August 20, 2007

Introduction

The North I-25 DEIS Package A alternative considers a single commuter rail route that will extend from the end of the planned RTD North Metro Commuter Rail Line and terminate in the city of Fort Collins. Proposed stations will be located in Erie, Longmont, Berthoud, Loveland, and Fort Collins.

The proposed commuter rail route follows the existing BNSF alignment which generally parallels the US 287 alignment from Fort Collins to Longmont. Between the Sugar Mill station in Longmont and the North Metro end-of-line station at SH-7, the alignment will parallel SH-119, WCR-7, and the UP Boulder branch. A map of the commuter rail route with station locations is provided in Figure 1.

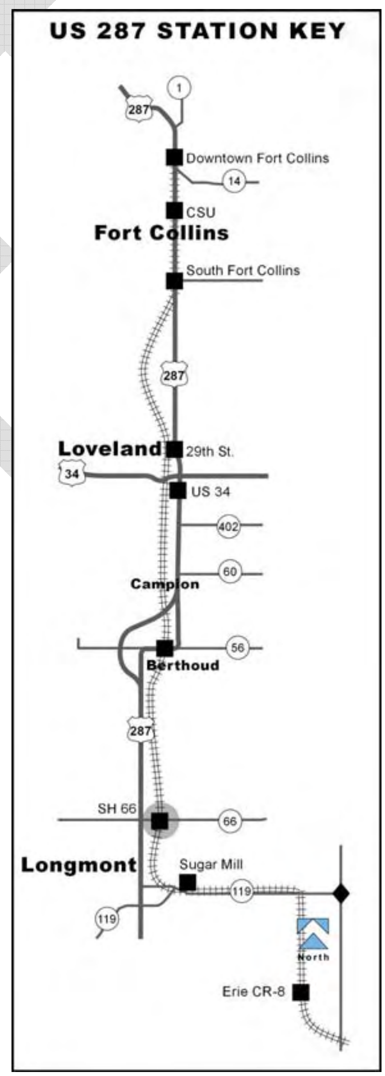

Figure 1. Vicinity Map

The proposed SH 66 and BNSF commuter rail station and platform will be located on the BNSF rail line just north of SH 66. Potential station parking will be just to the east of the BNSF rail line and the proposed station.

This report documents potential traffic impacts the proposed commuter rail station may have within the vicinity of SH 66 between US 287 and Alpine Street and provides technical documentation of the traffic data analysis. The other commuter rail stations are addressed in separate reports.

Existing Conditions

The proposed study area includes the following roadways and intersections.

SH 66

SH 66 is a two-way, two-lane highway that runs east/west from US 85 to N. Foothills Hwy. passing through the north edge of Longmont. Not only does SH 66 provide access to surrounding neighborhoods, it also gives access to Interstate 25 (I-25), Estes Park, and Greeley. The posted speed limit along SH 66 in the study area is 55 mph.

US 287/SH 66 Intersection

US 287 is a four lane, north/south highway located west of the BSNF railroad. The speed limit on US 287 is 45 mph south of SH 66 and 55 mph north of SH

BSNF railroad. The speed limit on US 287 is 45 mph south of SH 66 and 55 mph north of SH 66. The intersection of US 287 and SH 66 is signalized. The intersection geometry on the northbound and southbound approaches consists of two through lanes with a left turn lane and a right turn lane with an acceleration lane. The eastbound approach consists of two through lanes with two left turn lanes and a right turn lane. The westbound approach consists of two through lanes with a left turn lane and a right turn lane.

Alpine St. (115th St.)/SH 66

Alpine Street is a two lane minor road that accesses a neighborhood to the south. 115th Street is a rural two lane road that runs north from SH 66 to North County Line Road. The speed limit for Alpine Street (115th St.) is 25 mph. This intersection is controlled by two-way stop signs on Alpine Street (115th St.). The eastbound and westbound approaches to the intersection consist of a single through lane, a left turn lane, and a right turn lane. The northbound approach consists of a shared through/left turn lane and a right turn lane; and the southbound approach is a single lane.

Figure 2 summarizes the peak hour traffic counts collected in August 2006 within the study area. Additionally, 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 SH 66 in the vicinity of the US 287 intersection is about 7,700 – 8,500 vehicles per day (vpd). ADT on US 287 is around 16,000 – 19,000 vpd.

At the US 287 and SH 66 intersection, the westbound to southbound left-turn movement represents the highest turning volume during the AM peak hour with a count of approximately 185 vehicles per hour (vph). During the PM peak hour, the eastbound to northbound left turn movement represents the highest turning volume with a count of approximately 605 vph.

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 vehicles at intersections controlled by traffic signals and stop-signs.

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.

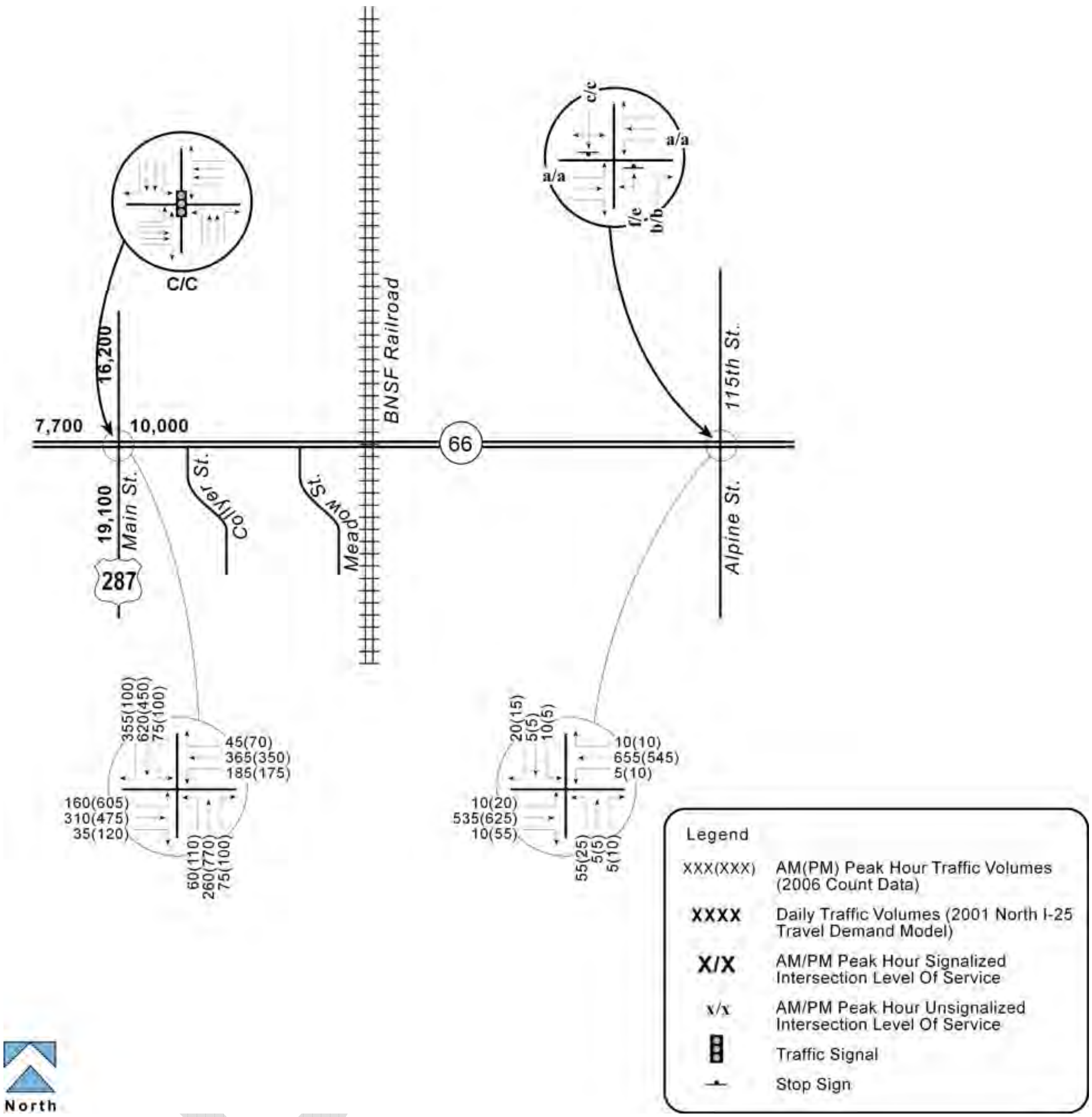

Figure 2. Existing Conditions

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	> 10.0 to <= 15
C	> 20 to <= 35	> 15.0 to <= 25
D	> 35 to <= 55	> 25.0 to <= 35
E	> 55 to <= 80	> 35.0 to <= 50
F	> 80	> 50

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

Figure 2 and Table 2 illustrate existing peak period levels of service at the signalized and unsignalized intersections within the study area. Currently, the intersection of US 287 and SH 66 operates at an acceptable overall LOS C during both AM and PM peak hours. The Alpine Street/SH 66 intersection currently operates with an overall acceptable LOS and delay; however, the northbound through/left movement operates at LOS F and E, in the AM and PM peak hours, respectively. However, queue lengths and v/c ratios for this movement indicate adequate operations.

Table 2. Existing Intersection LOS and Delay

Intersection / Movement	Level of Service		Delay (seconds)	
	AM	PM	AM	PM
SH 66 & US 287	C	C	25	32
SH 66 & Alpine St. (unsignalized)				
Northbound Thru/Left Turn	F*	E*	60*	42*
Northbound Right Turn	B	B	12	13
Southbound Approach	C	C	21	18

* Queue lengths for this movement are less than 50 feet and volume/capacity ratios are less than 1.5, so operations are adequate. However, this intersection should be monitored for signal warrant analysis based on future traffic growth.

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 project elements in the SH 66 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

Figure 3. No Action Alternative

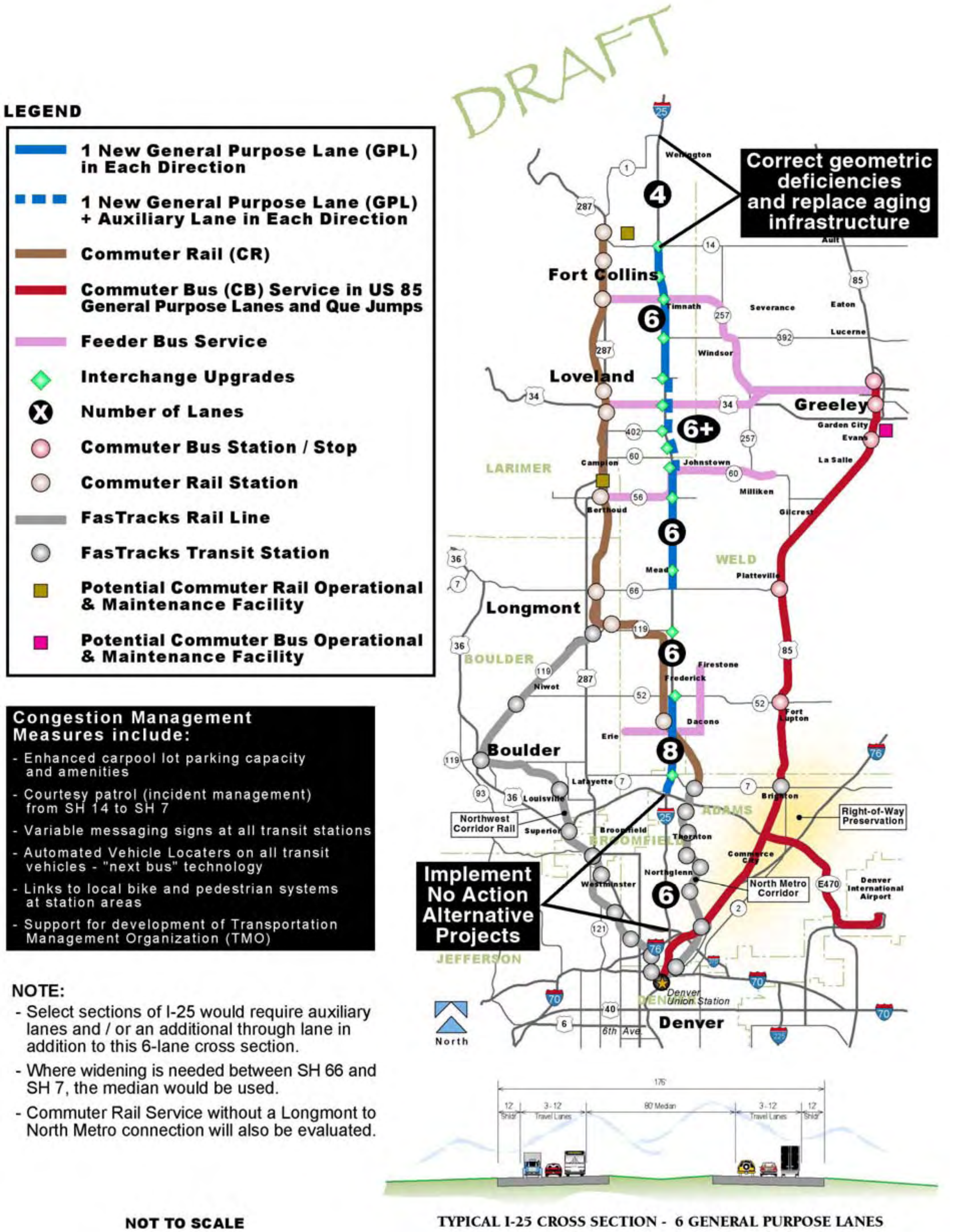

Figure 4. 2030 Package A Alternative

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 intersections within the study area are shown in Figure 4. As shown, the average daily traffic (ADT) projections on US 287 north of SH 66 is about 45,000 vehicles per day (vpd) and about 37,500 vpd just south of SH 66. The ADT projection on SH 66 west of the US 287 intersection is approximately 17,600 vpd while the projection east of the intersection is approximately 16,700 vpd.

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 rail 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 SH 66 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.

Table 3. Peak Hour Trip Generation for North I-25 EIS 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%

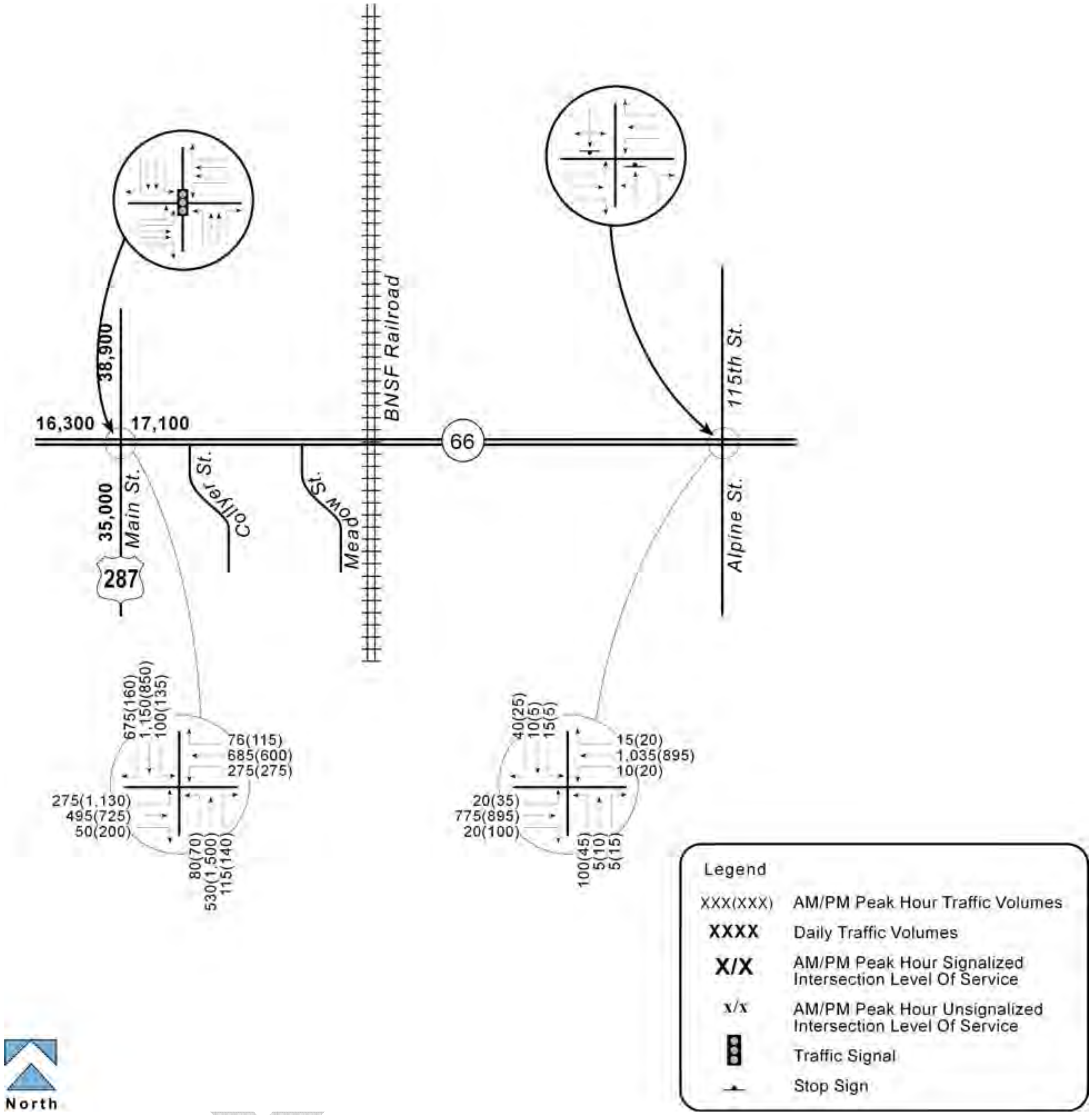

Figure 5. 2030 No Action Forecasts and Levels of Service

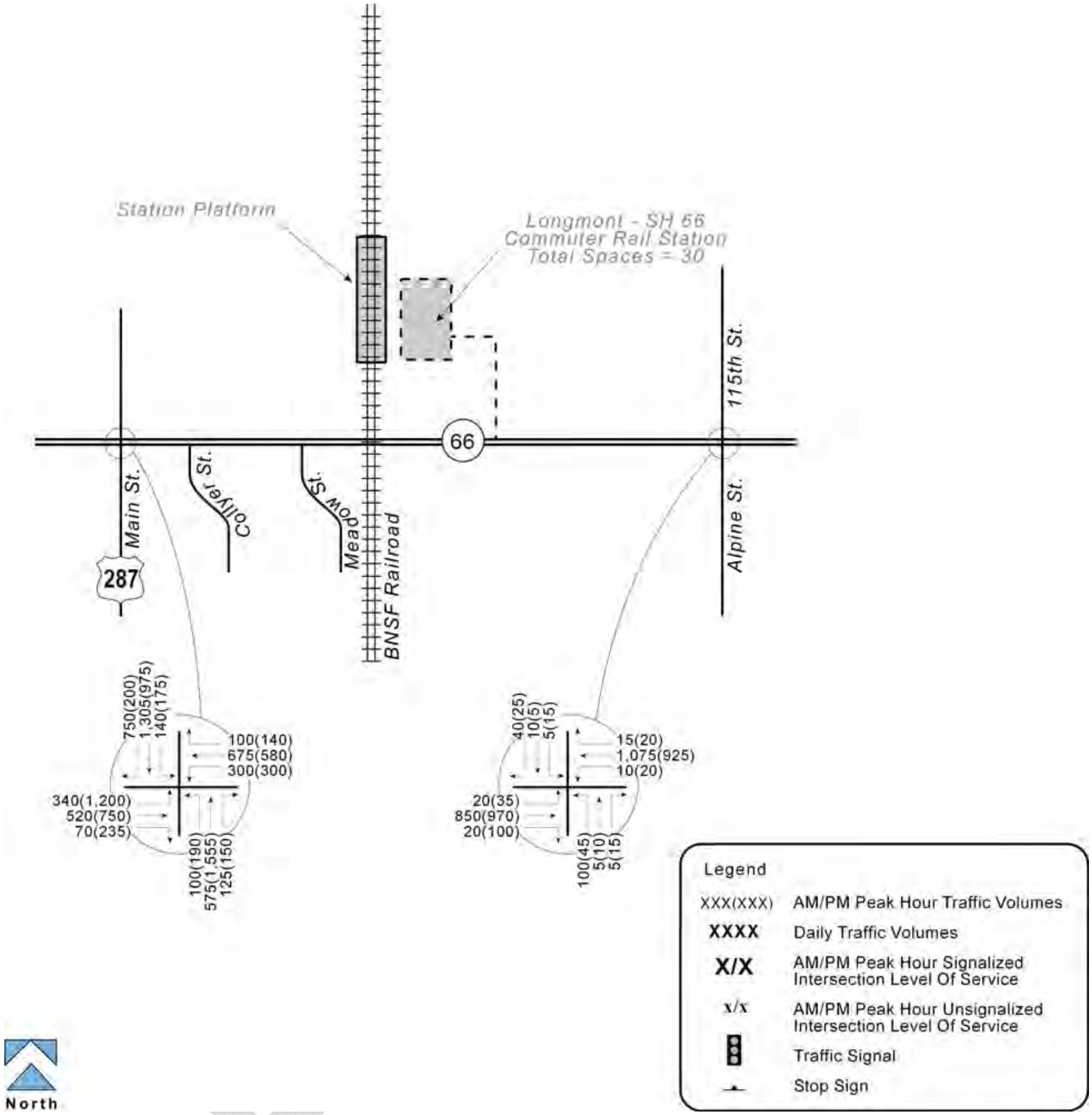

Figure 6. 2030 Package A Background Traffic Forecasts

The Fort Lupton commuter bus station would be located on the southeast corner of the US 85/14th Street/CR 14.5 intersection and would have 30 parking spaces. The future peak hour traffic from the proposed station is shown in Table 5.

Table 4. Future Peak Hour Traffic from the Berthoud Park-and-Ride Lot

Location	Daily Trips	AM Peak			PM Peak		
		In	Out	Total	In	Out	Total
SH 66 PNR Lot	70	18	3	21	3	11	14

Trip Distribution

The trip distribution and assignment for the station was determined based on existing and future residential land use patterns in the vicinity of the site. It was assumed that the access to the station would be provided from SH 66. 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 287 in the Package A alternative, as more regional traffic is attracted to the improved I-25 corridor.

2030 No Action Traffic Operations

Figure 5 and Table 6 show the projected levels of service at the study are intersections under the No Action scenario. As indicated, the intersection of US 287 and SH 66 is predicted to operate at an acceptable overall LOS during the AM peak hour, but during the PM peak hour, this intersection is predicted to operate at an overall LOS F. The northbound through/left turn movements at the intersection of Alpine Street and SH 66 are projected to operate at LOS F with an average delay of >100 seconds for both peak hours, and it is likely that this intersection would require signalization in year 2030, and volumes and operations should be monitored as growth occurs for signal warrant analysis.

Table 5. 2030 No Action Intersection LOS and Delay

Intersection / Movement	Level of Service		Delay (seconds)	
	AM	PM	AM	PM
SH 66 & US 287	D	F	37	>100
SH 66 & Alpine St. (unsignalized)				
Northbound Thru/Left Turn	F	F	>100	>100
Northbound Right Turn	C	C	16	19
Southbound Approach	F	F	>100	>100

<u>2030 Package A Traffic Operations</u>

Figure 8 and Table 7 show the projected levels of service at the study area intersections under the Package A alternative. As indicated, the intersection of US 287 and SH 66 is predicted to operate at an acceptable overall LOS during the AM peak hour, but during the PM peak hour, this intersection is predicted to operate at an overall LOS F. As in the No Action alternative, it is

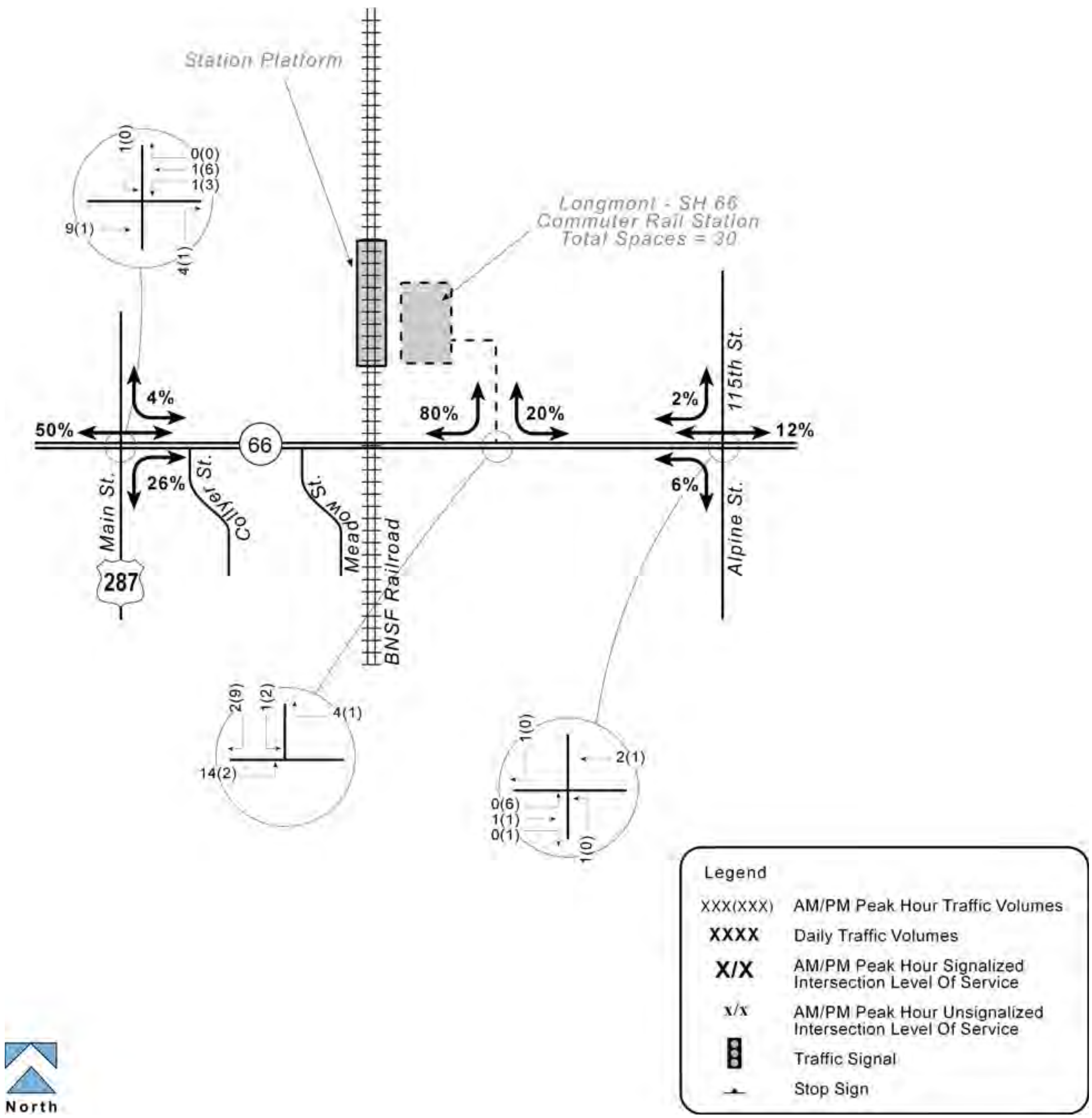

Figure 7. Park and Ride Lot Trip Distribution and Assignment

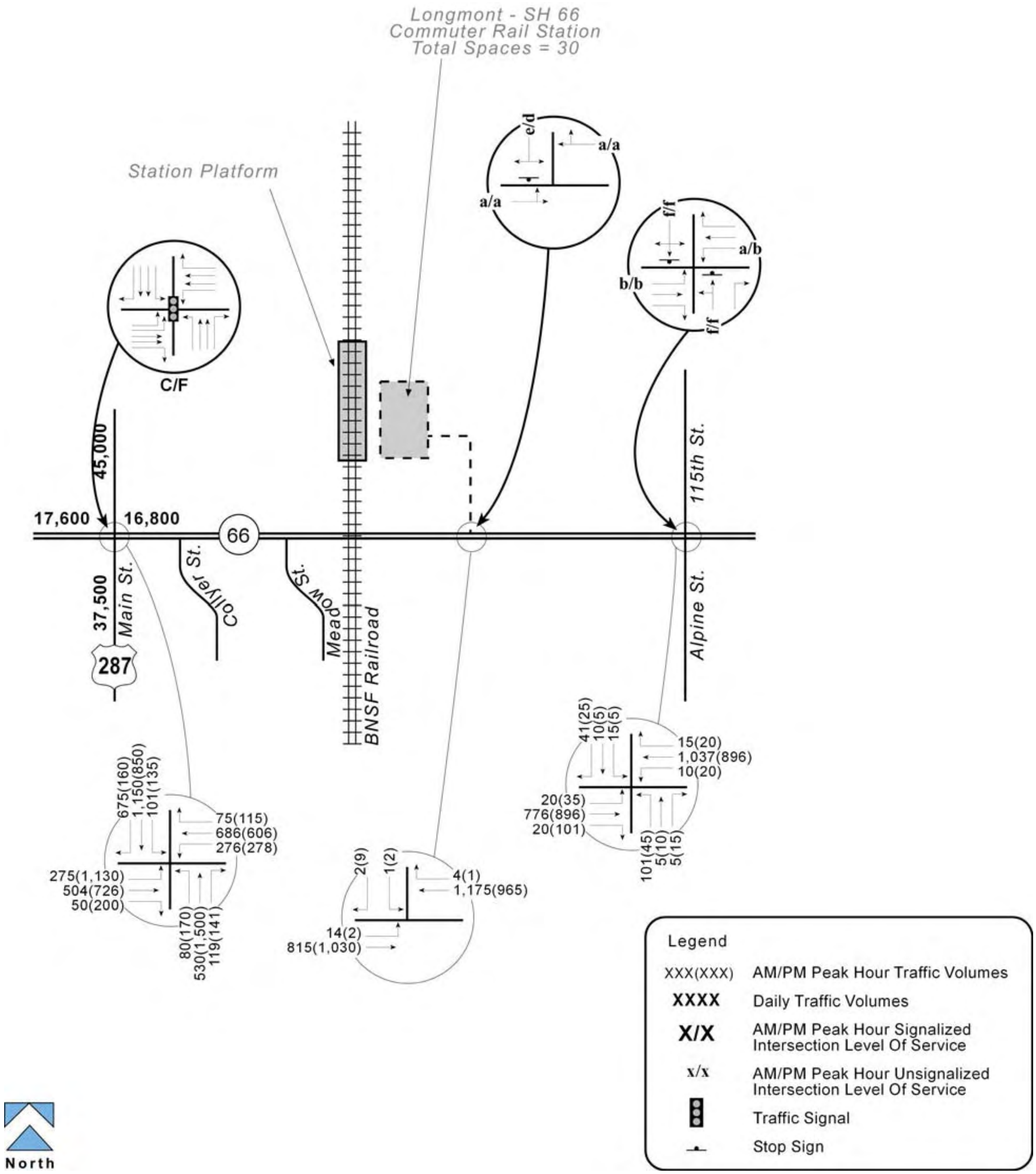

Figure 8. 2030 Package A Total Traffic Forecasts and Levels of Service

likely that the SH 66/Alpine Street intersection would require signalization in year 2030, and volumes and operations should be monitored as growth occurs for signal warrant analysis.

Access to the commuter rail station would be provided from SH 66. As shown on Figure 8 and Table 7, this access would be a single lane with stop-control on the station approach, and would operate at adequate levels of service without any need for laneage improvements to SH 66.

Table 6. 2030 Package A Intersection LOS and Delay

Intersection / Movement	Level of Service		Delay (seconds)	
	AM	PM	AM	PM
SH 66 & US 287	C	F	31	>100
SH 66 & Alpine St. (unsignalized)				
Northbound Thru/Left Turn	F	F	>100	>100
Northbound Right Turn	C	C	15	18
Southbound Approach	F	F	>100	69
PNR Access/SH 66 (unsignalized)				
Southbound Approach	E*	D*	43*	31*

* Queue lengths for this movement are less than 50 feet and volume/capacity ratios are less than 1.5, so operations are adequate. However, this intersection should be monitored for signal warrant analysis based on future traffic growth.

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, the Package A alternative has little impact on the key intersections in the study area, and the park-and-ride access would operate at acceptable levels of service.

Table 7. Intersection Level of Service and Delay

Intersection	No Action		Package A	
	AM Peak	PM Peak	AM Peak	PM Peak
SH 66 & US 287	LOS D (37 sec.)	LOS F (129 sec.)	LOS C (31 sec.)	LOS F (113 sec.)
SH 66 & Alpine St (Unsignalized)				
Northbound Thru/Left Turn	LOS F (>100sec.)	LOS F (>100 sec.)	LOS F (>100 sec.)	LOS F (>100 sec.)
Northbound Right Turn	LOS C (16 sec.)	LOS C (19 sec.)	LOS C (15 sec.)	LOS C (18 sec.)
Southbound Approach	LOS F (>100 sec.)	LOS F (>100 sec.)	LOS F (>100 sec.)	LOS F (69 sec.)
PNR Access/SH 66 (unsignalized)				
Southbound Approach	N/A	N/A	LOS E* (43 sec.)	LOS D* (31 sec.)
* Queue lengths for this movement are less than 50 feet and volume/capacity ratios are less than 1.5, so operations are adequate. However, this intersection should be monitored for signal warrant analysis based on future traffic growth.				

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