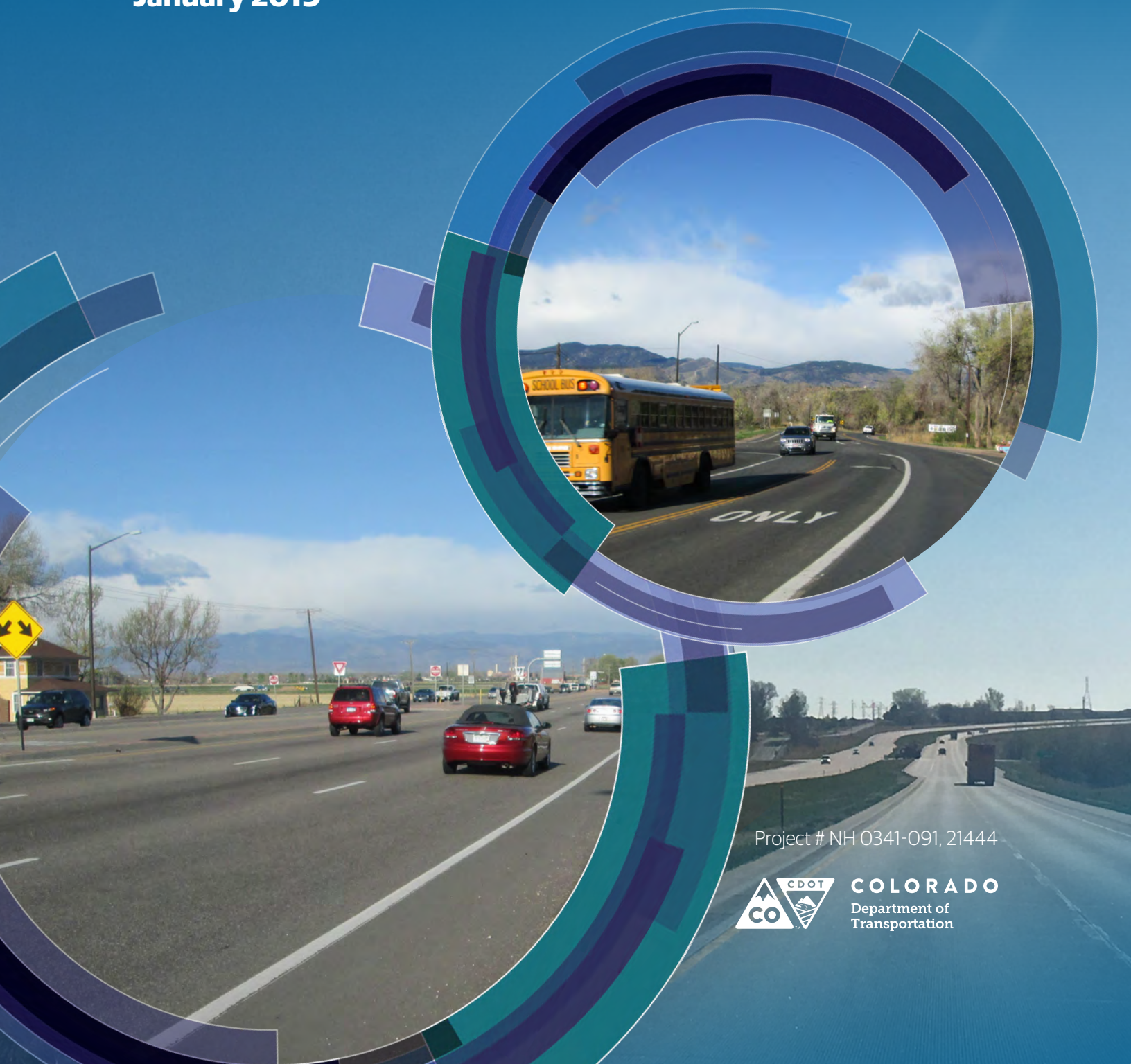
FINAL

US 34 Planning and Environmental Linkages (PEL) Study

January 2019



Project # NH 0341-091, 21444

COLORADO
Department of Transportation

FINAL

US 34 Planning and Environmental Linkages (PEL) Study

Prepared for:

COLORADO Department of Transportation

Region 4

January 2019

Prepared by:

ch2m

In association with:

TSIOUVARAS SIMMONS HOLDERNESS CONSULTING ENGINEERS

Stolfus

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February 4, 2019

Johnny Olson
Regional Transportation Director
CDOT Region 4
10601 West 10th Street
Greeley CO 80634

Subject: US 34 Planning and Environmental Linkages Study (PEL)

Dear Mr. Olson:

This letter is to acknowledge the completion of the Planning and Environmental Linkages (PEL) study initiative undertaken by CDOT in partnerships with various local agencies in Northern Colorado. 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. The benefits of this streamlining effort will undoubtedly be realized in terms of time and cost savings on future National and Environmental Policy Act (NEPA) studies conducted within the corridor planning study limits.

The completed PEL Questionnaire submitted to FHWA on January 25th, 2019 as an attachment to the PEL Report, provides a good summary of the work completed in the study and the information that will be needed once this project enters the NEPA process. The strengths of the study include; collaboration with a diverse set of stakeholders in a large corridor, the incorporation of Risk and Resiliency into the PEL Study, and the future action plan to be used as a resource to identify and implement future projects. As individual projects are initiated and funding becomes available, it will be necessary for FHWA to meet with CDOT and the Local Agencies 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 Ms. Tricia Sergeson of this office at (720) 963-3073 patricia.sergeson@dot.gov or Mr. Brian Dobling at (720) 963- 3032, brian.dobling@dot.gov.

Sincerely,

FOR John M. Cater
Division Administrator

By: Brian Dobling
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Cc:
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Acknowledgements

The US 34 PEL Study was prepared with contributions from the following individuals.

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Acronyms and Abbreviations

>	greater than
≤	less than or equal to
%	percent
AADT	annual average daily traffic
ACP	access control plan
ADT	average daily traffic
ADA	Americans with Disabilities Act of 1990
APE	area of potential effect
BNSF	Burlington Northern Santa Fe Railway
CDOT	Colorado Department of Transportation
CERCLA	Comprehensive Environmental Response, Compensation, and Liability Act of 1980
CFR	*Code of Federal Regulations*
CO	carbon monoxide
COLT	City of Loveland Transit
CPW	Colorado Parks and Wildlife
CR	county road
CRS	Colorado Revised Statutes
CWA	Clean Water Act
DOT	U.S. Department of Transportation
EA	environmental assessment
EIS	environmental impact statement
EO	Executive Order
FEMA	Federal Emergency Management Agency
FHWA	Federal Highway Administration
GET	Greeley Evans Transit
GIS	geographic information system
I-25	Interstate 25
ID	identification
IGA	intergovernmental agreement
LCR	Larimer County Road
LOS	level of service
LWCF	Land and Water Conservation Fund
MBTA	Migratory Bird Treaty Act

MOE	measure of effectiveness
MP	mile post
NEPA	National Environmental Policy Act
NCHRP	National Cooperative Highway Research Program
NEPA	National Environmental Policy Act
NFRMPO	North Front Range Metropolitan Planning Organization
NHPA	National Historic Preservation Act
NRCS	Natural Resources Conservation Service
NRHP	National Register of Historic Places
OAHP	Office of Archaeology and Historic Preservation
PEL	Planning and Environmental Linkages
PMT	project management team
RAFT	Rural Alternative for Transportation
RNMC	regional non-motorized corridors
ROD	Record of Decision
ROW	right-of-way
RTC	regional transit corridor
RTP	Regional Transportation Plan
SH 257	State Highway 257
SPUI	single-point urban interchange
SRHP	State Register of Historic Properties
TAC	technical advisory committee
TTI	Travel Time Index
UPRR	Union Pacific Railroad
US 34	U.S. Highway 34
USACE	U.S. Army Corps of Engineers
USC	United States Code
USFWS	U.S. Fish and Wildlife Service
USGS	U.S. Geological Survey
v/c	volume-to-capacity
VMT	vehicle miles traveled
vpd	Vehicles Per Day
WCR	Weld County Road

SECTION 1

Introduction and Purpose and Need

This report documents the results of a Planning and Environmental Linkages (PEL) Study for US Highway 34 (US 34) between Larimer County Road (LCR) 29 and Weld County Road (WCR) 53 within Larimer County; Weld County; the Cities of Evans, Greeley, and Loveland; and the Towns of Johnstown, Kersey, Garden City, and Windsor (**Figure 1-1**). Colorado Department of Transportation (CDOT), in cooperation with Federal Highway Administration (FHWA) and local agencies (see **Section 5.1**), conducted this PEL Study. The PEL process followed FHWA and CDOT PEL guidance (CDOT, 2016a) regarding the integration of transportation planning and the National Environmental Policy Act (NEPA) process; this guidance encourages the use of planning studies to provide information for incorporation into future NEPA documents (23 *Code of Federal Regulations* [CFR] 450). The goal of these early integrated planning efforts is to improve transportation decision making while streamlining subsequent alternatives analysis during the NEPA process.

US 34 is a critical east-west transportation corridor for northern Colorado's growing communities. Sustained and strong economic development along US 34 has increased, and travel demand has necessitated the need to enhance safety, reduce congestion, and improve mobility.

CDOT's Northeast Colorado Region (Region 4) and its local agency partners have made identifying effective transportation improvements through the US 34 PEL Study process a top priority. The operating charter, developed by CDOT and the US 34 Coalition, identified the following vision for the US 34 PEL Study:

> *Work collaboratively; build upon and validate past efforts; manage and meet public and agency expectations, develop a vision for US 34 that includes discrete projects that improve safety and mobility along this important corridor.*

CDOT initiated the US 34 PEL Study to catalog existing roadway characteristics, multimodal facilities, and traffic safety conditions; identify infrastructure deficiencies; develop and evaluate a reasonable range of alternatives; determine important existing environmental resources along US 34 within the Study Area; and create a vision for the US 34 corridor. **Figure 1-1** illustrates the Project Limits and Study Area.

The PEL Study is intended to provide a vision for the US 34 corridor and the framework for the long-term implementation of transportation improvements as funding is available and to be used as a resource for future NEPA documentation. The following NEPA principles were followed for this PEL Study:

- Preparation of a project Purpose and Need
- Evaluation of alternatives
- Evaluation of environmental impacts and conceptual mitigation strategies
- Coordination with federal, state, and local agencies
- Public involvement

The FHWA PEL questionnaire is intended to act as a summary of the PEL process and to be used for the transition from the planning study to a NEPA analysis. The PEL questionnaire for the US 34 PEL Study is included in **Appendix A**.

The project team prepared a separate *Corridor Existing Conditions Report* (**Appendix B**) that documents current and future conditions of US 34 regarding land use, planning context, the transportation system, and environmental resources. The information presented in the report was the basis for developing and evaluating possible transportation improvements along US 34.

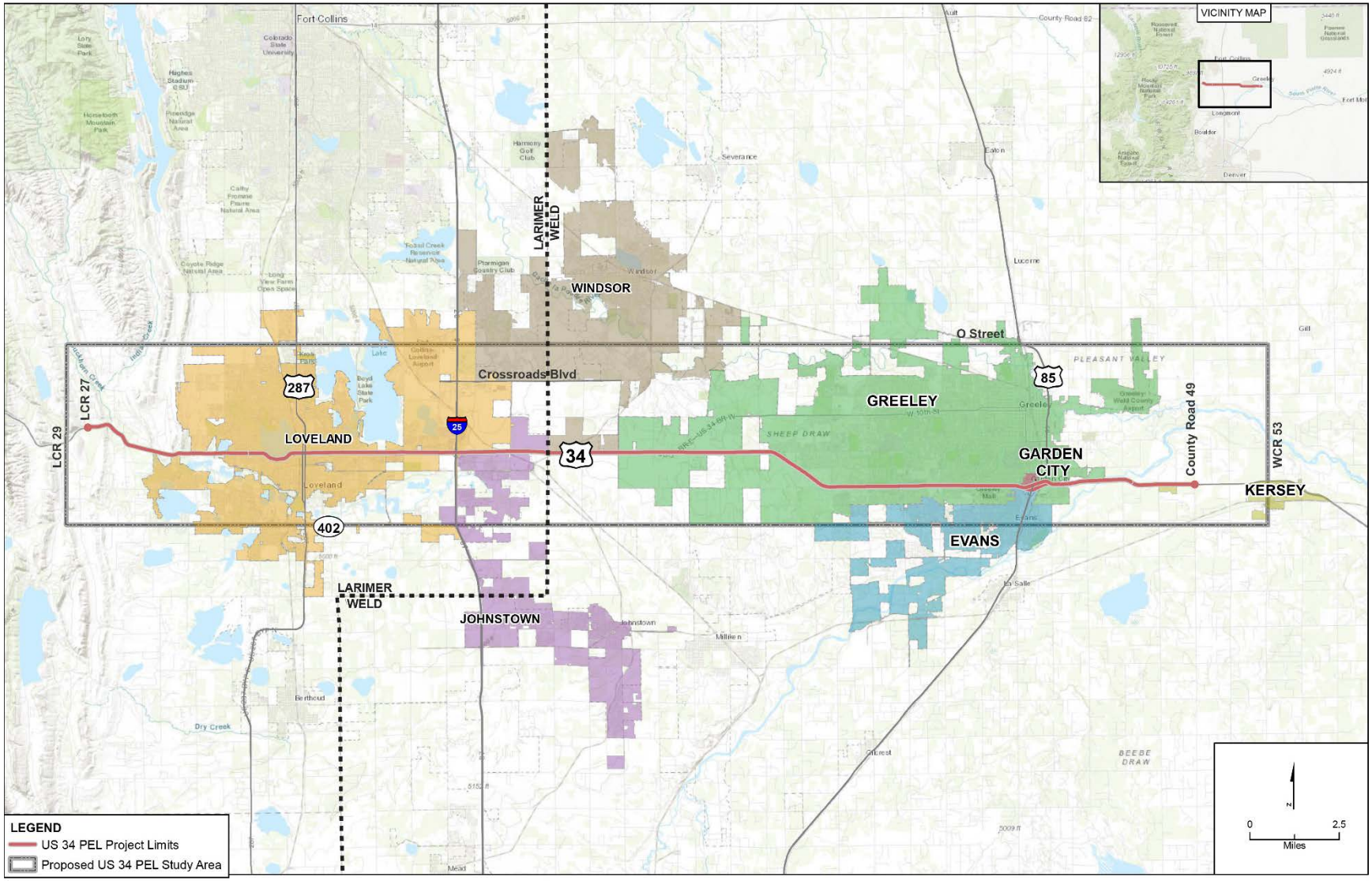

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Figure 1-1. Project Location and Study Area

1.1 Study Area

As shown on **Figure 1-1**, the 34.6-mile-long Study Area is bounded by LCR 29 to the west, State Highway (SH) 402 and Freedom Parkway (SH-402, LCR 18, WCR 54, and 37th Street) to the south, WCR 53 to the east, and O Street and Crossroads Boulevard to the north. The extent of this Study Area was carefully considered to incorporate key corridor influences such as changes in state highway access categories, speed limits, existing and future land uses, major trip generators, parallel routes, and adjacent studies. Defining a broader Study Area helped CDOT to understand the overall transportation system needs and the potential effects of proposed improvements for US 34 on adjacent corridors and surrounding communities. The Project Limits from LCR 27 to WCR 49, where proposed US 34 improvements are focused, comprise 31.7 miles.

The corridor is an important regional connection for the adjacent communities of Loveland, Johnstown, Windsor, Greeley, Garden City, Evans and Kersey, as well as other destinations such as Estes Park and Rocky Mountain National Park. In addition to east-west travel, the corridor includes intersections with several important north-south regional roadways, including US 287, Interstate 25 (I-25), US 85, and WCR 49, which was recently improved to a 4-lane controlled-access County highway connection to I-76. The US 34 corridor was divided into six segments due to the size of the Study Area, varying physical and operational corridor characteristics, and the context of adjacent communities (see **Table 1-1**), but do not represent logical termini for potential future projects. **Figure 1-2** illustrates the corridor segments. The I-25 Interchange Project (1.0 mile on US 34) and the US 34/US 85 Project (1.2 miles on US 34) are separate studies that will complement and accommodate the improvements proposed in the US 34 PEL Study. These two separate study areas are not included in the US 34 project segments, and the US 34 PEL Study does not include additional recommendations within these areas. Consistency of the Recommended Alternative with the separate study areas was considered during alternatives development and is discussed in **Section 2.3.2**.

Table 1-1. Corridor Segments within the Project Limits

Segment	Length (miles)	Segment Limits
Foothills	3.2	LCR 27 to Morning Drive
Loveland Urban	3.1	Morning Drive to North Garfield Avenue
Loveland 6-Lane	4.0	North Garfield Avenue to West of Rocky Mountain Avenue
I-25 Interchange Project (Separate Study)	*1.0*	*Rocky Mountain Avenue to Centerra/Thompson Parkway*
Johnstown-Greeley	6.1	Centerra/Thompson Parkway to east of SH 257
Greeley Expressway	9.3	East of SH 257 to 11th Avenue near the US 85 interchange
US 34/US 85 Interchange (Separate Study)	*1.2*	*11th Avenue to east of 1st Avenue*
East End	3.8	East of 1st Avenue to the Project Limits at WCR 49

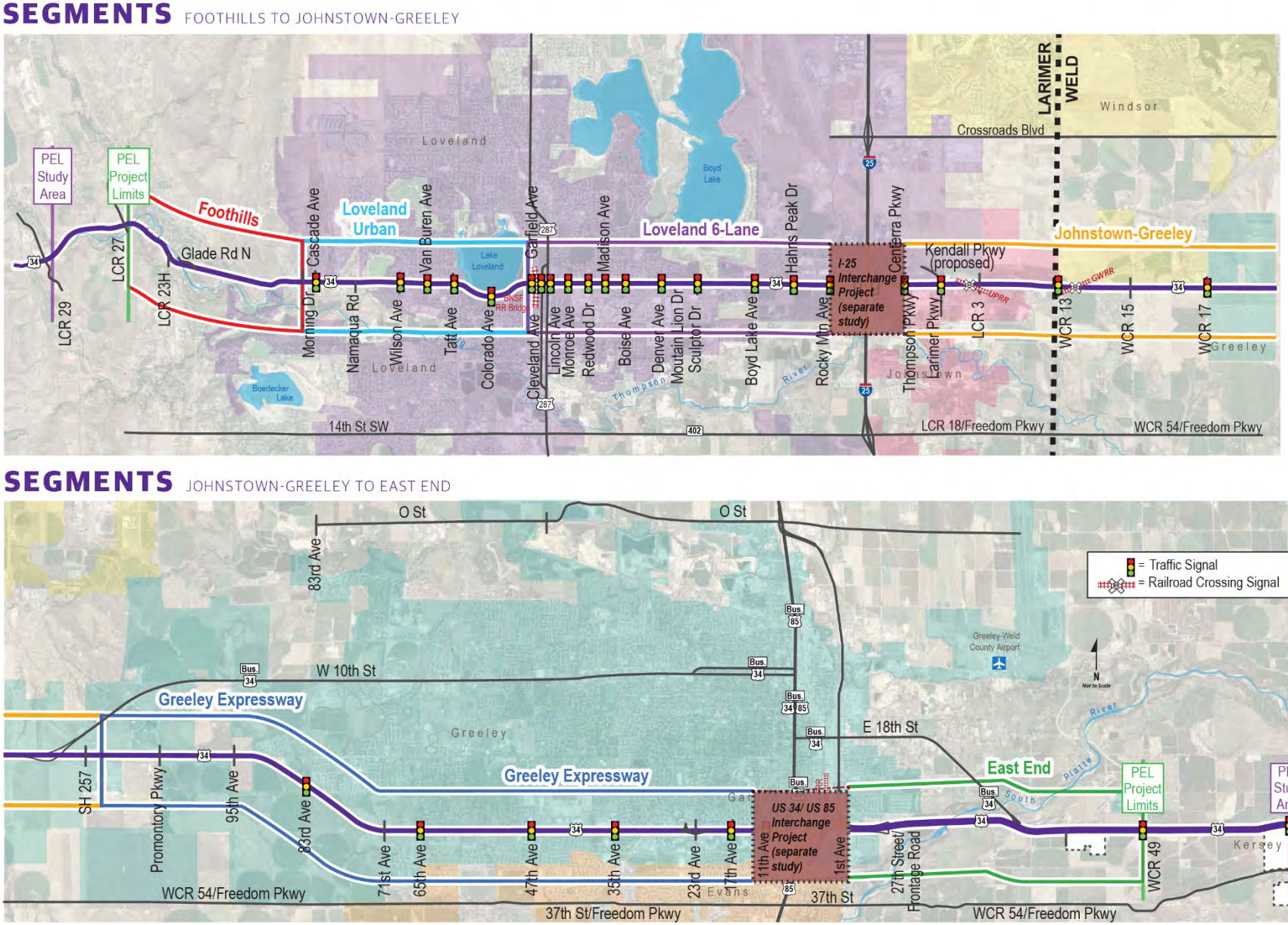


Figure 1-2. US 34 PEL Segments

1.2 Corridor and Planning Context

The following sections provide an overview of US 34 characteristics within the Project Limits and summarize previous studies. More detailed information, including maps and cross sections, can be found in the *Corridor Existing Conditions Report* located in **Appendix B**.

1.2.1 Corridor Characteristics

US 34 roadway characteristics vary widely west of I-25 through Loveland, from a 2-lane roadway at the western Project Limits, a 4-lane roadway with a center turn lane from Morning Drive to just east of SH 287, and a 4- and- 6-lane divided roadway from just east of SH 287 to I-25. East of I-25, the cross section of US 34 is some variation of a 4-lane divided roadway through the eastern Project Limit. The roadway classification changes along the corridor:

- Principal Arterial – Other (from the west Project Limit to WCR 17)
- Principal Arterial – Freeway and Expressway (from WCR 17 to the South Platte River Crossing)
- Principal Arterial – Other (from the South Platte River Crossing to the eastern Project Limit)

Right-of-way (ROW) width in the US 34 corridor varies widely, and is typically 80 feet in urban areas and up to 180 feet in developing areas west of I-25. ROW varies up to 400 feet in developing areas east of I-25 and includes ROW reserved for future interchanges at 35th Avenue and 47th Avenue in Greeley. Typical roadway cross sections and existing speed limits on US 34 are illustrated on **Figures 1-3** and **1-4**.

US 34 is functionally classified as a Principal Arterial with the primary function of carrying through-traffic with medium to high speeds over medium to long distances in a safe and efficient manner (CDOT, 2002). Direct access to the roadway is secondary to servicing through traffic. However, as development has occurred, the once-rural context of the corridor has evolved to become more of an urban landscape, with traffic signals, multiple turn lanes, and raised medians to accommodate local access.

Within the US 34 corridor, bicycle infrastructure includes bike lanes, designated bike routes/shared-use paths, and street trails. Expansion of the bicycle network, strategic intersection improvements, and major non-motorized regional corridors are planned by local agencies. Pedestrian infrastructure varies from areas with no sidewalks to areas with detached sidewalks, attached sidewalks, or shared-use paths. The majority of the bicycle and pedestrian infrastructure along the corridor is located within Loveland and Greeley.

Existing transit service within the US 34 corridor consists of local and regional bus routes that intersect US 34 rather than travel along US 34. Most of the existing transit facilities are concentrated within the city limits of Loveland and Greeley. However, there are potential future regional and local routes within the study area that would travel along and across US 34. Potential future regional routes were highlighted in the I-25 EIS as well as in the 2040 Regional Transit Element. In addition, Greeley-Evans Transit (GET) and City of Loveland Transit (COLT) have potential future local routes within the study area.

US 34 PEL

Typical Sections & Speeds

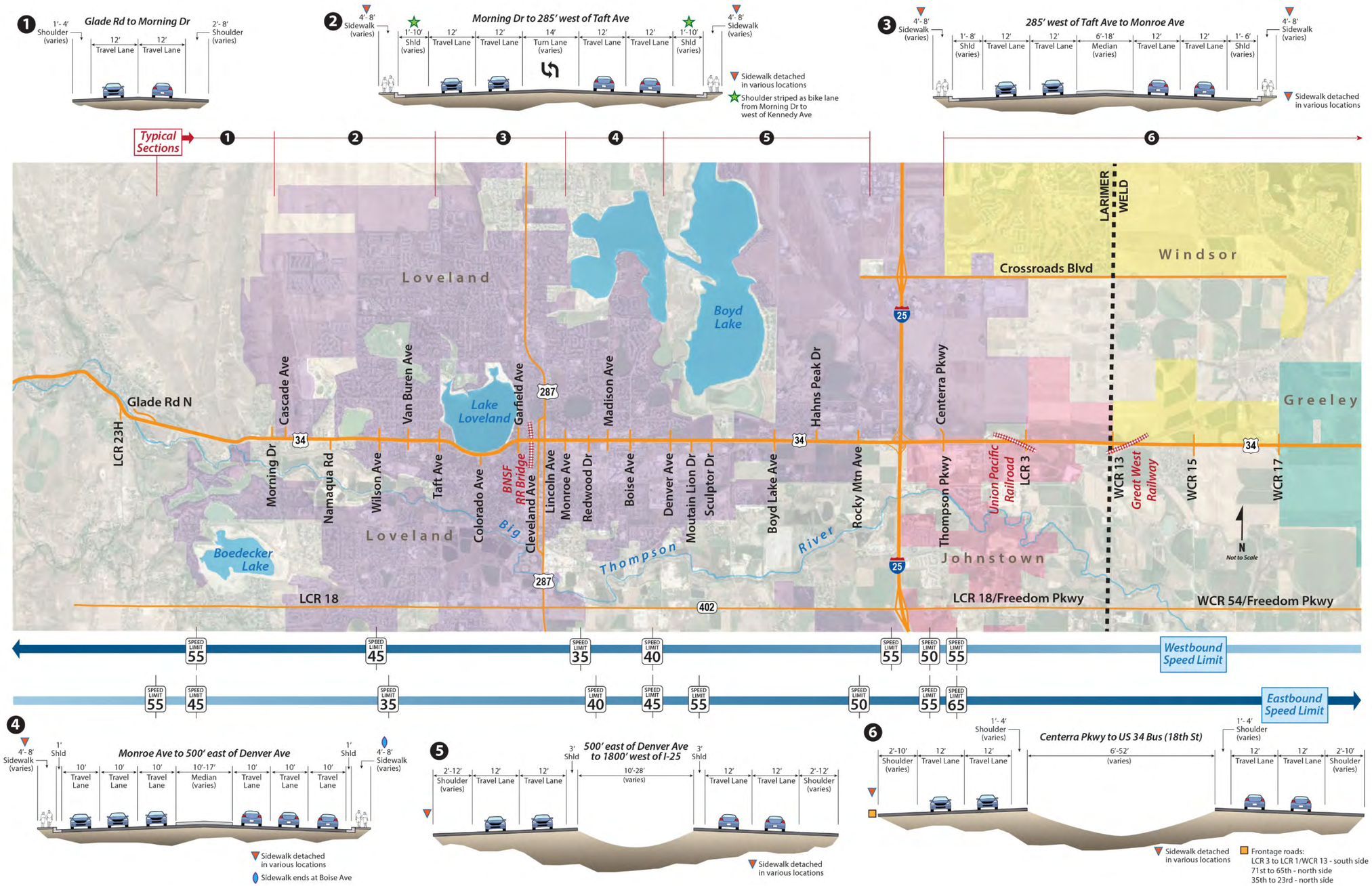


Figure 1-3. Typical Sections and Speeds: Foothills to Johnstown-Greeley Segments

Typical Sections & Speeds

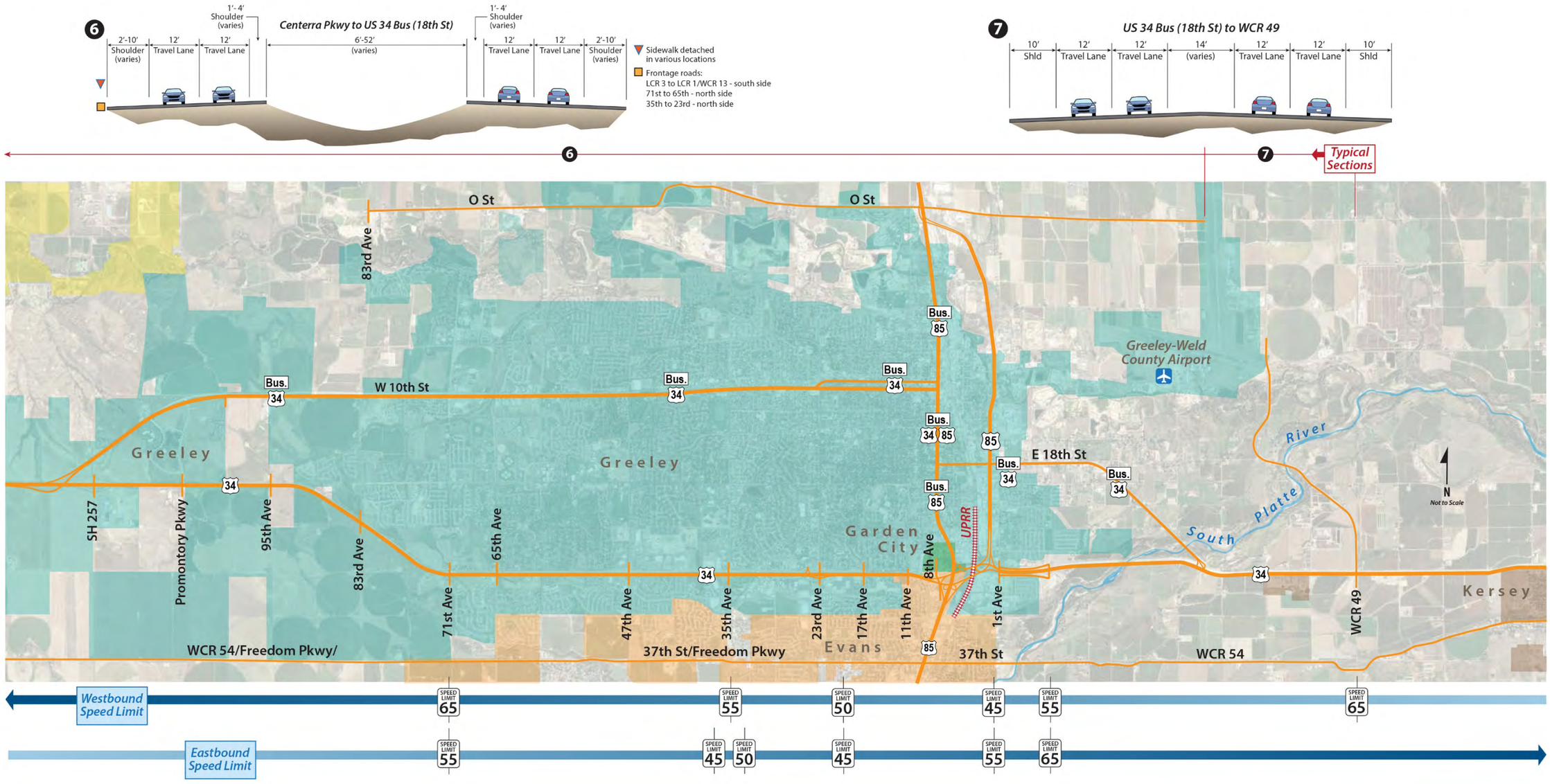


Figure 1-4. Typical Sections and Speeds: Greeley Expressway to East End Segments

1.2.2 Planning Context

Within the Study Area, numerous local plans and corridor-, regional-, and local-level studies and/or projects have previously been completed that informed the PEL process, including the following:

- CDOT, *North I-25 Environmental Impact Statement and Record of Decision* (ROD) (2011)
- CDOT, *SH 402 Environmental Assessment (2007) and Finding of No Significant Impact* (2008)
- CDOT, *US 34 Access Control Plan* (2003)
- CDOT, *US 34 Business Route Environmental Assessment* (2005)
- CDOT, *US 34 Corridor Optimization Plan* (2003)
- CDOT, US 34 Environmental Assessment (2007)
- CDOT, US 85 PEL Study (2017)
- City of Evans, *2010 Comprehensive Plan* (2010, updated 2014)
- City of Evans, *City of Evans Open Space and Trails Master Plan* (2004)
- City of Evans, *City of Evans Transportation Plan* (2004)
- City of Evans, *US 85 Overlay District Master Plan* (2014)
- City of Greeley, *2060 Comprehensive Plan* (2009)
- City of Greeley, *City of Greeley Bicycle Master Plan* (2015)
- City of Greeley, *Greeley 2035 Comprehensive Transportation Plan* (2011)
- City of Greeley, *Greeley Parks, Trails and Open Lands Master Plan* (2016)
- City of Loveland, *2035 Transportation Plan* (2012)
- City of Loveland, *Bicycle and Pedestrian Plan* (2012)
- City of Loveland, *Create Loveland Comprehensive Plan* (2016)
- Freedom Parkway Coalition, *Freedom Parkway Access Control Plan* (ongoing)
- Greeley Evans Transit, *2016* [Greeley Evans Transit] *GET 5- to 10-year Strategic Plan* (2016)
- Larimer County, *Larimer County Master Plan* (1997)
- Larimer County, *Larimer County Transportation Master Plan* (2017)
- Larimer County Department of Natural Resources, *Larimer County Open Lands Master Plan* (2015)
- North Front Range Metropolitan Planning Organization (NFRMPO), *2016 Non-Motorized Plan* (2017)
- NFRMPO, *2040 Regional Transit Element* (2015)
- NFRMPO, *2045 Regional Transit Element* (ongoing)
- NFRMPO, *2040 Regional Transportation Plan* (2015)
- NFRMPO, *Regional Bicycle Plan* (2013)
- NFRMPO, *Truck Traffic in the Northeast Quadrant of the NFRMPO Region Study* (2010)
- Town of Johnstown, *Johnstown Area Comprehensive Plan* (2006)
- Town of Johnstown, *Transportation Master Plan* (2008)
- Town of Kersey, *Comprehensive Plan* (2016)
- Town of Windsor, *Town of Windsor Comprehensive Plan* (2016)
- Weld County, *O Street Arterial Corridor Study* (2011)
- Weld County, *Weld County 2035 Transportation Plan* (2011)
- Weld County, *Weld County Comprehensive Plan* (2018)
- Weld County, *WCR 49 Access Control Plan* (2014)

1.3 Surrounding Land Use

Land use in the Study Area fluctuates between rural area and more developed urbanized areas. Many of the communities adjacent to US 34 have seen significant growth and development from 2000 to 2015, and growth forecasts indicate that the corridor and communities served by the corridor will continue to see strong growth and development (NFRMPO, 2012-2013). The western edge of the corridor is open

space and low density residential; this edge transitions into Loveland's older commercial corridor area, which accommodates neighborhoods, and commercial and traveler-related services. The Centerra development at the interchange of I-25 and US 34 provides retail, restaurant, office, residential, entertainment, and other commercial services. This area is continuing to build out, with SCHEELS on the east side of I-25 in Johnstown acting as an anchor for future commercial development clustered around the interchange. The area east of Johnstown through central Greeley is currently rural with some commercial services. These areas are also forecasted for significant future development. Kersey is to the east of Greeley and Garden City with a rural buffer separating them. Kersey is forecasted to grow on its western edge.

1.4 Purpose and Need

CDOT initiated this PEL Study to identify and assess potential transportation solutions along the US 34 corridor in Larimer and Weld Counties. The Purpose and Need statement was developed in coordination with stakeholders, including the state and local jurisdictions that encompass the Study Area and those represented in the US 34 Coalition (see **Section 5.1**). The Purpose and Need statement was reviewed by the general public at public meetings. The Purpose and Need was accepted by FHWA during the formal coordination checkpoint as part of the standard CDOT PEL process.

1.4.1 Purpose

The purpose of transportation improvements is to preserve US 34 as a vital east-west regional transportation corridor. Improvements will link and move people, goods and information reliably, and adapt to future travel demands and funding opportunities.

1.4.2 Need

Transportation improvements within the US 34 corridor are needed to:

- **Increase safety.** Increases in development and travel demand have resulted in safety concerns at intersections and other locations along the US 34 corridor.
- **Accommodate increased travel and tourism demands to maintain the economic vitality of the region.** Northern Colorado communities are among the fastest growing in the nation. Growth and tourism have spurred economic benefits and provides funding to improve transportation infrastructure and amenities that make these communities desirable.
- **Increase reliability of east-west regional travel, while balancing local access, mobility, and freight needs.** Traffic congestion and accidents can reduce the reliability of US 34 to serve its function as a Principal Arterial, while dampening the benefits of job growth, tourism, recreational opportunities, and freight needs.

During the development of the Purpose and Need, additional background information, studies, and analyses were collected to supplement and support the statement. This information is detailed in **Appendix B** and summarized in the following subsections.

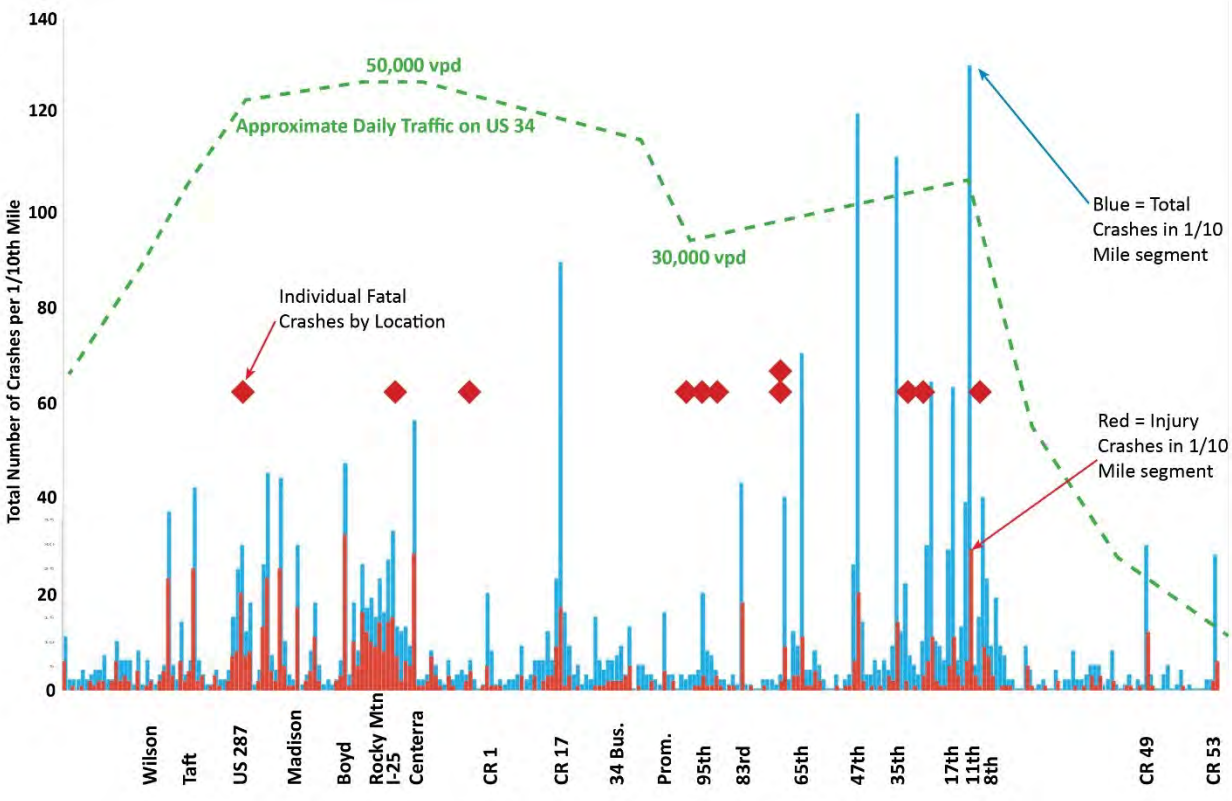
1.4.2.1 What are the safety concerns in the US 34 corridor?

Without the infrastructure to support increases in population and, consequently, travel demand, the safety of the US 34 corridor has decreased over time.

Traffic crash data from a 5-year period from 2011 through 2015 was reviewed. Within the Study Area, 2,650 crashes were recorded over the 5-year period, including 12 crashes with fatalities and 861 crashes involving injuries. The signalized intersections in the US 34 corridor, especially those east of I-25, have total crash rates that far exceed the statewide average for signalized intersections with similar

characteristics. This can be attributed to a high number of rear-end crashes likely attributable to traffic congestion, combined with the unexpected presence of stopped traffic on a facility with a 65-mile-per-hour speed limit. The rate of injury and fatality crashes in this corridor is near the statewide average for similar intersections.

The crash data were further evaluated to identify any substantial spikes in numbers or patterns that might guide the early stages of the PEL alternatives development process. **Figure 1-5** graphically illustrates the number of vehicles (as vehicles per day [vpd]) against the number of vehicle crashes, as well as crashes involving injury and fatalities as recorded within 0.1-mile sections along the entire corridor.



CDOT: Crash Data, 2011-2015 (from the *Corridor Existing Conditions Report* in Appendix B)

Figure 1-5. Summary of US 34 Crash Data

In reviewing the crash types and likely causes, some notable trends were observed.

- The most prevalent type of crash in the corridor is the rear-end crash. This type of accident is not unexpected in the context of the corridor because of the higher speed limits and travel speeds, larger distance between intersections, coupled with traffic signals and other access points interrupting traffic flow.
- The intersections in the western portion of the corridor through Loveland have crash rates that are slightly higher than the statewide average for similar intersections, as well as injury and fatality crash rates slightly higher than the statewide average. The intersections in Loveland generally have more cross-traffic (north-south) and total entering traffic than the intersections east of I-25, so even though the total number of injury and fatality crashes appears high, they are only slightly above the expected rate for similar intersections compared to the statewide average.

- Other than crashes normally expected with signalized intersections, there is no notable pattern or concentration of crashes in the remainder of the corridor. The crashes with fatalities are in dispersed locations and appear to occur for a wide range of reasons.
- Intersections such as WCR 17, 47th Avenue, and 35th Avenue have a high number of crashes (Figure 1-5) because they are relatively isolated intersections with a high volume of side street traffic and turning movements in locations with high travel speeds on US 34.

Additional crash data for the corridor is discussed in the *Corridor Existing Conditions Report* (**Appendix B**) and the *CDOT US 34 Alternatives Report* (Appendix C).

1.4.2.2 How has traffic demand increased along US 34?

Annual data from an automatic traffic recorder along US 34 near mile post (MP) 99 indicates steadily increasing volumes over the past 15 years of record, averaging a growth rate of approximately 3 percent per year.

To understand how the rate of traffic growth has changed over time, a traffic count at this same location taken in 1988 was also reviewed. Based on that count, traffic along US 34 has experienced an annual average growth rate of approximately 4.5 percent over the past 30 years. As shown in **Table 1-2**, traffic projections from the NFRMPO travel demand model reflect a 1.9 percent per year rate of growth (2015c). Traffic volumes fluctuate from year to year, often mirroring the state of the economy. As an area reaches buildout, the growth rate tends to slow.

Table 1-2. Average Annual Growth in Traffic (approximate)

1988 to 2016	2001 to 2016	2012 to 2040
4.5% per year	3.0% per year	1.9% per year[a]

[a] From the NFRMPO travel demand model (2015c)

% = percent

Throughout the corridor, volumes are approximately 10 percent less in the winter (November to February) than in the summer. West of I-25, the seasonal influence is even greater (15 percent or so) and likely a result of recreational traffic to locations like Estes Park and Grand Lake.

Typically, traffic volumes along US 34 during offpeak hours and weekends are less than during the typical weekday commuter periods. As shown on **Figure 1-6**, weekday traffic volumes along US 34 at the permanent count station located at the Larimer-Weld county line (MP 98.94) experience a distinct morning and afternoon peak that coincides with commuter traffic. East of I-25, midday volumes during the week are comparable to the peak volumes experienced on a weekend.

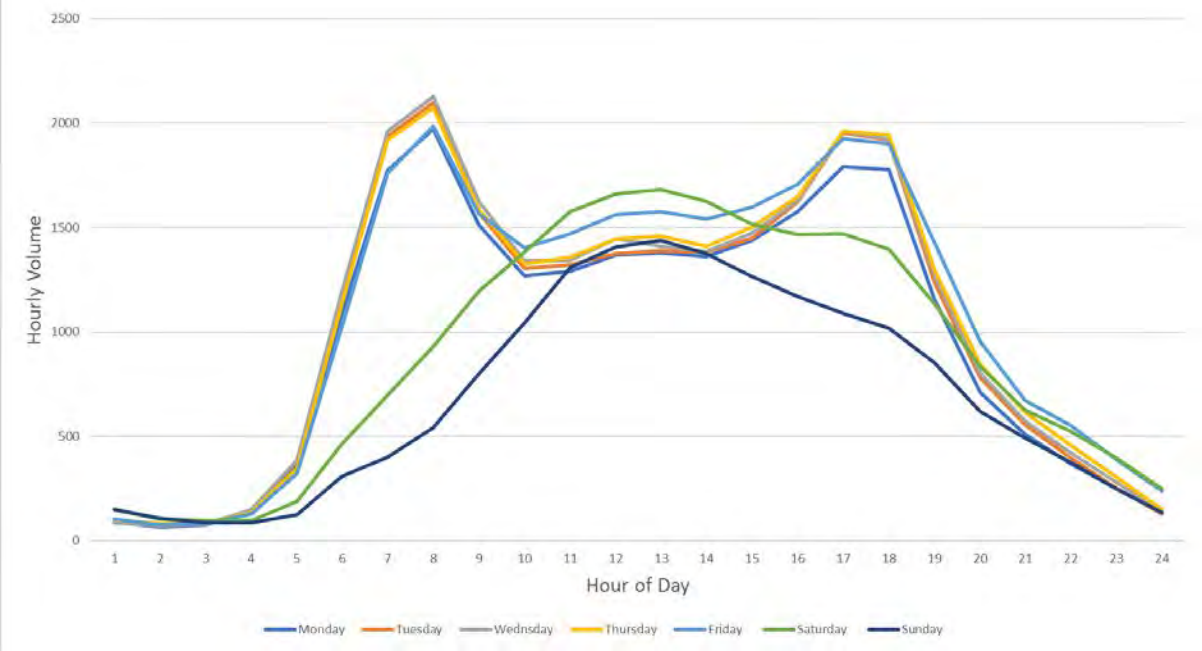


Figure 1-6. Average Hourly Traffic Volume by Day of Week: US 34 at Larimer-Weld County Line Permanent Count Station (2016)

1.4.2.3 Where is congestion increasing?

Traffic is increasing throughout northern Colorado in both developed and undeveloped areas. Much of the US 34 corridor has experienced a growth rate higher than 3 percent annually since 1988, resulting in many segments approaching unstable conditions or experiencing significant delays and low speeds. As shown on **Figure 1-7**, the largest growth in volume along the corridor has occurred between SH 287 and SH 257, where traffic volumes are growing at more than 5 percent per year.

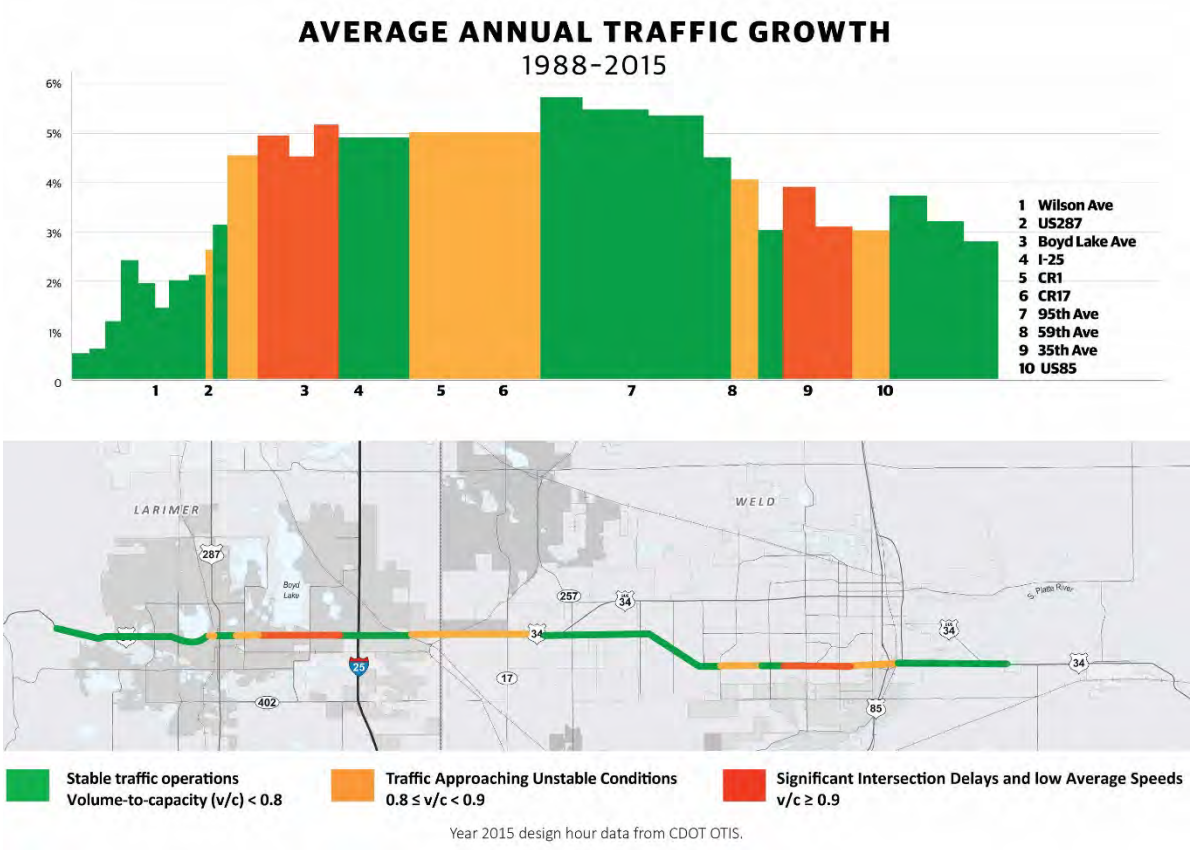


Figure 1-7. Traffic Growth on US 34

1.4.2.4 Where is future development occurring?

In general, the rate of development along US 34 is likely to continue to increase, given forecasts for population and employment growth in the Study Area. Future land uses envisioned for the corridor are primarily commercial- and employment-based. This will increase US 34 annual average daily traffic (AADT), freight and/or truck AADT, and need for capacity and/or transportation improvements.

The central areas of Loveland and Greeley may change less than the cities' outskirt areas, where vacant lands are planned and/or forecasted for development and redevelopment. Key areas of change from current conditions include the following:

- Area between La Quinta Inn and Rist Benson Reservoir (Loveland Urban segment, typical section 2)
- Land east of Denver Avenue (Loveland 6-Lane segment, typical section 5)
- Land at the I-25/US 34 interchange
- Land adjacent to Centerra (Johnstown-Greeley segment, typical section 6)
- Land at US 34 and WCR 13 (Johnstown-Greeley segment, typical section 6)
- Area between 71st and 64th Avenues in Greeley (Greeley Expressway segment, typical section 6)
- Land adjacent to Weld County Parkway (WCR 49) near Kersey (East End segment, typical section 7)

The population within the NFRMPO modeling area is forecast to grow between 2015 and 2040 by 2.1 percent annually from just over 537,000 residents to nearly 900,000 residents. Regional households are forecast to grow by 2.1 percent annually from 207,000 households to 350,000 households, with over 50,000 of the new households expected to be in the Study Area. Regional employment is also expected to increase from about 280,000 jobs to nearly 430,000 jobs by 2040, with over 60,000 of the forecast jobs in the Study Area. Within the Study Area, most of the growth in populations, households, and jobs is forecast to occur in Weld County.

With growth continuing in the major categories, AADT is expected to grow 1.9 percent (**Table 1-2)** per year over the next 20 years, as referenced by the NFRMPO travel demand model (2015c) and the *Corridor Existing Conditions Report* (**Appendix B**).

1.4.2.5 Where are the travel reliability and congestion challenges in the corridor?

US 34 is an important regional connection for the communities of Loveland, Johnstown, Windsor, Greeley, Garden City, Evans and Kersey, as well as other destinations, including Estes Park and Rocky Mountain National Park. In addition to east-west travel, the corridor includes intersections with several important north-south regional roadways, including US 287, I-25, US 85, and WCR 49. Residential, commercial, and industrial development in the region has increased traffic demands on US 34, creating safety and congestion concerns now that are projected to worsen as volumes increase.

Moreover, various routes within the Study Area are also used for the transport of hazardous materials. I-25 is a designated preferred highway route for controlled quantities of radioactive materials. Routes for nonradioactive hazardous materials within the Study Area include US 34 from I-25 east, I-25, and US 85 (Federal Motor Carrier Safety Administration, 2017).

CDOT's Online Transportation Information System (OTIS) (2017b) reports a volume-to-capacity ratio that can be loosely related to quality of traffic flow. Based upon the volume-to-capacity ratio, approximately 35 percent of the corridor currently experiences unstable traffic conditions or significant intersection delays. Corridor segments currently experiencing peak hour congestion are shown on **Figure 1-7** and include most of the Loveland 6-Lane segment and the Greeley Expressway segment west of 35th Avenue to east of 17th Avenue. This congestion affects the reliability of US 34 in meeting its intended function in the larger transportation system.

INRIX, an online data resource that maintains up-to-date traffic information, uses "big data" to provide travel time information along 5 million miles of highways throughout the country and around the world, including US 34 in Colorado. In this case, big data includes obtaining location data for tens of millions of vehicles and devices, in real time. This enables travel times and speeds (and by extension congestion) to be measured in real time. INRIX uses travel time index (TTI), which is the ratio of congested travel time to free-flow travel time. A TTI of 2.0, for example, means that it takes twice as long to travel from one point to another during that period of congestion than it takes when traffic volumes are light. **Figure 1-8** displays INRIX data from March 27 to 31, 2017, between 4:00 and 6:00 p.m. Using INRIX data, **Figure 1-8** shows that congestion occurred in the westbound direction at 23rd/35th Avenue, at WCR 17, between I-25 and Boyd Lake Road, and at US 287 (Cleveland Avenue). Congestion in the eastbound direction was less widespread and of shorter duration. More detailed TTI and INRIX data can be referenced in the *Corridor Existing Conditions Report* (**Appendix B**).

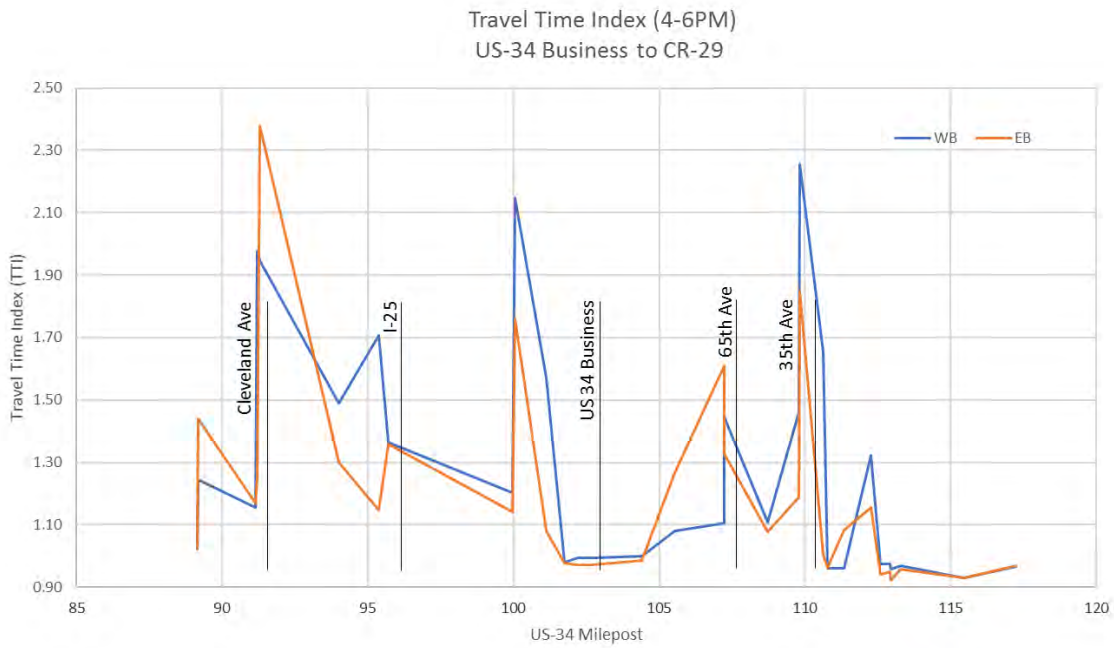


Figure 1-8. Graphs of TTI on US 34

1.5 Project Goals

Project goals were developed by the project management team (PMT) and refined and approved by the technical advisory committee (TAC). The goals supplement the Purpose and Need and help to define the elements that would comprise successful alternatives for the US 34 corridor. Successful alternatives for the US 34 PEL Study will:

- Be compatible with the natural and human environment
- Support community land use and aesthetics goals
- Be fiscally responsible and implementable
- Reduce risk and increase reliability
- Accommodate emerging technology

The project goals were used, in conjunction with the Purpose and Need, during each level of the alternatives evaluation process. This is discussed further in **Section 2.0**.

SECTION 2

Alternatives Development and Evaluation

This section summarizes the alternatives development and evaluation process used to identify a reasonable range of improvements for the US 34 corridor that address the transportation problems identified in the project Purpose and Need. The alternatives evaluation process included developing evaluation criteria based on the project Purpose and Need and project goals, developing a full range of reasonable alternatives, and documenting the elimination and recommendation of alternatives for future consideration. **Figure 2-1** illustrates the alternatives development and evaluation process used for the US 34 PEL, which is described in **Section 2.2**.

The CDOT *US 34 Alternatives Report* (**Appendix C**) describes in more detail the process used to identify concepts and site-specific alternatives, determine evaluation criteria, and evaluate the concepts and alternatives based on the Purpose and Need, the context of the corridor and potential environmental impacts, among numerous other criteria. The evaluation process included outreach efforts with local agencies and area stakeholders, including the TAC who helped to shape the Purpose and Need, project vision, and criteria used to evaluate concepts. The TAC also provided feedback on the results from each level of evaluation and the Recommended Alternative. Those efforts are summarized in **Section 5.0, Agency Coordination and Public Involvement**.

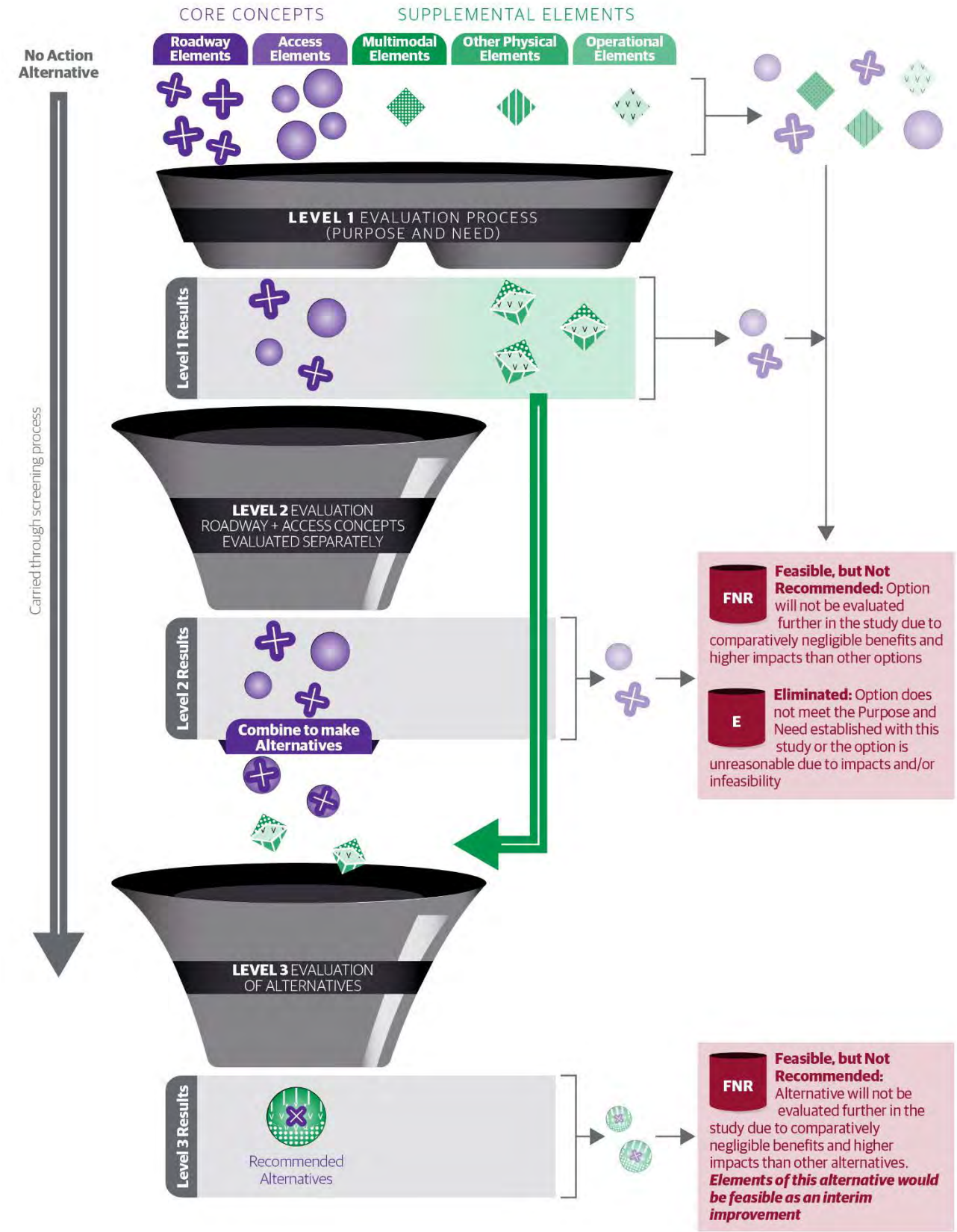


Figure 2-1. Alternatives Development and Evaluation Process for the US 34 PEL

2.1 No Action Alternative

Under the No Action Alternative, only improvements that are already planned and included in the fiscally constrained *2040 Regional Transportation Plan* (NFRMPO, 2015b) and routine maintenance would be completed. The No Action Alternative does not meet the Purpose and Need. It is carried forward as a baseline for comparison to the concepts and alternatives evaluated during the PEL Study. The programmed transportation improvements located within the Study Area are listed in **Table 2-1**.

Table 2-1. Programmed Transportation Improvements Included in the No Action Alternative

Facility Name	From	To	Number of Lanes		Year of Improvement	Cost (thousands)	Funding Source
			Before	After			
59th Avenue	20th Street	US 34 Bypass	2	2 (plus a center turn lane)	2015	$1,500	Greeley – Capital Improvement Program
65th Avenue	US 34 Bypass	WCR 54	2	4	2015	$3,000	Greeley – Road Development Funds
SH 402	St. Louis Avenue	Boise Avenue	2	4	2015	$6,000	Loveland – Transportation Capital Improvement Plan Funds; CDOT
Weld County Parkway (WCR 49)	US 34	I-76	0-4	4 (plus a center turn lane)	2017	$12,500	Weld County – General Fund
37th Street	35th Avenue	Two Rivers Parkway	2	4	2018	$1,500	Evans – Capital Projects Street Fund Future Development
59th Avenue	4th Street	C Street	2	4	2020	$2,400	Greeley – Road Development Funds
Boyd Lake Avenue	LCR 20C	US 34	2	4	2020	$1,988	Loveland – Transportation Capital Improvement Plan Funds
Boyd Lake Avenue	US 34	Canal	2	4	2020	$2,732	Loveland – Centerra Metro District
Crossroads Boulevard	Centerra Parkway	LCR 3	2	4	2020	$2,365	Loveland – Transportation Capital Improvement Plan Funds
I-25	SH 14	1.5 miles south of SH 402	4	6	2020	$250,700	CDOT; Local funding; Federal – TIGER
Taft Ave	Arkins Branch	US 34	4	4 (plus a center turn lane and bike lanes)	2020	$10,509	Loveland – Transportation Capital Improvement Plan Funds

Table 2-1. Programmed Transportation Improvements Included in the No Action Alternative

Facility Name	From	To	Number of Lanes		Year of Improvement	Cost (thousands)	Funding Source
			Before	After			
US 34	Denver Avenue	Boyd Lake Avenue	4	6	2020	$6,506	Loveland – Transportation Capital Improvement Plan Funds, CDOT, Surface Transportation Block Grant
US 34	Rocky Mountain Avenue	I-25	4	6	2020	$2,066	Loveland – Centerra Metro District, Transportation Capital Improvement Program Funds; CDOT
US 34	I-25	Kendall Parkway (LCR 3E)	4	6	2020	$12,000	Loveland – Centerra Metro District, Transportation Capital Improvement Program Funds; CDOT
83rd Avenue	US 34 Business Route	US 34 bypass	2	4	2025	$5,900	Greeley – Road Development Funds
Crossroads Boulevard	Great Western Drive	SH 257	0	2 (plus a center turn lane)	2025	$5,000	Windsor – Road Impact Fee and Adjacent Development
LCR 3	US 34	Crossroads Boulevard	0	2	2025	$8,073	Loveland – Transportation Capital Improvement Plan Funds
LCR 18	I-25 Frontage Road	WCR 13	2	4	2030	$13,890	Johnstown; Adjacent Developers
US 34	Boyd Lake Avenue	Rocky Mountain Avenue	4	6	2030	$4,291	Loveland – General Fund; CDOT
59th Avenue	US 34 Bypass	20th Street	2	4	2035	$3,500	Greeley – Road Development Funds
83rd Avenue	WCR 54	WCR 64	2	2 (plus a center turn lane)	2035	$7,000	Greeley – Road Development Funds
North Fairground Avenue (LCR 5)	Rodeo Road	71st Street (LCR 30)	2	4	2035	$3000	Loveland – Transportation Capital Improvement Plan Funds
O Street	SH 85	83rd Avenue	2	2 (plus a center turn lane)	2035	$4,700	Greeley – Road Development Funds

Table 2-1. Programmed Transportation Improvements Included in the No Action Alternative

Facility Name	From	To	Number of Lanes		Year of Improvement	Cost (thousands)	Funding Source
			Before	After			
SH 402	LCR 9	I-25	2	4	2035	$33,378	Loveland – Transportation Capital Improvement Plan Funds; CDOT
SH 402	US 287	St. Louis Avenue	2	4	2035	$3,000	Loveland – Transportation Capital Improvement Plan Funds; CDOT
Taft Avenue	US 34	22nd Street	4	4 (plus a center turn lane and bike lanes)	2035	$6,123	Loveland – Transportation Capital Improvement Plan Funds
WCR 54	35th Avenue	WCR 17	2	2 (plus a center turn lane)	2035	$6,800	Greeley – Road Development Funds
WCR 56	US 34 Bypass	WCR 17	0	2	2035	$21,000	Greeley – Road Development Funds

Source: 2040 Regional Transportation Plan (NFRMPO, 2015b), amended June 2017

Note:

Rows highlighted in yellow indicate projects that are located on US 34.

2.2 Alternatives Development and Evaluation

2.2.1 Level 1 Concept Development and Evaluation

A wide range of potential solutions was developed that could be implemented to address the project Purpose and Need. The Level 1 concepts focused on addressing the Purpose and Need and the issues identified in the evaluation of existing conditions, and were developed based on input received from agency stakeholders and public open houses. Concepts were developed for each of the six corridor segments and were categorized by roadway elements, access, multimodal elements, other physical elements, and operational elements.

Level 1 Evaluation Process

The Level 1 evaluation criteria were developed using the need categories of safety, travel demand, travel reliability, and local access and mobility. Concepts were evaluated by answering "yes" or "no" to the following questions to demonstrate each concept's ability to meet the project Purpose and Need:

- Does the concept increase safety?
- Does the concept accommodate future travel demand?
- Does the concept increase travel reliability?
- Does the concept support local access and mobility?

Concepts that received all "yes" answers to the criteria were carried forward as core concepts because they had the potential to address the Purpose and Need as a standalone alternative. Some concepts were able to address one or several needs, but not all four. These were carried forward for further consideration as a supplemental element. Concepts that could not meet the Purpose and Need were

eliminated from the US 34 PEL study. Concepts that had negligible benefits or higher impacts than other concepts, were not recommended for further evaluation in the PEL study.

Level 1 Evaluation Results

Up to 27 concepts and a No Action Alternative were considered for each corridor segment during Level 1 Evaluation. Descriptions of the build concepts evaluated are listed in **Table 2-2**.

Table 2-2. Description of the Build Concepts Evaluated in Level 1

Element Type	Concept Name and Description
Core Concepts	
Roadway Elements	Add lanes – Equates to adding general capacity to the segment.
	Add/expand auxiliary lanes – Differs from adding lanes because it focuses on adding capacity to existing intersections.
	Add frontage roads – Looked at applying a frontage road system to the length of an entire segment.
	Design Criteria – Looks at elements of the roadway cross-section that can be improved to meet the Purpose and Need such as lane width, horizontal and vertical alignment, curve radius, and freight movement.
Access Elements	Intersection Improvements – Looked at specific intersections within each segment to determine if improvements meet the Purpose and Need.
	Median Improvements – Treatments to medians to enhance functionality, visibility, and/or aesthetics of medians (includes installation or replacement of barriers, raised or painted center islands, and/or landscaping).
	Consolidate Access – Consolidate access points along US 34 to reduce conflict points and improve traffic flow.
	Parking – Parking considerations were limited to the few locations where a parking area abuts US 34 and does not have curbs, and or where cars are backing out of parking locations onto US 34.
Supplemental Elements	
Multimodal Elements	Bicycle and pedestrian regional connections along US 34 – Identifies opportunities for the Recommended Alternative to accommodate regional connections along US 34 based on project segments and constraints such as signed and marked crossings, and underpasses/overpass improvements and additions.
	Bicycle and pedestrian mobility improvements/enhancements – Identifies opportunities for the Recommended Alternative to accommodate bicycles and pedestrians along or parallel to US 34, crossing locations, and connections to other facilities such as bike lanes additions, sidewalk additions, bike and pedestrian bridges, and infill of missing trail connections.
	Transit Service on US 34 – Identifies opportunities for the Recommended Alternative to accommodate transit service and facilities along the corridor. Recommendations for transit service consist of proposed transit from previous regional and local plans as well as complementary services such as park and rides.
Other Physical Elements	Drainage improvements - Addresses existing drainage problems within each segment.
	Wildlife Crossings – Consist of underpasses/overpasses and at-grade crossings to safely and/or more visibly move wildlife across US 34.
	Localized Safety Improvements – Those that CDOT and local jurisdictions address in the normal course of business as the corridor evolves, such as addressing changes that come when new signals are installed, as new developments and accesses are changed, or if a pattern of crashes occurs that warrants minor changes (for example, in signing, striping, and/or signal phasing).
	Railroad Crossing Improvements – Consists of treatments to the railroad crossing grade such as at implementation of grade-separated crossings or grade separation. Includes enhancements to existing crossings, such as railway signals and systems advance warning signs, pedestrian fences, and lighting.
	Utilities – Refers to improvements or modifications to aboveground and buried utilities.

Table 2-2. Description of the Build Concepts Evaluated in Level 1

Element Type	Concept Name and Description
Operational Elements	Existing Technologies – Consists of integrating available technologies into alternatives to supplement the goals of the Purpose and Need such as: installing fiber, enhancing signal systems, improving communications, and active transportation demand techniques. More detail on specific technologies considered is discussed in **Appendix C**.
	Emerging Technologies – Consists of integrating emerging technologies into alternatives to supplement the goals of the Purpose and Need—additional capacity provided from alternatives could make room for emerging technology and how capacity can be managed. Emerging technology strategies include transit signal priority, dynamic lanes, active transportation demand techniques, and connected vehicle technology. More detail on specific technologies considered is discussed in **Appendix C**.
	Incident Management – Consists of processes intended to detect, respond to, remove, and/or prevent vehicle incidents along US 34 such as courtesy patrol to provide accident-scene protection and other roadside assistance; improved traffic control center communications to increase response time and active demand management; and implementation of corridor traffic operations managers.
	Maintenance Access – Assures that any design would accommodate access to all areas of the highway facility when construction is completed to maintain and repair infrastructure without dramatically affecting traffic operations. Strategies may include adequate shoulder space along US 34 and its intersections/interchanges, pull-off areas, overpass/bridge access ladders and walkways, and median accommodations.

Table 2-3 summarizes the results of Level 1 Evaluation by corridor segment. Concepts carried forward for further evaluation are denoted by a checkmark in **Table 2-3**. **Appendix C** includes the full Level 1 evaluation matrix and the results of the Level 1 evaluation.

Table 2-3. Level 1 Evaluation Results

Concepts	Corridor Segment					
	Foothills	Loveland Urban	Loveland 6-Lane	Johnstown-Greeley	Greeley Expressway	East End
Add lanes	✓	✓	✓	✓	✓	✓
Add/expand auxiliary lanes	✓	✓	✓	✓	✓	Not recommended for further evaluation Existing intersections in this segment have appropriate auxiliary lanes. Additional auxiliary lanes would most likely be implemented with development of adjacent parcels, as governed by the ACP.
Add frontage roads	Not recommended for further evaluation In all segments, adding frontage roads would only meet one element of the Purpose and Need (increases travel reliability) and result in higher impacts than other concepts. Frontage roads are not necessary to accommodate the access needs within any segment; thus, they are not recommended for further evaluation.					
Design Criteria	✓	✓	✓	✓	✓	✓
Intersection Improvements	✓	✓	✓	✓	✓	✓
Median Improvements	✓	✓	✓	✓	✓	✓
Consolidate Access	Not recommended for further evaluation An ACP is being developed for these segments. Once the ACP is adopted, the individual interchange/intersection improvements at public streets identified in the ACP will be implemented with public projects and are considered supplemental to those projects. Consolidation of access to private properties will occur with development regardless of what happens on the highway.			Not recommended for further evaluation These segments have an adopted ACP. The individual interchange/intersection improvements at public streets identified in the ACP will be implemented with public projects and are considered supplemental to those projects. Consolidation of access to private properties will occur with development regardless of what happens on the highway.		
Parking	✓	✓	Not recommended for further evaluation No specific locations for parking improvements were identified in these segments.			

Table 2-3. Level 1 Evaluation Results

Concepts	Corridor Segment					
	Foothills	**Loveland Urban**	**Loveland 6-Lane**	**Johnstown-Greeley**	**Greeley Expressway**	**East End**
Bicycle and pedestrian regional connections along US 34	✓	✓	✓	✓	✓	✓
Bicycle and pedestrian mobility improvements/enhancements	✓	✓	✓	✓	✓	✓
Transit Service on US 34	✓	✓	✓	✓	✓	Not recommended for further evaluation There are no planned existing or proposed transit services in this segment.
Drainage Improvements	✓	✓	✓	Not recommended for further evaluation No specific areas with drainage problems were identified in these segments.		
Wildlife Crossings	✓	Not recommended for further evaluation These segments fall within an urban area with limited need identified for wildlife crossings.		Not recommended for further evaluation Wildlife related crashes were not identified as an issue in these segments during scoping; therefore, the expected need for crossings is minimal.		✓
Localized Safety Improvements	✓	✓	✓	✓	✓	✓
Railroad Crossing Improvements	Not recommended for further evaluation There are no railroads within this segment.		Not recommended for further evaluation No at-grade railroad crossings exist in this segment. Impacts to the grade-separated railroad crossing in this segment will be evaluated with future roadway projects.	✓	Not recommended for further evaluation There are no railroads within this segment.	

Table 2-3. Level 1 Evaluation Results

Concepts	Corridor Segment					
	Foothills	**Loveland Urban**	**Loveland 6-Lane**	**Johnstown-Greeley**	**Greeley Expressway**	**East End**
Existing Technologies	✓	✓	✓	✓	✓	✓
Emerging Technologies	✓	✓	✓	✓	✓	✓
Incident Management	✓	✓	✓	✓	✓	✓
Maintenance Access	✓	✓	✓	✓	✓	✓
Utilities	Not recommended for further evaluation Does not meet Purpose and Need as a standalone improvement. Modifications to existing utilities would be addressed in conjunction with other projects.					

✓ = Concept carried forward for further evaluation

2.2.2 Level 2 Concept Refinement and Evaluation

Roadway improvements (improvements along a stretch of US 34) and access improvements (improvements at intersection locations) identified as core concepts within the Level 1 evaluation were further developed and refined to meet the needs of the roadway segment or a specific access location within the segment. Design details were added to concepts, as appropriate, to understand traffic operations and potential environmental effects. Level 2 concepts are listed in **Appendix C**.

Level 2 Evaluation Process

The purpose of the Level 2 evaluation was to compare how well concepts perform to meet the project Purpose and Need while balancing environmental effects. The Level 2 evaluation criteria expanded on measures from the Level 1 evaluation and provided additional criteria based on project goals (see **Section 1.5**). The roadway and access concepts developed for Level 2 were compared to determine how well each concept met the following evaluation criteria. Performance measures for each of these criteria were developed and are detailed in **Table 2-4**.

Table 2-4. Level 2 Evaluation Criteria and Performance Measures

Category	Criteria	Performance Measure (Measurement)
Safety	• Reduce crashes • Reduce crash severity • Enhance pedestrian/bike safety • Improve roadway geometry	Vehicle/vehicle conflict points (change) Vehicle/pedestrian-bicycle conflict points (change) Projected total number of crashes (change) Projected number of injury and/or fatal crashes (change)
Travel Demand	• Reduce congestion • Serve demand	Change in Vehicle Miles Traveled (VMT) (qualitative) Level of Service (LOS) (change) Vehicle Hours of Delay (VHD) (hours)
Reliability	• Improve travel reliability • Provide emergency access for adjacent communities • Quality of traffic operations	TTI (ratio) Travel Time by location/segment (percent change/minutes)
Mobility	• Provide local and regional route connectivity • Enhance non-motorized opportunities • Provide additional travel choices • Improve bicycle connectivity • Ability to not preclude transit/rail options	Access to transit facilities (qualitative) Reduce barriers for north/south pedestrian and bicycle travel (qualitative) Improve continuity for east/west bicycle and pedestrian travel (qualitative)
Freight	• Accommodate truck requirements	Minimize turning restrictions and/or out-of-direction travel (yes/no) Geometry accommodates truck turning movements (yes/no)
Environmental	• Identification of environmental effects	Relative environmental effects (Good, Fair, Poor)
Community, Land Use, and Transportation Priorities	• Included in community land use and transportation plans	Sufficient ROW to accommodate planned transportation projects, including ACP items (Good, Fair, Poor) Consistent with local plans (qualitative) Consistent with ACP (qualitative) Support economic development (qualitative)

Improvements that were identified as supplemental elements in the Level 1 evaluation, including existing and emerging technology, were not evaluated in Level 2 but were carried forward to be included in alternatives packaging and evaluation in Level 3.

Level 2 Evaluation Results

In the Level 2 evaluation, 75 roadway and access concepts were evaluated, the majority of which were recommended for further evaluation in Level 3. The following concepts were considered to be feasible but not recommended for further evaluation due to comparatively negligible benefits and higher impacts than other options. The reason why each concept is not recommended is included below.

- **Foothills Segment**
  - Add additional lanes (four lanes from Rossum Drive to Morning Drive with a center turn lane) – This concept is not recommended because traffic does not warrant the additional capacity, and the additional travel lanes would result in higher ROW and environmental impacts.
  - Roundabout at Morning Drive – This concept is not recommended due to the proximity of the signal at Cascade Avenue to this intersection.
- **Loveland Urban Segment**
  - Add additional lanes (six lanes through entire segment) – This concept is not recommended because the ROW required for this concept would be extensive compared to the other concepts, and the additional capacity provides relatively little benefit to safety or travel demand for the additional impacts.
- **Johnstown-Greeley Segment**
  - Indirect left turns at LCR 3E – This concept is not recommended because it is inconsistent with local plans, including the adopted ACP for LCR 3E.
  - Indirect left turns at LCR 3 – This option is not recommended because it is inconsistent with local plans, including the adopted ACP for LCR 3.
  - Indirect left turns at WCR 15 – This concept is not recommended because it is inconsistent with local plans, including the adopted ACP for WCR 15.
- **Greeley Expressway Segment**
  - Indirect left turns at 95th Avenue – This concept is not recommended because it is inconsistent with local plans, including the adopted ACP for 95th Avenue. If the ACP is revised this design option would work as an interim project.
- **East End Segment**
  - Add additional lanes (6-lane rural principal arterial/expressway through entire segment) – This concept is not recommended because future traffic volumes do not necessitate additional capacity in this roadway segment.

The following concepts were eliminated from further consideration in the US 34 PEL because they do not meet the project Purpose and Need nor contribute to achieving project goals.

- **Loveland 6-Lane Segment**
  - Add additional lanes (8-lane arterial west of I-25 to Boise Avenue) – Although this concept would improve reliability and meet travel demand, it is inconsistent with local plans, therefore it has been eliminated from further consideration.

– Hourglass roundabout at Cleveland Avenue and Lincoln Avenue intersection with US 34 – This concept would not improve LOS at this intersection unlike other concepts proposed for this location, therefore it has been eliminated from further consideration.

The remaining concepts were carried forward into alternatives packaging and Level 3 evaluation with the No Action Alternative. **Appendix C** includes a full listing of concepts evaluated in Level 2 and the results of the Level 2 evaluation.

2.2.3 Level 3 Alternatives Development and Evaluation

For the Level 3 evaluation, the roadway and access elements advancing from the Level 2 evaluation were combined with the supplemental elements (including existing and emerging technologies) that advanced out of the Level 1 evaluation to create alternative packages that could be further evaluated. **Table 2-5** lists the alternatives, and the concepts used to compile the alternatives by corridor segment. At some access locations, more than one concept that advanced out of Level 2 was included in the alternative packages. These are listed as design options within each alternative. Schematic drawings of select basic design concepts are included on **Figure 2-2**.

Table 2-5. Alternatives Evaluated in Level 3

Foothills Segment	
Concepts Included	***Alternative 1: 2-Lane Cross Section with Added or Expanded Auxiliary Lanes at Intersections and Modifications to Shoulders***
Roadway	Add/expand auxiliary lanes at major intersections to maximize the capacity of the 2-lane cross section while adding standard shoulders
Access	Eastbound left-turn lane at LCR 27 New traffic signal at Glade Road Intersection Rossum to Cascade Improvements: • Option 1: 2-way Left-turn Lane • Option 2: Roundabout at Rossum • Option 3: Channelized T at Morning Drive • Option 4: Raised Median
Supplemental Elements	Median improvements, Consolidate access, Bicycle and pedestrian regional connections along US 34, Transit service on US 34, Wildlife crossings, Localized safety improvements, Existing technologies, Emerging technologies, Incident management, Maintenance access, Parking, Drainage improvements
Loveland Urban Segment	
Concepts Included	***Alternative 1: 4-Lane Cross Section with added or expanded auxiliary lanes at major intersections***
Roadway	Add/expand auxiliary lanes at major intersections to maximize the capacity of the 4-lane cross section
Access	Wilson Avenue Improvements: • Double left-turn lanes all directions with right through-lanes Taft Avenue Improvements: • Double left-turn lanes southbound and westbound
Supplemental Elements	Median improvements, Consolidate access, Bicycle and pedestrian regional connections along US 34, Transit service on US 34, Localized safety improvements, Existing technologies, Emerging technologies, Incident management, Maintenance access, Parking, Drainage improvements
Loveland 6-Lane Segment	
Concepts Included	***Alternative 1: 6-Lane Cross Sections with Intersections***
Roadway	Add additional lanes from Lincoln to Monroe to create a 6-lane cross section

Table 2-5. Alternatives Evaluated in Level 3

Access	Cleveland Avenue/Lincoln Avenue (US 287) Improvements: • Option 1: Double Left-turn Lanes • Option 2: Indirect Left-turn Lanes • Option 3: 3-lane Roundabout	
Supplemental Elements	Median improvements, Consolidate access, Bicycle and pedestrian regional connections along US 34, Transit service on US 34, Localized safety improvements, Existing technologies, Emerging technologies, Incident management, Drainage improvements	
Johnstown-Greeley Segment		
Concepts Included	***Alternative 1: 4-Lane Cross Section with Interchanges***	***Alternative 2: 6-Lane Cross Section with Interchanges***
Roadway	Existing 4-lane cross section with interchanges	Add lanes to create a 6-lane cross section with interchanges
Access	Interchange at Larimer Parkway (LCR 3E) Interchange at LCR 3 WCR 13: • Option 1: Interchange at WCR 13 • Option 2: Interchange and realignment of WCR 13 ¾ movement at WCR 15 Interchange at WCR 17 No improvements are proposed for WCR 19 and SH 257 Widen the westbound on-ramp to US 34 Business (2-lane)	Interchange at Larimer Parkway (LCR 3E) Interchange at LCR 3 WCR 13: • Option 1: Interchange at WCR 13 • Option 2: Interchange and realignment of WCR 13 ¾ movement at WCR 15 Interchange at WCR 17 New signals at SH 257 Ramps with no changes to WCR 19 Widen the westbound on-ramp to US 34 Business (2-lane)
Supplemental Elements	Consolidate access, Bicycle and pedestrian regional connections along US 34, Transit service on US 34, Localized safety improvements, Railroad, Existing technologies, Emerging technologies, Incident management, Maintenance access	Median improvements, Consolidate access, Bicycle and pedestrian regional connections along US 34, Transit service on US 34, Localized safety improvements, Railroad, Existing technologies, Emerging technologies, Incident management, Maintenance access
Greeley Expressway Segment		
Concepts Included	***Alternative 1: 4-Lane Cross Section with Interchanges***	***Alternative 2: 6-Lane Cross Section with Interchanges***
Roadway	Existing 4-lane cross section with interchanges	Add lanes to create a 6-lane cross section with interchanges

Table 2-5. Alternatives Evaluated in Level 3

Access	Promontory Parkway: • Option 1: SPUI • Option 2: Interchange ¾ movement at 95th Avenue Interchange at 83rd Avenue 71st Avenue/65th Avenue: • Option 1: 3/4 Movement at 71st Avenue with a SPUI at 65th Avenue • Option 2: SPUI at 71st Avenue with an overpass at 65th Avenue • Option 3: Split diamond interchange Interchange at 47th Avenue Interchange at 35th Avenue Minor Changes at 23rd Avenue 17th Avenue: • Option 1: Add a third eastbound lane and a channelized T at 17th Avenue • Option 2: Overpass over 17th Avenue	Promontory Parkway: • Option 1: SPUI • Option 2: Interchange ¾ movement at 95th Avenue Interchange at 83rd Avenue 71st Avenue/65th Avenue: • Option 1: 3/4 Movement at 71st Avenue with a SPUI at 65th Avenue • Option 2: SPUI at 71st Avenue with an overpass at 65th Avenue • Option 3: Split diamond interchange Interchange at 47th Avenue Interchange at 35th Avenue Minor Changes at 23rd Avenue 17th Avenue: • Option 1: Add a third eastbound lane and a channelized T at 17th Avenue • Option 2: Overpass over 17th Avenue
Supplemental Elements	Consolidate access, Bicycle and pedestrian regional connections along US 34, Transit service on US 34, Localized safety improvements, Existing technologies, Emerging technologies, Maintenance access, Incident management	Median improvements, Consolidate access, Bicycle and pedestrian regional connections along US 34, Transit service on US 34, Localized safety improvements, Existing technologies, Emerging technologies, Incident management, Maintenance access
East End Segment		
Concepts Included	***Alternative 1: 4-Lane Cross Section with Intersections***	
Roadway	Existing 4-lane cross section with intersections	
Access	3/4 Movement at 27th/28th Street (frontage road) WCR 45 Improvements: • Option 1: Realign Intersection • Option 2: Right-in/Right-out Signalization at US 34 Business 3/4 Movement at WCR 45.5 3/4 Movement at WCR 47 3/4 Movement at WCR 47.5	
Supplemental Elements	Median improvements, Consolidate access, Bicycle and pedestrian regional connections along US 34, Wildlife crossings, Localized safety improvements, Existing technologies, Emerging technologies, Incident management	

SPUI= single-point urban interchange

EXAMPLES OF ROADWAY DESIGN FOR SELECT CONCEPTS EVALUATED IN THE US 34 PEL

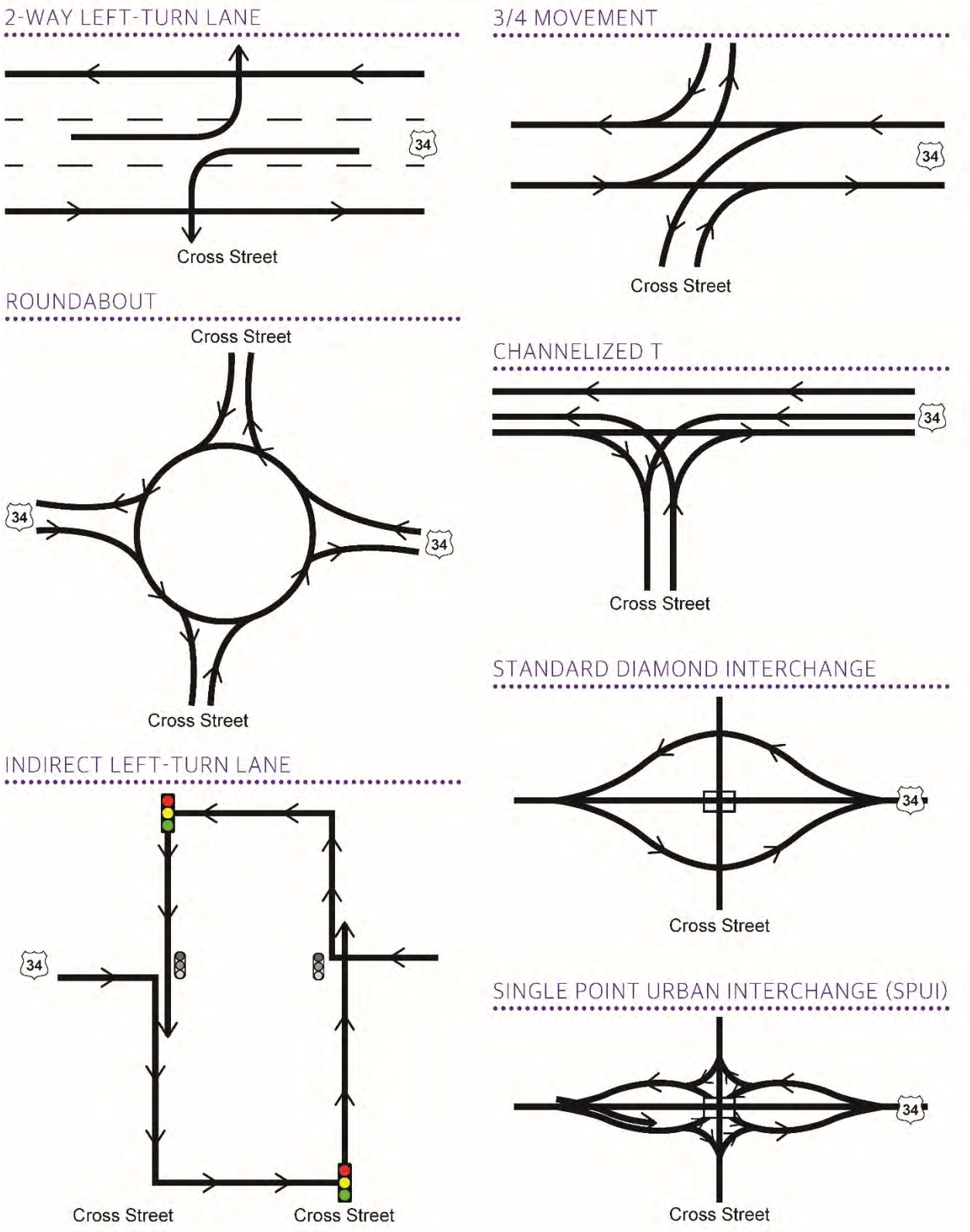


Figure 2-2. Schematic Drawings of Selected Concepts Evaluated in Level 3

Level 3 Evaluation Process

The purpose of the Level 3 evaluation was to compare how well each alternative meets the Purpose and Need, compare how well each alternative would perform, and identify environmental effects that each alternative may have. A number of the criteria used to evaluate concepts during Level 2 were retained or revised and used to evaluate the alternatives in Level 3, and new criteria were also included in the Level 3 evaluation. The evaluation criteria that was used for Level 3 is shown in **Table 2-6** (new criteria are denoted with [a]).

Table 2-6. Level 3 Evaluation Criteria and Performance Measures

Category	Criteria	Performance Measure (Measurement)
Safety	• Reduce crashes • Reduce crash severity • Enhance pedestrian/bike safety • Improve roadway geometry	Vehicle/vehicle conflict points (change) Vehicle/pedestrian-bicycle conflict points (change) Projected total number of crashes (change) Projected number of injury and/or fatal crashes (change)
Travel Demand	• Reduce congestion • Serve demand • Improve operations to adjacent and parallel routes[a]	Change in VMT (qualitative) Overall LOS (change)[a] VHD (hours)
Reliability	• Improve travel reliability • Provide emergency access for adjacent communities • Quality of traffic operations	Travel Time Index (ratio) Travel Time by segment (percent change/minutes)[a]
Mobility	• Provide local and regional route connectivity • Accommodate future transit service[a] • Enhance non-motorized opportunities[a] • Improve bicycle connectivity • Accommodate bicycle and pedestrian travel[a]	Access to transit facilities (qualitative) Accommodate future transit service and facilities (qualitative) Reduce barriers for north/south pedestrian and bicycle travel (qualitative) Improve continuity for east/west bicycle and pedestrian travel (qualitative) Accommodate planned regional non-motorized corridors (qualitative)[a]
Freight	• Accommodate truck requirements	Minimize turning restrictions and/or out-of-direction travel (yes/no) Geometry accommodates truck turning movements (yes/no)
Environmental	• Relative rating of environmental effects[a] • Identification of environmental effects	Relative environmental effects (Good, Fair, Poor)
Community, Land Use, and Transportation Priorities	• Included in community land use and transportation plans	Sufficient ROW to accommodate planned transportation projects, including ACP items (Good, Fair, Poor) Consistent with local plans (qualitative) Consistent with ACP (qualitative) Support economic development (qualitative)
Cost[a]	• Segment conceptual cost[a]	Cost or range of cost (2017 U.S. Dollars)

[a] = Criteria or performance measures new to Level 3 Evaluation

Level 3 Evaluation Results

The Level 3 evaluation resulted in one alternative in the Johnstown-Greeley segment and one alternative in the Greeley Expressway segment not being recommended. In both segments, Alternative 1, 4-Lane Cross Section with Interchanges, was not recommended for further consideration because the 6-lane cross section would achieve the following:

- Eliminate a transition that reduces traffic conflicts, providing consistency with the 6-lane highway section near I-25, and better connect with the I-25 Interchange Project and US 34/US 85 Project (separate studies)
- Better accommodate incident management
- Provide flexibility and be more resilient to accommodate unforeseen growth
- Not require additional ROW over the 4-lane cross section
- Have a relatively similar cost to the 4-lane cross section (difference of approximately 15 percent)
- Provide more flexibility to accommodate express lanes, bus rapid transit options, and/or future emerging technologies

2.3 Recommended Alternatives

Comparison of the alternatives against the Level 3 criteria resulted in the identification of a Recommended Alternative with potential design options for each segment. The Recommended Alternative meets the project Purpose and Need and project goals while minimizing environmental and community impacts and setting a vision for the future of US 34. The following improvements, listed by segment below and illustrated on **Figures 2-3** through **2-8**, comprise the Recommended Alternative for the US 34 corridor. These figures also show potential locations of supplemental elements to the Recommended Alternative including potential wildlife crossings, drainage improvements, parking improvements, transit elements, and a park and ride. A full listing of the roadway, access, and supplemental elements by corridor segment are described in **Table 2-5**. Although future NEPA studies may re-evaluate design options at individual locations, the most reasonable design options were included in each alternative for Level 3 segment evaluation. A detailed discussion describing how the multimodal facilities included in the supplemental elements would be incorporated into the Recommended Alternative is included in **Section 2.3.1**.

- **Foothills Segment**
  - Alternative 1: 2-Lane Cross Section with Added or Expanded Auxiliary Lanes at Intersections and Modifications to Shoulders
- **Loveland Urban Segment**
  - Alternative 1: 4-Lane Cross Section with Intersections
- **Loveland 6-Lane Segment**
  - Alternative 1: 6-Lane Cross Sections with Intersections
- **Johnstown-Greeley Segment**
  - Alternative 2: 6-Lane Cross Section with Interchanges
- **Greeley Expressway Segment**
  - Alternative 2: 6-Lane Cross Section with Interchanges
- **East End Segment**
  - Alternative 1: 4-Lane Cross Section with Intersections

FOOTHILLS SEGMENT RECOMMENDED ALTERNATIVE

3.2 MILES, LARIMER COUNTY ROAD 27 TO MORNING DRIVE

2-lane Roadway Cross Section with added or expanded auxiliary lanes at intersections and modifications to shoulders

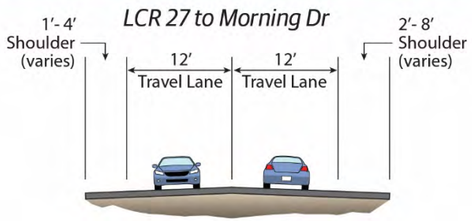
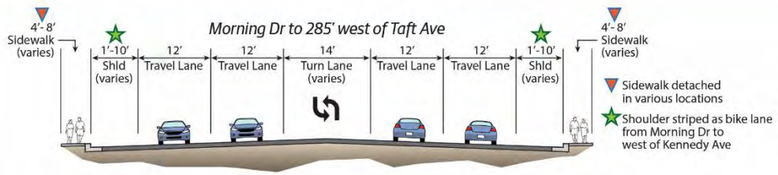


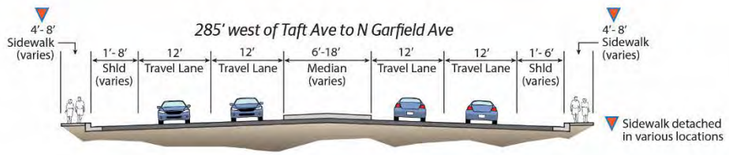
Figure 2-3. Recommended Alternative: Foothills Segment

LOVELAND URBAN RECOMMENDED ALTERNATIVE

3.1 MILES, MORNING DRIVE TO N. GARFIELD AVENUE

4-lane Roadway Cross Section with Intersections





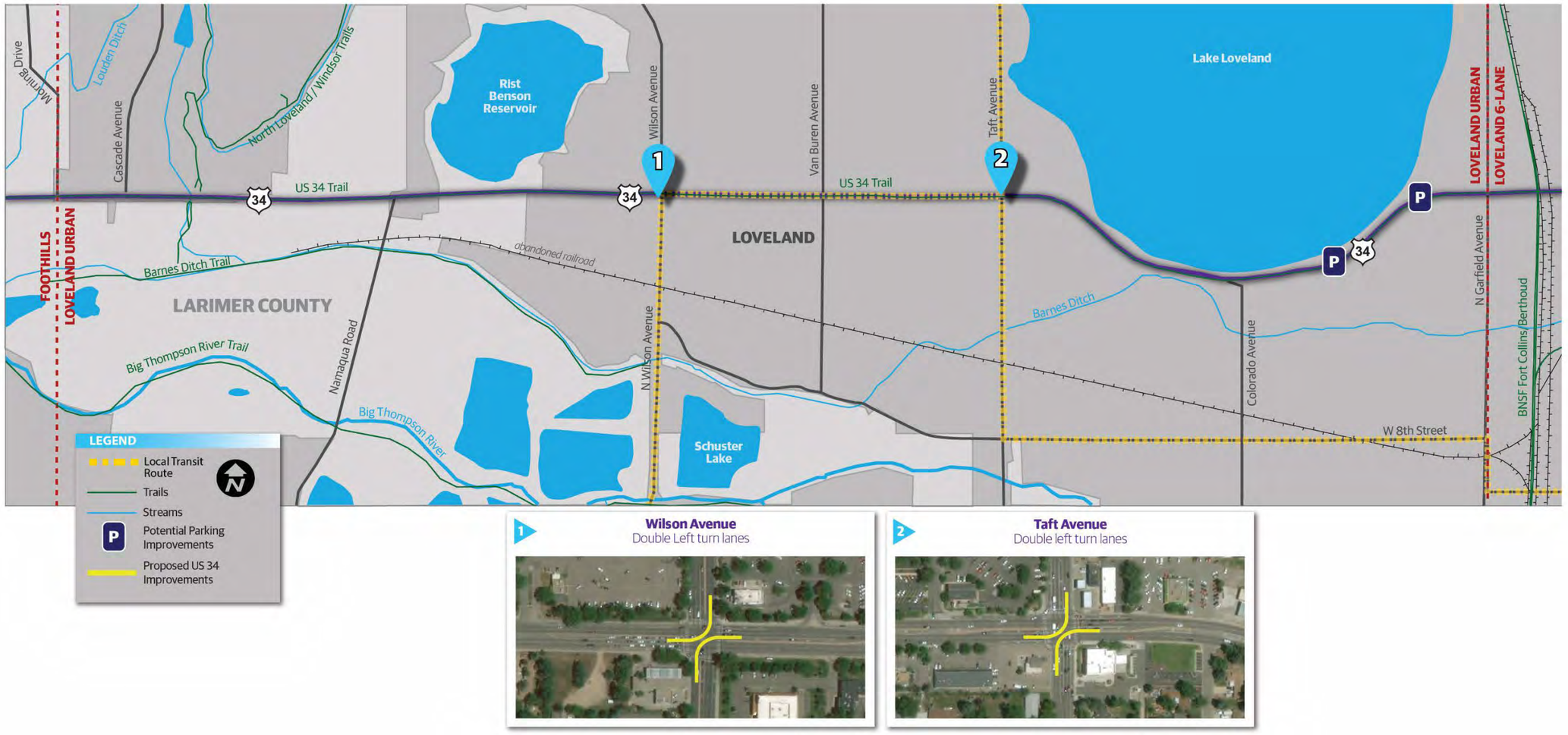


Figure 2-4. Recommended Alternative: Loveland Urban Segment

LOVELAND 6-LANE RECOMMENDED ALTERNATIVE

4.0 MILES. N. GARFIELD AVENUE TO ROCKY MOUNTAIN AVENUE

6-lane Roadway Cross Sections with Intersections

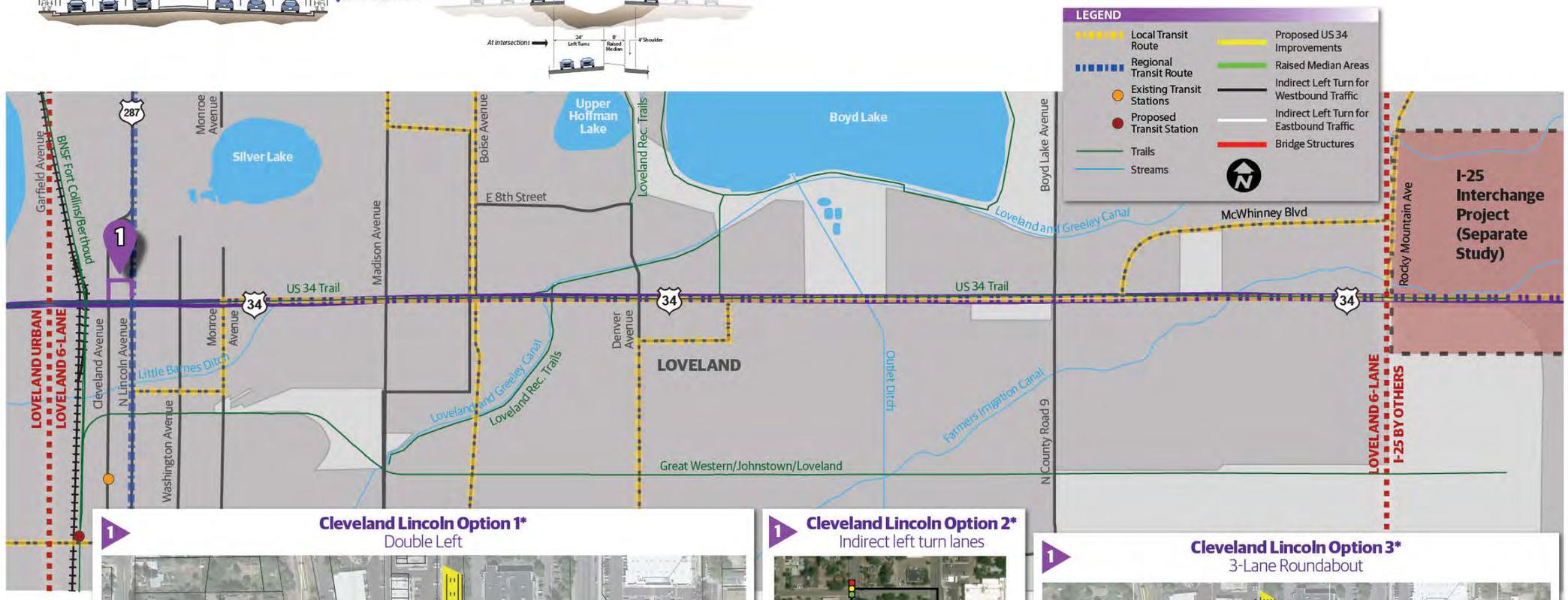
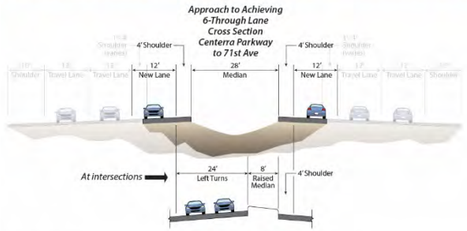


Figure 2-5. Recommended Alternative: Loveland 6-Lane Segment

JOHNSTOWN - GREELEY RECOMMENDED ALTERNATIVE

6.1 MILES, CENTERRA PKWY/THOMPSON PKWY TO EAST OF US 257

6-lane Roadway Cross Section with Interchanges



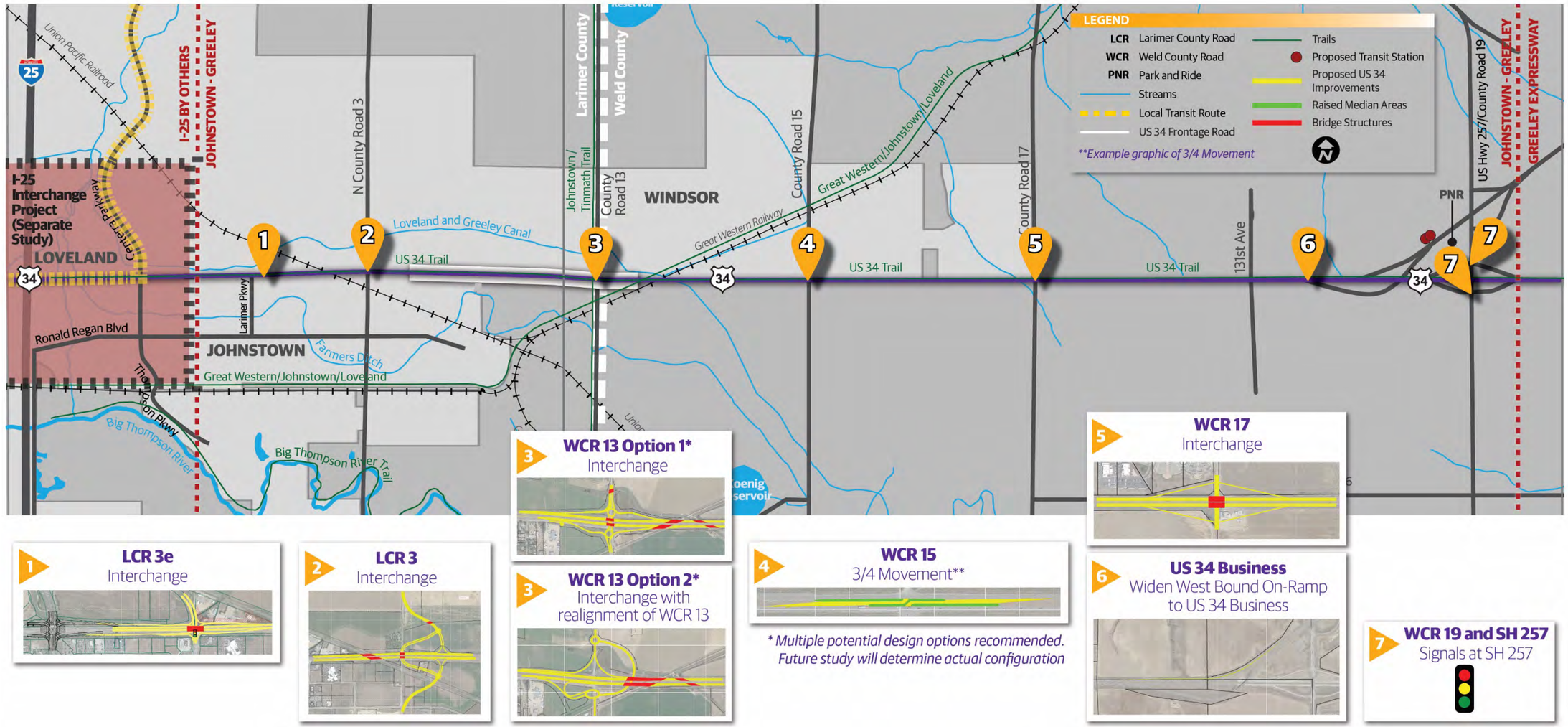
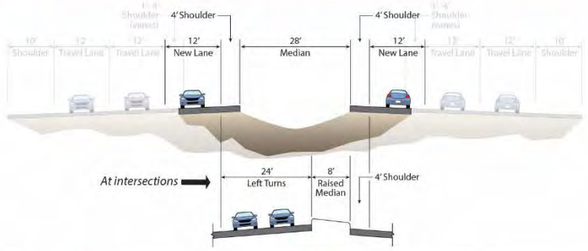


Figure 2-6. Recommended Alternative: Johnstown-Greeley Segment

GREELEY EXPRESSWAY RECOMMENDED ALTERNATIVE

9.3 MILES, EAST OF US 257 TO WEST OF 11TH AVE

6-lane Roadway Cross Section with Intersections



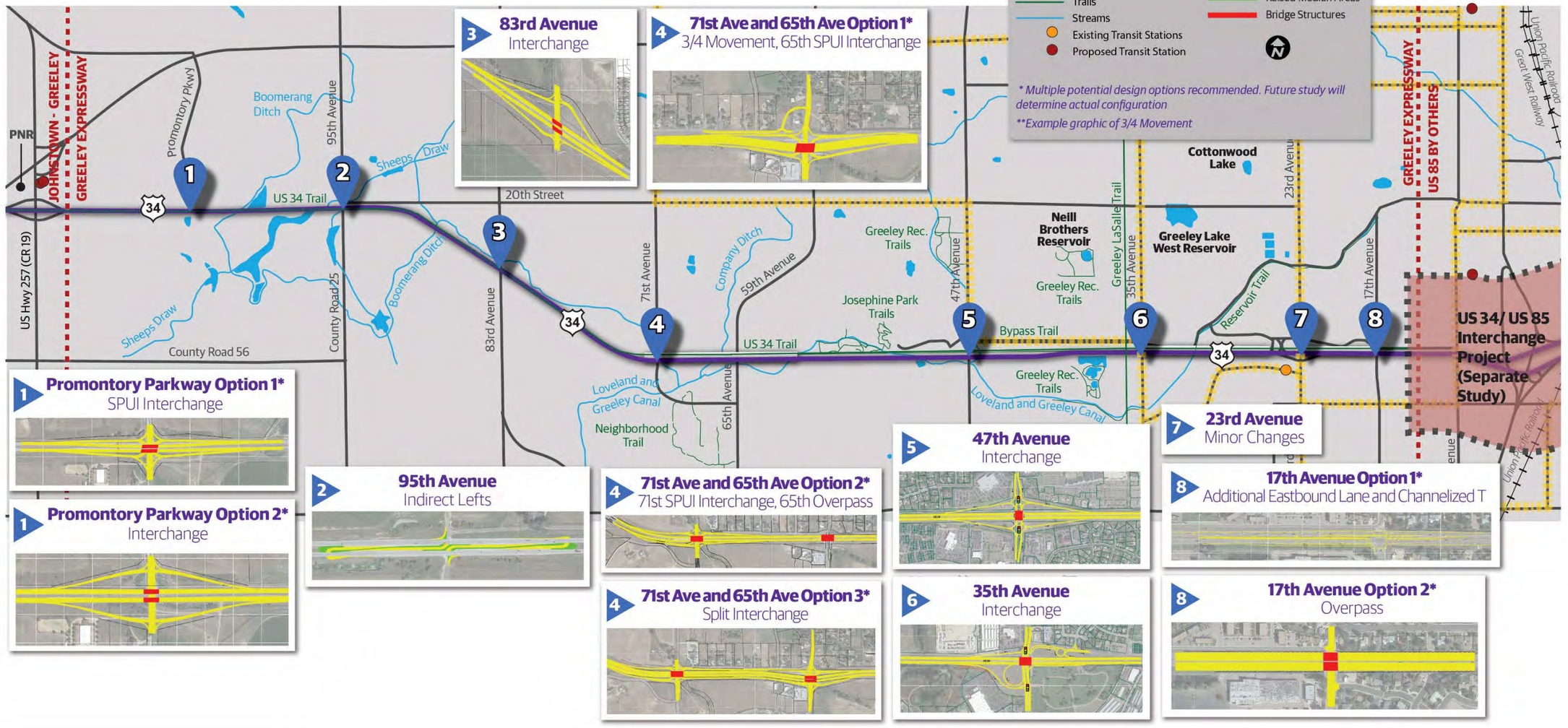


Figure 2-7. Recommended Alternative: Greeley Expressway Segment

EAST END RECOMMENDED ALTERNATIVE

3.8 MILES, 1ST AVENUE TO WCR 49

4-lane Roadway Cross Section with Intersections

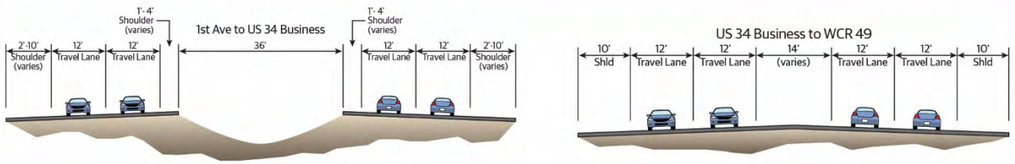


Figure 2-8. Recommended Alternative: East End Segment

2.3.1 Multimodal Considerations

Multimodal facilities were considered during the alternatives development process as supplemental elements for inclusion in the Recommended Alternative. The NFRMPO *Regional Bicycle Plan* (2013), discussed in **Appendix B**, identifies existing and planned regional bicycle corridors within the NFRMPO planning area. The *2016 Non-Motorized Plan* identifies each of these corridors as having the capacity to support pedestrian travel, therefore calling them regional non-motorized corridors (RNMC). **Figure 2-9** illustrates opportunities for the Recommended Alternative to provide potential east-west regional non-motorized connections along US 34 and parts of RNMCs 4, 7, and 3. **Figure 2-10** identifies existing park and rides and transfer stations, proposed routes by transit agencies and local municipalities, the transit routes and stations proposed in the *North I-25 Environmental Impact Statement* (EIS) (CDOT, 2011), and the location of a potential transit node or park and ride location at the intersection of US 34 and WCR 17 that could be constructed as part of the Recommended Alternative.

The following are the three multimodal supplemental elements that were included with the Recommended Alternative:

- **Bicycle and pedestrian regional connections along US 34:** This element identifies opportunities for the Recommended Alternative to accommodate a regional connection along US 34 (RNMC 11) based on project segments and constraints. It also highlights any other crossings of US 34 with north-south RNMCs for the Recommended Alternative to accommodate.
- **Bicycle and pedestrian mobility improvements/enhancements:** This element identifies opportunities for the Recommended Alternative to accommodate: bicycles and pedestrians along or parallel to US 34, crossing locations, and connections to other facilities. It also discusses other important bicycle and pedestrian considerations applicable to each segment.
- **Transit Service on US 34:** This category identifies opportunities for the Recommended Alternative to accommodate transit service and facilities along the corridor.

Within each segment the following terms are used to describe how multimodal supplement elements would be incorporated into future projects:

- Implement: Intended to be included as part of the Recommended Alternative.
- Accommodate: The element is not specifically included in the Recommended Alternative, but the Recommended Alternative should allow for future implementation of the element.
- Acknowledge: The element has been identified but is not included as part of the Recommended Alternative nor is it expressly accommodated by the Recommended Alternative.

Foothills Segment

- **Bicycle and pedestrian regional connections along US 34:** The Recommended Alternative would incorporate, where practical, the following:
  - Accommodation of a bicycle/pedestrian crossing of US 34 with RNMC 3 as an underpass at the Big Thompson River/US 34 bridge
  - Accommodation of RNMC 12 with US 34 at LCR 27

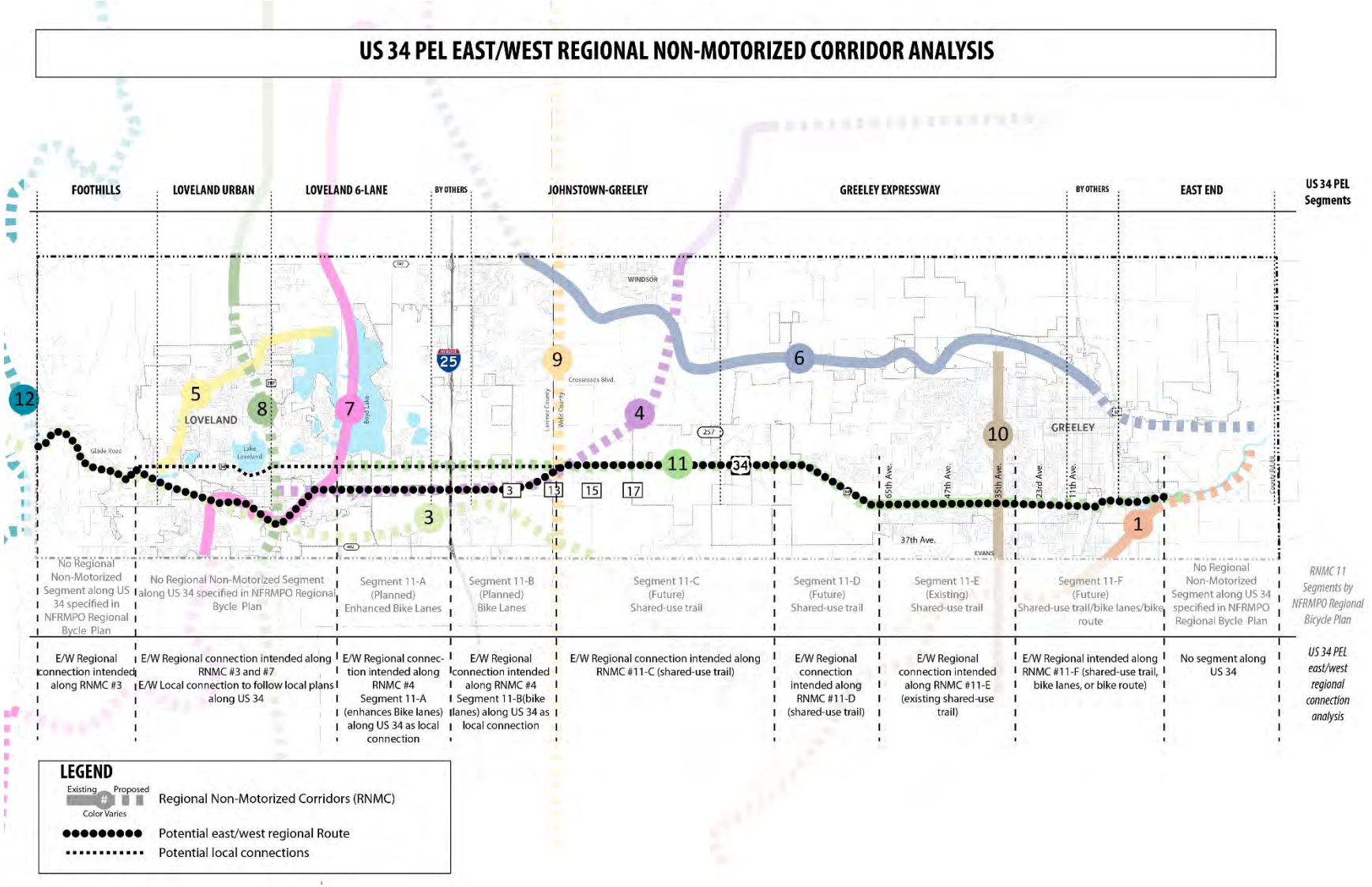


Figure 2-9. Diagram US 34 East-West Regional Non-Motorized Corridor Analysis

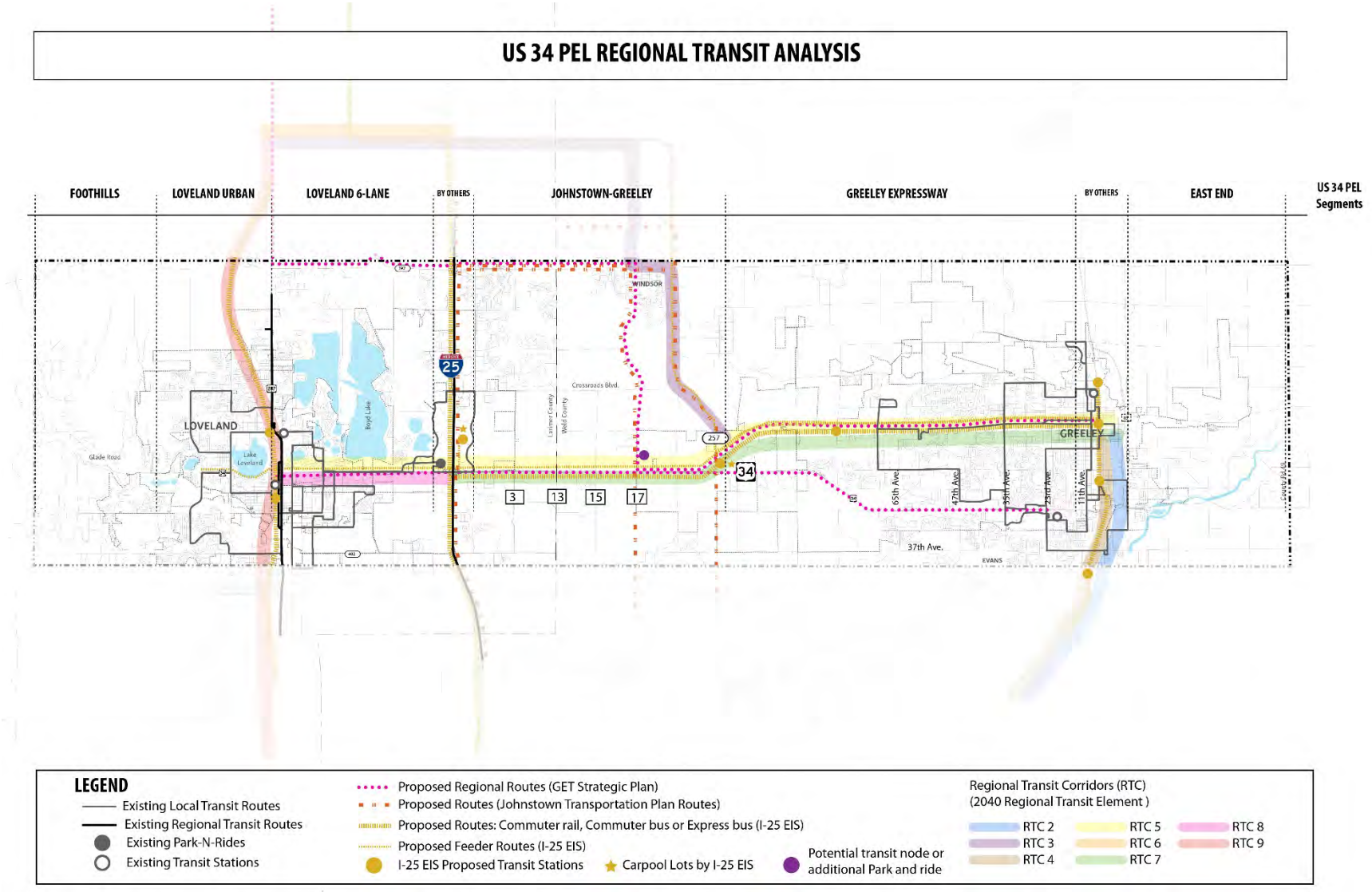


Figure 2-10. Diagram US 34 East-West Regional Non-Motorized Corridor Analysis

- **Bicycle and pedestrian mobility improvements/enhancements.** The Recommended Alternative would incorporate, where practical, the following:
  - Enhanced bike lanes and pedestrian facilities along US 34 from LCR 27 to Namaqua Road, where a connection is missing as identified in the Loveland *Bicycle and Pedestrian Plan* (2012a). The preferred facility width is 8 feet, with a minimum width of 6 feet.
  - A trail connection on the south side of US 34 within the ROW between Glade Park and Wild Natural Area. This would be an offroad detached trail. The elevation of the bike lane and road would be different from the detached trail. Maintenance of the trail would be independent.
  - A bicycle/pedestrian underpass crossing of US 34 on the east side of Rossum Avenue to connect to the planned future side path along Big Barnes Ditch (Loveland's recreational trail system) to a trailhead on the north of US 34, which will eventually connect west to Devil's Backbone Open Space and north to Skyline Natural Area all the way north to 57th Street.

Loveland Urban Segment

- **Bicycle and pedestrian mobility improvements/enhancements.** The Recommended Alternative would incorporate, where practical, the following:
  - Future planned bike lanes from Namaqua Road to North Monroe Avenue, where missing, as identified in the Loveland *Bicycle and Pedestrian Plan* (2012a).
- **Transit Service on US 34**
  - Accommodation of proposed transit route from Greeley to Loveland, as identified in the GET Strategic Plan (2016).
  - Accommodation of proposed feeder route from Greeley to West Loveland (US 34 at Wilson Avenue), as identified in the I-25 EIS (CDOT, 2011). Proposed route runs from US 85 and D Street in Greeley and proceeds west along US 34 (business route) to West Loveland along US 34.
  - Accommodation of proposed feeder route from Loveland to Crossroads Station as specified in the I-25 EIS (CDOT, 2011).

Loveland 6-Lane Segment

- **Bicycle and pedestrian regional connections along US 34.** The NFRMPO *Regional Bicycle Plan* (2013) and *Non-Motorized Plan* (2017) identifies two regional east-west corridors in this segment. RNMC 11 runs along US 34 and starts at the intersection of US 34 with RNMC 7 (underpass east of Boise Avenue). RNMC 4 runs parallel to US 34 approximately 0.5-mile south. The Recommended Alternative would incorporate, where practical, the following:
  - In this segment, the regional east-west trail connection is intended to happen along the proposed RNMC 4, which parallels US 34 and is located only 0.5-mile south of US 34. RNMC 4, as a proposed shared-use path facility, has the possibility of providing a better crossing of I-25.
  - Another possible crossing of I-25 is along RNMC 3, at or near the Big Thompson River Bridge. When the bridge is replaced, there is a possibility of preserving space for a future trail under the bridge. This additional potential crossing of I-25 is only 0.6-mile south of US 34, and around 1,000 feet south of RNMC 4. This potential crossing could serve as a crossing point of I-25 for several RNMCs.
  - The segment of RNMC 11 along US 34 within the Loveland 6-Lane segment should remain and be implemented as a local connection (enhanced bike lanes), as identified in the *Regional Bicycle Plan* (NFRMPO, 2013).

  - Accommodation of grade-separated crossing of US 34 by RNMC 8 at the Burlington Northern Santa Fe Railway (BNSF) rail lines.

- **Bicycle and pedestrian mobility improvements/enhancements.** The Recommended Alternative would incorporate, where practical, the following:
  - Implementation of the future planned bike lanes along US 34 from Namaqua Road to North Monroe Avenue, where missing, as identified in the Loveland *Bicycle and Pedestrian Plan* (2012a).
  - Implementation of the planned enhanced bike lanes along US 34 from North Monroe Avenue to LCR 3, where missing, as identified in the Loveland *Bicycle and Pedestrian Plan* (2012a).
  - Accommodation of proposed north-south bike lanes crossing US 34 at Madison Avenue, as identified in the Loveland *Bicycle and Pedestrian Plan* (2012a).
  - Improvements to the future new recreational trail north of US 34 from Denver Avenue to Boyd Lake Avenue, as identified in the Loveland *Bicycle and Pedestrian Plan* (2012a). This connection would serve as an alternate east-west connection to US 34.
- **Transit Service on US 34.** The Recommended Alternative would accommodate the following:
  - Acknowledgment of proposed commuter rail transit station at BNSF and approximately 6th Street (I-25 EIS [CDOT, 2011]).
  - Accommodation of proposed transit route from Greeley to Loveland, as identified in GET Strategic Plan (2016).
  - Accommodation of proposed feeder route from Greeley to West Loveland (US 34 at Wilson Avenue), as identified in the I-25 EIS (CDOT, 2011). Proposed route runs from US 85 and D Street in Greeley and proceeds west along US 34 (business route) to West Loveland along US 34 Johnstown-Greeley segment.
  - Accommodation of proposed feeder route from Loveland to Crossroads Station as specified in the I-25 EIS (CDOT, 2011).

Johnstown-Greeley Segment

- **Bicycle and pedestrian regional connections along US 34.** The intersection of WCR 13 and US 34 is a key node where RNMCs 4, 9 and 11 all intersect, as identified in the NFRMPO *Regional Bicycle Plan* (2013) and the *Non-Motorized Plan* (2017). The east-west regional trail connection in this segment is intended to be accommodated by a combination of RNMCs 4 and 11. West of WCR 13, the east-west regional trail connection is intended to happen along RNMC 4. East of WCR 13, the connection is intended to happen along RNMC 11. The Recommended Alternative would incorporate, where practical, the following:
  - Accommodation of east-west regional trail connection west of WCR 13 intended to happen along RNMC 4, which parallels US 34 and it is located only 0.5-mile south of US 34.
  - Implementation of east-west regional trail connection east of WCR 13 intended to happen along RNMC 11 as a side path along US 34 (Segment 11-C), as identified in the NFRMPO *Regional Bicycle Plan* (2013). The segment of RNMC 11 west of WCR 13 within the Johnstown-Greeley segment should remain and be implemented as a local connection (enhanced bikes lanes), as identified in the NFRMPO *Regional Bicycle Plan* (2013).
  - A protected crossing signal or underpass/overpass at WCR 13 where RNMCs 4 and 9 cross US 34, as identified by the NFRMPO *Regional Bicycle Plan* (2013).

- **Bicycle and pedestrian mobility improvements/enhancements.** The Recommended Alternative would incorporate, where practical, the following:
  - Implementation of planned enhanced bike lanes along US 34 from North Monroe Avenue to LCR 3, where missing, as identified in the Loveland *Bicycle and Pedestrian Plan* (2012a).
  - Accommodation of connection to proposed Johnstown's community/neighborhood trail between WCR 13 and WCR 15 heading southeast following the Loveland and Greeley Canal, as identified in *Johnstown Area Comprehensive Plan* (2006) and Johnstown *Transportation Master Plan* (2008).
  - Accommodation of proposed neighborhood trail along WCR 17, as identified in Johnstown *Transportation Master Plan* (2008).
  - Accommodation of proposed bike lanes north of US 34 along WCR 15 and WCR 13, as identified in the *Town of Windsor Comprehensive Plan* (2016).
  - A bicycle facility along WCR 17 as mapped in Greely's geographic information system (GIS) data for planned bicycle and pedestrian improvements.
- **Transit Service on US 34.** The Recommended Alternative would accommodate the following:
  - Accommodation of proposed north-south route along WCR 17, as identified in the Johnstown *Transportation Master Plan* (2008).
  - Accommodation of proposed routes, one north and one south, along SH 257 starting at the intersection of US 34 and SH 257, as identified in the Johnstown *Transportation Master Plan* (2008).
  - Accommodation of the proposed GET regional connection along US 34 from Greeley to Loveland, as identified in the GET Strategic Plan (2016).
  - Accommodation of proposed Express Bus from I-25 to Greeley, from I-25 to SH 257 along US 34, and from SH 257 to Greeley along US 34 Business, as identified in the I-25 EIS (CDOT, 2011).
  - Accommodation of proposed Express Bus Transit Station at US 34 and SH 257, as identified in the I-25 EIS (CDOT, 2011).
  - Accommodation of proposed feeder route from Greeley to West Loveland (US 34 at Wilson Avenue), as identified in the I-25 EIS (CDOT, 2011). Proposed route runs from US 85 and D Street in Greeley and proceeds west along US 34 (business route) to west Loveland along US 34 Johnstown-Greeley segment.
  - Accommodation and implementation of potential transit node or park and ride at the intersection of US 34 and WCR 17 based on the convergence of different proposed transit routes.

Greeley Expressway Segment

- **Bicycle and pedestrian regional connections along US 34**. The Recommended Alternative would incorporate, where practical, the following:
  - Implementation of east-west regional connection along RNMC 11 as a side path along US 34 (Segments 11-C and 11-D) as identified in the NFRMPO *Regional Bicycle Plan* (2013).
  - Acknowledgement of the existing segment of RNMC 11 along US 34 as a side path from 65th Avenue to 35th Avenue and intersection with RNMC 10 at the intersection of US 34 and 35th Avenue.

  - Implementation of RNMC 11 (Segment 11-F) along US 34 east of 35th Avenue. Coordination with US 85/US 34 Project (separate study) to implement side path, bike lanes, or parallel route along US 34 that goes across US 85 and connects to RNMC 1, as identified in the NFRMPO *Regional Bicycle Plan* (2013).

- **Bicycle and pedestrian mobility improvements/enhancements.** The Recommended Alternative would incorporate, where practical, the following:
  - Accommodation of crossings for proposed bicycle facilities across US 34 at Promontory Parkway, 95th Avenue, 83rd Avenue, 71st Avenue, 65th Avenue, 47th Avenue, Reservoir Road (grade-separated crossing), 23rd Avenue and 17th Avenue (grade-separated crossing), as identified in the *City of Greeley Bicycle Master Plan* (2015) and the *Greeley Parks, Trails and Open Lands Master Plan* (2016).
- **Transit Service on US 34.** The Recommended Alternative would accommodate the following:
  - Accommodation of proposed GET regional connection along US 34 from Greeley to Loveland, as identified in the GET Strategic Plan (2016)
  - Acknowledgment of proposed commuter bus service and station improvements along US 85 in close proximity to US 34, as identified in the I-25 EIS (CDOT, 2011)

East End Segment

- **Bicycle and pedestrian regional connections along US 34**
  - Implementation of RNMC 11 (Segment 11-F) along US 34 east of 35th Avenue. Coordination with US 85/US 34 Project (separate study) to implement side path/bike lanes or parallel route along US 34 that goes across US 85 and connects to RNMC 1, as identified in the NFRMPO *Regional Bicycle Plan* (2013).
  - Accommodation of crossing of US 34 with RNMC 1 at the South Platte River.
- **Bicycle and pedestrian mobility improvements/enhancements.** The Recommended Alternative would incorporate, where practical, the following:
  - Acknowledgment of a proposed grade-separated bicycle/pedestrian crossing of US 85 south of US 34, as identified in the *City of Evans Transportation Plan* (2004b).
- **Transit Service on US 34**. The Recommended Alternative includes, where practical, the following:
  - Accommodation of future long-term Bustang Outrider service plan to Fort Morgan that would travel along US 34.

2.3.2 Consistency of the Recommended Alternative in Segments Adjacent to Other Projects

Two separate studies, the I-25 Interchange Project and the US 34/US 85 Project, fall adjacent to US 34 PEL corridor segments. The I-25 Interchange project comprises 1.2 miles on US 34 between the Loveland 6-Lane and Johnstown-Greeley corridor segments. The US 34/US 85 Project comprises 1.3 miles on US 34 between the Greeley Expressway and East End corridor segments. Improvements to these two separate study areas are not included in the US 34 PEL Study; however, improvements proposed as part of the Recommended Alternative have been reviewed for consistency with these studies. This section summarizes how the US 34 corridor is consistent with and can be accommodated by the I-25 Interchange Project and the US 34/US 85 Project (separate studies).

2.3.2.1 I-25 Interchange Project

The I-25 Interchange Project study area, between Rocky Mountain Boulevard and Centerra/Thompson Parkways, was excluded from the US 34 PEL Study because its ultimate improvements are defined in the I-25 EIS/ROD (CDOT, 2011). The improvements include a multi-level directional interchange between US 34 and I-25, with SPUIs at both Rocky Mountain Boulevard and Centerra/Thompson Parkways on either side of I-25. An interim phase of these improvements will be constructed in 2018, with the addition of a third lane in each direction of US 34 in the 1-mile areas on either side of I-25.

On the west side of I-25 in the Loveland 6-Lane segment, the Recommended Alternative is to complete the construction of six lanes on US 34, which is consistent with both the interim 2018 6-lane project and the ultimate I-25 interchange improvements shown in the I-25 ROD (CDOT, 2011). On the east side of I-25 in the Johnstown-Greeley Expressway segment, the Recommended Alternative is to implement a series of interchanges, which were shown in the Access Control Plan (CDOT, 2003b) and is consistent with the I-25 interchange improvements as shown in the I-25 ROD.

2.3.2.2 US 34/US 85 Project

The US 34/US 85 project area (which includes 11th Avenue), located between the Greeley Expressway and East End segments, is a complex interchange that is currently under study. It is anticipated that recommendations for long-term improvements and phased implementation of that alternative will be determined in late 2018.

A constraint for the Recommended Alternative in the Greeley Expressway segment is that the generous ROW available east of 23rd Avenue begins to narrow moving eastward on US 34 to 11th Avenue. Within the current highway ROW, there would only be room for six lanes and an intersection at 11th Avenue. The Recommended Alternative would accommodate this minimum footprint. There are minimal ROW constraints east of the interchange moving into the East End segment, but there is no identified need to widen US 34 to the east, therefore it is not anticipated that there would be compatibility issues on the east side of the interchange with the Recommended Alternative.

2.4 Improvements to Parallel Roadways

A detailed analysis evaluating improvements to parallel roadways was not completed as part of the US 34 PEL Study. However, without the planned improvements on these roads as listed in the *2040 Regional Transportation Plan* (NFRMPO, 2015b), mobility and operations on US 34 would suffer. Similarly, improvements to US 34 will benefit parallel roadways by accommodating additional traffic.

SECTION 3

Transportation Analysis

This section summarizes the transportation analyses conducted for the US 34 PEL Study. Assessing travel conditions within the US 34 corridor consisted of travel forecasting, traffic operational analysis, multimodal considerations, and ACP review and development. Results of this analysis informed the alternative evaluation process (**Section 2.0**), guided the development of the Recommended Alternative, and helped define the priority projects.

3.1 Traffic Forecasting

Traffic forecasting is necessary to understand the long-term corridor traffic demand, and produces data needed for the traffic operations analysis (see **Section 3.2**) The NFRMPO travel demand model (base year 2012) was used to assess future conditions, which included developing future roadway traffic volumes, intersection turning movements, and regional performance measures. The 2015 forecast year was compared to existing 2017 traffic counts obtained for the study and served as the study base year. The 2040 forecast year was used to forecast future conditions for the No Action and Recommended Alternatives.

3.1.1 Transportation Network and Land Use Assumptions

So that products of the PEL process can be used in future NEPA processes, travel forecasting efforts were developed consistent with the NFRMPO's methods and latest planning assumptions. The NFRMPO transportation network, included in the fiscally constrained *2040 Regional Transportation Plan* (NFRMPO, 2015b), reflects the projects that can be reasonably funded and that served as the basis for the No Action Alternative (**Section 2.1**). Socioeconomic data, such as household and employment projections, describe the projected growth and changes in land use.

3.1.2 Analysis Years and Periods

The transportation analysis focused on two specific years – Existing (2017) and Future (2040). The future year is analyzed for both No Action and Recommended Alternatives for a typical weekday in the AM and PM peak periods.

Peak period traffic is the traffic at the times of day it is most busy.

Existing (2017)

The Existing scenario reflects present roadway conditions, traffic volumes, traffic patterns, and traffic operations. The existing analysis used traffic volume data compiled from intersection turning movement volumes and traffic tube count data.

Future (2040)

The Future (2040) scenario looked at the No Action Alternative and the Recommended Alternative. As discussed in **Section 2.1**, the Future (No Action Alternative) scenario assumes that no transportation improvements are made except those included in the fiscally constrained *2040 Regional Transportation Plan* (NFRMPO, 2015b). No Action Alternative traffic volumes were developed using the NFRMPO travel demand model (2015c), existing traffic count data, and adjustment procedures described in **Section 3.1.3**.

Future traffic volumes were developed for many concepts in support of the alternatives evaluation. However, this section only discusses future data on improvements and operational results for the Recommended Alternative. The forecasts for the Recommended Alternative were developed using a similar procedure as the No Action Alterative; changes in Recommended Alternative traffic volumes are compared to No Action Alternative patterns rather than the Existing year.

3.1.3 Post Processing Adjustments

The Iterative Procedure – Directional Method outlined in *National Cooperative Highway Research Program (NCHRP) Report 765 Analytical Travel Forecasting Approaches for Project-Level Planning and Design* (NCHRP, 2014) was used to generate intersection turning movement forecasts for the Future year. This method uses an iterative approach to alternatively balance entering traffic and departing traffic volumes. The method applies existing turning-movement volumes, and Existing and Future year link volumes. The Iterative Procedure – Directional Method, previously documented in *NCHRP Report 255*, is commonly accepted industry practice.

Intersection turning-movement volumes developed for the existing scenario, No Action Alternative (2040), and Recommended Alternative (2040) were used to assess operational conditions (see **Section 3.2**). The method requires directional link volume forecasts and an estimate of intersection turning-movement percentages. Estimated turning percentages can be based on existing turning-movement counts, turning-movement patterns at similar intersections, and professional judgment. The method alternatively balances intersection approach (inflow) and departure (outflow) volumes in an iterative process until an acceptable level of convergence is reached.

3.1.4 Performance Measures

Travel demand forecasts were used as input to the traffic operations analysis to evaluate and compare differences between concepts (Level 2 Evaluation) and alternative packages (Level 3 Evaluation) as discussed in **Section 2.0**. During the alternatives evaluation process, the Measure of Effectiveness (MOE) were tailored and presented at the corridor, study segment, or intersection level of detail. MOEs included:

- VMT
- LOS
- VHD
- Average Daily Traffic (ADT)
- TTI (the ratio of peak period travel time to free-flow travel time)
- Travel Time (Corridor and Segment)

Results for each MOE were presented in the Level 2 and Level 3 Evaluation matrices that are included in **Appendix C**.

3.1.5 Travel Forecasts

ADT is a common indicator used to show how corridor conditions change over time and with different potential improvements. The forecast ADT for the No Action and Recommended Alternatives is shown in **Table 3-1**. The annual average traffic growth rate from 2017 to 2040 in the Foothills, Loveland Urban, Loveland 6-Lane, and East End segments is less than 1 percent. Within the Johnstown-Greeley and Greeley Expressway, the annual growth rate is approximately 2.5 percent and 3 percent, respectively. The Recommended Alternative includes increased capacity in some of the corridor segments, thus the projected volumes increase where facilities can accommodate additional traffic.

Table 3-1. Existing and Forecast ADT

Segment	Existing (2017)	No Action Alternative (2040)[a]	Recommended Alternative (2040)[a]
Foothills	15,200	16,900	16,900
Loveland Urban	26,800	30,200	30,300
Loveland 6-Lane	38,900	46,500	48,900
Johnstown-Greeley	46,400	70,500	79,300
Greeley Expressway	33,000	48,300	63,400
East End	16,000	19,400	19,800

[a] Modeled volumes adjusted based on NCHRP procedures using daily tube counts on US 34 obtained for the project.

3.2 Traffic Operations

Traffic operations analysis for the PEL Study focused on a selection of MOEs discussed in **Section 3.1.4**: LOS, TTI, travel time, and reliability. The technical memorandum documenting the traffic operations analysis for the PEL Study is included in **Appendix E**.

LOS is a measure of the quality of traffic flow and is defined by a letter grade ranging from A (uninterrupted flow) to F (heavily congested conditions). For signalized intersections, LOS is reported for the intersection as a whole. At unsignalized intersections, the LOS for the worst performing movement is reported. In either of these cases, the LOS is primarily based on seconds of delay experienced per vehicle. Highway segments that span between two signalized intersections are also graded on a similar LOS scale. Segment LOS, however, is based on percent free flow speed where free flow speed represents the speed at which vehicles could travel between signalized intersections in uninterrupted conditions. **Table 3-2** shows the LOS thresholds for signalized intersections, stop-controlled intersections, and highway segments. In general, LOS D or better is considered an acceptable condition by most communities.

Table 3-2. LOS Thresholds

LOS	Signalized Intersections: Control Delay (seconds per vehicle)	Stop-Controlled Intersections: Control Delay (seconds per vehicle)	Urban Street Segments: Percent Free Flow Speed	Urban Freeway Segment: Density (passenger cars per mile per lane)	Rural Freeway Segment: Density (passenger cars per mile per lane)
A	≤ 10	≤ 10	> 80	≤ 11	≤ 6
B	> 10 ≤ 20	> 10 ≤ 15	> 67 ≤ 80	> 11 to 18	> 6 to 14
C	> 20 ≤ 35	> 15 ≤ 25	> 50 ≤ 67	> 18 to 26	> 14 to 22
D	> 35 ≤ 55	> 25 ≤ 35	> 40 ≤ 50	> 26 to 35	> 22 to 29
E	> 55 ≤ 80	> 35 ≤ 50	> 30 ≤ 40	> 35 to 45	> 29 to 39
F	> 80 or v/c > 1.0	> 50 or v/c > 1.0	≤ 30 or v/c > 1.0	> 45 (or v/c > 1.0)	> 39 (or v/c > 1.0)

Source: *HCM 2010: Highway Capacity Manual* (TRB, 2010)

> = greater than
≤ = less than or equal to
v/c = volume-to-capacity

Several combined segments, known as a facility, are also graded by LOS. Facility LOS range from LOS A, which describes primarily free flow operations, to LOS F which is characterized by flow at extremely low speeds within the facility. **Table 3-3** shows the existing facility LOS for each segment (facility) along the US 34 corridor. Notably, the existing Johnstown-Greeley segment flows poorly in the eastbound direction during the evening peak hour. Existing traffic conditions in the Loveland 6-Lane segment are also experiencing increased delay.

Table 3-3. Existing (2017 LOS by Segment)

	Morning		Evening	
Segment	Eastbound	Westbound	Eastbound	Westbound
Foothills	A	A	A	A
Loveland Urban	B	A	B	B
Loveland 6-Lane	D	C	E	D
Johnstown-Greeley	A	A	F	A
Greeley Expressway	B	B	B	C
East End	A	A	A	A

Table 3-4 displays the No Action Alternative (2040) LOS. Overall, traffic conditions and flow are expected to greatly deteriorate in the future. The Loveland 6-Lane, Johnstown-Greeley, and Greeley Expressway segments all show a facility LOS F during the morning and evening peak hour.

Table 3-4. No Action Alternative (2040 LOS by Segment)

	Morning		Evening	
Segment	**Eastbound**	**Westbound**	**Eastbound**	**Westbound**
Foothills	A	A	A	A
Loveland Urban	B	B	F	B
Loveland 6-Lane	F	F	F	F
Johnstown-Greeley	F	F	F	F
Greeley Expressway	F	F	F	F
East End	A	A	A	A

Table 3-5 shows the 2040 facility LOS along US 34 for the Recommended Alternative. Because the Recommended Alternative includes limited capacity improvements for the Loveland 6-Lane segment, it would remain at LOS F in the peak period. Facility LOS in the Johnstown-Greeley and Greeley Expressway segments vastly improve with the Recommended Alternative.

Table 3-5. Recommended Alternative (2040 LOS by Segment)

	Morning		Evening	
Segment	**Eastbound**	**Westbound**	**Eastbound**	**Westbound**
Foothills	A	A	A	A
Loveland Urban	B	B	F	B
Loveland 6-Lane	F	F	F	F
Johnstown-Greeley	B	C	C	C
Greeley Expressway	B	B	B	B
East End	A	A	A	A

Three other interrelated metrics were evaluated for the PEL Study: travel time, TTI, and reliability. In its simplest form, travel time is the time it takes a vehicle to travel from Point A to Point B. Delays often are encountered from signalized intersections, traffic congestion, change in roadway geometry, weather events, or stalled vehicles. TTI is a multiplicative measurement based on the travel times in completely ideal (uninterrupted) scenarios while traveling from Point A to Point B. For instance, if the uninterrupted travel time from A to B is 10 minutes and the TTI at a particular time of day is 1.5, a vehicle traveling from A to B can expect its travel time to be 15 minutes (10 minutes multiplied by 1.5) on average, which indicates that this vehicle will experience 5 minutes of delay when traveling from A to B.

Conditions that can cause delays in travel times are highly variable. Reliability is expressed as the percent of vehicles that travel from Point A to Point B in an acceptable amount of time (by definition a TTI of less than or equal to 2.5 for urban streets and 1.33 for freeways [TRB, 2010]).

Table 3-6 shows the reliability percentages by segment on US 34 under existing conditions. Current traffic conditions and travel times for both eastbound and westbound traffic on US 34 are generally acceptable and reliable during the morning peak hour. During the evening peak hour, however, congestion impacts reliability, particularly in the Loveland 6-Lane segment.

Table 3-6. Existing Reliability Percentages by Segment

Segment	Morning		Evening	
	Eastbound	Westbound	Eastbound	Westbound
Foothills	100	100	100	100
Loveland Urban	100	100	100	100
Loveland 6-Lane	100	100	85.5	99.9
Johnstown-Greeley	100	100	100	100
Greeley Expressway	100	99.8	100	100
East End	100	100	100	100

Reliability Percentage

100% 99.9% 0%

Table 3-7 displays the reliability percentages in the No Action Alternative (2040). In this scenario, travel times in the Loveland 6-Lane segment are extremely unreliable during the morning peak hour in the eastbound direction and during the evening peak hour in the westbound direction. Similarly, travel times in the Johnstown-Greeley segment are also predicted to be extremely unreliable during both the morning and evening peak hours. Finally, travel times in the Greeley Expressway segment are predicted to be extremely unreliable during the evening peak hour in the westbound direction.

Table 3-7. No Action Alternative (2040) Reliability Percentages by Segment

Segment	Morning		Evening	
	Eastbound	Westbound	Eastbound	Westbound
Foothills	100	100	100	100
Loveland Urban	100	100	99.8	100
Loveland 6-Lane	32.3	89.3	3.3	13.4
Johnstown-Greeley	21.1	65.8	24.4	34.3
Greeley Expressway	100	99.8	99.8	24.6
East End	100	100	100	100

Reliability Percentage

100% 99.9% 0%

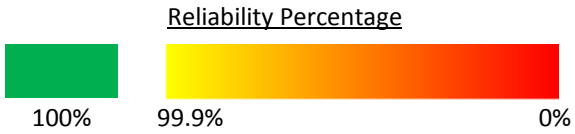
In general, the decrease in reliability percentages from existing conditions to the No Action Alternative (2040) indicate that the existing roadway infrastructure and operational controls on US 34 are ill-equipped to accommodate the predicted increase in travel demand.

Table 3-8 shows the reliability percentages along US 34 in 2040 for the Recommended Alternative. Because of physical constraints and local agency plans, additional capacity improvements for the Loveland 6-Lane segment will be minor, resulting in travel times remaining relatively unreliable. The reliability of the travel times for the Johnstown-Greeley and Greeley Expressway segments, however, have drastically improved with the proposed improvements. The expressway and interchange configuration and the addition of one lane of travel in each direction in the Johnstown-Greeley and

Greeley Expressway segments under the Recommended Alternative appears to make these segments completely reliable in 2040.

Table 3-8. 2040 Reliability Percentages by Segment with Improvements

Segment	Morning		Evening	
	Eastbound	Westbound	Eastbound	Westbound
Foothills	100	100	100	100
Loveland Urban	100	100	100	100
Loveland 6-Lane	37.5	83.3	4.2	14.2
Johnstown-Greeley	100	100	100	100
Greeley Expressway	100	100	100	100
East End	100	100	100	100



As previously mentioned, the average traveler is primarily concerned with how long it will take to get from Point A to Point B. **Table 3-9** presents travel times for the existing conditions, No Action Alternative (2040), and Recommended Alternative (2040).

Table 3-9. Travel Times on US 34 (minutes)

Scenario	Location	Morning		Evening	
		Eastbound	Westbound	Eastbound	Westbound
Existing	West of I-25[a]	15	15	18	17
	East of I-25[b]	25	27	29	29
No Action Alternative (2040)	West of I-25[a]	29	18	49	33
	East of I-25[b]	50	41	48	57
Recommended Alternative (2040)	West of I-25[a]	29	18	44	28
	East of I-25[b]	21	23	21	23

[a] West of I-25: Glade Road to Hahns Peak Drive

[b] East of I-25: Hahns Peak Drive to WCR 49

Travel times and reliability west of I-25 are projected to worsen in the future; however, these increases in travel time would be reduced under the Recommended Alternative. Meanwhile, future travel times and reliability east of I-25 are predicted to improve with the Recommended Alternative, even compared to existing conditions.

3.3 Transit Facilities

This section presents the existing and planned transit facilities in the Study Area and discusses the transit analysis that was completed for the PEL Study. The considerations outlined in this section were used to inform the transit concepts evaluated during the alternatives development process (summarized in **Section 2.0**) and ultimately incorporated into the Recommended Alternative.

3.3.1 Existing Conditions

Existing transit service and facilities within the corridor are mostly concentrated within the city limits of Loveland and Greeley. The COLT system operates on the western edge of the corridor, and GET serves the eastern side of the corridor. Two existing regional transit service routes cross US 34. The regional FLEX route operated by Transfort runs along SH 287, and the Bustang route operated by CDOT runs along I-25. Essential bus stations, transfer stations, and facilities along the US 34 corridor (from west to east) include:

- The South Transfer Station for the COLT and FLEX route systems, located south of US 34 at the Downtown Safeway, between Cleveland and Lincoln Avenues.
- The Centerra Park and Ride, located north of US 34 just west of I-25 (serves the Bustang and VanGo customers).
- An existing parking lot, located west of SH 257 between US 34 and US 34 Business.
- Within Greeley, the Greeley Mall Transit Center located south of US 34 between 23rd Avenue and 17th Avenue. This is an important transit node where most of the routes converge. Route 6 and the Boomerang do not serve this transit center.

In addition to fixed route service, service providers along the region also provide non-fixed route service. Additional details on existing transit facilities is included in the *Corridor Existing Conditions Report* (**Appendix B**).

3.3.2 Transit Analysis

Transit is integral to accommodating the growth anticipated to occur in Northern Colorado over the next 25 years. The current transit systems are localized systems within Loveland and Greeley, with a few exceptions of regional routes (FLEX and Bustang) on the western end. However, no regional routes or routes that connect to regional service exist on the eastern end of the Study Area. Additionally, no regional system exists that connects all the different communities in the area.

Several regional and local plans have proposed routes and corridors that would provide more regional connectivity (to other areas) as well as connectivity between the communities within the area. The NFRMPO *2040 Regional Transit Element* (RTE) recommends nine regional transit corridors (RTC) as priority corridors for transit investments over the next 25 years. These RTCs are suggested corridors and not specific routes. Three RTCs run along US 34 until the interchange with US 34 Business, at which point the routes leave US 34 and continue along US 34 Business. RTC 5 connects Greeley to Loveland. RTC 7 connects Greeley to the Bustang. RTC 8 connects Loveland to Bustang.

Proposed transit routes by local and agency plans include routes along and across US 34 as shown on **Figure 2-10**. In addition to service and route improvements including rapid bus service, GET Strategic Plan (GET, 2016) recommends two regional routes as mid- and long-term concepts. One regional route will run from Greeley Transfer Center along US 34 Business to Windsor then Fort Collins, heading north on WCR 17. The other regional route is proposed to run from Greeley Mall Transfer Center to COLT Transfer Center along US 34.

The I-25 EIS Selected Alternative includes an Express Bus Route from I-25/US 34 to Greeley Downtown Transfer Center at 8th Avenue and 8th Street running along US 34 and taking US 34 Business at the split. This route would have three proposed Express Bus Transit Stations.

- West Greeley Station: at US 34 and SH 257
- Greeley Station: US 34 (Business) and 83rd Avenue
- Greeley Downtown Transfer Center: 8th Avenue and 8th Street.

Other proposed transit stations from the I-25 EIS close to the US 34 corridor include a Commuter Bus Transit Station (South Greeley) at 8th Avenue and 24th Street, and in Loveland (Downtown Loveland) at BNSF and approximately 6th Street. Finally, proposed routes by Johnstown include proposed regional routes that intersect US 34 at three different locations: US 34 and I-25, US 34 and WCR 17, and at US 34 and SH 257.

As the primary east-west connection between Loveland and Greeley, the US 34 corridor can become an import transit link between Loveland and Greeley while providing opportunities to connect with communities north and south of US 34. Specific locations along the US 34 corridor where key transit opportunities were considered during alternative development are summarized as follows:

- In the Loveland 6-Lane segment, a transfer station exists along 8th Street between Cleveland Avenue and Lincoln Avenue . The I-25 EIS has a proposed commuter rail station south of US 34 at BNSF and approximately 6th Street. The existing park and ride that serves the Bustang is located north of US 34 and west of I-25. These areas represent opportunities to connect motorized and non-motorized users to transit in the Study Area. **Section 2.3.1** describes how these opportunities were accommodated by the Recommended Alternative.
- In the Johnstown-Greeley segment, the intersection of WCR 17 is a meaningful future transit node. Future transit routes from both Johnstown and GET use this intersection to go north or south. This location could be an excellent location for a transfer regional transfer station and park and ride. The junction with SH 257 is also a significant future transit node. Future Johnstown routes are proposed to originate here and travel to the communities north and south of US 34 via SH 257. In addition, SH 257 north of US 34 is identified as an RTC by the NFRMPO *2040 Regional Transit Element* (2015a). A carpool lot currently exists at this location, and the I-25 EIS proposed improvements include an express bus station that would serve the express bus route running along US 34 Business. There is an opportunity for future improvements to further evaluate these two crucial future transit nodes together. Because of their proximity to each other, a chance to combine them into one prospective transit node might exist. **Section 2.3.1** describes how these opportunities were accommodated by the Recommended Alternative.
- In the Greeley Expressway and East End segment, most of the potential future routes follow US 34 Business. However, there is a potential future Bustang Outrider route to Fort Morgan or Sterling that would follow US 34. In addition, GET has planned for one future regional route to travel on US 34 from Greeley Mall Transfer Center to Loveland, and the I-25 EIS identified a future Commuter Bus Transit Station at 8th Avenue and 24th Street. The existing Greeley Mall Transfer Center is a vital transit node to be considered when evaluating transit access from US 34. **Section 2.3.1** describes how these opportunities were accommodated by the Recommended Alternative.

3.4 Bicycle and Pedestrian Facilities

Numerous existing and planned bicycle and pedestrian facilities exist within in the Study Area. This section summarizes the existing condition of the non-motorized facilities in the Study Area and presents the bicycle and pedestrian facility analysis that was completed for the PEL Study. The considerations outlined in this section were used to inform the transit concepts evaluated during the alternatives development process (see **Section 2.0**) and ultimately incorporated into the Recommended Alternative.

3.4.1 Existing Conditions

Most of the bicycle and pedestrian existing facilities are concentrated within the city limits of Loveland and Greeley; not many facilities exist outside of the municipal boundaries. The types of bicycle facilities within the area include bike lanes, bike routes, and shared use paths. Pedestrian facilities within the region include sidewalks, and shared use paths or trails.

The bicycle facilities along the corridor mostly intersect rather than follow US 34. Few bicycle facilities exist along US 34, yet several bicycle facilities parallel the US 34 corridor and provide east-west connectivity. Pedestrian facilities vary along the US 34 study corridor and include detached sidewalks, attached sidewalks, and shared use paths; some sections have no sidewalks.

The infrastructure to accommodate bicycle and pedestrian movement across US 34 includes unsignalized intersections, signalized intersections, and underpasses. On the western side of the corridor, two underpasses of US 34 exist. The first underpass is east of Cascade Avenue and the other is east of Boise Avenue. On the eastern side, one existing underpass is at 15th Avenue Court. This underpass connects two residential neighborhoods on both sides of US 34, and it is located close to the Greeley Mall Transit Center. Additional details on existing bicycle and pedestrian facilities are included in the *Corridor Existing Conditions Report* (**Appendix B**).

3.4.2 Bicycle and Pedestrian Analysis

The existing bicycle and pedestrian infrastructure along and across the US 34 corridor offers some east-west and north-south connectivity, but gaps still exist. Within the urbanized areas, US 34 has many bicycle and pedestrian gaps but, in some cases, parallel or alternate routes provide similar east-west connectivity. Within the regional network of RNMCs, the US 34 corridor is an essential east-west connection. However, as part of the regional network, not many alternate or parallel facilities exist. Therefore, the missing gaps within the regional network become a more significant issue. There is a gap in the east-west regional network in the Loveland 6-Lane and Johnstown-Greeley segments on US 34 and no alternate east-west routes currently exist, resulting in an incomplete regional bicycle and pedestrian network. Additionally, several barriers for bicycle and pedestrian mobility exist in the Study Area. The I-25 interchange is a barrier to east-west connectivity, and the US 34 corridor itself acts as a barrier for north-south pedestrian mobility.

Several plans have analyzed the existing bicycle and pedestrian networks and have proposed improvements to help complete existing local and regional bicycle and pedestrian networks. Regional improvements include recommendations from NFRMPO's *2016 Non-Motorized Plan* (2017) and the 2013 *Regional Bicycle Plan*, which propose 12 RNMCs in the region (see **Appendix B**). In these plans, the US 34 RNMC (RNMC 11) is proposed to connect to multiple RNMCs as a shared-use trail that is separated from the highway. The NFRMPO *Regional Bicycle Plan* (2013) divides the corridor into six segments and provides more detail about what each segment is envisioned to be. This vision is illustrated on **Figure 2-9**, where the *Regional Bicycle Plan* recommendations are contrasted to the Recommended Alternative.

Local plans from Loveland, Johnstown, Windsor, and Greeley all provide recommendations to complete the bicycle and pedestrian network. Regarding east-west connectivity along US 34, most of the recommendations include a bicycle facility in parts of US 34 or along a parallel route.

As the US 34 corridor continues to develop, opportunities regarding proposed improvements to the local and regional pedestrian network should be considered to enhance corridor mobility. A completed local and regional bicycle and pedestrian network is an important part of providing mobility options within the Study Area. The PEL process provided the opportunity to consider and accommodate proposed improvements to the network that would help close the gaps and build a complete system. A summary of how the Recommended Alternative would accommodate and address non-motorized needs in the corridor is included in **Section 2.3.1**.

3.5 Access Control Plan

Access along Colorado State Highways is generally administered by CDOT on a case-by-case basis, as prescribed by the latest edition of the State of Colorado State Highway Access Code (2002). Per the

Access Code, CDOT or a local authority may develop an ACP for a segment of highway that defines access locations, level of access, and traffic control for future conditions. ACPs for state highways are binding agreements adopted by CDOT and the local authorities through an intergovernmental agreement (IGA).

An ACP is a long-range planning document that identifies access conditions that will be implemented as highway and land-use characteristics change. Developing an ACP provides CDOT and the local authorities with the opportunity to develop a single transportation plan that considers multiple access points along a segment of highway as a network rather than as individual access points. Corridor-specific issues such as intersection spacing, traffic movements, circulation, land use, topography, alternative access opportunities and other local planning documents, may be considered in developing the plan. ACPs do not define capacity improvements, off-network improvements, or funding sources for access improvements. However, in combination with a PEL Study, these elements can be considered in conjunction with the ACP.

ACPs are implemented as development and growth occur in the future, and when one of the following triggers along the corridor is met:

- Redevelopment that increases traffic by 20 percent or more
- Publicly funded projects by CDOT or a local agency
- Safety or operational issues

If nothing changes and the triggers are not met, accesses will remain in their existing condition. ACPs are living documents that can be amended in the future as dictated by the associated IGA.

The *US 34 ACP* was prepared by CDOT in conjunction with Loveland, Greeley, Evans, Kersey, and Larimer and Weld Counties in 2003. The purpose of the study was to develop a detailed interim and ultimate plan for access along the US 34 corridor from the US 34/I-25 interchange on the west to the US 34/WCR 55 intersection east of Kersey that would guide future land use and transportation decisions. The *US 34 ACP* was adopted through an IGA signed by CDOT and all participating local agencies. The IGA committed each signatory to regulating access in conformity with the *US 34 ACP* (CDOT, 2003b). The signatory communities to the *US 34 ACP* have shown their continued commitment to the access modifications shown in the existing ACP by participating in the robust amendment process for the US 34 corridor. In recognition of the plan's long-range nature and the potential for conditions to change over time, the amendment process requires mutual agreement of the IGA parties on modifications to the plan.

If improvements east of I-25 are pursued that are not consistent with the *US 34 ACP*, the ACP may need to be amended in accordance with the IGA before implementation. For example, if a grade-separated expressway is implemented east of I-25, 3/4-movement access points may need to be reconsidered based on safety, operations, and driver expectancy. In this case, alternative access to affected properties must be provided and a formal amendment to the ACP must be made. Amendments to the *US 34 ACP* require support of 75 percent of the IGA signatories and may require additional public process.

West of I-25, CDOT, Loveland, and Larimer County are developing a new ACP for US 34 between LCR 27 and I-25 concurrently with the US 34 PEL Study. The majority of the plan is concentrated in Loveland city limits, with portions located within unincorporated Larimer County. The Loveland US 34 ACP will recommend a single overall access scenario that defines location and level of access for each access point. The access improvements recommended in this plan were considered during the PEL's alternatives process. Further, the Loveland US 34 ACP will provide flexibility to accommodate intersection configurations where multiple design options were identified for the Recommended Alternative in the Foothills, Loveland Urban, and Loveland 6-Lane Segments, as detailed in **Section 2.3**. It is anticipated that CDOT, Loveland, and Larimer County will enter into an IGA to adopt the Loveland US 34 ACP in early 2019.

SECTION 4

Environmental Overview

The purpose of this section is to summarize likely environmental resources within the US 34 Study Area, and identify potential environmental impacts from the Recommended Alternative so they can be avoided or minimized to the extent possible during future design refinements. The Recommended Alternative has been conceptually designed to meet the project Purpose and Need, and specific mitigation measures for environmental impacts will be determined during subsequent NEPA evaluation processes and included in final plans as improvements move to construction.

An environmental scan was prepared as part of the US 34 PEL Study to identify resources early in the process to avoid fatal flaws and to consider sensitive environmental resources during the development and evaluation of alternatives. The environmental scan, included in the *US 34 PEL Alternatives Report* (**Appendix C**), contains additional resource details and mapping. All the resource topics summarized in the environmental scan will need to be revisited during subsequent NEPA review processes for individual projects developed out of the US 34 PEL Study.

4.1 Environmental Analysis

The environmental resources that were studied for the PEL were selected based on the characteristics of the Study Area and are generally consistent with NEPA as well as FHWA and CDOT guidelines.

4.1.1 Aquatic Resources

Aquatic resources address water-related resources within the Study Area, including wetlands and other surface waters (for example, streams, rivers, ponds, and lakes). Aquatic resources are protected by Section 404 of the federal Clean Water Act (CWA) and Executive Order (EO) 11990 Protection of wetlands. Under Section 404 of the CWA, impacts to waters of the United States, including wetland and open waters, must be avoided, minimized, or mitigated to ensure that there is no net loss of functions and values of jurisdictional wetlands. Additionally, impacts to nonjurisdictional waters of the United States may be subject to compensatory mitigation because of project activities and/or funding. The following federal and state regulations also apply to aquatic resources:

- Section 401 and 402 of the CWA
- Safe Drinking Water Act (40 CFR Parts 141-143)
- Erosion and Sediment Control on Highway Construction Projects (23 CFR 650 Subpart B)
- Colorado Water Quality Control Act (Colorado Revised Statutes [CRS] Title 25, Article 8)

Using the U.S. Fish and Wildlife Service (USFWS) National Wetlands Inventory (2018), Colorado Wetland Inventory (CNHP, 2018), U.S. Geological Survey (USGS) 7.5-minute topographic maps (1950, 1969, 1980a, 1980b, 1984a, and 1984b), and Google Earth aerial photography (Google Earth, 2016), 58 aquatic resources, consisting mainly of surface water features, have been identified in the Study Area. The aquatic resources breakdown is 9 wetlands, 1 lake, 7 ponds, and 42 individual linear surface water crossings. Each crossing of a linear surface water feature is counted individually even though the same stream may be crossed multiple times (e.g., the South Platte River crosses the Study Area three times). Most of the wetlands identified are classified as palustrine emergent or palustrine forested, with most occurring along rivers and drainages (Cowardin et al., 1979).

Within each segment, the Recommended Alternative has the potential to impact aquatic resources when roadway cross sections are updated either by the need to expand a bridge or culvert to the width of the new cross section or by impacting roadside wetlands. Intersection improvement in the Johnstown-Greeley, Greeley Expressway, and East End segments cross several waterways.

4.1.1.1 Next Steps and Mitigation Strategies

Aquatic resources should be delineated during the NEPA process in the areas that could be impacted by project-related activities in accordance with the 1987 U.S. Army Corps of Engineers (USACE) *Wetland Delineation Manual* and the regional supplements to the Wetland Delineation Manual: Western Mountains, Valleys and Coast Region (Version 2.0) (2010a), and Great Plains Region (Version 2.0) (2010b). To the greatest extent practicable, future planning and design will be required to incorporate avoidance and minimization of impacts to known wetland areas so that there is no net loss of wetland functionality. Where avoidance would not be practicable, impacts to wetlands could be minimized by using temporary and permanent best management practices to reduce direct and indirect impacts to these resources.

Each surface water identified has the potential to be considered jurisdictional by the USACE, resulting in impacts to surface waters that would likely be permitted under a Section 404 Nationwide Permit of the CWA. Only the USACE has the authority to make a final determination regarding jurisdiction, permit type, and mitigation. Impacts under 0.5-acre often are permitted under existing nationwide permits. Impacts greater than 0.5-acre may require obtaining an Individual Permit. An Individual Permit includes a public notice and would trigger a NEPA review and decision by the USACE. Generally, mitigation would be required under either permit type for impacts exceeding 0.1-acre of jurisdictional waters of the United States, including wetlands.

A Section 404 permit would likely be required from the USACE to authorize placement of dredge and fill. CDOT mitigates for wetland impacts regardless of CWA jurisdiction. A CDOT wetland finding will be required if permanent wetland impacts exceed 500 square feet or if temporary and permanent impacts combined exceed 1,000 square feet. This does not include impacts to open water areas.

4.1.2 Biological Resources

Biological resources are protected under multiple laws and regulations, including the following:

- Endangered Species Act of 1973
- Colorado's Non-game and Endangered Species Conservation Act of 1973
- Senate Bill 40 – Protection of Fishing Streams
- Migratory Bird Treaty Act (MBTA) of 1918
- Bald and Golden Eagle Protection Act of 1940
- EO 13186, *Responsibilities of Federal Agencies to Protect Migratory Birds*
- EO 13112, *Safeguarding the Nation from the Impacts of Invasive Species*
- Colorado Noxious Weed Act of 1990

4.1.2.1 Federally Listed Species

For the purposes of the analysis prepared for this PEL Study, biological resources refer to all flora and fauna not covered in **Section 4.1.1, Aquatic Resources**, with the main emphases being on federal and state threatened and endangered species. Fourteen federal- and 22 state-listed species were found to have the potential to occur within or downstream of the Study Area. Federal-listed species were identified using USFWS's online Information for Planning and Consultation (IPaC) decision support system (2017). State-listed species were identified using data from Colorado Parks and Wildlife (CPW) Threatened and Endangered List (2017) and Colorado Natural Heritage Program (CNHP) Tracking List (2017) databases. In addition to the federal- and state-listed species, suitable habitat for migratory birds is present throughout the Study Area as well as habitat for species tracked by CPW. No critical habitat for any federal-listed species occurs within the Study Area (USFWS, 2017).

Five of the federally-listed species (Least Tern [*Sterna antillarum*], Piping Plover [*Charadrius melodus*], Whooping Crane [*Grus americana*], pallid sturgeon [*Scaphirhynchus albus*], and western prairie fringed

orchid [*Platanthera praeclara*]) are listed because they occur downstream of the Study Area and could be impacted by projects that would result from water depletions to the South Platte River system. At this time, projects are not expected to acquire in-stream water, and any water usage for construction activities would be derived from municipal sources; therefore, there is no potential for these species to be impacted by the projects.

Four other federally-listed species were found to have potentially suitable habitat within the project area, including greenback cutthroat trout (*Oncorhynchus clarki stom*ias), Preble's meadow jumping mouse (*Zapus hudsonius preblei*), Colorado butterfly plant (*Gaura neomexicana var. coloradensis)*, and Ute ladies'-tresses orchid (*Spiranthes diluvialis*). The Big Thompson and South Platte Rivers have potential habitat for these species.

4.1.2.2 State Listed Species

Of the 22 state-listed species found to have potential to be within the Study Area, suitable habitat exists for Preble's meadow jumping mouse (state-threatened species), Burrowing Owl (*Athene cuniculalria*; state-threatened species), Northern leopard frog (*Lithobates pipiens*; state special-concern species), black-tailed prairie dog (*Cynomys ludovicianus*; state special-concern species), and common garter snake (*Thamnophis sirtalis*; state special-concern species). Potential habitat for Preble's meadow jumping mouse, Northern leopard frog, and common garter snake occur along riparian corridors. The Big Thompson and South Platte Rivers, as well as several of the other smaller water features, have potential habitat for these species. Potential habitat also exists for the Burrowing Owl near an active prairie dog colony within the Study Area.

4.1.2.3 Migratory Birds

To identify raptors and other migratory birds protected by the MBTA, GIS data from CPW Natural Diversity Information System (CPW, 2016) was reviewed to identify potential mapped raptor nest locations in and near the Study Area. According to the available data, three Bald Eagle (*Haliaeetus leucocephalus*) and two Osprey (*Pandion haliaetus*) nests occur within 1 mile of the Study Area. The vegetation communities in the Study Area provide habitat to support a variety of nesting migratory birds.

4.1.2.4 Other Wildlife

The Study Area occurs within the overall range for several game species that CPW tracks, including black bear (*Ursus americanus*), elk (*Cervus canadensis*), mountain lion (*Puma concolor*), mule deer (*Odocoileus hemionus*), white-tailed deer (*O. virginianus*), Canada Goose (*Branta canadensis*), and Wild Turkey (*Meleagris gallopavo*). The overall range for black bear, elk, and mountain lion overlap the Foothills, Loveland Urban, and Loveland 6-Lane segments. The range for Wild Turkey is limited to the Foothills and East End segments. The range for mule deer, white-tailed deer, and geese cover the entire project area. No federal wildlife reserves are located in the Study Area. The Browers State Wildlife Area is located approximately 0.5-mile south of US 34 near the US 34/US 85 interchange.

4.1.2.5 Noxious Weeds

The *Colorado Noxious Weed Act* (Title 35 Article 5.5) has identified plants that are a "threat to the natural resources of Colorado" and assigned them to one of three lists to determine the appropriate level of containment.

- List A: Species that are considered rare and designated for eradication
- List B: Species that must be managed to stop continued spread
- List C: Species that are managed in jurisdictions that have chosen to require management of the species

No List A species were observed within the Study Area. Each List B species is subject to different treatment levels depending on the county. The county then determines which List C species require treatment.

A review of CDOT 2016 noxious weed occurrence data (CDOT, 2016b) found a total of eight species located within the Study Area, as listed in **Table 4-1**.

Table 4-1. CDOT 2016 Noxious Weed Species Mapped Within the Study Area

	Noxious Weed List		
Common Name/Scientific Name	**Colorado[a]**	**Larimer County[b]**	**Weld County[c]**
Bouncingbet (*Saponaria officinalis*)	B	No	Yes
Canada thistle (*Cirsium arvense*)	B	Yes	Yes
Common burdock (*Arctium minus)*	C	No	Yes
Common mullein (*Verbascum thapsus)*	C	No	Yes
Musk thistle (*Carduus nutans*)	B	Yes	Yes
Puncturevine (*Tribulus terrestris)*	C	No	Yes
Russian olive (*Elaeagnus angustifolia*)	B	No	Yes
Scotch thistle (*Onopordum acanthium*)	B	Yes	Yes

[a] CDA, 2017
[b] Larimer County, 2017b
[c] Weld County, 2017

All projects have the potential to spread noxious weeds by disturbing land that has noxious weeds present.

4.1.2.6 Next Steps and Mitigation Strategies

Threatened and endangered species (and their habitats) are ecologically important to the ecosystems in the Study Area. Potential impacts should be carefully considered when developing the design of future projects that may result from this PEL Study. A comprehensive and updated special-status species lists will be obtained during the NEPA phase of each subsequent project. Based on the special-status species list, surveys for federal- and state-listed species should be conducted during the appropriate seasons, per USFWS and CPW recommendations. If species of concern are found to be within the Study Area, further coordination with the appropriate regulatory agencies must take place and suitable measures will need to be developed to avoid and/or minimize impacts to these sensitive resources. Depending on the presence of habitat and potential impacts to those habitats, formal consultation with the USFWS and other regulatory agencies may be required.

To protect species covered under the MBTA, if construction of any elements of the Recommended Alternative is proposed during the nesting season, preconstruction surveys for nesting birds (including eagles and other raptors) may be required. The nesting season is species-dependent and can range from April 1 to August 31. If active nests are found to be present within the project area, buffer zones will be established in coordination with the appropriate regulatory agencies and under the guidance of a qualified biologist, until the young have fledged. Further guidance on required surveys can be found in Section 240 Protection of Migratory Birds of the CDOT *Standard Specifications for Road and Bridge Construction* (CDOT, 2016c).

As elements of the Recommended Alternative progress, a noxious weed survey may be required to map any noxious weed populations. If found within the project area, an integrated noxious weed management plan may also need to be prepared. Regardless of whether an integrated noxious weed

management plan is required, the construction contractor for any recommended project would be required to follow the revised Section 217 of the CDOT *Standard Specifications* (2016c) and implement CDOT best management practices.

4.1.3 Cultural Resources

Federal legislation requires that federal government agencies assess the impacts of their decisions and actions on cultural resources before approving such actions. This legislation also provides a regulatory framework for the identification, evaluation, protection, and management of cultural resources. Cultural resources, including both archaeological and historic (buildings/structures/built environment) properties, are primarily protected through the National Historic Preservation Act (NHPA) of 1966 (54 United States Code [USC] §300101) and its implementing regulations (Protection of Historic Properties, 36 CFR Part 800). Section 106 is the primary portion of the NHPA relevant to cultural resource investigations and is codified in 54 USC §306108. Historic properties include prehistoric- or historic-age sites, buildings, structures, districts, objects, or properties of traditional religious and cultural importance to a Native American tribe that are included in or eligible for inclusion in the National Register of Historic Places (NRHP). Historic properties are evaluated for NRHP eligibility based on criteria outlined in 36 CFR Part 60 and must retain sufficient integrity to convey significance. Cultural resource investigations typically use an age threshold of 50 years or older when identifying resources. Large-scale construction and infrastructure projects, such as highway investigations, often use 45 years as the threshold to allow a 5-year review period. Occasionally, properties that are less than 45 or 50 years old may be considered eligible if they are of exceptional importance.

The NHPA also requires consultation with Native American tribes and encourages coordination with other relevant statutes that are part of the larger environmental review process. These statutes vary depending on the location and results of the project, but for highway projects, they typically include Section 4(f) of the U.S. Department of Transportation (DOT) Act of 1966 (49 USC §303, 23 USC §138, and 23 CFR 774)) and NEPA (42 USC §4321; 40 CFR Parts 1500-1508). Section 4(f) mandates that agencies of the DOT, including FHWA, cannot approve the use of historic sites unless there is no feasible and prudent alternative to the use of that location and the project includes all feasible planning to minimize harm or the project results in a *de minimis* impact. NEPA requires consideration of a broad range of factors related to the environment, including cultural and historic resources. Therefore, Section 106 compliance is one of the many required aspects of consideration in the NEPA process. In consideration of overlapping factors, the NHPA allows for a parallel, coordinated Section 106 and NEPA review process.

On a state level, cultural resource investigations are governed by the Colorado Historical, Prehistorical and Archaeological Resources Act of 1973 (CRS 240-80-401 to 410 and CRS 24-4-101) and its implementing regulations (8 CCR 1504-7). CDOT must comply with this legislation, and therefore it typically requests cultural resource investigations at various levels when state land or funding is involved. When both the Colorado Historical, Prehistorical and Archaeological Resources Act and Section 106 of the NHPA are triggered, the Section 106 investigation typically ensures compliance with both federal and state regulations. Additionally, many communities (including Greeley, Loveland, and Windsor) have municipal preservation laws.

A file search was conducted in mid-2017 for the *Corridor Existing Conditions Report* (**Appendix B**) to gather baseline information on potential cultural resources that may be impacted by proposed improvements along the US 34 corridor. The file search area consisted of the existing US 34 ROW, which is variable in size, with an additional buffer of 50 feet extending out to either side of the ROW boundary. This area was chosen to provide a representative overview of cultural resources that intersect or are directly adjacent to the highway and may be encountered by potential improvements. File search data were gathered from a variety of sources including the Colorado Office of Archaeology and Historic

Preservation (OAHP), historic maps, and county and municipal records. OAHP data include a search of the COMPASS database, which includes records of cultural resources (archaeological sites, and historic resources such as architectural properties and linear sites). Cultural resources listed on the State Register of Historic Properties (SRHP) and NRHP are included in the OAHP data. Properties that have been listed on the NRHP or SRHP, and those that have been assessed as eligible for inclusion on these registers, are included in this analysis, as are those known to have local historic landmark designations. No fieldwork was conducted to confirm the locations and conditions of the properties.

Table 4-2 shows historic properties located within the file search area for this study and that are listed in or that were evaluated as eligible for listing in the NRHP or SRHP. While the file search did reveal previously documented cultural resources in the file search area, none of these properties have been listed in the NRHP or SRHP. Twenty-six are considered eligible for listing, one is listed as Needs Data (and therefore is to be treated as though it is NRHP-eligible), and another is a historical marker and does not have an assessment. Historic resources listed as not eligible are listed in **Appendix B**.

Table 4-2. NRHP-Listed and NRHP-Eligible Historic Properties Located within the Study Area

Site Number	Description	Name	NRHP Status
Larimer County			
5LR.503	Ditch	Loveland - Greeley Canal (entire resource)	Needs Data
5LR.503.2 5LR.503.3	Ditch	Loveland - Greeley Canal; Greeley and Loveland Ditch and the Chubbuck Ditch (segments)	Officially Eligible
5LR.1731.1 5LR.1731.8	Railroad	Colorado Central Railroad, Colorado & Southern Railroad, BNSF (segments)	Officially Eligible
5LR.1815.2 5LR.1815.3 5LR.1815.12	Railroad	UPRR (segments)	Officially Eligible
5LR.8928.1 5LR.8928.3	Ditch	Farmer's Ditch	Officially Eligible
5LR.9631	Ditch	Barnes Ditch, Big Barnes Ditch	Officially Eligible
5LR.9881	Hotel	Columbine Camp, Columbine Cabin Court, Columbine Court, Estate Services	Officially Eligible
5LR.11182	Historic Farm	Eunice Linn Farmstead	Officially Eligible
5LR.11188	Historic Farm	David Barnes Farm, Hill Farm	Officially Eligible
5LR.11209	Historic Farm	Peters Farm Drake, Farm, Schmer Farm	Officially Eligible
5LR.11210	Historic Farm	McDonough Farm	Officially Eligible
5LR.11288	Residence	Chalfant House, Ackerman Residence	Officially Eligible
5LR.11297	Historic Farm	Lauver Farm	Officially Eligible
5LR.11299	Historic Farm	Zeiler Farm	Officially Eligible
5LR.13318.2	Road	US 34	Officially Eligible
Weld County			
5WL.841	Railroad	Great Western Railroad (entire resource)	Officially Eligible
5WL.841.5	Railroad	Great Western Railroad (entire resource)	Field Eligible
5WL.843	Ditch	Greeley No. 3 Canal (entire resource)	Officially Eligible

Table 4-2. NRHP-Listed and NRHP-Eligible Historic Properties Located within the Study Area

Site Number	Description	Name	NRHP Status
5WL.843.13	Ditch	Greeley No. 3 Canal (entire resource)	Field Eligible
5WL.898	Ditch	Loveland Greeley Canal (entire resource)	Field Eligible
5WL1969.85	Railroad	UPRR (segment)	Field Eligible
5WL.4661	Residence	Haefeli Quadruplex	Field Eligible
5WL.7549	Historical Marker	Loveland Historical Marker	No Determination

UPRR = Union Pacific Railroad

The file search indicated that, while cultural resource inventories have been conducted in the area and resulted in the resources discussed in **Table 4-2**, much of the US 34 corridor has not been surveyed at any point in the past or the inventories were conducted over 10 years ago and therefore may be out of date. A review of supplementary data sources, including Larimer and Weld County Assessors' records and historic maps of the area, demonstrates that previously undocumented historic resources exist within the area of review. Architectural properties and linear resources such as ditches, roads, railroads, and utility lines are the most prevalent, but other portions of the built environment meet the age criterion for evaluation under Section 106 of the NHPA and would require documentation and review for eligibility and effects. Archaeological resources have been documented in the area, and the history of human activities and occupation, as well as the general topography, suggest the potential for previously undocumented archaeological properties, both prehistoric and historic in age along US 34. None of the archaeological resources that have been documented are NRHP-eligible; however, most previous investigations have been tightly constrained to narrow road, railroad, and utility corridors where the ground was already disturbed. Because the data gathered for this PEL Study are the results of a literature review and prior investigations, they do not necessarily include all cultural resources present in the US 34 corridor.

Archaeological and historic resources are non-renewable, and, despite best efforts, cannot be completely restored or reconstructed once they are disturbed or destroyed. The Recommended Alternative has the potential to adversely impact cultural resources through direct physical effects where improvements directly intersect site boundaries. Direct effects can occur from actions such as re-aligning the highway, expanding the road to six lanes, creating interchanges and turn lanes, and elevating the highway. Indirect impacts can include visual impacts that may alter the setting by introducing new elements to the area or auditory impacts that also have the potential to affect setting. Actions such as raising the road from ground level to an elevated overpass, changing traffic patterns, or changing the cross section of a roadway may change the setting of historic properties and create indirect impacts.

4.1.3.1 Next Steps and Mitigation Strategies

As individual projects from the Recommended Alternative are identified and move forward through design and NEPA review, it is recommended that cultural resources inventories (Class III archaeological/ Intensive historical) be conducted, and should encompass the entire Area of Potential Effect (APE) for each project for a complete NRHP eligibility and effects analysis. APEs for individual projects may be larger or smaller than this review corridor, depending on the scope of the project and the resources within the APE. If there is a federal action or approval for the project, then these inventories must fulfill the requirements of Section 106 of the NHPA and include consultation with the OAHP as well as local governments (for example, the Cities of Loveland and Greeley) and Native American tribes. Such coordination is imperative as part of the NRHP for eligibility and effects analysis, as well as the development of resource-specific mitigation strategies if adverse impacts do occur. Avoidance of

adverse impacts to cultural resources that are listed in, or eligible for listing in, the NRHP, SRHP, and Local Landmark status is preferred over mitigation, which may result in time consuming and costly data recovery excavations of archaeological resources or highly intensive archival documentation of historic resources.

Additionally, historic properties of national, state, or local significance that are eligible for listing or are listed in the NRHP may also qualify as Section 4(f) properties under the DOT Act of 1966. Therefore, the Section 4(f) review and approval process should be done concurrently with the Section 106 review for consistency and efficiency when consulting with the State Historic Preservation Office and other consulting parties.

4.1.4 Environmental Justice

Environmental justice is a public policy goal of promoting the fair treatment of people of all races, cultures, and incomes with respect to the development, adoption, implementation, and enforcement of environmental laws and policies. It is defined through the following principles that, when implemented, help ensure the fair distribution of the benefits and burdens associated with any program or activity receiving federal financial assistance:

- To avoid, minimize, or mitigate disproportionately high and adverse human health and environmental effects, including social and economic effects, on minority and low-income populations
- To ensure the full and fair participation by all potentially affected communities in the transportation decision-making process
- To prevent the denial of, reduction in, or significant delay in the receipt of benefits by minority and low-income populations

Based on data from the U.S. Census Bureau's American Community Survey 5-year estimates (2011-2015) (Census, 2017), both minority and low-income populations are present within the Study Area[1]. Sixty-eight of the 139 census block groups within the Study Area contain larger minority populations than the respective county average (17 percent in Larimer County and 33 percent in Weld County). Similarly, 67 census block groups contain larger low-income populations than the respective county average (15 percent in Larimer County and 14 percent in Weld County). Minority and low-income populations are concentrated within central Loveland, Greeley and Evans, with a few outlying block groups with low-income populations (for example, in Greeley's western city limits and southeast Windsor). An overview of the statistics for the Study Area is provided in **Table 4-3**.

Table 4-3. Minority and Low-income Households in the US 34 PEL Study Area

Location	Total Population	Total Households	Percent Minority	Percent Low-Income
US 34 PEL Study Area	235,250	87,091	30	15
Larimer County	318,227	125,138	17	15
Weld County	270,948	94,294	33	14

Source: Census, 2017; HUD, 2016

Both beneficial and negative impacts from the Recommended Alternative would be expected in areas where minority and low-income populations have been identified. Whether these impacts would be

[1] Minority populations are defined as census-defined races other than White, Non-Hispanic. Low-income households are calculated using Housing and Urban Development's (HUD's) low-income thresholds established for Larimer and Weld Counties, which is based on the U.S. Department of Health and Human Services poverty guidelines.

predominantly borne by these populations or considered high and adverse would need to be evaluated as elements of the Recommended Alternative move into NEPA, and when more detailed project design is available. Conceptual design of the Recommended Alternative indicates that there are areas where additional ROW may be required from properties adjacent to US 34. An increase in noise levels and changes to the visual environment would also be expected, particularly in locations where the roadway profile would be raised. In locations where the roadway cross section would be wider, it could be more difficult for bicycles and pedestrians to reach transit. Short-term construction-related impacts would also be expected to be greatest in communities adjacent to US 34.

The Recommended Alternative would be expected to benefit the general population, including minority and low-income residents, by improving safety, mobility, and traffic flow. Most project segments also include bicycle and pedestrian connections and improvements, and will accommodate transit service on US 34, where none currently exists.

4.1.4.1 Next Steps and Mitigation Strategies

As the project moves forward into NEPA and more detailed design is available, the following is recommended:

- Field visit and coordination with local jurisdictions to confirm desktop analysis and evaluate the need for specialized outreach
- In areas adjacent to construction limits, consider updating census data to reflect the most current available
- Coordination with other resource evaluations to ensure all protected populations that fall under the umbrella of CDOT's Title VI program (for example, advanced age, disability, or limited English proficiency) are considered

Once ROW requirements and other impacts can be quantified and associated mitigation measures reviewed, the distribution of impacts should be evaluated to identify whether project activities have the potential to cause disproportionately high and adverse effects to minority and low-income populations. If disproportionately high and adverse effects are identified, additional mitigation measures would need to be considered.

4.1.5 Floodplains

Construction within a floodplain or floodway has the potential to change or impede the function of the floodplain, and result in new or increased flooding risk to facilities within and adjacent to the area. Communities must regulate development in these areas so that there are no increases in flood elevations. In addition to federal regulatory requirements, the CDOT *NEPA Manual* (2017c) divides floodplains into two areas: the floodway and the flood fringe. The flood fringe is the portion of the 100-year floodplain located outside of the designated floodway. There are four Federal Emergency Management Agency- (FEMA) mapped floodplains within the US 34 Study Area, consisting of the following three types: regulatory floodway, 100-year, and 500-year:

- Regulatory floodway refers to the channel of a river or other watercourse and the adjacent land area that must be reserved to discharge the base flood without cumulatively increasing the water surface elevation more than a designated height. Communities must regulate development in these floodways to ensure that there are no increases in upstream flood elevations.
- 100-year floodplain is defined as areas subject to inundation by the 1-percent annual chance flood event generally determined using detailed or approximate methodologies.
- 500-year floodplain is defined as areas with a 0.2-percent annual chance of flooding.

Three regulatory floodways cross the Study Area: Big Thompson River, Sheep Draw, and the South Platte River. Each regulatory floodway has both a 100-year and 500-year floodplain that extends into the Study Area. Lake Loveland is classified as a 100-year floodplain, but has no designated floodway.

The regulatory floodway of the Big Thompson River encroaches on US 34 in three locations within the Foothills segment. Lake Loveland's floodplain does not appear to infringe on US 34 within the Loveland Urban segment. The regulatory floodway of Sheep Draw crosses US 34 around 95th Avenue in the Greeley Expressway segment. Within the East End segment, the regulatory floodway of the South Platte River crosses US 34 once; however, the majority of roadway appears to be excluded from the floodway.

The Recommended Alternative has the potential to impact floodways and floodplains in the Foothills, Loveland Urban, Greeley Expressway, and East End segments. The baseline floodplain data above should be used so that project improvements allow passage of the 100-year flood, to avoid or minimize encroachment into floodplains to the maximum extent possible.

4.1.5.1 Next Steps and Mitigation Strategies

During project development after the PEL Study, the need to conduct a hydraulic study in accordance with 23 CFR 650A should be determined by CDOT. Under the requirements of EO 11988, Floodplain Management, all federal-aid projects must make diligent efforts to achieve the following:

- Avoid adverse effects and incompatible floodplain development
- Minimize the impact of highway actions that adversely affect the base floodplain
- Restore and preserve the natural and beneficial floodplain services
- Be consistent with the standards/criteria of FEMA's National Flood Insurance Program

Other federal, state, and local requirements for floodplains impacts discussed in Chapter 4 of the *Colorado Floodplain and Stormwater Criteria Manual* (Colorado Water Conservation Board, 2006) will need to be satisfied, if applicable. These could include, but are not limited to, the following:

- FEMA map revisions
- Section 404 of the CWA permit
- Colorado State Floodplain Development permit
- Erosion Control permit
- Construction Stormwater Discharge permit
- Construction Dewatering permit

4.1.6 Hazardous Materials

Hazardous materials include substances or materials determined by the U.S. Environmental Protection Agency to be capable of posing an unreasonable risk to health, safety, or property. Hazardous materials may exist within the Study Area at facilities that generate, store or dispose of these substances, or at locations of past releases of these substances. Examples of hazardous materials include asbestos, lead-based paint, heavy metals, dry-cleaning solvents, and petroleum hydrocarbons (for example, gasoline and diesel fuels), all of which could be harmful to human health and the environment.

Hazardous materials are controlled by various state and federal regulations. NEPA mandates that decisions involving federal funds and approvals consider environmental effects from hazardous materials. Other applicable regulations include the Comprehensive Environmental Response, Compensation, and Liability Act of 1980 (CERCLA) (42 USC 9601 et seq.), which provides federal authority for the identification, investigation, and cleanup of sites throughout the U.S. that are contaminated with hazardous substances (as specifically designated in the CERCLA) and the Resource Conservation and Recovery Act of 1976 (42 USC 321 et seq.), which establishes a framework for the management of both solid and hazardous waste. The federal Hazardous and Solid Waste Amendments

of 1984 established a new comprehensive regulatory program for underground storage tanks containing petroleum products and hazardous chemicals regulated under CERCLA.

Of the nine hazardous materials sites identified in the *Corridor Existing Conditions Report* (**Appendix B**), three are located within the existing ROW and two are immediately adjacent to the existing ROW. The West Lake Dry Cleaners site in Loveland on US 34 between Van Buren Avenue and Taft Avenue, and the Yellow Freight System, Inc. site in the southwest quadrant of the US 34/WCR 13 intersection, are both adjacent to improvements in the Recommended Alternative, but no ROW acquisitions are proposed for those sites. Two sites, an oil leak and a gas line puncture, are located in the US 34 ROW, outside of the Study Area, within the US 34/I-25 interchange. A chemical spill site on US 34, between 47th Avenue and 35th Avenue in Greeley, is within the existing ROW. The sites within existing ROW could be encountered during construction of projects from the Recommended Alternative.

Of the 15 water wells identified in the Study Area, 4 of the wells were adjacent to US 34 or within the ROW (one is within the footprint of US 34 at Fall River Drive, and three are adjacent to US 34 between the 27th/28th Street and US 34 intersection and CR 47). Additionally, 114 oil/gas wells were identified within 500 feet of US 34, with several being located on parcels adjacent to US 34.

4.1.6.1 Next Steps and Mitigation Strategies

A Phase I environmental site assessment or CDOT initial site assessment should be completed for projects within the US 34 PEL Study Project Limits. The result of those initial investigations would determine whether additional investigations, including subsurface investigations, would be required. When possible, hazardous material sites should be avoided. Where hazardous sites cannot be avoided, mitigation may be required as a project commitment.

Additionally, US 34 east of I-25 is designated as a nonradioactive hazardous materials route. If detours are required during construction, this designation should be taken into consideration when developing those detours.

The exact location and condition, as well as potential impacts to water and oil/gas wells should be identified during subsequent project development steps. Undocumented wells that are encountered during subsequent project development steps and/or the decommissioning of existing wells would follow applicable state and local requirements.

4.1.7 Land Use and Socioeconomics

Socioeconomics depicts population, household, and employment trends and forecasts for the communities in the Study Area, which is the baseline data upon which future transportation improvements are analyzed and recommended. It is complemented by depictions and descriptions of current and future land uses that provide an understanding of areas of future growth and urbanization.

The population of Larimer and Weld Counties and almost all cities and towns in relative proximity to US 34 experienced a population increase in the past 15 years. Loveland added the most residents and households during this time with an additional 21,000 persons in about 10,000 households. Greeley added about 20,000 persons in about 6,000 households in the same time period. The greatest percentage of population and household increases, however, have been experienced in the smaller communities such as Evans, Johnstown, Milliken, and Windsor. Larimer and Weld Counties added approximately 60,000 jobs during this time period.

Forecasts indicate an approximate annual growth rate of 2.1 percent per year for the Study Area through 2040 for both population and households. Study Area employment is forecast to grow at 1.8 percent per year through 2040.

The west end of the corridor is in Larimer County and comprises open space and a mix of low-density land uses. Land uses moving east to the Loveland core include residential and commercial uses, including neighborhood services and big box stores. The Centerra mixed-use community is located along the I-25 and US 34 interchange and includes residential and regional commercial uses. There are more commercial services east of the interchange with additional services being added in Johnstown. East of this commercial node is primarily agricultural land interspersed with small pockets of commercial and residential development. There are commercial nodes in Greeley at major intersections. The more urban feel of Greeley quickly turns to a rural, pastoral landscape east of the South Platte River with commercial and residential activity seen in Kersey.

In general, the intensity of commercial activity along US 34 is likely to continue to increase given forecasts for population and employment growth in the Study Area and given the fact that future land uses envisioned for the corridor are primarily commercial and employment-based uses. Significant land use changes are unlikely on the very western edge of the corridor. In the Loveland core, the land use vision remains commercial surrounded by residential land uses. The I-25/US 34 interchange area is predominantly commercial. The corridor area east of the interchange is slated for the greatest change, with commercial and commercial mixed use slated just east of the interchange and in the area between Johnstown and Greeley. Land uses east of the interchange area tend to be commercial with some industrial and residential. In Greeley, commercial is anticipated at major intersection nodes interspersed with residential uses.

It is anticipated that the Recommended Alternative would result in long-term positive socioeconomic benefits to the US 34 corridor and the adjoining communities. The Recommended Alternative includes improvements to transportation mobility, infrastructure, safety and security, which should benefit current and future businesses and services that help provide the basis for improvements in the regional economy.

The Recommended Alternative would result in long-term positive benefits to land uses in the corridor. Forecast land uses include commercial and employment directly in the corridor. The Recommended Alternative is expected to complement the communities' land use plans. Significant residential development is forecast for the communities adjoining the corridor. Better and safer access as a result of the improvements provided in the Recommended Alternative would help benefit current and future businesses and residents.

There would likely be socioeconomic impacts (business impacts) resulting from project implementation. There may be businesses that would be permanently affected because of property acquisition needs. In the event this option is pursued, any acquisition of property must conform with state and federal requirements, including the Uniform Relocation Assistance and Real Property Acquisition Policies Act of 1970, as amended (Uniform Act). The Uniform Act is a federally mandated program that applies to all acquisitions of real property or displacements of persons resulting from federal or federally assisted programs or projects.

Otherwise, the businesses most affected would be those within the zone of construction. Temporary effects would include disruption of traffic flow, noise, dust, and restricted or change in access. Businesses with direct access to the area under construction could experience intermittent closures of their access during the period of construction. Coordination with businesses would occur to mitigate the impact of temporary access closure.

Despite efforts to maintain access and minimize construction inconveniences, some businesses could suffer a temporary decline in sales. Research for other similar projects suggest that the decline in sales will depend on the type of business and the fidelity of the clientele. Businesses that rely heavily on drive-by customers are more likely to be negatively affected by construction because of people avoiding the area. Businesses with a marginal capital base are likely to be the most affected. Potential negative

impacts might be offset by construction workers who purchase goods and services in the Study Area during project construction.

4.1.7.1 Next Steps and Mitigation Strategies

Next steps and mitigation strategies should be centered on helping maintain the long-term viability of the business community in the corridor communities. As aspects of the Recommended Alternative are further defined in future NEPA processes, strategies around the following topic areas should be developed:

- Access: Maintaining access to businesses during all phases of construction
- Communication: Strategy to ensure communication before, during, and after construction with all businesses (and residents) in the corridor
- Additional Signage: Reduced visibility from construction activities requires additional signage
- Regional Outreach: Keeping the local community and region informed about construction and that businesses are open
- Special Events/Marketing/Additional Marketing Mitigation: Additional outreach, special events, and extra marketing could be undertaken with local business organization and jurisdictions to ensure that area residents, businesses, and visitors know that corridor businesses remain open during construction.

4.1.8 Noise

Under 23 CFR 772, noise impact analyses are required to assess the exact nature of noise level changes resulting from a Type I project. The Recommended Alternative will likely result in numerous Type I projects, which generally consist of new traffic lanes; roadway alignment changes; and removal of noise barriers (natural or manmade), or addition of weigh stations, rest stops, ride-share lots, and toll plazas. Type I projects also include additions of new interchanges or alterations of existing interchanges. In all cases in which a project is identified as Type I, a noise analysis study is required if noise-sensitive receptors are present within the Study Area. Noise abatement must be considered for Type I projects where noise impact levels are identified at noise-sensitive receptors, even though the project itself may not cause or contribute to an increase in traffic noise.

Noise-sensitive receptors within 500 feet of US 34 were identified within the Study Area in accordance with CDOT guidelines. Online resources were used along with desktop utilities, such as Google Earth, to identify existing noise mitigation measures and noise-sensitive receptors along the study corridor. The locations of noise-sensitive activity categories within the Study Area are mapped in **Appendix B**. Noise-sensitive activity categories found in the Study Area are defined as:

- Activity Category B: Residential properties
- Activity Category C: Active sport areas, amphitheaters, auditoriums, campgrounds, cemeteries, daycare centers, hospitals, libraries, medical facilities, parks, picnic areas, places of worship, playgrounds, public meeting rooms, public or nonprofit institutional structures, radio studios, recording studios, recreational areas, Section 4(f) sites, schools, television studios, trails, and trail crossings
- Activity Category E: Hotels, motels, timeshare resorts, vacation rental properties, offices, restaurants/bars, and other developed lands, properties, or activities not included in activity categories A through D or F (see **Appendix B** for complete category definitions)

Improvements proposed under the Recommended Alternative that could result in impacts to noise-sensitive receptors include construction of a roadway at a new location, moving traffic closer to

the receptors (halving the distance between the roadway and receptors), adding another through-lane in both directions on US 34, converting intersections to interchanges with ramps, and increasing the elevation of roadways more than 5 feet near noise-sensitive receptors. Noise-sensitive receptors that could be impacted by these improvements include the following:

- Activity B Category receptors, consisting of residences located within 500 feet of US 34 at Butte Road, Wilson Avenue, Taft Avenue, Cleveland Avenue, Lincoln Avenue, McWhinney Boulevard, between County Road 13 and County Road 15, east of County Road 15, east of 95th Avenue, east of 83rd Avenue, and between 71st Avenue and 11th Avenue
- Activity C Category receptors, including places of worship, parks and a natural area, a music lesson provider, hospitals and clinics, and schools
- Activity Category E receptors, including restaurants and hotels

4.1.8.1 Next Steps and Mitigation Strategies

During NEPA scoping and after the logical termini of the project is defined, a determination should be made whether the project is a Type I in accordance with 23 CFR 772 and whether a noise impact analysis is required. If it is determined that a noise analysis is required, then impacts to noise-sensitive receptors should be assessed during the NEPA review. The noise assessments will adhere to FHWA and CDOT noise evaluation standards and will model the existing and future conditions, evaluate noise increases at noise-sensitive receptors, and identify appropriate mitigation.

4.1.9 Recreational Resources

Parks and recreation areas of national, state, or local significance that are both publicly owned and open to the public are regulated under Section 4(f) of the DOT Act of 1966 [Section 4(f)]. Section 4(f) stipulates that DOT agencies, including FHWA, cannot approve the use of land from publicly owned parks, recreational facilities, wildlife and waterfowl refuges, or publicly or privately owned historic sites unless there is no feasible and prudent alternative to avoid the use of Section 4(f) resources and the action includes all possible planning to minimize harm to the Section 4(f) resource, or the project results in a *de minimis* impact to the Section 4(f) resource. Section 4(f) also applies if publicly owned land has been formally designated as a planned park or recreation area not yet developed and determined significant. Inclusion of the land and its function within a city or county master plan would be evidence of a formal designation.

Some park and recreational resources are regulated under the Land and Water Conservation Fund (LWCF) Act of 1965, which established a federal funding program to assist states in developing outdoor recreation sites. Section 6(f) of the LWCF Act prohibits the conversion of the property acquired or developed with these funds to a nonrecreational purpose without the approval of the National Park Service.

There are six parks and recreational facilities located within the Study Area that may qualify as Section 4(f) properties and may be used by the Recommended Alternative:

- Existing bike lanes adjacent to US 34 near the proposed Rossum Roundabout
- Existing bike lane east of Cascade Avenue that crosses under US 34
- Gateway Lakes Natural Area/Homestead Park near the proposed 35th Street interchange
- Bypass Trail near the proposed 35th and 47th Street US 34 interchanges
- Josephine Jones Park
- Colorado Potential Conservation Area

Section 6(f) applies to all recreational properties that were either purchased or improved with funds from the LWCF (FHWA, 2013). Section 6(f) protects these properties as public recreational use unless a

suitable (size, usefulness, monetary value) property can be found (FHWA, 2013). The LWCF Act is run by the National Park Service and administered locally in Colorado by CPW. The Recommended Alternative would not impact parks or recreational resources protected under Section 6(f).

4.1.9.1 Next Steps and Mitigation Measures

During subsequent NEPA reviews of projects, existing and potential park and recreational facilities that could be impacted should be evaluated for Section 4(f) applicability and use. Permanent incorporation, temporary occupancy (potentially exempt for construction) and constructive use should be evaluated, and avoidance and measures to minimize harm should be considered. When FHWA determines that a project as proposed would use a Section 4(f) property and there are no feasible or prudent alternatives that avoid use of Section 4(f) resources, there are three methods available to approve the use: 1) preparing a *de minimis* Impact Finding when there are no adverse effect to the activities, features, or attributes of the Section 4(f) resource; 2) applying a programmatic Section 4(f) evaluation for minor involvements with parks and recreational areas if the use meets specific criteria; 3) through preparation of an individual Section 4(f) evaluation if the use would result in adverse effects to the activities, features, or attributes of the 4(f) resource. If the proposed improvements result in a use of a Section 4(f) property, one of these approval processes must be completed.

4.1.10 Visual Resources

Visual resources are the natural and cultural features of the landscape that define its aesthetic quality and form the overall impression, or visual character, of an area. Visual impacts can generally be defined in terms of the relationship between a project's physical characteristics, the presence and location of viewers, and the character and quality of the environment in which a project is located. Because public concern over adverse visual impacts can generate controversy, the assessment of visual resources, evaluation of visual impacts, and consideration of mitigation and/or enhancement measures have become important components of the study, design, and implementation of most highway projects.

The Study Area is characterized by variable topography, generally flat in the more developed areas to the west and gently undulating to rolling in the more rural areas of the east. In the west portion of the Study Area, the landscape is more typical of suburban/urban development, broken up by parks, natural areas, or trail crossings. Apart from the more urbanized area through Greeley, the landscape in the eastern portion of the Study Area is more typical of northeastern Colorado's rural and agricultural settings. However, land use plans indicate that development of much of this area is anticipated in future years. Views to the west include the Rocky Mountains. Preliminary review indicates that the Study Area is composed of the following distinctive landscape character units:

- Residential (urban, suburban, rural) uses
- Commercial, industrial, and municipal uses
- Parks, recreational areas, and trails
- Water and natural resources
- Agricultural open space and undeveloped lands
- Rocky Mountain backdrops

The location and dominance of the land uses contained within these landscape units are discussed in **Appendix B**. Key visual features include Devil's Backbone Open Space, Lake Loveland, Mariana Butte Golf Course, Big Thompson River, South Platte River, Dwayne Webster Veteran's Park, protected agricultural lands, NRHP-eligible historic properties (with concentrations in Loveland), and a variety of recreational trails that cross US 34. Sensitive viewers include residences, motorists, and recreational users.

The Recommended Alternative includes design elements that would result in a change from the existing visual environment. Depending on the location, this level of change would be minor (not attracting attention or deviating from the overall visual setting), moderate (noticeable, but subordinate to the setting), or strong (attracting attention and dominate in the setting). Changes to the visual setting in the western portion of the Study Area would generally be minor because of the lower level of change introduced in these locations. Exceptions would be for the roundabout options at Rossum Road and Cleveland Avenue, which would represent a greater level of change from current conditions and a moderate impact. Changes in locations with signalized intersections would be moderate and not limiting to the existing mountain views.

US 34 corridor locations with proposed widened cross sections, especially 6-lane sections and new interchanges, would represent a strong level of change to the visual setting. The height and mass of interchange ramps and overpass structures on US 34 would be a dominant element in the adjacent and more rural landscapes that define the Johnstown and Greeley segments of the project. In locations where US 34 currently intersects with local roads, the highway would be constructed approximately 24 feet above the existing ground. In locations where US 34 would cross over railroads, the highway would be constructed approximately 32 feet above the existing ground. This would represent a substantial change to the visual setting and alter existing mountain views. However, as the area develops in accordance with local planning efforts, the contrast would be less notable.

In areas where sensitive land uses are adjacent to the project, greater impacts to viewers would be expected (for example, east of 35th Avenue in Greeley, where a cemetery, church, and school would be located next to a new elevated interchange structure).

4.1.10.1 Next Steps and Mitigation Strategies

As components of the Recommended Alternative advance as projects into NEPA and more detailed design is available, the following is recommended:

- More detailed evaluation, characterization, and photo documentation of the existing visual environment
- In areas with sensitive land uses (for example, east of 35th Avenue), consider the development of renderings to depict the anticipated visual change
- Conduct a formal visual impact assessment in accordance with FHWA's *Visual Impact Assessment for Highway Projects* (1998) and *Guidelines for the Visual Impact Assessment of Highway Projects* (2015)
- Develop additional mitigation measures and design guidelines

Mitigation measures to address visual impacts would include the following:

- Integrate the Recommended Alternative into the existing landscape with the use of color, texture, and other design features
- Minimize the project footprint and cut and fill activities
- Incorporate signage and architectural features that promote continuity within the Study Area
- Review, develop, and apply visual guidelines in conjunction with local communities

4.1.11 Other Resources

The resource areas discussed in this section were considered unlikely to influence outcomes of the PEL process, thus they were not considered in detail. However, these resources will require evaluation during future NEPA processes for projects that advance from the Recommended Alternative in compliance with applicable regulations.

4.1.11.1 Air Quality

Impacts to air quality are regulated by the Clean Air Act, which regulates emissions through the National Ambient Air Quality Standards and the Hazardous Air Pollutants program. This program also sets specific requirements for transportation projects through the evaluation of Mobile Source Air Toxics. Transportation projects proposed in areas that are found to be in nonattainment and do not meet the National Ambient Air Quality Standards emissions limits for six criteria pollutants (carbon monoxide [CO], ground level ozone, sulfur dioxide, nitrogen dioxide, particulate matter, and lead) will require additional analysis.

The Study Area is located in the attainment area for ground level ozone, and portions of the Study Area are within the Greeley CO attainment/maintenance area (CDPHE, 2017a; 2017b). Projects moving forward from the Recommended Alternative may require a more in-depth quantitative air quality analyses. Projects may have to meet regional conformity requirements through inclusion in the most current fiscally constrained NFRMPO plans that conform to the air quality improvement plans that cover portions of the Study Area. Projects located within the Greeley CO attainment/maintenance area may also require a project-level analysis for CO, as required by conformity rules. Although this requirement is set to expire in May 2019 when the second maintenance period concludes, redesignation from attainment/maintenance to attainment can take up to 1 year and a project-level analysis for CO will be required until redesignation has been approved by the U.S. Environmental Protection Agency.

4.1.11.2 Farmlands

The majority of the Study Area falls within an urbanized area. However, soils classified by the Natural Resources Conservation Service Soil Survey Geographic Database as prime, unique, and of statewide and/or local importance are present in the eastern portions of the Study Area. Improvements that advance from the Recommended Alternative may require the completion of a Farmland Conversion Impact Rating form and coordination with the Natural Resources Conservation Service for projects that have the potential to convert farmlands to other uses.

4.1.11.3 Paleontology

In accordance with Prehistorical and Archaeological Resources Act of 1973, paleontological resources must be considered for transportation projects with federal involvement. A record search and referencing of the Potential Fossil Yield Classification System was completed for the project. The majority of the Study Area has low to moderate potential to contain fossils, with the exception of the Morrison Formation, which has a high potential. There are no previously recorded fossil locations within the Study Area, although precise geographic coordinates were not available for all records.

As projects from the Recommended Alternative advance into NEPA, a paleontological survey and more extensive record search may be needed to evaluate the potential occurrence of sensitive resources. Surveying and potential construction monitoring as well as CDOT clearance may be required before the construction of projects emerging from this study.

4.1.11.4 Water Quality

The Study Area falls within the Big Thompson, Cache La Poudre, and Middle South Platte-Cherry Creek watersheds, and numerous drainages occur within the Study Area. Although there are numerous drainages in the project Study Area, surface water quality impacts are generally evaluated in the immediate vicinity of the streams and stream crossings, where surface water runoff from construction or the transportation system would collect and be discharged into the stream or waterbody.

As projects from the Recommended Alternative progress into NEPA and design, efforts should be made to avoid and minimize impacts to water-related resources to the extent possible. If avoidance is not feasible, best management practices should be implemented to reduce direct and indirect impacts to

these resources. As the project progresses, CDOT will continue to coordinate with federal and local agencies to maintain water quality standards and facilities within the Study Area.

4.2 Cumulative Impacts

Cumulative impacts are impacts on the environment that result from the incremental impact of the action when added to other past, present, and reasonably foreseeable future actions regardless of what agency or person undertakes these actions. Cumulative impacts can result from individually minor, but collectively significant, actions taking place over a period of time.

During future NEPA processes, scoping, technical studies, and coordination with agencies will be conducted to assess if there will be direct, indirect, or cumulative project-related impacts to affected resources. Resources that are adversely impacted by the Recommended Alternative or resources currently in poor/declining health or at risk will be analyzed for cumulative impacts even if the anticipated project impacts are relatively small. Additional coordination with resource agencies will be conducted to determine the appropriate geographical study area for each of the affected resources and to assist with the development of measures to avoid, minimize, or mitigate anticipated impacts.

Agency Coordination and Public Involvement

FHWA and CDOT were committed to involving federal, state, and local agencies and the public throughout the US 34 PEL Study process. The US 34 PEL Study aims to reach consensus among stakeholders for the vision, phasing, and financing of transportation solutions on US 34, building upon past studies and projects in the area. Stakeholder involvement was emphasized throughout the PEL process and feedback was solicited from the agency and the public at key decision points to foster acceptance of recommendations. Letters of agency support are included in **Appendix F**.

5.1 Local Agency Coordination

Stakeholder interest and level of involvement vary, so to provide appropriate mechanisms for different groups, CDOT engaged stakeholders through various forums. These included agency coordination, a TAC, and public outreach. The project team prepared the *US 34 PEL Project Communications Plan* at the beginning of the study to document how CDOT planned to engage stakeholders. The following subsections summarize the stakeholder outreach conducted as a part of the US 34 PEL Study.

5.1.1 Project Management Team

A PMT met biweekly during the US 34 PEL Study. PMT meetings facilitated coordination between CDOT, FWHA, and consultant staff. Additional meetings involving PMT members were held as needed. PMT members included:

- CDOT
- FHWA
- ArLand LLC
- CDR Associates
- CH2M HILL, Inc.
- Muller
- OV Consulting
- Stolfus and Associates
- TSH Engineering

5.1.2 Technical Advisory Committee Meetings

CDOT worked closely with other agencies and local communities throughout the study process, largely through the TAC. The TAC comprised local jurisdictions and other key stakeholders who have a significant stake in the Study Area's transportation system. TAC meetings served as the focal point for sharing of data and technical analyses. The TAC helped identify relevant materials that could be helpful to the study team (for example, previous studies), coordinate with and inform the US 34 Coalition (for more information on the US 34 Coalition, see **Section 5.1.3**) of project status, and help articulate problems and evaluate solutions for the corridor. In addition, the TAC had an important role in helping to define the vision for the project and in the shaping of the alternatives considered, alternative evaluation criteria and performance measures, and the evaluation of study recommendations. The TAC provided technical input and recommendations to CDOT, and shared information with and solicited input from their organizations, elected officials, and other constituents. The TAC included representatives from the following communities and agencies:

- CDOT
- Larimer County Mobility Committee (part of NFRMPO)
- Weld County Mobility Committee (part of the NFRMPO)
- NFRMPO
- City of Evans
- City of Greeley
- City of Loveland
- Town of Johnstown
- Town of Kersey
- Town of Windsor
- Larimer County

- Weld County
- ArLand LLC
- CDR Associates
- CH2M HILL, Inc.
- CPW
- FHWA
- Muller
- OV Consulting
- Stolfus and Associates
- TSH Engineering

TAC meetings included:

- April 19, 2017: Kickoff and Data Review
- May 17, 2017: Public Meeting No. 1/Scoping Input
- June 21, 2017: Purpose and Need
- July 19, 2017: Corridor Segments/Evaluation Criteria
- August 16, 2017: Range of Alternatives
- September 20, 2017: Level 1 Evaluation/Intersection Review
- October 18, 2017: Public Meeting No. 2
- December 13, 2017: Update/Alternatives
- February 21, 2018: Project Update
- March 21, 2018: Level 2 Progress
- April 18, 2018: Level 2 Updates/Level 3 Packaging
- May 5, 2018: Public Meeting No. 3/Project Updates
- May 16, 2018: Project Prioritization
- June 20, 2018: Recommendations and Letters of Support
- July 18, 2018: Coalition and Agency Briefings
- August 15, 2018: Project Wrap-up and Next Steps
- October 17, 2018: Comment Review
- November 26, 2018: Study Recap

5.1.3 US 34 Coalition Meetings

The US 34 Coalition's purpose is to establish a common vision, priorities, and an implementation plan to prioritize, fund, and construct improvements along the US 34 corridor. The US 34 Coalition provides the member entities a forum to engage in a coordinated and collaborative process to pool resources and identify and implement a common and politically cohesive vision for transportation improvements on US 34.

The US 34 Coalition provides the primary stakeholder representation on the US 34 PEL Study and has dedicated staff and resources to help CDOT with the study. The US 34 Coalition includes representatives from the following communities and agencies:

- City of Evans
- City of Greeley
- City of Loveland
- CDOT
- Larimer County
- NFRMPO
- Town of Johnstown
- Town of Kersey
- Town of Windsor
- Weld County

The US 34 Coalition met at the following intervals during project development:

- February 2, 2017: Project Kickoff
- March 2, 2017: Charter
- April 6, 2017: Project Updates/Public Meeting Review
- April 19, 2017: Finalize Charter
- June 21, 2017: Purpose and Need

- October 5, 2017: Project Updates/Public Meeting Review
- April 5, 2018: Project Updates
- August 2, 2018: Project Updates
- December 6, 2018: Study Recap

5.2 Resource Agency Coordination

Local agency coordination was done at the start of the US 34 PEL Study process. Letters were sent to local agencies to gauge interest in the project and determine if a resource agency meeting should be scheduled once existing conditions have been collected. Letters were sent on April 26, 2017, to each of the following local agencies seeking input:

- Weld County – Natural Resources
- Larimer County – Natural Resources
- Colorado Department of Public Health and Environment
- FHWA
- USFWS
- USACE
- Colorado State Land Board
- Larimer County Mobility Committee
- Weld County Mobility Committee
- COLT
- GET
- City of Fort Collins
- Colorado Motor Carriers Association
- Colorado State Patrol
- Northern Colorado Bicycle and Pedestrian Collaborative

5.3 One-on-One Stakeholder Meetings

Understanding ideas, perspectives, and needs of key stakeholders in the corridor is critical for broadly supported decisions. At the start of the project, one-on-one interviews were conducted with PMT-identified key stakeholders to understand their respective interests, goals, issues, and desired outcomes for the PEL Study. Members of the consultant team conducted a one-on-one meeting with each stakeholder before the US 34 Coalition chartering session. The list of stakeholders follows:

- City of Evans
- City of Greeley
- Town of Johnstown
- Town of Kersey
- Larimer County
- City of Loveland
- NFRMPO
- Weld County
- Town of Windsor

The Consultant Team prepared a list interview questions and topics to ensure key topics of interest were covered and provide consistency among the interviews. The Consultant team prepared an overall summary of interview themes (**Appendix D**). Results were incorporated in the Team Chartering Agreement, project management plan, and communications/stakeholder involvement plans.

5.4 Public Outreach Activities

The team developed a website to keep public and stakeholders informed about the study: https://www.codot.gov/library/studies/us-34-planning-and-environmental-linkages-pel-study. The website included general information on the project, a map of the Study Area, the PEL project schedule, public and agency outreach information, frequently asked questions, and a comment page. The comment page allowed the website visitor the opportunity to provide input and ask questions related to the project. The website was monitored daily, and reports on inquiries and comments were issued to the project team on a weekly basis.

The US 34 PEL Study also held three sets of public meetings throughout the PEL process to engage and inform the public as well as gather their input and opinions.

- Public Meeting No. 1
  - May 2, 2017 at the City of Loveland Public Works Administration Building
  - May 3, 2017 at the City of Evans Riverside Library and Cultural Center
- Public Meeting No. 2
  - November 8, 2017 at CDOT
  - November 15, 2017 at the Best Western, Loveland
- Public Meeting No. 3
  - May 23, 2018 at the City of Evans Riverside Library and Cultural Center
  - May 30, 2018 at the Embassy Suites, Loveland

The public and stakeholders were notified of the public meeting through the project website, postcard mailouts, a CDOT press release, social media postings orchestrated though local agencies, and flyer postings in communal areas. A public meeting summary with a copy of the boards and presentation was posted on the website after each round of public meetings (**Appendix D**).

5.5 Public Comments

Throughout the study, the public had ongoing and accessible opportunities to participate and provide input to inform the study. Input was solicited at the public meetings and community meetings with comment forms, through the project e-mail address, and the project website. All meeting materials were posted on the project web page noted in **Section 5.4**. Over the course of the study, the public submitted 208 comments that were reviewed and considered. The majority of the comments received were related to mobility and congestion, infrastructure and design elements, followed by comments related to technology, primarily signal timing, access, and safety.

Comments were shared by the project staff and the TAC and considered during the alternatives development and evaluation. The comments were collected and posted in public meeting summaries that were also posted to the project website. The public meeting summaries are included in **Appendix D**.

SECTION 6

Next Steps

This PEL Study has been prepared to support the transition of planning into NEPA in accordance with FHWA and CDOT PEL guidance (CDOT, 2016a) regarding the integration of transportation planning and the NEPA process; this guidance encourages the use of planning studies to provide information for incorporation into future NEPA documents (23 CFR 450). The PEL process is intended to provide a framework for long-term implementation of the Recommended Alternative as funding becomes available and inform the NEPA process as project implementation occurs. CDOT estimates that implementing the Recommended Alternative may cost between $500 million and $750 million dollars (2018 dollars) depending on which options are selected. This estimate will be substantially more in the future, as construction costs continue to rise. Currently there is no substantial funding for these corridor improvements. CDOT will implement projects that improve mobility and safety in the US 34 corridor through creative budgeting, leveraging existing funding, identification of new funding sources, and partnerships with local agencies.

Recognizing that funding is not currently available to fully construct the Recommended Alternative, many of the "feasible, but not recommended" improvements identified in this study could be built as interim phases as CDOT and local agency partners work toward achieving the full corridor vision. The following framework has been established for future teams to execute these projects by performing the following:

- Establishing a corridor implementation strategy with priorities that match the existing and expected future needs
- Identifying those improvements that can likely be implemented in the near term
- Providing an assessment of the threats in the corridor so that more resilient projects can be designed
- Defining potential funding sources

All of these items are important next steps in realizing the overall corridor vision.

6.1 Implementation Strategy

The Recommended Alternative will be implemented in phases to match corridor needs and available funding. CDOT developed an implementation strategy that identifies priorities that can be implemented in the short- and long term, while remaining flexible to adapt to changing conditions and emerging funding opportunities.

The PMT and TAC were engaged throughout the study and were integral in providing their local knowledge of the corridor, evaluating alternatives, and defining priorities. The US 34 Coalition, consisting of agency executives, was consulted at key milestones. Input from these ongoing partnerships with local agencies helped define the list of corridor priorities developed by CDOT. As a result of the number of improvements recommended, a priority was established based on how well individual projects met the Purpose and Need and considered the prospect of securing necessary funding.

East of I-25, implementing the Recommended Alternative to widen US 34 to six lanes with interchanges may cost upwards of $500 million. For an initial investment of $110 million, the corridor could be widened to six lanes while maintaining signalized intersections. However, as the corridor builds out, the cross-street traffic increases to a point where grade separations will be needed to ease congestion. The timing of these improvements will depend on economic conditions and rates of development. The 35th

Avenue, WCR 17, and 47th Avenue intersections are already approaching congested conditions and therefore interchanges at these locations were considered a likely initial phase.

West of I-25, implementing the Recommended Alternative will cost at least $26 million. Widening from four to six lanes between Denver Avenue and Boyd Lake Avenue is identified as a high priority. Dual left-turn lanes at the Lincoln Avenue/Cleveland Avenue intersections would improve operations near downtown Loveland; this improvement is also considered a high priority. Other local intersection and access improvements could be constructed because of their relatively lower costs. However, these improvements were considered lower priority when compared to needs at other locations in the corridor.

As presented on **Figure 6-1** (numbers in the list below match locations on **Figure 6-1**), the following lists details the high priority projects and potential initial phasing:

1. Widen US 34 from four to six lanes between Denver Avenue and Boyd Lake Avenue
2. Widen US 34 from four to six lanes between Boyd Lake Avenue and Rocky Mountain Avenue
3. Widen US 34 from four to six lanes from Centerra/Thompson Parkways to east of Larimer Parkway
4. Widen US 34 from four to six lanes on either side of the WCR 13 intersection and adjust timing to boost signalized intersection capacity
5. Construct an interchange at 35th Avenue and widen from four to six lanes to 47th Avenue
6. Construct an interchange at WCR 17
7. Construct eastbound/westbound dual left-turn lanes at the Lincoln Avenue/Cleveland Avenue intersections
8. Construct an interchange at 47th Avenue
9. Widen US 34 from four to six lanes between WCR 17 and the US 34 Business interchange
10. Construct an interchange at 83rd Avenue
11. Construct an interchange at either 65th Avenue or 71st Avenue (interchange location to be determined by future project teams)
12. Widen US 34 from four to six lanes between Larimer Parkway and WCR 17

Additional high priority projects not shown on **Figure 6-1** include: complete remaining 4- to 6-lane widening where recommended; complete remaining interchanges at Centerra/Thompson Parkways, Larimer Parkway, LCR 3, WCR 13, and Promontory Parkway; complete overpass at 17th Avenue; complete remaining lower priority projects included in the Recommended Alternative.

Multimodal elements were viewed as integral to any project being considered and therefore are not included explicitly in this in this priority list. Additionally, all projects may incorporate supplemental elements (for example, railroad crossing improvements, pedestrian and bicycle considerations, transit, wildlife crossings, intelligent transportation systems, and evolving technology opportunities, as appropriate). Future NEPA teams will determine which projects should be combined and evaluate their independent utility and logical termini as required by NEPA. The priority list may need to be modified as conditions change or funding becomes available.

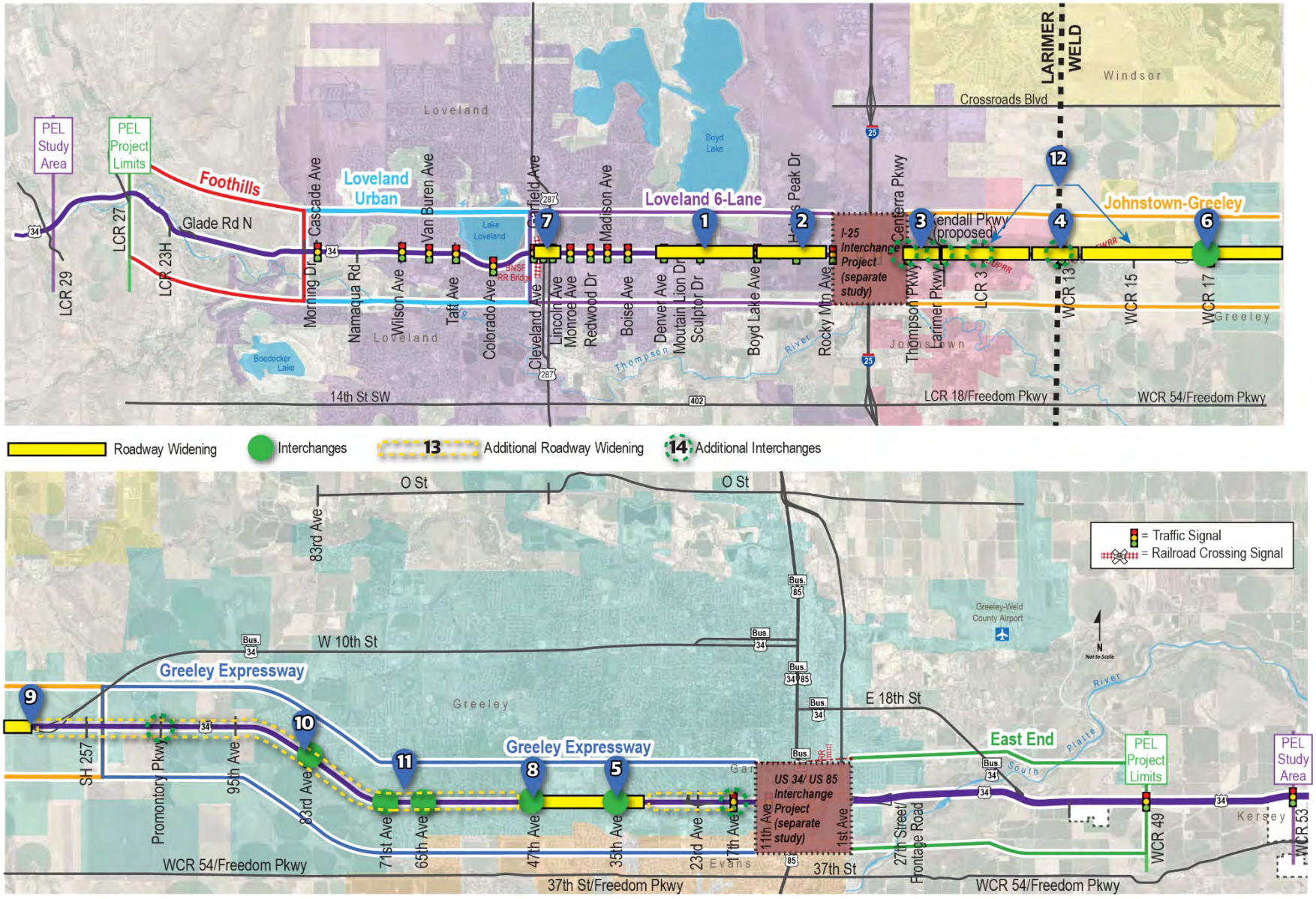


Figure 6-1. Priority Projects

6.2 Near-Term Improvements

Throughout the development of the Purpose and Need and evaluation of existing conditions, localized areas with specific issues or concerns were identified within the Study Area. Potential near-term improvements were developed to address the known problem areas. These improvements could be implemented quickly without lengthy planning or design, would have an immediate effect on improving the safety and operations, and some would be first steps toward the broader corridor vision. The following is a list of the recommended near-term improvements and identifies the lead agency:

- Periodically conduct signal warrant analysis at major cross streets (CDOT)
- Complete regular corridor traffic signal retiming to adjust to changing traffic conditions (CDOT)
- Complete a US 34 ACP for the west side of I-25 (CDOT, underway in parallel to this PEL Study)
- Expand the adaptive signal timing to more locations, which has proven beneficial at other US 34 intersections[2] (CDOT)
- Modify traffic signal timing at the US 34 and 83rd Avenue intersection (CDOT)
- Improve the US 34 4-lane to 2-lane transition area near Morning Drive (CDOT)
- Implement the displaced left-turn lane option at 71st Avenue in interim and update ACP as needed (CDOT)
- Restripe the US 34 and I-25 park and ride lot (CDOT)
- Re-align 28th Street to the north to improve spacing with the US 34 and 65th Avenue intersection (Greeley)
- Consider on-street bike lanes on 1st Avenue (Greeley)
- Widen 83rd Avenue to 4-lanes north of US 34 per the RTP (NFRMPO, 2015b) (Greeley)[3]
- Pave LCR 3 on the existing alignment (Johnstown and Loveland)
- Explore interim improvement options at the Lincoln Avenue/Cleveland Avenue intersections (for example, lengthening the eastbound and westbound left-turn lanes and improving the traffic signal timing) (Loveland)
- Intersection improvements at Taft Avenue and Wilson Avenue (Loveland)
- Widen existing sidewalks on Taft Avenue north of US 34 (Loveland)[2]
- Expand the south approach of the US 34 and WCR 17 intersection to create separate northbound left-turn lane and adjust signal timing (Weld County)
- Improve intersection spacing between Kelim Frontage Road and US 34 at LCR 3 and WCR 13 (Weld County)

[2] A system engineering assessment will be required to determine the need and function of adaptive signal timing at more locations.

[3] This improvement would also be implemented under the No Action Alternative.

6.3 Threats Assessment

CDOT has been expanding its focus to incorporate the mindset of resiliency within all phases of the project lifecycle from planning to design and construction. Integrating resiliency into planning efforts can help proactively identify potential natural, manmade, and operational threats to a corridor, creating an opportunity for CDOT to reduce its risk by including scope within its standard planned projects to address those threats.

6.3.1 Natural and Manmade Threats

In September 2013, a prolonged period of heavy rain and catastrophic flooding occurred in Colorado, leading to extensive infrastructure damage along drainageways. The heavy flood particularly affected communities along US 34. The 2013 floods are just one example of the natural and manmade threats that can disrupt the corridor and impact the surrounding community.

Planning for such events could help identify more resilient infrastructure designs. As part of this study, CDOT identified risk areas along the corridor where there are opportunities to enhance transportation infrastructure and reduce the risk of damage to its assets. These improvements will protect the integrity of the of the transportation system and the investment of funds.

The resiliency analysis, associated maps, cost worksheets, and risk assessment matrix are included in **Appendix E**. Primary natural and manmade threats that were considered applicable to the US 34 corridor included flooding, proximity to railroads, and utility failures. The floodplain limits, as well as the railroad and utility crossings, were mapped in relation to CDOT-owned assets along the corridor. Assets identified included major structures, the roadway prism, and traffic control items. Each area in which a natural threat overlapped with an asset was labeled as a "risk area." A risk assessment matrix was developed, pairing risk areas with the associated infrastructure and user costs that would be incurred if the natural threat were to occur. Assuming that the natural threat shuts down the highway, user costs were calculated based on the length of time it takes to travel the detour route using CDOT's Road User Cost Calculation spreadsheet. The study team determined three ranges of user costs: low, moderate, and high. Infrastructure costs, the cost to replace the damaged asset, were established using CDOT's Project Cost Planner tool with standard percentages. Three ranges of infrastructure costs were assigned: low, moderate, and high.

The vulnerability of these assets and their associated costs were used to predict consequences that natural threats could have on each specific asset. The team then evaluated the likelihood of occurrence of each natural threat and created a prioritization list of the highest risk areas. The prioritization list also considered the criticality of the roadway segment, or how important the segment was to the community's social and economic vitality. Recommendations made to increase the resiliency of the high- and moderate-level manmade and natural threats are shown in **Table 6-1**.

6.3.2 Operational Resiliency Analysis

Because of recent and dynamically changing land use in the area, CDOT embarked on a new operational corridor risk assessment process. The purpose of this analysis is to assess the risk and vulnerability of highway operational functionality loss due to unexpected traffic increases and unanticipated land use changes. The initial assessment of operational resiliency analysis for US 34 confirms the PEL recommendations and the initial priority projects. As corridor conditions remain dynamic, priorities may be adjusted to meet changing corridor demands. The complete operational corridor risk assessment will be issued as a separate report.

Table 6-1. Natural and Manmade Resiliency Recommendations

Risk Area ID	Threat	Assets in Threat Area	Location of Asset	Prioritization		Resilient Recommendations
				Criticality (additional value to risk based on criticality maps)	Prioritization (priority based on risk and incorporating criticality)	
1	Flood	Structures C-16-DD and C-16-AF, pavement, guardrail	Big Thompson River, MP 86.044, structures of the Big Thompson River and Buckingham Ditch	High	High	Ensure structure C-16-DD is built to withstand a 100-year flood event
2	Flood	Pavement, guardrail	MP 86.6, roadway within floodplain	High	Moderate	Raise vertical profile of road out of the floodplain or replace with overtopping pavement
3	Flood	Structure C-16-AE, pavement, guardrail	MP 86.931, structure over the Big Thompson River	High	Moderate	Ensure structure is built to withstand a 100-year flood event, perform floodplain conveyance improvements to channelize flow and prevent flooding on the north side of the highway (see Risk Area ID #4)
4	Flood	Structure C-16-AR, pavement	MP 87.651, structure over draw	High	High	Ensure channel and structure C-16-AE is built to convey and withstand a 100-year flood event (see Risk Area ID #3); or raise vertical profile of roadway out of floodplain or reinforce with overtopping pavement
5	Utility Failure	Pavement	36-inch transmission water main just west of Langston Lane	High	High	Work with utility owner to replace or reinforce existing waterline
6	Utility Failure	Pavement	48-inch transmission water main just east of Langston Lane	High	High	Work with utility owner to replace or reinforce existing waterline
7	Utility Failure	Pavement	48-inch transmission water main located at Morning Drive	High	High	Work with utility owner to replace or reinforce existing waterline
15	Railroad Proximity	Structures C-18-BH and C-18-AO Guardrail, pavement	Railroad crossing underneath Spaghetti Interchange	High	Moderate	Ensure railroad structure is equipped with acceptable pier protection per AREMA standards

6.4 Potential Funding Strategies

Historically, transportation has been funded by several reliable sources combined with other less predictable and variable sources (for example, grants). This PEL Study does not identify specific funding sources, but did identify current funding types and whether elements of the Recommended Alternative may qualify for this funding (see **Table 6-2**).

Table 6-2. Types of Funding and Qualifying Projects

Funding Type	Criteria/Constraints	Example Projects
Congestion Mitigation and Air Quality	Any project that can improve air quality (except capacity)	Intersection improvements, trails, operations
Surface Transportation Block Grant for Local Agencies (previously STP-Metro)	Funding for local agency projects - very flexible	All construction
Transportation Alternatives for Local Agencies (previously Transportation. Alternative Program)	Small funding pool	Trails, sidewalks, community improvements
Surface Transportation Block Grant for CDOT	CDOT's grant funding - very flexible	All construction
National Highway Performance Program (NHPP) (previously National Highway System [NHS])	Only for National Highway System roadways, flexible	All construction
ADA Ramp	Standalone ADA ramp initial installation/upgrade projects	ADA ramps
FASTER Safety	Must demonstrate a safety need, flexible	Intersection improvements, shoulders, wildlife crossings, signals, paths
Highway Safety Improvement Program	Must demonstrate a safety need, small funding pool	
Safety Hot Spot	Must demonstrate a safety need, small funding pool	
FASTER Transit	Transit only	Transit
National Highway Freight Program	Construction and operational improvements; competitive within Colorado, under $20 million available each year statewide	Freight
Federal Discretionary Grants	Compete statewide for permission to apply to compete nationally (US 34 would currently qualify for an Infrastructure for Rebuilding America grant); more grants may be initiated over time	All construction
Developer/Private Funding/Road Impact Fees	Associated with either development or redevelopment	Access consolidation as part of redevelopment
Downtown Development Authority - Loveland, Future	Small funding pool	Typical projects improve attractiveness including streets, curbs, gutters, sidewalks, landscaping; Downtown Development Authority area includes the Lincoln/Cleveland intersection
Urban Renewal Authority - Centerra, Loveland, Greeley Mall, Future	Small funding pool. Goals and requirements vary	Areas either include or are adjacent to US 34

Table 6-2. Types of Funding and Qualifying Projects

Funding Type	Criteria/Constraints	Example Projects
Foundations - UPRR, BNSF, others	Small funding pools	Railroad
Partnerships	Collaboration among stakeholders may include CDOT, local agencies, or developers	All
Future federal, state, and local revenue sources	As defined/specified	Unknown at this time

ADA = Americans with Disabilities Act of 1990

Fully implementing the Recommended Alternative will require pursuing all funding opportunities. In November 2018, state-wide transportation ballot measures Proposition 109 and Proposition 110 were both rejected by voters. Therefore, the approximate $90 million that was slated for US 34 widening and interchange improvements is not available. However, in May 2018, the State Legislature passed Senate Bill 1, which stipulates if a transportation bond issue was not passed by citizens in 2018, a bond issue would be referred to the November 2019 ballot. The 2019 measure would require the state to issue $2.337 billion in transportation revenue anticipation notes (TRANs). At the time of completion of this PEL, it is uncertain if the same level of funding will be available for improvements on US 34.

Citizens within the City of Greeley renewed their quality of life tax, which was set to sunset December 31, 2022. With the approval of ballot issue 2O, voters extended this 0.3 percent sales and use tax until December 31, 2042, for such purposes as transportation capacity, infrastructure projects, and building maintenance. It is possible that the City of Greeley will choose to allocate some of this local funding to improvements on US 34.

Despite the mixed results of the 2018 ballot, CDOT and local agencies remain committed to continuing communication, collaboration, and implementing improvements to US 34 that benefit Northern Colorado residents. These strong partnerships, and the ongoing support and continued efforts of the US 34 Coalition, are essential to securing the necessary funding to implement all the US 34 PEL Study recommendations.

SECTION 7

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Appendix A
PEL Questionnaire

Federal Highway Administration
Planning/Environmental Linkages Questionnaire

US 34 Planning and
Environmental Linkages (PEL) Study
Date Prepared: December 2018

This questionnaire is intended to act as a summary of the Planning process and ease the transition from planning to a National Environmental Policy Act (NEPA) analysis. Often, there is no overlap in personnel between the planning and NEPA phases of a project, so consequently much (or all) of the history of decisions made in the planning phase is lost. Different planning processes take projects through analysis at different levels of detail. Without knowing how far, or in how much detail a planning study provided, NEPA project teams are not aware of and may often redo work that has already been done. This questionnaire is consistent with the 23 CFR 450 (Planning regulations) and other Federal Highway Administration (FHWA) policy on Planning and Environmental Linkage (PEL) process.

The Planning and Environmental Linkages study (PEL Study) is used in this questionnaire as a generic term to mean any type of planning study conducted at the corridor or subarea level which is more focused than studies at the regional or system planning levels. Many states may use other terminology to define studies of this type and are considered to have the same meaning as a PEL study.

At the inception of the PEL study, the study team must decide how the work will later be incorporated into subsequent NEPA efforts. A key consideration is whether the PEL study will meet standards established by NEPA regulations and guidance. One example is the use of terminology consistent with NEPA vocabulary (e.g., purpose and need, alternatives, affected environment, environmental consequences).

1. Background:

a. Who is the sponsor of the PEL study? (state DOT, local agency, other)

Colorado Department of Transportation (CDOT)

b. What is the name of the PEL study document and other identifying project information (e.g., sub-account or STIP numbers, long-range plan or transportation improvement program years)?

Planning and Environmental Linkages (PEL) for US 34 CDOT Project Number: NH 0341-091 (21444)

c. Who was included on the study team (Name and title of agency representatives, consultants, etc.)?

The Project Management Team (PMT) comprised representatives from CDOT, FHWA, CH2M HILL, Inc. (CH2M), Stolfus and Associates, TSH Engineering, CDR Associates, Muller, OV Consulting, and ArLand LLC. CDOT and FHWA served as a decisionmakers throughout the PEL, with technical support and professional expertise to aid in decision-making provided by consultant staff.

The Technical Advisory Committee (TAC) comprised agencies and local communities with a significant stake in the future of the Study Area's transportation system. Representatives included CDOT, FHWA, Larimer County Mobility Committee/ North Front Range Metropolitan Planning Organization (NFRMPO), City of Evans, City of Greeley, City of Loveland, Town of Johnstown, Town of Kersey, Town of Windsor, Larimer County, Weld County, ArLand LLC, CDR Associates, Colorado Parks and Wildlife (CPW), CH2M, Muller, OV Consulting, and Stolfus and Associates.

A full listing of study team participants is included in **Section 5.1, Agency Coordination** in the PEL report.

d. Provide a description of the existing transportation facility within the corridor, including project limits, modes, functional classification, number of lanes, shoulder width, access control and type of surrounding environment (urban vs. rural, residential vs. commercial, etc.)

As shown on Figure 1-1 of the PEL report, the 34.6-mile-long Study Area is bounded by Larimer County Road (LCR) 29 to the west, State Highway (SH) 402 and Freedom Parkway to the south, Weld County Road (WCR) 53 to the east, and O Street to the north. The extent of this Study Area was carefully considered to incorporate key corridor influences such as changes in state highway access categories, speed limits, existing and future land uses, major trip generators, parallel routes, and adjacent studies. Defining a broader Study Area helped CDOT to understand the overall transportation system needs and the potential effects of proposed improvements on US 34 on adjacent corridors and surrounding communities. The Project Limits from LCR 27 to WCR 49, where proposed US 34 improvements are focused, comprises 31.7 miles.

The corridor is an important regional connection for the adjacent communities of Loveland, Johnstown, Windsor, Greeley, Garden City, Evans and Kersey, as well as other destinations, such as Estes Park and Rocky Mountain National Park. In addition to east-west travel, the corridor includes intersections with several important north-south regional roadways, including US 287, Interstate 25 (I-25), and US 85. As shown in **Table 1**, the US 34 Corridor was divided into six segments due to the size of the Study Area, varying physical and operational corridor characteristics, and the context of adjacent communities. These segments do not represent logical termini for potential future projects. Figure 1-2 in the PEL report illustrates the corridor segments. The I-25 Interchange Project (1.0 miles on US 34) and the US 34/US 85 Project (1.2 miles on US 34) are separate studies that will complement and accommodate the improvements proposed in the US 34 PEL Study. These two separate study areas are not included in the US 34 project segments, and the US 34 PEL report does not include additional recommendations within these areas. Consistency of the Recommended Alternative with the separate study areas was considered during alternatives development and is discussed in **Section 2.3.2** of the PEL report.

Table 1. Corridor Segments within the Project Limits

Segment	Length (miles)	Segment Limits
Foothills	3.2	LCR 27 to Morning Drive
Loveland Urban	3.1	Morning Drive to North Garfield Avenue
Loveland 6-Lane	4.0	North Garfield Avenue to West of Rocky Mountain Avenue
Johnstown-Greeley	6.1	Centerra/Thompson Parkway to east of SH 257
Greeley Expressway	9.3	East of SH 257 to 11th Avenue near the US 85 interchange
East End	3.8	East of 1st Avenue to the Project limits at WCR 49

US 34 roadway characteristics vary widely west of I-25 through Loveland, from a 2-lane roadway at the western Project Limits, a 4-lane roadway with a center turn lane from Morning Drive to just east of SH 287, and a 4- and- 6-lane divided roadway from just east of SH 287 to I-25. East of I-25, the cross section of US 34 is some variation of a 4-lane divided roadway through the eastern Project Limit. The roadway classification changes along the corridor, ranging from Principal Arterial – Other from the west Project Limit to WCR 17, Principal Arterial – Freeway and Expressway from WCR 17 to the South Platte River Crossing, and back to Principal Arterial – Other from the South Platte River Crossing to the eastern Project Limit. Right-of-way (ROW) width in the US 34 corridor varies widely

and is typically 80 feet in urban areas and up to 400 feet in developing areas west of I-25. ROW varies up to 400 feet in developing areas east of I-25 and includes ROW reserved for future interchanges at 35th Avenue and 47th Avenue in Greeley.

A detailed description of the existing conditions in the study area can be found in the *Corridor Existing Conditions Report* included as **Appendix B** of the PEL report.

e. Provide a brief chronology of the planning activities (PEL study) including the year(s) the studies were completed.

(Month/year noted below indicates date the activity and/or documentation was completed)

- Study initiation – January 2017
- Public Meeting No. 1 – May 2017
- Data collection – July 2017
- Purpose and Need development – August 2017
- Public Meeting No. 2 – October 2017
- Existing conditions assessment – January 2018
- Environmental overview – January 2018
- Public Meeting No. 3 – May 2018
- Alternatives development – June 2018
- Alternatives screening and evaluation – June 2018
- Final PEL Report – December 2018

f. Are there recent, current or near future planning studies or projects in the vicinity? What is the relationship of this project to those studies/projects?

A number of plans have been developed that relate to the study area, including the following:

- CDOT, North I-25 Environmental Impact Statement and Record of Decision (2011)
- CDOT, SH 402 Environmental Assessment (2007) and Finding of No Significant Impact (2008)
- CDOT, US 34 Access Control Plan (2003)
- CDOT, US 34 Business Route Environmental Assessment (2005)
- CDOT, US 34 Corridor Optimization Plan (2003)
- CDOT, US 34 Environmental Assessment (2007)
- CDOT, US 85 PEL Study (2017)
- City of Evans, *2010 Comprehensive Plan* (2010, updated 2014)
- City of Evans, City of Evans Open Space and Trails Master Plan (2004)
- City of Evans, City of Evans Transportation Plan (2004)
- City of Evans, US 85 Overlay District Master Plan (2014)
- City of Greeley, *2060 Comprehensive Plan* (2009)
- City of Greeley, City of Greeley Bicycle Master Plan (2015)
- City of Greeley, Greeley 2035 Comprehensive Transportation Plan (2011)
- City of Greeley, Greeley Parks, Trails and Open Lands Master Plan (2016)
- City of Loveland, *2035 Transportation Plan* (2012)
- City of Loveland, Bicycle and Pedestrian Plan (2012)
- City of Loveland, Create Loveland Comprehensive Plan (2016)
- Freedom Parkway Coalition, *Freedom Parkway Access Control Plan* (ongoing)
- Greeley Evans Transit, *2016* [Greeley Evans Transit] *GET 5- to 10-year Strategic Plan* (2016)
- Larimer County, Larimer County Master Plan (1997)
- Larimer County, Larimer County Transportation Master Plan (2017)

- Larimer County Department of Natural Resources, *Larimer County Open Lands Master Plan* (2015)
- NFRMPO, 2016 Non-Motorized Plan (2017)
- NFRMPO, 2040 Regional Transit Element (2015)
- NFRMPO, 2045 Regional Transit Element (ongoing)
- NFRMPO, 2040 Regional Transportation Plan (2015)
- NFRMPO, Regional Bicycle Plan (2013)
- NFRMPO, Truck Traffic in the Northeast Quadrant of the NFRMPO Region Study (2010)
- Town of Johnstown, Johnstown Area Comprehensive Plan (2006)
- Town of Johnstown, *Transportation Master Plan* (2008)
- Town of Kersey, *Comprehensive Plan* (2016)
- Town of Windsor, Town of Windsor Comprehensive Plan (2016)
- Weld County, O Street Arterial Corridor Study (2011)
- Weld County, Weld County 2035 Transportation Plan (2011)
- Weld County, Weld County Comprehensive Plan (2018)
- Weld County, WCR 49 Access Control Plan (2014)

A full summary of these plans and how they relate to the project can be found in the *Corridor Existing Conditions Report* included as **Appendix B** of the PEL report.

2. Methodology used:

a. What was the scope of the PEL study and the reason for completing it?

The scope of the US 34 PEL Study is to provide an understanding of the existing conditions of the study area and work with stakeholders to develop and evaluate a range of improvements to increase safety, accommodate increased travel and tourism demands to maintain the economic vitality of the region, and increase reliability of east-west regional travel while balancing local access, mobility, and freight needs.

b. Did you use NEPA-like language? Why or why not?

Yes. NEPA-like language was used to the degree possible to facilitate future NEPA needs.

c. What were the actual terms used and how did you define them? (Provide examples or list)

The following terms in this PEL Study are the same in meaning to those used in NEPA:

- Purpose and Need
- Alternative
- No Action Alternative
- Alternatives Eliminated
- Affected Environment
- Environmental Consequences/Mitigation Strategies

The term Recommended Alternative was used to refer to the alternatives package that was determined to meet the Purpose and Need and could be recommended by the PEL Study as the Preferred Alternative in the subsequent NEPA process. Based on the alternatives evaluation, the Recommended Alternatives was determined to meet the Purpose and Need to the highest degree while minimizing environmental and community impacts.

d. How do you see these terms being used in NEPA documents?

These terms will continue to be used in the same manner and in accordance with the 2017 *CDOT NEPA Manual*. The term Recommended Alternative can be used to refer to the recommendations from the alternatives evaluation conducted in the PEL Study when identifying the Preferred Alternative in the Alternatives chapter of a future NEPA document or when referencing PEL report recommendations for the NEPA documentation of the project phase.

e. What were the key steps and coordination points in the PEL decision-making process? Who were the decision-makers and who else participated in those key steps? For example, for the corridor vision, the decision was made by state DOT and the local agency, with buy-in from FHWA, the USACE, and USFWS and other resource/regulatory agencies.

A PMT (comprising CDOT, FHWA, and consultant staff) was formed and met biweekly over the course of the project. CDOT and FHWA served as a decisionmakers throughout the PEL, with technical support and professional expertise to aid in decision-making provided by consultant staff.

A TAC (comprising of CDOT, local agency, resource agency, and nongovernmental groups) was formed and met monthly over the course of the project.

The US 34 Coalition provided the primary stakeholder representation on the US 34 PEL Study and had dedicated staff and resources (by way of the TAC) to help CDOT with the study. The US 34 Coalition's purpose is to establish a common vision, priorities, and an implementation plan to prioritize, fund, and construct improvements along the US 34 corridor. The Coalition provides the member entities a forum to engage in a coordinated and collaborative process to pool resources, and identify and implement a common and politically cohesive vision, and transportation improvements for US 34.

Subject matter experts from the consultant team made determinations based on professional judgment, which were vetted with the PMT, then with the TAC. Revisions were made based on input received.

The following list includes a summary of key TAC milestones, dates, and documentation of decisions.

- April 19, 2017: Kickoff and Data Review
- May 17, 201: Public Meeting No. 1/Scoping Input
- June 21, 2017: Purpose and Need
- July 19, 2017: Corridor Segments/Evaluation Criteria
- August 16, 2017: Range of Alternatives
- September 20, 2017: Level 1 Screening/Intersection Review
- October 18, 2017: Public Meeting No. 2
- December 13, 2017: Update/Alternatives
- February 21, 2018: Project Update
- March 21, 2018: Level 2 Progress
- April 18, 2018: Level 2 Updates/Level 3 Packaging
- May 5, 2018: Public Meeting No. 3/Project Updates
- May 16, 2018: Project Prioritization
- June 20, 2018: recommendations and Letters of Support
- July 18, 2018: Coalition and Agency Briefings
- August 15, 2018: Project Wrap-up and Next Steps
- October 17, 2018: Comment Review
- November 26, 2018: Study Recap

Refer to **Section 5.0, Agency and Public Coordination** in the PEL report for information regarding coordination and key decision points.

f. How should the PEL information be presented in NEPA?

The PEL Study documentation was prepared consistent with NEPA requirements and allows for future NEPA processes to readily extract pertinent information from the reports. The PEL Study's alternatives development and analysis process included developing screening and evaluation criteria based on the project Purpose and Need, developing a full range of alternatives, and documenting the reason for alternatives elimination to limit the need for consideration during future NEPA processes. Concepts and alternatives were screened and evaluated in three levels to evaluate alternatives.

During Level 1, up to 27 concepts for each segment were evaluated against the criteria and performance measures that were developed based on Purpose and Need and project goals. If the concept aligned with the Purpose and Need and project goals, it was retained for further evaluation. If the concept did not align with the Purpose and Need and project goals, it was eliminated from further evaluation for this PEL Study. In Level 2 evaluation, design details were added to understand traffic operations and potential environmental effects for each concept. After evaluation, 69 roadway and access concepts were recommended for further evaluation in Level 3. In the Level 3 evaluation, the roadway and access elements advancing from Level 2 evaluation were combined with the supplemental elements that advanced out of Level 1 evaluation to create alternative packages that could be further evaluated. During Level 3, a Recommended Alternative with potential design options for each segment was identified.

Potential steps for proceeding through the NEPA process include identifying possible actions that could be categorically excluded from development of an environmental assessment (EA) or environmental impact statement (EIS). The alternatives evaluation process, environmental overview, and agency and public coordination completed in the PEL Study can be directly referenced in a Categorical Exclusion document for a project phase or interim improvements.

Should the NEPA process result in the development of an EA for all or a portion of the Recommended Alternative, the Introduction, Purpose and Need, and Agency and Public Coordination sections of the PEL Study can be used to develop the Purpose and Need chapter of the EA. **Section 4.0, Environmental Overview**, appendices, and the *Corridor Existing Conditions Report* (**Appendix B)** can be the starting point to develop a more in-depth evaluation and descriptions of the affected environment and possible impacts. The next steps to be undertaken for each resource topic are also identified in the Environmental Overview.

3. Agency coordination:

a. Provide a synopsis of coordination with federal, tribal, state and local environmental, regulatory and resource agencies. Describe their level of participation and how you coordinated with them.

Agency coordination was done at the start of the US 34 PEL Study process. Letters were sent to local agencies to gauge interest in the project and determine if a resource agency meeting should be scheduled once existing conditions had been collected. Input-seeking letters were sent on April 26, 2017, to each of the following agencies:

- Weld County – Natural Resources
- Larimer County – Natural Resources
- Colorado Department of Public Health and Environment
- FHWA

- U.S. Fish and Wildlife Service (USFWS)
- U.S. Army Corps of Engineers (USACE)
- Colorado State Land Board
- Colorado Parks and Wildlife
- Larimer County Mobility Committee
- Weld County Mobility Committee
- City of Loveland Transit
- Greeley-Evans Transit
- City of Fort Collins
- Colorado Motor Carriers Association
- Colorado State Patrol

Refer to **Section 5.2, Resource Agency Coordination** in the PEL report for information regarding agency coordination and involvement.

b. What transportation agencies (e.g., for adjacent jurisdictions) did you coordinate with or were involved during the PEL study?

The transportation agencies coordinated and/or involved in the PEL report include: CDOT, Larimer County Mobility Committee/NFRMPO, City of Evans, City of Greeley, City of Loveland, Town of Johnstown, Town of Kersey, Town of Windsor, Larimer County, and Weld County.

Refer to **Section 5.1, Agency Coordination** in the PEL report for information regarding agency coordination and involvement.

c. What steps will need to be taken with each agency during NEPA scoping?

The steps to be taken will depend on the type of future NEPA documentation prepared for the improvement project(s). CDOT will coordinate with identified transportation and resource agencies during the NEPA scoping process. Any scoping meetings may either be one-on-one with the relevant agency or in a group setting. During these meetings, CDOT will present the PEL Study findings and work to identify agency concerns regarding the project.

4. Public coordination:

a. Provide a synopsis of your coordination efforts with the public and stakeholders.

The US 34 PEL Study held three sets of public meetings during the PEL process to engage and inform the public as well as gather their input and opinions:

- Public Meeting No. 1
  - May 2, 2017 at the City of Loveland Public Works Administration Building
  - May 3, 2017 at the City of Evans Riverside Library and Cultural Center
- Public Meeting No. 2
  - November 8, 2017 at the Colorado Department of Transportation
  - November 15, 2017 at the Best Western, Loveland
- Public Meeting No. 3
  - May 23, 2018 at the City of Evans Riverside Library and Cultural Center
  - May 30, 2018 at the Embassy Suites, Loveland

The public and stakeholders were notified of the public meeting through the project website, postcard mailouts, a CDOT press release, social media postings orchestrated though local agencies,

and flyer postings in communal areas. A public meeting summary with a copy of the boards and presentation was posted on the website after each round of public meetings.

Refer to **Section 5.0, Agency and Public Coordination** in the PEL report for information regarding coordination efforts with the public and stakeholders.

5. Purpose and Need for the PEL study:

a. What was the scope of the PEL study and the reason for completing it?

The scope of the US 34 PEL Study is to provide an understanding of the existing conditions of the Study Area and work with stakeholders to develop and evaluate a range of improvements to increase safety, accommodate increased travel and tourism demands to maintain the economic vitality of the region, and increase reliability of east-west regional travel while balancing local access, mobility, and freight needs.

b. Provide the purpose and need statement, or the corridor vision and transportation goals and objectives to realize that vision.

The Purpose and Need statement for the US 34 PEL is included in **Section 1.4, Purpose and Need** of the PEL report. The goals of the transportation improvements for the project are listed in **Section 1.5, Project Goals** in the PEL report.

Project Purpose

The purpose of transportation improvements is to preserve US 34 as a vital east-west regional transportation corridor. Improvements will link and move people, goods and information reliably, and adapt to future travel demands and funding opportunities.

Project Need

Transportation improvements within the US 34 corridor are needed for three reasons:

- **Increase safety**. Increases in development and travel demand have resulted in safety concerns at intersections and other locations along the US 34 corridor.
- **Accommodate increased travel and tourism demands to maintain the economic vitality of the region.** Northern Colorado communities are among the fastest growing in the nation. Growth and tourism have spurred economic benefits and provides funding to improve transportation infrastructure and amenities that make these communities desirable.
- **Increase reliability of east-west regional travel, while balancing local access, mobility, and freight needs.** Traffic congestion and accidents can reduce the reliability of US 34 to serve its function as a Principal Arterial, while dampening the benefits of job growth, tourism, recreational opportunities, and freight needs.

Project Goals

Project goals were developed by the PMT and refined and approved by the TAC. The goals supplement the Purpose and Need and help define the elements that would comprise successful alternatives for the US 34 corridor. Successful alternatives for the US 34 PEL Study will:

- Be compatible with the natural and human environment
- Support community land use and aesthetics goals
- Be fiscally responsible and implementable
- Reduce risk and increase reliability
- Accommodate emerging technology

c. What steps will need to be taken during the NEPA process to make this a project-level purpose and need statement?

This Purpose and Need statement addresses the US 34 corridor from LCR 27 to WCR 49. Depending on the specific project, the Purpose and Need may need to be revised to address the specific needs at that location. Updated traffic data may be needed depending on when the NEPA study is initiated. Individual project elements that advance out of the Recommended Alternative should address at least one Need identified in **Section 1.4** of the PEL report.

6. Range of alternatives: Planning teams need to be cautious during the alternative screen process; alternative screening should focus on purpose and need/corridor vision, fatal flaw analysis and possibly mode selection. This may help minimize problems during discussions with resource agencies. Alternatives that have fatal flaws or do not meet the purpose and need/corridor vision cannot be considered viable alternatives, even if they reduce impacts to a particular resource. Detail the range of alternatives considered, screening criteria and screening process, including:

a. What types of alternatives were looked at? (Provide a one or two sentence summary and reference document.)

The alternatives focused on addressing the Purpose and Need and the issues identified in the evaluation of existing conditions, and were developed based on input received from agency stakeholders and public open houses. Concepts were developed for each of the six corridor segments and were categorized by roadway elements, access elements, multimodal elements, other physical elements, and operational elements.

The alternatives development process is discussed in detail in **Section 2.2, Alternatives Development and Evaluation** in the PEL report.

b. How did you select the screening criteria and screening process?

The screening criteria were developed based on the project Purpose and Need and goals. The process was developed to narrow down a wide range of alternatives from individual concepts into packages of alternatives, ultimately identifying a Recommended Alternative. The alternatives screening and evaluation process is discussed in detail in **Section 2.2, Alternatives Development and Evaluation** in the PEL report.

c. For alternative(s) that were screened out, briefly summarize the reasons for eliminating the alternative(s). (During the initial screenings, this generally will focus on fatal flaws)

During the screening process, alternatives were eliminated if the concept had a fatal flaw or did not meet the Purpose and Need. If a concept had negligible benefits or higher impacts than other concepts, it was not recommended for further evaluation in the PEL study.

The alternatives screening and evaluation process is discussed in detail in **Section 2.2, Alternatives Development and Evaluation** in the PEL report.

d. Which alternatives should be brought forward into NEPA and why?

The Recommended Alternative described in **Section 2.3, Recommended Alternatives** of the PEL report should be brought forward into NEPA. The Recommended Alternative meets the project Purpose and Need and project goals while minimizing environmental and community impacts and setting a vision for the future of US 34.

e. Did the public, stakeholders, and agencies have an opportunity to comment during this process?

Yes. Throughout the study, the public had ongoing and accessible opportunities to participate and provide input to inform the study. Input was solicited at public and community meetings with comment forms, and through the project e-mail address and project website. All meeting materials were posted on the project web page at us34pel.codot.us. Over the course of the study the public submitted 208 comments that were reviewed and considered.

Comments were shared by the project staff and the TAC and considered during the alternatives development and evaluation. The comments were collected and posted in public meeting summaries, which were also posted to the project website. The public meeting summaries are included in **Appendix D** of the PEL report.

Refer to **Section 5.5, Public Comments** in the PEL report for information regarding coordination efforts with the public and stakeholders.

f. Were there unresolved issues with the public, stakeholders and/or agencies?

No, there are no unresolved issues with the public, stakeholders, and/or agencies. A Recommended Alternative was identified as a part of the PEL Study. Potential near-term projects that would be common across all alternatives were identified in **Section 6.0** of the PEL report.

7. Planning assumptions and analytical methods:

a. What is the forecast year used in the PEL study?

The forecast year in the PEL Study was 2040.

b. What method was used for forecasting traffic volumes?

The NFRMPO travel demand model was used to assess future conditions, which included developing future roadway traffic volumes, intersection turning movements, and regional performance measures. The 2015 travel demand model served as the base year and was compared to existing traffic counts obtained for the study. The 2040 travel demand model was used to forecast future conditions for the No Action Alternative and Recommended Alternatives.

Transportation analysis methods and results are discussed in further detail in **Section 3.0, Transportation Analysis** in the PEL report.

c. Are the planning assumptions and the corridor vision/purpose and need statement consistent with the long-range transportation plan?

The travel forecast modeling was conducted based on the NFRMPO fiscally constrained model as discussed in detail in **Section 3.0, Transportation Analysis** of the PEL report. The project Purpose and Need and goals are consistent with the NFRMPO 2040 Regional Transportation Plan and local transportation planning elements.

d. What were the future year policy and/or data assumptions used in the transportation planning process related to land use, economic development, transportation costs and network expansion?

Travel forecasting efforts were developed consistent with the NFRMPO's methods and latest planning assumptions. The NFRMPO transportation network, included in the fiscally constrained 2040 Regional Transportation Plan, reflects the projects that can be reasonably funded and that served as the basis for the No Action Alternative. Socioeconomic data, such as household and employment projections, describe the projected growth and changes in land use.

Traffic modeling results are discussed in further detail in **Section 3.0, Transportation Analysis** and **Appendix E** in the PEL report.

8. Environmental resources (wetlands, cultural, etc.) reviewed. For each resource or group of resources reviewed, provide the following:

a. In the PEL study, at what level of detail was the resource reviewed and what was the method of review?

An environmental scan was prepared as part of the PEL study to identify resources early in the planning process. The environmental scan, included in the US 34 PEL *Corridor Existing Conditions Report* (**Appendix B**), contains environmental resource details and mapping that was obtained using readily available resources such as file searches, GIS mapping, windshield surveys, and literature review. All the environmental and community resources topics summarized in the environmental scan will need to be reviewed in NEPA clearances.

A detailed description of the environmental resources analyzed is included in **Section 4.0, Environmental Overview** of the PEL report and in the *Corridor Existing Conditions Report* (**Appendix B** to the PEL report).

b. Is this resource present in the area and what is the existing environmental condition for this resource?

The *Corridor Existing Conditions Report* (**Appendix B** to the PEL report) provides an overview of the existing conditions for the key resources with potential impact and limited potential for impact in the study area (**Table 2**).

Table 2. Existing Environmental Conditions for Potentially Impacted Resources

Resource	Existing Environmental Condition
Aquatic	Fifty-eight aquatic resources, consisting mainly of surface water features, have been identified in the Study Area. The aquatic resources breakdown is 9 wetlands, 1 lake, 7 ponds, and 42 individual linear surface water crossings. Each crossing of a linear surface water feature is counted individually even though the same stream may be crossed multiple times, e.g., the South Platte River crosses the Study Area three times. Most of the wetlands identified are classified as palustrine emergent or palustrine forested with most occurring along rivers and drainages.
Biological	Fourteen federal- and 22 state-listed species were found to have the potential to occur within or downstream of the Study Area. In addition to the federal- and state-listed species, suitable habitat for migratory birds is present throughout the Study Area as well as habitat for species tracked by CPW. No critical habitat for any federal-listed species occurs within the Study Area. Eight noxious weed species are located within the Study Area.
Cultural	A file search was conducted in mid-2017 for the *US 34 Corridor Existing Conditions Report* to gather baseline information on potential cultural resources that may be impacted by proposed improvements along the US 34 corridor. The file search area provided a representative overview of cultural resources that intersect or are directly adjacent to the highway and may be encountered by project improvements. While the file search did reveal previously documented cultural resources in the file search area, none of these properties have been listed in the National Register of Historic Places (NRHP)or State Register of Historic Places. Twenty-six are considered eligible for listing, one is listed as Needs Data, and therefore is to be treated as though it is NRHP eligible, and another is a historical marker and does not have an assessment.
Environmental Justice	Based on data from the U.S. Census Bureau's American Community Survey 5-year estimates (2011-2015), both minority and low-income populations are present within the Study Area.

Table 2. Existing Environmental Conditions for Potentially Impacted Resources

Resource	Existing Environmental Condition
Floodplains	There are four Federal Emergency Management Agency- (FEMA) mapped floodplains within the US 34 Study Area, consisting of the following three types: regulatory floodway, 100-year, and 500-year. Three regulatory floodways cross the Study Area: Big Thompson River, Sheep Draw, and the South Platte River.
Hazardous Materials	Of the nine hazardous materials sites identified in the *US 34 Corridor Existing Conditions Report* (**Appendix B**), three are located within ROW. Of the 15 water wells identified in the Study Area, 4 of the wells were adjacent to US 34 or within the ROW. Additionally, 114 oil/gas wells were identified with 500 feet of US 34, with several being located on parcels adjacent to US 34.
Land Use and Socioeconomics	Forecasts indicate an approximate annual growth rate of 2.1 percent per year for the Study Area through 2040 for both population and households. Study Area employment is forecast to grow at 1.8% per year through 2040.
Noise	Noise-sensitive receptors within 500 feet of US 34 were identified within the Study Area in accordance with CDOT guidelines. Online resources were used along with desktop utilities, such as Google Earth, to identify existing noise mitigation measures and noise-sensitive receptors along the study corridor. The locations of noise-sensitive activity categories within the Study Area are mapped in **Appendix B** of the PEL report.
Recreational Resources	There are six parks and recreational facilities located within the Study Area that may qualify as Section 4(f) properties and may be used by the Recommended Alternative.
Visual Resources	Preliminary review indicates that the Study Area is composed of the following distinctive landscape character units: residential (urban, suburban, rural) uses, commercial/industrial/municipal uses, parks/recreational areas/trail, water/natural resources, agricultural open space/undeveloped lands, and rocky mountain backdrops.
Air Quality	The Study Area is located in the attainment area for ground level ozone, and portions of the Study Area are within the Greeley, carbon monoxide attainment/maintenance area.
Farmlands	The majority of the Study Area falls within an urbanized area. However, soils classified by the Natural Resources Conservation Service Soil Survey Geographic Database as prime, unique, and of statewide and/or local importance are present in the eastern portions of the of the Study Area.
Paleontology	A record search and referencing of the Potential Fossil Yield Classification System was completed for the project. The majority of the Study Area has low to moderate potential to contain fossils, with the exception of the Morrison Formation, which has a high potential. There are no previously recorded fossil locations within the Study Area, although precise geographic coordinates were not available for all records.
Water Quality	The Study Area falls within the Big Thompson, Cache La Poudre and Middle South Platte-Cherry Creek watersheds, and numerous drainages occur within the Study Area. Surface water quality impacts are generally evaluated in the immediate vicinity of the streams and stream crossings, where surface water runoff from construction or the transportation system would collect and be discharged into the stream or waterbody.

The existing conditions of the environmental resources analyzed are discussed in **Section 4.0, Environmental Overview** of the PEL report and in the *Corridor Existing Conditions Report* (**Appendix B** to the PEL report).

c. What are the issues that need to be considered during NEPA, including potential resource impacts and potential mitigation requirements (if known)?

Table 3 presents a summary of the resources potentially impacted by the Recommended Alternative, with associated potential mitigation requirements.

Table 3. Potentially Impacted Resources and Associated Potential Mitigation Requirements

Resource	Issues to consider during NEPA
Aquatic	Within each segment, the Recommended Alternative has the potential to impact aquatic resources when roadway cross sections are updated (e.g. when a bridge or a culvert is expanded to match new roadway width or if expansion impacts roadside wetlands). Intersection improvement in the Johnstown-Greeley, Greeley Expressway, and East End segments cross several waterways. Where avoidance of wetlands would not be practicable, best management practices, in line with USACE's 2008 Mitigation Rule and CDOT's Environmental Stewardship Agreement, would be implemented to reduce impacts to aquatic resources.
Biological	Although not expected, potential impacts to federally-listed species may occur if projects result in water depletions to the South Platte River system. All improvements have the potential to spread noxious weeds through land disturbance. An updated special-status species list and a supplemental species survey will be developed during future NEPA studies. If species of concern are found to be within the Study Area, further coordination with the appropriate regulatory agencies must take place, and measures to avoid and/or minimize impacts to these sensitive resources will be developed. Depending on the presence of habitat and potential impacts to those habitats, formal consultation with the USFWS and other regulatory agencies may be required. If construction is proposed during the nesting season, preconstruction surveys for nesting birds may be required to protect species covered under the Migratory Bird Treaty Act (MBTA). A noxious weed survey may be required to map any noxious weed populations. If found within the project area, an Integrated Noxious Weed Management Plan may also need to be prepared.
Cultural	The Recommended Alternative has the potential to adversely impact cultural resources through direct physical effects where improvements directly intersect site boundaries, such as realigning the highway, expanding the road to six lanes, creating interchanges and turn lanes, and elevating the highway. The Recommended Alternative also has the potential to adversely impact cultural resources through indirect physical effects that change the setting of historic properties. If there is a federal action or approval for the project, the APE must fulfill the requirements of Section 106 of the NHPA—include consultation with the OAHP, local governments and Native American tribes. Additionally, the project may be required to comply with Section 4(f) under U.S. Department of Transportation Act of 1966. Avoidance of adverse impacts to cultural resources that are listed in or eligible for listing in the NRHP, State Register of Historic Properties (SRHP) and Local Landmark status is preferred over mitigation, which may result in time-consuming and costly data recovery, (excavations of archaeological resources or highly intensive archival documentation of historic resources).
Environmental Justice	Both beneficial and negative impacts from the Recommended Alternative would be expected in areas where minority and low-income populations have been identified. Whether these impacts would be predominantly borne by these populations or considered high and adverse would need to be evaluated during future NEPA studies, and when more detailed project design is available. If disproportionately high and adverse effects are identified, additional mitigation measures would need to be considered.
Floodplains	The need to conduct a hydraulic study in accordance with 23 CFR 650A should be determined by CDOT during future project development. Requirements under EO 11988 and the *Colorado Floodplain and Stormwater Criteria Manual* would apply. Other possible federal, state, and local requirements may need to be satisfied including: FEMA map revisions, Colorado State Floodplain Development permit, Erosion Control permit, Construction Stormwater Discharge permit, and/or Construction Dewatering permit.
Hazardous Materials	A Phase I Environmental Site Assessment or CDOT Initial Site Assessment should be completed for projects that forward into NEPA. The result of those initial investigations would determine whether additional investigations, including subsurface investigations, would be required. When possible, hazardous material sites should be avoided. Where hazardous sites cannot be avoided, mitigation may be required as a project commitment.

Table 3. Potentially Impacted Resources and Associated Potential Mitigation Requirements

Resource	Issues to consider during NEPA
Land Use and Socioeconomics	It is anticipated that the Recommended Alternative would result in long-term positive socioeconomic benefits to the US 34 corridor and the adjoining communities, long-term positive benefits to land uses in the corridor, and likely socioeconomic impacts (business impacts) resulting from project implementation. Mitigation strategies should be centered on helping maintain the long-term viability of the business community in the corridor communities. These strategies include: maintain access to businesses during construction, communication, additional signage, regional outreach, and special events/marketing.
Noise	Proposed improvements that could result in impacts to noise-sensitive receptors include: construction of a roadway at a new location, moving traffic closer to the receptors (halving the distance between the roadway and receptors), adding another through-lane in both directions on US 34, converting intersections to interchanges with ramps, and increasing the elevation of roadways more than 5 feet near noise-sensitive receptors. During future NEPA scoping, a determination should be made whether the project is a Type I project in accordance with 23 CFR 772 and whether a noise impact analysis is required. If so, then impacts to noise-sensitive receptors should be assessed during the NEPA process. The noise assessments will adhere to FHWA and CDOT noise evaluation standards and will model the existing and future conditions, evaluate noise increases at noise-sensitive receptors, and identify appropriate mitigation.
Recreational Resources	During future NEPA studies, existing and proposed park and recreational facilities that could be impacted should be evaluated for Section 4(f) applicability and use. If FHWA determines that a project as proposed would use a Section 4(f) property, and there are no feasible or prudent alternatives that avoid use of Section 4(f) resources, there are three methods available to approve the use: 1) preparing a *de minimis* impact finding when there are no adverse effect to the activities, features, or attributes of the Section 4(f) resource; 2) applying a Programmatic Section 4(f) evaluation for minor involvements with parks, and recreational areas if the use meets specific criteria; 3) through preparation of an individual Section 4(f) evaluation if the use would result in adverse effects to the activities, features, or attributes of the 4(f) resource.
Visual Resources	The Recommended Alternative includes design elements that would result in a change from the existing visual environment. Depending on the location, the level of change could be minor, moderate, or strong. During future NEPA studies and when more detailed design is available, the following approaches may be warranted based on potential impacts: conduct more detailed evaluations, develop renderings for affected and sensitive land uses, conduct a formal visual impact assessment in accordance with FHWA guidance, and develop mitigation measures and design guidelines.
Air Quality	Impacts to air quality may result from changes to traffic patterns, the number of idle vehicles, the speed of vehicles, and changes to vehicle miles traveled. Projects moving forward into NEPA may require a more in-depth air quality analysis to determine potential impacts and recommended mitigation measures.
Farmlands	As projects move forward from into NEPA, the completion of a Farmland Conversion Impact Rating form and coordination with the Natural Resources Conservation Service for projects that have the potential to convert farmlands to other uses may be required.
Paleontology	As projects move forward into NEPA, a paleontological survey and more extensive record search may be needed to evaluate the potential occurrence of sensitive resources. Surveying and potential construction monitoring, as well as CDOT clearance, may be required before the construction of projects emerging from this study.
Water Quality	As projects move forward into NEPA, efforts should be made to avoid and minimize impacts to water-related resources to the extent possible. If avoidance is not feasible, best management practices should be implemented to reduce direct and indirect impacts to these resources. As the project progresses, further coordination with federal and local agencies may be required.

Refer to **Section 4.0, Environmental Overview** of the PEL report for a discussion of potential resource impacts and potential mitigation requirements.

d. How will the data provided need to be supplemented during NEPA?

The environmental resources that have been reviewed in the US 34 PEL process include aquatic, biological, cultural, environmental justice, floodplains, hazardous materials, land use and socioeconomics, noise, recreational, visual, air quality, farmlands, paleontology, and water quality.

Additional analysis will be required during NEPA to examine the new potential resource impacts and new potential mitigation requirements. Consultations with appropriate agencies and continued public involvement will also be required.

Refer to **Section 6.0, Next Steps** of the PEL report for more information on the transition of the project from the PEL study into NEPA.

9. List environmental resources you are aware of that were not reviewed in the PEL study and why? Indicate whether or not they will need to be reviewed in NEPA and explain why.

Air quality, farmlands, paleontology, and water quality were deemed unlikely to influence outcomes of the PEL process, thus they were not considered in detail in the PEL report. However, these resources would require NEPA evaluation for future US 34 projects in compliance with applicable regulations.

A detailed description of the environmental resources analyzed is included in **Section 4.0, Environmental Overview** of the PEL report and in the *Corridor Existing Conditions Report* (**Appendix B** to the PEL report).

10. Were cumulative impacts considered in the PEL study? If yes, provide the information or reference where it can be found.

No, cumulative impacts were not considered in the PEL study. They will be considered during future NEPA processes.

11. Describe any mitigation strategies discussed at the planning level that should be analyzed during NEPA.

Mitigation strategies were only developed at a planning-level in this PEL study and are described for each of the resources considered in **Section 4.0, Environmental Overview**. The detailed mitigation measures for each impact resource should be further analyzed during future NEPA.

Refer to **Section 4.0, Environmental Overview** of the PEL document for a discussion of potential mitigation strategies.

12. What needs to be done during NEPA to make information from the PEL study available to the agencies and the public? Are there PEL study products which can be used or provided to agencies or the public during the NEPA scoping process?

The PEL study will serve as the basis of the NEPA document and will be included as an appendix, if applicable. The documents developed during the PEL process are available on the project website (https://www.codot.gov/library/studies/us-34-planning-and-environmental-linkages-pel-study). These documents will also be linked to the NEPA website.

13. Are there any other issues a future project team should be aware of?
Examples: Controversy, utility problems, access or ROW issues, encroachments into ROW, problematic land owners and/or groups, contact information for stakeholders, special or unique resources in the area, etc.

The PEL report provides a summary of issues and evaluations that should be considered during future project development. The Recommended Alternative and associated impacts are based on conceptual (planning) level design. ROW needs will require further detailed evaluation during project development. Next steps are discussed in **Section 6.0** of the PEL report.

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