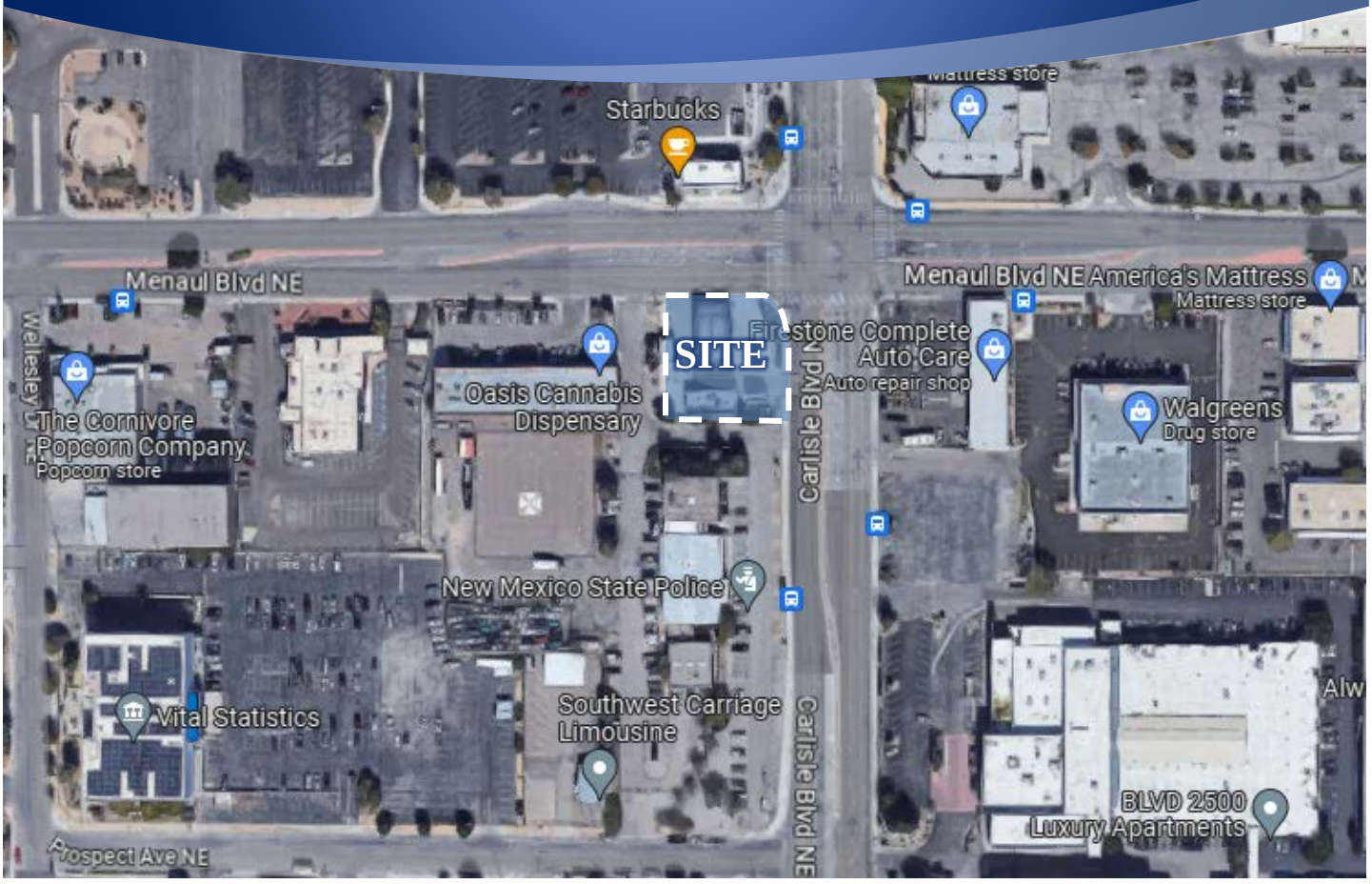
Traffic Impact Study
Proposed Dunkin Drive-Through

Albuquerque, New Mexico



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Prepared For:

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Kenig, Lindgren, O'Hara, Aboona, Inc.

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I. Executive Summary

This report summarizes the results of a traffic impact study conducted by Kenig, Lindgren, O'Hara, Aboona, Inc. (KLOA, Inc.) for a proposed Dunkin Drive-Through (Dunkin) to be located at 3520 Menaul Boulevard NE in Albuquerque, New Mexico. The objectives of the traffic study are as follows:

- Determine the existing vehicular conditions in the study area to establish a base condition.
- Assess the impact that the proposed development will have on traffic conditions in the area.
- Determine any roadway or access modifications and/or improvements that will be necessary to effectively accommodate and mitigate future conditions.

Vehicle, pedestrian, and bicycle counts were conducted during the weekday morning and weekday evening peak periods at the intersections of Carlisle Boulevard with Menaul Boulevard and Prospect Avenue/BLVD 2500 access drive to determine the peak hour of traffic activity during these time periods.

As proposed, the Dunkin will be approximately 1,200 square feet in size and will provide a drive through lane that will accommodate 12 vehicles. A total of 10 parking spaces will serve the site. Access to the site will be provided via a right-in/right-out access drive off Menaul Boulevard and a right-in/right-out access drive off Carlisle Boulevard.

Based on the proceeding analyses and recommendations, the following conclusions have been made:

- The proposed Dunkin will be located at 3520 Menaul Boulevard NE and will be an approximately 1,200 square-foot building providing double drive-through lanes that will accommodate 12 vehicles and a parking lot with 10 parking spaces.
- Access to the site will be provided via the two right-in/right-out access drives with one located off Menaul Boulevard and the second located off Carlisle Boulevard.
- The volume of traffic estimated to be generated by Dunkin will be reduced due to the volume of pass-by trips anticipated to be diverted from the existing traffic on Carlisle Boulevard and Menaul Boulevard.
- The access drives are projected to be adequate in accommodating the traffic estimated to be generated by Dunkin and will provide flexible and efficient access to the site.
- As part of the proposed development, stop signs should be provided for outbound traffic from both access drives.
- The drive-through stacking of 12 vehicles will be adequate in accommodating the peak drive-through activity for the coffee shop. The final site traffic layout and queueing acceptance is dependent on the Traffic Circulation Layout (TCL) approval by the City.
- Clear intersection sight distance should be provided at each driveway as per COA DPM 7-4(I)(5)(iii) Intersection Sight Distance

1. Introduction

This report summarizes the results of a traffic study conducted by Kenig, Lindgren, O'Hara, Aboona, Inc. (KLOA, Inc.) for a proposed Dunkin to be located at 3520 Menaul Boulevard NE in Albuquerque, New Mexico. The site, which is currently occupied by a fuel center building, is located on the southwest corner of the intersection of Menaul Boulevard with Carlisle Boulevard. The scoping document for this traffic impact study can be found in the Appendix.

As proposed, the proposed Dunkin will be approximately 1,200 square feet in size and will provide a drive through that will accommodate 12 vehicles. A total of 10 parking spaces will serve the site. Access to the site will be provided via a right-in/right-out access drive off Menaul Boulevard and a right-in/right-out access drive off Carlisle Boulevard.

Figure 1 shows the location of the site in relation to the area roadway network. **Figure 2** shows an aerial view of the site.

The sections of this report present the following:

- Existing roadway conditions
- A description of the proposed site
- Directional distribution of the site traffic
- Vehicle trip generation for the site
- Future traffic conditions, including access to the site.
- Traffic analyses for the weekday morning and weekday evening peak hours
- Crash summary for the intersections of Carlisle Boulevard with Menaul Boulevard and Prospect Avenue/BLVD 2500 access drive
- Recommendations with respect to the adequacy of site access and adjacent roadway system

Traffic capacity analyses were conducted for the weekday morning and weekday evening peak hours for the following conditions:

1. Existing Conditions – Analyzes the capacity of the existing roadway system using existing peak hour traffic volumes in the surrounding area.

2. Year 2024 No-Build Conditions – Analyzes the capacity of the existing roadway system using the ambient area growth, not attributable to any particular development and the traffic anticipated to be generated by the proposed 2500 Carlisle Boulevard development.

3. Year 2024 Total Projected Conditions – Analyzes the capacity of the future roadway system using the projected traffic volumes that include the existing traffic volumes, ambient area growth, the traffic generated by the proposed 2500 Carlisle Boulevard development, and traffic estimated to be generated by the proposed development.

Site Location **Figure 1**

Aerial View of Site **Figure 2**

2. Existing Conditions

The following provides a detailed description of the physical characteristics of the adjacent roadways, including geometry and traffic control, adjacent land uses, and peak hour traffic flows.

Site Location

The site of the proposed Dunkin is located on the southwest corner of the intersection of Menaul Boulevard with Carlisle Boulevard which is currently occupied by a gas station building. Land uses within the vicinity of the site are primarily commercial along Menaul Boulevard and Carlisle Boulevard and include Starbucks and American Home Furniture & Mattress to the north of the site, Oasis Cannabis Dispensary to the west, Firestone Auto Care to the east, and the Department of Public Safety and the New Mexico State Police to the south of the site.

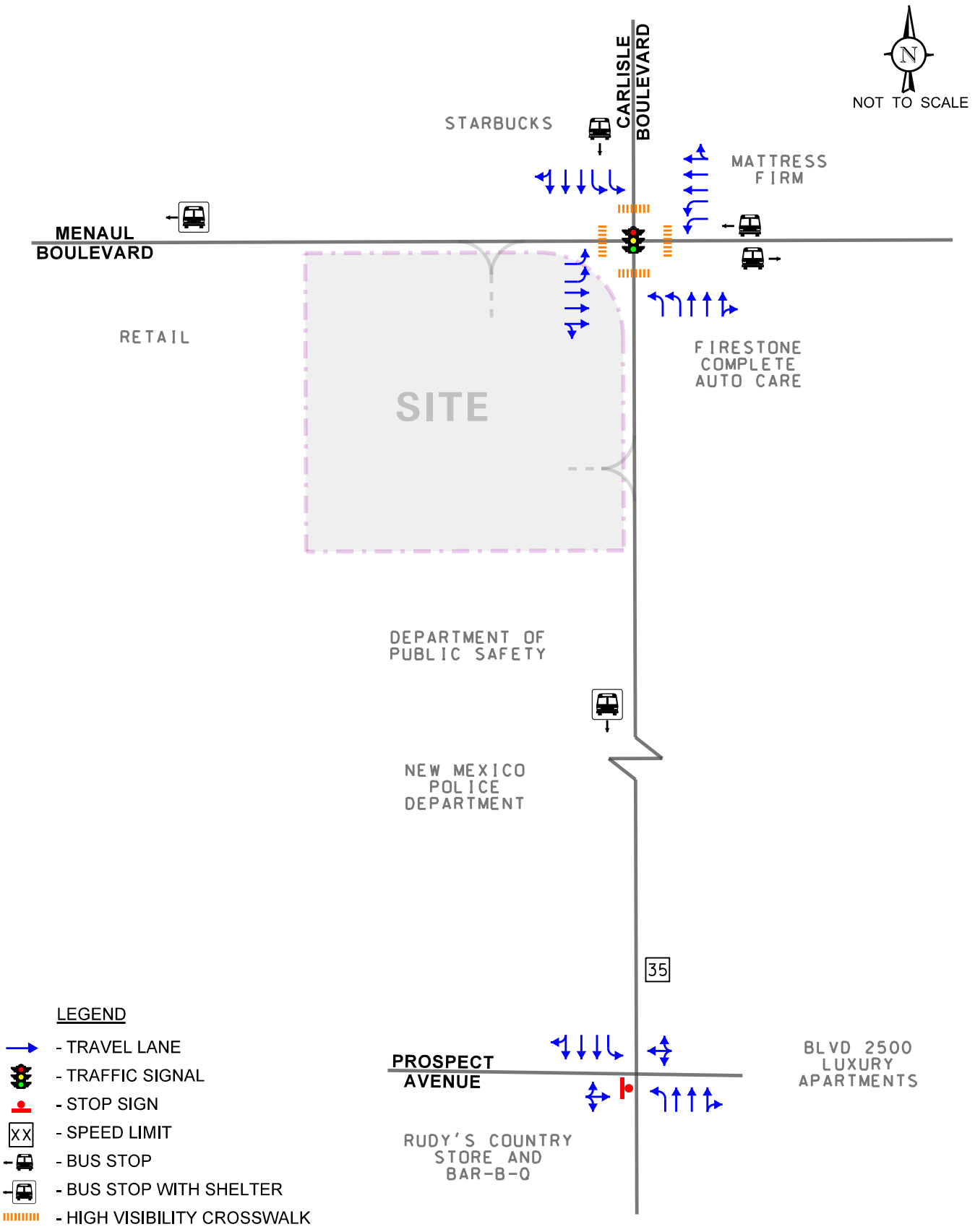
Existing Roadway Characteristics

Some of the key characteristics of the existing roadways within the study area are described below and illustrated in **Figure 3**.

Menaul Boulevard NE is an east-west principal arterial roadway that generally provides three travel lanes in each direction. At its signalized intersection with Carlisle Boulevard, Menaul Boulevard provides dual left-turn lanes, two through lanes, and a shared through/right-turn lane on both approaches. High visibility crosswalks and pedestrian signals are provided at all four legs of this intersection. Menaul Boulevard is under the jurisdiction of the City of Albuquerque and carries an Annual Average Daily Traffic (AADT) volume of 31,861 vehicles (NMDOT 2017) east of Menaul Boulevard and 15,370 vehicles (NMDOT 2020) west of Carlisle Boulevard. Menaul Boulevard has a posted speed limit of 40 miles per hour.

Carlisle Boulevard NE is a north-south minor arterial roadway that provides three lanes in each direction. At its signalized intersection with Menaul Boulevard, Carlisle Boulevard provides dual left-turn lanes, two through lane, and a shared through/right-turn lane on both approaches. At its unsignalized intersection with Prospect Avenue/BLVD 2500 access drive, Carlisle Boulevard provides an exclusive left-turn lane, two through lanes, and a shared through/right-turn lane on both approaches. Carlisle Boulevard is under the jurisdiction of the City of Albuquerque, carries an AADT volume of 29,556 vehicles (NMDOT 2018), and has a posted speed limit of 35 miles per hour.

Prospect Avenue is a north-south local roadway that that extends approximately 830 feet west from Carlisle Boulevard to its terminus at Wellesley Drive providing one lane in each direction. At its unsignalized intersection with Carlisle Boulevard, Prospect Avenue provides a shared left-turn/through/right-turn lane on the eastbound approach that is under stop sign control. The east leg of this intersection is the access drive serving BLVD 2500 which provides a shared left/through/right-turn lane that is under stop sign control. Prospect Avenue is under the jurisdiction of the City of Albuquerque.



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Existing Roadway Characteristics

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Job No: 23-159 Figure: 3

Existing Traffic Volumes

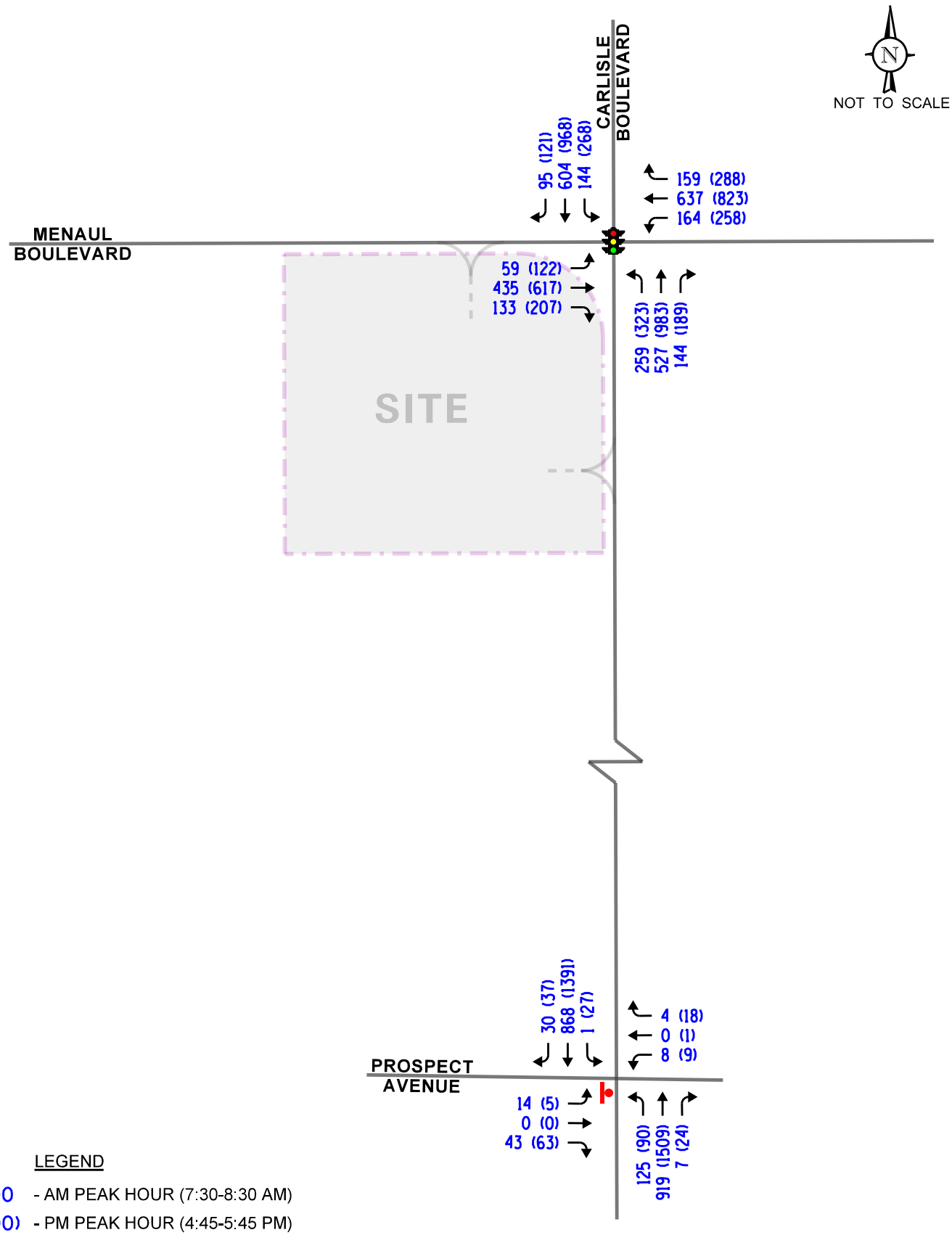
In order to determine current vehicle, pedestrian, and bicycle conditions within the study area, peak period traffic, pedestrian, and bicycle counts were conducted during the weekday morning (7:00 A.M. to 9:00 A.M.) and evening (4:00 P.M. to 6:00 P.M.) peak periods on Monday, May 22, 2023 at the following intersections:

- Menaul Boulevard with Carlisle Boulevard
- Carlisle Boulevard with Prospect Avenue/BLVD 2500 Access Drive

The results of the traffic counts show that the peak hours generally occur from 7:30 A.M. to 8:30 A.M. during the weekday morning peak hour and 4:45 P.M. and 5:45 P.M. during the weekday evening peak hour.

The traffic volumes were compared to hourly counts conducted by Lee Engineering as part of the traffic impact study prepared for the 2500 Carlisle Boulevard proposed development. The previously counts were collected on May 18 and May 20, 2021 at the intersection of Menaul Boulevard with Carlisle Boulevard. The 2023 traffic counts were found to be approximately ten percent higher than 2021 counts during the weekday evening peak hour and approximately the same during the weekday morning peak hour. As such, the May 2023 traffic counts reflect typical traffic conditions.

Figure 4 illustrates the existing peak hour vehicle traffic volumes. Summaries of the traffic counts are included in the Appendix.



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Existing Traffic Volumes

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Job No: 23-159 Figure: 4

Crash Data

KLOA, Inc. obtained crash data from the New Mexico Department of Transportation (NMDOT) for the most recent available past five years (2017 to 2021) for the intersections of Menaul Boulevard with Carlisle Boulevard and Carlisle Boulevard with Prospect Avenue. The crash data for the intersections including severity and crash type by year is summarized in **Tables 1** and **2**. As can be seen from Table 1 and based on a review of the crash data, the following was determined:

- During the review period, a total of 72 crashes occurred at the intersection of Menaul Boulevard with Carlisle Boulevard.
    - Over 90 percent of the crashes occurred during clear weather.
    - Approximately 80 percent of the crashes occurred during daylight.
    - Approximately 70 percent of the crashes resulted in property damage only, while approximately 15 percent of the crashes resulted in a Class C severity.
    - No fatal crashes were reported during the review period.
    - One crash involved a pedestrian and one crash involved a fixed object.
    - The only repetitive crash types involved angled/turning vehicles, rear end collisions, or the "Other Vehicle – From Opposite Direction" classification.
- During the review period, a total of 16 crashes occurred at the intersection of Carlisle Boulevard with Prospect Avenue.
    - Fourteen of the crashes occurred during clear weather.
    - Eleven of the crashes occurred during daylight.
    - Eleven of the crashes resulted in property damage, two resulted in Class B severity, and two resulted in Class C severity.
    - One fatal crash was reported during the review period. This crash involved a collusion with a vehicle traveling straight and a pedestrian. The weather was raining and it occurred in January at 7:41 P.M.
    - There is no real trend to be established by the cause/type of the crashes.

Table 1
MENAUL BOULEVARD WITH CARLISLE BOULEVARD – CRASH SUMMARY

Year	Type of Crash Frequency						
	2017	2018	2019	2020	2021	Total	Average
Property Damage Only	9	16	11	7	7	**50**	**10**
Class A Severity	0	0	0	0	2	**2**	**< 1**
Class B Severity	2	2	0	4	1	**9**	**1.8**
Class C severity	2	1	2	3	3	**11**	**2.2**
Fatalities	0	0	0	0	0	0	0
Total	**13**	**19**	**13**	**14**	**13**	**72**	**14.4**
Other Vehicle – Both Going Straight/Entering At Angle	2	3	1	0	0	**6**	**1.2**
Other Vehicle – Both Turn Left/Entering At Angle	0	1	1	0	0	**2**	**< 1**
Other Vehicle – Both Turn Right/Entering at Angle	0	1	0	0	0	**1**	**< 1**
Other Vehicle – From Same Direction/Both Going Straight	1	1	2	1	0	**5**	**1**
Other Vehicle – From Same Direction/Sideswipe Collision	0	0	1	0	0	**1**	**< 1**
Other Vehicle – One Left Turn/Entering At Angle	1	2	1	1	0	**5**	**1**
Other Vehicle – One Right Turn/Entering at Angle	0	2	2	1	0	**5**	**1**
Other Vehicle – From Opposite Direction	0	0	0	3	3	**6**	**1.2**
Other Vehicle – From Opposite Direction/Both Going Straight	0	0	1	1	0	**2**	**< 1**
Fixed Object – Traffic Signal Standard	1	0	0	0	0	**1**	**< 1**
Overturn/Rollover – Left Side of Road	1	0	0	0	0	**1**	**< 1**
Other Vehicle – From Same Direction/One Left Turn	1	0	0	0	0	**1**	**< 1**
Other Vehicle – From Same Direction/Rear End Collision	1	2	0	0	0	**3**	**< 1**
Other Vehicle – From Same Direction/One Right Turn	1	0	0	0	0	**1**	**< 1**
Other Vehicle – From Same Direction/Vehicle Backing	0	1	0	0	0	**1**	**< 1**
Vehicle on Other Roadway – Not Stated	0	0	0	1	0	**1**	**< 1**
Left Blank	4	6	4	6	10	**30**	**6**

Table 2
CARLISLE BOULEVARD WITH PROSPECT AVENUE – CRASH SUMMARY

Year	Type of Crash Frequency						
	2017	2018	2019	2020	2021	Total	Average
Property Damage Only	0	2	3	3	3	**11**	**2.2**
Class A Severity	0	0	0	0	0	**0**	**0**
Class B Severity	0	0	0	1	1	**2**	**< 1**
Class C severity	0	1	0	1	0	**2**	**< 1**
Fatalities	0	0	0	1	0	1	< 1
Total	**0**	**3**	**3**	**6**	**4**	**16**	**3.2**
Other Vehicle – From Opposite Direction/Both Turn Left	0	0	1	0	0	**1**	**< 1**
Other Vehicle – Both Going Straight/Entering At Angle	0	0	1	1	0	**2**	**< 1**
Other Vehicle – From Same Direction/Both Going Straight	0	2	1	0	0	**3**	**< 1**
Other Vehicle – One Left Turn/Entering At Angle	0	1	0	0	0	**1**	**< 1**
Pedestrian Collision – Vehicle Going Straight	0	0	0	1	0	**1**	**< 1**
Other Vehicle – From Opposite Direction	0	0	0	2	0	**2**	**< 1**
Left Blank	0	0	0	2	4	**6**	**1.2**

3. Traffic Characteristics of the Proposed Development

In order to properly evaluate future traffic conditions in the surrounding area, it was necessary to determine the traffic characteristics of the proposed development including the directional distribution and volumes of traffic that it will generate.

Proposed Site and Use Plan

As proposed, Dunkin will be approximately 1,200 square feet in size and will provide double drive-through lanes with stacking for 12 vehicles. A total of 10 parking spaces will serve Dunkin. Five of the parking spaces are located to the east of the proposed building and the remaining five spaces will be located on the east of the site. Access will be provided via two access drives that will serve the site which consist of the following:

- A right-in/right-out access drive off Menaul Boulevard which will be located approximately 105 feet west of Carlisle Boulevard. This access drive will provide one inbound lane and one outbound lane. While the location of this access drive does not meet the City's minimum distance between commercial site access and intersections, the location of this access drive and orientation of the building and drive-through were chosen to provide maximum on-site stacking for drive-through vehicles.

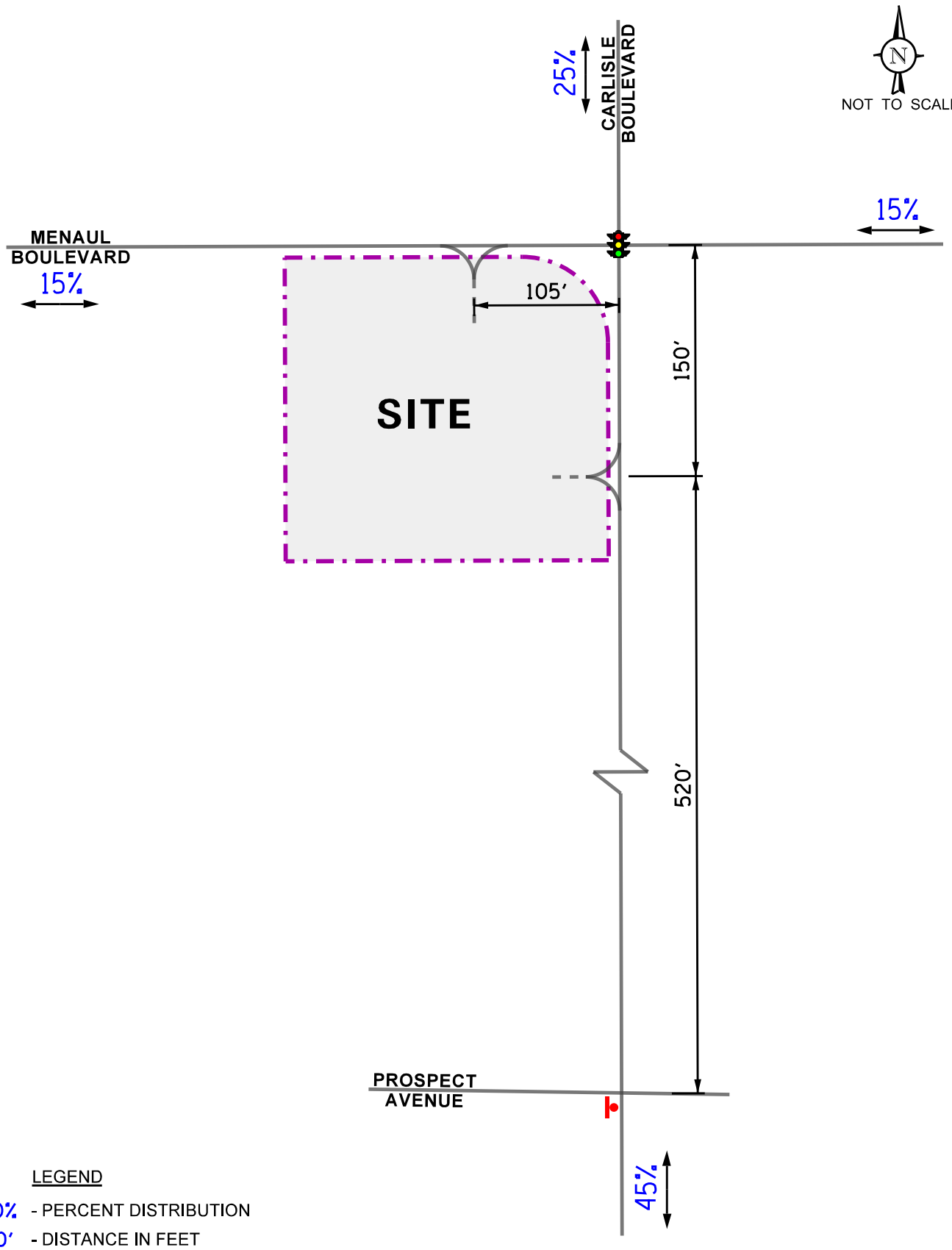
- A right-in/right-out access drive off Carlisle Boulevard which will be located approximately 150 feet south of Menaul Boulevard. This access drive will provide one inbound lane and one outbound lane.

It should be noted that outbound movements from the access drives should be under stop sign control and that turning movements at these access drives will be restricted to right-turn movements only via the raised barrier medians along both Menaul Boulevard and Carlisle Boulevard.

A copy of the proposed site plan is included in the Appendix.

Directional Distribution of Site Traffic

The directional distribution of how traffic will approach and depart the site was estimated based on the general travel patterns through the study area derived from the peak hour traffic volumes, in combination with the population information and socioeconomic forecasts provided by the Mid-Region Council of Governments (MRCOG) for the subareas surrounding the site and in coordination with the estimated directional distribution determined as part of the traffic impact study previously prepared for the 2500 Carlisle Boulevard proposed development. **Figure 5** shows the established directional distribution for the proposed Dunkin and illustrates the distance in feet between the access drives and the existing roadways.



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Directional Distribution

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Job No: 23-159 Figure: 5

Proposed Site Traffic Generation

The estimate of vehicle traffic to be generated by the proposed Dunkin is based upon the proposed land use types and sizes. The vehicle trip generation was calculated using data published in the Institute of Transportation Engineers (ITE) *Trip Generation Manual*, 11th Edition. Land-Use Code 937 (Coffee/Donut Shop with Drive-Through Window) was utilized. The ITE trip generation sheets are included in the Appendix.

It is important to note that surveys conducted by ITE have shown that a percentage of trips made to coffee/donut shops with drive-through lanes are diverted from the existing traffic on the roadway system. This is particularly true during the weekday morning and weekday evening peak hours when traffic is diverted from work-to-lunch and work-to-home trips. Such diverted trips are referred to as "pass-by" trips. Based on information published by ITE for coffee/donut shops, approximately 85 to 95 percent of trips are pass-by trips. However, in order to provide a conservative analysis, only a 70 percent pass-by reduction was applied to the trips estimated to be generated by Dunkin.

Table 3 shows the estimated vehicle trip generation for the weekday morning peak hour, weekday evening peak hour, and daily trips.

Table 3
ESTIMATED PEAK HOUR VEHICLE TRIP GENERATION

ITE Land Use Code	Type/Size	Weekday Morning Peak Hour			Weekday Evening Peak Hour			Daily Two-Way Trips		
		In	Out	Total	In	Out	Total	In	Out	Total
937	Coffee/Donut Shop with Drive-Through (1,200 s.f.)	53	50	103	23	24	47	320	320	640
70% Pass-By Reduction		*-35*	*-35*	*-70*	*-16*	*-16*	*-32*	*-224*	*-224*	*-448*
	Total New Trips	**18**	**15**	**33**	**7**	**8**	**15**	**96**	**96**	**192**

4. Projected Traffic Conditions

The total projected traffic volumes include the base traffic volumes, increase in background traffic due to growth, and the traffic estimated to be generated by the proposed Dunkin.

Development Traffic Assignment

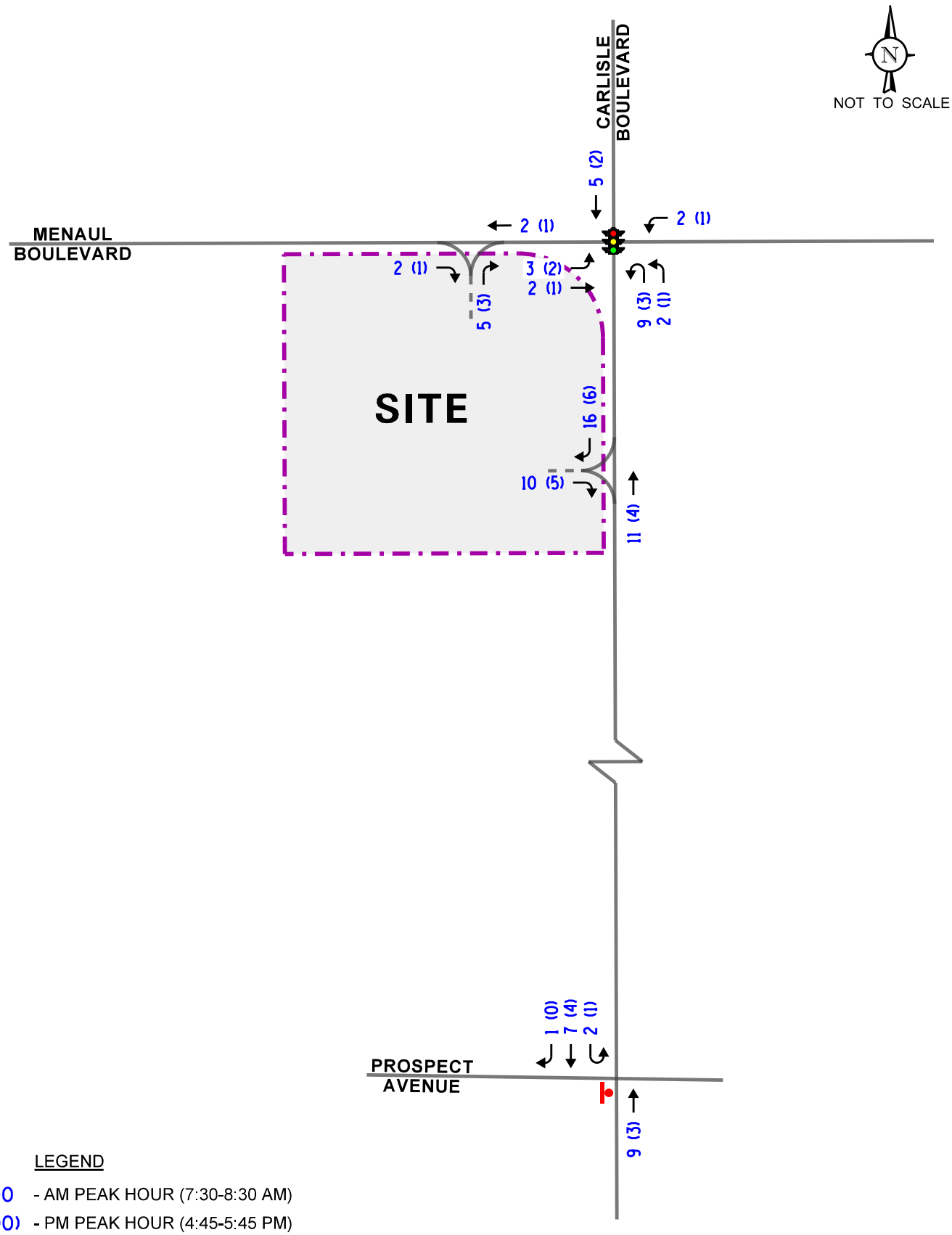
The estimated weekday morning and weekday evening peak hour traffic volumes that will be generated by the proposed Dunkin were assigned to the roadway system in accordance with the previously described directional distribution (Figure 5). **Figure 6** illustrated the traffic assignment of the new passenger vehicle trips and **Figure 7** illustrates the traffic assignment of the pass-by vehicles trips.

Ambient Traffic Growth

The existing traffic volumes were increased by an ambient growth factor of 1.0 percent per year for one year (project completion year) to represent Year 2024 no-build conditions. This background growth was determined from the population information and socioeconomic forecasts provided by the Mid-Region Council of Governments (MRCOG) for the subareas surrounding the site and in coordination with the estimated background growth as determined as part of the traffic impact study previously prepared for the 2500 Carlisle Boulevard proposed development. Furthermore, the peak hour trips anticipated to be generated by the proposed mixed-use development to be located at 2500 Carlisle Boulevard was included in the Year 2024 no-build traffic volumes, to provide a conservative analysis. **Figure 8** shows the Year 2024 no-build traffic volumes.

Year 2024 Total Projected Traffic Volumes

The new and pass-by development-generated traffic (Figures 6 and 7) was added to the no-build traffic volumes (Figure 8) to determine the Year 2024 total projected traffic volumes. These volumes are illustrated in **Figure 9**.



LEGEND

00 - AM PEAK HOUR (7:30-8:30 AM)

(00) - PM PEAK HOUR (4:45-5:45 PM)

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Site-Generated Traffic Volumes
New Trips

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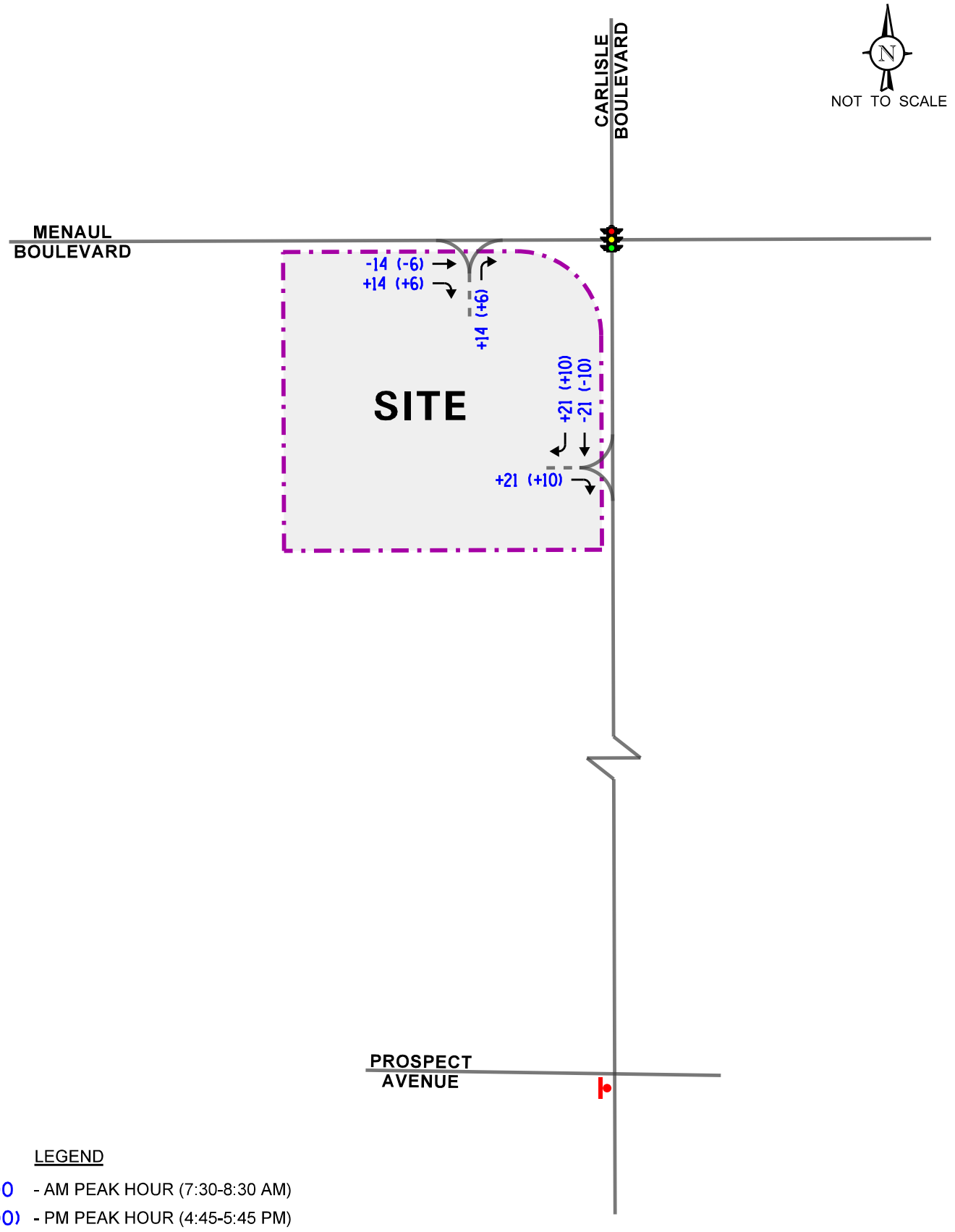

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Pass-By Traffic Volumes

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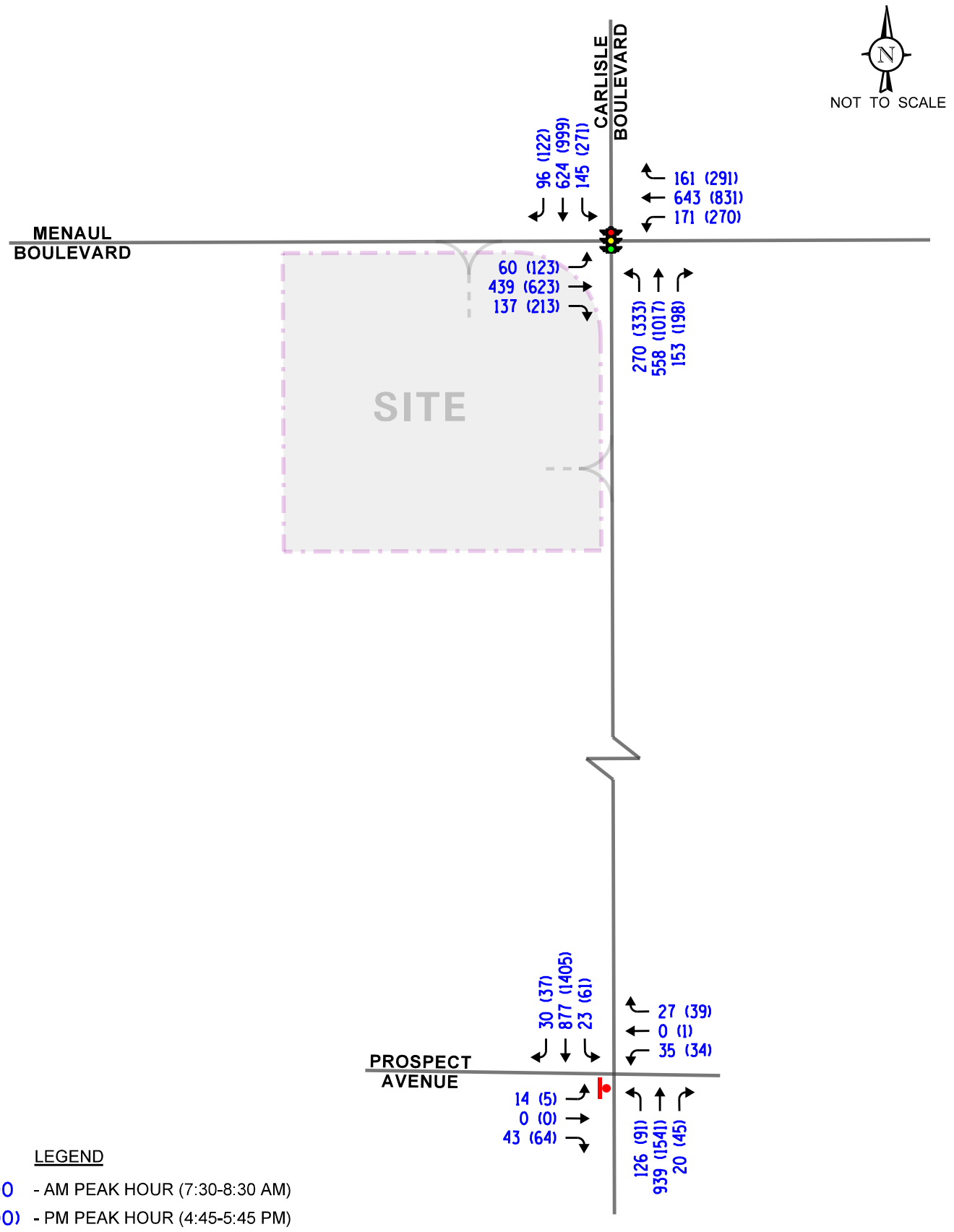
Job No: 23-159 Figure: 7



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Year 2024 No-Build Traffic Volumes

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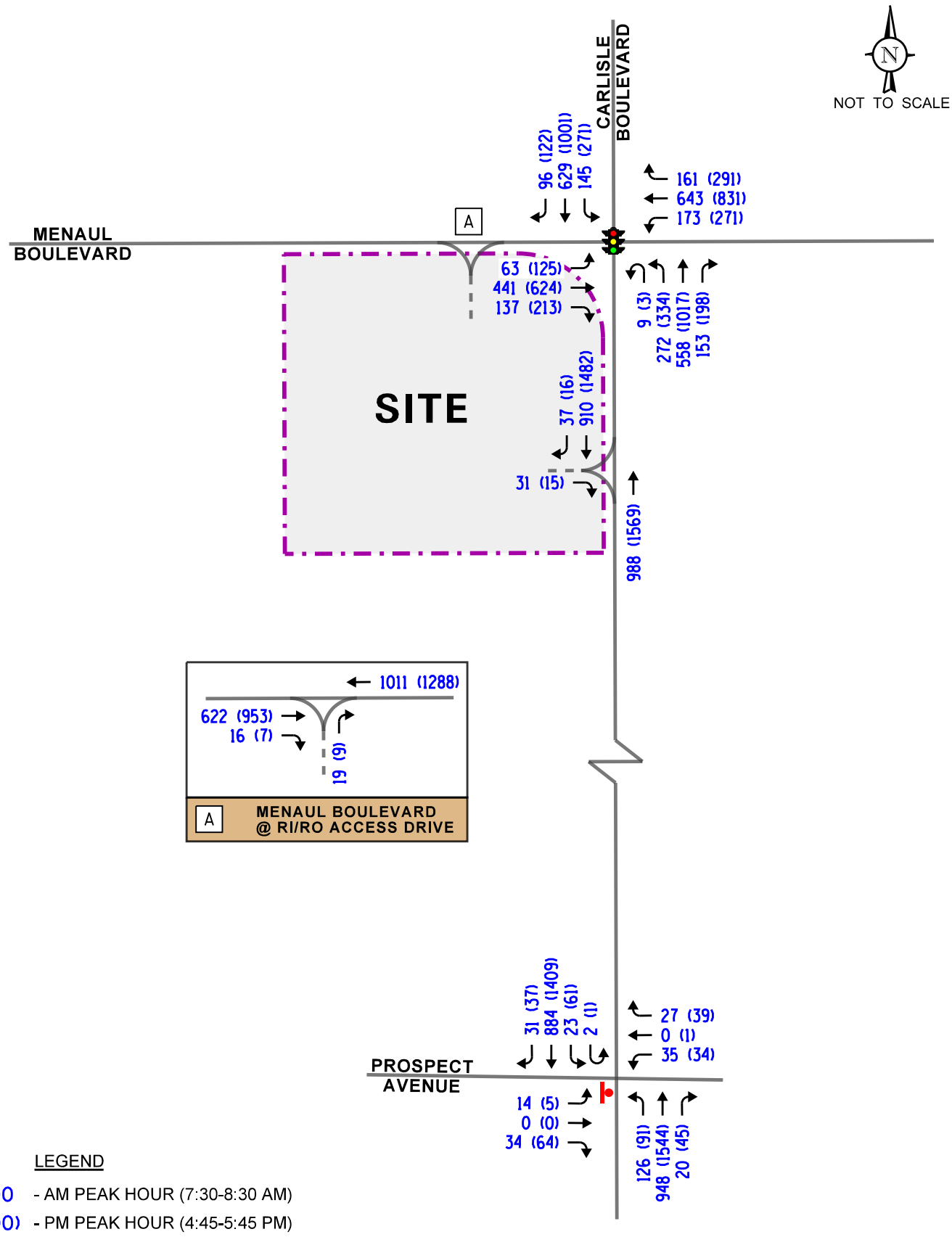

Dunkin Drive-Through
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Year 2024 Total Traffic Volumes

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Job No: 23-159 Figure: 9

5. Traffic Analysis and Recommendations

The following provides an evaluation conducted for the weekday morning and weekday evening peak hours. The analysis includes conducting capacity analyses to determine how well the roadway system and access drives are projected to operate and whether any roadway improvements or modifications are required.

Traffic Analyses

Intersection analyses were performed for the weekday morning and weekday evening peak hours for the existing, no-build (Year 2024), and total projected (Year 2024) traffic volumes.

The traffic analyses were performed using the methodologies outlined in the Transportation Research Board's *Highway Capacity Manual (HCM)*, 6th Edition and analyzed using Synchro/SimTraffic 11 software. The analysis for the signalized intersection of Menaul Boulevard with Carlisle Boulevard was accomplished utilized actual cycle lengths and phasings.

The analyses for the unsignalized intersections determine the average control delay to vehicles at an intersection. Control delay is the elapsed time from a vehicle joining the queue at a stop sign (includes the time required to decelerate to a stop) until its departure from the stop sign and resumption of free flow speed. The methodology analyzes each intersection approach controlled by a stop sign and considers traffic volumes on all approaches and lane characteristics.

The ability of an intersection to accommodate traffic flow is expressed in terms of level of service, which is assigned a letter from A to F based on the average control delay experienced by vehicles passing through the intersection. The *Highway Capacity Manual* definitions for levels of service and the corresponding control delay for signalized intersections and unsignalized intersections are included in the Appendix of this report.

Summaries of the traffic analysis results showing the level of service, overall intersection delay (measured in seconds), volume-to-capacity ratios, and 95th percentile queues for the existing, no-build, and Year 2024 total projected conditions are presented in **Tables 4** through **11**. A discussion of the intersections follows. Summary sheets for the capacity analyses are included in the Appendix.

Table 4
CAPACITY ANALYSIS RESULTS – SIGNALIZED – MENAUL BOULEVARD WITH CARLISLE BOULEVARD

	Peak Hour	Eastbound		Westbound		Northbound		Southbound		Overall
		L	T/R	L	T/R	L	T/R	L	T/R	
Existing Conditions	Weekday Morning	D 51.4	C 28.4	D 52.4	C 28.1	E 56.4	C 26.5	D 52.2	C 30.7	C 33.2
		C – 30.6		C – 32.2		C – 34.8		C – 34.4		
	Weekday Evening	E 57.4	C 31.7	E 60.1	C 32.2	E 69.2	D 45.6	E 60.8	D 44.6	D 43.5
		C – 35.0		D – 37.4		D – 50.7		D – 47.8		
No-Build Conditions	Weekday Morning	D 51.5	C 28.6	D 52.6	C 28.2	E 57.4	C 27.0	D 52.1	C 31.1	C 33.5
		C – 30.7		C – 32.4		D – 35.4		C – 34.6		
	Weekday Evening	E 57.4	C 32.0	E 60.9	C 32.4	E 71.2	D 47.9	E 61.0	D 45.9	D 44.7
		D – 35.2		D – 37.9		D – 52.9		D – 48.9		
Projected Conditions	Weekday Morning	D 51.6	C 28.7	D 52.6	C 28.2	E 58.4	C 27.0	D 52.1	C 31.3	C 33.8
		C – 31.0		C – 32.5		D – 35.9		C – 34.7		
	Weekday Evening	E 57.4	C 32.0	E 61.0	C 32.4	E 71.9	D 47.9	E 61.0	D 46.1	D 44.8
		D – 35.3		D – 38.0		D – 53.1		D – 49.0		

Letter denotes Level of Service L – Left Turn R – Right Turn
Delay is measured in seconds. T – Through

Table 5
CAPACITY ANALYSIS RESULTS – SIGNALIZED – MENAUL BOULEVARD WITH CARLISLE BOULEVARD
V/C RATIO (95TH PERCENTILE QUEUE)

	Peak Hour	Eastbound		Westbound		Northbound		Southbound	
		L	T/R	L	T/R	L	T/R	L	T/R
Existing Conditions	Weekday Morning	0.29 (44)	0.43 (156)	0.52 (96)	0.50 (218)	0.71 (145)	0.43 (178)	0.50 (86)	0.50 (197)
	Weekday Evening	0.46 (82)	0.54 (238)	0.69 (154)	0.66 (331)	0.84 (209)	0.85 (399)	0.71 (159)	0.81 (368)
No-Build Conditions	Weekday Morning	0.29 (44)	0.44 (158)	0.54 (100)	0.51 (221)	0.73 (151)	0.45 (190)	0.50 (87)	0.51 (204)
	Weekday Evening	0.47 (82)	0.55 (242)	0.71 (160)	0.67 (336)	0.86 (220)	0.88 (442)	0.72 (161)	0.84 (381)
Projected Conditions	Weekday Morning	0.30 (46)	0.45 (159)	0.54 (102)	0.51 (221)	0.75 (157)	0.45 (190)	0.50 (87)	0.52 (205)
	Weekday Evening	0.47 (84)	0.55 (243)	0.72 (161)	0.67 (336)	0.87 (223)	0.88 (442)	0.72 (161)	0.84 (381)

Queue length is measured in feet. L – Left Turn T – Through R – Right Turn

Table 6
CAPACITY ANALYSIS RESULTS – EXISTING CONDITIONS

Intersection	Weekday Morning Peak Hour		Weekday Evening Peak Hour	
	LOS	Delay	LOS	Delay
Carlisle Boulevard with Prospect Avenue/BLVD 2500 Access Drive[1]				
• Eastbound Approach	C	17.4	C	24.0
• Westbound Approach	C	17.1	C	23.2
• Northbound Left Turn	C	17.2	D	32.8
• Southbound Left Turn	A	9.1	B	10.8

LOS = Level of Service
Delay is measured in seconds.
1 – Two-way stop control.

Table 7
CAPACITY ANALYSIS RESULTS – EXISTING CONDITIONS
V/C RATIO (95TH PERCENTILE QUEUE)

Intersection	Weekday Morning Peak Hour		Weekday Evening Peak Hour	
	V/C Ratio	95th Queues (ft)	V/C Ratio	95th Queues (ft)
Carlisle Boulevard with Prospect Avenue/BLVD 2500 Access Drive[1]				
• Eastbound Approach	0.170	15	0.275	28
• Westbound Approach	0.040	3	0.122	10
• Northbound Left Turn	0.307	33	0.427	50
• Southbound Left Turn	0.001	0	0.044	3

LOS = Level of Service
Delay is measured in seconds.
1 – Two-way stop control.

Table 8
CAPACITY ANALYSIS RESULTS – NO-BUILD CONDITIONS

Intersection	Weekday Morning Peak Hour		Weekday Evening Peak Hour	
	LOS	Delay	LOS	Delay
Carlisle Boulevard with Prospect Avenue/BLVD 2500 Access Drive[1]				
• Eastbound Approach	C	18.7	D	26.5
• Westbound Approach	C	19.7	E	41.5
• Northbound Left Turn	C	17.5	D	33.9
• Southbound Left Turn	A	9.4	B	11.2

LOS = Level of Service
Delay is measured in seconds.
1 – Two-way stop control.

Table 9
CAPACITY ANALYSIS RESULTS – NO-BUILD CONDITIONS
V/C RATIO (95TH PERCENTILE QUEUE)

Intersection	Weekday Morning Peak Hour		Weekday Evening Peak Hour	
	V/C Ratio	95th Queues (ft)	V/C Ratio	95th Queues (ft)
Carlisle Boulevard with Prospect Avenue/BLVD 2500 Access Drive[1]				
• Eastbound Approach	0.185	18	0.304	30
• Westbound Approach	0.209	20	0.448	53
• Northbound Left Turn	0.313	33	0.439	53
• Southbound Left Turn	0.028	3	0.100	8

Queue length is measured in feet.
1 – Two-way stop control.

Table 10
CAPACITY ANALYSIS RESULTS – PROJECTED CONDITIONS

Intersection	Weekday Morning Peak Hour		Weekday Evening Peak Hour	
	LOS	Delay	LOS	Delay
Carlisle Boulevard with Prospect Avenue/BLVD 2500 Access Drive[1]				
• Eastbound Approach	C	18.0	D	26.8
• Westbound Approach	C	18.6	E	41.8
• Northbound Left Turn	C	17.6	D	34.1
• Southbound Left Turn	A	9.2	B	11.2
Menaul Boulevard with Proposed Right-In/Right-Out Access Drive[2]				
• Northbound Approach	B	11.6	B	13.3
Carlisle Boulevard with Proposed Right-In/Right-Out Access Drive[2]				
• Eastbound Approach	B	13.7	C	18.1

LOS = Level of Service
Delay is measured in seconds.
1 – Two-way stop control.
2 – One-way stop control.

Table 11
CAPACITY ANALYSIS RESULTS – PROJECTED CONDITIONS
V/C RATIO (95TH PERCENTILE QUEUE)

Intersection	Weekday Morning Peak Hour		Weekday Evening Peak Hour	
	V/C Ratio	95th Queues (ft)	V/C Ratio	95th Queues (ft)
Carlisle Boulevard with Prospect Avenue/BLVD 2500 Access Drive[1]				
• Eastbound Approach	0.177	15	0.306	25
• Westbound Approach	0.196	18	0.450	50
• Northbound Left Turn	0.316	33	0.441	50
• Southbound Left Turn	0.030	3	0.101	8
Menaul Boulevard with Proposed Right-In/Right-Out Access Drive[2]				
• Northbound Approach	0.035	3	0.021	3
Carlisle Boulevard with Proposed Right-In/Right-Out Access Drive[2]				
• Eastbound Approach	0.073	5	0.054	5

Queue length is measured in feet.
1 – Two-way stop control.
2 – One-way stop control.

Discussion and Recommendations

The following summarizes how the intersections are projected to operate and identifies any roadway and traffic control improvements necessary to accommodate the site-generated traffic.

Menaul Boulevard with Carlisle Boulevard

The results of the capacity analysis indicate that overall this intersection currently operates at Level of Service (LOS) C during the weekday morning peak hour and LOS D during the weekday evening peak hour. All the approaches currently operate at LOS C or D during the peak hours. It should be noted that the northbound left-turn movement currently operates at LOS E during the weekday morning peak hour and all four left-turn movements operate at LOS E during the weekday evening peak hour.

Under Year 2024 no-build and total projected conditions, the intersection is projected to continue operating at LOS C during the weekday morning peak hour and LOS D during the weekday evening peak hour with increases in delay of less than two seconds. All the approaches are projected to operate at LOS C or D during the peak hours with increases in delay of less than three seconds.

The 95th percentile queue for the eastbound through movement is projected to be approximately 240 feet during the weekday evening peak hour that will extend back to the proposed right-in/right-out access drive on Menaul Boulevard but a review of the traffic simulation showed that the queue will clear the intersection during one cycle. The 95th percentile queue for the northbound approach is projected to be approximately 225 feet which is an increase of one vehicle over no-build conditions and will continue to be accommodated with the left-turn lane storage provided. The 95th percentile queues for the westbound approach are projected to be approximately 160 feet which is an increase of one vehicle over no-build conditions and will continue to be provided within the left-turn lane storage provided.

Overall, the proposed Dunkin is only projected to increase the volume of traffic traversing this intersection by less than one percent during both peak hours. As such, this intersection has adequate reserve capacity to accommodate the traffic estimated to be generated by the proposed Dunkin Drive-Through and no roadway improvement or traffic control adjustments will be required.

Carlisle Boulevard with Prospect Avenue/BLVD 2500 Access Drive

The results of the capacity analysis indicate that the eastbound and westbound approach currently operates at LOS C during the weekday morning and weekday evening peak hour. The northbound and southbound left-turn movements operate at LOS C or better during the peak hours except for the northbound left-turn movement that operates at LOS D during the weekday evening peak hour.

Under Year 2024 no-build conditions, the eastbound approach is projected to operate at LOS C during the weekday morning peak hour and LOS D during the weekday evening peak hour with increases in delay of less than three seconds while the westbound approach is projected to operate at LOS C during the weekday morning peak hour and LOS E during the weekday evening peak hour with increases in delay of less than three seconds and less than 19 seconds, respectively. The northbound and southbound left-turn movements are projected to continue operating at the same existing levels of service during the peak hour with increases in delay of less than two seconds.

Under Year 2024 total projected conditions, the eastbound is projected to continue to operate at LOS C during the weekday morning peak hour and LOS D during the weekday evening peak hour as in no-build conditions. In addition, the westbound approach is projected to continue to operate at LOS C during the weekday morning peak hour and LOS E during the weekday evening peak hour as under no-build conditions. The northbound and southbound left-turn movements are projected to continue operating at no-build levels of service during the peak hours with increases in delay of less than one second. The 95th percentile queues for the northbound and southbound left-turn movements are projected to be approximately two vehicles that can be accommodated within the existing left-turn lanes at this intersection. As such, this intersection has adequate reserve capacity to accommodate the traffic estimated to be generated by the proposed Dunkin and no roadway improvements or traffic control adjustments will be required.

Menaul Boulevard with Proposed Right-In/Right-Out Access Drive

The results of the capacity analysis indicate that the northbound approach is projected to operate at LOS B during the weekday morning and weekday evening peak hours. As such, this access drive will be adequate to accommodate the traffic estimated to be generated by the proposed Dunkin Drive-Through and will provide efficient and flexible access to the site.

Carlisle Boulevard with Proposed Right-In/Right-Out Access Drive

The results of the capacity analysis indicate the eastbound approach is projected to operate at LOS B during the weekday morning peak hour and LOS C during the weekday evening peak hour. As such, this access drive will be adequate to accommodate the traffic estimated to be generated by the proposed Dunkin Drive-Through and will provide efficient and flexible access to the site.

On-Site Circulation and Drive-Through Stacking

Based on a review of the site plan, vehicles will enter the drive-through lanes on the northwest corner of the site then travel south along the west side of the site and make a left turn towards the pick-up window located on the southwest corner of the building. Vehicles will then exit the drive-through from the southeast corner of the building and will be able to proceed either left to the access drive on Menaul Boulevard or continue east to the access drive on Carlisle Boulevard.

A stop sign should be provided for outbound movements from the drive-through onto the main circulation drive aisles and a “Do Not Enter” sign should be provided at the drive-through exit facing west.

Based on the site plan, the drive-through facility will provide stacking for approximately four vehicles before the ordering boards and eight vehicles from the dual order boards to the pick-up window for a total of 12 stacked vehicles.

Observations conducted by KLOA, Inc. at existing coffee shops in the Chicagoland area indicated the following:

- During the weekday morning peak period (6:30 A.M. to 9:00 A.M.), an average queue of seven vehicles and a maximum queue of 12 vehicles were observed.

- During the weekday evening peak period (4:00 P.M. to 6:30 P.M.), an average queue of one vehicle and a maximum queue of two vehicles were observed.

As such, the proposed stacking for 12 vehicles will be adequate in accommodating the average and peak drive-through stacking anticipated for the coffee shop. However, it should be noted that final approval of the the on-site circulation and drive-through stacking is dependent on the City's TCL review and acceptance

6. Conclusion

Based on the proceeding analyses and recommendations, the following conclusions have been made:

- The proposed Dunkin will be located at 3520 Menaul Boulevard NE and will be an approximately 1,200 square-foot building providing a drive-through that will accommodate 12 vehicles and a parking lot with 10 parking spaces.

- Access to the site will be provided via the two right-in/right-out access drives with one located off Menaul Boulevard and the second located off Carlisle Boulevard.

- The volume of traffic estimated to be generated by Dunkin will be reduced due to the volume of pass-by trips anticipated to be diverted from the existing traffic on the roadways.

- The access drives are projected to be adequate in accommodating the traffic estimated to be generated by Dunkin and will provide flexible and efficient access to the site.

- As part of the proposed development, stop signs should be provided for outbound traffic from both access drives.

- The drive-through stacking of 12 vehicles will be adequate in accommodating the peak drive-through activity for the coffee shop. This layout is dependent on the TCL approval by the City.

- Parking for the site shall comply with the City's IDO parking requirements.

- While the proposed access drive on Menaul Boulevard is less than 300 feet from Carlisle Boulevard, the location of this access was chosen to provide maximum on-site stacking for drive-through vehicles and the location of the drive-through prohibits the ability to provide cross access to the west.

Appendix

TIS Scoping Form
Traffic Count Summary Sheets
Site Plan
ITE Trip Generation Summary Sheets
Level of Service Criteria
Capacity Analysis Summary Sheets

TIS Scoping Form

SCOPE OF TRAFFIC IMPACT STUDY (TIS)

TO: Brendan May, PE, PTOE
KLOA, Inc.
9575 W. Higgins Road, Suite 400
Rosemont, Illinois 60018

MEETING DATE: Wednesday, April 26, 2023 – Was a virtual meeting held

ATTENDEES: Matthew Grush, P.E. (City of Albuquerque), Brendan May, PE, PTOE (KLOA, Inc.), Luay Aboona, PE, PTOE (KLOA, Inc.) , Jeff Wooten, PE, LEED AP (Wooten Engineering, LLC)

PROJECT: Dunkin Donuts (3520 Menaul Boulevard NE)

REQUESTED CITY ACTION: ___ Zone Change _X_ Site Development Plan

___ Subdivision ___ Building Permit ___ Sector Plan ___ Sector Plan Amendment

___ Curb Cut Permit ___ Conditional Use ___ Annexation ___ Site Plan Amendment

ASSOCIATED APPLICATION: Coffee Shop with Drive-Through Window (1,200 s.f.)

SCOPE OF REPORT:
The Traffic Impact Study should follow the standard report format, which is outlined in the DPM. The following supplemental information is provided for the preparation of this specific study.

1. Trip Generation - Use Trip Generation Manual, 11th Edition.

2. Appropriate study area:
   Signalized Intersections; N/A
   a. Carlisle Boulevard NE with Menaul Boulevard NE

   Unsignalized Intersections;
   b. Carlisle Boulevard NE with Prospect Avenue NE

   Driveway Intersections: all site drives.- confirmed

3. Intersection turning movement counts
   Study Time – 7-9 a.m. peak hour, 4-6 p.m. peak hour
   Consultant to provide for all intersections listed above.

4. Type of intersection progression and factors to be used.
   Information to be determined from the results of the traffic counts

5. Boundaries of area to be used for trip distribution.
   2 mile radius – commercial;

6. Basis for trip distribution.

Commercial - Use relationship based upon population. Use population data from 2040 Socioeconomic Forecasts, MRCOG – See MRCOG website for most current data.
Commercial -
Ts = (Tt) (Sp) / (Sp)
Ts = Development to Individual Subarea Trips
Tt = Total Trips
Sp = Subarea Population

7. Traffic Assignment. Logical routing on the major street system.

8. Proposed developments which have been approved but not constructed that are to be Included in the analyses. Projects in the area include: 2500 Carlisle Boulevard

9. Method of intersection capacity analysis - planning or operational (see "2016 Highway Capacity Manual" or equivalent [i.e. HCS, Synchro, Teapac, etc.] as approved by staff). Must use latest version of design software and/or current edition of design manual.
   Implementation Year: 2024

10. Traffic conditions for analysis:
    a. Existing analysis X yes __ no - year (2023);
    b. Phase implementation year(s) without proposed development – N/A
    c. Phase implementation year(s) with proposed development – N/A
    d. Project completion year without proposed development – 2025
    e. Project completion year with proposed development – 2025
    f. Other –

11. Background traffic growth.
    Method: use 10-year historical growth based on standard data from the MRCOG Traffic Flow Maps. Minimum growth rate to be used is 1/2%.

12. Planned (programmed) traffic improvements.
    List planned CIP improvements in study area and projected project implementation year:
    a. N/A

13. Items to be included in the study:
    a. Intersection analysis. Yes
    b. Signal progression - An analysis is required if the driveway analysis indicates a traffic signal is possibly warranted. Analysis Method: N/A
    c. Arterial LOS analysis; N/A
    d. Recommended street, intersection and signal improvements. Yes
    e. Site design features such as turning lanes, median cuts, queuing requirements and site circulation, including driveway signalization and visibility. Yes
    f. Transportation system impacts.
    g. Other mitigating measures. Yes
    h. Accident analyses X yes __ no; Location(s): Carlisle Boulevard with Menaul Boulevard and Carlisle with Prospect avenue (5 years)
    i. Weaving analyses __ yes X no; Location(s): N/A

14. Other: N/A

S**UBMITTAL REQUIREMENTS:**

1. Number of copies of report required
   a. 1 digital copy
2. Submittal Fee – $1300 for up to 3 reviews plus technology fee

The Traffic Impact Study for this development proposal, project name, shall be performed in accordance with the above criteria. If there are any questions regarding the above items, please contact me at 505-924-3362.

P.E. 6/13/2023

Matt Grush, P.E. Date
Senior Engineer
City of Albuquerque, Planning
Transportation Development Section

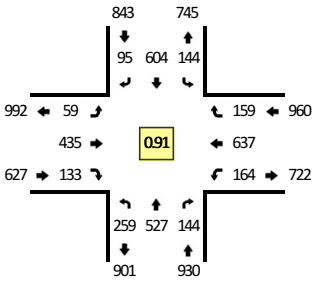
via: email
C: TIS Task Force Attendees, file

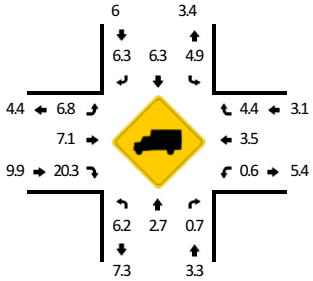
Traffic Count Summary Sheets

Type of peak hour being reported: System-wide Peak | Method for determining peak hour: Total Entering Volume

LOCATION: Carlisle Blvd NE -- Menaul Blvd NE | **QC JOB #:** 16204828
CITY/STATE: Albuquerque, NM | **DATE:** Tue, May 23 2023

Peak-Hour: 7:30 AM -- 8:30 AM
Peak 15-Min: 7:45 AM -- 8:00 AM





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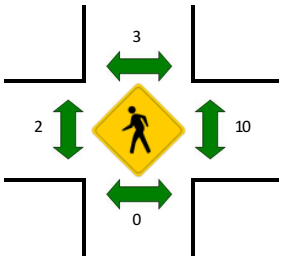

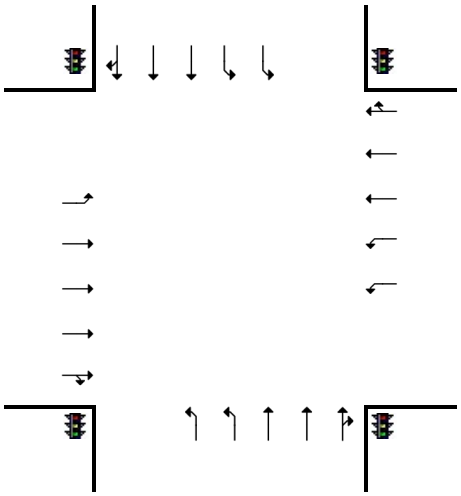

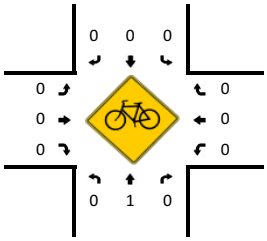

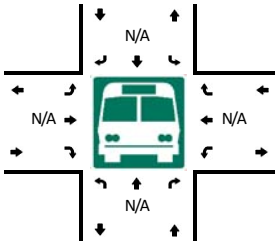

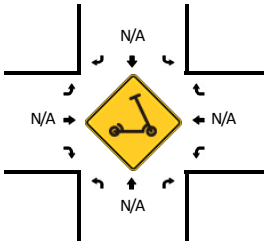

15-Min Count Period Beginning At	Carlisle Blvd NE (Northbound)				Carlisle Blvd NE (Southbound)				Menaul Blvd NE (Eastbound)				Menaul Blvd NE (Westbound)				Total	Hourly Totals
	Left	Thru	Right	U	Left	Thru	Right	U	Left	Thru	Right	U	Left	Thru	Right	U		
7:00 AM	40	113	22	0	23	87	17	0	5	69	19	0	18	74	27	0	514	
7:15 AM	54	100	22	0	28	105	15	0	10	70	28	0	24	115	25	0	596	
7:30 AM	69	134	28	0	23	140	23	2	14	104	27	0	36	153	44	0	797	
7:45 AM	56	119	34	0	44	167	31	0	15	130	40	1	40	209	41	0	927	2834
8:00 AM	73	131	40	0	47	142	20	0	13	107	33	1	44	152	37	0	840	3160
8:15 AM	60	143	42	1	28	155	21	0	15	94	33	0	43	123	37	1	796	3360
8:30 AM	51	136	27	1	37	140	21	0	8	116	43	1	37	116	40	0	774	3337
8:45 AM	64	153	46	2	36	132	20	0	19	129	43	0	31	102	32	1	810	3220

Peak 15-Min Flowrates	Northbound				Southbound				Eastbound				Westbound				Total
	Left	Thru	Right	U	Left	Thru	Right	U	Left	Thru	Right	U	Left	Thru	Right	U	
All Vehicles	224	476	136	0	176	668	124	0	60	520	160	4	160	836	164	0	3708
Heavy Trucks	12	8	0		0	40	12		0	28	28		4	12	4		148
Buses																	
Pedestrians		0				0				4				4			8
Bicycles	0	0	0		0	0	0		0	0	0		0	0	0		0
Scooters																	

Comments:

Report generated on 8/16/2023 1:56 PM | SOURCE: Quality Counts, LLC (http://www.qualitycounts.net) 1-877-580-2212

Type of peak hour being reported: System-wide Peak | Method for determining peak hour: Total Entering Volume

LOCATION: Carlisle Blvd NE -- Menaul Blvd NE
CITY/STATE: Albuquerque, NM

QC JOB #: 16204829
DATE: Mon, May 22 2023

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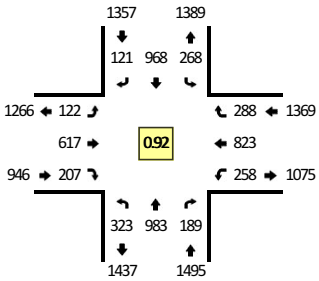
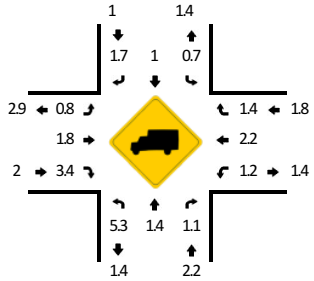
Peak 15-Min: 5:15 PM -- 5:30 PM





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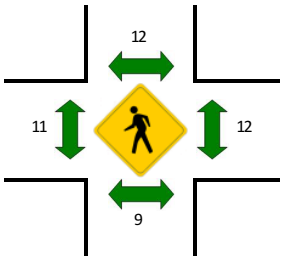

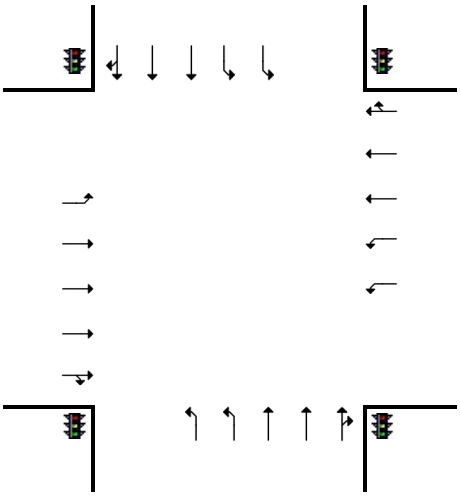

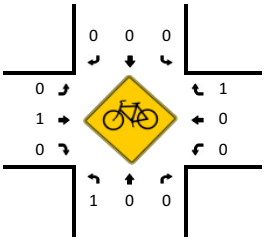

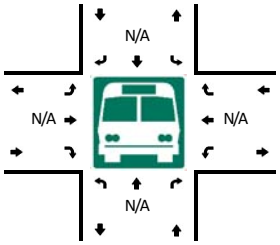

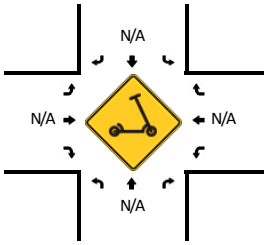

15-Min Count Period Beginning At	Carlisle Blvd NE (Northbound)				Carlisle Blvd NE (Southbound)				Menaul Blvd NE (Eastbound)				Menaul Blvd NE (Westbound)				Total	Hourly Totals
	Left	Thru	Right	U	Left	Thru	Right	U	Left	Thru	Right	U	Left	Thru	Right	U		
4:00 PM	61	168	39	1	70	228	15	2	11	184	49	0	51	164	86	0	1129	
4:15 PM	49	210	57	1	75	255	21	0	20	154	38	1	63	178	62	0	1184	
4:30 PM	61	190	46	0	65	212	20	0	26	198	59	1	55	168	75	0	1176	
4:45 PM	62	247	63	0	61	233	33	0	38	153	50	1	70	165	66	0	1242	4731
5:00 PM	88	235	35	2	71	225	31	0	27	178	57	1	66	210	86	0	1312	4914
5:15 PM	78	282	56	2	81	286	28	0	26	159	55	1	51	236	57	1	1399	5129
5:30 PM	90	219	35	1	55	224	29	0	27	127	45	1	70	212	79	0	1214	5167
5:45 PM	84	234	44	0	60	206	30	1	26	146	37	2	65	148	78	2	1163	5088

Peak 15-Min Flowrates	Northbound				Southbound				Eastbound				Westbound				Total
	Left	Thru	Right	U	Left	Thru	Right	U	Left	Thru	Right	U	Left	Thru	Right	U	
All Vehicles	312	1128	224	8	324	1144	112	0	104	636	220	4	204	944	228	4	5596
Heavy Trucks	20	8	4		0	12	0		0	16	12		4	24	0		100
Buses																	
Pedestrians		4				8				12				12			36
Bicycles	0	0	0		0	0	0		0	0	0		0	0	0		0
Scooters																	

Comments:

Report generated on 8/16/2023 2:00 PM

SOURCE: Quality Counts, LLC (http://www.qualitycounts.net) 1-877-580-2212

Type of peak hour being reported: System-wide Peak | Method for determining peak hour: Total Entering Volume

LOCATION: Carlisle Blvd NE -- Prospect Ave NE/Apartment Dwy | **QC JOB #:** 16204830
CITY/STATE: Albuquerque, NM | **DATE:** Tue, May 23 2023

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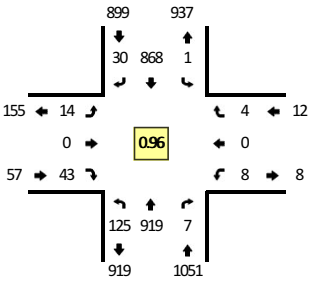
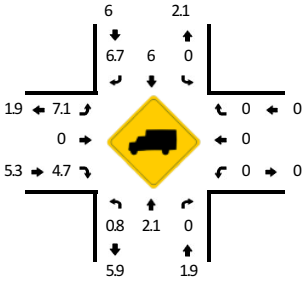
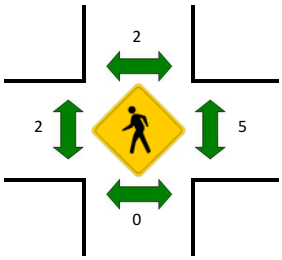
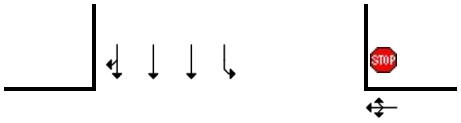
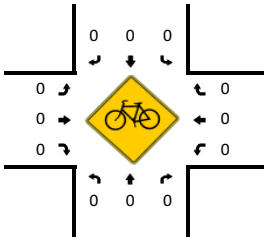
Peak 15-Min: 7:45 AM -- 8:00 AM

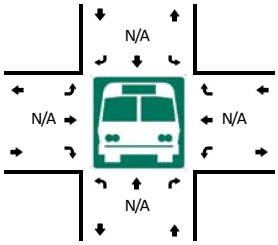


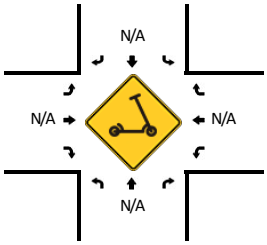












15-Min Count Period Beginning At	Carlisle Blvd NE (Northbound)				Carlisle Blvd NE (Southbound)				Prospect Ave NE/Apartment Dwy (Eastbound)				Prospect Ave NE/Apartment Dwy (Westbound)				Total	Hourly Totals
	Left	Thru	Right	U	Left	Thru	Right	U	Left	Thru	Right	U	Left	Thru	Right	U		
7:00 AM	11	165	1	0	0	129	2	0	1	0	6	0	6	0	2	0	323	
7:15 AM	27	172	3	0	1	154	3	0	3	0	10	0	5	0	2	0	380	
7:30 AM	18	234	2	0	0	192	10	0	2	0	7	0	0	0	2	0	467	
7:45 AM	33	220	3	0	0	243	7	0	5	0	11	0	3	0	0	0	525	1695
8:00 AM	36	234	1	0	0	214	5	0	3	0	11	0	0	0	1	0	505	1877
8:15 AM	38	231	1	0	1	219	8	0	4	0	14	0	5	0	1	0	522	2019
8:30 AM	23	208	2	1	1	222	5	0	5	0	14	0	1	0	1	0	483	2035
8:45 AM	20	274	2	1	4	199	5	0	4	0	10	0	2	0	1	0	522	2032

Peak 15-Min Flowrates	Northbound				Southbound				Eastbound				Westbound				Total
	Left	Thru	Right	U	Left	Thru	Right	U	Left	Thru	Right	U	Left	Thru	Right	U	
All Vehicles	132	880	12	0	0	972	28	0	20	0	44	0	12	0	0	0	2100
Heavy Trucks	0	8	0		0	64	0		4	0	0		0	0	0		76
Buses																	
Pedestrians		0				4				0				8			12
Bicycles	0	0	0		0	0	0		0	0	0		0	0	0		0
Scooters																	

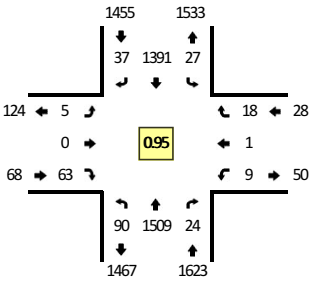
Comments:

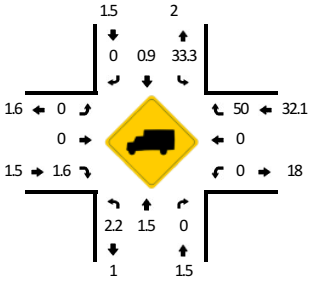
Report generated on 8/16/2023 1:56 PM | SOURCE: Quality Counts, LLC (http://www.qualitycounts.net) 1-877-580-2212

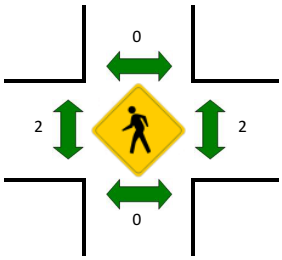
Type of peak hour being reported: System-wide Peak | Method for determining peak hour: Total Entering Volume

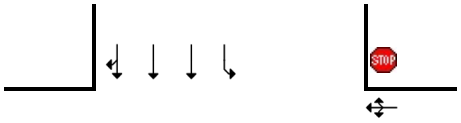
LOCATION: Carlisle Blvd NE -- Prospect Ave NE/Apartment Dwy | **QC JOB #:** 16204831
CITY/STATE: Albuquerque, NM | **DATE:** Mon, May 22 2023

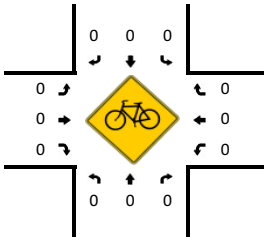
Peak-Hour: 4:45 PM -- 5:45 PM
Peak 15-Min: 5:15 PM -- 5:30 PM

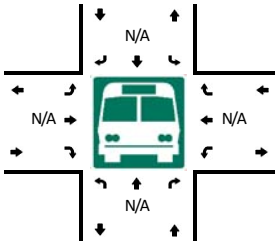


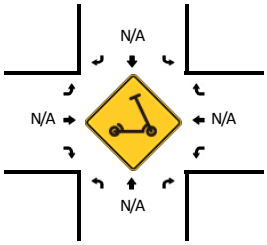












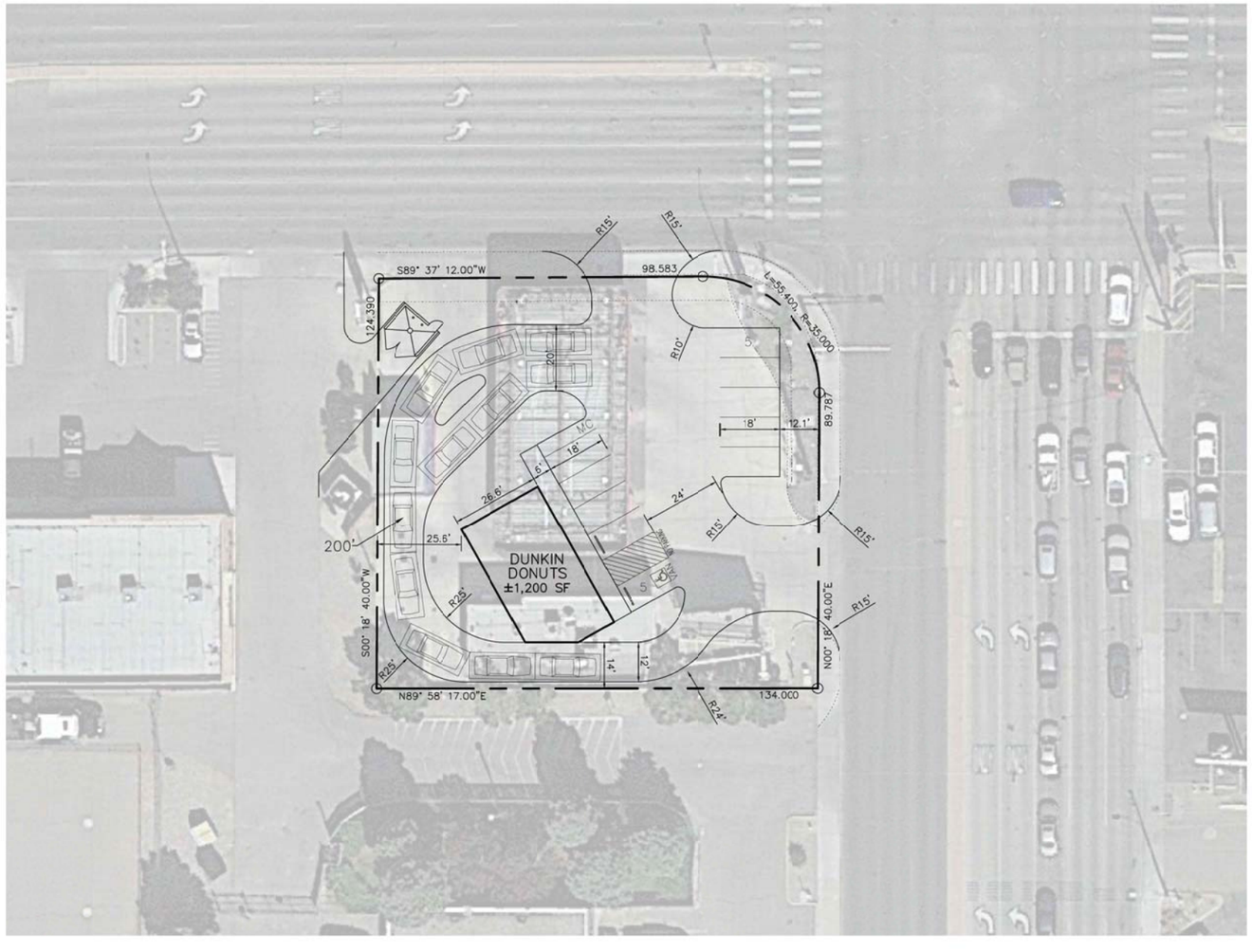
15-Min Count Period Beginning At	Carlisle Blvd NE (Northbound)				Carlisle Blvd NE (Southbound)				Prospect Ave NE/Apartment Dwy (Eastbound)				Prospect Ave NE/Apartment Dwy (Westbound)				Total	Hourly Totals
	Left	Thru	Right	U	Left	Thru	Right	U	Left	Thru	Right	U	Left	Thru	Right	U		
4:00 PM	14	294	2	1	6	325	7	0	3	0	14	0	2	0	3	0	671	
4:15 PM	23	279	4	0	4	340	6	1	4	0	20	0	1	0	4	0	686	
4:30 PM	20	321	11	0	15	326	6	0	2	0	26	0	8	0	4	0	739	
4:45 PM	24	345	3	2	4	344	5	0	1	0	26	0	2	0	7	0	763	2859
5:00 PM	19	398	9	1	3	349	7	1	1	0	16	0	0	0	2	0	806	2994
5:15 PM	29	386	8	1	11	369	11	0	3	0	9	0	2	1	3	0	833	3141
5:30 PM	14	380	4	0	8	329	14	0	0	0	12	0	5	0	6	0	772	3174
5:45 PM	20	315	5	2	2	287	15	1	0	1	15	0	2	0	2	0	667	3078

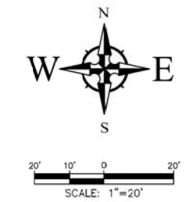
Peak 15-Min Flowrates	Northbound				Southbound				Eastbound				Westbound				Total
	Left	Thru	Right	U	Left	Thru	Right	U	Left	Thru	Right	U	Left	Thru	Right	U	
All Vehicles	116	1544	32	4	44	1476	44	0	12	0	36	0	8	4	12	0	3332
Heavy Trucks	4	8	0		16	20	0		0	0	0		0	0	4		52
Buses																	
Pedestrians		0				0				0				0			0
Bicycles	0	0	0		0	0	0		0	0	0		0	0	0		0
Scooters																	

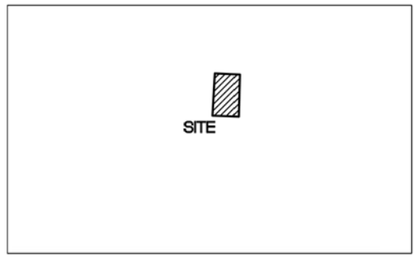
Comments:

Report generated on 8/16/2023 2:00 PM | SOURCE: Quality Counts, LLC (http://www.qualitycounts.net) 1-877-580-2212

Site Plan







VICINITY MAP
LEGAL DESCRIPTION: TR G-1 PLAT OF SOUTH BARELAS INDUSTRIAL PARK UNIT #2 CONT 0.8394 AC

SITE STUDY 2A

PROPOSED DUNKIN DONUTS

ALBUQUERQUE, NM

TOTAL PARKING SPACES =	10 SPACES
Total Required (8/1,000 SF):	10 spaces
Provided:	10 spaces

NO.	DATE	REMARKS	BY
		REVISIONS	
		DESIGN	
		DESIGNED BY: OG	DATE: JANUARY 2023
		DRAWN BY: OG	DATE: JANUARY 2023
			JOB NO.: 2023009
		CHECKED BY: JW	DATE: JANUARY 2023

Wooten Engineering
1005 21st St SE, Suite 13
Rio Rancho, N.M. 87124
Phone: (505) 980-3560

Dunkin Donuts
MENAUL AND CARLISLE
Albuquerque, NM

SITE PLAN

C1.0

ITE Trip Generation Summary Sheets

Coffee/Donut Shop with Drive-Through Window (937)

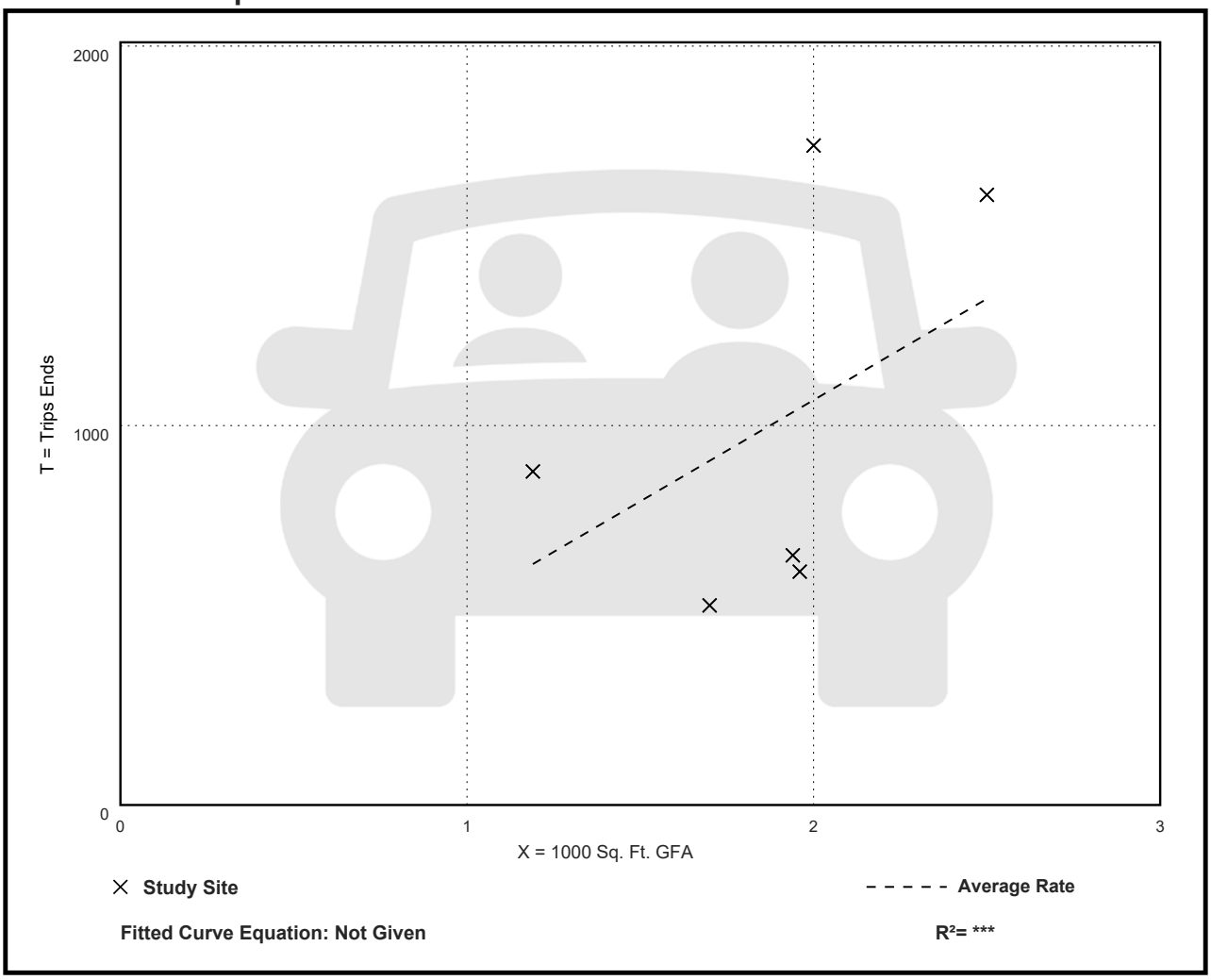
Vehicle Trip Ends vs: 1000 Sq. Ft. GFA
On a: Weekday

Setting/Location: General Urban/Suburban
Number of Studies: 6
Avg. 1000 Sq. Ft. GFA: 2
Directional Distribution: 50% entering, 50% exiting

Vehicle Trip Generation per 1000 Sq. Ft. GFA

Average Rate	Range of Rates	Standard Deviation
533.57	309.41 - 869.00	243.65

Data Plot and Equation



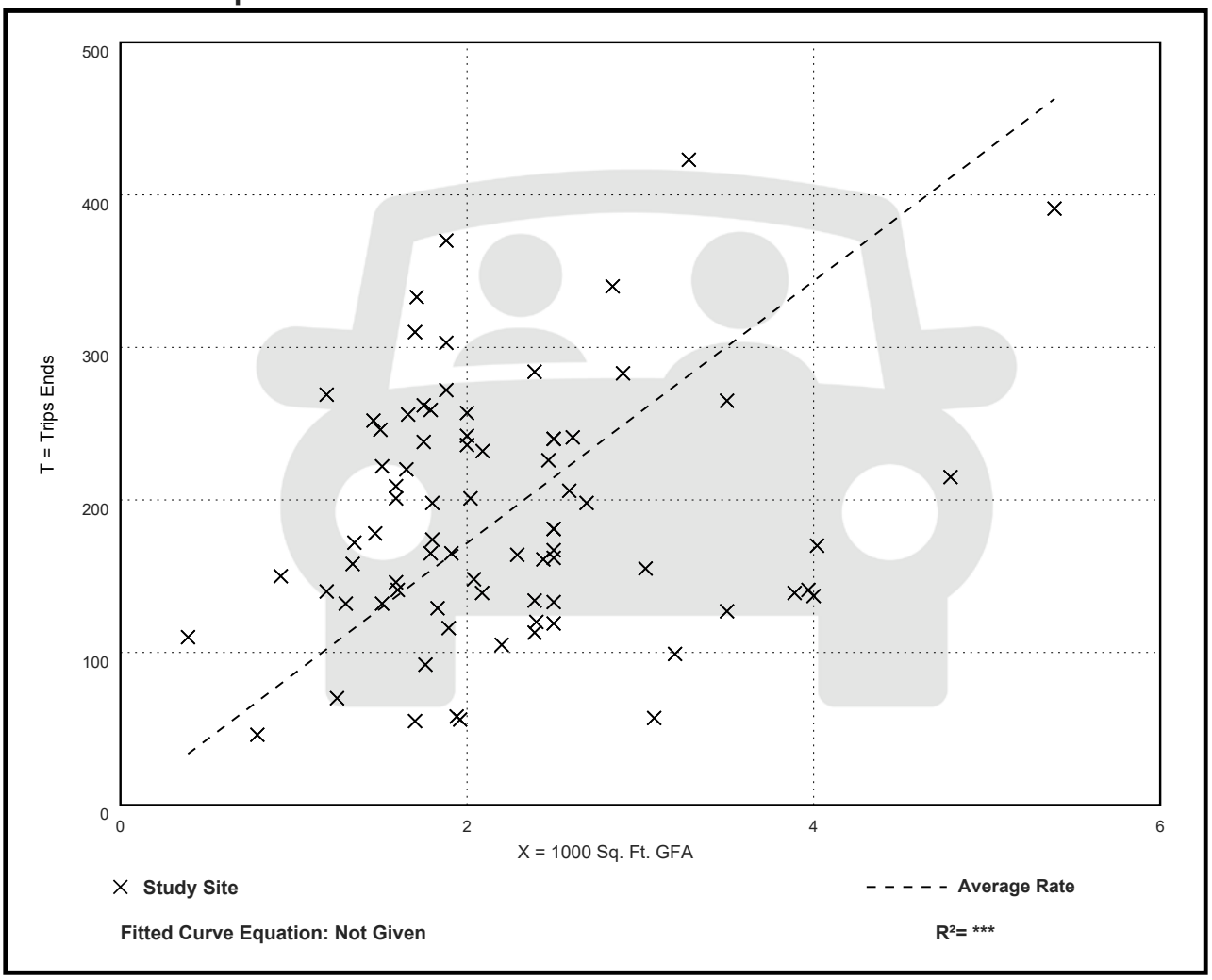
Coffee/Donut Shop with Drive-Through Window (937)

Vehicle Trip Ends vs: 1000 Sq. Ft. GFA
On a: Weekday,
Peak Hour of Adjacent Street Traffic,
One Hour Between 7 and 9 a.m.
Setting/Location: General Urban/Suburban
Number of Studies: 78
Avg. 1000 Sq. Ft. GFA: 2
Directional Distribution: 51% entering, 49% exiting

Vehicle Trip Generation per 1000 Sq. Ft. GFA

Average Rate	Range of Rates	Standard Deviation
85.88	18.51 - 282.05	44.92

Data Plot and Equation



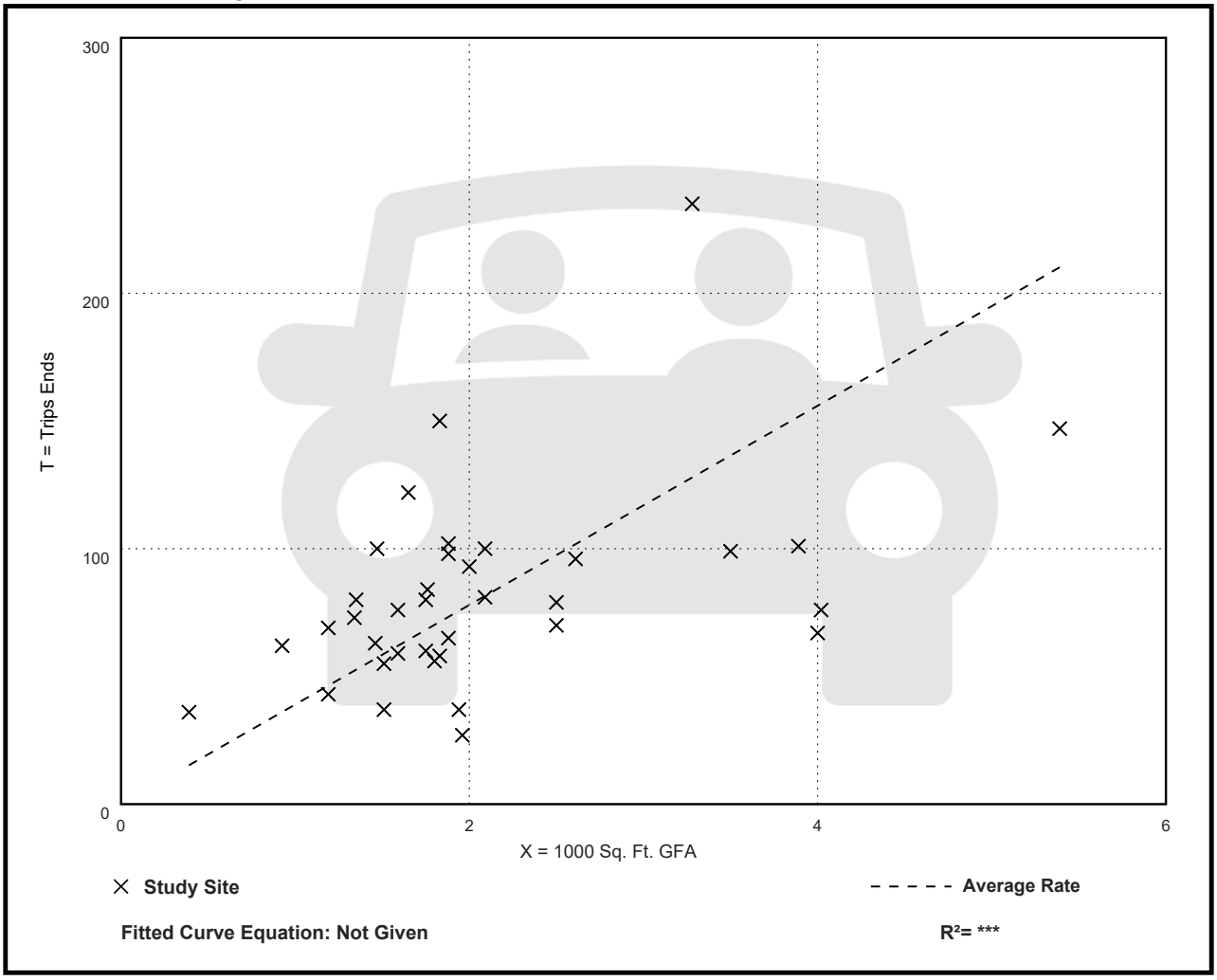
Coffee/Donut Shop with Drive-Through Window (937)

Vehicle Trip Ends vs: 1000 Sq. Ft. GFA
On a: Weekday,
Peak Hour of Adjacent Street Traffic,
One Hour Between 4 and 6 p.m.
Setting/Location: General Urban/Suburban
Number of Studies: 36
Avg. 1000 Sq. Ft. GFA: 2
Directional Distribution: 50% entering, 50% exiting

Vehicle Trip Generation per 1000 Sq. Ft. GFA

Average Rate	Range of Rates	Standard Deviation
38.99	13.78 - 92.31	17.79

Data Plot and Equation



Level of Service Criteria

LEVEL OF SERVICE CRITERIA

Signalized Intersections		
Level of Service	**Interpretation**	**Average Control Delay (seconds per vehicle)**
A	Favorable progression. Most vehicles arrive during the green indication and travel through the intersection without stopping.	≤10
B	Good progression, with more vehicles stopping than for Level of Service A.	> 10 - 20
C	Individual cycle failures (i.e., one or more queued vehicles are not able to depart as a result of insufficient capacity during the cycle) may begin to appear. Number of vehicles stopping is significant, although many vehicles still pass through the intersection without stopping.	> 20 - 35
D	The volume-to-capacity ratio is high and either progression is ineffective or the cycle length is too long. Many vehicles stop and individual cycle failures are noticeable.	> 35 - 55
E	Progression is unfavorable. The volume-to-capacity ratio is high and the cycle length is long. Individual cycle failures are frequent.	> 55 - 80
F	The volume-to-capacity ratio is very high, progression is very poor, and the cycle length is long. Most cycles fail to clear the queue.	> 80

Unsignalized Intersections	
Level of Service	**Average Total Delay (sec/veh)**
A	0 - 10
B	> 10 - 15
C	> 15 - 25
D	> 25 - 35
E	> 35 - 50
F	> 50

Source: *Highway Capacity Manual*, 6th Edition.

Capacity Analysis Summary Sheets

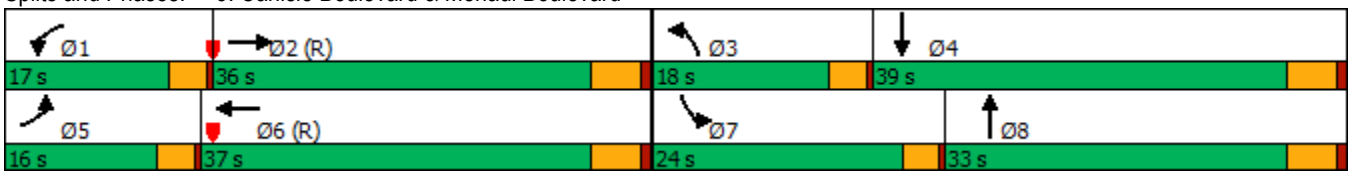
Existing Weekday Morning Peak Hour

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	59	435	133	164	637	159	259	527	144	144	604	95
Future Volume (vph)	59	435	133	164	637	159	259	527	144	144	604	95
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Storage Length (ft)	210		0	160		0	190		0	200		0
Storage Lanes	2		0	2		0	2		0	2		0
Taper Length (ft)	100			110			150			80		
Lane Util. Factor	0.97	0.91	0.91	0.97	0.91	0.91	0.97	0.91	0.91	0.97	0.91	0.91
Frt		0.965			0.970			0.968			0.980	
Flt Protected	0.950			0.950			0.950			0.950		
Satd. Flow (prot)	3273	4549	0	3467	4838	0	3303	4895	0	3335	4796	0
Flt Permitted	0.950			0.950			0.950			0.950		
Satd. Flow (perm)	3273	4549	0	3467	4838	0	3303	4895	0	3335	4796	0
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)		70			55			60			28	
Link Speed (mph)		35			35			35			35	
Link Distance (ft)		212			603			166			716	
Travel Time (s)		4.1			11.7			3.2			13.9	
Peak Hour Factor	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91
Heavy Vehicles (%)	7%	7%	20%	1%	4%	4%	6%	3%	1%	5%	6%	6%
Shared Lane Traffic (%)												
Lane Group Flow (vph)	65	624	0	180	875	0	285	737	0	158	768	0
Turn Type	Prot	NA		Prot	NA		Prot	NA		Prot	NA	
Protected Phases	5	2		1	6		3	8		7	4	
Permitted Phases												
Detector Phase	5	2		1	6		3	8		7	4	
Switch Phase												
Minimum Initial (s)	3.0	16.0		3.0	16.0		3.0	16.0		3.0	16.0	
Minimum Split (s)	16.0	23.0		9.5	23.0		18.0	23.0		19.0	23.0	
Total Split (s)	16.0	36.0		17.0	37.0		18.0	33.0		24.0	39.0	
Total Split (%)	14.5%	32.7%		15.5%	33.6%		16.4%	30.0%		21.8%	35.5%	
Yellow Time (s)	3.0	4.0		3.0	4.0		3.0	4.0		3.0	4.0	
All-Red Time (s)	0.5	1.0		0.5	1.0		0.5	1.0		0.5	1.0	
Lost Time Adjust (s)	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	
Total Lost Time (s)	3.5	5.0		3.5	5.0		3.5	5.0		3.5	5.0	
Lead/Lag	Lead	Lag		Lead	Lag		Lead	Lag		Lead	Lag	
Lead-Lag Optimize?	Yes	Yes		Yes	Yes		Yes	Yes		Yes	Yes	
Recall Mode	None	C-Max		None	C-Max		None	Max		None	Max	
Act Effct Green (s)	7.6	33.6		10.9	38.7		13.4	38.0		10.5	35.1	
Actuated g/C Ratio	0.07	0.31		0.10	0.35		0.12	0.35		0.10	0.32	
v/c Ratio	0.29	0.43		0.52	0.50		0.71	0.43		0.50	0.50	
Control Delay	51.4	28.4		52.4	28.1		56.4	26.5		52.2	30.7	
Queue Delay	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	
Total Delay	51.4	28.4		52.4	28.1		56.4	26.5		52.2	30.7	
LOS	D	C		D	C		E	C		D	C	
Approach Delay		30.6			32.2			34.8			34.4	
Approach LOS		C			C			C			C	
Queue Length 50th (ft)	22	113		63	169		100	132		55	156	
Queue Length 95th (ft)	44	156		96	218		145	178		86	197	

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Internal Link Dist (ft)		132			523			86			636	
Turn Bay Length (ft)	210			160			190			200		
Base Capacity (vph)	371	1438		425	1739		435	1728		621	1547	
Starvation Cap Reductn	0	0		0	0		0	0		0	0	
Spillback Cap Reductn	0	0		0	0		0	0		0	0	
Storage Cap Reductn	0	0		0	0		0	0		0	0	
Reduced v/c Ratio	0.18	0.43		0.42	0.50		0.66	0.43		0.25	0.50	

Intersection Summary			
Area Type:	Other		
Cycle Length: 110			
Actuated Cycle Length: 110			
Offset: 0 (0%), Referenced to phase 2:EBT and 6:WBT, Start of Green			
Natural Cycle: 85			
Control Type: Actuated-Coordinated			
Maximum v/c Ratio: 0.71			
Intersection Signal Delay: 33.2		Intersection LOS: C	
Intersection Capacity Utilization 55.4%		ICU Level of Service B	
Analysis Period (min) 15			

Splits and Phases: 3: Carlisle Boulevard & Menaul Boulevard



Intersection	
Int Delay, s/veh	1.6

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Vol, veh/h	14	0	43	8	0	4	125	919	7	1	868	30
Future Vol, veh/h	14	0	43	8	0	4	125	919	7	1	868	30
Conflicting Peds, #/hr	0	0	0	0	0	0	0	0	0	0	0	0
Sign Control	Stop	Stop	Stop	Stop	Stop	Stop	Free	Free	Free	Free	Free	Free
RT Channelized	-	-	None	-	-	None	-	-	None	-	-	None
Storage Length	-	-	-	-	-	-	125	-	-	80	-	-
Veh in Median Storage, #	-	0	-	-	1	-	-	0	-	-	0	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	96	96	96	96	96	96	96	96	96	96	96	96
Heavy Vehicles, %	7	0	5	0	0	0	1	2	0	7	6	0
Mvmt Flow	15	0	45	8	0	4	130	957	7	1	904	31

Major/Minor	Minor2			Minor1			Major1			Major2		
Conflicting Flow All	1565	2146	468	1585	2158	482	935	0	0	964	0	0
Stage 1	922	922	-	1221	1221	-	-	-	-	-	-	-
Stage 2	643	1224	-	364	937	-	-	-	-	-	-	-
Critical Hdwy	6.54	6.5	7.2	6.4	6.5	7.1	5.32	-	-	5.44	-	-
Critical Hdwy Stg 1	7.44	5.5	-	7.3	5.5	-	-	-	-	-	-	-
Critical Hdwy Stg 2	6.84	5.5	-	6.7	5.5	-	-	-	-	-	-	-
Follow-up Hdwy	3.87	4	3.95	3.8	4	3.9	3.11	-	-	3.17	-	-
Pot Cap-1 Maneuver	*266	96	457	268	94	*726	424	-	-	888	-	-
Stage 1	*218	352	-	450	509	-	-	-	-	-	-	-
Stage 2	*731	508	-	580	346	-	-	-	-	-	-	-
Platoon blocked, %	1	1		1	1	1		-	-	1	-	-
Mov Cap-1 Maneuver	*202	66	457	184	65	*726	424	-	-	888	-	-
Mov Cap-2 Maneuver	*202	66	-	240	150	-	-	-	-	-	-	-
Stage 1	*151	352	-	312	353	-	-	-	-	-	-	-
Stage 2	*504	352	-	523	346	-	-	-	-	-	-	-

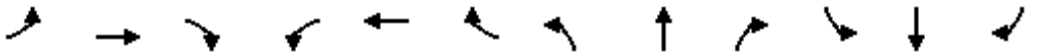
Approach	EB	WB	NB	SB
HCM Control Delay, s	17.4	17.1	2	0
HCM LOS	C	C		

Minor Lane/Major Mvmt	NBL	NBT	NBR	EBLn1	WBLn1	SBL	SBT	SBR
Capacity (veh/h)	424	-	-	349	309	888	-	-
HCM Lane V/C Ratio	0.307	-	-	0.17	0.04	0.001	-	-
HCM Control Delay (s)	17.2	-	-	17.4	17.1	9.1	-	-
HCM Lane LOS	C	-	-	C	C	A	-	-
HCM 95th %tile Q(veh)	1.3	-	-	0.6	0.1	0	-	-

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

Capacity Analysis Summary Sheets

Existing Weekday Evening Peak Hour

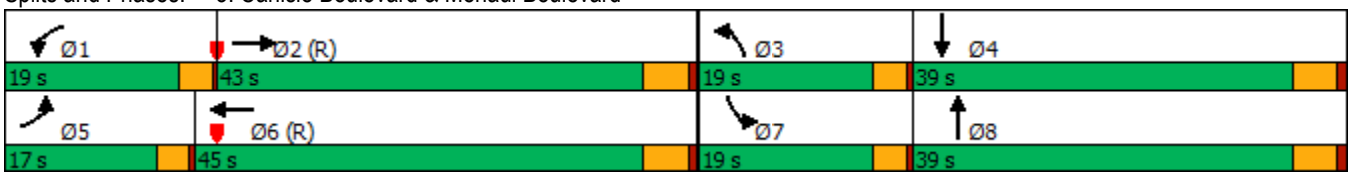


Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	122	617	207	258	823	288	323	983	189	268	968	121
Future Volume (vph)	122	617	207	258	823	288	323	983	189	268	968	121
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Storage Length (ft)	210		0	160		0	190		0	200		0
Storage Lanes	2		0	2		0	2		0	2		0
Taper Length (ft)	100			110			150			80		
Lane Util. Factor	0.97	0.91	0.91	0.97	0.91	0.91	0.97	0.91	0.91	0.97	0.91	0.91
Frt		0.962			0.961			0.976			0.983	
Flt Protected	0.950			0.950			0.950			0.950		
Satd. Flow (prot)	3467	4880	0	3467	4899	0	3335	5012	0	3467	5043	0
Flt Permitted	0.950			0.950			0.950			0.950		
Satd. Flow (perm)	3467	4880	0	3467	4899	0	3335	5012	0	3467	5043	0
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)		74			79			33			18	
Link Speed (mph)		35			35			35			35	
Link Distance (ft)		212			603			166			716	
Travel Time (s)		4.1			11.7			3.2			13.9	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Heavy Vehicles (%)	1%	2%	3%	1%	2%	1%	5%	1%	1%	1%	1%	2%
Shared Lane Traffic (%)												
Lane Group Flow (vph)	133	896	0	280	1208	0	351	1273	0	291	1184	0
Turn Type	Prot	NA		Prot	NA		Prot	NA		Prot	NA	
Protected Phases	5	2		1	6		3	8		7	4	
Permitted Phases												
Detector Phase	5	2		1	6		3	8		7	4	
Switch Phase												
Minimum Initial (s)	3.0	16.0		3.0	16.0		3.0	16.0		3.0	16.0	
Minimum Split (s)	17.0	23.0		9.5	23.0		19.0	23.0		19.0	23.0	
Total Split (s)	17.0	43.0		19.0	45.0		19.0	39.0		19.0	39.0	
Total Split (%)	14.2%	35.8%		15.8%	37.5%		15.8%	32.5%		15.8%	32.5%	
Yellow Time (s)	3.0	4.0		3.0	4.0		3.0	4.0		3.0	4.0	
All-Red Time (s)	0.5	1.0		0.5	1.0		0.5	1.0		0.5	1.0	
Lost Time Adjust (s)	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	
Total Lost Time (s)	3.5	5.0		3.5	5.0		3.5	5.0		3.5	5.0	
Lead/Lag	Lead	Lag		Lead	Lag		Lead	Lag		Lead	Lag	
Lead-Lag Optimize?	Yes	Yes		Yes	Yes		Yes	Yes		Yes	Yes	
Recall Mode	None	C-Max		None	C-Max		None	Max		None	Max	
Act Effct Green (s)	9.9	39.5		14.0	43.6		15.1	35.3		14.2	34.4	
Actuated g/C Ratio	0.08	0.33		0.12	0.36		0.13	0.29		0.12	0.29	
v/c Ratio	0.46	0.54		0.69	0.66		0.84	0.85		0.71	0.81	
Control Delay	57.4	31.7		60.1	32.2		69.2	45.6		60.8	44.6	
Queue Delay	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	
Total Delay	57.4	31.7		60.1	32.2		69.2	45.6		60.8	44.6	
LOS	E	C		E	C		E	D		E	D	
Approach Delay		35.0			37.4			50.7			47.8	
Approach LOS		C			D			D			D	
Queue Length 50th (ft)	51	191		108	266		138	336		112	309	
Queue Length 95th (ft)	82	238		154	331		#209	399		159	368	

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Internal Link Dist (ft)		132			523			86			636	
Turn Bay Length (ft)	210			160			190			200		
Base Capacity (vph)	390	1654		447	1828		430	1496		447	1457	
Starvation Cap Reductn	0	0		0	0		0	0		0	0	
Spillback Cap Reductn	0	0		0	0		0	0		0	0	
Storage Cap Reductn	0	0		0	0		0	0		0	0	
Reduced v/c Ratio	0.34	0.54		0.63	0.66		0.82	0.85		0.65	0.81	

Intersection Summary			
Area Type:	Other		
Cycle Length: 120			
Actuated Cycle Length: 120			
Offset: 0 (0%), Referenced to phase 2:EBT and 6:WBT, Start of Green			
Natural Cycle: 85			
Control Type: Actuated-Coordinated			
Maximum v/c Ratio: 0.85			
Intersection Signal Delay: 43.5		Intersection LOS: D	
Intersection Capacity Utilization 71.7%		ICU Level of Service C	
Analysis Period (min) 15			
# 95th percentile volume exceeds capacity, queue may be longer.			
Queue shown is maximum after two cycles.			

Splits and Phases: 3: Carlisle Boulevard & Menaul Boulevard



Intersection	
Int Delay, s/veh	1.7

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Vol, veh/h	5	0	63	9	1	16	90	1509	24	27	1391	37
Future Vol, veh/h	5	0	63	9	1	16	90	1509	24	27	1391	37
Conflicting Peds, #/hr	0	0	0	0	0	0	0	0	0	0	0	0
Sign Control	Stop	Stop	Stop	Stop	Stop	Stop	Free	Free	Free	Free	Free	Free
RT Channelized	-	-	None	-	-	None	-	-	None	-	-	None
Storage Length	-	-	-	-	-	-	125	-	-	80	-	-
Veh in Median Storage, #	-	0	-	-	1	-	-	0	-	-	0	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	95	95	95	95	95	95	95	95	95	95	95	95
Heavy Vehicles, %	2	0	2	0	0	50	2	2	0	33	1	0
Mvmt Flow	5	0	66	9	1	17	95	1588	25	28	1464	39

Major/Minor	Minor2			Minor1			Major1			Major2		
Conflicting Flow All	2366	3343	752	2433	3350	807	1503	0	0	1613	0	0
Stage 1	1540	1540	-	1791	1791	-	-	-	-	-	-	-
Stage 2	826	1803	-	642	1559	-	-	-	-	-	-	-
Critical Hdwy	6.44	6.5	7.14	6.4	6.5	8.1	5.34	-	-	5.96	-	-
Critical Hdwy Stg 1	7.34	5.5	-	7.3	5.5	-	-	-	-	-	-	-
Critical Hdwy Stg 2	6.74	5.5	-	6.7	5.5	-	-	-	-	-	-	-
Follow-up Hdwy	3.82	4	3.92	3.8	4	4.4	3.12	-	-	3.43	-	-
Pot Cap-1 Maneuver	*151	15	303	132	15	*503	222	-	-	*645	-	-
Stage 1	*83	179	-	504	504	-	-	-	-	-	-	-
Stage 2	*579	494	-	395	175	-	-	-	-	-	-	-
Platoon blocked, %	1	1		1	1	1		-	-	1	-	-
Mov Cap-1 Maneuver	*93	8	303	67	8	*503	222	-	-	*645	-	-
Mov Cap-2 Maneuver	*93	8	-	137	55	-	-	-	-	-	-	-
Stage 1	*47	171	-	288	288	-	-	-	-	-	-	-
Stage 2	*319	283	-	295	167	-	-	-	-	-	-	-

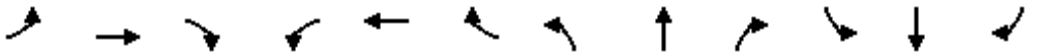
Approach	EB	WB	NB	SB
HCM Control Delay, s	24	23.2	1.8	0.2
HCM LOS	C	C		

Minor Lane/Major Mvmt	NBL	NBT	NBR	EBLn1	WBLn1	SBL	SBT	SBR
Capacity (veh/h)	222	-	-	260	225	* 645	-	-
HCM Lane V/C Ratio	0.427	-	-	0.275	0.122	0.044	-	-
HCM Control Delay (s)	32.8	-	-	24	23.2	10.8	-	-
HCM Lane LOS	D	-	-	C	C	B	-	-
HCM 95th %tile Q(veh)	2	-	-	1.1	0.4	0.1	-	-

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

Capacity Analysis Summary Sheets

Year 2024 No-Build Weekday Morning Peak Hour

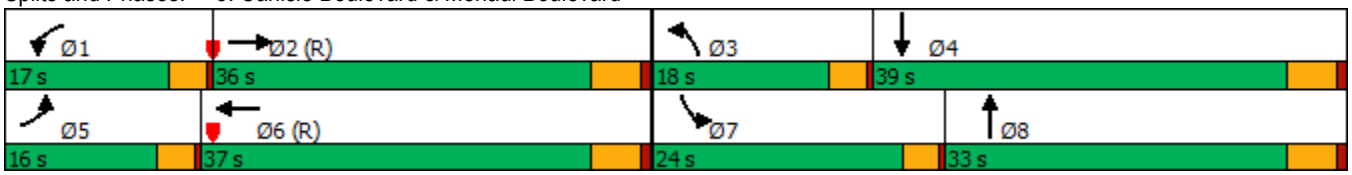


Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	60	439	137	171	643	161	270	558	153	145	624	96
Future Volume (vph)	60	439	137	171	643	161	270	558	153	145	624	96
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Storage Length (ft)	210		0	160		0	190		0	200		0
Storage Lanes	2		0	2		0	2		0	2		0
Taper Length (ft)	100			110			150			80		
Lane Util. Factor	0.97	0.91	0.91	0.97	0.91	0.91	0.97	0.91	0.91	0.97	0.91	0.91
Frt		0.964			0.970			0.968			0.980	
Flt Protected	0.950			0.950			0.950			0.950		
Satd. Flow (prot)	3273	4542	0	3467	4838	0	3303	4895	0	3335	4796	0
Flt Permitted	0.950			0.950			0.950			0.950		
Satd. Flow (perm)	3273	4542	0	3467	4838	0	3303	4895	0	3335	4796	0
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)		72			56			60			27	
Link Speed (mph)		35			35			35			35	
Link Distance (ft)		212			603			166			716	
Travel Time (s)		4.1			11.7			3.2			13.9	
Peak Hour Factor	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91
Heavy Vehicles (%)	7%	7%	20%	1%	4%	4%	6%	3%	1%	5%	6%	6%
Shared Lane Traffic (%)												
Lane Group Flow (vph)	66	633	0	188	884	0	297	781	0	159	791	0
Turn Type	Prot	NA		Prot	NA		Prot	NA		Prot	NA	
Protected Phases	5	2		1	6		3	8		7	4	
Permitted Phases												
Detector Phase	5	2		1	6		3	8		7	4	
Switch Phase												
Minimum Initial (s)	3.0	16.0		3.0	16.0		3.0	16.0		3.0	16.0	
Minimum Split (s)	16.0	23.0		9.5	23.0		18.0	23.0		19.0	23.0	
Total Split (s)	16.0	36.0		17.0	37.0		18.0	33.0		24.0	39.0	
Total Split (%)	14.5%	32.7%		15.5%	33.6%		16.4%	30.0%		21.8%	35.5%	
Yellow Time (s)	3.0	4.0		3.0	4.0		3.0	4.0		3.0	4.0	
All-Red Time (s)	0.5	1.0		0.5	1.0		0.5	1.0		0.5	1.0	
Lost Time Adjust (s)	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	
Total Lost Time (s)	3.5	5.0		3.5	5.0		3.5	5.0		3.5	5.0	
Lead/Lag	Lead	Lag		Lead	Lag		Lead	Lag		Lead	Lag	
Lead-Lag Optimize?	Yes	Yes		Yes	Yes		Yes	Yes		Yes	Yes	
Recall Mode	None	C-Max		None	C-Max		None	Max		None	Max	
Act Effct Green (s)	7.6	33.4		11.1	38.7		13.6	37.9		10.6	34.9	
Actuated g/C Ratio	0.07	0.30		0.10	0.35		0.12	0.34		0.10	0.32	
v/c Ratio	0.29	0.44		0.54	0.51		0.73	0.45		0.50	0.51	
Control Delay	51.5	28.6		52.6	28.2		57.4	27.0		52.1	31.1	
Queue Delay	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	
Total Delay	51.5	28.6		52.6	28.2		57.4	27.0		52.1	31.1	
LOS	D	C		D	C		E	C		D	C	
Approach Delay		30.7			32.4			35.4			34.6	
Approach LOS		C			C			D			C	
Queue Length 50th (ft)	23	116		65	172		104	143		55	162	
Queue Length 95th (ft)	44	158		100	221		151	190		87	204	

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Internal Link Dist (ft)		132			523			86			636	
Turn Bay Length (ft)	210			160			190			200		
Base Capacity (vph)	371	1430		425	1739		435	1725		621	1541	
Starvation Cap Reductn	0	0		0	0		0	0		0	0	
Spillback Cap Reductn	0	0		0	0		0	0		0	0	
Storage Cap Reductn	0	0		0	0		0	0		0	0	
Reduced v/c Ratio	0.18	0.44		0.44	0.51		0.68	0.45		0.26	0.51	

Intersection Summary			
Area Type:	Other		
Cycle Length: 110			
Actuated Cycle Length: 110			
Offset: 0 (0%), Referenced to phase 2:EBT and 6:WBT, Start of Green			
Natural Cycle: 85			
Control Type: Actuated-Coordinated			
Maximum v/c Ratio: 0.73			
Intersection Signal Delay: 33.5		Intersection LOS: C	
Intersection Capacity Utilization 56.2%		ICU Level of Service B	
Analysis Period (min) 15			

Splits and Phases: 3: Carlisle Boulevard & Menaul Boulevard



Intersection	
Int Delay, s/veh	2.2

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Vol, veh/h	14	0	43	35	0	27	126	939	20	23	877	30
Future Vol, veh/h	14	0	43	35	0	27	126	939	20	23	877	30
Conflicting Peds, #/hr	0	0	0	0	0	0	0	0	0	0	0	0
Sign Control	Stop	Stop	Stop	Stop	Stop	Stop	Free	Free	Free	Free	Free	Free
RT Channelized	-	-	None	-	-	None	-	-	None	-	-	None
Storage Length	-	-	-	-	-	-	125	-	-	80	-	-
Veh in Median Storage, #	-	0	-	-	1	-	-	0	-	-	0	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	96	96	96	96	96	96	96	96	96	96	96	96
Heavy Vehicles, %	7	0	5	0	0	0	1	2	0	7	6	0
Mvmt Flow	15	0	45	36	0	28	131	978	21	24	914	31

Major/Minor	Minor2			Minor1			Major1			Major2		
Conflicting Flow All	1631	2239	473	1665	2244	500	945	0	0	999	0	0
Stage 1	978	978	-	1251	1251	-	-	-	-	-	-	-
Stage 2	653	1261	-	414	993	-	-	-	-	-	-	-
Critical Hdwy	6.54	6.5	7.2	6.4	6.5	7.1	5.32	-	-	5.44	-	-
Critical Hdwy Stg 1	7.44	5.5	-	7.3	5.5	-	-	-	-	-	-	-
Critical Hdwy Stg 2	6.84	5.5	-	6.7	5.5	-	-	-	-	-	-	-
Follow-up Hdwy	3.87	4	3.95	3.8	4	3.9	3.11	-	-	3.17	-	-
Pot Cap-1 Maneuver	*237	81	454	234	80	*726	419	-	-	846	-	-
Stage 1	*199	331	-	425	490	-	-	-	-	-	-	-
Stage 2	*731	484	-	541	326	-	-	-	-	-	-	-
Platoon blocked, %	1	1		1	1	1		-	-	1	-	-
Mov Cap-1 Maneuver	*169	54	454	156	54	*726	419	-	-	846	-	-
Mov Cap-2 Maneuver	*169	54	-	214	131	-	-	-	-	-	-	-
Stage 1	*137	322	-	292	337	-	-	-	-	-	-	-
Stage 2	*483	332	-	474	317	-	-	-	-	-	-	-

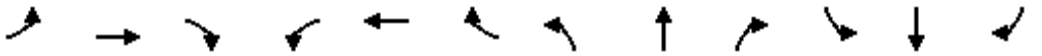
Approach	EB	WB	NB	SB
HCM Control Delay, s	18.7	19.7	2	0.2
HCM LOS	C	C		

Minor Lane/Major Mvmt	NBL	NBT	NBR	EBLn1	WBLn1	SBL	SBT	SBR
Capacity (veh/h)	419	-	-	321	309	846	-	-
HCM Lane V/C Ratio	0.313	-	-	0.185	0.209	0.028	-	-
HCM Control Delay (s)	17.5	-	-	18.7	19.7	9.4	-	-
HCM Lane LOS	C	-	-	C	C	A	-	-
HCM 95th %tile Q(veh)	1.3	-	-	0.7	0.8	0.1	-	-

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

Capacity Analysis Summary Sheets

Year 2024 No-Build Weekday Evening Peak Hour

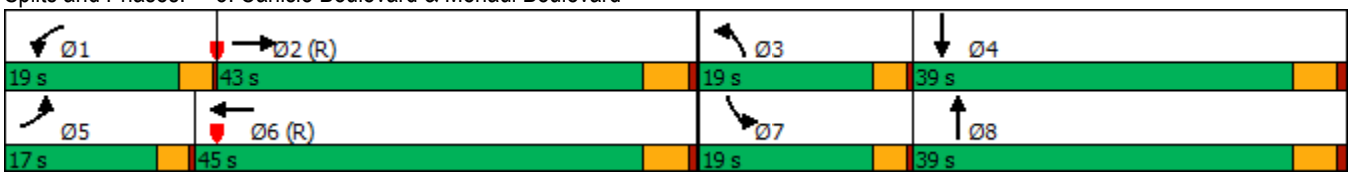


Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	123	623	213	270	831	291	333	1017	198	271	999	122
Future Volume (vph)	123	623	213	270	831	291	333	1017	198	271	999	122
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Storage Length (ft)	210		0	160		0	190		0	200		0
Storage Lanes	2		0	2		0	2		0	2		0
Taper Length (ft)	100			110			150			80		
Lane Util. Factor	0.97	0.91	0.91	0.97	0.91	0.91	0.97	0.91	0.91	0.97	0.91	0.91
Frt		0.962			0.961			0.976			0.984	
Flt Protected	0.950			0.950			0.950			0.950		
Satd. Flow (prot)	3467	4880	0	3467	4899	0	3335	5012	0	3467	5048	0
Flt Permitted	0.950			0.950			0.950			0.950		
Satd. Flow (perm)	3467	4880	0	3467	4899	0	3335	5012	0	3467	5048	0
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)		75			79			33			18	
Link Speed (mph)		35			35			35			35	
Link Distance (ft)		212			603			166			716	
Travel Time (s)		4.1			11.7			3.2			13.9	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Heavy Vehicles (%)	1%	2%	3%	1%	2%	1%	5%	1%	1%	1%	1%	2%
Shared Lane Traffic (%)												
Lane Group Flow (vph)	134	909	0	293	1219	0	362	1320	0	295	1219	0
Turn Type	Prot	NA		Prot	NA		Prot	NA		Prot	NA	
Protected Phases	5	2		1	6		3	8		7	4	
Permitted Phases												
Detector Phase	5	2		1	6		3	8		7	4	
Switch Phase												
Minimum Initial (s)	3.0	16.0		3.0	16.0		3.0	16.0		3.0	16.0	
Minimum Split (s)	17.0	23.0		9.5	23.0		19.0	23.0		19.0	23.0	
Total Split (s)	17.0	43.0		19.0	45.0		19.0	39.0		19.0	39.0	
Total Split (%)	14.2%	35.8%		15.8%	37.5%		15.8%	32.5%		15.8%	32.5%	
Yellow Time (s)	3.0	4.0		3.0	4.0		3.0	4.0		3.0	4.0	
All-Red Time (s)	0.5	1.0		0.5	1.0		0.5	1.0		0.5	1.0	
Lost Time Adjust (s)	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	
Total Lost Time (s)	3.5	5.0		3.5	5.0		3.5	5.0		3.5	5.0	
Lead/Lag	Lead	Lag		Lead	Lag		Lead	Lag		Lead	Lag	
Lead-Lag Optimize?	Yes	Yes		Yes	Yes		Yes	Yes		Yes	Yes	
Recall Mode	None	C-Max		None	C-Max		None	Max		None	Max	
Act Effct Green (s)	10.0	39.2		14.3	43.5		15.2	35.2		14.3	34.3	
Actuated g/C Ratio	0.08	0.33		0.12	0.36		0.13	0.29		0.12	0.29	
v/c Ratio	0.47	0.55		0.71	0.67		0.86	0.88		0.72	0.84	
Control Delay	57.4	32.0		60.9	32.4		71.2	47.9		61.0	45.9	
Queue Delay	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	
Total Delay	57.4	32.0		60.9	32.4		71.2	47.9		61.0	45.9	
LOS	E	C		E	C		E	D		E	D	
Approach Delay		35.2			37.9			52.9			48.9	
Approach LOS		D			D			D			D	
Queue Length 50th (ft)	52	196		113	270		143	354		113	321	
Queue Length 95th (ft)	82	242		160	336		#220	#442		161	381	

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Internal Link Dist (ft)		132			523			86			636	
Turn Bay Length (ft)	210			160			190			200		
Base Capacity (vph)	390	1646		447	1827		430	1493		447	1455	
Starvation Cap Reductn	0	0		0	0		0	0		0	0	
Spillback Cap Reductn	0	0		0	0		0	0		0	0	
Storage Cap Reductn	0	0		0	0		0	0		0	0	
Reduced v/c Ratio	0.34	0.55		0.66	0.67		0.84	0.88		0.66	0.84	

Intersection Summary			
Area Type:	Other		
Cycle Length: 120			
Actuated Cycle Length: 120			
Offset: 0 (0%), Referenced to phase 2:EBT and 6:WBT, Start of Green			
Natural Cycle: 85			
Control Type: Actuated-Coordinated			
Maximum v/c Ratio: 0.88			
Intersection Signal Delay: 44.7		Intersection LOS: D	
Intersection Capacity Utilization 72.9%		ICU Level of Service C	
Analysis Period (min) 15			
# 95th percentile volume exceeds capacity, queue may be longer.			
Queue shown is maximum after two cycles.			

Splits and Phases: 3: Carlisle Boulevard & Menaul Boulevard



Intersection	
Int Delay, s/veh	2.6

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Vol, veh/h	5	0	64	34	1	39	91	1541	45	61	1405	37
Future Vol, veh/h	5	0	64	34	1	39	91	1541	45	61	1405	37
Conflicting Peds, #/hr	0	0	0	0	0	0	0	0	0	0	0	0
Sign Control	Stop	Stop	Stop	Stop	Stop	Stop	Free	Free	Free	Free	Free	Free
RT Channelized	-	-	None	-	-	None	-	-	None	-	-	None
Storage Length	-	-	-	-	-	-	125	-	-	80	-	-
Veh in Median Storage, #	-	0	-	-	1	-	-	0	-	-	0	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	95	95	95	95	95	95	95	95	95	95	95	95
Heavy Vehicles, %	2	0	2	0	0	50	2	2	0	33	1	0
Mvmt Flow	5	0	67	36	1	41	96	1622	47	64	1479	39

Major/Minor	Minor2			Minor1			Major1			Major2		
Conflicting Flow All	2468	3488	759	2558	3484	835	1518	0	0	1669	0	0
Stage 1	1627	1627	-	1838	1838	-	-	-	-	-	-	-
Stage 2	841	1861	-	720	1646	-	-	-	-	-	-	-
Critical Hdwy	6.44	6.5	7.14	6.4	6.5	8.1	5.34	-	-	5.96	-	-
Critical Hdwy Stg 1	7.34	5.5	-	7.3	5.5	-	-	-	-	-	-	-
Critical Hdwy Stg 2	6.74	5.5	-	6.7	5.5	-	-	-	-	-	-	-
Follow-up Hdwy	3.82	4	3.92	3.8	4	4.4	3.12	-	-	3.43	-	-
Pot Cap-1 Maneuver	*120	10	300	100	10	*503	218	-	-	*645	-	-
Stage 1	*72	162	-	449	467	-	-	-	-	-	-	-
Stage 2	*579	450	-	354	159	-	-	-	-	-	-	-
Platoon blocked, %	1	1		1	1	1		-	-	1	-	-
Mov Cap-1 Maneuver	*66	5	300	47	5	*503	218	-	-	*645	-	-
Mov Cap-2 Maneuver	*66	5	-	106	38	-	-	-	-	-	-	-
Stage 1	*40	146	-	251	262	-	-	-	-	-	-	-
Stage 2	*296	252	-	247	143	-	-	-	-	-	-	-

Approach	EB	WB	NB	SB
HCM Control Delay, s	26.5	41.5	1.8	0.5
HCM LOS	D	E		

Minor Lane/Major Mvmt	NBL	NBT	NBR	EBLn1	WBLn1	SBL	SBT	SBR
Capacity (veh/h)	218	-	-	239	174	* 645	-	-
HCM Lane V/C Ratio	0.439	-	-	0.304	0.448	0.1	-	-
HCM Control Delay (s)	33.9	-	-	26.5	41.5	11.2	-	-
HCM Lane LOS	D	-	-	D	E	B	-	-
HCM 95th %tile Q(veh)	2.1	-	-	1.2	2.1	0.3	-	-

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

Capacity Analysis Summary Sheets

Year 2024 Total Projected Weekday Morning Peak Hour

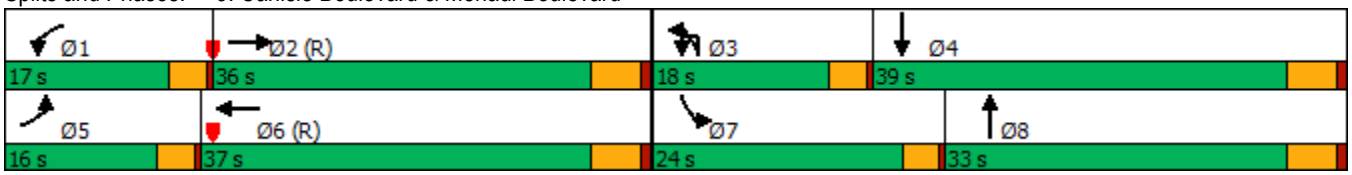
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBU	NBL	NBT	NBR	SBL	SBT
Lane Configurations												
Traffic Volume (vph)	63	441	137	173	643	161	9	272	558	153	145	629
Future Volume (vph)	63	441	137	173	643	161	9	272	558	153	145	629
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Storage Length (ft)	210		0	160		0		190		0	200	
Storage Lanes	2		0	2		0		2		0	2	
Taper Length (ft)	100			110				150			80	
Lane Util. Factor	0.97	0.91	0.91	0.97	0.91	0.91	0.91	0.97	0.91	0.91	0.97	0.91
Frt		0.964			0.970				0.968			0.980
Flt Protected	0.950			0.950				0.950			0.950	
Satd. Flow (prot)	3273	4542	0	3467	4838	0	0	3308	4895	0	3335	4796
Flt Permitted	0.950			0.950				0.950			0.950	
Satd. Flow (perm)	3273	4542	0	3467	4838	0	0	3308	4895	0	3335	4796
Right Turn on Red			Yes			Yes				Yes		
Satd. Flow (RTOR)		71			56				60			27
Link Speed (mph)		35			35				35			35
Link Distance (ft)		212			603				166			716
Travel Time (s)		4.1			11.7				3.2			13.9
Peak Hour Factor	0.91	0.91	0.91	0.91	0.91	0.91	0.92	0.91	0.91	0.91	0.91	0.91
Heavy Vehicles (%)	7%	7%	20%	1%	4%	4%	2%	6%	3%	1%	5%	6%
Shared Lane Traffic (%)												
Lane Group Flow (vph)	69	636	0	190	884	0	0	309	781	0	159	796
Turn Type	Prot	NA		Prot	NA		Prot	Prot	NA		Prot	NA
Protected Phases	5	2		1	6		3	3	8		7	4
Permitted Phases												
Detector Phase	5	2		1	6		3	3	8		7	4
Switch Phase												
Minimum Initial (s)	3.0	16.0		3.0	16.0		3.0	3.0	16.0		3.0	16.0
Minimum Split (s)	16.0	23.0		9.5	23.0		18.0	18.0	23.0		19.0	23.0
Total Split (s)	16.0	36.0		17.0	37.0		18.0	18.0	33.0		24.0	39.0
Total Split (%)	14.5%	32.7%		15.5%	33.6%		16.4%	16.4%	30.0%		21.8%	35.5%
Yellow Time (s)	3.0	4.0		3.0	4.0		3.0	3.0	4.0		3.0	4.0
All-Red Time (s)	0.5	1.0		0.5	1.0		0.5	0.5	1.0		0.5	1.0
Lost Time Adjust (s)	0.0	0.0		0.0	0.0			0.0	0.0		0.0	0.0
Total Lost Time (s)	3.5	5.0		3.5	5.0			3.5	5.0		3.5	5.0
Lead/Lag	Lead	Lag		Lead	Lag		Lead	Lead	Lag		Lead	Lag
Lead-Lag Optimize?	Yes	Yes		Yes	Yes		Yes	Yes	Yes		Yes	Yes
Recall Mode	None	C-Max		None	C-Max		None	None	Max		None	Max
Act Effct Green (s)	7.7	33.4		11.1	38.6			13.7	37.9		10.6	34.8
Actuated g/C Ratio	0.07	0.30		0.10	0.35			0.12	0.34		0.10	0.32
v/c Ratio	0.30	0.45		0.54	0.51			0.75	0.45		0.50	0.52
Control Delay	51.6	28.7		52.6	28.2			58.4	27.0		52.1	31.3
Queue Delay	0.0	0.0		0.0	0.0			0.0	0.0		0.0	0.0
Total Delay	51.6	28.7		52.6	28.2			58.4	27.0		52.1	31.3
LOS	D	C		D	C			E	C		D	C
Approach Delay		31.0			32.5				35.9			34.7
Approach LOS		C			C				D			C
Queue Length 50th (ft)	24	117		67	172			109	143		55	163
Queue Length 95th (ft)	46	159		102	221			157	190		87	205

Lane Group	SBR
Lane Configurations	
Traffic Volume (vph)	96
Future Volume (vph)	96
Ideal Flow (vphpl)	1900
Storage Length (ft)	0
Storage Lanes	0
Taper Length (ft)	
Lane Util. Factor	0.91
Frt	
Flt Protected	
Satd. Flow (prot)	0
Flt Permitted	
Satd. Flow (perm)	0
Right Turn on Red	Yes
Satd. Flow (RTOR)	
Link Speed (mph)	
Link Distance (ft)	
Travel Time (s)	
Peak Hour Factor	0.91
Heavy Vehicles (%)	6%
Shared Lane Traffic (%)	
Lane Group Flow (vph)	0
Turn Type	
Protected Phases	
Permitted Phases	
Detector Phase	
Switch Phase	
Minimum Initial (s)	
Minimum Split (s)	
Total Split (s)	
Total Split (%)	
Yellow Time (s)	
All-Red Time (s)	
Lost Time Adjust (s)	
Total Lost Time (s)	
Lead/Lag	
Lead-Lag Optimize?	
Recall Mode	
Act Effct Green (s)	
Actuated g/C Ratio	
v/c Ratio	
Control Delay	
Queue Delay	
Total Delay	
LOS	
Approach Delay	
Approach LOS	
Queue Length 50th (ft)	
Queue Length 95th (ft)	

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBU	NBL	NBT	NBR	SBL	SBT
Internal Link Dist (ft)		132			523				86			636
Turn Bay Length (ft)	210			160				190			200	
Base Capacity (vph)	371	1427		425	1735			436	1725		621	1535
Starvation Cap Reductn	0	0		0	0			0	0		0	0
Spillback Cap Reductn	0	0		0	0			0	0		0	0
Storage Cap Reductn	0	0		0	0			0	0		0	0
Reduced v/c Ratio	0.19	0.45		0.45	0.51			0.71	0.45		0.26	0.52

Intersection Summary			
Area Type:	Other		
Cycle Length: 110			
Actuated Cycle Length: 110			
Offset: 0 (0%), Referenced to phase 2:EBT and 6:WBT, Start of Green			
Natural Cycle: 85			
Control Type: Actuated-Coordinated			
Maximum v/c Ratio: 0.75			
Intersection Signal Delay: 33.8		Intersection LOS: C	
Intersection Capacity Utilization 56.7%		ICU Level of Service B	
Analysis Period (min) 15			

Splits and Phases: 3: Carlisle Boulevard & Menaul Boulevard



Lane Group	SBR
Internal Link Dist (ft)	
Turn Bay Length (ft)	
Base Capacity (vph)	
Starvation Cap Reductn	
Spillback Cap Reductn	
Storage Cap Reductn	
Reduced v/c Ratio	

Intersection Summary

Intersection	
Int Delay, s/veh	2.1

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBU	SBL	SBT	SBR
Lane Configurations													
Traffic Vol, veh/h	14	0	43	35	0	27	126	948	20	2	23	884	31
Future Vol, veh/h	14	0	43	35	0	27	126	948	20	2	23	884	31
Conflicting Peds, #/hr	0	0	0	0	0	0	0	0	0	0	0	0	0
Sign Control	Stop	Stop	Stop	Stop	Stop	Stop	Free	Free	Free	Free	Free	Free	Free
RT Channelized	-	-	None	-	-	None	-	-	None	-	-	-	None
Storage Length	-	-	-	-	-	-	125	-	-	-	80	-	-
Veh in Median Storage, #	-	0	-	-	1	-	-	0	-	-	-	0	-
Grade, %	-	0	-	-	0	-	-	0	-	-	-	0	-
Peak Hour Factor	96	96	96	96	96	96	96	96	96	92	96	96	96
Heavy Vehicles, %	7	0	5	0	0	0	1	2	0	2	7	6	0
Mvmt Flow	15	0	45	36	0	28	131	988	21	2	24	921	32

Major/Minor	Minor2			Minor1			Major1			Major2			
Conflicting Flow All	1646	2260	477	1681	2266	505	953	0	0	736	1009	0	0
Stage 1	989	989	-	1261	1261	-	-	-	-	-	-	-	-
Stage 2	657	1271	-	420	1005	-	-	-	-	-	-	-	-
Critical Hdwy	6.54	6.5	7.2	6.4	6.5	7.1	5.32	-	-	5.64	5.44	-	-
Critical Hdwy Stg 1	7.44	5.5	-	7.3	5.5	-	-	-	-	-	-	-	-
Critical Hdwy Stg 2	6.84	5.5	-	6.7	5.5	-	-	-	-	-	-	-	-
Follow-up Hdwy	3.87	4	3.95	3.8	4	3.9	3.11	-	-	2.32	3.17	-	-
Pot Cap-1 Maneuver	*264	87	451	259	86	*702	415	-	-	*1180	*863	-	-
Stage 1	*196	327	-	498	539	-	-	-	-	-	-	-	-
Stage 2	*707	531	-	537	322	-	-	-	-	-	-	-	-
Platoon blocked, %	1	1		1	1	1		-	-	1	1	-	-
Mov Cap-1 Maneuver	*188	58	451	172	57	*702	415	-	-	*881	*881	-	-
Mov Cap-2 Maneuver	*188	58	-	233	133	-	-	-	-	-	-	-	-
Stage 1	*134	317	-	341	369	-	-	-	-	-	-	-	-
Stage 2	*464	363	-	469	312	-	-	-	-	-	-	-	-

Approach	EB	WB	NB	SB
HCM Control Delay, s	18	18.6	2	0.2
HCM LOS	C	C		

Minor Lane/Major Mvmt	NBL	NBT	NBR	EBLn1	WBLn1	SBL	SBT	SBR
Capacity (veh/h)	415	-	-	336	329	* 881	-	-
HCM Lane V/C Ratio	0.316	-	-	0.177	0.196	0.03	-	-
HCM Control Delay (s)	17.6	-	-	18	18.6	9.2	-	-
HCM Lane LOS	C	-	-	C	C	A	-	-
HCM 95th %tile Q(veh)	1.3	-	-	0.6	0.7	0.1	-	-

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

Intersection	
Int Delay, s/veh	0.1

Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations						
Traffic Vol, veh/h	622	16	0	1011	0	19
Future Vol, veh/h	622	16	0	1011	0	19
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	95	95	95	95	95	95
Heavy Vehicles, %	0	0	0	0	0	0
Mvmt Flow	655	17	0	1064	0	20

Major/Minor	Major1		Major2		Minor1	
Conflicting Flow All	0	0	-	-	-	336
Stage 1	-	-	-	-	-	-
Stage 2	-	-	-	-	-	-
Critical Hdwy	-	-	-	-	-	7.1
Critical Hdwy Stg 1	-	-	-	-	-	-
Critical Hdwy Stg 2	-	-	-	-	-	-
Follow-up Hdwy	-	-	-	-	-	3.9
Pot Cap-1 Maneuver	-	-	0	-	0	568
Stage 1	-	-	0	-	0	-
Stage 2	-	-	0	-	0	-
Platoon blocked, %	-	-		-		
Mov Cap-1 Maneuver	-	-	-	-	-	568
Mov Cap-2 Maneuver	-	-	-	-	-	-
Stage 1	-	-	-	-	-	-
Stage 2	-	-	-	-	-	-

Approach	EB	WB	NB
HCM Control Delay, s	0	0	11.6
HCM LOS			B

Minor Lane/Major Mvmt	NBLn1	EBT	EBR	WBT
Capacity (veh/h)	568	-	-	-
HCM Lane V/C Ratio	0.035	-	-	-
HCM Control Delay (s)	11.6	-	-	-
HCM Lane LOS	B	-	-	-
HCM 95th %tile Q(veh)	0.1	-	-	-

Intersection	
Int Delay, s/veh	0.2

Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Traffic Vol, veh/h	0	31	0	988	910	37
Future Vol, veh/h	0	31	0	988	910	37
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	95	95	95	95	95	95
Heavy Vehicles, %	0	0	0	0	0	0
Mvmt Flow	0	33	0	1040	958	39

Major/Minor	Minor2		Major1		Major2	
Conflicting Flow All	-	499	-	0	-	0
Stage 1	-	-	-	-	-	-
Stage 2	-	-	-	-	-	-
Critical Hdwy	-	7.1	-	-	-	-
Critical Hdwy Stg 1	-	-	-	-	-	-
Critical Hdwy Stg 2	-	-	-	-	-	-
Follow-up Hdwy	-	3.9	-	-	-	-
Pot Cap-1 Maneuver	0	447	0	-	-	-
Stage 1	0	-	0	-	-	-
Stage 2	0	-	0	-	-	-
Platoon blocked, %				-	-	-
Mov Cap-1 Maneuver	-	447	-	-	-	-
Mov Cap-2 Maneuver	-	-	-	-	-	-
Stage 1	-	-	-	-	-	-
Stage 2	-	-	-	-	-	-

Approach	EB	NB	SB
HCM Control Delay, s	13.7	0	0
HCM LOS	B		

Minor Lane/Major Mvmt	NBT	EBLn1	SBT	SBR
Capacity (veh/h)	-	447	-	-
HCM Lane V/C Ratio	-	0.073	-	-
HCM Control Delay (s)	-	13.7	-	-
HCM Lane LOS	-	B	-	-
HCM 95th %tile Q(veh)	-	0.2	-	-

Capacity Analysis Summary Sheets

Year 2024 Total Projected Weekday Evening Peak Hour

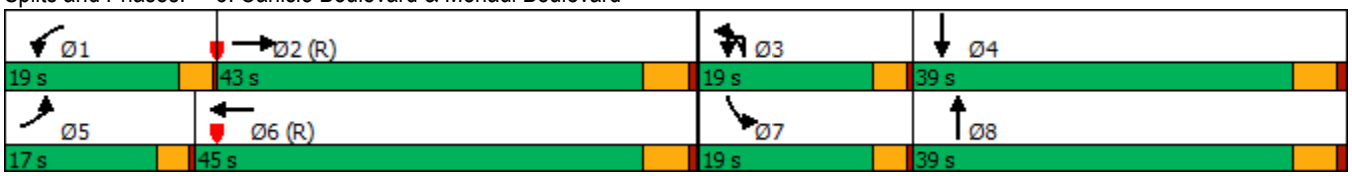
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBU	NBL	NBT	NBR	SBL	SBT
Lane Configurations												
Traffic Volume (vph)	125	624	213	271	831	291	3	334	1017	198	271	1001
Future Volume (vph)	125	624	213	271	831	291	3	334	1017	198	271	1001
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Storage Length (ft)	210		0	160		0		190		0	200	
Storage Lanes	2		0	2		0		2		0	2	
Taper Length (ft)	100			110				150			80	
Lane Util. Factor	0.97	0.91	0.91	0.97	0.91	0.91	0.91	0.97	0.91	0.91	0.97	0.91
Frt		0.962			0.961				0.976			0.984
Flt Protected	0.950			0.950				0.950			0.950	
Satd. Flow (prot)	3467	4880	0	3467	4899	0	0	3336	5012	0	3467	5048
Flt Permitted	0.950			0.950				0.950			0.950	
Satd. Flow (perm)	3467	4880	0	3467	4899	0	0	3336	5012	0	3467	5048
Right Turn on Red			Yes			Yes				Yes		
Satd. Flow (RTOR)		75			79				33			18
Link Speed (mph)		35			35				35			35
Link Distance (ft)		212			603				166			716
Travel Time (s)		4.1			11.7				3.2			13.9
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Heavy Vehicles (%)	1%	2%	3%	1%	2%	1%	2%	5%	1%	1%	1%	1%
Shared Lane Traffic (%)												
Lane Group Flow (vph)	136	910	0	295	1219	0	0	366	1320	0	295	1221
Turn Type	Prot	NA		Prot	NA		Prot	Prot	NA		Prot	NA
Protected Phases	5	2		1	6		3	3	8		7	4
Permitted Phases												
Detector Phase	5	2		1	6		3	3	8		7	4
Switch Phase												
Minimum Initial (s)	3.0	16.0		3.0	16.0		3.0	3.0	16.0		3.0	16.0
Minimum Split (s)	17.0	23.0		9.5	23.0		19.0	19.0	23.0		19.0	23.0
Total Split (s)	17.0	43.0		19.0	45.0		19.0	19.0	39.0		19.0	39.0
Total Split (%)	14.2%	35.8%		15.8%	37.5%		15.8%	15.8%	32.5%		15.8%	32.5%
Yellow Time (s)	3.0	4.0		3.0	4.0		3.0	3.0	4.0		3.0	4.0
All-Red Time (s)	0.5	1.0		0.5	1.0		0.5	0.5	1.0		0.5	1.0
Lost Time Adjust (s)	0.0	0.0		0.0	0.0			0.0	0.0		0.0	0.0
Total Lost Time (s)	3.5	5.0		3.5	5.0			3.5	5.0		3.5	5.0
Lead/Lag	Lead	Lag		Lead	Lag		Lead	Lead	Lag		Lead	Lag
Lead-Lag Optimize?	Yes	Yes		Yes	Yes		Yes	Yes	Yes		Yes	Yes
Recall Mode	None	C-Max		None	C-Max		None	None	Max		None	Max
Act Effct Green (s)	10.0	39.2		14.3	43.5			15.3	35.2		14.3	34.2
Actuated g/C Ratio	0.08	0.33		0.12	0.36			0.13	0.29		0.12	0.28
v/c Ratio	0.47	0.55		0.72	0.67			0.87	0.88		0.72	0.84
Control Delay	57.4	32.0		61.0	32.4			71.9	47.9		61.0	46.1
Queue Delay	0.0	0.0		0.0	0.0			0.0	0.0		0.0	0.0
Total Delay	57.4	32.0		61.0	32.4			71.9	47.9		61.0	46.1
LOS	E	C		E	C			E	D		E	D
Approach Delay		35.3			38.0				53.1			49.0
Approach LOS		D			D				D			D
Queue Length 50th (ft)	52	196		113	270			144	354		113	322
Queue Length 95th (ft)	84	243		161	336			#223	#442		161	381

Lane Group	SBR
Lane Configurations	
Traffic Volume (vph)	122
Future Volume (vph)	122
Ideal Flow (vphpl)	1900
Storage Length (ft)	0
Storage Lanes	0
Taper Length (ft)	
Lane Util. Factor	0.91
Frt	
Flt Protected	
Satd. Flow (prot)	0
Flt Permitted	
Satd. Flow (perm)	0
Right Turn on Red	Yes
Satd. Flow (RTOR)	
Link Speed (mph)	
Link Distance (ft)	
Travel Time (s)	
Peak Hour Factor	0.92
Heavy Vehicles (%)	2%
Shared Lane Traffic (%)	
Lane Group Flow (vph)	0
Turn Type	
Protected Phases	
Permitted Phases	
Detector Phase	
Switch Phase	
Minimum Initial (s)	
Minimum Split (s)	
Total Split (s)	
Total Split (%)	
Yellow Time (s)	
All-Red Time (s)	
Lost Time Adjust (s)	
Total Lost Time (s)	
Lead/Lag	
Lead-Lag Optimize?	
Recall Mode	
Act Effct Green (s)	
Actuated g/C Ratio	
v/c Ratio	
Control Delay	
Queue Delay	
Total Delay	
LOS	
Approach Delay	
Approach LOS	
Queue Length 50th (ft)	
Queue Length 95th (ft)	

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBU	NBL	NBT	NBR	SBL	SBT
Internal Link Dist (ft)		132			523				86			636
Turn Bay Length (ft)	210			160				190			200	
Base Capacity (vph)	390	1644		447	1824			430	1493		447	1453
Starvation Cap Reductn	0	0		0	0			0	0		0	0
Spillback Cap Reductn	0	0		0	0			0	0		0	0
Storage Cap Reductn	0	0		0	0			0	0		0	0
Reduced v/c Ratio	0.35	0.55		0.66	0.67			0.85	0.88		0.66	0.84

Intersection Summary			
Area Type:	Other		
Cycle Length: 120			
Actuated Cycle Length: 120			
Offset: 0 (0%), Referenced to phase 2:EBT and 6:WBT, Start of Green			
Natural Cycle: 85			
Control Type: Actuated-Coordinated			
Maximum v/c Ratio: 0.88			
Intersection Signal Delay: 44.8		Intersection LOS: D	
Intersection Capacity Utilization 72.9%		ICU Level of Service C	
Analysis Period (min) 15			
# 95th percentile volume exceeds capacity, queue may be longer.			
Queue shown is maximum after two cycles.			

Splits and Phases: 3: Carlisle Boulevard & Menaul Boulevard



Lane Group	SBR
Internal Link Dist (ft)	
Turn Bay Length (ft)	
Base Capacity (vph)	
Starvation Cap Reductn	
Spillback Cap Reductn	
Storage Cap Reductn	
Reduced v/c Ratio	

Intersection Summary

Intersection	
Int Delay, s/veh	2.6

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBU	SBL	SBT	SBR
Lane Configurations													
Traffic Vol, veh/h	5	0	64	34	1	39	91	1544	45	1	61	1409	37
Future Vol, veh/h	5	0	64	34	1	39	91	1544	45	1	61	1409	37
Conflicting Peds, #/hr	0	0	0	0	0	0	0	0	0	0	0	0	0
Sign Control	Stop	Stop	Stop	Stop	Stop	Stop	Free	Free	Free	Free	Free	Free	Free
RT Channelized	-	-	None	-	-	None	-	-	None	-	-	-	None
Storage Length	-	-	-	-	-	-	125	-	-	-	80	-	-
Veh in Median Storage, #	-	0	-	-	1	-	-	0	-	-	-	0	-
Grade, %	-	0	-	-	0	-	-	0	-	-	-	0	-
Peak Hour Factor	95	95	95	95	95	95	95	95	95	92	95	95	95
Heavy Vehicles, %	2	0	2	0	0	50	2	2	0	2	33	1	0
Mvmt Flow	5	0	67	36	1	41	96	1625	47	1	64	1483	39

Major/Minor	Minor2			Minor1			Major1			Major2			
Conflicting Flow All	2476	3497	761	2564	3493	836	1522	0	0	1221	1672	0	0
Stage 1	1633	1633	-	1841	1841	-	-	-	-	-	-	-	-
Stage 2	843	1864	-	723	1652	-	-	-	-	-	-	-	-
Critical Hdwy	6.44	6.5	7.14	6.4	6.5	8.1	5.34	-	-	5.64	5.96	-	-
Critical Hdwy Stg 1	7.34	5.5	-	7.3	5.5	-	-	-	-	-	-	-	-
Critical Hdwy Stg 2	6.74	5.5	-	6.7	5.5	-	-	-	-	-	-	-	-
Follow-up Hdwy	3.82	4	3.92	3.8	4	4.4	3.12	-	-	2.32	3.43	-	-
Pot Cap-1 Maneuver	*118	10	299	99	10	*503	217	-	-	*954	*645	-	-
Stage 1	*71	161	-	445	465	-	-	-	-	-	-	-	-
Stage 2	*579	448	-	353	158	-	-	-	-	-	-	-	-
Platoon blocked, %	1	1		1	1	1		-	-	1	1	-	-
Mov Cap-1 Maneuver	*65	5	299	47	5	*503	217	-	-	*648	*648	-	-
Mov Cap-2 Maneuver	*65	5	-	105	37	-	-	-	-	-	-	-	-
Stage 1	*40	145	-	249	260	-	-	-	-	-	-	-	-
Stage 2	*295	250	-	246	142	-	-	-	-	-	-	-	-

Approach	EB	WB	NB	SB
HCM Control Delay, s	26.8	41.8	1.8	0.5
HCM LOS	D	E		

Minor Lane/Major Mvmt	NBL	NBT	NBR	EBLn1	WBLn1	SBL	SBT	SBR
Capacity (veh/h)	217	-	-	237	173	* 648	-	-
HCM Lane V/C Ratio	0.441	-	-	0.306	0.45	0.101	-	-
HCM Control Delay (s)	34.1	-	-	26.8	41.8	11.2	-	-
HCM Lane LOS	D	-	-	D	E	B	-	-
HCM 95th %tile Q(veh)	2.1	-	-	1.2	2.1	0.3	-	-

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

Intersection	
Int Delay, s/veh	0.1

Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations						
Traffic Vol, veh/h	953	7	0	1288	0	9
Future Vol, veh/h	953	7	0	1288	0	9
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	95	95	95	95	95	95
Heavy Vehicles, %	0	0	0	0	0	0
Mvmt Flow	1003	7	0	1356	0	9

Major/Minor	Major1		Major2		Minor1	
Conflicting Flow All	0	0	-	-	-	505
Stage 1	-	-	-	-	-	-
Stage 2	-	-	-	-	-	-
Critical Hdwy	-	-	-	-	-	7.1
Critical Hdwy Stg 1	-	-	-	-	-	-
Critical Hdwy Stg 2	-	-	-	-	-	-
Follow-up Hdwy	-	-	-	-	-	3.9
Pot Cap-1 Maneuver	-	-	0	-	0	443
Stage 1	-	-	0	-	0	-
Stage 2	-	-	0	-	0	-
Platoon blocked, %	-	-		-		
Mov Cap-1 Maneuver	-	-	-	-	-	443
Mov Cap-2 Maneuver	-	-	-	-	-	-
Stage 1	-	-	-	-	-	-
Stage 2	-	-	-	-	-	-

Approach	EB	WB	NB
HCM Control Delay, s	0	0	13.3
HCM LOS			B

Minor Lane/Major Mvmt	NBLn1	EBT	EBR	WBT
Capacity (veh/h)	443	-	-	-
HCM Lane V/C Ratio	0.021	-	-	-
HCM Control Delay (s)	13.3	-	-	-
HCM Lane LOS	B	-	-	-
HCM 95th %tile Q(veh)	0.1	-	-	-

Intersection	
Int Delay, s/veh	0.1

Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Traffic Vol, veh/h	0	15	0	1569	1482	16
Future Vol, veh/h	0	15	0	1569	1482	16
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	95	95	95	95	95	95
Heavy Vehicles, %	0	0	0	0	0	0
Mvmt Flow	0	16	0	1652	1560	17

Major/Minor	Minor2		Major1		Major2	
Conflicting Flow All	-	789	-	0	-	0
Stage 1	-	-	-	-	-	-
Stage 2	-	-	-	-	-	-
Critical Hdwy	-	7.1	-	-	-	-
Critical Hdwy Stg 1	-	-	-	-	-	-
Critical Hdwy Stg 2	-	-	-	-	-	-
Follow-up Hdwy	-	3.9	-	-	-	-
Pot Cap-1 Maneuver	0	290	0	-	-	-
Stage 1	0	-	0	-	-	-
Stage 2	0	-	0	-	-	-
Platoon blocked, %				-	-	-
Mov Cap-1 Maneuver	-	290	-	-	-	-
Mov Cap-2 Maneuver	-	-	-	-	-	-
Stage 1	-	-	-	-	-	-
Stage 2	-	-	-	-	-	-

Approach	EB	NB	SB
HCM Control Delay, s	18.1	0	0
HCM LOS	C		

Minor Lane/Major Mvmt	NBT	EBLn1	SBT	SBR
Capacity (veh/h)	-	290	-	-
HCM Lane V/C Ratio	-	0.054	-	-
HCM Control Delay (s)	-	18.1	-	-
HCM Lane LOS	-	C	-	-
HCM 95th %tile Q(veh)	-	0.2	-	-