


CDOT Project C0703-379
Twin Tunnels
Environmental Assessment and
Section 4(f) Evaluation
Clear Creek County

Submitted Pursuant to:
42 U.S.C. 4332 (2)(c)
23 U.S.C. 128(a)
Executive Orders 11990, 12898, and 13112

By the
U.S. Department of Transportation
Federal Highway Division Administration
and
Colorado Department of Transportation

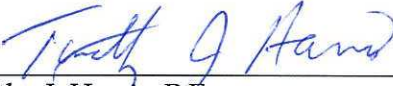
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Abstract

The Federal Highway Administration (FHWA) and the Colorado Department of Transportation (CDOT) have prepared this Environmental Assessment (EA) documenting analysis under the National Environmental Policy Act for the Twin Tunnels project. The purpose of the project is to improve eastbound highway safety and mobility in the Twin Tunnels area of Interstate 70 (I-70) in Idaho Springs and Clear Creek County, Colorado. The project is needed to address safety concerns and mobility challenges due to high traffic volumes and geometric conditions (narrow tunnel, sharp curves) that result in inconsistent and slow travel times through and west of the project area.

The Proposed Action would add a third eastbound travel lane and consistent 10-foot outside shoulder to I-70 between the East Idaho Springs interchange and the base of Floyd Hill (milepost 241.4 to 244.5). The eastbound bore of the Twin Tunnels would be expanded to accommodate the wider roadway section, and the existing tunnel portal face would be removed and replaced.

The impacts to social and natural resources are discussed in depth for the No Action and the Proposed Action. Potential impacts to resources resulting from the Proposed Action will be mitigated as defined by 40 CFR §1508.20. Following public comment on this EA, FHWA and CDOT plan to prepare a decision document to address public comments and identify an action for implementation.

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Written comments on this EA can be submitted through the project website <http://www.coloradodot.info/projects/i70twintunnels> or by mail or email to the following addresses:

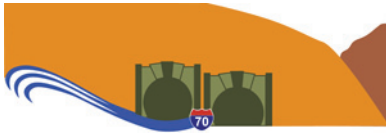
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A public hearing for this project will be held in Idaho Springs at the Clear Creek County Schools District Office (320 Highway 103, Idaho Springs, 80452) on July 25, 2012, from 5:30 to 7:30 p.m.

**Twin Tunnels
Environmental Assessment
and
Section 4(f) Evaluation
Colorado Department of Transportation, Region 1
CDOT Project Number C0703-379**

July 2012



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- Twin Tunnels EA Air Quality Technical Memorandum
- Twin Tunnels EA Energy Resources Technical Memorandum
- Twin Tunnels EA Environmental Justice Technical Memorandum
- Class III Cultural Resource Inventory Report for the Colorado Department of Transportation I-70 Twin Tunnels EA, Clear Creek County, Colorado
- Twin Tunnels EA Land Use Technical Memorandum
- Twin Tunnels EA Noise Technical Memorandum
- Paleontological Assessment for Project C 0703-377, I-70 Twin Tunnels EA
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Acronyms and Abbreviations

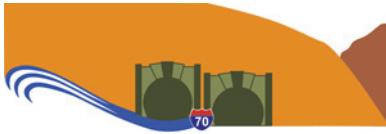
AASHTO	American Association of State Highway and Transportation Officials
ADA	Americans with Disabilities Act
AGS	Advanced Guideway System
ALIVE	A Landscape-Level Inventory of Valued Ecosystem Components
APCD	Air Pollution Control District
APE	area of potential effect
ARNF	Arapaho and Roosevelt National Forests
ASA	Areas of Special Attention
ATM	advanced traffic management
ATSM	advanced traffic system management
BLM	Bureau of Land Management
BMP	best management practice
Btu	British thermal units
CBC	concrete box culvert
CCC	Clear Creek County
CCMRD	Clear Creek Metropolitan Recreation District
CDOT	Colorado Department of Transportation
CDPHE	Colorado Department of Public Health and Environment
CFR	Code of Federal Regulations
CIS	City of Idaho Springs
CNHP	Colorado Natural Heritage Program
CO	carbon monoxide
CO2	carbon dioxide
Corridor	I-70 Mountain Corridor
CPW	Colorado Parks and Wildlife
CR	County Road
CRS	Colorado Revised Statute
CSP	Colorado State Patrol
CSS	Context Sensitive Solutions
dB(A)	A-weighted decibel
DOLA	Colorado Department of Local Affairs
DRCOG	Denver Regional Council of Governments
EA	Environmental Assessment
EIS	Environmental Impact Statement
EJMT	Eisenhower and Johnson Memorial Tunnels
EMS	emergency medical services
EPA	U.S. Environmental Protection Agency
ESA	Environmental Site Assessment
FACWet	Functional Assessment of Colorado Wetlands

Acronyms and Abbreviations continued

FC	federal candidate for listing
FE	federally endangered
FEMA	Federal Emergency Management Agency
FHWA	Federal Highway Administration
FT	federally threatened
FTA	Federal Transit Administration
GHG	greenhouse gas
GIS	geographic information system
GPL	general purpose lane
HUD	U.S. Department of Housing and Urban Development
HWY	Highway
I-70	Interstate 70
IPAC	Information, Planning, and Conservation
ITF	issue task force
ITS	Intelligent Transportation System
kg	kilograms
LIZ	linkage interference zone
LOS	level of service
M	million
MBTA	Migratory Bird Treaty Act
ML	managed lane
MOA	Memorandum of Agreement
MMT	million metric tons
MOU	Memorandum of Understanding
MP	milepost
mph	miles per hour
MSAT	Mobile Source Air Toxics
MUTCD	Manual on Uniform Traffic Control Devices
NA	not available; not available
NAAQS	National Ambient Area Quality Standards
NAC	Noise Abatement Criteria
NDIS	Natural Diversity Information Source
NEPA	National Environmental Policy Act
NHPA	National Historic Preservation Act
NO ₂	nitrogen dioxide
NRCS	Natural Resources Conservation Service
NRHP	National Register of Historic Places
OHWM	ordinary high water mark
PA	Programmatic Agreement

Acronyms and Abbreviations continued

PBA	Programmatic Biological Assessment
PEIS	Programmatic Environmental Impact Statement
PEM	palustrine emergent
PLT	Project Leadership Team
PM	particulate matter
PM10	particulate matter less than 10 microns in diameter
PM2.5	particulate matter less than 2.5 microns in diameter
PSS	palustrine scrub/shrub
ROD	Record of Decision
ROW	right-of-way
SAP	Systems, Applications, and Products
SCAP	Sediment Control Action Plan
SCCP	Sediment Control Conceptual Plan
SH	State Highway
SHPO	State Historic Preservation Officer
SWEET	Stream and Wetland Ecological Enhancement Program
SWMP	Stormwater Management Plan
TU	Trout Unlimited
USACE	U.S. Army Corps of Engineers
USDOT	U.S. Department of Transportation
USFS	U.S. Forest Service
USFWS	U.S. Fish and Wildlife Service
USGS	U.S. Geological Survey
VHT	vehicle hours of travel
VMS	variable message signs
VMT	vehicle miles of travel
VOC	volatile organic compound
vph	vehicles per hour
WRIS	Wildlife Resources Information System



Executive Summary

Where is the Twin Tunnels project located?

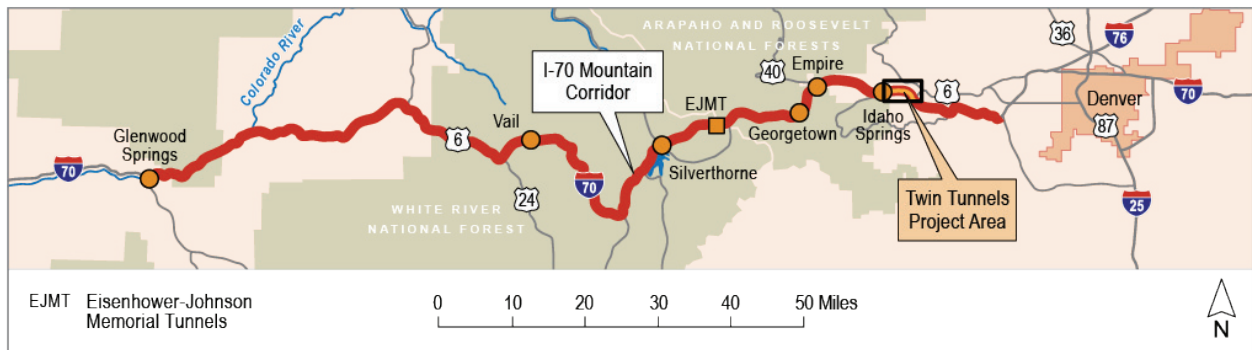
The Twin Tunnels are located on I-70 on the east side of Idaho Springs in Clear Creek County, Colorado. They are a key feature of the I-70 Mountain Corridor between Glenwood Springs and the Denver metropolitan area and serve as a visual gateway to Idaho Springs and Clear Creek County. **Figure ES-1** illustrates the I-70 Mountain Corridor

and Twin Tunnels project location. The project would add capacity and improve roadway geometry for approximately 3 miles of eastbound I-70 from the East Idaho Springs Interchange, through the Twin Tunnels, to the base of Floyd Hill where the project ties into an existing three-lane section (approximately milepost 241.4 to milepost 244.5).

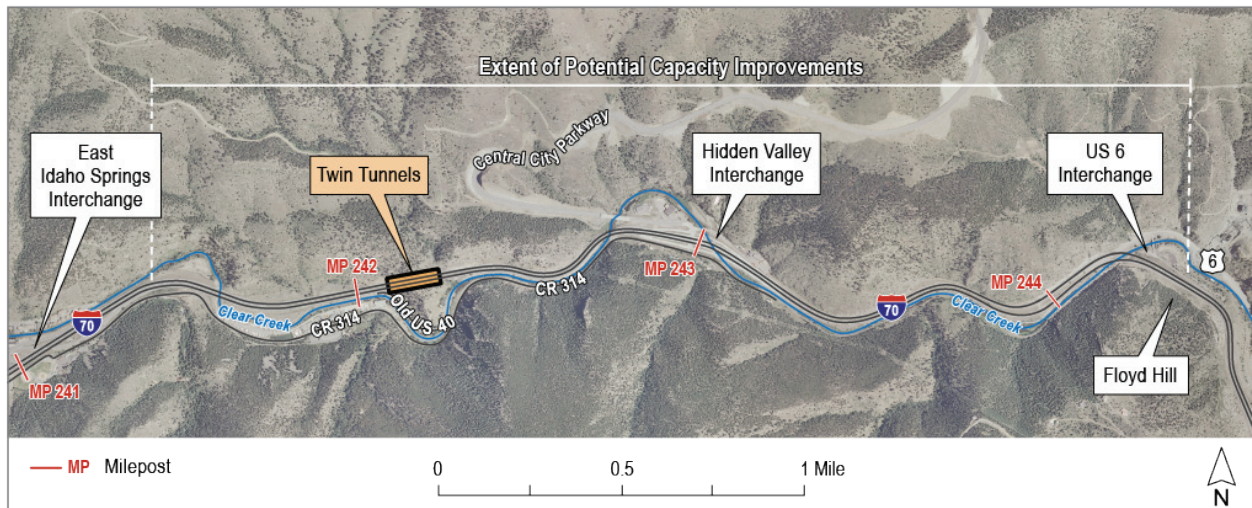
Figure ES-1. I-70 Mountain Corridor and Twin Tunnels Project Location Maps



I-70 Mountain Corridor



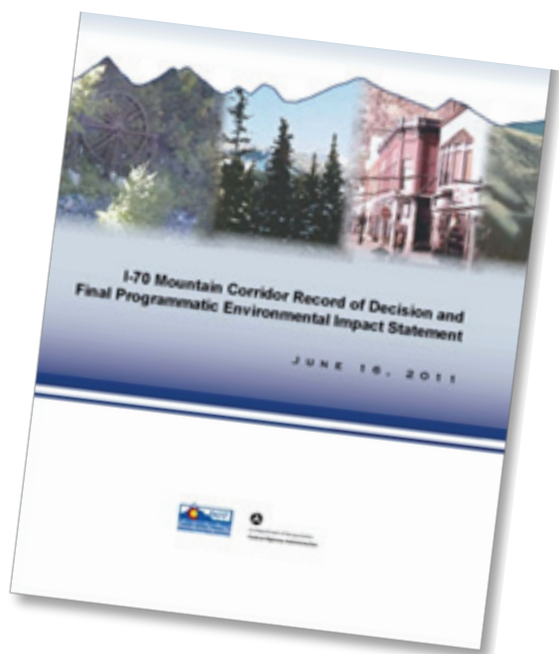
I-70 Twin Tunnels Project



NOTE: Capacity improvements are being considered between milepost (MP) 241.4 on the west to MP 244.5 on the east. The project limits extend west (to approximately MP 238.5) where signs may be installed in the I-70 median. However, no physical changes to the highway are being considered west of MP 241.4.

Why did the lead agencies prepare this Environmental Assessment, and how does it relate to the I-70 Mountain Corridor Programmatic Environmental Impact Statement?

The National Environmental Policy Act (NEPA) requires that the environmental effects of federally funded roadway projects be considered before deciding on a course of action. Over the past decade, the Colorado Department of Transportation (CDOT) and Federal Highway Administration (FHWA) (the lead agencies) followed a programmatic NEPA process to study and outline a program of improvements for the I-70 Mountain Corridor between Glenwood Springs and the western edge of the Denver metropolitan area. The lead agencies documented this broad analysis, also referred to as Tier 1 of the NEPA process, in the [I-70 Mountain Corridor Programmatic Environmental Impact Statement \(I-70 PEIS\)](#) (CDOT, 2011a). The I-70 PEIS Preferred Alternative, which includes a multimodal program of improvements that can be adaptively implemented over time according to current needs and conditions, was approved by FHWA in a [Record of Decision](#) issued in June 2011 (CDOT, 2011b). Developing and evaluating specific projects consistent with the programmatic decision requires subsequent NEPA processes, referred to as Tier 2 processes. This Twin Tunnels Environmental Assessment (EA) is the first Tier 2 NEPA process on the I-70 Mountain Corridor and focuses attention on one of its most problematic areas—the Twin Tunnels. This project focuses on eastbound I-70 improvements but does not preclude



Extreme traffic congestion leads to substantial delays for travelers returning from the mountains on winter and summer Sundays.

other transportation improvements identified in the I-70 PEIS, such as improvements in the westbound direction of I-70 or implementation of Advanced Guideway System transit, both of which are included in the I-70 PEIS Preferred Alternative in this location.

Why is this project needed?

The purpose of the Twin Tunnels project is to improve eastbound highway safety and mobility in the Twin Tunnels area of the I-70 Mountain Corridor (the Corridor). The project is needed to address safety concerns and mobility challenges due to high traffic volumes and geometric conditions (narrow tunnel, sharp roadway curves) that result in inconsistent and slow travel times through and west of the project area.

When compared to similar Colorado interstate highways, the three-mile segment of I-70 in the Twin Tunnels area experiences a high number of crashes historically, with a total of 625 crashes occurring between 2006 and 2010. The majority (65 percent) of crashes occur in the eastbound direction, where heavy congestion, tight curves, and drivers traveling too fast for conditions (either weather or curves) are the primary factors contributing to crashes. Most crashes occur around the horizontal curves, particularly the sharpest curve near Hidden Valley, which is the highest crash location in the project area.

Mobility through the project area is hampered by high levels of traffic congestion, most prominent on Sunday afternoons as recreational travelers make their way back from mountain communities to the Denver metropolitan area. The Twin Tunnels are a primary choke point for traffic on I-70. Eastbound traffic on winter and summer Sunday afternoons is often slowed from 65 miles per hour (mph) to less than 30 mph for 4 to 8 hours, with backups extending past Georgetown and sometimes reaching the Eisenhower-Johnson Memorial Tunnels (EJMT), nearly 30 miles away.

In the future, extreme congestion (travel speeds averaging less than 20 mph) extending from the Twin Tunnels west to Georgetown would occur 75 percent of the time between 9 a.m. and 11 p.m. on Sundays.

What are the lead agencies proposing to build?

The lead agencies propose to add a third eastbound travel lane and consistent 10-foot outside shoulder along I-70 between the East Idaho Springs Interchange and the base of Floyd Hill, where the project would connect to an existing third travel lane. The eastbound bore of the Twin Tunnels would be expanded to accommodate the wider roadway section, and the existing tunnel portal face would be removed and replaced. The Proposed Action would also straighten the eastbound curve west of the Hidden Valley Interchange where the highest number and most serious crashes in the project area occur.

The lead agencies are considering a range of widths (from a minimum of 4 feet to a maximum of 10 feet) for the inside shoulder of I-70 in the western portion of the project area. The width of the roadway section will be dictated by how much the tunnel can be expanded within existing cost and geotechnical constraints. The lead agencies are also considering whether the additional capacity would operate exclusively as a general purpose lane or if users would pay a fee to use the additional lane during peak periods (referred to as a managed lane). **Figure ES-2** provides an overview of the Proposed Action features.

What is the I-70 Mountain Corridor Context Sensitive Solutions process, and how was it followed for this project?

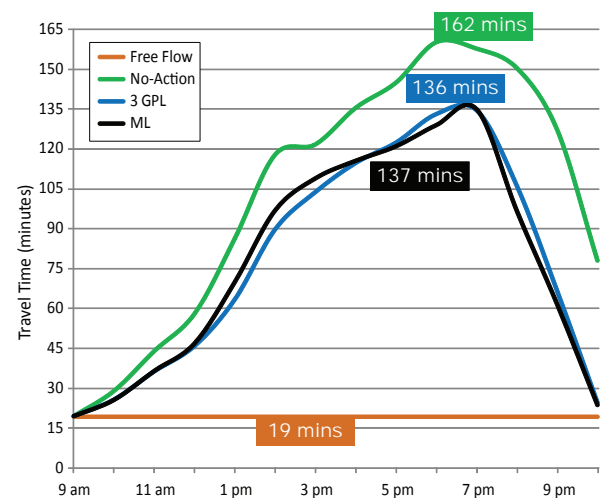
Context Sensitive Solutions (CSS) is an approach that considers the total context within which a transportation improvement project will exist, and it includes early, continuous, and meaningful involvement of the stakeholders throughout project development. The [I-70 Mountain Corridor CSS process](#) consists of a unique set of guidance developed specifically for the Corridor in collaboration with stakeholders (CDOT, 2009). This guidance includes a 6-Step Decision Process, Design Criteria, Aesthetic Guidance, and a Context Statement and Core Values for the I-70 Mountain Corridor. The Twin Tunnels EA established a Project Leadership Team, developed a Context Statement and Core Values specific to the project (see last page, p. ES-8, of the Executive Summary), and followed the 6-Step Decision Process. The Proposed Action reflects the core values and is heavily influenced by the Design Criteria and Aesthetic Guidance recommendations. [Appendix C](#) provides a full

summary of how the I-70 Mountain Corridor CSS process was used to achieve a context sensitive solution for this project.

What are the mobility and safety benefits of the Proposed Action?

The Proposed Action would provide immediate benefits to safety and mobility in the Twin Tunnels area and would substantially improve mobility and safety compared to No Action conditions in 2035. On peak Sundays in 2035, the Proposed Action would decrease average travel time for eastbound travelers between Georgetown and Floyd Hill by about 27 minutes compared to the No Action condition — from a worst-case travel time of 162 minutes to 135 minutes (compared to 19 minutes for the same trip under free-flow conditions) (see **Figure ES-3**). The travel time savings is similar under both the general purpose lane and managed lane scenarios, with the managed lane scenario saving an additional two to three minutes over the general purpose lanes throughout the day. Weekday congestion is not projected to occur regularly in 2035 under No Action conditions; however, the Proposed Action would also improve overall travel speeds and operations on weekdays over No Action conditions.

Figure ES-3. 2035 Eastbound Average Travel Time Between Georgetown and the Top of Floyd Hill



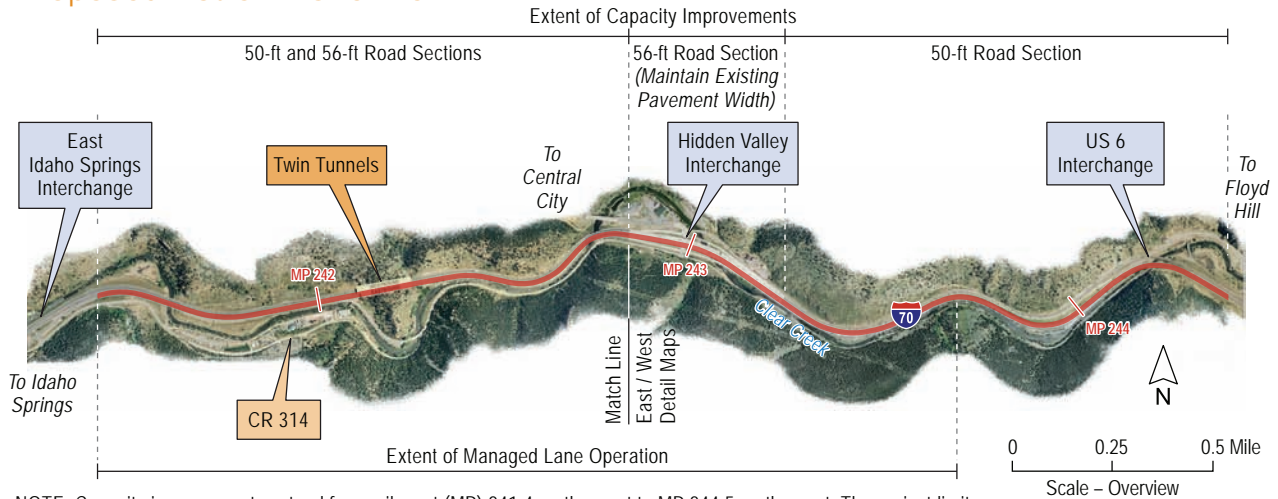
Source: CDOT, 2012

3 GPL = 3 General Purpose lanes operating scenario
ML = Managed Lane operating scenario

The Proposed Action's geometric and capacity improvements are projected to have a significant effect on safety, with the overall number of crashes within the project area expected to decrease 20 percent to 35 percent when compared to the No Action in 2035. In the highest crash location in the project area—at the curve west of Hidden Valley—crashes would decrease more than 75 percent.

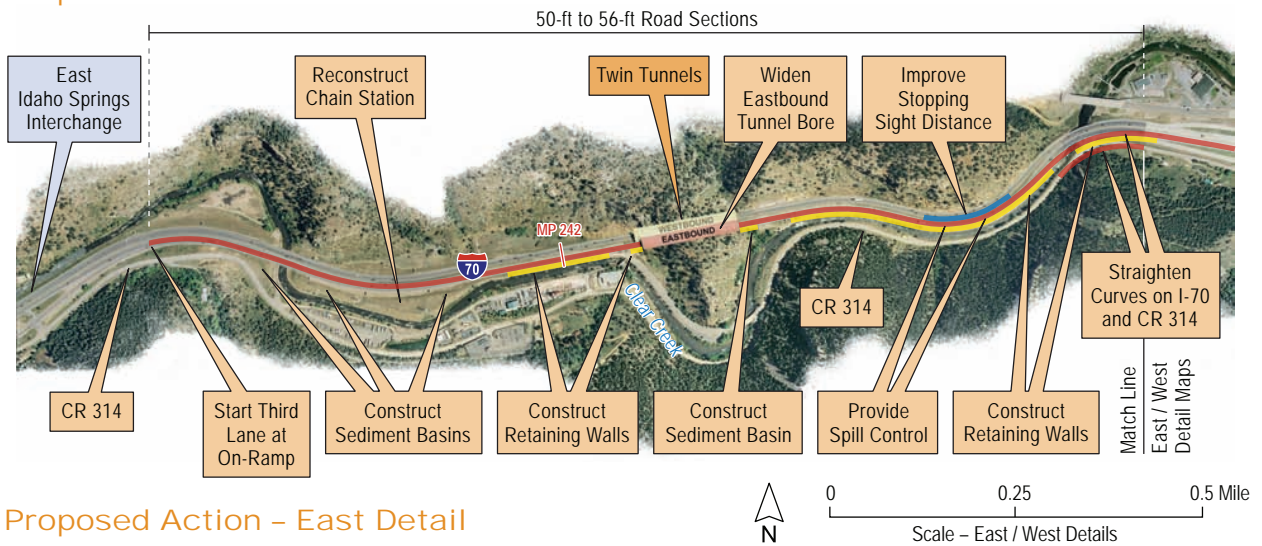
Figure ES-2. Twin Tunnels Proposed Action - Overview and Detail Maps

Proposed Action - Overview

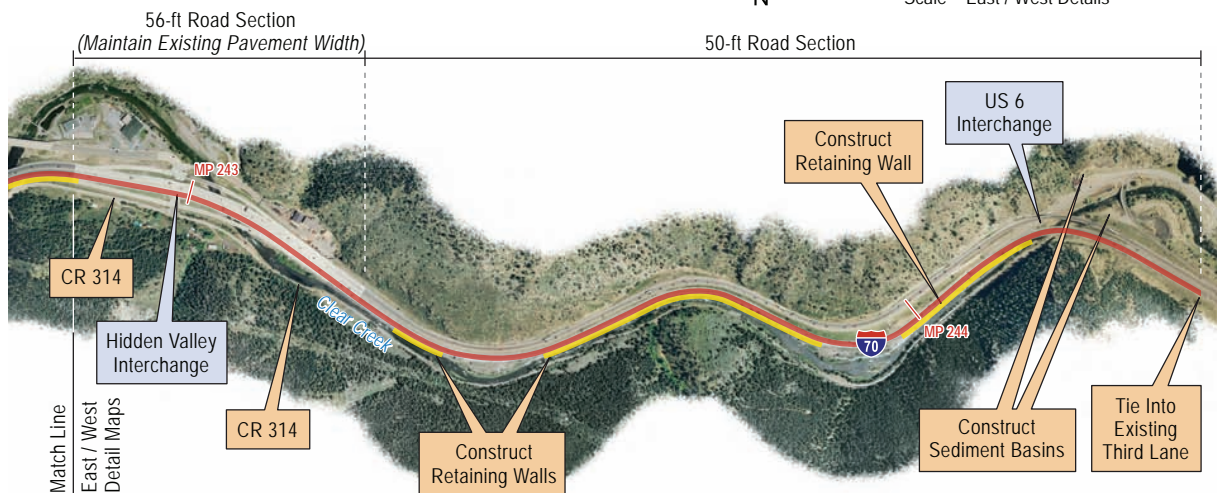


NOTE: Capacity improvements extend from milepost (MP) 241.4 on the west to MP 244.5 on the east. The project limits extend to MP 238.5 on the west where several signs would be installed in the highway median ahead of the capacity improvements.

Proposed Action - West Detail



Proposed Action - East Detail



How was the Proposed Action developed?

The I-70 PEIS Preferred Alternative and the Twin Tunnels visioning workshop conducted in February 2011 shaped the Proposed Action for the Twin Tunnels EA. The Proposed Action supports elements of the Preferred Alternative identified in the I-70 PEIS, including six-lane capacity between the Twin Tunnels and Floyd Hill and curve modifications east of the Twin Tunnels. The I-70 PEIS Preferred Alternative general recommendations were refined during the Twin Tunnels visioning workshop, where participants focused on the specific problems in the Twin Tunnels area to develop a concept that would fulfill the goals of the I-70 PEIS Preferred Alternative and address immediate mobility needs in the Twin Tunnels area. Both the I-70 PEIS and Twin Tunnels visioning workshop followed the [I-70 Mountain Corridor CSS process](#), partnering with stakeholders and technical experts to devise solutions.

CDOT refined the Proposed Action during the Twin Tunnels EA process. Refinements support the core values endorsed by the Project Leadership Team and Technical Team (see last page of this summary), address [I-70 Mountain Corridor CSS Design Criteria](#) and [Aesthetic Guidance](#), minimize social and environmental impacts, balance short-term benefits with longer-term Corridor needs, and do not preclude implementation of other elements of the I-70 PEIS Preferred Alternative.

What are the social and environmental consequences of the Proposed Action?

The Proposed Action would cause few permanent adverse impacts to social and natural resources. It would provide social and economic benefits for Idaho Springs, and would benefit wildlife, Clear Creek, and the natural resources it supports.

What permanent adverse impacts would occur?

The Proposed Action would primarily affect recreation, historic, and visual resources. The realigned curve on I-70 west of the Hidden Valley Interchange would close one of seven boating accesses to Clear Creek, and the installation of water quality treatment facilities would reduce parking at the Kermits boating access and trailhead.

The expansion of the eastbound tunnel bore and the removal and replacement of the portal faces would adversely affect the historic characteristics of the Twin Tunnels. No other effects to historic properties would occur, including to any properties identified by Clear Creek County as locally important.

Retaining walls and other features of the Proposed Action would create visual impacts for motorists and recreationalists in the vicinity. Recreationalists on Clear Creek and the Scott Lancaster Memorial Trail would experience greater visual effects than motorists on I-70 because the duration of their view is longer. Minor visual impacts would result from additional signage needed for managed lane operation, new guardrails, short retaining walls (5 feet tall or less), and bridge and roadway widening. Taller retaining walls along Clear Creek would noticeably contrast with the visual setting and change a scenic view of value to adjacent recreational activities.



A new noise barrier installed near the Scott Lancaster Memorial Bridge will reduce noise and improve the recreational experience for users of the Scott Lancaster Memorial Trail.

What permanent benefits would occur?

The Proposed Action would provide mobility and safety benefits for local and regional travelers by reducing average travel times during peak Sunday periods by nearly 30 minutes, reducing the expected crashes in the project area by 25 to 30 percent, and improving emergency response. Improved travel conditions provide other social and economic benefits to Idaho Springs by encouraging more recreation and tourism-related trips from Denver by travelers who avoid mountain travel in peak periods, and by providing safer travel conditions for residents commuting, shopping, or visiting Evergreen or Denver.

The Proposed Action would benefit wildlife, water quality, and aquatic habitat in Clear Creek. Wildlife would benefit from improved connectivity across I-70 under the reconstructed I-70 bridge over Clear Creek west of Hidden Valley, and culvert improvements under I-70 near milepost 242. Additionally, tree removal and fence replacement west of the Twin Tunnels and north of I-70 would reduce wildlife mortality from fence entanglement and animal-vehicle collisions.

Clear Creek water quality and aquatic habitat would benefit from implementation of the portions of the Upper Clear Creek Sediment Control Action Plan, which would provide facilities to treat stormwater runoff and reduce levels of pollutants and sediments entering the stream. In two locations of frequent hazardous materials spills, the Proposed Action would install spill containment structures in the median of I-70 to retain spilled hazardous materials, aid in cleanup, and reduce the potential for spilled materials to enter Clear Creek. Sediment traps and detention ponds would capture and remove substantial amounts of sediment and winter roadway maintenance materials from entering Clear Creek. CDOT will also restart the I-70 Clear Creek water quality monitoring program that was operated from 2001 through 2005, and will monitor water quality before, during, and after construction.

Existing wildlife movement/crossing area beneath Hidden Valley bridge will be improved.



Bighorn sheep have been caught and tangled in this wildlife fence, which will be replaced as part of the Proposed Action.

The Proposed Action would not increase noise levels perceptibly; however, existing noise levels exceed CDOT's noise abatement criteria at residences and recreational facilities in the project area. Noise mitigation was examined and found to be reasonable and feasible at the Scott Lancaster Bridge along the Scott Lancaster Memorial Trail. CDOT and the Clear Creek County Open Space Commission have agreed that a noise wall in this location would reduce noise for recreational users of the trail, is desirable, and will be constructed. Mitigation at other locations is not reasonable or feasible due to the distance between receptors and the terrain surrounding the I-70 highway.

How would CDOT construct this project?

CDOT would construct the Proposed Action from December 2012 through March 2014, and construction would occur in three general phases. The first phase would last from approximately December 2012 to March 2013 and would consist of activities to ready the tunnel for expansion and prepare the I-70 detour for use. The second phase would start after the 2012/2013 ski season, spanning from April 2013 to October 2013 for the 53-foot tunnel width or April 2013 to December 2013 for the 61-foot tunnel width. The second phase would expand the tunnel and roadway on I-70 while traffic is detoured around the tunnel (along a portion of old US 40 and County Road (CR) 314). During the use of the detour, CR 314 would be closed to through traffic. After this phase is complete, the reconstructed I-70 highway would open to traffic. The third phase consists of restoring the detour route; it would continue through March 2014.

How would social and environmental resources be affected during construction?

Construction activities and operation of the detour would impact social, economic, and recreation resources, Clear Creek, and wildlife. Construction and tunnel blasting activities would also create dust, noise, and vibration.

Detour operations and I-70 lane closures would increase emergency response times, increase travel time on I-70, and potentially reduce through-traveler patronage at local businesses. Although river closures are anticipated to occur outside of rafting season, unanticipated closures could result in reduced revenues for rafting companies during any hours of closure.

Preparation and restoration of the detour route would result in delays for pedestrians and bicyclists using the Scott Lancaster Memorial Trail along CR 314. Operation of the detour would reroute the trail from the existing Scott

Lancaster Bridge and old US 40 game check area to the gravel portion of CR 314 west of the Doghouse Rail Bridge. Trail users would continue along the trail, adjacent to the detour, via a barrier-separated path on the south side of CR 314. During the construction period, a boating access and a fishing access on Clear Creek would be temporarily closed (six others would remain open), parking would be reduced at Kermitts boating access, and periodic closures of Clear Creek would affect recreational activity on the creek.

Construction activities could also affect water quality and aquatic habitat in Clear Creek. Sedimentation from construction could cover brown trout eggs incubating in the stream substrate, and exposure of mineralized rock could increase contaminants entering the stream. These impacts are expected to be controlled by implementation of best management practices that prevent sediment and other pollutants from migrating off the construction site and into waterways. Operation of the detour could increase animal-vehicle collisions in the vicinity of the natural Twin Tunnels land bridge. Temporary fencing will be installed to prevent animals from crossing construction or detour traffic.

Tunnel blasting and other construction activities would occur around the clock, creating nighttime construction noise that could be perceptible at nearby residences. Tunnel blasting operations could also create dust emissions and noise loud enough to bother both people and wildlife in the vicinity. Blasting could result in vibration that could potentially damage infrastructure near the tunnels, including storage tanks at the Idaho Springs Wastewater Treatment Plant west of the Twin Tunnels. CDOT will install temporary air quality monitors during construction to trigger additional mitigation measures if threshold dust concentrations are exceeded. The contractor will design blasts to avoid vibration damage to nearby structures and will monitor charges to ensure that effects are below damage thresholds. CDOT will monitor vibration and noise levels and implement additional mitigation if necessary to reduce impacts.

How can the public provide comments on this document, and what happens next?

The lead agencies are providing this EA for agency and public comment. A public hearing has been scheduled in Idaho Springs at the Clear Creek County Schools District Office (320 Highway 103, Idaho Springs, CO 80542). Interested individuals can attend the public hearing to provide comments or learn more about the EA study and its recommendations. Comments can be provided in person at the public hearing, on the project website (www.colorado.gov/projects/i70twintunnels), or via mail/email to:

David Singer

Colorado Department of Transportation
425C Corporate Circle
Golden, CO 80401
david.singer@dot.state.co.us

Loretta LaRiviere

CH2M HILL
9191 South Jamaica Street
Englewood, CO 80112-5946
Loretta.LaRiviere@CH2M.com

After consideration of public comments, the lead agencies will make a final decision about the project. Key considerations for the decision include the width of the cross section on the west end of the project (within 53-foot to 61-foot range) and the operating scenario (managed lane or general purpose lane). If approved through this EA process, the Proposed Action would be constructed beginning in the fall of 2012 and open to traffic in the fall of 2013. A newsletter will be mailed to the entire mailing list at the end of the study to inform agency and public stakeholders of the study's conclusions and next steps.

The first tunneling operation on I-70, the Twin Tunnels, completed in 1961, have undergone little change since construction. Left to right: tunnel under construction (1959), early in its operation (1971), modern view (2012), and artist's rendering of the Proposed Action.



The Twin Tunnels project would improve safety, operations, and travel time reliability on eastbound I-70, in accordance with I-70 PEIS and tunnel visioning recommendations, and in support of core values identified by stakeholders.

As part of the CSS process, the lead agencies worked with stakeholders to create a context statement articulating the qualities and attributes of the Twin Tunnels project area and core values the project must respect and preserve (see below). The lead agencies—along with a broad range of local, state, and federal agencies, and members of the public and interest groups—revisited the core values at each step in developing the Twin Tunnels project, to ensure that decisions respected and supported their preservation.



Context Statement

I-70 is Colorado's only east-west Interstate, providing a link over the Continental Divide, interstate commerce, and mountain access.

Blasted through a geological feature and contained within a narrow canyon, the Twin Tunnels symbolize Colorado's historic endeavors to improve access to and from the mountains. Currently occupying this canyon are Clear Creek, the Frontage Road (CR 314), and I-70. The vision for the future includes an Advance Guideway System with existing transportation facilities.

The Twin Tunnels are a gateway for arriving and departing the mountains, provide a natural crossing for wildlife, and connect local communities to national and regional services. Parallel to I-70 is Clear Creek, a natural and recreational resource. The tunnels now are a constriction to travel and create a safety problem.

Core Values

The Twin Tunnels Project acknowledges core values for the area:

Wildlife

Wildlife, wildlife habitat, migration routes, and access to Clear Creek.

Community

Tourist destinations and community facilities, including the Scott Lancaster Trail and Bridge, the wastewater treatment plant, the planned Clear Creek Greenway, the frontage road, and Clear Creek.

Mobility

Mobility through safe and reliable transportation facilities.

Safety

Safe travel for people and goods.
Safety for emergency responders and maintenance workers.
A **safe** crossing for wildlife.

Gateway

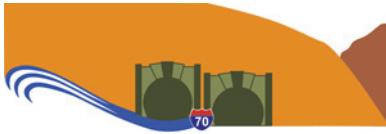
A primary access and visual **gateway** to the Mountain Mineral Belt, historic Idaho Springs, and Front Range communities.

Clear Creek

Clear Creek, as a clean, high-quality water resource, a recreational asset, an aquatic resource with sustainable fisheries' habitat, a drinking water source, and a defining natural feature of the corridor.

History

History as a defining element of Clear Creek County. Celebrating the cultural resources associated with mining and mining towns, and the first successful tunneling operation as part of the construction of I-70 west through Colorado's mountains.



Chapter 1. Purpose and Need

1.1 Why did the Federal Highway Administration and Colorado Department of Transportation prepare this Environmental Assessment?

In June 2011, the Federal Highway Administration (FHWA) signed the [Record of Decision \(ROD\)](#) for the [I-70 Mountain Corridor Programmatic Environmental Impact Statement \(I-70 PEIS\)](#) (CDOT, 2011a). The I-70 PEIS ROD documents broad agreements about the general location, mode types, and capacity for future transportation improvements for the I-70 Mountain Corridor (Corridor) between Glenwood Springs and the western edge of the Denver metropolitan area. The FHWA and the Colorado Department of Transportation (CDOT) (lead agencies) initiated the I-70 PEIS, also referred to as a Tier 1 document, to identify transportation solutions at the Corridor level and to provide a foundation for future project-level analyses of specific improvements. The I-70 PEIS does not authorize any construction but rather lays out a framework for future tier 2 National Environmental Policy Act (NEPA) processes to be completed so that specific projects consistent with the tier 1 decision can be developed and implemented. CDOT collaborated closely with stakeholders to reach consensus about a Preferred Alternative for the Corridor and the process by which site-specific improvements would be evaluated and carried out in the future. Both the I-70 PEIS and ROD are available online at www.coloradodot.info/projects/i-70mountaincorridor.

The Twin Tunnels Environmental Assessment (EA) is the first tier 2 NEPA process to be initiated under the I-70 PEIS. It incorporates the Corridor-wide analysis and discussions in the I-70 PEIS and focuses attention on one of the Corridor's most problematic areas: the Twin Tunnels on the eastern side of Idaho Springs. Improvements to I-70 eastbound travel in the Twin Tunnels area have been prioritized based on the analysis of transportation problems contained

in the I-70 PEIS and other studies, and public interest in addressing immediate congestion and safety issues at this location. While this project is focused on eastbound I-70 improvements, it does not preclude future improvements in the westbound direction of I-70 or future Advanced Guideway System transit improvements, both of which are included in the I-70 PEIS Preferred Alternative in this location. CDOT remains committed to working with stakeholders to implement other elements of the I-70 PEIS Preferred Alternative in this location and throughout the Corridor as funding becomes available.

The EA is being conducted consistent with the agreements and processes outlined in the I-70 PEIS, including the [I-70 Mountain Corridor Context Sensitive Solutions \(CSS\) process](#), the [Stream and Wetland Ecological Enhancement Program \(SWEEP\) Memorandum of Understanding \(MOU\)](#), [A Landscape Level Inventory of Valued Ecosystem Components \(ALIVE\) MOU](#), [Section 106 Programmatic Agreement](#), and other [mitigation strategies](#).

1.2 Where is the Twin Tunnels project located?

The Twin Tunnels, located on I-70 near Idaho Springs, are a key feature of the I-70 Mountain Corridor. **Figure 1-1** illustrates the I-70 Mountain Corridor and Twin Tunnels project area. The Twin Tunnels project would add capacity and improve roadway geometry for approximately 3 miles of eastbound I-70 from the East Idaho Springs Interchange (milepost 241.4) through the Twin Tunnels, to the base of Floyd Hill (milepost 244.5) where the project ties into an existing three-lane section.



Twin Tunnels from Eastbound I-70 near Idaho Springs.

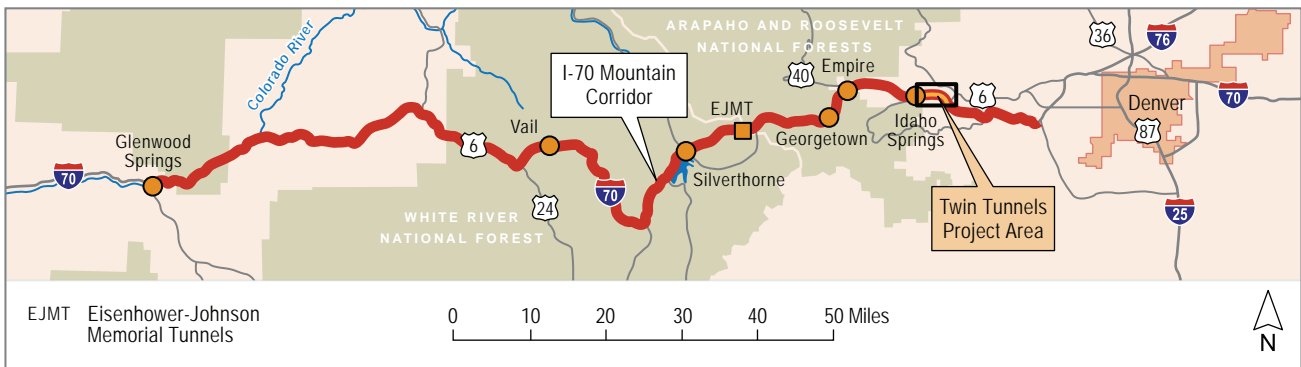
Historically, peak eastbound traffic congestion occurring on Sunday afternoons has been precipitated by the constrained tunnel and highway width at the Twin Tunnels in addition to the tight curve at Hidden Valley. Over the years as traffic volumes have increased, eastbound traffic congestion has extended farther west. To bypass this congestion, a portion of I-70 traffic uses the frontage roads

from as far west as Georgetown. Most of this traffic then re-enters I-70 at the East Idaho Springs Interchange. As a result, it is at this interchange (milepost 241) where a noticeable change in traffic patterns occurs; this change in traffic patterns provides a logical western location to begin the Twin Tunnels capacity improvements. At the eastern end of the project limits at the base of

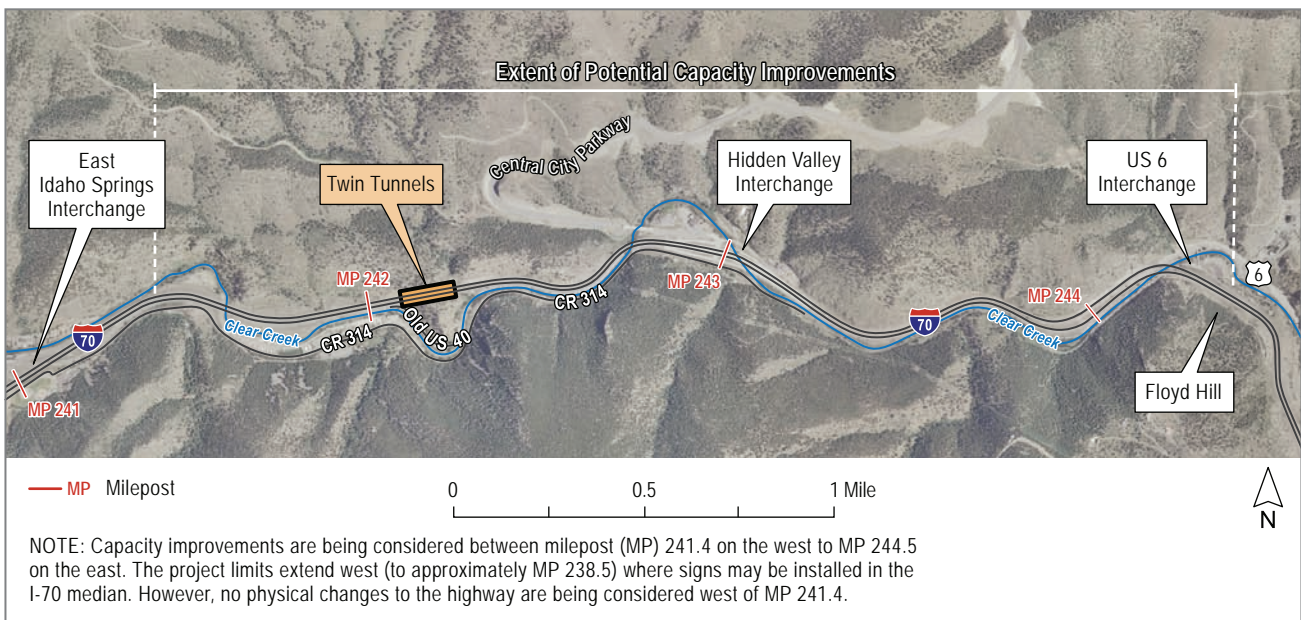
Figure 1-1. I-70 Mountain Corridor and Twin Tunnels Project Location Maps



I-70 Mountain Corridor



I-70 Twin Tunnels Project

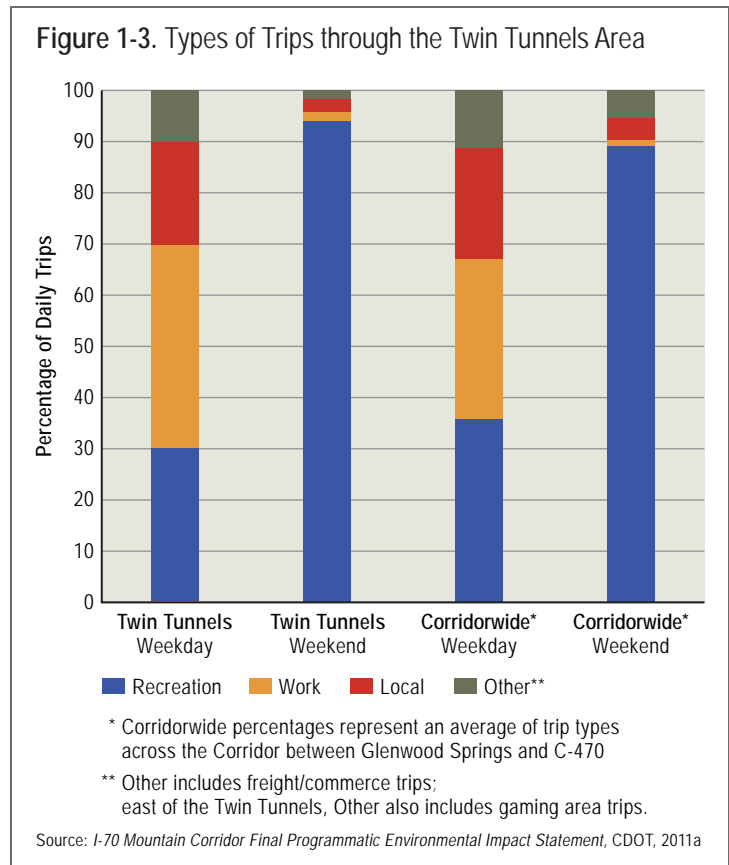


Floyd Hill, traffic congestion eases as the number of lanes on I-70 increases from two to three lanes continuing up and over Floyd Hill. Therefore, the base of Floyd Hill provides a logical location to end capacity improvements. These western and eastern project limits are referred to as logical termini, providing rational end points for both transportation improvements and the review of environmental impacts. The project limits extend approximately 3 miles to the west of the capacity improvements to account for advanced signing that would be installed in the highway median to provide drivers' notice of the beginning of the managed lane. The advance signing is only required for the managed lane option.

The Twin Tunnels project area is adjacent to County Road (CR) 314, which is part of the I-70 frontage road system (see **Figure 1-1**). The frontage road currently extends along the south side of Clear Creek in a discontinuous manner through Clear Creek County. Within the project area, CR 314 is continuous as a frontage road between east Idaho Springs and Hidden Valley. A closed section of old US 40, which was the main east-west route through Colorado prior to the construction of the Twin Tunnels and I-70 in the 1950s, is also located adjacent to the project area and is used by bicyclists as a trail (see **Figure 1-1**).

1.3 Who uses the Twin Tunnels, and for what reasons?

I-70 is the primary east-west route through Colorado and provides access to established communities and recreational areas that are important contributors to the state's economy and quality of life. I-70 provides access to the White River National Forest and the Arapaho and Roosevelt National Forests, two of the most visited National Forests in the United States (see **Figure 1-1**). Destinations along the Corridor include a number of major ski resorts that attract local, national, and international visitors.



The Twin Tunnels area of I-70 serves a variety of users. Travelers include commuters, recreationists, local residents, freight truckers, and others. The mix of users varies for weekdays and weekends, as illustrated in **Figure 1-3**. The overall mix of users is relatively consistent between summer and winter although travel volumes are higher in summer. Overall, travel volumes are highest during summer and winter weekends and holidays. While peak travel during these periods is predominantly for recreational purposes, the highway is important for local and commuting trips, as well as freight movement and commerce.



The Twin Tunnels are a gateway to the world-class recreation opportunities offered by Colorado's mountains.

As part of the CSS process, the lead agencies reviewed the [context](#) and [core values](#) developed for the overall I-70 Mountain Corridor. Within this framework, the lead agencies worked with stakeholders to create a context statement articulating the qualities and attributes of the Twin Tunnels project area and core values the project must respect and

preserve (see **Figure 1-2**). The lead agencies—along with a broad range of local, state, and federal agencies, and members of the public and interest groups—revisited the core values at each step in developing the Twin Tunnels project, to ensure that decisions respected and supported their preservation.

Figure 1-2. Twin Tunnels EA Context and Core Values



Context Statement

I-70 is Colorado's only east-west Interstate, providing a link over the Continental Divide, interstate commerce, and mountain access.

Blasted through a geological feature and contained within a narrow canyon, the Twin Tunnels symbolize Colorado's historic endeavors to improve access to and from the mountains. Currently occupying this canyon are Clear Creek, the Frontage Road (CR 314), and I-70. The vision for the future includes an Advance Guideway System with existing transportation facilities.

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The Twin Tunnels Project acknowledges core values for the area:

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Wildlife, wildlife habitat, migration routes, and access to Clear Creek.

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Mobility through safe and reliable transportation facilities.

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A **safe** crossing for wildlife.

Gateway

A primary access and visual **gateway** to the Mountain Mineral Belt, historic Idaho Springs, and Front Range communities.

Clear Creek

Clear Creek, as a clean, high-quality water resource, a recreational asset, an aquatic resource with sustainable fisheries' habitat, a drinking water source, and a defining natural feature of the corridor.

History

History as a defining element of Clear Creek County. Celebrating the cultural resources associated with mining and mining towns, and the first successful tunneling operation as part of the construction of I-70 west through Colorado's mountains.

1.4 What is the purpose and need for transportation improvements in this area?

The purpose of the Twin Tunnels project is to improve eastbound highway safety and mobility in the Twin Tunnels area of the I-70 Mountain Corridor. The project is needed to address safety concerns and mobility challenges due to high traffic volumes and geometric conditions (narrow tunnel, sharp roadway curves) that result in inconsistent and slow travel times through and west of the project area. The project advances improvements on the I-70 Mountain Corridor, supports the adaptive implementation of the [I-70 PEIS Preferred Alternative](#), and focuses on an immediate problem that affects safety and mobility for eastbound travel through the mountains.

Safety Concerns. A high number of crashes occur in the project area related to tight curves, poor sight distance, inclement weather/poor road conditions, and congested traffic conditions. Emergency response is hampered by congestion, lack of alternate routes to get to incidents, and narrow shoulders through the Twin Tunnels that provide room for emergency vehicles to pass.

Mobility Challenges. Slow and unpredictable travel times in peak traffic periods (Saturday and Sunday afternoons, and holidays) frustrate travelers, negatively affect economic conditions, and decrease safety. Capacity west of the Twin Tunnels is largely controlled by the reduced lane capacity of the Twin Tunnels, meaning that traffic backups extend



Eight curves between the Twin Tunnels and Floyd Hill slow travel and contribute to crashes.

beyond the project area due to the bottleneck at the tunnels. Real and perceived narrowness of the tunnels causes drivers to slow down and reduces capacity by up to 20 percent. Tight curves in the project area between the tunnels and Floyd Hill (east of the tunnels) also cause drivers to slow down. Crashes in the area are frequent and result in substantial traffic backups. Crashes reduce the flow of traffic and, therefore, increase delays. In the Twin Tunnels area, crashes are particularly difficult to clear from travel lanes because no alternate routes for emergency vehicles are present and in some locations, such as at the tunnels, shoulders are narrow.

1.4.1 What are the safety concerns in the project area?

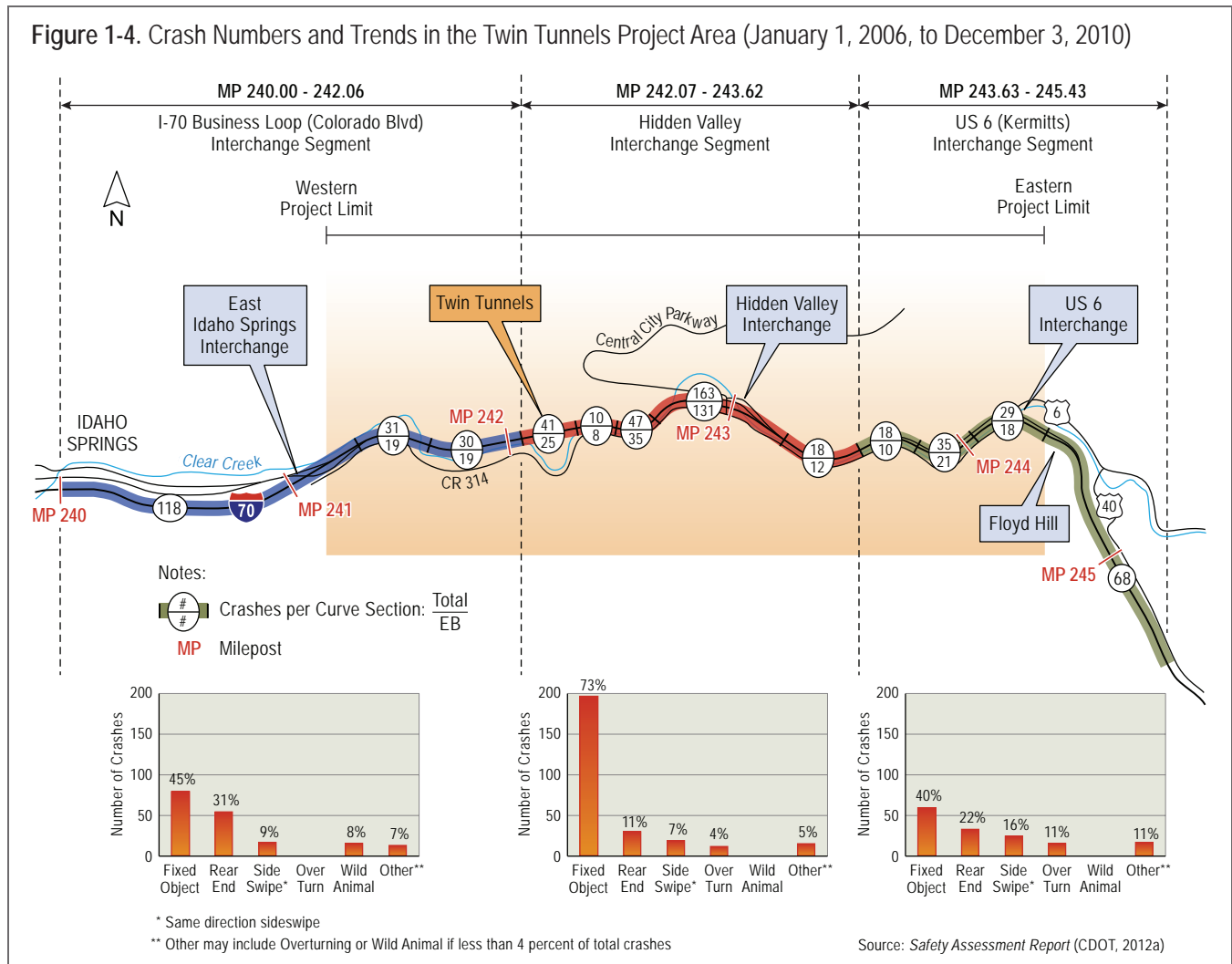
Geometric conditions (such as steep grades and tight curves), traffic congestion due to weekend and holiday traffic, drivers traveling too fast for conditions, speed differentials with fast-moving cars and slower-moving trucks, and winter driving conditions contribute to crashes. Crash numbers and trends are summarized here and presented in more detail in the [Twin Tunnels Safety Assessment Report](#) (CDOT, 2012a).

When compared to similar Colorado interstate highways, this segment of the I-70 Mountain Corridor historically experiences a high number of crashes. Existing safety deficiencies in the project area include:

- Heavy congestion contributes to frequent rear-end crashes.
- Inconsistent travel speeds and limited sight distance around sharp curves between the Twin Tunnels and Floyd Hill result in drivers traveling too fast for conditions and are a contributing factor to crashes.
- Winter driving conditions, including snowy and icy roads, are also a contributing factor to several types of crashes.

During a five-year study period (January 1, 2006 through December 31, 2010), a total of 625 crashes occurred in both directions of I-70 between the East Idaho Springs Interchange and the US 6 Interchange (milepost 240.00 to 245.43). The majority (65 percent) of these crashes occurred in the eastbound direction. The most predominant crash types were fixed-object type crashes (vehicles leaving the roadway due to excessive travel speeds and/or road conditions) and rear-end type crashes (stop and go traffic caused by congestion or other crashes blocking through travel). The higher number of fixed-object crashes (such as cars hitting guardrail) is nearly three times higher in the eastbound direction. The higher number of crashes is likely due to the grades in the eastbound direction, which allow vehicles to travel at higher speeds.

Figure 1-4. Crash Numbers and Trends in the Twin Tunnels Project Area (January 1, 2006, to December 3, 2010)



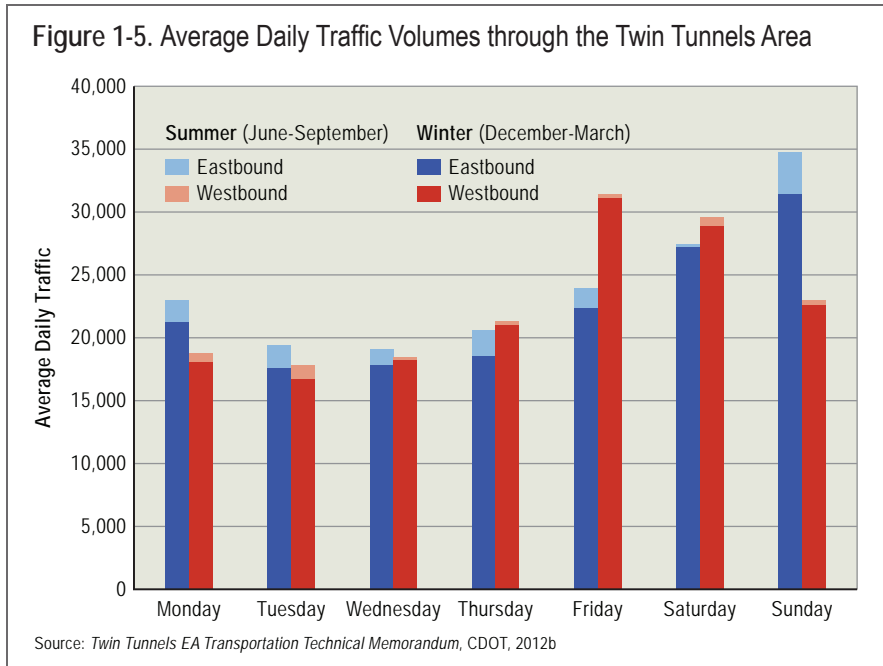
The largest concentrations of crashes are in the vicinity of the sharper horizontal curves along the highway. A total of ten curves are present in the project area, eight of which are east of the Twin Tunnels. As illustrated in **Figure 1-4**, the project area was divided into three primary segments from west to east to evaluate crash trends:

- I-70 Business Loop (Colorado Boulevard) Interchange Segment, which includes east Idaho Springs and the East Idaho Springs Interchange
- Hidden Valley Interchange Segment, which includes the Twin Tunnels and the Hidden Valley/Central City Parkway Interchange
- US 6 (Kermitts) Interchange Segment, which includes the US 6 Interchange and Floyd Hill

The Twin Tunnels *Safety Assessment Report* (CDOT, 2012a) compared the number of crashes per mile per year to the number of crashes on similar facilities. The east and west

segments have near the expected value for interstate segments with similar annual average daily traffic volumes. The Hidden Valley segment, however, is well above the average. This segment has the highest concentration of crashes in the project area—279 mainline crashes over the five-year period. Crashes were particularly concentrated in the location of the curves just west of and through the Hidden Valley Interchange, where nearly 60 percent of the crashes in the Hidden Valley segment and 40 percent of the total number of crashes in the project area occurred. Eighty percent of those crashes occurred in the eastbound direction. The most frequent crash type along this segment was fixed-object type (197 crashes), most of which occurred in the winter.

Excessive travel speeds through the curves in this segment are the main cause of crashes with nearly 60 percent of drivers involved in the crashes traveling at 60 miles per hour (mph) or faster (posted speed limit is 55 mph, and the design speed is 45 mph). Other crashes in this segment are



The second highest season (December through March) is a result of the winter recreation activities (primarily skiing) centered on mountain resorts. Most visitors drive to the mountains on Friday or Saturday for recreational activities and return to the Denver metropolitan area on Sundays in order to be at work on Monday morning. Thus, Sundays have the highest volumes of the week, contributing significantly to eastbound congestion on most Sundays during these two peak seasons.

Patterns of congestion indicate limited to no congestion downstream (east) of the Twin Tunnels on peak Sunday afternoons. Although traffic volumes are not at capacity, existing curve geometry causes some drivers to slow down, resulting in lower and inconsistent travel speeds (and lower capacity) downstream

concentrated around the Twin Tunnels. In and through the Twin Tunnels, rear end type crashes are the most common crash type. This is primarily a result of vehicles slowing down as they approach and drive through the tunnels, causing congestion, and increasing the possibility of rear end type crashes. The majority of crashes at the Twin Tunnels occur during peak traffic conditions during the winter.

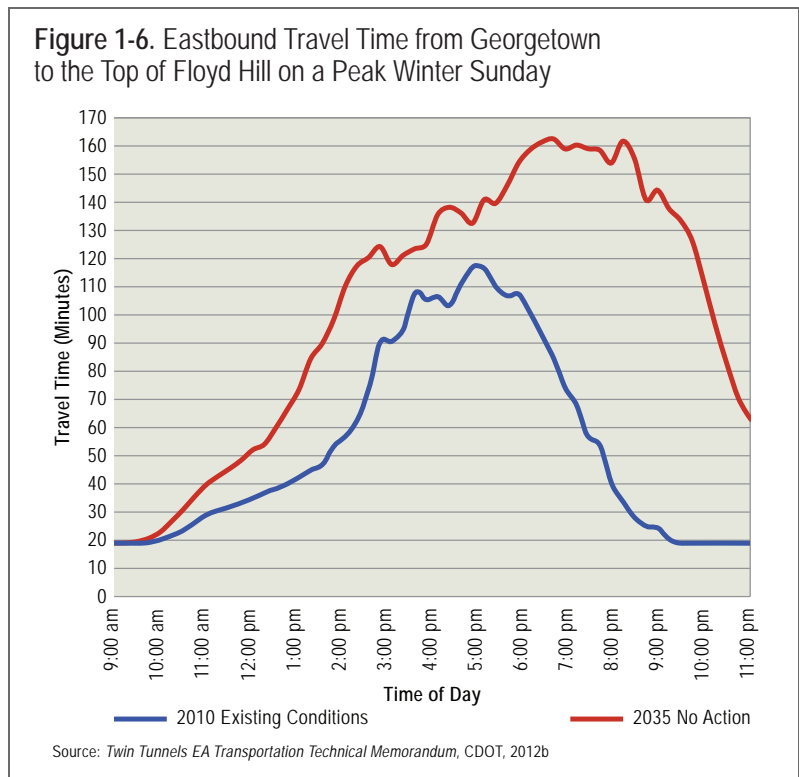
of the Tunnels. Traffic modeling shows that because of the reduced capacity of the tunnels compared with the roadway capacity east and west of the tunnels, the Twin Tunnels are the bottleneck that cause congestion upstream and result in travel time delays to Georgetown and farther west (Figure 1-6).

1.4.2. What are the mobility concerns in the project area?

Mobility through the Twin Tunnels area is hampered by high levels of weekend traffic congestion, with the highest volumes recorded eastbound on Sunday afternoons as recreational travelers make their way back from mountain communities to the Denver metropolitan area (CDOT, 2011a). The worst delays along the I-70 Mountain Corridor occur from Georgetown to the Twin Tunnels just east of Idaho Springs.

During both the summer and winter peak seasons, traffic volumes throughout the I-70 Mountain Corridor are highest on weekends (Figure 1-5) when recreational travelers comprise the vast majority (more than 90 percent) of trips through the Twin Tunnels area (CDOT, 2012b).

The summer season (June through September) generates the highest average daily volumes due to the dispersed recreational opportunities that the mountains of western Colorado provide.



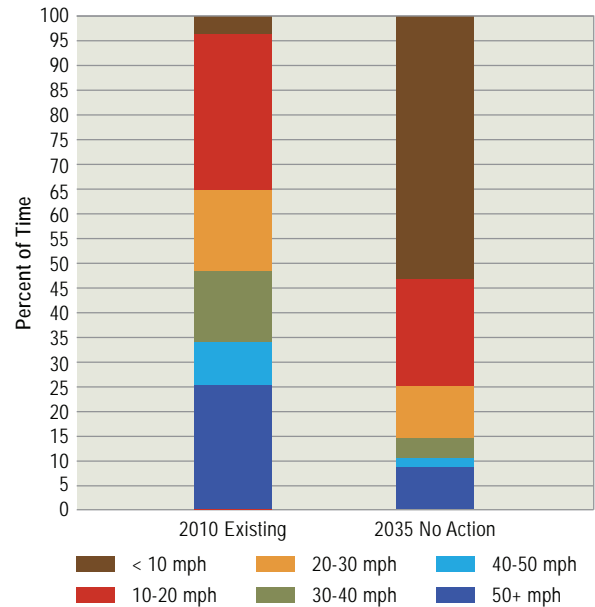
Currently, during winter and summer peak travel periods (Sunday afternoons), these slow travel speeds result in travel times ranging from two to eight times longer than uncongested conditions.

Uncongested free-flow conditions are when speeds are 50 mph or higher. Extreme congestion is reflected by speeds less than 20 mph. This range of traffic conditions can be measured using level of service (LOS) ratings. Free-flow conditions are described as LOS A whereas stop-and-go conditions are described as LOS F. As illustrated in **Figure 1-7**, in 2010, drivers experienced extreme congestion more than 35 percent of the time on Sundays, while free flow conditions were experienced about 25 percent of the time. Without improvements, by 2035, extreme congestion is projected to occur most of the day, while free flow conditions are projected to occur less than 10 percent of the time (see **Figure 1-7**). For more than half the day on Sundays in 2035, average travel speeds are projected to be less than 10 mph.

At the Twin Tunnels, the eastbound lanes currently operate at or near capacity for six hours on Sundays. By 2035, extreme traffic congestion is projected to occur in the eastbound direction for 10 hours or more during peak travel time, and travel times through the area could be increased by an hour or more compared to uncongested conditions. Characteristics of existing/future congestion and travel delays are discussed below.

- Traffic volumes are high during both summer and winter weekends. While traffic volumes are generally higher during the summer months, winter driving conditions can further slow travel and increase travel delays through the tunnels.
- Eastbound congestion occurs regularly on Sunday afternoons. An evaluation of eastbound hourly volumes on a peak summer day at the Twin Tunnels determined that the eastbound capacity of the Twin Tunnels is approximately 3,200 vehicles per hour (vph) (1,600 per lane) compared with 4,000 vph (2,000 per lane) west and east of the tunnels (see **Figure 1-8**).

Figure 1-7. Percentage of Time Traveling at Different Speeds on Sundays between Georgetown and Floyd Hill

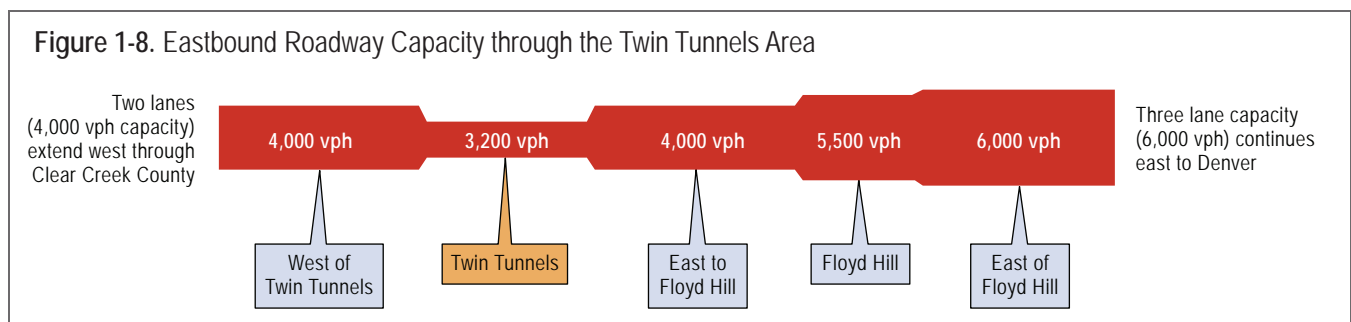


Source: Twin Tunnels EA Transportation Technical Memorandum, CDOT, 2012b

Capacity in this sense means the assumed maximum number of vehicles per lane that can pass a certain point or section of a road in an hour under ideal conditions. The capacity of the tunnels is reduced by the “tunnel effect” where the roadway appears to (and does) narrow and driver visibility is reduced. The 2010 eastbound hourly volumes on Sunday afternoons exceed or are near 3,200 vph from 11:00 a.m. to 5:00 p.m., resulting in congestion for at least six hours in the eastbound direction on Sunday afternoons.

By 2035, volumes are projected to be over capacity for ten hours or longer, and travel times between Georgetown and Floyd Hill could top 160 minutes in the early evening hours (compared to 20 minutes in uncongested conditions).

Figure 1-8. Eastbound Roadway Capacity through the Twin Tunnels Area



- Although Sunday travel is the most congested, peak eastbound travel on Saturdays is also expected to be noticeably congested in 2035. For approximately 40 percent of winter Saturdays and 20 percent of summer Saturdays, eastbound conditions are expected to be over capacity for three or more hours.
- Inclement weather and crashes blocking travel lanes contribute to travel delays. Because these conditions are unpredictable, travelers are often surprised and frustrated by long travel times. The I-70 PEIS concluded that many travelers chose not to travel on weekends because they feared long travel times. These suppressed trips adversely affect Corridor communities' economies and reduce quality of life benefits the mountains offer to Colorado residents.

1.5 What are the issues with travel speeds through the area?

Reduced capacity at the tunnels themselves, coupled with the multiple curves in the roadway east of the tunnels, cause drivers to slow down when traveling through the project area, resulting in inconsistent travel speeds. The I-70 PEIS identified the need for curve safety improvements in the area east of the Twin Tunnels (milepost 242 to milepost 245) to increase the design speed to match more closely the design speed on adjoining sections of the I-70 highway. This project addresses that need to improve consistency of travel speed. The I-70 PEIS also recognized a potential need for a consistent Corridor design speed of 55 mph or 65 mph, but deferred a decision on Corridorwide design speeds until tier 2 processes. This Tier 2 process does not make a decision about 55 mph or 65 mph design speed either, but does not preclude options to improve the highway to a higher design speed in a future project, as described in Chapter 2.

1.6 What previous studies and recommendations on the I-70 Mountain Corridor are relevant to this project?

Several related previous studies provide background for this document. They include:

- The [I-70 Mountain Corridor PEIS and ROD](#), which document the general location, travel mode, and capacity for improvements along the I-70 Mountain Corridor between Glenwood Springs and the western edge of the Denver metropolitan area, including the Twin Tunnels area (CDOT, 2011a and CDOT, 2011b). The I-70 PEIS is a tier 1 NEPA document that outlines a Preferred Alternative for the Corridor and lays out a process

by which tier 2 NEPA processes and project-specific improvements will be carried out. The Twin Tunnels EA tiers from the I-70 PEIS and is consistent with its recommendations, commitments, and vision.

A key commitment of the I-70 PEIS was that all projects on the I-70 Mountain Corridor would use the principles of CSS and follow the [I-70 Mountain Corridor CSS process](#) as described in Appendix A of the I-70 PEIS. CDOT has developed a website (<http://i70mtncorridorcss.com>) that provides guidance and tools for developing projects on the Corridor consistent with the CSS process to ensure that projects employ CSS principles; follow an open, comprehensive, and fair public process; and reflect the unique context of the Corridor.

- [I-70 Reversible Lanes, Georgetown to Floyd Hill, Feasibility Study](#). In May 2010, the Colorado legislature approved Senate Bill 10-184, which authorized CDOT to conduct a feasibility study to determine if a movable barrier system to create temporary reversible highway lanes would be a viable transportation management system for the I-70 highway. CDOT conducted a feasibility study and determined that reversible highway lanes operating in the peak period could be implemented but would result in substantial and undesirable backups in the off-peak direction (CDOT, 2010b and CDOT, 2010c). Traffic data and operational analysis from this study informed the Twin Tunnels EA. Off-peak periods are eastbound at the beginning of the weekend and westbound on Sundays.
- [Twin Tunnels Visioning](#). In response to specific interest in the Twin Tunnels area, CDOT sponsored a workshop in February 2011 with stakeholders and technical experts to discuss mobility issues and ultimately recommend concepts for improving near-term mobility at the Twin Tunnels (CDOT, 2011c). As a result of this week-long workshop, the team recommended a concept package for Twin Tunnels improvements that supported the I-70 PEIS recommendations, addressed the most immediate mobility and safety issues at the Twin Tunnels, could be implemented relatively quickly, and was affordable within CDOT's budget constraints. The recommended concept package from the workshop became the basis for the Twin Tunnels EA's Proposed Action described in Chapter 2.
- [I-70 Mountain Corridor Mobility and Operational Assessment](#). Similar to the Tunnel Visioning workshop, CDOT hosted a workshop with technical experts and Corridor stakeholders in May 2011 to explore low cost and no cost solutions to improve traffic congestion along I-70 (CDOT, 2011d). The group focused on solutions related to key areas: slow moving vehicles, highway maintenance and operations, active traffic management

and travel demand management, and traveler information. Ongoing implementation of these advanced traffic management systems—such as the I-70 pacing or rolling speed harmonization program that has police vehicles lead traffic along I-70 to maintain consistent speeds during congested periods—complements physical improvements such as the Twin Tunnels project.

- **Idaho Springs Area of Special Attention.** CDOT and Idaho Springs held a visioning workshop in October 2009 to define how I-70 PEIS improvements should interface with Idaho Springs’ vision for their town. The *Idaho Springs Area of Special Attention Report* (CDOT, 2010a) documents the important principles and guidelines to be considered when implementing transportation improvements in Idaho Springs. The recommendations in this report are relevant to the Twin Tunnels EA because the project area is located within Idaho Springs.

1.7 Why does this project not include westbound improvements?

While improvements are needed in the westbound direction, eastbound improvements were prioritized because:

- Eastbound congestion is more pronounced and occurs over a longer period. Improvements in the eastbound direction would provide immediate relief for I-70 Mountain Corridor travelers.
- Crash history indicates greater safety concerns in the eastbound direction. More than 65 percent of all crashes in the Twin Tunnels project area occur in the eastbound direction.
- Eastbound improvements are usable and a reasonable expenditure of funds even if no additional improvements

are made to the westbound lanes of I-70. The I-70 PEIS Preferred Alternative’s adaptive management philosophy encourages implementation of improvements in response to evolving transportation conditions and needs. Making incremental improvements, such as eastbound only improvements to the Twin Tunnels area, is consistent with this approach.

- Westbound improvements will be more costly and complex to construct due to the rock cuts and creek impacts that likely result from widening the westbound lanes. Unlike eastbound widening, there is not sufficient room to add a new lane either inside or outside of the existing roadway without substantial rock cuts or impacts to eastbound travel lanes and Clear Creek. Improving westbound travel is also a larger project scope, because widening to the top of Floyd Hill (an additional half mile), replacing the US 6 bridge, and flattening the curve at the bottom of Floyd Hill are additional actions required for westbound improvements.

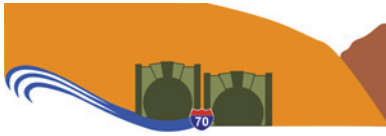
As described in Chapter 2, this project is being developed to preserve options for future westbound widening.

1.8 How is the project purpose and need used to evaluate the Proposed Action?

This project-specific purpose and need informed the development of the Proposed Action presented in Chapter 2 of this EA. The Proposed Action was developed and refined to achieve the project purpose, address safety and mobility needs, and reflect the core values for the Twin Tunnels area presented in this chapter. The Twin Tunnels Proposed Action addresses site-specific needs presented in the I-70 PEIS and reflects the I-70 PEIS decision regarding mode, general location, and capacity of overall I-70 Mountain Corridor improvements.



Long travel times for travelers returning from the mountains occur on most winter and summer Sundays today. Without improvements, travel times will become significantly longer in the future, with a peak trip between Georgetown and Floyd Hill projected to take more than 160 minutes in 2035—almost an hour longer than the longest trip today.



Chapter 2. Proposed Action

Chapter 2 describes the transportation features, operational characteristics, and cost of the Federal Highway Administration (FHWA) and Colorado Department of Transportation (CDOT) (lead agencies) Proposed Action for the Twin Tunnels area. This chapter also explains the process by which the Proposed Action was developed; its relationship to the I-70 Mountain Corridor Programmatic Environmental Impact Statement (PEIS) Preferred Alternative (CDOT, 2011a); and how it meets the project purpose and need, context, and supports the core values described in Chapter 1. A general construction plan, including sequencing and timing, is also discussed. The No Action Alternative (the transportation improvements that would occur whether or not the Proposed Action is implemented) is also described.

2.1 What is the Proposed Action for the Twin Tunnels area?

The Proposed Action would add a third eastbound travel lane and consistent 10-foot outside shoulder to approximately 2.5 miles of Interstate 70 (I-70) between the East Idaho Springs Interchange and the base of Floyd Hill, where the project would connect to the existing third lane (mileposts 241.4 to 244.5). The eastbound bore of the Twin Tunnels would be expanded to accommodate the wider roadway section, and the existing tunnel portal face would be completely removed and replaced. Additionally, the Proposed Action would straighten the eastbound curve west of the Hidden Valley Interchange where the highest number and most serious crashes in the project area occur. This curve reconstruction also involves replacing a bridge on I-70 over Clear Creek.

Other proposed improvements include reconstructing the chain station west of the Twin Tunnels, constructing new sediment basins throughout the project area to treat stormwater runoff, installing wildlife fencing, and constructing retaining walls. **Figure 2-1** illustrates the limits of capacity improvements and other proposed changes.

CDOT is considering a range of roadway widths in the western portion of the project area, as described in Section 2.1.1. CDOT is also considering whether the additional capacity will operate exclusively as a general purpose lane or if users would pay a fee to

use the additional lane during peak periods (also called a managed lane), as described in Section 2.1.2.

2.1.1 What roadway width sections are being considered and why?

The Proposed Action roadway section generally includes three 12-foot travel lanes, a 10-foot outside shoulder, and at least a 4-foot inside shoulder. Between the west project limits and west end of the Hidden Valley Interchange, CDOT is considering a range of inside shoulder widths from 4 feet up to 10 feet, for a total roadway width of 50 feet up to 56 feet (**Figure 2-2**). A 10-foot inside shoulder is the current American Association of State Highway Transportation Officials design standard for interstates and would match the existing 10-foot inside shoulder width through the Hidden Valley Interchange. East of Hidden Valley, a 50-foot roadway width would provide a 4-foot inside shoulder, which matches the existing shoulder (**Figure 2-3**).

Improvements east of Hidden Valley serve immediate needs but are “throw away” improvements in the long-term solution for I-70, as either a 55 mph or 65 mph alignment or even potentially westbound improvements would require this section to be rebuilt in the future.

Figure 2-2. 56-Foot-Wide Roadway Section

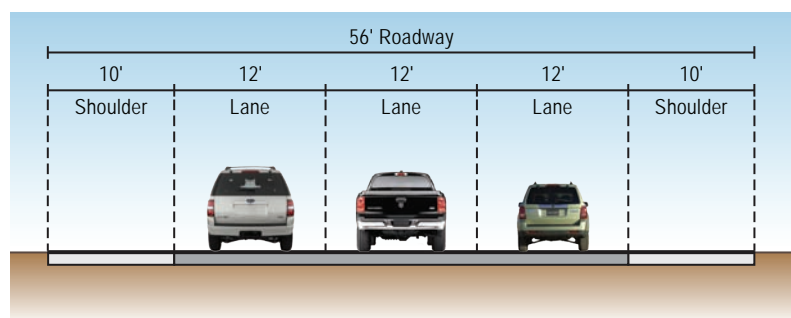


Figure 2-3. 50-Foot-Wide Roadway Section

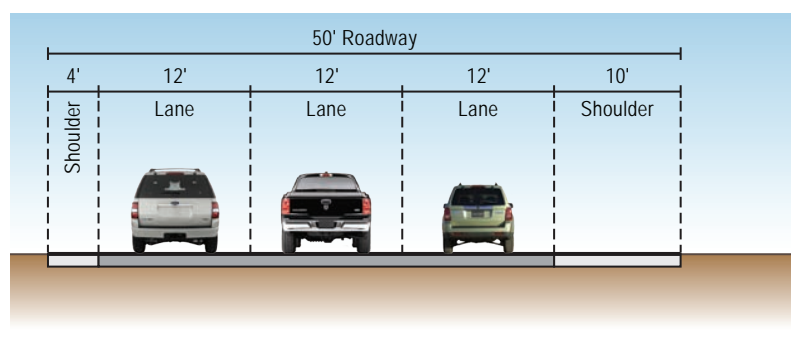
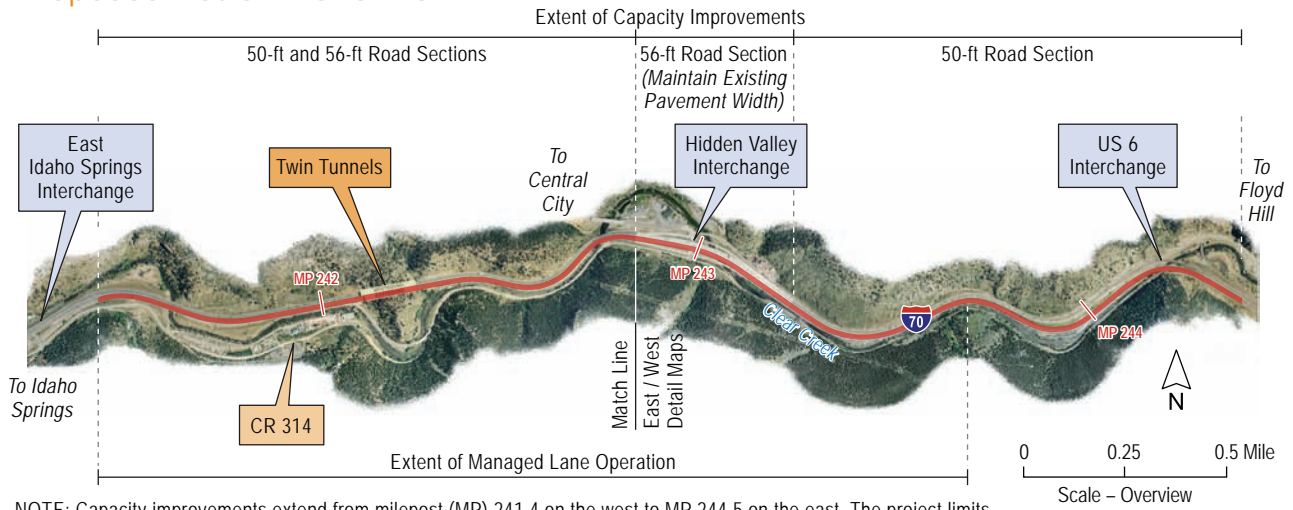


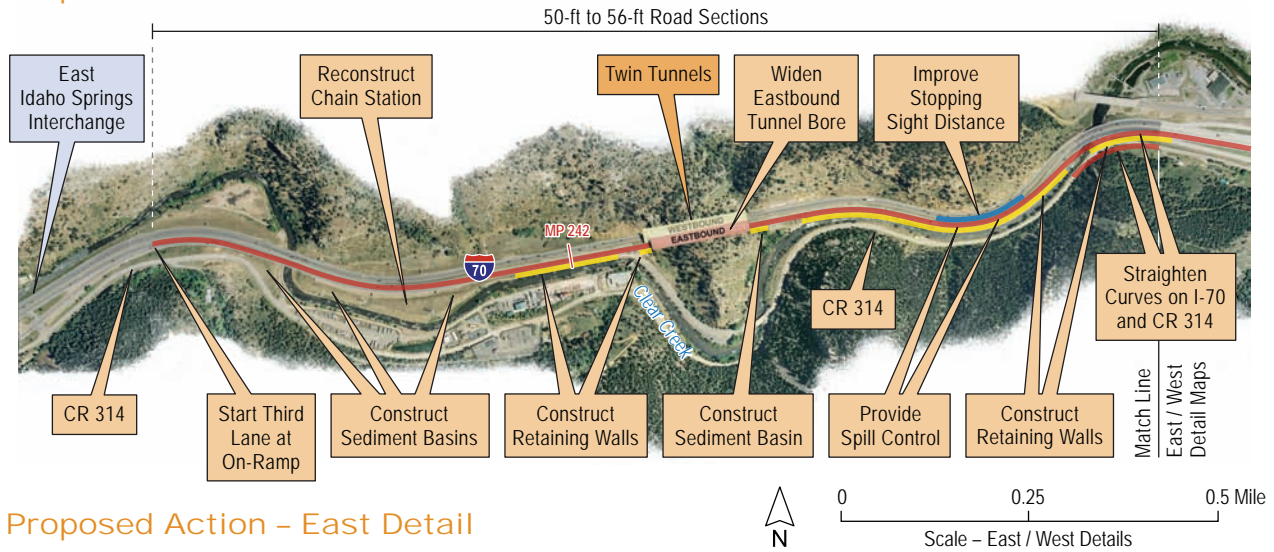
Figure 2-1. Twin Tunnels Proposed Action - Overview and Detail Maps

Proposed Action – Overview

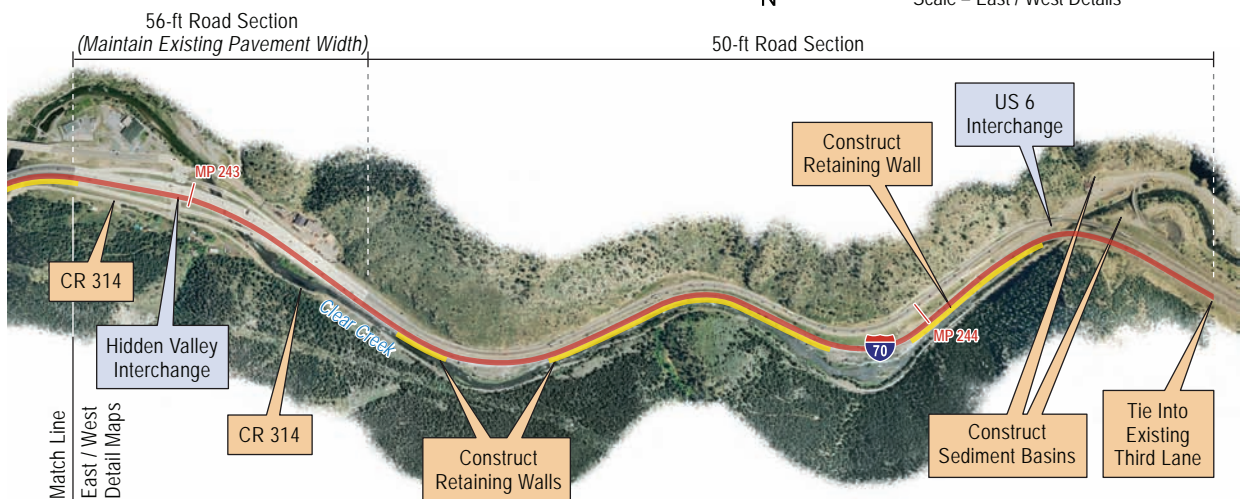


NOTE: Capacity improvements extend from milepost (MP) 241.4 on the west to MP 244.5 on the east. The project limits extend to MP 238.5 on the west where several signs would be installed in the highway median ahead of the capacity improvements.

Proposed Action – West Detail



Proposed Action – East Detail



For the west portion of the project area, the Proposed Action includes a range of roadway widths to allow consideration of a range of tunnel sections (and adjacent roadway sections). The range of widths provides flexibility in the decision making and allows full comparison of the benefits of a wider tunnel section with the environmental impacts, technical challenges, and costs. The roadway section will be within the range of 50 feet and 56 feet and will be a consistent width (that is, only one width will be selected that will apply throughout the western portion of the project area). The Federal Highway Administration will

make the final decision on the tunnel roadway widths after consideration of the analysis and comments on this EA.

Both cross sections would widen the roadway entirely to the south, maintaining the existing inside (or left) edge of pavement in its current location.

A 61-foot tunnel width would accommodate the wider inside shoulder and would provide dedicated 2.5-foot walkways on each side of the tunnel for emergency egress (see **Figure 2-4**). A 53-foot tunnel width would accommodate the smaller roadway section with a 4-foot inside shoulder, and emergency egress would be provided

along the highway shoulders rather than separated walkways (see **Figure 2-5**). Both tunnel sections would widen the tunnel entirely to the south, maintaining the existing inside (or left) wall in its current location.

2.1.2 How would CDOT operate the new lane?

The third lane could operate as a general purpose lane, meaning all vehicles could travel in it for free at all times; or as a managed lane, meaning a fee would be imposed during peak periods of congestion to maintain a reliable travel time in the managed lane. If the managed lane option is selected as the preferred operation, CDOT would impose a fee for use of the lane only during peak periods of congestion, which currently occur on Sundays and holidays during the summer and winter seasons. The lane would operate as a general purpose lane at all other times.

CDOT considered a full range of tolling options in determining that either a managed lane or general purpose lane would be appropriate for this project. In May 2011, CDOT held an I-70 Mountain Corridor [Mobility and Operational Assessment workshop](#) (CDOT, 2011b) to consider low-cost and no-cost non-infrastructure improvements that could be implemented in the I-70 Mountain

Figure 2-4. 61-Foot-Wide Tunnel Section

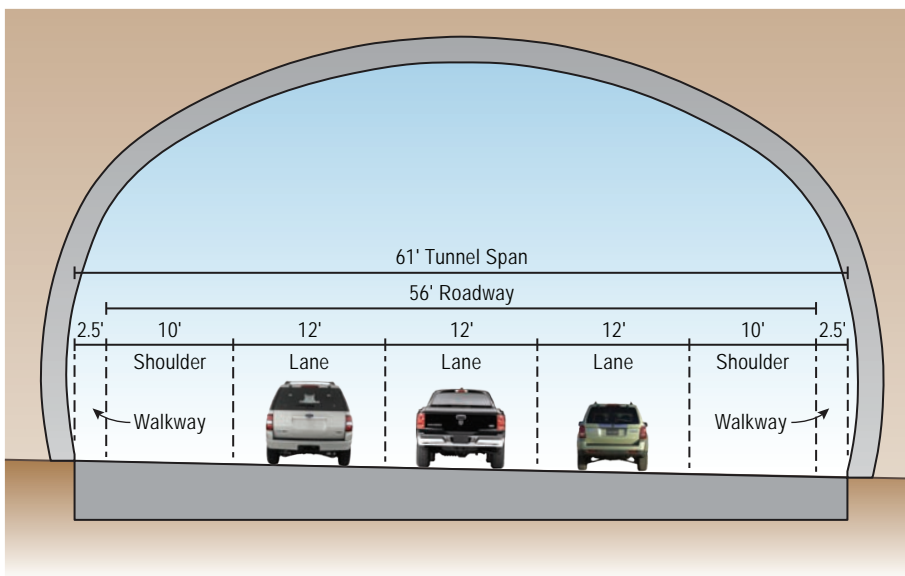


Figure 2-5. 53-Foot-Wide Tunnel Section

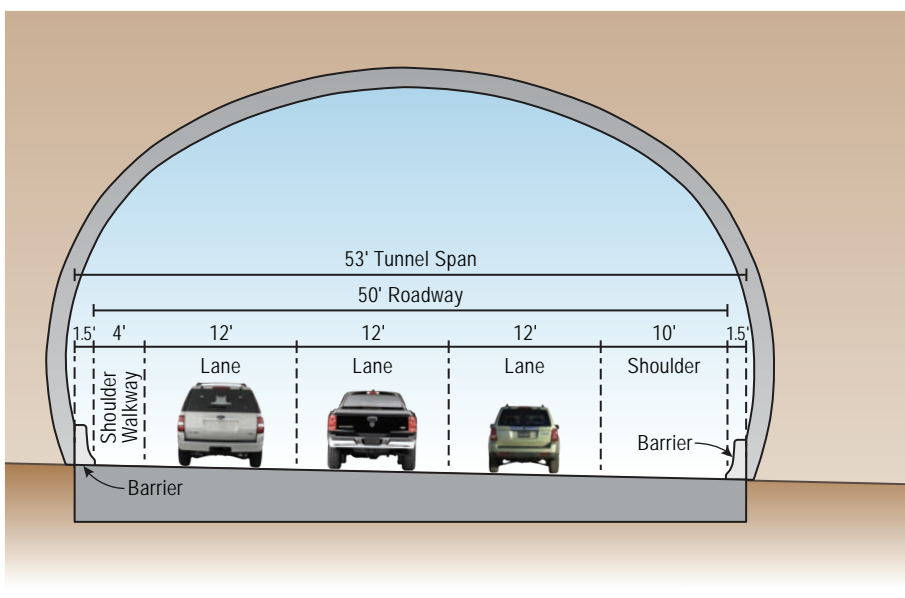


Table 2-1. Tolling (Fee) Options and Evaluation

Option	Evaluation
Toll all lanes all the time (<i>eliminated</i>)	<ul style="list-style-type: none"> • Not consistent with CDOT practices • Severe socioeconomic impacts • Does not meet freight needs • Results in frontage road congestion • Local jurisdictions do not support tolling existing capacity
Toll only new lane all the time (<i>eliminated</i>)	<ul style="list-style-type: none"> • More consistent with CDOT practices than tolling all lanes but disproportionately impacts local traffic
Impose a fee to use all lanes during congested periods only (<i>eliminated</i>)	<ul style="list-style-type: none"> • Similar issues as tolling all lanes all the time but lesser effects • Overload of frontage road • Not consistent with CDOT practices
Impose a fee to use new lane during congested periods only (<i>retained and evaluated in EA</i>)	<ul style="list-style-type: none"> • Has not yet been implemented but is consistent with CDOT desired practices • Offers opportunity to manage congestion
Do not implement tolling or user fees at this time but reserve the right to implement tolling or user fees as part of a larger project in the future (<i>retained and evaluated in EA</i>)	<ul style="list-style-type: none"> • Consistent with CDOT desired practices (and allowable under state user fee and federal tolling regulations) • Offers flexibility to manage future traffic congestion without affecting current operations or incurring capital costs of implementing a tolling program

Corridor to improve travel reliability consistent with the I-70 PEIS Preferred Alternative (CDOT, 2011a). Recommended improvements included peak period tolling and congestion pricing at the Twin Tunnels. During the scoping process for the Twin Tunnels EA, CDOT and some stakeholders also raised interest in considering tolling options for the Twin Tunnels project.

As a result of CDOT’s ongoing funding challenges, national initiatives for investigating user fees to defray the cost for transportation improvements, and the demonstrated ability of tolled or managed lanes to provide for a less congested, more reliable travel option over time, CDOT is examining the appropriate use of tolling on its major highway capacity projects, particularly in the most congested corridors in or adjacent to the Denver Regional Council of Governments (DRCOG) transportation region. All tolling options on interstate highways require FHWA approval. While both the [I-70 PEIS](#) and [Tunnel Visioning](#) workshop raised the potential of tolling as an innovative funding source, neither process fully explored or developed factors to consider if and how this operational variation might be included in the I-70 Mountain Corridor projects, including the Twin Tunnels project (CDOT 2011a, CDOT 2011c).

To determine how tolling options should be considered for this project, the following criteria were used to determine what, if any, tolling option might be appropriate for the Twin Tunnels:

- Ability to obtain FHWA approval
- Consistency with current CDOT desired practices for highway capacity projects in or adjacent to the DRCOG region
- Ability to maintain a less congested, more reliable option for travel
- Ability to alter travel behavior to encourage off peak travel
- Ability to accommodate freight traffic
- Socioeconomic impacts on local travelers
- Socioeconomic impacts associated with recreational traffic
- Ability to accommodate emergency vehicles
- Safety
- Energy consumption
- Effect to adjacent roads of diverted traffic
- Operating cost to implement tolling versus tolling revenue generated

Tolling options that were considered include: 1) toll all lanes all the time, 2) toll only new lane all the time, 3) impose a fee on all lanes during congested periods only, 4) impose a fee on the new lane during congested periods only, and 5) do not implement fees at this time but reserve the right to implement tolling or user fees as part of a larger project in the future. As summarized in Table 2.1, the first three options were determined not to be appropriate for the Twin Tunnels project because they did not meet one or more of the criteria. Assessing a fee for use of the new lane during peak travel periods (a managed lane) and assessing no fees at this time and (i.e., operating all lanes as general purpose “free” lanes) were the two operational concepts advanced for further evaluation in this EA.

Managed Lane. The managed lane would operate in the left lane, with vehicles entering east of the East Idaho Springs Interchange and exiting west of the United States Highway (US) 6 Interchange. Because the lane would be operated as a general purpose lane the majority of the time, it is not planned to be separated from the other two travel lanes by a buffer or barrier. CDOT could restripe the road in the future to provide up to a 2-foot buffer separation, if needed, to maintain safety or operations. Advanced signing would be required west of the managed lane entrance, as described in Section 2.1.3 and illustrated in [Appendix B - Conceptual Design and Signage Plans](#).

All vehicles except public or private buses with a capacity of 20 or more passengers and emergency vehicles would pay a fee to use the lane (when it is operating during congested periods). CDOT will either allow free use of the managed lane to all local emergency vehicles or will allow free use for emergency vehicles responding to incidents. Response to incidents must be validated by the emergency response agency. CDOT would also reserve the right to charge tolls for private or public buses in the future if the managed lane footprint or financing structure were changed. The toll price would change by time of day, going up as congestion increases, to maintain reliable travel time for vehicles in the managed lane. Initial modeling suggests that the toll would be a maximum of \$3, and most times would operate without a fee. Trucks with three or more axles, which cause more wear to the roadway than light vehicles, would pay an additional surcharge in addition to the posted fee.

General Purpose Lane. The general purpose lane would add a third lane throughout the project area. The new lane

Figure 2-6. Conceptual Illustrations of Changes to Tunnel Portal



Simulation of new 53-ft-wide tunnel (left); final facade will be determined with stakeholder input. Rendering (right) shows portal concept.

would operate the same way as the existing two general purpose lanes, and no fees would be assessed for travel during peak or non-peak periods. If all lanes are congested during peak periods, CDOT would have no option to manage congestion, and all three lanes would operate poorly.

2.1.3 What are other features of the Proposed Action?

The Proposed Action includes a variety of other features to improve safety, mobility, and operational characteristics, and to meet federal and state regulations and design standards.

Changes to tunnel portals. Portals on the new wider tunnel would be three-dimensional to soften the tunnel effect (**Figure 2-6**). The aesthetics of the portal faces have not been determined at this time but the design will be consistent with the I-70 Mountain Corridor Design Criteria and Aesthetic Guidance. Stakeholders will have input into the aesthetic considerations of the tunnel portal during final design.

Curve straightening at the I-70 curve west of the Hidden Valley Interchange. This curve has a lower design speed (45 mph) than other locations in the project area (where design speeds are 50 to 60 mph) and is the highest accident location in the project area. The Proposed Action would straighten the curve to bring the design speed up to 50 miles per hour (mph) and maintain the posted¹ speed up to 55 mph, consistent with the adjoining sections of the highway. By improving speed consistency, the curve modification is projected to reduce crashes by 75 percent in this location compared to the No Action. **Figure 2-7** illustrates the proposed curve realignment.

¹Design standards incorporate a significant safety factor. Posted speeds are based on the speed at which a majority of vehicles travel on a given roadway (the 85th percentile speed), and are often higher than the design speed.

Curve straightening on County Road (CR) 314 at Hidden Valley. Straightening the curve on I-70 would shift I-70 approximately 45 feet farther south toward CR 314, requiring reconstruction of a portion of CR 314 to maintain adequate separation between the two facilities. **Figure 2-7** illustrates the proposed curve realignment.

New bridge over Clear Creek at Hidden Valley. The I-70 curve realignment west of Hidden Valley would require construction of a new bridge over Clear Creek, and require demolition of the existing eastbound bridge on I-70 over Clear Creek. The piers for the new bridge would be placed outside of the stream bed and associated 100-year floodplain. Space for wildlife passage under the bridge would be maintained.

Stopping sight distance improvement. The Proposed Action would replace the existing sloped median west of the Hidden Valley curve with a retaining wall, improving the sight distance around the curve. **Figure 2-8** illustrates the difference in visibility around the curve between the existing and proposed conditions.



Location of proposed curve straightening. CR 314 on left, I-70 to the right.



Existing bridge over Clear Creek at Hidden Valley.

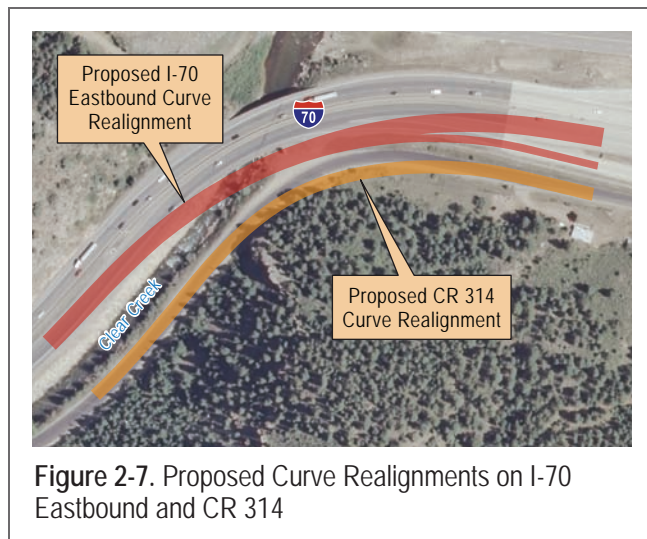


Figure 2-7. Proposed Curve Realignments on I-70 Eastbound and CR 314

Retaining walls. Retaining walls would be required in most locations where I-70 is adjacent to Clear Creek, as illustrated in **Figure 2-1**, and at the curve straightening on CR 314 at Hidden Valley. The majority of walls would range up to 10 feet tall, with isolated locations of walls up to 20 feet tall. Retaining wall aesthetics would adhere to the I-70 Mountain Corridor Design Criteria and Aesthetic Guidance and would be designed in conjunction with stakeholders during final design.

Sediment basins and water quality treatment. Six

sediment basins or ponds would treat stormwater runoff from I-70 within the project area, a portion of CR 314, the chain station, the eastbound tunnel, and the west slope of Floyd Hill (see **Figure 2-1**). The ponds would be adequately sized to filter roadway runoff from existing and expanded paved areas. The ponds would typically be dry except during and after storm events.

Special inlets would be installed to treat stormwater runoff in physically

Figure 2-8. Proposed Sight Distance Improvements West of Hidden Valley Curve

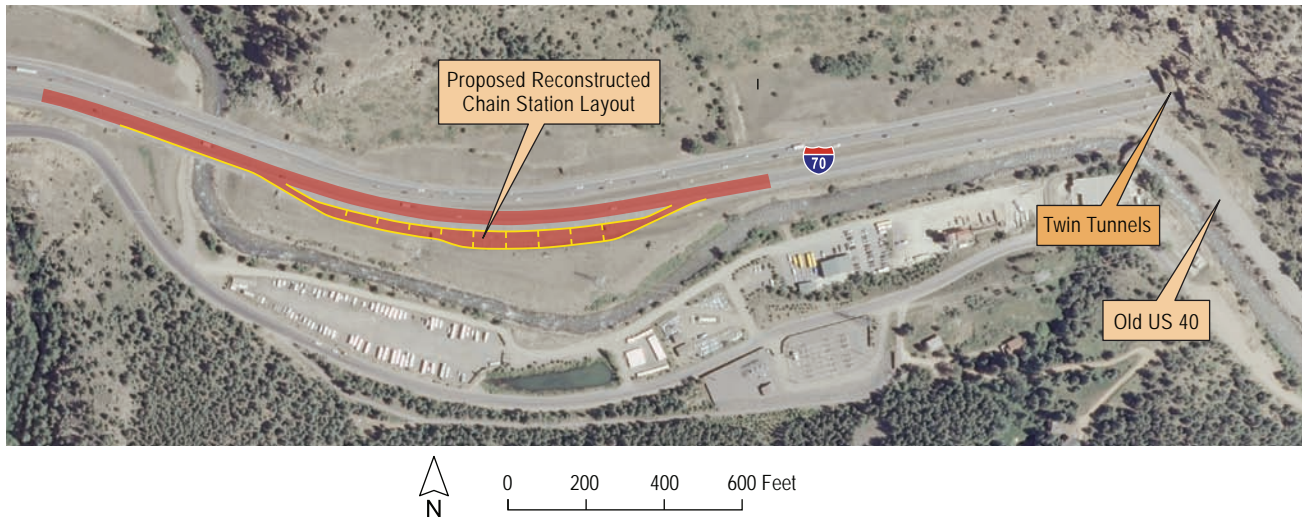


Existing condition.



Retaining wall to improve sight distance.

Figure 2-9. Chain Station Plan West of the Twin Tunnels



Existing chain station.

constrained locations that could not accommodate ponds. These inlets would allow sediment to settle out prior to discharging the runoff into Clear Creek.

Spill control. New concrete gutters, located in the median of I-70, would capture liquid spills in two locations between the Twin Tunnels and Hidden Valley (see **Figure 2-1**). These locations experience high numbers of rollover accidents for westbound trucks carrying full loads to mountain communities.

Reconstruction of existing chain station west of the Twin Tunnels. Roadway widening would require reconstruction of the chain station located approximately one-quarter mile west of the Twin Tunnels. The existing chain station does not meet the current standards for chain stations along the I-70 Mountain Corridor. The rebuilt chain

station would adhere to the *I-70 Mountain Corridor Chain Station Plan* (CDOT, 2008), with a buffer separated area between the chain station and highway, and would provide two lanes of parking with a total of 12 parking spaces (one more than the 11 spaces currently provided) (see **Figure 2-9**).

New wildlife fencing on north side of I-70 between Clear Creek and west portal of the Twin Tunnels. Existing barbed wire fencing in this location would be replaced with a combination smooth wire/barbed wire design that is more wildlife-friendly and will still contain livestock. **Figure 2-10** shows the location and condition of existing fencing.

Figure 2-10. Existing Wildlife Fencing



Barbed wire fencing to be replaced with wildlife-friendly fencing.

Variable message signs (VMS), signage, lighting, guardrails. No new permanent VMS, signage, or lighting would be constructed under the general purpose lanes option. CDOT would provide guardrails or concrete barriers at retaining walls for safety. For either operating option, any replacement of guardrail, lighting, or other features will comply with the I-70 Mountain Corridor Design Criteria and Aesthetics Guidance.

Advance signage, comprising VMS and multiple static signs, would be placed along I-70 in and west of Idaho Springs to alert drivers to the upcoming managed lane operations. CDOT has carefully considered sign locations and numbers to minimize visual effects and clutter. See [Appendix B](#), Conceptual Design Plans, for a conceptual signage plan for the managed lane.

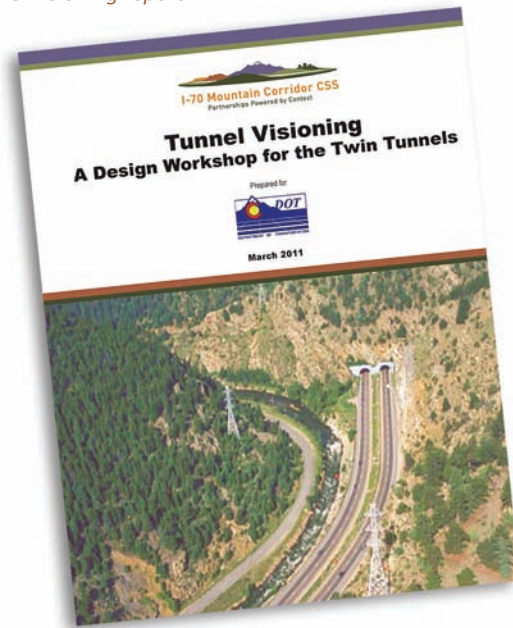
2.1.4 How were the I-70 Mountain Corridor Context Sensitive Solutions Design Criteria and Aesthetic Guidance incorporated into the Proposed Action?

The Proposed Action alignment is heavily influenced by the I-70 Mountain Corridor Design Criteria and Aesthetic Guidance recommendations to maintain existing median width. The alignment would widen entirely to the south, maintaining the existing median width and vertical separation between eastbound and westbound lanes throughout the project area. Decisions on the roadway width and operating scenarios will take the Design Criteria and Aesthetic Guidance into account as part of the core values stakeholders developed for the Twin Tunnels project. During final design, the design and aesthetics of the tunnel and portals, retaining walls, guardrails, bridge structures, and other features will follow the design standards and aesthetic guidance and will include stakeholder input. [Appendix C](#) contains additional information about how the Proposed Action meets applicable design and aesthetics criteria.

2.2 How was the Proposed Action developed?

The [I-70 PEIS Preferred Alternative](#) and recommendations of the [Twin Tunnels visioning workshop](#) shaped the Proposed Action for the Twin Tunnels EA. The I-70 PEIS Preferred Alternative identified capacity improvements from the Twin Tunnels area to Floyd Hill as one of the specific highway improvements that must be completed before other highway improvements can occur through Clear Creek County. The Twin Tunnels area is an area of congestion and a bottleneck along the I-70 Mountain Corridor, and is a high priority location for near-term capacity, mobility, and safety improvements.

Tunnel visioning report.



The I-70 PEIS Preferred Alternative general recommendations for the Twin Tunnels area were refined during the [Twin Tunnels visioning workshop](#), where participants identified multiple concept packages that would fulfill the goals of the I-70 PEIS Preferred Alternative and address near-term and current mobility needs in the Twin Tunnels area. CDOT collaborated with 54 stakeholders and technical experts to develop seven concept packages during this week-long workshop in February 2011. The concept packages were evaluated against critical success factors determined by the stakeholders, and the recommended package became the basis for the Twin Tunnels Proposed Action (CDOT 2011c).

The tunnel visioning participants generated broad ideas for physical improvements, operational improvements, and other strategies such as funding, and then packaged these into seven concept packages:

Concept Package 1. Widen both tunnel bores, and provide 55 mph design between Twin Tunnels and Hidden Valley

Concept Package 2. Widen eastbound tunnel bore, and fix the eastbound 45 mph curve west of the Hidden Valley Interchange

Concept Package 3. Widen both tunnel bores, and provide 65 mph design between Twin Tunnels and Hidden Valley

Concept Package 4. Widen eastbound tunnel bore, and provide 65 mph design in both eastbound and westbound directions between the Twin Tunnels and Hidden Valley

Concept Package 5. Construct 55 mph eastbound viaduct south of Twin Tunnels, and provide 55 mph design in eastbound direction between Twin Tunnels and Hidden Valley

Concept Package 6. Construct 65 mph eastbound viaduct south of Twin Tunnels, and provide 65 mph design in both directions between Twin Tunnels and Hidden Valley

Concept Package 7. Construct a new tunnel bore for eastbound traffic, and fix the eastbound 45 mph curve west of the Hidden Valley Interchange

Participants evaluated each of the concept packages against the critical success factors¹ developed at the beginning of the workshop. They recommended Concept Package 2 with variations to be considered, and this became the basis for the Proposed Action. CDOT refined the recommendation during this Twin Tunnels National Environmental Policy Act (NEPA) process to support core values developed by the Project Leadership Team (see **Figure 1-2** in Chapter 1), address I-70 Mountain Corridor Context Sensitive Solutions Design Criteria and Aesthetic Guidance, minimize social and environmental impacts, balance short-term benefits with longer-term Corridor needs, and not preclude implementation of other elements of the I-70 PEIS Preferred Alternative.

This Environmental Assessment (EA) fully evaluates the direct, indirect, and cumulative effects to the social and natural environment from the construction and operation of the Proposed Action as refined during this NEPA process. The evaluation includes considering a range of physical impacts associated with a more narrow or wide inside shoulder (from 4 feet to 10 feet) and operating the new lane as either a general purpose lane or managed lane.

2.2.1 How was the Proposed Action influenced by previous studies and recommendations for the I-70 Mountain Corridor?

As noted earlier, the [I-70 PEIS Preferred Alternative](#) and recommendations of the [Twin Tunnels visioning workshop](#) shaped the Proposed Action for the Twin Tunnels EA. Specifically, the I-70 PEIS analysis identified the Twin Tunnels area as an area of congestion and a bottleneck in the Corridor and identified a need for a third lane in each direction from the Twin Tunnels to Floyd Hill as one of the specific highway improvements that must be completed before other highway improvements can occur in the Corridor. The Twin Tunnels visioning workshop identified a package of improvements that refined the I-70 PEIS



Twin Tunnels EA scoping meeting.

recommendations for the Twin Tunnels area and became the basis for this Proposed Action. In addition to these overarching studies, CDOT also built on traffic analysis and recommendations from the [I-70 Reversible Lanes Study](#), [I-70 Mountain Corridor Mobility and Operational Assessment](#), and [Idaho Springs Visioning](#), as described in Chapter 1 of this EA.

2.2.2 How were public and agency stakeholders involved in the development and refinement of the Proposed Action?

Stakeholders were heavily involved in developing and refining the Proposed Action, first through outlining the foundation for Corridor improvements in the I-70 PEIS, then in focusing on site-specific solutions during the tunnel visioning workshop, and finally in participating in developing the design concepts throughout this EA process. The I-70 PEIS, tunnel visioning, and Twin Tunnels EA followed the I-70 Mountain Corridor Context Sensitive Solutions (CSS) process and involved a wide range of interests.

¹ The critical success factors included: improve mobility, compatibility with existing plans, timing of implementation, cost, level of environmental change, level of economic benefit, flexibility of design and long term usability, community stakeholder acceptance, attractive solution to gain funding and political support, safety, and construction disruption.

Scoping for the Twin Tunnels EA occurred in August and September 2011. CDOT met with agencies and members of the public at scoping meetings to present the project and seek input. A project newsletter, email blast, newspaper ads, website updates, and press releases provided information about the project and the scoping meeting. Also, early in the project development and consistent with the I-70 Mountain Corridor CSS process, CDOT established:

- A Project Leadership Team composed of CDOT, FHWA, and representatives from local jurisdictions to guide the project development
- A Technical Team composed of representatives from local, state, and federal agencies to advise and provide expertise on areas of interest or expertise relevant to the project
- Issue Task Forces to address the I-70 PEIS commitments to the [Stream and Wetland Ecological Enhancement Program \(SWEEP\) Memorandum of Understanding \(MOU\)](#), [A Landscape Level Inventory of Valued Ecosystem Components \(ALIVE\) MOU](#), the [Section 106 Programmatic Agreement](#), and the interaction of the proposed Greenway in Clear Creek County with the Twin Tunnels project

The Project Leadership Team and Technical Team met at least monthly through the EA to provide input as the design and evaluation of the project progressed. The Issue Task Forces met two to three times each to identify issues and make recommendations to reduce impacts or enhance benefits to resources. In addition to these committees, CDOT held numerous individual meetings with representatives of local, state, and federal agencies; property owners; and elected officials to seek input, answer questions or comments, and resolve differences.

Chapter 5, Public and Agency Involvement, provides more detailed information on public and agency stakeholder involvement.

2.3 How is the Proposed Action sensitive to the context and values identified by stakeholders?

The Project Leadership Team and Technical Team agreed upon an approach for addressing the [core values](#) in developing and evaluating the Proposed Action in the EA. For instance, safety and mobility were key components of the purpose and need and were addressed through application of design standards, analysis of crash history, analysis of travel demand, and inclusion of experts (such as emergency responders) in decision making. Other core values related to environmental and social values were

addressed through resource analysis and consultations with local, state, and federal agencies. The solution (Proposed Action) reflects the core values in many ways, such as:

- Implementing a curve modification for the highest crash location in the project area, resulting in a projected crash reduction of 75 percent in this location compared to the No Action
- Adding a third lane through the project area to reduce delays during peak travel periods and reduces projected crashes overall by approximately 15 percent compared to the No Action
- Improving compatibility of I-70 for wildlife by improving passage under the new Hidden Valley bridge, replacing barbed wire fencing, and including new fencing to direct wildlife to improved crossings
- Including sediment control and spill control areas to reduce contamination to Clear Creek
- Supporting elements of Clear Creek County's Greenway system through construction and restoration of the detour route along old US 40 game check area, which is a node on the Greenway
- Identifying and protecting historic sites of local importance by monitoring during construction

[Appendix C](#) provides a full summary of how the I-70 Mountain Corridor CSS process was used to achieve a context sensitive solution for this project.

2.4 How does the Proposed Action address safety needs?

The Proposed Action would reduce congestion over the No Action, which in turn would improve safety and reduce emergency response times in the project area. The Proposed Action would straighten the highest accident curve, west of the Hidden Valley Interchange, to match the design speed in that location with the rest of the project area. Stopping sight distance would be improved at the curve just west of the Hidden Valley curve, increasing drivers' ability to see vehicles around the curve ahead of them, and reducing the number of rear end and sideswipe accidents in that location. The [Twin Tunnels Safety Assessment](#) (CDOT, 2012) projected that congestion reduction and curve straightening would reduce crashes in the project area by 25 to 35 percent compared to the No Action.

2.5 How does the Proposed Action address mobility needs?

The Proposed Action would reduce congestion, improve travel times, and provide more consistent travel speeds in comparison to the No Action. Improved safety conditions would reduce crashes, which would also improve mobility, as crashes interrupt travel, often resulting in reduced speeds or lane closures. The widened tunnel bore would enhance mobility by reducing the perception of roadway narrowing, and resultant slower speeds, that occurs today, and providing shoulders that would allow emergency vehicles to get around traffic and respond to crashes more efficiently. The curve modification would allow drivers to maintain consistent, higher speeds through the project area, reducing slowing at this curve.

The general purpose and managed lane operating concepts perform similarly with regard to improved travel times and reduced congestion. However, the managed lane provides a greater opportunity to manage consistent, free-flow travel speeds through the project area during peak travel periods.

2.6 How much will this project cost, and how will CDOT pay for it?

The project is expected to cost \$60 million. In October 2011, the Colorado Transportation Commission approved allocating \$60 million for the project from federal and state sources. CDOT is working with DRCOG to amend the regional transportation improvement program to add the Twin Tunnels project to the list of projects to be constructed in the current 5-year cycle.

2.7 Why did CDOT prioritize improvements to the Twin Tunnels area?

The Twin Tunnels project will provide immediate benefits at an affordable cost. It addresses a system-level problem with the constraints of the tunnels, improves mobility and safety, has public support, and offers opportunities to enhance the natural and social environment through improved travel, aesthetics, and environmental mitigations.

This project supports elements of the Preferred Alternative identified in the [I-70 PEIS Record of Decision \(ROD\)](#), which is CDOT's long-term solution for transportation on the I-70 Mountain Corridor. Implementation of the I-70 PEIS Preferred Alternative was meant to be phased and adaptable to current priorities.

The I-70 PEIS recognized that future projects would need to be prioritized with stakeholders and outlined the following non-weighted factors in considering I-70 Mountain Corridor priorities:



The Twin Tunnels project would improve safety, operations, and travel time reliability on eastbound I-70, in accordance with I-70 PEIS and tunnel visioning recommendations, and in support of core values identified by stakeholders.

- **Greater magnitude and cost** – CDOT acknowledges that some projects are greater in magnitude and cost with long lead times and superior benefits. These long-term projects need a higher priority to move forward.
- **System quality** – Projects that improve and address system quality such as bridge service life or pavement quality have higher priority. Measurable factors are maintenance Level of Service, bridge inventory (functional deficiencies, structural deficiencies, and remaining service life), and the pavement management system.
- **Maximize cost/benefit** – Projects that maximize benefit versus cost will receive a higher priority. Projects that include benefits to performance, operations, economics, environment, and maintenance relative to the costs of financial investment and environmental impacts have higher priority.
- **Funding availability** – Projects that maximize public and private funding availability have a higher priority. This includes where public and private funding opportunities are enhanced and local match money is available.
- **Improve mobility** – Projects reducing Corridor congestion and improving mobility have a higher priority when improvements benefit the volume to capacity ratio, Level of Service, delays, travel times, throughput, and queuing.
- **Safety** – Projects that address safety have a higher priority. Safety is generally measured by a Weighted Hazard Index, high number of animal vehicle collisions, and curve deficiencies. Crash reports can be used to enhance this information.

- **Public support** – Projects with greater public support have a higher priority. Information will be gathered from comments on this document, I-70 Coalition input or other similar groups, county coordination meetings, I-70 Mountain Corridor Context Sensitive Solutions Team meetings, Collaborative Effort meetings or similar group, and public involvement in the planning process.
- **Environmental mitigation** – Projects that best mitigate impacts on the built and natural environment, avoid impacts, and offer more mitigation opportunities and enhancement opportunities have a higher priority.

The Twin Tunnels visioning workshop considered similar factors in comparing and recommending design solutions for the Twin Tunnels area.

2.8 How does this project relate to the ultimate improvements approved by the I-70 Mountain Corridor I-70 PEIS ROD?

The Twin Tunnels project supports “specific highway improvements” identified in the I-70 PEIS Preferred Alternative, including six-lane capacity between the Twin Tunnels and Floyd Hill and curve modifications east of the Twin Tunnels. While other needs in the Corridor and project area remain if this project is implemented, the Twin Tunnels project supports the ultimate solution by expanding the eastbound tunnel bore, adding eastbound highway capacity, and implementing a curve modification for the highest crash location in the project area.

The I-70 PEIS ROD approves a broad set of highway, transit, and non-infrastructure improvements. This project supports a portion of the highway capacity needs approved by the ROD and is consistent with the mode, capacity, and general location decisions in the ROD. The Proposed Action does not restrict consideration of other elements of the I-70 PEIS Preferred Alternative that will be implemented in the future, including eastbound highway improvements and addition of an Advanced Guideway System (AGS) transit system through the area. The eastbound lane widening is being designed in a manner to not force any particular alignment for future higher design speeds, westbound lane improvements, or any other ultimate improvements. Eastbound lane widening is being carefully designed to not touch the westbound lanes and to minimize encroachment into the median to preserve existing options for vertical and horizontal alignments for westbound improvements and future AGS alignment through the area. Expansion of the tunnel is being planned to fit future transportation facilities that may require expansion of the westbound bore and/or a third bore through the mountain.



Westbound I-70 lanes are nestled against the mountainside. Flattening the westbound curves or adding lanes in the westbound direction would require significant rock cuts and/or encroachment into eastbound travel lanes and Clear Creek.

2.8.1 How does the Proposed Action affect a future decision on a 55 mph or 65 mph design speed?

The I-70 PEIS Preferred Alternative noted that several locations in the Corridor, including the Twin Tunnels area, would require substantial realignment to meet either a 55 mph or 65 mph design speed. Because of the impacts associated with these higher design speeds, CDOT and FHWA determined that decisions regarding a Corridor-wide design speed would be made later in Tier 2 processes. Options would include 55 mph, 65 mph, or a variance for lower design speeds (such as in the Glenwood Canyon portion of I-70 near Glenwood Springs). The Twin Tunnels project did not make a decision about a higher design speed due to high costs and impacts of that decision and a desire to create immediate improvement to mobility and safety through a smaller scope, lower cost option. Modifying the alignment through the Twin Tunnels area to achieve a 55 mph or higher design speed would require realigning the westbound lanes on I-70, substantial rock cuts or new tunnels, and could potentially result in significant impacts to Clear Creek.

The Proposed Action has been carefully designed to preserve future options to increase the design speed through the area while minimizing “throw away” work that would need to be reconstructed should a higher design speed be desired in the future. For this reason, the Twin Tunnels project focuses on maximizing the improvements with the widened tunnel, which would be usable under any future design speed and alignment scenario, and limiting impacts of the expansion of the roadway east of Hidden Valley where straightening curves

to achieve a higher design speed would require both eastbound and westbound lanes of I-70 to be reconstructed in new locations. The [I-70 PEIS](#) (CDOT, 2011a) provides additional information about the alignment requirements for 55 mph or 65 mph, as well as details on the elements of the project that would need to be reconstructed under a higher design speed scenario.

2.8.2 How will the Advanced Guideway System be integrated into the Twin Tunnels area?

The I-70 PEIS approved an AGS in the general location of the I-70 highway. As committed to in the I-70 PEIS, CDOT is currently conducting a broad study to address the feasibility of different alignments, technologies, and other considerations such as ridership, financing, and environmental impacts of the AGS. The study is ongoing and expected to be completed after the Twin Tunnels EA is complete.

The Proposed Action would have no effect on the options for the AGS alignment through the Twin Tunnels. The AGS alignment could follow: one of the existing tunnel bores (including the proposed widened eastbound bore), a new bore to the south or above the existing bores, or another alignment in the general location of the existing I-70 highway (i.e., around or over the Twin Tunnels area without going through a tunnel).

Specific details of how the AGS will be integrated into the Twin Tunnels area are being developed as part of the AGS study. The Twin Tunnels project staff have coordinated with the AGS study staff to ensure that the Twin Tunnels Proposed Action does not preclude any options for the AGS through the Twin Tunnels area. Deferring a decision about the future design speed (55 mph or 65 mph) also preserves options for the AGS alignment. A straighter alignment through the Twin Tunnels area would accommodate a higher 65 mph design speed of I-70 and may be more suitable to accommodate an AGS alignment adjacent to the I-70 highway.

2.8.3 How does the Proposed Action affect future westbound improvements?

Westbound I-70 also needs to be expanded to three lane capacity to meet future mobility and safety needs as approved by the [I-70 PEIS Preferred Alternative](#). Adding a lane on the same geometry as the existing I-70 alignment in the westbound direction is more challenging since portions of the westbound alignment are situated against existing rock cuts. Adding capacity even without improving the design speed of westbound I-70 would require a combination of rock cuts, encroachment into the median (or eastbound I-70 lanes), and/or cantilevering the highway

so that the vertical profile is above the eastbound lanes. Any of these options is expensive, impactful, and less suitable to immediate improvements that are possible for the eastbound direction. Therefore, when westbound improvements are initiated, some parts of the Proposed Action will also need to be revisited, particularly in the eastern portion of the project area where realigned westbound I-70 could encroach on the location of the current and expanded eastbound lanes. For both eastbound and westbound improvements, the existing tunnels would be reused in their current locations to fit the transportation improvements (eastbound, westbound, AGS) planned for the area.



CR 314, shown to the left, is an I-70 frontage road that provides local and recreational access within the Twin Tunnels project area. CDOT is currently improving CR 314 to add a shared use path.

2.8.4 What is the relationship between the Twin Tunnels project and the I-70 Frontage Road project on CR 314?

The I-70 Frontage Road project is a roadway improvement project on CR 314 currently under construction. It is a separate project from the Twin Tunnels project but is occurring in the same area. Both the I-70 Frontage Road and Twin Tunnels projects were approved by the I-70 PEIS ROD as “specific highway improvements” that must be completed before other highway improvements can occur in the I-70 Mountain Corridor. The projects interact in that CDOT plans to use a portion of CR 314 to detour eastbound I-70 traffic during construction of the Proposed Action.

The purpose of the I-70 Frontage Road project is to provide enhanced safety and mobility for vehicles, pedestrians, and bicyclists on CR 314 (the frontage road) between east Idaho Springs and the Hidden Valley Interchange. The I-70 Frontage Road project has an independent purpose and provides many additional benefits beyond its use as

a temporary I-70 detour route. In addition to two travel lanes (which generally exist today), CR 314 will include a separated shared use path and pull outs for recreational uses that are not needed and would not be constructed for a temporary detour. CDOT has coordinated the planning of the Twin Tunnels and I-70 Frontage Road projects to ensure that the temporary detours would not affect long-term plans for the frontage road.

The Twin Tunnels project is not dependent on the I-70 Frontage Road project, since other alternatives to carry detoured traffic are available for the Twin Tunnels project to proceed. Other options for addressing eastbound traffic during construction include placing interstate traffic on the westbound lanes, closing the eastbound lanes entirely during blasting, using CR 314 for only one eastbound lane, or making minimal improvements to CR 314, such as adding a guardrail, to handle two eastbound lanes. Similar methods were used during previous construction projects along I-70 in the mountains such as construction in Glenwood Canyon. Interstate traffic was intermittently detoured to the other direction of travel or simply stopped while blasting occurred. Because the Twin Tunnels project can proceed without completing the I-70 Frontage Road project, it is said to have “independent utility.”

2.9 What are the construction requirements, and how long would construction take?

Construction of the Twin Tunnels project would affect resources in the immediate area and would affect all travelers through the area during the construction period. To understand construction impacts and required mitigation, CDOT has estimated the timeframe and sequencing of construction activities as presented here. This plan is tentative and dependent on FHWA approval of the Proposed Action through this EA process. As such, it is subject to change if and when the project progresses and design and construction plans are refined.

Expansion of the eastbound tunnel bore would require 6 to 9 months of construction, depending on the tunnel width chosen. During that time, eastbound I-70 traffic must be detoured to another route. Total construction duration, including preparing for and restoring the detour route, would last from approximately December 2012 to March 2014. Construction staging areas could include portions of old US 40 (the game check area) not being used for the detour route, the existing eastbound travel lanes on I-70 that will be closed while the detour is in operation, and the area surrounding the I-70/US 6 Interchange at the base of Floyd Hill. These areas within the public

right-of-way are anticipated to be sufficient for contractor staging activities; however, the contractor could choose to negotiate with land owners for access to additional staging areas. Other changes to the construction activities, schedule, or sequencing may be presented concurrent with this EA review.

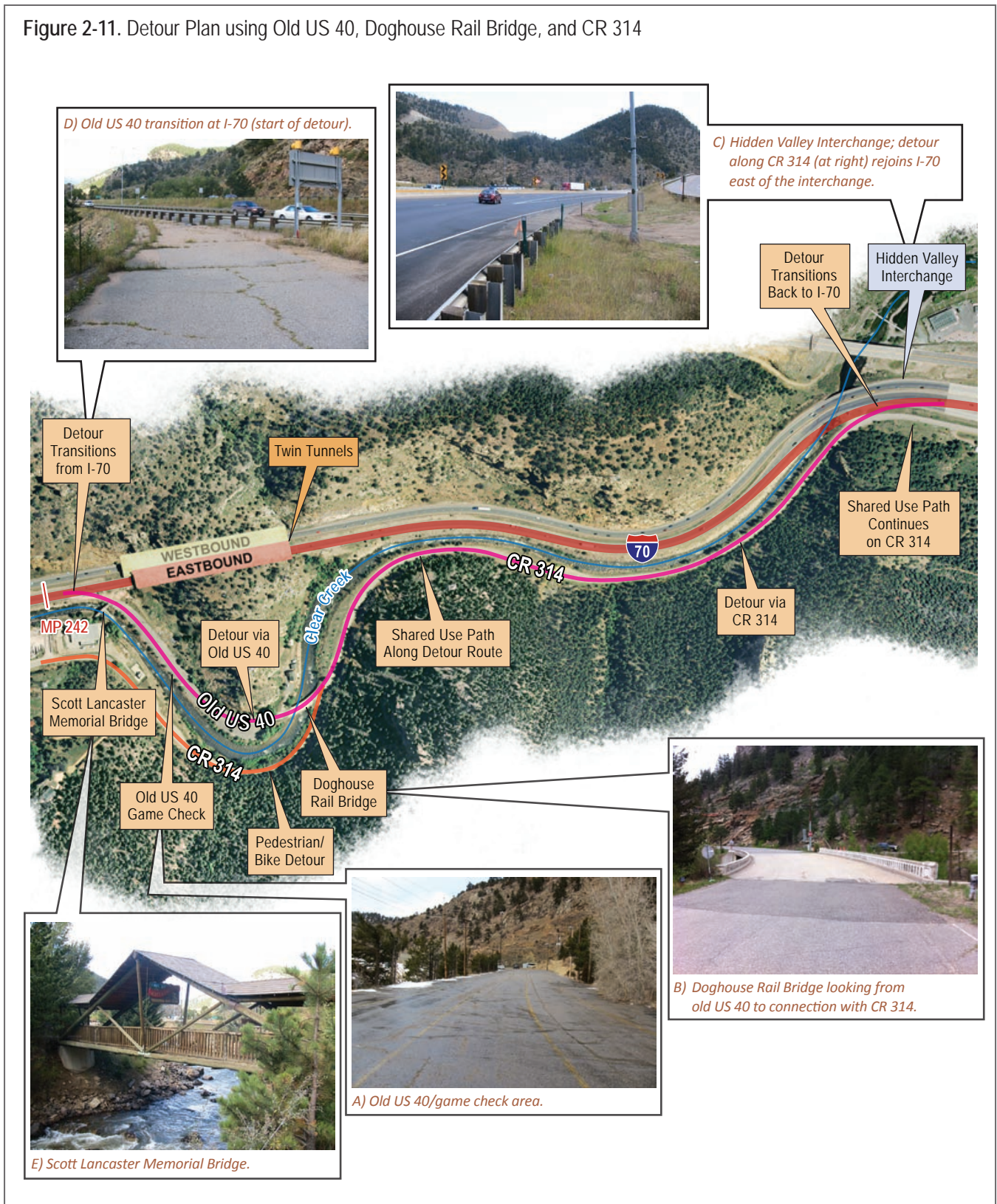
2.9.1 How would I-70 traffic be detoured during tunnel construction?

During expansion of the eastbound tunnel bore, old US 40 (the game check area) and a portion of CR 314 would carry I-70 traffic around the Twin Tunnels on a one-mile detour route (see **Figure 2-11**). The detour would carry two lanes of traffic at 35 mph. The use of this detour would require reconstruction of a portion of old US 40 between I-70 and CR 314 (the game check area [**Figure 2-11-A**]), rehabilitation of the Doghouse Rail Bridge to accommodate interstate traffic loads (**Figure 2-11-B**), use of an existing portion of CR 314, and construction of a transition between CR 314 and I-70 at the east end of the detour (**Figure 2-11-C**). CDOT would maintain pedestrian and bicycle access along CR 314; however, a portion of the existing trail would need to be rerouted during the detour operation. Temporary wildlife fencing would be installed along the north side of old US 40 to keep wildlife off the roadway and construction area while the detour is in place.

The Proposed Action would reconstruct approximately 1,200 linear feet of the old US 40 route (beginning just west of the eastbound tunnel where the old US 40 is separated from I-70 by guardrail) (see **Figure 2-11-D**). The guardrail next to I-70 would be removed, and old US 40 would be reconstructed to create two 12-foot travel lanes. The Scott Lancaster Memorial Bridge (**Figure 2-11-E**), located adjacent to the old US 40 route between I-70 and CR 314 and about 7 feet from the proposed detour route, would be closed to trail use during the detour operation, and a concrete barrier would be anchored in front of the bridge to protect it from damage during use of the detour.

From the Doghouse Rail Bridge, the detour would connect to the existing CR 314 and would continue along the county road to near the Hidden Valley Interchange. In this area, CR 314 has sufficient width to provide two 12-foot travel lanes, an 8-foot shoulder for emergency access, and an 8-foot shared use path for pedestrian and bicycle use on the south side of the road (see **Figure 2-12**). For the duration of the detour, CR 314 would be closed to local vehicular access and would only carry eastbound interstate traffic. Emergency responders would be allowed to access CR 314 to respond to incidents. During preparation and restoration of the detour, CR 314 would be open to local traffic.

Figure 2-11. Detour Plan using Old US 40, Doghouse Rail Bridge, and CR 314



While the Scott Lancaster Memorial Bridge is closed, pedestrians and bicyclists would be temporarily rerouted to remain on CR 314, as shown in **Figure 2-11**. Just west of the Hidden Valley Interchange, traffic would transition back to I-70. A 500-foot-long paved area would be constructed between CR 314 and I-70 to provide a transition back to I-70 from the detour.

Pedestrian and bicycle access would be maintained along CR 314. As the detour transitions vehicles back to I-70, pedestrian and bicycle users would continue along the existing trail that follows CR 314 east of the detour.

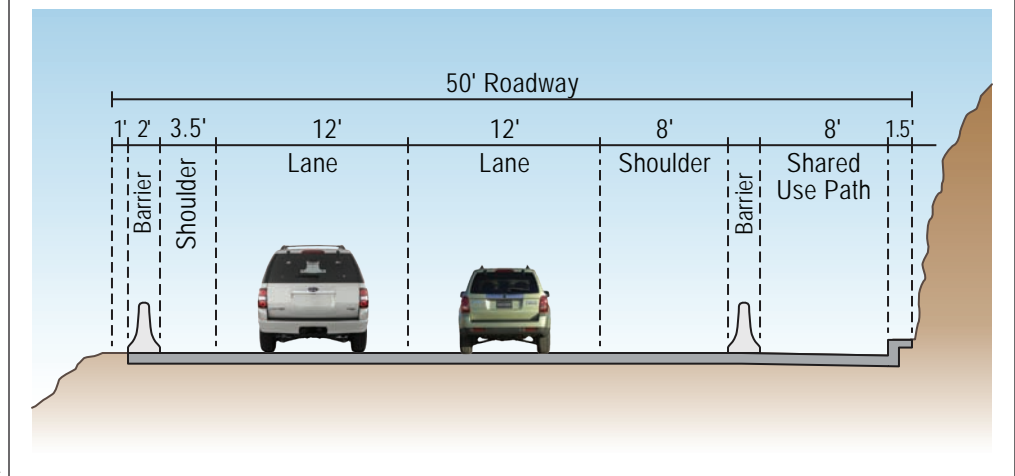
2.9.2 What would happen to the detour route after tunnel construction is complete?

When I-70 is reopened, the west and east portions of the detour route connecting I-70 to CR 314 would be removed, and CR 314 would be restored to its pre-detour condition with one travel lane in each direction and a buffer-separated shared use path on the north side of the road. Pedestrians and bicyclists would be rerouted back to the existing trail location over the Scott Lancaster Memorial Bridge. The new bridge decking and structural supports at the Doghouse Rail Bridge would remain in place. The pavement for the east transition at Hidden Valley would be removed and restored. The old US 40/game check area would be restored to a local bicycle trail; CDOT will work with Clear Creek County, the property owner, to determine what pavement would be removed and how the area will be restored. The realigned curve on CR 314 at Hidden Valley would be constructed after interstate traffic is routed back onto I-70. CR 314 would be open to local vehicles, bicycles, and pedestrians during restoration activities.

2.9.3 What is the timeframe and sequence of construction activities?

If the Proposed Action is approved, construction would occur from December 2012 through March 2014 and would occur in three general phases (see **Figure 2-13**). The first phase would consist of activities to ready the tunnel for expansion and prepare the detour for use. The second phase would expand the tunnel and roadway on I-70 while traffic is detoured around the tunnel. After Phase 2 is

Figure 2-12. Cross Section of Detour Route on CR 314






complete, the reconstructed I-70 highway would be open to traffic. The third phase would reclaim the detour and frontage road after traffic is routed back onto I-70.

Phase 1 would last from approximately December 2012 to March 2013 and would include construction of the detour route, rehabilitation of the Doghouse Rail Bridge, and tunnel portal preparations. Wall and bridge work outside of I-70, such as for the new I-70 bridge over Clear Creek west of Hidden Valley, could also be completed. Work on the bridge may require a temporary stream crossing.

Phase 2 would start after the 2012/2013 ski season, spanning from April 2013 to October 2013 for the 53-foot tunnel width or April 2013 to December 2013 for the 61-foot tunnel width. For the duration of the tunnel and roadway expansion activities in this phase, eastbound I-70 would be closed to traffic through the tunnel, and the detour would be in use. CR 314 would be closed during the use of the detour. CDOT would conduct blasting activities every 24 to 48 hours to expand the tunnel bore. Traffic on the detour route and in the westbound I-70 travel lanes, and recreation activities in Clear Creek, could be stopped for up to an hour surrounding tunnel blasting.

CDOT would widen the I-70 highway, construct retaining walls along Clear Creek, and construct the new bridge over Clear Creek at Hidden Valley during Phase 2. During reconstruction of the bridge, recreational access along the banks of Clear Creek may be restricted and the creek may be closed periodically for safety reasons. No fishing access in the vicinity of bridge construction activities would be allowed. Unless necessitated by safety concerns, creek closures are planned to occur outside of rafting season (June through August). The existing eastbound Hidden Valley bridge would remain in place for use as a construction staging area and would eventually be demolished.

Figure 2-13. Three Phases of Construction for the Proposed Action

Phase/Task	December 2012 through March 2014		
Phase 1 (<i>I-70 open, CR 314 closed</i>) <ul style="list-style-type: none"> • Construct detour route • Rehab Doghouse Rail Bridge • Tunnel portal and retaining wall preparation • Construct portions of Hidden Valley bridge outside of I-70 traffic 	 DEC 2012 MAR 2013		
Phase 2 (<i>eastbound I-70 detoured, CR 314 closed, recreational accesses along detour route closed for duration of construction</i>) <ul style="list-style-type: none"> • Construct narrower (53-ft) tunnel OR wider (61-ft) tunnel • Widen and pave I-70 roadway • Construct remainder of retaining walls along creek • Construct new bridge over Clear Creek at Hidden Valley Interchange • Possibly reconstruct chain station 	 MAR 2013 OCT 2013 DEC 2013	53-foot Tunnel 61-foot Tunnel	
Phase 3 (<i>I-70 open, CR 314 open</i>) <ul style="list-style-type: none"> • Restore CR 314 to pre-detour conditions • Realign CR 314 curve at Hidden Valley • Construct or finish chain station 		 NOV 2013 JAN 2014 MAR 2014	53-foot Tunnel 61-foot Tunnel

Demolition activities may require a temporary stream crossing. If right-of-way negotiations are complete, the chain station would be reconstructed in Phase 2 also.

Phase 3 would be initiated after the I-70 highway is opened to traffic. Activities include reclamation of the detour route, realignment of CR 314 at the Hidden Valley curve, reopening of CR 314 to local traffic and chain station reconstruction. If not completed in Phase 2, construction of the chain station would be planned to allow use by truckers during the construction period (that is, the chain station would not be closed during the winter season under any scenario). The duration of Phase 3 construction is November 2013 through March 2014.

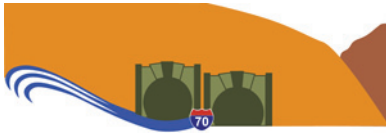
2.10 What happens if CDOT decides not to construct the Proposed Action?

The No Action is the condition where CDOT would not construct the Proposed Action. Only ongoing highway maintenance and improvements with committed funding sources would be implemented by the 2035 planning horizon. Like the Proposed Action, the No Action is evaluated under 2035 traffic conditions.

The No Action would include the following activities:

- Frontage Road (CR 314) Phase 1 (2012)
- Committed private bus service on I-70 (ongoing)
- Intelligent Transportation Systems / Advanced Traffic Management Systems improvements such as signage and speed harmonization or pacing (that is, setting driver speeds at a lower limit during periods of congestion, through the use of electronic signage or pace cars, to reduce congestion and improve travel time reliability) (ongoing)
- Replacement of the structurally deficient westbound I-70 bridge at the bottom of Floyd Hill (2017 to 2020, estimated)
- Regular roadway maintenance (ongoing)
- Addition of lighting at chain stations near Georgetown and Silver Plume (2012)

The No Action would not meet the project purpose and need. It is assessed in this document as a baseline against which the Proposed Action is compared.



Chapter 3. Affected Environment and Environmental Consequences

What is included in this chapter?

Chapter 3 discusses the affected environment and environmental impacts from construction and operation of the Proposed Action described in Chapter 2. Chapter 3 presents background; methodologies; agency coordination; existing conditions as of 2011; direct, indirect, and cumulative impacts; and commitments to mitigation.

The natural and human environment resources are inventoried and described in this chapter. These have been organized to correspond to the Core Values developed for this project, which are listed in Chapter 1 of this Environmental Assessment (EA). The resources are presented in the following order:

[3.1, Transportation \(including Mobility and Safety\)](#)

[3.2, Social and Economic Resources](#)

[3.3, Environmental Justice](#)

[3.4, Land Use and Right-of-Way](#)

[3.5, Recreation Resources](#)

[3.6, Historic Properties](#)

[3.7, Visual Resources](#)

[3.8, Air Quality](#)

[3.9, Noise](#)

[3.10, Terrestrial Wildlife](#)

[3.11, Aquatic Resources](#)

[3.12, Threatened or Endangered Species](#)

[3.13, Vegetation](#)

[3.14, Wetlands and other Waters of the United States](#)

[3.15, Floodplains](#)

[3.16, Water Resources and Water Quality](#)

[3.17, Geology](#)

[3.18, Regulated Materials and Solid Waste](#)

[3.19, Energy](#)

[3.20, Cumulative Impacts](#)

No record of fossils was revealed in the study area, and there is a low potential for fossils to occur around Clear Creek; therefore, paleontological resources were not analyzed as part of this study. However, discovery of subsurface lanes or other potential fossils in the project construction/materials excavation will lead to a halt in work and the contact of the CDOT staff paleontologist to assess significance and make recommendations.

What geographic areas are studied?

The limits of capacity improvements extend along Interstate 70 (I-70) from milepost 241.4 at the East Idaho Springs Interchange to milepost 244.5 at the base of Floyd Hill. The project limits extend approximately 3 miles to the west of the capacity improvements to account for the advance signing required for the managed lane option. Within the limits of the capacity improvements, two different geographic areas have been used to define impacts:

- The project area is the area of actual physical disturbance between milepost 241.5 and milepost 244.5. It includes 10 feet from the face of proposed fill or retaining walls, 25 feet from the toes of new highway fill slopes or cut slopes, the existing westbound edge of pavement, and any construction staging area or other planned improvements such as sediment control devices.
- The study area is a larger area and includes the half-mile or other resource-specific buffer area that encompasses the project footprint for capacity improvements. This is defined more specifically within each resource section.

The project analysis uses a 2035 planning horizon that is consistent with the most recent fiscally constrained, adopted Denver Regional Council of Governments (DRCOG) Regional Transportation Plan that includes this area (DRCOG, 2011; CDOT, 2011a).

What is the general methodology for the natural and human environment resource evaluations?

The public scoping process, Project Leadership Team, Technical Team, and Issue Task Force (Stream and Wetland Ecological Enhancement Program [SWEEP], A Landscape-Level Inventory of Valued Ecosystem Components [ALIVE], Section 106, and Greenway) processes identified the main natural and human environment resource issues. Each resource evaluation in Chapter 3 begins with information describing the analysis done at the Tier 1 level in the *I-70 Mountain Corridor Programmatic Environmental Impact Statement (I-70 PEIS)* (Colorado Department of Transportation [CDOT], 2011b).

Natural and human resource and built environment specialists collected data through the use of geographic information systems, public databases, consultation with state and federal resource agencies, published resources, and fieldwork.

Each of the environment resource subsections describes more specific methodologies. Techniques for assessing impacts of the Proposed Action at the Tier 2 level of analysis build on:

- The information developed during the I-70 PEIS level of analysis and
- The commitments made during Tier 1 for specific methodologies for data collection and analysis at Tier 2.

The Tier 2 analysis takes generalized resource mapping developed during the I-70 PEIS and supplements that with field reviews and more detailed secondary data of resources such as land use and zoning. The more refined resource mapping is overlaid with more detailed design information, such as retaining wall locations, cut-and-fill lines, and right-of-way limits. In many cases, this resulted in a narrower project footprint than that identified during the I-70 PEIS analysis.

What options are analyzed in Chapter 3?

The two roadway cross sectional variations described in Chapter 2 for the western portion of the study area are expressed in the relevant resource sections as a range of impacts, with the larger impact occurring with the 56 foot roadway cross section and the smaller impact occurring with the 50 foot roadway cross section. For many resources, there are no differences in impacts between the two cross section variations; therefore, no range is presented for these resources. The resources for which cross sectional variations are applicable and discussed include:

- [3.1, Transportation](#)
- [3.7, Visual Resources](#)
- [3.10, Terrestrial Wildlife](#)
- [3.11, Aquatic Resources](#)
- [3.13, Vegetation](#)
- [3.16, Water Resources and Water Quality](#)

Similarly, Chapter 2 describes two operational concepts for the proposed third eastbound lane: a general purpose lane that is open to general purpose traffic at all times or a lane that is open to general purpose traffic most of the time and operated as a managed lane during peak travel times.

For many resources, there are no differences in impacts between the two operational concepts; therefore, separate analysis of the operational concepts is not presented for these resources. Chapter 3 resources for which these operational concepts are applicable and discussed include:

- [3.1, Transportation](#)
- [3.2, Social and Economic Resources](#)

- [3.3, Environmental Justice](#)
- [3.6, Historic Properties](#)
- [3.7, Visual Resources](#)
- [3.8, Air Quality](#)
- [3.19, Energy](#)

What traffic information is provided?

The resource sections that use traffic data for their analysis include a variety of information, to reflect the unusual characteristics of the I-70 Mountain Corridor. Because the predominant existing and future congestion in the corridor occurs during weekends (and because the Proposed Action focuses on eastbound improvements), the focus of most of the analysis is on 2035 peak period travel in the eastbound direction, which occurs primarily on Sunday afternoons, as tourist and recreational travelers return to the Denver metropolitan area.

Traffic information is also provided for an average weekday period, to reflect local travel and transportation of goods and services. This traffic is projected to grow as population and employment in the corridor grows. By 2035, only occasional congestion is anticipated to occur on isolated weekdays; congestion would not occur on average weekdays. As documented in the I-70 PEIS, between 2035 and 2050, regular weekday congestion is forecast.

How are Tier 2 commitments addressed?

Each resource section begins with an assessment of how the analysis relates to the I-70 PEIS.

This information includes the specific commitments included in the I-70 PEIS regarding topics to be addressed and methods to be followed during Tier 2 processes. These are addressed in the documentation of each resource area, typically as a specific methodology that was followed.

Each resource section relies on the I-70 PEIS for existing conditions data and issues identified during the I-70 PEIS from the community and resource agencies. Each resource section also acknowledges mitigation strategies discussed in the I-70 PEIS that informed the specific mitigation commitments for this Tier 2 process.

The Project Leadership Team, Technical Team, and Issue Task Forces—which guided the development of the Proposed Action, the consideration of impacts, and the commitment to mitigation—were established consistent with commitments made in the I-70 PEIS.

Table 3-1 addresses the status of specific commitments made in the I-70 PEIS.

Table 3-1. Laws and I-70 PEIS Agreements to be Followed in Tier 2 Processes

Law and/or I-70 PEIS Agreement	Status
Follow the I-70 Mountain Corridor Context Sensitive Solutions process , and comply with design criteria for engineering and aesthetic guidance to further minimize impacts on communities and the environment.	Done. (See Appendix C for more detail.)
Apply the conditions set forth in the Programmatic Agreement among the consulting parties involving Section 106 of the National Historic Preservation Act.	Done. (See Section 3.6, Historic Properties , for more detail.)
Fulfill responsibilities set forth in the ALIVE (A Landscape-Level Inventory of Valued Ecosystem components) Memorandum of Understanding to address issues related to improving wildlife movement and reducing habitat fragmentation in the corridor.	Done (See Section 3.10, Terrestrial Wildlife , and Section 3.11, Aquatic Resources , for more detail)
Fulfill responsibilities set forth in the Biological Assessment/Biological Opinion developed in conjunction with the U.S. Fish and Wildlife Service.	Not applicable because no threatened and endangered species occur in the study area and downstream species are addressed in a separate Programmatic Biological Assessment
Develop mitigation measures to offset impacts on species identified in the Biological Report for the White River National Forest and the Arapaho and Roosevelt National Forests.	Not applicable because there are no National Forest lands in the project area
Comply with the 404(b)(1) guidelines of the Clean Water Act.	Done. (See Section 3.14, Wetlands and Other Waters of the United States , for more detail.)
Fulfill responsibilities set forth in the Stream and Wetland Ecological Enhancement Program (SWEEP) Memorandum of Understanding to integrate aquatic resource needs (such as streams, wetlands, and riparian areas) with mitigation recommendations.	Done (See Section 3.11, Aquatic Resources , and Section 3.14, Wetlands and Waters of the United States , for more detail)
Integrate winter storm management and maintenance procedures into any of the proposed improvements. Highway Alternative improvements throughout Clear Creek County will include snow storage areas in select locations to capture snow and other roadway runoff to reduce impacts on adjacent ecosystems.	Done. (See Section 3.16, Water Resources and Water Quality , for more detail.)
Address specifically identified total maximum daily load thresholds, and implement the Sediment Control Action Plans developed specifically for Straight Creek and Black Gore Creek to identify methods to control the existing transport of winter sanding materials. Develop Sediment Control Action Plans for other Corridor areas such as the upper reaches of Clear Creek.	Done. Methods identified in the Upper Clear Creek Sediment Control Action Plan have been incorporated into the Twin Tunnels site-specific mitigation measures. (See Section 3.16, Water Resources and Water Quality , for more detail.)
Develop information systems (such as advertising campaigns to support local businesses, signage with hours of operation, and detour plans) to inform affected communities, I-70 Mountain Corridor travelers, businesses, and homeowners about construction activities and schedules.	Done. (See Section 3.2, Social and Economic Resources , for more detail.)

What are the differences between direct and indirect impacts?

Direct impacts are defined as impacts that are:

- Caused by the action and occur at the same time and place [Title 40 of the Code of Federal Regulations (CFR) 1508.8(a)]

Indirect impacts are defined as impacts that:

- Are caused by the action and
 - Are later in time or farther removed in distance
 - Are reasonably foreseeable
 - May include growth-inducing effects, and other effects related to induced changes in the pattern of land use, population density, or growth rate, and related effects on air and water and other natural systems, including ecosystems [40 CFR 1508.8 (b)]

What are cumulative impacts?

Cumulative impacts result from the incremental impact of the Proposed Action when added to other past, present, and reasonably foreseeable future actions regardless of what agency (federal or non-federal) or person undertakes such other actions. Cumulative impacts can result from individually minor but collectively significant actions taking place over a period of time. Based on input from the Tier 1 analysis, public scoping, Project Leadership Team and Technical Team input, and input from state and federal resource agencies, cumulative impacts were evaluated for the following resources:

- Social and Economic Resources
- Recreation Resources
- Historic Properties
- Visual Resources
- Air Quality
- Wildlife
- Water Resources and Aquatic Habitat

The Proposed Action would not measurably impact threatened or endangered species, vegetation, wetlands, noise, floodplains, geology, regulated materials, land use, or right-of-way. Therefore, these resources are not included in analysis of cumulative effects.

How is the significance of an impact determined?

Each resource section within Chapter 3 identifies any impacts that meet the definition of a significant impact as determined by the Council on Environmental Quality (40 CFR 1508.27). This definition includes considerations of both context and intensity. It also includes direct, indirect and cumulative impacts. Information obtained during the public and agency review process will be used to make a final determination of the significance of an impact. This will be documented in the final decision document.

What is the adaptive management approach to mitigation?

The mitigation commitments in this Tier 2 document build upon the overall [mitigation strategies](#) identified in the I-70 PEIS. The I-70 PEIS strategies did not typically identify specific mitigation measures, but overall strategies to offset impacts. The mitigation measures in this Tier 2 document are project specific actions, addressing the unique needs of the project setting, while being consistent with the I-70 PEIS mitigation strategies.

Each resource section includes a mitigation discussion. For resources that identify direct or indirect impacts, mitigation is discussed using an adaptive management approach. This approach provides flexibility and incentive to the contractor to develop alternative construction methods to avoid or minimize impacts to environmental resources.

Clearly tying the mitigation to a specific activity and location provides more flexibility in final design and construction to avoid or minimize the activity that causes the impact and, thus, reduce or omit the need for mitigation. [Appendix A](#) summarizes the mitigation commitments made in Chapter 3.

3.1 Transportation and Safety

3.1.1 How does the analysis relate to the I-70 PEIS?

[Chapter 1](#) and [Chapter 2](#) of the I-70 PEIS (CDOT, 2011b) and the *I-70 Mountain Corridor PEIS Travel Demand Technical Report* (CDOT, 2011c) provide information about existing and future transportation conditions in the study area. Some of the key findings of the I-70 PEIS that are relevant to the Twin Tunnels study area are that weekend congestion is prevalent now, 2035 congestion is expected to occur for longer periods during the day and more days of the week (with severe congestion occurring at the Twin Tunnels area for more than 10 hours on a weekend), and these conditions are expected to deteriorate even more by 2050.

These key findings are generally consistent with new analyses that were conducted for this Tier 2 process, although weekday congestion is predicted to occur only occasionally, rather than on a consistent basis as was forecast during the I-70 PEIS.

3.1.2 What process was followed to analyze transportation conditions?

A panel of experts with backgrounds in transportation planning and the Interstate 70 (I-70) Mountain Corridor convened on December 15, 2011, to discuss and develop the methodology for forecasting future travel in the Corridor. This panel reviewed potential options for determining the rate of growth that might be used to forecast 2035 volumes and agreed that it would be appropriate to utilize two sources of base information because weekday and weekend travel patterns are substantially different.

For weekday forecasts, the panel recommended using 2035 forecasts from the Denver Regional Council of Governments (DRCOG), which is responsible for regional transportation planning efforts for this study area. DRCOG's forecasts were utilized as the basis for this Tier 2 analysis of weekday traffic volumes. These traffic volume growth rates assumed a growth factor of 1.41. The I-70 PEIS determined that population in the I-70 Mountain Corridor would generally double between 2000 and 2035. Recent population forecasts for the period from 2010 to 2035 (which were also the basis for DRCOG's analyses) show that population in counties along the I-70 Mountain Corridor will grow between 50 and 90 percent over this period. Population growth in Clear Creek County is forecast to increase approximately 40 percent from about 10,300 in 2010 to approximately 14,450 in 2035 (DRCOG, 2011).

For 2035 peak period weekend forecasts, the panel agreed to use the same traffic growth forecasts as were used in the I-70 PEIS—a traffic growth factor of 1.22. The lower weekend (compared to weekday) growth rate is reasonable because congestion currently restrains growth in weekend traffic and will do so in the future even if the Proposed Action is implemented.

Data Sources for Forecasting Future Traffic

- For weekday forecasts, DRCOG data were used.
 - For weekend forecasts, the I-70 PEIS traffic growth factors were used.
-

The study area for this Tier 2 transportation analysis consists of I-70 between Georgetown and the top of Floyd Hill, also called the I-70 Twin Tunnels Corridor in this section of the environmental assessment (EA). A systemwide study area covering the entire roadway system between Vail and C-470, including alternative routes to I-70 (such as SH 9 and US 285), was used to determine systemwide effects of the Twin Tunnels project. A detailed inventory of transportation conditions and the procedures used to analyze local and regional traffic analyses are documented in the *Twin Tunnels Environmental Assessment (EA) Transportation Technical Memorandum* (CDOT, 2012a).

3.1.3 What agencies were involved in this analysis and what are their issues?

DRCOG was the primary agency involved in the transportation analysis. DRCOG sent a scoping letter to the Colorado Department of Transportation on September 29, 2011, requesting that CDOT examine tolling/pricing options for the Twin Tunnels improvements and also stating that the DRCOG Metro Vision Regional Transportation Plan would need to be amended to include any additional lane capacity in the Twin Tunnels area.

The local agencies involved in the Project Leadership Team and the Technical Team also raised questions related to transportation issues, including the following:

- Travel Demand Analysis
 - How will the model be validated and tested?
 - What is the relationship between the I-70 PEIS model and the DynusT model being used for the Twin Tunnels EA?
 - What are the differences in analysis procedures for weekday and weekend analyses?

- Overview of the Managed Lane
 - How does a managed lane improve flow, reliability of travel time, and emergency response time?
 - What is the revenue generation?
 - What infrastructure is required?
 - How does a managed lane affect the project footprint?
 - Could the design speed be higher if CDOT does not have the managed lane?
 - What are the safety implications of the managed lane?
 - How will the managed lane operate (time of day, cost, traveler notification)?
- How will current safety problems be addressed, especially those related to headlight glare and the sharp curves?
- Construction phase effects: Will there be weekday backups during construction?

Project Leadership Team and Technical Team Issues are Related to:

- Travel forecasting methodology
 - Managed lane operations
 - Safety problems
 - Construction phase for traffic issues
-

3.1.4 What are the transportation conditions in the study area?

Interstate 70 in the vicinity of the Twin Tunnels is well described in the I-70 PEIS (CDOT, 2011b) as follows:

The I-70 Mountain Corridor is linked in the national interstate highway system and is part of the only east-west interstate crossing Colorado. The corridor provides for the movement of people, goods, and services across the state and is a major corridor for access to many of Colorado's recreation and tourism destinations. Existing transportation congestion on the corridor is degrading the accessibility of mountain travel for Colorado residents, tourists, and businesses. The population of corridor communities is expected to more than double by 2035. Additionally, there are a high percentage of second homes in the corridor. While the Denver

metropolitan area is not within the corridor, Denver residents are frequent users of the corridor, and the Denver metropolitan area population is projected to experience extensive growth.

With the combined growth in corridor users, travel demand in the corridor is projected to continue increasing over the next 25 years and beyond. Tourism and recreation travel are the primary sources of weekend congestion in the corridor. Ski slopes, trails, campsites, and resorts are drawing people to the corridor for recreational trips.

I-70 is generally a four-lane freeway west of the US 6 Interchange (Exit 244) at Floyd Hill. Unlike typical roadways in the Denver metropolitan area, the I-70 Mountain Corridor has wide variations in traffic volumes between seasons and between weekdays and weekends. Weekends (including Fridays) have the highest volumes. Traffic volumes on I-70 vary greatly by season with summer being the highest, followed closely by winter, and spring/fall being the lowest. These patterns are not common in the Denver metropolitan area.

The Twin Tunnels, located between the East Idaho Springs Interchange (Exit 241) and the Hidden Valley Interchange (Exit 243), present a primary choke point for traffic on I-70. Eastbound traffic on winter and summer Sunday afternoons is often slowed from 65 miles per hour (mph) to below 30 mph for 4 to 8 hours, with backups extending past Georgetown and sometimes reaching the Eisenhower-Johnson Memorial Tunnel.

In addition, the curve immediately west of the Hidden Valley Interchange (Exit 243) presents a serious safety concern. More vehicles than expected are leaving the road and hitting fixed objects (concrete highway barrier, guard rail, and embankments) or leaving their lanes and hitting other vehicles (sideswipes). These vehicles lose control (especially under adverse road conditions) because the curve is much sharper than drivers anticipate, in spite of advanced warning signs.

County Road (CR) 314 is part of the frontage road system that parallels I-70 from Georgetown to the Hidden Valley Interchange. CR 314 functions as the main street for Idaho Springs and the numerous smaller communities within the study area. Clear Creek County and Idaho Springs are concerned about the high volume of I-70 traffic that uses CR 314 when I-70 is congested. Traffic volumes on CR 314 east of Idaho Springs were counted in 2009, 2010, and 2011. These volumes are low during the weekday (between 200 and 400 vehicles per day) but are higher on summer Sundays (1,340 to 1,930 vehicles per day).



During peak periods on weekends, traffic operations are projected to deteriorate significantly if no improvements are made.

3.1.5 How does the No Action affect transportation conditions?

What is the effect of the No Action on mobility?

The existing configuration of I-70 through the study area cannot accommodate existing peak day (Sunday) traffic volumes without congestion. Traffic operations would continue to deteriorate in the future under the No Action. Peak traffic demand in the study area is forecast to increase 22 percent (based upon 0.8 percent annual growth) by 2035. The number of crashes through the study area would also continue to grow with increased traffic.

Analyses of 2035 average weekday volumes (CDOT, 2012a) led to the conclusion that there would be no congestion in the study area on average weekdays in 2035 with the No Action. Traffic operations would be good (level of service [LOS] C or better) during weekdays through 2035 for all segments in the I-70 Twin Tunnels study area between Georgetown and Floyd Hill. LOS is a qualitative measure of how traffic is operating, with LOS A representing minimal delay and LOS F representing excessive congestion and delay. A review of individual hourly volumes shows that only occasional congestion would occur on an average weekday and it would not last longer than 2 hours. Traffic would be able to maintain near free-flow speeds during the highest average hour. Free-flow speeds (65 mph in the eastbound direction and 60 mph in the westbound) would be achieved for all other hours of the day.

During peak periods on weekends, traffic operations are projected to deteriorate significantly if no improvements are made. As previously noted, peak Sunday traffic is forecasted to grow 22 percent by 2035. The greater volume of traffic in 2035 would result in much longer peak periods, such that the maximum traffic volume allowed by the

capacity of the Twin Tunnels would be spread out over more hours and later into the evening beyond 11:00 p.m. Speeds would drop below 20 mph earlier in the day (10:30 a.m.) and remain low for the rest of the day (after 11:00 p.m.).

The additional weekend congestion in 2035 would result in substantial increases in the average travel time experienced by eastbound motorists from Georgetown to the top of Floyd Hill—from a current maximum of 117 minutes to 162 minutes for the No Action in 2035. With no improvements, drivers would spend about 75 percent of their time traveling at speeds below 20 mph (nearly stopped) compared to 35 percent for existing conditions.

If no improvements are made to I-70, alternative routes would experience substantial increases in traffic volumes.

What is the effect of the No Action on safety?

Safety will continue to decline with the No Action. Currently, there is an annual average of 86 crashes on I-70 in the project area: between milepost 241.30 (east of Idaho Springs) and milepost 244.42 (at the base of Floyd Hill). The crash total for the 2035 No Action is forecast to increase to approximately 100 crashes per year. Both existing and No Action crash totals are almost 50 percent higher than normally expected when compared to the typical four-lane freeway in mountainous areas of Colorado.

3.1.6 How does the Proposed Action affect transportation conditions?

The Proposed Action (with or without a managed lane) would improve traffic operations when compared to the No Action. The following information summarizes future (2035) traffic operations and safety conditions for the two operational scenarios. More information is contained in the [Twin Tunnels EA Transportation Technical Memorandum](#) (CDOT, 2012a).

What is the effect of the Proposed Action with a managed lane on mobility?

What are the mobility conditions during average weekdays in 2035?

Occasional congestion is projected to occur in 2035 on weekdays. Traffic analyses show that for average weekday travel, operations through the two segments that would be widened (from Exit 241 to Exit 244) would improve to LOS B from LOS C, which would be the condition with the No Action. Traffic would be able to maintain free flow speeds (65 mph in the eastbound direction and 60 mph in the westbound) throughout the day.

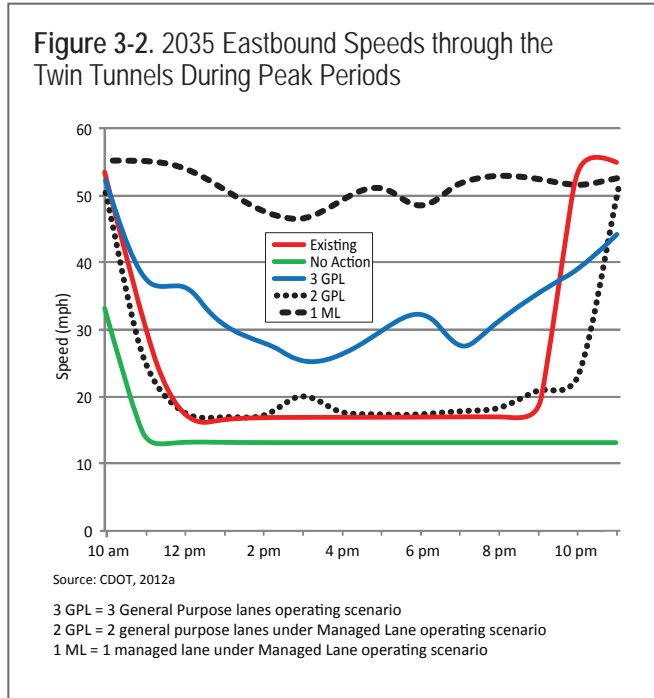
Congestion is forecast to occur on occasional winter Friday afternoons for eastbound traffic.

What are the mobility conditions during peak day (Sunday) traffic in 2035?

The traffic volumes that would be able to pass through the Twin Tunnels if the managed lane operating scenario is implemented would increase to approximately 4,000 vehicles per hour (vph), which is significantly higher than those for the No Action. The three lanes through the eastbound tunnel actually have more capacity than this, but the volumes are restricted by the capacity of the two lanes on I-70 west of the project area.

Figure 3-1 shows the percentage of vehicles that would experience a range of speeds (from less than 10 mph to over 50 mph) during the study period (9:00 a.m. to 11:00 p.m.). This figure shows that approximately 59 percent of peak day volumes would travel at speeds of 20 mph or less under the managed lane operating scenario. This is better than the 75 percent that would experience these very low speeds under the No Action.

Speeds in the two general purpose lanes would drop below 30 mph for much of the peak day while speeds in the managed lane would remain above 45 mph for the study period (see Figure 3-2). This figure illustrates one of the major benefits of the managed lane—reliability of travel time. Drivers are willing to pay for higher, more reliable speeds. A travel speed of 45 mph in the managed lane can be achieved over 95 percent of the time by manipulating the toll charge in response to demand volumes. This can result in up to 3 minutes savings in travel time compared to the two general purpose lanes through this relatively short study area.



This pattern of reliable travel in the managed lane also means that emergency vehicles responding to incidents would not be held up in congested eastbound traffic east of Idaho Springs, because emergency vehicles would be allowed to use the managed lane.

The increased reliability of travel that is assured in the managed lane would be expected to benefit riders in buses, because the current scenario assumes that public buses (and possibly private buses) would be able to use the managed lane for free. The toll to use the managed lane would be expected to result in increased vehicle occupancy, as travelers make the choice to carpool to spread the cost of the toll among more travelers.

The increased reliability of travel better serves I-70 users as travel demand continues to increase past 2035. The managed lane offers a sustainable choice to travelers so that a congestion free option is always available.

The addition of a third lane in the form of a managed lane through the Twin Tunnels area would result in improved average travel time experienced by eastbound motorists in 2035 compared to the No Action (see Figure 3-3). This figure shows the average travel time for eastbound travelers through the I-70 Twin Tunnels Corridor would reach a maximum of about 135 minutes from Georgetown to the top of Floyd Hill with the managed lane operating scenario, which is about 27 minutes shorter than the maximum time for No Action. Vehicles in the managed lane would save between 2 and 3 minutes over the two general purpose lanes throughout the day. As documented in the I-70 PEIS, travel times would continue to increase between 2035 and

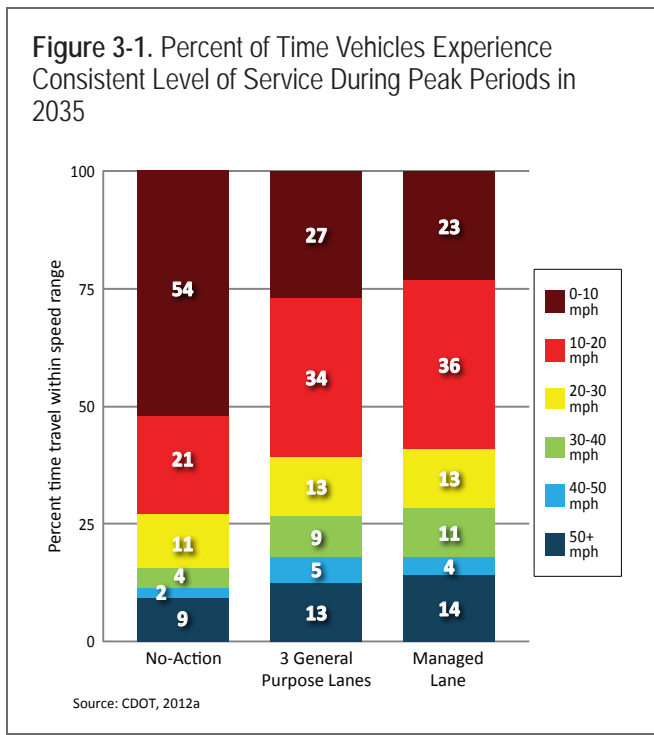
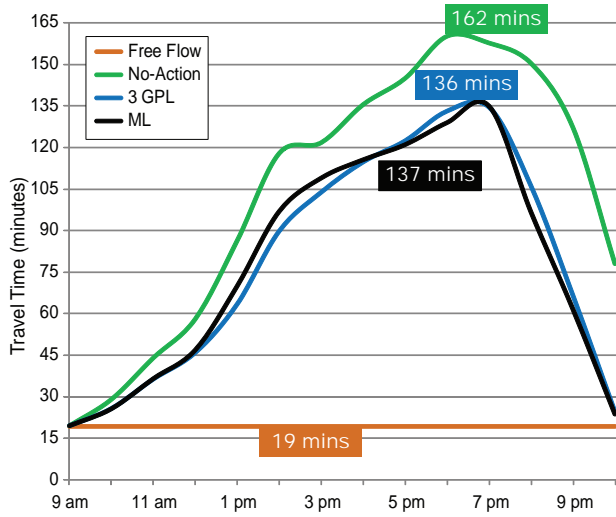


Figure 3-3. 2035 Eastbound Average Travel Time between Georgetown and the Top of Floyd Hill



Source: CDOT, 2012a

3 GPL = 3 General Purpose lanes operating scenario
ML = Managed Lane operating scenario

2050, and the travel time savings in the managed lanes would also become more pronounced.

Table 3-2 shows a slight increase in vehicle miles of travel (VMT) systemwide (all roads between Vail and C-470, including alternate routes such as SH 9 and US 285) and the I-70 Twin Tunnels Corridor (Georgetown to Floyd Hill) under the Proposed Action compared to the No Action. This is primarily because more lanes on I-70 allow more vehicles to choose I-70 as the route of choice. On the other hand, vehicle hours of travel (VHT) systemwide and for the I-70 Twin Tunnels Corridor show substantial improvements (15 percent and 22 percent, respectively) under the managed lane operating scenario. Thus, more cars are traveling on I-70, but they are completing their trips in less time. This reduction in VHT results in less air pollution and less energy consumption, a clear advantage of the managed lane. This reduction in VHT is anticipated to become more pronounced as traffic volumes continue to increase past 2035.

One of the expected impacts due to the decreased travel times and improved operations of I-70 under the managed

Table 3-2. Peak Day Vehicle Miles of Travel (VMT) and Vehicle Hours of Travel (VHT) for the Twin Tunnels Corridor versus Systemwide

Scenario	VMT				VHT			
	Systemwide ¹	Percent Difference	I-70 Twin Tunnels Corridor ²	Percent Difference	Systemwide ¹	Percent Difference	I-70 Twin Tunnels Corridor ²	Percent Difference
2010 Existing	6,506,996	NA	865,876	NA	208,787	NA	33,379	NA
2035 No Action	7,745,078	19 *	983,305	14 *	367,391	76*	59,919	80*
2035 Proposed Action with managed lane	8,003,880	3 **	988,153	1 **	311,907	-15**	46,590	-22**
2035 Proposed Action with no managed lane	8,006,185	3 **	996,898	1 **	309,231	-16**	47,674	-20**

¹The entire roadway system between Vail and C-470, including alternative routes to I-70 such as SH 9 and US 285.

²Eastbound and westbound lanes on I-70 between Georgetown and the top of Floyd Hill.

NA = Not applicable

*Compared to 2010 Existing Conditions

**Compared to the 2035 No Action Alternative

Source: CDOT, 2012a.

lane operating scenario is for more drivers to complete their trips eastbound out of the mountains using I-70 and divert off of the alternative routes in the region. Table 3-3 lists a summary of the projected impacts to daily volumes on alternative routes if the managed lane operating scenario were to be implemented. Compared to the No Action, the Proposed Action with a managed lane would result in fewer vehicles diverting away from I-70.

The managed lane operating scenario is more consistent with a “user pay” philosophy of transportation funding. This may serve a purpose over time to alter travel behavior to make more efficient use of our current transportation infrastructure. Travelers may choose to use alternate forms of transportation (carpooling, vanpooling, taking a bus or ultimately, taking other forms of mass transit such as the Advanced Guideway System identified in the I-70 PEIS Preferred Alternative) or travel at less congested times.

What is the effect of the Proposed Action on safety?

Safety would improve significantly with both operating scenarios for the Proposed Action, compared to future No Action conditions. The forecasted number of crashes in 2035 is less than currently experienced in the study area even with increased traffic volumes. Eastbound safety improvement of approximately 15 percent would result from widening the roadway from two to three lanes. Improvements in crash totals of approximately 75 percent could be expected from improving the radius of the curve just west of the Hidden Valley Interchange. Table 3-4 shows a range of potential improvements in safety.

The managed lane on I-70 would be the first application of a new capacity priced lane in a non-urban freeway setting in the nation. I-70 serves predominantly recreational trips, which are focused on weekends. Based on a review of the current research literature and professional experience, the safety implications for managed lane facilities vary

widely, and overall safety implications of each facility are based more on the individual facility characteristics, with inconclusive general crash trend data.

The primary objective of the proposed managed lane operating scenario is to provide reliable, free flowing trips. Free flowing traffic (i.e., uniform flow) is safer than variable flow (i.e., stop and go traffic). The managed lane would have one entrance and exit point, which would simplify weaving between the managed lane and general purpose lanes and provide for safer operations. An operational feature of managed lanes is the potential speed differential between the managed lane and adjacent general purpose lanes. The following parameters have been incorporated in the design to minimize any risks due to this characteristic.

1. Appropriate separation striping between the managed lane and general purpose lanes as prescribed in the 2009 Manual on Uniform Traffic Control Devices (MUTCD).
2. Adequate access openings providing time to maneuver into the managed lane but not so much space that vehicles are overtaking other vehicles at the same access area.
3. Clear, concise, and appropriate arterial and freeway signing that supports and informs driver expectations.
4. Adequate distance to make lane changes at the managed lane entrance and exit points. This will provide prospective managed lane users with more comfortable weaving between the managed lane and general purpose lanes. Where possible, the same geometric criteria should be applied as would be used for other access areas, such as at a freeway entrance and exit ramp.
5. A configuration that requires vehicles entering the managed lane facility to make an overt maneuver to enter the lane. The left lane should not end at a

Table 3-3. Eastbound Peak Day Traffic Shifts—Change in Daily Volume on Alternate Routes

Location	2010 Volume	No Action		Proposed Action with No Managed Lane		Proposed Action with Managed Lane	
		2035 Volume	Percent Difference*	2035 Volume	Percent Difference**	2035 Volume	Percent Difference**
I-70 Frontage Road east of Idaho Springs	1,930	4,000	107	460	-88	500	-87
SH 9 North of Fairplay	6,000	9,700	61	8,100	-17	8,200	-16
US 285 East of Grant	7,800	11,600	48	10,000	-13	10,100	-12

*Compared to 2010 Existing Conditions **Compared to the 2035 No Action Alternative
 Source: CDOT, 2012a.

managed lane entrance; the freeway lane should be moved laterally and the managed lane entrance located out of the normal path of travel.

6. Although the current approach is not to light the managed lane entrance because there is no physical gore that would represent a hazard (pavement markings only), as the final design proceeds, this approach will be analyzed with the rest of the design to ensure that it meets the safety requirements for urbanized freeway entrance and exit ramps.

What is the effect of the Proposed Action with no managed lane on the peak day (Sunday) traffic?

Figure 3-1 shows that approximately 61 percent of peak day volumes would travel at speeds of 20 mph or less when operating with three general purpose lanes and no managed lane, which is slightly worse than the 59 percent forecasted for the Proposed Action with a managed lane. This is better than the 75 percent that would experience these low speeds under the No Action. Traffic speeds without a managed lane drop to a low of 25 mph and generally remain below 30 mph from 1:00 p.m. to 7:30 p.m. (see Figure 3-2). This is symptomatic of congested traffic and means that the travel time for any one individual drive would be less reliable than could be achieved by drivers choosing to use the managed lane. Emergency vehicles would also be affected by the lower travel speeds, and the time to respond to incidents would be subject to the specific level of congestion when the call is received.

Figure 3-3 shows the average travel time for the Proposed Action with no managed lane in 2035 is essentially the same as that for the managed lane operating scenario. It shows the average travel time for eastbound travelers would reach a maximum of about 136 minutes with no managed lane, 1 minute longer than with the managed lane. The managed lane operating scenario takes longer during the first part of the peak hours, but once the managed lane reaches its capacity and continues to operate with maximum flow (ensuring the lane operates at or above 45 mph), then the travel times show slight improvement during the later peak hours.

In comparison with the managed lane operating scenario (see Table 3-2), the Proposed Action with no managed lane has more VMT (approximately 1 percent), less systemwide VHT (approximately 1 percent), and more I-70 Twin Tunnels Corridor VHT (approximately 2 percent). The systemwide study area includes the entire roadway system between Vail and C-470, including alternative routes to I-70 such as SH 9 and US 285. The I-70 Twin Tunnels Corridor study area includes the eastbound and westbound lanes on I-70 between Georgetown and the top of Floyd Hill.

Table 3-3 lists a summary of the projected impacts to daily volumes on alternative routes if the Proposed Action with no managed lane versus with a managed lane were implemented. Overall, the Proposed Action with no managed lane would attract slightly more traffic off the diversion routes and back onto I-70 compared to the managed lane operating scenario. However, both operating scenarios for the Proposed Action would result in fewer vehicles diverting away from I-70, compared to the No Action.

As previously discussed, safety with the Proposed Action with no managed lane is difficult to differentiate from the Proposed Action with a managed lane, but both would improve safety when compared to the No Action (see Table 3-4).

Table 3-4. Expected 2035 Crash Totals on I-70 (MP 241.30 to MP 244.42 [Both Directions])

	2035 No Action	2035 Proposed Action
Estimated number of crashes per year	100	65–80
Comparison to No Action	Not applicable	20 to 35 percent decrease
Source: CDOT, 2012a.		

What effects occur during construction?

Construction of the Twin Tunnels would present unique challenges. In order to widen the eastbound tunnel, it would need to be closed to all traffic for the duration of construction, expected to be from April 2013 through October 2013. As described in Chapter 2, a portion of old US 40 and CR 314 between the East Idaho Springs Interchange (Exit 241) and the Hidden Valley Interchange (Exit 243) is planned to be used as the detour for I-70 traffic during construction of the tunnel. The capacity of the detour is approximately 2,700 vph.

Tunnel blasting would require that all traffic be stopped for approximately 10 minutes before and 10 minutes (eastbound) to 20 minutes (westbound) after each detonation (although this may increase to 30 minutes under certain circumstances). There could be four to six blasts per day. Blasting during peak directional periods would be limited to the extent possible. These peak periods are anticipated to be Friday afternoons and early evenings, Saturday mornings, and Sunday afternoons and evenings.

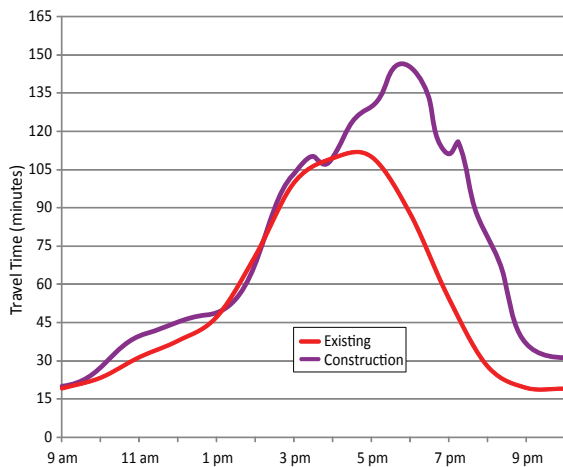
US 285/SH 9 is the only other route that can reasonably serve traffic between Denver and the Continental Divide

other than I-70. SH 14 west of Fort Collins is too far north. US 34 over Trail Ridge Road is closed to commercial traffic and open for other vehicles only during summer months. US 24 west of Colorado Springs is too far south.

Average weekday traffic should present only minor challenges during construction. The highest eastbound volume is approximately 1,700 vph between 4:00 p.m. and 5:00 p.m. This is less than the 2,700 vph capacity of the detour. Traffic should be largely unaffected, except for stoppages during blasting. Queues resulting from traffic closures for blasting should dissipate within approximately an hour. If a half-hour closure were to coincide with one of the weekday peak hours (peak volume of approximately 3,050 vph in both eastbound and westbound directions), the resulting queue could take approximately three hours to clear. Westbound capacity would not be affected by construction so westbound queues would be expected to clear quickly.

On peak days (Sundays), tunnel construction activity would result in increased travel time experienced by eastbound motorists. Figure 3-4 shows the average travel time for eastbound travelers in the I-70 Twin Tunnels Corridor (Georgetown to the top of Floyd Hill) during construction would reach a maximum of about 145 minutes from Georgetown to the top of Floyd Hill, which is about 30 minutes longer than maximum existing travel times. However, travel times later in the day would continue to be much longer than existing conditions. Drivers may experience up to 1 hour of additional delay due to the construction.

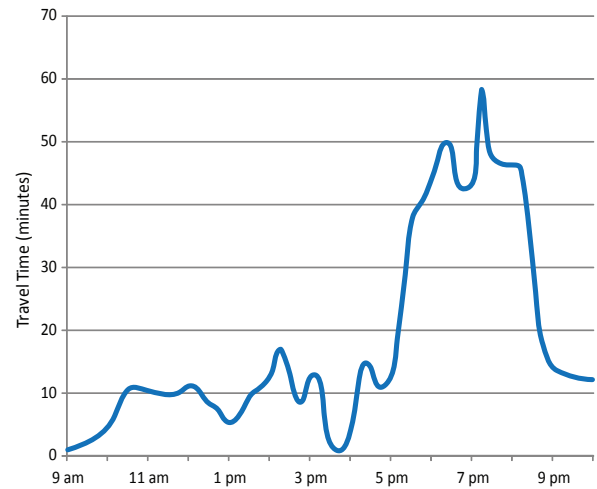
Figure 3-4. Average Travel Time between Georgetown and the Top of Floyd Hill during Construction vs. 2010 Existing Conditions on Peak Periods



Source: CDOT, 2012a

Figure 3-5 shows the average additional travel time that eastbound drivers would experience during construction of the improvements. The difference in travel times rise to almost an hour by 7:30 p.m. because current travel times begin to improve after 5:00 p.m.

Figure 3-5. Additional Average Travel Time between Georgetown and the Top of Floyd Hill during Construction vs. 2010 Existing Off-Peak Conditions

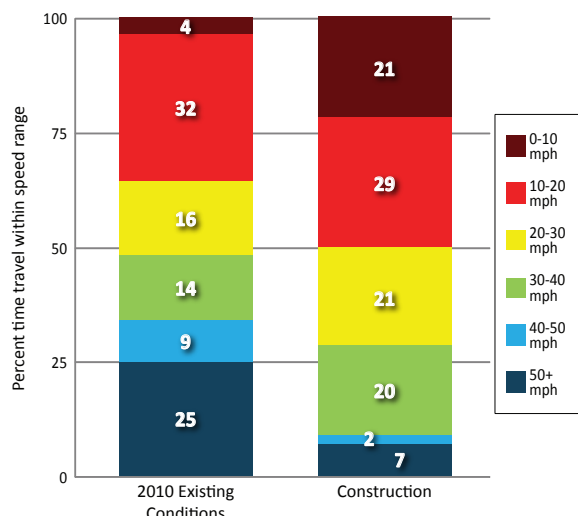


Source: CDOT, 2012a

Figure 3-6 shows that construction would have impacts to the level of service being experienced by drivers on I-70. During construction, drivers would experience less than 7 percent of their time in uncongested travel during peak periods compared to 25 percent for existing conditions. Conversely, drivers would experience congested conditions (speeds less than 50 mph) up to 93 percent of the time during peak weekend periods. Furthermore, during construction, weekend drivers during peak weekend periods would spend about 50 percent of their time traveling at speeds that are less than 20 mph (nearly stopped).

One of the expected impacts due to the increased travel times while I-70 is under construction is for more drivers to complete their trips eastbound out of the mountains by diverting off of I-70 and onto the alternative routes in the region. Table 3-5 lists a summary of the projected impacts to daily volumes on alternative routes during construction. The results show substantial traffic diverting onto the US 285/SH 9 route.

Figure 3-6. Peak Day Percent of Time Drivers Experience Each Level of Service during Construction vs. 2010 Existing Conditions



Source: CDOT, 2012a

3.1.7 What mitigation is needed?

CDOT has identified project mitigation for potential impacts on transportation resources. Table 3-6 (permanent impacts) and Table 3-7 (temporary impacts during the construction period) describe these mitigation measures.

Table 3-5. Peak Day Traffic Shifts: 2010 Construction vs. 2010 Existing Conditions—Change in Daily Volume on Alternate Routes

Location	Existing Volume	Construction Volume	Percent Difference
SH 9 North of Fairplay	6,000	8,200	36
US 285 East of Grant	7,800	10,000	28

Source: CDOT, 2012a.

Table 3-6. Mitigation Commitments for Permanent Impacts on Transportation Resources

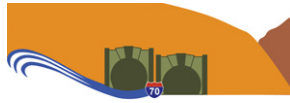
Activity	Location	Impact	Mitigation*
Drivers traveling on I-70 at night.	Locations as determined by safety analyses.	Crashes at night.	<ul style="list-style-type: none"> Existing lighting will be reviewed to make sure current light fixtures are operating as designed. Safety will be monitored closely after construction to see if nighttime crash patterns persist that could be addressed with localized lighting treatments. Lighting will follow I-70 Mountain Corridor Aesthetic Guidance (CDOT, 2009) and “dark sky” objectives.
Operation of the managed lane at night.	Entrance to managed lane.	Crashes at entrance to managed lane.	<ul style="list-style-type: none"> Current approach is to not light the managed lane entrance because there is no physical gore, which would be a hazard. This will be reanalyzed during the final design process. Lighting will follow I-70 Mountain Corridor Aesthetic Guidance and “dark sky” objectives.

* Mitigation is not necessary if impact can be avoided through changes in the design or construction of the Proposed Action (i.e., the activity is avoided).

Table 3-7. Mitigation Commitments for Temporary Impacts on Transportation Resources During the Construction Period

Activity	Location	Impact	Mitigation*
Construction on or adjacent to I-70.	Between East Idaho Springs Interchange and base of Floyd Hill.	<p>Increased potential for crashes.</p> <p>Traffic shifts from I-70 to less capable facilities such as SH 9 and US 285.</p> <p>Disruption of emergency response.</p> <p>Reduced through-travel to local businesses.</p>	<ul style="list-style-type: none"> • There will be extensive warning of the detour for eastbound traffic so drivers know to slow to the posted speed limit of 35 mph. • Colorado State Patrol and police will be encouraged to monitor speeds during off-peak periods when enforcement activities won't create traffic congestion. • Reducing crashes should also reduce the need of emergency response and attendant local costs to service providers. • As feasible, CDOT will minimize I-70 construction activities on weekends that could shift travel to alternative routes (SH 9 and US 285, in particular). • No scheduled construction projects on US 285 and SH 9 are planned to involve weekend activities. • CDOT will monitor signal operations and timing on these alternative routes during peak periods and will modify signal timing, if necessary. • Contractor will provide emergency responders traffic control contact information. In an emergency, responders will contact the CDOT traffic control office, provide their approximate arrival time at the construction zone, and traffic control will provide a clear path through the construction zone. • CDOT and the contractor will notify emergency service providers [Colorado State Patrol, sheriff, police, fire dispatchers, ambulance providers, etc.] of the timing of impending closures for blasting or other reasons. • CDOT will provide frequent and timely updates about construction activities and remind the public that the corridor is open except for necessary interruptions. • Signs notifying drivers of access to local business will be placed in both directions in advance of the East Idaho Springs Interchange (Exit 241).
Closure of eastbound lanes on I-70.	West of tunnels and east of Hidden Valley Interchange.	Traffic backups due to lane restriction during construction in the peak direction during peak periods.	<ul style="list-style-type: none"> • Contractor will prepare a CDOT-approved project-specific lane closure strategy that minimizes lane closures during peak weekend travel. • Any variances will be developed in close coordination with the contractor and approved by CDOT. • CDOT will work with local communities to minimize impacts to local traffic.
Roadway closures for blasting (anytime round the clock).	On I-70 westbound; on CR 314 for eastbound detour traffic.	Traffic backups.	<ul style="list-style-type: none"> • Stoppages will be minimized to the greatest extent possible during peak periods (westbound Friday afternoon and Saturday morning, and eastbound Sunday afternoon). • Advance signage along I-70 will give warning of impending closures.

* Mitigation is not necessary if impact can be avoided through changes in the design or construction of the Proposed Action (i.e., the activity is avoided).



(continued from previous page)

Table 3-7. Mitigation Commitments for Temporary Impacts during the Construction Period

Activity	Location	Impact	Mitigation*
Roadway closures for blasting (anytime round the clock).	On I-70 westbound; on CR 314 for eastbound detour traffic.	Traffic backups.	<ul style="list-style-type: none"> • Stoppages will be minimized to the greatest extent possible during peak periods (westbound Friday afternoon and Saturday morning) (eastbound Sunday afternoon). • Advance signage along I-70 will give warning of impending closures.
<p>* Mitigation is not necessary if impact can be avoided through changes in the design or construction of the Proposed Action (i.e., the activity is avoided).</p>			

3.2 Social and Economic Resources

3.2.1 How does the analysis relate to the I-70 PEIS?

The following commitments from [Section 3.8](#) of the I-70 PEIS (CDOT, 2011b) regarding social and economic resources are applicable to this Tier 2 process:

- The Colorado Department of Transportation (CDOT) will conduct further analysis of local county economic impacts and will develop information for use in the analysis that could include:
 - County-level travel demand
 - Project phasing
 - Time-phased estimates of capital expenditures
 - Worksite locations and scheduling
 - Sourcing of materials, equipment, services, and labor
- CDOT will provide information about construction impacts, including work duration, detours, lane closures, and other disturbances

3.2.2 What process was followed to analyze social and economic resources?

The study area for the social resources analysis includes an area within a 0.5 mile radius of the Proposed Action project limits. The study area for the economic analysis encompasses Clear Creek County because economic data are typically not available for smaller geographical boundaries.

The social and economic analysis is prepared in accordance with the *CDOT National Environmental Policy Act Manual* (CDOT, 2010a) and evaluates the social and economic effects associated with No Action and the construction and operation of the Proposed Action. The previous work conducted as part of the I-70 PEIS was incorporated, as applicable, into the analysis. CDOT collected the most current data available, including demographic information, historic and projected population, historic and projected employment, housing data, and economic data.

The analysis considers the effects on emergency services; effects on neighborhoods, community facilities, and community cohesion; changes to mobility, access, and safety; potential for changes in economic activity; and economic impacts of temporary construction activities, including detours and maintaining access to businesses.

3.2.3 What agencies were involved in this analysis and what are their issues?

Through the I-70 PEIS process, CDOT has coordinated with staff at Clear Creek County and Idaho Springs to discuss management priorities and concerns about impacts to social and economic resources in the I-70 Mountain Corridor. For the Twin Tunnels Environmental Assessment (EA), CDOT coordinated with the Colorado Department of Local Affairs (DOLA) to obtain demographic data, and discussed issues of growth, build-out assumptions, and tourism with representatives of Clear Creek County and the City of Idaho Springs.

The Mayor of Idaho Springs and Clear Creek County Commissioners are members of the Project Leadership Team, which met with CDOT and FHWA monthly throughout the EA process to offer leadership and guidance in developing the Twin Tunnels project. Other representatives of Clear Creek County participated in the Technical Team and other one-on-one meetings with CDOT to express concerns and offer expertise in community interests and values. Coordination will continue with Clear Creek County and Idaho Springs through design and construction of the Proposed Action.

3.2.4 What are the social and economic characteristics in the study area?

I-70 is the main travel corridor in the area, providing local travel through Clear Creek County communities, and access to the Denver metropolitan area, located approximately 30 miles to the east, and to the ski resorts to the west. Clear Creek County contains many popular recreational destinations in both the summer and winter. Many recreational activities in Idaho Springs center on Clear Creek's amenities for fishing, white water rafting, hiking, and biking. Recreational travel within and through Clear Creek County is the predominant contributor to peak I-70 highway traffic, especially during summer and winter weekends and holidays. Existing traffic during peak travel times is characterized by congestion that noticeably affects local travel, suppresses the number of skier and other recreational visits, and negatively affects the tourism economy.

Recreational travel on I-70 forms Clear Creek County's economic base and is also the predominant contributor to peak traffic volumes and congestion on I-70.

Several single-family residences are located along County Road (CR) 314 on the south side of I-70 through the study area. No residences are located north of the highway in the study area. Few community facilities exist in the study area, and residences rely on community facilities in the Idaho Springs area to the west and Evergreen area to the east. Nearly all of the community facilities in Idaho Springs (i.e., fire, police, schools, churches, food banks, and recreation) are located west of the study area. Community facilities in the study area include the Shelly/Quinn baseball field and a Colorado State Patrol detachment (detachments are not open to the public), both of which are west of the project limits. Also on the western end of the study area are several commercial businesses and the city's wastewater treatment plant. The western half of the study area is within the Idaho Springs city limits, and the eastern portion of the study area is within unincorporated Clear Creek County. Refer to [Section 3.4, Land Use and Right-of-Way](#), for information on current land uses and zoning in this area.

Population. From 2000 to 2010, total population decreased in both Idaho Springs and Clear Creek County. Idaho Springs population decreased by 172 to 1,717, and Clear Creek County population decreased by 234 to 9,088 (U.S. Census, 2010). The population in Clear Creek County is forecast to grow by 2015 and reach a population of 14,086 in 2035, an increase of about 55 percent from 2010.

Economy. DOLA (2010) estimates 4,428 jobs in Clear Creek County and an unemployment rate of 8.5 percent. By 2035, jobs are estimated to increase 24 percent to 5,498 and unemployment is estimated to drop to 4.9 percent. Recreational travel along I-70 from Front Range communities into Clear Creek County forms the economic base that supports the county's largest industry, tourism. Tourism in 2010 provided about 29 percent of the jobs in Clear Creek County and by 2035, tourism remains the largest employer, comprising about 36 percent of the jobs in the county. Mining activity continues to be a substantial component of the economy and is the second largest employer, comprising about 18 percent of the jobs in the county.

Commuting patterns. Because of the study area's proximity to the Denver metropolitan area, many residents in the area commute for employment to the Denver metropolitan area and nearby gaming areas in Central City and Black Hawk. More county residents currently commute to jobs in the surrounding counties than work in Clear Creek County (DOLA, 2010). This means that an important part of Clear Creek County's economic base, its residents' personal income, is derived from income and employment generated outside the county. These commuting patterns are expected to continue into 2035.



Clear Creek EMS responds to accidents on I-70 from the Eisenhower-Johnson Memorial Tunnels to Floyd Hill. Ambulances must travel 30 miles east to Jefferson County to access hospital services.

Safety and emergency services. The I-70 highway within the project area consists of a series of curves that experience higher than normal crash frequency when compared to the expected crash frequency on mountainous four-lane freeways (CDOT, 2011d). Clear Creek emergency medical services (EMS) provides ambulance and emergency response to most crashes on I-70 within the study area and throughout Clear Creek County, covering a geographic area of I-70 from the Eisenhower-Johnson Memorial Tunnels on the west to Floyd Hill on the east (approximately 50 miles). The lack of alternate routes through the project area hampers emergency response, especially during peak travel periods where congested conditions make it difficult to get to emergencies. Because no hospitals are located in Clear Creek County, emergency responders must travel about 30 miles east to Jefferson County for those incidents requiring hospital services.

3.2.5 How does the No Action affect social and economic resources?

The No Action would result in few impacts on social resources since few residences and community facilities are located in the study area. The current roadway safety conditions would persist, and Clear Creek EMS response times and convenience responding to crashes on I-70 would continue to be hampered by congested conditions during peak periods. The number of crashes along the highway, particularly around the curve west of Hidden Valley Interchange, would continue to be higher than expected and would increase as traffic volumes increase. Because

of the large geographic area covered by the Clear Creek EMS, the No Action would continue to burden emergency response in the study area and beyond. The No Action would not provide the potential for economic benefits related to construction spending and employment.

Bus service and intelligent transportation system/advanced traffic system management improvements included in the No Action could result in minor improvements to travel times, but weekend congestion along eastbound I-70 would continue to increase as traffic volumes increase. During peak periods in 2035, more traffic is anticipated to divert to other routes than under existing conditions. This additional diversion of traffic (beyond the suppressed trips of travelers who choose not to make trips to the mountains) could further negatively affect economic resources if travelers bypass Idaho Springs. Periods of weekday congestion could occur on some winter weekday afternoons (associated with “good snow days”) in 2035 under the No Action. However, the level of service for average travel would remain acceptable on weekdays and, therefore, commuters would not experience adverse traffic impacts.

3.2.6 How does the Proposed Action affect social and economic resources?

The Proposed Action would not cause any permanent adverse social and economic impacts.

The I-70 PEIS indicated that construction activities under the I-70 PEIS Preferred Alternative would likely suppress local economies during construction, but the I-70 PEIS Preferred Alternative would contribute to improved economic conditions surrounding the I-70 Mountain Corridor after construction. Dispersing construction activities through the corridor over time would minimize economic hardship, but Clear Creek County would experience more construction impacts than other counties because the scope of construction for the I-70 PEIS Preferred Alternative is greater there.

The conclusions of this Tier 2 process analysis are that nearby businesses may experience some reduction in business during the construction period. The effect is expected to be minor because only 4 percent of current vehicle miles traveled through the project area would divert to other routes, and many of these would divert to the frontage road through Idaho Springs. Minor economic benefits could result after construction if the additional trips through the project area result in additional recreation or tourism stops in Idaho Springs.

The Proposed Action would not cause any permanent adverse social and economic impacts.

The following sections discuss the impacts to social and economic resources as a result of the Proposed Action, including those effects expected during and after construction. The analysis evaluates the effects if the added third lane of the Proposed Action operates as: 1) a managed lane, which would institute fees to travel during peak periods, or 2) a general purpose lane, which would have no fees.



Idaho Springs commercial area.

What are the direct effects of the Proposed Action?

The Proposed Action is not anticipated to result in adverse impacts to any of the social or economic resources in the study area. Because the Proposed Action expands an existing highway facility and would be constructed in an area with few residences, little development, and few community facilities, it would not change existing community development patterns. With the exception of one undeveloped parcel next to the existing chain station, the Proposed Action would not directly affect any private properties, including residences and community facilities. The Proposed Action would not affect any existing highway accesses, and no new interchanges would be provided. Therefore, no changes in residential or commercial accesses would occur. The direct effects of the two roadway cross section options under consideration for the Proposed Action would not impact social and economic resources differently.

Effects on local residents and commuters. By improving the curve at the Hidden Valley Interchange, the Proposed Action would provide a consistent travel speed through the project area, improving both safety and travel times for those residents who commute east to Central City Parkway and/or the Denver metropolitan area for employment. Travel during peak periods would benefit from the additional capacity of the third travel lane. The operation of the managed lane during congested periods would encourage bus ridership and higher vehicle occupancy



Idaho Springs business district as seen from I-70.

during those times, because buses and higher occupancy vehicles could obtain more reliable travel time in the managed lane, and the charge would be distributed among more riders. The monetary charge for use of the managed lane is not expected to negatively affect local or regional travelers because the managed lane would operate only during peak periods, which are often avoided by local travelers, and two general purpose lanes would remain free of charge. Refer to [Section 3.3, Environmental Justice](#), for information on the effects of fees on the area populations.

Economic impacts. As identified in the I-70 PEIS, historical trends indicate that Clear Creek County has not experienced the population and economic growth that other mountain counties have received related to past improvements to the I-70 highway. The county’s geographic constraints (steep mountain slopes, narrow valleys, geologic hazards) and extensive public land ownership limit the amount of developable land. As discussed in [Section 3.4, Land Use and Right-of-Way](#), the Proposed Action is expected not to change growth trends.

The Proposed Action would not require the displacement of any businesses (refer to [Section 3.4, Land Use and Right-of-Way](#), for additional information on property acquisition). Although the Proposed Action would convert one parcel of land to transportation-related use, no negative effects on property tax revenues would be expected because the property is currently undevelopable due to its location and lack of access. The Proposed Action would improve travel from Clear Creek County to the Denver metropolitan area and may encourage more recreational trips for travelers who avoid recreation and tourism trips because of concern

The Proposed Action would cause temporary impacts on social and economic resources during the construction period, primarily due to travel delays on peak Sundays. Construction impacts would be less pronounced on weekdays when traffic volumes are lower.

about long return times. The Proposed Action would not cause permanent adverse economic effects in Clear Creek County. It would not result in any permanent access changes or impact parking that would negatively affect businesses.

Emergency response. The Proposed Action would improve eastbound travel on I-70 by adding a new lane and reducing the length of weekend congestion periods over the No Action. The Proposed Action would also straighten the highest crash location curve in the project area. The actions of flattening the curve and adding capacity are expected to reduce crashes in the study area by 20 percent to 35 percent or more compared to the No Action. (See [Section 3.1, Transportation and Safety](#), for additional information on safety benefits of the Proposed Action.) Improvements in safety would reduce the number of crashes on I-70, and improved travel time would shorten response times for emergency vehicles. Operation of the managed lane during highly congested periods, when many crashes occur, would create a reliable travel option through the project area for emergency response that would not exist without a managed lane.

How does the Proposed Action differ with or without a managed lane?

In general, the Proposed Action would generate similar social and economic impacts with or without a managed lane. Travel times would be similar with both concepts, but the managed lane would offer some additional mobility benefits over the general purpose lane concept, including a choice for a reliable speed and travel time during peak periods, free-flowing travel lane for emergency vehicles during congested periods to shorten their response times, and incentives for bus and higher occupancy travel. Although there would not be the same mobility benefits, the Proposed Action without the managed lane would not require any travelers to pay a charge during peak periods of congestion.

What indirect effects are anticipated?

Minor economic benefits may result from improved travel from Idaho Springs to Denver, which may encourage more recreation and tourism-related trips to Idaho Springs from

Safety improvements would reduce crashes by 20 to 35 percent.

travelers who avoid the area due to congested return times. Residents and businesses in the immediate project area on the east end of Idaho Springs would benefit from improved travel conditions near their properties.

What effects occur during construction?

Earth-moving and blasting activities would occur primarily within existing I-70 right-of-way, minimizing the extent of the construction effects on residents and community facilities in the study area. Construction activities would increase noise and dust levels, would have negative visual quality effects, and would result in changes to access.

The eastbound tunnel on I-70 would be closed to travel during tunnel construction, which is anticipated to last from April 2013 through October 2013. During this period, eastbound traffic would be routed around the tunnel onto a portion of CR 314, and travel delays on eastbound I-70 would occur, even in non-congested periods since the detour would reduce travel speeds to 35 miles per hour (mph) maximum. Westbound I-70 would also be closed periodically during blasting activities. Local travel would also be affected during the use of the detour, as CR 314 would be closed to both eastbound and westbound through-travel during its use as a detour. No local residences are present along the portion of CR 314 that would be used for the detour; however, several pullout accesses to the creek are present along the detour route and would not be accessible during this construction period. It is expected that bicycles would be able to continue to use the trail along CR 314 during the construction period. Refer to [Section 3.5, Recreation Resources](#), for information on construction effects to recreational access and facilities.

Only 4 percent of existing traffic would divert to alternate routes during construction, much of it to the frontage road through the Idaho Springs business district.

Alternate routes. Construction activities can induce drivers to travel on different routes to avoid construction congestion. A viable alternate route is SH 9/US 285 between Frisco and the Denver metropolitan area. Additionally, the frontage road (CR 314) east of US 40 could be used as a parallel route to avoid I 70 congestion; however, the frontage road is not continuous through the project area, so the frontage road does not provide an alternate route east of Idaho Springs. Traffic modeling conducted for this project indicates that construction would result in approximately 4 percent fewer vehicle miles traveled on I-70 in the study area, with these vehicles shifting to the frontage road and SH 9/US 285.



Rafting company in Clear Creek County (buses are used to transport customers to creek access points).

Effects on local residents and commuters. Construction delays would affect resident commuters and local travelers as well as recreational visitors. The effects of construction delays are most pronounced during the peak day (Sunday) during peak travel seasons and holidays and, therefore, primarily are borne by recreational travelers. Construction delays would have an effect on weekday commuters, who would be slowed traveling through the 35 mph detour. Backups, however, are not expected to be significant because weekday traffic volumes are much lower.

Economic impacts. Businesses in Idaho Springs may experience some reduction in business during the construction period due to travelers choosing to avoid the area. This effect is expected to be minor because only 4 percent of current vehicle miles traveled on eastbound I-70 would divert to other routes, and many of these would divert to the frontage road through the Idaho Springs business district west of the construction area. In addition, construction would occur east of Idaho Springs, and visitor access to retail businesses in Idaho Springs would not be affected—all interchanges would remain open during construction.

During reconstruction of the I-70 bridge over Clear Creek west of Hidden Valley Interchange, recreational access along the banks of Clear Creek may be restricted and the creek may be closed periodically for safety reasons. No fishing access in the vicinity of these construction activities would be allowed. Unless necessitated by safety concerns, closures are planned to occur outside of rafting season (June through August). If unanticipated closures occurred during rafting season, rafting companies that operate on Clear Creek within and east of the project limits would need to cancel trips or reduce trip duration along this portion of the creek during closures, potentially reducing revenues for those rafting companies. Mitigation measures described

in [Section 3.5, Recreation Resources](#), would reduce any potential impacts on rafting companies.

Some economic benefits from construction would be expected. It is anticipated that most construction workers would commute from the Denver metropolitan area given the shortage of housing in the study area and the close proximity of the Denver metropolitan area. Even though construction workers are not likely to relocate to Idaho Springs, construction would likely benefit businesses in Clear Creek County and Idaho Springs if goods and services related to construction activities and construction workers are purchased locally. Construction-related congestion could result in some travelers “waiting out” delays by visiting Idaho Springs businesses, resulting in increased sales tax revenues.

Emergency response. During peak travel times, construction congestion would result in increased travel times for emergency response between Clear Creek County and hospitals in Jefferson County. The detour route would include a shoulder allowing for emergency access, but some portions of I-70 would not have an adequate width shoulder for emergency access during periods of retaining wall construction. This would result in impacts on emergency services and safety in Clear Creek County during those peak times.

3.2.7 What mitigation is needed?

What I-70 PEIS mitigation strategies are relevant?

The phased approach of the I-70 PEIS Preferred Alternative allows for ongoing opportunities to avoid and minimize impacts to social and economic resources, establish mitigation, and employ I-70 Mountain Corridor Context Sensitive Solutions. The I-70 PEIS discussed many strategies to avoid, minimize, and mitigate construction impacts on I-70 Mountain Corridor communities and noted that the lead agencies would develop specific mitigation strategies, in concert with corridor communities, during Tier 2 processes in response to specific impacts.

The I-70 PEIS also stated that Tier 2 mitigation would consider strategies to address the disparity in the distribution of benefits and impacts that might result from construction activities. Tier 2 processes must include strategies to avoid and minimize construction impacts on Clear Creek County communities. [Strategies contained in the I-70 PEIS](#) applicable to the Twin Tunnels project are listed below:

- Considerations for peak seasonal traffic, such as cessation of construction activities during ski season weekends. Avoidance of peak travel periods for single-lane closures

on I-70 is included as a Twin Tunnels mitigation measure in Table 3-8.

- Accessibility to Idaho Springs businesses. The Proposed Action would not affect visitor access to Idaho Springs businesses, and all interchanges would remain open during construction.
- Developing a site-specific Tier 2 interpretive signage plan. CDOT and consulting parties are discussing interpretive signage as one of the measures that may be included in the Memorandum of Agreement addressing impacts to historic resources. See [Section 3.6, Historic Properties](#), for additional information.

In regards to mitigation strategies for emergency services, the I-70 PEIS stated that the lead agencies will address safety issues on I-70, reducing the number of crashes and the resulting frequency of emergency response to crashes, and ultimately reducing local community emergency services costs. This mitigation strategy has been addressed in safety improvements in the project design and is not included in the mitigation commitments below.

What mitigation is needed for this project?

CDOT has identified project mitigation for potential impacts on social and economic resources that could arise from future construction activities. Table 3-8 describes these mitigation measures.

Mitigation commitments for permanent impacts.

[Sections 3.1, Transportation](#); [3.4, Land Use and Right-of-Way](#); [3.5, Recreation Resources](#); [3.7, Visual Resources](#); [3.8, Air Quality](#); and [3.9, Noise](#), include a number of measures to reduce the effects of the Proposed Action on social and economic resources. No permanent adverse impacts to social and economic resources would occur as a result of the Proposed Action, and no permanent mitigation measures are required.

Mitigation commitments for temporary impacts during the construction period.

[Sections 3.1, Transportation](#); [3.4, Land Use and Right-of-Way](#); [3.5, Recreation Resources](#); [3.7, Visual Resources](#); [3.8, Air Quality](#); and [3.9, Noise](#), include a number of measures to reduce the effects of construction of the Proposed Action on social and economic resources. See [Section 3.5, Recreation Resources](#), for specific mitigation measures addressing closures of Clear Creek and restricted access for recreational activities such as rafting and fishing. Relevant mitigation measures identified in the I-70 PEIS to address construction effects related to the social and economic resources are included in Table 3-8.

Table 3-8. Mitigation Commitments for Temporary Impacts on Social and Economic Resources During the Construction Period

Activity	Location	Impact	Mitigation*
Operation of eastbound I-70 detour during construction.	On CR 314 between the Doghouse Rail Bridge and Hidden Valley Interchange.	Loss of local access for adjacent properties and local travelers on CR 314.	<ul style="list-style-type: none"> • CDOT will provide a detailed construction and detour plan to residents and business owners in the surrounding area as far in advance as possible. • CDOT will provide safe, effective, well-placed, and highly visible directional signage for access to properties along CR 314 during the detour.
Closure of eastbound lanes on I-70.	West portal of eastbound tunnel to Hidden Valley Interchange.	<p>Increase in emergency response travel times between Clear Creek County and hospitals in Jefferson County.</p> <p>Economic losses due to reduced through-traveler patronage at local businesses.</p> <p>Increased commuting travel times between Idaho Springs and the Denver metropolitan area.</p>	<ul style="list-style-type: none"> • Contractor will maintain access for emergency vehicles through the project area at all times by providing a shoulder of adequate width for emergency access. • Contractor will provide emergency responders traffic control contact information. In an emergency, responders will contact the traffic control office, provide their approximate arrival time at the construction zone, and traffic control will provide a clear path through the construction zone. • CDOT and the contractor will notify emergency service providers (Colorado State Patrol [CSP], sheriff, police, fire dispatchers, ambulance providers, etc.) of the timing of impending closures. • CDOT will develop a public information plan and will work with local public information officers to disseminate construction information to the traveling public. • CDOT will implement public information strategies such as media advisories, variable message signs, advance signs, a telephone hotline, real-time web cameras, the use of intelligent transportation systems and technology in construction work zones, a construction project website, and alternate route advisories to alert travelers to construction activities. • CDOT will provide well-placed and highly visible signage to direct patrons to businesses. • CDOT will work with Idaho Springs and Clear Creek County to identify community representatives who will partner in the construction traffic control program and provide assistance/feedback to the traffic control team. • CDOT will hold public meetings on the subject of critical construction phases to provide information and discuss mitigation strategies. CDOT will provide a construction information exchange center near the construction area for public input and up-to-date construction information.
Closure of eastbound lanes on I-70.	West of tunnels and east of Hidden Valley Interchange.	Increase in travel times.	<ul style="list-style-type: none"> • Work requiring closure of one lane will be conducted at night as much as possible. CDOT will work closely with the contractor to avoid all daytime construction during peak directional periods.

(continued on next page)

*(continued from previous page)***Table 3-8.** Mitigation Commitments for Temporary Impacts on Social and Economic Resources During the Construction Period

Activity	Location	Impact	Mitigation*
Construction of highway and retaining walls on I-70.	West of tunnels and east of Hidden Valley Interchange.	Increase in emergency response travel times between Clear Creek County and hospitals in Jefferson County.	<ul style="list-style-type: none"> • Contractor will maintain access for emergency vehicles through the project area by providing a shoulder of adequate width for emergency access when possible. • In areas with no shoulder access, contractor will provide emergency responders traffic control contact information. In an emergency, responders will contact the traffic control office, provide their approximate arrival time at the construction zone, and traffic control will provide a clear path through the construction zone when feasible. • CDOT and the contractor will notify emergency service providers (Colorado State Patrol, sheriff, police, fire dispatchers, ambulance providers, etc.) of the timing of impending closures.
Closure of chain station facility.	Twin Tunnels project area.	Roadway widening requires reconstruction of chain station to adhere to design standards.	<ul style="list-style-type: none"> • Construct temporary chain station facilities as necessary to maintain safe and effective chain station operations during winter months.
* Mitigation is not necessary if impact can be avoided through changes in the design or construction of the Proposed Action (i.e., the activity is avoided).			

3.3 Environmental Justice

3.3.1 How does the analysis relate to the I-70 PEIS?

The following commitments from [Section 3.9](#) of the I-70 PEIS (CDOT, 2011b) regarding environmental justice are applicable to this Tier 2 process:

- Adhering to any new laws and regulations
- Coordinating with local governments, social services agencies, and the Colorado Minority Business Office
- Developing project-specific best management practices (BMPs)

The I-70 PEIS included a full public and agency information and involvement program that included specialized outreach to minority and low-income populations. Additional outreach has been conducted to involve minority and low-income populations in this Tier 2 process. These efforts are detailed in Chapter 5, *Public and Agency Coordination*.

3.3.2 What process was followed to analyze environmental justice?

The study area for environmental justice encompasses a 0.5-mile radius around the project limits, which represents the area most likely to be affected by the Proposed Action. The environmental justice analysis was prepared in accordance with the Federal Highway Administration's (FHWA) *Guidance on Environmental Justice and NEPA* (FHWA, 2011), the *Colorado Department of Transportation Title VI and Environmental Justice Guidelines for National Environmental Policy Act (NEPA) Projects, Rev. 3* (CDOT, 2004), and *CDOT National Environmental Policy Act Manual* (CDOT, 2010a), and evaluates:

- The distribution of minority and low-income populations within the study area
- The issues, impacts, and benefits associated with the No Action and Proposed Action
- Whether or not the No Action and Proposed Action would result in disproportionately high and adverse human health and environmental impacts

More detailed information regarding the methodology for the analysis, applicable regulatory guidance, demographic data, impact analysis, and agency coordination is documented in the [Twin Tunnels EA Environmental Justice Technical Memorandum](#) (CDOT, 2012b).

3.3.3 What agencies were involved in this analysis and what are their issues?

The Clear Creek County Department of Health and Human Services expressed concern about congestion in the study area and the impact it has on residents and emergency response times. The department noted that transportation is a key issue for low-income households because many do not own a vehicle and those that do are negatively affected by congestion on I-70. No concerns about disparity were raised for a managed lane option, as long as pricing is reasonable and transit is available. The department indicated that project-generated employment would benefit their low-income clients because many are unemployed.

The Colorado Office of Economic Development and International Trade, Minority Business Office database was accessed in January 2012 to identify any registered minority and women-owned businesses throughout the study area. The database identified three businesses in the 80452 zip code. All are located more than 1 mile from the study area, within Idaho Springs. No businesses in the study area are known to provide services that are of unique importance to minority or low-income populations and no community facilities (i.e., churches, food banks, etc.) are located within the study area.

3.3.4 Where are minority and low-income populations in the study area?

As defined in Executive Order 12898 and Federal Highway Administration (FHWA) Order 6640.23, a minority is a person who is Black, Hispanic, Asian American, American Indian, or Alaska Native. Minority populations within the study area are identified in census blocks where the percentage of minorities exceeds that of Clear Creek County (8 percent). Of the 153 census blocks within the study area, 12 census blocks (8 percent) exceed the Clear Creek County threshold of 8 percent (U.S. Census 2010). As shown in Figure 3-7, only two of these are immediately adjacent to the project limits (block 3135 and block 3203). Block 3135 contains a population of 8, three of which (38 percent) are minority. This block extends almost 0.5 mile south of the project area. Approximately eight residences are located within the immediate project area. Of these, three are located in census block 3203. This block is 33 percent minority (with one minority and two non-minority residents). The remaining five residences are located in census blocks that do not contain higher than average concentrations of minorities. The majority of blocks within the study area (129, or 84 percent) contain a population of

zero, which is consistent with the limited land development and topography adjacent to the project limits.

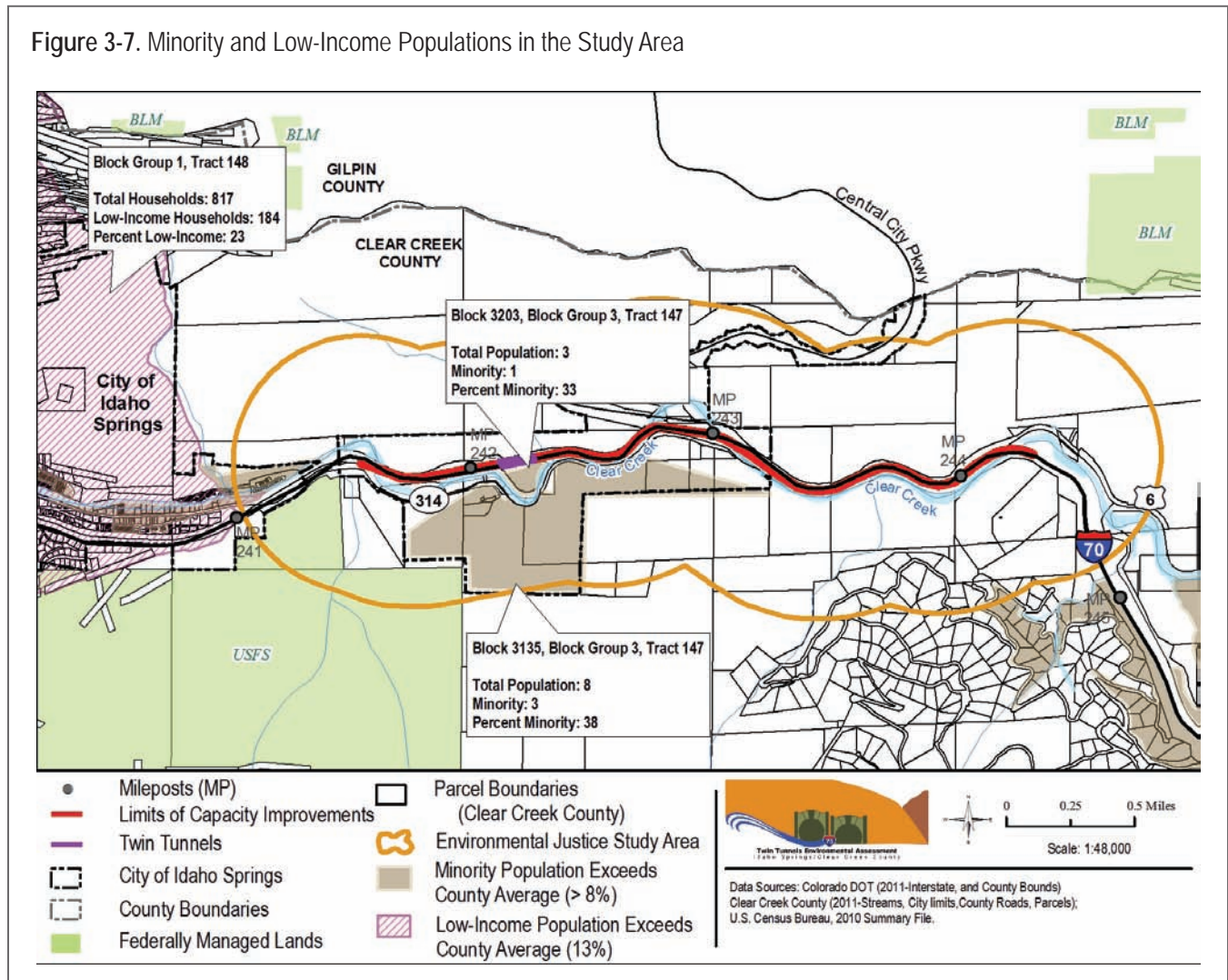
In Clear Creek County, low income is defined as households earning less than \$20,000 per year. This threshold was derived by adjusting the income limits set annually by the U.S. Department of Housing and Urban Development for identifying housing needs to reflect household size within Clear Creek County (2.14). Low-income populations within the study area are identified in census block groups where the percentage of low-income households exceeds that of Clear Creek County (13 percent). As shown in Figure 3-7, the study area is located within two census block groups. One of these (block group 1, tract 148) exceeds the 13-percent threshold. This block group is adjacent to the western

end of the project and reflects statistics for Idaho Springs because no residences within this block group are located within the project limits.

3.3.5 How does the No Action affect minority and low-income populations?

Traffic congestion in the I-70 Corridor would worsen over time, resulting in longer travel times, visual effects (from additional traffic on the highway), and lengthened emergency response times. Safety issues would persist. The implementation of the Frontage Road Phase I project on County Road (CR) 314 would result in some changes in visual quality due to the construction of retaining walls along CR 314, but would also improve

Figure 3-7. Minority and Low-Income Populations in the Study Area



recreational amenities within the study area. Bus service on I-70 would provide additional transportation options for all populations, including minority and low-income populations.

The effects of the No Action would not be borne by any particular segment of the population, and both minority and low-income and non-minority and non-low-income populations would be affected to the same extent. Therefore, the No Action would not cause disproportionately high and adverse effects on any minority or low-income populations.

3.3.6 How does the Proposed Action affect minority and low-income populations?

The I-70 PEIS concluded that the Preferred Alternative would not have direct effects on minority or low-income populations that are different (disproportionate) in comparison to the population on a corridor-wide basis. It concluded that construction impacts could disproportionately affect low-income residents living closer to I-70. The conclusions of this Tier 2 process analysis are that direct and construction impacts would not be high and adverse after mitigation and would be distributed across all segments of the population.

The following sections discuss the impacts to minority and low-income populations as a result of the Proposed Action, including those effects expected during and after construction. The analysis evaluates the effects if the added third lane of the Proposed Action operates as a managed lane, which would institute fees to travel during peak periods, or a general purpose lane, which would have no fees.

What are the direct effects of the Proposed Action?

The Proposed Action, with proposed mitigation, would not result in adverse effects to the general population, including minority and low-income populations. In general, project-related benefits and impacts would be evenly distributed and would not be predominantly borne by minority and/or low-income populations.¹

No low-income or minority residents would be displaced by the Proposed Action. The Proposed Action would not bisect any neighborhoods, result in any social isolation or separation of residents from community or public facilities, decrease the size of any neighborhood, or impact community cohesion. The Proposed Action would not impact any existing affordable housing units or increase

or decrease access to affordable housing. The Proposed Action would improve average travel times experienced by eastbound motorists during peak periods in 2035 by 27 minutes between Georgetown and Floyd Hill compared to the No Action.

How does the Proposed Action differ with or without a managed lane?

CDOT would price the managed lane only during peak periods of congestion, which typically occur on Sundays during the summer and winter seasons. The lane would operate as a general purpose (i.e., “free”) lane at all other times. Alternatives to the managed lane would continue to be available to commuters, including the existing general purpose lanes and transit services included in the No Action. The use of

the managed lane would improve travel times during the peak period in 2035 between Georgetown

and Floyd Hill by

an additional 2 to 3 minutes over the use of the general purpose lanes, but the general purpose lanes would still provide substantial congestion relief over the No Action. In addition, the managed lane would be available as a general purpose lane for the majority of the week, which would benefit all commuters that live west of the study area and commute to the Denver metropolitan area and nearby gaming areas in Central City and Black Hawk for work during the week. If the managed lane option is selected for the Proposed Action, CDOT would collect tolls via license plates or transponders and would accommodate offsite alternative payment options.

During peak periods of congestion, the managed lane would provide more reliable travel times and improve emergency response times. At first, these benefits would only be achieved on Sundays, but could extend to weekday periods as congestion grows over time. For the Twin Tunnels project, the current scenario assumes that public buses (and possibly private buses) would be able to use the managed lane for free. A managed lane added to the existing general purpose lanes would provide additional transportation options for all commuters, regardless of incomes, as drivers can choose to pay the charge when a faster, more reliable trip is necessary. For these reasons, a managed lane concept is not anticipated to result in a meaningful financial burden for lower-income commuters.

The Proposed Action would not result in disproportionately high and adverse effects on minority and/or low-income populations.

¹ All environmental resources were reviewed to identify adverse effects to all populations, including minority and low-income populations. Offsetting benefits and proposed mitigations were also considered to determine whether adverse effects would still be adverse after these other elements are considered. This analysis is detailed in Table 4 – Adverse Effects Analysis of the [Twin Tunnels EA Environmental Justice Technical Memorandum](#) (CDOT, 2012b).

The Proposed Action with three general purpose lanes and no managed lane would not affect minority and low-income populations differently from the Proposed Action with the managed lane. The only distinction between the options would be that all segments of the population would use general purpose lanes, and there would be no additional financial considerations for lower-income commuters.

What indirect effects are anticipated?

No indirect effects to minority or low-income populations within the study area are anticipated.

What effects occur during construction?

Construction effects would include detours, a temporary increase in roadway congestion in and around the area, the presence of large equipment, noise from blasting and construction equipment, dust from excavation and earthmoving activities, occasional closures of Clear Creek and access for recreational activities such as fishing, and general disruption to the surrounding area. Construction congestion is not expected to affect commuters on weekdays because weekday traffic volumes are currently low. Construction-related impacts would not be high and adverse after mitigation and would be distributed across all segments of the population.

Conclusion

Based on the discussion and analysis presented above, the Proposed Action with or without a managed lane would not result in disproportionately high and adverse effects

on minority and/or low-income populations in accordance with the provisions of Executive Order 12898 and FHWA Order 6640.23. No further environmental justice analysis is required.

3.3.7 What mitigation is needed?

What I-70 PEIS mitigation strategies are relevant?

The I-70 PEIS did not discuss specific mitigation approaches related to environmental justice. Rather, it noted that mitigation strategies for social and economic resources (discussed in [Section 3.2, Social and Economic Resources](#), of this document) will apply to all communities and also will benefit minorities and low-income communities. Additional mitigation measures would only need to be considered if a Tier 2 process resulted in disproportionately high and adverse effects on minority or low-income populations after considering mitigation, enhancement measures, and offsetting benefits.

What mitigation is needed for this project?

Resource-specific mitigation has already been factored into the analysis for environmental justice. Because the Proposed Action with or without a managed lane would not cause disproportionately high and adverse effects on any minority or low-income populations, no mitigation measures specific to environmental justice are needed.

3.4 Land Use and Right-of-Way

3.4.1 How does the analysis relate to the I-70 PEIS?

The following commitments from [Section 3.7](#) of the I-70 PEIS (CDOT, 2011b) regarding land use and right-of-way are applicable to this Tier 2 process:

- The Colorado Department of Transportation (CDOT) will conduct further analysis of changes that affect the functionality of parcels of land near Interstate 70 (I-70), such as changes in access, visibility, and noise levels.
 - The analysis will include coordination with individual communities and agencies to determine functional impacts on businesses, homeowners, and other property owners, and to determine appropriate mitigation.
- CDOT will consider approaches to effectively coordinate projects with local communities and their land use plans, including:
 - Identifying an I-70 Mountain Corridor Context Sensitive Solutions (CSS) Manager and agency staff liaisons who can serve across the entire corridor to provide process continuity
 - Providing communities with possible alignments as early as possible to allow them to make timely land use decisions

CDOT has followed the I-70 Mountain Corridor CSS process for this project, establishing a Project Leadership Team and Technical Team composed of community and agency stakeholders. Through these forums, CDOT has consulted early and often with community representatives regarding

the proposed improvements, thereby allowing them to make timely land use decisions. A CSS Manager and staff liaisons who can serve across the entire corridor are not necessary at this time; however, the CDOT I-70 Mountain Corridor Environmental Manager provides continuity in both the environmental and CSS processes for all Tier 2 processes that occur within the corridor.

3.4.2 What process was followed to analyze land use and right-of-way?

The study area used to analyze the direct impacts to land use includes the parcels surrounding the existing I-70 highway and County Road (CR) 314. The study area used to analyze the indirect impacts of induced growth includes Clear Creek County.

CDOT evaluated existing land uses in the study area by visiting the study area, reviewing aerial imagery, and reviewing adopted land use plans from Idaho Springs and Clear Creek County (see [Table 3-9](#)). The analysis evaluates consistency with future proposed land uses and growth management policies. CDOT met with planning staff from Clear Creek County and Idaho Springs to discuss land use planning and growth management policies and to gather information on present and future development projects in the county.

3.4.3 What agencies were involved in this analysis and what are their issues?

Representatives from Idaho Springs requested that the project remain consistent with the goals and objectives set forth in the *Idaho Springs Comprehensive Plan* (City of Idaho Springs [CIS], 2008b) and the *Clear Creek Greenway Plan* (Clear Creek County [CCC], 2005b). According to the

Table 3-9. Land Use Plans and Policies Evaluated for the Study Area

Municipality/Agency	Adopted Plans and Policies
City of Idaho Springs	<ul style="list-style-type: none"> • <i>Idaho Springs Comprehensive Plan</i> (2008b) • <i>3 Mile Area Plan</i> (2008a) • Article 21 (Zoning) of the City Municipal Code (2005)
Clear Creek County	<ul style="list-style-type: none"> • <i>Clear Creek County Master Plan 2030</i> (2004) • <i>Open Space Plan</i> (2005a) • <i>Greenway Plan</i> (2005b) • <i>Floyd Hill Gateway Sub-Regional Master Plan</i> (2009) • <i>Intercounty Non-Motorized Routes Master Plan</i> (1990) • Zoning Code (2011c)
Denver Regional Council of Governments	<ul style="list-style-type: none"> • <i>2035 Metro Vision Regional Transportation Plan</i> (DRCOG, 2011) • 2012-2017 Transportation Improvement Program

Idaho Springs Comprehensive Plan, the original construction of I-70 appropriated about one-third of developable land in the city and converted it into transportation uses, resulting in displaced homes, businesses, and historic structures. The city is sensitive to this issue, and expects the Twin Tunnels project to minimize acquisitions.

3.4.4 What are the current land uses, zoning, and adopted land use plans in the study area?

Current land uses (see Figure 3-8) at the west end of the study area, near the Twin Tunnels, include public undeveloped lands, rural residential, commercial, light industrial, and recreational uses. The land uses surrounding the Hidden Valley Interchange remain largely undeveloped, with three parcels developed as light industrial uses and a few rural residences south of the interchange. The study area between the Hidden Valley Interchange and the eastern project limit is currently undeveloped land with the exception of Kermitts restaurant at the US 6/I-70 Interchange (milepost 244.25).

Zoning in the study area includes light and heavy industrial west of the Twin Tunnels. Rural multifamily occurs between the Twin Tunnels and the Hidden Valley Interchange, with one parcel zoned for commercial interchange development.

The land surrounding the Hidden Valley Interchange is zoned as a Commercial Interchange Development District. Zoning from the Hidden Valley Interchange to the US 6/I-70 Interchange comprises rural residential, conservation, and planned unit development.

The Idaho Springs Comprehensive Plan (CIS, 2008b) identifies land surrounding the Twin Tunnels area to remain light industrial where light industrial uses currently operate, with residential uses continuing to expand north, south, and east of the Twin Tunnels. The city foresees the land immediately north of the Hidden Valley Interchange to redevelop from light industrial to regional commercial. Land surrounding this interchange and the Central City Parkway is planned to be developed into a mixed-use transition node. Planned land uses east of the Hidden Valley Interchange, within Clear Creek County, include large-lot residential south of I-70 and open space north of I-70 (Figure 3-9).

Historical growth trends in Clear Creek County show lower growth than surrounding counties, with little population growth pressure or unmet land demand. Neither Idaho Springs nor Clear Creek County identifies growth pressure as an issue of concern in the study area.

Figure 3-8. Existing Land Uses Surrounding the Twin Tunnels Project Limits

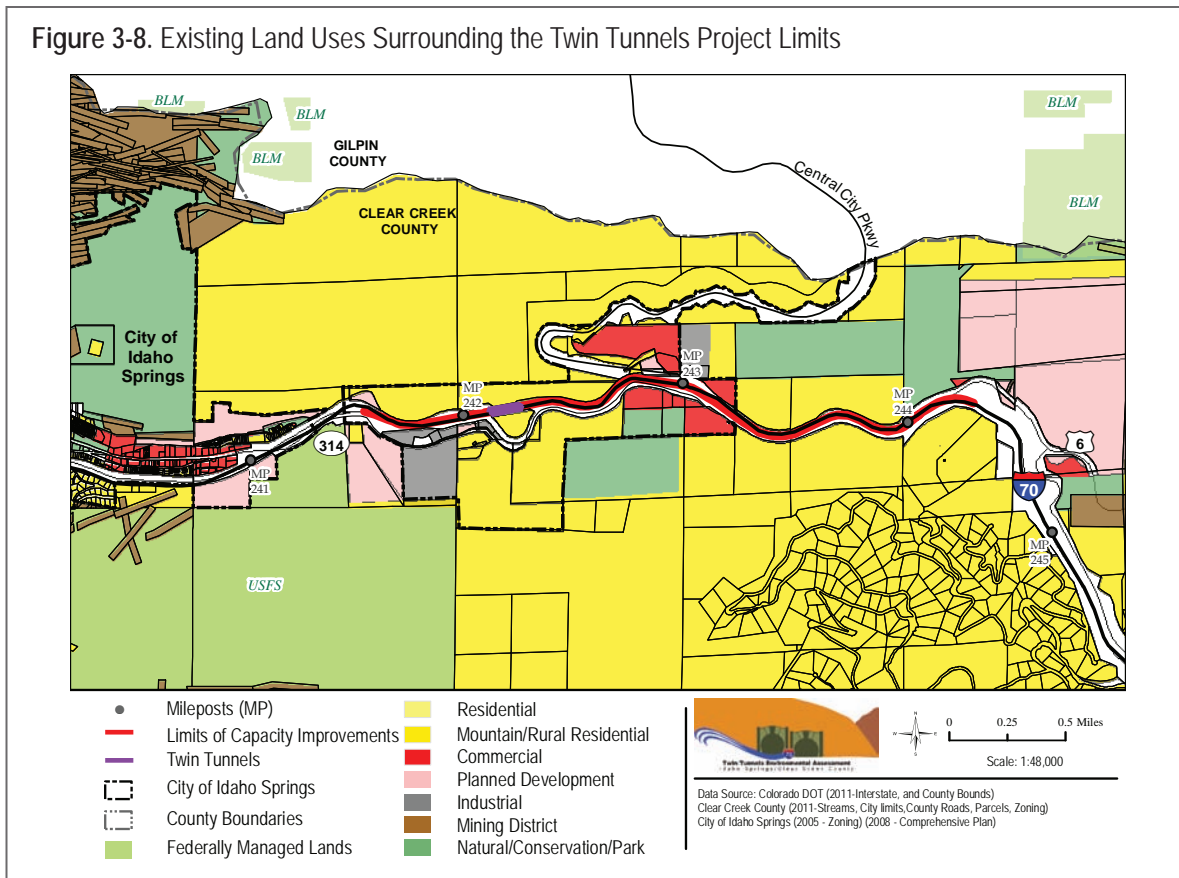
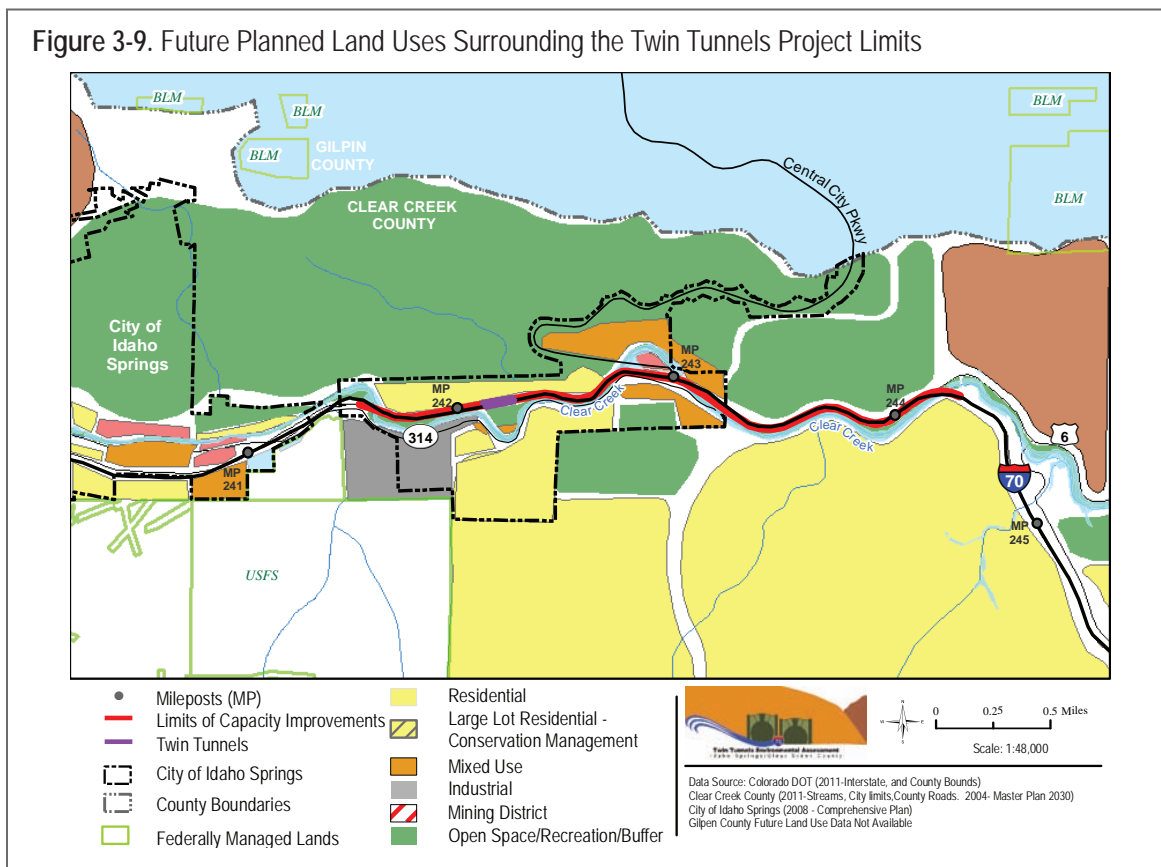


Figure 3-9. Future Planned Land Uses Surrounding the Twin Tunnels Project Limits



Several adopted land use plans provide goals and objectives for land use, transportation, and other planning elements within the study area. Table 3-9 lists the local and regional plans evaluated in the land use analysis. The [Twin Tunnels EA Land Use Technical Memorandum](#) (CDOT, 2012c) summarizes the relevant sections of those local and regional plans. These planning documents are supportive of transportation improvements, particularly developing a long-term transportation solution that addresses safety and operations and local mobility.

3.4.5 How does the No Action affect land use and right-of-way?

Under No Action conditions, CDOT would improve CR 314 between the East Idaho Springs Interchange and the Hidden Valley Interchange. The No Action would implement a multiuse trail between the existing Scott Lancaster Memorial Bridge and Hidden Valley Interchange, but would not contribute to a long-term transportation solution for I-70. No property would be acquired for transportation purposes.

Growth projections would likely follow historical trends for Idaho Springs and Clear Creek County, which are lower

than surrounding cities and counties in the I-70 Mountain Corridor. The No Action likely would not induce any change in land use patterns. It would be consistent with the current and future zoning of parcels located in the study area, and it would not preclude the planned growth identified by Clear Creek County and Idaho Springs.

3.4.6 How does the Proposed Action affect land use and right-of-way?

Fewer property impacts would result from the Proposed Action than estimated in the I-70 PEIS, because the I-70 PEIS used a larger footprint for estimating impacts than would actually occur under the Proposed Action. The I-70 PEIS indicated that Clear Creek County would not experience measurable induced growth as a result of the Preferred Alternative because its land areas are constrained and not developable due to slopes and geologic hazards, and a large portion of the county is publicly owned. The conclusions of this Tier 2 process analysis regarding growth are consistent with the conclusions of the I-70 PEIS.

The following sections discuss the impacts to land use and right-of-way as a result of the Proposed Action, including those effects expected during and after construction.

Table 3-10. Right-of-Way Acquisitions Needed for the Proposed Action

	Number of Fully Acquired Parcels	Acres of Fully Acquired Parcels	Number of Partially Acquired Parcels	Acres of Partially Acquired Parcels	Number of Ownerships of Full Acquisitions	Number of Ownerships of Partial Acquisitions
Residential	0	0	0	0	0	0
Commercial	0	0	1	0.87	0	1
Public	0	0	0	0	0	0
Vacant	0	0	0	0	0	0
Totals	0	0	1	0.87	0	1

The analysis considers the effects of the Proposed Action including a managed lane and two general purpose lanes, and effects with three general purpose lanes and no managed lane.

What are the direct effects of the Proposed Action?

The Proposed Action would alter existing land uses in the study area, primarily by converting private property to transportation facilities. No full acquisitions would be required under the Proposed Action. This project would require partial acquisition of one vacant property zoned for commercial use to accommodate the reconstruction of the truck chain station west of the Twin Tunnels. The portion of the property that would be acquired is not developable because it lies between the I-70 highway and Clear Creek with no means of accessing the property by vehicle. Table 3-10 provides a summary of right-of-way needs for this project.

Straightening the eastbound I-70 curve west of the Hidden Valley Interchange would require adjacent curve straightening on CR 314 to provide adequate separation of CR 314 from I-70. The alignment shift would occur within existing CDOT right-of-way and would not require any additional right-of-way acquisition in this location. Structures on the adjacent property sit very close to the property line, and personal property is located within CDOT right-of-way in this location, due to historical use of the property. None of these structures or personal property would be affected by the alignment shift of CR 314.

The Proposed Action would be consistent with the zoning of parcels located in the study area. The Proposed Action would not generate impacts upon parcels such that it would create non-conforming parcels. The adopted planning documents support the Proposed Action, particularly the development of a transportation system that addresses

safety and operations. The Proposed Action is not likely to serve as the impetus for zoning changes or changes in overall land use patterns but would accommodate the future planned land uses in the study area.

How does the Proposed Action differ with or without a managed lane?

The Proposed Action would generate the same land use and right-of-way impacts with or without a managed lane.

What indirect effects are anticipated?

Growth pressure, in the form of either land development or population growth, was not identified as an issue of concern in the study area during the I-70 PEIS or during the Twin Tunnels Tier 2 process. The I-70 PEIS found that I-70, including traffic conditions, has not been a constraint to historical population growth in Clear Creek County. Therefore, changes in travel conditions on I-70 are not expected to affect growth in the county, and it is unlikely to induce population shifts into Clear Creek County west of the Twin Tunnels. Under the Proposed Action, Idaho Springs and Clear Creek County would likely experience growth similar to the No Action and would likely follow historical growth trends.

It is possible that this project, in conjunction with additional growth from the Gaming Area in Gilpin County, could spur redevelopment of the light industrial uses along the Central City Parkway and at the Hidden Valley Interchange.

What effects occur during construction?

During the construction phase, eastbound interstate traffic would use CR 314 as a detour route. During the time that the detour is used, CR 314 would be an access-controlled facility open only to interstate traffic. No ingress or egress points to adjacent properties exist along this section of

roadway and, therefore, the detour would not affect any existing accesses.

It is unlikely use of the detour route would affect the viability of any of the businesses or result in any land use changes. If a business in the vicinity of Twin Tunnels vacates a property, the parcel would redevelop in a manner that is likely consistent with the current zoning and the future land use plan.

3.4.7 What mitigation is needed?

What I-70 PEIS mitigation strategies are relevant?

The phased approach of the I-70 PEIS Preferred Alternative provides ongoing opportunities to avoid and minimize impacts to adjacent land use, establish effective mitigation, employ the I-70 Mountain Corridor CSS process, and implement future phases of the I-70 PEIS Preferred Alternative as corridor communities are ready and able to accommodate those changes. [Primary mitigation strategies](#) to avoid or reduce direct effects to adjacent properties include design refinements, particularly at interchanges, and physical measures such as the use of retaining walls or elevated structures.

CDOT committed to assisting communities in the adoption of more comprehensive, regional growth management plans that can be applied to Tier 2 processes. Idaho Springs and Clear Creek County already adopted several land use plans that provide a framework for future land use decisions. As recommended in the I-70 PEIS, both communities already advanced the idea of open space as community separators and protecting viewsheds that distinguish their communities. Efforts to control growth are greatly dependent on local planning and community political direction.

What mitigation is needed for this project?

CDOT has identified project mitigation for potential land use and right-of-way impacts. Table 3-11 and Table 3-12 describe these mitigation measures.

In certain situations, it may be necessary to acquire improvements that are located within a proposed acquisition parcel. In those instances where the improvements are occupied, it becomes necessary to relocate those individuals from the subject property (residential or business) to a replacement site. The Uniform Relocation Assistance & Real Property Acquisitions Policies Act of 1970 (Uniform Act) provides for numerous benefits

to these individuals to assist them both financially and with advisory services related to relocating their residence or business operation. Although the benefits available under the Uniform Act are far too numerous and complex to discuss in detail in this document, they are available to both owner occupants and tenants of either residential or business properties. In some situations, only personal property must be moved from the real property, and this is also covered under the relocation program. As soon as feasible, any person scheduled to be displaced shall be furnished with a general written description of the displacing agency's relocation program that provides, at a minimum, detailed information related to eligibility requirements, advisory services and assistance, payments, and the appeal process. It shall also provide notification that the displaced person(s) will not be required to move without at least 90 days advance written notice. For residential relocatees, this notice cannot be provided until a written offer to acquire the subject property has been presented, and at least one comparable replacement dwelling has been made available. Relocation benefits will be provided to all eligible persons regardless of race, color, religion, sex, or national origin. Benefits under the Uniform Act to which each eligible owner or tenant may be entitled will be determined on an individual basis and explained to them in detail by an assigned Right-of-Way Specialist.

For any person(s) whose real property interests may be impacted by this project, the acquisition of those property interests will comply fully with the Uniform Act, as summarized in Table 3-11. 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. It was created to provide for and ensure the fair and equitable treatment of all such persons. To further ensure that the provisions contained within this Act are applied "uniformly," CDOT requires Uniform Act compliance on any project for which it has oversight responsibility regardless of the funding source. Additionally, the Fifth Amendment of the U.S. Constitution provides that private property may not be taken for a public use without payment of "just compensation." All impacted owners will be provided notification of the acquiring agency's intent to acquire an interest in their property, including a written offer letter of just compensation specifically describing those property interests. A Right-of-Way Specialist will be assigned to each property owner to assist with this process.

Table 3-11. Mitigation Commitments for Permanent Impacts Concerning Potential Land Use and Right-of-Way

Activity	Location	Impact	Mitigation*
Property acquisition.	Chain station reconstruction west of Twin Tunnels.	Acquisition of undevelopable property.	<ul style="list-style-type: none"> CDOT will comply with the Uniform Relocation Assistance and Real Property Acquisition Policies Act of 1970, as amended.
* Mitigation is not necessary if impact can be avoided through changes in the design or construction of the Proposed Action (i.e., the activity is avoided).			

Table 3-12. Mitigation Commitments for Temporary Impacts Concerning Potential Land Use and Right-of-Way During the Construction Period

Activity	Location	Impact	Mitigation*
Operation of detour on CR 314.	CR 314 between Doghouse Rail Bridge and Hidden Valley Interchange.	Loss of local access for local travelers on CR 314.	<ul style="list-style-type: none"> CDOT will provide detailed construction and detour plan to residents and business owners in the surrounding area as far in advance as possible. CDOT will provide safe, effective, well-placed, and highly visible directional signage for access to properties along CR 314 during the detour.
* Mitigation is not necessary if impact can be avoided through changes in the design or construction of the Proposed Action (i.e., the activity is avoided).			

3.5 Recreation Resources and Section 6(f) Evaluation

3.5.1 How does the analysis relate to the I-70 PEIS?

The following commitments from [Section 3.12](#) of the I-70 PEIS (CDOT, 2011b) regarding recreational resources are applicable to this Tier 2 process:

- The Colorado Department of Transportation (CDOT) will conduct further analysis of direct and indirect impacts on recreation resources during future project-specific Tier 2 processes to determine the degree and extent of impact.
- The lead agencies will continue to coordinate with jurisdictions regarding direct and indirect impacts to recreation resources, and specifically with Clear Creek County regarding the *Clear Creek Greenway Plan* (CCC, 2005b).

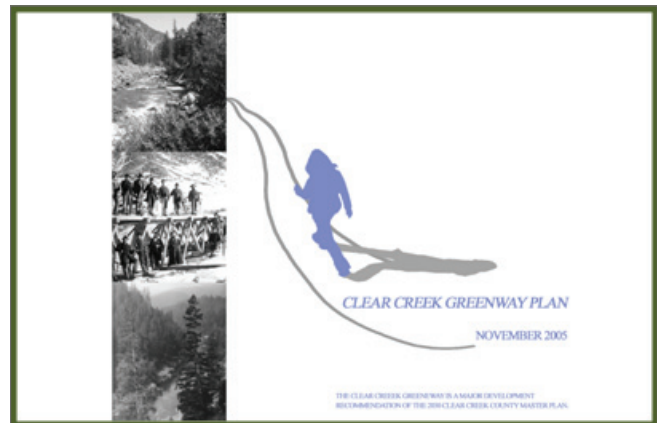
The I-70 PEIS recognized the local communities' desire to maintain and improve trail connectivity along Interstate 70 (I-70) as well as the many river access points on Clear Creek. Therefore, for this Environmental Assessment (EA), CDOT has considered approaches to incorporate and maintain future bike routes in the I-70 highway right-of-way, improve path connectivity, and continue to provide river access points in a manner compatible with CDOT and Federal Highway Administration (FHWA) guidance.

3.5.2 What process was followed to analyze recreation resources?

The study area for recreational resources encompasses the I-70 and CR 314 corridors from approximately I-70 milepost 241 to I-70 milepost 244.5, comprising areas where direct and indirect impacts to recreation resources may occur.

This analysis was conducted consistently with CDOT Bicycle and Pedestrian Procedural Directive 1602.1, which is codified at Colorado Revised Statute 43-1-120. The law requires the incorporation of bicycle and pedestrian considerations throughout CDOT's planning, programming, design, construction, and maintenance operations (as well as educational and enforcement efforts).

The location of existing and planned recreational resources and activities was determined through coordination with local jurisdictions, analysis of geographic information system data, site visits, and review of the I-70 PEIS and current comprehensive land use, parks, and public services and facilities plans. Management directives and planning for recreation resources within the study area are detailed in the *Clear Creek Greenway Plan* (CCC, 2005b) and are also



The Clear Creek Greenway is a priority of the Clear Creek Open Space Program tying communities to recreational and heritage sites along the creek.

identified to some extent in the *System-Wide Master Plan* (Clear Creek Metropolitan Recreation District, 2011), the *Clear Creek County Master Plan* (CCC, 2004), and the *Idaho Springs Comprehensive Plan* (CIS, 2008b). These additional plans endorse the proposals found within the *Clear Creek Greenway Plan* and tend to cede particular recreational development and management details to that plan.

Impacts to private and public parks, recreation, and open space facilities resulting from the proposed project are assessed based on the degree and extent of impacts to existing and planned facilities, and how well the project would accommodate planned facilities. Effects to existing and proposed recreation resources and activities from the Twin Tunnels project have been determined in coordination with the local jurisdictions and through public input.

Section 6(f) of the Land and Water Conservation Fund Act (Title 36 of the Code of Federal Regulations [CFR] Part 59) protects recreational lands planned, acquired, or developed with Land and Water Conservation Funds. The National Park Service and Colorado State Parks supplied information for the inventory of Section 6(f) resources. Data provided by these agencies identified no recreation properties within the study area funded with Land and Water Conservation Funds and, therefore, evaluation of Section 6(f) impacts is not applicable to this evaluation.

3.5.3 What agencies were involved in this analysis and what are their issues?

Through the I-70 PEIS process, CDOT has coordinated with staff at Clear Creek County, Idaho Springs, the United States Forest Service, and Colorado Parks and Wildlife to discuss management priorities and concerns about impacts to recreation resources in the I-70 Mountain

Corridor. For the Twin Tunnels EA, CDOT coordinated with local jurisdictions regarding the Proposed Action and the recreational resources in the study area. The local municipalities' primary concerns related to recreation resources revolve around the implementation of the Clear Creek Greenway Plan and the preservation of access to Clear Creek. Coordination will continue with Clear Creek County and Idaho Springs through design and construction of the Proposed Action. Many of the recreation amenities described within the plan are located partially or wholly within CDOT right-of-way, and long-term coordination between the agencies is needed for implementation of these elements of the plan.

3.5.4 What are the recreation resources in the study area?

The resources identified in the study area include paved and natural surface trails, a skateboard park, ball fields, a rock climbing area, and Clear Creek, which currently has nine recreational access points in the study area (see Figure 3-10). Three planned recreation properties and two planned trails were also identified in the study area. The primary recreational activities in the study area include fishing, bicycling, hiking, rock climbing, and rafting and kayaking in Clear Creek's class III rapids. These recreational resources are described in detail in the [Twin Tunnels Recreation and Section 6\(f\) Resources Technical Memorandum](#) (CDOT, 2012d).

Recreational resources in the study area that would be affected by the Proposed Action include the Scott Lancaster Memorial Trail, Kermitts Trailhead (planned), Game Check Area Park (planned), and Clear Creek. These resources are described below.

Scott Lancaster Memorial Trail. The Scott Lancaster Memorial Trail functions as part of the Clear Creek Greenway system and currently runs between Idaho Springs and the junction of I-70 and US 6 near Kermitts. The trail is asphalt and includes segments of 8-foot-wide off-street trail, on-street segments, and segments of old roadway exceeding 24 feet in width (CCC, 2005b). Uses include fishing access and cycling, and use is generally higher west of the Hidden Valley Interchange (Shanks, 2012, Personal Communication).

Kermitts Trailhead (planned). This trailhead for the Scott Lancaster Memorial Trail is accessible from a pull-off on the US 6 Interchange ramp (Exit 244) and is currently used informally. The *Clear Creek Greenway Plan* (CCC, 2005b) identifies future changes at this trailhead including formal parking, signage, and restrooms.



Scott Lancaster Bridge over Clear Creek, carrying the Scott Lancaster Memorial Trail.

Game Check Area Park (planned). The Game Check Area Park will serve as a park and trailhead with parking and restrooms. The site, which is currently owned by Clear Creek County and used informally for parking and recreational access, is located south of the Twin Tunnels along the Scott Lancaster Memorial Trail and old US 40.

Clear Creek. Clear Creek offers a range of activities for the outdoor enthusiast with fishing and boating being at the forefront. One formal and eight informal access points are located along Clear Creek within the study area, all of which are within CDOT right-of-way. Fifteen permitted rafting outfitters operate on Clear Creek through the study area. Recreational river activities are important to Clear Creek County from an economic development perspective (see [Section 3.2, Social and Economic Resources](#), for more information).



Clear Creek Rafting Company access point west of the Twin Tunnels.

3.5.5 How does the No Action affect recreation resources?

Phase 1 of the Frontage Road project on County Road (CR) 314 would improve the Scott Lancaster Memorial Trail and would affect several fishing and boating accesses on Clear Creek as described below:

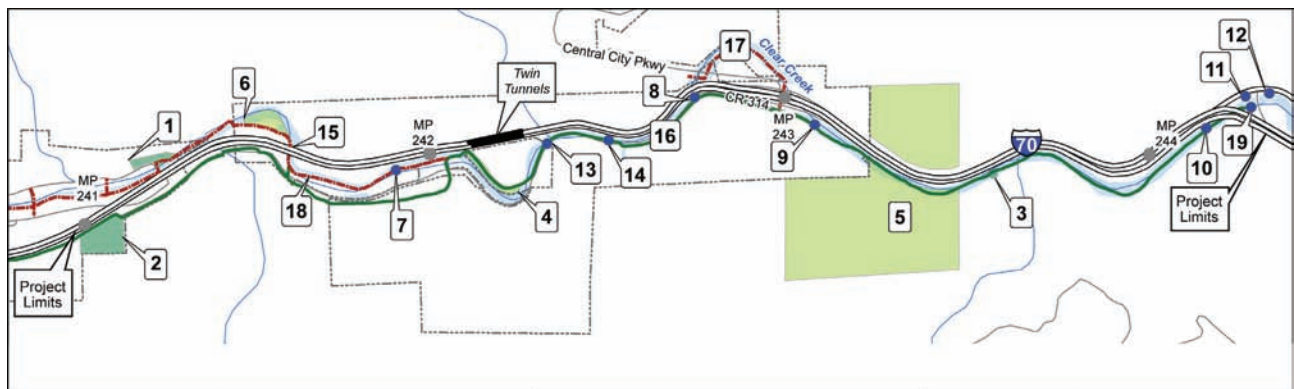
- The on-street segment of the Scott Lancaster Memorial Trail between the Doghouse Rail Bridge and approximately 500 feet west of Hidden Valley Interchange will be improved to a 10-foot shared-use path separated from travel lanes by a 5-foot buffer zone.
- Roadway widening will remove all parking at the Unnamed Fishing Access located on the north side of CR 314 approximately 400 feet east of the Doghouse Rail Bridge.
- The project will formalize the Unnamed Boating Access located on the north side of CR 314 approximately 1,400 feet east of the Doghouse Rail Bridge.
- New retaining walls along CR 314 will change visual quality, indirectly affecting recreationalists along Clear Creek and the Scott Lancaster Memorial Trail.

- During the blasting of rock outcrops, use and access of Clear Creek will be restricted. Use and access may also be restricted due to other construction that may cause safety concerns.

3.5.6 How does the Proposed Action affect recreation resources?

The I-70 PEIS concluded that highway capacity increases would have more direct impacts to recreation resources and lower increases in visitation to recreation amenities than transit improvements. The lower visitation increases would occur because highway improvements have less capacity for additional trips in the I-70 Mountain Corridor than transit. The conclusions of this Tier 2 process analysis are consistent with the conclusions of the I-70 PEIS. Direct impacts to several recreation resources are expected to occur as a result of the Proposed Action, but indirect effects do not include measurable increases in visitation to recreation amenities. Fewer recreation resources would be directly impacted by the Proposed Action than estimated in the I-70 PEIS, because the I-70 PEIS used a larger footprint for estimating impacts than would actually occur under the Proposed Action.

Figure 3-10. Existing and Planned Recreational Resources in the Study Area



1 Skateboard Park	8 Below Box Boating Access	15 Under Bridge Boating Access
2 Clear Creek Metropolitan Recreation District Ball Field Complex	9 Hidden Valley Fishing and Boating Access	16 Scott Lancaster Memorial Trail
3 Rock Wall	10 LI' Easy Boating Access	17 Trail at Hidden Valley Interchange (proposed)
4 Game Check Area Park (proposed)	11 Kermitts Fishing Access	18 Greenway Creekside Trail (proposed)
5 Simpson Property and Trail Rest Area (proposed)	12 Kermitts Boating Access	19 Kermitts Trailhead (proposed)
6 Park (Former Sewage Treatment Site) (proposed)	13 Unnamed Fishing Access	
7 Clear Creek Rafting Boating and Fishing Access	14 Unnamed Boat Access	

Legend

- Milepost
- Clear Creek
- City of Idaho Springs
- Scott Lancaster Memorial Trail
- Proposed Trails
- Existing Park/Recreation Areas
- Proposed Park/Recreation Areas
- River Recreation Access

Twin Tunnels Environmental Assessment
Data Source: Colorado DOT (2011-Interstate, and County Bounds)
 Clear Creek County (2011-Streams, City Limits, County Roads, Recreation)

Date: 4/20/2012

The following sections discuss the impacts to recreation resources as a result of the Proposed Action, including those effects expected during and after construction. The analysis considers the effects of the Proposed Action including a managed lane and two general purpose lanes, and effects with three general purpose lanes and no managed lane.

What are the direct effects of the Proposed Action?

Long-term, direct impacts would include realignment of the Scott Lancaster Memorial Trail, removal of one Clear Creek boating access, and potential reduction in parking availability at Kermitts Trailhead and Kermitts Boating Access.

The Scott Lancaster Memorial Trail and the Below Box Boating Access would be impacted to accommodate the realignment of I-70 west of Hidden Valley Interchange. The trail is an on-street route along CR 314 and would continue to be so under the Proposed Action. The realigned CR 314 would include a widened shoulder along the south side of the roadway, which would improve safety and mobility for pedestrian and bicycle traffic. The Below Box Boating Access, which is located along the north side of CR 314 near the bridge at Hidden Valley, would be removed. This is one of seven boating accesses to Clear Creek in the study area. Existing boating accesses located approximately ¼ mile upstream and ½ mile downstream would still be available for recreational river access.

The Sediment Control Action Plan being prepared for Clear Creek recommends a number of improvements near the US 6 Interchange to provide water quality enhancements to Clear Creek. Under the Proposed Action, implementation of these water quality measures may reduce the available space for parking at Kermitts Trailhead and Kermitts Boating Access. It is not anticipated that these water quality measures would preclude continued informal recreational use or desired recreational improvements to the trailhead or boating access.

Within the study area, I-70 crosses over two planned recreational trails: the Greenway Creekside Trail and the Trail at Hidden Valley Interchange. Under the Proposed Action, the existing I-70 bridge structures at these locations would remain in place and these planned trails would not be precluded.

Because I-70 would primarily stay on alignment under the Proposed Action, impacts to recreational resources would be minimized and are predominantly of a temporary nature.

The direct effects of the two roadway cross section options under consideration for the Proposed Action would not impact recreational properties differently.

How does the Proposed Action differ with or without a managed lane?

The Proposed Action would result in the same impacts on recreation resources with or without a managed lane.

What indirect effects are anticipated?

As discussed in [Section 3.7, Visual Resources](#), the Proposed Action would affect views of recreationalists along Clear Creek and the Scott Lancaster Memorial Trail. Visual impacts associated with retaining walls along the south side of I-70 for both roadway cross sections and a short cantilevered segment of I-70 for the 56-foot roadway cross section would be considered minor to moderate.

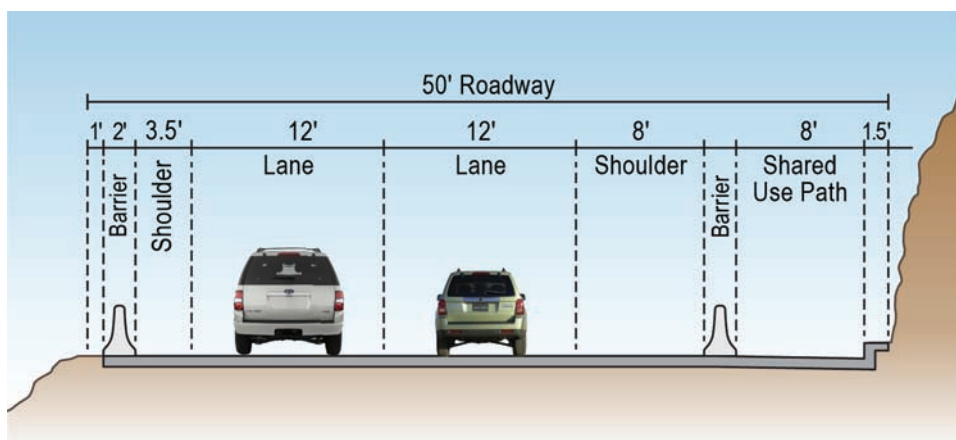
Visual changes for recreational users would primarily be associated with retaining walls along the south side of I-70.

As discussed in [Section 3.9, Noise](#), noise levels in the study area currently exceed the CDOT noise abatement criteria at most of the identified noise sensitive receptors, including the Scott Lancaster Memorial Trail. The noise level increase associated with the Proposed Action would be small and not perceptible to recreational users. Because existing noise levels exceed the CDOT noise abatement criteria, noise mitigation was examined at noise sensitive receptors in the study area and is recommended adjacent to the Scott Lancaster Bridge to reduce noise levels for trail users on the bridge.

What effects occur during construction?

Scott Lancaster Memorial Trail. Pedestrians and bicyclists could experience construction-related delays and inconvenience for the following reasons:

- Between the Scott Lancaster Bridge and the Doghouse Rail Bridge, the trail would be resurfaced for use as an interstate detour route for eastbound traffic during construction. Between the Doghouse Rail Bridge and Hidden Valley Interchange, the trail would be adjacent to the eastbound I-70 detour on CR 314. Pedestrians and bicyclists using the trail would be rerouted along the frontage road west of the Doghouse Rail Bridge (the detour plan and typical section are illustrated in Chapter 2, Figure 2-11 and Figure 2-12), and would travel adjacent to detour traffic on a barrier-separated shared use path on CR 314 east of the Doghouse Rail Bridge (a cross section of the detour route is shown on the following page).



Cross section of detour route on CR 314 with barrier-separated shared-use path for Scott Lancaster Memorial Trail.

- Pedestrians and bicyclists using the trail would be affected while 1) the eastbound I-70 detour route is being constructed, 2) when the trail and frontage road are restored after the detour, 3) when the trail is reconstructed along the new frontage road alignment to accommodate the I-70 realignment west of Hidden Valley Interchange, 4) when the retaining wall is constructed along CR 314, and 5) during construction of grade changes on CR 314.

Kermitts Trailhead (planned). Pedestrians and bicyclists using the trailhead could experience construction-related delays and inconvenience due to implementation of Sediment Control Action Plan improvements and construction staging at the trailhead and improvements to the segment of I-70 over the Scott Lancaster Memorial Trail directly west of the trailhead. Parking capacity could be temporarily reduced during construction, but trail access would be maintained.

Game Check Area Park (planned). This area would be unavailable for parking or use as a trailhead for up to 10 months during construction. After construction, this area would be returned to existing conditions (or better) for use as an informal parking area and trailhead.

Clear Creek. Three river access points would be temporarily unavailable for up to 12 months during construction; five river access points in the project area would remain open for use during construction. Unnamed Fishing Access and Unnamed Boating Access (between the Doghouse Rail Bridge and Hidden Valley Interchange) would be temporarily unavailable during the eastbound I-70 detour. Kermitts Fishing Access may be used for construction staging and would not be available for recreational access during construction. Construction activities may cause inconvenience at other river access locations, but access would be maintained.

During tunnel blasting near the portals, rehabilitation of the Doghouse Rail Bridge, and during reconstruction of the I-70 bridge over Clear Creek west of Hidden Valley Interchange, recreational access along the banks of Clear Creek may be restricted and the creek may be closed periodically for safety reasons. No fishing access in the vicinity of these construction activities would be allowed. The impact of Clear Creek closures to recreational river rafting is anticipated to be minimal because the closures are planned to occur outside of rafting season.

The Proposed Action would also require closure of CR 314 to local traffic for up to 7 months during the eastbound I-70 detour. Because some of the rafting companies use CR 314 for safety vehicles and shuttles, this closure could disrupt, but would not preclude, their operations.

3.5.7 What mitigation is needed?

What I-70 PEIS mitigation strategies are relevant?

The phased approach of the I-70 PEIS Preferred Alternative allows for ongoing opportunities to avoid and minimize impacts to recreational resources, establish mitigation, and employ I-70 Mountain Corridor Context Sensitive Solutions. [Mitigation approaches for recreational resources](#) from the I-70 PEIS document that are relevant to this project include the following:

- Adversely affected functions of parklands or trails will be replaced or enhanced.
- Design measures to minimize the area of impact will be implemented to the extent practicable.
- Pedestrian and bicycle access will be maintained during construction to the extent practicable.
- Lane closures will be avoided during peak travel weekends and special events to the extent practicable.

- Roadway and work zone conditions will be communicated to travelers using websites, pre-recorded messages, and other similar mechanisms.

What mitigation is needed for this project?

CDOT has identified project mitigation for potential impacts on recreation resources. Table 3-13 and Table 3-14 describe these mitigation measures.

Table 3-13. Mitigation Commitments for Permanent Impacts on Recreation Resources

Activity	Location	Impact	Mitigation*
Realignment of I-70.	West of Hidden Valley Interchange.	Reduction in long-term recreational river access due to removal of "Below Box" Boating Access.	<ul style="list-style-type: none"> • Do not preclude long-term use of other fishing and boating access locations in the study area to preserve adequate recreational river access.
SCAP improvements.	Kermitts Boating Access near junction of US 6 and I-70.	Potential for reduced parking capacity.	<ul style="list-style-type: none"> • Implement SCAP improvements so as not to preclude long-term use of the area for boating access to Clear Creek.
SCAP improvements.	Kermitts Trailhead (planned) near junction of US 6 and I-70.	Potential for reduced parking capacity.	<ul style="list-style-type: none"> • Implement SCAP improvements so as not to preclude long-term use of the area for trail access.

¹ Mitigation is not necessary if impact can be avoided through changes in the design or construction of the Proposed Action (i.e., the activity is avoided).
SCAP - Sediment Control Action Plan

Table 3-14. Mitigation Commitments for Temporary Impacts on Recreation Resources During the Construction Period

Activity	Location	Impact	Mitigation*
Operation of eastbound I-70 detour during construction.	On old US 40 between the Scott Lancaster Bridge and the Doghouse Rail Bridge (game check area).	Resurfacing and closure of the game check area and Scott Lancaster Memorial Trail alignment for use as a temporary detour route for interstate traffic during construction.	<ul style="list-style-type: none"> • Provide a temporary trail detour along CR 314 between the water treatment plant and the Doghouse Rail Bridge to maintain access for pedestrians and bicyclists during construction. Provide an anchored concrete barrier between the Scott Lancaster Bridge and detour traffic to protect the bridge from errant vehicles. • Restore the game check area after construction so as not to preclude the trail connection or the planned recreational improvements for this site. • Continue coordination with Clear Creek County regarding the restoration of the game check area.
Operation of eastbound I-70 detour during construction.	On CR 314 between the Doghouse Rail Bridge and Hidden Valley Interchange.	Loss of recreational use of the Scott Lancaster Memorial Trail due to resurfacing of trail alignment for use as a temporary detour route for interstate traffic during construction.	<ul style="list-style-type: none"> • Provide a barrier-separated, paved, 8-foot wide shared use path to maintain pedestrian and bicycle access during construction. • After eastbound interstate traffic is returned to the I-70 Corridor, CDOT will restore the Scott Lancaster Memorial Trail to existing conditions [which include I-70 Frontage Road Phase 1 improvements (CDOT, 2012g)].
Operation of eastbound I-70 detour during construction.	On CR 314 between the Doghouse Rail Bridge and Hidden Valley Interchange.	Temporary closure of Unnamed Fishing Access 400 feet east of the Doghouse Rail Bridge and Unnamed Boating Access 1,400 feet east of the Doghouse Rail Bridge.	<ul style="list-style-type: none"> • Restore accesses after construction so as not to preclude long-term use of the area for fishing and boating access to Clear Creek. The Unnamed Boating Access, which will be formalized with six parking spaces during the Frontage Road Phase 1 improvements, will be restored to that condition.
Construction and restoration of I-70 detour route and construction of retaining wall along CR 314.	On CR 314 between Doghouse Rail Bridge and Hidden Valley Interchange.	Resurfacing of trail alignment resulting in potential construction-related delays for pedestrians and bicycles on the Scott Lancaster Memorial Trail.	<ul style="list-style-type: none"> • Maintain pedestrian and bicycle access during construction and restoration of I-70 detour route and construction of retaining wall along CR 314. During these construction activities, one lane on the frontage road will be available for pedestrian, bicycle, and vehicular traffic and this lane will be managed using flaggers to direct two-way operation of traffic.
Construction and restoration of grade changes on CR 314.	On CR 314 near Doghouse Rail Bridge and curve west of Hidden Valley Interchange.	Temporary impediment to recreational trail activities due to closure of Scott Lancaster Memorial Trail.	<ul style="list-style-type: none"> • During construction and restoration of grade changes on CR 314, pedestrians and bicycles will be accommodated by shuttle through the project area to minimize disruption to recreational trail activities.

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Table 3-14. Mitigation Commitments for Temporary Impacts on Recreation Resources During the Construction Period

Activity	Location	Impact	Mitigation*
Rock blasting; I-70 Clear Creek bridge demolition, girder, and deck work; Doghouse Rail Bridge rehabilitation.	Twin Tunnels vicinity and west of Hidden Valley Interchange.	Temporary impediment to recreational river activities including boating and fishing due to periodic closures of Clear Creek.	<ul style="list-style-type: none"> • Unless necessitated by safety concerns, river closures due to rock blasting, bridge demolition, or bridge rehabilitation, will not occur during rafting season (June through August). • CDOT will coordinate with rafting companies prior to construction to develop communication protocols in the event of unanticipated river closures during rafting season. If river closures are necessary during rafting season, CDOT will communicate with rafting companies in accordance with previously agreed upon protocols. • Construction areas near the banks of the creek will be fenced off to prevent access by anglers or other pedestrians. • Temporary signage will be placed along Clear Creek to warn recreationalists of rock blasting activities and provide sources of information on the project and potential river closures. • A safety-critical zone will be established in the vicinity of rock blasting. Cyclists, pedestrians, and anglers will be evacuated from this zone before, during, and after rock blasting (approximately 30-minute durations).
Foundation work for I-70 bridge over Clear Creek.	West of Hidden Valley Interchange.	Temporary inconvenience to recreational river activities including boating and fishing due to construction activities adjacent to and over Clear Creek.	<ul style="list-style-type: none"> • Spotters will be stationed upstream of the bridge to alert boaters of the construction and alert construction crews of approaching boats. • Construction activities that present a safety risk to boaters will be stopped temporarily until the boaters have passed through the construction area. CDOT will coordinate with rafting companies regarding protocols for on-river communication between spotters and boaters during construction. • Construction areas near the banks of the creek will be fenced off to prevent access by anglers or other pedestrians.
Construction staging.	Kermitts Trailhead near US 6/I-70 Interchange.	Temporary construction-related delays and inconvenience and reduction in parking capacity.	<ul style="list-style-type: none"> • Maintain boating access and some parking capacity. • Restore area after construction so as not to preclude long-term use of the area for boating access.
Construction staging.	Kermitts Boating Access near US 6 Interchange.	Temporary construction-related delays and inconvenience and reduction in parking capacity.	<ul style="list-style-type: none"> • Maintain boating access and some parking capacity. • Restore area after construction so as not to preclude long-term use of the area for boating access.

¹ Mitigation is not necessary if impact can be avoided through changes in the design or construction of the Proposed Action (i.e., the activity is avoided).

3.6 Historic Properties and Native American Consultation

3.6.1 How does the analysis relate to the I-70 PEIS?

The I-70 PEIS (CDOT, 2011b) guided this Environmental Assessment (EA) in several important ways:

- [Section 3.13](#) of the I-70 PEIS identified historic properties throughout the Interstate 70 (I-70) Mountain Corridor based on file searches with the Office of Archaeology and History (conducted in 2004 and 2009) and a reconnaissance or windshield survey conducted in 2005. Although intensive field surveys were not conducted, the I-70 PEIS details previously recorded sites within the project area and provides background to the types of historic properties that may be encountered in the Twin Tunnels area. Historic properties identified in the I-70 PEIS informed the Twin Tunnels project Area of Potential Effects (APE) and contributed information to the intensive survey of historic properties for this project.
- As part of the I-70 PEIS, the Federal Highway Administration (FHWA) and Colorado Department of Transportation (CDOT) (the lead agencies) completed the [I-70 Mountain Corridor Section 106 Programmatic Agreement \(Appendix B\)](#) (Section 106 Programmatic Agreement) that defines how each of the steps for complying with Section 106 of the National Historic Preservation Act will be completed during Tier 2 processes (FHWA and CDOT et al., 2008). Appended to the Section 106 Programmatic Agreement is an agreement addressing tribal consultation along the I-70 Mountain Corridor (FHWA and CDOT et al., 2004). The Twin Tunnels EA Section 106 process followed these agreements, which informed consultations, definition of the APE boundary, identification of historic properties, assessment of effects, and development of mitigation measures.
- Also as part of the I-70 PEIS and Section 106 Programmatic Agreement, the lead agencies initiated a multi-themed historic context to be used as reference for future historic property evaluations across the I-70 Mountain Corridor. CDOT is in the process of finalizing this historic context as a Multiple Property Documentation Form, which will provide a basis for evaluating the eligibility of properties in the I-70 Mountain Corridor for the National Register of Historic Places (NRHP). While not finalized for formal use on the Twin Tunnels project, the information provided context for the assessment of historic property significance.

3.6.2 What process was followed to analyze historic properties?

The historic property analysis followed the stipulations of the Section 106 Programmatic Agreement. CDOT initiated the Section 106 process by inviting consulting parties to participate in this process. An APE was established, intensive historic property survey completed, and NRHP eligibility and effects to historic properties were assessed. The final step in the Section 106 process—the resolution of adverse effects—is ongoing and will result in an addendum to the Section 106 Programmatic Agreement.

The APE includes I-70 and surrounding areas that could be directly or indirectly affected by the Twin Tunnels project. A map of the APE is shown in the [historic properties inventory report](#) (see Appendix G). The APE generally extends along I-70 east from approximately milepost 238.5 to milepost 244.5. This area encompasses the capacity improvements (highway and tunnel widening and curve modifications) from the East Idaho Springs Interchange (approximately milepost 241.4) to the I-70/US 6 Interchange (approximately milepost 244) as well as an area west of the capacity improvements where signage may be required in the highway median. North and south, the APE boundary encompasses properties adjacent to the road improvements and is relatively linear. The APE was developed in September 2011 in consultation with Section 106 consulting parties, who agreed with CDOT that the linear APE was appropriate for this project because most improvements would occur within CDOT right-of-way, and the surrounding project area is generally rural in nature with limited historical development. An intensive survey of the APE was conducted in the fall of 2011 (Centennial Archaeology, 2011)

In May 2012, the APE was extended farther west along I-70 (within CDOT right-of-way—to approximately milepost 238.5) as a managed lane operating concept was refined and engineers noted the need for advanced signing for the managed lane operating scenario. Three signs would be located along the highway median in advance of capacity improvements to provide notice to drivers that a new lane would be available. CDOT conducted a field survey of the sign locations within the project limits extended to the west (to account for managed lane signage) to evaluate the surrounding properties and the visibility of the signage from different vantage points on both sides of the highway. Based on this survey and the fact that the signs would be installed within existing highway right-of-way, CDOT determined that the extended APE should be limited to the highway right-of-way and that no intensive-level survey of properties was necessary.

3.6.3 What agencies were involved in this analysis and what are their issues?

The Section 106 process involved a number of consulting parties, including representatives of the State Historic Preservation Office, federal agencies, local governments, historic preservation organizations, and property owners (see box). [Appendix F, Agency Correspondence](#) contains all correspondence related to the Section 106 consultation process, including Native American consultations.

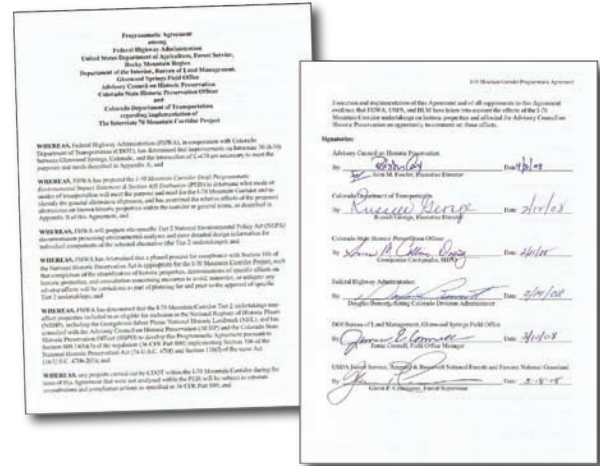
Many of the consulting parties were involved in the development of the Section 106 Programmatic Agreement and I-70 Mountain Corridor Context Sensitive Solutions (CSS) process and have a long history advocating historic preservation in the corridor. Within the Twin Tunnels project area, consulting parties expressed particular interest in properties related to the area's transportation and mining past. Local participants identified a number of properties of historical interest,

Section 106 Consulting Parties

- Cheyenne and Arapahoe Tribes of Oklahoma
- Clear Creek County
- Colorado State Historic Preservation Office
- Historical Society of Idaho Springs
- Idaho Springs
- Property Owners
- U.S. Forest Service

acknowledging that these resources might not convey significance according to the NRHP criteria but have significance to local residents. Participants also articulated support for the I-70 Mountain Corridor CSS and Section 106 Programmatic Agreement processes and building cooperation and collaboration between the lead agencies and consulting parties.

The consulting parties met twice during the EA process: in September 2011 and February 2012. The purpose of the initial meeting was to introduce the Section 106 consulting parties to the Twin Tunnels project and to review Section 106 process and pertinent stipulations of the Section 106 Programmatic Agreement. Participants also reviewed, provided input to, and endorsed the APE. The purpose of the second meeting was to advance the Section 106 process by discussing eligibility and effects determinations consistent with NRHP criteria, discussing other issues of local importance, and brainstorming potential mitigation options to resolve adverse effects. Participants agreed with the eligibility and effects determinations as defined by the Section 106 process and discussed treatment of resources of local importance that do not meet NRHP criteria for significance and/or integrity. The lead agencies and consulting parties will develop an



The Section 106 Programmatic Agreement guides historic property identification, evaluation, and preservation on the I-70 Mountain Corridor. The Twin Tunnels EA is the first project to follow the agreement. Consulting parties, many of whom were involved in drafting the original agreement, have worked cooperatively on Section 106 compliance for the Twin Tunnels project.

addendum to the I-70 Mountain Corridor Section 106 Programmatic Agreement that outlines mitigation measures for adverse effects to historic properties from the Twin Tunnels project.

In addition to the local corridor consulting parties, the Cheyenne and Arapahoe Tribes of Oklahoma are also participating as consulting parties for the Twin Tunnels EA. The tribes, as former inhabitants of Colorado, have an association with camp, battle, and burial sites of religious and cultural significance to the tribes.

3.6.4 What are the historic properties in the study area?

An intensive survey of the APE was conducted in the fall of 2011 ([Centennial Archaeology, 2011](#)). The survey identified a total of 21 properties within the APE, including segments of linear resources; nine of the sites were newly recorded (that is, not identified in the I-70 PEIS). Five properties—the Twin Tunnels (5CC1189.3), an archaeological site (5CC389), the Colorado Central Railroad (5CC427), US Highway 6 (5CC1184), and US Highway 6/40 (5CC2002)—were identified as eligible for the NRHP and subject to consultation under Section 106 of the National Historic Preservation Act.. No sites within the APE that are of cultural importance to the Cheyenne and Arapaho Tribes of Oklahoma will be directly impacted by the Proposed Action.

The Twin Tunnels were completed in 1961 and represent the first successful tunneling operation associated with I-70. The tunnels are included on FHWA's Final List of Nationally and Exceptionally Significant Features of the Federal Interstate Highway System. Identified areas of significance include engineering and transportation.

Archaeological site 5CC389 is located along westbound I-70 and would not be affected by the Proposed Action. It is, therefore, not discussed further.

Of the historic linear resources in the APE, two segments of old US Highway 40 (5CC2002.1 and 5CC2002.2), one segment of US Highway 6 (5CC1184.4), and one segment of the Colorado Central Railroad (5CC427.5) lack integrity and do not support NRHP eligibility. One segment of the Colorado Central Railroad (5CC427.1) was found to retain integrity and supports the eligibility of that overall linear resource.

In addition to the NRHP-eligible properties, Clear Creek County identified several properties of local interest, either for future community use (such as the Doghouse Rail Bridge) or historical interest (such as the flume remnants of the Seaton Power Plant, Bell residential property, and remnants of mining sites). The County agreed with CDOT's assessment that these properties are not historically significant according to NRHP criteria but noted that the properties are important to the local community and requested CDOT avoid affecting these properties during construction.

3.6.5 How does the No Action affect historic properties?

The No Action has no effect on historic properties. The No Action does not physically or visually change the highway or surrounding areas.

3.6.6 How does the Proposed Action affect historic properties?

The effects of the Twin Tunnels project on historic properties are consistent with what was presented in the I-70 PEIS. The I-70 PEIS followed a phased process to identify and evaluate historic properties in the I-70 Mountain Corridor. Effects to historic properties were determined broadly to assess potential differences among Action Alternatives evaluated in the I-70 PEIS. In the Twin Tunnels location and for this component of the I-70 PEIS Preferred Alternative, the effects of the Action Alternatives were similar since nearly all (including the Preferred Alternative Minimum Program of Improvements) included expansion of the Twin Tunnels and connecting three-lane capacity from the Twin Tunnels east to Floyd Hill. The I-70 PEIS acknowledged that Section 106 effect determinations require additional details about the integrity of the resources within the affected area as well as details about the undertaking that are not available at a programmatic level.

The I-70 PEIS identified impacts to the Twin Tunnels would occur when the tunnels were expanded. The I-70 PEIS also identified potential impacts to the previously recorded NRHP-eligible archaeological site, which was not affected in by this project, primarily because the Proposed Action only addresses eastbound improvements, and the archaeological site is located on the north side of I-70 along the westbound travel lanes. Lastly, the I-70 PEIS identified potential impacts to linear historic resources and noted that effects to those resources would require additional



The Twin Tunnels represent the first tunneling operation on I-70. Completed in 1961, the tunnels have undergone little change since construction. The Proposed Action would widen the eastbound bore and replace its portal face with a three-dimensional façade that will help reduce the “tunnel effect” that causes drivers to slow down entering the tunnel because of their perceived (and real) narrowness. From left to right, the tunnel under construction (1959), early in its operation (1971), modern view (2012), and artist’s rendering of the Proposed Action.

details about the integrity of the resources within the affected area as well as details about the undertaking. Nine new properties were recorded by the Twin Tunnels project but none of these was determined significant according to NRHP criteria.

The following sections discuss the impacts to historic properties as a result of the Proposed Action, including those effects expected during and after construction. The analysis considers the effects of the Proposed Action including a managed lane and two general purpose lanes, and effects with three general purpose lanes and no managed lane.

What are the direct effects of the Proposed Action?

The Proposed Action would expand the eastbound bore of the Twin Tunnels and remove and replace its portal face, adversely affecting the historic characteristics of the tunnel, including its design, material, workmanship, and feeling. The Proposed Action results in an *adverse effect* to this resource.

The Proposed Action would improve and use a portion of the old US 40 highway (5CC2002.1) (the game check area and portion of modern CR 314) to detour eastbound I-70 traffic during the construction of the tunnel. This segment of the old US 40 highway does not support the significance of the overall length of the historic highway. Therefore, the Proposed Action would have *no adverse effect* to site 5CC2002.1.

The Proposed Action would have no effects to any other properties in the APE.

The APE was extended to the west to address the managed lane advance sign installation within the highway right-of-way. An analysis of views toward and away from the sign locations at select points on both sides of the highway indicate that the signs will not be visually prominent; they will blend in with existing signage within and near the City of Idaho Springs and along the interstate. Based on this survey and the fact that the signs will be installed within highway right-of-way, CDOT determined that the sign installation would result in no adverse effect to historic properties in the extended APE. The Colorado State Historic Preservation Office agreed with this determination (see Appendix F, Agency Correspondence).

How does the Proposed Action differ with or without a managed lane?

The Proposed Action would result in the same effects to historic properties with or without a managed lane.

What indirect effects are anticipated?

No indirect effects to historic properties are anticipated. The Proposed Action has little to no permanent effect on the character or use of historic properties in the APE. Noise and visual conditions will be similar to the existing condition, and while the highway footprint will expand slightly, improvements are almost entirely contained within the highway right-of-way.

What effects occur during construction?

Although a comprehensive survey of the APE was conducted, construction could result in unexpected discovery of historic properties, such as buried historic rails or subsurface archaeological sites. Standard construction practices to evaluate any materials discovered during construction makes it unlikely that historic properties will be adversely affected during construction.

Construction could also temporarily affect visitation to historic sites. These effects are addressed in [Section 3.2, Social and Economic Resources](#).

3.6.7 What effects to locally important resources are anticipated?

The Proposed Action would not impact any properties of local concern. Construction could inadvertently damage locally important historic sites if contractors are not aware of their locations and importance.

3.6.8 What mitigation is needed?

What I-70 PEIS mitigation strategies are relevant?

Section VI of the I-70 Mountain Corridor [Section 106](#) Programmatic Agreement defines mitigation strategies for Tier 2 processes that include both corridor-wide strategies, such as adherence to the I-70 Mountain Corridor CSS [design criteria](#) and [aesthetic guidance](#), as well as guidance for individual Tier 2 undertakings. The I-70 PEIS also acknowledges that specific mitigation measures, and best management practices specific to each project, will be developed during Tier 2 process and formalized in addenda to the Section 106 Programmatic Agreement.

Some of the [I-70 PEIS strategies](#) that may be relevant for inclusion in the Section 106 Programmatic Agreement addendum include, but may not be limited to: interpretive efforts, such as roadside exhibits, historic documentation, and educational materials; protection of sites during construction; coordination of construction closures and activities with historic tourism sites; and assistance to local communities in historic property identification and interpretation.

What mitigation is needed for this project?

CDOT will develop an addendum to the I-70 Mountain Corridor Section 106 Programmatic Agreement that contains specific mitigation measures to resolve adverse effects of the Twin Tunnels project. In addition to documentation of the tunnels, some of the ideas that consulting parties have discussed include:

- Considering design options of the new tunnel portal that pay homage to the Twin Tunnels Art Deco style
- Salvaging portions of the portal for use in interpretive displays or for another purpose
- Using the old game check area for an interpretive display after the detour is complete
- Identifying and interpreting locally important resources
- Developing an interpretive plan, either county- or corridor-wide
- Providing access to historic sites during construction

The addendum to the Section 106 Programmatic Agreement will be completed before the NEPA decision is finalized.

Any discoveries of cultural artifacts or objects during construction shall be reported immediately to the CDOT Engineer and the CDOT Staff Archaeologist/Cultural Resource Manager. The contractor will follow Section 107.23 of CDOT’s *Standard Specifications for Road and Bridge Construction* regarding procedures for emergency discoveries during construction, which include evaluation of the significance of the cultural material and consultation with the State Historic Preservation Office, Native American tribes, and other consulting parties. Work will cease until evaluation and consultations are completed and the CDOT Staff Archaeologist/Cultural Resource Manager clears work to continue..

Tables 3-15 and 3-16 summarize mitigation commitments for the Twin Tunnels project.

Table 3-15. Mitigation for Adverse Impacts to Historic Properties

Activity	Location	Impact	Mitigation
Tunnel expansion.	Twin Tunnels eastbound bore.	Adverse effect to the Twin Tunnels SCC1189.3.	<ul style="list-style-type: none"> • Fulfill stipulations of the addendum to the Section 106 Programmatic Agreement developed for the Twin Tunnels project.
Ground-disturbing construction activities that result in unexpected discovery of cultural remains that could have historic significance or be important to Native American tribes	Within the Twin Tunnels project limits	Inadvertent damage to historic properties	<ul style="list-style-type: none"> • Follow Section 107.23 of CDOT’s Standard Specifications for Road and Bridge Construction regarding procedures for emergency discoveries during construction. • Follow process outlined in 36 CFR 800.12 regarding Section 106 compliance during emergency situations

Table 3-16. Mitigation for Adverse Construction Impacts to Locally Important Properties

Activity	Location	Impact	Mitigation
Construction on I-70 and detour route.	CR 314 along detour route.	Damage to locally important sites.	<ul style="list-style-type: none"> • Ahead of any construction activity walk through project area with Clear Creek County historian(s) to identify sites that should be protected during construction. • Fence locally important sites to protect them from construction damage.

3.7 Visual Resources

3.7.1 How does the analysis relate to the I-70 PEIS?

The following commitments from [Section 3.11](#) of the I-70 PEIS (CDOT, 2011b) regarding visual resources are applicable to this Tier 2 process:

- CDOT will conduct a more detailed and localized analysis of visual resources in individual jurisdictions and segments along the corridor to further define important visual elements and assess potential effects of Tier 2 processes.
- CDOT will consider creating visual simulations during Tier 2 processes to accurately illustrate the visual change at specific locations.
- CDOT will continue to coordinate with all jurisdictions regarding direct and indirect impacts to visual resources.
- Mitigation options (such as design modifications) that could minimize disruption to or interference with the corridor’s historic towns and mountain scenery will be explored using the I-70 Mountain Corridor Context Sensitive Solutions (CSS) Aesthetic Design Guidelines (see Appendix D for a complete list of guidelines).

3.7.2 What process was followed to analyze visual resources?

The visual analysis follows guidance from the FHWA publication *Visual Impact Assessment for Highway Projects* (FHWA, n.d.). In addition, the analysis uses the I-70 PEIS as a resource for the analysis approach and identification of specific views and features that are designated for consideration and protection.

The area studied in this visual resource assessment is called the project viewshed and is defined as areas that travelers on I-70 can see from the roadway and views toward the project from the surrounding areas such as the County Road (CR) 314 and Clear Creek corridors. Typically, if viewers can see an area or a feature from the project, a viewer located in that area or near the feature can also see the project.

Visual impacts are determined by assessing a project’s effects on visual character

What is a Viewshed?
A viewshed is the visible surface area from an observer’s point of view. Viewsheds are defined by what viewers can see from the project and what portions of the project viewers can see from the surrounding area.

and quality, and by predicting viewer response to that change. Potentially sensitive viewer groups include those who travel through the corridor and those who engage in recreational activities. Each of these viewer groups has a different response to visual change based on their level of sensitivity and exposure to views. The level of visual impact is determined by combining the severity of the change in the visual environment with the degree to which people are likely to react negatively to that change.

Four key views were selected to represent the range of views in the study area. Visual simulations were prepared to represent the range of visual impacts and illustrate how the project may appear after construction. More detailed information on the analysis and process can be found in the [Twin Tunnels EA Visual Resources Technical Memorandum](#) (CDOT, 2012e).

3.7.3 What agencies were involved in this analysis and what are their issues?

During the I-70 PEIS process, the I-70 Mountain CSS Solutions Team established the overall corridor aesthetic principles and regional functional context. Additionally, CDOT convened aesthetic working groups to assist the corridor and consultant teams in preparing the aesthetic guidance. The working groups collaboratively developed descriptions for four geographic design segments along the I-70 Mountain Corridor; the study area for the Twin Tunnels project falls within the Mountain Mineral Belt design segment.

During the Twin Tunnels Environmental Assessment (EA) scoping process, stakeholders expressed concern with the existing tunnel portal design and the impact of transitioning from open road conditions to a tunnel lighting environment. Agencies and stakeholders are also concerned that highway widening could increase congestion, cause indirect impacts, and make the unique mountain experience more urban, thus degrading the visual and aesthetic experience of the Colorado mountains. The potential of increasing light pollution in the corridor and changing the nature of the corridor from a small highway to an “expanse of pavement” are also of concern.

3.7.4 What are the visual resources in the study area?

A high percentage of recreationalists in the I-70 Mountain Corridor engage in sightseeing, indicating the importance of the visual character to visitors and residents. Rich in mining history, Clear Creek County includes historic towns (such as Idaho Springs) scenic views, lush forests, rocky hillsides, and waterways. However, the mountainous terrain breaks up any continuous or extended views in

the corridor. The landscape setting surrounding the Twin Tunnels is characterized by rugged terrain, V-shaped valleys, and historically mined lands. Clear Creek within the study area is characterized by steep rocky banks that generally lack contiguous vegetation. The study area is substantially natural in character except for the roadways and businesses located west of the Twin Tunnels.

The scenic attractiveness of the study area, as defined in the I-70 PEIS (CDOT, 2011b), is categorized as Class B, which indicates that the lands have some distinctive features but are overall typical of the landscape. The Scott Lancaster Memorial Trail is located on/adjacent to CR 314 within the study area. Other sensitive views include recreation sites along Clear Creek. Major overhead utilities that are visible along I-70 include electric transmission lines. The I-70 highway and Twin Tunnels are visible to motorists and recreationalists along Clear Creek and the Scott Lancaster Memorial Trail (CDOT, 2011b).

The I-70 PEIS designated three Areas of Special Attention (ASA) adjacent to the study area that are considered in the analysis: Idaho Springs, the Twin Tunnels, and Floyd Hill. ASAs are stretches along the I-70 Mountain Corridor identified by stakeholders as having multiple or unique aesthetic issues. The Idaho Springs ASA includes the unique developed setting of the city and evidence of historic mining. The Floyd Hill ASA is the first steep incline encountered when traveling west on I-70 from the Front Range and offers dramatic views of Clear Creek Canyon. These lie primarily east and west of the study area.

The Twin Tunnels ASA focuses on the Twin Tunnels, which are close to Clear Creek. Their portals are distinctive visual features that serve as the gateway to Idaho Springs and Clear Creek County for westbound motorists on I-70. The design and location of the Twin Tunnels create a major “pinch point” for travelers. Motorists generally reduce their speeds in this area because of limited shoulder space and the dark and imposing façade of the tunnels. They are the first tunnels encountered by westbound motorists from the Front Range, and they serve as a landmark to those entering and leaving Idaho Springs. The tunnel portals have various functions, acting as a transition between the open road and the tunnels, a location for signs, and protecting the tunnel entrances from rock falls.

3.7.5 How does the No Action affect visual resources?

Under the No Action, the Frontage Road Phase I project on CR 314 would result in visual effects due to retaining walls. In addition, traffic congestion and its visibility in the I-70 corridor would worsen over time. No other components of the No Action would result in measurable visual effects.

3.7.6 How does the Proposed Action affect visual resources?

The I-70 PEIS indicated that actions that increase the footprint of I-70 and have more elevated features would be more visible and create a stronger visual contrast. The conclusions of this Tier 2 process analysis are consistent with the findings of the I-70 PEIS, with most Proposed Action features causing minor visual impacts and tall retaining walls from highway widening causing moderate visual impacts.

The following sections discuss the impacts to visual resources as a result of the Proposed Action, including those effects expected during and after construction. The analysis considers the effects of the Proposed Action including a managed lane and two general purpose lanes, and effects with three general purpose lanes and no managed lane.

What are the direct effects including a managed lane?

The communities and key viewers (motorists and recreationalists) comprising the study area have views of the surrounding hillsides that include low vegetation with intermittent barren slopes; areas of evergreen trees; and Clear Creek. Viewers in the study area are likely accustomed to the traffic and sight of the highway. Although the improvements associated with the Proposed Action are minor relative to the large scale of these views, they would result in permanent changes to the visual environment.

Overall, direct visual effects after mitigation would range from minor to moderate, based on the following general categorizations:

- An effect was categorized as **minor** if it would not block or impede scenic views or diminish the visual character. This would include additional signage, new guardrails, retaining walls that are 5 feet or less in height, and bridge widening such as at the I-70 crossing over Clear Creek.
- An effect was categorized as **moderate** if it would noticeably contrast with the visual setting and change a scenic view of value to adjacent recreational activities. This would include retaining walls from 5 to approximately 20 feet in height.
- An effect was categorized as **high** if it would block or impede a scenic view of value or substantially increases contrasts with the visual setting. This would include retaining walls higher than 20 feet.

Although the project-related effects would be permanent, CDOT will avoid and minimize negative effects on visual quality by incorporating I-70 Mountain Corridor CSS Aesthetic Design Guidelines into the project design. CDOT

does not believe the Proposed Action would result in any high visual effects.

How do changes resulting from the Proposed Action affect viewers?

Motorists. Motorists on I-70 and CR 314 generally have a relatively lower sensitivity to their surroundings because they travel at high speeds and have relatively short views of the surrounding landscape. Most motorists on I-70 would notice the increased pavement width, the low retaining wall in one median area, and additional signage through Idaho Springs that would be required for the managed lane operation. Changes resulting from taller retaining walls south of the roadway and the bridge widening at the Clear Creek crossing would be less apparent. Motorists on CR 314 would have a visual experience similar to that of recreationalists. However, they would be less sensitive to contrast and change because of their relatively higher speed of travel. They may observe some minor changes associated with increased light and glare from the additional eastbound travel lane.

Recreationalists. Recreationalists on the Scott Lancaster Memorial Trail and fishing and boating recreationalists on Clear Creek would experience greater visual effects than motorists since the duration of their view would be longer. They also may have a greater expectation of experiencing a scenic and more natural setting. However, recreationalists in the area are likely accustomed to traffic and the sight of the existing highway. In addition, existing views to the highway are often obstructed by rock outcroppings and

vegetation. Recreationalists may observe some minor changes associated with increased light and glare from the additional eastbound travel lane.

What are the visual effects of the Proposed Action from the four key viewpoints?

This analysis considers visual effects from four key viewpoints shown in Figure 3-11, and described in more detail in the *Twin Tunnels EA Visual Resources Technical Memorandum* (CDOT, 2012e). The views were selected to represent where the greatest number of viewers would see the project and where representative features of the project would be prominent.

Viewpoint 1 shows a typical view of eastbound motorists on I-70 looking east toward the west portal of the eastbound tunnel (Figure 3-12: Views A and B). A 6-foot high noise wall would be constructed between I-70 and the Scott Lancaster Bridge. Although the noise wall would obstruct perpendicular views of the Bridge and its visual setting from I-70, motorists would have a relatively low sensitivity to a change in this view due to their high travel speeds. Recreationalists that use the bridge would likely be more sensitive to this view obstruction than motorists. However, they are accustomed to the sight and close proximity of the highway in this location. Design of the noise wall would follow the I-70 Mountain Corridor CSS Aesthetic Guidelines.

The tunnel portals provide a focal point that draws the viewer’s attention toward the opening. The widened roadway and larger portal would increase the scale, size, and height of built forms. In addition, rock fall mitigation

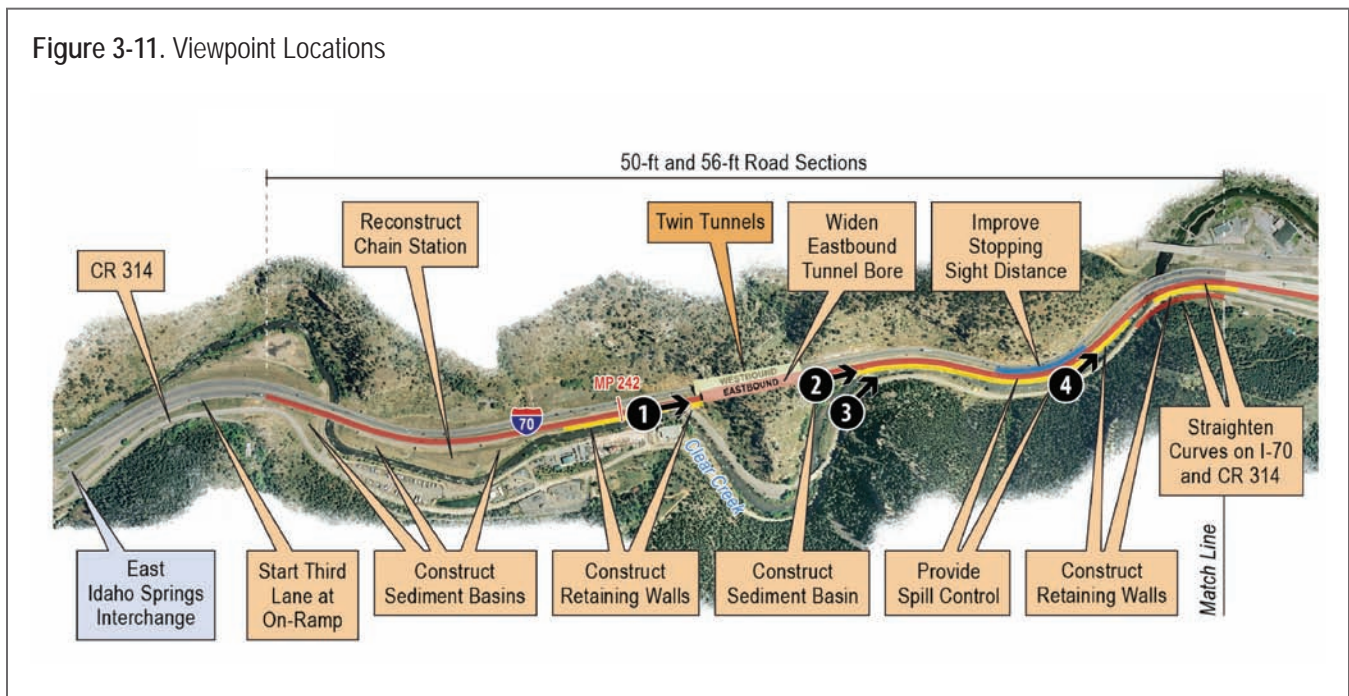


Figure 3-12. Viewpoint 1 Looking from I-70 East toward the West Tunnel Portals—Existing and Proposed Conditions (Simulation)

A. Existing View



B. Simulation



would include anchored wire mesh fencing above the tunnel portals. However, the view for motorists would continue to be dominated by natural features such as the rocky hillside, and the project elements would not noticeably increase contrasts or reduce visual quality. The range of roadway cross sections being considered (the 56-foot roadway width is shown in the simulations) and selection of either a concrete barrier or guardrail would not result in a meaningful variation in visual character or quality effects. The design of the concrete barrier or guardrail will conform to the goals outlined in the Aesthetic Guidance Index of the I-70 Mountain Corridor CSS Aesthetic Design Guidelines.

The aesthetics of the portal face have not been determined at this time. Various designs for the portal structure will be considered with respect to aesthetics and functionality, and the ultimate portal aesthetics will be decided on in the final design process in conjunction with stakeholders and will adhere to the I-70 Mountain Corridor CSS Aesthetic Design Guidelines.

Viewpoint 2 shows a typical view recreationalists would experience from the north side of Clear Creek looking east toward CR 314, Clear Creek, and I-70 (Figure 3-13: Views A and B). The existing view is memorable and vivid, but the presence of the roadways and utility tower and lines in the natural landscape reduce the visual quality of this view. Although recreationalists along the creek and trail would likely be focused on their recreational activities, the addition of the widened roadway and a retaining wall

along the north side of the creek would reduce the scenic and natural characteristics of the setting. Overall, the view quality would be diminished by the increase in contrast of the built forms with the natural landforms and vegetation.

Viewpoint 3 shows a typical view of recreationalists on Clear Creek looking from the streambed to the northeast (Figure 3-14: Views A, B, and C). The widened roadway and retaining wall would increase the scale and size of built forms, and the scenic and natural characteristics of the setting would be reduced. Overall, the view quality would be diminished by the increase in contrast of the built forms with the natural landforms and vegetation. The range of roadway cross sections being considered (the 56-foot roadway width is shown in the simulations) and selection of either a concrete barrier or guardrail would not result in a meaningful variation in visual character or quality effects. The design of the concrete barrier or guardrail will conform to the goals outlined in the Aesthetic Guidance Index of the I-70 Mountain Corridor CSS Aesthetic Design Guidelines.

Viewpoint 4 shows a typical view of eastbound motorists on I-70 looking east toward the Hidden Valley Interchange (Figure 3-15: Views A and B). The location between eastbound and westbound I-70 has a grassy median and the view is dominated by pavement and other encroaching elements such as the guardrail, signage, and lighting. Safety improvements would remove the grass vegetation and cut into the median slope to construct a low retaining wall. This would increase visibility around the curve for motorists on I-70 and result in low visual effects.

Figure 3-13. Viewpoint 2 Looking East from the North Side of Clear Creek toward I-70, Clear Creek, and CR 314—Existing and Proposed Conditions (Simulation)

A. Existing View



B. Simulation



Figure 3-14. Viewpoint 3 Looking from Clear Creek Streambed Northeast—Existing and Proposed Condition (Simulation)

A. Existing view



B. Simulation with concrete barrier



(continued on next page)

(continued from previous page)

Figure 3-14. Viewpoint 3 Looking from Clear Creek Streambed Northeast—Existing and Proposed Condition (Simulation)

C. Simulation with guardrail



Figure 3-15. Viewpoint 4 Looking East from I-70 toward the Hidden Valley Interchange—Existing and Proposed Conditions (Simulation)

A. Existing View



B. Simulation



How does the Proposed Action differ with or without a managed lane?

Changes to the visual setting's character or quality would not differ noticeably with or without the managed lane. However, more signage would be needed with the managed lane, slightly increasing visual clutter. Most of the additional signage would be needed farther west, throughout the Idaho Springs ASA, which already has some visual clutter from the existing signs near I-70. The additional signage associated with the managed lane would not result in a meaningful variation in visual character or quality effects.

What indirect effects are anticipated?

No notable indirect adverse effects would occur later in time or be farther removed in distance from the project than those already described in this section. Over time, the visual quality of the study area would improve as landscaping and other vegetation matures and softens the appearance of retaining walls.

What effects would occur during construction?

Construction effects would include detours, an increase in roadway congestion in and around the area, the presence of large equipment, dust from construction, and general disruption to the surrounding area. Temporary effects to visual quality would result from construction-related activities, including the visibility of construction equipment and workers, material stockpiles, dust and debris, signs, high-visibility fencing, and staging areas. Visual quality effects also would occur from the degree of disorder created by demolition activities, including preparation of CR 314 for use as a detour and rehabilitation of the Doghouse Rail Bridge.

Construction-related activities would affect the visual experience of motorists on I-70 and CR 314 to a lesser degree than recreationists. These short-term impacts would have a temporary visual effect on nearby communities such as Idaho Springs. A benefit of construction would be that

driving speeds on I-70 would likely be reduced, thereby giving viewers more time to experience the view.

3.7.7 What mitigation is needed?

What I-70 PEIS mitigation strategies are relevant?

The phased approach of the I-70 PEIS Preferred Alternative allows for ongoing opportunities to avoid and minimize impacts to visual resources, establish mitigation, and employ I-70 Mountain Corridor CSS. The I-70 PEIS indicates that [mitigation strategies](#) for visual resources will be defined in Tier 2 processes in coordination with corridor communities. The mitigation approaches will focus on reducing visual contrast associated with implementation of the I-70 PEIS Preferred Alternative. The lead agencies will refer to the I-70 Mountain Corridor CSS Aesthetic Design Guidelines and create a site-specific Tier 2 Aesthetic Plan and Lighting Plan mitigation strategies.

What mitigation is needed for this project?

Development of mitigation approaches involved a review of the visual standards of the U.S. Forest Service (1995), Bureau of Land Management (1980), and local jurisdictions, as well as the [I-70 Mountain Corridor CSS Aesthetic Design Guidelines](#) (CDOT, 2009). The mitigation approaches focus on reducing visual contrast associated with the project.

CDOT will avoid and minimize negative adverse impacts to visual resources by incorporating I-70 Mountain Corridor CSS Aesthetic Design Guidelines into the project design. CDOT has committed to the use of these criteria for the design of the project. The criteria describe mitigation measures for potential impacts on visual resources that could arise from future operations and construction activities.

3.8 Air Quality

In accordance with the Clean Air Act, the Environmental Protection Agency has established National Ambient Air Quality Standards (NAAQS) for the following six air pollutants.

- Carbon monoxide
- Ground level ozone
- Nitrogen dioxide
- Sulfur dioxide
- Lead
- Microscopic dust particles referred to as “particulate matter” or PM

The NAAQS indicate the concentration of pollutants in the air that should not be exceeded in order to protect human health. Details regarding the allowable concentrations of pollutants are provided in the [Twin Tunnels EA Air Quality Technical Memorandum](#).

The 1991 Clean Air Act Amendments established regulations to ensure that proposed Federal transportation plans, programs, or projects will not cause or contribute to a NAAQS violation in areas with ongoing or past NAAQS violations. These “conformity” regulations are detailed in Title 40, Part 93, of the Code of Federal Regulations. Project-level air quality conformity analysis is not required for Federal actions in areas where there is no history of NAAQS violations, such as Clear Creek County.

The air quality assessment performed for this Twin Tunnels EA is not a conformity analysis (that would focus on whether or not the project would cause or contribute to a NAAQS violation). Instead, it compares impacts of the Proposed Action and the No Action to one another, and examines mitigation needs, consistent with requirements of the National Environmental Policy Act. The analysis in this EA addresses primarily pollutant emissions, rather than pollutant concentrations.

3.8.1 How does the analysis relate to the I-70 PEIS?

[Section 3.1](#) of the I-70 PEIS (CDOT, 2011b) indicated that project-specific Tier 2 processes would include localized air quality modeling and conformity determinations where appropriate in designated non-attainment or maintenance areas. Along the I-70 Mountain Corridor, only Jefferson County, which has the corridor’s highest traffic volumes, is located within an air quality non-attainment area. It is part of the Denver and North Front Range Ozone Non-attainment Area, which does not meet the national air quality standards for 8-hour ozone. Jefferson County

also includes former areas of nonattainment including the Denver metropolitan PM₁₀ (particulate matter less than 10 microns in diameter) and carbon monoxide (CO) Maintenance Areas. The Twin Tunnels project is located entirely within Clear Creek County, outside of any non-attainment area. Thus, conformity regulations and localized air quality modeling requirements do not apply to this project.

Clear Creek County is considered an attainment area for air quality, meaning it is not believed to experience or contribute to a violation of National Ambient Air Quality Standards.

The I-70 PEIS also stated that Mobile Source Air Toxics (MSAT) analysis and consideration of new nitrogen dioxide (NO₂) standards would be examined along the corridor where appropriate. According to FHWA guidelines, quantitative MSAT analysis is required where traffic volumes will routinely exceed 140,000 vehicles per day (i.e., volumes typical of an eight-lane freeway). This threshold is not met by the Twin Tunnels project, which will expand an existing four-lane freeway to a five-lane freeway. Therefore, a qualitative analysis is appropriate for the Twin Tunnels project.

Similarly, the 2010 U.S. Environmental Protection Agency (EPA) Final Rule establishing the new NO₂ standard requires roadside monitoring of this pollutant in urban areas with more than a half million residents. The population in Clear Creek County is 9,088 residents according to the 2010 U.S. Census and does not meet this threshold.

3.8.2 What process was followed to analyze air quality resources?

The study area for the air quality analysis consists of the Clear Creek Valley following the Proposed Action project limits for approximately 3 miles between the East Idaho Springs Interchange and the base of Floyd Hill.

The *CDOT Air Quality Analysis and Documentation Procedures*, as revised in 2010 (CDOT, 2010b), details the processes and considerations taken into account for analyzing air quality impacts of CDOT transportation projects. These procedures ensure compliance with FHWA regulations and requirements of the Clean Air Act.

Estimates of future pollutant emissions were generated by the Colorado Department of Public Health and Environment’s (CDPHE) Air Pollution Control Division (APCD), using the MOVES2010a emissions model based on traffic assumptions provided by CDOT. Staff from

the two agencies met on January 24, 2012, to identify potential sites for Special Purpose Monitors to measure ambient concentrations of particulate matter (PM) during construction.

3.8.3 What agencies were involved in this analysis and what are their issues?

Through the I-70 PEIS process, CDOT coordinated with the EPA and APCD to discuss air quality in the I-70 Mountain Corridor. Other interested parties including Clear Creek County and the City of Idaho Springs were involved in the development of the I-70 PEIS. A common issue among these parties was interest in monitoring air quality to determine what emissions levels will occur, especially during construction.

For the Twin Tunnels Environmental Assessment (EA), interagency consultation between air quality staff from CDOT and APCD determined a scope of analysis for the Twin Tunnels project. To support an EPA request to include air quality monitoring during construction, CDOT and APCD developed an air quality monitoring plan, which is described in more detail under the mitigation Section 3.8.7.

No ambient air quality monitors exist in Clear Creek County or within a radius of over 15 miles distant from the Twin Tunnels. Clear Creek County recently investigated purchase and installation of PM monitors within the county to address local sensitivity and concern over potential air quality degradation (J. Sorensen, CCC, oral commun., 2011a).

3.8.4 What are the air quality conditions in the study area?

The low amount and intensity of emission-generating activity in Clear Creek County are below the EPA thresholds that require installation and operation of air quality monitors to determine NAAQS compliance. Therefore, no EPA or State ambient air quality monitoring stations are present in Clear Creek County. In the past, responding to new or revised NAAQS promulgation, CDPHE has conducted limited, short-term monitoring in Clear Creek County. Based on those efforts, CDPHE found no NAAQS violations within the county and also concluded that emissions from Clear Creek County do not meaningfully contribute to the air quality conditions in the Denver metropolitan area. Therefore, Clear Creek County is not included as part of any air quality nonattainment area.

Traffic on I-70 is the dominant generator of emissions in the study area. In 2010, I-70 averaged 42,000 vehicles per day (vpd) through the Twin Tunnels, and experienced nearly 70,000 vpd on the busiest day of the year (a Sunday in summer). No other roadway in Clear Creek County

carries this amount of traffic. By comparison, US 40 in Empire Junction carries 7,500 vpd and Business Route 70 in Idaho Springs carries 6,800 vpd. The I-70 annual average traffic volume of 42,000 vehicles per day includes 2,500 combination trucks (i.e., tractor-trailers) and 760 single-unit trucks, together accounting for about 8.5 percent of the traffic (CDOT, 2011e; CDOT, 2011f).

Minimal development exists in the study area due to topographical constraints. Nearby air quality sensitive receivers include three scattered houses near the Twin Tunnels, a few homes near the Hidden Valley Interchange, and a recreational trail along CR 314. No other air quality sensitive receivers, such as schools, hospitals, or nursing homes, exist nearby.

3.8.5 How would the No Action affect air quality?

With the No Action, tailpipe emissions from I-70 traffic in the Twin Tunnels project area are expected to decrease substantially between 2010 and 2035, even while traffic volumes increase. This is due to implementation of federal Corporate Average Fuel Economy standards minimizing vehicle (engine and exhaust) emissions and continuing improvements in motor vehicle fuels and technology.

Contrary to this trend, PM₁₀ emissions due to re-entrained dust would increase proportionately with the increased traffic volume. Re-entrained road dust is created by the mechanical process of the moving vehicle tires coming into contact with dirt or dust on the road and propelling it into the air. Table 3-17 presents a comparison of emissions burden for the 2010 existing conditions with the emissions burden projected for the 2035 No Action.

The [Twin Tunnels EA Air Quality Technical Memorandum](#) (CDOT, 2012f) includes a discussion of MSAT and other air quality issues not summarized above. Although quantitative analysis is not required for this project, emissions of five MSAT pollutants were estimated for the Twin Tunnels project using MOVES2010a emission factors. Table 3-18 presents the results, which indicate that MSAT emissions for the 2035 No Action would decrease by 38 to 47 percent from 2010 existing conditions, despite increased traffic volumes in 2035. These are emission changes ranging from slightly more than 1 ounce to slightly more than 4.5 pounds per day, over a study area that is nearly 3 miles long.

3.8.6 How would the Proposed Action affect air quality?

The following sections discuss the impacts to air quality as a result of the Proposed Action, including those effects expected during and after construction. The analysis considers the effects of the Proposed Action including a

Table 3-17. Winter Sunday Criteria Pollutant Emissions Burden for the 2010 Existing Conditions and the 2035 No Action (pounds per day)

Alternative	Particulate Matter Less than 2.5 Microns (PM _{2.5})	Sulfur Dioxide (SO ₂)	Oxides of Nitrogen (NO _x)	Carbon Monoxide (CO)	Re-entrained Road Dust (PM ₁₀)
2010 Existing Conditions	11.47	2.91	612.78	3,783.82	16.04
2035 No Action	5.39	3.56	151.54	2,675.39	20.01
Change	-6.07	+0.65	-461.24	-1,108.43	+3.97
Percent Change	53% reduction	22% increase*	75% reduction	29% reduction	25% increase

* SO₂ emissions declined by more than 90 percent between 2000 and 2010, due to reduced sulfur content in vehicle fuels.

Table 3-18. Winter Sunday MSAT Emissions Burden for the 2010 Existing Conditions and the 2035 No Action (pounds per day)

Alternative	1,3 Butadiene	Acetaldehyde	Acrolein	Benzene	Formaldehyde
2010 Existing Conditions	1.17	2.56	0.21	9.81	5.06
2035 No Action	0.67	1.52	0.13	5.18	3.10
Change	-0.50	-1.04	-0.08	-4.61	-1.96
Percent Change	43% reduction	41% reduction	38% reduction	47% reduction	39% reduction

Source:
MSAT = Mobile Source Air Toxics

managed lane and two general purpose lanes, and effects with three general purpose lanes and no managed lane.

What are the direct effects of the Proposed Action?

The I-70 PEIS indicated that corridor-wide I-70 traffic emissions for four pollutants (PM_{2.5}, SO₂, NO₂, and CO) are expected to decrease substantially over time as shown in Figure 3-16, the result of improved vehicle fuels, engines and emission control technology. However, emissions of PM₁₀ from re-entrained dust will increase due to increased traffic on the roadway.

The conclusions of this Tier 2 process analysis are consistent with the conclusions of the I-70 PEIS. Tailpipe emissions from year 2035 I-70 traffic in the Twin Tunnels project area are expected to decrease substantially from 2010 existing conditions, even while traffic volumes increase. The emissions decrease is due to continuing improvements in motor vehicle fuels and technology.

However, PM₁₀ emissions due to re-entrained dust would increase approximately in proportion with the increased traffic, as explained above.

Figure 3-16. Changes in Criteria Pollutant Emissions, 2000 to 2035

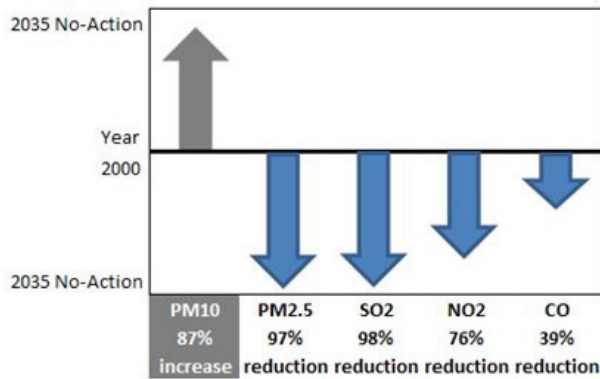


Table 3-19 presents the emission projections for the Proposed Action with a managed lane. Total PM levels may increase in the future because of higher traffic volumes, but it is expected that the resulting concentrations would meet the NAAQS. The proposed improvements were found not to cause violations of health-based air quality standards or other relevant evaluation criteria through the air quality analysis.

The *Twin Tunnels EA Air Quality Technical Memorandum* (CDOT, 2012f) includes a discussion of MSAT and other air quality issues not summarized above. Although quantitative analysis is not required for this project, emissions of five MSAT pollutants were estimated for the Twin Tunnels project using MOVES2010a emission factors. Table 3-20 presents the results.

The results of the MSAT analysis indicate that emissions for both the No Action and Proposed Action in 2035 would be less than emissions in the existing condition, and emissions for both operating scenarios of the Proposed Action would be less than the emissions for the 2035 No Action.

How does the Proposed Action differ with or without a managed lane?

Without a managed lane, CO and NOx emissions would be lower by another 1 to 2 percent from the Proposed Action levels with a managed lane, while emissions for the other pollutants would be unchanged.

What indirect effects are anticipated?

No indirect effects on air quality are anticipated as a result of the Proposed Action.

What effects occur during construction?

- Operation of the construction detour would generate slightly greater emissions burdens than the existing conditions, by differences of up to 0.15 pound per day (about 2 ounces), over the project length of nearly 3 miles. Table 3-21 presents these estimates. About 75 percent of the detour condition emissions would be generated on CR 314, closer to nearby receptors than traffic on existing or proposed I-70 eastbound lanes.

Construction activities for the Proposed Action would affect air quality in three ways, with temporary air quality impacts that would last for at least 6 months:

- Eastbound I-70 traffic would be detoured to CR 314, affecting hourly volumes and speeds of that traffic.
- Standard construction activities would generate fugitive dust and emissions from construction equipment.
- Tunnel excavation would generate emissions of particulate matter (e.g., PM₁₀).

Use of the detour route would shift eastbound traffic (about 75 percent of I-70's busy Sunday traffic) onto a roadway that is closer to nearby residences and the Scott Lancaster Memorial Trail than are the existing eastbound

Table 3-19. Peak Sunday Criteria Pollutant Emissions Burden for 2035 Proposed Action with a Managed Lane (pounds per day)

Alternative	Particulate Matter Less than 2.5 Microns (PM _{2.5})	Sulfur Dioxide (SO ₂)	Oxides of Nitrogen (NO _x)	Carbon Monoxide (CO)	Re-entrained Road Dust (PM ₁₀)
2035 No Action	5.39	3.56	151.54	2,675.39	20.01
2035 Proposed Action with a Managed Lane	5.39	3.56	147.54	2,643.98	20.01
Change	none	none	-4.00	-31.41	none
Percent Change from No Action	none	none	2.6% reduction	1% reduction	none
2010 Existing Conditions	11.47	2.91	612.78	3,783.82	16.04
2035 Proposed Action Change from Existing Conditions	53% reduction	22% increase*	76% reduction	30% reduction	25% increase

Source:

* SO₂ emissions declined by more than 90 percent between 2000 and 2010, due to reduced sulfur content in vehicle fuels.

Table 3-20. Peak Sunday MSAT Emissions Burden for the 2035 Proposed Action (pounds per day)

Alternative	1,3 Butadiene	Acetaldehyde	Acrolein	Benzene	Formaldehyde
2010 Existing Conditions	1.17	2.56	0.21	9.81	5.06
Detour Condition	1.19	2.63	0.22	9.86	5.21
Change	+0.02	+0.07	+0.01	+0.05	+0.15
2035 No Action	0.67	1.52	0.13	5.18	3.10
2035 Proposed Action with a Managed Lane	0.63	1.41	0.12	4.97	2.86
2035 Proposed Action with no Managed Lane	0.62	1.37	0.11	4.87	2.74

Source:
MSAT = Mobile Source Air Toxics

Table 3-21. Peak Sunday Criteria Pollutant Emissions Burden for Detour Conditions (pounds per day)

Alternative	Particulate Matter Less than 2.5 Microns (PM _{2.5})	Sulfur Dioxide (SO ₂)	Oxides of Nitrogen (NO _x)	Carbon Monoxide (CO)	Re-entrained Road Dust (PM ₁₀)
Existing Conditions	11.47	2.91	612.78	3,783.82	16.04
Detour Conditions	11.47	2.91	592.36	3,780.44	16.04
Change	none*	none*	-20.42*	-3.38*	none*
Percent Change	none	none	3% reduction	<0.1% reduction	none

Source:
* Note that 75 percent of these emissions would be generated on the detour route, closer to receptors than the existing I-70 eastbound lanes.

I-70 lanes. Due to the resulting traffic speeds, some types of emissions may decrease slightly under detour conditions, compared to the existing conditions, as seen in Table 3-21. Trails users would also be detoured during construction onto a shared use path adjacent to the detour travel lanes on CR 314. Vehicle traffic on CR 314 adjacent to this path would exceed 2,000 vph for most of the day, on a busy peak season Sunday.

3.8.7 What mitigation is needed?

What I-70 PEIS mitigation strategies are relevant?

The I-70 PEIS noted that the Preferred Alternative is not anticipated to cause or result in violations of any NAAQS, and therefore most mitigation measures for air quality will center on controlling fugitive dust during construction, operation, and maintenance. The [I-70 PEIS](#) discussed many

strategies to mitigate construction impacts to air quality, most of which have been incorporated into the mitigation commitments in the tables below. The I-70 PEIS also noted that CDOT will support policies and programs to improve air quality in the I-70 Mountain Corridor, such as highway maintenance strategies to minimize re-entrained dust.

What mitigation is needed for this project?

CDOT has identified project mitigation for potential air quality impacts that could arise from future and construction activities, including the detour operation and tunnel excavation. Table 3-22 and Table 3-23 describe these mitigation measures.

Table 3-23 briefly mentions the use of ambient air quality monitoring during tunnel excavation to provide feedback to trigger adaptive mitigation. CDOT will conduct PM₁₀

monitoring in the immediate project area in support of an adaptive mitigation approach for controlling emissions from tunnel excavation. The Twin Tunnels air quality monitors will be set up some months ahead of project construction to facilitate monitoring protocol establishment, equipment testing, and acquire short term baseline data. The monitoring will be geared toward PM₁₀ levels during blasting activities, not U.S. Department of Labor Occupational Safety and Health Administration-level or EPA long-term targets. The monitoring will provide a concentration alert threshold that will immediately

trigger additional implementation of construction best management practices to address dust. Tunnel boring activities will not be halted for alerts. Additionally, once the tunnel bore is completed, the monitoring will cease. This effort will be conducted for the duration of construction associated with tunnel boring/blasting only and not for post-construction air quality monitoring. See the [Twin Tunnels EA Air Quality Technical Memorandum](#) (CDOT, 2012f) for additional detail about PM₁₀ monitoring during construction.

Table 3-22. Mitigation Commitments for Permanent Impacts on Air Quality

Activity	Location	Impact	Mitigation
Increase in I-70 Future Traffic Volumes.	Within Twin Tunnels project limits.	Re-entrained road dust (PM ₁₀) will increase approximately in proportion to increased traffic volumes.	<ul style="list-style-type: none"> • CDOT has a maintenance yard north of I-70 at the Hidden Valley Interchange (Exit 243) and will implement measures to minimize any trackout by CDOT vehicles at that location. • When road closures occur, CDOT maintenance crews may have an opportunity to clean the roadway, if this can safely be done in conjunction with the other activities at the site. CDOT can station and maintain a street sweeper at its Hidden Valley maintenance yard for this purpose. • In the I-70 Twin Tunnels area, CDOT will continue its ongoing practice of minimizing the use of road sanding as safety permits.

3.9 Noise

3.9.1 How does the analysis relate to the I-70 PEIS?

The following commitments from [Section 3.10](#) of the I-70 PEIS (CDOT, 2011b) regarding noise are applicable to this Tier 2 process:

- Develop specific and more detailed mitigation strategies and measures
- Develop best management practices (BMPs) specific to each project
- Identify extent and intensity of noise impacts to the project and surrounding area
- Adhere to any new laws and regulations that may be in place when Tier 2 processes are under way, including new regulations regarding noise abatement criteria expected to go into effect in July 2011

3.9.2 What process was followed to analyze traffic noise?

The study area consists of a roughly 1,000-foot buffer around the project area, which is located in Clear Creek County and the eastern limits of the City of Idaho Springs.

This noise analysis complies with regulatory requirements defined in Title 23 of the Code of Federal Regulations (CFR) Part 772 and *CDOT Noise Analysis and Abatement Guidelines* approved June 16, 2011, by FHWA. Noise levels were predicted using the TNM 2.5 highway noise level prediction software program developed by the FHWA, which is approved for use on CDOT and federal-aid projects. TNM calculates the hourly, noise level at a receptor location based on the following factors:

- The noise emission level of automobiles, medium trucks, heavy trucks, buses and motorcycles
- The volume and speed of each of these vehicle types on each key roadway
- The relative location of all roadways, receptors, and terrain features
- The type of land cover between each receptor and each roadway

CDOT's *Noise Analysis and Abatement Guidelines* establish noise abatement criteria and design and cost requirements for noise mitigation. Traffic noise impacts occur when noise levels for different categories of land uses and activities meet or exceed the CDOT Noise Abatement Criteria (NAC) shown in [Table 3-24](#) or when predicted noise levels for

future conditions are greater than existing noise levels by 10 A-weighted decibels [dB(A)] or more.

3.9.3 What agencies were involved in this analysis and what are their issues?

Noise specialists with the lead agencies helped develop the methodology and approach to noise analysis for this project. The lead agencies consulted with Clear Creek County Open Space Commission regarding recommended noise mitigation at the Scott Lancaster Bridge in the study area. The Open Space Commission approved the proposal for mitigation in this location.

3.9.4 What are the noise characteristics in the study area?

I-70 is the main travel corridor and the predominant traffic noise generator in the area. A review of the project area, building permits, and outdoor functions and uses of industrial facilities identified eight residential receptors, one trail receptor, and 10 industrial and business receptors. Four of the residential receptors are located on the south side of I-70 west of the twin tunnels (labeled R1, R2, R3, and R4) and one receptor for the Scott Lancaster Memorial Trail is located just east of the Scott Lancaster Bridge (T1) (see [Figure 3-17](#)). The other four residential receptors are located in the Hidden Valley area on the south side of I-70 (labeled R5, R6, R7, and R8) ([Figure 3-18](#)).

The predicted existing 2012 noise levels equal or exceed the noise abatement criteria of 66 dB(A) at two of the residential receptors located west of the Twin Tunnels western portal (R2 and R3), all four of the residential receptors in the Hidden Valley area (R5, R6, R7, and R8), and the one location on the Scott Lancaster Bridge (T1). [Table 3-25](#) lists the predicted noise levels for each receptor.

3.9.5 How does the No Action affect noise resources?

The No Action is not anticipated to result in any negative direct effects to any of the noise receptors in the study area, and noise levels would continue to exceed the noise abatement criteria at six of the eight residential receptors and the one trail receptor in the study area. 2012 existing conditions and the No Action in year 2035 would have the same roadway configuration, number of lanes, and speeds with the same worst noise hour traffic volumes. While average daily traffic would increase by the year 2035 and the periods of congestion would be longer, the worst noise hour would remain the same point in time when the highest traffic volumes are able to travel at the highest posted speed. Thus, there would be no difference

Table 3-24. CDOT Noise Abatement Criteria

Activity Category	Activity Leq(h)*	Evaluation Location	Activity Description
A	56	Exterior	Lands on which serenity and quiet are of extraordinary significance and serve an important public need and where the preservation of those qualities is essential if the area is to continue to its intended purpose.
B ¹	66	Exterior	Residential
C ¹	66	Exterior	Active sport areas, amphitheatres, auditoriums, campgrounds, cemeteries, day care centers, hospitals, libraries, medical facilities, parks, picnic areas, places of worship, playgrounds, public meeting rooms, public or nonprofit institutional structures, radio studios, recording studios, recreation areas, Section 4(f) sites, schools, television studios, trails, and trail crossings.
D	51	Interior	Auditoriums, day care centers, hospitals, libraries, medical facilities, places of worship, public meeting rooms, public or nonprofit institutional structures, radio studios, recording studios, schools, and television studios.
E ¹	71	NA	Hotels, motels, offices, restaurants/bars, and other developed lands, properties or activities not included in A-D or F.
F	NA	NA	Agriculture, airports, bus yards, emergency services, industrial, logging, maintenance facilities, manufacturing, mining, rail yards, retail facilities, shipyards, utilities (water resources, water treatment, electrical), and warehousing.
G	NA	NA	Undeveloped lands that are not permitted for development.

¹ Includes undeveloped lands permitted for this activity category.
 * Hourly A-weighted sound level in dB(A), reflecting a 1-dB(A) approach value below 23CFR772 values.
 NA = not applicable; not available

in the noise levels and no changes to the existing noise environment from the 2035 No Action.

3.9.6 How does the Proposed Action affect noise resources?

The following sections discuss the impacts to noise as a result of the Proposed Action, including those effects expected during and after construction. The analysis considers the effects of the Proposed Action including a managed lane and two general purpose lanes, and effects with three general purpose lanes and no managed lane.

What are the direct effects of the Proposed Action?

The I-70 PEIS analyzed noise impacts at representative locations in the I-70 Mountain Corridor, and did not analyze specific noise impacts in the location of the Twin Tunnels project. Based on the project-specific Tier 2 noise analysis conducted for the Proposed Action, all of the receptors that currently experience noise levels equal to or

exceeding 66 dB(A) would still exceed the 66-dB(A) criteria. No receptors are predicted to have a substantial increase [≥ 10 dB(A)] in noise levels over existing levels. Table 3-25 lists the predicted noise levels for each receptor.

A managed lane would be actively controlled with variable pricing to ensure the maximum volume of traffic traveling at the posted speed in that lane. Payment would be collected by an electronic or video method with no delays to managed lane drivers. During peak hours this lane would have a higher travel speed than the general purpose lanes. During off-peak traffic hours this lane would operate as a general purpose lane. These off peak hours are when the highest traffic volumes would be traveling at the posted speeds on all three eastbound lanes, exactly like the three general purpose lanes operating scenario, and this would be the loudest hour for traffic as reflected in Table 3-25 in the 2035 Proposed Action column.

Figure 3-17. Receptor Locations West of the Twin Tunnels



Figure 3-18. Receptor Locations East of the Twin Tunnels



Table 3-25. Predicted Noise Level Results

Receptor		Modeled Noise Level, Leq(h)* in dB(A)				CDOT Abatement Criteria Impacts	
		2012 Existing	2035 No Action	2035 Proposed Action	Change in Noise Levels (Proposed Action from Existing)	Meet or Exceed CDOT Noise Abatement Criteria**	Increase over Existing Noise Levels by ≥ 10 dBA
West	R1	53.3	53.3	54.1	0.8	No	No
	R2	66.4	66.4	68.1	1.7	Yes	No
	R3	66.7	66.7	67.7	1.0	Yes	No
	R4	64.4	64.4	65.4	1.0	No	No
	T1	76.4	76.4	78.6	2.2	Yes	No
Hidden Valley	R5	70.8	70.8	71.4	0.6	Yes	No
	R6	66.6	66.6	67.9	1.3	Yes	No
	R7	70.1	70.1	71.1	1.0	Yes	No
	R8	72.2	72.2	73.3	1.1	Yes	No

* Hourly A-weighted sound level in dB(A).
 ** CDOT Noise Abatement Criteria are presented in Table 3-24 by activity category. Receptors fall into activity categories B and C.

How does the Proposed Action differ with or without a managed lane?

There would be no difference to the worst-hour noise impacts with no managed lane. As stated above, the model was developed for the worst noise hour, which will not change between the two operating scenarios.

What indirect effects are anticipated?

There are no indirect effects anticipated.

What effects occur during construction?

This project would have several temporary impacts to the noise environment during construction. These impacts are associated with detouring eastbound traffic around the Twin Tunnels site, excavation of the tunnel via blasting, and standard construction techniques. Blasting work on the tunnel would be done from both ends of the tunnel by two different crews working 24 hours per day, 7 days per week. The width of the tunnel would determine the cycle of blasting. Each crew would be on a different cycle, and several blasts would occur during each cycle. At the beginning of construction, the blasting will be done at the portals. As the work progresses, the blasting would be inside the tunnel. Each blast would be relatively small, removing roughly 6 feet of rock at a time. The closest

residential structure is 750 feet from the tunnel portal and is not expected to be impacted by the air blast overpressure. However, blasting noise levels would be noticeable and bothersome to humans and wildlife in the vicinity. The water treatment plant is located roughly 225 feet from the portal and may be susceptible to the air blast overpressure.

Aside from the tunnel blasting, standard construction techniques would generate noise from diesel-powered earth-moving equipment such as dump trucks and bulldozers, back-up alarms on certain equipment, and compressors. Construction noise at offsite receptor locations will usually be dependent on the loudest one or two pieces of equipment operating at the moment. Noise levels from diesel-powered equipment range from 80 to 95 dB(A) at a distance of 50 feet.

3.9.7 What mitigation is needed?

What I-70 PEIS mitigation strategies are relevant?

The phased approach of the I-70 PEIS Preferred Alternative allows for ongoing opportunities to avoid and minimize noise impacts, establish mitigation, and employ I-70 Mountain Corridor Context Sensitive Solutions. The I-70 PEIS stated that the lead agencies would consider a full [range of mitigation options](#) in Tier 2 processes to reduce

highway noise. Of the range of options to be considered, noise walls are the only federally approved noise mitigation measure that would be feasible in the project area. The topographic constraints in the narrow Clear Creek valley generally eliminate landscaping, vegetated noise berms, and the creation of noise buffer areas as feasible mitigation measures. Concrete barriers at the roadway edge were considered but would not perceptibly reduce noise levels. Adjusting the vertical or horizontal roadway alignment to the extent that noise impacts would be reduced is not possible given the topography of the study area.

This study adheres to the mitigation strategies discussed in the I-70 PEIS by conducting more specific and detailed noise analysis, including mitigation strategies in accordance with the CDOT's *Noise Analysis and Abatement Guidelines* and by incorporating BMPs into this project.

What mitigation is needed for this project?

CDOT has identified project mitigation for potential noise impacts that could arise from future operations and construction activities, including the tunnel excavation. Table 3-26 and Table 3-27 describe these mitigation measures.

Mitigation commitments for permanent impacts

As discussed in the previous section, predicted design-year noise levels equal or exceed CDOT's noise abatement criteria of 66 dB(A) at seven locations. CDOT policy requires analysis of the feasibility and reasonableness of constructing noise mitigation measures for impacted receptors for certain types of projects, called Type I projects. The Proposed Action meets the definition of a Type I project because it would include the addition of a new through-travel lane.

Feasibility of abatement reviews the physical considerations and concerns with the construction of an acoustically effective noise barrier at a particular site. These criteria include:

- Does the proposed mitigation measure provide at least 5 dB(A) of noise reduction to a front row receptor?
- Are there any "fatal flaw" safety or maintenance issues involved with the proposed mitigation measure?
- Are there any obvious constructability issues with the proposed mitigation measure?

Reasonableness of abatement evaluates the combination of environmental, economic, and social factors associated with noise abatement measures. Reasonableness criteria include:

- Does the proposed mitigation measure provide a minimum of 7 dB(A) for one benefitted receptor?

- Is the proposed mitigation cost-reasonable? Is the cost benefit index (cost per receptor per decibel of reduction) no more than \$6,800?
- What are the desires of benefitted residents and owners?

Mitigation for the residential receptors west of the Twin Tunnels proved to not be feasible (could not obtain a 5 dB(A) noise reduction) or reasonable (cost benefit was roughly \$123,373 per receptor per decibel reduction) and is not recommended. This is a result of the widely spaced homes being located up the mountain side from I-70.

Mitigation for the Hidden Valley residential receptors is feasible with a 1,900-foot-long wall averaging 17.6 feet high, providing an average of 5.6 dB(A) of noise reduction for the four residences. However, this \$1,538,000 wall was not reasonable based on the \$68,660 per receptor per decibel reduction cost benefit calculation. This wall is not recommended. This is again a result of the widely spaced homes being located above I-70 with a clear view of the roadway.

Mitigation for the Scott Lancaster Memorial Trail adjacent to the Scott Lancaster Bridge is feasible and reasonable. A wall 194 feet long and 6 feet high proceeding west from the west portal of the eastbound I-70 tunnel provides 8.1 dB(A) of noise reduction at this location. The wall is predicted to cost \$52,380 for a cost benefit of \$6,467 per receptor per decibel reduction. The Clear Creek County Open Space Commission, as the owner of the Scott Lancaster Memorial Trail, has stated its desire for this mitigation and, thus, the wall is recommended (see Table 3-26).

Mitigation commitments for temporary impacts during the construction period

It is anticipated noise from the blasting inside the tunnel would be largely muffled by the mountain. If safety procedures call for blasting debris blankets, those blankets would also act to muffle some of the blast's sound pressure wave. However, additional mitigation measures are recommended in Table 3-27 to address blasting noise.

While the detour alignment would be closer to many of the receptors than the existing I-70 highway, the predicted noise levels for all receptors would be lower than existing levels due to the slower 35 miles per hour (mph) speed of the detour and reduced speeds on eastbound I-70 immediately prior to the detour. No additional mitigation is proposed.

Table 3-26. Mitigation Commitments for Permanent Noise Impacts

Activity	Location	Impact	Mitigation ¹
Capacity improvements that meet the definition of a Type I Project.	Adjacent to Scott Lancaster Bridge.	Continued noise levels in exceedance of CDOT noise abatement criteria.	Construct a noise wall proceeding west from the west portal of the eastbound tunnel to reduce noise levels at the Scott Lancaster Bridge.
¹ Mitigation is not necessary if the activity is avoided or if the benefited owners prefer the mitigation not be constructed.			

Table 3-27. Mitigation Commitments for Temporary Noise Impacts

Activity	Location	Impact	Mitigation*
Nighttime construction.	Adjacent to residential receptors at Hidden Valley and west portal.	Nighttime construction noise at residential receptors.	<ul style="list-style-type: none"> • Limit night work to areas away from residences at Hidden Valley and west portal when feasible. • Require contractor to use well-maintained equipment, particularly with respect to mufflers. • Install temporary noise barriers where applicable. • Provide residents hotel vouchers during periods of nighttime construction.
Tunnel blasting.	Eastbound tunnel.	Noise impacts at nearby residences and recreation facilities.	<ul style="list-style-type: none"> • Develop a communication protocol in coordination with Idaho Springs, Clear Creek County, and law enforcement agencies to inform local residents, businesses, and the traveling public about blasting schedules. Consider the use of Variable Message Signs and the use of websites and media outlets. • During initial blasting at the entrance to the western portal the contractor, CDOT will monitor the air blast overpressure at business structures susceptible to damage. At that time, an engineer will make a determination of potential risks and need for additional mitigation. • During initial blasting at the entrance to the western portal CDOT will monitor 24-hour noise levels at sensitive receptors to determine if additional temporary mitigation is required.

* Mitigation is not necessary if impact can be avoided through changes in the design or construction of the Proposed Action (i.e., the activity is avoided).

3.10 Terrestrial Wildlife

3.10.1 How does the analysis relate to the I-70 PEIS?

The following commitments from [Section 3.2](#) of the I-70 PEIS (CDOT, 2011b) regarding recreational resources are applicable to this Tier 2 process:

- Adhere to any new or revised laws or regulations pertaining to biological resources
- Develop specific best management practices (BMPs) for each project
- Develop specific and more detailed mitigation strategies and measures
- Consider opportunities for enhancement on a project-by-project basis
- Fulfill responsibilities set forth in the [A Landscape-Level Inventory of Valued Ecosystem \(ALIVE\) Memorandum of Understanding \(MOU\)](#)

3.10.2 What process was followed to analyze wildlife resources?

An existing conditions wildlife assessment for the Twin Tunnels study area was completed in the fall of 2011. The purpose of this assessment was to evaluate plant communities and other habitat features within the study area to determine the wildlife species likely to occur. Particular attention was focused on culturally/economically important species such as bighorn sheep (*Ovis canadensis*), mule deer (*Odocoileus hemionus*), and Rocky Mountain elk (*Cervus elaphus*). In addition, the area was surveyed for the presence of any raptor nests, and other special wildlife attributes. Terrestrial wildlife issues were also assessed by performing a review of existing environmental sources. Primary sources of existing data included the *I-70 Mountain Corridor PEIS – Biological Resources Technical Report* (CDOT, 2010c) and the I-70 PEIS (CDOT, 2011b).

3.10.3 What agencies were involved in this analysis and what are their issues?

The lead agencies for the Twin Tunnels project, CDOT and FHWA, have coordinated with the U.S. Fish and Wildlife Service (USFWS), U.S. Forest Service (USFS), and Colorado Parks and Wildlife (CPW). Habitat connectivity for species of importance, such as elk, deer, bighorn sheep, and animal-vehicle collisions are a common concern among stakeholders and agencies, and were addressed by the ALIVE Committee established for this Tier 2 process. In addition, a series of onsite meetings with CPW northeast region terrestrial wildlife biologist and district wildlife

managers were held to discuss specific wildlife concerns and potential avoidance, minimization, and mitigation measures related to wildlife potentially impacted by construction and operation of the Twin Tunnels project. The [Twin Tunnels EA Terrestrial Wildlife Technical Memorandum](#) (CDOT, 2012h) provides additional information on agency involvement.

**ALIVE stands for
A Landscape-Level Inventory of Valued
Ecosystem Components.**

3.10.4 What are the wildlife resources in the study area?

The study area varies in elevation from 7,470 feet on the western end of the project (approximately milepost 241) to 7,240 feet on the eastern end of the project (approximately milepost 244). The study area encompasses both Foothills and Montane Zone vegetation, which is characterized by ponderosa pine (*Pinus ponderosa*) woodlands, and deciduous scrublands including mountain mahogany (*Cercocarpus montanus*) and Douglas-fir (*Pseudotsuga menziesii*) forests. The area north of the study area, and in the vicinity of Twin Tunnels, consists of open rocky/steep habitat intermixed with low shrubs and trees. In addition, the tunnels act as a land bridge over I-70, and mule deer have been observed accessing the steep, rocky terrain to safely cross I-70.

Habitat adjacent to Clear Creek within the study area is characterized by steep, riprap banks that generally lack contiguous riparian habitat or larger cottonwood woodlands. Riparian habitat is an important feature for wildlife due to the numbers and richness of wildlife supported and its value as a general wildlife movement corridor. Terrestrial wildlife within the study area can be broken into the following categories: big game, predators and other mammals, and birds. These categories are described below.

Big game

Three big game species—mule deer, elk, and bighorn sheep—use suitable habitat within the study area throughout the year. Portions of the study area are considered overall range for all three species (CPW, 2010).

Mule deer and elk typically occupy higher elevations, usually forested habitat, during the summer and then migrate to lower elevations and south facing slopes in the winter. Two seasonal ranges, designated by CPW, occur within the study area for mule deer: winter range and

summer range. Winter concentration areas generally occur on the north side of I-70 outside the study area (CPW, 2010). Only one seasonal range occurs within the study area for elk: winter range. Mule deer and elk seasonal activity areas within the study area are shown in Figure 3-19.

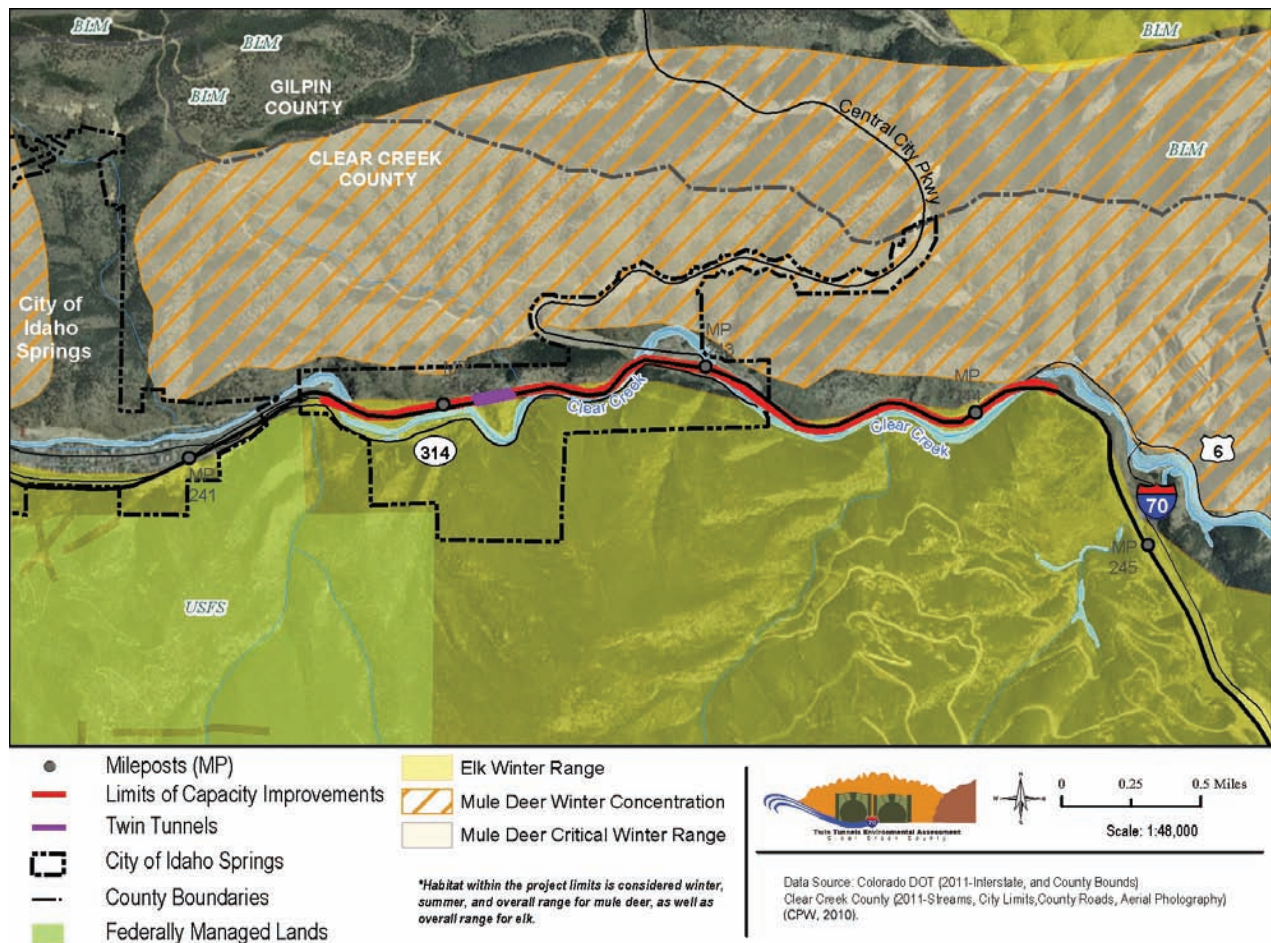
Bighorn sheep typically occupy steep, high mountain terrain. In Colorado, they prefer habitat dominated by grass, low shrubs, rock cover, and areas with good escape terrain and topographic relief (Fitzgerald et al., 1994). They often retreat to rest on inaccessible cliffs. In the vicinity of the study area, bighorn sheep (part of the Georgetown sheep management herd) are frequently observed alongside the north side of I-70 from Idaho Springs (milepost 240) to near Floyd Hill (milepost 245). Moreover, the majority of occupied sheep habitat occurs adjacent to the westbound lanes of I-70.



Bighorn Sheep.

Within the study area, bighorn sheep have been observed crossing I-70 via the Twin Tunnels land bridge to access

Figure 3-19. Mule Deer and Elk Seasonal Activity Areas within the Study Area



the rocky/open south facing slopes. Although sheep are observed on rocky steep habitat in the vicinity of the land bridge, sheep generally do not cross Clear Creek to access habitat on the south side of I-70. In general, habitat south of Clear Creek in the vicinity of the study area is densely forested and considered unsuitable for sheep. In addition, no lambing is known to occur in the study area (CPW, 2011a, personal commun.). Bighorn sheep seasonal activity areas within the study area are shown in Figure 3-20.

Predators and other mammals

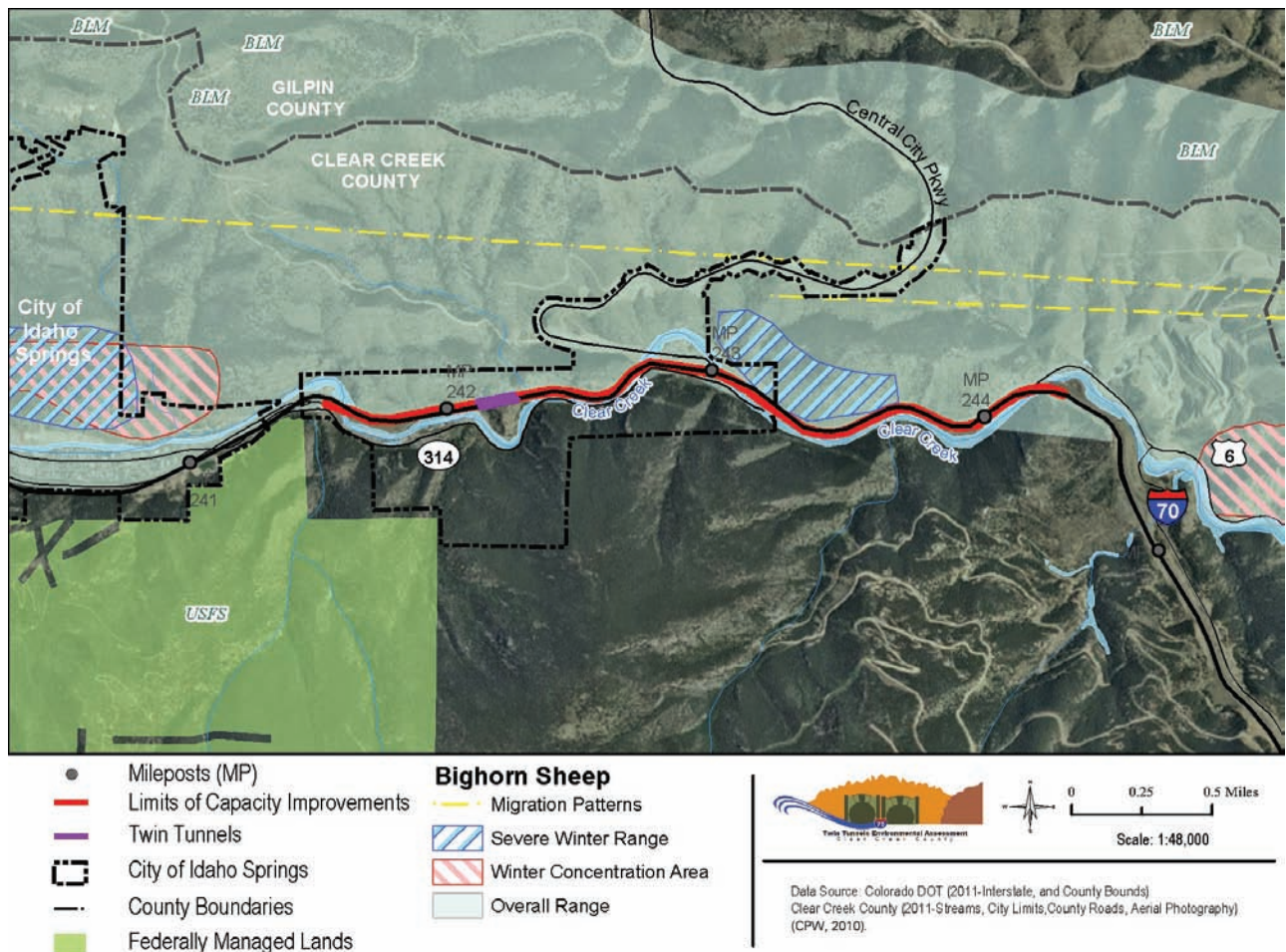
There is suitable forage habitat within the study area for several common predator species that are habituated to human presence. These species include: coyote (*Canis latrans*), red fox (*Vulpes vulpes*), bobcat (*Lynx rufus*), raccoon (*Procyon lotor*), and striped skunk (*Mephitis mephitis*). The entirety of the study area is considered overall range of the black bear (*Ursus americanus*) and fall

concentration areas have been mapped west of the study area. In addition, mountain lions (*Felis concolor*) are found throughout the region in areas that support populations of deer, bighorn sheep, and elk. Common small mammal species include ground squirrels, mice, chipmunks, and rabbits. A variety of beaver (*Castor canadensis*) activity has been observed adjacent to Clear Creek and several bank dens are located within the study area.

Migratory birds and raptors

The Migratory Bird Treaty Act (MBTA), passed in 1918, protects raptors and other migratory birds and their active nest sites. In Colorado, most birds, except for the European Starling (*Sturnus vulgaris*), House Sparrow (*Passer domesticus*), Rock Dove (*Columbia livia*) (Pigeon), Eurasian Collared-Dove (*Streptopelia decaocto*), and Common Grouse/Pheasant species (Order Galliformes), are protected under the MBTA.

Figure 3-20. Bighorn Sheep Seasonal Activity Areas within the Study Area



In addition to the MBTA, the Bald and Golden Eagle Protection Act provides for the protection of the Bald Eagle (*Haliaeetus leucocephalus*) and the Golden Eagle (*Aquila chrysaetos*) by prohibiting the taking, possession, and use of these two species for commerce except under certain specified conditions. The definition of “take” includes the following: pursue, shoot, shoot at, poison, wound, kill, capture, trap, collect, molest, or disturb.

The mixed montane forest, riparian habitat, and steep rocky terrain found within the study area provides both foraging and nesting habitat for a variety of migratory birds and raptors that summer, winter, or migrate through the area. An on-site nest survey was completed in the fall of 2011 to identify the presence/absence of active migratory or raptor nest locations within the project limits. Several areas of suitable nesting habitat were observed, however, no nests were identified at time of survey.

A Landscape-Level Inventory of Valued Ecosystem Components (ALIVE)

During the I-70 PEIS process, the lead agencies examined habitat connectivity and animal-vehicle collisions through an interagency committee known as “A Landscape-Level Inventory of Valued Ecosystem Components” (ALIVE) Committee. The Committee identified 13 areas where the I-70 Mountain Corridor interferes with wildlife migration, including elk, mule deer, bighorn sheep, and Canada lynx (*Lynx canadensis*). These locations are referred to as linkage interference zones (LIZs). By focusing on areas of known migration and wildlife use, and creating wildlife crossings, animal-vehicle collisions can be reduced and habitat connectivity can be increased. A MOU, signed in April 2008, details the responsibilities of each agency in addressing animal-vehicle collisions.

The ALIVE committee met twice during the NEPA process to discuss impacts and recommend mitigation.

In order to fulfill responsibilities set forth in the [ALIVE MOU](#) (see [Appendix C](#)), the ALIVE Committee scheduled two meetings to discuss wildlife connectivity issues and solicit input on any relevant topics related to the Twin Tunnels project.

Since the release of the I-70 PEIS, additional data has been compiled, and a systematic process was developed, to refine the 13 priority connectivity zones originally delineated in 2004. As a result, new analysis completed for the I-70 Mountain Corridor has identified 17 LIZs covering approximately 51 miles (Kintsch et al., 2011). This updated analysis identified one new LIZ that occurs within the study area (identified as the Clear Creek Junction LIZ)

from milepost 243.0 to milepost 244.9. The only area of concern within the study area is the divided bridge at the Central City Parkway exit (milepost 243.0). The specific recommendation at this location includes opening up the terrestrial pathway under the highway bridge and restoring the natural stream banks. Additional site-specific recommendations within the Clear Creek Junction LIZ at milepost 244.2 and milepost 244.9 do not occur within the study area. Specific mitigation opportunities for wildlife connectivity at the Central City Parkway Bridge are discussed in Section 3.10.7.

3.10.5 How does the No Action affect wildlife resources?

Under the No Action, continued highway maintenance and transportation improvements with approved funding sources would be implemented in the future. These activities could result in additional impacts to wildlife species and habitat.

3.10.6 How does the Proposed Action affect wildlife resources?

The following sections discuss the impacts to terrestrial wildlife as a result of the Proposed Action, including those effects expected during and after construction. The analysis considers the effects of the Proposed Action including a managed lane and two general purpose lanes, and effects with three general purpose lanes and no managed lane.

Direct effects to wildlife were identified based on the loss of existing habitats due to construction activities associated with the Proposed Action. Temporary direct effects include temporary habitat loss, construction noise disturbance, and mortality. Permanent direct effects generally include habitat fragmentation and permanent loss of habitat.

Indirect impacts to wildlife include bisecting a potential wildlife corridor, which may cause an increase in animal vehicle collisions or interruptions of migration patterns. In addition, indirect effects could be caused by the introduction and spread of noxious or invasive weed species, which degrades wildlife habitat.

What are the direct effects of the Proposed Action?

The I-70 PEIS indicated that corridor-wide direct impacts on wildlife would include loss of habitat due to construction and the increased barrier effect due to new roadway improvements. The conclusions of this Tier 2 process analysis are generally consistent with the conclusions of the I-70 PEIS. The Proposed Action would directly impact wildlife foraging and nesting habitat. Approximately 5.7 to 6.2 acres of habitat will be converted to transportation use. However, the majority (98 percent) of habitat that

would be converted is disturbed roadside habitat that has already been degraded. No permanent impact to wetland or riparian habitat is anticipated. The direct disturbance of wildlife habitat would slightly reduce habitat availability for a variety of common small mammals, birds, and their predators. Habitat loss resulting from the construction of the Proposed Action is shown in Table 3-34 in Section 3.13, *Vegetation*.

No direct permanent impacts to big game species would occur.

The disturbance of wildlife habitat from the Proposed Action could result in some direct mortality to small mammals, birds, and their predators and displacement of songbirds from construction activity.

No direct permanent impacts to big game (mule deer, bighorn sheep, or elk) migration corridors or winter range, critical winter range, and winter concentration areas would result from the construction of the Proposed Action.

How does the Proposed Action differ with or without a managed lane?

The Proposed Action would result in the same impacts on terrestrial wildlife with or without a managed lane.

What indirect effects are anticipated?

Construction of the Proposed Action (primarily in the vicinity of the Twin Tunnels land bridge) would have temporary effects on large and small mammal movement due to construction noise and vegetation removal and could increase animal vehicle collisions. Soil disturbance from construction equipment would also create favorable conditions for noxious weeds to introduce and establish, or to further spread. Based on the existing conditions in the study area, no permanent impact or disruption of movement or migration corridors is anticipated in the vicinity of the Twin Tunnels land bridge or along Clear Creek.

What effects occur during construction?

Wildlife species that are sensitive to indirect human disturbance (noise and visual disturbance) would be impacted most during the duration of construction. Construction activities would include blasting work on the tunnel, and use of the eastbound I-70 detour route on CR 314. Construction activities would temporarily affect wildlife resources due to disturbance from construction noise and increased human presence. In addition, construction activities in the vicinity of the Twin Tunnels land bridge would have temporary effects on large and small mammal movement due to construction noise

(blasting and vibration) and operation of the eastbound I-70 detour route.

3.10.7 Displacement/disturbance

Blasting work on the tunnel would start from both ends by two separate crews working 24 hours per day, 7 days a week. Blasting is anticipated to last from April 2013 through October 2013. At the beginning of construction, the blasting would be done at the portals. As the work progresses, the blasting would be inside of the tunnel. It is anticipated noise from the blasting inside the tunnel would be largely muffled by the mountain. Blasting would proceed from each portal to the center of the tunnel. Each blast would be relatively small, as the drill depth is expected to range from approximately 3 to 15 feet, and the greatest blast noise generation will be at the portals. Blasting activities would temporarily affect wildlife resources due to disturbance from construction noise and increased human presence. Noise disturbance to wildlife would be the greatest while blasting occurs at the portals (approximately April) then would gradually decrease as work progresses inside the tunnel.

Increased levels of human disturbance (e.g., traffic, blasting/vibration, or the operation of heavy machinery) would likely cause some wildlife species or individuals to avoid the study area during construction and

Temporary displacement of wildlife during construction and operation of the eastbound I-70 detour is likely.

operation of the eastbound I-70 detour. Although wildlife can become accustomed to human activity, they are generally sensitive to human encroachment. The presence of the construction work force, heavy machinery, and construction noise and vibration from blasting would likely lead to temporary wildlife displacement to individuals that occur in the vicinity of the project. Some species may be more susceptible to displacement than others, but species inhabiting adjacent areas may periodically be disturbed or displaced by human activity. Because of the mobility of many species, they are generally capable of avoiding activities causing disturbance. It is anticipated that wildlife would return to their habitats once blasting and construction is complete.

3.10.8 Operation of the eastbound I-70 detour

During agency scoping it was noted that the land bridge is not considered a significant travel or movement corridor for big game species. However, wildlife species, particularly mule deer, have been observed accessing the land bridge to safely cross I-70. The temporary disruption of wildlife

movement in the vicinity of the land bridge during operation of the eastbound I-70 detour could result in an increase in animal vehicle collisions to mule deer and other mammals. In addition, salt and deicing liquids placed on old US 40 (game check area) could attract bighorn sheep down to the roadway in the vicinity of the Twin Tunnels land bridge while the eastbound I-70 detour is in operation. As a result, specific mitigation measures listed in Section 3.10.7 are proposed to minimize animal vehicle collisions and prevent bighorn sheep from accessing the roadway while the eastbound I-70 detour is in operation.

3.10.9 What mitigation is needed?

What I-70 PEIS mitigation strategies are relevant?

The phased approach of the I-70 PEIS Preferred Alternative allows for ongoing opportunities to avoid and minimize impacts to terrestrial wildlife, establish mitigation, and employ I-70 Mountain Corridor Context Sensitive Solutions. Mitigation approaches for terrestrial wildlife from the I-70 PEIS that are relevant to this project are outlined in the [ALIVE MOU](#). These measures are intended to reduce animal-vehicle collisions and increase habitat connectivity throughout the I-70 Mountain Corridor. These measures include, but are not limited to:

- Use of underpasses or overpasses dedicated to wildlife movement, fencing, berms, and vegetation to guide wildlife to crossing structures.
- Use of signage to alert motorists of wildlife presence.
- Protection of existing natural features that enhance habitat connectivity to the extent practicable.

What mitigation is needed for this project?

All appropriate BMPs to prevent and minimize temporary impacts to vegetation and riparian habitat will be followed during construction. [Section 3.13, Vegetation](#), and [Section 3.16, Water Resources and Water Quality](#),

include a number of measures that would be applied during construction to reduce construction-related and/or permanent impacts to vegetation/wildlife habitat from the Proposed Action. To fulfill responsibilities in the [ALIVE MOU](#), several mitigation measures have been incorporated into the project in several locations. The purpose of these mitigation measures is to improve connectivity for terrestrial wildlife on the I-70 Mountain Corridor.

Table 3-28 and Table 3-29 summarize mitigation commitments for the Twin Tunnels project.



Wildlife movement/crossing area beneath Hidden Valley bridge.

Table 3-28. Mitigation Commitments for Permanent Impacts to Terrestrial Wildlife

Activity	Location	Impact	Mitigation*
Widening of I-70 eastbound lane and adding a through lane.	East portal of Twin Tunnels - riparian area that extends upgradient from Clear Creek.	Temporary loss of riparian habitat (trees and shrubs).	<ul style="list-style-type: none"> Riparian trees and shrubs removed during construction will be replaced as stipulated in CDOT's Guidelines for Senate Bill 40 Wildlife Certification, which state that trees removed during construction, whether native or non-native, shall be replaced with a goal of 1:1 replacement based on a stem count of all trees with diameter at breast height of two inches or greater. Shrubs removed during construction, whether native or non-native will be replaced based on their preconstruction areal coverage. In all cases, all such trees and shrubs will be replaced with native species.
<p>Reconstruction of the bridge on I-70 over Clear Creek west of Hidden Valley Interchange.</p> <p>This area was identified in the Clear Creek Junction linkage interference zone.</p>	I-70 over Clear Creek west of Hidden Valley Interchange (near milepost 243).	Potential to decrease wildlife connectivity if existing bench is not extended. In addition, the upstream side of the creek is steep and there is large rip rap on the south side of the existing bridge that is not favorable for wildlife movement.	<ul style="list-style-type: none"> When this bridge is replaced, the existing bench under the bridge will be extended to improve wildlife movement under the bridge. The approach on the upstream side of Clear Creek will be softened and large riprap will be replaced with smaller substrate to allow animals to move more freely.

* Mitigation is not necessary if impact can be avoided through changes in the design or construction of the Proposed Action (i.e., the activity is avoided).

Table 3-29. Mitigation Commitments for Temporary Impacts to Terrestrial Wildlife During the Construction Period

Activity	Location	Impact	Mitigation
Construction-related disturbance between April 1 and August 31.	Twin Tunnels project area in the vicinity of active nests.	Potential loss of eggs or young of nesting migratory birds.	<ul style="list-style-type: none"> If construction is to commence between April 1 and August 31, to avoid impacts to nesting birds in accordance with the MBTA, a qualified biologist will conduct a nest survey prior to construction. If active nests are found during construction, coordination with CPW and USFWS is required to determine an appropriate course of action, which may include, but is not limited to, a delay in construction to avoid the breeding season.
Use of temporary erosion control blankets for erosion control.	Twin Tunnels project area, where BMPs will control erosion adjacent to Clear Creek.	Potential snake mortality from entanglement in plastic mesh deployed for erosion control.	<ul style="list-style-type: none"> Erosion control blankets will have flexible natural fibers to allow for safe passage of snakes through the erosion control blanket.

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Table 3-29. Mitigation Commitments for Temporary Impacts to Terrestrial Wildlife During the Construction Period

Activity	Location	Impact	Mitigation
Widening of I-70 eastbound lane and adding a through lane.	Twin Tunnels project area—riparian and wetland habitat adjacent to Clear Creek.	Loss of vegetation and impacts to sensitive habitats.	<ul style="list-style-type: none"> Wetland/riparian areas not temporarily impacted by the project will be protected from construction activities by temporary and/or construction limit fencing.
Expansion of the eastbound tunnel bore, old US 40 (game check area), and CR 314 would carry eastbound I-70 traffic around the Twin Tunnels on a 1-mile detour route.	One segment of the eastbound I-70 detour will use the old US 40 alignment (game check area) for approximately 1,200 feet in the vicinity of the Twin Tunnels land bridge.	Potential for increased animal/vehicle collisions in the vicinity of the Twin Tunnels land bridge while the eastbound I-70 detour is in place. In addition, deicing liquids and salt placed on old US 40 (game check area) during the eastbound I-70 detour may attract big horn sheep down to the roadway in the vicinity of the Twin Tunnels land bridge.	<ul style="list-style-type: none"> A 10-foot-high temporary wildlife fence will be constructed along the north side of old US 40 (game check area). The fencing is intended to keep wildlife off the north side of old US 40 (game check area) and prevent big horn sheep from coming down to access the roadway while the eastbound I-70 detour is in place. The fence will be removed when the eastbound I-70 detour is no longer in place. If an increase in animal/vehicle collisions is observed during operation of the eastbound I-70 detour, temporary fencing will be considered on the south side of the roadway. Commence blasting as far in advance of the June to August lambing season as possible to familiarize wildlife with the practice. In addition, temporary lighting will be used on the eastbound I-70 detour to improve safety and detection of wildlife on the roadway.
During expansion of the eastbound tunnel bore, old US 40 (game check area) and CR 314 would carry eastbound I-70 traffic around the Twin Tunnels on a 1-mile detour route.	One segment of the eastbound I-70 detour will use the old US 40 alignment (game check area) for approximately 1,200 feet in the vicinity of the Twin Tunnels land bridge.	Deicing liquids and salt placed on old US 40 (game check area) during the eastbound I-70 detour may attract big horn sheep to the roadway in the vicinity of the Twin Tunnels land bridge. Potential for increase in animal-vehicle collisions.	<ul style="list-style-type: none"> Colorado Parks and Wildlife will place salt blocks on the north side of I-70 before blasting begins to keep sheep away from the tunnel and roadway during the eastbound I-70 detour.

* Mitigation is not necessary if impact can be avoided through changes in the design or construction of the Proposed Action (i.e., the activity is avoided).

MBTA = Migration Bird Treaty Act

USFWS = U.S. Fish and Wildlife Service

CPW = Colorado Parks & Wildlife

BMPs = best management practices

3.11 Aquatic Resources

3.11.1 How does the analysis relate to the I-70 PEIS?

[Section 3.2](#) of the I-70 PEIS (CDOT, 2011b) provided general descriptions of existing aquatic resources and impacts to the resource. While using the information provided in the I-70 PEIS, this Tier 2 evaluation considers site-specific issues and updates resource information. Furthermore, the I-70 PEIS specifies certain commitments to be carried out during Tier 2 evaluations. Commitments regarding aquatic resources include:

- A survey will be conducted for protected (threatened, endangered, or sensitive) species and their habitat. The survey will involve contacting the U.S. Fish and Wildlife Service (USFWS) and Colorado Parks and Wildlife (CPW) for relevant updated species lists.
- Laws and regulations pertaining to fisheries and aquatic resources will be reviewed for any updates.
- Best management practices (BMPs) will be developed, as appropriate, for the Twin Tunnels project.
- Specific and detailed mitigation strategies and measures will be developed. This will be accomplished, in part, by working with and adhering to the [Stream and Wetland Ecological Enhancement Program \(SWEET\) Memorandum of Understanding \(MOU\)](#) and Clear Creek Sediment Control Action Plan (SCAP) team, which is a component of the SWEET MOU. The SCAP team is focusing on the Twin Tunnels project and identifying opportunities to avoid and mitigate water quality impacts to Clear Creek.
- Fisheries will be evaluated, including localized temperature concerns.

Commitments regarding threatened, endangered, and sensitive aquatic species, water quality, and hazardous materials are presented in the respective resource sections of this environmental assessment (EA).

3.11.2 What process was followed to analyze aquatic resources?

The impact assessment for aquatics resources followed the procedures set out during the I-70 PEIS process as described above.

- Field reviews were conducted onsite with CPW representatives during late fall of 2011 and early 2012.
- Literature review was conducted, including a review of the long-term monitoring program for the Clear Creek drainage (CDOT, 2011b).

- The SWEET committee provided input related to aquatic habitat and fish species in the study area and concerns about specific impacts to these species.

Information relevant to defining the existing conditions of the aquatic resources was documented and discussed with the USFWS, CPW and the ALIVE (A Landscape-Level Inventory of Valued Ecosystems) and SWEET committees. Design plans specifying permanent and temporary changes to the Clear Creek regime were developed, impacts assessed, and mitigation defined.

3.11.3 What agencies were involved in this analysis and what are their issues?

The following agencies provided input and information on issues pertaining to the aquatic resources within and immediately downstream from the Twin Tunnels project.

U.S. Fish and Wildlife Service

The USFWS was contacted early in the process to request input on issues and concerns regarding potential impacts to endangered, threatened, or sensitive species inhabiting or frequenting areas associated with the Proposed Action. Informal consultation with USFWS was initiated to document the issues and potential impacts. This process is described further in [Section 3.12, Threatened or Endangered Species](#). Representatives from USFWS served on the SWEET committee and the Twin Tunnels Technical Team.

Concerns for potential impacts to sensitive species related to water depletions of the South Platte River have been addressed in [Section 3.12, Threatened or Endangered Species](#). No other federally listed threatened, endangered or sensitive species were considered to be affected by the project.

Colorado Parks and Wildlife

The CPW was contacted for input on issues or concerns regarding potential impacts to aquatic resources in the area of the Proposed Action. Representatives from CPW were present at field reviews and also served on the SWEET committee. CPW had the following issues and concerns:

- Potential for erosion/sedimentation to affect brown trout redds (nest) and benthic invertebrate habitat downstream from construction activities.
- Recommendation that in-stream construction activities not be conducted between October 1 and June 1 to avoid impacts to brown trout reproduction.

Trout Unlimited

The Colorado Chapter of Trout Unlimited (TU) was contacted during scoping for input as to issues and concerns regarding

potential impacts to aquatic resources within Clear Creek. In addition to providing scoping input, a TU representative served on the SWEEP committee and the Twin Tunnels Technical Team. Trout Unlimited had the following issues and concerns:

- The TU habitat restoration project on Clear Creek downstream from the Twin Tunnels project could be affected by sedimentation generated upstream.
- The rock in the area proposed for construction has the potential to be highly mineralized. There is a potential for leaching of minerals through the construction period with likely contamination to Clear Creek.
- Mine waste soils may have been used as road base during construction of I-70. Construction of additional facilities in the Twin Tunnels area has the potential to further disturb contaminated soils resulting in additional localized pollution.
- Concern about potential impacts to the federally-listed threatened Greenback cutthroat trout. Pure strains of this species occur in the upper reaches of Clear Creek (Bard Creek, a tributary to the West Fork of Clear Creek) approximately 25 miles upstream from the Twin Tunnels (USFS, 2002). According to the CPW (CPW, 2011b; CPW, 2012), pure strain Greenback cutthroat trout do not occur in Clear Creek within the area of the Proposed Action.

In addition to the agencies listed above, the SWEEP committee was established during the development of the I-70 PEIS to propose and support future improvements to enhance aquatic resources throughout the I-70 Mountain Corridor as opportunities arise including site-specific projects such as the Twin Tunnels project. The SWEEP committee identified the numerous issues relating to water quality, wetlands, and aquatic habitat. The water quality and wetland issues are addressed in their respective sections of this EA. The committee identified the following issues related to aquatic resources:

- Construction activities that could result in erosion of disturbed soils and sedimentation within Clear Creek may impact fish and benthic invertebrate habitat.

3.11.4 What are the aquatic resources in the study area?

The CPW considers the entire Clear Creek sub-basin as a “high value” fishery that provides high quantity/quality fish populations and recreational value (CDOT, 2011b). Numerous fish species, including species popular with anglers, inhabit Clear Creek. Clear Creek supports a naturally reproducing brown trout (*Salmo trutta*) population, which are the predominant trout species within the study area. Rainbow trout (*Oncorhynchus*



The naturally reproducing brown trout reportedly spawn in Clear Creek within the study area.

mykiss) stocked by CPW also inhabit Clear Creek but in much lower numbers than brown trout. Other species that would be expected to occur in the study area include brook trout (*Salvelinus fontinalis*), Snake River cutthroat trout (*Oncorhynchus clarki bouvieri*), fathead minnows (*Pimephales promelas*), common carp (*Cyprinus carpio*), and various species of sucker (*Catostomus spp.*).

The naturally reproducing brown trout reportedly spawn in Clear Creek within the study area. Brown trout spawning habitat consists of clean gravel substrate that is aerated by oxygenated water flowing through the nest (or redd) and over eggs that have been deposited in the substrate. These conditions are typically located at the tail of a pool and are present within and downstream from the Twin Tunnels study area.

Benthic invertebrate communities known to inhabit Clear Creek are composed primarily of clean-water taxa, including mayflies, stoneflies, caddisflies, and midges. Based on recent surveys (CDPHE, 2008; CPW, 2011c), the benthic invertebrate community within Clear Creek immediately downstream from Idaho Springs typically has the lowest species diversity and abundance compared to other segments of Clear Creek.

3.11.5 How does the No Action affect aquatic resources?

Water quality is currently impacted by various historical and current mine-related influences and drainages of mineralized geologic formations. These influences would continue to affect aquatic resources in the area of and downstream from the Twin Tunnels project.

3.11.6 How does the Proposed Action affect aquatic resources?

The following sections discuss the impacts to aquatic resources as a result of the Proposed Action, including those effects expected during and after construction. The analysis considers the effects of the Proposed Action including a managed lane and two general purpose lanes, and effects with three general purpose lanes and no managed lane.

What are the direct effects of the Proposed Action?

The I-70 PEIS indicated that corridor-wide direct impacts on aquatic resources would, in general, include the effects of increased sedimentation and reduced water quality as a result of construction, operation, and maintenance of a project.

The Proposed Action includes widening eastbound I-70 toward Clear Creek. To minimize direct encroachment on Clear Creek, the roadway design incorporates retaining walls between the roadway and the creek. As a result, the conclusions of this Tier 2 process analysis indicate no permanent direct impacts to Clear Creek aquatic resources are anticipated.

No permanent direct impacts to Clear Creek aquatic resources are anticipated.

However, construction of the roadway and retaining walls may result in temporary erosion of disturbed soils, sedimentation downstream, and incidentally spilled fuels.

How does the Proposed Action differ with or without a managed lane?

The Proposed Action would result in the same impacts on aquatic resources with or without a managed lane.

What indirect effects are anticipated?

The original construction of I-70 within the mountain corridor resulted in stream channelization (straightening of the stream channel) to accommodate roadway design requirements. The corridor continues to be impacted by growth and development, increased traffic, and winter maintenance activities (which includes road sanding). These influences have increased and continue to increase sedimentation, water quality alteration, and aquatic habitat modification.

Of particular concern are potential effects to brown trout spawning or reproduction areas. Brown trout typically begin spawning in early October by laying eggs within suitable stream substrate. The eggs incubate within the substrate for approximately 6 to 8 months depending on

stream temperatures. While in the redds, the incubating eggs require an aerated and sediment-free environment to survive. Sedimentation from increased traffic or winter maintenance activities could disrupt this condition and lower brown trout reproductive success.

An additional indirect effect could be potential increases in water temperatures as a result of runoff from the additional impervious surface area associated with the widening of I-70. This new impervious area ranges from 3.1 acres to 3.6 acres. Increasing water temperatures could impact the cold water aquatic resources inhabiting Clear Creek downstream from the Proposed Action. Because the Proposed Action would not modify stream width or alignment, this impact would be minimal.

The Proposed Action would not modify Clear Creek's stream width or alignment.

What effects occur during construction?

Activities associated with roadway and retaining wall construction, and bridge construction and demolition, would disturb soils adjacent to Clear Creek and increase the potential for erosion of the soils and sedimentation within Clear Creek. Sedimentation of substrate materials within Clear Creek would temporarily impact brown trout spawning habitat and forage species habitat. A temporary stream crossing could be constructed to minimize disturbance of the stream bed and banks during bridge construction and demolition.

3.11.7 What mitigation is needed?

What I-70 PEIS mitigation strategies are relevant?

The phased approach of the I-70 PEIS Preferred Alternative allows for ongoing opportunities to avoid and minimize impacts to aquatic resources, establish mitigation, and employ I-70 Mountain Corridor Context Sensitive Solutions. [Mitigation approaches for aquatic resources](#) from the I-70 PEIS that are relevant to this project include the following:

- Use BMPs and erosion control measures to reduce soil losses, soil inundation, and sedimentation in areas adjacent to the construction area and provide sufficient cross-slope drainage structures during new construction to allow natural hydrologic conditions to be maintained on both sides of the right-of-way.
- Fish habitat will be restored and replaced using photo documentation to help return these areas to previous conditions.

What mitigation is needed for this project?

Although direct impacts to aquatic resources are not anticipated from the Proposed Action, mitigation for indirect impacts resulting from impacts to water quality will be required and are summarized below. These

mitigation measures are described in more detail in [Section 3.16, Water Resources and Water Quality](#), and [Section 3.18, Regulated Materials and Solid Waste](#).

Table 3-30 and Table 3-31 summarize mitigation commitments for the Twin Tunnels project.

Table 3-30. Mitigation Commitments for Permanent Impacts to Aquatic Resources

Activity	Location	Impact	Mitigation*
Runoff (including sedimentation) from roadway during operations.	Throughout the study area.	Impacts to aquatic resources as a result of water quality degradation.	<ul style="list-style-type: none"> Hazardous spill containment structure locations have been identified and BMPs will be installed to reduce hazardous waste discharge to Clear Creek. CDOT will implement the adaptive mitigation identified in the Clear Creek Sediment Control Action Plan, which allows for flexibility in the number, sizing, type, and locations of BMP structures, while controlling all drainage entering Clear Creek. Three different drainage inlet sediment trap concept designs have been developed to accommodate various drainage conditions anticipated for the Proposed Action. These traps will be installed as part of the drainage system in locations where surface water is discharged to Clear Creek. Locations for surface sediment basins have also been identified in the plan and will be constructed as part of the drainage system.
<p>* Mitigation is not necessary if impact can be avoided through changes in the design or construction of the Proposed Action (i.e., the activity is avoided). BMPs = best management practices</p>			

Table 3-31. Mitigation Commitments for Temporary Impacts to Aquatic Resources during the Construction Period

Activity	Location	Impact	Mitigation*
Retaining wall construction during brown trout spawning (October through June).	Areas adjacent to and immediately upstream from brown trout redds.	Sedimentation from erosion of disturbed soils covering eggs incubating in the stream substrate.	<ul style="list-style-type: none"> CDOT will discuss with CPW the possibility of a spawning survey during the fall of 2012 to locate active redds within and immediately downstream from the Proposed Action. Erosion control BMPs will be established at each retaining wall location to avoid or minimize sedimentation within Clear Creek.
Construction of stream crossing	Adjacent to I-70 bridge over Clear Creek west of Hidden Valley Interchange.	Potential disturbance of aquatic habitat.	<ul style="list-style-type: none"> CDOT will coordinate with CPW regarding placement and timing of stream crossing.
Runoff from construction.	Throughout the study area.	Impacts to aquatic resources as a result of water quality degradation.	<ul style="list-style-type: none"> CDOT will implement appropriate BMPs for erosion and sediment control according to the CDOT Erosion Control and Storm Water Quality Guide (CDOT, 2002), develop a stormwater management plan (which includes water quality monitoring) and use adaptive mitigation identified in the Clear Creek Sediment Control Action Plan. The latter allows for flexibility in the number, sizing, type, and locations of BMP structures, while controlling all drainage entering Clear Creek, where feasible.
<p>* Mitigation is not necessary if impact can be avoided through changes in the design or construction of the Proposed Action (i.e., the activity is avoided). BMPs = best management practices</p>			

CPW = Colorado Parks & Wildlife

3.12 Threatened or Endangered Species

3.12.1 How does the analysis relate to the I-70 PEIS?

Although [Section 3.2](#) of the I-70 PEIS (CDOT, 2011b) indicated that many protected species are unlikely to occur in the I-70 Mountain Corridor, it did identify species that should be further studied in Tier 2 level analysis. The following commitments were identified in the I-70 PEIS for Tier 2 process:

- Perform surveys for protected species and their habitat. The U.S. Fish and Wildlife Service (USFWS), U.S. Forest Service (USFS), and Colorado Parks and Wildlife (CPW) will provide relevant and updated species lists. This information will be incorporated into the project's design to avoid or minimize effects on such species.
- Determine the effects on federally listed species that occur downstream from the I-70 Mountain Corridor in coordination with USFWS.
- Adhere to any new or revised laws or regulations pertaining to biological resources and protected species in particular.
- Develop best management practices and specific and more detailed mitigation strategies.
- Fulfill responsibilities set forth in the interagency committees including [A Landscape-Level Inventory of Valued Ecosystem \(ALIVE\)](#) and [Stream and Wetland Ecological Enhancement Program \(SWEET\) Memoranda of Understanding \(MOUs\)](#).
- Consider opportunities for enhancement on a project-by-project basis.

These commitments were addressed during the Twin Tunnels Tier 2 analysis. This analysis also includes discussion of potential site-specific impacts that were not assessed in the I-70 PEIS, such as but not limited to, the impact of erosion on adjacent vegetation and road effects on wildlife. Potential direct and indirect impacts on protected species and updated lists of threatened, endangered, and sensitive species are included in this analysis.

3.12.1 What process was followed to analyze threatened or endangered species resources?

Potential habitat for special status species was assessed by performing a review of existing data from readily available sources as well as site reconnaissance. The primary sources of data included the *I-70 Mountain Corridor PEIS – Biological Resources Technical Report* (CDOT, 2010c) and the *I-70 Mountain Corridor PEIS* (CDOT, 2011b). Further

clarification was obtained from USFWS in the *I-70 Mountain Corridor Final Programmatic Biological Opinion* (USFWS, 2011a). Documents reviewed included protected species lists and input from CPW (CPW, 2011d), Arapaho-Roosevelt National Forest, Natural Diversity Information Source (NDIS) (NDIS, 2011), Colorado Natural Heritage Program (CNHP) (CNHP, 1999; CNHP, 2011), Wildlife Resources Information System (WRIS), U.S. Army Corps of Engineers (USACE), and biological resources reports.

A threatened and endangered species list was obtained from USFWS through the Information, Planning, and Conservation (IPAC) System that identified potential species within the Twin Tunnels study area. Other sources of information used included coordination with USFWS representatives, coordination with CPW representatives and involvement in Tier 2 ALIVE and SWEET agreements as outlined in the MOUs for issues and concerns related to protected species potentially associated with the Twin Tunnels project.

Depending on the potential for a protected species to occur, a project-specific biological assessment would be prepared followed by a biological opinion from the USFWS. This determination would be made in coordination with the USFWS.

3.12.2 What agencies were involved in this analysis and what are their issues?

The lead agencies for the Twin Tunnels project, the Colorado Department of Transportation (CDOT) and Federal Highway Administration (FHWA), have coordinated with and will continue to coordinate with USFWS, USFS, CPW, and Bureau of Land Management (BLM). The USFWS has approved the *I-70 Mountain Corridor PEIS Programmatic Biological Assessment* (CDOT, 2011g) and the findings of the *Final Programmatic Biological Opinion* (USFWS, 2011a) were incorporated into this analysis. Comments from USFWS were received during the scoping process and addressed in this analysis. In addition, representatives from the USFWS participated in the project as members of the Technical Team and as participants in the ALIVE and SWEET meetings.

Federal agencies that were involved and provided comments also included U.S. Environmental Protection Agency Region 8. Representatives from the Twin Tunnels project team have been involved with the interagency SWEET and ALIVE committees that were formed to identify and address environmental issues in the I-70 Mountain Corridor.

3.12.3 What are the threatened or endangered species resources in the study area?

Federally listed threatened and endangered species are protected under the Endangered Species Act of 1973, as amended (16 U.S.C. 1531 et seq.). Potential effects on a federally listed species or its habitat resulting from a project with a federal action require informal consultation with USFWS under Section 7 of the Endangered Species Act. Projects that may result in adverse modification of designated critical habitat for a federally listed species require formal consultation with USFWS. No regulations require consultations for effects to candidate species; however, if a species were to become listed during project planning or construction, consultation with USFWS would be required.

Special status refers to species that have been listed by USFWS as endangered (FE), threatened (FT), or a candidate for listing (FC) under the Endangered Species Act; or by CPW as endangered (SE), threatened (ST), or special concern (SC) at the state level (under the authority of the Colorado Revised Statutes and Colorado Wildlife Commission regulations). A list of federally threatened, endangered, candidate, and proposed species potentially occurring in the study area was presented in the I-70 PEIS through project scoping with USFWS. These species, along with species that are on the South Platte River depletions list, are presented below. Recommendations from USFWS in the [I-70 Mountain Corridor Final Programmatic Biological Opinion](#) (USFWS, 2011a — see Appendix A of the [I-70 Mountain Corridor Record of Decision](#), June 2011) are also discussed.

No greenback cutthroat trout are found in this reach of Clear Creek.

Federally listed species potentially within Clear Creek County and the I-70 Mountain Corridor include:

- Canada lynx (*Lynx canadensis*)—FT
- North American wolverine (*Gulo gulo luscus*)—FC
- Mexican Spotted Owl (*Strix occidentalis lucida*) —FT
- Preble’s meadow jumping mouse (*Zapus hudsonius preblei*)—FT
- Greenback cutthroat trout (*Oncorhynchus clarki stomias*)—FT
- Ute ladies’-tresses orchid (*Spiranthes diluvialis*)—FT

Species potentially inhabiting the South Platte River System (South Platte River depletions list) include:

- Least Tern (*Sternula antillarum*)—FT
- Piping Plover (*Charadrius melodus*)—FT

- Western prairie fringed orchid (*Platanthera praeclara*)—FT
- Whooping Crane (*Grus americana*)—FE
- Pallid sturgeon (*Scaphirhynchus melodus*)—FE

Analysis of the vegetation communities, elevation, and habitat requirements, as well as communication with USFWS, indicates that suitable habitat likely does not exist for any of the federally listed species listed above except for the greenback cutthroat trout. Through consultation with CPW and USFWS it was determined that no greenback cutthroat trout are found in this reach of Clear Creek.

Suitable habitat does exist within the South Platte River system downstream for the species identified on the South Platte River depletion list. The North American wolverine (*Gulo gulo*) has been listed as a candidate species, but it is believed that no viable population currently exists in Colorado (USFWS, 2011b).

Sensitive Species include “State Listed Species” and “State Species of Special Concern.” State Listed Species are species CPW considers threatened or endangered within the state of Colorado. The only State Listed Species of concern that could occur in the study area based on the presence of suitable habitat is the American Peregrine Falcon (*Falco peregrines anatum*). In Colorado, peregrine falcons breed on cliffs and rock outcrops from 4,500 to 10,000 feet in elevation. Suitable nesting habitat exists within the vicinity of the study area, but no known nests have been identified within the study area.

3.12.4 How does the No Action affect threatened or endangered species?

Under the No Action, continued highway maintenance and transportation improvements with approved funding sources would be implemented in the future. However, these activities would not be expected to result in direct impacts to threatened or endangered species since no threatened or endangered species are known to inhabit the study area.

3.12.5 How does the Proposed Action affect threatened or endangered species resources?

The following sections discuss the impacts to threatened and endangered species as a result of the Proposed Action, including those effects expected during and after construction. The analysis considers the effects of the Proposed Action including a managed line and two general purpose lanes, and effects with three general purpose lanes and no managed lane.

What are the direct effects of the Proposed Action?

The I-70 PEIS indicated that, corridor-wide, approximately 68 individual protected species identified by the USFWS, USFS, and CPW could potentially be affected by roadway widening, including four species along the corridor protected under the Endangered Species Act. However, the conclusions of this Tier 2 process analysis indicate that no federally threatened, endangered, candidate, or proposed species would be affected by the Proposed Action because these species are not present or are unlikely to occur in the study area. Section 7 consultation is not needed for this project (A. Michael, USFWS, 2012 personal commun.).

Downstream impacts due to water depletions to the South Platte River basin as a result of CDOT activities are addressed by participation in the Platte River Recovery Implementation Program and the South Platte Water Related Activities Program. The Twin Tunnels project will be included in a Programmatic Biological Assessment currently being prepared by FHWA, in coordination with CDOT. A letter to that effect will be prepared by FHWA and submitted to USFWS for concurrence. The Programmatic Biological Assessment addresses the following species: Least Tern (interior population) (*Sternula antillarum*), pallid sturgeon (*Scaphirhynchus albus*), Piping Plover (*Charadrius melodus*), western prairie fringed orchid (*Platanthera praeclara*), and the Whooping Crane (*Grus americana*). The water used for this project would be reported to USFWS at year end after the completion of the project, as required by the aforementioned consultation. Effects to species not addressed in the Programmatic Biological Assessment or affected by causes other than water depletions to the South Platte would be analyzed separately.

How does the Proposed Action differ with or without a managed lane?

No federally threatened, endangered, candidate or proposed species would be impacted by the Proposed Action with or without a managed lane.

What indirect effects are anticipated?

No federally threatened, endangered, candidate or proposed species would be impacted from effects of the Proposed Action that could occur later in time or farther away in distance. Water depletions to the South Platte River basin are being addressed by CDOT participation in the Platte River Recovery Implementation Program and South Platte Water Related Activities Program.

What effects occur during construction?

No federally threatened, endangered, candidate, or proposed species would be impacted by construction disturbances such as noise, snow and ice control, and soil erosion. No impacts to federally listed or sensitive species would occur due to the eastbound I-70 detour such as the use of transition areas, CR 314 improvements and traffic, and replacement/rehabilitation of the Doghouse Rail Bridge.

Activities of the Proposed Action that will use water during construction include roadway, bridge, drainage and tunnel construction as well as dust watering during construction. Downstream impacts due to water depletions to the South Platte River basin as a result of CDOT activities are addressed by participation in the Platte River Recovery Implementation Program and South Platte Water Related Activities Program.

3.12.6 What mitigation is needed?

What I-70 PEIS mitigation strategies are relevant?

No mitigation strategies specific to protected species were included in the I-70 PEIS.

What mitigation is needed for this project?

No permanent adverse impacts on threatened or endangered species would occur as a result of the Proposed Action

CDOT has identified project mitigation for potential impacts on threatened and endangered species that could arise from future construction activities. Table 3-32 describes these mitigation measures.

Table 3-32. Mitigation Commitments for Temporary Impacts to Threatened or Endangered Species During the Construction Period

Activity	Location	Impact	Mitigation*
Construction activities that can cause water depletions include water used for compaction, cement mixing, detention ponds, dust control, and dewatering for access and construction in wetlands and riparian areas.	Throughout the study area.	Platte River fish species could be impacted by construction activities and water depletions in tributaries such as Clear Creek.	<ul style="list-style-type: none"> Mitigation for impacts caused by water depletions on federally listed species will be addressed by FHWA and CDOT participation in the Platte River Recovery Implementation Program and South Platte Water Related Activities Program. Water used for this project will be reported to the USFWS at the completion of the project.

* Mitigation is not necessary if impact can be avoided through changes in the design or construction of the Proposed Action (i.e., the activity is avoided).

3.13 Vegetation and Noxious Weeds

3.13.1 How does the analysis relate to the I-70 PEIS?

The following commitments from [Section 3.2](#) of the I-70 PEIS (CDOT, 2011b) regarding vegetation and noxious weeds are applicable to this Tier 2 process:

- Adhere to any new or revised laws or regulations pertaining to vegetation
- Develop best management practices (BMPs) and specific and more detailed mitigation strategies
- Consider opportunities for enhancement on a project-by-project basis

3.13.2 What process was followed to analyze vegetation, including noxious weeds?

Vegetation and noxious weed conditions within the study area were assessed by performing a review of existing environmental data sources as well as field reconnaissance. The primary sources of data included: the *I-70 Mountain Corridor PEIS—Biological Resources Technical Report* (CDOT, 2010c) and the I-70 PEIS (CDOT, 2011b). Noxious weed information was also referenced from the Clear Creek County Noxious Weed Management Plan (CCC, 2007). The weed management analysis complies with the following regulations and guidelines:

- Colorado Department of Agriculture (CDAG), Plant Industry Division (CDAG, 2003), Colorado Noxious Weed Act, 35-5.5-101 119, Colorado Revised Statutes (CRS) (2003)
- National Environmental Policy Act
- Federal Executive Order 13112 Invasive Species
- Federal Highway Administration *Guidance on Invasive Species* (FHWA, 1999)
- *Template and Guidance for the Preparation of an Integrated Noxious Weed Management Plan for CDOT Region 6 Planning and Environmental Unit* (CDOT, 2006).

3.13.3 What agencies were involved in this analysis and what are their issues?

The lead agencies for the Twin Tunnels project, CDOT and FHWA, have coordinated with and will continue to coordinate with the U.S. Fish and Wildlife Service (USFWS), U.S. Forest Service (USFS), Colorado Parks and Wildlife (CPW), and Bureau of Land Management (BLM). This agency coordination began with the tier 1 process. The USFWS has approved the *I-70 Mountain Corridor PEIS*

Programmatic Biological Assessment (CDOT, 2011g) and the findings of the *Final Programmatic Biological Opinion* (USFWS, 2011a) were incorporated into this analysis. Comments from EPA Region 8 and the CDOT Liaison to the USFWS were also received and addressed in this analysis. Representatives from the Twin Tunnels project team have been involved with the interagency [Stream and Wetland Ecological Enhancement Program \(SWEEP\)](#) and [A Landscape-Level Inventory of Valued Ecosystem \(ALIVE\)](#) committees that were formed to identify and address environmental issues in the I-70 Mountain Corridor.

An ongoing issue of concern by several federal agencies is the potential long-term impacts of the mountain pine beetle on forest resources in the I-70 Mountain Corridor. The USFS and USFWS are preparing a description on the influence of the mountain pine beetle on the state's forests. Temperature changes in subalpine forests (8,500 to 10,000 feet in altitude) have contributed to mountain pine beetle devastation of lodgepole pine forests (CDOT, 2011g). The Twin Tunnels project is located at lower elevations with forest communities of Douglas fir and ponderosa pine, which at this time do not exhibit beetle infestation.

3.13.4 What are the vegetation resources, including noxious weeds in the study area?

The study area varies in elevation from 7,470 feet on the western end (approximately milepost 241) to 7,240 feet on the eastern end (approximately milepost 244). The study area encompasses Foothills and Montane Zones that include plant communities of ponderosa pine (*Pinus ponderosa*), woodlands, deciduous scrublands including mountain mahogany (*Cercocarpus montanus*), and Douglas-fir (*Pseudotsuga menziesii*) forests. Plant communities located within the study area are described in the following sections.

Mixed Montane Forest

The dominant tree species within this community vary with aspect and elevation with Rocky Mountain juniper (*Juniperus scopulorum*) and ponderosa pine on south-facing slopes and at a lesser density on other slopes. East, west, and north-facing slopes are typically Douglas fir with a woody understory of mountain mahogany, waxy currant (*Ribes cereum*), and common juniper (*Juniperus communis*). Douglas fir occurs in the montane zone also in ravines or on north-facing slopes, forming a dense forest with less understory. These vegetation communities overlap within the study area depending on elevation and aspect.

Montane Shrubland

This community is primarily found on the south-facing slopes, roadsides, and banks of Clear Creek above

the stream channel and is dominated by fringed sage (*Artemesia frigida*), mountain muhly (*Muhlenbergia montana*), blue grama (*Bouteloua gracilis*), mountain mahogany, and waxy currant. In locations near the riparian fringe, snowberry (*Symphoricarpos rotundifolia*) and skunkbrush (*Rhus trilobata*) replace mountain mahogany.

Wetland

This community is found adjacent to Clear Creek and the riparian fringe community and is predominantly confined to a narrow strip along both sides of the creek and is dominated by emergent herbaceous vegetation with areas of mature woody vegetation. Larger wetlands are found where the floodplain widens. This community is dominated by forbs and graminoids such as creeping bentgrass (*Agrostis stolonifera*), Nebraska sedge (*Carex nebrascensis*), and Baltic rush (*Juncus balticus*). Larger areas of wetland located in low lying riparian areas contain woody and herbaceous vegetation including sandbar willow (*Salix exigua*), thinleaf alder (*Alnus incana*), Canada blue-joint reedgrass (*Calamagrostis canadensis*), Nebraska sedge (*Carex nebrascensis*), Baltic rush, and redbud (*Agrostis alba*).

Riparian

Riparian habitat occurs along Clear Creek and in drainage areas which enter Clear Creek. Narrowleaf cottonwood (*Populus angustifolia*) is the most dominant tree species with scattered ponderosa pine, Douglas fir, thinleaf alder, river birch (*Betula fontinalis*), willow (*Salix sp.*), and Englemann spruce (*Picea engelmannii*) on banks near and above the stream channel. Most of the riparian community has relatively sparse herbaceous vegetation due to the rocky nature of the soil and the shade conditions associated with the steep-sided drainages. The shrub understory in the narrow riparian corridor is dominated by snowberry and redbud dogwood (*Cornus stolonifera*).



Riparian Vegetation.

Disturbed

This community is made up of roadside grasses and scattered trees and shrubs characterized by large areas of exposed soil with patches of mostly weedy vegetation. Disturbances are mostly a result of human activity, and vegetation is dominated by grasses such as western wheatgrass (*Pascopyrum smithii*), smooth brome (*Bromopsis inermis*), and crested wheatgrass (*Agropyron cristatum*). Invasive species include common mullein (*Verbascum thapsus*), Canada thistle (*Cirsium arvense*), diffuse knapweed (*Centaurea diffusa*), bindweed (*Convolvulus arvensis*), kochia (*Kochia scoparia*), Chinese clematis (*Clematis orientalis*), yellow sweetclover (*Metilolus officinale*), Russian olive (*Elaeagnus angustifolia*), and common sunflower (*Helianthus annuus*).

Forested Non-Riparian

These areas are located adjacent to Clear Creek in zones that are above the stream channel and do not contain native riparian vegetation such as narrowleaf cottonwood, alder, and birch. Tree species such as ponderosa pine, juniper, and Douglas fir are found in areas of bank disturbance between the stream channel of Clear Creek and CR 314.



Forested Non-riparian.

Noxious Weeds

The Colorado Noxious Weed Act requires the control of the 71 plant species designated as “noxious weeds.” Noxious weeds are plants that reduce agricultural productivity, lower real estate values, endanger human health and well-being, and damage scenic values (CDAG, 2010). An inventory of vegetation and noxious weeds conducted in October 2011 for the project area resulted in mapping and identification of noxious weed species. Five plant species designated as noxious weeds by the State of Colorado were

found in the project area, including four “List B” species and one “List C” species (see Table 3-33).

Threatened, Endangered, and Candidate Plant Species (Endangered Species Act)

Existing disturbance and maintenance activities limit suitable habitat within the study area for threatened, endangered, and candidate species. Of the six federally listed plants considered in the I-70 PEIS, only two were identified as potentially occurring in the study area or potentially impacted by corridor construction. Ute ladies’-tresses orchid (*Spiranthes diluvialis*) is a federally listed threatened species that occurs in moist to wet alluvial meadows, floodplains of perennial streams, and around springs and lakes from 4,500 to 6,800 feet in elevation. The study area is outside the known elevation range and no areas of suitable habitat exist within the project limits. The western prairie fringed orchid (*Platanthera praeclara*) is not found within the project limits but occurs in Nebraska in association with the Platte River.

3.13.5 How does the No Action affect vegetation including noxious weeds?

No impacts to vegetation or increases in the spread or presence of noxious weeds would result from the No Action.

3.13.6 How does the Proposed Action affect vegetation, including noxious weeds?

The I-70 PEIS provided general descriptions of existing vegetation and noxious weeds, and impacts to these resources. While using the information provided in the I-70 PEIS, this Tier 2 evaluation considers site-specific issues and updates resource information.

Vegetation would be temporarily and permanently impacted in areas with construction, including the tunnel, detour road, additional lane, and managed lane signage (see Table 3-34). Potential disturbances to vegetation resulting from the construction of the Proposed Action would be most concentrated along eastbound I-70 and either side of CR 314 where eastbound I-70 will be detoured.

The following sections discuss the impacts to vegetation, including noxious weeds, as a result of the Proposed Action, including those effects expected during and after construction. The analysis considers the effects of the Proposed Action including a managed lane and two general purpose lanes, and effects with three general purpose lanes and no managed lane.

What are the direct effects of the Proposed Action?

Grading and construction activities in the disturbed roadside areas would temporarily increase soil disturbance and susceptibility to the spread of weed species. Noxious weed species observed in these roadside disturbance areas (especially diffuse knapweed and Chinese clematis) have the potential to spread into areas impacted by roadway construction. The largest amounts of temporary disturbance are found in the disturbed roadside vegetation types. Permanent impacts range from 5.54 to 6.07 acres, depending on whether a 50-foot or 56-foot roadway width is chosen.

How does the Proposed Action differ with or without a managed lane?

The Proposed Action would result in the same impacts on vegetation and noxious weeds with or without a managed lane.

Table 3-33. Noxious Weeds Present in the Project Area

Common Name	Scientific Name	Clear Creek County List	Colorado Dept. of Agriculture	Density
Diffuse Knapweed	<i>Centaurea diffusa</i>	Yes	List B	Common
Chinese Clematis	<i>Clematis orientalis</i>	Yes	List B	Scattered
Russian Olive	<i>Elaeagnus angustifolia</i>	No	List B	Uncommon
Canada Thistle	<i>Cirsium arvense</i>	Yes	List B	Scattered
Common Mullein	<i>Verbascum Thapsus</i>	Yes	List C	Scattered

Table 3-34. Impacts to Vegetation by Roadway Width (50' or 56') in Acres

Vegetation Type	Permanent Impacts Acres (50')	Permanent Impacts Acres (56')	*Temporary Impacts Acres (50')	*Temporary Impacts Acres (56')	Total 50' Impact by Vegetation Type	Total 56' Impact by Vegetation Type
Wetlands	0	0	0.03	0.03	0.03	0.03
Riparian	0	0	0.03	0.03	0.03	0.03
Disturbed	5.54	6.07	8.76	8.62	14.30	14.69
Forested Non-Riparian	0.14	0.14	0	0	0.14	0.14
Montane Shrubland	0	0	0	0	0	0
Mixed Montane Forest	0	0	0	0	0	0
Total Acres Impacted	5.68	6.21	8.82	8.68	14.50	14.89
* Temporary impacts include construction/access impacts and project grading impacts.						

What indirect effects are anticipated?

Changes in winter maintenance practices (e.g., deicers and traction materials) could impact vegetation, and increased sedimentation entering Clear Creek could impact areas downstream of the study area. The construction of the Proposed Action would increase impervious surfaces, thereby increasing runoff and exposing the surrounding vegetation to higher levels of pollutants. Soil disturbance from construction equipment would also create favorable conditions for noxious weeds to introduce and establish, or to further spread.

What effects occur during construction?

Construction disturbances such as equipment access, installation, and soil erosion could produce permanent and temporary impacts to vegetation immediately adjacent to the project. Impacts due to the eastbound I-70 detour (such as the use of transition areas) and CR 314 improvements and traffic would also produce permanent and temporary impacts to adjacent vegetation.

3.13.1 What mitigation is needed?

What I-70 PEIS mitigation strategies are relevant?

The phased approach of the I-70 PEIS Preferred Alternative allows for ongoing opportunities to avoid and minimize impacts to vegetation, establish mitigation, and employ I-70 Mountain Corridor Context Sensitive Solutions. Mitigation [strategies for vegetation](#) from the I-70 PEIS that are relevant to this project include the following:

- Identify areas of potential habitat restoration, in coordination with local entities.

- Manage the clearing and earthmoving operations to minimize the potential for weeds to infest new areas and/or increase in abundance through the construction disturbance area. This includes the application of BMPs to all construction sites to manage open soil surfaces and topsoil stockpiled for reuse, including landscape and planning designs that incorporate the use of native vegetation and integrated noxious weed controls.
- Prepare and implement a Noxious Weed Management Plan prior to construction to identify the status and location of noxious weed infestations in and near the project area and identify control methods (e.g., herbicides) and best management practices that will be used to eradicate or control weeds during and after construction.
- BMPs generally include, but are not limited to: minimization of soil disturbance; use of native species in seeding and revegetation plans; use of weed free hay; topsoil management; equipment cleaning and management; and coordination with relevant stakeholders such as County Weed Supervisors.

What mitigation is needed for this project?

Mitigation measures will be implemented to offset and minimize impacts to vegetation and to limit or manage noxious weed populations. [Section 3.16, Water Resources and Water Quality](#) also includes mitigation measures that are applicable to vegetation. No permanent adverse impacts would occur as a result of the Proposed Action. Construction impacts will be mitigated by the measures described in Table 3-35.

Table 3-35. Mitigation Commitments for Temporary Impacts to Vegetation During the Construction Period

Activity	Location	Impact	Mitigation*
Construction activities in and adjacent to Clear Creek.	East of Twin Tunnels, and I-70 bridge over Clear Creek west of Hidden Valley Interchange (near milepost 243).	<ul style="list-style-type: none"> • Previous impacts of I-70 roadway construction • Removal of riparian trees and shrubs • Temporary access and equipment footprints during construction of walls and bridge. 	<ul style="list-style-type: none"> • Enhance native vegetation along Clear Creek for wildlife habitat, water quality stabilization, and visual quality. Trees removed during construction shall be replaced with a goal of 1:1 replacement based on a stem count of all trees with diameter at breast height of 2 inches or greater. Shrubs removed during construction, whether native or non-native, will be replaced based on their preconstruction areal coverage. In all cases, all such trees and shrubs will be replaced with native species.
Temporary grading for roadways, bridges and walls.	South edge of I-70 and north and south of detour route on CR 314.	Vegetation disturbance and ground clearing that creates potential noxious weed issues.	<ul style="list-style-type: none"> • Reseed and protect temporary disturbance areas with CDOT-approved best management practices and avoid disturbance to existing vegetation, to the maximum extent possible. • Seed, mulch, and mulch tackifier will be applied in phases throughout construction. • Where permanent seeding operations are not feasible due to seasonal constraints (e.g., summer and winter months), disturbed areas will have mulch and mulch tackifier applied to prevent erosion. • Minimize the amount of disturbance and limit the amount of time that disturbed areas are allowed to remain non-vegetated. • An Integrated Noxious Weed Management Plan will be developed during final design and implemented during construction to prevent the spread of noxious weeds into temporary disturbance areas.

* Mitigation is not necessary if impact can be avoided through changes in the design or construction of the Proposed Action (i.e., the activity is avoided).

3.14 Wetlands and Other Waters of the United States

3.14.1 How does the analysis relate to the I-70 PEIS?

The Twin Tunnels Tier 2 analysis of wetlands and other waters of the United States included the following commitments from [Section 3.3](#) of the I-70 PEIS (CDOT, 2011b) regarding wetlands and other waters of the United States:

- A delineation of all wetlands in the project area using the latest approved U.S. Army Corps of Engineers (USACE) methodology.
- Functional assessment of wetlands within the corridor using the Functional Assessment of Colorado Wetlands (FACWet) Methodology.
- Analysis to separate jurisdictional and non-jurisdictional wetlands for permitting the specific alternative.
- A more detailed analysis of direct and indirect impacts on wetlands and other waters of the United States.
- Development of specific and detailed mitigation strategies and measures.
- Development of specific best management practices (BMPs) for each project.

Wetlands

Wetlands are areas that are inundated or saturated by surface or groundwater at a frequency and duration sufficient to support, and that under normal circumstances do support, a prevalence of vegetation typically adapted for life in saturated soil conditions.

3.14.2 What process was followed to analyze wetland resources and other waters of United States?

The term wetlands and other waters of the United States are defined and regulated under Section 404 of the Clean Water Act. This Act defines jurisdictional waters of the United States to include all surface waters such as navigable waters and their tributaries, interstate waters and their tributaries, wetlands adjacent to these waters, and all impoundments of these waters. Wetlands subject to Section 404 regulations include those that are bordering, contiguous, and neighboring to other waters of the United States. The USACE regulates and administers the Section 404 Program through a permitting process that regulates placement of dredged or fill material into waters of the United States. Enforcement of the Clean Water Act and

Section 404 is the responsibility of the U.S. Environmental Protection Agency (EPA).

Isolated non-jurisdictional wetlands that lack a connection to a waters of the United States as defined under Section 404, are considered under Executive Order 11990, "Protection of Wetlands," which requires federal agencies to avoid and minimize loss of wetlands. FHWA is responsible for compliance with EO 11990. Additional guidance to avoid and minimize impacts to wetlands is identified in FHWA Technical Advisory T6640.8A. No isolated non-jurisdictional wetlands are present in the study area that would be considered protected under EO 11990 and FHWA Technical Advisory T6640.8A. In compliance with EO 11990, wetlands and waters of the United States were minimized through including retaining walls along Clear Creek.

Wetlands

are areas that are inundated or saturated by surface or groundwater at a frequency and duration sufficient to support, and that under normal circumstances do support, a prevalence of vegetation typically adapted for life in saturated soil conditions.

The wetlands in the study area all are bordering and contiguous with Clear Creek. Therefore, they are considered jurisdictional by the USACE and subject to regulation under Section 404 of the Clean Water Act. No fens were identified in the study area during the wetland delineation completed in October 2011. Study area wetlands are important for wildlife, providing habitat for avian species and mammals that use the Clear Creek Watershed. The wetlands, in areas with a more diverse shrub component, also provide some shade for trout in Clear Creek. Other important qualities of these wetlands include water pollution buffering and transition areas to the limited riparian habitat present in the study area. Additional information on wetlands in the study area can be found in the *Twin Tunnels EA [Wetlands Delineation Report and Final Assessment](#)* (CDOT, 2012i).

Clear Creek represents the only other waters of the United States present within the study area. This stream is a tributary of the South Platte River. Clear Creek has water quality issues resulting from historical mining, but still provides important wildlife habitat, recreational opportunities, and conveys water to the South Platte River.

The study area for wetlands and other waters of the United States included all areas adjacent to the I-70 eastbound lanes that could be impacted by construction of the improvements and sedimentation. This study area primarily

encompassed the roadside down to the banks of Clear Creek. Within this study area, wetlands and riparian areas were delineated and the ordinary high water mark (OHWM) of Clear Creek was mapped.

Study area wetlands were delineated in accordance with the 1987 USACE *Wetland Delineation Manual and the Regional Supplement to the Corps of Engineers Wetland Delineation Manual: Western Mountains, Valleys, and Coast Regions* (Version 2.0) (USACE, 2010). During the delineation, the dominant vegetation was identified, the area was inspected for indicators of wetland hydrology, and the soils were inspected for hydric conditions. The National List of Plant Species that Occur in Wetlands Intermountain (Region 8) (Reed, 1998) was used to determine the wetland indicator status of the dominant plant species. Representative wetland areas were recorded on USACE Western Mountain, Valleys, and Coast Regions Wetland Determination Forms. Wetland boundaries were mapped using a Trimble GeoXH hand-held Global Position System that records positions to sub-meter accuracy.

The Clear Creek OHWM was mapped using the current edge-of-water survey and adding the 2-year flood event. This methodology was approved by the USACE for analyzing impacts to Clear Creek. The Clear Creek edge-of-water survey was completed in October and November 2011. The *Twin Tunnels EA Wetland Delineation Report and Final Assessment* (CDOT, 2012i) documents the mapping and delineation efforts.

3.14.3 What agencies were involved in this analysis and what are their issues?

A formal agency scoping meeting was held on September 26, 2011, that introduced the agencies to the project and important issues that would be addressed in the EA. The USACE did not attend the initial agency scoping meeting and did not provide early scoping comments on the wetland and other waters of the United States issues within the study area. However, the EPA did provide early agency scoping comments on issues associated with wetlands and Clear Creek. In a letter dated October 6, 2011, the EPA responded on potential impacts to the study area wetlands and Clear Creek exceeding 0.5 acre and the implementation of recommendations from the Stream and Wetland Ecological Enhancement Program (SWEET) Committee to ensure agency participation in developing mitigation strategies for wetland and stream impacts (CDOT 2012j).

The USACE was involved in meetings with CDOT to discuss the Section 404 permitting process, work on an independent utility designation for the Twin Tunnels project and identification of wetlands and other waters of the United States, along with estimates of temporary and

permanent impacts. In addition, early discussions with the USACE were initiated to introduce the methodology for identifying the OHWM and gaining their acceptance of the methodology. The USACE also participated as a part of the Technical Team, which met regularly to provide input to the EA process. Additional coordination with the USACE will continue through the Section 404 permitting process.

The SWEET Committee (described in more detail in [Chapter 5, Public and Agency Coordination](#)) scheduled meetings to discuss the issues associated with the Twin Tunnels project. A SWEET Committee kickoff meeting for the Twin Tunnels EA was held on October 19, 2011, to identify the role of the committee, implementation process, and solicit comments on any relevant topics. The following comments were received from the committee on wetlands and stream issues:

- USACE commented on the importance of keeping wetland impacts under 0.5 acre.
- USACE commented that any changes to wetlands and Clear Creek, including enhancement, may be considered in the overall impact area calculation.
- Temporary impacts due to construction do not add to the impact total under the Section 404 permit.

The SWEET meetings will continue to be held to discuss critical wetland and Clear Creek issues and potential mitigation strategies through the remainder of project development.

3.14.4 What are the areas of wetlands and other waters of the United States that were identified in the study area?

A total of seven wetland areas totaling approximately 0.88 acre were delineated in the study area. Table 3-36 summarizes the study area wetlands. The wetlands are associated with Clear Creek and were located on the banks of the stream. Figure 3-21 and Figure 3-22 show the locations of the wetlands along Clear Creek. Based on the standard Cowardin wetland classification system, all of the wetlands are classified as palustrine emergent/palustrine scrub/shrub (PEM/PSS) (Cowardin, et al., 1979).

Palustrine emergent (PEM) and palustrine scrub-shrub (PSS) combination wetlands are defined as dominated by equal parts PEM and PSS. PEM wetlands are dominated by erect rooted herbaceous plants. However, if the wetland site is dominated by a greater than 30 percent canopy cover of shrubs, the wetland would be classified as PSS (Cowardin, et al., 1979). The study area wetlands are an equal combination of PEM and PSS. The study area wetland vegetation is primarily composed of sedges (*Carex spp.*), rushes (*Juncus spp.*), sandbar willow (*Salix exigua*),

Table 3-36. Summary of Wetlands in the Twin Tunnels Study Area

Wetland Area	Wetland Type	Acres
1	PEM/PSS	0.02
2a	PEM/PSS	0.03
2b	PEM/PSS	0.29
3	PEM/PSS	0.30
4a	PEM/PSS	0.14
4b	PEM/PSS	0.03
5	PEM/PSS	0.07
Total Wetland Areas in Acres		0.88

thin-leaf alder (*Alnus incana*), red-twig dogwood (*Cornus stolonifera*), and other willow species (*Salix spp.*).

The water regime associated with the wetlands would be classified as seasonally flooded/saturated (E) (Cowardin, et al., 1979). All of the wetlands within the study area are seasonally flooded during the Clear Creek spring and summer periods of higher flows. Most of the wetlands soils were saturated in the top 1 to 5 inches. In addition, evidence of high water events was noted during the wetland delineation with drift lines and debris in the wetlands.

Functional Assessment of Colorado Wetlands (FACWet) Method

FACWet is a rapid assessment methodology that rates wetland conditions through evaluation of ecological stressors that drive wetland functions. Each variable is rated on a scale of 0.0 to 1.0 (non-functioning to reference

Figure 3-21. Wetlands Along Clear Creek in the Project Area between Milepost 242 and Milepost 243

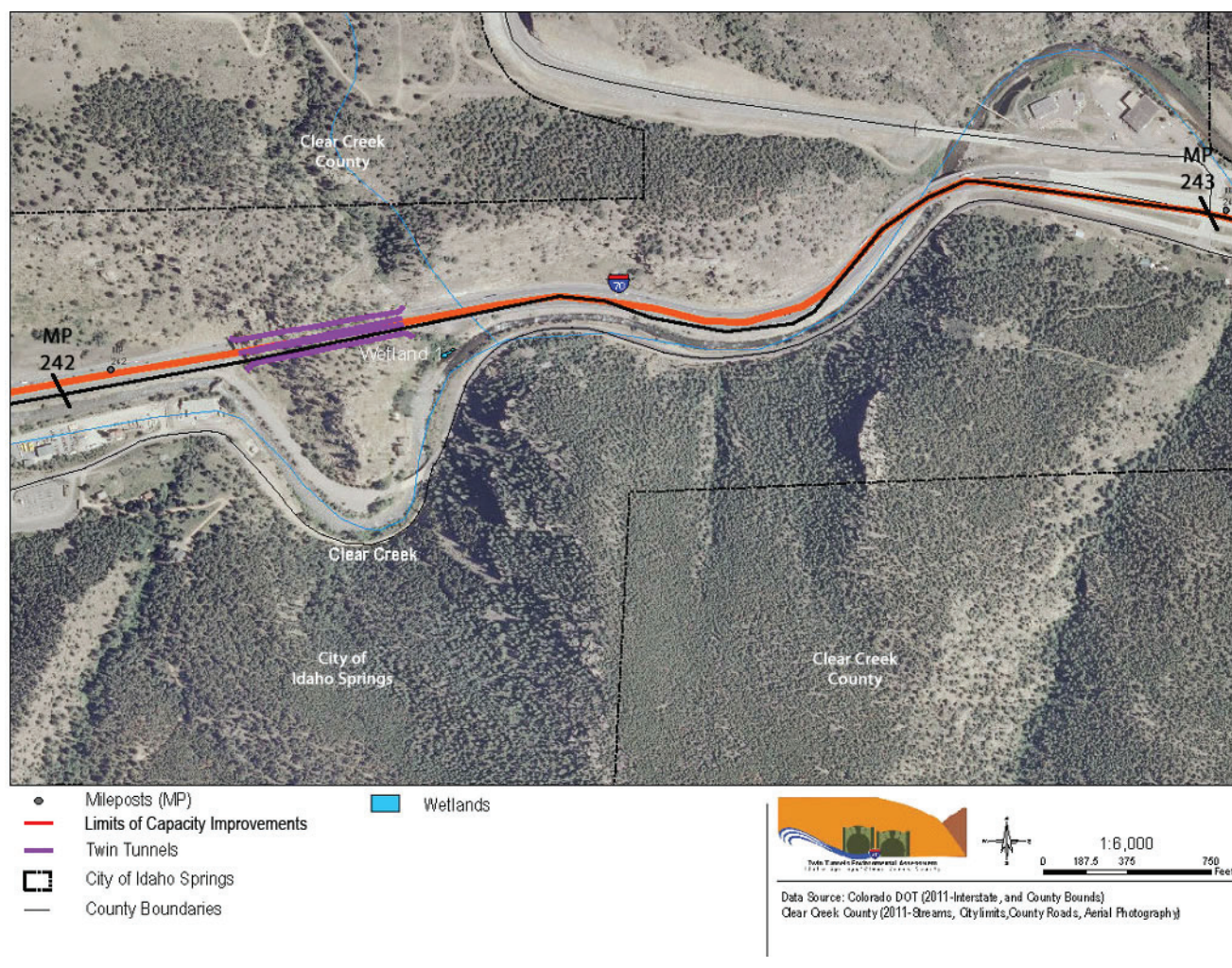
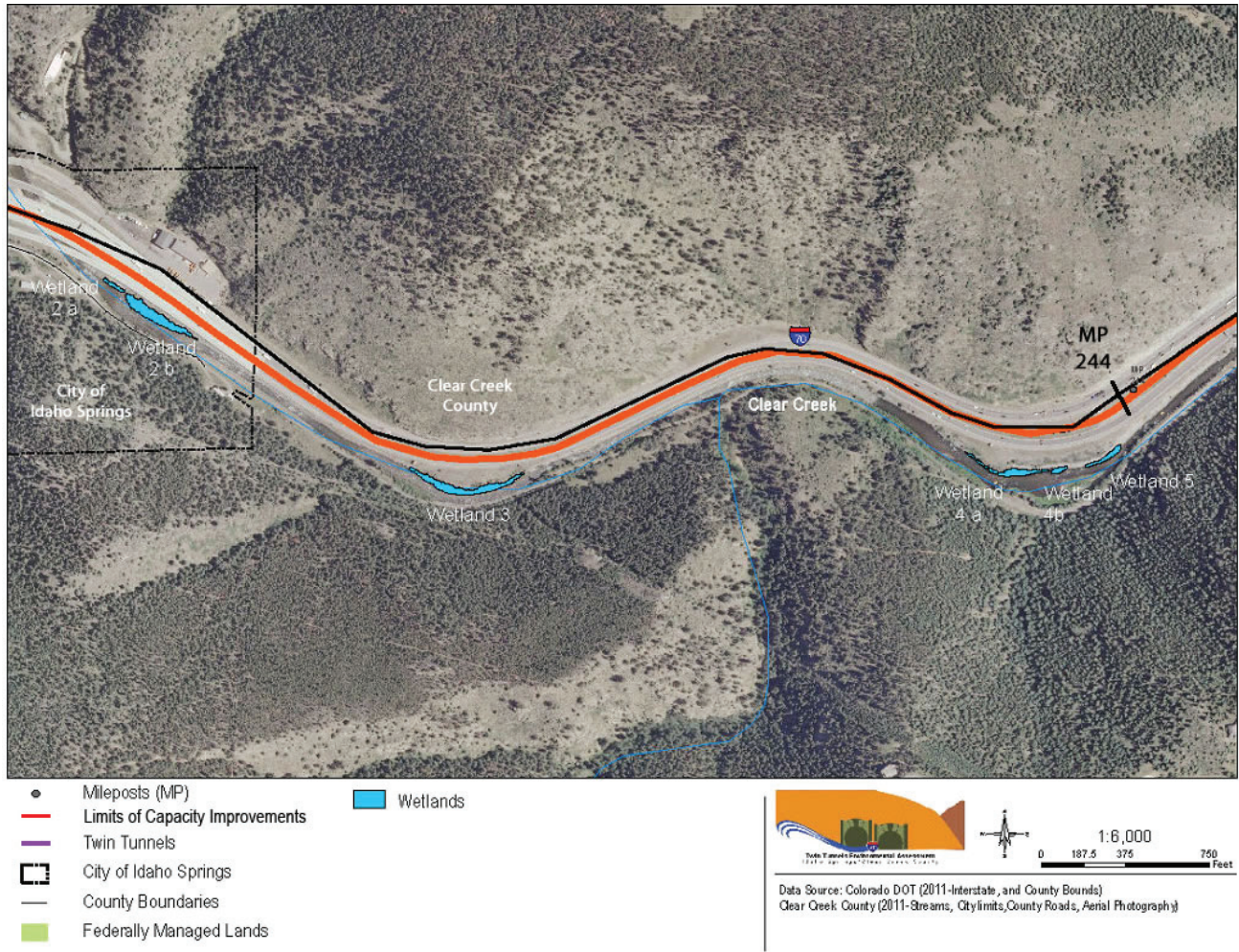


Figure 3-22. Wetlands Along Clear Creek in the Project Area East of Milepost 243



standard or essentially pristine, respectively). This method was developed specifically for Colorado and is used by CDOT as a standard method for projects impacting wetlands. The USACE and EPA were involved in the development of the FACWet method.

The FACWet method was utilized to evaluate the general condition of the delineated wetlands that occur along the north bank of Clear Creek within the study area. Based on this methodology, the study area wetlands were rated at the higher end of functioning category. Table 3-37 shows the study area wetland scoring for the seven FACWet criteria.

The study area wetlands are supported by a reliable hydrology source and a diverse mix of both emergent wetland plant species with a significant shrub component that result in functional wetlands. The channelization and slope armoring along I-70 on the north side of Clear Creek has resulted in the depletion of wetlands/riparian habitat



Clear Creek Wetland.

Table 3-37. FACWet Scorecard for Study Area Wetlands

Functional Capacity Indices	Wetland Variable Score
Support of Characteristic Wildlife Habitat	.75
Support of Characteristic Fish/aquatic Habitat	.81
Flood Attenuation	.80
Short-and Long-Term Water Storage	.79
Nutrient/Toxicant Removal	.70
Sediment Retention/Shoreline Stabilization	.75
Production Export/Food Chain Support	.80
Composite FCI Score (out of 100)	77

in the study area. The study area wetlands are rated as functioning, but are fragmented because of historical wetland loss along the Clear Creek corridor and lack of habitat connectivity.

Clear Creek is the only non-wetland waters of the United States present within the study area. This stream parallels I-70 and represents an important tributary of the South Platte River.

3.14.5 How does the No Action affect wetlands and other waters of the United States?

The No Action would likely not directly affect existing wetland and other waters of the United States. However, existing maintenance and repair of the roadway surface and associated infrastructure could result in some indirect effects to these resources. Effects to wetlands could include releases of petroleum; winter maintenance would contribute sedimentation from sanding and contamination via deicers, and erosion could occur from roadway runoff. Indirect effects to other waters of the United States could include increases in erosion and sediment loading from roadway maintenance activities.

3.14.6 How does the Proposed Action affect wetlands and other waters of the United States?

The following sections discuss the impacts to wetlands and other waters of the United States as a result of the Proposed Action, including those effects expected during and after construction. This section addresses direct and indirect impacts on wetlands and other waters of the United States for roadway improvements that are being

considered, including the two roadway cross-sections and the two operational concepts described in Chapter 2.

Direct impacts include temporary and permanent filling or draining of wetlands and other waters of the United States. These impacts are quantifiable and are presented in acres and linear feet for each build alternative being considered in the EA. Indirect impacts also include permanent impacts to these resources resulting from sedimentation; erosion; releases of petroleum products, deicers, and other pollutants to wetlands and streams; noxious weed invasion; and the loss of wetland vegetation due to bridge shadowing. With the exception of bridge shadowing, these impacts are not quantifiable.

Direct impacts on wetlands and other waters of the United States were determined by overlaying roadway design and construction disturbance limits for each build alternative onto the wetlands and 2-year Clear Creek floodplain (OHWM). If any of the roadway design that includes cut-and-fill areas and installation of concrete or other materials were placed in wetlands or other waters of the United States, it is considered a direct permanent impact. Temporary impacts include activities such as the temporary stream crossings associated with the removal and replacement of the I-70 bridge over Clear Creek west of the Hidden Valley Interchange, exposure of soil, buffers for construction access, removing vegetation, and other activities that do not result in permanent loss of wetlands and other waters of the United States.

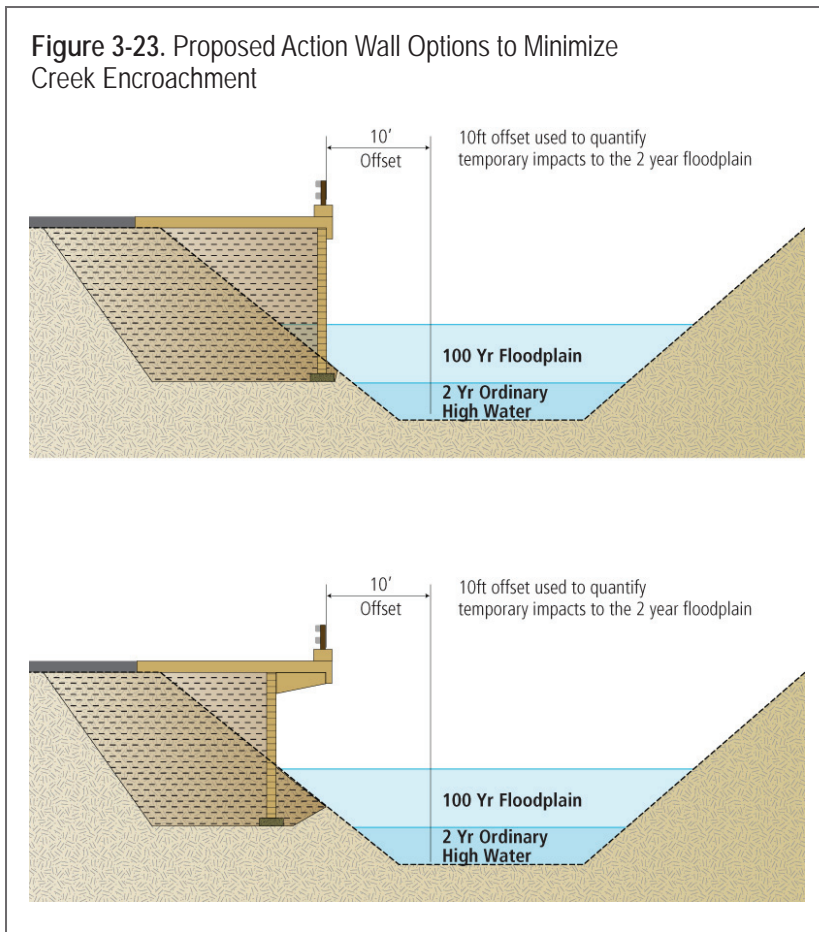
What are the direct effects of the Proposed Action?

The I-70 PEIS indicated that corridor-wide direct impacts on wetlands would occur where the conceptual footprint, including the estimated construction zone, intersects identified wetlands. The conclusions of this Tier 2 process analysis indicate that neither of the roadway cross-sectional options would result in impacts to wetlands in the study area. No direct permanent impacts to the Clear Creek 2-year floodplain would result from the roadway improvement alternatives. Two retaining wall options are under consideration to minimize encroachment on Clear Creek (see Figure 3-23). These design details will be selected during final design.

How does the Proposed Action differ with or without a managed lane?

The Proposed Action would result in the same impacts to wetlands and other waters of the United States with or without a managed lane.

Figure 3-23. Proposed Action Wall Options to Minimize Creek Encroachment



existing wetlands. Erosion can also increase flows into Clear Creek and change the existing vegetation structure of stream banks resulting in loss of important riparian habitat.

Increases in impervious surface would also require additional winter traction sanding and deicing. The winter traction sanding would increase sedimentation into study area wetlands and Clear Creek. Additionally, increases in deicing chemicals being applied could result in more contamination reaching wetlands and Clear Creek.

What effects occur during construction?

Direct temporary impacts of 0.11 acre to 0.16 acre within the 2-year floodplain (the area determined to be classified as a water of the United States) would occur primarily from the installation of retaining walls and bridge structures. While these retaining walls and bridge structures would be located outside the 2-year floodplain, construction equipment and workers would need to access the 2-year floodplain to install the retaining walls and bridge structures. These impacts would result from machinery, equipment, and construction access zones being sited in the 2-year floodplain.

What indirect effects are anticipated to wetlands and other waters of the United States?

Indirect impacts to wetlands and other waters of the United States would primarily result from the increase in impervious surface from roadway improvements. The indirect impacts resulting from the roadway construction could include increases in sedimentation, erosion, and an increase in winter traction sanding and deicing that could contaminate wetlands via runoff.

The project would increase impervious surface from approximately 8 to 9 percent in the project area. This would result in an increase in sediment releases to wetlands and Clear Creek. Sediment loading in wetlands degrades the function of wetlands and can contribute to water quality problems.

An increase in impervious surface also results in increased runoff from precipitation that contributes to erosion and transport of pollutants to wetlands and Clear Creek. Erosion resulting from increased runoff can damage wetlands by removing soil and vegetation. This results in the loss of some critical wetland functions and lowers the quality of

3.14.7 What mitigation is needed for wetlands and other waters of the United States?

What I-70 PEIS mitigation strategies are relevant?

The phased approach of the I-70 PEIS Preferred Alternative allows for ongoing opportunities to avoid and minimize impacts to wetlands and waters of the United States, establish mitigation, and employ I-70 Mountain Corridor Context Sensitive Solutions. Mitigation approaches for wetlands and waters of the United States from the I-70 PEIS that are relevant to this project include the following:

- Implement the SWEEP Memorandum of Understanding (see [Appendix C](#)), which includes mitigation strategies.
- The SWEEP Committee will coordinate with the ALIVE (A Landscape-Level Inventory of Valued Ecosystem) Committee to preserve essential ecosystem components.

Overall, mitigation strategies provide the opportunity to reduce impact and enhance wetland environments in the I-70 Mountain Corridor.

What mitigation is needed for this project?

The project mitigation measures developed for wetlands and other waters of the United States follow the [Tier 2 process guidelines](#) outlined in the I-70 PEIS. No compensatory wetland mitigation will be required for this project because the Proposed Action would not impact wetlands.

No permanent adverse impacts on wetlands or other waters of the United States would occur as a result of the Proposed Action.

Construction impacts on wetlands and other waters of the United States will be mitigated by the measures described in Table 3-38.

Table 3-38. Mitigation Commitments for Temporary Impacts to Wetlands and Other Waters of the United States During the Construction Period

Activity	Location	Impact	Mitigation*
General construction activities associated with the Twin Tunnels project.	The entire project area.	Direct and/or indirect impacts to wetlands and other waters of the United States.	<ul style="list-style-type: none"> • All wetlands delineated and mapped for the project will be protected from construction activities by properly installed construction limit fencing. • CDOT will achieve permanent stabilization through revegetation and permanent erosion controls measures and through maintenance of temporary erosion controls and plantings to stabilize non-rocky areas. • Fertilizers and/or hydro-mulching will not be allowed within 50 feet of wetlands.
Construction staging areas.	Along the entire project area.	Direct and/or indirect impacts to wetlands and waters of the United States.	<ul style="list-style-type: none"> • Construction staging and materials stockpiling will be located greater than 50 feet from the edge of wetlands or the edge of Clear Creek, when possible, to avoid disturbance of vegetation and to prevent pollutant discharges into sensitive habitats. Specific locations will be determined during construction planning and, considering the narrowness of the corridor and limited areas available, this buffer may need to be reduced. If this buffer is not achievable, CDOT will consider the placement of materials closer to the edge of wetlands or the edge of water and identify appropriate additional best management practices (BMPs) that would be required to minimize disturbance of vegetation and prevent pollutant discharges into sensitive habitats. BMPs will be determined on a site-by-site basis and any modifications will require CDOT environmental staff approval.
Construction work and installation of retaining walls within the two-year floodplain.	The entire project area.	Direct and/or indirect impacts to waters of the United States.	<ul style="list-style-type: none"> • Prohibit construction equipment from entering the ordinary high water mark (2-year floodplain) except where identified on design plans. • Replacement of rip-rap along Clear Creek will be closely monitored to ensure that additional fill is not placed into the 2-year floodplain. Any additional encroachment into the 2-year floodplain would need to be identified in the Section 404 permit. • Refuel equipment within designated refueling containment area away from floodplain, Clear Creek, and wetlands. • Ensure BMPs and containment structures are in place for work conducted within and adjacent to the 2-year floodplain to prevent concrete washout and other potential pollutants from reaching Clear Creek and wetlands.
Reconstruction of the bridge on I-70 over Clear Creek west of the Hidden Valley Interchange and potential stream crossing.	I-70 and Clear Creek west of the Hidden Valley Interchange.	Direct and/or indirect impacts to Clear Creek two-year floodplain.	<ul style="list-style-type: none"> • This work will take place close to or within the 2-year floodplain. All identified mitigation commitments for work within the ordinary high water mark will need to be implemented in this location. Work in this location will need to be closely monitored to ensure compliance with the U.S. Army Corps of Engineers Section 404 permit.

* Mitigation is not necessary if impact can be avoided through changes in the design or construction of the Proposed Action (i.e., the activity is avoided).
 BMPs = best management practices

3.15 Floodplains

3.15.1 How does the analysis relate to the I-70 PEIS?

The I-70 PEIS (CDOT, 2011b) committed to conducting specific additional analysis and coordination regarding floodplain impacts during Tier 2 process, including the Twin Tunnels project. The floodplain analysis is in compliance with Title 23 of the Code of Federal Regulations (CFR) Part 650.

3.15.2 What process was followed to analyze floodplain resources?

Flood insurance rate maps from the Federal Emergency Management Agency (FEMA, 2007) were used to identify the regulatory base flood (1 percent annual chance) delineation. The 1 percent annual chance flood is also commonly referred to as the 100-year flood. This reach of Clear Creek is shown as Zone A floodplain and does not include regulatory base flood elevations. The effective floodplain delineation was initially identified March 11, 1980, and is still shown as the effective floodplain delineation on the current flood insurance rate maps panel 08019C0226D, -0227D, and -0250D, dated March 19, 2007.

The regulatory floodplain information does not provide calculated base flood elevations, and delineations were based on topographic information that is now over 30 years old. To provide a more accurate 100-year floodplain delineation, a detailed hydraulic model of this reach of Clear Creek was created using HEC-RAS, version 4.1.0, with available topographic and survey information. This model was used to delineate a more accurate existing floodplain conditions.

3.15.3 What are the floodplain characteristics in the study area?

Clear Creek flows parallel to I-70 through the study area and includes three existing bridge crossings for I-70 and an existing bridge crossing for old US 40, the Doghouse Rail Bridge. Clear Creek has been channelized in much of this reach and the floodplain is narrow. The regulatory FEMA floodplain delineation is an approximate delineation based on 30-year-old topographic data. The FEMA 100-year delineation inaccurately includes a portion of the existing I-70 main lanes. The detailed modeling and mapping of the Clear Creek 100-year floodplain conducted for this project shows the 100-year floodplain is contained within the channelized section of Clear Creek and does not inundate the existing I-70 main lanes. **Figure 3-24** shows the regulatory and existing conditions floodplain in relationship to I-70.

3.15.4 What agencies were involved in this analysis and what are their issues?

CDOT coordinated with Clear Creek County and the City of Idaho Springs to discuss effective mapping, determine future floodplain permitting, and review existing modeling and mapping for this reach of Clear Creek. Both communities are concerned with fill placement and impacts to the Clear Creek floodplain and have established floodplain management regulations.

3.15.5 How does the No Action affect floodplain resources?

The No Action would result in no effects to the regulated 100-year floodplain or the mapped existing conditions 100-year floodplain within the project area. Improvements to CR 314 are proposed along this reach of Clear Creek as part of the I-70 Frontage Road Phase I project. The existing conditions hydraulic analysis developed for the Twin Tunnels project was provided to the I-70 Frontage Road project designers for their use.

3.15.6 How does the Proposed Action affect floodplain resources?

The following sections discuss the impacts to the floodplain as a result of the Proposed Action, including those effects expected during and after construction. The analysis considers the effects of the Proposed Action including a managed line and two general purpose lanes, and effects with three general purpose lanes and no managed lane.

Based on the inaccurate FEMA 100-year delineations, the Proposed Action would encroach upon and impact the regulatory 100-year floodplain. However, as mentioned in Section 3.15.3, more recent modeling and mapping indicates the Proposed Action would not encroach upon the regulatory 100-year floodplain. The Colorado Water Conservation Board is currently studying the Clear Creek watershed and proposes to provide more accurate floodplain delineation in the near future.

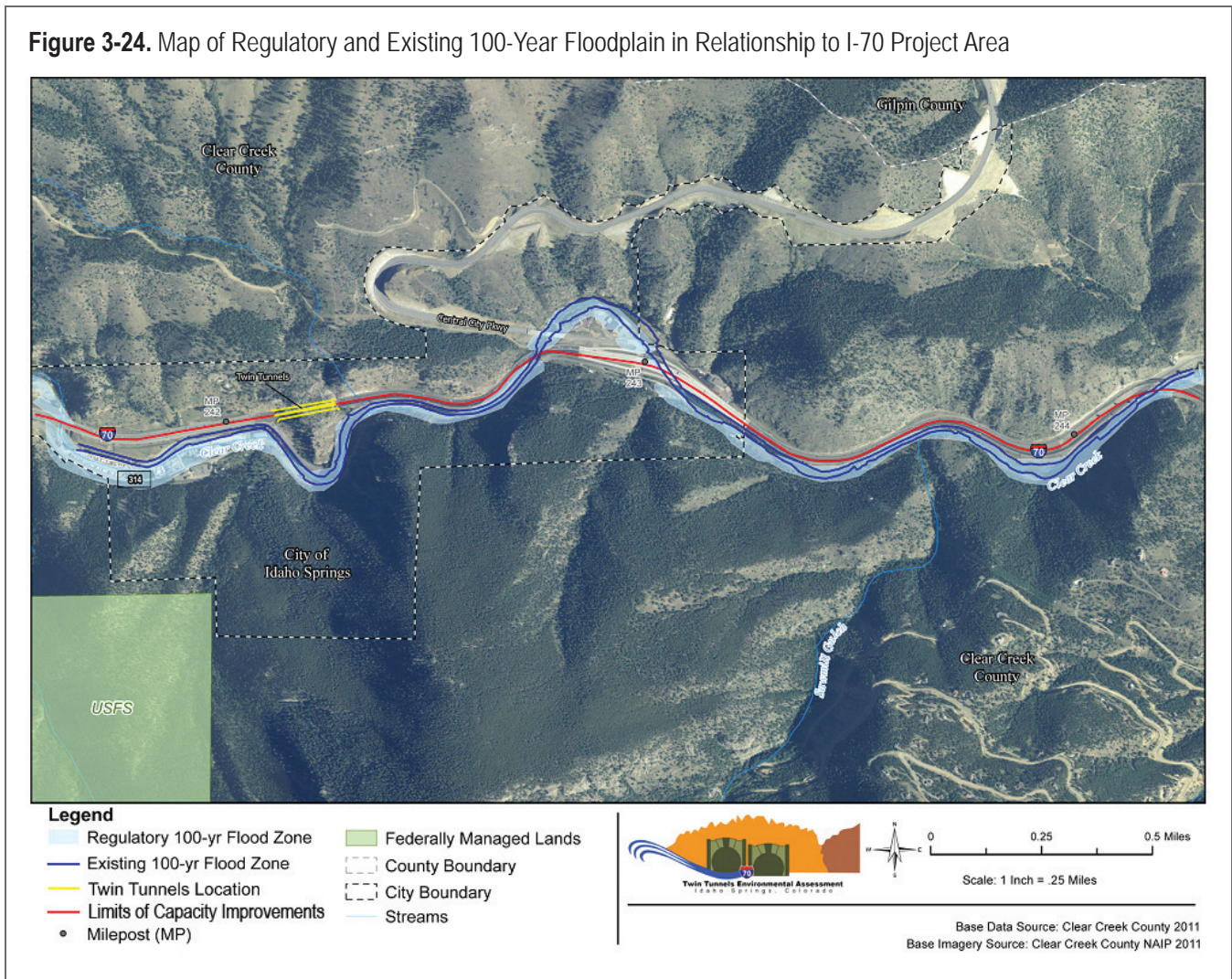
What are the direct effects of the Proposed Action?

The Proposed Action would avoid impacts to the existing conditions 100-year floodplain by:

- Placing retaining walls outside of the existing conditions 100-year floodplain
- Spanning the existing conditions 100-year floodplain for new bridge structures

Avoiding impacts to the 100-year floodplain results in no effects to the existing 100-year floodplain. This is true with both the 50-foot and 56-foot roadway cross-sections.

Figure 3-24. Map of Regulatory and Existing 100-Year Floodplain in Relationship to I-70 Project Area



How does the Proposed Action differ with or without a managed lane?

Effects to the 100-year floodplain are identical between the two operational concepts.

What indirect effects are anticipated?

No indirect effects are anticipated to the Clear Creek floodplain. Portions of the existing main lanes for I-70 have been shown to be in the regulatory Zone A floodplain for over 30 years. The proposed improvements within these portions of I-70 would continue to be shown in the regulatory Zone A floodplain until this entire reach of Clear Creek is remapped.

What effects occur during construction?

Construction effects are considered temporary compared to the operational life span of the Proposed Action. The majority of the construction activities would occur outside of the 100-year floodplain. Excavation and grading activities

would be required within portions of the floodplain to construct retaining walls and bridges. Excavation of the existing channel bank and replacement of channel armoring would be expected to occur within the 100-year floodplain. These activities would not result in changes to channel or floodplain elevations.

3.15.7 What mitigation is needed?

What I-70 PEIS mitigation strategies are relevant?

The I-70 PEIS did not specifically discuss floodplains and, therefore, did not identify Tier 2 mitigation approaches for floodplain impacts.

What mitigation is needed for this project?

Although the regulatory 100-year floodplain includes portions of the existing I-70 main lanes, the Proposed Action would not permanently impact the existing 100-year floodplain, and no floodplain mitigation is required.

3.16 Water Resources and Water Quality

3.16.1 How does the analysis relate to the I-70 PEIS?

[Section 3.4](#) of the I-70 PEIS (CDOT, 2011b) provides the background information and data for this assessment. Specifically, a series of reports entitled *Data Evaluation Report, Interstate 70 Mountain Corridor, Storm Event/Snowmelt Water Quality Monitoring, 2000-2009* (CDOT, 2011h) provide detailed water resources information for the study area.

The I-70 PEIS identified the following types of impacts that could result from the I-70 PEIS Preferred Alternative and should be investigated in detail during Tier 2 processes:

- Phosphorus concentrations in highway runoff impacts water quality.
- A decrease in stream flow caused by drought conditions lowers a stream’s ability to dilute contaminants and might lower the amount of acceptable pollutants allowed in the stream.
- Further analysis of permanent stormwater best management practices (BMPs) along the I-70 Mountain Corridor could verify that potential reductions to stream concentrations of priority constituents could be achieved by the alternatives beyond existing annual conditions.
- Potential water quality issues arising from disturbance of mine tailings and, therefore, metal loading, analyzed as part of detailed Regulated Materials and Historic Mining analysis.
- Evaluation and identification of permanent mitigation measures for specific issues could include structural controls beyond the Clear Creek Sediment Control Action Plan (SCAP) that is currently under development.
- Specific identification of stream disturbance during construction, including construction disturbance areas, channelized

In Tier 2 processes, it can be determined whether a stream channel will be affected by the proposed alignment and what kinds of mitigations could offset this impact. Likewise, the placement of permanent water quality features such as catchment basins could benefit the I-70 Mountain Corridor by repairing stream health and minimizing impacts of the projects.

segments, pier placement, and structural modifications (for example, embankment walls, cantilevered sections, or elevated structural segments and bridges). The USACE requires compliance with Section 404 of the Clean Water Act, which requires permitting of temporary and permanent impacts on stream flow and channels. Each Tier 2 process will determine the need for a Section 404 permit for the site-specific project being constructed under that process.

- Tunnel discharges are typically considered point source discharges under the Clean Water Act and require a Section 401 permit for dewatering. Further study will be necessary during Tier 2 processes to identify if any new tunnels will require permits and/or water treatment systems. Water rights issues must also be considered in the context of water law for new groundwater discharges or depletions of groundwater wells.
- Identify impacts associated with washout of sand onto bicycle paths.
- Determine how mitigation strategies developed by the Stream and Wetland Ecological Enhancement Program (SWEEP) Committee will be incorporated in the project design and be specified.
- Additional data on subsurface conditions will be collected and analyzed to assess various construction techniques, particularly for tunnels, and their potential effects on groundwater sources.

3.16.2 What process was followed to analyze water resources?

The study area for water resources and water quality extends from the East Idaho Springs Interchange (approximately milepost 241) to the base of Floyd Hill (approximately milepost 244). The [Twin Tunnels EA Water Resources Technical Memorandum](#) (CDOT, 2012k) was developed for this EA that provides detailed information on existing conditions, potential impacts, and mitigation options.

The Colorado Department of Transportation established the following three programs to gather information on water resources within the study area:

- The [SWEEP Memorandum of Understanding](#) (included in the I-70 PEIS Appendix D, SWEEP Memorandum of Understanding) identifies aquatic resource issues and outlines the process for the SWEEP Committee to identify stream and wetland mitigation opportunities in the I-70 Mountain Corridor.

- The I-70 Storm Event/Snowmelt Water Quality Monitoring Program conducted sampling from 2000 to 2009 to quantify existing water quality conditions from I-70 highway runoff (CDOT, 2011h).
- The Clear Creek Sediment Control Action Plan (SCAP) under development outlines mitigation strategies. A summary of SCAP mitigation concepts is provided in a memorandum, Sediment Control Action Plan Concept for I-70 Twin Tunnels Segment Milepost 241-244; additional information is in the *I-70 Mountain Corridor PEIS Water Resources Technical Report* (CDOT, 2010d).

For the I-70 PEIS, CDOT estimated impacts from highway runoff by quantifying increased impervious surface area and winter maintenance material usage (traction sand, and solid and liquid deicer salts). Highway stormwater runoff and associated increases in water quality pollutant concentrations and loads in streams were quantified using FHWA's water quality model (CDOT, 2010e).

Data sources used in this Tier 2 assessment include the following:

- CDOT I-70 PEIS information and modeling (CDOT, 2011i)
- CDOT I-70 water quality monitoring program data
- CDOT winter maintenance material usage data
- Upper Clear Creek Watershed Association flow and water quality data
- Stream water quality regulation standards
- Preliminary Clear Creek SCAP documentation

3.16.3 What agencies were involved in this analysis and what are their issues?

The following agencies participated in providing input and information on issues pertaining to water resources and water quality within Clear Creek in the area of and downstream from the proposed action:

- U.S. Fish and Wildlife Service
- U.S. Forest Service
- U.S. Army Corps of Engineers
- U.S. Environmental Protection Agency
- Colorado Department of Public Health and Environment
- Colorado Parks and Wildlife
- Trout Unlimited
- Representatives from the Clear Creek watershed, Clear Creek County, and Idaho Springs

These agencies were represented at the SWEEP Committee meetings. The SWEEP Committee was established during the development of the I-70 PEIS to propose and support future improvements to protect and enhance aquatic resources throughout the I-70 Mountain Corridor as opportunities arise, including site-specific projects such as the Twin Tunnels project. The SWEEP Committee identified numerous issues relating to water quality, wetlands, and aquatic habitat. The aquatic habitat and wetland issues are addressed in their respective sections of this EA. In general, these agencies raised general concerns regarding contaminants coming from the I-70 highway, including the possible release of contaminants from past mining activity during future highway construction.

Specific issues identified by the SWEEP Committee included:

- Potential for exposing mineralized rock during construction activity and the associated impacts to water quality, including an increase in metals loading, dissolved solids, and suspended solids within Clear Creek
- Sediment control during construction and operation of the highway
- Control of spills resulting from events such as freight vehicle accidents that could release contaminants into Clear Creek
- Increase in heavy metals loading, particularly cadmium, because this segment of Clear Creek is on the Clean Water Act Section 303(d) list of impaired waters
- Dewatering of Clear Creek by intercepting groundwater flow during the expansion of the tunnel

3.16.4 What are the water resources in the study area?

Existing conditions

Clear Creek is the primary water resource in the study area. Clear Creek flows immediately adjacent to I-70 through the length of the study segment and receives runoff from I-70. This highway segment is characterized by a steep canyon environment with hill slopes at the angle of repose and near vertical rock outcrops in several areas. I-70 was constructed on the north side of Clear Creek by cut and fill methods in most areas, with fill material placed on the north bank of Clear Creek. Clear Creek is constricted by the narrow canyon and was channelized by fill material from I-70 in many areas. The Twin Tunnels were constructed to accommodate design speeds in a sinuous portion of the canyon. Seasonal application of traction sand and deicer salts is required to maintain safe mobility during winter.

Construction of US 6/US 40 and I-70 has resulted in additional channel constriction/channelization, stream bank erosion, changes in the natural stream gradient, and channel scour and depositional areas. Existing stream channel impacts related to transportation are permanent and irreversible without the complete removal of both highway systems.

The City of Black Hawk operates an in-stream water supply diversion from Clear Creek within the study limits; water is withdrawn from Clear Creek and treated for municipal use. The City of Golden operates an in-stream water supply diversion from Clear Creek in Golden. Several other water supply intakes exist on Clear Creek downstream of the project including Farmers Highline Canal, Church Ditch, Molson-Coors, and Croake Canal. Diverted water is utilized for domestic, agricultural, and industrial uses.

Stream data collected since the I-70 PEIS support the original assertion that sediment and chloride are the primary water quality parameters of concern for I-70. The assumption in the I-70 PEIS that these will continue to be the primary water quality issues as traffic volume increases has been validated by recent (2008-2011) data summarized in the *Twin Tunnels EA Water Resources Technical Memorandum* (CDOT, 2012k). The highway can contribute surface runoff directly to receiving streams during snowmelt or rainfall runoff conditions. Snow is removed from the travel lanes, and traction sand or deicers are applied to maintain winter traffic mobility. A mixture of traction sand and salt accumulates along the highway shoulders over the winter in the Twin Tunnels area. Both snowmelt and rainfall runoff can mobilize liquid and solid contaminants from I-70 to Clear Creek.

The lower Clear Creek area is also affected by water quality changes from tributary inflow and historical mine drainage that is unrelated to I-70. However, the Twin Tunnels/Hidden Valley reach does not have substantial mining impacts to be targeted by the EPA sufficiently for mine remediation, even though this area is within the Clear Creek/Central City Superfund Study Area. Trace metal concentrations in Clear Creek are largely attributable to upstream mine drainage. CDOT monitoring shows that storm-related metal concentrations decreased or remained the same in the Twin Tunnels/Hidden Valley reach, indicating that I-70 did not contribute appreciable trace metals to Clear Creek (CDOT, 2008).



Clear Creek channel constriction/channelization.

The winter maintenance material (traction sand and deicer salts) usage data for I-70 is tracked by CDOT each year. The sand and salt use varies from year to year according to snowfall amounts. In recent years, traction sand and salt (solids) use has decreased by about two-thirds and liquid deicers are now the dominant material used in the study area (**Figure 3-25**). This trend has important implications for Clear Creek's water quality.

Clear Creek monitoring data show that chloride spikes are common in the winter months, the likely result of salt runoff from highway winter maintenance, when creek flows are low. Data indicate a slight increasing chloride trend over the past 7 years. At the lower end of the study site (but not at the upper end), concentrations approach quality standards for short periods each winter, and occasionally exceed them (CDOT, 2012k). These data show the effects of winter maintenance chloride salts on Clear Creek water quality in the study area.

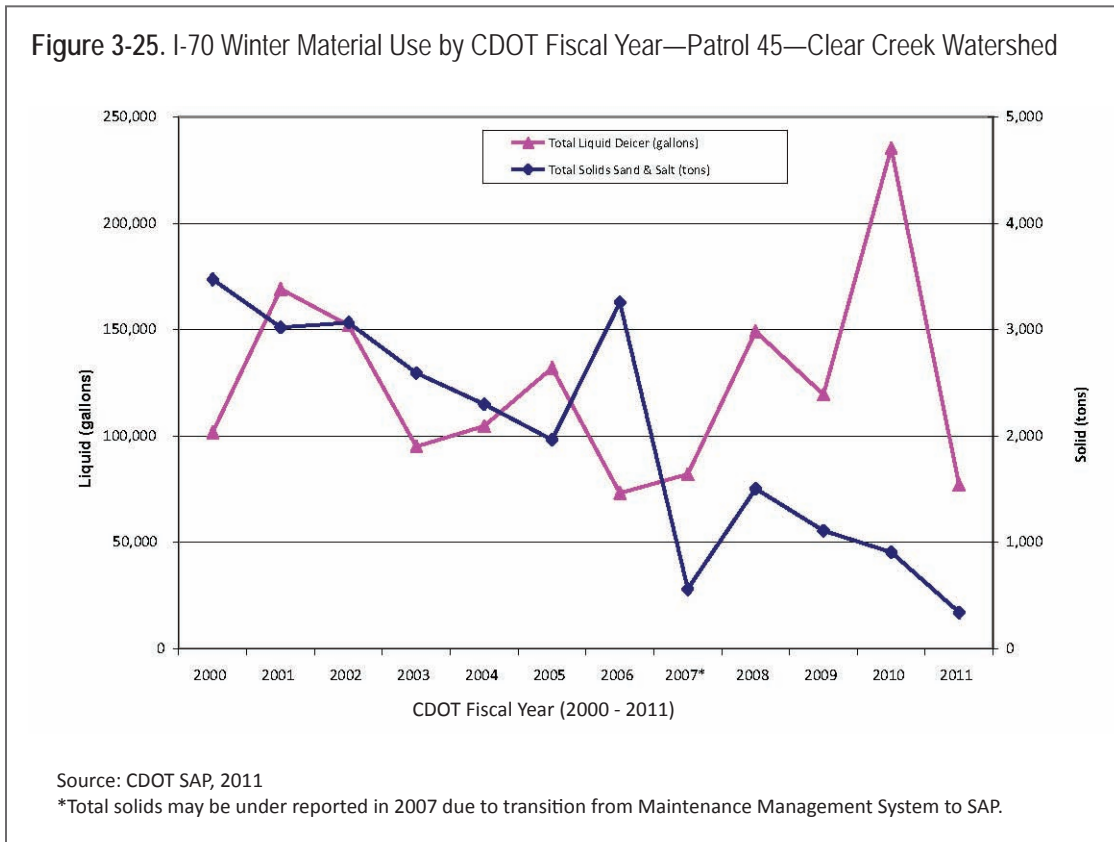
Future conditions and risks

Clear Creek will continue to be in high demand as a drinking water supply for water users in the Denver Metropolitan area. Trans-mountain diversions into Clear Creek will continue to increase with demand, thereby increasing in-stream flow conditions during certain times of the year. Natural variations in annual climatic conditions will continue to result in both low- and high-flow years in Clear Creek.

Water quality protection will continue to be a high priority for water users. New regulations aimed at protecting water quality will result in more stringent standards in the future. Clear Creek water quality is threatened by a myriad of conditions including erosion from historic mines, mine drainage, runoff from urban development, population growth, secondary roadway runoff, and I-70. An overall lack of mitigation for many of these water quality impacts in the past suggests that opportunities exist for future water quality improvements.

In the context of stream flow, minimum flows are typically the determining factor for impacts to aquatic life and water supplies. It is likely that trans-mountain diversions into Clear Creek from the Western Slope will continue to increase in the future, resulting in more water flow than would normally be in the basin. In the absence of large climatic fluctuations, Clear Creek flow is not considered to be at risk.

Figure 3-25. I-70 Winter Material Use by CDOT Fiscal Year—Patrol 45—Clear Creek Watershed



Water quality in Clear Creek is currently at risk and will continue to be a major concern in the future. The National Response Center data show that every stream in the I-70 Corridor has received a major hazardous waste spill from I-70 truck crashes within the last 10 years, with at least three large petroleum spills in lower Clear Creek. Smaller spills from trucks’ diesel tank occur almost annually. Refer to [Section 3.18, Regulated Materials and Solid Waste](#), for more detail. Clear Creek will remain at risk with a very high potential for contamination from hazardous substance spill incidents that threaten water supplies. Diligent implementation and maintenance of BMPs and Best Available Technology would control the risk to water quality.

3.16.5 How does the No Action affect water resources?

I-70 can currently affect water quality in Clear Creek in terms of sediment, nutrient, and chloride concentrations. Accidental spills that occur along the highway each year also affect water quality and threaten downstream water supplies.

As the I-70 infrastructure and drainage systems pass their design life and continue to deteriorate without significant upgrades, erosion of cut and fill slopes and sediment

transport from the highway would become worse under the No Action. This is a gradual process that has developed over the past 50 years and would continue under No Action.

The emphasis on use of liquid deicer salts to maintain safe winter mobility is likely to continue. Salt inputs into Clear Creek will vary from year to year depending on winter maintenance (snow conditions), but the trend towards higher stream chloride concentrations is likely to continue under the No Action.

Accidental spills of hazardous materials into Clear Creek would continue to be a major water quality concern under the No Action.

Water quality in Clear Creek is currently at risk and will continue to be so into the future.

3.16.6 How does the Proposed Action affect water resources?

The I-70 PEIS indicated that corridor-wide direct impacts on water resources would occur through the introduction of sediments and other contaminants into the stream channels, as well as by physically affecting stream length by placing the road or its supports next to or in the stream channel. The conclusions of this Tier 2 process analysis

indicate that impacts to water resources related to the Proposed Action would include increases in impervious surface area/roadbed expansion, new construction disturbances, potential impacts from disturbance of historic mine waste materials, and possible impacts from transportation system maintenance operations. Changes in impervious surface and roadbed expansion are considered permanent impacts, whereas construction impacts are usually temporary.

The following sections discuss the impacts to water resources and water quality as a result of the Proposed Action, including those effects expected during and after construction. The analysis considers the effects of the Proposed Action, including a managed lane and two general-purpose lanes, and effects with three general-purpose lanes and no managed lane.

What are the direct effects of the Proposed Action?

The direct impact assessment approach for water resources evaluates potential changes from existing I-70 conditions. Changes primarily include increases in the impervious surface area of the highway template (predicted to range from 3.1 to 3.6 acres of increase depending on whether the 50-foot or 56-foot roadway width is chosen) and associated changes in winter maintenance materials usage. Potential stream water quality changes were evaluated for the I-70 PEIS using a probabilistic dilution model. These are illustrated as a percentage increase from existing I-70 conditions.

The Proposed Action is assumed to be similar to the Six-Lane Highway (55 mph) Alternative evaluated in the I-70 PEIS, but with widening in the eastbound direction only. Therefore, potential water quality changes in the study area would be approximately 50 percent of those predicted in the I-70 PEIS. In addition, because this area is not within the mining district, and information collected in support

of this project indicates that the potential to encounter mine wastes is low (see [Section 3.18, Regulated Materials and Solid Waste](#)), metal concentrations are expected to continue to be low. Therefore, model predictions for this area are based on results for I-70 outside the mining district (e.g., Beaver Brook). **Table 3-39** summarizes the predicted sediment, chloride, and metal concentrations resulting from the Proposed Action, with no mitigation.

Sediment, nutrient, and chloride concentrations were estimated to increase by approximately 5 percent over existing conditions as a result of the Proposed Action (CDOT, 2012k). Trace metals were estimated to increase by approximately 0.5 to 1.5 percent as a result of the Proposed Action (with either roadway width). These increases are possible from the Proposed Action with no mitigation. These estimated changes (based on I-70 PEIS modeling) are relatively small and are unlikely to create any exceedance of water quality standards.

It is important to consider that while increases in water quality constituents are possible, permanent sediment control BMPs structures planned as part of the Proposed Action are expected to remove significant amounts of sediment, metals, and phosphorous from highway runoff (see [Figure 3-26](#) for proposed sediment basin locations). This could result in no change in water quality from the Proposed Action.

Direct Impacts to Water Resources

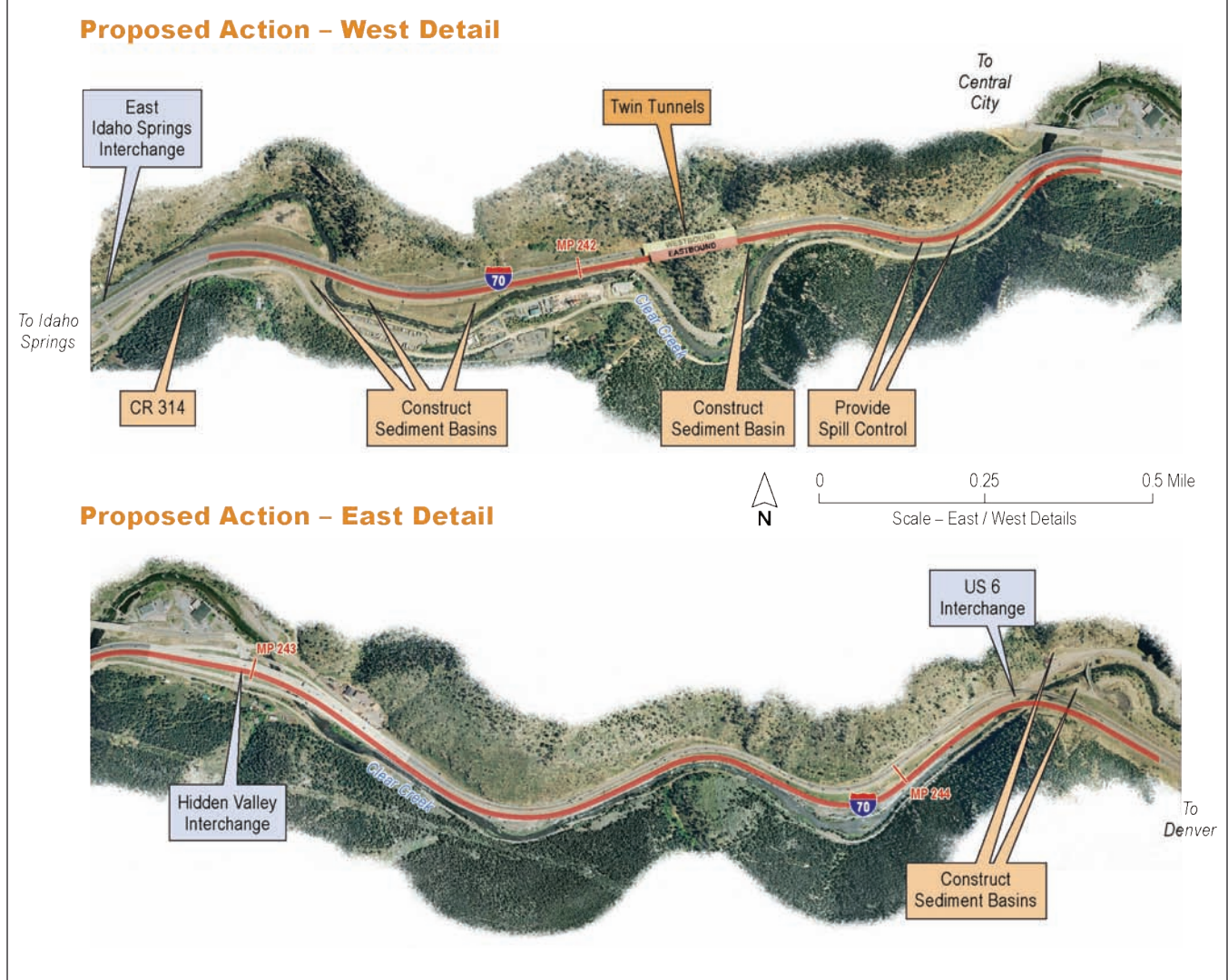
- Increase in impervious surface.
- New construction disturbances.
- Potential impact from disturbance of historic mine waste materials.
- Impacts from I-70 maintenance activities.

Table 3-39. Summary of Water Quality Changes between Existing and Future (Post-Construction) Conditions with No Mitigation

Water Quality Parameter	Percent Change in Concentration	
	I-70 PEIS Six-Lane Highway (55 mph) Alternative (eastbound and westbound I-70 lanes)	Twin Tunnels Proposed Action (eastbound I-70 lanes only)
Suspended Solids	10%	5%
Total Phosphorus	10%	5%
Chloride	10%	5%
Dissolved copper	3%	1.5%
Dissolved zinc	1%	0.5%

Direct stream disturbance impacts are expected to be minimal based on review of footprints and construction disturbance zones. Preliminary design indicates that no bridge piers or abutments would be located within the 100-year floodplain. No permanent stream channel impacts are anticipated if disturbance is avoided and there is no further infilling.

Figure 3-26. Sediment Basin and Spill Containment Locations



The Proposed Action would construct safety improvements that are expected to reduce the number of accidental spills of hazardous materials into Clear Creek.

How does the Proposed Action differ with or without a managed lane?

The Proposed Action would result in the same impacts on water resources and water quality with or without a managed lane.

What indirect effects are anticipated?

The Proposed Action has the potential for indirect impacts related to highway operation and maintenance activities, as well as construction disturbance of geological substrate that could release pollutants into the waterways.

What effects occur during construction?

Disturbance and erosion of underlying soil, stockpiles, and access roads during construction can contribute to water quality degradation in Clear Creek. Accidental spills from machinery, drilling activities, and storage tanks can affect water quality during construction. Staging areas used that are adjacent to Clear Creek may have water quality impacts. However, in order to minimize such impacts, CDOT usually requires that such areas be located a minimum of 50 feet away from Clear Creek, and that storage tanks have secondary containment. The 50-foot setback may be difficult to achieve in narrow canyon areas. Where such setbacks are not feasible, additional runoff control BMPs will be installed to ensure contaminants do not reach the waterway.

The City of Black Hawk water supply could be directly impacted if construction-related contaminants are allowed to enter Clear Creek above the water diversion.

The increased use of winter maintenance materials (sand and salt) required for the eastbound I-70 detour will have temporary water quality impacts during the construction phase. However, the eastbound I-70 detour impacts are not expected to be substantially different from the current operation and maintenance of eastbound I-70.

3.16.7 What mitigation is needed?

What I-70 PEIS mitigation strategies are relevant?

The phased approach of the I-70 PEIS Preferred Alternative allows for ongoing opportunities to avoid and minimize impacts to water resources and water quality, establish mitigation, and employ I-70 Mountain Corridor Context Sensitive Solutions. [Mitigation strategies for water](#) resources and water quality from the I-70 PEIS that are relevant to this project include the following:

- Implement water resource mitigation recommendations developed by the SWEEP Committee.
- Work cooperatively with various local, state, and federal agencies and local watershed groups to avoid further impacts on and possibly improve Clear Creek water quality, including management of impacted mine waste piles and tunnels within the I-70 Mountain Corridor and through the use of appropriate permanent BMPs.
- Incorporate local watershed initiatives into site-specific mitigation strategies and consider the goals of the local watershed planning entity in developing mitigation. Detention basins for the collection of sediment as outlined in the Clear Creek SCAP will be part of the mitigation strategy. The Clear Creek SCAP will be implemented concurrently with development of the Proposed Action and will consider drinking water source protection.

- Explore ways to mitigate for winter maintenance activities beyond the implementation of SWEEP that will provide for sediment and stormwater catchment basins. Better training for snowplow staff, so they know how to reduce the use of sand or deicers to match roadway conditions would help minimize the introduction of these contaminants over time.
- Manage construction impacts through the implementation of Stormwater Management Plans, which provide detailed guidance on the location, installation, and maintenance of temporary stormwater BMPs for erosion and sediment control during construction. The Stormwater Management Plan is in accordance with the CDOT Standards and Specifications for Road and Bridge Construction (2005), specifically subsection 208 Erosion Control. The temporary best management practices identified in the Stormwater Management Plan will be installed prior to commencement of construction activity and maintained throughout construction until the site has achieved stabilization and vegetation has been established.
- Efforts will be included in further design phases to minimize impacts on water quality and other water resources by refining placement of roadway and road piers to avoid impacts when feasible.

What mitigation is needed for this project?

CDOT has identified project mitigation for potential impacts on water resources and water quality. **Table 3-40** and **Table 3-41** describe these mitigation measures.

Table 3-40. Mitigation Commitments for Permanent Impacts to Water Resources and Water Quality

Activity	Location	Impact	Mitigation*
Runoff from roadway.	Throughout the study area.	Impacts to water resources as a result of water quality degradation due to contaminant runoff.	<ul style="list-style-type: none"> • Hazardous spill containment structure locations have been identified (see Figure 3-26) and the feasibility of BMPs will be evaluated to assess their potential effectiveness in reducing hazardous waste discharge to Clear Creek. • CDOT will implement adaptive mitigation by utilizing the Clear Creek SCAP, which allows for flexibility in the number, sizing, type, and locations of BMP structures, while controlling contaminated drainage entering Clear Creek. • Three different drainage inlet sediment trap concept designs have been developed to accommodate various drainage conditions anticipated for the Proposed Action. These traps will be installed as part of the drainage system in locations where surface water is discharged to Clear Creek. Locations for surface sediment basins have also been identified in the plan and will be constructed as part of the drainage system (see Figure 3-26).
Winter roadway maintenance.	Throughout the study area.	Elevated sediment and chloride levels in Clear Creek due to use of traction sand and liquid and solid deicer salts.	<ul style="list-style-type: none"> • Structural BMPs, such as detention basins, will be constructed to capture winter roadway maintenance traction sand and other solid material. Non-structural BMPs will include ongoing training of maintenance staff in the application of winter roadway maintenance materials.
Ongoing water quality monitoring.	Throughout the study area.	Ongoing changes to water quality of Clear Creek due to implementation of the Proposed Action. This includes impacts resulting from construction and roadway operations.	<ul style="list-style-type: none"> • The I-70 Clear Creek water quality monitoring program (conducted 2001-2005) in the Twin Tunnels/Hidden Valley reach will be re-started and operated before, during, and after construction to monitor water quality conditions. The duration of post-construction monitoring will be determined by CDOT. The water quality monitoring program will sample both ambient and runoff event (snowmelt or rainstorm) flows.
<p>* Mitigation is not necessary if impact can be avoided through changes in the design or construction of the Proposed Action (i.e., the activity is avoided).</p>			

Table 3-41. Mitigation Commitments for Temporary Impacts to Water Resources and Water Quality during the Construction Period

Activity	Location	Impact	Mitigation*
Runoff from construction.	Throughout the study area.	Impacts to water resources as a result of water quality degradation.	<ul style="list-style-type: none"> CDOT will implement appropriate BMPs for erosion and sediment control according to the <i>CDOT Erosion Control and Storm Water Quality Guide</i> (CDOT, 2002), and develop a stormwater management plan, which includes water quality monitoring.
Long-term erosion impacts from soil disturbance during construction.	Throughout the study area.	Erosion, leading to increased sedimentation.	<ul style="list-style-type: none"> CDOT will achieve permanent stabilization through revegetation and permanent erosion controls measures and through maintenance of temporary erosion controls and plantings to stabilize non-rocky areas.
Exposure and handling of mineralized rock.	During tunnel excavation of naturally occurring mineralized rock near the west tunnel portal, and subsequent handling of excavated rock.	Impacts to water resources due to the introduction of mineralized materials, which can increase loading of metals, dissolved solids, and suspended solids.	<ul style="list-style-type: none"> Encapsulate mineralized rock generated during blasting activities beneath the roadway pavement, away from groundwater, to prevent chemical reactions that could mobilize contaminants into water. Such interactions could cause the release of contaminants and migration into Clear Creek. If encapsulation is not feasible, mineralized rock will be removed from the project area to an appropriate disposal site.
Ongoing water quality monitoring.	Throughout the study area.	Ongoing changes to water quality of Clear Creek due to implementation of the Proposed Action. This includes impacts resulting from construction and roadway operations.	<ul style="list-style-type: none"> The I-70 Clear Creek water quality monitoring program (conducted 2001-2005) in the Twin Tunnels/Hidden Valley reach will be re-started and operated before, during, and after construction to monitor water quality conditions. The duration of post-construction monitoring will be determined by CDOT. The water quality monitoring program will sample both ambient and runoff event (snowmelt or rainstorm) flows.

* Mitigation is not necessary if impact can be avoided through changes in the design or construction of the Proposed Action (i.e., the activity is avoided).

3.17 Geology

3.17.1 How does the analysis relate to the I-70 PEIS?

The I-70 PEIS (CDOT, 2011b) provided information and analysis on the geologic setting and the geologic hazards present along the corridor. Tier 2 processes involve a more detailed analysis of the geologic hazards present in the project and identify specific mitigation measures that will be required. For alternatives requiring tunneling, the Tier 2 processes will address impacts of blasting activities and the disposal of waste materials. In locations where a strong potential for rockfall or avalanches exists, the Tier 2 processes will consider the options that may be used to avoid or contain debris. The most recent studies for active mitigation strategies will be used during Tier 2, including rockfall fencing and terracing.

3.17.2 What process was followed to analyze the geologic resources?

The study area for geology and soils includes the regional geology, soils, and geologic hazards that are near, underlie, or are located along the project corridor. Geologic conditions present along the I-70 Mountain Corridor were well described in the I-70 PEIS, from information obtained from geologic maps, topographic maps, aerial photographs, U.S. Geological Survey (USGS) reports, Colorado Department of Transportation (CDOT) reports, Colorado Geological Survey publications, and geotechnical consulting reports. This information was supplemented during the Tier 2 process with field reconnaissance, communications with local engineering and planning personnel, and communications with individuals with first-hand knowledge on mine subsidence and mitigation in the Hidden Valley area. Evaluation of existing geologic conditions was based on proximity to the project area, history of occurrence, and impact of occurrence on transportation and mobility.

The erosional susceptibility of the soils is based on mapping and ratings conducted by the Natural Resources Conservation Service (NRCS) and the U.S. Forest Service (USFS). The NRCS provided erodibility groups as well as the soil description. The USFS provided erodibility descriptions in the soil use and management considerations. Using the NRCS and USFS information and known conditions in the Corridor, the generalized descriptions are rated as slight, moderate, or severe susceptibility to erosion. The variation in susceptibility index along the Corridor is highly dependent on the topography, vegetation cover, and the orientation of the slope.

3.17.3 What agencies were involved in this analysis and what are their issues?

The NRCS and USFS provided maps and reports on the soil erosion potential in the study area. NRCS provided soil descriptions, characteristics, and modeling factors. The USFS provided erodibility descriptions and management considerations. Both agencies characterize soil types as slightly, moderately, or severely susceptible to erosion.

3.17.4 What are the geologic resources in the study area?

Geologic units and soil characteristics were assessed within the study area to establish the affected environment for geology and soils. The study area for specific issues related to geology and soils is defined as the area within approximately 100 feet on either side of the Proposed Action. However, when assessing the geology and soil characteristics, it was also necessary to consider geology on a regional basis to understand the mechanisms leading to current geology. The need for a regional review is particularly important to geologic hazards because the hazard could originate from anywhere along a slope, from the base to the ridgeline, throughout the project route.

Topography

Most of the present configuration of the study area is characterized by moderately rugged topographic relief. The mountains to the south and north are deeply incised by Clear Creek and its tributaries. The maximum local relief is about 3,000 feet. The elevation in the study area ranges from slightly over 7,200 feet along Clear Creek to more than 10,000 feet at Santa Fe Mountain to the south of the Twin Tunnels. Slopes are typically steep, averaging approximately 35 degrees (70 percent) in Clear Creek Canyon. Topographic forms are generally influenced by minor faulting, fractures, and zones of weakness in rock. Further influences from Clear Creek, rain, snowmelt, and wind have created deposits of alluvium (stream deposits), talus (rockfall deposits), and alluvial fans (debris flow deposits).

Bedrock

Bedrock is generally well exposed. Outcrops are most abundant on ridges and the sparsely vegetated south-facing slopes. Bedrock in the project areas consist primarily of metamorphic, Precambrian-aged quartz-feldspar gneiss, biotite gneiss, amphibolite, and migmatite. The metamorphic rock is well foliated and trends at a regional strike of about S 75° E with a dip ranging from 35 to 65 degrees to the northeast. Locally, variations in the orientation of the rock structure are attributed to the numerous folds and minor faults along the corridor. Igneous

intrusions of pink granite and pegmatite also reshaped the rock distribution and occur at various locations along the corridor (Tweto and Sims, 1963).

Groundwater

Groundwater was encountered in the pilot bore and is evident in the historic photographs of the original Twin Tunnels construction (Colorado Department of Highways, 1959). During the original construction, flow emanated from a minor fault that was intersected by the tunnel bore at a rate of approximately 1 to 2 gallons per minute, and there is indication that groundwater was encountered in the other portions of the tunnel at an average rate of 1 gallon per minute (Twin Tunnels As-Built Drawings, circa 1959). Recent observations made within the tunnel indicate that groundwater follows a fracture flow pattern within the rockmass and is directly related to precipitation events. Groundwater seepage in the tunnel lining develops immediately during the period of precipitation and dissipates relatively quickly following the event.

Groundwater
Recent observations made within the Twin Tunnels indicate that groundwater follows a fracture flow pattern within the rockmass and is directly related to precipitation events.

Mineralized rock

Small intrusions of porphyritic rock are numerous in the mining district. The district is generally zoned with a large area of gold bearing pyrite-quartz veins in the interior, an intermediate zone of pyrite-quartz veins bearing copper, lead and zinc, minerals, and a peripheral one containing galena-sphalerite-quartz-carbonate veins (Sims, 1989). The veins are typically fill planar fissures (sometimes mapped as “faults”) that strike northeast to east and dip north to northwest at medium angles. The principal vein minerals are pyrite, sphalerite, galena, chalcopyrite, arsenopyrite, tennanite, quartz, and local carbonate minerals.

One of the “faults” identified during the original Twin Tunnels construction is exposed at the surface above the west portals. Original mapping indicated that a zone containing fault gouge, soft seams, platy crushed rock, and some veins of pyrite was encountered in the first 100 to 150 feet of the tunnels. Recent mapping above the west portals confirms that a zone of weak, mineralized rock is present in the area. The zone ranges in thickness from 6 to 12 feet and is composed of fractured, altered, and porphyritic rock. Orientation of the seam appears to be consistent with a seam that was encountered in the

original pilot bore mapping for the Twin Tunnels. Most other veins observed within the project area are rarely more than a foot wide. Mineralized zones are discussed in the [Section 3.18, *Regulated Materials and Solid Waste*](#), and only rockfall potential is discussed here.

Mineral resources

The Idaho Springs mining district represents a succession of gold deposits extending from Idaho Springs, Clear Creek County, to Central City and Black Hawk in Gilpin County. Total production in this district was estimated to be about 1.8 million ounces of gold. The district has an area of about 25 square miles. Gold, silver, copper, lead, zinc, and uranium ores occur in the district, but the area is known primarily for its gold and silver production. The ore deposits



Zone of porphyritic rock above west portals. Note yellow staining on rock and retaining wall.



Rockfall mitigation installed under CDOT Rockfall Program.

are found in veins and stockworks and are genetically related to porphyritic intrusive rocks (Moench and Drake, 1966).

There is no visual evidence, such as glory holes or shallow workings, that high-grade ore bodies were mined within the study area. It is unlikely that gold, silver, or related minerals would be encountered during construction of the proposed improvements.

The Cold Bar Placer mine (Cold Bar Consolidated, 1884) was an underground placer mine located within the Hidden Valley area. Extensive workings are indicated on the 1884 mining claim map but likely only represent a portion of what was actually mined in the area. During construction of the current Hidden Valley Interchange in 1994, three drifts (mine openings) were encountered in the vicinity of the retaining wall along the south side in the interchange and in the area of the west bridge abutment. Some of these drifts are not indicated on the Cold Bar Placer claim map. Other workings are also evident by the numerous subsidence events that occurred in the area until the mid-1990s, when a grouting program was implemented to fill many of the voids.

A strip mine was identified near milepost 241.8 on the 1976 USGS geologic map of the area (Sheridan and Marsh, 1976). Visual evidence of the workings no longer exists today and appears to have been covered by I-70, the chaining area, and the earthen berm located between the highway and Clear Creek.

Geologic hazards

The varied and complex geologic and geomorphic processes have created several zones of instability and marginal subsurface material. Although a natural process, these features can pose a risk to the public either directly by an encounter with the hazard or indirectly through effect of the hazard on the highway, railway, or multi-use trails.

Geologic Hazards
Conditions that may adversely affect the public and/or the Proposed Action include existing geologic hazards (debris flows, unstable slopes creating rockfall and rock slides) and the potential for mine subsidence.

Unstable slope hazard areas. Existing rock slopes along I-70 through the study area generate rock falls that occasionally impact the interstate. Isolated areas in these road cuts, particularly above the west portals of the existing Twin Tunnels, have generated larger and more problematic rockslides. Some of the slides have been of sufficient size to

close portions of I-70 for short periods. As a result of one of these failures, a low-strength fence was damaged between the two portals on the west side of the Twin Tunnels. The fence was replaced by a higher-strength rockfall barrier.

Unstable Slope Hazard Areas
One of the sites with rockfall potential is just above the west portal of the Twin Tunnels.

The highly fractured metamorphic and igneous rocks along the highway are vulnerable to rock fall along many of the existing cut slopes and natural slopes. Rock fall may occur during construction when 1) new slopes cut through adverse rock structure and the boundaries between rock types, weakening the rock, or 2) where cut slopes are subject to construction activities such as blasting. The potential instability of the rock slopes depends on the material strength and the character and geometric relations of discontinuities in the rock mass.

The CDOT Rockfall Program has identified and rated seven unstable slopes along I-70 in the project area with potential for rock fall (including the west Twin Tunnel portals). Details on the locations and ratings for unstable slopes may be found in the Colorado Rockfall Hazard Rating System performed from 1991 to 1994 (Andrew, 1994); ratings were updated as part of the CDOT Rockfall Management Plan.

Debris flows. A debris flow is a flood that incorporates, transports, and deposits so much solid material (such as rock debris, valley fill, bed load, and/or large woody debris) that the solid material is a major component of the event, drastically increasing the destructive power of the flood and the resulting damage. When infrequent, intense rains fall on the hillside and cause flooding, the mountain watersheds can add into the flood waters both inorganic (rocky debris) and organic (woody debris) materials that can increase the destructiveness of the flood on the highway.

Debris flows in the study area occur at a relatively infrequent interval as compared to other locations to the west of the study area. There are several debris flow deposits in the study area; the largest is located along the south slope of the Hidden Valley Interchange.

Mine subsidence. Mine subsidence occurs when a void at depth collapses and causes vertical displacement (settlement) to the surface. Mine subsidence occurs at depth, rather than near the surface, as with collapsing soils. Underground placer mining occurred in the vicinity of the Hidden Valley Interchange in the 1880s, using a drift and pillar technique in which a placer deposit was mined into “chambers” (Tapp, 1981). The original workings stemmed for the Cold Bar Placer mine (Cold Bar Consolidated, 1884),

but other drifts were excavated in the area. Based on observations of the openings that were uncovered during construction of the interchange, many of these drifts were likely unsupported workings, and the few that were supported used timber sets. Subsidence typically occurs relatively soon after mining ceases because the gravel deposits in the placer do not resist stress well. In addition, the pillars were removed in many mines when mining was completed in order to encourage collapse of the void space. Over time, the empty void propagates to the surface creating a collapse feature.

A series of subsurface investigations was conducted by the Colorado Department of Highways (now CDOT) from 1981 to 1996 evaluating the potential for collapse. Investigation methods used both geophysical and exploratory borings to determine the extent of the workings. Over this time, several openings had propagated to the surface until the mid-1990s, when a grouting program was implemented to fill the voids that affect the interstate road base. There has been no reported incidence of subsidence since the grouting program began.

Faults and seismicity

The study area is considered to be in a seismically-inactive area. There are no known active faults either on or adjacent to the I-70 Mountain Corridor, so the potential for surface fault rupture is low.

Soils

Generalized soils from Idaho Springs to the base of Floyd Hill are primarily Resort-Cathedral-Rubble land and Rock outcrop. Cathedral soils typically occur on 30 to 70 percent slopes and ridges primarily derived from weathered mica schist or granite. Resort soils are typically found on 30-60 percent slopes and ridges primarily derived from weathered mica schist or granite. Rubble land occurs on talus slopes at 30 to 60 percent. The rock outcrop is found on 30 to 70 percent slopes and is typically composed of weathered mica schist or granite. All of these soils in the study area are severely susceptible to erosion (NRCS, 2003; USFS, 2008).

3.17.5 How does the No Action affect geologic resources?

Under the No Action, existing problems with slope erosion and geological hazards would continue. Existing hazards such as rockfall, debris flow/mudslides, and mine subsidence may impact the existing facilities. These impacts require ongoing highway maintenance and have the potential to cause roadway closures. New development along the corridor would continue to take place, resulting in more geologic risk from existing steep slopes, erosion, and geologic hazards.

3.17.6 How does the Proposed Action affect geologic resources?

The following sections discuss the impacts to geology as a result of the Proposed Action, including those effects expected during and after construction.

What are the direct effects of the Proposed Action?

The I-70 PEIS indicated that corridor-wide direct impacts on geology are rockfall, (particularly between Silver Plume and Georgetown), increased exposure to rock-fall hazards, and potential landslides at tunnel boring locations. Specifically, the I-70 PEIS notes that from the Twin Tunnels to Floyd Hill, including the bike trail and frontage road (CR 314), the project cuts through rugged terrain with areas of adverse structure and poor rock quality. Rockfall is the most prevalent hazard.

Under the Proposed Action, the widened eastbound tunnel portals would increase the exposure to rockfall, and the amount of erosion would increase slightly during construction due to the widening of the roadway template. The Proposed Action would reduce the risks posed by geologic hazards with the implementation of rockfall mitigation as part of the new portal design and using best management practices (BMPs) during construction to control erosion.

How does the Proposed Action differ with or without a managed lane?

The direct effects to any of the geological resources would be the same with or without the implementation of the managed lane.

What indirect effects are anticipated?

Indirect impacts from geologic hazards could result from operations and maintenance activities, including periodic maintenance of rockfall mitigation features, cleanup of rock slides and debris flows, and potential mine subsidence mitigation.

What effects occur during construction?

Construction activities may increase rock fall hazards temporarily where new slopes intersect either weak rock, or loose or marginally stable slopes, especially in the vicinity of the tunnel portals. These impacts should be limited to the construction period. The Proposed Action would include stabilizing rock slopes and providing rockfall mitigation.

Widening the tunnel under the Proposed Action would create large quantities of waste rock. The waste rock could be used onsite whenever possible for such uses as retaining wall backfill, drainage channels, berms, or as

road base. Excess waste rock would be disposed of offsite, or stockpiled onsite and processed for use in the highway construction.

Constructing the Proposed Action has the potential to increase erosion, especially in the areas where loose soil conditions exist. Erosion also could occur in areas of steep grades where surface water is directed to vulnerable areas, where fill embankments are constructed near loose soil, and where construction occurs along Clear Creek. Areas most susceptible to erosion are located along the I-70 embankment adjacent to Clear Creek.

Effects That Would Likely Occur During Construction

- Increase in rockfall hazards
- Generation of waste rock
- Increase in erosion

3.17.7 What mitigation is needed?

What I-70 PEIS mitigation strategies are relevant?

Relevant mitigation measures identified in the I-70 PEIS to address the effects related to the geologic resources are as follows:

- Incorporate new design features to minimize slope excavation and follow natural topography.
- Use excavation and landscaping techniques to minimize soil loss and reverse existing erosion problems.
- Use rock sculpting, which involves blasting rock by using the existing rock structure to control overbreak and blast damage, to create a more natural-looking cut.
- Use proven techniques (such as rockfall catchments, mesh, cable netting, fences, scaling, and blasting) to address rockfall from cut slope areas.

What mitigation is needed for this project?

CDOT has identified project mitigation for potential impacts on geologic resources that could arise. Table 3-42 and Table 3-43 describe these mitigation measures. Section 3.16, *Water Resources and Water Quality*, presents mitigation measures for erosion and sedimentation. Section 3.18, *Regulated Materials and Solid Waste*, presents mitigation measures for mineralized zones.

Table 3-42. Mitigation Commitments for Permanent Impacts on Geologic Resources

Activity	Location	Impact	Mitigation
New rock cuts and widened tunnel portals.	New rock cuts along I-70 and CR 314.	Exposure to potential rockfall hazards can pose a safety risk to the public. Large failures can cause road closures and increased maintenance.	<ul style="list-style-type: none"> • Incorporate permanent rockfall mitigation during construction and in the design of the new portals. Prior to blasting, the rock mass will be evaluated for the likelihood of rock fall occurring. • Use proven techniques (such as rockfall catchments, mesh, cable netting, fences, scaling, and blasting) to address rockfall from cut slope areas.

Table 3-43. Mitigation Commitments for Temporary Impacts on Geologic Resources During the Construction Period

Activity	Location	Impact	Mitigation
Tunnel portal excavation and construction of new slopes and new retaining walls.	Excavations at proposed fill walls, temporary median walls, tiered cut wall along CR 314, and the Twin Tunnels portals. Fill slopes occur throughout the study area.	Erosion can increase sediment transport through stormwater runoff into Clear Creek.	<ul style="list-style-type: none"> • Manage erosion and surface water away from water sources and ensure BMPs are in place to prevent migration of sediment from waste piles, slopes and excavations. • Implement BMPs for stormwater runoff.
New rock cuts.	New rock cuts along I-70 and CR 314.	Exposure to potential rockfall hazards can pose a safety risk to the public. Large failures during construction can cause road closures and maintenance.	<ul style="list-style-type: none"> • Temporary construction BMPs will be utilized to minimize this potential.

Notes:

1. Mitigation for erosion and sedimentation is also presented in Section 3.16.8, Water Resources and Water Quality.
2. Mitigation for mineralized zones is presented in Section 3.18.7, Regulated Materials and Solid Waste.
3. BMP = best management practices

3.18 Regulated Materials and Solid Waste

3.18.1 How does the analysis relate to the I-70 PEIS?

The following commitments from [Section 3.6](#) of the I-70 PEIS (CDOT, 2011b) regarding regulated materials and solid waste are applicable to this Tier 2 process:

- Involve stakeholders in the discussion of mine waste and regulated materials mitigation and develop specific mitigations and best management practices (BMPs) for each project.
- Consider alignments that avoid hazardous materials.
- Conduct a thorough analysis of the potential disturbance of acid mine drainage and acid rock drainage and recommend construction methods BMPs in areas of mineralized rock.
- Provide a comprehensive listing and description of current regulations for regulated materials, including regulatory requirements for Superfund and historical mining materials.
- Look at road construction as a source of metal loading from disturbance of mineralized veins in further detail and provide mitigation strategies to minimize or reduce metal loads from road construction.
- Provide procedures on identifying, characterizing, and handling waste in the study area. Information on contacting local authorities will also be provided in the event waste is encountered.
- Update information on regulated materials and historical mining.

3.18.2 What process was followed to analyze regulated materials and solid waste?

The study area is generally the area of land within 1 mile of the centerline of I-70 from the East Idaho Springs Interchange to the base of Floyd Hill.

The impact assessment for regulated materials and solid waste potentially affected by the Twin Tunnels project was based on the previous evaluation prepared during completion of the I-70 PEIS. The I-70 PEIS provided an overall assessment of regulated materials and sites that may be encountered during construction. Moreover, the I-70 PEIS evaluation noted several commitments regarding regulated materials, including a discussion and comprehensive evaluation of regulated materials and solid wastes and regulatory requirements. The process used to evaluate regulated materials and solid waste in this Tier 2

evaluation was designed to meet those commitments wherever practical.

To support evaluation of regulated materials and solid waste, a [Phase I Environmental Site Assessment](#) (ESA) was performed in accordance with ASTM E1527-05 “Standard Practice for Environmental Site Assessments: Phase I Environmental Site Assessment Process” (Pinyon, 2012). Additionally, a Limited Phase II ESA was completed, which included collection of soil, water, and lead-paint samples for laboratory analysis. Soil samples were collected during preliminary geotechnical drilling operations, and a mineralized rock sample was collected from near the ground surface above the west portal of the Twin Tunnels. CDOT previously contracted a survey of asbestos-containing materials on two bridge structures proposed for either rehabilitation or demolition (Walsh, 2011a; Walsh, 2011b). The [Twin Tunnels EA Regulated Materials and Solid Waste Technical Memorandum](#) (CDOT, 2012I) was developed for this environmental assessment (EA) that provides detailed information on existing conditions, methodology, analytical data, potential impacts, and mitigation options.

3.18.3 What agencies were involved in this analysis and what are their issues?

Several agencies were involved in this analysis, as noted in the commitments of the I-70 PEIS. The lead agencies coordinated with the: 1) Sediment Control Action Plan (SCAP) committee, 2) Stream and Wetland Ecological Enhancement Program (SWEEP) Committee, and 3) held a coordination meeting among CDOT, U.S. Environmental Protection Agency (EPA), and Colorado Department of Public Health and Environment (CDPHE). The lead agencies provided the SCAP Committee and SWEEP Committee information regarding previous spill locations and the results of subsurface investigation. The SCAP committee provided recommendations for spill and sediment control structure locations. The SWEEP Committee recommended implementing surface water monitoring to document any effects of construction activities in Clear Creek.

EPA and CDPHE reported that the project area is not within any active area of ongoing or planned remediation, and is generally east of the recognized limits of current or formerly mined areas. Therefore, EPA and CDPHE concluded that the project area contains very little mineralization or sulfides (primarily pyrite) that can react with water to create acid drainage. CDOT will comply with any identified permitting requirements that may relate to construction storm water runoff, potential dewatering operations, tunnel discharge, and other issues.

During Project Leadership Team meetings, the City of Idaho Springs expressed concern that tunnel blasting activities



Idaho Springs Wastewater Treatment Plant storage tank area.

could damage the City of Idaho Springs Wastewater Treatment Plant storage tanks located adjacent to Clear Creek and southwest of the west portal of the Twin Tunnels. Of particular concern is the potential that excessive vibration resulting from blasting activities could damage those structures and release untreated wastewater into Clear Creek.

3.18.4 What are the regulated materials and solid waste in the study area?

The I-70 PEIS provided general descriptions of potential regulated materials and solid waste, including but not limited to mining-related sites, located in the project area. While using the information provided in the I-70 PEIS, this Tier 2 evaluation considers site-specific issues and updates resource information.

Regulated materials include hazardous materials, mine wastes, and petroleum products. Regulated materials are transported on the I-70 highway, and may exist at sites within the project vicinity that generate, store, and dispose of these substances, or have been the location of past releases of these substances. Examples of regulated materials are asbestos; lead-based paint; soil or water contaminated with heavy metals such as arsenic, lead, and cadmium; dry-cleaning solvents; and petroleum hydrocarbons (e.g., gasoline and diesel fuels).

Historic mining is included in this discussion of regulated materials because: 1) mining activities are prevalent in the project vicinity, and 2) mine tailings, mine wastes, tunnel drainage, and mineralized rock have the potential to release contaminants before, during and after construction (as described in the I-70 PEIS). The main contaminants of concern related to mining are heavy metals and acid

drainage/runoff. In the project vicinity, the metals arsenic, lead, and cadmium are of particular concern. Encountering contaminants in soils, groundwater, and surface water can complicate construction and impact nearby residents, workers, and the environment if appropriate steps to mitigate and contain them are not taken.

The following conditions were noted during completion of supporting studies:

- Mining and milling activities occurred in the project vicinity from approximately 1859 to the 1980s. It is possible that mine-related wastes are located beneath the roadway on the project, which could be encountered during construction activities. It is likely that mine waste, if encountered, would be difficult to distinguish because it would likely have been mixed with “clean” embankment material beneath the roadway. If this is the case, chemical concentrations would be significantly diluted by those historical processes. Although historical information indicates mine wastes could be located in the project footprint (see [Section 3.17, Geology](#)), analytical testing for a Limited Phase II ESA indicates that mine waste is not located in the sampled areas.

Mine Waste

Analytical testing of sampling conducted in a Limited Phase II investigation indicated mine waste is not located in the areas sampled.

- The Colorado State Patrol (CSP) was contacted regarding records pertaining to response actions for releases that have occurred on I-70. CSP records are only available starting in 1997. A total of 18 responses were noted within the study area on or near I-70. Materials released included diesel fuel, hot asphalt, and carwash soap. Fuel spills were generally in relatively small quantities. Although no additional records were provided, CSP hazardous response crews generally clean these spills up quickly to protect the environment. Review of available information, including database listings and information from the CSP, indicated that additional investigation or remedial activities beyond initial response cleanup were not completed.
- Groundwater currently discharges continuously from the subsurface drainage system underlying the Twin Tunnels. Collected groundwater discharges from two pipes onto the ground surface of a box culvert floor immediately east of the Twin Tunnels, which extends below I-70. Water sampling indicates that this water contains concentrations of metals (including arsenic,



Lead-based paint on I-70 Hidden Valley Bridge over Clear Creek.

iron, lead, manganese, and selenium) that slightly exceed water quality standards. There is no evidence that these detections are the result of mine activities; they are likely the result of natural processes.

- Lead has been identified in paint on components of both the eastbound Hidden Valley Bridge over Clear Creek and the Doghouse Rail Bridge.
- Asbestos has been identified on both bridge structures, which will be either demolished or renovated during construction of this project.

3.18.5 How does the No Action affect regulated materials and solid waste?

It is possible that the No Action would lead to some degree of interaction with regulated materials or solid waste although those interactions are likely to be limited. For example, at sites where potential mine waste is encountered, lead paint is identified (e.g., the bridge at Floyd Hill or other painted surfaces), residual spill material, or spill sites on I-70. It is likely that spills resulting from traffic accidents and crashes would continue to be a problem. Groundwater intercepted and collected in drains underlying the Twin Tunnels, which flows through two discharge pipes (that drain onto the ground surface in the box culvert, then into groundwater), is expected to continue.

3.18.6 How does the Proposed Action Alternative affect regulated materials and solid waste?

The I-70 PEIS indicated that construction activities would increase the likelihood of encountering existing and unknown contamination, such as tailings or contaminated

water from past mining activities. Additionally, the I-70 PEIS noted that the transport of hazardous materials and potential for accident spills in the I-70 Mountain Corridor is a concern, and that curve safety and spill plan improvements would reduce the risk of spills. The conclusions of this Tier 2 process analysis are that the potential to encounter mine waste is low. Additionally, the Proposed Action will implement safety improvements and may include hazardous spill containment structures to minimize potential for and effects of hazardous spills.

The following sections discuss the impacts to regulated materials and solid waste as a result of the Proposed Action, including those effects expected during and after construction. The analysis considers the effects of the Proposed Action including a managed lane and two general purpose lanes, and effects with three general purpose lanes and no managed lane.

What are the direct effects of the Proposed Action?

Direct impacts to regulated materials and solid waste associated with the Proposed Action would occur during construction, as discussed below. The direct effect of encountering mine wastes or mineralized rock is not only evident during construction, but could also cause a direct effect on water quality by increasing the possibility that these disturbances, if not properly managed, could cause a transport of pollutants through wind dispersion, leaching, and drainage. However, information collected in support of this project indicates that the potential to encounter mine wastes is low.

Design of the Proposed Action would also include assessment of hazardous spill containment structures along the interstate in key areas where high accident rates have been reported, and where spills have occurred. Those structures would be designed to retain spilled materials, in particular fuel, to aid in ease and effectiveness of cleanup, and to reduce the potential that these materials will enter Clear Creek. Further discussion is presented in [Section 3.16, Water Resources and Water Quality](#).

How does the Proposed Action differ with or without a managed lane?

The Proposed Action would result in the same impacts on regulated materials and solid waste with or without a managed lane.

What indirect effects are anticipated?

The Proposed Action would allow increased truck transport along I-70, which could cause additional spills on the interstate. However, the Proposed Action would improve safety, decreasing the potential for crashes by 20 to 35 percent over the No Action and, thus, decreasing the

potential for spills. Therefore, these two issues tend to offset each other, as described in the I-70 PEIS.

What effects occur during construction?

The Proposed Action would require construction in areas where potential mine wastes may be located, and on bridges where lead-based paint has been identified.

- Wider roadway profiles increase the likelihood that mine wastes would be encountered due to increased construction footprints in cut-and-fill areas. However, based on a limited number of borings advanced, and a limited number of soil samples collected and analyzed, mine waste has not been identified in the subsurface of the primary construction areas within the roadway.
- It is possible that incidental spills of fuels could occur during construction during equipment fueling and/or maintenance activities. The Proposed Action would also likely use regulated materials during construction, in particular petroleum products. Excessive vibration resulting from blasting activities could damage underground storage tanks associated with the Idaho Springs Wastewater Treatment Plant without appropriate mitigation measures in place.
- Construction of the expanded bore of the Twin Tunnels may change the rate of discharge and/or chemistry of groundwater into the box culvert east of the Twin

The proposed action would improve safety, decreasing the potential for crashes by 20 to 35 percent, thereby decreasing the potential for spills.

Tunnels. It is not clear what those effects would be; however, it is possible that a new, more impermeable tunnel liner would preclude drainage, or it is possible that additional surface area could increase drainage. Under either of these scenarios, the chemistry of the water may also change with time.

3.18.7 What mitigation is needed?

What I-70 PEIS mitigation strategies are relevant?

Many of the [Tier 2 mitigation strategies](#) listed in the I-70 PEIS are relevant to this project. They include strategies for management, storage, and handling of mine waste, tailings materials, contaminated soils, and groundwater; minimization of property acquisitions and disturbance of mine waste and tailings materials; and minimization of impacts on Clear Creek.

What mitigation is needed for this project?

CDOT has identified project mitigation for potential impacts from regulated materials and solid waste. Table 3-44 describes these mitigation measures.

Impacts from regulated materials and solid waste are anticipated during construction, and not as a permanent result of the Proposed Action; therefore, no permanent mitigation is required.

[Section 3.16, Water Resources and Water Quality](#), includes measures for mitigating construction impacts on water quality. Construction impacts from regulated materials and solid waste will be mitigated by the measures described in Table 3-44.



Box culvert under I-70, east of Twin Tunnels (looking south across I-70 toward Clear Creek).

Table 3-44. Mitigation Commitments for Temporary Impacts from Regulated Materials and Solid Waste During the Construction Period

Activity	Location	Impact	Mitigation*
Construction, including excavation associated with retaining walls and bridge abutments.	Throughout the study area.	Potential mine wastes located within areas of excavation.	<ul style="list-style-type: none"> • Complete a project-specific Materials Management Plan that details site-specific standard operating procedures regarding the identification, sampling, handling, and disposal of mine-related wastes that could be encountered during construction of this project. • Complete a Health and Safety Plan to address potential mine wastes that could be uncovered during construction. • Implement best management practices as part of a Stormwater Management Plan to prevent potential mine wastes being exposed in the air (dust suppression) or impacting surface waters, in particular Clear Creek. • Workers on this project must follow CDOT Specification 250 – Environmental, Health, and Safety Management during excavation activities at this site.
Construction and maintenance of Twin Tunnels.	Groundwater drainage discharging into box culvert east of Twin Tunnels.	Groundwater containing naturally occurring metals that exceeds surface water standards continues to drain. The expanded bore may cause a change in discharge rate and chemistry of water.	<ul style="list-style-type: none"> • Seek opportunities to utilize adaptive mitigation during design to eliminate daylight discharge, thus avoiding permitting. • If discharge cannot be eliminated, permitting through the CDPHE may be required, including a CDPHE Subterranean Permit.
Exposure of mineralized rock.	Tunnel excavation and subsequent handling of excavated rock.	Impacts to water resources due to the introduction of mineralized materials.	<ul style="list-style-type: none"> • Encapsulate mineralized rock generated during blasting activities beneath the roadway pavement, away from groundwater, to prevent chemical reactions that could dissolve contaminants into the water. Such interactions could cause the release of contaminants and migration into Clear Creek. If encapsulation is not feasible, mineralized rock will be removed from the project area to an appropriate disposal site.
Blasting of Twin Tunnels.	Twin Tunnels expanded bore.	Excessive vibration resulting from blasting activities could damage underground storage tanks associated with the Idaho Springs Wastewater Treatment Plant.	<ul style="list-style-type: none"> • Contractor will comply with project specifications for vibration thresholds at adjacent structures and complete appropriate monitoring during blasting activities to evaluate effects. Adjustments to blasting program may be necessary to eliminate impacts to those buried facilities.

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Table 3-44. Mitigation Commitments for Temporary Impacts from Regulated Materials and Solid Waste During the Construction Period

Activity	Location	Impact	Mitigation*
Demolition or rehabilitation of bridge structures.	Clear Creek bridge west of Hidden Valley Interchange and Doghouse Rail Bridge.	Lead-based paint located on bridge components encountered by workers could cause adverse health effect.	<ul style="list-style-type: none"> • Notify the contractor that lead-based paint is located on the Hidden Valley Bridge over Clear Creek and the Doghouse Rail Bridge. • If possible, components that will require demolition should be removed carefully and properly recycled. • The contractor will avoid sanding, cutting, burning, or otherwise causing the release of lead from paint on these structures when possible. If this is not possible, the lead must be abated properly. • U.S. Department of Labor Occupational Safety and Health Administration (OSHA) Regulation 1926.62 should be consulted for worker protection prior to work on these structures. Worker health and safety precautions in compliance with OSHA must be followed to limit worker exposure to lead. Work should be completed on these structures in accordance with CDOT Specification 250.04, as well as the Materials Management Plan and Health and Safety Plan. • Workers on this project must follow CDOT Specification 250 – Environmental, Health, and Safety Management during excavation activities at this site.
Demolition or rehabilitation of bridge structures.	Clear Creek bridge west of Hidden Valley Interchange and Doghouse Rail Bridge.	Asbestos-containing materials located on bridge components encountered by workers.	<ul style="list-style-type: none"> • Any disturbance to regulated asbestos-containing materials will require proper abatement in accordance with CDPHE and EPA regulations prior to disturbance of that material. Non-regulated asbestos-containing materials are treated like any other solid waste as long as the disturbance does not render it friable. • Comply with CDOT Specification 250.07 – Asbestos-Containing Material Management.

* Mitigation is not necessary if impact can be avoided through changes in the design or construction of the Proposed Action (i.e., the activity is avoided).

3.19 Energy

3.19.1 How does the analysis relate to the I-70 PEIS?

The following commitments from [Section 3.16](#) of the I-70 PEIS (CDOT, 2011b) regarding energy are applicable to this Tier 2 process:

- The Colorado Department of Transportation (CDOT) will conduct more detailed analysis of construction and permanent impacts during future project-specific Tier 2 processes.
- The lead agencies will develop specific best management practices for each Tier 2 process

The I-70 PEIS provided a comparative operational energy analysis of corridor alternatives; this analysis builds on the I-70 PEIS by conducting a detailed energy analysis specific to the Proposed Action. The energy analysis for Tier 2 includes additional construction and operational analysis based on the Proposed Action. Tier 2 further considers power sources and mixes of energy supply types (renewable/alternative energy, fossil fuel, and other future concepts), as well as development of best management practices for the Proposed Action.

3.19.2 What process was followed to analyze energy resources?

The study area for the energy analysis extends between Empire Junction (milepost 232) and the top of Floyd Hill (milepost 248). This is the primary area that realizes a reduction in congestion due to the Proposed Action.

The daily energy consumption for each of the alternatives is measured with a traditional energy unit, British thermal units (Btu). To express the energy consumption in more common terms, the results are provided in equivalents of gallons of gasoline. Fossil fuels are analyzed for energy resources, because in 2012 they are the predominant source for operational and construction energy. Alternative and renewable energy sources may provide operational fuel by 2035 and into the future.

Operational energy consumption is directly proportional to the number of vehicle miles of travel (VMT). The energy calculation depends on the traffic variables of vehicle volume and distance traveled, vehicle speed, vehicle type, and average fuel economy. The project's traffic modeling provides vehicle volumes by speed and vehicle type, for the year 2035. Information was obtained from the United States Department of Energy *Transportation Energy Data Book: Edition 30* (Oak Ridge National Laboratory, 2011). The operational energy consumption is calculated for both

the eastbound and westbound directions of travel in the study area, for both weekday and weekend conditions. The average weekday analysis is for a 24-hour period. The weekend conditions are analyzed for a typical winter Sunday, between 9:00 a.m. and 11:00 p.m., during the hours of highest traffic volumes.

The daily operational energy consumption during construction was prepared with the same method. Construction energy usage is described qualitatively.

Since energy consumption directly contributes to the emission of greenhouse gases (GHG), this section also provides an analysis of GHG emissions for the alternatives. Carbon dioxide (CO₂), methane, and nitrous oxide are the primary GHG emissions resulting from fuel consumption. The GHG emissions are reported in terms of CO₂ equivalents and are based on technical data from the technical guidance, *Emission Factors for Greenhouse Gas Inventories* (EPA, 2011). The [Twin Tunnels EA Energy Resources Technical Memorandum](#) (CDOT, 2012m) provides detailed information on the methodology and results of the energy analysis.

3.19.3 What agencies were involved in this analysis and what are their issues?

No formal coordination occurred with agencies about energy issues or GHG emissions in the corridor. However, as noted in the methodology section, information from the U.S. Department of Energy and EPA was used for energy consumption and GHG emission calculations.

The importance of energy efficiency and the reduction of GHG emissions is recognized by the State of Colorado. In 2011, Colorado produced a "Colorado Energy Smart Transportation Initiative," which outlines a framework for considering energy efficiency and GHG emissions in transportation decision-making. This framework includes recommendations to consider energy and GHG emissions in transportation infrastructure planning and project development.

3.19.4 What are the energy resources in the study area?

In 2010, on an average weekday, eastbound and westbound traffic volumes are relatively balanced. Energy consumption is equivalent to 11,900 gallons of gasoline in the eastbound direction, and 11,300 gallons in the westbound direction for a total consumption of 23,200 gallons of gasoline (see [Table 3-45](#)). In 2010, on a typical winter Sunday, eastbound traffic is greater than westbound traffic, and eastbound traffic is congested for much of the analysis period. Energy consumption is equivalent to 20,100 gallons of

Table 3-45. Energy Resources in 2010

Direction	Weekday		Weekend Period	
	Gasoline Consumption (gals of gasoline equivalents)	Greenhouse Gas Emissions (kg of CO ₂ equivalents)	Gasoline Consumption (gals of gasoline equivalents)	Greenhouse Gas Emissions (kg of CO ₂ equivalents)
Eastbound	11,900	109,000	20,100	183,000
Westbound	11,300	103,000	7,900	73,000
Total	23,200	212,000	28,000	256,000
gals = gallons kg = kilograms				

gasoline in the eastbound direction, and 7,900 gallons in the westbound direction for a total consumption of 28,000 gallons of gasoline.

Regarding GHG emissions in 2010 for an average weekday, 212,000 kilograms (kg) of CO₂ equivalents are emitted by vehicles traveling through the study area. On a typical winter Sunday in 2010, 256,000 kg of CO₂ equivalents are emitted by vehicles traveling through the study area.

3.19.5 How does the No Action affect energy resources?

On an average weekday, traffic volumes increase in 2035 under the No Action compared to 2010. The energy consumption and GHG emissions reflect this by increasing 41 percent over 2010 levels. On a typical winter Sunday for the 2035 No Action, growth in traffic volume from 2010 is constrained by capacity. For this reason, the energy consumption and GHG emissions increase only 17 percent compared to existing conditions in 2010. Table 3-46 summarizes weekday and weekend energy consumption and GHG emissions for the No Action.

3.19.6 How does the Proposed Action affect energy resources?

The I-70 PEIS provided a comparative operational energy analysis of corridor alternatives and committed to conducting project-specific analysis of construction and permanent impacts for Tier 2 processes. The Proposed Action with a managed lane would result in lower energy usage on a typical winter Sunday in 2035 than the No Action and than the Proposed Action with no managed lane. Because the managed lane would not operate on weekdays in 2035, the Proposed Action would have the same energy consumption on weekdays regardless of operating scenario, and this would also be the same as the No Action condition.

The following sections discuss the energy use and GHG emissions resulting from the Proposed Action, including impacts during and after construction. The analysis considers the effects of the Proposed Action including a managed lane and two general purpose lanes, and effects with three general purpose lanes and no managed lane.

Table 3-46. 2035 No Action Energy Resources

Direction	Weekday		Weekend Period	
	Gasoline Consumption (gals of gasoline equivalents)	Greenhouse Gas Emissions (kg of CO ₂ equivalents)	Gasoline Consumption (gals of gasoline equivalents)	Greenhouse Gas Emissions (kg of CO ₂ equivalents)
Eastbound	16,700	153,000	23,800	217,000
Westbound	16,000	146,000	9,000	83,000
Total	32,700	299,000	32,800	300,000
gals = gallons kg = kilograms				

What are the direct effects of the Proposed Action with a managed lane?

The Proposed Action with one managed lane on a typical winter Sunday would improve travel speeds for the eastbound direction through the study area. Vehicles using the managed lane would be able to travel at a higher speed than the general purpose lanes, resulting in overall lower energy consumption and GHG emissions. As a result, the energy consumption and GHG emissions on a Sunday in 2035 would be lower for the Proposed Action with a managed lane than the No Action. The managed lane would not operate on weekdays in 2035, and weekday eastbound and westbound energy consumption and GHG emissions would be the same as No Action conditions. Table 3-47 summarizes weekday and weekend energy consumption and GHG emissions for the Proposed Action with a managed lane.

The effects of the two roadway cross section options under consideration for the Proposed Action would not impact energy usage or GHG emissions differently.

In the future, a variety of changes could affect the consumption of energy in the project area. This document

acknowledges the uncertainties that these future potential transformations introduce into the energy analysis. These potential changes include:

- Vehicle technology
- Worldwide petroleum supply and demand, fuel costs, future public policy regarding energy use, and environmental controls
- Future public policy regarding GHG emissions
- The implementation of an Advanced Guideway System transit system in the corridor.

How does the Proposed Action differ with or without a managed lane?

The Proposed Action with three general purpose lanes and no managed lane on a typical winter Sunday would have slightly better traffic conditions than the No Action, but not as good as the alternative with a managed lane. Because the managed lane would not operate on weekdays in 2035, the Proposed Action would have the same energy consumption on weekdays regardless of operating scenario, and this energy consumption would also be the same as No Action conditions. Table 3-48 summarizes weekday and

Table 3-47. 2035 Proposed Action with a Managed Lane Energy Resources

Direction	Weekday		Weekend Period	
	Gasoline Consumption (gals of gasoline equivalents)	Greenhouse Gas Emissions (kg of CO ₂ equivalents)	Gasoline Consumption (gals of gasoline equivalents)	Greenhouse Gas Emissions (kg of CO ₂ equivalents)
Eastbound	16,700	153,000	22,500	206,000
Westbound	16,000	146,000	9,000	82,000
Total	32,700	299,000	31,500	288,000
gals = gallons		kg = kilograms		

Table 3-48. 2035 Proposed Action with Three General Purpose Lanes Energy Resources

Direction	Weekday		Weekend Period	
	Gasoline Consumption (gals of gasoline equivalents)	Greenhouse Gas Emissions (kg of CO ₂ equivalents)	Gasoline Consumption (gals of gasoline equivalents)	Greenhouse Gas Emissions (kg of CO ₂ equivalents)
Eastbound	16,700	153,000	23,700	216,000
Westbound	16,000	146,000	9,000	83,000
Total	32,700	299,000	32,700	299,000
gals = gallons		kg = kilograms		

weekend energy consumption and GHG emissions for the Proposed Action with a managed lane.

What indirect effects are anticipated?

The reduction in crashes anticipated due to the Proposed Action with or without the managed lane would reduce energy consumption compared to the No Action, because accidents result in energy consumption due to operation of emergency response equipment, traffic vehicle delay, and energy to repair motor vehicles. In addition, the curve straightening and tunnel widening would allow motorists to operate vehicles more efficiently, thus reducing energy consumption and GHG emissions.

The managed lane of the Proposed Action would provide a reliable and faster travel time compared to the alternative with no managed lane. An increase in carpooling and bus use could occur because of this benefit of the managed lane, thus reducing VMT. The managed lane would also provide a more reliable travel option for emergency vehicles, thus reducing energy consumption by emergency responders. As traffic demand grows beyond 2035 levels, the managed lane of the Proposed Action would continue to provide a reliable travel time, thus providing energy consumption benefits into the future.

What effects occur during construction?

Energy consumption and GHG emissions would be higher than existing conditions during the period of construction. On an average weekday, eastbound traffic would travel a slightly longer distance at slow speeds on the detour. Periodically during construction on weekdays, both eastbound and westbound traffic lanes would have short-term closures while blasting occurs in the tunnel. Idling of traffic during these delays would result in additional energy consumption and GHG emissions.

During the period of construction on a typical Sunday, eastbound traffic levels would be lower than existing conditions in 2010. The eastbound traffic would travel a slightly longer distance at slow speeds on the detour. Table 3-49 summarizes weekday and weekend energy consumption and GHG emissions for the construction period during operation of the detour.

Construction energy would be required for processing raw materials and operating equipment to build the Proposed Action. Energy would be consumed for onsite construction activity (such as tunnel widening, bridge construction, and road widening). Energy would be consumed for offsite manufacture of pavement and bridge components. Transportation energy would be required to haul tunnel detritus and to deliver materials to the construction site.

3.19.7 What mitigation is needed?

What I-70 PEIS mitigation strategies are relevant?

[Relevant strategies](#) listed in the I-70 PEIS for reducing operational energy consumption focus on maintenance activities and are listed in Table 3-50. The I-70 PEIS discussed many strategies to reduce energy consumption during construction, which have been incorporated into the mitigation commitments in Table 3-51.

What mitigation is needed for this project?

CDOT has identified project mitigation for reducing energy consumption and GHG emissions from future travel on I-70 and construction activities for the Proposed Action. Table 3-50 and Table 3-51 describe these mitigation measures.

Table 3-49. Construction Energy Resources

Direction	Weekday		Weekend Period	
	Gasoline Consumption (gals of gasoline equivalents)	Greenhouse Gas Emissions (kg of CO ₂ equivalents)	Gasoline Consumption (gals of gasoline equivalents)	Greenhouse Gas Emissions (kg of CO ₂ equivalents)
Eastbound	12,200	111,000	19,200	175,000
Westbound	11,300	103,000	7,900	72,000
Total	23,500	214,000	27,100	247,000
gals = gallons		kg = kilograms		

Table 3-50. Mitigation Commitments for Permanent Impacts Regarding Energy Consumption and GHG Emissions

Activity	Location	Impact	Mitigation*
Maintenance	Project area	Fuel consumption and GHG emissions due to idling vehicles	<ul style="list-style-type: none"> CDOT will conduct maintenance activities when feasible during periods of reduced traffic volumes to reduce idling vehicles.
Maintenance	Project area	Fuel consumption and GHG emissions due to maintenance vehicles and equipment	<ul style="list-style-type: none"> CDOT will keep its maintenance equipment well-maintained and will use cleaner fuels, such as low-sulfur diesel, when possible.

* Mitigation is not necessary if impact can be avoided through changes in the design or construction of the Proposed Action (i.e., the activity is avoided).
 GHG = Greenhouse Gas

Table 3-51. Mitigation Commitments for Temporary Impacts Regarding Energy Consumption During the Construction Period

Activity	Location	Impact	Mitigation*
Operation of construction equipment.	Project area and staging areas.	<p>Fuel consumption and GHG emissions.</p> <p>Fuel consumption and GHG emissions due to poorly performing construction equipment.</p> <p>Fuel consumption and GHG emissions due to idling of construction equipment.</p>	<ul style="list-style-type: none"> CDOT will require the contractor to use the cleanest fuels available at the time in construction equipment and construction vehicles to reduce emissions. CDOT will encourage the contractor to use fuel-efficient construction vehicles (for example, low sulfur fuel, biodiesel, or hybrid technologies). CDOT will require the contractor to keep construction equipment well maintained. CDOT will require the contractor to prepare a cost/benefit analysis on retrofitting construction vehicles and equipment to reduce emissions and plan to minimize the idling of construction equipment.
Commuting of construction workers.	Project area and staging areas.	VMT due to workers commuting to construction staging areas.	<ul style="list-style-type: none"> CDOT will require the contractor to prepare a plan indicating where construction workers will park their personal vehicles and how they will shuttle or otherwise efficiently be transported to and from the work site to begin and end their shifts.
Travel between project area and staging areas.	Project area and staging areas.	Construction equipment VMT.	<ul style="list-style-type: none"> Staging areas will be located as close as possible to the project area.
Hauling of construction materials and detritus.	Surrounding the project area.	Construction equipment VMT.	<ul style="list-style-type: none"> CDOT will encourage the use of closest source for aggregates and other materials, and the closest location for unloading of tunnel detritus.

(continued on next page)

*(continued from previous page)***Table 3-51. Mitigation Commitments for Temporary Impacts Regarding Energy Consumption During the Construction Period**

Activity	Location	Impact	Mitigation*
Production of construction material.	Project area and staging areas.	Fuel consumption and GHG emissions.	<ul style="list-style-type: none"> • CDOT will encourage use of alternative fuels and asphalt binders.
Traffic management during construction.	I-70 approaching project area from east or west.	Fuel consumption and GHG emissions due to idling vehicles.	<ul style="list-style-type: none"> • CDOT will implement traffic management techniques that minimize motorist delays and vehicle idling (see mitigation measures in Section 3.1, <i>Transportation and Safety</i>).
Maintenance.	Project area.	Fuel consumption and GHG emissions due to idling vehicles.	<ul style="list-style-type: none"> • CDOT will conduct maintenance activities when feasible during periods of reduced traffic volumes to reduce idling vehicles.
* Mitigation is not necessary if impact can be avoided through changes in the design or construction of the Proposed Action (i.e., the activity is avoided).			

3.20 Cumulative Impacts

Federal regulations define a cumulative impact as

The impact on the environment which results from the incremental impact of the action when added to other past, present, and reasonably foreseeable future actions regardless of what agency (federal or non-federal) or person undertakes such other actions. Cumulative impacts can result from individually minor but collectively significant actions taking place over a period of time. (Title 40 of the Code of Federal Regulations Part 1508.7)

This section analyzes the cumulative impacts of the No Action and the Proposed Action when added to other past, present, and reasonably foreseeable future actions.

3.20.1 How does the analysis relate to the I-70 PEIS?

The I-70 PEIS (CDOT, 2011b) committed to conducting specific additional analysis and coordination regarding cumulative impacts during Tier 2 process. The intent of cumulative impacts analyses performed for Tier 2 processes is to focus on those environmental resources studied that are of most concern in the particular study area and watershed. The following commitments from the I-70 PEIS are applicable to this Tier 2 process:

- Update impacts information based on greater detail and much more localized resource information
- Revise study area boundaries, as necessary
- Conduct detailed studies to assess effects to historic properties
- Develop interagency cumulative impact mitigation plans through regional coordination and in conjunction with the implementation plan for the I-70 PEIS Preferred Alternative

The cumulative impacts analysis contained in Chapter 4 of the I-70 PEIS primarily focused on cumulative impacts related to induced growth from the transportation improvement alternatives evaluated in the document. Clear Creek County was not anticipated to experience a measurable amount of induced growth, partly because of topographic constraints. Therefore, many of the cumulative impacts identified for other portions of the I-70 Mountain Corridor including wetlands, recreation resources, and land use, were not anticipated within the Clear Creek Watershed. The cumulative impacts that were identified for the Clear Creek watershed were associated with additional impact to resources that were impacted previously by construction of the I-70 Mountain Corridor. These identified cumulative impacts included further reductions in wildlife

habitat, continued channelization of Clear Creek, additional visual impacts, and impact to historic properties.

3.20.2 What process was followed to analyze cumulative impacts?

The project team reviewed information from the I-70 PEIS, scoping input received from agencies and the public, actions taken by others, and determined the overall health of each resource within the cumulative study area defined for each resource. Resource analysts reviewed the environmental impacts of other past, present, and reasonably foreseeable projects and plans (which includes the No Action), the impacts of the Twin Tunnels Proposed Action, and determined whether cumulative impacts could occur. If the Proposed Action's incremental contribution to cumulative impacts on a resource is considerable, options for avoiding or mitigating the project's contribution to cumulative impacts were developed.

The geographic scope of the study area for cumulative impacts varies by resource. The study area for social resources includes Clear Creek County. The study area for natural resources comprises the Clear Creek watershed. The study area for air quality is the Clear Creek Valley, as the mountainous terrain limits the ability of emissions in one location to affect other locations in the county.

The time frame for the cumulative impacts analysis extends back to the 1850s, when Clear Creek County communities established around mining operations during the gold and silver rush, and extends to 2035.

The project team obtained data on past, present, and reasonably foreseeable future projects from discussions with Clear Creek County and Idaho Springs; project and plan information produced by the county and the city; and plans from CDOT, U.S. Forest Service (USFS), Colorado Parks and Wildlife (CPW), and the Denver Regional Council of Governments (DRCOG).

3.20.3 What are the past, present, and reasonably foreseeable future actions affecting the study area?

What past and present actions contribute to the context of the study area?

The history of Clear Creek County is centered on human interaction with the natural environment and its resources, and is dominated by mining and tourism. The influences of mining history and settlement remain evident to this day throughout the county. Communities in Clear Creek County were established during the Colorado gold and silver rush that began in 1858 with placer mining and later shifted to hardrock mining.

Mining and milling activities led to changes in the natural environment of Clear Creek County. The placer mines tore up the creek bottoms and bars in the creeks while the hardrock mines and mills often dumped waste materials directly into the waterways. The need for fuel led to clear-cutting many of the neighboring forests and, when combined with the mining and milling, caused severe degradation of local water supplies and soils.

Mining continued into the early twentieth century until rising production costs and decreases in mineable deposits curtailed mining activity. Mills, such as the Argo in Idaho Springs, sat idle as the age of gold and silver declined in Clear Creek County. As shown in Figure 3-27, community populations reached their peak from 1870 to 1900 during the mining boom and then declined sharply as gold and silver resources were depleted. The county's population reached a low of a little more than 2,000 in 1930. Clear Creek County and community populations began to swing upward again during the early 1960s with the completion of I-70 interchanges, tunnels, and highway through Clear Creek County. County population exceeded the mining boom era population in 2000. Since the mining boom, Clear Creek County's economic base has been tied more heavily to recreation and tourism.

The two largest communities within the county today are the Town of Georgetown and the City of Idaho Springs. Although their foundations arose from mining settlements, the growth of tourism and recreation in communities

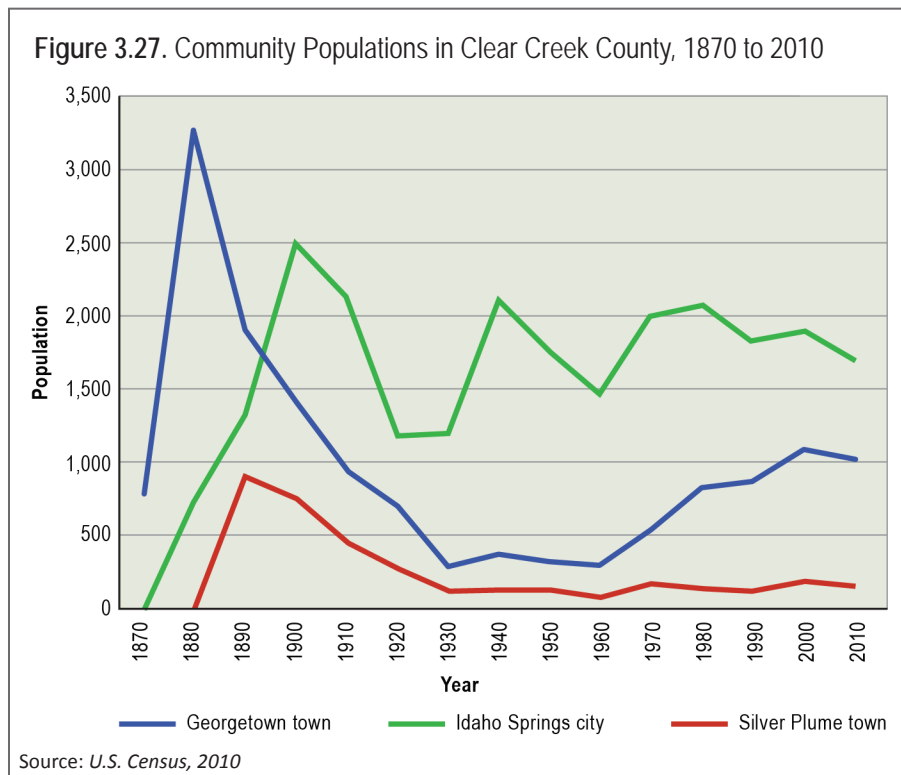
throughout Clear Creek County can be traced back as early as the 1860s, when rail companies published guides, offered special fares, and tried other ways to get people onto the trains for vacations. Today, the tourism industry plays a vital role in Clear Creek County, providing more jobs and personal income than any other industry. Mining activities, such as the Henderson molybdenum mine, continue to be a substantial component of the local economy. Mining is the second largest employer in Clear Creek County.

The history of development in the county has affected water quality, stream morphology (that is, the shape of a river channel and how it changes over time), and biological resources. The construction of I-70 through the county started in the 1960s and used cut-and-fill methods through mineral deposits and mine waste piles in the Clear Creek valley. This created the potential for pollutants, notably metals, to enter Clear Creek from stormwater runoff. Construction of I-70 has caused up to 35 percent of the stream channelization in the Clear Creek watershed. In Lower Clear Creek between Empire Junction and the I-70/US 6 Interchange, Clear Creek is constrained in a narrow canyon, and the construction of US 6, US 40, and I-70 has further channelized the stream, constricting it on both sides in many locations. Winter maintenance on I-70 and other roads throughout the county contributes sand and de-icing chemicals to highway runoff, impairing water quality.

Clear Creek County is located within the Southern Rockies Ecoregion, an ecological network of lands through

portions of Wyoming, Colorado, and New Mexico. Community and transportation development throughout the Southern Rockies Ecoregion, including Clear Creek County, have led to the loss and decline of native species, along with invasion by exotic plants and animal species; the loss and degradation of terrestrial and aquatic ecosystems; and the loss and fragmentation of wildlife habitat.

Modern tourism and recreation activities in Clear Creek County have led to increased preservation of open space and ongoing development of a greenway along Clear Creek that links communities together and ultimately will become part of a recreational corridor linking Denver's Platte River Greenway to the Continental Divide Scenic Trail.



Between 2000 and 2010, Clear Creek County experienced a decrease in total population from 9,322 to 9,088, according to the 2010 U.S. Census. Data from the Colorado Department of Local Affairs (DOLA, 2010) forecast the population in Clear Creek County will begin growing again by 2015 and will reach a population of 14,086 in 2035, an increase of approximately 55 percent. DOLA data for year 2010 estimate 4,428 jobs in the county and an unemployment rate of 8.5 percent. By 2035, jobs are estimated to increase by 24 percent to a total of 5,498, with unemployment dropping to 4.9 percent.

What reasonably foreseeable future actions were considered?

The project team considered reasonably foreseeable future actions that include water quality management and improvement plans, resource management plans, development planned for the near term, master plans to accommodate long-term development, and transportation projects. Generally, projects are reasonably foreseeable if: 1) project applications or entitlements or construction are pending with a government agency, 2) the project is included in an agency's budget or capital improvement program, 3) the project is a foreseeable future phase of an existing project, or 4) the project would likely occur within the 2035 planning horizon. A list of these projects within Clear Creek County is available in [Appendix E](#), Cumulative Analysis Project List, and the projects are summarized below. It should be noted that cumulative impacts for natural resources analyzed potential effects within the Clear Creek watershed, which is a much larger area. For these resources, additional information on reasonably foreseeable projects as documented in the I-70 PEIS was also considered.

Water quality plans. Future actions affecting water quality in the Clear Creek watershed include the following:

- Clear Creek Sediment Control Action Plan, to address roadway maintenance and natural erosion
- Installation of a bulkhead system to control contaminated flow from the Argo Tunnel prior to its treatment and release into Clear Creek
- Beaver Brook Watershed Management Plan, to manage recreation and natural resources in this watershed

Other resource plans. Other resource management plans in Clear Creek County include a Noxious Weed

Management Plan to control noxious weeds in the county, a Community Wildfire Protection Plan to reduce wildfire threats, and a Cultural Resources Management Plan to manage cultural resources on a county-wide basis.

U.S. Forest Service plans. The USFS has plans for several small projects in Clear Creek County, including a new electric power distribution line in the Squaw Pass area, communication tower expansion to improve emergency services, tree planting in developed recreation sites, and new habitat for boreal toads.

Development plans. No substantial future development projects are currently planned or funded in the county. However, the county has rezoned land surrounding the I-70 interchange in Bakerville to accommodate future commercial development of up to 5,000 square feet and trailhead parking and restrooms. The County has received preliminary plans for a Renewable Energy Theme Park south of Clear Creek near the Twin Tunnels on the site of the old Gem Power Plant. It is not clear when this project may proceed. Master plans, including the Idaho Springs Comprehensive Plan, Clear Creek County Master Plan, Open Space Plan, and Greenway Plan, were also considered in the assessment of cumulative impacts.

Transportation projects. Future transportation projects considered are listed below. It should be noted that only the funded components of the I-70 Mountain Corridor PEIS Preferred Alternative are considered reasonably foreseeable for the purposes of this cumulative analysis.

- Frontage Road Phase 1 reconstruction of CR 314 between old US 40 and the Hidden Valley Interchange
- Addition of auxiliary lane on eastbound I-70 from US 6 on-ramp (milepost 216.7) to Herman's Gulch off-ramp (milepost 218.4)
- Safety improvements on SH 119 and US 6 from Black Hawk to US 40
- Paving of Guanella Pass Road from US 285 to Georgetown
- Widening of US 285 from Conifer to Bailey
- Wildlife mitigation measures along I-70 at Floyd Hill to prevent animal vehicle collisions
- Bike lane and shoulder addition to Squaw Pass Road
- Reconstruction of the I-70/US 40 Interchange at Empire Junction

- Various paving and resurfacing projects throughout the county
- Advanced Guideway System (AGS) feasibility study¹

3.20.4 What agencies were involved in this analysis and what are their issues?

As part of the I-70 PEIS process, the scoping of cumulative impact issues was conducted in association with federal, state, and local agencies; special interest groups; the I-70 Mountain Corridor Advisory Committee; and communities and residents along the corridor. In their scoping comments, EPA highlighted the likelihood of impacts on aquatic resources and the natural and human environment if greater access to mountain recreation, resort, and “high-amenity” residential areas is provided. Regarding the scope of cumulative impact analysis and key environmental resources, EPA identified wetlands, water quality, air quality, threatened and endangered species and other fish and wildlife, and cultural and community resources. EPA, the USFS, and local communities expressed concern about the inducement of growth associated with a transportation project capacity increase.

As part of the Tier 2 process for the Twin Tunnels EA, outreach to federal, state, and local agencies, and potentially affected stakeholders was conducted to identify project activities and elements that could contribute cumulatively to impacts in Clear Creek County and the larger Clear Creek watershed. CDOT solicited input from federal, state, and local agencies regarding past impacts and reasonably foreseeable future projects. Clear Creek County expressed concern about a variety of potential impacts related to the construction activities and construction schedules of the Frontage Road Phase 1 (CDOT, 2012g) and Proposed Action. The county also noted that because both projects would implement retaining walls, there was potential for cumulative visual impacts. Trout Unlimited expressed concerns about potential cumulative impacts to fish in Clear Creek associated with sedimentation due to construction activities that would be occurring for the two projects (i.e., the Twin Tunnels and the Frontage Road).

¹The results of the feasibility study would affect the types of future capacity improvements in the I-70 Mountain Corridor. The I-70 PEIS Preferred Alternative included a Maximum Program and a Minimum Program to provide flexibility for future decision making. If AGS is determined to be feasible, highway capacity improvements included in the Maximum Program would not be implemented prior to implementation of AGS. If AGS is determined to be infeasible, improvements included in the Maximum Program could be implemented over time as needed. Until the appropriate studies are completed to facilitate informed decisions for implementation of the I-70 PEIS Preferred Alternative, the AGS component of the I-70 PEIS Preferred Alternative is not funded or considered to be reasonably foreseeable.

3.20.5 What are the anticipated cumulative impacts?

The following analysis describes the potential for the Proposed Action to contribute to cumulative impacts related to the environmental topics of Chapter 3 when considering past, present, and reasonably foreseeable future projects (which include the No Action). The environmental topics are discussed herein in the same order as they appear in Chapter 3.

The Proposed Action, with or without the managed lane, would not measurably impact threatened or endangered species, vegetation, wetlands, floodplains, geology, regulated materials, land use, or right-of-way. Therefore, this analysis does not discuss cumulative impacts on those resources. Noise is also not discussed in the cumulative impacts documentation. Although the Proposed Action is anticipated to increase noise levels in the study area, these increases are so small that they would not be perceptible. The other reasonably foreseeable transportation projects are predominantly surfacing and safety improvements that would not result in noise increases. Therefore, no cumulative noise impacts are anticipated in the study area. Energy-related issues are discussed in the section on global climate change.

As discussed previously, many of the components of the I-70 Mountain Corridor PEIS Preferred Alternative are not included in this cumulative impacts analysis. Some of these components, including widening of eastbound I-70 outside the Twin Tunnels study area, widening of westbound I-70, and AGS, could have cumulative impacts to air quality, water resources, wildlife, visual quality, noise, economic development, environmental justice, and historic properties. Regardless of the results of the AGS feasibility study, further studies would be undertaken for the components of the Preferred Alternative that are proposed for implementation. These studies would include a cumulative impacts analysis that would consider impacts to resources in potentially affected areas throughout the I-70 Mountain Corridor in more detail.

Social and economic resources

Existing context. As discussed in [Section 3.20.3](#), the mining industry drew people to settle and establish the towns and cities in Clear Creek County, including Idaho Springs. After the mining boom, the county’s population reached a low of a little more than 2,000 in 1930. Since then, Clear Creek County’s economic base has been tied more heavily to recreation and tourism. While the construction of the I-70 Mountain Corridor in the 1960s provided economic benefits to some communities, it disrupted the fabric of others. Clear Creek County’s historic mining communities most keenly felt these effects.

Idaho Springs lost 5 percent of the developed land in the community. This was a substantial impact considering that developable land in Idaho Springs and Clear Creek County is limited due to a number of geographic constraints (steep slopes and narrow valleys) and public ownership (the USFS owns approximately two-thirds of the land in Clear Creek County). The development of mountain resort communities west of Clear Creek County and the proximity to the Denver metropolitan area has resulted in Idaho Springs becoming a community where a number of people live and commute to either area for employment. Population growth in the county has been stagnant in recent years and is expected to grow at a slower rate than adjacent counties.

Impacts of other actions. Reasonably foreseeable future projects related to water quality, recreational enhancements, and private development are anticipated to positively impact social and economic resources. Rezoning for commercial development in Bakerville could contribute positively to the local economy. Clear Creek Greenway enhancements, trailhead development in Bakerville, and a renewable energy theme park near the Twin Tunnels could positively impact the tourism industry, which is important to the local communities and residents in the study area. Although very limited in scope, the construction and operation of these planned development projects could provide new sources of employment for residents of Clear Creek County.

Long-term, the improvements associated with the Frontage Road Phase 1 reconstruction on CR 314 are anticipated to have beneficial effects on social and economic resources due to improved mobility for local residents and emergency services. In the short-term, economic impacts could occur due to construction-related disruption of rafting operations. These potential impacts are anticipated to be negligible as construction activities would avoid disruption to rafting trips to the extent practicable.

If no capacity improvements are made to I-70, traffic congestion would continue to increase, resulting in increased travel times for all vehicles including emergency response vehicles, commuters, and the delivery of goods and services. Use of Intelligent Transportation Systems and/or Advanced Traffic Management Systems would be employed to minimize safety and travel time reliability issues, but these measures alone would not prevent increased congestion and crash rates as traffic volumes increase over time.

Impacts of the proposed action. The Proposed Action would result in long-term benefits for residents in the surrounding area by improving mobility and safety on I-70 east of Idaho Springs (with and without a managed lane). Many residents of Clear Creek County commute to employment centers east of Idaho Springs, and the

Proposed Action would serve to improve travel times for these residents. Safety improvements under the Proposed Action would also result in beneficial effects for travelers and reduce the number of emergency calls. In the short term, economic impacts could occur due to disruption of rafting operations and visitor avoidance of the area due to construction-related delays and inconvenience. These potential impacts are anticipated to be minor as both vehicular traffic on I-70 and rafting access on Clear Creek would be maintained during construction.

Cumulative impacts. When combined with other past, present, and reasonably foreseeable future projects, the Proposed Action is anticipated to contribute to a long-term beneficial cumulative effect on social and economic resources in Clear Creek County. The improvements in mobility associated with the Proposed Action and other transportation projects along with recreational enhancements, commercial development opportunities, and planning in the study area could collectively encourage economic development.

In the short term, the construction activities for Frontage Road Phase 1 and the Proposed Action could result in an adverse cumulative economic impact on communities in Clear Creek County. Both of these projects have the potential to impact commercial rafting operations to some degree, and the impacts will occur over two consecutive rafting seasons. Minor revenue reductions or operating cost increases for one season may be compounded if occurring over two consecutive seasons. Additionally, if rafting clientele experience inconvenience or degraded rafting experience due to construction activities during the 2012 season, it could contribute to reduced patronage in the 2013 season during construction of the Proposed Action. Rafting is an important component of the tourism industry in Clear Creek County. As documented in [Section 3.2, *Social and Economic Resources*](#), tourism is the mainstay of the local economy, providing approximately 29 percent of the jobs in the county. Reduced patronage for rafting companies could translate to reduced visitation to local communities and adverse temporary effects to the local economy.

Recreation resources

Existing context. Recreational travel is the predominant contributor to peak I-70 traffic, especially during summer and winter weekends. During the I-70 PEIS process, many concerns were expressed in public and agency meetings regarding the potential for improved or increased mobility on I-70 to cause a higher number of visitors on public lands, resulting in a deterioration of resources and visitor experiences. As documented in the *I-70 Mountain Corridor PEIS Recreation Resources Technical Report* (CDOT, 2011j)

and the *I-70 Mountain Corridor PEIS Cumulative Impacts Technical Report* (CDOT, 2011k), forest lands currently experience visitor use levels at or near their practical capacity. The USFS has indicated that the demand for recreation is such that the agency cannot maintain any additional parking or new trailheads.

In Clear Creek County (CCC), recreational visitation (primarily for rafting and fishing in Clear Creek) has long bolstered the economy of the local communities. For more than 20 years, Clear Creek County has been working to enhance the recreational experience and opportunities for residents and visitors by preserving open space and developing the vision of a greenway along Clear Creek. Development of the Clear Creek Greenway was first identified in the *Clear Creek County Intercountry Non-Motorized Routes Master Plan* (CCC, 1990). The greenway then became a major development recommendation of the *2030 Clear Creek County Master Plan* (CCC, 2004) and the focal point of the *Open Space Plan* (CCC, 2005a). The *Clear Creek Greenway Plan* (CCC, 2005b) provides the county's vision, planning, and management directives for recreation resources in the county. The greenway, as envisioned in these plans, will link communities together with a string of open spaces, parks, recreational facilities, and commercial recreational facilities along the creek. The greenway is also intended to provide connections to other open spaces such as the national forest, parks, recreation facilities and tourist attractions. In the larger context, the greenway would become part of a recreational corridor linking the Platte River Greenway in Denver to the Continental Divide National Scenic Trail.

Impacts of other actions. Reasonably foreseeable future projects that would affect recreational resources in the study area include trailhead enhancements at Bakerville, the renewable energy theme park south of the Twin Tunnels, and Frontage Road Phase 1 improvements to the Scott Lancaster Memorial Trail. As discussed in the *I-70 Frontage Road Improvements Categorical Exclusion* (CDOT, 2012g), Frontage Road Phase 1 will be completed in the fall of 2012. The Unnamed Fishing Access would be modified to provide pedestrian access only, and Unnamed Boating Access would be improved. Rafting companies and anglers would not have vehicular access along CR 314 between the Doghouse Rail Bridge and Hidden Valley Interchange during construction. During the blasting of rock outcrops or other construction that may cause safety concerns, use and access of Clear Creek may be restricted. Coordination with rafting companies will be required to accommodate recreational users safely. The project will also improve the Scott Lancaster Memorial Trail (which is part of the Clear Creek Greenway) by providing a 10-foot shared use path along a segment of the trail that is currently an on-street route. Trailhead enhancements at Bakerville and the

renewable energy theme park would also contribute to Clear Creek County's long-term vision for the greenway.

Impacts of the proposed action. The Proposed Action would improve a relatively short segment (approximately 3 miles) of the I-70 Mountain Corridor (144 miles), and no forest access points exist within the limits of the study area. Therefore, the indirect effects to recreational forest resources are anticipated to be negligible. Long-term, direct impacts associated with the Proposed Action would include realignment of approximately 500 feet of the Scott Lancaster Memorial Trail, removal of Below Box Boating Access, and potential reduction in parking availability at Kermitts Trailhead and Kermitts Boating Access. During construction, three out of nine river accesses in the study area would be unavailable. Rafting companies and anglers would not have vehicular access along CR 314 between the Doghouse Rail Bridge and Hidden Valley Interchange during operation of the I-70 detour. Temporary river closures during tunnel blasting and bridge work are anticipated, but the disruption to recreationalists would be minimal as closures would occur outside of peak rafting season or outside of daytime hours. Scott Lancaster Memorial Trail users could also experience delays due to construction activities including bridge reconstruction; trail realignment, resurfacing, and restoration; retaining wall construction; tunnel blasting; and construction staging. However, pedestrian and bicycle access through the project area would be maintained.

Cumulative impacts. When combined with other past, present, and reasonably foreseeable future projects, the Proposed Action would contribute to primarily beneficial long-term effects to recreational resources, with adverse effects anticipated to be mainly indirect or temporary in nature. There is potential for indirect visual impacts from retaining walls proposed under Frontage Road Phase 1 and the Proposed Action to cumulatively result in adverse visual impacts to recreational users of the Scott Lancaster Memorial Trail and Clear Creek. Although the I 70 Mountain Corridor Context Sensitive Solutions Aesthetic Design Guidelines would serve to minimize negative visual effects, retaining walls from both projects would be highly visible to recreational river and trail users between the Doghouse Rail Bridge and Hidden Valley Interchange.

In the short term, cumulative adverse impacts to recreational activities would occur in the study area due to nearly continuous construction activities affecting access to recreational resources and river rafting operations for an 18-month duration. This could result in avoidance of these recreational amenities or diminished recreational experience for an extended duration.

Historic resources

Existing context. The I-70 Mountain Corridor is rich in historic resources. Historic properties and districts are a physical reminder and link to the past, a source of revenue from heritage tourism, and a way to promote sustainable development. Historic properties and districts are an important part of the fabric of Clear Creek County, which is home to the Georgetown-Silver Plume National Historic Landmark District (just one of 21 National Historic Landmarks in Colorado), numerous historic and pre-historic properties and districts eligible for or listed in the National Register of Historic Places, and multiple historic communities, mining operations, and other historic developments. The [I-70 PEIS](#) noted that past actions, such as mining, road construction, and other transportation improvements, have affected the historical integrity of communities along the I-70 Mountain Corridor, specifically in Clear Creek County where historic and potentially historic resources are highly concentrated and developable areas are limited.

The Twin Tunnels project area reflects the historic development of the County, although the concentration of resources is less dense than in more developed communities, such as Idaho Springs or Georgetown. Resources in the area of potential effect include transportation-related resources (including the Twin Tunnels) and segments of linear railroad and highway resources. Mining history is reflected in remnants of mining and industrial properties. Homesteading is represented by residential properties and archaeological sites. While not all of the properties are considered historic under National Register criteria, they are reminiscent of the County's Constitution and heritage and add to the cumulative understanding of the area's history.

Impacts of other actions. Reasonably foreseeable future projects that would affect historic properties in the study area include transportation actions along I-70 in Clear Creek County, which were generally evaluated in the I-70 PEIS. Effects of new transportation elements, such as the Advanced Guideway System, have the potential to greatly affect the historic landscape of the I-70 Mountain Corridor. In Clear Creek County, effects of the Advanced Guideway System would be pronounced if its alignment follows the I-70 highway and is elevated, as conceptualized in the I-70 PEIS. If the alignment does not follow the highway right-of-way, historic properties could be directly affected if they are in the path of the alignment. The Advanced Guideway System study will provide additional details of the design and alignment, and information about the impacts. Ongoing transportation demand management/transportation system management strategies along I-70, such as variable messaging, could also have impacts to

historic properties, particularly if they result in additional signage along the highway. New signs combined with existing signs could increase visual clutter on the highway and affect/detract from the historic settings of properties located close to I-70. Lastly, the reconstruction of the I-70/US 40 Interchange at Empire has the potential to affect historic properties near the interchange, including railroad and mining sites. Other projects are relatively minor, occur within existing developed rights-of-way, and do not change the visual, noise, or other conditions in a manner that would have significant effects to historic properties.

Impacts of the proposed action. The Proposed Action would adversely affect a nationally significant interstate highway element in the Twin Tunnels. The Proposed Action would have no other adverse effects to historic properties or locally important historic remnants.

Cumulative impacts. When combined with other past, present, and reasonably foreseeable future projects, the Proposed Action would cumulatively affect historic transportation resources in the I-70 Mountain Corridor. The Proposed Action affects the Twin Tunnels, and future projects could further affect the Twin Tunnels and other significant interstate resources, including the Eisenhower-Johnson Memorial Tunnels, Vail Pass, the Genesee Park Interchange Bridge, and Glenwood Canyon. Other transportation features, such as railroad and non-I-70 historic roadways could also be affected by other projects. The application of the [I-70 Mountain Corridor CSS Design Criteria](#) and [Aesthetics Guidance](#) would serve to minimize adverse effects of highway projects by blending them into their context, including their historic settings. Loss of historic properties is a concern for every project along the I-70 Mountain Corridor, and the lead agencies will continue to design Tier 2 projects with the goal of avoiding or minimizing effects to historic properties.

Visual resources

Existing context. Clear Creek and the surrounding steep slopes and canyons are prominent natural features of the mountain setting in the study area. Roads, development, and mining activities have encroached on the natural setting since the 1850s when Clear Creek County experienced a mining boom. Since the construction of I-70 in the 1960s, the highway, the Twin Tunnels, and large cut and fill slopes have become prominent features of the visual setting along several stretches of Clear Creek canyon. During the I-70 PEIS process, stretches along the I-70 Mountain Corridor having multiple or unique aesthetic issues (Areas of Special Attention) were identified by stakeholders participating in aesthetic working groups. Idaho Springs, the Twin Tunnels, and Floyd Hill were all identified as Areas of Special Attention.

Impacts of other actions. Reasonably foreseeable future projects, including planned development and transportation improvements, would increase visual encroachment on the natural setting and result in segmentation of existing landscape views. These projects would contribute to the collective removal of vegetation, which could negatively affect existing views by decreasing the color, form, texture, and line elements that trees and shrubs provide. One planned development in particular, the renewable energy theme park, would be visible from CR 314, the Scott Lancaster Memorial Trail, and Clear Creek. Community controls on growth and land use planning will play a role in changes to the visual landscape associated with development.

Some of the USFS actions would improve the natural setting, while others could degrade the natural visual setting by introducing or expanding utility and communications infrastructure. The visual resource management plans of the Bureau of Land Management and the USFS will influence the potential for visual impacts on federal lands in the study area. Improvements under the I-70 Mountain Corridor PEIS Preferred Alternative would add visual contrast in the study area.

As documented in the *I-70 Frontage Road Improvements Categorical Exclusion* (CDOT, 2012g), the reconstruction of CR 314 would affect the visual character of the study area by widening the roadway, adding a shared-use path, and adding retaining walls. As part of various proposed transportation projects, the addition of signage would contribute potentially contrasting and distracting visual elements into natural or rural environments. Although the I-70 Mountain Corridor CSS Aesthetic Design Guidelines would serve to minimize negative effects, the Frontage Road Phase 1 project would result in permanent changes to visual quality.

Impacts of the proposed action. The Proposed Action would have minor to moderate visual impacts associated with signage, new guardrails, retaining walls, bridge widening, and the widening and modernization of the eastbound bore of the Twin Tunnels. Affected views would include those of recreationalists along Clear Creek and the Scott Lancaster Memorial Trail and motorists along I-70 and CR 314. Although the [I-70 Mountain Corridor CSS Aesthetic Design Guidelines](#) will serve to minimize negative effects, the Proposed Action would result in permanent changes to visual quality.

Cumulative impacts. When combined with other past, present, and reasonably foreseeable future projects, the Proposed Action would continue the trend of built/urban elements encroaching into the natural setting. The reconstruction of CR 314 and the Proposed Action would cumulatively contribute toward permanent visual

changes for drivers and recreationalists by widening the transportation corridors and collectively adding more than 8,000 linear feet of retaining walls. Directly west of the Hidden Valley Interchange, recreationalists on Clear Creek would see retaining walls on both sides of the creek approaching the reconstructed I-70 bridge over Clear Creek. These visual changes would be minor relative to the large scale of the natural setting.

Air quality

Existing context. Air quality within Clear Creek County is considered to be good. No air quality monitors are located in Clear Creek County because the area does not meet any of the EPA criteria that require a monitor. The I-70 highway, which carries an average of 42,000 vehicles per day, is the predominant emissions source in the study area. By comparison, US 40 in Empire Junction carries 7,500 vehicles per day, and Business Route 70 in Idaho Springs carries 6,800 vehicles daily (CDOT, 2012g). Other sources of air pollution include unpaved roads, wood burning, and gravel operations. Cumulative air quality impacts are typically considered at an airshed level, meaning within the area where emissions have the potential to accumulate and mix. Air quality within Clear Creek County is assessed independently of the adjacent Denver metropolitan nonattainment area to the east. Mountainous terrain within Clear Creek County limits the ability of emissions in one location to affect another location. As a result, the area where I-70 emissions can affect air quality receptors and can accumulate emissions from nearby sources is largely limited to the Clear Creek valley, which I-70 follows.

Impacts of other actions. Reasonably foreseeable future projects are not anticipated to pose air quality concerns. General population growth in Colorado, especially in the metropolitan areas along the Front Range, will affect future traffic volumes on I-70 and thereby, the amount of emissions generated by I-70 traffic. While tailpipe emissions from I-70 traffic will decline over time due to continued improvements in vehicle fuels and technology, levels of particulate matter less than ten microns in diameter (PM₁₀) will not benefit from fuel and technology improvement. Motor vehicle traffic kicks dust from the pavement into the air, and emissions of this pollutant will increase approximately in proportion to I-70 traffic volumes, as follows:

- Traffic volumes through the Twin Tunnels on weekdays would increase approximately 41 percent between 2010 and 2035 under the No Action.
- Traffic volumes through the Twin Tunnels on peak winter and summer Sundays would increase approximately 22 percent between 2010 and 2035 under the No Action.

Impacts of the proposed action. The Proposed Action would widen eastbound I-70 only, from the existing two lanes to three lanes, for a length of about three miles. This would increase the amount of traffic that can pass through the area during a given period of time. Air pollution effects of this project would be largely localized to the Twin Tunnels vicinity. Other capacity constraints exist along the I-70 Mountain Corridor, so widening just eastbound I-70 for only 3 miles would not lead to substantially increased traffic along the 144-mile I-70 Mountain Corridor. Under the Proposed Action, I-70 weekday traffic volumes would be the same as under the No Action, and peak winter and summer Sundays would increase approximately 27 percent as compared to 22 percent under the No Action. Although PM₁₀ would increase along with traffic volumes, levels would not exceed air quality standards.

Cumulative impacts. When combined with other past, present, and reasonably foreseeable future projects, the Proposed Action would have a negligible contribution to cumulative air quality impacts. Based on the rural, mountainous nature of the corridor and the lack of major non-transportation emission sources, the cumulative impacts would be unlikely to result in any air quality violation in the foreseeable future to 2035.

Global climate change

The federal government is addressing the issue of global climate change as an important national and global concern in several ways. The transportation sector is the second largest source of total greenhouse gas (GHG) emissions in the United States and the greatest source of carbon dioxide (CO₂) emissions. In 2004, the transportation sector was responsible for 31 percent of all U.S. CO₂ emissions. The principal anthropogenic (human-made) source of carbon emissions is the combustion of fossil fuels, which accounts for about 80 percent of anthropogenic emissions of carbon worldwide. Nearly all (98 percent) transportation-sector emissions result from the consumption of petroleum products such as gasoline, diesel fuel, and aviation fuel.

Recognizing this concern, FHWA is working nationally with other modal administrations through the U.S. Department of Transportation Center for Climate Change and Environmental Forecasting to develop strategies to reduce transportation's contribution to greenhouse gases, particularly CO₂ emissions, and to assess the risks to transportation systems and services from climate changes.

At the state level, there are also several programs under way in Colorado to address transportation GHGs. The Governor's Climate Action Plan, adopted in November 2007, includes measures to adopt vehicle CO₂ emissions standards and to reduce vehicle travel through transit, flex time, telecommuting, ridesharing, and broadband

communications. CDOT is working with several agencies to prepare a "Memorandum of Agreement for Interagency Collaboration to Address Mobile Source Air Toxics and Greenhouse Gas Emissions Affecting the State of Colorado."

The purpose of this Memorandum of Agreement is to establish a collaborative, working relationship among the Colorado Department of Public Health and Environment, EPA, FHWA, Federal Transit Administration, Regional Transportation District, the Regional Air Quality Commission, and CDOT to address unregulated Mobile Source Air Toxics and greenhouse gases (GHGs) produced from Colorado's state highways, interstates, and construction activities. CDOT's commitments would include:

1. Develop truck routes and restrictions with the goal of limiting truck traffic in proximity to facilities, including schools, with sensitive receptor populations.
2. Continue researching pavement durability with the goal of reducing the frequency of resurfacing and reconstruction projects.
3. Develop air quality educational materials, specific to transportation issues, for citizens, elected officials, and schools.
4. Offer outreach to communities to integrate land use and transportation decisions to reduce growth in vehicle miles traveled, such as smart growth techniques, buffer zones, transit-oriented development, walkable communities, and access management plans.
5. Commit to research additional concrete additives that would reduce the demand for cement.
6. Expand travel demand management efforts statewide to better utilize the existing transportation mobility network.
7. Continue to diversify the CDOT fleet by retrofitting diesel vehicles, specifying the types of vehicles and equipment contractors may use, purchasing low-emission vehicles, such as hybrids, and purchasing cleaner burning fuels through bidding incentives where feasible. Providing incentives is the likely vehicle for this.
8. Explore congestion and right-lane-only restrictions for motor carriers.
9. Fund truck parking electrification, mostly via exploring external grant opportunities.
10. Research additional ways to improve freight movement and efficiency statewide.
11. Commit to incorporating ultra-low sulfur diesel for non-road equipment statewide – likely using incentives during bidding.

12. Develop a low-volatile organic compound-emitting tree landscaping specification.

Because GHGs are directly related to energy use, GHG emissions are presented in [Section 3.19, Energy](#), of this EA. The relationship of 2005 and projected 2035 Colorado highway emissions to 2005 global CO₂ emissions is presented in [Table 3-52](#). Colorado highway emissions are expected to increase by 4.7 percent between 2008 and 2035. The benefits of the fuel economy and renewable fuels programs in the 2007 Energy Bill are offset by growth in vehicle miles traveled; the draft 2035 Statewide Transportation Plan predicts that Colorado vehicle miles traveled will double between 2000 and 2035. [Table 3-52](#) also illustrates the size of the project corridor relative to total Colorado travel activity.

Wildlife

Existing context. The potential for cumulative impacts to wildlife are considered within the Clear Creek watershed, which encompasses the area from the Continental Divide to the Denver metro area on both sides of I-70. Past and present effects of I-70 highway construction and ongoing residential and commercial growth in the I-70 Mountain Corridor have substantially changed the distribution of terrestrial wildlife, resulting in habitat loss and fragmentation (CDOT, 2011k). These actions also create barriers to wildlife movement, called wildlife linkage interference zones. Evidence suggests that the existing I-70 highway’s barrier effect impedes traditional wildlife movement through certain corridors. Within the Clear Creek watershed, five Wildlife Linkage Interference Zones have been identified.

Impacts of other actions. Planned commercial and residential growth along the I-70 Mountain Corridor, as documented in the [I-70 PEIS](#), could increase wildlife habitat loss and fragmentation, impede migration corridors, and contribute to issues with linkage interference zones. Continued highway maintenance and funded transportation

improvements are not anticipated to have direct adverse impacts to terrestrial wildlife. Indirect impacts, including minor disturbance to roadside habitat, could occur. Retaining walls are proposed under the Frontage Road Phase 1 improvements to CR 314, but are not anticipated to interfere with wildlife movement. No enhancements to improve connectivity for wildlife would be implemented in the study area under the No Action.

Impacts of the proposed action. Under the Proposed Action, improvements along the I-70 Mountain Corridor would not have permanent, adverse direct impacts to big game (mule deer, bighorn sheep, or elk) migration corridors or winter range, critical winter range, and winter concentration areas. Long-term effects of the Proposed Action would include indirect effects to wildlife through conversion of 5.7 to 6.2 acres of wildlife foraging and nesting habitat to transportation use. The majority of habitat that would be converted is disturbed roadside habitat that has already been degraded and no permanent impact to wetland or riparian habitat is anticipated. This impact would slightly reduce habitat availability for a variety of common small mammals, birds, and their predators.

Cumulative impacts. When combined with other past, present, and reasonably foreseeable future projects, the Proposed Action would contribute cumulatively to habitat loss and fragmentation due to disturbance of roadside habitat and implementation of retaining walls. A number of mitigation measures are proposed to improve connectivity for terrestrial wildlife on the I-70 Mountain Corridor and mitigate cumulative effects on wildlife. These measures fulfill responsibilities in the [A Landscape-Level Inventory of Valued Ecosystems \(ALIVE\) Memorandum of Understanding \(MOU\)](#). These measures are summarized in [Table 3-53](#) and include: replacing barbed-wire fence between Clear Creek and the west tunnel portal with more wildlife-friendly fencing; tree removal to improve driver visibility near the

Table 3.52. Colorado Highway Emissions

2005 Global CO ₂ Emissions ¹ MMT	2005 Colorado Highway CO ₂ Emissions ² MMT	2035 Colorado Highway CO ₂ Emissions ² MMT	2005 Colorado Percentage of Global Total ²	2005 Project Corridor VMT Percentage of Statewide VMT ³
27,700	29.9	31.3	0.108	0.6

¹ U.S. Energy Information Administration, *International Energy Outlook 2007*.
² Calculated by FHWA Resource Center.
³ Statewide VMT was 47.9 billion in 2005, based on the Colorado Department of Transportation’s *Fact Book 2006–2007*, Transportation Facts (CDOT, 2007).

tunnels; and improvements to a concrete box culvert west of the Twin Tunnels.

Water resources and aquatic habitat

Existing context. The potential cumulative impacts to water resources and aquatic habitat are considered within the Clear Creek watershed, which encompasses the area from the Continental Divide to the Denver metro area on both sides of I-70. As documented in the [I-70 PEIS](#), past activities have adversely affected water resources and water quality in the I-70 Mountain Corridor. Impacts include impairment to water quality, physical changes to streams (for example, channelization), and adverse effects on stream hydrology and habitat. Historic mining has affected streams in the Clear Creek watershed. Some of the most substantial impacts have been along Clear Creek immediately adjacent to I-70. Additionally, construction in the watershed played a role in the exposure and disturbance of mine waste and mineralized rock, further degrading water resources. Winter highway maintenance has contributed sand and de-icing chemicals to highway runoff and impaired water quality. Construction of I-70 has caused up to 35 percent of the stream channelization in the Clear Creek watershed. Most of Lower Clear Creek (Clear Creek from Empire Junction to US 6 Interchange) is constrained in a narrow valley or canyon. However, the construction of the US 6, US 40, and I-70 highways has further constricted or channelized streams; and there are many areas today where the embankments between the US 6, US 40, and I-70 highways constrict Clear Creek on both sides. Residential and commercial development has caused an increase in impervious surface, thereby increasing stormwater runoff.

Impacts of other actions. Reasonably foreseeable future projects in the Clear Creek watershed are anticipated to contribute both adverse and beneficial impacts to water resources and aquatic habitat. Increases in both point and non-point source pollution are anticipated due to planned urban and rural development. Per the I-70 PEIS, the *I-70 Mountain Corridor PEIS Biological Report* (CDOT, 2011I), and the *I-70 Mountain Corridor Final Programmatic Biological Assessment* (CDOT, 2011g) the planned urban and rural development in the Clear Creek watershed would have the greatest impact on aquatic resources. Development has the potential to reduce instream flows due to water consumption, increase sedimentation, remove or alter stream habitat, and alter instream temperature regimes. Along heavily mined areas such as the Clear Creek valley, development also has the potential to create a landscape that reduces metal mobility by removing mine waste or covering land with vegetation or impervious surfaces. As a result, land cover changes can result in a net reduction in metals transport when compared to formerly exposed mine waste piles.

Increased traffic volumes through the I-70 Mountain Corridor are anticipated under the No Action and would contribute to increased delivery of contaminants and increased risk of hazardous material spills. Additionally, roadway winter maintenance activities would increase, thereby introducing additional sediment and chlorides into the streams and lakes within the Clear Creek watershed. Without significant upgrades, the I-70 infrastructure and drainage systems would pass their design life and continue to deteriorate, resulting in increased erosion of cut and fill slopes and increased sediment transport to Clear Creek from the highway. The implementation of Frontage Road Phase 1 improvements would contribute to the continued channelization of Clear Creek by widening the roadway cross section and the associated fill bench within the valley.

Beneficial effects of reasonably foreseeable future projects are anticipated due to aquatic habitat enhancements, implementation of the Clear Creek Sediment Control Action Plan, CDOT wetland mitigation banking, USFS reforestation efforts, and implementation of the findings in the *Managing Stormwater to Protect Water Resources Report*. These effects would include increased filtration and flood retention due to wetland enhancements and a reduction in stormwater runoff due to innovative stormwater controls.

Impacts of the proposed action. Under the Proposed Action, direct stream disturbance impacts are expected to be minimal and no permanent encroachment on the regulatory 100-year floodplain would occur. However, by widening the roadway cross section and the associated fill bench within the valley, the Proposed Action would contribute to the continued channelization of Clear Creek. The increase in impervious surface area, leading to an increase in highway runoff, and the usage of highway winter maintenance materials would increase sedimentation to Clear Creek. Increased sedimentation can degrade habitat, impede spawning by blanketing the streambed, and reduce populations of macroinvertebrates on which fish feed. It is important to consider that while stormwater runoff would increase, permanent water quality best management practices (BMPs) planned as part of the Proposed Action are expected to remove significant amounts of sediment from highway runoff. In addition, these BMPs, combined with safety improvements included in the Proposed Action, decrease the risk of accidental spills of hazardous materials reaching Clear Creek.

Cumulative impacts. When combined with other past, present, and reasonably foreseeable future projects, the Proposed Action would contribute cumulatively to increased impervious surface, which can result in increased stormwater runoff and sedimentation. However, the permanent water quality BMP's associated with the Proposed Action would remove significant amounts of

sediment from highway runoff. Therefore, the Proposed Action would not contribute cumulatively to this adverse water quality impact. Through widening of the roadway cross section, the Proposed Action would contribute cumulatively to the continued channelization of Clear Creek. When combined with the past, present, and reasonably foreseeable future projects, the Proposed Action is not expected to have a noticeably negative impact on water resources and water quality and could actually show a beneficial result to water quality in the study area over time. In response to the recognized cumulative impacts to water resources and water quality within the Clear Creek drainage associated with highway development, operations, and maintenance; historic mining; and land development, a Clear Creek Sediment Control Action Plan (SCAP) has been developed. The SCAP identifies adaptive mitigation measures that locate hazardous spill containment and sediment control structures. The SCAP also allows for flexibility in the number, sizing, type, and location of BMP structures, while controlling contaminated drainage entering Clear Creek.

3.20.6 What mitigation is needed?

I-70 PEIS mitigation strategies

The phased approach of the I-70 Mountain Corridor PEIS Preferred Alternative allows for ongoing opportunities to avoid and minimize impacts, establish mitigation, and employ I-70 Mountain Corridor CSS. Mitigation approaches for cumulative impacts from the I-70 PEIS document that are relevant to this project include the following:

- Implement the strategies discussed in the global climate change cumulative impacts discussion to address Mobile Source Air Toxics and GHG emissions.
- Coordinate with Clear Creek County communities regarding implementation of a marketing program that

would include an approach to marketing for historic tourism to address the possible disparate distribution of benefits and impacts from construction activities.

- Follow the processes outlined in the [ALIVE MOU](#) to increase the ability of wildlife, particularly protected species, to cross the highway and transit infrastructure throughout the corridor.
- Continue to participate in and promote the SWEEP program. Implement the [SWEEP MOU](#) and matrix of mitigation to address stream impairment and benefit aquatic resources.
- Implement [aesthetic guidelines](#) prepared as part of the I-70 Mountain Corridor Context Sensitive Solutions program of the I-70 PEIS Preferred Alternative for establishing an aesthetically positive visual experience for all viewers.

Twin Tunnels mitigation

Mitigation strategies for direct and indirect impacts to the resources studied in this cumulative impacts analysis are addressed in their respective resource sections in Chapter 3, and in Table 3-53. With respect to water resources, CDOT will continue to work collaboratively with Clear Creek County to identify enhancement opportunities, which may include activities to ameliorate past actions that have resulted in channelization of Clear Creek. With implementation of the mitigation strategies documented in this chapter, the adverse cumulative impacts identified for the Proposed Action would be negligible to minor.

Table 3.53. Additional Mitigation Commitments for Impacts to Terrestrial Wildlife

Activity	Location	Impact	Mitigation*
Widening eastbound I-70 west of the Twin Tunnels and adding a through lane	The North side of I-70 from the west portal to Clear Creek.	Widening I-70 creates a wider I-70 barrier for sheep movement and access to Clear Creek.	<ul style="list-style-type: none"> The existing barbed and woven wire fencing located north of I-70 between the west portal and Clear Creek will be replaced. The new fence will be a more wildlife-friendly per Colorado Parks and Wildlife’s recommendations and the <i>Fencing with Wildlife in Mind</i> (Hanophy, 2009). The new fence will consist of smooth wire and barbed wire, and would continue to contain livestock.
	The north side I-70 outside the west portal of the westbound tunnel.	Increase in animal/vehicle collisions. Sheep are attracted to deicer salts that have accumulated on the shoulder of the highway and to vegetation north of the roadway. On average, one sheep per year is hit by a vehicle at this location.	<ul style="list-style-type: none"> Upland (non-riparian) trees, primarily junipers and pines, will be removed in this area. This will improve westbound motorists’ ability to detect sheep as they exit the tunnel.
	Concrete box culvert (CBC) near milepost 242. The CBC at this location carries flows from an intermittent drainage under I-70 and discharges to Clear Creek	Widening I-70 creates a wider I-70 barrier for sheep movement and access to Clear Creek. The CBC currently has a concrete bottom and the discharge point at Clear Creek has a steep drop-off, which is not conducive to wildlife movement or use.	<ul style="list-style-type: none"> To encourage use by wildlife, a natural substrate will be placed along the bottom of the CBC and baffles will be installed to retain the substrate and prevent scour. Material will also be used to fill in the steep drop-off at the CBC discharge point. In addition, when the barbed and woven wire fence is replaced, this drainage will be left open, and instead of fencing across the drainage (like the existing condition), the fence will be tied into the CBC to encourage wildlife usage.

* Mitigation is not necessary if impact can be avoided through changes in the design or construction of the Proposed Action (i.e., the activity is avoided).



Section 4(f) Evaluation

4.1 What is Section 4(f) and what are its requirements?

This Section 4(f) discussion has been prepared in accordance with the joint Federal Highway Administration (FHWA)/ Federal Transit Administration (FTA) regulations for Section 4(f) compliance codified at 23 Code of Federal Regulations §774, et seq. Additional guidance has been obtained from the FHWA Technical Advisory T 6640.8A (1987) and the revised FHWA Section 4(f) Policy Paper (2005).

Section 4(f) refers to a portion of a law that only applies to actions of the U.S. Department of Transportation (USDOT) agencies. It protects the following resources:

- Publicly owned park and recreation areas of national, state, or local significance, both existing and planned
- Historic sites either on the National Register of Historic Places (NRHP), eligible to be on the NRHP, or in some cases, of state or local significance
- Publicly owned wildlife and waterfowl refuges of national, state, or local significance

These protected resources are referred to as “Section 4(f) properties.” Section 4(f) of the U.S. Department of Transportation Act of 1966, as amended, and codified in 49 United States Code § 303, declares that “[I]t is the policy of the United States Government that special effort should be made to preserve the natural beauty of the countryside and public park and recreation lands, wildlife and waterfowl refuges, and historic sites.” Section 4(f) specifies that:

The Administration may not approve the use of a Section 4(f) property unless it makes a determination that:

- 1) there is no feasible and prudent avoidance alternative to the use of land from the property; and*
- 2) the action includes all possible planning to minimize harm to the property resulting from such use.*

A Section 4(f) “use” occurs when:

1. Land from a Section 4(f) property is permanently incorporated into a transportation facility; land will be considered permanently incorporated into a transportation project when it has been purchased as right-of-way or sufficient property interests have been otherwise acquired for the purpose of project implementation; or
2. There is a temporary use of land that is adverse in terms of the Section 4(f) statute’s preservation purposes; or
3. There is no permanent incorporation of land from a Section 4(f) property, but the project’s proximity impacts are so severe that the protected activities, features, or attributes that qualify the property for protection are

substantially impaired. This is called a constructive use of the property.

Congress amended Section 4(f) with the Safe Accountable Flexible Efficient Transportation Equity Act: A Legacy for Users (SAFETEA - LU) to include a subsection that authorizes FHWA to approve a project that results in a *de minimis* impact to a Section 4(f) property without the evaluation of avoidance alternatives typically required in a Section 4(f) Evaluation. Different processes are used for evaluating *de minimis* impacts for historic properties and for recreational properties.

- **De Minimis for historic properties.** A finding of *de minimis* impact can be made only if FHWA determines that the transportation program or project would have No Adverse Effect on the historic property or there would be No Historic Properties Affected as a result of the process required under Section 106 of the National Historic Preservation Act. The Section 106 findings have to receive written concurrence from the State Historic Preservation Officer (SHPO) and be developed in consultation with parties consulted under the Section 106 process. Additionally, FHWA must inform the SHPO of the intent to make a *de minimis* impact finding based on their written concurrence with the Section 106 determination and must consider the views of any consulting parties in the Section 106 consultation.
- **De Minimis for parklands and recreational properties.** A finding of *de minimis* impact can be made when impacts would not adversely affect the activities, features, and attributes that qualify the property for protection under Section 4(f). Public notice and an opportunity to comment must be provided and the finding has to receive written concurrence from the officials with jurisdiction over the parklands or recreational property.

Under the FHWA/FTA regulations (23 CFR 774.13(d)), a temporary occupancy of property does not constitute a use of a Section 4(f) property when the following conditions are satisfied:

- The occupancy must be of temporary duration (i.e., shorter than the period of construction) and not involve a change in ownership of the property.
- The scope of work must be minor, with only minimal changes to the protected property.
- There are no permanent adverse physical effects to the protected property, nor will there be temporary

or permanent interference with activities, features or attributes of the property.

- The land being used must be fully restored to a condition that is at least as good as that which existed prior to the proposed project.
- There must be documented agreement of the officials with jurisdiction over the Section 4(f) property regarding the above conditions.

If the temporary occupancy requirements are not met, then the result is a temporary use of the Section 4(f) property and the requirements of Section 4(f) apply.

Section 4(f) further requires consultation with the U.S. Department of the Interior and, as appropriate, involving the offices of the U.S. Departments of Agriculture and Housing and Urban Development in developing transportation projects and programs which use lands protected by Section 4(f). Section 4(f) applies only to the actions of agencies within the USDOT. The USDOT is responsible for applicability determinations, evaluations, findings and overall compliance.

This Section 4(f) Evaluation addresses the potential uses of Section 4(f) properties that occur as a result of alternatives developed to improve the Twin Tunnels area in the eastbound direction along the Interstate 70 (I-70) corridor. The chapter includes a summary of the purpose and need for the project, a discussion of alternatives considered and a least overall harm analysis since all of the alternatives use Section 4(f) properties.

4.2 How does this evaluation relate to the I-70 PEIS?

The [I-70 Mountain Corridor Programmatic Environmental Impact Statement](#) (PEIS) (CDOT, 2011a) addressed Section 4(f) issues on a broad Tier 1 scale. It came to the conclusion that the [I-70 PEIS Preferred Alternative](#) appeared to have the least harm to Section 4(f) properties among alternatives that meet the 2050 purpose and need. It also determined that there are no prudent and feasible alternatives at the corridor level. There was a recognition that additional Section 4(f) analysis would need to be done during site-specific Tier 2 processes to validate the conclusions of the I-70 PEIS analysis. Specifically, the I-70 PEIS defined what was still needed:

- **Step 1.** Conduct continued coordination with the Officials with Jurisdiction (local governments and the State Historic Preservation Officer [SHPO]). For parklands and recreational properties, the Officials with Jurisdiction are the local government entities that own and maintain the properties. Continued coordination is needed to

confirm the properties, confirm property boundaries, obtain input on the effects of the project and proposed mitigation, and if a *de minimis* impact is anticipated, obtain concurrence from Officials with Jurisdiction that the impact is indeed *de minimis*. For historic properties, coordination with SHPO will be done as part of the Section 106 consultation to obtain concurrence with eligibility of a property, with determination of effects, and with proposed mitigation. If a “no adverse effect” determination is proposed that will be used to determine a *de minimis* impact, SHPO will be notified of this intention on the part of CDOT and FHWA. If analysis of temporary impacts indicates the conditions of a temporary occupancy would be met, coordinate with the officials with jurisdiction to obtain concurrence.

- **Step 2.** Identify properties. Tier 2 processes will include a step to identify any additional properties and confirm the applicability of Section 4(f) to those properties assumed to be Section 4(f) properties during the I-70 PEIS process. This includes confirming ownership details, property boundaries, and National Register of Historic Places eligibility if the property is a historic property and property management practice details from resource management plans for refuges, parks, and recreational properties.
- **Step 3.** Collect information needed to determine detailed use by alternative. This step will include laying the edges of physical disturbance and future right-of-way over the mapping of the property boundaries. This information will then be used to determine whether or not the anticipated use could be avoided or evaluated as a *de minimis* impact. Combining this information with the findings of noise analysis, access analysis, and visual analysis will be used to determine whether or not an alternative could result in a constructive use. Indirect impacts will be examined to determine if there is a constructive use of the property. Analysis of temporary impacts will be done as well to determine if the conditions for temporary occupancy are met, as defined in Title 23 of the Code of Federal Regulations (CFR) Part 774.13 (d).
- **Step 4.** Conduct Section 4(f) evaluations to determine if a prudent and feasible alternative that avoids the Section 4(f) properties exists. This evaluation will include the I-70 Mountain Corridor Context Sensitive Solutions measures, alignment shifts, use of tunnels, use of design variances, and other design related measures. Uses of the properties will be considered and compared to the I-70 PEIS alternatives and this evaluation. If there is a substantial change in properties used, or in the significance of the use, a determination will be made of the need to revisit the I-70 PEIS decision. This

determination will take into account the adaptive nature of implementing the Preferred Alternative.

- **Step 5.** Identification of all possible planning to minimize harm. This step will include development of full mitigation measures as well as other measures to minimize harm.
- **Step 6.** Development of least harm analysis. If all of the alternatives use Section 4(f) properties and no prudent and feasible avoidance alternative exists, a least harm analysis will be conducted to determine which alternative causes the least overall harm in light of the statute's preservation purpose.

The Twin Tunnels EA is the first Tier 2 NEPA process to be initiated under the I-70 PEIS. It incorporates the Corridor-wide analysis and discussions in the I-70 PEIS and focuses attention on one of the Corridor's most problematic areas: the Twin Tunnels on the eastern side of Idaho Springs. The Environmental Assessment (EA) is being conducted consistent with the agreements and processes outlined in the I-70 PEIS, including the I-70 Mountain Corridor Context Sensitive Solutions (CSS) process, the Stream and Wetland Ecological Enhancement Program (SWEEP) Memorandum of Understanding (MOU), A Landscape Level Inventory of Valued Ecosystem Components (ALIVE) MOU, Section 106 Programmatic Agreement, and other mitigation strategies.

Improvements to I-70 eastbound travel in the Twin Tunnels area have been prioritized based on the analysis of transportation problems contained in the I-70 PEIS and other studies, and public interest in addressing immediate congestion and safety issues at this location. While this project is focused on eastbound I-70 improvements, it does not preclude future improvements in the westbound direction of I-70 nor does it preclude future Advanced Guideway System (AGS) transit improvements, both of which are included in the I-70 PEIS ultimate improvements in this location. CDOT remains committed to working with stakeholders to implement other elements of the long-term solution in this location and throughout the Corridor as funding becomes available.

4.3 What is the project purpose and need?

The Twin Tunnels project centers around the eastbound bore of the Twin Tunnels on I-70 near Idaho Springs, which has been long identified as a bottleneck and constraint to I-70 through traffic. The purpose

The project is needed to address safety, mobility, and operational characteristics that slow travel.

of the Twin Tunnels project is to improve eastbound highway safety, operations, and travel time reliability in the Twin Tunnels area of the I-70 Mountain Corridor at the east end of Idaho Springs.

Safety

Crashes in the project area are frequent and result in substantial traffic backups. Geometric conditions (such as steep grades, tight curves, and narrow shoulders), traffic congestion due to weekend traffic, high travel speeds, speed differentials with fast-moving cars and slower-moving trucks, and winter driving conditions contribute to crashes.

Within the Twin Tunnels project area, two areas in particular have a high concentration of crashes: inside and approaching the Twin Tunnels and the curve just west of the Hidden Valley Interchange. The most frequent crash type near the tunnels is rear-end type crashes primarily resulting from vehicles slowing down as they approach and drive through the tunnels. The majority of the crashes at the Twin Tunnels occur during peak traffic conditions in the winter months. The most frequent crash type near Hidden Valley Interchange is fixed-object type crashes, most of which occur in the winter months. These crashes primarily result from drivers losing control and leaving the roadway due to excessive speed and/or road conditions.

Crashes reduce the flow of traffic and, therefore, increase delays. In the Twin Tunnels area, crashes are particularly difficult to clear from travel lanes because shoulders are narrow, and no alternate routes for emergency vehicles are present.

Mobility

Slow and unpredictable travel times in peak traffic periods (Saturday and Sunday afternoons) frustrate travelers, affect economic conditions, and decrease safety. Travel times tend to be lower through the project area due to slower speed curves, a real and perceived narrowness of the Twin Tunnels, and traffic congestion.

Operational characteristics that slow travel

Capacity in the most congested portion of the I-70 Mountain Corridor between Georgetown and Floyd Hill is largely controlled by the lane capacity of the Twin Tunnels. Additionally, the capacity of the two travel lanes in each direction is reduced by up to 20 percent by the real and perceived narrowness of the tunnels, which causes drivers to slow down. Curves in the project area between the tunnels and Floyd Hill (east of the tunnels) also cause drivers to slow down. There are currently eight curves between the Twin Tunnels and the junction of US 6 that slow travel through the project area.

4.4 What is the Proposed Action?

The Proposed Action would add a third eastbound travel lane to the I-70 highway for approximately three miles between the East Idaho Springs interchange and the base of Floyd Hill where a third lane already exists. The eastbound bore of the Twin Tunnels would be expanded to accommodate the wider roadway section. The Proposed Action would provide a consistent 50 mph design speed and 55 mph posted speed. **Figure 4.1** illustrates the project limits and the proposed changes.

4.4.1 What are the proposed roadway and tunnel sections?

The roadway section generally includes three 12-foot travel lanes and a 10-foot outside shoulder. Between the Hidden Valley Interchange and the east project limits, the inside shoulder width would be 4 feet for a total roadway width of 50 feet. West of Hidden Valley Interchange through the Twin Tunnels to the west project limits, CDOT is considering a 4-foot or 10-foot inside shoulder width for a total roadway width of 50 feet or 56 feet. The 56-foot roadway cross section would provide the desired cross section for an interstate highway. The 50-foot roadway cross section would match the existing shoulder widths through most of the project area. Both cross sections would widen the roadway entirely to the south, maintaining the existing inside (or, left) shoulder in its current location. The new third lane would be constructed to the south of the existing travel lanes.

Two tunnel widths are being evaluated to accommodate the different roadway sections. A 61-foot tunnel width would accommodate the wider roadway section and would provide 2.5-foot walks on each side of the tunnel for emergency egress. A 53-foot tunnel width would accommodate the smaller roadway section, and emergency egress would occur on the highway shoulders rather than walks. Both tunnel sections would widen the tunnel entirely to the south, maintaining the existing inside (or, left) wall in its current location.

4.4.2 What are the other features of the Proposed Action?

The Proposed Action also includes other features as summarized below:

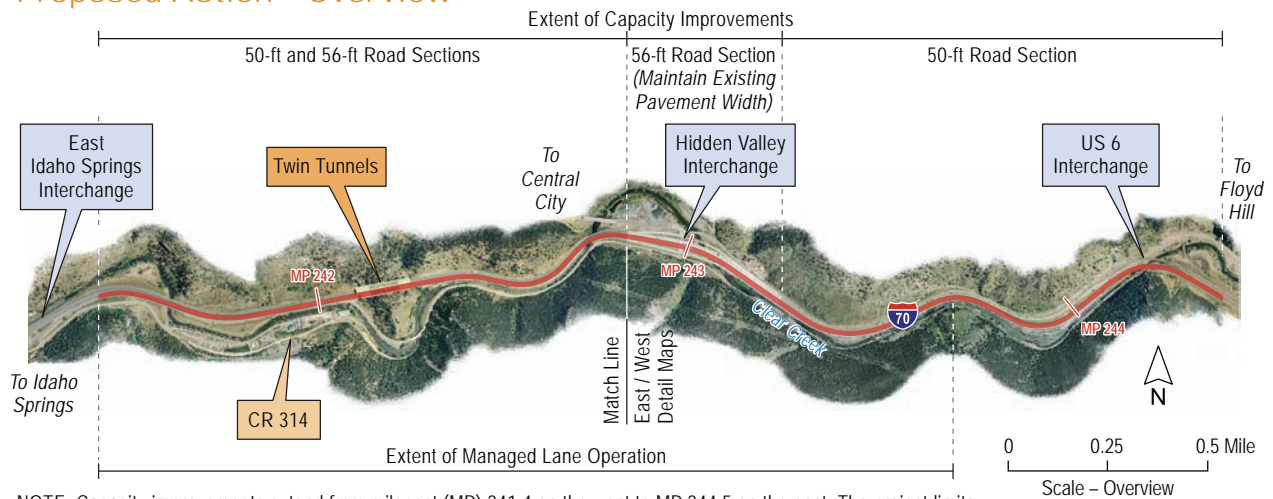
- **Changes to tunnel portals.** Portals on the new wider tunnel would be three-dimensional to soften the tunnel effect. The aesthetics of the portal faces have not been determined at this time but the design will be consistent with the [I-70 Mountain Corridor Aesthetic](#)

[Guidance](#). Stakeholders will have input into the aesthetic considerations of the tunnel portal during final design.

- **Curve straightening at the I-70 curve west of the Hidden Valley Interchange.** This curve has a lower design speed than other locations on I-70 and is the highest accident location in the project area. The Proposed Action would straighten the curve to bring the design speed up to 50 mph and the posted speed up to 55 mph, consistent with the adjoining sections of the highway, and is projected to reduce crashes by 75 percent in this location compared to the No Action.
- **Curve straightening on CR 314 at Hidden Valley.** Straightening the curve on I-70 would shift I-70 approximately 45 feet farther south toward CR 314, requiring reconstruction of a portion of CR 314 as well to maintain adequate separation between the two facilities.
- **New bridge over Clear Creek at Hidden Valley.** Curve straightening at this location would require demolition and construction of the eastbound bridge on I-70 over Clear Creek. It would not place any piers in the stream bed or associated 100-year floodplain, and it would provide space for wildlife passage under the bridge.
- **Stopping sight distance improvement.** The Proposed Action would replace the existing sloped median at the Hidden Valley curve with a retaining wall north of the eastbound lanes, improving the sight distance around the curve.
- **Retaining walls.** Retaining walls would be required in most locations along the south side of I-70 adjacent to Clear Creek and at the curve straightening on CR 314 at Hidden Valley. The majority of walls would be below I-70 and range up to 10 feet tall, with isolated locations of walls up to 20 feet tall. Retaining wall aesthetics would adhere to the [I-70 Mountain Corridor Aesthetic Guidance](#) and would be designed in conjunction with stakeholders during final design.
- **Reconstruction of the existing chain station west of Twin Tunnels.** Roadway widening would require reconstruction of the chain station. The new chain station would adhere to [I-70 Mountain Corridor Chain Station Plan](#) (CDOT, 2008) and would provide two lanes of parking with a total of 12 spaces.
- **Sediment basins and water quality treatment.** Six sediment basins or ponds would treat stormwater runoff from I-70 within the project area (primarily the eastbound lanes), a portion of CR 314, the chain station, the eastbound tunnel, and the west slope of Floyd Hill. The ponds would be adequately sized to filter roadway runoff from existing and expanded paved areas. The ponds would typically be dry except during and after

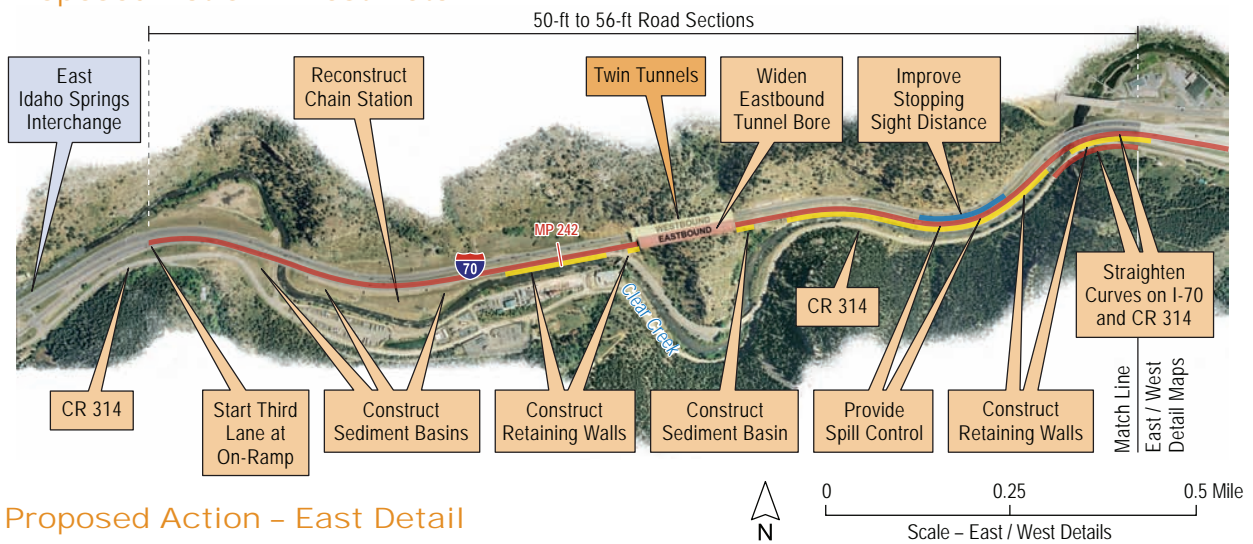
Figure 4-1. Twin Tunnels Proposed Action Overview and Detail Maps

Proposed Action – Overview

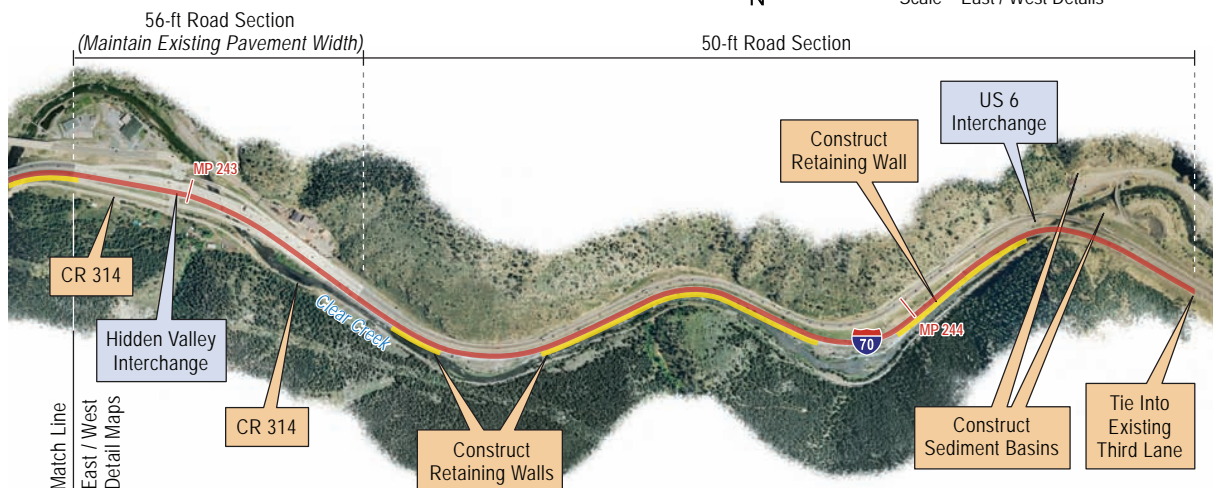


NOTE: Capacity improvements extend from milepost (MP) 241.4 on the west to MP 244.5 on the east. The project limits extend to MP 238.5 on the west where several signs would be installed in the highway median ahead of the capacity improvements.

Proposed Action – West Detail



Proposed Action – East Detail



storm events. Special inlets would be installed to treat stormwater runoff in physically constrained locations that could not accommodate ponds. These inlets would allow sediment to settle out prior to discharging the runoff into Clear Creek.

- **Spill control locations.** New concrete gutters, located in the median of I-70, would capture liquid spills in two locations between the Twin Tunnels and Hidden Valley. These locations experience high numbers of rollover accidents for westbound trucks carrying full loads to mountain communities.
- **New wildlife fencing on north side of I-70 between Clear Creek and west portal of Twin Tunnels.** Existing barbed wire in this location would be replaced with a combination smooth wire/barbed wire design that is more wildlife-friendly and will contain livestock.
- **Variable message signs (VMS), signage, lighting, guardrails.** No new permanent VMS, signage, or lighting would be constructed under the general purpose lanes option, but both would be provided for managed lanes (see below). CDOT would provide guardrails or concrete barriers at retaining walls for safety.
- **Managed lane infrastructure.** Advance signage, comprising VMS and multiple static signs, would be placed along I-70 and west of Idaho Springs to alert drivers to the upcoming managed lane operations. CDOT has carefully considered sign locations and numbers to minimize visual effects and clutter. See [Appendix B, Conceptual Design Plans](#), for a conceptual signage plan for the managed lane.

4.4.3 What are the construction requirements and how long would construction take?

Expansion of the eastbound tunnel bore would require 6 to 9 months of construction, depending on the tunnel width chosen. During that time, I-70 traffic must be detoured to another route. Total construction duration, including preparing for and restoring the eastbound I-70 detour route, would last from approximately December 2012 to March 2014 (pending determinations made in the NEPA process). Construction staging areas could include portions of old US 40 (the area previously used as a game check area) not being used for the eastbound I-70 detour route, the existing eastbound travel lanes on I-70 adjacent to the eastbound I-70 detour route, and the area surrounding the I-70/US 6 interchange at the base of Floyd Hill. These areas within the public right-of-way are anticipated to be sufficient for contractor staging activities; however, the contractor could choose to negotiate with private land owners for access to additional staging areas.

4.4.4 How would I-70 traffic be detoured during tunnel construction?

During expansion of the eastbound tunnel bore, old US 40 (the game check area) and a portion of CR 314 would carry I-70 traffic around the Twin Tunnels on a one-mile detour route (see [Figure 4.4](#) on page 4-14). The eastbound I-70 detour would carry two lanes of traffic at 35 mph. The use of this detour would require reconstruction of a portion of old US 40, rehabilitation of the Doghouse Rail Bridge to accommodate interstate traffic loads, and construction of a transition between CR 314 and I-70 at the east end of the eastbound I-70 detour. CDOT would maintain pedestrian and bike access along CR 314; however, a portion of the existing trail would need to be rerouted during the eastbound I-70 detour operation. Temporary wildlife fencing would be installed along the north side of old US 40 to keep wildlife and bighorn sheep off the roadway while the eastbound I-70 detour is in place.

4.5 What are the Section 4(f) properties in the study area?

Within the Twin Tunnels study area, a total of 11 historic resources, 21 recreational resources, and one wildlife refuge were identified in the I-70 PEIS. Under the Proposed Action for the Twin Tunnels EA, Section 4(f) was found to be applicable to five of the historic properties identified and one of these were determined to have a Section 4(f) use. The evaluation of historic sites is discussed below in Section 4.5.1. Parks and recreational properties in the Twin Tunnels study area were also explored in more detail through site visits and coordination with Clear Creek County and Idaho Springs. These included a number of Clear Creek recreational access points all of which have been determined to be within CDOT ROW. The recreational properties are discussed in [Section 4.5.2](#). The land bridge over the Twin Tunnels was identified as a wildlife refuge during the I-70 PEIS. Through further investigations as part of the Twin Tunnels EA, this parcel of land was determined to be privately-owned, and therefore not protected by Section 4(f).

4.5.1 Historic sites

Studies conducted for the Twin Tunnels EA, identified 19 properties in the area of potential effect (APE), 11 of which were previously identified during the I-70 PEIS. In accordance with the FHWA regulations, Section 4(f) requirements are applicable only to significant historic sites (i.e., those sites listed on or eligible for listing on the NRHP, or sites otherwise determined significant by the FHWA Administrator (23 CFR Section 774.17) and the

Table 4-1. Applicability of Section 4(f) to Significant Historic Sites

Site Name	Site Number	NRHP Eligibility	Section 4(f) Applicable	Proposed Action Use of Section 4(f) Property
Archaeological site	5CC389	Criterion D	No ¹	NA
Archaeological site	5CC2003	Unknown	Assumed ²	None
Colorado Central Railroad	5CC427	Criteria A and B	Yes	None
US Highway 6	5CC1184	Criterion A	Yes	None
Interstate 70 Twin Tunnels	5CC1189.3	Criterion C	Yes	Permanent use of land
US Highway 6/US Highway 40	5CC2002	Criterion A	Yes	None

¹This site is significant because of what can be learned by data recovery and has minimal value for preservation in place. Therefore, per 23 CFR 771.135, Section 4(f) is not applicable to this site.

²Eligibility for inclusion on the National Register of Historic Places has not been determined for this site and therefore, it is unknown if Section 4(f) is applicable to this site. This site is located north of I-70 and beyond the are proposed for improvements under the Proposed Action. For the purpose of this evaluation, it is assumed that Section 4(f) would apply.

FHWA Section 4(f) Policy Paper [3. Historic sites, Section 4(f) Significance]) that are subject to use by the transportation project. Through the Section 106 process for this EA, five of the properties were determined to be listed on the NRHP or determined officially eligible for listing on the NRHP (see **Table 4.1**). One additional property, for which NRHP eligibility is not known, was also identified.

The Section 4(f)-protected properties that were evaluated to determine if the proposed transportation improvements would result in a Section 4(f) use are discussed in detail in this chapter. The location of these properties is shown on **Figure 4.2**. Section 4(f)-protected properties in the study area that were determined not to have direct impacts were evaluated for a constructive use and are discussed in [Section 4.7](#). Historic sites located within the area of potential effect, whether impacted or not, are described in [Section 3.6, Historic Properties](#).

Twin Tunnels Description

The Twin Tunnels (5CC1189.3) are a pair of east and westbound tunnels that are components of I-70 through the Rocky Mountains, at an elevation of about 7,800 feet in Clear Creek County. The tunnels are two miles east of Idaho Springs and 900 feet north of Clear Creek. They were completed in 1961, from a design by the Colorado Department of Highways (now CDOT) and the Bureau of Public Roads (now FHWA). Each opening has a concrete façade and an earthen embankment separates the east and westbound lanes with a steel median barrier in the center of the embankment. The interior walls and openings feature a circular arch design. Twenty-five feet of rock and concrete separate the east and westbound tunnels. The eastbound tunnel is located

at milepost 242.163, and is 665 feet long and 32 feet wide. The westbound tunnel is located at milepost 242.164, 725 feet long and 32 feet wide. The retaining wall between the west-facing portals was part of the original tunnel design and construction in 1961. The east-facing tunnels feature a similar stepped retaining wall, but it is flush with the tunnel portals. The westbound tunnel is about six feet higher than the eastbound tunnel. While the east facing portals are aligned, the west facing portals are staggered.

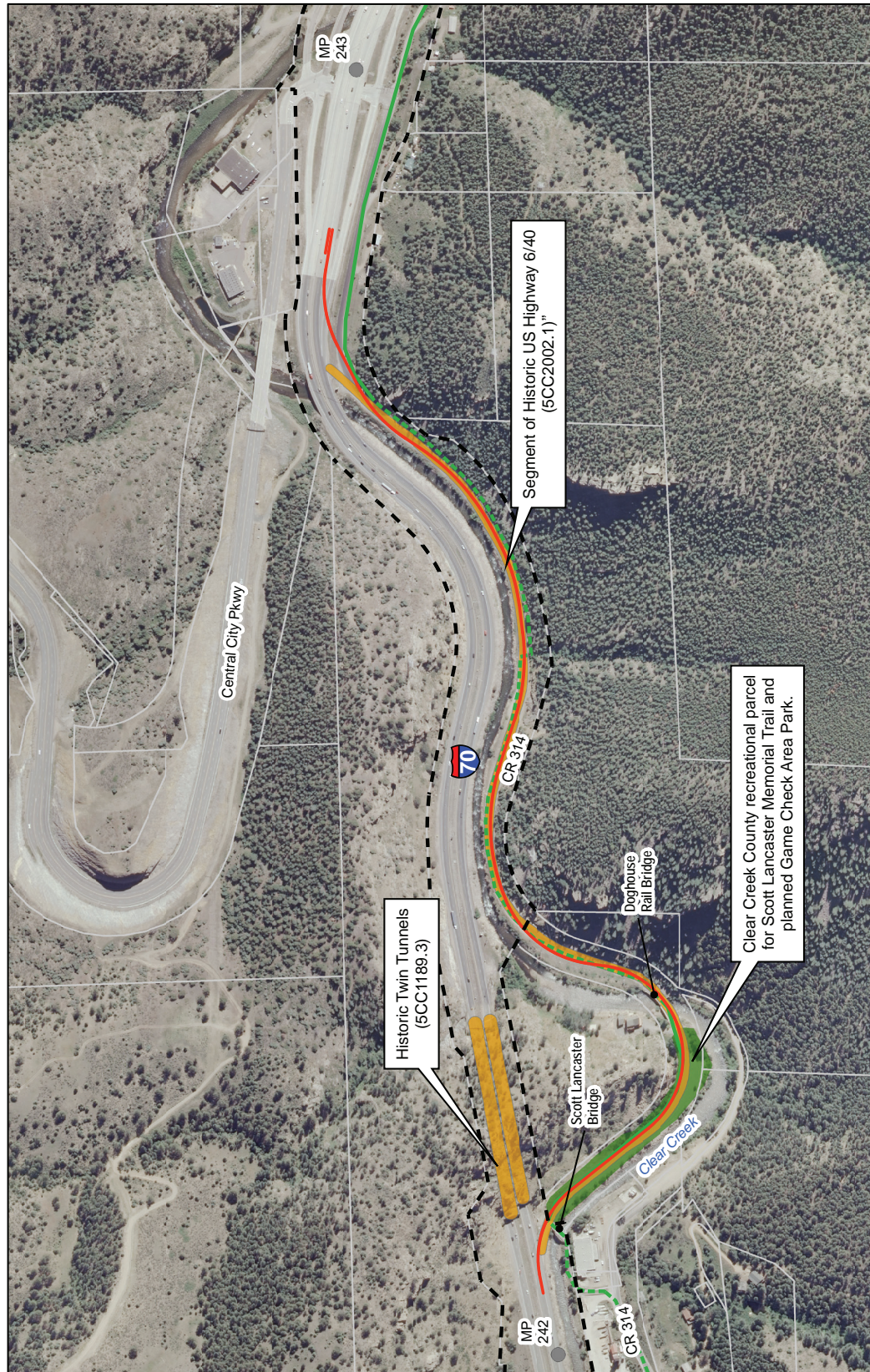
Significance. The tunnels are considered significant as the first successful tunneling operation associated with the construction of I-70 and as important early milestones of the highway’s advancement through the Rocky Mountains. They are on FHWA’s Final

The Twin Tunnels are on FHWA’s Final List of Nationally and Exceptionally Significant Features of the Federal Interstate Highway System in areas of engineering and transportation significance.



Twin Tunnels

Figure 4-2. Location Map of Section 4(f) Properties with a Use Under the Proposed Action



Legend

- Milepost
- ▭ Parcels
- - - CDOT I-70 ROW
- Detour Route

Section 4(f) Properties

- ▭ Historic Properties
- ▭ Game Check Area Park (Planned)
- - - Scott Lancaster Memorial Trail (Off-Street)*
- Scott Lancaster Memorial Trail (On-Street)*

* Assumes Phase 1 of the Frontage Road improvements are in place.

Twin Tunnels Environmental Assessment
CLEAR CREEK COUNTY

Data Source: Colorado DOT (2011 Interstate, and County Boundaries)
Clear Creek County (2011 Streams, City Limits, County Roads, Ownership, Recreation)
CH2M Hill (Historic Sites)

Scale: 1:6,000

0 0.025 0.05 0.1 Miles

N
W E
S

Date: 6/27/2012

List of Nationally and Exceptionally Significant Features of the Federal Interstate Highway System for Engineering and Transportation, and qualify under National Register Criterion C, for their engineering significance. Inclusion on the list of Nationally and Exceptionally Significant Features means that the SAFETEA-LU Exemption under Section 106 of the National Historic Preservation Act for the Interstate Highway System does not apply to the Twin Tunnels.

US Highway 6/US Highway 40 description

The US 6/US 40 route was mostly paved through the state of Colorado by 1938. In Colorado, the length of US 6 is 235.78 miles and US 40 is 403.84 miles. The segment of this route recorded for this project (5CC2002.1) is south of I-70 between exit 243 (Central City Parkway) and the western terminus of the Twin Tunnels. This segment was originally built by volunteers from Idaho Springs and was rebuilt by the Colorado Department of Highways between 1936 and 1938. The segment, shown on **Figure 4.2**, is 4331-foot long and most of the road is two-lanes approximately 28-feet wide. However, west of the Clear Creek Bridge, the road is currently used as a parking area for fishing access and as bike trail. The maximum width of the parking area is 118 feet and exceeds the original confines of the old highway route. East of the Doghouse Rail Bridge, the road is now called East Idaho Springs Road or County Road 314. The county road appears to follow the original highway

alignment but now includes a large turnout area on the east end of the segment that was likely built during the construction of I-70. The west end of the segment has been turned into a CDOT storage area for gravel and other media and has been widened to accommodate parking sometime either during the construction of I-70 or after. The site area, including turn-outs and the parking area is 4.6 acres.

Significance. The overall US 6/US 40 (5CC2002) may be significant under Criterion A for its association with the early transcontinental routes that included parts of US Highway 6 and US Highway 40, known as the Victory Highway. The segment recorded for this project (5CC2002.1) would not support the potential eligibility of the overall US 6/US 40 route because it has been heavily modified. Although the location of the historic segment has not changed, the integrity of design and materials in this segment has been compromised.

4.5.2 Park and recreational resources

Section 4(f) applies to significant publicly-owned and publicly-accessible parks and recreation areas. Pursuant to 23 CFR 774.11(c), Section 4(f) properties are presumed to be significant unless the official having jurisdiction over the site concludes that the entire site is not significant. The applicability of Section 4(f) to parks and recreation areas in the study area is identified in **Table 4.2**. The

Table 4-2. Applicability of Section 4(f) to Existing and Planned Recreation Resources

Resource Name	Ownership	Designated in Adopted Plan?	Publicly Accessible?	Purpose and Function	Significant Recreational Resource?	Section 4(f) Applicable	Type of Use
Skateboard Park	Idaho Springs	Idaho Springs Comprehensive Plan ¹	Yes	Public park; proposed river access point	Yes	Yes	None
Clear Creek Metropolitan Recreation District (CCMRD) Ball fields (Shelley/Quinn Fields)	Idaho Springs	Idaho Springs Comprehensive Plan	Yes	Public park; restrooms, baseball fields, concession stand, parking	Yes	Yes	None
Rock Wall	CDOT ROW	No	Yes	Highway ROW, Secondary use for Informal rock climbing area	Yes	No – primary use is HWY ROW	NA
Clear Creek Recreational Access (9 in study area)	CDOT ROW	Clear Creek County Master Plan ²	Yes	Highway ROW, Secondary use for recreational access	Yes	No – primary use is HWY ROW	NA

(continued on next page)

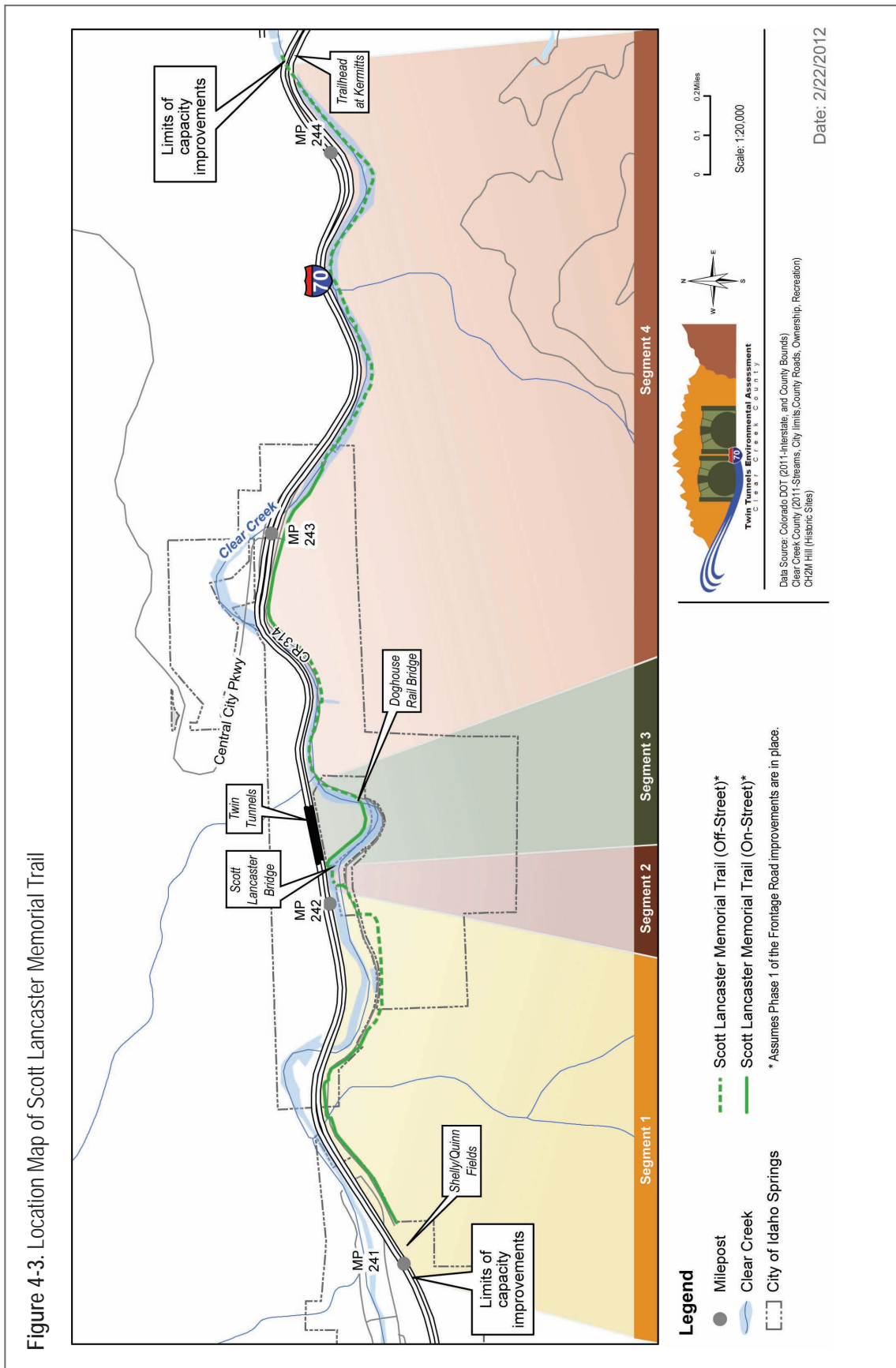
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Table 4-2. Applicability of Section 4(f) to Existing and Planned Recreation Resources

Resource Name	Ownership	Designated in Adopted Plan?	Publicly Accessible?	Purpose and Function	Significant Recreational Resource?	Section 4(f) Applicable	Type of Use
Scott Lancaster Memorial Trail	Clear Creek County	Clear Creek Greenway Plan ³	Yes	Multi-use trail	Yes	Yes	Temporary Use
	Private parcels (with easement)	Clear Creek Greenway Plan	Yes	Multi-use trail	Yes	Yes	None
	CDOW ROW	Clear Creek Greenway Plan	Yes	Highway ROW	Yes	No – primary use is HWY ROW	NA
Kermitts Trailhead	CDOT ROW	Clear Creek Greenway Plan	Yes	Highway ROW, Secondary use as informal trailhead parking	Yes	No – primary use is HWY ROW	NA
Trail at Hidden Valley Interchange (planned)	Private parcels (no easement)	Clear Creek Greenway Plan	No	Potential multi-use trail along Clear Creek	Yes	No – privately owned	NA
	CDOT ROW	Clear Creek Greenway Plan	Yes	Highway ROW, Potential secondary use for trail	Yes	No – primary use is HWY ROW	NA
Game Check Area Park (planned)	Clear Creek County	Clear Creek Greenway Plan	Yes	Planned park including trailhead, parking, and restrooms (currently used informally for recreational access)	Yes	Yes	Temporary Use
Simpson Property and Trail Rest Area (planned)	Clear Creek County	Clear Creek Greenway Plan	Yes	Open space planned for picnic sites along Scott Lancaster Memorial Trail	Yes	Yes	None
Park (Former Sewage Treatment Site) (planned)	Idaho Springs	Clear Creek Greenway Plan	Yes	Planned park including restrooms	Yes	Yes	None
Greenway Creekside Trail (planned)	Private parcels (no easement)	Clear Creek Greenway Plan	No	Potential multi-use trail along Clear Creek	Yes	No – privately owned	NA
	CDOT ROW	Clear Creek Greenway Plan	Yes	Highway ROW, Potential secondary use for trail	Yes	No – primary use is HWY ROW	NA

¹City of Idaho Springs, 2008²Clear Creek County, 2004³Clear Creek County, 2005

ROW = right-of-way, HWY = Highway, NA = Not Applicable



Section 4(f)-protected properties that were determined to have a use by the proposed transportation improvements are discussed in detail in this chapter. **Figure 4.2** shows the location of these properties. Section 4(f)-protected properties in the study area that were determined not to have direct impacts were evaluated for a constructive use and are discussed in Section 4.7. The parks and recreation resources identified within the study area, whether impacted or not, are described in Section 3.18 *Recreation Resources* of the EA.

Scott Lancaster Memorial Trail

The Scott Lancaster Memorial Trail is shown on **Figure 4.3**. The Scott Lancaster Memorial Trail connects between Idaho Springs and the junction of US 6 and I-70 where there is an informal trailhead known as Kermitts Trailhead. The Scott Lancaster Memorial Trail is a part of a system of trails in Clear Creek County (CCC) documented in the Clear Creek Greenway Plan (CCC, 2005). The greenway system currently extends from county line to county line. Although the ultimate vision for the Scott Lancaster Memorial Trail and the larger greenway system is for a separated multi-use trail, the resource currently exists as paved linkages of signed, off-street multi-use trails and on-street routes (Shanks, 2012a). No counts have been conducted to document the volume of use on the Scott Lancaster Memorial Trail. Casual observations indicate that use includes fishing access and cyclists and is generally higher west of the Hidden Valley Interchange (Shanks, 2012a).

The Scott Lancaster Memorial Trail is publicly owned, publicly accessible, and considered a significant recreation resource. The trail and bridge over Clear Creek were constructed as a memorial to an Idaho Springs high school student who was killed by a mountain lion in 1991. The trail crosses multiple parcels with varied ownership including CDOT right-of-way (ROW). Although CDOT has allowed portions of the trail to be constructed and maintained by Clear Creek County within CDOT ROW, the primary purpose of the ROW is for transportation use.

The Scott Lancaster Memorial Trail is depicted in **Figure 4.3**. The following description of segments assumes that Phase 1 of the CR 314 improvements is in place. The Frontage Road Phase 1 improvements include reconstruction of CR 314 between the Doghouse Rail Bridge and Hidden Valley Interchange with provision of a separated 10-foot-wide shared use path between the roadway and Clear Creek.

Segment 1. Within the Twin Tunnels study area, the trail proceeds east from Shelly/Quinn Fields

along CR 314 in an on-street condition to a point just east of Whitewater Road where it is detached from CR 314 and climbs up the hill above and south of CR 314. The trail rejoins CR 314 across from the Clear Creek Rafting company and proceeds along CR 314 in an on-street condition for approximately 400 feet before veering north towards Clear Creek. This portion of the trail exists on easements through private land and within CR 314 ROW owned and maintained by CCC.

Segment 2. From the south bank of Clear Creek, the trail crosses Clear Creek on the existing Scott Lancaster Bridge. This segment of the trail is within CDOT ROW and is subject to a 1993 license agreement with CCC.

Segment 3. After crossing the Scott Lancaster Bridge, the trail is located on old US 6/US 40 along the base of the hill over the Twin Tunnels. The trail proceeds across Clear Creek again on the Doghouse Rail Bridge and continues along the south side of Clear Creek as a 10-foot-wide separated shared-use path along the north side of CR 314. The portion of the trail between the Scott Lancaster Bridge and a point approximately 600 feet east of the Doghouse Rail Bridge is owned by CCC.

Segment 4. The 10-foot-wide separated shared-use path proceeds east along the north side of CR 314 to a point west of the Hidden Valley Interchange. At this point, the trail proceeds east in an on-street condition for approximately 1,000 feet before becoming a separate detached trail on the south side of Clear Creek to the junction of US 6 and I-70. This segment of the trail is primarily within CDOT ROW. The segment of the trail between the Hidden Valley Interchange and the junction of US 6 and I-70 is subject to a 1995 license agreement with CCC.



Scott Lancaster Memorial Trail

Both the 1993 and 1995 license agreements stipulate that "...the State must retain the superior right to use the State's right of way for highway purposes and that the County's use of the State right of way, as described in Exhibit A, is at all times subordinate to and subject to any and all current and future interstate roadway operations, maintenance and State highway needs and purposes, as determined by the State in its discretion." In both cases, the agreement is "limited in scope, use and time" and "vests no interest or right of any nature in the State right of way to the County." The agreements do not constitute an easement in perpetuity for the purposes of recreational use. Therefore, Section 4(f) is not applicable to these portions of the trail (Segments 2 and 4) because the primary purpose and function of this land is highway ROW for transportation use. Section 4(f) is applicable to the segments of the trail on CCC parcels or within permanent easements for recreational use (Segments 1 and 3).

Game Check Area Park (planned)

The Game Check Area Park is identified in the Clear Creek Greenway Plan as a planned park and trailhead with parking and restrooms. The land, which is owned by CCC, is located south of the Twin Tunnels (identified in **Figure 4.2**) and was formerly a Division of Wildlife (now Colorado Parks and Wildlife) game check station site. Currently, the site is traversed by the Scott Lancaster Memorial Trail and provides informal parking for recreational access. Because this planned facility is publicly owned, has been formally designated as a planned recreational facility in the Clear Creek Greenway Plan, and is a significant component of the greenway, Section 4(f) applies to this property. This planned facility is identified as an early action item in the Clear Creek Greenway Plan and CCC has initiated the process to prepare a master plan for the park (Tableman, 2012).

4.6 How does the Proposed Action use the Section 4(f) properties in the study area?

4.6.1 Use of Twin Tunnels

The Proposed Action would widen and increase the height of the eastbound bore of the tunnels and reconstruct the portal area. Widening is proposed to accommodate three travel lanes, shoulders, and evacuation walkways. The proposed roadway section would increase from 29 feet to 50 feet or 56 feet resulting in a tunnel width of 51 feet or 61 feet as compared with the existing width of approximately 32 feet. The height of the tunnel would increase from 17.6 feet to 29 feet or 32 feet to provide clearance for vehicles in the new outside travel lane. CDOT plans to make a final

decision on the size of the tunnel as part of the EA process, but the relative difference in size between the design options was deemed irrelevant to the Section 4(f) use. In addition to the larger bore, the face of the eastern tunnel bore would be modified to become more three-dimensional. The existing flat portal at the tunnel entrance exacerbates drivers' perceptions of the narrowness of the tunnel and this "tunnel effect" is considered by experts to reduce the capacity of the Twin Tunnels by as much as 30 percent. Redesigning the entrance is intended to increase capacity independent of the proposed additional travel lane. The proposed tunnel improvements would alter the design, materials, workmanship, and feeling of this historic property and were deemed an adverse effect to this historic property as part of the Section 106 process. As such, the Proposed Action would constitute a Section 4(f) use of the property.

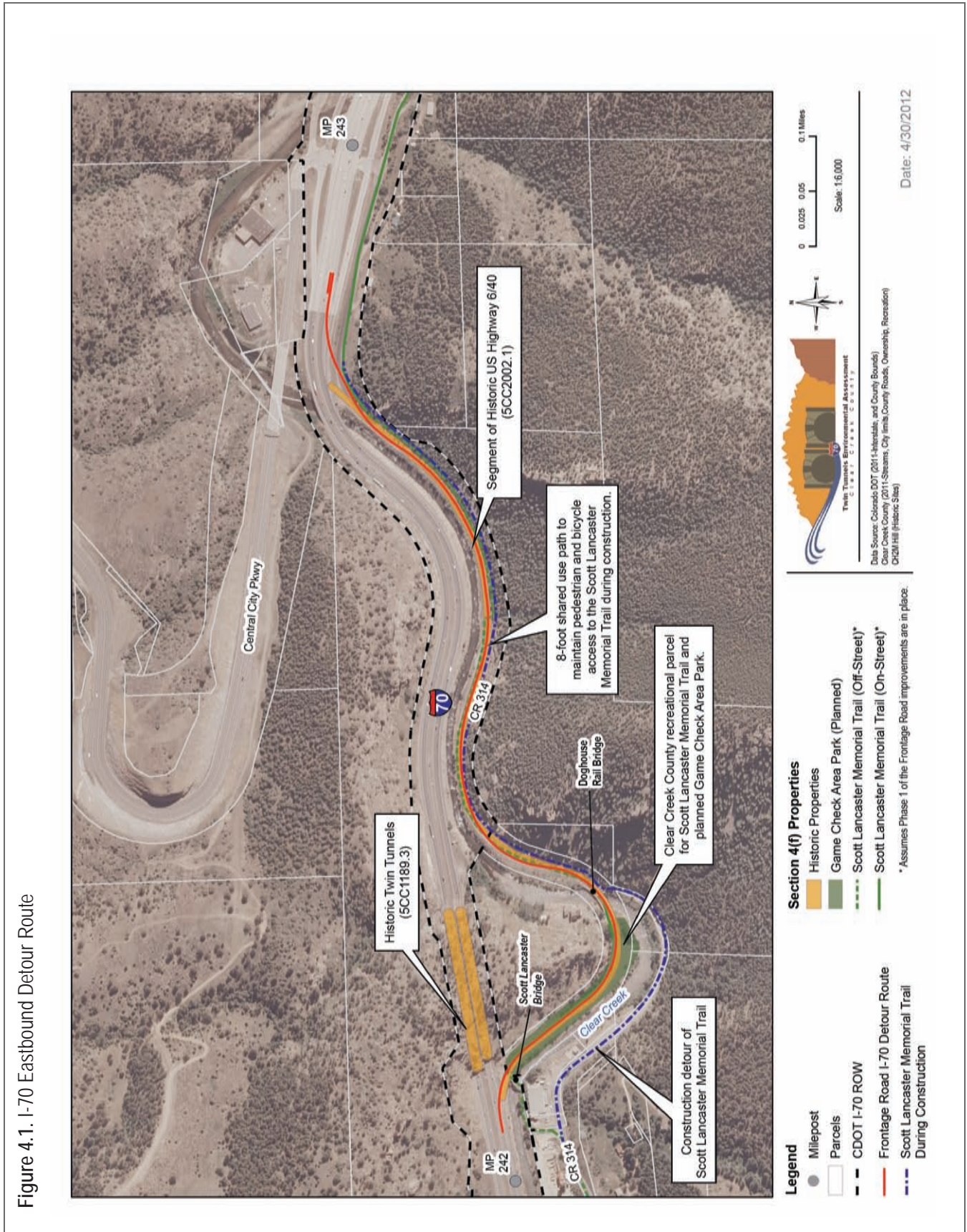
Options under consideration for the Proposed Action, including the two different roadway cross sections, use of a managed lane or general purpose lane, and tolling, do not affect the determination of use for this property

Use of US Highway 6/US Highway 40

During construction, the portion of the old US 6/US 40 between the west end of the Twin Tunnels and Hidden Valley Interchange would be used as a detour route (see **Figure 4.4**). The affected segment (5CC2002.1) provides access to a CDOT maintenance facility as well as recreational (fishing and rafting) access. The eastbound I-70 detour would follow the entire length of 5CC2002.1 routing two lanes of eastbound I-70 along the alignment of this historic property. This temporary detour would require reconstruction of this segment of old US 6/US 40, rehabilitation of the Doghouse Rail Bridge to accommodate interstate traffic loads, and construction of a transition between CR 314 and I-70 at the east end of the eastbound I-70 detour. Through the Section 106 process, the reconstruction and use of 5CC2002.1 as a temporary detour route were deemed to have no adverse effect to the overall length of US 6/US 40 (5CC2002) because this segment does not support the overall historic significance of US 6/US 40 (5CC2002). Because the Proposed Action would not demolish the historic highway and would not have an adverse effect on this historic property, no Section 4(f) use would occur.

The Proposed Action would result in a Section 4(f) use of the historic Twin Tunnels.

The Proposed Action would not require use of the US 6/US 40 historic property.



4.6.2 Park and Recreational Properties

Use of Scott Lancaster Memorial Trail

The use of CR 314 and old Hwy 40 as a detour route for eastbound interstate traffic during construction will result in a temporary use of Segment 3 of the Scott Lancaster Memorial Trail as defined in 23 CFR 774.17 (**Figure 4.4**). The eastbound I-70 detour, which will carry up to 2,700 vehicles per hour with a speed limit of 35 mph, will be in place for up to seven months through the summer and fall of 2013, pending determinations made in the NEPA process. It is anticipated that old Hwy 40, will be closed to pedestrian and bicycle traffic near the end of 2012 as construction crews begin preparations for the eastbound I-70 detour route. During construction, bicycle and pedestrian use of the Scott Lancaster Memorial Trail would be maintained to the extent practicable. Within Segment 3 of the Scott Lancaster Memorial Trail, the following provisions would be made:

- Pedestrian and bicycle traffic would be rerouted to CR 314 instead of using the segment of the trail across the Scott Lancaster Bridge and through the game check area. This portion of CR 314 is gravel and would only be used by bicycles, pedestrians, and emergency vehicles during the detour.
- East of the Doghouse Rail Bridge, an 8-foot wide shared use path would be provided along the south side of CR 314. The path would be paved and separated from vehicular traffic using the eastbound I-70 detour by a concrete barrier.

While the eastbound I-70 detour route is being constructed and also when it is being restored after the detour, pedestrians and cyclists could experience construction-related delays on CR 314 east of the Doghouse Rail Bridge. Although pedestrian and bicycle access can be maintained during these times, it is likely there would only be one lane available for pedestrian, bicycle, and vehicular traffic and this lane would be managed using flaggers to direct two-way operation of traffic. It is possible that construction-related delays and inconvenience could deter some recreationalists from using the trail during construction. After eastbound interstate traffic is returned to the I-70 corridor, the Scott Lancaster Memorial Trail will be restored to a condition that is at least as good as that which existed prior to the Proposed Action (which includes Frontage Road Phase 1 improvements).

The Proposed Action would not result in acquisition of this parcel or preclude the long-term use of the Scott Lancaster

Memorial Trail. The anticipated impacts are not considered a temporary occupancy because temporary interference to the activities, features and attributes of the property are anticipated due to construction-related delays and inconvenience. It

is possible that some recreationalists would be deterred from using the facility due to the temporary placement of interstate traffic on the eastbound I-70 detour. This traffic (up to 2,700 vehicles per hour) is a substantial increase in traffic volume placed immediately adjacent to recreationalists. This is not a minor change.

Options under consideration for the Proposed Action, including the two different roadway cross sections, use of a managed lane or general purpose lane, and tolling, do not affect the determination of use for this property.

Use of Game Check Area Park (planned)

The eastbound I-70 detour route described above would also result in a temporary use of the planned Game Check Area Park (see **Figure 4.4**). This planned park is within the same parcel as Segment 3 of the Scott Lancaster Memorial Trail. Although the park has not yet been developed, it already serves as an informal parking area and trailhead, which is part of its ultimate intended function. Prior to and during the eastbound I-70 detour, up to 10 months, this area will be unavailable for parking or use as a trailhead. After the detour, this area will be returned to existing conditions (or better) for use as an informal parking area and trailhead. Coordination with Clear Creek County is on-going to determine the post-construction condition of this property.

The Proposed Action would not result in acquisition of this parcel or preclude the planned development and use of this park. The anticipated impacts are not considered a temporary occupancy because the scope of the work is not minor and there will also be temporary interference to the activities of the property.

Options under consideration for the Proposed Action, including the two different roadway cross sections, use of a managed lane or general purpose lane, and tolling, do not affect the determination of use for this property.

The Proposed Action would result in a temporary use of the Scott Lancaster Memorial Trail.

The Proposed Action would result in a temporary use of the Game Check Area Park.

4.7 Are there avoidance alternatives available and are they prudent and feasible?

According to 23 CFR 774.17, an alternative is not feasible if it cannot be constructed as a matter of sound engineering judgment. An alternative is not prudent if:

- It compromises the project to a degree that it is unreasonable to proceed with the project in light of the stated purpose and need.
- It results in unacceptable safety or operational problems.
- After reasonable mitigation it still causes:
 - Severe social, economic or environmental impacts.
 - Severe disruption to established communities.
 - Severe disproportionate impacts to minority or low income populations.
 - Severe impacts to environmental resources protected under other federal statutes.
- It results in additional construction, maintenance, or operational costs of an extraordinary magnitude.
- It causes other unique problems or unusual factors.
- It involves multiple factors (listed above) that while individually minor, collectively cause unique problems or impacts of extraordinary magnitude.

4.7.1 Avoidance Alternatives

As described in Section 4.6, the Proposed Action would result in a use of three Section 4(f) properties. Alternatives that would avoid Section 4(f) properties must be identified and evaluated [23 CFR 774.7(a)]. The alternatives listed below would avoid any use of identified Section 4(f) properties in the Twin Tunnels study area. These alternatives were evaluated and eliminated as not being prudent and feasible.

No Action

The No Action would completely avoid the identified Section 4(f) properties in the Twin Tunnels study area. However, this alternative would not address the issues with congestion and safety as described for the project purpose and need. Based on this, the No Action does not meet the project purpose and need and, therefore, is not feasible and prudent.

I-70 Mountain Corridor PEIS Alternatives

The I-70 PEIS evaluated a number of corridor alternatives, some of which may avoid use of the Section 4(f) properties

in the Twin Tunnels study area. These include aviation alternatives, alternate routes, transportation management (such as travel demand management and pedestrian and bicycle facilities), localized highway improvements, fixed guideway transit, rubber tire transit (refers to a range of transit options that provide dedicated or priority lanes for buses, high occupancy vehicles, and tolled automobiles) and highway elements such as flex lanes and a movable median. In all cases, these corridor alternatives do not meet the Twin Tunnels purpose and need. None of these alternatives would remove enough traffic from I-70 to address the project's mobility needs. The mobility needs and issues of dramatic congestion in the eastbound direction would remain. In addition, none of these alternatives would address the problematic operational characteristics of sharp curves or real and perceived narrowness of the tunnels.

Because these alternatives do not meet the purpose and need, these corridor alternatives are not considered feasible and prudent. More detail about these alternatives is contained in the [I-70 PEIS, Section 3.14.7](#) (CDOT, 2011a).

Idaho Springs Northern Bypass Alternative

This alternative was developed during the Idaho Springs Visioning process in October 2009 and would relocate I-70 to the north of the Twin Tunnels area, thus avoiding any use of the identified Section 4(f) properties in the Twin Tunnels study area (CDOT, 2011b).

This alternative, shown on **Figure 4.5**, deviates from the current I-70 alignment at the Hidden Valley Interchange and climbs up on the hillside north of I-70. This alternative would completely bypass Idaho Springs by placing a new alignment north of the city rejoining the current I-70 alignment at the west Idaho Springs interchange. This alternative is similar to an alternative considered in the I-70 PEIS as a parallel route north of Idaho Springs between Fall River Road and the Hidden Valley Interchange. However, this alternative would replace I-70 with a four-lane highway.

The bypass alignment follows an area of extreme topography which would result in large cuts and fills. The alternative requires a 10 percent grade to tie into the existing I-70 interchanges at Hidden Valley and west Idaho Springs. This grade is well over the standard American Association of State Highway and Transportation Officials (AASHTO) criteria of 6 percent for mountainous terrain. Heavy vehicles and passenger vehicles alike have difficulty negotiating 7 percent grades in both dry and icy conditions. There are several extended steep grade sections of up to 7 percent in the I-70 corridor that were evaluated in the I-70 PEIS. These segments were cited as creating safety problems, decreasing capacity, and increasing congestion. Ten percent grades would exceed any of the existing grades

in the corridor and would have significant adverse effects on mobility and safety.

Substantial excavations would be required including 80-foot cuts in numerous locations and 100-foot-deep earth fills. These large excavations would produce substantial spoil material with the potential for mineralization (which is a water quality concern). The area north of Idaho Springs is also riddled with mine shafts and tunnels, substantially increasing the difficulty of construction. Some of the mine shafts and tunnels may also be classified as historic. A number of high-clearance bridges would be required including a 460-foot-high bridge in one location.

A complex interchange would be required at the existing Hidden Valley Interchange to accommodate the new I-70 alignment, Central City Parkway, CR 314, and local business access. The existing canyon terrain may not accommodate the required footprint for this complex interchange. The new I-70 alignment would also be parallel to the Central City Parkway, requiring either relocation of the Parkway, a viaduct, or an additional interchange at the top of the ridge. This new alignment would be highly visible to the residents of Idaho Springs and could have severe economic impacts to Idaho Springs because the retail establishments in Idaho Springs would no longer be easily visible and accessible to travelers on I-70.

From a technical perspective, this alternative would compromise the project to a degree that is unreasonable to proceed with the project in light of its stated purpose and need. This factor coupled with the unacceptable safety and operational problems associated with this avoidance alternative are cumulative of an extraordinary magnitude. For these reasons, this alternative is not feasible and prudent.

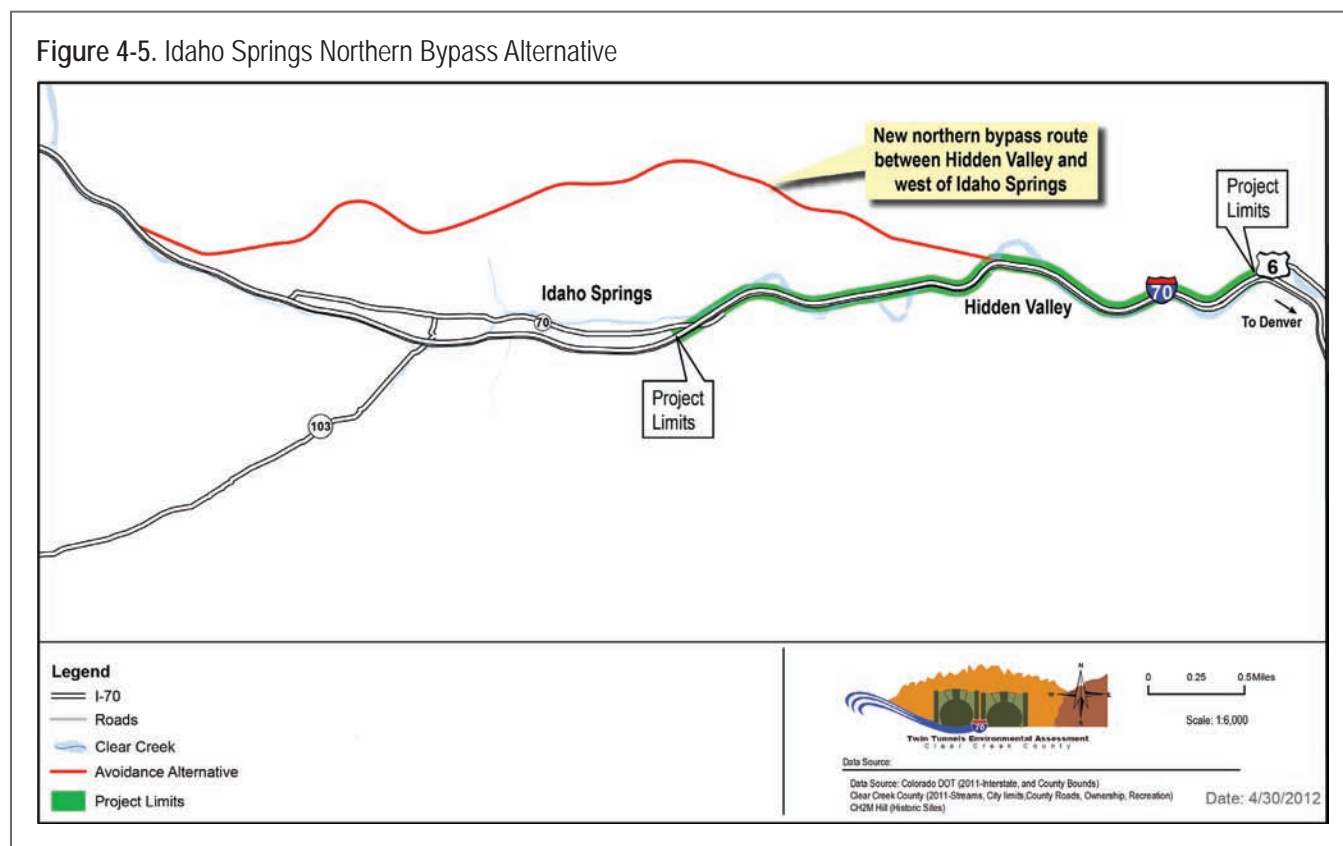
4.7.2 Partial Avoidance Alternatives

Additional alternatives were identified that would avoid some, but not all of the Section 4(f) properties in the study area. With the exception of Concept Package 7 (CDOT, 2011b), the following alternatives were evaluated and eliminated as not being prudent and feasible. These partial avoidance alternatives are discussed in more detail below.

Concept Package 7

Concept Package 7 was developed during the CDOT [Tunnel Visioning](#) workshop in February 2011 and was analyzed in the [I-70 PEIS](#) (at the corridor concept level) as the Preferred Alternative at this location. The alternative is a modified version of the alternative analyzed in the I-70 PEIS. The design for the new tunnel bore was shifted further to the south to maintain 100 feet of separation from the existing

Figure 4-5. Idaho Springs Northern Bypass Alternative



east-bound tunnel. This was deemed necessary to maintain the structural integrity of the existing tunnel.

This alternative includes a third bore south of the existing Twin Tunnels and is analyzed as an avoidance alternative for the Twin Tunnels (Figure 4.6). Although it is unknown at this time, the addition of a third bore under Concept Package 7 may result in a constructive use of the Twin Tunnels due to the changes in the setting. Because the Section 106 effect is not known, this alternative was evaluated as a potential avoidance alternative.

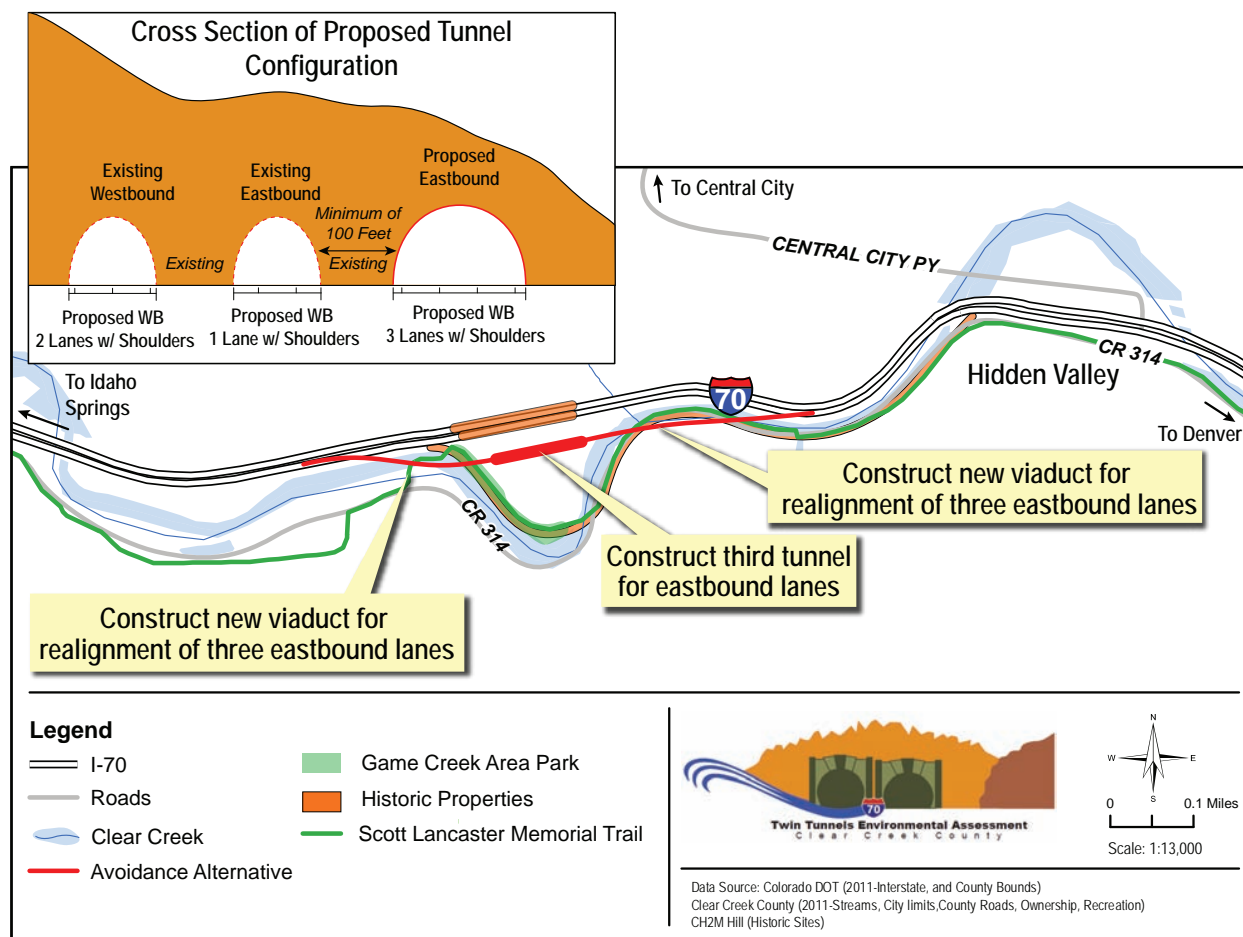
This alternative involves realigning an approximately ¾-mile segment of eastbound I-70 and constructing a third bore to accommodate a third tunnel south of the existing tunnels. The third tunnel would accommodate three eastbound lanes with improved shoulders. The existing eastbound tunnel would be converted for use as an additional westbound lane or could be used in the future for AGS or other transit. Other elements of this alternative would include curve flattening and a third eastbound lane from

Idaho Springs eastern most interchange to the bottom of Floyd Hill, similar to the Proposed Action.

The new tunnel would be approximately 750 feet long and 56 feet wide. A 1,400-foot-long viaduct east of the new tunnel would cross over Clear Creek and CR 314 along a roughly parallel alignment for nearly 100 feet. West of the tunnel, a 700-foot-long viaduct could cross over the planned Game Check Area Park, the Scott Lancaster Bridge, and Clear Creek before rejoining the existing I-70 alignment.

This alternative meets the purpose and need and could feasibly be constructed. This alternative would have direct, indirect, and temporary impacts to surrounding community and natural resources (see Table 4-4). The cost of constructing this alternative is estimated to be more than twice the cost of the Proposed Action and operation and maintenance costs associated with the viaducts would also be higher. Depending on which cross section is selected, the capital cost of the Proposed Action would range between

Figure 4-6. Concept Package 7



\$71 million and \$90 million. The estimated capital cost of Concept Package 7 is \$171 million.

The Concept Package 7 alternative is discussed in more detail in the [Tunnel Visioning report](#) (CDOT, 2011b).

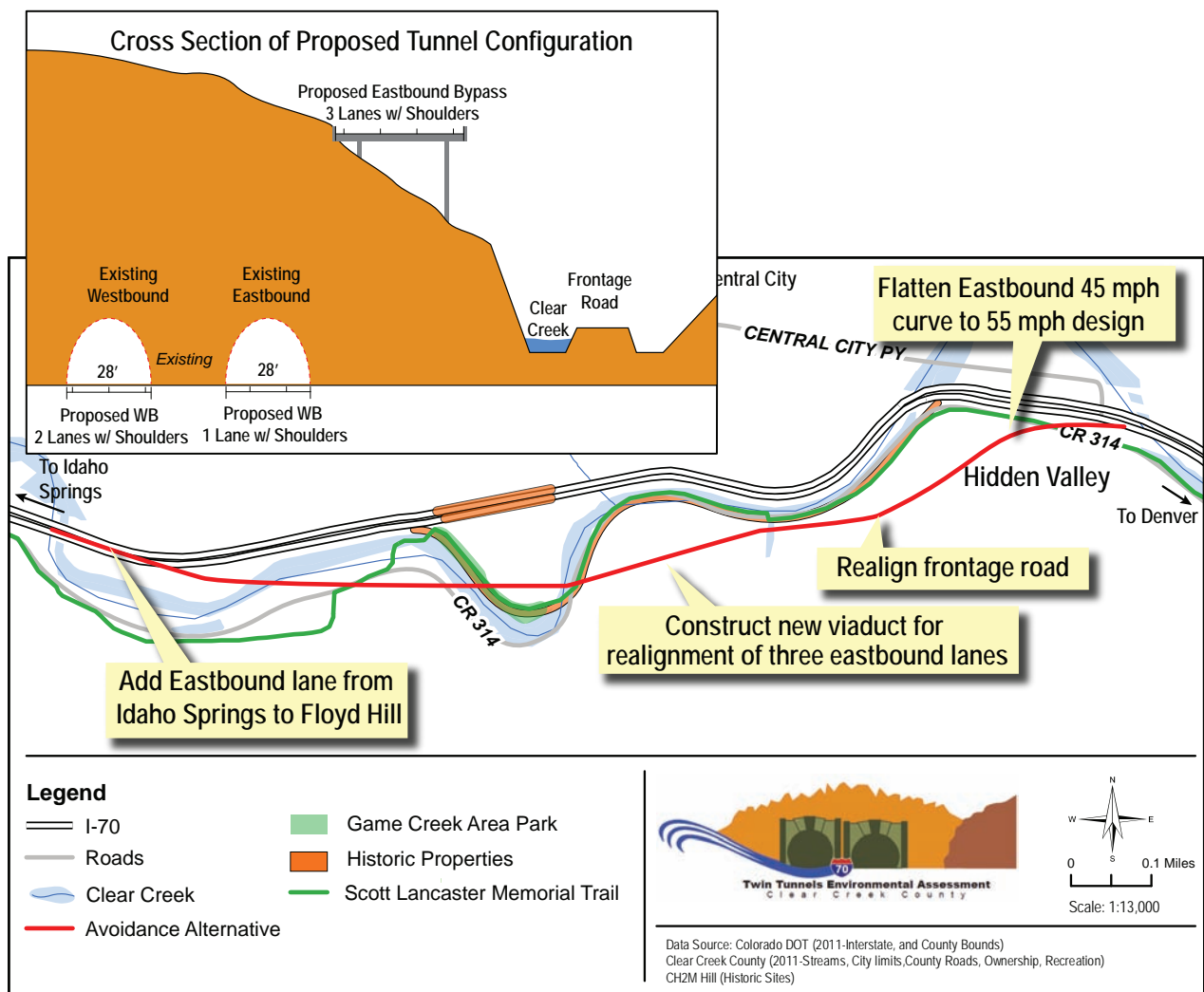
Concept Package 5 (Flyover viaduct south of existing Twin Tunnels Alternative)

The Concept Package 5 alternative was developed during the CDOT [Tunnel Visioning](#) process in November 2011. It involves constructing a flyover viaduct south of the tunnels for new eastbound lanes and converting the existing tunnels for westbound traffic (see **Figure 4.7**). The flyover would be located on the south side of the land mass through which the Twin Tunnels pass and would avoid use of the Twin Tunnels.

This alternative would require three new bridge crossings of Clear Creek, which could result in increased erosion/sedimentation, increased nonpoint source pollution, and long-term channel instability. Riparian areas along Clear Creek in this vicinity are of high quality because I-70 is in the tunnel. Additionally, because the alternative would cross the land mass over the Twin Tunnels partially at grade, it would disturb a current movement corridor for big game.

This alternative would cross over the Scott Lancaster Memorial Trail at four locations and would cross over the center of the planned Game Check Area Park. The viaduct would become a prominent, and in some cases dominant, element in the view of recreationalists along the Scott Lancaster Memorial Trail for over 1 mile of the trail's length. By crossing through the center of the Game Check

Figure 4-7. Concept Package 5



Area Park, this alternative would permanently change the character of this recreational parcel, which is a relatively unique location along the Clear Creek Greenway because it is buffered from I-70 by the land mass south of the Twin Tunnels. The recreational value of this parcel would be substantially impacted with this flyover alternative. With three crossings of Clear Creek, the viaduct structure would also alter the character of the river corridor through this stretch, thereby impacting the recreational experience of anglers and rafters.

In addition to the undesirable community and natural resource impacts, the safety issues presented by this alternative are unacceptable. The alternative requires a viaduct structure more than 1 mile long, which is a safety concern due to freezing and icing. This alternative requires 7 percent grades on this structure which exceeds AASHTO standard design criteria of 6 percent (for mountainous terrain at a 50 mph design speed) and exacerbates the safety issues related to freezing and icing. These steep grades combined with the long viaduct structure and increased potential for icing would result in the development of a severely unsafe segment of the interstate system with limited detour options in the event of an incident. Maintenance and emergency response issues are also a concern as a result.

This alternative is not feasible and prudent because these multiple factors (severe safety associated with the seven percent grade on a long viaduct structure, substantial adverse effects to the bighorn sheep movement corridor and herd viability, and recreational impacts) cumulatively cause impacts of an extraordinary magnitude.

Construct improvements using the westbound tunnel as the detour

This alternative assumes that while the eastbound tunnel is being widened, all lanes of I-70 traffic will use the westbound tunnel. The lanes in the westbound tunnel will be reconfigured to carry one lane each direction. This detour would be in operation 24 hours a day, 7 days a week for up to 7 months. This alternative would avoid use of the Scott Lancaster Memorial Trail, the planned Game Check Area Park, and the historic US 6/US 40 route.

The segment of I-70 through the study area is the most congested segment studied in the I-70 PEIS. Currently, drivers experience extreme congestion (speeds of less than 20 mph) in both the eastbound and westbound directions during peak travel times. Because this alternative would cut the capacity of this congested interstate segment by more than half, severe traffic delays and unacceptable operational problems would result. Based on current summer traffic volumes through the study area, congested conditions would occur through much of the weekend, and

the length of time that drivers would experience extreme congestion would increase substantially. It is anticipated that extreme congestion in the eastbound direction would begin Sunday morning and not clear up until late Tuesday evening, a period of more than 60 hours during which traffic could back up for over 50 miles, if there were no reduction in travel demand. In the westbound direction, it is anticipated that extreme congestion would begin Friday morning and last until late Monday night, a period of more than 80 hours during which traffic could back up for over 30 miles, if there were no reduction in travel demand.

Operating the westbound tunnel with two directions of traffic would increase the probability of crashes even with use of barriers. The severe congestion discussed above would further increase the probability of crashes, especially rear-end and side-swipe crashes. The provision of emergency services would be severely impaired, particularly if there is a crash in the westbound tunnel. These safety problems would be unacceptable.

The only routes around this bottleneck would be SH 9 or CR 316 to US 285, both of which would be substantially overloaded by adding traffic from I-70. Using SH 9 and US 285 would increase the distance between C-470 and Frisco (which is 59 miles on I-70) to 111 miles, almost doubling the distance. This alternative route consists primarily of a two-lane, mountainous roadway, which already carries heavy directional traffic (at or near capacity) during the same periods as I-70 since it also provides access to and from mountain recreational destinations. Using CR 316 and US 285 would be even more problematic. This alternate route would increase the distance between C-470 and Georgetown (which is 34 miles on I-70) to 84 miles, more than doubling the distance. The route would traverse a windy mountain road over Guanella Pass, which is closed typically from end of November to end of May. This alternate route could not handle the additional traffic. Use of either of these alternate routes would create unacceptable safety and operational problems.

The substantial travel delays during construction would severely discourage non-essential trips such as recreational travelers who might otherwise visit mountain communities. Additionally, the provision of goods and services to Clear Creek County would be substantially impaired. The economic impact of this alternative to Clear Creek County and other mountain communities during peak summer periods would be severe.

This alternative is not feasible and prudent because of unacceptable safety and operational problems (to the regular I-70 commuter, emergency service providers, and recreational travelers both on I-70 and the alternate routes) and severe social and economic impacts.

Use CR 314 for only one eastbound lane

This alternative is similar to the Proposed Action (Figure 4-4), except that only one eastbound detour lane would be provided for eastbound I-70 traffic during construction. Therefore, the detour could be routed along a portion of CR 314 and the remainder of the pavement on CR 314 would be open for recreational use. It would avoid use of the Scott Lancaster Memorial Trail, but would still result in a use of the Twin Tunnels, planned Game Check Area Park, and the historic US 6/US 40 route.

The impacts of this alternative would be even more severe than routing eastbound traffic through the westbound tunnel. Even with improved shoulders, one eastbound lane along CR 314 would have about two-thirds the capacity of one eastbound lane along I-70 in the westbound tunnel. With the exception of operating the westbound tunnel with two directions of traffic, all of the other operational and safety issues discussed for the previous alternative would occur under this alternative and would be more severe. Because the travel delays would be even more severe, visitation and provision of goods and services to Clear Creek County would also be impacted to an even greater extent.

This alternative is not feasible and prudent because of unacceptable and severe operational problems and severe economic impacts to the provision of goods and services along this segment of I-70.

Close the eastbound lanes for periods of time while the tunnel is being blasted

This alternative consists of closing the eastbound lanes for periods of time on a daily basis while the tunnel is being blasted. There would be no detour of I-70 traffic, specifically onto CR 314, which would avoid use of the Scott Lancaster Memorial Trail, the planned Game Check Area Park, and the historic US 6/US 40 route.

This concept would route traffic through a tunnel that is being excavated. Tunneling activities require that extensive equipment be used inside the tunnel to excavate and construct the tunnel structure. This equipment and the construction process are in direct conflict with maintaining traffic through the same space. Maintaining traffic through a tunnel that is being excavated would require a substantial portion of the available work time each day to make the roadway safe. The rock would need to be stabilized and a liner placed over it so that no rock would fall on vehicles traveling through the tunnel. Additionally, construction crews would need to mobilize large and extensive tunneling equipment into and out of the tunnel each shift. This scenario would require that only a small area of the tunnel be worked on each day and, thus, very little construction progress would be achieved. Given the large tunnel surface

area and volume of rock that needs to be excavated, the time required to perform the excavation and finish the tunnel structure would be prohibitively long. The cost associated with the traffic control, equipment mobilization, and duration of construction would also be prohibitive.

During the construction period, eastbound I-70 traffic would be closed every evening and through the night and early morning. Westbound traffic may also be closed for 30-minute intervals if blasting or other construction operations are employed which would jeopardize safety in the westbound bore. Although schedule for closures would avoid the peak traffic periods of I-70 traffic, this alternative would still cause substantial inconvenience for eastbound travelers who forgo trips during these daily closures or attempt to travel on alternate routes. As discussed under the [Section 4.7.2.3, Construction improvements using the westbound tunnel as the detour](#) alternative, the available alternate routes would add substantial length to trips and cannot accommodate the traffic volumes. Visitation and provision of goods and services to Clear Creek County would be substantially affected causing severe economic impacts. Because these impacts would occur for many years, the severity of impact would be far greater than the Proposed Action.

This alternative is not feasible and prudent because of unacceptable operational problems (to the regular I-70 commuter, emergency service providers, and recreational travelers both on I-70 and the alternate routes), severe social and economic impacts, and additional costs of an extraordinary magnitude.

4.8 What measures to minimize harm have been included?

The following measures to minimize harm have been included in the Proposed Action:

- To minimize disruption to recreational activities on the Scott Lancaster Memorial Trail, pedestrians and bicycle access along the Scott Lancaster Memorial Trail will be maintained during the I-70 detour period (See **Figure 4.4**). Along CR 314, an 8-foot barrier separated multi-use path will be provided. Between the Doghouse Rail Bridge and the water treatment plant, pedestrian and bicycle traffic will be rerouted to CR 314.
- To avoid permanent adverse physical effects to the Scott Lancaster Memorial Trail and Game Check Area Park, the Clear Creek County parcel used for the detour route (between Scott Lancaster Bridge and Doghouse Rail Bridge) will be restored after interstate traffic is returned to the I-70 corridor. CDOT will coordinate with

Clear Creek County to determine a desirable post-detour condition for the parcel.

- To minimize the number and height of retaining walls that would be visible to recreational users on the Scott Lancaster Memorial Trail, the design will incorporate shoulder widths that are less than the AASHTO standards.
- CDOT will complete a Historic American Engineering Record to document the tunnel complex.
- Additional mitigation measures will be identified through Section 106 consultation and documented in the Programmatic Agreement addendum.

4.9 What alternative results in the least overall harm?

This section provides a least overall harm analysis in accordance with 23 CFR 774.3(c)(1). FHWA may only approve the alternative that causes the least overall harm. Least overall harm is determined by the following factors:

- The ability to mitigate the adverse impacts to each Section 4(f) property;
- The relative severity of the remaining harm, after mitigation, to the protected activities, attributes or features that qualify each property for protection;
- The relative significance of each property;
- The view of the officials with jurisdiction over the property;
- The degree to which each alternative meets the purpose and need for the project;
- The magnitude, after mitigation, of any adverse impacts to resources not protected by Section 4(f); and
- Substantial differences in cost among the alternatives.

Two alternatives have been identified and are evaluated in this least overall harm section: the Proposed Action and Concept Package 7. Concept Package 7, which was developed during the Tunnel Visioning process in February 2011, is described in Section 4.7.2.1 of this chapter and is also known as the Third Bore South of the Existing Twin Tunnels Alternative. The third bore was evaluated (at the corridor concept level) in the I-70 PEIS and selected as part of the Preferred Alternative for the corridor. Concept Package 7 was not evaluated in this EA, because it was determined not reasonable during the Tunnel Visioning process. Therefore, a finding of effect on significant historic properties has not been submitted to SHPO for review.

4.9.1 Summary of Section 4(f) Use by alternative

Table 4.3 contains a summary of Section 4(f) uses by Alternative.

Under Concept Package 7, Section 4(f) uses of the Scott Lancaster Memorial Trail and the planned Game Check Area Park would be more substantial and permanent in nature as compared with the Proposed Action. Under the Proposed Action, these recreational properties would be temporarily used and returned to existing conditions after construction. Although access to the Game Check Area Park would be precluded for a 10-month period, the trail could be temporarily re-routed on CR 314 to maintain pedestrian and bicycle access during construction. Under Concept Package 7, a portion of the Clear Creek County parcel designated for the trail and planned park would be permanently incorporated for transportation use. The trail would be subject to periodic closures and the game check area would be closed for up to a two year period during construction.

Concept Package 7 would have no direct use of the historic Twin Tunnels, as would occur under the Proposed Action. Although it is unknown at this time, the addition of a third bore under Concept Package 7 may result in a constructive use of the Twin Tunnels due to the changes in the setting. Concept Package 7 would use the same segment of US 6/US 40 as the Proposed Action. Because the affected segment of this historic property does not support the NRHP-eligibility of the overall resource, this use is considered a *de minimis* impact for the Proposed Action and the same finding is likely for Concept Package 7.

4.9.2 Ability to mitigate adverse impacts

Twin Tunnels

For the Proposed Action, SHPO, CDOT, and FHWA will identify mitigation measures through the Section 106 process of the National Historic Preservation Act in an addendum to the I-70 Mountain Corridor Section 106 Programmatic Agreement. It is not anticipated that mitigation for adverse effects associated with the use of this property will be sufficient to compensate for the loss of integrity as the physical elements of the eastbound bore would be permanently removed when the tunnel is reconstructed.

Under Concept Package 7, the tunnel complex would be intact and therefore, the ability to mitigate for impacts under this alternative would be greater than under the Proposed Action.

Table 4-3. Section 4(f) Summary of Uses

Property	Use from Proposed Action	Use from Concept Package 7
Twin Tunnels (5CC1189.3)	Permanent use of land: Would require reconstruction and widening of the eastbound tunnel. The concrete façade of the eastbound tunnel portal would be removed and replaced. This would permanently alter the features and attributes that qualify this property for protection under Section 4(f).	No permanent use of land. Would not have any physical impact to the boundary of the Twin Tunnels historic property. Would add a third bore tunnel located a minimum of 100 feet from the current eastbound bore. The direction of vehicular travel within the eastbound tunnel would change. It is possible these changes could substantially impair the features and attributes that qualify this property for protection under Section 4(f). This could be a constructive use, but it is unknown at this time.
Scott Lancaster Memorial Trail	Temporary use: The eastbound I-70 detour would temporarily route interstate traffic onto a segment of the trail owned by Clear Creek County. Approximately 1/3 mile of the trail would be closed for up to a 10-month period between. During this time, pedestrian and bicycle traffic between the water treatment plant and the Doghouse Rail Bridge would be re-routed to CR 314 in an on-street condition.	Permanent use of land: Construction of a viaduct connecting to the new west tunnel portal would require permanent relocation of the Scott Lancaster Bridge and realignment of between 500 and 1,000 feet of the Scott Lancaster Memorial Trail. Approximately 0.4 acre of the Clear Creek County parcel for the trail would be permanently incorporated for transportation use. Construction of viaducts for the I-70 realignment would require periodic closures of a segment of the trail owned by Clear Creek County. Approximately ½ mile of the trail would be closed between the water treatment plant and a point approximately 1,500 feet east of the Doghouse Rail Bridge. The duration of construction would be up to two years. No feasible trail detour was identified.
Game Check Area Park	Temporary use: The eastbound I-70 detour would temporarily route interstate traffic through this area. This area would not be available for recreational access/parking for a 10-month period	Permanent use of land: Approximately 0.4 acre of the parcel for this planned park would be permanently incorporated into transportation use. Construction of viaducts for the I-70 realignment would require temporary closure of this area. This area would not be available for recreational access/parking for up to 2 years.

Scott Lancaster Memorial Trail

The temporary use of the Proposed Action to the Scott Lancaster Memorial Trail will be minimized by maintaining pedestrian and bicycle access during construction. Temporary impacts will be further reduced by the accelerated construction schedule. A 24-hour-per-day, 7-day per-week schedule during blasting of the tunnel is proposed, which will help to minimize the duration of the temporary use. The trail will be returned to existing conditions after construction and no permanent adverse impacts are anticipated.

Direct impacts to the trail associated with Concept Package 7 could be mitigated to some degree by relocating the trail and the Scott Lancaster Bridge to the south. There is public land along the south side of Clear Creek south of the water treatment plant that could potentially be used to relocate the bridge and trail. This would reduce visibility of the bridge from I-70, which would be considered an adverse impact by the official with jurisdiction (Clear Creek County). Clear Creek County is obligated to maintain visibility of the trail from I-70 per stipulations of the grant used to fund the bridge. The temporary use of the Scott Lancaster Memorial Trail would be minimized by maintaining pedestrian and bicycle access during construction to the extent practicable. Periodic closures of the trail would be necessary during construction to maintain safety and there is no feasible detour route to maintain trail access during these times. The indirect visual impact of the viaduct structures could not be mitigated.

Game Check Area Park

The temporary use of the Proposed Action to the Game Check Area Park will be minimized by the accelerated construction schedule. A 24-hour-per-day, 7-day per-week schedule during blasting of the tunnel is proposed, which will help to minimize the duration of the temporary use. The area will be returned to existing conditions after construction and no permanent adverse impacts are anticipated.

Concept Package 7 would require acquisition of land from the Clear Creek County parcel planned for the Game Check Area Park. To reduce the amount of land needed, the new tunnel would need to be shifted north. This is not possible, because the new tunnel needs to have a minimum separation of 100 feet from the existing eastbound tunnel to maintain the structural integrity. The potential indirect impacts are of particular concern based on the relative uniqueness of this location south of the Twin Tunnels. The Clear Creek Greenway Plan (CCC, 2005) notes that "...traffic noise from I-70 is not audible, one of only 2 or 3 locations along the Greenway where this is true." Noise barriers would not be feasible given the elevated nature

of the viaduct. Visual barriers such as vegetation could be implemented, but it would take many years to establish the mature trees needed to buffer the park from the visual intrusion of the interstate viaduct. For these reasons, the ability to mitigate adverse impacts under Concept Package 7 is low.

4.9.3 Relative severity of remaining harm

After mitigation, the severity of remaining harm to the protected activities, attributes, or features that qualify these properties for protection is markedly different when comparing the Proposed Action and Concept Package 7 as explained below.

Twin Tunnels

Under both the Proposed Action and Concept Package 7, the Twin Tunnels would be impacted. Completely removing the physical elements of the eastbound tunnel and replacing them with a new wider tunnel, as proposed under the Proposed Action, would constitute a greater level of harm than adding a new element adjacent to the historic property, as proposed under Concept Package 7.

Scott Lancaster Memorial Trail

Under the Proposed Action, bicyclists and pedestrians would use CR 314 as a trail detour for up to 10 months. Trail users would share the road with vehicular traffic, which is similar to the existing condition as this existing segment of the trail is also used for vehicle parking. The detour would be roughly parallel to the existing trail alignment and would not add length to trip distances for trail users. The primary difference for trail users would be that most of the detour route is gravel instead of a paved surface. Because access for pedestrians and cyclists can be maintained in a manner somewhat similar to existing conditions and there would be no permanent impacts, the remaining harm is relatively low.

Under Concept Package 7, indirect impacts would remain severe. The interstate viaducts would permanently diminish the recreational experience of trail users. The periodic closures of the Scott Lancaster Memorial Trail would inconvenience trail users over the 2-year construction period. Relative to the Proposed Action, the remaining harm to this recreational property is high.

Game Check Area Park

Because this park has not yet been developed, the temporary impacts of the Proposed Action would be relatively minor. Although this area will be unavailable for parking and recreational access during construction, there are numerous other river access locations along Clear Creek within a few miles of this location. The temporary use will

not impact or preclude any of the intended future uses of this property.

Concept Package 7 would permanently reduce the area of the park by approximately 15 percent. The potential indirect impacts associated with noise and visual intrusion from the viaduct could permanently diminish the recreational value of this property. Relative to the Proposed Action, the remaining harm for this recreational property is high.

4.9.4 Relative significance of each property

The relative significance of each Section 4(f) property that is used is described below.

Twin Tunnels

The Class III Cultural Resource Inventory Report (Centennial Archaeology, 2011) provides the following information regarding the significance of the Twin Tunnels:

The Twin Tunnels site (5CC1189.3) is significant under NRHP Criterion C for engineering and is listed on FHWA's Final List of Nationally and Exceptionally Significant Features of the Federal Interstate Highway System (Klima, 2005; FHWA, 2006), where it is stated that "The Twin Tunnels represents the first successful tunneling operation associated with the construction of I-70 and stands as an important early milestone as the highway advanced through Colorado's Rocky Mountains."

Scott Lancaster Memorial Trail

The trail is an integral part of the Clear Creek Greenway Plan, which envisions a trail corridor that will eventually link the Platte River Greenway in Denver to the Continental Divide National Scenic Trail. Within Clear Creek County, the Scott Lancaster Memorial Trail is an important community resource serving as a memorial and a recreational facility providing access to opportunities for fishing, kayaking, rock climbing, hiking, and bicycling. The trail and bridge were constructed as a memorial to an Idaho Springs high school student who was killed by a mountain lion in 1991. The community raised money to construct the bridge and Clear Creek County indicated that visibility and accessibility from the trail are important features of the bridge.

Game Check Area Park

The Clear Creek Greenway Plan identifies this planned park as a "tremendous opportunity" because the land is currently owned by the county and is a large, flat site with great creek and frontage road access. The site is also uniquely situated south of the Twin Tunnels where it is buffered from I-70 by the land bridge, which is frequented

by wildlife crossing I-70. The county expects to have a master plan for this park and trailhead completed in 2012.

4.9.5 Views of the Officials with Jurisdiction

The Officials with Jurisdiction include Clear Creek County and the SHPO.

State Historic Preservation Officer

With respect to the Proposed Action, the views of SHPO on the relative significance and value of the historic properties are based on documentation from the Section 106 determinations of eligibility and effects. On December 20, 2011, the determinations of eligibility and effect were sent to SHPO along with the [Class III Cultural Resource Inventory Report \(Appendix G\)](#) and the site forms. In a letter dated January 10, 2012, SHPO concurred with the recommended findings of National Register eligibility for the Twin Tunnels (5CC1189.3). Concurrence on the finding of effects was received from SHPO in a letter dated March 19, 2012.

Because Concept Package 7 is not being evaluated as an alternative in this EA, CDOT did not consult with SHPO relative to the impacts of Concept Package 7.

Clear Creek County

The views of Clear Creek County concerning parks and recreational properties are based on the Clear Creek Greenway Plan, input provided at Project Leadership Team meetings, and an interview with the county's contracted greenway planner (M. Tableman/Clear Creek County Open Space, 2012, personal commun.).

Clear Creek County has been engaged in this project and the process by which the Proposed Action was identified, developed, and refined. The Proposed Action was initially identified during the Tunnel Visioning workshop held in February 2011. Tim Mauck, Clear Creek County Commissioner, participated in the workshop which resulted in a recommended alternative package to improve mobility on I-70 in the vicinity of the Twin Tunnels. This recommended alternative package (the Proposed Action) was selected over the Concept Package 7 (the preferred alternative from the I-70 PEIS process) in part because it would have less impact to Clear Creek and recreational opportunities along Clear Creek and the Clear Creek Greenway (CDOT, 2011b).

Clear Creek County representatives have continued to participate in the EA process through the Project Leadership Team and Technical Team, as well as other meetings and correspondence. Input from these representatives indicates a strong desire to avoid permanent impact to recreational properties, provide recreational enhancements through this process as practicable, and to maintain recreational access

during construction. With mitigation, the Proposed Action achieves these outcomes to the satisfaction of Clear Creek County. Concept Package 7 is not viewed favorably because of the permanent and temporary recreational impacts that could not be adequately mitigated. Impacts of primary concern include: 1) diminished recreational experience along the Clear Creek Greenway due to the viaducts, 2) up to a 2-year closure of the game check area, and 3) periodic closures of the Scott Lancaster Memorial Trail with no feasible detour for recreational access during construction (K. Shanks/THK and Associates, 2012b, personal commun.).

4.9.6 Degree to which each alternative meets the purpose and need

When considering all of the different components of the purpose and need, the Proposed Action and Concept Package 7 perform similarly. Performance relative to each of the stated needs is discussed below.

Reduce congestion

Both alternatives would provide an additional lane in the eastbound direction to alleviate traffic congestion. There would be no discernable difference between the performance of the alternatives.

Safety

Both alternatives are anticipated to reduce the number of crashes in the project area by straightening curves, improving sight distance, and alleviating traffic congestion.

Concept Package 7 may present additional safety concerns for daily operations on the proposed viaduct related to icing. However, Concept Package 7 would have the benefit of providing an alternate eastbound tunnel access for interstate traffic and emergency service if an incident in the existing eastbound tunnel were to restrict access.

Mobility

Both alternatives would serve to provide faster and more predictable travel times in the peak period. The difference between the performance of the alternatives would be negligible.

Operational characteristics that slow travel

Both alternatives would improve lane capacity by adding a third eastbound travel lane from the base of Floyd Hill through the Twin Tunnels. Although Concept Package 7 would not change the existing tunnel entrance, it is likely that converting the tunnel from two lanes to one lane (assuming the tunnel is used for westbound travel) would alleviate the perception of narrowness that currently reduces the capacity of the tunnel. If the existing tunnel is

used for other purposes, the perception of narrowness may still be an issue.

4.9.7 Magnitude, after mitigation, of adverse impacts to other resources

The adverse impacts to other resources as a result of the Proposed Action would include temporary traffic, river recreation, economic, wetland, vegetation, and floodplain impacts as well as permanent visual, noise, and water quality impacts. Because I-70 would primarily stay on alignment under the Proposed Action, impacts to most resources would be minimized and predominantly of a temporary nature. After reasonable mitigation, the adverse impacts to other resources would be primarily confined to temporary traffic, river recreation, and economic impacts and relatively minor permanent impacts to visual character.

Concept Package 7 would shift the alignment of eastbound I-70 south to avoid the Twin Tunnels. To achieve this realignment, the interstate would have multiple new crossings of Clear Creek, CR 314, and the recreational resources along the Clear Creek Greenway. As documented in **Table 4.4**, this would result in permanent adverse impacts to the floodplain, habitat, and water quality of Clear Creek, as well as permanent noise and visual and economic impacts to recreational activities along Clear Creek and the Clear Creek Greenway. Additionally, the temporary impacts to these resources would be greater than under the Proposed Action. With respect to the resources summarized in **Table 4.4**, the only benefit of Concept Package 7 is reducing temporary travel delays for eastbound I-70 travelers.

4.9.8 Substantial differences in cost

A tabulation of costs for each alternative shows that the Proposed Action would cost substantially less than Concept Package 7. Based on the cost comparison conducted at the [Tunnel Visioning Workshop](#), Concept Package 2 was estimated at \$80 million as compared to the Proposed Action at \$55 million. Since the Tunnel Visioning, CDOT has gathered more geotechnical data that suggests costs for Concept Package 7 could be much higher (up to \$170 million).

4.9.9 Summary

The Proposed Action is identified as the alternative with the least overall harm per 23 CFR 774.3(c)(1) primarily based on the ability to mitigate adverse impacts; relative severity of remaining harm; views of the official with jurisdiction; and magnitude, after mitigation, of adverse impacts to resources not protected by Section 4(f). Additionally, there is a substantial difference in cost among the alternatives.

Table 4-4. Adverse Impacts from Proposed Action and Concept Package 7 to Other Resources

Resource	Impact from Proposed Action	Impact from Concept Package 7	Comparison of Alternatives
Traffic	During construction (12 months or more), eastbound interstate traffic would be subject to a temporary detour (6 to 7 months) that would result in major delays during peak periods. Because the detour route would follow CR 314 between Hidden Valley Interchange and the Doghouse Rail Bridge, local traffic would be restricted on this segment of the route for the duration of the detour. There would also be major delays for west bound interstate traffic during tunnel blasting. Traffic would be stopped for approximately 30 minutes, six times daily. Detoured east bound traffic would also be subject to these delays, but only for a small portion of the tunnel blasting period. Peak hours would be avoided to minimize delays. These temporary impacts could cause substantial inconvenience for the traveling public, including some commuters.	During construction (up to two years) an approximately 1,500-foot segment of CR 314 would be subject to periodic closures east of the Doghouse Rail Bridge affecting local traffic. There would also be major delays for eastbound and westbound interstate traffic during tunnel blasting. Traffic would be stopped for approximately 30 minutes, six times daily. Peak hours would be avoided to minimize delays. These temporary impacts may cause less inconvenience for the traveling public than the Proposed Action because no detour of interstate traffic would be necessary. However, the inconvenience would occur for a longer period of time due to the anticipated duration of construction (up to 2 years).	Concept Package 7 would cause less severe traffic impacts than the Proposed Action, but the impacts would occur for a longer duration.
Recreation Activities/ Operations	Permanent impacts to river recreation associated with traffic noise and visual intrusion from retaining walls. River access would generally be maintained during construction, but CR 314 (between Doghouse Rail Bridge and Hidden Valley Interchange) would not be available for river rafting shuttles or fishing access during construction (6-9 months). Short duration river closures would be necessary, but would occur outside of peak rafting seasons and times of day.	Moderate to major permanent impacts to river and trail recreation associated with traffic noise and visual intrusion from I-70 viaducts and retaining walls. Short-duration river closures would be necessary during construction of three new bridge crossings and reconstruction of one existing bridge crossing. During construction, periodic closures of CR 314 would disrupt river rafting shuttles and fishing access for up to 2 years. Approximately ½ mile of Scott Lancaster Memorial Trail near the middle of the trail would be subject to periodic closures for up to two years. Closures of this segment would impede users of the larger Clear Creek Greenway system starting from Idaho Springs from using the east half of the trail and users starting from the trailhead at Kermitts from using the west half of the trail.	Impact of Concept Package 7 would be greater than the Proposed Action.
Economic	Moderate, short-term economic impacts are anticipated during construction for service retail in Idaho Springs. River rafting outfitters may also experience some reduction in sales due to avoidance of the study area during construction. These impacts would affect one rafting season.	River rafting outfitters may experience some reduction in sales due to avoidance of the study area during construction and temporary river closures for bridge construction. These impacts would affect two rafting seasons. Some long-term economic impacts could occur if the multiple viaduct crossings of recreational amenities are a deterrent for rafting on Clear Creek and recreational visitation to the area.	Impact of Concept Package 7 would be greater than the Proposed Action.

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Table 4.4 Adverse Impacts from Proposed Action and Concept Package 7 to Other Resources

Resource	Impact from Proposed Action	Impact from Concept Package 7	Comparison of Alternatives
Noise	Six out of eight residential receptors would be impacted. Mitigation was determined not to be reasonable based on cost per benefited receptor.	Seven out of eight residential receptors would be impacted. It is assumed that mitigation would not be reasonable for the same reasons as the Proposed Action. Because the travels lanes would be closer to three of the receptors, the noise level increase would be higher at three residential receptors than under the Proposed Action.	Impact of Concept Package 7 would be greater than the Proposed Action.
Visual	Adverse visual effects associated with retaining walls, expanded tunnel portals, and highway widening would be minor to moderate. Affected views include those of recreationalists along Clear Creek River and the Scott Lancaster Memorial Trail as well as motorists on I-70 and CR 314.	Adverse visual effects would be moderate to high because of the proximity of the viaducts and piers to CR 314, Clear Creek, the Scott Lancaster Memorial Trail and the Game Check Area Park. These new project features would be dominant elements as viewed by recreationalists and motorists on CR 314. Adverse visual effects associated with retaining walls and new tunnel portals would be similar to the Proposed Action.	Impact of Concept Package 7 would be greater than the Proposed Action.
Wildlife and Habitat	Potential increased sedimentation resulting from erosion of disturbed soils. These impacts are able to be reasonably mitigated.	Permanent loss of aquatic habitat from potential placement of piers in the channel. Increased sedimentation would be greater than under the Proposed Action due to the pier placement and streamside construction.	Impact of Concept Package 7 would be greater than the Proposed Action.
Wetland/ Riparian Areas	Would result in 0.03 acre of temporary impact. Indirect impacts would be minimal due to existing buffers between the roadway and the wetlands. These impacts are able to be reasonably mitigated.	Would result in temporary impacts two to three times higher than under the Proposed Action. Indirect impacts including shading and nonpoint source pollution associated with the viaduct east of the tunnel.	Impact of Concept Package 7 would be greater than the Proposed Action.
Floodplain	No permanent impact; temporary impacts to the 2-year floodplain would be between 0.10 and 0.16 acre depending on the cross section selected. These impacts are able to be reasonably mitigated.	A permanent longitudinal encroachment into the 2-year floodplain would occur west of the Twin Tunnels. Temporary impacts would be two to three times greater than under the Proposed Action.	Impact of Concept Package 7 would be greater than the Proposed Action.
Water Quality	Potential for increased erosion/ sedimentation and increased nonpoint source pollution. These impacts are able to be reasonably mitigated.	Impacts would be similar to the Proposed Action. However, piers in the channel west of the Twin Tunnels could result in long-term channel instability.	Impact of Concept Package 7 would be greater than the Proposed Action.

- **Ability to mitigate adverse impacts**

Adverse impacts to recreation properties could be mitigated more easily under the Proposed Action because the impacts are predominantly temporary and access for trail users could be maintained during construction. Under Concept Package 7, adverse impacts to recreational properties are permanent and could not easily be mitigated. The ability to mitigate adverse impacts to historic properties is greater under Concept Package 7 because the Twin Tunnels complex would still be intact.

- **Relative severity of remaining harm**

The remaining harm for the Twin Tunnels would be greater under the Proposed Action because the physical elements of the eastbound tunnel would be permanently removed. The remaining harm to recreational properties would be much greater under Concept Package 7 because the temporary impacts are severe and the indirect impacts would permanently impact the recreational value of the properties.

- **Views of the Official with Jurisdiction**

Clear Creek County has been engaged in the EA process and has expressed great concern over potential impacts (permanent and temporary) to the Scott Lancaster Memorial Trail and the Game Check Area Park. These recreational properties are key elements of the Clear Creek Greenway, which is of high importance to the county. Concept Package 7 permanently diminishes the user's recreation experience at both of these properties. Through the Section 106 process, SHPO has provided concurrence on findings of eligibility and effect for the Twin Tunnels, which are designated as a nationally and exceptionally significant feature of the Federal Interstate Highway System. Because Concept Package 7 is not being evaluated as an alternative in this EA, CDOT has not consulted with SHPO on that alternative.

- **Magnitude, after mitigation, of any adverse impacts to resources not protected by Section 4(f)**

- **Proposed Action.** Because I-70 would primarily stay on alignment under the Proposed Action, impacts to most resources would be minor, temporary, and able to be mitigated. Temporary traffic impacts would be the exception and may cause substantial inconvenience to the traveling public, including some commuters. Permanent adverse impacts would include seven noise receptors, minor to moderate visual impacts, and minor water quality impacts.

- **Concept Package 7.** With the exception of short-term eastbound I-70 travel delays, Concept Package 7 would have greater temporary impacts to resources not protected by Section 4(f). Additionally, because this

alternative veers off of the existing I-70 alignment, it would have permanent adverse impacts on habitat, recreational activities, and the floodplain associated with Clear Creek. The moderate to major visual impacts associated with the I-70 viaducts would permanently diminish the experience of recreational users of Clear Creek and the Clear Creek Greenway. It would be difficult to fully mitigate the permanent adverse impacts, for recreational economic, noise, visual, wildlife, wetlands, floodplains, and water quality impacts.

The cost of constructing Concept Package 7 is estimated to be more than twice the cost of the Proposed Action and operation and maintenance costs associated with the viaducts would also be higher.

For the remaining factors considered in the least overall harm analysis (relative significance of each property and degree to which each alternative meets the purpose and need), the relative differences between the Proposed Action and Concept Package 7 are not distinguishing factors. Both alternatives meet the purpose and need to a similar degree and the Section 4(f) Properties with adverse impacts are all considered highly significant to the Officials with Jurisdiction.

4.10 What coordination has occurred with Officials with Jurisdiction?

Consultation for the purposes of this Section 4(f) evaluation has been initiated and is expected to continue through the final design and engineering phase. The consultation and coordination efforts that have occurred thus far are described below.

CDOT and FHWA have conducted the following meetings with SHPO and consulting parties to discuss historic resources in the Area of Potential Effect.

- September 16, 2011 – During this meeting, the group discussed the area of potential effect.
- February 16, 2012 – During this meeting, the group discussed eligibility and effects determinations, as well as potential mitigation options for adverse effects.

In consultation with SHPO, FHWA has determined that this project will have an adverse effect on the Twin Tunnels as stated in the Section 106 correspondence dated December 20, 2011, and the concurrence from SHPO dated March 19, 2012 (Appendix F, Agency Correspondence). On May 21, 2012, CDOT submitted documentation for a revised area of potential effect to account for proposed managed lane signage in the median of I-70 west of the limits of proposed capacity improvements for the Twin Tunnels project. In

coordination with SHPO, CDOT and FHWA are developing mitigation measures through the Section 106 process of the National Historic Preservation Act that will be documented in the revised programmatic Agreement. Section 106 documentation is included in Appendix F.

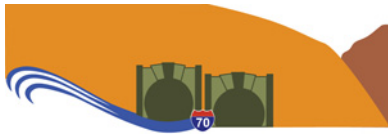
Meetings and coordination with Officials with Jurisdiction over the Scott Lancaster Memorial Trail and the planned Game Check Area Park include:

- Written communication was sent to Clear Creek County on November 21, 2011, to clarify the recreational properties in the study area. This communication provided a list and map of recreational properties and requested verification of the names, locations, extents, and any other pertinent information. A response was received on December 6, 2011, confirming the accuracy of the information provided and adding one additional recreational property to the inventory.
- The Frontage Road and Twin Tunnels project teams met with property owners and representatives from the National Park Service and Clear Creek County to coordinate planning and issues regarding the Clear Creek Greenway.
- Project leadership team meetings included Tim Mauck, Clear Creek County County Commissioner. Technical Team meetings included Cindy Neeley, Clear Creek County Land Use Director. The following meetings included discussions regarding Section 4(f) properties:
 - August 23, 2011 – During this meeting, the group discussed the importance/relevance of the Scott Lancaster Memorial Trail and Bridge and the game check area.
 - September 8, 2011 – During this meeting, the group discussed how the pedestrians and bicyclists would be accommodated during construction.

- September 22, 2011 – During this meeting, the group discussed Twin Tunnel Stakeholder’s Core Values and how they are being addressed. The Scott Lancaster Memorial Trail was identified as part of the core value of protecting tourist destinations and community facilities.
- October 6, 2011 – During this meeting, the group discussed concerns about funding and commitments to construct a shared-use path as part of either the Frontage Road or Twin Tunnels project. Constructing the path is seen as an important improvement to the current Scott Lancaster Memorial Trail, which currently exists in an on-street condition in certain segments.
- January 12, 2012 – During this meeting, the group discussed the desire for ongoing coordination with Clear Creek County regarding the master plan for the Game Check Area Park.
- February 8, 2012 – During this meeting, the group further discussed reclamation plans for the Game Check Area Park.

4.11 What is the conclusion of this evaluation?

The FHWA has determined that there is no feasible and prudent avoidance alternative to the use of land from the Twin Tunnels (5CC1189.3), from the Scott Lancaster Memorial Trail, and from the parcel planned for the Game Check Area Park. The Proposed Action causes the least overall harm and includes all possible planning to minimize harm to these properties resulting from the Proposed Action.



Chapter 5. Public and Agency Coordination

1 5.1 What are the objectives of the 2 stakeholder involvement program?

3 The objectives of the stakeholder involvement program
4 are to engage stakeholders actively by following the [I-70](#)
5 [Mountain Corridor Context Sensitive Solutions \(CSS\)](#)
6 [process](#); honoring the commitments of [Chapter 6](#) of the
7 *I-70 Mountain Corridor Programmatic Environmental*
8 *Impact Statement* (PEIS) (CDOT, 2011); meeting applicable
9 regulatory requirements; and providing timely and easy-to-
10 understand information to the public to support informed
11 decisions. This Environmental Assessment (EA) identifies
12 recommendations and commitments made in the I-70 PEIS
13 and explains how this Tier 2 process is consistent with
14 those recommendations and commitments.

15 5.1.1 How were stakeholders involved in the 16 Twin Tunnels EA?

17 The Federal Highway Administration (FHWA) and Colorado
18 Department of Transportation (CDOT) (the lead agencies)
19 received substantial input and help from stakeholders
20 in defining the Proposed Action, understanding its
21 consequences, and devising measures to achieve a project
22 that is respectful of the project context and values of
23 stakeholders. Working collaboratively with stakeholders has
24 improved this Twin Tunnels project. The lead agencies are
25 grateful for the substantial investment of stakeholders in
26 achieving a project that accomplishes transportation and
27 community needs.

28 To meet the objectives of the stakeholder involvement
29 program, the lead agencies followed the I-70 Mountain
30 Corridor CSS process; held public and agency scoping
31 meetings; established a Project Leadership Team, a
32 Technical Team, and Issues Task Forces that met and
33 provided input regularly throughout the project; and will
34 hold a public hearing on this EA document. Additionally,
35 the lead agencies conducted on-on-one meetings with
36 representatives of local, state, and federal agencies,
37 organizations, interest groups, property owners, and
38 businesses. The public information program provided
39 project and public meeting information through: mailings
40 to over 6,000 residents, businesses, and property owners
41 surrounding the project area; advertisements in local
42 newspapers and radio stations; and information on the
43 project website. Representatives of the Project Leadership
44 Team and Technical Team also helped distribute information
45 about the project through their communities, organizations,
52 and agencies.

5.1.2 What is the Project Leadership Team, and what is its role? 53 54

The Project Leadership Team consists of the lead agencies,
local leaders from Clear Creek County and Idaho Springs,
and consultant and contractor staff. The Project Leadership
Team’s primary roles are to lead the project, champion the
CSS process, and enable decision making. Specifically, the
Project Leadership Team:

- Ensures that the CSS Guidance, Context Statement, and
Core Values are integrated into the project. 61 62
- Enables decision making by identifying who must be
involved in making decisions, bringing the decision
makers together, and proposing solutions or approaches
to move the project forward. 63 64 65 66
- Facilitates formal actions required by councils, boards,
and/or commissions to keep the project moving forward. 67 68

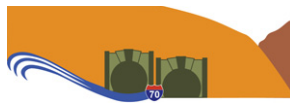
The Project Leadership Team has been engaged throughout
the project development, from the scoping period through
the publication of the EA, through monthly meetings. 69 70 71
The Project Leadership Team will continue to be involved
through the design and construction period. 72 73

5.1.3 What is the Technical Team, and what is its role? 74 75

The Technical Team consists of a broad group of
representatives from regulatory agencies, local government
departments, local elected governments, interest groups,
and interested citizens. The Technical Team’s primary
role is to provide technical guidance and expertise on the
following topics: 76 77 78 79 80 81

- Development and refinement of the Proposed Action 82
- Development of methodologies for data collection and
analysis 83 84
- Input on impacts evaluation 85
- Input on mitigation recommendations 86

The Technical Team also coordinates and communicates
with members of their respective agencies or organizations. 87 88
The Technical Team met approximately monthly, often
in combination with the Project Leadership Team, from
project scoping through the identification of impacts and
mitigation measures. 89 90 91 92



1 **5.1.4 What are Issue Task Forces, and what is**
2 **their role?**

3 Four Issue Task Forces were established for the Twin
4 Tunnels EA: the Section 106 Issue Task Force, Stream and
5 Wetland Ecological Enhancement Program (SWEEP) Issue
6 Task Force, A Landscape Level Inventory (ALIVE) Issue Task
7 Force, and Clear Creek County Greenway Issue Task Force.
8 The focus of the first three Issue Task Forces was to ensure
9 that I-70 PEIS commitments were followed during this
10 Tier 2 process. All of the Issue Task Forces provided input
11 on resource issues and recommended mitigation.

12 • The Section 106 Issue Task Force was responsible for
13 applying the conditions set forth in the I-70 Mountain
14 [Corridor Programmatic Agreement](#) among the consulting
15 parties involving Section 106 of the National Historic
16 Preservation Act. The Section 106 Issue Task Force
17 consists of the lead agencies and representatives from
18 the Colorado State Historic Preservation Office, Historical
19 Society of Idaho Springs, Clear Creek County, City of
20 Idaho Springs, U.S. Forest Service, and consultant staff.

21 • The SWEEP Issue Task Force ensured that the Twin
22 Tunnels EA fulfilled the responsibilities set forth in the
23 [SWEEP Memorandum of Understanding \(MOU\)](#), which
24 focuses on enhancing stream and wetland ecology
25 in the I-70 Mountain Corridor. The SWEEP Issue Task
26 Force was set up in the model of the MOU to establish
27 common group among those interested in Clear Creek
28 stream and wetland ecology, create mitigation strategies,
29 and encourage collaboration among interested parties.
30 The Issue Task Force consists of members of the I-70
31 Mountain Corridor SWEEP Committee and included
32 the lead agencies, consultant and contractor staff,
33 and representatives of the following agencies and
34 organizations:

- 35 • Bureau of Land Management
- 36 • Clear Creek Watershed Foundation
- 37 • Colorado Parks and Wildlife
- 38 • Colorado Trout Unlimited
- 39 • Colorado Water Quality Control Commission
- 40 • Colorado Watershed Assembly
- 41 • ECO-Resolutions
- 42 • Town of Georgetown
- 43 • U.S. Army Corps of Engineers
- 44 • U.S. Environmental Protection Agency
- 45 • U.S. Department of Agriculture, Natural Resources
46 Conservation Service
- 47 • U.S. Fish and Wildlife Service
- 48 • U.S. Forest Service
- 49 • Upper Clear Creek Watershed Association

• The ALIVE Issue Task Force was established to fulfill the
commitments set forth in the [ALIVE MOU](#) of identifying
mitigation and conservation measures during Tier 2
processes that could reduce animal-vehicle collisions and
increase habitat connectivity for terrestrial and aquatic
species. The ALIVE Issue Task Force consists of members
of the I-70 Mountain Corridor ALIVE Committee and
included the lead agencies, consultant and contractor
staff, and representatives of the following agencies and
organizations:

- Bureau of Land Management
- Clear Creek County
- Colorado Parks and Wildlife
- Colorado Watershed Assembly
- ECO-Resolutions
- Town of Georgetown
- Town of Vail
- Rocky Mountain Wild
- U.S. Forest Service
- U.S. Fish and Wildlife Service

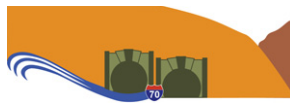
• The Clear Creek County Greenway Issue Task Force was
responsible for coordinating proposed transportation
improvements with existing and planned recreation
and trails improvements identified in the *Clear Creek
County Greenway Plan (CCC, 2005)*. The Greenway Issue
Task Force consists of the lead agencies, consultant
and contractor staff, citizen representatives from Idaho
Springs and Clear Creek County, and representatives from
the National Park Service and Clear Creek County.

5.1.5 **What additional coordination has** 79
occurred with local, state, and federal 80
agencies? 81

CDOT held an agency scoping meeting at FHWA offices
in Lakewood, Colorado, on September 26, 2011, to elicit
comments that would help establish the scope of the EA.
Comments received from agencies during the scoping
period, and information on how the EA addresses those
comments, are summarized in [Section 5.4](#) “What issues
were raised in scoping and during the NEPA process and
how did the lead agencies address those issues?” of this
chapter.

In addition, local, state, and federal agencies were involved
throughout the National Environmental Policy Act (NEPA)
process through Technical Team meetings and coordination
meetings with individual agencies. Specifically, the project
team met with the following agencies as part of the
Technical Team, Issue Task Forces, or through individual
meetings to discuss project development:

- Bureau of Land Management
- City of Idaho Springs



- 1 • Clear Creek County
- 2 • Colorado Department of Public Health and
- 3 Environment (CDPHE) – Air Pollution Control Division
- 4 • CDPHE – Water Quality Control Division
- 5 • CDPHE – Hazardous Materials and Waste Management
- 6 Division
- 7 • Colorado Parks and Wildlife
- 8 • Colorado Trout Unlimited
- 9 • Colorado Water Quality Control Commission
- 10 • Colorado Watershed Assembly
- 11 • Denver Regional Council of Governments
- 12 • Idaho Springs (Mayor and City Council)
- 13 • Idaho Springs Floodplain Administrator
- 14 • Jefferson County
- 15 • State Historic Preservation Officer
- 16 • Town of Georgetown
- 17 • Town of Vail
- 18 • U.S. Army Corps of Engineers
- 19 • U.S. Department of Agriculture, Natural Resources
- 20 Conservation Service
- 21 • U.S. Environmental Protection Agency
- 22 • U.S. Fish and Wildlife Service
- 23 • U.S. Forest Service
- 24 • Upper Clear Creek Watershed Association

25 **5.1.6 How has the general public been engaged**
26 **in the process?**

27 The public was invited to learn more about the Twin
28 Tunnels project and get engaged through a number of
29 ways. The public information program provided project
30 and public meeting information through: mailings to
31 over 6,000 residents, businesses, and property owners
32 surrounding the project area; advertisements in local
33 newspapers and radio stations; and information on the
34 project website. Representatives of the Project Leadership
35 Team and Technical Team also helped distribute information
36 about the project through their communities, organizations,
37 and agencies. The Project Leadership Team and Technical
38 Team met with the project team regularly (generally
39 monthly). Representatives of these teams provided
40 updates to their agencies, organizations, and constituents
41 throughout the project development.

42 CDOT held a public scoping meeting in Idaho Springs
43 the evening of September 27, 2011, to elicit comments
44 that would help establish the scope of the EA. Outreach
45 efforts for the scoping meeting included a press release,
46 postcards, emails, and calendar alerts. A legal notice and
47 advertisements were published in local newspapers. The
48 meeting began with 30 minutes of open house where
49 participants could review display boards and ask questions
50 of the project team. This was followed by a formal
51 presentation given by the CDOT I-70 Mountain Corridor

Manager. After the presentation, the project team took
comments and questions from the audience to inform the
scope of the EA study.

Comments received during the scoping period, and
information on how the EA addresses those comments,
are summarized in [Section 5.4](#) “What issues were raised
in scoping and during the NEPA process and how did
the lead agencies address those issues?” of this chapter.
The meeting information was also posted on the project
website. See the [Twin Tunnels EA Scoping Summary Report](#)
(CDOT, 2012) for additional information about the scoping
meeting.

The EA is being provided for public review and its
availability has been announced to the public through
direct mailings, advertisements through local newspapers
and radio stations, and on the project website. The lead
agencies will host a public hearing on July 25, 2012, at Clear
Creek County Schools District Office (320 Highway 103,
Idaho Springs, CO 80452). At the public hearing, members
of the public will have the opportunity to learn about the
project in an open house format, listen to a presentation
summarizing the conclusions of the EA, and provide
comments on the EA to a court reporter through a private
court reporter session or at the microphone after the
presentation.

51.7 **How did the lead agencies involve low-
income and minority populations?**

Low-income and minority residents near the project area
received notifications of the public scoping meeting and will
receive other project notifications through direct mailings
to over 6,000 residents, businesses, and property owners
surrounding the project area. These notifications include a
contact number for information in Spanish.

In addition to general public outreach and involvement
efforts, CDOT involved low-income and minority
stakeholders through targeted outreach efforts that
included advertising meetings in the Spanish-language
newspaper *El Semanario* and the bilingual Spanish-English
newspaper *La Voz*, and providing Spanish translation at
meetings upon request.

The I-70 PEIS outreach efforts identified two low-income
and minority communities in Idaho Springs within one
mile of I-70: the Cottonwood Mobile Home Park and the
Mountain Mobile Home Park. Both of these communities
are considered low-income and have large concentrations
of Spanish-speaking members. CDOT is distributing to these
communities bilingual project fact sheets announcing the
publication of the EA, and is sending them bilingual mailings
notifying them of the availability of the EA for public review
and the related public hearing.



1 5.2 What is the I-70 Mountain Corridor
2 CSS process?

3 FHWA defines CSS as:
4 CSS is a collaborative, interdisciplinary approach that
5 involves all stakeholders to develop a transportation facility
6 that fits its physical setting and preserves scenic, aesthetic,
7 historic, and environmental resources, while maintaining
8 safety and mobility. CSS is an approach that considers the
9 total context within which a transportation improvement
10 project will exist. CSS principles include the employment of
11 early, continuous, and meaningful involvement of the public
12 and all stakeholders throughout the project development
13 process.
14 The I-70 Mountain Corridor CSS process consists of a
15 unique set of guidance developed specifically for the
16 Corridor in collaboration with stakeholders. This guidance
17 includes a 6-Step Decision Process, Design Criteria and
18 Aesthetic Guidance, and a Context Statement and Core
19 Values for the I-70 Mountain Corridor.
20 CDOT and FHWA have committed to use the CSS process
21 on all projects on the I-70 Mountain Corridor. As described
22 on the Corridor CSS website (www.i70mtncorridorcss.com),
23 all Tier 2 processes will use the I-70 Mountain Corridor
24 CSS 6-Step Decision Process (**Figure 5-1**), include a Project
25 Leadership Team composed of stakeholders, and be guided
26 by the Context Statement and Core Values developed
27 specifically for each project.
28 The lead agencies are committed to the I-70 Mountain
29 Corridor Context Sensitive Solutions process. This process
30 recognizes that government agencies cannot cede statutory
31 or regulatory responsibilities.

5.3 How was the CSS process 32
incorporated into the Twin Tunnels EA? 33

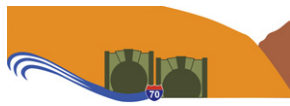
[Appendix C, Context Sensitive Solutions](#), provides details 34
about how the CSS process was incorporated into the Twin 35
Tunnels EA and how the EA addresses the Core Values 36
developed for the project. The Twin Tunnels EA established 37
a Project Leadership Team, developed a Context Statement 38
and Core Values specific to the project, and followed the 39
6-Step Decision Process as described below. 40

1. **Define Desired Outcomes and Actions**, which included 41
forming a Project Leadership Team, reviewing previous 42
work, developing a work plan, and completing NEPA 43
scoping. This step was accomplished in August and 44
September 2011. In reviewing previous work, the 45
project team consulted the recommendations of the 46
[I-70 PEIS](#) and the [Tunnel Visioning Workshop](#) held in 47
February 2011 and agreed to move forward with the 48
Tunnel Visioning Workshop recommendation (Concept 49
Package 2) as the Proposed Action. In defining issues, 50
CDOT and other stakeholders requested consideration of 51
tolling options for implementing the Proposed Action. 52

2. **Endorse the Process**, which included discussing issues 53
of importance, forming a Technical Team and Issue Task 54
Forces to address and track issues of concern through 55
the process, and developing a [Context Statement](#) 56
and [Core Values](#) together with the Project Leadership 57
Team and Technical Team. All participants endorsed 58
moving ahead with refining the Tunnel Visioning 59
recommendation as the Proposed Action and continuing 60
the consideration of tolling options. The project team 61
also clarified roles and responsibilities of the agencies, 62
consultants, and stakeholder project teams. 63

Figure 5-1. I-70 Mountain Corridor CSS 6-Step Decision Process





1	3. Establish Criteria. Criteria support decision-making	43
2	and ensure that alternatives support desired outcomes	44
3	and actions, as well as the Core Values. For this project,	45
4	the project team with the Project Leadership Team	46
5	and the Technical Team endorsed moving forward with	47
6	one Proposed Action, ensuring decision making was	48
7	consistent with previously established criteria of the	49
8	PEIS and Tunnel Visioning. The project team reviewed	50
9	the Core Values with the Project Leadership Team and	51
10	the Technical Team to ensure that each was reflected in	52
11	the NEPA evaluation. To address operational variations	53
12	that were not considered during Tunnel Visioning but	54
13	were raised by stakeholders in Step #1 of this process,	
14	the project team reviewed tolling options. Criteria were	
15	established to support decision making regarding tolling.	
16	In addition, a range of roadway width options at the	
17	western end of the corridor is being fully evaluated in	
18	the EA. The EA compiles the information to support the	
19	ultimate decision regarding this design variation.	
20	4. Develop Alternatives or Options. The Twin Tunnels	
21	EA did not develop alternatives to the Proposed Action	
22	because the Proposed Action was developed and	
23	endorsed by the recommendations of the I-70 PEIS and	
24	Tunnel Visioning workshop. The project team reviewed	
25	the full range of tolling options, evaluated them based	
26	on the criteria developed in Step #3, and carried forward	
27	two options for evaluation in the EA.	
28	5. Evaluate, Select and Refine Alternatives or Options.	
29	The PEIS and Tunnel Visioning each used a screening	
30	process to recommend the Proposed Action. The	
31	I-70 PEIS screening process identified a Preferred	
32	Alternative for the entire I-70 Mountain Corridor. The	
33	Tunnel Visioning screening process refined the I-70 PEIS	
34	Preferred Alternative to recommend a Proposed Action	
35	for the Twin Tunnels, which has been further refined	
36	in the Twin Tunnels EA process. Consistent with the	
37	I-70 PEIS, the Proposed Action design (road section)	
38	includes a range of widths to provide flexibility in the	
39	decision-making and allow full evaluation of impacts.	
40	The EA also includes a full evaluation of the impacts and	
41	benefits of operating the new lane as a managed lane or	
42	general purpose lane.	
	6. Finalize Documentation and Evaluate Process. The	43
	Twin Tunnels EA and associated decision document	44
	will document the decision-making process, define the	45
	conceptual design, detail effects of the Proposed Action,	46
	and finalize mitigation commitments. As the first project	47
	proposed in the I-70 Mountain Corridor since the signing	48
	of the PEIS ROD and completion of the CSS guidance,	49
	CDOT is committed to evaluating “lessons learned” for	50
	application on future projects. Other lessons learned	51
	to be discussed and documented including working	52
	with the Project Leadership Team, Technical Team, and	53
	implementation of the CSS guidance.	54
	5.4 What issues were raised in scoping	55
	and during the NEPA process and how	56
	did the lead agencies address those	57
	issues?	58
	Public scoping comments related to the Twin Tunnels	59
	project focused on traffic and safety, bicycle and pedestrian	60
	facilities, alternatives, the project’s relationship to other	61
	I-70 Mountain Corridor improvements, and environmental	62
	impacts. The Twin Tunnels EA Scoping Summary Report	63
	(CDOT, 2012) documents public scoping comments in more	64
	detail.	65
	Table 5-1 summarizes comments received and how they	66
	were addressed during the NEPA process.	67
	Agency scoping comments focused on the inclusion of the	68
	project in the DRCOG Regional Transportation Plan, ideas	69
	for consideration and documentation of tolling scenarios,	70
	environmental resource considerations, and construction	71
	impacts. The Twin Tunnels EA Scoping Summary Report	72
	(CDOT, 2012) documents agency scoping comments in more	73
	detail.	74
	Table 5-2 summarizes comments received and how they	75
	were addressed during the NEPA process.	76

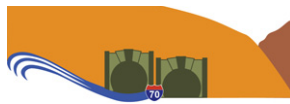


Table 5-1. Summary of How Public Comments Raised During Scoping and NEPA Were Addressed

Issue	Relevant EA Section	Information in EA
Project may cause traffic impacts elsewhere on I-70	<u>3.1 Transportation and Transportation Technical Memorandum</u>	Analyzes effects on travel patterns on I-70 from Georgetown to Floyd Hill to examine how improvements in the Twin Tunnels area of I-70 affect travel patterns elsewhere on I-70.
Desire for safety improvements on I-70	<u>2.1 What is CDOT's Proposed Action for the Twin Tunnels area?</u>	Proposed Action includes curve straightening to allow for a consistent design speed throughout the project area.
Implement lower impact options to tunnel expansion	<u>2.2 How was the Proposed Action developed?</u>	Explains why the Proposed Action focuses on capacity improvements through the Twin Tunnels, consistent with the I-70 PEIS Preferred Alternative.
Expand project to include westbound tunnel	<u>1.7 Why does this project not include westbound improvements?</u>	Explains why eastbound improvements were prioritized.
Will this project preclude future AGS in this area?	<u>2.8.2 How will the Advanced Guideway System be integrated into the Twin Tunnels area?</u>	Provides information on how the Proposed Action relates to future AGS in the area.
Water quality concerns related to mineralized rock, mine waste, maintenance activities, stormwater runoff	<u>3.16 Water Resources and Water Quality</u> <u>3.18 Regulated Materials and Solid Waste</u>	Discusses the effects of the No Action and Proposed Action on water resources and water quality and the potential for encountering mine waste or mineralized rock in the project area.
Detour effects on local access	<u>2.9 What are the construction requirements and how long would construction take?</u> <u>3.2 Social and Economic Values</u> <u>3.4 Land Use and Right of Way</u>	Provides information on operation of detour route; business and resident access will be maintained during detour operations
Air quality monitoring during construction	<u>3.8 Air Quality and Air Quality Technical Memorandum</u>	Recommends PM10 monitoring during construction and explains why PM2.5 monitoring is not necessary during construction
Vibration impacts on Idaho Springs Wastewater Treatment Plant storage tanks	<u>3.9 Noise</u> <u>3.18 Regulated Materials and Solid Waste</u>	Commits to mitigation measures by contractor to prevent impacts to storage tanks.
Visual impacts along Clear Creek, including past vegetation removal along banks	<u>3.7 Visual Resources</u>	Commits to following I-70 Mountain Corridor CSS Aesthetic Design Guidelines to reduce visual impacts and provide landscape screening.
Impacts to the federally-listed threatened Greenback cutthroat trout	<u>3.11 Aquatic Resources</u> <u>3.12 Threatened and Endangered Species</u>	Determined through consultation with CPW and USFWS that no native greenback cutthroat trout are found in this reach of Clear Creek.

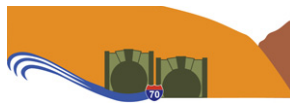
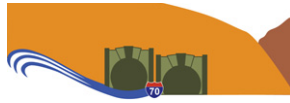


Table 5-2. Summary of How Agency Comments Raised During Scoping and NEPA Were Addressed

Issue	Relevant EA Section	Information in EA
Project must be included in DRCOG Regional Transportation Plan (RTP)	Not included in EA documentation	CDOT working with DRCOG to include the project in the RTP.
How does this project interact with other I-70 Mountain Corridor improvements?	<u>2.8 How does this project relate to the ultimate improvements approved by the I-70 Mountain Corridor PEIS ROD?</u>	Provides information about how the Proposed Action relates to ultimate improvements in the Corridor.
Fully evaluate different tolling options and the effects of the tolling option selected	<u>2.1.2 How would CDOT operate the new lane?</u> <u>3 Affected Environment and Environmental Consequences</u>	Documents the range of tolling options considered, the evaluation process, and recommendations. Assesses the effects of a managed lane on resources in the study area.
Address Total Maximum Daily Loads for cadmium	<u>3.16 Water Resources and Water Quality</u>	Documents anticipated percent change in dissolved cadmium concentrations (prior to mitigation) resulting from the Proposed Action.
Follow the ALIVE MOU	<u>3.10 Terrestrial Wildlife</u>	Documents existing conditions related to wildlife migration linkage interference zones and commits to mitigation approaches outlined in ALIVE MOU.
Long-term impacts on wildlife movement over the Twin Tunnels land bridge	<u>3.10 Terrestrial Wildlife</u>	Documents impacts to wildlife movement over the Twin Tunnels land bridge.
Perform a separate construction noise assessment due to round-the-clock construction activities	<u>3.9 Noise</u>	Narrative discussion of construction noise impacts and comprehensive mitigation measures proposed.
Shuttle construction workers from remote parking to site	<u>3.8 Air Quality</u> <u>3.19 Energy</u>	Commit to develop a plan for construction worker parking and shuttle or otherwise efficient transport to and from the work site.
Provide for emergency access during construction	<u>2.9 What are the construction requirements and how long would construction take?</u> <u>3.2 Social and Economic Resources</u>	Provide information on how emergency access would function on I-70 and on the detour route during construction.



1 5.5 How can stakeholders provide comments on this EA document 2 and input on the final decision?

3 The lead agencies are providing this EA for agency and
4 public comment. Reviewing agencies have been provided a
5 copy of the document, and individual meetings with agency
6 representatives will be held if requested.

7 A public hearing has been scheduled in Idaho Springs
8 at the Clear Creek County Schools District Office
9 (320 Highway 103, Idaho Springs, CO 80452). Interested
10 individuals can attend the public hearing to provide
11 comments or learn more about the EA study and its
12 recommendations. Comments can be provided in person
13 at the public hearing, on the project website ([www.](http://www.coloradodot.info/projects/i70twintunnels)
14 coloradodot.info/projects/i70twintunnels) or via mail or
15 email:

16 David Singer
17 Colorado Department of Transportation
18 425C Corporate Circle
19 Golden, CO 80401
20 david.singer@dot.state.co.us

21 OR

22 Loretta LaRiviere
23 CH2M HILL
24 9191 South Jamaica Street
25 Englewood, CO 80112-5946
26 Loretta.LaRiviere@CH2M.com

The lead agencies will review all comments received and
consider them before making a final decision about the
project. Key considerations for the decision include the
width of the cross section on the west end of the project
(around the tunnels) and the operating scenario (managed
lane vs. general purpose lane). All comments will be
addressed in a formal response, which will be issued with
the final decision on the project. A newsletter will be
mailed to the entire mailing list at the end of the study
to inform agency and public stakeholders of the study's
conclusions and next steps.

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Chapter 6. References

Much of the resource material listed in this chapter is available electronically on the Internet. Information related to CDOT manuals, reports, Colorado Revised Statutes, and studies may be available at the CDOT library online at:

<http://www.coloradodot.info/library>.

Joan Pinamont is the CDOT librarian. Ms. Pinamont can be reached at 303.757.9972 or joan.pinamont@dot.state.co.us.

The CDOT Library is located at:

CDOT Headquarters

Shumate Building

4201 East Arkansas Avenue

Denver, CO 80222

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