Traffic Impact Study

Porteos Distribution Facility
(Lot 10B)
Aurora, Colorado

Prepared for:

SunCap Property Group, LLC

Kimley»Horn

T R A F F I C I M P A C T S T U D Y

Porteos Distribution Facility (Lot 10B)

Aurora, Colorado

Prepared for
SunCap Poperty Group, LLC
1125 17th Street
Suite 800
Denver, CO 80202

Prepared by
Kimley-Horn and Associates, Inc.
4582 South Ulster Street
Suite 1500
Denver, Colorado 80237
(303) 228-2300

August 2021

TABLE OF CONTENTS

APPENDICES

LIST OF TABLES

LIST OF FIGURES

1.0 EXECUTIVE SUMMARY

Porteos Distribution Facility (Lot 10B) is proposed to be located on the northwest corner of the 56th Avenue and Jackson Gap Street intersection in Aurora, Colorado. It is expected that the project will be completed within the next couple of years; therefore, analysis was conducted for the 2023 short term horizon as well as the 2040 long-term horizon per City of Aurora requirements.

The purpose of this traffic study is to identify project traffic generation characteristics and potential project traffic related impacts on the local street system, as well as to develop mitigation measures required for identified impacts. The following intersection was incorporated into this traffic study in accordance with City of Aurora standards and requirements:

- Jackson Gap Street and 56th Avenue

In addition, the two proposed accesses along 56th Avenue and three proposed accesses along Jackson Gap Street were included for evaluation.

Regional access will be provided by Interstate 70 (I-70), Interstate 225 (I-225), E-470, and Pena Boulevard. Primary access to the site will be provided by 56th Avenue and Jackson Gap Street. Direct access to the project is proposed from one full movement access and one right-in/right-out access along 56th Avenue and three full movement accesses along Jackson Gap Street. The proposed west full movement access along 56th Avenue is designated for trucks and is the only access intended for heavy vehicles for the site. However, trucks could temporarily utilize the north access along Jackson Gap Street if internal scanning operations malfunction at the truck access along 56th Avenue. The proposed north full movement access along Jackson Gap Street is designated for vans. The truck and van accesses will have gated stations for entering and exiting the site. The right-in/right-out access along 56th Avenue and the south full movement access along Jackson Gap Street are designated for employee parking. The middle full movement access along Jackson Gap Street is for emergency uses only.

Based on the anticipated facility operations, the overall Porteos Distribution Facility is expected to generate approximately 2,656 daily weekday trips. Of these, 177 trips are expected to occur

during the weekday morning peak hour while 235 trips are expected during the weekday afternoon peak hour.

Distribution of site traffic on the street system was based on the area street system characteristics, existing traffic patterns, anticipated surrounding development in the area, and the proposed access system for the project. Assignment of project traffic was based upon the trip generation described previously and the distributions developed.

Based on the analysis presented in this report, Kimley-Horn believes the proposed Porteos Distribution Facility (Lot 10B) will be successfully incorporated into the existing and future roadway network. The proposed project development and expected traffic volumes resulted in the following recommendations and conclusions:

- With completion of the Porteos Distribution Facility (Lot 10B), the site proposes two accesses along the north side of 56th Avenue and three accesses along the west side of Jackson Gap Street. The west access along 56th Avenue will be designated for trucks and proposes full movements while the east access along 56th Avenue will serve employees and be restricted to right-in/right-out movements. The three accesses along Jackson Gap Street propose to allow full turning movements with the south access designated for employee parking, the middle access used only for emergency uses, and the north access serving the transport vans. The project accesses are recommended to have a R1-1 "STOP" sign installed for the exiting approaches. Single lanes should be sufficient on the exiting approaches at all five accesses; however, providing separate left and right turn lanes for exiting could be considered at the full movement accesses.

- The right-in/right-out access along 56th Avenue, it is recommended a R3-2 No Left Turn sign be placed underneath the STOP sign on the southbound driveway approach of the right-in/right-out access along 56th Avenue. In addition, a "Pork Chop" island is recommended to be installed at this access per City of Aurora requirements. Due to the absence of a raised median within 56th Avenue, a R3-2 No Left Turn sign should be placed on the northeast corner of the right-in/right-out access intersection, visible to eastbound drivers along 56th Avenue to restrict entering left turn movements.

- The truck access along 56th Avenue will require a designated eastbound left turn lane with a length of 275 feet. The south access along Jackson Gap Street will require a northbound left turn lane with a length of 150 feet.

- An eastbound left turn lane with a length of 275 feet should be provided at the intersection of 56th Avenue and Jackson Gap Street while a southbound left turn lane with a length of 150 feet should be provided at this intersection.

- Any on-site and off-site signing and striping improvements should be incorporated into the Civil Drawings and conform to City of Aurora Standards as well as the Manual on Uniform Traffic Control Devices – 2009 Edition (MUTCD).

2.0 INTRODUCTION

Kimley-Horn and Associates, Inc. has prepared this report to document the results of a Traffic Impact Study of future traffic conditions associated with the proposed Porteos Distribution Facility (Lot 10B) to be located on the northwest corner of the 56th Avenue and Jackson Gap Street intersection in Aurora, Colorado. A vicinity map is shown in **Figure 1**. A conceptual site plan illustrating the development is shown in **Appendix F**. It is expected that the project will be completed within the next couple of years; therefore, analysis was conducted for the 2023 short term horizon as well as the 2040 long-term horizon per Aurora requirements.

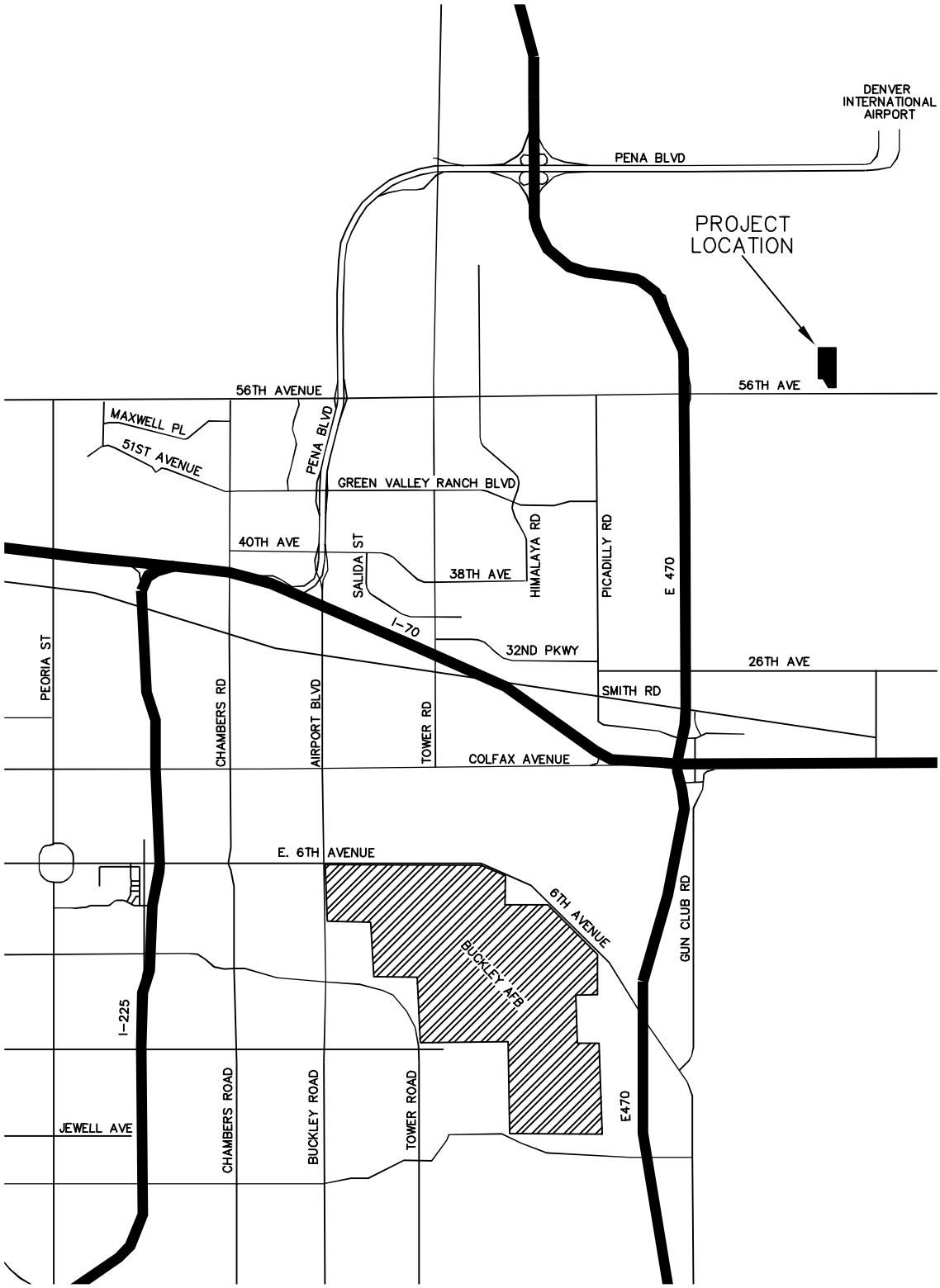
The purpose of this traffic study is to identify project traffic generation characteristics and potential project traffic related impacts on the local street system, as well as to develop mitigation measures required for identified impacts. The following intersection was incorporated into this traffic study in accordance with City of Aurora standards and requirements:

- Jackson Gap Street and 56th Avenue

In addition, the two proposed accesses along 56th Avenue and two proposed accesses along Jackson Gap Street were included for evaluation.

Regional access will be provided by Interstate 70 (I-70), Interstate 225 (I-225), E-470, and Pena Boulevard. Primary access to the site will be provided by 56th Avenue and Jackson Gap Street. Direct access to the project is proposed from one full movement access and one right-in/right-out access along 56th Avenue and three full movement accesses along Jackson Gap Street. The proposed west full movement access along 56th Avenue is designated for trucks and is the only access intended for heavy vehicles for the site. However, trucks could temporarily utilize the north access along Jackson Gap Street if internal scanning operations malfunction at the truck access along 56th Avenue. The proposed north full movement access along Jackson Gap Street is designated for vans. The truck and van accesses will have gated stations for entering and exiting the site. The right-in/right-out access along 56th Avenue and the south full movement access along Jackson Gap Street are designated for employee parking. The middle full movement access along Jackson Gap Street is for emergency uses only.

Kimley»Horn
NORTH
NTS 096360012



PORTEOS DISTRIBUTION FACILITY
AURORA, CO
VICINITY MAP

FIGURE 1

Kimley»Horn

3.0 EXISTING AND FUTURE CONDITIONS

3.1 Existing Study Area

The existing site is comprised of vacant land. East of the project site is a Fine Airport Parking Lot and a Silvercar by Audi car rental agency. North of the project site is an Ace Car Rental agency. A Costco Depot project is currently being constructed to the northeast of the project. Further north of the project site is the Denver International Airport. The extended area surrounding the project site is mainly comprised of vacant land. The land uses and roadway network surrounding the site are shown in the aerial of **Figure 2**.

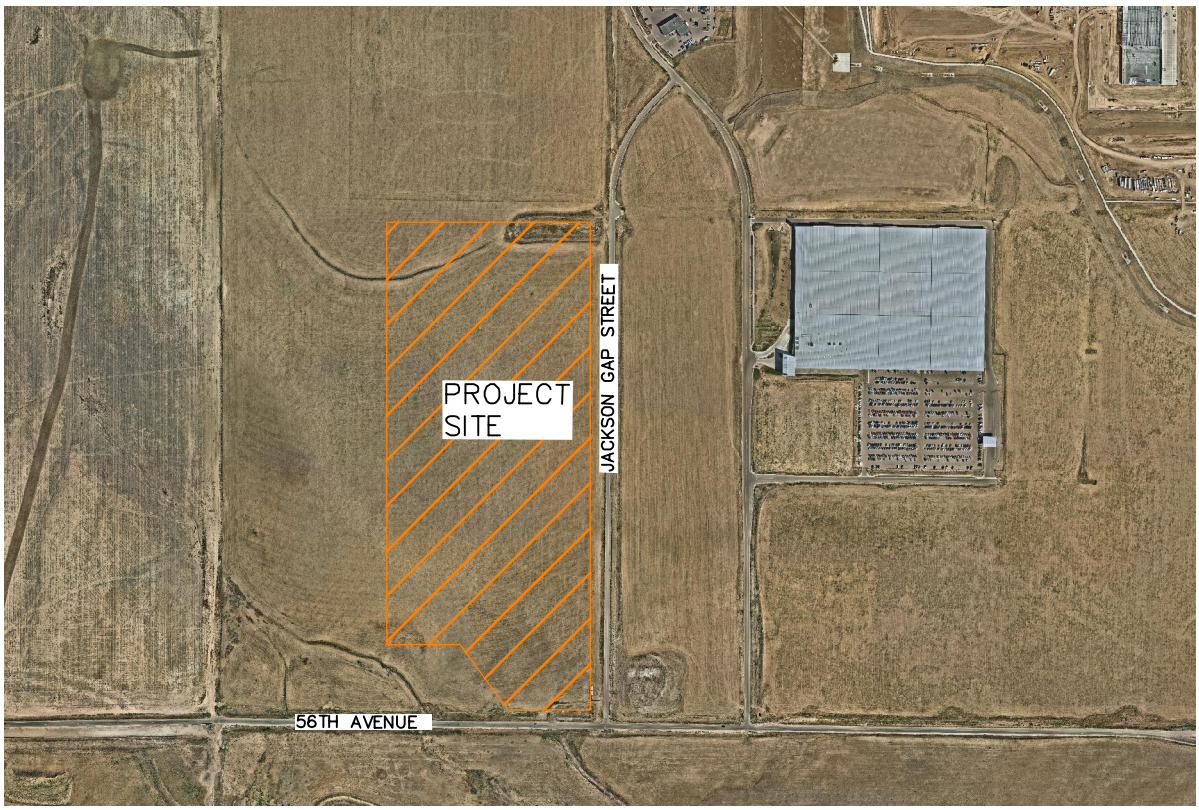
3.2 Existing and Future Roadway Network

Jackson Gap Street provides a single lane of travel in both directions, northbound and southbound, with a 40 mile per hour posted speed limit, and solid yellow centerline striping. It is anticipated that this portion of Jackson Gap Street through the study area will be improved to a three-lane roadway sometime in the future. 56th Avenue provides one lane of travel in each direction, eastbound and westbound, adjacent to the project site with a posted speed limit of 45 miles per hour.

Jackson Gap Street and 56th Avenue is an unsignalized "T"-intersection with stop control along the southbound Jackson Gap Street approach. The eastbound and westbound approaches provide a single approach lane for shared movements. The southbound approach provides a shared left/right turn lane.

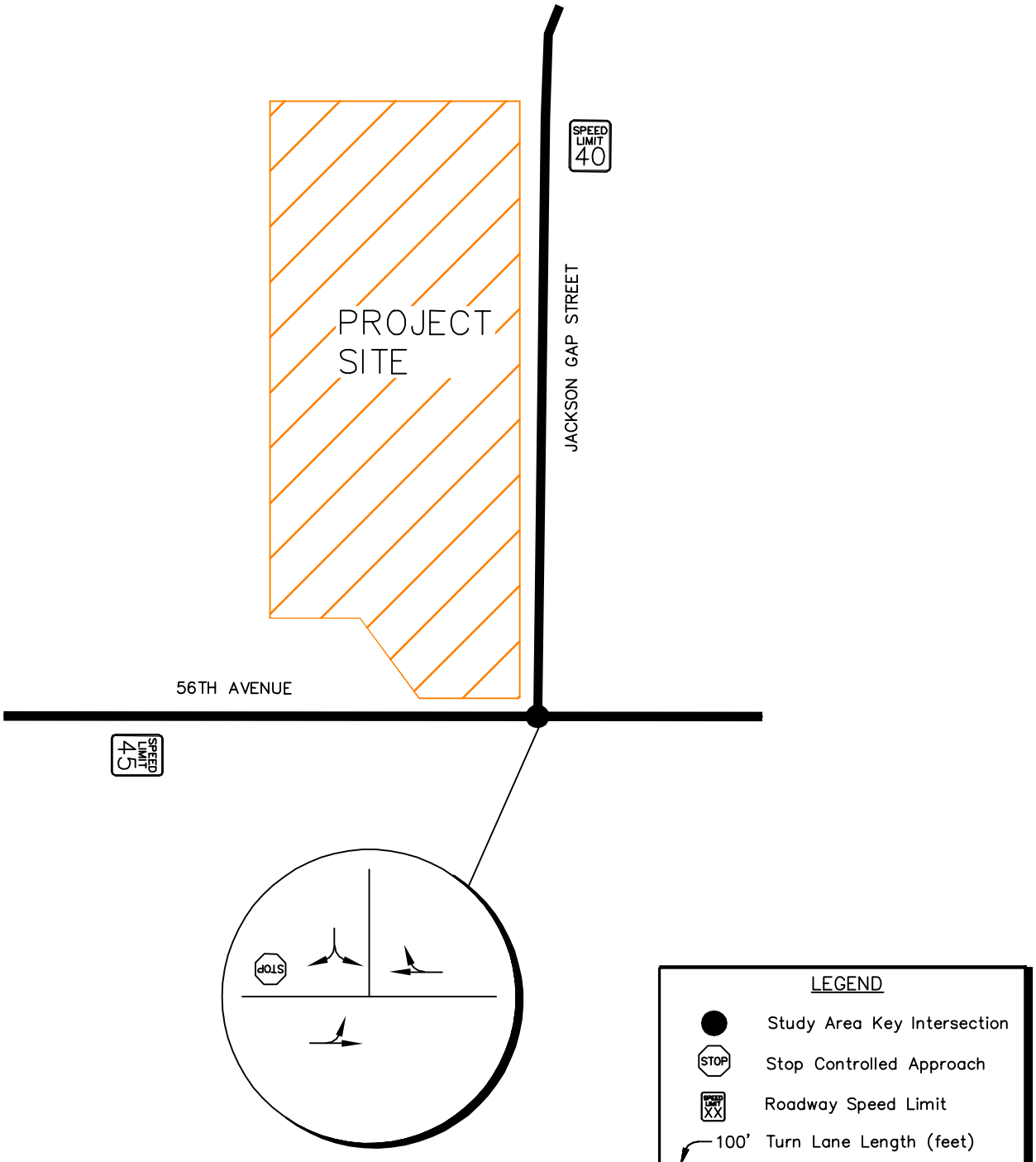
The intersection lane configuration and control for the study area key intersections are shown in **Figure 3**.

NORTH
NTS 096360012



PORTEOS DISTRIBUTION FACILITY
AURORA, CO
SURROUNDING SITE AREA

FIGURE 2



PORTEOS DISTRIBUTION FACILITY
AURORA, CO
EXISTING LANE CONFIGURATIONS

FIGURE 3

Kimley»Horn

3.3 Existing Traffic Volumes

Existing peak hour turning movement counts were conducted at the intersection of Jackson Gap Street and 56th Avenue on Thursday, October 8, 2020. Counts were conducted in 15-minute intervals during the morning and afternoon peak hours of adjacent street traffic from 7:00 AM to 9:00 AM and 4:00 PM to 6:00 PM on this count date.

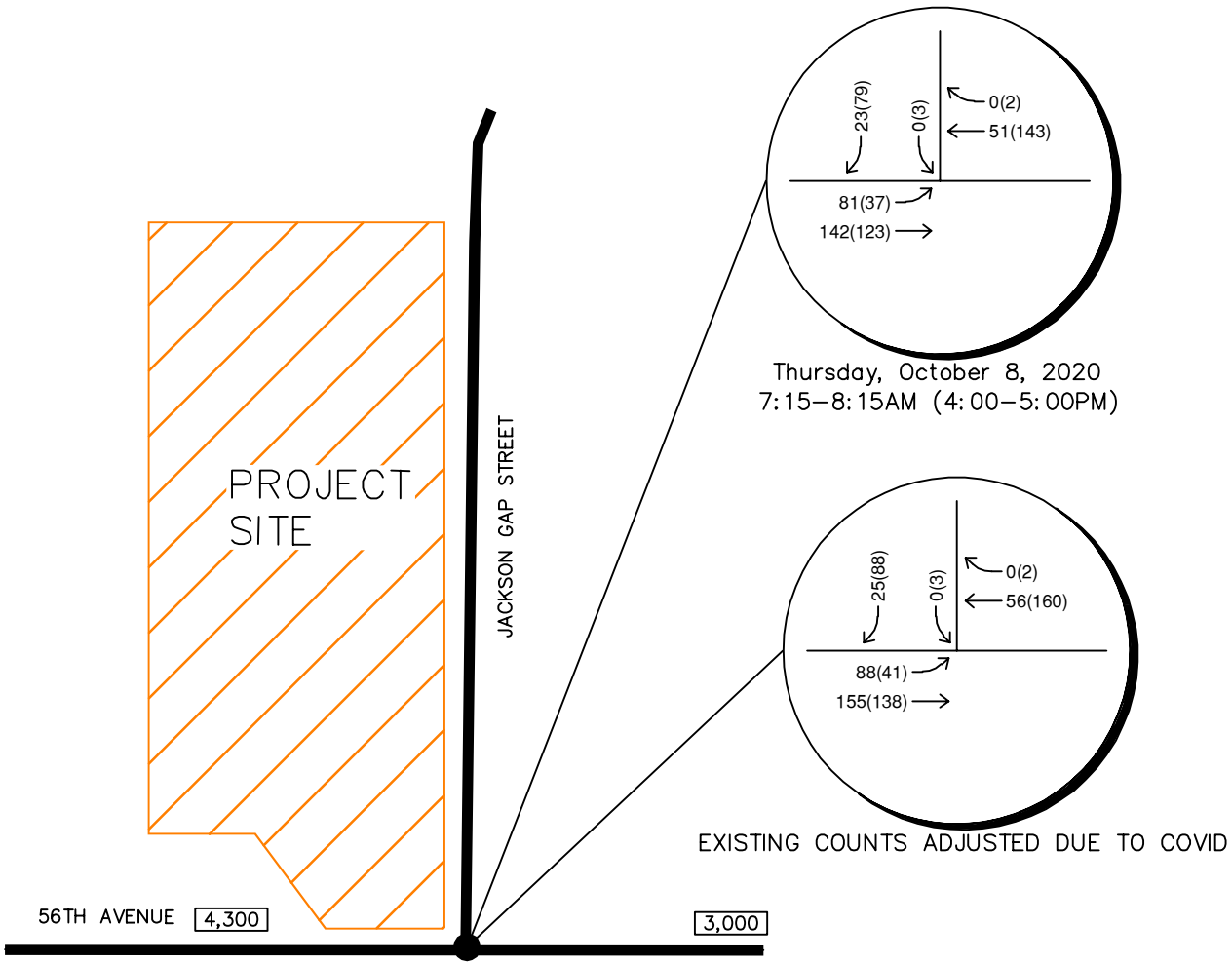
Due to the Jackson Gap Street and 56th Avenue counts being collected during the COVID-19 Pandemic, an adjustment factor was determined in order to grow the counts to pre-COVID conditions. Based on the count comparison with the Jackson Gap Street and Jackson Gap Way volumes, it was determined that a 1.09 adjustment factor be applied to the morning peak hour volumes and 1.12 adjustment factor be applied to afternoon peak hour existing volumes. In addition, a two (2) percent City of Aurora standard annual growth rate was applied to Jackson Gap Street and Jackson Gap way to generate existing 2020 volumes. The existing and adjusted existing peak hour turning movement counts are shown in **Figure 4** with count sheets provided in **Appendix A**.

3.4 Unspecified Development Traffic Growth

To generate background traffic volumes in year 2023, the City of Aurora standard annual growth rate of two (2) percent was applied to the existing turning movement counts. In addition, site generated traffic volumes from the "Porteos – Project Pearl in Aurora", September 2020, "Aurora Costco Depot Transportation Impact Study", August 2019, and "Ryder Truck Facility Traffic Impact Study", April 2020 were included as background traffic in 2023. The short-term and long-term total traffic volumes from the Porteos – Project Pearl study were used as a basis for 2023 and 2040 background traffic volumes along Jackson Gap Street in this study. Short-term background traffic volumes from the Porteos – Project Pearl study were based on volumes from the Jackson Gap ISP Traffic Study (2020) which used NEATS Refresh modeling and Porteos Master TIS Update (2017). The long-term background traffic volumes from the Porteos – Project Pearl study were estimated using traffic volume projections from the Jackson Gap ISP Traffic Study with the removal of estimated trips within PAs 8a and 8b associated with the Project Pearl site from the Porteos Master Plan Traffic Study.

2040 total traffic volumes from the Aurora Costco Depot study were used as a basis to determine 2040 background traffic volumes along 56th Avenue at the intersection with Jackson

Gap Street. Long-term background traffic volumes from the Aurora Costco Depot were based on volumes from the Porteos Master Transportation Plan, NEATS Refresh, Groot Distribution Center TIS, and JAG Logistics Center at DIA TIS. Applicable documents from the Porteos – Project Pearl, Aurora Costco Depot, and Ryder Truck traffic studies are included in **Appendix B**. The calculated background traffic volumes for 2023 and 2040 are shown in **Figure 5** and **Figure 6**, respectively.



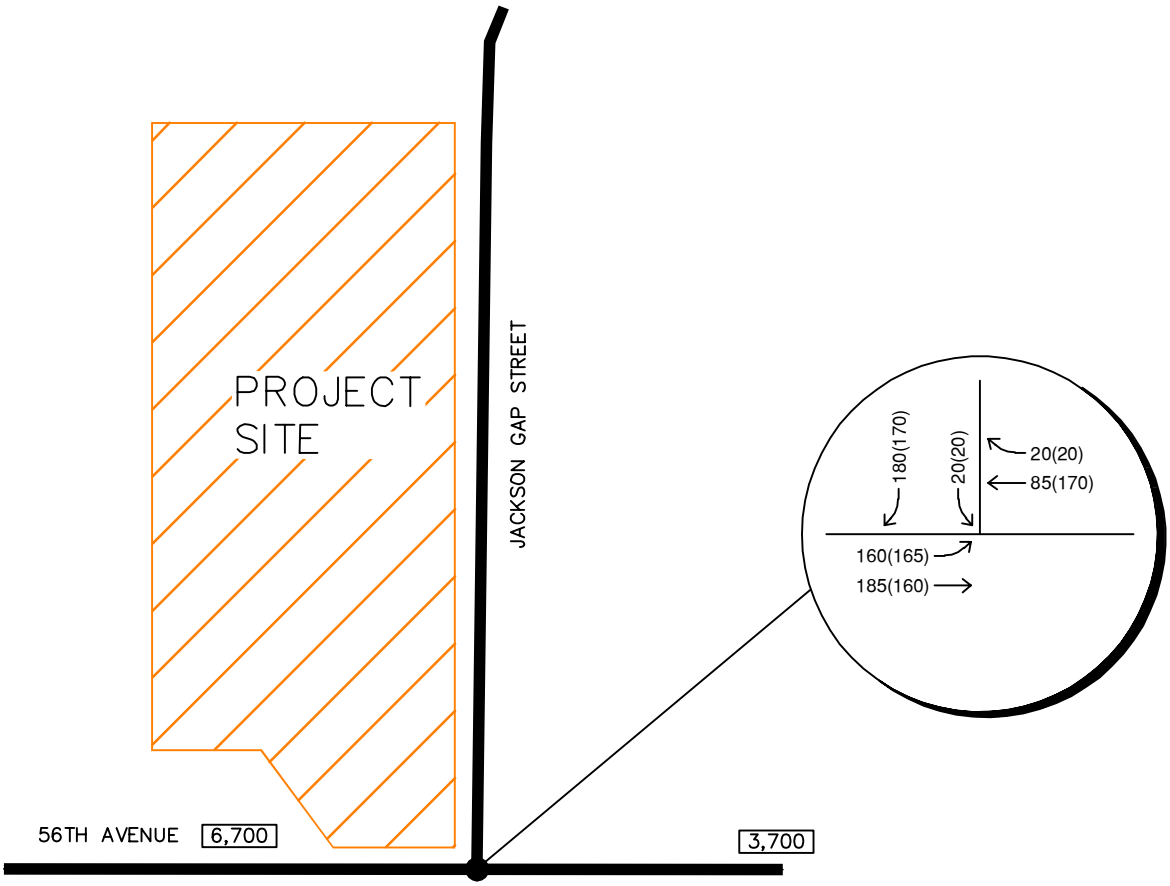
LEGEND

- ● Study Area Key Intersection
- XXX(XXX) Weekday AM(PM) Peak Hour Traffic Volumes
- XX,X00 Daily Traffic Volume

PORTEOS DISTRIBUTION FACILITY
AURORA, CO
EXISTING ADJUSTED TRAFFIC VOLUMES

FIGURE 4

Kimley»Horn



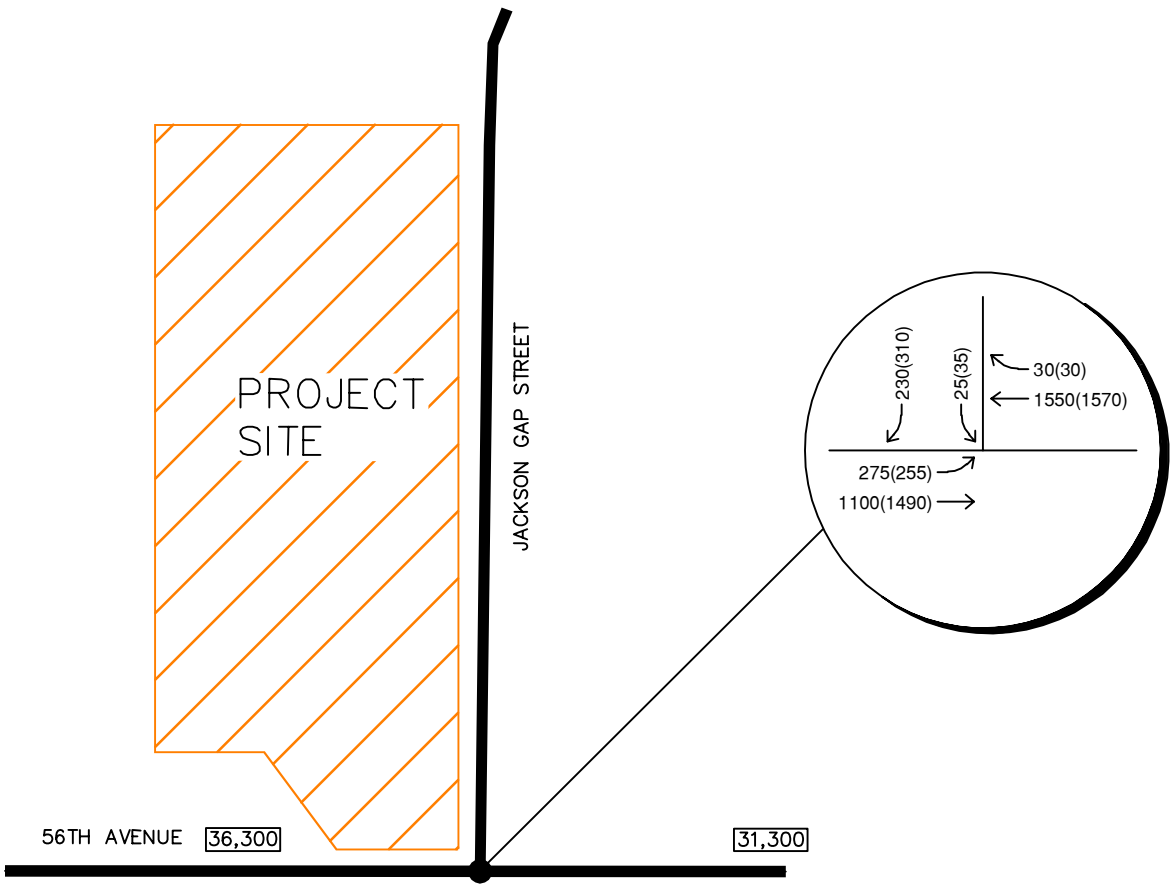
LEGEND

- ● Study Area Key Intersection
- XXX(XXX) Weekday AM(PM) Peak Hour Traffic Volumes
- XX,X00 Daily Traffic Volume

PORTEOS DISTRIBUTION FACILITY
AURORA, CO
2023 BACKGROUND TRAFFIC VOLUMES

FIGURE 5

Kimley»Horn



LEGEND

- ● Study Area Key Intersection
- XXX(XXX) Weekday AM(PM) Peak Hour Traffic Volumes
- XX,X00 Daily Traffic Volume

PORTEOS DISTRIBUTION FACILITY
AURORA, CO
2040 BACKGROUND TRAFFIC VOLUMES

FIGURE 6

Kimley»Horn

4.0 PROJECT TRAFFIC CHARACTERISTICS

4.1 Trip Generation

Site-generated traffic estimates are determined through a process known as trip generation. The proposed distribution processing facility is anticipated to be completed within a couple years with the facility opening sometime in 2023. Given the specific nature of this site, a methodology separate from the typical ITE Trip Generation Manual and Handbook was developed based on user specific data to determine the trip generation potential of such sites. The trip projections for package distribution facility are based on the anticipated employee automobile numbers, packing and delivery vans, spot trailers, and linehaul truck numbers associated with the project have been calculated based on project build-out year. The proposed Porteos Distribution Facility (Lot 10B) facility is anticipated to include an approximate 479,000 square feet of distribution facility. Trip generation rates and equations were determined by other sites with the same land use.

Based on the anticipated facility operations and user specific data provided, the overall Porteos Distribution Facility is expected to generate approximately 2,656 daily weekday trips. Of these, 177 trips are expected to occur during the weekday morning peak hour while 235 trips are expected during the weekday afternoon peak hour. Site specific trips have been allocated into passenger vehicle trips, truck trips, and delivery vehicle trips. **Table 1** summarizes the estimated trip generation for the proposed development. The trip generation worksheet is included in **Appendix C**.

Table 1 – Porteos Distribution Facility Traffic Generation

Land Use	Daily	Vehicle Trips					
		Weekday AM Peak Hour			Weekday PM Peak Hour		
		In	Out	Total	In	Out	Total
Passenger Vehicles	1,074	30	68	98	68	95	163
Trucks	1,430	27	30	57	22	35	57
Delivery Vehicles (Vans)	152	0	22	22	15	0	15
Total Trips Generated	**2,656**	**57**	**120**	**177**	**105**	**130**	**235**

4.2 Trip Distribution

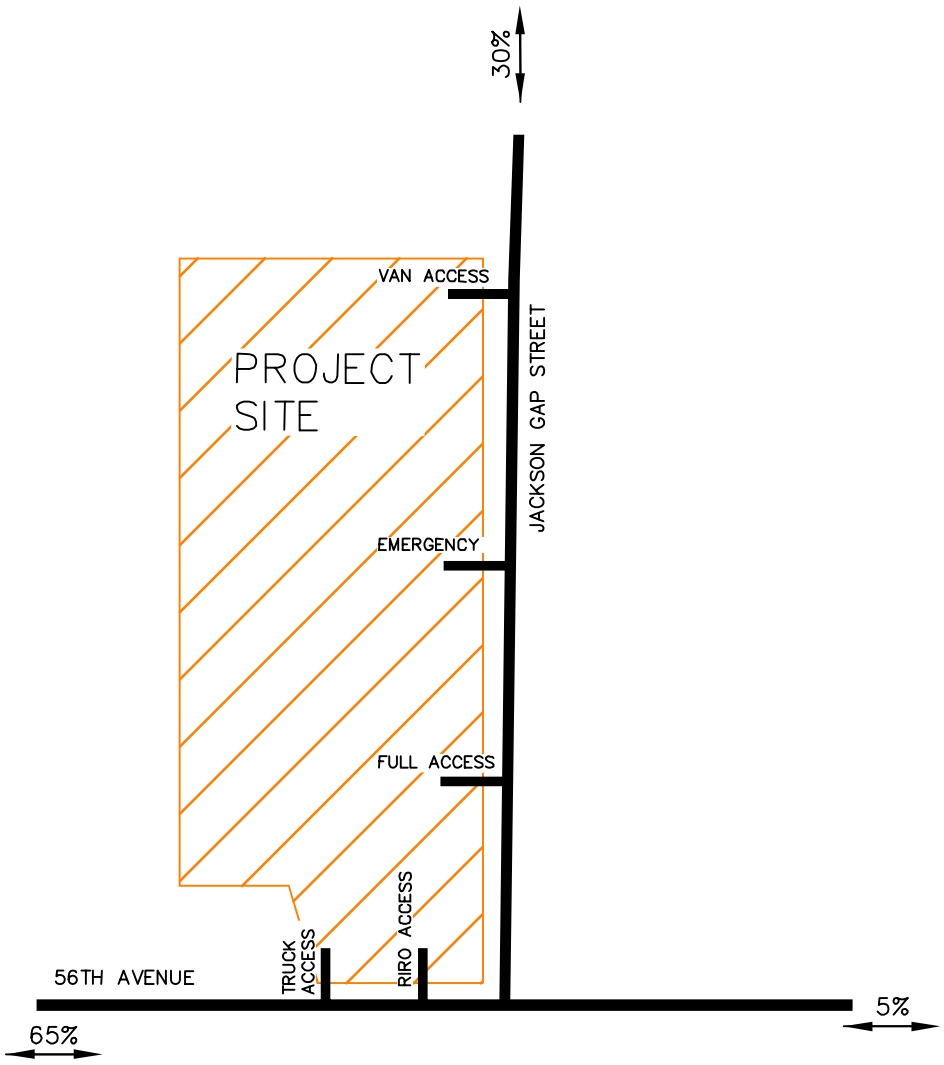
Distribution of site traffic on the street system was based on the area street system characteristics, existing traffic patterns, existing and anticipated surrounding demographic information, expected roadway improvements, and the proposed access system for the project. The directional distribution of traffic is a means to quantify the percentage of site-generated traffic that approaches the site from a given direction and departs the site back to the original source. Project trip distribution accounts for trucks having two designated accesses, delivery vehicles having one access, and the associate passenger vehicle lot having two access locations. The project trip distribution is illustrated in **Figure 7.**

4.3 Traffic Assignment

Traffic assignment was obtained by applying the project trip distribution to the estimated traffic generation of the development shown in **Table 1**. Site traffic assignment for the proposed Porteos Distribution Facility is shown in **Figure 8.**

4.4 Total (Background Plus Project) Traffic

Site traffic volumes were added to the background volumes to represent estimated traffic conditions for the short term 2023 horizon and long term 2040 horizon. These total traffic volumes for the site are illustrated for the 2023 and 2040 horizon years in **Figures 9** and **10**, respectively.



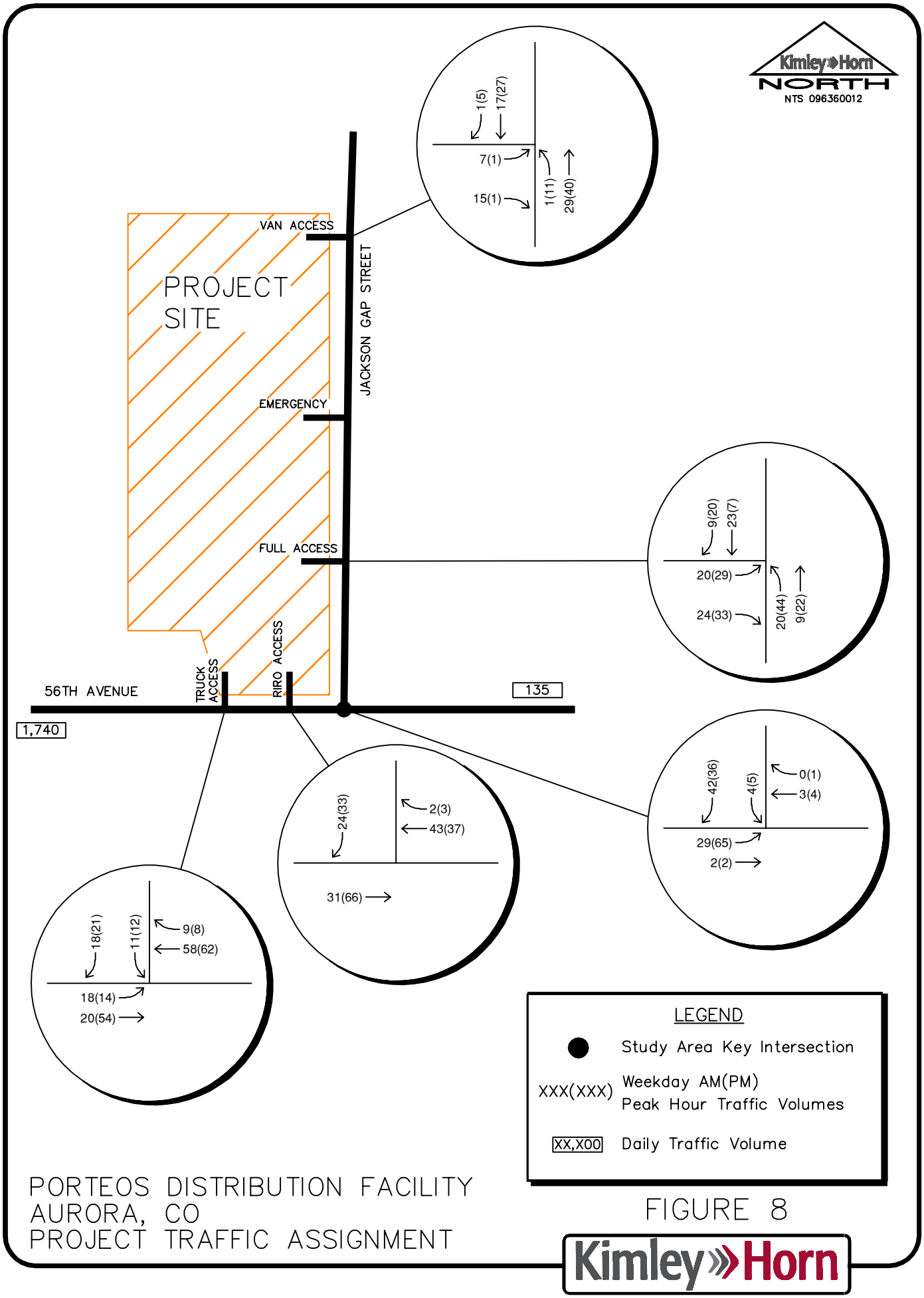
LEGEND

● Study Area Key Intersection

XX% External Trip Distribution Percentage

PORTEOS DISTRIBUTION FACILITY
AURORA, CO
PROJECT TRIP DISTRIBUTION

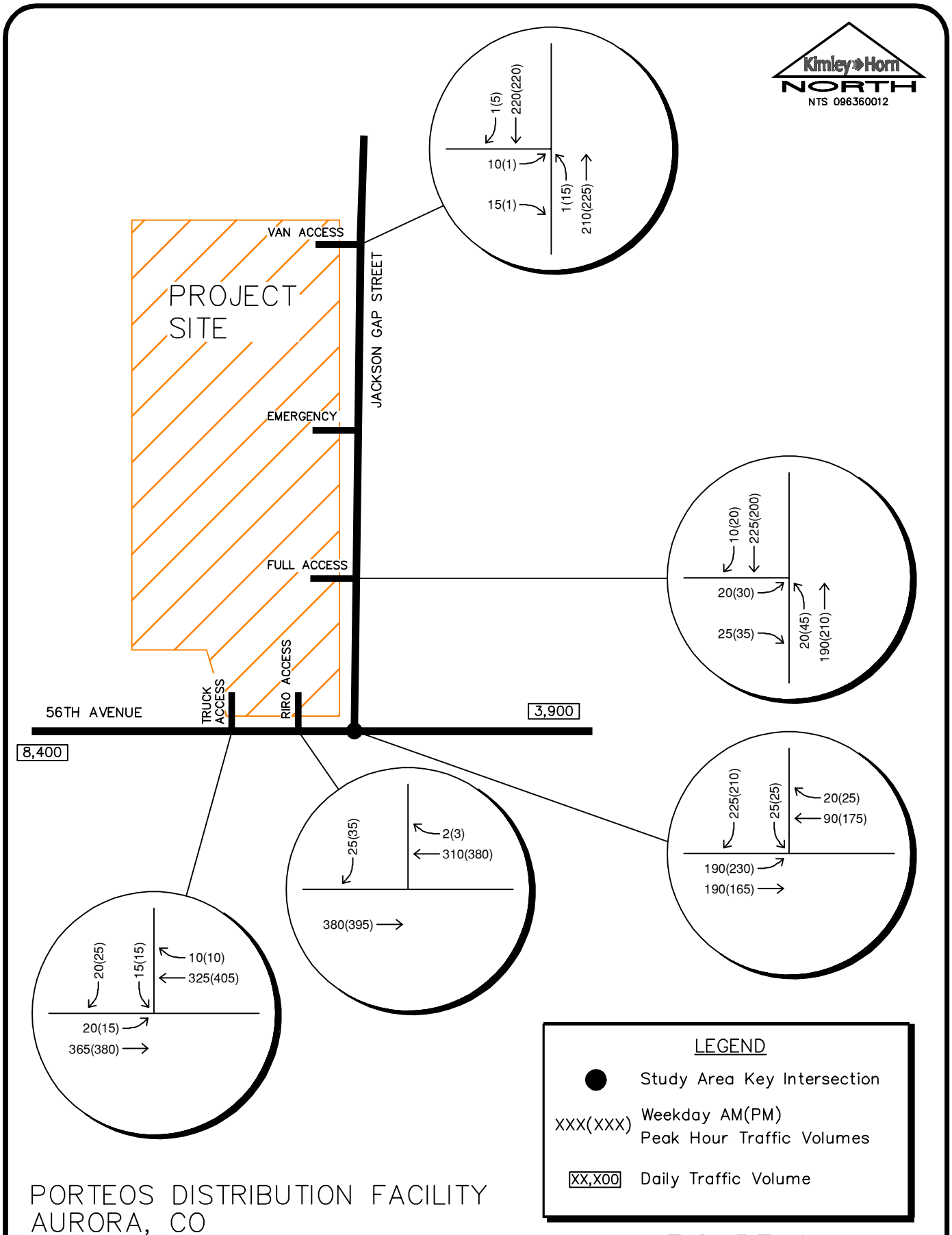
FIGURE 7



PORTEOS DISTRIBUTION FACILITY
AURORA, CO
PROJECT TRAFFIC ASSIGNMENT

FIGURE 8

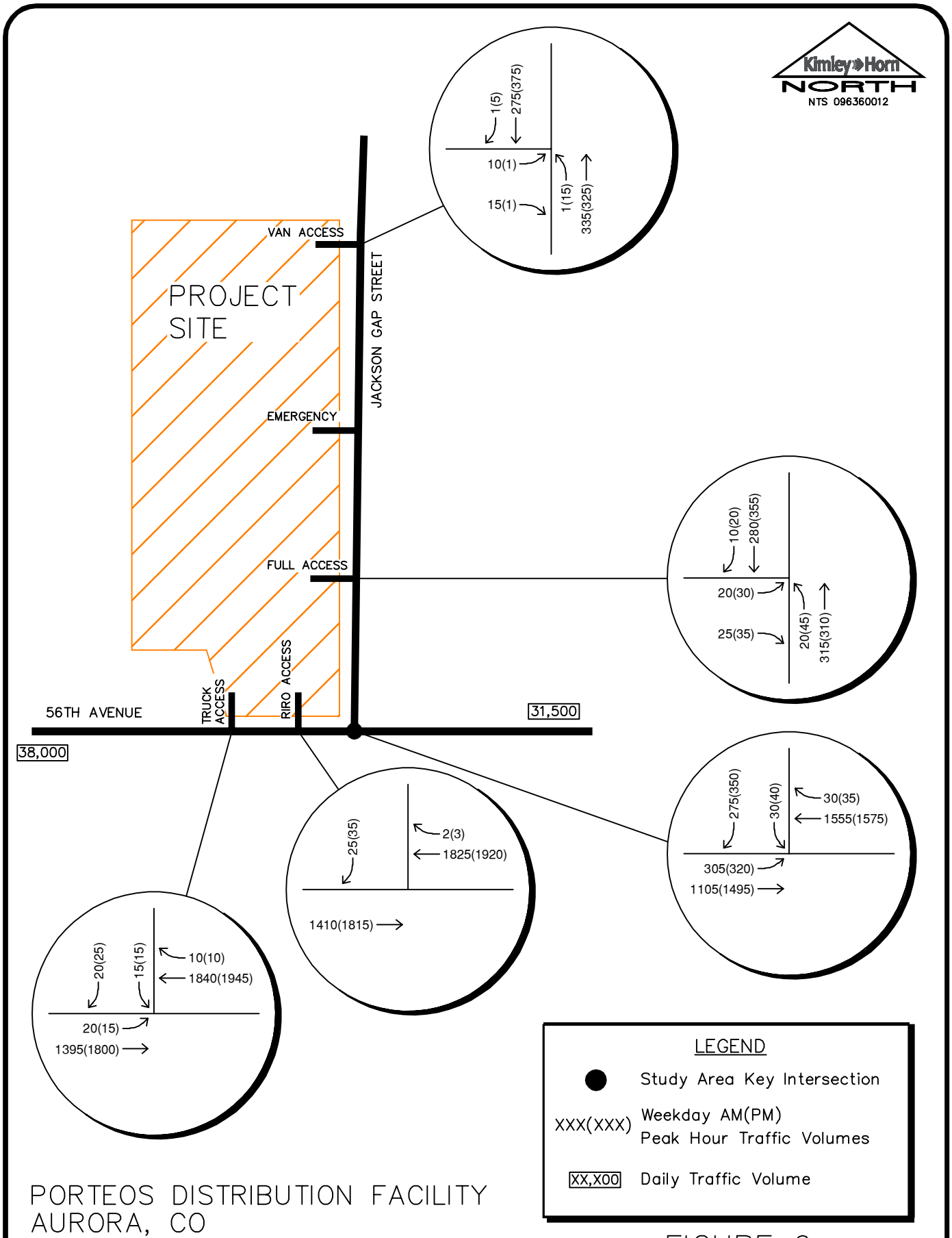
Kimley»Horn



PORTEOS DISTRIBUTION FACILITY
AURORA, CO
2023 BACKGROUND
PLUS PROJECT TRAFFIC VOLUMES

FIGURE 9

Kimley»Horn



PORTEOS DISTRIBUTION FACILITY
AURORA, CO
2040 BACKGROUND
PLUS PROJECT TRAFFIC VOLUMES

FIGURE 9

Kimley»Horn

5.0 TRAFFIC OPERATIONS ANALYSIS

Kimley-Horn's analysis of traffic operations in the site vicinity was conducted to determine potential capacity deficiencies in the 2023 and 2040 development horizons at the identified key intersections and access driveways. The acknowledged source for determining overall capacity is the current edition of the *Highway Capacity Manual (HCM)*[1].

5.1 Analysis Methodology

Capacity analysis results are listed in terms of Level of Service (LOS). LOS is a qualitative term describing operating conditions a driver will experience while traveling on a particular street or highway during a specific time interval. It ranges from A (very little delay) to F (long delays and congestion). According to City of Aurora guidelines for signalized intersections, individual movements may be allowed to fall to LOS E, but in most cases the overall intersection must operate (or be projected to operate) at a LOS D or better during AM and PM peak periods. If the existing LOS for an intersection is less than LOS D, potential alternatives to improve the intersection should be provided to achieve LOS D or maintain the existing critical lane volume with the addition of site generated traffic. Minor movements at unsignalized intersections, such as left turns onto a major arterial from a side street, may be allowed to fall below LOS D pending the specific conditions. Movements which have a light traffic demand and a viable travel alternative may be allowed to fall below LOS D. **Table 2** shows the definition of level of service for signalized and unsignalized intersections.

Table 2 – Level of Service Definitions

Level of Service	Signalized Intersection Average Total Delay (sec/veh)	Unsignalized Intersection Average Total Delay (sec/veh)
A	≤ 10	≤ 10
B	> 10 and ≤ 20	> 10 and ≤ 15
C	> 20 and ≤ 35	> 15 and ≤ 25
D	> 35 and ≤ 55	> 25 and ≤ 35
E	> 55 and ≤ 80	> 35 and ≤ 50
F	> 80	> 50

Definitions provided from the Highway Capacity Manual, Sixth Edition, Transportation Research Board, 2016.

[1] Transportation Research Board, *Highway Capacity Manual*, Sixth Edition, Washington DC, 2016.

Study area intersections were analyzed based on average total delay analysis for signalized and unsignalized intersections. Under the unsignalized analysis, the LOS for a two-way stop-controlled intersection is determined by the computed or measured control delay and is defined for each minor movement. LOS for a two-way stop-controlled intersection is not defined for the intersection as a whole. LOS for a signalized and all-way stop controlled intersection is defined for each approach and for the overall intersection.

5.2 Key Intersection Operational Analysis

Calculations for the level of service at the key intersections and project access driveways for the study area are provided in **Appendix D**. The existing year analysis is based on the lane geometry and intersection control shown in **Figure 3**. Existing peak hour factors were used for the existing and 2023 conditions, while the recommended HCM urban peak hour factor of 0.92 averaged with the existing peak hour was used for the 2040 analysis. A heavy vehicle usage of 13 percent was utilized during the morning peak hours and 10 percent was utilized during the afternoon peak hours based on data collected. In addition, the in and out movements at the truck accesses were analyzed with a heavy vehicle percentage of 100 while the in and out movement at the van and passenger vehicle accesses were analyzed with a heavy vehicle usage of two (2) percent. Synchro traffic analysis software was used to analyze the study area intersections and access driveways. The Synchro Highway Capacity Manual (HCM) methodology reports were used to analyze intersection delay and level of service.

Jackson Gap Street and 56th Avenue

The existing T-intersection Jackson Gap Street and 56th Avenue is unsignalized and operates with stop control along the southbound Jackson Gap Street approach. Based on the turn lane analysis, an eastbound left turn lane is required to meet Aurora guidelines; therefore, the intersection has been analyzed with an eastbound left turn lane throughout the long-term 2040 horizon. All movements at this intersection currently operate acceptably with LOS A during the morning and afternoon peak hours. With the addition of project traffic, all movements at this intersection are expected to operate acceptably with LOS C or better during the peak hours in 2023. It is recommended that the southbound approach of Jackson Gap Street provides separate left and right turn lanes.

The Northeast Area Transportation Study (NEATS) Refresh identifies 56th Avenue as a six-lane facility (three through lanes in each direction) by year 2040. Therefore, 56th Avenue was studied with three through lanes in each direction at this intersection in 2040. With the recommended lane configurations, all movements at this intersection are expected to continue to operate acceptably during the peak hours in 2040. **Table 3** provides the results of the level of service at this intersection.

Table 3 – Jackson Gap Street and 56th Avenue LOS Results

Scenario	AM Peak Hour		PM Peak Hour	
	Delay (sec/veh)	LOS	Delay (sec/veh)	LOS
2020 Existing				
Eastbound Left	7.6	A	7.7	A
Southbound Approach	8.8	A	9.9	A
2023 Background#				
Eastbound Left	8.0	A	8.2	A
Southbound Left	17.2	C	17.0	C
Southbound Right	11.4	B	10.7	B
2023 Background Plus Project#				
Eastbound Left	8.1	A	8.4	A
Southbound Left	19.9	C	21.7	C
Southbound Right	12.7	B	11.2	B
2040 Background##				
Eastbound Left	17.5	C	13.8	B
Southbound Left	26.0	D	20.7	C
Southbound Right	20.7	C	21.6	C
2040 Background Plus Project##				
Eastbound Left	18.9	C	15.7	C
Southbound Left	31.1	D	26.4	D
Southbound Right	26.2	D	25.5	C

= Addition of an EBL and SBL Turn Lanes; ## = Provide Eastbound and Westbound Through Lanes

5.3 Project Access Operational Analysis

With completion of the Porteos Distribution Facility (Lot 10B), the site proposes two accesses along the north side of 56th Avenue and three accesses along the west side of Jackson Gap Street. The west access along 56th Avenue will be designated for trucks and proposes full movements while the east access along 56th Avenue will serve employees and be restricted to right-in/right-out movements. The three accesses along Jackson Gap Street propose to allow full turning movements with the south access designated for employee parking, the middle access used only for emergency purposes, and the north access serving the transport vans.

The project accesses are recommended to have a R1-1 "STOP" sign installed for the exiting approaches. For the right-in/right-out access along 56th Avenue, it is recommended a R3-2 No Left Turn sign be placed underneath the STOP sign on the southbound driveway approach. In addition, a "Pork Chop" island is recommended to be installed at this access per City of Aurora requirements. Due to the absence of a raised median within 56th Avenue, a R3-2 No Left Turn sign should be placed on the northeast corner of the right-in/right-out access intersection, visible to eastbound drivers along 56th Avenue to restrict entering left turn movements. The truck access along 56th Avenue will require a designated eastbound left turn lane. The south access along Jackson Gap Street will require a northbound left turn lane. Single lanes should be sufficient on the exiting approaches at all five accesses; however, providing separate left and right turn lanes for exiting could be considered at the full movement accesses.

With the recommended lane configurations and control, all movements at the access intersections are expected to operate acceptably with LOS C or better during the peak hours throughout 2040. **Table 4** provides the results of the level of service at this intersection.

Table 4 – Porteos Distribution Facility Access LOS Results

Intersection	2023 Background Plus Project				2040 Background Plus Project			
	AM Peak Hour		PM Peak Hour		AM Peak Hour		PM Peak Hour	
	Delay (sec/ veh)	LOS	Delay (sec/ veh)	LOS	Delay (sec/ veh)	LOS	Delay (sec/ veh)	LOS
56th Avenue West Access (Trucks)								
Eastbound Left	9.6	A	10.0	A	12.9	B	13.4	B
Southbound Approach	16.7	C	18.3	C	16.6	C	18.3	C
56th Ave East Access (Employees)								
Southbound Right	10.3	B	11.0	B	12.7	B	13.4	B
Jackson Gap Street South Access (Employees)								
Northbound Left	7.8	A	7.8	A	7.9	A	8.3	A
Eastbound Approach	10.6	B	11.0	B	11.4	B	12.7	B
Jackson Gap Street North Access (Van Access)								
Northbound Left	8.9	A	9.0	A	9.2	A	9.8	A
Eastbound Approach	12.5	B	12.8	B	14.2	B	16.3	C

5.4 Turn Lane Requirement Analysis

The City of Aurora currently adheres to the Colorado Department of Transportation (CDOT) State Highway Access Code (SHAC) guidelines to determine if turn lanes are warranted for intersections within the project limits. CDOT classifies their state highways based on roadway types. The Non-Rural Arterial Category NR-B (moderate travel speeds and relatively moderate to high traffic volumes) was assigned to 56th Avenue based on matching the characteristics of the CDOT roadways and the Non-Rural Arterial Category NR-C (low to moderate travel speeds and moderate volumes) was assigned to Jackson Gap Street.

According to the State Highway Access Code for category NR-B and NR-C roadways, the following thresholds apply for an auxiliary lane:

- A left turn lane with storage length plus taper is required for any access with a projected peak hour left ingress turning volume greater than 25 vehicles per hour (vph). If the posted speed limit is greater than 40 miles per hour, a deceleration lane and taper is required for any access with a projected peak hour left ingress turning volumes greater than 10 vph. The taper length will be included within the deceleration length.
- A right turn lane with storage length plus taper is required for any access with a projected peak hour right ingress turning volume greater than 50 vehicles per hour (vph).

If the posted speed limit is greater than 40 miles per hour, a right turn lane deceleration lane and taper is required for any access with a project peak hour right ingress turning volume greater than 25 vehicles per hour.

56th Avenue currently has a posted speed limit of 45 miles per hour within the project limits. Based on the current speed limits and 2023 traffic volume projections, right turn lane and left turn lane requirements at the project intersections along 56th Avenue are as follows:

56th Avenue and Jackson Gap Street

- An eastbound left turn lane **is** warranted along 56th Avenue at the Jackson Gap Street intersection based on projected 2023 background plus project traffic volumes being 230 eastbound left turns during the peak hour and the threshold being greater than 10 vph. Based on a speed limit of 45 mph, a left turn deceleration length of 435 feet should be provided at this location. Since the taper length is incorporated within the deceleration lane length, an eastbound left turn lane length of 275 feet plus a 160-foot taper (13.5 to 1 ratio).
- A westbound right turn lane along 56th Avenue **is not** warranted at the 56th Avenue and Jackson Gap Street intersection based on projected 2023 background plus project traffic volumes being 25 westbound right turns during the peak hour and the threshold being greater than 25 vph.

56th Avenue and Truck Access

- An eastbound left turn lane **is** warranted along 56th Avenue at the Truck Full Access intersection based on projected 2023 background plus project traffic volumes being 20 eastbound left turns during the peak hour and the threshold being greater than 10 vph. Based on a speed limit of 45 mph, a left turn deceleration length of 435 feet should be provided at this location. Since the taper length is incorporated within the deceleration lane length, an eastbound left turn lane length of 275 feet plus a 160-foot taper (13.5 to 1 ratio).
- A westbound right turn lane along 56th Avenue **is not** warranted at the 56th Avenue and Truck Full Access intersection based on projected 2023 background plus project traffic volumes being 10 westbound right turns during the peak hour and the threshold being greater than 25 vph.

56th Avenue and Employee RIRO Access

- A westbound right turn lane along 56th Avenue **is not** warranted at the 56th Avenue and Employee right-in/right-out access intersection based on projected 2023 background plus project traffic volumes being three (3) westbound right turns during the peak hour and the threshold being greater than 25 vph.

Jackson Gap Street currently has a posted speed limit of 40 miles per hour within the project limits. Based on the current speed limits and 2023 traffic volume projections, right turn lane and left turn lane requirements at the project intersections along Jackson Gap Street are as follows:

Jackson Gap Street and Employee Full Access

- A northbound left turn lane **is** warranted along Jackson Gap Street at the Employee Full Access intersection based on projected 2023 background plus project traffic volumes being 45 northbound left turns during the peak hour and the threshold being greater than 25 vph. Based on a speed limit of 40 mph, the requirement for this left turn lane is storage length plus taper. The storage length requirement is one foot per turning vehicle movement during the peak hour. This equates to 45 feet of storage length based on projected 2023 background plus project traffic volumes being 45 northbound left turns during the peak hour; however, a City of Aurora minimum left turn storage length of 150 feet plus a 100-foot taper should be provided at this location.
- A southbound right turn lane along Jackson Gap Street **is not** warranted at the Employee Full Access intersection based on projected 2023 background plus project traffic volumes being 20 southbound right turns during the peak hour and the threshold being greater than 50 vph.

Jackson Gap Street and Van Access

- A northbound left turn lane **is not** warranted along Jackson Gap Street at the Van Access intersection based on projected 2023 background plus project traffic volumes being 15 northbound left turns during the peak hour and the threshold being greater than 25 vph.
- A southbound right turn lane along Jackson Gap Street **is not** warranted at the Van Access intersection based on projected 2023 background plus project traffic volumes

being five (5) southbound right turns during the peak hour and the threshold being greater than 50 vph.

5.5 Turn Bay Vehicle Queuing Analysis

A vehicle queuing analysis was conducted for turn lanes at the study area intersections. The queuing analysis was performed using the Synchro analysis software presenting the results of the 95th percentile queue length. Results of the vehicle queuing analysis are shown in the following **Table 5** with calculations provided in the intersection operational outputs located in **Appendix D**.

Table 5 – Turn Lane Length Analysis Results

Intersection Turn Lane	Existing Turn Lane Length (feet)	2023 Calculated Queue Length (feet)	2023 Recommended Turn Lane Length (feet)	2040 Calculated Queue Length (feet)	2040 Recommended Turn Lane Length (feet)
Jackson Gap St & 56th Avenue					
Eastbound Left	DNE	25'	**150' (275')**	100'	150' (275')
Southbound Left	DNE	25'	**150' (25')**	125''	150' (50')
56th Avenue West Access (Trucks)					
Eastbound Left	DNE	50'	**150' (275')**	50'	150' (275')
Southbound Approach	DNE	50'	50'	100'	100'
Jackson Gap Street South Access (Employees)					
Northbound Left	DNE	25'	**150' (50')**	25'	150' (50')
Eastbound Approach	DNE	25'	50'	25'	50'
Jackson Gap Street North Access (Van Access)					
Eastbound Approach	DNE	25'	**50'**	25'	50'

XXX' = 95th Queues or City of Aurora Minimum Length Standard (XXX' = CDOT Length Requirement)
DNE = Does Not Exist

As shown in the queuing table, turn lanes currently do not exist at the key intersection, but all new auxiliary turn lanes should be constructed and designated with the lengths reported in **Table 5**.

Based on the results of the intersection operational and turn lane analysis, the recommended lane configurations and control of the study key intersections are shown for the 2023 project buildout year in **Figure 11** and for the 2040 long term horizon in **Figure 12**.

5.6 Gated Queue Analysis

The project proposes two gate stations for entering and exiting: the truck and van delivery area. Therefore, a gated entry vehicle queuing analysis was performed to ensure trucks and delivery vans will not spillback into the public streets.

The truck access along 56th Avenue will have a gate station located approximately 550 feet from the driveway entrance while the van access along Jackson Gap Street will have a gate station located approximately 100 feet from the driveway entrance. During the peak hour of the generator (not the peak hour of the adjacent street), a maximum of 51 trucks are anticipated to enter the facility. This volume was used to analyze the queuing storage requirements. Since it is unreasonable to assume that vehicles will arrive at a constant rate throughout the truck peak

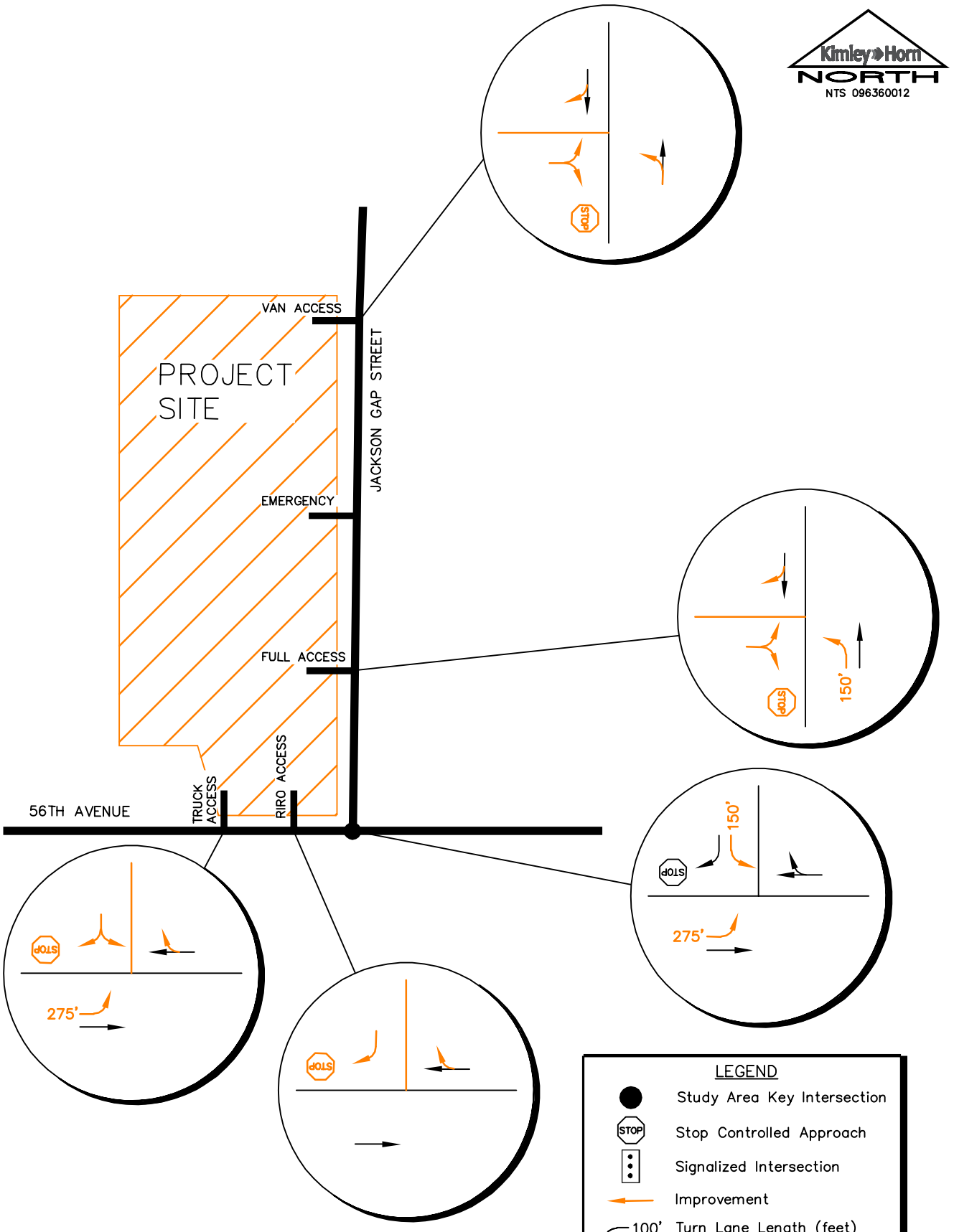
hour, a Poisson distribution storage equation was used to account for the variations in arrival rates. The gate for the truck access is anticipated to be operated by an overhead truck scanner and will automatically open a truck approaches the gate Therefore, the service rate is anticipated to be in the range of 10-15 seconds. However, to provide a conservative analysis, a service rate of 60 seconds per truck was utilized within the queuing analysis as the time identified to approach the gate and for the gate to open. Based on these volumes and service rate, it was calculated that a storage length of three (3) WB-67 truck (67 feet) is needed on site prior to the primary truck gate station. Therefore, it is anticipated that the truck queueing will be sufficiently accommodated on site without negative impact.

The gate for the van access is anticipated to be utilized with a key card or a vehicle scanner and will open once a van is scanned (or key card is used). It is anticipated that 15 delivery vehicles will arrive to the van access gated entry during the peak hour of the generator based on the trip generation calculations. This volume was used to analyze the queuing storage requirements. A service rate of 30 seconds per van was utilized within the queuing analysis as the time identified scanning an entry card. Based on these volumes and service rate, it was calculated that a storage length of one van (30 feet) is needed on site prior to the gate station; therefore, it is anticipated that the van queueing will be sufficiently accommodated on site without negative impact. Based on City of Aurora requirements, it is recommended that the gate to the van access be located 60 feet (two vehicle lengths) west of the Jackson Gap Street (measured from edge of pavement).

The gated entry vehicle queuing worksheets are included in **Appendix E.**

5.7 Pedestrian, Bicycle, and Transit Evaluation

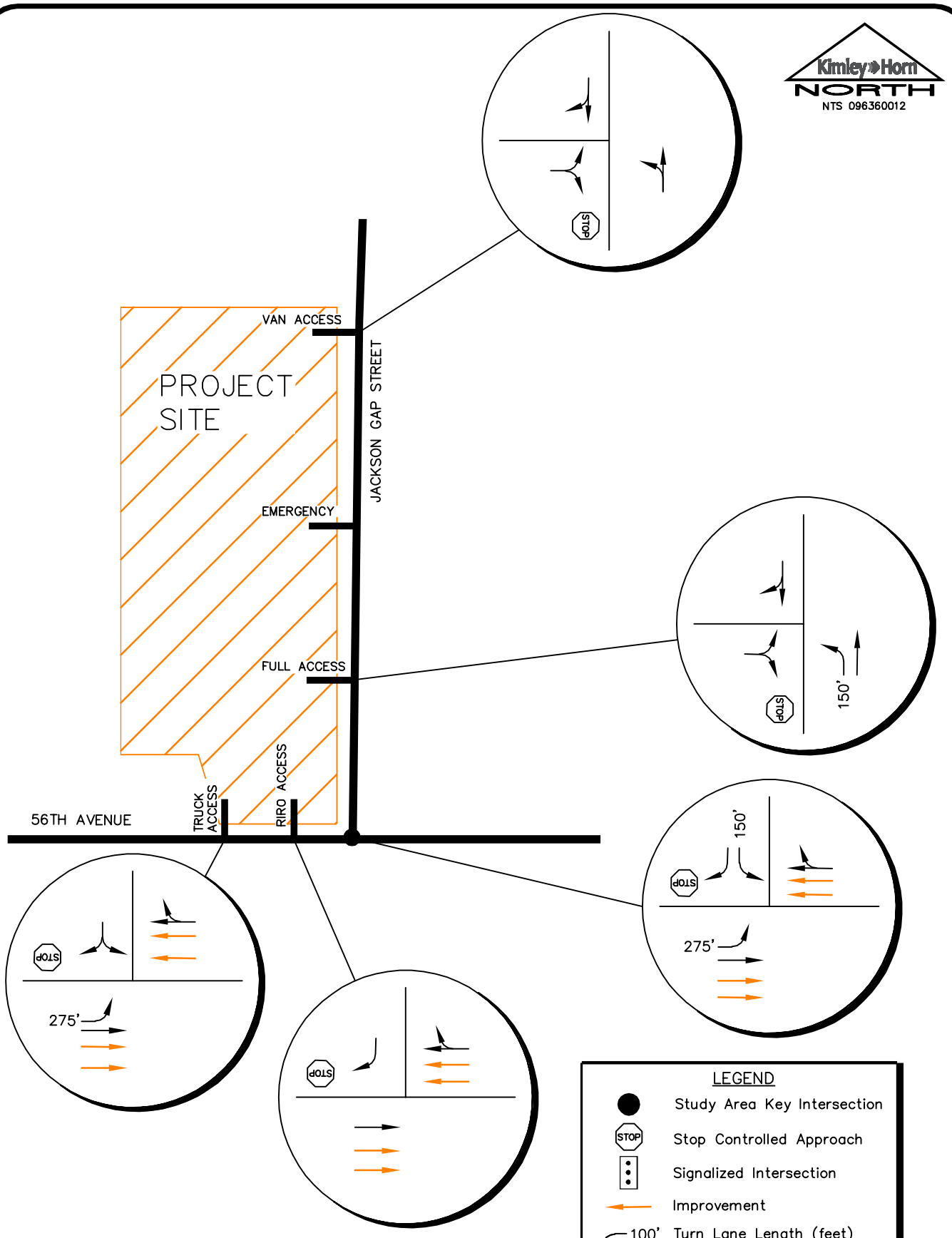
To address components of full transportation and mobility operations, pedestrian, bicycle, and transit evaluations were conducted. There are not any sidewalk facilities currently along 56th Avenue and Jackson Gap Street. Sidewalks are planned for construction by others as part of Jackson Gap Street and 56th Avenue planned improvements. 56th Avenue and Jackson Gap Street do not currently provide bike lane facilities. The nearest transit operations to the site include the RTD 61st and Pena Station which runs the A-Line in the area.



PORTEOS DISTRIBUTION FACILITY
AURORA, CO
2023 RECOMMENDATIONS

FIGURE 11

Kimley»Horn



PORTEOS DISTRIBUTION FACILITY
AURORA, CO
2040 RECOMMENDATIONS

FIGURE 12

Kimley»Horn

6.0 CONCLUSIONS AND RECOMMENDATIONS

Based on the analysis presented in this report, Kimley-Horn believes the proposed Porteos Distribution Facility (Lot 10B) will be successfully incorporated into the existing and future roadway network. The proposed project development and expected traffic volumes resulted in the following recommendations and conclusions:

- With completion of the Porteos Distribution Facility (Lot 10B), the site proposes two accesses along the north side of 56th Avenue and three accesses along the west side of Jackson Gap Street. The west access along 56th Avenue will be designated for trucks and proposes full movements while the east access along 56th Avenue will serve employees and be restricted to right-in/right-out movements. The three accesses along Jackson Gap Street propose to allow full turning movements with the south access designated for employee parking, the middle access used only for emergency uses, and the north access serving the transport vans. The project accesses are recommended to have a R1-1 "STOP" sign installed for the exiting approaches. Single lanes should be sufficient on the exiting approaches at all five accesses; however, providing separate left and right turn lanes for exiting could be considered at the full movement accesses.

- The right-in/right-out access along 56th Avenue, it is recommended a R3-2 No Left Turn sign be placed underneath the STOP sign on the southbound driveway approach of the right-in/right-out access along 56th Avenue. In addition, a "Pork Chop" island is recommended to be installed at this access per City of Aurora requirements. Due to the absence of a raised median within 56th Avenue, a R3-2 No Left Turn sign should be placed on the northeast corner of the right-in/right-out access intersection, visible to eastbound drivers along 56th Avenue to restrict entering left turn movements.

- The truck access along 56th Avenue will require a designated eastbound left turn lane with a length of 275 feet. The south access along Jackson Gap Street will require a northbound left turn lane with a length of 150 feet.

- An eastbound left turn lane with a length of 275 feet should be provided at the intersection of 56th Avenue and Jackson Gap Street while a southbound left turn lane with a length of 150 feet should be provided at this intersection.

- Any on-site and off-site signing and striping improvements should be incorporated into the Civil Drawings and conform to City of Aurora Standards as well as the Manual on Uniform Traffic Control Devices – 2009 Edition (MUTCD).

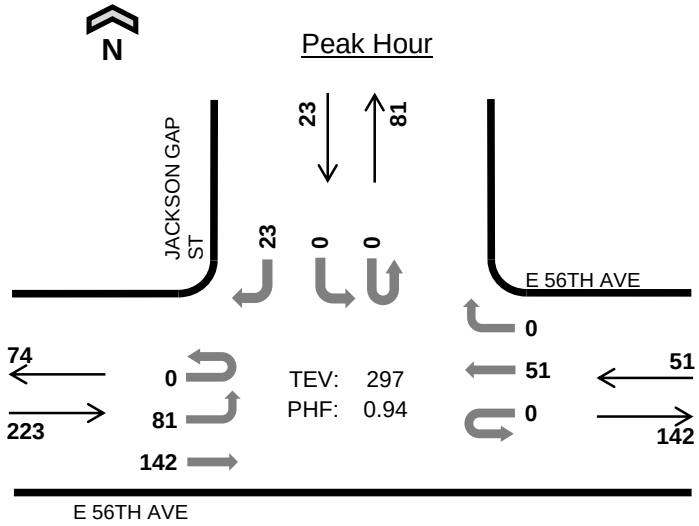
APPENDICES

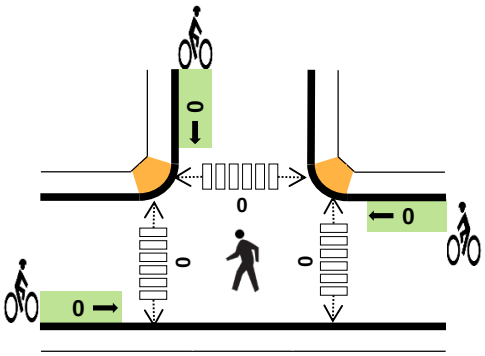
APPENDIX A

Intersection Count Sheets

JACKSON GAP ST
E 56TH AVE

Date: Thu, Oct 08, 2020
Count Period: 7:00 AM to 9:00 AM
Peak Hour: 7:15 AM to 8:15 AM





	HV %:	PHF
EB	10.3%	0.86
WB	15.7%	0.80
NB	-	-
SB	26.1%	0.52
TOTAL	12.5%	0.94

Two-Hour Count Summaries

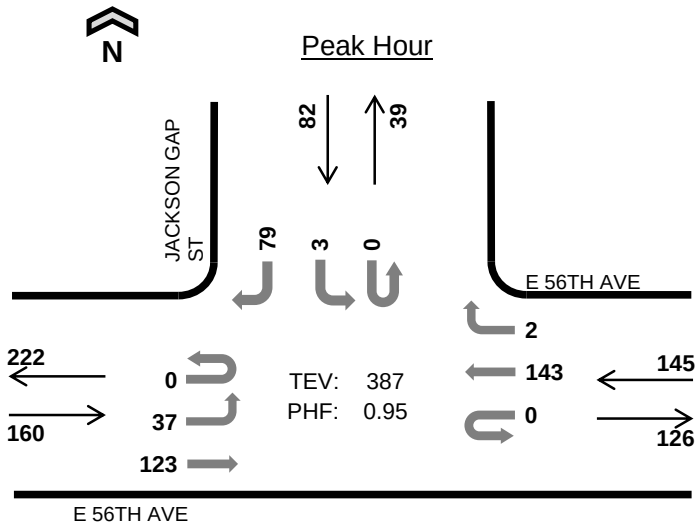
Interval Start	E 56TH AVE Eastbound				E 56TH AVE Westbound				0 Northbound				JACKSON GAP ST Southbound				15-min Total	Rolling One Hour
	UT	LT	TH	RT	UT	LT	TH	RT	UT	LT	TH	RT	UT	LT	TH	RT		
7:00 AM	0	23	26	0	0	0	10	0	0	0	0	0	0	0	0	7	66	0
7:15 AM	**0**	**19**	**34**	**0**	**0**	**0**	**13**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**6**	**72**	0
7:30 AM	**0**	**24**	**36**	**0**	**0**	**0**	**11**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**3**	**74**	0
7:45 AM	**0**	**18**	**47**	**0**	**0**	**0**	**11**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**3**	**79**	291
8:00 AM	**0**	**20**	**25**	**0**	**0**	**0**	**16**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**11**	**72**	**297**
8:15 AM	0	9	28	0	0	0	11	1	0	0	0	0	0	0	0	7	56	281
8:30 AM	0	14	34	0	0	0	16	0	0	0	0	0	0	0	0	4	68	275
8:45 AM	0	9	41	0	0	0	13	0	0	0	0	0	0	0	0	6	69	265
Count Total	0	136	271	0	0	0	101	1	0	0	0	0	0	0	0	47	556	0
Peak Hour	**0**	**81**	**142**	**0**	**0**	**0**	**51**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**23**	**297**	**0**

Note: Two-hour count summary volumes include heavy vehicles but exclude bicycles in overall count.

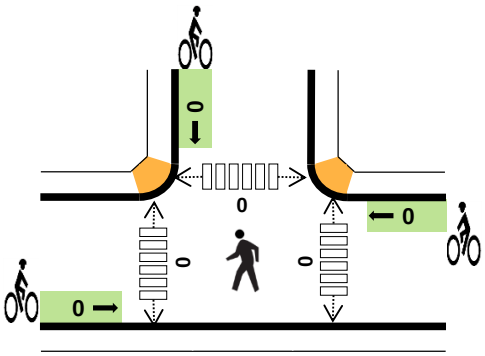
Interval Start	Heavy Vehicle Totals					Bicycles					Pedestrians (Crossing Leg)				
	EB	WB	NB	SB	Total	EB	WB	NB	SB	Total	East	West	North	South	Total
7:00 AM	12	1	0	0	*13*	0	0	0	0	*0*	0	0	0	0	*0*
7:15 AM	**5**	**1**	**0**	**0**	***6***	**0**	**0**	**0**	**0**	***0***	**0**	**0**	**0**	**0**	*0*
7:30 AM	**6**	**2**	**0**	**1**	***9***	**0**	**0**	**0**	**0**	***0***	**0**	**0**	**0**	**0**	*0*
7:45 AM	**5**	**3**	**0**	**1**	***9***	**0**	**0**	**0**	**0**	***0***	**0**	**0**	**0**	**0**	*0*
8:00 AM	**7**	**2**	**0**	**4**	***13***	**0**	**0**	**0**	**0**	***0***	**0**	**0**	**0**	**0**	***0***
8:15 AM	4	4	0	1	*9*	0	0	0	0	*0*	0	0	0	0	*0*
8:30 AM	8	4	0	0	*12*	0	0	0	0	*0*	0	0	0	0	*0*
8:45 AM	8	3	0	2	*13*	0	0	0	0	*0*	0	0	0	0	*0*
Count Total	55	20	0	9	*84*	0	0	0	0	*0*	0	0	0	0	*0*
Peak Hr	**23**	**8**	**0**	**6**	***37***	**0**	**0**	**0**	**0**	***0***	**0**	**0**	**0**	**0**	***0***

Mark Skaggs: (425) 250-0777 mark.skaggs@idaxdata.com

JACKSON GAP ST
E 56TH AVE



Date: Thu, Oct 08, 2020
Count Period: 4:00 PM to 6:00 PM
Peak Hour: 4:00 PM to 5:00 PM



	HV %:	PHF
EB	8.8%	0.91
WB	9.0%	0.91
NB	-	-
SB	11.0%	0.89
TOTAL	9.3%	0.95

Two-Hour Count Summaries

Interval Start	E 56TH AVE Eastbound				E 56TH AVE Westbound				0 Northbound				JACKSON GAP ST Southbound				15-min Total	Rolling One Hour
	UT	LT	TH	RT	UT	LT	TH	RT	UT	LT	TH	RT	UT	LT	TH	RT		
4:00 PM	**0**	**9**	**29**	**0**	**0**	**0**	**40**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**17**	**95**	0
4:15 PM	**0**	**13**	**31**	**0**	**0**	**0**	**35**	**1**	**0**	**0**	**0**	**0**	**0**	**1**	**0**	**21**	**102**	0
4:30 PM	**0**	**10**	**32**	**0**	**0**	**0**	**36**	**1**	**0**	**0**	**0**	**0**	**0**	**1**	**0**	**19**	**99**	0
4:45 PM	**0**	**5**	**31**	**0**	**0**	**0**	**32**	**0**	**0**	**0**	**0**	**0**	**0**	**1**	**0**	**22**	**91**	**387**
5:00 PM	0	6	23	0	0	0	38	0	0	0	0	0	0	0	0	15	82	374
5:15 PM	0	3	18	0	0	0	25	0	0	0	0	0	0	0	0	13	59	331
5:30 PM	0	8	16	0	0	0	46	1	0	0	0	0	0	0	0	11	82	314
5:45 PM	0	5	29	0	0	0	31	1	0	0	0	0	0	2	0	17	85	308
Count Total	0	59	209	0	0	0	283	4	0	0	0	0	0	5	0	135	695	0
Peak Hour	**0**	**37**	**123**	**0**	**0**	**0**	**143**	**2**	**0**	**0**	**0**	**0**	**0**	**3**	**0**	**79**	**387**	**0**

Note: Two-hour count summary volumes include heavy vehicles but exclude bicycles in overall count.

Interval Start	Heavy Vehicle Totals					Bicycles					Pedestrians (Crossing Leg)				
	EB	WB	NB	SB	Total	EB	WB	NB	SB	Total	East	West	North	South	Total
4:00 PM	**3**	**4**	**0**	**1**	***8***	**0**	**0**	**0**	**0**	***0***	**0**	**0**	**0**	**0**	*0*
4:15 PM	**4**	**3**	**0**	**2**	***9***	**0**	**0**	**0**	**0**	***0***	**0**	**0**	**0**	**0**	*0*
4:30 PM	**5**	**3**	**0**	**3**	***11***	**0**	**0**	**0**	**0**	***0***	**0**	**0**	**0**	**0**	*0*
4:45 PM	**2**	**3**	**0**	**3**	***8***	**0**	**0**	**0**	**0**	***0***	**0**	**0**	**0**	**0**	***0***
5:00 PM	2	2	0	1	*5*	0	0	0	0	*0*	0	0	0	0	*0*
5:15 PM	1	1	0	1	*3*	0	0	0	0	*0*	0	0	0	0	*0*
5:30 PM	1	0	0	0	*1*	0	0	0	0	*0*	0	0	0	0	*0*
5:45 PM	0	0	0	0	*0*	0	0	0	0	*0*	0	0	0	0	*0*
Count Total	18	16	0	11	*45*	0	0	0	0	*0*	0	0	0	0	*0*
Peak Hr	**14**	**13**	**0**	**9**	***36***	**0**	**0**	**0**	**0**	***0***	**0**	**0**	**0**	**0**	***0***

Mark Skaggs: (425) 250-0777 mark.skaggs@idaxdata.com

Porteos Distribution Facility

Jackson Gap Street Through Volumes		
Scenario	**AM Peak**	**PM Peak**
2019 Existing (Pre-COVID - 2019-10-15)	111	133
2019 to 2020 Grown Existing	113	136
2020 Counts (During COVID - 2020-10-08)	104	121
Percent Change	-8.14%	-10.81%
Growth Adjustment	8.87%	12.12%
Adjustment Factor	1.09	1.12

APPENDIX B

Background Volume Information

Transportation Impact Study

Aurora Costco Depot

Aurora, Colorado

Prepared For:
Peter Kahn
AVP of Real Estate Corporation
Costco Wholesale Corporation
999 Lake Drive
Issaquah, WA 98027

Prepared By:
Kittelson & Associates, Inc.
101 South Capitol Boulevard, Suite 600
Boise, ID 83702
(208) 338-2683

Project Principal: Brian Ray, PE
Project Manager: Andy Daleiden, PE
Project Team: Lauren Hunt, Alicia Hunter, and Yihang Sui

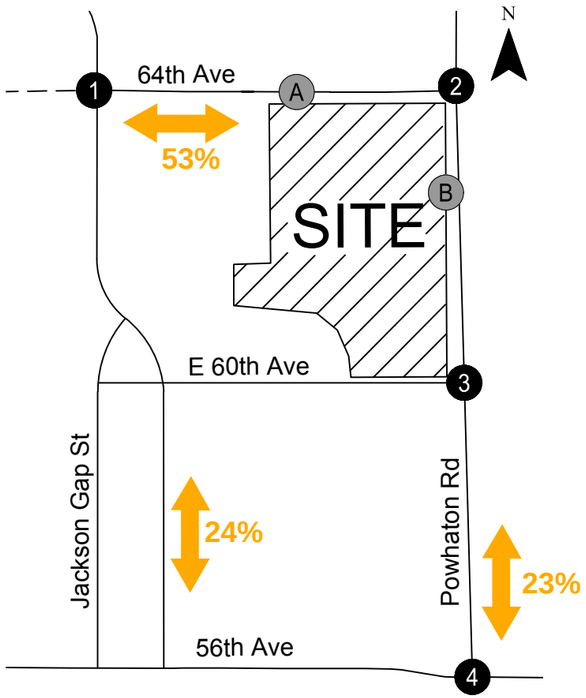
Project No. 24055

August 2019

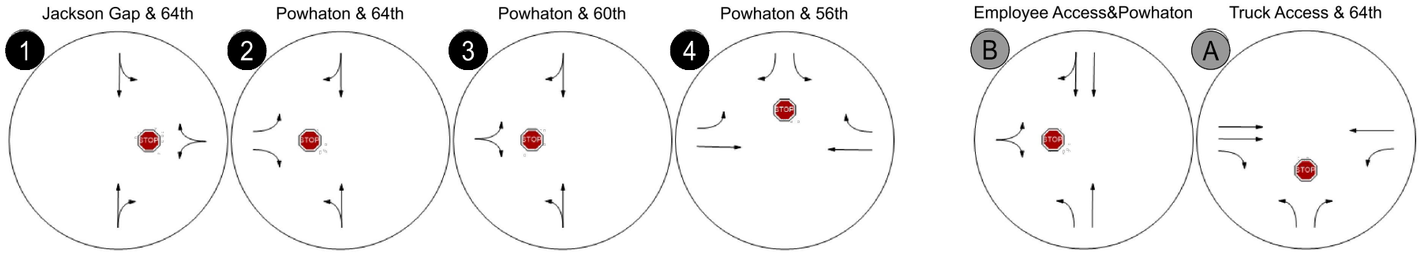
- All study access points are projected to operate acceptably at LOS D or better during the year 2020 total traffic conditions (weekday AM and PM peak hours).
    - The Manual on Uniform Traffic Control Devices (MUTCD, 9th Edition) eight-hour, four-hour, and peak-hour signal warrants are not met at the proposed access points on 64th Avenue and Powhaton Road.

Year 2040 Background and Total Traffic Conditions

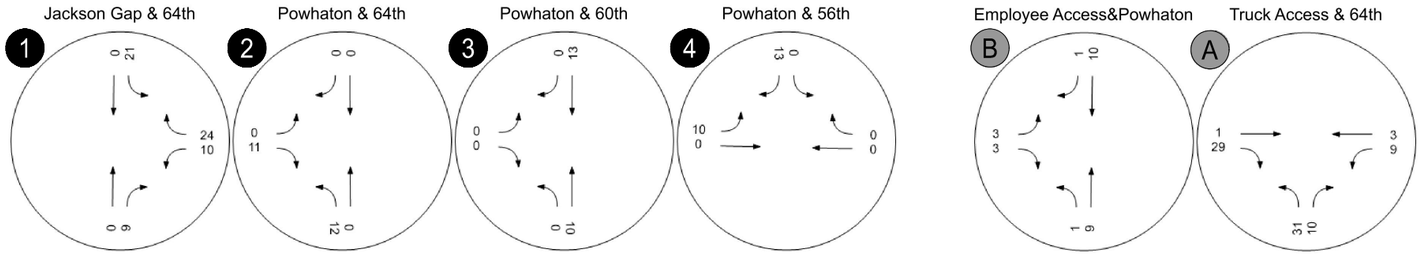
- Based on the Porteos Master Transportation Plan, NEATS Refresh, Groot Distribution Center TIS, and JAG Logistics Center at DIA TIS, there are several planned roadway improvements for 64th Avenue, 60th Avenue, 56th Avenue, Powhaton Road, and Jackson Gap Street. Additionally, traffic signals are planned at the following intersections: 64th Avenue/Jackson Gap Street, 64th Avenue/Powhaton Road, 60th Avenue/Powhaton Road, and 56th Avenue/Powhaton Road. These improvements are anticipated to accommodate the traffic volumes associated with the Porteos Master Plan, which includes the Costco Depot site as part of that plan.
- The Porteos Master Plan assumed a development size and trip generation of 1,322,900 square-feet and 7,280 daily trips for the planning area that includes the approved Groot Distribution Center and proposed Costco Depot sites. Based on the approved Groot Distribution Center TIS and proposed Costco Depot TIS, the total size of these two developments is 234,385 square-feet less than the development size assumed in the Porteos Master Plan. These two developments are estimated to generate 3,162 less daily trips than the trip generation assumed in the Porteos Master Plan. Therefore, the approved Groot Distribution Center and proposed Costco Depot will have a significantly smaller footprint and trip impact to the surrounding roadway network than estimated in the Porteos Master Plan for PA-7.
- The proposed Costco Depot and approved Groot Distribution Center daily traffic volumes are estimated to be less than what was assumed in the Porteos Master Plan TIS, NEATS Refresh, and JAG Logistics Center at DIA TIS. Therefore, the planned study area roadways are expected to have adequate capacity to accommodate the daily traffic volumes from the proposed Costco Depot.
- All study intersections are planned to be signalized by the year 2040. With traffic signals in place, all study intersections continue to operate acceptably at LOS D or better during the year 2040 background and total traffic conditions (weekday AM and PM peak hours).
    - The Manual on Uniform Traffic Control Devices (MUTCD, 9th Edition) eight-hour, four-hour, and peak-hour signal warrants are met at the study intersections.
- All study access points are projected to operate acceptably at LOS D or better during the year 2040 total traffic conditions (weekday AM and PM peak hours).
    - The Manual on Uniform Traffic Control Devices (MUTCD, 9th Edition) eight-hour, four-hour, and peak-hour signal warrants are not met at the proposed access points on 64th Avenue and Powhaton Road.



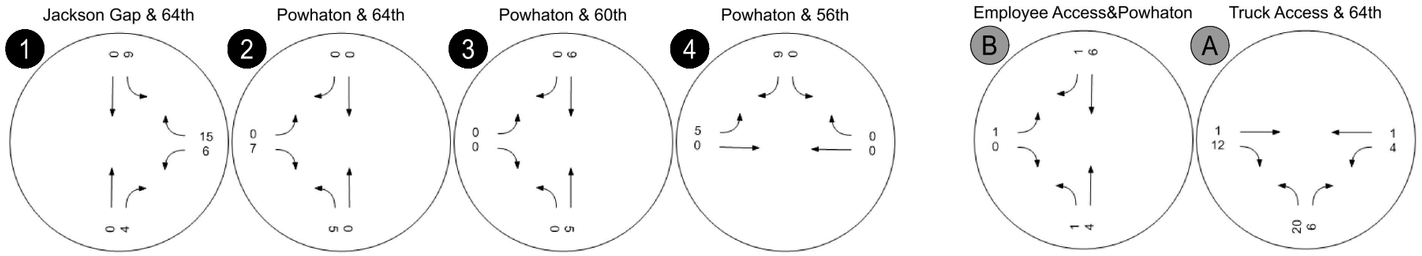
Lane Configurations



Weekday AM Peak Hour



Weekday PM Peak Hour



STOP - Stop Sign

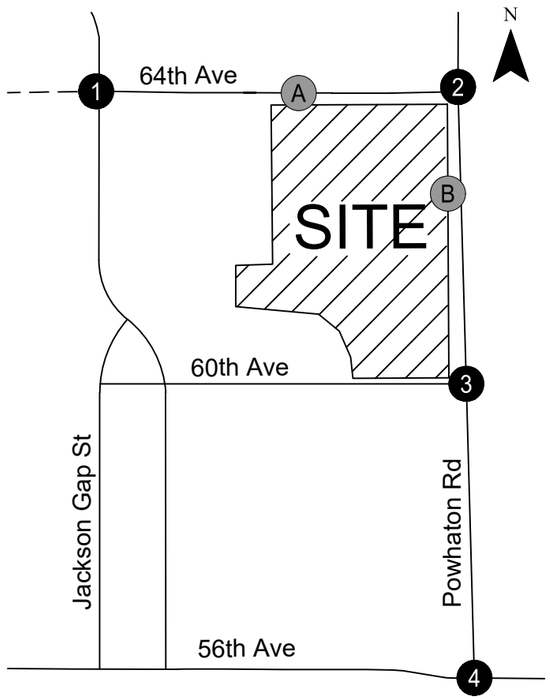
---- - Future Roadway

↔ - Trip Distribution

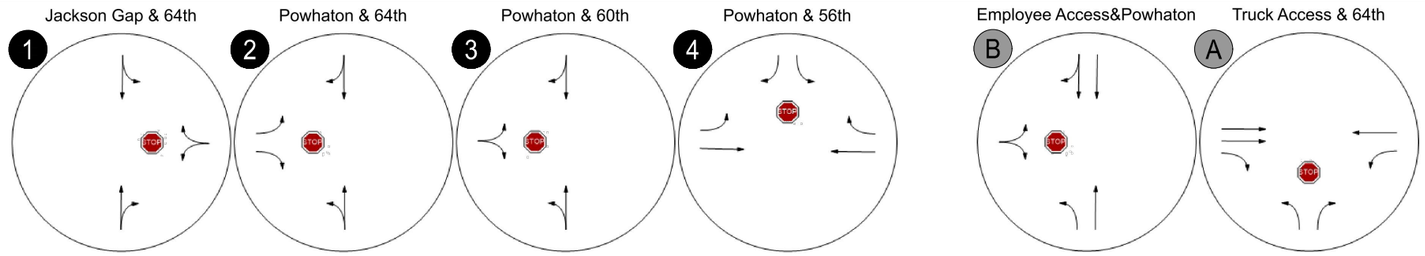
Costco Depot Trip Assignment Volumes
Weekday AM and PM Peak Hour
Aurora, Colorado

Figure
9

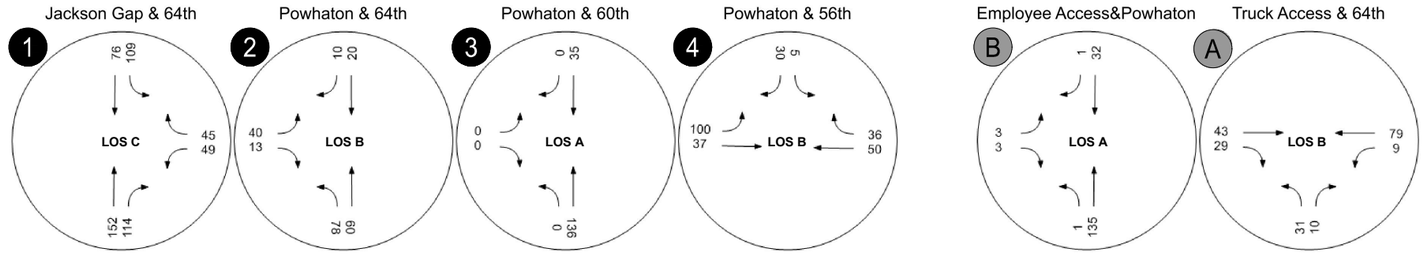
KITTELSON & ASSOCIATES



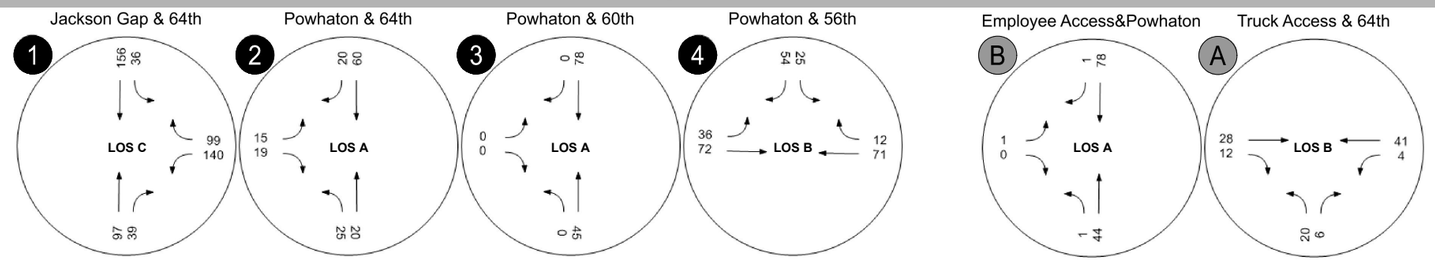
Lane Configurations



Weekday AM Peak Hour



Weekday PM Peak Hour



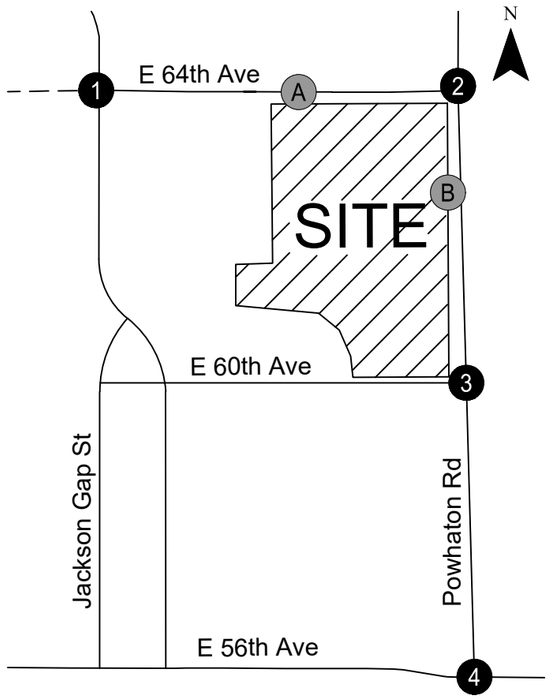
STOP - Stop Sign

---- - Future Roadway

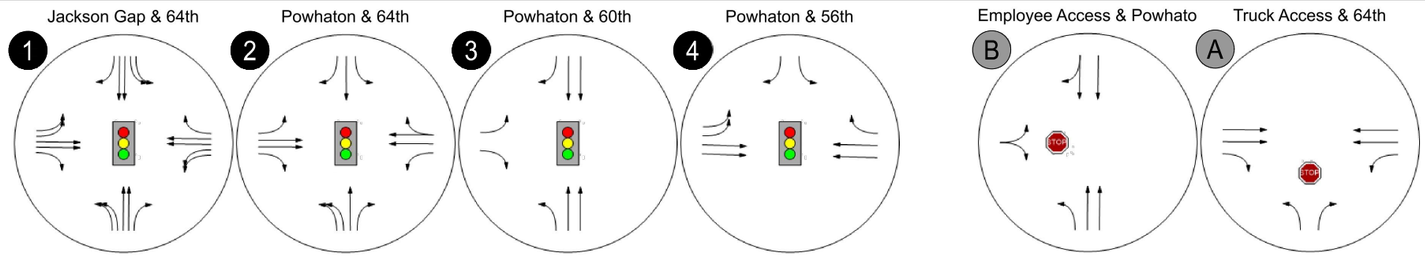
Year 2020 Total Traffic Conditions
Weekday AM and PM Peak Hour
Aurora, Colorado

Figure
10

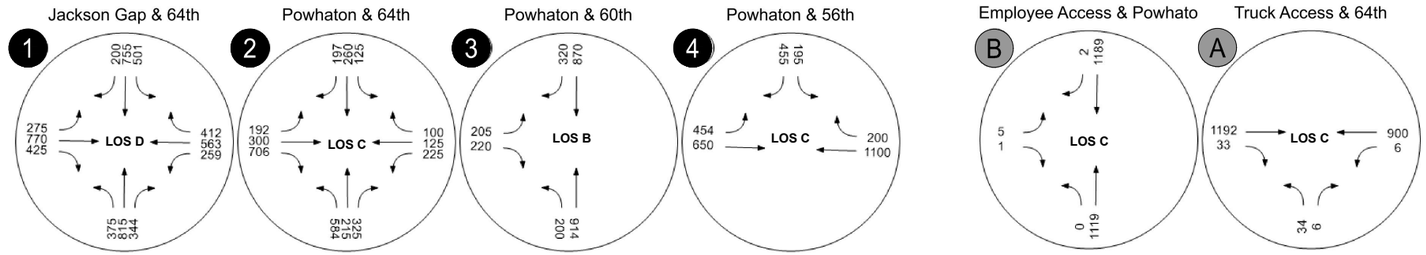
KITTELSON & ASSOCIATES



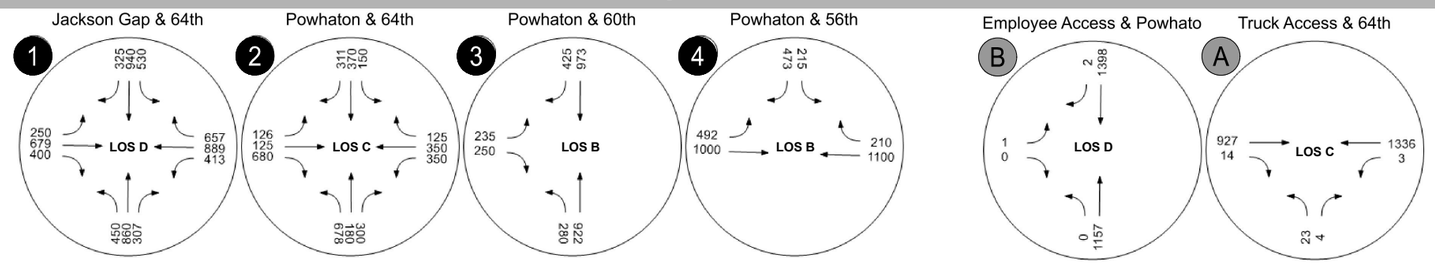
Lane Configurations



Weekday AM Peak Hour



Weekday PM Peak Hour



- Traffic Signal

---- - Future Roadway

Year 2040 Total Traffic Conditions
Weekday AM and PM Peak Hour
Aurora, Colorado

Figure
15

KITTELSON & ASSOCIATES

T R A F F I C I M P A C T S T U D Y

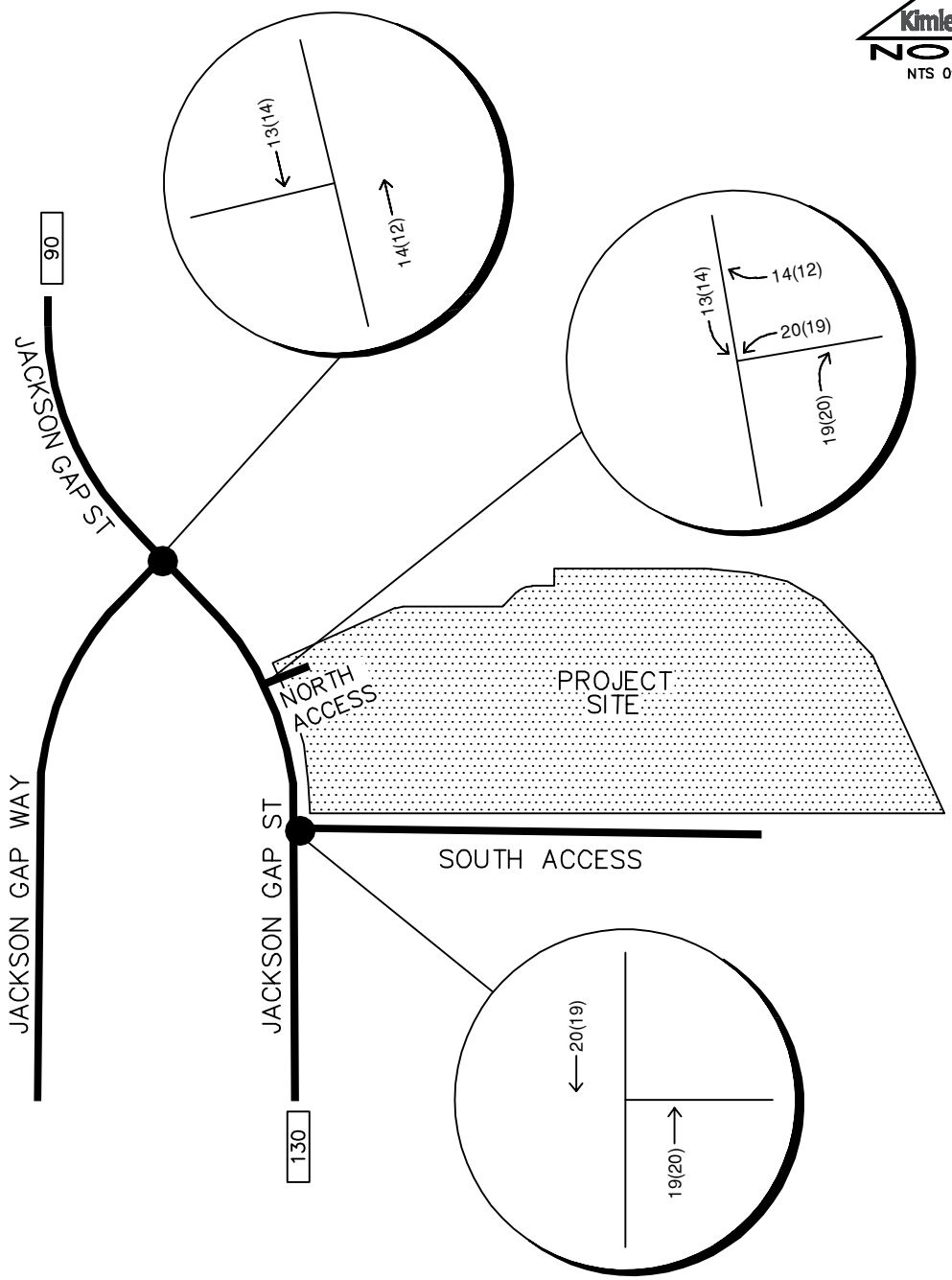
Ryder Truck Facility (Porteos Subdivision Filing 4)

A□rora□Colorado

Prepared for
Ware Malcomb
□□0 S□□roadwa□
S□ite 2□0
Denver□CO □020□

Prepared by
Kimley-Horn and Associates, Inc.
45□2 So□th □lster Street
S□ite 1500
Denver□Colorado □02□□
□□0□□22□-2□00

April 2020



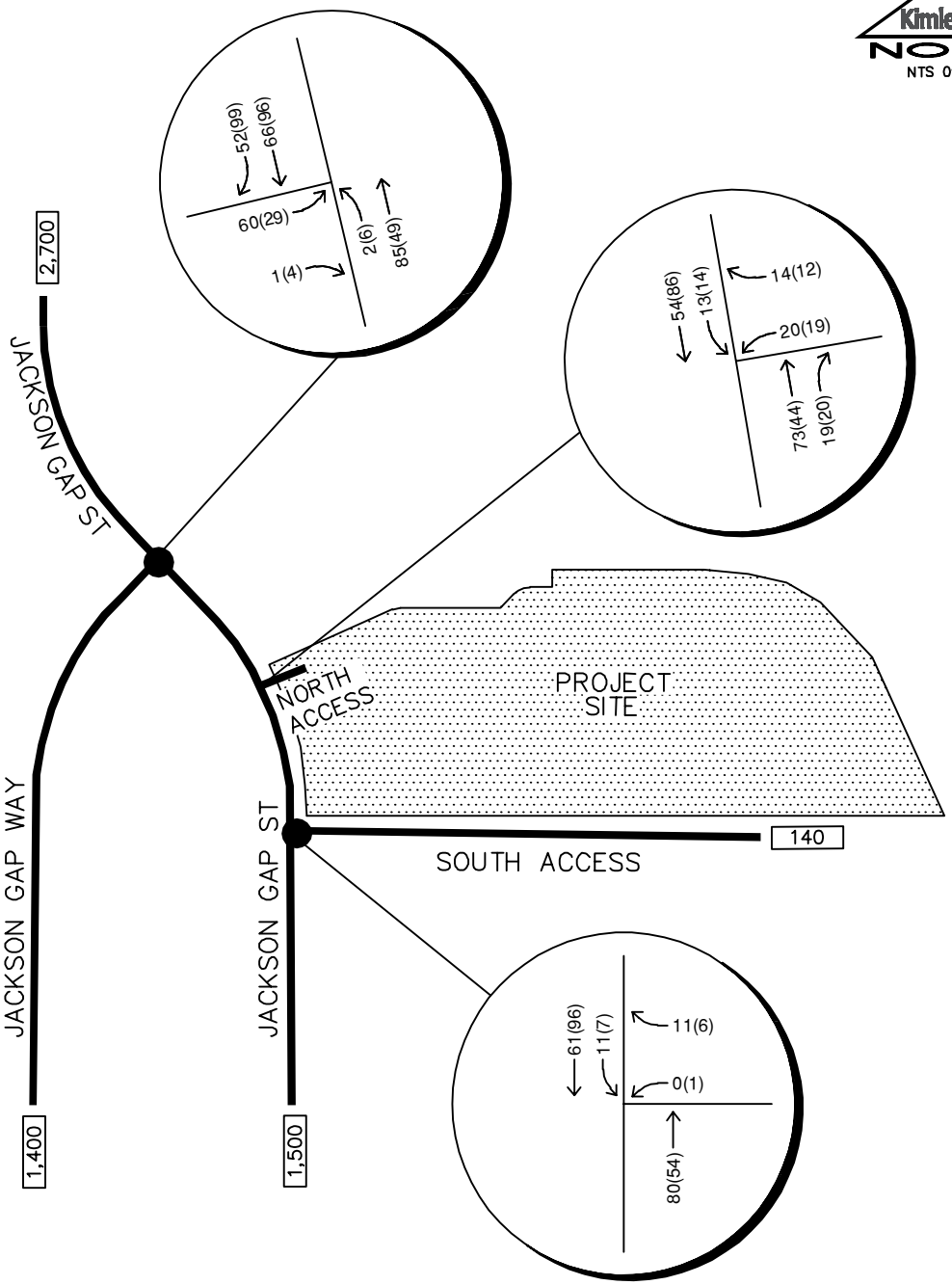
LEGEND

- ● Study Area Key Intersection
- XXX(XXX) Weekday AM(PM) Peak Hour Traffic Volumes
- XX,X00 Daily Traffic Volume

RYDER (PORTEOS SUBDIVISION FILING 4)
AURORA, CO
PROJECT TRAFFIC ASSIGNMENT

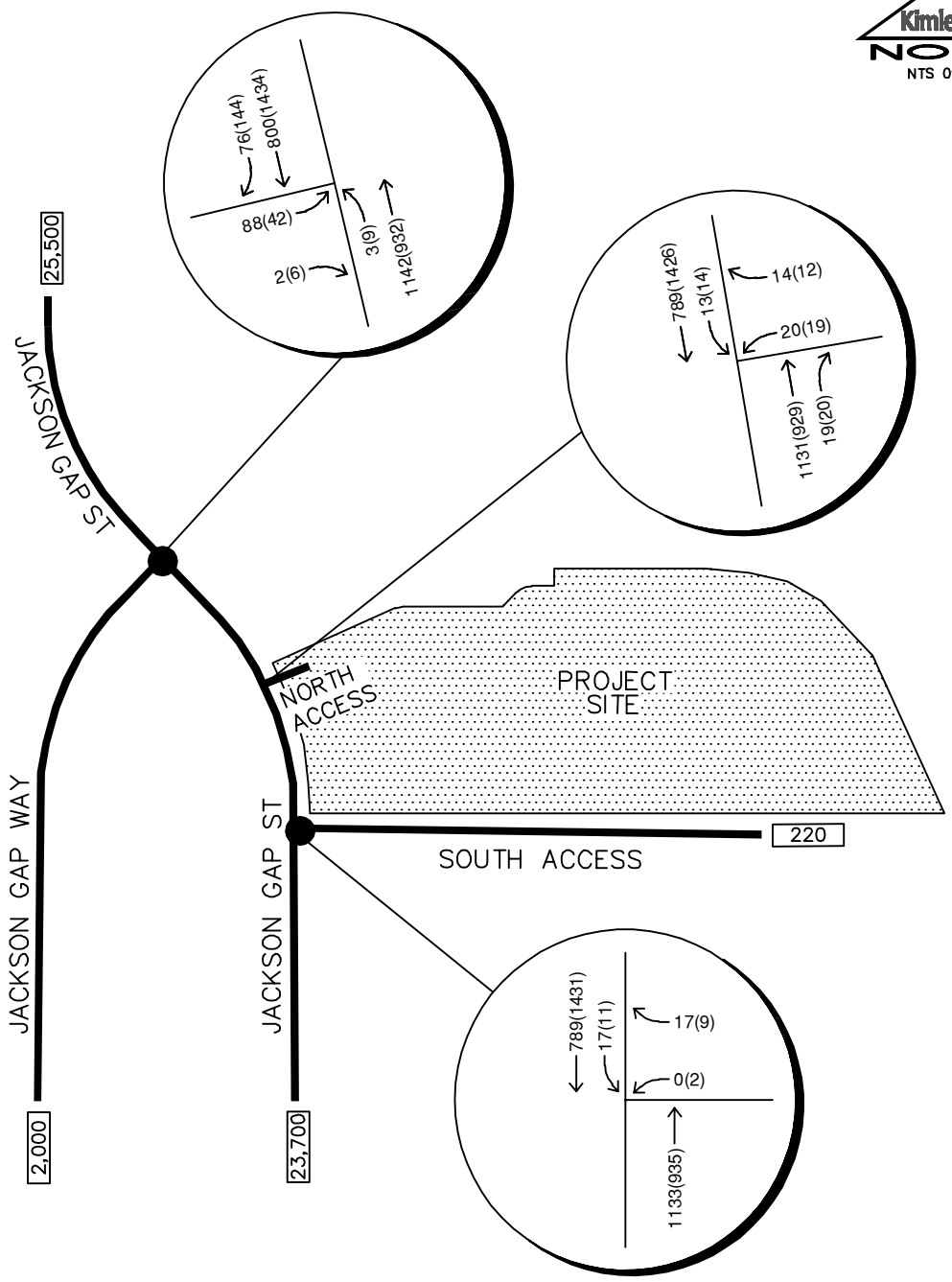
FIGURE 8

Kimley»Horn



RYDER (PORTEOS SUBDIVISION FILING 4)
AURORA, CO
2021 BACKGROUND PLUS
PROJECT TRAFFIC VOLUMES

FIGURE 9



RYDER (PORTEOS SUBDIVISION FILING 4)
AURORA, CO
2040 BACKGROUND PLUS
PROJECT TRAFFIC VOLUMES

FIGURE 10

Kimley»Horn

TRANSPORTATION IMPACT STUDY

Porteos – Project Pearl in Aurora

Prepared for:

Ryan Companies
533 South Third Street, Suite 100
Minneapolis, MN 55415

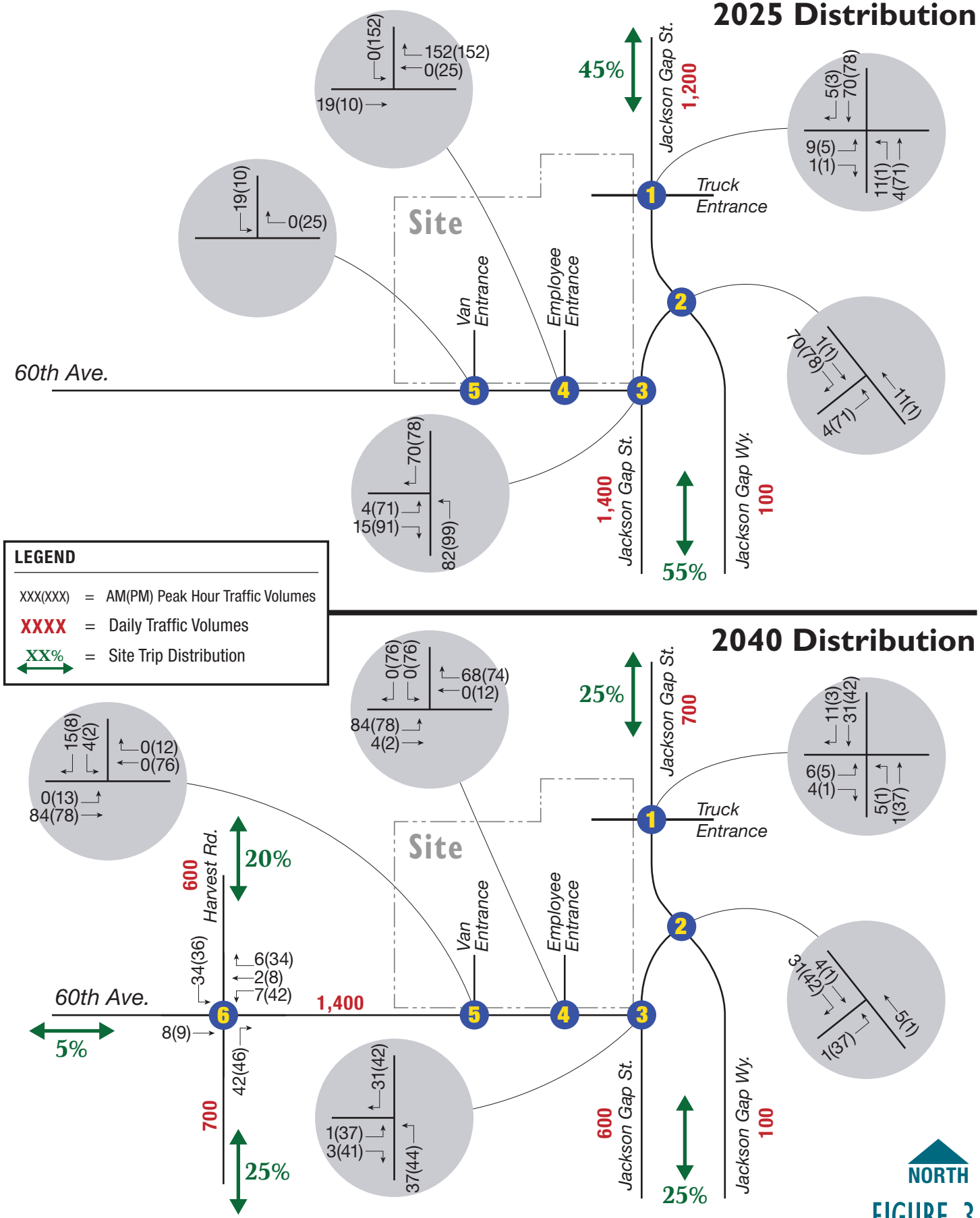
Prepared by:

Felsburg Holt & Ullevig
6400 S Fiddlers Green Circle, Suite 1500
Greenwood Village, CO 80111
303.721.1440

Principal: Christopher J. Fasching, PE, PTOE
Project Manager: Philip Dunham, PE, PTOE

FHU Reference No. 120196-01

September 2020



FELSBURG HOLT & ULLEVIG

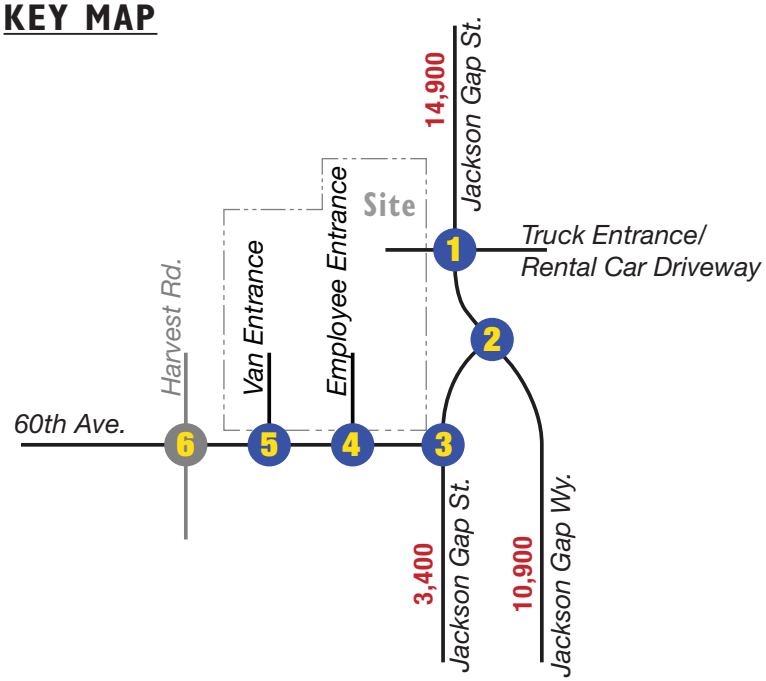
NOTE: Drawing Not to Scale

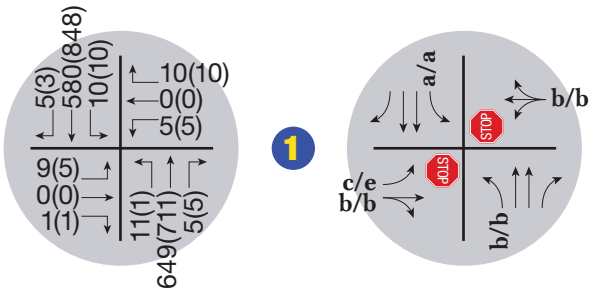
FIGURE 3

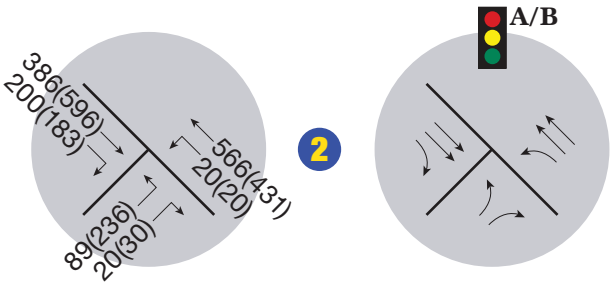
Site Generated Traffic and Distribution

Project Pearl 20-196 5/13/20

KEY MAP

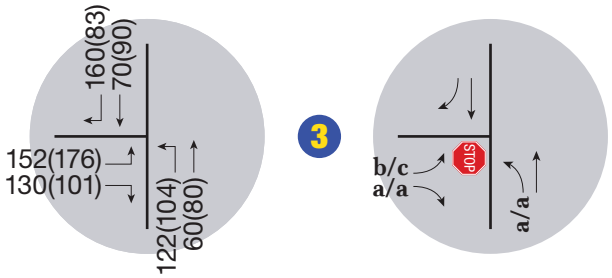


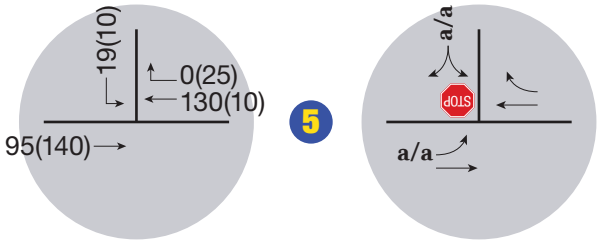


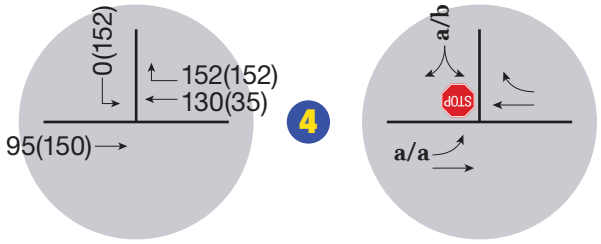


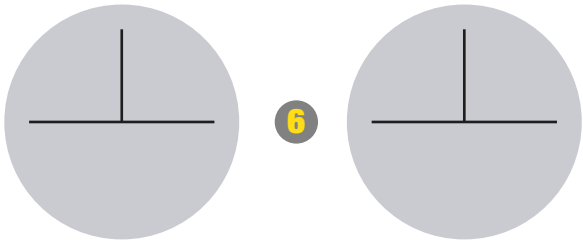
LEGEND

XXX(XXX)	=	AM(PM) Peak Hour Traffic Volumes
XXXX	=	Daily Traffic Volumes
X/X	=	AM/PM Peak Hour Signalized Intersection Level of Service
x/x	=	AM/PM Peak Hour Unsignalized Intersection Level of Service
STOP	=	Stop Sign
	=	Traffic Signal









NORTH

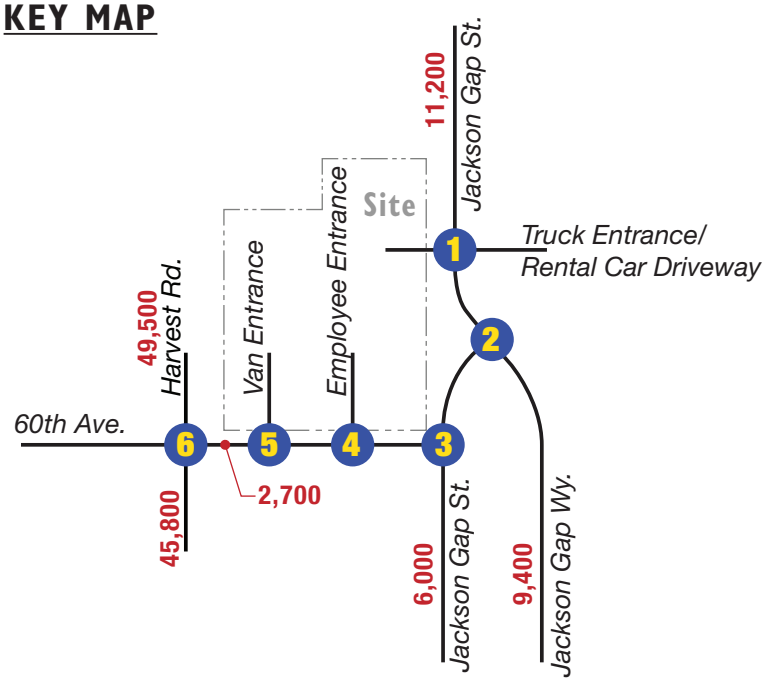
NOTE: Drawing Not to Scale

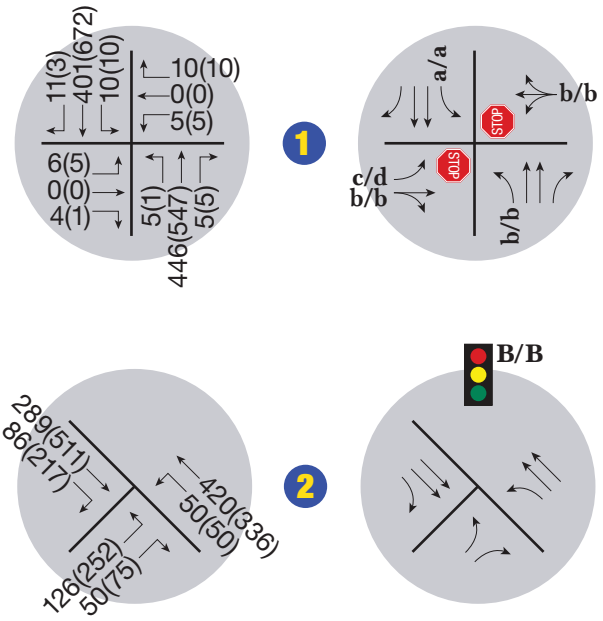
FELSBURG HOLT & ULLEVIG

FIGURE 6
Short-Term (2025) Total Traffic Volumes and Operations

Project Pearl 20-196 8/31/20

KEY MAP





LEGEND

XXX(XXX)	=	AM(PM) Peak Hour Traffic Volumes
XXXX	=	Daily Traffic Volumes
X/X	=	AM/PM Peak Hour Signalized Intersection Level of Service
x/x	=	AM/PM Peak Hour Unsignalized Intersection Level of Service
STOP	=	Stop Sign
	=	Traffic Signal

NOTE: Drawing Not to Scale

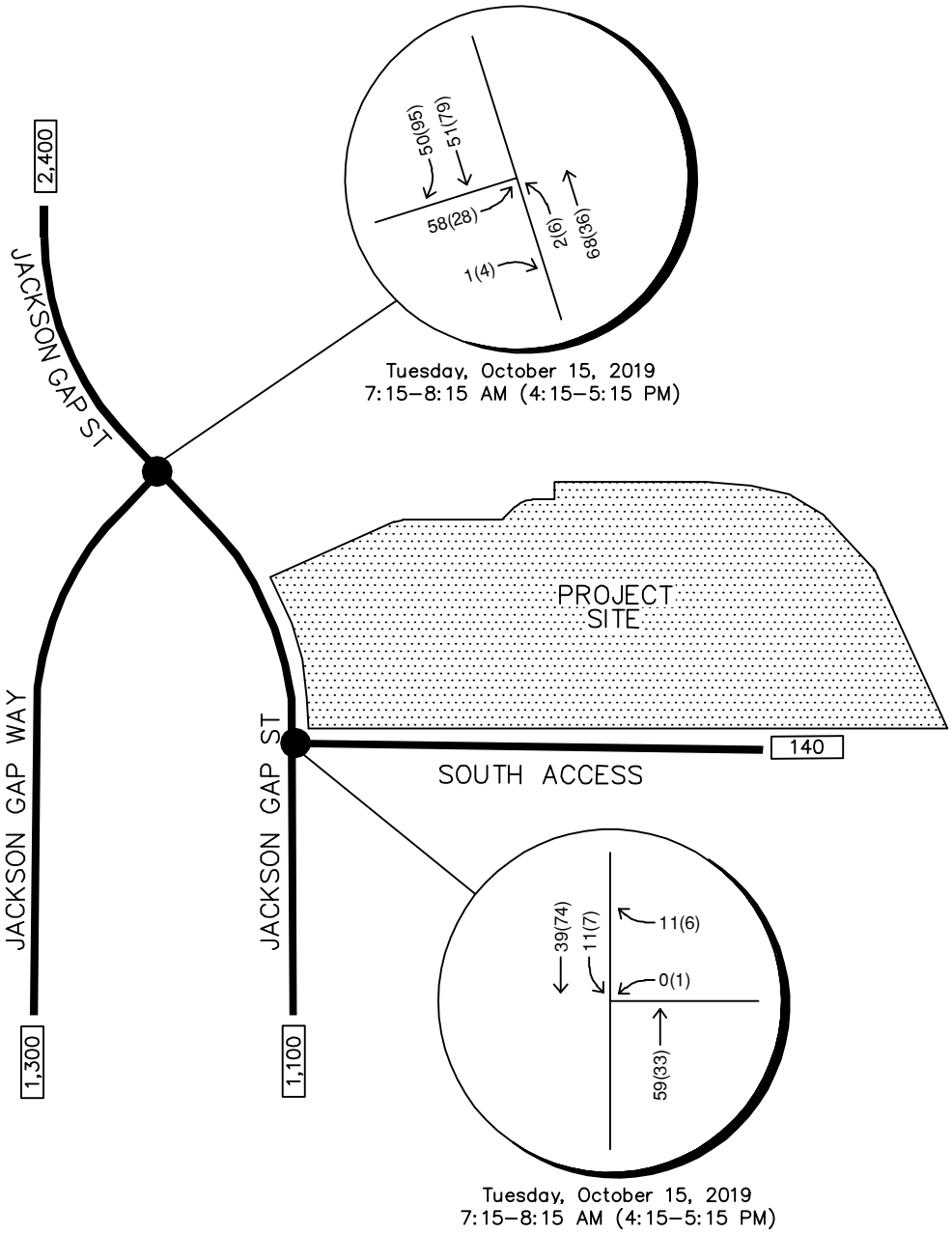
FELSBURG HOLT & ULLEVIG

NORTH

FIGURE 7

Long-Term (2040) Total Traffic Volumes and Operations

Project Pearl 20-196 8/31/20



RYDER (PORTEOS SUBDIVISION FILING 4)
AURORA, CO
2019 EXISTING TRAFFIC VOLUMES

FIGURE 4

Kimley»Horn

APPENDIX C

Trip Generation Worksheets

	Cars				Trucks				Delivery Vehicles				Total		
	Average Weekday				Average Weekday				Average Weekday				Average Weekday		
	In	Out	Total	% Usage	In	Out	Total	% Usage	In	Out	Total	% Usage	In	Out	Total
00:00	8	0	8	20.4%	22	9	31	79.6%	0	0	0	0.0%	30	9	39
00:30	0	5	5	11.9%	25	11	36	88.1%	0	0	0	0.0%	25	15	41
01:00	5	5	10	18.6%	26	16	42	81.4%	0	0	0	0.0%	31	21	52
01:30	5	0	5	13.2%	16	15	32	86.8%	0	0	0	0.0%	21	15	37
02:00	0	0	0	0.0%	18	21	38	100.0%	0	0	0	0.0%	18	21	38
02:30	0	0	0	0.0%	26	18	44	100.0%	0	0	0	0.0%	26	18	44
03:00	15	32	48	56.9%	19	17	36	43.1%	0	0	0	0.0%	35	49	84
03:30	19	40	59	57.0%	18	26	45	43.0%	0	0	0	0.0%	38	66	104
04:00	9	8	17	29.8%	17	23	40	70.2%	0	0	0	0.0%	26	31	58
04:30	5	0	5	11.6%	21	16	37	88.4%	0	0	0	0.0%	26	16	42
05:00	5	5	10	18.9%	24	17	42	81.0%	0	0	1	1.9%	29	22	51
05:30	21	5	26	40.9%	21	17	37	59.0%	0	0	1	1.6%	42	21	63
06:00	33	0	33	51.3%	18	12	30	46.9%	0	1	2	3.1%	51	14	64
06:30	21	0	21	39.3%	14	14	28	51.8%	0	5	5	9.3%	35	19	54
07:00	17	30	48	54.0%	14	18	33	37.1%	0	8	8	9.1%	32	56	88
07:30	13	38	51	56.5%	13	12	25	27.5%	0	14	15	16.6%	26	64	90
08:00	5	23	28	40.6%	12	12	24	34.6%	0	17	18	26.0%	17	52	69
08:30	5	19	24	38.4%	17	9	27	42.4%	0	12	13	20.6%	22	41	63
09:00	5	9	14	23.9%	15	22	36	63.9%	0	7	7	12.3%	20	37	57
09:30	5	5	10	18.7%	15	25	40	73.2%	0	4	5	9.2%	20	34	54
10:00	5	0	5	13.1%	16	17	32	80.5%	0	2	3	7.5%	21	20	40
10:30	5	7	11	28.6%	13	13	26	64.5%	2	1	3	7.5%	19	21	40
11:00	31	6	37	56.1%	15	12	26	40.3%	1	1	3	4.6%	46	19	65
11:30	39	2	40	60.5%	14	9	24	35.5%	2	1	3	4.5%	55	12	67
12:00	8	3	11	27.3%	13	12	25	64.0%	3	1	4	10.3%	24	15	39
12:30	0	3	3	9.5%	11	11	22	79.4%	3	1	4	14.4%	13	14	28
13:00	0	3	3	9.4%	14	12	26	80.2%	3	1	4	12.1%	17	16	33
13:30	5	5	10	22.7%	13	15	28	65.8%	5	0	5	11.7%	22	20	43
14:00	5	8	13	24.6%	13	24	37	68.6%	4	0	4	7.4%	21	32	54
14:30	0	10	10	21.2%	12	20	31	68.6%	5	0	5	10.9%	16	29	46
15:00	0	10	10	19.1%	11	25	36	70.7%	5	0	6	11.8%	16	35	51
15:30	0	10	10	21.4%	7	23	30	67.3%	5	0	6	13.3%	12	33	45
16:00	0	11	11	25.1%	9	18	27	59.8%	7	0	7	15.4%	16	30	46
16:30	30	44	74	67.2%	9	19	28	25.6%	8	0	8	7.3%	47	63	110
17:00	38	51	89	70.9%	13	16	29	23.1%	7	0	8	6.4%	58	67	125
17:30	13	17	30	47.0%	17	13	29	45.9%	4	0	5	7.9%	34	30	64
18:00	5	9	14	31.4%	13	13	26	58.8%	4	0	5	11.1%	23	22	45
18:30	0	8	8	21.0%	12	14	27	71.1%	3	0	3	8.0%	15	22	38
19:00	0	6	6	19.6%	12	12	24	76.2%	1	0	2	6.4%	14	18	31
19:30	0	6	6	18.8%	13	12	25	77.4%	1	0	2	6.1%	14	19	33
20:00	0	1	1	5.0%	12	12	24	90.1%	1	0	2	7.5%	13	14	27
20:30	0	6	6	22.3%	9	10	19	74.9%	1	0	1	3.9%	10	16	26
21:00	0	5	5	19.5%	10	11	21	78.5%	1	0	1	3.7%	11	16	27
21:30	32	0	32	59.4%	11	11	22	40.5%	0	0	1	1.8%	43	11	54
22:00	40	30	70	75.2%	12	11	23	24.7%	0	0	1	1.1%	53	41	94
22:30	13	38	51	70.8%	11	10	21	29.2%	0	0	0	0.0%	25	48	72
23:00	35	8	43	66.4%	13	8	22	33.4%	0	0	1	1.5%	49	16	65
23:30	38	6	44	74.0%	13	2	15	25.7%	0	0	1	1.7%	51	8	59
	537	537	1,074	40.4%	715	715	1,430	53.8%	76	76	173	6.5%	1,328	1,328	2,656

APPENDIX D

Intersection Analysis Worksheets

Intersection	
Int Delay, s/veh	3

Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Traffic Vol, veh/h	88	155	56	0	0	25
Future Vol, veh/h	88	155	56	0	0	25
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Stop	Stop
RT Channelized	-	None	-	None	-	None
Storage Length	-	-	-	-	0	-
Veh in Median Storage, #	-	0	0	-	0	-
Grade, %	-	0	0	-	0	-
Peak Hour Factor	87	87	80	80	52	52
Heavy Vehicles, %	13	13	13	13	13	13
Mvmt Flow	101	178	70	0	0	48

Major/Minor	Major1		Major2		Minor2	
Conflicting Flow All	70	0	-	0	450	70
Stage 1	-	-	-	-	70	-
Stage 2	-	-	-	-	380	-
Critical Hdwy	4.23	-	-	-	6.53	6.33
Critical Hdwy Stg 1	-	-	-	-	5.53	-
Critical Hdwy Stg 2	-	-	-	-	5.53	-
Follow-up Hdwy	2.317	-	-	-	3.617	3.417
Pot Cap-1 Maneuver	1464	-	-	-	547	963
Stage 1	-	-	-	-	926	-
Stage 2	-	-	-	-	668	-
Platoon blocked, %		-	-	-		
Mov Cap-1 Maneuver	1464	-	-	-	505	963
Mov Cap-2 Maneuver	-	-	-	-	505	-
Stage 1	-	-	-	-	855	-
Stage 2	-	-	-	-	668	-

Approach	EB	WB	SB
HCM Control Delay, s	2.8	0	8.9
HCM LOS			A

Minor Lane/Major Mvmt	EBL	EBT	WBT	WBR	SBLn1
Capacity (veh/h)	1464	-	-	-	963
HCM Lane V/C Ratio	0.069	-	-	-	0.05
HCM Control Delay (s)	7.6	0	-	-	8.9
HCM Lane LOS	A	A	-	-	A
HCM 95th %tile Q(veh)	0.2	-	-	-	0.2

Intersection	
Int Delay, s/veh	2.9

Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Traffic Vol, veh/h	41	138	160	2	3	88
Future Vol, veh/h	41	138	160	2	3	88
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Stop	Stop
RT Channelized	-	None	-	None	-	None
Storage Length	-	-	-	-	0	-
Veh in Median Storage, #	-	0	0	-	0	-
Grade, %	-	0	0	-	0	-
Peak Hour Factor	91	91	91	91	89	89
Heavy Vehicles, %	9	9	9	9	9	9
Mvmt Flow	45	152	176	2	3	99

Major/Minor	Major1		Major2		Minor2	
Conflicting Flow All	178	0	-	0	419	177
Stage 1	-	-	-	-	177	-
Stage 2	-	-	-	-	242	-
Critical Hdwy	4.19	-	-	-	6.49	6.29
Critical Hdwy Stg 1	-	-	-	-	5.49	-
Critical Hdwy Stg 2	-	-	-	-	5.49	-
Follow-up Hdwy	2.281	-	-	-	3.581	3.381
Pot Cap-1 Maneuver	1357	-	-	-	578	848
Stage 1	-	-	-	-	837	-
Stage 2	-	-	-	-	782	-
Platoon blocked, %		-	-	-		
Mov Cap-1 Maneuver	1357	-	-	-	557	848
Mov Cap-2 Maneuver	-	-	-	-	557	-
Stage 1	-	-	-	-	807	-
Stage 2	-	-	-	-	782	-

Approach	EB	WB	SB
HCM Control Delay, s	1.8	0	9.9
HCM LOS			A

Minor Lane/Major Mvmt	EBL	EBT	WBT	WBR	SBLn1
Capacity (veh/h)	1357	-	-	-	834
HCM Lane V/C Ratio	0.033	-	-	-	0.123
HCM Control Delay (s)	7.7	0	-	-	9.9
HCM Lane LOS	A	A	-	-	A
HCM 95th %tile Q(veh)	0.1	-	-	-	0.4

Intersection	
Int Delay, s/veh	6.7

Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Traffic Vol, veh/h	160	185	85	20	20	180
Future Vol, veh/h	160	185	85	20	20	180
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Stop	Stop
RT Channelized	-	None	-	None	-	None
Storage Length	150	-	-	-	0	0
Veh in Median Storage, #	-	0	0	-	0	-
Grade, %	-	0	0	-	0	-
Peak Hour Factor	86	86	80	80	52	52
Heavy Vehicles, %	13	13	13	13	13	13
Mvmt Flow	186	215	106	25	38	346

Major/Minor	Major1		Major2		Minor2	
Conflicting Flow All	131	0	-	0	706	119
Stage 1	-	-	-	-	119	-
Stage 2	-	-	-	-	587	-
Critical Hdwy	4.23	-	-	-	6.53	6.33
Critical Hdwy Stg 1	-	-	-	-	5.53	-
Critical Hdwy Stg 2	-	-	-	-	5.53	-
Follow-up Hdwy	2.317	-	-	-	3.617	3.417
Pot Cap-1 Maneuver	1389	-	-	-	386	904
Stage 1	-	-	-	-	880	-
Stage 2	-	-	-	-	535	-
Platoon blocked, %		-	-	-		
Mov Cap-1 Maneuver	1389	-	-	-	334	904
Mov Cap-2 Maneuver	-	-	-	-	334	-
Stage 1	-	-	-	-	762	-
Stage 2	-	-	-	-	535	-

Approach	EB	WB	SB
HCM Control Delay, s	3.7	0	12
HCM LOS			B

Minor Lane/Major Mvmt	EBL	EBT	WBT	WBR	SBLn1	SBLn2
Capacity (veh/h)	1389	-	-	-	334	904
HCM Lane V/C Ratio	0.134	-	-	-	0.115	0.383
HCM Control Delay (s)	8	-	-	-	17.2	11.4
HCM Lane LOS	A	-	-	-	C	B
HCM 95th %tile Q(veh)	0.5	-	-	-	0.4	1.8

Intersection	
Int Delay, s/veh	5

Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Traffic Vol, veh/h	165	160	170	20	20	170
Future Vol, veh/h	165	160	170	20	20	170
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Stop	Stop
RT Channelized	-	None	-	None	-	None
Storage Length	150	-	-	-	0	0
Veh in Median Storage, #	-	0	0	-	0	-
Grade, %	-	0	0	-	0	-
Peak Hour Factor	91	91	91	91	89	89
Heavy Vehicles, %	10	10	10	10	10	10
Mvmt Flow	181	176	187	22	22	191

Major/Minor	Major1		Major2		Minor2	
Conflicting Flow All	209	0	-	0	736	198
Stage 1	-	-	-	-	198	-
Stage 2	-	-	-	-	538	-
Critical Hdwy	4.2	-	-	-	6.5	6.3
Critical Hdwy Stg 1	-	-	-	-	5.5	-
Critical Hdwy Stg 2	-	-	-	-	5.5	-
Follow-up Hdwy	2.29	-	-	-	3.59	3.39
Pot Cap-1 Maneuver	1316	-	-	-	375	823
Stage 1	-	-	-	-	817	-
Stage 2	-	-	-	-	570	-
Platoon blocked, %		-	-	-		
Mov Cap-1 Maneuver	1316	-	-	-	323	823
Mov Cap-2 Maneuver	-	-	-	-	323	-
Stage 1	-	-	-	-	704	-
Stage 2	-	-	-	-	570	-

Approach	EB	WB	SB
HCM Control Delay, s	4.1	0	11.4
HCM LOS			B

Minor Lane/Major Mvmt	EBL	EBT	WBT	WBR	SBLn1	SBLn2
Capacity (veh/h)	1316	-	-	-	323	823
HCM Lane V/C Ratio	0.138	-	-	-	0.07	0.232
HCM Control Delay (s)	8.2	-	-	-	17	10.7
HCM Lane LOS	A	-	-	-	C	B
HCM 95th %tile Q(veh)	0.5	-	-	-	0.2	0.9

Intersection	
Int Delay, s/veh	7.8

Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Traffic Vol, veh/h	190	190	90	20	25	225
Future Vol, veh/h	190	190	90	20	25	225
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Stop	Stop
RT Channelized	-	None	-	None	-	None
Storage Length	150	-	-	-	0	0
Veh in Median Storage, #	-	0	0	-	0	-
Grade, %	-	0	0	-	0	-
Peak Hour Factor	86	86	80	80	52	52
Heavy Vehicles, %	13	13	13	13	13	13
Mvmt Flow	221	221	113	25	48	433

Major/Minor	Major1		Major2		Minor2	
Conflicting Flow All	138	0	-	0	789	126
Stage 1	-	-	-	-	126	-
Stage 2	-	-	-	-	663	-
Critical Hdwy	4.23	-	-	-	6.53	6.33
Critical Hdwy Stg 1	-	-	-	-	5.53	-
Critical Hdwy Stg 2	-	-	-	-	5.53	-
Follow-up Hdwy	2.317	-	-	-	3.617	3.417
Pot Cap-1 Maneuver	1381	-	-	-	345	896
Stage 1	-	-	-	-	873	-
Stage 2	-	-	-	-	492	-
Platoon blocked, %		-	-	-		
Mov Cap-1 Maneuver	1381	-	-	-	290	896
Mov Cap-2 Maneuver	-	-	-	-	290	-
Stage 1	-	-	-	-	733	-
Stage 2	-	-	-	-	492	-

Approach	EB	WB	SB
HCM Control Delay, s	4.1	0	13.4
HCM LOS			B

Minor Lane/Major Mvmt	EBL	EBT	WBT	WBR	SBLn1	SBLn2
Capacity (veh/h)	1381	-	-	-	290	896
HCM Lane V/C Ratio	0.16	-	-	-	0.166	0.483
HCM Control Delay (s)	8.1	-	-	-	19.9	12.7
HCM Lane LOS	A	-	-	-	C	B
HCM 95th %tile Q(veh)	0.6	-	-	-	0.6	2.7

Intersection	
Int Delay, s/veh	5.9

Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Traffic Vol, veh/h	230	165	175	25	25	210
Future Vol, veh/h	230	165	175	25	25	210
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Stop	Stop
RT Channelized	-	None	-	None	-	None
Storage Length	150	-	-	-	0	0
Veh in Median Storage, #	-	0	0	-	0	-
Grade, %	-	0	0	-	0	-
Peak Hour Factor	91	91	91	91	89	89
Heavy Vehicles, %	10	10	10	10	10	10
Mvmt Flow	253	181	192	27	28	236

Major/Minor	Major1		Major2		Minor2	
Conflicting Flow All	219	0	-	0	893	206
Stage 1	-	-	-	-	206	-
Stage 2	-	-	-	-	687	-
Critical Hdwy	4.2	-	-	-	6.5	6.3
Critical Hdwy Stg 1	-	-	-	-	5.5	-
Critical Hdwy Stg 2	-	-	-	-	5.5	-
Follow-up Hdwy	2.29	-	-	-	3.59	3.39
Pot Cap-1 Maneuver	1304	-	-	-	302	815
Stage 1	-	-	-	-	810	-
Stage 2	-	-	-	-	485	-
Platoon blocked, %		-	-	-		
Mov Cap-1 Maneuver	1304	-	-	-	243	815
Mov Cap-2 Maneuver	-	-	-	-	243	-
Stage 1	-	-	-	-	653	-
Stage 2	-	-	-	-	485	-

Approach	EB	WB	SB
HCM Control Delay, s	4.9	0	12.3
HCM LOS			B

Minor Lane/Major Mvmt	EBL	EBT	WBT	WBR	SBLn1	SBLn2
Capacity (veh/h)	1304	-	-	-	243	815
HCM Lane V/C Ratio	0.194	-	-	-	0.116	0.29
HCM Control Delay (s)	8.4	-	-	-	21.7	11.2
HCM Lane LOS	A	-	-	-	C	B
HCM 95th %tile Q(veh)	0.7	-	-	-	0.4	1.2

Intersection	
Int Delay, s/veh	3.5

Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Traffic Vol, veh/h	275	1100	1550	30	25	230
Future Vol, veh/h	275	1100	1550	30	25	230
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Stop	Stop
RT Channelized	-	None	-	None	-	None
Storage Length	150	-	-	-	-	0
Veh in Median Storage, #	-	0	0	-	2	-
Grade, %	-	0	0	-	0	-
Peak Hour Factor	89	89	86	86	72	72
Heavy Vehicles, %	13	13	13	13	13	13
Mvmt Flow	309	1236	1802	35	35	319

Major/Minor	Major1		Major2		Minor2	
Conflicting Flow All	1837	0	-	0	2932	919
Stage 1	-	-	-	-	1820	-
Stage 2	-	-	-	-	1112	-
Critical Hdwy	5.56	-	-	-	5.96	7.36
Critical Hdwy Stg 1	-	-	-	-	6.86	-
Critical Hdwy Stg 2	-	-	-	-	6.26	-
Follow-up Hdwy	3.23	-	-	-	3.93	4.03
Pot Cap-1 Maneuver	593	-	-	-	*~ 24	*542
Stage 1	-	-	-	-	*491	-
Stage 2	-	-	-	-	*672	-
Platoon blocked, %	1	-	-	-		1
Mov Cap-1 Maneuver	593	-	-	-	*~ 11	*542
Mov Cap-2 Maneuver	-	-	-	-	*206	-
Stage 1	-	-	-	-	*235	-
Stage 2	-	-	-	-	*672	-

Approach	EB	WB	SB
HCM Control Delay, s	3.5	0	21.2
HCM LOS			C

Minor Lane/Major Mvmt	EBL	EBT	WBT	WBR	SBLn1	SBLn2
Capacity (veh/h)	593	-	-	-	206	542
HCM Lane V/C Ratio	0.521	-	-	-	0.169	0.589
HCM Control Delay (s)	17.5	-	-	-	26	20.7
HCM Lane LOS	C	-	-	-	D	C
HCM 95th %tile Q(veh)	3	-	-	-	0.6	3.8

Notes			
~: Volume exceeds capacity	$: Delay exceeds 300s	+: Computation Not Defined	*: All major volume in platoon

Intersection	
Int Delay, s/veh	3

Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Traffic Vol, veh/h	255	1490	1570	30	35	310
Future Vol, veh/h	255	1490	1570	30	35	310
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Stop	Stop
RT Channelized	-	None	-	None	-	None
Storage Length	150	-	-	-	-	0
Veh in Median Storage, #	-	0	0	-	2	-
Grade, %	-	0	0	-	0	-
Peak Hour Factor	92	92	92	92	92	92
Heavy Vehicles, %	10	10	10	10	10	10
Mvmt Flow	277	1620	1707	33	38	337

Major/Minor	Major1		Major2		Minor2	
Conflicting Flow All	1740	0	-	0	2926	870
Stage 1	-	-	-	-	1724	-
Stage 2	-	-	-	-	1202	-
Critical Hdwy	5.5	-	-	-	5.9	7.3
Critical Hdwy Stg 1	-	-	-	-	6.8	-
Critical Hdwy Stg 2	-	-	-	-	6.2	-
Follow-up Hdwy	3.2	-	-	-	3.9	4
Pot Cap-1 Maneuver	*684	-	-	-	*~ 25	*547
Stage 1	-	-	-	-	*561	-
Stage 2	-	-	-	-	*588	-
Platoon blocked, %	1	-	-	-		1
Mov Cap-1 Maneuver	*684	-	-	-	*~ 15	*547
Mov Cap-2 Maneuver	-	-	-	-	*267	-
Stage 1	-	-	-	-	*334	-
Stage 2	-	-	-	-	*588	-

Approach	EB	WB	SB
HCM Control Delay, s	2	0	21.5
HCM LOS			C

Minor Lane/Major Mvmt	EBL	EBT	WBT	WBR	SBLn1	SBLn2
Capacity (veh/h)	* 684	-	-	-	267	547
HCM Lane V/C Ratio	0.405	-	-	-	0.142	0.616
HCM Control Delay (s)	13.8	-	-	-	20.7	21.6
HCM Lane LOS	B	-	-	-	C	C
HCM 95th %tile Q(veh)	2	-	-	-	0.5	4.2

Notes			
~: Volume exceeds capacity	$: Delay exceeds 300s	+: Computation Not Defined	*: All major volume in platoon

Intersection	
Int Delay, s/veh	4.6

Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Traffic Vol, veh/h	305	1105	1555	30	30	275
Future Vol, veh/h	305	1105	1555	30	30	275
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Stop	Stop
RT Channelized	-	None	-	None	-	None
Storage Length	150	-	-	-	0	0
Veh in Median Storage, #	-	0	0	-	1	-
Grade, %	-	0	0	-	0	-
Peak Hour Factor	89	89	86	86	72	72
Heavy Vehicles, %	13	13	13	13	13	13
Mvmt Flow	343	1242	1808	35	42	382

Major/Minor	Major1		Major2		Minor2	
Conflicting Flow All	1843	0	-	0	3009	922
Stage 1	-	-	-	-	1826	-
Stage 2	-	-	-	-	1183	-
Critical Hdwy	5.56	-	-	-	5.96	7.36
Critical Hdwy Stg 1	-	-	-	-	6.86	-
Critical Hdwy Stg 2	-	-	-	-	6.26	-
Follow-up Hdwy	3.23	-	-	-	3.93	4.03
Pot Cap-1 Maneuver	596	-	-	-	*274	*540
Stage 1	-	-	-	-	*493	-
Stage 2	-	-	-	-	*672	-
Platoon blocked, %	1	-	-	-	1	1
Mov Cap-1 Maneuver	596	-	-	-	*116	*540
Mov Cap-2 Maneuver	-	-	-	-	*179	-
Stage 1	-	-	-	-	*209	-
Stage 2	-	-	-	-	*672	-

Approach	EB	WB	SB
HCM Control Delay, s	4.1	0	26.7
HCM LOS			D

Minor Lane/Major Mvmt	EBL	EBT	WBT	WBR	SBLn1	SBLn2
Capacity (veh/h)	596	-	-	-	179	540
HCM Lane V/C Ratio	0.575	-	-	-	0.233	0.707
HCM Control Delay (s)	18.9	-	-	-	31.1	26.2
HCM Lane LOS	C	-	-	-	D	D
HCM 95th %tile Q(veh)	3.6	-	-	-	0.9	5.6

Notes			
~: Volume exceeds capacity	$: Delay exceeds 300s	+: Computation Not Defined	*: All major volume in platoon

Intersection	
Int Delay, s/veh	3.9

Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Traffic Vol, veh/h	320	1495	1575	35	40	350
Future Vol, veh/h	320	1495	1575	35	40	350
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Stop	Stop
RT Channelized	-	None	-	None	-	None
Storage Length	150	-	-	-	0	0
Veh in Median Storage, #	-	0	0	-	1	-
Grade, %	-	0	0	-	0	-
Peak Hour Factor	92	92	92	92	92	92
Heavy Vehicles, %	10	10	10	10	10	10
Mvmt Flow	348	1625	1712	38	43	380

Major/Minor	Major1		Major2		Minor2	
Conflicting Flow All	1750	0	-	0	3077	875
Stage 1	-	-	-	-	1731	-
Stage 2	-	-	-	-	1346	-
Critical Hdwy	5.5	-	-	-	5.9	7.3
Critical Hdwy Stg 1	-	-	-	-	6.8	-
Critical Hdwy Stg 2	-	-	-	-	6.2	-
Follow-up Hdwy	3.2	-	-	-	3.9	4
Pot Cap-1 Maneuver	*681	-	-	-	*225	*545
Stage 1	-	-	-	-	*559	-
Stage 2	-	-	-	-	*588	-
Platoon blocked, %	1	-	-	-	1	1
Mov Cap-1 Maneuver	*681	-	-	-	*110	*545
Mov Cap-2 Maneuver	-	-	-	-	*211	-
Stage 1	-	-	-	-	*273	-
Stage 2	-	-	-	-	*588	-

Approach	EB	WB	SB
HCM Control Delay, s	2.8	0	25.6
HCM LOS			D

Minor Lane/Major Mvmt	EBL	EBT	WBT	WBR	SBLn1	SBLn2
Capacity (veh/h)	* 681	-	-	-	211	545
HCM Lane V/C Ratio	0.511	-	-	-	0.206	0.698
HCM Control Delay (s)	15.7	-	-	-	26.4	25.5
HCM Lane LOS	C	-	-	-	D	D
HCM 95th %tile Q(veh)	2.9	-	-	-	0.8	5.5

Notes			
~: Volume exceeds capacity	$: Delay exceeds 300s	+: Computation Not Defined	*: All major volume in platoon

Intersection	
Int Delay, s/veh	1

Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Traffic Vol, veh/h	20	365	325	10	15	20
Future Vol, veh/h	20	365	325	10	15	20
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Stop	Stop
RT Channelized	-	None	-	None	-	None
Storage Length	150	-	-	-	0	-
Veh in Median Storage, #	-	0	0	-	0	-
Grade, %	-	0	0	-	0	-
Peak Hour Factor	92	92	92	92	92	92
Heavy Vehicles, %	100	13	13	100	100	100
Mvmt Flow	22	397	353	11	16	22

Major/Minor	Major1		Major2		Minor2	
Conflicting Flow All	364	0	-	0	800	359
Stage 1	-	-	-	-	359	-
Stage 2	-	-	-	-	441	-
Critical Hdwy	5.1	-	-	-	7.4	7.2
Critical Hdwy Stg 1	-	-	-	-	6.4	-
Critical Hdwy Stg 2	-	-	-	-	6.4	-
Follow-up Hdwy	3.1	-	-	-	4.4	4.2
Pot Cap-1 Maneuver	808	-	-	-	248	512
Stage 1	-	-	-	-	534	-
Stage 2	-	-	-	-	483	-
Platoon blocked, %		-	-	-		
Mov Cap-1 Maneuver	808	-	-	-	241	512
Mov Cap-2 Maneuver	-	-	-	-	241	-
Stage 1	-	-	-	-	520	-
Stage 2	-	-	-	-	483	-

Approach	EB	WB	SB
HCM Control Delay, s	0.5	0	16.7
HCM LOS			C

Minor Lane/Major Mvmt	EBL	EBT	WBT	WBR	SBLn1
Capacity (veh/h)	808	-	-	-	345
HCM Lane V/C Ratio	0.027	-	-	-	0.11
HCM Control Delay (s)	9.6	-	-	-	16.7
HCM Lane LOS	A	-	-	-	C
HCM 95th %tile Q(veh)	0.1	-	-	-	0.4

Intersection	
Int Delay, s/veh	1

Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Traffic Vol, veh/h	15	380	405	10	15	25
Future Vol, veh/h	15	380	405	10	15	25
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Stop	Stop
RT Channelized	-	None	-	None	-	None
Storage Length	150	-	-	-	0	-
Veh in Median Storage, #	-	0	0	-	0	-
Grade, %	-	0	0	-	0	-
Peak Hour Factor	92	92	92	92	92	92
Heavy Vehicles, %	100	10	10	100	100	100
Mvmt Flow	16	413	440	11	16	27

Major/Minor	Major1		Major2		Minor2	
Conflicting Flow All	451	0	-	0	891	446
Stage 1	-	-	-	-	446	-
Stage 2	-	-	-	-	445	-
Critical Hdwy	5.1	-	-	-	7.4	7.2
Critical Hdwy Stg 1	-	-	-	-	6.4	-
Critical Hdwy Stg 2	-	-	-	-	6.4	-
Follow-up Hdwy	3.1	-	-	-	4.4	4.2
Pot Cap-1 Maneuver	740	-	-	-	215	451
Stage 1	-	-	-	-	480	-
Stage 2	-	-	-	-	481	-
Platoon blocked, %		-	-	-		
Mov Cap-1 Maneuver	740	-	-	-	210	451
Mov Cap-2 Maneuver	-	-	-	-	210	-
Stage 1	-	-	-	-	469	-
Stage 2	-	-	-	-	481	-

Approach	EB	WB	SB
HCM Control Delay, s	0.4	0	18.3
HCM LOS			C

Minor Lane/Major Mvmt	EBL	EBT	WBT	WBR	SBLn1
Capacity (veh/h)	740	-	-	-	315
HCM Lane V/C Ratio	0.022	-	-	-	0.138
HCM Control Delay (s)	10	-	-	-	18.3
HCM Lane LOS	A	-	-	-	C
HCM 95th %tile Q(veh)	0.1	-	-	-	0.5

Intersection	
Int Delay, s/veh	0.3

Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Traffic Vol, veh/h	20	1395	1840	10	15	20
Future Vol, veh/h	20	1395	1840	10	15	20
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Stop	Stop
RT Channelized	-	None	-	None	-	None
Storage Length	150	-	-	-	0	-
Veh in Median Storage, #	-	0	0	-	1	-
Grade, %	-	0	0	-	0	-
Peak Hour Factor	92	92	92	92	92	92
Heavy Vehicles, %	100	13	13	100	100	100
Mvmt Flow	22	1516	2000	11	16	22

Major/Minor	Major1		Major2		Minor2	
Conflicting Flow All	2011	0	-	0	2656	1006
Stage 1	-	-	-	-	2006	-
Stage 2	-	-	-	-	650	-
Critical Hdwy	7.3	-	-	-	7.7	9.1
Critical Hdwy Stg 1	-	-	-	-	8.6	-
Critical Hdwy Stg 2	-	-	-	-	8	-
Follow-up Hdwy	4.1	-	-	-	4.8	4.9
Pot Cap-1 Maneuver	*475	-	-	-	*239	*397
Stage 1	-	-	-	-	*406	-
Stage 2	-	-	-	-	*478	-
Platoon blocked, %	1	-	-	-	1	1
Mov Cap-1 Maneuver	*475	-	-	-	*228	*397
Mov Cap-2 Maneuver	-	-	-	-	*297	-
Stage 1	-	-	-	-	*387	-
Stage 2	-	-	-	-	*478	-

Approach	EB	WB	SB
HCM Control Delay, s	0.2	0	16.6
HCM LOS			C

Minor Lane/Major Mvmt	EBL	EBT	WBT	WBR	SBLn1
Capacity (veh/h)	* 475	-	-	-	347
HCM Lane V/C Ratio	0.046	-	-	-	0.11
HCM Control Delay (s)	12.9	-	-	-	16.6
HCM Lane LOS	B	-	-	-	C
HCM 95th %tile Q(veh)	0.1	-	-	-	0.4

Notes			
~: Volume exceeds capacity	$: Delay exceeds 300s	+: Computation Not Defined	*: All major volume in platoon

Intersection	
Int Delay, s/veh	0.2

Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Traffic Vol, veh/h	15	1800	1945	10	15	25
Future Vol, veh/h	15	1800	1945	10	15	25
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Stop	Stop
RT Channelized	-	None	-	None	-	None
Storage Length	150	-	-	-	0	-
Veh in Median Storage, #	-	0	0	-	1	-
Grade, %	-	0	0	-	0	-
Peak Hour Factor	92	92	92	92	92	92
Heavy Vehicles, %	100	10	10	100	100	100
Mvmt Flow	16	1957	2114	11	16	27

Major/Minor	Major1		Major2		Minor2	
Conflicting Flow All	2125	0	-	0	2935	1063
Stage 1	-	-	-	-	2120	-
Stage 2	-	-	-	-	815	-
Critical Hdwy	7.3	-	-	-	7.7	9.1
Critical Hdwy Stg 1	-	-	-	-	8.6	-
Critical Hdwy Stg 2	-	-	-	-	8	-
Follow-up Hdwy	4.1	-	-	-	4.8	4.9
Pot Cap-1 Maneuver	*447	-	-	-	*167	*374
Stage 1	-	-	-	-	*382	-
Stage 2	-	-	-	-	*406	-
Platoon blocked, %	1	-	-	-	1	1
Mov Cap-1 Maneuver	*447	-	-	-	*161	*374
Mov Cap-2 Maneuver	-	-	-	-	*249	-
Stage 1	-	-	-	-	*368	-
Stage 2	-	-	-	-	*406	-

Approach	EB	WB	SB
HCM Control Delay, s	0.1	0	18.3
HCM LOS			C

Minor Lane/Major Mvmt	EBL	EBT	WBT	WBR	SBLn1
Capacity (veh/h)	* 447	-	-	-	315
HCM Lane V/C Ratio	0.036	-	-	-	0.138
HCM Control Delay (s)	13.4	-	-	-	18.3
HCM Lane LOS	B	-	-	-	C
HCM 95th %tile Q(veh)	0.1	-	-	-	0.5

Notes			
~: Volume exceeds capacity	$: Delay exceeds 300s	+: Computation Not Defined	*: All major volume in platoon

Intersection	
Int Delay, s/veh	0.4

Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Traffic Vol, veh/h	0	380	310	2	0	25
Future Vol, veh/h	0	380	310	2	0	25
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Stop	Stop
RT Channelized	-	None	-	None	-	None
Storage Length	-	-	-	-	-	0
Veh in Median Storage, #	-	0	0	-	0	-
Grade, %	-	0	0	-	0	-
Peak Hour Factor	92	92	92	92	92	92
Heavy Vehicles, %	2	13	13	2	2	2
Mvmt Flow	0	413	337	2	0	27

Major/Minor	Major1		Major2		Minor2	
Conflicting Flow All	-	0	-	0	-	338
Stage 1	-	-	-	-	-	-
Stage 2	-	-	-	-	-	-
Critical Hdwy	-	-	-	-	-	6.22
Critical Hdwy Stg 1	-	-	-	-	-	-
Critical Hdwy Stg 2	-	-	-	-	-	-
Follow-up Hdwy	-	-	-	-	-	3.318
Pot Cap-1 Maneuver	0	-	-	-	0	704
Stage 1	0	-	-	-	0	-
Stage 2	0	-	-	-	0	-
Platoon blocked, %		-	-	-		
Mov Cap-1 Maneuver	-	-	-	-	-	704
Mov Cap-2 Maneuver	-	-	-	-	-	-
Stage 1	-	-	-	-	-	-
Stage 2	-	-	-	-	-	-

Approach	EB	WB	SB
HCM Control Delay, s	0	0	10.3
HCM LOS			B

Minor Lane/Major Mvmt	EBT	WBT	WBR	SBLn1
Capacity (veh/h)	-	-	-	704
HCM Lane V/C Ratio	-	-	-	0.039
HCM Control Delay (s)	-	-	-	10.3
HCM Lane LOS	-	-	-	B
HCM 95th %tile Q(veh)	-	-	-	0.1

Intersection	
Int Delay, s/veh	0.5

Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Traffic Vol, veh/h	0	395	380	3	0	35
Future Vol, veh/h	0	395	380	3	0	35
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Stop	Stop
RT Channelized	-	None	-	None	-	None
Storage Length	-	-	-	-	-	0
Veh in Median Storage, #	-	0	0	-	0	-
Grade, %	-	0	0	-	0	-
Peak Hour Factor	92	92	92	92	92	92
Heavy Vehicles, %	2	10	10	2	2	2
Mvmt Flow	0	429	413	3	0	38

Major/Minor	Major1		Major2		Minor2	
Conflicting Flow All	-	0	-	0	-	415
Stage 1	-	-	-	-	-	-
Stage 2	-	-	-	-	-	-
Critical Hdwy	-	-	-	-	-	6.22
Critical Hdwy Stg 1	-	-	-	-	-	-
Critical Hdwy Stg 2	-	-	-	-	-	-
Follow-up Hdwy	-	-	-	-	-	3.318
Pot Cap-1 Maneuver	0	-	-	-	0	637
Stage 1	0	-	-	-	0	-
Stage 2	0	-	-	-	0	-
Platoon blocked, %		-	-	-		
Mov Cap-1 Maneuver	-	-	-	-	-	637
Mov Cap-2 Maneuver	-	-	-	-	-	-
Stage 1	-	-	-	-	-	-
Stage 2	-	-	-	-	-	-

Approach	EB	WB	SB
HCM Control Delay, s	0	0	11
HCM LOS			B

Minor Lane/Major Mvmt	EBT	WBT	WBR	SBLn1
Capacity (veh/h)	-	-	-	637
HCM Lane V/C Ratio	-	-	-	0.06
HCM Control Delay (s)	-	-	-	11
HCM Lane LOS	-	-	-	B
HCM 95th %tile Q(veh)	-	-	-	0.2

Intersection	
Int Delay, s/veh	0.1

Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Traffic Vol, veh/h	0	1410	1825	2	0	25
Future Vol, veh/h	0	1410	1825	2	0	25
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Stop	Stop
RT Channelized	-	None	-	None	-	None
Storage Length	-	-	-	-	-	0
Veh in Median Storage, #	-	0	0	-	0	-
Grade, %	-	0	0	-	0	-
Peak Hour Factor	92	92	92	92	92	92
Heavy Vehicles, %	2	13	13	2	2	2
Mvmt Flow	0	1533	1984	2	0	27

Major/Minor	Major1		Major2		Minor2	
Conflicting Flow All	-	0	-	0	-	993
Stage 1	-	-	-	-	-	-
Stage 2	-	-	-	-	-	-
Critical Hdwy	-	-	-	-	-	7.14
Critical Hdwy Stg 1	-	-	-	-	-	-
Critical Hdwy Stg 2	-	-	-	-	-	-
Follow-up Hdwy	-	-	-	-	-	3.92
Pot Cap-1 Maneuver	0	-	-	-	0	*497
Stage 1	0	-	-	-	0	-
Stage 2	0	-	-	-	0	-
Platoon blocked, %		-	-	-		1
Mov Cap-1 Maneuver	-	-	-	-	-	*497
Mov Cap-2 Maneuver	-	-	-	-	-	-
Stage 1	-	-	-	-	-	-
Stage 2	-	-	-	-	-	-

Approach	EB	WB	SB
HCM Control Delay, s	0	0	12.7
HCM LOS			B

Minor Lane/Major Mvmt	EBT	WBT	WBR	SBLn1
Capacity (veh/h)	-	-	-	497
HCM Lane V/C Ratio	-	-	-	0.055
HCM Control Delay (s)	-	-	-	12.7
HCM Lane LOS	-	-	-	B
HCM 95th %tile Q(veh)	-	-	-	0.2

Notes			
~: Volume exceeds capacity	$: Delay exceeds 300s	+: Computation Not Defined	*: All major volume in platoon

Intersection	
Int Delay, s/veh	0.1

Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Traffic Vol, veh/h	0	1815	1920	3	0	35
Future Vol, veh/h	0	1815	1920	3	0	35
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Stop	Stop
RT Channelized	-	None	-	None	-	None
Storage Length	-	-	-	-	-	0
Veh in Median Storage, #	-	0	0	-	0	-
Grade, %	-	0	0	-	0	-
Peak Hour Factor	92	92	92	92	92	92
Heavy Vehicles, %	2	10	10	2	2	2
Mvmt Flow	0	1973	2087	3	0	38

Major/Minor	Major1		Major2		Minor2	
Conflicting Flow All	-	0	-	0	-	1045
Stage 1	-	-	-	-	-	-
Stage 2	-	-	-	-	-	-
Critical Hdwy	-	-	-	-	-	7.14
Critical Hdwy Stg 1	-	-	-	-	-	-
Critical Hdwy Stg 2	-	-	-	-	-	-
Follow-up Hdwy	-	-	-	-	-	3.92
Pot Cap-1 Maneuver	0	-	-	-	0	*467
Stage 1	0	-	-	-	0	-
Stage 2	0	-	-	-	0	-
Platoon blocked, %		-	-	-		1
Mov Cap-1 Maneuver	-	-	-	-	-	*467
Mov Cap-2 Maneuver	-	-	-	-	-	-
Stage 1	-	-	-	-	-	-
Stage 2	-	-	-	-	-	-

Approach	EB	WB	SB
HCM Control Delay, s	0	0	13.4
HCM LOS			B

Minor Lane/Major Mvmt	EBT	WBT	WBR	SBLn1
Capacity (veh/h)	-	-	-	467
HCM Lane V/C Ratio	-	-	-	0.081
HCM Control Delay (s)	-	-	-	13.4
HCM Lane LOS	-	-	-	B
HCM 95th %tile Q(veh)	-	-	-	0.3

Notes			
~: Volume exceeds capacity	$: Delay exceeds 300s	+: Computation Not Defined	*: All major volume in platoon

Intersection	
Int Delay, s/veh	1.3

Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Traffic Vol, veh/h	20	25	20	190	225	10
Future Vol, veh/h	20	25	20	190	225	10
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Stop	Stop	Free	Free	Free	Free
RT Channelized	-	None	-	None	-	None
Storage Length	0	-	150	-	-	-
Veh in Median Storage, #	1	-	-	0	0	-
Grade, %	0	-	-	0	0	-
Peak Hour Factor	92	92	92	92	92	92
Heavy Vehicles, %	2	2	2	13	13	2
Mvmt Flow	22	27	22	207	245	11

Major/Minor	Minor2		Major1		Major2	
Conflicting Flow All	502	251	256	0	-	0
Stage 1	251	-	-	-	-	-
Stage 2	251	-	-	-	-	-
Critical Hdwy	6.42	6.22	4.12	-	-	-
Critical Hdwy Stg 1	5.42	-	-	-	-	-
Critical Hdwy Stg 2	5.42	-	-	-	-	-
Follow-up Hdwy	3.518	3.318	2.218	-	-	-
Pot Cap-1 Maneuver	529	788	1309	-	-	-
Stage 1	791	-	-	-	-	-
Stage 2	791	-	-	-	-	-
Platoon blocked, %				-	-	-
Mov Cap-1 Maneuver	520	788	1309	-	-	-
Mov Cap-2 Maneuver	595	-	-	-	-	-
Stage 1	778	-	-	-	-	-
Stage 2	791	-	-	-	-	-

Approach	EB	NB	SB
HCM Control Delay, s	10.6	0.7	0
HCM LOS	B		

Minor Lane/Major Mvmt	NBL	NBT	EBLn1	SBT	SBR
Capacity (veh/h)	1309	-	689	-	-
HCM Lane V/C Ratio	0.017	-	0.071	-	-
HCM Control Delay (s)	7.8	-	10.6	-	-
HCM Lane LOS	A	-	B	-	-
HCM 95th %tile Q(veh)	0.1	-	0.2	-	-

Intersection	
Int Delay, s/veh	2

Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Traffic Vol, veh/h	30	35	45	210	200	20
Future Vol, veh/h	30	35	45	210	200	20
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Stop	Stop	Free	Free	Free	Free
RT Channelized	-	None	-	None	-	None
Storage Length	0	-	150	-	-	-
Veh in Median Storage, #	1	-	-	0	0	-
Grade, %	0	-	-	0	0	-
Peak Hour Factor	92	92	92	92	92	92
Heavy Vehicles, %	2	2	2	10	10	2
Mvmt Flow	33	38	49	228	217	22

Major/Minor	Minor2		Major1		Major2	
Conflicting Flow All	554	228	239	0	-	0
Stage 1	228	-	-	-	-	-
Stage 2	326	-	-	-	-	-
Critical Hdwy	6.42	6.22	4.12	-	-	-
Critical Hdwy Stg 1	5.42	-	-	-	-	-
Critical Hdwy Stg 2	5.42	-	-	-	-	-
Follow-up Hdwy	3.518	3.318	2.218	-	-	-
Pot Cap-1 Maneuver	493	811	1328	-	-	-
Stage 1	810	-	-	-	-	-
Stage 2	731	-	-	-	-	-
Platoon blocked, %				-	-	-
Mov Cap-1 Maneuver	475	811	1328	-	-	-
Mov Cap-2 Maneuver	561	-	-	-	-	-
Stage 1	780	-	-	-	-	-
Stage 2	731	-	-	-	-	-

Approach	EB	NB	SB
HCM Control Delay, s	11	1.4	0
HCM LOS	B		

Minor Lane/Major Mvmt	NBL	NBT	EBLn1	SBT	SBR
Capacity (veh/h)	1328	-	673	-	-
HCM Lane V/C Ratio	0.037	-	0.105	-	-
HCM Control Delay (s)	7.8	-	11	-	-
HCM Lane LOS	A	-	B	-	-
HCM 95th %tile Q(veh)	0.1	-	0.3	-	-

Intersection	
Int Delay, s/veh	1

Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Traffic Vol, veh/h	20	25	20	315	280	10
Future Vol, veh/h	20	25	20	315	280	10
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Stop	Stop	Free	Free	Free	Free
RT Channelized	-	None	-	None	-	None
Storage Length	0	-	150	-	-	-
Veh in Median Storage, #	1	-	-	0	0	-
Grade, %	0	-	-	0	0	-
Peak Hour Factor	92	92	92	92	92	92
Heavy Vehicles, %	2	2	2	13	13	2
Mvmt Flow	22	27	22	342	304	11

Major/Minor	Minor2		Major1		Major2	
Conflicting Flow All	696	310	315	0	-	0
Stage 1	310	-	-	-	-	-
Stage 2	386	-	-	-	-	-
Critical Hdwy	6.42	6.22	4.12	-	-	-
Critical Hdwy Stg 1	5.42	-	-	-	-	-
Critical Hdwy Stg 2	5.42	-	-	-	-	-
Follow-up Hdwy	3.518	3.318	2.218	-	-	-
Pot Cap-1 Maneuver	408	730	1245	-	-	-
Stage 1	744	-	-	-	-	-
Stage 2	687	-	-	-	-	-
Platoon blocked, %				-	-	-
Mov Cap-1 Maneuver	401	730	1245	-	-	-
Mov Cap-2 Maneuver	506	-	-	-	-	-
Stage 1	731	-	-	-	-	-
Stage 2	687	-	-	-	-	-

Approach	EB	NB	SB
HCM Control Delay, s	11.4	0.5	0
HCM LOS	B		

Minor Lane/Major Mvmt	NBL	NBT	EBLn1	SBT	SBR
Capacity (veh/h)	1245	-	610	-	-
HCM Lane V/C Ratio	0.017	-	0.08	-	-
HCM Control Delay (s)	7.9	-	11.4	-	-
HCM Lane LOS	A	-	B	-	-
HCM 95th %tile Q(veh)	0.1	-	0.3	-	-

Intersection	
Int Delay, s/veh	1.5

Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Traffic Vol, veh/h	30	35	45	310	355	20
Future Vol, veh/h	30	35	45	310	355	20
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Stop	Stop	Free	Free	Free	Free
RT Channelized	-	None	-	None	-	None
Storage Length	0	-	150	-	-	-
Veh in Median Storage, #	1	-	-	0	0	-
Grade, %	0	-	-	0	0	-
Peak Hour Factor	92	92	92	92	92	92
Heavy Vehicles, %	2	2	2	10	10	2
Mvmt Flow	33	38	49	337	386	22

Major/Minor	Minor2		Major1		Major2	
Conflicting Flow All	832	397	408	0	-	0
Stage 1	397	-	-	-	-	-
Stage 2	435	-	-	-	-	-
Critical Hdwy	6.42	6.22	4.12	-	-	-
Critical Hdwy Stg 1	5.42	-	-	-	-	-
Critical Hdwy Stg 2	5.42	-	-	-	-	-
Follow-up Hdwy	3.518	3.318	2.218	-	-	-
Pot Cap-1 Maneuver	339	652	1151	-	-	-
Stage 1	679	-	-	-	-	-
Stage 2	653	-	-	-	-	-
Platoon blocked, %				-	-	-
Mov Cap-1 Maneuver	324	652	1151	-	-	-
Mov Cap-2 Maneuver	445	-	-	-	-	-
Stage 1	650	-	-	-	-	-
Stage 2	653	-	-	-	-	-

Approach	EB	NB	SB
HCM Control Delay, s	12.7	1	0
HCM LOS	B		

Minor Lane/Major Mvmt	NBL	NBT	EBLn1	SBT	SBR
Capacity (veh/h)	1151	-	537	-	-
HCM Lane V/C Ratio	0.042	-	0.132	-	-
HCM Control Delay (s)	8.3	-	12.7	-	-
HCM Lane LOS	A	-	B	-	-
HCM 95th %tile Q(veh)	0.1	-	0.5	-	-

Intersection	
Int Delay, s/veh	0.7

Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Traffic Vol, veh/h	10	15	1	210	220	1
Future Vol, veh/h	10	15	1	210	220	1
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Stop	Stop	Free	Free	Free	Free
RT Channelized	-	None	-	None	-	None
Storage Length	0	-	-	-	-	-
Veh in Median Storage, #	0	-	-	0	0	-
Grade, %	0	-	-	0	0	-
Peak Hour Factor	92	92	92	92	92	92
Heavy Vehicles, %	100	100	100	13	13	100
Mvmt Flow	11	16	1	228	239	1

Major/Minor	Minor2		Major1		Major2	
Conflicting Flow All	470	240	240	0	-	0
Stage 1	240	-	-	-	-	-
Stage 2	230	-	-	-	-	-
Critical Hdwy	7.4	7.2	5.1	-	-	-
Critical Hdwy Stg 1	6.4	-	-	-	-	-
Critical Hdwy Stg 2	6.4	-	-	-	-	-
Follow-up Hdwy	4.4	4.2	3.1	-	-	-
Pot Cap-1 Maneuver	409	608	915	-	-	-
Stage 1	616	-	-	-	-	-
Stage 2	624	-	-	-	-	-
Platoon blocked, %				-	-	-
Mov Cap-1 Maneuver	409	608	915	-	-	-
Mov Cap-2 Maneuver	409	-	-	-	-	-
Stage 1	615	-	-	-	-	-
Stage 2	624	-	-	-	-	-

Approach	EB	NB	SB
HCM Control Delay, s	12.5	0	0
HCM LOS	B		

Minor Lane/Major Mvmt	NBL	NBT	EBLn1	SBT	SBR
Capacity (veh/h)	915	-	509	-	-
HCM Lane V/C Ratio	0.001	-	0.053	-	-
HCM Control Delay (s)	8.9	0	12.5	-	-
HCM Lane LOS	A	A	B	-	-
HCM 95th %tile Q(veh)	0	-	0.2	-	-

Intersection	
Int Delay, s/veh	0.4

Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Traffic Vol, veh/h	1	1	15	225	220	5
Future Vol, veh/h	1	1	15	225	220	5
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Stop	Stop	Free	Free	Free	Free
RT Channelized	-	None	-	None	-	None
Storage Length	0	-	-	-	-	-
Veh in Median Storage, #	0	-	-	0	0	-
Grade, %	0	-	-	0	0	-
Peak Hour Factor	92	92	92	92	92	92
Heavy Vehicles, %	100	100	100	10	10	100
Mvmt Flow	1	1	16	245	239	5

Major/Minor	Minor2		Major1		Major2	
Conflicting Flow All	519	242	244	0	-	0
Stage 1	242	-	-	-	-	-
Stage 2	277	-	-	-	-	-
Critical Hdwy	7.4	7.2	5.1	-	-	-
Critical Hdwy Stg 1	6.4	-	-	-	-	-
Critical Hdwy Stg 2	6.4	-	-	-	-	-
Follow-up Hdwy	4.4	4.2	3.1	-	-	-
Pot Cap-1 Maneuver	380	606	911	-	-	-
Stage 1	615	-	-	-	-	-
Stage 2	589	-	-	-	-	-
Platoon blocked, %				-	-	-
Mov Cap-1 Maneuver	372	606	911	-	-	-
Mov Cap-2 Maneuver	372	-	-	-	-	-
Stage 1	603	-	-	-	-	-
Stage 2	589	-	-	-	-	-

Approach	EB	NB	SB
HCM Control Delay, s	12.8	0.6	0
HCM LOS	B		

Minor Lane/Major Mvmt	NBL	NBT	EBLn1	SBT	SBR
Capacity (veh/h)	911	-	461	-	-
HCM Lane V/C Ratio	0.018	-	0.005	-	-
HCM Control Delay (s)	9	0	12.8	-	-
HCM Lane LOS	A	A	B	-	-
HCM 95th %tile Q(veh)	0.1	-	0	-	-

Intersection	
Int Delay, s/veh	0.6

Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Traffic Vol, veh/h	10	15	1	335	275	1
Future Vol, veh/h	10	15	1	335	275	1
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Stop	Stop	Free	Free	Free	Free
RT Channelized	-	None	-	None	-	None
Storage Length	0	-	-	-	-	-
Veh in Median Storage, #	0	-	-	0	0	-
Grade, %	0	-	-	0	0	-
Peak Hour Factor	92	92	92	92	92	92
Heavy Vehicles, %	100	100	100	13	13	100
Mvmt Flow	11	16	1	364	299	1

Major/Minor	Minor2		Major1		Major2	
Conflicting Flow All	666	300	300	0	-	0
Stage 1	300	-	-	-	-	-
Stage 2	366	-	-	-	-	-
Critical Hdwy	7.4	7.2	5.1	-	-	-
Critical Hdwy Stg 1	6.4	-	-	-	-	-
Critical Hdwy Stg 2	6.4	-	-	-	-	-
Follow-up Hdwy	4.4	4.2	3.1	-	-	-
Pot Cap-1 Maneuver	304	558	861	-	-	-
Stage 1	573	-	-	-	-	-
Stage 2	529	-	-	-	-	-
Platoon blocked, %				-	-	-
Mov Cap-1 Maneuver	304	558	861	-	-	-
Mov Cap-2 Maneuver	304	-	-	-	-	-
Stage 1	572	-	-	-	-	-
Stage 2	529	-	-	-	-	-

Approach	EB	NB	SB
HCM Control Delay, s	14.2	0	0
HCM LOS	B		

Minor Lane/Major Mvmt	NBL	NBT	EBLn1	SBT	SBR
Capacity (veh/h)	861	-	418	-	-
HCM Lane V/C Ratio	0.001	-	0.065	-	-
HCM Control Delay (s)	9.2	0	14.2	-	-
HCM Lane LOS	A	A	B	-	-
HCM 95th %tile Q(veh)	0	-	0.2	-	-

Intersection	
Int Delay, s/veh	0.2

Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Traffic Vol, veh/h	1	1	15	325	375	5
Future Vol, veh/h	1	1	15	325	375	5
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Stop	Stop	Free	Free	Free	Free
RT Channelized	-	None	-	None	-	None
Storage Length	0	-	-	-	-	-
Veh in Median Storage, #	0	-	-	0	0	-
Grade, %	0	-	-	0	0	-
Peak Hour Factor	92	92	92	92	92	92
Heavy Vehicles, %	100	100	100	10	10	100
Mvmt Flow	1	1	16	353	408	5

Major/Minor	Minor2		Major1		Major2	
Conflicting Flow All	796	411	413	0	-	0
Stage 1	411	-	-	-	-	-
Stage 2	385	-	-	-	-	-
Critical Hdwy	7.4	7.2	5.1	-	-	-
Critical Hdwy Stg 1	6.4	-	-	-	-	-
Critical Hdwy Stg 2	6.4	-	-	-	-	-
Follow-up Hdwy	4.4	4.2	3.1	-	-	-
Pot Cap-1 Maneuver	249	474	769	-	-	-
Stage 1	501	-	-	-	-	-
Stage 2	517	-	-	-	-	-
Platoon blocked, %				-	-	-
Mov Cap-1 Maneuver	243	474	769	-	-	-
Mov Cap-2 Maneuver	243	-	-	-	-	-
Stage 1	488	-	-	-	-	-
Stage 2	517	-	-	-	-	-

Approach	EB	NB	SB
HCM Control Delay, s	16.3	0.4	0
HCM LOS	C		

Minor Lane/Major Mvmt	NBL	NBT	EBLn1	SBT	SBR
Capacity (veh/h)	769	-	321	-	-
HCM Lane V/C Ratio	0.021	-	0.007	-	-
HCM Control Delay (s)	9.8	0	16.3	-	-
HCM Lane LOS	A	A	C	-	-
HCM 95th %tile Q(veh)	0.1	-	0	-	-

APPENDIX E

Queuing Analysis Worksheets

QUEUE STORAGE WORKSHEET

Gated Entrance

ITE Transportation and Land Development, Chapter 8 - Drive-In Facilities

Location Distribution Facility (Truck Access)
Condition Peak Hour of Generator

Storage = (((ln P(x>M) - ln Qm) / ln p) - 1) x Average Length of Vehicle

M = queue length which is exceeded p percent of the time
N = number of service channels (drive in positions)
Q = service rate per channel (vehicles per hour)
p = demand rate/service rate = q/NQ = utilization factor
q = demand rate on the system (vehicles per hour)
Qm = tabled values of the relationship between queue length, number of channels and utilization factor (if n = 1, Qm = p)

Where:

Q = 60 vehicles/hour assuming a 60 second wait
P(x > M) = 5 percent = .05
67 ft/veh = Average Length of Vehicle
q = 51 vehicles per hour
N = Number of Lanes= 2

p = q/NQ = 0.43 Qm = 0.78

M = Storage = {[(ln .05 - ln 0.78) / ln 0.43]-1} * 67

M = Storage = {[(-2.996 - -0.24846) / -0.856] - 1} x 67

M = Storage = 148 ft

Where:

SL = Desirable Storage Per Lane= **148 Ft**

Available Storage = 550 Ft =Adequate Storage

QUEUE STORAGE WORKSHEET

Gated Entrance

ITE Transportation and Land Development, Chapter 8 - Drive-In Facilities

Location Distribution Facility (Van Access)
Condition Peak Hour of Generator

Storage = (((ln P(x>M) - ln Qm) / ln p) - 1) x Average Length of Vehicle

M = queue length which is exceeded p percent of the time
N = number of service channels (drive in positions)
Q = service rate per channel (vehicles per hour)
p = demand rate/service rate = q/NQ = utilization factor
q = demand rate on the system (vehicles per hour)
Qm = tabled values of the relationship between queue length, number of channels and utilization factor (if n = 1, Qm = p)

Where:

Q = 120 vehicles/hour assuming a 30 second wait
P(x > M) = 5 percent = .05
30 ft/veh = Average Length of Vehicle
q = 15 vehicles per hour
N = Number of Lanes= 1

p = q/NQ = 0.13 Qm = 0.13

M = Storage = {[(ln .05 - ln 0.13) / ln 0.13]-1} * 30

M = Storage = {[(-2.996 - -2.04022) / -2.079] - 1} x 30

M = Storage = 14 ft

Where:

SL = Desirable Storage Per Lane= **14 Ft**

Available Storage = 60 Ft =Adequate Storage

APPENDIX F

Conceptual Site Plan

PROPOSED DISTRIBUTION FACILITY

E 56TH AVE

EXISTING STORM WATER POND

FUTURE 60TH AVE

JACKSON GAP STREET (84' ROW)

NEW STATION REQUIREMENTS TABULATION

BASED UPON FACILITY REQUIREMENTS DATED: 1/15/20

ITEM	REQ'D.	PROV.	FUTURE
ACREAGE			
TOTAL		68.1	
BUILDING (S.F. AREA)			
DISTRIBUTION AREA		456,044	
ADMIN OFFICE		13,894	
REMOTE TOILET ROOM 1		690	
REMOTE TOILET ROOM 2		4,012	
PURPLE LOUNGE		4,020	
SECURITY AREA		623	
LINEHAUL OFFICE		2,024	
SWITCHGEAR ROOM 1		650	
SWITCHGEAR ROOM 2		329	
FIRE RISER ROOM		407	
TOTAL		479,083	
PARKING (SPACES)			
AUTOMOBILE TOTAL	668	670	
STANDARD	654	656	
HANDICAP	14	14	
MOTORCYCLE PARKING	0	26	
53' TRAILER EQUIVALENTS	311	304	
TRACTOR	21	130	
DOLLY STORAGE	21	135	
VAN STAGING	189	185	
INBOUND PARKING	X	15	
LINEHAUL DISPATCH	X	5	
DEADLINE	X	5	

NORTH

GRAPHIC SCALE IN FEET
0 50 100 200

PARCEL 10B
CONCEPTUAL SITE LAYOUT
8/21/2021

Kimley»Horn

4582 SOUTH ULSTER STREET, SUITE 1500, DENVER, 80237
PHONE: 303-228-2300