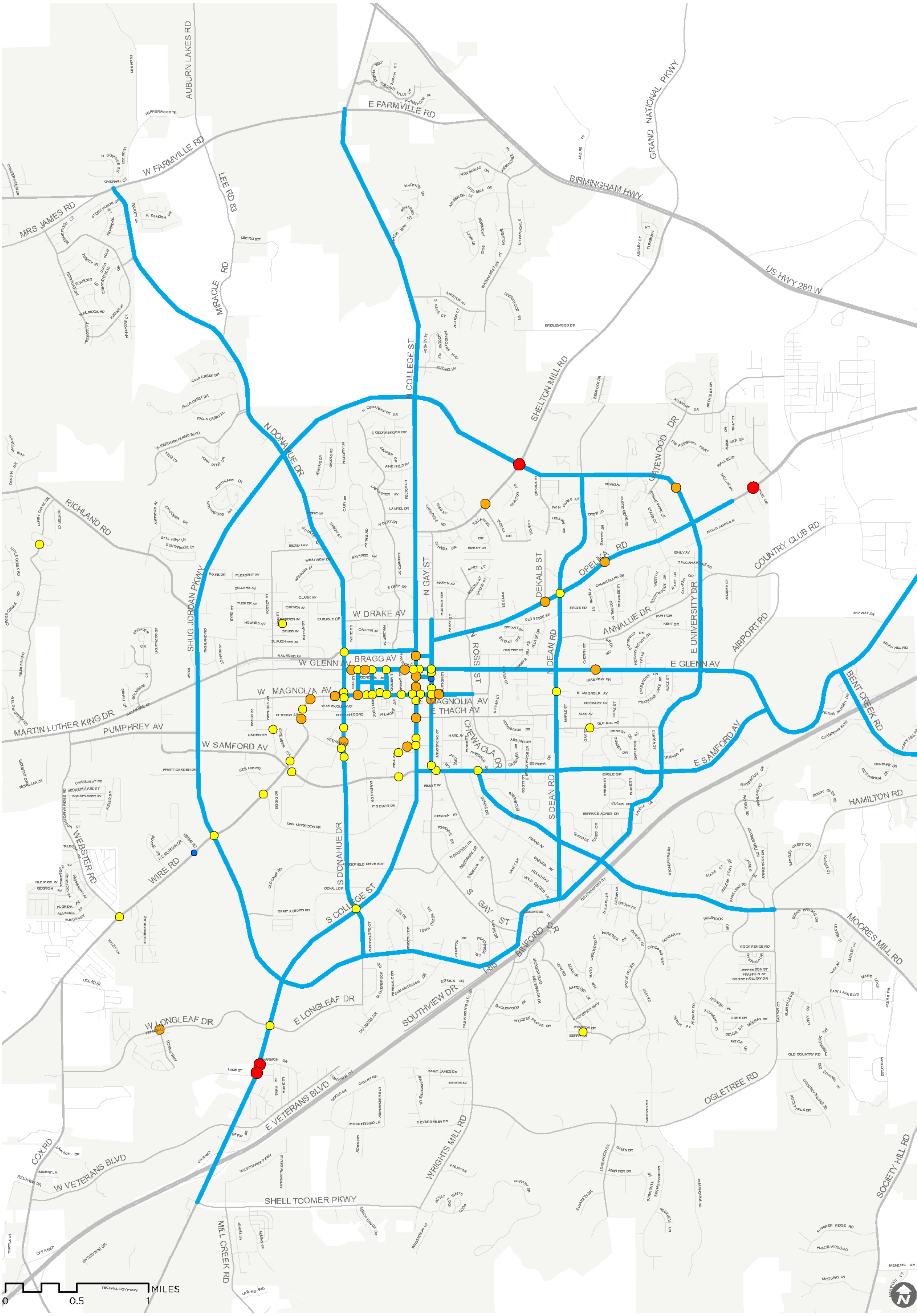
The table above reveals that **people walking and bicycling are underrepresented in crashes relative to commute mode share**, meaning that **people walking and bicycling are less likely to be involved in a crash than estimated rates of walking and bicycling suggest.**

Between 2012 and 2016, pedestrians made up 5.4% of commute trips but were involved in less than 1% of total reported crashes. During the same period bicyclists made up 1.2% of commute trips but were involved in only 0.5% of reported crashes. Motorists who drove alone, meanwhile, made up 78.7% of commute trips but were involved in 98.8% of the reported crashes.



Findings:

- **The overwhelming majority of reported crashes involving pedestrians (97%) resulted in an injury or fatality**, with 28% resulted in a serious injury and 5% resulting in a fatality.
- Compared to crashes involving pedestrians**, crashes involving bicyclists were less likely to result in an injury** (3% of pedestrian-involved collisions did not end in an injury compared to 26% of bicycle-involved collisions)**.**
- There were **zero bicyclist fatalities** between 2012 and 2016.
- **Crashes involving vulnerable road users** such as pedestrians and bicyclists were **much more likely to result in an injury** than crashes only involving people in motor vehicles.



CRASHES INVOLVING PEDESTRIANS

AUBURN, ALABAMA

Data provided by the City of Auburn, Alabama. Map produced May 2018.

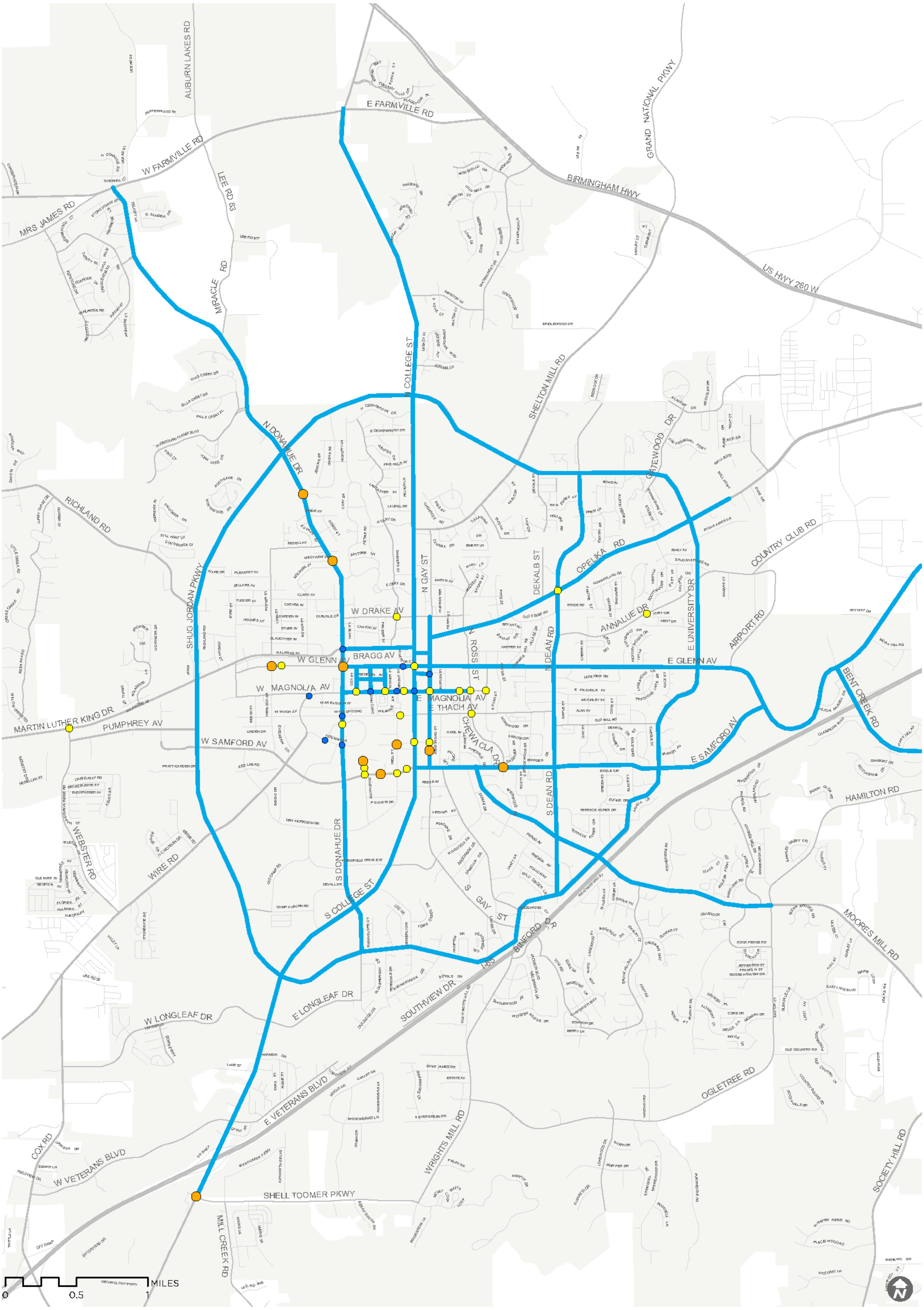
Crashes Involving Pedestrians, 2012-2016

- Fatality
- Serious Injury
- Minor Injury
- No Injury

Study Corridors

- Study Corridors

City of Auburn



CRASHES INVOLVING BICYCLISTS

AUBURN, ALABAMA

Data provided by the City of Auburn, Alabama. Map produced May 2018.

Crashes Involving Bicyclists, 2012-2016

- Serious Injury
- Minor Injury
- No Injury

Study Corridors

- Study Corridors

City of Auburn

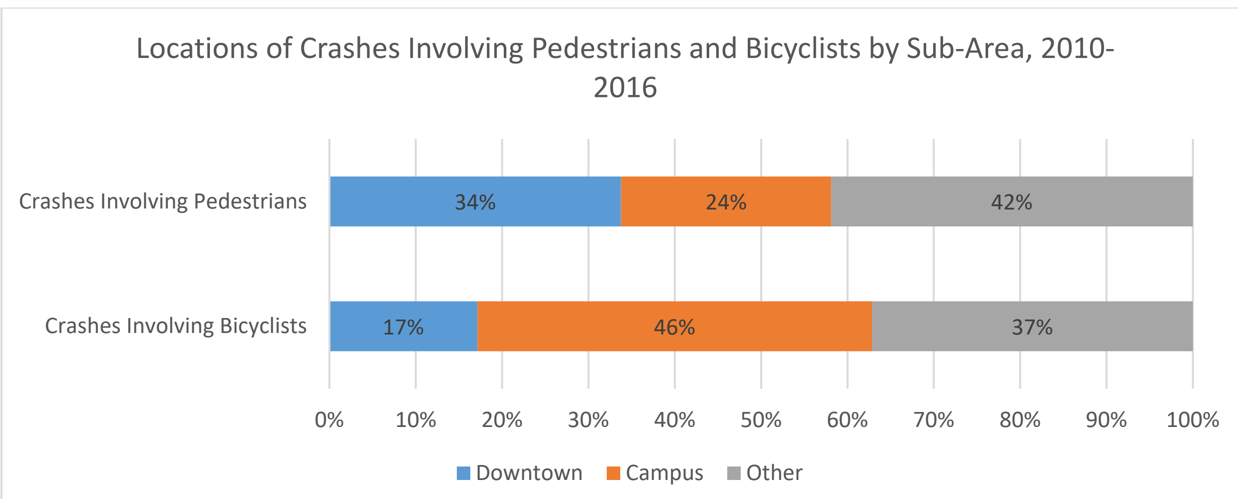
The maps on pages 12 and 13 depict the locations of all reported crashes involving people walking and bicycling between 2012 and 2016.

Crashes involving pedestrians are clustered along Magnolia Ave, College St, Glenn Ave, Gay St, and Donahue near Auburn University and Downtown Auburn. While it may be tempting to infer that these are inherently dangerous places to walk, based on observed conditions and the results of the pedestrian safety risk analysis (see pages 19-20 and 22) the more likely reason for this pattern is that **these corridors are the locations with the highest pedestrian volumes in the city, making conflicts between people driving and walking more likely. Nearly half of the crashes along the roadways connecting Auburn University's Campus and Downtown Auburn resulted in a serious injury to a pedestrian**, indicating that more can be done along these corridors to improve safety for people walking.

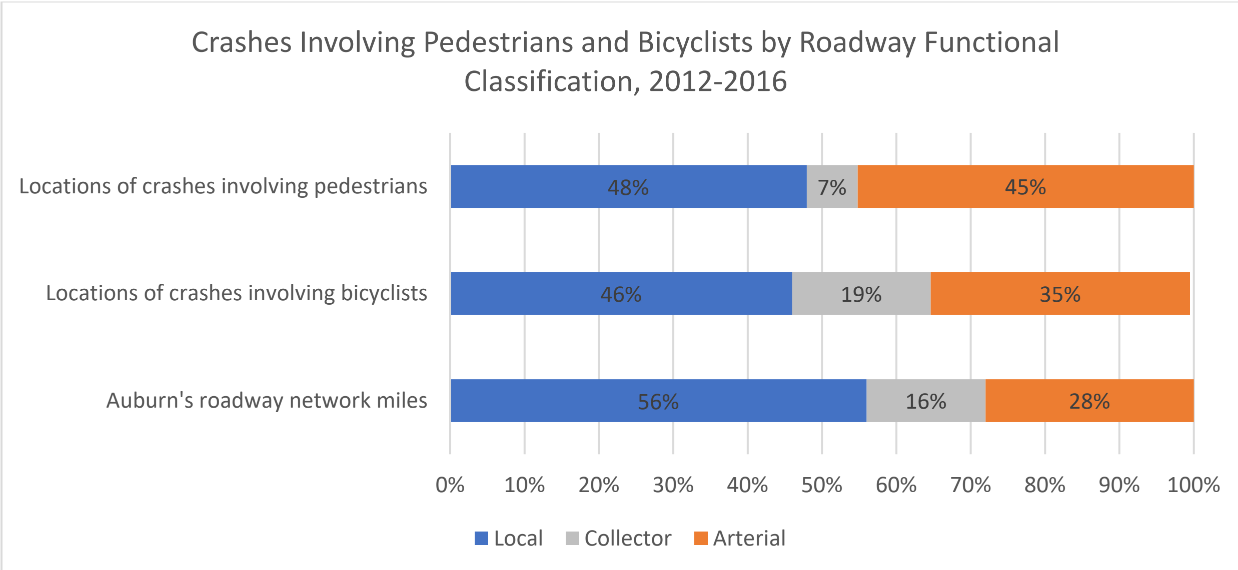
During this five-year period, **all fatal pedestrian crashes occurred, without exception, on high-speed multi-lane arterial roadways at the suburban periphery of the city.** Given what we know about the influence of vehicle impact speed on pedestrian crash severity, this finding is not surprising.

Crashes involving bicyclists exhibit a similar pattern to pedestrians: **the majority occurred in close proximity to Auburn University or Downtown Auburn. About one-quarter of all crashes involving bicyclists occurred on a single roadway between campus and downtown: Magnolia Ave**. None of these crashes, however, resulted in a serious injury. **33% of all serious bicyclist injuries occurred on N Donahue between Glenn Ave and Shug Jordan Parkway,** indicating a need to improve conditions for bicycling along this popular route. **Two serious injuries to bicyclists also occurred on Samford Ave** in sections where there is a gap in the bike lane.

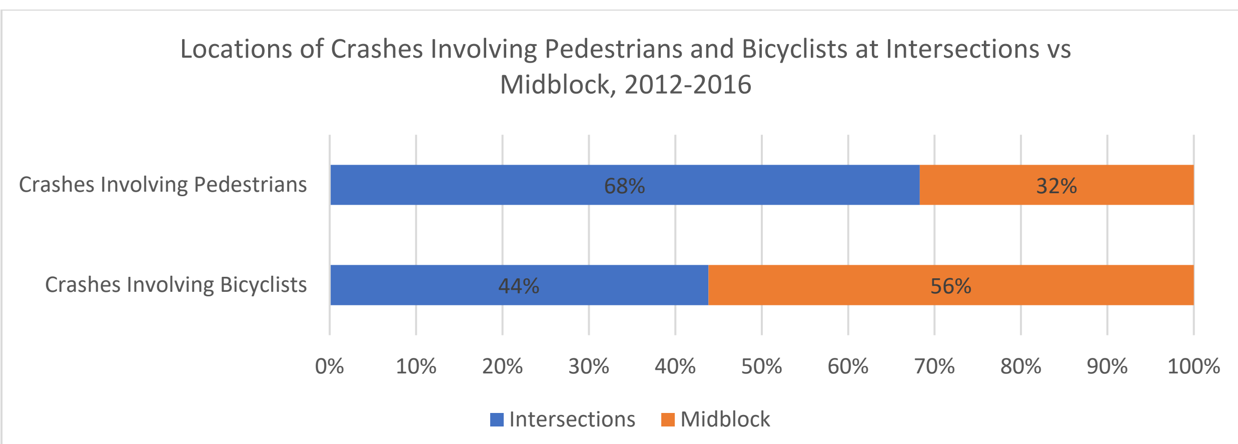
No fatal bicyclist crashes occurred between 2012 and 2016.



More than half of reported crashes involving pedestrians between 2012 and 2016 occurred either in downtown Auburn or on Auburn University's campus. Another 42% occurred outside of downtown or campus. **Close to two-thirds of crashes involving bicyclists between 2012 and 2016 occurred either downtown or on the Auburn University campus.** The remaining 37% occurred in other locations. This suggests that **downtown Auburn and Auburn University should be considered safety focus areas for people walking and bicycling.**



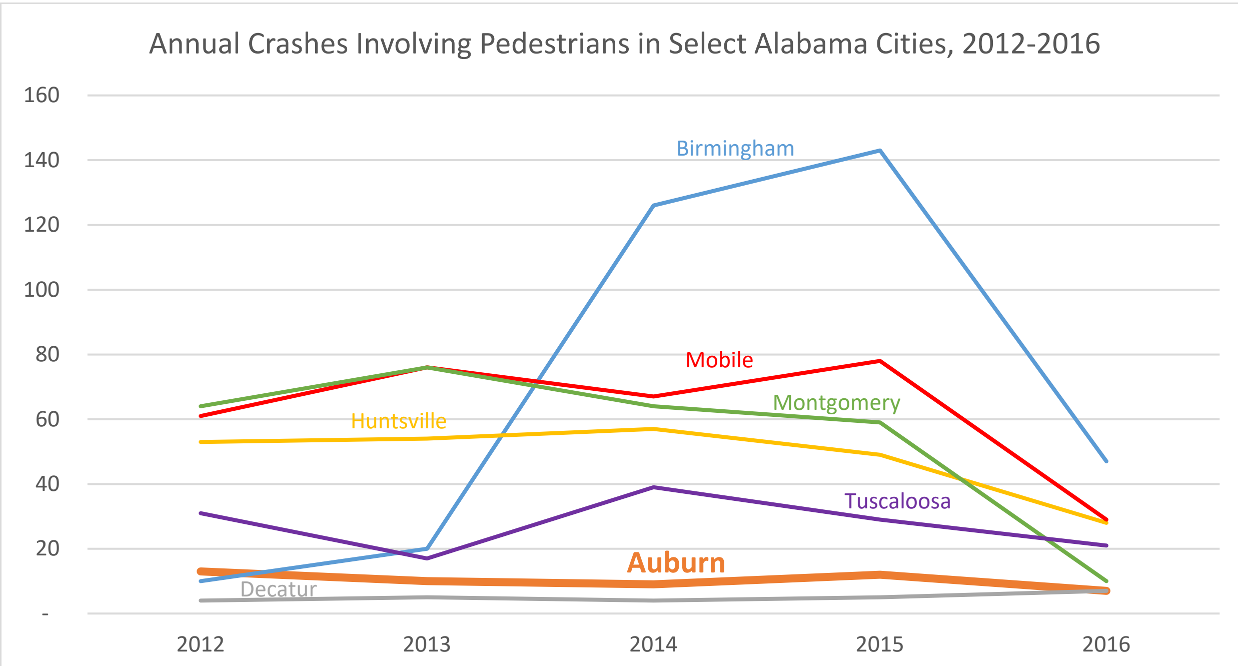
Auburn's arterial roadways make up 28% of the City's roadway network, yet 45% of all reported crashes involving pedestrians and 35% of all crashes involving bicyclists occur on roadways with this functional classification. Local streets make up more than half of the roadway network, but less than half of all crashes involving people walking or bicycling. **This indicates that special attention should be given to improvements for pedestrians and bicyclists along and across Auburn's major streets.**



More than two-thirds of crashes involving pedestrians occurred at intersections, while more than half of crashes involving bicyclists occurred mid-block.

Comparative Analysis of Crashes Involving Pedestrians and Bicyclists in Other Alabama Cities

The following set of charts is based on data downloaded from the University of Alabama's Center for Advanced Public Safety CARE Online Analysis site (https://safety.aladata.com/). Note that in some cases there are small discrepancies between the City of Auburn's database, the data source for the set of charts in the previous section, and the CARE data. For consistency between Alabama cities, data downloaded from the CARE system used in the production of charts in this section was not edited for any city, including for Auburn.

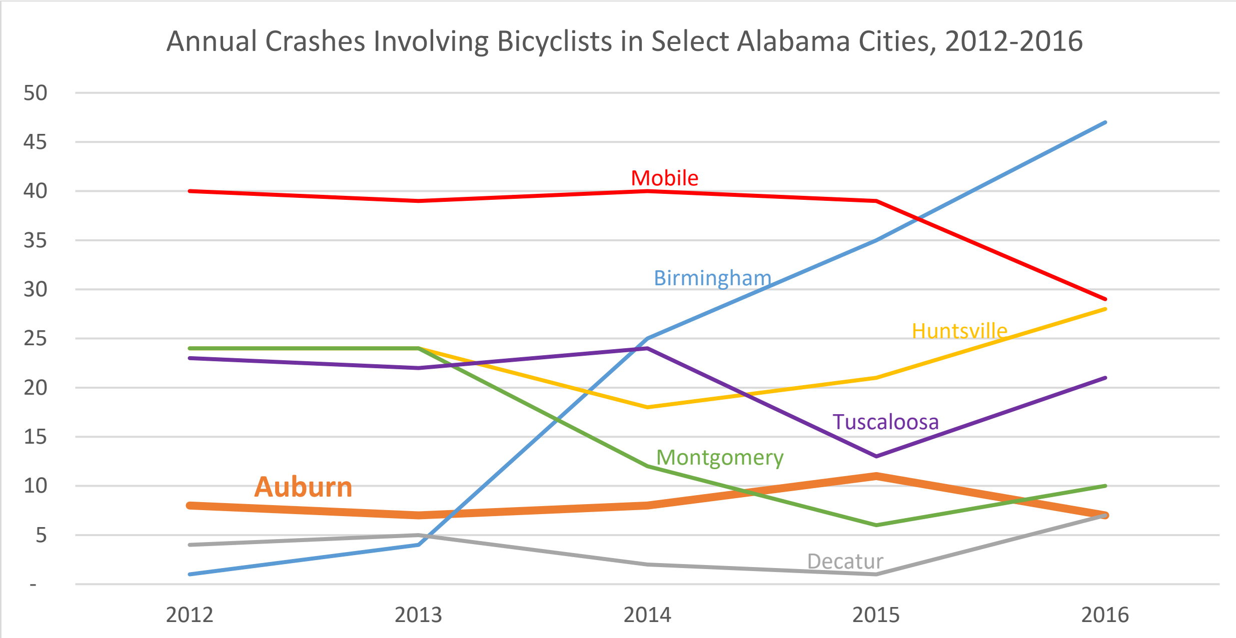


According to the CARE data, the number of total pedestrian crashes in Auburn have remained relatively stable[6] relative to other Alabama cities. Birmingham has experienced the most volatility,[7] with a rapid increase in pedestrian crashes between 2013 and 2015, followed by a similarly steep decrease between 2015 and 2016. The overall trend for Huntsville, Mobile, and most notably Montgomery has been a decrease in pedestrian crashes, while Birmingham and Tuscaloosa have both seen modest increases over the five-year period. Decatur's relatively flat trendline is most similar to Auburn's.

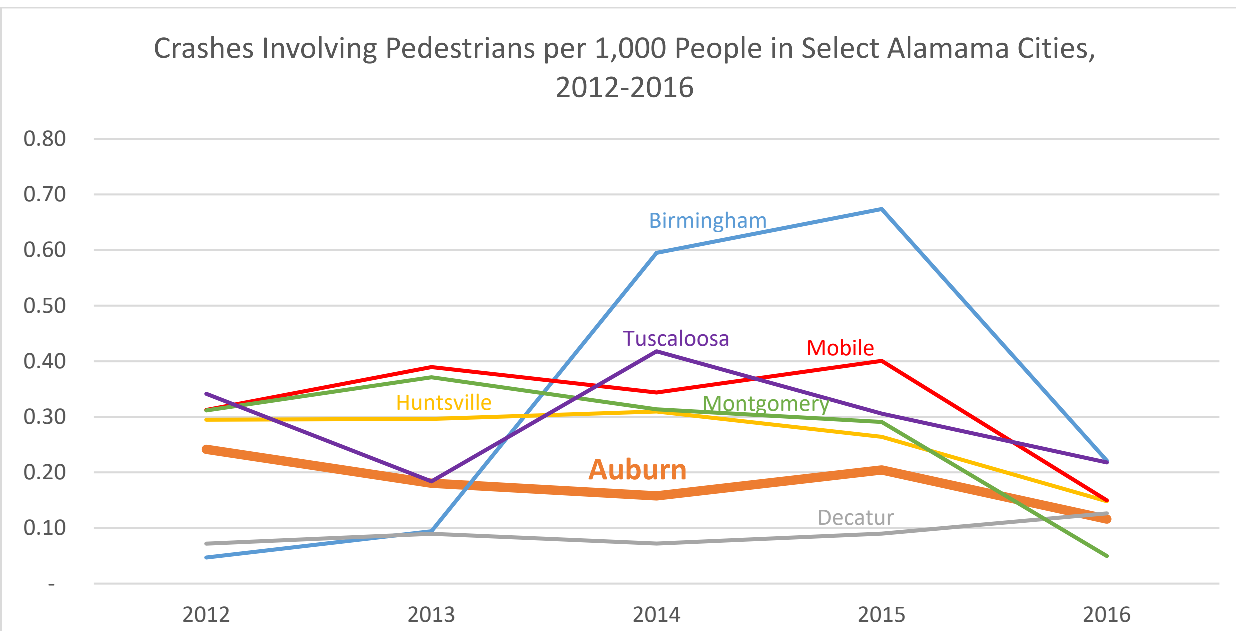
The other obvious and unsurprising finding here is that Auburn experiences fewer total pedestrian crashes compared to the other six cities due to its smaller population. Decatur is the only comparison city that experienced fewer pedestrian crashes. While Decatur's population is within a few thousand people of Auburn's population, rates of walking in Decatur are significantly lower than in Auburn per the US Census American Community Survey.

[6] Note that the finding based on CARE data differs slightly from the trend shown in the chart in the previous section on page 6. That chart, produced using data provided by the City of Auburn, shows crashes involving pedestrians increasing overall to 18 in 2016. The discrepancy here is not large, but it is large enough to change the overall trend over this time period.

[7] Given the magnitude of sudden increases and decreases for pedestrian crashes, there may be data quality issues associated with Birmingham's reported crashes. The rapid drop in pedestrian crashes in Montgomery between 2015 and 2016 also raises data quality concerns. Note that Alta did not take the time to investigate these and other similar potential data quality issues.

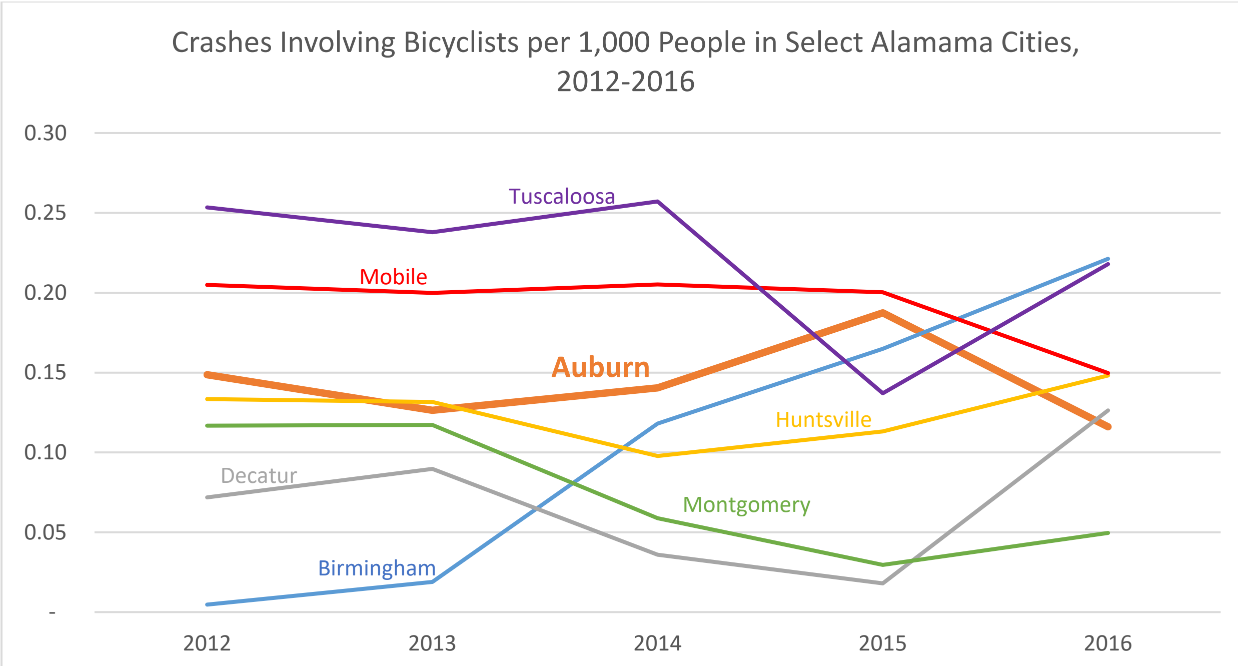


Crashes involving bicyclists also exhibit less variability[8] between 2012 and 2016 compared to other Alabama cities. Birmingham has seen by far the most rapid increase in crashes involving bicyclists, while Mobile has experienced the largest decrease.

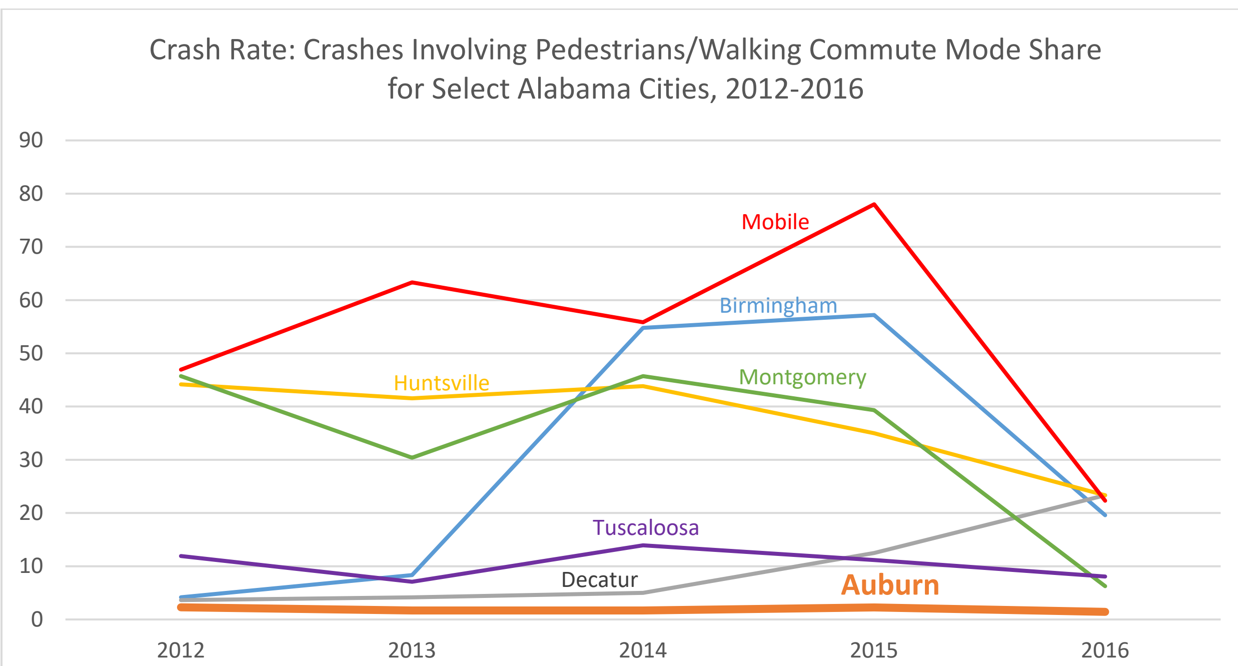


Based on crashes alone, it is not surprising that Auburn experienced fewer pedestrian-involved crashes than other larger cities such as Birmingham, Mobile, Montgomery, Huntsville, and Tuscaloosa. Yet **even after controlling for population, crashes involving pedestrians in Auburn were lower than in other Alabama cities, including cities with large student populations such as Tuscaloosa and Birmingham.**

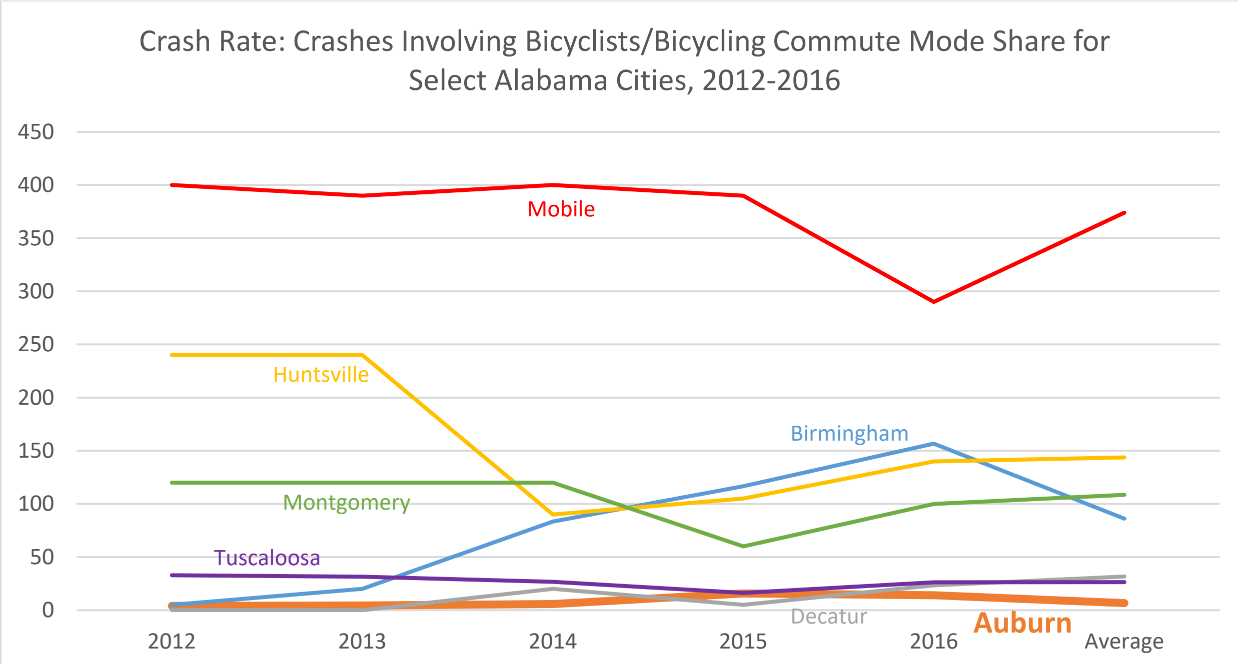
[8] Note that the finding based on CARE data differs slightly from the trend shown in the chart in the previous section on page 6. That chart, produced using data provided by the City of Auburn, shows crashes involving bicyclists increasing from 9 in 2014 to 19 in 2016. The chart on this page shows more than 10 crashes involving pedestrians in 2015 but only 6 crashes in 2016.



On a per-capita basis, Auburn's crash rate for bicyclists is near the middle of pack relative to the comparison cities. This may be due to higher rates of commute bicycling in Auburn than in comparison cities. Tuscaloosa, the only other "college town" comparison city, has a bicyclist crash rate is notably higher for most years in the study period.



When pedestrian-involved crashes are normalized by walking commute mode share, Auburn's pedestrian crash rate is low relative to other Alabama cities. This analysis suggests that walking in Auburn is safer than in many Alabama cities. Decatur's comparatively low crash rate here is explained by a small number of total crashes, while Tuscaloosa's rate is mostly due to higher-than-average rates of walking to work.



When bicyclist-involved crashes are normalized by bicycling commute mode share, Auburn's bicylist crash rate is similar to Tuscaloosa and Decatur, but lower than Montgomery, Birmingham, Huntsville, and Mobile.

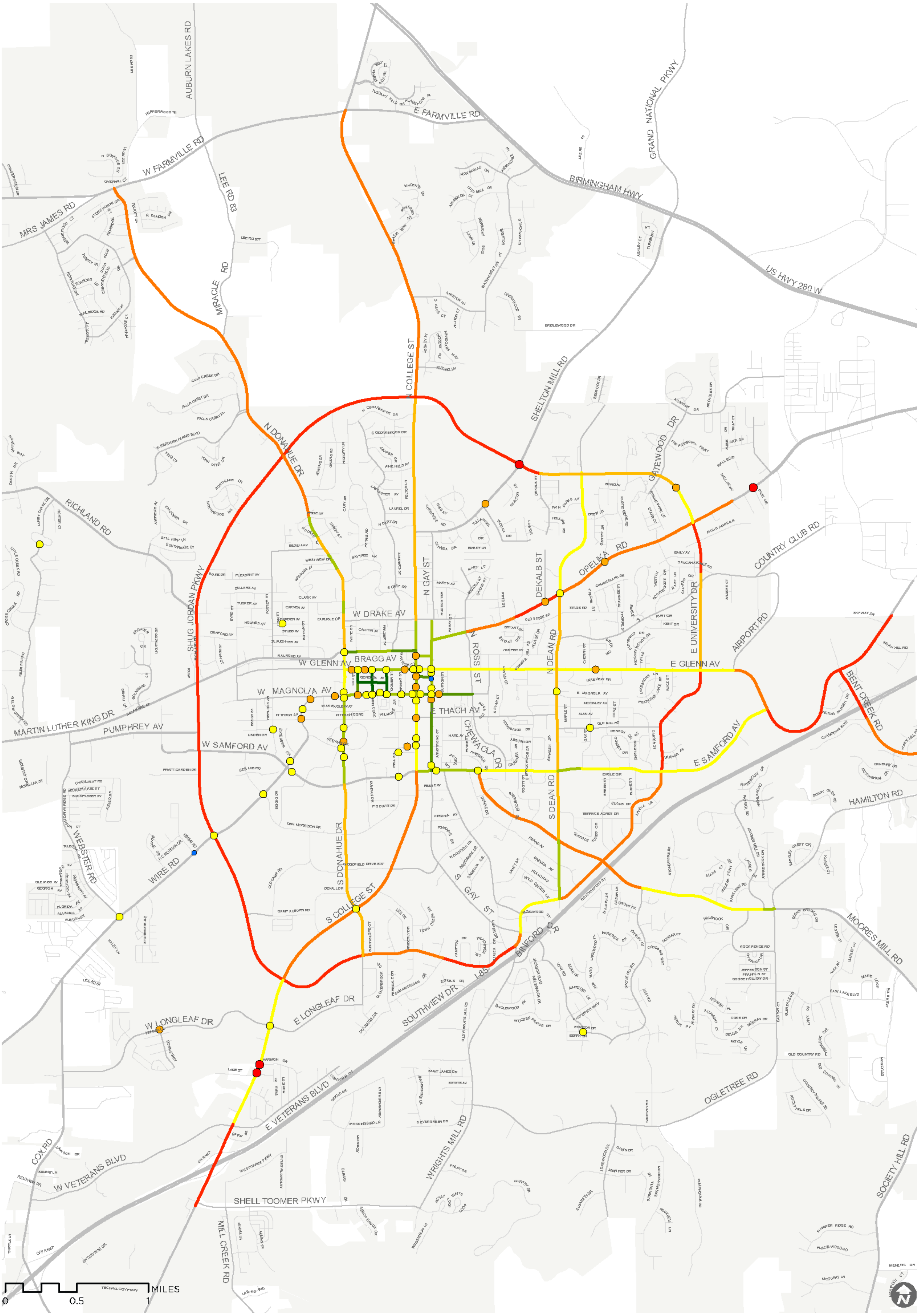
Systemic Risk Analysis of 2017 Citywide Traffic Study Corridors

This section presents the findings of the pedestrian and bicycle systemic risk analysis conducted for all 2017 Citywide Traffic Study corridors. The method for this analysis, including detailed scoring tables, is described on pages 1-4 of this memo. The results of the pedestrian and bicycle systemic risk analysis for 2017 Citywide Traffic Study corridors are shown on pages 20 and 21.

PEDESTRIAN SAFETY RISK

Study corridors with the relatively lowest safety risk for people walking are shown in dark green. These roadway segments feature sidewalks on both sides of low-speed 2-3 lane streets. Bright green and yellow-green roadway segments indicate slightly higher risk conditions than the dark green segments but are still generally considered low risk. These segments exhibit a range of conditions that include 1) dedicated walkways along sides of the roadway along streets with a posted speed of up to 35mph, 2) a dedicated walkway along only one side of the street along streets with a posted speed of up to 35mph and vehicle volumes up to 10,000 cars per day, and 3) no dedicated space for pedestrians along low speed roadways with fewer than 3,000 cars per day. Moderate to high risk segments for pedestrians are shown in yellow, orange, and red. These segments are characterized by either 1) sidewalks or multi-use paths along only one side of high speed and/or multi-lane roadways 2) no dedicated space for pedestrians combined with a posted speed of 30mph or higher and vehicle volumes greater than 3,000 cars per day.

Note that intersections were not included in this analysis.



PEDESTRIAN SAFETY RISK AND CRASHES INVOLVING PEDESTRIANS

AUBURN, ALABAMA

Data provided by the City of Auburn, Alabama. Map produced May 2018.

Crashes Involving Pedestrians, 2012-2016
- Fatality
- Serious Injury
- Minor Injury
- No Injury

Pedestrian Safety Risk
- Lowest Risk
- Highest Risk

Factors included in the pedestrian safety risk analysis:
- Number of Vehicle Lanes
- Posted Speed
- Average Daily Traffic
- Presence of Sidewalk

City of Auburn

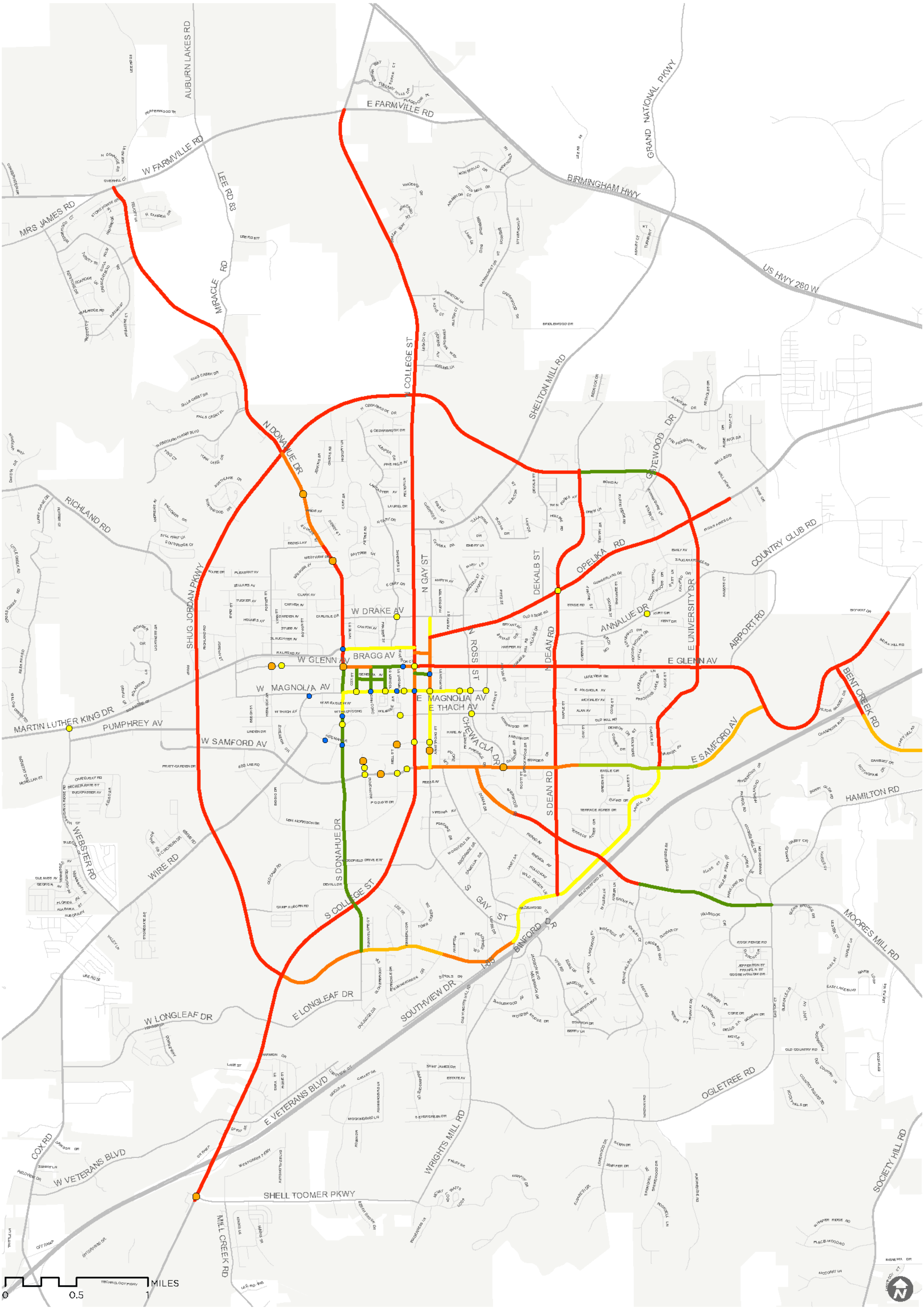
Key findings from the pedestrian safety risk analysis include:

- **Study corridors falling into lower-risk categories are concentrated near Auburn University and Downtown Auburn**. These roadways include local residential streets immediately north of Auburn University's campus such as Toomer St, in addition to higher-volume collector and arterial roadways that provide critical circulation functions either within campus (such as portions of Donahue Dr), between campus and downtown (such as Magnolia Ave), or between downtown and neighborhoods to the south and east (such as Gay St and the far western section of Opelika Rd).
- **Corridors with the highest observed number of pedestrian crashes** (such as W Magnolia Ave, W Glenn Ave, Donahue Dr, and portions of College St downtown) **score as low-risk for pedestrians**. While this outcome may seem paradoxical, the methodology used to assess pedestrian safety risk intentionally excludes pedestrian volumes, **the exposure metric that is likely to explain the fact that most pedestrian crashes are occurring along "low risk" streets.** In other words, the analysis conducted here is focused on the systemic factors that contribute to pedestrian safety as a *supplemental tool* in addition to a spatial analysis that reveals geographic crash patterns associated with higher rates of walking.
- **The majority of crashes involving pedestrians along "low risk" streets resulted in minor, not serious, injuries.** Serious pedestrian injuries and fatalities are more likely to occur on streets that score as moderate or high risk.
- **Pedestrian safety risk tends to increase as a function of distance from Auburn's center. This is due primarily to roadway design features that prioritize vehicle travel speed and throughput over pedestrian accessibility** such as those found on S College St, Opelika Rd and eastern portions of Glenn Ave. **The absence of sidewalks along roadways oriented toward accommodating high volumes of vehicles at high speeds amplifies these risks.** Shug Jordan Pkwy exemplifies such conditions.
- E University Dr is an example of a study corridor with a wide variability of pedestrian risk due to changing conditions. **The pedestrian safety risk model is sensitive to changes in posted speed, number of lanes, vehicle volumes, and the presence or absence of a dedicated sidewalk. Between S College and N College, these four factors are highly dynamic and result in a variety of scores.**

BICYCLIST SAFETY RISK

Study corridors with the lowest level of bicyclist risk are shown in green. These roadways include 1) low-speed, low-volume residential streets, 2) streets that feature off-street paths, and 3) streets with bike lanes and posted speeds of 35pmh or less and volumes of under 20,000 cars per day. Moderate to high risk segments for bicyclists are shown in yellow, orange, and red. Higher risk segments include corridors where there either is no dedicated space for bicycling despite multiple lanes, high traffic speeds, and/or high traffic volumes; or where conventional bike lanes do not provide sufficient accommodations given the context of multiple lanes, higher traffic speeds, and/or higher traffic volumes.

Note that intersections were not included in this analysis.



BICYCLIST SAFETY RISK AND CRASHES INVOLVING BICYCLISTS

AUBURN, ALABAMA

Data provided by the City of Auburn, Alabama. Map produced May 2018.

Crashes Involving Bicyclists, 2012-2016

- Serious Injury
- Minor Injury
- No Injury

Bicyclist Safety Risk

- Lowest Risk
- Highest Risk

Factors included in the bicyclist safety risk analysis

- Number of Vehicle Lanes
- Posted Speed
- Average Daily Traffic
- Presense of Bikeway

City of Auburn

Key findings from the bicyclist safety risk analysis include:

- **Since the majority of 2017 Traffic Study corridors are collector and arterial roadways with relatively high vehicle speeds and volumes, bicycling safety risk is relatively high for most study corridors.** Exceptions include low-speed, low-volume 2-lane streets immediately north of Auburn University such as Cox St; sections of S Donahue Dr, Moores Mill Dr, and E University Ave that feature an off-street path; and the portion of E Samford Ave that includes a bike lane.
- Bike lanes along N Donahue Dr and portions of E University Ave provide a dedicated space for bicycling, reducing safety risk for bicyclists. **Conventional bike lanes – bike lanes without a buffer or a vertical element to separate people bicycling from people bicycling – are not sufficient to create a low-risk outcome along streets with relatively high vehicle volumes and speeds.**

Conclusion

A comparative analysis of Auburn's pedestrian and bicycle safety outcomes relative to selected Alabama cities reveals that Auburn is a relatively safer place to walk and bike relative to other cities in the state. An analysis of recent crash patterns associated with walking and bicycling indicates, however, that walking and bicycling crashes are on an upward trend that is unlikely to be fully explained by population growth. The crash pattern analysis also highlights key opportunities — in the form of time of year, geographic areas, and specific corridors — where Auburn can continue to improve safety outcomes for people walking and bicycling. Finally, the results of the pedestrian and bicyclist systemic safety risk analysis provide an indication of the impact that specific investments such as sidewalks, bike lanes, and off-street paths have had on relative safety risk, as well as pointing toward effective safety counter measures to improve conditions for people walking and bicycling along 2017 Citywide Traffic Study corridors.

Section 1B:

Bicycle and Pedestrian Recommendations

84 Peachtree Street NW
Suite 600A
Atlanta, GA 30303
941.234.3287

MEMORANDUM

To: Richard Caudle, Skipper Consulting, Inc

From: Collin Chesston, Anna Bagget, Brian Rushcer, and John Cock, Alta Planning + Design

Date: September 24, 2018

Re: Auburn, AL Citywide Traffic Study: Bikeway and Pedestrian Facility Draft Recommendations

Purpose

This memo 1) describes the process used to develop draft pedestrian and bicycle corridor facility recommendations for the 2017 Citywide Traffic Study, and 2) presents the results of this process in the form of two facility recommendation overview maps and one implementation strategy map.

The recommendations development process involved three steps:

1. Project Screening
2. Preliminary Facility Selection
3. Final Facility Selection

Step 1: Project Screening using Existing Conditions & Demand

First, the 2017 Citywide Traffic **Study corridor segments with the lowest need for pedestrian and bicycle facilities were identified and excluded from the initial round of pedestrian and bicycle recommendations development.** Pedestrian and bicycle improvements along these roadway segments are unlikely to be priority investments in the near term, either because conditions are already relatively good, or because new or improved facilities are unlikely to be well-used. In total, Alta developed draft recommendations for about three quarters of 2017 Traffic Study corridor roadway mileage.

Determination of need for pedestrian and bicycle improvements was assessed using:

1. Pedestrian Level of Service (PLOS) segment scores,
2. Bicycle Level of Traffic Stress (BLTS) segment scores,
3. Pedestrian and Bicycle Demand segment scores, and
4. Recent aerial imagery

PLOS and BLTS segment scores were assigned by Alta during an earlier phase of this project and documented in Alta's "Auburn, AL Citywide Traffic Study: Pedestrian and Bicycle Safety Analysis" memo from May 25th. PLOS and BLTS scores range from 1 to 4 using half-point increments. A score of 1 indicates that existing facilities meet the needs of a wide range of potential users based on roadway context, whereas a score of 4 indicates that there is a significant need for a bicycle or pedestrian infrastructure improvement.

The 2016 Auburn-Opelika Metropolitan Planning Organization Bike and Pedestrian Master Plan provided recent demand scores for this process. The plan applied a travel demand analysis to quantify the relative amount of bicycle and pedestrian activity that would result along a corridor if facilities were constructed or improved.[1] These scores range between 1 and 5 with one-point increments. A score of 1 represents the lowest demand, and a score of 5 represents the highest demand.

Alta established cut-offs for each metric to identify corridors in need of improvement from both a demand and supply perspective. **For pedestrian recommendations, corridor segments with a PLOS score of 2 or higher and a demand score of 3 or higher qualified for consideration of improvements. For bikeway recommendations, corridor segments with a BLTS score of 2.5 or higher and a demand score of 2 or higher qualified for consideration of improvements.** In other words, corridor segments that exhibited both reasonable potential for bicycle and pedestrian use *and* lacked adequate facilities advanced to the recommendations stage. Note that study corridor segments with low demand scores but moderate to high PLOS or BLTS scores may still warrant improvements such as sidewalks, multi-use paths, or on-street bikeways, but we suggest consideration of such improvements at a later phase of implementation.

Additionally, a few corridors that did not meet the established thresholds for recommendations development provided a vital network connection. In these few cases, Alta provided a recommendation to close a network gap.

Step 2: Drafting Recommendations

Preliminary Recommendations

Second**, using national best-practice design guidelines** such as AASHTO's *Guide for the Planning, Design, and Operation of Pedestrian Facilities*, AASHTO's *Guide for the Development of Bicycle Facilities*, NACTO's *Designing for All Ages & Abilities: Contextual Guidance for High-Comfort Bicycle Facilities,* and FWHA's *Small Town and Rural Multimodal Networks* guide, **as well Alta's bicycle facility selection tool, all remaining study corridors were assigned an idealized pedestrian and bicycle facility type designed to maximize comfort and safety for the widest possible range of potential users based on existing traffic volumes, posted speeds, and roadway functional classification.**

Skipper Consulting provided the most recent average daily traffic (ADT) volume data. Posted speed limit data was provided by the City of Auburn and spot-checked by Alta for accuracy using Google Street View imagery. Roadway functional classification data was also provided by the City of Auburn.

Step 3: Tailoring Recommendations to Opportunities and Constraints

Final Recommendations

Third, Alta **examined the feasibility of the idealized walkway and bikeway recommendations to fit the realities of Auburn existing conditions.** Specifically, considerations included, but are not limited to:

- Existing pavement and Right-of-Way widths
- Average Daily Traffic relative to number of existing travel and turn lanes
- Crash history
- PLOS, BLTS, and pedestrian and bicycle demand scores
- Land Use Context
- Network connectivity and redundancy

[1] AOMPO Bicycle and Pedestrian Plan

- Utility conflicts (i.e. stormwater infrastructure, power lines, lighting poles, etc.)
- Driveway frequency
- Presence of sidewalks (informed decision to consider recommending a Multi-Use Path if neither a sidewalk nor an on-street bikeway was provided where both facilities were needed)
- Previously proposed pedestrian and bicycle facilities
- Current level of political support for walking and bicycling
- Estimated potential return on investment

Note that sidewalk quality -- including factors such as sidewalk width, ADA compliance, the presence of a planted buffer or shade trees, and access management – was not assessed as part of this project. As such, recommendations for pedestrian improvements are focused on where new sidewalks or multi-use paths are needed for improved safety, convenience, and network connectivity.

Also note that in a limited number of cases, Alta is recommending sidewalks or a multi-use path on only one side of selected collector and arterial streets. In these limited cases, current land uses, high implementation costs, or both are likely to make it politically difficult to justify spending public money to construct sidewalks on both sides of the street. However, as vacant parcels are developed, we assume that Auburn's development code will ensure that sidewalks and/or multi-use paths will be provided. It is anticipated that the update to Auburn's Greenway Master Plan will add additional specificity regarding where developers must provide multi-use paths when parcels are developed.

Results

The results of this process are presented in the form of recommended pedestrian and bicycle facility maps and a bikeway implementation strategy map. Native GIS files with additional information, including the recommended cross section dimensions, will be provided separately.

Bicycle Facility Type Definitions

This Appendix provides descriptions of the bicycle facilities recommended throughout the City of Auburn.

Multi-Use Path

A multi-use path provides a travel area separate from motorized traffic for bicyclists, pedestrians, skaters, wheelchair users, joggers, and other users. Multi-use paths are desirable for bicyclists of all skill levels preferring separation from traffic. Most multi-use paths are designed for two-way travel of multiple user types. A greenway trail is a type of multi-use path that provides routes and connections that are not provided by existing roadway network. A sidepath is a type of multi-use path located immediately adjacent and parallel to a roadway, typically within the roadway right-of-way. Sidepaths can offer a high-quality experience for users of all ages and abilities as compared to on-roadway facilities in heavy traffic environments, allow for reduced roadway crossing distances and maintain community character.

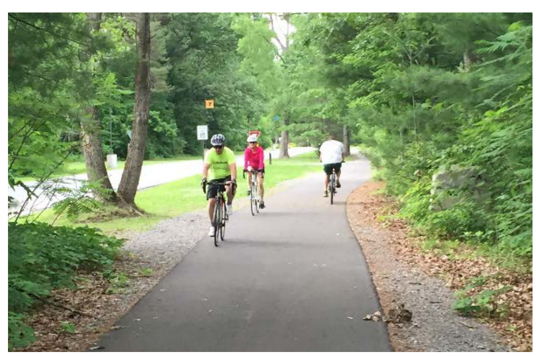


Figure 1 Multi-Use Path

Separated Bike Lanes

Separated Bike Lanes, sometimes called "Cycle Tracks," or "Protected Bike Lanes" are dedicated bikeways that use a vertical element to provide separation from motor vehicle traffic. The vertical separation discourages drivers from parking or idling in the bikeway. Including green infrastructure into the design of the buffer space can help manage stormwater, decrease urban heat island effect, and improve air quality. A planting strip between the walkway and bikeway can function as a detectable warning for people with vision impairments, help to minimize conflict between different users, and provide a place for shade trees.

Figure 2 Separated Bike Lane

Buffered Bike Lanes

Buffered bike lanes are conventional bike lanes (see "Bike Lanes" definition below) with a painted buffer between the bike lane and the travel lane. Buffered bike lanes provide added safety and comfort by further separating bicyclists from motorists.

Figure 3 Buffered Bike Lanes

Bike Lanes

Bike lanes designate an exclusive space for bicyclists through the use of pavement markings and signage. Bike lanes make bicycling a more visible and comfortable option for people who usually would drive or walk to a transit stop. Conventional bike lanes work well on collector streets with 3,000 to 9,000 cars per day and where there is potential for a road diet or a reduction in lane width. High frequency bus stops may pose unique challenges with added bus-bike conflicts.

Figure 4 Bike Lanes

Uphill Bike Lane/Downhill Sharrows

The Uphill Bike Lane/Downhill Sharrows recommendation is a combination of the Bike Lane and Shared Lane Markings recommendations. When roadways have a steep grade, uphill bike lanes can be combined with shared lane markings to create a safe and comfortable bike experience for both uphill and downhill cyclists. This recommendation is often used when one direction, often uphill, warrants a bike lane but the roadway and/or right-of-way is not wide enough for two bike lanes. Uphill bike lanes should be 6-7 feet wide (wider lanes are preferred because extra maneuvering room on steep grades can benefit bicyclists). Shared Lane Markings can then be used for downhill bicyclists who can more closely match prevailing traffic speeds.

Figure 5 Uphill Bike Lane/Downhill Sharrows

Enhanced Shared Roadway

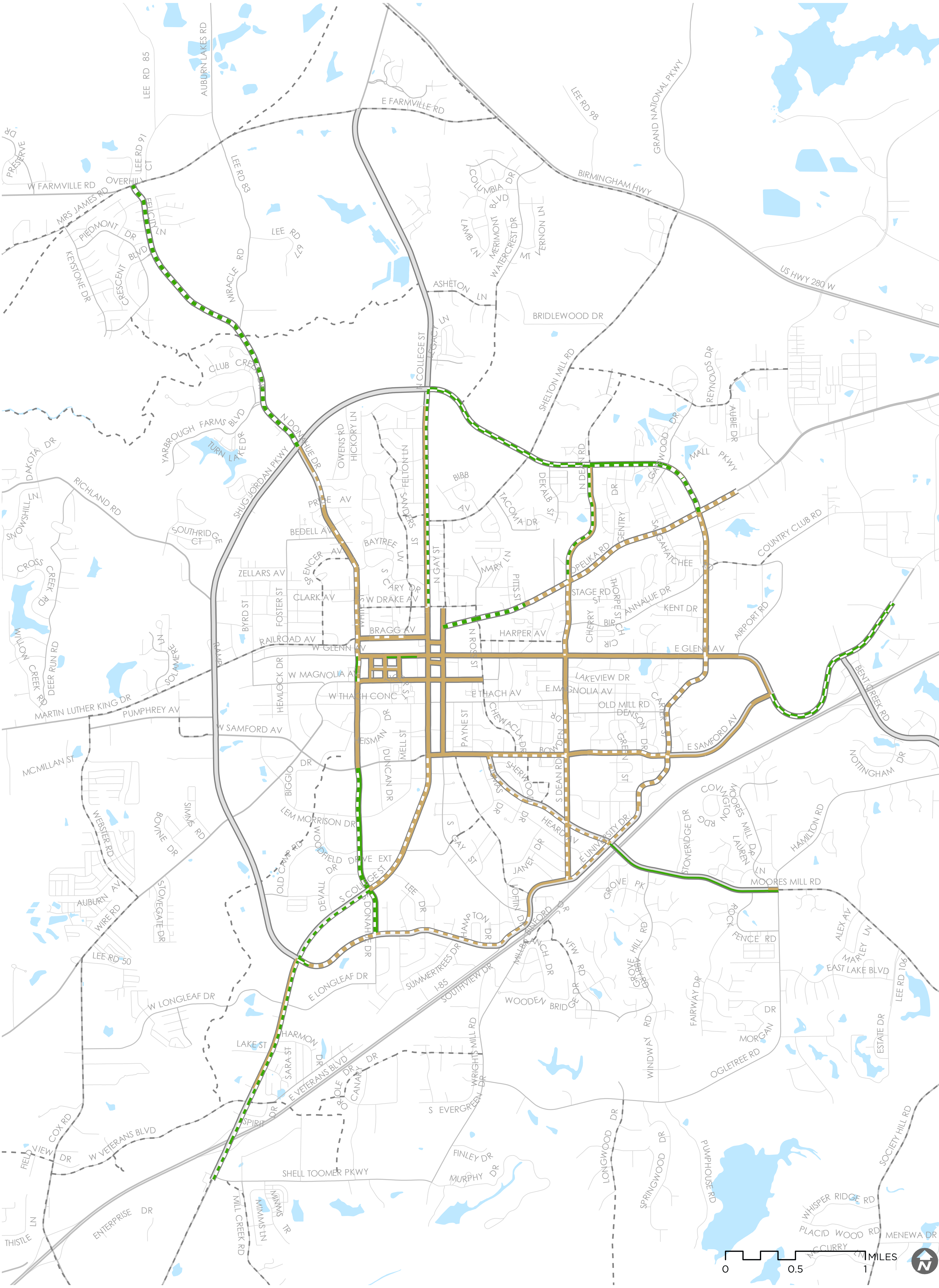
In some highly developed contexts, there may not be an opportunity to create a dedicated bikeway or off-street path, and traffic conditions may not allow for the kinds of volume management treatments often used on bicycle boulevards to create a comfortable bicycling experience. In these cases, a marked shared roadway (shared lane markings + "Bike Route" signage) can be enhanced with bicycle-oriented wayfinding and selected traffic calming devices. These facilities are appropriate where there are no viable alternative routes and it is not feasible to reduce traffic volumes and/or speeds along the identified street to bicycle boulevard levels.

Figure 6 Enhanced Shared Roadway (Chicanes)

Shared Lane Markings

A roadway with shared lane marking, also called "sharrows," encourages bicycle travel and proper positioning within the travel lane. In constrained conditions, shared lane markings are placed in the middle of the lane to discourage unsafe passing by motor vehicles. On a wide outside lane, shared lane markings can be used to promote bicycle travel to the right of motor vehicles. In all conditions, shared lane markings should be placed outside of the door zone of parked cars. Roadways with shared lane markings may also be signed with Bike Route and/or "Bikes may use full lane" signage.

Figure 7 Shared Lane Markings



DRAFT September 2018

PEDESTRIAN FACILITY RECOMMENDATIONS

Existing Conditions

- Sidewalk: One Side of Street
- Sidewalks: Both Sides of Street
- Multi-Use Path: One Side of Street

Proposed Walkways

- Sidewalk: One Side of Street
- Sidewalks: Both Sides
- Multi-Use Path: One Side of Street
- Multi-Use Paths: Both Sides
- Multi-Use Path: Side of Street TBD

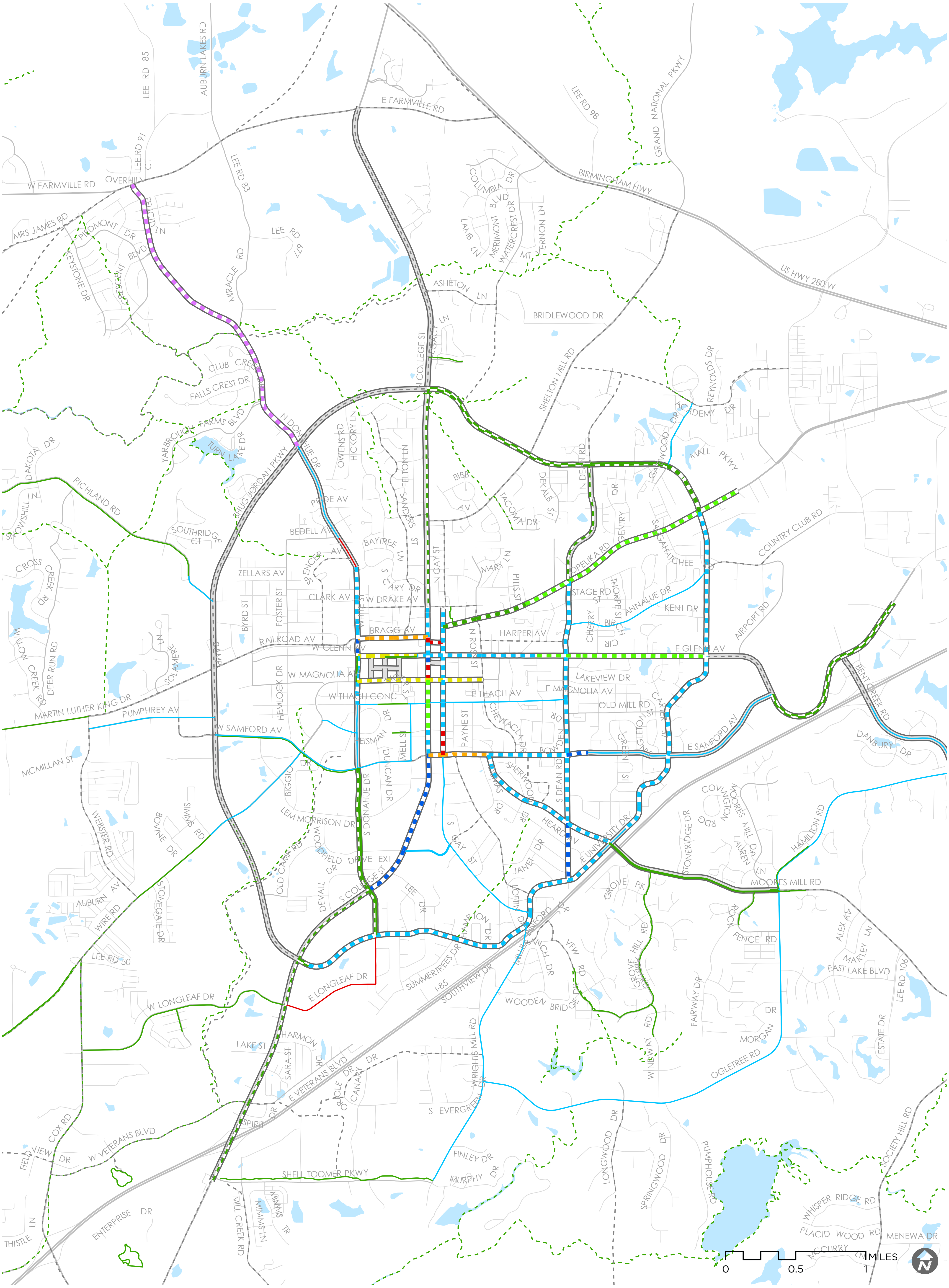
- 2017 Traffic Study Corridor
- Multi-Use Path Proposed in Auburn Bike Plan (1998)

2017 TRAFFIC STUDY
AUBURN, ALABAMA

Data provided by the City of Auburn, Alabama.

City of Auburn

alta PLANNING + DESIGN



DRAFT September 2018

BICYCLE FACILITY RECOMMENDATIONS

2017 TRAFFIC STUDY AUBURN, ALABAMA

Data provided by the City of Auburn, Alabama.

Existing Conditions
- Bike Lane
- Shared Lane Markings
- Multi-Use Path

Proposed Off-Street Bikeways
- Multi-Use Path: One Side of Street
- Multi-Use Path: Both Sides
- Multi-Use Path: Side of Street TBD

Proposed On-Street Bikeways
- Shared Lane Markings
- Enhanced Shared Roadway
- Uphill Bike Lane/Downhill Sharrows
- Bike Lanes
- Buffered Bike Lanes
- Separated Bike Lanes
- Buffered Bike Lanes + Multi-Use Paths

- 2017 Traffic Study Corridor
- Bikeway or Multi-Use Path Proposed in Auburn Bike Plan (1998)
- Greenway Proposed in Greenspace and Greenway Master Plan (2011)

City of Auburn

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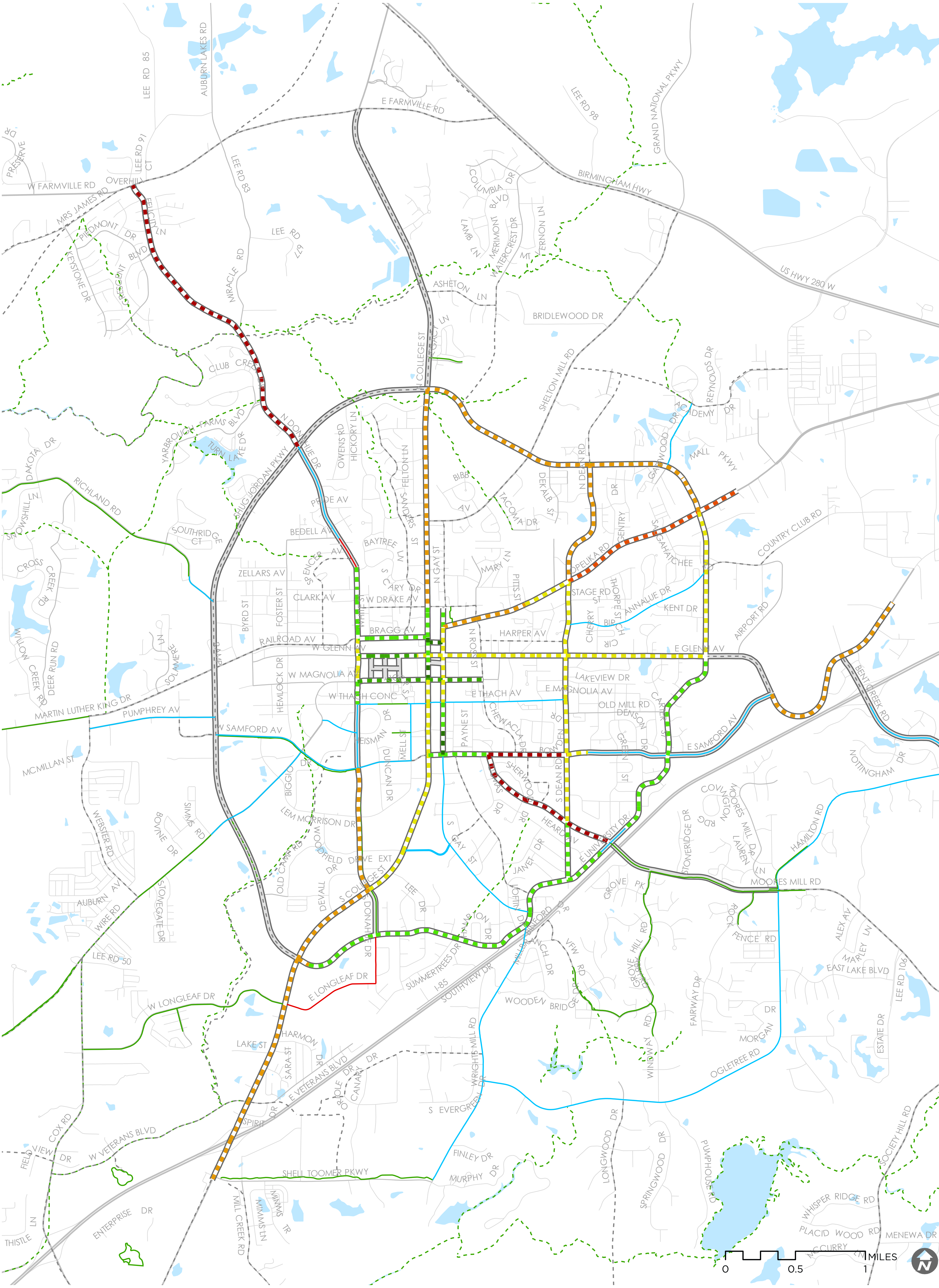

DRAFT September 2018

BICYCLE FACILITY RECOMMENDATIONS: IMPLEMENTATION STRATEGIES

2017 TRAFFIC STUDY
AUBURN, ALABAMA

Data provided by the City of Auburn, Alabama.

Implementation Strategy

- Install Shared Lane Markings
- Install Shared Lane Markings and Traffic Calming
- Reduce Widths of Existing Lanes
- Reconfigure Roadway
- Construct 10-12' Multi-Use Path(s)
- Construct Raised Separated Bike Lane
- Expand Roadway

Existing Bikeways

- Bike Lane
- Shared Lane Markings
- Multi-Use Path

- 2017 Traffic Study Corridor
- Bikeway or Multi-Use Path Proposed in Auburn Bike Plan (1998)
- Greenway Proposed in Greenspace and Greenway Master Plan (2011)

City of Auburn

alta PLANNING + DESIGN

Section 1C:

Bicycle and Pedestrian Project Prioritization

84 Peachtree Street NW
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941.234.3287

MEMORANDUM

To: Richard Caudle, Skipper Consulting, Inc

From: Collin Chesston, Heather Seagle, Kim Voros, and John Cock, Alta Planning + Design

Date: October 26, 2018

Re: Auburn, AL Citywide Traffic Study: Pedestrian and Bicycle Project Prioritization Methods and Results

Purpose

This memo describes Alta's prioritizing process, as applied to the projects proposed in the "Bikeway and Pedestrian Facility Draft Recommendations" memo sent via email on September 24, 2018.

Project Prioritization Process

We conducted a weighted, multi-criterion evaluation of each proposed pedestrian and bicycle corridor project. This method employed a data-driven process that builds upon Alta's previous analyses and resulted in a ranked project list that can be used to by the consultant team and the City of Auburn to build a 10-year capital improvement program associated with the FY 2017 Citywide Traffic Study.

The criteria, inputs, scores, scoring notes, and weights used to rank individual projects are shown in the table on the next page. Proposed projects may score up to 2 points per criterion. Points were assigned to projects that meet specific targets for each criterion. These targets are described in the "Scoring Notes" column. Weights are on a scale of 1 to 4, with 1 indicating the lowest relative importance and 4 indicating the highest relative importance.

Projects were scored individually and ranked against other projects of the same type, meaning:

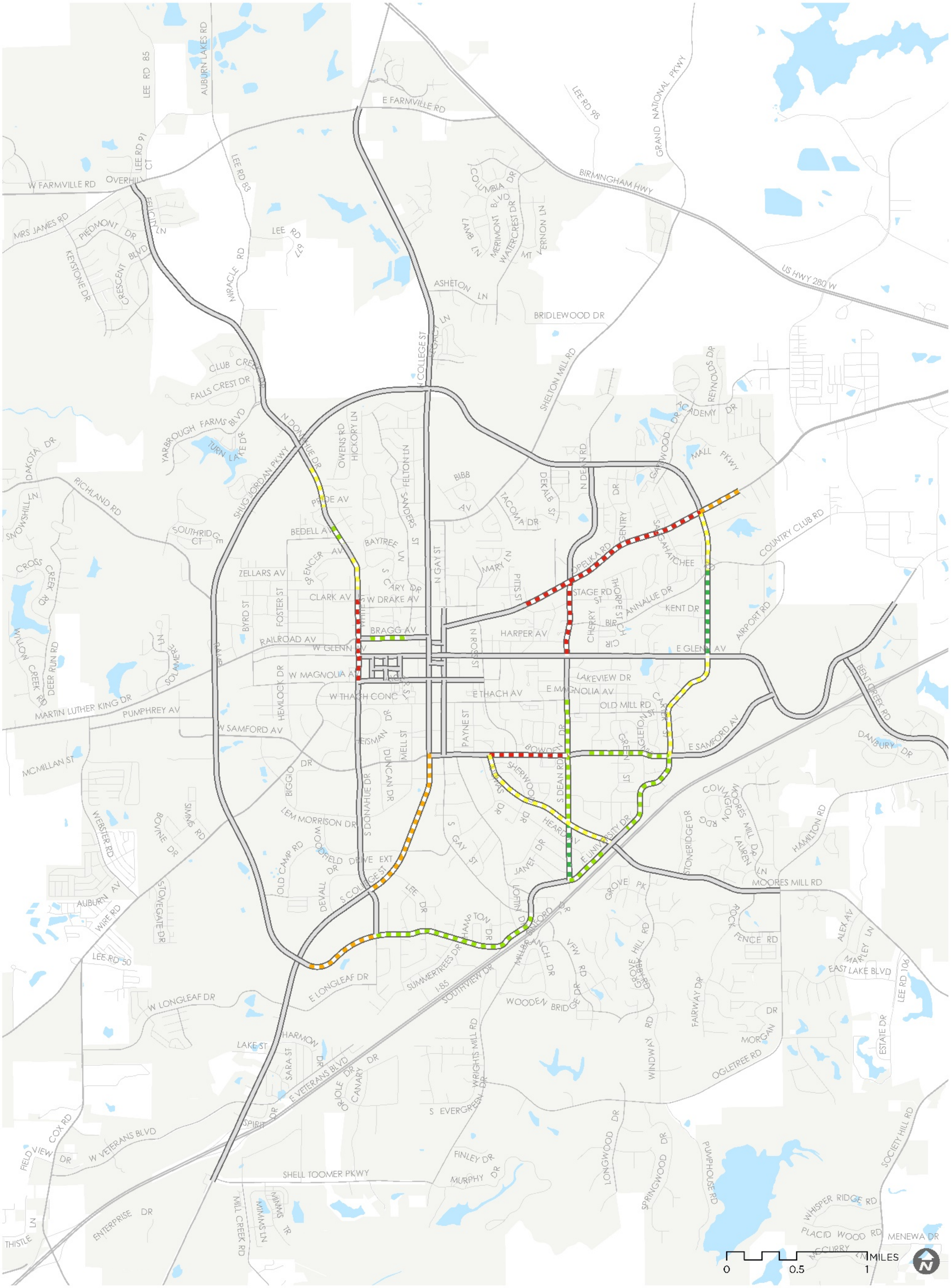
- Sidewalk projects were ranked relative to other sidewalk projects
- Multi-use path projects were ranked relative to other multi-use path projects
- On-street bikeway projects were ranked relative to other on-street bikeway projects

Project Prioritization Results

The result of this analysis is 3 separate lists of prioritized projects, with associated maps. Scoring projects by project type, as opposed to by study corridor, will allow greater flexibility when it comes to generating the 10-year capital improvement program associated with the FY 2017 Traffic Study.

For each project type, the projects were ranked by Priority Score and classified into 5 groups of relative priority (highest, high, moderate, low, and lowest) using the Natural break (Jenks) method. This method classifies data into groups, "based on natural groupings inherent in the data. Class breaks are identified that best group similar values and that maximize the differences between classes. The features are divided into classes whose boundaries are set where there are relatively big differences in the data values" (ArcGIS Desktop Data Classification Methods, http://pro.arcgis.com/en/pro-app/help/mapping/layer-properties/data-classification-methods.htm).

Criteria	Input	Score	Scoring Notes	Weight
Serves Activity Centers	Proposed project is located along a high demand corridor for walking and bicycling	2	"High demand" defined as a score of 4 or 5 per the AOMPO Bicycle and Pedestrian Master Plan demand analysis	3
	Proposed project is located along a moderately-high demand corridor for walking and bicycling	1	"Moderately-high demand" defined as a score of 3 per the AOMPO Bicycle and Pedestrian Master Plan demand analysis	
Improves Inadequate Infrastructure	Proposed project is located along a high need corridor	2	"High need corridor" defined as: Sidewalk and Multi-Use Path Projects: PLOS score of 3.5 or 4 On-street Bikeway Projects: BLTS score of 3.5 or 4	2
	Proposed project is located along a moderately-high need corridor	1	"Moderately-high need" defined as: Pedestrian Projects: PLOS score of 2.5 or 3 Bicycle Projects: BLTS score of 2.5 or 3	
Increases Network Connectivity	Proposed project connects to an existing facility	2	Sidewalk projects must connect to an existing pedestrian facility. On-street Bikeway projects must connect to an existing bicycle facility. Multi-Use Path projects may connect to an existing sidewalk, on-street bikeway, or another Multi-Use Path.	3
Promotes Safety	Multiple pedestrian or bicycle crashes reported along proposed project	2	Based on 2012-2016 crash data provided by City of Auburn	4
	Pedestrian or bicycle crash reported along proposed project	1	Based on 2012-2016 crash data provided by City of Auburn	
Promotes Equity	Proposed project intersects with a census tract indicating a high concentration of vulnerable and/or disadvantaged households	2	Score of 4 or 5 per Alta's equity analysis	2
	Proposed project intersects with a census tract indicating a moderately-high concentration of vulnerable and/or disadvantaged households	1	Score of 3 per Alta's equity analysis	
Responds to Public Input	Proposed project was identified as a priority during the public open house mapping activity	2	"Priority" is defined as having 2 or more dots placed on the "Complete Streets" board	1
	Proposed project was identified during the public open house mapping activity	1	One dot placed on the "Complete Streets" board	



DRAFT October 2018

PROPOSED SIDEWALK PROJECTS BY PRIORITY

2017 TRAFFIC STUDY
AUBURN, ALABAMA

Data provided by the City of Auburn, Alabama.

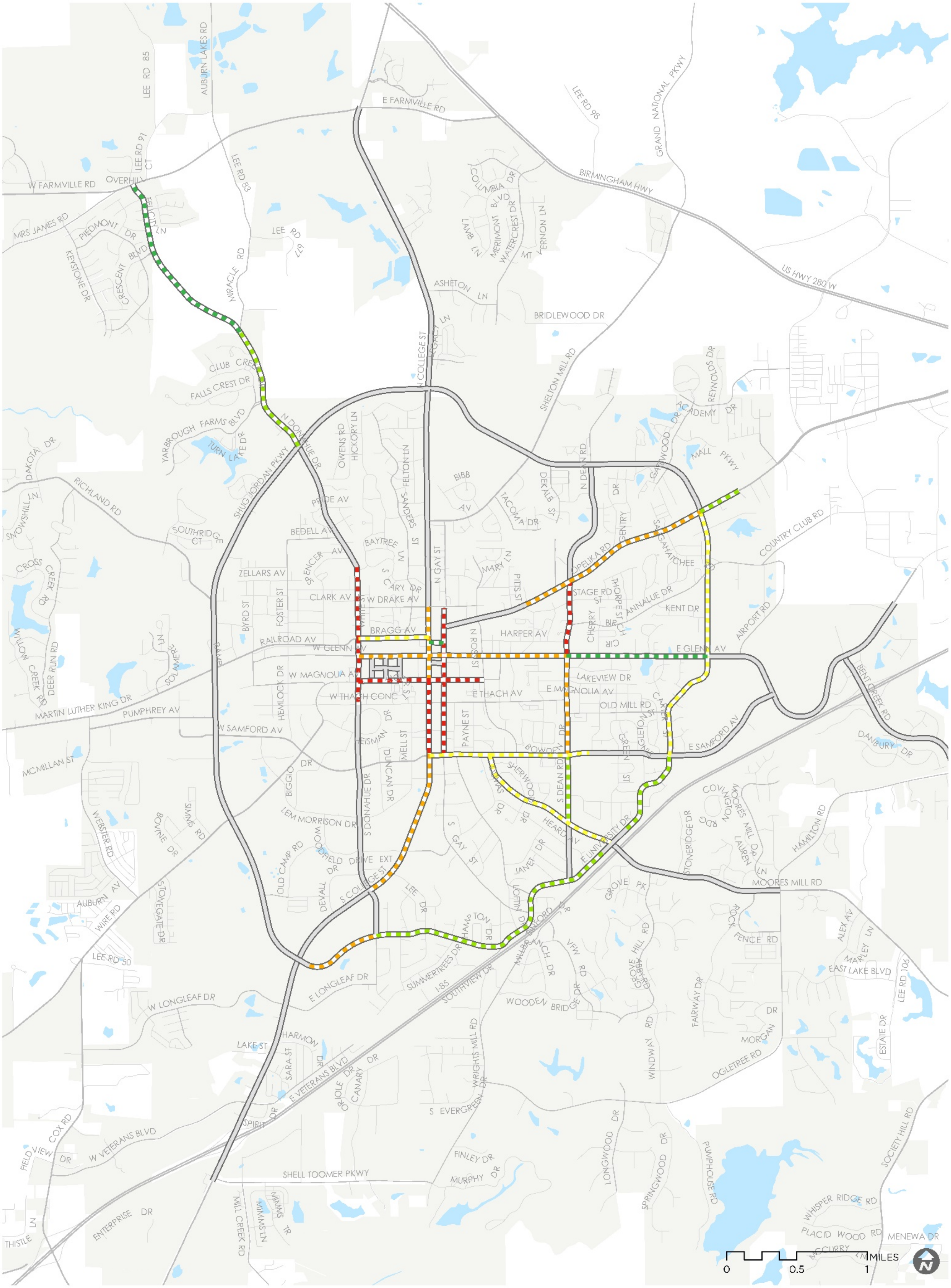
Sidewalk Project Priority Score
- Lowest
- Low
- Moderate
- High
- Highest

- 2017 Traffic Study Corridor
- Water Bodies

City of Auburn

Table 1. Sidewalk Projects in Order of Priority

Priority Level	Priority Score	Sidewalk Project ID	Corridor	From	To	Length (mi.)
Highest	28	19	Opelika Rd	n of Greentree Ter	Pride Ave	0.35
	26	4	N Donahue Dr	Raintree Ave	Luverne Ave	0.40
Highest	26	5	N Donahue Dr	Spencer Ave	Clark Ave	0.18
Highest	26	7	N Dean Rd	Carlisle Dr	Glenn Ave	0.53
Highest	26	20	Opelika Rd	Glenn Ave	Magnolia Ave	1.06
Highest	24	22	E Samford Ave	Samford Ave	Donahue Dr	0.56
High	22	6	S College St	Opelika Rd	Glenn Ave	1.10
High	21	21	Opelika Rd	Thatch Ave	Samford Ave	0.32
High	20	17	E University Dr	Samford Ave	Moores Mill Rd	0.54
Moderate	18	3	N Donahue Dr	Moores Mill Rd	University Dr	0.23
Moderate	18	13	E University Dr	Opelika Rd	Annalue Dr	0.83
Moderate	18	24	Moores Mill Rd	Annalue Dr	Glenn Ave	1.11
Moderate	17	1	N Donahue Dr	Glenn Ave	Samford Ave	0.29
Moderate	17	11	E University Dr	Samford Ave	Arnell Ln	0.43
Low	16	8	S Dean Rd	Dean Rd	w of Moores Mill Rd	0.40
Low	16	14	E University Dr	Donahue Dr	Gay St	0.47
Low	16	15	E University Dr	e of College St	Donahue Dr	0.50
Low	16	16	E University Dr	White St	Sanders St	1.24
Low	16	23	E Samford Ave	Oak St	University Dr	0.57
Low	15	2	N Donahue Dr	Temple St	Dean Rd	0.14
Low	14	9	S Dean Rd	Dean Rd	University Dr	0.48
Low	14	18	Bragg Ave	University Dr	Commercial Ctr	0.25
Lowest	12	10	S Dean Rd	Moores Mill Rd	Dean Rd	0.41
Lowest	11	12	E University Dr	Samford Ave	University Dr	0.61



DRAFT October 2018

PROPOSED ON-STREET BIKEWAY PROJECTS BY PRIORITY

2017 TRAFFIC STUDY
AUBURN, ALABAMA

Data provided by the City of Auburn, Alabama.

On-Street Bikeway Project Priority Score

- Lowest
- Low
- Moderate
- High
- Highest

- 2017 Traffic Study Corridor
- Water Bodies

City of Auburn

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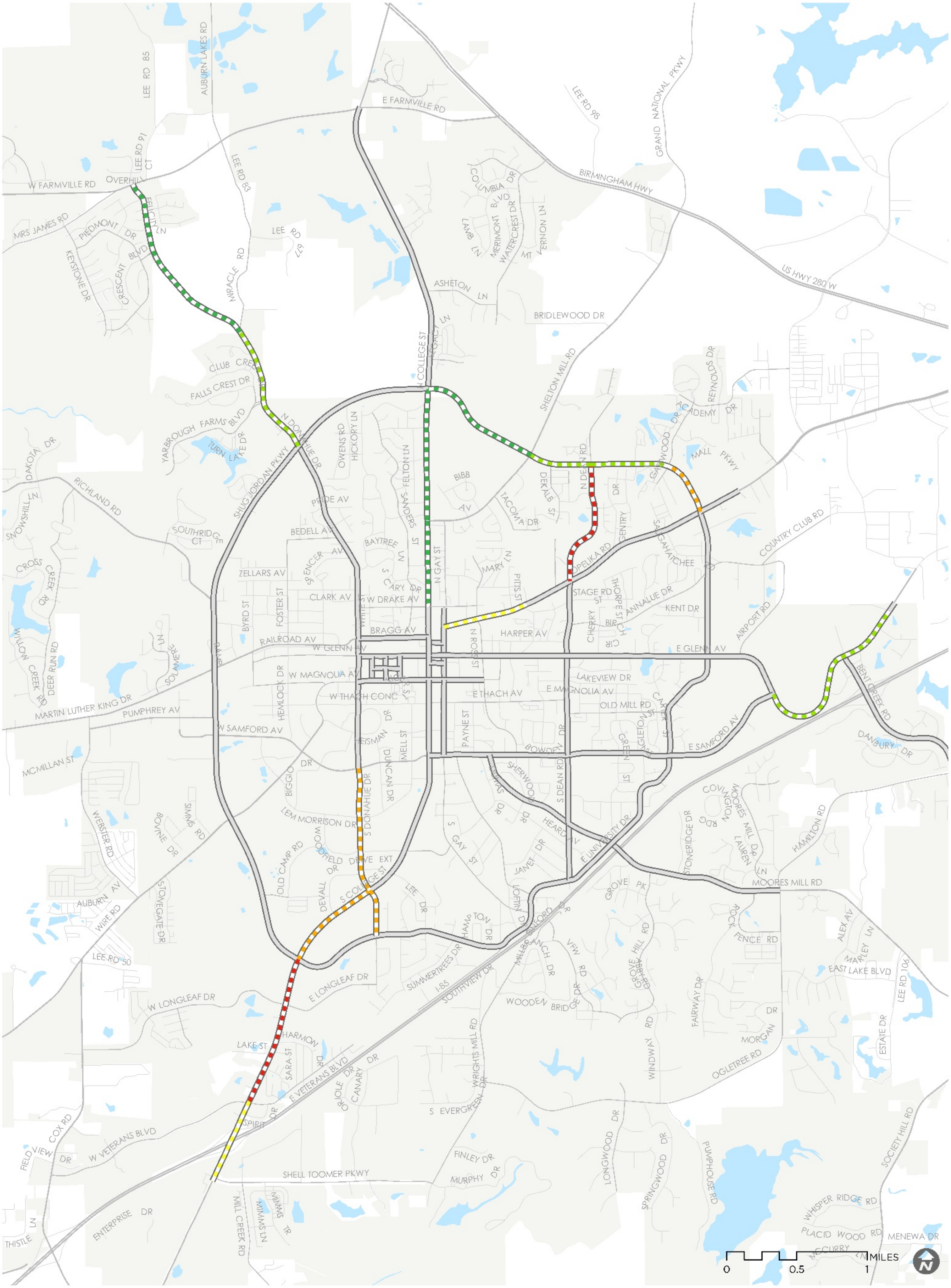
Table 2. On-Street Bikeway Projects in Order of Priority

Priority Level	Priority Score	On-street Bikeway Project ID	Recommended Facility Type	Corridor	From	To	Length (mi.)
Highest	28	3	Buffered BL	N Donahue Dr	Cary Dr	Bragg Ave	0.51
Highest	28	6	Buffered BL	S College St	Magnolia Ave	Samford Ave	0.52
Highest	26	8	Bike Lanes	Gay St	Drake Ave	Samford Ave	1.05
Highest	26	9	Bike Lanes/ Buffered BL	N Dean Rd	Opelika Rd	Glenn Ave	0.53
Highest	26	26	SLMs/ Bike Lanes/ Buffered Bike Lanes	Magnolia Ave	Donahue Dr	Ross St	0.90
Highest	24	4	Bike Lanes/ Separated Bike Lanes	N Donahue Dr	Bragg Ave	Thatch Ave	0.47
High	22	7	Buffered Bike Lanes	S College St	Samford Ave	Donahue Dr	1.10
High	22	23	Bike Lanes/ SLMs	W Glenn Ave	Donahue Dr	Wright St	0.42
High	22	24	Bike Lanes	Glenn Ave	Wright St	Dean Rd	1.06
High	21	10	Bike Lanes	Dean Rd	Glenn Ave	Samford Ave	0.71
High	20	5	Bike Lanes	N College St	Drake Ave	Magnolia Ave	0.52
High	20	17	Bike Lanes	E University Dr	e of College St	Donahue Dr	0.54
High	20	20	Bike Lanes/ Separated Bike Lanes	Opelika Rd	Temple St	Dean Rd	0.35
High	20	21	Bike Lanes	Opelika Rd	Dean Rd	University Dr	1.06
Moderate	19	28	Bike Lanes	E Samford Ave	Moores Mill Rd	Oak St	0.71
Moderate	18	12	Bike Lanes	E University Dr	Opelika Rd	Glenn Ave	1.04
Moderate	18	18	Bike Lanes	Bragg Ave	Donahue Dr	College St	0.50
Moderate	18	27	Uphill Bike Lane, Downhill SLMs	E Samford Ave	College St	Moores Mill Rd	0.43
Moderate	18	29	Shared Lane Markings	Moores Mill Rd	Samford Ave	University Dr	1.11
Moderate	17	13	Separated Bike Lanes	E University Dr	Glenn Ave	Samford Ave	0.83
Low	16	2	Separated Bike Lanes	N Donahue Dr	Miracle Rd	University Dr	0.94
Low	16	11	Separated Bike Lanes	S Dean Rd	Samford Ave	Moores Mill Rd	0.48
Low	15	22	Enhanced Shared Roadway	Opelika Rd	University Dr	Commercial Ctr	0.32
Low	14	14	Bike Lanes/ Separated Bike Lanes	E University Dr	Samford Ave	Lockwood St	0.67
Low	14	15	Separated Bike Lanes	E University Dr	Dean Rd	s of Moores Mill Rd	0.31
Low	14	16	Enhanced Shared Roadway	E University Dr	Donahue Dr	Dean Rd	1.67
Lowest	12	19	Uphill Bike Lane, Downhill SLMs	Mitcham Ave	College St	Gay St	0.11
Lowest	12	25	Bike Lanes/ Buffered Bike Lanes	E Glenn Ave	Dean Rd	University Dr	1.01
Lowest	8	1	Bike Lanes	N Donahue Dr	Farmville Rd	Miracle Rd	1.38



DRAFT October 2018

PROPOSED MULTI-USE PATH PROJECTS BY PRIORITY

2017 TRAFFIC STUDY
AUBURN, ALABAMA

Data provided by the City of Auburn, Alabama.

Multi-Use Path Project Priority Score

- Lowest
- Low
- Moderate
- High
- Highest

- 2017 Traffic Study Corridor
- Water Bodies

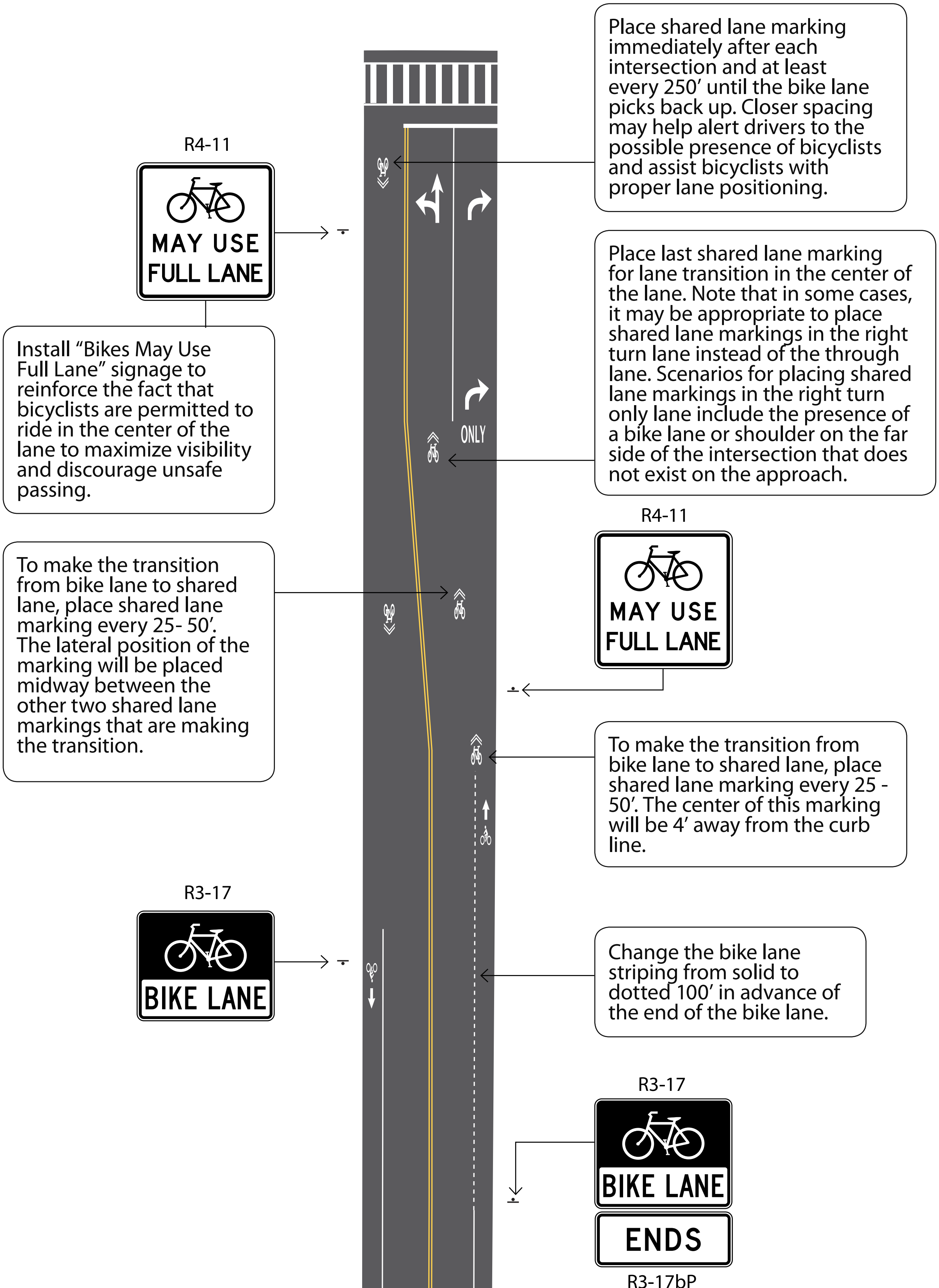
City of Auburn

Table 3. Multi-Use Path Projects in Order of Priority

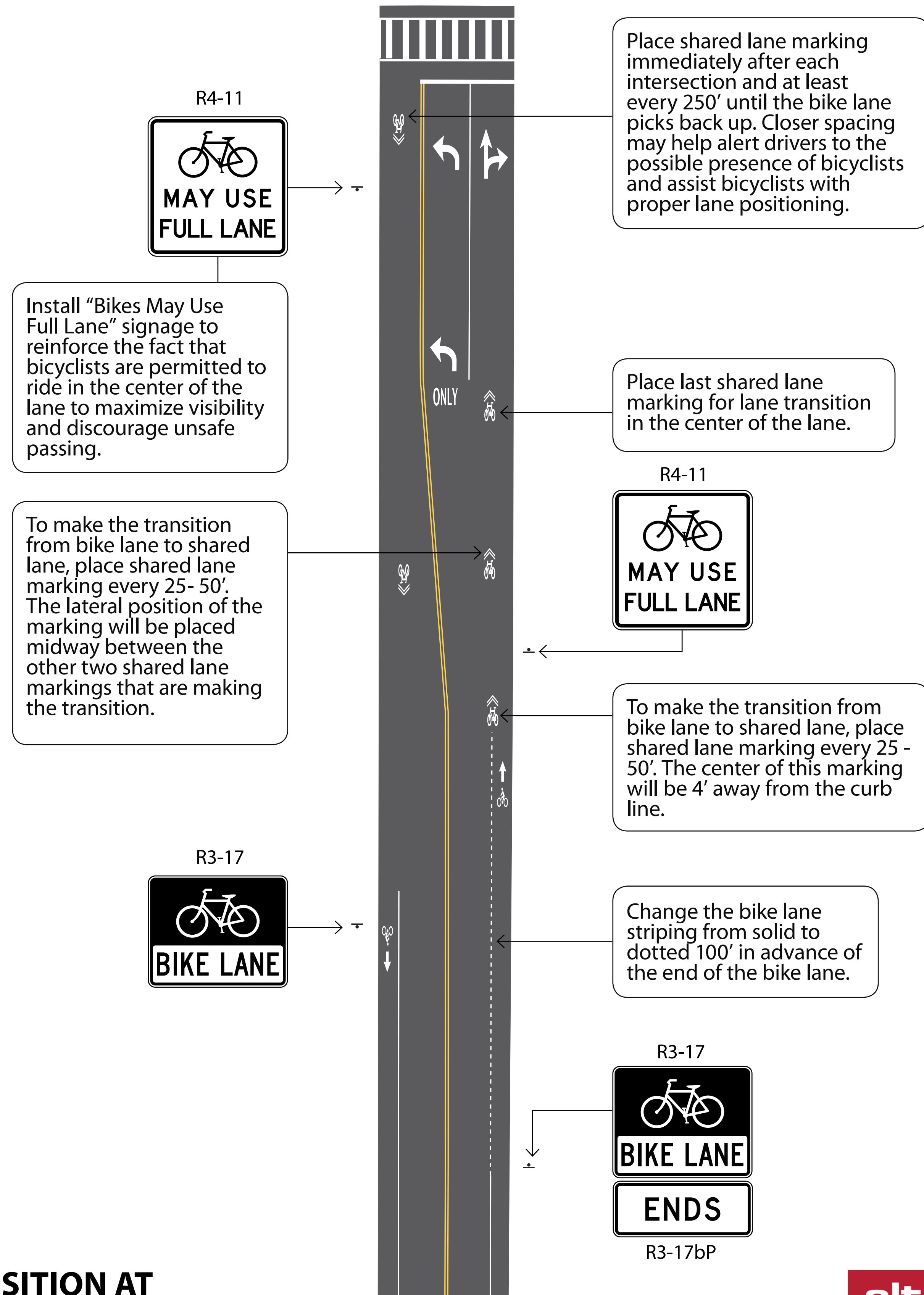
Priority Level	Priority Score	Ped Project ID	Corridor	From	To	Length (mi.)
Highest	30	8	S College St	Longleaf Dr	Veterans Blvd	1.07
Highest	29	10	N Dean Rd	University Dr	Opelika Rd	0.92
High	25	7	S College St	University Dr	Donahue Dr	0.72
High	22	14	E University Dr	Gatewood Dr	Opelika Rd	0.41
High	21	4	S Donahue Dr	College St	University Dr	0.34
High	20	3	S Donahue Dr	Samford Ave	College St	0.89
Moderate	18	9	S College St	Veterans Blvd	s of Shell Toomer Pkwy	0.63
Moderate	18	15	Opelika Rd	Gay St	Temple St	0.61
Low	14	2	N Donahue Dr	Miracle Rd	University Dr	0.94
Low	14	12	E University Dr	Shelton Mill Rd	Dean Rd	0.44
Low	14	16	E Glenn Ave	Samford Ave	Skyway Dr	1.32
Low	13	13	E University Dr	Dean Rd	Gatewood Dr	0.55
Lowest	10	5	N College St	University Dr	Shelton Mill Rd	0.94
Lowest	10	6	N College St	Shelton Mill Rd	Drake Ave	0.61
Lowest	9	11	E University Dr	College St	Shelton Mill Rd	0.91
Lowest	6	1	N Donahue Dr	Farmville Rd	Miracle Rd	1.38

Section 1D:

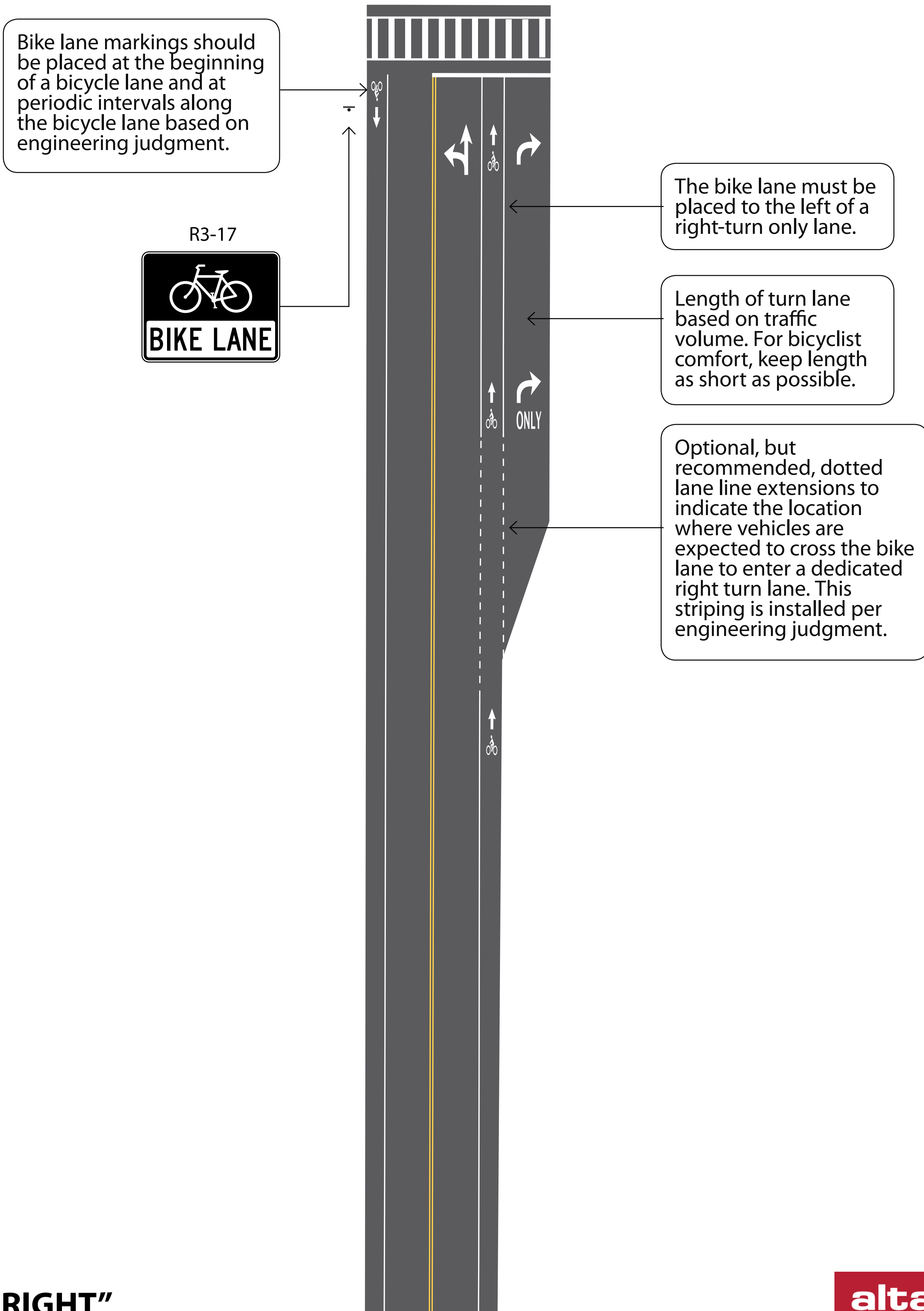
Bike Lane Concepts



TRANSITION AT DEDICATED RIGHT TURN LANE



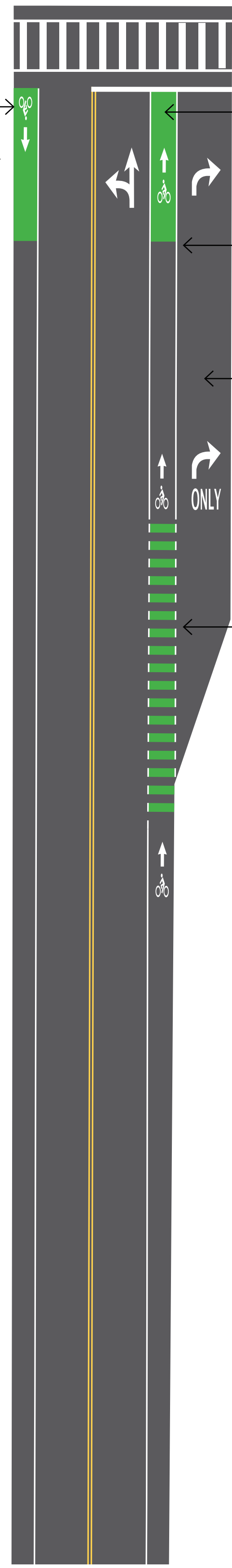
TRANSITION AT DEDICATED LEFT TURN LANE



"ADD RIGHT" CONFIGURATION

Bike lane markings should be placed at the beginning of a bicycle lane and at periodic intervals along the bicycle lane based on engineering judgment.

R3-17



Where bike lanes approach and are received across intersections, apply green pavement markings for a stretch of 50’ to increase conspicuity of the bike lane.

The bike lane must be placed to the left of a right-turn only lane.

Length of turn lane based on traffic volume. For bicyclist comfort, keep length as short as possible.

Optional, but recommended, dotted lane line extensions to indicate the location where vehicles are expected to cross the bike lane to enter a dedicated right turn lane. This striping is installed per engineer’s judgment. Green pavement markings installed between the dotted lines can be implemented at high volume intersections.

“ADD RIGHT” CONFIGURATION - WITH GREEN COLORED PAVEMENT MARKINGS

CHANNELIZED RIGHT TURN LANE

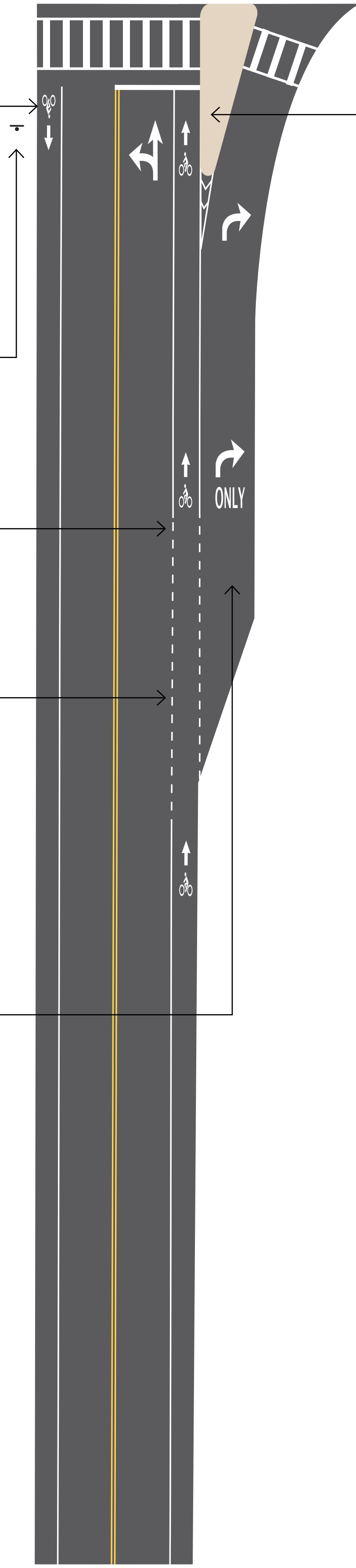
Bike lane markings should be placed at the beginning of a bicycle lane and at periodic intervals along the bicycle lane based on engineering judgment.

R3-17

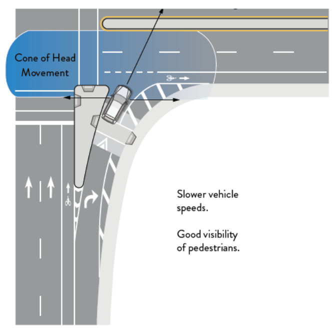
The bike lane must be placed to the left of a right-turn only lane.

Optional, but recommended, dotted lane line extensions to indicate the location where vehicles are expected to cross the bike lane to enter a dedicated right turn lane. This striping is installed per engineering judgment.

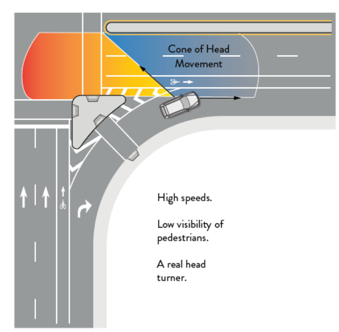
Length of turn lane based on traffic volume. For bicyclist comfort, keep length as short as possible.



Where a right turn channel is desired, configure the channelized lane as a “safety right” or “urban smart channel” to maximize driver visibility, encourage drivers to yield to pedestrians, and discourage high-speed turning movements.An example of conventional vs “urban smart” design is seen below.



Urban Smart Channel



Conventional Right Turn Channel