

## 4.22 CONSTRUCTION-RELATED IMPACTS

### Summary

Construction activities for the build packages would have short-term impacts to resources, residences, businesses, and travelers within the immediate vicinity of the project. These impacts would include fugitive dust, emissions from vehicles and heavy equipment, increased noise levels, erosion and runoff, traffic congestion and detours, and impacts to visual quality. Public safety during construction is also important to understanding the consequences of each package.

This section summarizes a probable approach to construction for each of the build packages and the impacts anticipated from construction. Short term is defined as the period of construction for a build package that may vary from 4 to 5 years; however, due to potential project phasing and the availability of funding, the actual duration of construction activities may be extended. Additional information on phasing can be found in Chapter 8, Phased Project Implementation.

*Construction activities for the build packages would have short-term impacts to area resources, residences, businesses, and travelers.*

### Construction Methods

The construction procedures would be analogous for all of the build packages. The six main activities associated with construction activities, in order of sequencing, would be:

1. Mobilization
2. Utility relocation
3. Demolition and site preparation
4. Lane construction
5. Structure and interchange construction
6. Bus rapid transit (BRT) station construction

All of the build packages would include utility relocation, grading, excavation, installation of pavements and retaining walls, and construction of interchanges and stations. Information on the phasing schedule is included in Chapter 8, Phased Project Implementation.

A brief description of the construction methods for each major project component is given below.

#### **Utility Relocation and Demolition**

As a prerequisite for construction on United States Highway 36 (US 36), all of the build packages would involve utility relocation and demolition as a primary task. This is standard construction involving excavation and backfill with trenching machines, wrecking balls, backhoes, front-end loaders, and the trucking of materials to and from the site. Utility relocations are primarily anticipated where:

- Cross streets would be realigned, such as Sheridan Boulevard, Wadsworth Parkway, and 120<sup>th</sup> Avenue.
- The highway or associated facilities would be widened beyond the existing right-of-way (ROW).

*Utility relocation and demolition are prerequisites for construction on US 36.*

### **Lane, Interchange, and Structure Construction and Demolition**

Highway lane construction represents approximately 45 percent of the project cost and the majority of the construction impact due to ROW needs, especially in the Adams Segment for Package 2 and Package 4. As discussed in Section 4.4, Right-of-Way and Relocations, these impacts in the Adams Segment would be minimized with the Combined Alternative Package (Preferred Alternative). Construction of 36 to 44 new, replaced, or widened bridges would require 100 feet on either side of US 36 to allow room for cranes and other equipment to place the girders. This is particularly important at the creek crossings in the corridor, where impacts to wetlands, stream water quality, and wildlife habitats could occur. To manage traffic and minimize congestion, three lanes would remain open east of Federal Boulevard, and at least two lanes of traffic would remain open in each direction for the remainder of the corridor. However, additional lane closures may occur during evening hours in order to place girders. Lane closures would be implemented according to the Colorado Department of Transportation's (CDOT) lane closure and girder erection policy.

*Demolition would require the removal of up to 693,800 square feet of commercial buildings and up to 183 residences.*

Demolition would require the removal of up to 693,800 square feet of commercial buildings and up to 183 residences. Site preparation would be accomplished through the use of scrapers, front-end loaders, dump trucks, and small construction equipment. Demolition materials removed from the site, backfill, and other construction material, would be conveyed to the site by truck, potentially increasing local traffic congestion. Construction would be sequenced so that sound walls and retaining walls would be constructed first, followed by the outside lanes. Traffic would then be redirected to the new outside lanes and the inside lanes would be constructed.

If precast structural systems are used, the pieces would be delivered to the site by truck. Haul routes for construction materials would be proposed by the contractor and approved by CDOT and the local jurisdiction. All of the major cross streets intersecting US 36 would likely be affected by construction traffic.

Approximately 107,300 feet, 97,300 feet, and 104,400 feet of retaining walls would be required for the construction of Packages 2 and 4 and the Combined Alternative Package (Preferred Alternative), respectively. These could consist of mechanically stabilized earth walls or cantilevered (cast-in-place) retaining walls. In all cases, these walls retain earthen fill. The mechanically stabilized earth walls would be used for grade separations.

### **BRT Stations**

The proposed construction for the six median BRT stations for Package 2 and Package 4 would use low platforms measuring 17 feet by 250 feet, and would be constructed of either pre-cast or cast-in-place concrete. For the Combined Alternative Package (Preferred Alternative), the BRT stations would be areas of the sidewalk on the interchange ramps that provide riders access to and from the buses. The platforms would measure 12 feet by 100 feet. Parking facilities would be constructed of asphalt. Pre-engineered canopy structures would be installed for the stations after completion of the concrete work. All construction materials would be brought to the site by truck. The construction period for the Combined Alternative Package (Preferred Alternative) is expected to be shorter since the BRT stations would be integrated into the interchange ramps.

## Impact Evaluation

The width of the construction footprint and the type of environment traversed by the corridor dictates construction impacts. For example, construction in restricted urban conditions along the Adams Segment would be disruptive to the community. Construction in rural areas in the Superior/Louisville and Boulder segments would have a greater effect on biological systems, especially at stream crossings.

*Construction impacts are dictated by the width of the construction footprint and the type of environment traversed by the corridor.*

### **Methodology**

The limits of construction for improvements on US 36 would include the toe of slope (the bottom of the slope that falls away from the edge of the highway) plus 15 feet for construction. Impacts from bridge construction would extend 100 feet from the edge of existing pavement.

### **Overview of Construction Impacts**

Table 4.22-1, Summary of Construction-Related Impacts, summarizes the construction-related impacts for all of the build packages. Only the environmental resources that can be numerically quantified are presented in the table.

The following sections present a general comparative evaluation of the packages for each resource to be impacted. More detail on construction impacts appears in the individual resource evaluations.

### **Land Use**

Construction is not expected to permanently change land use in the corridor. Land use planning and supporting policy would not be affected by the construction phase of any of the build packages. However, construction of any of the build packages would, in the short term, affect all of the different land uses in the corridor by introducing a multi-year, large-scale construction project.

Neighborhoods along the US 36 corridor would be affected by noise, vibration, dust, traffic congestion, visual conflicts, emissions from vehicles and heavy equipment, and restriction of access to residences and businesses during construction. The comparative level of community impact is directly correlated to the number of persons within 300 feet of the construction corridor. As shown in Table 4.22-1, Summary of Construction-Related Impacts, about 11,000 persons live within 300 feet of the US 36 corridor.

Community impacts would be temporary and unavoidable during the construction period.

### **Economic Considerations**

Construction of any of the build packages would provide both the benefit of employment opportunities and the impact of restricted access to businesses adjacent to the highway. The displacement of businesses and residences for construction can reduce employment and the assessed valuation (tax base) of the host community.

The greatest short-term, direct beneficial impact associated with the build packages would be temporary increases in construction employment and personal income. The effect would be proportionate to the construction cost of the package. As shown in Table 4.22-1, Summary of Construction-Related Impacts, Package 2 and the Combined Alternative Package (Preferred Alternative) would result in approximately 3,000 construction jobs, and Package 4 would result in

*The greatest short-term, direct beneficial impact associated with any of the build packages would be temporary increases in construction employment and personal income.*

approximately 2,700 construction jobs. The estimates assume that all funding is available to construct the project within 5 years. However, project construction is currently proposed to be phased over a longer period of time. See Chapter 8, Phased Project Implementation, for more information on phasing.

The ease of access for between 115 and 155 businesses located adjacent to the interchanges along the US 36 corridor could be reduced during the construction process. The greatest impact is anticipated at the Pecos Street and McCaslin Boulevard interchanges. The construction contractor would be required to maintain access to local businesses during construction. The magnitude of impact would be comparable for all of the build packages.

Package 2 would require the displacement of an estimated 138 businesses, and approximately 693,800 square feet of building space. Package 4 would require the displacement of an estimated 135 businesses, and approximately 639,000 square feet of building space. The Combined Alternative Package (Preferred Alternative) would require the displacement of an estimated 24 businesses, and approximately 256,544 square feet of building space.

Property acquisition would result in up to an estimated \$27.2 million loss in the tax base for Package 2, up to a \$23.3 million loss in the tax base for Package 4, and up to a \$26.3 million loss in the tax base for the Combined Alternative Package (Preferred Alternative).

### **Right-of-Way and Relocation**



Land is required during construction for staging and for the final transportation improvements. Construction staging areas would be needed throughout the corridor to provide adequate space for equipment, construction materials, materials stockpiling, and worker parking. These parcels would be purchased or leased before construction begins. In general, the amount of property required for staging is comparable between the packages.

Construction of the transportation improvements would require property acquisition for the final transportation improvements.

Table 4.22-1, Summary of Construction-Related Impacts, indicates that Packages 2 and 4 and the Combined Alternative Package (Preferred Alternative) would require 201, 202, and 65 residential displacements, respectively. The number of business displacements is estimated to be between 138, 135, and 24 for Packages 2 and 4 and the Combined Alternative Package (Preferred Alternative), respectively.

### **Environmental Justice**

Construction of any of the packages would have both beneficial and adverse effects on minority and low-income populations. The community disruption associated with construction, such as noise, dust, emissions from vehicles and heavy equipment, and increased congestion, can be weighed against the benefits of improved access to transit service once a build package is operational. Persons within 300 feet of the proposed construction would be the most affected.

As shown in Table 4.22-1, Summary of Construction-Related Impacts, many minority and low-income persons live within 300 feet of the US 36 corridor, especially in the Adams Segment. For information regarding impacts to low-income and minority populations in the Adams Segment during construction, and mitigation measures to address impacts, refer to Section 4.6, Environmental Justice.

Table 4.22-1: Summary of Construction-Related Impacts

PACKAGE	SOCIOECONOMIC AND FISCAL		PROPERTY ACQUISITION AND DISPLACEMENT	PARKS AND OPEN SPACE	ENVIRONMENTAL JUSTICE	HISTORIC PROPERTIES	VISUAL	NOISE	BIOLOGICAL	HAZARDOUS MATERIALS	WATER QUALITY	WETLANDS	FARMLANDS	GENERAL CONSTRUCTION ISSUES		
	Number of Persons within 300 feet of Area of Impact <sup>1</sup>	Construction Employment (Total for 5-Year Construction Duration)												Number of Business Displacements	Number of Residential Displacements	Number of Parks/Open Space Acquisitions (Acres)
1	4,800	No additional	No additional	No additional	Low-income: 261 Minority: 1,604	No additional	No additional	1,831	No additional	No additional	4	No additional	No additional	Not applicable	Major maintenance phased over 20 years	4 relocations, 1 adjustment
2	10,770	3,000	138	201	Low-income: 678 Minority: 3,504	22	107,300 linear feet	4,300	114-124	27	4	22.26-28.36	21	389	48 to 60	15 relocations, 48 adjustments
4	10,670	2,700	135	202	Low-income: 670 Minority: 3,467	22	97,300 linear feet	4,250	115-123	26	4	21.50-26.13	16	397	48 to 60	15 relocations, 48 adjustments
Combined Alternative Package (Preferred Alternative)	10,966	3,000	24	65	Low-income: 739 Minority: 3,384	19	104,400 linear feet	4,318	106	23	4	21.40	14	326	48 to 60	15 relocations, 48 adjustments

Source: US 36 Mobility Partnership, 2006.

Note:

<sup>1</sup> Number of low-income households and minority persons are higher in the build packages than in Package 1 for two reasons: 1) the footprint of the packages is larger than the original edge of pavement, and 2) the populations were measured from 300 feet of centerline in Package 1 and were measured 300 feet from construction footprint for the build packages.



### **Parklands and Open Space**

All of the build packages would have construction effects on local parks and open space. Numerous parks and open space properties are directly adjacent to US 36. Package 2 would result in the direct acquisition of 42.7 to 51.6 acres of park and open space resources. Package 4 would require acquisition of 43.1 to 51.7 acres. The Combined Alternative Package (Preferred Alternative) would result in the direct acquisition of 42.6 acres and would result in temporary construction impacts to Oakwood Park. All of the packages would impact four trail crossings, requiring temporary detours throughout construction. In addition, all of the parks located adjacent to the corridor would be affected by construction noise and dust, visual degradation, and increased traffic congestion.

*All of the build packages would have construction effects on local parks and open space.*

### **Historic Properties**

The construction effects to cultural resources are similar to other buildings and facilities along the alignments. These effects include acquisition and demolition, noise, vibration, dust, emissions from vehicles and heavy equipment, and restricted access.

Construction activities associated with both Packages 2 and 4 are anticipated to affect 22 properties adjacent to US 36. The Combined Alternative Package (Preferred Alternative) would affect 19 properties. The majority of these properties are historic canals and ditches.

See Section 4.7, Historic and Archaeological Preservation, for more information.

### **Public Safety and Security**

All of the build packages would include public safety risks during construction. There is the potential for accidents on US 36 due to congested conditions and reduced capacity. Excavations required for construction represent a safety risk to trespassers. These risks are comparable for all of the build packages.

Detours and traffic delays would affect emergency services. Emergency service providers would be informed of planned detours in advance, so appropriate response plans could be developed.

*All of the build packages would include potential public safety risks during construction.*

### **Visual and Aesthetic Resources**

Construction equipment and materials would clutter views in the corridor. Exposed earth, the use of heavy construction equipment, and stockpiled materials in staging areas would reduce the visual character of the US 36 corridor. Lights used for night construction could also affect people within 300 feet of construction.

### **Air Quality**

Construction of any of the build packages would temporarily affect air quality with fugitive dust and, to a lesser extent, the operation of vehicles and heavy equipment.

The potential for impacts from fugitive dust is proportional to the acres disturbed during construction. Fugitive dust is measured in daily pounds of particulate matter less than 10 microns in diameter (PM<sub>10</sub>). For each of the build packages, it was assumed that the area to be disturbed on a daily basis would be less than 10 acres. Therefore, the maximum daily fugitive dust emissions would be 100 pounds per day during project construction. All applicable regulations would be followed to mitigate for fugitive dust emissions during construction.

*Emissions from heavy equipment would affect air quality in localized areas.*

Emissions from heavy equipment would also affect air quality in localized areas. Although this effect is difficult to quantify, it is anticipated to be proportional to the energy consumption. Construction of Package 2, Package 4, and the Combined Alternative Package (Preferred Alternative) is estimated to require 6,590,990, 6,623,627, and 5,820,826 million British thermal units, respectively. Consequently, Package 2 and Package 4 represent higher emissions during construction than the Combined Alternative Package (Preferred Alternative).

### **Noise**

Noise during construction would affect local residents and business patrons located along the highway, near interchanges and stations, and along designated construction access routes. All of the build packages would generate similar types of noise. The most common noise source would be from engine-powered, heavy earth-moving equipment (e.g., scrapers, bulldozers), materials handling equipment (e.g., cranes), and stationary equipment (e.g., generators). The loudest and most disruptive construction noise would result from pile driving and demolition work requiring the use of jackhammers and hoe rams. Typical noise levels from construction equipment ranges from 69 to 85 decibel (A-weighted scale) (dBA) at 50 feet. Peak noise levels from pile driving are as high as 106 dBA at 50 feet. Most noise impacts to people would occur within 300 feet of construction.

Approximately 4,300 households are located within 300 feet of Packages 2 and 4 and the Combined Alternative Package (Preferred Alternative). These persons would experience noise levels greater than the impact criteria during construction.

### **Biological Resources**

Impacts to wildlife during construction would result from loss of habitat adjacent to the corridors and death from being crushed during earthwork and site clearing. Other wildlife would be driven from the project area due to the increased noise and activity associated with construction. The degree of effect is best represented by the acres of sensitive habitat disturbed during construction. Impacts are similar between the three build packages. Package 2 would affect approximately 114 to 124 acres of sensitive habitat, Package 4 would affect approximately 115 to 123 acres, and the Combined Alternative Package (Preferred Alternative) would affect approximately 106 acres.

### **Farmlands**

*Impacts to farmland are expected in cases where the project construction would move outside of the existing ROW.*

Impacts to farmland are expected in cases where the project construction would move outside of the existing ROW. The acquisitions of farmland are (approximately) 21, 16, and 14 acres for Package 2, Package 4, and the Combined Alternative Package (Preferred Alternative), respectively. Regardless of the package, construction activities would not restrict access to agricultural fields, existing farm operations, or irrigation needs.

### **Hazardous Materials**

The potential to encounter contaminated soils, lead paint, and asbestos during structure demolition, and contaminated groundwater during excavations exists with construction of any of the build packages.

### **Known Sites**

As shown in Table 4.22-1, Summary of Construction-Related Impacts, between 23 and 27 high and moderate hazardous material sites are within the footprints of the build packages.

## Unknown Sites

It is impossible to accurately predict which of the three build packages would encounter more hazardous materials. There is a correlation between the amount of building demolition and contact with hazardous materials, such as lead paint and asbestos. Given this consideration, Packages 2 and 4 would involve more risk of contact with hazardous materials since they would require the demolition of more commercial and residential buildings, as compared to the Combined Alternative Package (Preferred Alternative). With a narrower project footprint, the Combined Alternative Package (Preferred Alternative) would have a decreased potential for encountering hazardous materials in soil. Regardless of the package, CDOT and the Regional Transportation District (RTD) would conduct Phase II Site Assessments of specific sites during preliminary engineering, and prepare a materials management plan prior to construction to ensure the safe and legal handling of hazardous materials if encountered.

## Utilities

Since the engineering for the build packages is conceptual, the effects on utilities can only be generalized. Some utilities would need to be relocated during the construction of the build packages, while others may be relocated prior to construction. Although this is generally a cost issue, there can be temporary disruptions to service that would affect local residents. Both planned and, to a lesser extent, unplanned interruptions are possible.

*Some utilities would need to be relocated during the construction of the build packages.*

There are 74 major utilities in the US 36 corridor. Based on conceptual engineering, it is estimated that construction of Package 2, Package 4, or the Combined Alternative Package (Preferred Alternative) would require the relocation of 15 major utilities and the adjustment of 48 major utilities.

## Energy Impacts

Construction of either of the build packages would require the consumption of energy to manufacture and install materials, and to operate heavy equipment and support vehicles. The construction of elevated structures and tunnels is the most energy consuming. Package 2, Package 4, and the Combined Alternative Package (Preferred Alternative) are estimated to require 6,590,990, 6,623,627, and 5,820,826 million British thermal units, respectively. Consequently, Packages 2 and 4 represent slightly higher emissions during construction, as compared to the Combined Alternative Package (Preferred Alternative). For all build packages, the effect on energy would be short term and unavoidable.

## Water Resources Impacts

Water quality could be affected by erosion during construction, construction of bridges over watercourses, and by the dewatering of excavations.

A correlation exists between the number of acres disturbed during construction and potential erosion impacts. Compliance with local and state erosion and sediment ordinances would help to ensure minimum impacts to surface waters during construction. Additionally, construction activities over watercourses would be a concern during construction. All of the packages involve four stream crossings. All water crossings would involve construction in the riparian areas of the streams, causing short-term sedimentation. Due to the small width of these streams, direct construction impacts to the riparian areas would be from 0.1 to 0.2 acre on either side of the crossing. Vegetation removed would be replaced immediately after construction is complete.

Construction of the build packages would require some degree of excavation dewatering. As a result, some groundwater that may require dewatering may be contaminated. In cases where contaminated groundwater is found, it would be treated to meet water quality standards prior to discharge.

### Wetlands

*All of the build packages involve impacts to wetlands from highway and bridge construction.*

The protection of wetlands is important to the maintenance of biodiversity. Jurisdictional wetlands are highly regulated and need to be replaced on a 1:1 basis. However, non-jurisdictional wetlands would also be replaced on a 1:1 basis under CDOT policy.

Wetlands would be affected by the highway and bridge construction. The addition of highway lanes requires fill material that would eliminate some wetlands. The widening of bridges would require in-stream construction that can damage wetlands, and the shading effect from the wider structures would eliminate wetland vegetation. Package 2 would impact 22.26 to 28.36 acres of wetlands. By comparison, Package 4 would impact 21.50 to 26.13 acres of wetlands. The Combined Alternative Package (Preferred Alternative) would affect 21.40 acres.

### Traffic Impacts

Construction of any of the build packages would impact both US 36 and arterial traffic. These impacts, though unavoidable, can be mitigated through a variety of techniques, such as those described in CDOT's, "Lane Closure Strategy" (CDOT 2002). Package 1 would also have minimal construction impacts in areas where projects are already planned as part of the regional Transportation Improvement Program. Support for Transportation Demand Management activities including carpool and vanpool assistance, transit pass subsidies, employer/employee outreach, marketing, etc., would help mitigate some of the construction traffic impacts. Partnerships with the local transportation management organization would facilitate these mitigation efforts.

*All of the build packages involve major ramp reconstruction.*

### Detours During Construction

*Construction-related congestion is anticipated to put additional pressure on high-capacity arterials near the structures being modified.*

Several structures exist in the corridor that would need to be replaced in the build packages. These structures primarily include bridges and on- and off-ramps. Generally, the construction of new bridge structures would not result in traffic detours; however, construction of new on- and off-ramps would require some detours. Impacts from the construction detours would mainly use high-capacity arterials near the structure being reconstructed. In some instances, the detours would route drivers onto local streets, but any impacts could be mitigated to the extent practical through signing and special traffic calming measures during the construction process. In addition, some drivers could be detoured to the on- and off-ramps without using the local street network.

### Maintenance of Traffic

It would be necessary to continue a relatively free-flowing environment on US 36 during construction; therefore, maintaining the existing amount of through-lanes during peak periods would be essential. Major construction work that requires the closure of more lanes could occur during nighttime and weekend hours. Proper traffic control could minimize speed reductions through work zones. Transportation system management efforts, such as monitoring traffic accidents to quickly remove them from the highway, are also important in keeping traffic flowing. In addition, vehicle pull-outs could be used as part of an incident management plan.

## Construction Vehicle Access

Construction vehicles would impact traffic during the construction process. Vehicles would require access to construction sites in two different ways. First, vehicles may need access to the sites via US 36. This access would be made through construction access ramps to permit construction vehicles to safely enter and exit the sites. Second, the vehicles may require access to the sites from local streets.

The presence of construction vehicles within the US 36 corridor would add traffic to the existing volume on the highway, as well as to main arterials and local streets. The impacts of construction traffic would be mitigated through safety and precautionary measures.

## Indirect Impacts

Indirect employment from the construction of Package 2 and the Combined Alternative Package (Preferred Alternative) would result in 1,800 jobs, while Package 4 would result in 1,600 jobs. The project construction is currently proposed to be phased over a longer period of time. See Chapter 8, Phased Project Implementation, for more information on phasing.

## Mitigation

Mitigation planning will advance during final design. The general construction mitigation envisioned with implementation of any of the build packages is described below.

Specific mitigation measures including measures to avoid, minimize, or mitigate adverse environmental impacts are identified in the individual resource sections of this document.

As shown in Table 4.22-2, Mitigation Measures — Construction, construction mitigation measures will be prepared in a Construction Management Plan (CMP). The CMP will be developed during final design and refined during subsequent design phases. The purpose of the CMP is to address plans to avoid, minimize, and mitigate impacts to the communities in the US 36 corridor from construction activities. The CMP will be included in construction contracts, and CDOT and RTD will provide oversight of construction activities to monitor performance of these plans.

**Table 4.22-2: Mitigation Measures — Construction**

Impact	Impact Type	Mitigation Measure
Direct construction impacts on all resources	Construction	<p>A CMP will be developed during final design as the key mitigation measure for offsetting the construction impacts. The plan will be developed in cooperation with the affected communities, CDOT, and RTD. The CMP will include the following key elements:</p> <p><b>Communications Plan</b> — to address:</p> <ul style="list-style-type: none"> <li>• Construction safety issues.</li> <li>• Road closures.</li> <li>• Operating protocols.</li> <li>• Disruption of utility service.</li> <li>• Signage plan to inform the public of lane changes, temporary interchange closures, etc.</li> </ul> <p><b>Community Impact Plan</b> — to address:</p> <ul style="list-style-type: none"> <li>• Reduction of construction dust, noise, visual degradation, and traffic impacts.</li> <li>• Maintenance of access to local businesses during construction.</li> <li>• Reduction of the duration of construction in residential areas.</li> </ul> <p><b>Visual Protection</b> — to address:</p> <ul style="list-style-type: none"> <li>• Screening construction staging and storage areas.</li> <li>• Replacement of ground cover over exposed areas in a timely manner.</li> <li>• Removal of unused detour pavements or signage.</li> </ul>

**Table 4.22-2: Mitigation Measures — Construction**

Impact	Impact Type	Mitigation Measure
Direct construction impacts on all resources (continued)	Construction (continued)	<p><b>Air Quality Protection</b> — to address:</p> <ul style="list-style-type: none"> <li>• Control of dust through watering or dust palliatives.</li> <li>• Revegetation of exposed soils.</li> <li>• Stabilization of stockpiles.</li> <li>• Control of off-site tracking of mud and debris.</li> <li>• Usage of clean fuels and bio fuels in equipment to reduce emissions.</li> </ul> <p><b>Noise Control</b> — to address:</p> <ul style="list-style-type: none"> <li>• Construction of sound walls prior to construction.</li> <li>• Use of noise-mitigated equipment.</li> <li>• Minimization of the duration of construction in residential areas to the extent possible.</li> <li>• Minimization of night construction in residential areas to the extent possible.</li> <li>• Re-routing construction traffic away from residential areas where possible.</li> <li>• Usage of alternative construction methods, such as sonic or vibratory pile driving.</li> <li>• Performance of high-noise activities during daytime hours when possible (e.g., pile driving).</li> <li>• Providing hotel vouchers for those residents within 300 feet of the source when high-noise activities must be completed during evening or early morning hours.</li> </ul> <p><b>Biological Resource Protection</b> — BMPs and other practices will be reviewed and adopted to address:</p> <ul style="list-style-type: none"> <li>• Reduction of loss of vegetation in sensitive habitats.</li> <li>• Reduction of loss of prairie dog colonies.</li> <li>• Minimization of disturbances to nesting raptors and song birds.</li> <li>• Reduction of disruption of wildlife corridors.</li> <li>• Reduction of the amount of road kill.</li> <li>• Minimization and avoidance of habitat fragmentation.</li> <li>• Reduction of the loss of fisheries and aquatic habitat.</li> <li>• Reduction of the loss of threatened and endangered habitat and species.</li> <li>• Reduction of the spread of noxious weeds.</li> </ul> <p><b>Hazardous Waste Control</b> — to address:</p> <ul style="list-style-type: none"> <li>• Identification of hazardous wastes prior to construction through conducting Phase II Site Assessments.</li> <li>• Preparation of a Hazardous Materials Management Plan prior to construction.</li> <li>• Compliance with Occupational, Safety and Health Administration requirements, including preparation of health and safety plans prior to construction (if not included above).</li> </ul> <p><b>Utilities Relocation</b> — to address:</p> <ul style="list-style-type: none"> <li>• Notification of citizens of possible utility outages.</li> <li>• Scheduling of construction to reduce outages.</li> <li>• Coordination with local utilities.</li> </ul> <p><b>Water Quality and Wetlands Protection</b> — to address:</p> <ul style="list-style-type: none"> <li>• Implementation of best management practice for erosion control.</li> <li>• Treatment of contaminated dewatering effluents.</li> <li>• Fulfilling municipal Separate Stormwater System requirements.</li> <li>• Minimization of impacts to wetlands and riparian areas.</li> <li>• Identification of locations for replacement wetlands.</li> <li>• Usage of wetland replacement to help mitigate wildlife habitat fragmentation.</li> </ul>

**Table 4.22-2: Mitigation Measures — Construction**

Impact	Impact Type	Mitigation Measure
Direct construction impacts on all resources (continued)	Construction (continued)	<p><b>Traffic Control</b> — to address:</p> <ul style="list-style-type: none"> <li>• Minimization of impacts to emergency services.</li> <li>• Reduction of congestion through development of traffic management plans.</li> <li>• Coordination of bridge demolition and detour routes to avoid overloading local streets with detour traffic.</li> <li>• Limiting ramp closures to low-volume ramps.</li> <li>• Limiting high-volume ramp closures to nights and weekends.</li> <li>• Maintenance of access to local businesses and residences.</li> </ul> <p>The detailed elements of the CMP will be developed as a part of the preliminary engineering design and FEIS for the Preferred Alternative.</p>

Source: US 36 Mobility Partnership, 2006.

Notes:

- BMP = best management practice
- CDOT = Colorado Department of Transportation
- CMP = Construction Management Plan
- FEIS = Final Environmental Impact Statement
- RTD = Regional Transportation District

