City of Austin

Pedestrian Safety Action Plan

2018

VISION ZERO
Help Austin reach zero traffic deaths

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Federal Highway Administration – Texas Division
Mayor's Committee for People with Disabilities
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Urban Transportation Commission
Texas School for the Blind and Visually Impaired
Crossroads Coalition
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Executive Summary

Between 2010 and 2015 there were nearly 1,900 pedestrians involved in traffic crashes in Austin, resulting in 121 fatalities. In addition to these tragic deaths, the serious, often life-altering injuries suffered by people who are involved in these crashes often go unreported in the news headlines. In fact, for every pedestrian fatality in Austin there are another 10 serious injuries.

Austin's Pedestrian Safety Action Plan (PSAP) serves as a holistic framework for improving citywide pedestrian safety, so that the benefits of a safe and walkable city—from improved public health outcomes, to economic competitiveness, to environmental protection—can be realized for all people in Austin.

Pedestrian Crash Analysis

Austin Transportation Department staff conducted a yearlong analysis of crash data to better understand the causes and consequences of pedestrian crashes in Austin. Key findings from the crash analysis include the following:

Street design has a substantial impact on pedestrian crash severity

- 64% of pedestrian fatalities in Austin occurred on roads with speed limits of 45 mph or greater.
- A crash occurring in an area with sidewalks missing on both sides of the street was nearly twice as likely to result in serious injury or fatality as one that occurred at a location with a sidewalk on at least one side of the street.
- Crashes occurring over a half mile away from the nearest signalized crossing (i.e. traffic signal or pedestrian hybrid beacon) resulted in serious injury or fatality 43% of the time, compared with only 22% of the time if the crash occurred within one-eighth of a mile of a signal.
- The presence of street lighting was associated with an 8 percentage point reduction in the probability that crashes occurring in otherwise dark conditions would result in fatality or serious injury. On average, the further from the street light the more severe the crash.

Six behaviors contribute to most pedestrian crashes

- Failure to Yield
- Distraction/Inattention
- Impairment
- Improper Maneuver
- Speed
- Failure to Stop

Certain demographic groups in Austin are disproportionately affected by pedestrian crashes

- Minority communities, non-English speaking communities, and lower-income communities have higher rates of serious crashes than other groups.

- High-crash Census tracts in Austin were found to be associated with lower rates of car ownership, higher transit ridership, and more people walking or biking to work.
- Older pedestrians, males, and those experiencing homelessness are at higher risk of serious injury or fatality as a result of pedestrian crashes.

Community Priorities

The Austin community expressed their top concerns and priorities related to pedestrian safety through the PSAP public outreach process, which included 11 Open House meetings in all 10 City Council Districts. Austin residents logged nearly 3,000 comments related to pedestrian safety into the City's Vision Zero Input Tool. Top concerns included lack of sidewalks, speeding, and people failing to yield. Austin residents want to prioritize pedestrian safety treatments at areas with high crash histories and near schools, public facilities and transit stops.

Pedestrian Safety Priority Network

As part of the PSAP, ATD developed a new tool – the Pedestrian Safety Priority Network – to help identify and prioritize locations in Austin where pedestrian safety treatments can have the biggest impact. The tool has three components: Crash Scores, Demand Scores and Risk Characteristic Scores.

Action Plan

The Pedestrian Safety Action Plan offers 21 key recommendations in engineering, education, enforcement, evaluation, policy/land use, and partners/funding to improve pedestrian safety in Austin.

ENGINEERING ACTION ITEMS

1. Establish a Pedestrian Crossing Improvement Program to install large numbers of high-impact, cost-effective pedestrian safety treatments throughout Austin
2. Develop guidelines for implementing traffic signal modifications to enhance pedestrian priority and safety
3. Form a working group to recommend strategies to enhance street lighting to improve pedestrian safety
4. Implement the Sidewalk Master Plan to promote safe pedestrian mobility in Austin

EDUCATION ACTION ITEMS

5. Develop educational materials on pedestrian safety focusing on top contributing factors and crash types to disseminate to the Austin community and to transportation partners
6. Deploy Vision Zero Street Teams to conduct targeted educational campaigns promoting pedestrian safety
7. Lead neighborhood walkability audits with Austin residents, businesses and advocacy groups to identify opportunities to improve the safety and walkability of their neighborhoods

ENFORCEMENT ACTION ITEMS

8. Work with Austin Police Department to organize enforcement campaigns targeting the top contributing factors and crash types for pedestrian crashes
9. Identify existing City ordinances and State laws that can be strengthened, and explore potential new regulations needed, to better promote pedestrian safety and priority
10. Work with Austin Police Department to develop lesson plans and materials to train law enforcement personnel on pedestrian laws and safety

POLICY + LAND USE ACTION ITEMS

11. Include pedestrian safety and comfort as principal considerations in all City policies governing street and site design
12. Fund and construct pedestrian safety improvements through the City's development review process
13. Develop a Pedestrian Master Plan as a unifying strategy to promote pedestrianism in Austin
14. Ensure that pedestrian safety is a primary consideration in the promotion and adoption of emerging mobility technologies

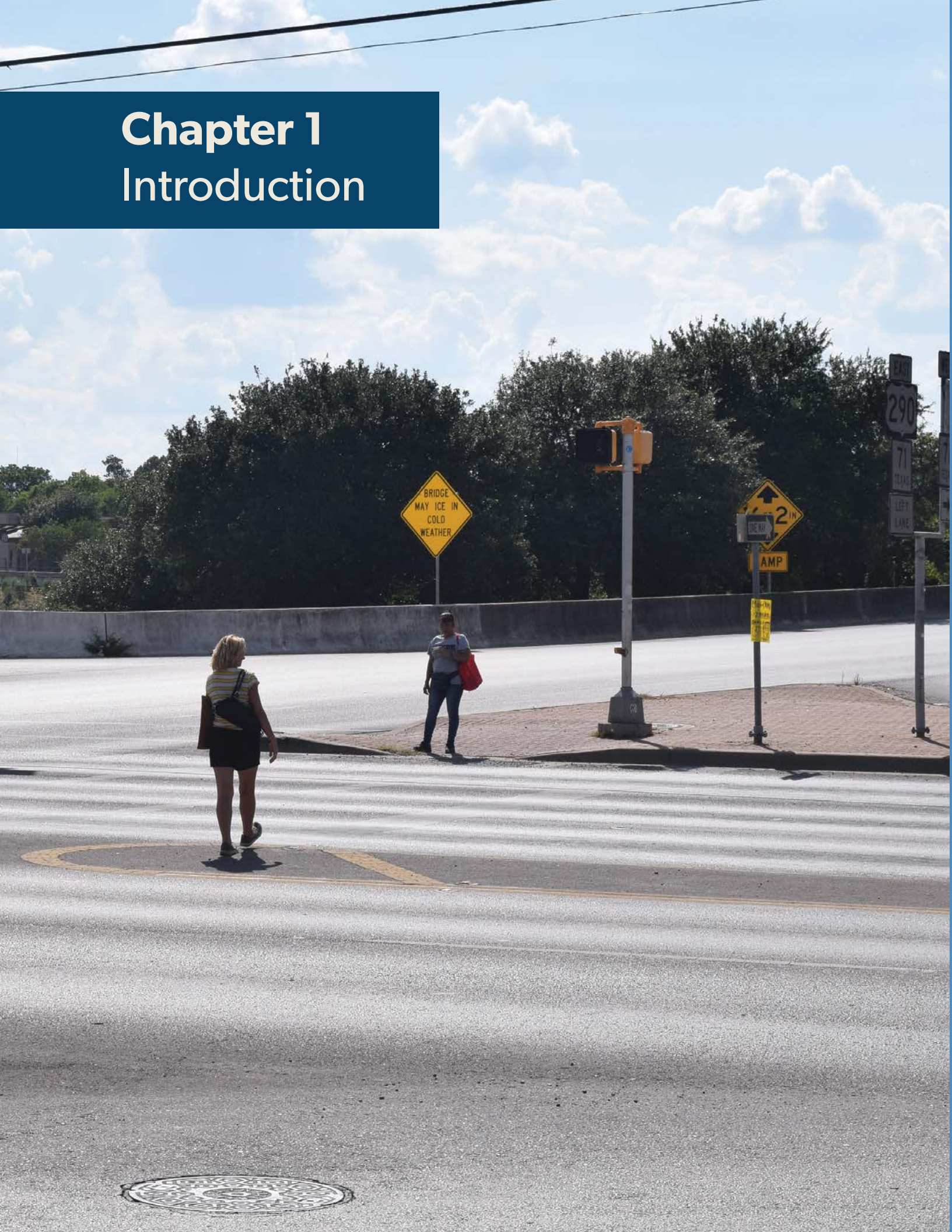
EVALUATION ACTION ITEMS

15. Establish a robust pedestrian counting program to gain a better understanding of walking demand in Austin and to help prioritize pedestrian improvements with limited resources
16. Regularly update the Pedestrian Safety Priority Network with new data inputs and develop more sophisticated prioritization tools over time
17. Regularly update pedestrian crash records with detailed crash type information and work with partner agencies to improve crash record data collection and reporting
18. Evaluate and report on the effectiveness of existing and newly-installed pedestrian facilities to help inform Austin-specific strategies

PARTNERS + FUNDING ACTION ITEMS

19. Work with partner agencies to identify opportunities to improve pedestrian safety on high-speed roadways not controlled by the City.
20. Work with Capital Metro to improve pedestrian safety around transit stops
21. Promote pedestrian safety and seek funding for pedestrian facilities in programs, plans and policies developed in conjunction with the Capital Area Metropolitan Planning Organization (CAMPO)

Chapter 1
Introduction



Why does Austin need a Pedestrian Safety Action Plan?

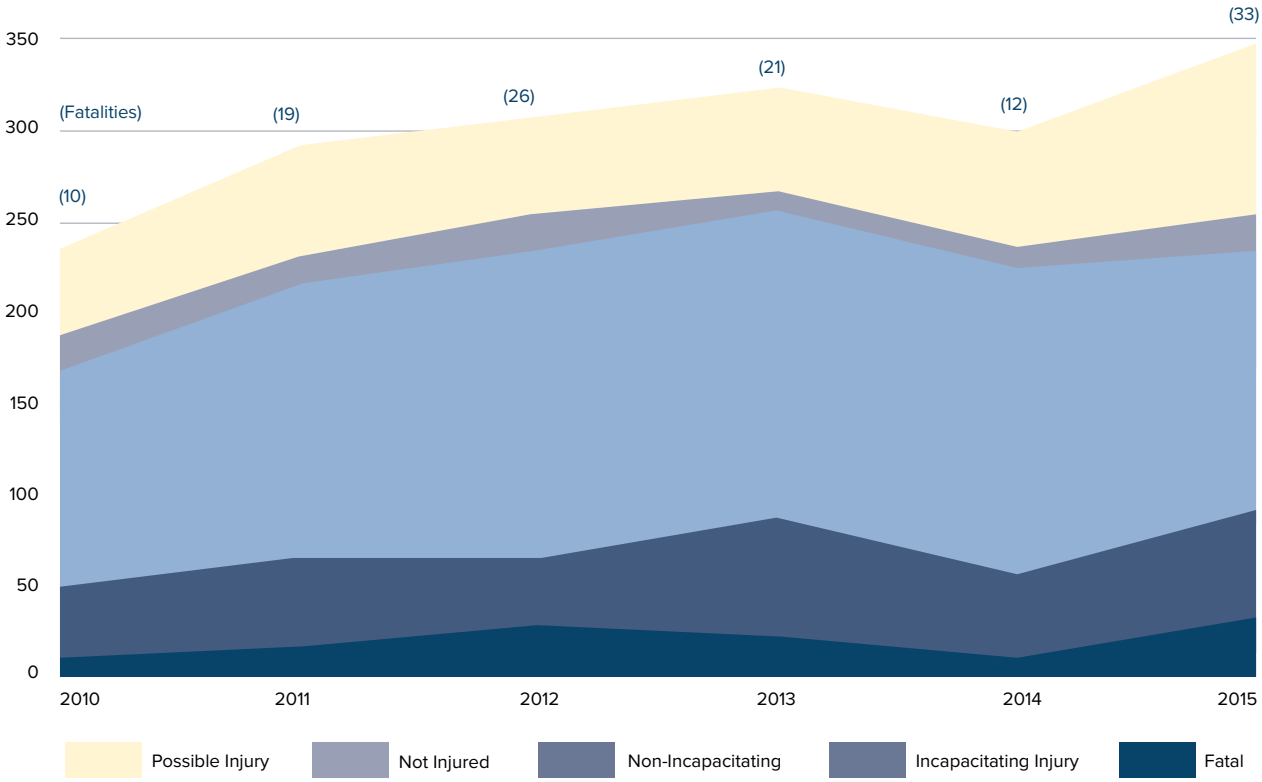
Walking is a fundamental aspect of life in American cities, yielding significant benefits to public health, economic activity and social equity. Austin's comprehensive plan, Imagine Austin, envisions a city where walking is safe and comfortable for everyone. The Austin Pedestrian Safety Action Plan is intended to provide a comprehensive approach to addressing pedestrian safety in service to a more walkable environment that contributes to Austin's vision for a sustainable, socially equitable, affordable and economically prosperous city.

Despite the efforts of many American cities to promote more walkable cities, pedestrian crashes and fatalities are on the rise nationally. Preliminary estimates indicate that nationwide, pedestrian fatalities in 2016 increased by 11% compared with 2015, which would be the largest one-year increase in the four decades in which national data has been tracked. Equally alarming is the finding that the number of pedestrian fatalities is increasing at a much faster rate than overall traffic deaths. Whereas overall traffic deaths in the U.S. increased by 6% from 2010 to 2015, pedestrian fatalities increased by an incredible 25% over the same time period.[1]

These trends are seen in Austin as well, although to a somewhat lesser extent, as can be seen in Figure 1 on the next page. Between 2010 and 2015 there were nearly 1,900 pedestrian crashes in Austin, resulting in 121 fatalities. In addition to these tragic deaths, the serious, often life-altering injuries suffered by people who are involved in these crashes often go unreported in the news headlines. In fact, for every pedestrian fatality in Austin there are another 10 serious injuries.[2]

“ Between 2010 and 2015 there were nearly 1,900 pedestrian crashes in Austin, resulting in 121 fatalities

Figure 1. Total Pedestrians Involved in Crashes, by Severity, Austin, Texas, 2010-2015



CRIS 2010-2015; a 'serious injury' is defined here as a non-incapacitating or incapacitating injury
National Safety Council, Estimating Cost of Unintentional Injuries (2014) http://www.nsc.org/NSCDocuments_Corporate/estimating-costs-unintentional-injuries-2016.pdf

In addition to permanently affecting the lives of people involved in these crashes and the lives of their friends and families, there are substantial economic costs to the Austin economy. Using methodology developed by the National Safety Council, it is estimated that each year crashes involving pedestrians in Austin result in $55 million in wage and productivity losses, medical expenses, administrative expenses, motor vehicle damage, and employers' uninsured costs. When taking into account quality of life measures, including costs people pay to reduce health and safety risks, these costs may reach more than $400 million per year.[3]

These alarming trends, both nationally and locally, underscore the critical need for cities to apply a renewed focus on improving pedestrian safety. Austin's Pedestrian Safety Action Plan seeks to serve as a framework for improving pedestrian safety citywide, so that the benefits of a safe and walkable city—from improved public health outcomes[4], to economic competitiveness[5], to environmental protection[6]—can be realized for all people in Austin.

How does the Austin PSAP relate to other City plans and programs?

In 2011 Austin was identified by the Federal Highway Administration (FHWA) as a Pedestrian Safety Focus City due to its high pedestrian fatality rate relative to the national average. As a Focus City, Austin has received technical support from FHWA in the form of webinars, assistance in conducting Road Safety Audits, and in-person courses on various safety topics. In 2013 FHWA led a three-day workshop in Austin on "How to Develop a Pedestrian Safety Action Plan." The

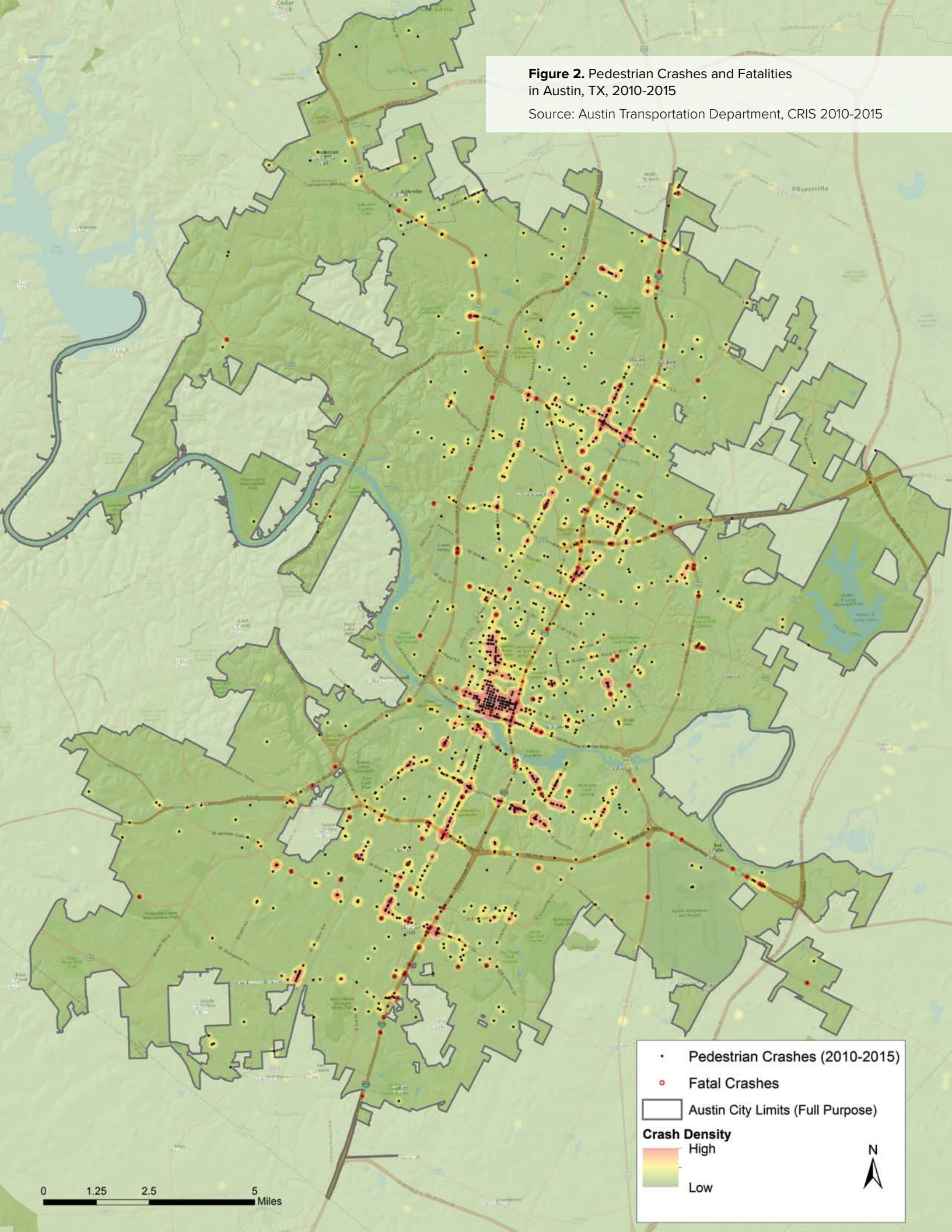


Figure 2. Pedestrian Crashes and Fatalities in Austin, TX, 2010-2015

Source: Austin Transportation Department, CRIS 2010-2015

workshop brought together representatives from various City departments, regional transportation partners, public health professionals, and pedestrian safety advocates to identify the City's top pedestrian safety concerns and make recommendations for improving pedestrian safety in Austin. With guidance from FHWA, this group developed a detailed PSAP template to serve as a starting point for developing a more robust plan of action going forward. Similarly, in March 2016 ATD hosted a professional development seminar on "Designing for Pedestrian Safety," with support from FHWA. With the creation of the Pedestrian Program in July 2016, City staff initiated development of the Austin Pedestrian Safety Action Plan presented in this document.

The Austin PSAP serves as a major component of the City's ongoing implementation of the Vision Zero Action Plan, passed by Austin City Council in summer 2016 (see sidebar). A key recommendation of that plan was to "develop action plans for vulnerable road user groups." Given that pedestrians make up around 30% of traffic fatalities in a typical year in Austin, the PSAP represents a crucial first step in furtherance of this action item. Recommendations to improve pedestrian safety, which are included in Chapter 5 of this plan, are intended to enhance and elaborate upon, rather than duplicate, recommendations included in the Vision Zero Action Plan.

Vision Zero Action Plan

Austin's Vision Zero Action Plan sets forth the ambitious goal of reducing traffic-related deaths and serious injuries to zero by 2025. The plan is underpinned by the principle that traffic deaths and injuries are a public health issue and that any traffic death is too many.

Key recommendations included in the Vision Zero Action Plan fall under five focus areas: Education, Engineering, Evaluation, Enforcement and Policy.

More information on Austin's Vision Zero Program can be found at austintexas.gov/visionzero

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In addition to contributing to the City's goal of reaching zero traffic fatalities and serious injuries, the PSAP also serves to support the implementation of other City plans and programs, including:

The **Imagine Austin Comprehensive Plan** (2012)[7], which serves as the City's 30-year plan to grow as a compact and connected city. Vision Zero was adopted as an official Imagine Austin policy in 2015";

The **Sidewalk Master Plan** and **ADA Transition Plan Update** (2016)[8], which outlines policies and programs to build out the City's pedestrian network, and which calls for partnership opportunities to enhance pedestrian crossings to support shared goals of improving pedestrian safety in Austin; and,

The **Austin Strategic Mobility Plan** (ongoing)[9], which will serve as the City's comprehensive multimodal transportation plan—including prioritized policies, programs and projects—to guide Austin's transportation investments for the next 10+ years. The ASMP is anticipated to be brought to Austin City Council for adoption in mid-2018.

What is included in the Austin PSAP?

Chapter 2 – Pedestrian Crash Analysis presents findings from a yearlong effort by ATD staff to better understand the causes and consequences of pedestrian crashes in Austin. This analysis relied on Austin crash data, sociodemographic information, and national studies on pedestrian safety, to help identify where pedestrian crashes are occurring, why they are occurring, and who is most affected by them.

Chapter 3 – Community Priorities summarizes the top concerns and opinions expressed by the Austin community through the PSAP public outreach process, which included a series of 11 open house meetings, a virtual open house, an online crowd-sourced mapping tool, individual stakeholder meetings and focus area workshops in engineering, education, enforcement, evaluation and policy/land use.

Chapter 4 – Pedestrian Safety Priority Networks describes a new tool developed by ATD to help identify and prioritize locations in Austin where pedestrian safety treatments might have the biggest impact. The tool has three components: Crash Scores, Demand Scores and Risk Characteristic Scores.

Chapter 5 – Action Plan presents 21 key recommendations in engineering, education, enforcement, evaluation, policy/land use, and partners/funding, to improve pedestrian safety in Austin.

Chapter 2
Pedestrian Crash Analysis

Introduction

There are numerous environmental and behavioral factors that contribute to pedestrian crashes in Austin. This chapter analyzes those factors to provide a data-driven underpinning for the action items recommended later in this plan. Crash data from 2010 to 2015, along with Austin sociodemographic data, was used for this analysis. Findings from national studies are also incorporated to provide context and fill in gaps in the Austin data.

Austin Crash Data

Much of the analysis presented in this chapter is informed by pedestrian crash records from the Texas Department of Transportation's (TxDOT) **Crash Record Information System** (CRIS). The CRIS database provides summary-level attributes on crashes occurring on public roadways in Texas, originating from Texas Peace Officers Crash Reports (CR-3) filled out by law enforcement agencies throughout the state. It is important to note that a CR-3 report is only required to be completed when apparent damage is $1,000 or more, or when the crash resulted in injury or death. This means that there is likely substantial undercounting of crashes occurring on Austin's streets, especially when a pedestrian is involved. The crash records also do not reflect the large number of near-misses that occur on a daily basis. Despite these shortcomings, the CRIS system provides a valuable source of information for analyzing crashes involving pedestrians.

To address the lack of detail provided in the state-level crash data, transportation agencies often use crash typing systems to code the preceding actions and positions of each unit (i.e. motorist, pedestrian, bicyclists, etc.) leading up to a crash. While crash typing is a time-consuming process involving a detailed review of each crash report's crash narrative, it provides another layer of detail that helps answer the why and how questions of pedestrian crashes. One such system, the Pedestrian and Bicycle Crash Analysis Tool, or **PBCAT**, has been used by researchers at the Texas A&M Transportation Institute (TTI) to assign a crash type to all serious pedestrian and bicycle crashes in the Austin region for the past decade. TTI and TxDOT, who is the sponsoring agency of this ongoing project, generously shared the PBCAT dataset with Austin Transportation Department for use in the Pedestrian Safety Action Plan and other traffic safety initiatives within the city. Findings from our analysis of the PBCAT data are included throughout this chapter.

Future direction of data collection

Transportation agencies across the country are seeking to improve their data collection capabilities to enhance their understanding of why pedestrian crashes happen, and how they can best be addressed. There is especially a need for better data on where, when and how much people walk. While agencies typically have quality data on motor vehicular volumes, it is rare to collect pedestrian counts at the same scale. Although the U.S. Census Bureau does collect information on walking mode share for commuters, this information is typically unreliable at smaller geographies and focuses on only one subset of the population: commuters. Understanding where and how much people are walking in Austin would provide an idea of which streets actually present the highest risk by controlling for pedestrian exposure. Ultimately, this could lead to the ability to predict where crashes have the highest likelihood of happening in the future. Such information would also give cities a better understanding of how changes to the built environment

and street design can lead to changes in walking levels over time. See Evaluation Action Items starting on page 89 to learn how Austin Transportation Department plans enhance the City's data collection and evaluation capabilities to aid in our understanding of pedestrian safety.

What are the street design characteristics of locations where pedestrian crashes occur?

The dominant paradigm in transportation planning in the second half of the 20th century was to design streets that moved as many cars through the system as quickly as possible. This meant designing streets for high speeds, with wide lanes, long blocks, and few crossing opportunities for pedestrians. While this strategy certainly enabled the rise of the automobile as the main mode of travel in the U.S., over the long run building larger and more roads has proven to be an ineffective strategy for managing congestion,[12] and has had deleterious effects on traffic safety and the walkability of cities.

As a city that came of age during this period, many areas of Austin exhibit these historical development patterns. As Austin has continued to grow, like many U.S. cities, it experienced a resurgence of interest in urban living, many of the streets that were designed solely for driving are now incompatible with changing land use patterns and consumer preferences for more walkable and active communities. Streets such as North Lamar and South Congress once literally served as highways to move people in and out of the city, but now have a greater mix and intensity of land uses and more pedestrian activity—conditions that call for a rethinking of how such streets can best serve all road users. This section explores some of the characteristics of streets where pedestrian crashes are occurring to provide insights into the ways in which street design influences pedestrian safety.

Most crashes occur at intersections, but mid-block crashes are more severe

The majority of pedestrian crashes (56%) between 2010 and 2015 occurred at an intersection or within 50 feet of the intersection. Another 38% occurred mid-block, away from an intersection, and 6% occurred at driveways. Mid-block crashes, however, were more severe than intersection crashes. In fact, a crash occurring mid-block was more than twice as likely to result in incapacitating injury or fatality as those occurring at or near an intersection. Indeed, three-quarters of pedestrian fatalities in Austin occurred at mid-block locations, which is consistent with the national finding that 72% of fatalities occur at non-intersection locations.[13]

The higher severity of mid-block crashes can likely be attributed to the higher vehicle speeds and lower driver expectation of pedestrians crossing, while the higher number of crashes overall at intersections is likely due to more pedestrian activity and more potential conflicts between pedestrians and vehicles.

Intersection or Intersection-Related Crashes	Mid-Block Crashes
• 76% occurred in the crosswalk area, 14% occurred in the travel lane (near the intersection) and 3% occurred within the intersection itself. • The crosswalk was marked 90% of the time in crashes that occurred in the crosswalk area (remember, legal crosswalks exist at all intersections whether marked or unmarked), and only 44% of the time in intersection crashes that occurred in the travel lane. • A traffic signal was present in 57% of intersection crashes that occurred in the crosswalk area, and in 27% of intersection crashes that occurred in the travel lane. • Motorists were found to be at fault 60% of the time and pedestrians 32% of the time. In intersection crashes occurring in the crosswalk, however, motorists were found to be at fault 71% of the time compared with pedestrians at 22% of the time.	• 83% occurred in the travel lane, 8% occurred on the sidewalk, shared use path or driveway crossing, and 6% occurred on the paved shoulder, bike lane or parking lane. • There were only five instances in which a pedestrian was struck at a marked, mid-block crosswalk. The motorist was found to be at fault in three of these crashes. Possible explanations for the low number of mid-block crashes are the low number of mid-block marked crosswalks (117 in Austin), hesitancy on the part of the pedestrian to utilize these crosswalks, or, perhaps, high driver yielding compliance at these locations. • Pedestrians were found to be at fault in 63% of mid-block crashes, and motorists in 28% of crashes.

Table 1. Characteristics of Intersection versus Mid-Block Crashes, Austin, Texas
Source: PBCAT 2010-2015

Severe crashes are more likely to occur on certain road types

Crash locations are classified into one of six road types within the PBCAT dataset: Local, Interstate, US Highway, State Highway/Loop, Farm-to-Market, and Park Road. While the vast majority (87%) of pedestrian crashes occurred on Local Roads, crashes occurring on non-Local roads had a much higher probability of resulting in an incapacitating injury or fatality (see Figure 3 below). The long crossing distances, higher vehicular speeds and drivers' lower expectation

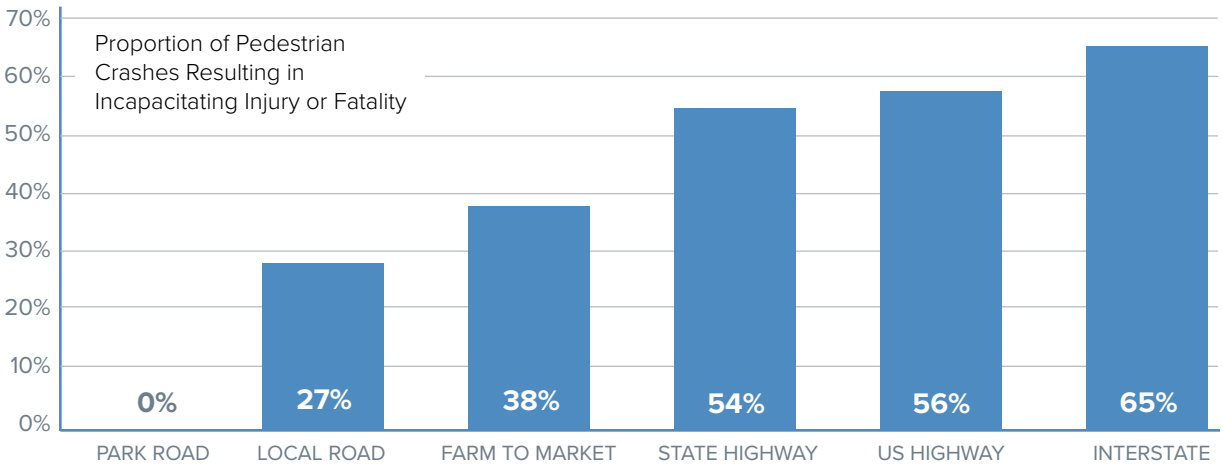


Figure 3. Crash Severity by Road Type, Austin, Texas
Source: PBCAT 2010-2015

that a pedestrian will be present on non-Local road types are conditions that may increase the risk of severe injury or fatality for pedestrians. These findings point to the need to focus both on the higher frequency of crashes on Local Roads, as well as the higher severity of crashes on non-Local Roads.

Other findings related to road types include:

Local Roads[14]

- Nearly half (48%) of crashes occurring on Local Roads occurred on Arterials, 21% on Collectors, and 14% on Residential streets (the other 17% were blank), per the City's road classification system. Residential streets make up 40% of Austin's local road system by mileage, yet accounted for only 14% of crashes.

Non-Local Roads[15]

- 13% of all pedestrian crashes occurred on non-Local Roads, with nearly half of these occurring on Interstate Highways.
- For crashes occurring on non-Local Roads, 57% occurred in the Main/Proper Lane, 41% on the Service/Frontage Road, and the remaining 3% on Entrance/On Ramp, Exit/Off Ramp or Other.

Interstate Highways

- For crashes occurring on IH-35 (the only Interstate Highway in Austin), 63% occurred on Service/Frontage Road, 36% on Main/Proper Lanes, and 1% on Entrance/On-Ramps.
- Of the 24 fatal Interstate crashes between 2010 and 2015, 15 occurred on the Main Lanes and 9 occurred on the Frontage Road.
- 58% of Service/Frontage Road crashes occurred at an intersection and 38% occurred at Non-Intersection; 4% occurred at a Non-Roadway (i.e. motor vehicle lost control on sidewalk).[16]
- Read more about pedestrian crashes on Interstate 35 on pages 42-44.

Crashes are more deadly when they occur on roads with high speeds

The relationship between speed and pedestrian crash severity is well-documented. One study conducted by the AAA Foundation, for example, found that small increases in vehicular speeds are associated with a relatively high increase in risk of severe injury or fatality for pedestrians. The study found that a pedestrian hit by a vehicle traveling 20 mph was severely injured nearly 20% of the time and killed around 7% of the time. When speed reaches 40 mph, however, the risk of severe injury increased to nearly 80% and risk of fatality to around 45%. At speeds of 58 mph, the risk of fatality increased to 90%.[17]

The effect of speed on pedestrian crash severity can be seen in the Austin data as well. Figure 4 shows that while the majority of pedestrian crashes occurred on streets with speed limits between 30-45 mph, the risk of serious injury or fatality substantially increases as speed limits increase beyond 45 mph. Indeed, between 2010 and 2015, 64% of pedestrian fatalities in Austin occurred on roads with speed limits of 45 mph or greater.

The increased severity of crashes occurring on non-Local road types (Interstates, US Highways, State Highways and Farm to Market Roads), which was discussed in the previous section, can likely

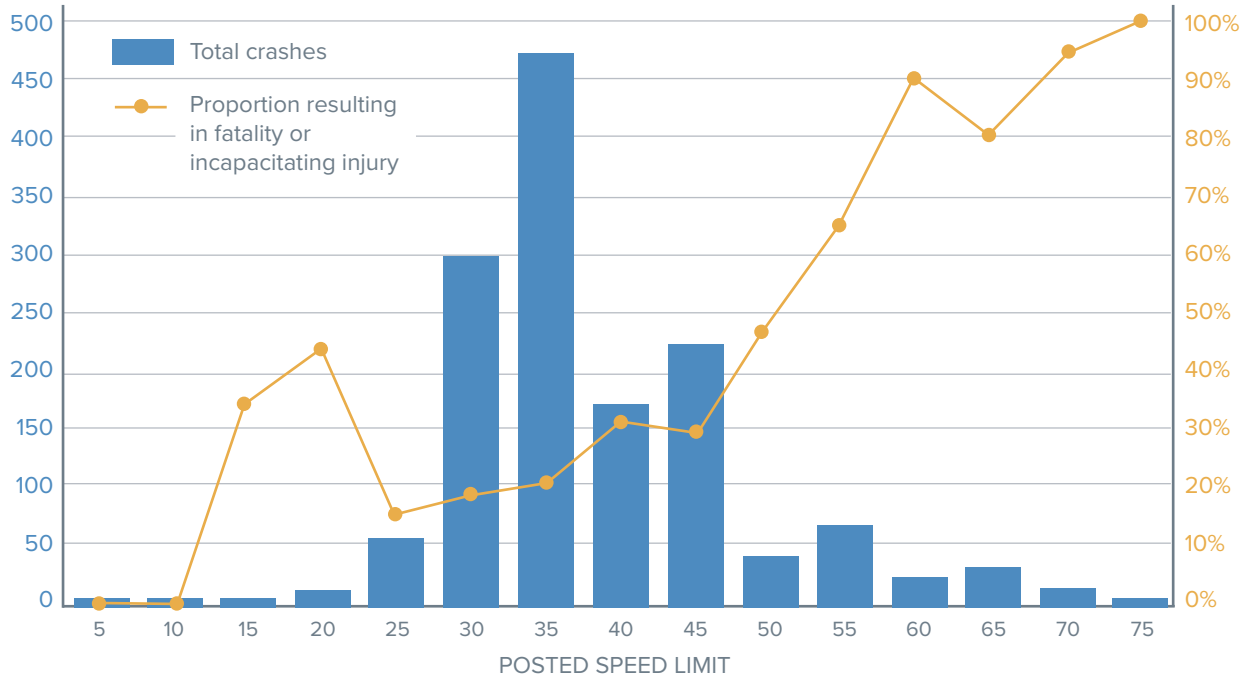


Figure 4. Total Pedestrian Crashes and Crash Severity by Speed Limit, Austin, Texas
Source: PBCAT 2010-2015

be explained almost entirely by the higher vehicle speeds of these roads. Indeed, 83% of crashes that occurred on non-Local roads had speed limits of 45 mph and over, while 81% of crashes occurring on Local Roads had speed limits of 40 mph and under.

It should be noted that the crash data only reports the posted speed limit, and not the actual speed in which the vehicle involved in the crash was traveling, which is very difficult to determine without observing the crash. Further discussion on speeding as a contributing factor can be found starting on page 28.

Wider streets produce more severe crashes

Closely related to speed is the number of lanes and total width of a street. Simply put, wider streets facilitate higher vehicular speeds. Indeed, a 2000 study by the Texas A&M Transportation Institute estimated that on four-lane roads, every 3.3 foot increase in lane width corresponds with a 9.4 mph increase in speeds.[18]

As Figures 5 and 6 on the next page show, there is a positive correlation between pedestrian crash severity for both the total number of traffic lanes and total street width, respectively.

An ongoing challenge for street designers is how to allocate limited right of way for different travel modes to best serve the City's various mobility goals. For pedestrians, narrower and fewer traffic lanes not only promote lower vehicle speeds, but they also reduce crossing distance and time, and thus exposure.[19]

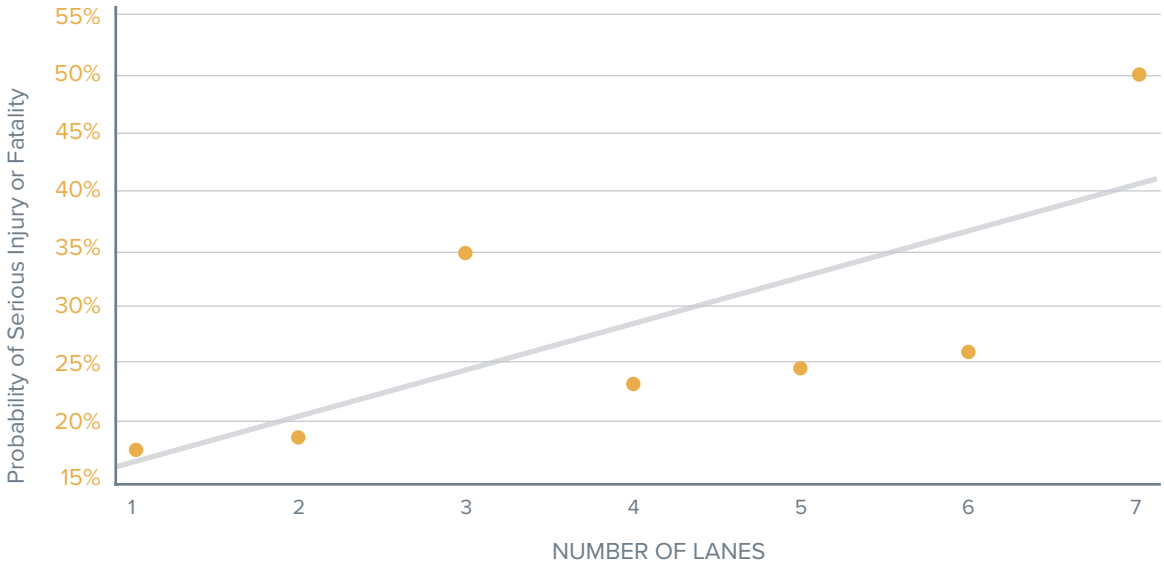


Figure 5. Number of Lanes and Pedestrian Crash Severity, Austin, Texas
Source: CRIS 2010-2015

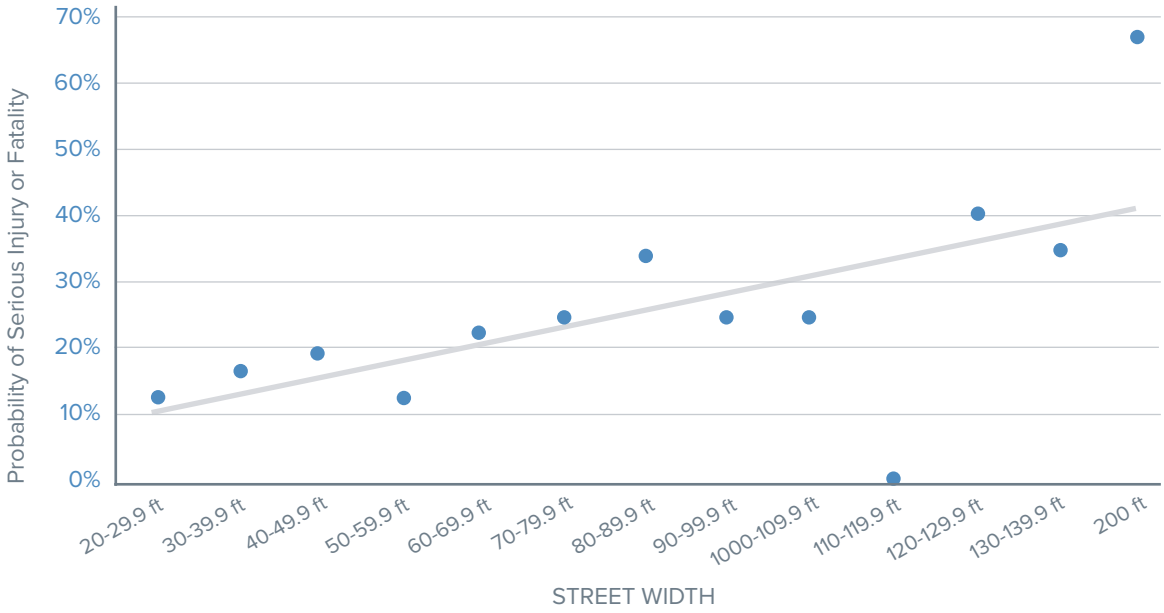


Figure 6. Street Width and Pedestrian Crash Severity, Austin, Texas
Source: CRIS 2010-2015

Streets with long distances between controlled crossing opportunities see more severe crashes

Traffic control devices, including traffic signals and pedestrian hybrid beacons (PHBs), provide pedestrians with a safe opportunity to cross high speed, high volume streets. If the distance to the nearest traffic control device is too far out of their path of travel, however, pedestrians may be more likely to cross the street in risky locations. The Austin crash data shows that the further away from a traffic control device (either a traffic signal or PHB) the more severe the crash. As Figure 7 shows, crashes occurring over a half-mile away from the nearest signalized crossing were

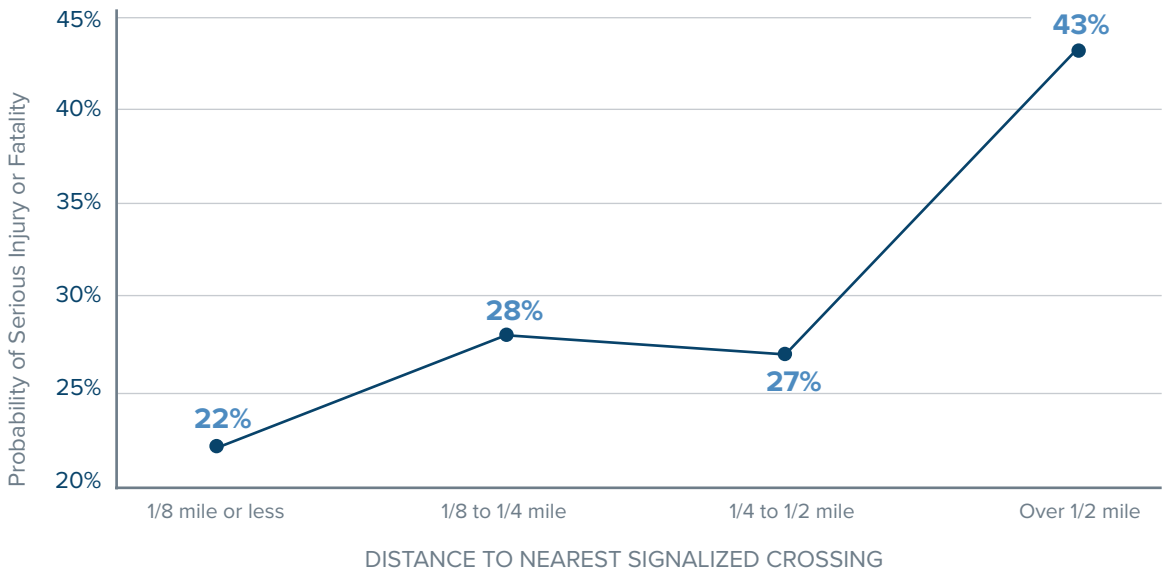


Figure 7. Distance to Nearest Signalized Crossing and Pedestrian Crash Severity, Austin, Texas
Source: CRIS 2010-2015

Pedestrian Safety Citywide Project

In 2015 the City of Austin received $2.4 million in Transportation Alternatives Program (TAP) funding from the Federal Highway Administration (FHWA) to install five pedestrian hybrid beacons (PHBs), Accessible Pedestrian Signals (APS) at 27 locations, and countdown timers at approximately 600 intersections across Austin. The treatments funded through the Pedestrian Safety Citywide project represent the types of low-cost, systemwide countermeasures that are needed to address the systemic nature of pedestrian safety.

PHBs are pedestrian-activated warning devices that help pedestrians safely cross major roadways where traffic signals are not present and/or warranted. PHBs have proven to be an effective treatment in terms of enhancing driver yielding compliance, as an average of 94% of drivers were found to yield to pedestrians in a recent study of 11 PHB locations in Austin.[i]

APSs provide audible tones at traffic signals and beacons to help people who are blind or visually-impaired locate the pedestrian push-button and gather information on the status of the "Walk" and "Don't Walk" intervals. APSs have been shown to improve the ability to navigate intersections for people who are blind or visually impaired.[ii]

Countdown timers allow pedestrians to see how much time they have remaining before the traffic signal will turn to the DON'T WALK interval, allowing them to determine whether or not to enter the intersection or to adjust their speed in order to make it across the intersection safely. According to one study in Detroit, installing pedestrian countdown timers at the citywide level was associated with a 70% decrease in pedestrian crashes over a 10 year period.[iii]

[i] https://ntl.bts.gov/lib/61000/61400/61456/16039.pdf

[ii] Scott, A. C., J.M. Barlow, B.L. Bentzen, T. Bond, and D. Gubbe. Accessible Pedestrian Signals at Complex Intersections: Effects on Blind Pedestrians.

[iii] Huitema, B., R. Van Houten, and H. Manal. An Analysis of the Effects of Installing Pedestrian Countdown Timers on the Incidence of Pedestrian Crashes in the City of Detroit, Michigan.

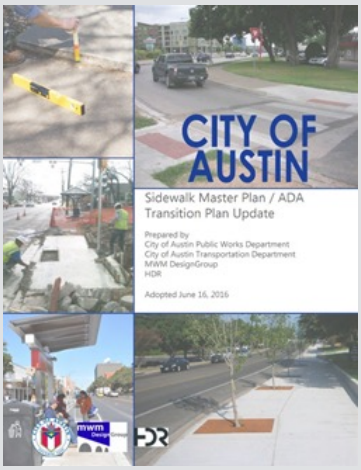
particularly severe, resulting in incapacitating injury or fatality 43% of the time. This is compared with only 22% of crashes if the crash occurred within one-eighth of a mile of a signal.

See Action Item #2 on page 79 to learn more about how ATD plans to address pedestrian safety and priority through strategies related to traffic signals.

Crashes occurring in areas without sidewalks are more severe

The crash data also highlights the relationship between the presence of sidewalks and pedestrian safety. A crash occurring in an area with sidewalks missing on both sides of the street, for example, was nearly twice as likely to result in incapacitating injury or fatality as one that occurred at a location with a sidewalk on at least one side of the street. It is difficult, however, to directly attribute the increased severity of these crashes to the lack of sidewalks alone, as there are likely to be other street characteristics, such as high speeds, that are highly correlated with the types of streets that are less likely to have sidewalks, such as highways. Indeed, of crashes that occurred in an area with sidewalks missing on both sides of the street, 58% were on non-Local streets (Interstate, U.S., State, or Farm-to-Market Roads); this is compared with only 13% of crashes overall occurring on non-Local streets.[20] While it is difficult to determine the exact effect that sidewalks have on pedestrian safety, especially with a relatively small sample size of crashes, the City of Austin considers sidewalks to be an integral component of a safe and accessible pedestrian network, particularly on arterial roadways. See the sidebar story below for more information on how the City seeks to complete the sidewalk network through the implementation of the 2016 Sidewalk Master Plan.

Sidewalk Master Plan



lAustin City Council adopted the Sidewalk Master Plan and ADA Transition Plan Update in June 2016, establishing goals and policies related to new sidewalk construction, rehabilitation of the exiting sidewalk network, and improving mobility for people with disabilities. The plan's asset inventory found that over 2,500 miles, or around 50%, of the City's sidewalk network was missing, and that an estimated 80% of the existing sidewalk network is functionally deficient.

Due to the large number of missing and deficient sidewalks, the plan included a prioritization tool that takes into account dozens of factors related to pedestrian safety, demand, and equity considerations, to objectively prioritize all absent and existing sidewalks for new construction and repair/ rehabilitation. The plan establishes a 10-year goal of addressing all very high and high priority sidewalks within one-quarter mile of all schools, bus stops, and parks, including both sides of arterial and collector streets and one side of residential streets. The plan also sets a goal of achieving 95% functionality for very high and high priority sidewalks and 55% functionality for the citywide sidewalk network over the next 10 years.

The plan offers several alternative strategies for completing the pedestrian network, including a residential Shared Streets pilot and a vegetative obstruction removal program. See the Sidewalk Master Plan here: https://austintexas.gov/sites/default/files/files/Public_Works/Street_%26_Bridge/Sidewalk_MPU_Adopted_06.16.2016_reduced.pdf.

The presence of bike facilities is associated with decreased pedestrian crash severity

The City's 2014 Bicycle Master Plan provides a roadmap for the completion of the Austin bicycle network, which seeks to make Austin a place where people of all ages and abilities can comfortably and safely bike for transportation, fitness and enjoyment.[21] Austin Transportation Department's Active Transportation and Street Design Division has installed over 250 miles of new or improved bicycle facilities since 2008. In addition to creating a safe network for bicyclists, bike facilities are correlated with decreased risk for pedestrians. In fact, the crash data shows that pedestrian crashes occurring on a street with a striped, buffered or protected bike lane were 22% less likely to result in an incapacitating injury or fatality than crashes occurring on streets without bicycle facilities.[22]

The safety effect of bicycle facilities for pedestrians has been seen in other cities as well. New York City, for example, found that streets where protected bike lanes were installed saw a 22% reduction in pedestrian injuries.[23] These safety effects may be attributable to the lower vehicular speeds resulting from traffic calming effects of installing bike lanes, reduced crossing distances created for pedestrians, or enhanced driver awareness of other modes using the road. Bike facilities have the added benefit of increasing walking comfort by providing a buffer between the street and the sidewalk, and by potentially reducing bike riding on sidewalks, which can present hazardous conditions for pedestrians in certain conditions.

Pedestrian crash totals vary by land use

Analyzing the adjacent land uses of pedestrian crash locations offers interesting insights. For example, nearly 40% of crashes occurred adjacent to Commercial land uses, despite making up only 5% of the City's land area. Office land use is similarly overrepresented (13% of crashes; 2% of land area). A likely explanation for this overrepresentation is increased pedestrian exposure attributed to greater pedestrian activity in these areas. Commercial and Office establishments are also more likely be served by high-speed arterials that are known to contribute to pedestrian safety issues. Conversely, while single-family housing makes up one-fifth of Austin's land area, it accounts for only 11% of total crashes. Residential areas, of course, are more likely to be made up of streets with lower speeds that are safer for pedestrians. As has previously been discussed, these findings don't explicitly take into account the amount of pedestrian or driving activity in these areas, which would give a clearer picture of which areas truly present more risk to pedestrians.

While the data does show that certain land uses experience more crashes than others, there does not appear to be a clear correlation between land use and crash severity. Crashes occurring in the top three land uses in terms of number of crashes—Commercial, Office and Single Family—all had similar probabilities that crashes would result in an incapacitating injury or fatality for the pedestrian (25%, 24%, and 23%, respectively), which are similar probabilities to total crashes overall (23% of crashes) (CRIS 2010-2015) .

When are pedestrian crashes occurring?

More crashes happen during the day, but crashes are more severe at night

Overall, 57% of pedestrian crashes occurred between 7 a.m. and 7 p.m. These crashes, however, were much less severe than those occurring at night. For example, while 43% of all crashes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occurred at night between 7 p.m. and 7 a.m., those hours account for 81% of pedestrian fatalities. Similarly, while 24% of pedestrian crashes occurred during the evening rush hour of 4 p.m. to 7 p.m., those hours accounted for only 8% of fatalities.

Crashes occurring in the early morning hours are particularly severe. A crash occurring between 3 a.m. and 6 a.m. had a 27% chance of resulting in a fatality, compared with only 6% of crashes for all time periods. Impaired driving is one likely explanation for the spike in severe crashes occurring after midnight. A crash occurring between midnight and 3 a.m. was five times as likely to include "Had Been Drinking" or "Under the Influence" as a contributing factor than for crashes overall. Of note is the spike in pedestrian crashes between 2 a.m. and 3 a.m., presumably associated with last call for Austin bars. Indeed, the 2 a.m. to 3 a.m. time period had the highest percentage of crashes in which "Had Been Drinking" or "Under the Influence" were recorded as contributing factors by the investigating officer (CRIS 2010-2015). More information on Impairment as a contributing factor in pedestrian crashes can be found starting on page 27.

Crashes are more severe in low light conditions

Low light conditions were also found to be associated with increased pedestrian crash severity. Indeed, the crash data shows that while 42% of crashes occurred in dark conditions (disregarding time of day), those crashes account for 82% of fatalities and 56% of serious injuries. Similarly, at the national level, 70% of pedestrian fatalities occurred in dark conditions in 2013.[24]

According to the Austin crash data, the presence of street lighting was associated with an 8 percentage point reduction in the probability in the probability that crashes occurring in otherwise dark conditions would result in a fatality or incapacitating injury. Distance from the street light also appears to influence crash severity. Table 2 shows that generally speaking, higher severity crashes occur farther away from street lights than lower severity crashes.

Crash Severity	Avg. Distance to Nearest Street Light
Fatal	134 feet
Incapacitating injury	99 feet
Non-incapacitating injury	72 feet
Not injured/Possible injury	78 feet
Average for all	**87 feet**

Table 2. Pedestrian Crash Severity by Distance to Nearest Street Light, Austin, Texas

Source: CRIS 2010-2015

Adequate street lighting can help prevent crashes in low light conditions by better illuminating people crossing the street, while also increasing feelings of personal safety and comfort. See Action Item #3 on page 79 to learn how the City of Austin plans to address pedestrian safety by improving street lighting.

Weekend crashes are more severe than weekday crashes

The highest number of crashes occurred on Fridays (17% of total crashes), while Sundays saw the fewest number of crashes (12%). Crashes occurring on Sunday, however, had the highest likelihood of serious injury (29% of Sunday crashes) and fatality (10%) (CRIS 2010-2015).

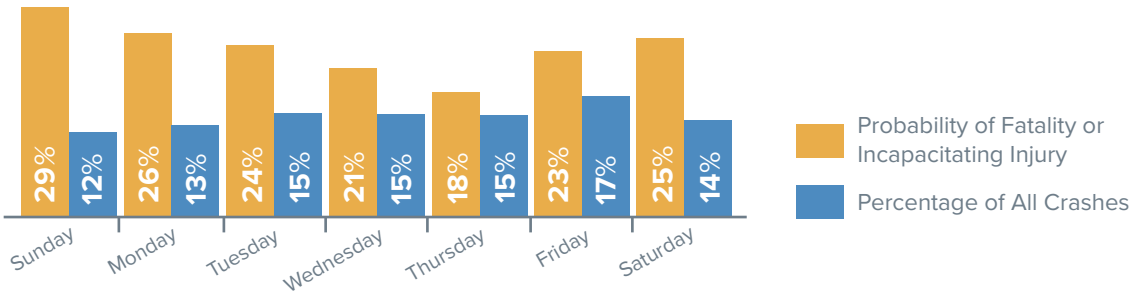


Figure 8. Total Pedestrian Crashes and Crash Severity by Day of Week, Austin, Texas
Source: CRIS 2010-2015

Crashes are more severe in summer months

Figure 9 shows that the highest number of pedestrian crashes occurred in the spring and fall months. Figure 10, however, shows that crashes occurring in the summer were more likely to result in a severe injury or fatality.

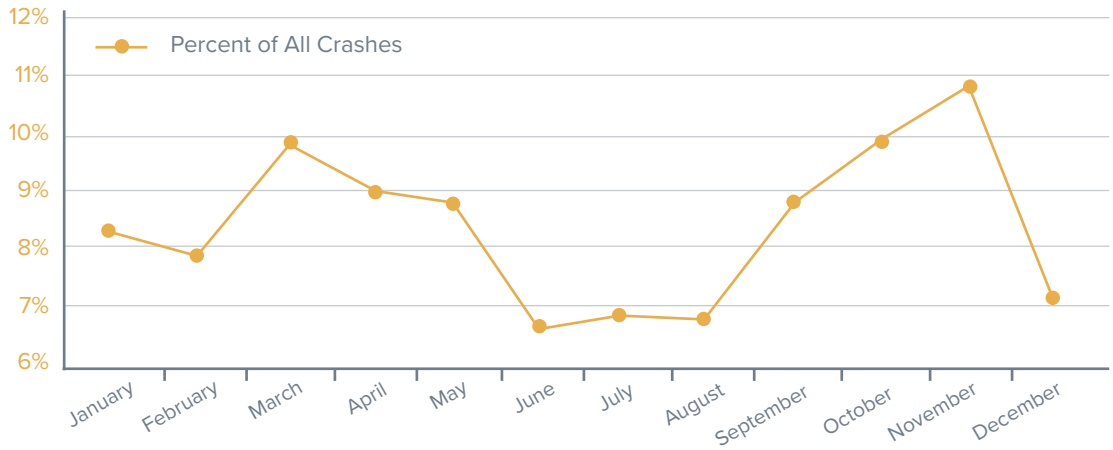


Figure 9. Total Pedestrian Crashes by Month, Austin, Texas
Source: CRIS 2010-2015

Figure 10. Pedestrian Crash Severity by Month, Austin, Texas
Source: CRIS 2010-2015

What behaviors are contributing to pedestrian crashes?

Officers investigating crashes can record one or more contributing factors in the crash report. For crashes occurring between 2010 and 2015, officers recorded at least one contributing factor in 38% of pedestrian crashes, and recorded more than one factor in 8% of crashes. This means that over 60% of crashes had no contributing factor recorded at all. The contributing factors that *were* recorded, however, provide insight into some of the behaviors—both on the part of the pedestrian and the motorist—that are contributing to pedestrian crashes in Austin. This section discusses the most common contributing factors, in order of prevalence, as reported by investigating officers.

Failure to Yield

Failure to Yield was the contributing factor most frequently cited by the responding officer in vehicle-pedestrian crashes, making up 53% of recorded factors for motorists and pedestrians combined. Within this category, Failure to Yield was assigned to the pedestrian 51% of the time and to the motorist 49% of the time. A more detailed analysis of Failure to Yield for individual Crash Types can be found starting on page 34.

The failure to yield issue perfectly represents the type of behavior that the City's Vision Zero Program seeks to address through holistic strategies. It is important to understand which Failure to Yield behaviors can be changed through better enforcement, engineering or education, or a combination of each. If pedestrians have to wait too long for a WALK signal to come up, for example, they will be tempted to cross against the light. On the other hand, it is possible that people driving are unaware that it is state law to yield to pedestrians, and that better education may help. Similarly, if bad behaviors persist, better enforcement of target behaviors may be necessary.

Distraction/Inattention

Distraction or Inattention, including Cell Phone/Mobile Phone Use, Distraction in Vehicle, Driver Inattention and Fatigued or Asleep, was the second most cited contributing factor overall, making up 19% of responses among motorists and pedestrians combined (n=306). When it was recorded, Distraction/Inattention was assigned to the motorist 91% of the time and the pedestrian 9% of the time. Within this category, Cell Phone/Mobile Use made up only 2% of recorded factors (93% were assigned the broader, "Driver Inattention" category). It is important to note that there is likely to

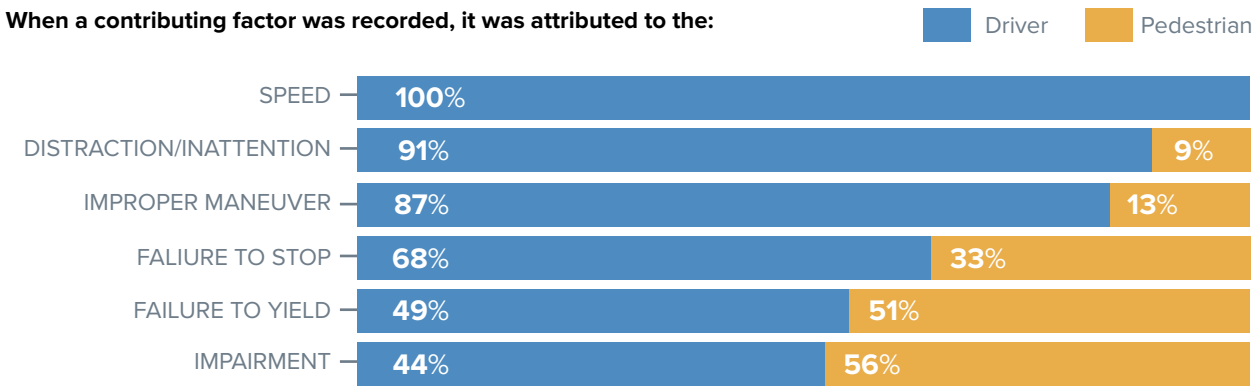


Figure 11. Contributing Factors to Pedestrian Crashes by Mode, Austin, Texas
Source: CRIS 2010-2015

be significant underreporting of distracted driving, and especially distracted driving attributable specifically to cell phone use, as it is difficult to verify whether the driver was indeed using a device at the time of the crash. Despite the low number of recorded cell phone/mobile use crashes, the dangers presented by phone use while driving are well documented, and there is general consensus that phone use increases the frequency of driving mistakes and risk of crashes or near-misses. In fact, studies have shown that using a cell phone while driving is just as dangerous, and in some ways more dangerous, than driving under the influence of alcohol. The effect of pedestrian distraction on crash risk is less understood. While national data shows that more than 1,500 pedestrians in 2012 received emergency room treatment for injuries suffered while walking and talking on cell phones (which was more than twice as many injuries as were reported in 2005),[25] there has been little evidence that pedestrian distraction has caused a rise in traffic fatalities.

Impairment

Impairment due to alcohol or other drug use was the third most cited contributing factor overall, making up 7% of responses for motorists and pedestrians combined (n=115). Impairment made up 5% of cited contributing factors for motorists, and 10% of cited contributing factors for pedestrians.

In a detailed review of fatal pedestrian crashes in 2015, Austin Police Department reported that 66% involved impairment or suspected impairment by either the motorist or the pedestrian.[26] Nationally, an estimated 49% of fatal pedestrian crashes involved either an intoxicated pedestrian or motorist.[27]

In Austin, crashes in which Driver Alcohol Use was affirmatively recorded were 1.5 times more likely to result in pedestrian fatality than those in which Driver Alcohol Use was negatively recorded. Crashes in which Pedestrian Alcohol Use was affirmatively recorded were six times more likely to result in pedestrian fatality than those in which Pedestrian Alcohol Use was negatively recorded. (PBCAT 2010-2015).

Motorist Impairment was most likely to be reported in the early morning hours. For crashes occurring between midnight and 3 a.m. in which a contributing factor was reported, 18% were related to Motorist Impairment, compared with only 5% of reported contributing factors for all other time periods.

Improper Maneuver

Improper Maneuver includes factors such as backing up, turning, or changing lanes unsafely, among others, and made up 5% of recorded responses for motorists and pedestrians combined. It made up 7% of cited contributing factors for motorists, and only 2% of cited contributing factors for pedestrians. When it was recorded, Improper Maneuver was assigned to the motorist 87% of the time and the pedestrian 13% of the time.

Speed

Motorist speeding was cited only 3% of the time when a contributing factor was noted in pedestrian-involved crashes. It is very likely that speed is vastly underreported as a contributing factor in the crash data, especially given what we know about the influence that speed has on severe pedestrian crashes (see Speed Limit analysis on page 18). One explanation is that it is very difficult for the investigating officer to determine if speeding was indeed a contributing factor when responding to a crash after it has occurred. It is important to consider, however, that even if

a person driving is traveling at the legal speed limit, these speeds are often high enough to cause significant injury to vulnerable road users such as pedestrians.

Speeding has been found to be closely associated with alcohol use. A national review of traffic fatalities by the National Highway Traffic Safety Administration found that "drivers who were speeding when involved in a fatal crash were more likely to have been drinking—and drinking more—than those drivers who were not speeding." In fact, the same study found that speeding drivers involved in fatal crashes were more than twice as likely to have been drinking as non-speeding drivers.[28]

See the Chapter 5 Action Plan to learn how the City plans to improve pedestrian safety through better street design and targeted education and enforcement efforts.

Failure to Stop

Failure to Stop (either at a traffic signal or stop sign) was cited 2% of the time when a contributing factor was noted in pedestrian-involved crashes (n=40). Among all contributing factors, it was cited 3% of the time for motorists, and 2% of the time for pedestrians. The PBCAT data shows that in serious injury and fatal pedestrian crashes, a signal was present 34% of the time and a stop sign 7% of the time.

Who is involved in pedestrian crashes?

Different populations are affected by pedestrian crashes in different ways. The Austin crash data provides information on the race/ethnicity, age and gender of people involved in pedestrian crashes. City staff also used census data to supplement the information included in the crash data to better understand how different demographic groups are affected by pedestrian crashes. Staff calculated the number of serious injury and fatal crashes per census tract and normalized the data by each tract's population to allow for comparisons across the 219 tracts in Austin (see Figure 12 on next page). While this index of crash severity does not account for pedestrian or vehicular volumes, or other land use or roadway characteristics that may vary across tracts, it does provide interesting insights into how certain populations in Austin are affected by pedestrian crashes. The findings in this section represent a combination of the crash data and the geographic analysis described above.

Minorities are disproportionately affected by pedestrian crashes

Nationally, non-white individuals account for a disproportionate share of pedestrian fatalities, accounting for 46 percent of pedestrian deaths despite making up only 35 percent of the national population.[29] In Austin, non-whites make up 51% of the population and around 49% of pedestrian fatalities.

Blacks, however, are disproportionately overrepresented in pedestrian crashes in Austin. While blacks make up only 7 to 8% of the Austin population,[30] they account for nearly 17% of pedestrian crashes, 18% of incapacitating injury crashes, and 24% of fatalities. This is consistent with national findings that blacks account for 19% of pedestrians fatalities despite making up only 12% of the overall population.[31] In Austin, blacks involved in pedestrian crashes are killed or seriously injured in 27% of crashes (compared with 23% of the time for all races), and are killed 9% of the time (compared with 6% of the time for all races).[32]

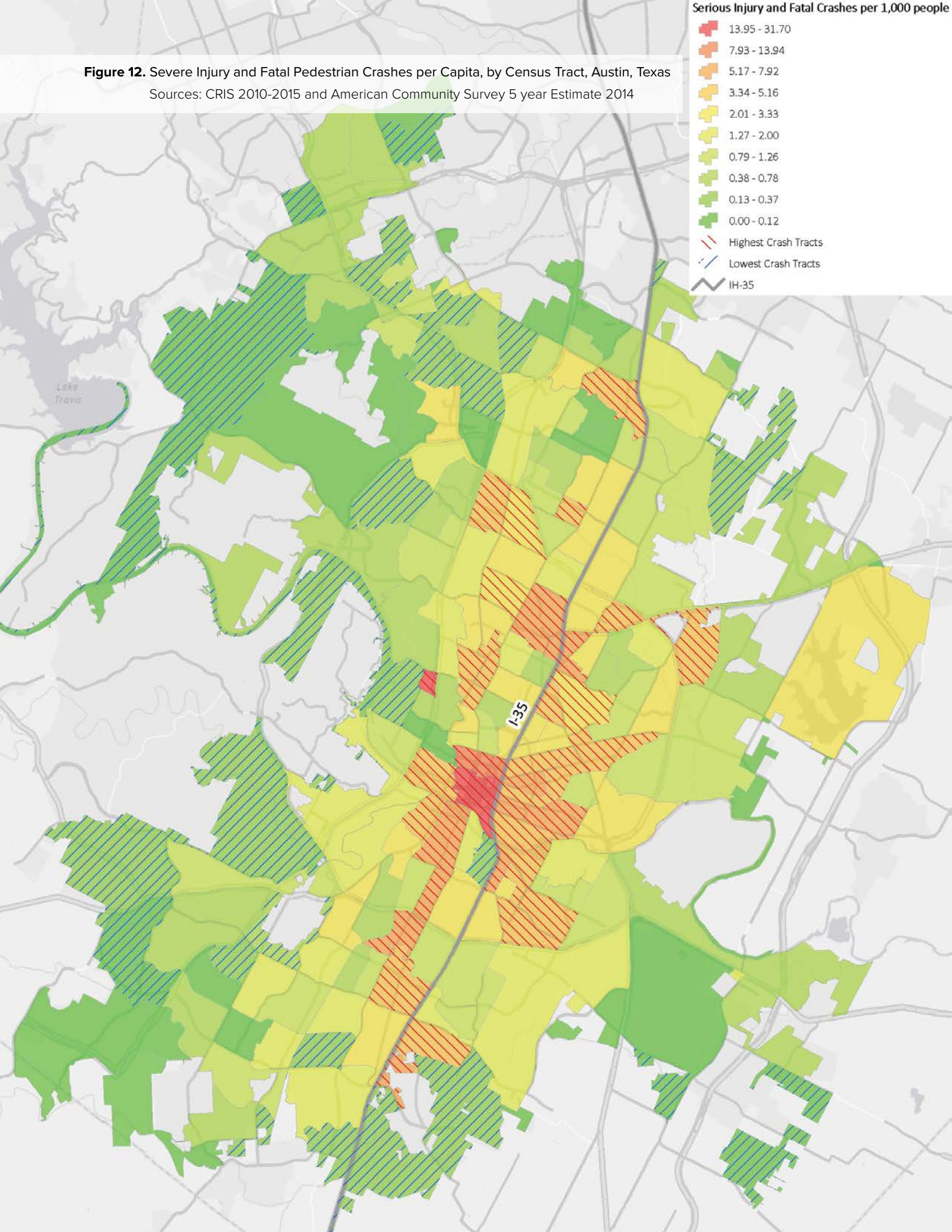


Figure 12. Severe Injury and Fatal Pedestrian Crashes per Capita, by Census Tract, Austin, Texas
Sources: CRIS 2010-2015 and American Community Survey 5 year Estimate 2014

Looking at geographic trends reveals further disparities when it comes to pedestrian safety and race:

- The ten tracts in Austin with the highest percentages of people who are non-white had, on average, 3.8 times as many severe crashes per capita than the ten tracts with the lowest percentages of people who are non-white.
- The 20% of tracts with the highest number of severe crashes per capita are, on average, 11% black, compared with the least dangerous tracts, which are 4% black, on average. Austin as a whole is estimated to be roughly 7-8% black.
- The 20% of tracts with the highest number of severe crashes per capita are, on average, 38% Hispanic/Latino, compared with the least dangerous tracts, which are 25% Hispanic/Latino. Austin as a whole is estimated to be roughly 34% Hispanic/Latino. The ten tracts in Austin with the highest percentages of people who are Hispanic/Latino had, on average, 3.5 times as many severe crashes per capita than the ten tracts with the lowest percentages of people who are Hispanic/Latino.

Non-English speaking communities are disproportionately affected by pedestrian crashes

Areas in Austin with higher percentages of non-English speakers have more severe crashes per capita than those with lower percentages of non-English speakers. Indeed, the ten tracts in Austin with the lowest percentages of people who only speak English experienced nearly twice as many severe crashes per capita than the ten tracts with the highest percentage of people who only speak English. In the top 20% highest crash tracts, an estimated average 28% of the population speaks Spanish, while in the lowest crash tracts, an estimated average 17% of the population speaks Spanish. The average for all census tracts within Austin is 24%.

Lower-income communities are disproportionately affected by pedestrian crashes

Smart Growth America's 2016 Dangerous by Design report found that "the lower a metro area's median household income, the more likely it is that its residents will be killed by cars while walking." This finding is consistent with findings from Austin, which show that Census tracts with lower median household incomes have more severe crashes per capita than those with higher incomes. Indeed, the 20% of tracts with the highest number of severe crashes per capita had an average median household income of $49,000, compared with the least dangerous tracts, which had an average median household income of $90,000. The median household income for the entire city was around $58,000 in 2015.[34]

Those experiencing homelessness are at higher risk for pedestrian fatalities

While the Austin crash data does not contain a field specifically describing whether or not individuals involved in pedestrian crashes are experiencing homelessness, Austin Police Department does have information on this topic. Their 2015 report, "An Analysis of Traffic Fatalities," found that 10 of the 30 pedestrian fatalities in 2015 involved "transients" and seven were considered "emotionally disturbed."[35] Similarly, a 2015 investigative report by the Austin American-Statesman found that pedestrian crashes accounted for 14% of homeless deaths, compared with less than 0.1% of deaths for the entire Travis County region.[36] See Austin's Vision Zero Action plan for more information on how the City's Vision Zero Program promotes Housing First as a strategy for improving traffic safety for those experiencing homelessness.

Older pedestrians are more at risk of severe injury and fatality

The share of pedestrian crashes for a given age group generally tracks closely with that group's share of the total population (see Figure 13). For example, the age group with the highest total number of crashes is ages 25-34 with 19% of pedestrian crashes; this age group makes up 21% of Austin's population. There is, however, a positive correlation between age and crash severity, as is seen in Figure 13. Indeed, all age groups over 45 have a higher share of pedestrian fatalities than their share of the Austin population. The age group 45-54 is especially overrepresented in the number of pedestrian fatalities. While this age group makes up only 12% of the Austin population, it accounts for 30% of pedestrian fatalities. This is consistent with national findings that the average age of pedestrians killed in crashes is 47.[37]

Demographic trends in the U.S. have long pointed to the coming "Silver Tsunami" of aging Baby Boomers. The 2010 Census showed that Austin had the nation's fastest-growing population between 55-64, and the second fastest growing population of people 65 and over.[38] In fact, by 2040, Austin's senior population is projected to make up 18% of the City's population, compared with only 8% in 2010.[39] In general, older adults may have diminished visual or auditory abilities, slower reflexes, and may rely on assistive devices for mobility. It is crucial that strategies aimed at improving pedestrian safety, and especially those related to engineering, have older populations in mind. Speed reduction strategies, for example, can benefit older pedestrians since older adults may take longer to react and to cross the street.

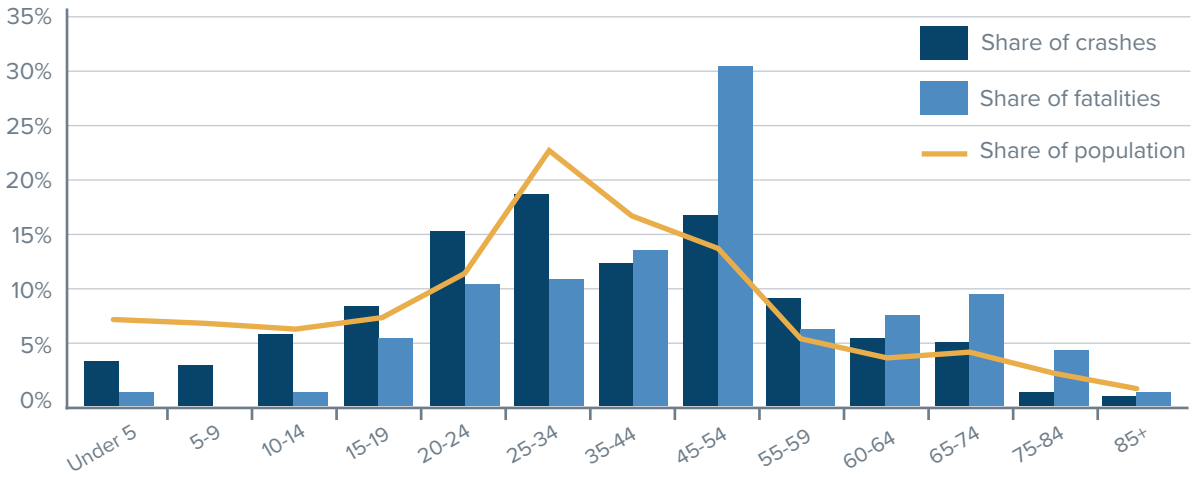


Figure 13. Pedestrian Crash Severity by Pedestrian Age, Austin, Texas
Source: CRIS 2010-2015

Males have a higher risk of severe injury or fatality than females

As Figure 14 shows, the Austin population is approximately evenly split between male and female residents. Males, however, are involved in more pedestrian crashes, incapacitating injury crashes, and fatal crashes than females. Similarly, when crashes do occur, crashes involving male pedestrians are more likely to result in an incapacitating injury and fatality than crashes involving females. Whereas 18% of crashes involving female pedestrians result in incapacitating injury or fatality, 27% of crashes involving males result in incapacitating injury or fatality (CRIS 2010-2015). The findings in Austin are consistent with national findings related to gender, which show that 70% of pedestrian fatalities in 2015 were males.[40]

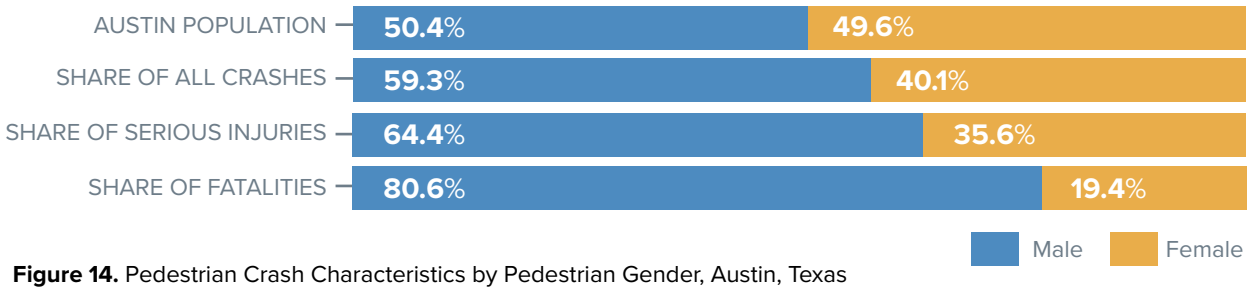


Figure 14. Pedestrian Crash Characteristics by Pedestrian Gender, Austin, Texas
Source: CRIS 2010-2015

Certain mobility characteristics of Austin residents are associated with higher rates of severe crashes

As is shown in Table 3 on the next page, high crash census tracts in Austin were found to be associated with:

- areas with lower rates of car ownership;
- areas with higher transit ridership;
- areas with lower household vehicle-miles traveled; and,
- areas in which more people walk and bike to work.

These mobility characteristics are consistent with the other sociodemographic findings of high-crash areas in Austin discussed previously. Specifically, lower income individuals tend to have lower rates of car ownership, and are therefore more dependent on other means of transportation, including active modes such as walking or biking.[41] The higher crash rates in these areas can therefore partially be explained by the simple fact that people are walking more, whether out of necessity or by choice, increasing their exposure. This is not the only explanation, however. The Dangerous by Design report found risks to be higher for certain demographic groups even after controlling for differences in walking levels.[42] Another likely explanation is the lack of pedestrian infrastructure in historically underserved communities. As an example in Austin, the 2016 Sidewalk Master Plan found that Council District 1, which makes up large swaths of historically-underserved East Austin, has nearly 150 miles of Very High and High Priority missing sidewalks, which is by far the most of the 10 Council districts. This underscores the need to prioritize resources where they are needed most. In order to address this historical disparity, more miles of sidewalk improvement projects have been implemented in historically underserved areas of the City, such as District 1, in the past 10 years than in other areas of the city. The City will continue to evaluate what effect these investments have had in improving pedestrian safety and walkability.

Sociodemographic Analysis Recap

Overall, these findings highlight the fact that certain populations are disproportionately affected by pedestrian crashes, and that targeted outreach to these communities will be necessary to achieve equitable outcomes. See Action Items #5-7 related to Education and Action Items #8-10 related to Enforcement for more information on how the City plans to reach traditionally underserved communities and those communities most affected by pedestrian crashes.

	Austin Average	The 20% of tracts with the *most* number serious crashes per capita	The 20% of tracts with the *least* number of serious crashes per capita
CAR OWNERSHIP#	1.7 cars/household	1.6 cars/household	1.9 cars/household
VEHICLE-MILES TRAVELED PER HOUSEHOLD#	20,865 miles/year	17,938 miles/year	23,231 miles/year
TRANSIT TRIPS PER HOUSEHOLD#	75 trips/year	134 trips/year	33 trips/year
TRANSIT COMMUTE MODE SHARE&	3.9%	6.6%	1.2%
WALK COMMUTE MODE SHARE&	2.7%	5.6%	1.2%
BIKE COMMUTE MODE SHARE&	1.5%	2.8%	0.5%
CAR COMMUTE MODE SHARE&	83.2%	76.4%	86.8%

Table 3. Mobility Characteristics of High and Low Pedestrian Crash Census Tracts, Austin, Texas
Source: CRIS 2010-2015

H+T Index, The Center for Neighborhood Technology
& American Community Survey, 2011-2015 5-Year Estimates.
Disclaimer: The Center for Neighborhood Technology bears no responsibility for the analyses or interpretations of the data presented here.

What are the most common pedestrian Crash Types in Austin?

Within the PBCAT crash type system there are 56 unique pedestrian Crash Types, which are grouped together into 16 broader categories called Crash Groups. The six Crash Groups shown in Table 4 on the next page account for 87% of non-incapacitating injury, incapacitating injury, and fatal crashes (known as KAB crashes in PBCAT) between 2010 and 2015. Focusing our attention on these top Crash Groups allows us to gain a detailed understanding of the specific actions, both on the part of the pedestrian and the motorist, that lead to pedestrian crashes in Austin.

Included in this section is a list of potential countermeasures for each of the top six Crash Groups, as recommended by Federal Highway Administration's Pedestrian Safety Guide and Countermeasures Selection System.[43] These countermeasures should not be thought of as the only strategies available, but they do provide an idea of the types of treatments that may be most appropriate for each type of crash. Chapter 5 - Action Plan, starting on page 74, outlines the steps ATD plans to take to address pedestrian safety based on Austin's crash characteristics.

Crash Group	Description	Total KAB	% of Total KAB Crashes
CROSSING ROADWAY-VEHICLES NOT TURNING	The pedestrian was struck while crossing the roadway (not an expressway) by a vehicle that was traveling straight through.	455	33%
CROSSING ROADWAY-VEHICLES TURNING	The pedestrian was struck while crossing a non-expressway road by a vehicle that was turning or about to turn.	299	22%
DASH/DART-OUT	The pedestrian either ran into the roadway in front of a motorist whose view of the pedestrian was not obstructed or walked or ran into the road and was struck by a motorist whose view of the pedestrian was blocked until an instant before impact.	182	13%
UNUSUAL CIRCUMSTANCES	The crash involved a disabled vehicle, emergency vehicle or vehicle in pursuit, driverless vehicle, or the pedestrian was struck intentionally, was clinging to a vehicle, or was struck as a result of other unusual circumstances.	161	12%
CROSSING EXPRESSWAY	The pedestrian was crossing a limited access expressway or expressway ramp.	50	4%
WALKING ALONG ROADWAY	The pedestrian was standing or walking along the roadway on the edge of a travel lane, or on a shoulder or sidewalk.	47	3%
K = Fatal **A** = Incapacitating Injury **B** = Non-Incapacitating Injury			87%

Table 4. Top Six Pedestrian Crash Groups, Austin, Texas
Source: PBCAT 2010-2015


DO NOT
ENTER
BAD ANTICS

Crossing the Roadway - Vehicle Not Turning

Description: The pedestrian was struck while crossing the roadway (excluding expressways) by a vehicle that was traveling straight through.

Key Findings:

- This Crash Group accounted for one-third of all KAB crashes and 17% of all fatalities in Austin.
- Crashes in which the Pedestrian Failed to Yield (Pedestrian FTY) were more severe than Motorist FTY crashes. Pedestrian FTY crashes resulted in incapacitating injury or fatality 29% of the time, compared with 16% of the time for Motorist FTY crashes. Overall, 31% of KAB crashes were incapacitating injuries or fatalities.
- Pedestrian Alcohol Use was recorded in 13% of Pedestrian FTY crashes, compared with 4% of motorists in Motorist FTY crashes. A large percentage of crashes were marked as Unknown, however.

Motorist Failed to Yield

- In nearly 90% of Motorist FTY crashes the pedestrian was in the crosswalk area when the crash occurred; the crosswalk was marked in 87% of these crashes. 98% of crashes occurring in the crosswalk area were at intersection crosswalks and 2% (n=3) occurred at mid-block crosswalks.
- A traffic signal was present in 49% of Motorist FTY crashes. 84% of crashes in this Crash Group occurred less than one-eighth of a mile from a traffic signal.
- Motorists were issued citations in 46% of Motorist FTY crashes, with the most common being Failure to Yield Right of Way to Pedestrian.

Figure 15. Crossing Roadway, Vehicle Not Turning
pedbikeinfo.org/pbcat_us/ped_images.cfm

Potential Countermeasures

- Improve crosswalk marking visibility.
- Improve roadway lighting.
- Reduce curb radii to slow vehicle speeds
- Install curb extensions or chokers.
- Use special paving treatments along street to slow traffic, add chicanes, or use serpentine design.
- Construct raised pedestrian crossing island.
- Install speed humps, speed tables, raised intersections, or raised crosswalks.
- Install traffic signal with pedestrian signals, if warranted.
- Install pedestrian hybrid beacon (PHB)
- Narrow or reduce the number of roadway lanes

Countermeasures and crash images adapted from FHWA's Pedestrian Safety Guide and Countermeasure Selection System http://www.pedbikesafe.org/PEDSAFE/guide_analysis_CrashTypeAnalysis.cfm

Pedestrian Failed to Yield

- Two-thirds of Pedestrian FTY crashes occurred with the pedestrian crossing outside of the crosswalk area. Nearly 70% of these occurred in the Travel Lane away from the intersection, while the other 30% occurred either inside the intersection or within 50 feet of the intersection (i.e. Intersection Related).
- In the 27% of Pedestrian FTY crashes in which the pedestrian was crossing in the crosswalk area, the crosswalk was marked 83% of the time and a traffic signal was present 28% of the time.
- Crashes occurring outside of the crosswalk area were more severe, resulting in an incapacitating injury or fatality 34% of the time, compared with those that occurred in the crosswalk area, which resulted in an incapacitating injury or fatality only 16% of the time.
- Pedestrians were issued citations in 19% of Pedestrian FTY crashes, the most common being Pedestrian Crossing Roadway/City Ordinance.
- A traffic signal was present in 28% of Pedestrian FTY crashes; 82% of crashes occurred less than one-eighth of a mile from a traffic signal.

Crossing the Roadway - Vehicle Turning

Description: The pedestrian was struck while crossing a non-expressway road by a vehicle that was turning or about to turn.

Key Findings:

- Crashes in this Crash Group were less severe than crashes in other Crash Groups, resulting in incapacitating injury 14% of the time and fatality only 2% of the time, compared with 23% and 9%, respectively, for all KAB crashes.
- 57% of the time there was a traffic signal present, 11% of the time there were signs or flashing signals, and 10% of the time there was a stop sign.
- Drivers were found to be at fault 80% of the time (pedestrians 9% of the time).
- Lamar Boulevard had the highest number of crashes in this crash group with 17 crashes, 11 of which were Left Turn – Parallel Paths.

Left Turn Crashes

- The Left Turn – Parallel Paths Crash Type accounts for 71% of crashes within this Crash Group. This crash type alone makes up 16% of all KAB pedestrian crashes in Austin, making it the second most common single crash type for all KAB crashes.
  - In Left Turn – Parallel Paths crashes,
  - o 95% occurred at or near an intersection and 5% occurred mid-block within the travel lane.
  - o 90% of the time the pedestrian was in the crosswalk area; these were marked 94% of the time.
  - o 57% of the time there was a traffic signal present.
  - o 16% of crashes resulted in incapacitating injury or fatality, compared with 31% for all KAB crashes.

Right Turn Crashes

- 27% of crashes in the Vehicle Turning Crash Group occurred with the motorist turning right.
- In 43% of right turn crashes the pedestrian and motorist were traveling on parallel paths and 23% were on perpendicular paths.
  - o However, nearly four times as many Right Turn on Red crashes occurred on perpendicular paths than as on parallel paths.
- 92% of all Right Turn crashes occurred with a marked crosswalk present.

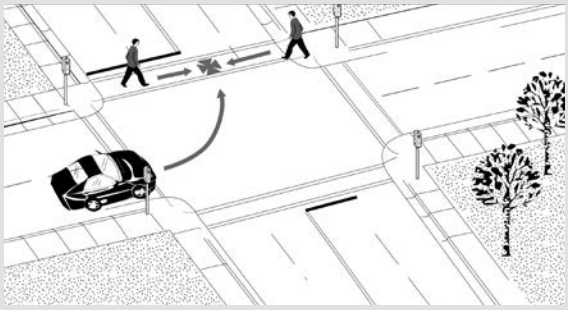


Figure 16. Crossing Roadway - Left Turn - Parallel Paths
pedbikeinfo.org/pbcat_us/ped_images.cfm

Potential Countermeasures

- Add curb ramps or curb extensions.
- Install raised median and pedestrian crossing island.
- Consider using modified T-intersections, intersection median barriers, diverters, or street closures.
- Use traffic-calming devices, such as a raised intersection or raised pedestrian crossing, to reduce vehicle speeds.
- Provide separate left-turn and WALK/DON'T WALK signals.
- Add special pedestrian signal phasing (e.g., exclusive protected pedestrian signal or leading pedestrian interval).
- Prohibit left turns.
- Install warning signs for pedestrians and/or motorists (see MUTCD).
- Install automated pedestrian detection system.
- Modify skewed intersections.
- Implement protected left turn phasing.
- Install push button and adjust signal timing.
- Reduce right-turn radii.
- Prohibit right turn on red (RTOR).
- Implement driver/pedestrian education program.

Countermeasures and crash images adapted from FHWA's Pedestrian Safety Guide and Countermeasure Selection System http://www.pedbikesafe.org/PEDSAFE/guide_analysis_CrashTypeAnalysis.cfm

Dash / Dart-Out

Description: The pedestrian either ran into the roadway in front of a motorist whose view of the pedestrian was not obstructed (Dash) or walked or ran into the road and was struck by a motorist whose view of the pedestrian was blocked until an instant before impact (Dart-Out).

Key Findings:

- Dash/Dart-Out crashes were more severe than crashes in other Crash Groups, resulting in incapacitating injury 36% of the time and fatality 10% of the time (compared with 23% and 9%, respectively, for all KAB crashes).
- The Dash Crash Type was responsible for the third most number of fatalities of any Crash Type (n=14).
- Pedestrians were found to be at fault in 86% of Dash crashes and 88% of Dart-Out crashes; Motorists were at fault 9% and 6% of the time, respectively.
- Pedestrian Alcohol Use was reported in 11% of Dash crashes and 6% of Dart-Out crashes, compared with Driver Alcohol Use, which was reported in 2% of Dash crashes and in zero Dart-Out crashes.
- There was a traffic signal within 50 feet of the crash in 18% of crashes in this Crash Group; 78% occurred within one-eighth of a mile of a traffic signal.
- 66% of Dash crashes occurred in the travel lane and 32% occurred in the crosswalk area.
    - o For crashes that occurred in the crosswalk area, 90% of the time they were marked.
- 82% of Dart-Out crashes occurred in the travel lane and 15% occurred within the crosswalk area.
    - o Of the crashes that occurred in the crosswalk area, 60% of the time they were marked.

Figure 17. Dart-Out
pedbikeinfo.org/pbcat_us/ped_images.cfm

Potential Countermeasures

- Provide adequate nighttime lighting.
- Narrow travel lanes.
- Provide curb extensions.
- Install spot street narrowing at high mid-block crossing locations.
- Implement traffic-calming measures such as chicanes, speed humps, or speed tables.
- Design gateway to alert motorists that they are entering neighborhood with high level of pedestrian activity.
- Convert street to driveway link/serpentine, shared street, or a pedestrian street.
- Provide adult crossing guard (in school zone).
- Remove or restrict on-street parking.
- Add on-street parking enhancements.
- Relocate bus stop.
- Install overpass or underpass.
- Install medians or pedestrian crossing islands.
- Provide staggered crosswalk through the median (forcing pedestrian to walk and look to the right for oncoming traffic in the second half of street).
- Alert drivers to pedestrian crossing area.
- Enforce speed limits and pedestrian ordinances.
- Implement driver education program.
- Implement pedestrian education program.

Countermeasures and crash images adapted from FHWA's Pedestrian Safety Guide and Countermeasure Selection System
http://www.pedbikesafe.org/PEDSAFE/guide_analysis_CrashTypeAnalysis.cfm


17
21
Exposition

Unusual Circumstances

Description: The crash involved a disabled vehicle, emergency vehicle or vehicle in pursuit, play vehicle, driverless vehicle, or the pedestrian was struck intentionally, was clinging to a vehicle, or was struck as a result of other unusual circumstances.

Key Findings:

- Crashes in this Crash Group resulted in an incapacitating injury 30% of the time and fatality 13% of the time, compared with 23% and 9%, respectively, for all KAB crashes.
- Pedestrian Alcohol Use was recorded in 4% and Driver Alcohol Use in 16% of crashes in this Crash Group. Pedestrian Alcohol Use was most prevalent in Pedestrian Loss of Control[44] Crash Type (30% of the time), while Driver Alcohol Use was most common in Motor Vehicle Loss of Control (23%), Vehicle – Vehicle/Object (22%), and Assault with a Vehicle (20%).
- The Crash Type, Motor Vehicle Loss of Control, defined as "(a) vehicle lost control due to mechanical failure, surface conditions, driver error or impairment", accounted for 35% of all crashes in this Crash Group.
    - o 40% of these crashes occurred on a sidewalk, shared-use path or driveway crossing, and 16% occurred on a non-roadway or parking lot, compared with only 3% and 1% for all crashes, respectively.
- The Crash Type, Vehicle-Vehicle/Object, defined as "the pedestrian was struck as a result of a prior vehicle-into-vehicle or vehicle into-object crash," accounted for 23% of crashes in this Crash Group.
    - o Driver Alcohol/Drug Use was suspected 22% of the time in Vehicle-Vehicle/Object crashes.
- The motorist was found to be at fault in 69% of crashes in this Crash Group and the pedestrian 20% of the time. This is compared with a 48% to 44% motorist/pedestrian split for all crashes.

Figure 18. Unusual Circumstances - Driverless Vehicle
pedbikeinfo.org/pbcat_us/ped_images.cfm

Figure 19. Unusual Circumstances - Emergency Vehicle-Related
pedbikeinfo.org/pbcat_us/ped_images.cfm

Potential Countermeasures

- Install/upgrade lighting.
- Provide public education.
- Increase police enforcement and surveillance.
- Provide taxi rides home from bars.
- Install automated enforcement systems.
- Pass/enforce laws and provide education programs against riding in back of pickup trucks.
- Increase police enforcement of teens "vehicle surfing."
- Enhance public transportation system

Countermeasures and crash images adapted from FHWA's Pedestrian Safety Guide and Countermeasure Selection System
http://www.pedbikesafe.org/PEDSAFE/guide_analysis_CrashTypeAnalysis.cfm

Crossing Expressway

Description: The pedestrian was on an expressway or expressway ramp when struck by a Motor vehicle.

Key Findings:

- Crashes in this Crash Group resulted in an incapacitating injury 34% of the time and fatality 56% of the time, compared with 23% and 9%, respectively, for all KAB crashes.
- With 28 fatalities, this Crash Type alone made up 24% of all fatalities in Austin, despite making up only 4% of KAB crashes overall.
- 17% of crashes in this Crash Group were classified as Hit and Runs.
- Pedestrian Alcohol Use was reported in 16% of crashes and Driver Alcohol Use in zero crashes – although over half of crashes were marked as Unknown.
- Road Type:
    - o 92% occurred on roads 55 mph or over
    - o 98% occurred away from an intersection
    - o 88% of the time there was no sidewalk present
- The pedestrian was found to be at fault in all 50 crashes in this Crash Group; by definition, a pedestrian crossing a prohibited roadway implies fault.
- Demographics:
    - o Males make up 78% of all Crossing Expressway crashes and females 22%
    - o Males over 46 make up 33% of all Crossing Expressway crashes.
    - o Blacks make up 24% of all Crossing Expressway crashes
    - o Black males alone accounted for 22% of all Crossing Expressway crashes.
- 78% of Crossing Expressway crashes occurred between 8 p.m. and 4 a.m.; 50% occurred between 8 p.m. and midnight and 28% occurred between midnight and 4 a.m.
- 90% of crashes occurred in either dark conditions or at dusk. Only four crashes occurred in daylight.

Figure 20. Crossing Expressway
pedbikeinfo.org/pbcat_us/ped_images.cfm

Potential Countermeasures

- Install/upgrade roadway lighting.
- Educate drivers on what to do if a vehicle is disabled.
- Increase police surveillance.
- Provide motorist assistance program.
- Improve access to transit.
- Provide pedestrian accommodations at complex intersections.

Countermeasures and crash images adapted from FHWA's Pedestrian Safety Guide and Countermeasure Selection System http://www.pedbikesafe.org/PEDSAFE/guide_analysis_CrashTypeAnalysis.cfm

I-35 Road Safety Audit

Between 2010 and 2015, nearly a quarter (24%) of pedestrian fatalities in Austin occurred when the pedestrian was crossing a limited access highway (PBCAT 2010-2015). Given the prevalence and severe nature of highway pedestrian crashes, Austin Transportation Department (ATD) staff, as part of a Pedestrian Safety Action Plan (PSAP), dedicated particular attention to understanding why these crash types are occurring in Austin. To help identify strategies that might reduce the occurrence of these crashes, the Federal Highway Administration (FHWA) Resource Center offered to lead a pedestrian-focused Road Safety Audit (RSA) of a high-crash location on an Austin highway. After consulting with the Texas Department of Transportation Austin District, I-35 between 51st Street and St. Johns Avenue in North Austin was chosen as the RSA study area. There have been 10 pedestrian fatalities along this stretch of highway between 2007-2016.

In March 2017, over the course of three days, the RSA Team conducted a thorough review of crash reports, reviewed schematics for improvements to the study area being considered as part of TxDOT's Mobility35 Program, and conducted field visits during midday and nighttime conditions. From this, the RSA Team gained an in-depth understanding of the conditions that may be contributing to pedestrian crashes in the study area. The RSA Team also hosted a stakeholder listening session with representatives from area neighborhoods, businesses, advocacy organizations and schools to hear concerns and insights from community members familiar with the study area.

Through these efforts, the RSA Team identified a number of factors that are likely contributing to pedestrian crashes along the RSA study area:

- A large number of destinations (businesses, motels, fast-food restaurants, etc.) with direct access to the frontage roads leads to relatively high pedestrian activity both along and across I-35.

- Long distances between overpasses/bridges add a substantial amount of walk time to destinations on the other side of highway. Many pedestrians may be unwilling to go out of their way to reach safe crossing opportunities, and therefore make a calculated risk to cross the main lanes as their shortest path. The pedestrian perspective from frontage road sidewalks show destinations on the other side of the highway to be relatively close due to flat grading and lack of visual or physical barriers. This could give pedestrians a false sense that it is safe to cross the highway.

- While there are sidewalks along most of the study area frontage roads, walking comfort level is low due to high vehicular speeds, lack of buffers between the curb and sidewalk, and lack of pedestrian-scaled lighting. Similarly, the high frequency of driveways with direct access to frontage roads creates many conflict opportunities with pedestrians, and the wide, sweeping turns facilitate high vehicular speeds which may decrease drivers' ability to see and yield to pedestrians

- Safety concerns in the area near St. Johns Avenue include a lack of pedestrian-scaled lighting, signal timing that doesn't prioritize pedestrians, sidewalk obstructions, and inconsistent signage and markings. Safety concerns near this area mainly fall under the City's jurisdiction (as opposed to the frontage road safety concerns which are under TxDOT's jurisdiction).

- Finally, people walking in the study area may have socioeconomic characteristics that make them more susceptible to pedestrian crashes. Specifically, conversations with stakeholders indicated that there is a large temporary population in this area due to proximity to motels, a Greyhound station and other destinations along the frontage roads. It is possible that people unfamiliar with the area, or who may have mental disabilities or be impaired, may be less aware of the severe risks posed by crossing the highway in this area.

I-35 Road Safety Audit

Recommendations

The RSA Team developed a number of short- and long-term recommendations to improve the pedestrian environment and discourage unsafe crossings. A key recommendation for the entire study area was to emphasize comfort and safety when developing future pedestrian improvements, including wider sidewalks/shared-use paths, pedestrian-scaled lighting, and better driveway design to reduce conflict opportunities.

The RSA Team recommended developing maps to distribute to area businesses with good wayfinding information to inform pedestrians of safe crossing opportunities to reach nearby destinations. Similarly, warning and regulatory signs could be used to discourage unsafe/illegal crossings.

The RSA Team also discussed how the installation of visual or physical barriers might influence people's decision to cross the highway. While the RSA Team agreed that barriers may be a viable option to prevent crossings, there may be unintended consequences. The barrier could trap stranded motorists on the mainlanes, create an additional hazard that could be struck and pushed into opposing traffic, and reduce driver visibility of businesses. Given the complexity of this issue, the RSA Team recommended the study of barrier options for this segment of I-35 to analyze the needs, context, and appropriate barrier treatments. The RSA Team also discussed the pros and cons of constructing a dedicated pedestrian overpass in the study area, but concluded that there are other solutions that should be explored first.

Moving Forward

Following the RSA, staff from ATD and TxDOT convened to discuss short-term measures that both agencies could take to address pedestrian safety concerns in the study area. ATD is reconfiguring traffic signal timing at St. Johns Avenue to better prioritize pedestrians and evaluating potential signage and marking improvements that could improve safety for all road users in the area. TxDOT is researching the feasibility of conventional and alternative median barrier solutions, additional signage near higher volume driveways along the frontage roads, and long-lasting sidewalk stenciling/art directing pedestrians to a safe crossing. TxDOT is also coordinating with AISD and the Safe Routes to School Program to ensure safe school crossings for Webb Primary and Middle Schools and performing public outreach with area businesses as part of the Mobility35 Outreach Program.

In terms of long-term improvements, TxDOT has begun construction on a multi-year program of projects known as Mobility35 to improve the I-35 corridor throughout the Austin area, including in the RSA study area. Construction is underway at I-35 and 51st Street, where a modern roundabout will include wider sidewalks, pedestrian-scaled lighting, and other amenities to enhance pedestrian safety and comfort. Construction is anticipated to begin in early 2018 on a project between Rundberg and US 290, which also includes safety enhancements for non-motorized users.

The RSA proved to be a valuable exercise in bringing together multiple agencies and stakeholders to tackle the complex problem of pedestrian safety on highways. ATD will seek future opportunities to conduct RSA's at other high-crash locations. Action Item #19 (page 91) discusses how ATD will continue to work with partner agencies, including TxDOT, to identify opportunities to improve pedestrian safety and comfort on high-speed roadways in Austin.

Walking Along Roadway

Description: The pedestrian was standing or walking along the roadway on the edge of a travel lane, or on a shoulder or sidewalk.

Key Findings:

- Crashes in this Crash Group resulted in an incapacitating injury 17% of the time and fatality 21% of the time, compared with 23% and 9%, respectively, for all KAB crashes.
- The Crash Type, (Pedestrian Walking) With Traffic – (Struck) From Behind, accounted for 87% of crashes in this Crash Group.
- 68% of crashes in this Crash Group occurred on Local Roads, 15% occurred on Interstate Highways, and 9% occurred on US Highways.
    - Of the Interstate Crashes, 71% occurred on the frontage road and two occurred on the main lanes.
- Sidewalks were missing on both sides of the street in 47% of crashes in this Crash Group.
- 70% of crashes in this Crash Group occurred in the travel lane and 21% occurred on a paved shoulder, bike lane or parking lane.
- Motorists were found to be at fault 60% of the time and the pedestrian 32% of the time.
- 40% of these crashes were classified as Hit and Runs.
- Pedestrian Alcohol Use was recorded in 11% of crashes while Driver Alcohol Use was not recorded in any crashes.
- 68% of crashes in this Crash Group occurred in Dark Conditions and 9% occurred in the daylight.
    - Of those that occurred in the Dark, 59% occurred in areas with street lighting.

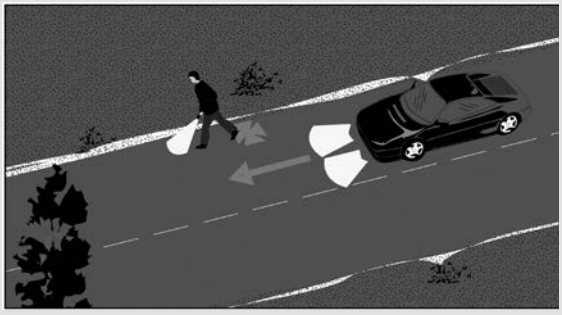


Figure 21. Walking Along Roadway with Traffic from Behind
pedbikeinfo.org/pbcat_us/ped_images.cfm

Potential Countermeasures

- Provide a sidewalk on both sides of road.
- Provide an asphalt path or paved shoulder.
- Construct and maintain sidewalks and curb ramps to be usable by people with disabilities.
- Improve lighting.
- Provide pedestrian accommodations at complex intersections.
- Implement pedestrian detours in work zones.
- Improve pedestrian safety at railroad crossings.
- Implement driver and/or pedestrian education program.
- Increase lateral separation between pedestrians and motor vehicles (e.g., bike lanes or landscape buffers).
- Construct gateway or install signs to identify neighborhood as area with high pedestrian activity.
- Install "Walk on Left Facing Traffic" signs.
- Use speed-monitoring trailers.
- Increase police enforcement of speed limit.
- Relocate poles and street furniture to provide continuous passage in sidewalk area.
- Enforce parking laws to prevent cars from blocking sidewalks and curb ramps.

Countermeasures and crash images adapted from FHWA's Pedestrian Safety Guide and Countermeasure Selection System http://www.pedbikesafe.org/PEDSAFE/guide_analysis_CrashTypeAnalysis.cfm

Chapter 3
Community Priorities

Introduction

The Crash Analysis presented in the previous chapter provides a data-driven underpinning for understanding pedestrian safety issues in Austin. It is equally important, however, that community input be incorporated to enable a more comprehensive understanding of how Austinites are affected by issues related to pedestrian safety. With nearly 300 square miles in Austin's city limits and a regional population that grows by around 160 people per day, the City of Austin depends on an active and engaged community to supplement our technical analysis in order to identify specific areas of the city where pedestrian safety can be improved. In this spirit, ATD embarked on a robust community engagement process to develop a plan that takes into account the rich on-the-ground knowledge of those who use Austin's streets on a daily basis.

This chapter summarizes some of the main concerns related to walking, along with ideas for improving pedestrian safety, that were expressed by the Austin community throughout the planning process. Main components of the community engagement process included:

- A **Community Advisory Group** made up of diverse stakeholders to help guide the development of the plan.
- **Walk + Bike Talks** – a series of 11 open house-style meetings to facilitate a community conversation about pedestrian safety in Austin.
- The **Vision Zero Input Tool** – an online tool created to gather crowd-sourced information on specific locations where Austin residents have traffic safety concerns.
- **Individual stakeholder meetings and briefings** with community groups to take a deeper dive into specific issues related to pedestrian safety.
- **Focus Area Workshops** with subject matter experts, City staff and community advocates to help develop action items in engineering, education, enforcement, evaluation, and policy/land use.

Community Advisory Group

The City's Vision Zero Task Force, which is composed of community groups, City departments, and other local and regional agencies, along with members of the Pedestrian Advisory Council, served as the Community Advisory Group (CAG) for the PSAP. The CAG's main role was to provide direction for the plan to ensure that it was developed in a way that was consistent with the Vision Zero Action Plan. Early on in the planning process the CAG provided input on which pedestrian safety topics were most important for ATD to include in the crash analysis. Members of the CAG also participated in the five Focus Area Workshops, described later in this chapter, to help develop action items recommended in the plan.

Figure 22. Flyer Promoting "Walk + Bike Talks"

Walk + Bike Talks

In early 2017 ATD hosted a series of 11 open house meetings called “Walk + Bike Talks” to gather community input on the PSAP as well as the build-out of the Austin bicycle network. Meetings took place in each of the 10 City Council Districts to ensure residents in all areas of the City could conveniently attend one of the meetings. A virtual open house with similar content was also provided on the ATD website for those who were unable to attend the in-person meetings.

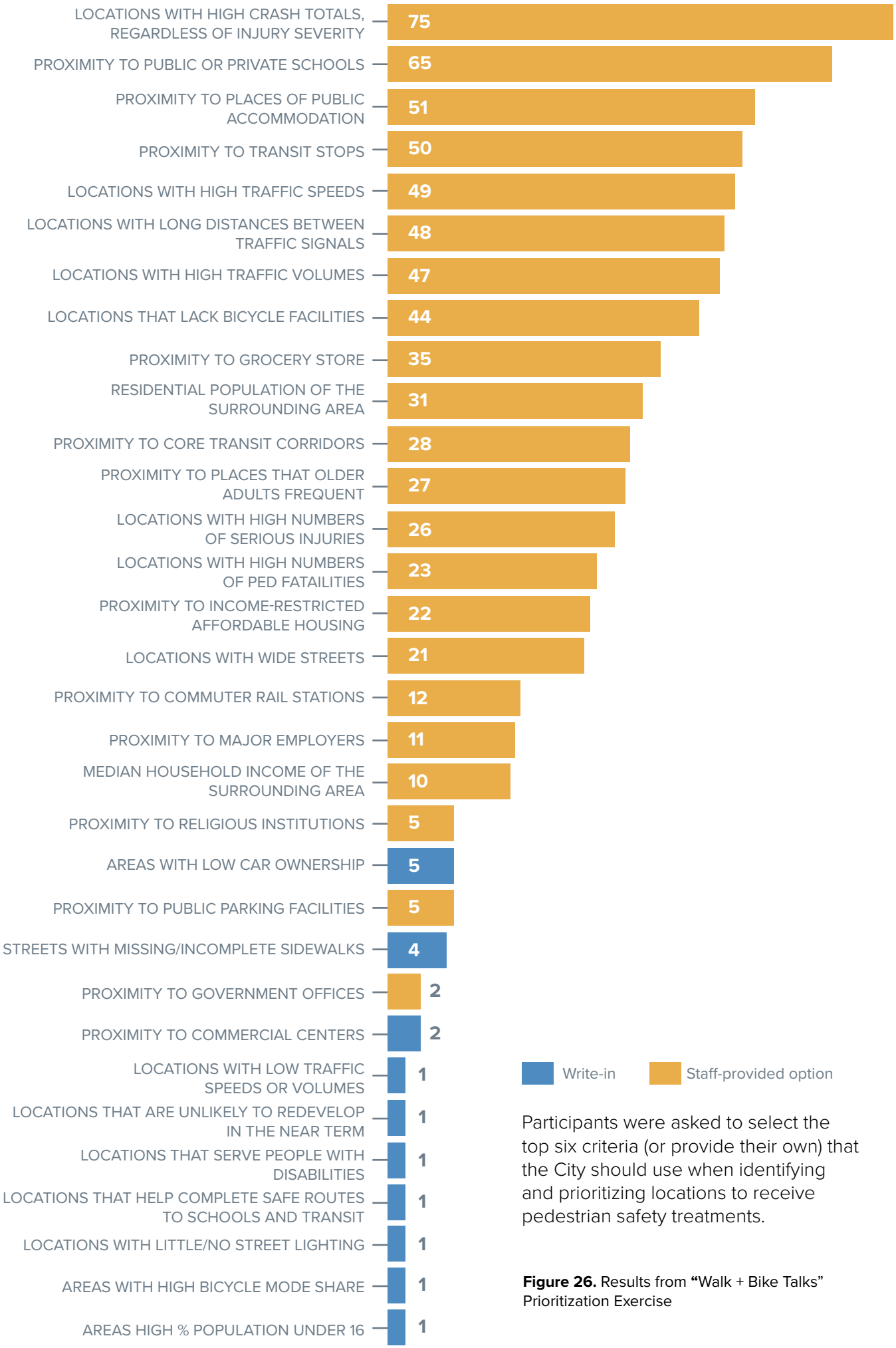
Participants were invited to review preliminary findings from the pedestrian crash analysis and converse directly with City staff about their pedestrian safety concerns. Attendees were then given the opportunity to utilize iPads to log locations of concern in the Vision Zero Input Tool, which is described in more detail later in this chapter.

Finally, participants were asked to help prioritize criteria that the City should use when identifying and prioritizing locations to receive pedestrian safety treatments. Participants were asked to choose their top six criteria related to pedestrian crash history, risk characteristics of city streets, and proxies for pedestrian demand, as identified by staff, and were also given the option to write in other criteria that were not listed. ATD received over 700 responses from participants of this exercise through the in-person meetings and virtual open house. Figure 26 on the next page shows the results of the prioritization exercise, which were then utilized in the development of the Pedestrian Safety Priority Network, which is described in detail in Chapter 4.

Figure 23. Walk + Bike Talks

Figure 24. Walk + Bike Talks

Figure 25. Walk + Bike Talks



Participants were asked to select the top six criteria (or provide their own) that the City should use when identifying and prioritizing locations to receive pedestrian safety treatments.

Figure 26. Results from "Walk + Bike Talks" Prioritization Exercise

Vision Zero Input Tool

In March 2017 ATD's Vision Zero Program launched an online input tool to gather crowd-sourced information on specific locations where Austin residents have traffic safety concerns. Users of the Vision Zero Input Tool were asked to mark locations on an online map of Austin where they experience traffic safety issues when traveling by various modes. Users could choose from a predetermined list of common safety concerns, as determined by staff, or could write in additional concerns if they were not listed. Finally, a comment box was provided so that users could enter additional details regarding the behaviors or facilities that contribute to their safety concerns. Between March and May 2017, over 7,500 locations were logged by the community in the Vision Zero Input Tool, 39% of which were for concerns as pedestrians. Figure 27 below shows the top safety issues logged for pedestrians in the tool, and Figures 28-31 show locations where pedestrian-related comments were logged. Missing sidewalks or sidewalk maintenance was by far the top pedestrian-related safety concern expressed by the community, garnering 43% of all pedestrian safety comments and nearly 17% of comments for all modes.

The crowd-sourced data provided by the Vision Zero Input Tool offers a valuable database for ATD staff to use to compare with crash data and to gather another layer of detail regarding the on-the-ground behaviors that lead to pedestrian safety concerns amongst the Austin community. The information gleaned from these comments was utilized to develop recommendations included in Chapter 5 of this plan, and will be mined by staff going forward as one of many pieces of information used to help identify and prioritize locations where pedestrian safety can be improved.

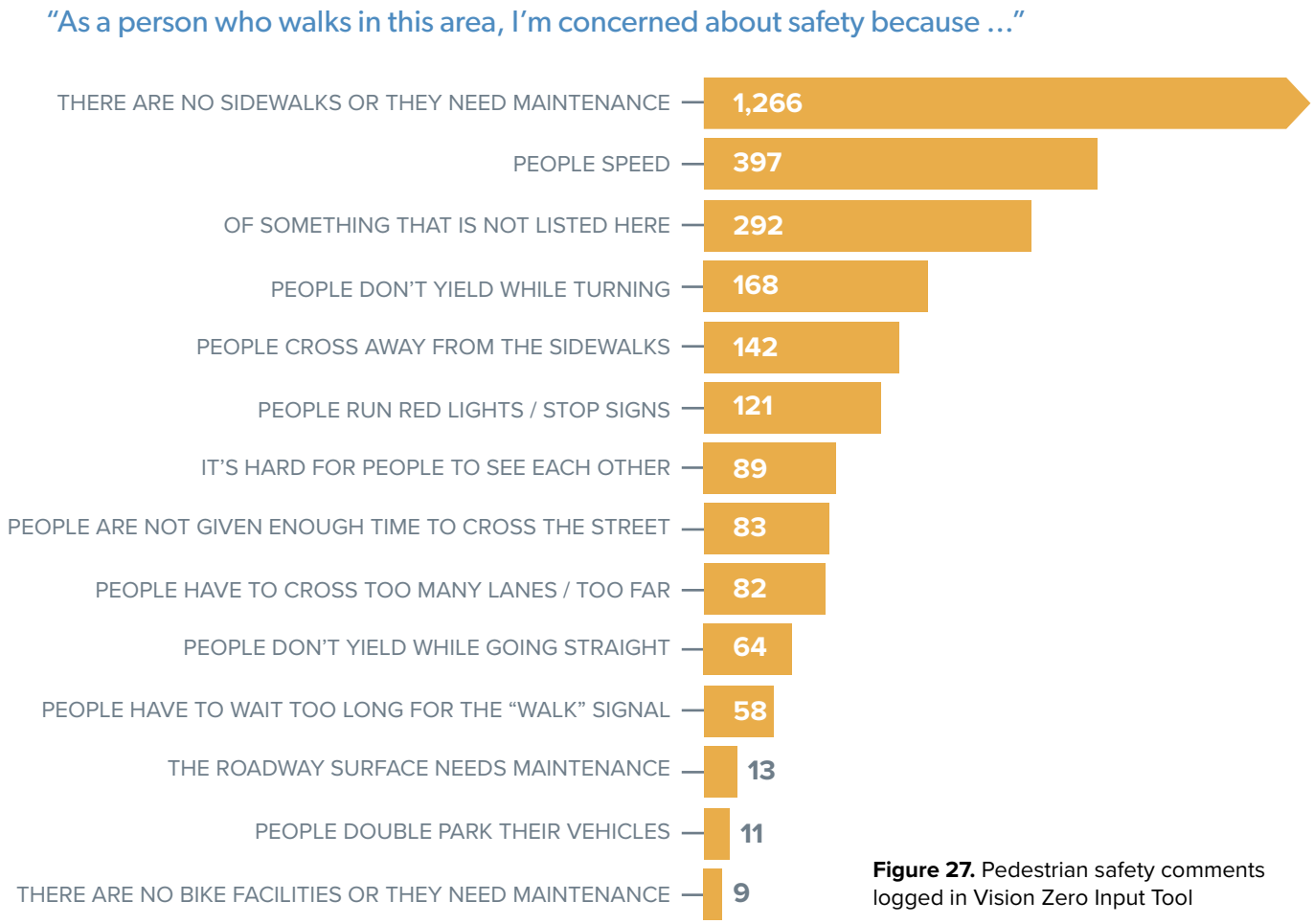
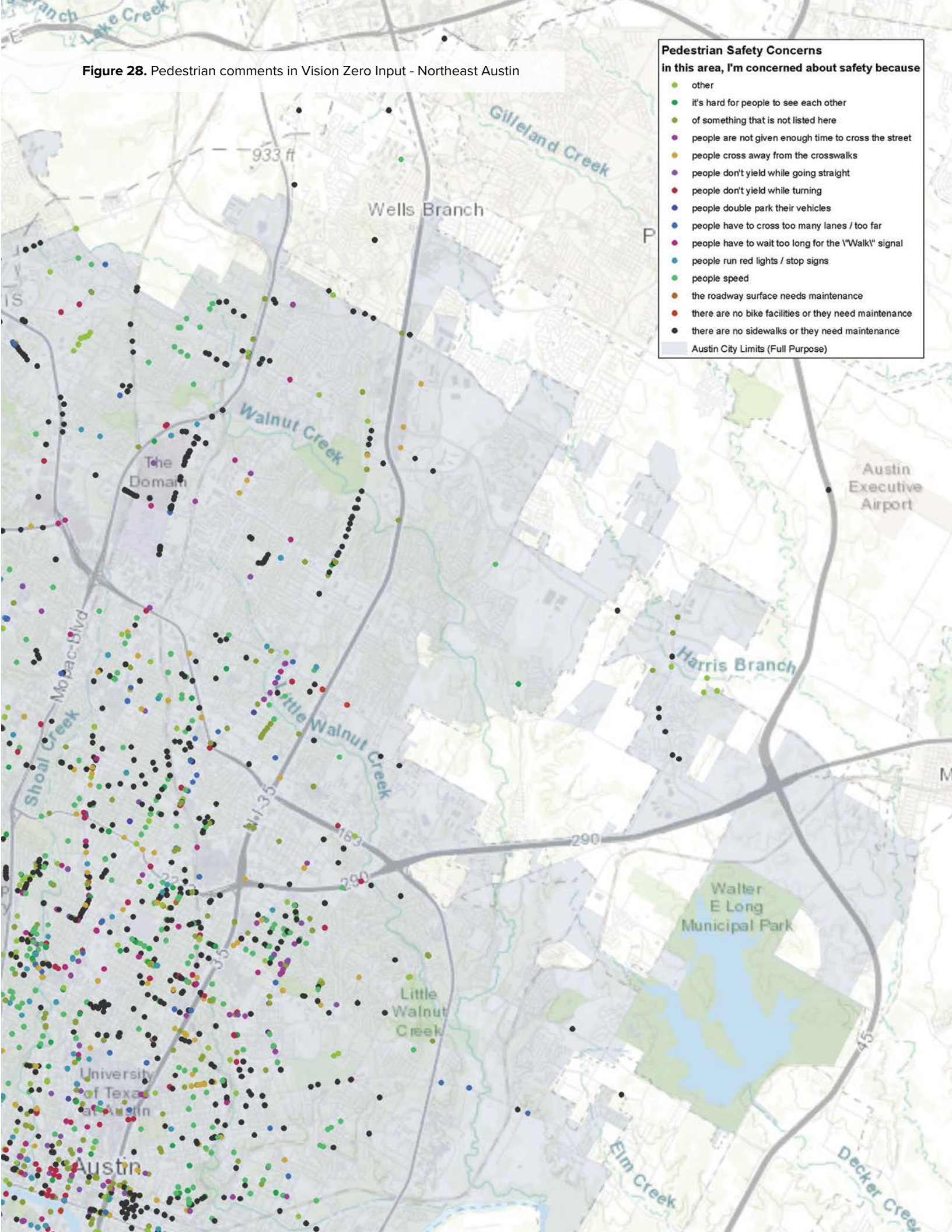


Figure 27. Pedestrian safety comments logged in Vision Zero Input Tool

Figure 28. Pedestrian comments in Vision Zero Input - Northeast Austin



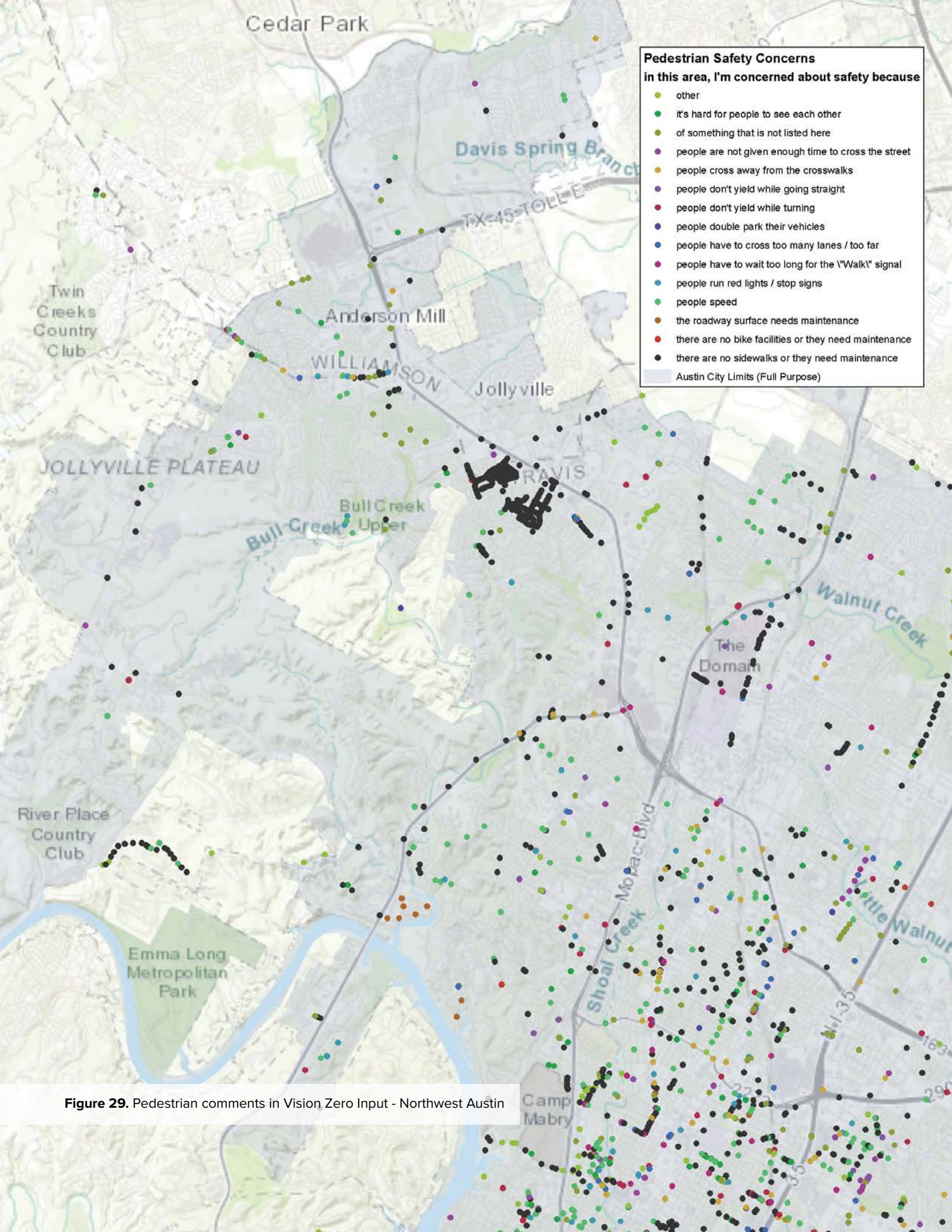


Figure 29. Pedestrian comments in Vision Zero Input - Northwest Austin

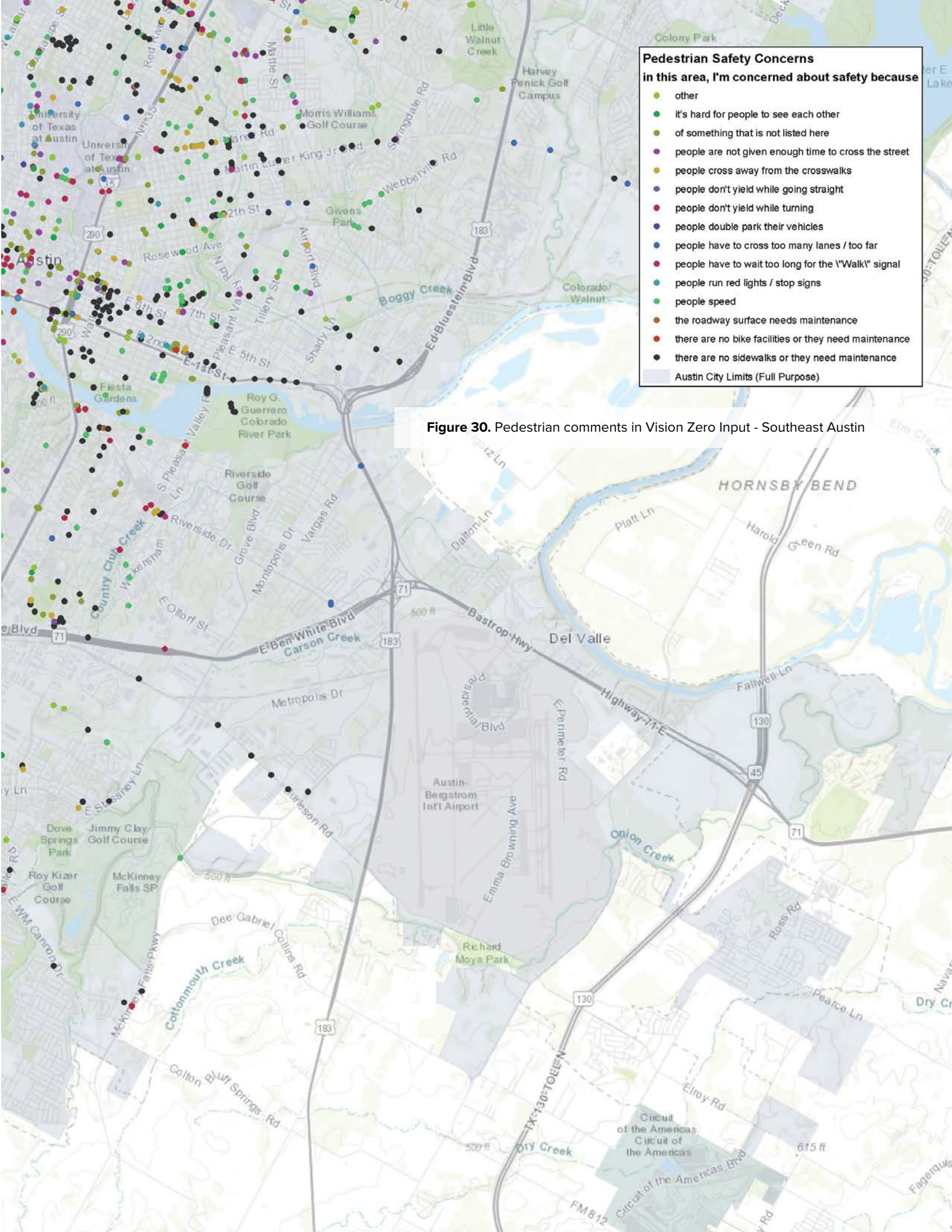


Figure 30. Pedestrian comments in Vision Zero Input - Southeast Austin

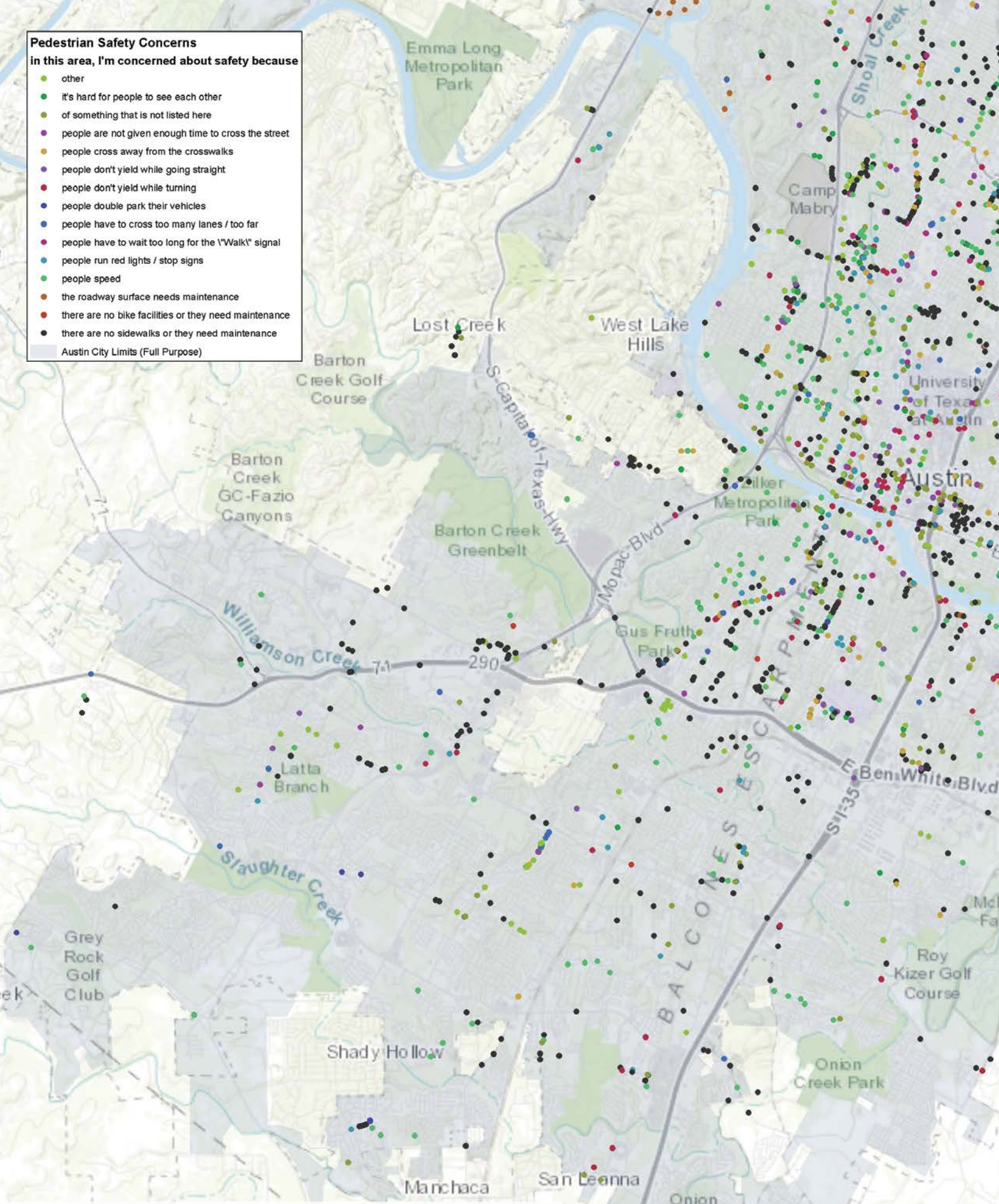


Figure 31. Pedestrian comments in Vision Zero Input - Southwest Austin

Individual stakeholder meetings and briefings

Certain pedestrian safety topics required more in-depth discussions than could be had at the Walk + Bike Talks public open house gatherings, the online virtual open house, or through the Vision Zero Input Tool. Understanding the pedestrian safety concerns of people with disabilities, for example, required a deeper dive into the myriad of nuanced issues experienced by people with barriers to mobility access in Austin. To this end, ATD reached out to certain key stakeholder groups for listening sessions to better understand their pedestrian safety concerns. Staff held meetings with representatives from the Texas School for the Blind and Visually Impaired, the Criss Cole Rehabilitation Center, and ARCIL Austin (A Resource Center for Independent Living) to understand how people with barriers to access move around the city, and how pedestrian facilities and City programs can be improved to accommodate them better. Coordinating pedestrian safety improvements with transportation partners also demanded that staff hold one-on-one meetings with TxDOT, Capital Metropolitan Transportation Authority (Capital Metro), CAMPO, and a multitude of other City departments. ATD staff also gave briefings to the Pedestrian Advisory Council, Urban Transportation Commission and Mayor's Committee for People with Disabilities to provide information on the PSAP planning process and to notify the community on opportunities to provide input.

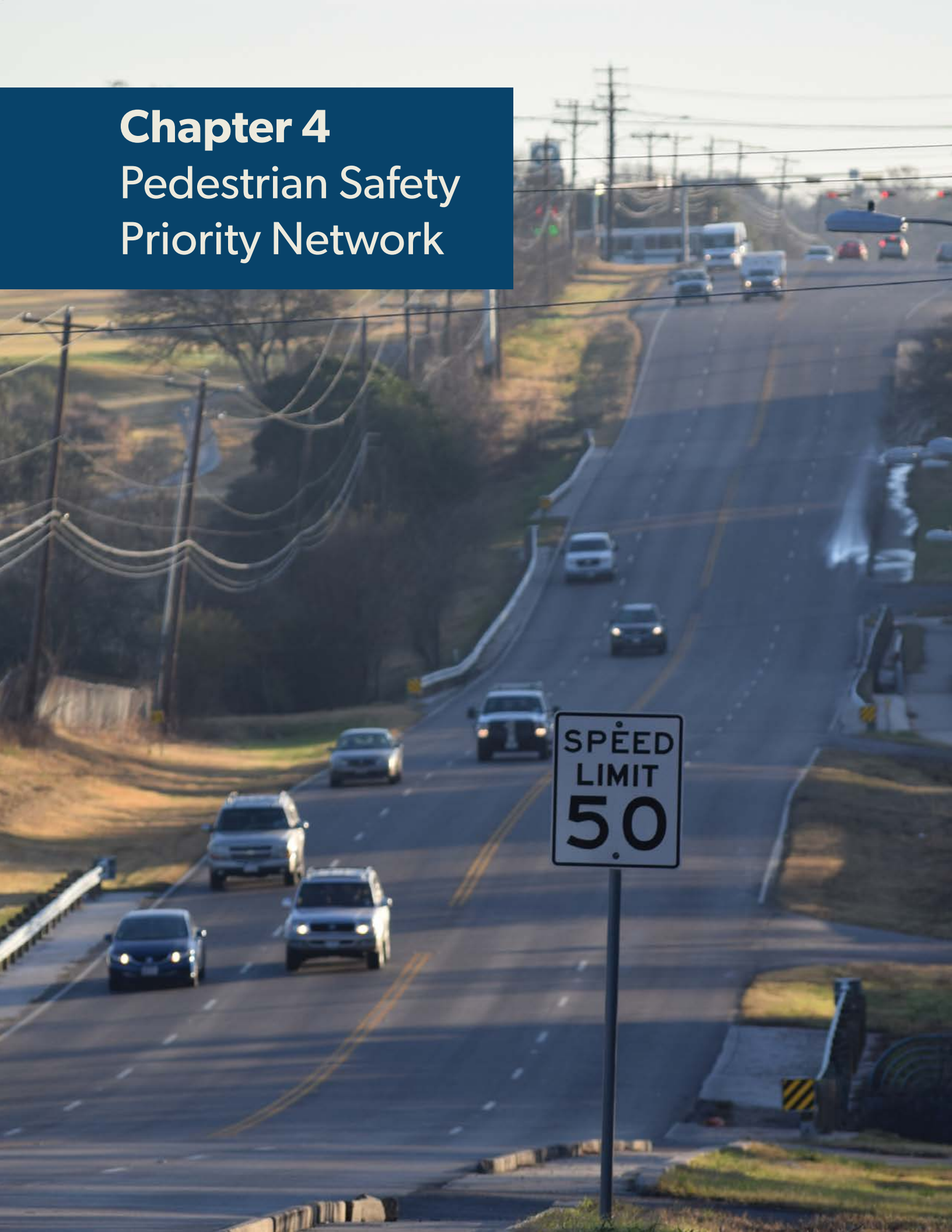
Focus Area Workshops

In Spring 2017 members of the Vision Zero Task Force and Pedestrian Advisory Council, along with select City staff, were invited to participate in a series of focus area workshops in engineering, education, enforcement, policy/land use, and evaluation, to help staff draft policy recommendations to include in the PSAP. These workshops began with an overview by ATD staff of key findings from the crash analysis relevant to each focus area. Following this briefing, participants were presented with three to five conceptual recommendations for each focus area as drafted by staff, and were asked to help fill in missing details based on their area of expertise. Similarly, participants were asked to provide additional action items if they felt staff's initial recommendations did not cover certain topics. The Focus Area workshops proved to be incredibly valuable in strengthening the recommendations included in Chapter 5 of this plan.

Figure 32. Focus Area Workshop on Engineering

Figure 33. ATD staff participates in blindfolded mobility training with staff from Texas School for Blind and Visually Impaired

Chapter 4
Pedestrian Safety Priority Network



Introduction

The Crash Analysis presented in Chapter 2 showed that pedestrian crashes, serious injuries and fatalities tend to be dispersed throughout the entire street network rather than occurring in concentrated hot spots. The systemwide nature of pedestrian safety requires that countermeasures be considered at locations across the city. Given the fact that the City of Austin encompasses nearly 300 square miles of land area, limited resources must be prioritized when looking to implement pedestrian safety treatments. Austin Transportation Department has therefore developed a Pedestrian Safety Priority Network to serve as a tool for identifying and prioritizing locations where treatments can have the biggest impact in improving safety, while also helping to achieve other city objectives related to creating a more walkable city. The three components of the Pedestrian Safety Priority Network are the Crash Scores, Demand Scores and Risk Characteristic Scores.

Crash Scores highlight pedestrian crash hotspots based on historical crash data, with a higher weight given to serious injury and fatal crashes.

Demand Scores map areas where strategic pedestrian safety treatments might serve latent pedestrian demand in areas with a high potential for walking due to their proximity to transit, businesses or other attractors, with a special focus on prioritizing traditionally underserved communities.

Risk Characteristic Scores identify locations on the street network that have physical characteristics that the crash data shows to contribute to severe injury and fatal crashes, including high vehicular speeds, wide street widths, long distances between signalized crossings or street lighting, and lack of sidewalks.

The rest of this chapter describes the methodology and data inputs used to develop the Pedestrian Safety Priority Network. Chapter 5 – Action Items, explains in more detail how the tool will be utilized in the implementation of specific action items related to engineering, education, enforcement, evaluation and policy/land use.

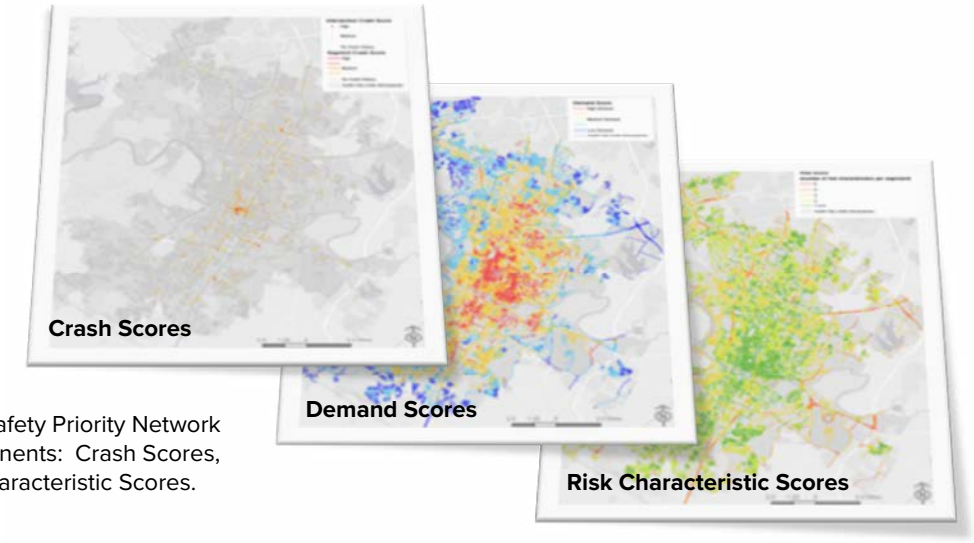


Figure 34. The Pedestrian Safety Priority Network is comprised of three components: Crash Scores, Demand Scores and Risk Characteristic Scores.

Crash Scores

Description

Crash Scores highlight pedestrian crash hotspots on the Austin street network based on historical crash data, with a higher weight applied to serious injury and fatal crashes. This tool helps answer the question, *where are serious pedestrian crashes occurring*?

Methodology

Crash Scores were assigned to both street segments and intersections. Crash Scores for street segments represent the number of pedestrian-involved crashes occurring on each street segment from 2010 to 2015, weighted by severity. Scores for each segment were then divided by their respective street length to allow for comparisons across streets of different lengths. Crash Scores for intersections represent the number of crashes from 2010 to 2015 that occurred within 100 feet of the intersection, weighted by severity.

The crash severity weights shown in Table 5 were used to calculate Crash Scores. For example, using these weights, a fatal crash would receive twice the weighting of a "No Injury" crash in the calculation of the Crash Score for a given intersection or segment. The chosen weights were informed in large part by the prioritization exercise conducted at the Walk + Bike Talks in spring 2017 (see page 48).

Figure 35-38 show Crash Scores for the entire Austin street network. Darker colors represent streets and intersections with higher numbers of severe crashes.

Crash Severity	Weight
No injury or possible injury	1.00
Non-incapacitating injury	1.50
Incapacitating injury	1.75
Fatality	2.00

Table 5. Crash severity weights used in Crash Score Calculation

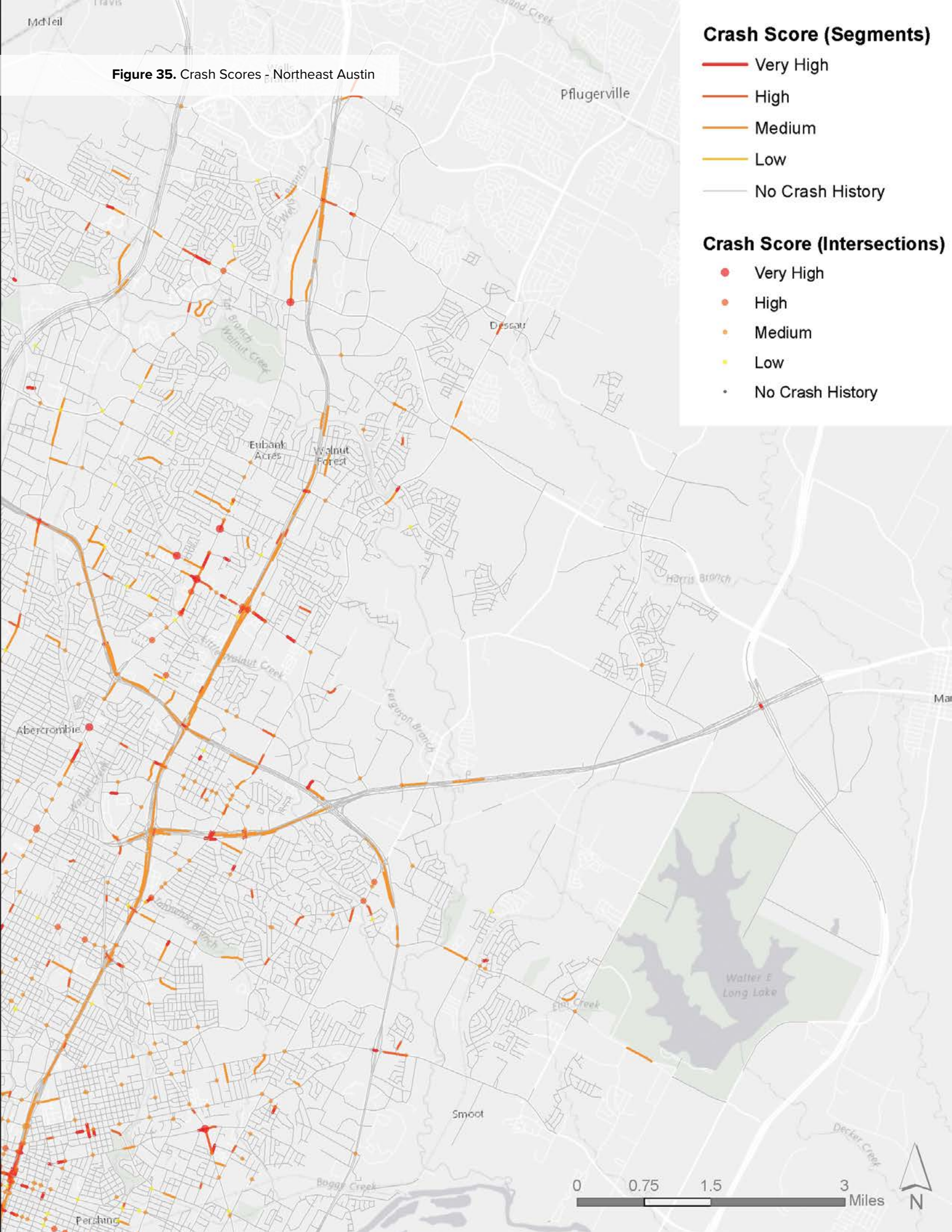


Figure 35. Crash Scores - Northeast Austin

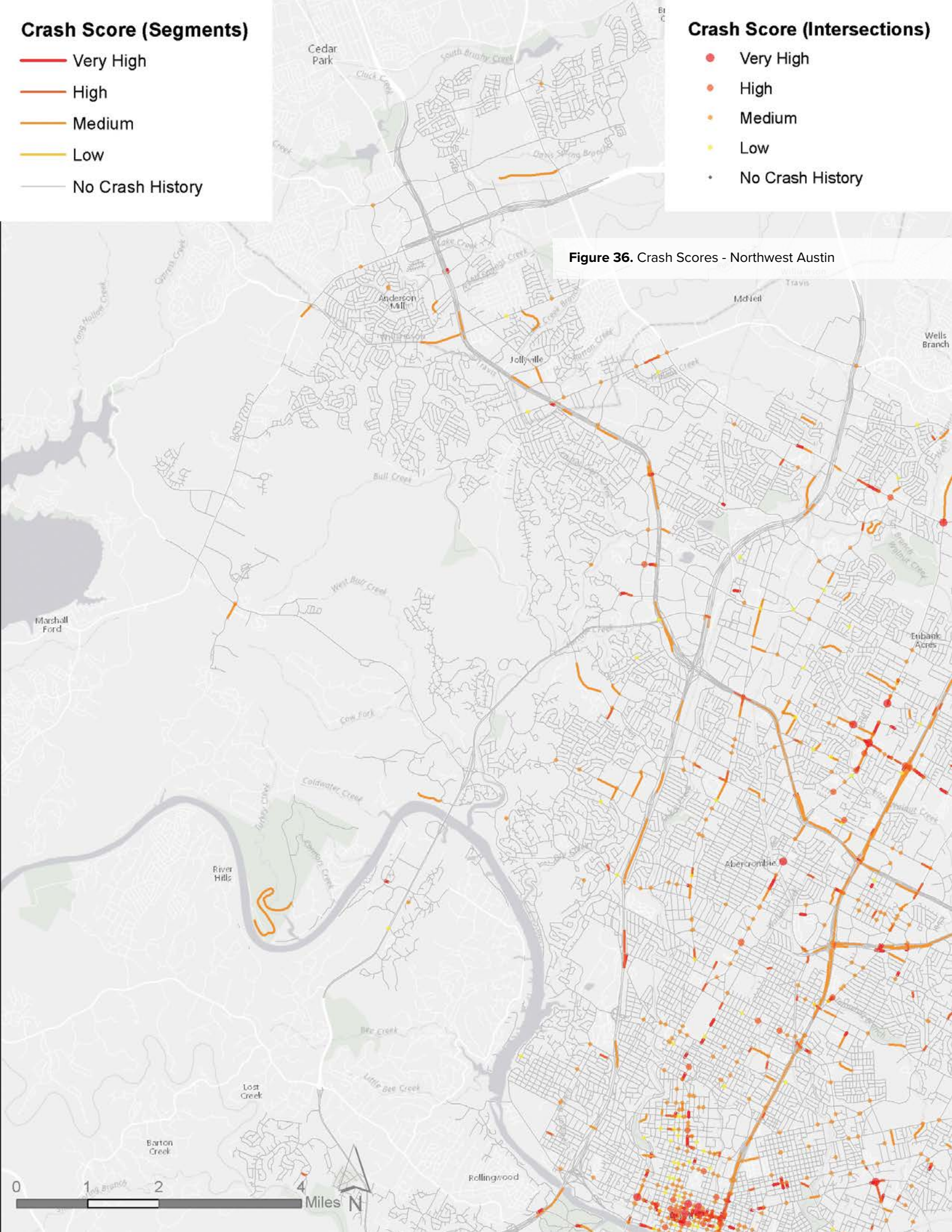


Figure 36. Crash Scores - Northwest Austin

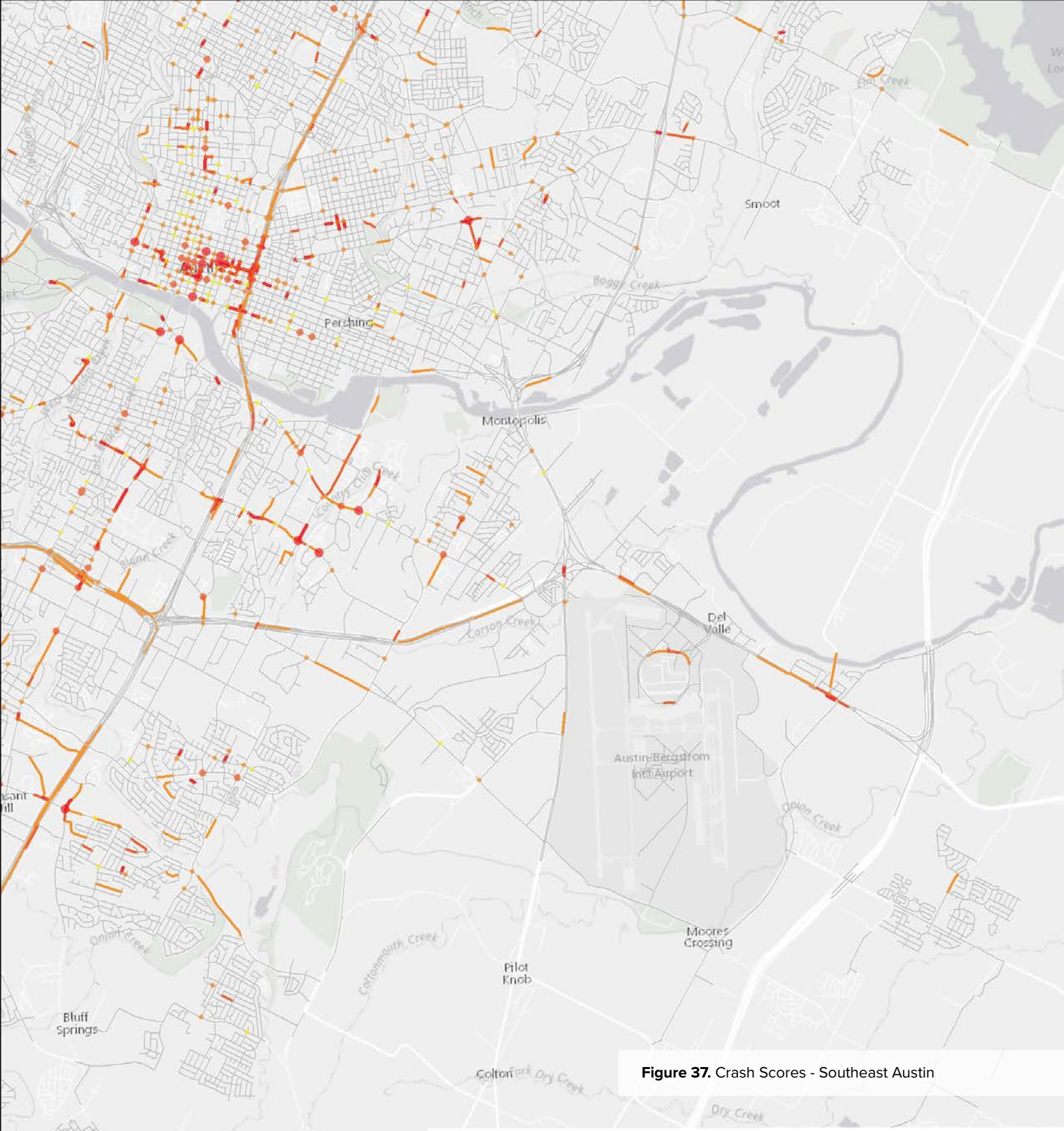


Figure 37. Crash Scores - Southeast Austin

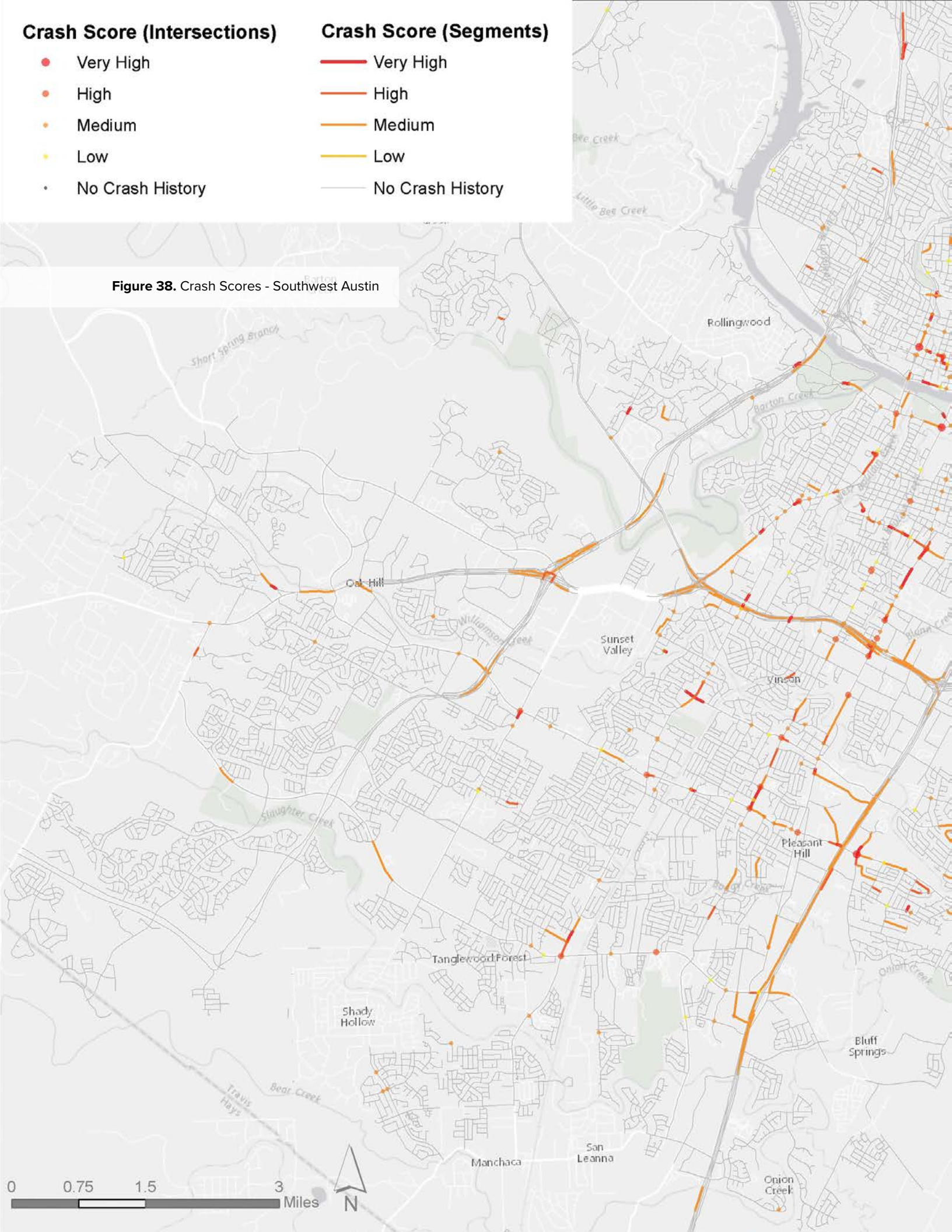


Figure 38. Crash Scores - Southwest Austin

Demand Scores

Description

Demand Scores identify areas where strategic pedestrian safety treatments might serve existing and latent pedestrian demand in areas with a high potential for walking due to their proximity to transit, businesses, schools or other demand drivers, with a special focus on prioritizing traditionally underserved communities. This tool helps answer the question, *how can we help achieve citywide objectives through a safer pedestrian network*?

Methodology

Demand Scores were calculated by adapting the methodology used to develop the City's Sidewalk Prioritization Tool as part of the 2016 Sidewalk Master Plan and ADA Transition Plan Update.[47] This tool used dozens of geographic datasets to provide an objective score for each sidewalk segment in Austin. Sidewalk prioritization scores had two components: a Pedestrian Attractor Score (PAS) and a Pedestrian Safety Score (PSS).

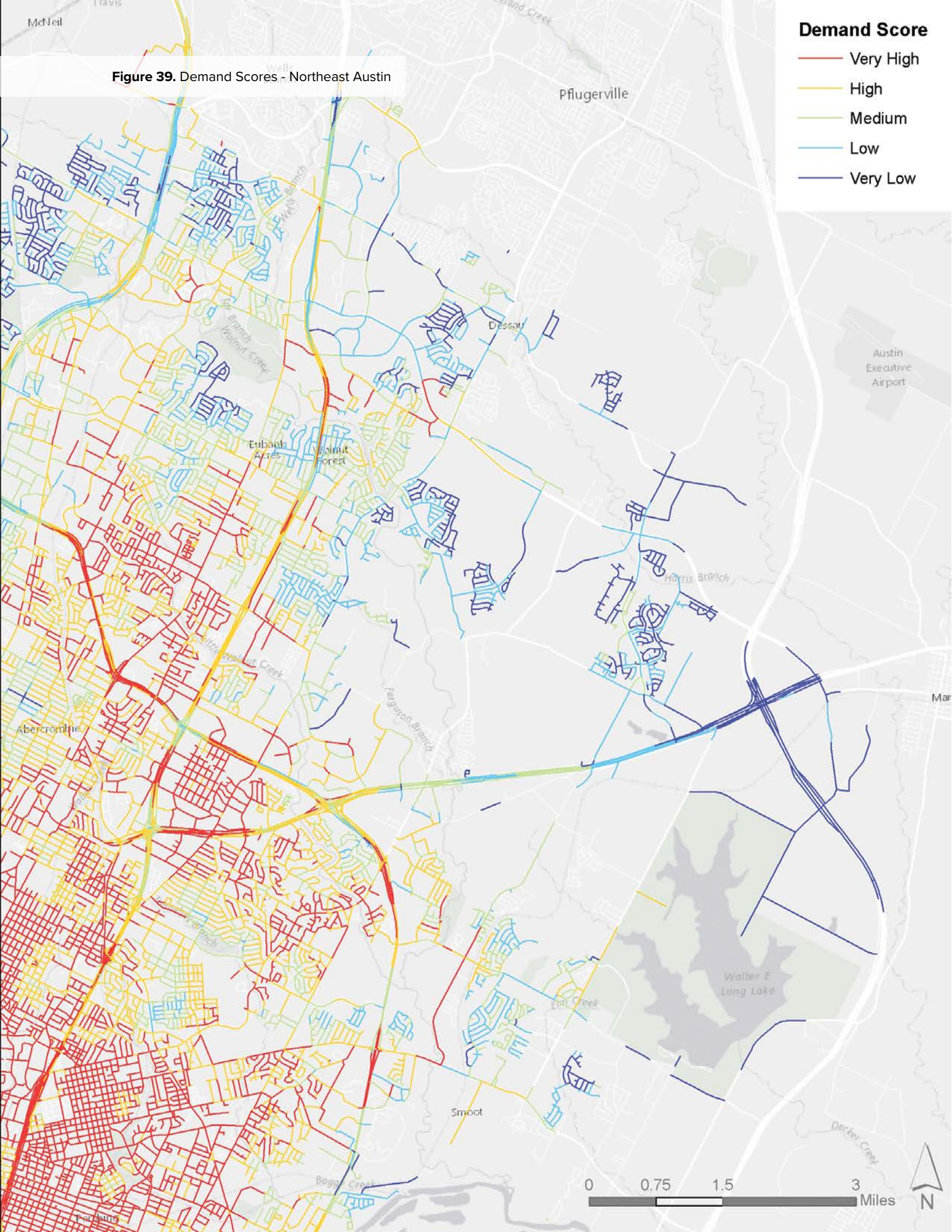
Because crash histories are already reflected in the Pedestrian Safety Priority Network through the Crash Scores, the PSS was removed from the calculation of Demand Scores. The PAS was therefore used as a proxy for pedestrian demand in calculating Demand Scores for the Pedestrian Safety Priority Network, using the criteria listed in Table 6. Three additional criteria which were not included in the original PAS scoring methodology-vehicle ownership, percentage of tract that speaks language other than English, and tracts with barriers to food access--were added to the Demand Score calculation to reflect priorities expressed by the community through the Walk + Bike Talks prioritization exercise (see page 48).

Figures 39-42 show Demand Scores for the entire Austin street network. Warmer colors (i.e. red or yellow) represent streets with higher potential for pedestrian demand, based on the criteria listed above.

Demand Score Criteria
Proximity to State or Local Government Offices
Proximity to Commuter Rail Stations
Proximity to Public or Private Schools
Proximity to Transit Stops
Proximity to Major Grocery Stores
Proximity to Places of Public Accommodation (parks, fire/police stations, hospitals, libraries, museums, etc.)
Proximity to Places that Older Adults Frequent (health care facilities, nursing homes, etc.)
Median Household Income of the surrounding area
Proximity to Employers with > 500 Employees
Proximity to Income Restricted Affordable Housing Secured through City and Federal Programs
Proximity to Public Parking Facilities
Proximity to Religious Institutions
Residential Population of the surrounding area
Median Household Income of Census Tract
Proximity to Core Transit Corridors
Presence of Bike Lanes
Vehicle Ownership of Census Tract
Percentage of Tract that speaks Language Other Than English
Food Focus Areas (Tracts with barriers to food access)

Table 6. Demand Score criteria

Figure 39. Demand Scores - Northeast Austin



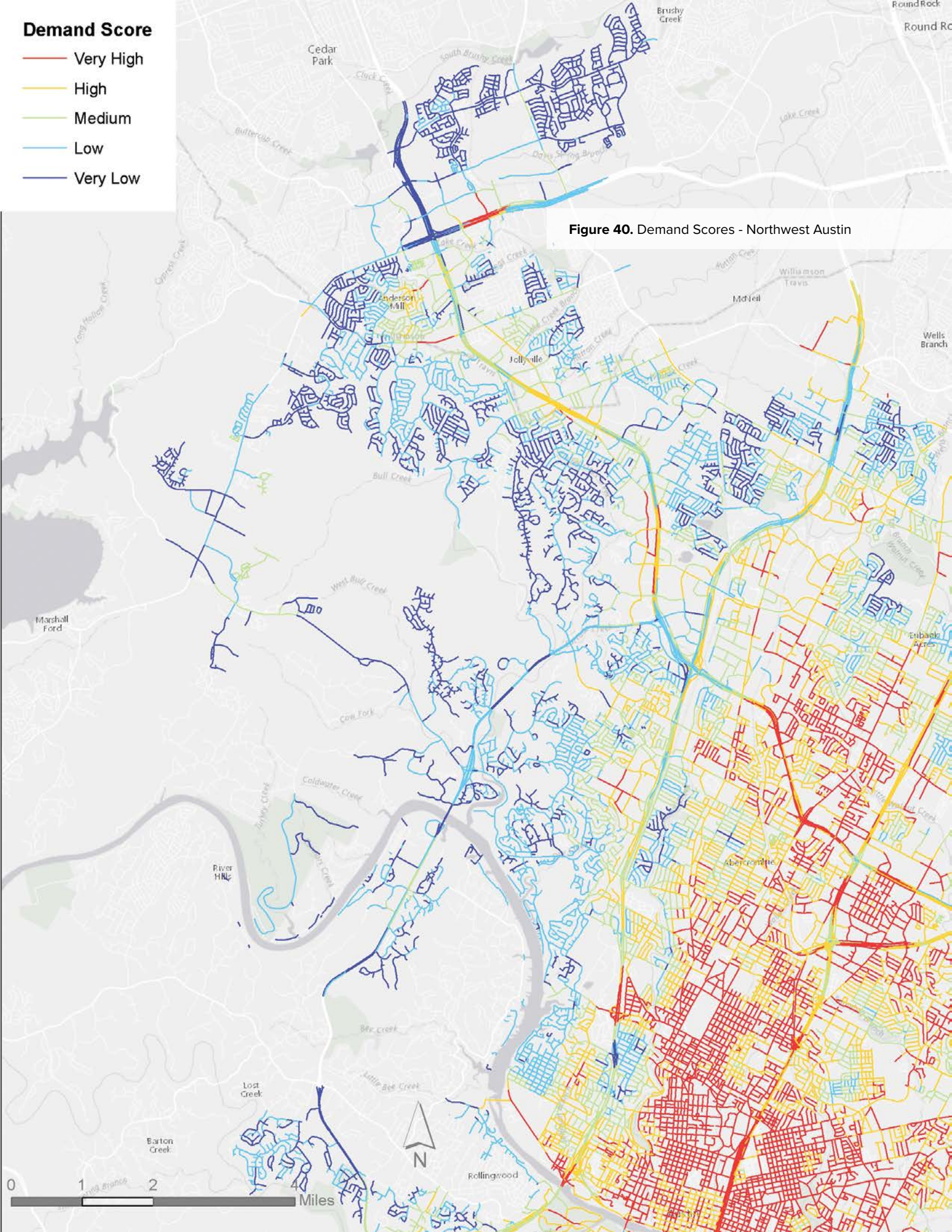


Figure 40. Demand Scores - Northwest Austin

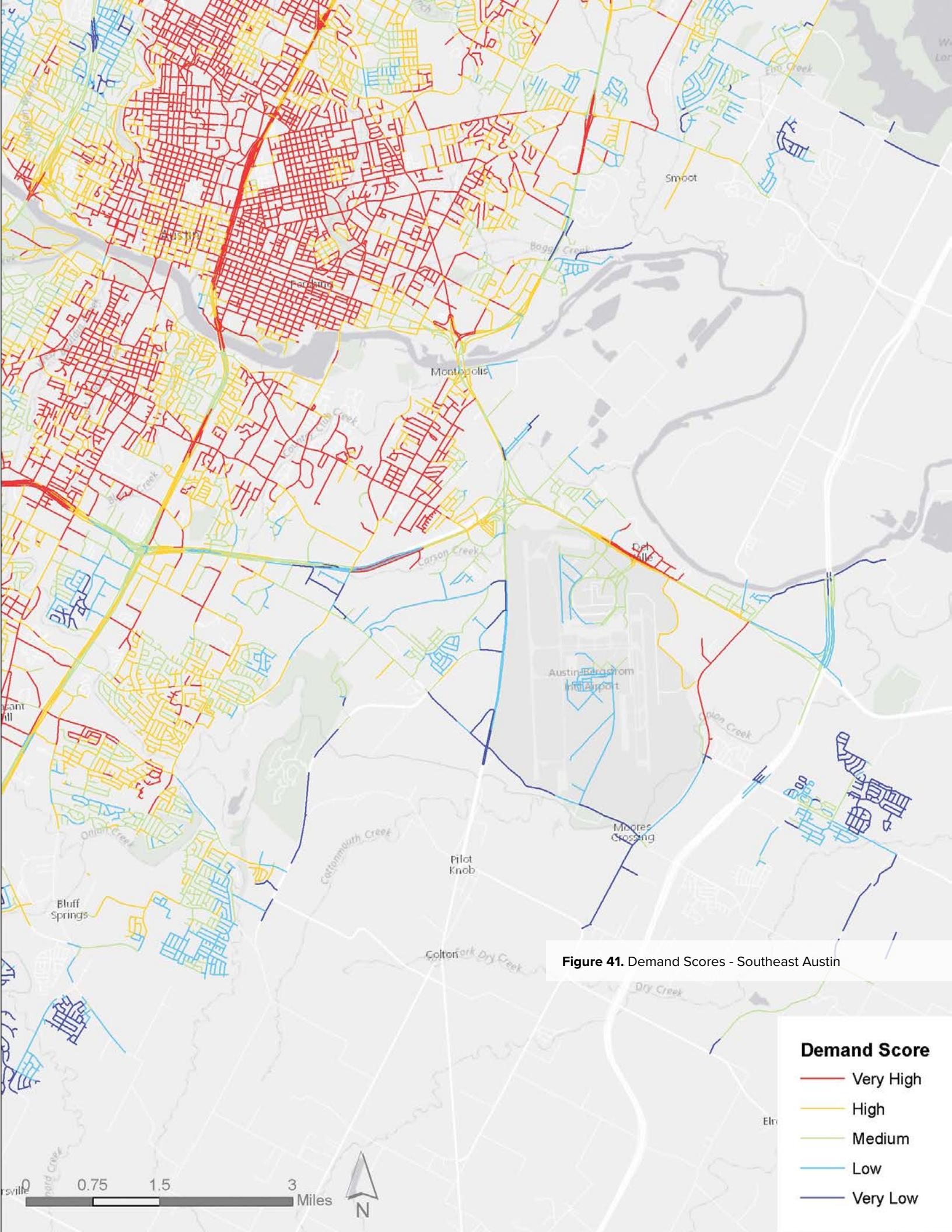


Figure 41. Demand Scores - Southeast Austin

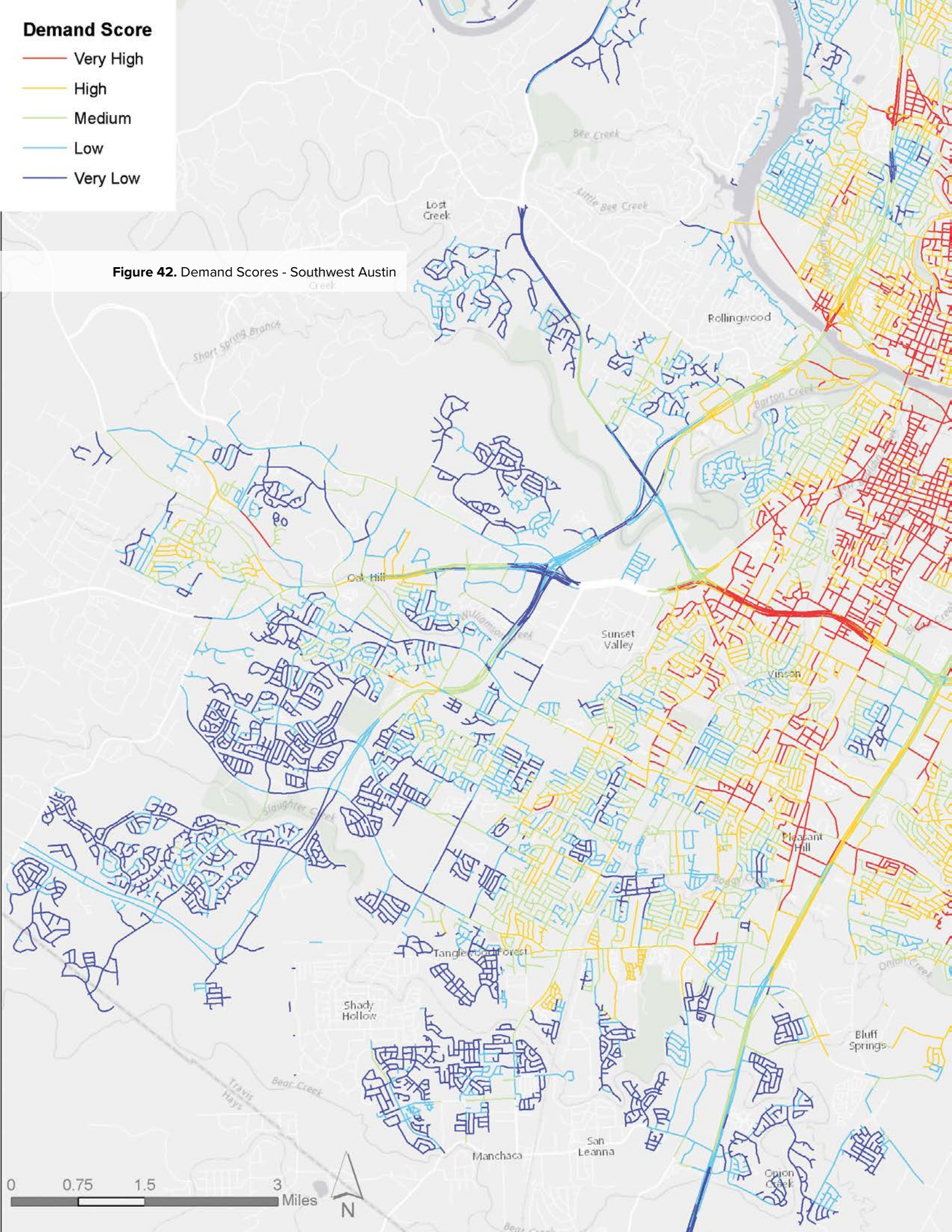


Figure 42. Demand Scores - Southwest Austin

Risk Characteristic Scores

Description

Risk Characteristic Scores identify streets with physical characteristics that the crash data shows to contribute to increased pedestrian crash severity. This tool helps answer the question, *what streets may be prone to serious pedestrian crashes (but which may not appear in the crash histories)*?

Methodology

Street characteristics used in calculating Risk Characteristic Scores were selected based on the probability of severe injury or fatality for crashes occurring on streets with different physical features. Five factors—posted speed limit, street width, distance to nearest signalized crossing, presence of sidewalks, and distance between street lights—were selected for this analysis based on their correlation with increased crash severity, as described in Chapter 2 – Crash Analysis. The tables to the right show the relationship between the selected roadway characteristics, their relative risk of severe injury or fatality, and the Risk Characteristic Score assigned to each. Risk Characteristic Scores for each street segment, as shown in Figures 43-46, represent the total number of individual risk characteristics of each street.

	Probability of Incapacitating Injury or Fatality	Risk Characteristic Score
Posted Speed Limit		
40 MPH AND UNDER	26%	**0**
45 MPH AND OVER	46%	1
Street Width		
2 OR FEWER LANES	**19%**	0
3 OR MORE LANES	**26%**	1
Distance to Nearest Signalized Crossing **i.e. traffic light or pedestrian hybrid beacon**		
1/4 MILE OR LESS	22%	0
OVER 1/4 MILE	30%	1
Presence of Sidewalks		
AT LEAST ONE SIDE	20%	0
NEITHER SIDE	37%	1
Average Distance Between Street Lights		
0 - 100 FT	19%	0
OVER 100 FT	24%	1

Table 7. Components of Risk Characteristic Scores

It is important to note that the risk characteristics chosen for this analysis may be highly correlated with one another. Speed, for example, is influenced to a large degree by street width. Similarly, the streets that are more likely to have high speed limits (e.g. highways) may also be more likely to have an incomplete sidewalk network. Parsing out these dynamics requires further statistical modeling, which is a key objective of ATD, as described in Action Item #17 on page 89. Predictive crash analysis is an emerging area of research in traffic safety; as additional evaluation capacity and analytical tools become available, the ability to quantify crash risk is expected to improve.

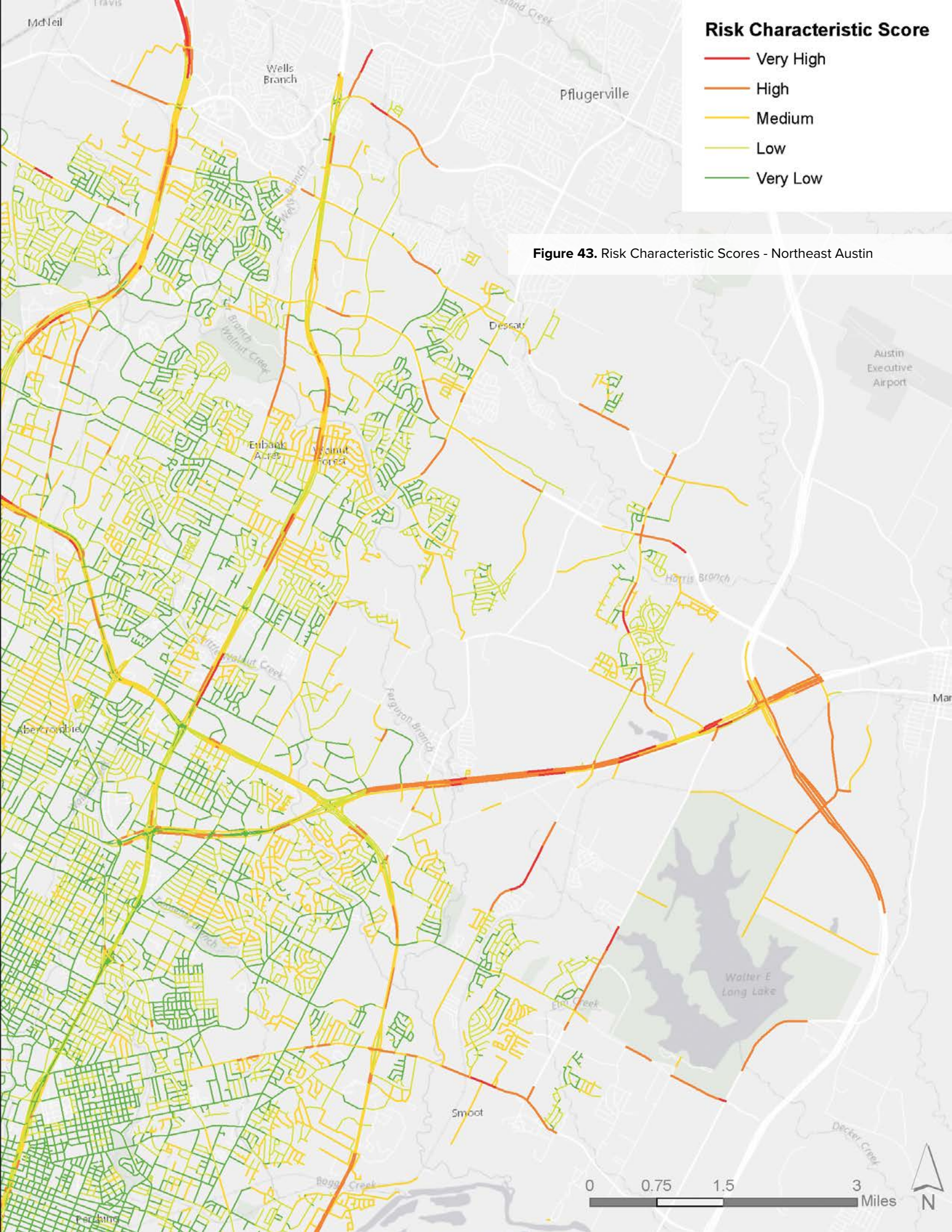


Figure 43. Risk Characteristic Scores - Northeast Austin

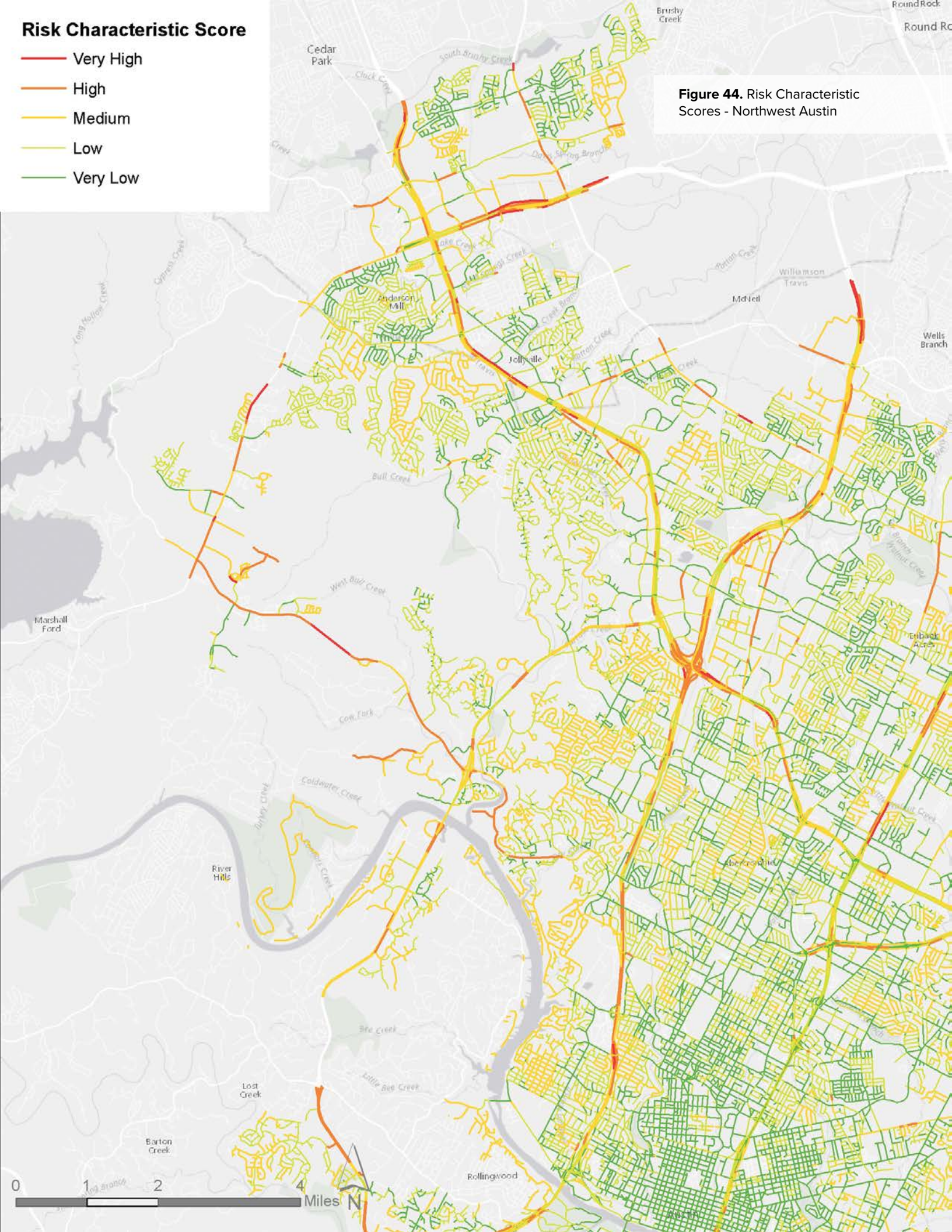


Figure 44. Risk Characteristic Scores - Northwest Austin

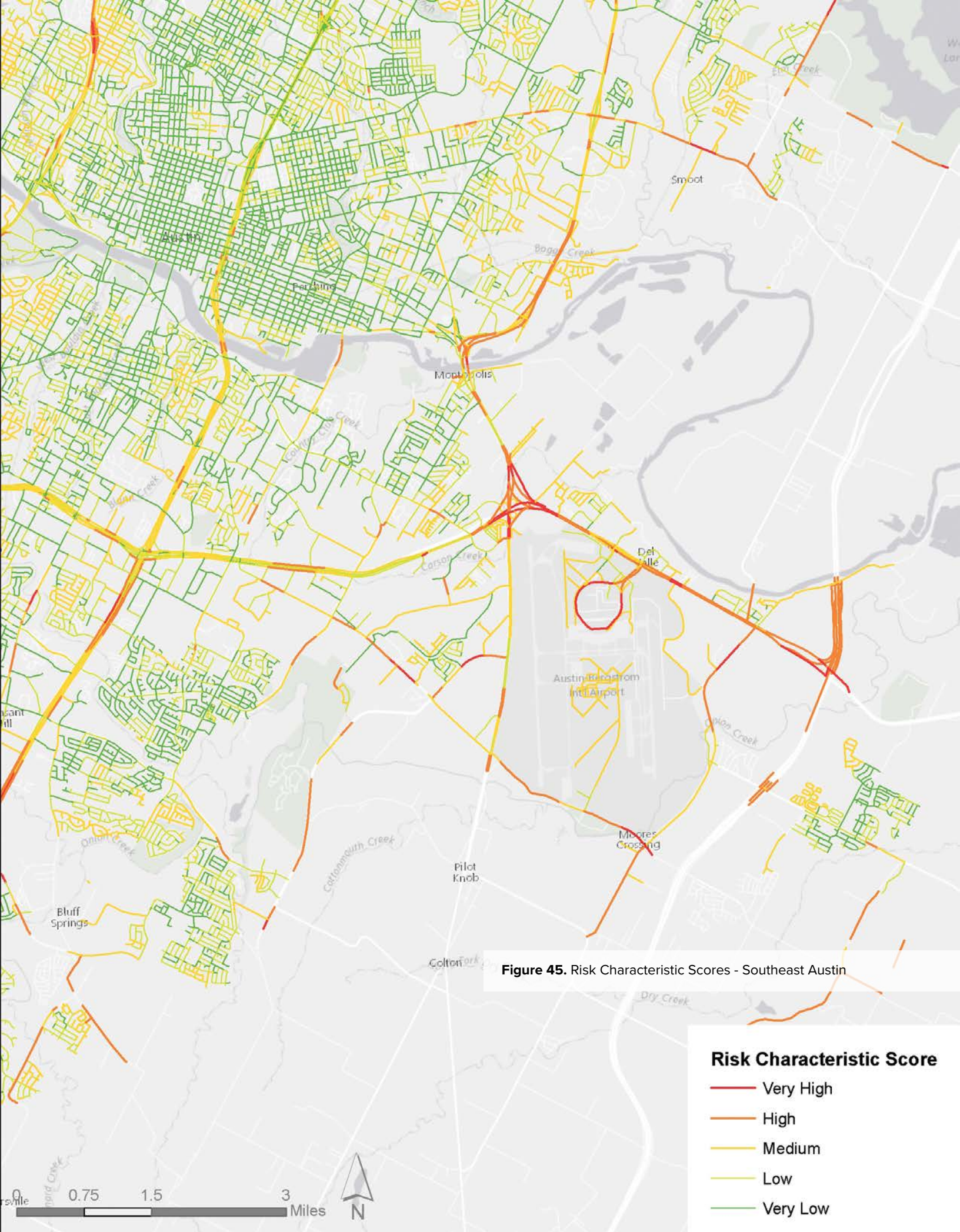


Figure 45. Risk Characteristic Scores - Southeast Austin

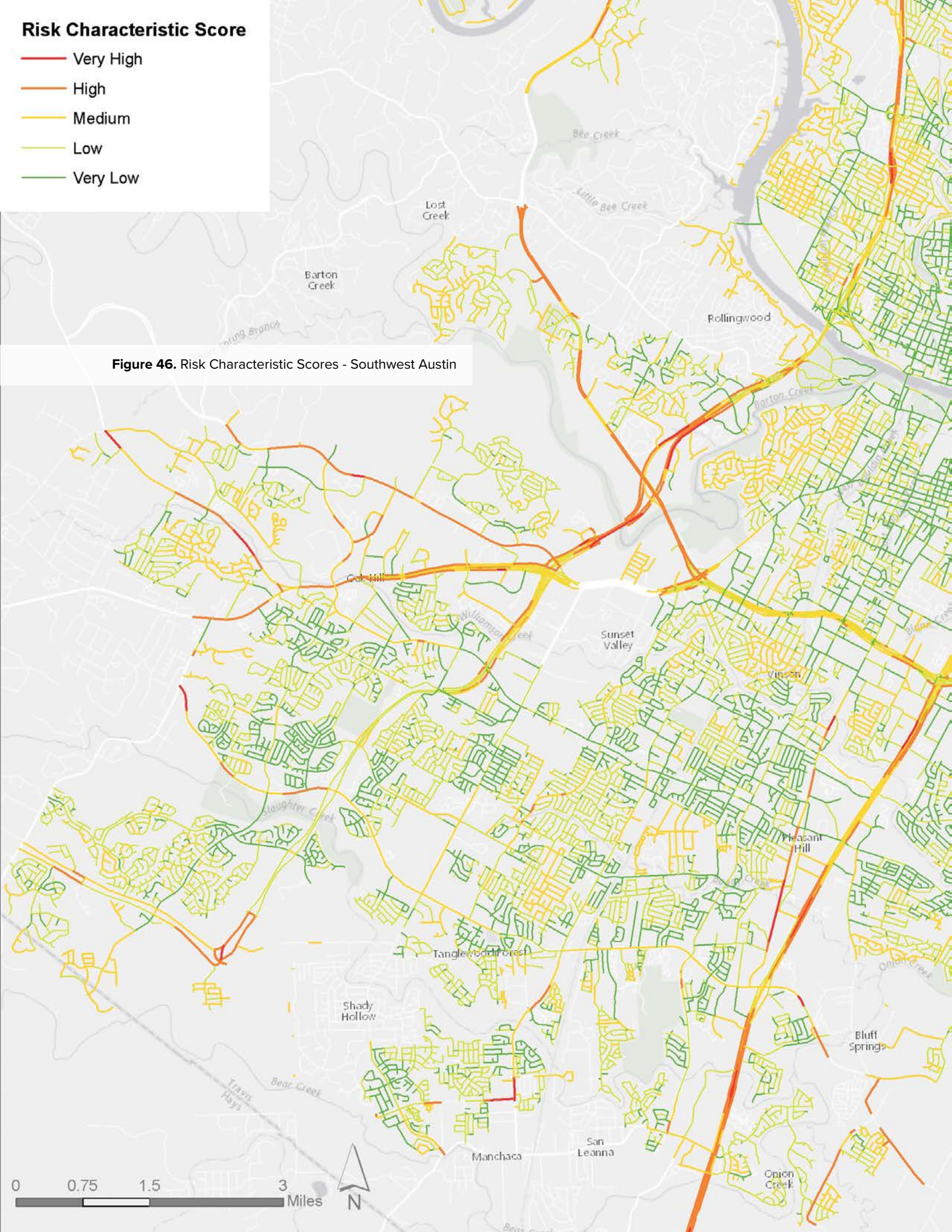


Figure 46. Risk Characteristic Scores - Southwest Austin

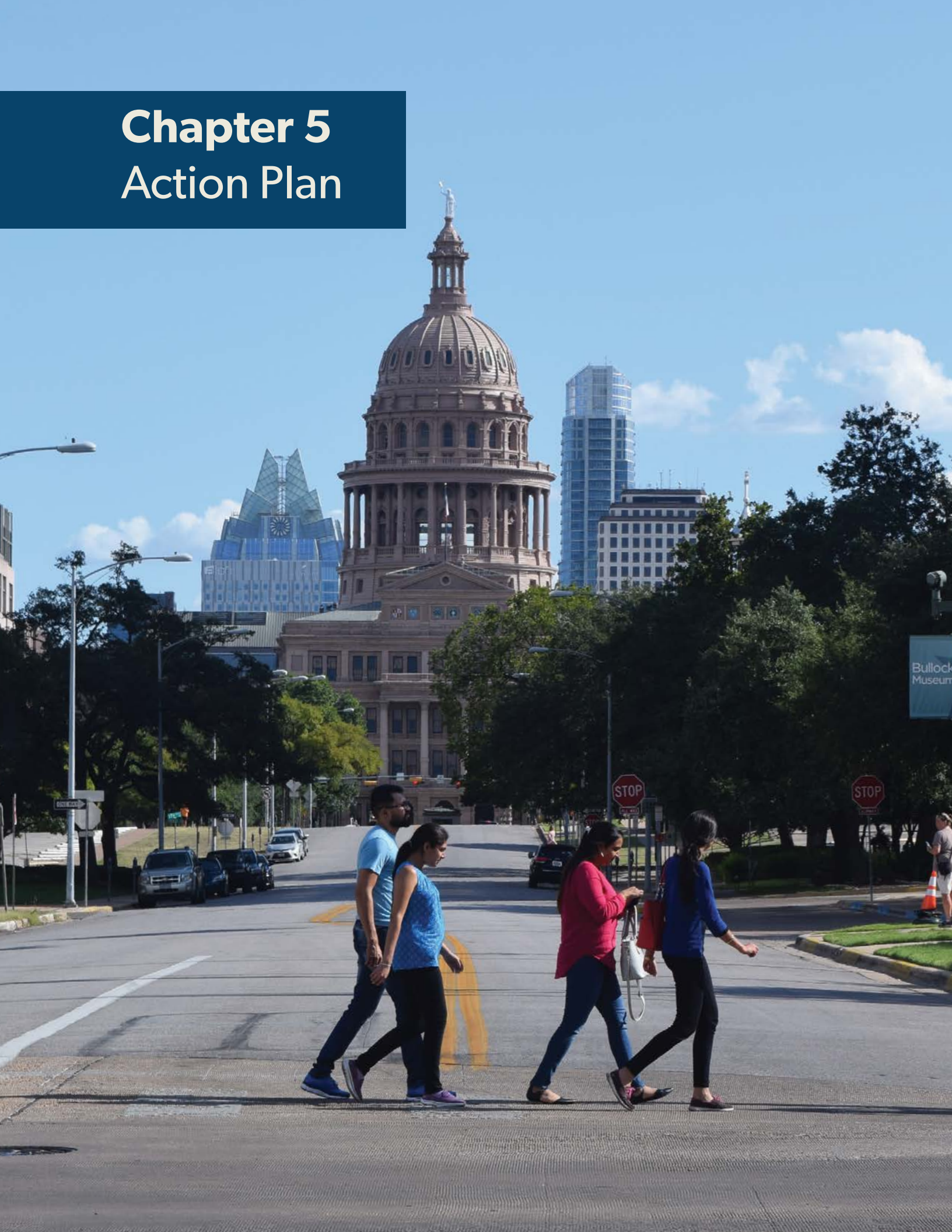
Chapter 4 Summary

The Pedestrian Safety Priority Network provides ATD with a new tool for identifying and prioritizing locations where countermeasures might have the biggest impact in improving pedestrian safety, while also helping to achieve other city objectives related to creating a more walkable city. This tool will be used as a starting point for further analysis by staff, as detailed safety and feasibility studies will be required before implementing treatments at specific locations. To supplement the findings from the Pedestrian Safety Priority Network, ATD will continue to gather input from the Austin community through the 3-1-1 system, the Vision Zero Input Tool and other outreach efforts.

As Austin continues to grow and travel patterns and land uses change, it is critical that the latest and greatest information be integrated into the Pedestrian Safety Priority Network in future iterations of the tool. Action Item #16 on page 89 provides more information on how the City plans to regularly update the Pedestrian Safety Priority Network with new data inputs and develop more sophisticated prioritization tools over time.

There are a number of opportunities to enhance the tool in future iterations. For example, the weights given to the different crash severities, which were used to develop the **Crash Scores**, may need to be adjusted in future versions of the tool based on changing community priorities or best practices. Similarly, **Demand Scores** represent only an approximation of pedestrian demand based on pedestrian generators, and do not take into account observed pedestrian activity. As ATD develops a more robust pedestrian counting program, observed pedestrian volumes can be used to validate the Demand Scores and improve their precision. The biggest opportunity for enhancing the tool, however, is with the **Risk Characteristic Scores**. There is a need to better understand how combinations of different roadway characteristics influence crash outcomes, which requires more sophisticated statistical modelling than could be performed for this planning effort. Additionally, the Risk Characteristic Score methodology does not account for observed pedestrian volumes, and thus exposure. Factoring in exposure would give a truer approximation of the risks posed to pedestrians at different locations, and may even enable the City to begin predicting where crashes might occur in the future based on different roadway or land use characteristics.

Chapter 5
Action Plan



Action Items Summary

In spring 2017 members of the Vision Zero Task Force and Pedestrian Advisory Council, along with select City staff, were invited to participate in a series of workshops to help develop and refine action items to address pedestrian safety in Austin. The action items presented in this chapter represent the consensus recommendations that came out of these discussions, and are informed by ideas offered by the Austin community through the PSAP public outreach effort and the findings from the crash analysis presented in Chapter 2. The information gathered from these efforts has resulted in a set of 21 recommendations across the PSAP's six focus areas – Engineering, Education, Enforcement, Policy/Land Use, Evaluation, and Partners/Funding – that provide the City with a data-driven roadmap for reducing and eliminating serious injury and fatal pedestrian crashes in Austin.

Note that recommendations included in this Action Plan are specifically targeted towards the top actions and contributing factors of pedestrian crashes, and are intended to enhance and elaborate upon, rather than duplicate, recommendations included in the Vision Zero Action Plan.[48] Therefore, recommendations that would help improve traffic safety more broadly, such as speed management strategies, are not specifically touched upon in the PSAP Action Plan. ATD will continue to evaluate the effectiveness of the strategies outlined in both the PSAP and the Vision Zero Action Plan to ensure that traffic safety for all road users is adequately being addressed.

PSAP Action Items

ENGINEERING ACTION ITEMS

1. Establish a Pedestrian Crossing Improvement Program to install large numbers of high-impact, cost-effective pedestrian safety treatments throughout Austin
2. Develop guidelines for implementing traffic signal modifications to enhance pedestrian priority and safety
3. Form a working group to recommend strategies to enhance street lighting to improve pedestrian safety
4. Implement the Sidewalk Master Plan to promote safe pedestrian mobility in Austin

EDUCATION ACTION ITEMS

5. Develop educational materials on pedestrian safety focusing on top contributing factors and crash types to disseminate to the Austin community and to transportation partners
6. Deploy Vision Zero Street Teams to conduct targeted educational campaigns promoting pedestrian safety
7. Lead neighborhood walkability audits with Austin residents, businesses and advocacy groups to identify opportunities to improve the safety and walkability of their neighborhoods

ENFORCEMENT ACTION ITEMS

8. Work with Austin Police Department to organize enforcement campaigns targeting the top contributing factors and crash types for pedestrian crashes
9. Identify existing City ordinances and State laws that can be strengthened, and explore potential new regulations needed, to better promote pedestrian safety and priority
10. Work with Austin Police Department to develop lesson plans and materials to train law enforcement personnel on pedestrian laws and safety

POLICY + LAND USE ACTION ITEMS

11. Include pedestrian safety and comfort as principal considerations in all City policies governing street and site design
12. Fund and construct pedestrian safety improvements through the City's development review process
13. Develop a Pedestrian Master Plan as a unifying strategy to promote pedestrianism in Austin
14. Ensure that pedestrian safety is a primary consideration in the promotion and adoption of emerging mobility technologies

EVALUATION ACTION ITEMS

15. Establish a robust pedestrian counting program to gain a better understanding of walking demand in Austin and to help prioritize pedestrian improvements with limited resources
16. Regularly update the Pedestrian Safety Priority Network with new data inputs and develop more sophisticated prioritization tools over time
17. Regularly update pedestrian crash records with detailed crash type information and work with partner agencies to improve crash record data collection and reporting
18. Evaluate and report on the effectiveness of existing and newly-installed pedestrian facilities to help inform Austin-specific strategies

PARTNERS + FUNDING ACTION ITEMS

19. Work with partner agencies to identify opportunities to improve pedestrian safety on high-speed roadways not controlled by the City.
20. Work with Capital Metro to improve pedestrian safety around transit stops
21. Promote pedestrian safety and seek funding for pedestrian facilities in programs, plans and policies developed in conjunction with the Capital Area Metropolitan Planning Organization (CAMPO)

Engineering Action Items

1. Establish a Pedestrian Crossing Improvement Program to install large numbers of high-impact, cost-effective pedestrian safety treatments throughout Austin

Because pedestrian crashes, serious injuries and fatalities tend to be dispersed throughout the network rather than occurring in concentrated hot spots, taking a systemic approach to pedestrian safety is a critical strategy for reducing pedestrian crashes in Austin.[49] In approaching pedestrian safety through this lens, Austin Transportation Department (ATD) will establish a Pedestrian Crossing Improvement Program to identify, prioritize and construct large numbers of cost-effective, high-impact engineering treatments across Austin.

Locations to receive crossing improvements will be identified and prioritized both proactively and opportunistically. For **proactive project identification**, ATD staff will conduct regular scans of the Pedestrian Safety Priority Network[50] to identify candidate locations that have high Crash, Demand and/or Risk Characteristic scores. Locations will also be informed by community input, such as through 3-1-1 requests, neighborhood plans, community-based walkability audits and consultation with City Council. ATD engineers will then evaluate candidate locations in further detail to determine which types of treatments would be most effective at improving pedestrian safety. For **opportunistic project identification**, Pedestrian Program staff will participate in an annual Local Mobility Capital Improvement Program (CIP) process, whereby program managers from ATD, Public Works Department (PWD) and other City departments will compare potential upcoming projects over the next year to find opportunities to leverage resources and deliver more comprehensive and cost-effective mobility and safety projects. As one example of how this process will work, the Pedestrian Safety Priority Network can be overlaid with the Sidewalk Program's annual sidewalk CIP list to identify areas where enhanced crossing treatments can be constructed at the same time as a sidewalk project. There may also be opportunities to partner with entities outside of the city, such as Capital Metro or TxDOT, to deliver cost-effective pedestrian safety projects as part of bus stop improvements or highway construction projects. The Pedestrian Program will maintain a database of all crossing opportunities identified through these proactive and opportunistic processes for prioritization as new funding is identified.

In support of the new Pedestrian Crossing Improvement Program, ATD planners and engineers will update the City's **Pedestrian Crossing Guidelines** that are used for determining which treatment types are to be used in different contexts. The past few decades have produced an abundance of new empirical evidence on the effectiveness of different pedestrian safety treatments. ATD is currently reviewing national best practices to develop standard treatments based on roadway characteristics such as speed, pedestrian and vehicular volumes, crossing distance, and other factors. New treatments will be continually evaluated to better understand what works in the Austin context, and how Crossing Criteria might need to be refined based on these findings. See Action Item #18 for more information on how ATD plans to evaluate the effectiveness of different treatment types.

Pedestrian crossing projects will be funded through a combination of operational funding, bond funding and grants. As stated previously, a major goal of the Pedestrian Crossing Improvement Program is to utilize cost-effective solutions to improve pedestrian safety. For example, in certain contexts lower cost treatments such as pedestrian refuge islands (approximately $10,000 per island) may provide a more cost-effective safety solution when compared to more expensive treatments such as a Pedestrian Hybrid Beacon (PHB), which currently cost approximately $100,000 to install. Other treatments that will be considered include geometric improvements (e.g. curb extensions), signage, traffic signal changes, lighting, raised crosswalks and other speed management and strategies.


STATE
LAW
TO
WITHIN
CROSSWALK

2. Develop guidelines for implementing traffic signal modifications to enhance pedestrian priority and safety

A few of the top crash types[51] in Austin can potentially be mitigated through strategies related to traffic signal timing and equipment. Replacing existing WALK/DON'T WALK signals with pedestrian countdown signals, for example, has been shown to reduce pedestrian crashes by 25%.[52] Similarly, giving pedestrians a few seconds head start to get into the crosswalk - called a Leading Pedestrian Interval (LPI) - can be an effective strategy for reducing vehicle-pedestrian conflicts at certain intersections. Before making large scale changes to traffic signals, it is important to first understand which locations have the highest potential to see improvement through signal changes, and how those changes might affect other mobility strategies such as signal system coordination. Therefore, ATD will review national best practices to develop Austin-specific guidelines for implementing traffic signal modifications to enhance pedestrian priority and safety, and utilize those guidelines to identify specific traffic signals that can be modified to better serve all road users. Once guidelines have been established, ATD will scan the crash data and community input to identify intersections where vehicle-pedestrian conflicts might be reduced through signal modifications. ATD will turn to other North American cities to understand how they prioritize pedestrians in their signal operations. Toronto, for example, has developed a Leading Pedestrian Interval Implementation Guide, which includes a worksheet and flowchart as guides for determining whether LPIs are suitable in different contexts.[53] Developing similar criteria for Austin will provide the City with a tool for consistently applying signal treatments where the data shows there to be conflicts or potential conflicts. Similar criteria will be developed for other signal strategies, such as when to use permissive versus protective phasing, when eliminating right turns on red might be warranted, when and where to install Audible Pedestrian Signals (APS), criteria for using exclusive pedestrian phasing (i.e. "pedestrian scrambles"), and crossing time assumptions, among others. Finally, ATD will evaluate signal modifications with before and after studies to determine their effectiveness in improving safety and comfort of pedestrians, and to understand implications for traffic progression.

3. Form a working group to recommend strategies to enhance street lighting to improve pedestrian safety

The Austin crash data shows that 82% of pedestrian fatalities and 56% of serious injuries occurred in dark conditions. The presence of street lighting, however, was correlated with an 8% reduction in the probability that crashes occurring in dark conditions would result in fatality or incapacitating injury. Pedestrian-scale lighting has been shown to increase drivers' awareness of the presence of pedestrians, increase driver yielding compliance, and lead pedestrians to divert their path to cross at the crosswalk.[54] Lighting can also enhance people's feelings of personal safety at night. Given the critical role that lighting can play in increasing pedestrian safety, ATD will initiate the formation of a working group made up of City staff and external technical experts to make recommendations on strategies to enhance street lighting to improve traffic safety, particularly for pedestrians. The group will first complete a comprehensive review of pedestrian crashes to determine the effect that lighting has on crash frequency and severity, and identify areas where there are opportunities to improve lighting. The group will then use those findings to make recommendations for how the City can work with partner agencies or implement new policies to expand the use of lighting to promote traffic safety. The working group will also explore emerging "smart" lighting technologies, such as sensor-based analytical tools, and seek opportunities to partner with research institutions or the private sector to test these technologies in Austin. The group will also establish criteria for when it is appropriate for the City to require pedestrian scale lighting as part of the development review process. Finally, it is important to acknowledge that lighting is a complex field requiring professional expertise. There are also differing opinions on aesthetic concerns of lighting that must

be considered, as well as Dark Skies ordinances that seek to reduce light pollution. The lighting working group will seek to balance all of the competing concerns related to lighting in forming recommendations.

4. Implement the Sidewalk Master Plan to promote safe pedestrian mobility in Austin

The PSAP Crash Analysis showed that a crash occurring in an area with sidewalks missing on both sides of the street was nearly twice as likely to result in serious injury or fatality as those that occurred at a location with a sidewalk on at least one side of the street. Sidewalks provide a safe, separated path of travel for pedestrians to get to the places they live, work and play, and provide vital connections to enable public transit. While sidewalks are a key component of providing safe access for pedestrians, Austin's 2016 Sidewalk Master Plan and ADA Transition Plan Update also calls for the City to "identify partnering opportunities with a special focus on enhancing safe pedestrian crossings," as part of a broader strategy to complete the pedestrian network in Austin. In this spirit, ATD will continue to provide support to the Public Works Department (PWD) in the implementation of the Sidewalk Master Plan as part a broader strategy to promote safe pedestrian mobility in Austin. PWD and ATD will closely coordinate to identify opportunities to construct safe crossings with sidewalk and curb ramp projects. Where determined to be feasible, ATD will also support the implementation of the plan's Shared Streets concept,[55] which has the potential to serve as a safe and cost-effective alternative to sidewalks in certain areas of the city. ATD is also assisting in the implementation sidewalk-related code changes in the Land Development Code, Environmental code, and Transportation Criteria Manual to ensure that new development adequately addresses sidewalks and does not create new gaps in the system. Other areas where ATD can provide support include establishing a driveway consolidation or closure program to reduce vehicle/pedestrian conflicts at driveways and removal of vegetative obstructions, all key strategies called for in the Sidewalk Master Plan.

Speed Management Strategies

The crash analysis presented in Chapter 2 showed the deadly effect that vehicular speed has on pedestrian crash outcomes (see page 18). The Vision Zero Action Plan places a heavy emphasis on speed management strategies to improve traffic safety for all modes, including no less than five Action Items in engineering and enforcement related to speed management.

Since the passage of the Vision Zero Action Plan in May 2016, Austin Transportation has made substantial progress in implementing a number of the speed management strategies called for in the plan. In further support of the Vision Zero Action Plan, on December 15, 2016, the Austin City Council passed Resolution 20161215-071, supporting the following speed management recommendations:

- Support legislative efforts to lower the prima facie speed in the urban district to 25 mph;
- Incorporate target design speed into plans and manuals;
- Systematically evaluate arterial speed limits citywide for appropriateness; and
- Establish a neighborhood slow zone pilot project.

Link: Vision Zero Action Plan, https://austintexas.gov/sites/default/files/files/Imagine_Austin/VisionZero/ActionPlan_5.19.16adoption.pdf

Education Action Items

5. Develop educational materials on pedestrian safety focusing on top contributing factors and crash types to disseminate to the Austin community and to transportation partners

ATD will develop educational materials that target the risky and unsafe behaviors – both on the part of people driving and people walking – that are known to contribute to pedestrian crashes in Austin. Messages will be driven by findings from the local crash analysis, such as the six Crash Groups that were found to make up 87% of serious injury and fatal crashes in Austin (see page 35), along with other known traffic safety concerns such as speeding, distraction or impairment. Materials will also utilize research from the Austin Pedestrian Advisory Council's Pedestrian Rules and Rights research to educate the community on pedestrian-related laws and unsafe behaviors. Messages will avoid a pedestrian-shaming tone, and will rather focus on the actions that all road users can take to improve pedestrian safety. Given that certain populations in Austin are disproportionately affected by pedestrian crashes—namely minorities, low-income communities, people experiencing homelessness, non-English speaking communities, and the elderly—educational campaigns will be tailored to reach these groups, through a wide range of mediums (e.g. social media, radio, television, print) and languages. ATD will seek co-branding opportunities with and actively disseminate educational materials to local and regional partners, including other City of Austin Departments, local transit providers, community groups, school districts, driver's education providers and others, to reach a wide cross section of the community. Finally, ATD will periodically evaluate the effectiveness of these campaigns to better understand which messages are most effective in leading to behavior change.

6. Deploy Vision Zero Street Teams to conduct targeted educational campaigns promoting pedestrian safety

The City's Vision Zero Program has initiated a pilot Street Team program to promote pedestrian safety by engaging with the community at a more personal level. Street Teams are a proven concept whereby City staff or volunteers go out into the community to distribute materials and talk to the public to promote safety messages. As an example, Street Teams can be utilized as part of the rollout of street re-designs or new facilities to help inform road users of the changes and expected behaviors. Street Team staff can also provide valuable support to law enforcement efforts by handing out educational materials to offenders in lieu of, or in addition to, traffic citations. The pilot program will be conducted through the fall of 2017 in partnership with the Housing Authority of Austin (HACA) and Austin Pathways. The pilot program will provide an opportunity to plan and execute a variety of Street Team interventions and build experience for a larger program in conjunction with the City's Vision Zero in Action Program, which provides targeted enforcement and education throughout the city based on key dangerous behaviors.

A larger Street Team Program will focus resources on target areas identified based on the Pedestrian Safety Priority Network, in areas with specific crash types of interest (e.g. targeting failure to yield in low compliance areas), and in areas that the community or elected officials have expressed particular safety concerns. Target areas and messages will also be chosen to reach those demographic groups that are disparately affected by pedestrian crashes, and communication materials will be provided in languages commonly used in those areas. The Street Team Program will also seek to partner with existing City programs, such as Safe Routes to Schools, to educate school-aged children on the importance of pedestrian safety.

7. Lead neighborhood walkability audits with Austin residents, businesses and advocacy groups to identify opportunities to improve the safety and walkability of their neighborhoods.

Austin community members have intimate knowledge of the conditions and interactions occurring on city streets and sidewalks that make walking a challenge. To utilize this knowledge, ATD staff will train community walk leaders to help lead walkability audits to facilitate a more focused, on-the-ground conversation about pedestrian safety in different areas of the city. While there are numerous off-the-shelf tools that can be used to conduct walkability audits — including AARP's Sidewalks and Streets Survey or Active Living Research's Active Neighborhood Checklist, to name a few — the actual tool used is less important than the simple act of prompting participants to observe and record the conditions that make them feel safe when walking. Objectives of the walkability audits include documenting existing conditions and concerns, informing participants about the tradeoffs of the various treatments available in the City's pedestrian safety toolbox, and empowering citizens to help improve the walkability of their community through available resources both within and outside of the City of Austin. Particular focus will be given to working with local schools and universities, which serve as community hubs for both newcomers and longtime residents.

Findings that emerge from community-based walkability audits will be incorporated into the Pedestrian Crossing Improvement Program's proactive project identification process (see page 77). Recommendations outside the purview of ATD will be referred to allied programs such as the Sidewalk Program for further analysis.

PEDESTRIAN ADVISORY COUNCIL

Enforcement Action Items

8. Work with Austin Police Department to organize enforcement campaigns targeting the top contributing factors and crash types for pedestrian crashes

Local law enforcement can play a critical role in helping to reduce the unsafe behaviors that contribute to pedestrian crashes. To this end, ATD and Austin Police Department will work together to develop enforcement initiatives targeting the top contributing factors, risky behaviors and crash types that lead to pedestrian crashes in Austin. Target locations will be chosen in close coordination with APD based on a combination of crash data, the Pedestrian Safety Priority Network and community input. ATD and APD will borrow from successful enforcement initiatives from other cities, including crosswalk stings or pedestrian decoy techniques that have proven to be effective in improving driver yielding compliance to pedestrians at crosswalks.[56] Enforcement initiatives will be supported by Vision Zero Street Teams (see Action Item #6) to inform the community on the objectives of safety campaigns, emphasizing that the goal is behavior change and not punishment. These combined education/enforcement initiatives will also be used in conjunction with new infrastructure installation to help inform road users of the changes and expected behaviors. To address concerns that increased enforcement could have a disparate impact on low-income and minority communities, including those vulnerable to immigration laws, new enforcement efforts will be advertised in multiple languages through local media ahead of time, and will primarily begin by issuing warnings rather than citations. Finally, ATD will measure the effectiveness of these initiatives through pre- and post- evaluation of crash data, speed studies, observations of yielding compliance, number of citations, gauging public awareness, and other appropriate metrics.

9. Identify existing City ordinances and State laws that can be strengthened, and explore potential new regulations needed, to better promote pedestrian safety and priority

The City's Vision Zero Action Plan highlights the need to research existing local and state policies to identify areas where traffic safety can be improved through policy change.[57] Analysis conducted as part of the Pedestrian Safety Action Plan has emphasized the need to reexamine certain existing laws and research the effectiveness of potential new laws from peer cities to help improve pedestrian safety in Austin. In support of this need, ATD will facilitate the formation of a working group made up of City staff and members of the Vision Zero Task Force to research and explore potential policy changes related pedestrian safety, specifically those that apply to the top contributing factors such as distraction, speeding and impairment. Existing policy areas to explore might include revisiting the Pedestrians on Certain Roadways Ordinance (e.g. should the scope be expanded or narrowed based on crash findings); evaluating how existing laws can be strengthened to reduce impaired driving; or, working with Austin Municipal Court to develop alternative punishments for misdemeanor traffic violations to educate, rather than punish, offenders of pedestrian-related laws. Laws from peer cities, such as New York's recent policy change to allow pedestrians to enter the crosswalk even after the flashing hand signals has initiated,[59] may also benefit pedestrian safety and priority in Austin. Thorough background research by a diverse working group is first needed to better understand how such policy changes might improve pedestrian safety in Austin, and to identify potential unintended consequences of such laws.

10. Work with Austin Police Department to develop lesson plans and materials to train law enforcement personnel on pedestrian laws and safety

Austin Police Department personnel are required to complete 40 hours of web-based training every two years, presenting a unique opportunity to emphasize the important role that law enforcement can play in protecting pedestrians as vulnerable users, and how it fits into the larger context of Vision Zero. ATD staff will consult with members of the Vision Zero Task Force and subject matter experts in the field of education to develop lesson plans and materials to train law enforcement personnel on pedestrian laws and safe behaviors. Analysis from the Pedestrian Advisory Council's Pedestrian Rules and Rights research has identified a number of common misconceptions and nuances related to pedestrian laws, and will be used to help inform the curriculum. Training topics could include clarifying what constitutes a legal crosswalk, where pedestrians are permitted to cross, which road users are required to yield to whom, and details related to Austin's Vulnerable Users Law. Special emphasis will be placed on how certain communities in Austin are disproportionately affected by pedestrian crashes and the importance that equity considerations play in enforcing laws. Materials will be concise but engaging, and compatible with APD's web-based platform.

Policy + Land Use Action Items

11. Include pedestrian safety and comfort as principal considerations in all City policies governing street and site design

Creating a safe city for pedestrians requires us to learn from past mistakes regarding street design and the built environment. As Austin continues to grow at a rapid pace, it is imperative that safety be built into the design of new streets and new development, as well as ongoing retrofits of existing streets and redevelopment. The City of Austin will therefore include pedestrian safety and comfort as principal considerations in all City policies governing street and site design, including (but not limited to) the Austin Strategic Mobility Plan (ASMP), Transportation Criteria Manual (TCM) and current and future updates to the Land Development Code.

- Currently under development, the **Austin Strategic Mobility Plan** (ASMP) represents the first update to the City's multimodal transportation plan since 1995, and will include prioritized policies, programs and projects to guide Austin's transportation investments for the next 10+ years. A key component of the ASMP is the Street Design Guide and updated road table, which will offer guidance and preferred cross sections for all streets in Austin (applicable to both new streets and retrofits of existing streets). In developing preferred cross sections, ATD will ensure that design criteria prioritize safe and comfortable design for pedestrians, including lower design speeds, spacing pedestrian crossings at intervals conducive to safe and easy road crossing, and guidance on when to provide enhanced treatments such as bulb outs.

- The Street Design Guide will eventually be integrated into the City's **Transportation Criteria Manual** (TCM), which provides design criteria for City streets and private streets. ATD and other City departments will initiate a comprehensive update of the TCM following the adoption of the ASMP, turning to national best practice to modernize standard design guidelines for turning radii, driveway width and spacing, parking lot design, sidewalk and curb ramp specifications, and other design considerations, all of which influence pedestrian safety and comfort. Special emphasis will be placed on establishing criteria that promotes safe design speeds of city streets.

- While the TCM and ASMP apply mainly to street design, the City's **Land Development Code** (LDC) covers much broader topics related to the built environment, land use and site design, which also play a key role in promoting a safe environment for pedestrians. At the time of writing the PSAP, a comprehensive re-write of the LDC, referred to as CodeNEXT, is underway. This rewrite seeks to align the LDC more closely with the goals of the Imagine Austin Comprehensive Plan.

  As Vision Zero is a core tenet of Imagine Austin, ATD will continually seek to find opportunities to promote pedestrian safety through the LDC, both during the CodeNEXT re-write and through ongoing identification of best practices that can be incorporated into the code. Key areas in the LDC with opportunities to improve pedestrian safety and comfort include increased connectivity standards, street lighting specifications, and requiring developers to construct sidewalks that would provide connectivity to/from a proposed development among many others.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12. Fund and construct pedestrian safety improvements through the City's development review process.

Because pedestrian safety is truly a systemwide problem, both the public and private sectors have a role to play in providing safer pedestrian access and connectivity across the City. As new trips are generated by new developments, adequate transportation infrastructure for all road users, including pedestrians, needs to be provided. Towards this end, ATD will take the lead in identifying opportunities to fund and construct pedestrian safety improvements through the City's development review process. There are a number of policies and practices within the development review process by which the City can require new developments to implement elements of safer pedestrian access. New development that is expected to generate over a certain threshold of new trips per day are required to submit either a traffic impact analysis (TIA) or Neighborhood Traffic Analysis (NTA) to identify and address the needs placed by the proposed development on the adjacent transportation system. After reviewing the TIA or NTA findings, City staff and the applicant use the TIA to identify gaps in the adjacent pedestrian network, and participate in providing adequate pedestrian infrastructure to address these deficiencies. Similarly, a recently adopted Mitigation ordinance (Ordinance No. 20170302-077, effective March 14, 2017) now allows the City to obtain certain offsite improvements for smaller scale developments not subject to TIAs or NTAs. Offsite improvements can include a number of treatments beneficial to pedestrian safety, including pedestrian hybrid beacons, refuge islands, sidewalks, and a wide range of traffic calming devices. In order to ensure safer pedestrian access and connectivity relating to new developments, the City will follow the following guidelines:

- Applicants and staff shall review and utilize the Pedestrian Safety Priority Network, Sidewalk Master Plan inventory and pedestrian crash histories as guidance in the review of new development applications.
- The Pedestrian Safety Priority Network, Sidewalk Master Plan inventory and crash histories will serve as guidance to identify areas where pedestrian safety treatments should be considered.
- Additional pedestrian counts may be required in traffic studies, including TIAs, in locations expected to have high pedestrian demand.
- Application for Planned Unit Developments (PUDs) shall consider safer pedestrian access and connectivity when demonstrating superiority.

13. Develop a Pedestrian Master Plan as a unifying strategy to promote pedestrianism in Austin

Analysis from U.S. cities shows that generally speaking, the more people walking, the lower the pedestrian crash rate. While there certainly may be a chicken-and-egg dynamic at play, this "safety in numbers" effect highlights the safety benefits that can be achieved by creating a walkable city, in addition to the tremendous environmental, public health, and economic benefits of walking. To realize the safety benefits of more people walking, the City must continue to promote the wide array of objective and subjective factors that people take into consideration when making the decision to walk, such as density and diversity of land use, feelings of personal security, wayfinding, and especially in Central Texas, shade. In other words, safety is a necessary component of creating a truly walkable city, but safety countermeasures alone cannot attract more people to walk. It is therefore recommended that ATD develop a Pedestrian Master Plan to serve as a unifying strategy to promote pedestrianism in Austin to achieve safety in numbers. Such a plan would tie together existing city plans and policies, such as the Sidewalk Master Plan, the PSAP, and the Complete Streets policy, among others, and make new recommendations for promoting walking in Austin. Austin's recent designation as a Silver-level Walk Friendly Community was a

recognition of the great work already being done in the community, and a Pedestrian Master Plan would help provide a roadmap for taking the next step towards Gold or Platinum level community in the future.

14. Ensure that pedestrian safety is a primary consideration in the promotion and adoption of emerging mobility technologies.

Innovations in mobility technology in recent years have the potential to substantially improve traffic safety, better manage urban congestion, and increase access to jobs and other opportunities in cities. The rise of automated and connected vehicles, electrification, and mobility as a service, are all undeniable forces that transportation agencies across the country are following closely to better understand the future of urban mobility. By the same token, the rapid pace of change has left many to speculate on the unintended consequences that these new trends may have, particularly for vulnerable road users such as pedestrians. It is unclear, for example, how these technologies will affect pedestrians' ability to move safety and freely through the transportation system, especially in complex urban environments. While it is difficult to predict exactly what the mobility landscape will look like in the future, adhering to a few fundamental principles will allow Austin to provide safeguards to pedestrians while also embracing new technologies. To this end, the City of Austin will ensure that safety, particularly emphasizing pedestrians, is a primary consideration in the promotion and adoption of emerging mobility technologies within the city. To better understand the rapidly changing dynamics involved in new mobility technologies, City staff will turn to national best practices for guidance on how to best promote safety in this new environment, such as the framework outlined in the National Association of City Transportation Officials' (NACTO) 2017 "Blueprint for Autonomous Urbanism" report, which establishes "people-centric" design principles for how fully autonomous vehicles should operate in cities to facilitate safe interactions with pedestrians. Finally, Austin has always been a hub for innovation. The City will continue to position itself to be a test bed, not only for these technologies, but also for how the technologies interact with vulnerable road users. To this end, in late 2017 the City of Austin, in collaboration with Capital Metro, released a "Smart Mobility Roadmap" outlining how the two agencies will take a proactive and deliberate approach in the promotion and adoption of new mobility technologies and policies to ensure a future that benefits all transportation system users.

Evaluation Action Items

15. Establish a robust pedestrian counting program to gain a better understanding of walking demand in Austin and to help prioritize pedestrian improvements with limited resources

The ultimate goal of the pedestrian safety strategies recommended in this plan is to improve peoples' real and perceived safety to encourage more walking in Austin. To evaluate how well the City is doing in this regard, there is a need for better data on where and how much people are walking. From a safety standpoint, pedestrian count data not only helps to put crash data in perspective by controlling for pedestrian exposure, it is also the first step in developing crash prediction tools that can help the City prioritize where pedestrian safety treatments are most needed. The ability to measure walking levels before and after the installation of new facilities would also provide the city with a better understanding of the effectiveness of different treatment types, and would help make the case for more or enhanced pedestrian facilities. ATD currently conducts pedestrian counts on a project-by-project basis, and has a few permanent counters deployed that provide information on walking trends throughout the year. In an effort to bolster ATD's counting program, staff will first conduct research on national best practices in measuring walking levels, including available methodologies, counting equipment, resources required (including the potential use of volunteers to assist in counting) and potential partnering opportunities with other City departments. Staff will then use the findings from that research to make recommendations on establishing and institutionalize an ongoing, robust pedestrian counting program. Data will be shared across departments for the benefit of the entire City.

16. Regularly update the Pedestrian Safety Priority Network with new data inputs and develop more sophisticated prioritization tools over time.

The Pedestrian Safety Priority Network developed as part of this plan provides the City with a valuable tool for proactively identifying and prioritizing locations in Austin where installing pedestrian safety treatments and conducting targeted education and enforcement campaigns might have the greatest impact. It is important to acknowledge, however, that this is just the first iteration of this tool. Constant changes to travel patterns and the built environment in Austin necessitate regular updates to data inputs of these tools and that the City follow emerging national best practice to refine the tool's capabilities over time. To this end, ATD will regularly update data inputs such as crash records, roadway attributes, and land use data for each of the three components of the network (i.e. Crash Scores, Demand Scores, and Risk Characteristic Scores). ATD will also seek opportunities to partner with research institutions or private entities to develop more sophisticated models related to pedestrian exposure and risk, with the ultimate goal of developing crash prediction tools.

17. Regularly update pedestrian crash records with detailed crash type information and work with partner agencies to improve crash record data collection and reporting.

The PBCAT crash type data provides detailed information on the preceding movements leading up to pedestrian crashes, allowing ATD planners and engineers to gain a deeper understanding of why pedestrian crashes are occurring and what strategies can best address them. This dataset adds an additional level of detail beyond what can be gleaned from existing state-level crash data alone. Therefore, ATD will dedicate resources to regularly update crash-type information for all serious injury and fatal pedestrian crashes in Austin. As this information is valuable to improving pedestrian safety for the entire region, ATD will seek to combine resources and pursue data sharing agreements with local and regional transportation agencies who are also interested in

such information. There may also be opportunities to improve data collection at the time of the crash, such as including additional attributes of interest to transportation agencies within the crash report form itself. ATD will work with APD and state-level agencies to discuss how to improve on-the-ground crash reporting without burdening investigating officers' workload. ATD will also continue to work with state and local health providers to gain access to hospital and trauma registry data to gather more detailed information on pedestrian crashes, including the numerous incidents that aren't reported in crash records. Finally, to the extent authorized by confidentiality laws, ATD will seek to make crash data available to the public on the City's website so the community can also track pedestrian crash patterns and trends.

18. Evaluate and report on the effectiveness of existing and newly-installed pedestrian facilities to help inform Austin-specific strategies.

While there is great national guidance on the effectiveness of different types of pedestrian safety treatments, there may be characteristics unique to Austin that need to be taken into consideration when designing for pedestrian safety. For example, in many U.S. cities, cultural norms lead drivers to reflexively yield to pedestrians stepping out into the crosswalk, which, even though it is state law, isn't always the case in Austin. These regional behavioral differences may require enhanced treatment types, or additional emphasis on education or enforcement. To better understand these dynamics, ATD will evaluate and report on the effectiveness of existing and newly-installed facilities by measuring objective performance measures such as driver yielding, speeding, and pedestrian volumes, as well as more subjective metrics such as pedestrian comfort. Findings will be used to refine ATD's Crossing Criteria used to determine appropriate treatment types in different contexts. Findings will also be shared with other City departments, particularly the PWD Sidewalks and Special Projects Division and Safe Routes to Schools Program, to help inform the types of treatments they can use to improve pedestrian safety as part of their projects. ATD will also publish results of select before/after studies on the City website. A longer-term goal of ATD is to deploy detection technologies capable of measuring near-misses between road users. These technologies have the potential to provide incredible insights into the types of treatments that can reduce conflicts between vehicles and pedestrians, and can help the City prioritize where interventions are most needed. To this end, ATD will seek opportunities to partner with research institutions and private entities to better understand this emerging area of practice and pilot new technologies.

Partners + Funding Action Items

19. Work with partner agencies to identify opportunities to improve pedestrian safety on high-speed roadways not controlled by the City

Austin's rapid growth has led to increased pedestrian activity in many areas of the city that were originally designed with vehicular movement as the primary consideration, particularly along major thoroughfares and access-controlled highways. While the City of Austin controls many of these high-speed thoroughfares, many fall under the jurisdiction of other agencies, such as the Texas Department of Transportation (TxDOT), Travis County or The Central Texas Regional Mobility Authority (CTRMA). As part of the City's ongoing effort to enhance pedestrian safety and access on all Austin streets, and in the spirit of interagency cooperation, ATD will continue to work closely with partner agencies to ensure that pedestrian accommodations are included in new construction projects and retrofits of high-speed roadways. As an example, TxDOT's ongoing Mobility35 program for Interstate 35 represents a once in a generation opportunity to improve pedestrian safety and connectivity in Austin. In support of this program, ATD will provide technical support to help identify opportunities where Mobility35 projects can support City objectives related to pedestrian safety and connectivity, such as TxDOT's commitment to construct shared used paths along I-35 where sufficient right of way exists. ATD will also continue to seek opportunities to work with TxDOT and other regional transportation providers to conduct Road Safety Audits of high speed roadways, both those owned by the City and others, to make recommendations for enhancing pedestrian safety and access, and will implement recommendations that fall under City jurisdiction when feasible.

20. Work with Capital Metro to improve pedestrian safety around transit stops

The high cost of car ownership, barriers to driving for the elderly or people with disabilities, or lifestyle preferences lead many Austinites to depend on safe and reliable public transportation for their daily mobility needs. The crash analysis presented in Chapter 2, however, showed that people who live in areas of Austin with the highest pedestrian crash rates also have substantially lower car ownership and higher transit ridership than areas with fewer pedestrian crashes (see page 34). To support the viability of public transportation as a critical component of Austin's transportation system, especially for vulnerable populations, ATD will continue to work closely with Capital Metro to ensure that people can safely and comfortably walk to and from transit stops by proactively improving pedestrian facilities in the areas immediately surrounding transit stops. To this end, ATD and PWD will invite Capital Metro to participate in an annual Local Mobility Implementation planning process to identify potential partnering opportunities to improve pedestrian safety and access in conjunction with transit-related capital projects or service changes anticipated for the coming year. Similarly, ATD will continue to participate in bi-weekly Transit Priority Working Group meetings with City and Capital Metro staff to identify more near-term opportunities to improve pedestrian safety as part of individual capital projects. As one near-term example, City staff will work closely with Capital Metro to help identify locations with opportunities to improve pedestrian safety as part of the implementation of Capital Metro's Connections 2025 service changes, which will require bus stop consolidation or new stop construction in many areas of the city. By sharing the findings from ATD's crash analysis, along with the Pedestrian Safety Priority Network framework, Capital Metro staff will have another set of tools to identify and prioritize areas that may be good candidates to receive pedestrian safety upgrades in support of transit stop reconfigurations. Similarly, through an interlocal agreement in place since 2012, the City of Austin will continue to support Capital Metro in its Bus Stop Accessibility and Connectivity Improvements Program by designing and building sidewalks and other pedestrian facilities to

make all transit stops in the city accessible. This partnership is expected to make 97% of Capital Metro bus stops accessible by the end of 2017.[62] Finally, Austin Transportation Department will continue to analyze the crash data to better understand how users of public transportation are affected by pedestrian crashes, identify areas where enhanced pedestrian facilities can support access to transit, and share findings with Capital Metro.

21. Promote pedestrian safety and seek funding for pedestrian facilities in programs, plans and policies developed in conjunction with the Capital Area Metropolitan Planning Organization (CAMPO)

CAMPO serves as the Central Texas region's Metropolitan Planning Organization (MPO), which is a federally-mandated entity that coordinates regional transportation planning with municipalities, counties and transportation providers in urbanized areas greater than 50,000 people. Notably, CAMPO's Transportation Policy Board approves the allocation of federal and state transportation funds within the region. Funding allocations are guided by the Long-Range Transportation Plan, which has a 20-year planning horizon, and the Transportation Improvement Program (TIP), which guides shorter-term spending. Given CAMPO's importance in coordinating regional transporting planning and funding, ATD will promote pedestrian safety and pursue funding for pedestrian facilities in programs, plans and policies developed through the regional transportation planning process. One such plan with substantial implications for pedestrian safety is the Regional Active Transportation Plan (RATP),[63] which is currently under development. The RATP represents the first such plan for the region, and will provide a roadmap for policies, programs and projects that will serve to create a safe and accessible regional transportation network. Projects identified in the RATP will be carried forward to the 2045 Regional Transportation Plan, which is expected to be adopted in 2019. In support of the RATP planning effort, ATD staff is serving on the plan's Active Transportation Advisory Committee to provide guidance and to promote Austin's vision for a safe and connected active transportation network as part of a larger regional system. ATD also worked with CAMPO to produce a case study of the Near Northwest Corridor in northwest Austin to analyze pedestrian and bike connectivity, access management, and potential safety enhancements. The case study resulted in an implementation plan with project and policy priorities for the corridor. Both ATD and CAMPO believe the Near Northwest Corridor study can serve as a model for corridor-level active transportation-related planning efforts going forward. Similarly, staff from ATD's Pedestrian Program will continue to serve on the CAMPO Technical Advisory Committee (TAC) to provide guidance and technical recommendations to the CAMPO Transportation Policy Board on matters related to active transportation, and will work with CAMPO staff to reinstitute the TAC Active Transportation Subcommittee to delve deeper into issues related to active transportation in the region, including pedestrian safety. Finally, ATD will continue to position itself to be competitive for federal and state transportation grants allocated through CAMPO, including grants through the Transportation Alternatives Program (TAP), which was used for the Citywide Pedestrian Safety Grant to install pedestrian signalization throughout Austin (see page 21 for more information). To this end, ATD has recently hired staff to serve as a liaison to CAMPO, as well as a dedicated grant writer, to ensure that Austin is in a good position to secure grants, including those related to pedestrian safety.


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Citations

[1]http://www.ghsa.org/sites/default/files/2017-03/2017ped_FINAL_4.pdf

[2]CRIS 2010-2015; a 'serious injury' is defined here as a non-incapacitating or incapacitating injury

[3]National Safety Council, Estimating Cost of Unintentional Injuries (2014) http://www.nsc.org/NSCDocuments_Corporate/estimating-costs-unintentional-injuries-2016.pdf

[4]pedbikeinfo.org/data/factsheet_health.cfm

[5]pedbikeinfo.org/data/factsheet_economic.cfm

[6]pedbikeinfo.org/data/factsheet_environmental.cfm

[7]austintexas.gov/department/about-imagine-austin

[8]austintexas.gov/sites/default/files/files/Public_Works/Street_%26_Bridge/Sidewalk_MPU_Adopted_06.16.2016_reduced.pdf

[9]austintexas.gov/asmp

[10]More information on PBCAT can be found at pedbikeinfo.org/pbcat_us

[11]The PBCAT dataset includes only those crashes that resulted in a fatality, incapacitating injury, or non-incapacitating injury, and does not include those in which no injury or possible injury were reported. An incapacitating injury is defined by TxDOT as, "... any injury, other than a fatal injury, which prevents the injured person from walking, driving or normally continuing the activities he was capable of performing before the injury occurred."

[12]Generated Traffic and Induced Travel - Implications for Transport Planning (2017) http://www.vtpi.org/gentraf.pdf

[13]Traffic Safety Facts, Pedestrians, 2015 Data, National Highway Safety Administration https://crashstats.nhtsa.dot.gov/Api/Public/ViewPublication/81237

[14]The City of Austin controls most Local Roads, but this classification does include a number of roads that have segments that are both on and off the state highway system, such as North Lamar (SL-275), South Lamar (SL-343), South Congress Avenue (SL-275), Cesar Chavez (SL-343), Airport Blvd (SL-111) and Manchaca Rd. (FM 2304).

[15]Includes Interstate Highways, US Highways, State Highways/Loops, Farm-to-Market, Park Roads

[16]PBCAT 2010-2015

[17]Tefft, B., 2011, "Impact of Speed and a Pedestrian's Risk of Severe Injury or Death," AAA Foundation for Traffic Safety." https://www.aaafoundation.org/sites/default/files/2011PedestrianRiskVsSpeed.pdf

[18]Fitzpatrick, Fitzpatrick, Carlson, Brewer and Wooldridge. 2000. "Design Factors That Affect Drier Speed on Suburban Streets." Transportation Research Record 1751: 18-25

[19]https://nacto.org/publication/urban-street-design-guide/street-design-elements/lane-width/

[20]PBCAT 2010-2015

[21]https://austintexas.gov/sites/default/files/files/2014_Austin_Bicycle_Master_Plan__Reduced_Size_.pdf

[22]CRIS 2010-2015; Note: to make comparisons across street types, crashes occurring on major highways were removed from this analysis as they are unlikely to have on-street bicycle facilities.

[23]http://www.streetsblog.org/wp-content/uploads/2014/09/2014-09-03-bicycle-path-data-analysis.pdf

[24]Brookshire, K., Sandt, L., Sundstrom, C., Thomas, L., & Blomberg, R. (2016, April). Advancing pedestrian and bicyclist safety: A primer for highway safety professionals (Report No. DOT HS 812 258). Washington, DC: National Highway Traffic Safety Administration.

[25]Scopatz, R. A. & Zhou, Y. (2016, April). Effect of electronic device use on pedestrian safety: A literature review (Report No. DOT HS 812 256). Washington, DC: National Highway Traffic Safety Administration.

[26]austintexas.gov/sites/default/files/files/Police/2015_Fatality_Report.pdf

[27]crashstats.nhtsa.dot.gov/Api/Public/ViewPublication/812375

[28]crashstats.nhtsa.dot.gov/Api/Public/ViewPublication/812409

[29]Dangerous by Design, 2016

[30]American Community Survey 5 year estimates 2014

[31]Dangerous by Design, 2016

[32]CRIS 2010-2015; American Community Survey 5 year estimates 2014

[33]https://s3.amazonaws.com/cdn.smartgrowthamerica.org/dangerous-by-design-2016.pdf

[34]U.S. Census Bureau, 2011-2015 American Community Survey 5-Year Estimates

[35]http://www.austintexas.gov/sites/default/files/files/Police/2015_Fatality_Report.pdf

[36]http://projects.statesman.com/news/homeless-deaths/index.html

[37]https://crashstats.nhtsa.dot.gov/Api/Public/ViewPublication/812375

[38]Age-Friendly Austin Action Plan, 2016 http://www.austintexas.gov/edims/document.cfm?id=260993

[39]https://communityimpact.com/austin/central-austin/city-county/2017/04/12/5-takeaways-from-austin-demographer-analysis-growing-senior-population/

[40]https://crashstats.nhtsa.dot.gov/Api/Public/ViewPublication/812375

[41]http://nhts.ornl.gov/briefs/PovertyBrief.pdf

[42]https://s3.amazonaws.com/cdn.smartgrowthamerica.org/dangerous-by-design-2016.pdf

[43]More information on pedestrian safety countermeasures can be found at http://www.pedbikesafe.org/PEDSAFE/guide_analysis.cfm

[44]The pedestrian stumbled, fell, or rolled into path of vehicle due to surface conditions, impairment or other mishap.

[45]http://www.bizjournals.com/austin/news/2017/03/22/how-many-people-moved-to-austin-in-2016.html

[46]A complete listing of individuals represented on the Vision Zero Task Force is included in the Acknowledgements section on page 3 of this document.

[47]For more detailed description of the Sidewalk Prioritization Tool, see pages 8-12 of the Sidewalk Master Plan and ADA Transition Plan Update: https://austintexas.gov/sites/default/files/files/Public_Works/Street_%26_Bridge/Sidewalk_MPU_Adopted_06.16.2016_reduced.pdf

[48]https://austintexas.gov/sites/default/files/files/Imagine_Austin/VisionZero/ActionPlan_5.19.16adoption.pdf

[49]http://safety.fhwa.dot.gov/systemic/fhwasa13019/chap1.cfm

[50]See Chapter 4 for more details on how the Pedestrian Safety Priority Network was developed

[51]See pages 27-34 for information on top crash types

[52]https://safety.fhwa.dot.gov/ped_bike/tools_solve/ped_tctpepc/

[53]http://docs.trb.org/prp/15-1579.pdf

[54]http://www.pedbikeinfo.org/cms/downloads/PedestrianLitReview_April2014.pd-#page=76&zoom=100,69,453

[55]According to the Sidewalk Master Plan, Shared Streets are areas, "...where people walking, bicycling, and driving share the same space in a way that prioritizes the safety and comfort of pedestrians while allowing for movement of bicycles and motor vehicles. Shared streets are a possible alternative for improving pedestrian access in areas that were developed without sidewalks; and shared streets may be a preferred alternative for aesthetic, social, or environmental reasons, or where construction of sidewalks would be particularly difficult."

[56]https://www.nhtsa.gov/sites/nhtsa.dot.gov/files/811786.pdf

[57]See page 49 of Vision Zero Action Plan

[58]A Differed Disposition program is already being used successfully in Austin, whereby people caught speeding in a school zone can opt to work as a crossing guard for a day through the City's Safe Routes to Schools program. For more information: http://www.austintexas.gov/department/child-safety-program

[59]http://nyc.streetsblog.org/2016/09/14/city-council-unanimously-passes-bill-to-expand-pedestrians-right-of-way/

[60]http://austintexas.gov/sites/default/files/files/Planning/CodeNEXT/2016_07_08_Mobility.pdf

[61]http://www.austintexas.gov/edims/document.cfm?id=272885

[62]https://www.capmetro.org/uploadedFiles/New2016/Public_Involvement/Board_Meetings/2017-03-27%20Board%20of%20Directors%20-%20Full%20Agenda.pdf

[63]http://www.campotexas.org/plans-programs/bicycle-pedestrian/2045-active-transportation-plan/