

#### 8.4.7 Express Lane and General Purpose Lane Operations

Consideration was also given to how the access point affected operations in both the express lanes and general purpose lanes. The goal of the express lane facility was to minimize its impacts it had on the operations of the general purpose lanes. Also, potential impacts to operations within the express lanes were evaluated to ensure that reliability and LOS C/D standards were maintained. The locations identified as having operational impacts to both the express lanes and general purpose lanes included I-25, Quebec Street, and Wadsworth Boulevard. Due to high volumes on both facilities in these locations, evaluating direct access was recommended. University Boulevard and Santa Fe Drive showed impacts to the operations of the general purpose lanes only. The remaining locations showed minimal impact to either facility.

#### 8.4.8 Access Spacing

To provide the free flowing traffic conditions and reliability a toll paying customer expects, limited facility access is required. Ideally, access locations should be spaced intervals of at least 2 miles to minimize turbulence caused when successive access points are introduced. The type of access ramps being considered also effects the spacing of access points. With a slip ramp, the access point will need to be positioned to provide a driver the opportunity to complete the weaving maneuver. The majority of access locations remaining in the screening process meet the 2-mile guideline, with the exception of the points between Santa Fe Drive and University Boulevard. With four access points spread over approximately 4 miles of the corridor, the number of access points needed to be reduced to approximately one location.

#### 8.4.9 Financial Feasibility

The financial feasibility factor was used to compare the projected net toll revenue to the estimated capital costs for the various access configurations. Based on the assumptions noted below, the initial financial feasibility for the final access configuration was calculated to be 0.26. (Note that the feasibility was then revised in a subsequent process of optimizing the traffic and revenue, which is discussed in Section 9.0.)

- \$6 value of time
- Opening year toll rate of \$0.12
- Toll rate increase every 5 years
- Toll collection during the peak hours
- Express lane capital costs only
- Express lane shoulder width of 12-foot outside shoulders and 10-foot inside shoulders
- \$0.09 per transaction for E-470 processing transactions
- 6.25% bond rate
- 1.25 coverage rate

#### 8.4.10 Selection of Final Access Configuration

Based on the screening analysis, the final recommendation of access points was determined. Access will be provided at I-25, Quebec Street, Colorado Boulevard, Lucent Boulevard, and Wadsworth Boulevard.

With I-25 and Quebec Street having very high volumes and potential operational problems, both were evaluated in the optimization phase to determine the operation benefits of providing direct access at these locations.

The Colorado Boulevard access has high demand and good operations due to the proposed direct access, good access spacing, and good reserve capacity, making it a logical choice for recommendation.

University Boulevard was eliminated based on its having the lowest demand of the four interchange locations between Santa Fe Drive and University Boulevard. It was determined that providing access in the vicinity of Broadway and Lucent Boulevard would provide good spacing, while potentially drawing traffic from the Santa Fe Drive and University Boulevard locations. With Lucent Boulevard providing a higher reserve capacity than Broadway, the access point in this section is proposed for Lucent Boulevard. The Lucent Boulevard location will also provide access to a potential future express bus service that might originate from the existing Santa Fe Drive/Mineral Avenue or Lucent Boulevard park-n-Ride location. The operations at Lucent Boulevard required further evaluation during the alternative refinement stage to determine whether a slip ramp access can accommodate the projected demand.

The access at Santa Fe Drive was eliminated due to relatively low demand, high geometric constraints, and associated construction costs.

The Wadsworth Boulevard location has high demand, good spacing, and moderate reserve capacity. The operations along both the express lanes and general purpose lanes needed to be evaluated during the refinement stage to determine whether the express lanes should be extended past Wadsworth Boulevard to Kipling Parkway to disperse the express lane traffic.

Table 8.6 summarizes the results of the analysis performed under each criterion.

**Table 8.3  
Fourth Level Screening Summary**

Express Lane Access Location Quantitative Screening Analysis								
Access Locations	Average PM Peak Hour EL Ramp Volumes	Interchange Reserve Capacity	Geometric Constraints	Toll/Non Toll Lane Operations	Access Spacing	Description	Disposition	
I-25	High	Moderate	High	Poor / Poor	Good	High demand with poor operations. Evaluate need for direct access.	Carried Forward	√
Quebec	High	Moderate	Low	Poor / Poor	Good	High demand with poor operations. Evaluate need for direct access.	Carried Forward	√
Colorado	High	High	Low	Good / Good	Good	Evaluate need for express lane auxiliary lane between Quebec and Colorado.	Carried Forward	√
University	Moderate	Low	Low	Moderate / Poor	Moderate does not	Moderate volumes with low reserve capacity. RTD require bus access due to short trip to I-25.	Eliminated	X
Broadway	High	Low	Low	Moderate / Moderate	Moderate	Evaluate limiting access in some directions to reduce impact to reserve capacity.	Carried Forward	√
Lucent	Moderate	Moderate	Low	Good / Moderate	Moderate	Access would draw a portion of the Santa Fe/RTD traffic with good reserve capacity.	Carried Forward	√
Santa Fe	Low	Low	High	Moderate / Poor	Moderate	Geometric constraints would require expensive access combined with low volume.	Eliminated	X
Wadsworth Blvd.	High	Moderate	Moderate	Poor / Poor	Good	Evaluate extension of express lanes to Kipling to allow dispersion of traffic.	Carried Forward	√

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