PALMER BUILDING
TRAFFIC IMPACT STUDY

BOULDER COUNTY, COLORADO

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DRAFT

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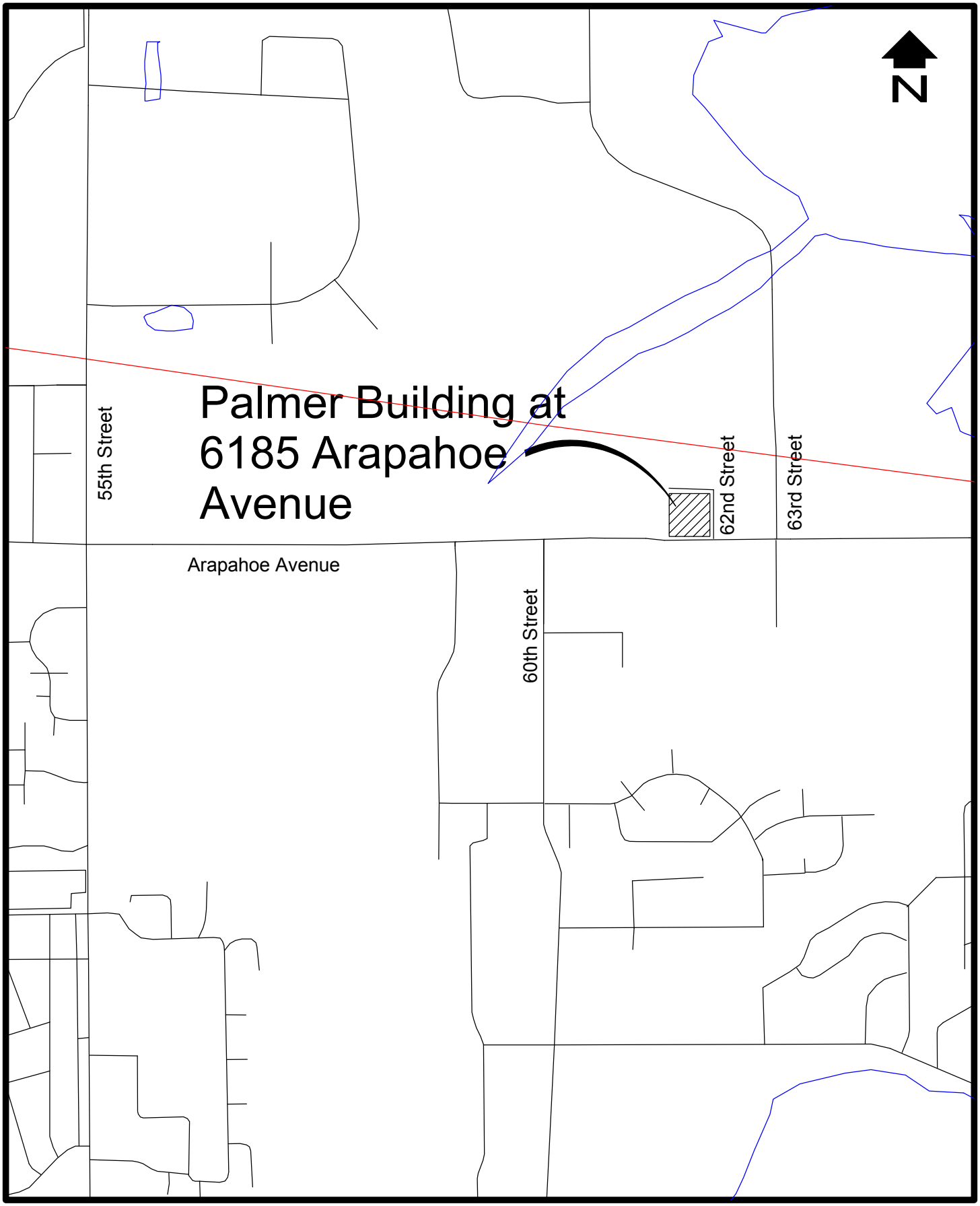
A Recent Peak Hour Traffic
B Current Peak Hour Operation/Level of Service Descriptions
C Trip Generation Data
D Long Range Background Traffic Analyses
E Long Range Total Traffic Analyses

I. INTRODUCTION

The Palmer Building at 6185 Arapahoe Avenue is proposing additional land uses within the existing building and on site. The Palmer Building is in the northwest quadrant of the Arapahoe/62nd intersection in Boulder County, Colorado. The site location is shown on Figure 1. Currently, the building is used as a dance studio, a warehouse, and light industrial. The purpose of this study is to address the traffic impacts of the proposed additional uses to the development. The focus of this review is the street/road network, which will serve the proposed development. The scope of this traffic impact study was discussed with Anita Riley, Boulder County Transportation Planner, and Lesley Swirhun, Boulder County Traffic Engineer



SCALE: 1"=1000'

SITE LOCATION

Figure 1

II. EXISTING CONDITIONS

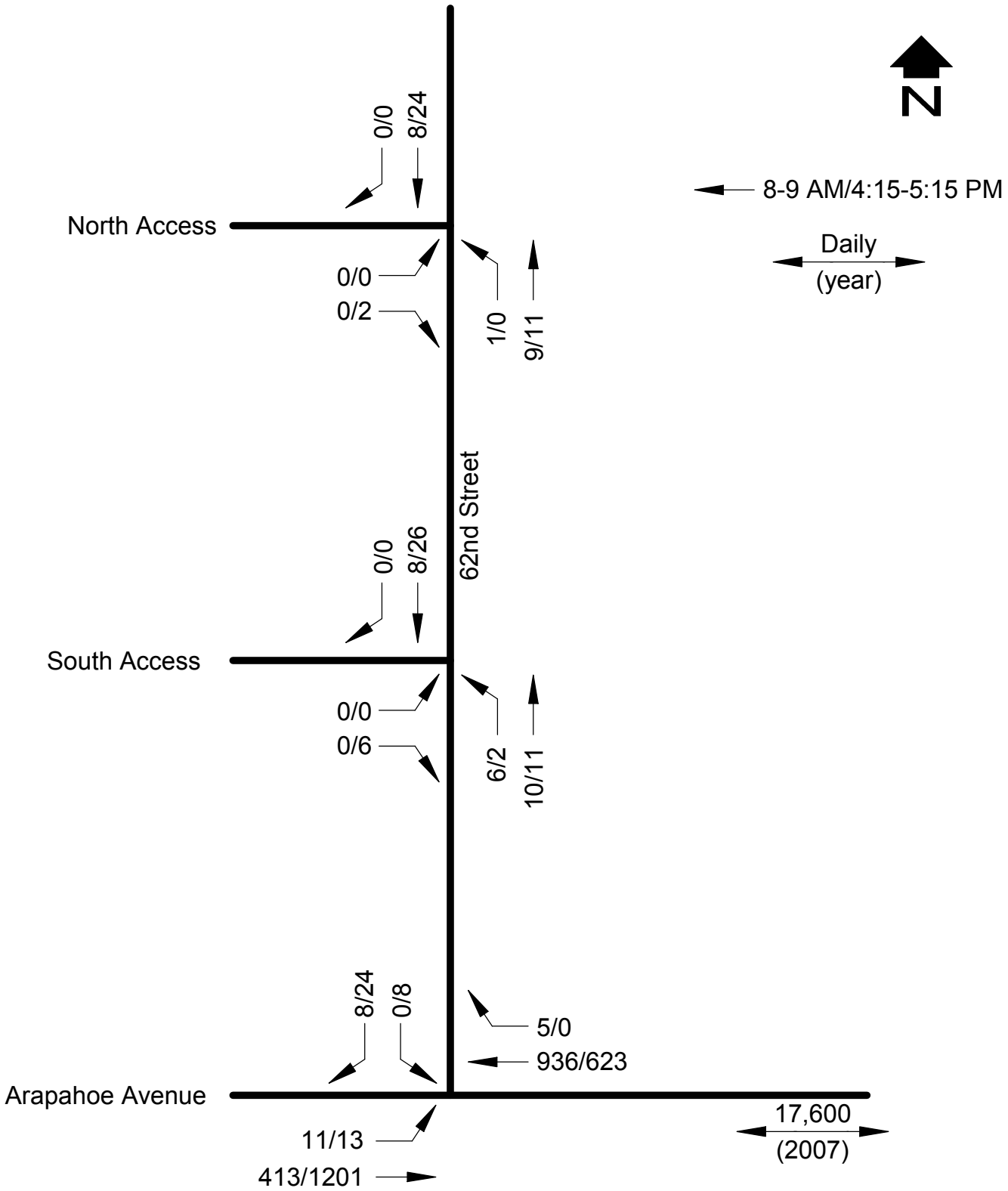
A. Existing Road Network

The major existing streets in the vicinity of the Palmer Building are Arapahoe Avenue and 62nd Street. Arapahoe Avenue is currently a three-lane street with a posted speed limit of 45 mph in the area of the Palmer Building. Arapahoe Avenue is also State Highway 7 (SH7) and is under the jurisdiction of CDOT. This segment is categorized as an NR-B highway. Sixty-Second Street is a minor street with a two lane cross section with a posted speed limit of 25 mph.

B. Existing Traffic Conditions

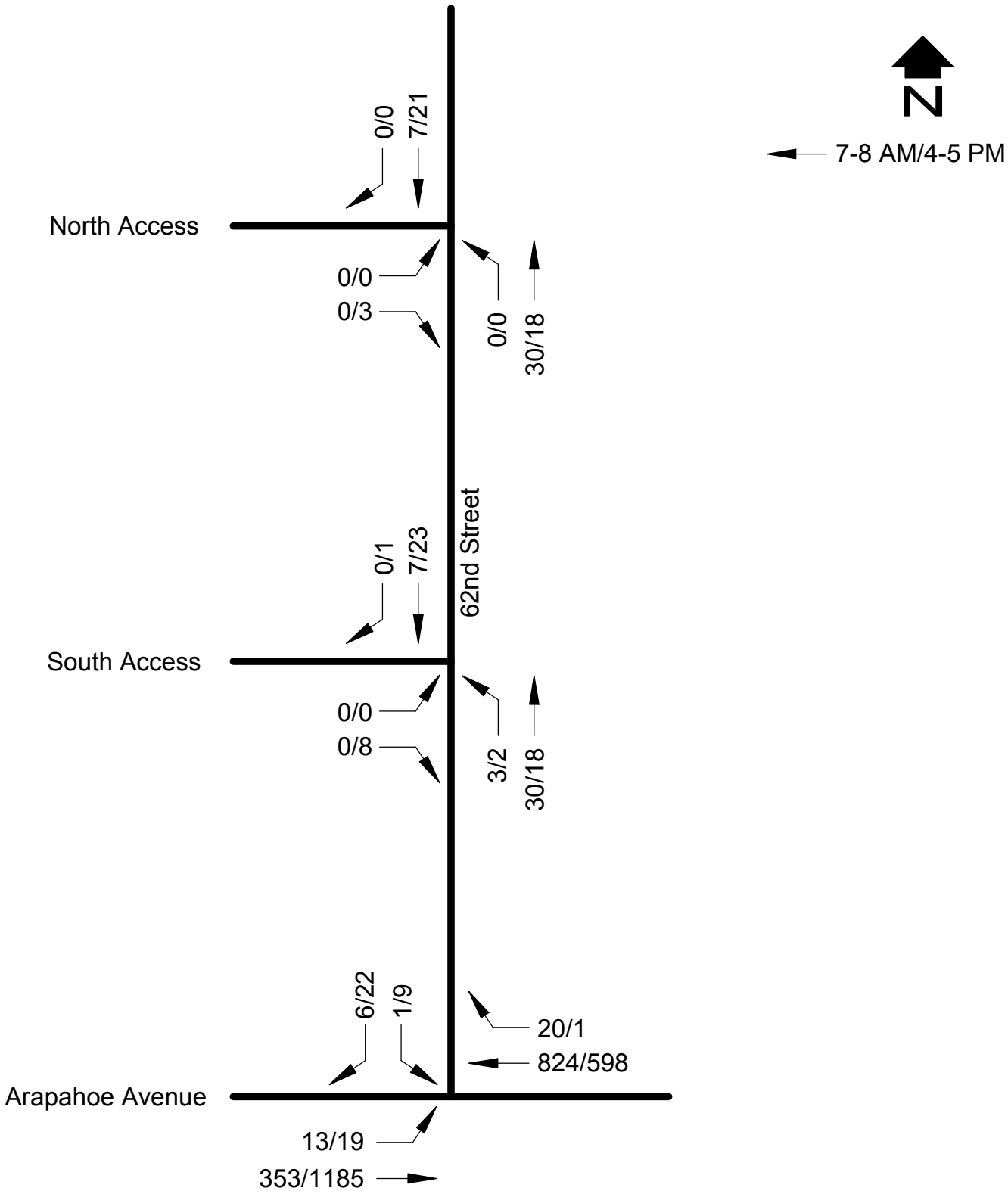
Morning and afternoon peak hour of Arapahoe Avenue traffic volumes at the Arapahoe/62nd, 62nd/South Access, and 62nd/North Access intersections are shown in Figure 2. Figure 2 depicts the peak hour of Arapahoe Avenue. Morning and afternoon peak hour of 62nd Street traffic volumes at the Arapahoe/62nd, 62nd/South Access, and 62nd/North Access intersections are shown in Figure 3. Figure 3 depicts the peak hour of 62nd Street. These counts are provided in Appendix A. These multiple peak hours are depicted in order to conduct a conservative analysis with regard to the auxiliary lanes at the Arapahoe/62nd intersection. A daily count, from CDOT, along Arapahoe Avenue is also shown in Figure 2. The peak hour counts at the key intersections were obtained in December 2008. Table 1 shows the current peak hour of Arapahoe Avenue operation at the Arapahoe/62nd, 62nd/South Access, and 62nd/North Access intersections. Table 2 shows the current peak hour of 62nd Street operation at the Arapahoe/62nd, 62nd/South Access, and 62nd/North Access intersections. Calculation forms are provided in Appendix B. At the Arapahoe/62nd intersection, the calculated delay for the afternoon peak hour minor street left-turn lane (62nd Street) was commensurate with level of service F. This is considered to be normal during the peak hours at stop sign controlled intersections along arterial streets. A description of level of service/delay for unsignalized intersections is also provided in Appendix B. From the counts, it is concluded that most of the peak hour traffic on 62nd Street is related to the land uses to the north of the Palmer Building.

Based upon the existing traffic counts, an eastbound left-turn lane is required at the Arapahoe/62nd intersection. Based upon the State Highway Access Code, this left-turn lane should be 435 feet long, including a bay taper at 13.5:1.



RECENT DAILY AND PEAK HOUR
OF ARAPAHOE AVENUE TRAFFIC

Figure 2



RECENT PEAK HOUR
OF 62ND STREET TRAFFIC

Figure 3

C. Surrounding Land Uses

There are currently existing residential and open space uses on the south side of Arapahoe Avenue. There are currently existing commercial uses on the west, east, and north sides of the Palmer Building site.

TABLE 1
Recent Operation, Peak Hour of Arapahoe Avenue

Intersection	Movement	Level of Service	
		AM	PM
Arapahoe/62nd (stop sign)	EB LT	B	A
	SB LT	A	F
	SB RT	C	B
	SB APPROACH	C	D
62nd/South Access (stop sign)	EB LT/RT	A	A
	NB LT/T	A	A
62nd/North Access (stop sign)	EB LT/RT	A	A
	NB LT/T	A	A

TABLE 2
Recent Operation, Peak Hour of 62nd Street

Intersection	Movement	Level of Service	
		AM	PM
Arapahoe/62nd (stop sign)	EB LT	A	A
	SB LT	D	F
	SB RT	C	B
	SB APPROACH	C	D
62nd/South Access (stop sign)	EB LT/RT	A	A
	NB LT/T	A	A
62nd/North Access (stop sign)	EB LT/RT	A	A
	NB LT/T	A	A

III. FUTURE TRAFFIC PROJECTIONS

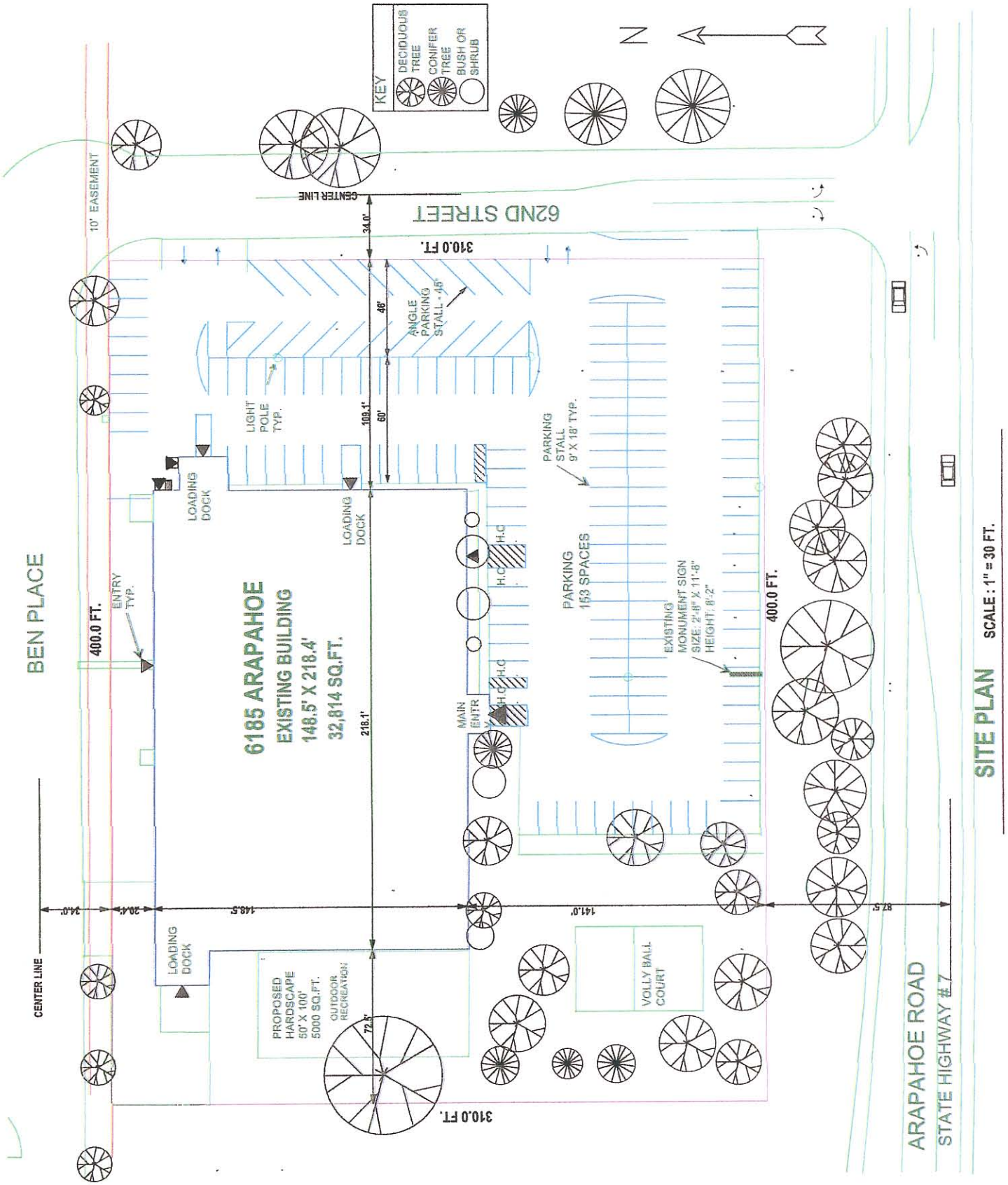
A. Development Assumptions

The site plan is shown on Figure 4. The Palmer Building accesses 62nd Street via two full-movement driveways.

B. Site Trip Generation

The proposed uses will be Professional Office – 2,800 square feet, Large Studio – 10,000 square feet, Small Studio – 5,000 square feet, and Outdoor Recreation – 5,000 square feet. Table 3 shows the estimated daily and peak hour trip generation. This was calculated using Trip Generation, 8th Edition, ITE as the reference for the professional office. The trip generation for the large and small studios and the Outdoor Recreation was determined using data provided by Chuck Palmer, which is shown in Appendix C. The total calculated trip generation for the additional uses is 298 daily trip ends, 42 morning peak hour trip ends, and 28 afternoon peak hour trip ends. The existing traffic counts reflect the peak hour traffic for the existing uses in the Palmer Building. The daily trip generation for the existing uses within the building would be on the order of 224 trip ends. Based upon information provided by Chuck Palmer, a significant portion of the daily trip generation occurs in the evening between 7:00 pm and 11:00 pm, when the through traffic on Arapahoe Avenue is lower and the other users of 62nd Street are not open.

It is significant to note that the previous use in this building was a firm known as Crosslink (2000-2005). It was an aerospace design office performing work related to the space shuttle. The office staff was 80 employees, with the expectation to grow to 150 employees. The calculated trip generation for this use is: 370 daily trip ends, 55 morning peak hour trip ends, and 90 afternoon peak hour trip ends. At the expected employee population (150) the calculated trip generation is: 626 daily trip ends, 95 morning peak hour trip ends, and 95 afternoon peak hour trip ends. Prior to Crosslink, the building was occupied by Sievers Instruments (1990-1995), with an employee population of 150. As a light industrial land use, the calculated trip generation is: 473 daily trip ends, 111 morning peak hour trip ends, and 102 afternoon peak hour trip ends. In the mid-1980’s, Neo Data (call center) was in this building with 300 employees on various shifts. It is not possible to determine the peak hour traffic due to the shift work, but the daily trip generation would have been on the order of 996 trip ends per day. The point of this history is to show that the current uses and proposal generate less than or equal to the previous uses in this building.



SITE PLAN

Figure 4

TABLE 3
Trip Generation

Code	Use	Size	AWDTE		AM Peak Hour				PM Peak Hour			
			Rate	Trips	Rate	In	Rate	Out	Rate	In	Rate	Out
	Small Studio	5.0 KSF		84		0		7		0		3
	Large Studio	10.0 KSF		126		10		14		7		10
	Outdoor Recreation	5.0 KSF		58		2		4		2		2
710	Office	2.8 KSF	11.01	30	1.36	4	0.19	1	0.25	1	1.24	3
Total				298		16		26		10		18

C. Trip Distribution

Trip distribution assumptions were derived utilizing the existing traffic. Figure 5 shows the trip distribution for the long range future.

D. Traffic Assignments and Volumes

Site Generated Traffic Volumes

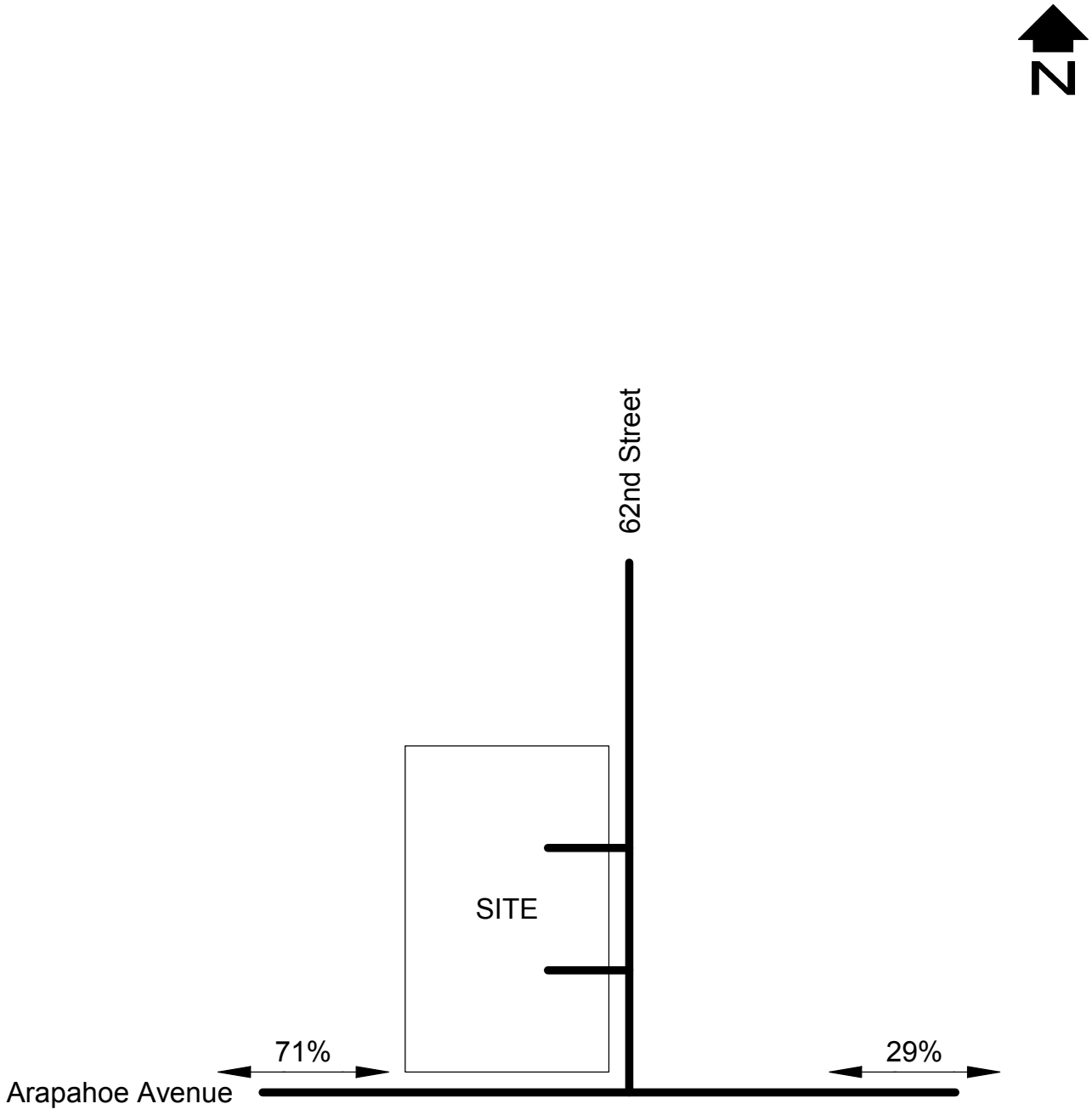
Utilizing the trip generation estimates and the distribution assumptions identified previously, projected vehicle trips were assigned to the existing street system. The resulting site generated traffic at the key intersections for the morning and afternoon peak hours was determined and is shown in Figure 6.

Background Traffic Volumes

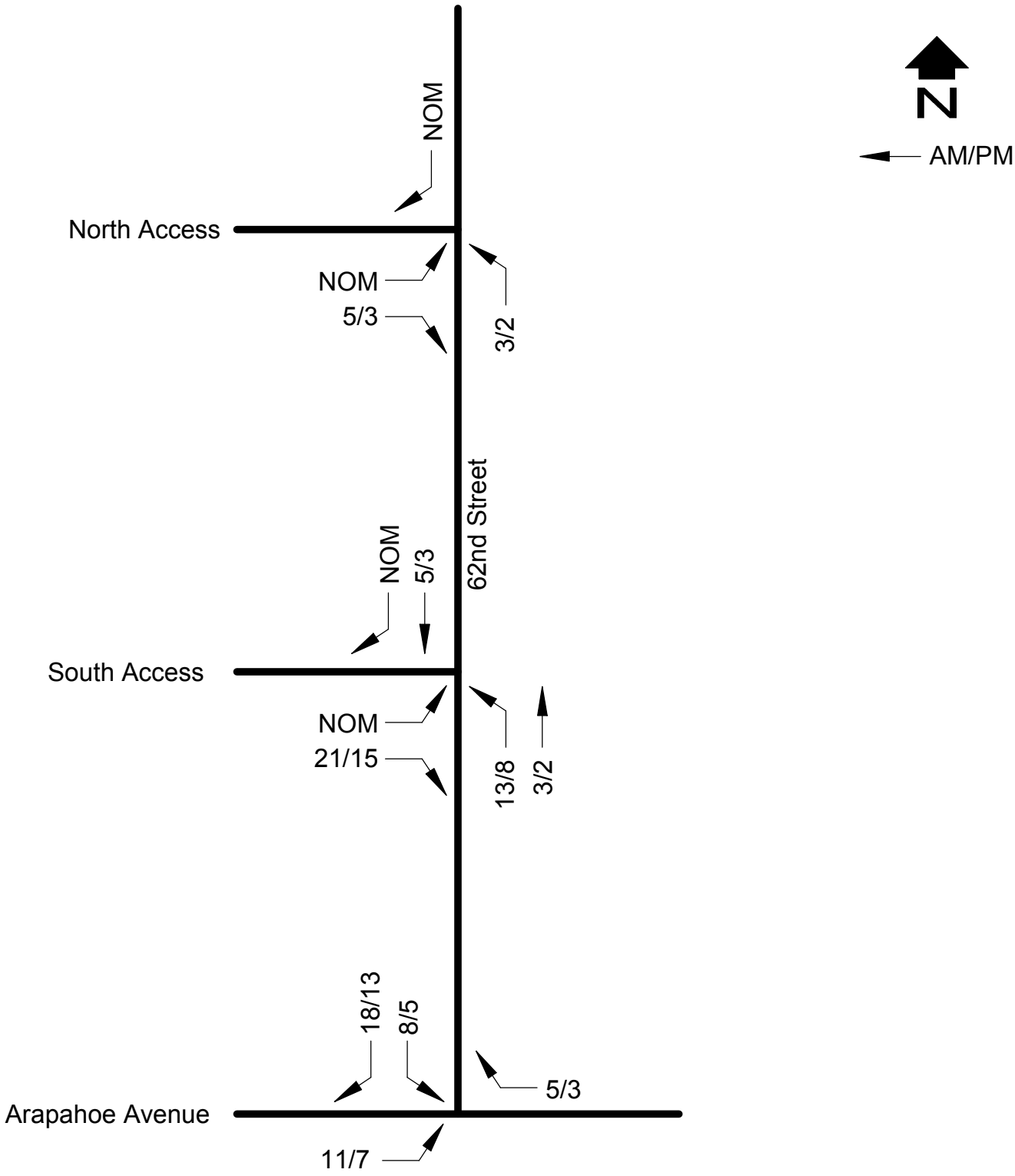
Figures 7 and 8 show the respective long range background peak hour of Arapahoe Avenue and of 62nd Street traffic volumes (traffic on the roadways not attributed to the proposed project). These were determined based upon existing traffic volumes, which were increased to account for adjacent/nearby development activity and a general increase in traffic passing through the study area. Traffic volumes along Arapahoe Avenue were developed based upon data obtained from CDOT.

Total Traffic

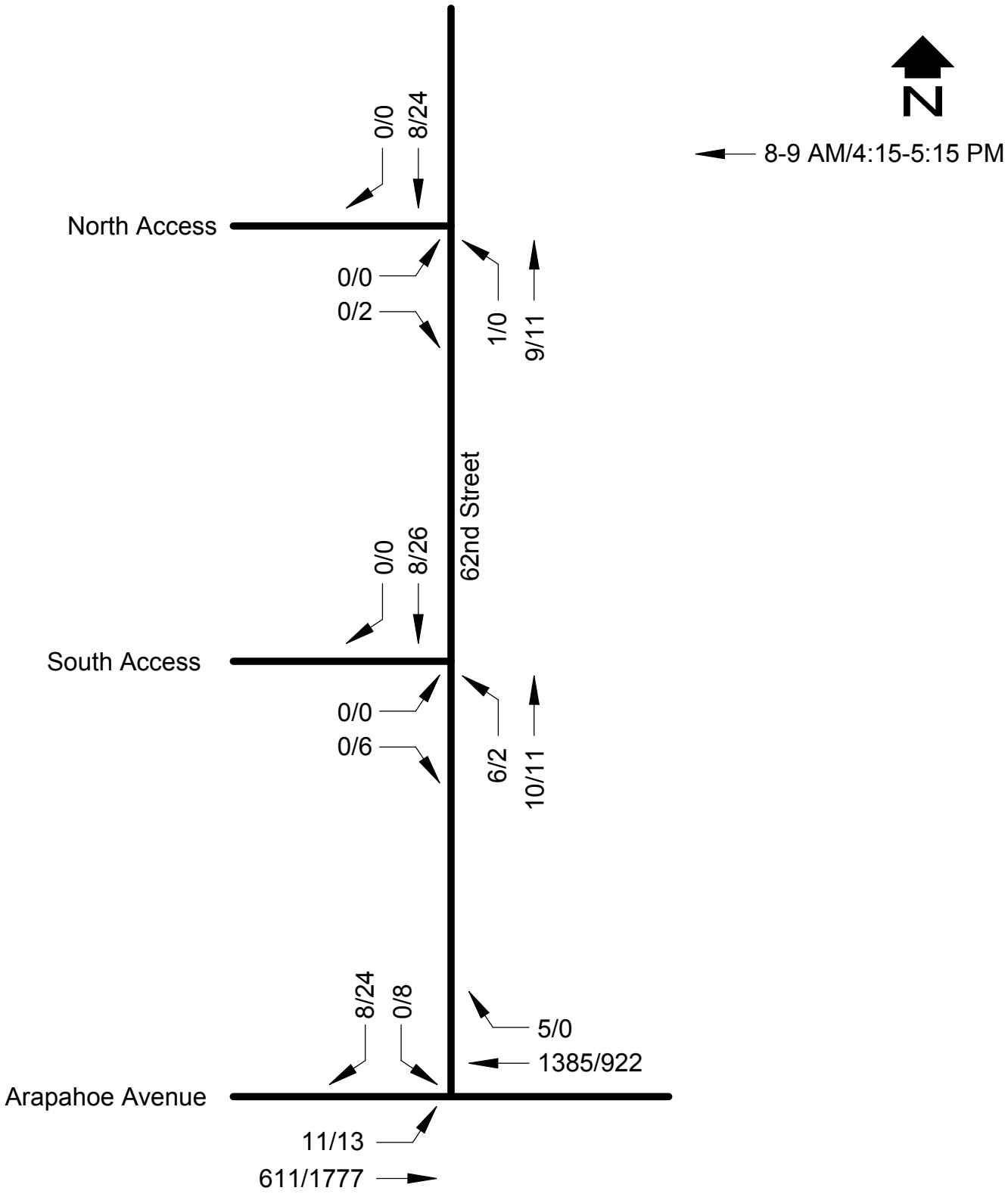
The traffic volumes generated by the proposed Palmer Building development were added to the background traffic to produce total traffic volume projections for the long range total peak hour of Arapahoe Avenue and the long range total peak hour of 62nd Street and are shown in Figures 9 and 10, respectively.



TRIP DISTRIBUTION Figure 5

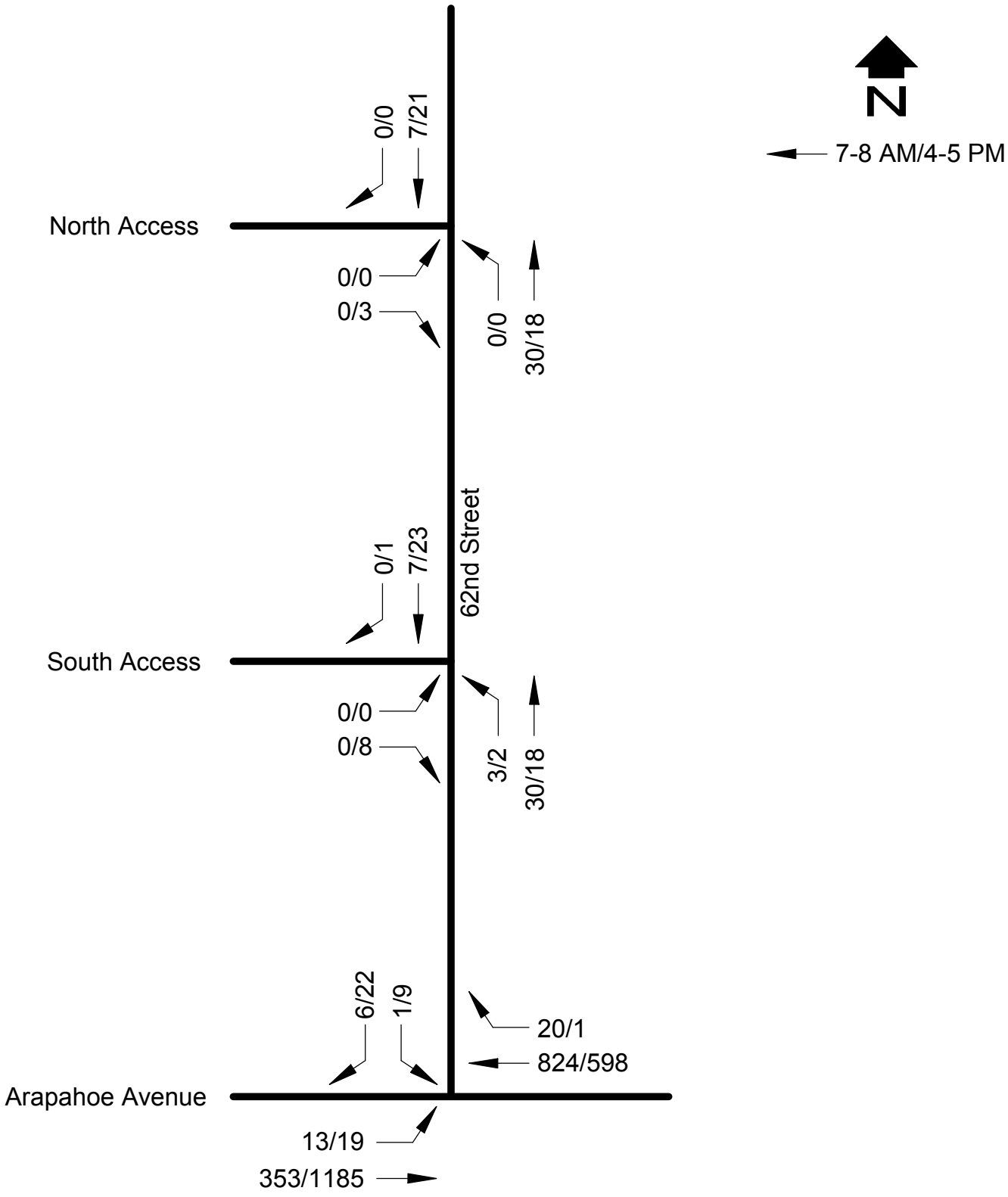


SITE GENERATED PEAK HOUR TRAFFIC Figure 6



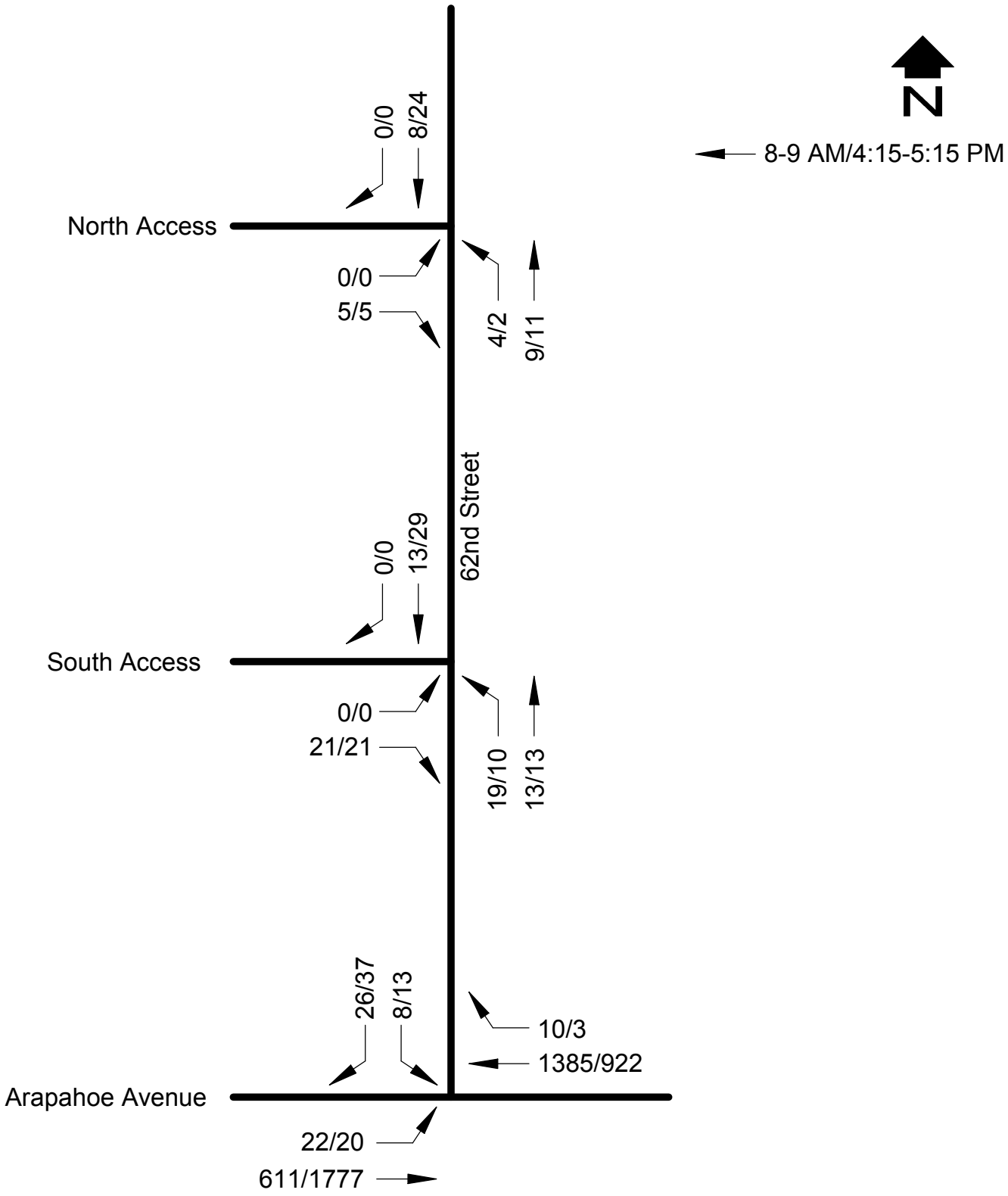
LONG RANGE BACKGROUND PEAK HOUR OF ARAPAHOE AVENUE TRAFFIC

Figure 7



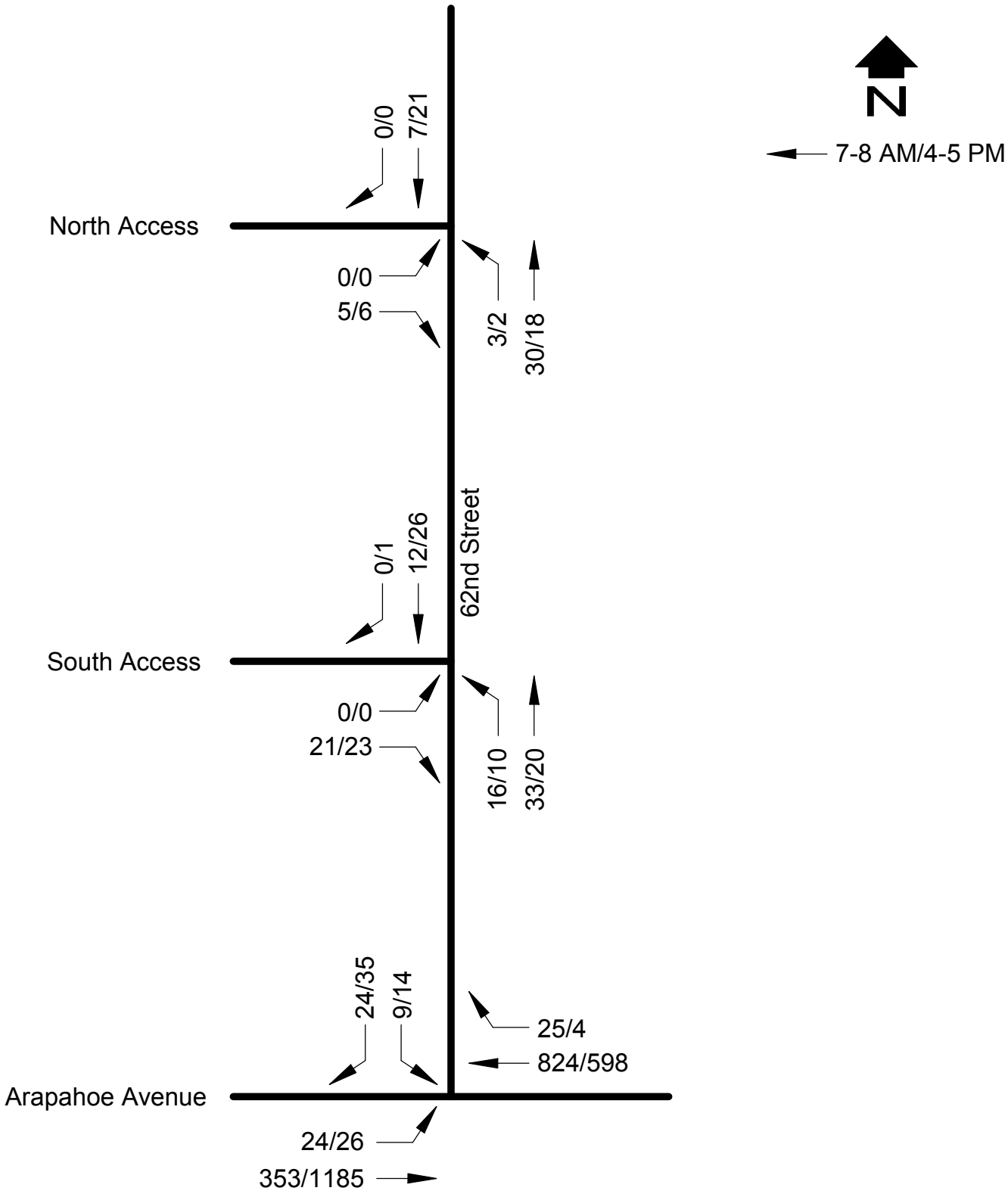
LONG RANGE BACKGROUND PEAK HOUR OF 62ND STREET TRAFFIC

Figure 8



LONG RANGE TOTAL PEAK HOUR
OF ARAPAHOE AVENUE TRAFFIC

Figure 9



LONG RANGE TOTAL PEAK HOUR
OF 62ND STREET TRAFFIC

Figure 10

IV. TRAFFIC IMPACTS

In order to determine the impacts of future traffic volumes, the key intersections were evaluated using capacity analysis procedures from the 2000 Highway Capacity Manual. Findings are as stated below.

Background Traffic

Traffic volumes presented on Figures 7 and 8 were used to evaluate background future traffic operations.

Table 4 presents the calculated levels of service at the key intersections in the long range background peak hour of Arapahoe Avenue future. As shown on Table 4, at the Arapahoe/62nd intersection, the calculated delay for the afternoon peak hour of the minor street approach (62nd Street) was commensurate with level of service F. This is considered to be normal during the peak hours at stop sign controlled intersections along arterial streets. Calculation forms are provided in Appendix D.

Table 5 presents the calculated levels of service at the key intersections in the long range background peak hour of 62nd Street future. As shown on Table 5, at the Arapahoe/62nd intersection, the calculated delay for the morning peak hour minor street left-turn lane and afternoon peak hour minor street approach (62nd Street) was commensurate with level of service F. This is considered to be normal during the peak hours at stop sign controlled intersections along arterial streets. Calculation forms are provided in Appendix D.

Total Traffic

Traffic volumes presented on Figures 9 and 10 were used to evaluate total future traffic operations. Peak hour signal warrants are not expected to be met in the long range future at the Arapahoe/62nd intersection.

Table 6 presents the calculated levels of service at the key intersections in the long range total peak hour of Arapahoe Avenue future. As shown on Table 6, at the Arapahoe/62nd intersection, the calculated delay for the morning and afternoon peak hour minor street approach (62nd Street) was commensurate with level of service F. This is considered to be normal during the peak hours at stop sign controlled intersections along arterial streets. Calculation forms are provided in Appendix E.

Table 7 presents the calculated levels of service at the key intersections in the long range total peak hour of 62nd Street future. As shown on Table 7, at the Arapahoe/62nd intersection, the calculated delay for the morning peak hour minor street approach and afternoon peak hour minor street approach (62nd Street) was commensurate with

TABLE 4 Long Range Background Operation, Peak Hour of Arapahoe Avenue			
Intersection	**Movement**	**Level of Service**	
		AM	**PM**
Arapahoe/62nd (stop sign)	EB LT	B	B
	SB LT	A	F
	SB RT	D	C
	SB APPROACH	D	F
62nd/South Access (stop sign)	EB LT/RT	A	A
	NB LT/T	A	A
62nd/North Access (stop sign)	EB LT/RT	A	A
	NB LT/T	A	A

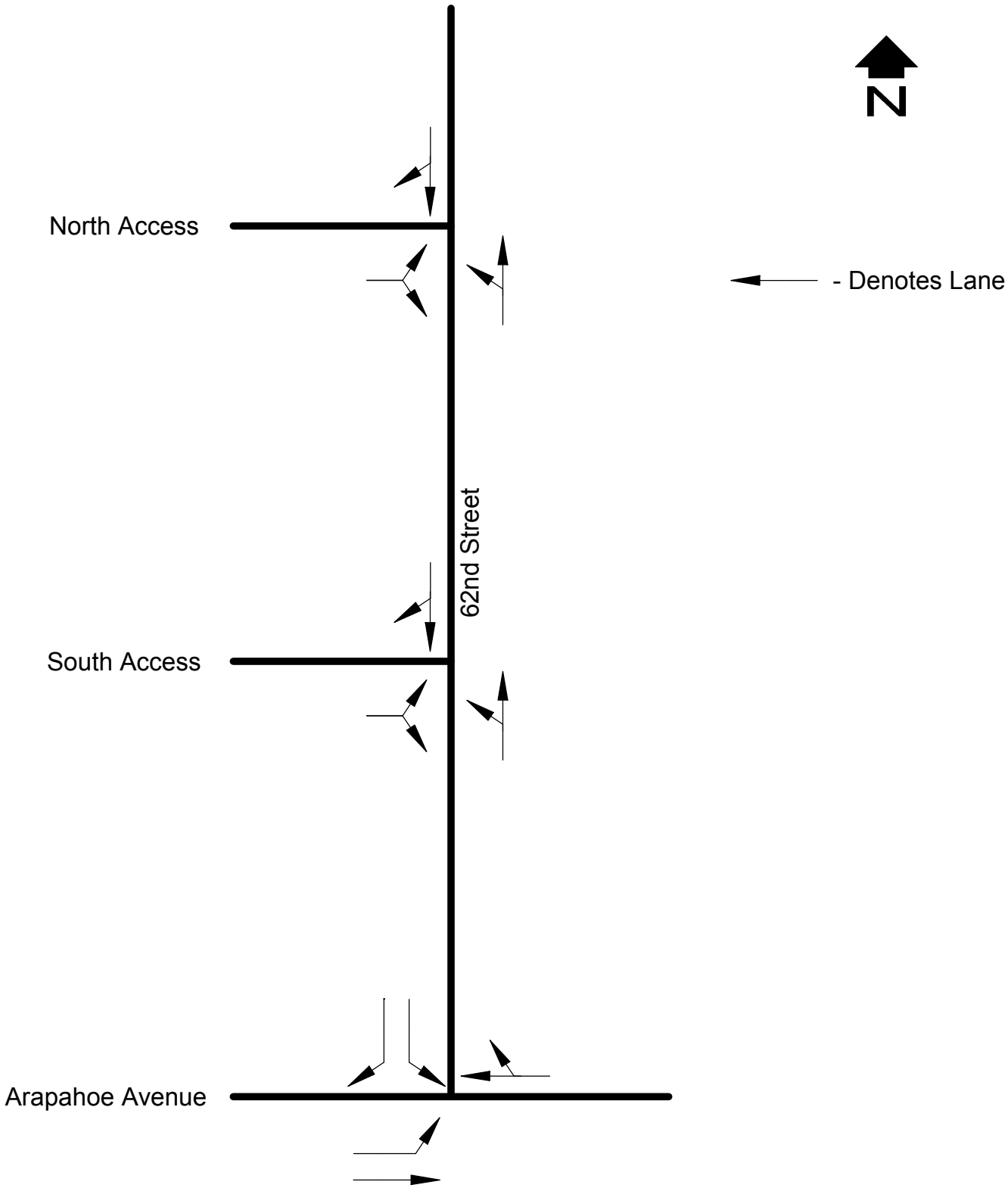
TABLE 5 Long Range Background Operation, Peak Hour of 62nd Street			
Intersection	**Movement**	**Level of Service**	
		AM	**PM**
Arapahoe/62nd (stop sign)	EB LT	B	B
	SB LT	F	F
	SB RT	C	C
	SB APPROACH	D	F
62nd/South Access (stop sign)	EB LT/RT	A	A
	NB LT/T	A	A
62nd/North Access (stop sign)	EB LT/RT	A	A
	NB LT/T	A	A

TABLE 6 Long Range Total Operation, Peak Hour of Arapahoe Avenue			
Intersection	**Movement**	**Level of Service**	
		AM	**PM**
Arapahoe/62nd (stop sign)	EB LT	B	B
	SB LT	F	F
	SB RT	E	C
	SB APPROACH	F	F
62nd/South Access (stop sign)	EB LT/RT	A	A
	NB LT/T	A	A
62nd/North Access (stop sign)	EB LT/RT	A	A
	NB LT/T	A	A

TABLE 7 Long Range Total Operation, Peak Hour of 62nd Street			
Intersection	**Movement**	**Level of Service**	
		AM	**PM**
Arapahoe/62nd (stop sign)	EB LT	B	B
	SB LT	F	F
	SB RT	D	C
	SB APPROACH	E	F
62nd/South Access (stop sign)	EB LT/RT	A	A
	NB LT/T	A	A
62nd/North Access (stop sign)	EB LT/RT	A	A
	NB LT/T	A	A

level of service E and F, respectively. This is considered to be normal during the peak hours at stop sign controlled intersections along arterial streets. Calculation forms are provided in Appendix E.

Figure 11 shows the long range geometry. This is the existing geometry. Using the State Highway Access Code, Arapahoe Avenue is categorized as an NR-B highway, an eastbound left-turn lane should provide length for deceleration length. The bay taper is included in the deceleration length. At the posted speed of 45 mph the deceleration length is 435 feet. Currently the eastbound left-turn lane is approximately 240 feet including bay taper. The eastbound left-turn lane should be lengthened based upon the existing traffic. This can be accomplished by restriping. It is recommended that this occur the next time Arapahoe Avenue is routinely restriped. Based on the long range total traffic a westbound right-turn lane is not required.



LONG RANGE GEOMETRY Figure 11

V. CONCLUSIONS

The following summarizes the significant findings as a result of this study:

- The proposed new uses in the Palmer Building will generate 42 morning peak hour trip ends, 28 afternoon peak hour trip ends, and 268 trip ends per day. This trip generation, along with the current uses, will be less than or equal to the former uses within this building.

- In the long range future with the total peak hour traffic forecasts, the delays on the minor street (62^{nd} Street) at the Arapahoe/62^{nd} intersection will be commensurate with levels of service E and F. This is considered to be normal during peak hours at stop sign controlled intersections along arterial streets.

- The long range geometry is shown in Figure 11.