



Audit of Pedestrian Safety

May 23, 2022

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Executive Summary

Objective and Scope

The objective of the audit was to evaluate the effectiveness and efficiency of traffic control operations in relation to pedestrian safety. The scope of this audit included fiscal years 2018 through 2020.

What We Recommend

To improve its strategic and operational planning for pedestrian safety, the Dallas Department of Transportation should:

- Develop and implement pedestrian safety related operating procedures, criteria and work instructions.
- Develop and implement a plan to eliminate maintenance backlog.
- Align maintenance schedules with federal and state guidelines.

Background

The City of Dallas has a high rate of pedestrian fatalities and severe injuries and has been designated a Federal Highway Safety Administration Focus City. In 2017, Dallas had the fifth highest pedestrian traffic fatality rate among the nation's 25 largest cities and the highest rate among Texas' six largest cities.

What We Found

The City of Dallas and the Dallas Department of Transportation have undertaken several programs to improve pedestrian safety, such as: *Vision Zero* efforts approved by the City Council in 2019 designed to eliminate traffic fatalities and achieve a 50 percent reduction in severe injuries by 2030; Complete Streets; Connect Dallas; Sidewalk Master Plan; Traffic Signal Replacement and Upgrades; and, Safe Routes to School. These efforts have resulted in the identification of streets with multiple pedestrian incidents and efforts to address them. However, the Dallas Department of Transportation does not have performance measures and written procedures directly related to pedestrian safety.

Additionally, the Dallas Department of Transportation:

- Has a backlog of 1,500 crosswalks where thermoplastic markings have not been refreshed.
- Does not maintain pedestrian countermeasures as frequently as federal and state guidelines recommend.

Objectives and Conclusions

1. Does the Dallas Department of Transportation have a documented, effective, and efficient process for reducing the risk of serious or fatal injuries to pedestrians at locations that experience multiple serious or fatal pedestrian crashes?

No. The Dallas Department of Transportation does not have a documented process for effectively and efficiently reducing the risk of serious or fatal injuries at locations that experience multiple serious or fatal pedestrian crashes. The Federal Highway Administration recommends developing a Pedestrian Safety Action Plan to improve pedestrian safety. (*See Observation A*).

2. Does the Dallas Department of Transportation service and maintain existing pedestrian safety countermeasures in accordance with best practices according to *Texas Manual on Uniform Traffic Control Devices* or other best practices?

No. The Dallas Department of Transportation does not service and maintain existing pedestrian safety countermeasures in accordance with best practices such as the *Texas Manual on Uniform Traffic Control Devices* and *Federal Highway Administration's Guide for Maintaining Pedestrian Facilities for Enhanced Safety*. In addition, the Dallas Department of Transportation is behind in meeting its maintenance goals. (*See Observations B and C*).

Audit Results

Both *City Council Resolution 88-3428* and Administrative Directive 4-09, *Internal Control* prescribe policy for the City to establish and maintain an internal control system. The audit observations listed are offered to assist management in fulfilling their internal control responsibilities.

Observation A: Pedestrian Safety Goals, Performance Measures, and Written Procedures

The Dallas Department of Transportation does not have formal, written, specific, measurable, and time-focused goals and performance measures and associated written procedures and work instructions for strengthening pedestrian safety in Dallas. A comparison of departmental written procedures and unwritten practices to the critical pedestrian safety elements recommended by the United States Department of Transportation, Federal Highway Administration's (found in *How to Develop a Pedestrian and Bicycle Safety Action Plan*) demonstrates the following improvements could increase pedestrian safety:

Goals and Performance Measures

The Dallas Department of Transportation does not have formal, written, specific, measurable, and time-focused goals and performance measures that specifically address pedestrian safety. The department does track the progress of crosswalk refreshment, replacement of aging signs, street striping, responsiveness to signal malfunctions, and signal cabinet inspections, and utilizes monthly crash reports, which provide the most recent statistics on traffic fatalities citywide, including pedestrian fatalities. The monthly crash reports detail factors such as incident locations and types (e.g., at a crosswalk, not at a crosswalk, or on the side of the roadway) but do not include severe injuries. Also, none of the procedures include setting and tracking:

- Explicit targets for reducing pedestrian fatalities, injuries, and/or crashes.
- Timeline for achieving these results.

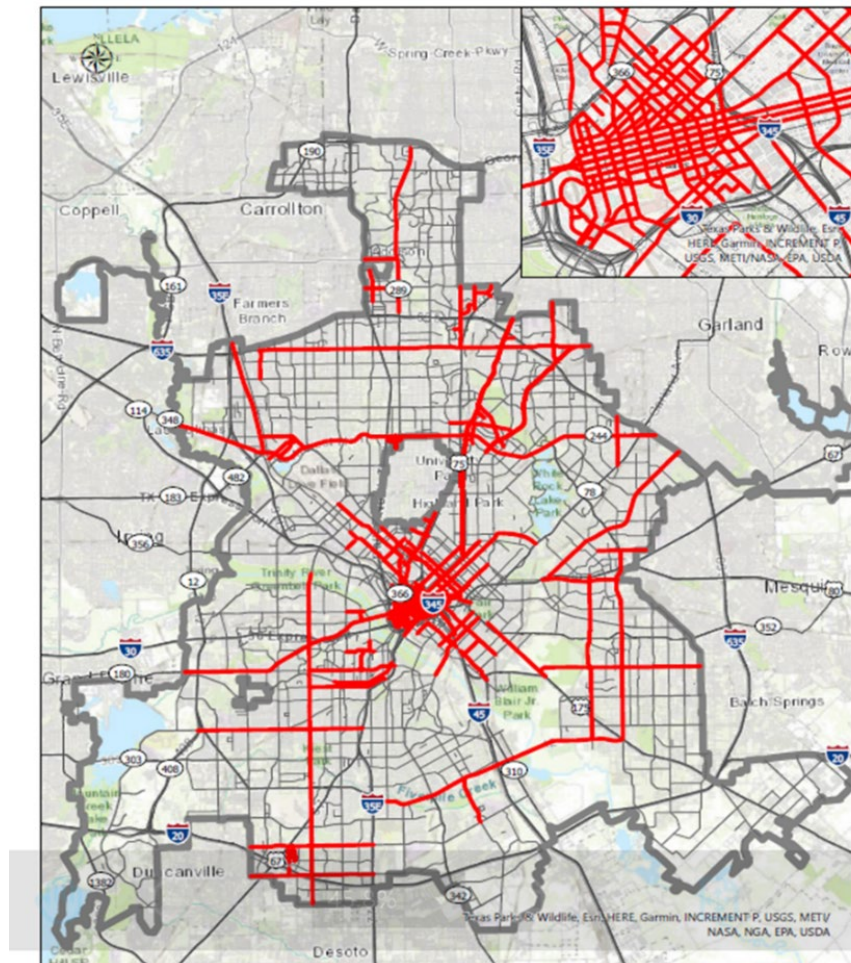
As a result, the Dallas Department of Transportation has not focused goals, performance measures, and written procedures on pedestrian safety and accommodation.

Data Analysis

Using crash data from the Texas Department of Transportation, the Dallas Department of Transportation has recently created a draft *Pedestrian High Injury Network*, i.e., a map of streets with multiple pedestrian incidents resulting in a fatality or severe injury as part of *Vision Zero* (See Exhibit 1 on page 4). However, the department does not have a formal written plan or operating procedures on how to apply this data to improve safety conditions in the identified high-incident areas, improve departmental operations, or support funding opportunities. Without a written plan or operating procedures, current operations may fail to be continued in the event of employee turnover or shifts in responsibilities.

Exhibit 1:

Pedestrian High Injury Network



Source: City of Dallas, Department of Transportation

Improvements to Pedestrian Countermeasures¹

The Dallas Department of Transportation does not have: 1) an explicit pedestrian priority written into procedures and work instructions; 2) criteria for which pedestrian incidents it should investigate and when to conduct a traffic study or road safety audit to evaluate issues at sites with multiple pedestrian incidents and what safety improvements to implement; and, 3) procedures to evaluate the effectiveness of implemented pedestrian countermeasures.

¹ Pedestrian countermeasures are traffic signs, traffic lights, and street and intersection engineering designs aimed at pedestrian accident prevention, such as sidewalks, walkways, crosswalks, crossing islands, dedicated lanes, signals and signs, etc.

Explicit Pedestrian Priority

The City's *Complete Streets Manual*, maintained by the Department of Public Works, does not detail an explicit pedestrian priority. An example of an explicit pedestrian priority model can be seen in *Complete Streets Chicago: Design Guidelines* that require all transportation projects and programs, from scoping to maintenance, to favor pedestrians first, then transit riders, cyclists, and automobiles. Without a policy or objective statement which clarifies that pedestrian safety should be prioritized, the Dallas Department of Transportation engineers lack direction on how to achieve this goal.

Incident Investigation, Traffic Studies, and Safety Audits

The Dallas Department of Transportation does not have procedures or criteria to prompt further investigation, traffic studies, or road safety audits at high injury pedestrian locations, and evaluate the effectiveness of the implemented countermeasures. Due to this, some high injury locations may not be addressed in a timely manner and may cause equity issues. According to *Dallas City Code Chapter 28, Article II, Traffic Administration, Division 2. Traffic Division, Sec. 28-17 Traffic Accident Studies*, the Dallas Department of Transportation and the Dallas Police Department are tasked with working together to determine the appropriate countermeasures at sites where injuries are numerous.

Criteria

- ❖ Federal Highway Administration's *How to Develop a Pedestrian and Bicycle Safety Action Plan*.
- ❖ *United States Department of Transportation Policy Statement on Bicycle and Pedestrian Accommodation Regulations and Recommendations*.
- ❖ Federal Highway Administration's *A Guide for Scalable Risk Assessment Methods for Pedestrian Safety*.
- ❖ Federal Highway Administration's *Guide for Improving Pedestrian Safety at Uncontrolled Crossing Locations*.
- ❖ The *2018-2019 Department of Transportation Annual Budget*.
- ❖ The Dallas City Code, Article II, Section 28: Traffic Administration:
 - *Subsection 8: Traffic Engineer – Duties*.
 - *Subsection 17: Traffic Accident Studies*.
- ❖ Per *The City of Dallas Complete Streets Design Manual*.
- ❖ Standards for Internal Control in the Federal Government:
 - *Principal 7 – Identify, Analyze, and Respond to Risks*.
 - *Principal 10 – Design Control Activities*.

Assessed Risk Rating:

High

We recommend the Director of the Dallas Department of Transportation:

- A.1:** Develop and implement specific, measurable, and time-bound goals, objectives, and performance measures to improve pedestrian safety.
- A.2:** Develop and implement written operating procedures for collecting, analyzing, and using pedestrian accident data to improve safety conditions at high injury locations.
- A.3:** Develop and implement written criteria and work instructions for decision-making related to: a) pedestrian incident investigations, traffic studies, and road safety audits; b) appropriate pedestrian countermeasures; and, c) re-design of high injury locations.
- A.4:** Align departmental procedures to prioritize pedestrian traffic over other modes of transportation as recommended by the Federal Highway Administration's *How to Develop a Pedestrian and Bicycle Safety Action Plan*.

Observation B: Crosswalk Maintenance

The City is not consistently budgeting to meet its crosswalk maintenance schedule and has a backlog of 1,500 crosswalks needing thermoplastic marking² refreshment, estimated to cost \$1.2 million. Since thermoplastic marking tape loses reflectivity and can also become slippery over time, this may result in less visibility and driver awareness of pedestrian crossings and reduced traction.

The Dallas Department of Transportation's maintenance cycle for crosswalk thermoplastic marking refreshment is once every ten years or 830 crosswalks per year. The fiscal year 2022 budget includes funding to meet the annual goal of 830 crosswalks. In fiscal year 2021, only 70 crosswalks (less than 1% of the 830 per year goal) were funded for maintenance.

Variable funding makes it difficult to achieve the Dallas Department of Transportation's maintenance cycle for refreshment, let alone eliminate the backlog. The Dallas Department of Transportation relies on a staff of seven people to manage crosswalk maintenance. The budget had been reduced by more than \$400,000 since fiscal year 2016.

As noted in [Observation D](#), the Federal Highway Administration's *Guide for Maintaining Pedestrian Facilities for Enhanced Safety* says crosswalk thermoplastic markings have a shorter life cycle than the City's replacement plan provides.

Criteria

- ❖ Standards for Internal Control in the Federal Government

Principal 17 – Evaluate Issues and Remediate Deficiencies.

Assessed Risk Rating:

Moderate

We recommend the Director of the Dallas Department of Transportation:

- B.1:** Develop and implement a plan to eliminate the refreshment of crosswalk thermoplastic markings backlog with:
- The department's strategy for the elimination of the backlog.
 - Criteria for prioritizing the crosswalks for refreshment.
 - Annual crosswalk refreshment goals and performance measures.
 - Required funding.
 - An estimated number of years it will take to eliminate the backlog.

² Reflective thermoplastic is a pavement marking tape that is a mixture of glass beads, pigments, binder, and filler materials applied to road surfaces to make road markings more visible.

Observation C: Maintenance Schedules

The Dallas Department of Transportation maintenance schedules for pedestrian countermeasures do not match Federal and State recommendations found in the Federal Highway Administration guidance and *Texas Manual on Uniform Traffic Control Devices* guidelines (see exhibit 2). As a result, the pedestrian countermeasures mentioned below may fail, exposing pedestrians to unnecessary risk.

Exhibit 2:

Pedestrian Countermeasure	Federal or State Guidance	Dallas Maintenance Requirements
Accessible Pedestrian Traffic Signals	Should be inspected every six months and after repairs to intersection signals, poles, or controller, and after changes to signal timing.	Every 18 months and/or after any signal component is repaired/replaced,
Pedestrian Traffic Signs	Should have scheduled inspections for reflectivity and should be replaced every ten years.	Serviced or replaced per citizen request or observation of a traffic sign in poor condition by Transportation staff.
Refreshment of Crosswalk Thermoplastic Markings	Should be performed as needed for wear and tear, with a maximum interval of every seven years.	Every ten years.

Source: Dallas Department of Transportation maintenance practices, Federal Highway *Administration Guide for Maintaining Pedestrian Facilities for Enhanced Safety* and *Texas Manual on Uniform Traffic Control Devices* guidelines.

According to the Dallas Department of Transportation, maintenance schedules have not been aligned with best practices due to limited resources and funding.

Criteria

- ❖ The Federal Highway Administration's *Guide for Maintaining Pedestrian Facilities for Enhanced Safety*.
- ❖ *Texas Manual on Uniform Traffic Control Devices*.
- ❖ Standards for Internal Control in the Federal Government:
 - Principal 10 – Design Control Activities.*
 - Principle 12 – Implement Internal Control.*

Assessed Risk Rating:

Low

We recommend the Director of the Dallas Department of Transportation:

- C.1:** Align maintenance schedules for pedestrian safety countermeasures with the *Federal Highway Administration's Guide for Maintaining Pedestrian Facilities for Enhanced Safety* and the *Texas Manual for Uniform Traffic Control Devices*.

Appendix A: Background and Methodology

Background

The Dallas Department of Transportation was established in fiscal year 2018 and in fiscal year 2021 had a budget of \$43,105,575.

Pedestrian Safety

The City of Dallas has a high rate of pedestrian fatalities and severe injuries. In 2017, Dallas had the fifth highest pedestrian traffic fatality rate among the 25 largest United States cities and the highest rate among Texas' six largest cities.

Exhibit 3:

Traffic Safety in Dallas: Comparison to Top 25 Largest U.S. Cities



Many cities across the nation are facing similar challenges with pedestrian safety. To combat this, the United States Department of Transportation has issued a policy statement *"to incorporate safe and convenient walking and bicycling facilities into transportation projects,"* further specifying that *"every transportation agency has the responsibility to improve conditions and opportunities for walking"* and that *"transportation agencies are encouraged to go beyond minimum standards to provide safe and convenient walking facilities."* The Federal Highway Administration has also released numerous resources and guides on how to improve pedestrian safety, including a guide on how to create a pedestrian safety action plan, for example:

- *United States Department of Transportation Policy Statement on Bicycle and Pedestrian Accommodation Regulations and Recommendations.*
- *How to Develop a Pedestrian and Bicycle Safety Action Plan.*
- *Federal Highway Administration's Guide for Maintaining Pedestrian Facilities for Enhanced Safety.*

The City of Dallas and the Dallas Department of Transportation have undertaken certain efforts to improve pedestrian safety, such as:

- *Vision Zero* - the City Council adopted *Vision Zero* in December 2019, which commits the City to a goal of zero traffic fatalities and a 50 percent reduction in severe injuries by 2030. The *Vision Zero Action Plan* draft presented to City Council on January 5, 2022, includes the following:
 - Develop metrics for evaluating safety projects and conduct before-and-after studies to assess their effectiveness.
 - Convene regular meetings between DDOT and DPD to review fatality reports with a target date of 4 meetings a year.
 - Install new or improved pedestrian crossings at locations identified by data.
- *City of Dallas Complete Streets Design Manual* initiative was launched in January 2016 to achieve phased transformation of Dallas' streets through public improvements and private developments.
- *Connect Dallas Strategic Mobility Plan* creates a framework for investing and addressing transportation issues in ways that support broader City goals, driving principles, and the vision for transportation in Dallas.
- *Dallas Sidewalk Master Plan* (Department of Public Works) is aimed at improving city-wide pedestrian experiences by identifying the most impactful projects and providing guidance for decision makers on budgeting for both new construction and sidewalk repair projects, in alignment with the City's *Connect Dallas Strategic Mobility Plan*.
- Traffic Signal Replacement and Upgrades: the Dallas Department of Transportation has been upgrading the infrastructure and technology of the City's 1,405³ traffic signals in accordance with the *2020 General Traffic Signal Construction Specification*.
- *Safe Routes to School*. The Dallas Department of Transportation regularly pursues external funding opportunities through the North Central Texas Council of Governments to improve routes for children and families to safely walk and bicycle to school.

³ As of December 2020.

In addition, the North Texas Council of Governments developed a Regional Pedestrian Safety Action Plan. The Regional Transportation Council took action to endorse the plan on June 10, 2021. The regional plan includes goals and policies that support the Regional Transportation Council's safety position and adopted safety targets, and action items to address pedestrian safety issues.

Methodology

The audit methodology included: (1) interviewing personnel from the Dallas Department of Transportation and other city departments; (2) reviewing policies and procedures, Dallas City Code, applicable Administrative Directives, the *Texas Manual on Uniform Traffic Controls Devices*, Federal Highway Administration policies and best practices; and, (3) performing various analyses, including the analysis of traffic controls located within the City's draft Pedestrian High Injury Network. In addition, all five components of *Standards for Internal Control in Federal Government* were considered.

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 upon our audit objective. We believe that the evidence obtained provides a reasonable basis for our findings and conclusions based on our audit objective.

Major Contributors to the Report

Kimberly Bernsen – In-Charge Auditor
Anatoli Douditski, MPA, CIA, ACDA – Engagement Manager

Appendix B: Management's Response

Memorandum



CITY OF DALLAS

DATE: May 20, 2022
TO: Mark S. Swann – City Auditor
SUBJECT: Response to Audit of Pedestrian Safety

This letter acknowledges the City Manager's Office received the *Audit of Pedestrian Safety* and submitted responses to the recommendations in consultation with the Dallas Department of Transportation (Transportation). We appreciate the City Auditor's review of pedestrian safety as it relates to Transportation's operations and the recommendations.

Transportation has thoughtfully reviewed the audit and associated recommendations. Coincidentally, the department previously recognized several of the issues described in the audit report as needing enhancement. Transportation has been developing and implementing solutions to address those issues over the past three years. A cornerstone of those solutions is the City's adoption of Vision Zero. Vision Zero is a globally recognized traffic safety strategy that seeks to eliminate all traffic fatalities, including pedestrian fatalities, and halve severe injuries by 2030. The department is confident the City's implementation of Vision Zero initiatives will increase safety, health, and equitable mobility for all.

Transportation agrees to implement most of the auditor's recommendations; however, we will accept the risk for two recommendations:

While Transportation agrees it would be ideal to align maintenance schedules for pedestrian safety with leading criteria, we will accept the risk for this recommendation due to resource challenges and uncertainty, particularly regarding funding and recruiting and retaining an adequate number of skilled employees.

Additionally, Transportation will accept the risk regarding the auditor's recommendation to prioritize pedestrian traffic over other modes of transportation. We believe that given the variety of the functions of our roadway system (e.g., residential, major thoroughfare, etc.), we must prioritize safety for all variations of multimodal movement and users, including

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pedestrians. Moreover, we believe the City's Vision Zero initiative will play a significant role in addressing the risk identified by the auditor and providing a safer roadway system for all users, including pedestrians.

Thank you for the opportunity to respond to this audit.

Sincerely,



T.C. Broadnax
City Manager

C: Genesis D. Gavino, Chief of Staff
M. Elizabeth Reich, Chief Financial Officer
Dr. Robert Perez, Assistant City Manager
Dr. Ghassan Khankarli, Director, Department of Transportation

Assessed Risk Rating	Recommendation	Concurrence and Action Plan		Implementation Date	Follow-Up/ Maturity Date
High	We recommend the Director of the Dallas Department of Transportation (TRN) :				
	A.1: Develop and implement specific, measurable, and time-bound goals, objectives, and performance measures to improve pedestrian safety.	Agree	The Dallas Department of Transportation (TRN) will develop and implement specific, measurable, and time-bound goals and objectives. TRN anticipates implementing this recommendation as part of the Vision Zero Action Plan developed in 2021. The action plan was presented to City Council on January 5, 2022 and we expect it to be adopted by the City Council later this year. Proposed Vision Zero measures include safety evaluations for streets on the High Injury Network (HIN), quick-build and lower cost safety improvements, improved pedestrian crossings at locations with identified safety challenges, and safe transportation around schools.	03/31/2023	09/30/2024
	A.2: Develop and implement written operating procedures for collecting, analyzing, and using pedestrian accident data to improve safety conditions at high injury locations.	Agree	TRN will document the department's existing process for acquiring monthly crash data reports from the Department of Data Analytics and Business Intelligence and ensure the procedures provide a consistent process for analyzing and using crash data reports to improve pedestrian safety.	09/30/2022	03/31/2023

Assessed Risk Rating	Recommendation	Concurrence and Action Plan	Implementation Date	Follow-Up/ Maturity Date
	A.3: Develop and implement written criteria and work instructions for decision-making related to: a) pedestrian incident investigations, traffic studies, and road safety audits; b) appropriate pedestrian countermeasures; and, c) re-design of high injury locations.	Agree TRN is in the process of creating written criteria and work instructions to ensure institutional knowledge is retained and there are consistent processes for conducting studies, interpreting information received, and applying appropriate countermeasures. Written criteria and work instructions will include (as appropriate) sources and location for information, criteria and data to be considered, where to store information for future retrieval/use, methodology of applying countermeasures, and how to engage other entities when projects go outside of TRN's sole scope of control.	03/31/2023	09/30/2023
	A.4: Align departmental procedures to prioritize pedestrian traffic over other modes of transportation as recommended by the <i>Federal Highway Administration's How to Develop a Pedestrian and Bicycle Safety Action Plan</i> .	Accept Risk City Ordinance Chapter 28, and sections of Chapter 43 and Chapter 51A, require TRN to perform safety assessments that consider all modes of transportation as part of an integrated approach to multimodal safety. Further, the variety of our roadway system (e.g., residential, major thoroughfare, etc.) requires prioritizing safety for all variations of movement and user, including pedestrians. Moreover, we believe the City's Vision Zero initiative will play a significant role in addressing the risk identified by the auditor and providing a safer roadway system for all users, including pedestrians. Therefore, we will accept the risk associated with this recommendation and continue to consider pedestrian and all other modes of transportation in our procedures and processes.	N/A	N/A

Assessed Risk Rating	Recommendation	Concurrence and Action Plan	Implementation Date	Follow-Up/ Maturity Date
Moderate	We recommend the Director of the Dallas Department of Transportation:			
	B.1: Develop and implement a plan to eliminate the refreshment of crosswalk thermoplastic markings backlog with: <ul style="list-style-type: none"> The department's strategy for the elimination of the backlog. Criteria for prioritizing the crosswalks for refreshment. Annual crosswalk refreshment goals and performance measures. Required funding. An estimated number of years it will take to eliminate the backlog. 	Agree In the fall of 2021, TRN began an in-depth analysis to address crosswalk and stop bar refreshment needs throughout the City. TRN has hired a vendor to supplement existing departmental resources in an effort to address the crosswalk markings backlog. Further, TRN's current appropriated budget and FY23 planned budget includes \$5,000,000 of American Rescue Plan Act funds to address 1,690 crosswalks in high priority areas. TRN will develop and implement a comprehensive multi-year plan as a tool to help address the crosswalk markings backlog and ongoing maintenance. The plan will be updated annually to reflect variances between projected and actual results, including funding appropriations.	9/30/2022	09/30/2024
Low	We recommend the Director of the Dallas Department of Transportation:			
	C.1: Align maintenance schedules for pedestrian safety countermeasures with the <i>Federal Highway Administration's Guide for Maintaining Pedestrian Facilities for Enhanced Safety</i> and the <i>Texas Manual for Uniform Traffic Control Devices</i> .	Accept Risk Due to resource challenges and uncertainties, particularly funding and recruiting and retaining an adequate number of skilled employees, TRN will accept the risk associated with this recommendation. However, TRN will review department maintenance schedules periodically to determine if closer alignment with the recommended criteria's pedestrian safety countermeasures' maintenance schedules is feasible. Further, we believe the City's Vision Zero initiative will play a significant role in addressing the risk identified by the auditor.	N/A	N/A