Cut Line

Partnering for Progress

U.S. 50 Corridor East

TIER 1 DRAFT ENVIRONMENTAL IMPACT STATEMENT

City of Pueblo, Colorado, to the vicinity of the Colorado-Kansas State Line

Volume 1 of 2

Colorado Department of Transportation

Project No. NH 0504-037 Sub Account No. 12812

June 2016

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U.S. 50 Corridor East

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Volume 1 of 2

Colorado Department of Transportation

Project No. NH 0504-037
Sub Account No. 12812
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U.S. 50 Corridor East
Tier 1 Draft Environmental Impact Statement
from the city of Pueblo, Colorado,
to the vicinity of the Colorado-Kansas state line

Submitted Pursuant to 42 USC 4332 (2)(C), 49 USC 303, and 23 USC 138

by the

U.S. Department of Transportation, Federal Highway Administration
and
Colorado Department of Transportation—Region 2

COOPERATING AGENCIES
United States Army Corps of Engineers
United States Environmental Protection Agency

PARTICIPATING AGENCY
United States Fish and Wildlife Service

Submitted by:

Karen Rowe, PE
Region 2 Transportation Director
Colorado Department of Transportation

Date 5/6/16

Concurred by:

Joshua Laipply, PE
Chief Engineer
Colorado Department of Transportation

Date 5/6/2016

Approved by:

John M. Cater, PE
Division Administrator, Colorado Division
Federal Highway Administration

Date 5/6/2016

A federal agency may publish a notice in the Federal Register, pursuant to 23 USC 139 (l), indicating that one or more federal agencies have taken final actions on permits, licenses, or approvals of a transportation project. If such notice is published, claims seeking judicial review of those federal agency actions will be barred unless such claims are filed within 150 days after the notice, or within such shorter time period as is specified in the federal laws pursuant to which judicial review of the federal agency action is allowed. If no notice is published, then the periods of time that otherwise are provided by the federal laws governing such claims will apply.

FHWA will issue a single Final Environmental Impact Statement and Record of Decision document pursuant to Pub. L. 112-141, 126 Stat. 405, Section 1319(b) unless FHWA determines statutory criteria or practicability considerations preclude issuance of the combined document pursuant to section 1319.

Abstract

This Tier 1 Draft Environmental Impact Statement (DEIS) documents the effects associated with the proposed transportation improvements along the U.S. Highway 50 (U.S. 50) Corridor. This document addresses a 150-mile-long portion of U.S. 50 through the Lower Arkansas Valley in southeastern Colorado, between Pueblo, Colorado, and the vicinity of the Colorado-Kansas state line. The Federal Highway Administration (FHWA), the Colorado Department of Transportation (CDOT), and local governments have identified the need to improve safety and mobility on this highway.

The U.S. 50 Tier 1 EIS analyzes the project on a broad scale. The document has been prepared under the guidance of the National Environmental Policy Act of 1969 (NEPA). The purpose of this document is to identify a general corridor location for improvements to U.S. 50, off and/or on the existing alignment, from I-25 in Pueblo to approximately one mile east of Holly, near the Colorado-Kansas state line. The Build Alternatives presented in this document are the results of this effort. They represent a 1,000-foot-wide corridor generally centered on the existing U.S. 50 alignment, as found between the communities located east of Pueblo. At the communities, the Build Alternatives also include realignments around the towns. These Build Alternatives were further screened to identify a preferred alternative, which identifies one of the choices around each community as the preferred alternative, except in Fowler and Swink. At these locations, two Build Alternatives are carried forward for Tier 2 analysis.

Following this Tier 1 process, Tier 2 NEPA studies would identify highway alignment alternatives within the 1,000-foot-wide corridor, which would consist of a maximum 250-foot-wide highway footprint (i.e., alignment) to accommodate a four-lane expressway. Tier 2 studies also would include additional socio-economic and environmental analysis, public involvement, and design.

Impacts of the No-Build Alternative and Build Alternatives, as well as the Preferred Alternative, on the rural and agricultural environment, natural environment, community and built environment, and other resources are identified in a broad range of categories. Mitigation strategies are identified to address impacts to these resources.

A public hearing will follow the publication of the Tier 1 DEIS. CDOT and FHWA then will prepare a combined Final Environmental Impact Statement (FEIS)/Record of Decision (ROD) outlining the decisions made and the reasoning behind their conclusions, per Section 1319 of Moving Ahead for Progress in the 21st Century Act of 2012 (MAP-21), unless conditions are present that preclude the use of a combined FEIS/ROD.

This Tier 1 DEIS is online at http://www.coloradodot.info/projects/us50e and at the following locations:

Pueblo City-County Library District
Tom L. and Anna Marie Giodone Library
24655 US 50 BUS
Pueblo, CO 81006
(719) 562-5600

Pueblo City-County Library District
Rawlings Library
100 E. Abriendo Avenue
Pueblo, CO 81004
(719) 562-5600

Fowler Public Library
400 6th Street
Fowler, CO 81039
(719) 263-4472

Manzanola Public Library
301 Catalpa Street
Manzanola, CO 81058
(719) 462-5528

Rocky Ford City Library
400 S. 10th Street
Rocky Ford, CO 81067
(719) 254-6641

Las Animas/Bent County Library
306 5th Street
Las Animas, CO 81054
(719) 456-0111

Lamar City Library
102 E. Parmenter Street
Lamar, CO 81052
(719) 336-4632

Southeast Transportation Planning Region
112 West Elm Street
Lamar, CO 81052
(719) 336-3850

Granada Town Hall
105 S. Main Street
Granada, CO 81041
(719) 734-5411

Holly Town Hall
100 Tony Garcia Drive
Holly, CO 81047
(719) 537-6622

Colorado Department of Transportation
Region 2 Pueblo Offices
905 N. Erie Avenue
Pueblo, CO 81001
(719) 562-5568

Colorado Department of Transportation
Region 2 Colorado Springs Offices
1480 Quail Lake Road
Colorado Springs, CO 80906
(719) 634-2323

Federal Highway Administration
12300 W. Dakota Ave, Ste. 180
Lakewood, CO 80228
(720) 963-3000

En Español

Para más información cerca de la carretera U.S. 50 Este, escrito en Español, por favor llame al (303) 209-2324.

Comments

Comments regarding this document will be accepted between June 13, 2016, and July 29, 2016. They may be submitted via the following avenues:

Online: http://www.coloradodot.info/projects/us50e/get-involved
E-mail: US50East@atkinsglobal.com
Phone: (303) 209-2324
In person: Public hearing open houses:

Monday, July 11, 2016
Las Animas Municipal Golf Course
220 Country Club Drive, Las Animas
11:00 a.m. to 2:00 p.m.

Monday, July 11, 2016
Lamar Community Building
610 S. 6th Street, Lamar
5:00 p.m. to 8:00 p.m.

Tuesday, July 12, 2016
Rocky Ford Chamber of Commerce,
The Gobin Building
105 N. Main Street, Rocky Ford
5:00 p.m. to 8:00 p.m.

Wednesday, July 13, 2016
Southeastern Colorado Heritage Center
201 W. B Street, Pueblo
5:00 p.m. to 8:00 p.m.

U.S. mail: U.S. 50 Corridor East
c/o Atkins North America, Inc.
7604 Technology Way, Ste. 400
Denver, CO 80237

Contacts

For additional information regarding the U.S. 50 Corridor East Tier 1 EIS, please contact:

Tricia Sergeson, MPA
Federal Highway Administration
12300 West Dakota Avenue, Suite 180
Lakewood, CO 80228
(720) 963-3073
Patricia.Sergeson@dot.gov

Dan Dahlke, PE
Colorado Department of Transportation
902 Erie Avenue
Pueblo, CO 81001
(719) 546-5702
Daniel.Dahlke@state.co.us

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List of Acronyms

A

AADT	Annual average daily traffic
AASHTO	American Association of State Highway and Transportation Officials
ACS	American Community Survey
APE	Area of Potential Effect

B

BNSF	Burlington Northern Santa Fe Railway
BTU	British thermal unit

C

CAFO	Concentrated Animal Feeding Operation
CDOT	Colorado Department of Transportation
CDOW	Colorado Division of Wildlife
CDPHE	Colorado Department of Public Health and Environment
CDRMS	Colorado Division of Reclamation, Mining, and Safety
CE	Categorical Exclusion
CEDIS	Colorado Economic and Demographic Information System
CEQ	Council on Environmental Quality
CFR	Code of Federal Regulations
CGS	Colorado Geological Survey
CH_4	Methane
CO	Carbon monoxide
CO_2	Carbon dioxide
COGCC	Colorado Oil and Gas Conservation Commission
CPI	Colorado Preservation, Inc.
CPW	Colorado Parks and Wildlife
CR	County Road
CRS	Colorado Revised Statutes
CWCB	Colorado Water Conservation Board

D

dBA	Decibel, A-weighted
DEIS	Draft Environmental Impact Statement
DNR	Colorado Department of Natural Resources
DOE	United States Department of Energy
DOLA	Colorado Department of Local Affairs

E

EA	Environmental Assessment
EIA	Energy Information Administration
EIS	Environmental Impact Statement
EPA	United States Environmental Protection Agency

F

FEIS	Final Environmental Impact Statement
FEMA	Federal Emergency Management Agency
FHWA	Federal Highway Administration
FONSI	Finding of No Significant Impact
FPPA	Farmland Protection Policy Act

G

GHG	Greenhouse gas

H

HUD	United States Department of Housing and Urban Development

I

I-10	Interstate 10
I-25	Interstate 25
I-90	Interstate 90
IGA	Intergovernmental Agreement

K

KDOT	Kansas Department of Transportation

L

LEDPA	Least Environmentally Damaging Practicable Alternative
LEP	Limited English Proficiency
Leq(h)	Hourly equivalent noise level
LOS	Level of service
LOSS	Level of service of safety

M

MAP-21	Moving Ahead for Progress in the 21st Century Act of 2012
MMT	Million metric tons
MOU	Memorandum of Understanding
MOVES	Motor Vehicle Emissions Simulator
MPH	Miles per hour
MPO	Metropolitan Planning Organization
MS4	Municipal Separate Storm Sewer System
MSAT	Mobile source air toxics

N

N_2O	Nitrous oxide
NAC	Noise Abatement Criteria
NDIS	National Diversity Information Source
NEPA	National Environmental Policy Act
NFRAP	No further remedial action planned
NHPA	National Historic Preservation Act
NHS	National Highway System
NHTSA	National Highway Traffic Safety Administration
NO_2	Nitrogen dioxide
NOI	Notice of Intent
NPS	National Park Service
NRCS	Natural Resources Conservation Service
NRHP	National Register of Historic Places

O

O_3	Ozone
OEDIT	Colorado Office of Economic Development and International Trade

P

PA	Programmatic Agreement
PACOG	Pueblo Area Council of Governments
PFYC	Paleontological Fossil Yield Classification
PM	Particulate matter
PTSF	Percent Time-Spent-Following

R

ROD	Record of Decision
RV	Recreational Vehicle

S

SAFETEA-LU	Safe, Accountable, Flexible, Efficient Transportation Equity Act: A Legacy for Users
SDS	Southern Delivery System
SECWCD	Southeastern Colorado Water Conservancy District
SH	State Highway
SHPO	State Historic Preservation Office
SIU	Section of Independent Utility
SO_2	Sulfur dioxide
STAA	Surface Transportation Assistance Act of 1982
STIP	Statewide Transportation Improvement Plan
SWReGAP	Southwest Regional Gap Analysis Project

T

TERC	Transportation Environmental Resource Council
TIMTC	Trucking Industry Mobility and Technology Coalition
TNC	The Nature Conservancy
TSM	Transportation system management

U

Uniform Act	Uniform Relocation Assistance and Real Property Acquisition Policies Act of 1970
U.S.	United States
U.S. 287	United States Highway 287
U.S. 50	United States Highway 50
USACE	United States Army Corps of Engineers

USBR	United States Bureau of Reclamation
USC	United States Code
USDOT	United States Department of Transportation
USFWS	United States Fish and Wildlife Service
USGS	United States Geological Survey

V

VMT	Vehicle miles of travel
VPD	Vehicles per day

W

WRCC	Western Regional Climate Center

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S Summary

The U.S. Highway 50 (U.S. 50) Tier 1 Environmental Impact Statement (EIS) is a 150-mile broad-scale transportation study from approximately the city of Pueblo, Colorado, to the vicinity of the Colorado-Kansas state line (see Figure S-1). The corridor traverses four counties and 10 municipalities (identified in Figure S-1), providing local and regional connections for the distribution of people, goods, and services through and beyond the Lower Arkansas Valley. The Federal Highway Administration (FHWA) and the Colorado Department of Transportation (CDOT) have identified the need to improve safety and mobility on this highway.

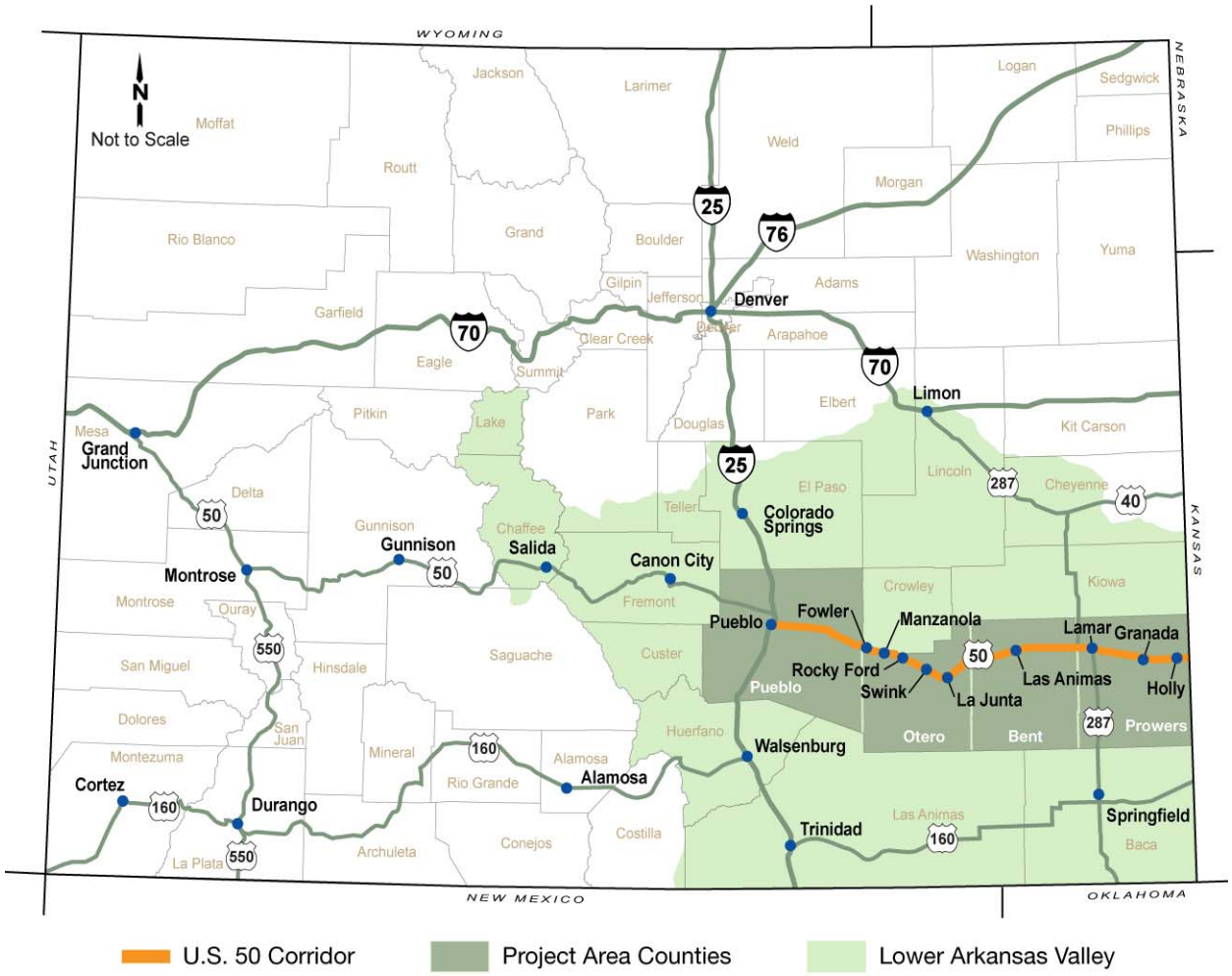


Figure S-1. U.S. 50 Corridor Through the Lower Arkansas Valley

This document has been prepared to comply with the National Environmental Policy Act (NEPA), which is required because of the likelihood that this project would use federal funds and/or require federal approvals for future right-of-way acquisition and highway improvements along the corridor. A tiered NEPA approach for U.S. 50 was selected for a number of reasons. First, past trends and uncertainty over the amount and timing of future federal and state funding suggests that a corridor-wide, 150-mile improvement to U.S. 50 could not be implemented as a single project. Second, a tiered approach would provide an understanding of the long-term consequences of corridor-wide improvements. This understanding could not be developed by looking at projects individually.

The objective of this Tier 1 EIS effort is to provide decisions that CDOT and the communities along the corridor can use to plan and program future improvements within the project area. Tiering the NEPA decision-making process will allow input from all involved agencies and the public to shape these transportation planning decisions. This will provide a level of predictability for CDOT and the communities to ensure that certain location decisions will not be revisited later in the process.

Tier 2 NEPA studies would provide detailed environmental review and analysis of project specific preliminary design. These studies would be covered by separate NEPA documents that would individually analyze each section of independent utility along the corridor.

S.1 U.S. 50 CORRIDOR CHARACTERISTICS

U.S. 50 is the only major east-west highway connecting from state line to state line south of Interstate 70 and north of U.S. 160 (see Figure S-2). The posted speed limit within established cities and towns ranges from 25 miles per hour (mph) to 45 mph, while the majority of rural segments are posted at 65 mph. The highway is predominantly asphalt, although there are also sections of concrete. With the exception of locations in a few communities, U.S. 50 is not illuminated. Figure S-2 is an example view of the U.S. 50 corridor.

Figure S-2. U.S. 50 West of Hasty, Colorado

U.S. 50 is part of the National Network, which was authorized by the Surface Transportation Assistance Act (STAA) of 1982 (P.L. 97-424) and specified in the U.S. Code of Federal Regulations (23 CFR 658) to require states to allow freight trucks on the Interstate System and portions of the Federal-aid Primary

System. Under Colorado state law, STAA-dimensioned commercial vehicles may legally operate on all highways that were designated as a federal-aid primary highway prior to June 1, 1991.

The stretch of U.S. 50 examined in this document is primarily two-lane highway, interspersed with four sections with four travel lanes (see Figure S-3). CDOT's existing right of way through towns generally varies from 60 feet wide to 80 feet wide. This typically is not wide enough to provide a roadway that meets current American Association of State Highway and Transportation Officials (AASHTO) safety standards.

Figure S-3. Four-Lane Section East of Rocky Ford

The largest community along this corridor is the City of Pueblo, with a population of slightly more than 105,000 (2010 Census). The other communities range in population from about 400 (Manzanola; see Figure S-4) to almost 7,800 (Lamar) (2010 Census). With the exception of Pueblo, growth in the Lower Arkansas Valley has lagged behind most other areas of the state. From 2000 to 2010, the combined population of the four counties increased approximately 8 percent, which is half the rate of growth experienced by the state over the same time period (approximately 17 percent). Between 2000 and 2010, the combined population of the nine communities east of Pueblo (along the U.S. 50 corridor) decreased overall by 10 percent from 28,350 people in 2000 to 25,474 people in 2010.

Figure S-4. Downtown Manzanola

The Lower Arkansas Valley is largely rural and heavily dependent on an agricultural economy (see Figure S-5). Currently, ranches and farms use approximately 3.5 million acres, or about 80 percent of the land that comprises the four counties of Pueblo, Otero, Bent, and Prowers (Agricultural Census 2007b). Most businesses in these four counties directly or indirectly support agriculture.

Figure S-5. Feedlot along U.S. 50

About 95 percent of the employers have fewer than 50 workers, and most of these small businesses provide a wide variety of services for individuals, business and government establishments, and other organizations, as defined by the Colorado Economic and Demographic Information System (CEDIS) (CEDIS 2006). Because most communities in the Lower Arkansas Valley are small, key services are available only in the larger regional centers; therefore, many residents drive to Pueblo, La Junta, or Lamar for employment, major medical care, shopping, and higher education.

S.2 PURPOSE AND NEED

The purpose for undertaking transportation improvements in the U.S. 50 corridor from approximately Pueblo, Colorado, to the vicinity of the Colorado-Kansas state line is to improve *safety* and *mobility* for local, regional, and long-distance users of U.S. 50 for present and future travel demand. This will be accomplished by balancing the mobility and access needs of these users and also providing the flexibility to meet future travel demands.

The need for improvements on U.S. 50 results from the combined effects of multiple safety and mobility issues. These issues are both directly and indirectly influenced by the differing needs of the road users and by highway deficiencies, outdated roadway geometrics, access issues (the ability to enter, exit, or cross U.S. 50), numerous speed reduction zones, and lack of passing opportunities.

S.2.1 Safety Issues

Traffic volumes usually drive the need for improvements along a highway. However, the need for improvements along U.S. 50 is a combination of user conflicts and roadway deficiencies. Factors that contribute to safety issues along the corridor include inadequate clear zones, frequent changes in design characteristics, and limited passing opportunities.

U.S. 50 has inadequate clear zones, meaning that obstructions or fixed objects and hazards along the side of the highway could be hit by vehicles that veer off the road. Common fixed-object hazards along U.S. 50 include utility poles (see Figure S-6), structures, buildings, bridge walls, and deep ditches. Collisions with fixed objects comprise 22 percent of total accidents along the corridor.

Figure S-6. Example of Inadequate Clear Zone along U.S. 50

U.S. 50 also has inconsistent roadway design, which includes frequent changes in roadway widths, posted speed limits, number of through-lanes, and shoulder and median widths. This is an issue because drivers expect roadways to be fairly consistent in design over a given distance. Furthermore, within the 150-mile corridor, 96 miles are two lanes and 55 of those miles do not provide passing opportunities. This reduces average speeds along the corridor and becomes a safety issue, since there is a greater potential for head-on collisions when faster vehicles attempt to pass slower vehicles.

S.2.2 Mobility Issues

U.S. 50 serves motorists making long-distance, regional, and local trips. This requires the roadway to accommodate users with different, sometimes conflicting, needs including personal, commercial, and agricultural uses. The conflicts between pedestrians, cars, trucks, tractors, and other industrial vehicles often result in mobility issues. These issues are especially evident on the in-town and two-lane sections of U.S. 50, where the ability to separate users is the most constrained. As shown in Figure S-7, passenger vehicles and long-distance trucking conflict with slow-moving agricultural equipment. This has been identified during public meetings as a concern for all users.

Figure S-7. Tractor on U.S. 50 in Rocky Ford

Additionally, speed reduction zones through communities along the corridor, as well as traffic signals in these communities, limit travel speeds along the corridor. The speed reduction zones result in a mobility problem that adversely affects users of U.S. 50 in the Lower Arkansas Valley. While speed reduction zones provide a necessary benefit to local users, they are a hindrance to long-distance passenger vehicles

and trucks who value a relatively high, consistent travel speed, and regional users, who travel the corridor often and bear the highest accumulated cost of chronic travel delays.

S.2.3 Access Issues

There are hundreds of access points along U.S. 50. This factor increases the risk of crashes, since motorists have numerous opportunities to enter, exit, or cross the highway, thus increasing the potential for conflicts with through-traffic. The observed total crash rates for U.S. 50 through the larger cities of Rocky Ford, Las Animas, and Lamar were above comparable statewide averages (CDOT 2003c). The majority of the crashes in these locations (68 percent) were attributed to intersection- or driveway-related conflicts.

S.2.4 Flexibility to Accommodate Future Needs

The safety and mobility issues and the user conflicts on U.S. 50 are expected to be compounded by increased travel demands in the future. While the overall population of the corridor east of Pueblo has not increased since 1960, traffic on this portion of U.S. 50 nevertheless has experienced modest growth (CDOT 2007a). Looking to the future, Colorado's *2040 Statewide Transportation Plan* indicates that vehicle miles of travel (VMT) in Colorado are expected to double by 2040 (CDOT 2015). Colorado's population has been growing rapidly and is expected to continue to do so. Even with minimal population growth in the Lower Arkansas Valley, the expected addition of nearly three million new residents in the state by 2040 (CDOT 2015) will likely increase traffic on the U.S. 50 corridor, because goods are transported along this corridor to reach Interstate 25 (I-25) and travel on to more urban areas.

Current safety and mobility issues of the U.S. 50 corridor are expected to worsen in the future. The existing road is not meeting the needs of its users today, so it would not accommodate future changes in travel demand.

S.3 PROJECT AREA

The project area for the Tier 1 EIS has been defined as one to four miles wide surrounding the existing U.S. 50 facility and extending from Pueblo, Colorado, at I-25 to the Colorado-Kansas state line (see Figure S-8). This area was used to adequately assess highway needs, as well as to assess existing conditions along the U.S. 50 corridor.

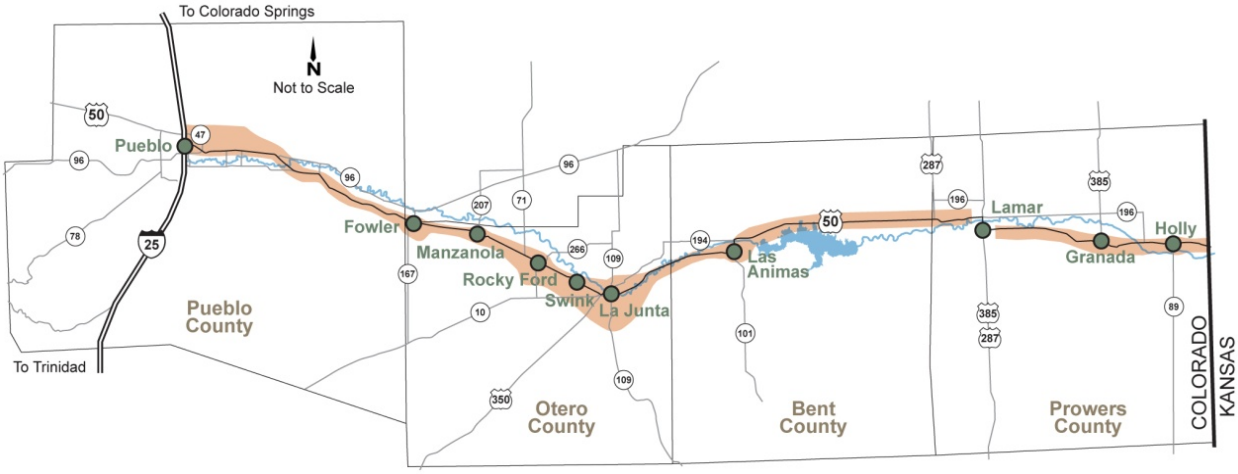


Figure S-8. U.S. 50 Project Area

The city of Lamar, Colorado, is excluded from the project area, as shown in Figure S-8. This area was studied under the separate *U.S. 287 at Lamar Reliever Route Environmental Assessment*, completed in August of 2013; the Finding of No Significant Impact (FONSI) for the project was signed in November 2014. More information on the U.S. 287 at Lamar Reliever Route Project, the Environmental Assessment (EA), and FONSI can be found online at http://www.coloradodot.info/projects/us287lamar.

S.4 ALTERNATIVES CONSIDERED

The alternatives development process involved the public, communities along the U.S. 50 corridor in the Lower Arkansas Valley, and various state and federal agencies. It included consideration of a number of different potential transportation solutions that were screened using criteria related to the project purpose and need. The remaining solutions formed the range of reasonable alternatives that were retained for additional evaluation and consideration.

The alternatives development process followed four steps, shown in Figure S-9, to arrive at the range of reasonable alternatives that were fully evaluated in this EIS. Two of the following steps focused on what type of transportation action is needed, while the other two focused on where the corridor would be located.

Step 1: Regional corridor location. Where would transportation improvements be made at a regional level?

Step 2: Transportation mode. What type(s) of transportation improvements would meet the needs of the corridor (highway, rail, and so on)?

Step 3: Facility type. What type of facility—two-lane highway, four-lane expressway, etc.—would meet the needs of the corridor?

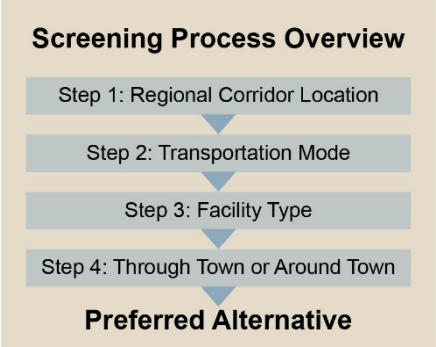


Figure S-9. Screening Approach Used to Develop the Range of Reasonable Alternatives

Step 4: Through town or around town. Would transportation improvements be made through communities along the corridor or around them?

This process included extensive public and agency involvement through public meetings, project committees, and working groups. The alternatives resulting from this process, the Build Alternatives, were carried forward in this document for subsequent comparison to a no-build alternative.

S.4.1 No-Build Alternative

In accordance with NEPA, a no-build alternative is included in an EIS to provide a basis for comparison with any build alternative(s). For U.S. 50, the No-Build Alternative includes ongoing maintenance of pavement and bridges on the existing U.S. 50 alignment. It also reflects, and does not preclude, ongoing or planned minor safety improvements, provision of passing-lane sections, routine pavement overlays, bridge replacements, and repair of any weather- or crash-related damage.

S.4.2 Build Alternatives

The Build Alternatives consist of constructing a four-lane expressway on or near the existing U.S. 50 from I-25 in Pueblo, Colorado, to approximately one mile east of Holly, Colorado. The Build Alternatives are not final roadway alignments. Each alternative is a corridor approximately 1,000 feet wide within which the 250-foot roadway alignment (or footprint) is needed to accommodate a four-lane expressway will be located. More specific roadway alignments will be identified during Tier 2 studies. Within this 1,000-foot-wide corridor, it may be possible to avoid resources during Tier 2 studies. In addition, portions of the existing highway that go through communities will remain in place to serve local needs even though they will no longer be U.S. 50.

In general, there is one Build Alternative alignment between each of the communities along the existing U.S. 50 with a north and south around-town Build Alternative at each of the communities. The exception to this is in Pueblo, between Pueblo and Fowler (Fort Reynolds area), and in La Junta. Because U.S. 50 connects to I-25 within Pueblo (the western terminus for the Tier 1 EIS), an around-town corridor location was not developed. Instead, three alternatives are considered: Pueblo Airport North (Alternative 1), Pueblo Existing Alignment (Alternative 2), and Pueblo State Highway (SH) 47 Connection (Alternative 3). In La Junta, four Build Alternatives are considered. One proposes to construct a new roadway alignment to the north and the other three propose alignments to the south of town.

Between communities, there are nine Build Alternatives that generally would remain on the existing U.S. 50 alignment. However, between Pueblo and Fowler, one realignment alternative near Fort Reynolds (known as Alternative 2: Fort Reynolds Realignment) is proposed to minimize impacts to homes in the Fort Reynolds area.

Figure S-10 depicts an overview of the location of the Build Alternatives. The project does not include alternatives in Lamar, as discussed in Chapter 3, Alternatives Considered, because that area was studied in the *U.S. 287 at Lamar Reliever Route Environmental Assessment* (FONSI signed November 10, 2014).

The selection of a preferred alternative in each section of the corridor, together with any other revisions to the Build Alternatives, has been identified in this Tier 1 Draft EIS. At this time, preparation of a joint Tier 1 Final EIS (FEIS)/Record of Decision (ROD) is anticipated.

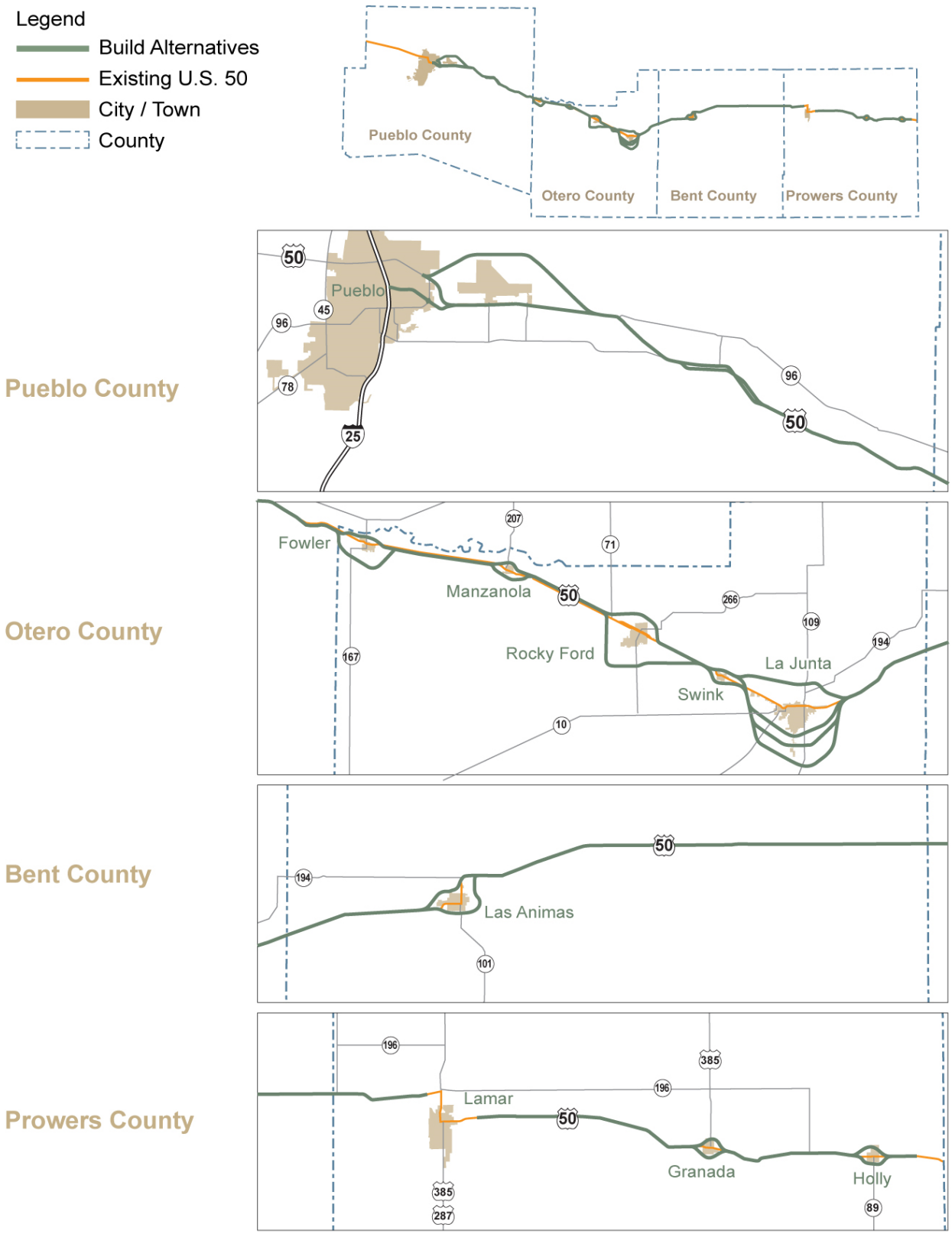


Figure S-10. Location of the U.S. 50 Tier 1 EIS Build Alternatives

S.5 AFFECTED ENVIRONMENT, ENVIRONMENTAL CONSEQUENCES, AND MITIGATION

A total of 18 resources, or groups of resources, were evaluated in this document. Because some of these resources are interconnected, they have been combined into four categories:

- Rural and Agricultural Environment—agricultural resources
- Natural Environment—wetland and riparian resources, wildlife and habitat, water resources, and geological and paleontological (fossil) resources
- Community and Built Environment—historic resources, archaeological resources, land use, parklands and recreational resources, social and economic conditions, environmental justice, aesthetics and visual resources, air quality issues, and traffic noise
- Other—transportation, hazardous materials, Section 4(f) resources, Section 6(f) resources, energy, global climate change, cumulative impacts, irreversible and irretrievable commitment of resources, and short-term uses versus long-term productivity

Chapter 4, Affected Environment, Environmental Consequences, and Mitigation, compares the effects of the No-Build Alternative and Build Alternatives on each resource listed. It also includes detail on cumulative effects and minimization activities. Section 4(f) resources are addressed separately in Chapter 5, Section 4(f) Evaluation. Chapter 8, Mitigation Strategies, provides additional detail on mitigation.

For this Tier 1 level of analysis, it was impractical to identify and evaluate resources at the same level of detail as a standard (non-tiered) EIS for several reasons. The U.S. 50 project area is 150 miles long and one to four miles wide. This makes field review prohibitively time consuming and expensive. Also, the build-out period for Tier 2 studies is estimated to be decades (not years). As a result, data collected from the field today are not likely to be relevant by the time many Tier 2 studies occur. Because of these factors, existing data were used whenever possible to identify and evaluate resources. When existing data were not available, limited field review was conducted, but at a planning level appropriate for Tier 1. The quantification of the affected environment and analysis of effects is based on the study area, which is 1,000 feet wide centered on the corridor alternatives beginning at I-25 in Pueblo and extending to approximately one mile east of Holly.

Additionally, because the roadway footprint will not be determined until Tier 2 studies, it was not feasible to identify which specific resources would be affected by the Build Alternatives. Therefore, this analysis considered every resource that could possibly be impacted during Tier 2 studies as a resource affected by the Build Alternatives. This resulted in an intentional overestimation of effects to some resources, as shown in Figure S-11. The figure shows how some resources could be avoided, depending on which roadway footprint might be selected. For the purposes of this analysis, all of the resources shown would be considered impacted by a Build Alternative, even though a future footprint chosen in Tier 2 may not affect them all.

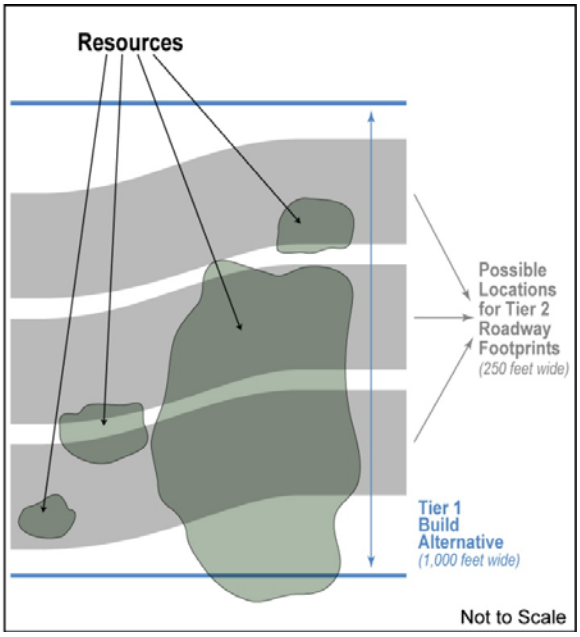


Figure S-11. Overestimation of Effects to Resources by a Build Alternative

While this Tier 1 analysis could not narrow the impacts to specific resources, the document has identified whether the resources could be avoided during Tier 2 studies, as shown in Figure S-12. A resource that crosses through an entire Build Alternative cannot be avoided no matter where the roadway footprint is located; however, some resources only partially cross an alternative. These resources could possibly be avoided by the roadway footprint.

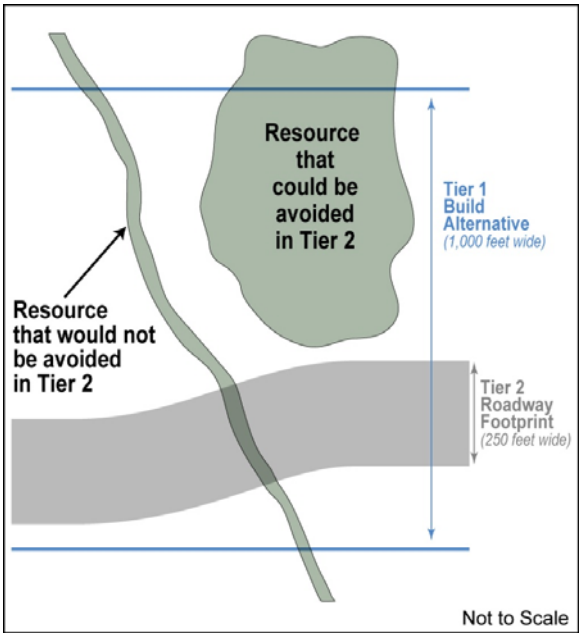


Figure S-12. Resources that Could and Cannot be Avoided by a Build Alternative

Table S-1 summarizes potential effects of the Build Alternatives to resources within the project area. Due to the length of the corridor, the table provides a very cursory summary of potential effects, which may be largely avoided during Tier 2 studies. A range of effects is provided because each section of the project corridor includes at least two Build Alternatives; impacts are dependent upon which Build Alternative would be constructed. Impacts and mitigation measures are discussed in Chapter 4, Affected Environment, Environmental Consequences, and Mitigation.

Table S-1. Summary of Build Alternatives Effects

Category	Resources	Build Alternatives Effects
Rural and Agricultural Environment	Agricultural resources	Affects approximately 2 percent of agricultural land in the project area. May affect up to four feedlots, up to six permanent roadside produce markets, and up to 24 canals and ditches. None of the identified feedlot effects would prevent continued operation.
Natural Environment	Wetland and riparian resources	Affects 587 acres to 713 acres of wetland and riparian resources of the 27,620 acres of wetland and riparian resources in the project area; most have low functionality (Category III or IV).
	Wildlife and habitat	Affects slightly more than 2 percent of the total identified wildlife habitat in the project area, or between 4,287 acres and 4,564 acres, although most of this acreage has been disturbed by human activity. Potential to affect up to 34 special-status species, of which eight are federal-listed threatened, endangered, or candidate species. Widens the roadway at 11 identified wildlife crossings (locations where wildlife frequently crosses the highway), which may increase the potential of animal-vehicle collisions. Future Tier 2 NEPA studies will analyze potential effects on wildlife and habitat in more detail. May remove existing noxious weeds, but also may increase the potential for noxious weed infestation through construction activities.
	Water resources	Where U.S. 50 adds crossings of surface water resources—primarily irrigation canals and ditches—the potential to degrade water quality exists. The increased paved surface also would increase the amount of stormwater runoff, although this is anticipated to be minimal.
	Geological and paleontological (fossil) resources	Potential to affect up to four existing surface mining operations (geological resources). The Build Alternative also has potential to encounter paleontological (fossil) resources within six geologic formations.
Community and Built Environment	Historic resources	Potential to affect 60 to 79 historic or potentially historic resources. Given the number and type of historic resources identified, effects by the Build Alternatives are unlikely to change the overall historic character of the Lower Arkansas Valley or of any community.
	Archaeological resources	Potential to affect nine known archaeological sites; however, there is always potential to encounter previously unknown archaeological sites.
	Land use	Potential to affect up to 13 conservation easements and 10 public properties. Conversion of existing land uses to a transportation use will occur as a result of right-of-way acquisition. Right-of-way acquisition would be required primarily from agricultural lands. No substantial effect on land use within the project area is anticipated.
	Parklands and recreational resources	Potential to affect up to 15 parkland and recreational resources, including Cottonwood Links Golf Course, Las Animas Municipal Golf Course, Karney Ranch State Wildlife Area, John Martin Reservoir State Wildlife Area, John Martin Reservoir State Park, Granada School District recreational facility, Mike Higbee State Wildlife Area, Granada State Wildlife Area, Holly State Wildlife Area, and four existing and two planned trails.

Table S-1. Summary of Build Alternatives Effects (continued)

Category	Resources	Build Alternatives Effects
Community and Built Environment	Social and economic conditions	Potential to positively affect social conditions in the project area overall. Moving traffic from U.S. 50 through a town to a new around-town route would remove long-distance and regional traffic from the main street within towns along U.S. 50, making the road easier to cross, especially for pedestrians. The following effects to local businesses are anticipated: • Continuation of existing economic trends despite around-town U.S. 50 routes • Conversion of agricultural land to roadway use, eliminating productive value to economy • Traveler-oriented businesses could be affected by reduction of pass-by traffic • Highway-dependent businesses such as truck stops or gas station convenient stores, would benefit from improved highway conditions and ability to drive faster on new around-town U.S. 50 routes Downtown areas could benefit by restoring commercial districts to their original “Main Street” status with speeds less than 30 mph and pedestrian and bicycle-friendly, safe crossings. In Pueblo, no economic effects are expected because none of the Build Alternatives involve moving U.S. 50 from the existing alignment. For the communities east of Pueblo, the Build Alternatives would move U.S. 50 away from downtown areas where most of the communities’ economic activity takes place; therefore, the Build Alternatives have the potential to negatively affect local businesses.
	Environmental justice	A higher percentage of minority and low-income residents live within the boundaries of the communities along the U.S. 50 corridor when compared to the state of Colorado averages. Specific effects to these communities cannot be identified at this time; however, further analysis will be conducted during Tier 2 studies.
	Aesthetics and visual resources	In areas where drivers’ views from the highway would change, these changes would not alter the character of those views; therefore, no visual resources from U.S. 50 would be affected. Visual resources from surrounding areas would be affected between communities, where the roadway footprint would be widened, and for residents living in areas where around-town routes are eventually selected. These visual resources would be negatively affected by increasing the existing visual intrusion or creating a visual intrusion (the highway) where one does not exist today.
	Air quality issues	No violations of federal pollutant standards are anticipated. Construction-related effects will be analyzed further in Tier 2 studies.
	Traffic noise	Given the modest existing and future traffic volumes, no substantial increase in traffic noise effects is expected. However, moving traffic from U.S. 50 through a town to a new around-town route would change the noise environment. Places that are near existing U.S. 50 would be quieter, while places near the new alignment would be noisier. Impact analysis at specific locations will be analyzed in Tier 2 studies.

Table S-1. Summary of Build Alternatives Effects (continued)

Category	Resources	Build Alternatives Effects
Other	Transportation	Anticipated to benefit overall transportation conditions. Expected to increase mobility for local, regional, and long-distance users. Anticipated to improve safety by increasing passing opportunities, providing adequate clear zones, and controlling access. Improved safety and mobility within towns because regional and long-distance traffic moves to U.S. 50 on the around-town routes.
	Hazardous materials	Potential to encounter up to 162 known hazardous materials sites. U.S. 50 would remain a designated route for transporting hazardous materials. Improving the roadway, as well as re-routing around communities, is expected to improve safety for transport of hazardous cargo along the corridor.
	Section 4(f) resources	Potential Section 4(f) resources include 15 publicly owned parkland and recreational resources, 60 to 79 historic resources, and up to nine archaeological resources that are known to be listed or may be listed on the NRHP. Additional research will be needed during Tier 2 studies to determine the use of Section 4(f) resources.
	Section 6(f) resources	No conversion of Section 6(f) resources was identified.
	Energy	Would result in a 2- to 12-percent increase in energy consumption in 2040, due to vehicles traveling longer distances on U.S. 50 along around-town routes. However, this increase is expected to be minor in the context of existing energy consumption along the corridor.
	Global climate change	Greenhouse gas (GHG) emissions related to the Build Alternative would not result in reasonably foreseeable future adverse impacts on the human environment. GHG emissions increases would be very small.

S.6 IDENTIFICATION OF PREFERRED ALTERNATIVE AND SUMMARY OF IMPACTS

To identify a preferred alternative, the Build Alternatives around communities were further screened. Identification of the Preferred Alternative was largely based on its ability to minimize environmental and social impacts. This evaluation focused on three broad categories that considered effects to the following environment categories:

- Rural and agricultural environment
- Natural environment
- Community and built environment

Criteria to screen around-town Build Alternatives were developed based on comments received from agencies and the public, as well as regulatory requirements. Public workshops also were held in each of the 10 communities along the U.S. 50 corridor to determine what resources were important to the local

economy and quality of life (see Chapter 7, Community Outreach and Agency Involvement, and Appendix C, Public and Agency Involvement).

The result of this analysis generally narrowed down the around-town Build Alternatives to a single preferred alignment, except in Fowler and Swink. Table S-2 summarizes the identified Preferred Alternative that resulted from the additional screening of these alternatives.

Table S-2. Summary of Preferred Alternative

Category	Preferred Alternative Components
Regional Corridor Location	Existing Regional Corridor
Transportation Mode	Highway
Facility Type	Four-Lane Rural Expressway
Build Alternatives	Pueblo—Alternative 2: Pueblo Existing Alignment
	Pueblo to Fowler—Alternative 2: Fort Reynolds Realignment
	Fowler—Alternative 1: Fowler North and Alternative 2: Fowler South
	Fowler to Manzanola Alternative (on or near existing alignment)
	Manzanola—Alternative 2: Manzanola North
	Manzanola to Rocky Ford Alternative (on or near existing alignment)
	Rocky Ford—Alternative 1: Rocky Ford North
	Rocky Ford to Swink Alternative (on or near existing alignment)
	Swink—Alternative 1: Swink North, and Alternative 2: Swink South
	La Junta—Alternative 2: La Junta South
	La Junta to Las Animas Alternative (on or near existing alignment)
	Las Animas—Alternative 1: Las Animas North
	Las Animas to Lamar Alternative (on or near existing alignment)
	Lamar to Granada Alternative (on or near the existing alignment)
	Granada—Alternative 2: Granada South
	Granada to Holly Alternative (on or near existing alignment)
	Holly—Alternative 2: Holly South

Impacts for the Preferred Alternative are summarized in Chapter 6, Identification of Preferred Alternative and Summary of Impacts.

S.7 COMMUNITY OUTREACH AND AGENCY INVOLVEMENT

The U.S. 50 Tier 1 EIS has followed a community and agency involvement process since the project began in September 2004. The 150-mile U.S. 50 corridor contains a large and diverse group of communities, agencies, and other stakeholders. Comments and opinions received from these groups have helped ensure the full range of issues is addressed and substantial issues identified, in accordance with the Notice of Intent (NOI) published in 71 Federal Register (FR) 4958 (January 30, 2006).

The following agreements and associated meetings are described in further detail in Chapter 7, Community Outreach and Agency Involvement:

- **Pre-Scoping Meetings with all the Agencies and Communities**. Presented project goals, including previous planning efforts, issues, and opportunities, during collaborative discussions and listened to agency and/or communities' concerns and internal initiatives that may pertain to the project.
- **Agency Charter Agreement and Community Memorandum of Agreement**. Established clear expectations for the role of the agencies and community representatives in decision making, identified responsibilities of the participating agencies/communities, and described procedures to support the collaborative problem-solving efforts.
- **Formal Agreements with Resource Agencies**. Developed a Tier 1 Programmatic Agreement (PA) (see Appendix C) for Section 106 of the National Historic Preservation Act (NHPA) and a NEPA/Section 404 of the Clean Water Act Merger and Cooperating Agency agreement with the U.S. Army Corps of Engineers (USACE).

Copies of these agreements may be found in Appendix C, Public and Agency Involvement, of this document. The open dialogue of the U.S. 50 project has developed new opportunities for agencies, communities, and stakeholders to build partnerships to achieve many of their individual goals and initiatives.

S.8 SECTION 4(F) EVALUATION

Within the project area, Section 4(f) resources include publicly owned parkland and recreational resources and historic properties that are known to be listed on the National Register of Historic Places (NRHP) or may be eligible for listing on the NRHP. Section 4(f) resources in the U.S. 50 project area were identified through a combination of agency coordination, field reconnaissance, and literature reviews.

The Tier 1 evaluation for U.S. 50 is based upon the identification and potential use of likely Section 4(f) resources. The investigation determined that the Build Alternatives would not likely preclude prudent and feasible alternatives in Tier 2 studies that would avoid use of Section 4(f) resources or would preclude actions to minimize harm to these resources. This means that, in future studies of the corridor, possible alignments may still be able to avoid a use of the identified Section 4(f) resources.

Section 4(f) resources that may potentially be used by the Build Alternatives include 15 publicly owned parkland and recreational resources, 60 to 79 historic resources, and nine archaeological resources that are known to be listed or may be listed on the NRHP. During Tier 2 studies, confirmation that these resources are protected under Section 4(f) will be needed and additional design efforts will be required to identify specifically how they would be used. It may be possible in Tier 2 studies to minimize and/or avoid the use of many of these resources.

During the alternatives development process, the use of potential Section 4(f) resources was minimized by eliminating through-town options. This by itself avoided the potential use of more than 200 historic properties that are listed or may be listed on the NRHP, as well as 11 parkland and recreational resources. Additionally, identifying a 1,000-foot-wide alternative in Tier 1 as the general location for a 250-foot-wide roadway footprint provides the opportunity to further avoid and minimize the use of Section 4(f) resources during Tier 2 studies. Tier 2 design efforts also will include conceptual design for the proposed highway improvements, which could provide opportunities to reduce the footprint and the use of Section 4(f) resources on a case-by-case basis.

S.9 MITIGATION STRATEGIES

This document is recommending a new and innovative approach to mitigate for natural resource effects. The Natural Resources Mitigation Strategies Plan (see Appendix E) was developed to guide mitigation activities for natural resource effects that occur as the result of future projects, including effects to wildlife and their habitat, wetlands and riparian areas, and water resources. It outlines a holistic approach to mitigation that prioritizes effective ecological outcomes and coordination with resource agencies and other organizations focused on environmental conservation.

Mitigation strategies for resources related to the built (human) environment were developed based on the potential effects the Build Alternatives could have on each type of resource. These strategies will guide mitigation activities for impacts identified in Tier 2 studies. In addition, mitigation strategies for historic

and archaeological resources were agreed to as part of the *U.S. 50 Tier 1 Section 106 Programmatic Agreement* (see Appendix C).

S.10 ANTICIPATED OUTCOMES OF TIER 1

The objective of the U.S. 50 Tier 1 EIS is to provide decisions that CDOT and the communities along the U.S. 50 corridor can use to design and program future transportation improvements of U.S. 50 in the Lower Arkansas Valley.

As discussed in Chapter 3, Alternatives Considered, the existing regional corridor, the highway mode, and a four-lane expressway facility type were carried forward for further consideration because they would meet the project purpose and need. In addition, the around-town corridors were carried forward for further consideration because they would meet the purpose and need while also minimizing impacts.

Following the Tier 1 NEPA analysis, individual sections throughout the corridor will undertake more detailed Tier 2 NEPA studies. Based on logical termini, each section is independent, useful, and stands on its own merits within the framework of this Tier 1 EIS. Each of these sections is referred to as a "section of independent utility." Logical termini for improvements would best be located at the around-town and between-town section transition points (totaling 18 sections); however, some of the around-town and between-town sections may have multiple sections of independent utility. Based on the analysis in this document, 23 sections of independent utility were identified.

Funding for construction of the improvements identified during this Tier 1 process is uncertain since CDOT's funding for highway improvements in this corridor is limited. The current Statewide Transportation Improvement Plan (STIP) (2016–2019) has approximately $17,500,000 identified for various projects within the U.S. 50 East Corridor from Pueblo to the Kansas state border (CDOT 2015a). There is no guarantee that the funds identified for U.S. 50 East from Pueblo to Kansas will be there in those fiscal years.

The 2040 Statewide Long-Range Transportation Plan includes the U.S. 50 corridor in its Regional Transportation Plans. The Southeast Transportation Planning Region, which contains Otero, Bent, and Prowers counties, three of the four counties along the U.S. 50 project corridor, has identified the U.S. 50 corridor as one of their priority corridors for improvements. Of the funds available to the Southeast Transportation Planning Region over the next 10 years for corridor improvements, the region has identified $14,000,000 of Regional Priority Program funds to go toward improvements on U.S. 50

(Pueblo Area Council of Governments [PACOG] 2015). When or if dependable and larger funding sources for transportation become available, then improvements identified in the Tier 1 EIS could move into a Tier 2 study for a section of independent utility and, eventually, construction of a portion of the highway.

1 Introduction

This Tier 1 EIS addresses a 150-mile-long portion of U.S. 50 through southeastern Colorado, from near the City of Pueblo east to the vicinity of the Colorado-Kansas state line (see Figure 1-1). FHWA, CDOT, and local governments have identified the need to improve safety and mobility on this mostly two-lane highway, which traverses four counties. This document was prepared by CDOT and the FHWA, which are the lead agencies for the project. The USACE and U.S. Environmental Protection Agency (EPA) are cooperating agencies for the document. Cooperating agencies are federal agencies with jurisdiction by law or special expertise in a particular resource or resource analysis. The USACE and EPA provide advice and recommendations to CDOT and FHWA on the scope and content of the environmental analyses. The U.S. Fish and Wildlife Service (USFWS) is a participating agency for this EIS. Participating agencies are federal agencies that have an interest in the project and provide input during the NEPA process, especially pertaining to development of the purpose and need, range of alternatives, methodologies, and analysis of alternatives (FHWA 2015).

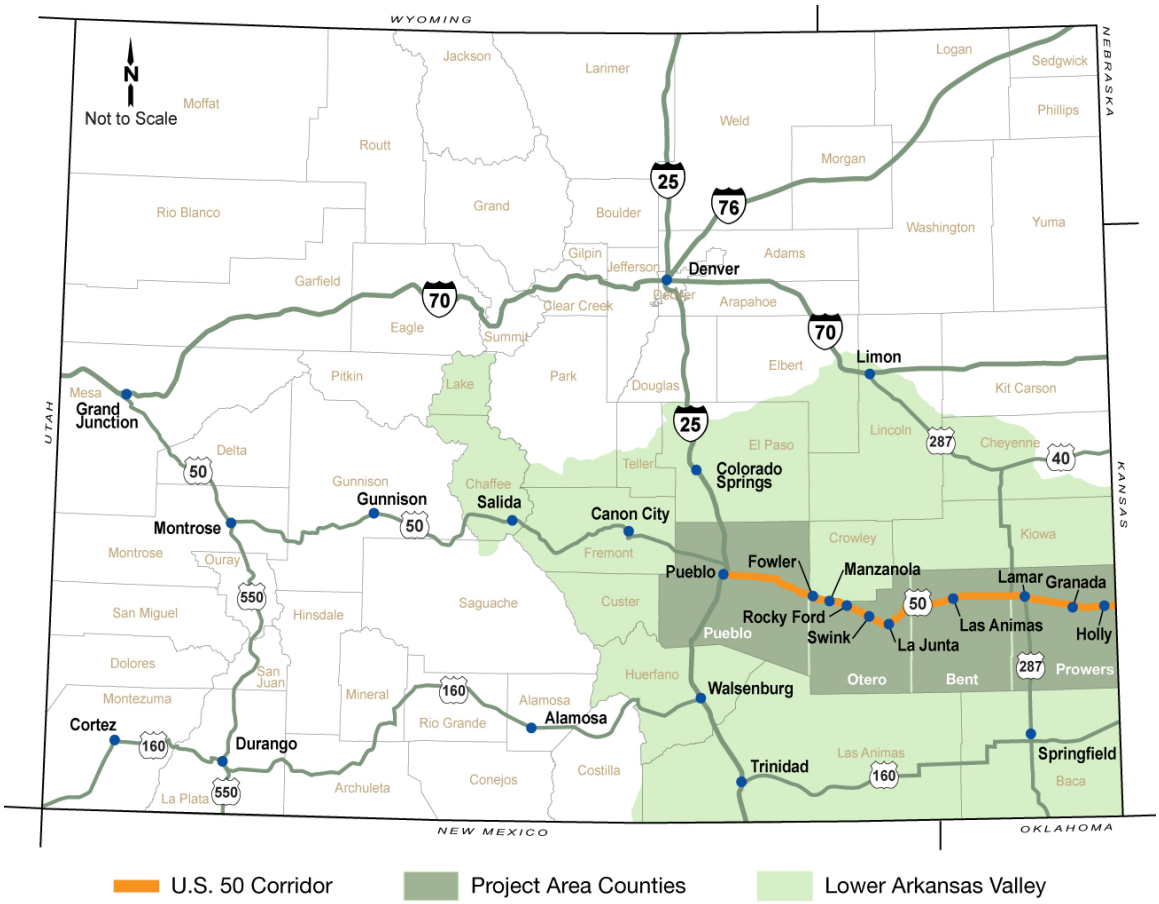


Figure 1-1. U.S. 50 through Lower Arkansas Valley

The purpose of this introductory chapter is to describe what studies have been done in the past and how previous plans have been incorporated into this study. It also describes the tiered approach to addressing NEPA and why tiering was selected to evaluate the U.S. 50 corridor. Compliance with NEPA is required because of the likelihood of using federal funds and/or requiring federal approvals for future right-of-way acquisition and highway improvements along the corridor.

1.1 PREVIOUS STUDIES

Numerous safety and environmental studies have been prepared by CDOT for portions of U.S. 50 during the past several decades. Due to a lack of funding, however, only a few short segments of the highway were improved. By the late 1990s, it became apparent to CDOT and the communities along the U.S. 50 corridor that a new approach was needed.

In 2000, CDOT and the communities along the corridor began to develop a corridor-wide vision for the future of the highway to improve safety and mobility in the Lower Arkansas Valley. This shared vision is documented in *A Corridor Selection Study: A Plan for U.S. 50*, which was completed in 2003. This study provided a plan for addressing long-term transportation needs for U.S. 50 users. The study examined the following three alternative regional corridors to serve U.S. 50 needs:

- A corridor one to 10 miles north of the existing highway
- A corridor on or near the existing highway
- A corridor one to 10 miles south of the existing highway

After extensive public input, the study concluded that transportation improvements would be made on or near the existing U.S. 50 corridor based on the following decision criteria:

- Public acceptance
- Utilization of existing infrastructure/right of way
- Ability to phase construction and use improvements to match funding
- Consistency/conformity with local/regional plans
- Maintenance of traffic during construction
- Potential economic benefits to local communities
- Ability to meet local mobility needs
- Future flexibility

The study also recommended development of NEPA analyses for the entire U.S. 50 corridor, which resulted in this Tier 1 EIS. The vision developed in the planning study provided the basis for the purpose

and need for this Tier 1 EIS. The study vision called for a safe roadway on or near the existing roadway alignment that maintains a free flow of traffic at a consistent speed for the movement of people and goods along and through the Lower Arkansas Valley, while providing flexibility to accommodate future transportation needs. A detailed discussion of the project's purpose and need is included in Chapter 2, Purpose and Need.

Other regional and statewide reports and plans have been completed that support the community vision identified in the 2003 study. These reports and plans also demonstrate statewide support for addressing the transportation needs of the corridor. These planning efforts are summarized in Table 1-1.

Table 1-1. U.S. 50-Related Planning Efforts

Planning Document	Prepared By	Type	Visions for U.S. 50 Included in the Study or Plan
Eastern Colorado Mobility Study 2003	CDOT	Regional	U.S. 50 serves as a Colorado freight corridor; improving U.S. 50 would enhance the movement of freight in Colorado.
2003 Strategic Investment Plan	Transportation Commission of the State of Colorado	Statewide	U.S. 50 is a substantial statewide corridor; addressing system quality, mobility, and safety deficiencies would provide a regional and statewide transportation system, as well as economic benefits.
Southeast Transportation Planning Region Corridor Vision 2003	CDOT	Regional	"To increase the east-west mobility … as well as to improve safety and maintain system quality to provide the necessary mobility … for region residents, tourists and freight movements by providing interstate level mobility for southern Colorado … to ensure continued and increased economic development in the Region."
Pueblo Transportation Planning Region Corridor Vision 2035	PACOG	Regional	To "improve safety as well as to maintain system quality and to increase mobility" (Pueblo Area Council of Governments [PACOG] 2008).
2040 Regional Transportation Plan, Southeast Transportation Planning Region	CDOT	Regional	U.S. 50 is listed by the Southeast Transportation Planning Region (TPR) to be a regional priority corridor. According to the Statewide Plan, the movement of industrial and agricultural freight along U.S. 50 and other freight routes is critical to the local and state economy.
Statewide Transportation Improvement Program 2016–2019	CDOT	Funding	Identified funding for the U.S. 50 Tier 1 EIS.

1.2 TIERED NEPA PROCESS

Tiering is a process for evaluating the environmental consequences of a project in two steps, known as tiers. The first tier examines a large area or a broad set of issues when a project is still in the formative stage. The first tier allows an agency to determine a corridor's needs and focus on broad environmental issues that may directly affect early planning decisions, such as the type of transportation mode, the general location of the project, and major design features.

The second tier generally involves the preparation of a detailed NEPA analysis addressing the consequences of one or more specific projects and including project impacts, costs, and mitigation strategies. This may take the form of a Tier 2 EIS, EA, or Categorical Exclusion (CE). Tier 2 studies may be conducted by CDOT and/or local governments.

A tiered NEPA approach for U.S. 50 was selected for a number of reasons. Based on past trends and uncertainty over the amount and timing of future federal and state funding, a corridor-wide, 150-mile improvement to U.S. 50 could not be implemented as a single project. In addition, a tiered approach would provide an understanding of the long-term consequences (both positive and negative) of corridor-wide improvements. Mitigation strategies also could be developed on a corridor-wide basis to maximize the financial investment. This long-term, high-level understanding could not be developed by looking at projects individually.

The objective of this Tier 1 EIS effort is to provide decisions that CDOT and the communities can use to plan and program future improvements. In the NOI for the U.S. 50 Tier 1 EIS in the Federal Register (71 FR 4958), published January 30, 2006, FHWA anticipated the following decisions would be made based on the outcomes of this document:

- Modal choice
- Selection of a preferred general corridor location for U.S. 50
- Evaluation of access management
- Identification of independent, stand-alone projects
- Plan for further action

Using the tiered NEPA decision-making process allows environmental analysis to shape these transportation planning decisions, with input from all involved agencies, communities, and the public. This also provides a level of predictability for CDOT and the communities so that certain location decisions will not be revisited later in the process.

1.3 PROJECT AREA AND STUDY AREA LIMITS

To adequately assess highway needs, the project area for this Tier 1 EIS has been defined as one to four miles wide aligning on the existing U.S. 50 facility and extending from Pueblo, Colorado, at I-25 to the Colorado-Kansas state line (see Figure 1-2). This area was generally used to assess the existing conditions of the U.S. 50 corridor, which are discussed further in Chapter 4. The project area encompasses the study area limits, which is where the Tier 1 corridor alternatives considered by this project would be located.

The study area is a site 1,000 feet wide centered on the corridor alternatives, beginning on or near the existing U.S. 50 at I-25 in Pueblo, Colorado, and extending to approximately one mile east of Holly, Colorado, in the vicinity of the Colorado-Kansas state line. The study area limits were used to assess potential impacts, as described in Chapter 4. Selection of the project area and study area limits, including the eastern and western termini, was based on the recommended improvements of previous planning studies.

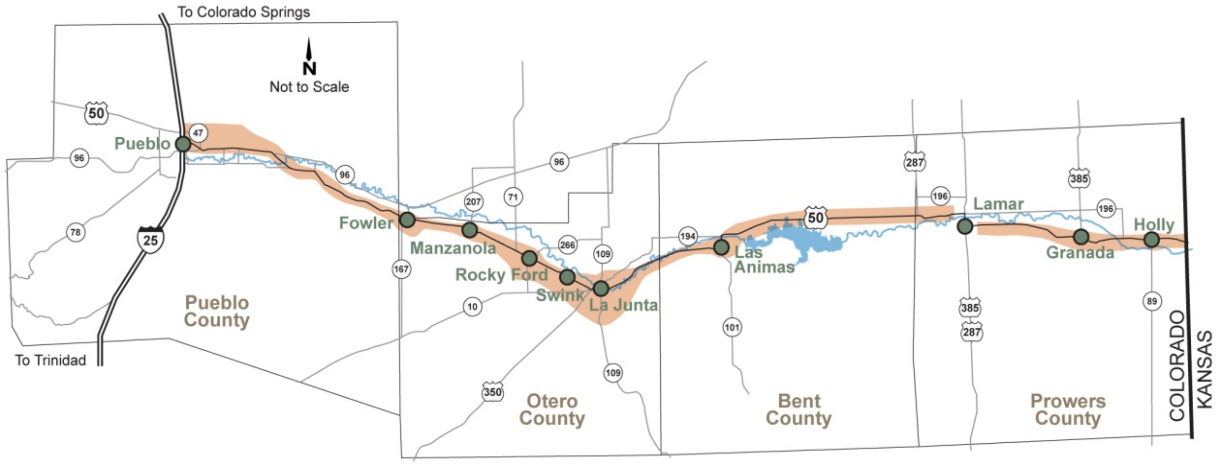


Figure 1-2. U.S. 50 Project Area

Note that the City of Lamar, Colorado (between approximately milepost 426.5 and milepost 437.7), is excluded from the project area, as shown in Figure 1-2, and, therefore, also excluded from the study area. This location was studied under the separate *U.S. 287 at Lamar Reliever Route Environmental Assessment* (FONSI signed November 10, 2014). The EA identified a proposed action that bypasses Lamar to the east beginning at the southern end of U.S. 287 near County Road (CR) C-C and extending nine miles to SH 196. More information on the U.S. 287 at Lamar Reliever Route project, as well as the EA and FONSI, is available online at http://www.coloradodot.info/projects/us287lamar.

1.4 LOGICAL PROJECT TERMINI

As stated in the NOI, transportation improvements are proposed on U.S. 50 between Pueblo, Colorado, and the vicinity of the Colorado-Kansas state line. These approximate limits were identified during a prior U.S. 50 planning study, reflecting extensive public input from the communities along the U.S. 50 corridor and the identification of the need for improvements along the corridor. The following discussion explains the project termini, or project limits, in more detail.

1.4.1 Logical Western Terminus

As shown in Figure 1-3, U.S. 50 connects to I-25 in Pueblo, Colorado, where travelers may continue to other destinations north or south on I-25 or west of the city on U.S. 50. As the largest community along U.S. 50 in Colorado, Pueblo is an important destination for residents along the corridor, particularly the communities within the Lower Arkansas Valley. I-25 also is a substantial link to other large communities along the Colorado Front Range, as well as other Rocky Mountain States, Canada, and Mexico; therefore, I-25 in Pueblo is a logical western terminus for this study.

1.4.2 Logical Eastern Terminus

The easternmost community along U.S. 50 within Colorado is Holly, which is located approximately two miles west of the Colorado-Kansas state line. For shopping, services, and other regional-trip purposes, residents of Holly travel west to Lamar, Colorado, which is a distance of 27 miles, rather than east to Garden City, Kansas, which is 73 miles to the east (see Figure 1-3).

Based on consultation with the Kansas Department of Transportation (KDOT), no U.S. 50 improvements are anticipated on the Kansas side for the foreseeable future. In the long term, however, KDOT intends to upgrade the corridor consistent with its congressional designation as a high-priority corridor on the National Highway System (NHS). Therefore, the selection of an eastern project terminus approximately one mile east of Holly (in the vicinity of the Colorado-Kansas state line) allows flexibility for CDOT to match any future KDOT improvements in the two miles between the end of the project and the state line.

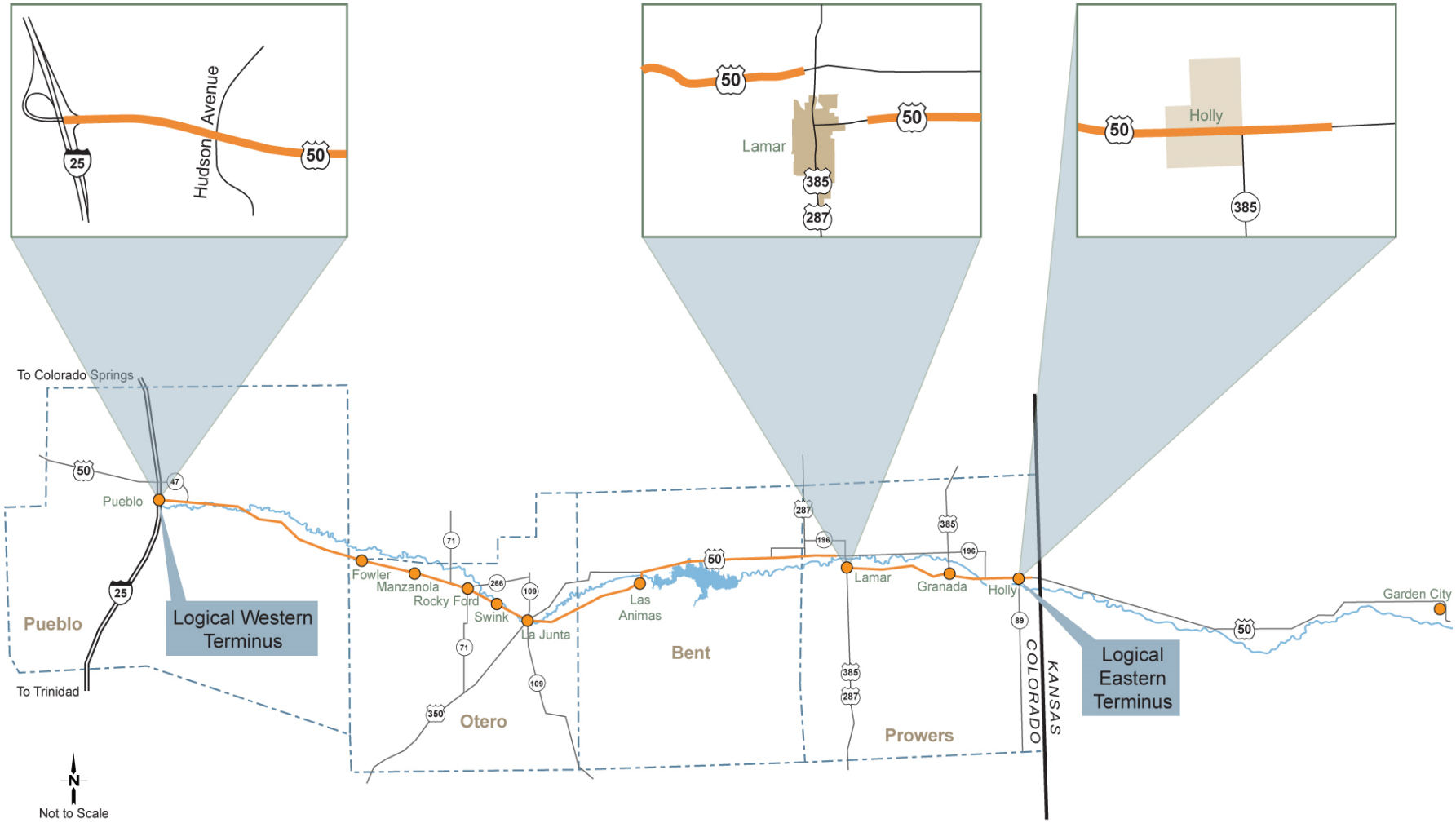


Figure 1-3. Logical Termini of U.S. 50 Corridor Improvements

1.5 U.S. 50 TIER 1 EIS CONTENTS

Based on requirements set forth in regulations from the Council on Environmental Quality (CEQ) for implementing NEPA (40 Code of Federal Regulations [CFR] Parts 1500–1508) and FHWA's Technical Advisory 6640.8A, and proceeding according to the NOI for U.S. 50 filed by FHWA (71 FR 4958), this document includes the following substantive chapters and discussion topics:

- Chapter 2, Purpose and Need—This chapter includes a discussion of the transportation issues experienced on U.S. 50 and provides the reasons why improvements are needed to the highway within the project area. These issues relate to improving safety and mobility for local, regional, and long-distance users of U.S. 50.
- Chapter 3, Alternatives Considered—This chapter discusses the processes used to develop and screen transportation solutions to arrive at the range of reasonable alternatives that were considered by project planners and designers and discussed in this document. It describes the steps that were followed to identify the type and location of transportation improvements that would meet the purpose and need.
- Chapter 4, Affected Environment, Environmental Consequences, and Mitigation—This chapter includes a discussion of the environmental and social resources that exist within the project area and identifies the potential impacts of alternatives considered. Mitigation strategies also are presented as they relate to each identified resource.
- Chapter 5, Section 4(f) Evaluation—This chapter identifies and evaluates Section 4(f) resources potentially used by the Build Alternatives.
- Chapter 6, Identification of Preferred Alternative and Summary of Impacts—This chapter identifies a preferred alternative by further screening the Build Alternatives. The screening process assesses impacts on the rural and agricultural environment, natural environment, and community and built environment, along with consideration of public input. While the Build Alternatives comprise a four-lane rural expressway and consider all alternatives, the Preferred Alternative generally narrows the Build Alternatives to one around-town corridor for each location, with a few exceptions. The chapter summarizes the Preferred Alternative's impacts by resource.
- Chapter 7, Community Outreach and Agency Involvement—This chapter consists of a description of the processes, actions, and outcomes of community and agency participation. It includes a discussion of EIS tiering, the roles and responsibilities of Agency and Community Working Groups, and the efforts made to engage the public.
- Chapter 8, Mitigation Strategies—This chapter discusses strategies that would be undertaken to mitigate adverse environmental effects if the Build Alternatives are constructed.

2 Purpose and Need

2.1 BACKGROUND INFORMATION

U.S. 50 serves national, regional, and local transportation needs. As a coast-to-coast element of the NHS, U.S. 50 is an important route for the movement of people and distribution of goods and services through and beyond the Lower Arkansas Valley. Within Colorado, U.S. 50 links two key north-south transportation routes: U.S. 287 and I-25. U.S. 287 is a designated interstate trade route called the Ports-to-Plains Corridor, which connects Laredo, Texas, and Denver, Colorado. I-25 extends through Colorado to the north and south, from Interstate 10 (I-10) in New Mexico to Interstate 90 (I-90) in Wyoming. U.S. 50 provides access to I-25, which connects Denver with Colorado's other large metropolitan areas.

U.S. 50 in southeastern Colorado generally parallels the Arkansas River, passing through four counties and 10 cities and towns, as previously shown in Figure 1-1. In most of the small communities, U.S. 50 also serves as Main Street. Four communities along the U.S. 50 corridor (Pueblo, La Junta, Las Animas, and Lamar) are county seats, as well as important regional service centers.

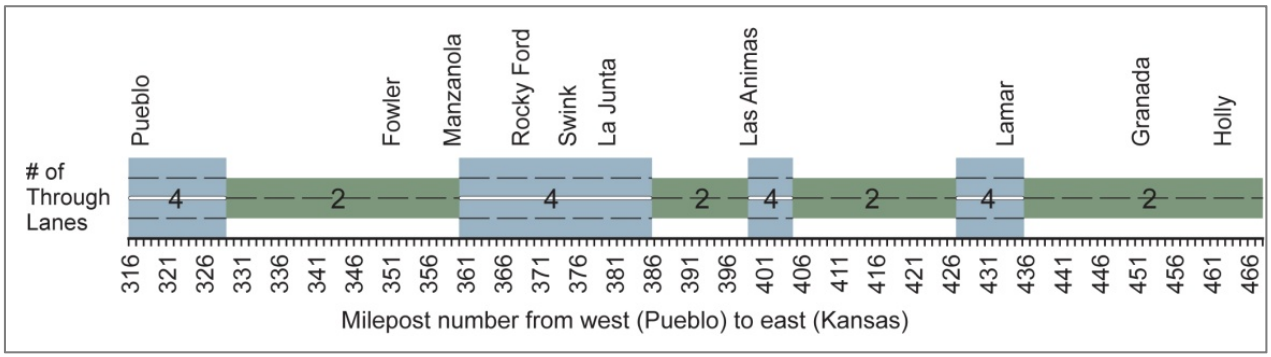
The largest community along this corridor is the city of Pueblo, with a population of just over 105,000 (2010 Census). The other rural communities range in population from approximately 400 (Manzanola) to almost 7,800 (Lamar) (2010 Census). Growth in southeastern Colorado has lagged behind most other areas of the state. From 2000 to 2010, the combined population of the four counties increased approximately 8 percent, which is half of the growth rate experienced by the entire state during the same time period (approximately 17 percent). The combined population of the 10 communities east of Pueblo decreased overall by 10 percent from 28,350 people in 2000 to 25,474 people in 2010.

The Lower Arkansas Valley is largely rural and heavily dependent on an agricultural economy. Currently, large ranches and farmland use approximately 3.5 million acres, or 80 percent, of the land that comprises the four counties of Pueblo, Otero, Bent, and Prowers (Agricultural Census 2007b). Public lands managed by several different state and federal agencies account for an additional 858,000 acres, or 20 percent, of the area of these counties (CDOT 2004b, CDOW 2003a). Towns and schools make up less than 1 percent of the land, accounting for 4,601 acres and 378 acres, respectively (CDOT 2004b). Most businesses in the four counties directly or indirectly support agriculture. With the exception of Pueblo County, there are few industrial employers in the area. Because most communities in the Lower Arkansas Valley are small, vital services are available only in the larger regional centers, such as Pueblo, La Junta, Las Animas, and

Lamar. Additional information about the socioeconomic characteristics of the project corridor is provided in Section 4.3.5, Social and Economic Considerations.

2.1.1 Existing Roadway Conditions

The segment of U.S. 50 between Pueblo, Colorado, at I-25 and the Colorado-Kansas state line is characterized by its surrounding rural and agricultural landscape and the diverse communities it traverses. Along this segment, the roadway is primarily a two-lane highway, interspersed with four sections that have four travel lanes, as shown in Figure 2-1. CDOT's existing right of way through towns generally varies from 60 feet to 80 feet, and typically is not wide enough to provide a roadway that meets current AASHTO safety standards. The posted speed limit within established cities and towns ranges from 25 mph to 45 mph, while the majority of rural segments are posted at 65 mph.



Source: CDOT 2003a

Figure 2-1. Two-Lane Versus Four-Lane Travel on U.S. 50

2.1.2 Types of Users on the U.S. 50 Corridor

The amount of existing and future traffic on a roadway is usually the driving force behind the need for improvements. For the U.S. 50 corridor, however, traffic volume is not the concern. The issue is the conflict between the different types of users and vehicles. U.S. 50 serves long-distance, regional, and local transportation needs and accommodates a number of diverse users with different—and sometimes conflicting—travel needs. The conflicts created by the different types of users and their different needs hinder mobility and create safety issues along U.S. 50. The travel needs of these different users are described below.

Long-Distance Travelers

These users pass through the Lower Arkansas Valley to reach destinations outside the 150-mile corridor. These trips neither originate nor end in the Lower Arkansas Valley. Long-distance motorists may stop in a U.S. 50 community for fuel, food, or lodging. For long-distance travelers, the desire is to get through

the Lower Arkansas Valley as quickly as possible. High speeds are desired for these users; stoplights, speed reduction zones, intersecting roads, and driveways present unwanted delays and hazards to these motorists.

An example of these users would be interstate truck drivers. U.S. 50 is part of the National Network, which was authorized by the Surface Transportation Assistance Act (STAA) of 1982 (P.L. 97-424) and specified in the U.S. Code of Federal Regulations (23 CFR 658) to require states to allow freight trucks on the Interstate System and portions of the Federal-aid Primary System. Under Colorado State law STAA-dimensioned commercial vehicles may legally operate on all highways which were designated as a Federal-aid primary highway prior to June 1, 1991.

Regional (Intercity) Travelers

These users take trips that start or end within the U.S. 50 corridor and pass through more than one city or town. These trips include visiting Pueblo or beyond for goods and services not available in local communities, farm-to-market travel, other trips between towns, travel to locations of employment, trips to access educational institutions and social events, and recreational trips. For example, many rural residents use the U.S. 50 corridor to access goods and services in Pueblo or in other more urban areas along I-25. Many residents drive to Pueblo, La Junta, or Lamar for employment, major medical care, shopping, and higher education. Regional (intercity) motorists tend to travel at moderate to high speeds and travel delays are anticipated. Access to major cross streets is needed to get these travelers to their destinations. Regional trips typically range from 15 miles to 100 miles in length.

Local Travelers

These users make trips into, out of, or through one town, or in a rural area between towns. These travelers use U.S. 50 as if it were a local street or county road because alternative routes may not be available or may not be as convenient. These travelers include pedestrians and bicyclists, as well as those who drive cars, school buses, trucks, and farm equipment. For local travelers, low speeds are typical and appropriate. These travelers use U.S. 50 to get to and from county roads, private driveways, farm fields, and local businesses. Speed reduction zones and stoplights provide the safety needed to make these trips on or across the highway. Local trips are typically less than 15 miles in length.

A subset of local travel consists of very short trips along or across U.S. 50 within a town. In many towns, U.S. 50 is the predominant location of businesses and services. Short internal trips are made by trucks, motor vehicles, pedestrians, or bicyclists. Figure 2-2 shows U.S. 50 user types based on their needs for access and desired travel speed.

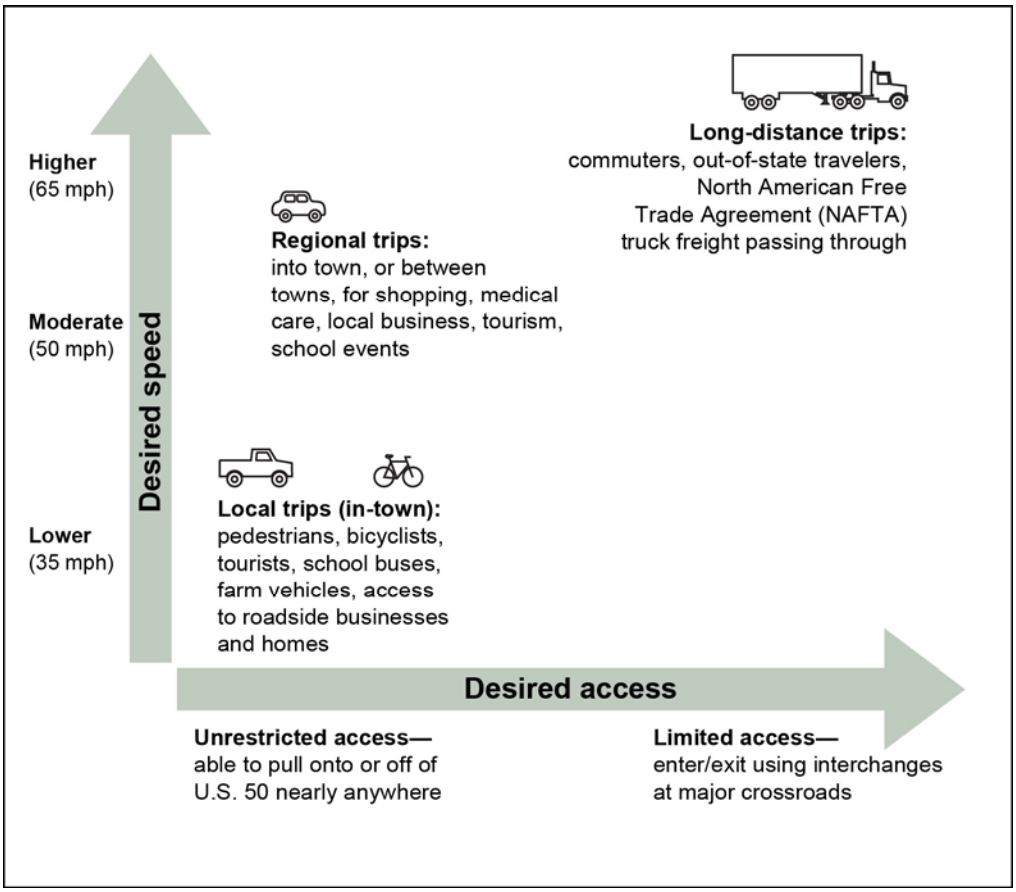


Figure 2-2. General Travel Needs of Various U.S. 50 Users

2.2 PROJECT PURPOSE

The purpose for undertaking transportation improvements in the U.S. 50 corridor from Pueblo, Colorado, to the vicinity of the Colorado-Kansas state line is to improve *safety* and *mobility* for local, regional, and long-distance users of U.S. 50 for present and future travel demand.

2.3 NEED FOR THE ACTION

The need for improvements on U.S. 50 results from the combined effects of multiple safety and mobility issues. These issues are both directly and indirectly influenced by the differing needs of the road users, highway deficiencies, roadway geometrics, access (the ability to enter, exit, or cross U.S. 50), numerous

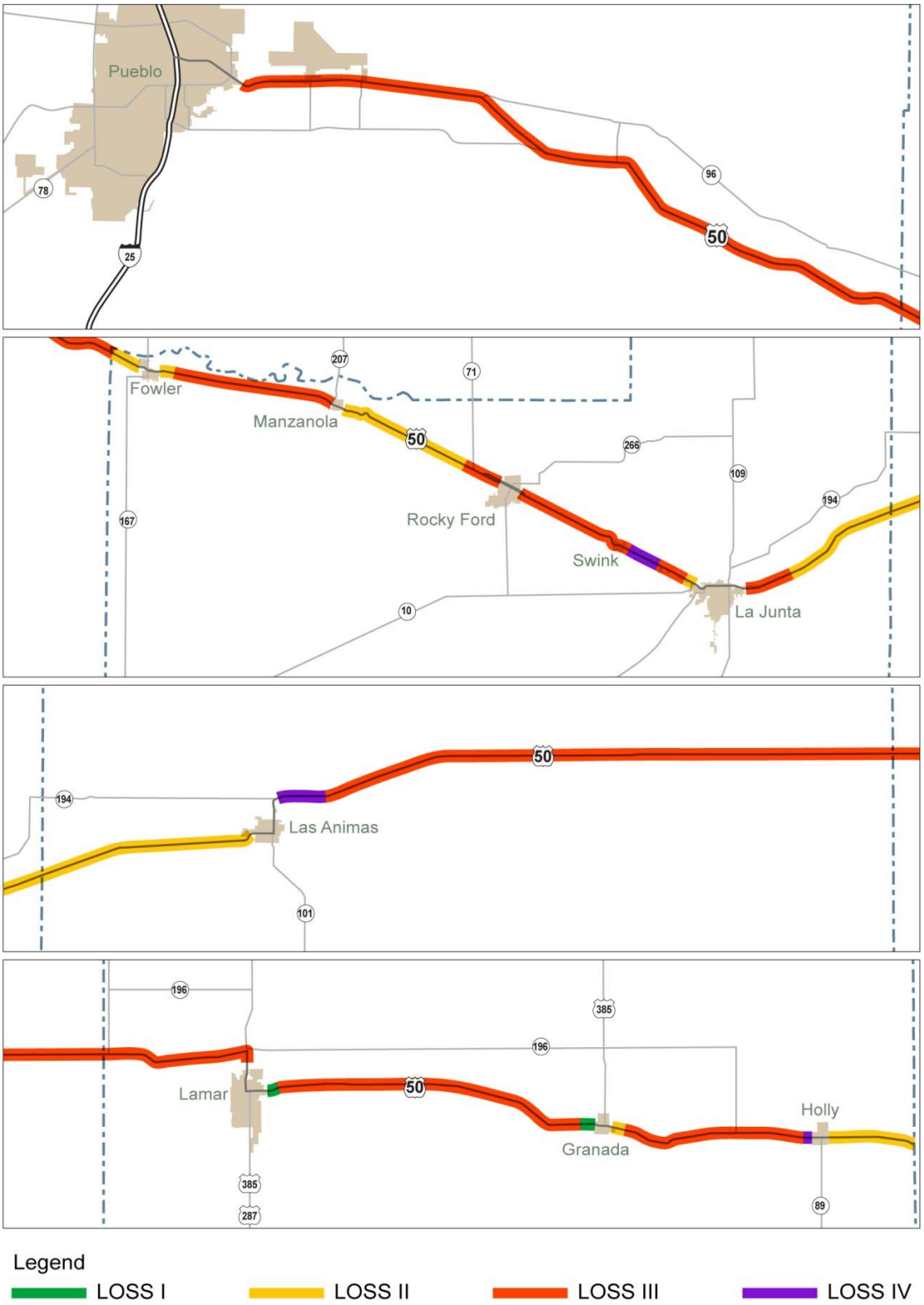
speed reduction zones, and lack of passing opportunities. Safety and mobility issues along U.S. 50 are discussed in the following sections.

2.3.1 Safety Issues

CDOT uses Level of Service of Safety (LOSS) to quantify the magnitude of safety issues for rural and nonurban areas. LOSS is a qualitative measure used to characterize the safety of a roadway segment in reference to its expected performance. LOSS reflects how the roadway segment is performing in regard to its expected crash frequency and severity at a specific level of annual average daily traffic (AADT).There are four LOSS categories:

- LOSS I: Indicates low potential for crash reduction since there is a low frequency of crashes
- LOSS II: Indicates low to moderate potential for crash reduction since there is a better-than-expected (not as many crashes as might be expected) frequency of crashes
- LOSS III: Indicates moderate to high potential for crash reduction since there is a worse-than-expected (more crashes than might be expected) frequency of crashes
- LOSS IV: Indicates high potential for crash reduction since there is a high frequency of crashes

Figure 2-3 depicts the LOSS throughout the corridor. As shown in Figure 2-3, a majority of the corridor is LOSS III, which indicates a relatively high magnitude of safety issues along the corridor. Around Swink, Las Animas, and Holly, safety is considerably worse than similar facilities (LOSS IV). A total of 80 percent of the rural areas on U.S. 50 are classified as LOSS III and IV, which identifies a need for safety improvements. It is important to note that due to the spacing of major intersections and access points, LOSS is not calculated for towns.



Source: Swenka 2014

Figure 2-3: Level of Service of Safety of U.S. 50, 2008-2012

While 18.3 miles (12 percent) of the corridor are classified as developed areas in towns, 39 percent of crashes occurred in these towns, resulting in a higher ratio of crashes per mile in developed areas (towns) than rural areas. This is to be expected due to the increase in conflict points and traffic volumes, confirmed by the fact that 68 percent of crashes occurring in the larger communities of Pueblo, Rocky Ford, La Junta, Las Animas, and Lamar occurred at intersections (broadside and rear-end crashes). Additionally, within towns, there is an increase in the potential for conflicts between cyclists, pedestrians, and vehicles because there is a larger likelihood of people walking and biking in town.

According to CDOT data for the years 2008–2012, there were more than 1,600 crashes reported along U.S. 50 from Pueblo to Kansas (approximately 330 crashes annually), which is an average of two crashes per mile each year (Swenka 2014). Over the five years examined, there were a total of 19 fatalities—an average of about four per year—and nearly one-eighth of all crashes involved injuries. As seen in the LOSS analysis in Figure 2-3, this is relatively high compared to state averages of similar corridors. Additional crash data analysis is provided in Section 4.4.1, Transportation.

There are several factors that contribute to safety issues along the U.S. 50 corridor, including inadequate clear zones, frequent changes in road design characteristics, and limited passing opportunities. These are discussed in the following sections.

Inadequate Clear Zones

By today's design standards, each side of a highway should provide an area that is clear of hazards (i.e., obstructions) so that motorists who run off the road have the space to recover and safely re-enter the highway. In rural areas, shoulders range from eight feet to 10 feet, with narrower shoulders located in urban portions of the corridor. For a roadway like U.S. 50, typical design standards require 10-foot shoulders and a 30-foot clear zone.

U.S. 50 has inadequate clear zones, meaning there are obstructions or fixed objects and hazards along the side of the road that could be hit by vehicles that veer off the road. Inadequate clear zones add to the potential severity for run-off-the-road crashes reported each year (CDOT 2004a). The problem of inadequate clear zones and shoulders is of concern to all types of users on U.S. 50. Examples of inadequate clear zones along U.S. 50 are shown in Figure 2-4.

Figure 2-4. Examples of Inadequate Clear Zones on U.S. 50

The most common type of crash along the U.S. 50 corridor involves hitting a fixed object. Common fixed-object hazards along U.S. 50 include utility poles, irrigation structures, and deep ditches. Between 2008 and 2012, there were a total of 360 reported crashes with fixed objects along U.S. 50 through the Lower Arkansas Valley, which accounts for approximately 22 percent of all crashes on this corridor. Three of these accidents, or less than one percent, resulted in a fatality (Swenka 2014). The existence of numerous roadside hazards and lack of adequate clear zones on U.S. 50 present a high level of risk for fatalities in run-off-the-road crashes.

Frequent Changes in Road Design Characteristics

Over time, national roadway design standards have evolved to make roads safer and more efficient. Each time changes were made to U.S. 50, design standards current at that time were used. Over many decades, this has resulted in a mixture of different roadway characteristics. Today, as a result, there are more than 170 roadway changes within the 150-mile U.S. 50 corridor (CDOT 2003b). These changes include the following:

- Posted speed limits change by 10 mph or more in 28 instances
- Road width changes 60 times due to variations in shoulder width, median width, and number of lanes
    - The number of through-lanes changes seven times
    - The width of the outside shoulder changes 33 times
    - The width of the median changes 42 times

These frequent changes in the roadway's design reduce safety on U.S. 50. Drivers expect the design of a roadway to be relatively consistent over a reasonable distance (driver expectancy). National safety studies have shown that roads with frequent design changes, or a lack of driver expectancy, increase the risk of crashes (McGee et al. 1986, Ogden 1990).

Repeated changes in roadway design are of greatest concern to long-distance users who pass through infrequently and are likely to be unfamiliar with the road. Regional and intercity users, who make frequent, moderate-length trips on the corridor, also may be affected. For these users, the problem is not their own driver expectancy but their greater chance of being in harm's way when long-distance users encounter the roadway design changes.

Limited Passing Opportunities

U.S. 50 is a two-lane highway for approximately 96 miles through the Lower Arkansas Valley; passing is not permitted on approximately 55 of these miles due to sight distance limitations (topography, access locations, highway curvature, etc.) or other safety constraints. A safety project added passing lanes along a three-mile stretch between mileposts 338 and 341 (between Pueblo and Fowler) in 2008, but there are no other passing lanes in the corridor. The two-lane sections of U.S. 50 range from 15 miles to 30 miles long and are located along four stretches of the highway (see Figure 2-1).

Limited passing opportunities are of concern to:

- Long-distance and regional users, whose ability to maintain consistent, high speeds is hindered by slow-moving vehicles in their way
- Regional low-speed users, who are unable to attain high speeds and lack safe opportunities to get out of the way of traffic queued behind them
- Local users, who need to decelerate for and make turns off the highway (where there are no turning lanes) and have high-speed traffic approaching from behind them
- Users driving agricultural equipment that is unable to meet posted speeds and must travel in the shoulder or right lane

Traveling behind slower vehicles for long distances has been shown to increase unsafe passing maneuvers, which leads to certain types of crashes with relatively high severity. The *2003 CDOT Safety Assessment Report* states, "The higher frequency of these more severe accidents within the 2-lane sections is evident, particularly in the segments west of Manzanola [milepost 360] and east of Lamar [milepost 436]" (CDOT 2003c). The report also indicates that the potential for head-on collisions is higher in areas where faster vehicles attempt to pass slower trucks (CDOT 2003c). CDOT crash records from 2008 to 2012 indicate that the U.S. 50 corridor experienced eight head-on collisions and 152 sideswipes, which are the types of crashes that tend to occur on two-lane roads without passing lanes (Swenka 2014).

Additionally, due to the current predominantly two-lane configuration and difficulty in passing, the average traffic speeds can be reduced occasionally as extended queues develop behind loaded trucks and slow vehicles such as farm vehicles, Recreational Vehicles (RVs), and slow cars.

School Traffic

Information obtained from school systems along the corridor show that school buses cross U.S. 50 at least 208 times daily and there are at least 43 bus stops along the highway. School officials report that other traffic rarely stops in either direction when buses pick up and drop off students, even though stopping for a school bus is required by Colorado law. Long-distance and regional users of U.S. 50 do not expect to encounter school buses stopping on the highway. The unexpected need to stop for school buses increases the possibility of crashes, making the roadway less safe for all users.

2.3.2 Mobility Issues

For trips along U.S. 50, mobility means traveling at a speed that is appropriate for the type of trip being made. Mobility needs are different for the different users of U.S. 50. This section includes a discussion of balancing the conflicting needs of long distance, regional, and local users. This section also includes a discussion of speed reduction zones, which constrain travel speeds and limit mobility along sections of the corridor.

Inadequate mobility on U.S. 50 in the Lower Arkansas Valley has been cited as a factor that limits economic development in the area. According to City Manager Rick Klein of La Junta, poor mobility on U.S. 50 limits the area's ability to retain and attract transportation-dependent businesses. In 2006, two major employers along the corridor ceased their operations: the Neoplan bus manufacturing facility in Lamar and the Bay Valley Foods plant in La Junta. Transportation concerns were cited as one of the issues making these operations noncompetitive. Similarly, local efforts to attract a Wal-Mart distribution warehouse reportedly were rebuffed because U.S. 50 is not a four-lane highway. With agriculture in the Lower Arkansas Valley in a continuing decline, all communities along the corridor are seeking to diversify their economies. This will be difficult to accomplish with inadequate mobility on U.S. 50.

Balancing the Conflicting Needs of Long Distance, Regional, and Local Users

It is difficult to meet the needs of all users on a single road. As a result, the conflicts between the needs of different users result in safety and mobility problems. These problems are especially evident on the in-town and two-lane sections of U.S. 50, where the conflicting needs are most apparent and the ability to separate users is the most constrained.

There is a conflict between long-distance travelers and residents within towns. Long-distance travelers normally desire consistent, relatively high speeds, while local residents need the ability to use and cross the highway safely. On two-lane sections with limited opportunities for passing, long-distance and regional travelers also are unable to maintain consistent high speeds when they encounter slow-moving vehicles. U.S. 50 is used extensively to move farm equipment from field to field and for transport of locally grown agricultural products throughout the year.

A study conducted near milepost 339 (west of Fowler) in November 2006 found that, on average, one out of every 20 vehicles on the road was traveling at a speed of 15 mph or slower (CDOT 2007b). During the active farming season, the percentage would likely be much higher. U.S. 50 is a two-lane highway in this area, with more miles of no-passing zones than miles where passing is allowed. Figure 2-5 provides two examples of agricultural equipment using more than one full travel lane in downtown Rocky Ford and of one using both the shoulder and the travel lane between communities.

Figure 2-5. Agricultural Vehicles Driving on U.S. 50 in Downtown Rocky Ford (left) and Mixing with Auto Traffic (right)

Speed Reduction Zones

Travel speeds along U.S. 50 are constrained by speed reduction zones where the highway passes through the communities along the corridor (see Figure 2-6). Traffic signals in the communities and an at-grade railroad crossing controlled by a light in Rocky Ford also constrain travel speeds along the corridor.

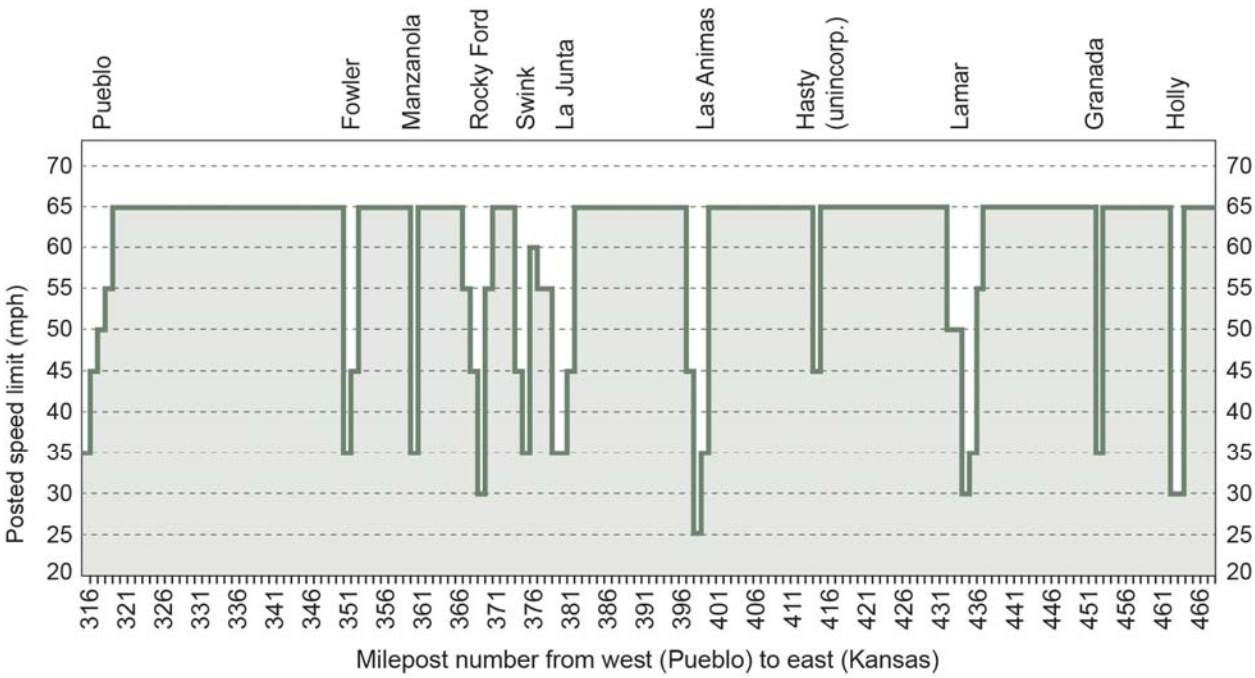


Figure 2-6. Posted Speed Limits (Primary) on U.S. 50 for Each Mile from I-25 in Pueblo (milepost 316) to the Kansas State Line (milepost 467.5) (CDOT 2012)

The speed limits within cities and towns are relatively low for safety reasons. Within the communities it connects, U.S. 50 serves as Main Street and is an important part of local street systems. Businesses, homes, parks, and important community facilities—such as town halls and post offices—are located along the highway. Therefore, residents must frequently cross U.S. 50, park on U.S. 50, or walk on sidewalks adjacent to U.S. 50 in their daily travels. For example, in Rocky Ford, where the municipal swimming pool is on one side of the highway, and residential areas are located on the other, children cross the highway on foot or bike to reach an important recreational destination.

While speed reduction zones provide a necessary benefit to local users, they are a hindrance to long-distance users who value a relatively high, consistent travel speed, and regional users, who travel the corridor often and bear the highest accumulated cost of chronic travel delays. As noted above, inadequate mobility also affects the ability of the Lower Arkansas Valley to attract and retain industry and the associated employment opportunities.

2.3.3 Access

Current access conditions along U.S. 50 have substantially impacted the safety and mobility of the corridor. The observed total crash rates for U.S. 50 through the larger cities of Rocky Ford, Las Animas, and Lamar were above comparable statewide averages (CDOT 2003c). The majority of the crashes in these locations (68 percent) were attributed to intersection- or driveway-related conflicts.

The number of access points influences safety because the number of conflict points increases with every access point where there is an opportunity to enter, exit, or cross a highway. There are a total of 394 permitted access points along U.S. 50, not including city, county, and state roads (CDOT 2003c). In addition, there are an estimated 1,100 additional non-permitted access points that were allowed prior to development of today's access standards. In total, the more than 1,500 access points over 150 miles average out to 10 accesses per mile along this section of U.S. 50. Within the city of Las Animas alone, there are more than 50 accesses, or approximately one access to U.S. 50 every 267 feet.

Current access configurations include stop-sign controlled cross streets, pull-off access for roadside businesses, residential driveways, signals, and private agricultural field access. In addition, there are 14 stoplight-controlled intersections along the 150-mile corridor. Many adjacent landowners, both in communities and rural areas, use U.S. 50 for local trips because there are no other convenient alternative routes. When motorists pull out onto high-speed U.S. 50 from adjacent properties, they introduce a crash risk and potentially impede the flow of traffic.

Access to and from U.S. 50 is of concern to:

- Bicyclists and pedestrians, who need convenient access to local and major cross streets and adjacent properties
- Long-distance users, who need convenient access to travel-related services such as gas, food, and lodging; beyond these minimal needs, any additional accesses diminish their safety and mobility
- Regional (intercity) users, who need convenient U.S. 50 access to and from major cross streets, because their trips include an origin, destination, or both along the corridor
- Local users, who need the ability to travel between U.S. 50 and adjacent properties, to cross U.S. 50 safely, to move farm implements along U.S. 50, and to make deliveries to addresses along U.S. 50
- Slow-moving agricultural vehicles needing access to and from ranches and farms

2.3.4 Flexibility to Accommodate Future Needs

The safety and mobility issues, along with the user conflicts on U.S. 50 discussed previously, are expected to be compounded by increased traffic volumes in the future. While the overall population of the corridor east of Pueblo has generally decreased since 2000, traffic on this portion of U.S. 50 nevertheless has experienced modest growth (a 2.8-percent increase from 1995 to 2000) (CDOT 2007a). The population of Colorado as a whole has been growing rapidly and is expected to continue to do so. Even with minimal population growth in the Lower Arkansas Valley itself, the expected addition of nearly

three million new residents in the state by 2040 will likely increase traffic on the U.S. 50 corridor (CDOT 2015).

Based on projections of increased traffic over the next 25 years, the 2003 CDOT Safety Assessment Report for U.S. 50 estimated that the total crash frequency for the two- and four-lane segments is expected to increase by 81 percent and 50 percent, respectively, if the highway is not substantially improved (CDOT 2003c). Proposed improvements to U.S. 50 will allow the corridor to accommodate the varied needs of existing and future users.

2.4 SUMMARY

In conclusion, there are existing safety and mobility issues on the U.S. 50 corridor, and these issues are expected to be exacerbated by projected traffic increases in the future. The highway is not meeting the needs of its users today and does not offer the flexibility to accommodate future changes in travel demand.

Based on these safety and mobility needs identified in this chapter, proposed improvements to U.S. 50 need to address:

- Limited passing opportunities
- Inadequate clear zones
- Frequent changes in roadway design
- Excessive number of access points
- Numerous speed reduction zones
- Travel delays resulting from time spent following slow-moving vehicles
- Meeting the needs of local, regional, and long-distance travelers

Chapter 3, Alternatives Considered, describes how these needs were considered in the development of alternatives.

3 Alternatives Considered

This chapter discusses the process used to develop and evaluate transportation solutions to arrive at the range of reasonable alternatives that were considered in this Tier 1 EIS. It describes the steps that were followed to identify the type and location of transportation improvements that will meet the purpose and need identified in Chapter 2, Purpose and Need.

The alternatives development process (i.e., screening process) involved CDOT, FHWA, the public, communities along U.S. 50, and various local, state, and federal agencies. A number of potential transportation solutions were screened based on a variety of criteria that relate to the purpose and need. Solutions were screened primarily on their ability to meet the project purpose and need, as well as construction feasibility and other criteria. The remaining solutions formed the range of reasonable alternatives that were retained for additional evaluation and consideration.

In accordance with NEPA, a no-build alternative is included in this EIS to provide a basis for comparison with the build alternatives. Under the No-Build Alternative, routine maintenance of pavement and bridges on the existing U.S. 50 alignment would be done, as necessary, to keep U.S. 50 in usable condition, but no efforts would be made to address corridor-wide transportation needs. As such, it was determined that the No-Build Alternative would not meet the purpose and need of the project because it would not improve safety and mobility for all users. Consequently, it has not been described throughout all steps of the screening process discussed in this chapter. However, the No-Build Alternative has been carried forward in this document to provide a baseline for analyzing the impacts of the Build Alternatives (see Chapter 4, Affected Environment, Environmental Consequences, and Mitigation).

3.1 PROCESS OVERVIEW

The alternatives development process involved using transportation, engineering, and environmental criteria to evaluate potential transportation solutions. Each of the criteria was directly related to the purpose and need of the project. This process followed four steps to arrive at the range of reasonable alternatives (Figure 3-1), which are outlined through the following questions:

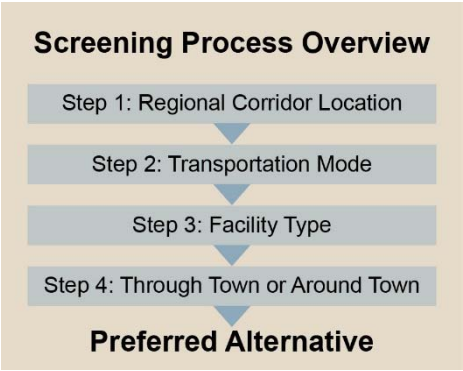


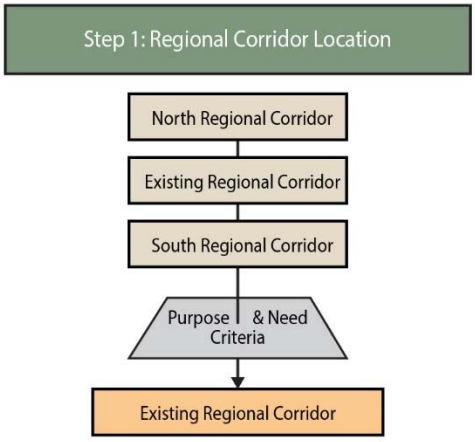
Figure 3-1. Screening Approach Used to Develop the Range of Reasonable Alternatives

- **Step 1: Regional Corridor Location.** At a regional level, where would transportation improvements be made?
- **Step 2: Transportation Mode.** What type(s) or mode(s) of transportation improvements would meet the needs of the corridor (e.g., highway, rail, transit, pedestrian, bicycle)?
- **Step 3: Facility Type.** What type of facility/facilities would meet the needs of the corridor?
- **Step 4: Through Town or Around Town.** Would transportation improvements be made through communities along the corridor or around them?

Two of these questions focus on what type of transportation action is needed, while the other two focus on where the corridor would be located. Each of these steps in the alternatives development process is discussed in more detail in the following sections.

3.2 REGIONAL CORRIDOR LOCATION

At a regional level, where would transportation improvements be made?



This document was preceded by CDOT's *Corridor Selected Study: A Plan for U.S. 50* (CDOT 2003a), which focused on where transportation improvements would be made. Using this study, and working with the public and with the communities of the Lower Arkansas Valley, CDOT developed and evaluated three regional locations for a transportation corridor to address U.S. 50 needs. These locations included a north regional corridor, an existing regional corridor, and a south regional corridor. Each corridor is described and shown in Figure 3-2.

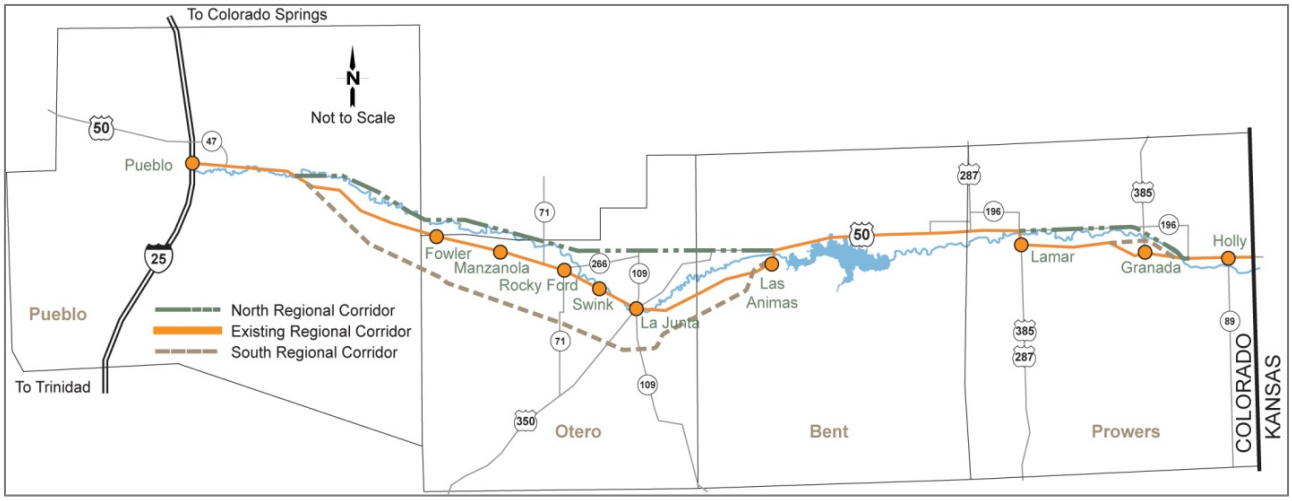


Figure 3-2. Location of the Regional Corridors Considered

3.2.1 Descriptions of Regional Corridor Locations

North Regional Corridor

The north regional corridor would be located one to 10 miles north of U.S. 50. It would use other existing roadway corridors, including SH 96, SH 266, and SH 196, as well as portions of U.S. 50. This corridor would remain entirely on the north side of the Arkansas River, including at the U.S. 287 junction. Currently, 90 miles of U.S. 50 are located south of the river, as are all of the communities along the U.S. 50 corridor, except for portions of Pueblo and Holly. With this alignment, the existing U.S. 50 facility would remain in place and would be relinquished to the city or county. As documented in the 2003 CDOT planning study, public preference for this corridor was supportive, but was not as favorable as it was for the existing regional corridor.

Existing Regional Corridor

The existing regional corridor would be on or near U.S. 50, generally on the existing alignment or within one mile of the existing alignment. During the 2003 CDOT planning study, a regional corridor location on or near the existing U.S. 50 received very strong support (76 percent of citizens participating in public meetings).

South Regional Corridor

The south regional corridor would be located one to 10 miles south of the existing U.S. 50 alignment. This corridor would follow existing power lines, which are located three to four miles south of U.S. 50 from eastern Pueblo County to La Junta. It would remain south of the existing U.S. 50 alignment to Las Animas. The south regional corridor would then turn north, crossing the Arkansas River to rejoin the

existing U.S. 50 highway north of Las Animas. It would continue east on the existing U.S. 50 highway and then shift just north of Granada. From Granada to the vicinity of the Colorado-Kansas state line, the south regional corridor would again follow the existing U.S. 50 highway. Similar to the North Regional Corridor, the existing U.S. 50 facility would remain in place and would be relinquished to the city or county. As documented in the 2003 CDOT planning study, public preference for this corridor was supportive, but not as favorable as it was for the existing regional corridor.

3.2.2 Screening of Regional Corridor Locations

The three regional corridor locations were evaluated to determine how well each would meet the project's purpose and need for local, regional, and long-distance highway users. The following screening criteria were used and are discussed with the results of the screening.

Screening results are ***summarized*** *in this chapter. Greater detail is provided in the* Range of Alternatives Technical Memorandum *in* ***Appendix B.***

How Well Each Corridor Location Addresses U.S. 50 Safety Issues

Addressing U.S. 50 safety issues would include:

- Improving passing opportunities
- Creating adequate clear zones
- Reducing design inconsistencies
- Reducing the number of access points

A new regional corridor to the north or south would be built to current safety standards, addressing all four safety criteria, but would leave the deficiencies on the existing U.S. 50. Transportation improvements in the existing regional corridor would eliminate the existing design deficiencies and address all four safety criteria.

How Well Each Corridor Location Improves Mobility for Local Users

Most of the local users of U.S. 50 are accessing homes and businesses located along or near the existing highway; therefore, a new regional corridor to the north or south would pull most through-traffic off the existing highway and would result in more out-of-direction travel for local users. However, a new regional corridor may improve mobility for local users by reducing traffic on local roadways. Comparatively, transportation improvements to the existing corridor would address mobility for local users because it is closest to where local users live and work and would positively affect their mobility for some local trips.

How Well Each Corridor Location Improves Mobility for Regional Users

A new regional corridor to the north or south of the existing roadway would require U.S. 50 users to travel a few miles north or south to the new corridor and then back again to U.S. 50. For short regional trips between nearby communities on the U.S. 50 corridor, it would be faster to stay on the existing highway rather than using the new corridor and users would face the same mobility issues that they face currently. The primary benefit from the around-town alternatives to these regional users would be the reduction in traffic along the existing corridor. Improving U.S. 50 at its current location would give greater benefit to regional travelers making intercity trips, but also may impede local trips by limiting highway crossing locations.

How Well Each Corridor Location Improves Mobility for Long-Distance Users

The in-town alternative would provide some benefits to long-distance users by increasing the average speed through urban areas and reducing the number of intersections. However, a north or south realignment of the highway would provide greater benefits in speed and conflict reduction. This would be achieved primarily by removing the interactions between local users and regional and long distance users, and reducing the number of intersections along the highway.

How Well Each Corridor Location Balances Mobility and Access for All Users

Because there would be fewer access points by avoiding existing towns—which would allow for more consistent travel speeds—a new north or south regional corridor would primarily benefit long-distance users and some regional users. Local users would gain peripheral benefits from the reduction in conflicts with regional and long-distance traffic on local roads. Alternatively, choosing the in-town option would provide moderate benefits to regional and long-distance users, but also would adversely affect local users by reducing local connectivity and increasing the barrier between sides of the highway. All corridor alignment alternatives would balance mobility and access for users by each providing a high-speed facility with the more consistent travel speeds desired by long-distance and regional users while maintaining access for local users.

How Well Each Corridor Location Provides Flexibility to Address Future Travel Needs

All three regional corridors could be modified in the future to meet newly emerging needs for highway modes. The results of this screening evaluation of the regional corridors are summarized in Table 3-1.

Table 3-1. Regional Corridor Location Screening Results Summary

Screening Criteria	North Regional Corridor	South Regional Corridor	Existing Regional Corridor
Addresses U.S. 50 safety issues	●	●	●
Improves mobility for local users	◒	◒	●
Improves mobility for regional users	◒	◒	●
Improves mobility for long-distance users	●	●	●
Balances mobility and access for all users	●	●	●
Provides flexibility to address future traffic needs	●	●	●

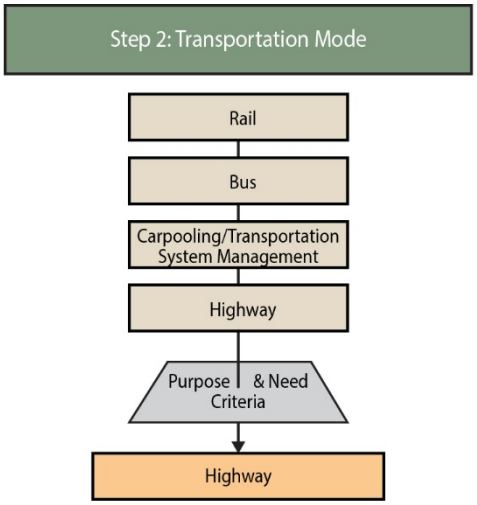
Key: ○ = does not address the need ◒ = partially addresses the need ● = fully addresses the need

3.2.3 Decision Regarding Regional Corridor Location

As indicated in Table 3-1, the north and south regional corridors only partially address mobility for the various user groups, and, therefore, would not fully meet the project's purpose and need. For this reason, they were eliminated from further consideration. Only the existing regional corridor (on or near U.S. 50) was carried forward for further consideration because it fully met each screening criterion.

3.3 TRANSPORTATION MODE

What type(s) or mode(s) of transportation improvements would meet the needs of the corridor?



There are a number of ways to improve the movement of people and goods within and through the existing regional corridor. These include a variety of modes (e.g., rail, bus, and highway improvements), as well as strategies such as carpooling and transportation system management (TSM), that make more efficient use of existing transportation systems. These modes and strategies are described below. Pedestrian and bicycle improvements were not analyzed as a standalone transportation mode, as these improvements alone would not meet the purpose and need of the project. However, in keeping with CDOT's policy directive 1602.0, none of the modes assessed would preclude improvements to pedestrian and bicycle facilities within the project area.

3.3.1 Descriptions of Transportation Modes

Rail

Most of the communities along U.S. 50 originally were established as stops along the railroad, serving passengers as well as freight. Today, railroad lines still pass through these communities and extend through the full length of the project area. Railways carry freight and serve part of the corridor with Amtrak passenger service, with stations in La Junta and Lamar, as shown in Figure 3-3.

It is possible that passenger rail service could be re-established along the corridor; however, the characteristics that make passenger rail service economically feasible—including large populations, high population densities, and major destinations—are not present along the U.S. 50 corridor. Therefore, current demand is not sufficient.

Rail freight is carried through the Lower Arkansas Valley on the Burlington Northern Santa Fe Railway (BNSF) (formerly the Atchison, Topeka, and Santa Fe Railway) tracks that closely parallel U.S. 50. Key factors that decide whether freight travels by truck or rail include the value and perishable nature of the freight, the weight and bulk of the shipment, and the trip distance. By the time freight reaches the U.S. 50 corridor from elsewhere, the transportation mode decision has already been made by the shipper.

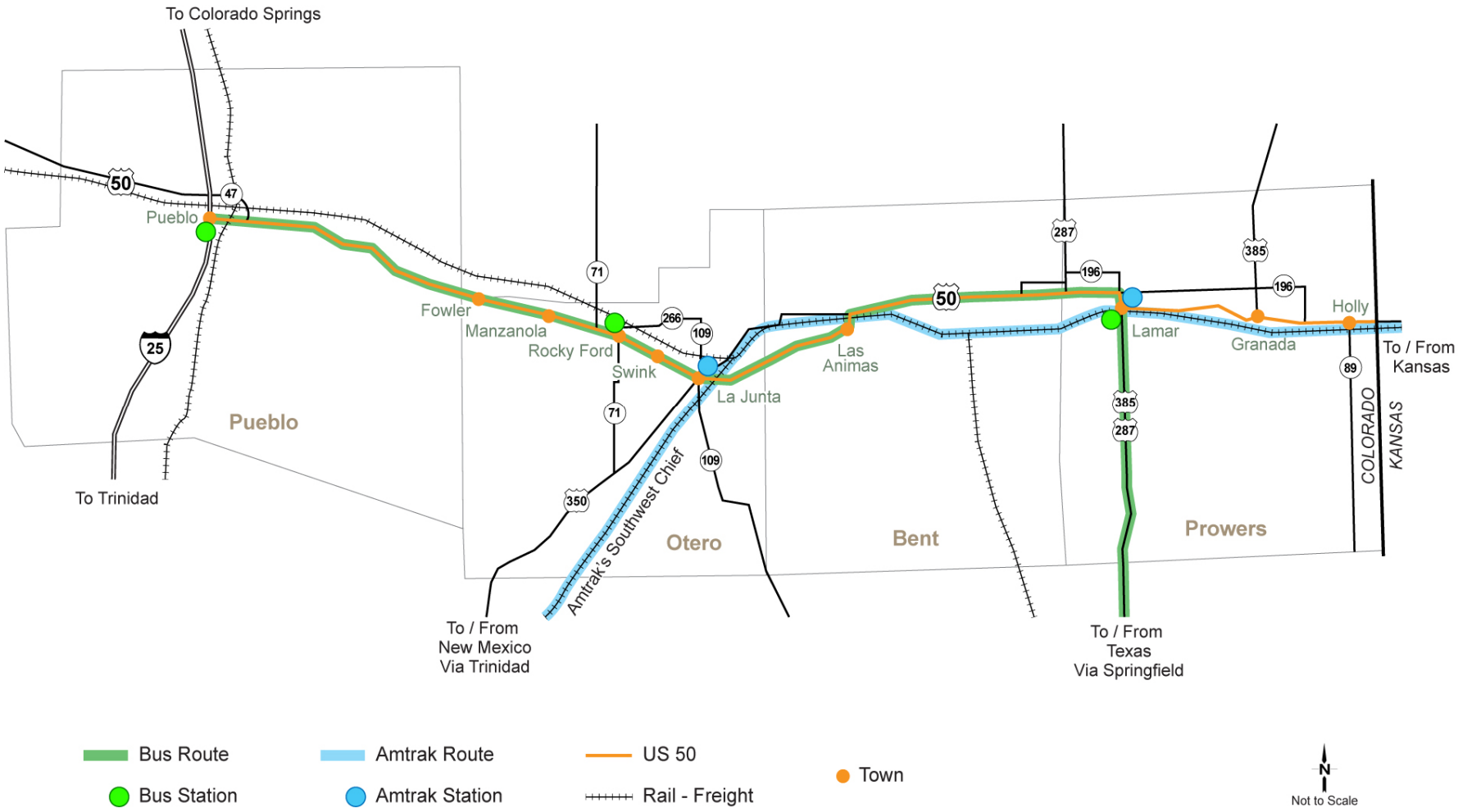


Figure 3-3. Passenger Rail, Freight Rail, and Bus Services Available within the U.S. 50 Corridor

Bus

Currently, Greyhound Lines offers twice-daily intercity bus service along the U.S. 50 corridor between Pueblo and Lamar with a stop in Rocky Ford, as part of a long-distance route connecting Denver and destinations in Texas. More stops or more frequent service could be added by Greyhound if there were sufficient demand from communities along the route; however, adding stops to the route would increase total trip time, making this mode less attractive for long-distance passengers. There is no regional bus transit service provided by either the private or public sectors serving all communities along U.S. 50. Local bus service is available in Lamar and Pueblo.

Carpooling/Transportation System Management

Carpooling programs, park-and-ride lots, and traffic signal synchronization are not a separate transportation mode, but instead are TSM strategies designed to get more efficient use out of existing roadways. These strategies often are used in metropolitan areas where roads are highly congested, with carpooling and park-and-ride lots generally serving the commuter community. In rural areas that lack a major central attraction zone, peak travel usually is multidirectional and highly dispersed across transportation corridors. TSM and carpooling programs provide few benefits in these places. Because the U.S. 50 corridor contains only 13 traffic signals spread across 150 miles and lacks major directional traffic flows, synchronizing the traffic signals or providing other TSM strategies would not make a significant difference in the overall corridor operations.

Highway

U.S. 50 is the most-used roadway serving east-west trips through the Lower Arkansas Valley. Typical 2011 traffic volumes on U.S. 50 were approximately 5,500 vehicles per day (vpd) (Swenka 2014). Truck volumes along the U.S. 50 corridor make up 10 percent of the overall corridor volume, including trucks that are typically used for local or regional deliveries and those larger tractor-trailers used for long-distance or regional deliveries (Swenka 2014). Highway use has been the dominant transportation mode in the region for decades, as it is well suited to the types of trips made and the low-density development patterns along the corridor.

3.3.2 Screening of Transportation Modes

The transportation modes and TSM strategies discussed above were screened to determine how well each would meet the project's purpose and need for local, regional, and long-distance users of the highway. The following screening criteria were used and they are discussed with the results of the screening.

How Well Each Transportation Mode Addresses U.S. 50 Safety Issues

Rail and bus transit, carpooling, and other TSM strategies may provide a small reduction in trips and, therefore, a reduction in conflicts; however, these minor conflict reductions would not be significant enough to eliminate the U.S. 50 safety issues, such as the need for improved passing opportunities, adequate clear zones, reduced design inconsistencies, and reduction in the number of access points. Only highway improvements could address these needs on U.S. 50.

How Well Each Transportation Mode Improves Mobility for Local Users

Rail and bus transit, with a station or stop at only one place in a community, would not serve any local trips. Similarly, carpooling and other TSM strategies would be of little benefit because local trips are so short in the small communities along U.S. 50. The highway mode currently serves these trips, and highway improvements have the potential to improve mobility for local users.

How Well Each Transportation Mode Improves Mobility for Regional Users

Regional trips are those traveling from one community along U.S. 50 to another. Bus and rail are good for regional trips, but not all commutes along U.S. 50 are served by regional bus and/or passenger rail. Where there is existing and planned bus or rail service, intervals would not be offered frequently enough to be convenient for most trips. TSM and carpooling would be excellent modes for regional trips due to the savings in vehicle operating costs available to the user. However, these transportation modes and strategies would be convenient only for a limited number of regional trips, thereby only partially meeting this need. Because it is available at all times of the day, with access to many more places, the highway mode has the potential to improve mobility for all regional users.

How Well Each Transportation Mode Improves Mobility for Long-Distance Users

The region is currently serviced by Greyhound buses and Amtrak long-distance rail service. There are Greyhound stations in the City of Pueblo and the City of Rocky Ford, and Amtrak stations in the City of Lamar and the City of La Junta. These services currently provide long-distance users with transit service to Denver, Santa Fe, Kansas City, and regions beyond. Adding long-distance transit service along the U.S. 50 corridor would duplicate these existing services. Additionally, TSM strategies would likely not have a significant impact on long-distance travelers because the major concerns of the corridor are not being caused by the roadway nearing or exceeding capacity. Highway improvements will have the largest benefit to long-distance users by increasing the average travel speeds across the corridor and reducing the conflicts with other user types.

How Well Each Transportation Mode Balances Mobility and Access for All Users

Rail and bus transit, carpooling, and TSM strategies primarily would benefit regional users of U.S. 50. However, these alternatives would not address the problem of excessive numbers of highway accesses, which impact mobility. Highway improvements would have the potential to benefit all users and address the access issue.

How Well Each Transportation Mode Provides Flexibility to Address Future Traffic Needs

Rail and bus transit, carpooling, and TSM strategies all have the ability to serve higher passenger volumes; however, due to the dispersed, rural land uses and lack of centralized trip generation nodes, such as a central business district or other major employment or recreation center, the effectiveness of mass transit, carpooling, and TSM would be limited. Their use would likely not reduce traffic volumes enough to provide major improvements in facility safety or efficiency. Additionally, transit, carpooling, and TSM would not have any effect on freight or agricultural vehicles currently using the highway. Therefore, transit, carpooling, and TSM strategies do not address the major conflicts between users. Highway improvements have the potential to serve both higher passenger vehicle volumes and reduce conflicts between private, commercial, and agricultural users.

The results of the transportation mode evaluation are summarized in Table 3-2.

Table 3-2. Transportation Mode Screening Results Summary

Screening Criteria	Rail/Bus Transit	Carpooling/ TSM Strategies	Highway
Addresses U.S. 50 safety issues	○	○	●
Improves mobility for local users	○	○	●
Improves mobility for regional users	◒	◒	●
Improves mobility for long-distance users	◒	○	●
Balances mobility and access for all users	○	○	●
Provides flexibility to address future traffic needs	◒	◒	●

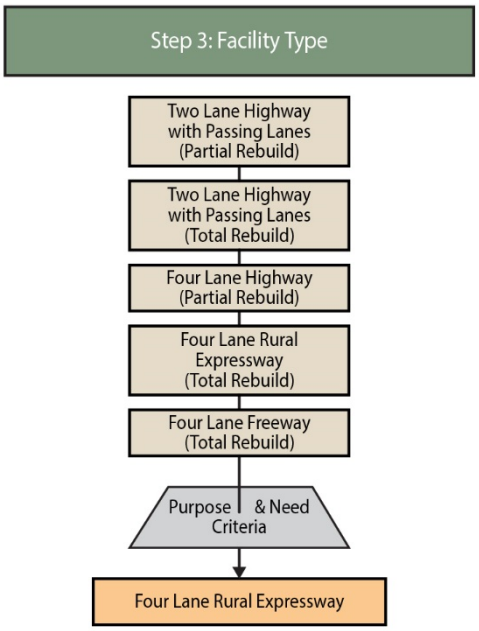
Key: ○ = does not address the need ◒ = partially addresses the need ● = fully addresses the need

3.3.3 Decision Regarding Transportation Mode

Rail, bus, and carpooling/TSM modes were eliminated from further consideration because they would not improve U.S. 50 corridor safety, improve mobility for local and long-distance users, or address access issues; therefore, they do not meet the purpose and need of the project. The highway mode was carried forward for further consideration because it would meet all of the identified needs along the corridor.

3.4 FACILITY TYPE

What type of facility would meet the needs of the corridor?



Projected traffic volumes along the U.S. 50 corridor would range from 2,500 vpd to 19,000 vpd by the year 2040. AADT for 2011 is in the range of 1,700 vpd to 13,500 vpd (Swenka 2014). Future volumes can be handled on a road with two to four through-lanes (varying by location), and would not require a six-lane highway; therefore, only two-lane and four-lane roadways were considered.

The following facility types are discussed in more detail below:

- Two-lane highway with passing lanes (partial rebuild)
- Two-lane highway with passing lanes (total rebuild)
- Four-lane highway (partial rebuild)
- Four-lane rural expressway (total rebuild)
- Four-lane freeway (total rebuild)

Note that in this screening level, the term “highway” generally is used to discuss a public roadway for purposes of vehicular travel. Distinctions between the terms expressway and freeway are made in the discussions below.

3.4.1 Description of Facility Types

Two-Lane Highway with Passing Lanes (Partial Rebuild)

The 96 miles where U.S. 50 is a two-lane highway would be reconstructed to add intermittent passing lanes. These lanes would be added for motorists to avoid having to follow a slow-moving vehicle for an extended time and distance. Extra-wide shoulders (10 to 12 feet) would be provided as well. In addition to making these improvements to the two-lane sections, safety improvements would be made at spot locations on existing four-lane sections in response to specific safety issues. Existing four-lane sections would remain four lanes. Speed limits would remain the same as they are currently, requiring vehicles to slow down as they approach urban areas and intersections. Figure 3-4 shows the roadway profile and the cross-section.

Partial Rebuild or Total Rebuild

The term "partial rebuild" means that only existing two-lane sections of U.S. 50 would be rebuilt to provide one additional passing lane or two additional through-lanes, resulting in a two-lane highway with passing lanes or a four-lane highway. This would improve 96 miles out of the total 150-mile corridor.

The term "total rebuild" means that the entire 150-mile corridor would be rebuilt with a consistent design that meets current safety standards.

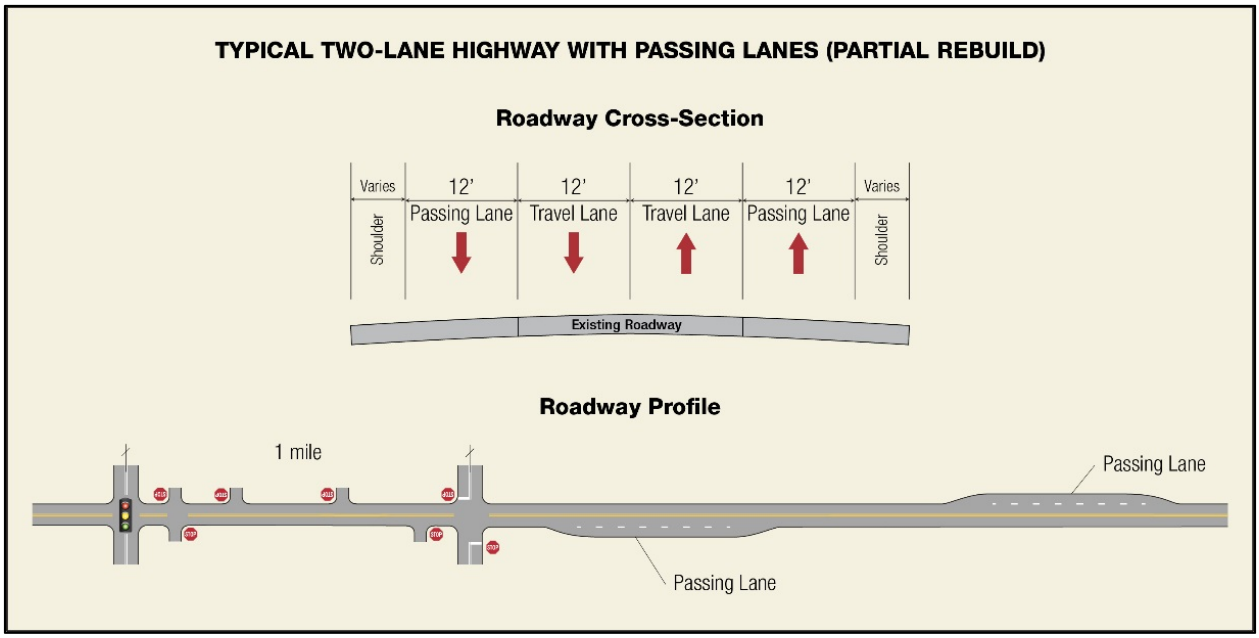


Figure 3-4. Typical Two-Lane Highway with Passing Lanes (Partial Rebuild) Roadway Profile and Cross-Section

Two-Lane Highway with Passing Lanes (Total Rebuild)

The entire 150-mile U.S. 50 corridor would be completely reconstructed as a two-lane highway with passing lanes and extra-wide shoulders. Existing four-lane sections of road would be rebuilt as a modern two-lane highway with passing lanes. The highway would be rebuilt in this way to avoid frequent roadway design changes that contribute to driver confusion. It would represent a decrease in the existing number of through-lanes for portions of the corridor between towns. Speed limits would remain the same as they are currently, requiring vehicles to slow down as they approach urban areas and intersections. Figure 3-5 shows the roadway profile and the cross-section.

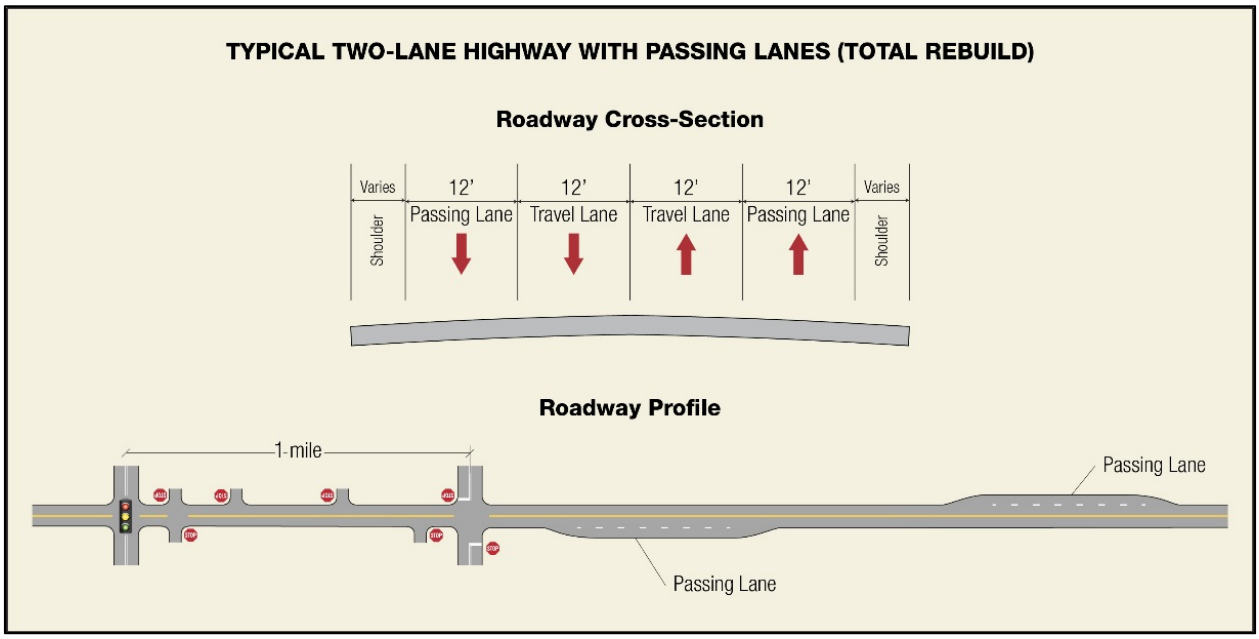


Figure 3-5. Typical Two-Lane Highway with Passing Lanes (Total Rebuild) Roadway Profile and Cross-Section

Four-Lane Highway (Partial Rebuild)

On the 96 miles of U.S. 50 where the highway is currently two lanes, the highway would be widened to four through-lanes, two in each direction. With the exception of at crossing locations, median types would vary from narrow, paved medians to wider, grassy medians depending on location, terrain, and other factors. The highway would have at-grade intersections, not grade-separated interchanges. On rebuilt portions, the posted speed limit typically would be 65 mph, and access to the highway generally would be available at intervals no closer than one-half mile apart.

Compliance with modern design standards generally would require a much wider cross-section than the existing CDOT right of way along the corridor. U.S. 50 and all intersecting roadways would meet at-

grade, requiring signalized intersections where warranted by traffic volumes. Figure 3-6 shows the roadway profile and the cross-section.

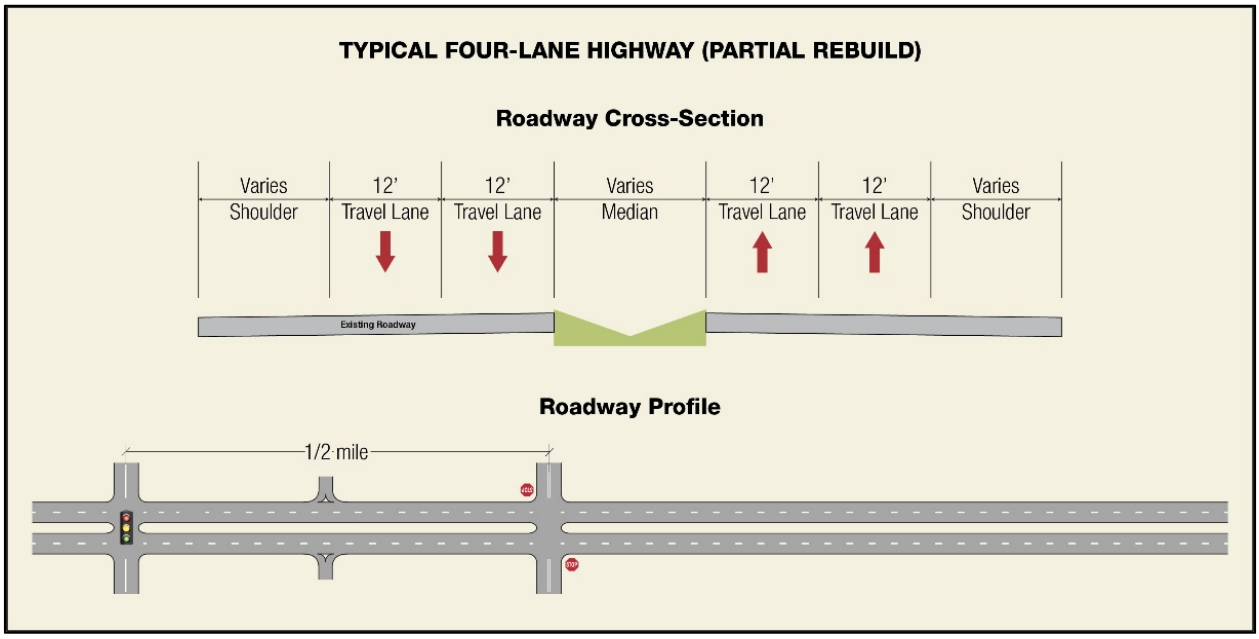


Figure 3-6. Typical Four-Lane Highway (Partial Rebuild) Roadway Profile and Cross-Section

Four-Lane Rural Expressway (Total Rebuild)

An expressway is a divided highway with partial access control. In this scenario, U.S. 50 would be reconstructed as an expressway with a wide median and access provided at a minimum of one-half mile spacing. The resulting elimination of numerous existing access points would require that some local trips use other roadways—and, in some cases, frontage roads—to reach U.S. 50. An expressway would maintain a posted speed limit of 65 mph in most locations, dropping to 50 mph for approaches to signalized intersections.

Grade separations would be provided to minimize the number of signalized intersections needed. Access to the highway would be available at intervals not closer than one-half mile apart and access into communities would be maintained. At locations with at-grade access, but not enough traffic to warrant a signalized intersection, unsignalized intersections would be provided. If an intersection is not signalized, there would be sufficient room in the median for a vehicle to cross one direction of traffic, then wait at a stop sign before crossing the other highway lanes or making a left turn onto the highway. Figure 3-7 shows the roadway profile and the cross-section.

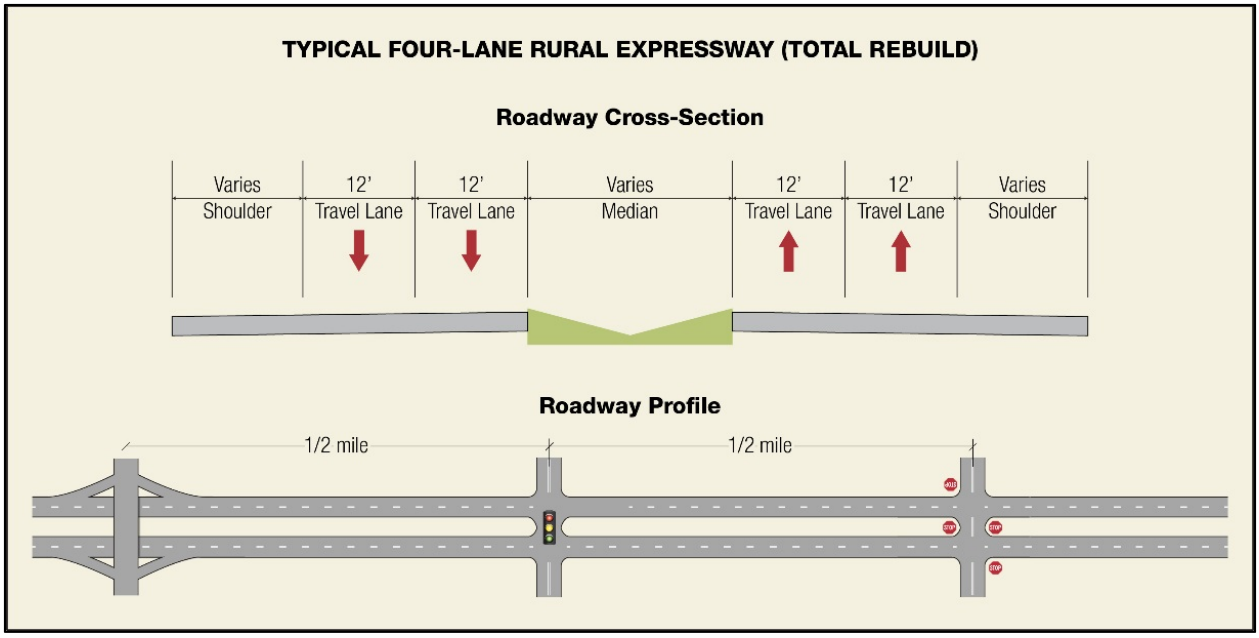


Figure 3-7. Typical Four-Lane Rural Expressway (Total Rebuild) Roadway Profile and Cross-Section

Four-Lane Freeway (Total Rebuild)

A freeway is a divided highway with full access control. Under the total rebuild, all 150 miles of U.S. 50 would be completely reconstructed as a freeway, with no at-grade access and with interchanges typically no closer than three miles or more apart. The posted speed limit would be 65 mph. To make local trips, motorists would have to use other local streets to reach a grade-separated interchange where U.S. 50 could be accessed or crossed. Figure 3-8 shows the roadway profile and the cross-section.

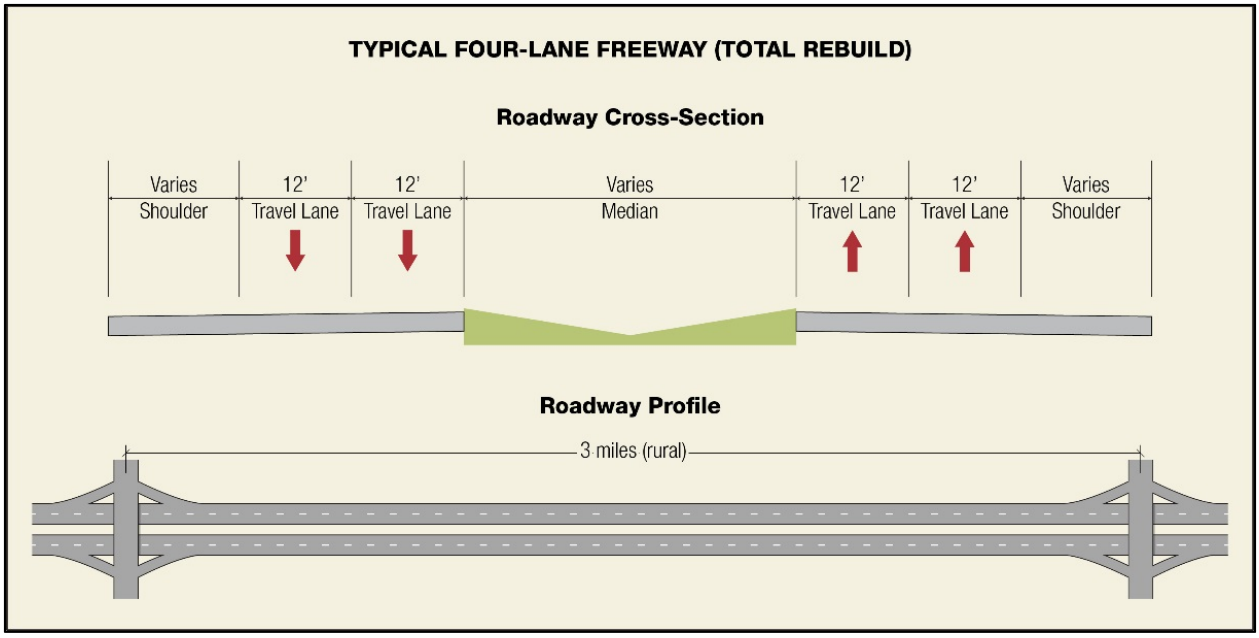


Figure 3-8. Typical Four-Lane Freeway (Total Rebuild) Roadway Profile and Cross-Section

3.4.2 Screening of Facility Types

The facility types described above were evaluated to determine how well each would meet the project's purpose and need for safety, mobility, and access by local, regional, and long-distance users of the highway. The criteria and results of this evaluation follow.

How Well Each Facility Type Addresses U.S. 50 Safety Issues

All five highway facility types would address U.S. 50 safety issues, but to different degrees. The differences are based on the idea that passing lanes allow slow-moving traffic to be passed safely—thereby reducing the number of accidents attributable to speed differentials. For example, alternatives providing a two-lane highway with intermittent passing lanes would not be as safe as four-lane alternatives because they would provide fewer opportunities to pass. Among the four-lane alternatives, improving the entire 150-mile corridor would address safety on a corridor-wide basis by providing uninterrupted opportunities to safely overtake slow-moving vehicles. Adequate clear zones would be provided in rebuilt sections of the corridor; therefore, total rebuild scenarios would better address roadside hazards because areas not proposed for reconstruction under partial rebuilds would only consist of safety improvements at spot locations on existing four-lane sections.

How Well Each Facility Type Improves Mobility for Local Users

A two-lane highway with passing lanes would degrade the ability of local users to cross the highway or to make left turns onto the highway. This would occur because users would need to cross an extra lane (the

passing lane) to make these maneuvers. Similarly, it would be difficult to make left turns onto a four-lane highway with no median refuge. The four-lane expressway offers a median refuge, which would make these crossings and left turns easier because the motorist would only have to contend with one direction of traffic at a time. With a four-lane freeway facility, however, crossings and left turns would be allowed only at grade-separated interchanges, spaced three miles or greater apart, thereby reducing the opportunities for local users to cross or access the highway. This also creates more out-of-direction travel for the local users.

How Well Each Facility Type Improves Mobility for Regional Users

Two-lane facilities with passing lanes and wide shoulders would offer some improvement, but four-lane facilities would allow opportunities to pass along the length of the corridor, providing a more consistent flow of travel to regional U.S. 50 users.

How Well Each Facility Type Improves Mobility for Long-Distance Users

Adding passing lanes would improve travel times over existing conditions, but four-lane facilities would be more effective at separating fast-moving and slow-moving vehicles on a corridor-wide basis by providing more consistent and higher average travel speeds for long-distance users of U.S. 50. Constructing a full, grade-separated, free flowing freeway facility would provide the best service to long-distance users.

How Well Each Facility Type Balances Mobility and Access for All Users

A two-lane highway with intermittent passing lanes would reduce the ability of local users to cross the highway or to make left turns onto the highway. Local users would need to cross an extra lane (the passing lane) to make these maneuvers. Likewise, it would be difficult to make left turns onto a four-lane highway with no median refuge. By offering a median refuge, the four-lane expressway would make these crossings and left turns easier since motorists would only have to contend with one direction of traffic at a time. With a freeway, however, crossings and left turns would be allowed only at grade-separated interchanges, spaced no less than three miles apart, thereby reducing the opportunities for local users to cross or access the highway. Therefore, the freeway would not balance mobility and access for all users.

How Well Each Facility Type Provides Flexibility to Address Future Travel Needs

The limited passing opportunities of a two-lane highway would not reduce the conflicts between local, regional, and long-distance traffic on U.S. 50 and would have limited flexibility for future travel changes

in the corridor. A partial rebuild to a four-lane highway would offer some improvement in the 96 miles of two-lane sections that would be widened, but it would leave 54 miles of existing four-lane roadway with design deficiencies. Corridor-wide reconstruction to a four-lane expressway, freeway, or highway would improve passing opportunities and maximize the corridor's ability to handle all types of users regardless of long-term variations in travel or land use.

The results of the facility type screening are summarized in Table 3-3.

Table 3-3. Summary of Facility Type Screening Results

Screening Criteria	Two-Lane Highway with Passing Lanes		Four-Lane Highway	Four-Lane Expressway	Four-Lane Freeway
	Partial Rebuild	Total Rebuild	Partial Rebuild	Total Rebuild	Total Rebuild
Addresses U.S. 50 safety issues	◒	◒	◒	●	●
Improves mobility for local users	◒	◒	●	●	○
Improves mobility for regional users	◒	◒	●	●	●
Improves mobility for long-distance users	◒	◒	●	●	●
Balances mobility and access for all users	○	○	○	●	○
Provides flexibility to address future traffic needs	○	○	◒	●	●

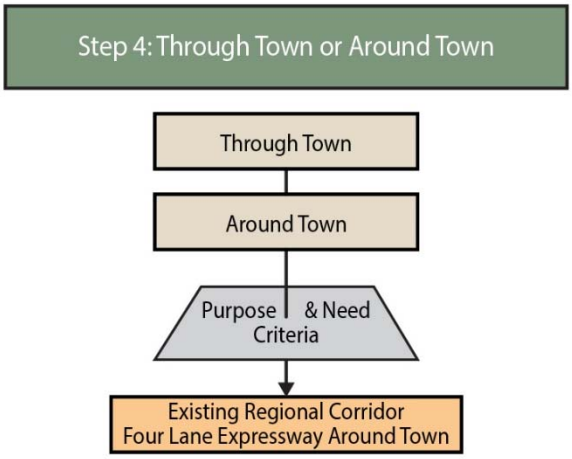
Key: ○ = does not address the need ◒ = partially addresses the need ● = fully addresses the need

3.4.3 Decision Regarding Facility Type

As shown in Table 3-3, a four-lane expressway provides the most improvement for the issues identified in the project's purpose and need. Facility types without a median refuge (two-lane alternatives and the four-lane highway option) would not improve the ability of local users to cross or turn left onto the highway. A freeway would severely limit the number of locations where crossing or local access could be accomplished. Therefore, it was determined that the two-lane highway, four-lane highway (partial rebuild), and four-lane freeway would not meet the purpose and need of the project. The four-lane expressway was identified as the preferred facility type to be carried forward for further consideration in the alternatives development process because it met all the needs identified along the corridor.

3.5 THROUGH TOWN OR AROUND TOWN (BYPASS)

Would transportation improvements be made through communities along the corridor or around them?



Corridors through communities and those around them were considered and evaluated, and the results are summarized in this document. This question was critical for a number of reasons. First, in all of the communities east of Pueblo, U.S. 50 is lined with homes and businesses, including many recognized historic sites and other important community resources that could be adversely affected. Second, along the existing corridor, CDOT-owned right of way through most of the communities is typically not wide enough to accommodate a highway built to current AASHTO safety standards. Third, U.S. 50 functions as Main Street in many of these communities. The highway is intersected by numerous cross streets and driveways and even has roadside parking for businesses. Highway improvements through the towns would change local access and traffic circulation patterns. Furthermore, with increased traffic in the future, the highway will become even more of a barrier, separating one side of town from the other. Additionally, moving the highway outside of the town centers would reduce the number of intersections and traffic signals, thus reducing delays and speed reductions. This would be especially beneficial to regional and long-distance travelers. These tradeoffs were recognized in the 2003 U.S. 50 planning study; and CDOT worked with the potentially affected communities to identify issues and concerns with through-town corridors, and to identify potential around-town corridors.

It should be noted that, at Pueblo, alignment alternatives—including the existing alignment—are technically within the city of Pueblo; therefore, it is partially inaccurate to define the alternatives at that location as “around town.” For this reason, the existing alignment was retained as a Build Alternative regardless of the outcome of the screening process for through-town versus around-town corridors.

It also should be noted that, between communities along the U.S. 50 corridor, the highway generally would remain in its current location, with the exception of the merger to a new alignment around towns and correction of one substandard curve, as discussed further in Section 3.6.2.

3.5.1 Descriptions of Through-Town and Around-Town Corridors

Through-Town Corridors

Planners and designers examined potential through-town corridors that used the existing U.S. 50 right of way plus adjacent land on its north side or south side in each town. CDOT's existing right of way through towns varies from 60 feet to 80 feet. Based on modern highway design, a minimum of 130 feet would be needed to accommodate through-traffic lanes, a center median, turn lanes, outside shoulders, sidewalks, and clear zones for vehicles to recover. Existing non-signalized intersections would be eliminated and the side roads turned into cul-de-sacs or connected together to form loops. No on-street parking would be allowed along the highway. The highway would be designed to carry traffic at posted speed limits of 50 mph.

A diagram depicting a 130-foot-wide right of way through a typical town setting is shown in Figure 3-9. Figure 3-10 shows that homes, businesses, historic resources, and other community assets would be displaced by a through-town corridor location.

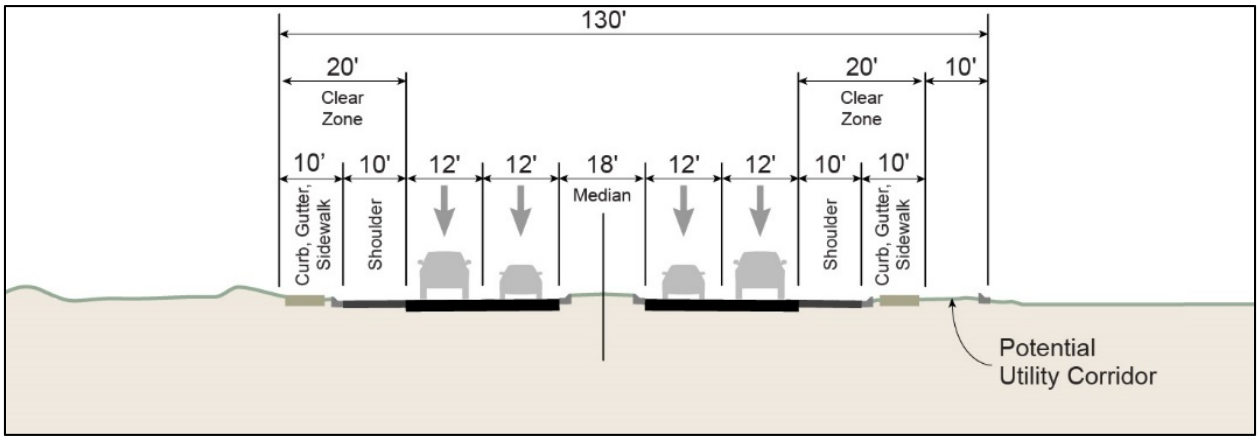
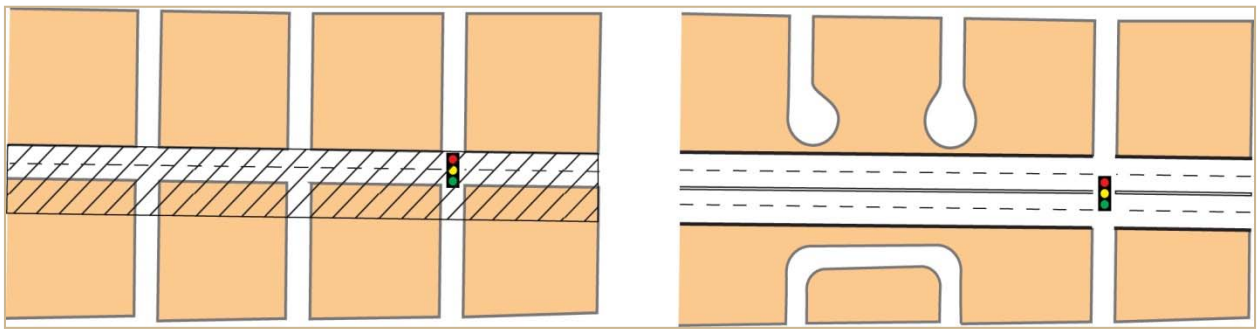


Figure 3-9. Ideal Through-Town Typical Section



The orange areas represent existing properties along U.S. 50. The cross-hatched area shows right of way needed for a higher-speed (50 mph), access-controlled highway designed to meet modern safety standards.

The orange areas show how connections between U.S. 50 and cross streets would be modified on either side of the highway to bring U.S. 50 up to modern safety standards.

Figure 3-10. Typical Right of Way and Access Effects for a Four-Lane Corridor through a Community

Intersections with U.S. 50 would be limited to other connecting state highways and other major roads, generally no closer together than one-half mile, and signalized where warranted. This would greatly reduce the number of places where people could cross U.S. 50 on foot, by bicycle, or even while driving. Since streets crossing U.S. 50 generally would be one-half mile apart, local residents would need to travel out of their way to cross the highway.

Based on public involvement, residents were concerned about the potential for community disruptions. Because of these concerns, impacts to communities were considered when analyzing through-town corridors. Depending on the corridors selected, through-town alternatives would unavoidably require removing at least 225 homes and businesses—and possibly as many as 445. Removing any homes or businesses within such small, rural communities could result in substantial effects to the communities. In addition, many homes, businesses, or public buildings that are important to the history of communities along U.S. 50 are located immediately adjacent to the highway. Shifting the highway to one side to avoid a particular historic site, for example, would likely result in affecting another historic site on the other side of the road.

Crossing the Highway

In most communities along the U.S. 50 corridor, residents have to cross the highway every day to work, shop, attend school, or use community services. The highway currently divides towns, and crossing it safely can be difficult. In Fowler, for example, children walk or bike from their homes south of U.S. 50 to reach the public swimming pool on the north side.

Table 3-4 shows the potential effects of the through-town corridors on homes, businesses, and historic sites that are listed or eligible for listing on the NRHP.

Table 3-4. Homes, Businesses, and Historic Resources Potentially Affected by Through-Town Corridors

Attribute	Through-Town Corridors[a]
Ideal right of way needed	130 feet (within the 1,000-foot-wide study area corridor)
Number of homes and businesses within the corridor[a]	225 to 445[b]
Number of historic resources within the corridor	150[b]

[a] Ranges reflect best-case and worst-case corridors through town.
[b] Resources mostly cannot be avoided because the existing highway is surrounded by homes and businesses, many of them historic.

Around-Town Corridors

Due to the community disruption of through-town corridors, CDOT explored potential around-town corridors in consultation with local communities. Around-town corridors—or bypasses, as they are technically known—were developed initially in the U.S. 50 planning study and refined during this Tier 1 EIS. Corridor alignments going around the north and the south sides of the communities were sketched onto aerial maps, attempting to avoid impacts to community and ecological resources. At the request of the communities, these corridors were kept as close to the current U.S. 50 alignment as possible, but moved just far enough around the towns to avoid impacting key resources. Because U.S. 50 connects to I-25 within the city of Pueblo (the western terminus for this Tier I EIS), an around-town corridor alternative was not developed for Pueblo.

The right of way needed for around-town corridors would be up to 250 feet to provide a wide enough median (typically 100 feet) to serve as a refuge for trucks and farm equipment crossing U.S. 50 (see Figure 3-11). To accommodate a wider median, this right-of-way width is greater than what was described for the through-town corridor. No sidewalks would be provided in these areas outside of the communities. Around-town corridors would have a posted travel speed of 65 mph to match posted speeds present between towns. Around-town corridors would allow access only from crossroads no closer than one-half mile apart. Generally, no direct access would be provided for driveways and field roads.

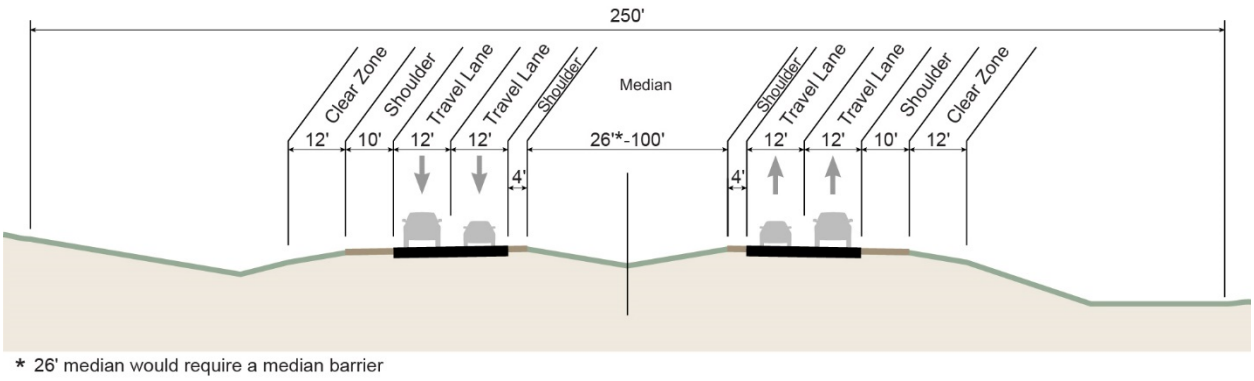


Figure 3-11. Ideal Around-Town Typical Section

Table 3-5 shows the potential effects of the around-town corridors on homes, businesses, and historic sites, including those that are listed or eligible for listing on the NRHP.

Table 3-5. Homes, Businesses, and Historic Resources Potentially Affected by Around-Town Corridors

Attribute	Around-Town Corridors[a]
Ideal right of way needed	250 feet (within the 1,000-foot-wide study area corridor)[b]
Number of homes and businesses within the corridor[a]	95 to 215[c]
Number of historic resources within the corridor[a]	60 to 79[c]

[a]Ranges reflect best-case and worst-case corridors around town.

[b]Right of way required is greater than that of the through-town corridor to accommodate a wider median.

[c]Resources are probably avoidable to a large degree since they were counted within a 1,000-foot-wide corridor, of which only 250 feet actually will be needed for right of way.

3.5.2 Evaluation of Through-Town and Around-Town Corridors

Through-town and around-town concepts for corridor locations were screened to determine how well each would meet the project's purpose and need for local, regional, and long-distance users of the highway. In addition to the six purpose-and-need-related criteria that were used in the earlier screening steps, a seventh criterion was used here to evaluate alternatives because of public concerns about potential community disruption. The seventh criterion addresses how well a through-town or around-town corridor would minimize community impacts. The following screening criteria were used and are discussed with the results.

How Well Each Alignment Addresses U.S. 50 Safety Issues

Highway improvements could be designed to address safety issues regardless of whether the corridor went through towns or around them.

How Well Each Alignment Improves Mobility for Local Users

Reconstructing the highway through towns with a design speed of 50 mph would require the elimination of most access from cross streets. This would substantially impede local travelers by adding out-of-direction travel as they access crossing points. Rerouting the highway to the north or south of the urban areas would provide half-mile spacing of access points around towns and would not be as disruptive to local users because it would maintain local connections along the existing U.S. 50 alignment through town. It is expected that some local roads would change to accommodate access to an around-town alignment. This may impact local mobility at certain highway access locations.

How Well Each Alignment Improves Mobility for Regional Users

The in-town alternative would moderately improve regional traveler mobility by increasing the in-town speeds and reducing intersections. However, this alternative would still require users to slow down as compared to the non-urban segments. Moving the highway to an around-town alternative would allow regional users to bypass towns and improve their mobility. However, they would be inconvenienced by the access restrictions in the communities where their trips begin or end, where there is the potential to add out-of-direction travel.

How Well Each Alignment Improves Mobility for Long-Distance Users

Mobility for long-distance users would improve due to maintaining 50 mph speeds through towns, but they still would encounter local traffic. Mobility would be better if U.S. 50 long-distance traffic could go around towns at 65 mph and avoid mixing with local traffic.

How Well Each Alignment Balances Mobility and Access for All Users

The through-town corridors would not improve mobility and access for local users; but they would partially benefit regional and long-distance users due to speed reductions and stoplights. Around-town corridors would improve mobility for regional and long-distance users, and would not impair local user access in town.

How Well Each Alignment Provides Flexibility to Address Future Travel Needs

Through-town routes would be surrounded by homes, businesses, historic sites, and other community resources, making it very difficult to modify or expand the roadway to address future needs. Around-town corridors would be located primarily in agricultural areas where there would be more flexibility for future modifications.

How Well Each Alignment Minimizes Community Impacts

Through-town corridors would require acquisition and removal of a large number of homes, businesses, historic sites, and other important community resources, while also impairing the ability to cross U.S. 50 safely. This option would substantially affect local traffic circulation patterns. Around-town corridors would require the removal of far fewer structures, although they would consume and bisect farmland and ranch lands that are important to local economies. Around-town corridors would reduce traffic volume through town, making the existing U.S. 50 easier to use or cross within the communities. However, a bypass also could negatively affect the local economy if it diverts traffic far from town. Fewer regional travelers passing through small town business districts could result in reduced retail sales for travel-related businesses, such as hotels/motels, restaurants/bars, convenience stores, grocery stores, gas stations, etc. This criterion is included because of its importance to the public.

The results of the through-town or around-town screening are summarized in Table 3-6.

Table 3-6.Through-Town or Around-Town Screening Results Summary

Screening Criteria	Through Town	Around Town
Addresses U.S. 50 safety issues	●	●
Improves mobility for local users	○	●
Improves mobility for regional users	◒	●
Improves mobility for long-distance users	◒	●
Balances mobility and access for all users	○	●
Provides flexibility to address future traffic needs	○	●
Minimizes community impacts	○	◒

Key: ○ = does not address the need ◒ = partially addresses the need ● = fully addresses the need

3.5.3 Decision Regarding Through-Town or Around-Town Corridors

The through-town corridors were eliminated from consideration because they would adversely affect local mobility (limiting access and continued traffic), do not balance mobility and access for all users of U.S. 50, and would not allow for flexibility to address future traffic needs because of the restricted setting within towns. Therefore, they do not meet the purpose and need of the project. In addition, the through-town corridors directly impact community resources (through land and property acquisition), which was a concern for the members of the communities. In Pueblo, however, U.S. 50 already is an expressway, so the existing corridor location was not eliminated. More information on this topic is provided in Section 3.6.2.

The around-town corridors were carried forward for further consideration because they would better meet aspects of the purpose and need while also minimizing community impacts.

3.6 ALTERNATIVES CARRIED FORWARD FOR FURTHER CONSIDERATION

The alternatives development process described previously was undertaken to identify one or more alternative corridor alignments that would meet the project's purpose and need. This process considered:

- Regional corridor locations
- Transportation modes
- Facility types
- Through-town versus around-town corridor locations in communities

The results of this process are Build Alternatives that will configure a highway as a four-lane expressway located on or near the existing U.S. 50 between communities, and located around the communities east of Pueblo along the U.S. 50 corridor. The Build Alternatives were carried forward in this document for subsequent comparison to the No-Build Alternative. The No-Build and Build Alternatives are described below.

3.6.1 No-Build Alternative

In accordance with NEPA, a no-build alternative is included in this EIS to provide a basis for comparison with the Build Alternatives. The No-Build Alternative includes ongoing maintenance of pavement and bridges on the existing U.S. 50 alignment. It also includes ongoing or planned minor safety improvements, provision of passing-lane sections, routine pavement overlays, and repair of any weather- or crash-related damage. The No-Build Alternative also would accommodate local agency improvements to the U.S. 50 corridor.

3.6.2 Build Alternatives

The decisions described previously determined that a four-lane expressway on or near the existing U.S. 50 alignment and going around each community, except in Pueblo, would meet the project's purpose and need. Therefore, the Build Alternatives consist of constructing a four-lane expressway on the existing U.S. 50 between I-25 in Pueblo (milepost 316) to approximately one mile east of Holly (milepost 466).

Access will be restricted by placing access points at least one-half-mile apart. The resulting elimination of numerous existing access points would require that some local travelers use other roadways, and in some cases frontage roads will be added to reach U.S. 50. The access locations will not be determined until the

completion of the Tier 2 studies. State highways and major regional roads will take priority as access points to U.S. 50. For example, if multiple access points exist within a one-half-mile segment, access to and from prioritized roads would be retained, while lower-priority access points would be eliminated. Portions of the existing highway that go through communities will remain in place to serve local needs, but will no longer serve as U.S. 50. For such roads, CDOT would negotiate relinquishing ownership to cities and/or counties, as discussed below.

The Build Alternatives would maintain a posted speed limit of 65 mph in most locations, dropping to 50 mph for approaches to signalized intersections. Some grade-separated intersections (where one of the roads crosses over or under the other) would be provided to minimize the number of signalized intersections. At locations with at-grade access but not enough traffic to warrant a signalized intersection, unsignalized intersections would be provided. The Build Alternatives would include a wide median with sufficient room for a vehicle to cross one direction of traffic, then wait at a stop sign before crossing the other highway lanes or making a left turn onto the highway.

It should be noted that the Build Alternatives do not represent final roadway alignments. Instead, each alternative consists of a corridor measuring approximately 1,000 feet in width and encompassing the actual 250-foot or less roadway alignment (i.e., footprint), which will be identified during Tier 2 studies. Within this 1,000-foot-wide corridor, resources can be avoided or minimized during Tier 2 studies. The Build Alternatives consist of constructing a four-lane rural expressway of typical AASHTO standard widths located along or near the existing U.S. 50 highway between and around communities.

At each community east of Pueblo, there generally are two Build Alternatives that propose realigning U.S. 50 around the community. General corridor alignments around each community were developed based on the purpose and need of the project, socioeconomic and environmental constraints, engineering feasibility, and public input. Between communities, the corridor location generally is centered on the existing highway alignment, except between Pueblo and Fowler. For this portion of U.S. 50, a realignment option was developed to avoid property acquisitions and the demolition of the historic Huerfano Bridge. Figure 3-12 provides an overview of the Build Alternatives along the project corridor. As previously mentioned, the existing road and right-of-way alignments through each community would be relinquished to the city or county through a process negotiated and documented in an Inter-Governmental Agreement (IGA). Generally, the process would follow this sequence:

1. Complete U.S. 50 Tier 1 EIS
2. Complete U.S. 50 Tier 2 NEPA documents for each individual project

3. Coordinate with local jurisdiction
4. Develop IGA for right of way, maintenance, and operations
5. Finalize design
6. Formalize IGA and submit to CDOT, Transportation Commission
7. Execute IGA

The project corridor consists of 18 sections, which represent the Build Alternatives between communities and around communities. These 18 sections are discussed briefly below in relation to the Build Alternative(s) proposed in each section. Figure 3-13 reflects the location of each of these sections along the existing U.S. corridor.

In Pueblo, three Build Alternatives are proposed that either improve U.S. 50 on its existing alignment and/or reroute it to the north to utilize SH 47. East of Pueblo, generally, there is one Build Alternative alignment between each of the communities along existing U.S. 50 with a north and south around-town Build Alternative at each of the communities.

3.6.3 Identification of the Least Environmentally Damaging Practicable Alternative

Since this Tier 1analysis includes potential impacts to waters of the United States, including wetlands, it must include a resolution that the alternative screening process does not eliminate the Least Environmentally Damaging Practicable Alternative (LEDPA)(Section 404(b)(1) of the Clean Water Act). The U.S. Army Corps of Engineers has given concurrence, in a letter dated November 2, 2015 (see Appendix C), that screening processes documented in this document and the identification of Build Alternatives do not eliminate the LEDPA. During Tier 2 studies, further evaluation will be completed to make a determination that the LEDPA is not eliminated through those individual NEPA processes.

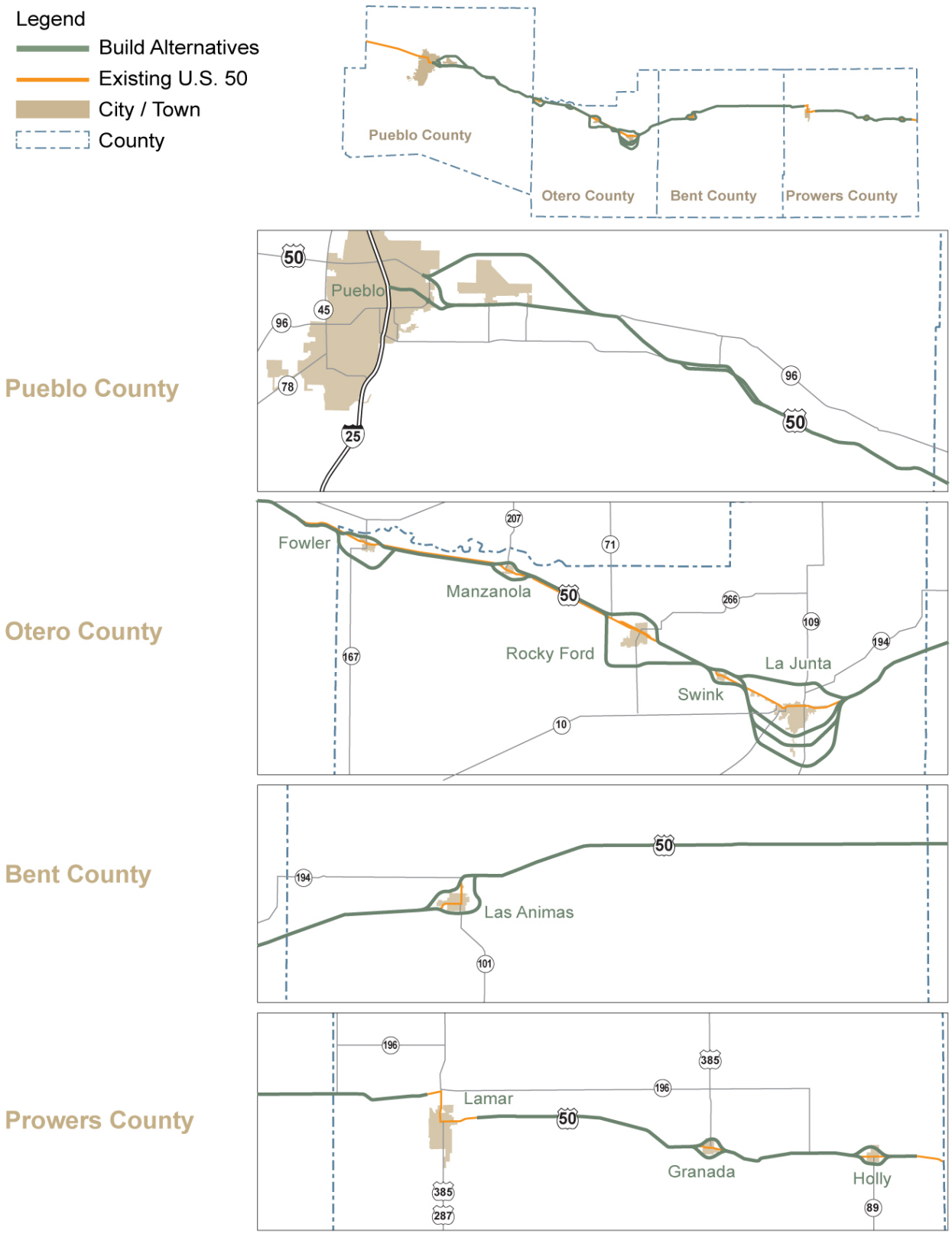


Figure 3-12. Build Alternatives Overview

No alternatives were developed for Lamar. Lamar was studied in a separate EA, titled *U.S. 287 at Lamar Reliever Route Environmental Assessment;* the FONSI for the project was signed November 10, 2014.

Section 1: Pueblo

Section 2: Pueblo to Fowler

Section 3: Fowler

Section 4: Fowler to Manzanola

Section 5: Manzanola

Section 6: Manzanola to Rocky Ford

Section 7: Rocky Ford

Section 8: Rocky Ford to Swink

Section 9: Swink

Section 10: La Junta

Section 11: La Junta to Las Animas

Section 12: Las Animas

Section 13: Las Animas to Lamar

Section 14: Lamar to Granada

Section 15: Granada

Section 16: Granada to Holly

Section 17: Holly

Section 18: Holly Transition

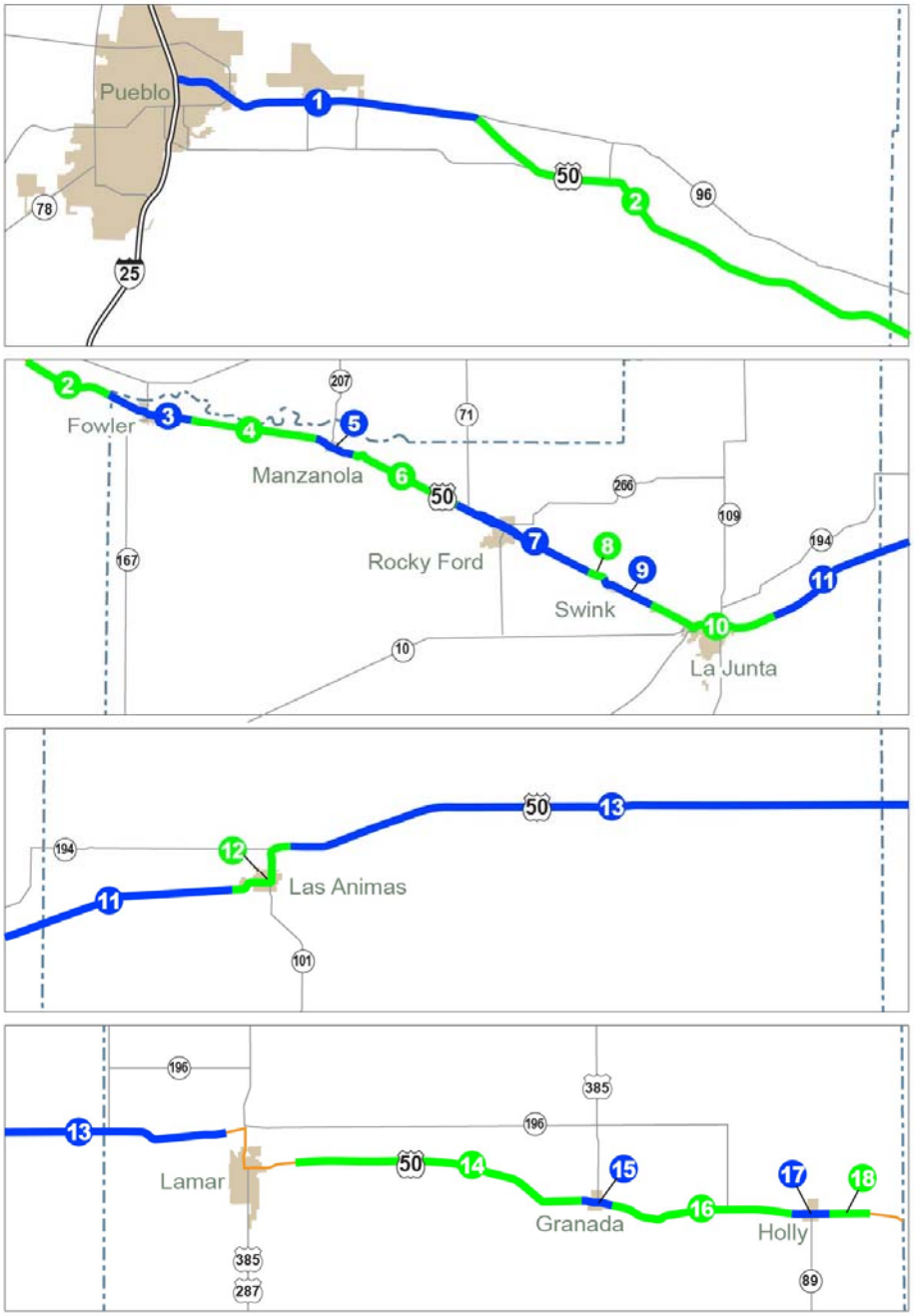


Figure 3-13. Project Corridor Sections

Section 1: Pueblo

Because U.S. 50 is already a four-lane expressway within Pueblo, an around-town Build Alternative was not developed. However, three Build Alternatives within Pueblo are under consideration:

- Alternative 1: Pueblo Airport North
- Alternative 2: Pueblo Existing Alignment
- Alternative 3: Pueblo SH 47 Connection

Figure 3-14 reflects these alternatives.

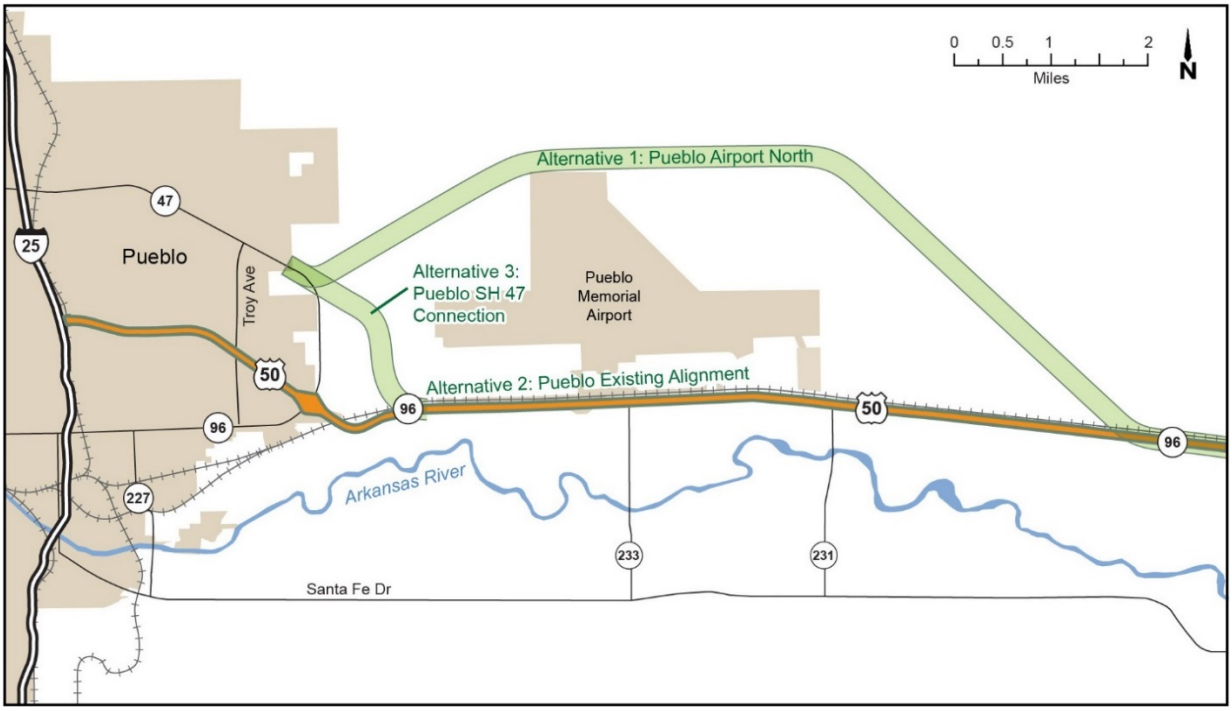


Figure 3-14. Pueblo Build Alternatives

Alternative 1: Pueblo Airport North consists of relocating U.S. 50 around the north side of the Pueblo Memorial Airport. This alternative was proposed by PACOG and is included in the Region's 2040 Long-Range Transportation Plan. The 7.9-mile corridor would tie into SH 47 approximately 1.5 miles north of U.S. 50 and 4.5 miles east of I-25. As part of this Build Alternative, a portion of SH 47 would be re-designated as U.S. 50. Also, the existing U.S. 50 would remain in use under its secondary designation of SH 96.

Alternative 2: Pueblo Existing Alignment is under consideration because U.S. 50 in the area of Pueblo is currently a divided, four-lane expressway. This Build Alternative would stay on the existing alignment, but would include some safety improvements to meet current design standards.

Alternative 3: Pueblo SH 47 Connection would include safety improvements like those under Alternative 2, but instead of staying on the existing alignment until the western terminus of the project, it would construct a new segment of highway to connect U.S. 50 to SH 47 west of the airport. This also was a local proposal considered in the CDOT 2003 planning study for U.S. 50.

It should be noted that Alternatives 1 and 3 would move the alignment to be consistent with U.S. 50 west of I-25.

Section 2: Pueblo to Fowler

Between Pueblo and Fowler, two Build Alternatives are under consideration (see Figure 3-15). Alternative 1: Fort Reynolds Existing Alignment consists of a 1,000-foot-wide corridor centered on the existing alignment. Alternative 2: Fort Reynolds Realignment is generally a 1,000-foot-wide corridor centered on the existing alignment, except between milepost 333 and milepost 339 near Fort Reynolds. Alternative 2 realigns the highway to the south in this area to minimize the potential acquisition of homes in the Fort Reynolds area. It also has the potential to avoid adverse effects to the historic Huerfano Bridge. The existing U.S. 50 could remain as a frontage road in this alternative, which would require the bridge to be left in place. This will be evaluated further during Tier 2 studies.

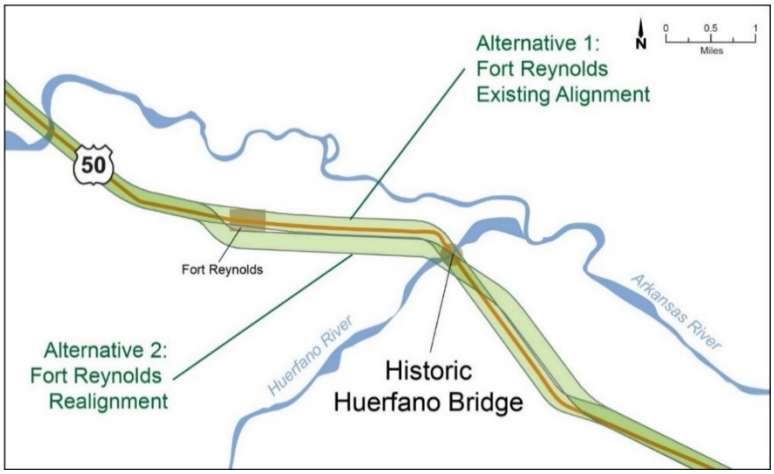


Figure 3-15. Pueblo to Fowler Build Alternatives

Section 3: Fowler

Two Build Alternatives are under consideration around Fowler, as shown in Figure 3-16. Alternative 1: Fowler North is 3.4 miles long and is aligned to minimize or avoid impacts to the BNSF Railway tracks and the Arkansas River. Alternative 2: Fowler South measures slightly less than five miles and extends nearly one mile south of town. This placement is meant to minimize effects to land irrigated by the Oxford Farmers Ditch, a major irrigation canal, and provide for additional development opportunities.

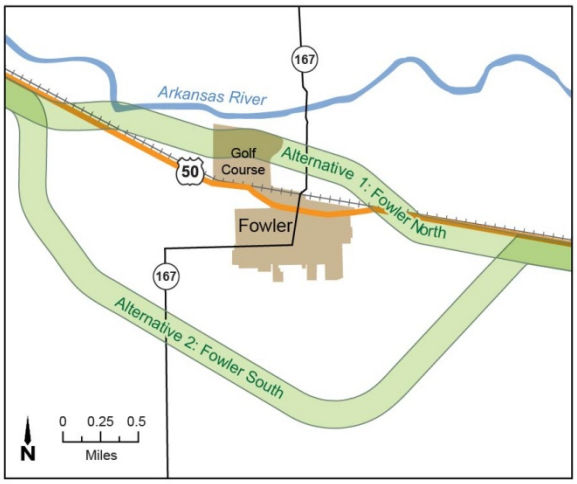


Figure 3-16. Fowler Build Alternatives

Section 4: Fowler to Manzanola

The Fowler to Manzanola Build Alternative is a 1,000-foot wide corridor on the existing alignment, as shown on Figure 3-17. The width of the corridor extends from the edge of highway right of way on the north side of U.S. 50 south 1,000 feet to avoid the railroad that parallels the highway to the north.

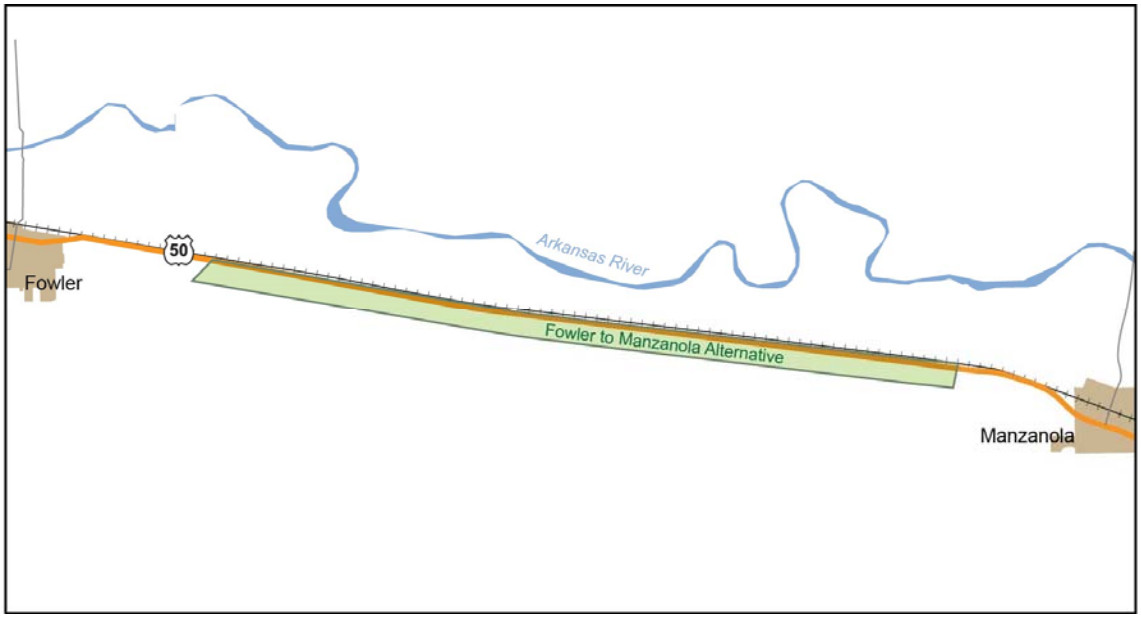


Figure 3-17. Fowler to Manzanola Build Alternative

Section 5: Manzanola

The two Build Alternatives considered around Manzanola are shown in Figure 3-18. Alternative 1: Manzanola North would require a new railroad crossing west of town and would remain north of the railroad. Alternative 2: Manzanola South would remain south of the tracks until crossing them east of town, as U.S. 50 does today. Each Build Alternative is a little more than 2.5 miles long and is situated to remain close to town. Alternative 1 was aligned to minimize impacts to agricultural land to the north. Similarly, Alternative 2 was developed to avoid bisecting major farmland and to border or minimize impacts to the Otero Canal.

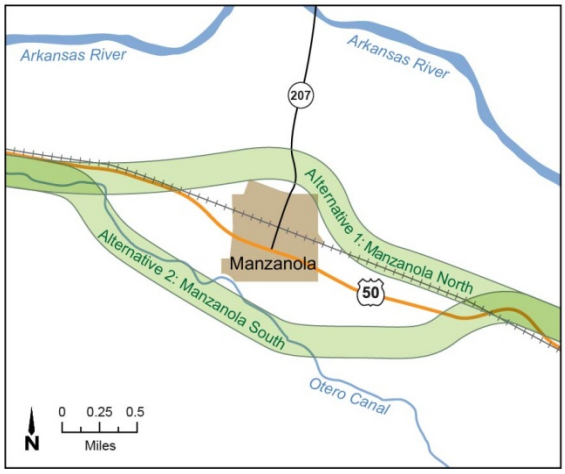


Figure 3-18. Manzanola Build Alternatives

Section 6: Manzanola to Rocky Ford

As shown in Figure 3-19, the Manzanola to Rocky Ford Build Alternative is a 1,000-foot-wide corridor on the existing alignment. The width of the corridor extends from the edge of the highway right of way on the south side of U.S. 50 north 1,000 feet to avoid the railroad that parallels the highway to the south.

Figure 3-19. Manzanola to Rocky Ford Build Alternative

Section 7: Rocky Ford

Figure 3-20 shows the two Build Alternatives considered around Rocky Ford. Alternative 1: Rocky Ford North is located between the city and the Arkansas River and measures slightly less than seven miles in length. Alternative 2: Rocky Ford South is located approximately one mile south of U.S. 50 and is approximately 8.2 miles long. Based on community input, Alternative 1 is intended to stay close to the city, while Alternative 2 was aligned further south to avoid potential development opportunities south of the city limits.

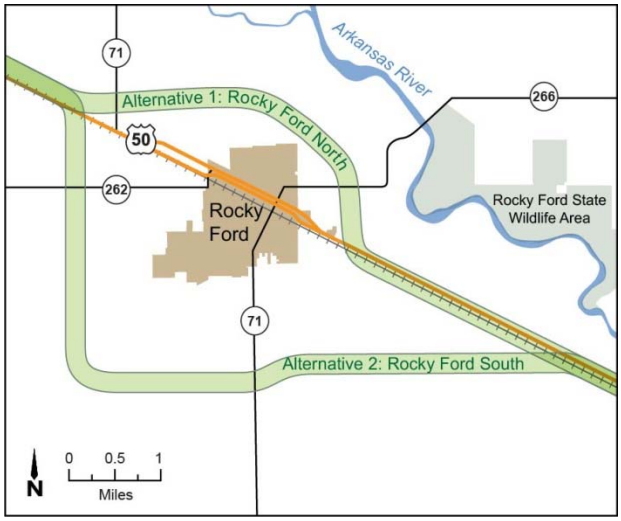


Figure 3-20. Rocky Ford Build Alternatives

Section 8: Rocky Ford to Swink

In this section, the existing U.S. 50 alignment parallels the railroad, which is located directly to the south of the highway. To avoid the railroad tracks in this area, the Rocky Ford to Swink Build Alternative extends 500 feet to the north of the railroad tracks (which extends along the existing U.S. 50 alignment) and 500 feet to the south of the railroad tracks (see Figure 3-21). The purpose of dividing the 1,000-foot-wide corridor in half was to generally avoid the railroad and associated right of way to the greatest extent possible. However, if the U.S. 50 alignment is shifted south of the tracks, a new crossing of the railroad could be required.

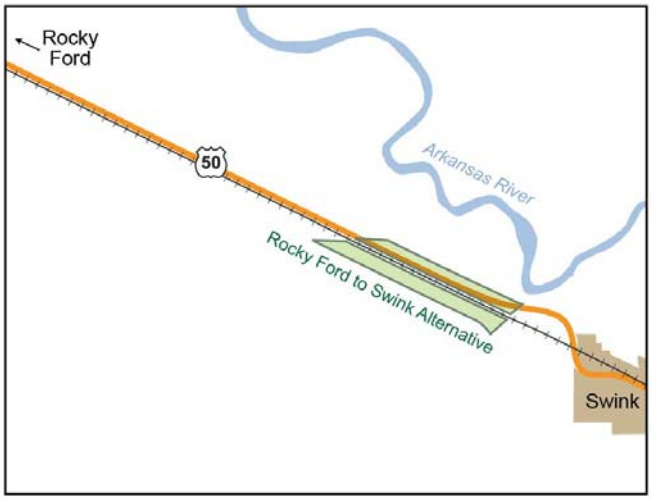


Figure 3-21. Rocky Ford to Swink Build Alternative

Section 9: Swink

Figure 3-22 shows the two Build Alternatives under consideration around Swink. Alternative 1: Swink North is located close to the Arkansas River and is 2.4 miles in length, while Alternative 2: Swink South is approximately 2.5 miles in length. Alternative 1 was aligned to avoid impacts to the Arkansas River and wastewater lagoons to the north. Alternative 2 was configured to avoid or minimize impacts to the Swink High School and a future area of development on the southern limits of town, while also remaining close to the town.

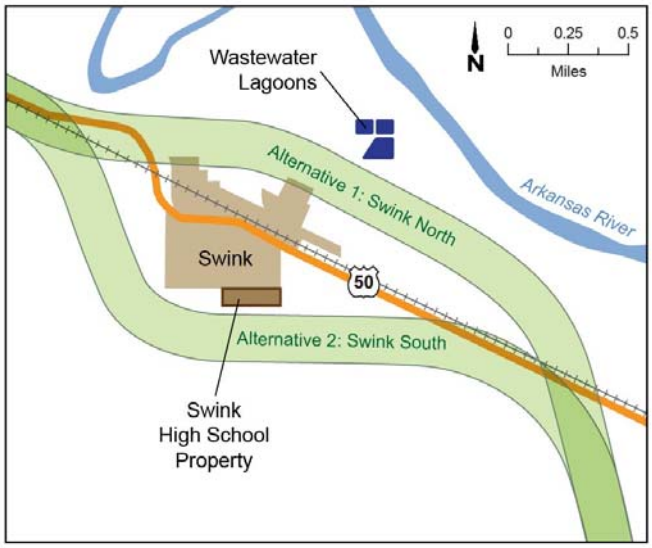


Figure 3-22. Swink Build Alternatives

Section 10: La Junta

Figure 3-23 shows the four Build Alternatives under consideration around La Junta. The southern alternatives primarily differ by length and proximity to the town. All La Junta Build Alternatives are summarized below:

- Alternative 1: La Junta North bypasses the town to the north and would construct two new bridges over the Arkansas River. It is 8.9 miles in length. This alternative is only viable if Section 9, Alternative 1: Swink North, is selected. An alignment tying to Section 9, Alternative 2: Swink South, was not developed due to having to cross the Fort Lyon Canal.
- Alternative 2: La Junta South is 8.5 miles in length and located approximately two miles south of the existing U.S. 50 alignment in La Junta.
- Alternative 3: La Junta South is 9.8 miles in length and located approximately 2.3 miles south of the existing U.S. 50 alignment in La Junta.
- Alternative 4: La Junta South is 11.9 miles in length and located approximately 3.3 miles south of the existing U.S. 50 alignment in La Junta.

Swink to La Junta

Because of the short distance between Swink and La Junta, and the length of the Build Alternatives around La Junta, the transition between the two communities was incorporated into the Build Alternatives for Section 10: La Junta.

Alternative 1 was developed to provide a northern route. Given the proximity of the Arkansas River to the city, the alignment was situated north of the river in a location to avoid existing development and the Fort Lyon Canal. Alternative 2 was developed to provide a southern route, but also remain close to the city limits. Alternative 3: La Junta South was developed during public involvement efforts for this document as a requested compromise between Alternative 2 and Alternative 4—a route closer to town, but farther from the city limits. The Alternative 4 alignment reflects a proposed trucking route identified in the La Junta Comprehensive Plan. It generally follows this alignment, with the exception of deviating to the west of La Junta to tie into Alternative 1: Swink North and Alternative 2: Swink South in Section 9 of the project corridor.

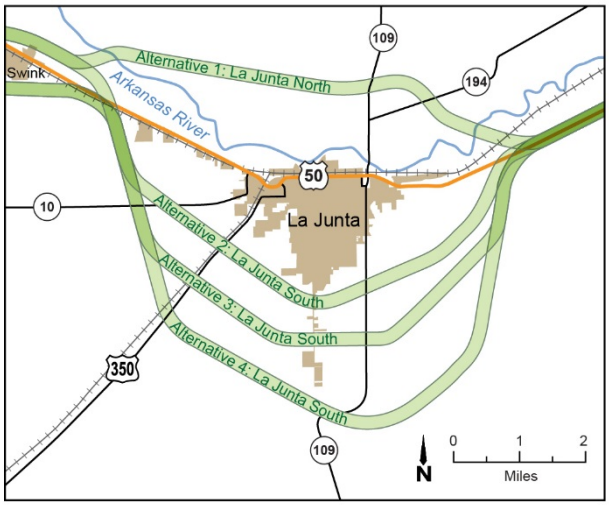


Figure 3-23. La Junta Build Alternatives

Section 11: La Junta to Las Animas

The La Junta to Las Animas Build Alternative consists of a 1,000-foot-wide corridor centered on the existing alignment, except in areas where the railroad parallels the highway to the north (see Figure 3-24). In these areas, the 1,000-foot corridor shifts to the south.

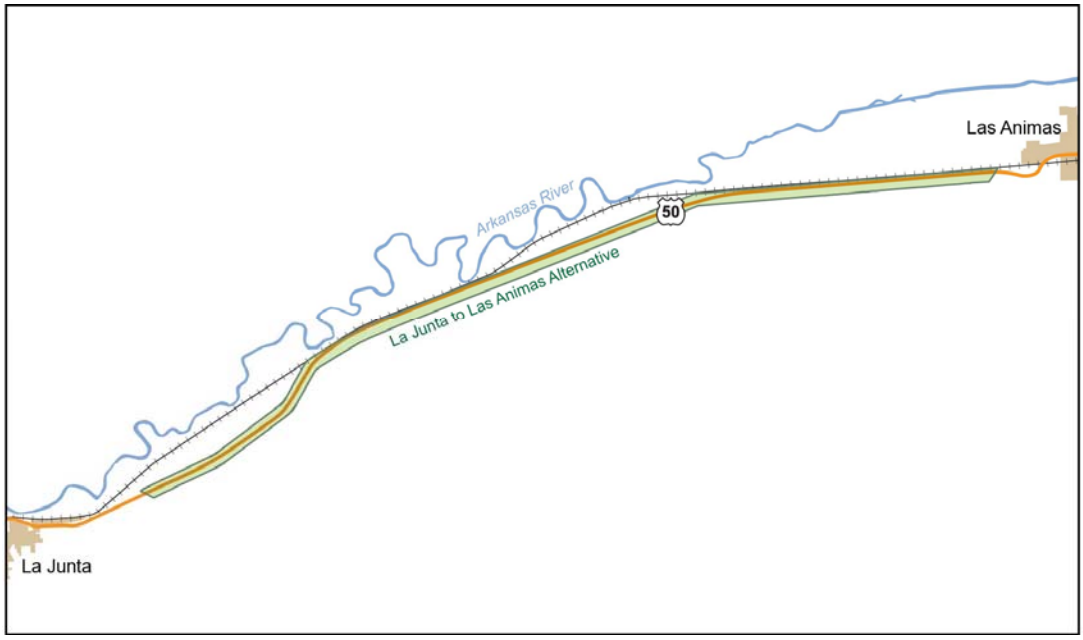


Figure 3-24. La Junta to Las Animas Build Alternative

Section 12: Las Animas

The two Build Alternatives considered around Las Animas are shown in Figure 3-25. U.S. 50 crosses the Arkansas River north of the city and both alternatives also would cross the river. Alternative 1: Las Animas North is approximately 3.5 miles long and would replace the existing bridge over the Arkansas River. The alignment is designed to avoid or minimize direct effects to community resources, including the Bent County jail and treatment facility, wastewater facilities, and Bent's Fort Inn (which is viewed as an important community gathering place), while using the existing U.S. 50 alignment to the greatest extent practicable. Alternative 2: Las Animas South is approximately 4.7 miles long and would include a new bridge crossing over the Arkansas River. This placement stays close to town, while avoiding direct effects to the fairgrounds—an important community resource—and the city and county airport.

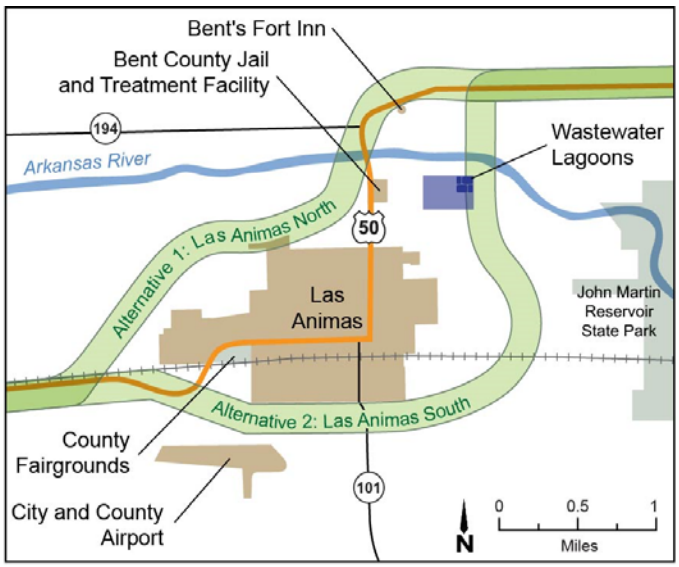


Figure 3-25. Las Animas Build Alternatives

Section 13: Las Animas to Lamar

As shown in Figure 3-26, the Las Animas to Lamar Build Alternative consists of a 1,000-foot-wide corridor centered on the existing alignment.

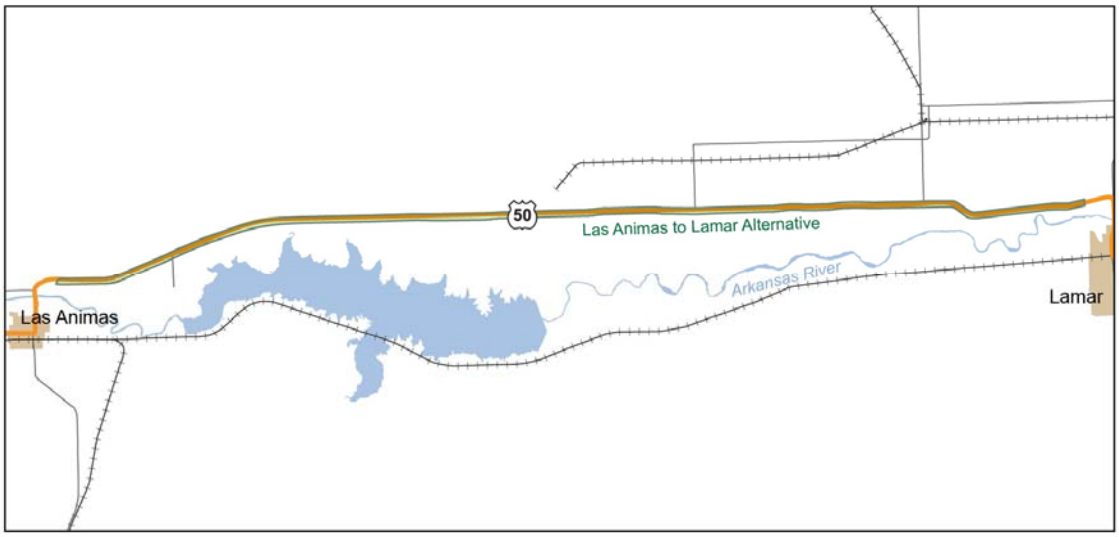


Figure 3-26. Las Animas to Lamar Build Alternative

Section 14: Lamar to Granada

The Lamar to Granada Build Alternative consists of 1,000 feet centered on the existing alignment, as shown in Figure 3-27. However, between Lamar and the U.S. 50 and CR GG.5 intersection, the corridor begins on the north edge of U.S. 50 and extends 1,000 feet south to avoid the railroad on the north side.

Lamar

The U.S. 287 at Lamar Reliever Route Environmental Assessment *studied Lamar to determine how U.S. 50 will go around this community because U.S. 50 and U.S. 287 share the same alignment for several miles in this area. Corridors around Lamar, therefore, were not considered in this document. For further details, please refer to the EA and FONSI located online at* http://www.coloradodot.info/projects/us287lamar/request-for-proposals-rfp/environmental-assessment.

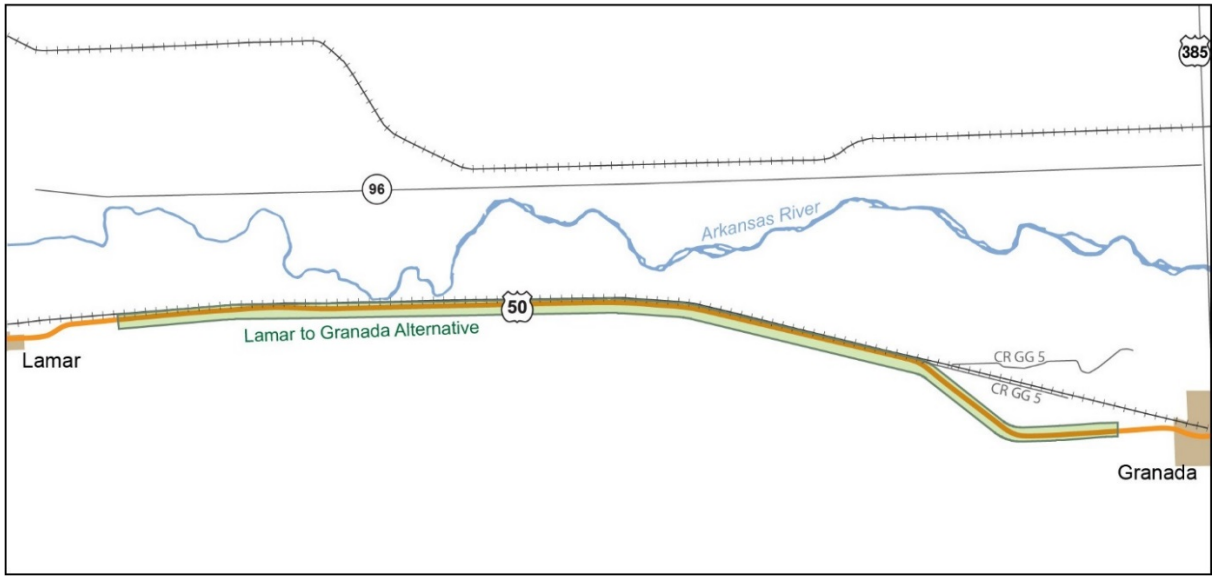


Figure 3-27. Lamar to Granada Build Alternative

Section 15: Granada

Figure 3-28 shows the two Build Alternatives under consideration around Granada. Alternative 1: Granada North is approximately 2.2 miles long, while Alternative 2: Granada South is 2.1 miles long. Both alternatives were intended to minimize or avoid potential effects to Camp Amache National Historic Landmark and/or the Granada State Wildlife Area.

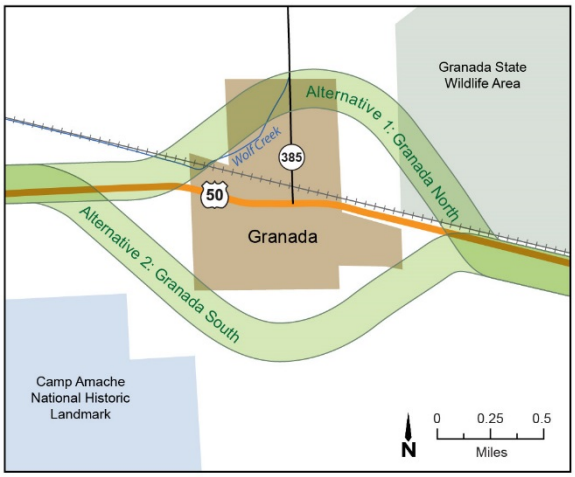


Figure 3-28. Granada Build Alternatives

Section 16: Granada to Holly

As shown in Figure 3-29, the Build Alternative between Granada and Holly is an alignment 1,000 feet wide centered on the existing roadway except where the corridor is near enough to the railroad to cause potential impacts. In these cases, the Build Alternative is shifted to the south or north along the existing U.S. 50 alignment.

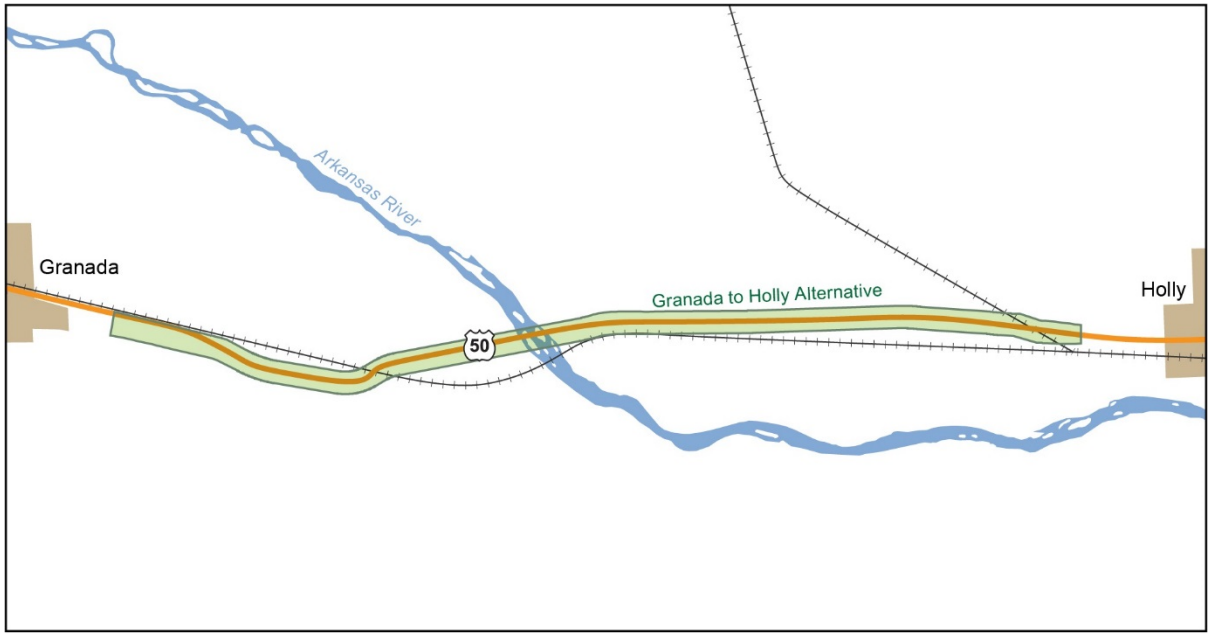


Figure 3-29. Granada to Holly Build Alternative

Section 17: Holly

The two Build Alternatives under consideration around Holly are shown in Figure 3-30. Both alternatives are approximately 2.1 miles long. Both Build Alternative alignments were intended to stay close to the existing city limits. Alternative 1 was aligned in a way to avoid potential development to the northwest of town, as well as potential housing development on the northeast of the existing town limits and the cemetery east of town. Community input also identified the best agricultural land as being north of town; keeping the northern alternative close to town was intended to minimize agricultural land impacts. Alternative 2 was

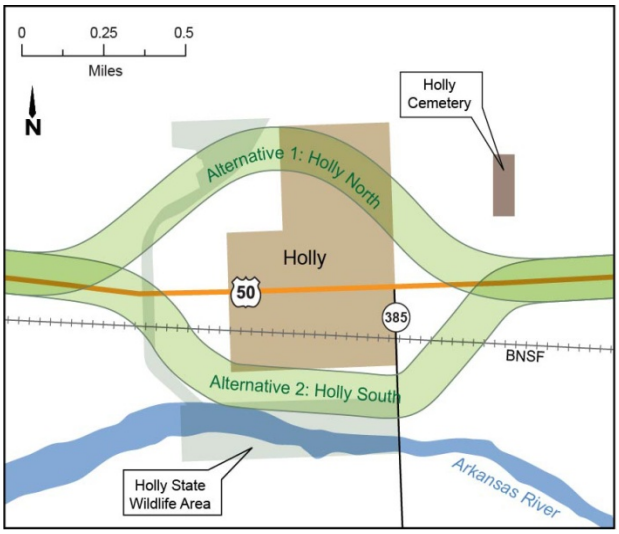


Figure 3-30. Holly Build Alternatives

aligned between the southern limits of town and the Arkansas River. This alternative has the potential to avoid the Holly State Wildlife Area while Alternative 1 would have unavoidable use of the wildlife area.

Section 18: Holly Transition

The Build Alternative in this section is 1,000 feet wide centered on the existing alignment, as shown on Figure 3-31. This section begins approximately one mile east of Holly and extends to the vicinity of the Colorado-Kansas state line. The limits of this section will be determined during Tier 2 studies.

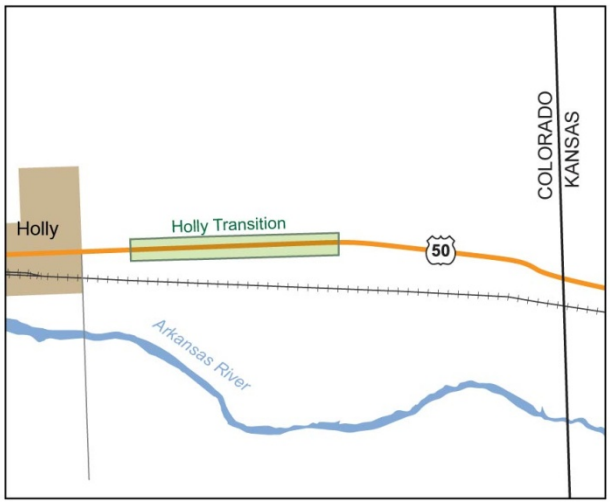


Figure 3-31. Holly Transition Build Alternative

3.6.4 Evaluation of Alternatives

The effects of the No-Build and Build Alternatives described above are evaluated in Chapter 4, Affected Environment, Environmental Consequences, and Mitigation. Chapter 4 addresses mobility and safety considerations, as well as impacts to resources from the Build Alternatives and the No-Build Alternative. Affected resources are discussed by appropriate resource groups, including the rural and agricultural environment, the natural environment, and the community and built environment. The identification of a preferred alternative, as well as a summary of its impacts, are provided in Chapter 6.

4 Affected Environment, Environmental Consequences, and Mitigation

This chapter discusses the affected environment, environmental consequences, and mitigation strategies associated with the resources evaluated for the U.S. 50 Tier 1 EIS.

What Does this Chapter Describe?

Affected Environment:

- *What resources exist?*
- *Where are they located?*
- *Why are they important?*

Environmental Consequences:

- *How would the resources be affected by the No-Build and Build Alternatives?*

Mitigation Strategies:

- *If an alternative affects a resource, what will be done about it?*

The affected environment describes the resources that exist within the project area. Environmental consequences describe how the alternatives considered (i.e., the Build Alternatives and the No-Build Alternative) may affect these resources. Effects can be either positive or negative. Mitigation strategies outline what actions would be taken to lessen or repair these effects if they occur.

The U.S. 50 Tier 1 EIS is a broad-scale document. The purpose of this Tier 1 phase is to identify a general corridor location for U.S. 50 through the Lower Arkansas Valley. The result is the Build Alternatives defined in Chapter 3, Alternatives Considered. Tier 2 studies carry on from this point to identify a 250-foot-wide (maximum) roadway footprint (i.e., alignment) within the Build Alternatives, additional environmental analysis as needed, and design and construction activities. Figure 4-1 shows the 1,000-foot-wide Build Alternatives corridor defined in this Tier 1 analysis in relation to the 250-foot-wide roadway footprint that would be identified during Tier 2 studies (i.e., the next project phase).

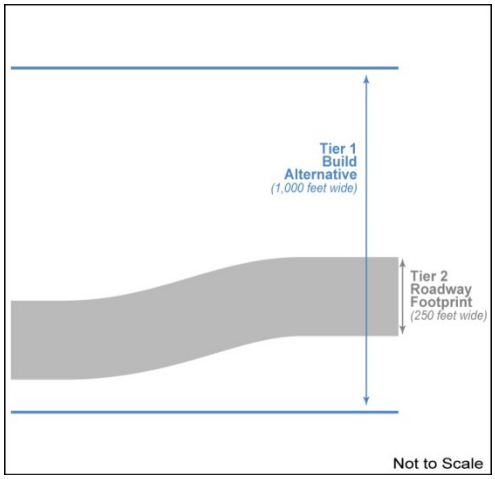


Figure 4-1. Tier 1 Build Alternative vs. Tier 2 Roadway Footprint

For this Tier 1 level of analysis, it was impractical for several reasons to identify and evaluate resources at the same level of detail as a traditional (i.e., non-tiered) EIS. The U.S. 50 project area is 150 miles long and one to four miles wide. This makes field review prohibitively time consuming and expensive. Also, the build-out

period for Tier 2 studies is estimated to be decades (not years). As a result, data collected from the field today are not likely to be relevant by the time most Tier 2 studies occur. Because of these factors, existing data were used whenever possible to identify and evaluate resources. When existing data were not available, limited field review was conducted, but at a level appropriate for a Tier 1 (planning-level) study.

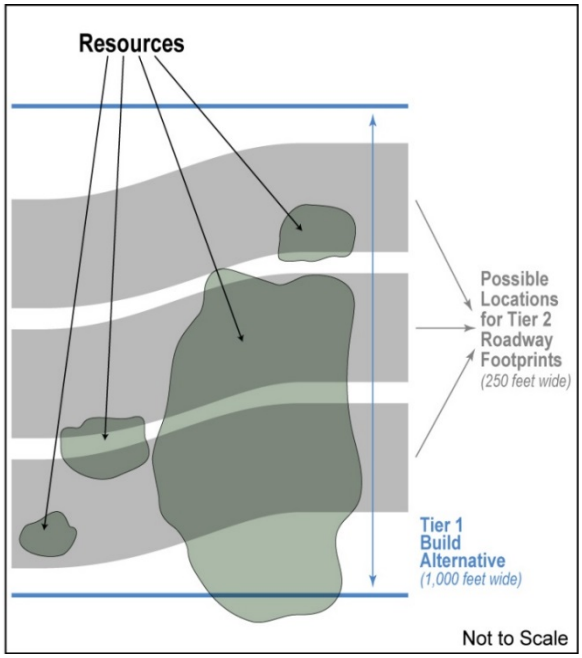


Figure 4-2. Overestimation of Effects to Resources by the Build Alternative

Because the roadway footprint will not be determined until Tier 2 studies, it was not feasible to identify which specific resources would be affected by the Build Alternatives. This analysis, therefore, considered every resource that could possibly be affected during Tier 2 studies as a resource affected by the Build Alternatives. This resulted in an intentional overestimation of effects to some resources, as shown in Figure 4-2. In the figure, each of the three possible locations for the Tier 2 roadway footprint affects a different number of resources (and a different group of resources). For the purposes of this analysis, all of the resources shown would be considered affected by the alternative, even though the footprint chosen in Tier 2 studies may not affect any or all of them. The phrase “up to” has been used to indicate that any number of resources (up to and including the number listed) may be affected by the alternative during Tier 2 studies. Any estimated acreage numbers included in this Tier 1 EIS represent a maximum, worst-case scenario and will be reduced or avoided during Tier 2 studies.

Generally, effects to resources were identified in one of the following ways:

- **Within the 1,000-foot-wide Tier 1 Build Alternatives.** This method counted every resource located (in whole or in part) within the alternative as affected. Examples of resources evaluated with this method include public lands and conservation easements.
- **Within the 1,000-foot-wide Tier 1 Build Alternatives, plus a buffer area.** This method was used to account for effects by the alternative that may occur beyond its footprint. It considered every resource located (in whole or in part) within the alternative—and within a buffer around the alternative—as affected. The width of the buffer varied by resource. Examples of resources evaluated with this method include traffic noise and hazardous materials sites.
- **Effect ratio.** This method was used for land area evaluations. The total acreage of the resource affected by the 1,000-foot-wide Tier1 Build Alternatives was multiplied by an *effect ratio* that the

future (Tier 2) construction footprint would represent. For most sections of the Build Alternatives, this ratio was 0.25, which represents one-quarter (or 250 feet) of this total 1,000-foot width. This type of evaluation provided a more accurate estimate of land area that would be affected by the alternative. Examples of resources evaluated with this method include agricultural land, wildlife habitat, and wetland/riparian resources.

While this Tier 1 analysis could not determine which specific resources would be affected, it has identified whether the resources could be avoided during Tier 2 studies, as shown in Figure 4-3. A resource that crosses through the entire Build Alternatives could not be avoided no matter where the roadway footprint is located; however, the alternative only partially crosses some resources. These resources could be avoided by the roadway footprint. To indicate whether the resource, or group of resources, could be avoided by the Tier 2 roadway footprint, the following phrases have been used throughout this chapter:

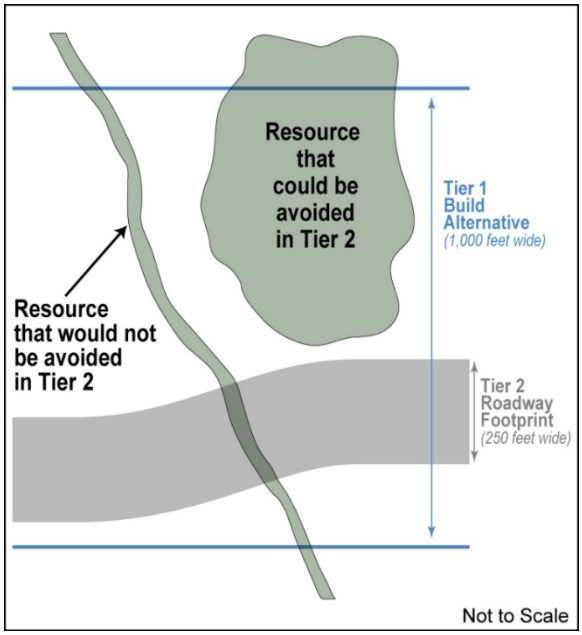


Figure 4-3. Resources that Could and Could Not be Avoided by a Build Alternative

- "Could affect" is used to describe a resource, or group of resources, that could be avoided during Tier 2 studies.
- "Would affect" is used to describe a resource, or group of resources, that could not be avoided during Tier 2 studies. This phrase also is used to describe a group of resources of which at least one could not be avoided (other resources within that group may be avoidable).

It is important to restate that these phrases describe the potential of the roadway footprint to avoid a resource. It does not mean that the footprint ultimately chosen during Tier 2 studies would avoid that resource.

For each resource, or group of resources, the following sections outline the affected environment, environmental consequences, and mitigation strategies. A total of 18 resources, or groups of resources,

were evaluated for the U.S. 50 Tier 1 EIS. Because some of these resources are interconnected, they have been combined into four categories based on those connections:

- Rural and Agricultural Environment—agricultural resources
- Natural Environment—wetland and riparian resources, wildlife and habitat, water resources, and geologic and paleontological resources
- Community and Built Environment—historic resources, archaeological resources, land use, parklands and recreational resources, social and economic conditions, environmental justice, aesthetics and visual resources, air quality issues, and traffic noise
- Other—transportation, hazardous materials, Section 4(f) resources, Section 6(f) resources, energy, global climate change, cumulative impacts, irreversible and irretrievable commitment of resources, and short-term uses versus long-term productivity

4.1 RURAL AND AGRICULTURAL ENVIRONMENT

This section discusses resources associated with the rural and agricultural environment in the U.S. 50 project area. The project area for the U.S. 50 Tier 1 EIS has been defined as approximately one to four miles wide surrounding the existing U.S. 50 facility (see Figure 4-4).

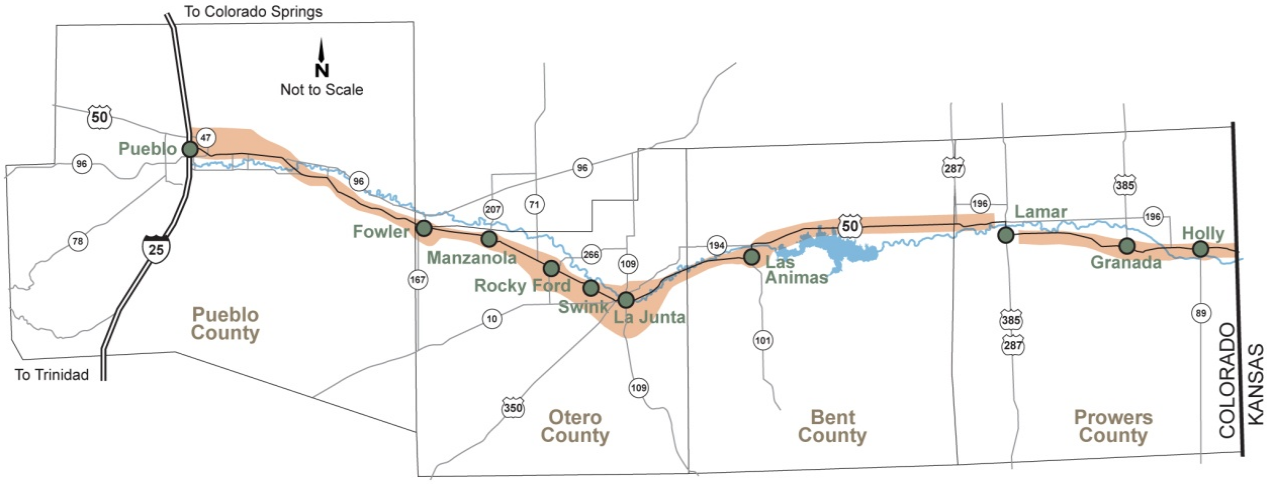


Figure 4-4. U.S. 50 Tier 1 EIS Project Area

Agricultural resources have been defined as land, infrastructure, and facilities related to the agricultural industry in the Lower Arkansas Valley. These items include:

- Prime and unique farmland and farmland of statewide importance
- Farmland and ranch lands
- Feedlots
- Irrigation canals and ditches
- Permanent roadside produce markets
- Agricultural product storage facilities
- Livestock sales facilities

Additional information about these topics can be found in the Agricultural Resources Technical Memorandum, which is located in Appendix A.

The term “project counties” refers to the counties located partially within the U.S. 50 project area. These counties include Pueblo, Otero, Bent, and Prowers counties.

Results of the Analysis

The Build Alternatives would affect slightly more than 2 percent of the agricultural land (farmland and ranch lands) in the project area, and 0.1 percent of the agricultural land in the project counties (Pueblo, Otero, Bent, and Prowers counties). In addition, along its 150-mile length, it has the potential to affect up to four feedlots, up to six permanent roadside produce markets, and 24 irrigation canals and ditches. None of the potentially affected feedlots would be affected in a manner that would prevent their continued operation. Water flows in the affected irrigation canals and ditches would be maintained. Due to the large amount of agricultural activity that takes place along U.S. 50 in the Lower Arkansas Valley, these effects are unlikely to have a dramatic impact on agricultural production in the area.

4.1.1 Affected Environment

The Lower Arkansas Valley has a long history of farming and ranching that dates back to the 1860s. Agriculture has been the economic foundation of the region for more than a century.

The most productive farming was—and continues to be—made possible by irrigation water from the Arkansas River watershed and the fertile soil that exists in the Lower Arkansas Valley. According to Census of Agriculture data, the total number of acres used for farming and ranching in the project counties peaked at nearly four million in 1950 (Historical Census Browser 2007a).

Since 1982, farming activities along the Arkansas River have decreased due to urban demand for water, pressure from communities downstream (i.e., the state of Kansas), and shifting of water supplies to electric generation (*Pueblo Chieftain* 2007). Even with this decline, agricultural activities remain the economic foundation of the region. In 2007, nearly 3.5 million acres of land in the project counties were used for farming and ranching (Agricultural Census 2007b). This agricultural land produced more than $500 million in agricultural goods during that year, which represented approximately 8 percent of the value of all agricultural products produced in the state of Colorado (Agriculture Census 2007a). Some of this agricultural land also was used to graze cattle and facilitated the sale of approximately 323,000 cattle and calves in 2007. This figure represented roughly 10 percent of all the cattle and calves sold in the state of Colorado (Agricultural Census 2007a).

Major crops grown in the Lower Arkansas Valley include corn for grain, corn for silage (i.e., feed for livestock), dry edible beans, forage, sorghum for silage, vegetables, and wheat for grain. While the majority of the crops listed above are grown in all four project counties, individual counties stand out as major growers of particular crops. In fact, each of the project counties produces at least one crop that

ranks it within the top 10 statewide for the number of acres in production (Agricultural Census 2007b). Agricultural activities in the Lower Arkansas Valley have played and continue to play an important role in both the local and statewide economies.

Employment data also illustrates the importance of agricultural activities to the economic life of the Lower Arkansas Valley. In 2011, the agricultural sector provided 8 percent of all jobs in Otero County, 26 percent in Bent County, and 11 percent in Prowers County. In Bent County, the agricultural sector is the second largest employer behind government. While Pueblo County is less dependent on its agricultural industries for employment opportunities (agriculture only provided 1 percent of all jobs in 2011), the other three project counties still rely heavily on agricultural activities for a substantial portion of their employment opportunities (CEDIS 2011). Impacts to the economy and employment are discussed in Section 4.3.6, Social and Economic Conditions.

Not all of the agricultural resources of the Lower Arkansas Valley are the same. The primary resources of the area include prime and unique farmland, farmland and ranch land, feedlots, irrigation canals and ditches, permanent roadside produce markets, agricultural product storage facilities, and livestock sales facilities.

Prime and Unique Farmland

Key farmlands are defined as part of the Farmland Protection Policy Act (FPPA, 7 CFR 658). The purpose of the FPPA is to minimize the extent to which federal programs contribute to the unnecessary and irreversible conversion of farmland to nonagricultural uses. As part of the NEPA process, agencies are required to identify prime and unique farmland that could be impacted by federally funded transportation projects. The Natural Resources Conservation Service (NRCS) identifies important farmlands in each county based on national regulations and state guidance.

The FPPA defines four types of important farmlands: prime farmland, unique farmland, farmland of statewide importance, and farmland of local importance.

1. **Prime farmland** is land that has the combination of physical and chemical characteristics for production of food, feed, and other agricultural crops.
2. **Unique farmland** is land other than prime farmland that is used for production of specific high-value agricultural products.
3. **Farmland of statewide importance** is land that has been identified by the Colorado State Experiment Station, the Colorado State Department of Agriculture, and the Colorado State Soil Conservation Board.

4. **Farmland of local importance** is land identified by a local agency or agencies as important to the local community, but it does not qualify as prime, unique, or of statewide importance.

Within the project counties, prime farmland and farmland of statewide importance make up more than 53 percent of the total land area (2.3 million acres) and 61 percent of the land within the project area (118,569 acres) (NRCS 2005). All prime farmland within the project area is classified as prime under certain circumstances, such as "prime if irrigated" or with favorable climate conditions or limited flooding events. Prowers County is the only county that contains farmland of statewide importance and—as shown in Table 4-1—is the county with the largest total acres of prime farmland and farmland of statewide importance of all the project counties. There are no farmlands classified as unique or of local importance in the four counties.

Table 4-1. Prime Farmland and Farmland of Statewide Importance

County	Prime Farmland (Acres)	Farmland of Statewide Importance (Acres)	Total (Acres)
Pueblo	705,357	—	705,357
Bent	444,525	—	444,525
Otero	371,707	—	371,707
Prowers	675,030	146,296	821,326
Total	**2,196,619**	**146,296**	**2,342,915**

Source: NRCS 2005

Because the analysis of prime farmland and farmland of statewide importance is based on soil and climate characteristics, it may include quantification of land that is not currently utilized for the production of agricultural goods. An analysis of farmland and ranchland productivity in the next section addresses recent farming activities.

Figure 4-5. Farmland—Prowers County

Farmland and Ranch Land

While both farms and ranches are agricultural in nature, these lands are used for different purposes. Farmland is land used for crop production (see Figure 4-5). Because farming activities depend heavily on water supplies, crop production in the project area tends to be located close to the Arkansas River or one of the irrigation canals associated with it. Like other businesses, farms also provide employment for producers of the products

needed to plant, maintain, and harvest crops. Farmers make annual purchases of items such as seeds and fertilizer, and make capital investments in farm equipment or irrigation systems. Local businesses that provide these items depend on the continued operation of farms to support their business activities. Because of this interdependency, removing farmland from production does not simply affect the land, but it also affects the people and other businesses that derive their livelihoods from it.

Figure 4-6. Ranch Land—Bent County

Ranch land is native pasture used for ranching and grazing activities (see Figure 4-6). These lands support livestock that feeds off the grasses growing on the land. Ranching and grazing activities in arid southeastern Colorado require large amounts of land because sparse native pastures in the area are unable to sustain a large number of livestock per acre. Unlike farming, where most of the investment is concentrated on a particular piece of land, much of a rancher's investment is in the livestock. Removing ranch lands from production could affect certain ranchers' ability to operate their businesses, depending on how many acres of land are removed.

The project area has approximately 83,000 acres of active farmland and 92,000 acres of active ranch lands. Of the farmland used for crop production within the project area, a majority of this land is farmed for corn and alfalfa, most of which is used for feeding livestock.

Feedlots

Feedlots, also known as Concentrated Animal Feeding Operations (CAFO), are commercial operations where livestock are kept in pens and prepared for market. These facilities serve as places of employment, as consumers of crops used for livestock feed, and as producers of agricultural revenue; therefore, they play an important role in the agricultural economy of the Lower Arkansas Valley. CAFOs are regulated by the state and must obtain permits for animal waste storage and disposal. Of the eight feedlots located in the project area, five are located in Otero County, one is located in Bent County, and two are located in Prowers County.

Irrigation Canals and Ditches

Water from the Arkansas River—and the irrigation canals that distribute water—facilitated the development and growth of the agricultural industry in the Lower Arkansas Valley. In the late 1800s, an

extensive system of irrigation canals and ditches was excavated to allow water from the river to reach nearby land, which increased fertility and made farming possible in these areas. This system of irrigation canals and ditches is still in use today. Because of their value, it is important to identify possible effects to canals and ditches because there may be resulting residual effects on the farmland drawing water from these features.

Permanent Roadside Produce Markets

Some farmers use roadside produce markets to sell their products, specifically vegetables and fruits, directly to consumers. These markets are important businesses in the Lower Arkansas Valley for more than just the money they add to the local economy. Many communities along U.S. 50 have expressed their desire to use roadside produce markets as a way to attract tourists to the region. This analysis identified nine permanent roadside produce markets in the U.S. 50 project area. In addition to these permanent markets, seasonal markets also operate along U.S. 50 in the Lower Arkansas Valley on a temporary basis. Because it is impossible to know which of these seasonal markets will open during any given season, or where they may be located, they were not included in this analysis.

Agricultural Product Storage Facilities

Some crops—mainly vegetables and fruits—must be sold immediately after being harvested. However, there are other crops that can be stored for a time before being sold, such as corn and hay. For these crops, agricultural product storage facilities, such as grain elevators, are an important part of the farm-to-market process. This analysis identified six facilities within the U.S. 50 project area.

Livestock Sales Facilities

Figure 4-7. Winter Livestock, Inc.—La Junta

Livestock sales facilities play a key role in getting livestock from ranches and pastures to consumers. The nature of this agricultural business is selling of livestock to other ranchers or businesses. The Colorado Department of Agriculture's Brand Board is responsible for inspecting livestock sales facilities, and they report that the Lower Arkansas Valley is home to three of them (State Board of Stock Inspection Commissioners 2009). One of these facilities, Winter Livestock, Inc., was established in 1936 and is one of the oldest cattle auctions in the nation (see Figure 4-7). In addition

to contributing to the economy as a substantial business entity, its presence also is an important part of the history of La Junta and of the Lower Arkansas Valley.

4.1.2 Environmental Consequences

Effects to agricultural resources were evaluated based on the type of effect that the Build Alternatives could have on agricultural activity. The method used for evaluating effects to each type of agricultural resource evaluated is discussed below.

Evaluation Methods

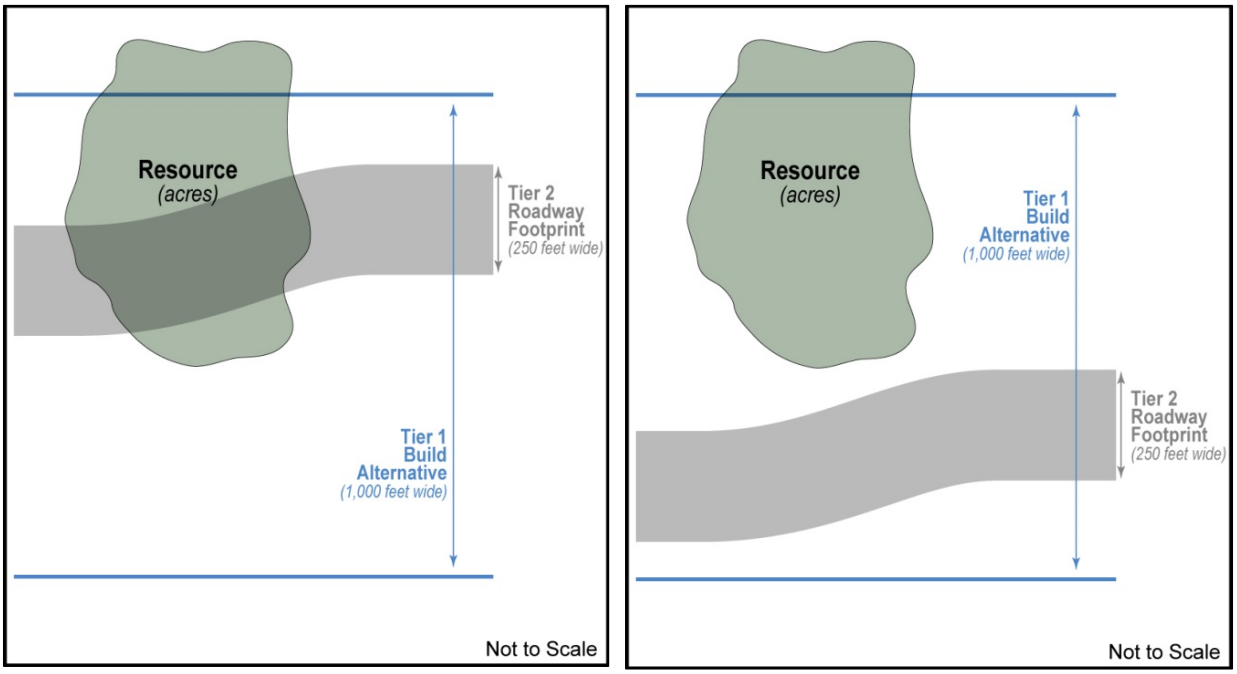
Prime Farmland and Farmland of Statewide Importance

Prime farmland and farmland of statewide importance were identified using spatial data from the NRCS National Cooperative Soil Survey (2005). Impacts to prime farmland are the total acres of prime farmland within the Build Alternatives, rounded to the nearest acre. All farmland identified as having any potential to be prime farmland, depending on irrigation and other land management practices, was considered prime.

Prime farmland area calculations for the Build Alternatives were multiplied by a conversion factor to better estimate impacts of a 250-foot-wide highway footprint. The conversion factor was necessary because the purpose of this document is to determine the location of a 1,000-foot-wide alternative within which a 250-foot-wide (maximum) roadway footprint would be identified during Tier 2 studies. The conversion factor, generally 0.25, reflects that only one-quarter of the alternative width would be needed for highway right of way. This conversion provides a more realistic value for expected effects from the Build Alternatives. Figure 4-8 shows examples where the roadway passes through a resource, such as a farm or ranch, and one where the roadway avoids it.

Farmland and Ranch Land

Effects to farms and ranches were evaluated based on the number of acres of farmland and ranch lands affected and the loss in productive value of those acres. These areas were identified by placing all of the non-urbanized land in the project area into one of two categories: (1) farmland, and (2) ranch land. Since the value of crops can vary widely, the farmland category was further divided into: (1) land used for vegetable production, and (2) land used to produce other crops, such as alfalfa or corn. Farmland and ranch lands were identified by photo interpretation conducted by an agricultural expert, not on a field-by-field analysis. Some factors were not considered by this analysis, including water rights, crop rotation activities, management practices, and new technologies, among others.



Roadway Passing Through a Resource **Roadway Avoiding a Resource**

Figure 4-8. Examples of Effects to Agricultural Resources

The following caveats apply to this effort:

- Land was placed in the categories based on the historic agricultural use of the land using the best available information known in 2008.
- Land was placed in the highest category possible (i.e., more productive). Land that was borderline between two categories was placed in the higher category. The primary use of the land determined the category to which it was assigned. For the purpose of this document, from highest to lowest, this is (1) farmland—vegetables, (2) farmland—alfalfa/corn, and (3) ranch land.

Similarly to the evaluation method used for prime farmland, the total number of acres affected by each 1,000-foot Build Alternative was multiplied by a conversion factor to provide a more realistic value for the expected effects of a Build Alternative.

The productive value of farmland and ranch lands was calculated by estimating the potential profit that could be generated from one season of farming or one year of grazing. Profitability was estimated differently for farmland and ranch lands due to the way each type of land is used.

The profitability of farmland (vegetables and corn/alfalfa) was estimated based on the income and expenses associated with the production of certain crops grown in the Lower Arkansas Valley in 2007. This information revealed that in one growing season the average profitability from one acre of farmland was roughly $4,500 if it was used to grow vegetables and approximately $400 if it was used to grow alfalfa/corn (Tranel 2008b).

The difference between these amounts represents the higher direct costs and net profits associated with vegetable production over those associated with alfalfa/corn production. These estimates are intended to show the relative loss in productive value that would occur when farmland is affected by the alternatives. They do not represent actual profits generated by individual farms in the Lower Arkansas Valley. Information about local data used to derive estimates for agricultural productivity is provided in the Agricultural Resources Technical Memorandum, which is located in Appendix A.

The profitability of ranch lands was estimated based on the amount of money an owner of one acre of ranch land in southeastern Colorado could earn from grazing livestock on it. The estimate involved identifying how much livestock could be grazed on one acre of ranch land and how much money a rancher could earn from that activity in one year. The number of acres required to graze one unit of livestock (one cow-calf pair) depends on many factors, including the type of animal, what months the grazing takes place, and pasture conditions. This analysis did not identify these factors for each ranching operation in the 150-mile U.S. 50 project area. Instead, several estimates for ranching operations in the Lower Arkansas Valley were averaged. This process resulted in a determination that 45 acres of ranch land is needed to graze one cow-calf pair in southeastern Colorado per year (Baker 2009; Fankhauser 2009; Stulp Farms 2009). This figure assumes that the animals are grazed for 12 months and supplemental feed may be necessary during the winter months.

The next step was to determine how much money a rancher could earn from grazing one cow-calf pair on 45 acres of ranch land. The most common charge for grazing in 2007 ranged from $18.00 to $25.50 per cow-calf pair per month, depending on the type of land (Tranel 2008b). Assuming the greatest charge ($25.50), a rancher could expect to earn approximately $306 per cow-calf pair in one year. Because that cow-calf pair would require 45 acres of ranch land, this translates into $306 per year for every 45 acres of ranch land, or approximately $7 per acre per year ($306 divided by 45 acres). Similar to the profitability estimates discussed previously, this figure does not represent actual profits generated by individual ranches in the Lower Arkansas Valley. They are estimates based on available information at a Tier 1 (corridor-wide) level of analysis.

This method also makes the assumption that most cattle production operators are not landowners. Calculating the loss in land productivity based on loss in beef sales revenue, as opposed to the loss in leasing value, would result in higher negative impacts (more than twice the value per acre), yet this difference is negligible when compared to impacts to vegetable production and alfalfa/corn farms. The determination of relative impacts to land is overwhelmingly influenced by the higher quality farmland within the study area.

Feedlots

Feedlots were considered potentially affected if any part of the property was located within the Build Alternatives. Feedlots require a substantial amount of infrastructure investment; therefore, effects to them not only include the value of the land, but also the value of this infrastructure. This analysis did not identify the specific value of the infrastructure held by feedlot owners in the project area because these figures require facility-specific information about capital expenses. Access to U.S. 50 also is an issue for feedlots. They depend on regional roadways to get their livestock to market; therefore, it is important for these facilities to maintain some type of connection between their property and the regional roadway network. This access also must accommodate large vehicles that haul feed and are used to transport livestock.

Irrigation Canals and Ditches

Irrigation canals and ditches were considered potentially affected if any part of the canal or ditch was located within the Build Alternatives. In the Lower Arkansas Valley, farmers primarily use the water to irrigate their fields. The fact that U.S. 50 would cross a canal or ditch does not necessarily result in adverse effects to it. U.S. 50 crosses many canals and ditches today with no adverse effect to water flows. Canals and ditches would only be adversely affected if their water flows were altered to prevent the water from reaching the receiving fields. During Tier 2 studies, improvements to U.S. 50 would be designed to avoid or minimize adverse effects to water flows. Additionally, roadways used to monitor and maintain canals and ditches would be preserved or replaced so that these operations could continue.

Permanent Roadside Produce Markets

Permanent roadside produce markets were considered potentially affected if any part of the market (including associated parking areas) was located within the Build Alternatives. Access to U.S. 50 also is an important issue for these markets. Roadside produce markets depend heavily on passing travelers for their customer base, so it is essential that drivers are able to see the markets from the road and access them at the time they are spotted. Because this document recommends that access to U.S. 50 be more limited than it is today, it is likely that the Build Alternatives would result in changes in access for some

of these markets. Additionally, markets currently located within U.S. 50 communities may be affected by a reduction in pass-by traffic after the new alignment of U.S. 50 (either north or south of town) is constructed. Indirect effects of new alignments and changes to access for roadside markets could include a reduction in produce sales.

Agricultural Product Storage Facilities

Agricultural product storage facilities, such as the one shown in Figure 4-9, were considered potentially affected if any part of the storage facility was located within the Build Alternatives. Since this document recommends that access to U.S. 50 become more limited than it is today, it is likely that the Build Alternatives would result in changes in access for some of these facilities.

Figure 4-9. Agricultural Product Storage Facility—Rocky Ford

Livestock Sales Facilities

Livestock sales facilities were considered potentially affected if any part of the property was located within the Build Alternatives. Access to U.S. 50 also is an issue for these facilities. They operate on a regional, not local, scale, so it is important for these facilities to maintain some type of connection to the regional roadway network. This connection also must accommodate large trucks used to transport livestock.

Summary of Effects

The following section summarizes potential effects to agricultural resources by the No-Build Alternative and the Build Alternatives.

No-Build Alternative

Under the No-Build Alternative, only minor and isolated construction would occur on U.S. 50. Routine maintenance and repairs would be made as necessary to keep U.S. 50 in usable condition, including standard overlays and repairs of weather- or crash-related damage. Additionally, smaller scale improvements may be undertaken, such as short passing lanes and other minor safety improvements.

Because routine maintenance and repairs are conducted on the existing highway, they would not cause permanent effects to agricultural resources. Smaller scale improvements may require acquisition of farmland or ranch land currently being used for agricultural activities. Those acquisitions would occur directly adjacent to the existing highway and are expected to be minimal.

Build Alternatives

The Build Alternatives could impact from 2,866 acres to 3,047 acres of prime farmland and farmland of statewide importance (NRCS 2005). This is between 0.12 percent and 0.13 percent of the total prime farmland and farmland of statewide importance within the project counties. Build Alternatives through Prowers County are the only alternatives that potentially impact farmland of statewide importance. Otero County has the most prime farmland potentially impacted by the Build Alternatives.

Approximately 90 percent of the land within the U.S. 50 project area (approximately 175,000 acres) has been identified by this analysis as productive farmland or ranch lands (Tranel 2008a; see Figure 4-10). Of the total area used for agricultural production, the Build Alternatives would affect between 3,600 acres and 4,588 acres of farmland and ranch lands, depending on which alternatives are selected. These areas represent slightly more than 2 percent of the agricultural land in the project area and 0.1 percent of the agricultural land in the project counties. It is unlikely that this loss of agricultural land would have a substantial effect on overall agricultural production in the Lower Arkansas Valley.

Figure 4-10. Ranch Land—Bent County

The farmland and ranch lands affected by the Build Alternatives include those used for vegetable production, alfalfa/corn production, and ranching/grazing activities. While only 279 acres to 403 acres of vegetable production would be affected, these areas are considered highly productive. The resulting loss in productive value ranges from $1.2 million to $1.8 million. Most of these vegetable production acres are located in Otero County, near the town of Rocky Ford; however, a small number are located in Prowers County, near to the town of Granada. In addition, acres of vegetable production located near Swink have been identified as some of the highest-quality farmland in the state of Colorado and are rivaled in quality by only a few small pockets of land in the Midwestern United States (Tranel 2008a).

The Build Alternatives also could result in the loss of between 1,531 acres and 1,805 acres of alfalfa/corn production and between 1,790 acres and 2,380 acres of ranch lands throughout the project area. The resulting loss in productive value ranges from $625,000 to $739,000. Although the alternatives could affect a combined total of roughly 4,200 acres of alfalfa/corn and ranch lands, the combined loss in productive value that would result is still less than half of the loss that would result from effects to the vegetable production.

The Build Alternatives have the potential to affect up to four feedlots. These facilities are located at the following locations:

- Rocky Ford Feed Yard, northwest of Rocky Ford at U.S. 50 and CR 16
- United Feeders, southeast of Rocky Ford at CR 20.5 and CR Dd
- Ribeye Feeders, north of Rocky Ford on CR 19
- JBS Five Rivers Cattle Feeding, west of Lamar on the south side of U.S. 50 near the junction of U.S. 50 and U.S. 287

None of these feedlots are located entirely within the Build Alternatives. Efforts will be made during Tier 2 studies to avoid them.

The Build Alternatives have the potential to affect up to 24 irrigation canals and ditches by crossing them (see Figure 4-11 for an example of canals along the corridor). These crossings would occur throughout the alternative and some of the canals and ditches would be crossed more than once. While there may be new crossings of these canals and ditches, or improvements to existing crossings, their water flows would be maintained after construction of the Build Alternatives. Therefore, the effects would not be considered adverse. Additionally, roadways used to monitor and maintain the ditches and canals would be preserved or replaced so that irrigation functions could continue.

Figure 4-11. Catlin Canal—Otero County

The following canals and ditches could be affected by the Build Alternatives:

- Amity Canal
- Buffalo Canal
- Catlin Canal
- Consolidated Ditch
- Excelsior Ditch
- Fort Lyon Canal
- Granada Ditch
- Holly Ditch
- Jones Ditch
- Lamar Canal
- Las Animas Town Ditch
- Lubers Drainage Ditch
- Main Leach Canal
- Manvel Canal
- McClave Drainage Ditch
- Miller Ditch
- Otero Canal
- Oxford Farmers Ditch
- Riverview Ditch
- Rocky Ford Canal
- Rock Ford Highline Canal
- Sunflower Ditch
- Vista Del Rio Ditch
- X-Y Canal

Historic irrigation canals and ditches are discussed by section of the U.S. 50 corridor in Section 4.3.1, Historic Resources, of this chapter.

The Build Alternatives have the potential to directly or indirectly affect up to six of the following permanent roadside produce markets by taking all or a portion of the property:

- **Mills Brothers Farm Market**—located on U.S. 50 west of Rocky Ford
- **O'Neal Produce (Arkansas Valley Produce)**—located on U.S. 50 west of Rocky Ford
- **Knapp's Farm Market**—located on SH 71 west of Rocky Ford
- **Sackett Farm Market**—located on U.S. 50 between Rocky Ford and Swink
- **Mary's Farm Market (Hanagan Farms)**—located on U.S. 50 just west of Swink (see Figure 4-12)
- **Lusk Farms (Grasmick's Produce)**—located on U.S. 50 just east of Swink

Figure 4-12. Mary's Farm Market—Swink

Efforts will be made to avoid direct effects to these markets during Tier 2 studies. The Build Alternatives also have the potential to indirectly affect access for some of these markets. Potential changes in access also will be evaluated during Tier 2 studies.

Finally, the Build Alternatives would not directly affect any of the agricultural product storage facilities or livestock sales facilities identified in the U.S. 50 project area.

Build Alternatives Effects by Location

The following section describes the agricultural resources that may be affected by the Build Alternatives by section (i.e., location) and alternative. Table 4-2 summarizes potential effects to agricultural lands and productive value. Table 4-3 summarizes potential effects to agricultural facilities. Only sections where potential impacts were identified are listed.

Table 4-2. Summary of Potentially Affected Agricultural Lands and Productive Value by Section for the Build Alternatives

Section	Build Alternatives (if more than one)	Acres					Productive Value			
		Prime and Unique Farmland[c]	Vegetable (farmland)	Alfalfa/Corn (farmland)	Ranch Lands	Total	Vegetable ($4,500[9])	Alfalfa/Corn ($400[9])	Ranching/Grazing ($7)	Estimated Value of Farmland and Ranch Land Production (2007 dollars)
Section 1: Pueblo	Alternative 1: Pueblo Airport North	41	0	2	350	352	$0	$755	$2,454	$3,208
	Alternative 2: Pueblo Existing Alignment	12	0	1	130	131	$0	$300	$909	$1,209
	Alternative 3: Pueblo SH 47 Connection	12	0	0	103	103	$0	$75	$721	$796
Section 2: Pueblo to Fowler	Alternative 1: Fort Reynolds Existing Alignment	361	0	86	533	619	$0	$34,412	$3,733	$38,145
	Alternative 2: Fort Reynolds Realignment	377	0	117	499	616	$0	$46,855	$3,490	$50,345
Section 3: Fowler	Alternative 1: Fowler North	76	0	51	38	89	$200	$20,569	$268	$21,037
	Alternative 2: Fowler South	146	0	144	2	146	$0	$57,760	$15	$57,775
Section 4: Fowler to Manzanola	—	170	3	171	12	186	$13,937	$68,412	$82	$82,432
Section 5: Manzanola	Alternative 1: Manzanola North	78	0	56	22	78	$0	$22,242	$152	$22,395
	Alternative 2: Manzanola South	79	14	58	5	77	$62,186	$23,294	$33	$85,512

Table 4-2. Summary of Potentially Affected Agricultural Lands and Productive Value by Section for the Build Alternative (continued)

Section	Build Alternatives (if more than one)	Acres					Productive Value			
		Prime and Unique Farmland[c]	Vegetable (farmland)	Alfalfa/Corn (farmland)	Ranch Lands	Total	Vegetable ($4,500[g])	Alfalfa/Corn ($400[g])	Ranching/Grazing ($7)	Estimated Value of Farmland and Ranch Land Production (2007 dollars)
Section 6: Manzanola to Rocky Ford	—	163	49	105	10	164	$220,363	$41,917	$69	$262,348
Section 7: Rocky Ford	Alternative 1: Rocky Ford North	223	170	0	66	236	$764,431	$0	$463	$764,894
	Alternative 2: Rocky Ford South	219	164	59	25	248	$738,050	$23,635	$173	$761,857
Section 8: Rocky Ford to Swink	—	24	25	3	3	31	$111,223	$1,087	$23	$112,333
Section 9: Swink	Alternative 1: Swink North	39	23	12	26	61	$102,193	$4,786	$184	$107,164
	Alternative 2: Swink South	71	74	0	2	76	$333,195	$0	$15	$333,210
Section 10: La Junta	Alternative 1: La Junta North	61	7	16	239	262	$29,925	$6,599	$1,672	$38,196
	Alternative 2: La Junta South	91	39	3	211	253	$175,236	$1,181	$1,480	$177,896
	Alternative 3: La Junta South	89	48	0	246	294	$213,977	$104	$1,722	$215,803
	Alternative 4: La Junta South	79	48	17	294	359	$214,170	$6,625	$2,055	$222,850
Section 11: La Junta to Las Animas	—	230	0	46	281	327	$0	$18,486	$1,970	$20,456

Table 4-2. Summary of Potentially Affected Agricultural Lands and Productive Value by Section for the Build Alternative (continued)

Section	Build Alternatives (if more than one)	Acres					Productive Value			
		Prime and Unique Farmland[c]	Vegetable (farmland)	Alfalfa/Corn (farmland)	Ranch Lands	Total	Vegetable ($4,500[g])	Alfalfa/Corn ($400[g])	Ranching/Grazing ($7)	Estimated Value of Farmland and Ranch Land Production (2007 dollars)
Section 12: Las Animas	Alternative 1: Las Animas North	70	0	33	68	101	$0	$13,142	$475	$13,617
	Alternative 2: Las Animas South	122	0	36	105	141	$0	$14,249	$734	$14,983
Section 13: Las Animas to Lamar[a]	—	690	0	488	245	733	$0	$195,118	$1,717	$196,835
Section 14: Lamar to Granada[a]	—	280	6	279	138	423	$25,494	$111,705	$963	$138,161
Section 15: Granada	Alternative 1: Granada North	63	3	45	0	48	$14,999	$18,144	$1	$33,145
	Alternative 2: Granada South	18	15	0	47	62	$66,993	$192	$327	$67,513
Section 16: Granada to Holly	—	208	0	148	100	248	$0	$59,337	$701	$60,037
Section 17: Holly	Alternative 1: Holly North	50	0	31	20	51	$0	$12,357	$139	$12,496
	Alternative 2: Holly South	58	0	20	43	63	$0	$7,953	$302	$8,256

Table 4-2. Summary of Potentially Affected Agricultural Lands and Productive Value by Section for the Build Alternative (continued)

Section	Build Alternatives (if more than one)	Acres					Productive Value			
		Prime and Unique Farmland[c]	Vegetable (farmland)	Alfalfa/Corn (farmland)	Ranch Lands	Total	Vegetable ($4,500[9])	Alfalfa/Corn ($400[9])	Ranching/Grazing ($7)	Estimated Value of Farmland and Ranch Land Production (2007 dollars)
Section 18: Holly Transition	—	71	0	44	66	110	$0	$17,392	$465	$17,857
Total[b]		**2,866 to 3,047**	**279 to 403**	**1,531 to 1,805**	**1,790 to 2,380**	**3,600 to 4,588**				**$1.9 million to $2.6 million**

[a] No Build Alternatives are proposed in Lamar, as discussed in Chapter 3, Alternatives Considered.
[b] The total range does not necessary summarize the same alternatives, but is simply the least and greatest impact by farmland type.
[c] Source: NRCS 2005

Table 4-3. Summary of Potentially Affected Agricultural Facilities by Section for the Build Alternatives

Section	Build Alternatives (if more than one)	Feedlots[a]	Permanent Roadside Produce Markets[b]	Irrigation Canals and Ditches (crossing count)
Section 1: Pueblo	Alternative 1: Pueblo Airport North	0	0	Excelsior Ditch (0)
	Alternative 2: Pueblo Existing Alignment	0	0	—
	Alternative 3: Pueblo SH 47 Connection	0	0	—
Section 2: Pueblo to Fowler	Alternative 1: Fort Reynolds Existing Alignment	0	0	Excelsior Ditch (0), Oxford Farmers Ditch (1), Rocky Ford Highline Canal (1)
	Alternative 2: Fort Reynolds Realignment	0	0	Excelsior Ditch (0), Oxford Farmers Ditch (1), Rocky Ford Highline Canal (1)
Section 6: Manzanola to Rocky Ford	—	0	Mills Brothers Farm Market and O'Neal Produce (Arkansas Valley Produce)	—
Section 7: Rocky Ford	Alternative 1: Rocky Ford North	Ribeye Feeders	Sackett Farm Market and Knapp's Farm Market (parking lot)	—
	Alternative 2: Rocky Ford South	United Feeders, and Rocky Ford Feedyard	2	—
Section 8: Rocky Ford to Swink	—	United Feeders	0	—
Section 9: Swink	Alternative 1: Swink North	0	Mary's Farm Market (Hanagan Farms)	—
	Alternative 2: Swink South	0	Lusk Farms (Grasmick's Produce)	—
Section 13: Las Animas to Lamar[a]	—	JBS Five Rivers Cattle Feeding	0	—
Total[b]		**4**	**6**	**6**

[a] Source: EPA ECHO 2013
[b] Source: Tranel 2008b

4.1.3 Mitigation

Because the ultimate roadway footprint would be identified during Tier 2 studies, this Tier 1 analysis cannot identify which specific agricultural resources would be affected by the Build Alternatives. The following mitigation strategies have been developed, however, to ensure that negative effects to these resources are minimized during Tier 2 studies.

Mitigation Strategies

The following strategies have been identified for mitigating impacts to agricultural resources that exist within the project area. The strategies discussed are primarily common best management practices, or they refer to additional analysis performed as Tier 2 studies are developed.

Prime Farmland and Farmland of Statewide Importance

Best management practices for ground-disturbing activities and revegetation would be used to minimize effects on prime farmland for all of the alternatives:

- Construction limits would be clearly marked with stakes or fencing prior to beginning ground-disturbing activities. No disturbance would occur beyond these limits other than nondestructive protection measures for erosion/sediment control.
- Erosion-control measures would be employed, as appropriate.
- Topsoil would be removed and stockpiled separately from surface soils for reapplication following construction.
- Topsoil, soil amendments, fertilizers, and mulches would be reapplied selectively, as appropriate, prior to revegetation during favorable plant establishment climate conditions to match site conditions and revegetation goals.
- Long-term effects on prime farmland would be avoided to the extent feasible. If avoidance is not possible, the U.S. Bureau of Reclamation (USBR) would complete and submit a Farmland Conversion Form (AD-1006) to the NRCS in compliance with the FPPA for any long-term change in land use.

Farmland and Ranch Lands

Section lines and existing roads frequently serve as boundaries between areas of farmland and ranch lands. Effects to farmland and ranch lands would be minimized by routing Tier 2 highway alignments to follow section lines and existing roads, where possible.

If farmland cannot be avoided, Tier 2 highway alignments would be routed to minimize the number of uneconomical remainders, when possible. Uneconomical remainders are the portions of farmland rendered unusable (see Figure 4-13) for a number of reasons, such as:

- Small size
- Farmer's inability to get to them
- Farmer's inability to water them
- Farmer's inability to reasonably move equipment between them
- Farmer's inability to harvest due to accessibility

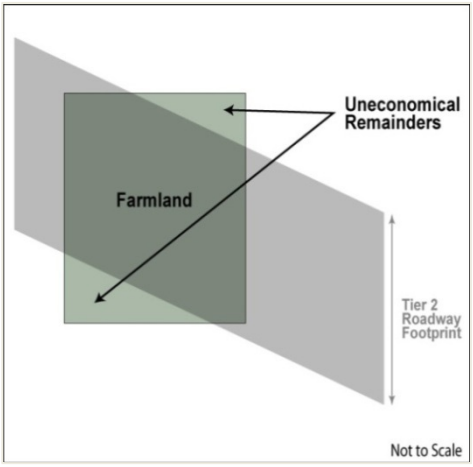


Figure 4-13. Uneconomical Remainder Example

When the route of the highway alignment causes uneconomical remainders, CDOT will purchase that land. All property acquisitions will comply fully with federal and state requirements, including the Uniform Relocation Assistance and Real Property Acquisition Policies Act of 1970 (Uniform Act), as amended.

Feedlots

To minimize effects to feedlots, Tier 2 highway alignments would be routed around the facilities, when feasible. When this is not possible, all reasonable methods would be employed to route alignments in a way that a feedlot could continue operations.

Irrigation Canals and Ditches

During Tier 2 studies, the Lower Arkansas Valley's extensive system of irrigation canals and ditches will be identified and effects to them will be analyzed. Tier 2 highway projects would be constructed in a manner that maintains the water flows of these systems. This does not mean that highway alignments would not cross them. In instances where the highway alignments would cross these systems, CDOT would ensure that mitigation measures maintain the functionality of these systems, including associated maintenance roads.

Permanent Roadside Produce Markets

To minimize effects to permanent roadside produce markets, Tier 2 highway alignments would be routed in a manner that avoids direct effects to them, where possible. In the event a market cannot be avoided, reasonable methods would be employed to ensure that owners are compensated. All acquisitions and

relocations (property acquisition) will comply fully with federal and state requirements, including the Uniform Act.

Other

Agricultural activities require the ability to move goods to market. Because U.S. 50 is the primary east-west route through the Lower Arkansas Valley, the highway is frequently used for this purpose. Construction activities would, when possible, be scheduled to minimize disruptions (including closures) to key portions of U.S. 50 that are heavily used for farm-to-market travel activities, especially during harvest times. These key portions include areas where co-ops and feedlots are located.

Avoidance Activities

Effects to some agricultural resources were avoided during the U.S. 50 Tier 1 EIS alternatives development process. By eliminating the through-town alternatives that were being considered during the alternatives development process, effects to in-town resources were avoided. This analysis determined that eliminating through-town alternatives avoided direct effects to three permanent roadside produce markets, two agricultural storage facilities, and three livestock sales facilities. Avoidance of through-town alternatives also resulted in the need to move U.S. 50 to around-town locations onto land that is predominantly agricultural.

The locations of alternatives around communities along the U.S. 50 corridor were determined in consultation with the affected communities during the previous U.S. 50 study (CDOT 2003a). This consultation included how to avoid unnecessary effects to agricultural resources. For example, many around-town alternatives were located far enough to the north or south to stay outside of existing irrigation systems.

4.2 NATURAL ENVIRONMENT

This section discusses the following various topics associated with the natural environment in the U.S. 50 project area:

- Wetland and riparian resources
- Wildlife and wildlife habitat
- Water quality
- Geology and paleontology

The project area for the U.S. 50 Tier 1 EIS has been defined as approximately one to four miles wide surrounding the existing U.S. 50 facility (see Figure 4-14).

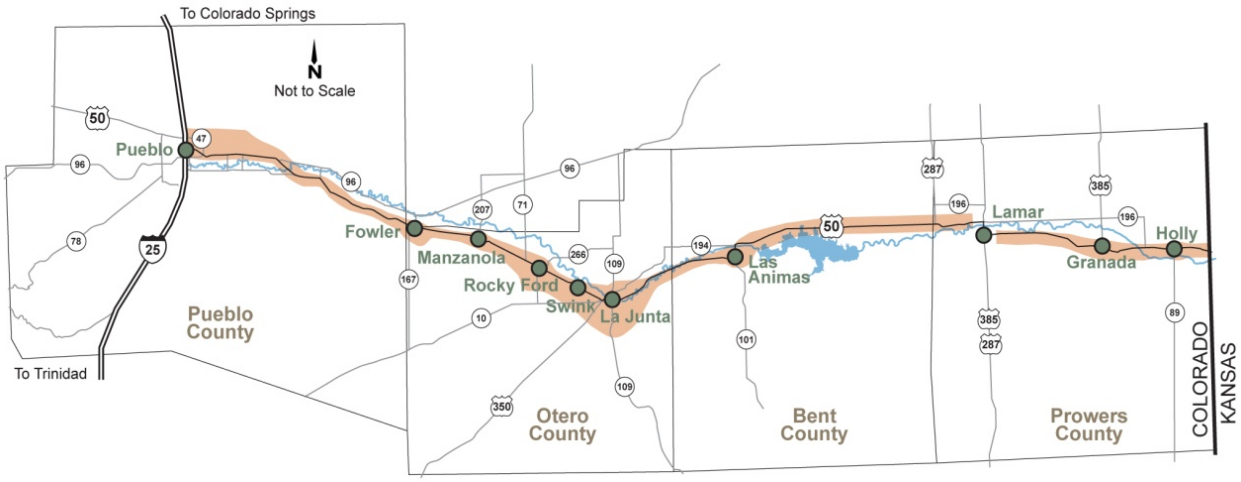


Figure 4-14. U.S. 50 Tier 1 EIS Project Area

Additional information about wetland and riparian resources, as well as wildlife habitat, can be found in U.S. 50 technical memoranda, which are included in Appendix A.

The following sections describe the existing conditions and effects from the No-Build Alternative and the Build Alternatives for each of the topics listed above.

4.2.1 Wetland and Riparian Resources

Riparian resources are transitional areas between terrestrial (land-based) and aquatic (water-based) ecosystems. Wetland resources typically include the wettest portions of riparian areas, commonly referred to as swamps, marshes, or bogs. Wetland and riparian resources are important to the environment because they provide a variety of functions, including:

- Water storage
- Flood flow attenuation (acting as a barrier to reduce flash flooding after a rain storm)
- Water quality improvement (diluting pollutants before they are released into the watershed)
- Habitat for wildlife

It is not feasible to delineate wetland and riparian resources (i.e., identify the specific boundaries) in the field for this U.S. 50 Tier 1 EIS. The area surveyed for these resources encompasses a 150-mile-long corridor that averages two miles wide, causing a field delineation to be extremely time-consuming and prohibitively expensive. In addition, the estimated build-out period for Tier 2 studies is expected to be decades (not years). This means that the boundaries of wetland or riparian resources identified by a field delineation likely would be irrelevant by the time a Tier 2 study is initiated.

For this reason, wetland and riparian resources were identified using existing data sources. These included land-cover data from the Southwest Regional Gap Analysis Project (SWReGAP) and riparian mapping data from Colorado Parks and Wildlife (CPW). One important limitation of these data is that they could not differentiate between wetlands and riparian areas; therefore, the term wetland/riparian resource is used throughout this section to represent an area that could be either a wetland or a riparian area.

Individual wetland/riparian resources can provide the environment with different functions, or different levels of functionality for the same function. For example, one resource may be capable of storing more water than another and one may provide wildlife habitat. A functional assessment of identified wetland/riparian resources was conducted to determine which resources provide more benefit/better function to the environment than others. Wetland/riparian resources are grouped into four functional categories: Category I, Category II, Category III, and Category IV. Category I resources provide the most benefit to the environment. In contrast, Category IV resources provide the least benefit of all the resources identified. For more details on how these categories were assessed, see the Wetland and Riparian Resources Technical Memorandum, which is located in Appendix A.

The term *waters of the United States* generally includes: (1) all historically navigable waterways (such as streams, rivers, lakes, and reservoirs) and their tributaries, (2) water bodies used in some way for interstate or foreign commerce, and (3) wetlands adjacent to these waters. Wetlands adjacent to waters of the United States typically are known as jurisdictional wetlands because they fall under the regulatory jurisdiction of the USACE. The wetland/riparian resources identified for the U.S. 50 Tier 1 EIS may or may not be classified as jurisdictional wetlands. These determinations would be made during Tier 2 studies.

Even though the jurisdiction of wetland/riparian resources was not determined during the U.S. 50 Tier 1 EIS, the USACE participated in the project as a cooperating agency under terms outlined in the NEPA/Clean Water Act Section 404 Merger Process and Agreement for Transportation Projects in Colorado (see Appendix C, Public and Agency Involvement).

Results of the Analysis

The Build Alternatives would affect 2.1 percent to 2.6 percent (587 acres to 713 acres) of the 27,620 total acres of wetland/riparian resources in the U.S. 50 project area. Most of these resources have been determined to have a relatively low functionality. For this reason, and because unavoidable impacts to wetland areas would be mitigated during Tier 2 studies, the loss of these resources is unlikely to have a substantial effect on the environment of the Lower Arkansas Valley.

Affected Environment

The following section details wetland/riparian resources within the project area. Figures illustrating these resources can be found in Appendix A, Resource Technical Memoranda, Wetland and Riparian Resources Technical Memorandum (Appendix E, Figures E-1 to E-31). In general terms, wetland/riparian resources can be seen in the Lower Arkansas Valley during the summer months as the greenbelt adjacent to streams, rivers, lakes, and reservoirs. They also can occur adjacent to irrigation ditches and canals and in areas where ground water is close to the soil surface.

Approximately 27,620 acres of wetland/riparian resources were identified in the project area. These resources were grouped based on their functional category, or how much they benefit the environment, as shown in Table 4-4. Category I wetland/riparian resources have the highest functionality when taking into account wildlife habitat, hydrology, and water quality, while Category IV wetland/riparian resources have the lowest functionality.

Table 4-4. Wetland/Riparian Resources in the Project Area by Functional Category

Functional Category	Wetland/Riparian Resources	
	Acres	Percent*
Category I (highest function)	3,699	13
Category II	7,084	26
Category III	13,233	48
Category IV (lowest function)	3,603	13
Total (all categories)	27,620	100

*Note: The sum of individual items may not equal totals due to rounding.
Sources: McLean 2006, SWReGAP 2006

Approximately 13 percent of the identified resources, or nearly 3,699 acres, were considered to be Category I. These resources, which have the most benefit to the environment due to their high functionality, are located primarily along the Arkansas River.

Category II wetland/riparian resources comprise approximately 7,084 acres, or about 26 percent of all identified resources. They generally are located along perennial or intermittent streams. Perennial streams are those that have a continuous flow year-round during periods of normal rainfall. Intermittent streams only flow for part of the year.

Most of the identified resources (nearly 61 percent) fell into either Category III (48 percent) or Category IV (13 percent), which generally are not high-quality wetland/riparian resources. These wetlands are found throughout the project area and are characterized by lack of vegetative diversity or habitat, and often are directly or indirectly disturbed by urban and agricultural land uses. Therefore, while acres of highly functional wetland/riparian resources exist in the project area, the majority of the identified resources have a lower functionality, or less benefit to the environment.

Environmental Consequences

Effects to wetland/riparian areas are evaluated based on the estimated number of acres that the Build Alternatives could potentially affect. To calculate this acreage of potential impact, the total number of acres within the 1,000-foot-wide Build Alternatives is multiplied by a conversion factor. The conversion factor was necessary because the purpose of the U.S. 50 Tier 1 EIS is to determine the location of a 1,000-foot-wide alternative within which a 250-foot-wide roadway footprint would be identified during Tier 2 studies. The conversion factor, generally 0.25, reflects that only one-quarter of the alternative width would be needed for highway right of way (see Figure 4-15). This conversion provides a more realistic value for expected effects to wetland/riparian resources from the Build Alternatives. There are

three exceptions to using this conversion factor: (1) Section 1, Alternative 2: Pueblo Existing Alignment, which uses a 1:1 effect ratio since the proposed segment corridor is only 250 feet in width, and (2) Section 1, Alternative 3: Pueblo SH 47 Connection, which uses a 0.25 effect ratio for the western half since this area would be new location and is 1,000 feet wide, and uses a 1:1 effect ratio along the eastern half where this alternative uses the existing alignment, and (3) Section 7, Alternative 1: Rocky Ford North which uses a 0.31:1 effect ratio to account for a 310 foot construction footprint associated with the adjacent railroad corridor.

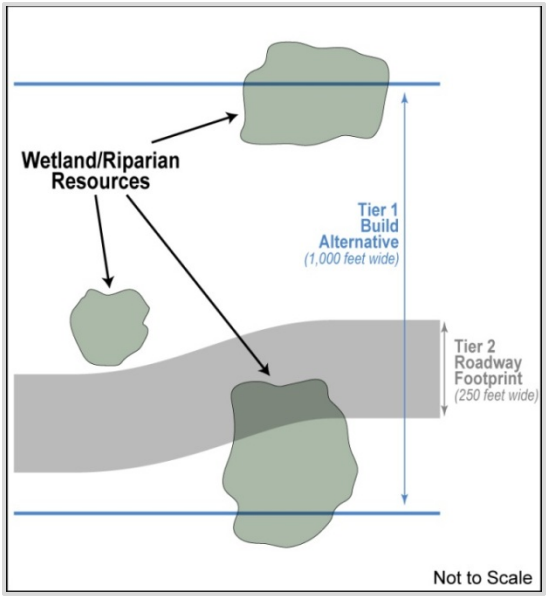


Figure 4-15. Example of Effects to Wetland/Riparian Resources

These estimated acreage numbers represent a maximum worst-case scenario and will be reduced or avoided during Tier 2 studies.

Direct Effects

Direct effects to wetland/riparian resources result from the physical destruction or degradation of the resources. Examples of this type of effect are the clearing, excavation, fill, or grading of a wetland/riparian area during construction of a road. The estimate of affected resources partially or wholly contained within the study area then was further refined by applying the conversion factors described above. Efforts will be made to avoid these resources during Tier 2 studies, when the location of the 250-foot roadway alignment within the Build Alternatives is determined. Furthermore, CDOT will incorporate highway design features to avoid and minimize adverse impacts to wetlands.

Indirect Effects

Indirect effects to wetland/riparian resources have the potential to change the characteristics of the resource but do not destroy it. An example of this type of effect is when roadway improvements modify water drainage patterns. Changes in the amount of water delivered to a site can alter the types of plants that can live there, altering the characteristics of the resource. The U.S. 50 Tier 1 EIS identifies only general corridor locations, not specific roadway footprints; therefore, this analysis does not include detailed analyses of indirect effects to all wetland/riparian resources because it is difficult to know which specific resources would be indirectly affected.

Summary of Effects

The following section summarizes potential direct effects to wetland/riparian resources by the No-Build Alternative and the Build Alternatives. Figures illustrating these impacts can be found in Appendix A, Resource Technical Memoranda, Wetland and Riparian Resources Technical Memorandum (Appendix E, Figures E-1 to E-31).

No-Build Alternative

Under the No-Build Alternative, only minor and isolated construction would occur. Routine maintenance and repairs would be made as necessary to keep U.S. 50 in usable condition, including standard overlays and repairs of weather- or crash-related damage. Additionally, smaller scale improvements may be undertaken, such as short passing lanes and other minor safety improvements.

Because routine maintenance and repairs are conducted on the existing highway, these activities generally would not affect wetland/riparian resources except potentially when repairing or replacing culverts. Smaller scale improvements have the potential to affect resources located directly adjacent to the highway.

Build Alternatives

The Build Alternatives could affect roughly 587 acres to 713 acres of wetland/riparian resources. This represents roughly 2.1 percent to 2.6 percent of the 27,620 acres of wetland/riparian resources identified in the project area. These estimated acreage numbers represent a maximum, worst-case scenario and will be reduced or avoided during Tier 2 studies.

Figure 4-16. Wetland/Riparian Area—Las Animas

Wetland/riparian resources are located throughout the project area. The Build Alternatives could affect between 49 acres and 76 acres of Category I wetland/riparian resources, which have the highest functionality and, therefore, the most benefit to the environment. These Category I resources are located primarily near the Arkansas River (see Figure 4-16). Because the majority of wetland/riparian resources that have the potential to be impacted are Category III and IV, it is unlikely that the loss of these resources would have a substantial effect on the overall environment in the Lower Arkansas Valley.

Build Alternatives Effects by Location

Table 4-5 lists the number of acres of wetland/riparian resources that would be affected by the Build Alternatives by location, from west to east.

Table 4-5. Summary of Potentially Affected Wetland/Riparian Resources by Section and Functional Assessment Category for the Build Alternatives

Section	Build Alternatives (if applicable)	Wetland/Riparian Resources (acres)				
		Category I	Category II	Category III	Category IV	Total[b] (all Categories)
Section 1: Pueblo	Alternative 1: Pueblo Airport North	—	1	9	3	13
	Alternative 2: Pueblo Existing Alignment	—	1	22	37	60
	Alternative 3: Pueblo SH 47 Connection	—	—	21	27	48
Section 2: Pueblo to Fowler	Alternative 1: Fort Reynolds Existing Alignment	14	22	63	27	126
	Alternative 2: Fort Reynolds Realignment	14	20	54	24	112
Section 3: Fowler	Alternative 1: Fowler North	11	5	7	2	25
	Alternative 2: Fowler South	2	1	1	3	7
Section 4: Fowler to Manzanola	—	14	4	27	4	49
Section 5: Manzanola	Alternative 1: Manzanola North	1	—	2	2	5
	Alternative 2: Manzanola South	3	1	—	—	4
Section 6: Manzanola to Rocky Ford	—	—	1	—	—	1
Section 7: Rocky Ford	Alternative 1: Rocky Ford North	—	4	6	—	10
	Alternative 2: Rocky Ford South	1	2	10	—	13
Section 8: Rocky Ford to Swink	—	1	—	2	—	3
Section 9: Swink	Alternative 1: Swink North	3	2	2	—	7
	Alternative 2: Swink South	—	—	1	—	1
Section 10: La Junta	Alternative 1: La Junta North	9	3	15	1	28
	Alternative 2: La Junta South	1	1	11	2	15
	Alternative 3: La Junta South	3	7	8	1	19
	Alternative 4: La Junta South	3	1	7	—	11

Table 4-5. Summary of Potentially Affected Wetland/Riparian Resources by Section and Functional Assessment Category for the Build Alternatives (continued)

Section	Build Alternatives (if applicable)	Wetland/Riparian Resources (acres)				
		Category I	Category II	Category III	Category IV	Total[b] (all Categories)
Section 11: La Junta to Las Animas	—	—	4	13	3	20
Section 12: Las Animas	Alternative 1: Las Animas North	5	5	16	14	40
	Alternative 2: Las Animas South	3	3	16	1	23
Section 13: Las Animas to Lamar[a]	—	3	36	77	14	130
Section 14: Lamar to Granada[a]	—	9	10	66	23	108
Section 15: Granada	Alternative 1: Granada North	—	4	1	—	5
	Alternative 2: Granada South	1	—	1	—	2
Section 16: Granada to Holly	—	—	20	34	1	55
Section 17: Holly	Alternative 1: Holly North	1	8	7	—	16
	Alternative 2: Holly South	—	2	18	—	20
Section 18: Holly Transition	—	1	14	6	1	22
Total[b]		**49 to 76**	**119 to 147**	**326 to 379**	**75 to 132**	**587 to 713**

Sources: McLean 2006; SWReGAP 2006

[a]The Build Alternatives do not include Lamar, as discussed in Chapter 3, Alternatives Considered.

[b]The ultimate effect of the Build Alternatives will depend on which alternatives are chosen; therefore, a range of effects is shown instead of a single number.

The Build Alternatives could affect roughly 587 acres to 713 acres of wetland/riparian resources. The sections of the Build Alternatives that have the potential to affect the most wetland/riparian resources are Las Animas to Lamar (130 acres) and Pueblo to Fowler (125 acres in Alternative 1 and 112 acres in Alternative 2). The fewest potential effects to wetland/riparian resources would result from Manzanola to Rocky Ford (one acre).

Mitigation

The U.S. 50 Tier 1 EIS has developed a Natural Resources Mitigation Strategies Plan, which is presented in Appendix E of this document. This plan is intended to guide mitigation activities for natural resource effects that occur during Tier 2 studies—primarily effects to wildlife and its habitat. Because the roadway footprint will not be identified until Tier 2 studies, this Tier 1 analysis cannot identify effects to specific resources or develop mitigation actions. Also, the period for Tier 2 studies is estimated to be decades (i.e., not months or years), and best management practices for mitigation activities could change during this time period. As a result, mitigation strategies—not mitigation activities—have been developed as part of this document. These strategies are meant to guide mitigation activities for Tier 2 studies to ensure that negative effects are minimized.

The mitigation strategies plan contains the following three overarching goals that approach mitigation activities on a broad-based and long-term planning level:

- **Maintain and enhance biodiversity in the Lower Arkansas River Valley**—Effective mitigation needs to address biodiversity on several scales simultaneously: landscape level, ecosystem level, species level, and genetic level.
- **Improve ecosystem integrity in the Lower Arkansas River Valley**—Ecosystem integrity means that the natural system is complete, unimpaired, and sound.
- **Accommodate social and economic objectives in the Lower Arkansas River Valley when possible**—Biking, birding, wildlife viewing, hunting, and fishing are recreational activities of economic importance to the region. A sustainable balance must be struck so that the economic activities do not degrade the sustainability of the ecosystems upon which they depend.

To meet these goals, a hierarchy of mitigation strategies was developed that includes general mitigation strategies, mitigation banking strategies, early mitigation strategies, and partnering opportunities. The final mitigation plan will be determined during Tier 2 studies, but is expected to include mitigation banks ("third-party" compensatory mitigation), natural resources preservation, early on-site mitigation (improved wildlife crossings, improved habitat connectivity, noxious weed management), and other regional mitigation partnerships. All applicable laws and regulations will be followed, including the

USACE Compensatory Mitigation Rule of 2008, and wetlands would be mitigated at a 1:1 ratio, per FHWA guidelines. The Natural Resources Mitigation Strategies Plan can be found in Appendix E.

Avoidance Activities

Effects to wetland/riparian resources were avoided to the greatest extent possible in the U.S. 50 Tier 1 EIS during the alternatives development process by selecting a 1,000-foot-wide general corridor for the Build Alternatives. This allows for avoidance and minimization while identifying the 250-foot-wide roadway footprint during Tier 2 studies. Therefore, avoidance activities will be determined during Tier 2 studies.

4.2.2 Wildlife and Wildlife Habitat

Wildlife and wildlife habitat are fundamental parts of any ecosystem. The wildlife and wildlife habitat found in the Lower Arkansas Valley help define the natural environment of the region, along with climate conditions, water resources, and other factors.

Human activity in the Lower Arkansas Valley also has played a large role in defining its natural environment. For example, the substantial acreage of native grassland transformed to agricultural fields by human settlement has changed not only the plants found on that land but the wildlife that live on it as well. Human activity also resulted in an influx of noxious weeds, which are non-native plants harmful to the natural environment that generally out-compete and replace native species. Even construction of U.S. 50 has modified this environment by creating a substantial barrier (i.e., the highway) for wildlife to cross to have access to areas they use for feeding, getting water, sleeping, or reproduction.

This analysis evaluated several impact topics in the project area, including: (1) wildlife and wildlife habitat, (2) noxious weeds, (3) special-status species, (4) wildlife crossings, and (5) wildlife migration routes. Additional information about wildlife and wildlife habitat can be found in the Biological Resources Technical Memorandum located in Appendix A.

Results of the Analysis

The Build Alternatives have the potential to affect the following resources related to wildlife and wildlife habitat in the project area:

- They would affect slightly more than 2 percent of the total identified wildlife habitat, or between 4,287 acres and 4,564 acres. Most of this habitat has already been disturbed by human activity (through farming, ranching, and urban areas, among other uses).
- They could result in the removal of existing noxious weeds in the locations where the Build Alternatives are constructed; however, these same construction activities also could spread these harmful plants to new locations. It should be noted that CDOT construction policies require noxious weed control plans and activities; therefore, any effect is expected to be minimal.
- They could affect up to 34 special-status species that are either known to exist or have a moderate to high potential to exist in the U.S. 50 project area. An additional seven special-status species could be affected based on a low potential of occurrence. At this time, it is not known how many of these species are present within the area of the Build Alternatives.
- They would widen U.S. 50 to four lanes at 11 of the 16 wildlife crossings (locations where wildlife are known to cross U.S. 50 more frequently or in higher concentrations). This would make it less safe for wildlife to cross the highway and for motorists to drive on it.

Affected Environment

The following section details wildlife and wildlife habitat within the project area. The method for identifying wildlife and wildlife habitat in the project area is described in the Biological Resources Technical Memorandum located in Appendix A.

Eastern Colorado, including the project area, lies within the rain shadow east of the Rocky Mountains. The mountains obstruct the passage of rain-producing weather systems, creating an area of dryness (or shadow) behind them. This results in a climate with low relative humidity, abundant sunshine, infrequent precipitation, moderate to high winds, and a wide seasonal range in temperature. For example, the project area receives an average of only 13 inches of precipitation per year. Temperatures can reach more than 100 degrees Fahrenheit in the summer and can drop below zero degrees Fahrenheit in the winter (Western Regional Climate Center [WRCC] 2006).

Wildlife and Wildlife Habitat

Wildlife and wildlife habitat are important parts of the ecosystem of the Lower Arkansas Valley. Wildlife in the project area could potentially include approximately 320 different bird species, 10 amphibian species, 40 reptile species, and 70 mammal species (National Diversity Information Source [NDIS] 2007). Most of the bird species potentially found in the project area are migratory. Spring and summer are active seasons for bird migration in the area. Aside from bird migration routes, no wildlife migration routes exist within the project area (CDOW 2006).

The project area contains a variety of habitat types, including agricultural land (i.e., farmland and ranch land), grassland and shrubland plant communities, and wetland and riparian areas. Each of these is described in more detail below. The plants found in these habitat areas are important because they provide food and cover for the wildlife species that live there, as well as contributing to overall biodiversity.

Plants found on agricultural land include crops grown on farmland and grasses growing on ranch land. Approximately one half of the land in the project area falls into this category. (Other habitat types also are used for agricultural activities—mostly ranching—and they are discussed below.) Because farmers sometimes rotate their crops and plant different crops at different times of the year, farmland plants may change throughout the year, or from year to year. The grasses found on ranch land are used primarily to graze livestock. In the project area, farmland generally is located adjacent to water sources (rivers, tributaries, or irrigation canals and ditches), while ranch land typically is located away from these water sources.

The number and variety of wildlife species generally is much lower on farmland than on ranch land or native grasslands. This is because fewer species of plants are present and the land has been disturbed by human activity. Agricultural lands support a number of wildlife species. Among the most common are the American Kestrel, Ring-Necked Pheasant, Western Meadowlark, great plains toad, white-tailed deer, and red fox. Additionally, Mourning Doves are important game birds that nest throughout the corridor (CDOW 2006). Agricultural land provides important habitat for migrating birds, primarily during the spring and fall seasons. Many of these species use the agricultural land for hunting and feeding and rely on adjacent habitats (such as shade trees, woodlands, or grassland areas) for cover.

The grassland plant community is the second most common habitat type in the project area. While these grasslands are primarily used for grazing livestock, they also provide food and cover for wildlife. Under typical grazing activities, grassland is maintained as dense, short grass with areas of sparse vegetation or bare soil. The difference between grassland and ranch land is that the ranch land has been altered by past

or present land management practices, while the grassland has not. For example, in some areas the amount of food that a pasture can produce may have been increased by plowing the native prairie up and planting other, more productive grass species. Most of the grassland in the project area is western Great Plains shortgrass prairie.

The shortgrass prairie of eastern Colorado, which includes the project area, is an important part of the state's agricultural productivity, ecological diversity, and unique character. Conversion of native grassland for agriculture and development purposes has altered the character and size of the shortgrass prairie region (CDOW 2003b). Over the past several years, concern has grown for the long-term sustainability, diversity, and integrity of the shortgrass prairie ecosystem in eastern Colorado. As a result, several groups have developed plans or agreements to protect this vital ecosystem (CDOW 2003b, Rich et al. 2004, CDOT 2001).

A study completed by the Rocky Mountain Bird Observatory in 2005 documented more than 110 different bird species that use the grasslands of eastern Colorado as habitat (Sparks et al. 2005). Common wildlife species that use grassland for habitat include the Cassin's Sparrow, prairie lizard, western rattlesnake, coyote, white-tailed jackrabbit, and prairie vole. The pronghorn is probably the most abundant large mammal that resides in this habitat.

In the project area, birds may use the central flyway, which is a key migration route for many bird species between breeding grounds in the north and wintering areas in the south. A principal route of the flyway crosses the project area (north-south) as shown in Figure 4-17.

Figure 4-17. Principal Routes of the Central Flyway

The shrubland plant community has the same general composition of plants as grassland, except it also has a large number of woody plants (shrubs or trees). Shrubland in the project area is used primarily for grazing livestock; however, the prominence of shrubs and trees introduces additional habitat areas available for use by wildlife. Most of the shrubland in the project area is western Great Plains sandhill shrubland (also known as sand sage shrubland).

Bird species' use of shrublands varies based on the percentage of shrub cover within the shrubland ecosystem. Common bird species that use shrubland as habitat include the Brewer's Sparrow and Green-Tailed Towhee; reptile species include several varieties of snakes and lizards. Mammals commonly found in this habitat include pronghorn, white-tailed deer, coyote, red fox, and several species of mice.

Wetland and riparian areas generally are considered to be among the most ecologically sensitive and important habitat types in the western United States. These areas provide habitat for a variety of plant and animal species that do not thrive in other habitats. They also provide other ecological benefits, such as improving water quality, preventing flooding, and maintaining stream banks.

Common species that use wetlands and riparian areas as habitat include the northern water snake, tiger salamander, snapping turtle, white-tailed deer, red fox, raccoon, and a variety of bats.

Riparian areas generally hold the most diverse communities of bird species (Bottorff 1974). Important species include the Great Horned Owl and Yellow Warbler. Hawks and other raptors are plentiful in the project area (CDOW 2006), and the Arkansas River bottom is especially important to nesting raptors.

Other habitats found in the project area include woodlands, open water, rocky outcrops, urban or rural areas, and disturbed areas. Each of these habitat types covers only a small fraction of the project area and has the following characteristics:

- Woodlands are areas covered by trees and shrubs.
- Open water includes reservoirs, lakes, natural or man-made ponds, and mudflats and beaches adjacent to these water bodies.
- Habitat on rock outcrops is restricted to the exposed areas and crevices of the rock.
- Urban and rural habitat includes developed sites such as landscaped areas, parks, golf courses, and other areas covered by plants.
- Disturbed areas are those areas where the native plants or soil have been removed, substantially altered, or replaced, such as mining areas and burned land.

Noxious Weeds

Data obtained from CDOT and the Colorado Department of Agriculture county weed supervisors confirmed 14 species of noxious weeds are present within five miles of the project area in current CDOT right of way (CDOT 2013). Additional noxious weeds may exist in the project area, but the most common species among those known to exist in the existing right of way are salt cedar (tamarisk), puncturevine,

Johnsongrass, and field bindweed. The 14 noxious weed species are listed in Table 4-6 by weed category and county.

Noxious weeds have a variety of negative effects on the natural and human (man-made) environments. Invading weeds can overwhelm native plants because they have growth and reproductive advantages and generally can survive under harsh conditions, such as drought. They can negatively affect crops on farmland for the same reasons. Also, noxious weeds often are toxic to wildlife and livestock, and they can spread easily along roadway corridors by wind and human activity. In addition, they can alter the pH of the soil, negatively affecting both native and agricultural crops. For these reasons, laws exist—such as the Colorado Noxious Weed Act (Colorado Revised Statutes [CRS] 35-5.5)—that require control of noxious weeds by landowners and implementation of management strategies by local jurisdictions.

Table 4-6. Noxious Weed Species in CDOT Right of Way within 5 Miles of the Project Area

Common Name	Scientific Name	Weed Category[a]	County	Within Current CDOT Right of Way in Project Area?
Canada thistle	*Cirsium arvense*	B	Pueblo	Yes
Chicory	*Cichorium intybus*	C	Pueblo	No
Cutleaf teasel	*Dipsacus laciniatus*	B	Pueblo	No
Field bindweed	*Convolvulus arvensis*	C	Bent	Yes
			Otero	Yes
			Prowers	Yes
			Pueblo	Yes
Hoary cress	*Cardaria draba*	B	Bent	Yes
			Prowers	Yes
Johnsongrass	*Sorghum halepense*	C	Bent	Yes
			Otero	Yes
			Prowers	Yes
			Pueblo	Yes
Musk thistle	*Carduus nutans*	B	Pueblo	No
Perennial pepperweed	*Lepidium latifolium*	B	Pueblo	No
Prickly lettuce	*Latuca serriola*	C	Bent	Yes
			Otero	Yes
			Prowers	Yes
			Pueblo	Yes
Puncturevine	*Tribulus terrestris*	C	Otero	Yes
			Prowers	No
			Pueblo	Yes
Russian knapweed	*Acroptilon repens*	B	Bent	Yes
			Otero	Yes
			Pueblo	Yes
Russian olive	*Elaeagnus angustifolia*	B	Bent	No
			Otero	No
			Prowers	No
			Pueblo	Yes
Salt cedar (Tamarisk)	*Tamarix ramosissima*	B	Bent	Yes
			Otero	Yes
			Prowers	Yes
			Pueblo	Yes
Scotch thistle	*Onopordum tauricum*	B	Otero	Yes
			Pueblo	No

Sources: CDOA 2013, CDOT Noxious Weed List, 2013, CDOT Noxious Weed GIS Data

[a] Type B: Develop and implement state noxious weed management plans to stop the spread of a species.
Type C: Develop and implement state noxious weed management plan designed to support local efforts.

Special-Status Species

Special-status species are those designated by the federal government (i.e., U.S. Fish and Wildlife Service [USFWS]) or the state of Colorado (i.e., CPW) as either threatened or endangered or those that could be designated as such in the future. Colorado also has an additional designation called "species of concern." These special-status categories are explained in more detail below.

- **Federally Endangered:** A species in danger of extinction throughout all or a substantial portion of its range (i.e., the area where the species naturally lives) (USFWS, 50 eCFR 17.11 and 17.12)
- **Federally Threatened:** A species likely to become endangered in the foreseeable future (USFWS, 50 eCFR 17.11 and 17.12)
- **Federal Candidate for Listing:** A species that has been or could be proposed for possible listing as threatened or endangered
- **State Endangered:** A species native to Colorado whose prospects for survival or recruitment within the state are in jeopardy (the term "recruitment" applies to fish species and refers to the number of fish of a specific species that grow to become vulnerable to fishing) (CPW, CRS 33-2-105)
- **State Threatened:** A species not in immediate jeopardy of extinction but that might become endangered because it exists in such small numbers or is so severely restricted throughout all or a substantial portion of its range (CPW, CRS 33-2-105)
- **Species of Concern:** A species not listed as threatened or endangered but is of concern to state wildlife managers in Colorado (CPW, CRS 33-2-105)

Table 4-7 lists special-status species present or potentially present in the project area. It also indicates the type of habitat those species typically use.

Table 4-7. Special-Status Species Present or Potentially Present in the Project Area

Wildlife Type	Common Name	Scientific Name	Listing Status[a]	Habitat Type
Birds	American Peregrine Falcon	*Falco peregrinus*	Species of concern	Cliffs and open spaces
	Bald Eagle	*Haliaeetus leucocephalus*	Species of concern	Grasslands, wetlands and riparian areas, open water
	Burrowing Owl	*Athene cunicularia*	State threatened	Grasslands
	Ferruginous Hawk	*Buteo regalis*	Species of concern	Grasslands, shrublands
	Greater Sandhill Crane	*Grus canadensis*	Species of concern	Agricultural lands, wetlands and riparian areas, open water
	Interior Least Tern	*Sternula antillarum*	Federally endangered; State endangered	Wetlands and riparian areas, open water
	Lesser Prairie Chicken	*Tympanuchus pallidicinctus*	Federally threatened; State threatened	Shrublands
	Long-Billed Curlew	*Numenius americanus*	Species of concern	Grasslands
	Mexican Spotted Owl	*Strix occidentalis lucida*	Federally threatened	Woodlands, rocky outcrops
	Mountain Plover	*Charadrius montanus*	Species of concern	Grasslands
	Piping Plover	*Charadrius melodus*	Federally threatened; State threatened	Wetlands and riparian areas, open water
	Western Snowy Plover	*Charadrius alexandrines*	Species of concern	Wetlands and riparian areas, open water
Mammals	Black-footed ferret	*Mustela nigripes*	Federally endangered	Grasslands
	Black-tailed prairie dog	*Cynomys ludovicianus*	Species of concern	Grasslands
	Botta's pocket gopher	*Thomomys bottae*	Species of concern	Agricultural lands, grasslands, shrublands
	Canada lynx	*Lynx canadensis*	Federally threatened	Subalpine coniferous forests
	Swift fox	*Vulpes velox*	Species of concern	Grasslands
	Townsend's big-eared bat	*Corynorhinus townsendii*	Species of concern	Shrublands

Table 4-7. Special-Status Species Present or Potentially Present in the Project Area (continued)

Wildlife Type	Common Name	Scientific Name	Listing Status[a]	Habitat Type
Reptiles	Common king snake	*Lampropeltis getula*	Species of concern	Agricultural lands, wetlands and riparian areas
	Massasauga snake	*Sistrurus catenatus*	Species of concern	Shrublands
	Round-tailed horned lizard	*Phyrnosoma modestum*	Species of concern	Grasslands, shrublands
	Texas blind snake	*Leptotyphlops dulcis*	Species of concern	Woodlands, rocky outcrops
	Texas horned lizard	*Phrynosoma cornutum*	Species of concern	Grasslands
	Triploid checkered whiptail	*Cnemidophorus neotesselatus*	Species of concern	Rocky outcrops
	Yellow mud turtle	*Kinosternon flavescens*	Species of concern	Wetlands and riparian areas
Amphibians	Couch's spadefoot toad	*Scaphiopus couchii*	Species of concern	Grasslands
	Northern leopard frog	*Rana pipiens*	Species of concern	Wetlands and riparian areas
	Plains leopard frog	*Rana blairi*	Species of concern	Wetlands and riparian areas
Fishes	Arkansas darter	*Etheostoma cragini*	State threatened; Federal candidate	Open water
	Greenback cutthroat trout	*Oncorhynchus clarki stomias*	Federally threatened	Open water
	Flathead chub	*Platygobio gracilis*	Species of concern	Open water
	Plains minnow	*Hybognathus placitus*	State-endangered	Open water
	Southern redbelly dace	*Phoxinus erythrogaster*	State-endangered	Open water
	Suckermouth minnow	*Phenacobius mirabilis*	State-endangered	Open water

Sources: NDIS 2007; CDOW 2006; Hammerson 1999; Burt and Grossenheider 1980; Andrews and Righter 1992; Tomelleri 2007
[a]State = Colorado, USFWS 2015.

One of the special-status species listed in Table 4-7 is the black-tailed prairie dog, which is a state species of concern in Colorado (see Figure 4-18). Black-tailed prairie dog colonies exist in many locations within the project area (CDOW 2006; CDOW 2003b). This species of prairie dog plays an integral part in prairie ecosystems because many other wildlife species interact with them or are dependent on them. For example, black-tailed prairie dogs support other special-status species by serving as prey for them. Special-status species that prey on prairie dogs include the Ferruginous Hawk and Bald Eagle. Additionally, the Mountain Plover and Burrowing Owl use prairie dog colonies for nesting.

Figure 4-18. Black-Tailed Prairie Dog (Colorado state species of concern)

In 2009, the USFWS completed a status review of the black-tailed prairie dog and determined that populations of the mammal are stable and do not warrant protection as a threatened or endangered species under the Endangered Species Act. The USFWS also reported that occupied habitat appears to be steadily increasing despite adverse conditions (USFWS 2009) such as:

- Loss of habitat due to development and agricultural activities,
- Aggressive efforts designed to remove them from private property, and
- Sylvatic plague (a disease that can wipe out an entire colony).

It also is important to note that the round-tailed horned lizard, which is a state species of concern, is known in Colorado from one isolated population several kilometers south-southeast of Fowler. No special-status plant species have been documented in the project area.

The Colorado Natural Heritage Program (CNHP) inventories rare species present in Colorado. These species also may be designated as special-status species by the federal government or the state of Colorado. The program has identified the following species as critically imperiled that are either known to occur or potentially occur in the project area (NDIS 2007):

- **Birds**—Bald Eagle, Chestnut-Collared Longspur (*Calcarius ornatus*), Gray Vireo (*Vireo vicinior*), Interior Least Tern, Lesser Prairie Chicken, Long-Billed Curlew, Mexican Spotted Owl, Mountain Plover, Ovenbird (*Seiurus aurocapillus*), Piping Plover, Rufous-Crowned Sparrow (*Aimophila ruficeps*), Western Snowy Plover
- **Mammals**—black-footed ferret, eastern spotted skunk (*Spilogale putorius*), Townsend's big-eared bat

- **Reptiles**—common king snake, massasauga snake, round-tailed horned lizard, triploid checkered whiptail, yellow mud turtle
- **Amphibians**—Couch's spadefoot toad, green toad (*Bufo viridis*), northern leopard frog
- **Fishes**—Arkansas darter, southern redbelly dace
- **Invertebrates**—dusted skipper (*Atrytonopsis hianna*), Colorado clue (*Euphilotes rita coloradensis*), giant floater (*Pyganodon grandis*), Rhesus skipper (*Polites rhesus*)
- **Plants**—Altai chickweed (*Stellaria irrigua*), American yellow lady's-slipper (*Cypripedium parviflorum*), Arkansas Valley evening primrose (*Oenothera harringtonii*), Colorado gumweed (*Grindelia inornata*), dwarf milkweed (*Asclepias involucrata*), Eaton's lip fern (*Cheilanthes eatonii*), ebony spleenwort (*Asplenium platyneuron*), golden blazing star (*Mentzelia chrysantha*), lace hedgehog cactus (*Echinocereus reichenbachii*), lavender hyssop (*Agastache foeniculum*), New Mexico cliff fern (*Woodsia neomexicana*), peck sedge (*Carex peckii*), prairie violet (*Viola pedatifida*), Pueblo goldenweed (*Oonopsis puebloensis*), Rocky Mountain bladderpod (*Lesquerella calcicola*), round-leaf four-o'clock (*Mirabilis rotundifolia*), sandhill goosefoot (*Chenopodium cycloides*), silver beard grass (*Bothriochloa laguroides*)

Wildlife Crossings

Wildlife crossings are locations on a roadway where wildlife cross from one side of the road to the other in higher concentrations or more frequently than in other locations along the road. Identifying these crossings is important because motorists collide with wildlife more often at these locations, posing a safety concern for both drivers and animals. Available data show that more than 40 animals, primarily deer, were reported killed or injured by vehicles on U.S. 50 in the project area in 2009 (CDOT 2009b).

The locations selected as wildlife crossings generally are determined by the habitat types, surface water that exists on either side of the road, and travel routes, such as stream corridors. Most crossings on U.S. 50 are found in areas where the highway crosses a water resource, such as the Arkansas River, or is adjacent to a State Wildlife Area. State Wildlife Areas in the project area are primarily managed for hunting; however, they are attractive to wildlife because they contain high-quality habitat or food resources.

Animal-vehicle collision data and other information obtained from CDOT, CPW, and the Colorado State Patrol were used to identify known or likely wildlife crossings of U.S. 50 in the project area. A total of 16 crossings were identified, which are listed in Table 4-8, along with their relative priority. The relative priority of the crossing is based on the number of animals killed per mile per year at that location. These

relative priority categories include moderate, high, and very high, with moderate affecting the lowest number of animals per mile and very high affecting the highest.

Table 4-8. Wildlife Crossings on U.S. 50 in the Project Area

Milepost(s)[a]	Description	Relative Priority[b]
320–324	Near the Pueblo Memorial Airport	Moderate
329	Between Pueblo and Fowler, where U.S. 50 crosses Chico Creek	High
330–332	Between Pueblo and Fowler, where U.S. 50 crosses the Arkansas River	High
334–336	Between Pueblo and Fowler, where U.S. 50 crosses the Huerfano River	High
347–349	Just west of Fowler, where U.S. 50 is adjacent to the Arkansas River and crosses the Oxford Farmer's Ditch	High
355	Between Fowler and Manzanola, where U.S. 50 crosses the Apishapa River	High
373–374	Just west of Swink, where U.S. 50 crosses Timpas Creek	Very high
401–402	Just east of Las Animas and northwest of the John Martin Reservoir and Fort Lyon State Wildlife Area	High
408	East of Las Animas near the John Martin Reservoir	Moderate
429–430	Just west of Lamar, where U.S. 50 is adjacent to the Vista Del Rio (irrigation) Ditch	High
440–442	Between Lamar and Granada, where U.S. 50 is directly adjacent to the Arkansas River, Lamar Canal, and Mike Higbee State Wildlife Area	Very high
442–444	Between Lamar and Granada, where U.S. 50 is directly adjacent to several drainage ditches	High
444–445	Between Lamar and Granada, where U.S. 50 crosses the Manvel (irrigation) Canal	Very high
445–446	Between Lamar and Granada, where U.S. 50 is directly adjacent to the Manvel (irrigation) Canal	High
454–458	Between Granada and Holly, where U.S. 50 is directly adjacent to the X-Y (irrigation) Canal and Granada (irrigation) Ditch and crosses the Granada State Wildlife Area	Very high
462–463	Just west of Holly	Moderate

Sources: Black et al. 2007; Black 2009; CDOW 2003a; CDOW 2007; CDOW 2009b; McLean 2006
[a]Rounded to the nearest milepost
[b]Moderate = 0.5 or fewer animal fatalities per mile per year; high = 0.6 to 0.9 animal fatalities per mile per year; very high = 1.0 or more animal fatalities per mile per year

Environmental Consequences

This analysis identified issues related to wildlife and wildlife habitat within the 1,000-foot-wide Build Alternatives. Because the location of U.S. 50 within the Build Alternatives will not be determined until Tier 2 studies, not all of the wildlife resources identified in the project area would be affected (see Figure 4-19).

Direct and indirect effects to wildlife and wildlife habitat from the 1,000-foot-wide Tier 1 Build Alternatives are discussed below.

Direct Effects

Direct effects to wildlife and wildlife habitat result from actions that kill or destroy them. An example of this type of effect is the excavation of grassland habitat during construction of a road.

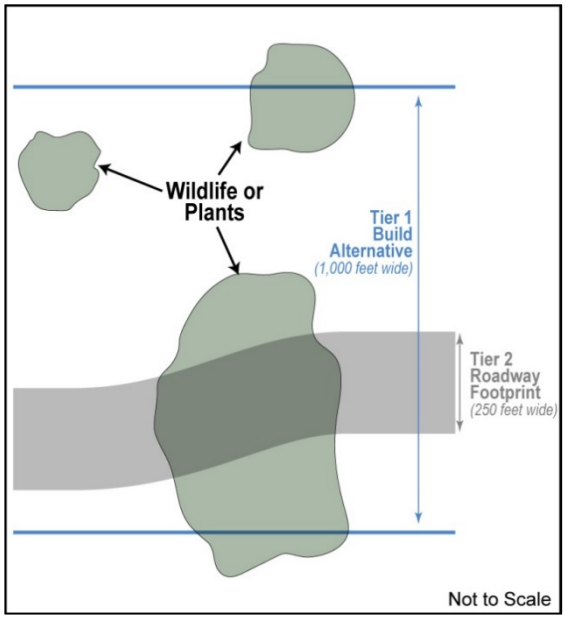


Figure 4-19. Example of Effects to Wildlife and Plants

Effects to habitat were evaluated based on the number of acres of habitat affected. The acreage was calculated by identifying the total number of acres affected by the alternative and multiplying this number by a conversion factor. The conversion factor, generally 0.25, reflects that only one-quarter of the alternative width would be needed for highway right of way. This conversion provides a more realistic value for expected effects to habitat from the Build Alternatives. There are three exceptions to using this conversion factor: (1) Section 1, Alternative 2: Pueblo Existing Alignment, which uses a 1:1 effect ratio since the proposed segment corridor is only 250 feet in width, and (2) Section 1, Alternative 3: Pueblo SH 47 Connection, which uses a 0.25 effect ratio for the western half since this area would be new location and is 1,000 feet wide, and uses a 1:1 effect ratio along the eastern half where this alternative uses the existing alignment, and (3) Section 7, Alternative 1: Rocky Ford North, which uses a 0.31:1 effect ratio to account for a wider construction footprint (approximately 310 feet) associated with the adjacent railroad corridor.

For any areas of habitat affected, the special-status species known or likely to occur in that type of habitat also were considered to be affected. Noxious weeds were considered affected if the alternative crossed into areas where they are known to occur. Wildlife crossings were considered affected if the alternative would make it more or less difficult for wildlife to cross the highway at that location.

Indirect Effects

Indirect effects can be predicted and do not result from direct harm to the wildlife or plants affected. An example of this type of effect is the introduction and establishment of noxious weeds in newly disturbed soils. After the noxious weeds become established, they out-compete native plant species. This leads to

reduced food and habitat availability for wildlife, and also can result in wildlife leaving the area or using the habitat less frequently.

Habitat Fragmentation

Habitat fragmentation can occur either as a direct or an indirect effect. It occurs as a direct effect when a roadway or other development splits a contiguous area of habitat into disconnected pieces, as shown in Figure 4-20. It also can occur as an indirect effect through an increase in the level of activity on or near the habitat, which could hinder or prevent wildlife from using it. Either type of effect can hinder wildlife movement and corresponding genetic exchange among populations. Habitat fragmentation already is occurring in the project area due to the existence of U.S. 50, county roads, and the railroad, which have split areas of native habitat.

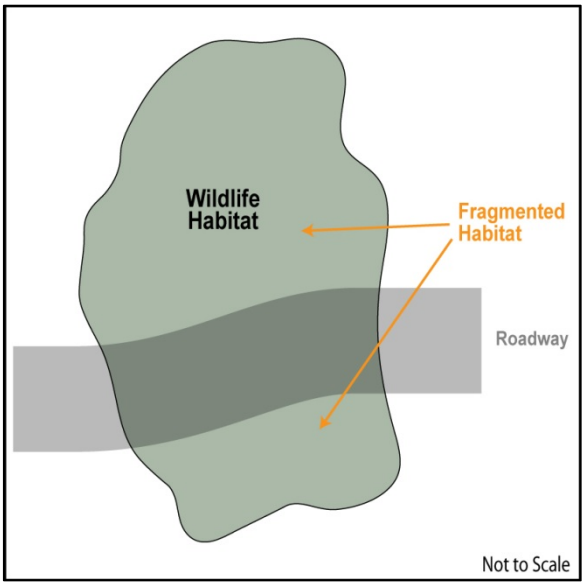


Figure 4-20. Example of Habitat Fragmentation

Agricultural activities also have converted a substantial amount of native habitat to agricultural land, changing the types of wildlife that can use it for habitat, food, and reproduction.

Summary of Effects

The following section summarizes potential effects to wildlife and wildlife habitat by the No-Build Alternative and the Build Alternatives.

Potential Effect on Wildlife and Plants

The Build Alternatives would affect approximately 2.2 percent to 2.3 percent of the habitat identified in the U.S. 50 project area (between 4,287 acres and 4,564 acres); however, most of these areas already have been disturbed by human activity.

Additionally, there are 25 special-status species with a moderate to high potential to occur in the project area that could be affected by the Build Alternatives (by affecting those species' habitats). An additional seven special-status species could be affected based on a low potential of occurrence. It is unknown at this time which of these species may be present within the project area.

Wildlife also could be affected by having to cross additional lanes of traffic on U.S. 50. Eleven of the 16 identified wildlife crossings are located in areas that would be expanded to four lanes by the Build Alternatives. Having to cross additional lanes would make a trip across the highway less safe for local wildlife and motorists alike.

No-Build Alternative

Under the No-Build Alternative, only minor and isolated construction would occur. Routine maintenance and repairs would be made as necessary to keep U.S. 50 in usable condition, including standard overlays and repairs of weather- or crash-related damage. Additionally, smaller-scale improvements may be undertaken, such as short passing lanes and other minor safety improvements.

Routine maintenance activities likely will continue to affect biological resources along the highway. Some examples of these activities are spraying for noxious weeds and mowing the areas directly adjacent to the highway (the CDOT right of way). Also, animal-vehicle collisions will continue to occur on the highway.

Build Alternatives

Potential effects from the Build Alternatives to wildlife and wildlife habitat, noxious weeds, special-status species, and wildlife crossings are discussed below. Because no wildlife migration routes exist within the project area, with the exception of the central flyway, none would be affected by the Build Alternatives.

Wildlife and Wildlife Habitat. Effects to wildlife and wildlife habitat are discussed in terms of the type of habitat an area provides for wildlife and, more specifically, the amount of that habitat that would be lost if the alternative is built. The Build Alternatives would affect approximately 4,287 acres to 4,564 acres of habitat. This represents slightly more than 2 percent of the 194,700 acres of habitat identified in the project area.

The following list summarizes potential losses to different habitat types in the project area from a Tier 2 roadway footprint:

- Agricultural land (i.e., farmland and ranch land)—2,378 acres to 2,683 acres[1]
- Wetlands and riparian areas—587 acres to 712 acres
- Grassland (primarily used for ranching activities)—642 acres to 1,025 acres
- Shrubland (primarily used for ranching activities)—173 acres to 294 acres
- Other habitats (including woodland, open water, rocky outcrops, urban and rural areas, and disturbed areas)—90 acres to 276 acres

[1] This quantification is based on SWReGAP data and classifications, as opposed to Section 4.1, which uses data from Tranel 2008a that is specific to agricultural uses in the project area.

Most of these effects would occur to agricultural land. The native plants in these areas already have been disturbed by human settlement of the region. This acreage still provides habitat for wildlife, but the types of animals that use the land are likely to have changed.
Additionally, a sizable number of wetland and riparian acres also would be affected by the Build Alternatives. These areas have the potential to contain plants and wildlife that do not thrive in other types of habitat found in the project area. However, the majority (68 percent to 72 percent) of the affected wetland/riparian resources are low functioning (Class III and IV), and are unlikely to provide quality habitat. Therefore, the Build Alternatives are unlikely to have a substantial effect on habitat in the Lower Arkansas Valley.

Impacts to agricultural land and wetland/riparian habitat areas would further fragment and reduce the available nesting and foraging habitat for migratory birds within the central flyway. However, the effects of this reduction are anticipated to be minimal. The Build Alternatives largely stay on or near the existing, previously disturbed U.S. 50 corridor, with the exception of around towns, and effects to wetland/riparian resources primarily would be to Category III and IV resources (low functioning). In addition, there is an abundance of agricultural land adjacent to the project area, which would require minimal expenditure of energy for migratory birds to reach for foraging.

Noxious Weeds. The Build Alternatives have the potential to positively and negatively affect the natural environment of the Lower Arkansas Valley due to their effect on noxious weeds. They could have positive effects by causing the removal of existing noxious weeds in the areas where the Build Alternatives are constructed. However, 14 species of noxious weeds were identified in the project area and it is common for construction activities to facilitate the delivery and spread of noxious weeds. Construction activities create areas of bare, disturbed ground where the native plant cover has been removed. These conditions are perfect environments for noxious weeds. As their seeds are carried to these areas by wind or human activity, noxious weeds can easily establish themselves as the dominant plant species. Once established, they can out-compete native species (prevent them from establishing on those sites) or spread to nearby areas and degrade the native habitat found there. During Tier 2 studies, when specific roadway footprints are identified, a detailed analysis of existing noxious weeds along the highway would be obtained so that plans can be created to contain them as much as practical during construction activities. CDOT construction policies require noxious weed control plans and activities, so any effect by the Build Alternatives is expected to be minimal.

Special-Status Species. The Build Alternatives would affect wildlife by replacing their natural habitats with a roadway or by fragmenting habitat (see the Biological Resources Technical Memorandum in

Appendix A for more detail). The following special-status species—even those species that have not been observed in the project area or in the area of the Build Alternatives, but may occur there due to existing habitat conditions—could be affected by the alternatives:

- **Birds**—American Peregrine Falcon, Bald Eagle, Burrowing Owl (see Figure 4-21), Ferruginous Hawk, Greater Sandhill Crane, Interior Least Tern, Lesser Prairie Chicken, Long-Billed Curlew, Mexican Spotted Owl, Mountain Plover, Piping Plover, Western Snowy Plover
- **Mammals**—black-footed ferret, black-tailed prairie dog, Botta's pocket gopher, swift fox, Townsend's big-eared bat
- **Reptiles**—common king snake, Massasauga snake, Texas horned lizard, triploid checkered whiptail, yellow mud turtle
- **Amphibians**—Couch's spadefoot toad, northern leopard frog, plains leopard frog
- **Fishes**—Arkansas darter, flathead chub, plains minnow, southern redbelly dace, suckermouth minnow

Figure 4-21. Burrowing Owl

Wildlife Crossings. A total of 16 wildlife crossings were identified along U.S. 50 in the Lower Arkansas Valley. CPW assigned these crossings a moderate (0.5 or fewer mortalities per mile per year), high (0.6 to 0.9 mortalities per mile per year), or very high (1.0 or more mortalities per mile per year) relative priority. Widening the highway to four lanes at these locations, per the Build Alternatives, would make it less safe for animals to cross there, as well as potentially increasing animal-vehicle collision rates.

In the area of 11 of the 16 crossings, the highway width would be doubled from two lanes to four lanes, making it less safe for wildlife to cross at these locations and for motorists using the highway (for exhibits of wildlife crossing locations, see Appendix J of the Biological Resources Technical Memorandum, which is located in Appendix A). These 11 crossing are:

- Between milepost 330 and milepost 332 (in Pueblo County)
- Between milepost 334 and milepost 336 (in Pueblo County)
- Between milepost 347 and milepost 349 (near the Pueblo-Otero county line)
- At milepost 355 (in Otero County)
- At milepost 408 (in Bent County)
- Between milepost 440 and milepost 442 (in Prowers County)
- Between milepost 442 and milepost 444 (in Prowers County)

- Between milepost 444 and milepost 445 (in Prowers County)
- Between milepost 445 and milepost 446 (in Prowers County)
- Between milepost 454 and milepost 458 (in Prowers County)
- Between milepost 462 and milepost 463 (in Prowers County)

Build Alternatives Effects by Location

This section describes the potential impacts from the Build Alternatives to wildlife and wildlife habitat by location. Table 4-9 summarizes wildlife habitat effects (locations are listed from west to east). Table 4-10 presents a summary by location of wildlife crossings and special-status species present or potentially present in the project area that could be affected by the Build Alternatives. The table includes all special-status species that could be affected due to a known occurrence in the project area, as well as those species that have not been observed in the project area but have a moderate to high potential to occur there due to existing habitat conditions. The following species have a low potential to occur in the project area because habitat requirements are not satisfied: American Peregrine Falcon, Mexican Spotted Owl, black-footed ferret, round-tailed horned lizard, Texas blind snake, northern leopard frog, and plains minnow. Finally, Table 4-11 summarizes effects to noxious weeds that are or may be present in the project area.

Table 4-9. Summary by Location of Potential Effects to Habitat from the Build Alternatives

Section	Build Alternatives (if applicable)	Habitat (acres)					
		Agriculture	Grassland	Shrubland	Wetland/ Riparian	Other	Total
Section 1: Pueblo	Alternative 1: Pueblo Airport North	8	276	67	13	5	368
	Alternative 2: Pueblo Existing Alignment	45	64	5	60	137	310
	Alternative 3: Pueblo SH 47 Connection	45	88	20	48	90	291
Section 2: Pueblo to Fowler	Alternative 1: Fort Reynolds Existing Alignment	174	213	47	125	60	620
	Alternative 2: Fort Reynolds Realignment	221	190	54	112	39	616
Section 3: Fowler	Alternative 1: Fowler North	80	1	0	25	1	105
	Alternative 2: Fowler South	140	0	0	8	1	149
Section 4: Fowler to Manzanola	—	132	3	0	49	2	186

Table 4-9. Summary by Location of Potential Effects to Habitat from the Build Alternatives (continued)

Section	Build Alternatives (if applicable)	Habitat (acres)					
		Agriculture	Grassland	Shrubland	Wetland/ Riparian	Other	Total
Section 5: Manzanola	Alternative 1: Manzanola North	64	0	0	5	9	78
	Alternative 2: Manzanola South	73	0	0	4	3	79
Section 6: Manzanola to Rocky Ford	—	156	1	1	1	4	164
Section 7: Rocky Ford	Alternative 1: Rocky Ford North	231	1	2	11	6	251
	Alternative 2: Rocky Ford South	207	16	7	12	6	248
Section 8: Rocky Ford to Swink	—	26	2	1	3	6	37
Section 9: Swink	Alternative 1: Swink North	58	0	0	6	9	72
	Alternative 2: Swink South	75	0	0	1	0	76
Section 10: La Junta	Alternative 1: La Junta North	102	115	15	28	2	262
	Alternative 2: La Junta South	127	78	23	15	15	257
	Alternative 3: La Junta South	131	130	15	19	2	297
	Alternative 4: La Junta South	129	208	21	20	2	360
Section 11: La Junta to Las Animas	—	183	207	21	20	1	431
Section 12: Las Animas	Alternative 1: Las Animas North	59	0	2	40	4	105
	Alternative 2: Las Animas South	108	2	4	23	6	142
Section 13: Las Animas to Lamar	—	560	71	5	130	11	777
Section 14: Lamar to Granada	—	272	0	39	108	2	423
Section 15: Granada	Alternative 1: Granada North	59	2	1	5	0	67
	Alternative 2: Granada South	27	1	34	2	0	63
Section 16: Granada to Holly	—	155	13	33	55	4	259
Section 17: Holly	Alternative 1: Holly North	44	0	4	16	1	65
	Alternative 2: Holly South	43	0	3	20	0	66
Section 18: Holly Transition	—	73	12	3	22	1	110

Source: McLean 2006, SWReGAP 2006
Note: The sum of individual items may not equal totals due to rounding.

Table 4-10. Summary by Location of Wildlife Crossings and Special-Status Species Present or Potentially Present in the Project Area that Could be Affected by the Build Alternatives

Section	Build Alternatives (if applicable)	Wildlife Crossings		Special-Status Species																										
		Number of Crossings	Priority (Very High, High, or Moderate)	Bald Eagle	Burrowing Owl	Ferruginous Hawk	Greater Sandhill Crane	Interior Least Tern	Lesser Prairie Chicken	Long-Billed Curlew	Mountain Plover	Piping Plover	Western Snowy Plover	Black-Tailed Prairie Dog	Botta's Pocket Gopher	Swift Fox	Townsend's Big-Eared Bat	Common King Snake	Massasauga Snake	Texas Horned Lizard	Triploid Checkered Whiptail	Yellow Mud Turtle	Couch's Spadefoot Toad	Northern Leopard Frog	Plains Leopard Frog	Arkansas Darter	Flathead Chub	Southern Redbelly Dace	Suckermouth Minnow	Total Number of Special-Status Species
Section 1: Pueblo	Alternative 1: Pueblo Airport North	0	NA		X	X					X			X	X	X	X								X					8
	Alternative 2: Pueblo Existing Alignment	1	Moderate		X	X					X			X	X	X	X								X					8
	Alternative 3: Pueblo SH 47 Connection	1	Moderate		X	X					X			X	X	X	X								X					8
Section 2: Pueblo to Fowler	Alternative 1: Fort Reynolds Existing Alignment	3	High		X	X					X			X	X	X	X								X	X		X		10
	Alternative 2: Fort Reynolds Realignment	3	High		X	X					X			X	X	X	X								X	X		X		10
Section 3: Fowler	Alternative 1: Fowler North	1	High	X			X			X						X		X				X			X					7
	Alternative 2: Fowler South	1	High				X			X						X									X					4
Section 4: Fowler to Manzanola	—	1	High				X			X						X		X				X			X			X		7
Section 5: Manzanola	Alternative 1: Manzanola North	0	NA				X			X						X		X				X			X					6
	Alternative 2: Manzanola South	0	NA				X			X						X		X				X			X					6
Section 6: Manzanola to Rocky Ford	—	0	NA				X			X						X		X				X			X					6
Section 7: Rocky Ford	Alternative 1: Rocky Ford North	0	NA				X			X						X		X				X			X					6
	Alternative 2: Rocky Ford South	0	NA				X			X						X		X				X			X					6
Section 8: Rocky Ford to Swink	—	1	Very high				X			X						X		X				X			X			X		7

Table 4-10. Summary by Location of Wildlife Crossings and Special-Status Species Present or Potentially Present in the Project Area that Could be Affected by the Build Alternatives (continued)

Section	Build Alternatives (if applicable)	Wildlife Crossings		Special-Status Species																										
		Number of Crossings	Priority (Very High, High, or Moderate)	Bald Eagle	Burrowing Owl	Ferruginous Hawk	Greater Sandhill Crane	Interior Least Tern	Lesser Prairie Chicken	Long-Billed Curlew	Mountain Plover	Piping Plover	Western Snowy Plover	Black-Tailed Prairie Dog	Botta's Pocket Gopher	Swift Fox	Townsend's Big-Eared Bat	Common King Snake	Massasauga Snake	Texas Horned Lizard	Triploid Checkered Whiptail	Yellow Mud Turtle	Couch's Spadefoot Toad	Northern Leopard Frog	Plains Leopard Frog	Arkansas Darter	Flathead Chub	Southern Redbelly Dace	Suckermouth Minnow	Total Number of Special-Status Species
Section 9: Swink	Alternative 1: Swink North	1	Very high				X			X						X		X				X			X					6
	Alternative 2: Swink South	0	NA				X			X						X		X				X			X					6
Section 10: La Junta	Alternative 1: La Junta North	0	NA		X	X	X			X	X			X		X	X	X	X	X	X	X	X		X					15
	Alternative 2: La Junta South	0	NA		X	X	X			X	X			X		X	X	X	X	X	X	X	X		X					15
	Alternative 3: La Junta South	0	NA		X	X	X			X	X			X		X	X	X	X	X	X	X	X		X					15
	Alternative 4: La Junta South	0	NA		X	X	X			X	X			X		X	X	X	X	X	X	X	X		X					15
Section 11: La Junta to Las Animas	—	0	NA		X	X	X			X	X			X		X	X	X	X	X	X	X	X		X					15
Section 12: Las Animas	Alternative 1: Las Animas North	0	NA	X			X			X			X			X	X	X		X		X	X		X	X	X			13
	Alternative 2: Las Animas South	0	NA	X			X			X			X			X	X	X		X		X	X		X	X	X			13
Section 13: Las Animas to Lamar	—	2	Moderate (1); High (1)	X	X	X	X	X		X	X	X	X	X		X		X	X	X		X	X		X					17
Section 14: Lamar to Granada	—	4	Very high (2); High (2)	X			X		X	X						X		X	X	X		X	X		X					11
Section 15: Granada	Alternative 1: Granada North	1	Very high				X		X	X						X		X	X	X		X	X		X					10
	Alternative 2: Granada South	1	Very high				X		X	X						X		X	X	X		X	X		X					10
Section 16: Granada to Holly	—	2	Very high (1); Moderate (1)	X			X		X	X						X		X	X	X		X	X		X	X			X	13
Section 17: Holly	Alternative 1: Holly North	1	Moderate	X			X			X						X		X				X	X		X	X				9
	Alternative 2: Holly South	1	Moderate	X			X			X						X		X				X	X		X	X				9
Section 18: Holly Transition	—	0	NA		X	X	X			X	X			X		X		X				X	X		X	X				12

Table 4-11. Summary by Location of Noxious Weeds Present or Potentially Present in the Project Area that Could be Affected by the Build Alternatives

Section	Build Alternatives (if applicable)	Noxious Weeds														
		Canada Thistle	Chicory	Cutleaf Teasel	Field Bindweed	Hoary Cress	Johnsongrass	Musk Thistle	Perennial Pepperweed	Prickly Lettuce	Puncturevine	Russian Knapweed	Russian Olive	Salt Cedar	Scotch Thistle	Total Number of Noxious Weeds
Section 1: Pueblo	Alternative 1: Pueblo Airport North	X	X	X	X		X	X		X	X		X	X	X	11
	Alternative 2: Pueblo Existing Alignment	X	X	X	X		X	X			X	X	X	X	X	11
	Alternative 3: Pueblo SH 47 Connection	X	X	X	X		X	X			X		X	X	X	10
Section 2: Pueblo to Fowler	Alternative 1: Fort Reynolds Existing Alignment	X		X	X		X	X	X	X	X	X	X	X		11
	Alternative 2: Fort Reynolds Realignment	X		X	X		X	X	X	X	X	X	X	X		11
Section 3: Fowler	Alternative 1: Fowler North				X		X			X	X	X	X	X		7
	Alternative 2: Fowler South				X		X			X	X	X	X	X		7
Section 4: Fowler to Manzanola	—				X		X			X	X	X	X	X		7
Section 5: Manzanola	Alternative 1: Manzanola North				X		X			X	X	X	X	X		7
	Alternative 2: Manzanola South				X		X			X	X		X	X		6
Section 6: Manzanola to Rocky Ford	—				X		X			X	X	X	X	X		7
Section 7: Rocky Ford	Alternative 1: Rocky Ford North				X		X				X	X	X	X		6
	Alternative 2: Rocky Ford South				X		X				X	X	X	X	X	7
Section 8: Rocky Ford to Swink	—				X		X				X		X	X		5
Section 9: Swink	Alternative 1: Swink North				X		X				X		X	X	X	6
	Alternative 2: Swink South				X		X				X		X	X	X	6

Table 4-11. Summary by Location of Noxious Weeds Present or Potentially Present in the Project Area that Could be Affected by the Build Alternatives (continued)

Section	Build Alternatives (if applicable)	Noxious Weeds														
		Canada Thistle	Chicory	Cutleaf Teasel	Field Bindweed	Hoary Cress	Johnsongrass	Musk Thistle	Perennial Pepperweed	Prickly Lettuce	Puncturevine	Russian Knapweed	Russian Olive	Salt Cedar	Scotch Thistle	Total Number of Noxious Weeds
Section 10: La Junta	Alternative 1: La Junta North				X		X				X	X		X	X	6
	Alternative 2: La Junta South				X		X				X			X	X	5
	Alternative 3: La Junta South				X		X				X			X	X	5
	Alternative 4: La Junta South				X		X				X			X	X	5
Section 11: La Junta to Las Animas	—				X		X				X	X	X	X	X	7
Section 12: Las Animas	Alternative 1: Las Animas North				X		X						X	X		4
	Alternative 2: Las Animas South				X		X					X	X	X		5
Section 13: Las Animas to Lamar	—				X	X	X			X	X	X	X	X		8
Section 14: Lamar to Granada	—				X		X			X	X		X	X		6
Section 15: Granada	Alternative 1: Granada North				X		X			X	X		X	X		6
	Alternative 2: Granada South				X		X			X	X		X	X		6
Section 16: Granada to Holly	—				X	X	X				X		X	X		6
Section 17: Holly	Alternative 1: Holly North				X	X	X			X	X			X		6
	Alternative 2: Holly South				X	X	X			X	X			X		6
Section 18: Holly Transition	—				X	X	X				X			X		5

Mitigation

The U.S. 50 Tier 1 EIS has developed a natural resources mitigation strategies plan. This plan is intended to guide mitigation activities for natural resource impacts that occur during Tier 2 studies, primarily impacts to wildlife and their habitat. The three goals identified in the Natural Resources Mitigation Strategies Plan are as follows:

- Maintain and enhance biodiversity in the Lower Arkansas River Valley
- Improve ecosystem integrity in the Lower Arkansas River Valley
- Accommodate social and economic objectives when possible

Strategies to meet these goals include mitigation banking, a wildlife crossing study, management of noxious weeds and aquatic nuisance species, and partnering opportunities, just to name a few. Further mitigation strategies are discussed in the Natural Resources Mitigation Strategies Plan located in Appendix E. All applicable laws and regulations will be followed, and mitigation measures would be applied as needed to offset identified impacts during Tier 2 studies.

Avoidance Activities

Effects to wildlife and wildlife habitat were avoided to the greatest extent possible in the U.S. 50 Tier 1 EIS during the alternatives development process by selecting a 1,000-foot-wide general corridor for the Build Alternatives. This allows for avoidance and minimization while identifying the 250-foot-wide roadway footprint during Tier 2 studies. Therefore, avoidance activities will be determined during Tier 2 studies.

4.2.3 Water Resources

Plants, animals, and humans depend on water to support life, and to maintain this resource, it must be clean (i.e., free of pollutants). “Clean water supports an incredible diversity of plant and animal life, and it is a source of drinking water and food that sustains human life. It is a valuable resource that is used for many other activities, such as boating and swimming. It also is used by industry and for agricultural purposes” (United States Environmental Protection Agency [EPA] 2010). For these reasons, it is important to protect quality water resources.

Water quality describes whether water is suitable for its intended use. Various uses include human consumption or recreational activities, as well as for wildlife usage, such as for aquatic species habitat. It is the biological, chemical, and physical characteristics and general composition of water that determines its suitability.

This analysis evaluated several types of water resources and related water issues in the project area, including surface water, ground water, stormwater runoff, and floodplains. Each of these water resources are defined below:

- **Surface water flows across the top of the soil rather than seeping into it.** Common surface water resources are rivers, streams, reservoirs, and irrigation ditches and canals. In the project area, this water is primarily used for farming (i.e., irrigation of land used for crop production). A small amount of surface water also is used for domestic consumption (i.e., drinking water and other household uses).
- **Ground water is found in the top layers of soil or in rock layers below the soil.** In the project area, it is primarily used for irrigated farming and domestic consumption and is accessed through wells.
- **Stormwater runoff occurs when precipitation (i.e., rain or snow) falls on an impervious surface, such as a road.** An impervious surface is one that does not allow liquids to pass through it. The stormwater flows over the roadway surface and collects transportation-related pollutants along with it. Transportation-related pollutants are substances associated with the operation of vehicles driving on the road or roadway maintenance activities, such as oil, grease, and de-icing compounds, among others. The water carries these pollutants into nearby surface water resources or onto adjacent land, where they eventually seep into ground water resources. Once there, they also can be transported to other water resources in the Arkansas River basin. As a result, pollutant levels rise in those water resources, causing a decline in water quality. Stormwater also runs off into local storm sewer systems. The municipalities that operate these systems are required to treat the water before releasing it back into nearby surface water resources.
- **Floodplains are the low areas adjacent to a water resource, such as a river or creek, that occasionally or periodically flood.** The purpose of a floodplain is to contain floodwater during a storm event. It is important to identify these areas so that development plans take them into consideration or develop them (or do not develop them) accordingly.

Results of the Analysis

The Build Alternatives would relocate U.S. 50 from its current through-town route to an around-town route at eight communities in the project area: Fowler, Manzanola, Rocky Ford, Swink, La Junta, Las Animas, Granada, and Holly. They also would expand the existing two-lane sections of the highway to four lanes. These changes could result in the following effects to water quality:

- The Build Alternatives would require additional crossings of surface water resources, primarily irrigation canals and ditches, by U.S. 50. These new structures have the potential to add pollution to these water resources, thereby decreasing water quality.
- The Build Alternatives would increase the amount of stormwater runoff originating from U.S. 50. This is likely to increase the amount of pollutants (from vehicles and road maintenance) washing off into nearby surface water resources (and eventually entering ground water resources) or into local storm sewer systems. Compared to other sources of water quality impairment in the Lower Arkansas River Basin, the amount of existing pollution related to U.S. 50 stormwater runoff is extremely small.
- Irrigated farming activities are the greatest contributor to water quality impairment in the project area. While the Build Alternatives would remove approximately 3,600 acres to 4,588 acres of agricultural land from production, that is only 2 percent to 3 percent of the approximately 175,000 acres of agricultural land that exist in the project area today (Tranel 2008a). Therefore, no substantial reduction in irrigation activities, and subsequently impairment levels, is expected.

Affected Environment

The following water resources and issues were evaluated for the U.S. 50 Tier 1 EIS, and they are discussed in detail below.

- Surface water
- Ground water
- Stormwater runoff
- Floodplains

Surface Water

The Arkansas River basin is the largest river basin in Colorado. It covers more than 28,000 square miles in southeastern Colorado and encompasses 27 percent of the state. The Arkansas River begins near Leadville at an elevation of more than 14,000 feet and flows south-southeast through the mountains before it turns east and enters the plains near Pueblo. From Pueblo, the river essentially follows a path parallel with U.S. 50 to the Colorado-Kansas state line (see Figure 4-22). The river's elevation at the state

line is approximately 3,300 feet, representing an elevation drop of more than 10,000 feet from its start in Leadville (Colorado Water Conservation Board [CWCB] 2006a).

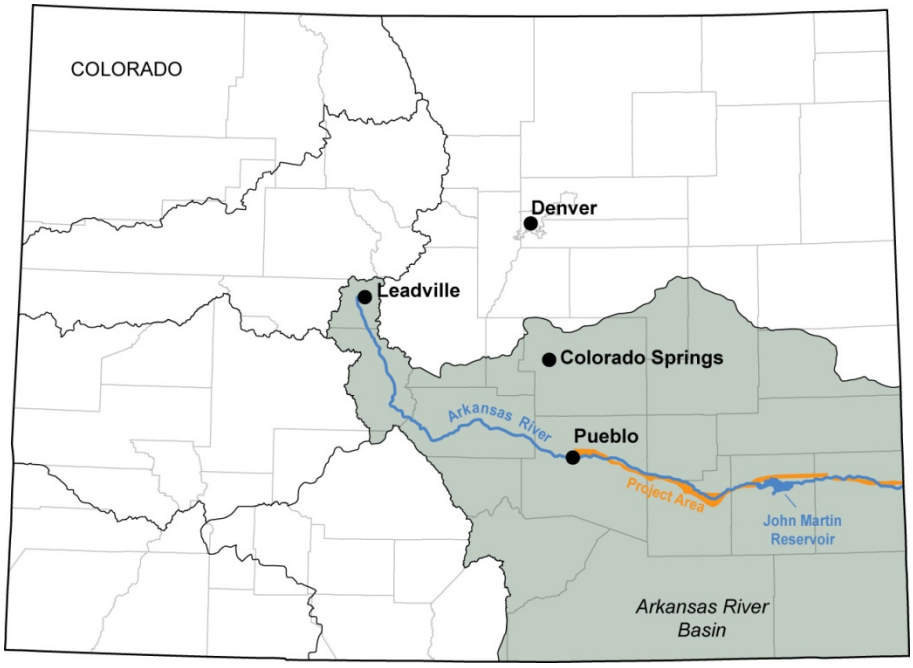


Figure 4-22. Arkansas River Basin

Well-known tributaries to the Arkansas River include the Purgatoire River, Huerfano River, Cucharas River, Apishapa River, Fountain Creek, and Big Sandy Creek (Colorado Geological Survey [CGS] 2003). Approximately one million acre-feet[2] of water flows down the Arkansas River each year (CGS 2003).

The amount of water that would naturally occur in the basin has been augmented by trans-basin diversions, which are transfers of water from one river basin to another. The Arkansas River basin participates in 11 major trans-basin diversions, which reallocate roughly 136,000 acre-feet of additional water to the basin each year (Department of Natural Resources [DNR] 2000). Table 4-12 provides details about these diversions.

[2] Acre-feet is a unit of measurement for large volumes of water. The volume of this measurement is equal to one acre in surface area per one foot of depth.

Table 4-12. Major Trans-Basin Diversions Into and Out of the Arkansas River Basin

Name	Water Diverted Annually (acre-feet)[a]
Boustead Tunnel	+ 54,000
Twin Lakes Tunnel	+ 46,900
Homestake Tunnel	+ 24,500
Hoosier Pass Tunnel	+ 9,300
Busk-Ivanhoe Tunnel	+ 4,100
Wurtz Ditch	+ 2,100
Columbine Ditch	+ 1,700
Madano Ditch	+ 800
Ewing Ditch	+ 800
Larkspur Ditch	+ 100
Aurora Rocky Ford Ditch	- 8,300
Total	**+ 136,000**

Source: DNR 2000

[a] "+" represents a diversion into the Arkansas River basin and "-" represents a diversion out of the basin (rounded to the nearest 100 acre-feet)

In addition to the Arkansas River, there are 21 other named streams or rivers, two reservoirs, and 28 irrigation canals or ditches within the project area (U.S. Geological Survey [USGS] 2007). These surface water resources are listed below.

- **Rivers and streams**—Anderson Arroyo, Apishapa River, Cheyenne Creek, Chico Creek, Chicosa Creek, Clay Creek, Crooked Arroyo, Fountain Creek, Gageby Creek, Granada Creek, Graveyard Creek, Huerfano River, King Arroyo, Limestone Creek, Prowers Arroyo, Purgatoire River, Thompson Arroyo, Timpas Creek, Vandiver Arroyo, Wild Horse Creek, and Wolf Creek
- **Canals and ditches**—Amity Canal, Buffalo Canal, Catlin Canal, Consolidated Ditch, Excelsior Ditch, Fort Bent Canal, Fort Lyon Canal, Holly Ditch, Jones Ditch, Lamar Canal, Las Animas Town Ditch, Levere Ditch, Lubers Ditch, Lubers Drainage Ditch, Manvel Canal, McClave Drainage Ditch, Miller Ditch, North Granada Ditch, Old Otero Canal, Otero Canal, Oxford Farmers Ditch, Riverview Ditch, Rocky Ford Canal, Rocky Ford Highline Canal, South Granada Ditch, Sunflower Ditch, Wiley Drainage Ditch, and X-Y Canal
- **Reservoirs**—G.W. Verhoeff Reservoir and John Martin Reservoir

Numerous unnamed streams and ditches also are present. None of the rivers in the project area have been designated as wild and scenic under 16 USC 1271–1287.

Surface water in the project area is used primarily for irrigated farming, which is consistent with the agricultural nature of the region. The Arkansas River has been a primary source of irrigation water for farmland in the region since it was settled in the late 1800s. Water from the Arkansas River reaches

farmland through an interconnected system of irrigation canals and ditches that were excavated by the early settlers. The project area contains about 83,000 acres of farmland, which is 43 percent of its total area (Tranel 2008a).

Surface water resources in the project area include water storage facilities. The John Martin Reservoir (Figure 4-23), located near Las Animas, has a storage area of approximately 618,600 acre-feet (CWCB 2006a). Some of the surface water resources in the project area are impaired or threatened. Impaired waters are resources that do not currently meet water quality standards, and threatened waters are those that are not expected to meet those standards at some time in the future.

Figure 4-23. John Martin Reservoir and Dam

The Colorado Department of Public Health and Environment (CDPHE), with guidance from the EPA, establishes maximum levels in water resources for pollutants that have been found to be harmful to humans, wildlife, and plants. Impaired surface water resources within the project area are cataloged in the Colorado Section 303(d) list. The list is created by the Colorado Water Quality Control Commission and is approved by the EPA. The list used in this analysis was adopted on March 9, 2010, and became effective on April 30, 2010.

It is important to identify impaired water resources so that plans can be developed to help them meet water quality standards in the future. In Colorado, the CDPHE is responsible for identifying impaired resources and for developing these plans. Because the department cannot address all impaired waters at once, they are prioritized into three categories by the amount of risk they pose to human health or the environment: high priority (most risk), medium priority, and low priority (least risk) (CDPHE 2008a, CDPHE 2010).

Impaired surface water resources in the project area are listed in Table 4-13. This table also shows the segment number assigned to the resource, the general location of the resource, what portion of the resource is impaired, the cause of the impairment, and the priority of the impairment. Additionally, the CDPHE identifies water resources where “there is a reason to suspect water quality problems, but there is also uncertainty regarding one or more factors” (CDPHE 2008a) about the resource or the data collected about its quality. Four of the water resources identified as impaired also fall into this category. These resources are labeled as suspected in Table 4-13, and the cause of the potential impairment is listed. The

project is not expected to substantially affect any of the 303-listed impaired waters because the pollutant sources typically associated with roadways (see Table 4-13) do not contribute to the known or suspected impairments to surface waters identified by CDPHE.

Table 4-13. Impaired Surface Water Resources in the Project Area

Segment Number	Location[a]	Impairment(s)			
		Portion of the Resource Impaired	Cause	Priority[b]	Suspected Impairment
COARFO02a	Fountain Creek—Monument Creek to SH 47	All	*E. Coli*	High	Selenium
COARFO02b	Fountain Creek—SH 47 to the Arkansas River	All	Selenium, *E. Coli*	Low, High	
COARFO04	All tributaries to Fountain Creek that are not on National Forest or U.S. Air Force Academy land	All	*E. Coli*	High	
COARLA01a	Arkansas River—Fountain Creek to the Colorado Canal headgate	All	Selenium, Sulfate	Low	
COARLA01b	Arkansas River—Colorado Canal headgate to the John Martin Reservoir	All	Selenium	Low	
COARLA01c	Arkansas River—John Martin Reservoir to the Colorado-Kansas state line	All	Selenium, Uranium	Low	
COARLA04	Apishapa River, Timpas Creek, Lorencito Canyon	All	Selenium	Low	
COARLA07	Purgatoire River—I-25 to the Arkansas River	All	Selenium	Low	Sediment
COARLA09a	Main stem of Adobe Creek and Gageby Creek	All, Horse Creek	Selenium, Iron	Low, High	
COARLA09b	Apache Creek, Breckenridge Creek, Little Horse Creek, Bob Creek, Wild Horse Creek, Wolf Creek, Big Sandy Creek	All	Selenium	Low	
COARLA09c	Rule Creek, Muddy Creek, Caddoa Creek, Clay Creek, Cat Creek, Chicosa Creek	Chicosa Creek only	Iron, Selenium	Low	Zinc (Rule Creek only)
COARLA11	John Martin Reservoir	All	Selenium	Low	
COARMA04a	Wild Horse Creek	All	*E. Coli*	High	Nitrogen Dioxide
COARMA12	Huerfano River—Muddy Creek to the Arkansas River	All	Selenium	Low	

Sources: CDPHE 2008a, CDPHE 2010

[a]Some water resources listed may not be located inside the project area; a segment is listed as long as a portion of it is inside the project area.

[b]Impaired waters are prioritized into three categories by the amount of risk they pose to human health or the environment: high priority (most risk), medium priority, and low priority (least risk).

The major contributors to poor water quality and impairment in the Lower Arkansas River basin (the portion of the basin from Pueblo to the Colorado-Kansas state line) are salinity, selenium, noxious weeds, and other bacterial or mineral sources. Agricultural irrigation is known to increase the concentration of salt in water or soil. Dissolved mineral salts occur naturally in all irrigation water. When water is applied to farm fields, salts accumulate through evaporation and insufficient absorption. Concentrated salts are transported to water supplies during normal runoff, thereby increasing the salinity of those resources. Elevated levels of salinity can reduce plant growth (including crop production) and impede most other beneficial uses of the water resource. Research conducted by Colorado State University found that buildup of salt on farmland has cut per-acre yields by an average of 10 percent around La Junta and by 15 percent around Lamar (Stein 2005).

Elevated selenium concentrations also impair water quality in the Lower Arkansas River basin. The chemical selenium is a trace element that is essential to organic growth, but only in very small quantities. Both humans and fish require selenium. The primary source of selenium in the Arkansas River basin is runoff from the shale and limestone rock found there. Most of the selenium present in the basin appears to be dissolved in water, not held in sediments within water resources (Gates and Labadie 2000; Gates et. al 2006). In the Arkansas River, selenium generally increases in a downstream manner. Fountain Creek (located near Pueblo) acts as a source, increasing selenium concentrations. John Martin Reservoir (located east of Las Animas) acts as a sink, retaining selenium. Selenium concentrations are higher in the winter during periods of low stream flow than in the month of June when stream flows are higher due to snowmelt in the mountains of Colorado.

The tamarisk tree also is a substantial contributor to poor water quality in the project area. Tamarisk is far more drought tolerant than native plant species and can persist in areas where native species are susceptible to reduced quantity and quality of water resources. The ability of the tamarisk to survive under stressful conditions advances water loss within the basin and increases the concentration of pollutants in nearby water bodies. Approximately 11,300 acres of tamarisk occur throughout the project area, primarily along the Arkansas and Huerfano rivers (CDOW 2004; SWReGAP 2006). It has been estimated that tamarisk along the Arkansas River consumes 53,800 acre-feet of water per year (CWCB 2006b). Also, tamarisk reproduces and grows quickly—a plant can produce seeds capable of germinating in 24 hours and can grow up to one foot per month (Southeastern Colorado Water Conservancy District [SECWCD] 2008). This combination has enabled tamarisk to spread quickly and extensively along the Arkansas River and cause substantial harm to the quality of water resources in the basin.

Other sources of water quality impairment in the Lower Arkansas River basin include fecal coliform bacteria (also known as *E. coli*), iron, sulfate, and uranium. Specific sources of *E. coli* causing water quality impairment in portions of Fountain Creek, its tributaries, and Wild Horse Creek have not been determined (CDPHE 2008b). Elevated concentrations of iron, sulfate, and uranium in surface water come from naturally occurring rock formations.

CAFOs (or feedlots) have been identified by the EPA's Office of Enforcement and Compliance Assurance as an environmental problem affecting water quality (EPA 2009). Pollutants in water and soil associated with animal waste include nitrogen and phosphorus. The analysis conducted for this document, however, did not identify CAFOs as substantial contributors to water quality impairments in the project area.

Ground Water

Ground water represents a substantial water resource in the project area. It is generally pumped from wells located throughout the area. The primary uses are irrigated farming and domestic consumption. Ground water in the project area comes from two main sources: the shallow Arkansas River alluvial aquifer and the deeper Dakota-Cheyenne aquifer (CGS 2003).

In the project area, the Arkansas River alluvial aquifer is located approximately five feet to 30 feet below the ground surface along much of the Arkansas River (CGS 2003). This aquifer is an unconfined, water-table aquifer that is directly connected to the river and its tributaries. Water from this aquifer is primarily used for irrigation (CWCB 2006a). It is replaced mainly by water passing through the soil at the bottom of the Arkansas River (water infiltrating the river bottom). A considerable amount of water also is replaced by infiltrating the bottom of irrigation canals and ditches and by infiltrating farm fields after they have been irrigated. The water quality of this aquifer degrades in portions of the basin downstream of Pueblo due to impacts of heavy irrigation in these areas. These uses increase concentration of salinity and reduce its usefulness for irrigation and other activities (CWCB 2006a).

The Dakota-Cheyenne aquifer is present throughout most of Colorado, but it is used mostly in the eastern half of the state (CGS 2003). The Dakota-Cheyenne aquifer is deeper than the Arkansas River alluvial aquifer, ranging from a depth of zero feet to more than 9,000 feet below ground (CWCB 2006a). Water from the Dakota-Cheyenne aquifer is used for irrigation and domestic consumption. Water quality within this aquifer generally is very good (CWCB 2006a).

The water in these aquifers is used for irrigation and domestic consumption from wells. In the lower Arkansas River alluvium, the mean depth of wells is 58 feet below ground surface, and more than 90 percent of them are completed at depths of less than 120 feet (CGS 2003). The Dakota-Cheyenne aquifer is much deeper than the Arkansas River alluvial aquifer; so well depths also are deeper. The Colorado Division of Water Resources tracks well permits in the state. The agency's database contains records for roughly 3,400 wells tapping into the Arkansas River alluvial aquifer and more than 27,500 wells associated with the Dakota-Cheyenne aquifer within the basin (CGS 2003).

Stormwater Runoff

During rainstorms, water running off a roadway carries pollutants from the roadway along with it. Consequently, when this water enters a nearby water resource or storm sewer system, the pollutants enter that resource or system as well. This is important because these pollutants may be harmful to human health or aquatic life. Human health effects may include cancer risks, breathing problems, nervous system disorders, and stomach disorders.

Federal law requires jurisdictions that operate storm sewer systems to obtain a permit. The permit sets limits on the amount of pollutants that can be released from the system into nearby water resources. The intent of these permits is to ensure that water returning to rivers, streams, and other water resources does not exceed high levels of pollutants. This preserves the quality of those water resources and, in turn, protects the health of the humans, wildlife, and plants that come into contact with that water. There are two jurisdictions in the project area that are required to hold a permit for their storm sewer system, which are known as municipal separate storm sewer system (MS4) permits. These jurisdictions are Pueblo County and the City of Pueblo (EPA 2008). Each of these jurisdictions discharges stormwater to the Arkansas River.

Common pollutants that can be found in stormwater runoff are shown in Table 4-14.

Table 4-14. Potential Roadway Pollutants

Relevant Project Phase	Source(s)	Pollutant(s)
Construction of the roadway	Adhesives	Phenol, formaldehyde, asbestos, benzene, naphthalene
	Cleaners	Metals, acidity, alkalinity, chromium
	Plumbing	Lead, copper, zinc, tin
	Painting	Volatile organic compounds, metals, phenolics, mineral spirits
	Wood	Organic material, formaldehyde, copper, creosote
	Masonry or concrete	Acidity, sediment, metals, asbestos
	Demolition	Asbestos, aluminum, zinc, dust, lead
	Yard operations and maintenance	Oil, grease, coolants, benzene and derivatives, vinyl chloride, metals, organic material, sediment, disinfectants, sodium arsenate, dinitro compounds, rodenticides, insecticides
	Landscaping and earthmoving	Pesticides, herbicides, fertilizers, organic material, alkalinity, metals, sulfur, aluminum sulfate
	Materials storage	Spills, leaks, dust, sediment
Operation of the roadway	Leaks, spills, or accidents	Oil, gasoline, diesel, grease, volatile organic compounds, chemicals, other potentially hazardous materials
	Vehicle traffic	Oil, grease, gasoline, diesel, benzene and derivatives, aromatic hydrocarbons, coolants, iron (rust), heavy metals, rubber, asbestos
	Winter sanding	Sediment
	De-icing	Calcium, sodium, magnesium, chloride
	Landscape maintenance	Herbicides, pesticides, fertilizers, alkalinity, metals, sulfur, aluminum sulfate
	Adhesives	Phenol, formaldehyde, asbestos, benzene, naphthalene
	Cleaners	Metals, acidity, alkalinity, chromium
	Painting	Volatile organic compounds, metals, phenolics, mineral spirits

Source: CDOT 2008b

Floodplains

Floodplains are designated by the size and frequency of the floods that occur within their area. One hundred-year floods have a 1-percent chance of being equaled or exceeded during any given year (Federal Emergency Management Agency [FEMA] 2013). The 100-year floodplain, also known as the Special Flood Hazard Area, includes all areas that would be under water during this type of flood event.

U.S. 50 follows a route generally parallel to the Arkansas River within the project area. Over this roughly 150-mile corridor, U.S. 50 crosses the river and its floodplain four times. It crosses in the areas between Pueblo and Fowler, just north of Las Animas, just north of Lamar, and between Granada and Holly. In several other locations along this route, the project area encroaches into the floodplain. Floodplains associated with other major tributaries to the Arkansas River also exist within the project area.

Environmental Consequences

This analysis identified water resources and issues within the project area; however, because the location and design of U.S. 50 within the Build Alternatives will not be determined until Tier 2 studies, it is not possible to identify effects to specific water resources. For this reason, this evaluation focuses on the following general effects to water resources in the project area:

- **Surface water—**Whether the Build Alternatives would add crossings of these resources by U.S. 50 or change the conditions causing existing water quality impairments
- **Ground water**—Whether the Build Alternatives would result in more pollutants entering ground water systems (i.e., the aquifers in the project area)
- **Stormwater**—Whether the Build Alternatives would result in more stormwater runoff, which would increase the amount of transportation-related pollutants likely to flow into nearby surface water resources and into local storm sewer systems
- **Floodplains**—Whether the Build Alternatives would cross into known floodplains

Summary of Effects

The following section summarizes potential effects to water resources and issues by the No-Build Alternative and the Build Alternatives.

No-Build Alternative

Under the No-Build Alternative, only minor and isolated construction would occur. Routine maintenance and repairs would be made as necessary to keep U.S. 50 in usable condition, including standard overlays and repairs of weather- or crash-related damage. Additionally, smaller scale improvements may be undertaken, such as short passing lanes and other minor safety improvements.

U.S. 50 would continue to contribute pollutants to the water resources of the Arkansas River basin through stormwater runoff. Traffic levels are expected to rise in the future, and as a result, pollutant levels are expected to rise as well. Traffic volumes are expected to increase by approximately 2,800 cars per day by 2040 on this 150-mile portion of U.S. 50 (CDOT 2010a; CDOT 2010d).

Build Alternatives

The Build Alternatives would relocate U.S. 50 from its current through-town route to an around-town route at eight communities in the project area: Fowler, Manzanola, Rocky Ford, Swink, La Junta, Las Animas, Granada, and Holly. These new around-town routes would be four lanes (two lanes in each direction). Between communities, the alternative would expand the existing two-lane portions of the highway to four lanes. This expansion and movement of the highway footprint has the potential to affect

water resources. Potential effects to surface water, ground water, stormwater, and floodplains are discussed below.

Surface Water. Possible effects to surface water resources in the Lower Arkansas River Basin include additional crossings of the resources by U.S. 50 and changes to conditions causing existing water quality impairments.

The Build Alternatives would add new crossings of water resources within the project area. Adding new structures across a surface water resource, such as a river, has the potential to decrease water quality by adding transportation-related pollution to the resource. This pollution would originate from the vehicles using the new crossing or from maintenance activities (e.g., the use of de-icing solvents during winter storms). Therefore, it is important to identify where new crossings may occur. Additional crossings are identified by location in the section "Build Alternatives Effects by Location," which is located later in this discussion.

U.S. 50 currently crosses the Arkansas River three times within the project area: between Pueblo and Fowler, just north of Las Animas, and between Granada and Holly. The highway also crosses the river just north of Lamar; however, this crossing is outside the project area. The Build Alternatives generally would retain crossings at these locations. The crossings between Pueblo and Fowler and between Granada and Holly would be maintained at the same location where U.S. 50 crosses the river today. The crossing just north of Las Animas could cross the river at the existing bridge location or it could be moved to a location

Potential Effect on Water Resources

The Build Alternatives would relocate U.S. 50 around eight communities and expand the existing two-lane sections of the highway to four lanes. These changes have the potential to affect water resources in the project area in the following ways:

- *New crossings of surface water resources by U.S. 50 have the potential to increase the amount of pollutants from the roadway that wash into those surface waters, decreasing the quality of those resources.*
- *The amount of stormwater running off U.S. 50 would increase if the alternative is built, which is likely to increase the amount of pollutants running off the highway into nearby surface water resources (and eventually into ground water resources). The amount of this increase cannot be determined, however, until roadway footprint and design are completed during Tier 2 studies.*

The Build Alternatives are not expected to have a substantial effect on the following water quality resources and issues:

- *Major causes of existing impairments (salinity, selenium, or tamarisk)*
- *Floodplains*

just west of the existing bridge (see Figure 4-24). The specific location of this crossing would be identified during Tier 2 studies when the roadway footprint is determined.

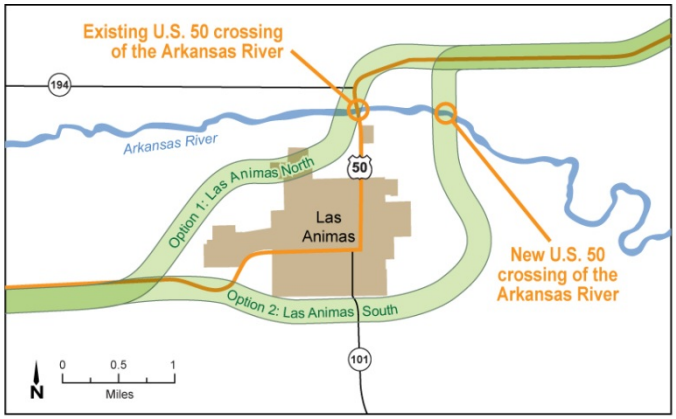


Figure 4-24. U.S. 50 Crossing of the Arkansas River at Las Animas

Table 4-15 in the following section lists the sections of the Build Alternatives and whether they are most likely to require new crossings of water resources for the new around-town routes. Because most of these areas are currently used as farmland, numerous irrigation canals and ditches flow through them. Many of these canals and ditches traverse the entire width of the alternative, so they would require new crossings by U.S. 50 if the alternative is built. It should be noted that irrigation canals and ditches in the project area frequently are crossed today by U.S. 50, county roads, and the BNSF Railway. Other types of water resources also could require new crossings depending on where the roadway footprint is located during Tier 2 studies.

The Build Alternatives would not require new crossings of the two reservoirs located in the project area. Currently, U.S. 50 already crosses the G.W. Verhoeff Reservoir approximately three miles east of Hasty. While the highway already crosses a small portion of the property used for the John Martin Reservoir State Park roughly eight miles east of Las Animas and then again almost 10 miles east of Las Animas, it does not cross the reservoir itself, and the Build Alternatives would not add a new crossing over the reservoir.

Figure 4-25. Irrigated Farmland—Otero County

Salinity is a major cause of water quality impairment in the Lower Arkansas River Basin, and irrigated farming is the primary cause of this impairment (see Figure 4-25). The Build Alternatives would convert approximately 3,600 to 4,600 acres of agricultural land to transportation use. While this would stop irrigation activities on these areas, it would not result in a substantial water quality improvement in the basin. This is because the salinity impairment is linked to farm irrigation practices, and roughly 83,000 acres of land

in the project area are currently used for farming. As a result, the acreage removed from irrigation by the project would not be large enough to substantially improve salinity levels in the lower portion of the basin, where the greatest problem with salinity exists. As a result, this project is not expected to have a substantial effect on water quality impairment from salinity.

The other substantial water quality issues in the Lower Arkansas River Basin are selenium and tamarisk. The Build Alternatives also would not affect selenium concentrations in the basin since they are caused by naturally occurring sources. However, some reduction of selenium concentrations may result from the rehabilitation and/or enhancement of wetlands required as compensatory mitigation for this project. Tamarisk may be removed during construction in the areas where the alternative is built, but these same construction activities also could facilitate the delivery and spread of this noxious weed. For example, existing tamarisk trees could be spread to newly disturbed soils on construction sites by wind carrying the seeds or by human activity. Even if the Build Alternatives result in a net reduction of tamarisk in the basin, this amount would be too small to substantially benefit water quality. Approximately 11,300 acres of tamarisk occur within the project area (i.e., not even within the entire basin), and the Build Alternatives only have the potential to remove between 279 and 388 acres depending on which alternatives are selected (CDOW 2004; SWReGAP 2006).

Ground Water. Ground water resources in the project area are recharged by water seeping through river bottoms, irrigated farm fields, and irrigation canals and ditches. These processes would continue if the Build Alternatives are built. They have the potential to decrease the quality of ground water resources by increasing the amount of contaminates available for transport. This pollution would originate from the vehicles using U.S. 50 or from maintenance activities. These pollutants would run off the roadway surface onto nearby land or into surface water resources. From there, the pollutants would seep through the soil down to ground water resources.

Stormwater Runoff. The amount of stormwater that runs off a roadway from a rain or snowstorm depends, in part, on the width of the road. Since the surface of a road is generally impervious, the wider the road is, the more precipitation falls on it and the more water runs off. Consequently, more transportation-related pollutants run off the road as well.

The Build Alternatives would widen the existing two-lane sections of U.S. 50 to four lanes and create new, four-lane, around-town routes on the periphery of eight communities. These changes would increase the area of the highway's impervious surface, and as a result, increase the overall amount of stormwater runoff and pollutants originating from U.S. 50 within the project area. The amount of additional runoff

would be calculated through a Tier 2 assessment because many factors that substantially influence stormwater runoff levels will not be determined until Tier 2 studies are identified. These factors include the design of the highway in terms of drainage, catchment, and treatment of runoff. Compared to other sources of water quality impairment in the Lower Arkansas River basin, the amount of existing pollution related to U.S. 50 stormwater runoff is extremely small.

Floodplains. U.S. 50 follows a route similar to the path of the Arkansas River throughout the project area. Consequently, the Build Alternatives also follow this route and cross into the river's known floodplain in several locations. Most of these locations are near the communities along the highway and in places where the Build Alternatives cross the river. Federal policies and regulations (E.O. 11988 and 23 CFR 650 Subpart A) seek to avoid and/or minimize encroachments within floodplains where practicable, and provide design standards for encroachments that are deemed unavoidable. During Tier 2 studies, FHWA and CDOT will perform a more thorough analysis on the location, design, and potential affects to floodplains that result from the U.S. 50 project.

Due to the nature of the Build Alternatives in relation to the other issues that threaten water quality in the Lower Arkansas River basin, the Build Alternatives likely would have a negligible effect on water quality.

Build Alternatives Effects by Location

All sections of the Build Alternatives are within the same ground water systems. Therefore, all of them would have the same effect on ground water resources. Those segments that are located along existing U.S. 50 would have minor impacts to increases from stormwater runoff from impervious cover, since the majority of these facilities already are paved and any additional paving would be less than what is already present. In the sections where around-town corridor alternatives are proposed, all of these sections and their associated alternatives would have impacts to stormwater runoff due to the addition of impervious cover where it does not exist currently. All Build Alternatives could affect surface water resources and floodplains differently. The proposed changes to surface waters are discussed in Table 4-15 below.

Table 4-15. Proposed New Surface Water Crossings by Location

Section	Build Alternatives (if applicable)	New Surface Water Crossings
Section 1: Pueblo	Alternative 1: Pueblo Airport North	No new crossings
	Alternative 2: Pueblo Existing Alignment	No new crossings
	Alternative 3: Pueblo SH 47 Connection	No new crossings
Section 2: Pueblo to Fowler	Alternative 1: Fort Reynolds Existing Alignment	No new crossings, but would replace existing bridge over the Huerfano River
	Alternative 2: Fort Reynolds Realignment	New crossing of the Huerfano River
Section 3: Fowler	Alternative 1: Fowler North	No new crossings needed, but the North Alternative would locate the highway closer to the Arkansas River than it is today
	Alternative 2: Fowler South	No new crossings
Section 4: Fowler to Manzanola	—	No new crossings
Section 5: Manzanola	Alternative 1: Manzanola North	No new crossings
	Alternative 2: Manzanola South	No new crossings
Section 6: Manzanola to Rocky Ford	—	No new crossings
Section 7: Rocky Ford	Alternative 1: Rocky Ford North	No new crossings
	Alternative 2: Rocky Ford South	No new crossings
Section 8: Rocky Ford to Swink	—	No new crossings
Section 9: Swink	Alternative 1: Swink North	No new crossings
	Alternative 2: Swink South	No new crossings
Section 10: La Junta	Alternative 1: La Junta North	Two new crossings needed on the Arkansas River
	Alternative 2: La Junta South	No new crossings
	Alternative 3: La Junta South	No new crossings
	Alternative 4: La Junta South	No new crossings
Section 11: La Junta to Las Animas	—	No new crossings
Section 12: Las Animas	Alternative 1: Las Animas North	No new crossings needed, but the existing bridge across the Arkansas River may be replaced
	Alternative 2: Las Animas South	A new bridge would be built about 3,600 feet to the east of the existing one on the Arkansas River
Section 13: Las Animas to Lamar	—	No new crossings

Table 4-15. Proposed New Surface Water Crossings by Location (continued)

Section	Build Alternatives (if applicable)	New Surface Water Crossings
Section 14: Lamar to Granada	—	No new crossings
Section 15: Granada	Alternative 1: Granada North	No issue because corridor would be located one mile south of the Arkansas River.
	Alternative 2: Granada South	No issue because corridor would be located three miles south of the Arkansas River.
Section 16: Granada to Holly	—	No new crossings
Section 17: Holly	Alternative 1: Holly North	Add a new crossing of Horse Creek, a tributary of the Arkansas River
	Alternative 2: Holly South	No new crossings needed, but the South Alternative would locate the highway closer to the river than it is today
Section 18: Holly Transition	—	No new crossings

Mitigation

The U.S. 50 Tier 1 EIS has developed a Natural Resources Mitigation Strategies Plan. This plan is intended to guide mitigation activities for natural resource impacts that occur during Tier 2 studies, including water quality impacts. As discussed earlier in this section, selenium creates a substantial water quality impairment for many of the streams and rivers in the U.S. 50 project area. Wetlands have been shown to be effective at reducing selenium concentrations in water. It appears to be worthwhile for CDOT and FHWA to explore the possibility of using wetlands to reduce selenium concentrations in selenium-impaired waters, such as the Arkansas River, Purgatoire River, Huerfano River, Apishapa River, and Timpas Creek, among others. If dealing with selenium loading by using wetlands is found to be feasible and practicable, wetland mitigation could be implemented to both mitigate for projected wetland impacts and reduce selenium concentrations in impaired waters.

The Natural Resources Mitigation Strategies Plan can be found in Appendix E. All applicable laws and regulations will be followed, and mitigation measures would be applied as needed to offset identified impacts during Tier 2 studies.

Avoidance Activities

Effects to water resources were avoided to the greatest extent possible during the alternatives development process by selecting a 1,000-foot-wide general corridor for the Build Alternatives. This allows for avoidance and minimization during identification of the 250-foot-wide roadway footprint

during Tier 2 studies. Water quantity delivery to specific locations within the U.S. 50 project area could be indirectly affected because of increases in impervious cover, changes in flow routing across the landscape, or both. CDOT will address these potential increases or decreases in water quantity caused by improvements associated with the U.S. 50 Tier 1 EIS and subsequent Tier 2 studies by maintaining historic drainage patterns and using best management practices. Examples of best management practices include sedimentation basins, infiltration strips, revegetation, and tamarisk eradication in CDOT right of way. Complete site-specific best management practices and any other avoidance activities will be developed for each Tier 2 study associated with the U.S. 50 Tier 1 EIS.

4.2.4 Geologic and Paleontological Resources

Geology is the study of the Earth's surface and underlying rock layers. The geology of an area includes the features and soils on its surface, the rock that lies beneath the surface, deposits of mineral or energy resources in that rock, and the potential for those rock layers to move and produce earthquakes (seismic activity). The geologic resources found in the Central Arkansas Valley are part of its natural environment.

Paleontology studies the remains of ancient animals or plants that have been preserved in rock. Paleontological resources can take the form of fossils, associated rocks, sediments, or organic matter related to these remains. Because these resources are comprised of the remains of ancient life, they provide information about the history of those life forms and the environment they inhabited.

Because paleontological resources often are found within the rock layers below the surface, they are not always uncovered until the layers above the resources are disturbed. This analysis focuses on known (documented) paleontological resources. However, it is likely that other resources exist that have not yet been discovered. During Tier 2 studies, a more detailed analysis of paleontological resources will be conducted to ensure that these resources are preserved.

Paleontological resources are classified as a nonrenewable scientific-cultural resource and are protected by several federal and state statutes. Investigations were performed in compliance with the National Historical Preservation Act of 1966 (Public Law [PL] 89-665), as amended; the National Environmental Policy Act of 1969 (PL 91-190. 83 Stat. 915, 42 USC 4321, 1970); and in accordance with the Uniform Rules and Regulations of the Antiquities Act of 1906 (36 CFR Part 251, Subpart B, 36 CFR Part 296), and guidelines set forth by the Society of Vertebrate Paleontology. Paleontological resources located on land owned or under the care of the state of Colorado also are subject to the Historical, Prehistorical, and Archaeological Resources Act of 1973 (CRS 24-80-401 to 410).

This analysis evaluated several features in the project area, including soils, mineral and energy resources, seismic activity, and paleontological resources.

Results of the Analysis

The Build Alternatives have the potential to affect up to four existing surface mining operations (geologic resources) and also have the potential to encounter paleontological resources within six geologic formations. None of the Build Alternatives would affect identified paleontological resources. The specific effect to geologic and paleontological resources will depend on the location of the roadway footprint (alignment) identified during future Tier 2 studies.

Affected Environment

The following section details the geological and paleontological resources within the project area. The project area lies on the Eastern Plains of Colorado and is characterized by relatively flat rolling plains with some moderately sloped plateaus. Elevations slope eastward and range from approximately 4,400 feet above mean sea level (amsl) at Pueblo to 3,400 feet amsl at Holly near the Kansas state line. There are no areas of extreme topography or unique geologic features within the project area.

Data obtained both from the USGS and from the Colorado Geological Survey (CGS), show that bedrock in the project area dates from the Mesozoic and Cenozoic Eras (Stoeser et al. 2005; Tweto 1979). This is important because this age influences what type of paleontological, energy, and mineral resources could be found there (such as fossils, natural gas, and gold). The Mesozoic Era occurred between 65.5 million and 251 million years ago and included the evolution, domination, and extinction of the dinosaurs. The Cenozoic Era began at the end of that era and continues to this day. This most recent geologic period is distinguished primarily by the evolution and dominance of mammals (USGS 1999).

Issues related to geological and paleontological resources evaluated for the U.S. 50 Tier 1 EIS include the following and are discussed in more detail below:

- Soils
- Mineral and energy resources
- Paleontological resources

Soils

Soils are discussed in terms of the types of soil series found in the project area and within the study area. A soil series is a group of soils formed from the same type of rock with similar layers but with varying

characteristics according to their location. There are 56 soil series represented within the project area (NRCS 2014). Table 4-16 lists these soil series and the portion of the land that they cover, as well as information about their drainage, stormwater runoff, and permeability characteristics. Information on the soils classification for prime and unique farmland can be found in Section 4.1. It is important to know what types of soil exist in an area being proposed for development (in this case, for a highway) because some soils are less appropriate for development than others, and some require additional measures during the design or construction phases of the project to ensure that they can adequately support the proposed development.

Table 4-16. Soil Series Located in the Project Area

Primary Series	Project Area		Drainage	Stormwater Runoff	Permeability
	Acres	Percent			
Rocky Ford	46,792	24%	Well drained	Slow to very slow	Moderate to slow
Numa	11,999	6%	Well drained	Low to very low	Moderate to slow
Kornman	11,958	6%	Well to moderately well drained	Slow to very slow	Moderate to rapid
Las	11,905	6%	Somewhat poorly drained	Slow (occasional flooding occurs)	Moderately slow
Limon	11,849	6%	Well drained	Medium	Slow
Minnequa	10,588	5%	Well drained	Medium or rapid	Moderately high to moderately low
Valent	9,715	5%	Excessively drained	Low	High or very high
Midway	6,464	3%	Well drained	Low to very high (depending on slope)	Very slow or slow
Penrose	6,322	3%	Well or somewhat excessively drained	Low to very rapid	Moderate or moderately slow
Apishapa	4,954	3%	Somewhat poorly drained or poorly drained	Very slow or ponded	Slow
Oterodry	4,874	3%	Somewhat excessively drained	N/A	High
Las Animas	4,047	2%	Poorly drained or somewhat poorly drained	Slow or ponded (flooding is common to frequent)	Moderate or moderately rapid
Manvel	3,894	2%	Well drained	Medium or rapid	Moderate or moderately slow
Colby	3,846	2%	Well drained to somewhat excessively drained	Low to very high	Moderate
Glenberg	3,465	2%	Well drained	Negligible to low	Moderately rapid to rapid

Table 4-16. Soil Series Located in the Project Area (continued)

Primary Series	Project Area		Drainage	Stormwater Runoff	Permeability
	Acres	Percent			
Bankard	3,305	2%	Well to somewhat excessively drained	Low to very low	Rapid to very rapid
Cascajo	3,191	2%	Excessively drained	Slow	Rapid
Timpas	3,116	2%	Well drained	N/A	Moderately high or high
Cheraw	2,896	1%	Moderately well drained	N/A	Low or moderately low
Harvey	2,466	1%	Well drained	Negligible to medium (depending on slope)	Moderate
Otero	2,287	1%	Well drained or somewhat excessively drained	Low to medium	High
Heldt	2,277	1%	Well or moderately well drained	Slow or very slow	Slow to moderately slow
Fort	2,017	1%	Well drained	N/A	Moderately high or high
Kimera	1,919	1%	Well drained	N/A	Moderately high
Other Soils (<1% Cover)	16,249	8%			
Other Land Cover	2,229	1%			
Total Acres	194,623				

Source: NRCS 2014

As Table 4-16 illustrates, soils in the Rocky Ford series cover approximately 24 percent of the project area (NRCS 2014). These soils are used primarily for irrigated farming (NRCS 2010). While they are located throughout the project area, large areas are concentrated in Otero and Bent counties. No other soil series covers more than 6 percent of the project area, and more than half of them (32 soil series) cover less than 1 percent of the project area.

Very few of the soils represented by these series would require extensive measures to construct the Build Alternatives.

Mineral and Energy Resources

While the western portion of Colorado has a long and extensive history of extracting mineral and energy resources from below ground, the Lower Arkansas Valley does not. There are no coal mines in the project

area, although the BNSF Railway line running adjacent to U.S. 50 is a major route for transporting coal mined in Wyoming to locations within and outside of Colorado (Carroll 2005; CGS 2007). Additionally, there are no active subsurface mining operations for gold or similar minerals (CGS 2008). The Colorado Oil and Gas Conservation Commission (COGCC) maintains records of all oil and gas wells in Colorado. The commission's database includes information on nearly 91,200 producing or abandoned wells statewide (COGCC 2010a). Those records show only one producing well in the project area. It extracts natural gas and is located southeast of U.S. 50 and CR 30 in Prowers County (COGCC 2010b). The commission's database also shows that there are no pending applications for new well permits in the project area (COGCC 2010a).

Surface mining activity also occurs in the project area on a limited basis. There are 19 active mines, and all but one extracts gravel, sand, or both (Colorado Division of Reclamation, Mining, and Safety [CDRMS] 2009). The remaining mine extracts clay. These facilities are located throughout the project area, including eight mines in Pueblo County, six mines in Otero County, two mines in Bent County, and three mines in Prowers County.

Paleontological Resources

A standard "Class 1" technical literature and records review was conducted to assess the paleontological resources potential within the one- to four-mile-wide project area. This study was conducted using records from the University of Colorado Museum of Natural Science, the Denver Museum of Nature and Science, Colorado Office of Archaeology and Historic Preservation, and the University of California Museum of Paleontology.

The records searches identified 27 documented paleontological resources within the project area. Of these resources, 24 were recorded by the University of Colorado Museum of Natural History (2002), one was recorded by the Denver Museum of Nature and Science (2002), and two were reported by Atkins (Rowe 2012). The number of documented paleontological resources, formation, and documented species are located in Table 4-17.

Table 4-17. Known Paleontological Resources by County

County	Number of Resources	Geologic Formation	Species
Pueblo	2	Pierre shale	Baculite
Otero	14	Niobrara Carlile/Greenhorn/Graneros	Ammonite Bivalve Gastropod Shark
Bent	8	Carlile/Greenhorn/Graneros	Ammonite Bivalve Gastropod
Prowers	3	Niobrara Carlile/Greenhorn/Graneros	Baculite Ammonite

The geologic formations are described below. Most of the identified resources are located in the area between La Junta and Las Animas from within the expansive Carlile shale/Greenhorn limestone/Graneros shale formation. Additional information about these resources is not provided because they are sensitive and further identification or description of them might put them at risk for intentional disturbance.

The Bureau of Land Management (endorsed by the Society of Vertebrate Paleontology) has developed a set of explicit, broadly applicable, and relatively objective criteria for assessment of the paleontological significance: the Paleontological Fossil Yield Classification (PFYC) (BLM 2008). These criteria lead to a ranking of geographic area according to the probability of occurrence and the level of importance of the fossils, from no potential to encounter paleontological resources (Class 1) to a formation with high sensitivity that is known to contain paleontological resources (Class 5) (BLM 2008).

A PFYC was assigned to the project area based on identified resources that have been found within mappable geological units and the type of rock formations that are crossed by the project area. Mappable geological unit areas are defined by their geological distinctive characteristic details of their composition (Christopherson 2008). Table 4-18 summarizes the PFYC classes within the project area as identified from state geologic maps (Stoeser et al. 2005; Tweto 1979).

Table 4-18. Geologic Formations within the Project Area and their PFYC

Unit Name	Unit Symbol	Era	Period	Geology	Depositional Environment	Species	PFYC
Modern alluvium	Qa	Cenozoic	Quaternary	Gravels and sands	Riverine	—	3
Aeolian deposits	Qe	Cenozoic	Quaternary	Dunal sand, silt, and Peoria loess	Semi-desert	—	3
Gravel and alluvium	Qg	Cenozoic	Quaternary	Gravels and dunal sands	Riverine	—	3
Older alluvium	Qgo	Cenozoic	Quaternary	Gravels and sands	Riverine	—	3
Ogallala formation	To	Cenozoic	Tertiary	Loosely to well cemented sand and gravels	Piedmont	Pleistocene mammals	4
Carlile shale/ Greenhorn limestone/ Graneros shale	Kcg	Mesozoic	Upper Cretaceous	Thin bedded with chalk limestone and calcareous shale	Shallow shore	Carlile: Plesiosaur, Sharks Greenhorn: Ammonites, Mollusks, Sharks Graneros: Mollusks, Baculites	4
Niobrara formation	Kn	Mesozoic	Upper Cretaceous	White limestone with alternations of shale	Marine	Mosasaur, Plesiosaur, Pterosaur, Bivalves, Boney fish	4
Pierre shale	Kp	Mesozoic	Upper Cretaceous	Thick grey to brown-grey marine shale with some sandstone, limestone, and bentonite	Marine	Ammonites, Mosasaur, Bivalves, Gastropods, Baculites	4
Dakota formation	Kpd	Mesozoic	Lower Cretaceous	Massive brown sandstone with ferric staining with conglomer-ates	River channels and floodplains	Early dinosaurs, Pterosaurs	5

Source: Stoeser et al. 2005; Tweto 1979

For this analysis, all Quaternary sediments, summarized above in Table 4-18, were given a PFYC Class 3 designation because they are of unknown fossil yield potential. Due to the variability in source material for these sediments, the actual determination of fossil yield potential would be made on the basis of more detailed information (maps and literature) and field surveys during the project-specific assessment in Tier 2 studies. It is from these sediments where large mammal fossils of the Pleistocene era may be found, but these finds are very unpredictable.

Environmental Consequences

Effects to geological and paleontological resources were evaluated based on the types of effect the No-Build Alternative or Build Alternatives could have on them or the effect they could have on the alternatives:

- **Soils**—whether extensive measures would be required to construct the Build Alternatives on the soils present or to continue existing maintenance practices for the No-Build Alternative
- **Mineral and energy resources**—whether any alternatives could hinder proposed or active surface or subsurface mining or extraction operations
- **Paleontological resources**—whether any alternatives have the potential to encounter documented resources or the potential to encounter paleontological resources based on lithography

Summary of Effects

The following section summarizes potential effects to geological and paleontological resources by the No-Build Alternative and the Build Alternatives.

No-Build Alternative

Under the No-Build Alternative, only minor and isolated construction would occur. Routine maintenance and repairs would be made as necessary to keep U.S. 50 in usable condition, including standard overlays and repairs of weather- or crash-related damage. Additionally, smaller-scale improvements may be undertaken, such as short passing lanes and other minor safety improvements.

Because routine maintenance and repairs are conducted on the existing highway, these activities would not directly affect geological or paleontological resources. Smaller-scale improvements have the potential to affect resources located directly adjacent to the highway.

Build Alternatives

The Build Alternatives would relocate U.S. 50 from its current through-town route to an around-town route at eight communities in the project area: Fowler, Manzanola, Rocky Ford, Swink, La Junta, Las Animas, Granada, and Holly. In addition, a realignment is proposed in the area of Fort Reynolds. These new around-town routes, as well as the Fort Reynolds realignment, would be four lanes wide (two in each direction). Between communities, the Build Alternatives would expand the existing two-lane portions of the highway to four lanes rather than reroute the highway. This expansion and movement of the highway footprint has the potential to affect some geological and paleontological resources. Potential effects to soils, mineral and energy resources, and paleontological resources are discussed below.

Soils. Approximately one-quarter of the project area is covered by soils in the Rocky Ford series. These soils are not likely to require extensive measures to build the alternatives in the areas where they are present. Soils identified in the project area that have the potential to require additional measures to construct the Build Alternatives are part of the Las, Apishapa, and Las Animas series. Additional measures are likely required because these soil series are prone to ponding or flooding due to poor drainage and slow permeability. These soils generally are found near the Arkansas River, in and surrounding Las Animas, and between Granada and Holly. Table 4-19 shows the potential impacts to soils by the Build Alternatives.

Table 4-19. Summary of Build Alternatives Potential Soil Impacts

Primary Series	Build Alternative Footprints		Primary Series	Build Alternative Footprints	
	Acres	Percent[1]		Acres	Percent[1]
Rocky Ford	5,565	23	Colby	465	2
Numa	1,140	5	Glenberg	589	2
Kornman	2,360	10	Bankard	232	1
Las	1,621	7	Cascajo	442	2
Limon	868	4	Timpas	447	2
Minnequa	1,361	6	Cheraw	287	1
Valent	592	2	Harvey	343	1
Midway	674	3	Otero	695	3
Penrose	1,440	6	Heldt	146	1
Apishapa	684	3	Fort	248	1
Oterodry	970	4	Kimera	412	2
Las Animas	319	1	Other Soils (<1% Cover)	2,082	8
Manvel	472	2	Other Land Cover	115	0

Source: NRCS 2014

[1]Percentage is based on a total Build Alternative footprint of 24,569 acres

The 1,000-foot-wide Build Alternatives only identify a general corridor location (north of town, south of town, or along the existing U.S. 50 alignment), so it is not feasible at this time to identify what specific soils would be encountered by the roadway footprint. During Tier 2 studies, when the roadway footprint is identified, detailed surveys will be conducted to determine how CDOT will manage any soil-related issues likely to be encountered during construction.

Mineral and Energy Resources. The Build Alternatives would not affect the only producing natural gas well identified within the project area. Additionally, they would not affect proposed subsurface mining or extraction operations because no new permits for such activities are pending approval (as of 2010).

The Build Alternatives could affect the following four existing surface mining operations:

- Continental Materials Corporation—located on U.S. 50 just west of the Pueblo Memorial Airport
- Murillo Gravel Pit—located on U.S. 50 between Pueblo and Fowler (just east of the area known as Avondale)
- Valco, Inc., Rocky Ford east pit—located on U.S. 50 between Manzanola and Rocky Ford
- Midwestern Farms Resource (also known as Eastern Colorado Aggregates)—located on U.S. 50 between Granada and Holly (just west of milepost 460)

All of these facilities mine gravel and sand. The Build Alternatives could affect them by requiring the acquisition of property directly adjacent to U.S. 50. Decisions about whether property acquisition in these areas is needed and how much property would be required are not being made by this Tier 1 analysis. These decisions would be made during Tier 2 studies, when the roadway footprint is identified in each area.

Paleontological Resources. Of the 27 paleontological resources identified by this analysis, none would be affected by the 1,000-foot-wide Build Alternatives. However, based on the geologic formations of the area, there is the potential for the Build Alternatives to encounter paleontological resources. The various formations the study area crosses over are identified in Table 4-20, along with their PFYC. Because the location of U.S. 50 within the Build Alternatives will not be determined until Tier 2 studies, potential effects to paleontological resources cannot be fully evaluated until that time.

Table 4-20. Geologic Formations with Location and PFYC

Location Description	Formation[a]	PFYC
Between Pueblo and the Pueblo Memorial Airport	Pierre shale	4
Between Pueblo Memorial Airport and east of Fowler	Quaternary gravels and sands	3
East of Fowler to Timpas Creek	Pierre shale	4
Timpas Creek to La Junta	Niobrara limestone	4
La Junta to Highway 287 interchange	Graneros shale	4
Highway 287 interchange to just east of Lamar	Quaternary gravels and sands	3
Just east of Lamar to just west of Carlton	Dakota sandstone	4
Just west of Carlton to just east of Granada (Shale)	Carlile shale	4
Just east of Granada to Kansas State Line	Quaternary gravels and sands	3

[a]Tweto, O. 1979

Build Alternatives Effects by Location

Most of the geological resources that could be affected by the Build Alternatives are located in the rural areas between the communities along U.S. 50 or in Pueblo in areas that the existing U.S. 50 already traverses. Given the sensitive nature of paleontological resources, further details about the resource contents or locations are not provided in this document. Please refer to Table 4-20 for general location descriptions.

During Tier 2 studies, when roadway footprints are identified, detailed surveys will be conducted to determine geological, soil, and energy resource issues and potential effects along the U.S. 50 corridor. Given the broad-based analysis of these resources at this time (i.e., Tier 1 level analysis), effects by location are not discussed.

Mitigation

Because the ultimate roadway footprint would be identified during Tier 2 studies, this Tier 1 analysis cannot identify which specific geological or paleontological resources would be affected by the Build Alternatives. The following mitigation strategies have been developed, however, to ensure negative effects to these resources are minimized during Tier 2 studies:

- All efforts would be made to avoid and minimize effects to paleontological resources. If such resources are encountered, reasonable efforts would be made to identify and implement methods to preserve those resources.
- All property acquisitions of surface mining operations directly affected by the alternatives will comply fully with federal and state requirements, including the Uniform Act.

Avoidance Activities

Effects to geological and paleontological resources were avoided to the greatest extent possible during the alternatives development process by selecting a 1,000-foot-wide general corridor for the Build Alternatives. This allows for avoidance and minimization while identifying the 250-foot-wide roadway footprint during Tier 2 studies. Therefore, avoidance activities will be determined during Tier 2 studies.

4.3 COMMUNITY AND BUILT ENVIRONMENT

The following topics associated with the community and built environment in the U.S. 50 project area are discussed in this section:

- Historic resources
- Archaeological resources
- Land use
- Parklands and recreational facilities
- Social and economic considerations
- Environmental justice
- Aesthetic and visual resources
- Air quality
- Traffic noise

The project area for the U.S. 50 Tier 1 EIS has been defined as approximately one to four miles wide surrounding the existing U.S. 50 facility (see Figure 4-26).

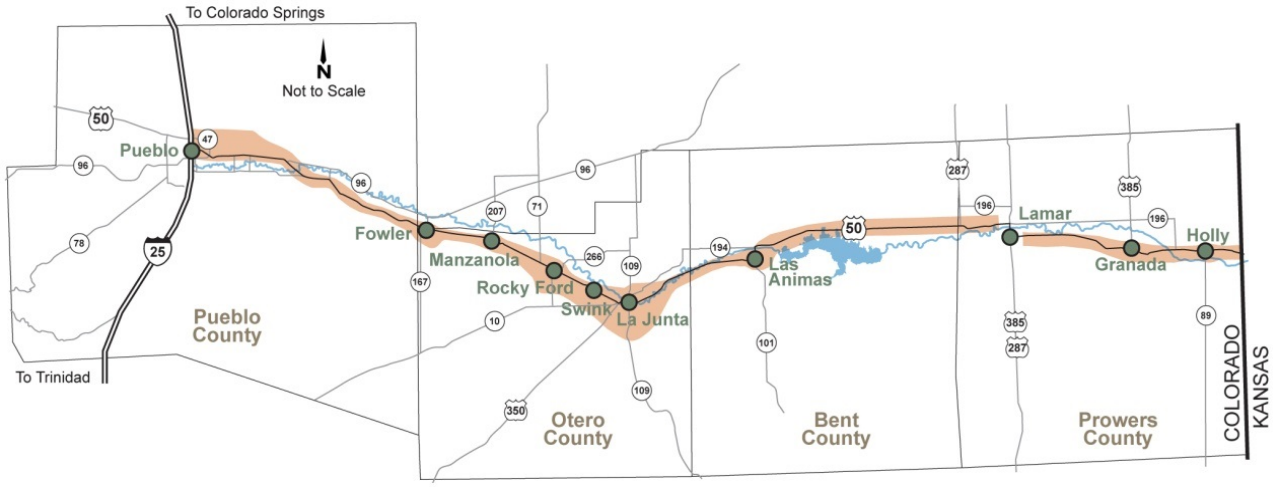


Figure 4-26. U.S. 50 Tier 1 EIS Project Area

Additional information about these topics can be found in U.S. 50 Tier 1 EIS technical memoranda, which are attached as appendices to this document. Each technical memorandum listed below can be found in Appendix A:

- Historic and Archaeological Resources Technical Memorandum
- Land Use and Social Considerations Technical Memorandum
- Section 4(f) and Section 6(f) Resources Technical Memorandum—parklands and recreational facilities
- Economics Technical Memorandum
- Minority and Low-Income Populations Technical Memorandum
- Air Quality Technical Memorandum
- Traffic Noise Technical Memorandum

The following sections describe the existing conditions and effects from the No-Build Alternative and Build Alternatives for each of these topics.

4.3.1 Historic Resources

Under Section 106 of the National Historic Preservation Act of 1966, federal agencies are required to evaluate the effects of their undertakings on historic properties and to give the Advisory Council on Historic Preservation (Council) a reasonable opportunity to comment on such undertakings. Guidance for the Section 106 process is outlined in the Council's regulations under 36 CFR Part 800, Protection of Historic Properties, which were amended in 2004. This process involves identification of historic properties, evaluating effects to historic properties, resolution of adverse effects, and mitigation. Resources identified for the U.S. 50 Tier I EIS include buildings, structures, objects, sites, and districts that are 45 years old or older (excluding archaeological resources, which are discussion in Section 4.3.2).

This section summarizes the Section 106 process for the U.S. 50 Tier I EIS, including the development of the Area of Potential Effects (APE), identification of properties, development of the Programmatic Agreement (PA), an overview of potential effects, and mitigation.

Area of Potential Effects

The APE was developed in consultation with SHPO in 2006. Due to the size of the corridor and the number of cultural resources, the APE extended along the U.S. 50 corridor between project termini at Pueblo and approximately the Colorado-Kansas state line. In rural areas between communities, the APE generally consists of a 1,000-foot-wide corridor centered on the existing highway alignment. Within

communities where around-town routes are being studied, the APE is comprised of a 1,000-foot-wide corridor along the existing highway alignment that bisects those same communities.

Within the context of this APE, three areas of concern were identified:

1. **Urban areas of concern**—includes areas near the existing U.S. 50 facility in, or in proximity to, the cities and towns located along the roadway
2. **Rural areas of concern**—includes areas within the around-town and between-town alignment alternatives, as well as areas within 1,000 feet of these alignment alternatives
3. **Archaeological areas of concern**—includes any area within approximately 1,000 feet of the alignment alternatives and corresponds to the areas considered by the combined urban and rural areas of concern

The APE for Tier 2 analyses may vary from the boundary defined at the Tier 1 level of analysis, which evaluates effects to historic properties on a broad scale. Detailed maps of the APE are included in the appendices of the Historic and Archaeological Resources Technical Memorandum, included in Appendix A. Correspondence regarding the APE consultation is included in Appendix C.

Historic Resource Identification in the Area of Potential Effects

The following section summarizes the methodology and information sources used to identify historic resources in the APE, as documented in the Cultural Resource Reconnaissance Survey Report (CDOT 2009a).

The historic resources data collection and identification included preliminary database searches, agency coordination, field visits, and “windshield” surveys. Historic resources identified in the APE that have not been previously documented were assigned NRHP eligibility recommendations of “likely eligible” and “likely not eligible.” These preliminary recommendations were used to standardize the documentation process and make consistent evaluations throughout the Tier 1 survey phase. Official eligibility determinations will occur during Tier 2 studies (U.S. 50 Tier 1 Section 106 PA 2007, Sec II[B][1][d]), when specific direct and indirect effects also will be identified. The results of the data collection and identification efforts are at the reconnaissance level and are not comprehensive. It is likely that more resources will become known during Tier 2 studies.

For the purpose of this document, historic resources are considered either linear or non-linear. Linear resources are those that are typically long and narrow. Some examples of linear resources in the APE are the BNSF Railway, Santa Fe National Historic Trail (5BN.391), and various irrigation canals and ditches.

Non-linear resources are those located at a specific site or place, such as a public building or house, bridge, or historic district. Some examples of non-linear historic resources include the Bent County Courthouse, the U.S. 50 bridge over the Huerfano River (5PE.302), and the Granada Relocation Center National Historic Landmark (also known as Camp Amache) (5PW.48).

This analysis identified 433 resources within the APE. Of these, 27 are linear resources and 406 are non-linear. The linear resources are more evenly distributed along the entire length of U.S. 50 through the Lower Arkansas Valley. U.S. 50 crosses some of these resources already, and several of them more than once. Most of the non-linear resources are located in or immediately surrounding the communities along U.S. 50.

Of the 433 identified resources, 410 are categorized as field eligible. Resources in this category have been identified as eligible for listing in the NRHP by the historians and archaeologist working on the U.S. 50 Tier 1 EIS, but they have not yet received that designation. The other 40 resources were categorized as follows:

- One resource is designated as a National Historic Landmark
- One resource is designated as a Nationally Recognized Historic Trail
- 14 resources are listed in the NRHP
- Five resources are listed in the State Register of Historic Properties
- Eight resources have been determined to be officially eligible for the NRHP
- 11 resources need more data

Results of the Analysis

This analysis identified 433 resources that are either known to be historic or may be historic in the APE. The Build Alternatives have the potential to affect 60 to 79 of these resources, depending on which alternatives are chosen.

Effects to the 433 identified resources were minimized during the development of alternatives for this Tier 1 EIS. Minimizing effects to the resources was possible because most of them are located within the communities along the existing U.S. 50 corridor, and since U.S. 50 will be routed around communities, it will not affect resources within communities.

The following other key findings were identified during the analysis:

- Potentially affected historic resources include numerous linear resources, such as the BNSF Railway, Santa Fe National Historic Trail, and irrigation canals. U.S. 50 already crosses most of these resources today and some of them multiple times. New or widened U.S. 50 crossings are unlikely to change the historic character of these linear resources.
- Many of the oldest structures in the Lower Arkansas Valley are still in use today, housing important community services, including schools, churches, and town halls. The Build Alternatives avoid most of these historic resources by going around communities.
- Given the number and type of historic resources identified, effects to those resources by the Build Alternatives are unlikely to change the overall historic character of the Lower Arkansas Valley or of any individual community.

U.S. 50 Tier 1 Section 106 Programmatic Agreement

FHWA and CDOT developed a PA per guidance in 36 CFR 800.14(b) to outline the Section 106 process for the Tier 1 evaluation and to clarify processes for future Tier 2 studies. Signed by the agencies and concurring parties in 2007, the PA states that the U.S. 50 project, "… shall use a two phased approach in which Phase I will involve initiating the Section 106 process at the Tier 1 stage, and Phase 2 will involve refining alternatives and concluding Section 106 consultation during Tier 2 for individual projects." The PA outlines tasks to be completed during Phase I, including:

- Identification of consulting parties
- Development of APE
- Historic property identification (reconnaissance survey and historic context)
- Preparation of relative effects report
- Mitigation strategies that implement the principles of Context Sensitive Solutions (CSS)

In fulfillment of the PA, the following stipulations have been met:

1. Identification of consulting parties (February 2007)
2. Development of APE and consultation on APE with SHPO (November 2006)
3. Completion of historic property identification (Cultural Resources Reconnaissance Survey Report and Historic Context Overview (submitted to SHPO and consulting parties in August 2009))
4. Preparation of Relative Effects Report (submitted to SHPO in May 2016)
5. Mitigation strategies that implement the principles of Context-Sensitive Solutions (Summarized in the Relative Effects Report, May 2016; if SHPO and Consulting Parties request a meeting, this will be completed prior to the Final EIS/ROD)

As outlined in the PA, CDOT will not request SHPO concurrence on the historic context and reconnaissance survey reports. Consultation on eligibility and effect determinations will occur in the Tier 2 studies. A copy of the PA and associated correspondence is included in Appendix C.

Environmental Consequences

Effects to historic resources are identified as either direct or indirect. Definitions for direct and indirect effects are provided in the following discussion.

Direct Effects

An identified resource is considered directly affected if any part of the feature (for linear resources) or property (for non-linear resources) is located within the 1,000-foot-wide Build Alternatives. Efforts will be made to avoid these resources during Tier 2 studies when the location of the 250-foot roadway alignment within the Build Alternatives is determined. Note that effects to non-linear resources will be easier to avoid than effects to linear resources.

Indirect Effects

Indirect effects have the potential to change the characteristics for which historic resources are listed or considered eligible for the NRHP, but they are not direct effects to the resource. Indirect effects may include visual, air quality, noise, traffic, economic, social, or land use effects that could cause changes to the historic setting or use of historic properties.

Since this document identifies only general corridor locations, not specific roadway footprints, it does not include detailed analysis of indirect effects for all resources because it is difficult to know which specific resources would be indirectly affected.

Summary of Effects

The following section summarizes the analysis of potential direct and indirect effects by the Build Alternatives to known historic resources and resources that may be historic within the APE, as identified in the Historic and Archaeological Resources Technical Memorandum. Additional properties may be identified during Tier 2 studies and will be evaluated as part of those studies.

No-Build Alternative

Under the No-Build Alternative, only minor and isolated construction would occur. Routine maintenance and repairs would be made, as necessary, to keep U.S. 50 in usable condition, including standard overlays and repairs of weather- or crash-related damage. Additionally, smaller-scale improvements may be undertaken, such as short passing lanes and other minor safety improvements.

Routine maintenance and repairs would continue to be conducted on the existing highway. These activities are not expected to directly affect historic properties or linear historic resources. Smaller-scale improvements have the potential to affect resources located directly adjacent to the highway. If bridge replacements are required, such as the historic Huerfano and Rocky Ford Highline Canal bridges, direct effects to historic resources would occur.

Historic resources currently experience indirect effects from U.S. 50, including traffic noise, visual intrusion, and other proximity effects. These indirect effects will continue to affect these resources in the future.

Build Alternatives

Depending on which alignment alternatives are chosen around towns, the Build Alternatives could affect (directly or indirectly) 60 to 79 of the 433 resources identified in the APE. Potentially affected resources include 23 to 27 linear resources and 37 to 52 non-linear resources. See the Historic and Archaeological Resources Technical Memorandum in Appendix A for more detailed information and graphics that illustrate historical and archaeological resources.

The 23 to 27 linear historic resources that could be affected include the BNSF Railway, Santa Fe National Historic Trail, Arkansas River levee at Las Animas, and up to 24 irrigation canals and ditches. These resources are located throughout the Build Alternatives, both near communities and in the areas between them. In many instances, U.S. 50 already crosses them and, in some cases, it crosses them multiple times. For these resources, modifying existing crossings or adding new ones typically would not diminish the

historic significance of the resource to any great degree. Nevertheless, effects to these resources will be avoided and minimized, to the extent feasible, during Tier 2 studies.

The 37 to 52 non-linear historic resources that could be affected are primarily residences, businesses, and buildings associated with farms or ranches. Non-linear resources also include 14 to 17 bridges, a ditch tunnel, a historic neighborhood (which could include multiple resources), a highway rest area along U.S. 50, and a building ruin. One of the bridges is the U.S. 50 bridge over the Huerfano River, which is listed in the NRHP (5PE.302). Another bridge is the U.S. 50 bridge over the Rocky Ford Highline Canal, which has been determined to be officially eligible for the NRHP. Most of the non-linear resources are located in those areas of the Build Alternatives near or around communities. Efforts will be made to avoid and minimize effects to these resources to the extent feasible during Tier 2 studies, in accordance with federal regulations. In addition, potential effects to historic properties will be analyzed during Tier 2 studies.

Build Alternatives Effects by Location

The following section describes, by location and alternative, the historic resources that are either known to be historic or may be historic and could be affected by the Build Alternatives discussed in Chapter 3. Table 4-21 summarizes these resources by location, from west to east.

Table 4-21. Summary of Potentially Affected Historic Resources by U.S. 50 Corridor Section

Section	Build Alternatives (if applicable)	Non-Linear Resources					Linear Resources				Total
		Residence	Business	Farm or Ranch Building	Bridge	Other	BNSF Railway	Santa Fe National Historic Trail	Arkansas River Levee at Las Animas	Irrigation Canals or Ditches	
Section 1: Pueblo	Alternative 1: Pueblo Airport North	—	—	—	—	—	1	—	—	1	**2**
	Alternative 2: Pueblo Existing Alignment	—	—	—	2	1	1	—	—	—	**4**
	Alternative 3: Pueblo SH47 Connection	—	—	—	—	—	1	—	—	—	**1**

Table 4-21. Summary of Potentially Affected Historic Resources by U.S. 50 Corridor Section (continued)

Section	Build Alternatives (if applicable)	Non-Linear Resources					Linear Resources				Total
		Residence	Business	Farm or Ranch Building	Bridge	Other	BNSF Railway	Santa Fe National Historic Trail	Arkansas River Levee at Las Animas	Irrigation Canals or Ditches	
Section 2: Pueblo to Fowler	Alternative 1: Fort Reynolds Existing Alignment	—	—	6	4	1	1	—	—	3	**15**
	Alternative 2: Fort Reynolds Realignment	—	—	5	4	—	1	—	—	3	**13**
Section 3: Fowler	Alternative 1: Fowler North	1	—	—	—	—	1	—	—	1	**3**
	Alternative 2: Fowler South	—	—	—	—	—	—	—	—	2	**2**
Section 4: Fowler to Manzanola	—	—	—	—	1	—	1	—	—	2	**4**
Section 5: Manzanola	Alternative 1: Manzanola North	—	—	—	—	—	1	—	—	2	**3**
	Alternative 2: Manzanola South	—	—	—	—	—	—	—	—	2	**2**
Section 6: Manzanola to Rocky Ford	—	—	—	—	—	1	1	—	—	1	**3**
Section 7: Rocky Ford	Alternative 1: Rocky Ford North	—	—	—	—	—	1	—	—	2	**3**
	Alternative 2: Rocky Ford South	—	—	1	—	1	1	—	—	4	**7**
Section 8: Rocky Ford to Swink	—	—	—	—	1	—	1	—	—	—	**2**
Section 9: Swink	Alternative 1: Swink North	1	1	—	—	—	1	—	—	—	**3**
	Alternative 2: Swink South	—	—	—	—	1	1	—	—	—	**2**

Table 4-21. Summary of Potentially Affected Historic Resources by U.S. 50 Corridor Section (continued)

Section	Build Alternatives (if applicable)	Non-Linear Resources					Linear Resources				Total
		Residence	Business	Farm or Ranch Building	Bridge	Other	BNSF Railway	Santa Fe National Historic Trail	Arkansas River Levee at Las Animas	Irrigation Canals or Ditches	
Section 10: La Junta	Alternative 1: La Junta North	—	—	—	—	—	1	1	—	1	**3**
	Alternative 2: La Junta South	—	—	—	—	—	1	1	—	1	**3**
	Alternative 3: La Junta South	—	—	—	—	1	1	1	—	1	**4**
	Alternative 4: La Junta South	—	—	—	—	—	1	1	—	1	**3**
Section 11: La Junta to Las Animas	—	—	—	—	2	—	1	—	—	2	**5**
Section 12: Las Animas	Alternative 1: Las Animas North	—	—	—	—	—	1	1	1	2	**5**
	Alternative 2: Las Animas South	1	—	—	—	1	1	—	1	1	**5**
Section 13: Las Animas to Lamar[a]	—	1	2	9	3	—	—	1	—	7	**23**
Section 14: Lamar to Granada[a]	—	—	—	1	1	—	—	—	—	2	**4**
Section 15: Granada	Alternative 1: Granada North	1	—	—	—	—	1	—	—	2	**4**
	Alternative 2: Granada South	—	—	—	—	—	—	—	—	1	**1**
Section 16: Granada to Holly	—	1	1	—	2	—	1	—	—	2	**7**

Table 4-21. Summary of Potentially Affected Historic Resources by U.S. 50 Corridor Section (continued)

Section	Build Alternatives (if applicable)	Non-Linear Resources					Linear Resources				Total
		Residence	Business	Farm or Ranch Building	Bridge	Other	BNSF Railway	Santa Fe National Historic Trail	Arkansas River Levee at Las Animas	Irrigation Canals or Ditches	
Section 17: Holly	Alternative 1: Holly North	1	—	1	—	—	—	1	—	2	**5**
	Alternative 2: Holly South	—	—	—	—	—	1	—	—	—	**1**
Section 18: Holly Transition	—	—	—	—	—	1	—	1	—	2	**4**
Total		**37 to 52[b]**					**23 to 27[c]**				**—**

[a]The Build Alternatives do not include alternatives in Lamar, as discussed in Chapter 3, Alternatives Considered.

[b]The ultimate effect of the Build Alternatives will depend on which alternatives are chosen around towns; therefore, a range of effects is shown instead of a single number.

[c] 23 to 27 linear resources are affected by the Build Alternatives—while some are affected in multiple locations, each of these resources is counted only once in this total.

The sections of the Build Alternatives that have the potential to affect the most identified resources are Las Animas to Lamar (5 linear and 15 non-linear resources) and Pueblo to Fowler (4 linear and 9 to 11 non-linear resources). These also are two of the longest sections of the Build Alternatives, each measuring more than 20 miles long.

Effects to identified historic resources by the Build Alternatives are discussed below by location (from west to east along U.S. 50).

Section 1: Pueblo

There are three alternatives in this section of the Build Alternatives. One to four historic resources could be affected.

Alternative 1: Pueblo Airport North. Two resources that may be historic could be affected: the BNSF Railway and the Excelsior Ditch.

Alternative 2: Pueblo Existing Alignment. Up to four resources that may be historic could be affected, including the Belmont neighborhood (a post-World War II subdivision), the U.S. 50 bridges over Dry Creek (two structures—one carrying westbound traffic and one carrying eastbound traffic), and the BNSF Railway.

Alternative 3: Pueblo SH 47 Connection. Only the BNSF Railway would be affected by this alternative.

Section 2: Pueblo to Fowler

There are two alternatives in this section of the Build Alternatives, which could affect 13 to 15 historic resources.

Alternative 1: Fort Reynolds Existing Alignment. Up to 15 resources could be affected, including two known historic resources and 14 that may be historic. These resources include six buildings associated with farms, five bridges, the BNSF Railway, and three irrigation canals or ditches. The bridges include two U.S. 50 bridges over Chico Creek (one for eastbound traffic and one for westbound traffic), the Ordnance Depot road interchange over U.S. 50, the U.S. 50 bridge over the Huerfano River (5PE.302), and the U.S. 50 bridge over the Rocky Ford Highline Canal. The irrigation canals or ditches that could be affected are the Excelsior Ditch, Rocky Ford Highline Canal, and Oxford Farmers Ditch.

Figure 4-27. U.S. 50 Bridge over the Huerfano River (5PE.302)—Pueblo County

The bridge over the Huerfano River was built in 1921, after the Arkansas River flood in Pueblo destroyed or damaged every bridge in the city. It is listed in the NRHP and is pictured in Figure 4-27. The U.S. 50 bridge over the Rocky Ford Highline Canal was built during the Great Depression in 1932 by the Works Progress Administration, and it has been determined to be officially eligible for listing.

Alternative 2: Fort Reynolds Realignment. This alternative shifts the U.S.50 alignment and could affect 13 resources, as compared to the Fort Reynolds Existing Alignment. These include the BNSF Railway, three irrigation canals or ditches, four bridges, and five farms. The alternative realigns the highway to the south to avoid acquisition of homes in the area of Fort Reynolds. It also avoids potential

effects to the historic Huerfano bridge. U.S.50 could remain as a frontage road in this design alternative, which would allow the bridge to remain in place. This will be evaluated further during Tier 2 studies.

Section 3: Fowler

There are two alternatives in this section of the Build Alternatives, which could affect two to three historic resources.

Alternative 1: Fowler North. Alternative 1 could affect up to three resources that may be historic. Resources affected by this alternative are a residence, the BNSF Railway, and the Otero Canal.

Alternative 2: Fowler South. This alternative would affect two resources that may be historic. Resources affected by Alternative 2 are the Rocky Ford Highline Canal and the Oxford Farmers Ditch.

Section 4: Fowler to Manzanola

Up to four resources that may be historic could be affected in this corridor section. These include the BNSF Railway, Catlin Canal, Otero Canal, and the U.S. 50 bridge over the Otero Canal.

Section 5: Manzanola

There are two alternatives in this section of the Build Alternatives, which could affect two to three historic resources.

Alternative 1: Manzanola North. Three resources that may be historic would be affected: the BNSF Railway, Catlin Canal, and Otero Canal.

Alternative 2: Manzanola South. Two canals that may be historic would be affected: the Catlin Canal and the Otero Canal.

Section 6: Manzanola to Rocky Ford

Up to three resources that may be historic could be affected in this corridor section. These include a building ruin, the BNSF Railway, and Main Leach Canal.

Section 7: Rocky Ford

There are two alternatives in this section of the Build Alternatives, which could affect three to seven historic resources.

Alternative 1: Rocky Ford North. Up to three resources that may be historic could be affected: the BNSF Railway, Main Leach Canal, and Rocky Ford Canal.

Alternative 2: Rocky Ford South. Up to seven resources that may be historic could be affected: a ranch building, an unnamed resource, the BSNF Railway, and four canals/ditches.

Section 8: Rocky Ford to Swink

Up to two resources that may be historic could be affected in this corridor section. These are the U.S. 50 bridge over Timpas Creek and the BNSF Railway.

Section 9: Swink

There are two alternatives in this section of the Build Alternatives, which could affect two to three historic resources.

Alternative 1: Swink North. The north alternative at Swink would affect the BNSF Railway. Additionally, it could affect a residence and a business. None of these resources are known to be eligible for the NRHP, but they may be historic.

Alternative 2: Swink South. The south alternative at Swink would affect the BNSF Railway. Additionally, it could affect one residence, which is not known to be eligible for the NRHP, but may be historic.

Section 10: La Junta

There are four alternatives in this section of the Build Alternative. These alternatives could affect three to four historic resources. All of the design alternatives in this section have the potential to affect the Santa Fe National Historic Trail.

The Santa Fe Trail is designated as a National Historic Trail by the National Park Service (NPS). Only 18 trails in the United States have been given this designation, which is given to trails to, "… commemorate historic (and prehistoric) routes of travel that are of significance to the entire Nation …" (NPS 2009). Only the approximate location of the trail is known. In La Junta, this approximate location runs diagonally from northeast to southwest through the city (paralleling U.S. 350). U.S. 50 crosses the trail today, and any alternative around the city also would cross it. The trail generally is located on privately owned land that has not been used for transportation purposes for more than 100 years, and there are no known remnants of the trail (wagon ruts or associated features) in the area likely to be crossed by the La Junta alternatives (NPS 2008). A detailed field investigation will be conducted during Tier 2 studies to identify any detectable trail remnants and make reasonable efforts to avoid them.

Alternative 1: La Junta North. The north alternative at La Junta would affect three resources: the BNSF Railway, the Santa Fe National Historic Trail, and the Fort Lyon Canal.

Alternative 2: La Junta South. The most northern of the southern alternatives at La Junta would affect three resources. These are the Santa Fe National Historic Trail, the BNSF Railway (see Figure 4-28) and the Otero Canal.

Figure 4-28. BNSF Railway Crossing of U.S. 50—La Junta

Alternative 3: La Junta South. The middle of the southern alternatives would affect four resources. Three of them are the Santa Fe National Historic Trail, the BNSF Railway, and the Otero Canal. The South 2 Alternative also could affect an irrigation ditch tunnel. The Santa Fe Trail is known to be historic, and the remainder of the resources may be historic.

Alternative 4: La Junta South. The most southerly of the southern alternatives at La Junta would affect three resources. These are the Santa Fe National Historic Trail, the BNSF Railway, and the Otero Canal.

Section 11: La Junta to Las Animas

Up to five resources that may be historic could be affected in this corridor section. These are: two U.S. 50 bridges over Thompson Arroyo (one for eastbound traffic and one for westbound traffic), the BNSF Railway, the Consolidated Ditch, and the Jones Ditch.

Section 12: Las Animas

There are two alternatives in this section of the Build Alternatives; each could affect five historic resources.

Alternative 1: Las Animas North. Up to five resources that may be historic would be affected by this alternative. These include the BNSF Railway, Consolidated Ditch, Las Animas Town Ditch, Arkansas River Levee at Las Animas (see Figure 4-29), and the Santa Fe National Historic Trail.

Figure 4-29. Arkansas River Levee—Las Animas

Alternative 2: Las Animas South. Up to five resources that may be historic would be affected in this alternative. These include the BNSF Railway, a ditch, the Arkansas River Levee at Las Animas (see Figure 4-29), a segment of U.S. 50, and a residence.

Section 13: Las Animas to Lamar

Up to 20 resources that may be historic could be affected in this corridor section. These include nine buildings associated with farms, three U.S. 50 bridges, two businesses, one residence, the Santa Fe National Historic Trail, and seven irrigation canals and ditches. The U.S. 50 bridges cross the McCrae Arroyo, an unnamed draw, and Limestone Creek.

Section 14: Lamar to Granada

Up to four resources that may be historic could be affected in this corridor section. These include a building associated with a farm, a U.S. 50 bridge over the Willow Creek overflow, the Manvel Canal, and the Lamar Canal.

Section 15: Granada

There are two alternatives in this section of the Build Alternatives, which could affect one to four historic resources.

Alternative 1: Granada North. This design alternative could affect one residence, the BNSF Railway, and two ditches.

Alternative 2: Granada South. The X-Y Canal would be affected. This canal is not currently known to be historic, but it may be historic.

Section 16: Granada to Holly

Up to seven resources that may be historic could be affected in this corridor section. These include a residence, a business (Gateway Downs, a former horse-racing track), a U.S. 50 bridge crossing Granada Creek, a U.S. 50 overpass of the BNSF Railway, the BNSF Railway, the X-Y Canal, and Granada Ditch.

Section 17: Holly

There are two alternatives in this section of the Build Alternatives, which could affect one to five historic resources.

Alternative 1: Holly North. This design alternative could affect five resources. These include a residence, a farm building, the Santa Fe National Historic Trail, and two ditches.

Alternative 2: Holly South. The BNSF Railway could be affected.

Section 18: Holly Transition

Up to four resources that may be historic could be affected in this corridor section. These include the Hadley rest area, Holly Ditch, Buffalo Canal, and the Santa Fe National Historic Trail.

Mitigation

The *U.S. 50 Tier 1 Section 106 Programmatic Agreement* outlines how historic resources will be identified and evaluated in the U.S. 50 Tier 1 EIS. The PA was developed and signed by representatives from the lead agencies (CDOT and FHWA) and the Colorado SHPO. The following mitigation strategies were agreed to as part of the *U.S. 50 Tier 1 Section 106 Programmatic Agreement*:

- When a preferred alternative is chosen, the lead agencies will meet with the Colorado State Historic Preservation Officer and the Section 106 consulting parties "… to discuss appropriate mechanisms for avoiding, minimizing and mitigating adverse effects …" to historic resources (U.S. 50 Tier 1 Section 106 PA, Sect III[B][3]).
- "Resolution of adverse effects for individual properties will occur … during Tier 2 studies when more detailed engineering plans are developed. During Tier 2 adverse effects will be addressed in

accordance with standard Section 106 process …" (U.S. 50 Tier 1 Section 106 PA, Sect III[A][5]).

The following additional mitigation strategies also have been identified:

- To assist local communities with their heritage tourism efforts, CDOT has shared the information obtained for this project related to historic resources with the communities in the Lower Arkansas Valley. This includes information associated with specific resources as well as the historic context of the region.
- To the extent feasible, CDOT will support communities' efforts related to heritage tourism along U.S. 50 in the Lower Arkansas Valley.

Avoidance Activities

Direct effects to some known historic resources and resources that may be historic were avoided during the alternatives development process. This occurred because most of the resources are located within the communities. Corridor alternatives were considered that would improve U.S. 50 on its existing alignment through these communities; however, these through-town alternatives were eliminated from further consideration during the alternatives development process. The elimination of the through-town alternatives avoided effects to resources that would have been affected (directly or indirectly), such as the resource shown in Figure 4-30. This analysis determined that eliminating through-town alternatives avoids direct effects to nearly 150 identified resources and indirect effects to nearly 100 additional resources. In addition, effects to linear resources may be avoided or minimized by bridging the resources; however, this will be determined during Tier 2 studies.

Figure 4-30. Avoided Historic Resource (I.O.O.F. Hall Lodge No. 11)—Las Animas

4.3.2 Archaeological Resources

Archaeology is the study of human cultures through the recovery, documentation, analysis, and interpretation of material remains. Archaeological resources are protected by a variety of laws and their implementing regulations. Archaeological resource identification and coordination with consulting parties were included in the *U.S. 50 Tier 1 Section 106 Programmatic Agreement* (2007) (see discussion in Section 4.3.1, Historic Resources). The APE for archaeological resources is the same used in Section 4.3.1 for Historic Resources. This section provides a summary of the consultation with Native American

tribes, and an overview of the potential effect to archaeological resources located within the APE by the project alternatives.

In accordance with the *U.S. 50 Tier 1 Section 106 Programmatic Agreement* (2007), the following reports identify known archeological resources in the APE and document potential effects to those resources:

- Cultural Resources Reconnaissance Survey Report (CDOT 2009a)
- Historic and Archeological Resources Technical Memorandum

Native American Consultation

As previously identified in Section 4.3.1, Historic Resources, the *U.S. 50 Tier 1 Section 106 Programmatic Agreement* included specific tasks to be completed during Phase 1 of the Section 106 consultation process. One of these tasks was identification of consulting parties.

Federal law and regulation (16 USC 470[f] and 36 CFR 800.2[c][2][ii]) mandate that federal agencies coordinate with interested Native American tribes in the planning process for federal undertakings (projects). Consultation with Native American tribes recognizes the government-to-government relationship between the United States government and sovereign tribal groups. In that context, federal agencies must acknowledge that historic properties of religious and cultural significance to one or more tribes may be located on ancestral, aboriginal, or ceded lands beyond modern reservation boundaries.

Consulting tribes are offered the opportunity to identify concerns about cultural resources and to comment on how the project might affect them. If it is found that the project will affect properties that are eligible for inclusion on the NRHP and are of religious or cultural significance to one or more consulting tribes, their roles in the consultation process also may include participation in resolving how best to avoid, minimize, or mitigate those effects. By describing the proposed project and the nature of any known cultural sites and consulting with the interested Native American community, FHWA and CDOT strive to effectively protect areas important to Native American people.

In February 2006, FHWA invited six federally recognized tribes with established interests in Pueblo, Otero, Bent, Crowley, and Prowers counties to participate in the U.S. 50 Tier 1 EIS as consulting parties:

- Apache Tribe of Oklahoma
- Cheyenne and Arapaho Tribes of Oklahoma (two tribes administered by a unified tribal government)
- Comanche Nation of Oklahoma
- Kiowa Tribe of Oklahoma

- Northern Arapaho Tribe (Wyoming)
- Northern Cheyenne Tribe (Montana)

The Comanche Nation of Oklahoma replied to the solicitation in writing and indicated a desire to participate as a consulting party. The tribe was, and will continue to be, kept apprised of progress on the project and was provided all available documentation for review. Because no additional tribal governments responded, only the Comanche Nation is considered a formal consulting tribe for the U.S. 50 Tier 1 EIS.

Additional information about archaeological resources identified by this analysis is in the Historic and Archaeological Resources Technical Memorandum located in Appendix A.

Results of the Analysis

This analysis identifies 17 known archaeological sites in the APE. The Build Alternatives have the potential to affect 9 of the 17 known sites. All of the sites are located within two segments of the Build Alternatives: Pueblo to Fowler and La Junta to Las Animas. Exact locations of the 17 known archaeological sites are not listed in this document, as the sites are sensitive and irreplaceable remnants of cultural heritage that are subject to looting and other disturbances.

All of the archaeological resources that could be affected by the Build Alternatives are located in largely rural areas between the communities along U.S. 50. The Build Alternatives generally have only one alternative in these locations, which is along the existing U.S. 50 alignment. Therefore, effects to archaeological resources would be the same no matter which around-town alternatives (north or south of town) are chosen.

Archaeological Resources Identified in the Area of Potential Effects

The following section summarizes the methodology and resources used to identify archeological resources in the APE as documented in the Cultural Resource Reconnaissance Survey Report (CDOT 2009a).

Previously documented archaeological resources in the APE were identified using various archival sources. No field reconnaissance surveys were conducted to identify additional archaeological sites at this Tier 1 level of analysis. Similar to historic resources, the known archaeological sites are either eligible, likely eligible, or listed in the NRHP. Additional information about the criteria for listing in the NRHP is in the Historic and Archaeological Resources Technical Memorandum located in Appendix A.

The primary sources used to identify known archaeological resources were the online Compass cultural resources database (maintained by the Colorado Office of Archaeology and Historic Preservation) and files maintained by the CDOT Archaeological Unit. This analysis identified 17 archaeological resources within the APE, including both historic and prehistoric localities. Some of these known resources may meet the criteria for NRHP listing, but more information is necessary before this determination can be made. These determinations will occur during Tier 2 studies (U.S. 50 Tier 1 Section 106 PA 2007), and they will include an assessment of whether the resources are worthy of preservation in place.

The locations of these 17 known archaeological sites are not listed in this document, as they are sensitive and irreplaceable remnants of cultural heritage that are subject to looting and other disturbances.

Summary of Effects

The following section summarizes the analysis of approximate direct and indirect effects to known archaeological resources and resources that may be archaeological within the APE as identified in the Historic and Archaeological Resources Technical Memorandum located in Appendix A.

Direct Effects

An identified resource is considered directly affected if any part of the resource is located within the 1,000-foot-wide Build Alternatives. The consequence of affecting archaeological resources is the potential loss of information that could enhance our understanding of the cultural history of the Lower Arkansas Valley. Efforts will be made to avoid these resources during Tier 2 studies when the location of the 250-foot-wide roadway alignment (within the Build Alternatives) is determined.

Indirect Effects

Indirect effects have the potential to change the characteristics for which archaeological resources are listed or considered eligible for the NRHP, but are not direct effects to the resource. Indirect effects may include visual, air quality, noise, traffic, economic, social, or land use effects that could cause changes to the historic setting or use of the resource. The U.S. 50 Tier 1 EIS identifies only general corridor locations, not specific roadway footprints; therefore, this analysis does not include detailed study of indirect effects for all resources because it is difficult to know which specific resources would be indirectly affected.

No-Build Alternative

Under the No-Build Alternative, only minor and isolated construction would occur. Routine maintenance and repairs would be made, as necessary, to keep U.S. 50 in usable condition, including standard overlays

and repairs of weather- or crash-related damage. Additionally, smaller-scale improvements may be undertaken, such as short passing lanes and other minor safety improvements.
These activities are not expected to directly affect archaeological resources. Smaller-scale improvements have the potential to affect resources located directly adjacent to the highway.

Archeological resources currently experience indirect effects from U.S. 50, including traffic noise, visual intrusion, and other proximity effects. These indirect effects will continue to affect these resources in the future.

Build Alternatives

The Build Alternatives could affect nine of the 17 known archaeological resources in the APE. The affected resources are all located within two sections of the Build Alternatives: Section 2: Pueblo to Fowler and Section 11: La Junta to Las Animas.

Additional information about these sites is not provided because they are sensitive and further identification or description of them might put them at risk for being disturbed. Reasonable efforts will be made to avoid these resources during Tier 2 studies when the location of the 250-foot roadway alignment is determined. The consequence of affecting archaeological resources is the potential loss of information that could enhance overall understanding of the cultural history of the Lower Arkansas Valley; however, affecting the sites identified is unlikely to substantially impede this understanding.

Mitigation

The *U.S. 50 Tier 1 Section 106 Programmatic Agreement* (PA) outlines how archaeological resources will be identified and evaluated in the U.S. 50 Tier 1 EIS. The PA was developed and signed by representatives from the lead agencies (CDOT and FHWA), as well as the Colorado State Historic Preservation Officer. The following mitigation strategies were agreed to as part of the *U.S. 50 Tier 1 Section 106 Programmatic Agreement*:

- When a preferred alternative is chosen, the lead agencies will meet with the Colorado State Historic Preservation Officer and the Section 106 consulting parties “to discuss appropriate mechanisms for avoiding, minimizing and mitigating adverse effects” to archaeological resources (U.S. 50 Tier 1 Section 106 PA, Sect III[B][3]).
- “Resolution of adverse effects for individual properties will occur… during Tier 2 studies when more detailed engineering plans are developed. During Tier 2 adverse effects will be addressed in accordance with the standard Section 106 process” (U.S. 50 Tier 1 Section 106 PA, Sect III[A][5]).

Avoidance Activities

Avoidance activities for known and unknown archaeological resources will be identified during Tier 2 studies.

4.3.3 Land Use

This section focuses on how the Build Alternatives could affect land use in the project area. The land use issues that were evaluated include:

- Compatibility with planning documents
- Compatibility with future development areas
- Effects to conservation easements and public lands
- Property acquisition

It is important to acknowledge that land use planning is an ongoing activity; therefore, information related to all of these items will be updated during Tier 2 studies so decisions about the alignment of U.S. 50 are made with the most up-to-date information. Additional information about land use is in the Land Use and Social Considerations Technical Memorandum located in Appendix A.

Results of the Analysis

The Build Alternatives would not have a substantial effect on land use within the project area. Only five jurisdictions have adopted planning documents that include the project area. However, plans for the three largest cities (Pueblo, La Junta, and Las Animas) include provisions for U.S. 50 to be in a different location than the Build Alternatives. Additional coordination between CDOT and these jurisdictions will be required during the Tier 2 process to resolve inconsistencies between their local plans and the Build Alternatives.

During workshops held for this project, the communities in the project area identified future development (growth) areas and the type(s) of growth that was expected within them. In many cases, it could not be determined whether the Build Alternatives would be compatible with them—primarily because the type of development was either too broad or not specified.

The Build Alternatives could affect up to 13 conservation easements and 12 public properties. Five of the public properties (the Karney Ranch, John Martin Reservoir, Mike Higbee, Granada, and Holly State Wildlife Areas) are currently crossed by U.S. 50, and most of the effects to them would occur at or near these existing crossings.

The Build Alternatives recommend that U.S. 50 be four lanes throughout the Lower Arkansas Valley and be rerouted around eight communities east of Pueblo, as well as realigning the road near Fort Reynolds. This would require CDOT to purchase property in the Lower Arkansas Valley. In most locations, property would be acquired immediately adjacent to the highway; however, near the communities east of Pueblo, property would need to be acquired on the periphery of the communities (either north or south) to build the new around-town routes. A large portion of the land in the project area is used for agricultural activities (farming or ranching); therefore, it is expected that most of the land CDOT would acquire to construct the Build Alternatives would be shifted from agricultural use to transportation use.

Affected Environment

Pueblo, located at the western end of the project, is the largest municipality in the project area, with an estimated population of slightly more than 105,000 (2010 Census). It serves as a regional center for many types of goods and services in the Lower Arkansas Valley, including big-box retailers, health care, higher education, and commercial airline service. In Pueblo, the highway connects the main portion of the city to the Pueblo Memorial Airport and the large industrial area surrounding it.

In the communities east of Pueblo, U.S. 50 functions as Main Street. Most of the areas zoned for commercial activity are located directly adjacent to the highway, creating a downtown area along U.S. 50 in each community (see Figure 4-31). The populations of the communities range from approximately 400 to 7,800 people (2010 Census). Most residents live within the urbanized portion of each community. The land surrounding these towns is primarily used for agricultural purposes (farmland or ranch lands) and inhabited by the farmers and ranchers who own the fields.

Figure 4-31. Downtown Area along U.S. 50—Fowler

Public lands and conservation easements are important assets to the communities in the Lower Arkansas Valley. State Wildlife Areas and other public properties, such as the John Martin Reservoir State Park (see Figure 4-32), provide recreational opportunities and draw visitors to the region. Conservation easements preserve the natural resources that draw those visitors and provide an economic boost to individual property owners.

Figure 4-32. Sign Guiding Visitors to John Martin Reservoir State Park—Bent County

The remainder of this section describes conditions in the project area related to planning documents, future development areas, conservation easements, public lands, and property acquisition.

Planning Documents

Only five local governments have prepared land use planning documents that include portions of the project area. These were prepared by: the City of Pueblo, Pueblo County, Bent County, Town of Fowler, and City of Las Animas.

Additionally, the City of Pueblo and Pueblo County have adopted a long-range transportation plan. This plan evaluates the existing and future transportation needs of the Pueblo region. Also, Prowers County has adopted a plan that outlines potential pedestrian trails in the county.

Zoning ordinances regulate land use within a community. They dictate where certain uses are acceptable (residential, commercial, and agricultural, among other uses). Most of the municipalities and two counties have adopted such ordinances. They were reviewed during the course of this analysis to understand how land uses could change if the Build Alternatives are built.

Future Development Areas

Future development areas—locations where communities expect development to occur—are considered to understand whether the Build Alternatives would be compatible with potential growth.

During workshops held by the U.S. 50 Tier 1 EIS project team (CDOT 2006b), residents of the cities east of Pueblo in the project area identified how their communities may grow. Pueblo identified these development areas in its most recent comprehensive plan.

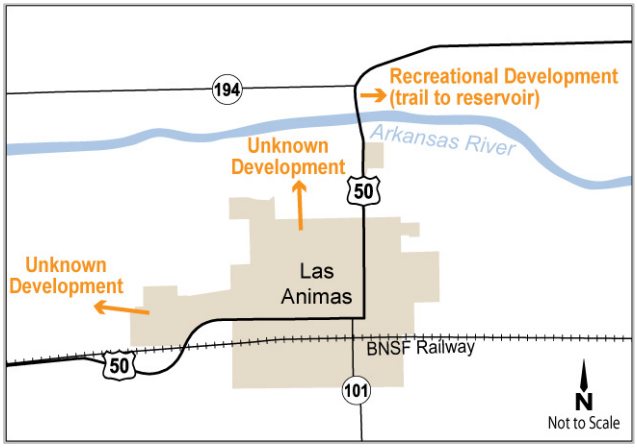


Figure 4-33. Future Development Areas—Las Animas

All of the potential development identified would occur immediately adjacent to the existing cities and towns (see Figure 4-33). The location of that development (which side of town) varied by community. Planned growth focused primarily on residential, commercial, and industrial development, although other types of development also were identified.

Conservation Easements

A conservation easement is “a restriction placed on a piece of property to protect its associated resources” (The Nature Conservancy [TNC] 2007). When property is designated as a conservation easement, property owners retain their ownership, but they give up the right to develop the property in the future in exchange for monetary compensation. These properties were important to consider for a number of reasons. They exist throughout the project area, and some of them contain a substantial amount of acreage. Development is not allowed to occur on these properties unless the easement is removed. Any acquisition of this property (to construct the Build Alternatives) likely would require additional coordination with the property owners. Also, because easement owners receive monetary compensation for giving up their development rights, changes to these easements also have financial consequences for these owners.

This analysis identifies 27 conservation easements located within the project area, as illustrated in the detailed maps contained in Appendix D of the Land Use and Social Considerations Technical Memorandum (Figures D-10 through D-13), which is located in Appendix A of this document. These easements include approximately 6,600 acres of land, constituting slightly more than 3 percent of the project area. The easements are located throughout Pueblo, Otero, and Prowers counties and are managed by either the Otero County Land Trust or The Greenlands Reserve.

Public Lands

Public land is defined as land owned by a state or federal government agency. In several locations, these properties provide recreational opportunities for hunting, fishing, camping, and other activities. Public lands also bring visitors (and their money) to the Lower Arkansas Valley. Public lands are considered because additional coordination may be necessary with the government agency that owns or manages the land (or both) to acquire them.

Nearly 6 percent of the land in the project area is owned by either the federal government or the State of Colorado. These properties are summarized in Table 4-22.

Table 4-22. Public Land by Owner in the Project Area

Owner	Manager	Number of Properties
Federal Government	Bureau of Land Management	11
	U.S. Army Corps of Engineers	1
State of Colorado	Colorado Parks & Wildlife	6
	Colorado State Land Board	16
	Unknown	2

Sources: CDOT 2004; CDOW 2003a; Black 2009; Black et al. 2007; USACE 2010

The state of Colorado owns 24 properties located, in whole or in part, in the project area, as illustrated in Appendix D of the Land Use and Social Considerations Technical Memorandum (Figures D-10 through D-13), which is located in Appendix A of this document. Six of these public lands are managed by the CPW as State Wildlife Areas. These areas are open to the public and are managed primarily for recreational uses, such as hunting, camping, and hiking. The Colorado State Land Board is responsible for 16 of the state's properties. The management of the other two state-owned properties is unknown.

The federal government owns 12 properties, including 11 managed by the Bureau of Land Management, which is a division of the U.S. Department of the Interior. The other federal property is the John Martin Reservoir State Park, which has a reservoir (John Martin Reservoir) that is managed by the USACE as a water storage and flood control facility (see Figure 4-34). The property also is a major recreational asset to the Lower Arkansas Valley because of the state park and State Wildlife Area (managed by CPW). Virtually all of this property is located south of the project area, including the entire reservoir and most of the park and wildlife area; however, the existing U.S. 50 corridor crosses a small portion of the wildlife area in two places.

Figure 4-34. John Martin Reservoir—Bent County

There also are public properties in the Lower Arkansas Valley outside the project area that could be indirectly affected by the Build Alternatives. The issue is how the Build Alternatives could affect the ability of visitors to access these sites. Property managers at the Comanche National Grassland and Bent's Old Fort National Historic Site have reported that a substantial number of their visitors use U.S. 50 as part of their primary route to the property (Ott-Jones 2007; Peters 2007). Changes to U.S. 50 that would affect these routes would be evaluated. It is reasonable to assume that the Boggsville National Historic Site receives many visitors from U.S. 50 as well, due to its proximity to the corridor. Therefore, indirect effects as a result of changes to U.S. 50 also would be evaluated for this site.

Property Acquisition

Property acquired by CDOT to construct the Build Alternatives will comply fully with federal and state requirements, including the Uniform Act.

Environmental Consequences

Effects to land use are evaluated based on the type of effect that the Build Alternatives could have on the existing or predicted (i.e., future) use. The methods used for these evaluations are discussed below.

Planning Documents

Planning documents in the project area are reviewed to determine whether the Build Alternatives would be compatible with them. For comprehensive plans and Pueblo's long-range transportation plan, this

review focuses on whether the Build Alternatives under consideration and the planning documents recommend the same future route for U.S. 50. If they do, then they are considered to be compatible. In the case of the Prowers County trails plan, the review focuses on how the Build Alternatives could affect the future use of the planned trails. Zoning ordinances are used to determine how land use could change, since the Build Alternatives could shift existing land uses to a transportation use. Any changes from a non-transportation use to a transportation use mean the Build Alternatives are incompatible with the ordinance.

Future Development Areas

Compatibility with future development is measured by how the Build Alternatives could affect those areas. If the effects likely would be positive, then the Build Alternatives are considered to be compatible. If they likely would be negative, then the Build Alternatives are considered to be incompatible with future growth. The following guidelines are used to determine this compatibility:

- Residential areas generally value quiet surroundings, and a highway is not a quiet use. So, if the Build Alternatives would move U.S. 50 closer to potential residential growth areas, then it is considered to be incompatible with that growth. Conversely, if the Build Alternatives would move U.S. 50 farther away from these areas, then it is considered to be compatible with the growth.
- Some recreational areas, such as parks and golf courses, also generally value quiet surroundings, so compatibility would be the same as with residential growth areas.
- Commercial or industrial areas generally value good connections to regional, statewide, and interstate transportation facilities. These

Potential Effect on Land Use

The three largest communities in the project area (Pueblo, La Junta, and Las Animas) have officially stated a preference (either in a comprehensive plan or by resolution) that envisions U.S. 50 in a different location than the Build Alternatives.

The Build Alternatives would affect up to 13 conservation easements and 12 public properties. Five of those public properties are State Wildlife Areas—the Karney Ranch, John Martin Reservoir, Mike Higbee, Granada, and Holly State Wildlife Areas—and one is the John Martin Reservoir State Park. U.S. 50 crosses the five State Wildlife Areas today and most of the effects to them would occur at or near these existing crossings.

The Build Alternatives recommend that U.S. 50 be four lanes through the Lower Arkansas Valley. CDOT would be required to purchase property to accomplish this goal. In most locations, property would be acquired immediately adjacent to the highway. In the communities east of Pueblo, property would need to be acquired on the periphery of the communities, either north or south, to build the new around-town routes. This property acquisition would shift existing land uses, which are primarily agricultural, to transportation (or use for the highway).

connections facilitate delivery of raw materials into these areas and delivery of finished products out to regional markets and beyond. For the communities east of Pueblo, U.S. 50 is their primary connection to major transportation facilities outside the Lower Arkansas Valley. The farther away the highway is located from commercial and industrial areas, the weaker their connection is to needed transportation systems. If the Build Alternatives would move U.S. 50 farther from future commercial or industrial development areas, it is considered incompatible with that growth. In contrast, it is considered compatible if the Build Alternatives would move the highway closer to these growth areas.

Conservation Easements and Public Lands

Conservation easements and public lands are considered to be potentially affected if any portion of the property is located within the Build Alternatives. Because the alignment of U.S. 50 within the Build Alternatives will not be determined until Tier 2 studies, not all of the identified properties would be affected. For example, if the Build Alternatives cross public lands, there may be opportunities to avoid those lands during Tier 2 studies, when the alignment of the highway is determined.

Additionally, for some properties, it may be possible to take a portion of the property to use for the Build Alternatives and maintain the remainder for its existing use (as an easement or public land). In other cases, this would not be possible. For example, the remaining portion of a conservation easement may not be large enough for the property owner or easement manager to consider continuing the easement. Because this type of information is not known for every identified property, this analysis considers them affected as long as the Build Alternatives cross any portion of the property.

Property Acquisition

Property acquisition would be required to construct the Build Alternatives. The Build Alternatives only identify a general location for the highway, not a specific alignment, so it is not possible to identify specific properties that would be acquired. This evaluation, therefore, identifies general locations where property acquisition is likely. Decisions about specific parcels would be made during Tier 2 studies after specific roadway alignments are identified. This evaluation also identifies how the uses of that land (within the general locations) could change if the Build Alternatives are implemented.

The Build Alternatives would transform the existing two-lane sections of U.S. 50 into four lanes and create new routes around each of the communities east of Pueblo. The Build Alternatives also could require highway expansion in certain areas for safety improvements, such as wider shoulders, added turn

lanes, or other improvements. This would change the current use of the land, e.g., residential or agricultural, to a transportation use.

Summary of Effects

The following section summarizes potential effects to land use by the No-Build Alternative and the Build Alternatives.

No-Build Alternative

Under the No-Build Alternative, only minor and isolated construction would occur. Routine maintenance and repairs would be made, as necessary, to keep U.S. 50 in usable condition, including standard overlays and repairs of weather- or crash-related damage. Additionally, smaller-scale improvements may be undertaken, such as short passing lanes and other minor safety improvements.

No effects to land use or social considerations are expected under the No Build Alternative; however, communities also would not have the opportunity to make certain improvements to their city or town.

Planning Documents. The No-Build Alternative is not consistent with planning documents that identify U.S. 50 on a new alignment.

Future Development Areas. The No-Build Alternative would not enhance or inhibit growth in planned future development areas. There would be no direct effects from the No-Build Alternative. The No-Build Alternative could indirectly inhibit development in future development areas, since local economies would be unwilling to invest in development areas if U.S 50 is not improved.

Conservation Easements. The No-Build Alternative would not impact conservation easements in the project area, since property acquisition is not anticipated by the No-Build Alternative.

Public Lands. The No-Build Alternative would not impact public lands in the project area, since property acquisition would not result from this alternative.

Property Acquisition. The No-Build Alternative would not require property acquisition.

Build Alternatives

The Build Alternatives involve relocating U.S. 50 around eight communities in the project area, as well as realigning U.S. 50 slightly south of Fort Reynolds. In each case, the highway would be relocated just

outside the currently developed area of the communities in the project area. Between communities, the highway would be widened in certain areas to accommodate safety improvements (such as wider shoulders or turn lanes) or to add lanes (in the existing two-lane portions only to make the roadway four lanes). Potential effects from the Build Alternatives on land use are discussed below for each evaluation topic.

Planning Documents. Only five communities in the project area have planning documents that specifically discuss U.S. 50: City of Pueblo, Pueblo County, Fowler, Bent County, and Las Animas. Planning documents covering Pueblo (city and county) and Las Animas envision a different future location for U.S. 50 than the Build Alternatives. La Junta also has indicated its preference for an alignment south of the city by adopting a resolution on the subject (City of La Junta 2007). However, the La Junta alternatives included in the Build Alternatives generally are considered to be consistent with the resolution even though they are not on the exact location presented in the resolution. Based on the inconsistencies between the Build Alternatives and the preferences stated by the City of Pueblo, Pueblo County, La Junta, and Las Animas, coordination between CDOT and these communities will be required during future land use and long-range planning activities to ensure consistency between the proposed project and local planning documents.

Inconsistencies with city preferences are described in more detail later in this section (in the “Build Alternatives Effects by Location” subsection).

Additionally, Prowers County has pedestrian trail plans that traverse Granada and Holly and several of the communities have adopted zoning ordinances. Any inconsistencies between the Build Alternatives and these documents also are described in the “Build Alternatives Effects by Location” subsection of this discussion.

Future Development Areas. The compatibility of the Build Alternatives with future growth areas varies by community. These issues are detailed in the “Build Alternatives Effects by Location” subsection. It is important to note, however, that whether the Build Alternatives ultimately are compatible with these potential development areas depends on if that growth occurs as planned.

Conservation Easements. The Build Alternatives have the potential to affect up to 13 conservation easements located in the project area. Effects to these easements are detailed in the “Build Alternatives Effects by Location” subsection. Effects to individual easements may or may not prevent the remainder of the property from functioning as an easement. Decisions about which easements could or could not retain

their designation would be made during Tier 2 studies when the roadway alignment is identified (and when more specific effects to the easements could be determined).

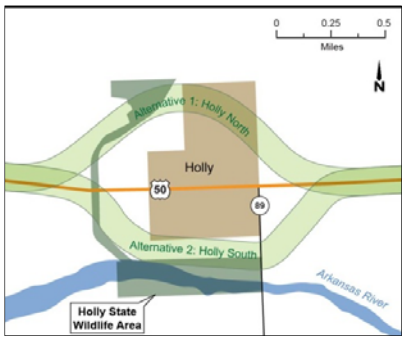
Public Lands. The Build Alternatives have the potential to affect up to 12 public properties. The State of Colorado owns 11 of them and one is owned by the Department of Defense. Six of the 12 properties are managed by the State Land Board and the other six are managed by CPW as State Wildlife Areas/State Parks.

Five State Wildlife Areas could be affected: the Karney Ranch, John Martin Reservoir, Mike Higbee, Granada, and Holly State Wildlife Areas. The existing U.S. 50 alignment crosses each of the State Wildlife Areas. Effects to them would be limited to changes to those existing crossings (such as widening), as shown in Figure 4-35. The actual effects to the properties is expected to be minimal and would not hinder the continued operation of the park, reservoir, or State Wildlife Area at any of the locations. Whether these effects occur depends on the location of the roadway alignment, which would be determined during the Tier 2 studies in this area.

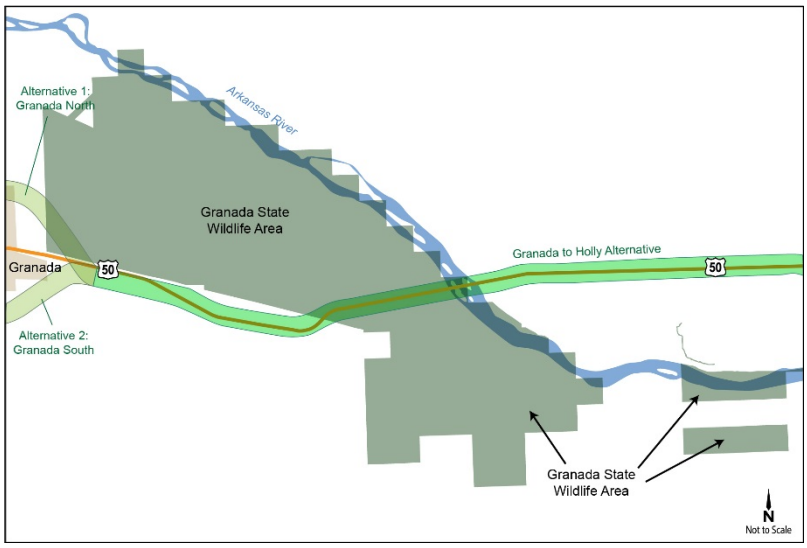
The other property is the John Martin Reservoir State Park, which is adjacent to the John Martin Reservoir State Wildlife Area. The land within the property boundaries would not be affected; however, the primary entrance to the park is located at the junction of U.S. 50 and CR 24 near Hasty (known locally as School Street). Changes to the junction of U.S. 50 and CR 24 would be evaluated during Tier 2 studies to determine how they might affect travelers going to or coming from the park.

There also are public properties in the Lower Arkansas Valley that are outside the project area but could be indirectly affected by the Build Alternatives. The issue is how the Build Alternatives could affect the ability of visitors to access these properties. Property managers at the Comanche National Grassland and Bent's Old Fort National Historic Site have all reported that most of their visitors use U.S. 50 to get to their facilities (up to 95 percent of visitors, in one case). All of these properties are regional attractions and draw a number of visitors to the area. Although not directly stated by property managers, it also is reasonable to assume that the Boggsville National Historic Site receives much of its traffic from U.S. 50, since visitors likely use U.S. 50 to get to SH 101 (located adjacent to the site). Therefore, changes to U.S. 50 that could affect the ability of visitors to access these attractions would be evaluated during Tier 2 studies to ensure this access is maintained.

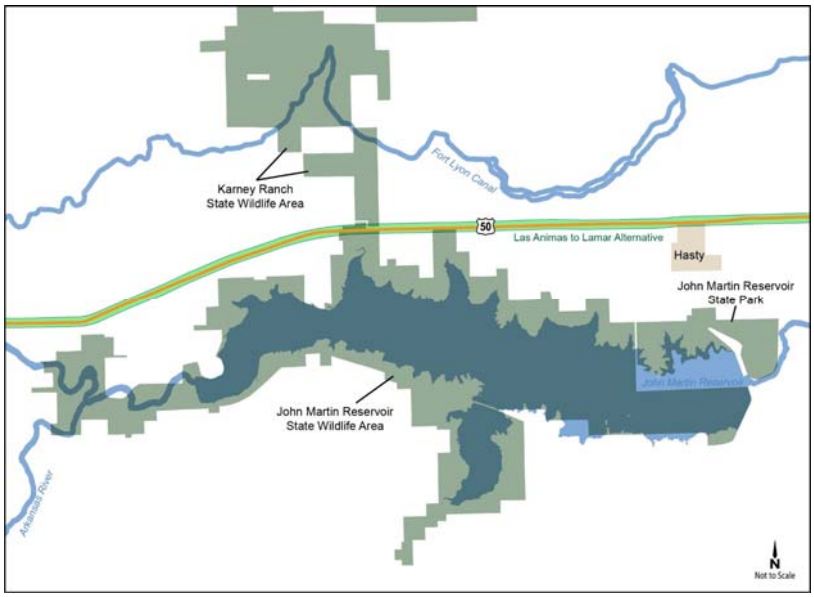
Mike Higbee State Wildlife Area



Holly State Wildife Area



Granada State Wildlife Area



Karney Ranch and John Martin Reservoir State Wildlife Area

Figure 4-35. Examples of Effects to State Wildlife Areas

Property Acquisition. Construction of the Build Alternatives would require CDOT to purchase additional property for U.S. 50. The amount of property purchased would vary by location and depend on the type of improvements being made to the highway in each location. The following summary provides a general idea about the property acquisition that would be needed for the Build Alternatives:

- In Pueblo, U.S. 50 already is configured in the manner proposed by the U.S. 50 Tier 1 EIS (a four-lane rural expressway), so no substantial property acquisition would occur. Property could be needed, however, to build frontage roads if existing accesses to U.S. 50 are eliminated in any locations along this portion of the highway. Decisions about individual access points on and off U.S. 50 are not being made by this Tier 1 analysis. These decisions would be made during Tier 2 studies.
- Between the communities, property acquisition generally would occur directly adjacent to U.S. 50. The Build Alternatives recommend the entire highway be four lanes from I-25 in Pueblo to just east of Holly near the Colorado-Kansas state line. In the locations where U.S. 50 is currently two lanes, this property would be used to expand the highway to four lanes. In most cases, the decision about whether to build the new lanes north or south of the existing lanes would be made during Tier 2 studies when the roadway alignment is determined. In the areas where U.S. 50 already is four lanes, property acquisition would occur immediately adjacent to the highway only if certain improvements are needed, such as wider shoulders, turn lanes, or other changes.
- The new routes around the communities east of Pueblo would require CDOT to purchase property around the periphery of the communities (either north or south of town).

More than 90 percent of the land within the project area (approximately 175,000 acres) is farmland or ranch lands (Tranel 2008a). Therefore, it is likely that a large portion of the property CDOT would have to acquire to construct the Build Alternatives currently is being used for agricultural purposes. The Build Alternatives would change the use of the acquired property from agricultural to transportation.

Build Alternatives Effects by Location

Since the Build Alternatives are mostly on new locations, direct land use changes from the alternatives includes converting land needed for right of way from its existing use to a transportation use. The land needed for right of way includes a wide variety of uses, such as industrial, commercial, residential, recreational (public/semi-public), and agricultural. For this study, acreages of land to be converted to transportation use as a result of the project were estimated based on the 1,000 foot wide corridor for new location portions. These acreages were multiplied by a conversion factor to better estimate impacts of a 250-foot-wide highway footprint within the 1,000 foot wide corridor. The conversion factor, generally 0.25, reflects that only one-quarter of the alternative width would be needed for highway right of way.

This conversion provides a more realistic value for expected effects from the Build Alternatives. These conservative estimates will be refined during Tier 2 studies when specific alignments are identified.

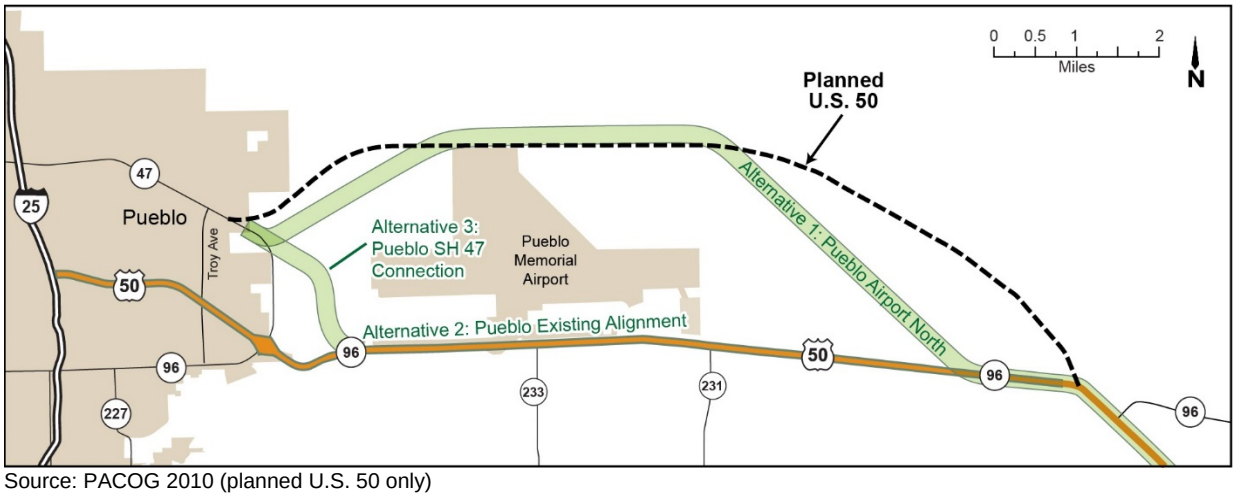
Because the Build Alternatives only identify a general location for the highway, not a specific roadway footprint, it is not possible to identify specific properties that would be converted to a transportation use. Therefore, this evaluation identifies general locations where property acquisition is likely.

Property acquisition will result in some business and residential relocations. Potential relocations are most likely to occur in alternative sections between communities where the Build Alternatives require widening on the existing alignment. However, impacts to specific parcels will be evaluated in greater detail during Tier 2 studies after specific roadway footprints are identified.

Effects to land use by the Build Alternatives are discussed below by section along the corridor (from west to east along U.S. 50). This discussion focuses on existing and future land use at each location. If particular issues do not exist or land use is not affected by the Build Alternatives in a particular area, they are not mentioned.

Section 1: Pueblo

U.S. 50 connects to I-25 within Pueblo at the western terminus of the project. Additionally, two local corridor proposals are considered, resulting in three alternatives considered in Section 1 of the project corridor, as shown in Figure 4-36.



Source: PACOG 2010 (planned U.S. 50 only)

Figure 4-36. Planned (Future) Route for U.S. 50 as Envisioned in the 2040 Long-Range Transportation Plan for the Pueblo Region

The primary land use issue is the compatibility of the Build Alternatives with local planning documents covering the area. Future development areas in Pueblo are located north, northwest, southwest, south, and east of the city. Most of these areas are expected to contain multiple types of development, primarily residential and commercial. Industrial and institutional (public use) development also is expected in some locations. Table 4-23 identifies the estimated acres of existing land use to be converted to a transportation use in Section 1 of the project corridor.

Table 4-23. Comparison of Acres to be Converted to a Transportation Use in Section 1

Alternative	Land Use	Acres Converted to Transportation*	Total Acres Converted by Alternative
Alternative 1: Pueblo Airport North	Commercial	1	368
	Industrial	0	
	Public Use	5	
	Residential	10	
	Agriculture/Rural	352	
Alternative 2: Pueblo Existing Alignment	Roadway already configured to Build Alternatives recommendation		
Alternative 1: Pueblo SH 47 Connection	Commercial	1	91
	Industrial	22	
	Public Use	7	
	Residential	10	
	Agriculture/Rural	51	

*Acreage estimates are based on a 1,000-foot-wide corridor multiplied by a conversion factor of 0.25 for new location portions. These conservative acreage estimates are anticipated to be reduced during Tier 2 studies.

Alternative 1: Pueblo Airport North. The 2040 long-range transportation plan prepared for the Pueblo region envisions U.S. 50 as a freeway following a different route than it does today (PACOG 2008). As shown in Figure 4-36, this planned route, would relocate the highway north of the Pueblo Memorial Airport between approximately Troy Avenue and SH 96. This alternative would require the greatest amount of change to existing land use in the study area (approximately 368 acres). Approximately 352 acres of agricultural and grazing land would be converted to a transportation use with this alternative. The Airport North Alternative is the “Preferred” Plan in the 2040 Regional Transportation Plan, but is not funded.

Alternative 2: Pueblo Existing Alignment. U.S. 50 already is configured in the manner recommended by the Build Alternatives in this area. No substantial property acquisition is anticipated; however, property could be needed to build frontage roads if existing accesses to U.S. 50 are eliminated. The existing alignment alternative is consistent with the region’s adopted 2040 Regional Transportation Plan.

Alternative 3: Pueblo SH 47 Connection. This alternative is a local proposal considered in the CDOT 2003 planning study for U.S. 50. The alternative includes approximately two miles of new roadway alignment to connect existing U.S. 50 to SH 47, west of the airport. This alternative would convert approximately 91 acres to a transportation use. Approximately, 51 acres of existing agricultural and grazing land would be converted to a transportation use with this alternative. This alternative is not consistent with the adopted 2040 Regional Transportation Plan.

Section 2: Pueblo to Fowler

Two alternatives are considered in this section of the project corridor. In this section, the Build Alternatives could affect the use of conservation easements and public lands. Close to Pueblo in this section, U.S. 50 is already four lanes and is configured in the manner recommended by the Build Alternatives (between approximately milepost 327 and milepost 332), so property acquisition would be minimal. Property could be needed to build frontage roads if existing accesses to U.S. 50 are eliminated. Property acquisition would be required to expand U.S. 50 to four lanes near Fowler.

From Pueblo to Fowler, land on either side of U.S. 50 is primarily zoned for agricultural use (mainly for ranching) with small amounts of land in use for commercial and public purposes (conservation easements). Therefore, most land acquired for the Build Alternatives would shift from agricultural use to a transportation use. Table 4-24 identifies the estimated acres of existing land use to be converted to a transportation use in Section 2 of the project corridor.

Table 4-24. Comparison of Acres to be Converted to a Transportation Use in Section 2

Alternative	Land Use	Acres Converted to Transportation*	Total Acres Converted by Alternative
Alternative 1: Fort Reynolds Existing Alignment	Agriculture/Rural	619	622
	Commercial	1	
	Public Use	2	
Alternative 2: Fort Reynolds Realignment	Agriculture/Rural	616	619
	Commercial	2	
	Public Use	1	

*Acreage estimates are based on a 1,000-foot-wide corridor multiplied by a conversion factor of 0.25 for new location portions. These conservative acreage estimates are anticipated to be reduced during Tier 2 studies.

Alternative 1: Fort Reynolds Existing Alignment. U.S. 50 between Pueblo and Fowler is two lanes (between approximately milepost 332 and milepost 349). Additional property adjacent to the highway (either north or south of the existing lanes) would be needed to build the additional two lanes.

This alternative could affect up to three conservation easements. The two easements managed by The Greenlands Reserve are located between milepost 335 and milepost 343. The other easement is managed by the Otero County Land Trust and is located near milepost 349 on the west side of Fowler. In addition, this alternative would affect three public properties, all managed by the Colorado State Lands Board. All of these properties are located between milepost 335 and milepost 343. This alternative would require approximately 620 acres of agricultural land to be converted to a transportation use.

Alternative 2: Fort Reynolds Realignment. Similar to Alternative 1, additional property adjacent to the highway (either north or south of the existing lanes) would be needed to build the additional two lanes along the existing U.S. 50 alignment. This alternative also realigns the highway at the intersection of U.S. 50 and SH 209, and shifts the highway south to avoid acquisition of homes in the area of Fort Reynolds.

This alternative could affect up to three conservation easements. The two easements managed by The Greenlands Reserve are located between milepost 335 and milepost 343. The other easement is managed by the Otero County Land Trust and is located near milepost 349 on the west side of Fowler. In addition, this alternative would affect three public properties, all managed by the Colorado State Lands Board. All of these properties are located between milepost 335 and milepost 343. This alternative would require approximately 616 acres of agricultural land to be converted to a transportation use.

Section 3: Fowler

Two alternatives are considered in this section. Both the Fowler North and Fowler South alternatives would potentially affect the use of a conservation easement managed by the Otero County Land Trust (located near milepost 349 on the west side of Fowler), and would require acquisition of additional property for the new around-town route (either north of south of town). Both alternatives would change land zoned for agricultural use to a transportation use. Table 4-25 identifies the estimated acres of existing land use to be converted to a transportation use in Section 3 of the project corridor.

Table 4-25. Comparison of Acres to be Converted to a Transportation Use in Section 3

Alternative	Land Use	Acres Converted to Transportation*	Total Acres Converted by Alternative
Alternative 1: Fowler North	Public Use	13	104
	Agriculture/Rural	91	
Alternative 2: Fowler South	Public Use	0	149
	Agriculture/Rural	149	

*Acreage estimates are based on a 1,000-foot-wide corridor multiplied by a conversion factor of 0.25 for new location portions. These conservative acreage estimates are anticipated to be reduced during Tier 2 studies.

Alternative 1: Fowler North. The North Alternative would require acquisition of a portion of the Cottonwood Links Golf Course, which is a recreational use (public use). To maintain the course's operations, some of its holes would have to be reconstructed on nearby property. The Fowler North Alternative is consistent with the comprehensive plan adopted by Fowler in 2009. This plan states that if U.S. 50 is realigned, then the town prefers it to be located north of town (Town of Fowler 2009). The plan also states that to ensure future redevelopment is consistent with the town's objectives "no realignment [should] occur to the south of Town" (Town of Fowler 2009). Growth in Fowler in recent years has occurred south of town and has been residential in nature. The Fowler North Alternative would require approximately 91 acres of agricultural land to be converted to a transportation use. This land has limited development potential due to adjacent floodplains.

Alternative 2: Fowler South. The Fowler South Alternative extends nearly a mile south of the town to stay south of the Oxford Farmers Ditch. The alternative is not consistent with the Town of Fowler's comprehensive plan, which identifies that "no realignment [should] occur to the south of Town" (Town of Fowler 2009). The Fowler South Alternative would require approximately 149 acres of agricultural land to be converted to a transportation use, which is a greater amount than the Fowler North Alternative. This alternative would convert land to a transportation use that is better suited for other types of development.

Section 4: Fowler to Manzanola

From Fowler to Manzanola, the Build Alternative could affect the use of a conservation easement managed by the Otero County Land Trust (located between milepost 353 and milepost 354). In addition, property acquisition would be needed to expand this two-lane section of U.S. 50 to four lanes. Property would be acquired south of the existing lanes because the railroad, located on the north side of U.S. 50, creates a barrier to expanding the highway in that direction. Currently, land south of the highway is zoned for agricultural use, so the Build Alternative would convert up to 186 acres in this area from agricultural to transportation use.

Section 5: Manzanola

There are two alternatives in this section. The primary land use issues in Manzanola involve whether the Build Alternatives are compatible with future development areas and acquisition of additional property for a new around-town route. The town does not have an adopted land use plan. A community workshop held with Manzanola residents identified that future development areas in Manzanola are likely to occur south of town. Table 4-26 identifies the estimated acres of existing land use to be converted to a transportation use in Section 5 of the project corridor.

Table 4-26. Comparison of Acres to be Converted to a Transportation Use in Section 5

Alternative	Land Use	Acres Converted to Transportation*	Total Acres Converted by Alternative
Alternative 1: Manzanola North	Residential	< 1	78
	Agriculture/Rural	77	
Alternative 2: Manzanola South	Residential	0	77
	Agriculture/Rural	77	

*Acreage estimates are based on a 1,000-foot-wide corridor multiplied by a conversion factor of 0.25 for new location portions. These conservative acreage estimates are anticipated to be reduced during Tier 2 studies.

Alternative 1: Manzanola North. This alternative would convert some residential land (less than one acre) and approximately 77 acres of agricultural land to a transportation use. However, this agricultural land is not recognized as being as valuable as the agricultural land south of the town. Development potential north of the town is limited by floodplains.

Alternative 2: Manzanola South. This alternative would convert approximately 77 acres of agricultural land to a transportation use. This land includes higher quality vegetable farmland. Land south of town has better development potential as identified by local residents.

Section 6: Manzanola to Rocky Ford

U.S. 50 is already four lanes in this section. Property acquisition would occur immediately adjacent to the highway only if certain improvements are needed, such as wider shoulders, turn lanes, or other changes. The land immediately adjacent to the highway is zoned for agricultural use. The Build Alternative would convert a minimal amount of agricultural land to a transportation use.

Section 7: Rocky Ford

There are two alternatives in the section. The Build Alternatives in Rocky Ford could affect future development areas and conservation easements. The Build Alternatives also would require the acquisition of additional property for a new around-town route. Future development areas in Rocky Ford could include a golf course or residential development south of the city and an industrial park north of the city.

Up to two conservation easements could be affected by this section of the Build Alternatives. The easements are both managed by the Otero County Land Trust and are located near SH 71 and CR GG on the west side of Rocky Ford.

Alternative 1: Rocky Ford North. The Rocky Ford North Alternative would require the conversion of approximately 246 acres of agricultural land to a transportation use for the Build Alternatives. The North Alternative would pass through fewer acres of agricultural land than the South Alternative. This alternative would be compatible with potential growth because it would move the highway closer to a proposed industrial growth area and farther away from the potential residential and recreation growth area.

Alternative 2: Rocky Ford South. The Rocky Ford South Alternative would require the conversion of approximately 248 acres of agricultural land to a transportation use for the Build Alternatives.

Section 8: Rocky Ford to Swink

This section of U.S. 50 is already four lanes, so minimal property acquisition would occur immediately adjacent to the highway (either north or south) only if certain improvements are needed, such as wider shoulders, turn lanes, or other changes. This land is currently zoned for agricultural use; the Build Alternative would change this agricultural use to a transportation use.

Section 9: Swink

There are two design alternatives in this section. Either alternative could affect future development areas and conservation easements. They also would require the acquisition of additional property for a new around-town route. Recent growth in Swink has occurred west of town, and future development areas exist south and northeast of town, but the type of development that could take place in these areas is unknown. Swink residents also indicated that they would like to locate a park in the southern development area.

Whether the alternatives are consistent with this growth would depend on what type of development (residential, industrial, etc.) is expected to occur there in the future. Since that question remains, it is not clear whether either alternative would be compatible with Swink's future development areas. Both the North and South Alternatives would require additional property acquisition for the new around-town route, and land would be acquired in areas currently zoned for agricultural use. The Build Alternatives, therefore, would shift some land use from agricultural to transportation, no matter which alternative is chosen in Swink. Table 4-27 identifies the estimated acres of existing land use to be converted to a transportation use in Section 9 of the project corridor.

Table 4-27. Comparison of Acres to be Converted to a Transportation Use in Section 9

Alternative	Land Use	Acres Converted to Transportation*	Total Acres Converted by Alternative
Alternative 1: Swink North	Residential	1	62
	Agriculture/Rural	61	
Alternative 2: Swink South	Residential	1	77
	Agriculture/Rural	76	

*Acreage estimates are based on a 1,000-foot-wide corridor multiplied by a conversion factor of 0.25 for new location portions. These conservative acreage estimates are anticipated to be reduced during Tier 2 studies.

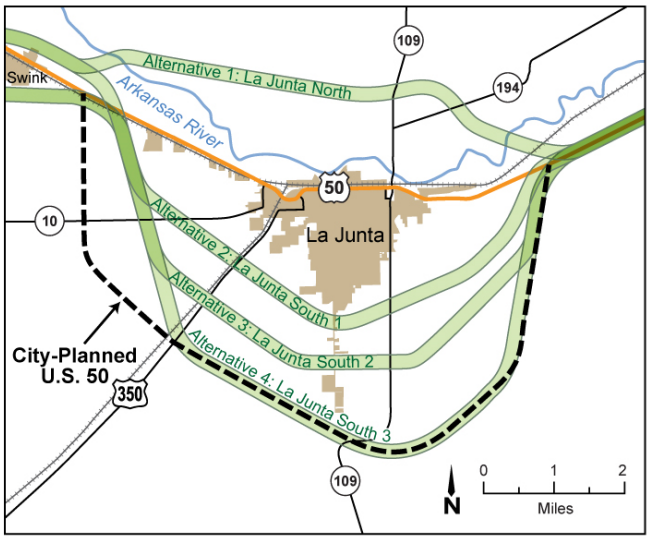
Alternative 1: Swink North. The Swink North Alternative would convert approximately 61 acres of agricultural land to a transportation use for the Build Alternatives. This land has limited development potential due to adjacent floodplains.

The North Alternative would affect a conservation easement (that would not be affected by the south alternative). This conservation easement is managed by the Otero County Land Trust and is located northeast of the town boundaries.

Option 2: Swink South. The Swink South Alternative would convert approximately 77 acres of agricultural land to a transportation use for the Build Alternatives. This alternative would place U.S. 50 near the town's school, which may affect existing and future land use near the school.

Section 10: La Junta

There are four design alternatives around La Junta in this section. One alternative goes around the town to the north and three alternatives go around the town to the south, as shown in Figure 4-37. The La Junta City Council adopted a resolution endorsing the relocation of U.S. 50 to the extreme southern portion of the city (City of La Junta 2007). Future development areas are located southwest and west of the city, and the western growth is likely to be residential.



Source: City of La Junta 2007 (city-planned U.S. 50 only)

Figure 4-37. City-Planned (Future) Route for U.S. 50 in La Junta

Even though the exact location of the southern alternatives differs, all three would alter land

use in the same way. Each would move U.S. 50 traffic to a new route south of town, removing it from the downtown area, and each would provide the city with a sizable area for future development to the south. Because the southern alternatives of the Build Alternatives would move U.S. 50 closer to future development areas, no matter which alternative is chosen, the Build Alternatives would seem to be incompatible with growth in future development areas; however, the city's resolution calls for the highway to be relocated closer to these growth areas. Therefore, the Build Alternatives are considered to be consistent with the resolution adopted by the La Junta City Council. All four of the design alternatives would require property acquisition resulting in a change from existing use to a transportation use. Table 4-28 identifies the estimated acres of existing land use to be converted to a transportation use in Section 10 of the project corridor.

Table 4-28. Comparison of Acres to be Converted to a Transportation Use in Section 10

Alternative	Land Use	Acres Converted to Transportation*	Total Acres Converted by Alternative
Alternative 1: La Junta North	Residential	0	262
	Agriculture/Rural	262	
Alternative 2: La Junta South	Residential	2	255
	Agriculture/Rural	253	
Alternative 3: La Junta South	Residential	1	295
	Agriculture/Rural	294	
Alternative 4: La Junta South	Residential	0	358
	Agriculture/Rural	358	

*Acreage estimates are based on a 1,000-foot-wide corridor multiplied by a conversion factor of 0.25 for new location portions. These conservative acreage estimates are anticipated to be reduced during Tier 2 studies.

Alternative 1: La Junta North. Only rural land (262 acres) would be converted to a transportation use by the La Junta North Alternative. No agricultural land would be converted. This design alternative is located outside of the City's planning area. This alternative is not consistent with the city's adopted resolution to relocate U.S. 50 to the south of the city.

Alternative 2: La Junta South. Approximately 253 acres of agricultural land would be converted to a transportation use by Alternative 2. This is consistent with the city's adopted resolution to relocate the highway south of the city. However, the alternative could affect potential future development areas to the southwest and west of the city.

Alternative 3: La Junta South. Alternative 3 was developed during public involvement efforts for this Tier 1 EIS, as a requested compromise between the other two southern alternatives, which had been identified in the 2003 U.S. 50 planning study. Similar to Alternative 2: La Junta South 1, this alternative

is consistent with the city's adopted resolution to relocate the highway south of the city. However, it could affect potential future development areas to the southwest and west of the city. Approximately 294 acres of agricultural land would be converted to a transportation use by the La Junta South 2 Alternative.

Alternative 4: La Junta South. This design alternative is reflected in the city's adopted resolution and would require the greatest amount of agricultural land to be converted to a transportation use. Approximately 358 acres of agricultural land would be converted to a transportation use by the La Junta Alternative 4.

Section 11: La Junta to Las Animas

From La Junta to Las Animas, the Build Alternative would require some property acquisition from one public property, which is managed by the Colorado State Land Board (located between milepost 391 and milepost 392 immediately adjacent to U.S. 50 on the south side of the highway). Close to La Junta in this section, U.S. 50 is already four lanes (between approximately milepost 382 and milepost 386), so minimal property acquisition would occur. Property could be needed to build frontage roads if existing accesses to U.S. 50 are eliminated in any locations along this portion of the highway. The remainder of U.S. 50 between La Junta and Las Animas is two lanes (between approximately milepost 386 and milepost 397). Additional property adjacent to the highway (either north or south of the existing lanes), therefore, would be needed to build the additional two lanes. Up to 431 acres of agriculture/rural land would be converted to a transportation use in this section.

Section 12: Las Animas

There are two design alternatives in this section of the corridor. Neither alternative is consistent with the Bent County/City of Las Animas comprehensive plan, which calls for the improvement of U.S. 50 along its existing alignment (through town). Future development areas in Las Animas are likely to occur north and west of the city. Land CDOT would have to acquire for the Build Alternatives would shift a small area from residential or agricultural uses to a transportation use. Table 4-29 identifies the estimated acres of existing land use to be converted to a transportation use in Section 12 of the project corridor.

Table 4-29. Comparison of Acres to be Converted to a Transportation Use in Section 12

Alternative	Land Use	Acres Converted to Transportation*	Total Acres Converted by Alternative
Alternative 1: Las Animas North	Commercial	< 1	108
	Residential	7	
	Industrial	0	
	Institutional	0	
	Parks/Open Space	0	
	Agriculture/Rural	101	
Alternative 2: Las Animas South	Commercial	0	162
	Residential	0	
	Industrial	15	
	Institutional	5	
	Parks/Open Space	2	
	Agriculture/Rural	140	

*Acreage estimates are based on a 1,000-foot-wide corridor multiplied by a conversion factor of 0.25 for new location portions. These conservative acreage estimates are anticipated to be reduced during Tier 2 studies.

Alternative 1: Las Animas North. This design alternative would convert approximately 101 acres of agricultural land to a transportation use. This alternative would impact land that already has some existing utility infrastructure with existing commercial and residential land uses.

Alternative 2: Las Animas South. This design alternative would convert approximately 140 acres of agricultural land to a transportation use. Additional land uses that may be affected by this alternative include industrial, institutional, and parks/open space.

Section 13: Las Animas to Lamar

From Las Animas to Lamar, the Build Alternative could affect the use of conservation easements and public lands. Portions of U.S 50 in this section are two lanes and portions are four lanes. The four-lane segments occur near Las Animas and near Lamar, with a two-lane segment in between. In the two-lane portion, additional property adjacent to the highway (either north or south of the existing lanes) would be needed for the additional lanes of the Build Alternative. Up to 737 acres of agriculture/rural land could be converted to a transportation use. In the four-lane segments, property acquisition would occur immediately adjacent to the highway only if certain improvements are needed, such as wider shoulders or turn lanes.

Up to two conservation easements could be affected. Both are managed by The Greenlands Reserve and they are located directly adjacent to U.S. 50 (and to one another) between milepost 429 and milepost 431.

Additionally, up to four public properties could be affected. These properties include two managed by the Colorado State Land Board, which are located along U.S. 50 near milepost 406 and milepost 420. The other properties are the Karney Ranch State Wildlife Area and John Martin Reservoir, which includes a water storage and flood control facility, State Park, and State Wildlife Area. No portion of the reservoir would be affected by the Build Alternative. Only a small amount of State Wildlife Area (two sections) immediately adjacent to U.S. 50 (between milepost 408 and milepost 411) would be affected.

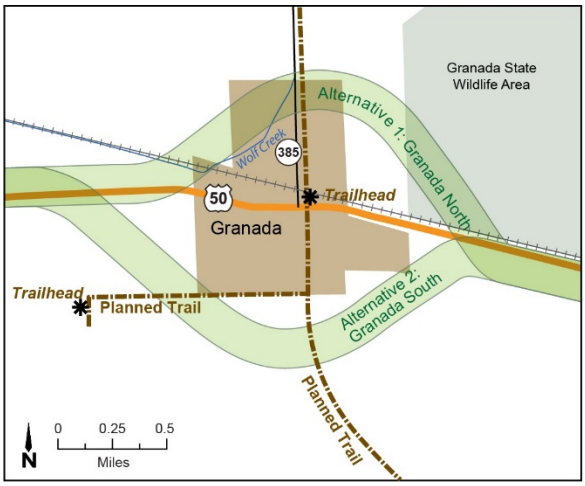
Section 14: Lamar to Granada

From Lamar to Granada, the Build Alternative could affect conservation easements and public lands. U.S. 50 is only two lanes between Lamar and Granada, so additional property adjacent to the highway (either north or south of the existing lanes) would be needed to construct the Build Alternative. Up to 422 acres of agriculture/rural land could be converted to a transportation use.

Three conservation easements would be affected by the Build Alternatives in this section. They are all managed by The Greenlands Reserve and are located near milepost 441, milepost 442, and milepost 448. The Build Alternatives also could affect the Mike Higbee State Wildlife Area, which is managed by CPW.

Section 15: Granada

There are two design alternatives in this section of the corridor. Potential effects from the Build Alternatives in this section include compatibility with the Prowers County trails plan, impacts to future development areas, and property acquisition. The Prowers County trails plan identifies future routes for pedestrian trails within the county, including trails in Granada, as shown on Figure 4-38. Future development areas in Granada are located southeast or south of town. Compatibility with the Build Alternatives cannot be determined because the type of growth expected in this area is unknown. Both design alternatives would require property acquisition resulting in a change from existing use to a transportation use. Table 4-30 identifies the estimated acres of existing land use to be converted to a transportation use in Section 15 of the project corridor.



Source: Prowers County 2006 (county-planned trails only)

Figure 4-38. County-Planned (Future) Trails in Granada

Table 4-30. Comparison of Acres to be Converted to a Transportation Use in Section 15

Alternative	Land Use	Acres Converted to Transportation*	Total Acres Converted by Alternative
Alternative 1: Granada North	Residential	17	66
	Public/Semi-Public	0	
	Agriculture/Rural	49	
Alternative 2: Granada South	Residential	0	63
	Public/Semi-Public	1	
	Agriculture/Rural	63	

*Acreage estimates are based on a 1,000-foot-wide corridor multiplied by a conversion factor of 0.25 for new location portions. These conservative acreage estimates are anticipated to be reduced during Tier 2 studies.

Alternative 1: Granada North. This design alternative would convert approximately 17 acres of residential land and approximately 49 acres of agricultural land to a transportation use. However, this agricultural land has limited development potential due to adjacent floodplains. This alternative includes one crossing of a planned trail and would affect the southwest corner of the Granada State Wildlife Area, which currently lies to the northeast of Granada and north of the existing U.S. 50 alignment.

Alternative 2: Granada South. This design alternative would convert approximately 62 acres of agricultural land to a transportation use. This alternative includes two crossings of a planned trail.

Section 16: Granada to Holly

From Granada to Holly, the Build Alternative could affect a conservation easement managed by The Greenlands Reserve land trust (located adjacent to U.S. 50 near milepost 462). The Build Alternative also would affect the Granada State Wildlife Area in the same location that U.S. 50 crosses this facility today. Property acquisition would be needed to expand this two-lane section of U.S. 50 to four lanes. Up to 254 acres of agriculture/rural property would be acquired adjacent to the existing lanes (either north or south of the highway). The Build Alternative would convert approximately 254 acres of agricultural land to a transportation use.

Section 17: Holly

There are two design alternatives in this section of the corridor. This section of the Build Alternatives would affect one conservation easement, which is managed by The Greenlands Reserve. The easement is located on the west side of Holly near milepost 462. The Prowers County trails plan identified future routes for pedestrian trails within the county, including trails in Holly. The planned trails could be affected by the Build Alternatives, as shown in Figure 4-39.

Future development areas are identified west of town (commercial land use), northeast of town (residential land use), and to the northwest (industrial land use). Construction of the Build Alternatives would change existing land uses to a transportation use.

Table 4-31 identifies the estimated acres of existing land use to be converted to a transportation use in Section 17 of the project corridor.

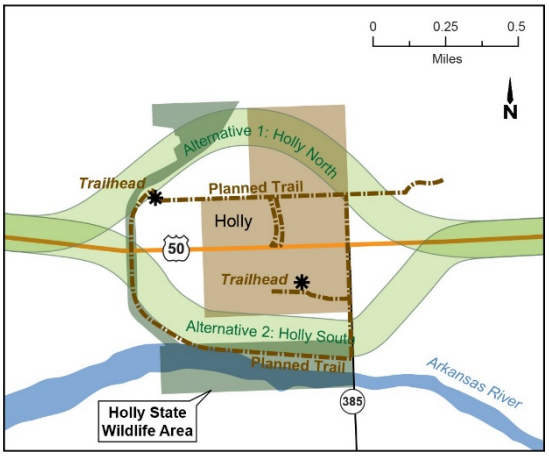
Table 4-31. Comparison of Acres to be Converted to a Transportation Use in Section 17

Alternative	Land Use	Acres Converted to Transportation*	Total Acres Converted by Alternative
Alternative 1: Holly North	Public/Semi-Public	< 1	51
	Residential	< 1	
	Agriculture/Rural	51	
Alternative 2: Holly South	Public/Semi-Public	0	63
	Residential	0	
	Agriculture/Rural	63	

*Acreage estimates are based on a 1,000-foot-wide corridor multiplied by a conversion factor of 0.25 for new location portions. These conservative acreage estimates are anticipated to be reduced during Tier 2 studies.

Alternative 1: Holly North. This alternative would convert approximately 51 acres of agricultural land to a transportation use. This alternative could affect future development areas identified north of the town and includes one crossing of a planned trail. Additionally, the alternative would affect the northern section of the Holly State Wildlife Area.

Alternative 2: Holly South. This alternative would convert approximately 63 acres of agricultural land to a transportation use. However, this land has limited development potential due to adjacent floodplains. This alternative includes two crossings of planned trails, as shown in Figure 4-39. Additionally, the alternative would affect the southern section of the Holly State Wildlife Area.



Source: Prowers County 2006 (county-planned trails only)

Figure 4-39. County-Planned (Future) Trails in Holly

Section 18: Holly Transition

U.S. 50 is only two lanes in this section; therefore, additional property adjacent to the highway (either north or south of the existing lanes) would be needed to construct the Build Alternative. This land is currently being used for agricultural activities; therefore the Build Alternative would change this agricultural use (up to 110 acres) to a transportation use.

Mitigation

Because the ultimate roadway footprint would be identified during Tier 2 studies, this Tier 1 analysis cannot identify which specific resources and properties would be affected by the Build Alternatives. The following mitigation strategies have been developed to ensure that negative effects to these resources are minimized during Tier 2 studies:

- All reasonable efforts would be made to maintain the functionality of existing pedestrian trails during and after construction. Note, pedestrian trails are identified and discussed in Section 4.3.4, Parklands and Recreational Resources.
- All reasonable efforts would be made to avoid or minimize impacts to conservation easements and public lands.
- All acquisitions and relocations (property acquisition) will comply fully with federal and state requirements, including the Uniform Act.

4.3.4 Parklands and Recreational Resources

Parklands and recreational resources are defined as properties that are owned by a public agency, accessible to the public, and used primarily for recreational activities. Examples include State Wildlife Areas, state or local parks, golf courses, and pedestrian trails.

These facilities are important to the communities along U.S. 50 in the Lower Arkansas Valley. The large facilities, such as John Martin Reservoir State Park, attract visitors to the region, bringing additional customers to local restaurants, gas stations, and other businesses. The small facilities (such as city or town parks and school recreational facilities) primarily serve local needs. CPW estimates that residents in southeastern Colorado, "… typically recreate within four miles of their home during weekdays. Subsequently, local recreation [facilities] meet a substantial portion of the recreation demand …" (Colorado State Parks 2008). During workshops held in 2006, community leaders were asked to identify their community's important assets. All the communities east of Pueblo identified at least one park or recreational facility as an asset, and most communities named more than one (CDOT 2006b).

Three facilities located outside the project area also are considered in this analysis: the Comanche National Grassland, Bent's Old Fort National Historic Site, and Boggsville National Historic Site. The Comanche National Grassland and Bent's Old Fort National Historic Site are included because a large portion of visitors to these sites use U.S. 50 to access them. How the Build Alternatives could affect access to these sites is included with the evaluation. For similar reasons, although unconfirmed, it is assumed that the Boggsville National Historic Site also receives visitor traffic from U.S. 50 (which provides access to SH 101 adjacent to the site), so there would be effects to visitor access.

Additional information about parklands and recreational resources is in the Section 4(f) and Section 6(f) Resources Technical Memorandum and the Land Use and Social Considerations Technical Memorandum, included in Appendix A.

Results of the Analysis

This analysis identifies 89 parklands and recreational resources in the project area. The Build Alternatives have the potential to affect up to 15 of these resources. The following resources could be affected, with the listed types of effects:

- **Golf Courses:** Up to four holes on the Cottonwood Links Golf Course could be affected and a small portion of the Las Animas Municipal Golf Course could be acquired.
- **John Martin Reservoir State Park:** Effects to this park would be minimal and limited to temporary construction impacts to the primary entrance at the U.S. 50 and CR 24 junction in Hasty.
- **Granada School District property:** Effects could include taking a small amount of land from the southeast corner of the property.
- **State Wildlife Areas:** Five areas would be affected, including the Karney Ranch, John Martin Reservoir, Mike Higbee, Granada, and Holly State Wildlife Areas. Effects would be primarily in locations where U.S. 50 currently crosses through these areas.
- **Existing pedestrian trails:** Four Colorado birding trails could be affected by new access limitations onto or off of U.S. 50, including the Prairie Canyons, Plover, Two Buttes, and Pronghorn trails.
- **Planned pedestrian trail systems:** Two planned trail systems, in Granada and Holly, could be affected by requiring new crossings of the trail by U.S. 50.

Affected Environment

The following section details parklands and recreational resources within the project area. This analysis identified 89 parklands and recreational resources in the project area. Resources were identified using existing information and a limited field review. The field review did not cover the entire project area—only areas within or near the alternatives considered by the U.S. 50 Tier 1 EIS were reviewed (north corridor, south corridor, and existing through-town corridor). This means that the following list does not include every parkland and recreational resource within the project area, but does include all resources that have the potential to be affected by the Build Alternatives. The resources identified by this analysis include the following types and numbers of facilities. They are discussed in more detail below.

- National Historic Landmark (one site)
- State park (one facility)
- Fairgrounds (two facilities)
- Golf courses (four facilities)
- City, town, or county parks (including public swimming pools) (41 facilities)
- School recreation areas or parks (28 facilities)
- State Wildlife Areas (six areas)
- Pedestrian trails (four individual existing trails and three planned trail systems)

Granada Relocation Center National Historic Landmark

The Granada Relocation Center also is known as Camp Amache. Located just southwest of Granada, this site was used as a Japanese relocation camp during World War II. It was one of only 10 such camps in the United States. It housed more than 7,000 Japanese-American citizens at its peak, making it the tenth largest city in Colorado at that time. The NPS designated Camp Amache as a National Historic Landmark, and Colorado Preservation, Inc. (CPI) has identified it as one of the state's most endangered places (CPI 2009). The NPS, in conjunction with the town of Granada, has created a development concept for the site that includes a museum and visitor's center, parking, and a maintenance area. If developed, this site could draw visitors from outside the Lower Arkansas Valley, bringing additional customers to local gas stations, restaurants, and other businesses.

John Martin Reservoir State Park

This property is located on U.S. 50 between Las Animas and Lamar. It is owned by the U.S. Department of Defense and managed by the USACE as a water storage and flood control facility. The property also includes a State Wildlife Area and a state park managed by CPW. The park is a major regional attraction, drawing visitors from within and outside the state. Activities at the park include biking, camping, fishing, hiking, horseback riding, boating, swimming, and other land-based and water-based recreational pursuits.

Fairgrounds

The fairgrounds identified by this analysis are the Arkansas Valley Fairgrounds in Rocky Ford and the Bent County Fairgrounds in Las Animas (see Figure 4-40). These facilities are important to these communities. During the 2006 workshops, community leaders in both Rocky Ford and Las Animas referred to their fairgrounds as community assets and gathering places for community-wide events. Community leaders in Rocky Ford even noted that they thought the Arkansas Valley Fairgrounds set their city apart from other communities in the Lower Arkansas Valley (CDOT 2006b). The Arkansas Valley Fairgrounds boasts that it hosts the oldest continuous fair in the state of Colorado (Arkansas Valley Fair 2009).

Figure 4-40. Bent County Fairgrounds—Las Animas

Golf Courses

The golf courses in the project area also are important facilities to the communities in which they are located. The facilities identified by this analysis are the Walking Stick Golf Course in Pueblo, Cottonwood Links Golf Course in Fowler, Rocky Ford Golf Course, and the Las Animas Municipal Golf Course. Community leaders in Fowler and Las Animas have stated that their facilities are both important community assets and gathering places for community-wide events (CDOT 2006b). In fact, Fowler holds many town meetings at the club house at Cottonwood Links. Rocky Ford leaders also referred to their golf course as an important community asset (CDOT 2006b).

City, Town, or County Parks

Local governments along the U.S. 50 corridor own 41 facilities that fall into this category, which include parks and swimming pools.

School Recreation Areas or Parks

In the project area, there are 28 recreation areas or parks associated with schools. These facilities include elementary school playgrounds and high school recreational facilities (such as football and baseball fields, as shown in Figure 4-41). Every city and town along U.S. 50 in the project area has these types of facilities, although the amenities found within them vary by facility.

Figure 4-41. High School Football Field—Las Animas

State Wildlife Areas

There are six separate State Wildlife Areas in the project area. They include the Rocky Ford, Karney Ranch, John Martin Reservoir, Mike Higbee, Granada, and Holly State Wildlife Areas (CDOW 2007, Black 2009). The wildlife crossing locations within the project area can be found in the exhibits of the Biological Resources Technical Memorandum in Appendix A. These areas are used primarily for hunting, with the exception of John Martin Reservoir, which offers a wide variety of land-based and water-based recreational activities. These areas draw visitors from outside the Lower Arkansas Valley, bringing additional customers to local gas stations, restaurants, and other businesses.

Trails

Four individual existing trails and three planned trail systems are located in the project area. The four individual trails are all part of the Colorado birding trail system, which is managed by CPW. The birding trails located within the project area are the Prairie Canyons, Plover, Two Buttes, and Pronghorn trails (CDOW 2009a). Each trail offers different bird-watching opportunities and points of interest.

Additionally, Prowers County has planned for trail systems in and near the cities and towns within its boundaries (Prowers County 2006), including trail systems for both Granada and Holly. Even though these are only planned trails, they are being included because, if they are developed, effects to them would be considered during Tier 2 studies.

In addition to the resources noted above, three resources located outside the project area also were considered by this analysis: the Comanche National Grassland, Bent's Old Fort National Historic Site, and Boggsville National Historic Site. As previously discussed, they have been included because changes

to U.S. 50 may affect visitors' ability to get to and from these sites. They are discussed in more detail below.

Comanche National Grassland

Comanche is an approximately 400,000-acre U.S. Forest Service site located approximately 60 miles south of the project area. Approximately 100,000 people visit the property annually (Colorado State Parks 2008). The Comanche District Ranger has indicated that 90 percent to 95 percent of the visitors to the Timpas Unit (the northern portion of the property) access the site from U.S. 50 by U.S. 350 or SH 109 south from La Junta (Peters 2007). Changes to the junctions of U.S. 50 and these roadways would be evaluated during Tier 2 studies in these areas to determine how they might affect travelers going to, or coming from, Comanche.

Bent's Old Fort National Historic Site

Bent's Fort is a NPS property located just north of the project area between La Junta and Las Animas on SH 194. The site is a "reconstructed 1840s trading post where fur trappers, traders, travelers, and Plains Indian tribes once converged on the Santa Fe Trail to trade furs and supplies" (Colorado State Parks 2008). CPW reports that more than 25,000 people visit the Fort each year (Colorado State Parks 2008). The park superintendent indicated that the majority of the Fort's visitors access the site from two routes that both originate on U.S. 50 (Ott-Jones 2007). The first route takes visitors from U.S. 50 to SH 109 (in La Junta) to SH 194. The second route allows visitors to connect directly from U.S. 50 to SH 194 north of Las Animas. Additionally, the NPS is working with FHWA to develop access to the Fort directly from U.S. 50 between milepost 389 and milepost 390 (just east of the county line between Otero and Bent counties). Changes to the junctions of U.S. 50 and SH 109 in La Junta, U.S. 50 and SH 194 in Las Animas, or the site of the future direct access from U.S. 50 would be evaluated during Tier 2 studies in these areas to determine how they might affect travelers going to or coming from the fort.

Boggsville National Historic Site

Located approximately two miles south of Las Animas, the Boggsville National Historic Site is a 19th-century settlement typical of what would have been found along the Santa Fe Trail. The Pioneer Historical Society of Bent County currently operates and maintains the site, but it is being surveyed (as of 2013) by the NPS for a possible turnover in operations and maintenance responsibilities. Access to the site is from SH 101, which originates with U.S. 50 when it intersects at Las Animas. From this intersection, visitors can follow SH 101 south until entering Boggsville. Changes to the junctions of U.S. 50 and SH 101 in Las Animas would be evaluated during Tier 2 studies to determine how they may affect travelers going to or from the site.

Environmental Consequences

This analysis identifies parklands and recreational resources located, in whole or in part, within the Build Alternatives. Because the exact location of U.S. 50 within the Build Alternatives will not be determined until Tier 2 studies, not all of these facilities would be affected.

Potential Effect on Parklands and Recreational Resources

The Build Alternatives could affect up to 15 parklands or recreational resources. These effects vary by the resource. Effects to any single property are expected to be minimal, with the exception of the Cottonwood Links Golf Course in Fowler. The design alternative affecting this resource could affect up to four holes on the course.

Summary of Effects

The following section summarizes potential effects to parklands and recreational resources by the No-Build Alternative and the Build Alternatives.

No-Build Alternative

Under the No-Build Alternative, only minor and isolated construction would occur. Routine maintenance and repairs would be made as necessary to keep U.S. 50 in usable condition, including standard overlays and repairs of weather- or crash-related damage. Additionally, smaller-scale improvements may be undertaken, such as short passing lanes and other minor safety improvements.

Because routine maintenance and repairs are conducted on the existing highway, they would not cause permanent effects to parklands or recreational resources. Smaller-scale improvements may require acquisition of land located directly adjacent to the existing highway; however, few parklands or recreational resources are in these areas.

Build Alternatives

Of the 89 identified parkland and recreational resources, the Build Alternatives could affect up to 15, depending on which design alternatives are chosen. These resources, and the potential effects to them, are discussed in more detail below.

Cottonwood Links Golf Course. This property is located in Fowler and is owned and operated by the town. There are two Build Alternatives in Fowler: Alternative 1: Fowler North, or Alternative 2: Fowler South. The Fowler South Alternative would not affect the golf course, but the Fowler North Alternative has the potential to affect the golf course by taking a portion of the property currently used for four different holes (see Figure 4-42). This is due to a limited amount of space between the golf course and the Arkansas River, and by project efforts to minimize the number of new river crossings. The clubhouse, which also is used to hold some town meetings, would not be affected. Fowler's land use plan comments on the possible future realignment of U.S. 50 by stating that the, "[T]own of Fowler is more supportive of the northern alignment" (Town of Fowler 2009). The same plan also shows this golf course at its current location, however.

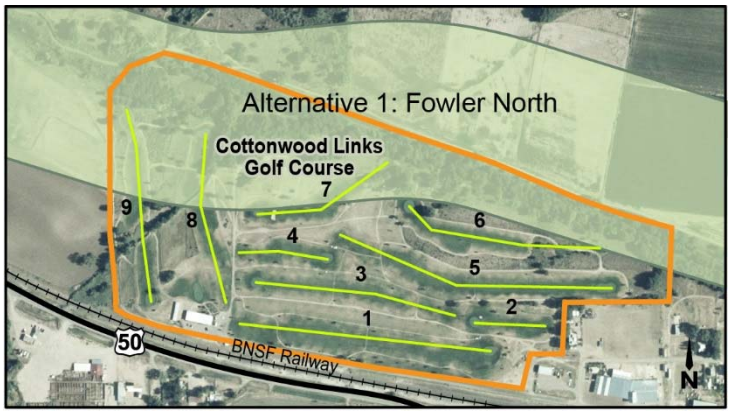


Figure 4-42. Effects to the Cottonwood Links Golf Course (in Fowler) by the Build Alternative

Las Animas Municipal Golf Course. This property is located in Las Animas on the northeast side of the community and is owned and operated by the town. The Build Alternatives would not impact any holes on the golf course, but may require property acquisition under Alternative 2, Las Animas South, as shown in Figure 4-43.

Figure 4-43. Effects to the Las Animas Municipal Golf Course by the Build Alternative

Granada School District Property. This property is a recreational facility associated with the Granada School District Re-1. The Build Alternatives have the potential to affect the property by taking a small amount of land from its extreme southeast corner, as shown in Figure 4-44.

Figure 4-44. Effects to the Granada School District Property by the Build Alternative

State Wildlife Areas. The Build Alternatives would affect five State Wildlife Areas, located in Bent and Prowers Counties: the Karney Ranch, John Martin Reservoir, Mike Higbee, Granada, and Holly State Wildlife Areas.

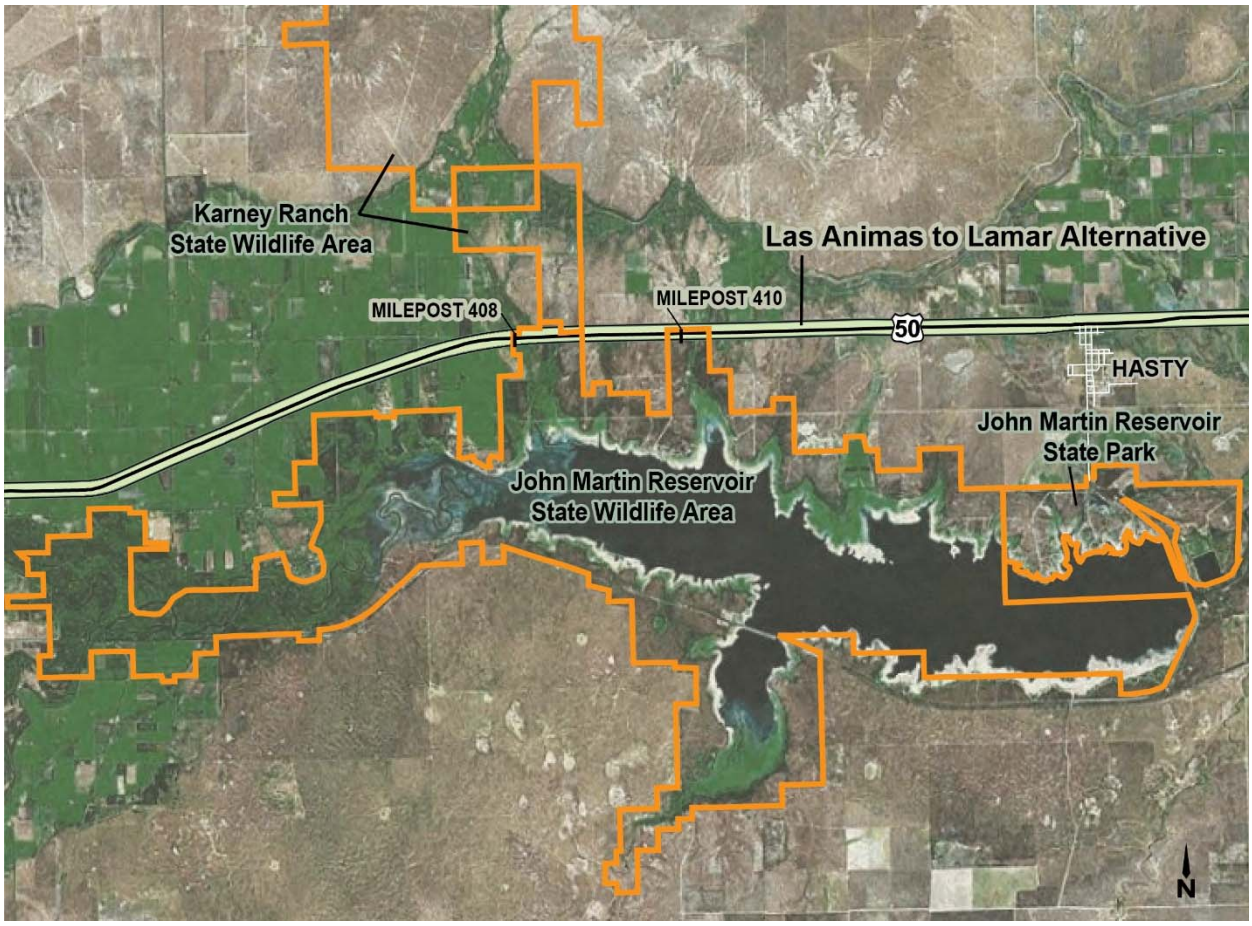


Figure 4-45. Effects to Karney Ranch and John Martin Reservoir State Wildlife Areas by the Build Alternative

The Karney Ranch State Wildlife Area is located to the north of U.S. 50 and joins with the John Martin Reservoir State Wildlife Area, located to the south of U.S. 50, near milepost 408. The Build Alternative crosses the Karney Ranch State Wildlife Area in one location between milepost 408 and 409, and will cross the John Martin Reservoir State Wildlife Area in two locations at mileposts 408 and 410 (see Figure 4-45). Effects to the properties by the Build Alternative would include taking a small amount of land adjacent to the existing highway facility in these three areas as a result of further encroachment. Additionally, the primary entrance to the John Martin Reservoir State Park, located adjacent to but separate from the State Wildlife Area, is located at the junction of U.S. 50 and CR 24 near Hasty (known locally as School Street). The CPW website lists this route as the only suggested way to access the park (Colorado State Parks 2007). Changes to the junction of U.S. 50 and CR 24 would be evaluated during Tier 2 studies to determine how they might affect travelers going to or coming from the park.

Figure 4-46. Effects to the Mike Higbee State Wildlife Area by the Build Alternative

The effect from the Build Alternatives would be similar to the Mike Higbee and Granada State Wildlife Areas, as shown in Figure 4-46 and Figure 4-47. The Build Alternative is located along the existing U.S. 50 alignment, so effects to the property are anticipated to include taking a small amount of land adjacent to the existing highway facility.

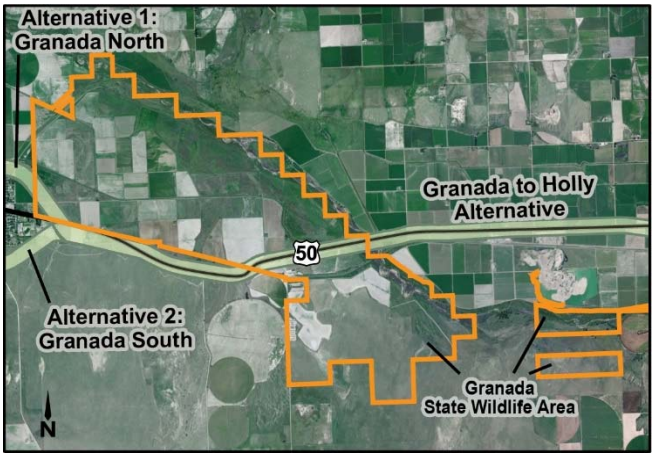


Figure 4-47. Effects to the Granada State Wildlife Area by the Build Alternative

In the case of the Holly State Wildlife Area, the Build Alternatives could cross the property in two locations (Figure 4-48). West of Holly, the Build Alternatives would cross the wildlife area in the same general location as the existing U.S. 50 crossing. The Build Alternatives have the potential to affect the property by requiring an upgraded or new crossing of the State Wildlife Area (by U.S. 50) in this

location. The Build Alternatives also could affect the wildlife area at its southern end by requiring the acquisition of some of this land.

Pedestrian Trails. Six of the seven identified pedestrian trails and planned trail systems located within the project area would be affected by the Build Alternatives. This is primarily because the Build Alternatives cross the trails. A crossing of the trail could cause temporary trail closures during construction and create potential conflict points between pedestrians and automobiles.

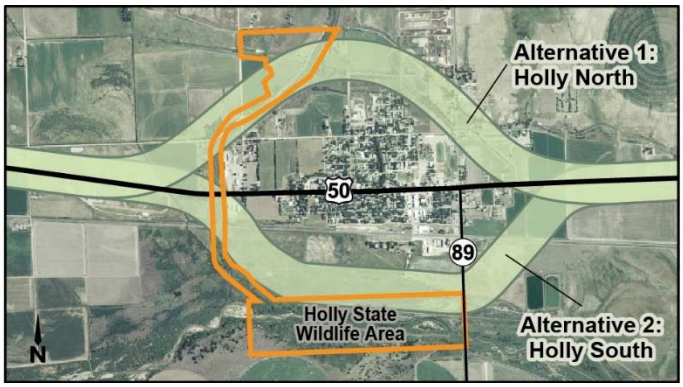


Figure 4-48. Effects to the Holly State Wildlife Area by the Build Alternative

The four Colorado birding trails in the project area are trails that follow the existing U.S. 50 roadway in many locations within the project area. They are the Prairie Canyons, Plover, Two Buttes, and Pronghorn trails. Bird watchers using the trails likely use U.S. 50 to travel from one portion of the trail to another. Improving safety and mobility along the highway, as recommended by the Build Alternatives, would benefit those users. The Build Alternatives also recommend limiting access on and off U.S. 50 from current conditions. Potential access limitations could affect some bird watchers who could be prevented from exiting the highway to access the birding trails in the same places they do today.

Two of the three Prowers County planned trail systems (the Granada and Holly portions) would be affected by the Build Alternatives in several places. Impacting these two planned trail systems would require additional coordination with the county to determine how the Build Alternatives could affect them. If these planned trails are developed by the time Tier 2 studies begin, effects to them would be evaluated in more detail.

Build Alternatives Effects by Location

The following subsections discuss the parkland and recreational resources that would be affected by the Build Alternatives by location along the corridor. Only sections that have potential impacts are presented below. The effects to linear resources, specifically trails, would be requiring crossings of the trails. In some areas, the 1,000-foot-wide corridor would allow for avoidance of these resources during Tier 2 studies.

Table 4-32 shows parkland and recreational resources that could potentially be impacted by the Build Alternatives.

Table 4-32. Parkland and Recreational Resources Potentially Impacted by the Build Alternatives

Section	Build Alternatives (if more than one)	Parkland and Recreational Resources
Section 3: Fowler	Alternative 1: Fowler North	Cottonwood Links Golf Course and Pronghorn Trail
Section 4: Fowler to Manzanola	—	Pronghorn Trail
Section 5: Manzanola	Alternative 1: Manzanola North	Pronghorn Trail
	Alternative 2: Manzanola South	Pronghorn Trail
Section 6: Manzanola to Rocky Ford	—	Pronghorn Trail
Section 7: Rocky Ford	Alternative 1: Rocky Ford North	Pronghorn Trail
	Alternative 2: Rocky Ford South	Pronghorn Trail
Section 10: La Junta	Alternative 1: La Junta North	Prairie Canyons and Plover trails
	Alternative 2: La Junta South	Prairie Canyons and Plover trails
	Alternative 3: La Junta South	Prairie Canyons and Plover trails
	Alternative 4: La Junta South	Prairie Canyons and Plover trails
Section 11: La Junta to Las Animas	—	Prairie Canyons and Plover trails
Section 12: Las Animas	Alternative 1: Las Animas North	Plover Trail
	Alternative 2: Las Animas South	Las Animas Municipal Golf Course and Plover and Prairie Canyons trails
Section 13: Las Animas to Lamar	—	John Martin Reservoir State Park and State Wildlife Area Karney Ranch State Wildlife Area, and Plover Trail
Section 14: Lamar to Granada	—	Mike Higbee State Wildlife Area and Two Buttes Trail
Section 15: Granada	Alternative 1: Granada North	Two Buttes Trail and Granada State Wildlife Area
	Alternative 2: Granada South	Prowers County planned trail and Granada School District recreational facility
Section 16: Granada to Holly	—	Two Buttes Trail and Granada State Wildlife Area
Section 17: Holly	Alternative 1: Holly North	Holly State Wildlife Area, Two Buttes Trail, and Prowers County planned trail
	Alternative 2: Holly South	Holly State Wildlife Area, Two Buttes Trail, and Prowers County planned trail

Mitigation

The final roadway footprint will not be identified until Tier 2 studies. As a result, this Tier 1 analysis cannot distinguish specific impacts to identified resources that could potentially be affected by the Build Alternatives. However, the following mitigation strategies have been developed to ensure potential negative effects to these resources are minimized during Tier 2 studies.

Cottonwood Links Golf Course. If Tier 2 studies result in effects to the golf course, Fowler officials have indicated in the past that they would agree to altering the course layout (CDOT 2002b). To minimize disruption and loss of revenue to the facility, new holes would be constructed prior to affecting the existing ones, and changes to the course would be made during the course's low-use season (the course is open year round).

Granada School District Property. If Tier 2 studies result in a direct effect to this resource, CDOT will need to coordinate with the school district to identify mitigation during Tier 2 studies.

State Wildlife Areas. If Tier 2 studies result in a direct effect to State Wildlife Areas, CDOT will need to coordinate with the manager/owner of the resource to identify mitigation during Tier 2 studies.

Pedestrian Trails. If Tier 2 studies result in effects to trails managed by local government entities or CPW, CDOT would work with these agencies to maintain the operation of the trails. CDOT also would incorporate reasonable measures to enable the continued operation of the trails during construction.

Specific mitigation measures have not been developed for potential property acquisition from the Las Animas Golf Course or the John Martin Reservoir State Park. Coordination with the owners of these properties to develop mitigation strategies will be required and conducted during Tier 2 studies.

Avoidance Activities

Effects to some parklands and recreational resources, many of which are located within communities in the project area, were avoided during the alternatives development process. The U.S. 50 Tier 1 EIS considered alternatives that would improve U.S. 50 on its existing alignment through these communities. However, these through-town alternatives were eliminated from further consideration during the alternatives development process, which results in the avoidance of effects to parklands and recreational resources that would be affected by them. This analysis determined that eliminating through-town alternatives avoids direct effects to 11 identified resources:

- Fowler City (swimming) Pool

- A town park in Manzanola
- Welcome Center Park (which serves as a gateway into Rocky Ford)
- A town park in Swink
- Potter Park (which includes La Junta's swimming pool) (see Figure 4-49)
- Santa Fe Plaza (a city park in La Junta)
- Las Animas City Park (which includes the city swimming pool)
- Bent County Fairgrounds (in Las Animas)
- A football field and track associated with the Las Animas school district
- A town park in Holly
- Holly Gateway Park

Figure 4-49. Potter Park—La Junta

4.3.5 Social and Economic Conditions

Social conditions involve community operations, activities, or residents. Social conditions are defined as the ability of residents to travel within their community and access important community facilities and services. Facilities and services considered for this analysis include emergency services, medical facilities, government facilities, public schools, airports, and recreational facilities.

Economic conditions are defined as existing and future levels of economic activity for local businesses. The types of businesses evaluated were chosen based on their connection to and reliance on U.S. 50. They include businesses along the existing U.S. 50, traveler-oriented businesses, and highway-dependent businesses. Effects to agricultural operations (farms and ranches) also were evaluated because of the importance of the agricultural industry in the Lower Arkansas Valley and because U.S. 50 is the primary farm-to-market route for the products these businesses produce.

Additional information on social and economic conditions can be found in the following U.S. 50 Tier 1 EIS technical memoranda in Appendix A.

- Land Use and Social Considerations Technical Memorandum—social conditions
- Economics Technical Memorandum

Results of the Analysis

The Build Alternatives have the potential to positively affect social conditions in the project area. Moving traffic from the current U.S. 50 through-town routes to new around-town routes would remove long-distance and regional traffic from U.S. 50 Main Streets, making the existing highway easier for local travelers to cross, especially for pedestrians.

Additionally, the Build Alternatives are likely to affect local businesses in the following ways:

- Existing economic trends are likely to continue, not be reversed, by constructing an around-town U.S. 50 route.
- Some agricultural land would be converted to roadway use, eliminating its productive value to the economy.
- Traveler-oriented businesses could be affected due to the reduction in pass-by traffic on the existing U.S. 50 after new around-town routes are constructed. The effect on individual businesses is likely to depend on the business's distance, access, and visibility to the new around-town U.S. 50 route.
- Highway-dependent businesses such as truck stops or gas station convenient stores would benefit from improved highway conditions and the ability to drive at a more consistent, faster speed on the new around-town routes; this includes farms and ranches that need to deliver their products to market.
- Some permanent roadside produce markets may be affected directly (by acquiring the property) or indirectly (by limiting access from U.S. 50). Also, markets located within communities may experience reduced pass-by traffic.
- Downtown areas could benefit by restoring commercial districts to their original Main Street status with speeds less than 30 mph and pedestrian and bicycle-friendly, safe crossings.
- U.S. 50 would be moved farther away from existing gateways into the communities; however, communities would have the opportunity to create new gateways near the new U.S. 50 connections east and west of their downtown areas.

Important community facilities and services that could be affected by the Build Alternatives include the Cottonwood Links Golf Course in Fowler, a post office in Hasty (between Las Animas and Lamar), and the recreational facility associated with the Granada School District Property.

Effects to identified resources were minimized during the development of alternatives for the U.S. 50 Tier 1 EIS. During this process, alternatives that would have improved U.S. 50 through the towns were eliminated. The following impacts were avoided by eliminating those through-town alternatives:

- Elimination avoids effects to community facilities and services located within the communities.
- Elimination avoids effects to large portions of the communities' downtown areas, which would have been acquired and demolished to widen the highway through the center of each town.

Affected Environment

The affected environment section identifies the existing social and economic conditions in the project area.

Existing Social Conditions

This section includes a summary of the demographic profile, community cohesion, and community services of the project area.

Demographic Profile. The U.S. 50 project area includes nine municipalities and portions of four counties. These jurisdictions include Pueblo (city), Fowler, Manzanola, Rocky Ford, Swink, La Junta, Las Animas, Granada, Holly, Pueblo County, Otero County, Bent County, and Prowers County. The project area does not include Lamar, as discussed in Chapter 3, Alternatives Considered.

Census and American Community Survey (ACS) data were used to identify population growth/decline, racial and ethnic composition, Limited English Proficiency (LEP) populations, and median household income in the project area. Information on racial and ethnic composition, LEP population, and median household income in the project area is presented in Section 4.3.6, Environmental Justice.

Population. A demographic analysis was conducted using Census and ACS data. The city of Pueblo is the largest community in the study area, and it is one of four major urban centers along Colorado's Front Range. The population of Pueblo is slightly more than 105,000 residents (2010 Census). The city of Pueblo serves as a regional center for goods and services for all of southern Colorado, including the communities east of it along U.S. 50. Trends in Pueblo show that the city has steadily grown in population since its incorporation in 1885.

In contrast, the eight communities east of Pueblo are small, rural communities. They developed as stops along the railroad constructed through southeastern Colorado in the late 1800s. The first residents of these communities relied on agricultural activities, which remain a central focus of economic activity in the Lower Arkansas Valley. Populations in these communities range from approximately 400 people to 7,800 people (2010 Census). The population of each individual community is shown in Table 4-33. From 2000 to 2010, the population declined in all eight of the communities east of Pueblo.

Table 4-33. Population Change

2010 Census Geography	2000 Population	2010 Population	Difference	Percent Change 2000–2010	
				Overall	Annualized
Pueblo County	141,472	159,063	17,591	12.4%	1.2%
Pueblo	102,121	106,595	4,474	4.4%	0.4%
Otero County	20,311	18,831	-1,480	-7.3%	-0.8%
Fowler	1,206	1,182	-24	-2.0%	-0.2%
Manzanola	525	434	-91	-17.3%	-1.9%
Rocky Ford	4,286	3,957	-329	-7.7%	-0.8%
Swink	696	617	-79	-11.4%	-1.2%
La Junta	7,568	7,077	-491	-6.5%	-0.7%
Bent County	5,998	6,499	501	8.4%	0.8%
Las Animas	2,758	2,410	-348	-12.6%	-1.3%
Prowers County	14,483	12,551	-1,932	-13.3%	-1.4%
Granada	640	517	-123	-19.2%	-2.1%
Holly	1,048	802	-246	-23.5%	-2.6%
Colorado	4,301,261	5,029,196	727,935	16.9%	1.6%

Source: U.S. Census Bureau, Census 2010, Tables P001 (2000), P1 (2010), "Total Population"

Community Cohesion. U.S. 50 is the primary east-west route through southeastern Colorado. U.S. 50 serves as the main route into, out of, and through the communities in the project area. Although traffic volumes on the highway are relatively low, U.S. 50 sometimes creates a barrier for residents traveling within towns along the corridor. Some examples of this barrier effect include the following:

- Due to the small size of these communities, children commonly walk or bike to school. In many of the communities, the highway is located between schools and residential areas. This creates a safety issue for students who have to cross the highway on their way to school.
- Most of the school districts in the project area have reported altering bus routes to avoid crossing or stopping (picking up students) on U.S. 50. A concern commonly cited by school district officials is that vehicles driving on the highway frequently pass the buses while they are stopped. This makes it unsafe for the buses to pick up students.
- In Fowler, U.S. 50 lies between the public swimming pool and the town's residential area. During the summer months (when the pool is open), residents must cross the highway to get to the pool. This is done primarily on foot due to the relatively small size of the town and the limited amount of parking near the pool facility. This creates a safety issue for Fowler residents who have to cross the highway on foot to access the pool, which is one of only four public recreation areas in town.

As traffic levels on U.S. 50 rise in the future, issues associated with situations like these are likely to worsen. Traffic is projected to increase by approximately 52 percent by the year 2040. This is expected to

increase AADT to 18,914 vpd on U.S. 50 in Pueblo (growth of 5,385 vpd) and increase AADT to 6,376 vpd in Holly (growth of 2,998 vpd) (CDOT 2012, Swenka 2014).

Community Services. A vital function of any community is to provide for the needs of its residents; therefore, facilities and services that fill those needs (such as fire departments, town halls, and schools) are important to the community. Their operations must be maintained, and residents must have access to them. The following community facilities and services are located in the project area:

- Emergency services—fire, police, and ambulance services
- Major medical facilities—hospitals and clinics
- Government facilities—places where town meetings are held or government services are provided
- Public schools—elementary and secondary schools (K-12)
- Public airports
- Public recreational facilities—parks, ball fields, and similar facilities open to the public

Nearly 200 important community facilities and services are located within the project area. More than half of them are either public recreational facilities (76 sites) or government facilities (38 facilities). Some examples of public recreational facilities are parks, golf courses, and recreational facilities associated with schools (baseball fields, elementary school playgrounds, etc.). Government facilities include city, town, and county administrative offices, post offices, public libraries, and community centers (including senior citizens' centers). Schools make up the next largest category with 36 facilities. Every community in the project area has at least one elementary school and one secondary school.

These facilities and services are not located uniformly across all the communities in the project area. Within Pueblo alone, 42 of these facilities and services were identified. Because Pueblo is not entirely contained within the project area, it is important to note that this analysis describes only those facilities and services in the portion of the city that is inside the project area (the eastern portion of the city). There are additional community facilities located in the remainder of the city.

In contrast, each of the communities east of Pueblo has, on average, fewer than 20 of these facilities and services. The fact that there are so few of these resources within each community makes them extremely important to local residents.

Many of these facilities have been identified as community gathering places (places where community-wide events are held) by city or town leaders (CDOT 2006b). Additionally, many serve multiple functions.

Fowler has two examples of facilities with multiple functions. The first is the administration building, which is home to the city hall, fire department, and public library (see Figure 4-50). The other is the clubhouse at the Cottonwood Links Golf Course. It not only serves the golfers using the course, but it also is frequently used for town meetings and other community-wide events.

Figure 4-50. City Hall, Fire Department and Library—Fowler

U.S. 50 is used by residents to access facilities and services in neighboring communities when those types of facilities do not exist in their own communities. For example, there are no emergency services available in the town of Swink and only two communities have hospitals (Pueblo and La Junta) (see Figure 4-51). Residents from the other communities must go to one of these cities for that level of health care. This makes U.S. 50 critical for residents to access these facilities and services.

Figure 4-51. Arkansas Valley Regional Medical Center—La Junta

Existing Economic Conditions

The economy of the Lower Arkansas Valley is heavily reliant on agricultural activities (farming and ranching). A large portion of the land in the project counties is used for agricultural activities, and a substantial portion of the communities' employment is provided by the agricultural sector.

This activity generates a large amount of revenue, not just for local businesses, but for the statewide economy as well. In 2007, the nearly 3.5 million acres of land in the project counties used for agricultural activities produced $506 million in agricultural goods, which represented approximately 8 percent of the value of all agricultural products produced in the state of Colorado (Agricultural Census 2007a). In 2007, the sale of livestock accounted for a majority of the sale of agricultural goods for the four project

counties. These sales represented approximately 9 percent of all the livestock sales in the state of Colorado (Agricultural Census 2007a).

Despite this agricultural contribution, the project area counties lag behind most other Colorado counties in economic activity. This has resulted in the project area counties now being located within Colorado Enterprise Zones (Colorado Office of Economic Development and International Trade [OEDIT] 2009b). The State established enterprise zones in 1986 to encourage job creation and capital investment in economically depressed areas. To be designated as a Colorado Enterprise Zone, areas must have high unemployment rates, low per capita income, and slower population growth than the state average. Additionally, three of the four counties (Otero, Bent, and Prowers) also were designated as Colorado Enhanced Rural Enterprise Zones for the 2009–2010 fiscal year (OEDIT 2009a). This also is a state-run program intended to support job creation in economically lagging rural counties.

In the communities east of Pueblo, employment figures also indicate how important agricultural activities are to the Lower Arkansas Valley. The agricultural industry provides 11 percent of all jobs in Otero, Bent, and Prowers counties, which include both farming and ranching activities. Government is the largest employer in these three counties, followed by retail trade and then agriculture, as shown in Table 4-34. The size of these communities does not support the types of economic development activities that require large populations (such as big-box stores and commercial airports). Also, the current condition of U.S. 50 (having only two lanes in certain locations) makes the highway unattractive to businesses that require a fast, efficient transportation system to move goods from their locations to regional or long-distance destinations.

Table 4-34. Jobs by Industry

Economic Sector	Otero, Bent, and Prowers Counties (% of all jobs)	Pueblo County (% of all jobs)
Accommodation and food	6	9
Agriculture	11	1
Construction	3	7
Finance activities	3	3
Government	25	18
Health services	10	16
Manufacturing	8	6
Retail trade	13	14
Transportation and warehousing	3	3
Other[a]	18	23

Sources: Department of Local Affairs (DOLA) 2007; BEA 2007; 2005 zip code business patterns data
[a]All jobs not included in the other categories

Pueblo County's more urbanized employment base is seen in the industry breakdown of jobs (see Table 4-34). Government, health services, and retail trade are the top three employers, with nearly 50 percent of all jobs. The higher percentage of employment in health services could be because the city of Pueblo is considered a regional center for health care services and, therefore, has more facilities than any of the other counties. The higher percentage of jobs in traveler-oriented services (accommodation and food) is likely the result of Pueblo's location along I-25. Agriculture comprises only 1 percent of jobs in Pueblo County, reflecting that the county is less dependent on this industry than the counties to the east.

Retail trade employs a large number of individuals in all the project counties (see Table 4-34). In the city of Pueblo, retail trade employment is provided in numerous locations throughout the city, but not along the portion of U.S. 50 located in the project area, which is primarily industrial and agricultural. East of Pueblo, however, retail trade activities occur primarily along U.S. 50. The highway defines the downtown area for these communities, which include Fowler, Manzanola, Rocky Ford, Swink, La Junta, Las Animas, Granada, and Holly. Because U.S. 50 is a coast-to-coast highway, it serves long-distance and regional travelers, as well as those who live along it. Some of the businesses in these downtown areas are traveler oriented, meaning that they are particularly dependent on through-traffic—for example, gas stations, restaurants (see Figure 4-52), lodging, convenience stores, and other related services.

Figure 4-52. Jasper's Restaurant—Manzanola

Another important characteristic of the economy of the Lower Arkansas Valley is that employers tend to be small businesses (have fewer than 50 employees) and, due to the small number of businesses in each community, each one is an important part of the local economy. Table 4-35 shows the number of businesses in each project county and the relative sizes of those businesses (by the number of employees).

Table 4-35. Businesses by Size

Jurisdiction	Number of Businesses	Businesses by Size		
		1–49 Employees	50–499 Employees	500 or More Employees
State of Colorado	154,536	147,605	6,661	270
Pueblo County	3,317	3,164	146	7
Otero County	525	511	14	0
Bent County	63	62	1	0
Prowers County	376	362	14	0

Source: 2006 county business patterns data

Environmental Consequences

Effects to social and economic conditions were evaluated based on the type of effect that the Build Alternatives could have on them. Effects to social conditions were based on whether the Build Alternatives would make it more or less difficult for residents to travel within their community (reduce or increase the barrier effect of U.S. 50) and access important community facilities and services. Economic effects were evaluated based on how the Build Alternatives could affect local businesses.

Summary of Effects

The following section summarizes potential effects to social and economic conditions by the No-Build Alternative and the Build Alternatives.

No-Build Alternative

Under the No-Build Alternative, only minor and isolated construction would occur. Routine maintenance and repairs would be made as necessary to keep U.S. 50 in usable condition, including standard overlays and repairs of weather- or crash-related damage. Additionally, smaller-scale improvements may be undertaken, such as short passing lanes and other minor safety improvements.

No effects to social or economic conditions are expected. However, communities also would not have the opportunity to make the following improvements to their city or town:

- Improvements to the highway, such as turning the current two-lane sections to four lanes and eliminating existing safety issues, could attract highway-dependent businesses to the region. This could bring employers to the Lower Arkansas Valley that would not consider moving their businesses there today (due to the increased transportation costs associated with the condition of the existing highway).
- Moving long-distance and regional traffic out of downtown areas would enable communities to make these areas

Potential Effect on Social and Economic Conditions

The Build Alternative would move U.S. 50 to around-town locations (from through-town locations) in eight communities: Fowler, Manzanola, Rocky Ford, Swink, La Junta, Las Animas, Granada, and Holly. This has the potential to:

- *Reduce the barrier effect of U.S. 50, making it easier (and safer) for residents to travel within their communities*
- *Convert some residential and agricultural land to highway use*
- *Affect traveler-oriented businesses, such as lodging and restaurants, depending on their location relative to the new around-town route*
- *Benefit highway-dependent businesses, including farms and ranches, that rely on the highway to deliver their products to markets outside the Lower Arkansas Valley*
- *Affect some permanent roadside produce markets by acquiring the properties, limiting access to them from U.S. 50, or reducing pass-by traffic*
- *Allow communities to make their downtown areas more pedestrian-friendly*
- *Affect the following important community facilities and services: the Cottonwood Links Golf Course in Fowler, a post office in Hasty (between Las Animas and Lamar), and the recreational facility associated with the Granada School District.*
- *Move U.S. 50 farther from existing gateways into the communities and may decrease local sales and sales tax revenue, but also create opportunities for these communities to develop new gateways near the new U.S. 50 connections.*

more pedestrian-friendly. In community workshops held in 2006, leaders from many communities expressed their desire to do this (CDOT 2006b). Moving traffic out of town also would increase residents' ability to travel within their communities.

Build Alternatives

The Build Alternatives would relocate U.S. 50 around eight communities in the project area. In each case, the highway would be relocated just outside the currently developed area of each community. Potential effects from the Build Alternatives on social and economic conditions are discussed below.

Social Conditions. U.S. 50 currently runs through the eight communities in the project area. Having a state highway running through town creates a barrier effect, making it more difficult (and less safe) for residents to get from one side of town to the other. The Build Alternatives would move U.S. 50 from its current through-town location to the periphery of each community, taking much of the regional and long-distance traffic with it. This reduction in downtown traffic would remove a portion of the highway's barrier effect, improving residents' ability to move within town.

The majority of community facilities and services identified by this analysis are located within the communities. Therefore, the Build Alternatives would not affect these facilities and services. However, the following three facilities could be affected by the Build Alternatives depending on where the Tier 2 roadway footprints in these areas are located during Tier 2 studies:

- Cottonwood Links Golf Course (in Fowler)—the Build Alternatives have the potential to use land (for the highway) that is currently used for a portion of several holes on the course.
- U.S. Postal facility (between Las Animas and Lamar in the unincorporated area known as Hasty)—the Build Alternative could affect this facility by using the property for the highway.
- Granada School District Property (in Granada)—the Build Alternatives could affect this facility by using a small portion of the property (on its extreme southeast corner) for the highway.

Economic Conditions. In Pueblo, the Build Alternatives would maintain U.S. 50 on or near its current location and in its existing configuration, so no economic effects are expected. For the communities east of Pueblo, the Build Alternatives would move U.S. 50 away from downtown areas where most of the communities' economic activity takes place; therefore, the Build Alternatives have the potential to negatively affect local businesses.

The remainder of this section discusses potential effects to local economies, agricultural operations, businesses along existing U.S. 50, traveler-oriented businesses, and highway-dependent businesses.

Local Economies. There is an extensive body of literature examining and analyzing the economic effects of implementing new around-town routes on communities. To understand the potential effect of the Build Alternatives on local economies, a literature review was conducted that focused on the impact of new around-town routes on small towns and rural communities. These studies are identified in Appendix C of the Economics Technical Memorandum. The studies were all conducted in the 1990s and early 2000s. These studies reached the following conclusions about how new around-town routes could impact the local economies:

- They do not change existing economic trends
- They were either beneficial or neutral in most of the communities studied; however, negative business impacts were seen primarily in towns with a population of fewer than 5,000

All the communities in the project area have fewer than 4,000 residents, with the exception of La Junta and Pueblo (2010 Census). The Build Alternatives, therefore, have the potential to cause negative effects to some businesses. However, those effects are unlikely to alter general economic trends in any community (see the Economics Technical Memorandum located in Appendix A).

Figure 4-53. Obelisk—West Side of Rocky Ford

One concern expressed by local officials is whether the future location of U.S. 50 would support perceived gateways into their communities. The purpose of a gateway is to attract through-traffic to local businesses. One current example is the set of obelisks located along U.S. 50 when entering Rocky Ford from the east or west (see Figure 4-53). These gateway features indicate to drivers that they are entering a community. Because communities generally include local businesses, it indicates that those businesses and other amenities exist at that location. Fowler has included this concept in its current land use plan, which notes that U.S. 50 "serves as the primary entrance to the [t]own at the eastern and western incorporated boundaries" and that "[f]uture land uses would be reflective of 'gateway' features […]" (Town of Fowler 2009).

The Build Alternatives propose new around-town routes that are just outside the developed area of each community. In all cases, the new around-town route connects with the existing U.S. 50 within approximately two miles of the town boundary (on both sides, east and west). While these changes would move U.S. 50 away from the current gateway features that exist in many communities, it also would provide opportunities for communities to create new gateways into town at the new U.S. 50 connections.

Rerouting a state highway from a through-town location to an around-town location creates the potential for new development, such as gas stations or other commercial activities, along the new around-town route. This often is referred to as induced growth. For the communities along U.S. 50 in the Lower Arkansas Valley, however, this may not be the case. With the exception of Pueblo, these communities have not experienced substantial economic growth in several decades. Some key factors limiting potential growth along the new around-town routes are declining population, low traffic volumes, and limited development infrastructure.

These factors would limit the possibility of induced growth for the following reasons:

- **Population.** All eight communities east of Pueblo experienced population decline from 2000 to 2010. The small size of the communities east of Pueblo limits the economic viability of commercial activities that rely on a large customer base, such as big-box stores, commercial airports, and other activities.
- **Traffic volumes.** Traffic volumes on U.S. 50 east of Pueblo are relatively low (on average roughly 5,500 vpd), and they are expected to remain that way well into the future (on average 8,653 vpd in 2040) (Swenka 2014). This limits the amount of pass-by traffic that could support new traveler-oriented businesses, such as gas stations, restaurants, and hotels.
- **Development infrastructure.** The new around-town routes are located in areas outside the developed portions of the communities. To move from the downtown area to the new around-town route, communities would first have to extend services (water, power, etc.) to those locations. Communities along U.S. 50 also could restrict development in the areas of the around-town alternatives by refusing to extend services or using zoning or other land use tools.

Due to these factors, the small, rural communities along U.S. 50 are not likely to experience growth that sometimes accompanies roadway improvements in larger urban areas.

Agricultural Operations. Because the local economies in the Lower Arkansas Valley are heavily dependent on agricultural activities, it is important to understand the potential effect of the Build Alternatives on farms and ranches. The Build Alternatives move U.S. 50 to around-town locations that are primarily used for farming or ranching today. Replacing agricultural land with a new around-town route for U.S. 50 would eliminate the value of those acres for producing agricultural products. To calculate this loss, different productive values were used depending on the historic best (most productive) agricultural use of the land. The analysis revealed that $2.2 million to $2.5 million in annual productive value could be lost, depending on which alternatives are chosen in Fowler, Swink, and La Junta (Tranel 2008a,

2008b). The higher of these two figures represents less than 1 percent of the $506 million in agricultural goods produced by the project counties in 2007 (CO AgInsights 2007).

Businesses along the Existing U.S. 50. The same studies reviewed to determine the effect of the Build Alternatives on local economies were reviewed to identify the effect on businesses along the existing U.S. 50. This analysis concluded that the Build Alternatives could have the following effects on these businesses:

- For individual businesses, effects would be evened out over time
- Older and smaller businesses often cannot move, so the owners would retire
- Small local businesses are more likely to be replaced by chains
- Communities that plan for change are able to weather the change better than those communities that did not plan

Figure 4-54. Van Hook's Produce Stand—La Junta

Effects to individual businesses are likely to depend on the type of business and its location in relation to U.S. 50. One category of businesses located directly adjacent to the existing highway is the roadside produce market. There are nine permanent roadside produce markets (markets housed in permanent structures) in the project area. Farmers use these markets to sell their products directly to consumers (see Figure 4-54). They are important businesses in the Lower Arkansas Valley because they not only add to the local economy, but many communities have expressed their desire to use them as a way to attract tourists to the region (agritourism). As their name implies, roadside produce markets depend heavily on passing travelers for their customer base. Therefore, it is essential that drivers are able to see the markets from the road and access them at the time they are spotted. Effects to these markets could be direct (taking the property) or indirect (reducing access to them by limiting access on and off U.S. 50 at their location). In addition, markets located within U.S. 50 communities may be affected by a reduction in pass-by traffic after the new around-town routes are constructed. Both permanent and temporary markets operate in the region. Because it is impossible to know which temporary markets will open during any given season, or where they may be located, this analysis only considered effects to permanent roadside markets.

The Build Alternatives would relocate U.S. 50 from downtown areas where most of the communities' economic activity takes place to new around-town locations. While this may be detrimental to traveler-oriented businesses (such as gas stations) in the old downtown area, it provides communities with an opportunity to improve conditions for many downtown establishments. With less traffic on downtown streets, communities would be able to return the existing U.S. 50 to its original Main-Street-district status, creating a more pedestrian-friendly commercial area. During workshops organized and facilitated by the project in August 2006, many of the communities along U.S. 50 expressed their desire to make this change (CDOT 2006b).

Traveler-Oriented Businesses. Traveler-oriented businesses—such as gas stations, restaurants, lodging facilities, convenience stores, and related services—are those more reliant on through-traffic. Table 4-36 shows the estimated number of traveler-oriented businesses in each community east of Pueblo in relation to the total number of businesses in the community.

Table 4-36. Number of Traveler-Oriented Businesses by Location (2005)

Location	Number of Businesses	
	Total	Traveler-Oriented
Fowler	54	11
Manzanola	13	2
Rocky Ford	133	24
Swink	15	2
La Junta	304	20
Las Animas	60	12
Lamar[a]	--	--
Granada	7	2
Holly	37	7

Source: 2005 zip code business patterns data
[a]The Build Alternatives do not include alternatives in Lamar, as discussed in Chapter 3, Alternatives Considered.

The same studies that were reviewed to determine the effect of the Build Alternatives on local economies also were reviewed to identify the effect on traveler-oriented businesses. This analysis concluded that the Build Alternatives could have the following effects on these businesses:

- Traveler-oriented businesses tend to be impacted more than other types of businesses, particularly in smaller towns; however, those that can be seen from the existing roadway are the least likely to feel the effects of a new around-town route.
- In general, the area adjacent to the new around-town route competes with the existing area if it is within three miles of the existing area, has water and sewer services, and is more than five miles from the next nearest services exit.

- The area adjacent to the new around-town route can be integrated with the downtown if it is less than two miles away and has supporting water and sewer services.
- An interchange from the new around-town route that is close to a downtown area increases the chance of potential customers stopping at the current service areas, and negative impacts of the new route on downtown can be minimized by connecting the two areas with access and signage.

Of all the businesses in the project area, those that are traveler oriented have the potential to be the most impacted by the Build Alternatives. In most communities, the new around-town route would be close enough to town that many existing businesses would remain visible from the new route. This could serve to lessen the effect of the new route by maintaining the businesses' pass-by customers.

Also, the areas where the new around-town routes are proposed generally are used for agricultural activities currently, so they generally lack supporting services (water, sewer, etc.) required for businesses to move into the area. This lack of services is likely to limit development in these areas, reducing the possibility of competition with the existing downtown areas. Individual businesses could experience fluctuations in activity; however, these fluctuations are likely to depend on the distance, access, and visibility of the business from the new around-town route.

Highway-Dependent Businesses. Highway-dependent businesses are those that rely on a fast, efficient transportation system that can move goods between their locations and regional or long-distance destinations. Officials from several communities along U.S. 50 in the Lower Arkansas Valley have reported that current conditions on the highway hinder their efforts to retain or attract these businesses. An example of this occurred in 2006 when the region lost two of its largest employers.

Figure 4-55. Bay Valley Foods Plant—La Junta

In January 2006, the Neoplan USA transit bus manufacturing plant in Lamar closed, eliminating 300 jobs. Later that year, the Bay Valley Foods plant in La Junta closed, leaving nearly 150 people out of work (see Figure 4-55). Local officials have stated that high transportation costs were cited by both firms as a reason for their closures. Both of these operations relied heavily on U.S. 50 for transporting raw materials and manufactured goods into and out of the

Lower Arkansas Valley. Improving U.S. 50 is likely to help communities attract and retain these types of employers, providing much needed jobs in the Lower Arkansas Valley.

Farms and ranches in the project area also are highway-dependent businesses. Because most of what they produce is consumed outside the area, farmers and ranchers rely on U.S. 50 to move their products to market. The highway is a primary farm-to-market route. The Build Alternatives recommend that U.S. 50 be a high-speed (65 mph minimum), limited-access roadway, which would help make farm-to-market travel faster for these businesses.

Build Alternatives Effects by Location

The summary of effects generally is applicable to each location along the U.S. 50 corridor. The primary difference by location is agricultural land conversion and the effect to the agricultural economy by removing land with a high productive value. For this analysis, please refer to Section 4.1, Rural and Agricultural Environment.

Mitigation

Because the ultimate roadway footprint would be identified during Tier 2 studies, this Tier 1 analysis cannot identify specific effects to social and economic conditions by the Build Alternatives. The following mitigation strategies have been developed, however, to ensure that negative effects to these conditions are minimized during Tier 2 studies.

Corridor Preservation

CDOT would assist communities with their efforts to preserve right of way around their communities for a preferred alternative (once selected). Preliminary identification of a preferred alternative is described in more detail in Chapter 6, Preliminary Identification of Preferred Alternative and Summary of Impacts. This assistance could include helping them draft zoning ordinances or buy development rights for the property. In 2005, all 12 communities (eight municipalities and four counties) participating in the U.S. 50 Tier 1 EIS project passed resolutions of support for the project. Those resolutions stated that the jurisdictions will “work with CDOT to develop and implement corridor preservation strategies for the route selected as the preferred corridor […]” (PACOG 2005; Otero County 2005; Bent County 2005; Prowers County 2005; Town of Fowler 2005; Town of Manzanola 2005; City of Rocky Ford 2005; Town of Swink 2005; City of La Junta 2005; City of Las Animas 2005; Town of Granada 2005; Town of Holly 2005).

Signage

CDOT would work with communities to ensure that travelers on U.S. 50 are advised of the services and other amenities available in communities along the highway.

Permanent Roadside Produce Markets

To minimize negative effects to permanent roadside produce markets, Tier 2 highway alignments would be routed to avoid acquisition of those properties or disruption of their access to U.S. 50 where possible. If the routing of the Tier 2 alignment cannot avoid the acquisition of a market, the owners will receive reasonable compensation under state and federal law. All property acquisitions and relocations will comply fully with federal and state requirements, including the Uniform Act.

Farm-to-Market Travel

Agricultural activities require the ability to move goods to market. Because U.S. 50 is the primary east-west route through the Lower Arkansas Valley, the highway is frequently used for this purpose. Construction activities would be scheduled to minimize disruptions (including closures), when possible, to key portions of U.S. 50 that are heavily used for farm-to-market travel activities, especially during harvest times.

Public Involvement

Continue public involvement activities and community outreach during all phases of the tiered EIS process.

Avoidance Activities

Effects to some social and economic conditions were avoided during the alternatives development process. During this process, alternatives were considered that would improve U.S. 50 on its existing alignment through communities in the project area; however, these through-town alternatives were eliminated from further consideration. This resulted in the following avoidance activities:

- Most of the nearly 200 important community facilities (ball fields, post offices, golf courses, etc.) and services identified are located within the communities; therefore, elimination of the through-town alternatives avoids effects to most of these resources.
- In the eight communities east of Pueblo, U.S. 50 is the center of their commercial districts (downtown areas). Implementing the through-town alternatives would mean widening the highway, eliminating a large portion of these downtown areas.
- A migrant housing complex on U.S. 50 just west of Manzanola would have been affected by one of the through-town alternatives in Manzanola. This will no longer be an issue.

- The through-town alternatives would have directly affected two out of nine permanent roadside produce markets in the project area. This effect would have involved potential acquisition of these properties.
- The through-town alternatives would have directly affected two of the four birding trail kiosks that CPW has constructed, or plans to construct, along U.S. 50 in the Lower Arkansas Valley to encourage ecotourism. Those kiosks include one in Fowler (the kiosk location is near the town swimming pool on U.S. 50) and one in La Junta (the kiosk location is near Depot Park).
- Improving U.S. 50 through the towns would increase the barrier effect the highway currently creates for residents of the communities east of Pueblo. This would occur because the speed limit on the improved highway will be higher than it is currently, making it more difficult to cross the highway than it already is today, especially for pedestrians.

4.3.6 Environmental Justice

Environmental justice is closely related to Title VI of the Civil Rights Act of 1964. Title VI of the Civil Rights Act protects individuals from discrimination on the grounds of race, age, color, religion, disability, sex, and national origin. Under Title VI, FHWA is required to ensure that no person—on the grounds of race, color, or national origin—is excluded from participation in, denied the benefits of, or subjected to discrimination under any program or activity receiving federal financial assistance. Executive Order 12898, on Environmental Justice, reinforces Title VI responsibilities while also addressing effects on minority and low-income populations. Under this Executive Order, federal agencies are mandated to identify and address any disproportionately high and adverse effects on minority and/or low-income populations. The Order also directs federal agencies

How is minority defined as it applies to environmental justice?

Per USDOT Order 5610.2(a), minority is defined as a person who is:

Black or African American: *A person having origins in any black racial groups of Africa.*

Hispanic or Latino: *A person who claims Mexican, Puerto Rican, Cuban, Central or South American, or other Spanish culture of origin, regardless of race.*

Asian American: *A person with ancestry in any of the original peoples of the Far East, Southeast Asia, or the Indian subcontinent.*

American Indian and Alaskan Native: *People who identify their origins in any of the native civilizations of North America or South America (including Central America), who maintain cultural identification through tribal affiliation or community recognition.*

Native Hawaiian or Pacific Islander: *People who claim cultural identity with any of the original peoples of Hawaii, Guam, Samoa, or other pacific Islands.*

to provide minority and low-income communities with access to public information and meaningful public participation. The three environmental justice principles are:

1. To ensure the full and fair participation of all potentially affected communities in the transportation decision-making process
2. To avoid, minimize, or mitigate disproportionately high and adverse human health or environmental effects, including social and economic effects, on minority or low-income populations
3. To fully evaluate the benefits and burdens of transportation programs, policies, and activities on low-income and minority populations

A disproportionately high and adverse effect on minority and low-income populations means an adverse effect that:

- Is predominately borne by a minority population and/or a low-income population
- Will be suffered by the minority population and/or low-income population and is appreciably more severe or greater in magnitude than the adverse effect that will be suffered by the non-minority population and/or non-low-income population

Results of Analysis

Hispanic minority and low-income populations are dispersed throughout the study area. Specific impacts to these populations cannot be determined at this time. Additional analysis will be conducted during Tier 2 studies to refine the Build Alternatives.

Affected Environment

2010 Census and ACS data indicate a notable presence of a Hispanic minority population and low-income population that meets the criteria for Environmental Justice within the project area. Populations were identified geographically by Census Block Group. In rural areas where Census Block Groups can be very large, the actual location of populations often is obscured. However, the analysis did identify a higher percentage of Hispanic and low-income residents living within the municipal boundaries of communities along the U.S. 50 corridor.

Additional information on environmental justice can be found in the Minority and Low-Income Populations Technical Memorandum in Appendix A.

Race and Ethnicity

Census 2010 data was collected to show the racial profile of the state of Colorado and the four counties in the project area (Table 4-37). The largest census population group is “Some Other Race.” This is consistent with the percentage of residents who are Hispanic or Latino (Table 4-38). The percentage of Hispanic or Latino residents in the study area (43.6 percent) is double the number for the state of Colorado (20.7 percent). Hispanic or Latino is an ethnic category and can include persons of any race; as a result, many people of Hispanic or Latino heritage often will identify as “Some Other Race” in census surveys.

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Table 4-37. Racial Composition for the Study Area, State, and Counties

2010 Census Geography	Total Population	White		Black or African American		American Indian & Alaska Native		Asian		Native Hawaiian/ Pacific Islander		Some Other Race		Two or More Races		Total-Non-White	
		#	%	#	%	#	%	#	%	#	%	#	%	#	%	#	%
Study Area[1]	71,218	54,993	77.2	1,525	2.1	1,365	1.9	742	1.0	79	0.1	10,003	14.0	2,511	3.5	16,225	22.8
Colorado	5,029,196	4,089,202	81.3	201,737	4.0	56,010	1.1	139,028	2.8	6,623	0.1	364,140	7.2	172,456	3.4	939,994	18.7
Pueblo County	159,063	126,229	79.4	3,222	2.0	3,055	1.9	1,258	0.8	160	0.1	19,285	12.1	5,854	3.7	32,834	20.6
Total of Study Area Block Groups in Pueblo County	40,782	30,708	75.3	866	2.1	838	2.1	525	1.3	63	0.2	6,209	15.2	1,573	3.9	10,074	24.7
Otero County	18,831	14,788	78.5	143	0.8	338	1.8	143	0.8	11	0.1	2,690	14.3	718	3.8	4,043	21.5
Total of Study Area Block Groups in Otero County	18,831	14,788	78.5	143	0.8	338	1.8	143	0.8	11	0.1	2,690	14.3	718	3.8	4,043	21.5
Bent County	6,499	5,149	79.	496	7.6	156	2.4	62	1.0	4	0.1	506	7.8	126	1.9	1,350	20.8
Total of Study Area Block Groups in Bent County	6,499	5,149	79.2	496	7.6	156	2.4	62	1.0	4	0.1	506	7.8	126	1.9	1,350	20.8
Prowers County	12,551	10,165	81.0	64	0.5	112	0.9	38	0.3	2	0.0	1,848	14.7	322	2.6	2,386	19.0
Total of Study Area Block Groups in Prowers County	5,106	4,348	85.2	20	0.4	33	0.6	12	0.2	1	0.0	598	11.7	94	1.8	758	14.8

Source: U.S. Census Bureau, Census 2010, Table P3, "Race"

[1]Study Area is a total of 64 Census Block Groups in the Project Area.

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Table 4-38. Hispanic or Latino Population

2010 Census Geography	Total Population	Hispanic or Latino	
		#	%
Study Area[1]	71,218	31,023	43.6%
Colorado	5,029,196	1,038,687	20.7%
Pueblo County	159,063	65,811	41.4%
Total of Study Area Block Groups in Pueblo County	40,782	20,051	49.2%
Otero County	18,831	7,596	40.3%
Total of Study Area Block Groups in Otero County	18,831	7,596	40.3%
Bent County	6,499	1,985	30.5%
Total of Study Area Block Groups in Bent County	6,499	1,985	30.5%
Prowers County	12,551	4,417	35.2%
Total of Study Area Block Groups in Prowers County	5,106	1,391	27.2%

Source: U.S. Census Bureau, Census 2010, Table P4, "Hispanic or Latino Origin"
Note: Hispanic or Latino is an ethnic category and can include persons of any race; therefore, the Hispanic or Latino percentages are presented exclusive of race.
[1]Study Area is a total of 64 Census Block Groups in the Project Area.

Median Household Income

Median household income data obtained from the ACS identifies that household incomes in the project counties and communities are not as high as in the state overall. All the project counties and communities have lower median household incomes than the state, ranging from approximately $20,833 (Holly) to $41,273 (Pueblo County), compared to the state average of $57,685 (Table 4-39).

Table 4-39. Median Household Income

2010 Census Geography	Median Household Income in the Past 12 Months (dollars)*
Pueblo County	**$41,273**
Pueblo	$34,750
Otero County	**$31,246**
Fowler	$31,625
Manzanola	$21,346
Rocky Ford	$24,520
Swink	$40,694
La Junta	$31,024
Bent County	**$35,667**
Las Animas	$31,446
Prowers County	**$34,513**
Granada	$33,882
Holly	$20,833
Colorado	**$57,685**

Source: U.S. Census Bureau (2011b), American Community Survey, 5-Year Estimates (2007–2011), Table B19013
* In 2011 Inflation-Adjusted Dollars

Minority Populations

Census data from 2010 shows the Hispanic minority population percentage of the project area is higher in comparison to the state of Colorado and the four counties in the project area (Table 4-40). The percentage of Hispanic or Latino residents in the study area (43.6 percent) is double the number for the state of Colorado (20.7 percent). Hispanic or Latino is an ethnic category and can include persons of any race. The population percentage of the remaining Environmental Justice minority population groups in the study area (Black or African American; American Indian and Alaskan Native; Asian; and Native Hawaiian/Pacific Islander) is less than 6 percent of the total population (see Table 4-41).

Table 4-40. Hispanic or Latino Population

2010 Census Geography	Total Population	Hispanic or Latino	
		#	%
Study Area[1]	71,218	31,023	43.6%
Colorado	5,029,196	1,038,687	20.7%
Pueblo County	159,063	65,811	41.4%
Total of Study Area Block Groups in Pueblo County	40,782	20,051	49.2%
Otero County	18,831	7,596	40.3%
Total of Study Area Block Groups in Otero County	18,831	7,596	40.3%
Bent County	6,499	1,985	30.5%
Total of Study Area Block Groups in Bent County	6,499	1,985	30.5%
Prowers County	12,551	4,417	35.2%
Total of Study Area Block Groups in Prowers County	5,106	1,391	27.2%

Source: U.S. Census Bureau, Census 2010, Table P4, "Hispanic or Latino Origin"
Note: Hispanic or Latino is an ethnic category and can include persons of any race; therefore, the Hispanic or Latino percentages are presented exclusive of race.
[1]Study Area is a total of 64 Census Block Groups in the Project Area.

Table 4-41. Minority Populations for the Study Area, State, and Counties

2010 Census Geography	Total Population	White		Black or African American		American Indian & Alaska Native		Asian		Native Hawaiian/ Pacific Islander	
		#	%	#	%	#	%	#	%	#	%
Study Area[1]	71,218	54,993	77.2	1,525	2.1	1,365	1.9	742	1.0	79	0.1
Colorado	5,029,196	4,089,202	81.3	201,737	4.0	56,010	1.1	139,028	2.8	6,623	0.1
Pueblo County	159,063	126,229	79.4	3,222	2.0	3,055	1.9	1,258	0.8	160	0.1
Total of Study Area Block Groups in Pueblo County	40,782	30,708	75.3	866	2.1	838	2.1	525	1.3	63	0.2
Otero County	18,831	14,788	78.5	143	0.8	338	1.8	143	0.8	11	0.1
Total of Study Area Block Groups in Otero County	18,831	14,788	78.5	143	0.8	338	1.8	143	0.8	11	0.1
Bent County	6,499	5,149	79.0	496	7.6	156	2.4	62	1.0	4	0.1
Total of Study Area Block Groups in Bent County	6,499	5,149	79.2	496	7.6	156	2.4	62	1.0	4	0.1
Prowers County	12,551	10,165	81.0	64	0.5	112	0.9	38	0.3	2	0.0
Total of Study Area Block Groups in Prowers County	5,106	4,348	85.2	20	0.4	33	0.6	12	0.2	1	0.0

Source: U.S. Census Bureau, Census 2010, Table P3, "Race"

[1]Study Area is a total of 64 Census Block Groups in the Project Area. Note population groups shown do equal 100% of Total Population.

Low-Income Populations

To identify the low-income population or residents living below the poverty level, the methodology outlined in CDOT's *NEPA Manual* (2013b) was followed. This includes a combination of U.S. Census data, ACS data, and U.S. Department of Housing and Urban Development (HUD) data.

The low-income threshold for each county was calculated and is shown in Table 4-42. This income limit then was applied to ACS data to identify the percentage of households considered to be low income. The ACS data provides household income in $5,000 increments. If the 30% Income Limit is within a $5,000 increment, for example $15,214 is within the $15,000 to $19,999 increment, all households in that increment and below (regardless of the number of individuals in the household) are considered low income. This methodology is consistent with CDOT's *NEPA Manual* (2013b) in calculating low-income populations.

The low-income threshold for each county applies to the communities and block groups within that county. The percentage of households considered low income was calculated for each of the 64 block groups and communities in the study area counties. These values then were compared to their respective county to identify low-income populations in the study area.

Table 4-42. Low-Income Households by County and Study Area Block Groups within County

2010 Census Geography	FY 2013 30% AMI[1]	Total Number of Households	Number of Households by Household Income in the Past 12 Months			Low-Income Households	
			Less than $10,000	$10,000 to $14,999	$15,000 to $19,999[2]	Subtotal	% of Total
Colorado	$18,375	1,941,193	122,221	88,005	88,479	298,705	15.4
Pueblo County	$15,214	61,858	6,265	4,501	4,196	14,962	24.2
Total of Study Area Block Groups in Pueblo County		15,973	2,208	1,324	1,144	4,676	29.3
Otero County	$15,124	7,453	1,069	742	739	2,550	34.2
Total of Study Area Block Groups in Otero County		7,453	1,069	742	739	2,550	34.2
Bent County	$14,890	1,975	237	80	--	317	16.1
Total of Study Area Block Groups in Bent County		1,975	237	80	--	317	16.1
Prowers County	$15,142	4,996	562	477	376	1,415	28.3
Total of Study Area Block Groups in Prowers County		2,045	141	201	162	504	24.6

Source: U.S. Census Bureau (2011b), American Community Survey 5-Year Estimates (2007–2011), Table B19001

[1]The 30% Average Median Income (low-income threshold) was calculated for each county using the method from the CDOT NEPA Manual (March 2013) as applied to HUD FY 2013 Income Limits. County low income threshold applies to all communities within that county.

[2]If a FY2013 30% AMI falls within an income range, all households in that income range are included in the estimate of low-income households.

Pueblo, Otero, and Prowers counties each have a notably higher percentage of households that are considered low-income when compared to the state of Colorado. The percentage low-income households in the study area block groups within Pueblo County is higher when compared to Pueblo County, which indicates a low-income concentration around U.S. 50 in Pueblo County.

Due to the geographic size and limited number of block groups in Otero and Bent counties, the percentage of low-income households is the same number for the county and the total of block groups within the study area. The percentage of low-income households in the study area block groups for Prowers County is lower when compared to Prowers County, which indicates the low-income population of Prowers County is not concentrated on U.S. 50.

Limited English Proficiency. Executive Order 13166, “Improving Access to Services for Persons with Limited English Proficiency,” requires all federal fund recipients to provide meaningful access to persons who are limited in their English proficiency (LEP). The U.S. Department of Justice defines LEP

individuals as those "who do not speak English as their primary language and who have a limited ability to read, write, speak, or understand English" (67 Federal Register [FR] 41459).

Transportation projects applying for federal funds must ensure they comply with their obligations to provide written translations in languages other than English. The U.S. Department of Transportation's (USDOT) Policy Guidance Concerning Recipients' Responsibilities to Limited English Proficient Persons (USDOT 2005b) outlines the circumstances that can provide a "safe harbor" for recipients regarding the requirements for translation of written documents.

This guidance defines the Safe Harbor threshold as either 5 percent of the total adult population in the study area or 1,000 adult persons within a particular language group who speak English less than "Very Well." Data was used from the ACS 5-Year Estimates (2007–2011) to identify adults aged 18 or older who speak English less than "Very Well" by language group. Results of the LEP analysis are shown in Table 4-43. The study area meets the U.S. Department of Justice's Safe Harbor threshold requirement for the presence of a Spanish LEP population. The presence of a Spanish LEP population is expected due to the high percentage of Hispanic or Latino residents in the study area.

In accordance with the Safe Harbor provisions, written translations of important documents will be provided for the Spanish LEP language group in addition to other measures assuring meaningful access. These other measures include providing notice of citizens' Right to Language Access for all future project meetings and using interpreters when deemed necessary to help with public participation. Additional detail on outreach to Spanish-speaking residents in the project area is included in Chapter 7, Community Outreach and Agency Involvement.

Table 4-43. Limited English Proficiency of Project Area Census Block Groups

County	2010 Census Geography	Total Adult Population*	Primary Language Group of Persons Who Speak English Less than Very Well							
			Spanish		Other Indo-Euro		Asian/ Pacific		Other	
			#	%	#	%	#	%	#	%
Pueblo	CT 05, BG 1	769	90	11.7%	0	0.0%	0	0.0%	0	0.0%
	CT 08, BG 1	833	49	5.9%	0	0.0%	0	0.0%	0	0.0%
	CT 08, BG 2	756	93	12.3%	0	0.0%	0	0.0%	0	0.0%
	CT 08, BG 3	838	214	25.5%	0	0.0%	8	1.0%	0	0.0%
	CT 09.02, BG 1	743	0	0.0%	0	0.0%	0	0.0%	0	0.0%
	CT 09.02, BG 2	1,160	11	0.9%	0	0.0%	0	0.0%	0	0.0%
	CT 09.02, BG 3	633	0	0.0%	0	0.0%	20	3.2%	0	0.0%
	CT 09.02, BG 4	715	86	12.0%	0	0.0%	0	0.0%	0	0.0%
	CT 09.02, BG 5	1,035	10	1.0%	0	0.0%	0	0.0%	0	0.0%
	CT 09.03, BG 1	662	0	0.0%	15	2.3%	0	0.0%	0	0.0%
	CT 09.04, BG 1	1,028	33	3.2%	0	0.0%	0	0.0%	0	0.0%
	CT 09.04, BG 2	836	31	3.7%	0	0.0%	0	0.0%	0	0.0%
	CT 09.04, BG 3	1,620	120	7.4%	65	4.0%	0	0.0%	0	0.0%
	CT 09.05, BG 1	1,083	0	0.0%	12	1.1%	0	0.0%	0	0.0%
	CT 09.05, BG 2	746	43	5.8%	0	0.0%	4	0.5%	0	0.0%
	CT 10, BG 1	1,039	177	17.0%	0	0.0%	0	0.0%	0	0.0%
	CT 10, BG 2	925	105	11.4%	0	0.0%	0	0.0%	0	0.0%
	CT 10, BG 3	644	6	0.9%	0	0.0%	0	0.0%	0	0.0%
	CT 10, BG 4	742	47	6.3%	0	0.0%	0	0.0%	0	0.0%
	CT 11, BG 1	616	12	1.9%	0	0.0%	0	0.0%	0	0.0%
	CT 11, BG 2	536	13	2.4%	0	0.0%	0	0.0%	0	0.0%
	CT 11, BG 3	538	82	15.2%	0	0.0%	0	0.0%	17	3.2%
	CT 12, BG 2	959	125	13.0%	0	0.0%	0	0.0%	0	0.0%
	CT 29.03, BG 1	1,967	0	0.0%	0	0.0%	0	0.0%	0	0.0%
	CT 29.03, BG 2	2,835	25	0.9%	43	1.5%	150	5.3%	0	0.0%
	CT 30.01, BG 1	1,133	77	6.8%	0	0.0%	0	0.0%	0	0.0%
	CT 30.04, BG 1	1,093	4	0.4%	4	0.4%	0	0.0%	0	0.0%
	CT 30.04, BG 2	1,098	8	0.7%	25	2.3%	9	0.8%	0	0.0%
	CT 32, BG 2	714	0	0.0%	0	0.0%	0	0.0%	0	0.0%
	CT 32, BG 3	770	46	6.0%	0	0.0%	0	0.0%	0	0.0%
	CT 35, BG 2	669	104	15.5%	0	0.0%	0	0.0%	15	2.2%
	CT 36, BG 1	855	130	15.2%	0	0.0%	0	0.0%	0	0.0%
	CT 36, BG 2	453	23	5.1%	0	0.0%	0	0.0%	0	0.0%

Table 4-43. Limited English Proficiency of Project Area Census Block Groups (continued)

County	2010 Census Geography	Total Adult Population*	Primary Language Group of Persons Who Speak English Less than Very Well							
			Spanish		Other Indo-Euro		Asian/ Pacific		Other	
			#	%	#	%	#	%	#	%
Otero	CT 9680, BG 1	728	20	2.7%	3	0.4%	0	0.0%	0	0.0%
	CT 9680, BG 2	421	0	0.0%	0	0.0%	0	0.0%	0	0.0%
	CT 9681, BG 1	570	155	27.2%	0	0.0%	0	0.0%	0	0.0%
	CT 9681, BG 2	759	147	19.4%	0	0.0%	0	0.0%	0	0.0%
	CT 9681, BG 3	562	39	6.9%	0	0.0%	0	0.0%	0	0.0%
	CT 9682, BG 1	809	34	4.2%	0	0.0%	0	0.0%	0	0.0%
	CT 9682, BG 2	615	31	5.0%	0	0.0%	0	0.0%	0	0.0%
	CT 9682, BG 3	831	54	6.5%	0	0.0%	0	0.0%	0	0.0%
	CT 9683, BG 1	538	0	0.0%	0	0.0%	0	0.0%	0	0.0%
	CT 9683, BG 2	791	19	2.4%	0	0.0%	0	0.0%	12	1.5%
	CT 9683, BG 3	985	10	1.0%	7	0.7%	0	0.0%	0	0.0%
	CT 9683, BG 4	583	23	3.9%	7	1.2%	0	0.0%	0	0.0%
	CT 9684, BG 1	922	62	6.7%	0	0.0%	0	0.0%	0	0.0%
	CT 9685, BG 1	771	26	3.4%	0	0.0%	0	0.0%	0	0.0%
	CT 9685, BG 2	449	0	0.0%	0	0.0%	0	0.0%	0	0.0%
	CT 9686, BG 1	856	58	6.8%	0	0.0%	0	0.0%	0	0.0%
	CT 9686, BG 2	363	14	3.9%	0	0.0%	0	0.0%	0	0.0%
	CT 9686, BG 3	890	0	0.0%	0	0.0%	32	3.6%	0	0.0%
	CT 9686, BG 4	1,047	0	0.0%	0	0.0%	0	0.0%	0	0.0%
	CT 9686, BG 5	614	35	5.7%	0	0.0%	0	0.0%	0	0.0%
Bent	CT 9667, BG 1	781	14	1.8%	0	0.0%	0	0.0%	0	0.0%
	CT 9667, BG 2	778	42	5.4%	0	0.0%	0	0.0%	0	0.0%
	CT 9667, BG 3	907	20	2.2%	0	0.0%	0	0.0%	0	0.0%
	CT 9667, BG 4	625	17	2.7%	0	0.0%	0	0.0%	0	0.0%
	CT 9667, BG 5	2,004	247	12.3%	0	0.0%	0	0.0%	0	0.0%
Prowers	CT 1, BG 1	528	5	0.9%	0	0.0%	0	0.0%	0	0.0%
	CT 1, BG 2	513	18	3.5%	0	0.0%	3	0.6%	0	0.0%
	CT 6, BG 1	451	29	6.4%	0	0.0%	0	0.0%	0	0.0%
	CT 6, BG 2	532	52	9.8%	0	0.0%	0	0.0%	0	0.0%
	CT 7, BG 1	730	168	23.0%	0	0.0%	0	0.0%	0	0.0%
	CT 7, BG 2	993	11	1.1%	0	0.0%	0	0.0%	0	0.0%
Total Study Area		**53,989**	**3,114**	**5.8%**	**181**	**0.3%**	**226**	**0.4%**	**44**	**0.1%**

Source: U.S. Census Bureau (2011b), American Community Survey 5-Year Estimates (2007–2011), Table B16004
*Total adult population are persons age 18 and over.

In compliance with the U.S. Department of Justice provisions regarding the LEP population and the LEP Handbook, Spanish translation was available at all the meetings during the outreach process. Bilingual flyers in English and Spanish were posted throughout the corridor and public service announcements on

Spanish-speaking radio stations were made to encourage participation from the Spanish-speaking LEP population.

Minority and Low-Income Population Involvement in the Project Analysis

Executive Order 12898 and environmental justice guidelines require that minority and low-income populations are provided with opportunities for meaningful public involvement. Extensive public outreach was performed to inform minority and low-income populations about the project and to provide an opportunity to comment on issues, impacts of concern, and the alternatives under consideration. These efforts included hosting call-in spots on radio shows, public meetings, posting fliers in 81 locations throughout the corridor to provide contact information and meeting locations (in Spanish and English), and providing Spanish translators at each meeting. A detailed description of these outreach activities and more is included in Chapter 7, Community Outreach and Agency Involvement.

Summary of Effects

The following section summarizes potential effects to environmental justice populations from the No-Build Alternative and the Build Alternatives.

No-Build Alternative

The No-Build Alternative does not include new roadway construction. Routine maintenance and repairs would continue to be made, as necessary, to keep U.S. 50 in usable condition, such as routine overlays and repairs of weather- or crash-related damage. Additionally, smaller scale improvements may be undertaken, such as short passing lanes and other minor safety improvements. Routine maintenance and repairs conducted on the existing highway are not expected to result in disproportionately high or adverse effects to minority or low-income populations. The lack of improvements will be felt equally across all population groups in the corridor.

Build Alternatives

The Build Alternatives would relocate U.S. 50 from its current through-town route to an around-town route at eight communities in the project area. Between towns, the highway would be improved along its existing route. The entire highway would be four lanes (i.e., two lanes in each direction), including the new around-town routes. Within the city of Pueblo, the existing U.S. 50 within the highway's right of way is already configured in a similar manner to that recommended by the U.S. 50 Tier 1 EIS. Minimal changes to the highway are anticipated in this segment.

Hispanic minority and low-income populations exist throughout the study area. Specific impacts to these populations cannot be determined at this time. Additional analysis will be conducted during Tier 2 studies to refine the Build Alternatives. However, during the alternatives development process, CDOT eliminated the alternative of having U.S. 50 go through towns, as it currently does. More households would have been affected by these through-town alternatives, increasing the potential to adversely affect minority or low-income households. As a result, CDOT has reduced the potential to adversely affect minority and/or low-income households.

With regard to benefits and burdens, all residents from communities along the corridor, including low-income and minority populations, should benefit from the improved safety of U.S. 50, but also will bear the burden of temporary impacts during construction of the Build Alternative improvements.

Build Alternatives Effects by Location

At this time, distinctive effects to minority or low-income populations by location along the U.S. 50 corridor cannot be determined. Further analysis will be conducted during Tier 2 studies.

Based on the percentage and distribution of minorities and low-income households, none of the Build Alternatives appear to have direct effects on minority or low-income populations that are different (disproportionate) in comparison to the population on a corridor-wide basis.

The Tier 1 impact analysis for all environmental resources was reviewed to identify the potential for adverse effects and project benefits on all segments of the population, including minority and low-income population groups. Benefits primarily relate to transportation and safety benefits throughout the corridor. Adverse impacts to minority and/or low-income populations are not likely to exceed those of the general population. Assessing the distribution of localized adverse impacts requires more detailed project information (design and construction details) than can be determined at this first tier. The lead agencies recognize this limitation at Tier 1 and commit to conducting more in-depth impact analysis during Tier 2 studies, when more detailed design and construction information has been developed and impacts are evaluated at the local level.

The types of localized impacts that could occur from implementation of the Build Alternatives in Tier 2 studies include property acquisition for right of way; displacements of businesses and residences; changes in access; localized air, noise, or water pollution; localized disturbance of hazardous wastes, including soil or water contamination; effects to historic properties or community facilities; and changes in public services or facilities relied on by minority or low-income populations.

Environmental Justice Concerns to be Addressed in Tier 2 Studies

This document and the associated Minority and Low-Income Populations Technical Memorandum (included in Appendix A) provide an overview of the minority and low-income populations from a corridor perspective. Most, if not all, of the Tier 2 studies can and will reference updated U.S. Census and ACS data.

Tier 2 studies will use the most current data and guidance, including updated data on affordable housing, to analyze impacts on minority and low-income populations. During Tier 2 studies, CDOT will:

- Develop specific and more detailed mitigation strategies and measures
- Develop best management practices specific to each project
- Adhere to any new laws and regulations that may be in place when Tier 2 studies are underway
- Continue to directly coordinate with local government entities and social services to identify low-income and minority populations along the corridor

Public Involvement activities conducted with Tier 2 studies will developed to ensure full and fair participation by all potentially affected communities in the transportation decision making process.

Mitigation

Mitigation strategies for social and economic resources will apply to all communities along the corridor, including minority and low-income populations. If Tier 2 studies conclude that disproportionately high or adverse impacts will occur to minority or low-income populations, CDOT will work to avoid, minimize, or mitigate such impacts. Tier 2 studies that occur in populated areas will consider pockets of minority and/or low-income populations that may require additional attention and/or mitigation for such issues as listed below:

- Localized air quality impacts
- Noise impacts
- Residential and business relocations
- Changes in access or travel patterns
- Loss of community cohesion

The lead agencies will consider mitigation, enhancement measures, and offsetting benefits when determining whether there will be disproportionately high and adverse effects on minority and low-income populations. If, after considering these factors, a disproportionately high impact to minority or

low-income populations is identified, the project "will only be carried out if further mitigation measures or alternatives that would avoid or reduce the disproportionately high and adverse effects are not practicable. In determining whether a mitigation measure or an alternative is 'practicable,' the social, economic (including costs) and environmental effects of avoiding or mitigating the adverse effects will be taken into account" (FHWA Order 6640.23A, June 14, 2012).

4.3.7 Aesthetics and Visual Resources

Aesthetics involves how people view visual resources (whether the view is pleasing). Visual resources for the U.S. 50 Tier 1 EIS are views from the highway of the surrounding environment and views of the highway from the surrounding environment. Along U.S. 50 in the Lower Arkansas Valley, these views include both natural and cultural (man-made) features, such as vegetation, the Arkansas River, residences and businesses, and the railroad. This analysis was conducted to determine how the Build Alternatives could alter views seen from the highway by drivers and views of the highway seen by local residents.

Results of the Analysis

Visual resources (views) from U.S. 50 would not be affected by the Build Alternatives. In areas where drivers' *views from the highway* would change, these changes would not alter the character of those views; therefore, they are considered to be unaffected by the Build Alternatives.

The following *views of the highway* (from surrounding areas) would be affected:

- Between communities, views of U.S. 50 would be affected in locations where the highway is currently two lanes. In these areas, U.S. 50 would be expanded to four lanes, doubling the area of pavement residents see. This would be considered a negative effect.
- Residents living in the areas of the new around-town routes recommended by the Build Alternatives also would be affected. The Build Alternatives would add a four-lane highway to their view that does not exist today. This also would be considered a negative effect.
- Noise analyses conducted during Tier 2 studies may recommend the construction of sound walls. Sound walls have the potential to negatively affect the views from U.S. 50 around communities, and views of U.S. 50 from surrounding areas.

Views along U.S. 50 in the Lower Arkansas Valley were identified by compiling a visual inventory from the following sources:

- Findings and photographs from the U.S. 50 Tier 1 EIS Cultural Resources Reconnaissance Survey Report

- U.S. Department of Agriculture aerial photography
- Previous visual studies and photo inventories of the U.S. 50 corridor
- Field review

Affected Environment

Common features are found in many views along U.S. 50 through the Lower Arkansas Valley. These include a lack of substantial elevation change, farmland and ranch land, the Arkansas River, irrigation canals and ditches, urban development, rural residences, the BNSF railway, and U.S. 50. These features are described in more detail below.

Lack of Substantial Elevation Change

The landscape along U.S. 50 through the Lower Arkansas Valley gradually slopes downward from approximately 4,400 feet in elevation at Pueblo to 3,400 feet at Holly. This relatively horizontal landscape facilitates expansive views of surrounding features from the highway, as well as unobstructed views of the highway from surrounding areas.

Farmland and Ranch Lands

Farmland is agricultural land used for crop production. A view of this feature primarily consists of vegetation (see Figure 4-56). The vegetation changes throughout the year based on the type of crop planted and the maturity of that crop.

Figure 4-56. Farmland—Pueblo County

Ranch land is land used for grazing activities. Views of ranch land also consist of vegetation, which are primarily grasses used to feed livestock (see Figure 4-57). Unlike farmland, the views of ranch lands do not change substantially throughout the year.

Figure 4-57. Ranch Land—Bent County

Rural Residences

Rural residences are homes associated with farms and ranches (see Figure 4-58). These types of residences are seen commonly between communities and on the periphery of communities.

Figure 4-58. Rural Residence—Bent County

Arkansas River

The Arkansas River parallels U.S. 50 throughout the Lower Arkansas Valley, and the highway crosses it several times. In the locations where the river is farther from U.S. 50, its location often can be determined based on the vegetation growing nearby. This can include small groves of trees, riparian shrubs, or tamarisk (also known as salt cedar) (see Figure 4-59).

Figure 4-59. Arkansas River and nearby Vegetation—Otero County

Irrigation Canals and Ditches

A system of canals and ditches were built in the Lower Arkansas Valley in the late 1800s to bring water from the Arkansas River to nearby fields for irrigation. This system is still in use today. U.S. 50 crosses several canals and ditches, and many of them can be seen from U.S. 50 (see Figure 4-60).

Figure 4-60. Catlin Canal (View from U.S. 50)—Otero County

Urban Development

U.S. 50 is the primary east-west route through the cities and towns in the Lower Arkansas Valley. Features within these developed areas primarily include businesses and residences. The majority of the development in the communities east of Pueblo occurred prior to 1960. It generally consists of one- and two-story structures (see Figure 4-61), although in La Junta the views also include three-story buildings (see Figure 4-62). Newer development has occurred since that time, though it has been limited. More development has occurred since 1960 in Pueblo, where economic and population growth has been more robust.

Figure 4-61. Urban Development—Rocky Ford (Downtown along U.S. 50)

Figure 4-62. Urban Development—La Junta (Downtown along Colorado Avenue)

BNSF Railway

The BNSF Railway is located immediately adjacent to U.S. 50 through much of the Lower Arkansas Valley, as shown in Figure 4-63, and the highway crosses it several times. The tracks are in many views from U.S. 50, and because it is an operational rail line, trains often are visible as well.

U.S. 50

Views of U.S. 50 (from surrounding areas) are not the same throughout the Lower Arkansas Valley. This is the case, in part, because of national roadway standards that have evolved over time. Each time changes have been made to the highway, the most recent standards were used. As a result, U.S. 50 includes more

than 170 roadway changes (CDOT 2003). Examples of these changes are the number of lanes (either two or four) and the existence or width of shoulders and medians.

Figure 4-63. Railroad Track Adjacent to U.S. 50—Pueblo

It is not feasible to describe every view along 150 miles of highway, so representative views have been identified. These are views typically seen by travelers driving on U.S. 50 or views of the highway seen by residents that live and work along it. This analysis identified representative views from U.S. 50 within Pueblo, between communities, and within other communities. It also identified representative views around communities and views of U.S. 50 from surrounding areas. All of these views are described below.

Within Pueblo (from U.S. 50). Views from U.S. 50 within Pueblo change from urban to rural as drivers travel east. Within the city approximately between I-25 and Troy Avenue, drivers typically see urban development on both sides of the highway. Scattered within the urban development are areas of undeveloped land. East of this point, the landscape turns industrial, and then rural. Predominant features within views from U.S. 50 in this area are industrial facilities (near the Pueblo Memorial Airport), ranch land, rural residences, and the railroad.

Figure 4-64 shows representative views from U.S. 50 within Pueblo.

At Troy Avenue (looking west)

At Troy Avenue (looking east)

Near 28th Lane

Figure 4-64. Representative Views from U.S. 50 within Pueblo

Between Communities (from U.S. 50). Drivers traveling along U.S 50 between communities in the Lower Arkansas Valley typically see a combination of natural and cultural features that include farmland, ranch land, the Arkansas River, irrigation canals and ditches, rural residences, and the railroad. Where the views include farmland, drivers are more likely to see irrigation canals and ditches because these features are used to facilitate crop production. There is minimal development in these areas, and what does exist is frequently related to agricultural activities. This includes not only rural residences, but also agriculture-related businesses, such as grain elevators, roadside produce stands, and feedlots. The railroad is a prominent feature of many views from U.S. 50 between communities because, in many areas, it is immediately adjacent to the highway.

Figure 4-65 shows views from U.S. 50 of these between-community sections.

Between Swink and La Junta

Near the Colorado-Kansas State Line

Figure 4-65. Representative Views from U.S. 50 between Communities

Within Other Communities (from U.S. 50). Drivers traveling along U.S. 50 within the communities east of Pueblo see urban development on both sides of the highway. These communities include Fowler, Manzanola, Rocky Ford, Swink, La Junta, Las Animas, Granada, and Holly. The business district in each of these communities is directly adjacent to U.S. 50, but drivers also see residences mixed in with the businesses.

Figure 4-66 shows views from U.S. 50 within the communities east of Pueblo.

Manzanola

Las Animas

Figure 4-66. Representative Views from U.S. 50 within Other Communities

Around Communities (from U.S. 50). On the periphery of the communities east of Pueblo, land is primarily used for agriculture. Views away from town in these areas generally include farmland, ranch land, the Arkansas River, and rural residences. Within farmland views, irrigation canals and ditches also may be present. Views away from town generally include agricultural land uses. The development that can be seen from the periphery of town consists primarily of rural residences. Views looking toward town

would be primarily of urban development. This would be the case because the around-town alternatives would be located just outside the currently developed portions of the communities. The one exception is La Junta, where some alternatives are located a distance from the majority of the developed areas within the city.

Figure 4-67 shows representative views around communities.

Alternative 2: Swink South (looking away from town)

Alternative 2: Swink South (looking toward town)

Figure 4-67. Representative Views Around Communities

Views of U.S. 50 (from Surrounding Areas). Residents have different views of U.S. 50 depending on where they live. In some areas, the highway is two lanes and in some areas it is four lanes. Other elements also exist that alter the view of the highway, such as shoulders, passing lanes, turn lanes, and medians. These elements do not exist in every segment of U.S. 50, providing different views to different residents along its route.

Figure 4-68 shows representative views of U.S. 50 in the Lower Arkansas Valley.

Two-Lane Segment of U.S. 50 (Bent County)

Four-Lane Segment of U.S. 50 with a Median (Otero County)

Four-Lane Segment of U.S. 50 with a Turn Lane (Swink)

Figure 4-68. Views of U.S. 50

Environmental Consequences

Effects are determined by evaluating how representative views along U.S. 50 in the Lower Arkansas Valley would change if the Build Alternatives are constructed. Changes that would be consistent with the existing character of the view are considered to have no effect or a positive effect on that view. In contrast, changes that would alter the character of the view in a negative way are considered to have a negative effect on that view.

Summary of Effects

The following section summarizes potential effects to views along U.S. 50 in the Lower Arkansas Valley by the No-Build Alternative and the Build Alternatives.

No-Build Alternative

The No-Build Alternative does not include new roadway construction. Routine maintenance and repairs would be made, as necessary, to keep U.S. 50 in usable condition, such as routine overlays and repairs of weather- or crash-related damage. Additionally, smaller-scale improvements may be undertaken, such as short passing lanes and other minor safety improvements. The character of existing views would not be affected by these changes.

Potential Effect on Views

Visual resources (views) that could be negatively affected by the Build Alternatives include local residents' views of U.S. 50 in those areas where the highway is currently two lanes. The effect would occur because the Build Alternatives recommend expanding the highway to four lanes in these areas, which would double the amount of pavement seen by residents.

Also, views in the areas of the new around-town routes would be affected by adding a highway that does not exist there today.

Build Alternatives

This section describes how representative views along U.S. 50 would change if the Build Alternatives are constructed. This discussion is divided into views from U.S. 50 within Pueblo, views between communities, and views within other communities. It also includes a discussion about views around communities and views of U.S. 50 from surrounding areas. Noise analyses conducted during Tier 2 studies may recommend the construction of sound walls. Sound walls have the potential to negatively affect the views from U.S 50 around communities, and views of U.S. 50 from surrounding areas.

Within Pueblo. The Build Alternatives within Pueblo would improve U.S.50 on its existing alignment, construct a new connection via SH 47, or reroute U.S. 50 around the Pueblo Airport from its current alignment.

Views from U.S. 50

- The Pueblo Existing Alternative would improve U.S. 50 on its existing alignment in Pueblo. Because drivers would see the same types of views from the highway that they do today, the character of those views would not change, resulting in no effect.

- The SH 47 Connection Alternative also would improve U.S. on its existing alignment and construct a new connection to SH 47 on the west side of the Pueblo Airport. Because drives would see the same types of views from the highway that they do today, the character of those views would not change, resulting in no effect.
- The Pueblo Airport North Alternative would reroute U.S. 50 around the airport property. Rerouting U.S. 50 around the airport would mean drivers traveling along this new around-airport route would have different views than they do today. Instead of views of urban development on both sides of the highway, drivers would see urban development on one side (views toward airport) and views similar to the between-town sections on the other (views away from airport). This change would exchange in-town views for more of the same views drivers already see between towns. Because the overall character of the new views would be consistent with what drivers see today on other portions of the highway, the result would be no effect to these views.

Between Communities (from U.S. 50). The Build Alternatives would improve U.S. 50 on its existing alignment between communities. Because drivers would see the same types of views from the highway that they do today, the character of those views would not change, resulting in no effect.

Within Other Communities (from U.S. 50). The Build Alternatives would reroute U.S. 50 from its current through-town location to the periphery of eight communities. This would change views seen by drivers as they traveled in these areas. Today, drivers see views of urban development on both sides of the highway. If the Build Alternatives are implemented, they would see urban development on one side (views toward town) and views similar to the between-town sections on the other side (views away from town). This change, however, would only mean exchanging in-town views for more of the same views drivers already see between towns. Because the overall character of the new views would be consistent with what drivers see today on other portions of the highway, the result would be no effect to these views.

Around Communities (from U.S. 50). Rerouting U.S. 50 around eight communities would mean drivers traveling along these new around-town routes would have different views than they do today. Instead of views of urban development on both sides of the highway, drivers would see urban development on one side (views toward town) and views similar to the between-town sections on the other (views away from town). This change would exchange in-town views for more of the same views drivers already see between towns. Because the overall character of the new views would be consistent with what drivers see today on other portions of the highway, the result would be no effect to these views.

Views of U.S. 50

Views of U.S. 50 from surrounding areas could change in various ways. Within Pueblo, the highway is already configured in the manner recommended by the Existing Pueblo Alternative and mostly configured for the SH 47 Alternative (a four-lane rural expressway). Therefore, no substantial changes to it are expected from these alternatives. This means that views of the highway by local residents would not be affected. For residents living near the Pueblo Airport North Alternative, it would mean their views would now include a highway that is not there today. This change would dramatically alter the character of these views, resulting in a negative effect.

Between communities, changes would depend on where residents are located along U.S. 50. The Build Alternatives recommend the highway become a four-lane rural expressway through the Lower Arkansas Valley. This would mean that existing two-lane sections would be expanded to four lanes. Other elements also may be added to the highway in certain locations to improve safety or mobility for drivers, including turn lanes, medians, and wider shoulders. These changes would alter the look of the highway by widening the area of pavement within the view.

For residents with views of the existing four-lane segments, this change would be minimal. For example, widening the shoulders on an existing four-lane highway is unlikely to drastically change the view of that roadway; however, in the existing two-lane segments, expanding the highway to four lanes would double the amount of pavement seen by local residents. This type of change would alter the character of the view for local residents in these areas. While the Build Alternatives would not affect views of U.S. 50 for residents near the sections that already are four lanes, they would affect views for residents living along the existing two-lane segments.

The Build Alternatives also recommend relocating U.S. 50 to an around-town route at Fowler, Manzanola, Rocky Ford, Swink, La Junta, Las Animas, Granada, and Holly.

For residents living in these areas, it would mean their views would now include a highway that is not there today. This change would dramatically alter the character of these views, resulting in a negative effect.

Mitigation

Because the ultimate roadway footprint would be identified during Tier 2 studies, this Tier 1 analysis cannot identify which specific views would be affected by the Build Alternatives. Specific mitigation

measures cannot be determined at this time; however, CDOT will develop design guidelines addressing design elements during Tier 2 studies.

4.3.8 Air Quality

EPA sets standards for the amount of certain pollutants that can be in the air before they become harmful to public health and the environment. Air quality is measured by the amount of these pollutants in the air based on these standards.

Air quality is evaluated because high levels of pollutants in the air can cause harm to human health and the environment. Examples of health concerns related to air pollution include effects on breathing and respiratory systems, damage to lung tissue, cancer, and other illnesses.

There are many sources of air pollution. Those likely to be found along U.S. 50 in the Lower Arkansas Valley include:

- Emissions from vehicles driving on U.S. 50
- Dust from agricultural activities, such as plowing
- Gasses given off by animal waste accumulated at feedlots

Pollutants associated with these sources that have been identified as potentially harmful to human health include particulate matter (PM), carbon monoxide (CO), sulfur dioxide (SO_2), nitrogen dioxide (NO_2), Ozone (O_3), mobile source air toxics (MSAT), and greenhouse gas (GHG) emissions. There also are natural sources of air pollution (biogenic sources), such as trees and vegetation, which contribute to background levels of pollutants, including nitrogen, CO, and others.

The term “project counties” refers to the counties in which the U.S. 50 study area occurs. These counties are Pueblo, Otero, Bent, and Prowers. All towns along the U.S. 50 corridor have been considered in the analysis of project impacts to air quality. Although Lamar is technically excluded from the U.S. 50 study area, information about Lamar has been included for this resource because impacts to air quality are generally shared between jurisdictions. GHG emissions are discussed in Section 4.4.5, Global Climate Change, as these pollutants have statewide impacts and are known to be associated with global climate change.

Results of the Analysis

The No-Build Alternative would improve the roadway along its existing location without moving vehicle emissions from air-quality sensitive sites, such as schools, hospitals, and elder care facilities.

The Build Alternatives would move U.S. 50 traffic and its resulting emissions away from populated areas in town to the less-populated periphery of the eight communities along the highway. None of the communities along the U.S. 50 corridor in the Lower Arkansas Valley has violated federal pollutant standards because of vehicle emissions in the past, and, even with the Build Alternatives, they are not expected to do so in the future.

Affected Environment

The following section details air quality issues within the project counties. Air quality in the project counties is affected by dust (from local agricultural plowing, unpaved roads, and open lands), vehicle emissions, and other commercial or industrial activities. Emissions are produced by motor vehicles, agricultural activities, fuel combustion equipment (at industrial facilities), and biogenic sources (trees and vegetation that contribute to background emission levels) (EPA 2007).

Along U.S. 50 in the Lower Arkansas Valley, emissions from motor vehicles are a major source of air pollution; however, emissions levels have never been high enough to cause a violation of air pollution standards. As shown in Figure 4-69, the average traffic volume on U.S. 50 was roughly 5,500 vpd in 2011. This figure ranged widely from roughly 13,500 vpd in Pueblo to about 1,700 vpd from Holly to the Colorado-Kansas state line. In contrast, I-25 through Pueblo averaged approximately 47,846 vpd in 2012 (CDOT 2012).

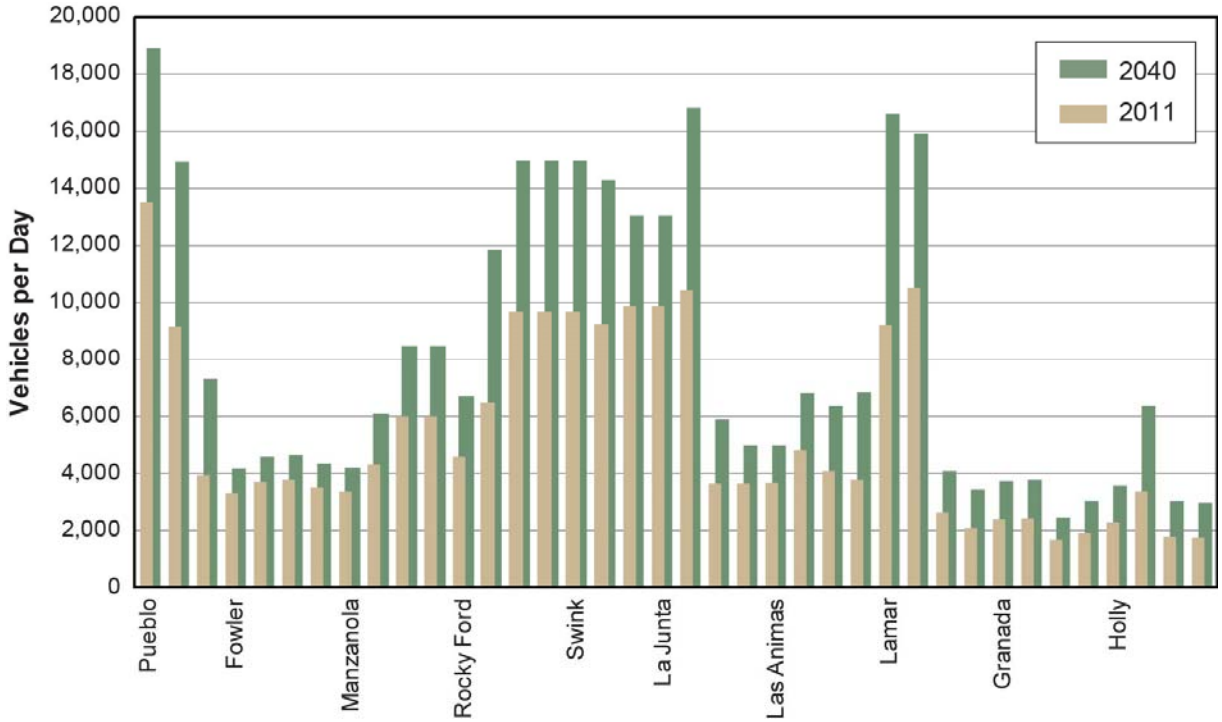


Figure 4-69. Annual Average Daily Traffic on I-25 through Pueblo and on U.S. 50 in the Lower Arkansas Valley (2011 and projected 2040)

On average, traffic volumes are expected to rise by approximately 52 percent by 2040 (see Figure 4-69) along the U.S. 50 corridor. The traffic volumes on U.S 50 in Pueblo will increase by 40 percent, adding slightly more than 5,500 vpd between 2011 and 2040. The most substantial increase in vpd is expected to occur in the town of La Junta. Traffic through La Junta is projected to increase by 60 percent, adding 6,000 vpd (CDOT 2012; Swenka 2014). Despite these increases in traffic, future volumes are not expected to cause a violation in pollution standards in any of the communities along the U.S. 50 corridor.

This assumption is supported by a comparison of air quality impacts along other heavily traveled roadways in the region. I-25 north of the interchange with U.S. 50 in Pueblo had nearly 70,000 vpd in 2011 (Swenka 2014), more than twice the 2040 volumes projected for most locations within the U.S. 50 project area. Although this comparison between locations does not account for variations in geographical, meteorological, and roadway conditions, since the traffic volumes on I-25 have not caused a violation of the NAAQS, we can assume that locations along U.S. 50 with less traffic also will not violate the national standards.

Additionally, traffic data show that nearly 12 percent of the vehicles driving on U.S. 50 in 2012 were commercial trucks. This proportion varied widely along the corridor, from 6 percent in Pueblo to more than 25 percent near the Colorado-Kansas state line (CDOT 2012). This distinction is important when evaluating air quality because commercial trucks generally have diesel engines, which produce diesel PM, a known pollutant of concern for sensitive sites, such as schools, hospitals, and elder care facilities. The percentage of commercial trucks on the highway is expected to remain about the same through 2040. While a sizable percentage of the vehicles driving on U.S. 50 are commercial trucks, vehicle-related pollution has not been an issue along U.S. 50 in the Lower Arkansas Valley, and it is not expected to be an issue through 2040. Additionally, recent advances in diesel technology have already reduced emissions from these types of engines, and this trend is expected to continue into the future (Trucking Industry Mobility and Technology Coalition [TIMTC] 2010).

All the project counties currently are designated as unclassifiable/attainment for air quality. This designation means that: (1) there is sufficient data to determine that the area is meeting EPA pollutant standards or, (2) due to no data or insufficient data, the agency cannot make a determination. All cities and towns within the project counties, except Lamar, share this attainment classification. Lamar is designated as attainment/maintenance for air quality.

In Lamar, PM was monitored at levels that violated pollutant standards in the 1980s, but this was primarily due to exceptional events. The most recent violations occurred in 2008, 2009, and 2011. The Attainment/Maintenance Plan for Lamar documents all the recorded exceedances of the EPA standards as Exceptional Events caused by high wind. “All Lamar [particulate matter] exceedances are clearly rare events that are well above the 95th percentile and occur in the three seasons associated with high wind events” (CDPHE, APCD 2012). However, because not all of these events were recorded with the EPA, several values greater than the NAAQS for PM_{10} were recorded as exceedances and long-term attainment of the standard must be demonstrated.

Colorado’s large metropolitan areas have vehicle-related air quality issues. These issues result from conditions not currently present in the Lower Arkansas Valley, such as the higher levels of traffic (producing more emissions) and high industrial activity. The purpose of the U.S. 50 Tier 1 EIS is to improve safety and mobility for local, regional, and long-distance users of U.S. 50 by correcting roadway deficiencies, while balancing the mobility and access needs of these users and providing flexibility to meet future travel demands.

Environmental Consequences

Air quality effects from the Build Alternatives would include air contaminant emissions from combustion of fuel in vehicles, idling of vehicles, and construction activities resulting from Tier 2 studies. Qualitative information was used to evaluate how these activities would affect air quality.

This project has been determined to generate minimal air quality effects for criteria pollutants regulated by the Clean Air Act of 1990 (and its amendments) and has not been linked with any specific concerns about MSATs. This project would not result in changes in traffic volumes, vehicle mix, basic project location, or any other factor that would cause an increase in effects from MSATs from the project when compared to the No-Build Alternative. The FHWA guidance used to make this determination has been included in Appendix D.

New and more stringent EPA regulations for vehicle engines and fuels will cause overall MSAT emissions to decline substantially over the next several decades. Based on current and future pollution control measures, an analysis of national trends using the EPA's MOVES2010b model forecasts a combined reduction of 83 percent in the total annual emission rate for priority MSATs from 2010 to 2050, while VMT is projected to increase by 102 percent (FHWA 2012b). This would reduce the background level of MSATs, while also decreasing the possibility of even minor MSAT emissions from this project. Air quality effects in the Lamar area are not included in this analysis.

Summary of Effects

The following section summarizes potential air quality effects by the No-Build Alternative and the Build Alternatives.

Potential Effect on Air Quality

The Build Alternatives would move U.S. 50 around the eight communities: Fowler, Manzanola, Rocky Ford, Swink, La Junta, Las Animas, Granada, and Holly. This would move traffic, and resulting emissions, from populated areas in town to less populated areas outside of town.

No-Build Alternative

Under the No-Build Alternative, only minor and isolated construction would occur. Routine maintenance and repairs would be made as necessary to keep U.S. 50 in usable condition, including standard overlays and repairs of weather- or crash-related damage. Additionally, smaller-scale improvements may be undertaken, such as short passing lanes and other minor safety improvements.

No direct effects to air quality are expected; however, the following conditions will continue to affect air quality in the Lower Arkansas Valley:

- Between 2011 and 2040, average traffic volumes on U.S. 50 are expected to increase by approximately 52 percent (CDOT 2012; Swenka 2014). Consequently, more motor vehicles will be producing emissions. Continued improvements in fuel and motor vehicle technologies are expected to result in lower emission rates for engine- and exhaust-related criteria pollutants, MSATs, and GHGs in the future. These reductions could offset some of the expected emissions increases from additional traffic. Non-exhaust vehicle pollutants, such as particulates from brake and tire wear, are expected to increase with greater VMT.
- Non-vehicle-related sources of air pollution will continue to affect air quality. Feedlots are one of these sources, which generate large amounts of animal waste in a concentrated area. There are eight feed lots located along or near U.S. 50 in the Lower Arkansas Valley, and several of them are located directly adjacent to the highway.
- Communities in the Lower Arkansas Valley are actively pursuing economic diversification, which includes commercial and industrial activities. Assuming that any new point or mobile emission sources comply with established air quality regulations, there is no reason to anticipate any air quality issues stemming from these facilities for the foreseeable future.
- Valley soils are sensitive to disturbances that cause airborne dust and debris. Highway maintenance activities will temporarily increase the number of sources of dust. These impacts can be reduced with the use of spraying and other dust control measures.

Build Alternatives

U.S. 50 is the primary east-west route through the communities along U.S. 50 in the Lower Arkansas Valley. The Build Alternatives would relocate U.S. 50 around eight of these communities: Fowler, Manzanola, Rocky Ford, Swink, La Junta, Las Animas, Granada, and Holly. This would remove emissions originating from traffic on U.S. 50, including commercial trucks, away from populated areas in town to the less-populated periphery of these communities. Because most sensitive sites—such as schools, hospitals, and elder care facilities—are located in town, the Build Alternatives would move traffic and near-road vehicle emissions away from these sites, as well.

In these eight communities, the average traffic volume in 2011 was slightly more than 5,600 vpd (Swenka 2014). In 2040, this figure is expected to rise by approximately 56 percent, to slightly more than 8,800 vpd (CDOT 2012; Swenka 2014). The Build Alternatives would move a portion of this traffic out of town, potentially improving air quality in these downtown areas (see Figure 4-70). Many of these communities have expressed a desire to revitalize their downtowns, making them more suitable for

pedestrians (CDOT 2006b). The Build Alternatives could help these communities reach this goal by improving air quality in these areas.

Figure 4-70. Traffic on U.S. 50–Fowler (Downtown)

Construction activities resulting from Tier 2 studies are expected to produce diesel PM, nitrogen oxide, and hydrocarbon emissions from the use of construction equipment and dust emissions from ground disturbance. These emissions would result in minor, short-term effects on air quality in the immediate vicinity of the activities. It also is expected that clean vehicle technologies would be applied to construction equipment; therefore, it is likely that the equipment used for construction of the Build Alternatives in the future would produce fewer emissions than today's equipment. More specific effects to air quality by construction-related activities would be identified during Tier 2 studies. An assessment of the level of MSAT effects will be conducted during Tier 2 studies; an appropriate level of assessment will be determined per 2012 FHWA interim guidance.

Build Alternatives Effects by Location

The summary of effects is sufficient for comparing air quality impacts among each of the Build Alternatives. As mentioned above, in general, the Build Alternatives would move the highway alignment away from sensitive populations. Detailed analysis of all Build Alternatives is included in the Air Quality Technical Memorandum, which is located in Appendix A.

Mitigation

Because the ultimate roadway footprint would be identified during Tier 2 studies, this Tier 1 analysis cannot identify specific air quality effects from the Build Alternatives. The following strategies have been developed for air quality-related mitigation of impacts resulting from Tier 2 studies.

Dust Control

Temporary dust emissions are likely to result from Tier 2 construction activities. Techniques such as watering the areas disturbed by construction would be used to minimize dust issues.

CDOT Air Quality Directive

CDOT would implement the appropriate air quality mitigation measures included in CDOT Air Quality Policy Directive 1901.

Avoidance Activities

Some air quality effects were avoided during the alternatives development process. This occurred because most of the air quality sensitive sites (schools, hospitals, elder care facilities, etc.) are located within the communities. The U.S. 50 Tier 1 EIS considered alternatives that would improve U.S. 50 on its existing alignment through these communities; however, these through-town alternatives were eliminated from further consideration during the alternatives development process. This resulted in the avoidance of potential air quality effects for many receptors, including most sensitive sites. This analysis did not calculate the specific number of receptors that were avoided; however, because most of the development is located within the communities, there would be more human exposure to vehicle emissions from U.S. 50 traffic if these through-town alternatives had not been eliminated.

4.3.9 Traffic Noise

Noise is generally defined as unwanted or undesirable sound. Traffic noise is generated by vehicles passing by and includes noise from tires on the pavement, engines, and exhaust. The pitch or frequency of the sound coming from these sources can vary from high for tire noise to low for noise from truck diesel engines. Factors that influence traffic noise include the number of vehicles on the road, the types of vehicles (such as cars, trucks, or motorcycles), traffic speed, and the distance between the roadway and the person hearing the noise. Due to the physical properties of noise, it has a highly localized effect because sound energy dissipates with distance. Therefore, people closer to the source experience higher levels of noise than those successively farther away. In general, noise from the source should not be heard at more than a 500-foot distance.

Results of the Analysis

Effects from U.S. 50 traffic noise by the Build Alternatives would vary by location. These effects would generally be greater within the larger communities, such as Pueblo, which have higher traffic volumes than in rural areas. Traffic volumes on U.S. 50 east of Pueblo are relatively low (on average, roughly 6,600 vpd in 2011), and they are expected to remain that way well into the future (on average, slightly more than 11,000 vpd in 2040) (CDOT 2012; Swenka 2014). Given these modest traffic volumes, no major increases in traffic noise effects are expected, even from the new highway sections around towns.

Additionally, noise effects were minimized during the alternatives development process for this Tier I EIS. This was possible because most of the potential noise receptors in the project area are located along existing U.S. 50 within the communities, and the alternatives that would have improved U.S. 50 through towns were eliminated during this process. This analysis did not calculate the specific number of receptors that were avoided; however, because most of them are located within the communities, the number of receptors affected by increased traffic noise would have been dramatically higher if the through-town alternatives had not been eliminated.

Affected Environment

The following section details traffic noise from U.S. 50 within the project area. However, for this noise analysis only, potential noise sensitive receptors were identified within a 1,600-foot-wide corridor, which includes the areas within a Build Alternative (1,000 feet) and also within 300 feet on either side of that alternative to the north and south. An extra 300 feet was added on each side of the Build Alternatives because noise from U.S. 50 traffic is heard on land adjacent to either side of the highway. This additional 300 feet ensures that all potential receptors that could be affected are counted if a new highway section is built on the edge of the Build Alternatives. However, a study area width of only 750 feet was used in the Pueblo area (Section 1) for Alternative 2: Pueblo Existing Alignment, since it is proposed to stay on its current alignment, and the portion of Alternative 3: Pueblo SH 47 Connection that would remain on the existing U.S. 50.

Traffic noise generated on U.S. 50 depends on many factors, including the amount of traffic on the highway and the receptors that hear the traffic noise. These factors are discussed in more detail below.

U.S. 50 Traffic Volumes

The AADT for a given roadway is the number of vehicles that drive the roadway during an average day. As previously shown in Figure 4-69, traffic volumes on U.S. 50 currently decline from a maximum of roughly 13,500 vpd within Pueblo city limits to a minimum of about 1,700 vpd east of Holly. The average traffic volume on U.S. 50 is approximately 5,500 vpd. By the year 2040, traffic volumes are expected to

increase by about 52 percent to 19,000 vpd in Pueblo and 6,500 vpd by Holly (CDOT 2012; Swenka 2014).

In comparison, the amount of traffic carried on I-25 through Pueblo was, on average, approximately 47,846 vpd in 2012 (CDOT 2012). In other words, traffic volumes on U.S. 50 are roughly 11 percent of the volumes on I-25 through Pueblo. Thus, traffic noise levels on U.S. 50 are relatively low.

Ambient Noise Levels

In January 2014, highway traffic noise levels were collected along U.S. 50 in the project area to provide quantitative context to the corridor noise environment. The site selections were based on highway segment AADT volumes serving regional population centers. Noise measurements were taken at three locations along the U.S. 50 corridor:

- Milepost 334 located just east of Avondale
- Milepost 365.5 located between Manzanola and Rocky Ford
- Milepost 384 located between La Junta and Las Animas at Otero County Road 33

Measurements ranged from 58.5 dBA to 66.2 dBA. In addition, noise data was collected in the vicinity of the city of Lamar in 2002 for the *U.S. 287 at Lamar Reliever Route Environmental Assessment*. Data collected during this time was located near the intersection of U.S. 287 and U.S. 50 and on the east side of the city of Lamar along U.S. 50. At these locations, measurements ranged from 50.4 dBA to 60.1 dBA. Please refer to the Traffic Noise Technical Memorandum, located in Appendix A, and the U.S. 287 at Lamar Reliever Route Noise Report for additional ambient noise data. Additional information regarding noise conditions in the vicinity of Lamar can be found in the *U.S. 287 at Lamar Reliever Route Environmental Assessment*.

Noise Sensitive Receptors

U.S. 50 is the primary east-west route through the communities in the Lower Arkansas Valley. Within these communities, many homes, businesses, and public facilities are located immediately adjacent to U.S. 50 and are, therefore, exposed to noise from U.S. 50 traffic today. Between the communities and in the areas surrounding them, fewer roads exist to produce traffic noise, and fewer people live in these areas to hear it.

Noise sensitive receptors are sites or areas where the functionality of the receptor can be adversely affected by traffic noise. Long-established state and federal noise guidelines prescribe how to determine whether a nearby property (i.e., receptor) is adversely affected by traffic noise (FHWA 2010, FHWA

2011, and CDOT 2013b). If traffic noise is expected to approach or exceed those guidelines, noise mitigation may be considered to mitigate for the impacts that these receptors receive from the project.

Noise sensitive receptors are categorized by the type of land use activities associated with the receptor. Some categories are much more sensitive to the effects of traffic noise than others. For example, an outdoor amphitheater would be more affected by traffic noise than areas used occasionally by business customers, such as outdoor waiting areas at restaurants. Table 4-44 shows the categories of activity involved in a noise analysis (CDOT 2013b).

Table 4-44. CDOT Noise Abatement Criteria (NAC)

Activity Category	Activity Leq(h)*	Evaluation Location	Activity Description
NAC A	56	Exterior	Lands on which serenity and quiet are of extraordinary significance, and that serve an important public need where the preservation of those qualities is essential if the area is to continue to serve its intended purpose.
NAC B	66	Exterior	Residential
NAC C	66	Exterior	Active sport areas, amphitheaters, 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, recreational areas, Section 4(f) sites, schools, television studios, trails, and trail crossings.
NAC 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.
NAC E	71	Exterior	Hotels, motels, offices, restaurants/bars, and other developed lands, properties or activities not included in A-D or F.
NAC F	NA	NA	Agriculture, airports, bus yards, emergency services, industrial, logging, maintenance facilities, manufacturing, mining, rail yards, retail facilities, ship yards, utilities (water resources, water treatment, electrical), and warehousing.
NAC G	NA	NA	Undeveloped lands that are not permitted for development.

* Hourly A-weighted sound level in dB(A), reflecting a 1-dB(A) approach value below 23CFR772 values
Leq(h)–Hourly equivalent noise level

Examples of noise sensitive receptors found in the project area include parklands and recreational areas, residences, hotels and motels, schools, and hospitals. The U.S. Department of Education's National Center for Education Statistics database was used to identify public elementary and secondary schools (Kindergarten through 12th Grade). Hospitals were identified using information from the CDPHE, which is the government agency responsible for licensing these facilities. All other noise sensitive receptors were identified using ESRI aerial photography.

A total of 1,720 receptors were identified using aerial photography and GIS files within the aforementioned traffic noise study area. Of the 1,720 receptors, 93.4 percent (1,607 receptors) were NAC B, 3.5 percent (60 receptors) were NAC C, and 3.1 percent (53 receptors) were NAC E. In addition, 1,007 receptors (58.5 percent) were identified in the Pueblo area, as this is the most populated section of the study area, and the majority (80 percent) of receptors in the study area are located within the communities rather than in between towns.

There were no NAC A or D receptors identified in the study area. Any NAC F and NAC G receptors that were identified were not counted for this analysis, as they do not have a designated NAC Leq(h) criterion. Therefore, they are not considered for any noise abatement measures (i.e., noise walls) that may be applicable based on the results of any future noise analysis done during Tier 2 studies.

The NAC C receptors include park areas, rest stops, churches, day care centers, schools, and several CDOW/CPW recreation trails that cross through the project area. A receptor was placed at each location, and for recreation areas (parks, sports fields, etc.), a receptor was placed for each individual amenity feature within the recreation area. For example, if a park contained a playground, tennis courts, basketball courts, and open recreation space, a total of four receptors would be placed within the park area to represent each individual function that is available.

For trails, while CDOT's Noise Abatement Guidelines (2013b) do not specify how many receptors should be placed along a trail to represent it appropriately in the noise analysis (i.e., one receptor every 1,000 feet), it does say that usage, stopping sites, rest areas, etc., should be taken into account when deciding on the number of representative receivers. As field visits were not required for this Tier 1 analysis to quantify the usage of the trails in the study area, for the purposes of this analysis, one receptor was placed every time a recreation trail crossed the 1,600-foot study area corridor.

Potential Traffic Noise Effects

Eighteen of the 31 Build Alternatives would move U.S. 50 through-traffic from the downtown areas of eight communities, reducing noise in these locations. However, it also would result in increased noise levels where the new sections of U.S. 50 are built around towns.

Environmental Consequences

At this time, since traffic noise has not been not measured for the entire project corridor or modeled, it is assumed that all noise receptors within these areas could be exposed to traffic noise levels that approach or exceed the guidelines discussed above. However, because the location of U.S. 50 within the Build

Alternatives will not be determined until Tier 2 studies, not all of the receptors within the 1,600-foot analysis area would be affected.

Summary of Effects

The following section summarizes potential effects from U.S. 50 traffic noise by the No-Build Alternative and the Build Alternatives.

No-Build Alternative

Under the No-Build Alternative, only minor and isolated construction would occur. Routine maintenance and repairs would be made as necessary to keep U.S. 50 in usable condition, including standard overlays and repairs of weather- or crash-related damage. Additionally, smaller scale improvements may be undertaken, such as passing lanes and other minor safety improvements.

Land adjacent to U.S. 50 today would continue to experience traffic noise from the highway. Traffic volumes are expected to increase by approximately 52 percent on U.S. 50 in southeastern Colorado between 2008 and 2040 (CDOT 2010a, CDOT 2010d). In general, traffic would need to double to result in a perceptible noise increase. Therefore, the No-Build Alternative would result in only a slight increase in noise due to expected increases in traffic on U.S. 50 in the future, and this change would likely be imperceptible to the human ear.

Build Alternatives

Eighteen of the Build Alternatives would relocate U.S. 50 from its current through-town route to an around-town route at eight communities in the project area. These new around-town routes would be four lanes. Between communities, the Build Alternatives generally would not move U.S. 50 off its existing alignment, but it would expand the existing two-lane portions of the highway to four lanes. This expansion and movement of the highway footprint has the potential to affect traffic noise levels. Potential noise impacts are discussed below.

The Build Alternatives have the potential to affect between 480 and 1,524 noise sensitive receptors. The number of these potentially affected receptors will vary depending on which alternatives are chosen. Table 4-45 provides more information about how these receptors could be affected by the Build Alternatives.

Table 4-45. Potential Traffic Noise Effects on Identified Noise Receptors by the Build Alternatives

Location	Number of Receptors	Potential Traffic Noise Effects by the Build Alternatives
Between communities[a]	266–309	Slight noise increase—Traffic on U.S. 50 is expected to increase in the future, resulting in a small increase in traffic noise. Based on traffic predictions, this change is likely to be imperceptible to the human ear. However, there remains potential for future levels of traffic noise to result in noise impacts.
Around communities[a]	214–1,215	Noticeable noise increase—These receptors would experience new traffic noise after U.S. 50 is rerouted into their respective areas. However, these traffic noise levels would not be appreciably different than noise levels experienced today along U.S. 50 between communities. Traffic noise would be noticeable to those receptors currently located far away from the highway or other busy roads, as there is currently little to no traffic in these areas.

[a]Each receptor was counted as it occurred in each respective area. Due to the fact that some sections share common study areas, the receptors listed here may be counted twice if they occur in more than one section study area.

Traffic noise effects resulting from the Build Alternatives are discussed in more detail below in the "Between Communities" (current alignments) and "Around Communities" (bypass alignments) subsections.

Between Communities. The Build Alternatives generally would maintain U.S. 50 on or near its current location between towns, and would add one lane in each direction, to create a four-lane section. In these locations, up to 309 receptors have the potential to be affected by traffic noise. These receptors are already affected by traffic noise on U.S. 50, and they will experience increased noise levels as traffic increases on U.S. 50 in the future. Since the average traffic volume on U.S. 50 is expected to increase by approximately 52 percent between 2008 and (CDOT 2010a, CDOT 2010d), this will increase traffic noise slightly, but the increase over existing traffic noise levels would likely be imperceptible to the human ear, as traffic generally has to double to make a perceptible change. However, there remains potential for future levels of traffic noise to result in noise impacts.

Around Communities. The Build Alternatives would provide alternate routes for U.S. 50 through-traffic around eight communities. In these locations, between 214 and 1,215 receptors would be potentially affected, depending on what alternatives are chosen in these areas. These receptors include the Cottonwood Links Golf Course (in Fowler), two school recreational facilities (one in Swink and one in Granada), and the Best Western Bent's Fort Inn (just north of Las Animas). The Build Alternatives would result in increased noise levels for these receptors due to the construction of a new highway and its resulting traffic that does not currently exist there today. In most cases, the receptors are currently located far from U.S. 50 and many are far from other roadways. Because of this, traffic noise would be noticeable for these receptors. However, these traffic noise levels would not be substantially different than noise

levels that are experienced today along U.S. 50 between communities. The average traffic volume on U.S. 50 between communities was approximately 4,900 vehicles in 2011, which is comparable to the average traffic volume through Las Animas (4,800 vehicles) in that year (CDOT 2012).

Build Alternatives Effects by Location

The noise sensitive receptors that have the potential to be affected by the Build Alternatives are summarized in Table 4-46 by location. Locations are listed from west to east and include the number of receptors by NAC Category that have the potential to be impacted.

Table 4-46. Summary of Potentially Affected Noise Sensitive Receptors by Location

Section[a]	Build Alternatives (if more than one)	Number of Receptors per NAC Category[b]		
		B	C	E
Section 1: Pueblo	Alternative 1: Pueblo Airport North	74	0	1
	Alternative 2: Pueblo Existing Alignment	876	11	45
	Alternative 3: Pueblo SH 47 Connection	180	1	16
Section 2: Pueblo to Fowler	Alternative 1: Fort Reynolds Existing Alignment	115	1	0
	Alternative 2: Fort Reynolds Realignment	72	1	0
Section 3: Fowler	Alternative 1: Fowler North	11	3	0
	Alternative 2: Fowler South	18	0	0
Section 4: Fowler to Manzanola	—	20	1	0
Section 5: Manzanola	Alternative 1: Manzanola North	35	4	0
	Alternative 2: Manzanola South	21	0	0
Section 6: Manzanola to Rocky Ford	—	22	2	0
Section 7: Rocky Ford	Alternative 1: Rocky Ford North	59	3	1
	Alternative 2: Rocky Ford South	26	1	0
Section 8: Rocky Ford to Swink	—	8	0	0
Section 9: Swink	Alternative 1: Swink North	34	1	1
	Alternative 2: Swink South	10	6	0
Section 10: La Junta	Alternative 1: La Junta North	13	6	0
	Alternative 2: La Junta South	43	5	0
	Alternative 3: La Junta South	31	3	0
	Alternative 4: La Junta South	13	2	0
Section 11: La Junta to Las Animas	—	15	8	0
Section 12: Las Animas	Alternative 1: Las Animas North	29	4	2
	Alternative 2: Las Animas South	40	2	1

Table 4-46. Summary of Potentially Affected Noise Sensitive Receptors by Location (continued)

Section[a]	Build Alternatives (if more than one)	Number of Receptors per NAC Category[b]		
		B	C	E
Section 13: Las Animas to Lamar[c]	—	76	5	1
Section 14: Lamar to Granada[c]	—	16	1	0
Section 15: Granada	Alternative 1: Granada North	14	1	0
	Alternative 2: Granada South	7	1	0
Section 16: Granada to Holly	—	9	2	0
Section 17: Holly	Alternative 1: Holly North	17	3	1
	Alternative 2: Holly South	2	1	0
Section 18: Holly Transition	—	5	2	0

[a] The study area for each section location is 1,600 ft in width, except for the existing alignment area in both Section 1, Alternative 2 and Section 1, Alternative 3, where it is 750 feet in width.
[b] Each receptor was counted as it occurred in each respective section. Due to the fact that some sections share common study areas, the receptors listed here may be counted twice if they occur in more than one section study area.
[c] The Build Alternatives do not include alternatives in Lamar, as discussed in Chapter 3, Alternatives Considered.

Mitigation

Since the ultimate roadway footprint would be identified during Tier 2 studies, this Tier 1 analysis cannot identify which specific noise receptors would be affected by the Build Alternatives. However, specific noise conditions would be modeled during Tier 2 studies and mitigation would be considered based on the results of that analysis.

Avoidance Activities

Some traffic noise effects were avoided during the U.S. 50 Tier 1 EIS alternatives development process. Most of the noise receptors along U.S. 50 are located within the communities. The U.S. 50 Tier 1 EIS considered Build Alternatives that would improve U.S. 50 on its existing alignment through these communities. However, these through-town alternatives were eliminated from further consideration during the alternatives development process. This resulted in the avoidance of traffic noise effects on some noise receptors within communities. This analysis did not calculate the specific number of receptors that were avoided. However, since most of the development is located within the communities, the number of receptors affected by increased traffic noise would have been dramatically higher if the through-town alternatives had not been eliminated.

4.4 OTHER

This section discusses several topics in the U.S. 50 project area, including:

- Transportation
- Hazardous materials
- Section 6(f) resources
- Energy
- Global climate change
- Irreversible and irretrievable commitment of resources
- Short-term uses versus long-term productivity

The project area for the U.S. 50 Tier 1 EIS has been defined as approximately one to four miles wide surrounding the existing U.S. 50 facility (see Figure 4-71).

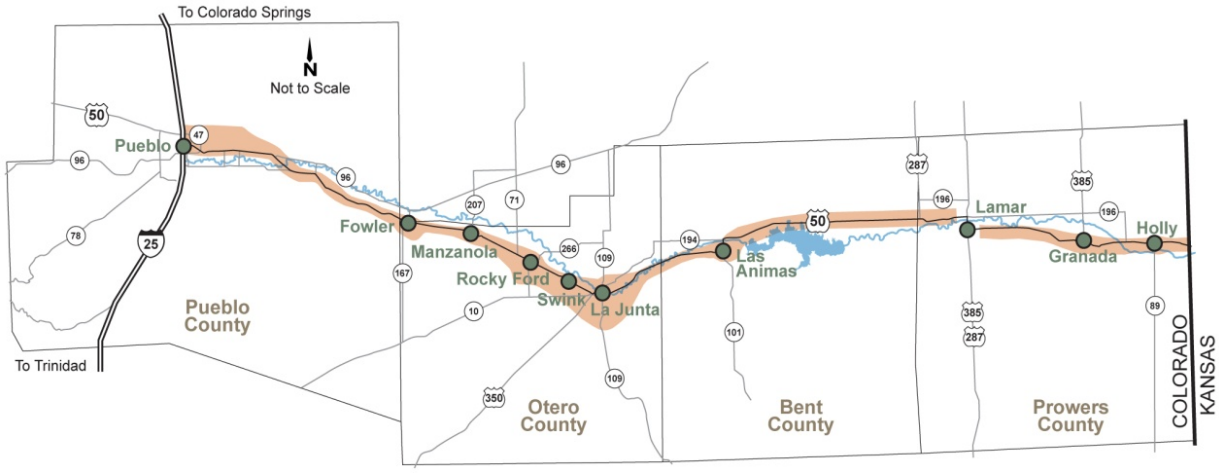


Figure 4-71. U.S. 50 Tier 1 EIS Project Area

Additional information about hazardous materials, Section 4(f), and Section 6(f) can be found in U.S. 50 Tier 1 EIS technical memoranda, which are attached in Appendix A of this document. The following sections describe the existing conditions and effects from the No-Build Alternative and the Build Alternatives for each of these topics in the order listed above.

4.4.1 Transportation

This section discusses the existing and future conditions of various transportation-related topics within the U.S. 50 project area. These topics include access categories, highway characteristics, traffic, crash data, and bike and pedestrian facilities.

Results of the Analysis

Traffic volume and congestion on U.S. 50 are not a major problem currently, but as traffic continues to grow, there will be fewer passing opportunities, which will result in safety and mobility issues. Today, 80 percent of the rural distance on U.S. 50 is classified as Level of Service of Safety (LOSS) III and IV, which indicates a safety concern and that U.S. 50 has the potential to be improved.

The Build Alternatives address the roadway deficiencies by increasing passing opportunities in two-lane sections of the highway, removing obstructions and hazards from the sides of the road, and controlling access. Between towns, all two-lane sections of U.S. 50 would be replaced with four lanes, which would allow safe passing of slower vehicles and improve mobility. A median refuge area would be provided, which will reduce delay since drivers will only have to maneuver across one direction of U.S. 50 traffic at a time.

Affected Environment

U.S. 50 is a regional highway traveling from I-25 in Pueblo to the border with Kansas. The highway travels through many towns as well as agricultural land. In many locations, U.S. 50 also serves as Main Street in the communities and is the backbone of the local street system. The varied nature of the corridor results in a mix of the type of users: long-distance travelers, farm equipment, pedestrians, etc. This mix of travelers can affect mobility and safety within the corridor.

Access Categories

Along the U.S. 50 corridor, there are nearly 400 permitted access points, not including city, county, and state roads (CDOT 2003b). There also are hundreds of unpermitted access points, indicating a lack of access control within the corridor. As the number of access points increases, the number of conflict points also increases, impacting safety.

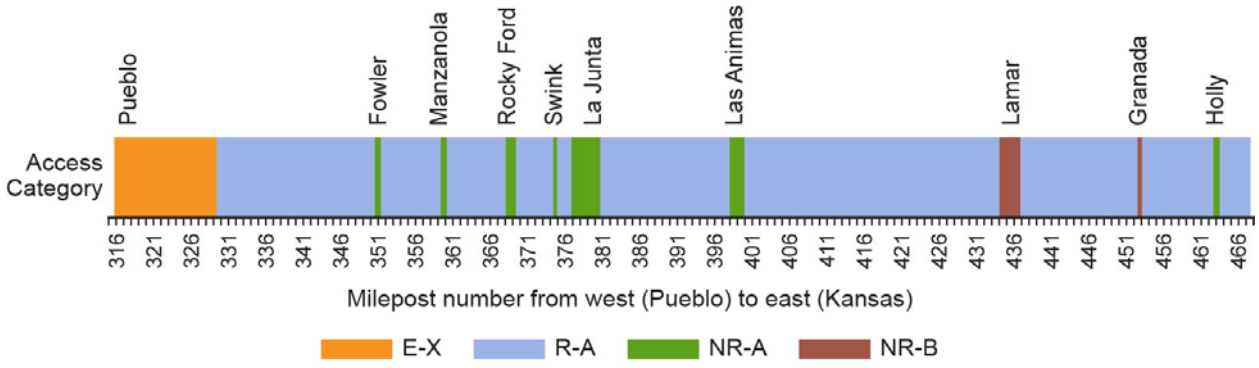
All state highways are assigned an access category and are listed in the State Highway Access Category Assignment Schedule. These access categories are based on the type of use for each facility and dictate the type of access allowed. Each access category designates requirements and thresholds for access frequency, spacing, operation, and design. Table 4-47 summarizes the characteristics of the access categories on U.S. 50 within the project area.

Table 4-47. Comparison of U.S. 50 Access Categories

Category	Traffic Volume	Highway Speeds	Access Spacing	Travel Types
Expressway, Major Bypass (E-X)	High	High	Every one mile	Inter-state Inter-regional Intra-regional Inter-city Intra-city
Rural, Regional Highway (R-A)	Medium to High	Medium to High	Every one-half mile for full-movement intersections	Inter-regional Intra-regional Inter-city
Non-Rural, Principle Highway (NR-A)	Medium to High	Medium to High	Every one-half mile for full-movement intersections	Inter-regional Intra-regional Inter-city Intra-city
Non-Rural, Arterial (NR-B)	Moderate	Moderate	One per parcel	Inter-city Intra-city Inter-community

Source: *State Highway Access Code*

Figure 4-72 shows the access category at each milepost throughout the corridor. A majority of U.S. 50 is categorized as R-A, which is one of the highest and most restrictive categories to allowable accesses, after E-X. However, the access category changes several times when U.S. 50 passes through towns, which also impacts the posted speed limit on the highway. Much of U.S. 50 has a posted speed limit of 65 mph, though posted speed limits change frequently (Figure 4-73) as motorists reach town limits. These changes also coincide with the changes in access category along the corridor.



(Source: Colorado State Highway Access Category Assignment Schedule 2013)

Figure 4-72. Access Category by Location

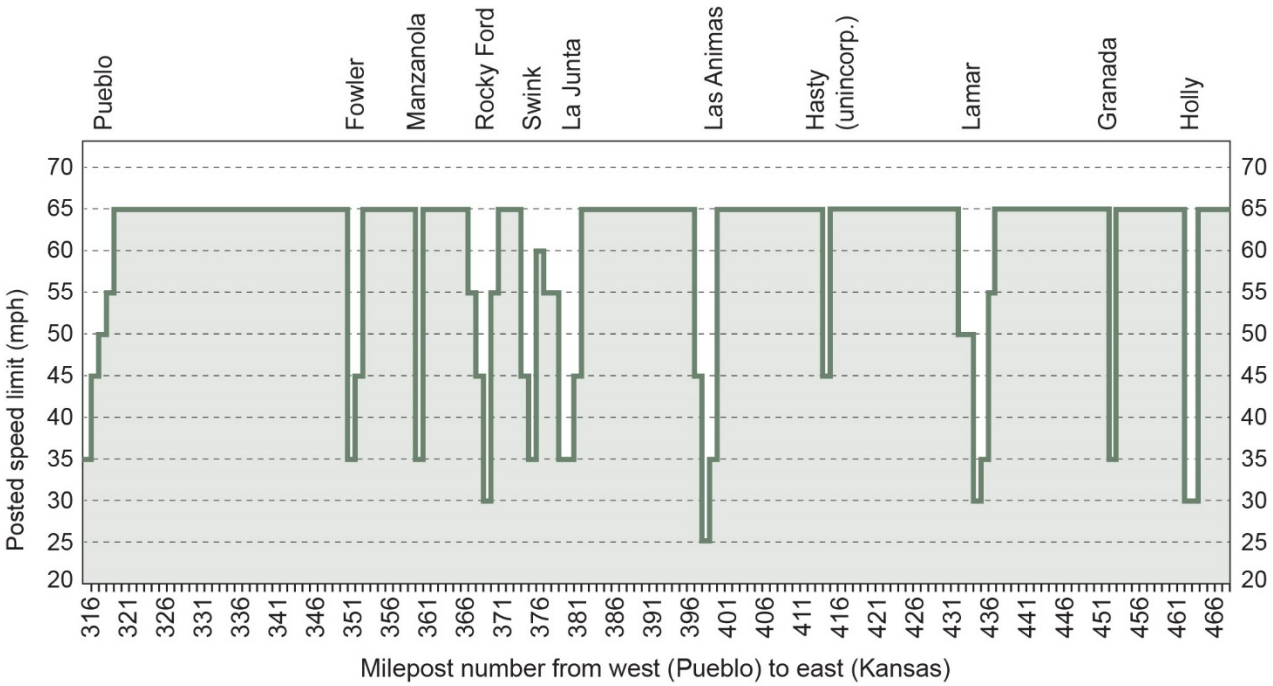


Figure 4-73. Posted Speed Limits (Primary) on U.S. 50 for Each Mile from I-25 in Pueblo (milepost 316) to the Kansas State Line (milepost 467.5) (CDOT 2012)

Highway Cross-Section

The typical section of U.S. 50 changes several times throughout the corridor. The urban areas typically have a four-lane cross section while the rural areas typically are two-lane cross sections. U.S. 50 is a two-lane highway for approximately 96 miles of the total 150-mile project corridor length; passing is not permitted on approximately 55 of these miles due to sight distance limitations (topography, access locations, highway curvature, etc.) or for other safety constraints. A safety project added passing lanes along a three-mile section between mileposts 338 and 341 (between Pueblo and Fowler) in 2008, but there are no other passing lanes in the corridor. The two-lane sections of U.S. 50 range from 15 miles to 30 miles long and are located along four portions of the highway (see Figure 4-74).

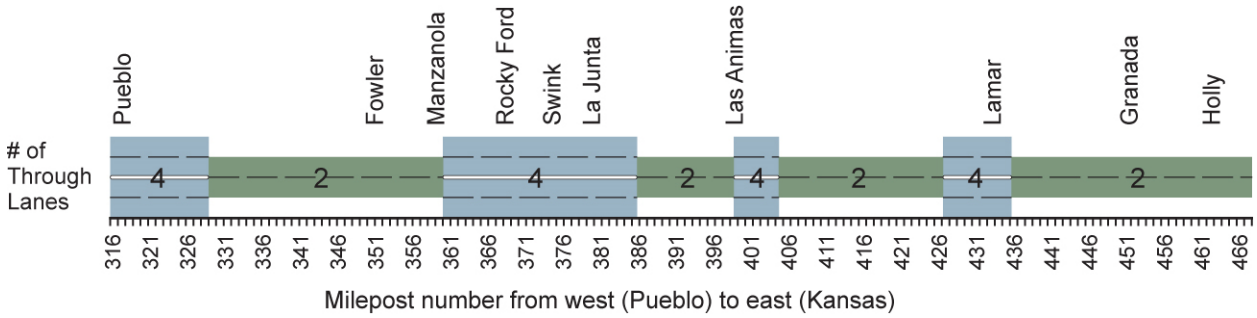


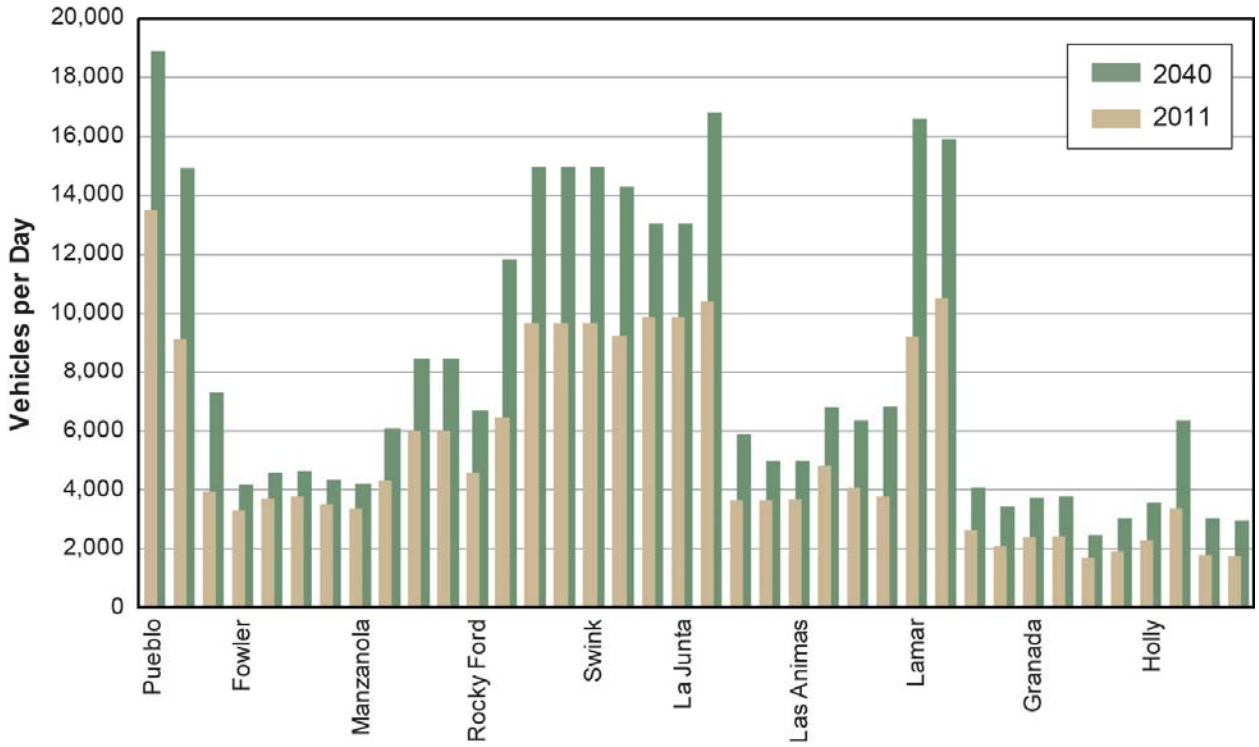
Figure 4-74. Number of Through-Lanes on U.S. 50, West to East

There are four portions (approximately 56 miles) on U.S. 50 that have four lanes. These sections are located near more populated areas of the corridor, around Pueblo, Las Animas, Lamar, and from Manzanola to east of La Junta. The four-lane sections range from approximately seven miles to 17 miles in length.

Auxiliary lanes for vehicle movements are provided throughout the corridor, but are primarily located in rural sections of U.S. 50. Auxiliary lanes exist at both signalized and stop-controlled intersections for deceleration and acceleration movements. The lack of auxiliary lanes within the two-lane sections results in congestion and safety issues for motorists entering or exiting the highway.

Traffic

Much of U.S. 50 currently operates under capacity based on 2011 traffic volumes. The traffic along the U.S. 50 corridor is projected to increase relatively slowly (average growth factor of approximately 1.3 percent between 2011 and 2040). Figure 4-75 shows the U.S. 50 AADT for 2011 and for 2040 (CDOT 2012; Swenka 2014).



Sources: CDOT 2012, Swenka 2014

Figure 4-75. Existing (2011) and Future (2040) Traffic Volumes

Typical capacities for the two-lane and four-lane portions within the U.S. 50 corridor are roughly 8,000 vehicles per day (vpd) and 17,000 vpd, respectively (CDOT OTIS data). The growth in volume by 2040 is not expected to create substantial congestion issues; most areas will remain under, or close to, capacity. However, within the rural two-lane highway sections, the growth in traffic volume will reduce the number of passing opportunities. This reduction may result in drivers making unsafe passing maneuvers, which may increase the risk of crashes.

U.S. 50 is defined as a national truck route by FHWA, and is used heavily by large trucks. Truck traffic on the corridor is approximately 10 percent of the daily traffic. In addition to large trucks, agricultural equipment utilizes the highway for traveling between communities. A study conducted near milepost 339 (west of Fowler) in November 2006 found that, on average, one out of every 20 vehicles on the road was traveling at a speed of 15 mph or slower (CDOT 2007b). During the active farming season, the percentage would likely be much higher. U.S. 50 is a two-lane highway in this area, with more miles of no-passing zones than miles where passing is allowed. The speed differential between the farm equipment and cars causes safety issues because drivers do not expect to encounter vehicles driving at such slow speeds. Figure 4-76 provides examples of agricultural equipment using more than one full travel lane in downtown Rocky Ford and of one using both the shoulder and the travel lane between communities.

Figure 4-76. Agricultural Vehicles Driving on U.S. 50 in Downtown Rocky Ford (left) and Mixing with Auto Traffic (right)

The limited passing zones combined with the mix of users present on U.S. 50 causes motorists additional delays while traveling behind a slow moving vehicle on a two-lane road, which leads to an increase in travel times. This decrease in mobility may lead to an increase in unsafe passing maneuvers.

Bicycle and Pedestrian Facilities

Currently, four Colorado birding trails have access onto or off of U.S. 50, including the Prairie Canyons, Plover, Two Buttes, and Pronghorn trails. There are two planned trail systems in Granada and Holly that

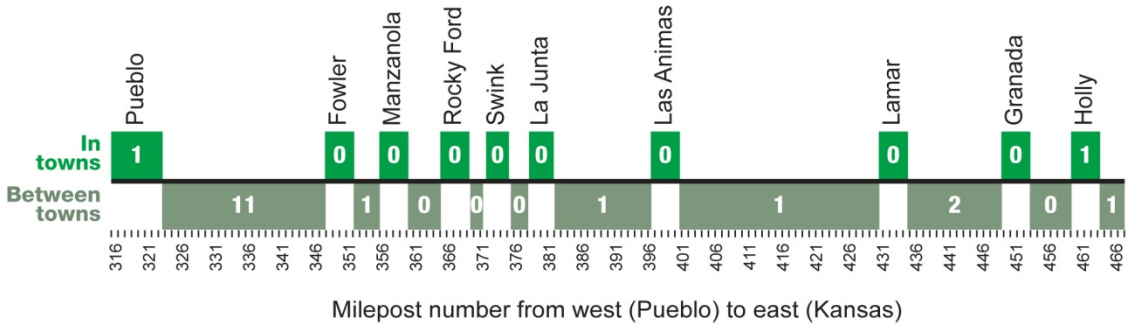
may require new crossings of U.S. 50. More information on these systems can be found in Section 4.3.4, Parklands and Recreational Resources.

Within the communities along the U.S. 50 corridor, pedestrian and bicycle mobility is provided by sidewalks along U.S. 50. However, for the entire corridor, bicycle facilities are absent from the typical section. Cyclists on U.S. 50 must ride in the shoulder, if it is available, which is not a safe alternative. Sidewalks are only found in some urban areas.

Crash Data Analysis

CDOT analyzed crash data to determine characteristics of crashes on the corridor and the LOSS in rural sections of the highway. Between 2008 and 2012, there were slightly more than 1,600 crashes reported along U.S. 50 from Pueblo to Kansas (more than 300 annually), which is an average of two crashes per mile each year (Swenka 2014). During the five years examined, there were a total of 19 fatalities, an average of about four per year, and nearly one-eighth of all crashes involved injuries.

Nearly all of the fatalities occurred in rural areas (see Figure 4-77) and approximately 70 percent of them occurred in the two-lane sections of the highway. Four fatalities were the result of head-on collisions, all of which occurred in two-lane sections of the highway and can be attributed to unsafe passing maneuvers. Additionally, overturning of a vehicle led to four of the fatalities and also involved crashing into a fixed object. Of note, one crash that resulted in a fatality was due to a rear-end collision with farm equipment—evidence that the speed differential between farm equipment and other vehicles is a safety concern to travelers on the corridor.

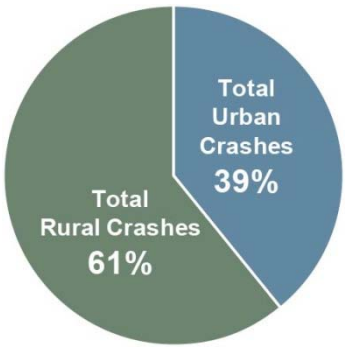


Source: Swenka 2014

Figure 4-77. Location of U.S. 50 Crash Fatalities for Years 2008 to 2012

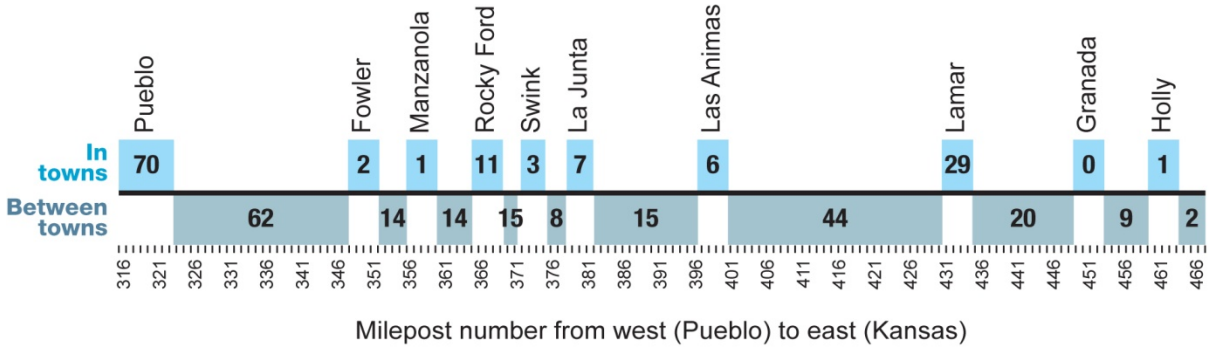
A majority (61 percent) of crashes occurred in rural areas, as shown in Figure 4-78 and Figure 4-79. Of all crashes, 34 percent took place in the larger communities of Pueblo, Rocky Ford, La Junta, Las

Animas, and Lamar, which together comprise less than 10 percent of the corridor length. In those communities, 68 percent of the crashes occurred at intersections (broadside and rear-end crashes), with the majority occurring in the eastern Pueblo urban area.



Source: Swenka 2014

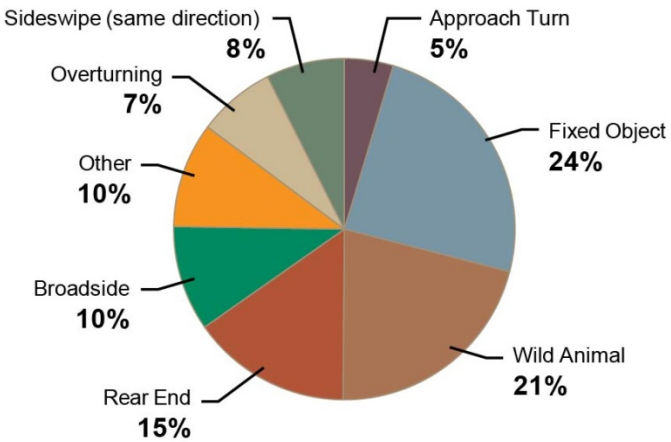
Figure 4-78. Percent of Rural vs. Urban Crashes on U.S. 50, 2008 to 2012



Source: Swenka 2014

Figure 4-79. Average Annual Crashes on U.S. 50 by Location, 2008 to 2012

The most common type of crash within the corridor involves hitting an object, as shown in Figure 4-80. U.S. 50 has inadequate clear zones, meaning that there are obstructions or fixed objects and hazards along the side of the road that could be hit by vehicles that veer off the road. Common fixed-object hazards along U.S. 50 include utility poles, irrigation structures, and deep ditches.



Source: Swenka 2014

Figure 4-80. Types of Crashes on U.S. 50 between 2008 and 2012

By today's design standards, each side of a highway should provide an area that is clear of these hazards, so that motorists who run off the road have the space to recover and safely re-enter the highway. In rural areas, existing shoulders range from eight feet to 10 feet, with narrower shoulders located in the urban portions of the corridor. For this type of roadway, typical design standards require 10-foot shoulders and a 30-foot clear zone. Inadequate clear zones add to the potential severity for run-off-the-road crashes reported each year (CDOT 2004a). Examples of inadequate clear zones along U.S. 50 are shown in Figure 4-81.

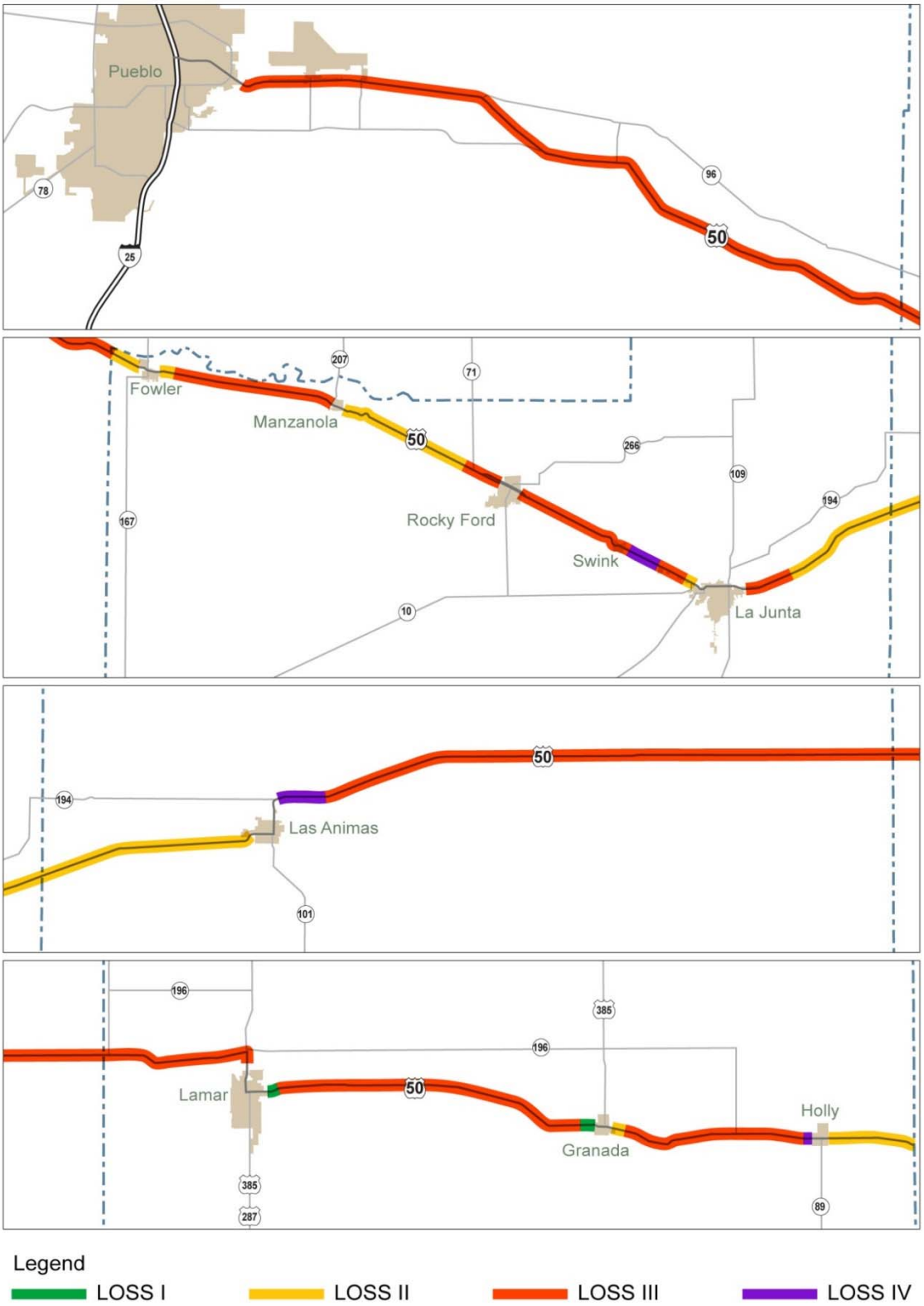
Figure 4-81. Examples of Inadequate Clear Zones on U.S. 50

Crashes due to wild animals are the second most common on U.S. 50. While these are not fully preventable, providing adequate clear zones will reduce the risk of drivers hitting a fixed object if they swerve to avoid animals.

Large trucks make up approximately 10 percent of the overall corridor traffic volume and are involved in approximately 12 percent of the reported crashes. Additionally, five crashes involved farm equipment and 81 (about 5 percent) involved a mobile home or vehicle with a trailer. Traveling behind slower vehicles for long distances has been shown to increase unsafe passing maneuvers, which leads to certain types of crashes with relatively high severity. CDOT crash records from 2008 to 2012 indicate that the U.S. 50 corridor experienced eight head-on collisions and 152 sideswipes, which are the types of crashes that tend to occur on two-lane roads without passing lanes (Swenka 2014). The *2003 CDOT Safety Assessment Report* states, "The higher frequency of these more severe accidents within the 2-lane sections is evident, particularly in the segments west of Manzanola [milepost 360] and east of Lamar [milepost 436]" (CDOT 2003c).

Approximately 85 percent of all crashes occurred on dry roads. Only 15 percent of crashes occurred during adverse weather conditions, indicating that—overall—road maintenance is at a high level and crashes generally are not related to loss of control due to icy or snow-packed road conditions. Additionally, 40 percent of the total crashes occur during night driving conditions, which is not unusual considering the frequent changes in roadway geometry and lack of lighting in the rural areas.

CDOT uses LOSS to quantify the magnitude of safety issues for rural or nonurban areas. LOSS is a qualitative measure to characterize the safety of a roadway segment in reference to its expected performance. As displayed in Figure 4-82, which depicts the LOSS throughout the corridor, a majority of the corridor is LOSS III, which indicates a relatively high magnitude of safety issues along the corridor. Around Swink, Las Animas, and Holly, safety is considerably worse than similar facilities (LOSS IV). Note that LOSS is not calculated for urban areas. A total of 80 percent of U.S. 50 in the rural areas is classified as LOSS III and IV, which identifies a need for safety improvements. It is important to note that due to the spacing of major intersections and access points, LOSS is not calculated for urban areas.



Source: Swenka 2014

Figure 4-82. Level of Service of Safety of U.S. 50, 2008–2012

Environmental Consequences

This section describes the effects to transportation from the No-Build Alternative and the Build Alternatives.

No-Build Alternative

Under the No-Build Alternative, only minor and isolated construction would occur. Routine maintenance and repairs would be made as necessary to keep U.S. 50 in usable condition, including standard overlays and repairs of weather- or crash-related damage. Additionally, smaller scale improvements may be undertaken, such as short passing lanes and other minor safety improvements. The existing U.S. 50 access locations would remain and the issues created by the existing unpermitted access locations would persist.

As illustrated in Figure 4-69, traffic will continue to increase along the U.S. 50 corridor, with or without roadway improvements. The growth in volume will cause a decrease in mobility and increase in travel times due to fewer passing opportunities. Fewer passing opportunities will lead to motorists performing unsafe passing maneuvers. The deficiencies contributing to the rate and severity of crashes include limiting passing opportunities, inadequate clear zones, and uncontrolled access. These issues will remain the same under the No-Build Alternative.

Build Alternatives

As illustrated in Figure 4-69, traffic will continue to increase along the U.S. 50 corridor, with or without roadway improvements. The Build Alternatives address all of the concerns relating to the roadway deficiencies by increasing passing opportunities in two-lane sections of the highway, removing obstructions and hazards from the sides of the road, and controlling access.

The Build Alternatives between towns would replace two-lane sections of U.S. 50 with four lanes, which would allow safe passing of slower vehicles and improve mobility. A median refuge area would be provided, which would reduce delay since motorists will only have to maneuver across one direction of U.S. 50 traffic at a time. Mobility will increase with the additional passing opportunities.

Portions of the existing highway that go through communities will remain in place to serve local needs, but will no longer be designated as U.S. 50. For such roads, CDOT would relinquish ownership to cities and or counties through a process negotiated and documented in an IGA. This would allow for more restricted access on U.S. 50 by choosing an access category that meets the new function of U.S. 50 through these areas.

For this Tier 1 analysis, general assumptions are made about the spacing of access points in the Build Alternatives. During Tier 2 analysis, CDOT will be able to examine the need and suitability of access point locations in greater detail. The access locations will not be determined until the completion of the Tier 2 studies. State highways and major regional roads will take priority as access points to U.S. 50. For example, if multiple access points with full movements exist within a half-mile segment, access to and from prioritized roads would be retained, while lower-priority access points would be eliminated.

The highway would maintain a posted speed limit of 65 mph in most locations, dropping to 50 mph for approaches to signalized intersections. Grade-separated interchanges (where one of the roads crosses over or under the other) would be provided to minimize the number of signalized intersections. The Build Alternatives would include a wide median with sufficient room for a vehicle to cross one direction of traffic, then wait at a stop sign before crossing the other highway lanes or making a left turn onto the highway.

Pedestrian and bicycle improvements were not analyzed as a standalone transportation mode, as these improvements alone would not meet the purpose and need of the project. However, in keeping with CDOT's policy directive 1602.0, none of the alternatives assessed would preclude improvements to pedestrian and bicycle facilities within the project area. Four Colorado birding trails and two planned trail systems may be affected by access limitations. More information can be found in Section 4.3.4, Parklands and Recreational Resources.

Build Alternatives Effects by Location

The summary of effects is sufficient for comparing transportation impacts among each of the Build Alternatives. As mentioned above, in general, the Build Alternatives would:

- Limit the number of access locations to U.S. 50
- Provide a wide refuge median
- Increase the number of lanes
- Improve conditions for all travelers

Mitigation

The Build Alternatives require half-mile spacing of full-movement access to address the deficiencies identified in the purpose and need statement (see Chapter 2, Purpose and Need). In general, the county roads already are spaced at half-mile intervals, but there are properties with direct access to U.S. 50 that may require mitigation to adhere to the proposed access spacing.

If Tier 2 studies impede an existing direct access from U.S. 50 to a property, reasonable measures would be taken to develop an alternative access point to ensure future access to the properties is provided. Examples of mitigation measures that could be employed are the creation of a frontage road or improving an alternate route to the site. In a worst-case scenario, where reasonable access could not be maintained, the property would be acquired under procedures outlined in state and federal law. All acquisitions and relocations will comply fully with federal and state requirements, including the Uniform Act.

4.4.2 Hazardous Materials

Hazardous materials are substances known to be harmful to human health and the environment when not managed properly. This analysis identified locations where large quantities of hazardous materials exist and where incidents involving hazardous materials have occurred and have been documented. It is important to acknowledge that additional sites, which have not been documented as of this time, could exist. Also, existing sites could be cleaned up before Tier 2 studies begin. During Tier 2 studies, this list of hazardous materials sites will be updated to ensure that CDOT is working with the most recent data available. These sites were considered because additional precautions or clean-up activities may be necessary during Tier 2 studies if the sites are encountered.

It is not unusual for CDOT to encounter hazardous materials sites along its highway corridors. Most of these sites are minor and localized, such as a leaking storage tank. If CDOT identifies these sites during Tier 2 studies, they can be avoided (by moving the Tier 2 roadway alignment), or CDOT will remove and safely dispose of the hazardous substances.

This analysis also identified whether U.S. 50 is used for transporting hazardous materials. Since the highway is the primary east-west route through the communities in the Lower Arkansas Valley, this is important because it would mean that hazardous materials are currently being transported through the downtown areas of these communities. Since more people live and work in these downtown areas than in other parts of the communities, there would be more risk to human health if an accident occurred.

Additional information about hazardous materials can be found in the Hazardous Materials Technical Memorandum, which is located in Appendix A.

Results of the Analysis

This analysis identified the location of documented hazardous material sites in the U.S. 50 project area. These sites were considered because additional precautions or clean-up activities may be necessary prior to Tier 2 construction activity if the sites are encountered.

The Build Alternatives have the potential to encounter up to 162 of the currently identified sites, depending on the Build Alternatives selected. Most of these sites (144) are storage tanks, tank leaks, or spill sites. CDOT often encounters these types of sites during its construction activities. When this happens, the hazardous substances are safely removed and disposed of, often leaving no contaminants on the site. Eighteen sites fall into one of the following categories: Superfund (one site), delisted Superfund (five sites), landfills (four sites), corrective action (four sites), or state clean-up list (four sites). These types of sites generally require a greater effort to clean up. However, if CDOT identifies any of these sites during Tier 2 studies, they can be avoided by moving the roadway alignment or undertaking appropriate clean-up activities.

U.S. 50 is designated as a route for transporting hazardous materials (but not nuclear materials). The Build Alternatives would not change this status. However, 18 of the Build Alternatives would move the highway from its existing through-town location to a new around-town location in Fowler, Manzanola, Rocky Ford, Swink, La Junta, Las Animas, Granada, and Holly. This change would move traffic, including vehicles carrying hazardous substances, out of the communities' existing downtown areas, where most residents live and work. The Build Alternatives would improve the highway, making it safer to transport hazardous cargo along U.S. 50.

Affected Environment

The following section details documented locations where hazardous materials are known to be present within the project area. The following hazardous materials sites were identified by this analysis.

- **Superfund sites**—sites designated for clean up by the federal government under the Comprehensive Environmental Response, Compensation, and Liability Information System
- **Delisted Superfund sites**—Superfund sites that have been cleaned up (i.e., where no further remedial action is planned [NFRAP])
- **Landfills**—waste storage sites (includes both active and abandoned landfills)
- **Corrective action sites**—sites where hazardous materials were released into soil, groundwater, surface water, or air that have been cleaned up under the Resource Conservation and Recovery Act Corrective Action Program
- **State clean-up list sites**—sites that may be designated for clean-up by the state of Colorado
- **Tanks**—storage tanks used to hold hazardous materials (includes both above ground and underground storage tanks)
- **Tank leaks**—sites where storage tanks have leaked into the environment

- **Spills**—sites where hazardous materials have been spilled

Figure 4-83. Storage Tank (Lusk Farms Market)—Otero County

A total of 380 hazardous materials sites were identified. Approximately 93 percent of them (354 sites) are storage tanks (see Figure 4-83), tank leaks, or spill sites. Storage tanks are commonly used to hold contaminants, such as gasoline and diesel fuel. Often when these tanks leak or spills occur while transporting them, the contamination is safely removed and disposed of, leaving no contaminants on the site. The remaining 26 sites are categorized as follows: Superfund (three sites), delisted Superfund (six sites), landfills (seven sites), corrective action (seven sites), or state clean-up list (three sites). These types of sites generally require a greater effort to clean up. However, if CDOT identifies any of them during Tier 2 studies, appropriate clean-up activities would be undertaken.

The 380 hazardous materials sites identified are not evenly distributed. Most of the sites are located within the municipalities (i.e., cities and towns) along U.S. 50. Additionally, almost half of the sites are located in the city of Pueblo or Pueblo County (with most located in the city).

U.S. 50's designation as a hazardous materials route means that the highway carries vehicles hauling these contaminants (CDOT 2007). Currently, the highway serves as the primary east-west route within and through the nine cities and towns in the project area. This poses a risk to human health if an accident were to occur involving these vehicles. The risk involves the hazardous substances leaking or spilling from these vehicles and contaminating the surrounding environment.

Environmental Consequences

This analysis identified the location of documented hazardous materials sites within the 1,000-foot-wide Build Alternatives and within standard search distances from the Build Alternatives. The standard search distance used for most of the hazardous materials types evaluated was a half mile. However, for corrective action sites, a 1.0-mile search distance was used (EPA 2009, ASTM International 2005).

Since the location of U.S. 50 within the Build Alternatives will not be determined until Tier 2 studies, not all of the identified sites would be disturbed (see Figure 4-84). The Tier 2 study location decisions would depend, in part, on what type of hazardous materials sites are identified. Sites that are likely to affect the

location of U.S. 50 during Tier 2 studies are Superfund sites, delisted Superfund sites, or landfills. Other sites, such as state clean-up list sites, tanks, tank leaks, or spills, are not likely to deter CDOT from locating the highway in the area. This is because CDOT is able to safely remove and dispose of hazardous substances on these types of sites when they are encountered.

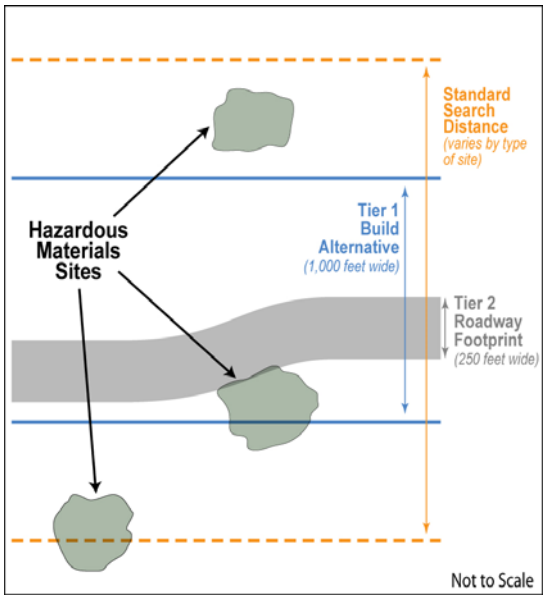


Figure 4-84. Example of Effects to Hazardous Materials

Summary of Effects

The following section summarizes potential effects to documented hazardous materials sites and routes by the No-Build Alternative and the Build Alternatives.

No-Build Alternative

Under the No-Build Alternative, only minor and isolated construction would occur. Routine maintenance and repairs would be made as necessary to keep U.S. 50 in usable condition, including standard overlays and repairs of weather- or crash-related damage. Additionally, smaller scale improvements may be undertaken, such as short passing lanes and other minor safety improvements.

Since routine maintenance and repairs are conducted on the existing highway, no known and documented hazardous materials sites would be disturbed by these activities. Smaller-scale improvements have the potential to disturb sites located directly adjacent to the existing highway. However, few sites are located in these areas. Also, U.S. 50 would continue to be used as a hazardous materials route, and vehicles carrying hazardous substances would continue to travel through the downtown areas of the communities along the highway.

Build Alternatives

Of the 380 documented hazardous materials sites identified by this analysis, the Build Alternatives have the potential to encounter up to 162 of them. Most of these sites are tanks (67 sites), tank leaks (61 sites), and spills (16 sites). CDOT routinely encounters these types of sites during its activities. When they are encountered, the contaminants are safely removed and disposed of, often leaving no contaminants on the site.

Other sites that could be disturbed by the Build Alternatives include the following (the general location of the site is noted in parentheses).

- **Superfund Sites.** Pueblo 4-F Drum (Pueblo County)
- **Delisted Superfund Sites.** Safety-Kleen Corporation (Pueblo), Pueblo Concrete (Pueblo County), Rocky Ford Power Plant & Service Area (Rocky Ford), and Cliff's Shamrock Service (Holly)
- **Landfills.** Swift Transportation Terminal (Pueblo), Tom's Towing (Pueblo), Transportation Technology Center (Pueblo), and Frozen Foods Rocky Foods, Co. (Rocky Ford)
- **Corrective Action Sites.** ALM Aviation of Colorado (Pueblo), CDOT (Pueblo), Safety-Kleen Corporation (Pueblo), and Cliff's Shamrock Service (Holly)
- **State Clean-Up List Sites.** Belmont Shopping Center (Pueblo), Kurt Manufacturing (Pueblo), Pueblo Poleyard (Pueblo), and Standard Sales Company (Pueblo)

These sites generally require a greater effort to clean up. However, if CDOT encounters any of these sites during Tier 2 studies, appropriate clean-up activities would be undertaken.

Of the 162 hazardous materials sites that could be disturbed by the Build Alternatives, 51 percent of them (82 sites) are located in the Pueblo Build Alternatives. This can be explained by two factors. First, the city of Pueblo is the largest community in the project area by a wide margin. In 2010, Pueblo's population was slightly more than 105,000 residents (2010 Census). In contrast, the population of the communities east of Pueblo ranged from approximately 400 to 7,800 people (2010 Census). Additionally, I-25 runs through Pueblo. This interstate, which is both a hazardous materials and nuclear materials route, carries far more vehicles than the roadways in the communities east of Pueblo. With more traffic, it is likely that more vehicles carrying hazardous cargo also are present on this interstate highway.

The Build Alternatives would not change the status of U.S. 50 as a hazardous materials route. However, 18 Build Alternatives would move the highway from its existing through-town location to a new around-town location in Fowler, Manzanola, Rocky Ford, Swink, La Junta, Las Animas, Granada, and Holly. This change would move traffic, including vehicles carrying hazardous materials, out of the communities' existing downtown areas, where most residents live and work. Implementation of the Build Alternatives also would improve the highway, making it safer to transport these types of materials through the Lower Arkansas Valley.

Other contaminants, such as lead paint and asbestos, could be encountered during construction of the Build Alternatives. CDOT also would conduct appropriate investigations for these contaminants during Tier 2 studies and properly dispose of them.

Build Alternatives Effects by Location

Table 4-48 lists the number of documented hazardous materials sites that could be affected by the Build Alternatives by location. Locations are listed from west to east.

Table 4-48. Summary of Potentially Disturbed Hazardous Materials Sites by Location for the Build Alternatives[a]

Section	Build Alternatives (if more than one)	State Clean-Up List	Delisted Superfund	Superfund	Landfill	Corrective Action	Tank	Tank Leak	Tank Spill	Total Sites[b]
Section 1: Pueblo	Alternative 1: Pueblo Airport North	—	—	—	—	3	3	4	—	10
	Alternative 2: Pueblo Existing Alignment	5	3	—	2	3	26	28	8	75
	Alternative 3: Pueblo SH 47 Connection	1	1	—	1	3	18	12	2	38
Section 2: Pueblo to Fowler	Alternative 1: Fort Reynolds Existing Alignment	—	—	—	—	—	2	2	—	4
	Alternative 2: Fort Reynolds Realignment	—	—	—	—	—	2	2	—	4
Section 3: Fowler	Alternative 1: Fowler North	—	—	—	—	—	6	—	—	6
	Alternative 2: Fowler South	—	—	1	—	—	—	—	—	1
Section 4: Fowler to Manzanola	—	—	—	—	—	—	2	1	—	3
Section 5: Manzanola	Alternative 1: Manzanola North	—	—	—	—	—	1	3	—	4
	Alternative 2: Manzanola South	—	—	—	—	—	1	4	—	5
Section 6: Manzanola to Rocky Ford	—	—	—	—	—	—	1	—	1	2

Table 4-48. Summary of Potentially Disturbed Hazardous Materials Sites by Location for the Build Alternatives[a] (continued)

Section	Build Alternatives (if more than one)	State Clean-Up List	Delisted Superfund	Superfund	Landfill	Corrective Action	Tank	Tank Leak	Tank Spill	Total Sites[b]
Section 7: Rocky Ford	Alternative 1: Rocky Ford North	—	—	—	1	—	5	1	2	9
	Alternative 2: Rocky Ford South	—	—	—	—	—	2	1	—	3
Section 8: Rocky Ford to Swink	—	—	—	—	—	—	—	—	—	0
Section 9: Swink	Alternative 1: Swink North	—	—	—	—	—	6	3	—	9
	Alternative 2: Swink South	—	—	—	—	—	5	2	—	7
Section 10: La Junta	Alternative 1: La Junta North	—	—	—	—	—	2	2	—	4
	Alternative 2: La Junta South	—	—	—	—	—	3	3	—	6
	Alternative 3: La Junta South	—	—	—	—	—	3	2	—	5
	Alternative 4: La Junta South	—	—	—	—	—	3	—	—	3
Section 11: La Junta to Las Animas	—	—	—	—	—	—	1	—	—	1
Section 12: Las Animas	Alternative 1: Las Animas North	—	—	—	—	—	6	7	1	14
	Alternative 2: Las Animas South	—	—	—	—	—	2	1	—	3
Section 13: Las Animas to Lamar	—	—	—	—	—	—	2	1	1	4
Section 14: Lamar to Granada	—	—	—	—	—	—	—	—	—	0

Table 4-48. Summary of Potentially Disturbed Hazardous Materials Sites by Location for the Build Alternatives[a] (continued)

Section	Build Alternatives (if more than one)	State Clean-Up List	Delisted Superfund	Superfund	Landfill	Corrective Action	Tank	Tank Leak	Tank Spill	Total Sites[b]
Section 15: Granada	Alternative 1: Granada North	—	—	—	—	—	2	3	—	5
	Alternative 2: Granada South	—	—	—	—	—	1	2	—	3
Section 16: Granada to Holly	—	—	—	—	—	—	—	—	—	0
Section 17: Holly	Alternative 1: Holly North	—	1	—	—	1	4	5	2	13
	Alternative 2: Holly South	—	1	—	—	1	3	3	1	9
Section 18: Holly Transition	—	—	1	—	—	1		3	1	6

[a]Some sites could be encountered by more than one section of the Build Alternatives (i.e., location)
[b]The ultimate effect of the Build Alternatives will depend on which alternatives are chosen.
Source: CDOT 2009a

Mitigation

Since the ultimate roadway footprint would be identified during Tier 2 studies, this Tier 1 analysis cannot identify which specific hazardous materials sites would be encountered by the Build Alternatives. However, appropriate mitigation measures would be taken during Tier 2 studies to ensure that encountered sites do not cause harm to human health or the environment. If such sites are encountered, CDOT or the party responsible for the contamination will safely remove and dispose of any hazardous substances during Tier 2 construction activities when required.

4.4.3 Section 6(f) Resources

The Land and Water Conservation Fund program provides matching grants to state and local governments for the acquisition and development of public outdoor recreation areas and facilities. Properties acquired and developed using these federal funds are called "Section 6(f) resources" after the section of the federal law that authorized the program in 1965.

This analysis identified existing Section 6(f) resources within the U.S. 50 project area. However, since the Land and Water Conservation Fund program continues to fund new recreation areas and facilities, it is important to acknowledge that additional sites could be acquired and developed in the future. During Tier 2 studies, this list of Section 6(f) resources will be updated to ensure that CDOT is working with the most recent data available.

Additional information about Section 6(f) resources can be found in the Section 4(f) and Section 6(f) Resources Technical Memorandum, which is located in Appendix A.

Results of the Analysis

This analysis identified 36 Section 6(f) resources in the project area. None of these resources would be directly affected or converted to a non-recreational use by the Build Alternatives.

Affected Environment

The following section details Section 6(f) resources within the project area. This analysis identified 36 Section 6(f) resources, including:

- 1 campground
- 18 city or town parks
- 8 parks associated with schools

- 1 swimming pool
- 2 recreation centers
- 3 sports facilities
- 3 segments of the Fountain trail

Most of these resources are located within the city of Pueblo or Pueblo County (22 resources) (see Figure 4-85). The rest are located primarily within the communities east of Pueblo (see Figure 4-85).

Portland Park—Pueblo

Rocky Ford Pool—Rocky Ford

Figure 4-85. Examples of Section 6(f) Resources in the Project Area

Environmental Consequences

Section 6(f) resources are considered to be directly affected if part of a Build Alternative occupies or overlaps the property containing the resource. Indirect effects to these resources also could occur if a Build Alternative impedes access to the resource from U.S. 50 (directly).

Summary of Effects

The following section summarizes potential effects to Section 6(f) resources by the No-Build Alternative and the Build Alternatives.

No-Build Alternative

Under the No-Build Alternative, only minor and isolated construction would occur. Routine maintenance and repairs would be made as necessary to keep U.S. 50 in usable condition, including standard overlays and repairs of weather- or crash-related damage. Additionally, smaller scale improvements may be undertaken, such as short passing lanes and other minor safety improvements. None of these activities are expected to result in a conversion of Section 6(f) resources to a non-recreational use.

Build Alternatives

None of the identified Section 6(f) resources would be directly affected or converted to a non-recreational use by the Build Alternatives because most are located in the communities along U.S. 50, which would be avoided by the Build Alternatives. However, access to one potentially obsolete Section 6(f) resource may be affected. The former Baxter Elementary School is located in Pueblo County and its associated park is identified as a Section 6(f) resource. Access to the park is directly from U.S. 50. The school was closed in the 1980s and the park appears to be in disrepair. Whether this access is impeded and/or the property is acquired, which could result in the conversion of a Section 6(f) resource if the park is not determined to be obsolete, will be determined during the Tier 2 study in this area when the roadway footprint is identified. Regardless, it is anticipated that the existing access to the old school could be retained.

Build Alternatives Effects by Location

No Section 6(f) resources are expected to be directly converted by the Build Alternatives. Therefore, a specific discussion on each section of the corridor is not included.

Mitigation

If Tier 2 studies identify that a proposed action would result in a conversion of a Section 6(f) resource to a non-recreational use, this resource would be replaced with land of at least current fair market value and of reasonable equivalent usefulness and location, in accordance with Section 6(f)(3) of the Land and Water Conservation Act.

Avoidance Activities

Figure 4-86. **City Park—Las Animas**

Effects to all of the Section 6(f) resources were avoided during the U.S. 50 Tier 1 EIS alternatives development process. This occurred because most of the resources are located within the communities. This document considered alternatives that would improve U.S. 50 on its existing alignment through these communities. However, these through-town alternatives were eliminated from further consideration during the alternatives development process. This results in the avoidance of effects to resources that would have been affected by them. This analysis determined that eliminating through-town alternatives avoids direct effects (i.e., conversion from recreational to non-recreational use) to three identified resources, including a city park in Las Animas (see Figure 4-86), a

school park in Holly, and the Holly Trailer Park/Campground.

4.4.4 Energy

Energy is consumed during many daily activities, including moving people and goods from place to place. It is used to power many types of transportation, including vehicles (cars, trucks, etc.), freight trains, airplanes, and others. Of all the different ways to move goods and people, vehicles are responsible for using more energy than all the others. In fact, "vehicles were responsible for over 80 percent of all transportation energy use in 2007 [nationwide]" (Department of Energy [DOE] 2009).

In addition, burning fossil fuels such a gasoline and diesel releases carbon dioxide (CO_2) and other GHGs into the atmosphere, contributing to global climate change. A discussion of potential impacts of the project on air pollution and global climate change are included in Section 4.3.8, Air Quality, and Section 4.4.5, Global Climate Change.

Results of the Analysis

The Build Alternatives would result in a 2 percent to 12 percent increase in energy consumption in 2040. This increase would result from vehicles traveling longer distances on U.S. 50 due to the addition of around-town routes in most communities. This translates into an additional 1,429 gallons to 8,573 gallons of gasoline used per day along the highway in the Lower Arkansas Valley.

To put this figure in perspective, this effect is relatively minor compared to other factors already impacting U.S. 50. For example, traffic volumes are expected to increase by nearly 52 percent along the highway in the Lower Arkansas Valley between 2011 and 2040 (CDOT 2012). The additional energy consumption resulting from this change, by itself, would be equivalent to an additional 27,000 gallons of gasoline used per day, or six times the effect of the Build Alternatives.

Factors in Energy Consumption

This analysis focused on the amount of fuel consumed by vehicles driving on U.S. 50 within the project area and the energy used in that process. Energy and fuel consumption was calculated for vehicles driving the existing U.S. 50 route and for vehicles traveling proposed design alternatives of the Build Alternatives.

The energy consumed by vehicles is influenced by a number of factors, including traffic volumes, vehicle type, and distance traveled. For this Tier 1 EIS, not all of these factors were evaluated for vehicles traveling on the highway. Assumptions that were made for each of these factors are described below.

Traffic Volumes

Traffic volumes describe how many vehicles are driving on a roadway during a specific time period. Traffic volumes were evaluated by estimating the number of vehicles on U.S. 50 during an average day. Estimated traffic volumes for the year 2040 were obtained for all segments of U.S. 50 through the Lower Arkansas Valley. Traffic forecasts for the year 2040 were used because it is assumed that Tier 2 projects on U.S. 50 would be completed over several decades. As Tier 2 studies are developed, these data should be updated with volumes for anticipated project completion dates.

Figure 4-87. Truck on U.S. 50—Pueblo County

Vehicle Type

For the purposes of this analysis, passenger vehicles include cars and trucks with two axles and four tires. Commercial vehicles include single unit trucks (i.e., box trucks) and combination trucks (i.e., trucks with 18 wheels or a separate cab and trailer) (see Figure 4-87). This is substantial when determining energy consumption because these vehicles have different fuel economies and use different types of fuel.

The fuel economy of a vehicle is the number of miles it can travel per gallon of fuel consumed. Different types of vehicles have different fuel economies, as shown in Table 4-49. Because passenger vehicles generally have substantially higher fuel economies than commercial vehicles, this analysis utilized a separate number for each category: 20.3 miles per gallon for passenger vehicles and 6.7 miles per gallon for commercial vehicles (DOE 2009).

Passenger vehicles generally use gasoline, while commercial vehicles use diesel fuel. This is relevant to energy consumption because these fuels produce different amounts of energy when burned. Gasoline produces approximately 115,400 British Thermal Units (BTU) per gallon and diesel fuel produces about 128,700 BTUs per gallon (DOE 2009). A BTU is the standard measurement for energy use.

Table 4-49. Average Fuel Economy by Vehicle Type (2007)

Type of Vehicle	Average Fuel Economy (miles per gallon)	
Passenger Vehicles		
Cars	22.5	20.3
Trucks (2-axle, 4-tire trucks)	18.0	
Commercial Vehicles		
Single unit trucks (box trucks)	8.2	6.7
Combination trucks (vehicles with 18 wheels or a separate cab and trailer)	5.1	

Source: DOE 2009

To provide a better comparison between the No-Build and Build Alternatives, this analysis uses existing (2007) fuel economies for traffic in 2040. All of the results describe projected energy consumption for vehicles driving U.S. 50 during an average day in 2040. This analysis did not consider the potential energy savings (i.e., drop in consumption) that may occur due to increased fuel efficiency by 2040, nor did it consider the growing number of vehicles powered by electricity, compressed natural gas, or other advanced fuel technologies. Because of new and improving technologies, it is likely that the fuel economy of most vehicles will increase by that time.

This analysis also did not evaluate the energy consumption of construction vehicles during construction of Build Alternative projects. The purpose of the U.S. 50 Tier 1 EIS is to determine the location of a 1,000-foot-wide alternative within which a 250-foot-wide (maximum) roadway footprint would be identified during Tier 2 studies. Since the design elements, construction requirements, and other details involved in Tier 2 studies have not been identified yet, it is not possible to determine what amount of energy consumption would occur.

Potential Effect on Energy Consumption

The Build Alternatives would result in a 2 percent to 12 percent increase in energy consumption in 2040, depending on which Build Alternatives are chosen. This increase would result from vehicles traveling longer distances due to the addition of around-town routes in most communities. While this is a negative environmental effect, it would be minimal when compared to the effect that increased traffic volumes are expected to have on energy consumption through 2040.

Distance Traveled

The length of each section of the corridor was determined to use as a comparison between Build Alternatives. For this Tier 1 analysis, it is not necessary to calculate average travel distances along the

corridor. Instead, energy use was evaluated for vehicles traveling the entire length of each Build Alternatives section.

Based on these factors, if the Build Alternatives route resulted in higher energy consumption, the Build Alternatives were considered to have a negative impact on energy consumption. If travel on the Build Alternatives resulted in lower energy consumption, it was considered to have a positive impact on energy consumption.

Affected Environment

Traffic volumes on the highway are relatively low today, and although they are expected to increase, estimates show that traffic volumes will remain low through 2040 compared to average volumes in parts of the state with denser populations. The section of U.S. 50 in Pueblo, where the highest volumes occur, is projected to carry about 19,000 vpd. East of Pueblo, traffic volumes will continue to be lower, ranging from approximately 3,000 vpd to 15,000 vpd. In contrast, I-25 through Pueblo is expected to average nearly 73,400 vpd, and for I-25 through Denver that figure is approximately 291,000 vpd. This means that the average traffic volume on U.S. 50 is expected to be about 12 percent of the volumes on I-25 through Pueblo and about 3 percent of the volumes on I-25 through Denver in 2040 (CDOT 2010d).

Additionally, traffic forecasts show that more than 10 percent of the vehicles driving on U.S. 50 in 2040 will be commercial trucks. This proportion varies widely along the corridor. It is highest in and around communities where other regional or statewide roads connect to U.S. 50, including Pueblo, Rocky Ford, and La Junta (CDOT 2012).

Environmental Consequences

Effects to energy consumption were evaluated based on whether the Build Alternative would result in higher or lower consumption. This was determined by calculating the energy consumed by vehicles driving U.S. 50 along its existing route and along the Build Alternative route on an average day in the year 2040. This difference was considered to be the change in energy consumption resulting from the Build Alternative. An increase in consumption was considered a negative environmental effect, and a decrease in consumption was considered to be a positive effect.

Summary of Effects

The following section summarizes potential energy consumption by vehicles driving on the No-Build Alternative (i.e., the existing U.S. 50) and the Build Alternatives.

No-Build Alternative

U.S. 50 is 150 miles within the project area at its existing alignment. The No-Build Alternative would maintain the highway on its current alignment and would have no effect on the projected traffic volumes, the current types of vehicles that travel the corridor, nor the average distances traveled along the highway; however, with projected increases in average annual daily traffic, it is expected that congestion and idling times would increase where vehicles encounter intersections within towns along the route. Therefore, the No-Build Alternative would have a negative impact on energy consumption by vehicles traveling the corridor.

Build Alternatives

The Build Alternatives generally would maintain the existing highway alignment between towns in the project area. Because energy consumption is primarily affected by a change in linear distance, only sections that include around-town alternatives are included in the analysis. There would be no changes to energy consumption caused by the Build Alternatives for between-town sections.

Within towns, the Build Alternatives would move the highway alignment to around-town locations. Consequently, in most locations, drivers traveling through sections of the U.S. 50 corridor would drive a longer distance than they do today because of the new around-town routes. Under the Build Alternatives, this drive would be two miles to 11 miles longer that the existing route, depending on which Alternatives are chosen. In general, increased traveling distances around towns would result in higher vehicular energy consumption, and, therefore, a negative environmental effect.

U.S. 50 drivers are expected to consume more than 73,000 gallons of gasoline traveling through the Lower Arkansas Valley on an average day in 2040. The additional distance added by the Build Alternatives would increase this consumption by 2.0 percent to 11.7 percent (or between 1,428 and 8,573 gallons of gasoline). However, this effect is minimal compared to other factors that are expected to affect energy consumption on U.S. 50 in the future. For example, increases in traffic volumes on the highway through 2040 are projected to increase energy consumption by 46 percent. This translates into an additional 27,000 gallons of gasoline used per day. Additionally, moving vehicles to around-town routes would result in less vehicle idling time at signals and pedestrian crossings that occur on through-town routes, and increased vehicle efficiency. This means that while the Build Alternatives would have a negative environmental effect due to increased distances traveled, it would be minimal compared to other factors that already are projected to affect U.S. 50.

Build Alternatives Effects by Location

The following section describes the potential energy consumption effects of the Build Alternatives in the around-town locations. In these locations, the additional mileage needed to route around town would, in most cases, cause an increase in energy use. It could be assumed that increases in operational efficiencies from the new roadway would balance increases in energy consumption caused by increases in the highway segment length. Ultimately, this would result in a net energy use reduction in the long term.

Section 1: Pueblo

Alternative 1: Pueblo Airport North. Pueblo Airport North would add a highway connection with SH 47 and would move the highway alignment around the north side of the Pueblo Memorial Airport. This alternative is 0.3 miles shorter than the existing U.S. 50 alignment and would result in a 2.3 percent reduction in energy consumption, equal to 324 less gallons of gasoline consumed per day.

Alternative 2: Pueblo Existing Alignment. Vehicles traveling Alternative 2 would travel slightly more than 12 miles, consuming the same amount of energy in a given day as under existing conditions.

Alternative 3: Pueblo SH 47 Connection. The SH 47 Connection Alternative in Pueblo would create a connection between SH 47 and the existing highway that is nearly one mile shorter than the existing highway. This would result in a 7.4-percent reduction in energy consumption for the segment, equal to 1,048 less gallons of gasoline consumed per day.

Section 2: Pueblo to Fowler

Alternative 1: Fort Reynolds Existing Alignment. The existing alignment between Pueblo and Fowler consists of 20.5 miles of highway. Vehicles traveling Alternative 1 would consume comparable amounts of energy as under existing conditions.

Alternative 2: Fort Reynolds Realignment. Alternative 2 between Pueblo and Fowler would reduce the traveling distance of the highway section by 0.1 miles. This difference in distance would result in a 4.2-percent reduction (413 gallons of gasoline per day) in energy consumption and a positive environmental impact.

Section 3: Fowler

Alternative 1: Fowler North. The Fowler North Alternative would be less than 0.1 mile shorter than the existing U.S. 50 route through Fowler. This alternative would result in 1.8 percent (18 gallons of gasoline per day) less energy consumption and a positive environmental impact.

Alternative 2: Fowler South. The Fowler South Alternative is approximately 1.4 miles longer than the existing through-town route. This would result in higher energy consumption by approximately 39.3 percent (389 gallons of gasoline per day), which would be a negative environmental effect.

Section 5: Manzanola

Alternative 1: Manzanola North. Routing U.S. 50 to the north of Manzanola would cause an increase in energy use of 9.1 percent by vehicles traveling the highway at this location, the equivalent of an increase of 122 gallons of gasoline per day.

Alternative 2: Manzanola South. The Manzanola South Alternative is less than one mile longer than the existing highway alignment. This would result in a 7.5-percent increase in energy consumption, the equivalent of 101 gallons of gasoline. This increase is slightly less than the increases that would occur with Alternative 1 in this section.

Section 7: Rocky Ford

Alternative 1: Rocky Ford North. Rerouting U.S. 50 to the north of town under this alternative would cause nearly a one-mile increase in the highway segment length and an increase in energy use equivalent to 602 gallons of gasoline per day. This is an 11.2-percent increase in energy consumption compared to the No-Build Alternative.

Alternative 2: Rocky Ford South. Alternative 2 would result in an increase in traveling distance of two miles and an increase in energy consumption equal to 2012 gallons of gasoline per day. This increase is greater than the energy consumption increases expected for Alternative 1 through this section.

Section 9: Swink

Alternative 1: Swink North. The Swink North Alternative is less than one mile longer than the existing U.S. 50 route through town and would result in slightly increased energy consumption due to longer highway alignments in this location. The north alternative would cause the equivalent energy use to 123 gallons of gasoline consumed per day. This Section has the third highest average daily traffic of the locations along the corridor. Therefore, distance changes in this section have a higher impact on energy consumption.

Alternative 2: Swink South. The Swink South Alternative is less than one mile longer than the existing U.S. 50 route through town and would result in slightly increased energy consumption due to longer

highway alignments in this location. The south alternative would result in an increase equivalent to 230 gallons of gasoline per day.

Section 10: La Junta

Alternative 1: La Junta North. Alternative 1 at La Junta would increase the traveling distance of the existing alignment by three miles. This would increase energy consumption at this location by 39.4 percent, which equates to an increase of 2,576 gallons of gasoline used per day. This would be considered a negative environmental effect. This section has the second highest daily traffic of the evaluated locations along the corridor. Therefore, distance changes in this section have a higher impact on energy consumption.

Alternative 2: La Junta South. Alternative 2 is longer than the existing U.S. 50 route through town. Thus, it would increase energy consumption by vehicles traveling on the roadway and have a negative environmental effect. Of all the sections of the Build Alternatives, Alternatives 2, 3, and 4result in the highest increase in energy consumption because they are the longest around-town alternatives. Alternative 2 is two miles longer than the existing route, which translates into an increase of approximately 2,206 gallons of gasoline per day with an average daily traffic of 17,000 vehicles.

Alternative 3: La Junta South. Alternative 3 is longer than the existing U.S. 50 route through town. Thus, it would increase energy consumption by vehicles traveling on the roadway and have a negative environmental effect. Alternative 3 is more than three miles longer than the existing route, which means an extra 3,602 gallons of gasoline per day. As a result, Alternative 3 would cause a higher increase in energy consumption (by roughly 1,400 gallons of gasoline per day) than the Alternative 2.

Alternative 4: La Junta South. Alternative 4 at La Junta would increase the traveling distance on the highway by 5.5 miles. This would result in an increase of 87.2 percent in energy consumption, which equates to an increase of 5,710 gallons of gasoline per day. This is the highest expected increase in energy consumption of the four Build Alternatives at this location and the greatest increase of all alternatives along the corridor.

Section 12: Las Animas

Alternative 1: Las Animas North. Rerouting U.S. 50 to the north of town under the Build Alternatives would cause a one-mile decrease in the highway segment length and a 21 percent-decrease in energy use, the equivalent of 382 gallons of gasoline per day.

Alternative 2: Las Animas South. Alternative 2 would cause an increase of 0.3 miles of distance traveled along the highway and an increase of 7.7 percent in energy consumption. This energy consumption is equivalent to the use of 140 gallons of gasoline per day, and would have a negative environmental effect.

Section 15: Granada

Alternative 1: Granada North. Rerouting U.S. 50 to the north of Granada would result in an increase of 0.5 miles in distance traveled along the highway and an increase of energy consumption of 26.0 percent. This energy consumption is equivalent to the use of 121 gallons of gasoline per day. This increase in energy consumption is slightly higher than that of Alternative 2.

Alternative 2: Granada South. Rerouting U.S. 50 to the south of town under the Build Alternatives would cause slightly less than a half mile increase in the highway segment length and an 18.1-percent increase in energy use, the equivalent of 84 gallons of gasoline per day.

Section 17: Holly

Alternative 1: Holly North. Alternative 1 would cause slightly less than a half mile increase in the highway segment length and a 25.2-percent increase in energy use, the equivalent of 173 gallons of gasoline per day.

Alternative 2: Holly South. Rerouting U.S. 50 to the south of town under the Build Alternatives would cause slightly less than a half mile increase in the highway segment length, roughly the same difference as Alternative 1.

Mitigation

Mitigation strategies to reduce energy impacts will be considered for construction and operation activities during Tier 2 project evaluation. Mitigation will include strategies such as limiting idling of construction equipment, performing maintenance during low traffic times, and encouraging the use of transit.

4.4.5 Global Climate Change

Climate change is an important national and global concern and an issue that is linked with fossil fuel-based energy sources and motor vehicle emissions. While Earth has gone through many natural changes in climate in its history, there is general agreement that the Earth's climate is currently changing at an accelerated rate and will continue to do so for the foreseeable future. Human-caused GHG emissions contribute to this rapid change. The transportation sector was responsible for approximately 27 percent of

all anthropogenic GHG emissions in the U.S. in 2010 (EPA 2012). CO_2 makes up the largest component of these GHG emissions. Other prominent transportation GHGs include methane (CH_4) and nitrous oxide (N_2O).

GHGs trap heat in the Earth's atmosphere and because atmospheric concentration of GHGs continues to climb, Earth will continue to experience climate-related phenomena. For example, warmer global temperatures can cause changes in weather patterns and the melting of the ice caps and the associated rising of sea level. Transportation projects that will impact vehicular traffic have the potential to effect GHG emission trends at a local and global scale. U.S. transportation CO_2 emissions accounted for about 6 percent of worldwide CO_2 emissions.

GHGs are different from other air pollutants evaluated in federal environmental reviews because their impacts are not localized or regional due to their rapid dispersion into the global atmosphere, which is characteristic of these gases. For this reason, models are used to estimate vehicle exhaust emissions of CO_2 and other GHGs.

To date, no national standards have been established regarding GHGs, nor has the EPA established criteria or thresholds for ambient GHG emissions beyond standards that already exist for CO_2 under the Clean Air Act. CO_2 is frequently used as an indicator of overall transportation GHG emissions because the quantity of these emissions is much larger than that of all other transportation GHGs combined, and because CO_2 accounts for 90 percent to 95 percent of the overall climate impact from transportation sources.

When an agency is evaluating reasonably foreseeable adverse effects on the human environment in an EIS and there is incomplete or unavailable information, the agency is required to make clear that such information is lacking (40 CFR 1502.22). The methodologies for forecasting GHG emissions from transportation projects continues to evolve and the data provided should be considered in light of the constraints affecting the currently available methodologies. There presently is no scientific methodology that can identify causal connections between individual source emissions and specific climate impacts at a particular location.

Affected Environment

The affected environment for CO_2 and other GHG emissions is the entire planet. Global climate change is the cumulative result of numerous and varied emissions sources in terms of both absolute numbers and types, each of which makes a relatively small addition to global atmospheric GHG concentrations.

From a quantitative perspective, global climate change is the cumulative result of numerous and varied emissions sources (in terms of both absolute numbers and types), each of which makes a relatively small addition to global atmospheric GHG concentrations. In contrast to broad-scale actions such as those involving an entire industry sector or very large geographic areas, it is difficult to isolate and understand the GHG emissions impacts for a particular transportation project. Furthermore, currently there is no scientific methodology for attributing specific climatological changes to a particular transportation project's emissions.

Based on emissions estimates from EPA's Motor Vehicle Emissions Simulator (MOVES) model, and global CO_2 estimates and projections from the Energy Information Administration (EIA), CO_2 emissions from motor vehicles in the entire state of Colorado contributed 0.0773 percent of global emissions in 2010 and are projected to contribute an even smaller percentage (0.0612 percent) in 2040 (Table 4-50).

Table 4-50. Statewide and Project Emissions Potential, Relative to Global Totals

	Global CO2 Emissions[1] (MMT)	U.S. CO2 Emissions[1] (MMT) [% of global]	Colorado Vehicle CO2 emissions[2] (MMT) [% of global]	Project Area Vehicle CO2 Emissions[3] (MMT) [% of global]
2010	31,183	5,608 [18%]	24.1 [0.0773%]	0.55 [0.00176%]
2040	45,453	5,691 [12.5%]	27.9 [0.0614%]	0.70 [0.000154%]

MMT = million metric tons

[1]These estimates are from the EIA's International Energy Outlook 2013, and are considered the best-available projections of emissions from fossil fuel combustion. These totals do not include other sources of emissions, such as cement production, deforestation, or natural sources; however, reliable future projections for these emissions sources are not available.

[2]MOVES projections suggest that Colorado motor vehicle CO_2 emissions may increase by 15.8 percent between 2010 and 2040; more stringent fuel economy/GHG emissions standards will not be sufficient to offset projected growth in VMT.

[3]If Colorado vehicle CO_2 emissions are 24.1 MMT in 2010, which represents 27,898,493,950 VMT and the project study area represents 2.3 percent of VMT in the state, then, accordingly, the project area emissions should be 0.55 MMT of CO_2 emissions. The same process was used for the 2040 projections.

Other than U.S. 50, background sources of GHG emissions within the project area include train traffic, farming equipment, and animal feed operations. As U.S. 50 is the major vehicular travel corridor in the project area, it can be assumed that traffic on U.S 50 is the largest source of GHG emissions in the project area.

Environmental Consequences

The context in which the emissions from the proposed project would occur, together with the expected GHG emissions contribution from the project, illustrate why the project's GHG emissions will not be substantial and will not be a factor in the identification of a preferred alternative. In terms of the project area, changes in GHG emissions will have more to do with increases in traffic volume projected for the U.S. 50 corridor than with changes in roadway design or location. These changes are not expected to be different between the No-Build and Build Alternatives.

Summary of Effects

The following section summarizes potential impacts of the No-Build and Build Alternatives on GHG emissions.

No-Build Alternative

The No-Build Alternative includes impacts expected from forecasted traffic increases in the project area. Vehicle miles traveled (VMT) in the project area counties represents 2.3 percent of total Colorado travel activity in 2010. In 2040, VMT on U.S 50 will increase to 2.5 percent of the VMT in the state of Colorado (CDOT 2010d). It is estimated that the proposed project would result in an increase of 2.3 percent in Colorado's transportation CO2 emissions. This very small change in global emissions is well within the range of uncertainty associated with future global emissions estimates, which vary by almost 20 percent (EIA 2013).

It should be noted that this analysis includes travel on other principal arterial roadways in each of the four counties in addition to the project area. U.S. 50 is classified as a principal arterial roadway by CDOT (2003b); however, for this air pollution analysis, CDOT does not disseminate VMT with more precision than at the county level.

As previously stated, tools such as EPA's MOVES model can be used to estimate vehicle exhaust emissions of CO2 and other GHGs. However, only rudimentary information is available regarding the GHG emissions impacts of highway construction and maintenance. Estimation of GHG emissions from vehicle exhaust is subject to the same types of uncertainty affecting other types of air quality analysis, including imprecise information about current and future estimates of vehicle miles traveled, vehicle travel speeds, and the effectiveness of vehicle emissions control technology.

Build Alternatives

The Build Alternatives are not expected to have a major impact on traffic volumes on the U.S. 50 corridor. Therefore, based on the nature of GHG emissions and the exceedingly small potential GHG impacts of the Build Alternatives, GHG emissions from the Build Alternatives will not result in "reasonably foreseeable significant adverse impacts on the human environment" (40 CFR 1502.22(b)). The GHG emissions from the Build Alternatives will be insignificant and will not play a meaningful role in the identification of a preferred alternative.

Build Alternatives Effects by Location

Impacts of the Build Alternatives on the emissions of GHGs are measured at a regional level. It is not possible to determine the effects of the Build Alternatives by location.

Mitigation for Global Climate Change

To help address the global issue of climate change, the USDOT is committed to reducing GHG emissions from vehicles traveling on our nation's highways. USDOT and EPA are working together to reduce these emissions by substantially improving vehicle efficiency and shifting toward lower carbon intensive fuels. The agencies have jointly established new, more stringent fuel economy and first-ever GHG emissions standards for model year 2012 to 2025 cars and light trucks, with an ultimate fuel economy standard of 54.5 miles per gallon for cars and light trucks by model year 2025. In addition, on September 15, 2011, the agencies jointly published the first-ever fuel economy and GHG emissions standards for heavy-duty trucks and buses (NHTSA 2011). Increasing use of technological innovations that can improve fuel economy, such as gasoline- and diesel-electric hybrid vehicles, will improve air quality and reduce CO_2 emissions in future years.

Consistent with its view that broad-scale efforts hold the greatest promise for meaningfully addressing the global climate change problem, FHWA is engaged in developing strategies to reduce transportation's contribution to GHGs—particularly CO_2 emissions—and to assess the risks to transportation systems and services from climate change. In an effort to assist states and Metropolitan Planning Organizations (MPOs) in performing GHG analyses, FHWA has developed a *Handbook for Estimating Transportation GHG Emissions for Integration into the Planning Process.* The Handbook presents methodologies reflecting good practices for the evaluation of GHG emissions at the transportation program level, and will demonstrate how such evaluation may be integrated into the transportation planning process. FHWA also has developed a tool for use at the statewide level to model a large number of GHG reduction scenarios and alternatives for use in transportation planning, climate action plans, scenario planning exercises, and in meeting state GHG reduction targets and goals. To assist states and MPOs in assessing

climate change vulnerabilities to their transportation networks, FHWA has developed a draft vulnerability and risk assessment conceptual model and has piloted it in several locations.

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 CO_2 emissions standards and to reduce vehicle travel through transit, flex time, telecommuting, ridesharing, and broadband communications. CDOT issued a Policy Directive on Air Quality in May 2009. This Policy Directive was developed with input from a number of agencies, including the State of Colorado's Department of Public Health and Environment, EPA, FHWA, the Federal Transit Administration, the Denver Regional Transportation District, and the Denver Regional Air Quality Council. This Policy Directive and implementation document, the CDOT Air Quality Action Plan, address unregulated MSATs and GHGs produced from Colorado's state highways, interstates, and construction activities.

As a part of CDOT's commitment to addressing MSATs and GHGs, some of CDOT's program-wide activities include:

- Developing truck routes/restrictions with the goal of limiting truck traffic in proximity to facilities, including schools, with sensitive-receptor populations.
- Continuing to research pavement durability opportunities with the goal of reducing the frequency of resurfacing and/or reconstruction projects.
- Developing air quality educational materials, specific to transportation issues, for citizens, elected officials, and schools.
- Offering outreach to communities to integrate land use and transportation decisions to reduce growth in VMT, such as smart growth techniques, buffer zones, transit-oriented development, walkable communities, access management plans, etc.
- Committing to research additional concrete additives that would reduce the demand for cement.
- Expanding Transportation Demand Management efforts statewide to better utilize the existing transportation mobility network.
- Continuing 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. Incentivizing is the likely vehicle for this.
- Exploring congestion and/or right-lane only restrictions for motor carriers.
- Funding truck parking electrification (note: mostly via exploring external grant opportunities).

- Researching additional ways to improve freight movement and efficiency statewide.
- Committing to incorporate ultra-low sulfur diesel for non-road equipment statewide.
- Developing a low-VOC emitting tree landscaping specification.

Even though project-level mitigation measures will not have a substantial impact on global GHG emissions because of the exceedingly small amount of GHG emissions involved, implementing the measures described during construction will have the effect of reducing GHG emissions. The above-identified activities are part of a program-wide effort by FHWA and CDOT to adopt practical means to avoid and minimize environmental impacts in accordance with 40 CFR 1505.2(c).

4.4.6 Cumulative Effects

Cumulative impacts are defined as, " … the impact on the environment which results 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 substantial actions taking place over a period of time" (CEQ, 40 CFR §1508.7).

This cumulative effects analysis examines direct and indirect impacts that could occur as a result of the Build Alternatives and how they affect the resources of concern. These impacts can build on each other—they do not always result in a one-to-one relationship. Instead, they can compound the degree of impact.

Cumulative Effects Analysis Methodology

The focus of the cumulative effects analysis in this document is to identify possible cumulative effects that may result from reasonably foreseeable future actions, the U.S. 50 Tier 1 Build Alternatives, and a combination of these factors. For four resources, either no impacts or only minor impacts are anticipated; therefore, the Build Alternatives are not expected to cause cumulative impacts and have not been addressed in this section. Below is a brief description of why these four resources are not expected to have cumulative impacts.

- Air quality—No violations of federal standards are anticipated from the Build Alternatives. Construction effects to air quality will be analyzed further in Tier 2 studies.
- Traffic noise—While alignment changes may cause noise impacts to some sensitive receptors, these will be offset with improvements in noise conditions for others. However, given projected traffic volumes, no substantial increase in noise is anticipated.

- Energy—Vehicles would travel longer distances on U.S.50 along around-town routes; however, this increase is expected to be minor in the context of existing energy consumption along the entire corridor.
- Global climate change—GHG emissions related to the Build Alternatives would be small compared to the No-Build Alternative and are not expected to adversely impact the human environment.

This Tier 1 DEIS identifies only general corridor locations, not specific roadway footprints. For six resources, it was possible to assess potential impacts but without specific design and alignment details or information on required construction activities, impacts could not be fully analyzed. During Tier 2 studies, efforts will be made to specifically identify impacts. If impacts are expected, CDOT will include these resources in the cumulative affects analyses. The six resources are:

- Geologic and paleontological (fossil) resources—There is a potential to affect up to four existing surface mining operations (geological resources) and encounter paleontological (fossil) resources. The specific effect to these resources will depend on the location of the roadway footprint (alignment) to be identified during future Tier 2 studies.
- Archaeological resources—There are nine known archaeological sites that could potentially be affected by the Build Alternatives. Specific effects to these resources will be assessed during future Tier 2 studies.
- Environmental justice—When compared to the state, a higher percentage of minority and low-income residents live within the boundaries of the communities along the U.S. 50 corridor. Effects to these communities cannot be identified until further analyses are conducted during Tier 2 studies.
- Aesthetics and visual resources—These resources could be affected between communities, where the highway footprint would be widened, and for residents living in areas where around-town routes could be located. Specific aesthetic impacts and visual intrusion of the highway will be assessed during Tier 2 studies.
- Hazardous materials—There is a potential to encounter up to 162 known hazardous materials sites. Specific impacts to these sites will be assessed and discussed in Tier 2 studies.

The following analysis focuses on the potential effects to resources that would be subject to notable impacts, including land use, agriculture, riparian resources, water resources, historic resources, parks and

recreational areas, economic conditions, and wildlife and wildlife habitat. It describes trends and how the Build Alternatives could affect these trends at a resource level based on a Tier 1 level of analysis. A more-detailed cumulative effects analysis will be completed during Tier 2 studies when the 250-foot-wide roadway footprint is identified.

Study Area for Cumulative Effects Analysis

The cumulative effects analysis focuses on resources that the Build Alternatives might affect within a specified geographic area. The cumulative effects study area was developed to encompass the area where a cumulative effect on key resources is expected to occur. As shown in Figure 4-88, the four-county Tier 1 study area includes Pueblo, Otero, Bent, and Prowers counties. The four-county study area was selected since it is broad enough to capture resources impacted by past, present, and future projects.

Resources Included in the Cumulative Effects Analysis

Environmental resources that are analyzed for cumulative effects were identified through project scoping and by the potential for direct impacts as a result of resource impacts, as previously identified in this chapter. Formal scoping for this Tier 1 EIS began in September 2004, as detailed in Chapter 7, Community Outreach and Agency Involvement.

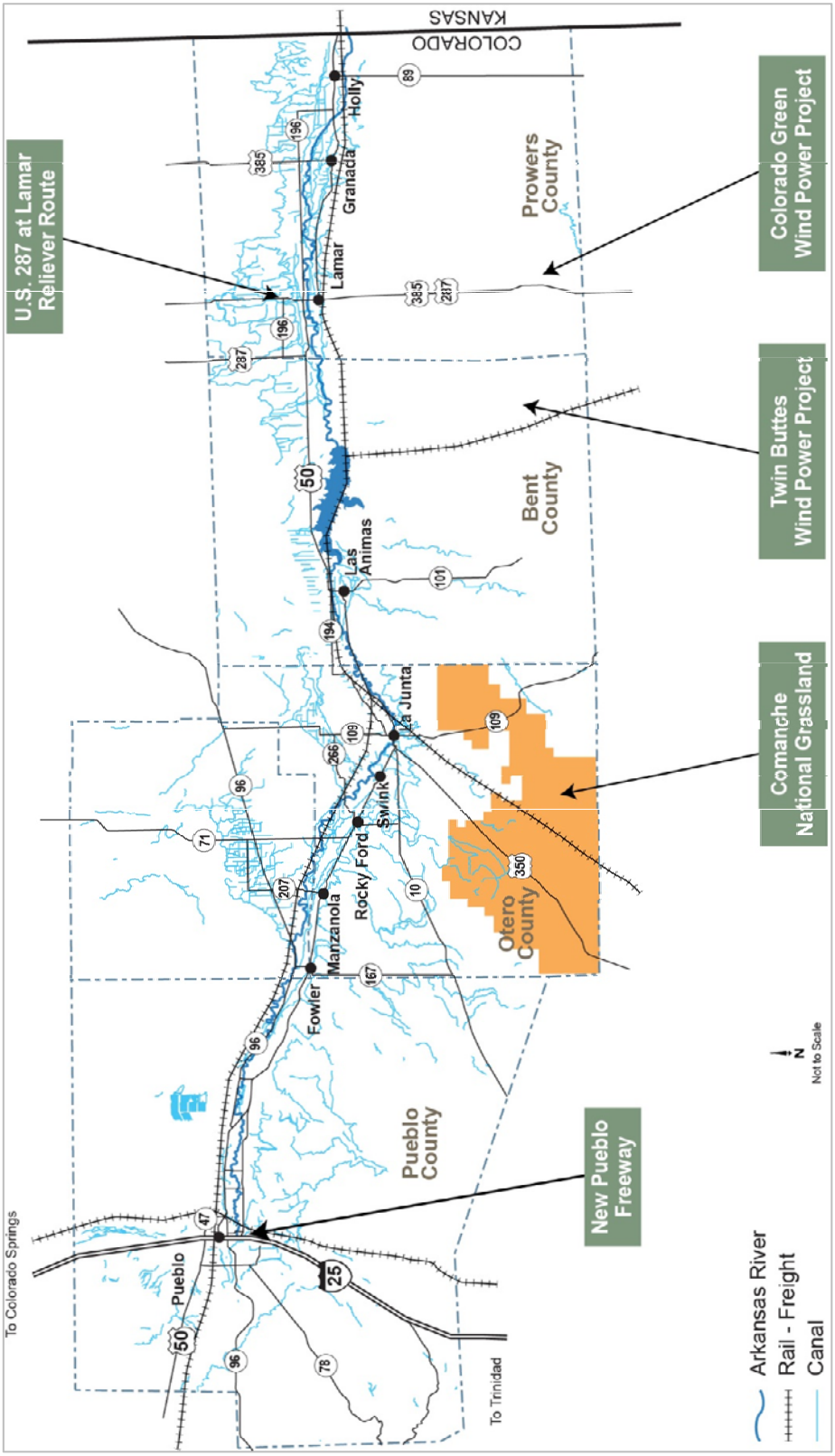
The scoping meetings included representatives from CDOT, FHWA, resource agencies, local government, and the public. Listed below are the key resources identified for this cumulative effects analysis.

- Rural and Agricultural Lands
- Wetlands and Riparian Resources
- Water Resources
- Historic Resources
- Land Use
- Parklands and Recreational Resources
- Economic Conditions
- Wildlife and Wildlife Habitat

See Table 4-51 for more information on resources included in the cumulative impacts discussion and their basis for inclusion.

Table 4-51. Resources Included in the Cumulative Effects Analysis

Resource	Basis for Inclusion
Rural and Agricultural Lands	Potential direct impacts, agency and stakeholder requests, and its relationship to other resources evaluated for cumulative effects
Wetland and Riparian Resources	Potential direct impacts and by agency and stakeholder requests
Water Resources	Potential direct impacts and by agency and stakeholder requests
Historic Resources	Potential direct impacts and by agency and stakeholder requests
Land Use	Agency and stakeholder requests and its relationship to other resources evaluated for cumulative effects
Parklands and Recreational Resources	Agency and stakeholder requests
Economic Conditions	Potential direct impacts and by agency and stakeholder requests
Wildlife and Wildlife Habitat	Potential direct impacts



For descriptions of the projects called out in this figure, see the text on the following pages.

Figure 4-88. Cumulative Effects Study Area

Timeframe for Cumulative Effects Analysis

The analysis timeframe begins with the passage of the Homestead Act in 1862 and goes through the year 2040. This time period has been established based on settlement of the Lower Arkansas Valley (located in the study area counties) and regional planning documents. The passage of the Homestead Act had a substantial effect on the Great Plains—including the Lower Arkansas Valley. The Act gave willing settlers 160 acres of land for free, but in return settlers were required to make improvements to the land. The analysis uses the end year of 2040 because it is the horizon year of the Southeast Transportation Planning Region, *2040 Regional Transportation Plan*. This plan includes long-range transportation priorities of the communities within the study area.

The cumulative effects analysis involves adding the effects of Build Alternatives to similar resource effects caused by other past, present, and reasonably foreseeable future actions. If the Build Alternatives have no direct or indirect impacts on a resource, then they have no cumulative impacts on that resource.

Past, Present, and Future Actions Included in the Analysis

To perform a cumulative effects analysis, a baseline condition was evaluated for each resource. That baseline has been identified as the impacts resulting from the No-Build Alternative coupled with all other past, present, and reasonably foreseeable future projects. These are identified and described in Table 4-52. Although the No-Build Alternative is included in the baseline conditions, impacts resulting from its implementation are noted, when applicable.

To determine cumulative effects, the Build Alternatives are analyzed for their combined impact when coupled with the other past, present, and reasonably foreseeable future actions. The project team obtained information on these actions through review of local, state, and federal planning documents. It is not the intent to provide an exhaustive list of every project in the study area, but to provide a reasonable characterization of projects that have affected or may affect key resources being evaluated.

As a starting point, past, present, and reasonably foreseeable future actions are separated into transportation and development categories, as catalogued in Table 4-52. For the purposes of this analysis, transportation and development projects considered are large-scale projects that change either the way people move or live, or dramatically change physical geography (for example, the development of previously unused land). Generally, present and reasonably foreseeable future transportation projects are those listed in either long-range transportation plans or capital improvement programs. Local and regional land use and other comprehensive planning documents generally identify foreseeable future development projects.

Table 4-52. Past, Present, and Future Projects

Project Type	Project	Timeframe	Description
Development	Homestead Act	Past, 1862	Act gave willing settlers 160 acres of land for free, but in return settlers were required to make improvements to the land
Transportation	Railroad Construction	Past, 1870s	Railroad through the Lower Arkansas Valley
Development	Irrigation Canals	Past, Present	Water diversion from the Arkansas River for farmland irrigation
Development	Arkansas River Levees	Past	Irrigation and flood control
Transportation	U.S. 50	Past, 1926	Designation as one of the first cross-country routes in the National Highway System
Development	John Martin Reservoir	Past, 1939 to 1948	Irrigation and flood-control project by the U.S. Army Corps of Engineers
Development	G.W. Verhoeff Reservoir	Past	Water storage
Development	Land Preservation	Past, Present, Future	Designation of State Wildlife Areas, National Grasslands, creation of conservation easements
Development	Fryingpan-Arkansas Water Project	Past, 1962	Water diversion from Colorado's Western Slope to the Arkansas River basin
Transportation	New Pueblo Freeway	Future	Widen and realign sections of I-25 through Pueblo
Transportation	U.S. 287 at Lamar Reliever Route	Present, Future	Planned alignment for U.S. 287 around Lamar to remove heavy truck traffic from the city's downtown streets; the realignment of the highway is approximately one mile east of U.S. 50 and would remain contiguous with U.S. 287 along the new route around Lamar
Development	Fort Lyons Medical Facility	Past, 2013	Converted to a rehabilitation center for homeless people
Development	Southern Delivery System (SDS)	Present	Project to supplement existing municipal drinking water supplies in the communities of Colorado Springs, Fountain, Security, and Pueblo West; construction began in 2011 and is ongoing
Development	Arkansas Valley Conduit	Past, Present, Future	Project to deliver clean water from the Pueblo Reservoir to the communities between Pueblo and Lamar in southeastern Colorado
Development	Wind Power Projects	Present, Future	Colorado Green Wind Power Project, located 30 miles south of Lamar, and the 75-Megawatt-generating Twin Buttes Wind Project in south Bent County; continued maintenance of wind farms occasionally requires transportation access for oversized loads

Table 4-52. Past, Present, and Future Projects (continued)

Project Type	Project	Timeframe	Description
Development	Conservation Reserve Program	Present, Future	The Conservation Reserve Program (CRP) is a land conservation program administered by the Farm Service Agency under the U.S. Department of Agriculture (USDA). Farmers enrolled in this program agree to remove environmentally sensitive land from agricultural production and plant species that will improve environmental health and quality. The long-term goal of the program is to help improve water quality, prevent soil erosion, and reduce loss of wildlife.

Past, Present, and Future Trends in the Lower Arkansas Valley

The cumulative effects analysis includes a discussion of the historic settlement pattern of the Lower Arkansas Valley (located within the study area), present development activity, and natural and built environment trends.

Historic Settlement Patterns

The Santa Fe Trail served as the 19th-century transportation route through central North America. Back in the early 1800s, the trail was an important commercial and military route that connected Franklin, Missouri with Santa Fe, New Mexico via the Lower Arkansas Valley. This historic trade route saw its heaviest use between the 1820s and the 1870s until the introduction of the railroad in the 1870s. With improved access to the region, Anglo-American pioneers began homesteading along the Arkansas River. Today, U.S. 50 generally follows the Santa Fe Trail between Kansas and La Junta, where the trail then turns southwest, and follows the route of U.S. 350 toward New Mexico. At the midpoint along the Colorado segment of the Santa Fe Trail is Bent's Old Fort, once a trading post and now a National Historic Site.

The Homestead Act of 1862 had a substantial effect on the Great Plains—including the Lower Arkansas Valley. The Act gave willing settlers 160 acres of then-unappropriated federal land for private ownership, but in return settlers were required to make improvements to the land (i.e., build a house) and live there for at least five years. Settlers who made claims to property under the Act introduced farming to Colorado's southeastern grasslands. Farming and ranching became the region's primary economic activity.

The arrival of the railroad in the 1870s accelerated human settlement in the Lower Arkansas Valley and the study area, which spurred land conversion activities. The railroad enabled more settlers to reach the region, and towns quickly sprang up along its route. As transportation systems modernized, and travel via

automobile increased, the roadway between the largest communities of the Lower Arkansas Valley was established. U.S. 50 was among the first abandoned routes established within the National Highway System in 1926. Since construction of U.S. 50, population growth in the project area has remained fairly stagnant—with a 21.1percent increase in population between 1930 and 1990 (from 20,656 to 26,188 individuals, respectively). Between 2000 and 2010, the communities east of Pueblo experienced a decline in population (from 27,596 to 24,800 individuals), with an average decline in population of 12.5 percent. These original settlement patterns established trends for future population and economic growth.

Human settlement of the region has resulted in substantial modifications to the natural environment within the project area. This has included the conversion of native grassland and wetland and riparian resources into farms, ranches, roads, cities, and towns. Human settlement of the region changed the area into an agricultural-based economy and altered many of the native wildlife and plants in the region.

Human settlement also has resulted in the alteration of natural hydrologic systems. First delivered in 1975, diversion of waters from Colorado's western slope to support agricultural uses and other development also changed the water quality, quantity, and seasonal flow patterns of the lower Arkansas River basin, resulting in changes to associated riparian habitat. These habitat changes occurred because the water diversion brought more water to the area than would naturally occur in this semi-arid region. Additionally, the use of dams allowed peak flows to be controlled, enabling the release of stored water during dry spells, which provided a more stable flow over time. This altered the natural flood-based scouring for which native riparian vegetation was adapted.

In addition, settlers introduced noxious weeds to the region, which affected native plant species and water quality in the valley. Tamarisk generally was planted to serve as a wind break, create shade, or stabilize eroding stream beds. However, planted tamarisk overwhelmed native plant species, spreading quickly and extensively and consequently reduced the availability of habitat for wildlife in the area.

Establishment and Decline of the Agricultural Industry

Agriculture has continued to be the foundation of the region's economy for more than a century. The most productive farming was, and continues to be, made possible by water sourced from the Arkansas River watershed. Authorized in 1962, the Fryingpan-Arkansas water project increased the resilience of farmland in the Arkansas Valley by diverting water from Colorado's Western Slope to the Arkansas River basin.

From approximately 1950 to 2007, there was a gradual decline in the amount of agricultural lands within the project counties. Some of this loss was the result of the transfers of water rights from the Lower

Arkansas Valley to fast-growing municipalities along Colorado's Front Range. Water sales can reduce the amount of irrigated farmland, since the water being sold can no longer be used to irrigate fields. Between 1950 and 2007, the project counties experienced a half-million acre (or roughly 13 percent) decrease in farmland and ranch lands (Agricultural Census 2007b).

Continuing recent trends, it is likely that the agricultural industry in the Lower Arkansas Valley and study area will continue to decline. This situation is, in part, due to increasing demand for water supplies in Colorado metropolitan areas, as previously mentioned. Additional transfers of water rights likely will occur as metropolitan areas along Colorado's Front Range search for water supplies, and farmers find it more profitable to sell their water than to plant crops. Additionally, a study by the Environment Colorado Research and Policy Center predicts that 484,000 acres of farm and ranch lands in the project counties will be converted to other uses by 2022. This figure represents a decline of 46 percent in Pueblo County, 3 percent in Bent County, 13 percent in Otero County, and 2 percent in Prowers County. In Pueblo, the losses are expected to result, in part, from urban development; however, development is not expected to cause substantial losses in the other project counties. The report also indicates that agricultural decline is not limited to the Lower Arkansas Valley, but is a statewide trend. These trends have the potential to reduce agricultural production in the region.

Even with this decline in agricultural activity, the Lower Arkansas Valley's agricultural output remains substantial. In 2007, the total market value of agricultural production in the four project counties was approximately $506 million. This is equivalent to 9 percent of the value of the state's total agricultural production (CO AgInsights 2007). Agricultural acreage used to graze cattle facilitated the sale of approximately 323,000 cattle and calves in 2007 in the project counties. This figure represented about 10 percent of all such animals sold in the state of Colorado (Agricultural Census 2007a).

Anticipated Cumulative Effects

Development and transportation improvements made in the past, present, and reasonably foreseeable future are major contributing factors to the past, present, and future conditions of all resources evaluated for cumulative impacts. As a starting point for establishing these conditions, Table 4-52 summarizes past, present, and foreseeable future transportation and development projects evaluated in this document.

Rural and Agricultural Lands

As discussed earlier, the Homestead Act of 1862 attracted thousands of settlers to this part of the Great Plains to introduce farming, participate in ranching, and ultimately provide private property to those who persevered for a minimum of five years to live on and work the land. In addition to the Act, access to the

region was improved through construction of the rail line in 1870 and later, further enhanced by construction of U.S. 50. Between 1862 and approximately 1950, hundreds of people came to the area because agricultural lands supported rural communities and sustained the area's economic base.

Authorized in 1962 and completed in 1981, the Fryingpan-Arkansas Project diverted water from Colorado's Western Slope to southeastern Colorado. The water diversion project increased water available to the Lower Arkansas Valley, but—despite additional water coming to the farming and ranching communities—by 1950, the region began to see a decline in agricultural and ranch lands. Loss of these resources started in 1950, and there has been a steady decline since then. As described in detail in the section above, this trend is expected to continue not only for this corner of Colorado but for all agricultural lands throughout the entire state.

U.S. 50 Build Alternatives will have a negative effect on agricultural production due to potential impacts on agricultural lands being converted to a transportation purpose; however, these effects are not expected to increase the past or anticipated rate of agricultural activity decline in the area. The direct effects of U.S. 50 on agricultural resources are discussed in detail in Section 4.1 of the U.S. 50 Tier 1 EIS. Other foreseeable future actions are expected to impact agricultural resources. The effects of the U.S. 287 at Lamar Reliever Route Project are expected to impact approximately 365 acres of farmland of statewide importance and farmland considered prime under certain conditions. The U.S. 50 Tier 1 Build Alternatives would impact between 2,866 acres and 3,047 acres of farmland of statewide importance or farmland considered prime under certain conditions within the study area. The cumulative effect of this impact amounts to about 1 percent of the loss already predicted in the four project counties over the next two decades and 0.5 percent of the total value of agricultural goods produced by the four project counties in 2007. Although this loss is important to the economic vitality of the communities along the U.S. 50 corridor, it is only a very minor contributor to the general trend of decreasing agricultural activity in the Lower Arkansas Valley.

Water projects, such as the Arkansas Valley Conduit and Southern Delivery System, have the potential to reduce water available for agricultural activities (i.e., irrigation). These impacts are only anticipated to be noticeable during drought years and during the winter season. With some loss in the predictability of water supplies, there is the chance of this resulting in more land being removed from productive agricultural use.

As a cumulative benefit to the agricultural economy, the Build Alternatives and other reasonably foreseeable future actions, such as the New Pueblo Freeway and the U.S. 287 at Lamar Reliever Route

(Table 4-52), have the potential to increase transportation efficiencies that provide increased mobility for farm-to-market activities, making it easier for farmers and ranchers to get their products to market. Despite the trend toward decline, agricultural activities are expected to remain an integral part of the economy of the region. Reducing farm-to-market transportation costs could enable farmers and ranchers to spend those dollars on new equipment or other technologies that could increase the productivity of their operations.

Wetland and Riparian Resources

Prior to the Homestead Act of 1862, the region was not settled because early immigrants believed the area was too dry to be productive for farming or ranching, so their interests where drawn instead to regions further west of Colorado. Following passage of the Act, settlers moved to the area to farm, ranch, and establish the rural communities that are located along present-day U.S. 50. Construction of the railroad in 1870 and development of U.S. 50 in 1926 would have likely affected wetland and riparian resources in the study area at the time. Due to the rural nature of the communities in the study area, there would have been minimal effects on these resources from development. Because impacts to wetlands were not regulated until passage of the federal Clean Water Act (CWA) of 1972, effects to riparian areas from development activities were not quantified.

Historically, the Fryingpan-Arkansas water projects of the 1960s had the most noteworthy impacts to wetland and riparian resources of the Lower Arkansas Valley. These water diversion projects increased the water flowing to the Arkansas River and its tributaries, which helped maintain wetlands and riparian areas. However, reasonably foreseeable future actions—including the Arkansas Valley Conduit, Southern Delivery System, the New Pueblo Freeway, and the U.S. 287 at Lamar Reliever Route—in addition to impacts of the Build Alternatives, have the potential to temporarily and permanently impact wetland and riparian resources by acquiring land, thereby reducing the quantity and quality of these resources.

The Tier 1 Build Alternatives identify between 587 acre and 711 acres of wetland and riparian impacts. However, during Tier 2 studies, the alignment would have a better-delineated footprint and could be modified to avoid or greatly reduce impacts to these resources.

The Arkansas Valley Conduit project would have a temporary impact on 29 acres of wetland and four open water sources. (BOR 2013). The Southern Delivery System is expected to have a permanent impact on 13.4 acres of wetland, most of which are Category III (defined as more common than Category I or II wetlands and has less vegetative diversity).

The preferred alternative for the New Pueblo Freeway would impact 0.02 acre of open water, 2.54 acres of riparian habitat, 0.93 acre of wetland, and 9.49 acres of wooded upland habitat (CDOT 2013a). As reported in the FEIS, CDOT will prioritize the replacement of wetland on a one-to-one basis within the project area, but the exact determination of locations for replacement wetland are not known at this time.

The greatest threat to wetland and riparian resources in the project area is the invasion of salt cedar, commonly referred to as tamarisk. According to data from the Southwest Regional Gap Analysis Project (SWReGAP 2006) and Colorado Parks and Wildlife (CPW 2004), approximately 11,300 acres of tamarisk exist within the project area. The largest, contiguous blocks of tamarisk are located along the Arkansas and Huerfano rivers; however, smaller patches occur in other locations as well. This highly invasive, non-native shrub has become a major problem in southeastern Colorado. Tamarisk invades native wetland and riparian resources, reducing their ability to function (or provide benefits to the environment). Additionally, tamarisk also can change the formation of stream channels and thereby prevent native plant species from taking root. Consequently, the tamarisk in the project area is not only degrading existing resources, it also is preventing the creation of new resources. Left unmitigated, the potential is great for tamarisk to have devastating negative impacts on wetland and riparian habitats. U.S. 50 Build Alternatives are not anticipated to effect this past trend negatively, and have the potential to support several existing efforts to slow and reverse the invasion of tamarisk to native wetland and riparian resources.

Currently, there are several projects to eradicate tamarisk in the area. The Arkansas River Watershed Invasive Plant Project (ARKWIPP), an overarching plan for wetland restoration, is working to establish guidelines and policies for eliminating invasive species in the area. If successful, this effort will reduce the effects of tamarisk on the local ecology and will reduce the cumulative effects of projects on water resources.

Additionally, the Conservation Reserve Program could help preserve wetland/riparian resources in the region. The program encourages the use of agricultural land for natural purposes instead of development. Because irrigation efforts bring additional water to this land, some of it may serve as wetland or riparian areas when it is not being actively farmed.

The U.S. 50 Tier 1 EIS project has already made a contribution to the conservation of wetland/riparian resources by developing the U.S. 50 Tier 1 EIS Natural Resources Mitigation Strategies Plan (see Appendix E of this EIS). This plan is intended to guide mitigation activities for natural resource impacts that occur during Tier 2 studies, primarily impacts to wildlife and their habitat. Since wetland/riparian

resources serve as habitat to certain types of wildlife, they are discussed in this plan. While the mitigation strategies in the plan are tied to the roadway improvements, they also provide a framework for future collaborative planning efforts by key stakeholders for natural resource-related issues in the Lower Arkansas River Valley.

Because U.S. 50 and other reasonably foreseeable future transportation projects are implementing the CDOT policy of "no net loss" and would mitigate for permanent impacts to wetlands combined with actions included in the ARKWIPP, the proposed project is not expected to have a permanent, negative effect on wetland and riparian resources when added to other past, present, or reasonably foreseeable future actions.

Water Resources

Several reasonably foreseeable future actions have the potential to affect water resources. These include the Arkansas Valley Conduit, Southern Delivery System, New Pueblo Freeway Project, and the U.S. 287 at Lamar Reliever Route Project.

Since passage of the Homestead Act of 1862, the Arkansas River Valley has sustained valuable agricultural production and a rural lifestyle for communities along U.S. 50 for more than a hundred years. While the river has supported a productive agricultural economy, there are many side effects from so many years of irrigation. The vast irrigation canal systems made up of more than 1,000 miles of channels have diverted and distributed water from the Arkansas River for agricultural purposes (Gates 2006). Irrigation made it possible to develop a productive agricultural economy in the Arkansas River Valley. But there is a downside to water diversion practices. The ground water table has become shallower and salinity levels in the water sources have increased because of excessive irrigation. Also, the canals experience seepage, which contributes to the water table issues. Adding to the water quality concerns are years of pesticides, herbicides, and fertilizers used in farming to protect plants against pests, reduce competition from weeds and improve the quality of produce.

In August 2013, the Bureau of Reclamation completed an Environmental Impact Statement (EIS) titled, *Arkansas Valley Conduit and Long-Term Excess Capacity Master Contract, Fryingpan-Arkansas Project.* The proposed project would store water in available space in the Pueblo Reservoir and deliver water throughout the Arkansas River Basin in Colorado to meet existing and future municipal and industrial water demands. The water supplied for this project would not be used for agricultural irrigation since this is not a congressionally authorized purpose for the Arkansas Valley Conduit. In general, the project is expected to decrease streamflow in the Arkansas River at the Pueblo Reservoir, reducing the amount of

water flowing in the river downstream of that location. As a result, less water may be left in the river to dilute salt, selenium, and other pollutants. This may diminish water quality in the river. However, to mitigate moderate effects of occasional low stream flow below Pueblo Reservoir and the effects of low stream flow on water quality and aquatic life, the Bureau of Reclamation would limit water storage and/or exchange of water for project use (per the excess capacity contracts) when stream flow is less than 50 cfs. This and other mitigation commitments are outlined in the EIS document.

Similar to the conduit, the Southern Delivery System would remove water from the Arkansas River at the Pueblo Reservoir, reducing water flows downstream, which could negatively affect water quality in the river. However, the participating municipalities (i.e., those receiving the water) have made commitments to ensure that adverse water quality effects are mitigated. They have agreed that if the operation of the pipeline causes such effects, whether directly or by diminishing water levels, the municipalities would coordinate with appropriate federal and state agencies to evaluate and select measures to mitigate these effects (BOR 2009).

The Build Alternatives have the potential to adversely affect water quality by increasing both the volume and the amount of pollutants that are carried from the surface of U.S. 50 via stormwater into nearby water resources. The increased volume and pollutants add to the existing pollutant loads from commercial land uses with large impervious areas, such as parking lots. This increase would occur in the portions of Build Alternatives where the highway is expanded from two lanes to four lanes and to a lesser extent in the areas where other improvements are added to the highway (i.e., wider shoulders, turn lanes, etc.). Also, additional crossings of water resources by U.S. 50 would be required, primarily over irrigation canals and ditches. These new crossings have the potential to increase the amount of pollutants that reach the surface water resource being crossed, leading eventually to ground water resources. Because there are few other similar roadway projects along the corridor, the cumulative effects of the Build Alternatives are mainly described by the direct effects of the project, as discussed in Section 4.1 of the U.S. 50 Tier 1 EIS.

Two reasonably foreseeable highway improvement projects have the potential to increase the amount of transportation-related pollutants that flow into the river at their locations. This includes the New Pueblo Freeway Project, where proposed expansion of the portion of U.S. 50 crosses Fountain Creek. Additionally, the U.S. 287 at Lamar Reliever Route Project would reroute U.S. 287, which is also U.S. 50 in this area, around that city. The new alignment would require a new crossing of the Arkansas River by U.S. 287/U.S. 50 east of Lamar and four new crossings of irrigation sources. It also would expand crossings of two canals in the area.

Even with runoff from metropolitan areas and transportation routes, the water quality impairment in the lower portion of the Arkansas River is primarily due to selenium and salinity from more than 100 years of agricultural production. Therefore, while water quality issues are critical concerns in the region, and it is important to understand how foreseeable future events could affect them, the effect of projects in the U.S. 50 corridor are not anticipated to change the water quality trends in the Lower Arkansas Valley.

Historic Resources

Cultural resources are located throughout the study area due to its early function as a transportation corridor and because of the long history of settlement in the region. Historians believe the only discernible pattern to the location of these resources is along present and historical transportation routes.

While the history of cities and towns in the Lower Arkansas River Valley has been studied by numerous writers, a complete list of historic and archeological sites does not exist. Given the rich history of the region, there could be thousands of properties within existing cities and towns and hundreds located on farms, ranches, and abandoned town sites. The number of sites associated with early urbanization has been drastically reduced since World War II because many of the towns entered a redevelopment phase, removing older structures. Furthermore, vandals, souvenir hunters, and weather have caused resources once available to disappear. (Carter 1984)

To preserve cultural resources like those found in the Lower Arkansas River Valley, the National Historic Preservation Act (NHPA; Public Law 89-665; 16 USC 470 *et seq*.) was passed in 1966. Before this date, preservation of historical and archaeological sites in the Lower Arkansas River Valley was not required; therefore, many resources could have been damaged or destroyed. Exactly how many sites have been affected is unknown; however, since passage of this act, cultural resources that tell the story of the spread of the urban frontier on the Colorado plains have been and will continue to be assessed in detail before CDOT implements improvements to U.S. 50.

Historic resources include homestead sites and transportation and irrigation infrastructure. Several of the reasonably foreseeable future actions listed in Table 4-52 have the potential to affect historic resources. There is an ongoing trend in the study area of minimal disturbances to historic resources as a result of day-to-day activities.

The cumulative effects to historic resources in the study area are expected to be greatest where direct and indirect impacts of other urban activities are anticipated. The New Pueblo Freeway would have an adverse effect on 40 historic resources (CDOT 2013a). These impacts, combined with the potential for

urbanization on the outskirts of the City of Pueblo, could cause increasing development pressure on historic properties along U.S. 50. Impacts to historic properties are likely to be less substantial east of Pueblo. The U.S. 287 at Lamar Reliever Route is not expected to have an adverse effect on historic properties (CDOT 2013b). Most of the direct effects to historic properties identified in the Arkansas Valley Conduit FEIS are located near the Pueblo Reservoir, outside of the project area. However, it is likely that cultural deposits will be impacted along the route.

While the U.S. 50 Build Alternatives would not have a direct effect on Bent's Old Fort National Historic Site or the Granada Relocation Center National Historic Landmark, it may have indirect effects (increased visitation due to improved access) on these properties. These effects would be identified during Tier 2 studies when the roadway footprint (i.e., alignment) in these areas is determined.

The cumulative effect on historic resources in the study area would be minor as Tier 2 studies will minimize or avoid direct impacts to historic resources. Because of the large scale and linear nature of foreseeable projects in the area, there are few opportunities for avoiding some resources in certain circumstances. It is not anticipated, however, that U.S. 50 will impact the overall trend of ongoing minimal disturbances of historic resources in the area. The U.S. 50 Build Alternatives would contribute to this trend; however, the historic resources would remain in place and retain their historic integrity.

Land Use

There is a long history of urbanization in southeastern Colorado. Beginning with trading posts and small towns that developed before the Civil War, post-war communities formed larger towns and cities to meet commercial and entertainment needs of the early settlers. From the early 1870s through 1910, cities were located along rail lines due to easy access for trade and grain shipments. As local roads were established and improved, towns did not require close rail connections to maintain their agricultural economy, so they were able to move farther away from the rail line. (Carter 1984)

The population of these early towns throughout the Lower Arkansas River Valley fluctuated, and some completely disappeared due to competition for residents from neighboring towns. The more successful towns established a local government that provided services and social facilities, schools and public buildings, libraries, and locally funded opera houses. Land uses in these early towns were re-creations of what town residents had left behind in the cities of the Midwest or East. (Carter 1984)

From the early 1870s through the 1950s, historic settlement patterns caused much of the change in landscape from natural prairie and wetland of the Arkansas River floodplain to agricultural and urban

uses. With this general trend in urban development came the gradual diminishment of Colorado's shortgrass prairie ecosystem.

The Shortgrass Prairie Initiative is an MOU between CDOT, FHWA, USFWS, state natural resource agencies, and The Nature Conservancy signed in 2003. It commits the participants to work to mitigate anticipated impacts to the shortgrass prairie ecosystem from CDOT projects identified in the 20-year transportation plan prior to their construction. By mitigating in advance of impacts, land required by at-risk, threatened, and endangered species will be preserved.

Urban development also has enabled the identification of private property, public lands, parks, open space, and transportation uses. Within the study area, along the 150-mile project corridor, a total of 36 public lands and 27 conservation easements (either in whole or in part) exist. As development pressure has slowed within communities and population has declined, the conversion of farmland and ranch lands has diminished. Along the majority of the corridor where the Build Alternatives upgrade the existing facility, land use conversion would be minimal. Including U.S. 50, other foreseeable future projects listed in Table 4-52 will convert land to a transportation use from some other use (primarily agricultural). The cumulative effect from this land use conversion is minimal considering the relative impacts of individual resources as identified in the U.S. 50 Tier 1 EIS.

Parklands and Recreational Resources

Not long after settlers came to the Arkansas Valley to take advantage of the opportunity to own property granted by the Homestead Act of 1862, residents and federal land management agencies started developing parks and recreational resources throughout southeastern Colorado. Approximately 435,000 acres of grassland was managed by the U.S. Forest Service as grazing land for cattle ranchers and, in 1960, the land was designated as the Comanche National Grassland. Throughout the 1900s, efforts to preserve parklands and recreation resources resulted in 90 areas being designated as parks, wildlife areas, and trails.

Southern Colorado's rural nature has provided opportunities for designation of numerous State Wildlife Areas, parks, and the Comanche National Grassland, which are primarily accessed via U.S 50. Although no future parks are currently planned, preservation of this rural area is ongoing through the creation of additional conservation easements and future state wildlife areas. In regard to trails, Prowers County has plans for two county trails in Granada and Holly. These trails could provide an opportunity for tourism in the region.

The U.S. 50 Tier 1 Build Alternatives could affect up to 13 parkland or recreational resources within the study area. However, direct effects to these resources are localized. Reasonably foreseeable future actions listed in Table 4-52 are not anticipated to have a notable cumulative impact on these same resources, nor are the general effects to parkland and recreational resources of concern for the study area. It should be noted that with improved mobility throughout the U.S. 50 corridor, due to the Build Alternatives, the New Pueblo Freeway, and the U.S. 287 at Lamar Reliever Route, there are better opportunities for visitors to travel to and from parklands and recreational sites in the study area.

Economic Conditions

The economy of the Lower Arkansas Valley has been heavily reliant on agricultural activities (i.e., farming and ranching) since the region was settled in the late 1800s. A large portion of the land in the project counties is still used for agricultural activities and a significant portion of the communities' employment is provided by the agricultural sector.

As the state's population grew through the 1900s, so did the Lower Arkansas River Valley's contribution to the statewide economy. The production of agricultural goods and produce has consistently generated significant revenue for local businesses and for Colorado.

The counties east of Pueblo County recognize the need to diversify their economies. However, recent economic trends in those counties reflect minimal growth or diversification. This may be due to the continuing productivity of farming. Nonetheless, some new businesses have relocated to the Lower Arkansas Valley, including a private prison in Las Animas and a wind farm south of Lamar. The Fort Lyon Veteran's Administration medical facility (located east of Las Animas near the John Martin Reservoir) was converted to a state correctional facility in 2002. The correctional facility closed in 2011 and, in September 2013, the facility opened as a rehabilitation center for homeless people. Two major employers went out of business in 2006: a transit bus manufacturing plant in Lamar (Neoplan USA) and a food processing plant in La Junta (Bay Valley Foods).

Residents and economic development agencies along U.S. 50 have begun efforts to increase tourism to the region as a way to diversify local economies. Given that Colorado's population grew by 16.9 percent from 2000 to 2010 and it continues to grow, there is a large market of potential tourists who could visit the Lower Arkansas Valley in the study area, if interesting attractions were made known. Different types of tourism are being considered in the area, including heritage tourism, ecotourism, and agritourism. Heritage tourism focuses on historic resources, ecotourism focuses on natural resources (landscapes and wildlife), and agritourism focuses on agricultural activities.

The following reasonably foreseeable future actions would support tourism efforts in the Lower Arkansas Valley, which residents hope will increase economic activity in the area:

- A new access point is proposed for the Bent's Old Fort National Historic Site that would allow tourists to access the site directly from U.S. 50. Today, drivers must use either SH 109 in La Junta or SH 194 north of Las Animas to reach the site.
- The federal government has authorized $38 million for the preservation of World War II relocation centers. Currently, the Granada Relocation Center National Historic Landmark is open to visitors, but there is minimal interpretive infrastructure on the site. Plans exist for a visitor's center, parking lot, and other infrastructure to educate visitors about the site.
- In 2005 and 2006, the Colorado Historical Society awarded grant monies to communities along U.S. 50 to preserve particular resources and promote heritage tourism along the highway. Grant recipients in 2006 included the Bent County Courthouse and Jail in Las Animas.
- Southeastern Colorado is part of North America's western Central Flyway for migratory birds. It is home to the annual migration of snow geese and many other bird species in abundant numbers. Colorado Parks and Wildlife has developed birding trails that include segments of the flyway in the Lower Arkansas Valley. The division is constructing four kiosks related to the trail along U.S. 50 (in Fowler, La Junta, Lamar, and Holly).
- Farmers in the region are using agritourism activities, such as roadside produce markets and pick-your-own produce activities, to expand their businesses and profitability.
- The new around-town routes would reduce traffic in existing downtown areas. This could make these areas more pedestrian friendly. Since most of the identified historic resources (those known to be historic and potentially historic) are located within these downtowns, this type of change could help communities encourage heritage tourism within their jurisdictions.

In addition to tourism, improvements to U.S. 50 would have economic benefits in terms of increased safety. A safer highway means fewer and less-severe accidents, reduced property and vehicle damage, reduced fatalities, and fewer personal injuries. This reduces economic impacts to local sheriff and police departments, emergency medical services (ambulance/firefighters/paramedics), and individuals involved in accidents. Overall, both public and personal savings can be realized due to an improved highway.

The U.S. 50 Tier 1 EIS project has already made a contribution to the study area and the Lower Arkansas Valley's heritage tourism efforts by releasing a summary of the historic resources identified along U.S. 50, as well as a historic context overview to Section 106 consulting parties. This research may help residents and economic development agencies identify resources worthy of preservation and promotion.

When added to past, present, and reasonably foreseeable actions, the Build Alternatives' benefit of improved safety has the potential to have a cumulative benefit to the social and economic conditions in the project area by assisting in the diversification of the corridor economy. Further analysis will be conducted during Tier 2 studies.

Wildlife and Wildlife Habitat

Long before the Homestead Act of 1862 brought settlers to the Arkansas Valley, the Arkansas River was used as a travel corridor by Apache, Arapaho, Cheyenne, Comanche, Kiowa, and Ute Indian Tribes of the Great Plains. Native Americans roamed this land in pursuit of the plentiful wildlife, including 320 different bird species, 10 amphibian species, 40 reptile species, and 70 mammal species (NDIS 2007). Later, trappers, traders, and settlers showed up and the Santa Fe Trail became the main route for accessing western lands. Attracted to the Arkansas River, those trappers and early settlers followed the river and left evidence of their habitation in the form of outposts, farms, and ranches. These activities converted native shortgrass prairie lands into residences, trading posts, farm fields, and ranches, all of which modified the types of wildlife and wildlife habitat that occupied these areas.

The Homestead Act of 1862 accelerated human settlement in the Lower Arkansas Valley by giving willing settlers 160 acres of unappropriated federal land for private ownership. In return, settlers were required to make improvements to the land (i.e., build a house) and live there for five years. No single act had more effect on the Great Plains. It brought tens of thousands of settlers to the region and subsequently introduced farming and ranching as the region's primary economic activity. The arrival of the railroad in the 1870s stimulated the growth of towns and roads resulting in even more habitat being consumed, affecting migration routes, and introducing barriers and hazards to wildlife movement.

To make farming work in the Lower Arkansas Valley, an extensive, interconnected system of irrigation canals and ditches was built in the late 1800s to divert water from the Arkansas River. Another water-related action that impacted the river was the introduction of Tamarisk (salt cedar). This was planted to serve as a wind break and ornamental shrub, to create shade, or to stabilize eroding stream beds. However, the unintended side effect of planting tamarisk is that it generally overwhelms native plant species. This plant, classified today as a noxious weed, has spread quickly and extensively, replacing native plants and reducing the availability of habitat for wildlife in the area.

Construction of U.S. 50 impacted the wildlife and wildlife habitat native to the Lower Arkansas Valley by transforming hundreds of acres of grassland to land used for the highway. Not only has the physical road

alignment created a substantial obstacle for wildlife to access sites for feeding, getting water, sleeping, and other needs, but it is dangerous for wildlife.

Approximately 194,705 acres of wildlife habitat were identified in the project area. The Build Alternatives would affect up to 4,737 acres, which represents slightly more than 2 percent of the total. The Build Alternatives could affect up to 25 special-status species that either are known to be present or potentially are present within the footprint of the Build Alternatives. However, even these impacts—when combined with the effects of past, present, and reasonably foreseeable future actions presented in Table 4-52—are unlikely to have a substantial cumulative effect on the Lower Arkansas Valley's wildlife or wildlife habitat.

The project generally occurs along the existing alignment of U.S. 50 or close to existing urban centers. As a result, any habitat affected by the Build Alternatives would be located near areas that already have been disturbed by human settlement. Much of the corridor has been converted from native plant communities into agricultural production, so construction of the Build Alternatives is likely to occur on land that has already been disturbed by human settlement. The project will implement mitigation measures to offset the impacts it does have.

The U.S. 50 Tier 1 EIS has developed a natural resources mitigation strategies plan. This plan is intended to guide mitigation activities for natural resource impacts that occur during Tier 2 studies, primarily impacts to wildlife and wildlife habitat. The three goals identified in the Natural Resources Mitigation Strategies Plan are as follows:

- Maintain and enhance biodiversity in the Lower Arkansas River Valley
- Improve ecosystem integrity in the Lower Arkansas River Valley
- Accommodate social and economic objectives when possible

Strategies to meet these goals include wetland mitigation banking, a wildlife crossing study, management of noxious weeds and aquatic nuisance species, and partnering opportunities, just to name a few. Further mitigation strategies are discussed in the Natural Resources Mitigation Strategies Plan located in Appendix E. All applicable laws and regulations will be followed, and mitigation measures would be applied as needed to offset identified impacts during Tier 2 studies.

Recognizing the importance of the shortgrass prairie ecoregion and the potential for further decline of more than 100 wildlife and plant species, in 2003 CDOT entered into an MOU with The Nature Conservancy, FHWA, the USFWS, and the Colorado Division of Wildlife. This agreement describes how

the parties will work together for habitat conservation and how CDOT will use best management practices to avoid, minimize, and mitigate the impacts of highway maintenance and improvements with this ecoregion.

Effects to wildlife and wildlife habitat were avoided to the greatest extent possible in the U.S. 50 Tier 1 EIS during the alternatives development process by selecting a 1,000-foot-wide general corridor for the Build Alternatives. This allows for avoidance and minimization while identifying the 250-foot-wide roadway footprint during Tier 2 studies. Therefore, avoidance activities will be determined during Tier 2 studies.

Cumulative Effects Summary

The purpose of this Tier 1 EIS cumulative effects analysis is to evaluate the effect of the Build Alternatives on agricultural production and community and environmental resources in the study area, as well as to identify the cumulative effect on these resources. When combined with direct and indirect impacts from the U.S. 50 Tier 1 Build Alternatives, future actions are not expected to affect resources much more than they are currently or have been affected by other past and present actions. Additionally, potential effects to the resources included in this analysis would not result in substantial cumulative effects, particularly given regulatory protection mechanisms that are currently in place.

As mentioned at the beginning of this chapter, the U.S. 50 Tier 1 EIS is a broad-scale document. The purpose of this Tier 1 phase is to identify a general 1,000-foot-wide corridor location for U.S. 50 through the Lower Arkansas Valley. Through the tiering process, future Tier 2 studies will provide opportunities to avoid and minimize potential impacts within the smaller 250-foot-wide corridor that will be the highway footprint and also to better understand the cumulative effects of U.S. 50 projects in the area.

4.4.7 Irreversible and Irretrievable Commitment of Resources

42 USC 4432 102(C)(v) requires a discussion of any irreversible or irretrievable commitments of resources that would be involved in a project proposal should it be implemented. An irretrievable commitment of a resource is one in which the resource or its use is lost for a period of time. An irreversible commitment of a resource refers to a resource that is used in the project implementation and will never return.

Because the No-Build Alternative only consists of minor and isolated construction to maintain the roadway, the irreversible and irretrievable commitment of resources would be minor. Maintenance

practices would result in the irreversible expenditure of labor, fiscal resources, and fossil fuels, as well as the irretrievable commitment of construction materials.

Implementation of the Build Alternatives would involve a commitment of a range of natural, physical, human, and fiscal resources. Land used for the construction of the Build Alternatives is considered an irretrievable commitment during the time period that the land is used for the highway facility. However, if a greater need arises for use of the land or if the highway facility is no longer needed, the land can be converted to another use. At present, there is no reason to believe such a conversion will be necessary or desirable.

Considerable amounts of fossil fuels, labor, and highway construction materials, such as cement, aggregate, and asphalt material, would be expended. Additionally, large amounts of labor and natural resources would be used in the fabrication and preparation of construction materials. Labor and expenditure of fossil fuels, such through electricity and vehicle use, during construction activities would be irreversibly expended. Construction materials such as aggregate and steel would be irretrievable until the project is removed, recycled, and used elsewhere. Any construction also would require a substantial one-time expenditure of both state and federal funds, which is dedicated to the project and cannot be restored.

The commitment of these resources is expected to benefit residents in the immediate area, region, and state as a result of the improved quality of the transportation system. These benefits will consist of improved safety, mobility, savings in time, and greater availability of quality of services, which are anticipated to outweigh the commitment of these resources. During Tier 2 studies, irreversible and irretrievable commitments of resources will be further identified and disclosed.

Mitigation for Irreversible and Irretrievable Commitment of Resources

The irreversible and irretrievable commitment of resources is unavoidable in order to construct the project. However, implementation of BMPs and mitigation measures, as discussed in Sections 4.1 through 4.4 and summarized in Chapter 8, are expected to minimize resource losses to the extent practicable. During Tier 2 studies, when project footprints are identified, additional mitigation measures will be developed as needed.

4.4.8 Short-Term Uses versus Long-Term Productivity

42 USC 4432 102(C)(iv) requires a discussion of the relationship between local, short-term uses of the environment and the long-term productivity resulting from the project. Because the No-Build Alternative

only consists of minor and isolated construction to maintain the roadway, it would result in fewer short-term uses of resources, as compared to the Build Alternatives. However, long-term productivity would be adversely affected because safety and mobility would not be improved along the corridor.

The greatest short-term impacts associated with the proposed project would occur during land acquisition and project construction proposed with the Build Alternatives. However, these short-term uses of human, physical, socioeconomic, cultural, and natural resources would contribute to the long-term productivity of the project area.

The short-term local impacts and use of resources by implementing any of the Build Alternatives would be offset by long-term benefits of improved safety and mobility. Construction of the Build Alternatives would improve the U.S. 50 corridor, which is the critical link to the long-range transportation system for the region. The project is consistent with the long-range transportation goals and objectives of the *CDOT 2012–2017 State Transportation Improvement Program*. It is anticipated that the roadway would enhance long-term access and connectivity opportunities in the Lower Arkansas Valley, and would support local, regional, and statewide commitments to transportation improvement and economic viability.

Mitigation for Short-Term Uses

Short-term uses will be minimized through all of the mitigation measure listed in Chapter 8, Mitigation Strategies, or the resource specific mitigation discussions in Sections 4.1 through 4.4. Additional measures to reduce short-term uses will be implemented as needed.

5 Section 4(f) Evaluation

Section 4(f) of the U.S. Department of Transportation Act of 1966 declared 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 …" (49 USC 303). To implement the Act, the FHWA adopted regulations to preserve and protect these resources. Any transportation projects that impact these resources are considered to "use" Section 4(f) resources.

A "use" of a Section 4(f) resource can occur in three ways:

- Land is permanently incorporated into a transportation facility, such as through right-of-way acquisition. This is a **direct use**.
- Land is temporarily occupied by a transportation project, such as by a construction easement, and the occupancy is adverse in terms of the Section 4(f) statute's preservationist purposes. This is a **temporary use**.
- There is no permanent incorporation of land, but the proximity of the transportation project results in adverse effects (such as noise, access, and/or ecological effects) that are so severe that the activities, features, or attributes that qualify the resource for protection under Section 4(f) are substantially impaired. These types of effects are considered a **constructive use**.

Section 4(f) Resources that May Be Used by the Build Alternatives

Publicly owned parks and recreation areas:

- *2 public golf courses*
- *5 State Wildlife Areas (used for hunting and other recreational activities, not including John Martin Reservoir)*
- *1 state park*
- *2 planned trails*
- *1 school recreational facility*

Wildlife and waterfowl refuges: none

Historic resources:*
Linear (23 to 27)

- *1 railroad*
- *20 to 24 irrigation canals*
- *Arkansas River levee at Las Animas*
- *Santa Fe Trail*

Non-linear (37 to 52)

- *14 to 17 U.S. 50 bridges*
- *15 to 17 buildings associated with farms and ranches*
- *6 to 16 other buildings or structures*
- *1 historic neighborhood*
- *1 segment of U.S. 50*

Archeological resources:

- *9 archaeological sites*

** Tier 1 analysis has identified sites that are known historic resources and sites that may be historic. Additional research will be needed during Tier 2 studies to determine whether a particular site is a Section 4(f) resource.*

In addition to these use categories, a *de minimis* finding can be applied if the use is minimal or one with little or no influence to the activities, features, and/or attributes of the Section 4(f) resource. Given the broad level of analysis for this Tier 1 EIS, uses identified in this Section 4(f) evaluation are considered "potential" uses. Therefore, temporary use, constructive use, and *de minimis* findings are not made in this document.

The Section 4(f) regulations require that land cannot be used from these resources for a transportation project or program unless the following circumstances exist:

- There is no prudent and feasible alternative to using the protected resource
- The program or project includes all possible planning to minimize harm to the park, recreation area, wildlife and waterfowl refuge, or historic site resulting from this use
- If there is no feasible or prudent alternative, FHWA must approve the alternative with the least overall harm

The regulations define that an alternative is not feasible if it cannot be built as a matter of sound engineering judgment. An alternative is not prudent if:

- It doesn't address the purpose and need of the project
- It results in unacceptable safety or operation problems
- Reasonable mitigation does not effectively address impacts
- It results in additional construction, maintenance, or operational costs of an extraordinary degree
- It causes other unique or unusual factors
- It involves multiple factors listed previously that, while individually minor, cumulatively cause unique problems or impacts of an extraordinary degree

The purpose and need for this project is described in detail in Chapter 2, Purpose and Need. Chapter 3, Alternatives Considered, discusses the alternatives that were carried forward for further consideration (i.e., the No-Build and Build Alternatives). The Build Alternatives were found to meet the purpose and need of the project; however, the No-Build Alternative would not. These content areas are summarized in Section 5.2 and Section 5.3.

Chapter 4, Affected Environment, Environmental Consequences, and Mitigation, discusses the social, economic, and environmental resources that could be affected by the Build Alternatives and the No-Build Alternative. Across the 150-mile U.S. 50 corridor, there are a number of public recreation lands, as well as designated historic sites and numerous other sites that may be historic. The State Wildlife Areas along

U.S. 50 are managed for and serve recreation purposes, such as hunting, and are not designated wildlife or waterfowl refuges. Some of the resources that may be affected could be protected under Section 4(f), as shown in the text box on the preceding page. Section 5.5 describes these resources and the potential of each Build Alternative to use them.

A key principle in Section 4(f) regulations is the requirement to avoid and minimize impacts to Section 4(f) resources. However, for a Tier 1 EIS, federal regulations recognize that the level of detail and information needed to demonstrate avoidance and minimization of impacts may not be available. Furthermore, at this level of analysis, it may not be possible to even accurately or adequately identify land and properties that are subject to Section 4(f) protection. As a result, decisions made during Tier 1 will focus on not precluding opportunities to minimize harm to these resources during Tier 2 studies. This approach to evaluating Section 4(f) properties reflects these concepts and provisions in the federal regulations. The approach used for this Tier 1 Section 4(f) evaluation is presented below in Section 5.1, Methodology for Section 4(f) Resources.

At the time Tier 2 studies are prepared, additional evaluations will be made of all feasible and prudent alternatives that avoid or minimize the use of Section 4(f) resources and reflect all possible planning to minimize harm to them.

The following sections summarize:

- The approach used in this Tier 1 Section 4(f) evaluation
- The purpose and need for the project
- The alternatives that were investigated to address that need
- The Build Alternatives
- The potential use the Build Alternatives may have on land and properties that likely are subject to the provisions of Section 4(f)
- Tier 1 avoidance and minimization measures
- Summary of the Tier 1 Section 4(f) Evaluation
- The next steps to be taken during Tier 2 studies

5.1 METHODOLOGY FOR SECTION 4(F) RESOURCES

Section 4(f) resources in the one- to four-mile-wide U.S. 50 project area were identified through a combination of agency coordination, field reconnaissance, and literature reviews. Two resource types protected under Section 4(f) are present in the area. These include publicly owned recreation areas and properties that are listed or may be eligible for listing on the NRHP. CPW manages State Wildlife Areas in southeast Colorado for hunting and preservation of species; however, since the State Wildlife Areas are not solely managed for preservation, CPW does not consider them a wildlife refuge (Black 2009). Because of this, there are no wildlife or waterfowl refuges present in the area.

Potential effects to historic resources and publicly owned recreation areas, which are considered Section 4(f) resources, are considered if any part of the resource was contained within a 1,000-foot-wide corridor (see Figure 5-1). This corridor width is used to evaluate most resources for this Tier 1 EIS, and is the area that could be directly affected by a Build Alternative.

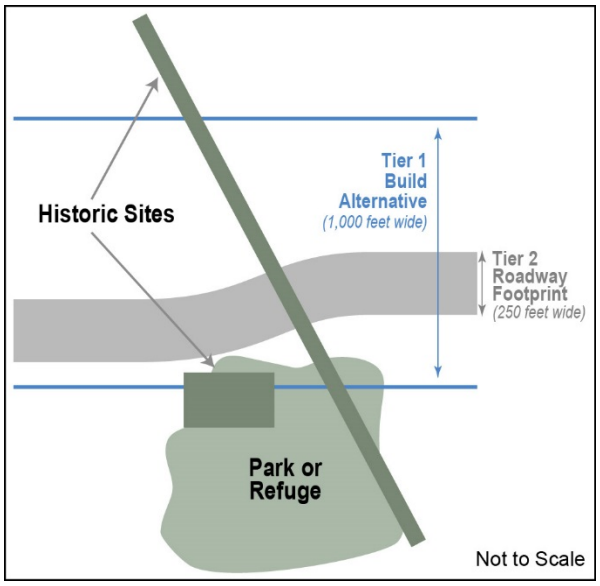


Figure 5-1. Corridor Widths Used to Consider Potential Use of Section 4(f) Resources

There are three important limitations or qualifications regarding this Tier 1 Section 4(f) analysis that need to be recognized. These limitations in the analysis pertain to:

- The methodology used to identify resources that are or may be historic
- The degree of confidence that a resource would be affected by a Build Alternative
- The uncertainty that potentially affected land within a publicly owned multiple use area with recreation would be used for recreation

These limitations are discussed in the following subsections. These limitations do not allow for a detailed Section 4(f) evaluation; therefore, FHWA cannot approve the use of Section 4(f) resources at the Tier 1 level. Section 4(f) approvals will be made during subsequent Tier 2 studies.

5.1.1 Methodology Used to Identify Resources that are or may be Eligible for Listing on the NRHP

A review of existing literature, a file and records search, and a "windshield" survey were used to identify known historic resources and resources that may be eligible for listing. This approach is adequate for the broad-scale Tier 1 transportation study of identifying a general corridor location. However, additional research in Tier 2 studies may determine that other historic sites exist or that some of the resources identified in Tier 1 are not eligible for listing. The conservative approach used in this document was to treat sites that may be eligible as if they are Section 4(f) resources. Additional resources also may become eligible for the NRHP by the time Tier 2 studies commence. These resources will be disclosed and analyzed at that time.

5.1.2 Degree of Confidence that a Resource would be Affected by a Build Alternative

Since the exact alignment of the proposed rural expressway is not known and will not be determined until Tier 2 studies, it cannot be said with certainty whether there would be any direct effects (e.g., right-of-way acquisition) to a particular resource that may constitute a use under Section 4(f).

5.1.3 Uncertainty that Potentially Affected Land within a Publicly Owned Multiple Use Area would be Used for Recreation

If it is determined in Tier 2 studies that land from a publicly owned multiple-use facility is needed for roadway improvements, it will be necessary to determine whether the specific land needed is actively managed for a recreation purpose. There are several State Wildlife Areas adjacent to the existing U.S. 50 that are publicly owned, managed for multiple uses, and may be used for recreation. Determining the specific use of land within State Wildlife Areas will be conducted in Tier 2 studies when roadway alignments and avoidance alternatives are evaluated. For purposes of this Section 4(f) evaluation, State Wildlife Areas are treated as Section 4(f) resources.

5.2 PURPOSE AND NEED FOR THE PROJECT

The purpose for undertaking transportation improvements in the U.S. 50 corridor from Pueblo, Colorado, to the vicinity of the Colorado-Kansas state line is to improve *safety* and *mobility* for local, regional, and long-distance users of U.S. 50 for present and future travel demand.

The need for improvements on U.S. 50 results from the combined effects of multiple safety and mobility issues. These inter-related issues are both directly and indirectly influenced by the differing needs of the road users, highway deficiencies, roadway geometrics, accessibility (the ability to enter, exit, or cross U.S. 50), numerous speed reduction zones, and lack of passing opportunities.

5.3 BUILD ALTERNATIVES

The Build Alternatives are described in greater detail in Chapter 3, Alternatives Considered, of this document. The Build Alternatives consist of constructing a four-lane expressway on or near the existing U.S. 50 from I-25 in Pueblo, Colorado, to approximately one mile east of Holly, Colorado. In Pueblo, three Build Alternatives are proposed that either improve U.S. 50 on its existing alignment and/or reroute it to the north to utilize SH 47. East of Pueblo, generally, there is one Build Alternative alignment between each of the communities along existing US 50 with a north and south around-town Build Alternative at each of the communities. The around-town alternatives propose relocating U.S. 50 from its current through-town route at Fowler, Manzanola, Rocky Ford, Swink, La Junta, Las Animas, Granada, and Holly. Figure 5-2 provides an overview of the Build Alternatives as proposed.

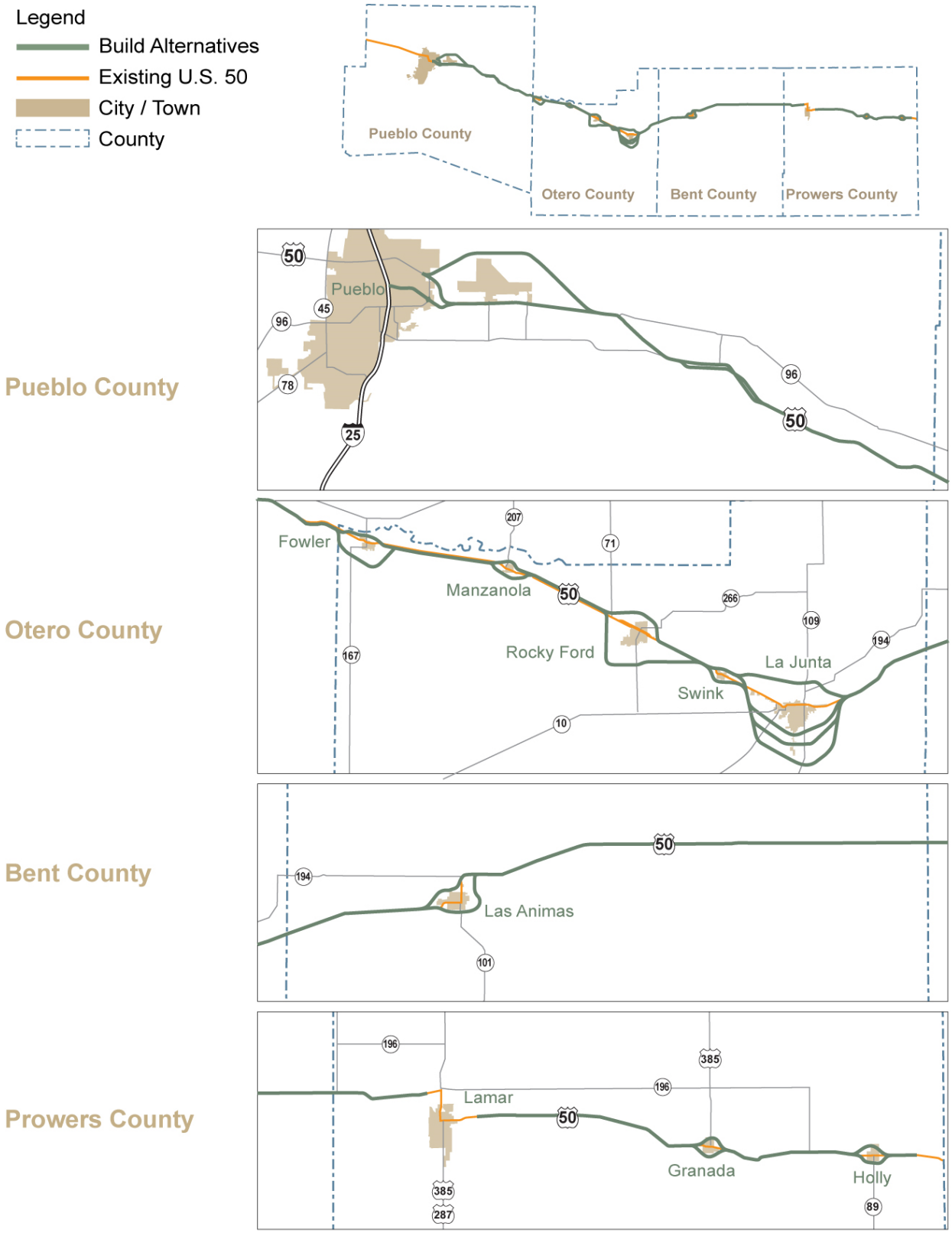


Figure 5-2. Build Alternatives Overview

5.4 SECTION 4(F) RESOURCES AND POTENTIAL USE

The project area contains 89 parkland and recreational resources, 433 historic resources, and 17 archaeological resources, all of which are or may be considered Section 4(f) resources. The APE was used to assess historic properties. As previously discussed, there are no wildlife or waterfowl refuges within the project area.

Section 4(f) resources that the Build Alternatives may potentially use include 11 publicly owned parkland and recreational resources and 60 to 79 historic resources and nine archaeological resources that are listed, or may be eligible for listing, on the NRHP. Please refer to Figure 5-10 through Figure 5-13 (located in Section 5.5.3) for an overview of Section 4(f) resources potentially subject to a use. Preliminary approval of any Section 4(f) use is not possible in this Tier 1 EIS because project details (the ultimate 250-foot-wide highway right of way) within each 1,000-foot-wide corridor will not be defined until Tier 2 studies.

Tier 2 study efforts will need to: (1) determine which of these resources would qualify as Section 4(f) resources, and (2) identify specifically how the Section 4(f) resources would be affected, or used, by each alternative. It may be possible in Tier 2 studies to avoid the use of many of these resources. Discussed below at the conceptual level are potential uses of the two Section 4(f) resource types that are present: parkland and recreational resources and historic and archaeological resources.

5.4.1 Parkland and Recreational Resources

There are 11 parkland and recreational resources in the project area that may incur a potential use by the Build Alternatives. For this evaluation, officials with jurisdiction over the recreation areas in the U.S. 50 project area have been contacted and are a part of the Agency Working Group for this Tier 1 EIS. However, no official determinations of significance of their properties have been requested and, therefore, each resource with a potential use was assumed to be of state or local significance. Coordination regarding significance would occur during Tier 2 studies. In addition, during Tier 2 studies, more detailed information on property boundaries and the functions and use of these properties will be obtained.

Table 5-1 lists the public recreational resources that are found within the 1,000-foot width of the Build Alternatives. Listed are two public golf courses, one state park, five Colorado State Wildlife Areas, two planned trails in Prowers County, and a school recreational facility. Corridor sections not shown in the table contain no identified parkland or recreational resources that would require a use by the respective Build Alternative or Build Alternatives in those sections.

Table 5-1. Parkland and Recreational Resources with a Potential Use by the Build Alternatives

Section	Build Alternatives (if more than one)	Parkland and Recreational Resources
Section 3: Fowler	Alternative 1: Fowler North	Cottonwood Links Golf Course
Section 12: Las Animas	Alternative 2: Las Animas South	Las Animas Municipal Golf Course
Section 13: Las Animas to Lamar	—	Karney Ranch State Wildlife Area and John Martin Reservoir State Park and State Wildlife Area
Section 14: Lamar to Granada	—	Mike Higbee State Wildlife Area
Section 15: Granada	Alternative 1: Granada North	Granada State Wildlife Area
	Alternative 2: Granada South	Prowers County planned trail and Granada School District recreational facility
Section 16: Granada to Holly	—	Granada State Wildlife Area
Section 17: Holly	Alternative 1: Holly North	Holly State Wildlife Area, and Prowers County planned trail
	Alternative 2: Holly South	Holly State Wildlife Area, and Prowers County planned trail

The ultimate assessment of Tier 2 impacts, and thereby the determination of potential Section 4(f) uses, would depend on the specific location of the parkland or recreational facility property lines in relation to the proposed highway right of way, the functions and use of the property, and the extent and type of encroachment on each property. During Tier 2 studies, methods to avoid and minimize impacts will be evaluated. Based on the 1,000-foot-wide corridors evaluated in Tier 1, the potential may exist to avoid the use of some of these resources, such as the State Wildlife Areas. The following discussion describes the use of each of the parkland and recreational resources. For more information on these resources, see Section 4.3.5, Parklands and Recreational Resources.

Public Golf Courses

The Cottonwood Links Golf Course is located in Fowler and is owned and operated by the town. Alternative 1: Fowler North has the potential to affect the golf course by acquiring a portion of the property currently used for holes 6, 7, 8, and 9, which would constitute a direct use of the resource (see Figure 5-3). The clubhouse, which also is used to hold some town meetings, would not be affected. Fowler's land use plan comments on the possible future realignment of U.S. 50 by stating that the "[t]own of Fowler is more supportive of the northern alignment" (Town of Fowler 2009). The same plan also shows this golf course at its current location, however. The potential use of the golf course could affect the alternative chosen at this location. Given that Alternative 1: Fowler North is situated tightly between the Arkansas River and the golf course, there is only limited room to avoid the golf course. However, there is the potential to align the ultimate 250-foot highway to the very north beyond the identified 1,000-foot-wide corridor of the alternative during Tier 2 studies, which could avoid a direct use.

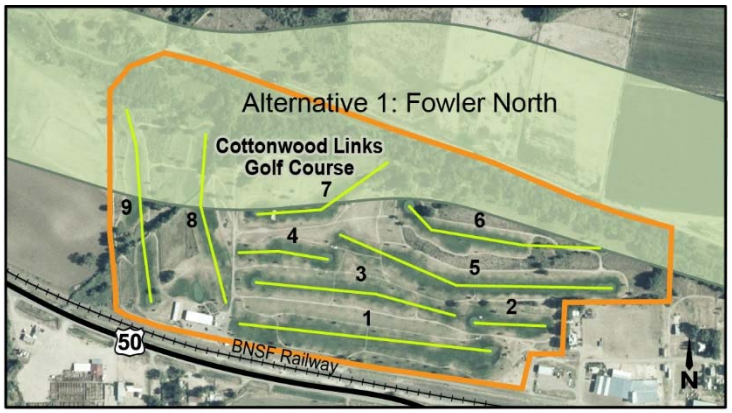


Figure 5-3. Cottonwood Links Golf Course Potential Use

The Las Animas Municipal Golf Course is located in Las Animas on the northeast side of the community and is owned and operated by the town. As shown in Figure 5-4, Alternative 2: Las Animas South could acquire a small portion of right of way on the far eastern property line of the golf course, which would constitute a direct use of the property. At this time, it does not appear that any holes would be affected. The potential to use the golf course could affect the alternative chosen in these locations; however, it is likely that the Las Animas Municipal Golf Course could be avoided during Tier 2 studies. However, since each alternative is a 1,000-foot corridor, each golf course could likely be avoided during Tier 2 studies. Therefore, it is not anticipated to affect the overall decisions made at Tier 1.

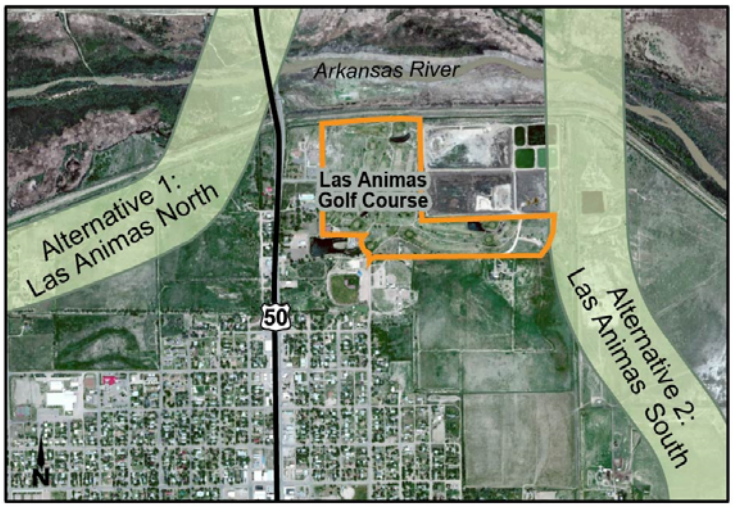


Figure 5-4. Las Animas Municipal Golf Course Potential Use

State Park

The John Martin Reservoir State Park, shown in Figure 5-5, is located between Las Animas and Lamar, adjacent to the John Martin Reservoir State Wildlife Area. In this area, the Las Animas to Lamar Build Alternative is located along the existing two-lane U.S. 50 facility, therefore does not cross the park. However, the primary entrance to the park is located at the junction of U.S. 50 and CR 24 near Hasty (known locally as School Street). The CPW website lists this route as the only suggested way to access the park (Colorado State Parks 2007). Construction activities at the junction could result in a temporary restriction of access to the John Martin Reservoir Park. Detours are likely to be provided during construction, therefore avoiding a temporary restriction of access. However, further evaluation will be completed during Tier 2 studies.

State Wildlife Areas

Five Colorado State Wildlife Areas are located along the existing U.S. 50 corridor Karney Ranch State Wildlife Area, John Martin Reservoir State Wildlife Area, Mike Higbee State Wildlife Area, Granada State Wildlife Area, and Holly State Wildlife Area. These multi-use State Wildlife Areas offer recreational uses that include hunting of wildlife and waterfowl, fishing, and camping, but are not considered wildlife or waterfowl refuges by CPW (Black 2009). The Karney Ranch State Wildlife Area is located to the north of U.S. 50, adjacent to the John Martin Reservoir State Wildlife Area, located to the south of U.S. 50, near milepost 408 (see Figure 5-5). U.S. 50 currently crosses the Karney Ranch State Wildlife Area in one location between milepost 408 and 409, and crosses the John Martin Reservoir State Wildlife Area in two locations at mileposts 408 and 410. At these locations, the Build Alternative would expand the highway to a four-lane rural expressway. As a result, a direct use of the properties may occur by acquiring small amounts of land adjacent to the existing highway facility. Because the existing U.S. 50 facility traverses a portions of these two State Wildlife Areas, it is likely that use of the property will be unavoidable to facilitate highway improvements; however, additional minimization measures will be evaluated in Tier 2 studies.

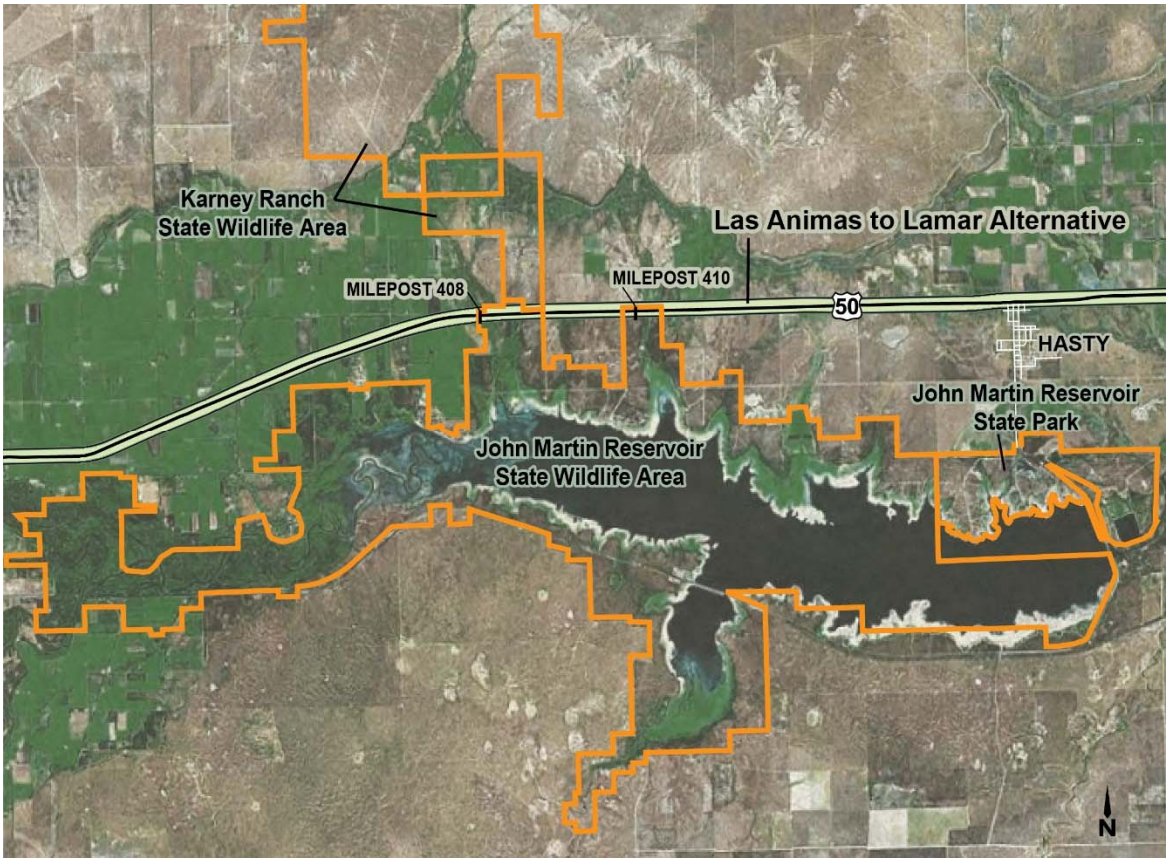


Figure 5-5. Karney Ranch and John Martin Reservoir State Wildlife Areas Potential Use

The Mike Higbee State Wildlife Area is located between Lamar and Granada (see Figure 5-6). In this section of the corridor, the existing U.S. 50 facility is two lanes and the Build Alternative proposes to expand the highway to a four-lane rural expressway. As a result of this expansion, it is anticipated the Build Alternative would acquire a small amount of additional right of way adjacent to the existing highway facility, which constitutes a direct use under Section 4(f).

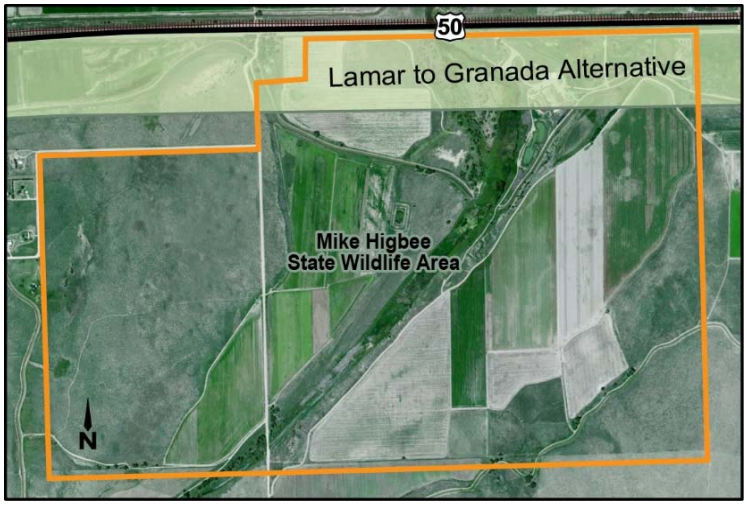


Figure 5-6. Mike Higbee State Wildlife Area Potential Use

Similarly, the Granada State Wildlife Area is located on both sides of the existing two-lane U.S. 50 facility between Granada and Holly (see Figure 5-7). In this location, the Granada to Holly Build Alternative would expand the highway to four lanes and could require additional right of way from the resource, which would be a direct use. Because both of these State Wildlife Areas are located directly adjacent to the existing U.S. 50 in these locations, it is expected that avoidance of these resources is unlikely.

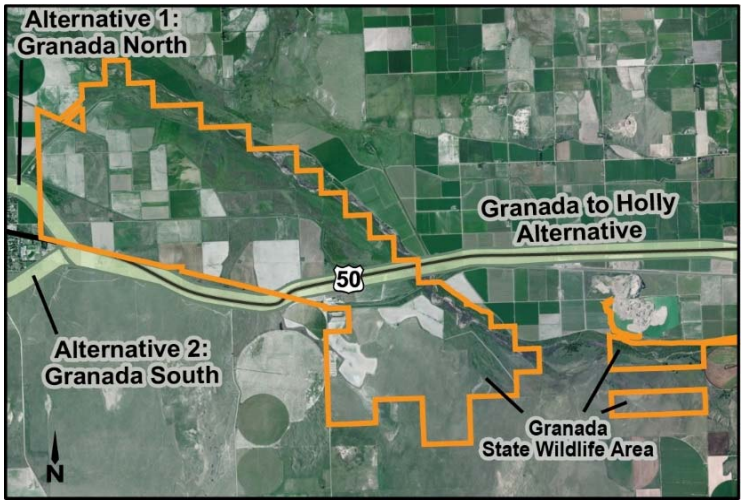


Figure 5-7. Granada State Wildlife Area Potential Use

In addition, a portion of the Granada State Wildlife Area is located just east of the Granada town limits. In this location, Alternative 1: Granada North would traverse a portion of the State Wildlife Area and would require new right-of-way acquisition from the property, which also would be a direct use under Section 4(f). With the alignment of Alternative 1: Granada North, the Granada State Wildlife Area cannot be avoided during Tier 2 studies; therefore, the potential use of the Granada State Wildlife Area is likely to affect the alternative chosen at this location.

In the case of the Holly State Wildlife Area, Alternative 1: Holly North and Alternative 2: Holly South could cross the property in three separate locations, as shown in Figure 5-8. Alternative 1: Holly North would require one new crossing of the State Wildlife Area and right-of-way acquisition, which would be a direct use under Section 4(f). West of Holly, Alternative 2: Holly South would cross the wildlife area in the same general location as the existing U.S. 50 crossing. In this area, the existing U.S. 50 facility is two lanes and Alternative 2: Holly South would require right-of-way acquisition to expand the facility to a four-lane expressway. In addition, Alternative 2 could require a new crossing of—and, therefore, new right-of-way acquisition from—the portion of the wildlife area south of

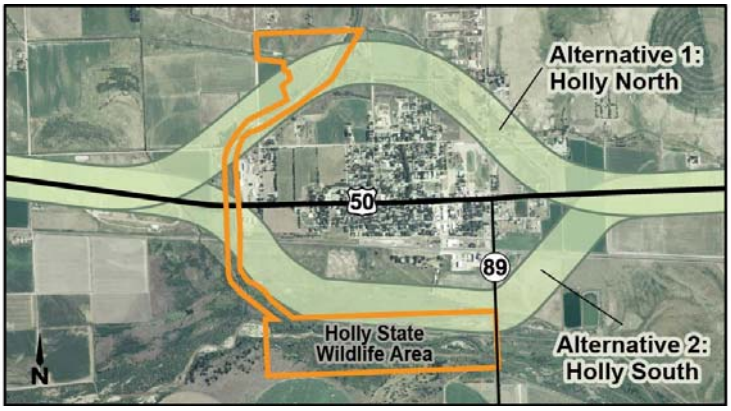


Figure 5-8. Holly State Wildlife Area Potential Use

Holly. However, because the alternative is a 1,000-foot-wide corridor, it is possible that in this area Alternative 2 could avoid a new crossing of the Holly State Wildlife Area during Tier 2 studies. Because there is the opportunity to minimize the potential use of the Holly State Wildlife Area with Alternative 2, while Alternative 1 has unavoidable impacts, the potential use of the Section 4(f) resource is likely to affect Tier 1 decisions in this location.

It has been determined that the State Wildlife Areas in the project area do not serve the primary purpose of being a wildlife refuge; therefore, the Section 4(f) status for each cannot be determined by that criteria. If it is determined that land from a State Wildlife Area would be needed during Tier 2 studies, it will be necessary to determine whether that specific land is used for recreation. CPW, the agency with jurisdiction over State Wildlife Areas, will be consulted to make this determination. If it is not used for recreation, then the property does not qualify as a Section 4(f) resource and no use under Section 4(f) would occur. Since these details will not be known until Tier 2 studies, this Tier 1 Section 4(f) evaluation includes these State Wildlife Areas in this discussion.

Trails

The Prowers County planned trail system traverses both Granada and Holly. In Granada, the planned trail would extend south from Two Buttes Trail and run along CR 25 and also extend east and west along West Amache Road. This alignment would require two crossings by Alternative 2: Granada South. In Holly, the planned trail follows the existing north-south SH 385 and local roadways throughout the town. Neither Alternative 1: Holly North nor Alternative 2: Holly South could avoid a potential direct use of the planned trail. Many of these locations require additional coordination with the county to determine how the Build Alternatives could affect them. If these planned trails are developed by the time Tier 2 studies begin, effects to and potential use of them would be evaluated in more detail.

The four existing Colorado birding trails in the study area are trails on the existing right of way of U.S. 50 and roadways connecting to U.S. 50 within the project area. These trails are the Prairie Canyons, Plover, Two Buttes, and Pronghorn trails. Descriptions and maps of these trails can be found at http://coloradobirdingtrail.com//field guide/CBT-Field-Guide-SE.pdf.

According to 23 CFR 774.13, there are exceptions to the requirement for Section 4(f) approvals. If a trail or path occupies a transportation facility without a specific location within the right-of-way, which is the case of these four birding trails, there is no requirement for Section 4(f) approval. Future improvements to U.S. 50 would not substantially impair the continuity of these bird trails and they would continue to

generally occur in the highway and roadways in the project area, therefore, these four trails are consistent with Section 4(f) exceptions under 23 CFR 774.13(f).

School Recreational Facilities

The Granada School District Re-1, which is located within Granada, contains a recreational facility just south of the existing U.S. 50 alignment. Alternative 2: Granada South could have a direct use of the property by acquiring a small amount of land from its extreme southeast corner (see Figure 5-9). However, because the alternative is a 1,000-foot-wide corridor, it is anticipated the school recreational facility could be avoided during Tier 2 studies. Therefore, the potential use of this property is not expected to influence Tier 1 decisions.

Figure 5-9. Granada School District Property Potential Use

5.4.2 Historic and Archaeological Resources

Section 4(f) affords protection to sites that are eligible for or listed on the NRHP. Resources that may be historic were identified using methods that were discussed and agreed upon by CDOT, FHWA, and the State Historic Preservation Officer. These methods are documented in a PA signed by all three agencies (included in Appendix C, Public and Agency Involvement). Some historic and archaeological resources may not have been identified during this Tier 1 reconnaissance, and some of the resources that were assumed to be eligible for listing may not be. Official eligibility determinations will occur during Tier 2 studies, when specific properties are determined to be eligible and direct and indirect effects are identified. Historic and archaeological resources within the U.S. 50 corridor were identified as linear or non-linear, and are discussed further below. For more details on each resource, please refer to Section 4.3.1, Historic Resources, and Section 4.3.2, Archaeological Resources.

Linear Resources

Linear resources primarily include railroads, trails, and irrigation ditches and canals. Four types of linear resources are listed in Table 5-2. Resources that may be historic include the BNSF Railway, canals and ditches, and the Arkansas River Levee. The Santa Fe Trail is a known historic resource, and has been designated as a National Historic Trail.

The only railroad referred to in Table 5-2 is the actively used BNSF Railway line that was originally part of the Atchison, Topeka, and Santa Fe Railway. The fact that it is listed 15 times in the table indicates how closely U.S. 50 parallels the railroad tracks and must cross them. The existing U.S. 50 alignment crosses the railroad tracks seven times, and the following Build Alternatives have the potential to add new crossings:

- Alternative 1: Pueblo Airport North
- Alternative 1: Rocky Ford North
- Alternative 1: La Junta North
- Alternative 1: Las Animas North
- Alternative 2: Las Animas South
- Alternative 1: Granada North
- Alternative 2: Holly South

The total number of crossings is unlikely to approach 15. In locations where a crossing of the railroad may be avoidable because another Build Alternative would avoid the railroad, such as in Pueblo, the potential use of the resource may affect the alternatives chosen in these locations.

Table 5-2. Linear Resources that May be Historic and Could be Used by the Build Alternatives

Section	Build Alternatives (if more than one)	Linear Resources that May be Historic			
		BNSF Railway[1]	Canals and Ditches[2]	Santa Fe Trail[3]	Arkansas River Levee
Section 1: Pueblo	Alternative 1: Pueblo Airport North	1	1	—	—
	Alternative 2: Pueblo Existing Alignment	1	—	—	—
	Alternative 3: Pueblo SH 47 Connection	1	—	—	—
Section 2: Pueblo to Fowler	Alternative 1: Fort Reynolds Existing Alignment	1	3	—	—
	Alternative 2: Fort Reynolds Realignment	1	3	—	—
Section 3: Fowler	Alternative 1: Fowler North	1	1	—	—
	Alternative 2: Fowler South	—	2	—	—

Table 5-2. Linear Resources that May be Historic and Could be Used by the Build Alternatives (continued)

Section	Build Alternatives (if more than one)	Linear Resources that May be Historic			
		BNSF Railway[1]	Canals and Ditches[2]	Santa Fe Trail[3]	Arkansas River Levee
Section 4: Fowler to Manzanola	—	1	2	—	—
Section 5: Manzanola	Alternative 1: Manzanola North	1	2	—	—
	Alternative 2: Manzanola South	—	2	—	—
Section 6: Manzanola to Rocky Ford	—	1	1	—	—
Section 7: Rocky Ford	Alternative 1: Rocky Ford North	1	2	—	—
	Alternative 2: Rocky Ford South	1	4	—	—
Section 8: Rocky Ford to Swink	—	1	—	—	—
Section 9: Swink	Alternative 1: Swink North	1	—	—	—
	Alternative 2: Swink South	1	—	—	—
Section 10: La Junta	Alternative 1: La Junta North	1	1	1	—
	Alternative 2: La Junta South	1	1	1	—
	Alternative 3: La Junta South	1	1	1	—
	Alternative 4: La Junta South	1	1	1	—
Section 11: La Junta to Las Animas	—	1	2	—	—
Section 12: Las Animas	Alternative 1: Las Animas North	1	2	1	1
	Alternative 2: Las Animas South	1	1	—	1
Section 13: Las Animas to Lamar	—	—	7	1	—
Section 14: Lamar to Granada	—	—	2	—	—

Table 5-2. Linear Resources that May be Historic and Could be Used by the Build Alternatives (continued)

Section	Build Alternatives (if more than one)	Linear Resources that May be Historic			
		BNSF Railway[1]	Canals and Ditches[2]	Santa Fe Trail[3]	Arkansas River Levee
Section 15: Granada	Alternative 1: Granada North	1	2	—	—
	Alternative 2: Granada South	—	1	—	—
Section 16: Granada to Holly	—	1	2	—	—
Section 17: Holly	Alternative 1: Holly North	—	2	1	—
	Alternative 2: Holly South	1	—	—	—
Section 18: Holly transition	—	—	2	1	—

Note: Existing U.S. 50 already crosses the railroad, trail, and most of the ditches and canals referenced here multiple times. Known historic resources include the Huerfano Bridge, Rocky Ford Highline Canal bridge, and the Santa Fe Trail. Both bridges are located on U.S. 50 between Pueblo and Fowler.
[1]All impacts would be to the same railroad, crossed multiple times.
[2]Up to 24 irrigation canals and ditches may be crossed, some of them multiple times.
[3] Trail location is only approximately known; few distinguishable segments remain.

An extensive interconnected system of irrigation canals and ditches is found along U.S. 50 carrying water from the Arkansas River to the highly productive agricultural lands of the Lower Arkansas Valley. The existing U.S. 50 alignment crosses many of these canals. Improvements on the existing U.S. 50 alignment would affect these canals, and realignment alternatives around communities along the corridor could result in crossings of additional canals (see Figure 5-10). A total of 24 canals could be crossed by the Build Alternatives, and many of these could be crossed more than once. These crossings could result in a direct use of the canals and ditches. For more information on the irrigation canals and ditches, please refer to Section 4.1, Rural and Agricultural Environment. Because of the extensive and linear nature of these canals and ditches, crossing these resources is primarily unavoidable and, therefore, it is unlikely to have a bearing on the decisions made in Tier 1.

The following resources are examples of known historic properties that could have a use under the Build Alternatives.

The Santa Fe Trail (5BN.391) was a major travel route that contributed to the expansion of America's western frontier. It has been designated as a National Historic Trail by the NPA. As most of the land where the trail was once traveled has been in private use for more than 100 years, there is little physical evidence of where the trail existed. Maps indicate the approximate location of the trail, and wagon ruts and other features can be found on the ground in a few locations. Based on these maps, it is reasonably certain that the existing U.S. 50 crosses the Santa Fe Trail in at least four locations, and three Build Alternatives (Alternative 2: La Junta South , Alternative 3: La Junta South, and Alternative 4 La Junta South) would result in at least one new crossing south of La Junta. Crossing of the trail could result in a direct use under Section 4(f).

Extensive field investigation will be needed in Tier 2 studies to determine whether there is any physical remnant of the trail in the location(s) where Build Alternatives would cross it. Because of the linear nature of the resource, avoidance in areas of proposed crossings does not appear to be feasible. However, in locations such as Las Animas and Holly, where at least one Build Alternative in each location would avoid the use of the trail, the potential use of the trail could have a bearing on the alternative chosen in these locations.

The Arkansas River levee is a flood-control levee along the north side of the city of Las Animas. A major bridge carries U.S. 50 from Las Animas over the levee to the north side of the river. The Build Alternative would do so, as well. Unlike the other linear resources listed in the table, the Build Alternative would cross the levee at only one location—Las Animas. The effects to the levee would be determined during Tier 2 studies; however, crossing the levee could result in a direct use of the resource. Because neither Alternative 1: Las Animas North or Alternative 2: Las Animas South could avoid the east-west alignment of the levee, it is unlikely to have a bearing on decisions made in this section of the project corridor.

Non-Linear Resources

Non-linear resources in the project area are represented by bridges, buildings, farm and ranch complexes, and archaeological resources. The effects to each of these resources, if any, could constitute a direct use under Section 4(f).

There are 14 to 17 bridges along U.S. 50 that may be historic. One of these, in fact, is already listed in the NRHP—the U.S. 50 bridge over the Huerfano River (5PE.813), located in eastern Pueblo County. The other U.S. 50 bridges will need to be evaluated in Tier 2 studies to determine whether they would qualify for listing in the NRHP. All of these bridges are part of U.S. 50 today, and are located between communities. The majority of these bridges cannot be avoided, since they are on the existing U.S. 50

alignment, and therefore are not expected to affect Tier 1 decisions. However, the Huerfano River bridge could be avoided by Alternative 2: Fort Reynolds Realignment if the existing U.S. 50 facility were used as a frontage road in this location.

The Build Alternative could affect between 15 and 18 buildings associated with farms or ranches. Because building complexes and surrounding associated land can be considered historic, the evaluation of the potential use of farm and ranch complexes under Section 4(f) can be challenging. Some farms and ranches are very extensive, encompassing hundreds or even thousands of acres. For this reason, it may be more difficult to avoid the use of a farm or ranch than to other non-linear resources that involve a specific structure that does not depend on surrounding acreage for its historical significance. The Build Alternatives between communities have less potential for avoidance of these buildings, since most of them are directly adjacent to the existing U.S. 50 alignment. However, around-town Build Alternatives have a greater potential for avoidance of buildings because it would be on a new alignment and the 1,000-foot-wide corridor would allow for avoidance or minimization measures during Tier 2 studies.

Other resources along the corridor include, but are not limited to, a Pueblo neighborhood, a produce stand, and a former horse racing track. Other than the Belmont neighborhood in Pueblo, which would not be directly affected by any of the Pueblo Build Alternatives, these resources tend to be smaller in size than farms or ranches. Because they are smaller, they may be more easily avoidable in Tier 2 studies. Unlike U.S. 50 bridges, these other resources are not part of the existing highway and also may be more avoidable.

Up to nine known archaeological sites that exist along the U.S. 50 corridor have the potential to be used by the Build Alternatives. Due to the sensitive nature of these sites, their locations are not disclosed in this document. Section 4(f) applies to all archaeological sites that are on or eligible for inclusion in the NRHP and that warrant preservation in place. An example of an archaeological resource that exhibits preservation in place is Mesa Verde National Park in southwest Colorado. Section 4(f) does not apply if FHWA, after consultation with the State Historic Preservation Officer or a Tribal Historic Preservation Officer, determines that the archaeological resource is important chiefly because of what can be learned by data recovery (even if it is agreed not to recover the data) and has minimal value for preservation in place [23 CFR 774.13(b(1))]. These decisions cannot be made in Tier 1, but will be made in Tier 2 studies.

Also, while known archaeological resources were identified in Tier 1, additional sites may be discovered during Tier 2 studies and would be evaluated at that time. Table 5-3 summarizes the potential use of non-linear historic resources, with the exception of archaeological sites due to their sensitivity to disturbance. The table also addresses the potential use of these resources to have a bearing on decisions made during Tier 1. Given the limited information available regarding the resources, as well as not having a specific roadway alignment at Tier 1, the potential effect these uses could have on Tier 1 decisions are primarily related to identification of a preferred alternative.

Table 5-3. Non-Linear Resources that May be Historic and Have the Potential to Affect Tier 1 Decisions

Section	Build Alternatives (if more than one)	Resources that May be Historic	NRHP Eligibility[1]	Figure 5-10 through Figure 5-13 ID	Potential to Affect Tier 1 Decisions (Y/N)	Reasoning
Section 1: Pueblo	Alternative 1: Pueblo Airport North	—	N/A	N/A	N/A	N/A
	Alternative 2: Pueblo Existing Alignment	Belmont Neighborhood Post WW-II subdivision	FE	H-1	N	At this location, the highway is a four-lane expressway. No direct use of the district is anticipated because no houses were identified as potentially impacted.
		U.S. 50 bridge over Dry Creek (eastbound)	FE	H-2	N	The bridge is on the existing U.S. 50 alignment. At this location, the highway is a four-lane expressway, so there may be no direct use of the bridge.
		U.S. 50 bridge over Dry Creek (westbound)	FE	H-3	N	The bridge is on the existing U.S. 50 alignment. At this location, the highway is a four-lane expressway, so there may be no direct use of the bridge.
	Alternative 3: Pueblo SH 47 Connection	—	N/A	N/A	N/A	N/A
Section 2: Pueblo to Fowler	Alternative 1: Fort Reynolds Existing Alignment	U.S. 50 bridge over Chico Creek (westbound)	FE	H-4	N	The bridge is on the existing U.S. 50 alignment and would need to be crossed regardless of alternative. However, the highway is already a four-lane highway, reducing the potential for adverse impacts to the bridge.
		U.S. 50 bridge over Chico Creek (eastbound)	FE	H-5	N	The bridge is on the existing U.S. 50 alignment and would need to be crossed regardless of alternative. However, the highway is already a four-lane highway. Reduce the potential for adverse impacts.

Table 5-3. Non-Linear Resources that May be Historic and Have the Potential to Affect Tier 1 Decisions (continued)

Section	Build Alternatives (if more than one)	Resources that May be Historic	NRHP Eligibility[1]	Figure 5-10 through Figure 5-13 ID	Potential to Affect Tier 1 Decisions (Y/N)	Reasoning
Section 2: Pueblo to Fowler (cont.)	Alternative 1: Fort Reynolds Existing Alignment (cont.)	U.S. 50 underpass, Ordnance Depot Road interchange	FE	H-6	N	The bridge is on the existing U.S. 50 alignment, which is a two-lane section at this location. Effects are likely unavoidable regardless of the alternative.
		Farm	FE	H-7	Y	The farm is adjacent to the existing U.S. 50 alignment, which would be improved to a four-lane expressway, resulting in a direct use of the property. However, avoidance is possible with Alternative 2 affecting the identification of a preferred alternative.
		Farm	FE	H-8	Y	The farm is adjacent to the existing U.S. 50 alignment, which would be improved to a four-lane expressway resulting in a direct use of the property. However, avoidance is possible with Alternative 2 affecting the identification of a preferred alternative.
		U.S. 50 bridge over Huerfano River	NR	H-9	Y	The bridge is on the existing U.S. 50 alignment. The bridge would need to be replaced to accommodate the four-lane expressway. However, avoidance is possible with Alternative 2 in this section if the bridge could be preserved in place as a frontage road, affecting the identification of a preferred alternative.
		Rocky Ford Highline Canal Bridge	OE	H-10	N	The bridge is on the existing U.S. 50 alignment, which is a two-lane section at this location. Effects are likely unavoidable regardless of the alternative.

Table 5-3. Non-Linear Resources that May be Historic and Have the Potential to Affect Tier 1 Decisions (continued)

Section	Build Alternatives (if more than one)	Resources that May be Historic	NRHP Eligibility[1]	Figure 5-10 through Figure 5-13 ID	Potential to Affect Tier 1 Decisions (Y/N)	Reasoning
Section 2: Pueblo to Fowler (cont.)	Alternative 1: Fort Reynolds Existing Alignment (cont.)	Ranch	FE	H-11	N	The ranch is adjacent to the existing U.S. 50 alignment. At this location, U.S. 50 is a two-lane highway and would be expanded to a four-lane expressway. Due to its proximity, impacts are likely unavoidable. However, impacts could be minimized during Tier 2 studies.
		Farm	FE	H-12	N	The farm is adjacent to the existing U.S. 50 alignment. At this location, U.S. 50 is a two-lane highway and would be expanded to a four-lane expressway. Due to its proximity, impacts are likely unavoidable. However, impacts could be minimized during Tier 2 studies.
		Farm	FE	H-13	N	The farm is adjacent to the existing U.S. 50 alignment. At this location, U.S. 50 is a two-lane highway and would be expanded to a four-lane expressway. Due to its proximity, impacts are likely. However, impacts could be minimized during Tier 2 studies.
		Farm	FE	H-14	N	The farm is adjacent to the existing U.S. 50 alignment. At this location, U.S. 50 is a two-lane highway and would be expanded to a four-lane expressway. Due to its proximity, impacts are likely unavoidable. However, impacts could be minimized during Tier 2 studies.

Table 5-3. Non-Linear Resources that May be Historic and Have the Potential to Affect Tier 1 Decisions (continued)

Section	Build Alternatives (if more than one)	Resources that May be Historic	NRHP Eligibility[1]	Figure 5-10 through Figure 5-13 ID	Potential to Affect Tier 1 Decisions (Y/N)	Reasoning
Section 2: Pueblo to Fowler (cont.)	Alternative 2: Fort Reynolds Realignment	U.S. 50 bridge over Chico Creek (westbound)	FE	H-4	N	The bridge is on the existing U.S. 50 alignment and would need to be crossed regardless of alternative. However, the highway is already a four-lane highway, reducing the potential for adverse impacts.
		U.S. 50 bridge over Chico Creek (eastbound)	FE	H-5	N	The bridge is on the existing U.S. 50 alignment and would need to be crossed regardless of alternative. However, the highway is already a four-lane highway, reducing the potential for adverse impacts.
		U.S. 50 underpass, Ordnance Depot Road interchange	FE	H-6	N	The bridge is on the existing U.S. 50 alignment, which is a two-lane section at this location. Effects are likely unavoidable since the bridge would need to be improved to a four-lane expressway regardless of the alternative.
		Rocky Ford Highline Canal Bridge	FE	H-10	N	The bridge is on the existing U.S. 50 alignment, which is a two-lane section at this location. Effects are likely unavoidable since the bridge would need to be improved to a four-lane expressway regardless of the alternative.
		Ranch	FE	H-11	N	The ranch is adjacent to the existing U.S. 50 alignment. At this location, U.S. 50 is a two-lane highway and would be expanded to a four-lane expressway. Due to its proximity, impacts are likely unavoidable. However, impacts could be minimized during Tier 2 studies.

Table 5-3. Non-Linear Resources that May be Historic and Have the Potential to Affect Tier 1 Decisions (continued)

Section	Build Alternatives (if more than one)	Resources that May be Historic	NRHP Eligibility[1]	Figure 5-10 through Figure 5-13 ID	Potential to Affect Tier 1 Decisions (Y/N)	Reasoning
Section 2: Pueblo to Fowler (cont.)	Alternative 2: Fort Reynolds Realignment (cont.)	Farm	FE	H-12	N	The farm is adjacent to the existing U.S. 50 alignment. At this location, U.S. 50 is a two-lane highway and would be expanded to a four-lane expressway. Due to its proximity, impacts are likely unavoidable. However, impacts could be minimized during Tier 2 studies.
		Farm	FE	H-13	N	The farm is adjacent to the existing U.S. 50 alignment. At this location, U.S. 50 is a two-lane highway and would be expanded to a four-lane expressway. Due to its proximity, impacts are likely unavoidable. However, impacts could be minimized during Tier 2 studies.
		Farm	FE	H-14	N	The farm is adjacent to the existing U.S. 50 alignment. At this location, U.S. 50 is a two-lane highway and would be expanded to a four-lane expressway. Due to its proximity, impacts are likely unavoidable. However, impacts could be minimized during Tier 2 studies.
Section 3: Fowler	Alternative 1: Fowler North	Montoya residence (house)	FE	H-15	N	The 1,000-foot-wide alternative allows for avoidance of this property during Tier 2 studies.
	Alternative 2: Fowler South	—	N/A	N/A	N/A	N/A
Section 4: Fowler to Manzanola	—	U.S. 50 bridge over the Otero Canal	FE	H-16	N	The bridge is on the existing U.S. 50 alignment, which is a two-lane section at this location. Effects are likely unavoidable since the bridge would need to be improved to a four-lane expressway.

Table 5-3. Non-Linear Resources that May be Historic and Have the Potential to Affect Tier 1 Decisions (continued)

Section	Build Alternatives (if more than one)	Resources that May be Historic	NRHP Eligibility[1]	Figure 5-10 through Figure 5-13 ID	Potential to Affect Tier 1 Decisions (Y/N)	Reasoning
Section 5: Manzanola	Alternative 1: Manzanola North	—	N/A	N/A	N/A	N/A
	Alternative 2: Manzanola South	—	N/A	N/A	N/A	N/A
Section 6: Manzanola to Rocky Ford	—	Building ruin	FE	H-17	N	The building ruin is located within a parcel adjacent to the existing U.S. 50 alignment and is more than 200 feet from the edge of the highway. At this location, U.S. 50 is already a four-lane highway; so there is potential to avoid or minimize effects to this resource in Tier 2 studies.
Section 7: Rocky Ford	Alternative 1: Rocky Ford North	—	N/A	N/A	N/A	N/A
	Alternative 2: Rocky Ford South	Barn	FE	H-18	N	The 1,000-foot-wide alternative allows for avoidance of this property during Tier 2 studies.
		Canal (structure)	FE	H-19	Y	There is an alternative in this section that avoids potential use of the canal structure (Alternative 1: Rocky Ford North), affecting identification of the preferred alternative.
Section 8: Rocky Ford to Swink	—	U.S. 50 bridge over Timpas Creek	FE	H-20	N	The bridge is on the existing U.S. 50 alignment and would need to be crossed regardless of alternative. However, the highway is already a four-lane highway, reducing the potential for adverse impacts.

Table 5-3. Non-Linear Resources that May be Historic and Have the Potential to Affect Tier 1 Decisions (continued)

Section	Build Alternatives (if more than one)	Resources that May be Historic	NRHP Eligibility[1]	Figure 5-10 through Figure 5-13 ID	Potential to Affect Tier 1 Decisions (Y/N)	Reasoning
Section 9: Swink	Alternative 1: Swink North	Migrant worker housing	FE	H-21	N	The 1,000-foot-wide alternative allows for avoidance of this property during Tier 2 studies.
		Mary's Fruit Stand	FE	H-23	N	The 1,000-foot-wide alternative allows for avoidance of this property during Tier 2 studies.
	Alternative 2: Swink South	Residence/ House	FE	H-22	N	The 1,000-foot-wide alternative allows for avoidance of this property during Tier 2 studies.
Section 10: La Junta	Alternative 1: La Junta North	—	N/A	N/A	N/A	N/A
	Alternative 2: La Junta South	—	N/A	N/A	N/A	N/A
	Alternative 3: La Junta South	Otero Ditch tunnel	FE	H-24	N	The 1,000-foot-wide alternative allows for avoidance of this resource during Tier 2 studies.
	Alternative 4: La Junta South	—	N/A	N/A	N/A	N/A
Section 11: La Junta to Las Animas	—	U.S. 50 bridge over Thompson Arroyo (westbound)	FE	H-25	N	The bridge is on the existing U.S. 50 alignment and would need to be crossed regardless of alternative. However, the highway is already a four-lane highway, reducing the potential for adverse impacts.
		U.S. 50 bridge over Thompson Arroyo (eastbound)	FE	H-26	N	The bridge is on the existing U.S. 50 alignment and would need to be crossed regardless of alternative. However, the highway is already a four-lane highway, reducing the potential for adverse impacts.

Table 5-3. Non-Linear Resources that May be Historic and Have the Potential to Affect Tier 1 Decisions (continued)

Section	Build Alternatives (if more than one)	Resources that May be Historic	NRHP Eligibility[1]	Figure 5-10 through Figure 5-13 ID	Potential to Affect Tier 1 Decisions (Y/N)	Reasoning
Section 12: Las Animas	Alternative 1: Las Animas North	—	N/A	N/A	N/A	N/A
	Alternative 2: Las Animas South	Old U.S. 50 segment	FE	H-27	Y	This is a part of the existing U.S. 50 and cannot be avoided to upgrade the highway to a four-lane expressway with Alternative 2: Las Animas South. However, the potential use of the resource could be avoided by Alternative 1: Las Animas North, affecting the preferred alternative identification.
		D-Arcangelis house	FE	H-28	N	The 1,000-foot-wide alternative allows for avoidance of this resource during Tier 2 studies.
Section 13: Las Animas to Lamar	—	Barn	FE	H-29	N	The barn is adjacent to the existing U.S. 50 alignment. However, the highway is four lanes so there may be potential to avoid or minimize effects to the barn during Tier 2 studies.
		Farmstead	FE	H-30	N	The farmstead is adjacent to the existing U.S. 50 alignment. However, the highway is four lanes so there may be potential to avoid or minimize effects to the barn during Tier 2 studies.
		Residence/ House	FE	H-31	N	The 1,000-foot-wide alternative allows for avoidance of this resource during Tier 2 studies.

Table 5-3. Non-Linear Resources that May be Historic and Have the Potential to Affect Tier 1 Decisions (continued)

Section	Build Alternatives (if more than one)	Resources that May be Historic	NRHP Eligibility[1]	Figure 5-10 through Figure 5-13 ID	Potential to Affect Tier 1 Decisions (Y/N)	Reasoning
Section 13: Las Animas to Lamar (cont.)	—	U.S. 50 bridge over McCrae Arroyo	FE	H-32	N	The bridge is on the existing U.S. 50 alignment, which is a two-lane section at this location. Effects are likely unavoidable since the bridge would need to be improved to a four-lane expressway.
		Higley Gems	FE	H-33	N	This resource is adjacent to the existing U.S. 50 alignment. At this location, U.S. 50 is a two-lane highway and would be expanded to a four-lane expressway. Due to its proximity, impacts are likely unavoidable. However, impacts could be minimized during Tier 2 studies.
		Clave Farmstead	FE	H-34	N	The 1,000-foot-wide alternative allows for avoidance of this resource during Tier 2 studies.
		Hasty post office/mercantile	FE	H-35	N	This resource is adjacent to the existing U.S. 50 alignment. At this location, U.S. 50 is a two-lane highway and would be expanded to a four-lane expressway. Due to its proximity, impacts are likely unavoidable. However, impacts could be minimized during Tier 2 studies.
		Farmstead	FE	H-36	N	This farmstead is adjacent to the existing U.S. 50 alignment. At this location, U.S. 50 is a two-lane highway and would be expanded to a four-lane expressway. Due to its proximity, impacts are likely unavoidable. However, impacts could be minimized during Tier 2.

Table 5-3. Non-Linear Resources that May be Historic and Have the Potential to Affect Tier 1 Decisions (continued)

Section	Build Alternatives (if more than one)	Resources that May be Historic	NRHP Eligibility[1]	Figure 5-10 through Figure 5-13 ID	Potential to Affect Tier 1 Decisions (Y/N)	Reasoning
Section 13: Las Animas to Lamar (cont.)	—	U.S. 50 bridge over a draw	FE	H-37	N	The bridge is on the existing U.S. 50 alignment, which is a two-lane section at this location. Effects are likely unavoidable since the bridge would need to be improved to a four-lane expressway.
		Barn	FE	H-38	N	The barn is adjacent to the existing U.S. 50 alignment. At this location, U.S. 50 is a two-lane highway and would be expanded to a four-lane expressway. Due to its proximity, impacts are likely unavoidable. However, impacts could be minimized during Tier 2 studies.
		U.S. 50 bridge over Limestone Creek	FE	H-39	N	The bridge is on the existing U.S. 50 alignment, which is a two-lane section at this location. Effects are likely unavoidable since the bridge would need to be improved to a four-lane expressway.
		Farmstead	FE	H-40	N	The farmstead is adjacent to the existing U.S. 50 alignment. At this location, U.S. 50 is a two-lane highway and would be expanded to a four-lane expressway. Due to its proximity, impacts are likely unavoidable. However, impacts could be minimized during Tier 2 studies.

Table 5-3. Non-Linear Resources that May be Historic and Have the Potential to Affect Tier 1 Decisions (continued)

Section	Build Alternatives (if more than one)	Resources that May be Historic	NRHP Eligibility[1]	Figure 5-10 through Figure 5-13 ID	Potential to Affect Tier 1 Decisions (Y/N)	Reasoning
Section 13: Las Animas to Lamar (cont.)	—	Barn	FE	H-41	N	The barn is adjacent to the existing U.S. 50 alignment. At this location, U.S. 50 is a two-lane highway and would be expanded to a four-lane expressway. Due to its proximity, impacts are likely unavoidable. However, impacts could be minimized during Tier 2 studies.
		Farmstead	FE	H-42	N	The farmstead is adjacent to the existing U.S. 50 alignment. At this location, U.S. 50 is a two-lane highway and would be expanded to a four-lane expressway. Due to its proximity, impacts are likely unavoidable. However, impacts could be minimized during Tier 2 studies.
		Building	FE	H-43	N	This resource is located directly adjacent to the existing U.S. 50 alignment. At this location, U.S. 50 is a two-lane highway and would be expanded to a four-lane expressway. Due to its proximity, impacts are likely unavoidable. However, impacts could be minimized during Tier 2 studies.

Table 5-3. Non-Linear Resources that May be Historic and Have the Potential to Affect Tier 1 Decisions (continued)

Section	Build Alternatives (if more than one)	Resources that May be Historic	NRHP Eligibility[1]	Figure 5-10 through Figure 5-13 ID	Potential to Affect Tier 1 Decisions (Y/N)	Reasoning
Section 14: Lamar to Granada	—	U.S. 50 bridge over Willow Creek overflow	FE	H-44	N	The bridge is on the existing U.S. 50 alignment, which is a two-lane section at this location. Effects are likely unavoidable since the bridge would need to be improved to a four-lane expressway.
		Farmhouse	FE	H-45	N	This resource is adjacent to the existing U.S. 50 alignment. At this location, U.S. 50 is a two-lane highway and would be expanded to a four-lane expressway. Due to its proximity, impacts are likely unavoidable. However, impacts could be minimized during Tier 2 studies.
Section 15: Granada	Alternative 1: Granada North	Residence/ House	FE	H-46	N	The 1,000-foot-wide alternative allows for avoidance of this resource during Tier 2 studies.
	Alternative 2: Granada South	—	N/A	N/A	N/A	N/A
Section 16: Granada to Holly	—	Residence/ House	FE	H-47	N	The 1,000-foot-wide alternative allows for avoidance of this resource during Tier 2 studies.
		U.S. 50 bridge over Granada Creek	FE	H-48	N	The bridge is on the existing U.S. 50 alignment, which is a two-lane section at this location. Effects are likely unavoidable since the bridge would need to be improved to a four-lane expressway.

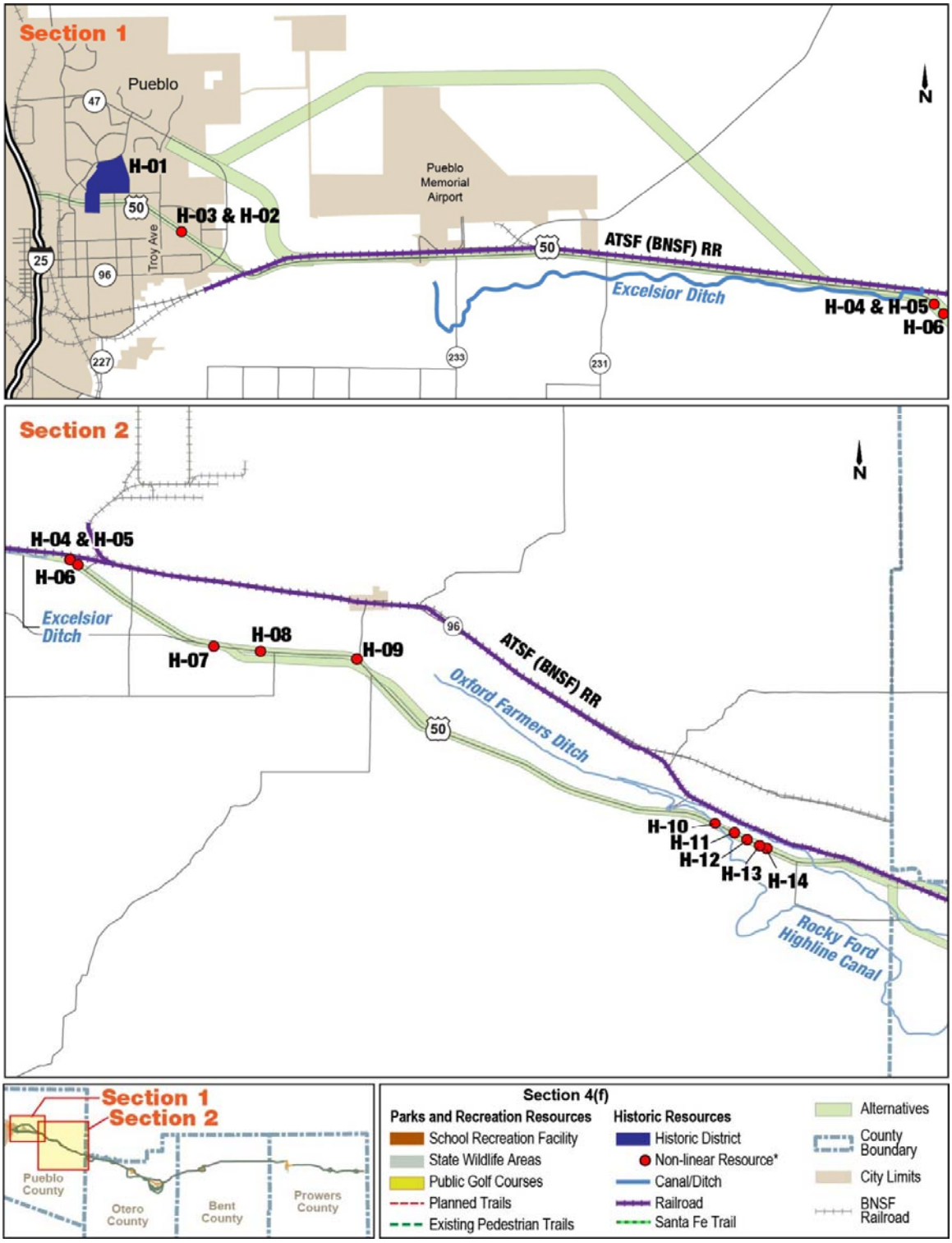
Table 5-3. Non-Linear Resources that May be Historic and Have the Potential to Affect Tier 1 Decisions (continued)

Section	Build Alternatives (if more than one)	Resources that May be Historic	NRHP Eligibility[1]	Figure 5-10 through Figure 5-13 ID	Potential to Affect Tier 1 Decisions (Y/N)	Reasoning
Section 16: Granada to Holly (cont.)	—	U.S. 50 overpass, BNSF Railway separation	FE	H-49	N	The bridge is on the existing U.S. 50 alignment, which is a two-lane section at this location. Effects are likely unavoidable since the bridge would need to be improved to a four-lane expressway.
		Gateway Downs	FE	H-50	N	The 1,000-foot-wide alternative allows for avoidance of this resource during Tier 2 studies.
Section 17: Holly	Alternative 1: Holly North	Horse ranch complex	FE	H-51	N	The 1,000-foot-wide alternative allows for avoidance of this resource during Tier 2 studies.
		Willett's house	FE	H-52	N	The 1,000-foot-wide alternative allows for avoidance of this resource during Tier 2 studies.
	Alternative 2: Holly South	—	N/A	N/A	N/A	N/A
Section 18: Holly transition	—	Holly Rest Area	FE	H-53	N	The 1,000-foot-wide alternative allows for avoidance of this resource during Tier 2 studies.

[1]NRHP Eligibility: FE = Field Eligible, NR = Listed on NRHP, OE = Officially Determined Eligible

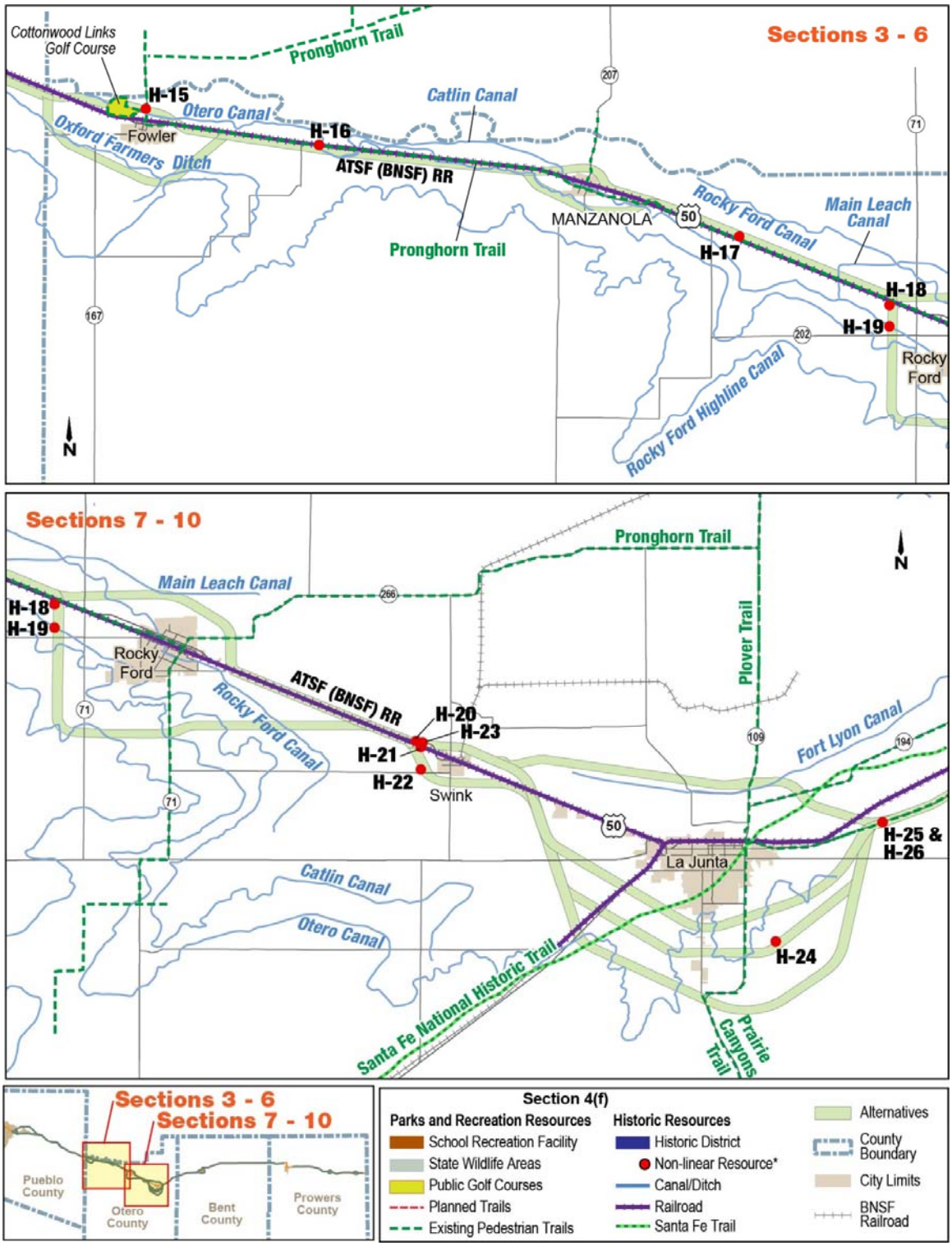
5.4.3 Location Maps of Section 4(f) Resources

The following figures show location maps of the Section 4(f) resources discussed previously in Table 5-3.



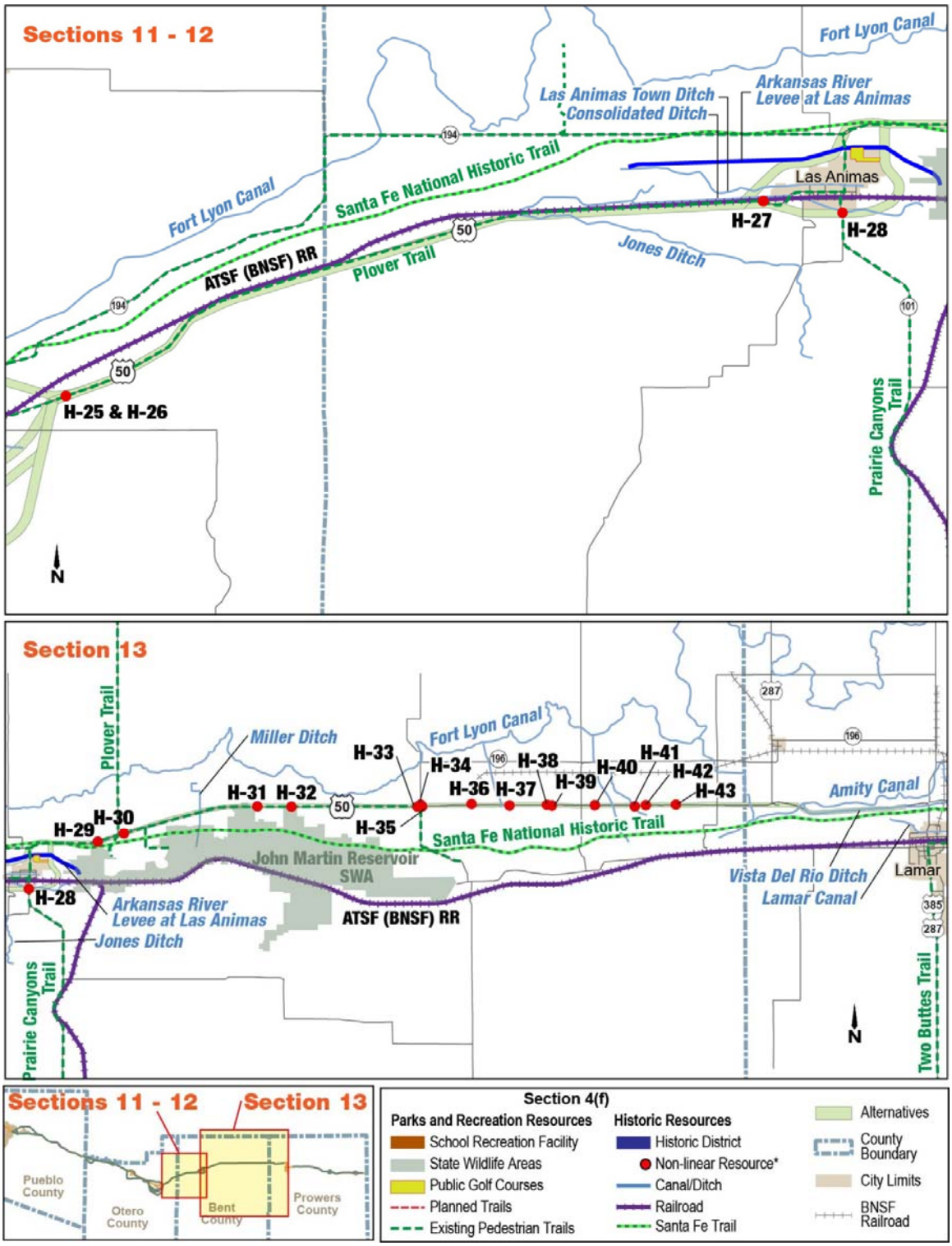
**Refer to Table 5-4 for resource description.*

Figure 5-10. Location Maps of Section 4(f) Resources



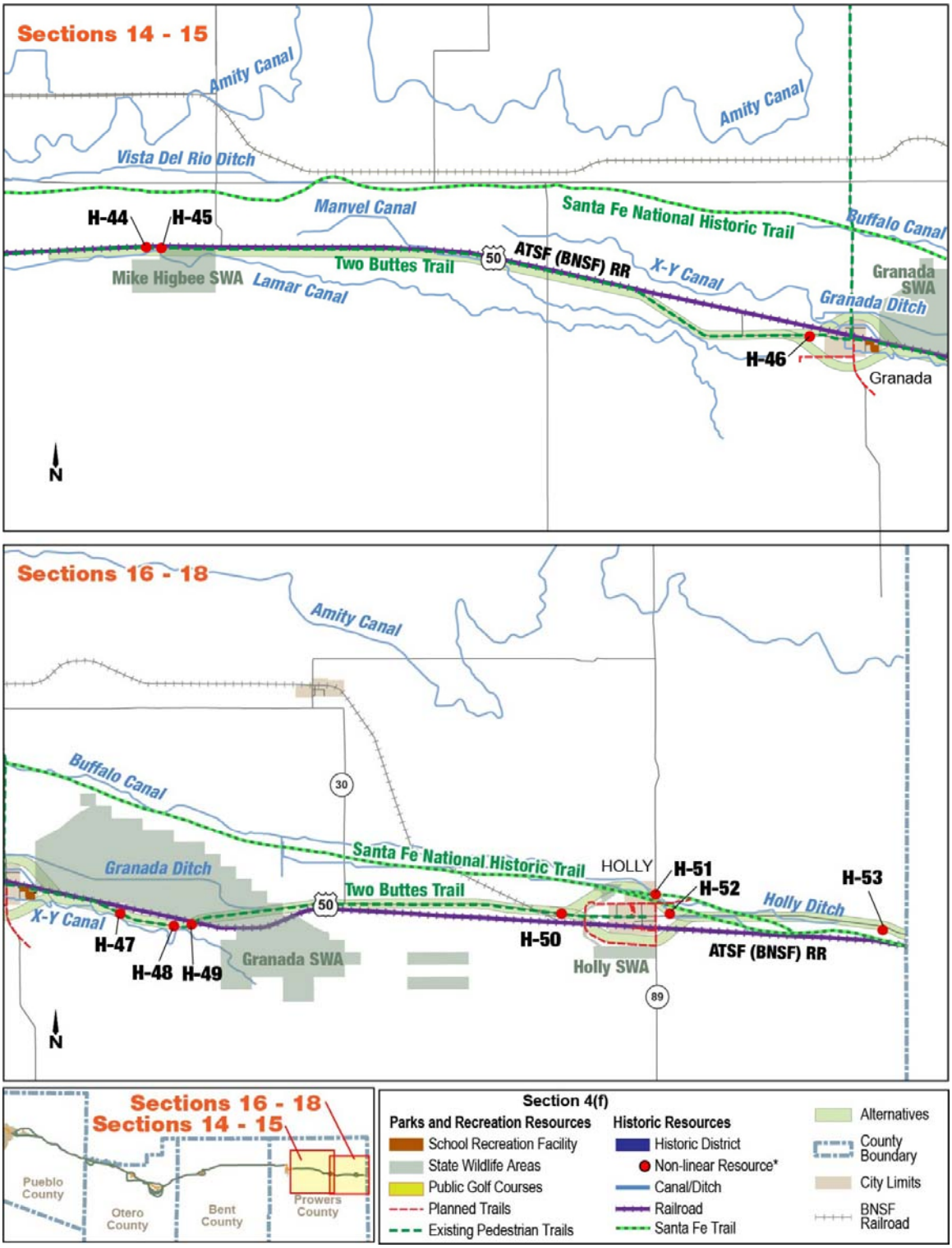
**Refer to Table 5-4 for resource description.*

Figure 5-11. Location Maps of Section 4(f) Resources



**Refer to Table 5-4 for resource description.*

Figure 5-12. Location Maps of Section 4(f) Resources



**Refer to Table 5-4 for resource description.*

Figure 5-13. Location Maps of Section 4(f) Resources

5.4.4 Summary of Section 4(f) Resources and Potential Use

This chapter identifies potential Section 4(f) resources by category. Table 5-4 shows the number of potential resources used by the Build Alternatives in each corridor section. Since many of the resources summarized in the table may be avoidable during Tier 2 studies, the table reflects a conservative over-estimate of the project's potential use of resources under Section 4(f).

Based on environmental and social considerations, as well as public input, a preferred alternative has been identified, which is discussed in Chapter 6, Identification of Preferred Alternative and Summary of Impacts. This corridor-wide alternative was developed with the intent to avoid many of the Section 4(f) resources along the corridor, which consist of historic and archaeological resources and parkland and recreational resources. Alternatives highlighted in gray in Table 5-4 are identified as components of the identified Preferred Alternative. Because of the broad scale nature of this Tier 1 EIS, not enough information is known about the potential Section 4(f) resources or the potential use of these resources by the Build Alternatives. However, there is no feasible and prudent avoidance alternative, as described in the following section, and the remaining Build Alternatives under consideration have not precluded the least overall harm alternative. During Tier 2 studies, specific use of Section 4(f) resources will be assessed when project-specific information is available. At that time, coordination with officials with jurisdiction over Section 4(f) resources will be conducted, a complete Section 4(f) evaluation will determine if prudent and feasible alternatives to avoid the use of Section 4(f) resources exist, and planners and engineers will identify all possible planning to avoid Section 4(f) resources and to minimize harm.

Table 5-4. Summary of Section 4(f) Resources Potentially Used by Build Alternative in Each Corridor Section

Section	Build Alternatives (if more than one)	Number of Parkland and Recreational Resources that May be Used by the Build Alternatives	Number of Historic Resources that May be Used by the Build Alternatives[1]	
			Linear[2]	Non-Linear
Section 1: Pueblo	Option 1: Pueblo Airport North	—	2	
	Option 2: Pueblo Existing Alignment	—	1	3
	Option 3: Pueblo SH 47 Connection	—	1	
Section 2: Pueblo to Fowler	Option 1: Fort Reynolds Existing Alignment	—	4	11
	Option 2: Fort Reynolds Realignment	—	4	9
Section 3: Fowler	*Option 1: Fowler North*	1	2	1
	Option 2: Fowler South	—	2	—
Section 4: Fowler to Manzanola	—	—	3	1
Section 5: Manzanola	*Option 1: Manzanola North*	—	3	—
	Option 2: Manzanola South	—	2	—
Section 6: Manzanola to Rocky Ford	—	—	2	1
Section 7: Rocky Ford	*Option 1: Rocky Ford North*	—	3	—
	Option 2: Rocky Ford South	—	5	2
Section 8: Rocky Ford to Swink	—	—	1	1
Section 9: Swink	*Option 1: Swink North*	—	1	2
	Option 2: Swink South	—	1	1

Table 5-4. Summary of Section 4(f) Resources Potentially Used by Build Alternative in Each Corridor Section (continued)

Section	Build Alternatives (if more than one)	Number of Parkland and Recreational Resources that May be Used by the Build Alternatives	Number of Historic Resources that May be Used by the Build Alternatives[1]	
			Linear[2]	Non-Linear
Section 10: La Junta	Option 1: La Junta North	—	3	—
	Option 2: La Junta South	—	3	—
	Option 3: La Junta South	—	3	1
	Option 4: La Junta South	—	3	—
Section 11: La Junta to Las Animas	—	—	3	2
Section 12: Las Animas	*Option 1: Las Animas North*	—	5	—
	Option 2: Las Animas South	1	3	2
Section 13: Las Animas to Lamar	—	2	5	15
Section 14: Lamar to Granada	—	1	2	2
Section 15: Granada	Option 1: Granada North	1	3	1
	Option 2: Granada South	2	1	—
Section 16: Granada to Holly	—	1	3	4
Section 17: Holly	Option 1: Holly North	2	3	2
	Option 2: Holly South	2	1	—
Section 18: Holly transition	—	—	3	1

[1]This total does not include archaeological resources.
[2]Linear resources include the BNSF Railway, 27 irrigation canals and ditches, the Arkansas River levee, and the Santa Fe Trail. All linear resources may be crossed, some of them multiple times in various locations.

5.5 AVOIDANCE ALTERNATIVES

Section 4(f) regulations refer to an alternative that would not require the use of any Section 4(f) property as an avoidance alternative. Section 4(f) requires a determination of: (1) whether there are feasible and prudent alternatives that avoid the use of Section 4(f) resources, and (2) that these alternatives do not cause severe issues of a magnitude that substantially outweighs the importance of protecting the Section 4(f) resource. An alternative may be removed from consideration after comparing the relative value of the resource to the preservation goal of the statute.

As stated in 23 CFR 774.17, an alternative is not feasible if:

- It cannot be built as a matter of sound engineering judgment.

An alternative is not prudent if:

- It does not address the purpose and need of the project.
- It results in unacceptable safety or operation problems.
- After reasonable mitigation it still causes severe impacts.
- It results in additional construction, maintenance, or operational costs of an extraordinary degree.
- It causes other unique or unusual factors.
- It involves multiple factors listed previously that, while individually minor, cumulatively cause unique problems or impacts of an extraordinary degree.

5.5.1 No-Build Alternative

In accordance with NEPA, a no-build alternative is included in this EIS to provide a basis for comparison with the build alternatives. Under the No-Build Alternative, routine maintenance, repairs, and bridge repair would be done, as necessary, to keep U.S. 50 in usable condition, but no efforts would be made to address corridor-wide transportation needs. As such, it was determined that the No-Build Alternative would not meet the purpose and need of the project because it would not improve safety and mobility for all users.

5.5.2 Regional Corridor Locations

In addition to the No-Build Alternative, two regional corridors were evaluated during the alternatives development process. As discussed in Chapter 3, Alternatives Considered, regional corridor alternatives were eliminated because they did not address the project purpose and need, goals, and objectives.

North Regional Corridor

The north regional corridor would be located one to 10 miles north of U.S. 50. It would use other existing roadway corridors, including SH 96, SH 266, and SH 196, as well as portions of U.S. 50. This corridor would remain entirely on the north side of the Arkansas River, including at the U.S. 287 junction. The north regional corridor only marginally addresses mobility for the various user groups, and, therefore, would not fully meet the project's purpose and need. For this reason, the alternative was not found to be a potential feasible and prudent avoidance alternative and was eliminated from further consideration.

South Regional Corridor

The south regional corridor would be located one to 10 miles south of U.S. 50. This corridor would follow existing power lines, which are located three to four miles south of U.S. 50 from eastern Pueblo County to La Junta. It would remain south of U.S. 50 to Las Animas. The south regional corridor would then turn north, crossing the Arkansas River to rejoin the existing U.S. 50 highway north of Las Animas. It would continue east on the existing U.S. 50 highway and then shift just north of Granada. From Granada to the Colorado-Kansas state line, the south regional corridor would again follow the existing U.S. 50 highway. The south regional corridor only marginally addresses mobility for the various user groups, and, therefore, would not fully meet the project's purpose and need. For this reason, the alternative was not found to be a potential feasible and prudent avoidance alternative and was eliminated from further consideration.

As discussed above, a reasonable range of feasible and prudent avoidance alternatives involving different alignments and including the No-Build Alternative were studied to avoid, and/or minimize the use of significant public parks, recreation areas, wildlife and waterfowl refuges and historic sites by the U.S. 50 project. Through analyses described in Chapter 3, Alternatives Considered, none of the avoidance alternatives were determined to be a prudent and feasible alternative because they would compromise the project to the degree that the project would no longer meet the purpose and need.

5.6 MEASURES TO MINIMIZE HARM

During the alternatives development process, alternatives were evaluated that would remain on the existing U.S. 50 alignment through towns east of Pueblo. Because it was determined a four-lane rural expressway would best meet the purpose and need of the project, each two-lane alignment through the communities would need to be substantially widened. The existing right of way through these communities varies from 60 feet to 80 feet. The ideal typical section for the four-lane expressway through the towns would require a 194-foot-wide right of way. These through-town alternatives would

unavoidably require taking of at least 150 resources that could be historic. In addition, 11 parkland and recreational resources would be impacted by the through-town alternatives. By eliminating the through-town alternatives during the alternatives development process, the use of nearly 200 Section 4(f) resources were avoided and overall potential Section 4(f) impacts minimized.

To minimize potential impacts in the around town alternatives, a 1,000-foot-wide corridor was identified for each Build Alternative in Tier 1. These 1,000-foot-wide corridors are intended to accommodate the ultimate 250-foot-wide highway right of way during Tier 2 studies. By identifying large corridors for each alternative, it allows for additional avoidance and minimization of the potential use of Section 4(f) resources during Tier 2 studies. Tier 2 study efforts also will include conceptual design for the proposed highway improvements, providing design opportunities to shrink the footprint of project impacts on a case-by-case basis, where needed. Therefore, the 1,000-foot-wide Build Alternatives would not preclude additional avoidance or minimization efforts during Tier 2 studies.

5.7 LEAST HARM

When all alternatives result in the use of a Section 4(f) resource and if there is no feasible and prudent avoidance alternative, an analysis must be completed to identify the alignment that results in the least overall harm to each Section 4(f) property. The ability to conduct this analysis during this Tier 1 EIS is limited because project details within each of the 1,000-foot-wide corridors around towns will not be defined until Tier 2 studies are conducted.

As preferred alternatives are advanced in Tier 2 studies, design details within the 250-foot-highway right of way will be refined to avoid and minimize impacts to Section 4(f) properties, where applicable. Guidance included in FHWA's Section 4(f) Policy Paper (FHWA 2012a) notes that during a tiered process, when sufficient information is unavailable during a first-tier stage, then the EIS may be completed without any preliminary Section 4(f) approvals. Planning during this Tier 1 EIS has been limited to ensuring that opportunities to minimize harm later in the development process have not been precluded by decisions made during this Tier 1 EIS.

5.8 SUMMARY OF TIER 1 SECTION 4(F) EVALUATION

The Section 4(f) evaluation presented in this chapter is based upon a level of detail consistent with Tier 1 analysis. It is intended to:

- Evaluate each Build Alternative's potential use of Section 4(f) resources as those uses relate to the general corridor location decision to be made at Tier 1
- Ensure that opportunities to minimize harm to Section 4(f) resources in Tier 2 studies are not precluded by decisions

With regard to around-town alternatives, note that the number of Section 4(f) resources in one around-town Build Alternative versus another is not a definitive indication of relative Section 4(f) uses of the alternatives in that particular location. For example, suppose the northern alternative around a town includes three resources while the southern alternative contains two. These numbers do not tell the whole story because, in Tier 2 studies, a detailed analysis may show that the ultimate alignment could avoid the use of one or more of the resources in either corridor or that the significance of one resource is greater than another. This could change an apparent advantage from one corridor to the other.

A key objective of the Tier 1 Section 4(f) evaluation is to support the decisions made regarding the type and general corridor location of transportation improvements that meet the project's purpose and need. Completing this limited evaluation at Tier 1 reduces the potential that decisions made in the Tier 1 EIS would need to be reconsidered during Tier 2 studies on the basis of Section 4(f) requirements.

5.9 AGENCY COORDINATION

The primary coordination with officials with jurisdiction has been through the Agency Working Group, which was developed for the Tier 1 EIS. The group is comprised of representatives from 13 federal, state, and local agencies. The Agency Working Group was not specifically developed for Section 4(f) resources. The roles of the group include facilitating corridor decisions regarding modal choice, identifying a preferred location and logical termini, providing the prioritization and design parameters for Tier 2 studies, and developing corridor-wide environmental mitigation strategies.

Information about certain Section 4(f) resources was obtained during consultations with the following agencies:

- CPW—to identify boundaries, uses, and potential effects to state wildlife areas
- NPS—to determine potential effects to the Santa Fe National Historic Trail (5BN.391)
- Bent's Old Fort National Historic Site (5OT.149), and the Granada Relocation Center National Historic Landmark (i.e., Camp Amache) (5PW.48).

These consultations were documented using the Section 4(f) review form (see the Section 4(f) and Section 6(f) Resources Technical Memorandum in Appendix A).

For historic and archaeological resources, FHWA and CDOT developed a Programmatic Agreement (PA) with the SHPO (located in Appendix A: Resource Related Technical Reports titled, "Process and Agreements")to outline the Section 106 process for the Tier 1 evaluation and to clarify processes for future Tier 2 studies. In fulfillment of the PA, the following stipulations have been met:

1. Consultation on APE with SHPO (November 2006)
2. Identification of consulting parties
3. Completion of Cultural Resources Reconnaissance Survey Report and Historic Context Overview (submitted to SHPO and consulting parties in August 2009 and included in Appendix A: Resources Related Technical Reports titled, "Historic and Archeological Resources")

Consultation on eligibility and effect determinations will occur in the Tier 2 studies. A copy of the PA and associated correspondence is included in Appendix C.

Coordination and consultation with officials with jurisdiction over Section 4(f) resources is ongoing. More extensive coordination will be conducted during Tier 2 studies when roadway alignments have been identified.

5.10 NEXT STEPS: TIER 2 PROCESSES

Given the broad-scale nature of this Tier 1 EIS, FHWA cannot approve the use of any Section 4(f) resources at this time. However, Section 4(f) approvals will be made during Tier 2 studies. The following steps will be required at that time:

1. Identify Section 4(f) resources on a project-specific basis (i.e., each section of independent utility).
2. Continue coordination with officials with jurisdiction over Section 4(f) resources to determine eligibility of property, potential effects, and potential mitigation.
3. Identify the use of each identified Section 4(f) resource by the alternatives proposed during the Tier 2 study.
4. Complete a Section 4(f) evaluation to determine if prudent and feasible alternatives to avoid the use of Section 4(f) resources exist.
5. Identify all possible planning to minimize harm.
6. If no prudent or feasible avoidance alternatives are identified, conduct a least-harm analysis to determine which alternative causes the least overall harm. FHWA may approve only the alternative that causes the least overall harm.

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6 Identification of Preferred Alternative and Summary of Impacts

Chapter 4, Affected Environment, Environmental Consequences, and Mitigation, discusses the affected environment, environmental consequences, and mitigation strategies associated with the resources evaluated for this U.S. 50 Tier 1 EIS. This chapter further screens the Build Alternatives to identify a preferred alternative and it summarizes the resource impacts for that alternative by resource category.

6.1 PREFERRED ALTERNATIVE IDENTIFICATION

Chapter 3, Range of Alternatives, describes the process used to identify and evaluate the regional corridor locations, the transportation modes, facility types, and through-town and around-town options for U.S. 50. To identify a preferred alternative, the Build Alternatives around communities, including the proposed realignment between Pueblo and Fowler, were further screened. For most communities, two around-town alternatives (one to the north and one to the south) were identified during the alternatives development process. This happened by involving community members, agency stakeholders, and others in the decision making, while also considering the alternative's ability to meet the purpose and need of the project as well as socioeconomic and environmental constraints. These locations then were evaluated based on criteria consistent with a Tier 1 level of analysis. This evaluation focused on three broad purpose and need-related categories that considered effects to the following environment categories:

- Rural and agricultural environment
- Natural environment
- Community and built environment

6.1.1 Evaluation of Build Alternatives (Around-Town Corridors)

Criteria to screen around-town Build Alternatives were developed based on comments received from agencies and the public, as well as regulatory requirements.

Public workshops were held in each of the 10 communities along the U.S. 50 corridor to determine what resources were important to the local economy and quality of life (see Chapter 7, Community Outreach and Agency Involvement, and Appendix C, Public and Agency Involvement). One important local concern was that the U.S. 50 corridor location should not be too far away from the communities and it should support the idea of creating a gateway into the community. The purpose of the gateway is to attract through-traffic to visit local businesses, which can be achieved by improved access and mobility.

Effects to agriculture also were a concern to community members (due to the region's economic dependence on agriculture), especially those effects that might impact highly productive, irrigated lands.

Federal regulations protect certain resources, such as agricultural land uses, threatened and endangered species, wetlands, waterways, historic resources, parks, and recreational facilities. Evaluation criteria were developed to assess impacts to these resources, in addition to those concerns identified as important to the affected communities. Resources specific to each community—whether because of their presence within or near the community or because of their importance to the community—generally are identified in the screening criteria tables throughout this chapter.

To understand the relationship between the affected resources and community concerns, the screening criteria were grouped together by their potential effects on the rural and agricultural environment, the natural environment, and the community and built environment. These three criteria groups are presented in Table 6-1, Table 6-2, and Table 6-3, respectively. A detailed analysis of the screening criteria results can be found in the Range of Alternatives Technical Memorandum located in Appendix B.

Table 6-1. Rural and Agricultural Environment Screening Criteria

Resource	Importance	How Assessed
Agricultural land	Agriculture is the foundation of the regional and local economies.	Quantity and quality of farmland and ranch lands within the corridor
Agricultural operations	Productivity and economies of scale depend on the ability to efficiently irrigate fields and move equipment and livestock, typically on larger, unfragmented parcels of land.	Qualitative determination

Table 6-2. Natural Environment Screening Criteria

Resource	Importance	How Assessed
Wetland/riparian areas	Wetlands are highly beneficial to the ecology and are protected by federal law and presidential Executive Order 11990.	Quantity and quality (number of acres and functional value) of wetland/riparian areas in the corridor
Waterways	The Arkansas River and its associated floodplain sustain wetlands and riparian vegetation, wildlife habitat, and movement corridors, and provide a vital water source.	Number of new bridge crossings needed
Wildlife	Threatened and endangered species and their habitat are protected by federal and state laws. Other species also are important to the health of the ecosystem. Hunting, fishing, and bird-watching are important recreational activities in the region.	Potential for occurrence of threatened and endangered species habitats in the corridor; effects to State Wildlife Areas; proximity to the Arkansas River; qualitative assessment of habitat fragmentation

Table 6-3. Community and Built Environment Screening Criteria

Resource	Importance	How Assessed
Historic resources	Historic resources are protected by federal law. Effects to historic properties must be considered under federal regulations. Historic resources are important to the culture of the area and have the potential to encourage "heritage tourism."	Number of historic resources within the corridor; number of times a linear historic resource (such as railroads, irrigation canals, and the Santa Fe Trail) is crossed
Homes and businesses	Communities along the U.S. 50 corridor are relatively small and stable, so loss of homes and businesses can disrupt the local economy.	Number of homes and businesses within the corridor
Public parklands and recreation areas	These amenities are important to communities along the U.S. 50 corridor and also are protected by federal regulations.	Number of parklands and recreation facilities affected within the corridor
Visibility of town from the roadway	If the town is not visible from the corridor, through-travelers may be less inclined to stop for goods and services.	Distance from existing U.S. 50 to the new corridor
Compatibility with local land use	The corridor has potential to impact local land use or change existing economic development patterns	Qualitative determination
Air quality	Transportation activities can impact air quality in a manner that may be harmful to people and the environment.	Qualitative determination
Noise	Changes to U.S. 50 will affect the way the noise originating from the roadway impacts the community.	Number of noise-sensitive receptors (e.g., residences) within the 1,000-foot-wide corridor and within 300 feet of the corridor
Other concerns	In some communities, issues were identified in community workshops.	Qualitative determination

Most of the screening criteria involve counting the number of units of the resource potentially affected in the corridor (acres of wetland/riparian zones or number of historic properties). However, considering only the quantity of certain resources, but not the quality, could misrepresent the significance of the impact. Therefore, the quality of these resources also is considered in the assessment.

Tradeoffs

For most communities along the U.S. 50 corridor, the Build Alternative going around town to the north (closer to the Arkansas River) would include comparatively more wetlands, while the Build Alternative going around town to the south would include more farm/ranch lands.

The following paragraphs describe the Build Alternatives around each community and, in one instance, between communities. Key differences between the alternatives are discussed and summarized in a table to show which Build Alternative would have the least potential effects to the rural and agricultural environment, the natural environment, and the community and built environment. In addition, while all Build Alternatives meet the project purpose and need, the ability of the individual alternatives to meet the project purpose and need is discussed where alternatives differ.

At the end of each discussion, recommendations for corridor locations around each community are presented. These results identify locations that are identified as the Preferred Alternative.

A more detailed look at all the screening results for each community is provided in the Range of Alternatives Technical Memorandum, located in Appendix B.

6.1.2 Screening of and Decisions Regarding Build Alternatives

Pueblo Build Alternatives

U.S. 50 connects to I-25 within the city of Pueblo (the western terminus for this Tier 1 EIS). Unlike other Build Alternatives for communities along U.S. 50 that include through-town and around-town options, two local corridor alignments were considered, as well as the existing U.S. 50 alignment, as shown in Figure 6-1.

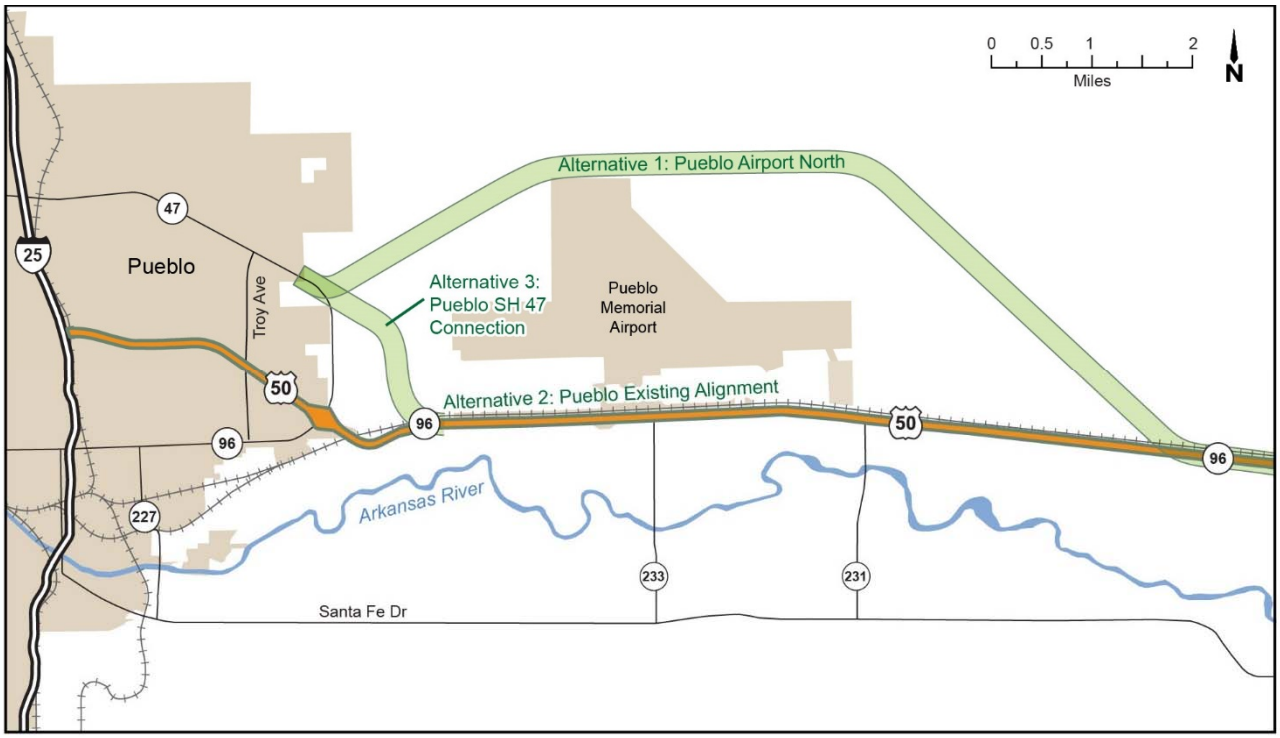

Figure 6-1. Pueblo Build Alternatives

A relocation of U.S. 50 around the north side of the Pueblo Memorial Airport (Alternative 1: Pueblo Airport North in Figure 6-1) was proposed by local officials and included in the region's 2035 Long-Range Transportation Plan. This approximately 12-mile corridor would tie into SH 47 approximately 1.5 miles north of U.S. 50 and 4.5 miles east of I-25. This local proposal would redesignate a portion of SH 47 as U.S. 50. Also, as part of the proposal, U.S. 50 would remain in use under its secondary designation of SH 96.

Another corridor location that could be completed without building a new road was identified by using the existing U.S. 50 corridor (Alternative 2: Pueblo Existing Alignment), which is already a divided, four-lane expressway.

Alternative 1: Pueblo Airport North and a shorter new roadway that would connect U.S. 50 to SH 47 west of the airport (Alternative 3: Pueblo SH 47 Connection) were considered in the CDOT 2003 planning study for U.S. 50. Alternative 3 comprises about two miles of new roadway to tie into SH 47, with the remaining roughly nine miles consisting of minor safety improvements along the existing U.S. 50 alignment.

Evaluation of the resources and issues associated with the Build Alternatives in Pueblo resulted in the findings summarized in Table 6-4. For a detailed analysis, which steps through the resources and/or considerations that make up the criteria category in the table, please refer to Appendix B, Range of Alternatives Technical Memorandum.

Table 6-4. Pueblo Build Alternatives Comparison

Criteria Category	Build Alternative(s) with Fewer Potential Impacts (indicated by checkmark)			Key Differences
	Alternative 1: Pueblo Airport North	Alternative 2: Pueblo Existing Alignment	Alternative 3: Pueblo SH 47 Connection	
Rural and Agricultural Environment		✓	✓	Alternative 2 and Alternative 3 would take less farmland and ranch lands (131 and 103 acres for Alternative 2 and Alternative 3, respectively, compared with 352 acres for Alternative 1) or alter fewer agricultural operations as compared to Alternative 1, which would fragment existing grazing land.
Natural Environment		✓		The existing U.S. 50 (Alternative 2) is already a developed transportation corridor. The other corridors would consume and fragment prairie habitat, with two to nine miles of new roadway.
Community and Built Environment		✓		The existing U.S. 50 corridor (Alternative 2) is already fully integrated with the Pueblo area road network. The other corridors would increase traffic, noise, and vehicular emissions in existing neighborhoods by diverting U.S. 50 traffic onto SH 47. Alternative 1 is the preferred corridor in the 2035 long-range plan, but it is not funded and is anticipated to have a notable impact on existing land use by converting agricultural land to a transportation use.

Alternative 2: Pueblo Existing Alignment has the fewest potential environmental effects to the natural environment and community and built environment because it would not construct new roadway segments, which reduces the potential for effects. In addition, since it is already a divided, four-lane expressway, Alternative 2 would need minimal improvements. For these reasons, it is identified as the Preferred Alternative in Pueblo. The two other Build Alternatives are not preferred because of greater environmental effects resulting from construction of new roadway to connect U.S. 50 and SH 47. In addition, Alternative 1 would result in greater out-of-direction travel for local and regional users, which would not improve mobility to the same extent that Alternatives 2 or 3 would.

Pueblo to Fowler Build Alternatives

The two Build Alternatives under consideration in this section are largely the same; however, Alternative 2: Fort Reynolds Realignment has been proposed to provide additional safety improvements by realigning the road to minimize potential impacts (see Figure 6-2). Improvements to meet design standards for a four-lane rural expressway along the existing alignment (Alternative 1: Fort Reynolds Existing Alignment) in the unincorporated town of Fort Reynolds would result in numerous home acquisitions in the immediate area and removal of the historic Huerfano bridge. The realignment has the potential to minimize or avoid impacts to residences and the bridge.

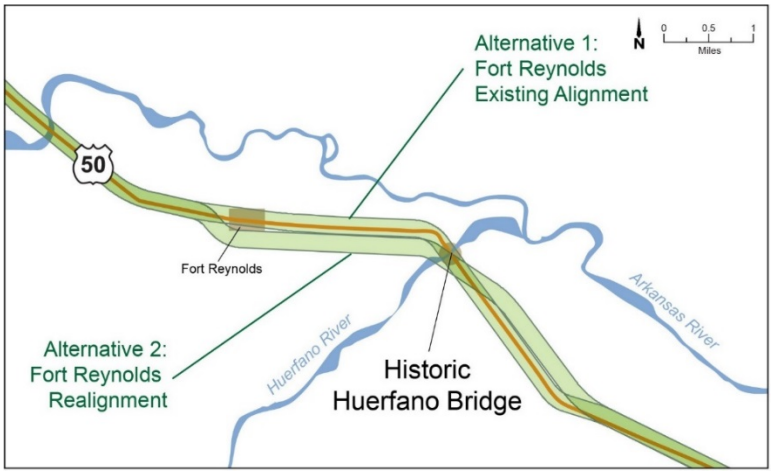

Figure 6-2. Pueblo to Fowler Build Alternatives

Evaluation of the resources and issues associated with the Build Alternatives between Pueblo and Fowler resulted in the findings summarized in Table 6-5. For a detailed analysis, which steps through the resources and/or considerations that make up the criteria category in the table, please refer to Appendix B, Range of Alternatives Technical Memorandum.

Table 6-5. Pueblo to Fowler Build Alternatives Comparison

Criteria Category	Build Alternative(s) with Fewer Potential Impacts (indicated by checkmark)		Key Differences
	Alternative 1: Fort Reynolds Existing Alignment	Alternative 2: Fort Reynolds Realignment	
Rural and Agricultural Environment	✓	✓	The Build Alternatives would have similar impacts to farmland, the realignment option having a slightly higher impact to agricultural productivity due to potential alignment through alfalfa/corn-producing farmlands.
Natural Environment	✓	✓	Both Build Alternatives would require crossing the Arkansas River; Alternative 1 would replace the existing structure and Alternative 2 would require a new crossing. Both have comparable potential to affect wetland and riparian resources, and Alternative 2 has a slightly higher potential for wildlife impacts due to additional ground disturbance for the realignment. However, there are no key differences between the two options.
Community and Built Environment		✓	Alternative 2 would improve safety while also minimizing potential impacts to the community and built environment by having greater opportunity to avoid the acquisition of homes and businesses, shift traffic away from noise-sensitive receptors, and avoid adversely affecting the historic Huerfano bridge.

The two Build Alternatives in this section of the corridor do not differ greatly because they generally follow the same alignment until near the Fort Reynolds area. Both alternatives meet the purpose and need, however, Alternative 2: Fort Reynolds Realignment is better suited to minimize impacts to the community and built environment. Therefore, it is identified as the Preferred Alternative at this location.

Fowler Build Alternatives

The two Build Alternatives considered around Fowler are shown in Figure 6-3. Alternative 1: Fowler North is 3.4 miles long and would be located between the BNSF Railway tracks and the Arkansas River. Alternative 2: Fowler South is slightly less than five miles long, extending nearly one mile south of town to minimize effects to land irrigated by the Oxford Farmers Ditch, a

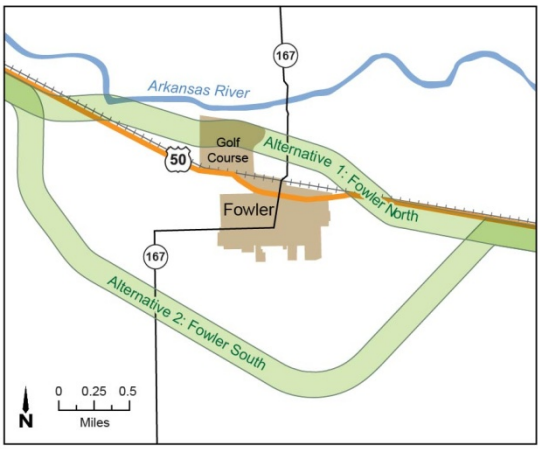

Figure 6-3. Fowler Build Alternatives

major irrigation canal. Alternative 2 provides for additional development opportunities. Both alternatives were developed with community input during the previous CDOT U.S. 50 planning study and have been refined during this study.

Because Alternative 1: Fowler North is closer to town, it would provide a convenient and visible gateway into town. In a community workshop, Fowler residents indicated that they would like the corridor to go north, through floodplains with limited development potential, rather than go south, which would result in a loss of highly productive farmland and ranch lands. However; because Alternative 1 is located close to the Arkansas River, there would be much greater impacts to wetland/riparian areas, amounting to approximately 25 acres. Alternative 1 crosses through a 100-year floodplain, which would increase the risk of flooding of the road and surrounding resources such as residences. Additionally, Alternative 1 would be situated to cross through the Cottonwood Links Golf Course. The public and Fowler town officials were aware of possible effects to the nine-hole, publicly owned Cottonwood Links Golf Course and suggested modifications to the course that would accommodate the north corridor.

Alternative 2: Fowler South would have less potential effect to wetland/riparian areas, but it would affect more farmland and ranch lands than the north corridor because it is nearly 1.5 miles longer. Also, the quality of the farmland and ranch lands is better south of town than it is to the north. Alternative 2 would potentially impact almost twice as much agricultural land as Alternative 1. Because the southern alternative is much farther from the business district and center of town, it would not provide as convenient a gateway into town.

Evaluation of the resources and issues identified for these Build Alternatives in Fowler resulted in the findings summarized in Table 6-6. For a detailed analysis, which steps through the resources and/or considerations that make up the criteria category in the table, please refer to Appendix B, Range of Alternatives Technical Memorandum.

Table 6-6. Fowler Build Alternatives Comparison

Criteria Category	Build Alternative(s) with Fewer Potential Impacts (indicated by checkmark)		Key Differences
	Alternative 1: Fowler North	Alternative 2: Fowler South	
Rural and Agricultural Environment	✓		Alternative 1 would affect fewer acres of farmland and ranch lands (89 acres, compared with 146 acres in the south) and is less likely to interfere with agricultural operations.
Natural Environment		✓	Alternative 2 has fewer acres of wetland/riparian area (approximately 1 acre, compared with 25 acres in Alternative 1), and this acreage is of lesser ecological value than the acreage in the north corridor, which is very close to the Arkansas River. Alternative 1 is located in a 100-year floodplain, whereas Alternative 2 is not.
Community and Built Environment	✓	✓	Alternative 1 is much closer and more visible to town, providing a better gateway. Alternative 2 avoids effects to the publicly owned golf course, as well as the need for two costly bridges over the historic railroad tracks.

Alternative 1: Fowler North would have fewer adverse impacts on agriculture, while Alternative 2: Fowler South would have fewer effects on the natural environment. The two alternatives are comparable in their effects on the community and built environment, as well as their ability to meet the purpose and need of the project. As each Build Alternative has its tradeoffs in the three categories, no Preferred Alternative could be identified at this location and both Build Alternatives for Fowler are carried forward for Tier 2 analysis.

Manzanola Build Alternatives

The two Build Alternatives considered around Manzanola are shown in Figure 6-4. Alternative 1: Manzanola North would require a new railroad crossing west of town and remain north of the railroad tracks. Alternative 2: Manzanola South would remain south of the tracks until crossing them east of town, as U.S. 50 does today.

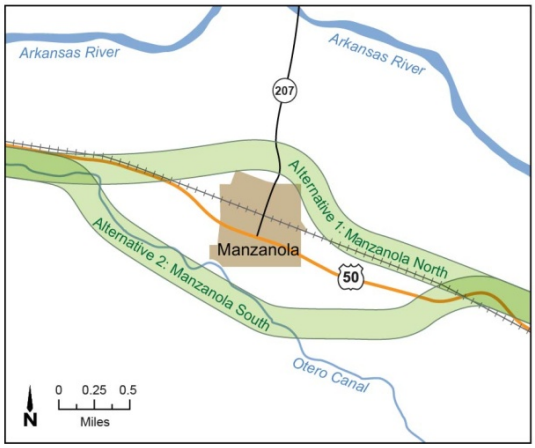

Figure 6-4. Manzanola Build Alternatives

Both alternatives generally are of comparable length and comparable distance from the existing highway. Both alternatives also increase the traveling distance from the existing alignment by slightly more than one-quarter mile through the area.

Manzanola is a small town with approximately 214 homes. Eighteen of these homes (i.e., nine percent of the total) are located within Alternative 2: Manzanola South, compared with nine homes (4 percent) in Alternative 1: Manzanola North. The acreage of potentially affected farmland and ranch lands and riparian/wetland area is comparable for the two Build Alternatives, but the resources in the southern alternative are of slightly higher quality. While Alternative 1 consists of alfalfa/corn and ranch lands, Alternative 2 potentially would impact vegetable farms, which have a much higher productive value.

Evaluation of the resources and issues identified for these 1,000-foot-wide Build Alternatives in Manzanola resulted in the findings summarized in Table 6-7. For a detailed analysis, which steps through the resources and/or considerations that make up the criteria category in the table, please refer to Appendix B, Range of Alternatives Technical Memorandum.

Table 6-7. Manzanola Build Alternatives Comparison

Criteria Category	Build Alternative(s) with Fewer Potential Impacts (indicated by checkmark)		Key Differences
	Alternative 1: Manzanola North	Alternative 2: Manzanola South	
Rural and Agricultural Environment	✓		Both alternatives impact approximately the same amount of farmland and ranch land (about 78 acres), but the acreage in Alternative 1 is of lower quality than the acreage in Alternative 2. Farmland and ranch land in Alternative 1 includes no vegetable-quality land, and 28 percent of it is grazing quality, while Alternative 2 includes 14 acres of vegetable-quality land and only 6 percent is grazing quality.
Natural Environment	✓		Both alternatives have approximately the same amount of wetland/riparian area (5 acres in Alternative 1 and 4 acres in Alternative 2), but the acreage in Alternative 1 is of lesser ecological value than in Alternative 2. About 75 percent of the resource in Alternative 2 is Category I (best functional value), compared to 20 percent in Alternative 1.
Community and Built Environment	✓		Alternative 1 has fewer homes that would be impacted (nine, compared to 18 in Alternative 2). Alternative 1 also received more support at community meetings.

Differences between the Build Alternatives were slight; however, Alternative 1: Manzanola North has fewer potential effects to agricultural productivity and the community and built environment. Although both alternatives are comparable in their improvements to safety, Alternative 1 maintains flexibility to

accommodate future travel, since it contains fewer homes and is less likely to be the direction of future town expansion. It also had greater public support. In a community workshop, Manzanola residents indicated that they would like the corridor to be located north, in part because they felt that the community's potential future growth was likely to occur south of town. Therefore, Alternative 1: Manzanola North is identified as the Preferred Alternative at this location.

Rocky Ford Build Alternatives

The Build Alternatives considered around Rocky Ford are shown in Figure 6-5. Both options increase the travel distance through the area. Alternative 1: Rocky Ford North is between the city and the Arkansas River and is slightly less than seven miles in length. It is much closer to the community than Alternative 2: Rocky Ford South, which is located approximately one mile south of U.S. 50 and creates a travel distance of approximately 8.5 miles. Alternative 2 follows existing county roads to minimize fragmentation of farmland and ranch lands.

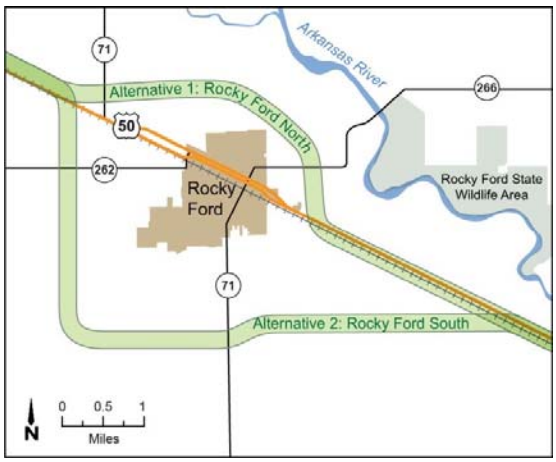

Figure 6-5. Rocky Ford Build Alternatives

The eastern junction of the existing U.S. 50 and the proposed options vary substantially. The junction associated with Alternative 1: Rocky Ford North lies much closer to town than the associated junction for Alternative 2: Rocky Ford South. The city of Rocky Ford would be more visible for potential visits by through-travelers from the north corridor. Also, Alternative 1 would provide much better access to the Arkansas Valley Fairgrounds than Alternative 2, which is an important economic resource to the community. The amount of wetland/riparian acreage is comparable between the two Build Alternatives (10 acres versus 13 acres).

Alternative 1 also is adjacent to Arkansas River floodplains. However, the community has zoned several properties for light industrial use, out of the floodplain, in an effort to develop an industrial park.

Evaluation of the resources and issues identified for the Build Alternatives in Rocky Ford resulted in the findings summarized in Table 6-8. For a detailed analysis, which steps through the resources and/or considerations that make up the criteria category in the table, please refer to Appendix B, Range of Alternatives Technical Memorandum.

Table 6-8. Rocky Ford Build Alternatives Comparison

Criteria Category	Build Alternative(s) with Fewer Potential Impacts (indicated by checkmark)		Key Differences
	Alternative 1: Rocky Ford North	Alternative 2: Rocky Ford South	
Rural and Agricultural Environment	✓	✓	The Build Alternatives have comparable impacts to farmland and ranch lands. No key differences.
Natural Environment	✓	✓	Both alternatives have comparable wetland/riparian acreage and functional value, with Alternative 2 having 3 acres more of potential wetland/riparian impacts. Alternative 1 is closer to the Arkansas River (between 0.5 and 0.8 mile), but it is not in close enough proximity to affect the area.
Community and Built Environment	✓		Alternative 1 avoids multiple crossings of historic canals and railroads that would occur in Alternative 2. Alternative 1 is much closer to the city and provides better access to the fairgrounds and the city's proposed industrial park.

The Build Alternatives at Rocky Ford generally were comparable when looking at the screening criteria, as well as in their ability to meet the project purpose and need, except when considering the community and built environment. Alternative 1: Rocky Ford North has a greater potential to minimize effects to historic resources and received greater community support. Having an alignment close to town was important for the community, both for having an effective "gateway" into the town and to provide adequate access to their fairgrounds and industrial park. Therefore, Alternative 1: Rocky Ford North is identified as the Preferred Alternative.

Swink Build Alternatives

The two Build Alternatives considered around Swink are shown in Figure 6-6. Both alternatives are located close to town. Alternative 1: Swink North is located close to the Arkansas River and is 2.4 miles long, while Alternative 2: Swink South traverses highly productive farmland and is approximately 2.5 miles long. The existing route through Swink is slightly longer than two miles.

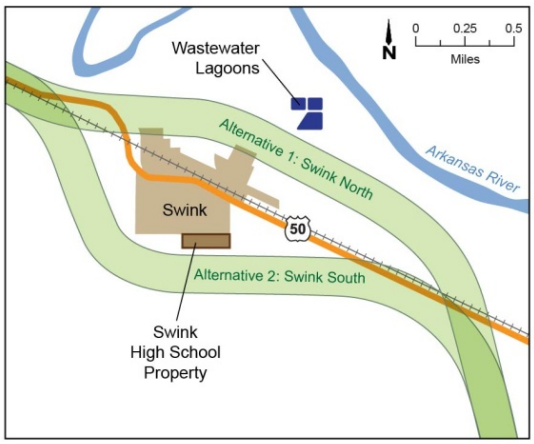

Figure 6-6. Swink Build Alternatives

Alternative 1: Swink North includes 14 of the town's 286 homes or housing units, compared to six homes in Alternative 2: Swink South. However, Alternative 2 runs adjacent to the town's school facilities, which are key community assets. The school district also is a

major employer in the town. Noise, air pollution, and traffic near the school grounds were noted as public concerns at a community meeting. The school site is one of two air quality-sensitive sites in the southern alternative, compared to none in the northern alternative. More farm/ranch land is included in Alternative 2, and its productivity is approximately three times higher than the farm/ranch land in Alternative 1.

Evaluation of the resources and issues identified for the Build Alternatives in Swink resulted in the findings summarized in Table 6-9. For a detailed analysis, which steps through the resources and/or considerations that make up the criteria category in the table, please refer to Appendix B, Range of Alternatives Technical Memorandum.

Table 6-9. Swink Build Alternatives Comparison

Criteria Category	Build Alternative(s) with Fewer Potential Impacts (indicated by checkmark)		Key Differences
	Alternative 1: Swink North	Alternative 2: Swink South	
Rural and Agricultural Environment	✓		Alternative 1 includes less and lower-quality farmland and ranch lands than Alternative 2 (15 acres difference). Alternative 1 would use land with limited development potential due to adjacent floodplains.
Natural Environment		✓	Alternative 2 has less wetland/riparian acreage than Alternative 1 (1 acre versus 7 acres) and most of the acreage in Alternative 1 has high functional value.
Community and Built Environment	✓	✓	Alternative 2 includes fewer homes and businesses (11 versus 21) than Alternative 1; however, Alternative 2 is adjacent to the town's school facilities. The school district is a major employer, and their facilities are key community assets.

Because each Build Alternative considered in Swink has advantages, and the alternatives are comparable in their ability to meet the purpose and need of the project, no Preferred Alternative is identified at this location. Therefore, both Build Alternatives are carried forward for Tier 2 analysis.

La Junta Build Alternatives

The four Build Alternatives considered around La Junta are shown in Figure 6-7. One of the alternatives crosses the Arkansas River to the north (Alternative 1: La Junta North), while the other three are located south of the city (Alternatives 2 through 4). Alternative 3: La Junta South was developed during public involvement efforts for the Tier 1 EIS, as a requested compromise between the other two southern alternatives, which had been identified in the 2003 U.S. 50 planning study.

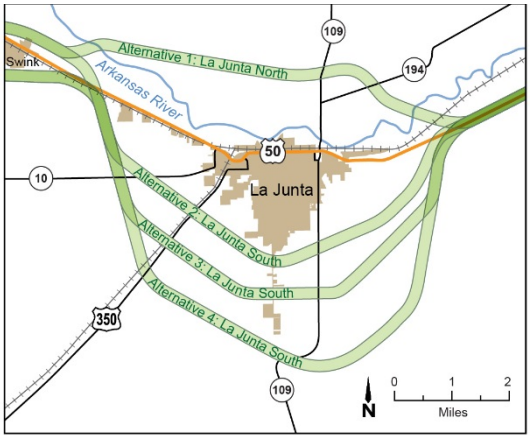

Figure 6-7. La Junta Build Alternatives

Alternative 1: La Junta North is the second shortest (8.9 miles length) of the four Build Alternatives around the city, and would have minimal effects on the La Junta Gardens residential area north of the Arkansas River. However, it would require the construction of two new bridges across the Arkansas River, which would be a major ecological drawback.

Alternative 1: La Junta North and Alternative 3: La Junta South have the greatest amount of wetland/riparian acres (30 acres), but Alternative 1 would affect higher-functioning wetlands. In addition, some of the wetland/riparian acres in the southern alternatives may be avoided because they are isolated or are not perpendicular to the corridor. However, these opportunities for avoidance are not possible with Alternative 1 because it crosses the Arkansas River.

The most striking differences among the three southern alternatives are their comparative lengths and distances from the existing U.S. 50 facility. Compared with the current trip on U.S. 50 from west of Swink to the east side of La Junta, which is approximately six miles, the alternatives are as follows:

- Alternative 1: La Junta North is about 2.9 miles longer and 1.5 miles north.
- Alternative 2: La Junta South is about 2.5 miles longer and 2.0 miles south.
- Alternative 3: La Junta South is about 4.0 miles longer and 2.3 miles south.
- Alternative 4: La Junta South is about 6.0 miles longer and 3.3 miles south.

Alternative 4 would add six miles to the length of a regional or long-distance trip on U.S. 50, and thus would be twice as long as the current route through the city. At 65 mph, this route would not save time compared to taking the existing U.S. 50 through the city at lower speeds and stopping at a traffic signal. Instead, Alternative 4 would add two minutes of travel time to the trip. For this reason, Alternative 4 would be expected to draw minimal traffic, not fully providing the intended benefits. In comparison, Alternative 3 would be time-neutral, and Alternative 2 would save travel time.

Evaluation of the resources and issues identified for the Build Alternatives in La Junta resulted in the findings summarized in Table 6-10. For a detailed analysis, which steps through the resources and/or considerations that make up the criteria category in the table, please refer to Appendix B, Range of Alternatives Technical Memorandum.

Because Alternative 1 would be the most environmentally damaging route, requiring two bridges through a major floodplain, and since there is a general lack of major adverse impacts in the southern alternatives, Alternative 1 was not identified as preferred. In addition, Alternative 4 adds the greatest travel time to the corridor and has more out-of-direction travel, so it was not identified as preferred. Between Alternative 2 and Alternative 3, Alternative 2 is shorter, is closest to town, and compares favorably or equally with Alternative 3 in terms of potentially impacted resources. However, Alternative 3 has more impacts to farm/ranch lands and wetland/riparian areas because it is longer than Alternative 2. Alternative 2 has a better ability to meet the purpose and need of the project and has been carried forward for Tier 2 analysis.

Table 6-10. La Junta Build Alternatives Comparison

Criteria Category	Build Alternative(s) with Fewer Potential Impacts (indicated by checkmark)				Key Differences
	Alternative 1: La Junta North	Alternative 2: La Junta South	Alternative 3: La Junta South	Alternative 4: La Junta South	
Rural and Agricultural Environment	✓	✓			Alternative 3 and Alternative 4 would have the greatest impacts to agricultural lands, amounting to a loss of 65 and 48 acres of productive farmland (i.e., vegetables, corn, and alfalfa). Alternative 1 and Alternative 2 have fewer effects to agricultural land and productivity, totaling 23 and 42 acres of loss to productive farmland.
Natural Environment		✓	✓	✓	Alternatives 2–4 have comparable impacts, with Alternative 4 having the fewest potential impacts to wetland/ riparian areas (11 acres). They are the least harmful to the natural environment. Alternative 1's two crossings of the Arkansas River and impacts to the associated wetlands/riparian area represent a major ecological impact that is avoidable by keeping the highway south of the river.
Community and Built Environment		✓	✓		Alternative 1 would not produce the east-west thoroughfare to the south that is desired. Alternative 4 would be twice as long as the current length of U.S. 50 through La Junta (six miles compared to the current three miles). This additional length would add time to a trip through La Junta, instead of reducing it. Alternative 2 and Alternative 3 have comparable impacts, but Alternative 2 is located closer to the city than the other alternatives, providing a better "gateway" to the central business district.

Las Animas Build Alternatives

The two Build Alternatives considered around Las Animas are shown in Figure 6-8. U.S. 50 crosses the Arkansas River north of the city, and either Build Alternative also would cross the river. Alternative 1: Las Animas North is located along a flood control levee for the Arkansas River and would cross the river on or near the existing U.S. 50 bridge. Alternative 2: Las Animas South is located south of the BNSF Railway tracks, close to the City of Las Animas-Bent County Airport and the Bent County Correctional Facility. Alternative 2 would require construction of a new bridge across the Arkansas River on the northeast side of the city.

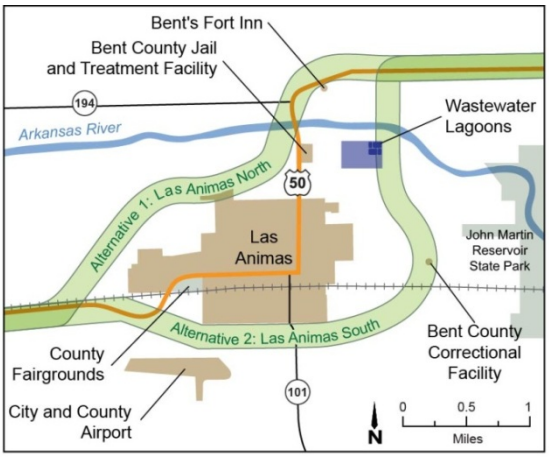

Figure 6-8. Las Animas Build Alternatives

Alternative 1 includes 14 more acres of wetland/riparian area than Alternative 2 and would include replacement of the existing U.S. 50 bridge over the Arkansas River. However, it may be less ecologically disruptive than building a new bridge downstream for the southern alternative.

Alternative 1 includes acquiring a slightly greater number of homes than Alternative 2 (16 versus 9), but the difference is minimal in comparison with the city's total housing stock (1,214 homes). Alternative 1 would traverse land with higher development potential, including vacant land that has existing utility infrastructure. An important benefit of Alternative 1: Las Animas North is that it leads westbound traffic into the city toward the existing U.S. 50, and thus provides a gateway into the downtown business district with minimal disruption to existing traffic patterns. By contrast, Alternative 2: Las Animas South does not lead conveniently to downtown and instead takes through-traffic past the correctional facility, which was expanded in 2008. This consideration favors Alternative 1.

Evaluation of the resources and issues identified for the Build Alternatives in Las Animas resulted in the findings summarized in Table 6-11. For a detailed analysis, which steps through the resources and/or considerations that make up the criteria category in the table, please refer to Appendix B, Range of Alternatives Technical Memorandum.

Table 6-11. Las Animas Build Alternatives Comparison

Criteria Category	Build Alternative(s) with Fewer Potential Impacts (indicated by checkmark)		Key Differences
	Alternative 1: Las Animas North	Alternative 2: Las Animas South	
Rural and Agricultural Environment	✓		Alternative 1 would impact 40 acres less and lower-quality farmland and ranch lands than Alternative 2.
Natural Environment	✓	✓	Alternative 2 has less wetland/riparian acreage than Alternative 1 (23 acres versus 40 acres), but Alternative 2 would require building a new bridge across the Arkansas River versus replacing an existing bridge over the river.
Community and Built Environment	✓		Having a convenient gateway into town is important to Las Animas, where many businesses and historic districts line the highway. Alternative 1 provides a convenient eastbound connection to downtown. Alternative 2 would not connect as well with the existing street system.

Alternative 1: Las Animas North has major access advantages that may alleviate potential socioeconomic effects of a bypass, and also received support from the City. In addition, Alternative 1 provides fewer access points that could disrupt highway traffic operations than Alternative 2. Therefore, Alternative 1 is identified as the Preferred Alternative in this location.

Granada Build Alternatives

The two Build Alternatives considered in Granada are shown in Figure 6-9. Alternative 1: Granada North would cross to the north side of the historic BNSF Railway tracks and back again, cut through the Granada State Wildlife Area, and run parallel to Wolf Creek, largely in floodplains. Alternative 2: Granada South would cross comparatively dry lands and pass just northeast of the Granada Relocation Center National Historic Landmark, also known as Camp Amache[1].

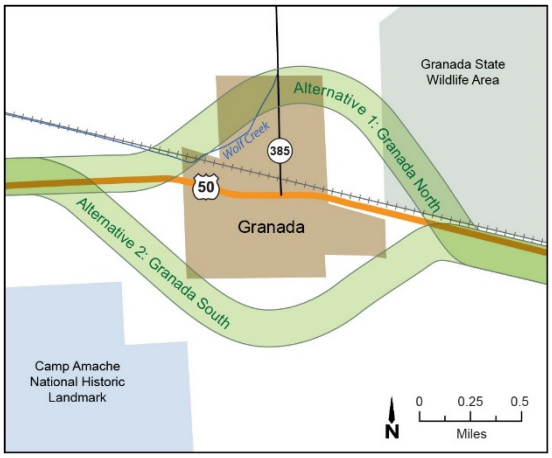

Figure 6-9. Granada Build Alternatives

[1] Camp Amache was a relocation center where Japanese-Americans were held by the U.S. government during World War II. This is a noteworthy historic resource that is owned by the town of Granada with oversight by the NPS. A consultation meeting was conducted with the NPS to determine whether the indirect noise and visual impacts of a nearby south corridor would be acceptable to that agency. The result of this meeting was the determination that the corridor is feasible, provided that appropriate planning, coordination, and mitigation occur during Tier 2 studies.

Both alternatives at the Granada location would impact productive farmland; however, Alternative 2 (62 acres of impacts) would have a greater impacts to farmland than Alternative 1 (48 acres of impacts).

Evaluation of the resources and issues identified for the Build Alternatives around Granada resulted in the findings summarized in Table 6-12. For a detailed analysis, which steps through the resources and/or considerations that make up the criteria category in the table, please refer to Appendix B, Range of Alternatives Technical Memorandum.

Table 6-12. Granada Build Alternatives Comparison

Criteria Category	Build Alternative(s) with Fewer Potential Impacts (indicated by checkmark)		Key Differences
	Alternative 1: Granada North	Alternative 2: Granada South	
Rural and Agricultural Environment	✓		Alternative 2 impacts more farmland and ranch lands than Alternative 1 (62 acres, compared to 48 acres), and would affect land with higher productive value.
Natural Environment		✓	Both alternatives have comparable potential impacts to wetland/ riparian areas (5 acres with Alternative 1 and 2 acres with Alternative 2) and no key issues with the Arkansas River; however, Alternative 2 is preferable because of its avoidance of the Granada State Wildlife Area.
Community and Built Environment		✓	The numbers and differences are small, but Alternative 2 includes fewer historic resources and noise receptors than the north corridor, and would not require railroad crossings.

The Build Alternatives are comparable in meeting the purpose and need of the project; however, Alternative 2: Granada South has slightly fewer potential impacts to the natural and community and built environments, and input from a community meeting indicated local preference for the south corridor (see Appendix C, Public and Agency Involvement). Therefore, Alternative 2 is identified as the Preferred Alternative in this location.

Holly Build Alternatives

The two Build Alternatives considered around Holly are shown in Figure 6-10. Alternative 1: Holly North would cross through the northern part of the Holly incorporated area and also go through the Holly State Wildlife Area. Alternative 2: Holly South would pass to the south of the town crossing the historic BNSF Railway tracks twice and would pass through or run adjacent to a southern portion of the Holly State Wildlife Area along the north bank of the Arkansas River. Alternative 1: Holly North would pass through the northern portion of the Holly State Wildlife Area, which is used for dove, pheasant, and waterfowl hunting and for wildlife viewing. For safety reasons, hunting is not permitted in the immediate vicinity of U.S. 50 (within 50 feet on either side of center line).

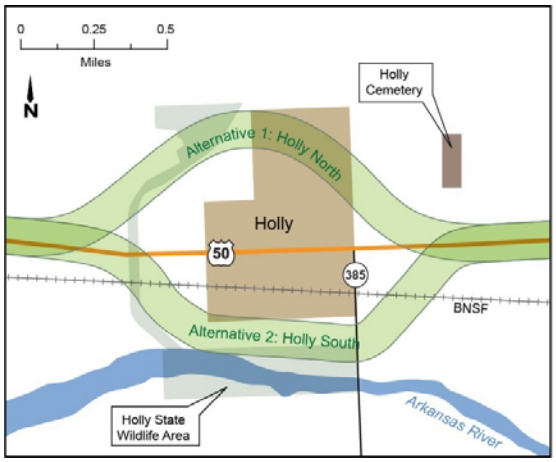

Figure 6-10. Holly Build Alternatives

The Horse Creek drainage that crosses under the existing U.S. 50 facility on the west side of Holly is reported to contain the Arkansas darter. This fish species is threatened within the state of Colorado. Alternative 1: Holly North would be parallel and adjacent to Horse Creek, and thus would have potential adverse effects to this habitat. Alternative 2: Holly South also must cross this creek, but it crosses it perpendicularly, as U.S. 50 does today. Alternative 1 also would include and follow the historic Santa Fe Trail and have potential impacts to its setting.

Evaluation of the resources and issues identified for the Build Alternatives around Holly resulted in the findings summarized in Table 6-13. For a detailed analysis, which steps through the resources and/or considerations that make up the criteria category in the table, please refer to Appendix B, Range of Alternatives Technical Memorandum.

Table 6-13. Holly Build Alternatives Comparison

Criteria Category	Build Alternative(s) with Fewer Potential Impacts (indicated by checkmark)		Key Differences
	Alternative 1: Holly North	Alternative 2: Holly South	
Rural and Agricultural Environment	✓	✓	No key differences. Alternative 2 has slightly more farmland and ranch lands than Alternative 1 (62 acres compared to 48 acres), but the north alternative has a slightly higher impact to farmland productivity.
Natural Environment		✓	Alternative 2 has slightly more acres of wetland/riparian area than Alternative 1 (20 acres compared to 16 acres), but wetlands in Alternative 1 are higher quality. Alternative 2 would avoid a new crossing of Horse Creek (which contains the Arkansas darter). Alternative 2 runs parallel to the Holly State Wildlife Area and could reduce hunting.
Community and Built Environment		✓	The numbers and differences are small, but Alternative 2 includes fewer historic resources (one compared to five, with greater potential effects to the Santa Fe Trail under Alternative 1) and fewer noise receptors than Alternative 1 (three compared to 21).

Alternative 2: Holly South was determined to have fewer potential impacts to the natural environment and community and built environment, as compared to Alternative 1: Holly North. Both alternatives are comparable in meeting the purpose and need of the project; however, Alternative 2 improves access from SH 89 to U.S. 50 and vice versa, while also eliminating the need to go through Holly. For these reasons, Alternative 2: Holly South is identified as the Preferred Alternative at this location.

The total and combined results of the evaluation process are presented in the next section.

6.1.3 Results of Build Alternative Screening

The result of the preceding analysis generally identified the Preferred Alternative as one around-town alternative for each project corridor section, except in Fowler and Swink. Table 6-14 summarizes the Preferred Alternative.

Table 6-14. Summary of the Preferred Alternative

Category	Preferred Alternative Components
Regional Corridor Location	Existing Regional Corridor
Transportation Mode	Highway
Facility Type	Four-Lane Rural Expressway
Build Alternatives	Pueblo—Alternative 2: Pueblo Existing Alignment
	Pueblo to Fowler—Alternative 2: Fort Reynolds Realignment
	Fowler—Alternative 1: Fowler North and Alternative 2: Fowler South
	Fowler to Manzanola Alternative (on or near existing alignment)
	Manzanola—Alternative 1: Manzanola North
	Manzanola to Rocky Ford Alternative (on or near existing alignment)
	Rocky Ford—Alternative 1: Rocky Ford North
	Rocky Ford to Swink Alternative (on or near existing alignment)
	Swink—Alternative 1: Swink North and Alternative 2: Swink South
	La Junta—Alternative 2: La Junta South
	La Junta to Las Animas Alternative (on or near existing alignment)
	Las Animas—Alternative 1: Las Animas North
	Las Animas to Lamar Alternative (on or near existing alignment)
	Lamar to Granada (on or near existing alignment)
	Granada—Alternative 2: Granada South
	Granada to Holly Alternative (on or near existing alignment)
	Holly—Alternative 2: Holly South

6.2 PREFERRED ALTERNATIVE ANALYSIS

Figure 6-11 provides an overview of the Preferred Alternative for the corridor as a whole. Table 6-15 summarizes the environmental effects for the Preferred Alternative. Ranges of impact are still provided, as applicable, because impacts are dependent on the alternative to be chosen in Fowler and Swink. For a summary of the Preferred Alternative impacts by location (i.e., by section of the U.S. 50 corridor), please refer to Appendix F.

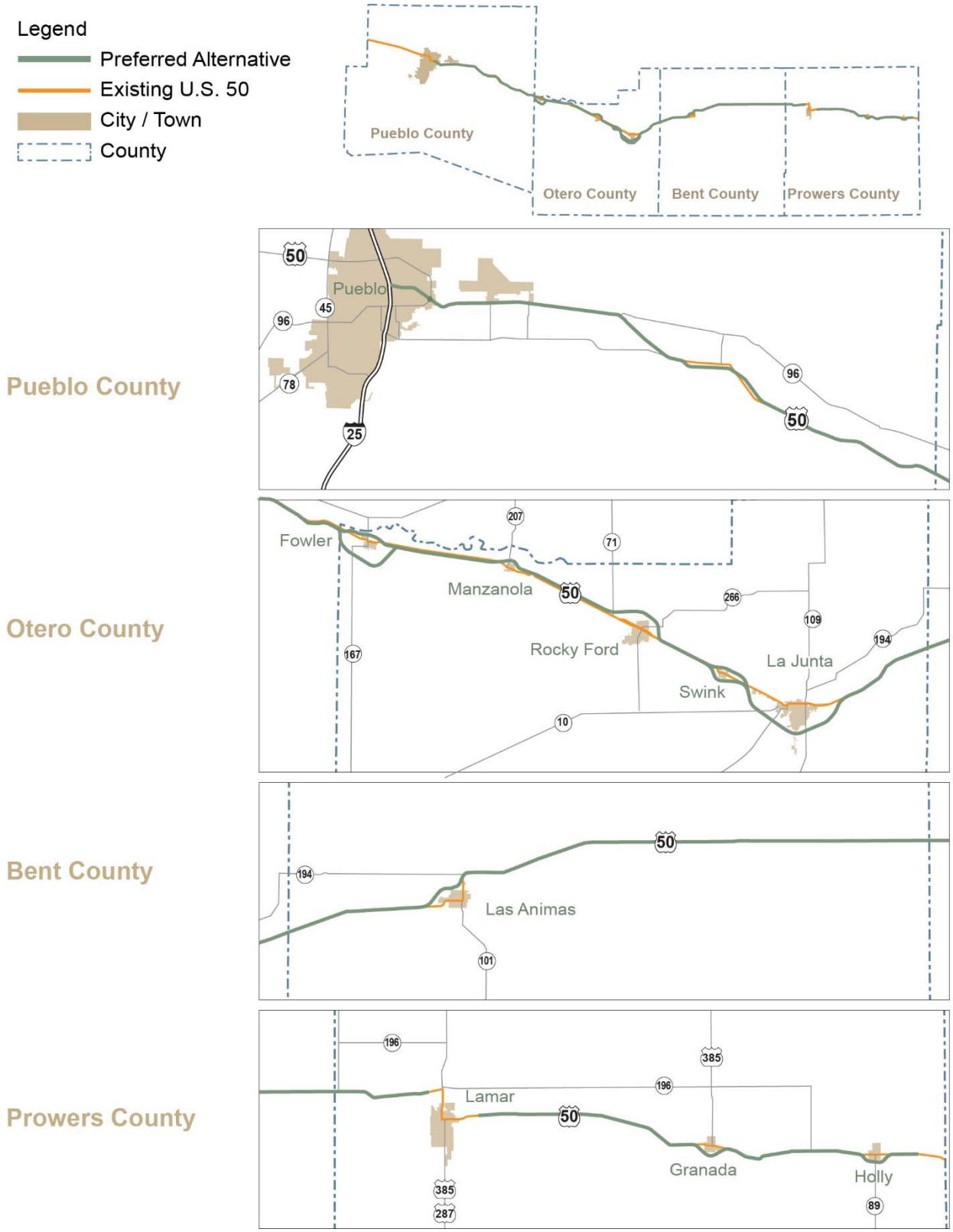

Figure 6-11. Preferred Alternative

Table 6-15. Summary of Preferred Alternative Effects

Category	Resources	Effects
Rural and Agricultural Environment	Agricultural resources	Affects 3,911 to 4,024 acres of agricultural land. May affect up to four feedlots, up to six permanent roadside produce markets, and up to 24 canals and ditches. None of the identified feedlot effects would prevent continued operation.
Natural Environment	Wetland and riparian resources	Affects 565 acres to 685 acres of wetland and riparian resources; most have low functionality (Category III or Category IV).
	Wildlife and habitat	Affects 4,302 acres to 4,389 acres of habitat, although most of this acreage has been disturbed by human activity. Potential to affect up to 24 special-status species. Widens the roadway at 11 identified wildlife crossings (locations where wildlife frequently crosses the highway), which may increase the potential of animal-vehicle collisions. May remove existing noxious weeds, but also may increase the potential for noxious weed infestation through construction activities.
	Water resources	Where U.S. 50 adds crossings of surface water resources—primarily irrigation canals and ditches—the potential to degrade water quality exists. The increased paved surface also would increase the amount of stormwater runoff, although this is anticipated to be minimal.
	Geologic and paleontological (fossil) resources	Potential to affect up to three existing surface mining operations (geologic resources) and has potential to encounter paleontological (fossil) resources within six geologic formations. None of the 27 identified paleontological resources would be affected.
Community and Built Environment	Historic resources	Potential to affect 65-67 historic or potentially historic resources. Given the number and type of historic resources identified, effects by the Preferred Alternative are unlikely to change the overall historic character of the Lower Arkansas Valley or of any community.
	Archaeological resources	Potential to affect nine archaeological sites.
	Land use	Potential to affect up to 13 conservation easements and 10 public properties. Right-of-way acquisition would be required primarily from agricultural lands. No substantial effect on land use within the project area is anticipated.
	Parklands and recreational resources	Potential to affect up to 13 parkland and recreational resources, including Cottonwood Links Golf Course, Las Animas Municipal Golf Course, John Martin Reservoir State Park and State Wildlife Area, Granada School District recreational facility, Mike Higbee State Wildlife Area, Granada State Wildlife Area, Holly State Wildlife Area, and four existing and two planned pedestrian trails.

Table 6-15. Summary of Preferred Alternative Effects (continued)

Category	Resources	Effects
Community and Built Environment (continued)	Social and economic conditions	Potential to positively affect social conditions in the project area overall. Moving traffic from U.S. 50 through a town to a new around-town route would remove long-distance and regional traffic from U.S. 50 Main Streets, making the existing highway easier to cross, especially for pedestrians. The following effects to local businesses are anticipated: • Continuation of existing economic trends despite around-town U.S. 50 routes • Conversion of agricultural land to roadway use, eliminating productive value to economy • Traveler-oriented businesses could be affected by reduction of pass-by traffic • Highway-dependent businesses such as truck stops or gas station convenient stores would benefit from improved highway conditions and ability to drive faster on new around-town U.S. 50 routes • Downtown areas could benefit by restoring commercial districts to their original Main Street status with speeds less than 30 mph and pedestrian and bicycle-friendly, safe crossings.
	Environmental justice	A higher percentage of minority and low-income residents live within the boundaries of the communities along the U.S. 50 corridor when compared to averages for the state of Colorado. Specific effects to these communities cannot be identified at this time; however, further analysis will be conducted during Tier 2 studies.
	Aesthetics and visual resources	In areas where drivers' views from the highway would change, these changes would not alter the character of those views; therefore, no visual resources from U.S. 50 would be affected. Visual resources from surrounding areas would be affected between communities, where the roadway footprint would be widened, and for residents living in areas where around-town routes are eventually selected. These visual resources would be negatively affected by increasing the existing visual intrusion or creating a visual intrusion (the highway) where one does not exist today.
	Air quality issues	No violations of federal pollutant standards are anticipated. Construction-related effects will be analyzed further in Tier 2 studies.
	Traffic noise	Potential to affect 1,402 to 1,456 noise-sensitive receptors. Given the modest existing and future traffic volumes, no substantial increase in traffic noise effects is expected.

Table 6-15. Summary of Preferred Alternative Effects (continued)

Category	Resources	Effects
Other	Transportation	Anticipated to benefit overall transportation conditions. Expected to increase mobility for local, regional, and long-distance users. Anticipated to improve safety by increasing passing opportunities, providing adequate clear zones, and controlling access.
	Hazardous materials	Potential to encounter 146 to 156 hazardous materials sites. U.S. 50 would remain a designated route for transporting hazardous materials. Improving the roadway, as well as re-routing around communities, is expected to improve safety for transport of hazardous cargo along the corridor.
	Section 4(f)	Potential section 4(f) resources include 15 publicly owned parkland and recreational resources, as much as 65-67 historic sites, and nine archaeological resources that are known to be listed or may be listed on the NRHP. Additional research will be needed during Tier 2 studies to determine whether a particular site is a Section 4(f) resource.
	Section 6(f) resources	No conversion of Section 6(f) resources was identified.
	Energy	Would result in a 2.8 percent to 5.6 percent increase in energy consumption in 2040; however, this increase is expected to be minor in the context of existing energy consumption along the corridor.
	Global climate change	Greenhouse gas (GHG) emissions would not result in reasonably foreseeable future adverse impacts on the human environment. GHG emissions would be insignificant.

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7 Community Outreach and Agency Involvement

The 150-mile-long U.S. 50 project area includes a large and diverse group of communities, agencies, and other stakeholders. The objective of the U.S. 50 Tier 1 EIS states: "To ensure that the full range of issues related to this proposed action are addressed and all significant issues identified, comments and suggestions are invited from all interested parties" (71 FR 4958). This chapter summarizes the community outreach and agency involvement associated with this document, including the:

- Tiering of the EIS, pre-scoping process, and results
- Scoping process and results
- Community outreach efforts
- Working group coordination
- Agency coordination
- Future public and agency involvement opportunities

7.1 TIERING OF THE EIS, PRE-SCOPING PROCESS, AND RESULTS

Prior to the initiation of the U.S. 50 Tier 1 EIS, meetings were held to confirm a tiered approach to planning improvements for the U.S. 50 corridor, to identify stakeholders, and to determine their interest in participating in the project. These meetings and their results are described below.

7.1.1 Tiering Meeting

In September 2004, staff members from CDOT and FHWA met to discuss the possibility of implementing a tiered approach to analyzing the U.S 50 corridor. Tiering is a process for evaluating the environmental consequences of a project in two steps, known as tiers. The first tier examines a large area or a broad set of issues when a project is still in the formative stage. The second tier involves the preparation of a detailed NEPA analysis addressing the consequences of one or more specific projects and including project impacts, costs, and mitigation strategies.

They determined that a tiered EIS approach was reasonable to meet the long-term transportation project objective of providing a corridor location decision that CDOT and the impacted communities can use to plan and program future improvements, preserve right of way, and pursue funding opportunities.

Meeting discussions included:

- Issues associated with U.S. 50 in southeastern Colorado
- Lessons learned from other tiered EIS projects
- Project goals
- The tiering process (including how to comply with NEPA and FHWA requirements)
- Corridor preservation
- Interagency coordination
- Logical termini

CDOT and FHWA agreed that a tiered EIS would best integrate transportation planning decisions with environmental regulations while formally involving local communities in the process.

7.1.2 Community Pre-Scoping

Stakeholders from 14 communities (10 municipalities and four counties) were invited, via email, to participate in the U.S. 50 EIS process. Invitees included:

- City of Holly
- City of Granada
- City of Lamar
- City of Las Animas
- City of La Junta
- City of Swink
- City of Rocky Ford
- City of Manzanola
- City of Fowler
- City of Pueblo
- Prowers County
- Pueblo County
- Bent County
- Otero County

Each community was asked to have a publicly elected official represent their jurisdiction throughout the project. Community representatives would be asked to participate in a Community Working Group where they would learn about the project, identify their community's desired level of participation in the project, and provide information about any major issues or concerns they had about the project at that time.

Between April and June 2005, pre-scoping meetings were held that included these community representatives. More information about the project team's pre-scoping meeting dates, attendees, and discussion topics can be found in Appendix C, Public and Agency Involvement.

Another stakeholder included in pre-scoping of the EIS was Action 22. Action 22 is a coalition of cities, communities, counties, associations, businesses, and organizations in Southern Colorado. The project team met with a representative from the group on May 11, 2005, to establish ongoing communication that would last throughout the project.

Resolutions Adopted by U.S. 50 Communities

In June and July 2005, all 14 communities along U.S. 50 adopted resolutions in support of the U.S. 50 Tier 1 EIS project. A resolution also was adopted by Baca County, located in the southeastern corner of the state. These resolutions state that community leaders:

- Support the recommendations made in the previous U.S. 50 planning study (*A Corridor Selection Study, A Plan for U.S. 50*);
- Will work with CDOT to develop and implement corridor preservation strategies for the route selected (as the preferred alternative);
- Recognize and will comply with NEPA; and
- Have selected a project liaison to serve on the Community Working Group who is authorized to speak on behalf of the community.

7.1.3 Agency Pre-Scoping

Following the decision by CDOT and FHWA to pursue a tiered EIS for U.S. 50 through the Lower Arkansas Valley, federal, state, and local agencies with potential interests in the project were contacted. Representatives from these agencies were asked if they would meet to learn about the project, identify their agency's desired level of participation in it, and provide information about any major issues or concerns they had about the project at that time. Between May and August 2005, the project team met with the agencies listed in Table 7-1.

Table 7-1. Agencies Involved in the Pre-Scoping Process

Federal	
U.S. Army Corps of Engineers	Natural Resources Conservation Service
U.S. Environmental Protection Agency	Bureau of Land Management
U.S. Fish and Wildlife Service	National Park Service
Federal Emergency Management Agency	
State	
Colorado Department of Local Affairs	Colorado Department of Public Health and Environment
Colorado Parks & Wildlife (previously Colorado Division of Wildlife and Colorado State Parks)	Colorado Department of Natural Resources
Colorado State Historic Preservation Office	Colorado State Land Board of the U.S. Forest Service
Local	
Lower Arkansas Valley Water Conservancy District	

The lead agencies entered into two formal agreements with resource agencies during the U.S. 50 Tier 1 EIS. They include: (1) a PA among CDOT, FHWA, and the Colorado SHPO focusing on cultural resources (i.e., historic and archaeological resources), and (2) an agreement to integrate NEPA and Clean Water Act Section 404 criteria.

7.1.4 Railroad Coordination

The project team also met with the BNSF Railroad (formerly Atchison, Topeka and Santa Fe) on August 11, 2005. BNSF owns and operates an active rail line through southeastern Colorado that closely parallels U.S. 50. More information about the project team's pre-scoping meetings with the agencies and BNSF can be found in Appendix C, Public and Agency Involvement.

7.1.5 Formation of Project Working Groups

After the project team identified active stakeholders, the next step was to develop means by which these stakeholders would work together, provide input, and make decisions. Three primary working groups were formed to accomplish this, including the Project Management Team, Community Working Group, and Agency Working Group. More information about how each of these groups was formed and their function is discussed below.

Project Management Team

The Project Management Team is comprised of representatives from the lead agencies (CDOT and FHWA) and the consultant team. The purpose of the Project Management Team is to coordinate the interests and information identified during the U.S. 50 Tier 1 EIS process to ensure that NEPA is followed and participating interests reach a general agreement on a preferred corridor within a reasonable timeframe and budget. The project team held several agency-specific meetings to adopt formal agreements dealing with historic resources and coordination with the Clean Water Act Section 404.

Community Working Group

The Community Working Group is comprised of publicly elected officials from each of the 14 communities located along U.S. 50 in the Lower Arkansas Valley. These communities have expressed an interest in being active participants in the U.S. 50 Tier 1 EIS project by adopting resolutions stating that fact. One or more elected official(s) from each community volunteered to serve as the community representative during the process. The community is responsible for selecting a replacement representative in the case that their member can no longer serve. The purpose of the Community Working Group is to help facilitate consensus on project-related issues involving the communities within the U.S. 50 project area.

To clarify how the Community Working Group would interact with the lead agencies and other project groups, Community Working Group members were brought together with representatives from the lead agencies at a charter workshop held on September 22, 2005. At this workshop, participants discussed how they would work together and make decisions on project-related issues. These discussions were translated into a charter agreement, which outlined participants' roles in project decision making, their responsibilities, and a dispute resolution process to be followed in situations when the group could not come to an agreement. (Ultimately, this dispute resolution process was never needed.) All 14 communities signed the charter agreement, formally called the Community Memorandum of Understanding (MOU), along with CDOT and FHWA. The Community MOU is presented in Appendix C, Public and Agency Involvement.

Agency Working Group

The Agency Working Group is comprised of representatives from 13 federal, state, and local agencies. These agencies expressed an interest in being active participants in the U.S. 50 Tier 1 EIS project during pre-scoping meetings. Each agency chose their own representative(s), and when their member(s) can no longer serve, the agency is responsible for selecting their replacement(s). The purpose of the Agency Working Group is to help coordinate decision making on resource issues and to provide technical input on resources within each agency's legal or regulatory jurisdiction.

To clarify how the Agency Working Group would interact with the lead agencies and other project groups, Agency Working Group members were brought together with representatives from the lead agencies at a charter workshop held on August 10, 2005. At this workshop, participants discussed how they would work together and make decisions on project-related issues. The discussions from this meeting were translated into an Agency Charter Agreement, which was signed by 13 agencies, including CDOT and FHWA.

The Agency Charter Agreement identifies CDOT and FHWA as lead agencies and discusses the roles of the Agency Working Group in the planning process. The Agency Working Group is supported by the Project Management Team. Roles of the Agency Working Group include facilitating corridor decisions regarding modal choice, identifying a preferred location and logical termini, providing the prioritization and design parameters for Tier 2 studies, and developing corridor-wide environmental mitigation strategies. The Agency Charter Agreement is included in Appendix C, Public and Agency Involvement.

7.2 SCOPING PROCESS AND RESULTS

After the NOI was published in the Federal Register in January 2006, the project scope, issues, and concerns were formally defined through a series of meetings. A single meeting was held for agency participants, and 10 meetings were held for the public, one in each of the municipalities along U.S. 50 in the Lower Arkansas Valley. Approximately 235 private citizens, 14 agencies, 14 communities, and six other organizations participated in these meetings, which are described in more detail below.

7.2.1 Agency Scoping Meeting

The agency scoping meeting was held on February 23, 2006. The purpose of the meeting was to establish a foundation for informed and meaningful agency scoping comments specific to the U.S. 50 Tier 1 EIS process. The goals of the meeting were to:

- Develop an understanding of the corridor, including previous planning efforts
- Provide clarity regarding project milestones, decision making, and resource methodology approaches
- Provide an opportunity for agency representatives to review the draft purpose and need statement and draft project area

The group was asked to provide feedback on project assumptions. They informally agreed with eliminating the previously considered north and south regional corridors, and with using a community-developed vision to identify a general location for U.S. 50 north, through, or south of the communities within the boundaries of the existing regional corridor.

Agencies discussed project topics of specific importance to their respective agencies. These topics included avoiding habitat fragmentation, minimizing impacts to wetlands and riparian habitats, protecting Section 4(f) resources, and considering impacts to low-income and minority populations. The group also discussed opportunities that the project would create for coordination between agencies on environmental strategies. A summary of agency participation in this meeting and comments obtained is presented in Appendix C, Public and Agency Involvement.

7.2.2 Public Scoping Meeting

Public scoping meetings took place between February 27, 2006, and March 7, 2006. One meeting was held in each of the towns and cities along U.S. 50 in the Lower Arkansas Valley, including Pueblo, Fowler, Manzanola, Rocky Ford, Swink, La Junta, Las Animas, Lamar, Granada, and Holly. A total of 235 people attended these meetings, which were designed to facilitate open communication and dialogue.

As with all the public meetings associated with the U.S. 50 Tier 1 EIS, members of the public were encouraged to comment in writing, via telephone, or online if they could not attend a meeting.

The purpose of the meetings was to:

- Review the results of the previous U.S. 50 study, *A Corridor Selection Study: A Plan for U.S. 50* (CDOT 2003a)
- Clarify the goals for the U.S. 50 tiered EIS process
- Collect issues and concerns that needed to be considered while developing a preferred corridor location for U.S. 50 through the Lower Arkansas Valley

Key issues identified by the communities during this process included concerns for increasing traffic in through-town routes and impacts to the local economy. The project team used the comments provided by the communities to develop alternative evaluation criteria. A discussion of the evaluation criteria used to screen alternatives is included in Chapter 3, Alternatives Considered. Appendix C, Public and Agency Involvement, includes a summary of the public scoping process.

7.3 COMMUNITY OUTREACH EFFORTS

Outreach to the public began early in the project and continued throughout the U.S. 50 Tier 1 EIS process. This outreach included resolutions adopted by communities along U.S. 50 within the project area (discussed in Section 7.1.2), public meetings at key project milestones, and communication with the public.

7.3.1 Communication with the Public

A *Communication Handbook* was developed to guide the project's community outreach efforts. This plan is included in Appendix C, Public and Agency Involvement. The goal of this plan was to ensure that the project's outreach efforts created an atmosphere of openness and trust with the public and other project stakeholders. The communication plan included several techniques utilized to communicate with the public and solicit input about project-related issues. These techniques included:

- Developing and maintaining a contacts database
- Holding public meetings
- Sending more than 1,200 mailings (newsletters and postcards) to households and businesses along the corridor
- Hosting a project website with e-mail link located at www.coloradodot.info/projects/us50e
- Creating an information telephone line

- Hosting call-in spots on radio shows
- Providing a children's table to accommodate members of the public attending with children
- Ensuring Spanish translators were on call for every meeting
- Implementing a Speaker's Bureau
- Responding to individual inquiries
- Placing ads in all the local newspapers
- Disseminating information to the media, including public service announcements
- Posting fliers in 81 locations within the communities to provide contact information and meeting locations (in Spanish and English)
- Creating press releases that announced the NOI, answered frequently asked questions, and gave project status updates

These tools were used as appropriate to maximize the public's ability to actively participate in the project and provide input about project-related issues. Feedback received from the public at large was collected during meetings, from a project website, using a project-specific telephone number, by facsimile, and by direct mail.

Outreach to Minority and Low-Income Populations

The U.S. 50 Tier 1 EIS project team worked hard to reach out to people who, if not encouraged, might not prefer to attend meetings or provide input for various reasons. While not exclusively focused on reaching minority and low-income populations, the strategy for scheduling the public meetings and communicating the information incorporated outreach to these populations. Low-income and minority populations were identified using 2000 U.S. Census data for each of the counties in the corridor. Following release of the 2010 Census, low-income and minority populations were re-identified. The following issues were taken into consideration during the public engagement planning process:

- Meeting venue selection incorporated accessibility because most low-income and minority populations in the study area live within urbanized areas of the project corridor.
- Meeting announcements and communications included alternate methods of outreach, such as posting flyers in targeted locations and providing information in English and in Spanish.
- Spanish-speaking radio stations were incorporated as communication vehicles, and a special public service announcement in Spanish was created.
- All communications included a paragraph in Spanish explaining that all reasonable accommodations would be made for people with disabilities and those who require Spanish translation.

- A member of the project team attending all public meetings was prepared for basic translation services, as needed.

7.3.2 Public Meetings at Key Project Milestones

In addition to the scoping meetings, a series of public meetings were held in August 2007, which included one meeting in each of the cities and towns along U.S. 50 in the Lower Arkansas Valley (10 meetings total). The goal of the meetings was to obtain public input on the proposed purpose and need, range of alternatives, and screening criteria. A total of 302 people attended these meetings. The Range of Alternatives and Screening Criteria Public Meetings Report is included in Appendix C, Public and Agency Involvement.

As with all the public meetings associated with the U.S. 50 Tier 1 EIS, these meetings were held in a format that facilitated open communication and dialogue. Members of the public were encouraged to comment in writing, via telephone, or online if they could not attend a meeting. Also, meetings were held in each community so that residents who lived in one community and worked in another could attend a meeting in whichever location was more convenient.

A total of 69 comments were received from the public. A majority of the comments received were in favor of the process and decisions made in drafting project alternatives and screening criteria. Other comments identified concerns for impacts to the local economy and welfare of the communities impacted by the project. Some comments identified concerns for the purchase of private land for right-of-way uses.

7.4 WORKING GROUP COORDINATION

As described previously in Section 7.1.5, working groups were established by the lead agencies early in the project to provide active stakeholders the opportunity to work together, provide input, and make decisions. The Agency Working Group provides the technical background for environmental impact evaluation and decision processes. The Community Working Group provides local knowledge of transportation, land use, and social issues and serves as liaisons between the project team and local decision makers.

The Community Working Group and Agency Working Group have met at key project milestones to provide input on project-related issues, as described in the Community Working Group MOU and Agency Working Group Charter Agreement. These milestones represented identification of:

- Scoping results
- The project area, and the purpose and need
- A full range of alternatives and proposed screening criteria
- Preliminary alternatives to be evaluated
- A preferred alternative and mitigation

The scoping results milestone meeting was cancelled at the request of the working groups. Most of the group's members attended the public scoping meeting in their community, and some of them attended the agency scoping meeting. The groups ultimately determined that they did not need to meet to review the results of the scoping process since they had all participated in it.

Each working group convened to review the project area and purpose and need in June 2006. The groups then met to review the full range of alternatives and proposed screening criteria on July 24 and 25, 2007. This meeting was attended by members of CDOT, FHWA, the Agency Working Group, the Community Working Group, and project consultants. The meeting schedule included a half-day office-based meeting followed by a bus tour of the U.S. 50 project area. The purpose of the bus tour was to enable members of both working groups to discuss conflicts among human (i.e., built) and natural resources that existed in the project area. The office-based meeting had 23 attendees; the corridor tour had 24 participants. The topics discussed during this meeting included floodplain issues, community/economic impacts, agricultural resources, historic resources, wetland and riparian impacts, and disaster recovery (within the town of Holly).

The Agency Working Group met on August 20, 2008, to discuss mitigation strategies for wetland, riparian, and biological resources. This meeting helped develop the Mitigation Strategies Plan, included in Appendix E. A detailed discussion of recommendations for mitigating impacts of potential Tier 2 projects is included in Chapter 8, Mitigation Strategies.

7.5 NEXT STEPS

The DEIS Notice of Availability was prepared in collaboration with CDOT and published in the Federal Register on June 10, 2016, and announced in publications distributed in Pueblo, Otero, Bent, and Prowers counties.

Public hearings have been scheduled for the following dates and locations:

Lamar
Monday, July 11, 2016
Lamar Community Center

Las Animas
Monday, July 11, 2016
Las Animas Municipal Golf Course

Rocky Ford
Tuesday, July 12, 2016
Rocky Ford Chamber of Commerce

Pueblo
Wednesday, July 13, 2016
Southeastern Colorado Heritage Center

During these public hearings, verbal and written comments will be recorded and obtained through mailings/forms available on the website. All comments will be gathered, sorted, and formatted in a summary report. FHWA will prepare a combined FEIS/ROD with responses to public input and will outline the decisions made and reasoning for their conclusions, per Section 1319 of the Moving Ahead for Progress in the 21st Century Act (MAP-21), unless conditions are present (such as practicability issues) that preclude the use of a combined FEIS/ROD. As Tier 2 studies are conducted in the future by CDOT, continued public outreach will include website updates, mailings, and additional opportunities for agency and public involvement.

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8 Mitigation Strategies

This chapter discusses strategies that would be undertaken to mitigate adverse impacts if the Build Alternatives are built. Mitigation generally includes avoiding, minimizing, or compensating for those adverse effects (40 CFR 1508.20) in the following manner:

- Avoid the effects altogether by not taking a certain action or parts of an action, or revise an alternative if it is possible to avoid a resource
- Minimize effects by limiting the degree or magnitude of the action or revising the alignment
- Compensate for the effects by repairing, rehabilitating, or restoring the affected environment
- Reduce or eliminate the effects over time through preservation and maintenance operations during the life of the action
- Compensate for the effect by replacing or providing substitute resources or environments

The following sections describe the avoidance activities undertaken in this document and the mitigation strategies developed for Tier 2 studies.

8.1 TIER 1 AVOIDANCE AND MINIMIZATION ACTIVITIES

The U.S. 50 Tier 1 EIS alternatives development process was able to avoid effects to resources in many locations along the U.S. 50 corridor. Through-town options, which would have improved U.S. 50 on its current alignment through the municipalities along the highway, were eliminated from further consideration because they didn't fully meet the purpose and need of the U.S. 50 Tier 1 EIS, but also because they have a greater potential for affecting community resources. These options could have impacted:

- As many as 250 resources (directly or indirectly) that are either known to be historic or may be historic, representing more than 60 percent of the historic resources identified within the APE
- The downtown areas (i.e., primary commercial districts) of the eight municipalities east of Pueblo by widening the highway, and, therefore, requiring property acquisition in these areas
- Access to about 200 important community facilities and services through alterations to existing travel routes

Tier 2 Avoidance Opportunities

Avoidance of resources will be the first priority during Tier 2 studies, followed by minimization, then compensation. Because the Tier 1 Build Alternative is 1,000 feet wide and the Tier 2 roadway footprint will be a maximum of 250 feet wide, numerous opportunities for resource avoidance will exist during Tier 2 studies.

- A small number of agricultural resources, parklands, and recreational resources, and Section 6(f) and Section 4(f) resources

More detail about this process and its associated avoidance activities can be found in Chapter 3, Alternatives Considered, and Chapter 4, Affected Environment, Environmental Consequences, and Mitigation.

8.2 MITIGATION STRATEGIES

The purpose of this document is to determine the location of a 1,000-foot-wide alternative within which a 250-foot-wide (maximum) roadway footprint would be identified during Tier 2 studies (see Figure 8-1). Because the roadway footprint will not be identified until Tier 2 studies, this Tier 1 analysis cannot identify effects to specific resources or develop mitigation actions. Also, the build-out period for Tier 2 studies is estimated to be decades (i.e., not months or years), and best management practices for mitigation activities could change during this time period. As a result, mitigation strategies—not mitigation activities—have been developed as part of this document. These strategies are meant to guide mitigation activities for Tier 2 studies to ensure that negative effects are minimized.

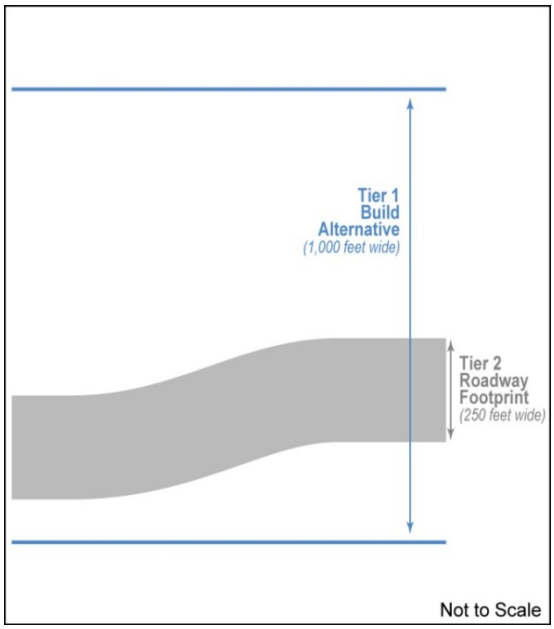

Figure 8-1. Tier 1 vs. Tier 2 Decision

Since the approach used to develop mitigation strategies was different for natural resources than for resources associated with the built (human) environment, they are discussed separately.

8.2.1 Mitigation Strategies for Natural Environment Resources

The Natural Resources Mitigation Strategies Plan, included as Appendix E of this document, was developed to guide mitigation strategies for natural resource effects that occur as the result of all Tier 2 studies, including effects to wildlife and their habitat, wetlands and riparian areas, and water resources. It outlines a holistic approach to mitigation that prioritizes effective ecological outcomes and coordination with resource agencies and other organizations focused on environmental conservation.

Since the build-out time period for Tier 2 studies is estimated to be decades, the intent of this plan is to help decision makers better coordinate mitigation activities over the long term. As a result of this long-term vision and focus on coordination, the ultimate objective of the plan is to produce better results than traditional, smaller-scale mitigation efforts that normally are undertaken in individual projects.

The plan contains the following three overarching goals that approach mitigation activities on a broad-based and long-term planning level:

- **Maintain and enhance biodiversity in the Lower Arkansas River Valley**—Effective mitigation needs to address biodiversity on several scales simultaneously: landscape level, ecosystem level, species level, and genetic level.
- **Improve ecosystem integrity in the Lower Arkansas River Valley**—Ecosystem integrity means that the natural system is complete, unimpaired, and sound.
- **Accommodate social and economic objectives in the Lower Arkansas River Valley when possible**—Biking, birding, wildlife viewing, hunting, and fishing are recreational activities of economic importance to the region. A sustainable balance must be struck so that the economic activities do not degrade the sustainability of the ecosystems upon which they depend.

To meet these goals, a hierarchy of mitigation strategies was developed that includes general mitigation strategies, mitigation banking strategies, early mitigation strategies, and partnering opportunities. The mitigation hierarchy is presented on Figure 8-2 and the individual strategies are summarized in the following discussion. Details on mitigation strategies are included in Appendix E.

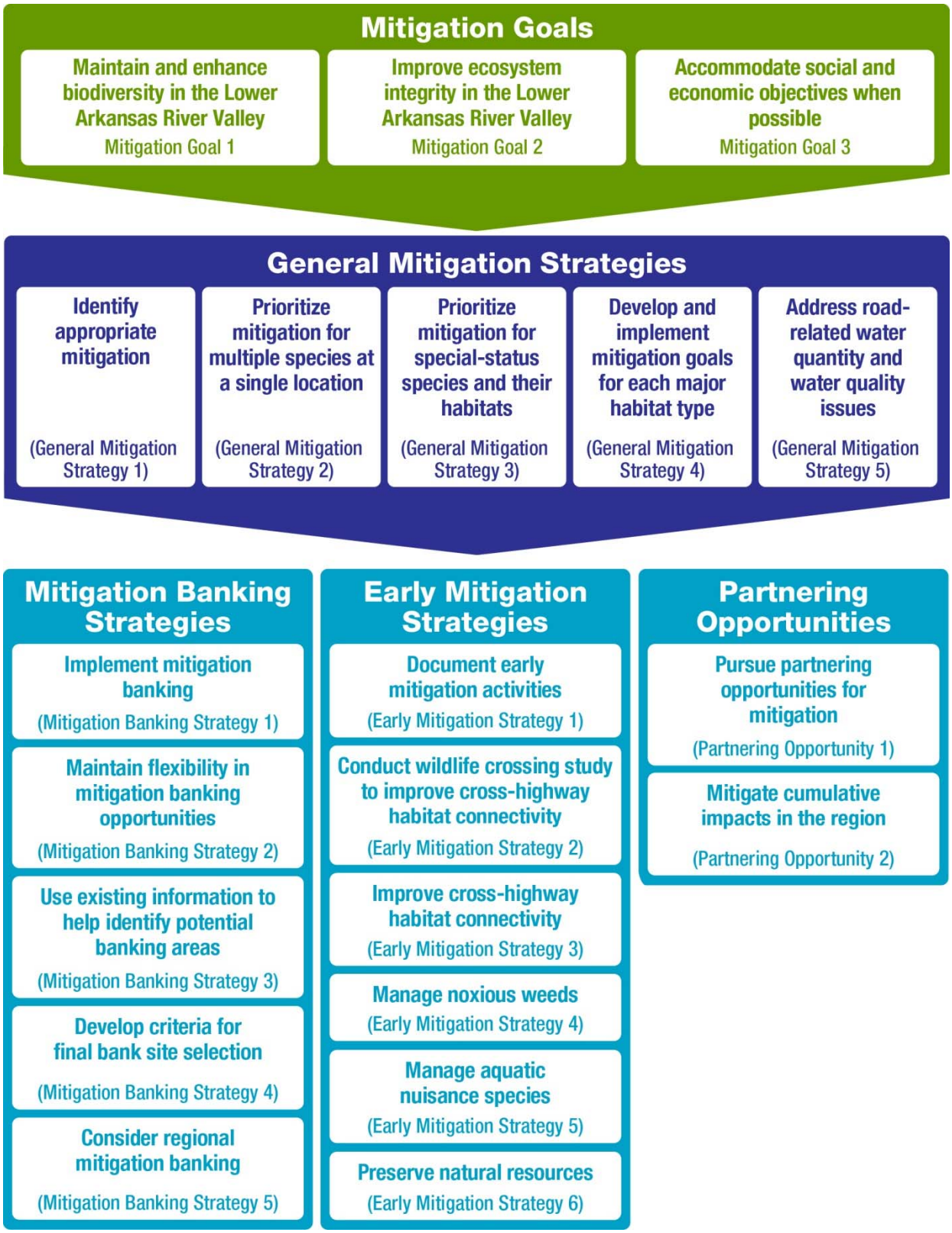

Figure 8-2. Hierarchy of U.S. 50 Tier 1 EIS Mitigation Strategies

General Mitigation Strategies

General mitigation strategies include overall approaches to mitigating impacts to natural resources. The five general mitigation strategies are:

1. Identify appropriate mitigation

Assess site-specific impacts and determine if the most meaningful compensatory mitigation for the impacted habitat or species should occur onsite or at an offsite location. In some cases, compensatory mitigation will be most meaningful to the species inhabiting the area if the mitigation is accomplished onsite, such as impacts to aquatic habitats. However, in other situations, compensatory mitigation will frequently be most meaningful and successful if accomplished at one location where resources can be focused and larger tracts of land can be preserved and restored to natural conditions (e.g., shortgrass prairie, sand sage, and wetland/riparian areas).

2. Prioritize mitigation for multiple species at a single location

Prioritize compensatory mitigation for multiple species in a single location over single-species mitigation, unless regulatory obligations prevent this course of action. This strategy does not preclude mitigation for single species that are unique or uncommon.

3. Prioritize mitigation for special-status species and their habitat

Prioritize mitigation for special-status species (state and federally listed threatened, endangered, and candidate plants and animals) that will likely be directly or indirectly impacted by U.S. 50 improvements over general wildlife species or vegetation. To a lesser degree, species listed by the Colorado Natural Heritage Program as critically imperiled, imperiled, or vulnerable to extirpation within the state of Colorado (ranked S1, S2, or S3) that will be adversely impacted by proposed improvements should be given preference over general wildlife species or vegetation.

4. Develop and implement mitigation goals for each major habitat type

Develop, implement, and document compensatory mitigation goals and objectives for each of the four major habitat/ecosystem types impacted by the Build Alternatives during Tier 2 studies, which include shortgrass prairie, sand sage, wetland/riparian areas, and aquatic.

5. Address road-related water quantity and water quality issues

Address potential increases or decreases in water quantity and delivery caused by improvements associated with the U.S. 50 Tier 1 EIS and subsequent Tier 2 projects by maintaining historic drainage patterns and using best management practices. Similarly, water quality issues also will be addressed during the development and implementation of Tier 2 studies through the creation of site-specific construction stormwater management plans.

Mitigation Banking Strategies

Mitigation banking strategies are specific to wetland or habitat banking. The five strategies related to mitigation banking are:

1. Implement mitigation banking

Wetland and habitat/ecosystem mitigation banks are a form of compensatory mitigation in which the responsibility for compensatory mitigation implementation and success is assumed by a party other than the permittee. In most cases, mitigation banking provides more ecologically important and cost-effective mitigation for impacts than mitigation done in piecemeal fashion. Furthermore, the Compensatory Mitigation Rule of 2008 established a preference for the use of banks when appropriate credits are available.

2. Maintain flexibility in mitigation banking opportunities

Maintain flexibility in creating a mitigation bank (or banks) so that these opportunities can be pursued as they arise. However, maintaining flexibility must be tempered with reasonable judgment so that when a major banking opportunity surfaces, it should not be passed up or overlooked simply to maintain this flexibility.

3. Use existing information to help identify potential banking areas

A substantial amount of environmental, demographic, and species-specific information is available for southeastern Colorado from a variety of sources. Building on this information, and perhaps working within the conservation framework it presents, is both logical and economical because at least a portion of the preliminary research has been completed and will help to focus the search for a banking site.

4. Develop criteria for final bank site selection

The evaluation of sites for final mitigation bank site selection should be based on objective criteria established prior to selecting the site. Evaluation criteria should be scored and based on mitigation strategies described above, as well as land owner interest, projected cost, partnering opportunities, and other relevant variables.

5. Consider regional mitigation banking (i.e., umbrella mitigation bank)

If or when wetland/habitat mitigation bank sites are being developed for the U.S. 50 Tier 1 EIS (including projects resulting from Tier 2 studies), the potential mitigation needs of other CDOT projects (or projects of other agencies in the area) also should be considered. This type of integrated planning approach for mitigating impacts from multiple projects at one or several select bank locations will streamline future permitting, be more cost effective in the long run, and likely result in more "ecologically significant" mitigation.

Early Mitigation Strategies

Early mitigation projects can include anything that is done to mitigate impacts to natural resources prior to impacts occurring within a specific segment of the U.S. 50 Tier 1 EIS Build Alternative. The six early mitigation strategies are:

1. Document early mitigation activities

U.S. 50 early mitigation actions must be documented and approved by the Agency Working Group. This group is comprised of representatives from federal, state, and local agencies. A description of the membership and roles of the Agency Working Group is found in this EIS in Chapter 7, Community Outreach and Public Involvement. Without a documented review process, it is likely that early mitigation projects would either fail to adequately address mitigation concerns of the Agency Working Group or would not receive the appropriate amount of credit commensurate to the beneficial impact of the mitigation activity.

2. Conduct wildlife crossing study to improve cross-highway habitat connectivity

CDOT and FHWA, in cooperation with CPW, will implement a wildlife crossing study to identify structure and non-structure crossings, as well as the best locations within the Build Alternative for new or improved wildlife crossings. The agencies also will identify opportunities to minimize the use of road salt or decrease palatable browse plant species that may attract deer, pronghorn, and other wildlife to the road.

3. Improve cross-highway habitat connectivity

CDOT and FHWA, with the cooperation of CPW and the USFWS, will implement the recommendations of the wildlife crossing study (as described above) to improve cross-highway habitat connectivity and thereby reduce wildlife mortality and improve driver safety.

4. Manage noxious weeds

CDOT will participate, support, and foster coordinated long-term noxious weed management efforts in the U.S. 50 project area. To effectively combat noxious weeds, a coordinated effort across federal, state, and local levels is required. Long-term management of noxious weeds would be necessary to facilitate the restoration of shortgrass prairie, sand sage, and wetland/riparian habitats to a properly functioning native state.

5. Manage aquatic nuisance species

CDOT will participate, support, and foster coordinated efforts to manage aquatic nuisance species in the U.S. 50 project area. Management should include the eradication of aquatic nuisance species populations and the prevention of their spread through public education and monitoring.

6. Natural resource preservation

Under certain circumstances, CDOT may elect to pursue preservation of natural resources, such as acquisition of lands with established, highly functional habitats. Preservation could be preferable and justifiable based on the presence of unique habitat and/or special-status species. The use of preservation as compensatory mitigation would be determined with consideration for compliance with the other established mitigation goals, as well as the amount of credit generated.

Partnering Opportunities

Though not specifically required under NEPA, partnering with federal, state, and local agencies, local governments, and others will help CDOT meet their goals for sustainability in transportation and environmental stewardship, and help FHWA meet some of their goals under MAP-21. The following mitigation strategies relate to partnering opportunities.

1. Pursue partnering opportunities for mitigation

Consult with the Agency Working Group, demonstrating that a reasonable effort has been expended in pursuing financial or in-kind types of partnering opportunities for all types of natural resource mitigation (i.e., avoidance, minimization, and compensatory). In addition to the Agency Working Group, consider discussing partnering opportunities within the U.S. 50 project area with local governments, and non-governmental organizations. The Transportation Environmental Resource Council (TERC), made up of federal, state, and local agencies and Colorado Indian tribes, meet quarterly with CDOT to discuss projects and environmental issues. Partnering opportunities for mitigation may exist with this active group.

2. Mitigate cumulative impacts in the region

Explore opportunities to team with other agencies or organizations operating in the area to help mitigate impacts to natural resources by coordinating efforts to minimize habitat fragmentation, restore degraded habitat and water quality, expand or connect existing habitats, and increase public awareness.

8.2.2 Mitigation Strategies for Built Environment Resources

Mitigation strategies for resources related to the built (human) environment were developed based on the potential effects the Build Alternative could have on each type of resource. Similar to the strategies developed for natural resources, these strategies also are intended to guide mitigation activities for effects that occur as the result of Tier 2 studies.

Mitigation strategies for historic properties (i.e., historic and archaeological resources) were agreed to as part of the *U.S. 50 Tier 1 Section 106 Programmatic Agreement*. This agreement outlines how historic properties will be identified and evaluated in the U.S. 50 Tier 1 EIS. It was developed and signed by representatives from the lead agencies (CDOT and FHWA) and the Colorado State Historic Preservation Officer. The agreement includes the following mitigation strategies:

- When a preferred alternative is chosen, the lead agencies will meet with the Colorado State Historic Preservation Officer and the Section 106 consulting parties “to discuss appropriate mechanisms for avoiding, minimizing and mitigating adverse effects” to historic properties (U.S. 50 Tier 1 Section 106 PA, Sect III(B)(3)).
- Tier 2 studies will include the standard Section 106 consultation process.

Mitigation strategies developed for other resources associated with the built environment are listed in Table 8-1. They also are discussed in Chapter 4, Affected Environment, Environmental Consequences, and Mitigation.

Table 8-1. Mitigation Strategies for Built Environment Resources

Resource	Mitigation Strategies
Air quality	Watering, sweeping, and other dust-suppression techniques would be used to minimize fugitive dust emissions during construction. Additional efforts to minimize pollutant emissions during construction would be made in accordance with CDOT Air Quality Directive 1901.
Agricultural resources	Tier 2 roadway footprints would be routed in the following manner, where possible, to: • Follow section lines and existing roads • Minimize impacts to Prime and Unique Farmlands and losses to agricultural productivity • Minimize the number of uneconomical remainders • Work around feedlots and in a manner that would allow operations to continue at these facilities • Avoid direct effects to roadside produce markets • Minimize disruptions to key portions of U.S. 50 that are heavily used for farm-to-market travel, especially during harvest times Also, these footprints would be constructed in a manner that maintains water flows in irrigation canals and ditches and the functionality of those systems' maintenance roads.
Paleontological resources	If paleontological resources are encountered, reasonable efforts would be made to avoid them and to identify and implement efforts to preserve them.
Hazardous materials	Appropriate mitigation measures would be taken during Tier 2 studies to ensure that hazardous materials sites encountered do not cause harm to human health or the environment. Efforts will be made to avoid hazardous material sites, with special consideration for sites that require a Phase 1 assessment and are determined to be Recognized Environmental Condition sites during Tier 2 studies. CDOT or the party responsible for the contamination will safely remove and dispose of any hazardous materials encountered.
Historic resources	In addition to the strategies outlined in the *U.S. 50 Tier 1 Section 106 Programmatic Agreement*, CDOT would—to the greatest extent feasible—support communities' efforts related to heritage tourism along U.S. 50 in the Lower Arkansas Valley.
Archaeological resources	Follow the strategies outline in the *U.S. 50 Tier 1 Section 106 Programmatic Agreement*.
Land use	Attempt to remain consistent with existing and planned land uses.

Table 8-1. Mitigation Strategies for Built Environment Resources (continued)

Resource	Mitigation Strategies
Parklands and recreational resources	If the Tier 2 roadway footprint in Granada affects the Granada School District Property, CDOT would evaluate potential noise effects to the facility. If Tier 2 roadway footprints affect any trails managed by local governments or CPW, CDOT would make reasonable efforts to ensure the continued operation of these trails during construction. If Tier 2 roadway footprints result in a direct effect to State Wildlife Areas, including the John Martin Reservoir State Park and State Wildlife Area, CDOT will coordinate with the manager/owner of the resource to identify mitigation during Tier 2 studies. If Tier 2 studies result in effects to the Cottonwood Links Golf Course, Fowler officials have indicated in the past that they would agree to altering the course layout (CDOT 2002b). To minimize disruption and loss of revenue to the facility, new holes would be constructed prior to affecting the existing ones, and changes to the course would be made during the course's low-use season (the course is open year round), to the extent possible. If Tier 2 roadway footprints result in a direct effect to the Las Animas Golf Course, CDOT will coordinate with the manager/owner of the resource to identify mitigation during Tier 2 studies.
Section 4(f) resources	CDOT will undergo a complete Section 4(f) evaluation (see Chapter 5, Section 4(f) Evaluation) during Tier 2 studies to better determine uses and the significance of resources that can't be avoided.
Section 6(f) resources	If Tier 2 roadway footprints would result in a conversion of a Section 6(f) resource, the resource would be replaced with land of at least current fair market value and of reasonable equivalent usefulness and location, in accordance with Section 6(f)(3) of the Land and Water Conservation Act. At this time, no Section 6(f) resources would be affected.
Social and economic conditions	CDOT would assist municipalities with their efforts to preserve the Preferred Alternative right of way around their communities. This could include assistance in drafting zoning ordinances or buying development rights for the property. CDOT would work with municipalities to ensure that signage along U.S. 50 advises travelers of services, businesses, recreational areas, and other amenities available in the communities. CDOT would route Tier 2 roadway footprints to minimize impacts to permanent roadside produce markets and avoid disrupting their access to U.S. 50, where possible. CDOT would schedule construction activities to minimize disruption on key portions of U.S. 50 that are heavily used for farm-to-market travel, especially during harvest times.
Traffic noise	Specific noise conditions would be modeled during Tier 2 studies, and mitigation activities would be considered based on the results of that analysis.
Transportation	If Tier 2 studies impede an existing direct access from U.S. 50 to a property, reasonable measures would be taken to develop an alternative access point to ensure future access to the properties is provided.

Table 8-1. Mitigation Strategies for Built Environment Resources (continued)

Resource	Mitigation Strategies
Energy	Mitigation strategies to reduce energy impacts will be considered for construction and operation activities during Tier 2 project evaluation. These strategies will include reducing idling time for construction and maintenance vehicles, and assessing the potential for increased access to transit.

When effects to resources cannot be avoided or minimized during Tier 2 studies, CDOT will compensate for the effects. All acquisitions and relocations (i.e., property acquisition) will comply fully with federal and state requirements, including the Uniform Relocation Assistance and Real Property Acquisition Policies Act of 1970 (Uniform Act), as amended.

9 References

American Association of State Highway and Transportation Officials (AASHTO). *Policy on Geometric Design of Highways and Streets.* Washington, D.C.: American Association of State Highway and Transportation Officials (AASHTO), 2004. Print. [AASHTO 2004]

Andrews, R., and R. Righter. *Colorado Birds.* Denver, CO: Denver Museum of Natural History, 1992. Print.

Arkansas Valley Fair. *Historic Information about the Arkansas Valley Fair*. Web. 8 Dec. 2009. <http://www.arkvalleyfair.com/>.

ASTM International. *Standard Practice for Environmental Site Assessments: Phase I Environmental Site Assessment Process.* West Conshohocken, Pennsylvania: ASTM International, 2005. Print.

Baker, C. Natural Resources Conservation Service (NRCS). Rocky Ford Field Office. Consultation about the carrying capacity of ranch lands for livestock grazing. Feb. 2009.

Bent County. Resolution 2005-14. 20 Jun. 2005.

Bent County Assessor. Property records for buildings within the boundaries of Las Animas that are 45 years of age or older. Bent County, CO: Bent County Assessor. File search completed Nov. 2006.

Black, T. Colorado Division of Wildlife (CDOW). Lamar area wildlife manager. Consultation regarding Colorado Division of Wildlife newly established (interim) state wildlife areas. 20 Apr. 2009. [Black 2009]

Black, T. (Lamar area wildlife manager), M. Smith (conservation biologist), and B. Will (CDOW). Consultation regarding state wildlife areas in the project area. 5 Nov. 2007.

Black & Veatch, CDM, Farnsworth Group, Merrick & Company, MWH. *Arkansas Valley Conduit Pre-National Environmental Policy Act State and Tribal Assistance Grant Report.* Southeastern Colorado Water Conservancy District, May 2010. Print

Bottorff, R.L. "Cottonwood Habitat for Birds in Colorado." *American Birds* 28 (1974): 975-979. Print.

Bureau of Economic Analysis (BEA). *Jobs Information*. Web. 2007. <http://www.bea.gov/regional/reis/default.cfm#step3>.

Bureau of Land Management (BLM). *Potential Fossil Yield Classification (PFYC) System for Paleontological Resources on Public Lands. Instruction Memorandum No. 2008-009.* Washington, D.C.: Department of the Interior, 2007. Print.

Bureau of Land Management. *Guidance for Implementation of Potential Fossil Yield Classification (PFYC) System. Instruction Memorandum No. 2008-009.* Washington, D.C.: Department of the Interior, 2008. Print.

Burt, W.H., and R.P. Grossenheider. *A Field Guide to Mammals. Peterson Field Guides.* New York: Houghton Mifflin Company, 1980. Print.

Carroll, C. *Coal Production, Distribution, and Electric Generation Map of Colorado.* Denver, CO: Colorado Geological Survey (CGS), 2005. Web. May 2010. <http://geosurvey.state.co.us>.

Carter, Carrol Joe, and Steven F. Mehls. *Colorado Southern Frontier Historical Context*. Denver, CO: Colorado Historical Society, Office of Archaeology and Historic Preservation, 1984. Print. [Carter 1984]

Chapman, S., et al. *Ecoregions of Colorado.* Reston, VA: U.S. Geological Survey (USGS), 2006. Print.

Christopherson, Robert W. *Geosystems: An Introduction to Physical Geography*. 7th ed. Upper Saddle River, New Jersey: Prentice Hall, 2008. Print.

Chronic, H. and F. Williams. *Roadside Geology of Colorado*. Missoula, MT: Mountain Press, 2007. Print.

City of La Junta. Resolution R-14-2005. 16 May 2005.

City of La Junta. Resolution R-7-2007. 16 Jan. 2007.

City of Las Animas. Resolution 14-05. 12 Jul. 2005.

City of Rocky Ford. Resolution 11 (2005 series). 14 Jun. 2005.

Colorado Department of Agriculture. Ag Facts (CO Ag Facts). *Value of Agricultural Products Sold by County.* 2002. Web. Feb. 2006. <http://www.ag.state.co.us/mkt/AgStatsMap.pdf>.

Colorado Department of Local Affairs (DOLA), State Demography Office. *Historical Census Data.* Web. Dec. 2006. <http://www.dola.state.co.us/demog_webapps/population_census>.

Colorado Department of Local Affairs (DOLA). *Jobs Information.* Web. 2007. <http://www.dola.colorado.gov/demog_webapps/jobs_sector_naics>.

Colorado Department of Local Affairs (DOLA). *Colorado Economic and Demographic Information System.* Denver, CO: Colorado Department of Local Affairs (DOLA). Web. 28 Jul. 2009. <http://www.dola.state.co.us/is/cedishom.htm>.

Colorado Department of Local Affairs (DOLA). *Population Estimates by County and Municipality (2000-2008).* Web. Feb. 2010. <http://www.dola.state.co.us/dlg/demog/pop_totals.html>.

Colorado Department of Local Affairs (DOLA). Colorado Economic and Demographic Information System (CEDIS). *Colorado Jobs by Sector in 2011—NAICS Based (2001 to Current).* 2011. Web. 16 Oct. 2013. <https://dola.colorado.gov/demog_webapps/jsParameters.jsf?sic=F>.

Colorado Department of Natural Resources (DNR). *Major Trans-Basin Divisions in Colorado.* Sep. 2000. Web. 15 Apr. 2010. <http://sciencepolicy.colorado.edu/admin/publication_files/resource-647-wwa_map_3.pdf>.

Colorado Department of Public Health and Environment (CDPHE). Air Pollution Control Division. *PM_{10} Maintenance Plan for Lamar, Colorado.* Denver, CO; CDPHE, Nov. 2001. Print.

Colorado Department of Public Health and Environment (CDPHE). *Hospitals in Colorado*. Web. 10 Oct. 2006. <http://www.cdphe.state.co.us/hf/static/hospital.htm>.

Colorado Department of Public Health and Environment (CDPHE). Water Quality Control Commission. *Colorado's Monitoring and Evaluation List (Regulation #94).* Denver, CO: CDPHE, 30 Apr. 2008. Web. 15 Apr. 2010. <http://www.cdphe.state.co.us/regulations/wqccregs/100294wqccmonitoringevaluationlist.pdf>. [CDPHE 2008a]

Colorado Department of Public Health and Environment (CDPHE). Water Quality Control Division. *Status of Water Quality in Colorado—2008: The Update to the 2002, 2004, and 2006 305(b) Reports.* Denver, CO: CDPHE, Apr. 2008. Web. May 2009. <http://www.cdphe.state.co.us/op/wqcc/Resources/wqresdoc.html>. [CDPHE 2008b]

Colorado Department of Public Health and Environment (CDPHE). Water Quality Control Commission. *Section 303(d) List: Water-Quality-Limited Segments Requiring Total Daily Maximum Loads (Regulation #93).* Denver, CO: CDPHE, 9 Mar. 2010. Web. Apr. 2010. <http://www.cdphe.state.co.us/regulations/wqccregs/>.

Colorado Department of Public Health and Environment (CDPHE). Air Pollution Control Division. *PM_{10} Maintenance Plan for Lamar, Colorado.* Denver, CO: CDPHE, Nov. 2012.

Colorado Department of Transportation (CDOT). Memorandum of Understanding. *Shortgrass Prairie Initiative*. Denver, CO: Colorado Department of Transportation, 2001. Print.

Colorado Department of Transportation (CDOT). Notes from bus tour conducted in Fowler, Colorado, as part of *A Corridor Selection Study: A Plan For U.S. 50.* Colorado Department of Transportation (CDOT) Region 2, 2 May 2002. Print. [CDOT 2002b]

Colorado Department of Transportation (CDOT). *A Corridor Selection Study: A Plan for U.S. 50.* Colorado Springs, CO: Colorado Department of Transportation (CDOT) Region 2, Sep. 2003. Print. [CDOT 2003a]

Colorado Department of Transportation (CDOT). *Existing Conditions Report, Project No. NH 0504-037.* Denver, CO: CDOT, May 2003. Print. [CDOT 2003b]

Colorado Department of Transportation (CDOT). *SH 50B Corridor Safety Study: MP 316–467.58.* Denver, CO: Colorado Department of Transportation, Jan. 2003. Print. [CDOT 2003c]

Colorado Department of Transportation (CDOT). *Accident Data 1996–2004.* Denver, CO: CDOT, 4 Dec. 2006. Print. [CDOT 2004a]

Colorado Department of Transportation (CDOT). *Land Ownership in Colorado*. ESRI ArcGIS 9.2. Denver, CO: Colorado Department of Transportation (CDOT), 31 Dec. 2004. Web. 20 Sep. 2005. <http://www.dot.state.co.us/App_DTD_DataAccess/GeoData/index.cfm?fuseaction=GeoDataMain&MenuType=GeoData>. [CDOT 2004b]

Colorado Department of Transportation (CDOT). *U.S. 50 Tier 1 EIS Community Workshops Report.* Colorado Springs, CO: Colorado Department of Transportation (CDOT) Region 2, Aug. 2006. Print. [CDOT 2006b]

Colorado Department of Transportation (CDOT). *Colorado Hazardous and Nuclear Materials Route Restrictions*. 2007. Web. 7 Aug. 2009. <http://www.dot.state.co.us/App_DTD_DataAccess/Downloads/StatewideMaps/HazMatFront.pdf>.

Colorado Department of Transportation (CDOT). *Straight Line Diagram of SH050B from MP 316 to MP 468.* Web. 4 Jun. 2007. <http://dtdexternal.dot.state.co.us/sld/>. [CDOT 2007a]

Colorado Department of Transportation (CDOT). *National Environmental Policy Act Manual*. Denver, CO: Colorado Department of Transportation, Dec. 2008. Web. Apr. 2010. <http://www.coloradodot.info/programs/environmental/nepa-program/nepa-manual>. [CDOT 2008b]

Colorado Department of Transportation (CDOT). *Roadway Statistics: Daily Vehicle Miles Traveled by County in Colorado.* 2008. Web. Jun. 2010. <http://www.dot.state.co.us/app_DTD_DataAccess/Statistics/dsp_folder/Roadway/2008/2008DVMTbyCounty.htm>. [CDOT 2008c]

Colorado Division of Reclamation, Mining, and Safety (CDRMS). *Permitted Mines in Colorado.* ESRI ArcGIS 9.3. 1 Dec. 2009. Web. May 2010. <http://mining.state.co.us/GIS%20Data.htm>.

Colorado Department of Transportation (CDOT). *Documented Hazardous Material Sites in Colorado.* 2009. Acquired from the Colorado Department of Transportation (CDOT), Craig Clark, Hazardous Materials Specialist, on October 29, 2009. [CDOT 2009a]

Colorado Department of Transportation (CDOT). *Roadkill Database.* 2009. Provided by Jeff Peterson, Colorado Department of Transportation (CDOT) Wildlife Program Manager, Apr. 2010. [CDOT 2009b]

Colorado Department of Transportation (CDOT). *Future Traffic Volumes of SH050B from MP 315 to MP 467.* Web. 2 Feb. 2010. <http://www.dot.state.co.us/App_DTD_DataAccess/Traffic/index.cfm?fuseaction=TrafficMain&MenuType=Traffic>. [CDOT 2010a]

Colorado Department of Transportation (CDOT). *Traffic Data for I-25 from MP 200 to MP 214 (Denver).* Web. 15 Feb. 2010. <http://www.dot.state.co.us/App_DTD_DataAccess/Traffic/index.cfm?fuseaction=TrafficMain&MenuType=Traffic>. [CDOT 2010c]

Colorado Department of Transportation (CDOT). *Traffic Information for SH050B from MP 315 to MP 467.* Web. 2 Feb. 2010. <http://www.dot.state.co.us/App_DTD_DataAccess/Traffic/index.cfm?fuseaction=TrafficMain&MenuType=Traffic>. [CDOT 2010d]

Colorado Department of Transportation (CDOT). *Online Transportation Information System (OTIS) Data for 2012.* Web. Mar. 2014. <http://dtdapps.coloradodot.info/otis>. [CDOT 2012]

Colorado Department of Transportation (CDOT). CDOT Online Transportation Information System (OTIS). *Noxious Weed Data*. Web. Oct. 2013. <http://dtdapps.coloradodot.info/noxiousweeds/>.

Colorado Department of Transportation (CDOT). *Final Environmental Impact Statement and Section 4(f) Evaluation for Interstate 25 Improvements through Pueblo.* Denver, CO: CDOT, Sep. 2013. Print. [CDOT 2013a]

Colorado Department of Transportation (CDOT). *Noise and Abatement Guidelines*. Denver, CO: Colorado Department of Transportation, 8 Feb. 2013. Print. [CDOT 2013b]

Colorado Department of Transportation (CDOT). *National Environmental Policy Act Manual. Version 3.* Denver, CO: Colorado Department of Transportation, 2013. Print. (CDOT 2013c).

Colorado Department of Transportation (CDOT). *2040 Statewide Transportation Plan*. 19 Mar. 2015. Web. Nov. 2015. http://coloradotransportationmatters.com/wp-content/uploads/2015/07/CDOT-SWP-Executive-Summary-2015-07-01.pdf. [CDOT 2015]

Colorado Department of Transportation (CDOT). Statewide Transportation Improvement Program, Fiscal Years 2016–2019. May 2015. Web. <https://www.codot.gov/business/budget/statewide-transportation-improvement-program-stip-reports-information/current-stip-reports-information/FINAL%20FY%202016-2019%20STIP%20-%20Adopted%20May%2021%20 2015.pdf/view>. [CDOT 2015a]

Colorado Division of Wildlife (CDOW). *State Wildlife Area (SWA) Boundaries*. ESRI ArcGIS 9.0. 17 Apr. 2003. Print. [CDOW 2003a]

Colorado Division of Wildlife (CDOW) and Colorado Grassland Species Working Group. *Conservation Plan for Grassland Species in Colorado.* Denver, CO: Colorado Division of Wildlife, Nov. 2003. Print. [CDOW 2003b]

Colorado Division of Wildlife (CDOW). *Riparian Mapping Methodology.* 2004. Web. Jan. 2007. <http://ndis1.nrel.colostate.edu/riparian/Methods.htm>.

Colorado Division of Wildlife (CDOW). *Fisheries Data for Streams along U.S. 50 from 1979 to 2005*. Extracted from the fisheries database by Jim Ramsay (CDOW Area 12 aquatic biologist). Data extracted January 2007. [CDOW 2005]

Colorado Division of Wildlife (CDOW). *Habitat and Wildlife Issues along U.S. 50 in Southeastern Colorado.* Meeting notes from T. Black (CDOW Area 12 wildlife manager), M. Smith (CDOW Area 12 habitat biologist), and R. McEldowney (Post, Buckley, Schuh, and Jernigan, Inc., ecologist). 24 Oct. 2006. Print.

Colorado Division of Wildlife (CDOW). *Colorado State Wildlife Areas (SWA).* Web. Jan. 2007. <http://wildlife.state.co.us/Apps.swa/view.asp>. [CDOW 2007]

Colorado Division of Wildlife (CDOW). *Colorado Birding Trails on the Eastern Plains.* Web. 12 Dec. 2009. <http://www.coloradobirdingtrail.com/trails/eastern-plains.php>. [CDOW 2009a]

Colorado Division of Wildlife (CDOW). *Colorado State Wildlife Areas (SWA).* Web. Jul. 2009. <http://wildlife.state.co.us/LandWater/StateWildlifeAreas/>. [CDOW 2009b]

Colorado Economic and Demographic Information System (CEDIS). *Economic Information from the 2000 U.S. Census.* Denver, CO: Colorado Department of Local Affairs. 2000. Web. 6 Dec. 2006. <http://www.dola.state.co.us/is/cedishom.htm>.

Colorado Geological Survey (CGS). Colorado Natural Hazards Mitigation Council, Earthquake Subcommittee. *Colorado Earthquake Information.* 15 Nov. 1999. Web. May 2010. <http://geosurvey.state.co.us>.

Colorado Geological Survey (CGS). *Ground Water Atlas of Colorado*. Denver, CO: Colorado geological Survey, 2003. Web. 2010. <http://geosurvey.state.co.us/wateratlas/>.

Colorado Geological Survey (CGS). *Colorado Coal Fact Sheet*. Denver, CO: Colorado Geological Survey (CGS), 2007. Web. May 2010. <http://geosurvey.state.co.us>.

Colorado Geological Survey (CGS). *Colorado Minerals Fact Sheet.* Denver, CO: Colorado Geological Survey (CGS), 2008. Web. May 2010. <http://geosurvey.state.co.us>.

Colorado Office of Economic Development and International Trade (OEDIT). *Colorado Enhanced Rural Enterprise Zone Program Fact Sheet*. Web. 12 Jul. 2009. <http://www.colorado.gov/cs/Satellite /OEDIT/OEDIT/1167928191402>. [OEDIT 2009a]

Colorado Office of Economic Development and International Trade (OEDIT). *Colorado Enterprise Zone Program Fact Sheet.* Web. 12 Jul. 2009. <http://www.colorado.gov/cs/Satellite/ OEDIT/OEDIT/1167928191402>. [OEDIT 2009b]

Colorado Oil and Gas Conservation Commission (COGCC). *Oil and Gas Facility, Well, and Permit Locations in Colorado.* ESRI ArcGIS 9.1. Denver, CO: Colorado Oil and Gas Conservation Commission (COGCC), 14 May 2010. Web. May 2010. <http://cogcc.state.co.us/>.[COGCC 2010a]

Colorado Oil and Gas Conservation Commission (COGCC). *Oil and Gas Well Database*. Denver, CO: Colorado Oil and Gas Conservation Commission (COGCC). Web. 14 May 2010. <http://cogcc.state.co.us/>. [COGCC 2010b]

Colorado Oil and Gas Conservation Commission (COGCC). *GIS Online Map*. Denver, CO: Colorado Oil and Gas Conservation Commission (COGCC). Web. Sep. 2013. <http://cogcc.state.co.us/>.

Colorado Preservation, Inc. (CPI). *Colorado's Most Endangered Places Program: Summary Of 2009 Endangered Places.* Denver, CO: Colorado Preservation, Inc., 2009. Print.

Colorado State Land Board. *About the State Land Board*. Web. 12 Jan. 2010. <http://trustlands.state. co.us/NewsandMedia/Pages/AbouttheSLB.aspx>.

Colorado State Parks. *Directions to John Martin Reservoir State Park.* Web. 10 Apr. 2007. <http://parks.state.co.us/Parks/JohnMartinReservoir/MapsandDirections/>.

Colorado State Parks. *Colorado Statewide Comprehensive Outdoor Recreation Plan*. Denver, CO: Colorado State Parks, 2008. Web. Dec. 2009. <http://parks.state.co.us/Trails/LWCF/ SCORPplan/>.

Colorado Water Conservation Board (CWCB). *Arkansas River Basin Statewide Water Supply Initiative Fact Sheet*. Denver, CO: Colorado Water Conservation Board (CWCB), Feb. 2006. <http://cwcb.state.co.us/Home/RiverBasinFacts/>. [CWCB 2006a]

Colorado Water Conservation Board (CWCB). *Tamarisk Inventory for the Colorado, Arkansas, and Purgatoire Rivers*. Presented by the Tamarisk Coalition, 25 Jan. 2006. [CWCB 2006b]

Denver Museum of Nature and Science. *Generalized Fossil Locations Within the U.S. Highway 50 Corridor from Pueblo to the Colorado-Kansas State Line Recorded by the Denver Museum of Nature and Science.* ESRI ArcGIS 9.2. Colorado Springs, CO: URS Corporation, 5 Mar. 2002.

Energy Information Administration (EIA). *International Energy Outlook.* May 2007. Web. Jul. 2009. <http://tonto.eia.doe.gov/ftproot/forecasting/0484(2007).pdf>.

Environment Colorado Research and Policy Center. *Losing Ground: Colorado's Vanishing Agricultural Landscape.* Denver, CO: Environment Colorado, Mar. 2006. Web. 2008. <http://www.environmentcolorado.org/uploads/Ch/IV/ChIVMUHVcqkMltQLgaPg5g/Losing_Ground.pdf>.

Fankhauser, T. Colorado Cattleman's Association. Consultation about the carrying capacity of ranch lands for livestock grazing. Feb. 2009.

Federal Emergency Management Agency (FEMA). *Flood Zones.* Web. Sep. 2013. <http://www.fema.gov/floodplain-management/flood-zones>.

Federal Highway Administration (FHWA). *The Development of Logical Project Termini.* 5 Nov. 1993. Web. 11 Mar. 2010. <http://www.environment.fhwa.dot.gov/projdev/tdmtermini.asp>. [FHWA 1993]

Federal Highway Administration (FHWA). *Bent's Old Fort Access Road Draft Environmental Assessment and Section 4(F) Evaluation.* Washington, D.C.: Federal Highway Administration. 17 Sep. 2007. Print.

Federal Highway Administration (FHWA). *Procedures for Abatement of Highway Traffic Noise and Construction Noise*. Washington, D.C.: GPO, 3 Jul. 2010. Web. <http://www.gpo.gov/fdsys/pkg/FR-2010-07-13/html/2010-15848.htm>.

Federal Highway Administration (FHWA). *Highway Traffic Noise: Analysis and Abatement Guidance.* Washington, D.C.: Federal Highway Administration. Dec. 2011. Web. http://www.fhwa.dot.gov/environment/noise/regulations_and_guidance/analysis_and_abatement_guidance/.

Federal Highway Administration (FHWA). *Section 4(f) Policy Paper*. Washington, D.C.: Federal Highway Administration, 20 Jul. 2012. Print. [FHWA 2012a]

Federal Highway Administration (FHWA). *Interim Guidance Update on Mobile Source Air Toxic Analysis in NEPA Documents*. Washington, D.C.: Federal Highway Administration, 6 Dec. 2012. Print. [FHWA 2012b]

Federal Highway Administration (FHWA). *Environmental Review Toolkit.* Web. Nov. 2015. <https://www.environment.fhwa.dot.gov/strmlng/safe_faq.asp#faq_1>. [FHWA 2015]

Gates, T.K., and J. Labadie. *Description and Interpretation of Salinization in the Lower Arkansas River Valley, Colorado*. Reston, VA: United States Geological Survey (USGS), 2000. Print.

Gates, T., L. Garcia, and J. Labadie. *Toward Optimal Water Management in Colorado's Lower Arkansas River Valley: Monitoring and Modeling to Enhance Agriculture and Environment.* Ft. Collins, CO: Colorado State University (CSU), June 2006. Web. May 2009. <http://digitool.library.colostate.edu/R/?func=dbin-jump-full&object_id=4997>.

Hammerson, G.A. *Amphibians and Reptiles in Colorado*. 2nd ed. Boulder, CO: University Press of Colorado and Colorado Division of Wildlife (CDOW), 1999. Print.

Historical Census Browser. *Agricultural Data from 1900 to 1974.* Charlottesville, VA: University of Virginia Library. Web. Feb. 2007. <http://fisher.lib.virginia.edu/collections/stats/histcensus/>. [Historical Census Browser 2007a]

Historical Census Browser. *Population Data*. Charlottesville, VA: University of Virginia Library. Web. Feb. 2007. <http://fisher.lib.virginia.edu/collections/stats/histcensus/>. [Historical Census Browser 2007b]

McLean, S. Colorado Division of Wildlife (CDOW). Consultation regarding riparian mapping data. April 28, 2006.

Morgan, M. *Colorado's Earthquake and Fault Map*. Denver, CO: Colorado Geological Survey, 2007. Web. May 2010. <http://geosurvey.state.co.us>.

Natural Diversity Information Source (NDIS). *Species and Habitat Information*. Denver, CO: CPW, 2007. Web. Jan. 2007. <http://ndis.nrel.colostate.edu/wildlife.asp>.

Natural Resources Conservation Service (NRCS). *Digital Soil Survey: Soil Data for Eastern Colorado*. ESRI ArcGIS 9.2. Lakewood, CO: Natural Resources Conservation Service (NRCS); 25 Jan. 2005. Print.

Natural Resources Conservation Service (NRCS). *National Engineering Handbook: Chapter 7, Hydrologic Soil Groups.* Lakewood, CO: Natural Resources Conservation Service, May 2007. Web. May 2010. <http://directives.sc.egov.usda.gov/OpenNonWebContent.aspx?content =17757.wba>.

Natural Resources Conservation Service (NRCS). *Official Soil Series Descriptions*. Lincoln, NE: National Resources Conservation Service. Web. May 2010. <https://soilseries.sc.egov.usda.gov/ osdname.asp.

Natural Resources Conservation Service. *Soil Survey Geographic (SSURGO) Database*. Web. Jan. 2014. <http://soildatamart.nrcs.usda.gov>.

National Center for Education Statistics (NCES). *Public School Districts: 2003-2004 School Year*. Web. 11 Oct. 2006. <http://nces.ed.gov/ccd/districtsearch/>.

National Environmental Policy Act/Clean Water Act Section 404 (NEPA/404) merger process and agreement for transportation projects in Colorado. 2005.

National Park Service (NPS). *U.S. 50 Tier 1 EIS National Park Service Consultation Meeting Minutes.* Denver, CO: Colorado Department of Transportation (CDOT) Region 2, 15 Feb. 2008. Print.

National Park Service (NPS). *General Information*. Web. 2009. <http://www.nps.gov>.

National Research Council. National Cooperative Highway Research Program. *Research Results Digest 275: Application of European 2+1 Roadway Designs.* Washington, DC: The National Academies Press, 2003. Print.

Otero County. Resolution 2005-010. 16 May 2005.

Otero County Assessor. Property records for buildings within the boundaries of Fowler, Manzanola, Rocky Ford, Swink and La Junta that are 45 years of age or older. Otero County, CO: Otero County Assessor. File search completed November 2006.

Ott-Jones, C. Park Superintendent, Bent's Old Fort National Historic Site (NHS). Consultation regarding routes used by visitors to access Bent's Old Fort National Historic Site. 18 Apr. 2007.

Pallante, A. Colorado Office of Archaeology and Historic Preservation. Consultation regarding number of listed properties on the Colorado State Register of Historic Places. 11 Feb. 2009.

Peters, T. District Ranger, Comanche National Grassland. Consultation regarding routes used by visitors to access the Comanche National Grassland. 20 Apr. 2007

Programmatic Agreement among the Colorado Department of Transportation (CDOT), the Federal Highway Administration (FHWA), and the State Historic Preservation Officer (SHPO) regarding implementation of the U.S. Highway 50 Corridor East Project (U.S. 50 Tier 1 Section 106 PA). June 25, 2007.

Prowers County. Resolution 2005-11. 20 Jun. 2005.

Prowers County. *Arkansas River Trails Plan*. 2006.

Prowers County Assessor. Property records for buildings within the boundaries of Granada and Holly that are 45 years of age or older. Prowers County, CO: Prowers County Assessor. File search completed November 2006.

PublicLibraries.com. *Public Libraries in Colorado*. Web. 30 Apr. 2007. <http://www.publiclibraries.com/colorado.htm>.

Pueblo Area Council of Governments (PACOG). Resolution 2005-022. 30 Jun. 2005.

Pueblo Area Council of Governments (PACOG). *2030 Comprehensive Plan*. Pueblo, CO: PACOG, 11 Jan. 2010. Print.

Pueblo Area Council of Governments (PACOG). *2040 Long-Range Transportation Plan*. Pueblo, CO: PACOG, 2 Nov. 2015. Web. <http://www.pacog.net/> [PACOG 2015]

Pueblo Chieftain. "Agricultural Decline to Continue In Arkansas River Valley." 11 Mar. 2007. Web. 11 Mar. 2007. <http://www.pueblochieftain.com>.

Pueblo County Assessor. Property records for buildings within the boundaries of Pueblo that are 45 years of age or older. Pueblo County, CO: Pueblo County Assessor. File search completed November 2006.

Rich, T.D., et al. *Partners in Flight: North American Landbird Conservation Plan*. Ithaca, NY: Cornell Lab of Ornithology, 2004. Print.

Rowe, Robert. *Paleontological Technical Report: Front Range Pipeline Project, Spread 2, Licoln, Crowley, Otero, Bent, Las Animas, and Baca Counties, Colorado.* Denver, CO: Atkins North America, Inc. 2012. Print.

Southeastern Colorado Water Conservancy District (SECWCD). *Arkansas River Watershed Invasive Plant Plan: Why is Tamarisk a Problem?* 2008. Web. May 2010. <http://arkwipp.org/why-problem.asp>.

Southern Delivery System (SDS). *Fact Sheet*. 24 Aug. 2009. Web. May 2010. <http://www.sdswater.org/docs/newsroom/related_docs/FactSheet_general_8-24-09.pdf>.

Southwest Regional Gap Analysis Project (SWReGAP). *Land Cover Datasets*. 2006. Web. Jan. 2007. <http://fws-nmcfwru.nmsu.edu/swregap/>.

Sparks, R.A., D.J. Hanni, and M. McLachlan. *Section-Based Monitoring of Breeding Birds Within the Shortgrass Prairie Bird Conservation Region (BCR 18).* Brighton, CO: Rocky Mountain Bird Observatory, 2005. Print.

State Board of Stock Inspection Commissioners. *2009 Public Livestock Market List*. List made available by staff 23 Jan. 2009.

Stein, T. "For Some, River Not Worth its Salt: Economically Slumping Towns on the Arkansas River are Faced with Treating the Tainted Water." *Denver Post.* 27 Feb. 2005. Print.

Stoeser, D., G. Green, L. Morath, W. Heran, A. Wilson, D. Moore, and B. Van Gosen. *Preliminary Integrated Geologic Map Databases for the United States Central States: Montana, Wyoming, Colorado, New Mexico, Kansas, Oklahoma, Texas, Missouri, Arkansas, and Louisiana.* ESRI ArcGIS 9.2. Denver, CO: U.S. Geological Survey (USGS), 2005. Web. May 2010. <http://tin.er.usgs.gov/geology/state/state.php?state=CO>.

Stulp Farms. Carrying capacity of ranch lands for livestock grazing. Web. Feb. 2009. <http://www.cminet.net/~stulp/>.

Swenka, David, PE, PTOE. *2008-2012 Crash Summary and 2011 AADTs and LOSS for U.S. 50.* Colorado Department of Transportation (CDOT). Safety and Traffic Engineering Branch. Data emailed Feb. 2014. [Swenka 2014]

The Nature Conservancy (TNC). *Conservation Easements: What are Conservation Easements?* Web. 10 May 2007. <http://www.nature.org/aboutus/howwework/conservationmethods/privatelands/conservationeasements/about/art14925.html>.

Tomelleri, J.R. "Front Range Native Minnows: Lake Chub, Northern Redbelly Dace, Southern Redbelly Dace and Common Shiner." *Wildlife in Danger*. Web. Jan. 2007. <http://www.wildlife.state.co.us/NR/rdonlyres/DFBF3DEB-600A-4AF8-BCB6-65CO20449117/0/frontrange.pdf>.

Town of Fowler. Resolution 682-05. June 14, 2005.

Town of Fowler. *2035 Comprehensive Plan*. February 2009.

Town of Granada. Resolution 2-2005. July 13, 2005.

Town of Holly. Resolution 2005-4. July 6, 2005.

Town of Manzanola. Resolution 05-03. June 16, 2005.

Town of Swink. Resolution 2005-7. June 13, 2005.

Tranel. J. *Identification of Highest and Best Agricultural Use of Non-Urbanized Land in the Project Area.* Lafayette, CO: WYCO Associates, LLC. 24 Apr. 2008. Print. [Tranel 2008a]

Tranel. J. *Enterprise Budget Information for Certain Groups of Crops Grown in the Lower Arkansas Valley*. Lafayette, CO: WYCO Associates, LLC. 13 Aug. 2008. Print. [Tranel 2008b]

Transportation Research Board (TRB). 2003. Access Management Manual. TRIB Committee on Access Management. Washington, DC.

Trucking Industry Mobility and Technology Coalition (TIMTC). *Green Trucks: The View from the Road.* Webinar presented on 11 Feb. 2010. Web. <http:// www.freightmobility.org>.

Tweto, O. *Geologic Map of Colorado*. Reston, VA: United States Geological Survey, 1979. Print.

U.S. Army Corps of Engineers (USACE). *John Martin Reservoir Recreation Area Information.* Web. 12 Jan. 2010. <http://www.spa.usace.army.mil/recreation/jm/index.htm>.

U.S. Bureau of Reclamation (BOR). *Record of Decision for the Southern Delivery System Final Environmental Impact Statement.* Billings, MT: Bureau of Reclamation (BOR) Great Plains Region, 20 Mar. 2009. Web. May 2010. <http://www.sdseis.com/ROD.html>.

U.S. Bureau of Reclamation (BOR). *Arkansas Valley Conduit and Long-Term Excess Capacity Master Contract, Final Environmental Impact Statement.* Billings, MT: Bureau of Reclamation (BOR) Great Plains Region, Aug. 2013. Web. <http://www.usbr.gov/avceis/avc_final_eis.pdf>.

U.S. Department of Agriculture (USDA) Aerials. USDA Aerial Photography Field Office. Flown June 2004.

U.S. Department of Agriculture (USDA). *2007 Census of Agriculture. Volume 1, U.S. Summary and State Reports.* Washington, D.C. 2007. Web. 24 Oct. 2013. <http://www.agcensus.usda.gov/ Publications/2007/Full_Report/>. [Agricultural Census 2007a]

U.S. Department of Agriculture (USDA). *2007 Census of Agriculture. County Profiles for Pueblo, Otero, Bent, and Prowers Counties.* Washington, D.C. 2007. Web. 22 Oct. 2013. <http://www.agcensus.usda.gov/ Publications/2007/Online_Highlights/County_ Profiles/Colorado/>. [Agricultural Census 2007b]

U.S. Department of Commerce, Economics, and Statistics Administration. U.S. Census Bureau. *1997 Economic Census.* Washington, D.C. 1997. Web. 27 Jul. 2009. <http://www.census.gov/ epcd/mwb97/us/us.html>.

U.S. Department of Commerce, Economics, and Statistics Administration. U.S. Census Bureau. *2000 Census.* Washington, D.C. 2000. Web. 12 Dec. 2006. <http://dola.colorado.gov/dlg/demog/ pop_totals.html>.

U.S. Department of Commerce, Economics, and Statistics Administration. U.S. Census Bureau. *State and County QuickFacts: 2000*. Web. Jul. 2007. <http://quickfacts.census.gov/qfd/states/>.

U.S. Department of Commerce, Economics, and Statistics Administration. U.S. Census Bureau. *2005 Zip Code Business Patterns Data.* Washington, D.C. 2005. Web. 2007. <http://www.censtats.census. gov/cbpnaic/cbpnaic.shtml>.

U.S. Department of Commerce, Economics, and Statistics Administration. U.S. Census Bureau. *2006 County Business Patterns Data*. Washington, D.C. 2006. Web. 28 Jul. 2009. <http://www.census.gov/econ/cbp/index.html>.

U.S. Department of Commerce, Economics, and Statistics Administration. U.S. Census Bureau. *State and County QuickFacts: 2006.* Web. Jul. 2009. <http://quickfacts.census.gov/qfd/states/>.

U.S. Department of Commerce, Economics, and Statistics Administration. U.S. Census Bureau. *2010 Census.* Washington, D.C. 2010. Web. 30 Aug. 2013. <http://www.census.gov/2010census/data/>. [U.S. Census 2011a]

U.S. Department of Commerce, Economics, and Statistics Administration. U.S. Census Bureau. *American Community Survey Data.* Web. 30 Aug. 2013. http://www.census.gov/acs/www/data_documentation/2010_release/. [ACS 2011b]

U.S. Department of Energy (DOE). *Transportation Energy Data Book*. 28th ed. Oak Ridge, TN: U.S. Department of Energy (DOE), 2009. Print.

U.S. Department of Health and Human Services (HHS). *2000 Federal Poverty Guidelines.* Washington, D.C. 2000. Web. Dec. 2006. <http://aspe.hhs.gov/poverty/00poverty.htm>.

U.S. Department of Transportation. "Policy Guidance Concerning Recipients' Responsibilities to Limited English Proficient Persons." *Federal Register* 70.239 (14 Dec. 2005): 74087-74100. Print. [USDOT 2005b].

U.S. Environmental Protection Agency (EPA). "Approval and Promulgation of Air Quality Implementation Plans; CO; PM_{10} Designation of Areas for Air Quality Planning Purposes, Lamar; State Implementation Plan Correction." *Federal Register* 70.233 (6 Dec. 2005): 72597-72598. Print.

U.S. Environmental Protection Agency (EPA). *AirData*. Web. 2007. <http://www.epa.gov/air/data/geosel.html>.

U.S. Environmental Protection Agency (EPA). *Region 8: Municipal Storm Water Permits*. 10 Mar. 2008. Web. 14 Apr. 2010. <http://www.epa.gov/region8/water/stormwater/municipal.html>.

U.S. Environmental Protection Agency (EPA). *Hazardous Waste Types*. Web. 4 Sep. 2009. <http://www.epa.gov/waste/hazard/index.htm>.

U.S. Environmental Protection Agency (EPA). *Water Quality Criteria: Basic Information*. Web. 13 Apr. 2010. <http://www.epa.gov/waterscience/criteria/basic.htm>.

U.S. Environmental Protection Agency (EPA). Environmental Compliance History Online (ECHO). Web. 25 Oct. 2013. <http://echo.epa.gov/facility_search>.

U.S. Fish and Wildlife Service (USFWS). *Questions and Answers Regarding the Status Review Finding for the Black-Tailed Prairie Dog.* 2009. Web. 25 Mar. 2014. <http://www.fws.gov/mountain-prairie/species/mammals/btprairiedog/QandA12022009.pdf>. [USFWS 2009]

U.S. Fish and Wildlife Service (USFWS). Inform*ation for Planning and Conservation System, Official Species List*. Web. 24 Sep. 2015. <http://ecos.fws.gov/ipac>.

U.S. Geological Survey (USGS). *National Hydrography Dataset: Geographic Information System Hydrography Data for the Arkansas River Basin.* Reston, VA: U.S. Geological Survey (USGS). Web. Dec. 2007. <http://nhd.usgs.gov/>.

U.S. Geological Survey (USGS). *Major Divisions of Geologic Time: Major Chronostratigraphic and Geochronologic Units*. 27 Aug. 1999. Web. May 2010. <http://pubs.usgs.gov/gip/geotime/divisions.html>.

University of Colorado Museum of Natural History. *Generalized Fossil Locations Within the U.S. Highway 50 Corridor from Pueblo to the Colorado-Kansas State Line Recorded by the University of Colorado Museum of Natural History*. ESRI ArcGIS 9.2. Colorado Springs, CO: URS Corporation, 5 Mar. 2002. Print.

Virginia Department of Transportation (VDOT). *I-81 Corridor Improvement Study—Tier 1 Draft Environmental Impact Statement.* 2005. Web. <http://www.virginiadot.org/projects/constSTAN-I-81-DEIS.asp>. [VDOT 2005]

Western Regional Climate Center (WRCC). *Climate of Colorado Narrative and State Temperature and Precipitation Data*. 2006. Web. Jan. 2007. <http://www/wrcc/dri.edu>.

Williams, K. *NCHRP Highway Practice Synthesis 337: Cooperative Agreements for Corridor Management.* Washington D.C.: Transportation Research Board, National Research Council, 2004. Print.

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10 List of Preparers

CDOT Project No. NH 0504-037

Sub Account No. 12812

U.S. 50 Corridor East Tier 1 Draft Environmental Impact Statement

From the city of Pueblo, Colorado, to the vicinity of the Colorado-Kansas state line

LEAD AGENCIES

Federal Highway Administration	
Stephanie Gibson Environmental Program Manager	• B.S., Civil Engineering • 20 years of experience on projects pertaining to NEPA and other environmental laws, and with FHWA policies and procedures pertaining to those laws
Chris Horn Senior Area Engineer	• B.S., Civil Engineering • 23 years of experience in transportation project development
Tricia Sergeson, MPA Transportation Specialist	• B.A., Political Science • B.A., Foreign Languages and Culture • MPA, International Development and Natural Resources • 1 year of experience in Environmental Planning, NEPA documentation, and statewide planning • 3 years of experience in Public Policy and Involvement
Colorado Department of Transportation	
Dick Annand CDOT Environmental (previous)	Retired
Dan Dahlke, P.E. Resident Engineer	• B.S., Civil Engineering Technology • 15 years of experience in transportation construction, project management, and design

Colorado Department of Transportation (continued)	
Judy DeHaven CDOT Environmental (previous)	Retired
Rob Frei NEPA and Natural Resource Manager	• B.S., General Biology • M.S., Rangeland Ecosystem Science • 16 years of NEPA and Natural Resource Management, 6 years in transportation
Donald Garcia, P.E. CDOT Project Manager (previous)	Retired
Joe Garcia CDOT Project Manager	• B.S., Physics • 28 years of experience in survey, right of way, design, and construction
Karen Rowe, P.E. Region 2 Director	• B.S., Civil Engineering • 11 years of experience with managing CDOT projects, including CDOT NEPA documents
Lisa Schoch Senior Staff Historian	• B.A., English, History • M.A., History • 12 years of transportation-related Section 106 Compliance and Section 4(f) evaluations and more than 10 years evaluating historic properties
Lisa Streisfeld Region 2 Planning and Environmental Manager	• B.A., Biology • M.S., Environmental Science; MPA (Master of Public Administration) • 19 years of experience in transportation planning and environmental science

CONSULTANTS AND SUBCONSULTANTS

Atkins North America, Inc.	
Jason Bright Resource Specialist: cultural resources, Section 4(f) and Section 6(f) resources	• B.S., Anthropology • M.S., Anthropology
Coral Cosway Environmental Manager, GIS Manager (previous) Resource Specialist: agricultural resources, cumulative effects, hazardous materials, land use, social considerations, Section 6(f), Section 4(f), traffic noise, energy, geology/paleontology	• B.S., Public Policy • M.S., Urban Planning • 6 years of experiences on NEPA projects and 16 years of public involvement experience
Heather Darrow Resource Specialist: wetlands, waters of the U.S., biological, protected species, and mitigation	• B.S., Evolution, Ecology and Behavioral Biology • 4 years of experience in wetland and waters of the U.S. delineation, functional assessment, permitting, and mitigation • 10 years of experience in environmental compliance, special status species surveys, and GIS analysis.
Darren Even Resource Specialist: land use, social and economic considerations, parkland and recreational resources, aesthetic and visual resources	• AICP • B.S., Construction Management • M.S., Urban Planning • 9 years of experience in planning and environmental analysis
Andrea Garcia Consultant Project Manager	• B.S., Forest Resources • M.S., Urban and Regional Planning • 18 years of experience in NEPA documentation and transportation planning

Atkins North America, Inc. (continued)	
Michael Gloden Resource Specialist: wetlands, waters of the U.S., protected species, and mitigation	• Professional Wetland Scientist • B.S., Natural Resources, Ecosystem Assessment • 9 years of experience in wetland and waters of the U.S delineation, functional assessment, permitting, and mitigation, protected species surveys, and GIS analyses
Andrew Iltis Resource Specialist: air quality, agricultural resources, and energy	• M.S., Urban Planning • B.A., Geography • 3 years of experience in environmental planning, community engagement, and GIS
Gary Ingman Resource Specialist: water resources (previous)	• B.A., Environmental Biology • 33 years of experience in watershed and water quality assessment
Loren D. Lauvray, P.E. Resource Specialist: transportation (previous)	• 5 years of experience in transportation and traffic design and planning
Devin Louie Resource Specialist: transportation, energy	• B.S., Civil Engineering • 2 years of experience in transportation analysis and design
Richard McEldowney Resource Specialist: environmental sciences (previous)	• B.S., Wildlife Biology • M.S., Rangeland Ecosystem Science • PWS (Professional Wetlands Scientist) • 15 years of experience as an ecologist and certified professional wetland scientist
Anne C. Morris Resource Specialist: environmental justice analysis (previous)	• B.A., Architecture • MCRP, (Master's in City and Regional Planning) • 37 years of experience in NEPA documentation, public involvement, community impact assessment, environmental justice, and land development

Atkins North America, Inc. (continued)	
Anita M. Rasper GIS Analyst (previous)	• M.A., Applied Geography • GIS Professional certification (GISP) • 6 years of GIS experience in spatial analysis, modeling, database development, metadata creation, and mapping
Robert Rowe Resource Specialist: paleontology (previous)	• M.A., Anthropology • 25 years of experience in cultural and paleontological research
Becky Rude Consultant Project Manager Resource Specialist: environmental sciences, Section 4(f), and Section 6(f) (previous)	• B.A., Biology and English Literature • M.S., Environmental Law • 8 years of experience in NEPA documentation, environmental analysis, permitting, public involvement
Lukas Schroeder Resource Specialist: wetlands, waters of the U.S., biological, parkland and recreational resources, GIS	• B.S., Operations Management • 4 years of experience in environmental planning and GIS analysis
Brian Shaw Resource Specialist: historic resources	• B.A., History • M.A., History and Historic Preservation
Jenifer Sullivan Resource Specialist: technical editing	• B.A., English • 32 years of experience in technical writing and editing
Ruben I. Velasquez, P.E. Resource Specialist: air quality (previous)	• B.S., Chemical Engineering • 28 years of experience in air quality
Carrie Wallis, P.E. Environmental resources and documentation (previous)	• B.S., Civil Engineering • 13 years of experience in transportation planning, engineering, and environmental analysis, specializing in the development of NEPA planning documents

Wilson & Company	
Doug Eberhart Senior Environmental Planner	• B.S., Transportation Engineering • MBA, Finance • 30 years in transportation and environmental planning
Cheryl Everitt Communications	• B.A., History • Paralegal Degree • MBA, Marketing and Communications • 34 years of experience in public involvement and communications
Mike Falini Deputy Project Manager	• 32 years of experience in project management/oversight, conceptual roadway alternatives, public involvement and traffic engineering
Gina Schaarschmidt Editor	• B.A., English • M.A., Information and Learning Technologies • 20 years of experience in communications, 5 of which are in transportation
Lawrence E. Sly III Consultant Project Manager (previous)	• AICP • B.S., Finance/Economics • 17 years of experience in transportation and environmental planning and project management and controls
ArLand Land Use Economics	
Arleen Taniwaki Resource Specialist: land use/economics (previous)	• Master of City Planning • 18 years of experience in land use economic analysis and planning
Bunyak Research Associates	
Dawn Bunyak Resource Specialist: historic resources (previous)	• M.A., Public History • 15 years of experience as Historian specializing in cultural resources and 9 years of experience as Historian specializing in Section 106 for transportation projects

Cuartelejo HP Associates, Inc.	
Richard Carrillo Resource Specialist: historical archeology (previous)	• Archaeological Survey Permit #2010-91 issued by Office of Archaeology & Historic Preservation, Colorado Historical Society, Denver • A.A., Anthropology • B.A., Anthropology • 39 years of experience in borderlands, historical, urban and industrial archaeology, archival and historical research, general historic preservation and cultural resource management
Parametrix	
David W. Mayfield Resource Specialist: historic resources (previous)	• M.A., Cultural Ecology • B.A., Environmental Studies and Planning • 32 years in environmental planning and permitting
Mike Gallagher Resource Specialist: historic resources (previous)	• M.S., Resource Geography/Anthropology • B.S., Anthropology • 27 years in cultural resources and environmental planning
PKM Design Group, Inc.	
Charles Schrader, Ph.D., RLA Resource Specialist: aesthetics/visual (previous)	• Colorado Registered Landscape Architect: LA-413, Certified Arborist, Certified Wetlands Delineator • Ph.D., Landscape Architecture/Natural Resources • Master of Landscape Architecture • B.S., Wildlife Biology • 24 years of experience in landscape architecture/planning

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11 Recipients

CDOT Project No. NH 0504-037

Sub Account No. 12812

- Colorado Department of Transportation: Region 2 Colorado Springs and Pueblo Offices, Public Affairs Office, Environmental Programs Branch, Central Files, Administrative Services
- Federal Highway Administration
- U.S. Department of the Interior:
  - Bureau of Land Management
  - National Park Service
  - Natural Resources Conservation Service
  - U.S. Fish and Wildlife Service
  - U.S. Forest Service
- U.S. Army Corps of Engineers
- U.S. Environmental Protection Agency
- Colorado Department of Local Affairs
- Colorado Parks & Wildlife
- Colorado State Historic Preservation Office
- Colorado State Land Board
- District Senators and Representatives
- County Commissioners
  - Bent
  - Otero
  - Prowers
  - Pueblo
- Libraries:
  - Robert Hoag Rawlings Public Library (Pueblo)
  - Tom L & Anna Marie Giodone Library (Pueblo)
  - Fowler Public Library

- Manzanola Public Library
- Rocky Ford Public Library
- Woodruff Memorial Library (La Junta)
- Las Animas/Bent County Library District
- Lamar Public Library

- City and town government offices:
  - Pueblo
  - Fowler
  - Manzanola
  - Rocky Ford
  - Swink
  - La Junta
  - Las Animas
  - Lamar
  - Granada
  - Holly
- Pueblo Area Council of Governments/Metropolitan Planning Organization
- Southeast Colorado Transportation Planning Region
- Action 22