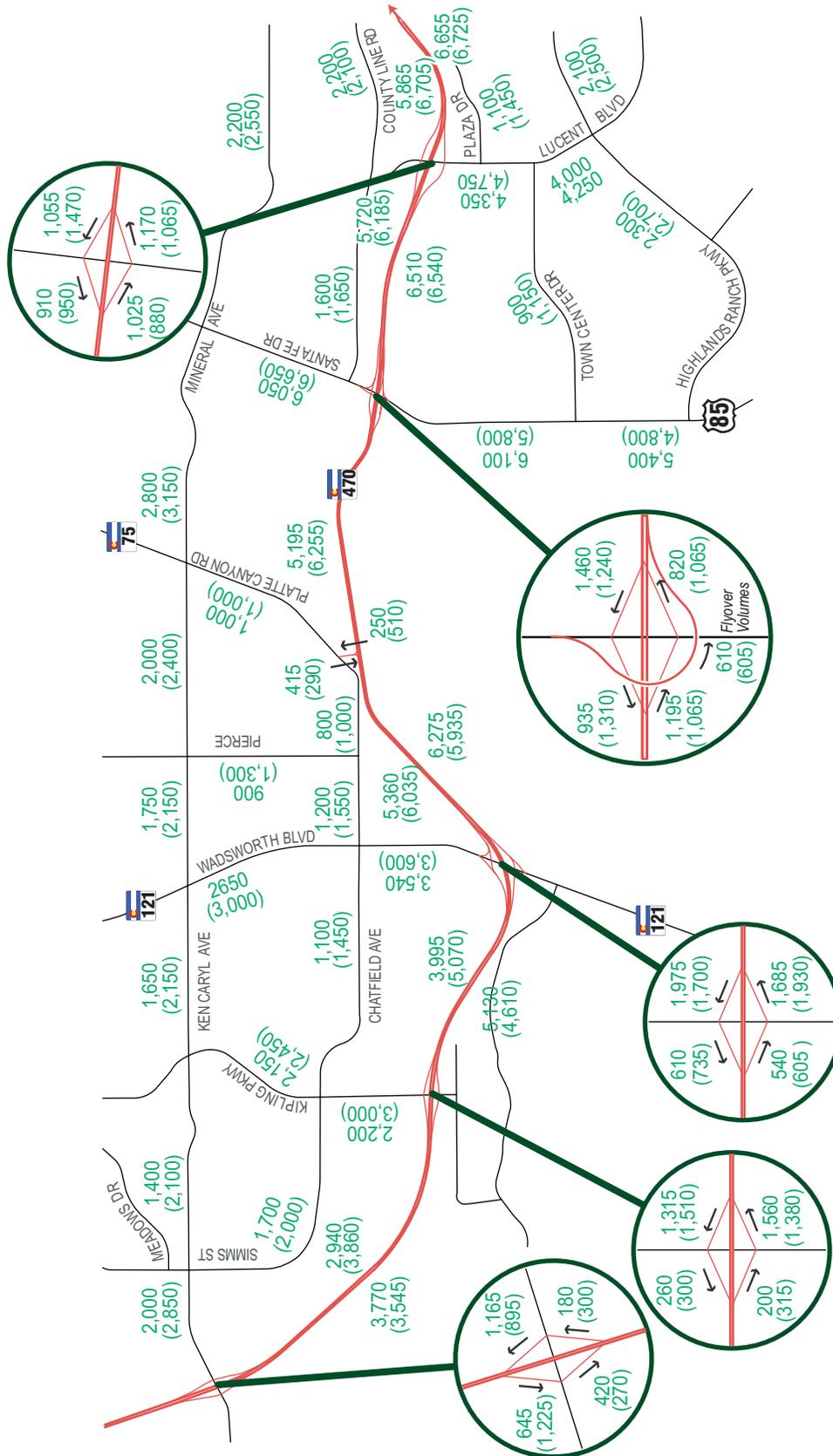


Figure 3-13a
2025 General Purpose Lanes Alternative Traffic Volumes



Legend

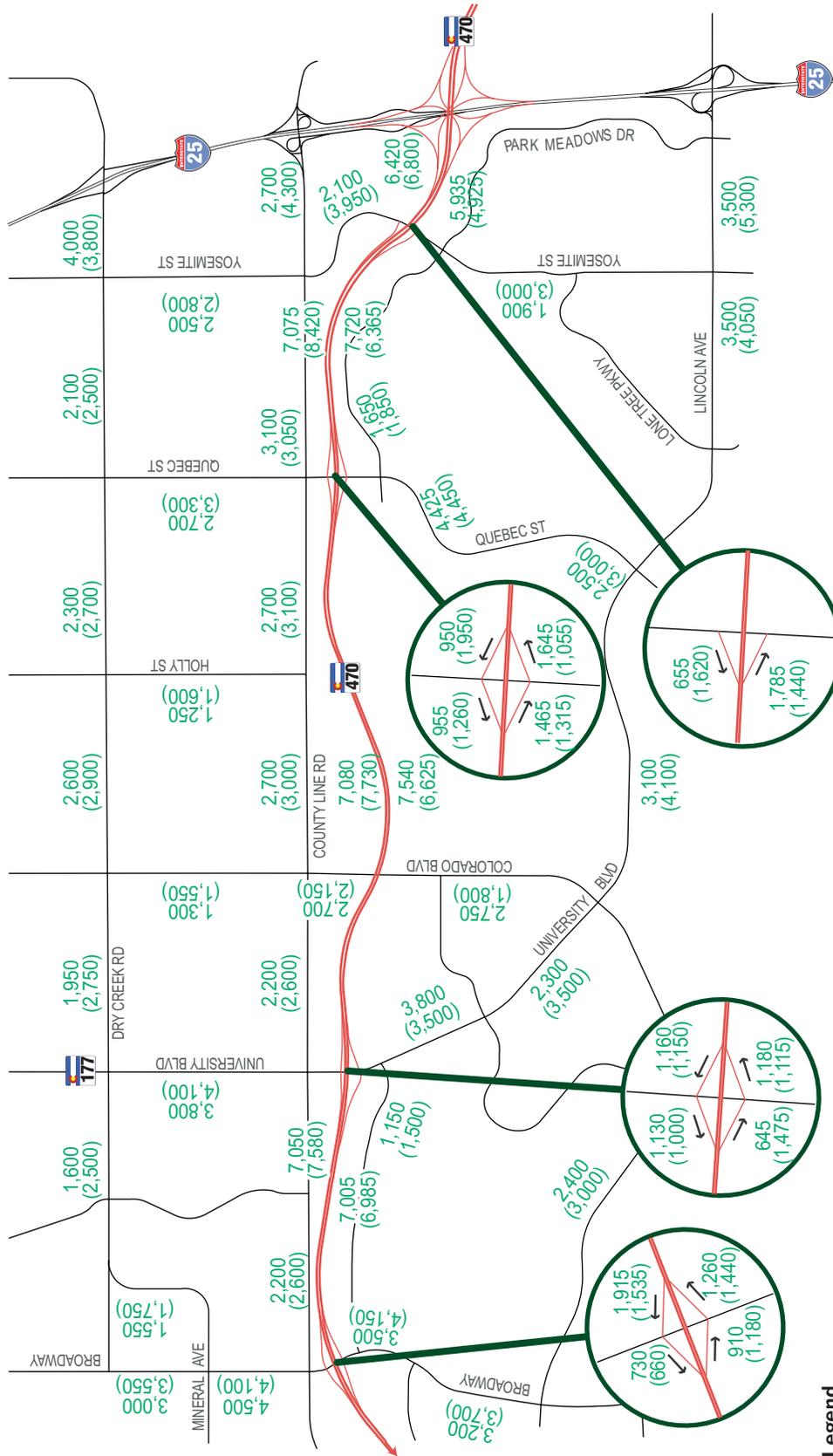
XXX 2025 AM Peak Hour Traffic Volumes
 (XXX) 2025 PM Peak Hour Traffic Volumes



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Figure 3-13b
2025 General Purpose Lanes Alternative Traffic Volumes



Legend

XXX 2025 AM Peak Hour Traffic Volumes
 (XXX) 2025 PM Peak Hour Traffic Volumes



1 peak hour, average travel times are predicted
 2 to be 17 to 19 minutes. The GPL Alternative
 3 demonstrates a travel time reduction of 16 to
 4 19 minutes during the AM peak hour and 12
 5 to 17 minutes during the PM peak hour
 6 compared to the No-Action Alternative in
 7 2025. The projected future travel times under
 8 the GPL Alternative also demonstrate a four-
 9 to nine-minute travel time reduction during
 10 AM peak hour, and a two- to 12-minute
 11 reduction during the PM peak hour
 12 compared to existing peak hour travel times.

14 **FREEWAY VEHICLE MILES OF TRAVEL 15 AND VEHICLE HOURS OF TRAVEL.**

16 The reported VMT and VHT for each peak hour
 17 is shown in **Table 3-20**.

19 With the increased capacity of the GPL Alter-
 20 native, peak hour VMT would increase by 61
 21 percent over the No-Action Alternative.
 22 However, peak hour VHT would decrease by
 23 23 percent in the AM peak hour and 30
 24 percent in the PM peak hour. Even though
 25 C-470 traffic would increase with the GPL
 26 Alternative, overall improvement in capacity
 27 and freeway speeds with this alternative
 28 would result in less time spent on the
 29 freeway.

31 **TRAVEL PATTERNS.** The additional
 32 capacity provided by the GPL Alternative
 33 would result in a higher-intensity peak
 34 period, but for a shorter amount of time for
 35 both the freeway and arterial street system as
 36 compared to the No-Action Alternative. This
 37 effect would provide reasonable and reliable
 38 traffic operations along C-470 as compared to
 39 the No-Action Alternative. The additional
 40 capacity provided is not expected to substan-
 41 tially change travel patterns within the
 42 project area compared to the No-Action
 43 Alternative. The limitation on arterial street
 44 capacity influences the ability of traffic to
 45 redistribute, and constrains the amount of
 46 traffic that can get to and from C-470.

51 Compared to the No-Action Alternative, the
 52 traffic volumes on the arterial street system
 53 would be 15 to 20 percent higher on
 54 Wadsworth Boulevard, Kipling Parkway,
 55 and sections of Chatfield Avenue. On
 56 Broadway, the GPL Alternative PM peak
 57 hour traffic volumes are projected to be
 58 approximately 10 to 15 percent higher, on
 59 Lucent Boulevard 18 to 22 percent higher,
 60 and on University Boulevard 10 to 30 percent
 61 higher. Volumes for the GPL Alternative are
 62 projected to be 10 to 20 percent greater than
 63 the No-Action Alternative on County Line
 64 Road and Quebec Street.

66 **INTERCHANGE AND ARTERIAL INTER- 67 SECTION OPERATIONS.**

68 In evaluating the effects of the GPL Alternative on inter-
 69 changes and other arterial intersections in the
 70 study area, there are many intersections that
 71 must be considered. Analysis was performed
 72 on all these locations in the study area to
 73 determine the effects that would be caused
 74 by the build alternatives. The discussion
 75 herein focuses primarily on those locations
 76 that experienced adverse effects requiring
 77 mitigation.

79 In making the determination of whether
 80 mitigation is required, consistency among
 81 projects in the Denver region was important.
 82 Planners must try to attribute long-term
 83 intersection improvements to the subject
 84 project versus other factors that contribute to
 85 traffic growth over time.

87 In order to determine whether adverse
 88 effects of this project would require
 89 mitigation, performance criteria were
 90 developed that are considered to be
 91 consistent with the approach taken by other
 92 projects in the Denver region. Consideration
 93 of potential effects was limited to ramp
 94 terminal intersections and one adjacent inter-
 95 section on either side of the C-470 mainline.
 96 The resulting LOS that would be associated
 97 with each build alternative was then
 98 compared to that which would have existed

Table 3-22
Performance Criteria for Determining Effects Caused by Project

2025 No Action Condition	Build Alternative Condition	Resulting Action
LOS F	LOS F plus 20 seconds delay more than No Action	mitigation required
LOS F	LOS A – E, or LOS F with delay no greater than 19 seconds more than No Action	no mitigation required
LOS E	LOS F	mitigation required
LOS E	LOS A – E	no mitigation required
LOS A – D	LOS E – F	mitigation required
LOS A – D	LOS A – D	no mitigation required

Table 3-23a
Interchange and Arterial Intersections with Mitigation
Comparison of 2025 AM Peak Delay and Level of Service

Intersection	No-Action Alternative		GPL Alternative		EL Alternative	
	Average Delay (seconds)	LOS	Average Delay (seconds)	LOS	Average Delay (seconds)	LOS
Lucent Boulevard/County Line Road	22.2	C	23.4	C	30.0	D
Broadway/County Line Road	49.5	D	80.0	E/F	84.6	F
University Boulevard/County Line Road	44.7	D	60.6	E	63.8	E
Colorado Boulevard/County Line Road	50.8	D	50.3	D	66.8	E
Quebec Street/County Line Road	45.1	D	57.0	E	70.3	E

Table 3-23b
Interchange and Arterial Intersections with Mitigation
Comparison of 2025 PM Peak Delay and Level of Service

Intersection	No-Action Alternative		GPL Alternative		EL Alternative	
	Average Delay (seconds)	LOS	Average Delay (seconds)	LOS	Average Delay (seconds)	LOS
Lucent Boulevard/County Line Road	25.2	C	27.1	C	34.5	C
Broadway/County Line Road	83.7	F	>100.0	F	91.7	F
University Boulevard/County Line Road	72.5	E	>100.0	F	>100.0	F
Colorado Boulevard/County Line Road	55.3	E	65.9	E	69.1	E
Quebec Street/County Line Road	>100.0	F	>100.0	F	>100.0	F

without the improvement. **Table 3-22** describes the magnitude of change between the No-Action condition and the build condition that requires mitigation.

Tables 3-23a and **3-23b** present those intersections which meet the performance criteria for requiring mitigation for either of the two build alternatives, and compare them to conditions that would exist under the No-Action condition. Of the 55 signalized intersections where traffic operations were evaluated for the GPL Alternative, 44 intersections would operate at LOS D or better during the AM peak hour, and 38 intersections during the PM peak hour would operate at LOS D or better. Those intersections projected to operate at LOS E or worse are located along County Line Road from Broadway to Yosemite Street, and along Dry Creek Road from University Boulevard to Yosemite Street. Projected intersection operations are generally consistent between the No-Action and GPL Alternatives. From this assessment, it can be concluded that the intersections affected by the GPL Alternative are County Line Road at Lucent Boulevard, Broadway, University Boulevard, Colorado Boulevard, and Quebec Street. Discussion regarding EL Alternative effects can be found in that section.

SAFETY. Capacity improvements included in the GPL Alternative would result in significant safety benefits in addition to the targeted operational improvements. Generally, freeway facilities of six or more lanes are expected to have fewer accidents than four-lane facilities carrying the same amount of traffic. This can possibly be explained by increased gap availability for weaving, merging, and diverging. Increased capacity, therefore, also yields a safety dividend. Although data establishing the safety benefits of corridor expansion from six to eight lanes are not readily available in Colorado, a conservative estimate of 10 percent reduction in accidents

may be a reasonable assumption, as explained in the *Safety Chapter for the C-470 Corridor Environmental Assessment* (February 2005). Therefore, the GPL Alternative which would expand C-470 from four lanes to eight lanes is expected to yield a total reduction in overall, mainline vehicular collisions of approximately 30 percent. As explained in the *Safety Chapter for the C-470 Corridor Environmental Assessment* (February 2005), a 20 percent reduction would be achieved by increasing laneage from four to six lanes, and another 10 percent reduction by increasing laneage from six to eight lanes. The GPL Alternative is also expected to address geometric problems at interchanges identified in the existing conditions analysis.

SANTA FE DRIVE INTERCHANGE.

Improvements to the Santa Fe Drive interchange were included as part of the GPL Alternative. These improvements consist of an improved diamond interchange with one flyover. The southbound to eastbound flyover from Santa Fe Drive would allow for vehicles to enter C-470 at 45 mph and then merge onto eastbound C-470 past the steep incline section east of Santa Fe Drive. Another benefit of the flyover is that approximately 1,000 vehicles during the peak hours would not have to travel through the Santa Fe Drive/County Line Road or the C-470 ramp terminal intersections. These vehicles would be accommodated by the southbound to eastbound flyover, thereby reducing vehicle demand at these intersections.

As shown in **Tables 3-21a** and **3-21b**, the interchange intersections along Santa Fe Drive are projected to operate at LOS D or better during 2025 peak hour conditions with the GPL Alternative with the exception of Highlands Ranch Parkway intersection projected to LOS F. The northbound through-vehicle queues at the County Line Road/Santa Fe Drive intersection are projected to extend south past the C-470 north ramp

terminal intersection under this alternative during the PM peak hour.

I-25 INTERCHANGE. The I-25 interchange would accommodate 35 to 50 percent higher volumes on most ramps in the GPL Alternative compared to the No-Action Alternative. As a result, the northbound I-25 to C-470/E-470 and the C-470/E-470 to southbound I-25 ramps would operate at LOS F due to lack of capacity. This would cause vehicle queuing, delays at the interchange and on mainline I-25, C-470, and E-470. Weave movements on I-25 between the C-470/E-470 interchange and the Lincoln Avenue interchange are projected to operate at LOS F and affect adjacent interchanges in addition to mainline I-25 operations. More information on I-25 interchange design and operations can be found in *I-25 Lane Configuration – County Line to Lincoln*, (February 9, 2005) as discussed in **Chapter 5**.

Express Lanes Alternative (Preferred Alternative)

Capacity and operational improvements included in this alternative decreased congestion and delay on C-470 and improved the reliability of the highway facility.

FREEWAY VOLUMES AND OPERATIONS.

Similar to the GPL Alternative freeway volumes, the EL Alternative AM peak hour volumes would be higher than for the 2025 No-Action Alternative volumes by 15 to 25 percent in portions of the corridor west of Santa Fe Drive and by approximately 30 to 35 percent east of Santa Fe Drive. The EL Alternative PM peak hour volumes would be higher than the No Action volumes by 15 to 30 percent west of Santa Fe Drive and by 40 to 60 percent east of Santa Fe Drive. Similarly, the EL Alternative PM peak hour volumes would be higher than those for the No-Action Alternative volumes by 10 to 25 percent west of Santa Fe Drive and by 30 to 50 percent east of Santa Fe Drive. 2025 AM and PM peak hour traffic volumes on C-470

and the surrounding arterial street system for the EL Alternative are shown in **Figure 3-14a** and **Figure 3-14b**.

With the EL Alternative, the tolled express lanes section and the general purpose lanes section of the facility would be barrier-separated and have different operational characteristics. The express lanes section is predicted to operate at LOS D or better in the peak direction and at LOS C or better in the off-peak direction. (**Table 3-18** summarizes the duration of peak periods in 2025.) The congestion period in the express lanes would last for under one hour. The general purpose lanes section is projected to operate at LOS E or F in the AM and PM peak periods in both directions. The duration of congestion in the general purpose lanes section would last for approximately five hours. Forecasted 2025 traffic operations are summarized in **Tables 3-17a** and **3-17b**.

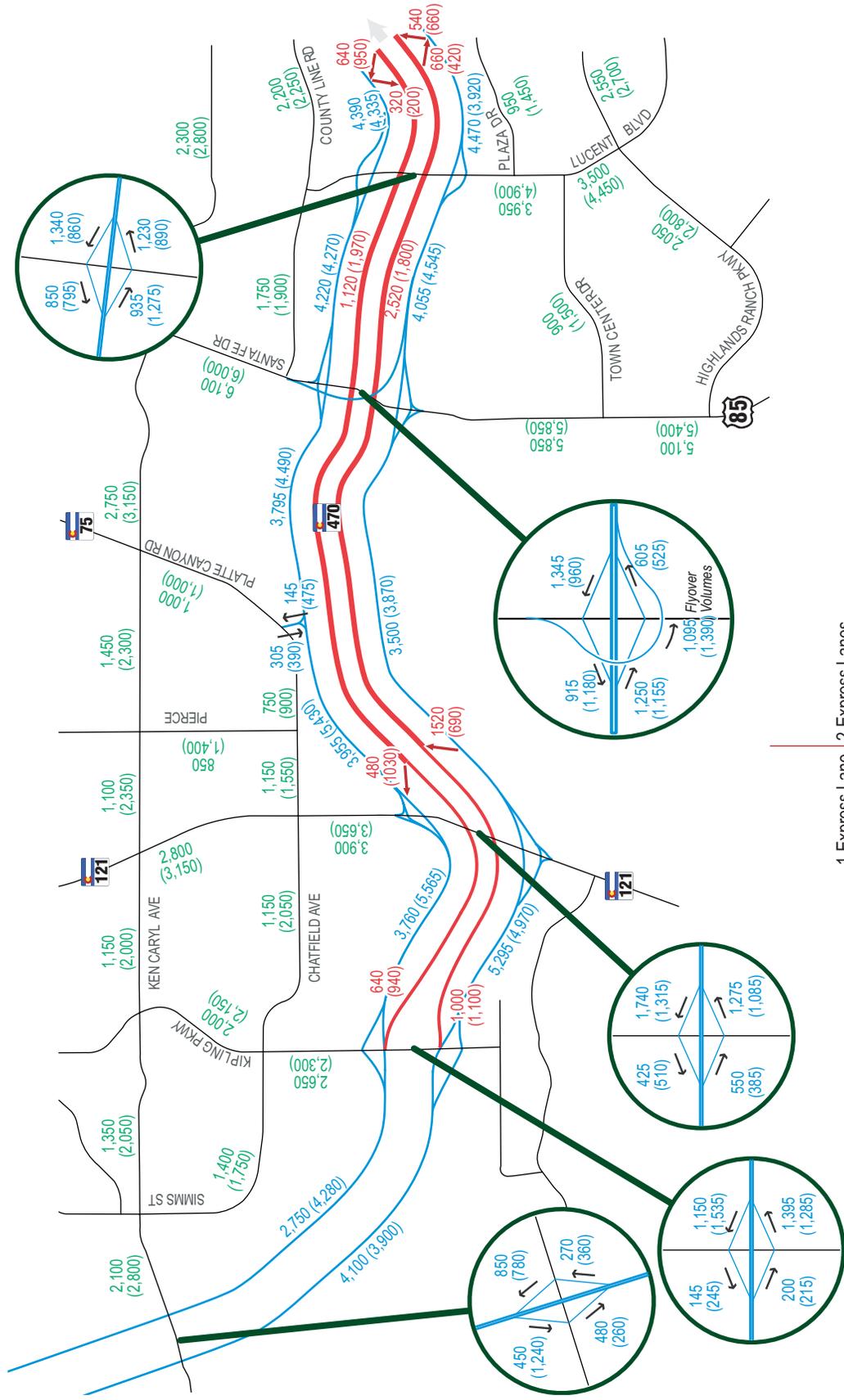
FREEWAY TRAVEL TIMES. The travel time in the express lanes section from Kipling Parkway to I-25 would be approximately 11-14 minutes in the peak direction. Travel time in the general purpose lanes section for the same stretch is 28 to 32 minutes in the peak direction. Travel times in the express lanes section of the EL Alternative would be 18 to 23 minutes lower than the No-Action Alternative. Travel times in the general purpose lanes section would be three to nine minutes lower than in the No-Action Alternative. The forecasted AM and PM peak-hour travel times are shown in **Table 3-19**.

FREEWAY VEHICLE MILES OF TRAVEL AND VEHICLE HOURS OF TRAVEL. VMT and VHT for each peak hour are reported in **Table 3-20**.

VMT for the EL Alternative would increase by approximately 58 percent, compared to the No-Action Alternative. However, peak hour VHT would decrease by approximately three percent in the AM and PM peak hours.

Figure 3-14a
2025 Express Lanes Alternative Traffic Volumes

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1 Express Lane in each direction to Kipling to I-25
 2 Express Lanes in each direction to Kipling to I-25

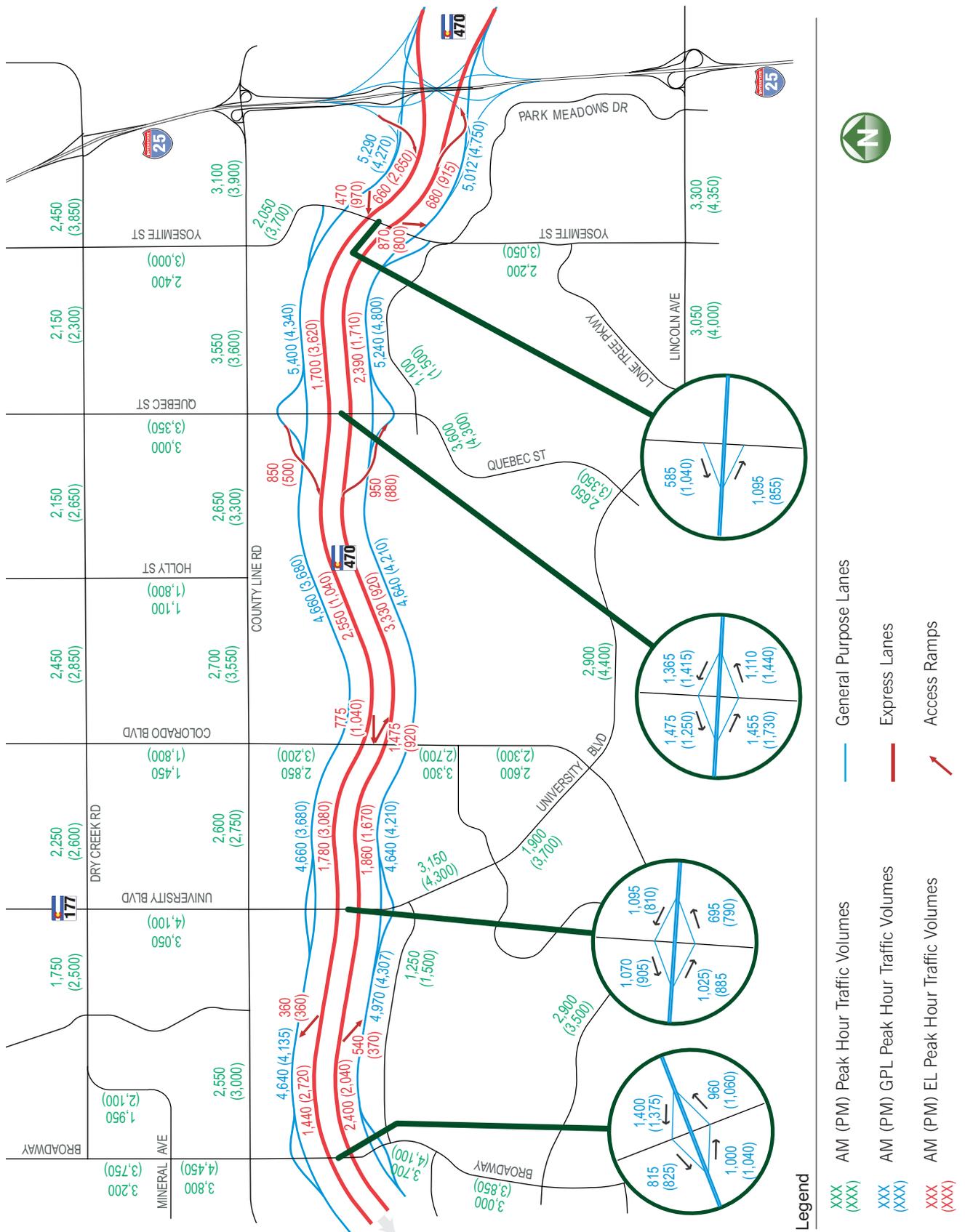
Legend

- AM (PM) Peak Hour Traffic Volumes
- AM (PM) GPL Peak Hour Traffic Volumes
- AM (PM) EL Peak Hour Traffic Volumes
- General Purpose Lanes
- Express Lanes
- Access Ramps



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Figure 3-14b
2025 Express Lanes Alternative Traffic Volumes



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