

measure to minimize conflicts at freeway entrance points as part of this alternative.

Because RTD has determined that C-470 is too congested for buses to operate with reliable and acceptable travel times, transit service is not currently provided on C-470. Bus service in the project area is currently provided on local arterial streets rather than on C-470. Under the No-Action Alternative, this situation is expected to continue as congestion on C-470 worsens. LRT is currently not provided on C-470 and, other than the Southwest and Southeast LRT Corridor Extensions, is not planned by RTD within the 2030 planning horizon.

**2.4.2 General Purpose Lanes Alternative**

The GPL Alternative would add up to four additional travel lanes and auxiliary lanes to the existing four travel lanes, extending from Kipling Parkway to I-25. It includes improving ramps and reconstructing the C-470/Santa Fe Drive interchange. Access improvements at the

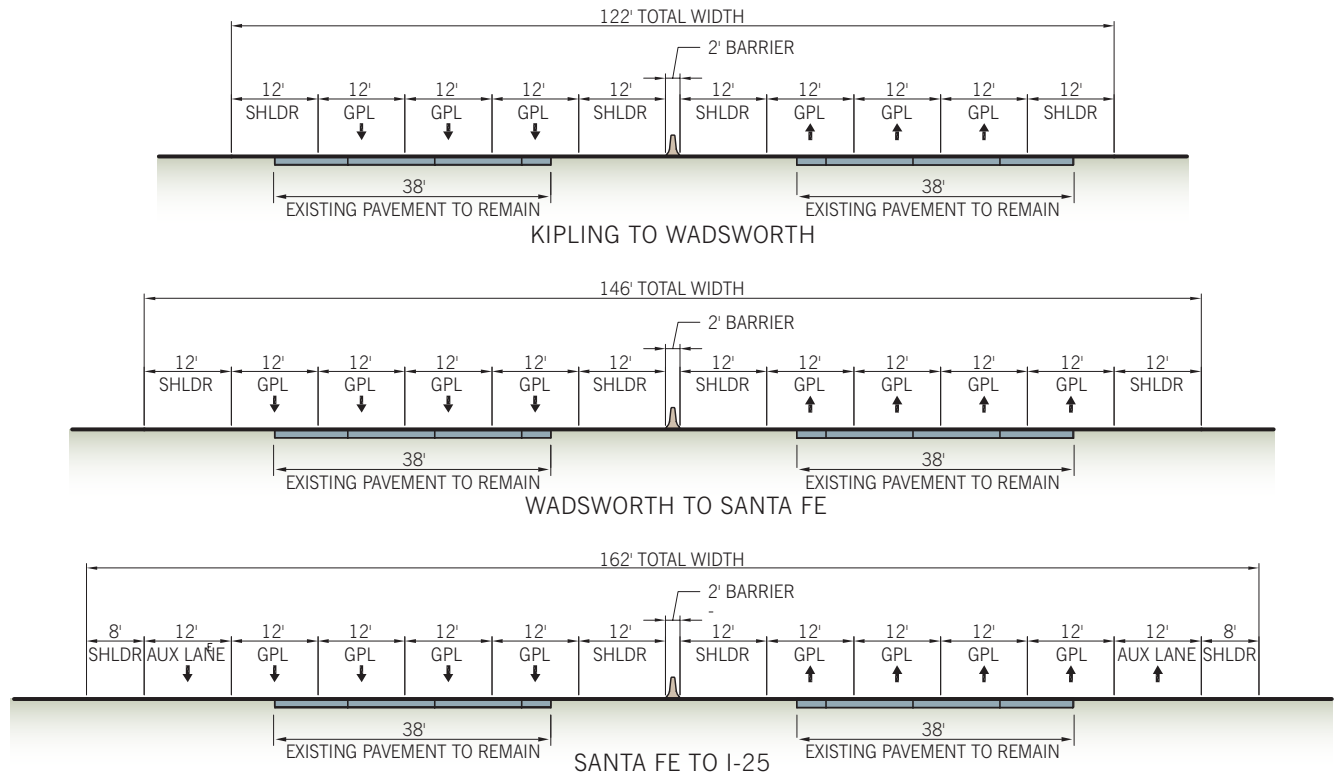
Santa Fe Drive interchange would result from a realigned interchange to improve traffic flow. This alternative would reduce congestion and improve travel time on C-470.

**2.4.2.1 Typical Section**

The typical section for this alternative, as shown in Figure 2-6, would include three general purpose lanes in each direction between Kipling Parkway and Wadsworth Boulevard with 12-foot travel lanes and paved shoulders varying from eight to 12 feet and a two-foot concrete barrier separating opposing directions of traffic. This widening would take place in the median of the existing facility.

Between Wadsworth Boulevard and Santa Fe Drive, the typical section would be widened to four general purpose lanes in each direction. The additional lanes would be created by widening and resurfacing the existing pavement. From Santa Fe Drive to I-25, the typical section would widen further to include four general purpose

**Figure 2-6  
General Purpose Lane Alternative Typical Section**



lanes plus one auxiliary lane in each direction. In this section, the existing pavement would be widened and overlaid to create the additional lanes.

### 2.4.2.2 Access Locations

Access locations and interchange types for this alternative would remain the same as they currently exist, with the exception of the Santa Fe Drive and I-25 interchanges, which would be reconfigured. At all other interchanges, only minor ramp modifications would be made to tie the widened mainline into the existing ramp terminals.

### Santa Fe Drive Interchange

The Santa Fe Drive interchange would be reconstructed in its current diamond configuration to accommodate additional capacity, and a flyover ramp for southbound to eastbound traffic would be added to improve overall interchange opera-

tions. The proposed new interchange configuration is shown in **Figure 2-7**.

This interchange configuration was selected as the most desirable due to several factors. The southbound to eastbound flyover diverges from southbound Santa Fe Drive prior to the County Line Road and C-470 ramp terminal intersections, thereby removing traffic from those congested intersections and greatly improving operations. The ramp leading to the flyover also has the potential to provide Wolhurst residents some noise reduction from the Santa Fe Drive traffic, depending on the structure type selection for the flyover, which will be determined during final design. The flyover configuration for southbound to eastbound traffic improves merging operations onto C-470 as compared to other configurations due to its higher profile and higher design speed, both of which allow traffic to merge into eastbound C-470 at a higher speed

**Figure 2-7**  
**Improved Diamond Interchange with Southbound to Eastbound Flyover at Santa Fe Drive**



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on the steep seven-percent gradient. This configuration would also avoid the need for right-of-way acquisition from Chatfield State Park in the southwest quadrant of the interchange. While this alternative has positive characteristics, the negative aspects are its intrusion into the visual landscape and its higher construction cost. Additional comparative data for the Santa Fe Drive interchange alternatives can be found in the *Alternatives Screening Report* (March 2005).

### I-25 Interchange

The I-25 interchange would require only minor modifications with the GPL Alternative. These are limited to reconfiguring the southbound on-ramp to I-25 to consist of two lanes rather than one.

#### 2.4.2.3 Mobility Enhancement Elements

Mobility enhancement elements consist of minimal action strategies to either reduce demand placed on, or maximize the capacity of, the existing facility. In combination with each of the action alternatives, these strategies can help reduce traffic congestion, air pollution, and travel times. The mobility enhancement elements include four general categories: travel demand management, transportation system management, intelligent transportation systems (ITS), and bicycle/pedestrian trails. This alternative family was eliminated from consideration as a stand alone alternative due to its inability to meet the purpose and need on its own. However, certain elements were incorporated into the two action alternatives for their ability to provide some relief to congestion and delay, and to improve reliability.

#### Travel Demand Management

Travel demand management (TDM) strategies attempt to change driver behavior to reduce demand for a facility, and therefore its congestion. Typical strategies include carpooling, changing work hours to spread the peak, and telecommuting or shifting to other travel modes to reduce the demand. The specific travel demand management recommendation for combination with each action alternative

includes enhanced marketing of DRCOG's rideshare program. This approach would help promote the program by installing additional promotional signing along C-470 to encourage program use. A signing plan would be jointly developed with DRCOG and implemented as part of this alternative. The rideshare program allows travelers with common destinations (such as employment centers and park-n-Rides) to travel in one vehicle and share associated vehicle costs. Ridesharing includes both carpooling and vanpooling.

#### Transportation System Management

Transportation system management (TSM) strategies strive to maximize the capacity of existing transportation systems by making them operate more efficiently, thus reducing congestion. The specific transportation systems management strategy that would be implemented with each action alternative includes developing an incident management plan (IMP) for the C-470 Corridor. C-470 does not currently have a comprehensive IMP. An IMP could provide traffic operations managers with the tools to allow quick and efficient response to accidents, hazardous spills, and other emergencies. An IMP would develop contact lists, detour routes, communication protocols, and identify other innovative technologies to expedite incident response times. By reducing response times and the time it takes to clear an incident, capacity bottlenecks could be removed sooner, allowing traffic to resume normal operations as soon as possible.

#### Intelligent Transportation Systems

ITS strategies encompass a broad range of communication-based information, control, and electronics technologies that help monitor and manage traffic flow, reduce congestion, and provide alternate routes to travelers. Specific ITS elements that would be combined with each action alternative are an advanced traveler information system and a weather information system. Ramp metering will continue to be implemented as a mobility enhancement

measure to minimize conflicts at freeway entrance points as part of the GPL Alternative.

Advanced traveler information systems include such technologies as electronic variable message signs and other systems to communicate data directly to commuters. These systems deliver data directly to travelers, allowing them to make better choices about alternate routes or transportation modes. Systems include variable message signs, radio, television, internet, closed circuit television, traffic counters, speed monitors, and accident notification.

Installation of a remote weather system along the C-470 Corridor would provide updated weather conditions to maintenance crews, thus enabling them to make more responsive decisions on maintenance activities to help enhance safety and mobility. Weather information could also be provided to travelers to aid in trip planning.

### Bicycle and Pedestrian Trails

The GPL Alternative would reconstruct 7.5 miles of the C-470 trail. Generally, the trail is shifted northerly 40 to 50 feet to allow roadway widening. In addition to this linear trail reconstruction, the trail would be realigned and reconstructed at three locations to provide a grade-separated crossing of the arterial streets intersecting C-470. One location is at the new Santa Fe Drive interchange, where grade separation structures would be incorporated into the reconstructed interchange. A second location is at the Colorado Boulevard overpass where no interchange exists. The lack of an interchange at this location facilitates the realignment of the trail under the bridge without any ramp conflicts. Trail spurs would connect the trail to sidewalks on Colorado Boulevard. The third location is at Quebec Street, where the trail would be realigned to pass under the Quebec Street bridge. Because of the interchange at Quebec Street, ramp underpass structures are included in the alternative. A separate discussion regarding effects to the C-470 trail is included in **Section 3.3.16**.

### 2.4.2.4 Cost

The total cost for the GPL Alternative was estimated at \$255 million. Of this, the Santa Fe Drive interchange cost is \$60 million. These costs are in 2005 dollars.

## 2.4.3 Express Lanes Alternative

The EL Alternative would add up to four tolled express lanes to the existing four general purpose lanes, from Kipling Parkway to I-25, improve ramps for the general purpose lanes, and reconstruct the Santa Fe Drive interchange.

### 2.4.3.1 Typical Section

The express lanes typical section is generally a four-lane, barrier-separated facility constructed in the center of a four-lane general purpose lanes facility. From Kipling Parkway to Platte Canyon Road, the laneage varies in that there are only two express lanes. From Kipling Parkway to Wadsworth Boulevard, the express lanes are not physically separated from the general purpose lanes. Beginning east of Wadsworth Boulevard, the roadway widens to include a four foot buffer-separation between the express lanes and general purpose lanes in each direction. Barrier-separation and an additional express lane in each direction begins east of Platte Canyon Road and continues east to I-25. The term buffer refers to a safety zone between the two facilities delineated by paint stripes only. By using this typical section, most widening could occur within the existing median, minimizing effects. The typical section is illustrated in **Figure 2-8**.

The segment between Platte Canyon Road and I-25, also shown in **Figure 2-8**, would require widening and overlaying the existing pavement to the outside to accommodate the necessary roadway width. Shoulder width would vary to accommodate existing geometric constraints. The overall roadway width for the section between Kipling Parkway and Platte Canyon Road is 110 feet; from Platte Canyon Road to I-25, the width is 162 feet.



**2.4.3.2 Access Locations**

Because the EL Alternative consists of two parallel facilities, access to the express lanes is different than for the general purpose lanes. The configuration of each is described herein, and illustrated in Figure 2-9.

**Access Locations for Express Lanes**

Access to the express lanes would be provided at Kipling Parkway, Wadsworth Boulevard, between Lucent Boulevard and Broadway, between Broadway and University Boulevard, Quebec Street, Colorado Boulevard, and I-25. Some locations have full access (ingress and egress), while others have only partial access. Access is provided via slip ramps at Kipling Parkway, Wadsworth Boulevard, between Lucent Boulevard and Broadway, and between Broadway and University Boulevard. T-ramps would provide direct access to the express lanes at Colorado Boulevard. Access at I-25 consists of a combination of both slip ramps and partial direct connection ramps, depending on the movement.

**Access Locations for General Purpose Lanes**

Access to the general purpose lanes would replicate existing conditions, with the exception of Santa Fe Drive, where a new interchange configuration is included as part of the alternative.

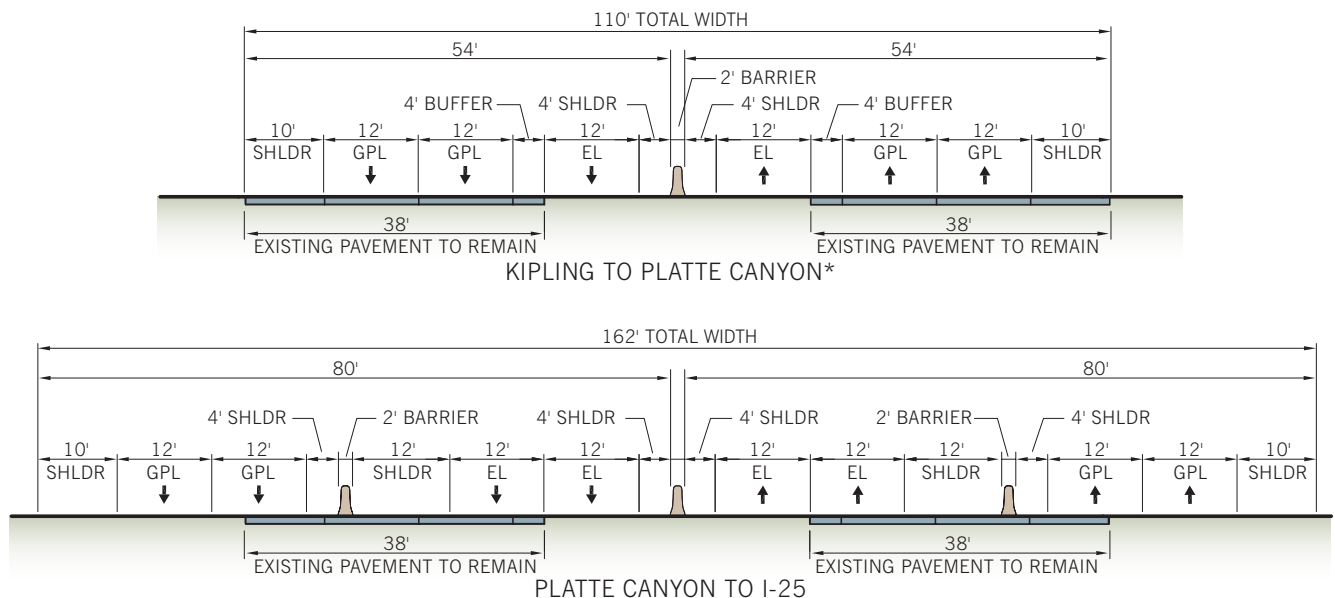
**SANTA FE DRIVE INTERCHANGE.**

The Santa Fe Drive interchange would be reconstructed under the EL Alternative in the same way as under the GPL Alternative, as shown in Figure 2-7. The only difference between the two is that the EL Alternative would have only one lane exiting westbound at Santa Fe Drive, whereas the GPL Alternative would have two.

**COLORADO BOULEVARD INTERCHANGE.**

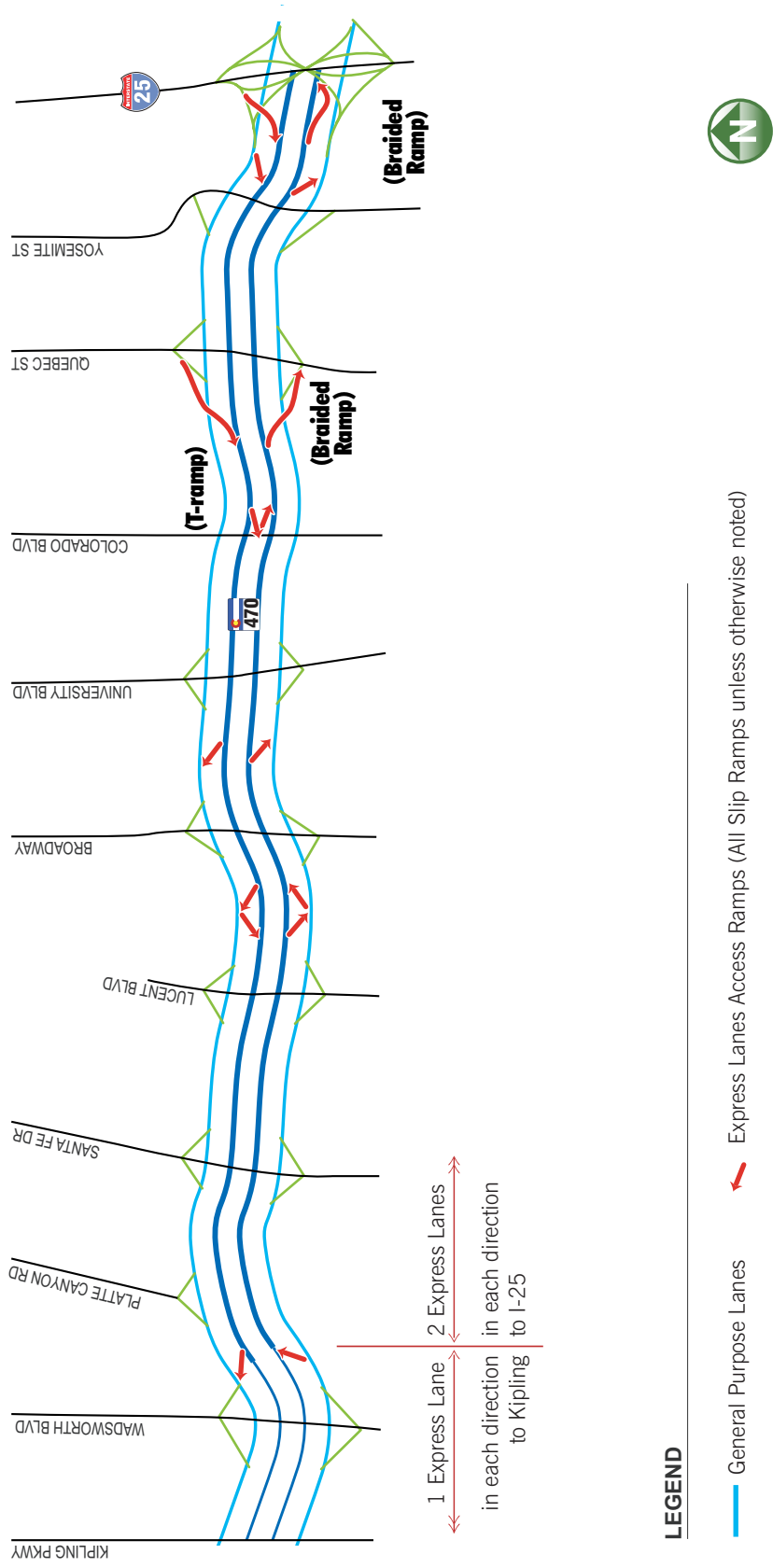
The EL Alternative would add access at Colorado Boulevard to the express lanes only. No access would be provided to the general purpose lanes. A T-ramp interchange configuration would be used to provide direct access to the express lanes to and from the east only (westbound off and eastbound on).

**Figure 2-8  
Express Lanes Alternative Typical Section**



\* Typical section from Kipling to Wadsworth does not include buffer separation. Total pavement width is 100'.

**Figure 2-9**  
**Express Lanes Alternative Access Types and Locations**



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**I-25 INTERCHANGE.** The I-25 interchange would require substantial reconfiguration to accommodate the EL Alternative. As a result, several configurations were evaluated. The final layout determined to best serve traffic operations for all facilities at the interchange is included in the EL Alternative. The final configuration is shown in **Figure 2-10**. Direct connections are provided to the C-470 express lanes from southbound I-25 and from eastbound express lanes to northbound I-25 to accommodate heavy volumes to and from the north toward Denver. Express lanes access to and from I-25 to the south are accommodated with slip ramp access just east of Yosemite Street.

congestion rather than solve it by adding capacity. The concept is to provide an alternative choice to congestion, rather than continuing to add more capacity as traffic increases and the lanes become congested again. The ability to provide a congestion-free facility is greatly enhanced by charging tolls to users, which would provide a mechanism to manage the volume in the lanes and thereby hold congestion to acceptable levels.

Because traffic volumes vary throughout the day, so too would the tolls charged to use the express lanes. During peak periods of heavy congestion, toll prices would be the highest in response to facility demand. During off-peak periods of lighter congestion, the toll would be lowered to reflect less demand. This strategy reflects the concept of value pricing, meaning that the price to use the facility varies in direct relation to the demand for it.

**2.4.3.3 Managed Lanes Concept**

The EL Alternative represents an emerging congestion management strategy called managed lanes, which seeks to manage

**Figure 2-10  
I-25 Interchange Express Lanes Alternative**

