



COLORADO
Department of Transportation
Region 1

Santa Fe Drive (C-470 to I-25) Action Plan

A Planning and Environmental Linkages Study

Final July 2022

Santa Fe Drive (C-470 to I-25) Action Plan

A PLANNING AND ENVIRONMENTAL LINKAGES STUDY



Prepared for:



Prepared by:



DAVID EVANS
AND ASSOCIATES INC.

July 2022



U.S. Department
of Transportation
**Federal Highway
Administration**

Colorado Division

August 17, 2022

12300 W. Dakota Ave., Suite 180
Lakewood, Colorado 80228
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720-963-3001

Jessica Myklebust
Regional Transportation Director
CDOT Region 1
2829 W. Howard Place
Denver CO 80204

Subject: Santa Fe Drive (C-470 to I-25) Action Plan, A Planning and Environmental Linkages Study (PEL)

Dear Mrs. Myklebust:

This letter is to acknowledge the completion of the US-85 (Santa Fe Drive) Planning and Environmental Linkages (PEL) study initiative undertaken by CDOT in cooperation with the City and County of Denver, City of Englewood, City of Littleton, City of Sheridan, Arapahoe County, Douglas County, Denver Regional Council of Governments (DRCOG), and Regional Transportation District (RTD). We appreciate and commend the efforts the team has undertaken to conduct this corridor planning study in a manner consistent with the Federal Highway Administration (FHWA) PEL guidance. Additionally, we appreciate the effort and study happening on Hampden Avenue before specific improvements are identified at the Santa Fe Drive and Hampden Avenue interchange. This interchange serves two major routes and although the PEL indicates one route has a lower functional classification, in this area they both are designated and function at the same functional classification level.

As individual projects are initiated and funding becomes available, it will be necessary for FHWA to meet with CDOT to determine the scope of the NEPA study required, purpose and need, logical termini, and the extent to which the corridor study can be used to supplement or replace certain milestones in the NEPA process.

If you have any questions, please feel free to contact Mr. Chris Horn of this office at (720) 963-3017 or by email at Chris.Horn@dot.gov.

Sincerely,

CHRISTOPHER R HORN
Digitally signed by
CHRISTOPHER R HORN
Date: 2022.08.17
14:00:32 -06'00'

Chris Horn
Senior Area Engineer

Cc:

Steve Sherman, CDOT Region 1 Resident Engineer
Vanessa Halladay, CDOT Region 1 Environmental Manager
Troy Halouska, CDOT PEL Program Manager

BRYAN D. WEIMER, PWLF
DirectorLima Plaza
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720-874-6500
arapahoegov.comArapahoe County
Public Works and Development
6924 S. Lima Street
Centennial, CO 80112

ATTN: CDOT Executive Director Lew

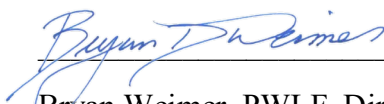
Subject: Letter of Support - Santa Fe Drive Action Plan

Dear Director Lew,

Arapahoe County supports the recommendations of the Santa Fe Action Plan (Action Plan) Planning and Environmental Linkages (PEL) study. The Colorado Department of Transportation (CDOT), in cooperation with the Federal Highway Administration (FHWA), City and County of Denver, City of Englewood, City of Littleton, City of Sheridan, Arapahoe County, Douglas County, the Denver Regional Council of Governments (DRCOG), and the Regional Transportation District (RTD) completed the Action Plan in August 2022. The Action Plan developed recommendations for Santa Fe Drive from Colorado 470 (C-470) to the junction of Alameda Avenue and Interstate 25 (I-25). There are many transportation needs along the corridor, including crash hotspots, congestion and bottlenecks, and gaps in multimodal connectivity. The Action Plan provides concepts for improvements in the form of Project Recommendations, Early Action Projects, and Future Actions.

Arapahoe County has participated in the PEL process as a member of the Project Management Team, Executive Oversight Committee, Elected Officials update meetings, and by participating in the Task Force groups. Arapahoe County supports advancing the Project Recommendations and Early Action Projects, along with additional efforts to consider the Future Actions, published in the Action Plan. As the Project Recommendations and Early Action Projects advance into preliminary engineering and environmental clearance, we are committed to providing continued support and participation in the process.

We look forward to working closely with CDOT and the other corridor agencies on making further progress for improving Santa Fe Drive.



Bryan Weimer, PWLF, Director

8/16/22

Date

Arapahoe County



Jennifer Hillhouse
DOTI | Transportation & Mobility Planning
201 W. Colfax Dept 608
Denver, CO 80202

ATTN: CDOT Executive Director Lew

Subject: Letter of Support - Santa Fe Drive Action Plan

Dear Director Lew,

The Denver Department of Transportation & Infrastructure (DOTI) supports the recommendations of the Santa Fe Action Plan (Action Plan) Planning and Environmental Linkages (PEL) study. The Colorado Department of Transportation (CDOT), in cooperation with the Federal Highway Administration (FHWA), City and County of Denver, City of Englewood, City of Littleton, City of Sheridan, Arapahoe County, Douglas County, the Denver Regional Council of Governments (DRCOG), and the Regional Transportation District (RTD) completed the Action Plan in August 2022. The Action Plan developed recommendations for Santa Fe Drive from Colorado 470 (C-470) to the junction of Alameda Avenue and Interstate 25 (I-25). There are many transportation needs along the corridor, including crash hotspots, congestion and bottlenecks, and gaps in multimodal connectivity. The Action Plan provides concepts for improvements in the form of Project Recommendations, Early Action Projects, and Future Actions.

DOTI has participated in the PEL process as a member of the Project Management Team, Executive Oversight Committee, Elected Officials update meetings, and by participating in the Task Force groups. DOTI supports advancing the Project Recommendations and Early Action Projects, along with additional efforts to consider the Future Actions, published in the Action Plan. As the Project Recommendations and Early Action Projects advance into preliminary engineering and environmental clearance, we are committed to providing continued support and participation in the process.

We look forward to working closely with CDOT and the other corridor agencies on making further progress for improving Santa Fe Drive.

Director – Transportation & Mobility Planning
Department of Transportation & Infrastructure

9.2.2022

City and County of Denver – Department of Transportation & Infrastructure
201 West Colfax Ave. Dept. 608 | Denver, CO 80202
www.denvergov.org/doti
Phone: 720-865-8630

August 3, 2022

Executive Director Shoshana M. Lew
Colorado Department of Transportation
2829 West Howard Place
Denver, CO 80204

via email

Subject: Douglas County Letter of Support for the Santa Fe Drive Action Plan

Dear Director Lew,

Douglas County Public Works Engineering Department supports the recommendations of the Santa Fe Action Plan (Action Plan) associated with the recently completed Planning and Environmental Linkage (PEL) Study. The Colorado Department of Transportation (CDOT), in cooperation with the Federal Highway Administration (FHWA), the City and County of Denver, City of Englewood, City of Littleton, City of Sheridan, Arapahoe County, Douglas County, the Denver Regional Council of Governments (DRCOG), and the Regional Transportation District (RTD) will complete the Action Plan in August 2022. The Action Plan developed recommendations for Santa Fe Drive from C-470 north to the junction of Alameda Avenue and I-25. Many transportation needs were identified for the US 85 corridor, which includes crash hotspots, congestion and bottlenecks, and gaps in multimodal connectivity. The Action Plan provides concepts for improvements in the form of Project Recommendations, Early Action Projects, and Future Actions.

Douglas County actively participated in the PEL process as a member of the Project Management Team, Executive Oversight Committee, Elected Officials group meetings, and provided staff that participated in several Project Task Force groups. Douglas County supports advancing the Project Recommendations and Early Action Projects and Future Actions. As the Project recommendations advance, we look forward to working with CDOT, corridor stakeholders and the other local government agencies on making further progress for improving Santa Fe Drive.

Sincerely,

 Digitally signed by art griffith
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Date: 2022.08.01 15:05:45 -06'00'

Arthur E. Griffith, P.E.

Douglas County Transportation CIP Manager

Copy: Commissioner George Teal, (DC), Janet Herman, (DC), Steve Sherman (CDOT)



1000 Englewood Parkway
Englewood, CO 80110
303.762.2300
www.englewoodco.gov

August 1, 2022

Ms. Shoshana Lew
Executive Director
Colorado Department of Transportation
2829 W. Howard Place
Denver, CO 80204

RE: Letter of Support – Santa Fe Drive Action Plan

Dear Ms. Lew:

The City of Englewood supports the recommendations of the Santa Fe Action Plan (Action Plan) Planning and Environmental Linkages (PEL) study. The Colorado Department of Transportation (CDOT), in cooperation with the Federal Highway Administration (FHWA), City and County of Denver, City of Englewood, City of Littleton, City of Sheridan, Arapahoe County, Douglas County, the Denver Regional Council of Governments (DRCOG), and the Regional Transportation District (RTD) completed the Action Plan in August 2022. The Action Plan developed recommendations for Santa Fe Drive from Colorado 470 (C-470) to the junction of Alameda Avenue and Interstate 25 (I-25). There are many transportation needs along the corridor, including crash hotspots, congestion and bottlenecks, and gaps in multimodal connectivity. The Action Plan provides concepts for improvements in the form of Project Recommendations, Early Action Projects, and Future Actions.

The City of Englewood has participated in the PEL process as a member of the Project Management Team, Executive Oversight Committee, Elected Officials update meetings, and by participating in the Task Force groups. A critical aspect for the city is to ensure that any improvements adjacent to the South Platte Renew wastewater treatment plant are developed in close coordination with the city and do not compromise operations. South Platte Renew is the 3rd largest water renewal facility in Colorado and cleans nearly 20 million gallons of wastewater a day from 300,000 residents in Littleton, Englewood and 19 other connecting communities.

The City of Englewood supports advancing the Project Recommendations and Early Action Projects, along with additional efforts to consider the Future Actions, published in the Action Plan. As the Project Recommendations and Early Action Projects advance into preliminary engineering and environmental clearance, we are committed to providing continued support and participation in the process.



1000 Englewood Parkway
Englewood, CO 80110
303.762.2300
www.engagewoodco.gov

We look forward to working closely with CDOT and the other corridor agencies on making further progress for improving Santa Fe Drive.

Sincerely,

City of Englewood

A handwritten signature in blue ink that reads "J. Shawn Lewis". The signature is fluid and cursive.

J. Shawn Lewis
City Manager

o: 303.762.2312 c: 303-358-4139



Office of the City Council
2255 West Berry Avenue
Littleton, Colorado 80120
303-795-3720

August 25, 2022

Shoshana M. Lew
Executive Director
Colorado Department of Transportation
2829 W. Howard Pl.
Denver, CO 80204

Subject: Letter of Support - Santa Fe Drive Action Plan


Dear Ms. Lew:

The City of Littleton supports the recommendations of the Santa Fe Action Plan (Action Plan) Planning and Environmental Linkages (PEL) study. The Colorado Department of Transportation (CDOT), in cooperation with the Federal Highway Administration (FHWA), City and County of Denver, City of Englewood, City of Littleton, City of Sheridan, Arapahoe County, Douglas County, the Denver Regional Council of Governments (DRCOG), and the Regional Transportation District (RTD) completed the Action Plan in August 2022. The Action Plan developed recommendations for Santa Fe Drive from Colorado 470 (C-470) to the junction of Alameda Avenue and Interstate 25 (I-25). There are many transportation needs along the corridor, including crash hotspots, congestion and bottlenecks, and gaps in multimodal connectivity. The Action Plan provides concepts for improvements in the form of Project Recommendations, Early Action Projects, and Future Actions.

The City of Littleton has participated in the PEL process as a member of the Project Management Team, Executive Oversight Committee, Elected Officials update meetings, and by participating in the Task Force groups. The City of Littleton supports advancing the Project Recommendations and Early Action Projects, along with additional efforts to consider the Future Actions, published in the Action Plan. As the Project Recommendations and Early Action Projects advance into preliminary engineering and environmental clearance, we are committed to providing continued support and participation in the process.

We look forward to working closely with CDOT and the other corridor agencies on making further progress for improving Santa Fe Drive.

Sincerely,

DocuSigned by:

523C318589A149B...

Kyle Schlachter, Mayor
City of Littleton

8/25/2022

Date



From the Office of the City Manager

July 21, 2022

Colorado Department of Transportation
ATTN: Executive Director Shoshana Lew
2829 W. Howard Pl.
Denver, CO. 80204

RE: Letter of Support – Santa Fe Drive Action Plan

Dear Director Lew,

The City of Sheridan supports the recommendations of the Santa Fe Action Plan (Action Plan) Planning and Environmental Linkages (PEL) study. The Colorado Department of Transportation (CDOT), in cooperation with the Federal Highway Administration (FHWA), City and County of Denver, City of Englewood, City of Littleton, City of Sheridan, Arapahoe County, Douglas County, the Denver Regional Council of Governments (DRCOG), and the Regional Transportation District (RTD) expect to complete the Action Plan in August 2022. The Action Plan developed recommendations for Santa Fe Drive from Colorado 470 (C-470) to the junction of Alameda Avenue and Interstate 25 (I-25). There are many transportation needs along the corridor, including crash hotspots, congestion and bottlenecks, and gaps in multimodal connectivity. The Action Plan provides concepts for improvements in the form of Project Recommendations, Early Action Projects, and Future Actions.

The City of Sheridan has participated in the PEL process as a member of the Project Management Team, Executive Oversight Committee, Elected Officials update meetings, and by participating in the Task Force groups.

The City of Sheridan supports advancing the Project Recommendations and Early Action Projects, along with additional efforts to consider the Future Actions, published in the Action Plan. As the Project Recommendations and Early Action Projects advance into preliminary engineering and environmental clearance, we are committed to providing continued support and participation in the process.

We look forward to working closely with CDOT and the other corridor agencies on making further progress for improving Santa Fe Drive.


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City Manager

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Cc:
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ACKNOWLEDGEMENTS

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City of Sheridan
Devin Granbery
City Manager

Regional Transportation District
Brian Welch
Senior Manager
Planning Technical Services



Elected Officials Committee

City and County of Denver
Councilman Jolon Clark
District 7

City of Englewood
Former Mayor Linda Olson

City of Littleton
Former Mayor Pro Tem Scott Melin

City of Littleton
Mayor Kyle Schlachter

City of Sheridan
Mayor Tara Beiter-Fluhr

Arapahoe County
Commissioner Carrie Warren-Gully
District 1

Douglas County
Commissioner George Teal
District 2

Douglas County
Commissioner Roger Partridge
Former District 2 Commissioner

Regional Transportation District
Doug Tisdale
RTD Board of Directors, District H



ACRONYMS AND ABBREVIATIONS

| | |
|------------------|---|
| ADA | Americans with Disabilities Act |
| AM | ante meridiem |
| APCD | Air Pollution Control Division |
| C-470 | Colorado State Highway 470 |
| CDOT | Colorado Department of Transportation |
| CDPHE | Colorado Department of Public Health and Environment |
| CMAQ | Congestion Mitigation and Air Quality |
| CO | carbon monoxide |
| COVID-19 | coronavirus disease 2019 |
| DRCOG | Denver Regional Council of Governments |
| EOC | Executive Oversight Committee |
| ESA | Environmental Site Assessment |
| FASTER | Funding Advancements for Surface Transportation and Economic Recovery Act of 2009 |
| FEMA | Federal Emergency Management Agency |
| FHWA | Federal Highway Administration |
| HOV | high occupancy vehicle |
| HSIP | Highway Safety Improvement Program |
| I-25 | Interstate 25 |
| ISA | Initial Site Assessment |
| ITS | Intelligent Transportation Systems |
| LOS | Level of Service |
| LRT | light rail transit |
| MESA | Modified Environmental Site Assessment |
| NEPA | National Environmental Policy Act |
| PEL | Planning and Environmental Linkages |
| PM | post meridiem |
| PM ₁₀ | particulate matter less than 10 microns in diameter |
| PMT | Project Management Team |
| RTD | Regional Transportation District |
| RTP | Regional Transportation Plan |
| SB 40 | Senate Bill 40 |
| STP | Surface Transportation Program |
| TAP | Transportation Alternatives Program |
| TAZ | Transportation Analysis Zones |
| TIP | Transportation Improvement Program |
| U.S. | United States |
| US 85 | United States Highway 85 |
| USACE | United States Army Corps of Engineers |
| USDOT | United States Department of Transportation |



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Executive Summary

Introduction

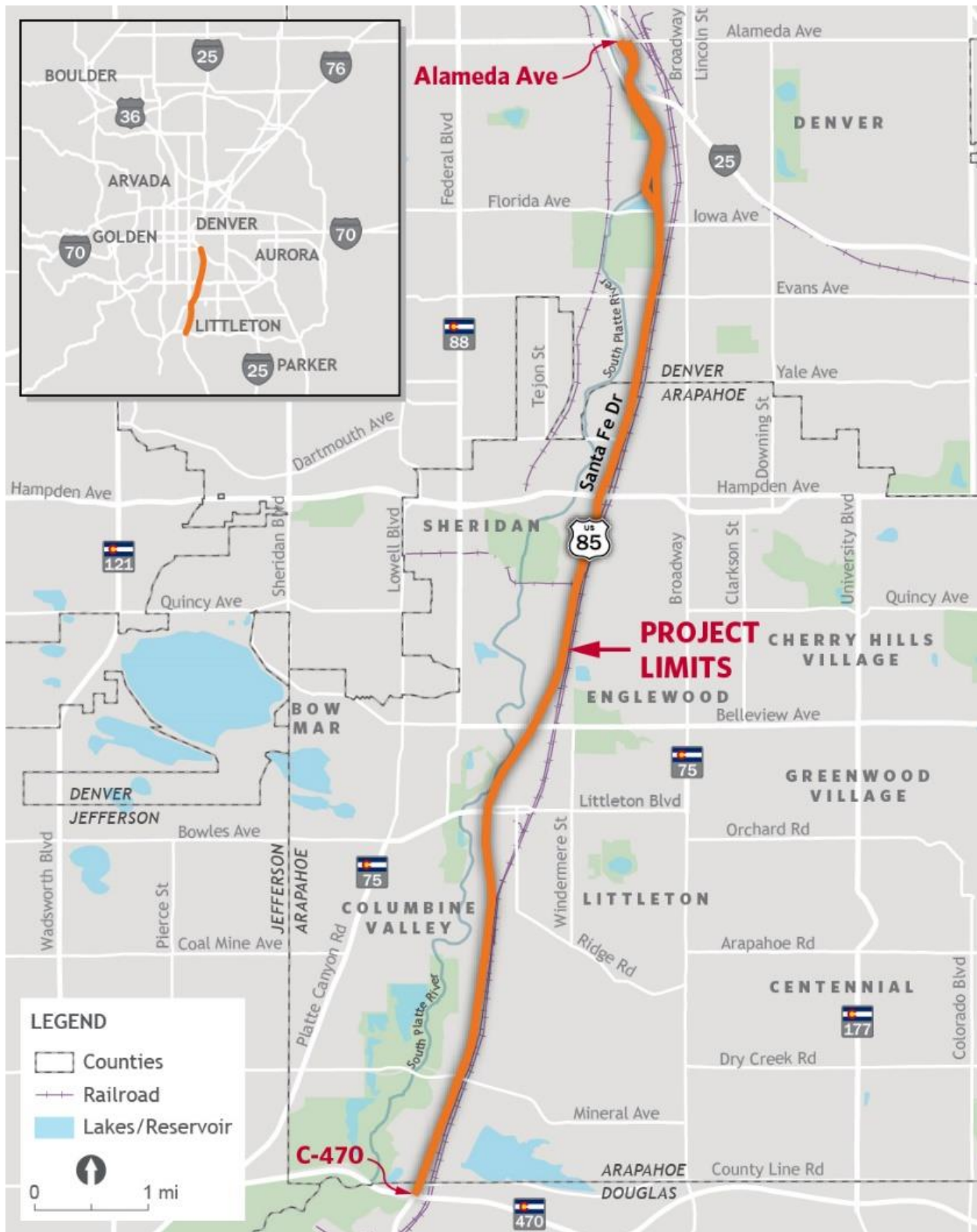
United States Highway 85 (US 85), commonly known as Santa Fe Drive, is a primary north-south interregional highway between Castle Rock and Denver. The 11-mile segment of Santa Fe Drive studied for this report is between C-470 and the junction of Alameda Avenue and Interstate 25 (I-25) (the Santa Fe Drive corridor). It traverses six local jurisdictions — Arapahoe County, City and County of Denver, Douglas County, City of Englewood, City of Littleton, and City of Sheridan. Figure ES-1 shows the project limits in the context of the Denver metropolitan area. The Santa Fe Drive corridor serves and passes through areas of changing land use. Travel demand in the corridor is expected to continue to rise based on the Denver Regional Council of Governments (DRCOG) 2040 Travel Demand Model. Santa Fe Drive has inconsistent driveway accesses, a parallel light rail transit (LRT) system, and an underutilized high occupancy vehicle (HOV) express lane.

With mutual interests in safety, operational efficiency, and multimodal connection improvements, the Colorado Department of Transportation (CDOT) and the cities and counties in the Santa Fe Drive corridor partnered to fund a collaborative study. A Planning and Environmental Linkages (PEL) study process was selected to bring together the local agency partners to collaborate and build consensus on a range of multimodal improvements that could require two or more partner agencies to work together to develop. Existing conditions were assessed, and potential improvements were analyzed that would lead to a safer and more efficient transportation network with improved multimodal connections. The process resulted in consensus around Project Recommendations and Future Actions. Project Recommendations are projects that could be completed within 10 years, including Early Action Projects that can be implemented even sooner, if funding becomes available. Future Actions may require longer than 10 years to fund and complete.

The results and documentation prepared for the *Santa Fe Drive Action Plan (C-470 to I-25) (A Planning and Environmental Linkages Study)* will be incorporated by reference into future projects that are developed under the National Environmental Policy Act (NEPA), pursuant to the statutory conditions in 23 U.S.C. 168(d) and Federal Highway Administration (FHWA) regulations 23 CFR 450.212 (a)-(c) and 450.318 (a)-(d), regarding incorporation of the results of transportation planning studies as part the overall project development process consistent with NEPA and its implementing regulations.

For additional information when reading this document digitally, click on the [underlined blue text](#) to link directly to the associated section in the Action Plan.

Figure ES-1. Project Limits



Public and Agency Involvement

A comprehensive [stakeholder, public, and agency involvement strategy](#) was created and customized specifically for the Action Plan. The strategies in the plan obtained feedback received from various groups and communities engaged through a series of stakeholder interviews, technical meetings, a survey, virtual public events, and other communication platforms. These strategies took into consideration the coronavirus disease 2019 (COVID 19) mandates and were primarily implemented in virtual settings. General feedback included concerns over east-west connectivity, safety of bicycle and pedestrian users, crashes, and congestion and bottlenecks. Feedback also included stakeholder willingness to promote the project, and input on the process to evaluate and screen alternatives. Comments and input received helped frame the Purpose and Need, goals, and objectives; and ultimately informed the study's findings and Project Recommendations.

In addition, several committees were convened with participating jurisdictions FHWA, CDOT, DRCOG, and Regional Transportation District (RTD) for executive-level decision-making, project management, and technical task forces.

Existing Transportation System – Critical Issues

Based on the data collection and analysis completed for the *Santa Fe (C-470 to I-25) PEL Corridor Conditions Report* (CDOT, 2020), the following issues are [critical for consideration](#) when planning improvements for the Santa Fe Drive Corridor.

Roadway characteristics of the Santa Fe Drive corridor are highly variable and demonstrate a mix of previous strategies to increase safety, provide and manage access, and accommodate demand. The corridor varies in cross-section, from four to eight lanes with a bifurcated section (split into two, divided by development and the S. Platte River); access control classifications of Expressway, Major Bypass south of Florida Avenue with inconsistent direct access from private driveways, and Non-Rural Principal Highway north of Florida Avenue; and surrounding character and use that begins suburban on the south end of the project limits and becomes urban on the north end of the project limit. These characteristics create different issues for travelers that use some or all its various sections.

Crash data obtained for the three-year period of January 1, 2016, to December 31, 2018, shows that 2,282 crashes occurred on Santa Fe Drive between C-470 and I-25. 80% of crashes resulted in property damage only, 20% were injury crashes, and less than 1% were fatal crashes. 43% of crashes occurred at non-intersection locations, 53% of crashes occurred at or near intersections, 3% of crashes occurred at interchange ramps, and 1% of crashes occurred at driveway access points. Rear-end collisions, a predominantly intersection-related crash type due to the turbulence and speed differential created by stopping and queueing conditions, were the most common crash type accounting for 56.5% of all crashes reported during the study period. Based on the analysis, short segments that exhibit a higher concentration of crashes when compared to the rest of the corridor include:

- Mississippi Avenue to Iowa Avenue

- Harvard Avenue to Hampden Avenue
- Union Avenue to Prince Street
- Bowles Avenue to Vinewood Street

Santa Fe Drive intersections with the greatest number of crashes are at:

- Dartmouth Avenue (144 crashes)
- Mississippi Avenue (141 crashes)
- Bowles Avenue (80 crashes)
- Mineral Avenue (79 crashes)
- Oxford Avenue (79 crashes)

Congestion and bottlenecks have been identified along the Santa Fe Drive corridor in the following areas:

Southbound, to a greater extent during the evening peak

- Between I-25 and Mississippi Avenue (Mississippi Avenue bottleneck), up to 1.5 miles of congestion to I-25.
- Between Dartmouth Avenue and Oxford Avenue (Oxford Avenue bottleneck), up to one mile of congestion.
- Between Bowles Avenue and Mineral Avenue (Mineral Avenue bottleneck), up to two miles of congestion.
- Approaching the C-470 interchange, up to half a mile of congestion.

Northbound, during both morning and evening peaks

- Between C-470 and Mineral Avenue (Mineral Avenue bottleneck), up to one mile of congestion.
- Approaching Bowles Avenue (Bowles Avenue bottleneck), up to 1.5 miles of congestion.
- Between Hampden Avenue and Dartmouth Avenue (Dartmouth Avenue bottleneck), up to half a mile of congestion.
- Approaching the I-25 interchange (I-25 flyover bottleneck), up to half a mile of congestion.

Santa Fe Drive intersections that experience the most congested conditions

- Mississippi Avenue.
- Dartmouth Avenue.
- Oxford Avenue.
- Bowles Avenue.
- Mineral Avenue.

These intersections are also the intersections with the greatest number of crashes along the corridor. The high crash frequency is related to long queues leading to rear-end and other types of congestion-related crashes.

Multimodal travel and connectivity can be uncomfortable, difficult to navigate, and confusing. Multimodal users experience the following key issues:

- While there are sections of sidewalk adjacent to Santa Fe Drive, primarily within Denver and Littleton, there are several sidewalk gaps and long stretches where there is no sidewalk along the roadway where sidewalks could benefit local mobility.
- Making the connection to the Mary Carter Greenway Trail and South Platte River Trail from Santa Fe Drive can sometimes prove difficult, especially in areas where the trail is located close to Santa Fe Drive but there is no adequate connection or wayfinding, including at and along Mississippi Avenue and Dartmouth Avenue.
- The Mary Carter Greenway Trail and South Platte River Trail have areas with bottlenecks and other potential safety issues related to multiple users and limited width, which may inhibit overall multimodal mobility and connections to crossing facilities across Santa Fe Drive.
- The Oxford-City of Sheridan LRT Station lacks bicycle and pedestrian infrastructure to the station along Oxford Avenue from the Mary Carter Greenway Trail and residential and commercial areas west of Santa Fe Drive, which is especially important since this station does not offer a park-n-ride. The Englewood LRT Station also lacks bicycle and pedestrian infrastructure access, with no way of crossing over Santa Fe Drive at Hampden Avenue, the closest roadway access across Santa Fe Drive.
- Twenty-two fixed bus routes provide direct service to the Santa Fe Drive corridor. Most bus routes provide service across Santa Fe Drive or on parallel streets, with the light rail stations serving as major hubs for area transit service. Comfortable access to the bus stops along the corridor and on intersecting streets, and bicycle and pedestrian connections to/from the stops are key issues.

Purpose and Need and Goals

The [purpose](#) of the recommended transportation improvements from this study is to improve safety for all users, improve operational performance, and enhance multimodal connectivity for the Santa Fe Drive corridor from C-470 to I-25 through Arapahoe County, the City and County of Denver, Douglas County, and the cities of Englewood, Littleton, and Sheridan.

Transportation improvements are needed to address:

- Safety
- Operational Performance
- Multimodal Connection

Additional goals of the recommended transportation projects for the Santa Fe Drive corridor are to:

- Consider local community surroundings and context
- Support local and regional planning efforts
- Minimize environmental impacts
- Balance local access and regional travel with consistent application of the defined access category for Santa Fe Drive (Expressway – Major Bypass from C-470 to Florida Avenue and Non-Rural Principal Highway north of Florida Avenue to the end of the state highway north of I-25)
- Optimize transit use and multimodal travel opportunities for the travel corridor
- Enhance connections and wayfinding to adjacent pedestrian and bicycle facilities
- Provide redundancy for the regional transportation system to accommodate traffic when incidents impact other north-south routes such as I-25, South Broadway, or Federal Boulevard

Environmental Resource Considerations

Existing conditions data for the social, natural, and built environmental resources was collected and documented in the *Santa Fe (C-470 to I-25) PEL Corridor Conditions Report* (CDOT, 2020). Based on preliminary analyses, it was determined that only a few environmental resources potentially have impacts that could influence decisions about which concepts and elements would be carried forward as recommendations of the Action Plan. Additional analysis for those resources was conducted, as needed, to support the alternatives evaluation and screening process. The Action Plan identifies [next steps for environmental resource considerations](#) and potential cost and schedule implications during future project development.

Alternatives Development and Evaluation

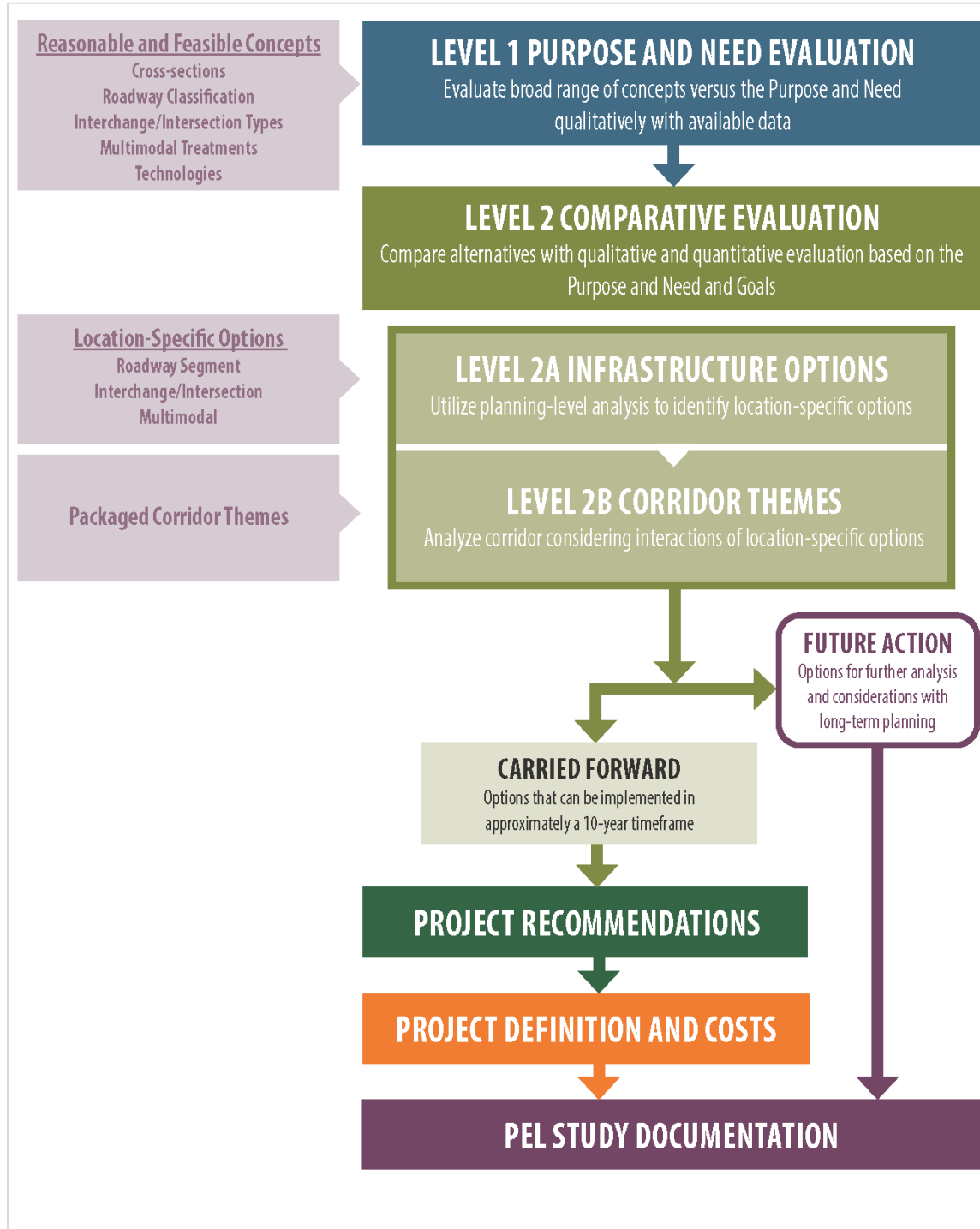
The Action Plan was developed using a three-step [alternatives evaluation process](#). Concepts were developed in Level 1 and narrowed down and combined in subsequent analyses for Level 2A and Level 2B evaluations. The process included developing evaluation criteria based on the Purpose and Need developed for the Santa Fe Drive corridor, developing a range of improvement concepts, and identifying recommendations through a tiered evaluation process shown in Figure ES-2.

The Level 1 evaluation identified a range of corridor improvement concepts that could meet the Purpose and Need, while eliminating concepts from detailed consideration that had “fatal flaws” and did not meet the Purpose and Need. Concepts that were retained for further consideration in Level 2 evaluation included various roadway cross-sections, highway functional classifications, intersection modifications, multimodal treatments and infrastructure, and technology and system management strategies.

At Level 2A, concepts were further refined into location-specific options along the corridor and evaluated on how well they met the Purpose and Need and goals. At Level 2B, the options were

combined into four corridor themes and were again evaluated on how well the improvements met the Purpose and Need and goals. The general elements carried forward from the Level 2B evaluation were further refined to define the study’s Project Recommendations.

Figure ES-2. Alternatives Evaluation Process



Implementation Strategy and Project Ratings

Based on the results of the alternatives development and evaluation process, improvement recommendations were identified for the Santa Fe Drive corridor. The recommendations are identified with the following timeframes for implementation and further project development:

- **Project Recommendations** are [improvements](#) that provide Safety, Operational Performance, and Multimodal Connectivity benefits along the Santa Fe Drive corridor that can possibly be implemented within the next 10 years. These also include technology and system management recommendations.
- **Early Action Projects** are a subset of the Project Recommendations that are projects with relatively simple project development requirements (e.g., little to no right-of-way, minimal environmental resource impacts) and the potential to secure immediately available funding. Four of these projects have secured funding and are moving forward.
- **Future Actions** are [projects](#) that have the potential to provide additional improvements for the Santa Fe Drive corridor but would require further study, more complicated environmental and design processes, or funding levels and schedules that are expected to take longer than 10 years to implement.

The Project Recommendations were categorized into Roadway projects and Multimodal projects that were then ranked according to more refined criteria to compare their relative benefits and to compare each project's ability to contribute toward the Santa Fe Drive Purpose and Need. Project rating tables and estimated project costs were developed to be used to identify projects which meet CDOT and participating jurisdictions policy goals and/or criteria for specific funding sources.

Document Organization

This document provides a complete record of the study process that resulted in the development of the Santa Fe Drive Action Plan.

Section 1.0 [Introduction](#)

Provides an overview of the project and study area, the reason for the study, and who participated in the decision-making process. It provides an overview of the existing transportation system and the land use context that affects existing and projected traffic patterns.

Section 2.0 [Purpose and Need and Goals](#)

Contains the Purpose and Need statement that demonstrates why improvements are needed along the corridor, and lists additional goals that are important for the corridor.

Section 3.0 Environmental Resources

Describes the existing conditions of the environmental resources along the corridor, the potential impacts of the transportation alternatives evaluated, and the considerations for future NEPA studies.

Section 4.0 Public Engagement and Agency Coordination

Describes how the public and affected agencies were informed about and engaged in the decision-making process.

Section 5.0 Alternatives Evaluation and Recommendations

Describes the decision-making process and various alternatives considered to address the project Purpose and Need and goals and the set of recommended improvements. It describes how the Project Recommendations can be implemented—both Early Action Projects that can begin implementation immediately and Future Actions identified for longer-term implementation.

Section 6.0 Project Ratings

Contains a complete list of the recommended projects that could be implemented within 10 years with their ratings, estimated costs for implementation, and general funding strategies.

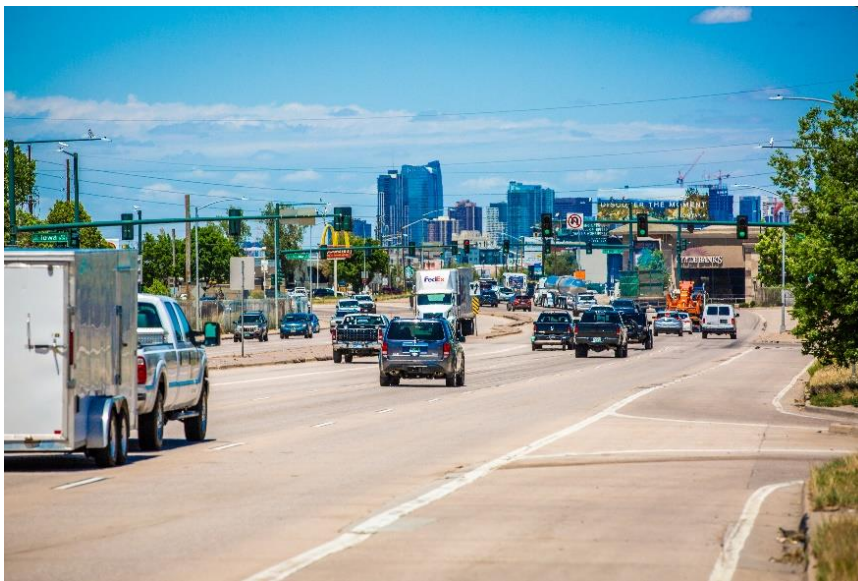
Appendices

Appendix A is the FHWA PEL Questionnaire that summarizes the Santa Fe Drive Action Plan study process to facilitate the transition to a NEPA analysis. The additional appendices present technical data and detailed analysis supporting the results provided in this document.

1.0 Introduction

In partnership with the Federal Highway Administration (FHWA) and the six local jurisdictions within the 11-mile stretch of Santa Fe Drive (United States Highway 85 [US 85]), between Colorado State Highway 470 (C-470) and Interstate 25 (I-25), the Colorado Department of Transportation (CDOT) conducted a Planning and Environmental Linkages (PEL) study process to evaluate the needs in the Santa Fe Drive corridor and determine potential improvements. A PEL study process was selected to bring together the local agency partners to collaborate and build consensus on a range of multimodal improvements that could require two or more partner agencies to work together to develop. This *Santa Fe Drive Action Plan (C-470 to I-25) (A Planning and Environmental Linkages Study)* (Action Plan) documents the transportation issues and environmental concerns in the Santa Fe Drive corridor and the Project Recommendations that could be implemented within 10 years, including the Early Action Projects that can be implemented immediately, and the Future Actions that would likely require longer than 10 years to implement. Photo 1 shows Santa Fe Drive looking north at Iowa Avenue.

Photo 1. Santa Fe Drive Looking North at Iowa Avenue

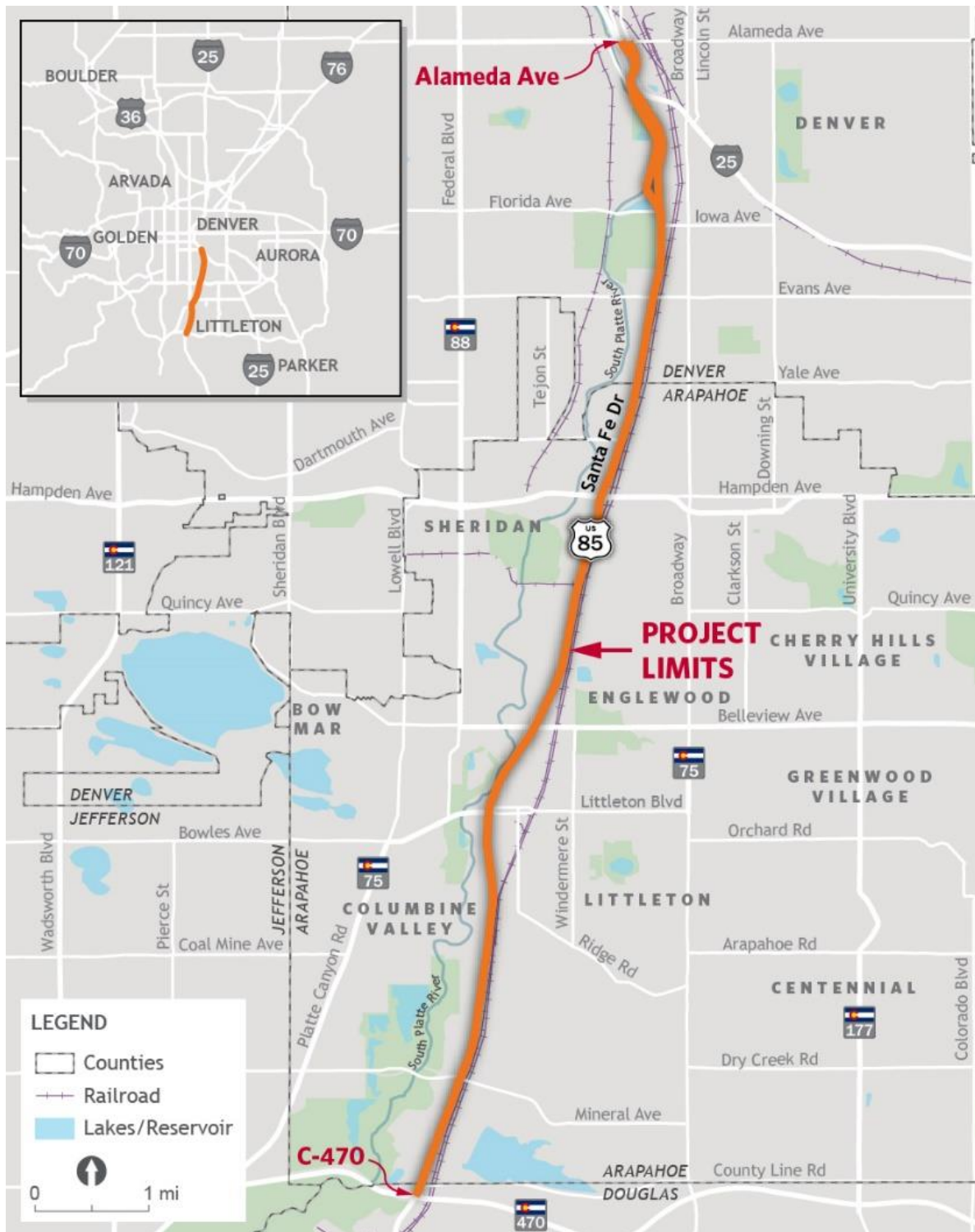


1.1 Project Location and Project Limits

Owned and operated by CDOT, Santa Fe Drive is a significant north-south interregional highway between Castle Rock and Denver. The Santa Fe Drive corridor traverses six local jurisdictions: Arapahoe County, City and County of Denver, Douglas County, City of Englewood, City of Littleton, and City of Sheridan.

Figure 1-1 shows the project location in the context of the Denver metropolitan area and the limits of the Santa Fe Drive Action Plan corridor. The northern end of the project limits extends just past I-25 to Alameda Avenue. The southern end of the project limits ends at C-470.

Figure 1-1. Project Limits



1.2 Purpose of a PEL Study Process

This Action Plan is the report documenting a PEL study process. A PEL study is a transportation planning tool that can streamline the time it takes to identify and advance needed transportation improvements within a corridor from planning to construction. The PEL study process is an approach used to identify transportation issues, priorities, and environmental concerns. It can be applied to make planning decisions and used for planning analysis. The PEL study process engages affected agencies and the public in creating a short- and long-term plan of defined improvements that the responsible agencies can use to further develop specific projects. Project development entails identifying project funding; performing more detailed study and coordination with affected agencies, stakeholders, and the public through the National Environmental Policy Act (NEPA) process on the specific project; and developing design plans for construction.

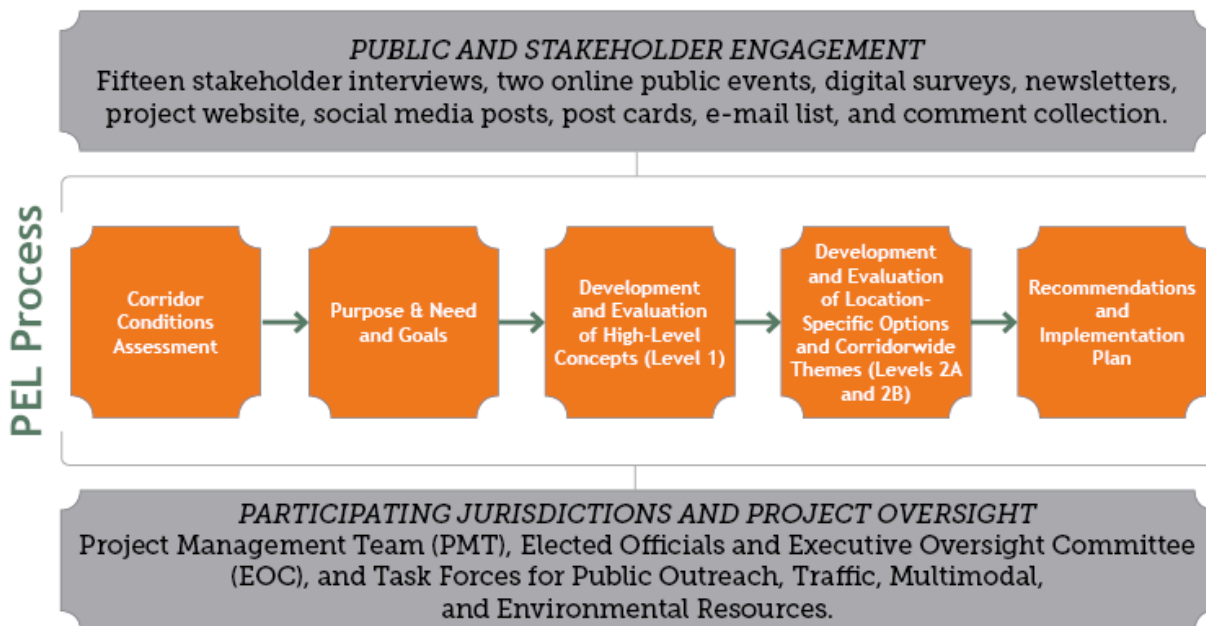
Benefits of the PEL Study Process

- Improved project coordination between agencies
 - Elimination of duplicate efforts in transportation planning and NEPA processes
 - Improved communication and stronger relationships with agencies, stakeholders, and the general public
 - Early identification of potential social and environmental impacts
 - Better environmental outcomes
 - Better decision-making in general
-

NEPA requires that any project considered to be a Federal Action (e.g. receives federal funding or requires federal permits) go through a study process to assess the environmental, social, and economic effects of a proposed action. Council on Environmental Quality (CEQ) regulations 40 CFR §§ 1500-1508 define Federal Actions and address the basic decision-making framework and provisions established in NEPA. When complete, a PEL study process links transportation planning to environmental issues and results in planning products and analyses that can be carried forward into the NEPA process. The results and documentation prepared for the *Santa Fe Drive (C-470 to I-25) Action Plan* will be incorporated by reference into future projects that are developed under NEPA, pursuant to the statutory conditions in 23 U.S.C. 168(d) and FHWA regulations 23 CFR 450.212 (a)-(c) and 450.318 (a)-(d), regarding incorporation of the results of transportation planning studies as part the overall project development process consistent with NEPA and its implementing regulations.

The PEL study process is flexible. The Santa Fe Drive Action Plan process generally had five primary steps identified in Figure 1-2. All the steps involve two-way engagement between the study team and the interested stakeholders, including the public, property owners, resource agencies and local government partners. Stakeholders are engaged throughout the process to draw out their ideas and suggestions and to develop support and ultimately consensus on the study's recommendations. Information about the planning process used to develop the Action Plan is also available in the FHWA PEL Questionnaire in Appendix A.

Figure 1-2. Santa Fe Drive Action Plan Study Process



1.3 Participating Jurisdictions and Building Consensus

Mutual interests of multiple jurisdictions along the Santa Fe Drive corridor led Arapahoe County to apply for Denver Council of Regional Governments (DRCOG) Transportation Improvement Program (TIP) funding for the Action Plan. Ultimately, the Santa Fe Action Plan was funded and developed by CDOT, Arapahoe County, City and County of Denver, Douglas County, City of Englewood, City of Littleton, and City of Sheridan. FHWA, DRCOG, and Regional Transportation District (RTD) also participated in the process. Consensus-building was at the heart of the process used to develop recommendations for improvements within the study area. The participating jurisdictions agreed that building consensus on a corridorwide approach would benefit all the parties involved.



Three groups met regularly throughout the study to provide direction and oversight, build consensus, work through challenges, and provide input to the decision-making process.

- **Project Management Team (PMT).** This group was composed of representatives consisting of staff from each participating jurisdiction, as well as FHWA, DRCOG, and the RTD. The PMT convened monthly to discuss the study progress, provide input for the PEL study process steps shown in Figure 1-2, and address challenges or questions brought forward by the study team. PMT members joined a charter that established the roles and

responsibilities for the PMT and outlined how decisions would be made through consensus agreement. In a consensus agreement, the parties recognize that given the combination of gains and trade-offs in the package agreement, the resulting recommendations are the best the parties can make at a given point in time.

- **Executive Oversight Committee (EOC) and Elected Officials.** This group was composed of elected officials and executives from each participating jurisdiction, as well as representatives from FHWA, DRCOG and RTD. The EOC convened at major milestones to provide input to the study process, endorse decisions, and preview public engagement materials.
- **Task Forces.** Task forces were formed specifically to discuss public outreach, traffic, multimodal, and environmental resources. Each participating jurisdiction was invited to send a representative or technical expert to the meetings. The task force meetings occurred at study milestones, and results from those meetings were shared with the PMT and EOC.

Decisions during the study were made through a process that involved the PMT, EOC and Elected Officials, but also included guidance from FHWA and input from public and stakeholder engagement. Figure 1-3 illustrates the decision-making structure that led to the study milestones and how interaction with the public and FHWA was a key part of that process. Records of agency coordination are included in Appendix B. Records of public and stakeholder engagement are included in Appendix C.

Figure 1-3. Decision-Making Structure



1.4 Existing Transportation System – Critical Issues

This section summarizes the physical and operational characteristics of the transportation system elements and the related critical issues that were identified as part of the Action Plan. Further details about the existing physical and operational characteristics of the Santa Fe Drive corridor are included in the *Santa Fe PEL (C-470 to I-25) Corridor Conditions Report (Corridor Conditions Report)* (<https://www.codot.gov/projects/santafepel/assets/conditions-report.pdf>) (CDOT, 2020).

1.4.1 Roadway Characteristics

The geometric characteristics of the 11-mile Santa Fe Drive corridor are highly variable and demonstrate a mix of previous strategies to increase safety, provide and manage access, and accommodate demand. The corridor varies in cross-section, access control classification, surrounding character, and use, which creates different issues for travelers that use some or all its various sections. Generally, the Santa Fe Drive corridor has four roadway typical cross-sections (exclusive of turn lanes and auxiliary lanes), shown in Figure 1-4.

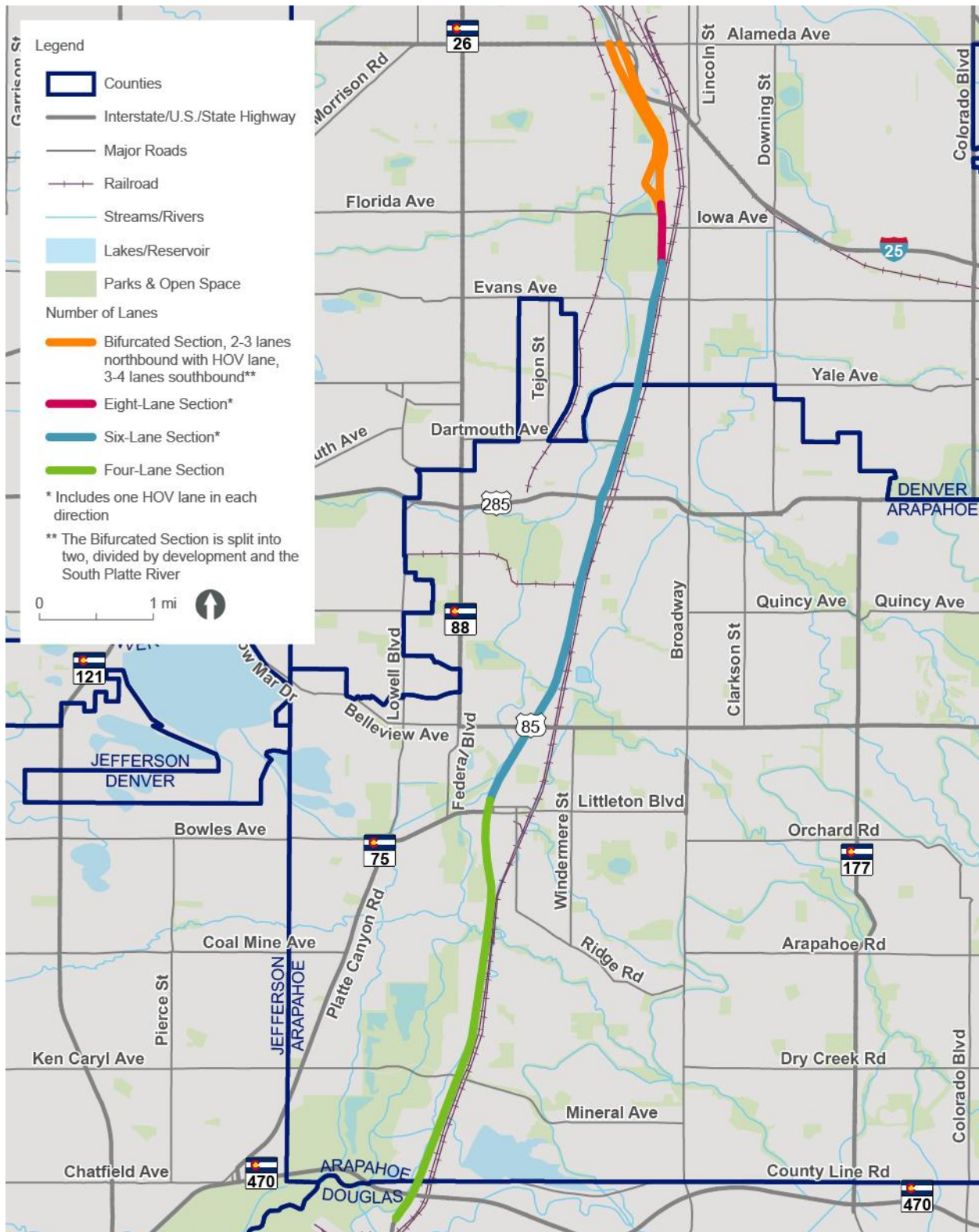
CDOT assigns access categories to state highways that define specific roadway functions and access characteristics for a roadway segment. The categories are associated with certain requirements for access spacing and auxiliary lanes, as documented in the *Colorado State Highway Access Code* (State of Colorado, 2002). For most of the corridor, from C-470 to Florida Avenue, Santa Fe Drive is classified as an Expressway, Major Bypass. At the northern end of the corridor, from north of Florida Avenue to north of I-25, the corridor is classified as a Non-Rural Principal Highway.

Individual private driveways and business accesses on Santa Fe Drive between C-470 and Florida Avenue are inconsistent with the corridor access category classification of Expressway and negatively impact corridor travel and operations with turning conflicts and speed differentials. The highway also does not meet the required spacing of one mile between public road intersections in some segments. The lack of a local roadway network, especially on the west side of the corridor, for property access contributes to the high number of private driveways and business accesses on Santa Fe Drive, particularly south of Bowles Avenue, as well as on the west side of the corridor north of Belleview Avenue and north of Dartmouth Avenue.

1.4.1.1 Rail

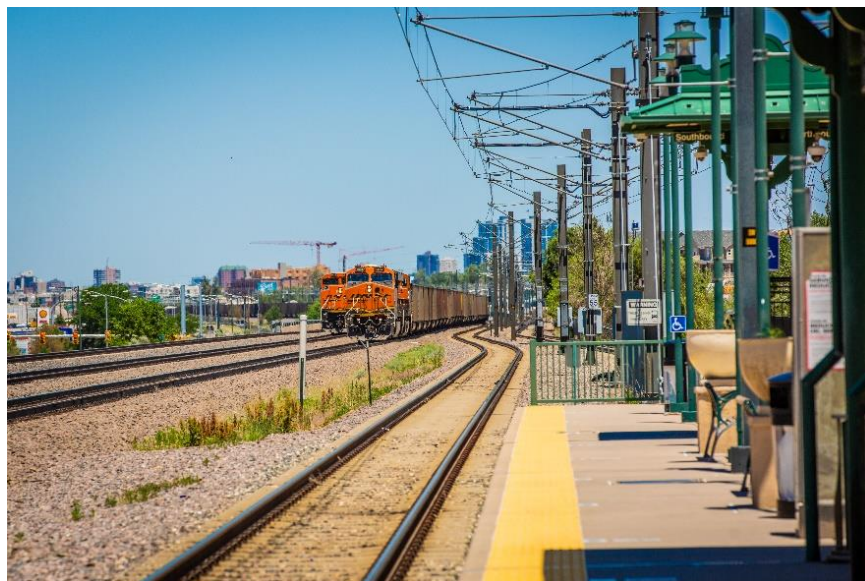
Freight rail tracks, along with RTD LRT tracks, parallel the Santa Fe Drive corridor along its east side for much of its length. Two freight rail tracks are immediately adjacent to the Santa Fe Drive corridor from Iowa Avenue to Union Avenue. At approximately Union Avenue the freight rail tracks and LRT tracks switch positions and separate from the Santa Fe Drive corridor through downtown Littleton. From the Sumner Drive and Santa Fe Drive intersection, the LRT tracks are immediately adjacent to the east side of Santa Fe Drive with the freight rail tracks immediately adjacent to the east side of the LRT tracks to the Mineral Station where the LRT tracks end. The freight tracks continue adjacent to the Santa Fe Drive corridor south of the Mineral Station through the southern project limits. The freight rail and LRT facilities cross over and under the east-west streets that intersect Santa Fe Drive, and these rail crossings are frequently near the intersection of the cross street and Santa Fe Drive, which constrains intersection geometrics and related operations. Photo 2 shows freight rail tracks adjacent to LRT tracks and a station.

Figure 1-4. Number of Lanes



There is one at-grade rail crossing of the Santa Fe Drive corridor just south of Oxford Avenue. This single-track crossing is skewed, and vehicular traffic along Santa Fe Drive is controlled by a traffic signal separate from the signal at Oxford Avenue, although it is interconnected to the CDOT signal network. The crossing is operated by Union Pacific Railroad, and it is utilized two times per day on average. The location of the crossing is a physical constraint for potential improvements at the Oxford Avenue intersection, and when trains cross Santa Fe Drive at grade, significant congestion and queues occur that affect multiple intersections and cross streets on either side of the crossing.

Photo 2. Freight Rail Tracks Adjacent to RTD's Light Rail Tracks and Santa Fe Drive



1.4.2 Safety

Data obtained for the three-year period of January 1, 2016, to December 31, 2018, shows that 2,282 crashes occurred on Santa Fe Drive between C-470 and I-25. The number of crashes per year were generally consistent through the three-year period, ranging between 730 and 790 crashes annually. 80 percent (%) of crashes resulted in property damage only, 20% were injury crashes, and less than 1% were fatal crashes.

Of the 2,282 crashes that were reported during the three-year period, 43% of crashes occurred at non-intersection locations, 53% of crashes occurred at or near intersections, 3% of crashes occurred at interchange ramps, and 1% of crashes occurred at driveway access points. Rear-end collisions, a predominantly intersection-related crash type due to the turbulence and speed differential created by stopping and queueing conditions, were the most common crash type accounting for 56.5% of all crashes reported during the study period. This prevalence of rear-end crashes is consistent with the trend of predominantly intersection and intersection-related crashes.

A spatial heat map of crash density on the Santa Fe Drive corridor is shown in Figure 1-5. The line graph below the heat map mirrors the corridor alignment and charts crash frequencies by

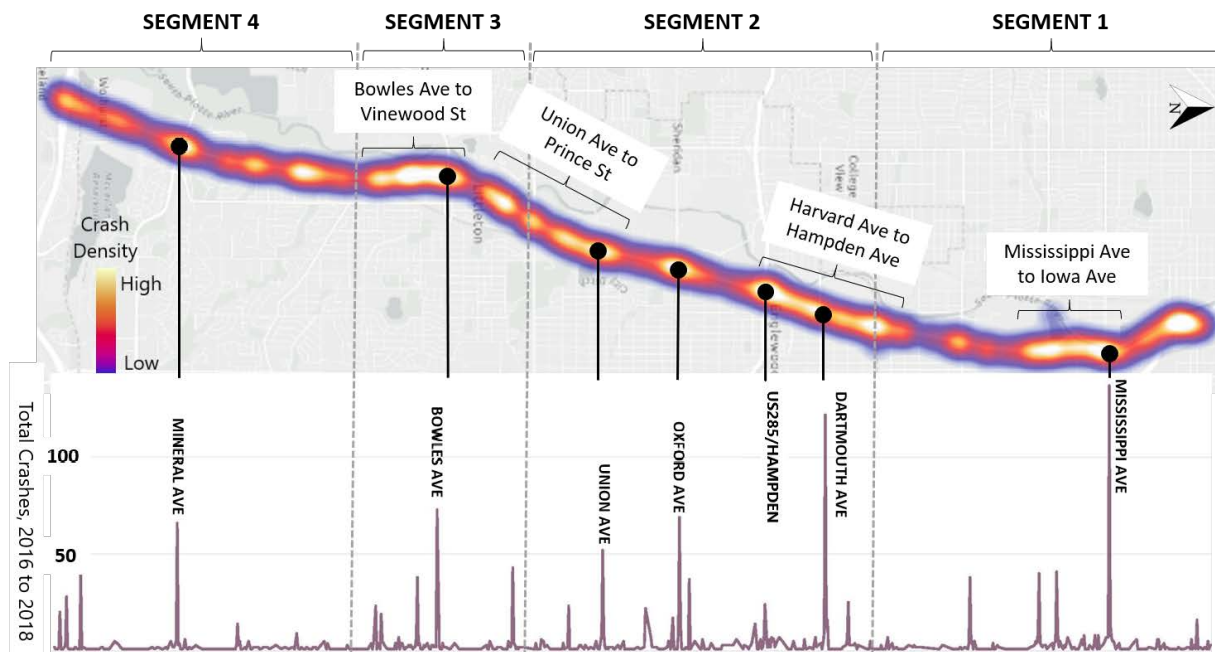
milepost. Spikes along the graph correlate with crashes that occurred at intersections. The heat map was used to identify locations of high crash frequency along the corridor. Based on analysis from the heat map, short segments that exhibit a higher concentration of crashes when compared to the rest of the corridor include:

- Mississippi Avenue to Iowa Avenue
- Harvard Avenue to Hampden Avenue
- Union Avenue to Prince Street
- Bowles Avenue to Vinewood Street

Santa Fe Drive intersections with the greatest number of crashes are at:

- Dartmouth Avenue (144 crashes)
- Mississippi Avenue (141 crashes)
- Bowles Avenue (80 crashes)
- Mineral Avenue (79 crashes)
- Oxford Avenue (79 crashes)

Figure 1-5. Crash Density



The crash hotspot intersections identified above correlate with many of the most congested intersections on the corridor. The relationship between crashes and congestion is illustrated in Figure 1-6, which indicates some correlation between congested areas as measured by morning (AM) and afternoon/evening (PM) travel speeds to the crash hotspots. Scans of relative congestion levels on the corridor indicate that the worst congestion occurs in the segments

North of Iowa Avenue (including the Mississippi Avenue to Iowa Avenue crash hotspot) and south of Bowles Avenue (including the Bowles Avenue to Vinewood Street crash hotspot). The Harvard Avenue to Hampden Avenue crash hot spot includes the congested Dartmouth Avenue intersection. The high crash frequency from Union Avenue to Prince Street may be less related to congestion along the corridor.

Figure 1-6. Crash Density and Traffic Congestion



1.4.3 Traffic Operations

Existing (2018) daily traffic volumes and vehicle classification data shows average daily traffic on Santa Fe Drive ranges between 49,000 vehicles per day and 112,000 vehicles per day, depending on the location along the corridor. In general, daily traffic is greatest in the northern part of the corridor, peaking in the Florida Avenue area, and gradually decreases heading south along the corridor. During the morning and evening peak periods, directional volumes reflect the commuter characteristics of the corridor, with higher volumes northbound during the AM peak period and southbound during the PM peak period, through the length of the corridor. This directional peaking is progressively more pronounced to the north end of the corridor.

Trucks make up between 7.5% and 9.2% of vehicular traffic throughout the length of the corridor, with an average weighted truck percentage for the complete Santa Fe Drive corridor of 8.1%. This truck proportion is greater than other parallel north-south routes, such as Federal Boulevard (4.0%), Wadsworth Boulevard (2.5%), and I-25 (6.0%).

Considering a four-month sample period of weekdays between February and April 2019, corridor travelers between C-470 and I-25 experienced increased travel time during peak periods of up to seven minutes (47%) longer than free-flow travel times. Peak period travel times can also vary by as much as 10 minutes ($\pm 48\%$) from the average travel time due to such local factors as weather events and crashes or major incidents on Santa Fe Drive or parallel routes.

Segments of the Santa Fe Drive corridor north of Evans Avenue and south of Bowles Avenue experience the greatest variability in travel time with trips through the central part of the corridor experiencing a better level of reliability and shorter peak traffic demand duration. Travelers on Santa Fe Drive between Littleton and C-470 (the south end of the project) regularly experience very poor trip reliability throughout the day and especially during peak periods, as do travelers using the Denver segment of the corridor north of Evans Avenue.

1.4.3.1 Congestion and Bottlenecks

The following areas of congestion and bottleneck locations have been identified along the Santa Fe Drive corridor:

Southbound, to a greater extent during the PM peak

- Between I-25 and Mississippi Avenue (Mississippi Avenue bottleneck), up to 1.5 miles of congestion to I-25.
- Between Dartmouth Avenue and Oxford Avenue (Oxford Avenue bottleneck), up to one mile of congestion.
- Between Bowles Avenue and Mineral Avenue (Mineral Avenue bottleneck), up to two miles of congestion.
- Approaching the C-470 interchange, up to half a mile of congestion.

Northbound, during both AM and PM peaks

- Between C-470 and Bowles Avenue (Bowles Avenue bottleneck), up to three miles of congestion.
- Between Hampden Avenue and Dartmouth Avenue (Dartmouth Avenue bottleneck), up to half a mile of congestion.
- Approaching the I-25 interchange (I-25 flyover bottleneck), up to half a mile of congestion.

Santa Fe Drive intersections that experience the most congested conditions

- Mississippi Avenue.
- Dartmouth Avenue.
- Oxford Avenue.
- Bowles Avenue.
- Mineral Avenue.

These intersections are also the intersections with the greatest number of crashes along the corridor, as noted in Section 1.4.2. The high crash frequency is related to long queues leading to rear-end and other types of congestion-related crashes.

1.4.4 Multimodal Travel and Connectivity

1.4.4.1 Pedestrian/Bicyclist Crossings

Throughout the 11-mile Santa Fe Drive corridor, there are 17 at-grade or grade-separated crossings for pedestrians and bicyclists. The distance between crossings ranges from approximately 200 feet to almost two miles, with an average of 0.6 mile. The longest distance between crossing opportunities is between Oxford Avenue and the Little Dry Creek Trail. Additional long distances between crossing opportunities over a mile include Mississippi Avenue and Alameda Avenue (1.1 miles), Dartmouth Avenue and Evans Avenue (1.3 miles), and the Mineral Station pedestrian bridge and Lee Gulch Trail (1.3 miles). This can be problematic for pedestrians and bicyclists trying to cross Santa Fe Drive because accessing the crossings over Santa Fe Drive can add considerable distance to modes that are already sensitive to long distances.

Of the 17 existing crossings, 5 are grade separated, creating a more comfortable environment for these vulnerable users. Of the 12 remaining crossings that are at grade, a number of these are uncomfortable for multimodal users. The intersections often have high vehicle turning volumes, channelized free right-turn lanes, many lanes to cross, missing or faded crosswalk markings, and prohibited crossings on some intersection legs. These conditions can make crossing Santa Fe Drive difficult for pedestrians and bicyclists. The Florida Street intersection has many challenges to multimodal users, with many lanes to cross, missing crosswalk markings, and high turning movements. The Prince Street intersection is also notably difficult for bicyclists since the bike lanes are discontinued through the intersection that experiences high traffic volumes. Photo 3 shows an example of an existing grade-separated east-west crossing at Mineral Avenue, but also highlights that bicyclists at this location often choose not to use the grade-separated crossing either because it's not convenient or is thought to be only for pedestrians headed to or from the Mineral Station.

Photo 3. Bicyclist Crossing Santa Fe Drive at Mineral Avenue Intersection



1.4.4.2 Pedestrian/Bicyclist Facilities and Connections

While there are sections of sidewalk adjacent to Santa Fe Drive, primarily within Denver and Littleton, there are several sidewalk gaps and long stretches where there is no sidewalk along the roadway. There are a few small gaps on the west side of Santa Fe Drive between Church Avenue and Weaver Avenue, just south of downtown Littleton. The width and condition of the sidewalk along Santa Fe Drive varies, and some sidewalks are relatively narrow with overgrowth (between Mississippi Avenue and Florida Avenue and just south of Crestline Avenue). While there is a mix of detached and attached sidewalks, most of the sidewalks are attached, with little to no buffer from the adjacent highway traffic. The attached sidewalks in Littleton are more likely to see pedestrians because of their proximity to downtown Littleton.

The narrow width of existing sidewalk facilities can only accommodate pedestrians. This leads to a complete lack of bicycle facilities along Santa Fe Drive. The South Platte River Trail/Mary Carter Greenway Trail located just west of Santa Fe Drive is a north-south facility that is separated from the roadway corridor. Making the connection to this trail from Santa Fe Drive can sometimes prove difficult, especially in areas where the trail is located close to Santa Fe Drive but there is no adequate connection or wayfinding, including at and along Mississippi Avenue, Dartmouth Avenue, and Bowles Avenue. It is also recognized that the South Platte River Trail has areas with bottlenecks and other potential safety issues related to multiple users and limited width, which may inhibit overall multimodal mobility and connections to crossing facilities.

1.4.4.3 Transit Facilities and Connections

The RTD LRT Southwest Corridor runs parallel to the east side of Santa Fe Drive, except through downtown Littleton, and terminates at the Mineral Station. Photo 4 shows the RTD LRT Southwest Corridor. The C Line provides service to/from Union Station, while the D Line operates to/from the 18th Street/California Station. The C Line service was suspended as of January 10, 2021, although a transfer to Union Station is still available at the I-25/Broadway Station. LRT stations are important transfer points between transit and other modes along the corridor. Prior to the coronavirus disease 2019 (COVID-19) service plan, both the C and D Lines operated at 15-minute frequencies during peak periods and 30-minute frequencies outside of peak periods. This transit service provides an important connection between downtown Denver and the southwest Denver metropolitan area. The easiest way to access these stations is by driving, which is reflected in the park-n-ride parking utilization. The park-n-rides experience utilization from 91% to 97%, with four of the six park-n-rides in the study area being over 95% utilized on a typical pre-COVID-19 weekday (Alameda Station, Broadway and I-25, Evans Station, and Littleton/Downtown Station). Although the Mineral Station has a slightly lower average utilization rate (at 92%), because it is the end of the line station, this is the most popular station for riders accessing the rail line from the south and anecdotally fills up quickly on weekday mornings.

Photo 4. Light Rail Transit Southwest Corridor



While most LRT stations provide park-n-rides (Oxford-City of Sheridan Station is the only exception), available parking is limited and throughout the RTD system, many riders walk or bike to and from the stations. Based on the 2019 RTD Customer Satisfaction Survey Final Report, train riders walk (50%) or bike (2%) to the station and walk (62%) or bike (2%) from the station. Gaps in pedestrian and bicycle facilities leading from the west side of Santa Fe Drive and across the highway to connect pedestrians and bicyclists to the LRT stations prevents the light rail to be used to its fullest potential. For example, the Oxford-City of Sheridan Station lacks bicycle and pedestrian infrastructure to the station along Oxford Avenue from the Mary Carter Greenway Trail and residential and commercial areas west of Santa Fe Drive, which is especially important since this station does not offer a park-n-ride. The Englewood Station also lacks bicycle and pedestrian infrastructure access from the west, with no way of crossing Santa Fe Drive at or near Hampden Avenue.

1.5 Land Use and Transportation Analysis

Future traffic volume conditions along the corridor will be influenced by the planned regional development that is expected to add significant traffic volume to Santa Fe Drive and its cross streets. To confirm that the traffic modeling process reflects these conditions, the study team reviewed population and employment figures throughout the southern Denver metropolitan area.

DRCOG's Focus 2.2 travel demand model for 2040 was used to forecast future traffic volumes on Santa Fe Drive. The travel demand model uses socioeconomic projections for the Denver metropolitan area to generate travel demand. The socioeconomic information encompasses population and employment for a base year (2020) and forecasts for a future horizon year (2040).

The socioeconomic data sets are based on local comprehensive land use plans prepared by local governments to guide development of their respective jurisdictions into the future. DRCOG references this information to develop geographically allocated socioeconomic forecasts of future population and employment that conform to regional control totals developed by the State Demography Office. The 2020 base year calculations use the United States (U.S.) Census, local survey results, and other available data to reflect observed population and employment numbers. The 2040 forecasts incorporate development plans, zoning policies, and other factors to geographically project future numbers of population and employment. This information is the primary input to the travel demand model.

Data was collected for Transportation Analysis Zones (TAZ) as far north as downtown Denver, as far south as Castle Rock, as far west as Wadsworth Boulevard, and as far east as I-25. This expanded area was used to capture not only development within the project limits, but regional development that could produce trips that use the Santa Fe Drive corridor. Population data for the 25 highest-growth TAZs were determined based on the absolute difference between the 2020 and 2040 population figures. Major growth areas that are likely to generate additional trips along the corridor are summarized as follows and shown in Figure 1-7:

- **Platte/Englewood Area.** Two high-growth neighborhoods (Overland and Southwest Englewood) are located along the northern half of the Santa Fe Drive corridor. A large percentage of trips from these areas is likely to use the corridor, and approximately 5,200 residents are expected to be added by 2040, an increase of 219% within these two TAZs.
- **Sterling Ranch Area.** Sterling Ranch is a large development underway along Santa Fe Drive south of Chatfield State Park and west of Santa Fe Drive. TAZs in this immediate area are expected to see an overall increase of approximately 11,000 residents by 2040, and increase of 78% within these three TAZs.
- **Castle Rock Area.** Multiple high-growth zones on the south side of Castle Rock were considered as potential trip generators for the corridor. Although these TAZs are 15 miles south of the study area, they may produce trips on Santa Fe Drive, particularly when the I-25 corridor is congested, or an incident occurs. By 2040, this area is expected to see an increase of over 19,000 residents, an increase of 333% within these six TAZs.

Employment data (in terms of jobs) for the 25 highest-growth TAZs were determined based on the absolute difference between the 2020 and 2040 employment job figures. Major growth areas that would likely produce trips along the Santa Fe Drive corridor are summarized as follows:

- **Platte/Englewood Area.** High-growth zones are located around the Swedish Medical Center and Craig Hospital. These zones are likely to produce a large number of trips along the corridor, with approximately 6,400 jobs expected to be added by 2040, an increase of 95% within these two TAZs.

Figure 1-7. Major Population and Employment Growth Areas



- **Castle Rock Area.** High-growth zones at the Outlets at Castle Rock, North Twin Oaks, and Sedalia were considered as potential trip generators for the corridor. Though these are more than 10 miles south of the study area, they may generate regional trips, particularly when the I-25 corridor is congested, or an incident occurs. By 2040, approximately 7,400 jobs are expected to be added, an increase of 313% within these three TAZs.

In addition to assessing the land use and resulting demographics to model traffic, the study team assessed existing and future land use along the corridor. These results were used to understand the land use context along the corridor, which varies greatly. Immediate land uses in the corridor are transitioning to mixed-use industrial, commercial, and residential uses. Much of the former industrial lands along Santa Fe Drive are now a mix of industrial and commercial uses. Land use plans indicate that land uses are forecasted to continue to transition from primarily industrial and industrial mixed uses in parts of the corridor to a mix of higher-density residential, commercial, and industrial uses oriented towards transit stations and downtowns. Planned future development nodes adjacent to the project limits include the following:

- **Alameda Station Area.** The *Alameda Station Area Plan* (City and County of Denver, 2009) set the framework for high-density, mixed-use development near Alameda Station. Implementation of the plan is underway and established through development guidelines set by the *Denver Design District General Development Plan* (City and County of Denver, 2009), which calls for up to 3,700 residential units and up to 3.8 million square feet of office, retail and hotel space near the station.
- **Broadway Station Area.** Transit-oriented development plans are progressing for the area near the I-25/Broadway Station. The policy framework established by the *I-25/Broadway Station Area Plan* (City and County of Denver, 2016a) is further detailed in the *Infrastructure Master Plan for the Broadway Station Infrastructure Master Plan* (City and County of Denver, 2016b). The more detailed development plans include up to 2,800 residential units, 1.2 million square feet of office space, and 250,000 square feet of retail and restaurant space near the I-25/Broadway Station.
- **Englewood CityCenter.** Redevelopment planning documents for Englewood's CityCenter, which includes Englewood's civic center and the properties between Floyd Avenue and Hampden Avenue east of Santa Fe Drive extending to Broadway, highlight the desire to make the CityCenter area a vibrant heart of the city that is more attractive and walkable (City of Englewood, 2016). The City of Englewood is currently working with potential private development partners on a plan that would ultimately add up to 950 residential units, as well as a hotel and office space, around a revamped retail plaza festival gathering area to help activate the public area immediately adjacent to the station platform. It is part of the "Downtown Matters" initiative to revitalize CityCenter, Broadway, and the commercial areas near the Swedish Medical Center and Craig Hospital to the east in the vicinity of Downing Street (City of Englewood, 2020).

- **Littleton (Santa Fe Drive and C-470) Area.** Littleton has planned development near Santa Fe Drive between County Line Road and Mineral Avenue and the Mineral Station. The Santa Fe Park South development proposal is west of Santa Fe Drive and north of the Littleton Equine Medical Center on approximately 78 acres that is to include 400 to 450 single-family attached townhomes, 350 to 400 multifamily residential units, and open space. The area at the southwest corner of the Santa Fe Drive and Mineral Avenue intersection also has planned development, the River Park development, which is proposed as a 33-acre mixed-use development (City of Littleton, 2020).

Specific notable potential or planned development projects are shown in Figure 1-7. In addition to the development nodes and specific development projects, local municipalities are planning for redevelopment and infill development in the vicinity of the following areas adjacent to Santa Fe Drive: Dartmouth Avenue and Harvard Avenue, Oxford Avenue (South Santa Fe Business Park), and Bowles Avenue.

The Corridor Conditions Report (CDOT, 2020) provides a summary of the following local land use plans:

- DRCOG, Metro Vision: Our place, our plan (Amended 2019)
- Douglas County, Comprehensive Master Plan 2040: Vision, Balance, Community (2019)
- Arapahoe County, Comprehensive Plan (Amended 2020)
- City of Littleton, Envision Littleton Comprehensive Plan (2019) and Corridor and Area Plans:
 - ◆ Belleview Avenue Corridor Vision (2018)
 - ◆ Mineral Station Area Framework (2018)
 - ◆ Santa Fe & Mineral Intersection Study (2019)
- City of Sheridan, Comprehensive Plan (2015)
- City of Englewood, Englewood Forward Comprehensive Plan (2016) and Small Area Plans:
 - ◆ Englewood Light Rail Corridor Plan (2013)
 - ◆ Englewood Forward Light Rail Corridor Next Steps Study (2015)
- City and County of Denver, Comprehensive Plan 2040 (2019), Blueprint Denver (2019), and Small Area Plans:
 - ◆ I-25/Broadway Station Area Plan (2016)
 - ◆ Alameda Station Area Plan (2009)

In addition to the land use planning context, the study team also reviewed 21 transportation planning documents involving long-term planning within the Santa Fe Drive corridor. The Corridor Conditions Report (CDOT, 2020) provides a summary of those transportation planning documents.

1.6 Greenhouse Gases

In recognition of the role that transportation plays in greenhouse gas emissions, the following recent legislation and state agency policy initiatives have set the path toward reducing greenhouse gas emissions through transportation planning measures.

- **House Bill 19-1261.** In 2019, the Colorado State Legislature passed House Bill 19-1261, the Climate Action Plan to Reduce Pollution, which set greenhouse gas emission reduction targets to combat climate change. This includes targets of reducing statewide greenhouse gas pollution 26% by 2025, 50% by 2030, and 90% by 2050 from 2005 levels.
- **Greenhouse Gas Reduction Roadmap Report (2021).** The *Colorado Greenhouse Gas Pollution Reduction Roadmap* (State of Colorado, 2021) (Roadmap) describes actions Colorado has taken to address climate change, analyzes the current trajectory for greenhouse gas emissions, and presents a suite of actions the state can pursue in the near term to make progress toward the House Bill 19-1261 goals.
- **Senate Bill 21-260.** In 2021, the Colorado State Legislature passed Senate Bill 21-260, the Sustainability of the Transportation System, to fund, improve, and expand transportation infrastructure; build infrastructure for electric vehicles; and mitigate environmental health impacts. In terms of transportation planning, this legislation included protections for disproportionately impacted communities and created the foundation for new state requirements for the transportation planning process and regionally significant projects.
- **Greenhouse Gas Emissions Transportation Planning Standard.** Approved in 2021, the new rule requires CDOT and the state's five Metropolitan Planning Organizations to determine the total pollution and greenhouse gas emission increase or decrease expected from future transportation projects and take steps to ensure that greenhouse gas emission levels do not exceed set reduction amounts.

These greenhouse gas emissions reduction measures are applicable to this Action Plan, as recommendations that meet the definition of regionally significant project would be subject to Senate Bill 21-260 and the Greenhouse Gas Emissions Transportation Planning Standard. Because the recommendations in this Action Plan are generally provided at a high level, without detailed design, no greenhouse gas metrics have been used. However, many of the recommendations of this plan provide improved bicycle and pedestrian facilities and better access to transit, which improves the multimodal functionality of the corridor.

2.0 Purpose and Need and Goals

Purpose

The purpose of the recommended transportation improvements from this study is to improve safety for all users, improve operational performance, and enhance multimodal connectivity for the Santa Fe Drive corridor from C-470 to I-25 through Arapahoe County, the City and County of Denver, Douglas County, and the cities of Englewood, Littleton, and Sheridan.

Need

Transportation improvements are needed to address:

SAFETY

- Vehicular
 - ◆ The most common crash types experienced along the corridor are related to congestion (Photo 5 shows a crash on Santa Fe Drive).
 - Over a three-year period from January 1, 2016 to December 31, 2018, there were 2,282 crashes on Santa Fe Drive from C-470 to Alameda Avenue. Rear-end crashes were the most common crash type followed by sideswipe (same direction). These types of crashes are typically related to vehicular congestion.
 - ◆ Crashes along Santa Fe Drive are highly concentrated during the peak commuting periods at the short segments of Mississippi Avenue to Iowa Avenue, Harvard Avenue to Hampden Avenue, Union Avenue to Prince Street, and Bowles Avenue to Vinewood Street.
 - Over half of all recorded crashes occurred at or near intersections.
 - Intersections are dominated by rear-end and sideswipe crash types that primarily occur on intersection approaches
 - ◆ Santa Fe Drive intersections with the greatest number of crashes are at:
 - Dartmouth Avenue (144 crashes)
 - Mississippi Avenue (141 crashes)
 - Bowles Avenue (80 crashes)
 - Mineral Avenue (79 crashes)
 - Oxford Avenue (79 crashes)
 - ◆ Total crash rates on all segments of Santa Fe Drive (2.27 – 3.65 crashes/million vehicle-miles of travel) exceed the CDOT average rate for an expressway facility (1.62 crashes/million vehicle-miles of travel).

- North of Dartmouth Avenue, fatal crashes (0.024 crashes/million vehicle-miles of travel) occurred more frequently compared to the CDOT average rate for a principal arterial (0.014 crashes/million vehicle-miles of travel). Ten fatal crashes occurred along Santa Fe Drive and most of those crashes (seven crashes) occurred north of Dartmouth Avenue.

Photo 3. Crash on Santa Fe Drive



- Access
 - ◆ Areas with more frequent direct access driveways and public road intersections along Santa Fe Drive create speed differentials and turning conflicts.
 - ◆ The sections with more frequent direct access driveways and intersections along Santa Fe Drive see an increased proportion of rear-end and angle crashes, and an increase in overall crash frequency, such as south of Bowles Avenue, south of Union Avenue, north of Dartmouth Avenue, and Iowa Avenue to Mississippi Avenue.

OPERATIONAL PERFORMANCE

- Congestion and Travel Time Reliability
 - ◆ Drivers along the Santa Fe Drive corridor experience substantial delays and queues during commuter peak periods between 6AM and 9AM northbound, and 3PM and 7PM northbound and southbound (Photo 4).
 - ◆ The existing HOV express lanes are underutilized and a high number of users during peak hours are violators.
- Travel times during the AM and PM peak hours are up to 40% longer than the travel time to drive the corridor at free flow speeds.

- ◆ Bottlenecks with congestion and long queues regularly occur at the signalized intersections at Mineral Avenue, Bowles Avenue, Oxford Avenue, Dartmouth Avenue, Alameda Avenue, and Mississippi Avenue, and approaching the I-25 interchange flyover. During peak travel times, congested segments reach up to three miles in length.
- Providing pedestrian crossing times at the signalized intersections for the relatively wide roadway creates additional delay for drivers along Santa Fe Drive when pedestrians utilize the at-grade intersections to cross the corridor. A pedestrian crossing Santa Fe Drive at an intersection as wide as Dartmouth Avenue increase the red time for Santa Fe traffic by up to one minute. Pedestrian activations also take the signal out of coordination for several cycles, impacting traffic flow up and down the corridor.

Photo 4. Congestion on Santa Fe Drive



- ◆ Congestion along the Santa Fe Drive corridor is expected to worsen by 2040 with longer recurring periods of delay and slower speeds, as well as new areas of congestion.
- Traffic volumes are expected to increase by an average of 13% on the corridor, and up to 30% south of Mineral Avenue, due to local and regional population and employment growth.
- ◆ Varying geometric characteristics along the Santa Fe Drive corridor, such as inconsistent driveway and intersection spacing, acceleration/deceleration lane design, median treatments, and the number of travel lanes, create traffic disruptions, particularly weaving maneuvers between intersections/interchanges and lane changes to/from the HOV express lane during peak hours.

- ◆ The existing HOV express lane creates operational issues with weaving maneuvers and lane changes due to the need for left turning traffic to utilize the lane, and the need for HOV express lane traffic to stop at the signalized intersections (Photo 5 shows the HOV express lane near Hampden Avenue).
- ◆ Congestion also occurs on Santa Fe Drive outside of typical peak commuting hours during 75% of weekdays with congestion due to community events, crashes, severe weather, freight rail crossing south of Oxford Avenue, and traffic diversion to Santa Fe Drive when other regional corridors (like I-25 and Broadway) experience congestion.

Photo 5. HOV Express Lane on Santa Fe Drive Near Hampden Avenue



- Access
 - ◆ The inconsistent spacing and types of intersections and driveways contribute to operational issues along the Santa Fe Drive corridor.
 - An example of this inconsistency, the types of intersection and driveway accesses in two segments of the corridor are:
 - ➔ In the two miles south of Belleview Avenue: 1 grade separated interchange, 4 at grade signalized intersections, and 26 driveway/street accesses (full movement and right-in/right-out)
 - ➔ In the two miles north of Hampden Avenue: 2 grade separated interchanges, 1 at grade signalized intersection, and 9 driveway/street accesses (all right-in/right-out)
 - ◆ Individual private driveways and business accesses on Santa Fe Drive between C-470 and Florida Avenue are inconsistent with the corridor access category classification of Expressway. These accesses negatively impact corridor travel and operations with

turning conflicts, speed differentials and do not meet the required public road intersection spacing of one mile in some segments.

- The lack of a local roadway network to provide property access contributes to the frequency of private driveways and business access on Santa Fe Drive, particularly in Littleton south of Bowles Avenue, as well as on the west side of the corridor south of Union Avenue and north of Dartmouth Avenue in Englewood.
- Freight
 - ◆ The Santa Fe Drive corridor is a designated critical freight corridor serving regional freight movements between I-25 in Denver and areas south of C-470, in addition to serving local community freight needs directly along the corridor.
 - The percentage of truck traffic to the overall daily volume is 7.5% to 9.2%, which is higher than a typical urban principal arterial highway of approximately 2%.
 - Industrial and commercial land uses adjacent to the corridor between Belleview Avenue and Evans Avenue create heavy truck movements on and off of the corridor at the intersections of Union Avenue, Oxford Avenue, and Dartmouth Avenue, as well as at driveways and minor street accesses. These heavy trucks contribute to poor operational performance at these intersections.
 - ◆ The unreliable or unpredictable travel times along the corridor cause difficulty in trip planning and have negative impacts for freight operators.
- Corridor stakeholders like the Colorado Motor Carriers Association express concern with trucks, like other vehicles, experiencing increased delays traveling along the corridor as traffic volumes and the associated congestion increase.

MULTIMODAL CONNECTIONS

- Pedestrian and Bicycle
 - ◆ Santa Fe Drive lacks adequate facilities to accommodate pedestrian and bicyclist crossings of the highway with connections to area sidewalks, trails, and LRT stations.
 - ◆ With high traffic volumes and speeds plus a width of four lanes or more, Santa Fe Drive is a barrier for pedestrian and bicyclist travel.
 - Various land uses along the Santa Fe Drive corridor generate demand for walking and biking trips, including residential areas, LRT stations, Arapahoe Community College, employment centers, non-profit centers, community hubs, and recreational amenities such as the South Platte River, Mary Carter Greenway Trail, South Platte Park and Carson Nature Center, and numerous nearby public parks. Because many of the origins and destinations of these trips are on opposite sides of the highway, conflicts occur at intersections due to insufficient pedestrian/bicycle facilities and limited crossing locations.

- The speed and volume of traffic and roadway width, combined with turn lanes, acceleration/deceleration lanes, and the parallel freight rail/LRT, hinder the ability of pedestrians and bicyclists to cross the highway.
- ◆ Lack of pedestrian and bicycle wayfinding within the Santa Fe Drive corridor area reduces the use and effectiveness of the multimodal facilities.
- Traffic congestion and speed combined with the lack of connected pedestrian and bicycle facilities create conflicts and uncomfortable conditions for pedestrians and bicyclists crossing the roadway and moving along the roadway where sidewalks exist.
- Transit
 - ◆ Lack of sidewalks and pedestrian crossing opportunities impact comfort and safety at bus stops on streets crossing Santa Fe Drive and along Santa Fe Drive such as at County Line Road and Oxford Avenue.
 - ◆ Bicyclist and pedestrian access to adjacent LRT stations is impeded by the lack of comfortable connections across the Santa Fe Drive corridor, particularly at the Englewood and Oxford-City of Sheridan Stations.

Goals

Additional goals for the Santa Fe Drive corridor are to:

- Consider local community surroundings and context
- Support local and regional planning efforts
- Minimize environmental impacts to the extents possible
- Balance local access and regional travel with consistent application of the defined access category for Santa Fe Drive (Non-Rural Principal Highway from I-25 to Florida Avenue and Expressway, Major Bypass from Florida Avenue to C-470)
- Optimize transit use and multimodal travel opportunities for the travel corridor
- Enhance connections and wayfinding to adjacent pedestrian and bicycle facilities
- Provide redundancy for the regional transportation system to accommodate traffic when incidents impact other north-south routes such as I-25, South Broadway, or Federal Boulevard.

3.0 Environmental Resources

3.1 Process

During the PEL study process, existing conditions data for the social, natural, and built environmental resources was collected within an Environmental Study Area (Figure 3-1), which for most resources was defined as a 1,000-foot buffer from the centerline of Santa Fe Drive. For some resources, the area of analysis was adjusted in accordance with resource-specific guidance or professional judgment to cover potential impacts. When the area of analysis differs from the Environmental Study Area, it was defined for those specific resources within the Corridor Conditions Report (CDOT, 2020).

The Corridor Conditions Report details the analyses conducted for these resources, including a brief description of the resource, a list of agencies involved in regulation of the resource, a list of laws and regulations pertaining to the resource and relevant studies and plans, a description of data collected and methodology used for the analysis, a summary of the resource's existing conditions based research conducted, and a summary of recommendations for how to use the findings during project planning and NEPA.

During development of the Corridor Conditions Report, CDOT, FHWA and the participating jurisdictions agreed that to streamline alternatives development and screening, only resources that could influence the decisions made during the alternatives screening would be used in the evaluation of alternatives. These differentiating resources were identified as resources that could potentially have environmental impacts requiring mitigation resulting in increased project complexity and risk to cost and schedule for projects that are recommended for implementation.

While applying the resource analysis findings during the Level 2A alternatives screening, the following resources were determined to not be environmental differentiators between the alternatives under consideration. The determination was made by the Environmental Resources Task Force using professional judgement. However, information on these resources is contained in the Corridor Conditions Report. These were:

- Archaeological and Paleontological Resources
- Threatened & Endangered Species, Species of Concern, Migratory Birds and Eagles
- Water Quality

This Action Plan documents the resources that were determined to be differentiators between the alternatives under consideration. These are:

- Air Quality
- Socioeconomic Conditions
- Environmental Justice
- Floodplains
- Hazardous Materials
- Historic Resources

- Noise
- Recreational Resources (Parks, Trails and Open Space, and Wildlife and Waterfowl Refuges)
- Visual/Aesthetics
- Wetlands and Other Waters of the U.S.

Additionally, Greenhouse Gases were not included as a differentiating resource because the alternatives developed and screened in this Action Plan are generally provided at a high level, without a level of design that would allow application of greenhouse gas metrics. As stated in Section 1.6, projects that result from the recommendations set forth in this Action Plan will be subject to applicable federal and state air quality and greenhouse gas environmental regulations and processes, including those established in House Bill 19-1261, Greenhouse Gas Reduction Roadmap Report, Senate Bill 21-260, and Greenhouse Gas Transportation Planning Standard, as applicable.

3.2 Corridor Conditions and NEPA Considerations

This section describes corridor conditions for the resources determined to be environmental differentiators, related NEPA considerations, and schedule considerations for subsequent NEPA analysis. Specific and actionable recommendations are summarized for resources and documented in the FHWA PEL Questionnaire in Appendix A.

3.2.1 Air Quality

Transportation conformity rules and regulations apply to projects based on recommended federal action, regional significance, and funding. These regulations may apply for projects that are developed out of this study, depending on the nature of the improvements, funding and whether the project is determined to be a project of regional significance. In addition, regionally significant transportation capacity projects may require additional air quality analysis under state regulations.

The Environmental Study Area is in maintenance status for PM₁₀ (particulate matter less than 10 microns in diameter) and carbon monoxide (CO). Any future NEPA actions will conform to CDOT's *Air Quality Project Level Analysis Guidance* (CDOT, 2019) when determining the need for hot-spot analysis for these criteria pollutants, and when determining the level of analysis required for other air pollutants such as mobile source air toxics (MSATs).

The Environmental Study Area is in nonattainment status for ozone; therefore, in order to demonstrate regional air quality conformity, future regionally significant projects must be included in a conforming DRCOG Regional Transportation Plan and TIP.



NEPA CONSIDERATIONS: Any project requiring a future NEPA action should include early coordination with FHWA, CDOT and the Colorado Department of Public Health and Environment (CDPHE) Air Pollution Control Division (APCD) to determine the extent of required analysis. Any analysis must comply with CDOT's most recent guidance for air quality analysis. In addition, such a project must be included in the DRCOG fiscally constrained Regional Transportation Plan (RTP) and the conforming TIP prior to the conclusion of the NEPA process and before beginning construction.

3.2.2 Socioeconomic Conditions

Socioeconomic resource impacts such as land use, right-of-way requirements and changes to access were addressed under criteria for Community/Quality of Life during the Level 2A and Level 2B screening levels. Due to the approximate 11-mile length of the project limits, the Environmental Study Area intersects several municipalities and neighborhoods, including those with existing development consisting of commercial businesses; industrial businesses and services; recreational resources such as parks and open space, trails and golf facilities; multifamily housing, single-family housing, and some remaining agriculture south of Mineral Avenue. Redevelopment is occurring in several areas within the Environmental Study Area, as noted in Section 1.5. Freight rail and LRT tracks serve as a barrier between Santa Fe Drive Iowa Avenue and Union Avenue and then again from the Sumner Drive and Santa Fe Drive intersection through the southern project limits at C-470.



NEPA CONSIDERATIONS: Socioeconomic conditions such as land use and compatibility with local plans, right-of-way requirements, existing direct access to adjacent parcels, and proximity impacts such as air quality and noise, should be considered during NEPA. Public outreach activities will help project teams understand how the communities along Santa Fe Drive use the roadway and how projects may impact them; therefore, public outreach activities should occur early and throughout the project development process.

3.2.3 Environmental Justice

The identified minority and low-income populations will inform the environmental justice analysis to occur during NEPA. Additional data analysis will need to be completed using updated data sets tailored to the specific project area and follow the newest policies and guidance. If environmental justice communities are present in the Environmental Study Area, an environmental justice analysis must be performed, including documentation of avoidance and minimization of impacts to environmental justice populations. The alternatives screening process included consideration of impacts in areas with a higher relative minority or low-income populations, which influenced the screening of options at those locations.

Analysis during NEPA should include required documentation to consider the affected populations and potential impacts to these communities and the resources that serve them. Every effort should be made to avoid disproportionately high and adverse impacts to environmental justice populations.

Opportunities for meaningful public participation, including targeted outreach to environmental justice populations and other historically under-represented populations should occur early and throughout the project development process.



NEPA CONSIDERATIONS: For any project that has the potential of high and adverse impacts to environmental justice populations, coordination should be initiated with affected populations and agencies early in the project. Early coordination should identify targeted outreach methods and opportunities, impacts, and mitigation measures and to reduce any delay to schedule. Additionally, Senate Bill 21-260 included a framework for additional state requirements for Regionally Significant Transportation Capacity Projects to identify disproportionately impacted communities and impacts to those communities, develop a plan to mitigate air quality impacts, and promote transparency and increase public participation.

3.2.4 Floodplains

The Environmental Study Area contains floodplains for the South Platte River and its tributaries in several locations. Future projects should involve as little impact to the flood zones as practicable. Effects from projects must minimize impacts to avoid a raise in the base flood elevation and increase the spread of the 100-year flood zone.



NEPA CONSIDERATIONS: At the onset of any future projects that potentially could result in floodplain impacts, proper consideration should be taken to avoid and mitigate impacts to floodplains and floodways prior to final design to avoid the need for a Letter of Map Revision, which may have risks to schedule. Designs should be developed in conjunction with the U.S. Army Corps of Engineers (USACE), Federal Emergency Management Administration (FEMA) and all other floodplain regulatory authorities.

3.2.5 Hazardous Materials

The acquisition of property for right-of-way and potential construction disturbance requires the identification of recognized or potential hazardous materials, including solid waste, hazardous waste, and other materials contaminated with hazardous substances. The presence of major hazardous material sites can influence project selection.

There were 77 locations within the Environmental Study Area identified as recognized or potential hazardous material sites, 42 of which are historic landfills.



NEPA CONSIDERATIONS: During NEPA, every CDOT project requires an Initial Site Assessment (ISA) Checklist/Form 881, a Modified Environmental Site Assessment (MESA), or a Phase I Environmental Site Assessment (ESA), which provide requirements for conducting a more detailed analysis. If the site assessment indicates a potential for recognized hazardous materials present in the project area, a Phase II ESA (i.e., materials testing) and/or remediation activities may be required prior to any construction or property acquisition. Additional coordination with regulatory agencies and property owners and

remediation activities, if needed, may result in substantial delays to schedule during design development or project construction.

3.2.6 Historic Resources

Historic resources include sites, buildings, structures, objects, and districts that are significant to history or prehistory. Types of historic resources within the Environmental Study Area include buildings, historic districts, railroads, irrigation ditches, bridges, and culverts.

There are 351 known historic resources in the Environmental Study Area. Some of these have been determined “officially eligible” for the National Register of Historic Places and some need additional analysis to determine eligibility. In addition, as time progresses, other properties may become eligible as they reach 50 years of age.

Two regulations apply when conducting historic resource analysis during NEPA. Section 106 of the National Historic Preservation Act of 1966 requires federal agencies to consider the effects on eligible historic and potentially eligible historic resources when they are funding or permitting a project. Section 4(f) of the Department of Transportation Act of 1966 (and implementing regulations) require the Federal Highway Administration to only approve transportation projects that have a use of historic properties when either the impacts are *de minimis* or when there is no feasible and prudent alternative that avoids the use of historic properties, and the project has done all possible planning to minimize harm to the historic property.



NEPA CONSIDERATIONS: If federal funds are used for implementation, recommended projects will require compliance with Section 106 of the National Historic Preservation Act of 1966 and Section 4(f) of the Department of Transportation Act of 1966 where there is a use of historic properties. Early identification and evaluation of historic resources will be necessary to determine what historic resources may be potentially affected by a project. Agency coordination and avoidance/minimization of adverse impacts should be conducted as early as possible in the design development phase to ensure approvals can be obtained and to avoid lengthy schedule delays.

3.2.7 Noise

Traffic noise levels can increase (unless mitigated) as a result of transportation projects that accommodate increased traffic volumes or locate roadway facilities closer to noise-sensitive land uses. Some Project Recommendations will be Type 1 projects which may cause noise impacts and require noise analysis, and others will be Type 3 projects which would not cause noise impacts and do not require noise analysis.

The traffic noise study area was defined using a 500-foot buffer from the edge of pavement on either side of Santa Fe Drive. Of the parcels identified within the noise study zone, 753 parcels were categorized as Noise-Sensitive Land Uses, which are locations where highway traffic noise may be detrimental to enjoyment and functional use of a property.



NEPA CONSIDERATIONS: During NEPA, a traffic noise analysis will be required for all Type 1 projects (as defined in the CDOT *Noise Analysis and Abatement Guidelines* [CDOT, 2020]) to determine if the project would cause noise impacts to sensitive receptors. If impacted receptors are identified by the noise analysis, CDOT will analyze the feasibility and reasonableness of noise abatement (barriers) for the impacted receptors. If a noise barrier is proposed, all benefited property owners and residents would be surveyed to determine if the majority of responding owners/residents are in favor of the barrier. Additional time should be included in the design schedule to allow for coordination with property owners/residents prior to final design.

3.2.8 Recreational Resources (Parks, Trails and Open Space, and Wildlife and Waterfowl Refuges)

Recreational resources, including existing and planned parks, trails/multi-use paths and open space areas, and wildlife and waterfowl refuges are important community assets that provide environmental, aesthetic, and recreational benefits. These recreational resources may be eligible for protection under Section 4(f) of the Department of Transportation Act and Section 6(f) of the Land and Water Conservation Fund (LWCF) Act. Section 4(f) affords special protection of publicly owned public parks, recreation areas, and wildlife and waterfowl refuges of national, State, or local significance. Section 6(f) refers to a section of the Land and Water Conservation Fund Act of 1965 and protects public outdoor recreation areas acquired or developed with funds provided through the LWCF Program.

There are more than 24 recreational and open space resources within the Environmental Study Area that could be impacted by recommended projects. There are no existing wildlife or waterfowl refuges.



NEPA CONSIDERATIONS: If a project cannot avoid Section 4(f) and Section 6(f) properties, it must be demonstrated that appropriate steps were taken to avoid the resource, minimize harm to the resource, and mitigate for impacts that would occur; and that coordination with the officials with jurisdiction has occurred.

To avoid schedule delays, potential "uses" of Section 4(f) and Section 6(f) properties for transportation improvements should be identified as early as possible and early coordination initiated with applicable agencies and stakeholders. Significant impacts to Section 4(f) properties can trigger the need to process an Individual Section 4(f) Evaluation which can take a year or more for approval. Conversion of Section 6(f) property to a transportation use requires National Parks Service approval which can take 16 months or more, and requires identification of replacement land to mitigate the conversion. Simpler and shorter processes may apply, depending on impacts to the resources.

3.2.9 Visual/Aesthetics

Visual impacts caused by transportation improvements are experienced both by people traveling on the road and by neighbors adjacent to it. A visual inventory was conducted for the

Santa Fe Drive corridor to identify the visual character of the foreground and background views of the corridor (greater than 5 miles to limits of visibility).

The Santa Fe Drive corridor is located within a highly developed, relatively dense combination of urban and suburban areas. The roadway is partially surrounded by buildings, highway infrastructure, and railroad infrastructure. The visual quality of the corridor is defined by an inharmonious foreground with distinct views of the Colorado Front Range Mountains in the background from several locations. Alterations to the corridor, including infrastructure improvements, may alter views to the west toward the Colorado Front Range Mountains (background views) and could have visual impacts on neighbors.



NEPA CONSIDERATIONS: Since transportation infrastructure can complement or detract from the aesthetics of the urban landscape character, project design elements should consider the surrounding area and any relevant neighborhood plans and associated design criteria. Visual impacts associated with any proposed improvements will need to be evaluated during NEPA using the CDOT Visual Impact Assessment to determine the necessary steps to document the visual impacts and identify mitigation depending on potential improvements at a site-specific location. Discussion with local agencies and interested stakeholders to identify possible concerns regarding design elements should occur early in the design process to avoid any delay to the schedule.

3.2.10 Wetlands and other Waters of the U.S.

Wetlands and other waters of the U.S. resources are wetlands or other waterbodies considered “jurisdictional” that are required to be evaluated for a project that receives federal funds. The Environmental Study Area contains several riverine, open waters, and wetlands that may be considered “jurisdictional.” The South Platte River (shown in Photo 6), Lee Gulch, and Big Dry Creek have the most intact vegetation and largest wetland and riparian communities adjacent to Santa Fe Drive.

Photo 6. South Platte River Parallel to Santa Fe Drive





NEPA CONSIDERATIONS: Estimates of impacts to wetlands and other waters of the U.S. should be determined as early as possible during project development to determine if the impacts would trigger the need for an Individual Permit from the USACE (greater than 0.5 acre of permanent impacts). The merger process and obtaining an Individual Permit requires much more time and effort than authorization under one or more Nationwide Permit (permits for types of projects with minimal impacts to jurisdictional resources).

Early in the NEPA process, a delineation should occur to look at opportunities for avoidance to jurisdictional water features. If proposed project improvements impact an area that may contain a Senate Bill 40 (SB 40) jurisdictional stream or its banks or tributaries, the project would be required to document SB 40 certification with Colorado Parks and Wildlife, which would include mitigation measures designed to improve fish and wildlife habitat.

Wetlands and other Waters of the U.S. served as a proxy for Vegetation and Wildlife/Fisheries Resources at this stage in planning since most of the wildlife habitat is located adjacent to the South Platter River. Vegetation and Wildlife/Fisheries Resources should be considered as separate resources during NEPA.

4.0 Public and Stakeholder Engagement and Agency Coordination

A comprehensive stakeholder, public, and agency involvement plan was created and customized specifically for the Action Plan. The strategies in the plan obtained feedback received from various groups and communities engaged through a series of stakeholder interviews, technical meetings, a survey, virtual public events, and other communication platforms. These strategies took into consideration the COVID 19 mandates and were primarily implemented in virtual settings. Comments and input received helped frame the Purpose and Need, goals, and objectives; and ultimately informed the study's findings and recommendations.

The plan was designed to obtain key input and comments at each critical phase or step of the study process:

- Project Introduction
- Purpose and Need
- Evaluation Criteria and Level 1 Alternatives
- Early Action Projects and Level 2 Themes
- Study Recommendations

Its design and execution were based on the overarching desired outcomes to:

- Obtain meaningful and productive public input leading to better decisions that meet the community's needs.
- Promote an open and transparent public involvement process that inspires trust in the information that is presented.
- Assure participants that their input is heard and considered, and that they understand how their comments would be used.
- Engage community leaders to help access hard-to-reach groups, including youth, the elderly, minorities, immigrants, and low-income residents; and to understand their interests.

The Stakeholder & Public Involvement Plan is included in Appendix C. It describes the various strategies used and summarizes the comments received through each of the public involvement tools described in this section.

4.1 Committees and Groups

To understand the needs of users and the communities in and around the Santa Fe Drive corridor, the study engaged stakeholders representing the corridor's diverse geographies and interests. Stakeholders included:

- Cities and counties
- Americans with Disabilities Act (ADA) organizations
- Local businesses along the corridor
- Neighborhood organizations
- Bicycle and pedestrian advocacy groups
- Landowners and developers
- Emergency responders
- Freight and public transit agencies
- Utility and resources organizations
- Motor carrier associations

The following working groups were convened throughout the study to provide feedback and oversight.

- **Project Management Team, Executive Oversight Committee, and Elected Officials.** The purpose of these groups is defined in Section 1.3. The groups were comprised of elected officials, executives, and staff from participating jurisdictions, and provided oversight and feedback regarding strategies for engaging the public and stakeholders and how the input received was incorporated into the study process.
- **Stakeholder Engagement Task Force.** This group included representatives from the planning and public communications staffs from the city and counties along the corridor. They coordinated at key milestones to discuss upcoming stakeholder and public engagement and helped distribute study information through their respective agency communication outlets.
- **Community Ambassadors.** Those who were involved in the stakeholder interviews agreed to commit to being community ambassadors to help disseminate study information and build public buy-in. They were provided with toolkits of collateral materials to promote during study milestones, including social media posts, poster invites and graphics.

4.2 Stakeholder and Public Engagement

The stakeholder and public engagement plan was developed using the results of a Social and Political Risk Assessment that analyzed the existing perception and experiences of the community within the corridor. Social media posts and news articles about the Santa Fe Drive corridor were examined to better understand the perception of and concerns along the Santa Fe Drive corridor. Census data and community characteristics were also analyzed to better understand the audience, how they travel, and how the community has evolved over the years. This research aided in the development of an effective and customized public and stakeholder engagement approach. The Social and Political Risk Assessment is included in Appendix C.

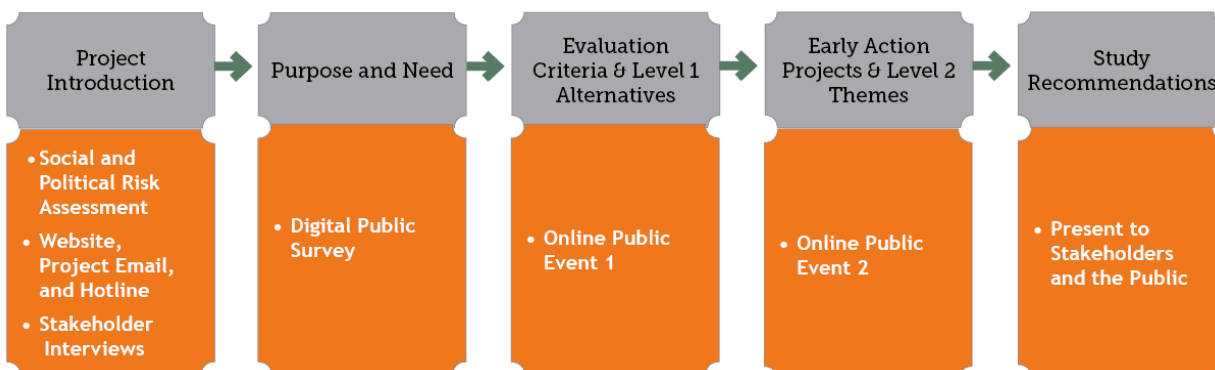
Communication aids supporting and increasing public awareness included the following:

- Newsletters, announcements, and mailings
- Media relations tools
- Project website
- Social media tools
- Project-specific email and hotline
- “Outreach toolkit” for Community Ambassadors
- Posters that were distributed to local businesses along the corridor.

In addition, meetings took place with individual residents, business owners, and property owners to address specific interests or concerns that arose throughout the study process.

The timeline in Figure 4-1 shows public and stakeholder involvement was continuous throughout the study process. There were specific input opportunities at each key study milestone.

Figure 4-1. Milestones for Public and Stakeholder Involvement



4.2.1 Input to Project Introduction and Purpose and Need

4.2.1.1 Website, Project Email, and Hotline

A CDOT project website was created that provided general information, opportunities for public engagement, and educational materials, as well as a place to sign up for the distribution list or submit a comment. A project-specific email and hotline number were provided on all public-facing materials for people to submit questions and concerns. The hotline also allowed users to request information if they did not have access to the virtual engagement platforms.

4.2.1.2 Stakeholder Interviews

There were 15 stakeholder interviews held with business owners and other key stakeholders to understand their unique needs and to involve them early in the study. This helped build trust and establish relationships that were leveraged throughout the stakeholder and public

engagement process to gather feedback and inform the study. A summary of the interviews is included in Appendix C.

Input Highlights

Below are common topics that came up in discussion.

- West-east connectivity issues for walking and biking
 - ◆ Not safe for pedestrians
 - ◆ Crosswalk signals aren't long enough
- Need for consistent intersections
- Traffic congestion and vehicular crashes are an issue along Santa Fe Drive
- Santa Fe Drive and Mineral Avenue is a challenging intersection
- Access turn lanes are unsafe
- People drive too fast - should be a slower corridor
- Bottlenecks at various spots along the corridor
 - ◆ Santa Fe Drive and Mineral Avenue intersection
 - ◆ South end of corridor with two lanes
 - ◆ I-25 on-ramp
- Stakeholders willing to promote the projects and opportunities for engagement

4.2.1.3 Digital Survey

The public engagement kicked off with a digital survey that was open from the end of October 2020 to the end of December 2020. The survey asked participants about their existing travel along Santa Fe Drive, including their primary mode of travel, reason for traveling, challenges experiences, what improvements they wanted to see, and additional feedback. The survey had 493 participants and received more than 250 open-ended comments. The survey was promoted through social media and posters at local businesses, and it was distributed to key stakeholders to distribute through their contact lists. Responses to the survey informed development of the draft Purpose and Need and made sure that the range of alternatives considered and the process to evaluate alternatives considered the issues that were important to the users of the corridor.

Input Highlights

- The most-common response by a wide margin, at 98%, was that respondents travel along Santa Fe Drive using personal vehicles. Transit was the second-most used by 17% of respondents. Bicycle use was the third-most common use by 11% of respondents.
- The top four reasons why people travel along Santa Fe Drive included to run errands (80%), to enjoy recreation and entertainment (68%), to commute to and/or from work (56%), and to visit family and friends (53%).

- Most respondents answered that traffic congestion (90%) is the main challenge they experience traveling along Santa Fe Drive. Safety (51%) and unpredictable travel conditions (42%) were also challenges for corridor travel.
- Traffic congestion was the most frequent answer from survey respondents (77%) for what challenges they would most like to see improved. Respondents indicated that safety issues (34%) and unpredictable travel conditions (22%) would be next in line to be improved.
- The largest share of comments indicated concerns with the existing congestion and traffic along Santa Fe Drive (25%). Key bottleneck locations were noted, such as Mineral Avenue and Bowles Avenue, as well as congestion along the entire corridor. The second highest number of comments regarding the existing traffic signals and existing intersections (17%). The lack of traffic signal coordination along the corridor was the main concern. Existing intersections of concern were Mineral Avenue, Bowles Avenue, and Church Avenue, among others.

4.2.2 Input to Level 1 Screening

4.2.2.1 Online Public Event 1

A self-guided online public event launched on January 18, 2021 and closed on February 8, 2021. The event generated 339 visitors, 212 survey responses, and 104 map comments. Participants provided feedback on the Purpose and Need statement, potential stakeholders, and location-specific concerns on a map of the corridor. Topics of the meeting included:

- Video overview of the project
- What is a PEL video
- Purpose and Need
- Existing conditions – summary of data and public comments
- Timeline
- Early Action Projects
- Level 1 Evaluation
- Level 1 Results
- Next Steps

Input Highlights

Purpose and Need

76 comments were made regarding the Purpose and Need statement, according to the three identified needs (Safety, Operational Performance, and Multimodal Connections), as well as an “other” category. 60% of the comments were in the “other” category. The majority were concerning environmental impacts of vehicles along the corridor, including greenhouse gas emissions, vehicle miles traveled, and noise impacts to surrounding residents.

Comment Map

An online tool allowed attendees to leave a comment at any location along the corridor on a map and have the comment attached to that location. A total of 105 comments were received on the corridor map. The comments were concentrated at C-470 and Mineral Avenue (10% each) and Alameda Avenue, Bowles Avenue, I-25, Oxford Avenue and Union Avenue (6% each). The distribution of comments is shown in Figure 4-2.

Most comments were concerning bicycle and pedestrian safety and improvements along the corridor (12% each), including connecting to the South Platte River Trail and Mary Carter Greenway. Other comment themes included general roadway improvements, such as the number of lanes (9%) and improvements to intersections and interchanges (8%).

4.2.3 Input to Early Action Projects and Level 2 Themes

4.2.3.1 Online Public Event 2

A second self-guided online public event launched on July 14, 2021 and closed on August 8, 2021. The event generated 497 visitors, 150 survey responses, and 490 comments. The event gained feedback on the Early Action Projects and Level 2 Themes, including surveys and thumbs up/down activities. Topics included:

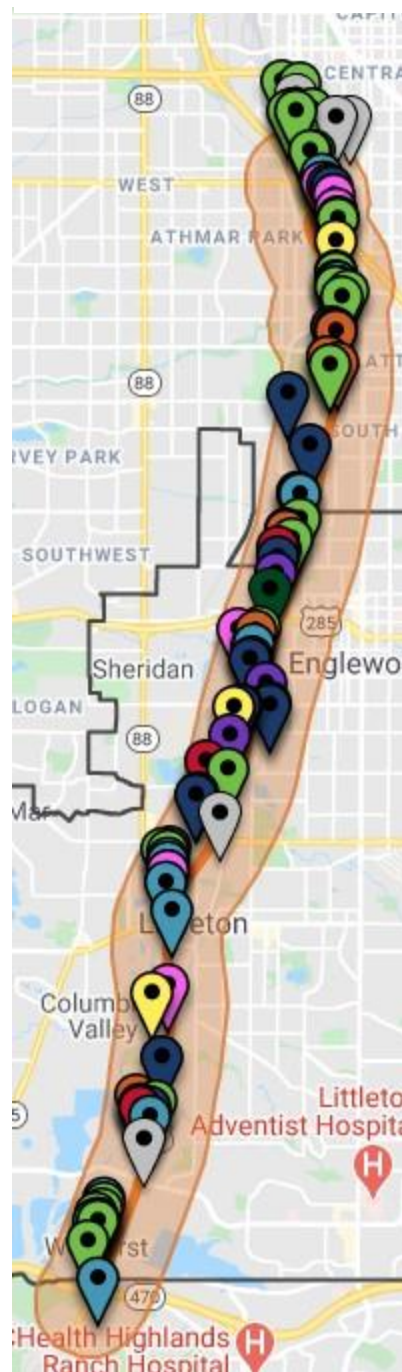
- What is the Santa Fe Drive Action Plan?
- Where are we in the process?
- Alternatives Evaluation Process
- Location-Specific Options
- Early Action Projects
- Level 2 Themes
- Next Steps
- Staying Involved

Input Highlights

Top Early Action Projects

1. Auxiliary Lanes – Hampden Avenue to Florida Avenue
2. Prince Street Intersection Improvements and Bike Lanes
3. Northbound Auxiliary Lane – Vinewood Street to Bowles Avenue
4. New Sidewalk – South Side of Oxford Avenue

Figure 4-2. Distribution of Comments



Top Level 2 Themes

1. Corridor Safety and Operations Focus
2. Multimodal Focus
3. Adaptability/Flexibility
4. Corridor Access Focus

4.2.4 Study Recommendations

Study recommendations and final Action Plan incorporated public input from Online Public Event 2, as well as review and input from the PMT, EOC, Elected Officials, and task forces. The final Action Plan was advertised on social media, email blasts to the public and stakeholders, through a press release, and through participating jurisdiction outlets. The website will remain open after the Action Plan is published.

4.3 Agency Coordination

4.3.1 Resource Agencies

In addition to the participating jurisdictions identified in Section 1.3, federal, state, and regional resource agencies were given opportunities to participate in the PEL study process. On June 17, 2020, they were notified of the study and were asked for input regarding the resources under their jurisdiction. On September 30, 2020, the agencies were provided the opportunity to review the Corridor Conditions Report (CDOT, 2020). Finally, a draft of this Santa Fe PEL Action Plan was provided to them in April 2022 for comment before publication.

The resource agencies included:

- CDOT Environmental Programs Branch, CDPHE Liaison
- CDOT Environmental Programs Branch, U.S. Fish and Wildlife Service Liaison
- CDPHE, Air Pollution Control Division
- CDPHE, Energy Liaison
- CDPHE, Hazardous Materials and Solid Waste Management Division
- CDPHE, Water Quality Control Division
- Colorado Parks and Wildlife
- Office of Archaeology and Historic Preservation
- U.S. Army Corps of Engineers
- U.S. Environmental Protection Agency
- Mile High Flood District

CDPHE provided a packet of general information regarding requirements and recommendations that apply to many but not all local agency projects concerning hazardous and solid waste, water quality, air quality, and health equity and environmental justice.

The Office of Archaeology and Historic Preservation noted that any subsequent projects must comply with Section 106, and they look forward to commenting on the undertaking upon receipt of documentation intended for consultation under Section 106.

No other feedback was provided.

4.3.2 Other Organizations

At the request of local jurisdictions, the study team also provided updates to other public agencies and organizations. The following agency bodies were briefed on the study and provided feedback:

- Littleton Transportation and Mobility Advisory Board (January 28, 2021): CDOT presented a virtual overview including the study video, encouraged participants to help direct people to the January/February online public event, reviewed potential Early Action Projects, and fielded several questions about the types of Multimodal projects that were being considered.
- South Platte Working Group (February 25, 2021): CDOT provided a brief presentation to the group, including a virtual overview including the study video and schedule; identified a few possible Early Action Projects and a brief discussion about the potential synergy between the Action Plan multimodal recommendations and the South Platte Working Group priority projects.
- Littleton City Council (July 27, 2021): CDOT presented in person to the full City Council. Presentation highlights included a review of the study schedule, status, and decision-making process; feedback from stakeholder interviews and online public events; discussion of the key alternatives' evaluation criteria; and a review of the Early Action Projects, Level 2B themes and Future Actions. Members of the City Council indicated their support for projects that would reduce the barrier effect of Santa Fe Drive dividing their community and encouraged additional outreach to potentially impacted property owners prior to release of the final recommendations.
- Denver One Plan (April 5, 2021): CDOT presented a virtual overview, including the study video, schedule, purpose and need and alternatives evaluation process; feedback from the first online public event; reviewed the Level 2A Options; and identified a few possible Early Action Projects.
- Denver One Plan (October 4, 2021): CDOT presented an update including feedback receive at the two online public events, a highlight of a few of the key evaluation criteria, and a review of the Early Action Projects and Project Recommendations.

A record of agency outreach and coordination is included in Appendix B.

5.0 Alternatives Evaluation and Recommendations

5.1 Overall Process

The alternatives development and evaluation process identified and evaluated a broad range of reasonable improvement alternatives for the Santa Fe Drive corridor that recognize the diverse elements of the corridor roadway and multimodal facilities and the context of the surrounding environment. The process included developing evaluation criteria based on the project Purpose and Need, developing a range of improvement concepts, and identifying Project Recommendations through a tiered evaluation process. The process documents the rationale for why certain recommendations were carried forward and others were not, which will streamline the alternatives analysis process of future NEPA projects.

Appendix D presents the technical detail and evaluation criteria and evaluation matrices for Level 1, Level 2A, and Level 2B evaluations. Appendix E includes traffic operations methodology and evaluation that supports the results in this section and Appendix D. The alternatives evaluation process included input and review by local jurisdiction and regional agency representatives, as well as the public.

Figure 5-1 on the next page illustrates the tiered alternatives development and evaluation process developed specifically for this study.

5.2 No Action Alternative

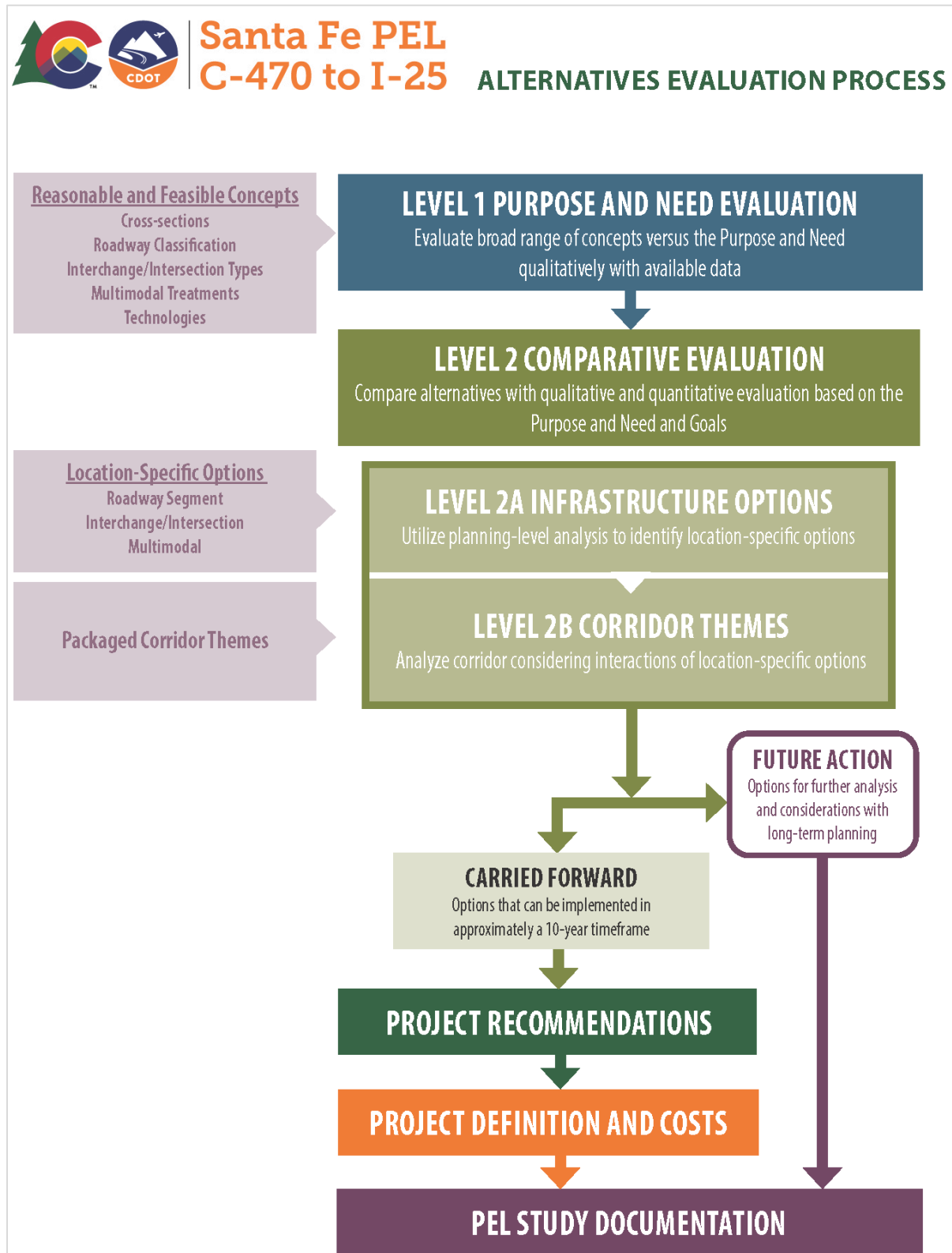
The No Action Alternative served as a base against which to compare benefits and impacts of the alternatives evaluated at each evaluation level. The No Action Alternative was carried forward through the analysis as a baseline for comparison, even if it does not address the Purpose and Need.

The No Action Alternative only includes programmed projects with reasonably expected funding. These include projects in DRCOG's 2040 Fiscally Constrained Regional Transportation Plan and the funded DRCOG 2022-2025 TIP (DRCOG, 2021). It also includes federal, state, and locally funded projects if they are currently in a phase of project development and have reasonably expected funding to be constructed. Projects with less funding certainty could be subject to change by the findings and recommendations of the Action Plan and are therefore not included in the No Action Alternative.

The No Action Alternative includes the following projects (continued on the page after the figure) with reasonable funding expectations along the Santa Fe Drive corridor, shown in Appendix D:

- Santa Fe Drive widening from four to six lanes south of County Line Road (DRCOG TIP)
 - ◆ Replacement and widening the US 85 bridge over C-470, including adding a pedestrian/bicyclist trail across C-470 and bus stop enhancements
 - ◆ New and improved signal interconnection and ITS infrastructure
 - ◆ Grade separation of the C-470 trail and High Line Canal trail under US 85

Figure 5-1. Alternatives Evaluation Process



- New traffic signal on Santa Fe Drive south of Mineral Avenue (privately funded)
- Mineral Mobility-shed improvements (DRCOG TIP)
 - ◆ Pedestrian/bicyclist improvements east of Santa Fe Drive
- Mineral Avenue intersection improvements at Santa Fe Drive (DRCOG TIP)
- Oxford Avenue pedestrian/bicyclist bridge (DRCOG TIP)
 - ◆ Grade-separated pedestrian/bicycle bridge over Oxford Avenue east of Santa Fe Drive
- Dartmouth Avenue sidewalks Santa Fe Drive to Zuni Street (Safer Main Streets grant for Englewood)
- Pedestrian/bicyclist bridge at Jewell Avenue over Santa Fe Drive (Denver Capital Improvement Program)
- Iowa Avenue railroad underpass improvements and pedestrian improvements at Santa Fe (Denver Capital Improvement Program)
- Kentucky bridge over South Platte and new signals on Santa Fe Drive (privately funded)
- I-25 and Alameda Avenue improvements (DRCOG TIP)
 - ◆ Interchange reconstruction with new bridge over South Platte River
 - ◆ Local street improvements to Lipan Street
 - ◆ Pedestrian and bicycle facility improvements and grade-separated South Platte River Greenway path

Funded transportation projects near the Santa Fe Drive corridor that are underway were also considered. An illustrated map of the funded transportation projects near the Santa Fe Drive corridor is in Appendix D.

5.3 Level 1 Purpose and Need Evaluation

The initial concepts were developed through a series of collaborative workshops with representatives from the study team, the PMT and other corridor agency representatives, and transportation subject matter experts. They were elements that CDOT and/or the participating agencies have control over and do not expand outside transportation.

The Level 1 evaluation identified a range of corridor improvement concepts categorized by cross-section, roadway classification, interchange/intersection types, multimodal treatments, and technologies. It assessed whether those concepts could meet the Purpose and Need for the Santa Fe Drive corridor, while eliminating concepts from detailed consideration that had “fatal flaws” (that did not meet the Purpose and Need). The concepts evaluated in the Level 1 evaluation are described and illustrated in Appendix D, which also includes the Level 1 evaluation matrix.

Level 1 evaluation criteria were based on the following three Purpose and Need elements: Safety, Operational Performance, and Multimodal Connections. The initial concepts were evaluated with a “Yes” or “No” answer to the following questions to demonstrate each concept’s ability to meet the corridor Needs.

- Safety
 - ◆ Does the concept improve safety for users on Santa Fe Drive?
- Operational Performance
 - ◆ Does the concept reduce future congestion on Santa Fe Drive?
 - ◆ Does the concept provide more consistent travel time on Santa Fe Drive?
 - ◆ Does the concept improve geometric characteristics that create safety concerns and traffic disruptions on Santa Fe Drive?
- Multimodal Connections
 - ◆ Does the concept improve connections across Santa Fe Drive to existing multimodal facilities?

If a concept could not meet any of the criteria (that is, all “No” responses), it was removed from further consideration. However, if a concept met a portion of the needs, it was retained for further consideration in the Level 2 evaluation.

More than 45 general concepts were reviewed for the corridor with the Level 1 evaluation, including the No Action Alternative. Most of the identified concepts were retained for the Level 2 evaluation. Four concepts were eliminated from further consideration because they did not meet the Purpose and Need:

- **Convert Existing Corridor Lanes/Shoulders for Multimodal.** Eliminated because removal of vehicular lanes and/or narrowed shoulders for substantial distances along Santa Fe Drive would reduce safety and operational performance with increased congestion and does not improve multimodal connections across Santa Fe Drive.
- **Increased Capacity/Widening on Parallel Roadways.** Eliminated because the scope of reasonable capacity improvements that could be made along Broadway, Platte Canyon Road, or Federal Boulevard would not remove enough traffic on Santa Fe Drive to improve identified safety issues or operational performance on the Santa Fe Drive corridor and does not improve multimodal connections across Santa Fe Drive.
- **Non-Rural Arterial Roadway Classification.** Eliminated because it does not improve identified safety issues or operational performance on Santa Fe Drive, and it does not best serve high vehicular volumes and regional travel.
- **Special Bus Operations.** Eliminated because with the parallel LRT route and associated minimal bus service on Santa Fe Drive (a single route travels through the C-470, County Line Road, and Mineral Avenue signals), this concept does not improve Safety, Operational Performance, or Multimodal Connections across Santa Fe Drive.

5.4 Level 2A Evaluation

To generate results in a framework for implementable solutions that can be completed relatively quickly, the Level 2 evaluation focused on identifying recommendations for implementation within an approximately 10-year timeframe.

The purpose of the Level 2 evaluation was to establish a means for estimating and comparing how well potential corridor improvements performed in meeting the Purpose and Need in a cost-effective and least environmentally harmful manner. The Level 2 evaluation expanded measures for each criterion from the Level 1 evaluation and provided additional evaluation criteria based on the project goals. At each of the Level 2 evaluation steps, there were three possible results: Not Recommended, Carried Forward, and Future Action.

-
- **Not Recommended** means the option was not a recommended solution, considering the Purpose and Need and goals developed with the study.
 - Improvements that were **Carried Forward** were considered as part of the Project Recommendations, as projects that could be implemented within an approximately 10-year timeframe.
 - Improvements that are noted for **Future Action** at Level 2A or Level 2B evaluation are seen as valuable, longer-term improvements that may be advanced in the future with more detailed analysis, planning, or design information, beyond the scope of this Action Plan, or future property redevelopment.
-

5.4.1 Level 2A Evaluation

In the Level 2A evaluation, infrastructure options were developed for specific locations along the Santa Fe Drive corridor. The improvement options were applied at locations to respond to existing and forecasted transportation conditions and issues. Concepts were considered at locations appropriate to meet the traffic and multimodal needs and adapt to physical features to develop the most appropriate Level 2A options. The Level 2A evaluation criteria focused on elements responding to the Purpose and Need and goals. The improvement options were compared to determine how well each concept met the evaluation criteria shown in Table 5-1. More information on the options evaluated in the Level 2A evaluation is included in Appendix D with the Level 2A evaluation matrix and list of results.

Table 5-1. Level 2A Evaluation Criteria

| Level 2A Evaluation Criteria |
|---|
| Safety Criteria |
| Relative level of conflict - Vehicular |
| Relative level of conflict – Pedestrians/bicyclists |

| |
|---|
| Level 2A Evaluation Criteria |
| Potential crash reduction |
| Operational Criteria (Vehicular) |
| Roadway capacity related to 2040 travel demand |
| Volume throughput |
| Travel time reliability |
| Freight movements |
| Access operational impacts on Santa Fe Drive |
| Multimodal Connections Criteria |
| Enhanced walking and biking crossings |
| Expansion of walking and biking opportunities |
| Optimized transit access |
| Community/Quality of Life Criteria |
| Property impacts |
| Property access modifications |
| Support of local and regional planning and policy efforts |
| Environmental Resources Criteria |
| Potential impacts on environmental resources |
| Potential impacts on social and built environment |
| Ease of implementation |
| Ability to implement as standalone project |
| Constructability |
| Ease of implementation |
| Ability to implement as standalone project |

The Level 2A options included two non-conventional intersection designs that modify vehicle, pedestrian, and bicycle paths to improve safety, reduce delay, and increase efficiency: the quadrant road intersection (Figure 5-2) and channelized T intersection (Figure 5-3).

Quadrant Road Intersection

What is a quadrant road?

- Intersection design with one main intersection and two secondary intersections that are linked by a connector road in any quadrant of the intersection
- Left-turn vehicles from all four legs of the main intersection use the secondary intersections and connector road, instead of the main intersection, to complete left-turn movements
- Secondary intersections are typically signalized but can also be unsignalized
- When all three intersections are signalized, traffic signals are timed to operate together

When should it be considered?

- At locations with an existing roadway that can be used as the connector roadway
- At four-legged intersections with heavy through and left-turn traffic volumes on the major and side streets

Benefits

- **Improved safety.** Reduces and spreads out the number of points where vehicles cross paths
- **Increased efficiency.** Rerouting left turns allows for fewer traffic signal phases at the main intersection, which means less time waiting for through and right-turn vehicles
- **Better synchronization.** Synchronization of three signalized intersections improves corridor travel times on both the major and side streets

Channelized T Intersection

What is a channelized T?

- Intersection design where one major street direction of travel (the top side of the “T”) can pass through the intersection without stopping, and the opposite major street direction of travel is controlled by a traffic signal
- Left-turn vehicles from the side street use a channelized receiving lane on the major street to merge onto the major street

When should it be considered?

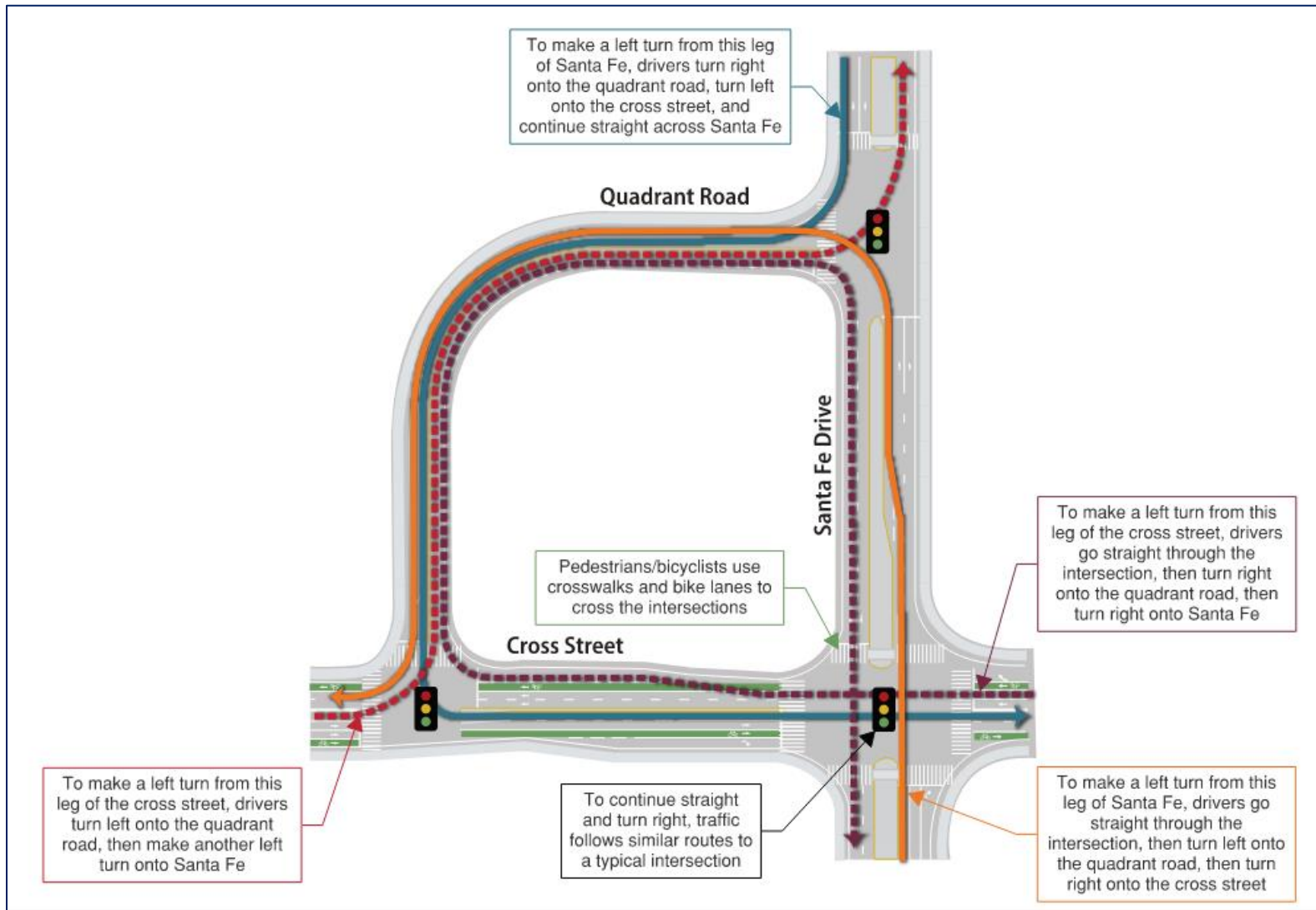
- At intersections:
 - ◆ With three legs
 - ◆ With heavy through traffic volumes on the major street and moderate to low left-turn traffic volumes on the side street

- ◆ Where there are no driveways along the major street opposite the side street
- ◆ With a limited number of pedestrian crossings across the major street or with an alternative pedestrian crossing location nearby

Benefits

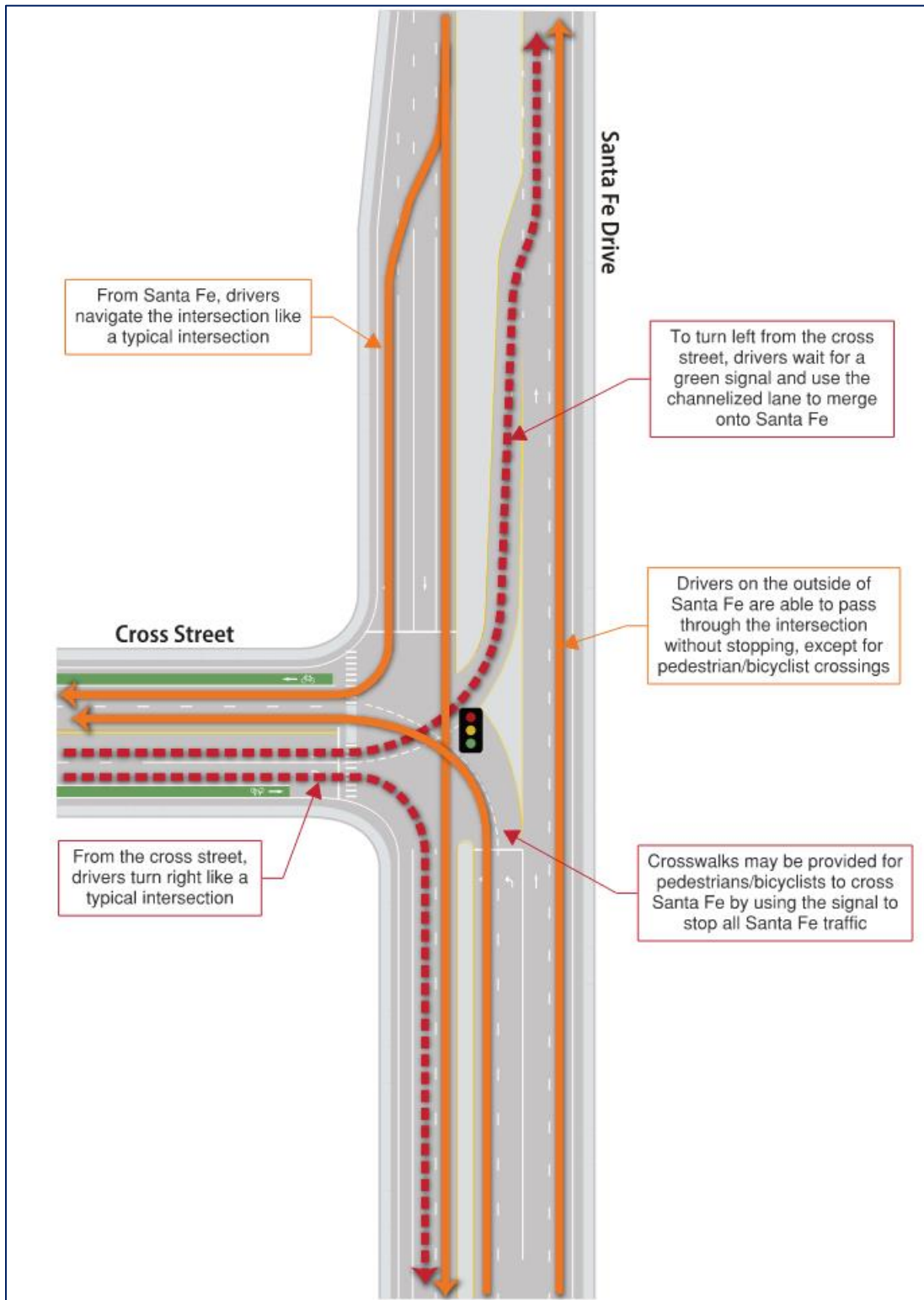
- **Improved safety.** Channelizing left-turn vehicles from the side street reduces the potential for angle crashes
- **Increased efficiency.** One direction of travel on the major street is free-flow, and, as a result, more green time can be provided to the other movements, reducing delay
- **Free-flow in one direction:** One direction of travel on the major street never stops, which improves traffic signal synchronization and reduces corridor travel times

1 **Figure 5-2. How to Navigate a Quadrant Road Intersection**



2
3

Figure 5-3. How to Navigate a Channelized T Intersection



Over 95 infrastructure improvement options and the No Action Alternative were evaluated at different locations along the Santa Fe Drive corridor.

- 61 options were *carried forward* for further evaluation in Level 2B as part of potential Project Recommendations for implementation in the 10-year timeframe.
- 24 options were identified as *Future Actions* for consideration with future long-term planning and/or design efforts. While these concepts have the potential to provide notable improvements for the Santa Fe Drive corridor, they would require further study, more complicated processes, unknown property redevelopment, and/or funding levels that are expected to take longer than the 10-year timeframe for implementation.
- 11 options were *not recommended* for further evaluation due to comparatively negligible benefits and higher impacts than other options.
- No options were *eliminated* as they all met at least a portion of the Purpose and Need.

All 28 multimodal infrastructure options considered in the Level 2A evaluation were either carried forward or identified as Future Actions. The rationale for the result for each option are provided in the Level 2A evaluation matrix in Appendix D.

5.5 Level 2B Evaluation

The purpose of the Level 2B evaluation was to complete additional analysis on the potential improvement options by packaging the options into corridor themes to evaluate the overall interaction of potential improvements along the corridor. Infrastructure options carried forward from the Level 2A evaluation were combined and applied to locations to create corridorwide themes. Not every combination of concepts was considered; the themes combined the most applicable options to create uniquely different corridor themes that responded to the Purpose and Need and goals.

The corridor themes focused on the primary elements of the Santa Fe Drive corridor Purpose and Need. Each of the four themes compiled the infrastructure options along the corridor that best addressed the Purpose and Need elements, with an added theme of adaptability/flexibility:

- **Theme 1 Safety and Operations Focus.** Options that minimize vehicular and multimodal conflicts (e.g., pedestrian/bicyclist grade separations, interchanges, trail improvements), remove bottlenecks (e.g., auxiliary lanes, intersections with grade separations), and address areas of frequent accesses that affect safety and operational performance (e.g., frontage roads)
- **Theme 2 Corridor Access Focus.** Options that preserve current property access (e.g., no access closures or relocations), minimize the need to acquire property (e.g., trail paving, wayfinding), and improve property access (e.g., auxiliary lanes)
- **Theme 3 Multimodal Focus.** Options that prioritize pedestrian/bicyclist movements (e.g., pedestrian/bicyclist grade separations, additional north/south trail capacity), improve

access to transit stations (e.g., trail connections, wayfinding), provide new multimodal infrastructure (e.g., new sidewalks and trail connections, bike lanes), and consider intersection types that optimize multimodal crossings, comfort, and safety

- **Theme 4 Adaptability/Flexibility Focus.** Options that provide area and infrastructure for future improvements (e.g., wider shoulders, frontage roads) and are relatively easy to adapt to future long-term upgrades (e.g., quadrant roads adaptable to future interchange)

Like the Level 2A evaluation, Level 2B criteria were developed to compare how well the improvements within each of the corridor themes met the Purpose and Need and goals of the Santa Fe Drive corridor. The criteria are listed in Table 5-2. More information on the specific options included in each corridor theme, the Level 2B evaluation criteria, and the Level 2B evaluation summary is included in Appendix D.

Table 5-2. Level 2B Evaluation Criteria

| Level 2B Evaluation Criteria |
|---|
| Safety Criteria |
| Crash Rate |
| Relative level of conflict – Pedestrians/bicyclists |
| Potential crash reduction |
| Operational Criteria |
| 2040 Vehicle Hours Traveled in AM and PM peak hours |
| Overall Corridor Delay |
| Volume Throughput |
| Access Operational Impacts |
| Multimodal Connections Criteria |
| Pedestrian/Bicyclist Comfort and Safety |
| Pedestrian and Bicyclist Crossings |
| Pedestrian/Bicyclist Traveling Experience |
| Optimized Transit Use |
| Community/Quality of Life Criteria |
| Property Impacts |
| Property Access Modifications |
| Support of Local and Regional Planning and Policy Efforts |
| General Public Sentiment |

| Level 2B Evaluation Criteria |
|---|
| Environmental Resources Criteria |
| Potential impacts on environmental resources |
| Potential impacts on social and built environment |
| Constructability |
| Ease of implementation |
| Ability to implement as standalone project |

The elements carried forward from each theme, as well as the elements not recommended, are shown in Table 5-3. General elements carried forward represent a broad variety of roadway, multimodal, intersection, and access elements that provide integrated improvements that address Safety, Operational Performance, and Multimodal Connectivity needs.

Table 5-3. Level 2B Results

| -- | No Action | Theme 1 Safety and Operations | Theme 2 Corridor Access | Theme 3 Multimodal | Theme 4 Adaptability / Flexibility |
|---|--|---|---|--|--|
| General Elements Carried Forward as Project Recommendations | <ul style="list-style-type: none"> • Programmed projects along the corridor • C-470 Interchange Improvements • County Line Intersection Improvements • Mineral Ave Quadrant Rd • Kentucky Ave Bridge and Signal | <ul style="list-style-type: none"> • Santa Fe Dr mainline: Preserve/procure right-of-way for future potential additional lanes and/or multimodal elements • Bottleneck Reduction <ul style="list-style-type: none"> • Auxiliary lanes • Frontage roads and access consolidation • Channelized T and Quadrant Road intersections; improved signal timing • Closure and turn restrictions at intersections • Multimodal • Pedestrian/bicyclist grade separations | <ul style="list-style-type: none"> • Santa Fe Dr mainline: Preserve/procure right-of-way for future potential additional lanes and/or multimodal elements • Bottleneck Reduction <ul style="list-style-type: none"> • Auxiliary lanes • Frontage roads and access consolidation • Channelized T and Quadrant Road intersections; improved signal timing • Multimodal <ul style="list-style-type: none"> • Pedestrian/bicyclist grade separations • Trail improvements – paving, widening, and new connections | <ul style="list-style-type: none"> • Bottleneck Reduction <ul style="list-style-type: none"> • Auxiliary lanes • Frontage roads and access consolidation • Channelized T and Quadrant Road intersections; improved signal timing • Closure and turn restrictions at intersections • Multimodal <ul style="list-style-type: none"> • Pedestrian/bicyclist grade separations • Trail improvements – paving, widening, and new connections • New sidewalk and bike lanes | <ul style="list-style-type: none"> • Bottleneck Reduction <ul style="list-style-type: none"> • Auxiliary lanes • Frontage roads and access consolidation • Channelized T and Quadrant Road intersections; improved signal timing • Multimodal <ul style="list-style-type: none"> • Trail improvements – paving, widening, and new connections • New sidewalk and bike lanes |
| General Elements Identified as Future Actions | | <ul style="list-style-type: none"> • Belleview Ave and Evans Ave interchange modifications | <ul style="list-style-type: none"> • Belleview Ave and Evans Ave interchange modifications | <ul style="list-style-type: none"> • Belleview Ave and Evans Ave interchange modifications | <ul style="list-style-type: none"> • Belleview Ave and Evans Ave interchange modifications |
| General Elements Not Recommended | | <ul style="list-style-type: none"> • Channelized T intersections with grade separation not recommended due to added impacts and cost • Quadrant Road at Dartmouth not recommended due to Environmental Justice impacts • Offset T at Florida and Iowa not recommended due to property impacts | | <ul style="list-style-type: none"> • Quadrant Road at Church not recommended due to property impacts with minimal benefit • Quadrant Road at Dartmouth not recommended due to Environmental Justice impacts | <ul style="list-style-type: none"> • Widened shoulders along full corridor not recommended due to property impacts and cost, but areas may consider widened shoulders • Quadrant Road at Church not recommended due to property impacts with minimal benefit • Quadrant Road at Dartmouth not recommended due to Environmental Justice impacts |

5.6 Project Recommendations

Project Recommendations are improvements that provide Safety, Operational Performance, and Multimodal Connectivity benefits along the Santa Fe Drive corridor that can possibly be implemented within an approximately 10-year timeframe.

The Project Recommendations are illustrated in Figure 5-4 and listed in Table 5-4 with brief descriptions. The recommendations are located along the entire 11-mile highway corridor and adjacent trail and light rail transit systems. The Project Recommendations include a broad variety of roadway, multimodal, intersection, and access elements that provide integrated improvements to address the Santa Fe Drive corridor's Safety, Operational Performance, and Multimodal Connectivity needs. The recommendations also include technology and system management elements that would maximize the safety and operational benefits along the corridor.

Early Action Projects were identified from the Project Recommendations projects with relatively simple project development requirements (e.g., little to no right-of-way, minimal environmental resource impacts) and the potential for immediately available funding sources. Four of these have secured funding and are moving forward. The identified Early Action Projects are noted within the lists of Project Recommendations and described in more detail in Section 5.7.

Appendix F contains Project Information Sheets that summarize the Project Recommendations for improvements within specific areas along the Santa Fe Drive corridor. The illustrations are not intended to represent individual projects but demonstrate how the improvements are integrated to enhance Safety, Operational Performance, and Multimodal Connectivity.

Figure 5-4. Project Recommendations

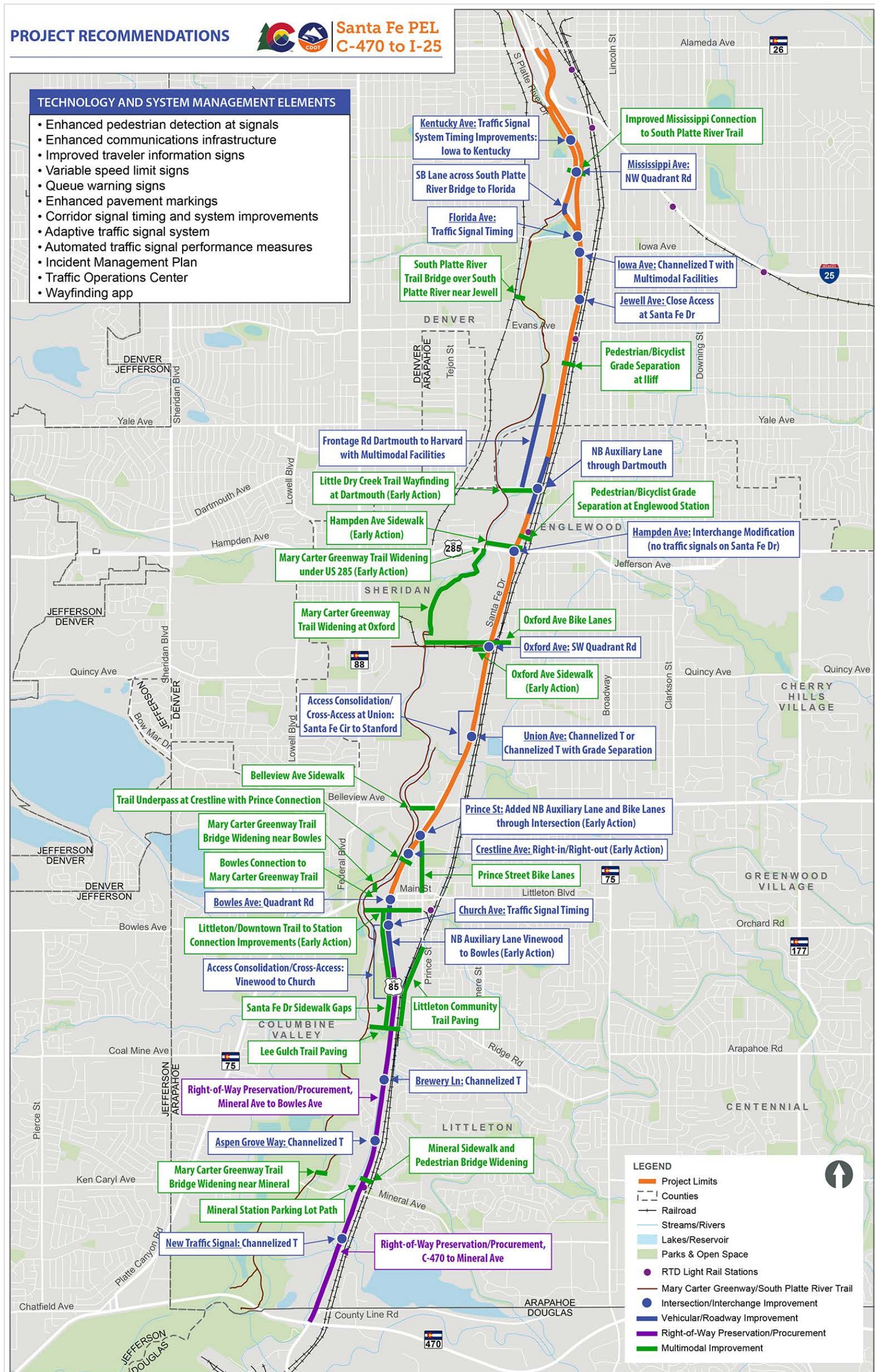


Table 5-4. Project Recommendations

| Project Recommendation Santa Fe Drive Corridor (south to north) | Description |
|--|--|
| C-470 to Mineral | - |
| Right-of-Way Preservation/Procurement, C-470 to Mineral Ave | CDOT or local agencies obtain additional right-of-way adjacent to Santa Fe Dr as opportunities arise with property redevelopment or other construction projects. Area provides flexibility for future vehicular and/or multimodal infrastructure to address safety, operational, and connection needs as land use and regional and local travel needs transform. |
| New Traffic Signal: Channelized T | New (privately funded) traffic signal south of Mineral Dr with channelized T layout considered to minimize impacts to Santa Fe Dr traffic flow and safety |
| Mineral to Bowles | - |
| Right-of-Way Preservation/Procurement, Mineral Ave to Bowles Ave | CDOT or local agencies obtain additional right-of-way adjacent to Santa Fe Dr as opportunities arise with property redevelopment or other construction projects. Area provides flexibility for future vehicular and/or multimodal infrastructure to address safety, operational, and connection needs as land use and regional and local travel needs transform. |
| Mineral Station Parking Lot Path | New path through Mineral Station parking area improves safety and provides more direct connection for pedestrians and bicyclists between trail and LRT station. |
| Mineral Sidewalk and Pedestrian Bridge Widening | Widening of existing pedestrian bridge over Santa Fe Dr at Mineral and sidewalks east of LRT station to increase capacity and safety for pedestrians and bicyclists. No change to at-grade crossing at Mineral Ave/Santa Fe Dr intersection. |
| Mary Carter Greenway Trail Bridge Widening near Mineral | Widening of existing trail bridge over South Platte River west of Mineral Station increases capacity and safety for pedestrians and bicyclists. |
| Aspen Grove Way: Channelized T | Channelized T intersection reduces delays and queuing along Santa Fe Dr and improves safety, addressing areas of substantial congestion. |
| Brewery Ln: Channelized T | Channelized T intersection reduces delays and queuing along Santa Fe Dr and improves safety, addressing areas of substantial congestion. |
| Lee Gulch Trail Paving | Paving trail improves existing multimodal connection across Santa Fe Dr and increases capacity and safety for pedestrians and bicyclists. |
| Santa Fe Dr Sidewalk Gaps | New sidewalk along west side of Santa Fe Dr south of Vinewood/Sumner signal provides new multimodal connections with a direct access to properties. |
| Littleton Community Trail Paving | Paving trail improves existing multimodal connection and increases capacity and safety for pedestrians and bicyclists. |
| Access Consolidation/Cross-Access: Vinewood to Church | Relocation of direct driveway access to Santa Fe Dr between Vinewood and Church with cross-access agreements or construction of new accesses to side streets |

| Project Recommendation Santa Fe Drive Corridor (south to north) | Description |
|---|---|
| | improves operations and addresses existing congestion and safety issues. |
| NB Auxiliary Lane Vinewood to Bowles (Early Action) | NB auxiliary lane through the Vinewood/Sumner, Church St, and Bowles Ave signals, addressing congestion bottleneck and improving safety with reduced queues. New NB right turn lanes provided at Church St and Bowles Ave. Traffic signal timing modified to optimize traffic flow and integrate pedestrian/bicyclist crossings. |
| Littleton/Downtown Trail to Station Connection Improvements (Early Action) | Improvements along Little's Creek Trail to enhance existing multimodal connection across Santa Fe Dr to Downtown Littleton LRT Station. Additional wayfinding and enhanced at-grade street crossings improve safety for pedestrians and bicyclists. |
| Bowles to Hampden | - |
| Bowles Ave: Quadrant Road | Alignment of quadrant road in northwest quadrant of intersection to be coordinated with local planners and property owner to complement future development by providing access and circulation through the site. Quadrant road design also includes multimodal facilities to provide new connections at Bowles Ave and Santa Fe Dr with at-grade crossing improvements at the signalized intersections. |
| Bowles Connection to Mary Carter Greenway Trail | New sidewalk connection from trail to south side of Bowles Ave provides more direct connection for pedestrians and bicyclists to travel along Bowles Ave. |
| Prince Street Bike Lanes | New bike lanes east of Santa Fe Dr connect to existing bike lanes on Prince St west of Santa Fe Dr to Lake Ave south of downtown Littleton. |
| Crestline Ave: Right-in/Right-out (Early Action) | Converting Crestline Ave intersection to right-in/right-out only improves safety with reduced intersection movements and conflict points. |
| Mary Carter Greenway Trail Bridge Widening near Bowles | Widening of existing trail bridge over South Platter River increases capacity and safety for pedestrians and bicyclists along the regional trail system. |
| Prince St: Added NB Auxiliary Lane and Bike Lanes through Intersection (Early Action) | New NB through lane and eastbound/westbound bike lanes through Prince St intersection improve safety by reducing existing conflicts and congestion bottleneck. |
| Trail Underpass at Crestline with Prince Connection | New trail underpass of Santa Fe Dr south of Crestline Ave improves pedestrian/bicyclist crossings and multimodal and community land use connections across Santa Fe Dr. |
| Bellevue Ave Sidewalk | New/improved sidewalk on south side Bellevue Ave from existing trail connection to Santa Fe Dr. |
| Union Ave: Channelized T or Channelized T with Grade Separation | Channelized T intersection reduces delays and queuing along Santa Fe Dr and improves safety, addressing areas of substantial congestion. Further study for benefits of grade separation with Channelized T for freight versus impacts and cost. |
| Access Consolidation/Cross-Access at Union: Santa Fe Cir to Stanford | Relocation of direct driveway access to Santa Fe Dr between Santa Fe Cir and Stanford Ave with cross-access agreements or construction of new accesses to side streets |

| Project Recommendation Santa Fe Drive Corridor (south to north) | Description |
|--|--|
| | improves operations and addresses existing congestion and safety issues. |
| Oxford Ave Sidewalk (Early Action) | New sidewalk along south side of Oxford Ave connects existing sidewalk at bus stop east of River Point Parkway with a raised crosswalk or treatments at Santa Fe Dr intersection to enhance safety of the crossing. |
| Oxford Ave: SW Quadrant Rd | Alignment of quadrant road in southwest quadrant of intersection expected to utilize existing local streets and alignment, operations, and multimodal elements to be coordinated to complement future development. At-grade multimodal crossing improvements included at the signalized intersections. |
| Oxford Ave Bike Lanes | New bike lanes west of Santa Fe Dr from River Run Park area, across Santa Fe Dr, to connect to existing bike lanes along Oxford Ave east of Santa Fe Dr. |
| Mary Carter Greenway Trail Widening at Oxford | Widening existing trail north of River Run Park increases capacity and safety for pedestrians and bicyclists along the regional trail system. |
| Hampden to Florida | - |
| Mary Carter Greenway Trail Widening under US 285 (Early Action) | Widening existing trail under US 285 bridge addresses narrow choke point and increases safety for pedestrians and bicyclists along the regional trail system. |
| Hampden Ave: Interchange Modification (no signals on Santa Fe Dr) | Ramp signals shifted from Santa Fe Dr to Hampden Ave, as a lower functional classification (Principal Arterial). Modifications improve safety on Santa Fe Dr with the elimination of signal conflict points. |
| Hampden Ave Sidewalk (Early Action) | New sidewalk along north side of Hampden Ave through Santa Fe Dr interchange connecting to existing sidewalk at South Platte River Dr addresses missing east-west multimodal gap. |
| Pedestrian/Bicyclist Grade Separation at Englewood Station | New pedestrian/bicyclist grade separation of Santa Fe Dr north of Hampden Ave to connect to Englewood LRT Station improves pedestrian/bicyclist crossings and increases capacity and safety for pedestrians and bicyclists accessing the Englewood LRT Station and residential and commercial land uses. |
| Little Dry Creek Trail Wayfinding at Dartmouth (Early Action) | Improvements along trail to enhance existing multimodal connection across Santa Fe Dr. |
| NB Auxiliary Lane through Dartmouth (Early Action) | Modified striping for additional NB through lane at the Dartmouth signal. Traffic signal timing modified to optimize traffic flow and integrate pedestrian/bicyclist crossings. |
| Frontage Rd Dartmouth to Harvard with Multimodal Facilities | New frontage road west of Santa Fe Dr to relocate direct driveway access with cross-access agreements or construction of new accesses to frontage road improves operations and addresses existing congestion and safety issues. |
| Pedestrian/Bicyclist Grade Separation at Iliff | New pedestrian/bicyclist grade separation of Santa Fe Dr south of Evans Ave improves pedestrian/bicyclist crossings and increases multimodal capacity and safety. |

| Project Recommendation Santa Fe Drive Corridor (south to north) | Description |
|---|---|
| Jewell Ave: Close Access at Santa Fe Dr | Closing Jewell Ave access removes existing vehicular conflicts in close proximity to Evans Ave interchange ramp. |
| South Platte River Trail Bridge over South Platte River near Jewell | New trail bridge over South Platte River west of Overland Golf Course near Jewell Ave provides enhanced multimodal connection for area neighborhoods to Broadway Station |
| Iowa Ave: Channelized T with Multimodal Facilities | Channelized T intersection reduces delays and queuing along Santa Fe Dr and improves safety at the intersection. Design to include signalized crossing or infrastructure for multimodal travel across Santa Fe Dr. |
| Florida Ave: Traffic Signal Timing | Traffic signal timing modified to optimize traffic flow and integrate pedestrian/bicyclist crossings. |
| North of Florida | - |
| SB Lane across South Platte River Bridge to Florida | New SB lane across South Platte River bridge provides a continuous lane from I-25 (with the additional lane to be added with development) to the existing lane at Florida Ave and improves safety by removing bottleneck created by additional lane with Kentucky Ave bridge and signal. |
| Mississippi Ave: NW Quadrant Rd | Alignment of quadrant road in northwest quadrant of intersection expected to utilize existing local streets, and the operations and infrastructure elements to be coordinated with local planners and area property owners. At-grade multimodal crossing improvements included at the signalized intersections. |
| Kentucky Ave: Traffic Signal System Timing Improvements: Iowa to Kentucky | Traffic signal timing modified to optimize traffic flow and integrate pedestrian/bicyclist crossings. |
| Improved Mississippi Connection to South Platte River Trail | Improved trail connection from trail in SE corner of SB Santa Fe Dr signal at Mississippi Ave provides a better connection for pedestrians and bicyclists to access Mississippi Ave for east-west travel. |

NB = Northbound; SB = Southbound; WB = Westbound; NW = Northwest; SW = Southwest; SE = Southeast

5.6.1 Technology and System Management Recommendations

Technology and system management elements were also developed for implementation along the Santa Fe Drive corridor. These elements are recommended to maximize the safety and operational benefits along the corridor. Because most system management strategies would improve regional mobility with minimal community and environmental impacts, these types of recommended elements should be pursued as funding for these supplemental transportation improvements becomes available.

Many of the technology recommendations require ancillary infrastructure to operate and communicate with motorists, as well as with the rest of the CDOT and/or local agency Intelligent Transportation System (ITS) network. The technology requires power, communications (e.g., fiber optic cable), and detection inputs. Power may be available near Santa Fe Drive but may still require lengthy new cable runs to reach any ITS installations adjacent to the roadway.

It is also important to consider potential impacts to right-of-way with ITS deployment. While some ITS equipment is installed in-pavement or adjacent to the roadway, ancillary cabinets and poles need to be located outside the clear zone or protected by guardrail, along with maintenance access, so projects for ITS installations should be evaluated considering right-of-way needs. The required ancillary infrastructure and potential additional right-of-way needs for specific technology options would be identified with future project development. Evaluation of ITS improvements along the Santa Fe Drive corridor included the following:

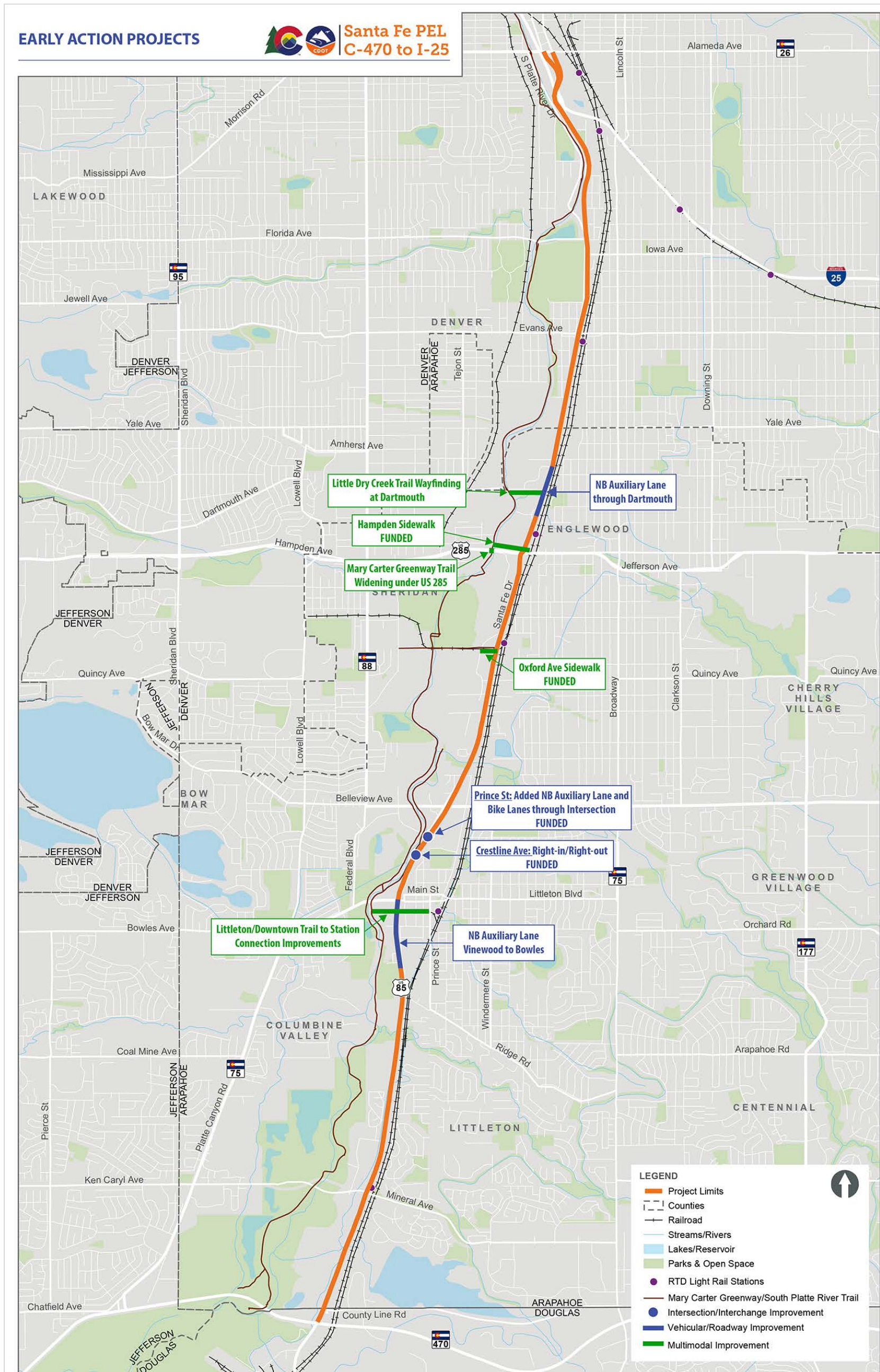
- Enhanced pedestrian detection at signals
- Enhanced communications infrastructure
- Improved traveler information signs
- Variable speed limit signs
- Queue warning signs
- Enhanced pavement markings
- Corridor signal timing and systems improvements
- Adaptive traffic signal control
- Automated traffic signal performance measures
- Access Control Plan
- Incident Management Plan
- Traffic Operations Center
- Wayfinding app

The most immediate and impactful ITS solutions for Santa Fe Drive include expanding the communications infrastructure along the entire corridor, enhancing traffic operation center capabilities (including closed-circuit television coverage along the corridor where blind spots may exist), implementing traffic signal performance measures so that signals operate in a manner efficient for the corridor, and keeping signal optimization and equipment up to date. Choices for other technologies, such as variable message signs and queue warning systems to warn motorists of incidents on the corridor would also improve incident response protocols for the corridor. The *Intelligent Transportation Systems White Paper: Technology and Strategies for Santa Fe Drive*, attached to the Traffic and Safety Technical Report located in Appendix E, provides a description of ITS improvements and information about them, including their benefits.

5.7 Early Action Projects

Early Action Projects were identified from the overall PEL Action Plan Project Recommendations as projects that can be advanced by the participating jurisdictions to address existing Santa Fe Drive corridor deficiencies that fit within the corridorwide strategy for improvements. Early Action Projects can be accomplished within reasonable budgets that may be funded with available sources and implemented within the next two to five years or sooner. Early Action Projects are illustrated in Figure 5-5.

Figure 5-5. Early Action Projects



Those that already have secured funding are noted below and in the Figure 5-5. A brief description of each Early Action Project is provided below, and one-page summaries outlining the description, benefits, trade-offs, approximate cost, and agencies involved are provided in Appendix G.

NB Auxiliary Lane Vinewood to Bowles - UNFUNDED

Striping along northbound Santa Fe Drive would be modified, along with island modifications, to provide an additional through lane approximately 2,500 feet, through the Vinewood Street, Church Street, and Bowles Avenue signals. New northbound right turn lanes would be provided at the Church Street and Bowles Avenue signals. The auxiliary lane would alleviate an identified congestion bottleneck approaching the Bowles Avenue intersection.

Littleton/Downtown Trail to Station Connection Improvements - UNFUNDED

Enhanced and additional wayfinding signage would be installed along the Little's Creek Trail south of the Bowles Avenue intersection to enhance multimodal connections across Santa Fe Drive between the Mary Carter Greenway Trail and the Littleton/Downtown Station. Enhanced crossings would also be installed at the three existing at-grade downtown street crossings. The project would improve a grade-separated multimodal crossing of the Santa Fe Drive corridor and enhance the connection to the Littleton/Downtown Station.

Crestline Avenue: Right-in/Right-out – FUNDED

At the existing $\frac{3}{4}$ -movement Santa Fe Drive and Crestline Avenue intersection south of the Prince Street signal, a raised center median along Santa Fe Drive would be constructed to prohibit southbound left turns. The southbound left-turn movement to the area east of Santa Fe Drive would shift to the Prince Street signalized intersection, less than 1,000 feet to the north. This project has secured funding. At the time of publication, CDOT is coordinating with City of Littleton on specific design details, which may vary.

Prince Street: Added NB Auxiliary Lane and Bike Lanes through Intersection – FUNDED

The raised center median on Santa Fe Drive and striping would be modified to delineate the left-turn lane more clearly from the existing HOV express lane at Prince Street and to add a northbound lane for approximately 850 feet through the intersection. Island modifications would add a northbound through lane and eastbound/westbound bike lanes through the intersection, extending the existing bike lanes along Prince Street west of Santa Fe Drive. With the additional delineation, vehicular lane, and bike lanes through the intersection, this project addresses safety and operational concerns as well as multimodal connectivity issues identified at this intersection. This project has secured funding.

Oxford Avenue Sidewalk– FUNDED

New sidewalk would be constructed on the south side of Oxford Avenue west of Santa Fe Drive. The new sidewalk would connect to existing sidewalk at the bus stop east of River Point Parkway and at the Santa Fe Drive intersection with a raised crosswalk or other design

treatments to enhance safety of the crossing. The new sidewalk would alleviate an issue with inadequate multimodal connections to the Oxford-City of Sheridan Station. This project will be coordinated with the Oxford Bike Lanes Project Recommendation. This project has secured funding.

Hampden Sidewalk – FUNDED

New sidewalk would be constructed along the north side of Hampden Avenue through the Santa Fe Drive interchange, connecting to existing sidewalk at South Platte River Drive. The sidewalk would be attached to Hampden Avenue under the existing Santa Fe Drive bridge, and enhanced pedestrian crossing treatments or grade separations would be installed at the three ramp crossings. The new sidewalk would alleviate an issue with inadequate multimodal connections to the Englewood Station, and would provide an additional crossing of Santa Fe Drive. This project has secured funding.

Mary Carter Greenway Trail Widening under US 285 - UNFUNDED

The Mary Carter Greenway Trail would be widened under US 285, as much as possible without major structural modifications to US 285 bridge. The trail improvement would address an existing narrow choke point for pedestrians and bicyclists and would increase capacity and safety along the regional trail system.

NB Auxiliary Lane through Dartmouth - UNFUNDED

Striping along Santa Fe Drive would be modified to provide an additional northbound through lane at the Dartmouth Avenue signal (approximately 950 feet long). The auxiliary lanes would address an identified congestion bottleneck through the Dartmouth Avenue intersection and reduce crashes related to congestion and long queues approaching the signal.

Little Dry Creek Trail Wayfinding at Dartmouth - UNFUNDED

Enhanced and additional wayfinding signage would be installed along the Little Dry Creek Trail south of the Dartmouth Avenue intersection to direct pedestrians and bicyclists to use the trail underpass to cross Santa Fe Drive. The project would improve a grade-separated multimodal crossing of the Santa Fe Drive corridor.

5.8 Future Actions

With the development of improvement concepts for the Santa Fe Drive corridor, many meaningful and more complex options were identified that would provide valuable, large-scale corridor benefit in accordance with the Purpose and Need and goals. **Future Actions** are projects that have the potential to provide notable improvements for the Santa Fe Drive corridor, but they would require further study, more complicated environmental and design processes, or funding levels and schedules that are expected to take longer than the 10-year timeframe to implement. Other Future Actions are intended to be considered for implementation with future property redevelopment and timing is unknown. To capture these improvement concepts for future consideration, they are documented in this Action Plan as Future Actions. The Future Actions identified along the corridor are listed in Table 5-5 and illustrated in Figure 5-6.

Because the implementation timeline and processes for these improvements are less defined, the level of detail explored for these Future Actions varied. To highlight the interaction of potential Future Actions with the Project Recommendations, Future Actions are noted on Project Information Sheets in Appendix F, when applicable.

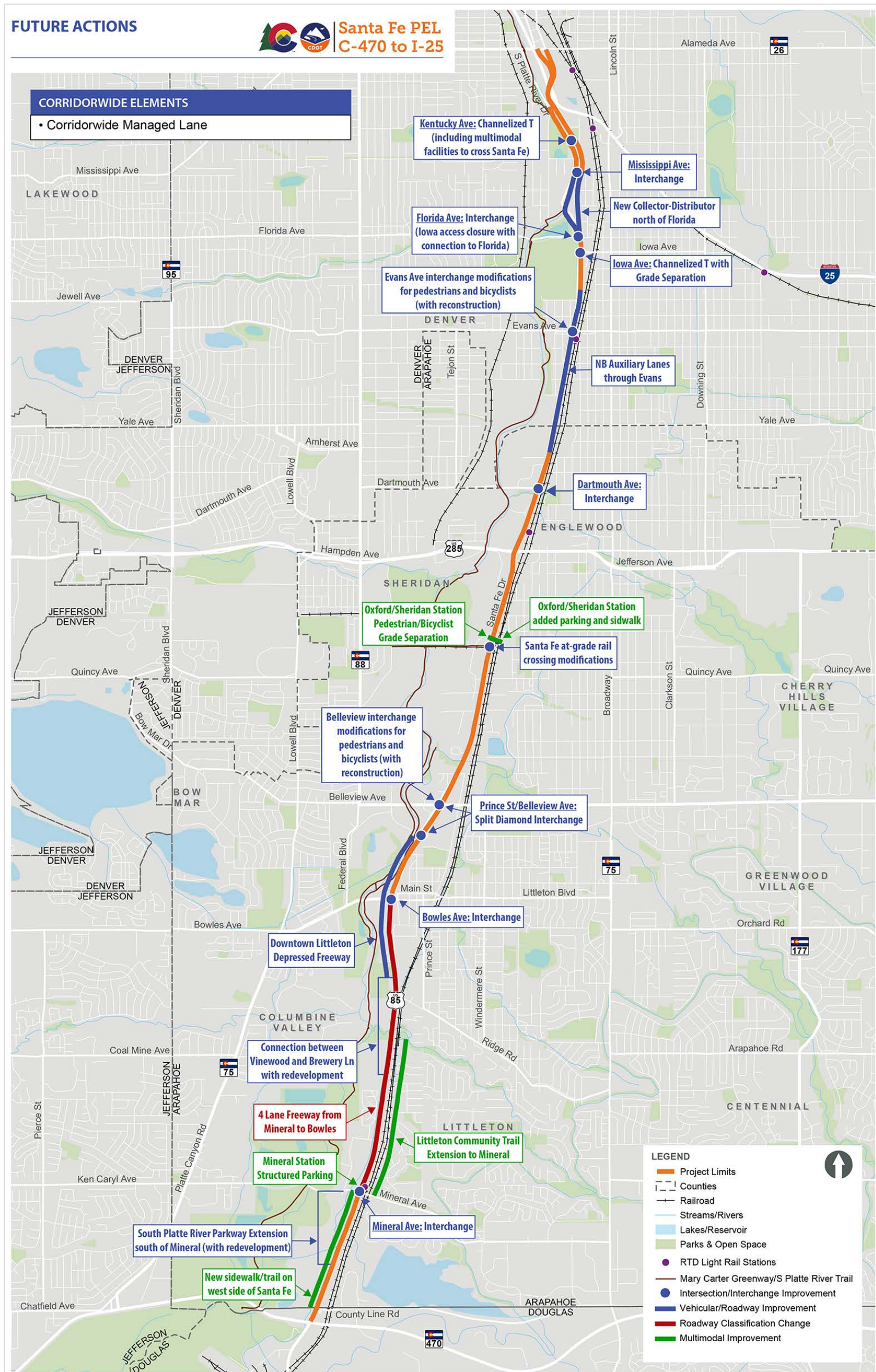
Data and options for a corridorwide express lane were initially evaluated in Attachment A of the Traffic and Safety Report in Appendix E.

The evaluation of the Project Recommendations for implementation priorities in Section 6.0 may indicate a need to further evaluate the Future Actions to begin implementation in an earlier timeframe. For example, the prioritization evaluation may show that a Project Recommendation does not provide a substantial benefit for a critical issue, in comparison to other improvements along the corridor. In that case, it may be beneficial to move up the investment for a larger-scale improvement identified as a Future Action, rather than spend funding on the Project Recommendation. Future Actions to be considered for more immediate implementation to address critical issues are described in Section 6.5.

Table 5-5. Future Actions

| Future Actions Santa Fe Drive Corridor (south to north) |
|--|
| <p>C-470 to Mineral</p> <ul style="list-style-type: none"> • South Platte River Pkwy Extension south of Mineral Ave – with redevelopment • New sidewalk/trail connection on west side of Santa Fe Dr north of County Line Rd – with redevelopment |
| <p>Mineral to Bowles</p> <ul style="list-style-type: none"> • Four Lane Freeway (no at-grade access to Santa Fe Dr) – Mineral Ave to Bowles Ave • Mineral Station Structured Parking – consistent with Littleton future land use planning • Littleton Community Trail Extension to Mineral • Mineral Ave Interchange • Connection Vinewood to Brewery Lane – with redevelopment • Downtown Littleton Depressed Freeway – consistent with Littleton long-term goals |
| <p>Bowles to Hampden</p> <ul style="list-style-type: none"> • Bowles Ave Interchange • Belleview Ave Interchange Modifications for Pedestrians/Bicyclists - with interchange reconstruction • Prince St/Belleview Ave Split Diamond Interchange • Santa Fe Dr At-grade Rail Crossing south of Oxford Ave Modifications • Oxford/Sheridan Station Pedestrian/Bicyclist Grade Separation – consistent with Sheridan planning • Oxford/Sheridan Station Added Parking and Sidewalk (east side) |
| <p>Hampden to Florida</p> <ul style="list-style-type: none"> • Dartmouth Ave Interchange • Northbound Auxiliary Lanes through Evans • Evans Ave Interchange Modifications for Pedestrians/Bicyclists - with interchange reconstruction • Iowa Ave Channelized T with Grade Separation • Iowa Ave/Florida Ave interchange (Iowa access closure with connection to Florida) |
| <p>North of Florida</p> <ul style="list-style-type: none"> • New Collector-Distributor North of Florida Ave • Mississippi Ave Interchange • Kentucky Ave Channelized T (including multimodal facilities to cross Santa Fe Dr) |
| <p>Corridorwide Technology and System Management Elements</p> <ul style="list-style-type: none"> • Corridorwide Express Lane – further evaluation to identify location, operations, and treatments. Data and options for these elements are analyzed in Attachment A of the Traffic and Safety Report (Appendix E) |

Figure 5-6. Future Actions



6.0 Project Ratings

Project Ratings: Roadway and Multimodal Projects

The criteria used to rate the Project Recommendations are based on the Santa Fe Drive Action Plan Purpose and Need. Criteria definitions were developed separately for Roadway projects and Multimodal projects to better compare their relative benefits; therefore, Roadway project ratings should not be compared to Multimodal project ratings.

6.1 Recommended Projects

The results of the Level 2B analysis identified the highest performing projects from the themes. This section provides ratings for the projects identified in the Plan Recommendations, including the Early Action Projects, but does not discuss Future Actions since the implementation strategy for those is different. The Project Recommendations are categorized into Roadway projects and Multimodal projects to use more refined criteria to compare their relative benefit. The rating tables provide a comparison of each project's ability to contribute toward the Santa Fe Drive Action Plan Purpose and Need and include an estimated project cost. The tables can be used by CDOT and the participating jurisdictions to easily sort projects by the primary criteria of a particular funding source – whether that is Safety, Operational Performance, Multimodal Connectivity, or some combination thereof. The complete list of potential projects is presented in Appendix H, which also includes additional considerations for implementation, including potential environmental resource impacts, consistency with local plans, and constructability.

6.1.1 Roadway Projects

Each Roadway project was eligible to score up to 15 points, with 5 points each for benefits related to the Purpose and Need elements of Safety, Operational Performance, and Multimodal Connectivity.

- Safety ratings were based on the anticipated reduction in the number of crashes per year, considering how a project might impact intersection and segment crash patterns due to elements like intersection geometry, congestion, or improved signalization. The introduction or removal of conflict points for potential impact to crash patterns was also considered.
- Operational improvements were rated based on the projected improvement of peak hour intersection LOS, which is based on the average delay of all vehicles through an intersection and results in a letter grade A through F. Roadway segment operational improvements were rated based on the estimated improvement in peak hour travel time.
- Multimodal connectivity was evaluated based on the type of multimodal facilities included. A higher rating indicates that the project provides multimodal facilities with greater benefits to user safety and comfort.

Table 6-1 defines the scores of 1 through 5 for each Purpose and Need element for a Roadway project. Some scores were not defined or used. Table 6-2 shows the scores for each recommended Roadway project.

Table 6-1. Roadway Project Score Definitions for Each Purpose and Need Element

| Score Definitions |
|--|
| Safety Scores Definitions |
| 1 = Little to No Reduction (approximate reduction of 1 or fewer crashes per year) |
| 2 = Low Reduction (approximate reduction of 2 to 3 crashes per year) |
| 3 = Medium Low Reduction (approximate reduction of 4 to 6 crashes per year) |
| 4 = Medium High Reduction (approximate reduction of 7 to 10 crashes per year) |
| 5 = High Reduction (approximate reduction of 11 plus crashes per year) |
| Operational Performance Scores Definitions |
| 1 = Would not improve intersection LOS or segment travel time |
| 2 = Low potential to improve intersection LOS (1 peak hour letter grade) or segment travel time (<5% change) |
| 3 = Moderate potential to improve intersection LOS (2 peak hour letter grades) or segment travel time (5% to 15% change) |
| 4 = Above average potential to improve intersection LOS (3 peak hour letter grades) or segment travel time (15% to 30% change) |
| 5 = High potential to improve intersection LOS (3 peak hour letter grades) or segment travel time (>30% change) |
| Multimodal Connectivity Scores Definitions |
| 1 = No improvement for non-motorized users |
| 2 = N/A |
| 3 = Some positive improvement for non-motorized users, where facilities already exist but receive a minor upgrade |
| 4 = N/A |
| 5 = Dedicated multimodal facility provided for non-motorized users |

N/A = Not Applicable; LOS = Level of Service

Table 6-2. Ratings Scores for Each Roadway Project (from South to North)

| Roadway Projects (south to north) | Safety Rating | Operational Performance Rating | Multimodal Connections Rating | Overall Rating | Project Cost ^a |
|---|------------------|--------------------------------------|-------------------------------------|-------------------|------------------------------|
| Right-of-Way Preservation/Procurement, C- 470 to Mineral Ave | No Rating | No Rating | No Rating | No Rating | Varies |
| Right-of-Way Preservation/Procurement, Mineral Ave to Bowles Ave | No Rating | No Rating | No Rating | No Rating | Varies |
| Aspen Grove Way: Channelized T | 1 | 1 | 1 | 3 | \$10-20M |
| Brewery Ln: Channelized T | 1 | 1 | 1 | 3 | \$10-20M |
| Access Consolidation/Cross- access: Vinewood to Church | 5 | 2 | 1 | 8 | \$100-300k |
| NB Auxiliary Lane Vinewood to Bowles (Early Action) | 2 | 4 | 1 | 7 | \$4-6M |
| Church Ave: Traffic Signal Timing ^b | 3 | 3 | 1 | 7 | \$200-400k |
| Bowles Ave: Quadrant Rd | 2 | 5 | 5 | 12 | \$20-30M |
| Crestline Ave: Right-in/Right- out (Early Action) | 2 | 1 | 1 | 4 | \$1-2M |
| Prince St: Added NB Auxiliary Lane and Bike Lanes through Intersection (Early Action) | 1 | 2 | 5 | 8 | \$2-3M |
| Union Ave: Channelized T | 1 | 2 | 1 | 4 | \$10-20M |
| Union Ave: OPTION Channelized T with Grade Separation ^c | 5 | 5 | 1 | 11 | \$20-30M |
| Access Consolidation/Cross- access at Union: Santa Fe Cir to Stanford | 1 | 2 | 1 | 4 | \$2-5M |
| Oxford Ave: SW Quadrant Road | 2 | 5 | 3 | 10 | \$20-30M |
| Hampden Ave: Interchange Modification (no traffic signals on Santa Fe Dr) | 2 | 5 | 1 | 8 | \$40-60M |
| NB Auxiliary Lane through Dartmouth (Early Action) | 3 | 2 | 3 | 8 | \$1-2M |

| Roadway Projects (south to north) | Safety Rating | Operational Performance Rating | Multimodal Connections Rating | Overall Rating | Project Cost ^a |
|---|---------------|--------------------------------|-------------------------------|----------------|---------------------------|
| Frontage Rd Dartmouth to Harvard with Multimodal Facilities | 3 | 2 | 5 | 10 | \$4-8M |
| Jewell Ave: Close Access at Santa Fe Dr | 1 | 1 | 3 | 5 | Less than \$500k |
| Iowa Ave: Channelized T with Multimodal Facilities | 2 | 2 | 3 | 7 | \$15-25M |
| Florida Ave: Traffic Signal Timing | 1 | 1 | 1 | 3 | Less than \$25k |
| SB Lane across Platte River Bridge to Florida | 3 | 3 | 1 | 7 | \$15-30M |
| Mississippi Ave: NW Quadrant Road | 3 | 3 | 3 | 9 | \$20-30M |
| Kentucky Ave: Traffic Signal System Timing Improvements: Iowa to Kentucky | 4 | 3 | 1 | 8 | \$150-400k |

NB = Northbound; SB = Southbound; SW = Southwest; NW = Northwest; M = Million; k = Thousand

^aHigh-level estimate based on 2021 costs for the purpose of project planning. Costs are subject to fluctuation based on market factors.

^bOnly applicable if implemented with NB Auxiliary Lane Vinewood to Bowles (Early Action) project.

^cOption for Union Ave and Santa Fe Dr intersection improvements.

6.1.2 Multimodal Projects

Each Multimodal project was eligible to score up to 15 points, with 5 points each for benefits related to the Purpose and Need elements of Safety, Operational Performance, and Multimodal Connectivity.

- Safety ratings were assigned on a qualitative basis considering the substantive effect of the project regarding safety. High scores were awarded for projects that provided at-grade dedicated facilities for bikes and pedestrians; the highest scores were awarded for new facilities that would be grade separated from vehicular traffic.
- Operational improvement ratings were evaluated based on the amount of physical space allocated on the multimodal facilities for bicycles and pedestrians, considering comfortable sight lines and additional space for users to maneuver around one another. Additional operational consideration was given for improvements that include trail surfacing and wayfinding. If the operational improvement achieved multiple benefits, it was awarded the higher rating.

- For multimodal connectivity, a higher rating indicates that a project does a better job providing access to larger activity centers, closes a gap in the transportation network, or provides direct access to a transit station.

Table 6-3 defines the scores of 1 through 5 for each Purpose and Need element for a Multimodal project. Some scores were not defined or used. Table 6-4 shows the scores for the Purpose and Need elements of each recommended multimodal project.

Table 6-3. Multimodal Project Score Definitions for Each Purpose and Need Element

| Score Definitions |
|--|
| Safety Scores Definitions |
| 1 = Expected to have minimal level of safety improvement to existing or new facility. |
| 2 = N/A |
| 3 = Expected to have a modest level of safety improvement (improvements to existing facility). |
| 4 = Expected to have high level of safety improvement (separate but at-grade facility for bikes and or pedestrians). |
| 5 = Expected to have highest level of safety improvement (grade separated from vehicles). |
| Operational Performance Scores Definitions |
| 1 = Expected to have a minimal operational improvement. |
| 2 = N/A |
| 3 = Improvement to a shared bicycle and pedestrian facility. |
| 4 = N/A |
| 5 = Improvement that separates pedestrians and/or bicyclists from drivers. |
| Multimodal Connectivity Scores Definitions |
| 1 = Facility that serves pedestrians and/or bicyclists. |
| 2 = Facility that serves either pedestrians or bicyclists with access to activity center (park, shopping center, major employer, and/or urban center). |
| 3 = Facility that serves both pedestrians or bicyclists with access to activity center (park, shopping center, major employer, and/or urban center). |
| 4 = Facility that serves both pedestrians and bicyclists and fills a trail network gap. |
| 5 = Facility that serves both pedestrians and bicyclists providing access to transit. |

N/A = Not Applicable

Table 6-4. Ratings Scores for Each Multimodal Project (from South to North)

| Multimodal Projects (south to north) | Safety Rating | Operational Performance Rating | Multimodal Connections Rating | Overall Rating | Project Cost |
|--|------------------|--------------------------------------|-------------------------------------|-------------------|-----------------|
| Mineral Station Parking Lot Path | 5 | 5 | 5 | 15 | \$300-600k |
| Mineral Sidewalk and Pedestrian Bridge Widening | 1 | 3 | 5 | 9 | \$2-4M |
| Mary Carter Greenway Trail Bridge Widening near Mineral | 1 | 3 | 3 | 7 | \$2-4M |
| Lee Gulch Trail Paving | 3 | 3 | 3 | 9 | \$500-900k |
| Santa Fe Dr Sidewalk Gaps | 5 | 5 | 2 | 12 | \$1-3M |
| Littleton Community Trail Paving | 3 | 3 | 3 | 9 | \$1-2M |
| Littleton/Downtown Trail to Station Connection Improvements (Early Action) | 3 | 1 | 5 | 9 | \$1-2M |
| Bowles Connection to Mary Carter Greenway Trail | 3 | 1 | 1 | 5 | \$200-500k |
| Prince Street Bike Lanes | 4 | 5 | 5 | 14 | \$3-5M |
| Mary Carter Greenway Trail Bridge Widening near Bowles | 1 | 3 | 3 | 7 | \$2-4M |
| Trail Underpass at Crestline with Prince Connection | 5 | 5 | 4 | 14 | \$2-3M |
| Bellevue Ave Sidewalk | 5 | 5 | 2 | 12 | \$300-600k |
| Oxford Ave Sidewalk (Early Action) | 5 | 5 | 1 | 11 | \$1-2M |
| Oxford Ave Bike Lanes | 4 | 5 | 5 | 14 | \$2-4M |
| Mary Carter Greenway Trail Widening at Oxford | 1 | 3 | 3 | 7 | \$1-2M |
| Mary Carter Greenway Trail Widening under US 285 (Early Action) | 1 | 3 | 1 | 5 | \$150-400k |
| Hampden Ave Sidewalk (Early Action) | 5 | 5 | 5 | 15 | \$1-2M |

| Multimodal Projects (south to north) | Safety Rating | Operational Performance Rating | Multimodal Connections Rating | Overall Rating | Project Cost |
|---|---------------|--------------------------------|-------------------------------|----------------|--------------|
| Pedestrian/Bicyclist Grade Separation at Englewood Station | 5 | 5 | 5 | 15 | \$5-10M |
| Little Dry Creek Trail Wayfinding at Dartmouth (Early Action) | 5 | 5 | 3 | 13 | \$600k-\$1M |
| Pedestrian/Bicyclist Grade Separation at Iliff | 5 | 5 | 5 | 15 | \$6-10M |
| South Platte River Trail Bridge over South Platte River near Jewell | 1 | 3 | 3 | 7 | \$2-3M |
| Improved Mississippi Connection to South Platte River Trail | 5 | 3 | 4 | 12 | \$300-600k |

M = Million; k = Thousand

^aHigh-level estimate based on 2021 costs for the purpose of project planning. Costs are subject to fluctuation based on market factors.

6.2 Ease of Implementation

Ease of implementation identifies the factors that could result in additional cost or schedule requirements as an individual project moves towards implementation. These include the need for additional environmental analysis and documentation, refinement to bring the project into alignment with local plans and policies, and the need for right-of-way acquisition.

These factors are briefly summarized for each project in the full table in Appendix H to provide awareness as projects move into further development.

6.2.1 Environmental

The Corridor Conditions Report (CDOT, 2020) identified community and natural resources that are present or may be encountered within individual project study areas. The critical resources include historic resources, parks, recreation and open space, noise, environmental justice, and additional environmental site- and project-specific resources. Early resource evaluation can help to determine if environmental conditions may affect the ability to implement a proposed project element. If so, project redesign to avoid or minimize resource impacts combined with subsequent mitigation measures may be required.

6.2.2 Local Planning

When considering a project’s consistency with local plans (e.g., Transportation Master Plan, Comprehensive Plan, etc.), the participating jurisdictions helped determine the level of local support for each project during the study process. Based on their input, the level of support for each recommended project was noted in Appendix H and can be used to estimate the amount of additional project refinement and/or community engagement that may be needed.

6.2.3 Right-of-Way

Ease of implementation related to right-of-way was determined based on the study team’s corridor knowledge, engineering judgement, and experience with similar projects. For each recommended project, the study team identified where easements or realignments may complicate the project development process, and where a significant number of commercial access and parking modifications would be required for project implementation.

6.2.4 Summary

These factors are briefly summarized for each project in the full table in Appendix H.

6.3 Project Recommendations Ratings by Category

Project Ratings: Relative Benefits

Ratings for Roadway projects and Multimodal projects are relative to the level of benefit those projects proved compared to other Roadway and Multimodal projects.

The top-rated projects overall for the Roadway and Multimodal projects are presented in Table 6-5 and Table 6-6, respectively.

Table 6-5. Top-Rated Roadway Projects

| Recommendations | Overall Rating |
|--|----------------|
| Bowles Ave: Quadrant Road | 12 |
| Union Ave (Option): Channelized T with Grade Separation | 11 |
| Oxford Ave: SW Quadrant Road | 10 |
| Frontage Road Dartmouth to Harvard with Multimodal Facilities | 10 |
| Mississippi Ave: NW Quadrant Road | 9 |
| Access Consolidation/Cross-access: Vinewood to Church | 8 |
| Prince St: NB Auxiliary Lane and Bike Lanes on Prince St (Early Action) | 8 |
| Hampden Interchange Modification (no traffic signals on Santa Fe Dr) | 8 |
| NB Auxiliary Lane through Dartmouth | 8 |
| Traffic Signal System Timing Improvements Iowa – Iowa to Kentucky (potential adaptive traffic signal system) | 8 |

NB = Northbound; SB = Southbound; SW = Southwest

Table 6-6. Top-Rated Multimodal Projects

| Recommendations | Overall Rating |
|---|----------------|
| Mineral Station Parking Lot Path | 15 |
| Pedestrian/Bicyclist Grade Separation - Englewood Station | 15 |
| Hampden Ave Sidewalk (Early Action) | 15 |
| Pedestrian/Bicyclist Grade Separation – Iliff | 15 |
| Trail Underpass at Crestline with Prince Connection | 14 |
| Prince Street Bike Lanes | 14 |
| Oxford Ave Bike Lanes | 14 |

6.4 Estimated Costs and Potential Funding Strategies

The Project Recommendations in the tables above are rated but not prioritized. Because CDOT and each of the participating jurisdictions have unique priorities and access to different funding sources, the study team created a menu of projects to select from to better respond to agency priorities and available funding opportunities. It is also possible to select individual projects or to bundle two or more projects to better compete for funds or take advantage of other environmental, design, or construction efficiencies.

An array of funding sources exists at the local, regional, state and federal level – and the naming conventions, evaluation criteria and timing of the call for projects is always evolving. Table 6-7 includes a list of the most common sources for these types of Roadway and Multimodal projects, as they existed in 2021.

The Crestline Avenue conversion to right-in/right-out, Prince Street northbound auxiliary lane with bike lanes, Hampden Avenue sidewalk improvements, and Oxford Ave sidewalk improvements Early Action Projects have already secured some construction funding from CDOT’s Highway Safety Improvement Program and are moving forward into the design phase. Additional project development will also occur in 2022 for certain additional projects selected by the PMT.

The Project Recommendations are those that are of a modest size and complexity making them likely to be able to advance through the NEPA, final design, and funding processes to be constructed within the next 10 years. As was discussed during the study process, these Recommended Projects are most likely to secure funds from the following sources:

- CDOT’s Highway Safety Improvement Program
- CDOT’s Regional Priority Program
- DRCOG’s Regional and Subregional Transportation Improvement Program
- Capital Improvement Program funds from local jurisdictions

- Special allocation funds such as the Arapahoe County Open Space Grant and Shareback Program

Additional funding opportunities, which may be sought for Early Action Projects, Project Recommendations, or Future Actions are compiled in Table 6-7. Since, the Future Actions are generally larger projects with more complex designs requiring larger budgets, this table of funding sources is particularly applicable to those projects.

Table 6-7. Potential Funding Opportunities

| Funding Source | Applicable Project Categories |
|---|---|
| FHWA Formula Grants | -- |
| FHWA - Surface Transportation Program (STP)-Metro | Roadway, Transit, and Active Transportation |
| FHWA – Congestion Mitigation and Air Quality (CMAQ) Improvement Program | Roadway, Transit, and Active Transportation |
| FHWA – Transportation Alternatives Program (TAP) (<i>note: Both DRCOG and CDOT award TAP Funding</i>) | Active Transportation |
| CDOT Revenue Allocation Programs | -- |
| Asset Management: Surface Treatment | Roadway |
| Asset Management: Structures | Roadway |
| Asset Management: Systems Operations | Roadway |
| Asset Management: Geohazards Mitigation | Roadway |
| Asset Management: Permanent Water Quality Management | Roadway |
| Safety: Highway Safety Improvement Program (HSIP) | Roadway |
| Safety: Rail-Highways Crossings Program | Roadway |
| Safety: Hot Spots | Roadway |
| Safety: Funding Advancements for Surface Transportation and Economic Recovery Act of 2009 (FASTER) Bridge | Bridges |
| Safety: FASTER Safety | Roadway |
| Safety: Americans with Disabilities Act (ADA) Compliance | Roadway, Transit, and Active Transportation |
| Mobility: Regional Priority Program | Roadway, Freight, Transit and Active Transportation |
| Mobility: Strategic Projects | Roadway, Freight, Transit and Active Transportation |
| Mobility: National Highway Freight Program | Freight |

| Funding Source | Applicable Project Categories |
|--|--|
| Suballocated Programs (Highway and Transit/Multimodal) | -- |
| Highways: Surface Transportation Program (STP) - Metro | Roadway, Freight |
| Highways: Congestion Mitigation and Air Quality (CMAQ) Program | Roadway congestion mitigation, Transit and Active Transportation |
| Highways: Bridge Off-System | Roadway |
| Transit and Multimodal: Safe Routes to School | Active Transportation |
| Transit and Multimodal: TAP (<i>Note: DRCOG also award TAP Funding- see above</i>) | Active Transportation |
| Transit and Multimodal: Transit Grant Program | Transit |
| Transit and Multimodal: Multimodal Options Program | Transit |

6.5 Future Action Projects

In addition to the Project Recommendations, many meaningful and more complex options were identified as Santa Fe Drive corridor improvements that would provide valuable, corridorwide benefits in accordance with the project’s Purpose and Need and goals. It was noted that these Future Actions would likely be implemented beyond the 10-year timeframe for Project Recommendations because they would need more detailed study and additional public and stakeholder coordination, require more complicated environmental and design processes, or would need funding levels that are expected to take longer to acquire. Future Actions are listed in Table 5-5 in Section 5.8.

6.5.1 Future Actions - Priorities

The Project Recommendations with the top-rated Roadway and Multimodal projects are listed in Table 6-5 and Table 6-6 in Section 6.3. Since many of these indicate that they do not fully address the issues at their respective locations, a need to further evaluate the Future Actions may need to begin in an earlier timeframe at those locations.

Mississippi Avenue Interchange

The Mississippi Avenue intersection is identified as the intersection with the second-highest number of crashes along the Santa Fe Drive corridor (2016-2018) and as a significant congestion bottleneck. An interchange would address these critical issues related to safety and operational performance, and it would provide a better connection for pedestrians and bicyclists across Santa Fe Drive at a location with identified pedestrian- and bicycle-related safety concerns. Because the Mississippi Avenue quadrant road recommendation is not one of the top-rated Roadway projects, it may be more beneficial to prioritize the planning for a larger-scale investment to study the longer-term safety, traffic operations, and multimodal improvements for this area. This effort should also identify potential property and environmental impacts and physical constraints.

Kentucky Avenue Channelized T

A new signalized intersection will be constructed on Santa Fe Drive at Kentucky Avenue with a new bridge over the South Platte River to new development east of Santa Fe Drive, north of Mississippi Avenue. Traffic signal system timing improvements from Iowa Avenue to Kentucky Avenue is a top-rated near-term Roadway project in the Project Recommendations. However, a channelized T intersection may be considered to potentially alleviate congestion issues in the area and to reduce the potential for back-ups along southbound Santa Fe Drive extending to the I-25 off-ramp. A signalized pedestrian/bicyclist crossing or a pedestrian/bicyclist grade separation with a channelized T intersection would need to be considered to provide the multimodal connection across southbound Santa Fe Drive.

Corridorwide Express Lane

The utilization and operation of the existing HOV express lane along Santa Fe Drive from Bowles Avenue to I-25 was identified by the public and corridor stakeholders as a critical issue for overall corridor operational performance and safety. Opportunities for an express lane along the corridor have previously been studied and recommended for consideration (*Colorado Express Lane Master Plan*, February 2020). The options for a corridorwide express lane (including conversion of the existing HOV lane to an express lane) were explored at a high level in this Action Plan to provide information on the potential benefits, impacts, and next steps that would be needed to further evaluate the larger-scale improvement. The technical memorandum summarizing the evaluation is in Appendix E. Bus rapid transit (BRT) service that utilizes the existing HOV lane was not considered during the alternatives evaluation, as it would be redundant to the adjacent RTD LRT service. Intercity or regional bus service could be considered during future planning efforts for the express lane.

6.5.2 Future Actions - Phasing

Several Future Actions are long-term, ultimate improvements at intersections/locations with near-term improvements identified as part of the Project Recommendations. These Future Actions should be considered with the evaluation and implementation of the Project Recommendation to optimize future planning and construction and to not preclude future improvements.

Bowles Avenue Interchange

The near-term quadrant road recommendation at the Bowles Avenue intersection is one of the top-rated Roadway projects. Additional study and coordination with the City of Littleton will occur to determine the compatibility of the recommendation with future development in the northwest quadrant of the intersection. The quadrant road could serve as ramps for the Future Actions of a Bowles Avenue interchange or a depressed Santa Fe Drive under the Bowles Avenue intersection. Having the quadrant road connection would reduce the physical impacts of the Future Actions in the area immediately adjacent to Santa Fe Drive and would provide a valuable bypass during major construction at the Bowles Avenue intersection. These long-term opportunities related to the Future Actions at Bowles Avenue should be evaluated with the Project Recommendations at the intersection.

Santa Fe Drive At-Grade Rail Crossing South of Oxford Modifications

The near-term quadrant road recommendation at the Oxford Avenue intersection is one of the top-rated Roadway projects. Opportunities to incorporate long-term improvements to modify the at-grade rail crossing south of the intersection should also be considered. Incorporating rail crossing improvements may also provide opportunities to leverage additional funding sources, such as the Rail-Highways Crossing Program.

Mineral Station Structured Parking

The near-term recommendation for the Mineral Station parking lot path is one of the top-rated Multimodal projects. The location, alignment, and connections for the path through the parking area should consider the longer-term planning for structured parking at the Mineral Station consistent with the City of Littleton future land use planning. Considering the location and layout of future structured parking would optimize investment by reducing reconstruction of the path and connections with the future construction.

6.5.3 Future Actions - Development

Several Future Actions were identified to provide longer-term planning considerations with land use changes, redevelopment, or new development opportunities along the Santa Fe Drive corridor. The concepts for these Future Actions are less defined and are envisioned as potential improvements that would be implemented with development and private funding investment:

- South Platte River Parkway Extension south of Mineral Avenue – with development.
- New sidewalk/trail connection on west side of Santa Fe Drive north of County Line Road – with development adjacent to Santa Fe Drive.
- Connection Vinewood to Brewery Lane – with redevelopment.

6.6 Next Steps

CDOT and the participating jurisdictions should continue to coordinate at regular intervals to assess and prioritize these Project Recommendations. Implementation of the Project Recommendations will require leadership and continued collaboration and effort among the participating jurisdictions and CDOT to seek funds, especially those through grant applications.

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SANTA FE DRIVE (C-470 to I-25) ACTION PLAN
A Planning and Environmental Linkages Study

Appendix A.

FHWA PEL QUESTIONNAIRE

Appendix B.

AGENCY COORDINATION

- Local Agency Scoping
- Resource Agencies
- Other Organizations
- Local Agency Land Use Review

Appendix C.

PUBLIC AND STAKEHOLDER ENGAGEMENT

- Public and Stakeholder Involvement Plan
- Social and Political Risk Assessment
- Stakeholder Interviews
- Online Public Event 1
- Online Public Event 2

Appendix D.

ALTERNATIVES EVALUATION DOCUMENTATION

SANTA FE DRIVE (C-470 to I-25) ACTION PLAN
A Planning and Environmental Linkages Study

Appendix E.

TRAFFIC AND SAFETY TECHNICAL REPORT

Appendix F.

PROJECT RECOMMENDATIONS INFORMATION SHEETS

Appendix G.

EARLY ACTION PROJECTS INFORMATION SHEETS

Appendix H.

RECOMMENDED PROJECTS LIST