

Audit Report

Traffic Safety: Design and Education

September 2019



The City has made significant efforts to improve traffic safety and in 2016 set a goal to eliminate fatal and serious injury crashes. As part of these efforts, the Austin Transportation Department (ATD) has improved intersections that had many crashes. While it appears those areas are now safer, ATD's efforts could be better aligned with the City's goal to reduce serious crashes in Austin. The City could also improve its traffic safety efforts by continuing its efforts to improve crash data and by more specifically targeting education efforts at dangerous driving behaviors. Despite efforts to improve traffic safety, factors outside the City's control make it unlikely that the City will reach its goal of zero fatal and serious injury crashes.

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Cover: Intersection of Oltorf Street and South Congress Avenue, courtesy of the Austin Transportation Department

Objective

Is the City promoting traffic safety by effectively designing streets and intersections and educating the public about traffic safety?

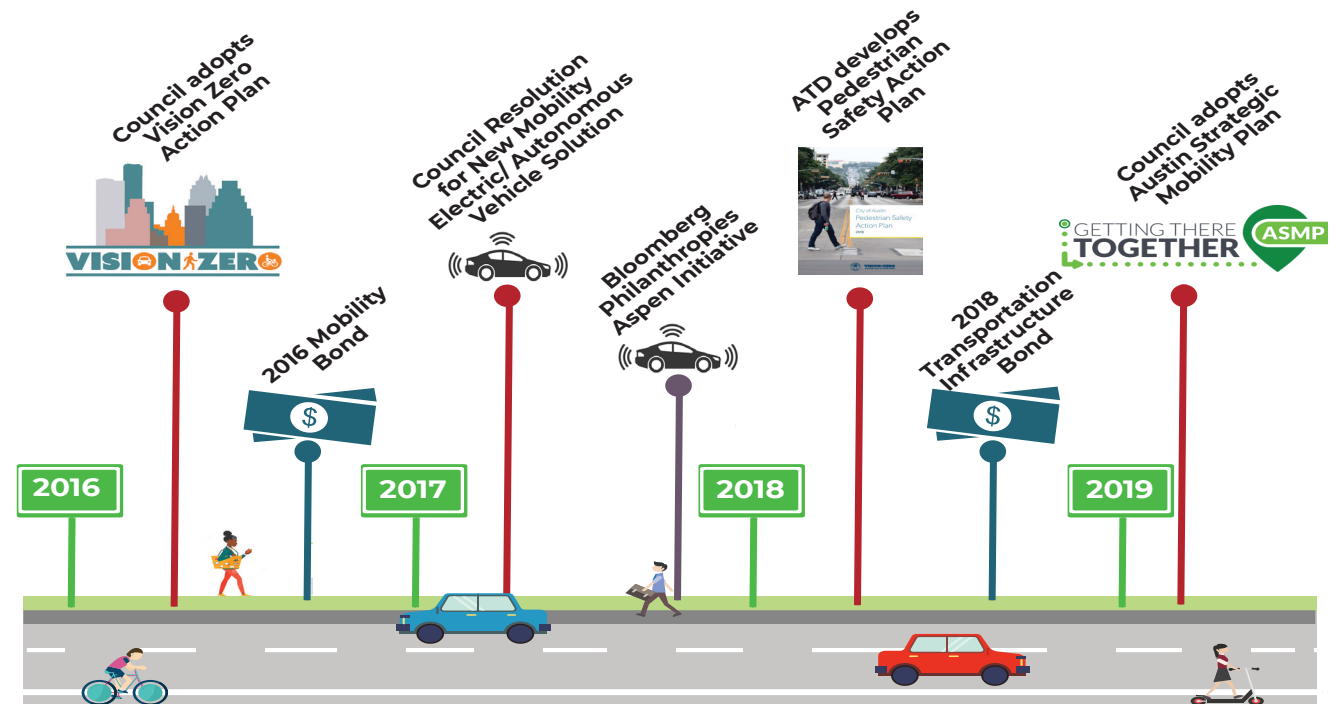
Background

The Austin Strategic Mobility Plan reports, on average, more than 70 people lose their lives on Austin streets and another 450 suffer life altering injuries each year.

More than 100 people died in traffic crashes in Austin in 2015 and several hundred others were seriously injured. In an effort to improve traffic safety, City Council adopted the Vision Zero Action Plan in 2016. The goal of the plan is zero fatal and serious injury crashes in Austin by 2025. The plan identified critical actions in five areas: evaluation, enforcement, engineering, education, and policy.¹

Since 2015, Austin has done many things to promote traffic safety. For example, voters approved transportation bonds in 2016 and 2018 that provided \$30 million for intersection infrastructure improvements, as well as other traffic safety projects. The City also developed transportation safety strategies, such as Pedestrian Safety Action Plan in 2018 and the Austin Strategic Mobility Plan in 2019.

Exhibit 1: Examples of City Efforts to Promote Traffic Safety



SOURCE: OCA analysis of City efforts, June 2019

¹ The Audit of Traffic Enforcement (August 2018) addressed the City's enforcement efforts.

In addition to these efforts, the City has partnered with entities such as the Capital Metropolitan Transportation Authority and the Texas Department of Transportation (TxDOT) to coordinate on traffic safety efforts. The City's commitment to improving traffic safety was also recognized by Bloomberg Philanthropies. Austin was selected as one of the first 10 cities in the world to participate in Bloomberg's Aspen Initiative to further new transportation technologies.

The Austin Transportation Department has led many of the City's traffic safety efforts. Their responsibilities include improving Austin roads, educating the public, and supporting new mobility technology.

What We Found

Summary

The City has made significant efforts to improve traffic safety and in 2016 set a goal to eliminate fatal and serious injury crashes. As part of these efforts, the Austin Transportation Department (ATD) has improved intersections that had many crashes. While it appears those areas are now safer, ATD's efforts could be better aligned with the City's goal to reduce serious crashes in Austin. The City could also improve its traffic safety efforts by continuing its efforts to improve crash data and by more specifically targeting education efforts at dangerous driving behaviors. Despite efforts to improve traffic safety, factors outside the City's control make it unlikely that the City will reach its goal of zero fatal and serious injury crashes.

Finding 1

The Austin Transportation Department supports traffic safety by improving intersections with a high number of crashes but could better align these efforts with the City's goal to eliminate fatal and serious injury crashes.

As part of its traffic safety efforts, ATD has focused on improving intersections, because this is where U.S. Federal Highway Administration guidance suggests most fatal and serious injury crashes occur. ATD has improved nine intersections since 2015 and is working on another eight. Preliminary data from ATD indicates that there are significantly fewer crashes, including severe crashes, at some of the improved intersections. However, ATD staff said it is still too early to determine the long-term success of these efforts because the improvements were only recently completed.

Improving intersections may reduce crashes and make the intersections safer. However, ATD's initial process to select intersections may not have supported the Vision Zero goal of reducing fatal and serious injury crashes. In 2015, ATD identified a group of 28 intersections to improve with funding from the 2016 transportation bond. ATD selected these intersections based on lists of dangerous intersections identified by the Austin Police Department (APD). Our review of documentation related to improvements at these intersections indicated there were few fatal or serious injury crashes between 2012 and 2016.²

Recently, ATD created a new list of 150 dangerous intersections intended to guide future improvement efforts. The initial list was based on the number of crashes at each intersection though and staff did not consider crash severity until later in the process. We analyzed the same crash data used by ATD and found five intersections with a relatively high number of fatal and/or serious injury crashes that were not included on ATD's list. However, ATD staff said they are currently reviewing how crash severity and other factors are considered in the intersection selection process. ATD staff said that crash patterns also need to be considered when determining which intersections to improve in order to best use limited resources.

Even if ATD considers crash severity when selecting intersections for improvement, this may have little impact on the overall number of fatal

U.S. Federal Highway Administration guidance suggests most fatal and serious injury crashes occur at intersections.

² Issues with this documentation are described in Finding 2.

Austin's High Injury Network is made up of 8% of the City's street network, but accounts for 70% of all fatal and serious injury crashes.

and serious injury crashes in the City. One reason is fatal and serious injury crashes have historically happened at many different intersections. Between 2012 and 2016, over 750 intersections had a severe crash. And 75% of those intersections only had one severe crash in that five-year period. ATD is only able to improve 3-4 intersections per year, so addressing all intersections with a severe crash is not possible. Additionally, ATD staff noted that historical crash locations may not predict future crash locations and a severe crash could occur at any of the other 20,000 intersections in Austin.

In an effort to best use limited resources to address the most dangerous areas, ATD recently adopted the Austin Strategic Mobility Plan. This plan notes that approximately 70% of all fatal and serious injuries occur on just 8% of the City's street network. ATD plans to use this information to direct future improvement projects.

Finding 2

The Austin Transportation Department previously lacked some data that would help determine where and how to make City streets safer, and decisions related to intersection design improvements were not well documented.

ATD identifies dangerous locations in the City based on TxDOT crash data.

Many factors can contribute to crashes, such as street design, vehicle speeds, traffic volume, and human behavior. ATD staff uses data about crashes to help determine where and how to make City streets safer and has worked to improve the quality of this data. However, we noted some areas where crash data could be improved.

Existing crash data is not always complete or accurate

ATD maps the location of crashes based on crash coordinates in the Texas Department of Transportation's (TxDOT) crash database. This database has information from crash reports prepared by officers and TxDOT uses these reports to determine the crash coordinates.³ ATD staff said that this is the best source of data available for mapping where crashes happen.

While we found that most of the crash coordinates appeared to be accurate, the coordinates did not always appear to correctly indicate where the crash occurred. We reviewed a sample of crash data and found about 7% of crashes had coordinates that did not match the location described in the officer's report. Additionally, about 10% of the crashes in TxDOT's data do not have coordinates. ATD staff said they did not have the resources to include crashes without coordinates in their analysis, even though some of these crashes involved serious injuries. However, ATD staff said they are working internally and with APD to address these issues with crash coordinates.

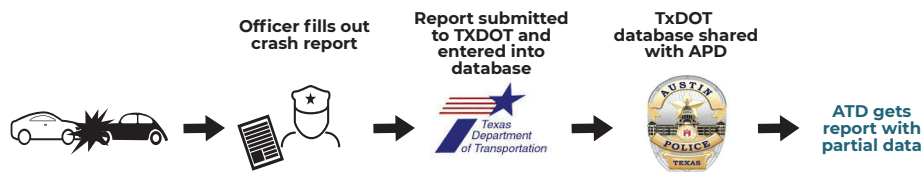
In addition, ATD staff said they previously had issues accessing some crash data. In the past, the crash data ATD used came from a report APD pulled from TxDOT's crash database, as shown in Exhibit 2. This report did not contain all available crash data such as some potential causes of crashes. Potential causes are factors, such as driver inattention, intoxication, or speed, which an officer may think contributed to the crash. Because this data was not in the report ATD previously used, ATD staff would not have known this information. ATD could have gotten this information by

³ Crash reports can be completed by various officers including those working with APD, Texas Department of Public Safety, and County Sheriffs.

reviewing every crash report, but this process would be time consuming. ATD staff said they recently signed a new agreement with TxDOT which gives them access to the entire database.

ATD said they recently gained direct access to TxDOT's crash database.

Exhibit 2: Crash Data starts with a Crash Report



SOURCE: OCA analysis of crash data sources, June 2019

We also noted instances where an officer's narrative description of the crash differed from what was recorded in the contributing factor sections. In one example, an officer wrote that a driver ran a red light because they were distracted, but driver distraction was not listed as a contributing factor on the crash report. In another example, a driver was charged with intoxication manslaughter, but intoxication was not listed as a contributing factor on the crash report.

Crash data used by ATD is primarily collected for law enforcement purposes and not to identify potential design improvements. As a result, ATD staff often review individual crash reports for selected intersections to determine what factors may have contributed to the crash and what design solutions might help prevent future crashes. More complete and consistent crash reports would allow ATD to identify potential design improvements more easily. ATD staff said they plan to work with APD to train new cadets about Vision Zero and how critical accurate crash report information is to this effort.

In addition to these crash data issues, ATD staff said that, like other cities, they are working to collect better data on where, when, and how much people walk and bike in Austin. This information could help determine where improvements are most needed and how many road users would be impacted by the changes. Staff say they are currently working with UT and other partners on strategies to gather this data.

Documentation Issues

ATD provided us with documents related to analyzing improvements at 13 intersections, and we noted some inconsistencies in these records. In several instances documents for an intersection did not list the same number of crashes for that intersection. It is unclear if these inconsistencies affected ATD's analysis or decisions related to improvements at those intersections.

ATD is working to refine its process for identifying dangerous streets and intersections.

Additionally, although staff said they considered various factors when identifying the causes of crashes, there was limited evidence of this in the documents ATD provided. For example, crash data at several intersections indicated a high percentage of crashes occurred at night, but ATD did not provide documentation that showed staff had considered poor lighting or

lack of visibility as possible causes.

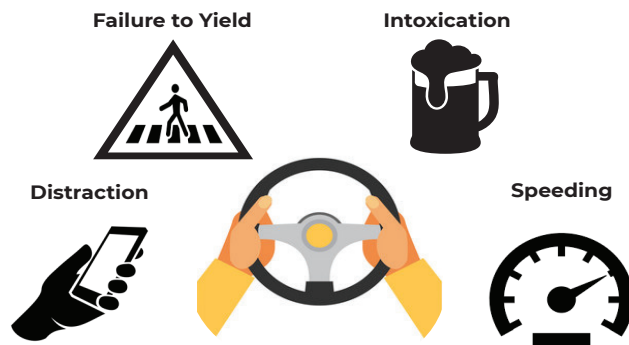
Finally, ATD's methodology for identifying the top 150 dangerous intersections in the City was not formally documented. This process was complex, time-intensive, and made more difficult with the data reliability issues noted above. Without clearly documenting the process, it may be difficult for staff to repeat it in the future or identify areas where it could be improved. ATD staff stated they are in the process of reviewing this methodology and will formally document it for future efforts.

Finding 3

The City uses various ways to educate the public about traffic safety, but these efforts could be better targeted to address the dangerous behaviors that frequently result in serious crashes.

ATD and its partners used a wide variety of materials and methods to reach road users, including social media, print and digital materials, and radio and TV advertisements. They also distributed safety materials directly to vulnerable populations and at public health related events. However, ATD lacked targeted education campaigns to address the dangerous behaviors noted as frequent causes of crashes.

Exhibit 3: Four Dangerous Behaviors are Frequently Cited as Causes of Crashes in Austin



SOURCE: Austin Strategic Mobility Plan 2019

In Austin, most fatal and serious injury crashes are attributed to four dangerous driver behaviors. These behaviors, as shown in Exhibit 3, are failure to yield, distraction, speeding, and intoxication. Only one of these behaviors was the focus of a specific education action in the original Vision Zero Action Plan.

Some of the City's more recent traffic safety plans note the need to address dangerous behaviors, but also lack specific strategies for educating the public on these issues. For example, the Austin Strategic Mobility Plan calls for the creation of safety education campaigns to target the dangerous behaviors mentioned above. However, these plans also do not include specific strategies or details for how and when education efforts will be implemented. ATD staff said they are continually refining their strategies and told us they recently created a postcard to distribute at outreach events (shown in Exhibit 4) to address the dangerous behaviors.

Exhibit 4: Example of a recent ATD effort to address dangerous driving behaviors



SOURCE: Austin Transportation Department, 2019

Philadelphia's "Safety Six" education campaign helps give visibility to six dangerous driving behaviors that cause crashes in their city.

We reviewed Vision Zero efforts in peer cities and found that some had more specific actions to address dangerous road user behaviors. For example, Philadelphia created an educational campaign around dangerous driving behaviors called the "Safety Six" and New York City had a public education campaign with videos and signage that address dangerous behaviors and consequences.

Many of these cities have only recently adopted Vision Zero plans and it is too early to determine how well these education efforts have addressed dangerous driving behaviors. However, targeting education efforts to the specific dangerous behaviors that contribute to most of Austin's fatal and serious injury crashes may be more effective at reducing those types of crashes.

Additional Observation

The City and the Austin Transportation Department have worked to promote traffic safety, but the City's ability to address some of the conditions related to traffic deaths and serious injuries is limited. This makes it unlikely the City will be able to eliminate these types of crashes.

The City and ATD have engaged in numerous programs and initiatives to promote traffic safety in the last several years. Despite these efforts, the fatality rate in Austin is relatively unchanged compared to 2008. While the fatality rate has declined since 2015, traffic deaths in 2019 are 19 percent higher than this time last year.⁴

One reason may be that the City has a limited ability to address some of the conditions that contribute to these crashes. For example, many of Austin's traffic deaths occur on roads the City does not control, such as Interstate 35. According to the Pedestrian Safety Action Plan, from 2010 to 2015, nearly 20% of Austin's pedestrian deaths occurred on Interstate Highways. In other instances, state laws limit the City's ability to effectively promote traffic safety, such as making it difficult to reduce speed limits and prohibiting red-light cameras. Additionally, some vulnerable populations, like people experiencing homelessness, are more at-risk for being seriously injured or killed in a crash. Almost all the pedestrians killed in traffic crashes during the first half of 2019 have involved people experiencing homelessness.

The Austin Strategic Mobility Plan notes many of these challenges and the importance of working with federal and state partners on traffic safety issues. While a goal of zero traffic deaths and serious injuries is an appropriate vision for Austin, ATD staff acknowledged that it is unlikely the City will achieve that goal by 2025.

⁴ Fatality rate calculated as of 8/15/2019

Recommendations and Management Response

1 | The Austin Transportation Department Director should ensure that the severity of crashes is considered at all stages of analysis in future decisions related to improving safety on City streets.

Management Response: Agree

Proposed Implementation Plan: Beginning in April 2019, ATD staff engaged with the University of Texas's Center for Transportation Research and other faculty from the Department of Mechanical Engineering and the LBJ School of Public Affairs to perform research this summer on transportation safety program best practices. This includes identifying methods of systemic analysis of the City's roadway network for identification of candidate locations for engineering treatments, using appropriate weighting for crashes based on severity of crash outcomes as a primary factor. With additional insights on how to optimize safety project spending, this work will inform future project selection for use of the 2018 bond program funds for transportation safety.

ATD staff continue to convene a Fatality Review Board consisting of other City departments and TxDOT staff to review every fatal crash that occurs, and this group identifies where engineering solutions would be beneficial based on specific crash details and historical crash patterns at those respective locations.

Proposed Implementation Date: First phase of systemic analysis complete by December 31, 2019, final systemic modeling with full data capabilities by Summer 2020.

2 | The Austin Transportation Department Director should improve data related to traffic crashes by working with the Austin Police Department and other relevant parties to identify ways to improve and collect key data. This includes gaining access to all of TxDOT's crash data, working with APD to improve data collection and consistency of data entries, and gathering additional data on pedestrian and bicycle traffic volumes.

Management Response: Agree

Proposed Implementation Plan: ATD's Vision Zero and Data and Technology Services teams have collaborated on an approach to ensure full access to TxDOT crash data and are in the process of creating an internal database of crash records. This includes establishing a new process to verify and fill in geolocation data where it is missing, with a focus on severe crashes. In the future, this relational database will be linked to other ATD and City databases based on locational attributes to ensure robust analyses can be achieved.

ATD staff continue to work with Austin Police Department staff on improving the source data that are included in police reports that are analyzed. APD leadership have offered to include additional information in their cadet training courses related to the importance of full and accurate information in the crash reports.

ATD is involved with several pilot projects aiming to leverage new technologies to detect active users on and around our roadways. This, in addition to purchased data sets and data from our signal and counter technology in the field, should provide a more robust understanding of active user volumes into the future.

Proposed Implementation Date: The new crash database with improved data quality, along with new information for APD cadet trainings, is scheduled to be in place by January 2020.

3 | The Austin Transportation Department Director should ensure that decisions related to all roadway improvements are appropriately documented. This includes any methodology used to identify and prioritize dangerous locations, analysis of crashes at selected intersections, and improvements recommended to address safety issues.

Management Response: Agree

Proposed Implementation Plan: The work being done this summer by UT's Center for Transportation Research and partners will provide much of the information needed to develop a methodology to apply moving forward on identifying and prioritizing dangerous locations. This will include clear criteria, documentation on each step in the analysis, countermeasures considered and the associated cost/benefit analysis, and the resulting project rankings. ATD staff will also perform before/after analyses to assess whether the countermeasures are performing as anticipated. Any improved locations will be incorporated back into the prioritization process to determine if additional improvements are needed at the locations where the countermeasures were implemented (full cycle analysis).

Proposed Implementation Date: First phase of systemic analysis complete by December 31, 2019, final systemic modeling with full data capabilities by Summer 2020.

4 | The Austin Transportation Department Director should expand traffic safety education efforts by developing and implementing strategies to specifically target dangerous behaviors.

Management Response: Agree

Proposed Implementation Plan: The most recent analysis of the top contributing behaviors for Austin crashes was done in conjunction with the development of the Austin Strategic Mobility Plan, which was completed earlier in 2019. Since that time, ATD staff have focused our public education communications on the four key behaviors identified. However, these behaviors have not always been described as a defined group (using terminology found in other cities, like the "fatal four"). Vision Zero staff are in the process of developing a communications plan for the Vision Zero program with a multi-agency group, and this potential strategy will be considered within that planning process.

In addition, ATD staff are in the process of developing and soliciting a contract for marketing services for the department, and the Vision Zero program will be prioritized for development of effective marketing messages based on proven behavioral science research. ATD staff intend to utilize crash data analysis to inform more targeted campaigns on the key behaviors to specific populations.

Proposed Implementation Date: The communications plan, contract solicitation, and development of a new marketing campaign will all be completed in Spring 2020.

Management Response




AUSTIN TRANSPORTATION DEPARTMENT

MEMORANDUM

TO: Corrie Stokes
City Auditor, Office of the City Auditor

CC: Gina Fiandaca, Assistant City Manager

FROM: Robert Spillar, P.E.
Director, Austin Transportation Department 

DATE: September 19, 2019

SUBJECT: Management Response to Audit of Traffic Safety

Thank you for the opportunity to respond to the "Traffic Safety: Design and Education" audit report findings and recommendations. Management agrees with the specific recommendations and appreciate the work your team did over the course of the audit to understand the complexity of the issues and how these issues have evolved over time with this relatively new program. We view the internal audit as a reinforcement of our efforts to further strengthen our program targeting the elimination of serious injuries and fatalities on our transportation system. In addition, ATD would like to provide some additional context in response to the summary statement in the report, as this audit's scope did not allow for a comprehensive overview of the topic.

The foundational concept behind the Vision Zero approach is that any loss of life due to preventable car crashes is unacceptable, and therefore no goal above zero traffic fatalities is reasonable. This approach to transportation safety has its roots in Europe from the 1990s, and the most successful places have seen reductions in traffic fatalities of as much as 60%. These reductions have been achieved by continuous efforts on the part of participating jurisdictions to reduce these tragedies over a long period of time.

However, no comparable community to Austin has been able to achieve zero deaths/serious injuries, even with substantial investments and policy changes. When adopting the goal of Vision Zero just four years ago, the community and the policy makers understood that this is an aspirational goal and the City aims to make as much progress towards this as quickly as it can, similar to other public safety goals such as the goal for zero unintentional fire deaths.

Since the implementation of Vision Zero, we have been able to reduce the number of fatalities and serious injuries from our City's previous high in 2015. We have been able to reduce the fatality rate while the community has experienced dramatic population growth. For Austin to realize further significant progress towards zero deaths and zero serious injuries, we will need to make significant systemic changes. Those changes that are still needed include aggressive management of driver speeds, increasing enforcement efforts to address the key behaviors contributing to crashes, fully prosecuting traffic offenses to make sure frequent offenders are removed from the roadways, increasing targeted education efforts, increasing alternative

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that enhances the environment and economic strength of the region.*

transportation options so that people can choose not to drive, and continuing to adapt the City's built environment to reduce the negative impacts of human errors.

This initiative will take continued, sustained commitment from policy makers, policy administrators, and users of the roadway system toward the ultimate goal of zero deaths and zero serious injuries. ATD is committed to this goal and looks forward to continued discussion with City Council on how to achieve substantial progress towards our ambitious Vision Zero goal.

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that enhances the environment and economic strength of the region.*

Scope

City efforts related to implementation of the Vision Zero Action Plan with a focus on intersection improvements (including crash data from 2012 to 2016) and education efforts.

Methodology

To complete this audit, we performed the following steps:

- interviewed key staff in the Austin Transportation Department, Austin Public Health, Public Works and Austin Police Department;
- analyzed crash data from the Crash Records Information System (CRIS) from 2012 to 2016;
- reviewed Austin Transportation Department methodologies for analyzing crash data;
- reviewed Austin Transportation Department collision analysis reports and other analysis of crash causes;
- reviewed Austin Transportation Department before and after crash analysis of improved intersections;
- reviewed sample communication between the Austin Transportation Department and Public Works Department to coordinate street maintenance activities;
- interviewed members of the Pedestrian and Bicycle Advisory Councils;
- interviewed staff from the Texas Department of Transportation's Data Integrity and Analysis group in the Traffic Safety Division;
- reviewed the Texas A&M Transportation Institute report, Transportation Safety Education: A Strategic Guidance Report;
- reviewed Public Works' policies and procedures;
- reviewed the City of Austin 2016-2018 Vision Zero Action Plan;
- reviewed the City of Austin Pedestrian Safety Action Plan 2018;
- reviewed the Austin Strategic Mobility Plan, 2019;
- reviewed the Vision Zero plans of the following cities: Denver, New York, Philadelphia, Portland, San Antonio, and Seattle;
- reviewed City of Austin census data for 2008 through 2018;
- evaluated internal controls related to ATD's traffic design and education efforts; and
- evaluated the risks related to fraud, waste, and abuse with regard to ATD's traffic safety design and education efforts.

Audit Standards

We conducted this performance audit in accordance with Generally Accepted Government Auditing Standards. Those standards require that we plan and perform the audit to obtain sufficient, appropriate evidence to provide a reasonable basis for our findings and conclusions based on our audit objectives. We believe that the evidence obtained provides a reasonable basis for our findings and conclusions based on our audit objectives.

The Office of the City Auditor was created by the Austin City Charter as an independent office reporting to City Council to help establish accountability and improve City services. We conduct performance audits to review aspects of a City service or program and provide recommendations for improvement.

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