METHODS
CONSULTING

ROAD SAFETY AUDIT: 2200 WEST IN LAYTON (GORDON AVE TO ANTELOPE DR)

8/24/2026

PREPARED FOR:

WASATCH FRONT REGIONAL COUNCIL

SUBMITTED BY:

METHODS
CONSULTING

801-341-9020 Office
methodsconsulting.com
hello@methodsconsulting.com

Table of Contents

List of Figures

List of Tables

1. INTRODUCTION

Layton City, Utah, submitted a request to the Wasatch Front Regional Council (WFRC) to conduct a Road Safety Audit along 2200 West from Gordon Avenue to Antelope Drive. WFRC approved this request and retained METHODS Consulting as a third-party consultant to perform a Road Safety Audit with WFRC and staff from Layton in April 2026. This report summarizes the existing conditions of the project area, observations made in the field and short-, medium-, and long-term recommendations.

Road Safety Audit Definition

According to the Federal Highway Administration (FHWA), a **Road Safety Audit (RSA)** is a formal safety performance examination of an existing or future road or intersection by an independent, multidisciplinary team. It qualitatively estimates and reports on potential road safety issues and identifies opportunities for safety improvements for all road users.

Figure 1: Summary of What RSAs Are and Are Not

RSAs ***are:***	RSAs ***are not:***
• Focused on road safety • A formal examination • Proactive in nature • Conducted by a multidisciplinary team • Conducted by a team independent of the operations, design, or ownership of the facility • Conducted by a qualified team • Broad enough to consider the safety of all road users of the facility • Qualitative in nature	• A means to evaluate the design of a facility • A check of compliance with standards • A means of ranking or justifying one project over another • A means of rating one design option over another • A redesign of a project • A crash investigation (although the crash history of an existing facility is reviewed by an RSA team)

Road Safety Audit Meetings and Process

As noted above, the RSA process is conducted in accordance with FHWA guidelines. ***Figure 2*** outlines the steps involved in an RSA.

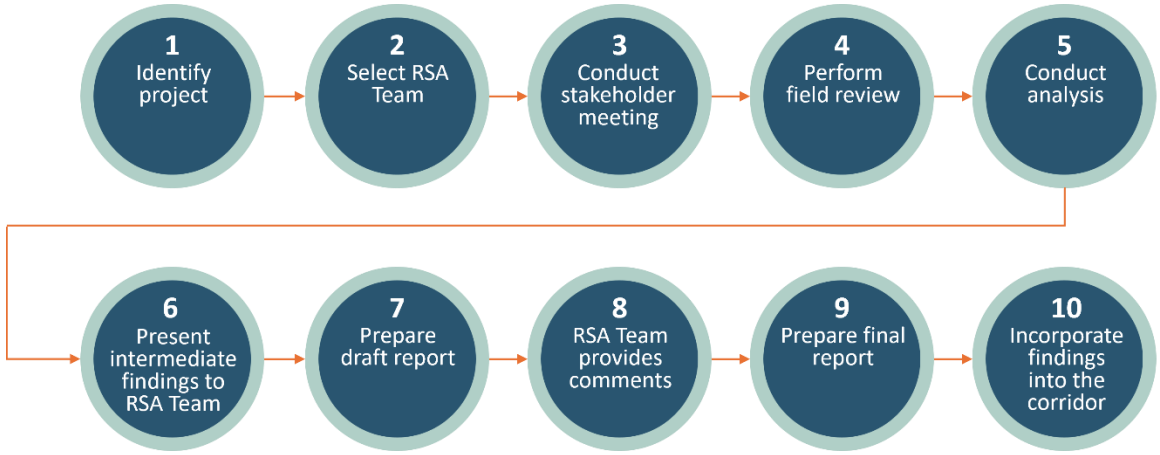


Figure 2: Key Steps in a Road Safety Audit

Stakeholders and points of contact participate throughout the process, particularly during key meetings. The kick-off meeting introduced the concept of an RSA, its process, and the responsibilities of the point of contact. At the organization meeting, WFRC staff, METHODS staff, and the point of contact identified the following locations for the field review:

- Antelope Drive
- Railroad crossing
- Denver and Rio Grand Western Rail Trail crossing
- Gordon Avenue

At the stakeholder meeting the RSA process was introduced, key features of the corridor were presented, and the plan for the field review was outlined. At the field review, observations were made at the locations outlined above. Key takeaways from the field review are included in the Appendix. The consultant team presented the identified key concerns and potential solutions at the intermediate meeting.

Project Team and Field Review

RSAs require an independent, qualified, and multidisciplinary team of experts. Team members should act independently of the project owner/design team and have the freedom, ability, and comfort to comment frankly on potentially controversial safety issues. Having a combination of skills and experience in different areas is also helpful to ensure the most critical aspects of the project are addressed[1].

The 2200 West RSA's team included 17 members, identified in ***Table 1*** with the elements of the audit for which they were present. Erica Wygonik of METHODS Consulting was the RSA team leader.

[1] FHWA Road Safety Audit Guidelines, Publication No. FHWA-SA-06-06, page 27

Table 1: RSA Team Members and Attendance

Name	Agency	AM Peak Hour Review	Stakeholder Meeting	Field Review	PM Peak Hour Review	Intermediate Results Meeting
Mindy Hunsaker	Layton City		X	X		X
Mike Calarino	Layton City		X	X		X
Jeremy Stell	Layton City		X	X		
Brad McIlrath	Layton City		X	X		X
Brad Schaff	Layton City		X	X		X
Paul Applonie	Layton City		X	X		
Jamie Senninger	Layton City		X	X		
JoEllen Grandy	Layton City					X
Braden Felix	Clearfield		X	X		
Joel Temple	WFRC		X	X		X
Fariba Soltani	WFRC		X	X		X
Wayne Bennion	WFRC		X	X		
Erica Wygonik (team leader)	METHODS (Consultant)					X
Scott Johnson	METHODS (Consultant)	X	X	X	X	
Dallas Wall	METHODS (Consultant)		X	X		
Jeremy Searle	METHODS (Consultant)		X	X		
Savanah Allen	METHODS (Consultant)					X

The team gathered for a stakeholder meeting at the Layton City Engineering Division conference room at 9:00 am on 16 April 2026, then held a field review, driving the corridor and making stops at key locations to discuss and observe together. METHODS also observed the corridor throughout the day, including during periods before and after school started. After the formal field review was over, METHODS collected speed data and sight distance measurements and made additional observations throughout the corridor. Findings and analysis from these observations are included in this report.

Following the field review and additional observations, METHODS met with members of the RSA team to discuss a list of short-, medium-, and long-term recommendations to include in the final report.

2. PROJECT CONTEXT

The total length of the study corridor is the 1.0-mile segment between Gordon Avenue and Antelope Drive. The project corridor is located to the west of I-15, east of the West Davis Corridor (SR-177). 2200 West is a north-south route and is a federal aid eligible road

(1472)[2]. Land use surrounding 2200 West is residential with some light industrial at the north end of the corridor.

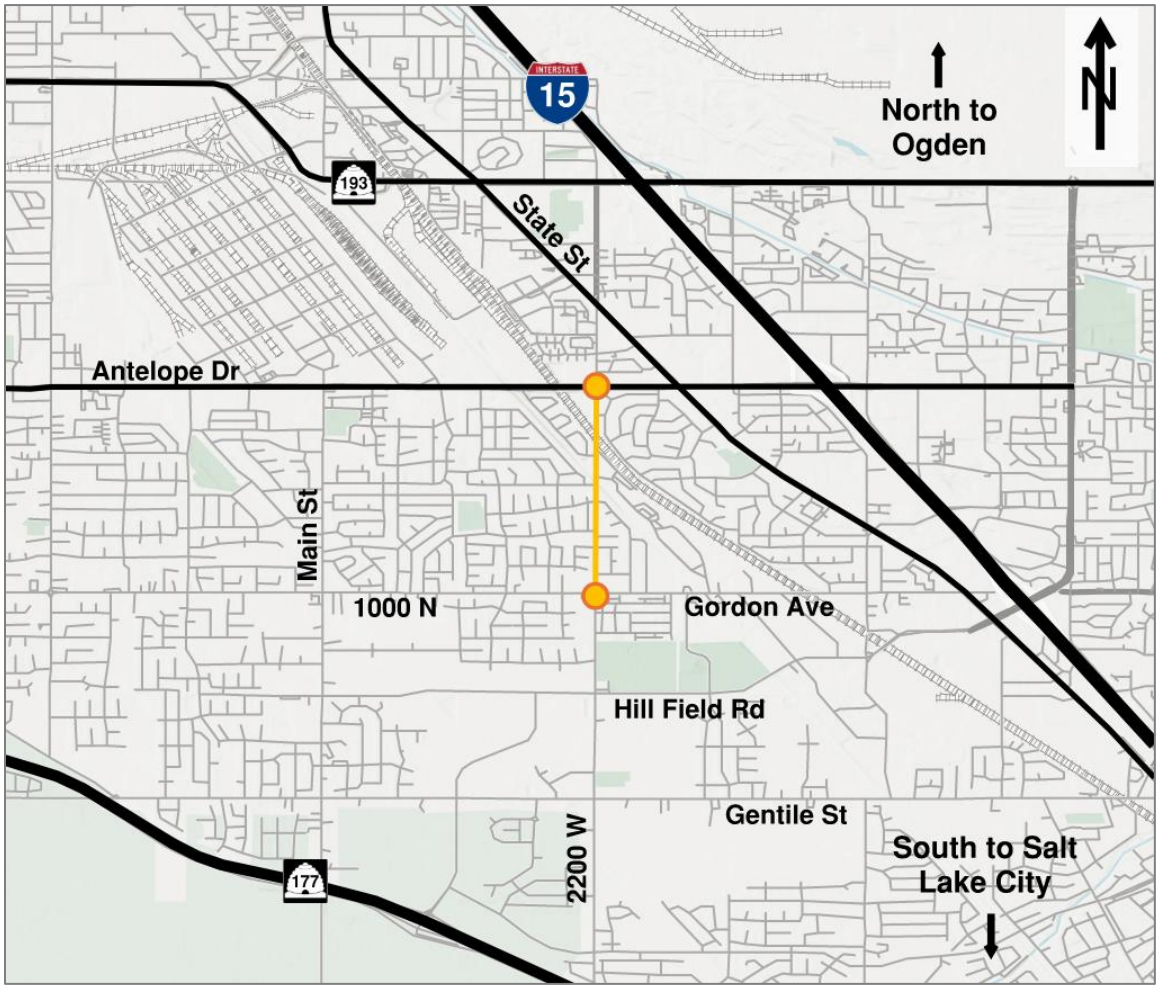


Figure 3: Project Location

Planned Improvements

Layton City has secured funding to construct an active transportation bridge over the railroad crossing. The bridge will be approximately 860 feet long on the west side of 2200 West and provide a grade-separated crossing for pedestrians, bicyclists, and other users over the railroad crossing. A rendering of this bridge was provided by Layton City and is shown in ***Figure 4***.

[2] Federal-aid eligible roads are roads the Federal-Aid Highway Program supports with financial assistance for the nation's highway network, which includes locally owned roads. https://www.fhwa.dot.gov/federal-aidessentials/federalaid.cfm

Figure 4: Planned Active Transportation Bridge on 2200 West in Layton, Utah

WFRC Comprehensive Safety Action Plan

The WFRC Comprehensive Safety Action Plan (CSAP) was completed in 2024. This plan presents strategies to reduce roadway fatalities and serious injuries in the WFRC region. 2200 West was one of the corridors identified in the plan for safety improvements, from Gentile Street to Antelope Drive. Safety measures identified in the plan are shown in ***Figure 5***.

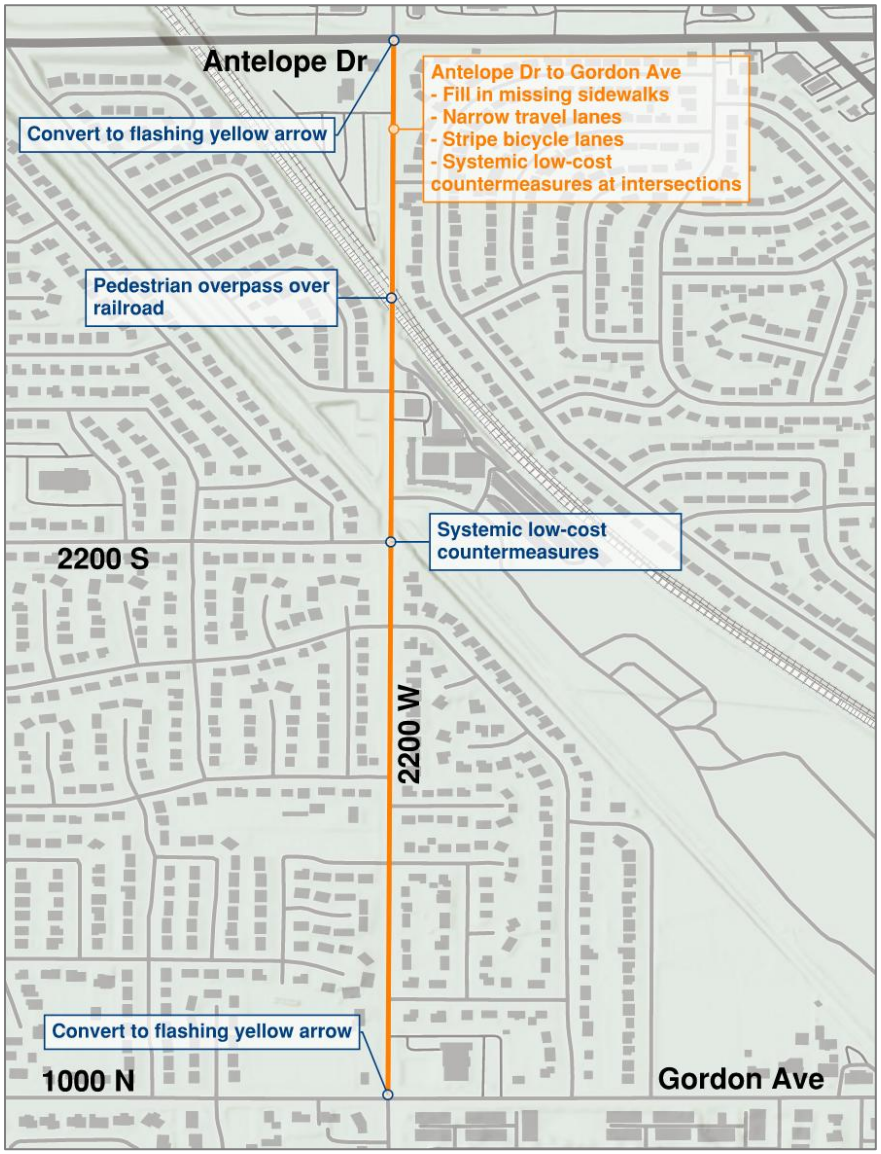


Figure 5: Safety Measures Identified in WFRC CSAP

3. EXISTING CONDITIONS

Roadway Cross Section

2200 West consists of a two-lane cross section, one travel lane in each direction, with a pavement width of approximately 42 feet. The northbound approach to Antelope Drive (SR-108) consists of separate left-turn, through, and right-turn lanes, and the southbound approach at Gordon Avenue consists of a left-turn lane and a shared through/right-turn lane.

Curb, gutter, park strip, and sidewalk are present on both sides of 2200 West throughout most of the study corridor. There is one 220-foot section on the east side of 2200 West immediately south of the trail crossing and a 455-foot segment on the west side of 2200 West at the railroad crossing where no side treatments are present. North of the railroad crossing, sidewalk is present intermittently, with no sidewalk on either side of 2200 West immediately south of Antelope Drive (SR-108).

Volumes

The annual average daily traffic volumes along the study corridor were 1,800 vehicles per day in 2024 as reported by UDOT.

Speeds

The speed limit is 35 mph along the study corridor. Speed data was collected by METHODS on May 1, 2026, and the 85th percentile speed was calculated to be 37.0 mph.

Crash Summary

Crash data was obtained from the UDOT Traffic and Safety Division. Crash data may be protected under 23 USC 407. Data from the most recent five full years (January 2020 to December 2024) was used. Crashes reported in 2025 and 2026 were also reviewed, but they may not be fully verified. Crashes are summarized in ***Table 2*** shown in ***Figure 6***.

Table 2: Crash Data Summary

Year	All Crashes	
	Total	Severe (Fatal or Serious Injury)
2020	27	1
2021	32	1
2022	31	0
2023	41	2
2024	38	0
2025*	39	4
2026*	7	0
Total:	**215**	**8**

*2025 and 2026 crash data may not be fully validated

Figure 6: Crash Summary

Notable Crash History Findings Along the Study Corridor

- A total of 169 crashes were reported between 2020 and 2024, including three serious injury crashes and one fatal crash.
    - Three serious injury crashes were reported at the intersection with Antelope Drive. Two crashes involved a westbound left turning vehicle turning in front of an eastbound through vehicle. One involved a westbound through vehicle running a red light and hitting a pedestrian in the crosswalk.

- The fatal crash was reported at the intersection with Gordon Avenue, where an eastbound vehicle veered into the westbound lane and had a head-on collision with a westbound vehicle.

- There have been 11 reported crashes involving pedestrians or cyclists; all involved potential injuries.
  - Of these, 9 crashes occurred at the intersection with Antelope Drive. 8 of these crashes involved right-turning vehicles.
  - One crash involved a vehicle hitting a pedestrian crossing 1850 N.
  - One crash involved an eastbound right turning vehicle hitting a pedestrian crossing 2200 S.

4. FINDINGS AND MEASURES FOR CONSIDERATION

During the RSA stakeholder meeting, field review, and intermediate results meetings, the project team members discussed their collective knowledge and experience with the corridor, observed the corridor together at various stopping points, and identified possible improvements. The following sections summarize these findings and measures for consideration, backed by data after a summary of corridor-wide findings and measures for consideration. Measures for consideration are identified as **short-**, **medium-**, or **long-** term.

All the included measures are nationally and locally vetted options to address the noted concerns. In some cases, multiple measures are recommended. Generally, when multiple measures are recommended all can be implemented, and they would work in tandem to address the concern. However, measures can be implemented individually as funding or resources allow or, in some cases, reflect options to choose between, as funding and resources allow.

A summary map of all location-specific insights and issues is shown in ***Figure 7***. Insights are not necessarily safety concerns, but observations or background information that inform recommended safety measures. Issues are safety concerns which the suggested measures intend to address.

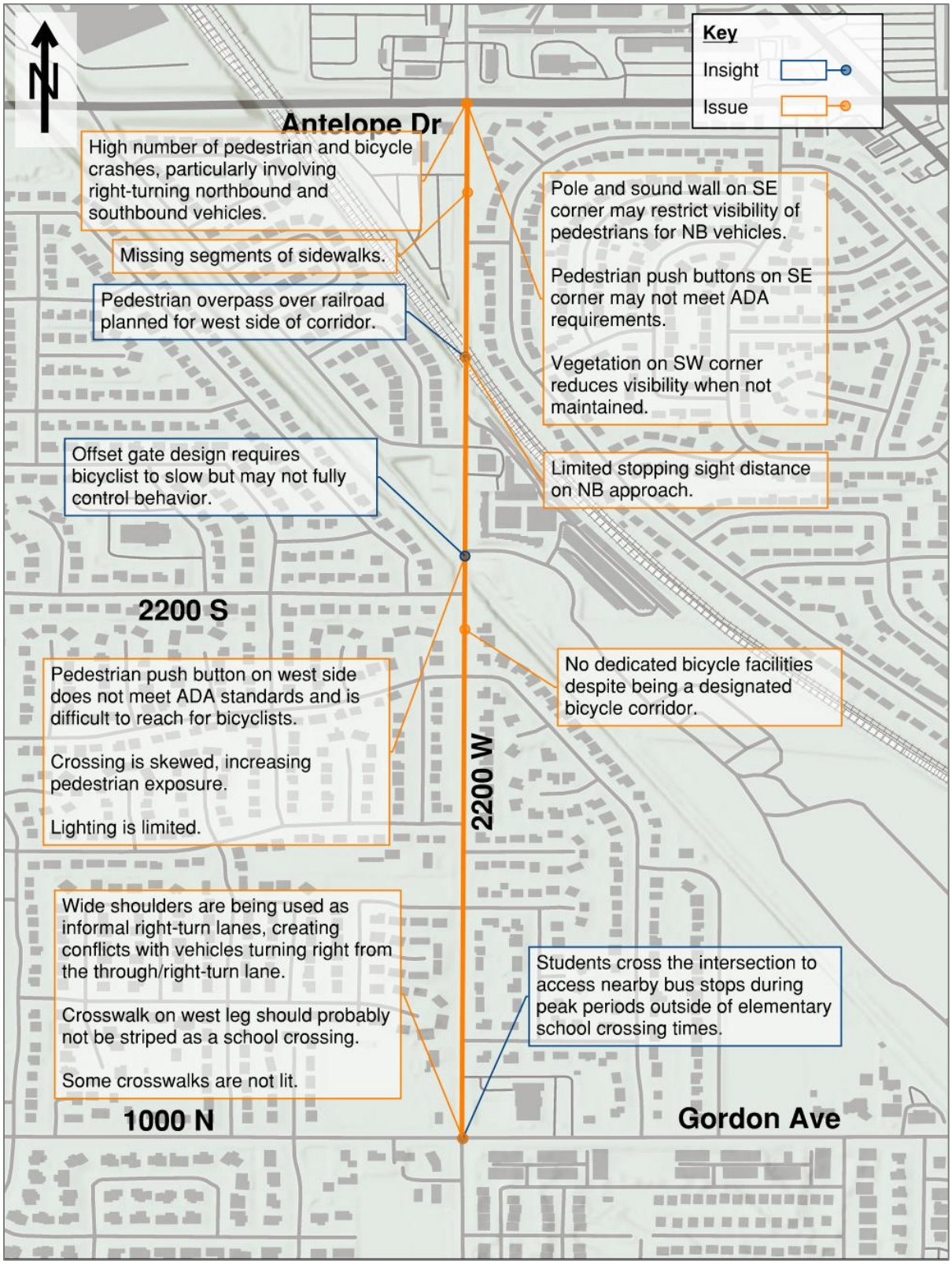
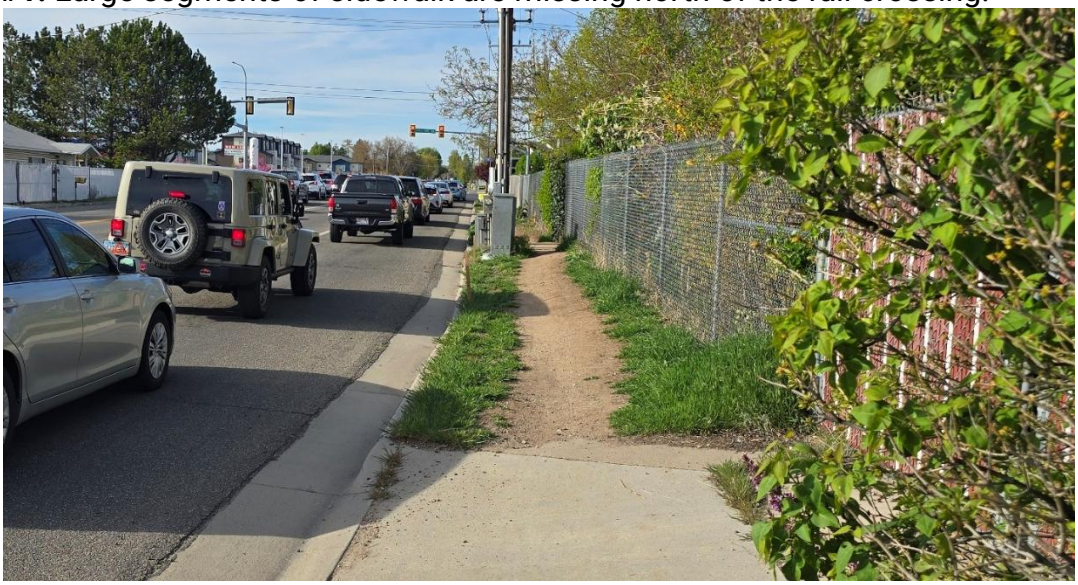


Figure 7: Insights and Issues Summary

Corridor-Wide

Insight: The city has interest in expanding active transportation along corridor.

Issue #1: Large segments of sidewalk are missing north of the rail crossing.



Medium-Term Measure:

- Complete missing sections of sidewalk

Issue #2: Limited or inconsistent lighting along corridor segments and at crossings.

Medium-Term Measure:

- Improve lighting

Issue #3: Pedestrian ramps are non-directional and do not meet current ADA standards.

Medium-Term Measure:

- Update pedestrian ramps to meet ADA requirements

Issue #4: Lack of dedicated bicycle facilities despite corridor identified in city bike plans.

Short-Term Measure:

- Stripe bike lanes

Long-Term Measure:

- Install buffered bike lanes

Issue #5: Speeds exceed posted speed limit

Short-Term Measure:

- Stripe bike lanes
- Consider lowering the speed limit

Medium-Term Measure:

- Install a raised median at the Denver and Rio Grand Western rail trail crossing

Antelope Drive

Issue #1: Limited sight distance for westbound left-turning vehicles, especially when opposing vehicles (e.g., buses) are present.

Short-Term Measure:

- Evaluate protected-only left-turn phasing

Issue #2: Pole and sound wall on southeast corner may restrict visibility of pedestrians for northbound drivers.

Short-Term Measure:

- Implement Leading Pedestrian Intervals
- Prohibit right-turn on red during pedestrian phase, particularly for the northbound and southbound

Long-Term Measure:

- Relocate pole and sound wall on southeast corner

Issue #3: Vegetation on southwest corner reduces visibility when not maintained.

Short-Term Measure:

- Maintain/remove vegetation on southwest corner

Issue #4: Pedestrian push buttons on southeast and southwest corners are located far from ramps and may not meet ADA accessibility expectations; ramps may not be ADA compliant.

Medium-Term Measure:

- Update pedestrian ramps
- Improve pedestrian push button access

Issue #5: High number of pedestrian and bicycle crashes, particularly involving northbound and southbound right-turning vehicles.

Short-Term Measure:

- Implement Leading Pedestrian Intervals
- Evaluate protected-only left-turn phasing
- Prohibit right-turn on red during pedestrian phase, particularly for the northbound and southbound

Issue #6: Long queues and observed cycle failures for turning movements during peak periods (particularly eastbound left turn in AM, northbound left turn in PM).

Short-Term Measure:

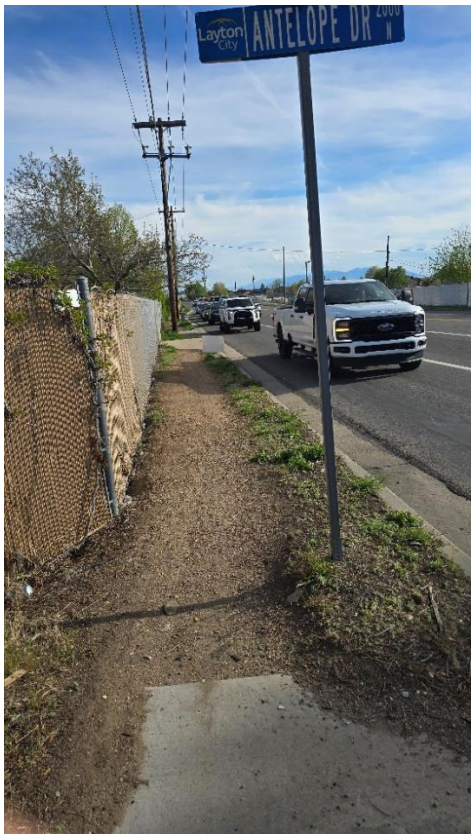
- Evaluate permitted-protected (flashing yellow arrow) left-turn phasing for the northbound and southbound
- Evaluate signal phasing and update signal timing

Issue #7: High presence of school buses contributing to visibility and operational challenges.

Short-Term Measure:

- Evaluate protected-only left-turn phasing

Issue #8: There are no sidewalks on the south leg, but pedestrian activity is evidenced by worn footpaths on both sides of the road.



Medium-Term Measure:

- Install sidewalks on both sides of south leg

Railroad Crossing

Issue #1: There are 80+ train crossings per day (freight and commuter rail) that create frequent interruptions to traffic flow. Future double tracking of commuter rail line will result in increased crossing events. Emergency response is impacted by railroad crossings, requiring rerouting when trains are present.

Long-Term Measure:

- Full roadway grade separation

Issue #2: Limited stopping sight distance on northbound approach (~180 feet).

Long-Term Measure:

- Full roadway grade separation
- Regrade roadway south of crossing to increase sight distance

Issue #3: Pedestrians and bicyclists continue to cross at-grade despite lack of crossing infrastructure.

Medium-Term Measure:

- Install pedestrian bridge

Issue #4: Pedestrians should be guided to west side of the road to encourage use of the future pedestrian bridge.

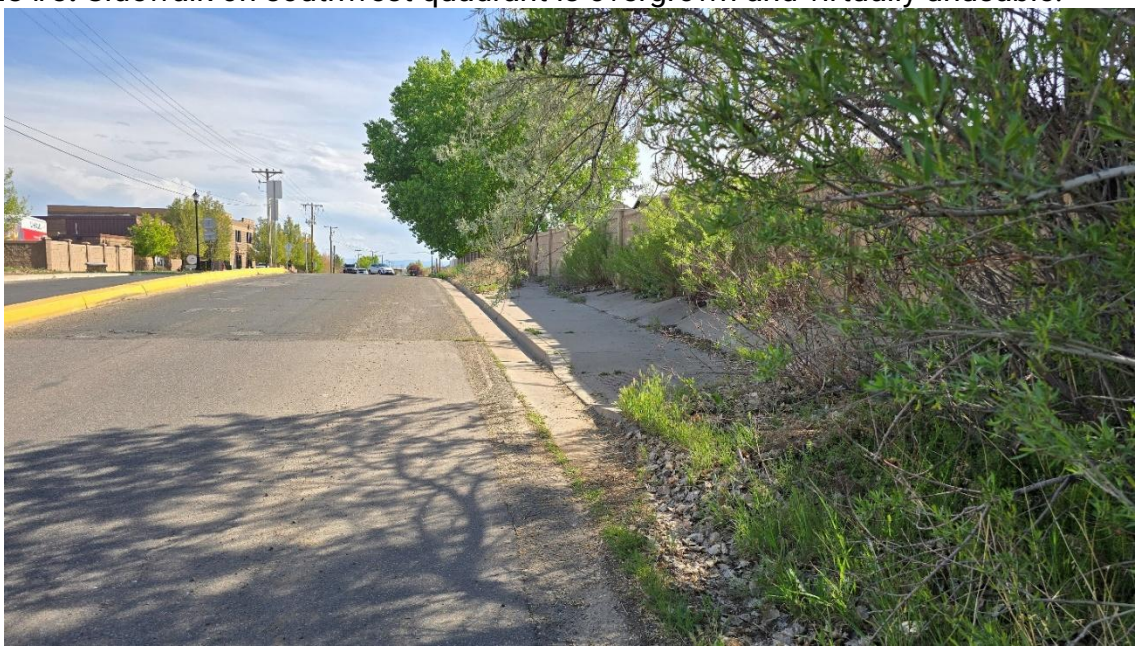
Short-Term Measure:

- Trim landscaping and improve sidewalk on southwest quadrant
- Install a crosswalk and signage directing pedestrians to the west side

Medium-Term Measure:

- Remove sidewalk on southeast quadrant

Issue #5: Sidewalk on southwest quadrant is overgrown and virtually unusable.



Short-Term Measure:

- Trim landscaping and improve sidewalk on southwest quadrant

Denver and Rio Grand Western Trail Crossing

Issue #1: Pedestrian push button location on west side does not meet ADA standards and is difficult to reach, especially for cyclists.

Short-Term Measure:

- Relocate signs and obstacles
- Pave approach to pedestrian push button

Medium-Term Measure:

- Relocate pedestrian push button to be ADA and bicycle accessible

Issue #2: Trail users frequently cross without activating the signal.

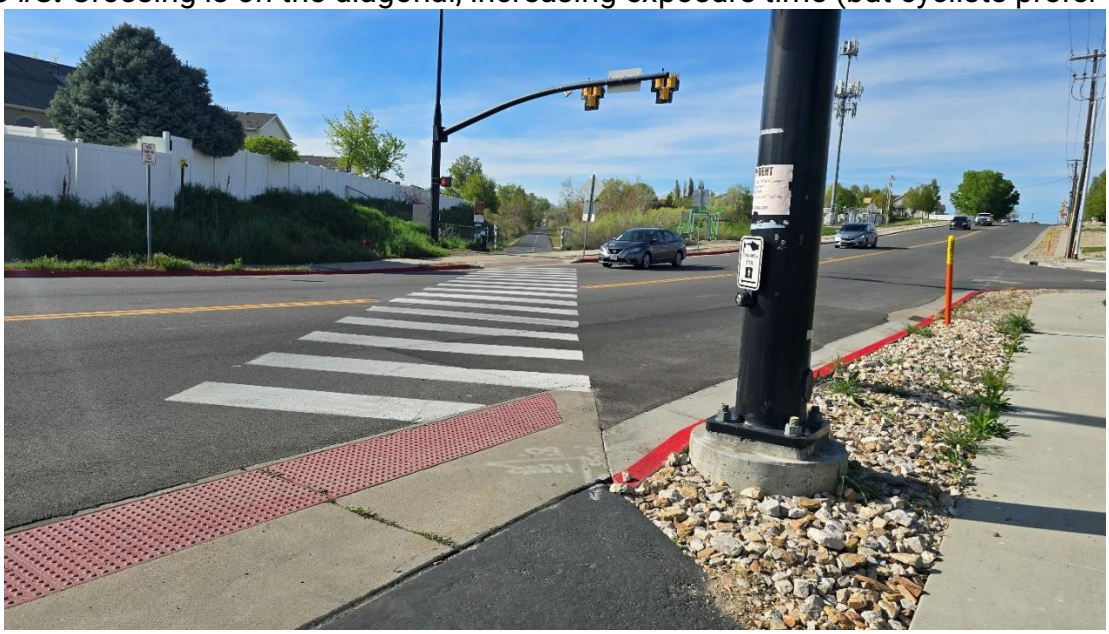
Medium-Term Measure:

- Realign crossing to be perpendicular & install fencing to direct users

Long-Term Measure:

- Grade separate the trail (while ensuring trail user access to 2200 W is still maintained)

Issue #3: Crossing is on the diagonal, increasing exposure time (but cyclists prefer this).



Medium-Term Measure:

- Realign crossing to be perpendicular & install fencing to direct users
- Raised median through crossing

Issue #4: Lighting is limited, particularly on the east side of the crossing.

Short-Term Measure:

- Improve lighting

Issue #5: Offset gate design requires bicyclists to slow but may not fully control behavior.

Medium-Term Measure:

- Realign crossing to be perpendicular & install fencing to direct users

Long-Term Measure:

- Grade separate the trail (while ensuring trail user access to 2200 W is still maintained)

Gordon Avenue

Insight: Students cross the intersection to access nearby bus stops during peak periods outside of elementary school crossing times.

Issue #1: Doghouse (Type V) signal heads on all approaches could be updated; switching to FYA would likely require an extension.

Medium-Term Measure:

- Implement Flashing Yellow Arrow (FYA) signal phasing

Issue #2: Wide shoulders are being used as informal right-turn lanes, creating conflicts with vehicles turning right from the through/right-turn lane.

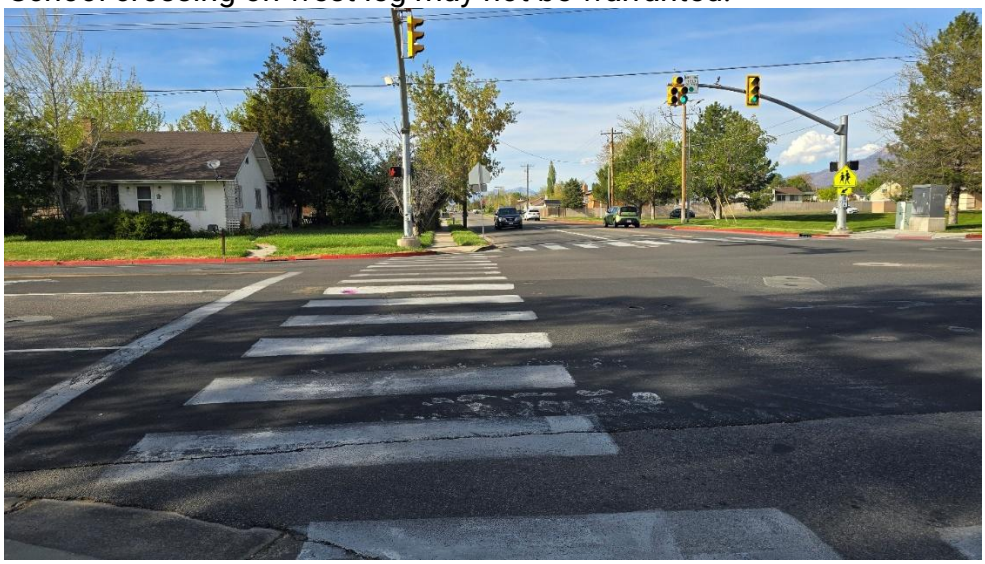
Short-Term Measure:

- Stripe hatch marks in the shoulder; install flex posts

Medium-Term Measure:

- Install bulb-outs

Issue #3: School crossing on west leg may not be warranted.



Short-Term Measure:

- Evaluate crosswalk striping; restripe as warranted

Issue #4: Some crosswalks are not currently illuminated. Luminaires are only present on two corners.

Medium-Term Measure:

- Improve lighting

Benefit-Cost Analysis

The following tables show the cost estimate, expected crash reduction, and benefit-cost ratio of each improvement. These are high-level estimates, based on the best available information. Cost estimates rely on current unit costs, available project estimates, or estimates from similar projects. METHODS estimated the safety costs in the study area using the observed crash data.

To estimate how the suggested safety measures may impact the number of crashes, crash modification factors (CMFs) were used. CMFs from the Utah CMF database, the WFRC CSAP, and CMF Clearinghouse were applied to each measure when there was an applicable equivalent countermeasure. Not all measures have an equivalent countermeasure for various reasons. The lower the CMF, the greater reduction in crashes a countermeasure is expected to produce.

The following table summarizes the improvements with their CMF, cost estimate, and benefit-cost ratio. A benefit-cost ratio (B/C) above 1 means the benefit of a countermeasure is greater than the cost of that countermeasure. The benefit values used to determine the final B/C ratio are based on a 20-year analysis. The cost of a

countermeasure is factored based on its service life. Complete calculations for each improvement are included in the Appendix.

Measures are prioritized in terms of their relative ease of implementation (short-, medium-, and long-term). Short-term measures can generally be addressed within regular maintenance and operations budgets; medium-term measures may require some advanced planning but can generally be addressed within a CIP; long-term measures require more substantial planning or funding and may require grants or bonds to implement. In general, treatments with a higher benefit-cost ratio have a higher return on investment.

Table 3: Benefit-Cost Analysis[3,4]

ID	Location	Measure	CMF	20-Year Benefit	20-Year Cost	Benefit-Cost Ratio (B/C)
SHORT TERM						
S-1	Corridor Wide	Lower speed limit to 30 MPH throughout corridor	1.000	$1,201,000	$19,500	61.59
S-2	Corridor Wide	Stripe bike lanes	0.997	$382,000	$273,500	1.40
S-3	Antelope Drive	Implement Leading Pedestrian Intervals	0.995	$442,000	$7,000	63.14
S-4	Antelope Drive	Evaluate and update as appropriate left-turn phasing and signal timing	0.948	$4,416,000	$14,000	315.43
S-5	Antelope Drive	Prohibit right-turn on red during pedestrian phase, particularly for the northbound and southbound	0.995	$442,000	$7,000	63.14
S-6	Antelope Drive	Maintain/remove vegetation on southwest corner	0.973	$2,336,000	$76,600	30.50
S-7	RR Crossing	Improve sidewalk on southwest quadrant	0.974	$18,000	$7,000	2.57
S-8	Trail Crossing	Improve lighting	0.982	$68,000	$24,900	2.73
S-9	Trail Crossing	Relocate signs and obstacles	0.990	$15,000	$1,200	12.50
S-10	Trail Crossing	Pave approach to pedestrian push button	0.990	$15,000	$1,200	12.50
S-11	Gordon Avenue	Stripe hatch marks in the shoulder; install flex posts	0.920	$2,360,000	$52,600	44.87
S-12	Gordon Avenue	Evaluate and update as appropriate crosswalk striping	0.990	$295,000	$54,100	5.45

[3] Lower CMFs indicate a countermeasure is expected to result in a larger reduction in crashes.

[4] Because bicycle and pedestrian crashes are relatively infrequent, available methodologies do not accurately reflect the value of these improvements. Although the benefit-cost ratio for many of these treatments is low – and sometimes below 1, protecting the most vulnerable users is beneficial from both a human life and financial perspective. In Utah the average cost of a pedestrian-involved crash is 5-6 times higher than the average cost of a vehicle crash. (Utah's Crash Costs Memo March 16, 2026)

ID	Location	Measure	CMF	20-Year Benefit	20-Year Cost	Benefit-Cost Ratio (B/C)
MEDIUM TERM						
M-1	Corridor Wide	Update pedestrian ramps to meet ADA requirements	0.990	$1,231,000	$165,000	7.46
M-2	Corridor Wide	Improve lighting	0.957	$6,229,000	$461,000	13.51
M-3	Corridor Wide	Complete missing sections of sidewalk	0.974	$3,202,000	$92,000	34.80
M-4	Corridor Wide	Plant street trees where park strip width allows	0.929	$11,786,000	$461,000	25.57
M-5	Antelope Drive	Update pedestrian ramps	0.990	$849,000	$52,000	16.33
M-6	Antelope Drive	Improve pedestrian push button access	0.990	$849,000	$68,000	12.49
M-7	Antelope Drive	Install sidewalks on both sides of south leg	0.974	$642,000	$42,000	15.29
M-8	RR Crossing	Install pedestrian bridge	0.995	$4,000	$3,416,000	0.00
M-9	RR Crossing	Remove sidewalk on southeast quadrant; install crosswalk at Demetro to direct to pedestrian bridge	0.990	$7,000	$31,000	0.23
M-10	Trail Crossing	Relocate pedestrian push button to be ADA and bicycle accessible	0.990	$15,000	$14,000	1.07
M-11	Trail Crossing	Realign crossing to be perpendicular & install fencing to direct users	0.750	$368,000	$37,000	9.95
M-12	Trail Crossing	Raised median through crossing	0.994	$33,000	$27,000	1.22
M-13	Trail Crossing	Connect sidewalk on northeast corner to trail	0.974	$38,000	$18,000	2.11
M-14	Gordon Avenue	Implement Flashing Yellow Arrow (FYA) signal phasing	0.974	$767,000	$10,000	76.70
M-15	Gordon Avenue	Improve lighting	0.982	$1,505,000	$50,000	30.10
M-16	Gordon Avenue	ADA improvements at southwest corner pedestrian ramp	0.990	$41,000	$10,000	4.10
M-17	Gordon Avenue	Install bulb-outs	0.680	$1,303,000	$80,000	16.29
LONG TERM						
L-1	Corridor Wide	Install buffered bike lanes	0.975	$3,103,000	$1,106,000	2.81
L-2	Antelope Drive	Relocate pole and sound wall on southeast corner	0.866	$11,415,000	$256,000	44.59
L-3	RR Crossing	Regrade 2200 W near railroad crossing to improve sight lines	0.692	$1,003,000	$1,068,000	0.94
L-4	RR Crossing	Full roadway grade separation	0.000	$641,000	$8,540,000	0.24
L-5	Trail Crossing	Grade separate the trail (while maintaining trail user access to 2200 W)	0.995	$8,000	$3,416,000	0.00
L-6	Gordon Avenue	Install buffered bike lanes on Gordon Ave	0.988	$366,000	$45,000	8.13

5. RECOMMENDATIONS

The following is a summary of recommendations based on known operations, safety, and geometry along the study corridor and the preliminary evaluation of the measures described above.

Table 4: Recommendations

ID	Location	Measure	Details
SHORT TERM			
S-1	Corridor Wide	Consider lowering speed limit throughout corridor	
S-2	Corridor Wide	Stripe bike lanes	
S-3	Antelope Drive	Implement Leading Pedestrian Intervals	
S-4	Antelope Drive	Evaluate left-turn phasing and signal timing	
S-5	Antelope Drive	Prohibit right-turn on red during pedestrian phase, particularly for the northbound and southbound	
S-6	Antelope Drive	Maintain/remove vegetation on southwest corner	
S-7	RR Crossing	Improve sidewalk on southwest quadrant	
S-8	Trail Crossing	Improve lighting	
S-9	Trail Crossing	Relocate signs and obstacles	
S-10	Trail Crossing	Pave approach to pedestrian push button	
S-11	Gordon Avenue	Stripe hatch marks in the shoulder; install flex posts	
S-12	Gordon Avenue	Evaluate crosswalk striping	
S-13	Corridor Wide	Stripe bike lanes	
MEDIUM TERM			
M-1	Corridor Wide	Update pedestrian ramps to meet ADA requirements	
M-2	Corridor Wide	Improve lighting	
M-3	Corridor Wide	Complete missing sections of sidewalk	
M-4	Corridor Wide	Plant street trees where park strip width allows	
M-5	Antelope Drive	Update pedestrian ramps	
M-6	Antelope Drive	Improve pedestrian push button access	
M-7	Antelope Drive	Install sidewalks on both sides of south leg	
M-8	RR Crossing	Install pedestrian bridge	
M-9	RR Crossing	Remove sidewalk on southeast quadrant; install crosswalk at Demetro to direct to pedestrian bridge	
M-10	Trail Crossing	Relocate pedestrian push button to be ADA and bicycle accessible	
M-11	Trail Crossing	Realign crossing to be perpendicular & install fencing to direct users	
M-12	Trail Crossing	Raised median through crossing	
M-13	Trail Crossing	Connect sidewalk on northeast corner to trail	
M-14	Gordon Avenue	Implement Flashing Yellow Arrow (FYA) signal phasing	
M-15	Gordon Avenue	Improve lighting	
M-16	Gordon Avenue	ADA improvements at southwest corner pedestrian ramp	
M-17	Gordon Avenue	Install bulb-outs	

ID	Location	Measure	Details
LONG TERM			
L-1	Corridor Wide	Install buffered bike lanes	
L-2	Antelope Drive	Relocate pole and sound wall on southeast corner	
L-3	RR Crossing	Regrade 2200 W near railroad crossing to improve sight lines	
L-4	RR Crossing	Full roadway grade separation	
L-5	Trail Crossing	Grade separate the trail (while maintaining trail user access to 2200 W)	Monitor crossing; may be warranted in future
L-6	Gordon Avenue	Install buffered bike lanes on Gordon Ave	

APPENDIX

A: Summary of Issues

B: Detailed Benefit-Cost Calculation Table

APPENDIX A: SUMMARY OF ISSUES

The following list of issues is a compilation of the project team's observations during the RSA field review on April 17, 2026, the experience of City officials, and the crash history and volumes discussed in Section 3.0.

Entire Corridor

- Large segments of sidewalk are missing on the north end of the corridor (north of the rail crossing)
- Limited or inconsistent lighting along corridor segments and at crossings
- Pedestrian ramps are non-directional and do not meet current ADA standards
- Lack of dedicated bicycle facilities despite corridor being identified in city bike plans
- Emergency response is impacted by railroad crossings, requiring rerouting when trains are present

Antelope Drive

- Limited sight distance for westbound left-turning vehicles, especially when opposing vehicles (e.g., buses) are present
- Pole and sound wall on southeast corner may restrict visibility of pedestrians for northbound drivers
- Vegetation on southwest corner reduces visibility when not maintained
- Pedestrian push button on southeast and southwest corners are located far from ramp and may not meet ADA accessibility expectations; ramps may not be ADA compliant
- High number of pedestrian and bicycle crashes, particularly involving northbound and southbound right-turning vehicles
- Long queues and observed cycle failures for turning movements during peak periods (particularly EB LT in AM, NB LT in PM)
- High presence of school buses contributing to visibility and operational challenges
- There are no sidewalks on the south leg, but pedestrian activity is evidenced by worn footpaths on both sides of the road

Railroad Crossing

- There are 80+ train crossings per day (freight and commuter rail) that create frequent interruptions to traffic flow

    - Future double tracking of commuter rail line will result in increased crossing events
- Limited stopping sight distance on northbound approach (~180 feet)
- Pedestrians and bicyclists continue to cross at-grade despite lack of crossing infrastructure
- Pedestrians should be guided to west side of the road to encourage use of the future ped bridge
- Sidewalk on southwest quadrant is overgrown and virtually unusable

Denver and Rio Grand Western Rail Trail Crossing (HAWK Signal)

- Pedestrian push button location on west side does not meet ADA standards and is difficult to reach, especially for cyclists
- Trail users frequently cross without activating the signal
- Crossing is skewed/diagonal, increasing pedestrian exposure time (but cyclists prefer it)
- Lighting is limited, particularly on the east side of the crossing
- Offset gate design requires bicyclists to slow but may not fully control behavior

Gordon Avenue

- Doghouse (Type V) signal heads on all approaches could be updated; switching to FYA would likely require an extension
- Wide shoulders are being used as informal right-turn lanes, creating conflicts with vehicles turning right from the through/right-turn lane
- Crosswalk on west leg should probably not be striped as a school crossing
- Some crosswalks are not illuminated
- Students cross the intersection to access nearby bus stops during peak periods outside of elementary school crossing times.
- 2 luminaires are present

Appendix B: Detailed Benefit-Cost Calculation Table

ID	Location	Measure	ID	Location	Measure	CMF												
						Fatal	SI	Minor Injury	Possible Injury	PDO	Overall CMF	Fatal	SI	Minor Injury	Possible Injury	PDO	# of Crashes	Fatal w/ Treatment
SHORT TERM			**SHORT TERM**															
S-1	Corridor Wide	Lower speed limit to 30 MPH throughout corridor	S-1	Corridor Wide	Lower speed limit to 30 MPH throughout corridor	0.984	0.974	1.000	1.000	1.000	1.000	0.2	0.6	7.4	6.2	19	33.4	0.20
S-2	Corridor Wide	Stripe bike lanes	S-2	Corridor Wide	Stripe bike lanes	0.997	0.997	0.997	0.997	0.997	0.997	0.2	0.6	7.4	6.2	19	33.4	0.20
S-3	Antelope Drive	Implement Leading Pedestrian Intervals	S-3	Antelope Drive	Implement Leading Pedestrian Intervals	0.995	0.995	0.995	0.995	0.995	0.995	0	0.6	4.8	4	12.2	21.6	0.00
S-4	Antelope Drive	Evaluate and update as appropriate left-turn phasing and signal timing	S-4	Antelope Drive	Evaluate and update as appropriate left-turn phasing and signal timing	0.948	0.948	0.948	0.948	0.948	0.948	0	0.6	4.8	4	12.2	21.6	0.00
S-5	Antelope Drive	Prohibit right-turn on red during pedestrian phase, particularly for the northbound and southbound	S-5	Antelope Drive	Prohibit right-turn on red during pedestrian phase, particularly for the northbound and southbound	0.995	0.995	0.995	0.995	0.995	0.995	0	0.6	4.8	4	12.2	21.6	0.00
S-6	Antelope Drive	Maintain/remove vegetation on southwest corner	S-6	Antelope Drive	Maintain/remove vegetation on southwest corner	0.973	0.973	0.973	0.973	0.973	0.973	0	0.6	4.8	4	12.2	21.6	0.00
S-7	RR Crossing	Improve sidewalk on southwest quadrant	S-7	RR Crossing	Improve sidewalk on southwest quadrant	0.974	0.974	0.974	0.974	0.974	0.974	0	0	0	0.2	0.2	0.4	0.00
S-8	Trail Crossing	Improve lighting	S-8	Trail Crossing	Improve lighting	0.947	0.947	0.947	0.947	1.000	0.982	0	0	0	0.4	0.6	1	0.00
S-9	Trail Crossing	Relocate signs and obstacles	S-9	Trail Crossing	Relocate signs and obstacles	0.990	0.990	0.990	0.990	0.990	0.990	0	0	0	0.4	0.6	1	0.00
S-10	Trail Crossing	Pave approach to pedestrian push button	S-10	Trail Crossing	Pave approach to pedestrian push button	0.990	0.990	0.990	0.990	0.990	0.990	0	0	0	0.4	0.6	1	0.00
S-11	Gordon Avenue	Stripe hatch marks in the shoulder; install flex posts	S-11	Gordon Avenue	Stripe hatch marks in the shoulder; install flex posts	0.920	0.920	0.920	0.920	0.920	0.920	0.2	0	1.8	1.4	3.2	6.6	0.18
S-12	Gordon Avenue	Evaluate and update as appropriate crosswalk striping	S-12	Gordon Avenue	Evaluate and update as appropriate crosswalk striping	0.990	0.990	0.990	0.990	0.990	0.990	0.2	0	1.8	1.4	3.2	6.6	0.20
MEDIUM TERM			**MEDIUM TERM**															
M-1	Corridor Wide	Update pedestrian ramps to meet ADA requirements	M-1	Corridor Wide	Update pedestrian ramps to meet ADA requirements	0.990	0.990	0.990	0.990	0.990	0.990	0.2	0.6	7.4	6.2	19	33.4	0.20
M-2	Corridor Wide	Improve lighting	M-2	Corridor Wide	Improve lighting	0.949	0.949	0.949	0.949	0.962	0.957	0.2	0.6	7.4	6.2	19	33.4	0.19
M-3	Corridor Wide	Complete missing sections of sidewalk	M-3	Corridor Wide	Complete missing sections of sidewalk	0.974	0.974	0.974	0.974	0.974	0.974	0.2	0.6	7.4	6.2	19	33.4	0.19
M-4	Corridor Wide	Plant street trees where park strip width allows	M-4	Corridor Wide	Plant street trees where park strip width allows	1.000	0.890	0.890	0.890	0.950	0.929	0.2	0.6	7.4	6.2	19	33.4	0.20
M-5	Antelope Drive	Update pedestrian ramps	M-5	Antelope Drive	Update pedestrian ramps	0.990	0.990	0.990	0.990	0.990	0.990	0	0.6	4.8	4	12.2	21.6	0.00
M-6	Antelope Drive	Improve pedestrian push button access	M-6	Antelope Drive	Improve pedestrian push button access	0.990	0.990	0.990	0.990	0.990	0.990	0	0.6	4.8	4	12.2	21.6	0.00
M-7	Antelope Drive	Install sidewalks on both sides of south leg	M-7	Antelope Drive	Install sidewalks on both sides of south leg	0.974	0.974	0.974	0.974	0.974	0.974	0	0.2	1.4	0.8	2	4.4	0.00
M-8	RR Crossing	Install pedestrian bridge	M-8	RR Crossing	Install pedestrian bridge	0.995	0.995	0.995	0.995	0.995	0.995	0	0	0	0.2	0.2	0.4	0.00
M-9	RR Crossing	Remove sidewalk on southeast quadrant; install crosswalk at Demetro to direct to pedestrian bridge	M-9	RR Crossing	Remove sidewalk on southeast quadrant; install crosswalk at Demetro to direct to pedestrian bridge	0.990	0.990	0.990	0.990	0.990	0.990	0	0	0	0.2	0.2	0.4	0.00
M-10	Trail Crossing	Relocate pedestrian push button to be ADA and bicycle accessible	M-10	Trail Crossing	Relocate pedestrian push button to be ADA and bicycle accessible	0.990	0.990	0.990	0.990	0.990	0.990	0	0	0	0.4	0.6	1	0.00
M-11	Trail Crossing	Realign crossing to be perpendicular & install fencing to direct users	M-11	Trail Crossing	Realign crossing to be perpendicular & install fencing to direct users	0.750	0.750	0.750	0.750	0.750	0.750	0	0	0	0.4	0.6	1	0.00
M-12	Trail Crossing	Raised median through crossing	M-12	Trail Crossing	Raised median through crossing	0.978	0.978	0.978	0.978	0.978	0.994	0	0	0	0.4	0.6	1	0.00
M-13	Trail Crossing	Connect sidewalk on northeast corner to trail	M-13	Trail Crossing	Connect sidewalk on northeast corner to trail	0.974	0.974	0.974	0.974	0.974	0.974	0	0	0	0.4	0.6	1	0.00
M-14	Gordon Avenue	Implement Flashing Yellow Arrow (FYA) signal phasing	M-14	Gordon Avenue	Implement Flashing Yellow Arrow (FYA) signal phasing	0.974	0.974	0.974	0.974	0.974	0.974	0.2	0	1.8	1.4	3.2	6.6	0.19
M-15	Gordon Avenue	Improve lighting	M-15	Gordon Avenue	Improve lighting	0.947	0.947	0.947	0.947	1.000	0.982	0.2	0	1.8	1.4	3.2	6.6	0.19
M-16	Gordon Avenue	ADA improvements at southwest corner pedestrian ramp	M-16	Gordon Avenue	ADA improvements at southwest corner pedestrian ramp	0.990	0.990	0.990	0.990	0.990	0.990	0	0	0.6	0	1	1.6	0.00
M-17	Gordon Avenue	Install bulb-outs	M-17	Gordon Avenue	Install bulb-outs	0.680	0.680	0.680	0.680	0.680	0.680	0	0	0.6	0	1	1.6	0.00
LONG TERM			**LONG TERM**															
L-1	Corridor Wide	Install buffered bike lanes	L-1	Corridor Wide	Install buffered bike lanes	0.975	0.975	0.975	0.975	0.975	0.975	0.2	0.6	7.4	6.2	19	33.4	0.19
L-2	Antelope Drive	Relocate pole and sound wall on southeast corner	L-2	Antelope Drive	Relocate pole and sound wall on southeast corner	0.866	0.866	0.866	0.866	0.866	0.866	0	0.6	4.8	4	12.2	21.6	0.00
L-3	RR Crossing	Regrade 2200 W near railroad crossing to improve sight lines	L-3	RR Crossing	Regrade 2200 W near railroad crossing to improve sight lines	0.490	0.490	0.490	0.490	0.800	0.692	0	0	0.2	0.2	0.6	1	0.00
L-4	RR Crossing	Full roadway grade separation	L-4	RR Crossing	Full roadway grade separation	0.000	0.000	0.000	0.000	0.000	0.000	0	0	0.2	0.2	0.6	1	0.00
L-5	Trail Crossing	Grade separate the trail (while ensuring trail user access to 2200 W is still maintained)	L-5	Trail Crossing	Grade separate the trail (while ensuring trail user access to 2200 W is still maintained)	0.995	0.995	0.995	0.995	0.995	0.995	0	0	0	0.4	0.6	1	0.00
L-6	Gordon Avenue	Install buffered bike lanes on Gordon Ave	L-6	Gordon Avenue	Install buffered bike lanes on Gordon Ave	0.988	0.988	0.988	0.988	0.988	0.988	0.2	0	1.8	1.4	3.2	6.6	0.20

Appendix B: Detailed Benefit-Cost Calculation Table (continued)

			Observed												
ID	Location	Measure	SI w/ Treatment	Minor Injury w/ Treatment	Possible Injury w/ Treatment	PDO w/ Treatment	# w/ Treatment	Crashes Avoided	Annual Crash Costs	Annual Crash Cost w/ Treatment	Safety Benefit per Year	20-year analysis period, 3% rate	Service Life (Years)	20-year Cost	Benefit-Cost Ratio (B/C)
SHORT TERM															
S-1	Corridor Wide	Lower speed limit to 30 MPH throughout corridor	0.58	7.40	6.20	19.00	33.38	0.02	$8,277,060	$8,196,352	$80,708	$1,201,000	5	$19,500	61.59
S-2	Corridor Wide	Stripe bike lanes	0.60	7.38	6.18	18.94	33.30	0.10	$8,277,060	$8,251,401	$25,659	$382,000	3	$273,500	1.40
S-3	Antelope Drive	Implement Leading Pedestrian Intervals	0.60	4.78	3.98	12.14	21.49	0.11	$5,708,780	$5,679,094	$29,686	$442,000	10	$7,000	63.14
S-4	Antelope Drive	Evaluate and update as appropriate left-turn phasing and signal timing	0.57	4.55	3.79	11.57	20.48	1.12	$5,708,780	$5,411,923	$296,857	$4,416,000	10	$14,000	315.43
S-5	Antelope Drive	Prohibit right-turn on red during pedestrian phase, particularly for the northbound and southbound	0.60	4.78	3.98	12.14	21.49	0.11	$5,708,780	$5,679,094	$29,686	$442,000	10	$7,000	63.14
S-6	Antelope Drive	Maintain/remove vegetation on southwest corner	0.58	4.67	3.89	11.86	21.01	0.59	$5,708,780	$5,551,789	$156,991	$2,336,000	1	$76,600	30.50
S-7	RR Crossing	Improve sidewalk on southwest quadrant	0.00	0.00	0.19	0.19	0.39	0.01	$47,300	$46,070	$1,230	$18,000	20	$7,000	2.57
S-8	Trail Crossing	Improve lighting	0.00	0.00	0.38	0.60	0.98	0.02	$98,820	$94,271	$4,549	$68,000	15	$24,900	2.73
S-9	Trail Crossing	Relocate signs and obstacles	0.00	0.00	0.40	0.59	0.99	0.01	$98,820	$97,832	$988	$15,000	15	$1,200	12.50
S-10	Trail Crossing	Pave approach to pedestrian push button	0.00	0.00	0.40	0.59	0.99	0.01	$98,820	$97,832	$988	$15,000	15	$1,200	12.50
S-11	Gordon Avenue	Stripe hatch marks in the shoulder; install flex posts	0.00	1.66	1.29	2.94	6.07	0.53	$1,983,200	$1,824,544	$158,656	$2,360,000	3	$52,600	44.87
S-12	Gordon Avenue	Evaluate and update as appropriate crosswalk striping	0.00	1.78	1.39	3.17	6.53	0.07	$1,983,200	$1,963,368	$19,832	$295,000	10	$54,100	5.45
MEDIUM TERM															
M-1	Corridor Wide	Update pedestrian ramps to meet ADA requirements	0.59	7.33	6.14	18.81	33.07	0.33	$8,277,060	$8,194,289	$82,771	$1,231,000	20	$165,000	7.46
M-2	Corridor Wide	Improve lighting	0.57	7.02	5.88	18.27	31.93	1.47	$8,277,060	$7,858,406	$418,654	$6,229,000	15	$461,000	13.51
M-3	Corridor Wide	Complete missing sections of sidewalk	0.58	7.21	6.04	18.51	32.53	0.87	$8,277,060	$8,061,856	$215,204	$3,202,000	20	$92,000	34.80
M-4	Corridor Wide	Plant street trees where park strip width allows	0.53	6.59	5.52	18.05	30.89	2.51	$8,277,060	$7,484,833	$792,227	$11,786,000	15	$461,000	25.57
M-5	Antelope Drive	Update pedestrian ramps	0.59	4.75	3.96	12.08	21.38	0.22	$5,708,780	$5,651,692	$57,088	$849,000	20	$52,000	16.33
M-6	Antelope Drive	Improve pedestrian push button access	0.59	4.75	3.96	12.08	21.38	0.22	$5,708,780	$5,651,692	$57,088	$849,000	10	$68,000	12.49
M-7	Antelope Drive	Install sidewalks on both sides of south leg	0.19	1.36	0.78	1.95	4.29	0.11	$1,660,240	$1,617,074	$43,166	$642,000	20	$42,000	15.29
M-8	RR Crossing	Install pedestrian bridge	0.00	0.00	0.20	0.20	0.40	0.00	$47,300	$47,054	$246	$4,000	25	$3,416,000	0.00
M-9	RR Crossing	Remove sidewalk on southeast quadrant; install crosswalk at Demetro to direct to pedestrian bridge	0.00	0.00	0.20	0.20	0.40	0.00	$47,300	$46,827	$473	$7,000	15	$31,000	0.23
M-10	Trail Crossing	Relocate pedestrian push button to be ADA and bicycle accessible	0.00	0.00	0.40	0.59	0.99	0.01	$98,820	$97,832	$988	$15,000	10	$14,000	1.07
M-11	Trail Crossing	Realign crossing to be perpendicular & install fencing to direct users	0.00	0.00	0.30	0.45	0.75	0.25	$98,820	$74,115	$24,705	$368,000	15	$37,000	9.95
M-12	Trail Crossing	Raised median through crossing	0.00	0.00	0.39	0.59	0.98	0.02	$98,820	$96,606	$2,214	$33,000	20	$27,000	1.22
M-13	Trail Crossing	Connect sidewalk on northeast corner to trail	0.00	0.00	0.39	0.58	0.97	0.03	$98,820	$96,251	$2,569	$38,000	20	$18,000	2.11
M-14	Gordon Avenue	Implement Flashing Yellow Arrow (FYA) signal phasing	0.00	1.75	1.36	3.12	6.43	0.17	$1,983,200	$1,931,637	$51,563	$767,000	15	$10,000	76.70
M-15	Gordon Avenue	Improve lighting	0.00	1.70	1.33	3.20	6.42	0.18	$1,983,200	$1,882,052	$101,148	$1,505,000	15	$50,000	30.10
M-16	Gordon Avenue	ADA improvements at southwest corner pedestrian ramp	0.00	0.59	0.00	0.99	1.58	0.02	$273,700	$270,963	$2,737	$41,000	20	$10,000	4.10
M-17	Gordon Avenue	Install bulb-outs	0.00	0.41	0.00	0.68	1.09	0.51	$273,700	$186,116	$87,584	$1,303,000	20	$80,000	16.29
LONG TERM															
L-1	Corridor Wide	Install buffered bike lanes	0.58	7.21	6.04	18.52	32.56	0.84	$8,277,060	$8,068,478	$208,582	$3,103,000	20	$1,106,000	2.81
L-2	Antelope Drive	Relocate pole and sound wall on southeast corner	0.52	4.15	3.46	10.56	18.70	2.90	$5,708,780	$4,941,520	$767,260	$11,415,000	25	$256,000	44.59
L-3	RR Crossing	Regrade 2200 W near railroad crossing to improve sight lines	0.00	0.10	0.10	0.48	0.68	0.32	$139,940	$72,495	$67,445	$1,003,000	25	$1,068,000	0.94
L-4	RR Crossing	Full roadway grade separation	0.00	0.00	0.00	0.00	0.00	1.00	$139,940	$0	$139,940	$2,082,000	25	$8,540,000	0.24
L-5	Trail Crossing	Grade separate the trail (while ensuring trail user access to 2200 W is still maintained)	0.00	0.00	0.40	0.60	0.99	0.01	$98,820	$98,306	$514	$8,000	25	$3,416,000	0.00
L-6	Gordon Avenue	Install buffered bike lanes on Gordon Ave	0.00	1.78	1.38	3.16	6.52	0.08	$1,983,200	$1,958,608	$24,592	$366,000	10	$45,000	8.13