US 85 Commuter Bus – Platteville DEIS Evaluation

August 20, 2007

Introduction

The North I-25 DEIS Package A alternative considers two commuter bus routes: one that would extend from the Denver Union Station (DUS), and a second that would extend from the Denver International Airport (DIA). Both routes will terminate in Greeley. Line stations will be located at designated existing transit stops in Denver, Commerce City, and Brighton, as well as new proposed stops in Fort Lupton, Platteville, Evans, and Greeley.

The proposed commuter bus route generally follows the existing US 85 alignment. The end-of-line station along with a parking/development opportunity is proposed in the vicinity of the US 85/D Street intersection in Greeley. A map of the proposed commuter bus routes showing the station locations is provided in Figure 1.

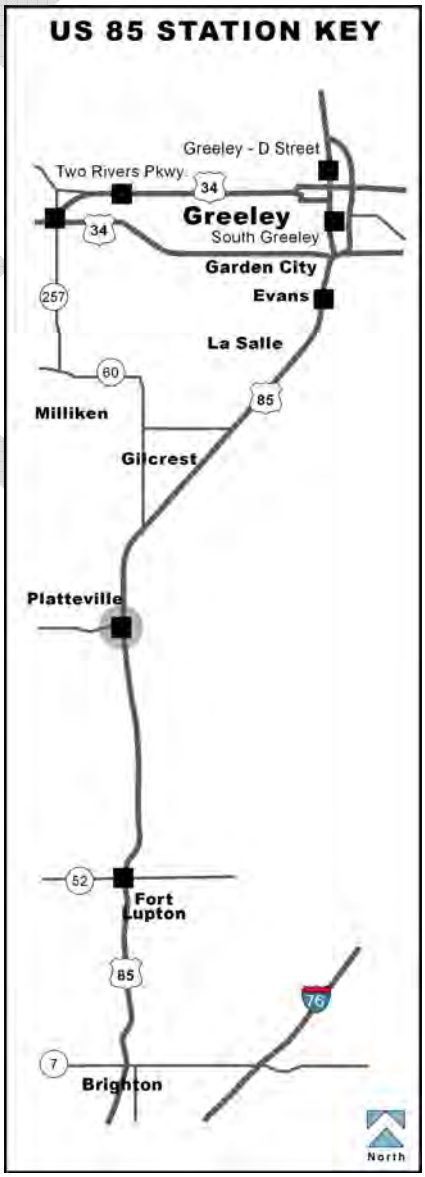

Figure 1. Vicinity Map

A commuter bus station is proposed in the vicinity of the US 85/SH 66 intersection in Platteville. This report documents the potential traffic impacts of the proposed commuter bus station and provides technical documentation of the traffic data analysis. The other proposed commuter bus stations are addressed in separate reports.

Existing Conditions

The proposed commuter bus station is located northeast of the SH 66/Main Street intersection and would have approximately 60 parking spaces. The surrounding area includes several land use types including residential, commercial, retail development, gas stations, and small offices.

The proposed study area includes the following major roadways and intersections:

United States Highway 85 (US 85)

US 85 is a four lane divided highway from I-76 exit 12 north through Brighton, Platteville, and Greeley to the north side of Ault. The expressway has grade-separated interchanges at SH 7, SH 52, US 34, and USB 85 (Business Route 85).

State Highway 66 (SH 66)

SH 66 is a major east-west highway in the North Front Range area. The east end of SH 66 is located at the US 85 junction in Platteville while the west end is located at the junction of US 36 east of Lyons. SH 66 connect places such as Lyons, Longmont, and Platteville.

US 85/SH 66 intersection

The US 85/SH 66 intersection is signalized. The posted speed limit on US 85 near the intersection is 50 mph and is 30 mph on SH 66. The intersection geometry on the eastbound approach consists of a single shared through/left turn lane and a right turn lane. The westbound approach consists of a single shared through/right/left turn lane. The southbound and northbound approaches consist of a through lane, a shared through/ right turn lane and an exclusive left turn lane. US 85 carries moderate southbound through traffic during the AM peak hour and moderate northbound through traffic during the PM peak hour.

SH 66/W. Frontage Road intersection

The SH 66/W Frontage Road/Vasquez Blvd. intersection is an unsignalized tee intersection. The posted speed limit near the intersection on both SH 66 and W. Frontage Rd. is 30 mph. SH 66 travels in the east-west direction and Frontage Road travels in the north-south direction. The intersection geometry on eastbound approach consists of a shared through/left turn lane. The westbound approach consists of a shared through/right turn lane. The southbound approach consists of a shared left/right turn lane.

SH 66/Main Street intersection

The SH66/Main Street intersection is unsignalized. The posted speed limit near the intersection on SH 66 is 30 mph and is 25 mph on Main Street. SH 66 runs in the east-west direction and the intersection geometry on the eastbound and westbound approaches consist of a shared through/right/left turn lane. Main Street runs in the north-south direction and the intersection geometry on the northbound and southbound approaches consists of a shared through/left/right turn lane.

Figure 2 summarizes the peak hour traffic counts collected in August 2006 and January 2007 within the study area. Additionally, the Average Daily Traffic (ADT) data was obtained from the North I-25 Travel Demand Model – 2001 base year. As shown, the average daily traffic on US 85 north of the US 85/SH 66 intersection is around 21,800 vehicles per day (vpd) and 15,500 vpd south of the intersection. The average daily traffic on SH 66 west of the US 85/SH 66 intersection is around 6,600 vpd. At the US 85/SH 66 intersection, the eastbound to southbound right-turning movement represents the highest turning volume during both the morning (165 vehicles per hour) and the afternoon peak hours (195 vehicles per hour).

Traffic Operations Evaluation

Operational analyses of each key intersection were conducted based on methodology developed in the Highway Capacity Manual (Transportation Research Board, 2000). The result of such analysis is a level of service (LOS) rating. Level of service is a qualitative assessment of the traffic flow based on the average stopped delay per vehicle at intersections controlled by traffic signals and stop-signs.

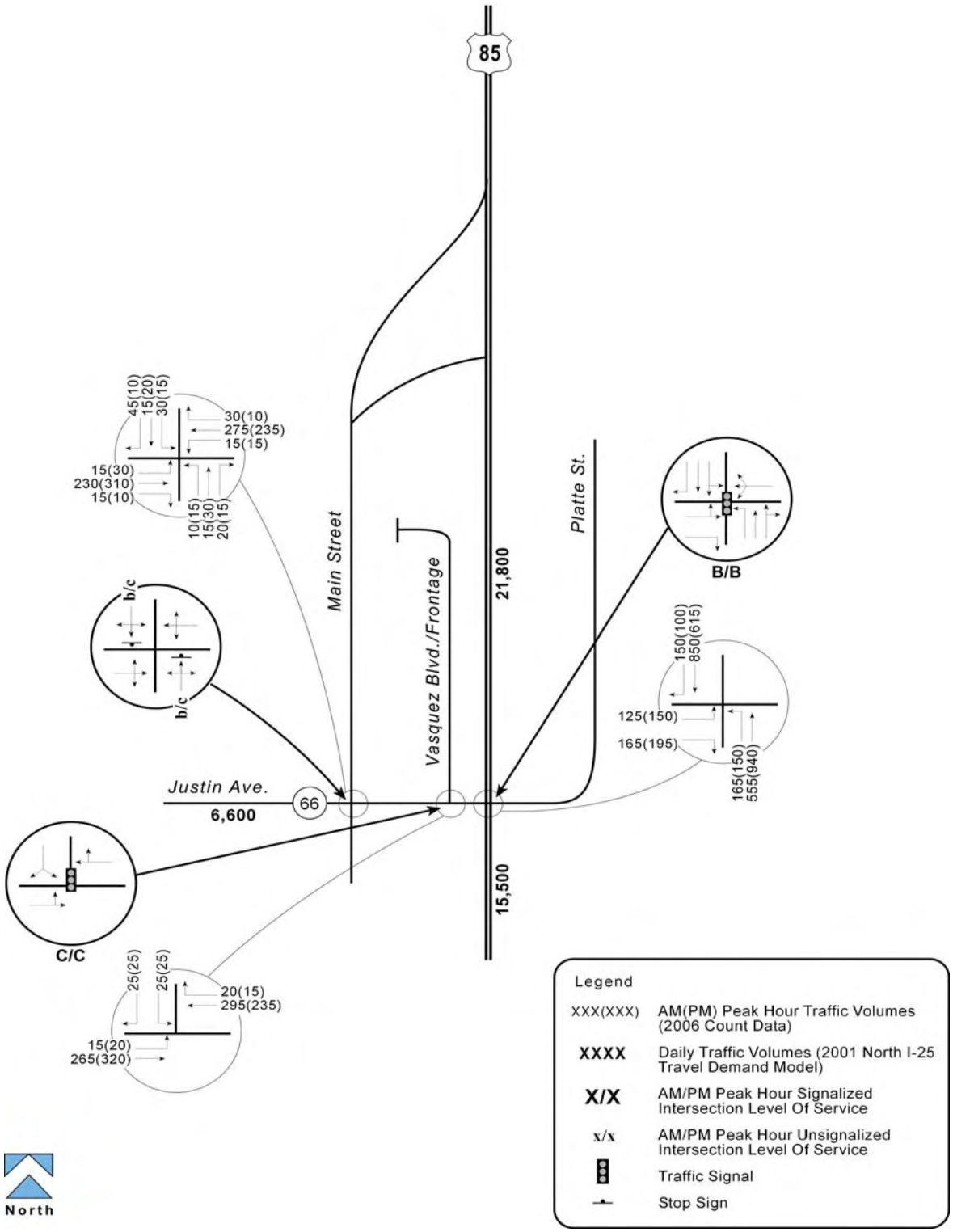

Figure 2. Existing Conditions

Levels of service are described by a letter designation ranging from "A" to "F", with LOS A representing essentially uninterrupted flow, and LOS F representing a breakdown of traffic flow with excessive congestion and delay. Signalized intersection analyses result in a level of service rating for each movement and for the entire intersection but typically only the level of service for the entire intersection is reported. For unsignalized intersections a level of service rating is determined for each turn movement that must yield to another turn movement but an overall level of service rating is not determined for the entire intersection. The following table shows how average stopped delay at controlled intersections equates to levels of service.

Table 1. Equivalent Level of Service to Average Stopped Delay

Level of Service	Average Delay at Signalized Intersections (sec./veh.)	Average Delay at Stop-Controlled intersections (sec./veh.)
A	0 to <=10	0 to <=10
B	> 10 to <= 20	> 10 to <= 15
C	> 20 to <= 35	> 15 to <= 25
D	> 35 to <= 55	> 25 to <= 35
E	> 55 to <= 80	> 35 to <= 50
F	> 80	> 50

Peak hour traffic counts were conducted in August 2006 and January 2007 at the study area intersections. Other background parameters are documented in the *DEIS Traffic Evaluation – Methodology Summary.*

Figure 2 and Table 2 illustrate the existing peak period levels of service at the signalized and unsignalized intersections within the study area. Currently, the US 85/SH 66 intersection operates at a Level of Service (LOS) B during both the AM and PM peak hours. The SH 66/W. Frontage Road intersection operates at LOS C during both the AM and PM peak hours. The southbound and northbound approaches of the SH 66/Main Street unsignalized intersection operate at LOS B during the AM peak hour and LOS C during the PM peak hour.

Table 2 Existing Intersection LOS and Delay

Intersection / Movement	Level of Service		Delay (seconds)	
	AM	PM	AM	PM
US 85/SH 66	B	B	13	17
SH 66/W. Frontage Road	C	C	22	29
SH 66/Main Street (unsignalized)				
Southbound Approach	B	C	15	17
Northbound Approach	B	C	14	17

2030 Conditions

2030 traffic projections were developed for the two alternatives being considered:

1) No Action Alternative
2) Package A: GPL + CR + CB 85

These packages are illustrated in Figures 3 and 4. Since there are no elements in the Platteville area in Package B, the No Action results are representative of Package B conditions. In developing peak hour turning movements at the study area intersections, the North I-25 Travel Demand Model – 2001 base year, 2030 No Action and 2030 Package A results were utilized to calculate the growth factors over a 29 year period. Since the actual traffic counts were conducted in year 2006, the growth factors were adjusted to reflect a 24 year growth rate. These growth factors along with existing turning movement data were used in the NCHRP 255 balancing procedure to develop 2030 peak hour turning movement forecasts. These forecasts were checked for balancing between intersections and reasonableness.

2030 No Action Traffic Volumes

The 2030 No Action daily and peak hour projections for the study area intersections are shown in Figure 5. As shown, the average daily volume on US 85 north of the SH 66/US 85 intersection is around 49,600 vehicles per day (vpd) and around 37,200 vpd south of the intersection. The average daily volume on SH 66 west of the SH 66/US 85 intersection is 12,600 vpd. During the AM peak hour major traffic flows are southerly from Platteville towards Fort Lupton, Brighton, and Denver. During the PM peak hour major traffic flows are northerly from Denver, Brighton, and Fort Lupton towards Platteville.

2030 Package A Traffic Volumes

The same methodology used to develop the 2030 No Action volumes was applied to estimate 2030 background traffic volumes for the Package A alternative. The North I-25 Travel Demand Model does not include park-and-ride patrons in its traffic assignment procedure. Therefore, in addition to these background forecasts – which are shown in Figure 6 – peak hour site traffic associated with the development of the commuter bus station and park-and-ride lot was estimated and assigned to the local road network according to the methodology outlined in the *Park-and-Ride Trip Generation and Distribution Methodology* report. A summary of this methodology and its application for this park-and-ride is provided below.

Park-and-Ride Trip Generation

The number of proposed spaces at the Platteville park-n-ride lot was determined using the methodology outlined in the *North I-25 DEIS Parking Results* report (Carter & Burgess, November 2006). Using the results of this report, trip generation is estimated at each site, by applying the following factors.

- First, a conservative estimate of maximum utilized spaces is determined by multiplying the number of spaces provided by 90 percent (or 0.9). This is referred to as the *number of occupied spaces*.

- Then, the number of occupied spaces is multiplied by the factors shown in Table 4.

Figure 3. No Action Alternative

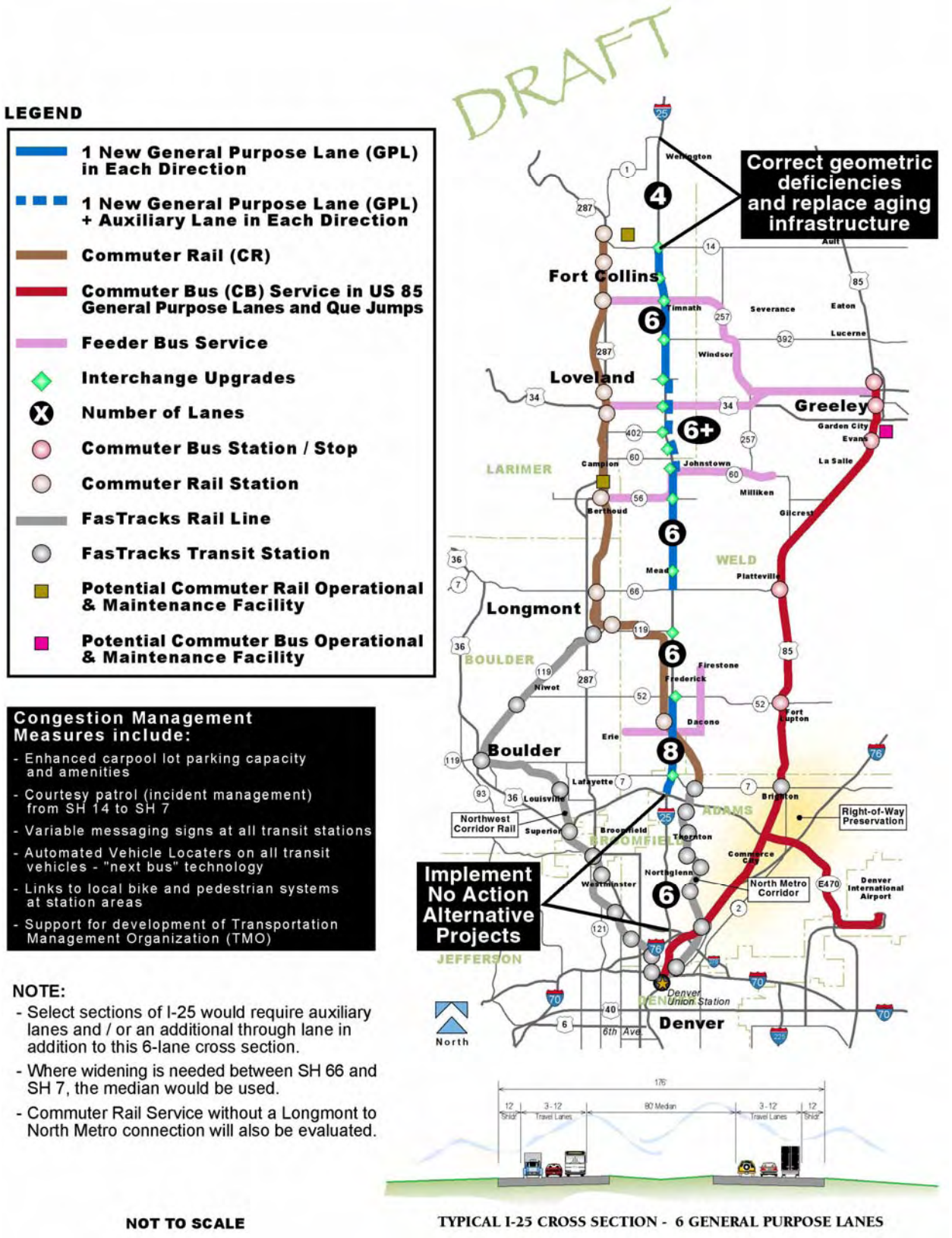

Figure 4. Package A Alternative

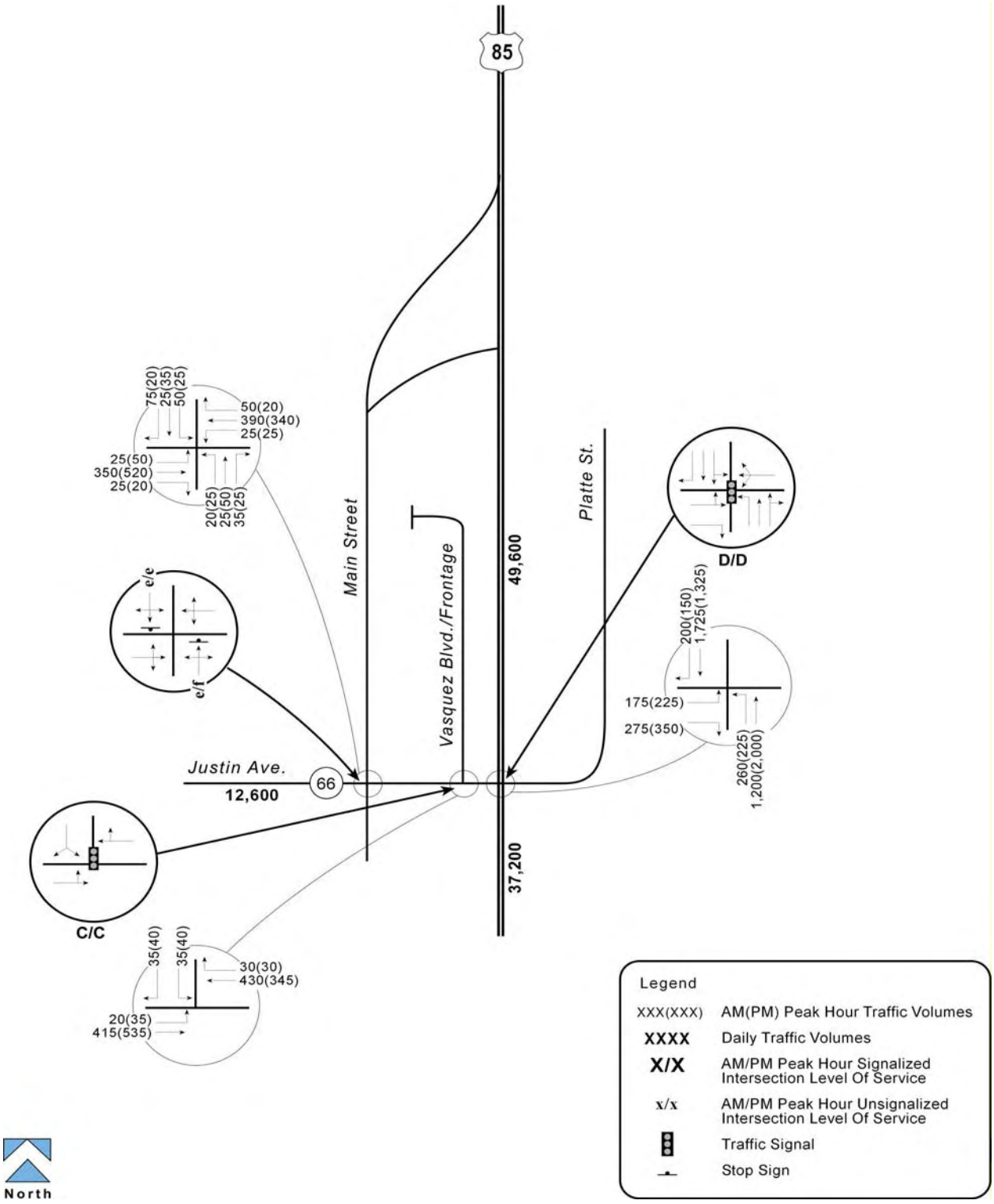

Figure 5. 2030 No Action Forecasts and Levels of Service

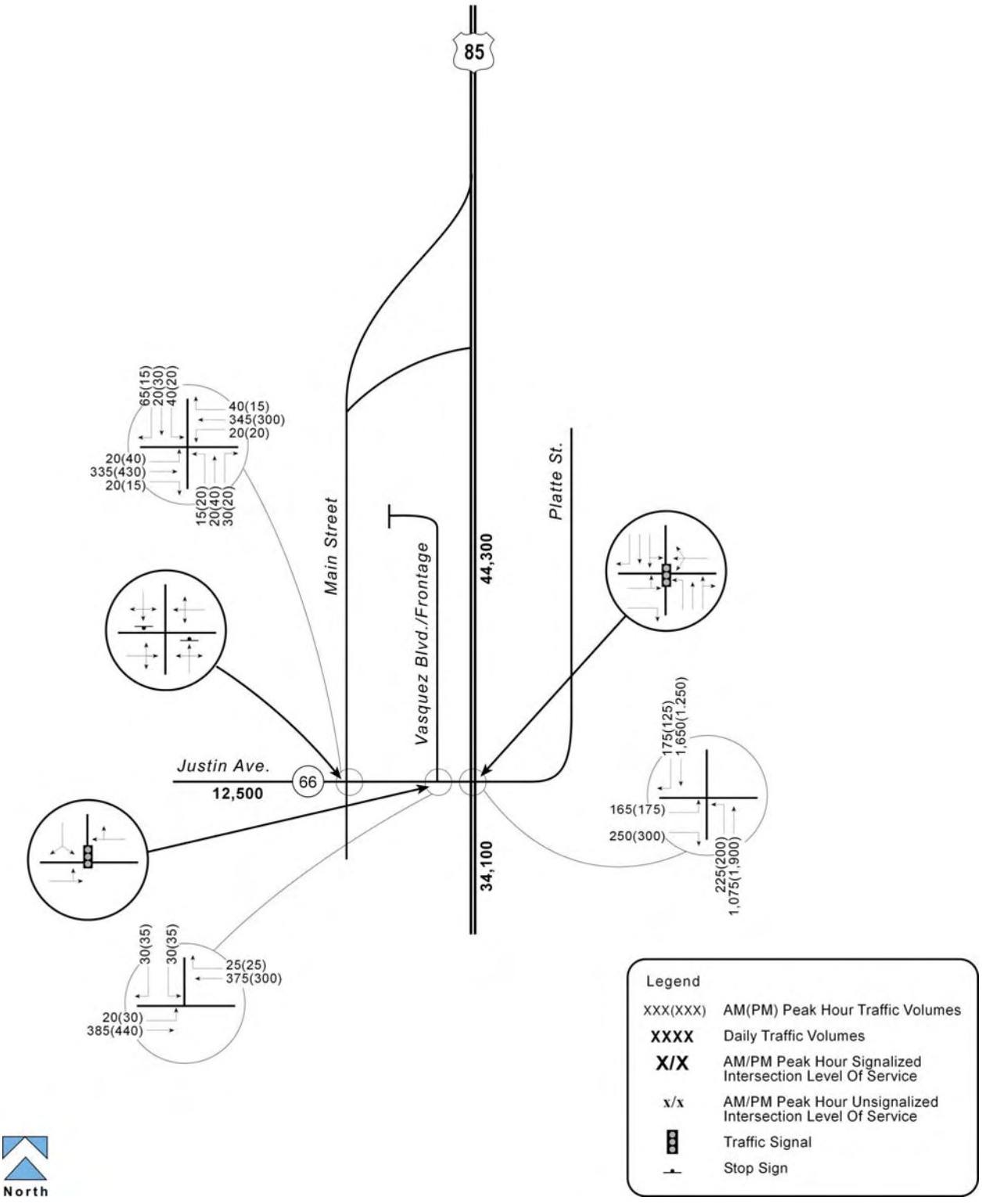

Figure 6. 2030 Package A Background Traffic Forecasts

Table 4 – Peak Hour Trip Generation for North I-25 DEIS Park-and Ride Lots

	Trip Rate	Entering	Exiting
AM Peak Hour			
Trips per occupied space	0.75	87%	13%
PM Peak Hour			
Trips per occupied space	0.50	20%	80%

The Fort Lupton commuter bus station would be located on the northeast corner of the SH 66/Main Street intersection and would have 60 parking spaces. The future peak hour traffic from the proposed station is shown in Table 5.

Table 5 Future Peak Hour Traffic from Platteville Park-and-Ride Lot

Location	Daily Trips	AM Peak			PM Peak		
		In	Out	Total	In	Out	Total
Platteville PNR Lot	?	35	5	40	5	25	30

Trip Distribution

The trip distribution and assignment for the station was determined based on existing and future land use patterns in the vicinity of the site. It was assumed that the access to the station would be provided from Main Street. The peak hour trip generation and distribution estimates for the proposed park-and-ride lot are shown in Figure 7. These peak hour trip generation estimates were combined with the background traffic projections to arrive at the total 2030 Package A peak hour projections in Figure 8. In general, daily traffic is projected to be less along US 85 in the Package A alternative, as more regional traffic is attracted to the improved I-25 corridor.

2030 No Action Traffic Operations

Figure 5 shows the projected levels of service at the study area intersections under the No Action scenario. For the purpose of No Action analysis it was assumed that the US 85 would remain as a four lane roadway, since that geometry is more representative of true future no action conditions in the area.

As Figure 5 and Table 3 indicate, the US 85/SH 66 intersection would operate at LOS D during both the AM and PM peak hours. However, the northbound left turn approach and the eastbound shared through/left turn approach would operate at LOS F during both the AM and PM peak hours. The SH 66/W. Frontage Road intersection would operate at LOS C during both the AM and PM peak hours. The southbound approach of the SH 66/Main Street unsignalized intersection would operate at LOS E during the AM peak hour and LOS F during the PM peak hour. The northbound approach would operate at LOS E during the AM peak hour and LOS F during the PM peak hour.

It is not uncommon for movements from driveways and side streets along higher volume roadways to experience poor levels of service, however. As noted in Chapter 17 (Unsignalized Intersections) of the Highway Capacity Manual (2000):

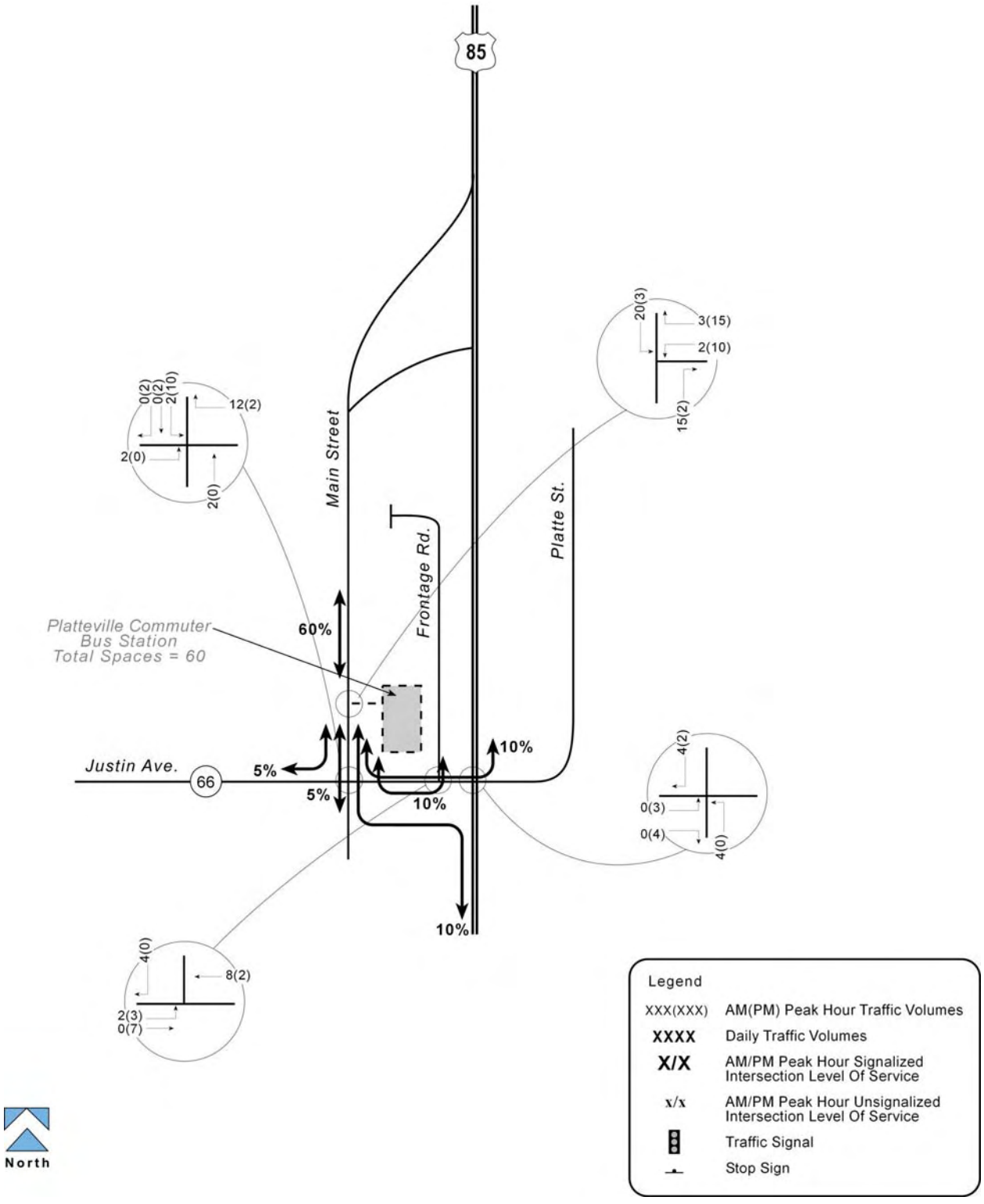

Figure 7. Park and Ride Lot Trip Distribution and Assignment

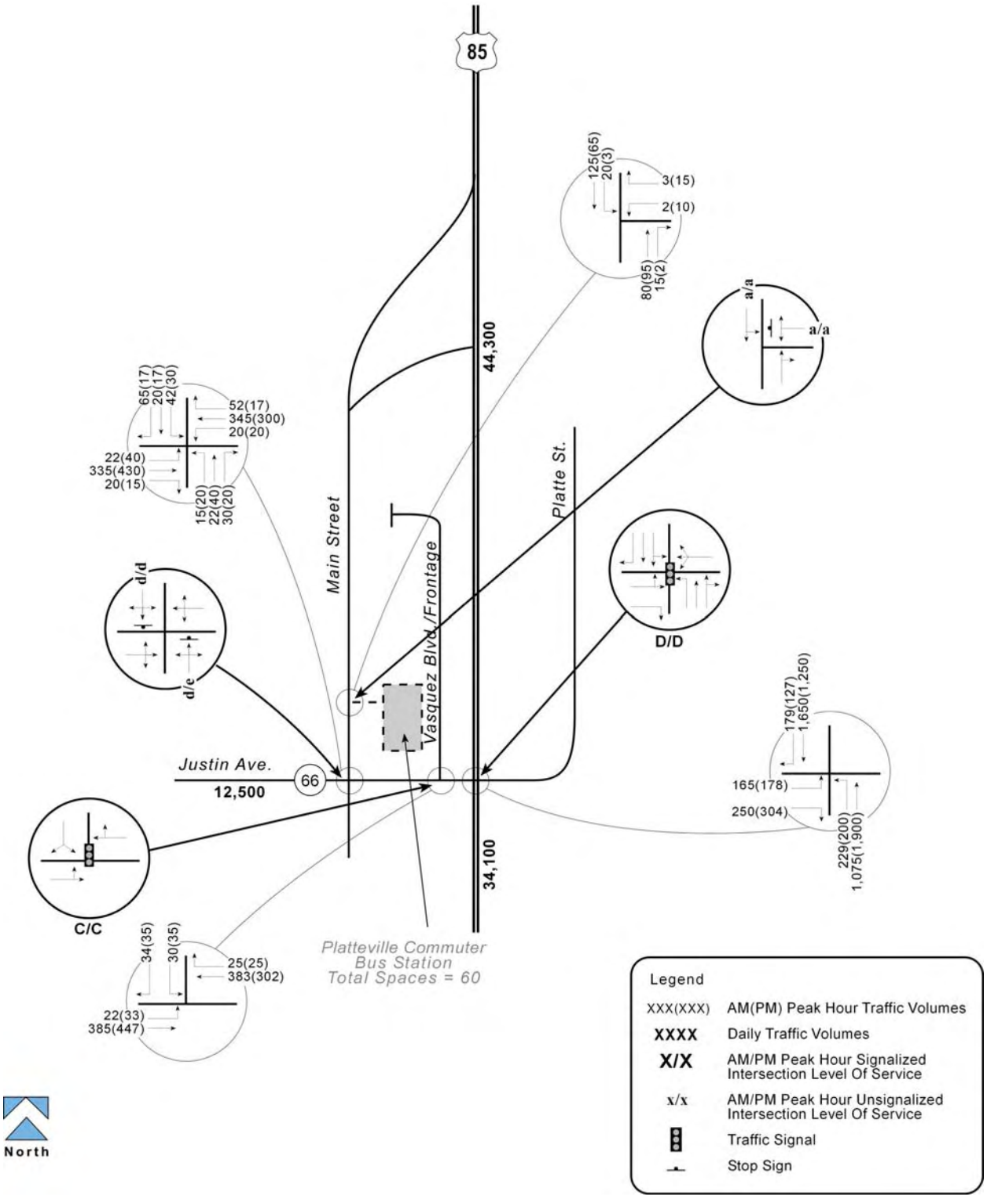

Figure 8. 2030 Package A Total Traffic Forecasts and Levels of Service

In evaluating the overall performance of two-way stop control intersections, it is important to consider measures of effectiveness in addition to delay, such as v/c ratios for individual movements, average queue lengths, and 95th percentile queue lengths. By focusing on a single measure of effectiveness for the worst movement only, such as delay for the minor street left turn, users may make less effective traffic control decisions.

A more detailed analysis of the intersection indicated the v/c ratio for the southbound approach at the SH 66/Main Street intersection is 0.36 and the 95th percentile queue length is 50 feet, the v/c ratio for the northbound approach is 0.63 and the 95th percentile queue length is about 75 feet, which indicated acceptable traffic operations. Therefore, no improvements are recommended at that location.

Table 3 2030 No Action Intersection LOS and Delay

Intersection / Movement	Level of Service		Delay (seconds)	
	AM	PM	AM	PM
US 85/SH 66	D	D	42	46
SH 66/W. Frontage Road	C	C	25	31
SH 66/Main Street (unsignalized)				
Southbound Approach	E	E	40	49
Northbound Approach	E	F	42	53

2030 Package A Traffic Operations

As Figure 8 and Table 6 indicate, the signalized US 85/SH 66 intersection would operate at LOS D during both the AM and PM peak hours. However, the northbound left turn approach and the eastbound shared through/left turn approach would operate at LOS F during both the AM and PM peak hours. The signalized SH 66/W. Frontage Road intersection would operate at LOS C during both the AM and PM peak hours.

The southbound approach of the unsignalized SH 66/Main Street intersection would operate at LOS D during both the AM and PM peak hours. The northbound approach would operate at LOS D during the AM peak hour and LOS E during the PM peak hour. These are the same or better levels of service as in the No Action scenario.

Table 6 2030 Package A Intersection LOS and Delay

Intersection / Movement	Level of Service		Delay (seconds)	
	AM	PM	AM	PM
US 85/SH 66	D	D	40	43
SH 66/W. Frontage Road	C	C	24	30
SH 66/Main Street (unsignalized)				
Southbound Approach	D	D	27	31
Northbound Approach	D	E	29	37
Park-n-Ride Access/Main Street (unsignalized)				
Westbound Approach	A	A	9	9

Station Access

Access to the commuter bus station will be provided from Main Street north of SH 66/Main Street intersection. As shown in Figure 8 and in Table 6, this access would be a single lane with stop-control on the station approach, and would operate at acceptable levels of service without any need for laneage improvements to Main Street.

Proposed Mitigation

The Package A alternative includes six general purpose lanes on I-25 and commuter rail in addition to the proposed bus routes. This would result in more trip attractions towards I-25 lowering the average daily traffic and peak hour traffic volumes on US 85. However, the results of the traffic analysis indicate that some improvements will be needed to address the eastbound and northbound approaches of the US 85/SH 66 signalized intersection regardless of the Package A consideration. The proposed mitigation is discussed below:

US 85/SH 66 intersection

Under the No-Action alternative, this intersection is forecast to drop from LOS B to LOS D during both the AM and PM peak hours. The northbound left turn would operate at LOS F during both the AM and PM peak hours. The eastbound shared through/left turn would also operate at LOS F during both the AM and PM peak hours. The following intersection improvements are proposed.

- Exclusive northbound-to-westbound left-turn lane with protected left turn phasing.
- Exclusive eastbound-to-northbound left turn lane with 100 feet pocket length instead of existing shared through/left turn lane.

This would improve operations to LOS D or better for these approaches. Because this improvement addresses an existing deficiency, it should be considered regardless of the proposed North I-25 EIS preferred alternative.

In addition to the above improvements, the following improvements in the vicinity of the proposed Platteville commuter bus station were identified in CDOT's *US 85 Access Control Plan*, December 1999:

US 85/SH 66 intersection

A new east leg will be added by a pending development on the east side of the railroad tracks. The east leg will cross the railroad tracks and then tie to a connection which will be built to CR 30. The southern end of the UPRR siding track will be moved north of this new crossing so there is no interference with standing trains.

Weld County and Platteville will also cooperate to build a new connection (bypass) between SH 66 and CR 32 on the east side of Platteville to facilitate travel for motorists heading south on US 85 or west on SH 66.

US 85/Main Street intersection

This intersection will be closed and Main Street will be relocated to the west to intersect CR 34 at Division Street.

Alternatives Evaluation Comparison

Traffic Operational Analysis

Table 7 compares the levels of service and delay at the study area intersections for the two packages. As the table indicates, except the US 85/SH 66 intersection, the area in the vicinity of the Platteville commuter bus station would operate at acceptable levels of service. Although the US 85/US 66 intersection operates at LOS D, the northbound and eastbound approaches operate at LOS F with a v/c ratio greater than 1.00. The mitigation measures suggested above would improve operations to acceptable levels of service under both the No Action and Package A alternatives.

Table 7. Intersection Level of Service and Delay

Intersection	No Action		Package A	
	AM Peak	PM Peak	AM Peak	PM Peak
US 85/SH 66	LOS D (42sec.)	LOS D (46sec.)	LOS D (40 sec.)	LOS D (43 sec.)
SH 66/W. Frontage Road	LOS C (25sec.)	LOS C (31 sec.)	LOS C (24 sec.)	LOS C (30 sec.)
SH 66/Main Street (unsignalized)				
Southbound Approach	LOS E (40 sec.)	LOS E (49sec.)	LOS D (27 sec.)	LOS D (31 sec.)
Northbound Approach	LOS E (42 sec.)	LOS F (53 sec.)	LOS D (29 sec.)	LOS E (37 sec.)
Park-n-Ride Access/Main Street (unsignalized)				
Westbound Approach	N/A	N/A	LOS A (9 sec.)	LOS A (9 sec.)

LOS X – Level of service
##.# - Average delay in seconds per vehicle