



Appendix C: FHWA Check-In Points

1. Determining the Reason for the PEL Study
2. Purpose & Need
3. Alternatives to be Evaluated during the PEL Study
4. PEL Document



Appendix C-1

Determining the Reason for the PEL Study



Project: State Highway (CO) 52 PEL/ACP Study (21656)
To: Brian Dobling - *Federal Highway Administration, Project Manager*
From: Chad Hall, PE – *CDOT R4, Project Manager*
Date: May 13, 2020
Subject: PEL Study for State Highway (CO) 52 Corridor between CO 119 and CO 79 – FHWA Check-In #1

CDOT, in agreement with the Federal Highway Administration (FHWA), has determined that a Planning and Environmental Linkages (PEL) Study and Access Control Plan (ACP) is the correct study approach for the State Highway (CO) 52 corridor between CO 119 north of Boulder in Boulder County to CO 79 east of Hudson in Weld County. The PEL/ACP provides a preliminary step to a National Environmental Protect Act (NEPA) review of specific transportation improvement projects that will be developed during the PEL/ACP process. The PEL documentation includes a FHWA PEL Questionnaire which may be used during NEPA environmental permitting and approval.

On July 23, 2019, CDOT and FHWA held a pre-scoping meeting to determine the appropriate approach for the CO 52 corridor that would identify a vision to inform alternative transportation improvement projects. Participants of the meeting concluded that a PEL/ACP is an appropriate method to study the CO 52 corridor since rapid expansion along the corridor community is anticipated. As such, the PEL/ACP will fulfill a need to understand future demand and develop a list of transportation improvement alternatives.

CDOT determined the scope of work for the PEL Study should include the development of purpose and need which will provide a basis for future NEPA work. The report should also summarize research and define the existing and future transportation systems as well as a comprehensive environmental evaluation. The study will also include a range of feasible alternatives. The PEL Study will encourage communication among the local agencies along the corridor with a defined goal and vision for CO 52.

Should you have any additional questions please do not hesitate to reach out through email, chad.hall@state.co.us or 970-350-2227.



Appendix C-2

Purpose & Need





COLORADO
Department of Transportation

Region 4

CDOT R4
10601 W 10th Street
Greeley, CO 80634

October 30, 2020

Troy Halouska
CDOT Environmental Programs Branch
2829 W Howard Place
Denver CO, 80204

Subject: CO 52 Planning and Environmental Linkages (PEL) Study – Final Purpose and Need Memo

Dear Mr. Halouska:

The Colorado Department of Transportation (CDOT) has revised the Purpose and Need Memo to address FHWA comments for CO 52 PEL Study (CO 119 to CO 79). Please submit to Stephanie Gibson, Environmental Program Manager and Brian Dabling, FHWA Area Engineering, as acknowledgement and completion of this second FHWA Coordination Point as a part of the Planning and Environmental Linkages process.

Should you have any additional questions or comments please do not hesitate to reach out through email, chad.hall@state.co.us or 970-350-2227.

Sincerely,

Chad Hall
Project Manager

Attachment:

CO 52 PEL Final Purpose and Need Memo





Project: CO 52 Planning and Environmental Linkages Study (PEL) / Access Control Plan (ACP)
To: Brian Dabling, FHWA; Stephanie Gibson, FHWA
From: Chad Hall, CDOT R4; Troy Halouska, CDOT HQ
Date: October 28, 2020
Subject: CO 52 PEL Purpose and Need Memo

CDOT initiated this PEL Study to identify and assess potential transportation solutions along the CO 52 corridor in Weld and Boulder Counties. The Purpose and Need statement was developed in coordination with stakeholders, including the state and local jurisdictions located along the corridor and those represented in the CO 52 Coalition

PURPOSE OF TRANSPORTATION IMPROVEMENTS

The purpose of the recommended transportation improvements is to increase safety, accommodate increased travel and freight demand, and support multi-modal connections.

NEED FOR TRANSPORTATION IMPROVEMENTS

This section summarizes the transportation needs for the CO 52 corridor with a more detailed description that supports each of the needs from the Existing Conditions Report. In summary, transportation improvements are needed to:

- **Increase Safety** – Increased highway access from continued development, high percentages of truck traffic, poor pedestrian and bicycle facilities, and geometric issues have resulted in safety concerns along the corridor.
- **Accommodate increased travel and freight demand** – Traffic congestion from additional commuter and freight traffic has decreased travel time reliability. Increased corridor use requires roadway improvements to accommodate the movement of people, goods, and services.
- **Support multimodal connections** — Stakeholder input and prior planning efforts identified the need to improve north-south pedestrian mobility and support enhanced parallel connectivity.

INCREASE SAFETY

The need for corridor improvements to support the increases in development has resulted in safety concerns at intersections and other locations along the CO 52 corridor.

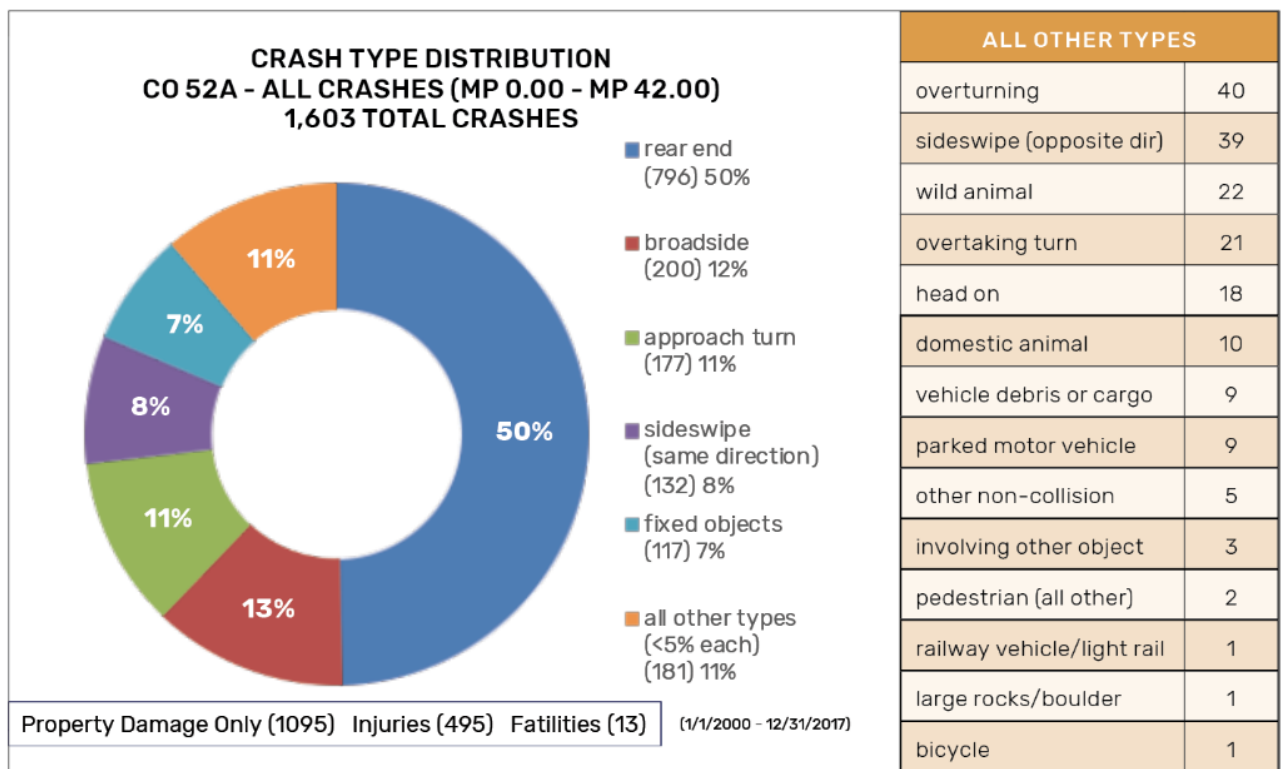
Crash Data

A review of CDOT's statewide crash history between July 1, 2014 to June 30, 2019 indicates that 1,603 crashes were reported on CO 52 in the study corridor. Of the total crashes, 1,095 were property damage only (PDO), 495 resulted in injuries, and 13 crashes resulted in 15 fatalities (



Figure 1). Rear-end crashes accounted for 50 percent of all crashes, primarily occurring near intersections and urban areas with concentrated access points. Overall, the frequency and severity of crashes at intersection locations were about average when compared to similar facilities. The next most common crash types were broadside and approach turn at 13 percent and 11 percent, respectively. These crashes were focused at intersections, both signalized and stop-controlled side street approaches, where gaps in traffic are less frequent for motorists attempting to turn onto or cross CO 52. Of the total crashes, 69 percent were classified as intersection or intersection-related crashes. Most crashes occurred in the western half of the corridor and tend to be clustered near major intersections and adjacent development. As development continues, there is concern that crashes will continue to rise near major intersections and adjacent to developments.

Figure 1 CO 52 Crash Distribution Breakdown



CDOT’s Safety Performance Function (SPF) analysis procedure revealed 17 intersections that exhibited high crash frequency and have a high potential for crash reduction. Two intersections were rated with a level of service safety (LOSS) III but were the location of a fatal crash occurrence and could be considered at an equal priority level for improvement recommendations as intersections with a LOSS IV (Table 1).



Table 1 Intersections with High Potential for Crash Reduction

MP	DESCRIPTION	LEGS	SIGNAL	NUMBER OF CRASHES				LOSS TOTAL	LOSS SEVERE
				PDO ¹	INJURY	FATAL	TOTAL		
4.67	US 287	4	Yes	47	59	1	107	III	IV
8.17	WCR 3	3	No	12	3	0	15	IV	III
10.39	Puritan Way	3	No	28	7	0	35	IV	IV
10.95	West Frontage Road (I-25)	4	Yes	26	17	0	43	IV	IV
11.08	SB I-25 Ramps	4	Yes	28	6	0	34	IV	II
11.21	NB I-25 Ramps	4	Yes	99	23	0	122	IV	IV
11.45	East Frontage Road (I-25)	4	Yes	79	29	0	108	IV	IV
12.81	Flying Circle Boulevard	3	Yes	20	11	0	31	IV	IV
13.19	Colorado Ave (WCR 13)	4	Yes	40	15	1	56	III	III
13.45	Cherry Street	3	No	5	2	1	8	III	III
13.64	Forest Street	3	No	10	2	0	12	IV	III
13.9	Mac Davidson Drive	3	No	3	3	0	6	IV	IV
16.42	WCR 19	4	No	20	5	0	25	IV	IV
25.46	WCR 37	4	No	4	7	1	12	IV	IV
27.46	WCR 41	4	No	5	6	3	14	IV	IV
29.07	West Frontage Road (I-76)	4	No	11	1	0	12	IV	II
36.92	WCR 59	4	No	3	2	0	5	IV	III
37.92	WCR 61	4	No	3	1	0	4	IV	IV
41.94	CO 79 (WCR 69)	4	No	4	0	0	4	IV	II

Although non-intersection crashes are less prevalent (31 percent of total crashes), three head-on collisions and one fatality occurred near the reverse curves segment situated in the vicinity of WCR 17 (MP 15.50 and MP 15.70). Field observations also identified two non-standard intersections on the reverse curves (MP 15.00 and MP15.65).

Truck Freight

The presence of truck freight varies along the corridor. In the Boulder County portion of the corridor, the percentage of truck traffic varies from 2.8 percent near CO 119 to 5 percent at County Line Road. A large increase in truck traffic occurs along the Weld County portion of the corridor from west to east. Truck traffic accounts for 6.5 percent of traffic at I-25 and increases to 19 percent in the final section nearing CO 79. In addition to truck freight, CO 52 is designated as a hazardous materials and oversize vehicle route from CO 119 to CO 79. The corridor provides an east-west freight route for the northern Denver metropolitan area that has relatively few horizontal and vertical clearance issues. Among the types of oversized cargo are wind turbine blades from the Windsor and Greeley area.

Due to the corridor's crucial role in moving freight, CO 52 improvements must ensure that freight mobility is maintained in a safe and efficient manner. Intersections, turning paths, lane widths, horizontal and vertical clearances, and shoulders should be designed to accommodate the frequent movement of semi-tractor trailer trucks and oversized loads. Stretches of the corridor with higher truck traffic can significantly increase travel time and bottleneck situations which can lead to safety concerns and impact the travel time reliability of the corridor.



Geometric Issues

Geometric issues result in a significant safety issue along CO 52. Spot deficiencies were identified throughout the corridor where headwalls, narrow bridges, or irrigation features are located directly adjacent to the roadway or within the clear zone. Ditches and trees were observed encroaching on the clear zone along corridor stretches east of Fort Lupton. These geometric deficiencies increase the risk and severity of potential crash occurrences.

Poor pavement conditions were observed from east of I-25 through Dacono to WCR 19 and from east of US 85 through Fort Lupton to WCR 29 ½. Shoulder widths are inconsistent along the corridor, ranging from 2- and 10-foot throughout most of the corridor and no shoulders east of Hudson. Improved pavement conditions and consistent shoulder widths are necessary should a motorist need to take evasive action, recover control of their vehicle, or pull a disabled vehicle out of the path of traffic.

Safety concerns occur at locations along the corridor where vertical curves do not meet design criteria (MP 21.5, WCR 43, MP 32.15, WCR 53, and WCR 55). Vertical sight issues can increase the risk and severity of crashes due to lowered sight distances decreasing reaction times and ability to safely evade obstacles. Noncompliant grades can also cause issues with safely braking a vehicle or with rider comfort.

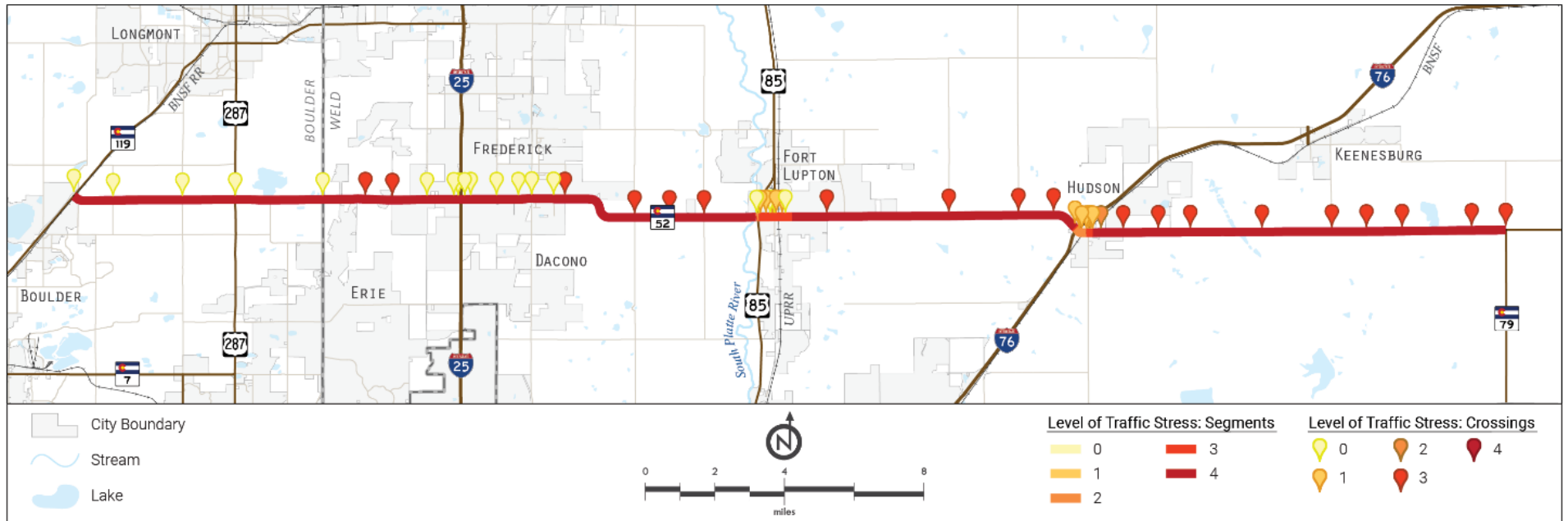
There are 51 bridge structures along the project corridor. Major structures account for 22 of the identified structures. Results of a structures field visit identified an absence of guardrail at several major and minor structures along the corridor. The presence of guardrail helps cars to maintain travel along the roadway prism, as well as prevent major accidents where vehicles leave the roadway prism along major structures (span length of 20 feet or greater) and minor structures (span length between 4 feet and 20 feet).

Bicycle and Pedestrian Facilities

High traffic volumes and high travel speeds along CO 52, paired with a lack of bicycle and pedestrian facilities along the corridor, create safety concerns for bicyclists and pedestrians traveling along and across CO 52. There are currently no designated bicycle routes along CO 52; however, shoulders along much of the western section from CO 119 to US 85 are 4-foot or greater. The shoulders provide some physical infrastructure for east-west bicycle connectivity between CO 119 and Fort Lupton, but high vehicle travel speeds result in a level of traffic stress (LTS) of 4 (Figure 2). In addition, gaps in shoulders at major intersections (95th St, US 287, I-25, and US 85) make it challenging for bicycle crossings. Shoulders east of Fort Lupton to CO 79 vary from less than 2-foot to not present. Bicyclists are forced to mix with vehicular traffic in these sections, further increasing difficulty and discomfort.



Figure 2 Level of Traffic Stress (LTS) Analysis





Crossing CO 52 is a significant challenge for bicyclists and pedestrians. Of 80 intersections, only 20 are signalized intersections and only two existing multi-use trails cross CO 52; the LOBO Trail crosses at an underpass just west of 79th St, and the Firestone/Legacy/Old Railroad Trail crosses CO 52 at-grade at Colorado Boulevard.

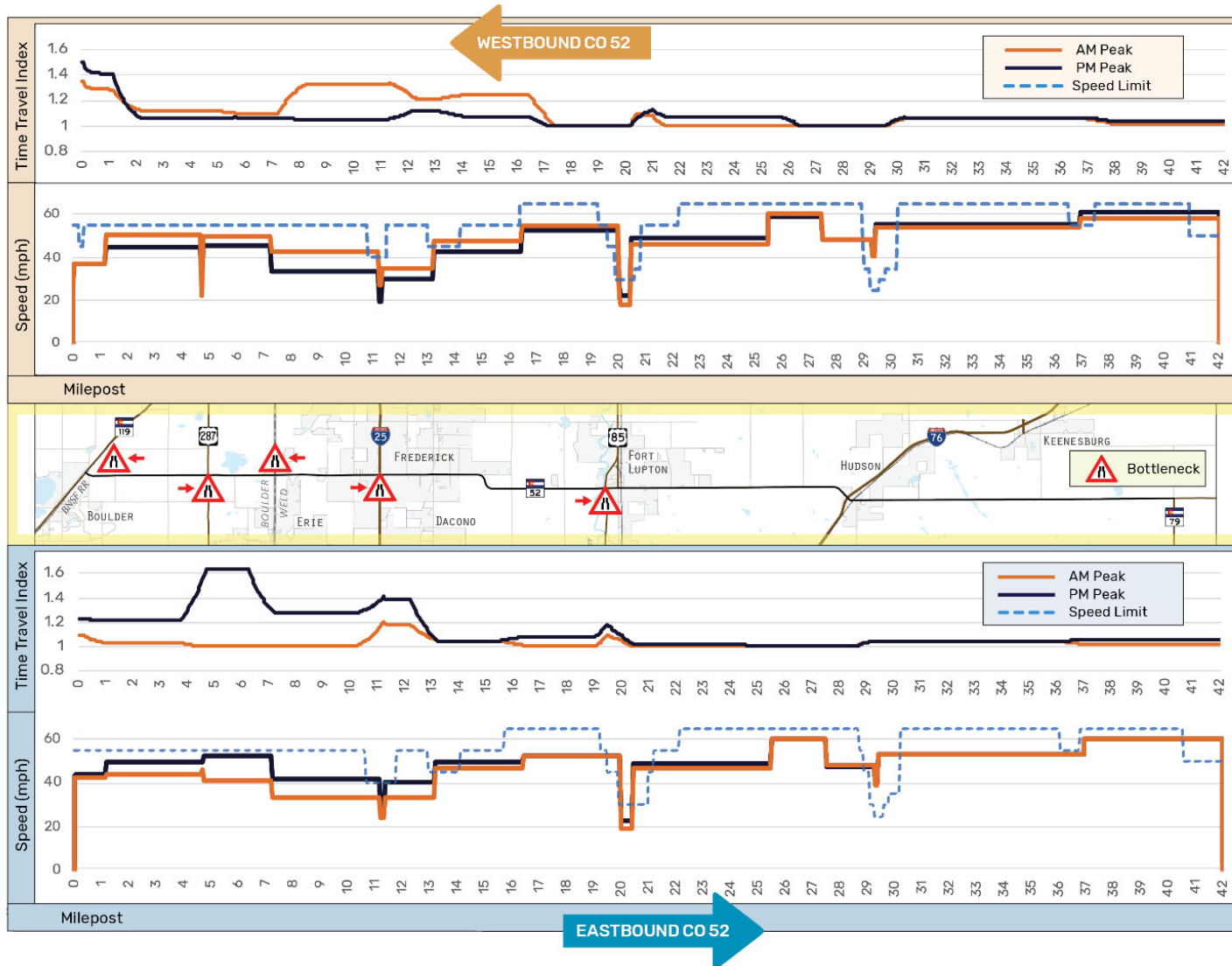
ACCOMMODATE INCREASED TRAVEL AND FREIGHT DEMAND

A review of data from the Existing Conditions Report supports the need for improvements to anticipate the continued growth of both residential communities and freight movement along the project corridor.

Traffic Volumes

Existing traffic volumes create areas of congestion throughout the CO 52 corridor; lack of capacity at major signalized intersections is a major contributor. The result is delay to the traveling public with lengthy queues forming at multiple locations along the corridor. Between CO 119 and WCR 19 there are current delays with travel time indices at 1.3 (AM, in westbound direction) and 1.2 (PM, in eastbound direction). By 2045 they are expected to range from 1.8 to 2.1. From WCR 19 to WCR 31, the travel time index will increase to 1.2 to 1.4 (Figure 3). East of this location, the travel time index is expected to remain at or near 1.0. In the 2045 No Action scenario, travel times for the entire corridor are expected to increase by 22 percent to 31 percent during peak hours, with the western half expected to see increases of up to 71 percent in travel times.

Figure 3 CO 52 Segment Operations - September 2019





Corridor Growth and Development

CDOT's travel demand model, StateFocus (Version 1.4), uses socioeconomic growth projections to generate projected travel demand. 2045 No Action traffic volumes are projected to increase 40 to 55 percent in Boulder County, and over 90 percent in Weld County between Colorado Boulevard and US 85. Between US 85 and I-76, an increase of 6,000-7,000 vehicles per day is projected; east of I-76 will see an increase of 1,500 vehicles per day or less. Vehicle miles traveled (VMT) on CO 52 is projected to increase 74 percent between CO 119 and CO 79, from 308,000 VMT in 2015 to 534,000 in 2045.

This growth is due in part to increases in residential development along the corridor. As current agricultural or undeveloped land along the corridor becomes developed, into mostly residential areas, CO 52 will be utilized more frequently to connect to employment centers within the region. This is accentuated due to CO 52 serving as one of the main east-west corridors in the area. This may particularly affect connections to major north-south roadways such as CO 119, I-25, US 85, and I-76. Improvements will need to anticipate the projected traffic volumes to identify potential improvements that will increase travel time reliability along the project corridor.

CDOT's StateFocus model projects that the number of households within the corridor study area (defined as 3-mile buffer on either side of CO 52 extending from CO 119 to CO 79) will more than double by 2045, adding over 30,000 households for a total of nearly 54,000. As current agricultural or undeveloped land along the corridor is developed, CO 52 will be utilized more and more to connect employment centers within the region, significantly increasing the commuter traffic in the area. This growth could further increase congestion and reliability issues near major intersections.

Freight

The Upper Front Range 2045 Regional Transportation Plan identified CO 52 as a freight corridor in Colorado, which is a critical route that facilitates the movement of goods. Approximately 35-miles of CO 52 is located in Weld County, which is one of the state's top three agricultural producers and the number one producer of oil and gas in the state of Colorado. These industries require substantial amounts of heavy, lower-speed, and oversized vehicles. When roadway characteristics do not accommodate vehicle travel around slow-moving equipment, bottlenecks occur.

Freight rail lines traverse the corridor at three locations. The western crossing is located immediately east of CO 119, is 56-foot wide, has one set of tracks, and averages 6 trains per day. The central crossing is in Fort Lupton, is 56-foot wide, has one set of tracks, and averages 10 trains per day. The eastern crossing is in Hudson, is 40-foot wide, has three sets of tracks, and averages 18 trains per day. All crossings are at grade and have active signalization. Rail crossings slow traffic as trains traverse the corridor and are an additional cause for low travel time reliability.

Burlington Northern Santa Fe (BNSF) is building a Logistics Center at I-76 and CR 49, just north of the CO 52 corridor. This 430-acre facility will feature 15 sites for customers to ship via individual railcars and a unit train site for customers to ship entire trainloads. The improvements are designed to help customers more easily reach Denver and the surrounding markets via new rail-served sites. It is anticipated that this Logistics Center will increase the number of trains as well as motor vehicle freight in the surrounding area, directly impacting the CO 52 corridor.



SUPPORT MULTIMODAL CONNECTIONS

Stakeholder input and prior planning efforts identified the need to improve north-south mobility and support enhanced parallel connectivity.

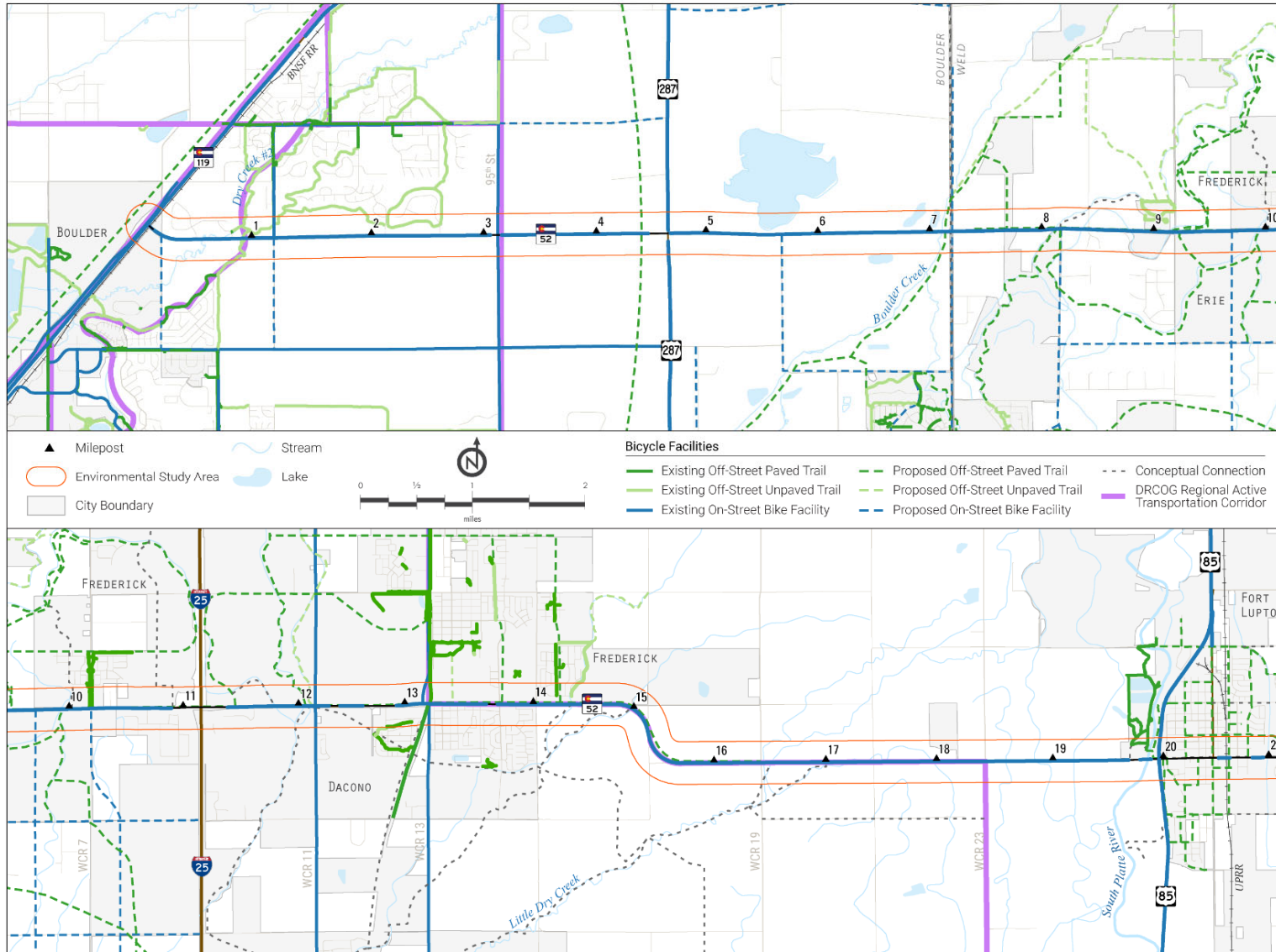
Multimodal Plans

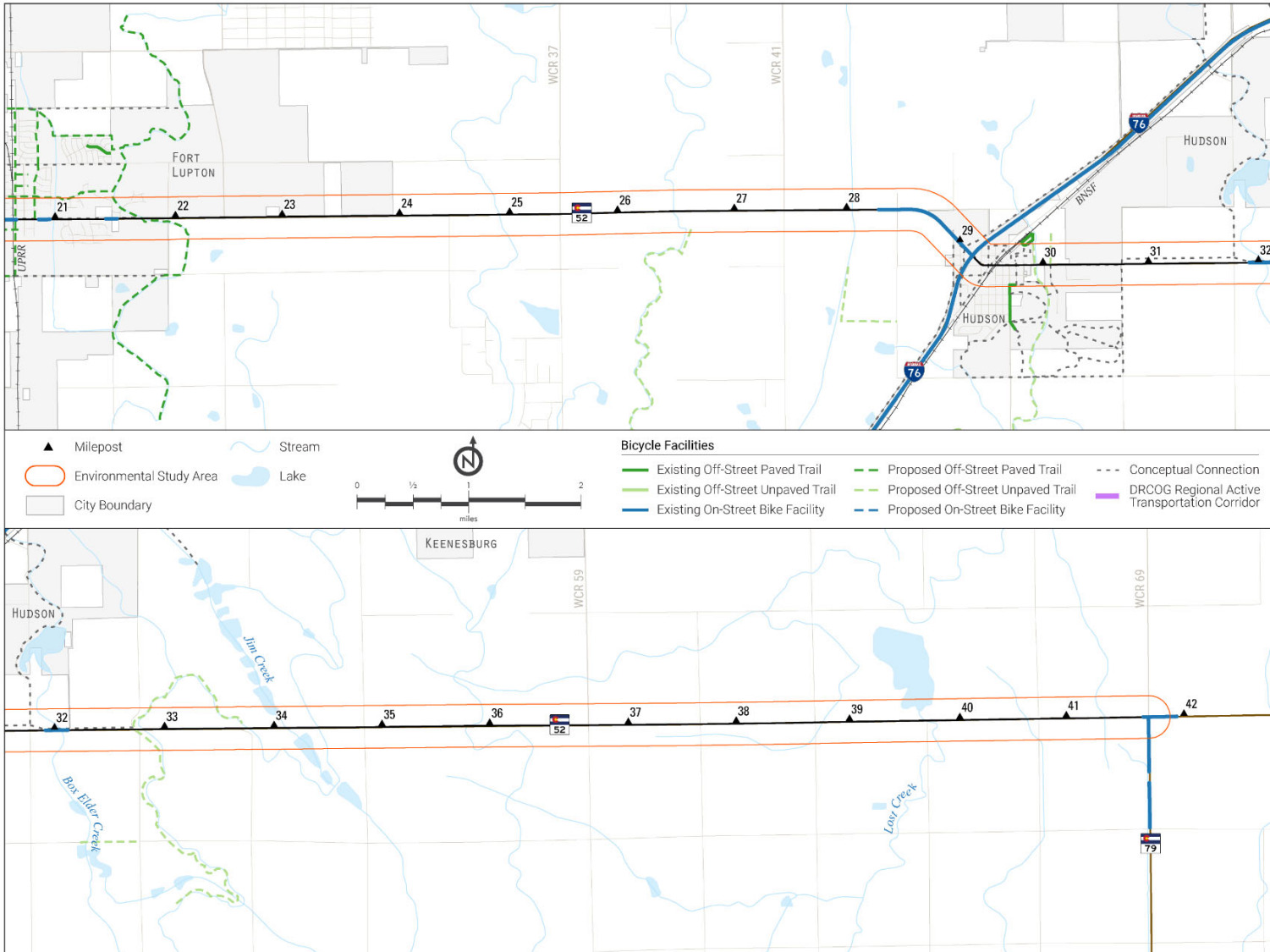
It is anticipated that increased multimodal use of the corridor will continue to occur as local agencies plan for additional pedestrian and bicycle facilities parallel to and crossing the corridor. CO 52 is a critical link between many communities from east to west. However, in several communities the corridor acts as a multimodal barrier between residential areas on one side and schools, parks, or businesses on the other.

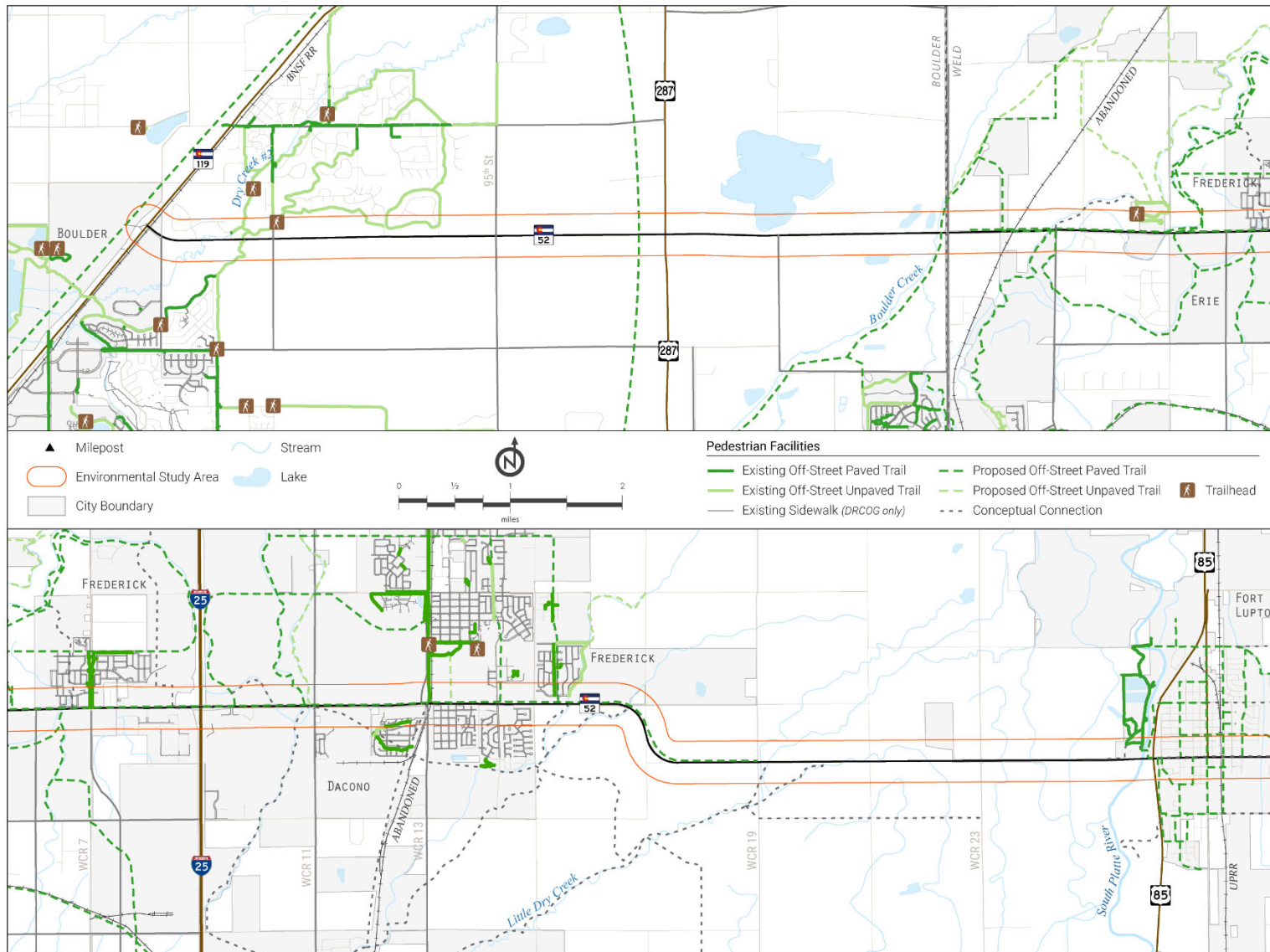
The few existing pedestrian and bicyclist facilities that cross or run parallel to CO 52 are mostly located near Dacono, Frederick, Fort Lupton, and Hudson (Figure 4). Pedestrian needs are limited to these municipalities that are bisected by the corridor. Pedestrian travel is generated by schools, parks, and commercial use. In Frederick, Thunder Valley K-8 and Carbon Valley Parks and Recreation District have facilities located adjacent to or in the vicinity of CO 52. Within Fort Lupton, Fort Lupton Middle School, Butler Elementary, and Community Center Park and Recreation Center are located close to the corridor. The proximity of these facilities requires many students to cross CO 52 from the northern residential areas to these schools south of the corridor. Similar conditions exist in Hudson with Hudson Elementary and most residential areas to the south, and Hudson Memorial Park and many commercial uses primarily to the north. Overall needs of this corridor include improvements to safety and comfort level of existing pedestrian facilities by means of expanding sidewalk networks, increasing widths, detaching sidewalks from roadway edges, and installing controlled crossings where demand exists, and physical conditions allow.

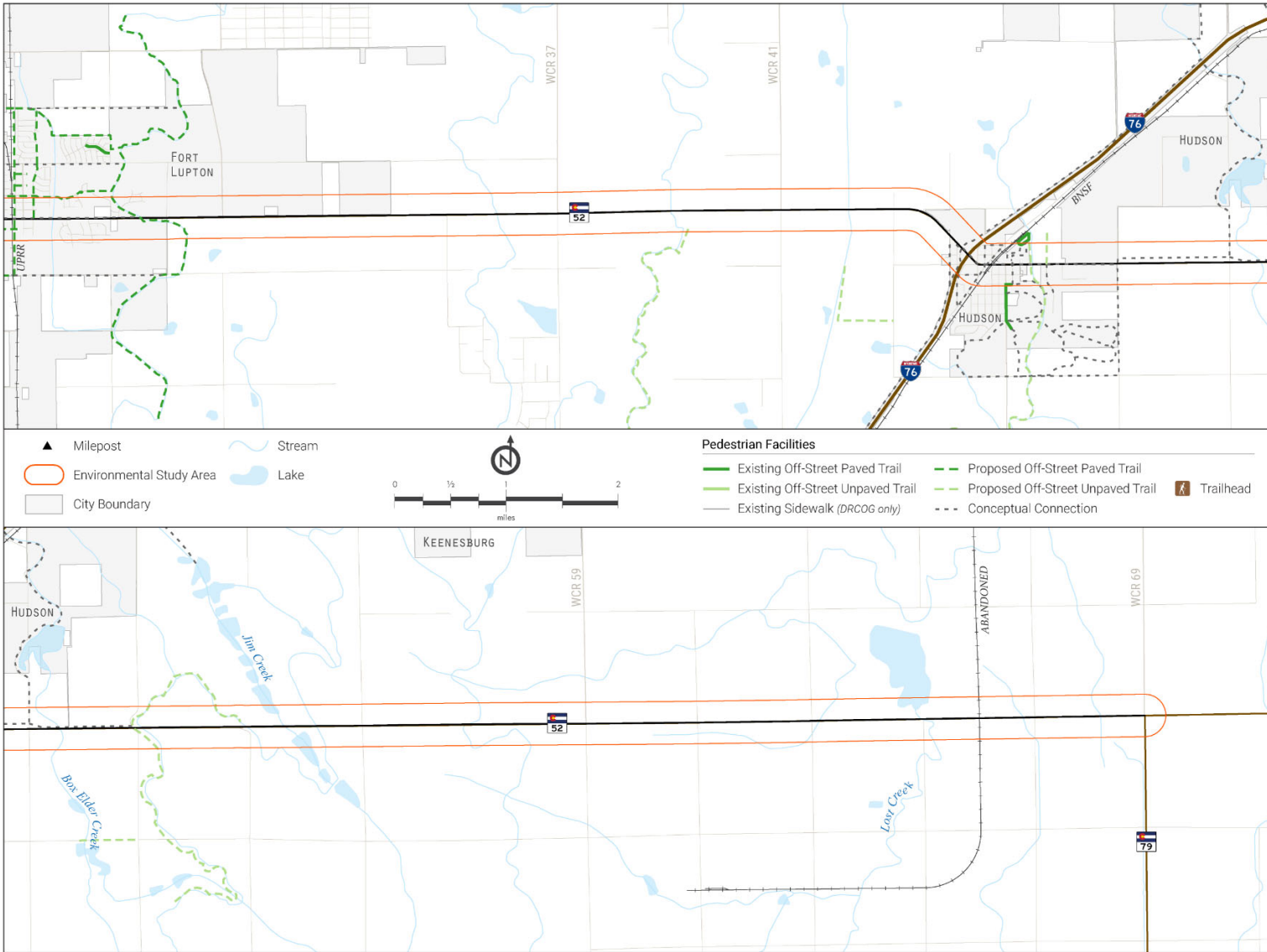


Figure 4 Bicycle and Pedestrian Facilities











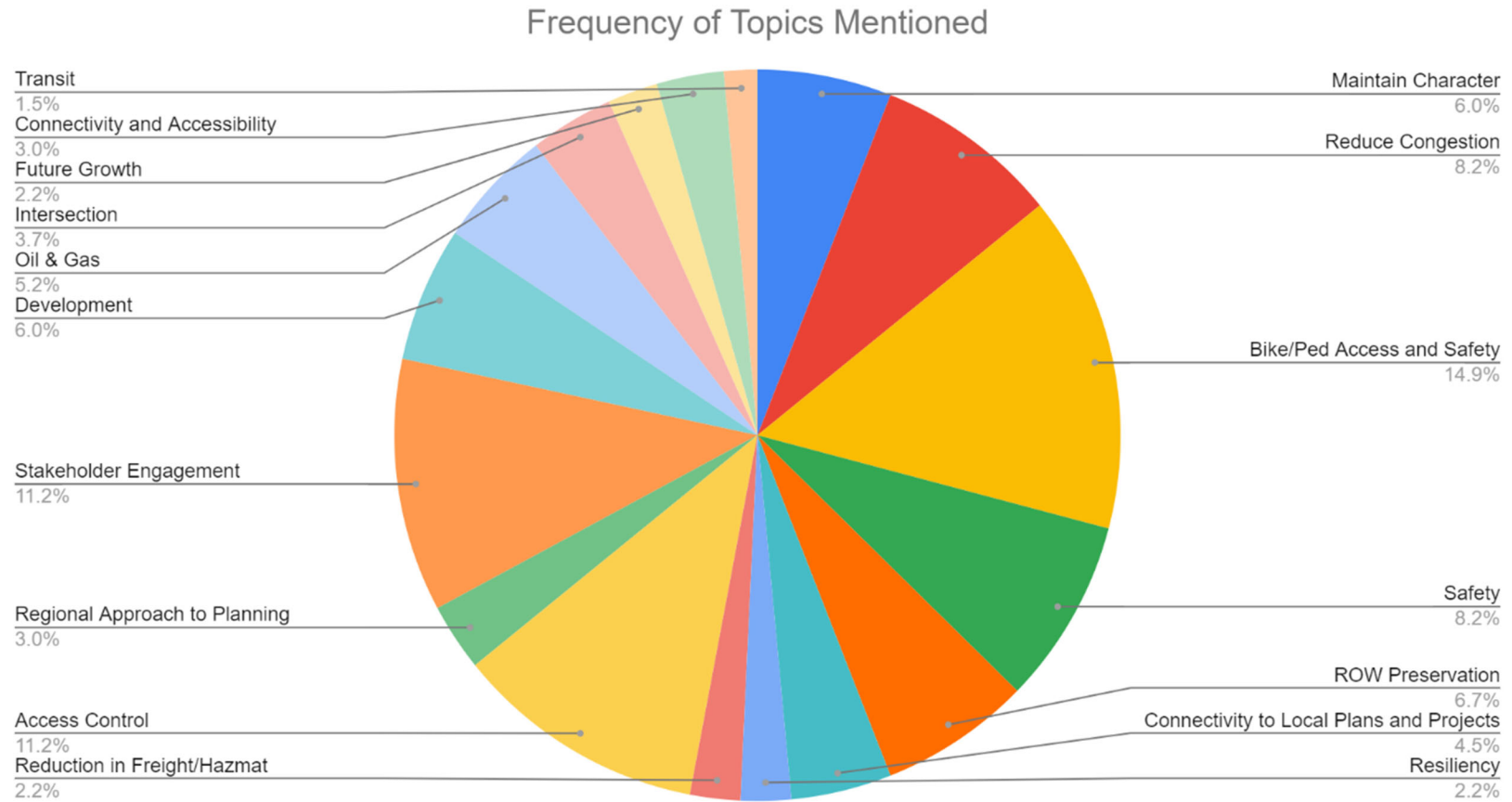
Each of the individual municipalities has proposed regional bicycle facilities and improvements, including extending and building new paths as the jurisdictional populations grow (Figure 4).

Stakeholder Interviews

Many project stakeholders, including Fort Lupton, Hudson, Dacono, Frederick, Erie, Keenesburg, and Boulder County, have expressed a strong desire to increase the pedestrian and bicycle facilities along and across the corridor (Figure 5). An assessment of the frequency of stakeholder mentions of corridor concerns indicates that multimodal improvements has the highest number of mentions during stakeholder discussions about the project. Specific multimodal needs mentioned by stakeholders include safe crossings and connectivity to existing trails, and safe travel between residential neighborhoods, business districts, parks, and schools. On the eastern end of the corridor, Keenesburg highlighted the lack of available shoulders or bicycle facilities. As described above, the CO 52 corridor provides a critical connection for bicyclists traveling east since bicycles are not allowed on I-76. Expanded shoulder widths are essential for cyclist safety on the eastern end of the corridor. Overall, improvements are needed to meet the expected growth in travel demand for pedestrians and bicyclists between communities along and across the corridor.



Figure 5 Frequency of Stakeholder Topic Mentions





GOALS OF TRANSPORTATION IMPROVEMENTS

The recommended transportation improvements were developed to support the project needs. The project goals should:

- **Consider the natural and built environment** – Improvements should minimize impacts to documented environmental resource constraints to the greatest extent possible. Environmental resource constraints documented in the Existing Conditions Report included wetlands, stream channels, floodplains, potential habitat for threatened and endangered (T&E) species and general wildlife, underground and above ground utilities, historic resources, and hazardous materials. Improvements should consider the built environment through a context-sensitive approach to land uses and character along the corridor that should consider both function and aesthetic of the surrounding land uses and character.
- **Support local and regional planning efforts** – Improvements should consider planning efforts by recognizing spatial recommendations for future and proposed local agency plans, such as multimodal connections, adjacent multi-use paths, and streetscape plans.
- **Identify estimated ROW needs** – Recommended project alternatives will be used to define the estimated ROW needs to support future growth along the corridor. Although a separate and concurrent process, the ACP will show the estimated ROW line developed during the PEL process to support local agencies in land use decision making.
- **Accommodate future technology** – Improvements should consider that increases in development and traffic volumes will result in changes in implementation and advancement of technology along the corridor. Transportation technology is anticipated to change within the next 20 to 30 years and improvements should consider the potential for technological advancement.

Appendix C-3

Alternatives to be Evaluated during
the PEL Study



COLORADO
Department of Transportation

Region 4

CDOT R4
10601 W 10th Street
Greeley, CO 80634

September 30, 2021

Troy Halouska
CDOT Environmental Programs Branch
2829 W Howard Place
Denver CO, 80204

Subject: CO 52 Planning and Environmental Linkages (PEL) Study – FHWA Check in Point 3: Evaluation Criteria and Alternatives to be Evaluated

Dear Mr. Halouska:

The Colorado Department of Transportation (CDOT) with support from a consultant team and stakeholders has finalized the Evaluation Criteria and Alternatives to be Evaluated for CO 52 PEL Study (CO 119 to CO 79). Please submit to Stephanie Gibson, Environmental Program Manager and Brian Dabling, FHWA Area Engineering, as acknowledgement and completion of this third FHWA Coordination Point as a part of the Planning and Environmental Linkages process.

Should you have any additional questions please do not hesitate to reach out through email, chad.hall@state.co.us or 970-350-2227.

Sincerely,

Chad Hall
Project Manager

Attachment: CO 52 PEL Evaluation Criteria and Alternatives to be Evaluated Memo

CDOT R4
10601 W 10th Street
Greeley, CO 80634





Project: CO 52 Planning and Environmental Linkages Study/Access Control Plan (21656)
To: Troy Halouska – CDOT, Planning and Environmental Linkages/NEPA
From: Chad Hall, PE – CDOT R4, Project Manager
Date: September 28, 2021
Subject: PEL Study for State Highway (CO) 52 Corridor between CO 119 and CO 79
FHWA Check in Point 3: Evaluation Criteria and Alternatives to be Evaluated

CDOT, in agreement with the Federal Highway Administration (FHWA), has determined that the attached Alternatives Evaluation Criteria (Attachment A) and Alternatives to be Evaluated (please see below) are sufficient in addressing the established Purpose & Need and Goals of the CO 52 PEL, while avoiding excessive analysis.

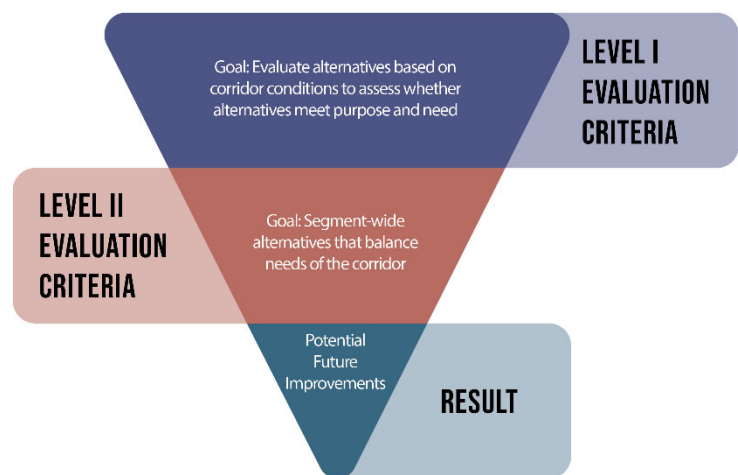
EVALUATION CRITERIA AND PERFORMANCE MEASURES

Development, evaluation, and refinement of alternatives focused on identifying alternatives that meet Purpose & Need for the corridor and that match corridor context. Evaluation criteria and performance measures were developed prior to beginning the alternatives development and evaluation process. The Project Team reviewed the proposed Evaluation Criteria with the Project Management Team (PMT) and Technical Team (TT) at numerous meetings, incorporating their revisions to ensure that the final Evaluation Criteria would address the project’s established Purpose & Need and Goals. These meetings included representatives of all coordinating agencies along the corridor, as well as representatives from FHWA.

Two-tiered Approach

A two-tiered evaluation process was developed to evaluate alternatives. Evaluation criteria were developed for each level of evaluation and were used to assess alternatives relative to the Purpose & Need. The Level 1 performance measures assess the ability of each alternative to meet Purpose & Need at a high level. The Level 2 performance measures delve into more detail for each category of Purpose and Need and as well as evaluate how well alternatives meet project goals.

The final Evaluation Criteria are included as **Attachment A.**





ALTERNATIVES DEVELOPMENT AND EVALUATION PROCESS

Alternatives were developed through a multi-level iterative process. The process began with a large number of alternatives that led to a smaller number of more detailed alternatives, following a focused evaluation effort. Agency coordination and public involvement played a major role in the alternative development process.

Corridor Segments

In order to better analyze the 42-mile-long CO 52 study corridor, the study team divided the corridor into meaningful segments (Figure 1). Segment divisions considered political boundaries, community characteristics, and land use similarities. Other than Segment 2, which includes the communities of Erie, Frederick, and Dacono, the other segments only include one community along the corridor allowing individual community desires to be accommodated in the context of the overall corridor vision.

- Segment 1: CO 119 to Boulder/Weld County line
- Segment 2: Boulder/Weld County line to Weld CR 19 (eastern DRCOG planning boundary)
- Segment 3: Weld CR 19 to Weld CR 31 (East of Fort Lupton)
- Segment 4: Weld CR 31 to Weld CR 49 (East of Hudson)
- Segment 5: Weld CR 49 to CO 79



Figure 1. CO 52 Segments Map

No Action Alternative

The No Action Alternative anticipates future conditions of the CO 52 corridor without completing any transportation improvements that are recommended by this PEL. The No Action Alternative does include required safety and maintenance improvements to maintain an operational transportation system, as well as those fiscally constrained projects that have committed funding sources that will be built regardless of other improvements recommended in the PEL. Funding sources for those fiscally constrained projects include the State Transportation Improvement Program (STIP), regional Transportation Improvement Programs (TIP) funded by Metropolitan Planning Organizations (MPOs), and local agency Capital Improvement Programs (CIPs). The No Action Alternative does not meet the Purpose and Need of this PEL but is used as a baseline for comparison to the operational and safety benefits that would result from recommended transportation improvements resulting from this PEL.

Table 1 provides information on 2045 fiscally constrained projects that have been included in the No Action Model.





Table 1. 2045 Fiscally Constrained Projects Considered in No Action Alternative Model (STIP/TIP)

Facility	Project Name	Project Description	ID	Source
CO 52	CO 52 & US 287 Intersection	Intersection Improvements	SR46666.071	CDOT (STIP)
CO 52	CO 52 & I-76 Interchange	Interchange improvements	SR46600.055	CDOT (STIP)
CO 52	CO 52 & WCR 41 Intersection	Intersection improvements	1414	CDOT (Upper Front Range, TRP)
I-25	MP 214-269	Congestion, safety, travel time and freight reliability improvements	2008-081	CDOT (TIP)
N 71 st St	Lookout Rd to CO 52	Realignment and widening of intersection		Boulder (CIP)
WCR 7	CO 52 to Erie Pkwy	Realignment and widening to 4 lanes	30	Erie Transportation Plan (CIP)

Range of Alternatives

To develop a range of alternatives for consideration, the study team utilized data from the existing conditions report as well as input collected from stakeholders (Table 2).

Table 2. Stakeholder Meeting Highlights

Agency	Summary of Input
Boulder County (Segment 1)	<ul style="list-style-type: none"> • Relationship building • Intersection to accommodate transit, queue jump, and bypass lanes • Keep the rural feel • Fiscally responsible building • Acknowledge policy against widening roads between intersections • Improve safety • Desire for separate bike trail (west end)





<p>Weld County (Segment 2-5)</p>	<ul style="list-style-type: none"> • Right-of-way preservation • Work with community partners • Identify future bottleneck locations • Interest in widening corridor to 4 lanes
<p>Erie (Segment 2)</p>	<ul style="list-style-type: none"> • Improve traffic flow • North/South turn lane improvements • Congestion at WCR 7 • Commercial Development at WCR 7 • Improvements for bicycles • Identify right-of-way needs
<p>Frederick (Segment 2)</p>	<ul style="list-style-type: none"> • Safety improvements for I-25 Frontage Road intersection • Improve North-South pedestrian connectivity • Consider adequate turn lanes to improve congestion • Improve roadway safety
<p>Dacono (Segment 2)</p>	<ul style="list-style-type: none"> • Safety concerns at WCR 17 • Improve pedestrian safety at Colorado (WCR 13) • Improve pedestrian safety at Glenn Creighton • Interest in improving connections for vulnerable populations
<p>Fort Lupton (Segment 3)</p>	<ul style="list-style-type: none"> • Potential to close Grand Ave intersection • Extension of lower "in-town" speed limits • Right-of-way preservation • Intersection improvements at WCR 19 • Pedestrian crossings desired near the river (overpass or underpass)
<p>Hudson (Segment 4)</p>	<ul style="list-style-type: none"> • Improve bike/ped movements across CO 52 • Improve railroad crossings • Maintain town character • Discourage truck use along CO 52 • Right-of-way preservation
<p>Keenesburg (Segment 5)</p>	<ul style="list-style-type: none"> • Roadway improvements for freight • Widen shoulders • Right-of-way preservation • Commercial development planned at CO 52 / WCR 59 • Wild animal sanctuary traffic on WCR 53

The study corridor is primarily rural apart from more urban areas near I-25 and Fort Lupton. In addition to the I-25 and Fort Lupton areas, urban sections are also being considered between WCR 7/Aggregate Blvd. and Silver Birch and through Hudson due to the more urban feel in these locations. Rural roadway sections are also being considered in these areas, consistent with existing conditions.





The rural roadway character alternatives include adding or widening a shoulder to increase safety as well as adding general purpose lanes, auxiliary lanes, and medians treatments where traffic projections and access warrant.

The team held several meetings that focused on individual segments to develop alternatives that had potential to meet project needs and goals while still addressing stakeholder concerns. The list of Alternatives to be Evaluated below summarizes the alternatives considered along the corridor.

Final Range of Alternatives to be Evaluated

- No Action
- 2 Lane Rural
- 2 Lane Urban
- 2 Lanes with Peak Period Shoulder
- 2 +1 Alternating Passing Lane
- 2 Lanes + Reversible Lane
- 2 Lanes + HOV/Managed Lanes
- 4 Lane Rural
- 4 Lane urban
- 6 Lane urban

Based on adjacent land use, environmental concerns, traffic and safety concerns, truck percentages, and geometric evaluation, not all alternatives were considered throughout the entire corridor.

LEVEL 1 EVALUATION

The goal of the Level 1 Evaluation was to assess a full range of alternatives based on the corridor Existing Conditions Report to determine whether alternatives would meet purpose and need appropriately. The Needs defined for the corridor were to increase in safety, accommodation of increased travel and freight demand, and support of multimodal connections. Each Alternative was evaluated according to the established evaluation criteria.

- Does this alternative have the potential to improve safety by way of crash frequency, crash severity, ped/bike safety, roadway geometry, truck/oversize vehicle safety, and freight safety?
- Does this alternative have the potential to accommodate projected travel and freight demand by way of congestion, corridor capacity travel times, travel reliability, and quality of traffic operations?
- Does this alternative have the potential to increase and not preclude multimodal mobility by way of local and regional route connectivity, non-motorized opportunities, bicycle connectivity, and pedestrian crossings?

Level 1 evaluation was limited to a simple yes or no to the questions above for alternatives to advance to Level 2. Study team members, as well as members of the Project Management and Technical teams had the opportunity to review and discuss inputs to this table as well as the alternatives progressing to the next tier. The full Level 1 Evaluation Matrix can be found in **Attachment B**.





Result of Level 1

Multiple alternatives were screened within each segment and the following language was used to document the findings:

Carried Forward: meets Purpose and Need, considered reasonable and feasible, and may be considered for further evaluation in this study or subsequent NEPA and Project development

Retained as Element: does not fully meet Purpose and Need, but will be evaluated as packaged element of a larger-scale alternative

Eliminated: does not meet Purpose and Need, has a fatal flaw, and/or is considered unreasonable. A project alternative that is Eliminated is removed from further consideration in the PEL Study.

The Project Team conducted the evaluation and several alternatives were considered to not meet the needs of the Study and therefore not carried to Level 2 for further evaluation. Eliminated alternatives are shown below in Table 3.





Table 3. Eliminated Alternatives

Segment	Alternative	Reason
1	2+1 Alternating Passing Lanes	Configuration does not accommodate access or traffic needs along the segment.
1	2 Lanes plus Reversible Lane	Configuration does not accommodate access or traffic needs along the segment.
2	HOV/Managed Lane	Demand for HOV/Managed lane insufficient
3	2 Lanes w/ 10' shoulder and turn lanes at intersections	Minimal benefit over No Action
3	2 Lanes w/ 10' shoulder and turn lanes at intersections	Precluding passing reduces operations performance; limited safety benefit over no-build option
3	2 Lane w/ Peak Period Shoulder Lane	Precluding passing reduces operations performance; limited safety benefit over no-build option
3	Fort Lupton Bypass	Evaluation was filled out by route perspective (SH 52), some outcomes may vary if evaluated at regional level. (per the City of Fort Lupton concern for economic vitality with a bypass)
4	2 Lanes w/ 10' shoulder and turn lanes at intersections	Minimal benefit over No Action
4	2 Lanes w/ 10' shoulder and turn lanes at intersections	Precluding passing reduces operations performance; limited safety benefit over no-build option
4	2 Lanes w/ Peak Period Shoulder Lane	Precluding passing reduces operations performance; limited safety benefit over no-build option
4	2 Lanes plus Reversible Lane	Configuration does not accommodate access or traffic needs along the segment.

LEVEL 2 EVALUATION

After assessing the full range of alternatives in Level 1 and narrowing the options to only the alternatives that meet project needs, the team moved to Level 2. During the Level 2 analysis, alternatives were evaluated based on more detailed criteria related to project needs as well as how well they met the project goals. Each Alternative was evaluated according to the established evaluation criteria shown in **Attachment A**.





The full Level 2 Evaluation Matrix can be viewed in **Attachment C**.

Design Refinements and Advanced Study Areas

The more detailed analysis completed during Level 2 allowed the team to make design refinements to the alternatives put forth in Level 1, mostly related to location. For example, the team added a 6-lane alternative between WCR 7 and Silver Birch/York St. to better manage the expected traffic volumes and thereby creating a sub-segment within Segment 2. Similarly, the analysis indicated that a four-lane section wasn't required in Segment 3 east of Denver Avenue so a 2-lane section was introduced in this area.

As part of the study, a few key locations were identified for a more in-depth study than the remainder of the corridor. These included the US 287 and CO 52 intersection in Segment 1, the Reverse Curves between WCR 15 and WCR 19 in Segment 2, and the WCR 59 and CO 52 intersection in Segment 5.





CORRIDOR RECOMMENDATIONS

The following map show the Recommended corridor alternatives.

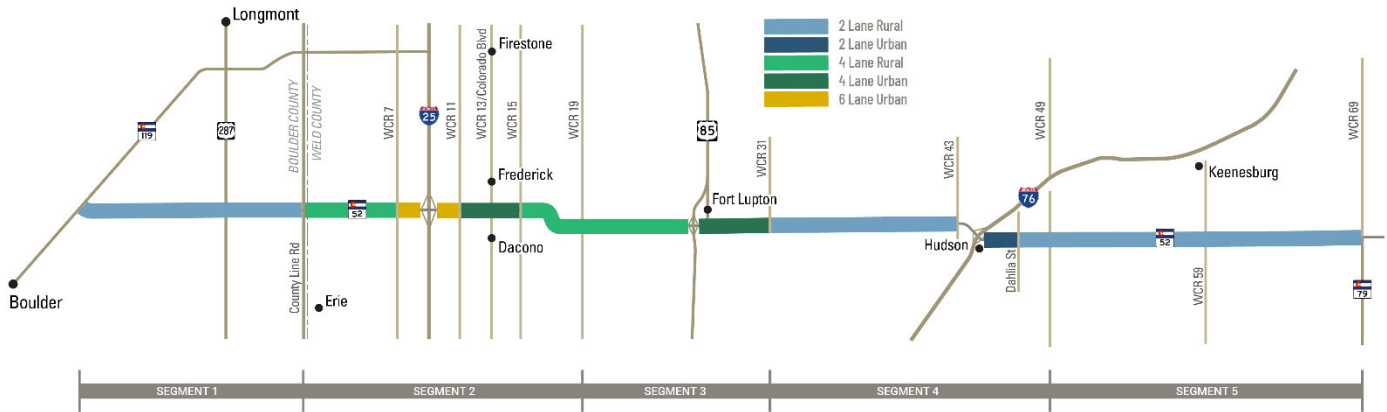


Figure 2. Recommended Corridor Alternatives Map

In addition to the recommended alternatives, additional alternatives were Carried Forward. These are alternatives that are considered reasonable and feasible and would be expected to perform well if implemented but were not the strongest-performing alternative.

Table 4. Alternatives Carried Forward

Segment	Alternative
1	2 Lanes with Peak Period Shoulder Lane
2A	4 Lane Urban
2B	4 Lane Rural
2B	4 Lane Urban
2C	4 Lane Urban
2D	4 Lane with Median Cable Rail
3B	2 Lane Urban
4A	4 Lane Rural

Should you have any additional questions please do not hesitate to call or reach out through email, 970-350-2227 or chad.hall@state.co.us.

Sincerely,

Chad Hall
 Project Manager





Attachment A: Evaluation Criteria and Performance Measures





Attachment B: Level 1 Evaluation Matrix





Attachment C: Level 2 Evaluation Matrix



Attachment A

Category	Criteria	Performance Measure Evaluation	
		Level 1	Level 2
PROJECT NEEDS			
Increase Safety	<ul style="list-style-type: none"> • Crash frequency • Crash severity • Ped/bike safety • Roadway geometry • Presence of truck freight 	Potential to improve safety (Y/N)	Reduce frequency and severity of crashes. Reduce vehicle/pedestrian conflict points (number) Reduce Level of Traffic Stress (LTS) Implement geometric features that accommodate truck freight
Accommodate Increased Travel and Freight Demand	<ul style="list-style-type: none"> • Congestion • Corridor capacity • Travel times • Travel reliability • Quality of Traffic Operations 	Potential to accommodate projected travel demand (Y/N)	Decrease Travel Time Index (ratio) Decrease Travel time by minutes (minutes) Reduce Delay Accommodates Freight Destinations (Improves/Neutral/Limits)
Support Multimodal Connections	<ul style="list-style-type: none"> • Local and Regional Route Connectivity • Non-Motorized Opportunities • Bicycle connectivity • Pedestrian crossings 	Potential to increase multimodal mobility (Y/N)	Reduce barriers for N/S pedestrian and bicycle travel (qualitative) Improve continuity for E/W bicycle and pedestrian travel (qualitative) Reduce uncontrolled vehicle/pedestrian conflict points (number) Increase shoulder width to accommodate bicycle traffic. (Y/N)

Category	Criteria	Performance Measure Evaluation	
		Level 1	Level 2
PROJECT GOALS			
Consider the Natural and Built Environment	<ul style="list-style-type: none"> Environmental resource constraints Contextual function and aesthetics of surrounding land uses 	Not evaluated in Level 1	<p>Identification of critical resources impacted based on footprints. No quantitative impacts will be done.</p> <p>Qualitative measurement of context sensitive approach of land use and character along the corridor</p>
Support Local and Regional Planning Efforts	<ul style="list-style-type: none"> Included in community land use plans for multimodal connections, multi-use paths, and streetscapes 	Not evaluated in Level 1	<p>Relative improvement/spatial alignment with goals of local agency plans [Good (closely aligned), Fair (some variations between alternatives), Poor (significant variations)]</p>
Identify Estimated ROW Needs	<ul style="list-style-type: none"> Opportunity to preserve ROW 	Not evaluated in Level 1	<p>Complexity of acquisition (based on presence of structures, land use type)</p> <p>Relative expected ROW cost</p>
Accommodate Future Technology	<ul style="list-style-type: none"> Inclusion of technology along the corridor that will counteract increases in development and traffic volumes 	Not evaluated in Level 1	<p>Accommodate present and future implementation of emerging existing and future technology</p>

Appendix C-4

PEL Document





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

Colorado Division

March 8, 2022

12300 W. Dakota Ave., Suite #180
Lakewood, Colorado 80228
720-963-3000

Heather Paddock
CDOT Region 4 Transportation Director
10601 W. 10th Street
Greeley, CO 80634
VIA EMAIL ONLY

Subject: Acceptance of Colorado State Highway (CO) 52 from CO 119 to CO 79 Planning and Environmental Linkages (PEL) Study

Dear Ms. Paddock:

This letter is to acknowledge the completion of the Planning and Environmental Linkages (PEL) study initiative undertaken by Colorado Department of Transportation (CDOT), for the Colorado State Highway (CO) 52 corridors in Boulder and Weld counties. The study will support CDOT, the local agencies, stakeholders, and the public to determine improvements that should be made and estimate a corridor preservation footprint for future projects. We appreciate and commend the efforts the team has undertaken to conduct this planning study in a manner consistent with the Federal Highway Administration (FHWA) PEL guidance which outlines a process similar to that required by the National Environmental Policy Act (NEPA). The benefits of this streamlining effort will undoubtedly be realized in terms of time and cost savings on future NEPA studies conducted within the area planning study limits.

The final PEL Questionnaire provides a good summary of the work completed in the PEL study and the information that will be needed as projects move forward within the corridor. The strengths of the study include: identifying and balancing different needs along the corridor; focused coordination with local, state and federal agencies; extensive public involvement through the process; the development of a corridor Purpose and Need statement; development of a robust alternatives analysis; and a list of potential projects with prioritization. As project funding becomes available, it will be necessary for FHWA to meet with the local agency sponsors and CDOT to determine the scope of the NEPA study, including level of study required, Purpose and Need, logical termini, and the extent to which the PEL study can be used to supplement or replace certain milestones in the NEPA process.

If you have any questions, please feel free to contact Brian Dabling, Area Engineer, at Brian.Dabling@dot.gov or 720-963-3032.

Sincerely,

John M. Cater, P.E.
Division Administrator

CC:

Jim Eussen, CDOT Region 4 Planning and Environmental Manager
Chad Hall, CDOT Region 4 Project Manager
Lou Keen, CDOT Region 4 Resident Engineer
Troy Halouska, CDOT HQ PEL Program Manager