

2.1 INTRODUCTION

Chapter 2, Alternatives Considered, presents the development of alternatives, the alternative screening criteria, and the process used to eliminate alternatives from further consideration. This chapter also describes the packages of alternatives that are evaluated in detail in this Final Environmental Impact Statement (FEIS), the development of a hybrid alternative, and identifies a Preferred Alternative.

Useful Chapter Definitions

The alternatives development and screening process and resulting packages are presented using some technical terms, which are defined for this project as follows:

Station Types

- **Bus rapid transit (BRT) station** is a station that provides enhanced bus service and facilities. A BRT station and the associated platforms could be located in the highway median or highway on- and off-ramps.
- **park-n-Ride** is a station that provides both a parking and a loading area for bus service. Buses access the park-n-Ride from the arterial street network or via highway bus pull-outs. A pedestrian bridge or underpass connects parking on both sides of the highway.
- **Rail station** is a station that provides a boarding location for rail service.
- **Transit station** is a general term used to refer to any combination of the above station types. This term also includes multi-modal hubs, such as Denver Union Station (DUS).

Lane Types

- **BRT/high-occupancy vehicle (HOV) lanes** are lanes designated for use by buses and HOVs (including carpools and vanpools). Single-occupant vehicles (SOVs) are not allowed in these lanes.
- **Express lanes** are the existing managed lanes on Interstate 25 (I-25) and United States Highway 36 (US 36).
- **Managed lanes** are toll lanes designated for use by buses and HOVs at no cost. Any remaining capacity would be sold to SOVs through variable or dynamic pricing. The Colorado Department of Transportation (CDOT) intends to manage the high-occupancy toll lanes with the goals of optimizing their use, maximizing travel time savings, and keeping traffic flowing in the managed lanes at 45 miles per hour or faster, even when the general-purpose lanes are congested. To accomplish this goal, CDOT will employ dynamic pricing in which the toll rate is increased or decreased depending on the levels of congestion needed to meet the goals. The definition of HOV is another tool that could be used to manage the lane. The current definition of HOV requires vehicles to have two or more occupants. Revising the HOV definition to require more than two occupants per vehicle would also reduce HOV demand for the managed lane.
- **Special lanes** is a general term used to refer to BRT/HOV lanes, the US 36 managed lanes, and the I-25 express lanes.



Other

- **Bus pull-outs** are designated areas located on highway on- and off-ramps for use by transit vehicles only. The bus pull-outs allow buses to leave the highway and to stop at transit stations to pick-up and drop-off passengers.
- **Bypass lanes** are lanes located at on-ramps that allow HOVs and buses to avoid or “bypass” the ramp meters.
- **Drop-ramps** provide access to the special lanes via a grade-separated structure.
- **Queue jumps** are additional lanes at signalized intersections. These lanes are restricted to buses. The intent of these lanes is to allow buses to be at the front of the queue, reducing delay caused by the signal and improving the operational efficiency of the BRT system.
- **Ramp meters** are traffic signals located on on-ramps to control the volume of traffic entering the highway. Ramp meters are typically active during peak periods.
- **Slip-ramps** provide access between the special lanes and the general-purpose lanes at the same elevation.

Four primary steps were used in developing and evaluating alternatives. These steps are described below.

- **Assessment of Needs** consisted of identifying six points, described in Chapter 1, Purpose and Need, that demonstrated the need for transportation improvements in the US 36 corridor. These needs relate to the project purpose and summarize the major transportation issues facing the US 36 corridor.
- **General Alternatives** consisted of identifying a broad range of alternatives for meeting transportation needs in the US 36 corridor. This includes many of the alternatives originally defined and evaluated in the *US 36 Major Investment Study* (RTD 2001), along with other alternatives suggested during the agency and public scoping process. The general alternatives were evaluated using four criteria related to the project Purpose and Need and goals. The criteria used for the general alternatives evaluation include Purpose and Need, unacceptable environmental impacts, conformance with *2025 Metro Vision Interim Regional Transportation Plan (2025 MVIRTP)* (DRCOG 2002) local plans, and practicality and feasibility.
- **Development of Conceptual Alternatives** consisted of evaluating the alternatives remaining after the general alternatives evaluation process. The conceptual alternatives were developed further to consider capital and operating costs, travel demand, facilities development, and environmental factors. The conceptual alternatives were evaluated using criteria developed from the project goals, which are: improve mobility, minimize environmental impacts, support of local and regional land use visions and policies, and cost-effectiveness.
- **Packages** consisted of combinations of one or more of the remaining alternatives. The resulting five packages include Package 1 (No Action) and four build packages (Packages 2 through 5). The packages were evaluated using criteria developed from the project goals. After the initial evaluation, two packages were eliminated based on transportation mobility and cost-effectiveness. After the Draft Environmental Impact Statement (DEIS), a hybrid package, the Combined Alternative Package (Preferred Alternative), was developed. In addition to Package 1, Packages 2 and 4 and the Combined Alternative Package are studied in detail in this FEIS. These packages represent all reasonable alternatives and are described in more detail in Section 2.5, DEIS Package Descriptions, and Section 2.7, FEIS Package Descriptions.

Separation of Highway and Rail Corridor Studies

In November 2004, following the initial development of the packages, the voters in the Denver metropolitan area approved the FasTracks Program through an increase in the sales tax for transit purposes. FasTracks provides funding for a program of transit improvements, such as rail transit and BRT improvements throughout the Denver metropolitan area, including the US 36 project area. Due to this availability of local funding for commuter rail improvements and after conceptual design of the initial packages in April 2006, CDOT and the Regional Transportation District (RTD) agreed with the Federal Transit Administration (FTA) and the Federal Highway Administration (FHWA) to move forward separately with rail and highway improvements in the US 36 project area. This decision determined that the projects each met the following tests:

- Connect logical termini and be of sufficient length to address environmental matters on a broad scope.
- Have independent utility or independent significance (i.e., be usable and be a reasonable expenditure), even if no additional transportation improvements are made in the area.
- Not restrict consideration of alternatives for other reasonably foreseeable transportation improvements.

This decision required that the initial packages be revised so that commuter rail along the BNSF Railway and park-n-Ride improvements and bus service improvements along US 36 are now included as part of Package 1, since they are included in the conforming 2025 *MVIRTP* (DRCOG 2002), and are considered planned and funded improvements.

National Environmental Policy Act of 1969/Section 404 Merger Process

During early coordination with the U.S. Army Corps of Engineers (USACE), it was determined that the US 36 project would require a Section 404(b)(1) evaluation for an individual permit. This evaluation, in conjunction with National Environmental Policy Act of 1969 (NEPA) regulations, is referred to as the NEPA/Section 404 merger process. The NEPA/Section 404 merger process is guided by and supports the requirements of Section 404 of the Clean Water Act (Public Law 92-500, as amended), U.S. Environmental Protection Agency regulations (40 Code of Federal Regulations Part 230 et seq.), and the Memorandum of Agreement among the USACE, FHWA, and CDOT. The NEPA/Section 404 merger agreement requires consultation and concurrence on four key points: (1) Purpose and Need, (2) Merger Alternatives Selected for Detailed Evaluation, (3) the Preferred Alternative, and (4) Compensatory Mitigation. Recently, the application of the NEPA Section 404 merger process was modified for this project because of a change in the Section 404 requirements for final mitigation plans. Originally, the plan for this project was to apply for the Section 404 Permit with the release of the FEIS to the public. Because of the more stringent requirements for final mitigation plans, all parties involved have agreed to postpone the application for the Section 404 Permit until all the requirements can be met and before there are any impacts to waters of the United States (U.S.).

USACE consultation with FHWA and FTA has been documented in Appendix C, Section 404(b)(1) Evaluation. A copy of the original Memorandum of Agreement regarding the NEPA/Section 404 merger process may be obtained from the CDOT website at <http://www.dot.state.co.us/environmental/Wetlands/Docs/NEPA404Merger.pdf>. A copy of the modified agreement is located in Appendix C, Section 404(b)(1) Evaluation.

2.2 GENERAL ALTERNATIVES DEVELOPMENT AND EVALUATION

The general alternatives were developed in response to the assessment of transportation needs identified for the US 36 corridor. General alternatives included those from the *US 36 Major Investment Study* (RTD 2001), *2025 MVIRTP* (DRCOG 2002), and public and agency comments obtained during the project scoping phase. A list of general alternatives, grouped by category and subcategory, appears in Table 2.2-1, List of General Alternatives by Category and Subcategory.

Table 2.2-1: List of General Alternatives by Category and Subcategory

Service Category	Subcategory	General Alternative
No Action	None	<ul style="list-style-type: none"> None.
Roadway Alternatives	New roadway capacity	<ul style="list-style-type: none"> New freeways on new alignment. New general-purpose lanes on US 36 to increase capacity. New lanes on arterials in the US 36 corridor.
	Operational improvements	<ul style="list-style-type: none"> Acceleration/deceleration lanes on US 36 at major interchanges. Climbing lanes on US 36 (eastbound and westbound on either side of Davidson Mesa).
	Other roadway improvements	<ul style="list-style-type: none"> HOV lanes on US 36. Toll lanes on US 36.
Transit Alternatives	Local (shorter trips within communities)	<ul style="list-style-type: none"> Local bus expansion throughout the US 36 corridor.
	Express/regional (longer trips between communities)	<ul style="list-style-type: none"> Regional bus expansion primarily on US 36. Commuter rail (using either LHC or DMU self-propelled vehicles) on US 36.
	Rapid transit (moderate-length trips with high-frequency service and frequent stops)	<ul style="list-style-type: none"> BRT on US 36. LRT on US 36. Advanced guideway transit, including monorail, automated guideway transit, personal rapid transit, magnetic levitation transit, or similar grade-separated beam guideway transit on US 36.
Alternate Transportation Strategies	None	<ul style="list-style-type: none"> TDM improvements throughout the corridor, such as strategies designed to make the most efficient use of existing transportation facilities by reducing the actual "demand" placed on these facilities. Examples include: coordinating flexible work schedules to help decrease demand at peak periods, carpooling/vanpooling, employer and community-based ECO passes, and coordinated land use and transportation planning that increases the convenience of using transit. TSM and ITS improvements on US 36 and arterials that might include ramp metering, bus transit priority treatments like signal by-pass lanes, network surveillance/control, signal system monitoring/control, and traffic information dissemination. Bicycle and pedestrian facilities along US 36 and other locations.

Source: US 36 Mobility Partnership, 2007.

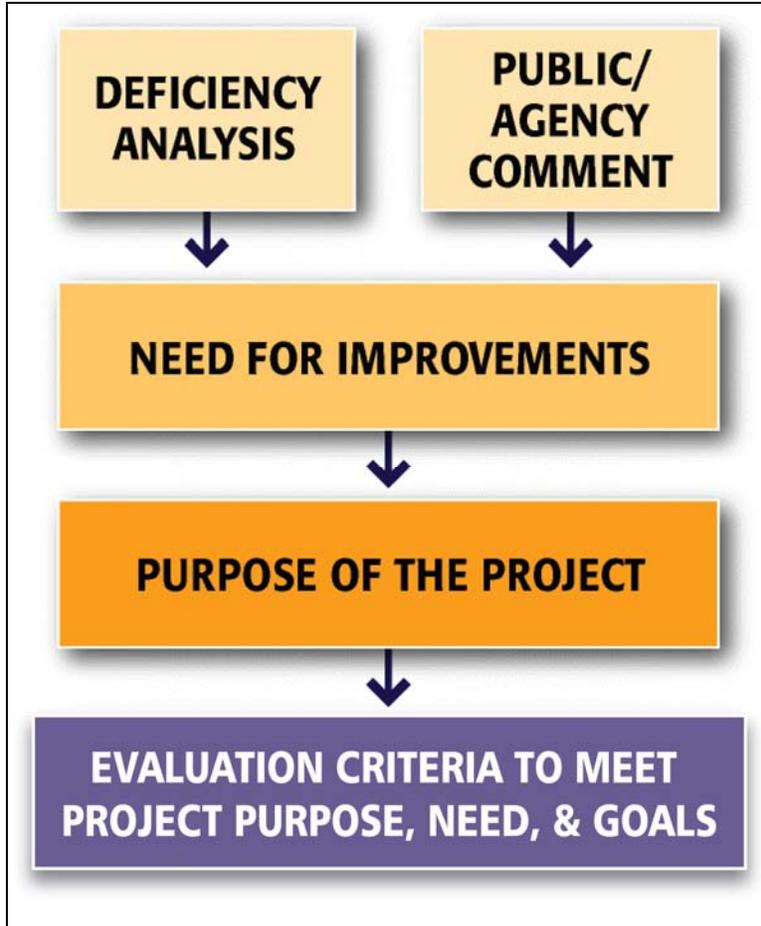
Notes:

BRT = bus rapid transit	LHC = locomotive-hauled coach
DMU = diesel multiple unit	LRT = light rail transit
ECO = Economic, Ecological	TDM = Transportation Demand Management
HOV = high-occupancy vehicles	TSM = Transportation System Management
ITS = intelligent transportation system	US 36 = United States Highway 36

The alternatives were developed using a context-sensitive solution approach. This process seeks transportation solutions that improve mobility and safety while complementing and enhancing community values and objectives. Context-sensitive solutions are reached through the joint efforts of collaborative, interdisciplinary teams.

The general alternatives were evaluated based on four goals (see the Project Goals subsection, below) which were derived from the six Purpose and Need elements and other requirements developed from state and federal laws, consistency with local policies, and funding availability. Figure 2.2-1, Relationship of Evaluation Criteria to Project Purpose, Need, and Goals, illustrates the general methodology used to develop the process and criteria for evaluating the general alternatives.

Figure 2.2-1: Relationship of Evaluation Criteria to Project Purpose, Need, and Goals



Source: US 36 Mobility Partnership, 2007.

Project Goals

In response to the Purpose and Need statement described in Chapter 1, Purpose and Need, the project team developed and refined, with the assistance of the project’s Technical Support Committee and the Corridor Governments Committee, four overall goals. These goals were derived from the six Purpose and Need elements and other requirements developed from state and federal laws, consistency with local policies, and funding availability. The goals were used to assist in the development of evaluation criteria for all evaluation levels.

In response to the Purpose and Need statement described in Chapter 1, Purpose and Need, the project team developed and refined four overall goals.

- **Goal 1:** Improve transportation mobility through and within the US 36 corridor.
- **Goal 2:** Minimize adverse impacts to the socioeconomic and natural environments, and foster positive environmental impacts.
- **Goal 3:** Support the land use vision and future development patterns in the Denver Regional Council of Governments (DRCOG) *2035 Metro Vision Regional Transportation Plan (2035 MVRTP)*, as amended (DRCOG 2009) and local plans and policies.
- **Goal 4:** Provide a cost-effective and efficient transportation investment strategy.

Although Goal 1 was used as the primary goal when developing and evaluating alternatives, Goals 2 through 4 supplemented the evaluation process by providing additional “discriminators,” or areas to focus evaluation efforts.

Four screening criteria, based on the four major goals described above, were used to evaluate the general alternatives. Table 2.2-2, Application of Goals to General Alternatives Evaluation, illustrates the application of the goals to the general alternatives screening process.

Table 2.2-2: Application of Goals to General Alternatives Evaluation

Goal	Screening Criterion	Description
Goal 1: Improve transportation mobility through and within the US 36 corridor.	Purpose and Need	Does the alternative increase trip capacity, expand access, provide congestion relief, a multi-modal opportunity, efficient transit service, and/or upgrade outdated highway facilities?
Goal 2: Minimize adverse impacts to the socioeconomic and natural environments, and foster positive environmental impacts.	Unacceptable environmental impacts	Does the alternative have a major environmental impact, or “fatal flaw?”
Goal 3: Support the land use vision and future development patterns in the <i>2035 MVRTP</i> , as amended (DRCOG 2009), and local plans and policies.	Conformance with the <i>2035 MVRTP</i> , as amended and local plans	Does the alternative conform to the <i>2035 MVRTP</i> , as amended and/or the local plan or policy with jurisdiction?
Goal 4: Provide a cost-effective and efficient transportation investment strategy.	Practical and feasible	Would an alternative fail one of the following two tests: <ul style="list-style-type: none"> • The alternative has substantial construction costs or operational complexity that would result in impacts well beyond those of other general alternatives. • The alternative performs the same or similar transportation function as another alternative but with less complexity and less impacts. This could include alternatives that are unproven in revenue service in applications similar to those of the US 36 corridor (meaning that there are other, more traditional and accepted modes that can perform similar transportation functions at lower cost or less construction complexity), or that are inconsistent with local existing or planned transportation modes and systems.

Source: US 36 Mobility Partnership, 2009.

Notes:

2035 MVRTP = 2035 Metro Vision Regional Transportation Plan, as amended

US 36 = United States Highway 36

General Alternatives Evaluation

Using the four goals of (1) improve transportation mobility, (2) minimize adverse environmental impacts, (3) support DRCOG plans and policies, and (4) provide a cost-effective and efficient investment that were derived from the six Purpose and Need elements, four criteria were developed to evaluate the general alternatives. The four criteria for general alternatives evaluation were (1) Purpose and Need, (2) unacceptable environmental impacts, (3) conformance with DRCOG and local land use plans, and (4) practical and feasible. A summary of the evaluation by criterion is described in the following sections, focusing only on those alternatives that failed to advance beyond this point in the process.

Criterion 1: Purpose and Need

The alternative for new freeways was unable to meet the transportation needs of the US 36 corridor.

The alternative for new freeways on a new alignment was determined to not meet the Purpose and Need of the project because this alternative would not substantially improve mobility. Improved mobility often requires increasing capacity and providing greater access to existing land uses and future land development. Therefore, new freeways outside the existing US 36 corridor would not serve the existing and planned activity centers in the project area. Because of the amount of right-of-way (ROW) needed for the construction of a new freeway, this alternative would essentially displace the very activity centers the roadway is meant to serve. For this reason, the alternative for new freeways was unable to meet the transportation needs of the US 36 corridor and was not considered reasonable.

Alternative transportation strategies, which includes Transportation System Management (TSM) and Transportation Demand Management (TDM) and contains elements such as ramp metering and bicycle facilities, would by themselves not meet the Purpose and Need of the project since they would not substantially improve mobility or travel times between Denver and Boulder. The most effective TSM programs in the country are focused at the activity center level and have achieved trip reductions of 20 to 25 percent. While the US 36 corridor has a large amount of employment and retail activity, few of these areas are highly concentrated enough to substantially reduce trips within the corridor through the use of alternative transportation strategies. The overall effect of alternative transportation strategies, such as a TSM alternative, in the US 36 corridor by itself would not be sufficient to meet the Purpose and Need. Therefore, alternative transportation strategies are not considered reasonable. While this alternative was not carried forward from the conceptual alternatives evaluation, elements of the alternative were considered as supportive measures in the conceptual alternatives development and evaluation process.

Criterion 2: Unacceptable Environmental Impacts

At this level of detail, no alternative showed evidence of unacceptable environmental impacts. Therefore, no alternatives were eliminated as a result of this criterion.

Criterion 3: Conformance with the 2035 Metro Vision Regional Transportation Plan, as amended, and Local Land Use Plans

At this level of detail, all the alternatives were in conformance with the 2035 MVRTP (DRCOG 2009) and local land use plans and policies. Therefore, no alternatives were eliminated as a result of this criterion.

Criterion 4: Practical and Feasible

The test for “practical and feasible” is cost-effectiveness and efficiency. The advanced guideway transit alternative failed the practical and feasible test. A monorail or similar grade-separated guided-beam transit improvement is very complex. There is no situation anywhere in the U.S., similar to the US 36 corridor, where such a technology has been used in everyday proven transit revenue service. In addition, advanced guideway transit would be a new technology that is much different than what is in use or planned for other transit service in the Denver metropolitan area and would not be able to interface with other regional transit systems. Other rapid transit alternatives would provide a similar or greater level of transportation service with less cost and logistical complexity than the advanced guideway transit alternative. For these reasons, combined with a lack of community support, the alternative was not considered reasonable and was eliminated from further consideration.

The advanced guideway transit alternative failed the practical and feasible test.

Due to technology and cost issues, commuter rail within or on US 36 was not carried forward for further study. At Davidson Mesa near McCaslin Boulevard, the grade is a sustained 5 percent for approximately 1 mile westbound and approximately 0.5 mile eastbound. According to RTD criteria, the absolute maximum grade that diesel multiple unit or locomotive-hauled coach rail technology could accommodate for short distances is approximately 4.0 percent, with greater grades as the distance increases. Constructing a rail tunnel through Davidson Mesa was determined to not be practical based on substantial construction costs. Tunneling costs would be 10 to 15 times more than at-grade construction costs and the presence of abandoned underground coal mines creates additional design challenges. For these reasons, commuter rail on US 36 was not considered reasonable.

Recommendations

As described above, the following four general alternatives were not considered reasonable and were not carried forward for further study as major alternatives:

- New freeways on a new alignment
- Alternative transportation strategies
- Advanced guideway transit on US 36
- Commuter rail on US 36

Table 2.2-3, Evaluation Results of General Alternatives, summarizes the general alternatives analysis, including analysis of all alternatives that were advanced beyond this point in the process.

Table 2.2-3: Evaluation Results of General Alternatives

Alternative	Description/ Location	Purpose and Need	Unacceptable Environmental Impacts	Practical and Feasible	Pass or Fail Alternative to Next Level	Reason for Failing
No Action	US 36	N/A	N/A	N/A	Pass	N/A
New parallel freeway or roadway	Roughly parallel to US 36	Fail	Not evaluated (failed to meet Purpose and Need)	Not evaluated (failed to meet Purpose and Need)	Fail	Would not improve mobility due to inability to serve existing and planned activity centers.
New general-purpose lanes	US 36	Pass	Pass	Pass	Pass	N/A
New lanes on arterials	US 36 project area	Pass	Pass	Pass	Pass	N/A
Acceleration/deceleration lanes	US 36	Pass	Pass	Pass	Pass	N/A
Climbing lanes	US 36	Pass	Pass	Pass	Pass	N/A
HOV lanes	US 36	Pass	Pass	Pass	Pass	N/A
Toll lanes	US 36	Pass	Pass	Pass	Pass	N/A
Local bus expansion	US 36 project area	Pass	Pass	Pass	Pass	N/A
Regional bus expansion	US 36	Pass	Pass	Pass	Pass	N/A
Commuter rail	US 36	Pass	Pass	Fail	Fail	Rail on US 36 is not practical due to steep grades (existing 5% grade vs. rail maximum of 2.5%) and cost of tunnel.
BRT	US 36	Pass	Pass	Pass	Pass	N/A
LRT	US 36	Pass	Pass	Pass	Pass	N/A
Advanced guideway transit	US 36	Pass	Pass	Fail	Fail	Did not meet practicability criterion due to very complex technology; logistically difficult to implement; no proven service in a similar corridor; technology not compatible with plans for Denver metropolitan area; less costly alternatives provide greater levels of transportation service.
Alternative Transportation Strategies	US 36	Fail	Pass	Pass	Fail	Did not meet improve mobility criterion of Purpose and Need. Elements such as TSM, TDM, ITS, and bicycle facilities were carried forward as supportive alternatives.

Source: US 36 Mobility Partnership, 2006.

Notes:

- % = percent
- BRT = bus rapid transit
- HOV = high-occupancy vehicles
- ITS = intelligent transportation system
- LRT = light rail transit
- N/A = not applicable
- TDM = Transportation Demand Management
- TSM = Transportation System Management
- US 36 = United States Highway 36

Major Alternatives and Supportive Alternatives

After the general alternatives evaluation process, the remaining alternatives were submitted to an organizing process. The alternatives were sorted by the potential to meet many or all of the project needs. If it was determined that an alternative, by itself, would not meet many or all of the project needs, then it was a supportive alternative that would function in a complementary role. All other alternatives were considered to be major alternatives. The results of this process appear in Table 2.2-4, Categorization of Major Alternatives and Supportive Alternatives.

Table 2.2-4: Categorization of Major Alternatives and Supportive Alternatives

Major Alternatives	Supportive Alternatives
• No action	• Acceleration/deceleration lanes
• New general-purpose lanes on US 36	• Climbing lanes
• New arterial lanes	• Interchange upgrades or replacements
• HOV lanes on US 36	• Local and regional bus expansion
• Toll lanes on US 36	• TDM and TSM improvements
• BRT (barrier-separated or buffer-separated) on US 36	• ITS
• Light rail on US 36	• Bicycle and pedestrian facilities

Source: US 36 Mobility Partnership, 2006.

Notes:

- BRT = bus rapid transit
- HOV = high-occupancy vehicles
- ITS = intelligent transportation system
- TDM = Transportation Demand Management
- TSM = Transportation System Management
- US 36 = United States Highway 36

2.3 CONCEPTUAL ALTERNATIVES EVALUATION

The seven remaining major alternatives were further refined using results of the travel demand and engineering concept studies. The alternatives were then subjected to a conceptual alternatives evaluation process using the four goals developed during the general alternatives evaluation process, including (1) factors related to Purpose and Need, (2) minimizing environmental impacts, (3) supporting the DRCOG plans, and (4) providing a cost-effective and efficient investment. These goals formed the basis for developing the conceptual alternatives evaluation criteria. The alternatives were evaluated against each of the goals by measuring how they met each criterion.

Table 2.3-1, Application of Goals to Conceptual Alternatives Evaluation, lists the conceptual alternatives evaluation criteria and illustrates the relationship between each criterion and the four goals. This evaluation used a combination of qualitative and quantitative comparisons. For a detailed description of the application of the criteria and results, see the technical memorandum, *Conceptual Alternatives Definition and Evaluation* (URS 2004).

Table 2.3-1: Application of Goals to Conceptual Alternatives Evaluation

Goal	Evaluation Criteria
Goal 1: Improve transportation mobility through and within the US 36 corridor.	<ul style="list-style-type: none"> • Peak-hour capacity at screenline locations • Daily travel capacity at screenline locations • Peak transit mode share • Travel times for both automobiles and transit • Levels of service
Goal 2: Minimize adverse impacts to the socioeconomic and natural environments, and foster positive environmental impacts.	<ul style="list-style-type: none"> • Land use • ROW and relocations • Social impacts and community facilities • Environmental justice • Parks and open space • Air quality measured in VMT and VHT • Noise measured by households and schools within 500 feet • Biological resources, wildlife, vegetation, and threatened and endangered species • Water resources/floodplains/water quality • Construction-related impacts
Goal 3: Support the land use vision and future development patterns in the 2035 MVRTP, as amended (DRCOG 2009), and local plans and policies.	<ul style="list-style-type: none"> • Compatibility with current land use and transportation policies • Consistency with future land use and transportation plans • Compatibility with existing land uses
Goal 4: Provide a cost effective and efficient transportation investment strategy.	<ul style="list-style-type: none"> • Capital cost • Annualized cost/increase in peak-hour capacity • Annualized cost/increase in daily demand • Annualized cost/increase in direct transit and/or HOV user

Source: US 36 Mobility Partnership, 2009.

Notes:

Screenline is a collection of parallel facilities analyzed as a group.

2035 MVRTP, as amended = 2035 Metro Vision Regional Transportation Plan, as amended

HOV = high-occupancy vehicle

ROW = right-of-way

VHT = vehicle hours traveled

VMT = vehicle miles traveled

US 36 = United States Highway 36

Conceptual Alternatives Evaluation

The following conclusions were made based on the results of the conceptual alternatives evaluation:

- New arterial lanes were not carried forward because this alternative does not meet the project Purpose and Need and does not meet the goal to minimize adverse impacts to socioeconomic and natural environments. This alternative would provide no substantial increase in regional automobile capacity, transit capacity, or percentage of trips carried by transit; thus, it would not meet the projected demand threshold of an additional 10,000 peak-hour person-trips, nor would it expand mode of travel options or expand access to activity centers. Likewise, new arterial lanes would not make improvements to the existing highway and improve safety issues on US 36, and would not reduce US 36 congestion. New arterial lanes would result in substantial environmental impacts because nearly every arterial in the US 36 corridor would need to be widened. In discussions with local agencies, this alternative would create the greatest level of impacts of any roadway alternative (ROW acquisition, low-income and minority populations, parkland, and noise impacts). For these reasons, new arterial lanes were not found to be reasonable and were excluded from further consideration.
- Light rail transit (LRT) on US 36 was not carried forward because it failed to meet the project Purpose and Need, and failed to meet the goals of cost effectiveness and minimum adverse impacts to socioeconomic and natural environments. LRT would result in additional ROW acquisition (with additional environmental impacts), and would not provide the same multi-purpose mobility benefit as a BRT/HOV or managed lane. Without the highway improvements, LRT would not meet the projected demand threshold of an additional 10,000 peak-hour person-trips, and would not improve the existing highway design and related safety issues identified in the Purpose and Need. At the conceptual level, the mobility benefits associated with LRT and BRT on US 36 were similar. For example, ridership was the same for both LRT and BRT. To a minor degree, BRT would offer a small advantage over LRT in a few of the mobility categories, including travel time savings, cost per new transit user, and cost per vehicle miles traveled reduced. LRT would offer similar mobility benefits but would cost as much as \$0.8 billion more than BRT. LRT capital cost estimates on US 36 were between \$1.3 and \$1.7 billion compared to between \$900 million and \$1.05 billion for BRT. Therefore, LRT is not cost effective compared to BRT. Additionally, the west-end terminus for LRT would require additional ROW acquisition and result in additional impacts to local roadways and/or properties, in order to create an alignment along Foothills Parkway that could access the Boulder Transit Village. LRT on US 36 would require use of CDOT ROW for transit. LRT would also duplicate transit service in the corridor, as commuter rail on the BNSF Railway is part of the No Action Package. Lastly, there are substantial visual impacts associated with the overhead electrification required for LRT. For these reasons, LRT on US 36 was not found to be reasonable and was not carried forward.

Recommendations

As described above, the following two conceptual alternatives were not considered reasonable and were not carried forward for further study:

- New arterial lanes
- LRT on US 36

Table 2.3-2, Conceptual Alternatives Carried Forward for Packaging, details the conceptual alternatives that were recommended for further study and inclusion in packages.

Table 2.3-2: Conceptual Alternatives Carried Forward for Packaging

Major and Supportive Alternatives
• No action (required by federal mandate)
• New general-purpose lanes on US 36
• HOV lanes on US 36
• Toll lanes on US 36
• BRT on US 36 (barrier-separated or buffer-separated; in the median or along either side of the highway; or in an exclusive busway)
• Toll lanes with BRT on US 36
• Acceleration/deceleration lanes
• Climbing lanes
• Interchange upgrades or replacements
• Local and regional bus expansion
• TDM and TSM improvements
• ITS
• Bicycle and pedestrian facilities

Source: US 36 Mobility Partnership, 2006.

Notes:

- BRT = bus rapid transit
- HOV = high-occupancy vehicles
- ITS = intelligent transportation system
- TDM = Transportation Demand Management
- TSM = Transportation System Management
- US 36 = United States Highway 36

2.4 PACKAGE DEVELOPMENT

Using the evaluation results from the conceptual alternatives phase and the bullets listed below as a guide, the project team developed multi-modal packages for further evaluation in the Environmental Impact Statement (EIS).

- A preliminary assessment of the ability of the combination to meet overall project needs.
- A review of the compatibility of various improvements when combined together in the same package.
- The development of packages that show clear differences in operational characteristics and impacts.

None of the alternatives evaluated at the conceptual level would address all of the mobility needs in the US 36 corridor.

The project team received comments from the Technical Support Committee, Corridor Governments Committee, the public, and agencies regarding possible elements and combinations for packaging.

As a result of public and agency input, four build packages, in addition to Package 1, were developed and carried forward for further analysis. The intent of developing these packages was to focus on the performance of specific transportation modes or combinations of modes that best met the Purpose and Need of the project.

As a result of public and agency input, four build packages were developed.

Managed lanes provided a congestion management tool that extended beyond the project horizon. Managed lanes provided new capacity that offered a choice for travelers in the corridor to use the general-purpose lanes or the managed lanes. The managed lanes would be available for use by transit and HOV traffic at no cost, and any remaining capacity could be tolled for use by SOV traffic through dynamic pricing. Additionally, revenue from the managed lanes could be used to cover operations and maintenance costs for the lanes and/or some construction costs, a funding mechanism that is not available in the other packages. This package was identified as Package 2.

- Some local stakeholders expressed a preference for additional general-purpose lane capacity in the US 36 corridor as a means to improve mobility. Other local stakeholders expressed a strong interest in examining a BRT-only facility to better serve activity centers along the corridor. This interest included the suggestion that a separate BRT guideway—an exclusive BRT lane running primarily alongside US 36 instead of in the median—could facilitate BRT ridership and travel times in the corridor. Therefore, a package providing additional general-purpose lanes in the corridor and a separate BRT guideway was developed that would focus on facilitating general-purpose automobile traffic in addition to high-speed bus transit service in the corridor. It was designed to focus as much transit ridership as possible onto the bus system. This package was identified as Package 3.
- Some local stakeholders expressed strong interest in a package that resembled the locally preferred alternative in the *US 36 Major Investment Study* (RTD 2001). This package was designed to maximize transportation usage from all modes, focused on additional capacity with a BRT/HOV lane in the median of US 36 that would provide uncongested operations for transit, carpools, and vanpools. Comparing this new capacity with expected demand still left a deficiency; therefore, additional general-purpose lanes were added to meet the remaining demand. This package was identified as Package 4.
- Finally, the federal agencies expressed an interest in determining the extent to which commuter rail could absorb as much excess demand as possible. Therefore, a package was developed that focused on maximizing commuter rail service (provided in Package 1), supplemented by providing express bus service and separate bus/HOV lanes the length of the corridor. These lanes would use slip-ramps

to access park-n-Rides alongside US 36. The package would also provide additional general-purpose lanes to increase capacity for the remaining demand. This package was identified as Package 5.

Table 2.4-1, Packages Developed from Conceptual Alternatives, summarizes the packages that were carried forward for further evaluation.

Table 2.4-1: Packages Developed from Conceptual Alternatives

Mode Improvement	Package 1: No Action	Package 2: Managed Lanes/BRT	Package 3: General-Purpose Lanes and Exclusive BRT	Package 4: General-Purpose Lanes, HOV, and BRT	Package 5: General-Purpose Lanes and HOV
Transportation management improvements (TSM and TDM) and bikeway		✓ ¹	✓	✓	✓
New general-purpose lanes on US 36			✓	✓	✓
HOV		✓		✓	✓
BRT		✓	✓	✓	
Express bus	✓				✓
Managed lanes		✓			
Commuter rail on BNSF Railway ROW	✓				
Method of separating managed/BRT/HOV lanes from general-purpose lanes	N/A	Median barrier	Exclusive guideway (BRT lane)	Median buffer	Median buffer
Station type		Median (in US 36 ROW)	Side-loading (in US 36 ROW)	Median (in US 36 ROW)	Off-line (outside US 36 ROW or along US 36 ramps), uses existing park-n-Ride network

Source: US 36 Mobility Partnership, 2004.

Notes:

¹ Check marks denote applicable mode improvement.

BRT = bus rapid transit

HOV = high-occupancy vehicles

N/A = not applicable

ROW = right-of-way

TDM = Transportation Demand Management

TSM = Transportation System Management

US 36 = United States Highway 36

Conceptual Design of Packages

Conceptual engineering design on each of the packages served as the physical definition of the package for evaluation of impacts and costs. The initial planning and engineering work resulted in development of a set of concept-level designs and plans. Special attention was given to areas and resources where impacts could be avoided or minimized by refining the conceptual design. This was especially true to avoid parks, wetlands, historic resources, and residential property acquisitions.

Initial Package Evaluation

Each of the packages was evaluated using the four goals developed as part of the Purpose and Need. As with the alternatives evaluation process, the packages were evaluated against each of the goals. For a detailed description of the application of the criteria and results, see *Alternatives Analysis Technical Report: Package Development and Evaluation* (URS 2007).

Following the development of the five packages, more detailed design refinement and assessment of transportation performance and environmental impacts was undertaken. More detailed evaluation criteria were defined using the four goals and previous criteria as the starting point.

Design concepts were reviewed with corridor jurisdictions and with the general public. The footprint of the improvements for each package was developed from the conceptual design work for use in analyzing the extent of environmental impacts.

Detailed travel demand forecasts were developed for each package for 2025. Highway and transit travel demands were compared among the packages. Capital and annual operating costs were estimated as well as annualized costs to compare to annual transportation benefits.

Table 2.4-2, Application of Goals to Evaluation of Packages, lists the evaluation criteria and illustrates the relationship between each criterion and the four goals.

Table 2.4-2: Application of Goals to Evaluation of Packages

Goal	Detailed Evaluation Criterion
Goal 1: Improve transportation mobility through and within the US 36 corridor.	<ul style="list-style-type: none"> • Peak-hour capacity at screenline locations • Daily travel demand at screenline locations • Freeway levels of service • Peak-period transit mode share at selected screenlines • Daily transit boardings by mode • Daily carpool person-trips • Travel time by mode • Linked and unlinked total daily transit trips • Transit passengers per hour • Daily VMT (corridor and region) • Daily VHT (corridor and region) • Interchange and intersection improvements
Goal 2: Minimize adverse impacts to the socioeconomic and natural environments, and foster positive environmental impacts.	<ul style="list-style-type: none"> • Land use • ROW and relocations • Social impacts and community facilities • Environmental justice • Historic preservation and paleontology • Parks and open space • Air quality • Noise • Biological resources, wildlife, vegetation, and threatened and endangered species • Water resources/floodplains/water quality • Construction-related impacts
Goal 3: Support the land use vision and future development patterns in the Denver Regional Council of Governments (DRCOG) 2035 MVRTP, as amended (DRCOG 2009), and local plans and policies.	<ul style="list-style-type: none"> • Compatibility with current land use and transportation policies • Consistency with future land use and transportation plans • Compatibility with existing land uses
Goal 4: Provide a cost effective and efficient transportation investment strategy.	<ul style="list-style-type: none"> • Capital cost • Annualized cost/increase in peak-hour capacity • Annualized cost/increase in daily demand • Annualized cost/increase in direct transit and/or HOV user

Source: US 36 Mobility Partnership, 2009.

Notes:

Screenline is a collection of parallel facilities analyzed as a group.

2035 MVRTP, as amended = 2035 Metro Vision Regional Transportation Plan, as amended

HOV = high-occupancy vehicle

ROW = right-of-way

VHT = vehicle hours traveled

VMT = vehicle miles traveled

US 36 = United States Highway 36

The evaluation included measuring each package against the criteria in Goal 2, which calls for minimizing adverse impacts to the socioeconomic and natural environments, and fostering positive environmental impacts, and in Goal 3, which calls for support of regional and local land-use visions and future development patterns. These criteria did not prove to be discriminators among the four build

packages. Environmental impacts were similar for the four build packages. However, Packages 3, 4, and 5 have fewer acres of impacts to wetlands and waters of the U.S. than Package 2. This is because of differences in the construction of lanes and highway features such as drop-ramps.

After a thorough and detailed review of the operational features of the packages, Packages 3 and 5 clearly do not serve the mobility criteria of the Purpose and Need for the project identified in Goal 1. Additionally, Packages 3 and 5 did not meet the cost-effectiveness goal of the project Purpose and Need identified in Goal 4.

Key discriminators in the initial evaluation of packages, as described below, proved to be the criteria from Goal 1 related to Transportation Need #2: Expand Access, and Transportation Need #4: Expand Mode of Travel Options, and criteria from Goal 4 related to Transportation Need #5: Efficient Transit Service.

Package 3: General-Purpose Lanes and Exclusive BRT, does not include any provision for HOV lanes to serve carpools or vanpools. This package has an exclusive BRT guideway that is used only by buses. Therefore, the carpools and vanpools must operate in mixed traffic and would not have the time savings required to attract users to these high-occupancy modes. This package therefore did not meet the Expanded Mode of Travel Options component of the Purpose and Need.

Package 3: General-Purpose Lanes and Exclusive BRT, would be expensive to build because an exclusive barrier-separated BRT guideway would be constructed. In conjunction with the other improvements in this package, this would require rebuilding all of the existing interchanges and acquiring large amounts of additional ROW. The capital and operating cost for this guideway would be so costly that it would likely not meet the cost-effectiveness criteria for FTA funding.

Package 5: General-Purpose Lanes and HOV, did not improve any interchange intersections, and thus, would not improve access to existing and planned activity centers.

The cost per total corridor transit rider in Package 5: General-Purpose Lanes and HOV, would be at least double the cost of the other packages. This low cost-effectiveness makes this package not practical due to cost. Package 5 would provide a separate HOV lane and a bikeway but would fail to provide an additional modal option, such as a managed lane or transit priority, which would meet the expand mode of travel options need. Although the HOV lane and bikeway would be included in Package 5, the added benefit to shift travelers from SOVs to managed lanes, or to transit with improved priority or median stops, would not be available. Due to the lack of ability of Package 5 to meet two of the Purpose and Need categories, it was eliminated from further consideration.

Recommendations

As described above, the following three packages were considered reasonable and were carried forward for evaluation in the EIS:

- **Package 1:** No Action
- **Package 2:** Managed Lanes/Bus Rapid Transit
- **Package 4:** General-Purpose Lanes, High-Occupancy Vehicle, and Bus Rapid Transit

Section 2.6, Package Descriptions, presents the specific transportation improvement elements contained in each of the remaining packages.

2.5 COMBINED ALTERNATIVE PACKAGE DEVELOPMENT

The DEIS comment period identified public and agency interest in minimizing community and environmental impacts and reducing project costs, while providing increased mobility improvements throughout the US 36 corridor.

To respond to public and agency comments, a Preferred Alternative Committee (PAC), comprised of agency representatives, elected officials, and technical staff from local jurisdictions, was convened in January 2008. The purpose of the PAC was to recommend a Preferred Alternative for inclusion in the FEIS. The PAC process reviewed and addressed DEIS public comments, evaluated corridor elements, identified a Preferred Alternative, and outlined implementation phases.

In July 2008, the PAC recommended a multi-modal transportation solution known as the Combined Alternative Package (Preferred Alternative). The Combined Alternative Package (Preferred Alternative) includes both transit and highway improvements that are responsive to the public and provide long-term transportation benefits.

Analysis and Findings

Following development of the Combined Alternative Package (Preferred Alternative), additional analysis was conducted to verify consistency with the project's Purpose and Need, design and safety standards, financial feasibility, and regulatory requirements. The PAC and Transportation Working Groups met to address issues that required further analysis, including the barrier versus buffer-separated managed lanes, BRT, and the west-end lanes. These issues are summarized below.

- **Barrier versus buffer-separated managed lanes:** The PAC recommended the implementation of one new managed lane in both directions that would be buffer-separated to provide greater access to the managed lane and reduce ROW impacts. Analysis was conducted to evaluate the safety and operational impacts of buffer-separated managed lanes. The results of the analysis validated the PAC recommendation.
- **BRT:** The PAC and a BRT Operations Working Group met, analyzed, and established the BRT elements to be included in the Combined Alternative Package (Preferred Alternative). The PAC agreed to a BRT concept which included ramp and side-loading stations supported by parking facilities and local transit services, with specific premium components to support BRT operations. Ramp and side-loading stations were identified as the preferred option because they would reduce costs and impacts, and would potentially provide increased operational flexibility as compared to median stations. Bus service enhancements and optimizations will be developed to serve side-loading stations. Additionally, a BRT Operations Working Group met and outlined the specific components of the BRT service and operations.
- **West-end lanes:** In the west-end of the corridor, between the McCaslin Boulevard interchange and the Foothills Parkway/Table Mesa Drive interchange, concerns were expressed by the City of Boulder and Boulder County regarding traffic impacts resulting from an increase in highway capacity. To address this concern, the PAC evaluated the extension of climbing lanes on US 36 between McCaslin Boulevard and Table Mesa Drive to bus-only lanes, as well as the use of shoulders for transit during peak travel periods.

Following evaluation of the west-end lanes, the PAC recommendation was to include a bus-only lane to cover the “gap” between the end of the climbing lanes and the beginning of the downstream interchange off-ramps. This bus-only lane would be constructed when and if certain bus-related “triggers” are met and a re-evaluation process would be conducted. The need for implementing a bus-only continuous auxiliary lane would be based on bus-related measures of effectiveness, with the goal of improving the number of person trips on US 36 and parallel arterials.

2.6 PACKAGE DESCRIPTIONS

Introduction to Package Descriptions

This section describes each package evaluated in detail. Each description covers roadway, transit, and pedestrian/bikeway improvements by segments. There are six segments in the corridor that were grouped together and are generally defined as follows:

- **Denver and Adams Segments** – I-25 from downtown Denver to US 36, and US 36 from I-25 to Sheridan Boulevard/88th Avenue. Interchanges along US 36 in these segments include Broadway, Pecos Street, and Federal Boulevard.
- **Westminster and Broomfield Segments** – US 36 from Sheridan Boulevard/88th Avenue to Interlocken Loop/StorageTek Drive. Interchanges along US 36 in these segments include Sheridan Boulevard/92nd Avenue, Church Ranch Boulevard/104th Avenue, Wadsworth Parkway/120th Avenue, East Flatiron Circle, and Interlocken Loop/StorageTek Drive.
- **Superior/Louisville and Boulder Segments** – US 36 from Interlocken Loop/StorageTek Drive to Foothills Parkway/Table Mesa Drive. Interchanges along US 36 in these segments include West Flatirons Circle, McCaslin Boulevard, and Foothills Parkway/Table Mesa Drive.

Package 1: No Action

Although it does not meet the Purpose and Need of the project, Package 1 must be considered throughout the NEPA process for comparison purposes to the build packages, pursuant to Council on Environmental Quality requirements. Package 1 does not propose any new build elements for US 36. However, the package assumes that committed improvements, like the Northwest Rail Corridor Project, bus, and park-n-Ride improvements from the locally funded FasTracks Program, would be implemented as planned by others. Figure 2.6-1, Package 1 (No Action), is a map depicting this package.

The 2004 *FasTracks Plan* (RTD 2004) included seven rail stations for the Northwest Rail commuter rail line. Those stations were located at Twin Peaks in Longmont, Gunbarrel, Boulder Transit Village, Downtown Louisville, Flatiron in Broomfield, Church Ranch Boulevard, and South Westminster. Additional rail stations at 88th Avenue/Sheridan Boulevard in Westminster, 116th Avenue in Broomfield, and 63rd Avenue/Arapahoe Road in Boulder, were added in the early planning stages of the US 36 EIS at the request of corridor stakeholders when the Northwest Rail Corridor and US 36 projects were one combined project. The exact station locations and amenities at each station will be determined in the USACE/RTD Northwest Rail Environmental Assessment (EA)/Environmental Evaluation, now a separate study.

Figure 2.6-1: Package 1 (No Action)



Note: The 116th Avenue Rail Station is not a part of the 2004 FasTracks Program. Additional stations were added in the early planning stages of the US 36 Environmental Impact Statement. Exact rail station locations and additional stations may be reconsidered in the U.S. Army Corps of Engineers/Regional Transportation District Northwest Rail Environmental Assessment/Environmental Evaluation.

Denver and Adams Segments

Roadway

The I-25 corridor is an urban freeway with reversible express lanes from 20th Street north to 84th Avenue, just north of US 36. I-25 has major interchanges with I-70, I-76, and I-270, where it also connects with US 36. The express lanes are open southbound to traffic going into downtown in the morning and northbound out of downtown in the evening. Westbound on US 36, the managed lane extends to Federal Boulevard, and from Pecos Street to I-25 in the eastbound direction. While there are numerous auxiliary lanes in these corridors, there are typically three general-purpose lanes in each direction on I-25 and US 36 in these segments. In addition, Package 1 includes 80th Avenue reconstruction where it crosses over US 36.

Transit

As shown in Table 2.6-1, Parking and Pedestrian Crossings at Transit Stations, there are three transit stations in these segments. The Denver Segment contains the DUS, and the Adams Segment contains the Broadway park-n-Ride and the South Westminster Rail Station.

DUS is currently the railroad terminal for passenger service in the Denver metropolitan area handling RTD light rail and Amtrak services.. DUS would be upgraded in Package 1 as part of the FasTracks Program. Improvements planned are to consolidate existing and future LRT tracks; the 16th Street Mall shuttle turn-around; passenger rail tracks from the Gold Line Corridor, Northwest Rail Corridor, North Metro Corridor, and East Corridor; regional bus (including the relocation of the existing Market Street bus station); and the future downtown circulator and pedestrian circulation into one multi-modal transportation center.

As a result of Package 1, 25 buses would enter downtown Denver from US 36 during the peak-hour. Twenty-two of these buses would serve DUS. Buses would no longer serve the downtown Denver Market Street Transfer Station, but the remaining four buses would serve the Civic Center Transfer Station to and from I-25 on 19th Street and 20th Street.

No improvements to the station, parking, or access at the Broadway park-n-Ride are planned as part of Package 1.

Pedestrian/Bicycle

There are no pedestrian or bicycle improvements as part of Package 1. Existing bicycle facilities, such as the Little Dry Creek Trail, Clear Creek Trail, and Platte River Trail system, would be used by pedestrians and bicyclists in these segments.

Table 2.6-1: Parking and Pedestrian Crossings at Transit Stations

Segment	Station Name	Station Type: Package 1	Parking Spaces and Pedestrian Crossings: Package 1	Station Type: Combined Alternative Package (Preferred Alternative)	Parking Spaces and Pedestrian Crossings: Combined Alternative Package (Preferred Alternative)	Station Changes between Package 1 and Combined Alternative Package (Preferred Alternative)
Denver and Adams	Denver Union Station (17 th Street/Wynkoop Street)	Multi-modal hub	N/A	Multi-modal hub	N/A	None
	Westminster Center (US 36/Sheridan Boulevard)	park-n-Ride	park-n-Ride east side: 874 spaces (in existing parking structure) park-n-Ride west side: 351 spaces Total spaces: 1,225 Existing pedestrian bridge overpass	BRT	BRT east side: 874 spaces (in existing parking structure) BRT west side: 500 spaces Total spaces: 1,374 Pedestrian bridge overpass	+149 spaces on west side Replace existing pedestrian bridge overpass
Broomfield	Church Ranch/104 th Avenue	park-n-Ride/rail	park-n-Ride east side: 144 spaces park-n-Ride west side: 252 spaces Rail west side: 230 spaces ¹ Total spaces: 626 Existing pedestrian (and vehicular) underpass	BRT/Rail	park-n-Ride east side: 144 spaces park-n-Ride west side: 252 spaces Rail west side: 230 spaces ¹ Total spaces: 626 Pedestrian (and vehicular) underpass	No parking Replace existing pedestrian (and vehicular) underpass
	116 th Avenue ² (US 36/116 th Avenue)	park-n-Ride/rail	park-n-Ride west side: 940 spaces (200 dedicated spaces and 740 shared spaces in existing joint use parking structure) park-n-Ride east side: none Rail east side: 360 spaces ¹ Total spaces: 1,300 Planned pedestrian bridge overpass	BRT/Rail	park-n-Ride west side: 940 spaces (200 dedicated spaces and 740 shared spaces in existing joint use parking structure) park-n-Ride east side: 870 spaces Rail east side: 360 spaces ¹ Total spaces: 2,170 Pedestrian bridge overpass	+870 spaces on east side Extend pedestrian bridge overpass
	Flatiron (US 36/96 th Street)	park-n-Ride/rail	park-n-Ride/rail east side: 250 spaces ¹ Total spaces: 250 Existing pedestrian underpass	BRT/Rail	park-n-Ride/rail east side: 250 spaces ¹ Total spaces: 250 Pedestrian underpass	No parking Extend existing pedestrian underpass

Table 2.6-1: Parking and Pedestrian Crossings at Transit Stations

Segment	Station Name	Station Type: Package 1	Parking Spaces and Pedestrian Crossings: Package 1	Station Type: Combined Alternative Package (Preferred Alternative)	Parking Spaces and Pedestrian Crossings: Combined Alternative Package (Preferred Alternative)	Station Changes between Package 1 and Combined Alternative Package (Preferred Alternative)
Superior/Louisville and Boulder	McCaslin (US 36/McCaslin Boulevard)	park-n-Ride	park-n-Ride south side: 294 spaces park-n-Ride north side: 172 spaces Total spaces: 466 Existing pedestrian bridge overpass	BRT	park-n-Ride south side: 178 spaces park-n-Ride north side: 10 spaces Total spaces: 188 ³ Pedestrian bridge overpass	Loss of 116 spaces on south side Loss of 162 spaces on north side 278 total spaces lost (due to interchange expansion) Modify existing pedestrian bridge overpass
	Table Mesa (US 36/T able Mesa Drive)	park-n-Ride	park-n-Ride east side: 825 spaces (in existing parking structure) Total spaces: 825 Planned pedestrian bridge overpass	BRT	Side-loading park-n-Ride east side: 825 (in existing parking structure) spaces Total spaces: 825	No parking Modify pedestrian bridge overpass
	Boulder Transit Village (30 th Street/Pearl Street)	Boulder Transit Village Super Stop	park-n-Ride: 100 spaces Rail: 280 spaces ¹ Total spaces: 380	Boulder Transit Village Super Stop	park-n-Ride: 100 spaces Rail: 280 spaces ¹ Total spaces: 380	None
	Boulder Transit Center (14 th Street/Walnut Street)	Multi-modal transfer center	N/A	Multi-modal transfer center	N/A	None

Source: US 36 Mobility Partnership, 2009.

Notes:

¹ Estimated based on concept plans from the Northwest Rail Environmental Assessment/Environmental Evaluation.

² These rail stations are not a part of the 2004 FasTracks Program. Additional stations were added in the early planning stages of the US 36 Environmental Impact Statement. Exact rail station locations and additional stations may be reconsidered in the U.S. Army Corps of Engineers/Regional Transportation District Northwest Rail Environmental Assessment/Environmental Evaluation.

³ The loss of parking spaces would be mitigated as described in Section 3.5.8, Impacts of Transit Station Parking.

+ = additional

BRT = bus rapid transit

N/A = not applicable

US 36 = United States Highway 36

Westminster and Broomfield Segments

Roadway

US 36 is typically two lanes in each direction in the Westminster and Broomfield segments. There is an auxiliary lane in each direction between Wadsworth Boulevard and East Flatiron Circle. In addition, 120th Avenue would be extended west across US 36 to link with State Highway 128 at Wadsworth Parkway.

Transit

There are four transit stations in these segments: the Westminster Segment contains the Westminster Center park-n-Ride and the Church Ranch/104th Avenue Station. The 116th Avenue Station and the Flatiron Station are located in the Broomfield Segment.

In Package 1, all the park-n-Rides and park-n-Ride/rail stations for the Westminster and Broomfield segments would have parking on both sides of US 36, except the 116th Avenue park-n-Ride. The 116th Avenue park-n-Ride would have parking on the south side of US 36, a pedestrian crossing to connect the parking areas, and would be accessed by buses on US 36 via bus pull-outs. Rail stations would also have a boarding platform to access the Northwest Rail line. The type of pedestrian crossing (underpass or bridge over US 36), and parking associated with each station are listed in Table 2.6-1, Parking and Pedestrian Crossings at Transit Stations.

Queue jumps would be provided in both directions at Church Ranch Boulevard and the westbound on-ramp at Interlocken Loop.

Pedestrian/Bicycle

There would be no pedestrian or bicycle improvements as part of Package 1 in these segments. In Package 1, there are no existing continuous bikeway facilities adjacent to US 36 in the Westminster Segment. In the Broomfield Segment, on the south side of US 36, there is a multi-use path that extends from East Flatiron Circle to West Flatiron Circle through Interlocken and Flatiron Crossing.

Superior/Louisville and Boulder Segments

Roadway

US 36 is typically two lanes in each direction in the Superior/Louisville and Boulder segments. In the Superior/Louisville Segment, Northwest Parkway connects to US 36 via 96th Street.

Transit

There are four stations located in the Boulder Segment, and two in the Superior/Louisville Segment. There are two stations associated with the Northwest Rail Corridor Project, the Downtown Louisville and Gunbarrel West rail stations. There are two park-n-Rides, located at McCaslin Boulevard and Table Mesa Drive. The Boulder Transit Center would have bus service, while the Boulder Transit Village would have both bus and rail service.

The Downtown Louisville and Gunbarrel rail stations would be constructed as part of the Northwest Rail Corridor Project. The exact location and parking spaces associated with these stations would be determined as part of that project.

As shown in Table 2.6-1, Parking and Pedestrian Crossings at Transit Stations, both park-n-Rides would have parking. However, parking for the McCaslin park-n-Ride would be on both sides of US 36, while the Table Mesa park-n-Ride would only have parking on the north side of US 36. Both park-n-Rides would be accessed from the highway by bus pull-outs and have a pedestrian bridge over US 36.

The City of Boulder has prepared a redevelopment plan for the Boulder Transit Village, which would be located at 33rd Street and Valmont Road in Boulder, west of the Northwest Rail Corridor Project. In Package 1, three in-bound buses would access the Boulder Transit Village during the peak-hour. The City of Boulder is building enhanced bus stops along 28th Street called super stops. Super stops include amenities for transferring transit customers (such as shelter, seating, schedule information, fare payment systems, supporting retail, etc.) and quality connections to important community destinations (such as improved roadway crossings, multi-paths, pedestrian connections, signage, and wayfinding systems). These buses would stop at the super stops and terminate at the Boulder Transit Village.

No improvements to the station, parking, or access at the Boulder Transit Center are planned as part of Package 1. However, fourteen in-bound buses would access the Boulder Transit Center during the peak hour as a result of this package.

A queue jump would be provided in the westbound direction at McCaslin Boulevard.

Pedestrian/Bicycle

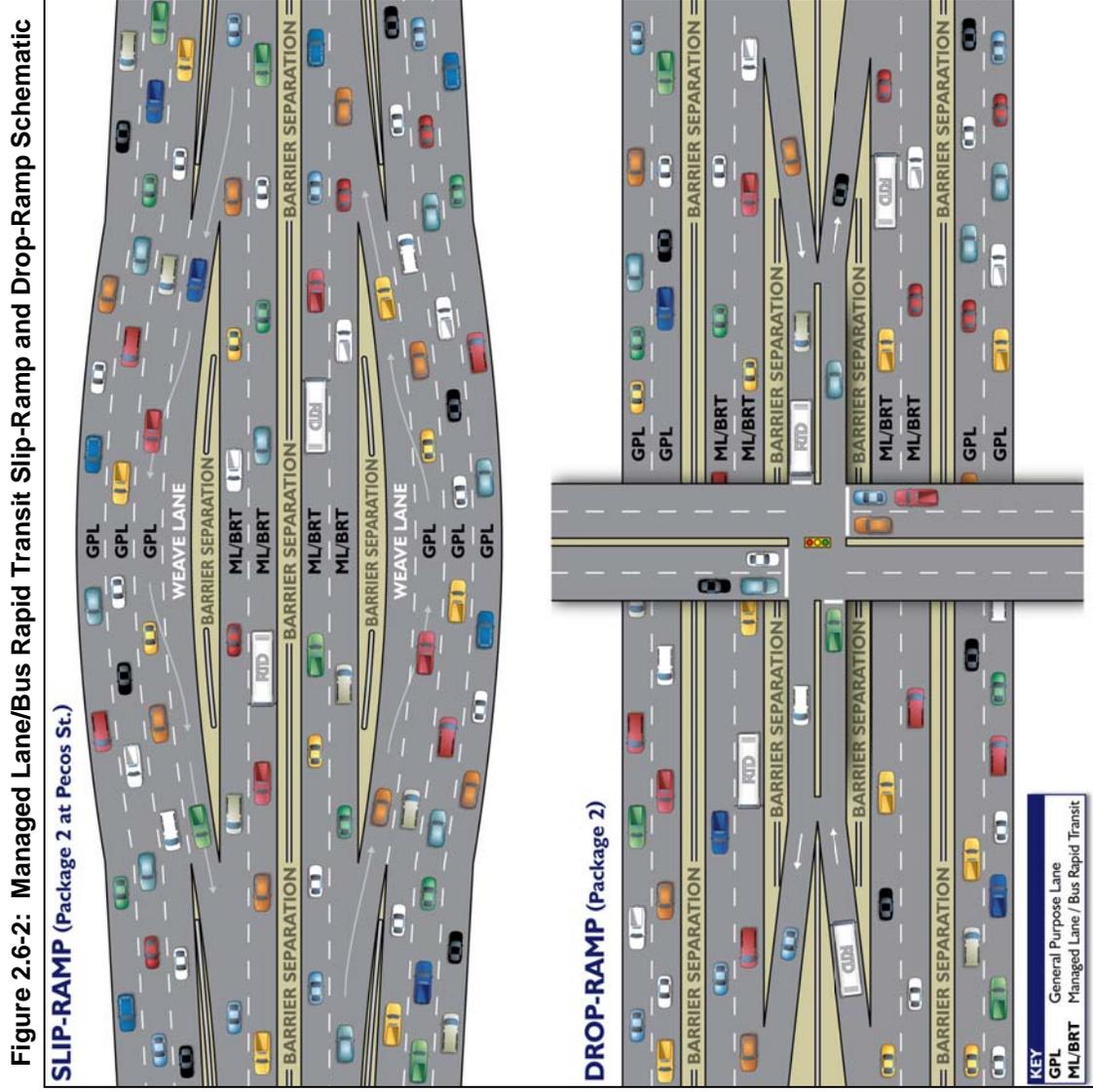
There will be no pedestrian or bicycle improvements as part of Package 1 in the Superior/Louisville and Boulder segments. In Package 1, there are no continuous bikeway facilities adjacent to US 36 in the Superior/Louisville Segment. In the Boulder Segment, there is a bike route located along South Boulder Road and Cherryvale Road. In addition, US 36 itself is designated as a bike route from McCaslin Boulevard to Baseline Road.

Package 2: Managed Lanes/Bus Rapid Transit

Appendix A, Corridor Reference Maps, contains drawings of this package.

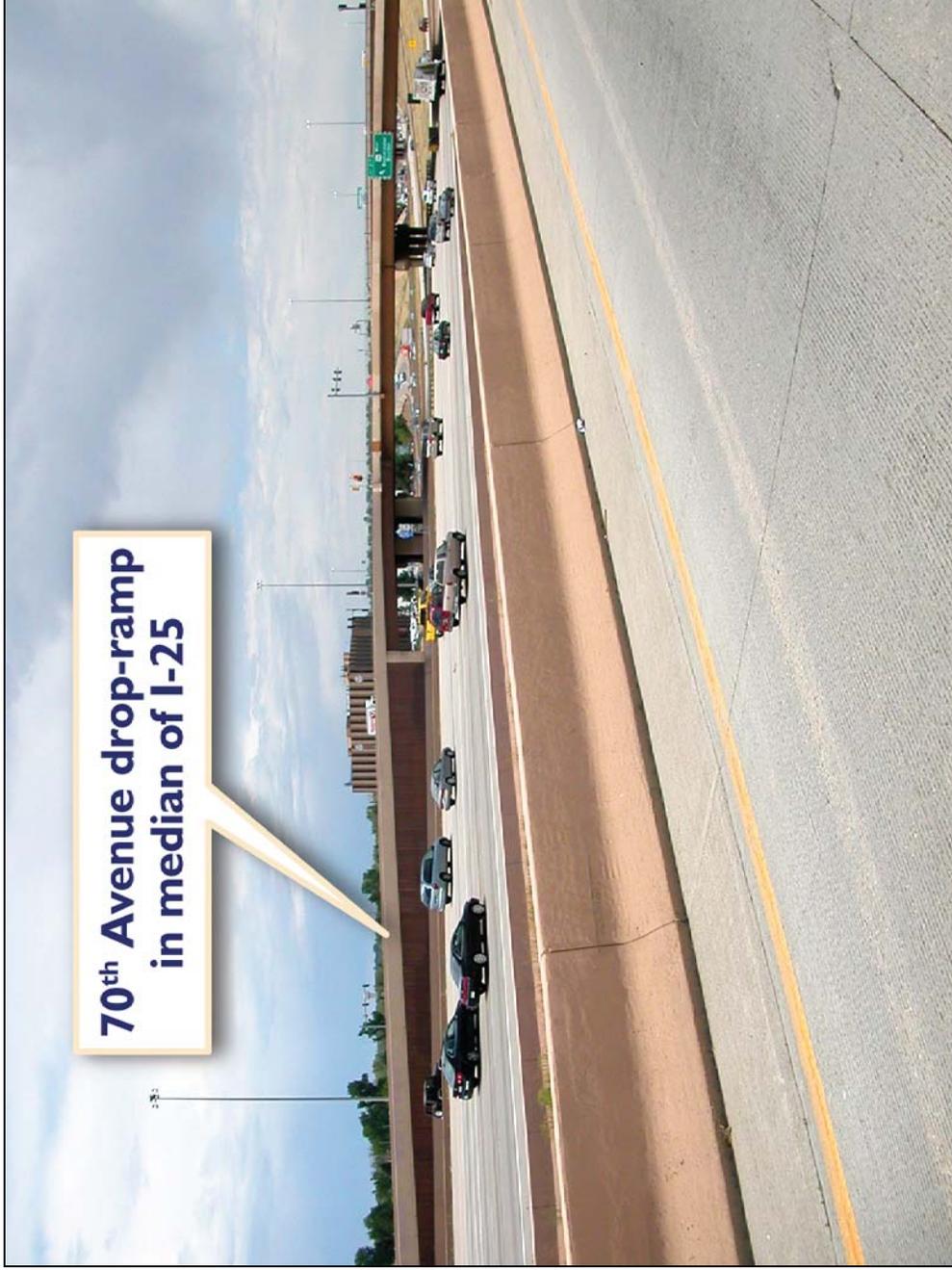
In general, Package 2 would add two managed lanes in each direction on US 36. The managed lanes would connect to and be an extension of the existing reversible I-25 express lanes that go to and from downtown Denver. The managed lanes on US 36 would be bi-directional, located in the median and separated from the general-purpose lanes by a concrete barrier. BRT stations would be located in the median and connected to adjacent parking via pedestrian bridges or underpasses.

A barrier-separated facility is proposed for safety reasons, volumes, and speed differences between traffic in the general-purpose and the managed lanes. The barrier-separated portion is from the reversible I-25 lane to just east of McCaslin Boulevard. From McCaslin Boulevard to Boulder, a single buffer-separated managed lane in each direction is sufficient based on forecast volumes. Access to and from the managed lanes would be provided by a combination of drop- and slip-ramps. Figure 2.6-2, Managed Lane/Bus Rapid Transit Slip-Ramp and Drop-Ramp Schematic, is a conceptual drawing of the slip-ramp and drop-ramp concepts in Package 2. Drop-ramps would be used at certain locations because travel demand forecasts showed that the volume of traffic trying to exit and enter the managed lanes through a slip-ramp would be enough to cause congestion in both the managed and general-purpose lanes. The drop-ramps would provide access to and from the managed lanes at the existing Westminster Boulevard bridge and a new bridge at Midway Boulevard. The drop-ramps would consist of one or more separate lanes in each direction that would transition from the managed lanes up to bridges, allowing access to and from arterial streets. Bypass managed lanes would continue on either side of the drop-ramp lanes. Figure 2.6-3, 70th Avenue Drop-Ramp to I-25 Express Lanes, shows an example of what a drop-ramp would look like. Figure 2.6-4, Package 2: Managed Lanes/Bus Rapid Transit, depicts this package, and Figure 2.6-5, Typical Section for Package 2, shows the typical sections.



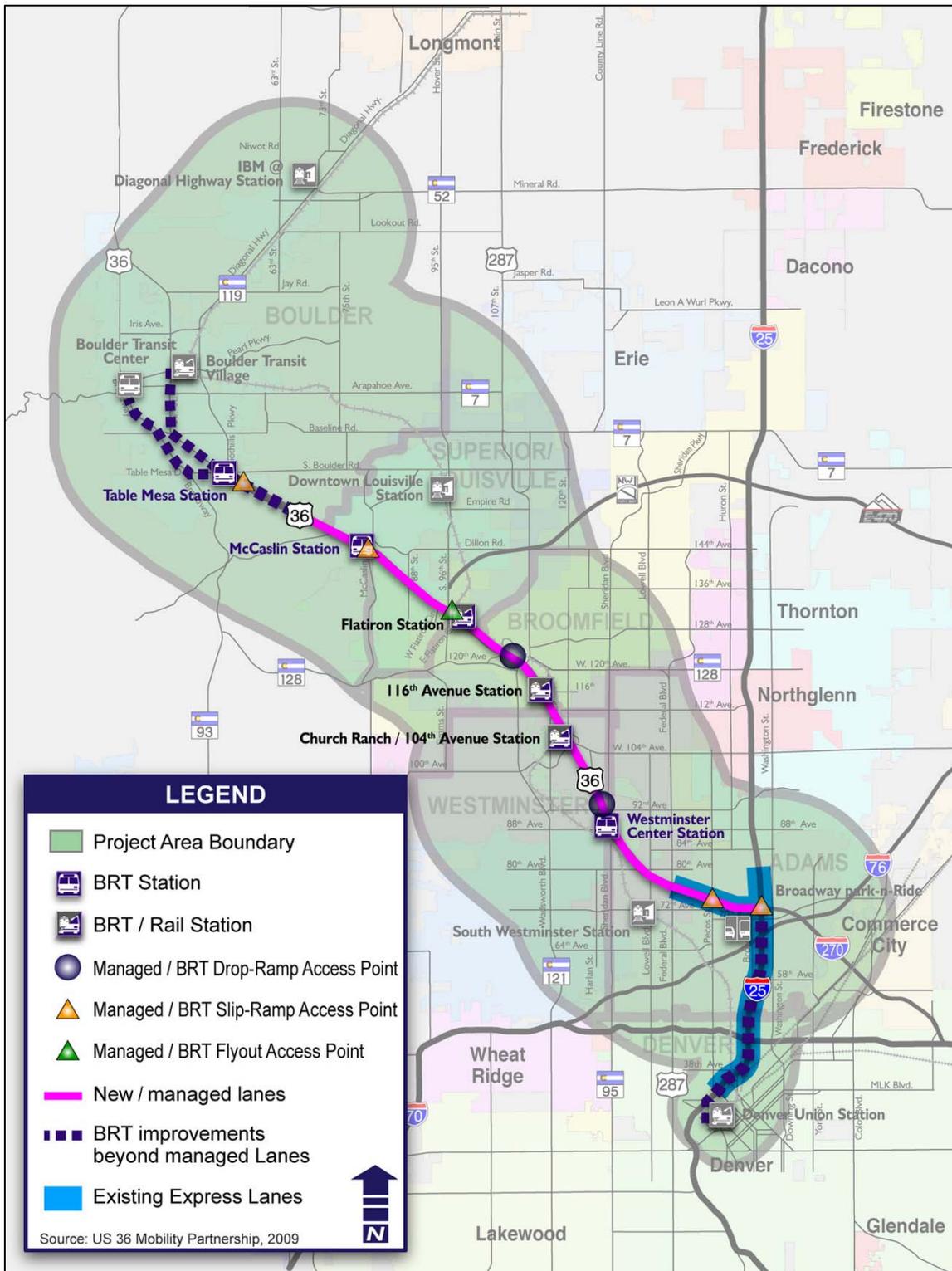
Source: US 36 Mobility Partnership, 2009.

Figure 2.6-3: 70th Avenue Drop-Ramp to I-25 Express Lanes



Source: US 36 Mobility Partnership, 2006.

Figure 2.6-4: Package 2: Managed Lanes/Bus Rapid Transit



Note: The 116th Avenue Rail Station is not a part of the 2004 FasTracks Program. Additional stations were added in the early planning stages of the US 36 Environmental Impact Statement. Exact rail station locations and additional stations may be reconsidered in the U.S. Army Corps of Engineers/Regional Transportation District Northwest Rail Environmental Assessment/Environmental Evaluation.

Package 2 would include a bikeway facility adjacent to US 36. In general, the bikeway is an off-street separated multi-use path adjacent to US 36. Where appropriate, the bikeway connects to and makes use of existing on-street and off-street facilities. Maintenance of the US 36 bikeway would be the responsibility of the local jurisdictions through an Intergovernmental Agreement with CDOT.

Package 2 would also include TDM improvements throughout the corridor, such as strategies designed to make the most efficient use of existing transportation facilities by reducing the actual demand placed on these facilities. Examples include coordinating flexible work schedules to help decrease demand at peak periods, carpooling/vanpooling, encouraging telecommuting, employer and community-based ECO passes (bus passes), incident management, and coordinated land use and transportation planning that increases the convenience of using transit. Additionally, Package 2 would offer the ability to use Intelligent Transportation System (ITS) messaging to alert drivers to roadway conditions.

These TDM elements are designed to be supportive of the major highway and transit improvements and would be considered long-term strategies. TDM elements, such as a communications plan and traffic management plan, are also included as short-term construction-related impact mitigation measures. The US 36 corridor has an excellent opportunity for partnerships to promote TDM measures because of the very visible and active 36 Commuting Solutions Transportation Mobility Organization.

Options that can be employed during the various phases of the project include:

- Setting aside funds to be used during construction to promote TDM-type measures so the inconvenience to travelers can be minimized, including subsidizing transit fares, providing incentives for carpool and vanpool creation, assisting with implementing telecommuting programs, and enhancing communication and outreach to area employers.
- Continuing to work closely with local agencies to make sure the supportive land use and zoning controls are in place. The corridor already serves as an excellent example of this.
- Where feasible, installing the appropriate and most up to date technological hardware, so that options like providing real-time traveler information can be realized.

Package 2 roadway changes would include improvements to intersections with cross streets at interchanges. Those improvements would include upgrading lane transitions of ramp terminals, widening cross streets at the intersection, lengthening turn-lanes and adding turn-lanes. These improvements are conceptual in nature and are based on the traffic analysis and engineering work completed at this level of project development. The design concepts will be further refined in final design but would occur within the conceptual project footprint.

Package 2 would provide BRT improvements including new and more frequent bus service in the US 36 corridor. Proposed improvements include more frequent service on existing routes B and H between Denver and Boulder, a rerouted skyRide route for service from Boulder to Denver International Airport and new Activity Center Circulator/Connector routes to activity centers in the corridor. Table 2.6-2, Proposed Changes to the RTD Bus System Plan for Package 2, shows the proposed bus service for the corridor. The proposed changes in Package 2 are subject to change. Bus service plans for BRT would need to be merged with bus service plans for the Northwest Rail Corridor Project. Bus operations would be phased-in commensurate with service standards and ridership growth. RTD makes schedule changes and adjustments several times a year to respond to demand and improve productivity.

**Table 2.6-2: Proposed Changes to the RTD
Bus System Plan for Package 2**

Service Type	Route	Route Name	Peak Headway ¹ (minutes)	Off-Peak Headway (minutes)	Early/ Late Headway (minutes)	Change from Package 1
Regional/ Express/ skyRide	AB	Boulder to DIA (via Northwest Parkway)	30	30	60	Rerouted
	B	Boulder – Denver (all stop)	10	15	30	Improved peak and off-peak service
	B	Boulder – Denver (express)	10	30	30	Improved peak and off-peak service
	B	Broomfield – Denver (express)	N/A	N/A	N/A	Eliminated
	DD	Boulder – Colorado Boulevard	15	N/A	N/A	Improved peak
	H	Boulder Transit Village (all stop)	10	15	N/A	Improved peak and off-peak service
	H	Boulder Transit Village (express)	10	N/A	N/A	Peak service only
	L	Longmont – Denver	30	60	N/A	Improved peak and off-peak service
	S	Denver – East Boulder	N/A	N/A	N/A	Eliminated
Local/ Limited	229	Louisville – Broomfield via Sun Microsystems	15	30	N/A	New route
	230	Lafayette-Louisville-Interlocken	15	30	N/A	New route
Boulder Local	DASH	To Lafayette	10	15	30	Improved peak and off-peak service
Activity Center Circulator/ Connector	AC-I	Denver – Boulder via Interlocken	15	30	N/A	New route
	AC-S	Denver – Boulder via Sun Microsystems	15	30	N/A	New route
	AC-CU	Broomfield/Westminster – University of Colorado, Boulder	15	30	N/A	New route

Source: US 36 Mobility Partnership, 2006.

Notes:

¹Headway refers to frequency of service.

DIA = Denver International Airport

N/A = not applicable

Denver and Adams Segments

Roadway

The US 36 improvements for Package 2 would begin at the US 36/I-25 interchange. The major changes at this interchange are improvements to the southbound I-25 to westbound US 36 ramp, which would be realigned to connect directly to US 36 instead of connecting to Broadway. This ramp would merge with the westbound on-ramp from Broadway. Access to Broadway from southbound I-25, westbound US 36, and westbound I-270 would no longer be available at this location with the elimination of the off-ramps. Access to Broadway would continue to be accommodated via southbound I-25 at 84th Avenue and northbound I-25 at 70th Avenue. Another improvement to the interchange would be reconstructing the existing reversible managed lane ramp to accommodate full-time, two-way managed lane traffic between US 36 and I-25.

In the eastbound direction on US 36, one managed lane would connect directly to the existing I-25 reversible express lanes. The other managed lane would transition to a general-purpose lane at Pecos Street and continue east to I-270. The westbound direction on US 36 would be the opposite configuration. From the US 36/I-25 interchange westbound, two managed lanes in each direction would be built in the median of US 36. These lanes would be separated from the general-purpose lanes by a concrete barrier. In addition to the access at I-25, access in and out of the managed lanes in both the eastbound and westbound direction would be allowed through slip-ramps at Pecos Street. Table 2.6-3,

Package 2, Managed Lane Access Points, lists the locations where access to the managed lanes would be provided.

Table 2.6-3: Package 2, Managed Lane Access Points

Access Location	Access Type	Description
Cherryvale Road	Slip-ramp (facility terminus)	Eastbound entrance; westbound exit
McCaslin Boulevard	Slip-ramp (lane addition)	Eastbound entrance
East Flatiron Circle	Flyout (new structure)	Westbound exit
Midway Boulevard	Drop-ramp (new bridge)	Eastbound entrance and exit; westbound entrance and exit
Westminster Boulevard	Drop-ramp (existing bridge)	Eastbound entrance and exit; westbound entrance and exit
Pecos Street	Slip-ramp	Eastbound entrance and exit; westbound entrance and exit
I-25 Interchange	Slip-ramp	Eastbound exit and connection to I-25; westbound entrance and connection from I-25

Source: US 36 Mobility Partnership, 2007.

Note:

I-25 = Interstate 25

The existing general-purpose lanes in these segments would need to be rebuilt, as they would move outward to accommodate the managed lanes in the median. No additional general-purpose lanes would be constructed. Both the Pecos Street and Federal Boulevard interchanges would be reconstructed but maintain their existing configuration. The Pecos Street bridge would be widened but the Federal Boulevard bridge would not need to be reconstructed. The Lowell Boulevard bridge would also be reconstructed as part of Package 2.

There are several arterial improvements in these segments. The improvements include:

- An extension of Bronco Road west to Greenwood Boulevard and the addition of a cul-de-sac at the east end of Bronco Road.
- Shortening the Inca Street cul-de-sac.
- Closing the Turnpike Drive access to Federal Boulevard.
- Reconstruction of Turnpike Drive between Lowell Boulevard and Federal Boulevard to connect to Grove Street.
- Realignment of the Turnpike Drive connection to Sheridan Boulevard.
- Realignment of Sheridan Boulevard to the southwest between US 36 and the BNSF Railway tracks.
- Closing 88th Place access to Sheridan Boulevard.

An assessment of impacts to local intersections from improvements to US 36 revealed that traffic mitigation is recommended at the Federal Boulevard and 80th Avenue intersection and the Federal Boulevard and 74th Avenue intersection. Turn-lane additions and lane lengthening will mitigate the impacts at these intersections. For more detailed discussion about the traffic impacts and recommended mitigation see Chapter 3, Transportation Impacts and Mitigations.

Transit

No improvements to the station, parking, or access at DUS are included in Package 2. However, as part of the BRT service enhancements in Package 2, 37 buses would enter downtown Denver during the peak-hour. This is 22 more than in Package 1. Twenty-five of these buses would serve DUS, with the remaining 12 buses serving the Civic Center Transfer Station to and from I-25 on 19th and 20th streets. No improvements to the station, parking, or access at the Broadway park-n-Ride or South Westminster Station are planned as part of Package 2.

Pedestrian/Bicycle

The bikeway in the Denver Segment would continue to use existing facilities. In the Adams Segment, the proposed bikeway would begin at Bradburn Boulevard at the existing Little Dry Creek Trail. An on-street bike route would go north from the Little Dry Creek Trail along Bradburn Boulevard to US 36. Only signing improvements are planned along Bradburn Boulevard. A separated bikeway would then continue on the south side of US 36 to Sheridan Boulevard and the Westminster Center BRT Station, with a direct connection to the transit facilities.

Westminster and Broomfield Segments

Roadway

In these segments, the two managed lanes in each direction would remain in the median of US 36 and be separated from the general-purpose lanes by a concrete barrier. Drop-ramps connecting the managed lanes and the arterial street network would be located at Westminster Boulevard and Midway Boulevard. The drop-ramps would provide access in and out of the managed lanes in both the eastbound and westbound directions.

The existing general-purpose lanes would need to be rebuilt, as they would move outward to accommodate the managed lanes in the median. No additional general-purpose lanes would be constructed. The BNSF Railway bridge would be reconstructed and the East Flatiron Circle bridge widened as part of Package 2. In addition, a new bridge at 112th Avenue would be constructed to replace the existing Old Wadsworth bridge. The approaches to the bridge and any associated street improvements would be constructed by other projects. Auxiliary lanes would be constructed in both directions between Wadsworth Parkway and East Flatiron Circle.

At the Sheridan Boulevard interchange, the existing configuration would be expanded to a split-diamond between 92nd Avenue and Sheridan Boulevard, with an additional on-ramp to eastbound US 36 from the frontage road. The Church Ranch Boulevard/104th Avenue interchange would be reconstructed but would maintain its existing configuration.

At Wadsworth Parkway, the proposed partial cloverleaf configuration would incorporate loop-ramps in the northeast and southwest quadrants. These loop-ramps would eliminate the left-turn movements required for traffic to access US 36 from Wadsworth Parkway. This configuration would also provide a grade-separated roadway for the eastbound US 36 off-ramp traffic destined for southbound Wadsworth Parkway to bypass the Wadsworth Parkway/120th Avenue intersection. A braided connection, where one ramp goes over the other, between Wadsworth Parkway and 120th Avenue to the north of US 36, would allow traffic from 120th Avenue to bypass Wadsworth Parkway for access to US 36. In addition, a new on- and off-ramp to and from the east would be provided at 120th Avenue.

Arterial improvements associated with Package 2 include:

- Widening of Westminster Boulevard from Westcliff Parkway to the new 98th Avenue which would be constructed for drop-ramp access.
- Realignment of Old Wadsworth Boulevard to intersect with 112th Avenue.
- Closing 120th Avenue at Emerald Lane, and vacating Carr Street.
- Realignment of Commerce Street to connect to the new 120th Avenue (provided by others).
- Extension of Midway Boulevard and grade-separation over the BNSF Railway tracks for the drop-ramp.
- Realignment of Industrial Lane to the north to provide access to the new Midway Boulevard drop-ramp.

An assessment of impacts to local intersections from improvements to US 36 revealed that mitigation will be recommended at the Wadsworth Parkway/Midway Boulevard intersection. Additional lanes on Wadsworth Parkway south of Midway Boulevard, and signal timing changes, will mitigate the traffic impacts at the Wadsworth Parkway and Midway Boulevard intersection. For more detailed discussion about the traffic impacts and recommended mitigations see Chapter 3, Transportation Impacts and Mitigations.

Transit

In Package 2, parking spaces and a median BRT station would be added to the Westminster Center BRT Station and 116th Avenue BRT Station. See Table 2.6-1, Parking and Pedestrian Crossings at Transit Stations, for a list of the proposed changes at stations. Buses would access these stations through one of the managed lanes located in the median instead of bus pull-outs on the sides of the highway.

A BRT station would also be added to the Church Ranch Boulevard/104th Avenue and Flatiron BRT/rail stations. No additional parking spaces would be added at these locations as part of Package 2. Buses would also have direct access to these stations from the managed lanes in the median of the highway.

Bikeway

In the Westminster Segment, the proposed bikeway would continue west via a grade-separated crossing of 88th Avenue and Sheridan Boulevard. It would leave the Westminster Center BRT Station and travel west along the south side of US 36, with another grade-separated crossing at 92nd Avenue, until it reaches Westminster Boulevard. The bikeway would cross US 36 on the east side of the Westminster Boulevard bridge on existing bicycle facilities. The bikeway would then leave Westminster Boulevard and travel along the north side of US 36 until it reaches the Big Dry Creek Trail. At the Big Dry Creek Trail, the bikeway would travel under US 36 via the existing Big Dry Creek underpass. The bikeway would continue west on the south side of US 36, with a separated crossing of Church Ranch Boulevard. It would then travel over the BNSF Railway and cross into the Broomfield Segment, where it would go under the proposed 112th Avenue overpass.

In the Broomfield Segment, the bikeway would continue west on the south side of US 36. It would travel under Wadsworth Parkway via a grade-separation, with a connection between the bikeway and 120th Avenue on the west side of Wadsworth Parkway. The proposed bikeway would continue west on the south side of US 36 until it reaches East Flatiron Circle.

Superior/Louisville and Boulder Segments

Roadway

West of the West Flatiron Circle interchange, the number of westbound managed lanes would reduce to a single lane. A flyover exit would carry the other managed lane to the north side of US 36. This lane would then join the West Flatiron Circle on-ramp before merging with the westbound US 36 general-purpose lanes. In the eastbound direction, a second managed lane would be added east of McCaslin Boulevard. From McCaslin Boulevard to the west, these lanes would not be separated from the general-purpose lanes by a concrete barrier. Instead, a painted buffer would separate the lanes.

The McCaslin Boulevard interchange would remain in the existing configuration. However, the bridge over US 36 would need to be replaced to provide additional lanes on McCaslin Boulevard, and to allow for the proposed median BRT station. The existing loop-ramp would need to be reconstructed to accommodate the new McCaslin Boulevard bridge.

The Foothills Parkway/Table Mesa Drive interchange would be reconfigured slightly to improve geometric conditions. In particular, the existing loop-ramp from westbound Table Mesa Drive to eastbound US 36 would be removed. Additionally, the current on-ramp from Table Mesa Drive to eastbound US 36 would be lengthened and incorporated with the US 36 eastbound on-ramp from Foothills Parkway before joining US 36. The ramp from Foothills Parkway to eastbound US 36 would be

relocated to improve the merging operations among the US 36, Table Mesa Drive, and Foothills Parkway traffic.

The existing general-purpose lanes in these segments would need to be rebuilt, as they would move outward to accommodate the managed lanes in the median. No additional general-purpose lanes would be constructed. Eastbound access to the managed lanes would be allowed at the facility terminus near Cherryvale Road and McCaslin Boulevard, where a lane would be added in the eastbound direction. Westbound, an exit from the managed lane would be provided at a flyout structure near East Flatiron Circle and at the facility terminus near Cherryvale Road. The West Flatiron Circle and Coal Creek bridges would be reconstructed, and the Interlocken Loop and South Boulder Creek bridges would be widened as part of Package 2.

Two options were considered for the project terminus at Foothills Parkway/Table Mesa Drive. The options are summarized below and are shown in Figure 2.6-6, West-End Terminus Option A, and Figure 2.6-7, West-End Terminus Option B.

- Option A: The managed lanes would merge into the general-purpose lanes just west of Cherryvale Road. Traffic could exit to Foothills Parkway or South Boulder Road or continue on to 28th Street.
- Option B: This option would provide a bus-only lane directly to the Table Mesa Station via a new bridge to and from the managed lanes in the median. All westbound vehicles in the managed lanes, except for buses, would be required to exit the managed lanes just west of Cherryvale Road and merge into the general-purpose lanes.

In these segments, additional improvements include:

- Realignment of the West Flatiron Circle off-ramp and the East Flatiron Circle on-ramp to the south
- Realignment of the West Flatiron Circle on-ramp and the East Flatiron Circle off-ramp to the north
- Reconstruction of the vehicular underpass that provides access to the Superior Cemetery
- Addition of a westbound left-turn and through-lane on Dillon Road
- Realignment of Dyer Road at US 36 to the north so that the new alignment is outside the current ROW
- Closing access to Loop Drive from Table Mesa Drive
- Reconstruction of Loop Drive to connect to Tantra Drive, restoring access to Table Mesa Drive

An assessment of impacts to local intersections from improvements to US 36 revealed that mitigation will be recommended at Dillon Road and on the US 36 ramp intersections with Baseline Road.

Recommended mitigation on Dillon Road will include an additional through-lane/left lane for westbound traffic. The improvement to Baseline Road will consist of adding a right-turn lane to the northbound on-ramp for eastbound Baseline Road traffic. For more detailed discussion about the traffic impacts and recommended mitigations see Chapter 3, Transportation Impacts and Mitigations.

Figure 2.6-6: West-End Terminus Option A

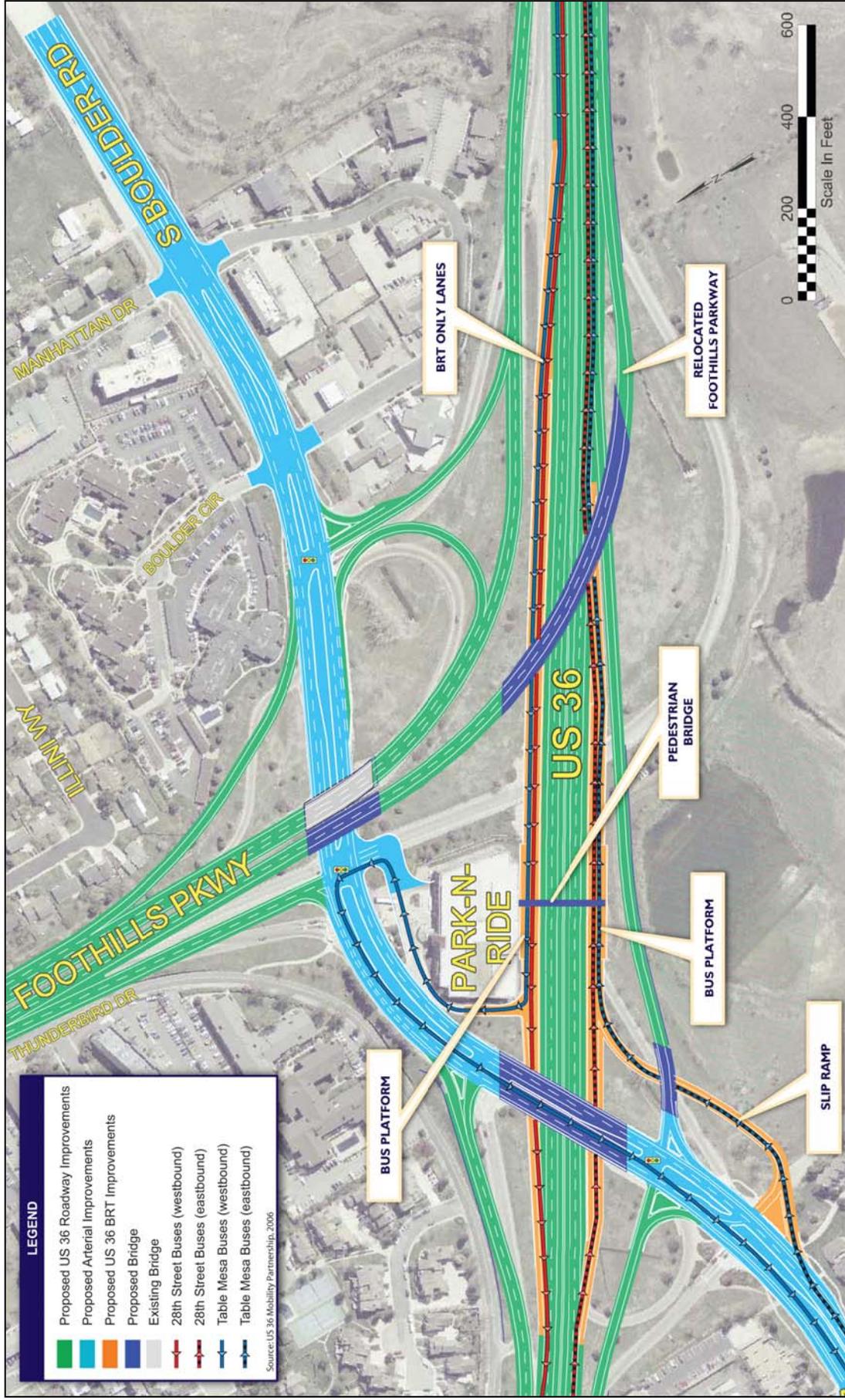
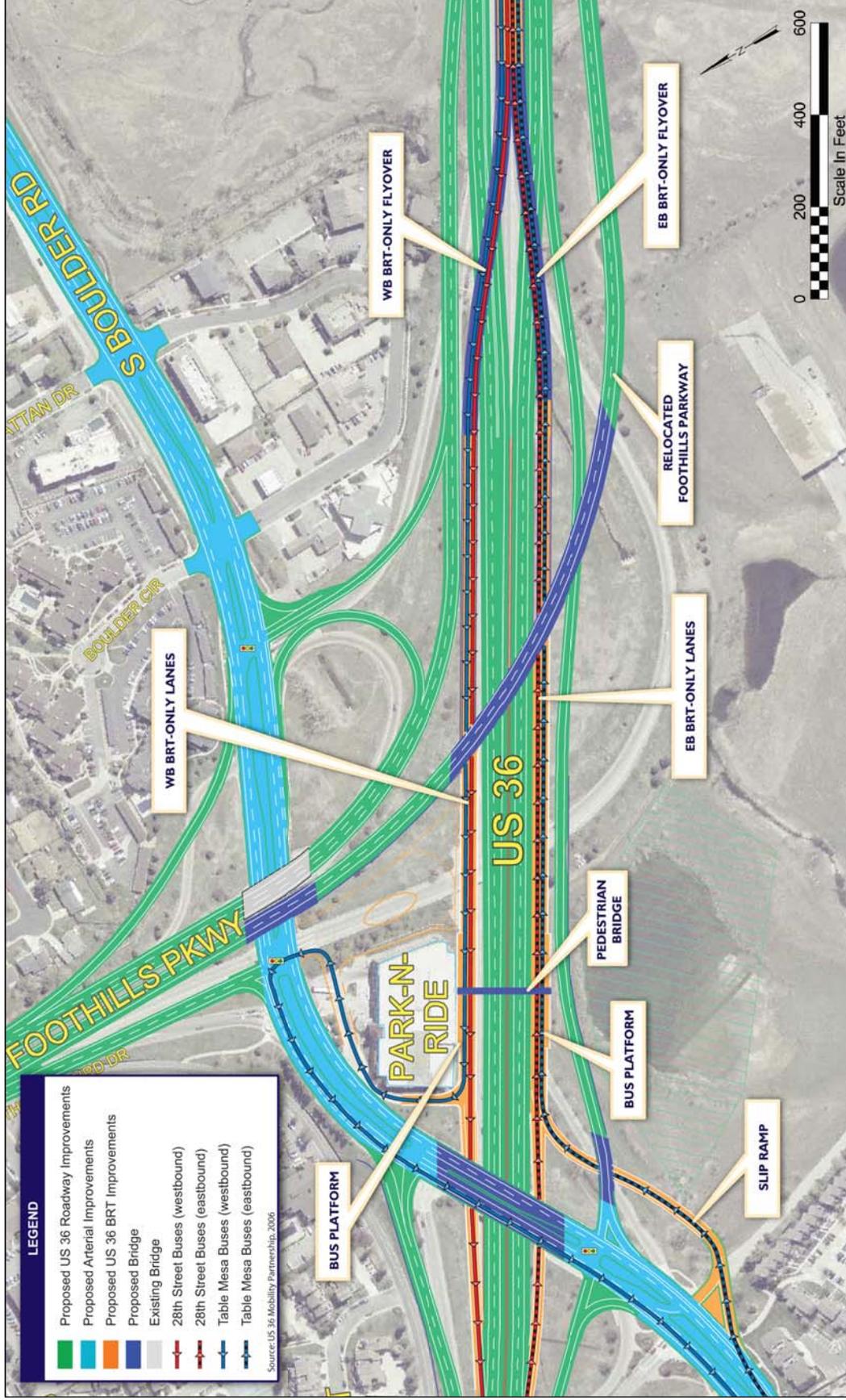


Figure 2.6-7: West-End Terminus Option B



Transit

At the McCaslin BRT Station, parking on both sides of US 36 would be reduced due to expansion of the interchange.

BRT and express bus service would continue from the Foothills Parkway/Table Mesa Drive interchange to Boulder along Broadway to the Boulder Transit Center, and along 28th Street to the Boulder Transit Village.

The US 36 Corridor FEIS assumes both existing and planned super stops in the City of Boulder. Super stops are in place or planned by the City of Boulder along Broadway and along 28th Street. The map of super stops includes a potential super stop along US 36 at the Bear Creek pedestrian underpass, to serve both Williams Village and Martin Acres residents. Physical improvements at the potential Williams Village Super Stop will not be considered as part of the US 36 project, but will be identified as a project to be implemented by others.

As a result of Package 2, 24 in-bound buses would access the Boulder Transit Village during the peak-hour. This is 20 more buses per hour at this location than in Package 1.

Eighteen in-bound buses would access the Boulder Transit Center during the peak-hour as a result of Package 2. This is 10 more buses per hour at this location than in Package 1.

As part of Package 2, side-loading BRT would be added at the Table Mesa park-n-Ride. No additional parking spaces would be added at this station.

Bikeway

In the Superior/Louisville Segment, the proposed bikeway would continue along the existing bikepath on the south side of US 36 from East Flatiron Circle to West Flatiron Circle. The path would then cross under US 36 and continue west on the north side of US 36, past the Coal Creek Golf Course, and cross under McCaslin Boulevard, where it enters the Boulder Segment.

In the Boulder Segment, the proposed bikeway would continue west from McCaslin Boulevard on the north side of US 36 to Cherryvale Road. Two bikeway alignments were considered between Cherryvale Road and Table Mesa Station.

US 36 Alignment

In this alignment, the bikeway would go under Cherryvale Road and continue west on the north side of US 36 until it reaches South Boulder Creek. The bikeway would then go under US 36 via the South Boulder Creek underpass structure and continue west on the south side of US 36 to the Table Mesa Station. Direct access to the Table Mesa Station from the bikeway would be provided via Table Mesa Station pedestrian bridge over US 36. On-street facilities along Table Mesa Drive from the west terminus of the bikeway at Table Mesa Drive and across US 36 could also be used to access the Table Mesa Station, as described below.

Cherryvale Road/South Boulder Road Off-Street Alignment

In this alignment, the bikeway would go under Cherryvale Road and continue north along the west side of South Cherryvale Road and the south side of South Boulder Road. The bikeway design in this area is context sensitive, assuming a 12-foot wide paved path that would be constructed on top of the existing dirt path.

There were two design options for terminating the Cherryvale Road/South Boulder Road off-street bikeway at Table Mesa Station.

One option would terminate the off-street bikeway at the intersection with Manhattan Drive east of the Table Mesa Drive interchange. At Manhattan Drive, the bikeway would transition to the existing on-street bike lanes located on South Boulder Road. To do this safely, a new pedestrian crossing traffic

signal could be installed at Manhattan Drive as part of the project. Additionally, new striping and crosswalks at the intersection would be required. To transition from the off-street bi-directional bikeway located on the south side of South Boulder Road, to the on-street directional bike lanes on both sides of South Boulder Road, bikeway users headed west would need to make a 90 degree right-turn onto Manhattan Drive from the bikeway near the Manhattan Drive intersection. From there, users would need to cross South Boulder Road at the pedestrian crossing on Manhattan Drive to access the bike lane on South Boulder Road. This option is the assumed design.

A second option would extend the off-street separated bikeway along the south side of South Boulder Road west to the Table Mesa Station using easements and/or new ROW. This alignment would require at-grade crossings of Manhattan Circle east and west, and the US 36 off-ramps to South Boulder Road and Table Mesa Drive. Additionally, users would have to cross two commercial driveways.

Package 4: General-Purpose Lanes, High-Occupancy Vehicle, and Bus Rapid Transit

Appendix A, Corridor Reference Maps, contains drawings of this package.

The basic configuration in Package 4 consists of one additional general-purpose lane and one additional BRT/HOV lane in each direction. The BRT/HOV lanes would be located in the median of US 36 in a buffer-separated configuration similar to the existing condition between Sheridan Boulevard and Pecos Street, with new median BRT stations connected to adjacent park-n-Rides via pedestrian bridges or underpasses. Rather than exiting the highway to pick up and drop off passengers at park-n-Rides, buses would stop at the median stations for passenger boarding and alighting.

Package 4 includes the US 36 bikeway and TDM elements as described in Package 2, except that Package 4 would not include the use of ITS to notify drivers of roadway conditions.

Figure 2.6-8, Package 4: General-Purpose Lanes, High-Occupancy Vehicle, and Bus Rapid Transit, depicts this package; and Figure 2.6-9, Typical Sections for Package 4, shows the typical sections.

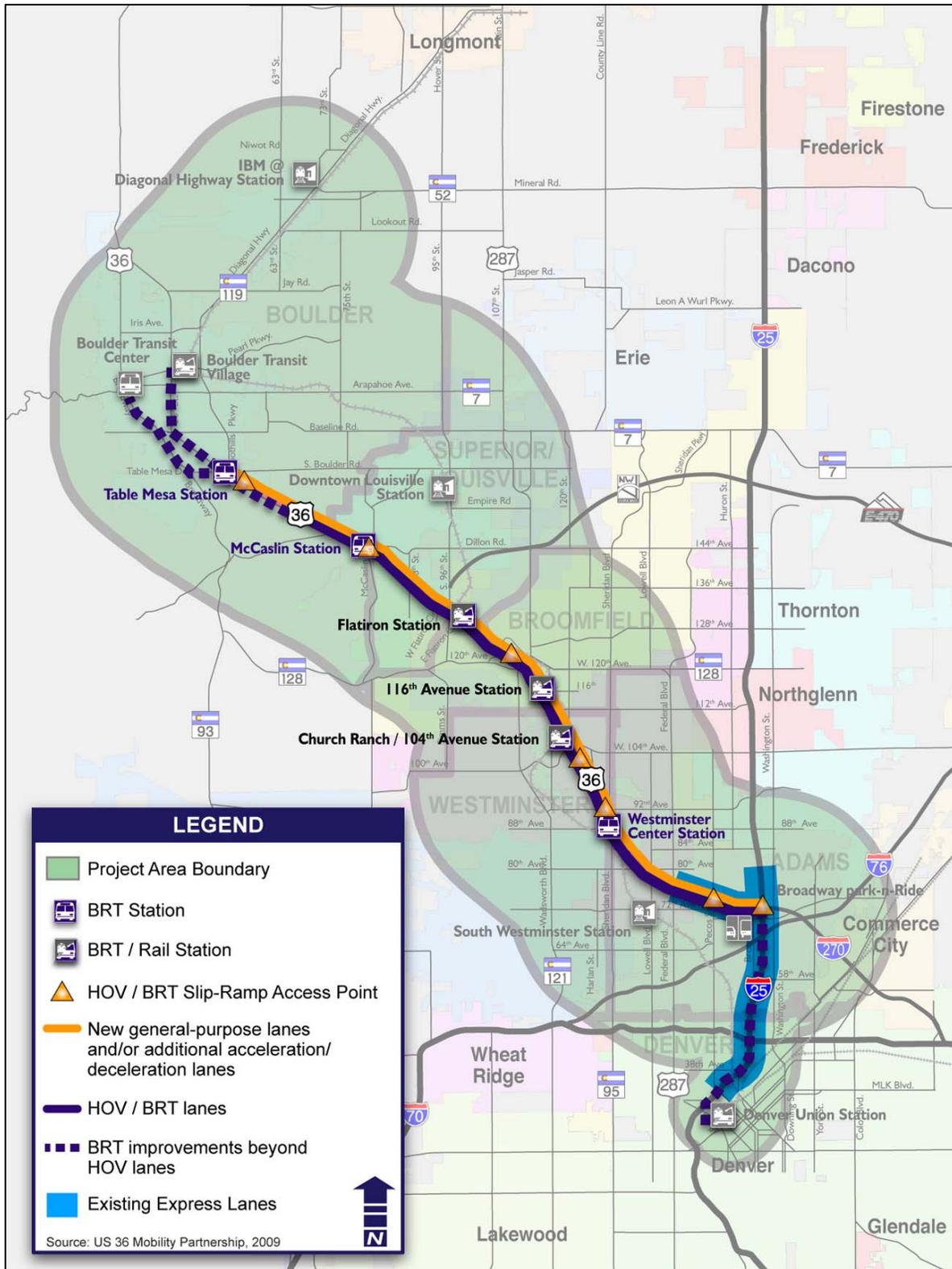
Denver and Adams Segments

Roadway

The US 36 improvements would begin at the US 36/I-25 interchange. From the US 36/I-25 interchange westward, the BRT/HOV lanes would be buffer-separated in the median of US 36 beginning at the existing location of the reversible barrier-separated lanes. The existing general-purpose lanes would need to be rebuilt, as they would move outward to accommodate the BRT/HOV lanes in the median. The additional general-purpose lanes would result in four general-purpose lanes in each direction.

The major changes at the I-25/US 36 interchange are improvements to the southbound I-25 to westbound US 36 ramp, which would be realigned to connect directly to US 36 instead of connecting to Broadway. This ramp would merge with the westbound on-ramp from Broadway. Access to Broadway from southbound I-25, westbound US 36, and westbound I-270 would no longer be available at this location. Access to Broadway would be accommodated via southbound I-25 at 84th Avenue, and northbound I-25 at 70th Avenue. Another improvement to the interchange would be reconstructing the existing reversible managed lane ramp to accommodate full-time, two-way BRT/HOV traffic between US 36 and I-25.

Figure 2.6-8: Package 4: General-Purpose Lanes, High-Occupancy Vehicle, and Bus Rapid Transit



Note: The 116th Avenue Rail Station is not a part of the 2004 FasTracks Program. Additional stations were added in the early planning stages of the US 36 Environmental Impact Statement. Exact rail station locations and additional stations may be reconsidered in the U.S. Army Corps of Engineers/Regional Transportation District Northwest Rail Environmental Assessment/Environmental Evaluation.

In the eastbound direction on US 36, a BRT/HOV lane and an additional general-purpose lane would be built in the median. The BRT/HOV lane would connect directly to the existing I-25 reversible express lane. An additional general-purpose lane would be added at Federal Boulevard between the BRT/HOV lane and the other general-purpose lanes, to allow BRT/HOV traffic not entering the reversible I-25 express lanes to return to the general-purpose lanes. This lane would continue on to eastbound I-270. The westbound direction on US 36 would be the opposite configuration. From the US 36/I-25 interchange westbound, one BRT/HOV lane would be built in the median of US 36. The BRT/HOV lanes would be separated from the general-purpose lanes by a painted buffer.

In addition to the access at I-25, access to and out of the BRT/HOV lanes for westbound traffic would be provided through slip-ramps at Pecos Street. Table 2.6-4, Package 4, High-Occupancy Vehicle/Bus Rapid Transit Lane Access Points, lists the locations where access to the BRT/HOV lanes would be provided. Figure 2.6-10, High-Occupancy Vehicle/Bus Rapid Transit Lane Slip-Ramp Access Schematic, provides a conceptual schematic of a Package 4 slip-ramp access point.

Table 2.6-4: Package 4, High-Occupancy Vehicle/Bus Rapid Transit Lane Access Points

Access Location	Access Type	Description
Cherryvale Road	Slip-Ramp (facility terminus)	Eastbound entrance; westbound exit
McCaslin Boulevard	Slip-Ramp	Eastbound entrance and exit; westbound entrance and exit
Midway Boulevard	Slip-Ramp	Eastbound entrance and exit; westbound entrance and exit
Westminster Boulevard	Slip-Ramp	Eastbound entrance and exit; westbound entrance and exit
80 th Avenue	Slip-Ramp	Eastbound entrance and exit; westbound entrance and exit
Pecos Street	Slip-Ramp	Eastbound exit; westbound entrance
I-25 Interchange	Slip-Ramp	Connection to I-25 Connection to I-25

Source: US 36 Mobility Partnership, 2007.

Note:

I-25 = Interstate 25

The existing general-purpose lanes in these segments would need to be rebuilt, as they would move outward to accommodate the BRT/HOV and additional general-purpose lanes in the median. Both the Pecos Street and the Federal Boulevard interchanges would be reconstructed but maintain their existing configuration. The Lowell Boulevard bridge would also be reconstructed as part of Package 4.

Arterial improvements in these segments are the same as those in Package 2.

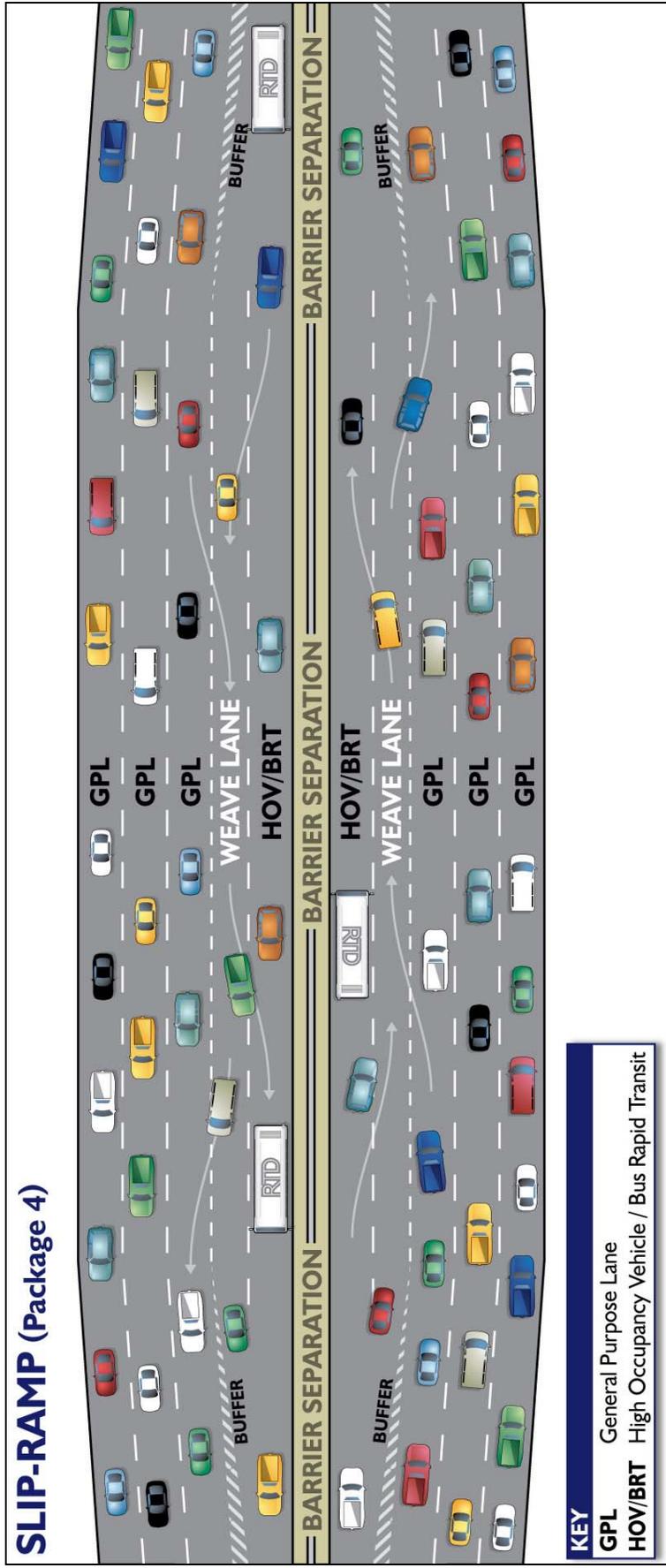
Transit

Transit stations and improvements to bus service in these segments are the same as those proposed in Package 2.

Bikeway

Bicycle and pedestrian facilities proposed for these segments are the same as those described in Package 2.

Figure 2.6-10: High-Occupancy Vehicle/Bus Rapid Transit Lane Slip-Ramp Access Schematic



Source: US 36 Mobility Partnership, 2006.

Westminster/Broomfield Segments

Roadway

In these segments, the BRT/HOV lanes would remain in the US 36 median. The four general-purpose lanes in each direction between Sheridan Boulevard and Wadsworth Parkway would transition to three general-purpose lanes and one auxiliary lane in each direction between Wadsworth Parkway and East Flatiron Circle.

The Sheridan Boulevard interchange would be reconstructed to include a split-diamond between 92nd Avenue and Sheridan Boulevard, with an additional on-ramp to eastbound US 36 from the frontage road. The Wadsworth Parkway interchange would be improved with a partial cloverleaf-ramp configuration with loop-ramps in the northeast and southwest quadrants. These loop-ramps would eliminate the left-turn movements required for traffic to access US 36 from Wadsworth Parkway. This configuration would also provide a grade-separated roadway for the eastbound US 36 off-ramp traffic destined for southbound Wadsworth Parkway, to bypass the Wadsworth Parkway/120th Avenue intersection. A braided connection, where one ramp goes over the other, between Wadsworth Parkway and 120th Avenue to the north of US 36, would allow traffic from 120th Avenue to bypass Wadsworth Parkway for access to US 36. The East Flatiron Circle and Church Ranch Boulevard/104th Avenue interchanges would be reconstructed but maintain their existing configuration. The bridge over the BNSF Railway tracks would be replaced, and a new bridge at 112th Avenue would be constructed to replace the existing Old Wadsworth Boulevard bridge. The approaches to the bridge and any associated street improvements would be constructed by other projects.

In these segments, access in and out of the BRT/HOV lanes would be provided in the eastbound and westbound directions via slip-ramps at 80th Avenue, Westminster Boulevard, and Midway Boulevard.

Arterial improvements in these segments are the same as those listed in Package 2, except that Package 4 does not include the widening of Westminster Boulevard, the extension of Midway Boulevard, or the realignment of Industrial Lane.

Transit

Transit stations and improvements to bus service in these segments are the same as those proposed in Package 2.

Bikeway

Bicycle/pedestrian facilities proposed for these segments are the same as those described in Package 2.

Superior/Louisville and Boulder Segments

Roadway

On US 36 west of East Flatiron Circle, the three general-purpose lanes would transition to two general-purpose lanes and one auxiliary lane in each direction. The auxiliary lane would exit at McCaslin Boulevard. The BRT/HOV lane, two general-purpose lanes, and an auxiliary lane would continue from the McCaslin Boulevard interchange to the Foothills Parkway/Table Mesa Drive interchange. The existing general-purpose lanes would need to be rebuilt, as they would move outward to accommodate the BRT/HOV lanes in the median.

During the planning process, corridor stakeholders, including the City of Boulder and Boulder County, requested that the project team consider two variations of Package 4 that would modify the westbound auxiliary lane between McCaslin Boulevard and the Foothills Parkway/Table Mesa Drive interchange. The concern expressed by stakeholders was that the amount of westbound capacity that would be provided by Package 4 would be greater than the amount of traffic the intersections in the city could reasonably accommodate.

In response to this request, one variation of Package 4 was developed that would shorten the auxiliary lane between McCaslin Boulevard and the Foothills Parkway/Table Mesa Drive interchange. Another variation of Package 4 was developed that would eliminate the auxiliary lane altogether. These two variations of Package 4, referred to as the “Reduce Auxiliary Lane Variation” and the “Eliminated Auxiliary Lane Variation,” were not included in Package 4 based on the results of traffic impact analysis. Section 3.5, Transportation Impacts and Mitigation Associated with Each Package, describes the traffic impacts analysis and results of the two variations.

The McCaslin Boulevard and Foothill Parkway/Table Mesa Drive interchange improvements, and project terminus Options A and B being considered at Foothills Parkway/Table Mesa Drive, would be the same as those described in Package 2.

Eastbound access into the BRT/HOV lanes and a westbound exit would be provided at the facility terminus near Cherryvale Road. Eastbound and westbound access into and out of the BRT/HOV lanes would be provided near McCaslin Boulevard.

Transit

Transit stations and improvements to bus service in these segments are the same as those proposed in Package 2.

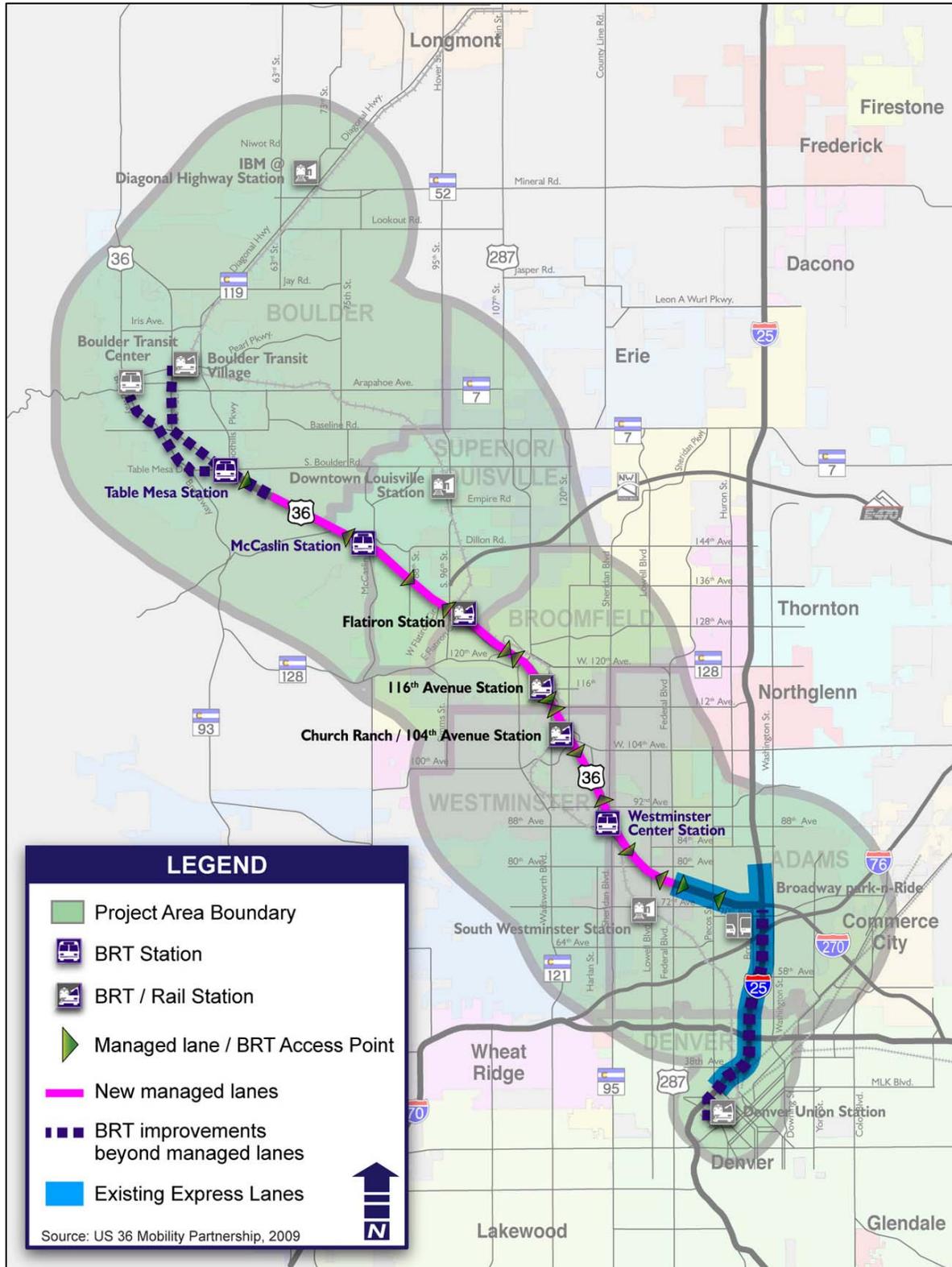
Bikeway

Bicycle/pedestrian facilities proposed for these segments are the same as those described in Package 2.

Combined Alternative Package: Managed Lanes, Auxiliary Lanes, and Bus Rapid Transit

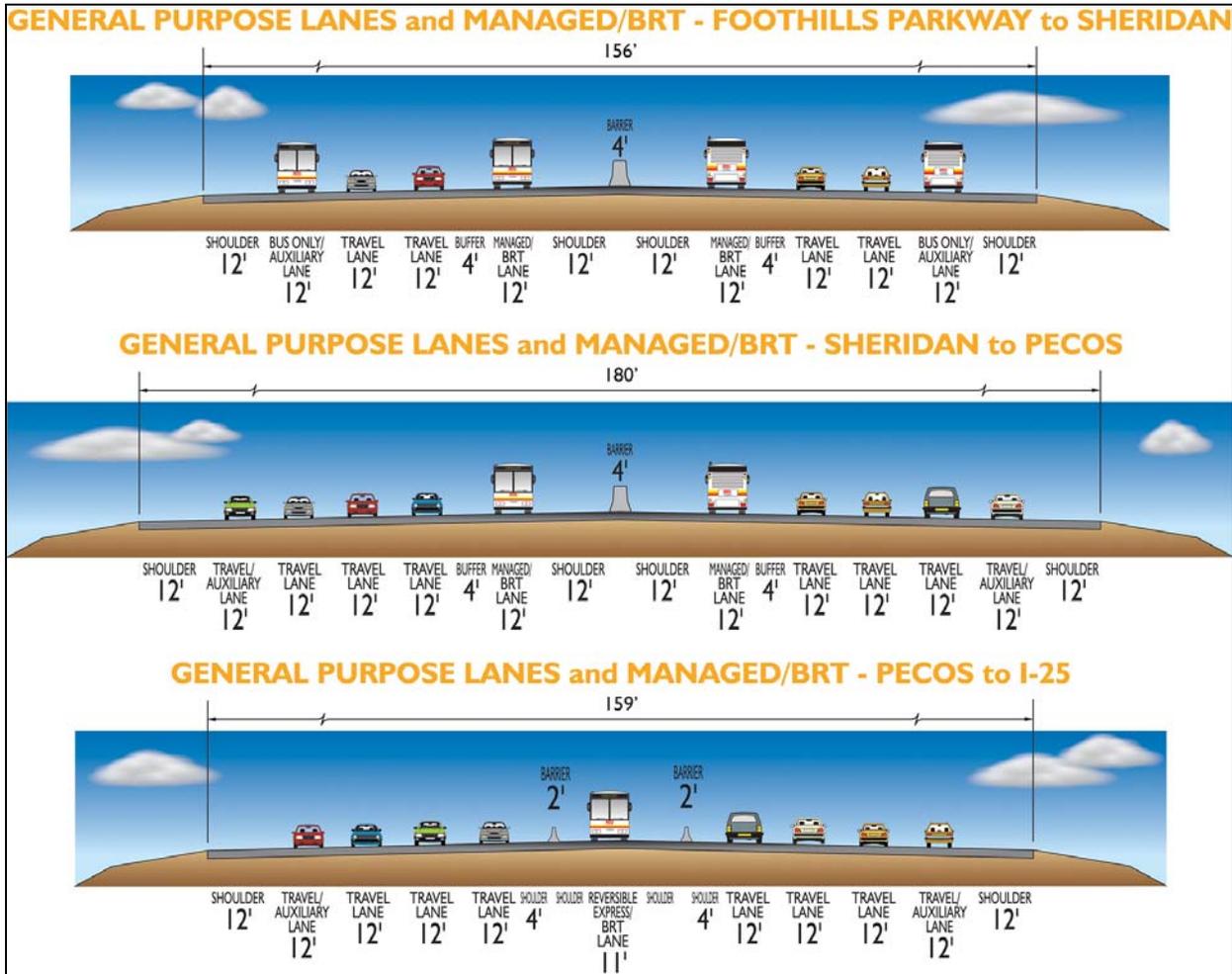
Appendix A, Corridor Reference Maps, contains drawings of this package. An overview of the package elements is shown in Figure 2.6-11, Combined Alternative Package (Preferred Alternative): Managed Lanes, Auxiliary Lanes, and Bus Rapid Transit. Typical sections for this package are shown in Figure 2.6-12, Typical Sections for the Combined Alternative Package (Preferred Alternative), and Figure 2.6-13, Bikeway Typical Section.

**Figure 2.6-11: Combined Alternative Package (Preferred Alternative):
 Managed Lanes, Auxiliary Lanes, and Bus Rapid Transit**



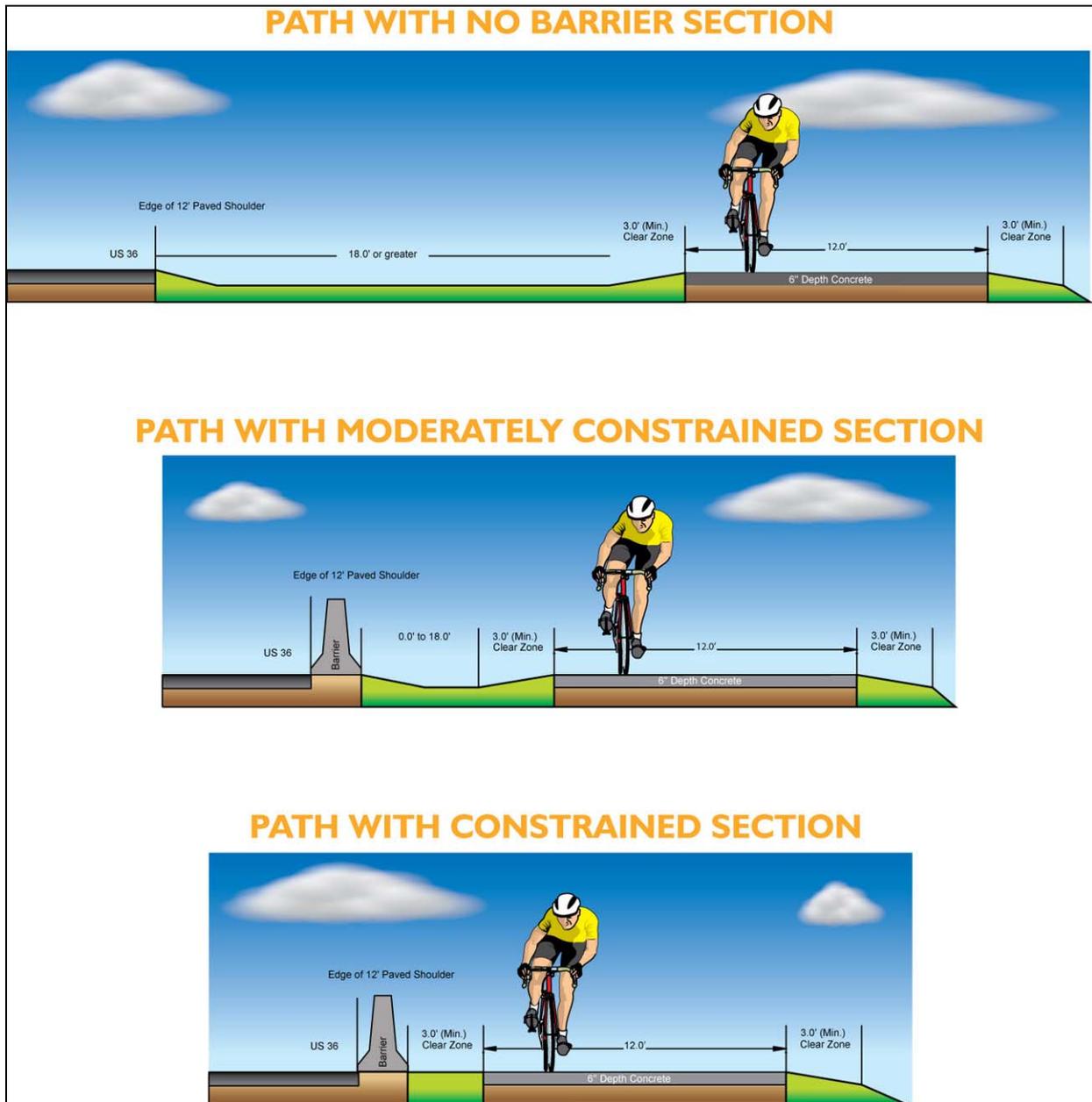
Note: The 116th Avenue Rail Station is not a part of the 2004 FasTracks Program. Additional stations were added in the early planning stages of the US 36 Environmental Impact Statement. Exact rail station locations and additional stations may be reconsidered in the U.S. Army Corps of Engineers/Regional Transportation District Northwest Rail Environmental Assessment/Environmental Evaluation.

Figure 2.6-12: Typical Sections for the Combined Alternative Package (Preferred Alternative)



Source: US 36 Mobility Partnership, 2009.

Figure 2.6-13: Bikeway Typical Section



Source: US 36 Mobility Partnership, 2009.

In general, the Combined Alternative Package would add one managed lane in each direction on US 36 and auxiliary lanes between most interchanges. The managed lanes would connect to and be an extension of the existing I-25 express lanes that go to and from downtown Denver. The reversible managed lane between I-25 and Pecos Street would remain and traffic would continue to use the existing I-25/US 36 managed lane ramp. The managed lanes from Pecos Street to West of Cherryvale Road in Boulder would be bi-directional, located in the median of US 36, and separated from the general-purpose lanes by a painted buffer. Buses would exit the highway to pick up and drop off passengers at stations located on ramps and adjacent park-n-Rides. Bypass lanes would be provided at all on-ramps, with the exception of Foothills Parkway eastbound, Federal Boulevard, Pecos Street, and Broadway. Access to the managed lane would be provided at separate ingress and egress points located between each interchange. The general location of these access points is shown on Figure 2.6-11, Combined Alternative Package (Preferred Alternative): Managed Lanes, Auxiliary Lanes, and Bus Rapid Transit. Table 2.6-5, Combined Alternative Package — Managed Lane Access Points, lists the locations where slip-ramp access to the managed lanes would be provided.

Table 2.6-5: Combined Alternative Package — Managed Lane Access Points

Access Location	Description
Cherryvale Road	Eastbound entrance; westbound exit
West of McCaslin Boulevard	Eastbound exit; westbound entrance
East of McCaslin Boulevard	Eastbound entrance; westbound exit
West of West Flatiron Circle	Eastbound entrance; westbound exit
East of East Flatiron Circle	Eastbound exit; westbound entrance
West of Wadsworth Boulevard	Eastbound entrance; westbound exit
West of 120 th Avenue	Eastbound exit; westbound entrance
West of 104 th Avenue/Church Ranch Boulevard	Eastbound entrance; westbound exit
East of 104 th Avenue/Church Ranch Boulevard	Eastbound exit; westbound entrance
West of Sheridan Boulevard	Eastbound entrance; westbound exit
East of Sheridan Boulevard	Eastbound exit; westbound entrance
West of Federal Boulevard	Eastbound entrance; westbound exit
East of Federal Boulevard	Eastbound exit; westbound entrance
West of Pecos Street	Eastbound entrance; westbound exit

Source: US 36 Mobility Partnership, 2009.

Combined Alternative Package roadway changes would include improvements to cross street intersections and interchanges. Those improvements would include upgrading lane transitions of ramp terminals, widening cross streets at the intersection, lengthening turn-lanes and adding turn-lanes. These improvements are conceptual in nature and are based on the traffic analysis and engineering work completed at this level of project development. The design concepts will be further refined during final design but would occur within the conceptual project footprint.

The Combined Alternative Package would include a bikeway facility adjacent to US 36. In general, the bikeway is an off-street separated multi-use path adjacent to US 36. Where appropriate, the bikeway connects to and makes use of existing on-street and off-street facilities. Maintenance of the US 36 bikeway would be the responsibility of the local jurisdictions through an Intergovernmental Agreement with CDOT. Grade separations and connections are shown in Table 2.6-6, Bikeway Crossings and Connections.

Table 2.6-6: Bikeway Crossings and Connections

Cross Street/Trail/ park-n-Ride	Grade Crossing Type	Connection to Cross Street, Trail, park-n-Ride
72 nd Avenue	Utilize existing	Utilize existing
80 th Avenue	Underpass extended	Existing trail
Westminster Center Station	Overpass	park-n-Ride
Sheridan Boulevard	Underpass	park-n-Ride
92 nd Avenue	Underpass	Not connected
Westminster Boulevard	Overpass (existing)/underpass	Existing bridge trail/southwest
Big Dry Creek Trail	Underpass	Existing trail
Church Ranch Boulevard	Underpass	Existing trail
Church Ranch/104 th Avenue Station	Underpass to parking	park-n-Ride (existing)
Wadsworth Boulevard (Old Wadsworth)	Overpass/at-grade	No
112 th Avenue	Underpass	No
116 th Avenue Station	Overpass	park-n-Ride
120 th Avenue	Underpass	Yes
Wadsworth Parkway	Underpass	Not connected
East Flatiron Park Trail	Crossing over existing underpass	Existing trail should be tied into
East Flatiron Circle	Overpass (existing)	Existing trail
Interlocken Loop	Underpass (existing)	Existing trail
Rock Creek Trail	Underpass	Existing trail
88 th Street	Underpass	N/A (no trail)
Cattle Crossing at Avista Hospital	Underpass	Intersects with existing
Coal Creek Trail	Underpass	Existing trail
McCaslin Boulevard	Underpass	Existing trail
McCaslin Station	Overpass (extended)	park-n-Ride
Cherryvale Road	Underpass	No
South Boulder Creek	Underpass	Intersects with existing
Table Mesa Station	Underpass	park-n-Ride
Table Mesa Drive	Underpass (under ramp)	Existing trail

Source: US 36 Mobility Partnership, 2009.

Note:

N/A = not applicable

The Combined Alternative Package would also include TDM improvements throughout the corridor, such as strategies designed to make the most efficient use of existing transportation facilities by reducing the actual demand placed on these facilities. Examples include coordinating flexible work schedules to help decrease demand at peak periods, carpooling/vanpooling, encouraging telecommuting, employer and community-based ECO passes (bus passes), an incident management plan and courtesy patrol, and coordinated land use and transportation planning that increases the convenience of using transit. Additionally, the Combined Alternative Package would offer the ability to use ITS messaging to alert drivers to roadway conditions.

Development of a TDM program for the Combined Alternative Package would begin with establishment of an advisory committee or task force. Topics for this TDM task force would include identification of stakeholders in the corridor and development of a preliminary TDM program in collaboration with the stakeholders. A part of the development of the program would include identifying performance measures, target groups, employer surveys, development of trip reduction plans, and a marketing plan. Possible programs that would be considered include:

- Vanpools and carpools
 - Matching services
 - RideArrangers
 - Subsidies and information services
- Financial incentives
 - Transit pass subsidies
 - Vanpool subsidies
- Stakeholder outreach and education
 - Websites
 - Alternative work schedules
 - Telecommuting/compressed work week
 - Preferential parking programs
 - Bicycle commuting support

Surveys and data collection to assess the efficacy of the TDM program, including the establishment of baseline data, a mid-point assessment (including periodic travel behavior surveys), and a post-construction assessment would be conducted.

CDOT and RTD have agreed that for the first phase of the project, a portion of the construction budget will be set aside for TDM-related construction mitigation. This will be initiated during final design and run throughout the first construction phase. Future construction phases will include this program as well.

The TDM task force would also look for longer-term funding for TDM programs. One option for this could be diverting some of the excess toll revenue derived from SOVs in the managed lanes. Another longer-term funding option could be tasking corridor employers with participation in funding from parking cash-out programs.

After construction, the TDM task force would continue to work closely with local agencies to make sure supportive land use and zoning controls are in place. The US 36 corridor has an excellent opportunity for partnerships to promote these types of TDM measures because of the very visible and active 36 Commuting Solutions Transportation Mobility Organization. These construction TDM elements are designed to be supportive of the major highway and transit improvements and would lead to implementation of long-term strategies for the corridor.

Improvements and changes to transit stations would be made throughout the corridor as part of the Combined Alternative Package. Table 2.6-1, Parking and Pedestrian Crossings at Transit Stations, shows the changes as a result of the Combined Alternative Package and in comparison to Package 1.

The Combined Alternative Package would provide BRT improvements, including the following elements:

- Regional bus service enhancements.
- Local bus service enhancements.
- Ticket vending machines at BRT stations.
- Fare box upgrades on buses.
- Fiber along US 36 and connecting to the BRT stations.
- Funding for marketing and branding for BRT.
- Safety measures at BRT stations including closed circuit television/video surveillance, emergency telephones, and Crime Prevention Through Environmental Design strategies.

- Variable message signage at BRT stations to provide information on the next scheduled bus. This will be upgraded over time to provide real time bus information.
- Bus instrumentation to allow for future real time transit data collection. The intent is to initiate real time transit data collection and display.
- Smart cards, as the technology allows.
- If available and appropriate for the corridor, use of low floor buses. These would need to consider the higher speeds and smoother travel needed for longer trips and also allow for bicycles.
- Wireless service on vehicles will continue to be explored and will be implemented if cost-effective and if it works.
- Automated stop announcements on buses in compliance with the Americans with Disabilities Act.
- Analysis of, and if appropriate, implementation of signal priority at key intersections. The intent is to move buses quickly through intersections. The analysis that will be done will include current and projected delay at key intersections, capital and operating costs, and effects to other signals in the vicinity.

New and more frequent bus service in the US 36 corridor would be provided. Proposed improvements include more frequent service on existing Route B and Route H between Denver and Boulder, a re-routed skyRide route for service from Boulder to Denver International Airport, and new Activity Center Circulator/Connector routes to activity centers in the corridor. Table 2.6-7, Proposed Changes to the RTD Bus System Plan for the Combined Alternative Package (Preferred Alternative), shows the proposed bus service for the corridor. The proposed bus route changes in the Combined Alternative Package (Preferred Alternative) are subject to change. Bus service plans for BRT would be merged with bus service plans for the Northwest Rail Corridor Project. Bus operations would be phased-in commensurate with service standards and ridership growth. RTD makes schedule changes and adjustments several times a year to respond to demand and improve productivity. The Combined Alternative Package proposed service changes reflect improvements to operations based on existing service at this time.

Table 2.6-7: Proposed Changes to the RTD Bus System Plan for the Combined Alternative Package (Preferred Alternative)

Service Type	Route	Route Name	Peak Headway ¹ (minutes)	Off-Peak Headway ¹ (minutes)	Early/ Late Headway ¹ (minutes)	Change from Package 1
Regional/ Express/ skyRide	AB	Boulder to DIA (via Northwest Parkway)	30	60	60	Rerouted to Northwest Parkway; improved peak service, consolidated patterns so slightly less off-peak service (with fewer stops along US 36)
	B	Boulder – Denver (all stop)	15	15	30	Improved off-peak service
	H	Boulder Transit Village (all stop)	15	30	N/A	Improved peak and off-peak service (new pattern)
	HX	Boulder Transit Village (express)	10	N/A	N/A	Flatiron Crossing stop removed; improved peak service
	L	Longmont – Denver	30	60	180	Improved off-peak service
Boulder Local	230	Lafayette – Louisville – Interlocken	15	30	N/A	New route

Table 2.6-7: Proposed Changes to the RTD Bus System Plan for the Combined Alternative Package (Preferred Alternative)

Service Type	Route	Route Name	Peak Headway ¹ (minutes)	Off-Peak Headway ¹ (minutes)	Early/ Late Headway ¹ (minutes)	Change from Package 1
Activity Center Circulator/ Connector	AC-I	Denver – Boulder via Interlocken	15	30	N/A	New route
	AC-CP	Denver – Boulder via ConocoPhillips	15	30	N/A	New route

Source: US 36 Mobility Partnership, 2009.

Notes:

¹Headway refers to the frequency of service.

DIA = Denver International Airport

N/A = not applicable

US 36 = United States Highway 36

Denver and Adams Segments

Roadway

The US 36 improvements for the Combined Alternative Package would begin at the US 36/I-25 interchange. The major changes at this interchange are improvements to the southbound I-25 to westbound US 36 ramp, which would be realigned to connect directly to US 36 instead of connecting to Broadway. This ramp would merge with the westbound on-ramp from Broadway. Access to Broadway from southbound I-25, westbound US 36, and westbound I-270 would no longer be available at this location with the elimination of the off-ramps. Access to Broadway would continue to be accommodated via southbound I-25 at 84th Avenue and northbound I-25 at 70th Avenue.

In the eastbound direction on US 36, the managed lane would transition to a general-purpose lane at Pecos Street, or users could enter the existing I-25 reversible managed lanes during the morning peak period. In the westbound direction, vehicles exiting from the existing I-25 reversible managed lane would continue on a new managed lane, which would replace the existing HOV lane between Pecos Street and Federal Boulevard. From Federal Boulevard to the west, one managed lane in each direction would be built in the median of US 36. These lanes would be separated from the general-purpose lanes by a painted buffer.

The existing general-purpose lanes in these segments would need to be rebuilt, as they would move outward to accommodate the managed lanes in the median. An additional general-purpose lane would be constructed eastbound from Sheridan Boulevard to I-25. Both the Pecos Street and Federal Boulevard interchanges would be reconstructed but would maintain their existing configuration. The Pecos Street and Lowell Boulevard bridges would be widened but the Federal Boulevard bridge would not need to be reconstructed.

There are several arterial improvements in these segments. The improvements include:

- An extension of Bronco Road west to Greenwood Boulevard and the addition of a cul-de-sac at the east end of Bronco Road
- Closing the Turnpike Drive access to Federal Boulevard
- Reconstruction of Turnpike Drive to connect to Grove Street
- Realignment of Sheridan Boulevard to the southwest between US 36 and the BNSF Railway tracks
- Closing 88th Place access to Sheridan Boulevard

An assessment of impacts to local intersections from improvements to US 36 revealed that traffic mitigation will be recommended at the Federal Boulevard and 74th Avenue intersection. Turn-lane additions and lane lengthening will mitigate the impacts at this intersection. For a more detailed discussion about the traffic impacts and recommended mitigation see Chapter 3, Transportation Impacts and Mitigation.

Transit

No improvements to the station, parking, or access at DUS are included in the Combined Alternative Package. However, as part of the BRT service enhancements in the Combined Alternative Package, 42 buses would enter downtown Denver from US 36 during the peak hour. This would be 17 more than in Package 1. Thirty-two of these buses would serve DUS, with the remaining 10 buses serving the Civic Center Transfer Station to and from I-25 on 19th Street and 20th Street. No improvements to the station, parking, or access at the Broadway park-n-Ride or South Westminster BRT Station are planned as part of the Combined Alternative Package.

Pedestrian/Bicycle

The bikeway in the Denver Segment would continue to use existing facilities. In the Adams Segment, the proposed bikeway would begin at Bradburn Boulevard at the existing Little Dry Creek Trail. A proposed pedestrian/bicycle signal and on-street striping would facilitate crossing 72nd Avenue at Bradburn Boulevard. An on-street bike route would go north from the Little Dry Creek Trail along Bradburn Boulevard to 80th Avenue. Only signing improvements are planned along Bradburn Boulevard. At 80th Avenue, the existing underpass would be extended and utilized by the bikeway. Connection to 80th Avenue would be provided by the existing trail. A grade-separated bikeway would then continue on the south side of US 36 to the Westminster Center BRT Station. A direct connection to the transit facilities would be provided. An at-grade crossing of 88th Avenue at the entrance to the Westminster Center BRT Station is proposed and access to 88th Avenue west would be provided.

Westminster and Broomfield Segments

Roadway

In these segments, the managed lane in each direction would remain in the median of US 36 and be separated from the general-purpose lanes by a painted buffer.

The existing general-purpose lanes would need to be rebuilt, as they would move outward to accommodate the managed lanes in the median. No additional general-purpose lanes would be constructed. The BNSF Railway and East Flatiron Circle bridges would be reconstructed as part of the Combined Alternative Package. In addition, a new bridge at 112th Avenue would be constructed to replace the existing Old Wadsworth bridge. The approaches to the bridge and any associated street improvements would be constructed by other projects. Auxiliary lanes between interchanges would be constructed in both directions between East Flatiron Circle and Sheridan Boulevard.

At the Sheridan Boulevard interchange, the existing configuration would be expanded to a split-diamond between 92nd Avenue and Sheridan Boulevard, with an additional on-ramp to eastbound US 36 from the frontage road. The Church Ranch Boulevard/104th Avenue interchange would be reconstructed but would maintain its existing configuration.

At Wadsworth Parkway, the proposed partial cloverleaf configuration would incorporate loop-ramps in the northeast and southwest quadrants. These loop-ramps would eliminate the left-turn movements required for traffic to access US 36 from Wadsworth Parkway. This configuration would also provide a grade-separated roadway for the eastbound US 36 off-ramp traffic destined for southbound Wadsworth Parkway to bypass the Wadsworth Parkway/120th Avenue intersection. A braided connection, where one ramp goes over the other, between Wadsworth Parkway and 120th Avenue to the north of US 36, would

allow traffic from 120th Avenue to bypass Wadsworth Parkway for access to US 36. In addition, a new on- and off-ramp to and from the east would be provided at 120th Avenue.

Arterial improvements associated with the Combined Alternative Package include:

- Realignment of Old Wadsworth Boulevard to intersect with 112th Avenue
- Closing 120th Avenue at Commerce Street, and vacating Carr Street

An assessment of impacts to local intersections from improvements to US 36 revealed that mitigation will be recommended at the Wadsworth Parkway/Midway Boulevard intersection. Additional lanes on Wadsworth Parkway south of Midway Boulevard, and signal timing changes, will mitigate the traffic impacts at the Wadsworth Parkway and Midway Boulevard intersection. For a more detailed discussion about the traffic impacts and recommended mitigations see Chapter 3, Transportation Impacts and Mitigation.

Transit

In the Combined Alternative Package, additional parking spaces would be provided at the Westminster Center BRT Station and 116th Avenue Transit Station. See Table 2.6-1, Parking and Pedestrian Crossings at Transit Stations, for a list of the proposed changes at stations. Buses would access these stations by exiting the highway to pick up and drop off passengers.

Bikeway

In the Westminster Segment, the proposed bikeway would continue west on the south side of the Westminster Center BRT Station and then under Sheridan Boulevard. Access to Sheridan Boulevard from the bikeway would be provided via 88th Avenue. From Sheridan Boulevard, the bikeway would travel west along the south side of US 36 and under 92nd Avenue. No direct access from the bikeway to 92nd Avenue would be provided. The bikeway would continue along the south side of US 36, until it reaches Westminster Boulevard. The bikeway would cross US 36 on the east side of the Westminster Boulevard bridge, then loop around to cross under Westminster Boulevard. Direct access from the bikeway to Westminster Boulevard would be provided. The bikeway would then leave Westminster Boulevard and travel along the north side of US 36 until it reaches the Big Dry Creek Trail. At the Big Dry Creek Trail, the bikeway would travel under US 36 via the existing Big Dry Creek underpass and direct access to the Big Dry Creek Trail would be provided. The bikeway would continue west on the south side of US 36, and cross under Church Ranch Boulevard. Access to the Church Ranch/104th Avenue Station and Church Ranch Boulevard would be provided through use of an existing trail at this location. The bikeway would then travel over the BNSF Railway and cross into the Broomfield Segment, where it would go over Old Wadsworth Boulevard and under the proposed 112th Avenue overpass. No direct connection from the bikeway to Old Wadsworth Boulevard or 112th Avenue would be provided.

In the Broomfield Segment, the bikeway would continue west on the south side of US 36 providing access to the 116th Avenue Station. Prior to crossing under Wadsworth Parkway, a bikeway connection to 120th Avenue would be provided at the Arista development. A connection to Wadsworth Parkway would also be provided via a connection to the bikeway being constructed along 120th Avenue by others. After crossing under Wadsworth Parkway, the bikeway would also cross under 120th Avenue and continue west on the south side of US 36 until it reaches East Flatiron Circle. A connection to the trail at the East Interlocken Park would be provided. Just east of East Flatiron Circle, the bikeway would transition to the existing bike/pedestrian trail and a series of grade-separated crossings within the Flatiron Marketplace and the Flatiron Crossing shopping area as it enters the Superior/Louisville Segment. It would access the Flatiron Station at this location.

Superior/Louisville and Boulder Segments

Roadway

In these segments, the managed lane in each direction would remain in the median of US 36 and be separated from the general-purpose lanes by a painted buffer.

In the westbound direction, the managed lane would become a general-purpose lane west of Cherryvale Road. In the eastbound direction, traffic would enter the added managed lane just west of Cherryvale Road. A new climbing lane in each direction would be provided from McCaslin Boulevard westbound and from Table Mesa Drive/Foothills Parkway eastbound to the top of Davidson Mesa. From Davidson Mesa westbound to Table Mesa Drive/Foothills Parkway and eastbound to McCaslin Boulevard, the climbing lane would become a bus-only lane. The bus-only portion of the lane would be constructed after certain conditions are met (see Section 2.7, Resolution of Issues).

The McCaslin Boulevard interchange would remain in the existing configuration. However, the bridge over US 36 would need to be replaced to provide additional lanes on McCaslin Boulevard. The existing loop-ramp would need to be reconstructed to accommodate the new McCaslin Boulevard bridge.

The existing general-purpose lanes in these segments would need to be rebuilt, as they would move outward to accommodate the managed lanes in the median. No additional general-purpose lanes would be constructed. The Interlocken Loop, West Flatiron Circle, Coal Creek, Cherryvale Road, and South Boulder Creek bridges would be reconstructed.

In these segments, additional improvements would include:

- Reconstruction of the vehicular underpass under US 36 that provides access to the Superior Cemetery
- Addition of a westbound left-turn and through-lane on Dillon Road
- Realignment of Dyer Road at US 36 to the north so that the new alignment would be outside the current ROW
- Closing access to Loop Drive from Table Mesa Drive
- Reconstruction of Loop Drive to connect to Tantra Drive, restoring access to Table Mesa Drive

An assessment of impacts to local intersections from improvements to US 36 revealed that mitigation will be recommended at the intersection of Dillon Road and McCaslin Boulevard and on the US 36 ramp intersections with Baseline Road. Recommended mitigation on Dillon Road includes an additional through-/left-lane for westbound traffic. The improvements to Baseline Road will consist of adding a right-turn lane to the northbound on-ramp for eastbound Baseline Road traffic. For more detailed discussion about the traffic impacts and recommended mitigations, see Chapter 3, Transportation Impacts and Mitigation.

The Foothills Parkway/Table Mesa Drive interchange would be reconfigured slightly to improve geometric conditions. In particular, the existing loop-ramp from westbound Table Mesa Drive to eastbound US 36 would be removed. The ramp from Foothills Parkway to eastbound US 36 would be relocated to improve the merging operations among the US 36, Table Mesa Drive, and Foothills Parkway traffic.

At this location, two options were evaluated to provide access from the University of Colorado, Boulder South Campus to Table Mesa Drive. This access is currently provided through Loop Drive, which connects to Table Mesa Drive at an intersection with the eastbound US 36 exit to Table Mesa Drive. The Preferred Alternative would maintain this connection and require buses to access the BRT Station on the south side of US 36 from a ramp located on Loop Drive. If approval of this alternative through CDOT's 1601 process and an agreement to participate in cost sharing is not reached, then the Local Streets Option would be implemented. In the Local Streets Option, this access would be provided from Table Mesa Drive, eliminating direct access from the Boulder South Campus to Table Mesa Drive from Loop Drive.

Instead, this access to Table Mesa Drive would be provided through a connection to Tantra Drive. These options are shown in Appendix A, Corridor Reference Maps.

Transit

At the McCaslin BRT Station, parking on both sides of US 36 would be reduced due to expansion of the interchange. This will be mitigated as described in Section 3.5.8, Impacts of Transit Station Parking.

BRT and express bus service would continue from the Foothills Parkway/Table Mesa Drive interchange to Boulder along Broadway to the Boulder Transit Center, and along 28th Street to the Boulder Transit Village.

The US 36 Corridor FEIS assumes both existing and planned super stops in the City of Boulder. Super stops are in place or planned by the City of Boulder along Broadway and along 28th Street. The map of super stops includes a potential super stop along US 36 at the Bear Creek pedestrian underpass, to serve both Williams Village and Martin Acres residents. Physical improvements at the potential Williams Village Super Stop will be implemented by others and are not considered as part of the US 36 project.

As a result of the Combined Alternative Package, 18 in-bound buses would access the Boulder Transit Village during the peak-hour. No in-bound, US 36-related regional buses serve this location in Package 1.

Twelve in-bound buses would access the Boulder Transit Center during the peak-hour as a result of the Combined Alternative Package. This is three more buses per hour than in Package 1 at this location.

Bikeway

In the Superior/Louisville Segment, the proposed bikeway would continue along the existing bikepath on the south side of US 36 from East Flatiron Circle to West Flatiron Circle. The bikeway would use the existing Rock Creek Trail through Frank Varra Park. The bikeway would then cross under US 36 and continue west on the north side of US 36, going under 88th Street, to the vehicular underpass just east of Superior Cemetery, where it would cross back under US 36. No direct access from the bikeway to 88th Street would be provided. Continuing west, the bikeway would cross to the north of US 36 using the Coal Creek Trail underpass. Access to the Coal Creek Trail would be provided. Prior to crossing under McCaslin Boulevard, access would be provided to McCaslin Boulevard and the McCaslin BRT Station.

In the Boulder Segment, the proposed bikeway would continue west from McCaslin Boulevard on the north side of US 36, go around the Davidson Mesa scenic overlook, cross under Cherryvale Road, and continue west on the north side of US 36 until it reaches South Boulder Creek. No direct access from the bikeway to Cherryvale Road would be provided. The bikeway would then go under US 36 using the South Boulder Creek Trail underpass structure and continue west on the south side of US 36 to the Table Mesa BRT Station. Direct access to the Table Mesa BRT Station from the bikeway would be provided via the Table Mesa BRT Station pedestrian bridge over US 36. On-street facilities along Table Mesa Drive from west of Loop Drive and across US 36 could also be used to access the Table Mesa BRT Station.

2.7 RESOLUTION OF ISSUES

The following text briefly itemizes and addresses issues that needed resolution prior to publication of the DEIS. These issues have been resolved for the FEIS.

Bikeway Alignments

Two alternatives were considered for the proposed bikeway in the Boulder Segment, from Cherryvale Road to Table Mesa Station. The US 36 alignment would parallel US 36 from Cherryvale Road to Foothills Parkway/Table Mesa Drive, where it would access Table Mesa BRT Station. The Cherryvale Road/South Boulder Road off-street bikeway alignment would follow an existing trail along Cherryvale Road and South Boulder Road, then access the Table Mesa BRT Station via existing on-street bike lanes from Manhattan Drive west to the BRT Station. Also considered in the Cherryvale Road/South Boulder Road alignment was a second design option. This option would extend the off-street path on the south side of South Boulder Road, west of Manhattan Drive, to the Table Mesa BRT Station.

As part of the PAC process to develop the Combined Alternative Package, the US 36 alignment was identified as part of the Preferred Alternative. With this alignment along US 36, there is a Section 4(f) use of land in Boulder Open Space, but it avoids the use of other historic properties that are also protected under the Section 4(f) statute. This alignment offers a more direct route for commuters and responds to the needs identified early in the NEPA process better than the Cherryvale Road/South Boulder Road alignment. In addition to support from the City of Boulder and Boulder County, many of the comments received on the DEIS in reference to this issue supported the US 36 alignment.

Design Options A and B

Two design options were considered for the western terminus of the corridor improvements for BRT service. In Option A, the managed lanes or BRT/HOV lanes would merge into the general-purpose lanes just west of Cherryvale Road. Traffic could exit to Foothills Parkway or South Boulder Road, or could continue on to 28th Street.

In Option B, a bus-only lane would be provided directly to Table Mesa Station via a new bridge to and from the managed lanes or BRT/HOV lanes adjacent to the median. All westbound vehicles in the managed lanes or BRT/HOV lanes, except for buses, would be required to exit the lanes just west of Cherryvale Road and merge into the general-purpose lanes.

As part of the PAC process to develop the Combined Alternative Package, Option A was identified for inclusion in the Combined Alternative Package. While Option B provided improved transit travel time, it was more expensive and had more environmental impacts. For detailed analysis results, see Chapter 3, Transportation Impacts and Mitigation.

Access to Special Lanes (Managed or Bus Rapid Transit/High-Occupancy Vehicle)

Drop-ramps connecting the managed lanes and the arterial street network are proposed at Westminster Boulevard and Midway Boulevard in Package 2. The drop-ramps would consist of one or more separate lanes in each direction that would transition from the managed lanes up to bridges, providing access to and from the existing Westminster Boulevard bridge and a new bridge at Midway Boulevard. The drop-ramps would provide access in and out of the managed lanes in both the eastbound and westbound directions.

Refinement of access treatment (type and location) was suggested by corridor jurisdictions. The Combined Alternative Package includes managed lanes located in the median of US 36 and separated from the general-purpose lanes by a painted buffer. Access to the managed lanes would be provided at

separate ingress and egress points located between each interchange. For more information on the Combined Alternative Package configuration, see Section 2.6, Package Descriptions.

Boulder Floodplain Study

The City of Boulder recently completed and adopted an initial study of the South Boulder Creek floodplain. Flood control maps under consideration in draft form until the Federal Emergency Management Agency (FEMA) accepts the new delineation show that a portion of the existing US 36 highway would be in the 100-year floodplain.

Removing US 36 from the 100-year floodplain map or the latest City of Boulder study map would require the mainline profile of US 36 to be elevated by at least 4 feet for a distance of nearly 5,000 feet; a 1,000-foot long, 20-foot high levee to be built in Boulder open space; and construction of a large upstream reservoir.

Due to these requirements, the complexity surrounding this issue, and the current difference in definition for the 100-year floodplain limits between the City of Boulder and FEMA flood control maps, US 36 at this location would remain in the 100-year floodplain.

For more information on floodplains, see Section 4.20, Water Resources: Water Quality and Floodplains.

National Register of Historic Places Eligibility for Post World War II Residential Development

In addition to the properties identified in the DEIS as eligible for the National Register of Historic Places (NRHP), the eligibility of 10 post World War II residential developments was evaluated. Analysis of these subdivisions after the publication of the DEIS indicated that no individual structures, sites, or historic districts in these areas are eligible for the NRHP. The State Historic Preservation Officer (SHPO) concurred with this analysis on February 2, 2009 (see Appendix B, Consultation and Coordination).

Since this study was conducted, three more residential developments were included in the evaluation. Two on the west end of the corridor along US 36 are under evaluation by the City of Boulder. Therefore, this FEIS is assuming these neighborhoods are eligible until this evaluation is concluded. The other neighborhood is just northeast of the Foothills Parkway/Table Mesa Drive interchange and has been evaluated and submitted to SHPO as no individual structures, sites, or historic districts in these areas are eligible for the NRHP. SHPO concurred with this determination in correspondence dated September 15, 2009.

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

Auxiliary Lane between McCaslin Boulevard and Foothills Parkway/Table Mesa Drive

During the planning process, corridor stakeholders, including the City of Boulder and Boulder County, requested that the project team consider two variations of Package 4 that would modify the westbound auxiliary lane between McCaslin Boulevard and the Foothills Parkway/Table Mesa Drive interchange. The concern expressed by stakeholders was that the amount of westbound capacity that would be provided by Package 4 would be greater than the amount of traffic the intersections in Boulder could reasonably accommodate.

In response to this request, one variation of Package 4 was developed that would shorten the auxiliary lane between McCaslin Boulevard and the Foothills Parkway/Table Mesa Drive interchange. Another variation of Package 4 was developed that would eliminate the auxiliary lane altogether. These two variations of Package 4, referred to as the “Reduce Auxiliary Lane Variation,” and the “Eliminated Auxiliary Lane Variation,” were not carried forward based on the results from the traffic impact analysis.

Chapter 3, Transportation Impacts and Mitigation, describes the traffic impacts analysis and results for this section of US 36.

This issue was discussed at length as part of the PAC process to develop the Combined Alternative Package. For the Combined Alternative Package agreement in July 2008, one new climbing lane in each direction, extending westbound from McCaslin Boulevard and eastbound from Foothills Parkway/Table Mesa Drive to the top of Davidson Mesa, was agreed upon for inclusion in the Combined Alternative Package. At that time, the PAC also agreed to evaluate the extension of climbing lanes on US 36 between McCaslin Boulevard and Table Mesa Drive to bus-only lanes, as well as the use of shoulders for transit during peak travel periods.

Further traffic analysis indicated that the general-purpose lanes between McCaslin Boulevard and Foothills Parkway/Table Mesa Drive would operate at level of service (LOS E) with the climbing lane as described above. With the climbing lane extended as a general-purpose lane (westbound to Foothills Parkway/Table Mesa Drive and eastbound to McCaslin Boulevard), it was estimated that the general-purpose lanes would operate at LOS D. Therefore, the extension of the lane was determined to be a necessary element of the Combined Alternative Package. However, only buses would be permitted to use this portion of the lanes. While the traffic analysis indicates a need for this lane by 2035, it is unclear at what point in the future the lane will become necessary. Therefore, “triggers” for the implementation of this lane have been established and agreed upon by the PAC.

The bus-only auxiliary lane would be addressed and evaluated for construction only if certain bus-related triggers are met; only after a re-analysis process has been completed; and only after the Phase I improvements (one managed lane in each direction and bikeway elements) and climbing lanes have been constructed. The triggers for considering the bus-only auxiliary lane include:

- Degradation of average peak period bus travel times along US 36 in the segment between the existing McCaslin park-n-Ride and Table Mesa park-n-Ride due to persistent congestion. The degradation, for each respective direction, officially occurs when the peak period peak direction bus travel time (initially measured and established 1 year after the managed lanes are open) has delays of 2 minutes or more for at least 2 days per week for at least 3 weeks in a row. The delay shall not include those associated with inclement weather, road maintenance, or special events, but shall include days with vehicle accidents or stalls since these are typical causes of congestion and would likely be avoided with a bus-only auxiliary lane.
- Degradation of average peak period bus travel times resulting from congestion on US 36 along South Boulder Road between the Table Mesa park-n-Ride and McCaslin Boulevard. This bus service is currently known as the “DASH.” The degradation, for each respective direction, officially occurs when the peak period peak direction bus travel time (initially measured and established 1 year after the managed lanes are open) has delays of 3 minutes or more for at least 2 days per week for at least 3 weeks in a row. The delay shall not include those associated with inclement weather, road maintenance, road construction, or special events, but shall include days with vehicle accidents or stalls since these are typical causes of congestion.
- Degradation of average peak period bus travel times resulting from congestion on US 36 for bus Route 228 along McCaslin Boulevard between the McCaslin park-n-Ride at US 36 and South Boulder Road due to persistent congestion. The degradation officially occurs when the northbound peak period bus travel time (initially measured and established 1 year after the managed lanes are open) has delays of 2 minutes or more for at least 2 days per week for at least 3 weeks in a row. The delay shall not include those associated with inclement weather, road maintenance, road construction, or special events, but shall include days with vehicle accidents or stalls since these are typical causes of congestion.

It is expected that the above triggers will be measured during normal monitoring cycles by RTD, CDOT, or the local agencies that have responsibility for these routes or modes so that extra efforts to monitor these triggers will not be necessary. At a minimum, the above triggers will be looked at when traffic numbers require updating during re-evaluation processes.

If a trigger is met, a re-analysis process will be initiated and will include all US 36 communities along with FHWA, CDOT, and RTD representatives to develop and evaluate methods to improve bus operations. Goals of this process are to improve bus operations on US 36 and parallel arterials.

When a trigger is met, some action will be taken to improve transit operations as defined above. Should actions other than construction of the bus-only auxiliary lane occur and the triggers are met again, the re-analysis process will be re-initiated as necessary.

The re-analysis process will follow the basic NEPA steps of establishment of need (based on current conditions), development of various options to respond to that need, including such options as, but not limited to, bus operation changes on US 36 or parallel arterials, addition of queue jump lanes or transit signal priority on parallel arterials, congestion pricing, or building the bus-only auxiliary lane. Then, these various options will be evaluated in an objective manner to determine the effect of each on factors such as bus and passenger travel times, safety, capital and operating costs, air quality, and environmental impacts. The most cost-effective and practical alternatives would be implemented. Full public and agency involvement will be included in this re-analysis process.

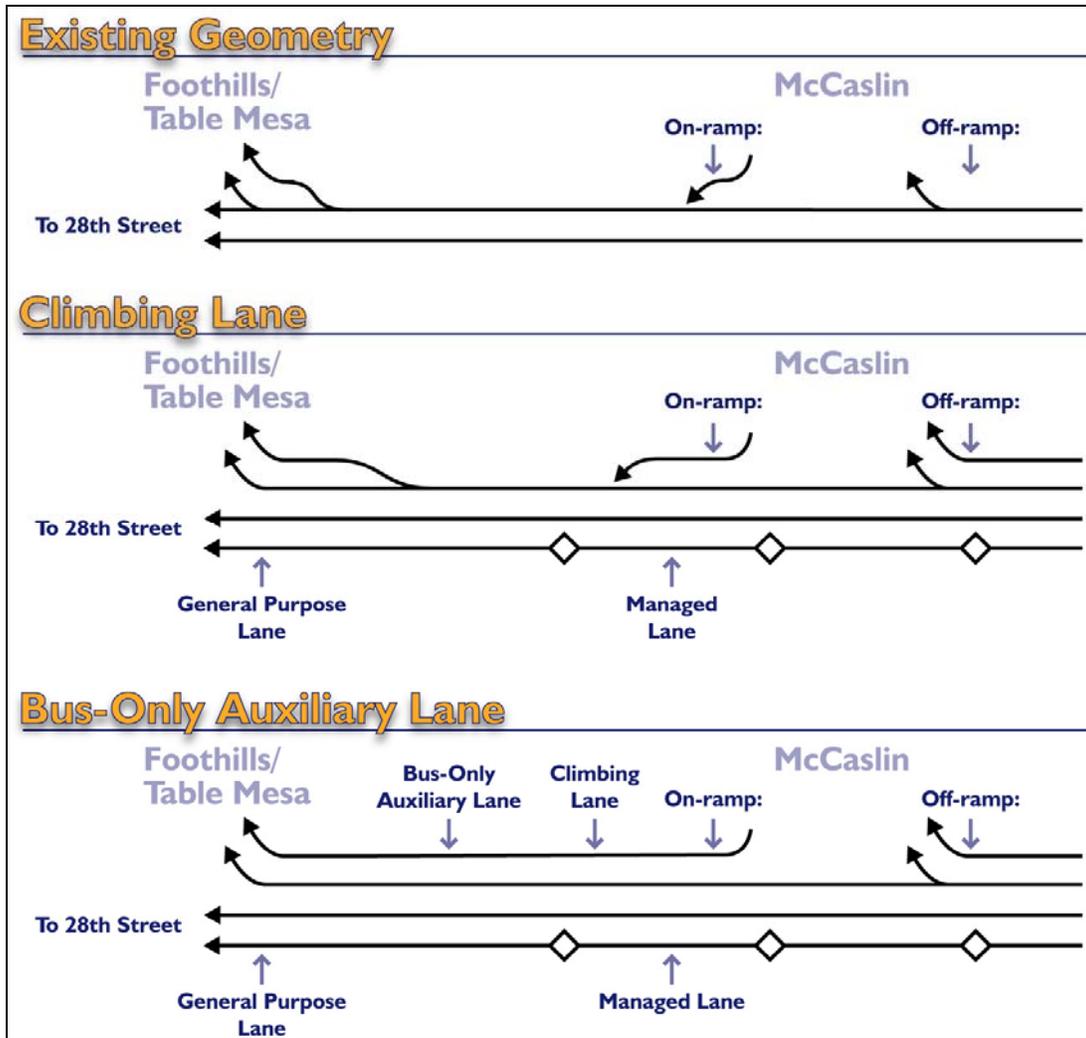
No use of the bus-only auxiliary lane for any other modes (such as general-purpose or HOV) is included as a part of this FEIS. If such a use were to be contemplated in the future, a separate, and new NEPA evaluation would be initiated to include:

- Full public involvement
- Full analysis of impacts
- Full agency involvement with FHWA, USACE, CDOT, RTD, and all US 36 communities

The analysis of the Combined Alternative Package in this FEIS includes both the climbing lane and the bus-only auxiliary lane between Foothills Parkway/Table Mesa Drive. Figure 2.7-1, Lanes between McCaslin Boulevard and Foothills Parkway/Table Mesa Drive, shows the existing configuration, the initial configuration with the climbing lanes, and the final configuration with the bus-only auxiliary lane, for the westbound direction. The construction of the bus-only auxiliary lane will not commence until approved. Acquisition of any additional ROW required for the bus-only auxiliary lanes will not take place until the re-analysis is complete and the lanes approved.

The use of shoulders was also considered during the analysis. Shoulders for transit operations or bus travel were determined to not be an acceptable component of the Combined Alternative Package. The shoulder is intended to be used for emergencies such as breakdowns or as a recovery area for vehicles that have to leave the travel lanes. Where long-term improvements are being made, full-width shoulders for these purposes are an important project element. Additionally, road shoulders are typically not constructed to accommodate the weight of buses on a consistent basis.

Figure 2.7-1: Lanes between McCaslin Boulevard and Foothills Parkway/Table Mesa Drive



Source: US 36 Mobility Partnership, 2009.

Other Federal Actions Required

The following other federal actions, opinions, or agreements are required to support the Preferred Alternative:

- Issuance of a Section 404 permit from the USACE will be required prior to impacting any waters of the U.S. See Appendix C, Section 404(b)(1) Evaluation, for more information.
- Issuance of a Biological Opinion from the U.S. Fish and Wildlife Service will be included with the Record of Decision (ROD).
- If a Conditional Letter of Map Revision (CLOMR) and Final Letter of Map Revision for 100-year floodplain encroachments from FEMA are required, the CLOMR will be prepared during final design. The Final Letter of Map Revision will be prepared after construction is completed.
- Concurrence on the Final Section 4(f) Evaluation from the Department of the Interior will be requested during the FEIS comment period. For more information see Chapter 7, Final Section 4(f) Evaluation.
- The Programmatic Agreement among CDOT, SHPO, and FHWA regarding adverse resolution of adverse effects and procedures for future evaluations during project design will be included with the ROD.

Other Actions Required

Approval of the 1601 process by the Colorado Transportation Commission would also be required prior to construction.

The I-25/Broadway interchange is depicted in this FEIS as having a system-to-system ramp from southbound I-25 to westbound US 36. This would eliminate the existing ramp from southbound I-25 and the westbound US 36/I-270 off-ramp to Broadway that currently exist. This interchange configuration is based on a 1985 EA, which was updated in 1998, and an Interstate Access Request (IAR) for the I-25/US 36/I-270/I-76 interchange, which was prepared in 1990. During the FEIS and the PAC process, Adams County and local stakeholders raised concerns about the elimination of local access at Broadway. Impacts associated with this proposed closure are presented in Chapter 4, Affected Environment and Environmental Consequences. Based on public comments, potential impacts, and the length of time that has elapsed from the Finding of No Significant Impact and IAR for this action, the FEIS recommends that prior to any construction occurring at the I-25/Broadway interchange, a separate study be undertaken. This study would evaluate local access in the area and re-evaluate the proposed federal action of closing access, prior to a final determination on local access to the interstate(s) for this area.

At the Table Mesa Drive interchange, access to the University of Colorado, Boulder South Campus property was to be provided through a new connection to the local street network. Objections to this proposal have been made by the City of Boulder and the University of Colorado due to future development ideas for the area. As a result, two alternatives are being considered. Both the Preferred Alternative and a Local Streets Option are shown on the Combined Alternative Package (Preferred Alternative) maps in Appendix A, Corridor Reference Maps. Approval of these alternatives through CDOT's 1601 process and participation in cost sharing for the Preferred Alternative would be required prior to these alternatives being constructed. In the future, when the ROD for this phase of the improvements is being prepared and the South Campus Master Plan (to be prepared by the University of Colorado) is more fully developed, these alternatives will be re-evaluated. A Memorandum of Understanding (MOU) among CDOT, the City of Boulder, Boulder County, and the University of Colorado will be developed to document the process and participation in cost sharing. This MOU will be developed when funding for this phase has been identified and prior to a ROD.