TRAFFIC IMPACT STUDY

For

Clifton Cheder Inc.
Proposed Enrollment Expansion

Property Located at:

213 & 224 Barkley Avenue
Block 19.08 – Lot 13 & Block 19.10 – Lot 1
City of Clifton, Passaic County, NJ

Prepared by:

1904 Main Street
Lake Como, NJ 07719

245 Main Street, Suite #110
Chester, NJ 07930

(732) 681-0760

Craig W. Peregoy, PE
NJ PE License #45880

Connor G. Hughes, PE
NJ PE License #57245

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2072-23-01158

CGH

INTRODUCTION

It is proposed to re-locate and expand the enrollment of an existing private girl's school known as Clifton Cheder School ("The Project"). Currently, there are about 90 girls enrolled at the existing school which shares a location with the private boy's school at 1333 Broad Street in Clifton. It is proposed to re-locate the girl's school to a new location at 213 Barkley Avenue and expand the enrollment to a maximum of 190 students. The property is located within the southeast corner of the intersection of Barkley Avenue and Delaware Street in the City of Clifton, Passaic County, New Jersey (see Figure 1 in Appendix A). The site is designated as Block 19.08 – Lot 13 and Block 19.10 – Lot 1 on the City Tax Maps. The site is currently developed with the Clifton Jewish Center as well as a day care center. It is proposed to re-occupy the day care space with the private girl's school, while the Clifton Jewish Center will remain. Access to the site is currently provided via one (1) full movement driveway along Barkley Avenue and two (2) full movement driveways along Delaware Street, which will remain and provide access to a parking lot across Barkley Avenue from the building. Parking will continue to be provided via the existing forty-four (44) parking stalls located in the parking lot.

Dynamic Traffic, LLC has been retained to prepare this study to assess the traffic impact associated with the construction of The Project on the adjacent roadway network. This study documents the methodology, analyses, findings and conclusions of our study and includes:

- A detailed field inspection was conducted to obtain an inventory of existing roadway geometry, traffic control, and location and geometry of existing driveways and intersections.

- Existing traffic data was collected via manual turning movement (MTM) counts during the weekday AM and weekday PM peak periods at the intersection of Barkley Avenue and Delaware Street. The operations of the existing school at 1333 Broad Street as well as the existing day care center were also observed.

- Projections of traffic to be generated by the proposed development were prepared utilizing information obtained through consultations with representatives of the proposed school. Site traffic was then assigned to the adjacent street system based upon the anticipated directional distribution.

- Capacity analyses were conducted for the Existing, No Build, and Build conditions for the study intersections.

- The proposed points of ingress and egress were inspected for adequacy of geometric design, spacing and/or alignment to streets and driveways on the opposite side of the street, relationship to other driveways adjacent to the development, and conformance with accepted design standards.

- The parking was assessed based on demand experienced at similar developments.

- A queuing analysis was conducted for the drop-offs and pick-ups of students along Delaware Street during the dismissal and arrival times.

EXISTING CONDITIONS

A review of the existing roadway conditions near the subject site was conducted to provide the basis for assessing the traffic impact of the development. This included field investigations of the surrounding roadways and intersections, collection of traffic volume data, and extensive analyses.

Existing Roadway Conditions

The following are descriptions of the roadways in the study area:

Barkley Avenue is a local roadway under the jurisdiction of the City of Clifton. In the vicinity of the site the speed limit is not posted and the roadway provides one travel lane in each direction with a general east/west orientation. Curb is provided along both sides of the roadway, while sidewalk is provided along the south side of the roadway and the majority of the north side of the roadway. Barkley Avenue provides a straight horizontal alignment and an uphill vertical alignment from east to west. The land uses along Barkley Avenue in the vicinity of The Project are a mix of commercial and residential.

Delaware Street is a local roadway under the jurisdiction of the City of Clifton. In the vicinity of the site the speed limit is not posted and the roadway provides one travel lane in each direction with a general north/south orientation. Curb is provided along both sides of the roadway, while sidewalk is provided along the east side of the roadway. Delaware Street provides a straight horizontal alignment and a relatively flat vertical alignment. The land uses along Delaware Street in the vicinity of The Project are a mix of commercial and residential.

Existing Traffic Volumes

Manual turning movement (MTM) counts were conducted on Wednesday, April 19, 2023 from 7:00 – 10:30 AM and 3:30 – 6:30 PM at the intersection of Barkley Avenue and Delaware Street. Additionally, the existing day care was counted to establish the current traffic demands of the site as well as observe the queueing activity on Delaware Street along the site frontage. Additionally, the existing school at 1333 Broad Street was counted on Wednesday, May 10, 2023 to establish existing trip generation and queuing demands.

Note that these time periods capture both the day care and roadway peak times, and also incorporate the arrival/dismissal times of the proposed private school. Review of the collected traffic data reveals that the weekday morning peak street hour (PSH) occurs from 7:30 – 8:30 AM and the weekday evening PSH occurs from 4:45 – 5:45 PM.

Existing Capacity Analysis

The methodology utilized in the capacity analyses is described in the *Highway Capacity Manual*, published by the Transportation Research Board. In general, the term Level of Service (LOS) is used to provide a "qualitative" evaluation of capacity based upon certain "quantitative" calculations related to empirical values, such as traffic volume and intersection control.

An unsignalized (STOP sign controlled) driveway or side street along a through route is seldom critical from an overall capacity standpoint, however, it may be of great significance to the capacity of the minor cross-route, and it may influence the quality of traffic flow on both. When analyzing an unsignalized intersection, it is assumed that both the major street through and right turn movements are unimpeded and have the right-of-way over all side street traffic and left turns from the major street. All other turning movements in the intersection cross, merge with, or are otherwise impeded by major street movements. Traffic delays at unsignalized intersections are determined by sequentially processing these impeded movements. Table 1 describes the level of service ranges for unsignalized (stop controlled) intersections.

Table 1
Level of Service Criteria
for Unsignalized Intersections

Level of Service	Average Control Delay (seconds per vehicle)
A	0.0 to 10.0
B	10.1 to 15.0
C	15.1 to 25.0
D	25.1 to 35.0
E	35.1 to 50.0
F	greater than 50.0

It should be noted that the analyses within the *Highway Capacity Manual* assume a random arrival for all the movements, which may not be the case if an adjacent traffic signal is present that platoons vehicles.

All capacity analyses were performed utilizing Synchro 11 software. It should be noted that the existing percentage of trucks and peak hour factors were used in the existing analysis. Table 2 summarizes the existing levels of service (LOS) and delays. All capacity analysis calculation worksheets are contained in Appendix C.

Table 2
Existing Levels of Service

Intersection	Direction/ Movement		AM PSH	PM PSH
Barkley Avenue and Delaware Street	EB	LTR	B (12)	A (10)
	WB	LTR	B (13)	B (11)
	NB	LTR	A (7)	A (7)
	SB	LTR	A (8)	A (7)

A (#) - Unsignalized Intersection Level of Service (seconds of delay per vehicle)

The following are discussions pertaining to each of the existing intersections analyzed.

Barkley Avenue and Delaware Street

Delaware Street intersects Barkley Avenue to form an unsignalized four-leg intersection with Barkley Avenue operating under stop control. The eastbound and westbound approaches of Barkley Avenue each provide a shared left turn/through/right turn lane. The northbound and southbound approaches of Delaware Street each provide a shared left turn/through/right turn lane.

A review of the existing analysis reveals that the individual intersection movements operate at Levels of Service "B" or better during the analyzed peak periods. See Table 2 for the individual movement Levels of Service and delays.

FUTURE CONDITIONS

Traffic volumes and operational analyses were developed for both the No Build and Build conditions. The No Build conditions provide a baseline for assessing the impact of site development traffic on the roadway system. The process of developing the No Build and Build traffic volumes and the subsequent analyses is outlined below.

Regardless of whether the subject site is developed or not, traffic volumes on the surrounding roadways are expected to increase as a result of developments throughout the region. A growth rate for roadways within the study area was obtained from the NJDOT Annual Background Growth Rate Table, which indicates a growth rate of 1% per year.

It should also be noted that through consultation with the Applicant, the growth from the existing 90 students to the proposed maximum enrollment of 190 students is projected occur over a 5-6 year time period. Therefore, future No Build traffic volumes were developed by applying the background growth rate of 1% for six (6) years to the study area existing traffic volumes. Figure 3, in Appendix A, shows the Future No Build traffic volumes.

Traffic Generation

Trip generation projections for the proposed school were developed based on specific operational data provided by the Applicant. It is proposed that the private school will ultimately operate with a full enrollment of 190 students accompanied by 20 staff members. As noted above, the growth from the existing 90 students to the proposed maximum enrollment of 190 students is projected to take place over a 5-6 year time period, which will lessen the immediate traffic impacts since the new students will not all start attending during the same school year.

Based on the school's anticipated operations, students will arrive starting at 8:45 AM and will be dropped off along the Delaware Street frontage. In the afternoon, students will be dismissed at 4:00 PM. In order to lessen the queuing along Delaware Street during pick-ups, parents that arrive early will be asked to wait in the parking lot and then circulate around to Delaware Street once dismissal begins. Additionally, any parents picking up 3+ students will be asked to park in the parking lot, where the students will be walked out to them. This will help alleviate any longer waiting times along Delaware Street as well as reduce queuing.

Additionally, based on the observations at the existing location, carpooling is a very prevalent practice for this particular school. Through consultation with the applicant, the attendance the day the counts were taken was 259 students, whereas a total of 67 vehicles were observed to arrive during the pick-up periods. This translates to 0.26 cars/student, which further translates to 49 vehicles for the proposed maximum enrollment of 190 girls at the new location after accounting for the utilization of carpooling. The count data also revealed that 63% of parents drive with 3+ students, which translates to 31 vehicles utilizing the parking lot and 18 vehicles utilizing Delaware Street during afternoon pick-ups.

As for the staff members, it is planned for them to work in shifts whereas there will be different teachers for morning studies versus afternoon studies. Accordingly, it is anticipated that only 12 of the 20 staff will arrive prior to students. There will be 8 morning shift teachers who will leave between 1:00 – 2:00 PM, during which time the 8 afternoon shift teachers will arrive. Upon dismissal of the students in the afternoon, the remaining 12 staff members will leave. Therefore, it was assumed that 12 staff members will arrive in the morning and leave in the afternoon during drop-offs/pick-ups.

The following Table 3 identifies the trip generation based on the various operational factors described above.

Table 3
Trip Generation

Location	Trip Type	AM PSH			PM PSH		
		In	Out	Total	In	Out	Total
Delaware Street	Drop-off/Pick-up	49	49	98	18	18	36
	Staff	0	0	0	0	0	0
	Total	49	49	98	18	18	36
Parking Lot	Drop-off/Pick-up	0	0	0	31	31	62
	Staff	12	0	12	0	12	12
	Total	12	0	12	31	43	74
Total	**Drop-off/Pick-up**	**49**	**49**	**98**	**49**	**49**	**98**
	Staff	**12**	**0**	**12**	**0**	**12**	**12**
	Total	**61**	**49**	**110**	**49**	**61**	**110**

Additionally, as mentioned previously, the building space being occupied by the school is currently occupied by a day care center which has an existing trip generation and was counted during the MTM counts. The following Table 4 compares the trips associated with the proposed use to the existing trip generation of the day care.

Table 4
Existing vs. Proposed Trip Generation Comparison

Land Use	AM PSH			PM PSH		
	In	Out	Total	In	Out	Total
Existing Day Care Center (As Counted)	23	23	46	29	32	61
Proposed 190-Student Private School	61	49	110	49	61	110
Difference	**+38**	**+26**	**+64**	**+20**	**+29**	**+49**

As shown in Table 4 above, it is anticipated that 64 additional trips during the weekday morning peak hour and 49 additional trips during the weekday evening peak hour are anticipated to access the site with the proposed redevelopment.

It should be noted that the number of new trips falls below the industry accepted standard of a significant increase in traffic of 100 trips even without consideration of the existing uses on-site. Based on Transportation Impact Analysis for Site Development, published by the ITE "it is suggested that a transportation impact study be conducted whenever a proposed development will generate 100 or more added (new) trips during the adjacent roadways' peak hour or the development's peak hour." Additionally, NJDOT has determined that the same 100 vehicle threshold is considered a "significant increase in traffic," hence, it is not anticipated that the proposed redevelopment will have any perceptible impact on the traffic operation of the adjacent roadway network.

Furthermore, the ITE calculates trip generation data for both the peak street hour as well as the peak hour of the generator. The peak street hour coincides with the peak hour of the adjacent roadway network while the peak hour of the generator coincides with the peak hour of the proposed development. It was conservatively assumed that traffic associated with the proposed school will peak at the same time as the adjacent roadway traffic volumes. Realistically, particularly during the PM peak hour, the proposed school will observe its peak activity prior to the roadway peak.

Once the magnitude of traffic to be generated by the site is known, it is necessary to assign that traffic to the adjacent street system. The distribution of new traffic to the surrounding roadways is based on the location of primary arterial roadways, major signalized intersections and existing traffic patterns. As noted previously, drop-offs of students will occur along Delaware Street while pick-ups will occur both within the parking lot and along Delaware Street, while all staff will utilize the parking lot. As such, the trip distribution was prepared accordingly.

Located in Appendix A, Figure 4 illustrates the removal of the existing day care traffic volumes. Figure 5 illustrates the percent distribution of site generated trips for the parking lot, Figure 6 illustrates the site generated traffic volumes for the parking lot, Figure 7 illustrates the percent distribution of site generated trips for Delaware Street, Figure 8 illustrates the site generated traffic volumes for Delaware Street, and Figure 9 illustrates the total site generated volumes assigned to the study area network. The site generated volumes were added to the No Build traffic volumes to generate the Build traffic volumes, shown in Figure 10.

Future Capacity Analysis

Operational conditions at the study intersections were analyzed under the No Build and Build conditions and are summarized in Table 5 below.

Table 5
Future Levels of Service

Intersection	Direction/ Movement		AM PSH		PM PSH	
			No Build	Build	No Build	Build
Barkley Avenue and Delaware Street	EB	LTR	B (12)	B (13)	B (10)	B (10)
	WB	LTR	B (14)	B (15)	B (11)	B (11)
	NB	LTR	A (7)	A (7)	A (7)	A (7)
	SB	LTR	A (8)	A (8)	A (7)	A (7)
Barkley Avenue and Site Driveway	EB	LT	-	A (7)	-	A (7)
	SB	LR	-	-	-	A (9)
Delaware Street and North Site Driveway	WB	LR	-	-	-	A (9)
	SB	LT	-	A (8)	-	A (7)
Delaware Street and South Site Driveway	WB	LR	-	-	-	A (9)
	SB	LT	-	A (8)	-	A (7)

A (#) - Unsignalized Intersection Level of Service (seconds of delay per vehicle)

Barkley Avenue and Delaware Street

With the addition of the site traffic, the individual intersection movements are anticipated to continue operating at No Build Levels of Service "B" or better during the analyzed peak hours. See Table 5 for the individual movement Levels of Service and delays.

Barkley Avenue and the Site Driveway

The southbound approach of the site driveway is proposed to continue intersecting Barkley Avenue to form an unsignalized T-intersection with the site driveway operating under stop control. The eastbound and westbound approaches of Barkley Avenue are proposed to continue providing a shared left turn/through lane and a shared through/right turn lane, respectively. The southbound approach of the site driveway is proposed to continue providing a shared lane for left and right turns.

With the addition of the site traffic, the individual intersection movements are anticipated to operate at Level of Service "A" during the analyzed peak hours. See Table 5 for the individual movement Levels of Service and delays.

Delaware Street and the North Site Driveway

The westbound approach of the north site driveway is proposed to continue intersecting Delaware Street to form an unsignalized T-intersection with the site driveway operating under stop control. The northbound and southbound approaches of Delaware Street are proposed to continue providing a shared through/right turn lane and a shared left turn/through lane, respectively. The westbound approach of the site driveway is proposed to continue providing a shared lane for left and right turns.

With the addition of the site traffic, the individual intersection movements are anticipated to operate at Level of Service "A" during the analyzed peak hours. See Table 5 for the individual movement Levels of Service and delays.

Delaware Street and the South Site Driveway

The westbound approach of the south site driveway is proposed to continue intersecting Delaware Street to form an unsignalized T-intersection with the site driveway operating under stop control. The northbound and southbound approaches of Delaware Street are proposed to continue providing a shared through/right turn lane and a shared left turn/through lane, respectively. The westbound approach of the site driveway is proposed to continue providing a shared lane for left and right turns.

With the addition of the site traffic, the individual intersection movements are anticipated to operate at Level of Service "A" during the analyzed peak hours. See Table 5 for the individual movement Levels of Service and delays.

SITE PLAN

Site Access and Circulation

The site plan was reviewed with respect to the site access and on-site circulation design. As noted previously, access to The Project will continue to be provided via one (1) full movement driveway along Barkley Avenue and two (2) full movement driveways along Delaware Street which provide access to the existing parking lot.

The parking lot will continue to be serviced by parking aisles with widths that are consistent with accepted engineering design standards and will provide for two-way circulation with access to 90-degree parking. These dimensions will adequately accommodate the anticipated site traffic.

Drop-Offs/Pick-Ups

As discussed previously, drop-offs and pick-ups of students are proposed to occur alongside the curb on Delaware Street as well as within the existing parking lot. The drop-off/pick-up area along Delaware Street begins at the southeast corner of its intersection with Barkley Avenue and continues along the curbline to the southern property line where is terminates. The length of the drop-off/pick-up area measures approximately 160 feet and as such a total of eight (8) vehicles can stage along the curb to perform drop-off/pick-up procedures. Additionally, with 44 parking spaces provided in the lot, there are 32 spaces available for afternoon pick-ups after accounting for the 12 staff members that will be present.

It should be noted that the characteristics of the morning drop-offs are that the process (enter and exit) occurs more quickly than the afternoon pick-ups. Drop-offs of students happen very quickly whereas each vehicle pulls up, the students get out of the car and are escorted into the school. However for pick-ups, vehicles tend to arrive prior to the actual dismissal and stage within the pick-up area. Therefore, it is proposed that any vehicles arriving early for afternoon pick-ups will be asked to park in the parking lot and then circulate around to the pick-up area along Delaware Street once the dismissal period actually begins. Additionally, any parents picking up 3+ students will be asked to park in the parking lot where the students will be walked out to them. As such, vehicles will not stage along Delaware Street before dismissals begin and will only circulate to the pick-up area once students are ready. This will allow the adjacent roadways to continue operating in an efficient manner during the drop-off period. Students crossing Barkley Avenue to the parking lot will also be safely facilitated by the existing crosswalk as well as the presence of a staff member.

In order to quantify the ability of the 8 drop-off/pick-up spaces within the site to accommodate the projected demand, a queuing analysis was performed which takes into account the vehicular demand, duration of drop-off/pick-up procedures, available queue storage, among other factors. As outlined previously in Table 3, there is projected to be a maximum demand of 49 vehicles during the morning drop-off period and 18 vehicles during the afternoon pick-up period utilizing Delaware Street. The queuing analysis resulted in a calculated 95th percentile queue length of four (4) vehicles for both drop-offs pick-ups, which can be accommodated within the Delaware Street frontage while still providing extra buffer space in the event the queue extends further than these calculations. It should also be noted that the existing day care was observed to have a maximum queue of nine (9) cars along Delaware Street, which extends in front of the neighboring property to the south. As such, the proposed school operations will provide an improvement compared to existing conditions. The Queue Analysis calculations are contained in Appendix D.

Parking

The City of Clifton Ordinance sets forth a parking requirement of 1 parking for each staff member for schools with elementary school grades. This equates to a parking requirement of 20 spaces for the proposed 20 staff members. The Project is proposed to provide 44 parking spaces and as such the Ordinance requirement is met.

In the morning, the parking demand will only be driven by staff members since parents will primarily utilize the site frontage along Delaware Street during drop-offs. However in the afternoon, the parking demand will be driven by both staff members and parents since parents picking up 3+ students will also park in the parking lot. As described previously, it is projected that there will only be 12 staff members present at the time of dismissal, and approximately 31 parents will utilize the parking lot for pick-ups. This translates to a total parking demand of 43 vehicles, which can be accommodated by the 44 spaces provided.

It should also be noted that the Ordinance sets forth a parking requirement of 1 parking space for every 4 seats for the existing Clifton Jewish Center. This equates to a parking requirement of 60 spaces for the 238 seats currently provided. However, it is important to note that this an existing condition to remain, and the current parking supply has proven to be more than adequate to accommodate the peak demands. Furthermore, the Clifton Jewish Center will operate at separate times from the school with no overlap in parking demands. Therefore, the existing 44 parking spaces will continue to adequately serve the Clifton Jewish Center as well as the proposed school.

FINDINGS & CONCLUSIONS

Findings

Based upon the detailed analyses as documented herein, the following findings are noted:

- The proposed re-located and expanded private school is projected to generate 61 entering trips and 49 exiting trips during the morning arrival period and 49 entering trips and 61 exiting trips during the afternoon dismissal period.

- Access to the site will continue to be provided via one (1) full movement driveway along Barkley Avenue and two (2) full movement driveways along Delaware Street which provide access to the existing parking lot.

- With the addition of the site generated traffic, the individual intersection movements of Barkley Avenue and Delaware Street are anticipated to operate at No Build Levels of Service "B" or better during the studied peak hours.

- With the addition of the site generated traffic, the individual intersection movements of Barkley Avenue and the site driveway are anticipated to operate at Level of Service "A" during the studied peak hours.

- With the addition of the site generated traffic, the individual intersection movements of Delaware Street and the site driveways are anticipated to operate at Level of Service "A" during the studied peak hours.

- As proposed, The Project's site driveways and internal circulation have been designed to provide for safe and efficient movement of vehicles on-site.

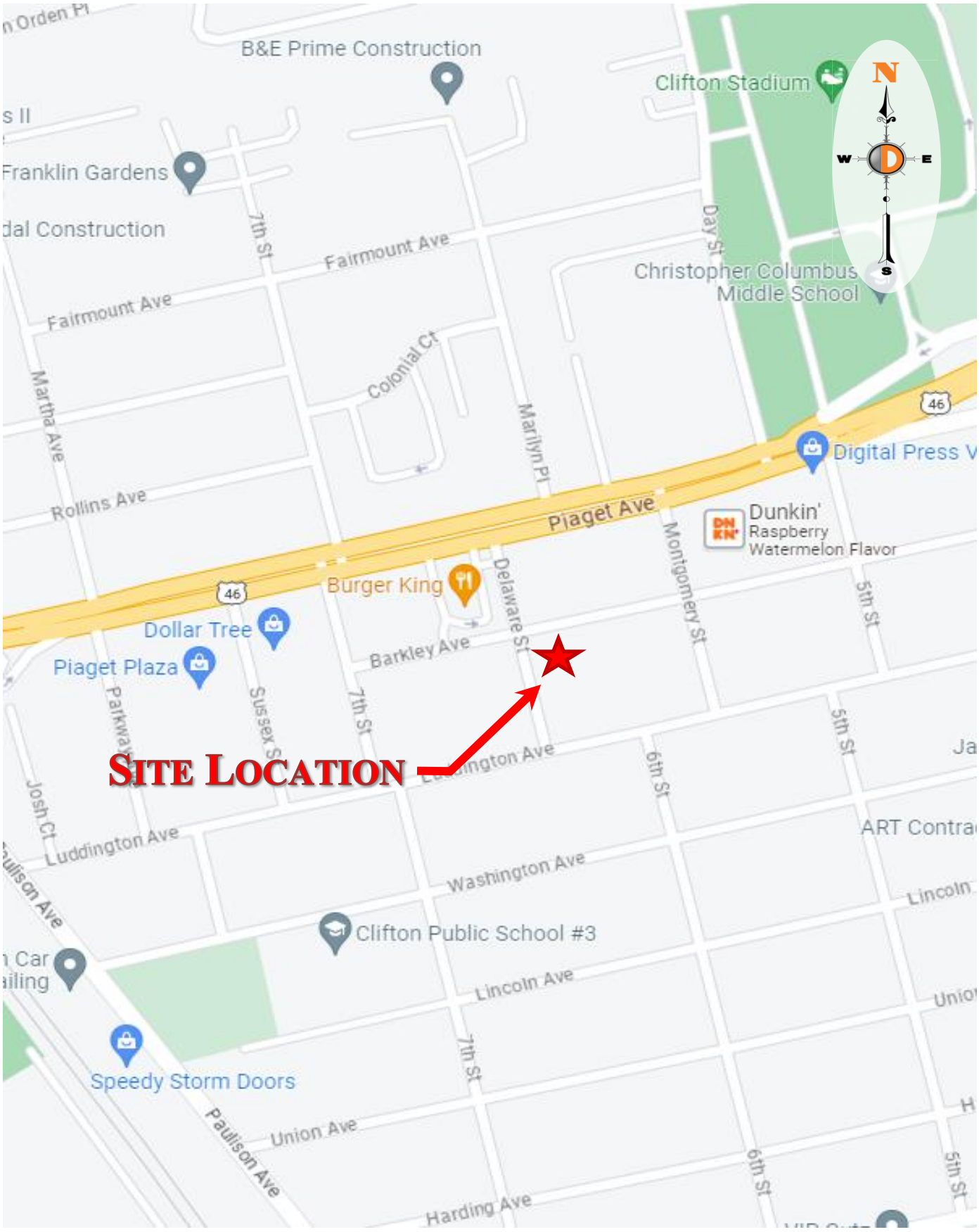
- The combination of the proposed drop-off/pick-up area along Delaware Street as well as the parking lot across the street will be sufficient to support the maximum anticipated demand of drop-offs and pick-ups.

- The proposed parking supply and design is sufficient to support the maximum anticipated demand.

Conclusions

Based upon our Traffic Impact Study as detailed in the body of this report, it is the professional opinion of Dynamic Traffic, LLC that the adjacent street system of the City of Clifton will not experience any significant degradation in operating conditions with the construction of the Project. The site driveways are located to provide safe and efficient access to the adjacent roadway system. The site plan as proposed provides for good circulation throughout the site and provides adequate parking to accommodate the Project's needs.

Appendix A
Traffic Volume Figures



Proposed Enrollment Expansion
Traffic Impact Study
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Figure 1

Site Location Map

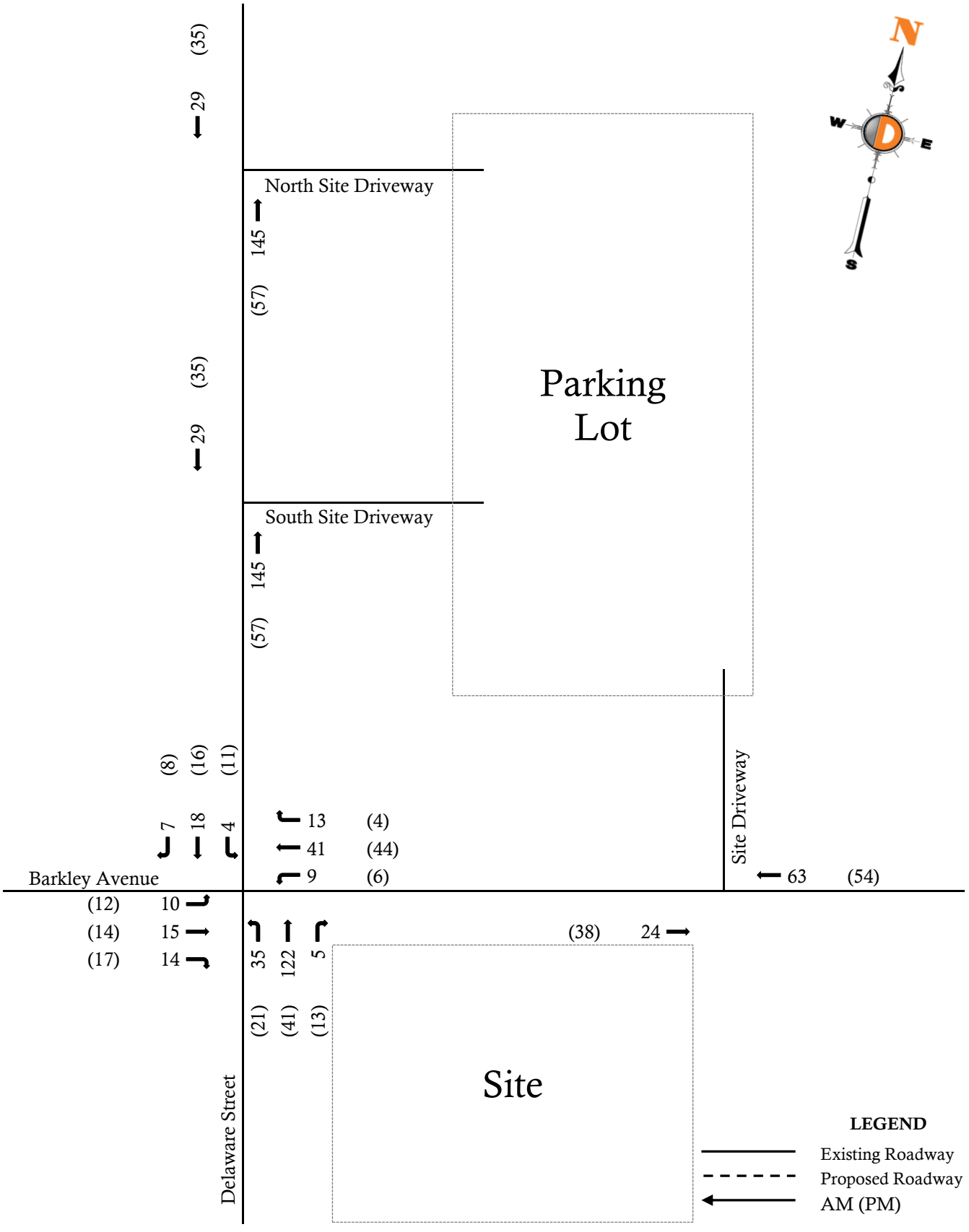

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Figure 2

Existing Traffic Volumes

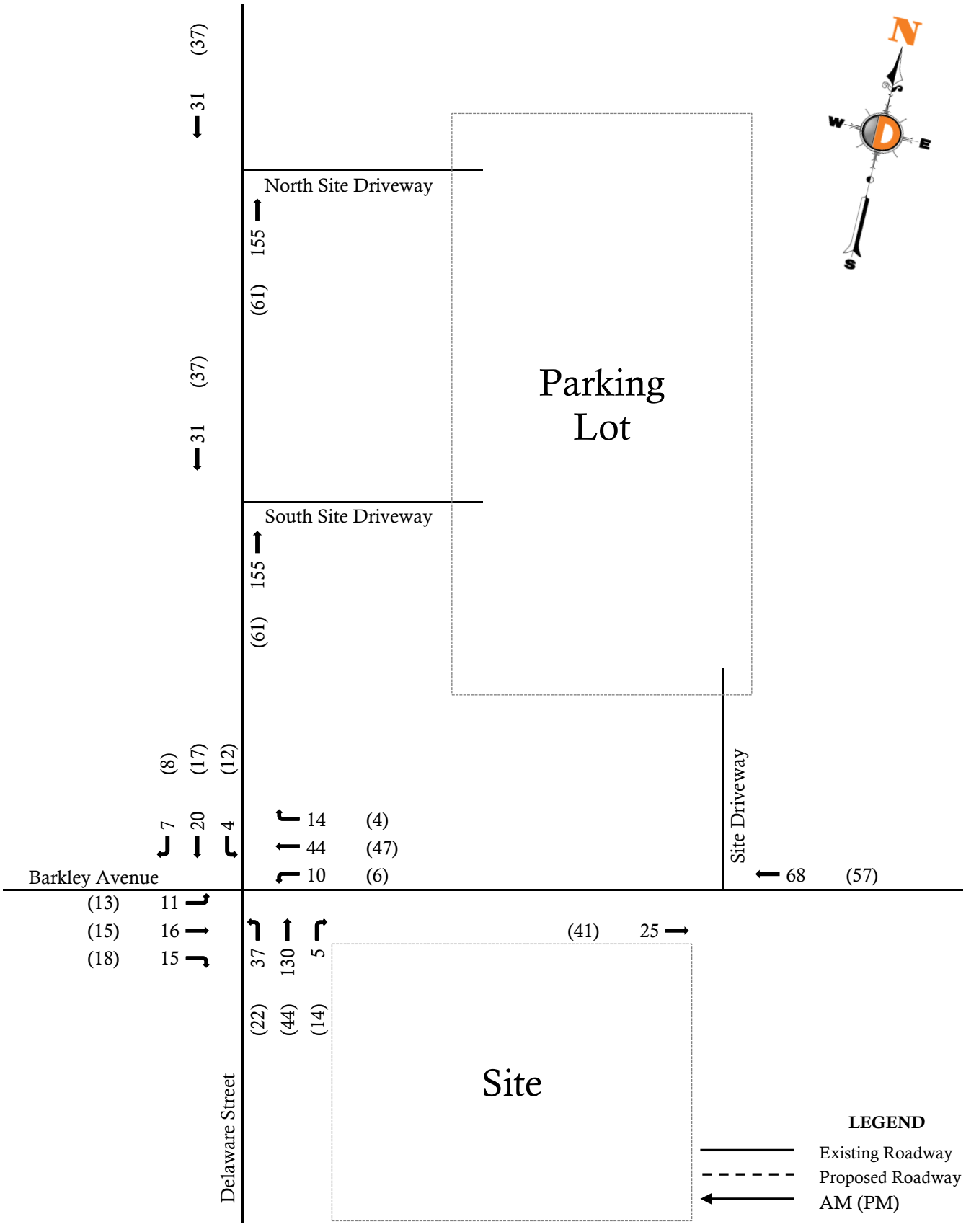

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Figure 3

No Build Traffic Volumes

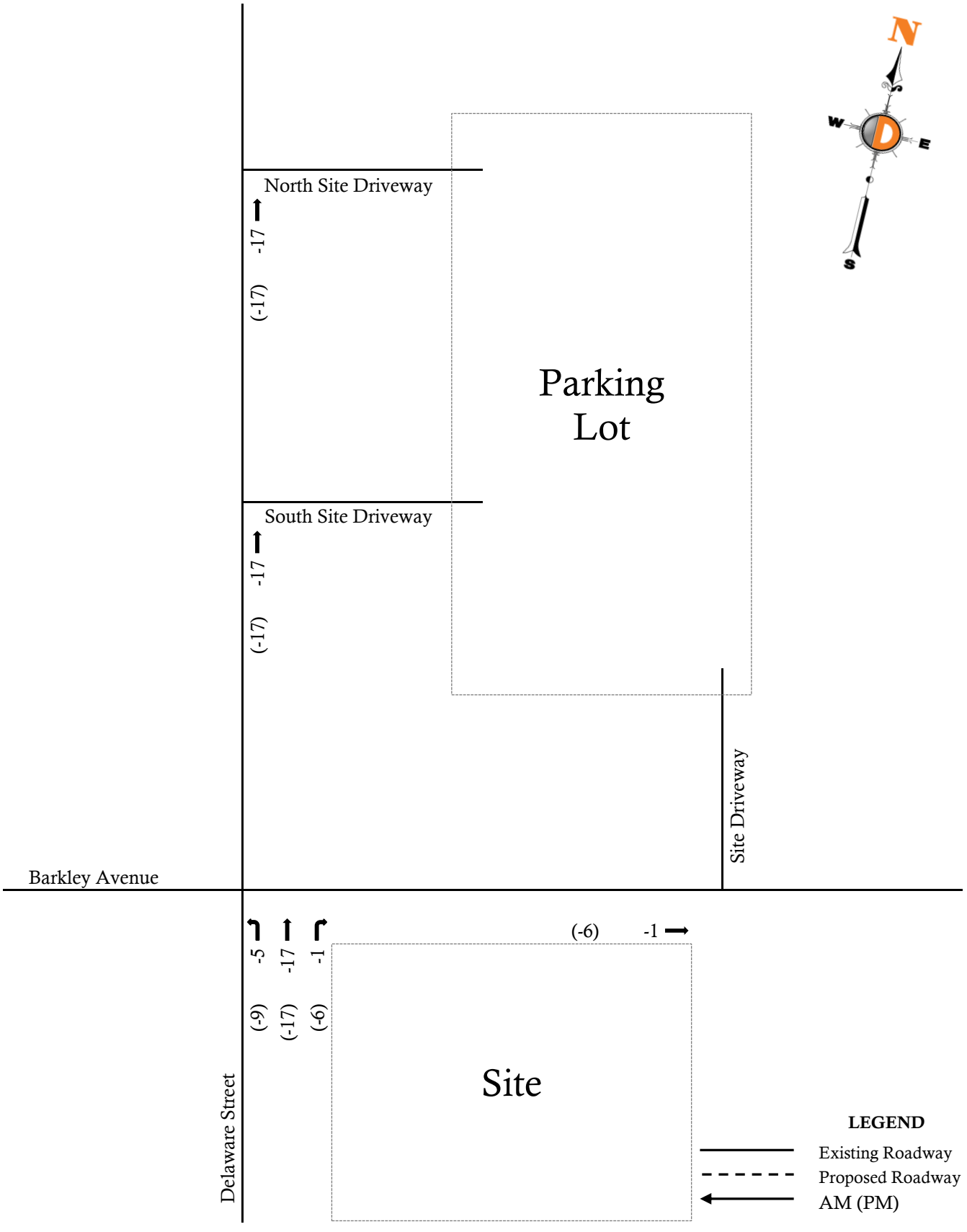

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Figure 4

Removal of Existing Traffic Volumes

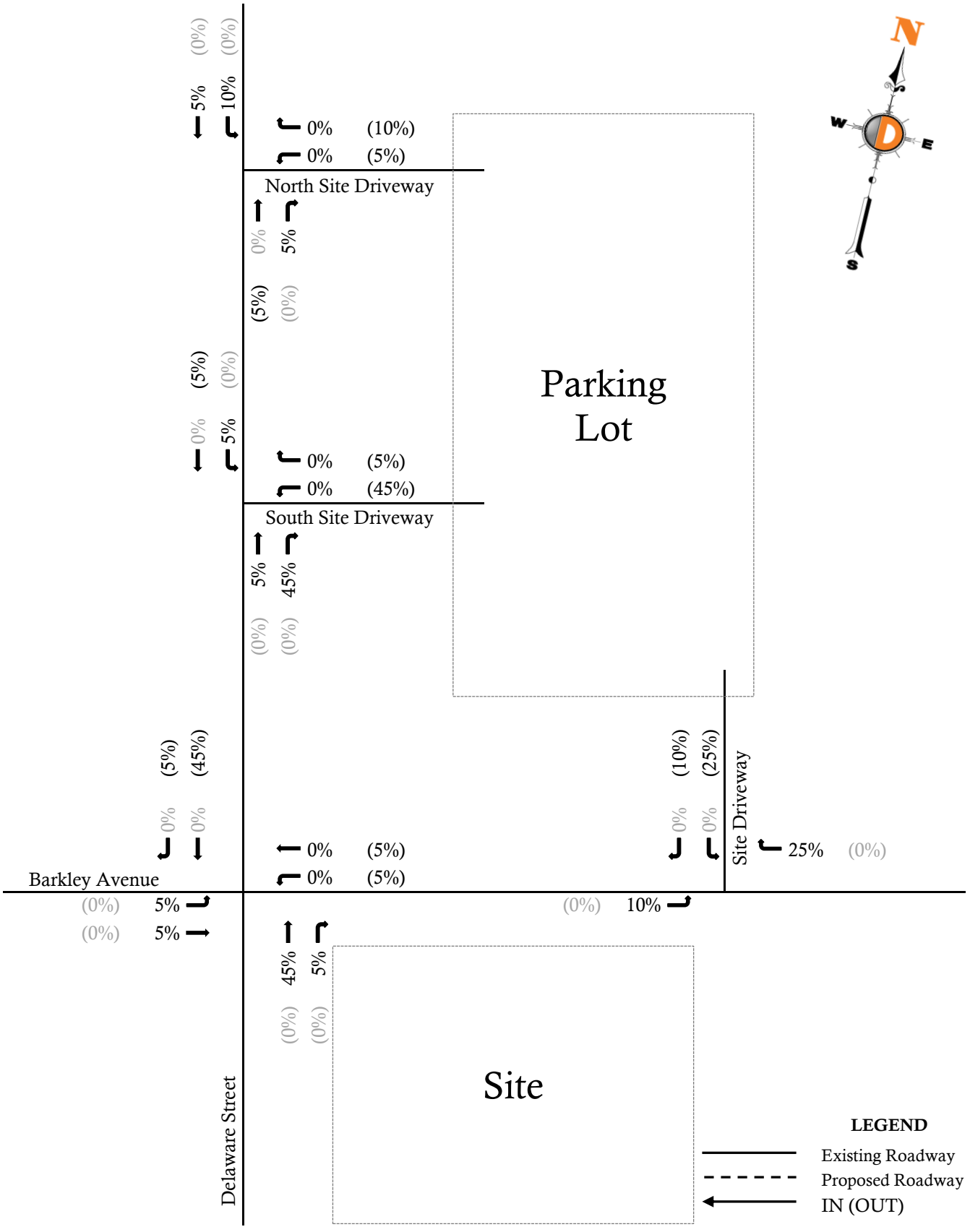

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Figure 5

Percent Distribution (Parking Lot)

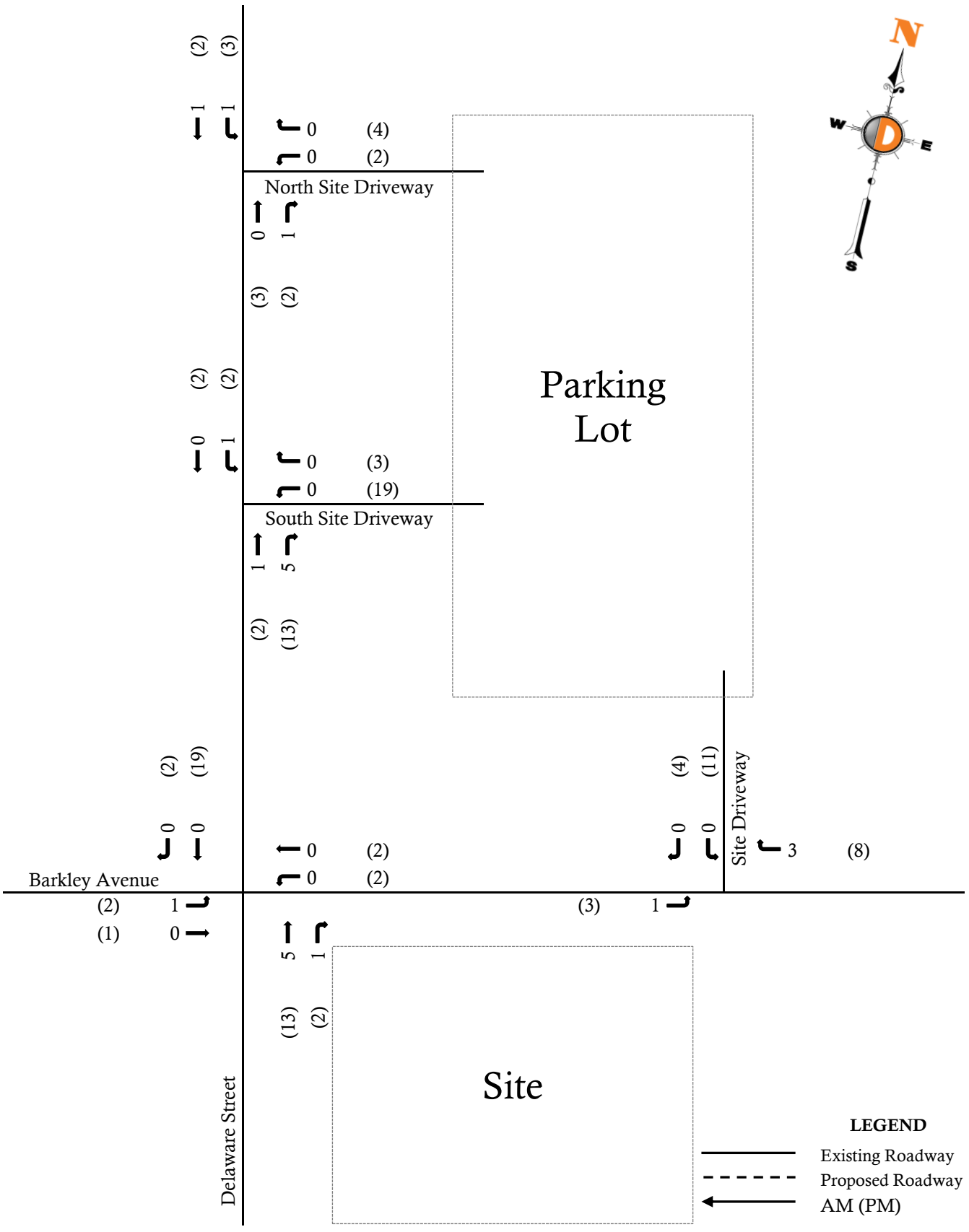

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Figure 6

Site Generated Trips - Parking Lot

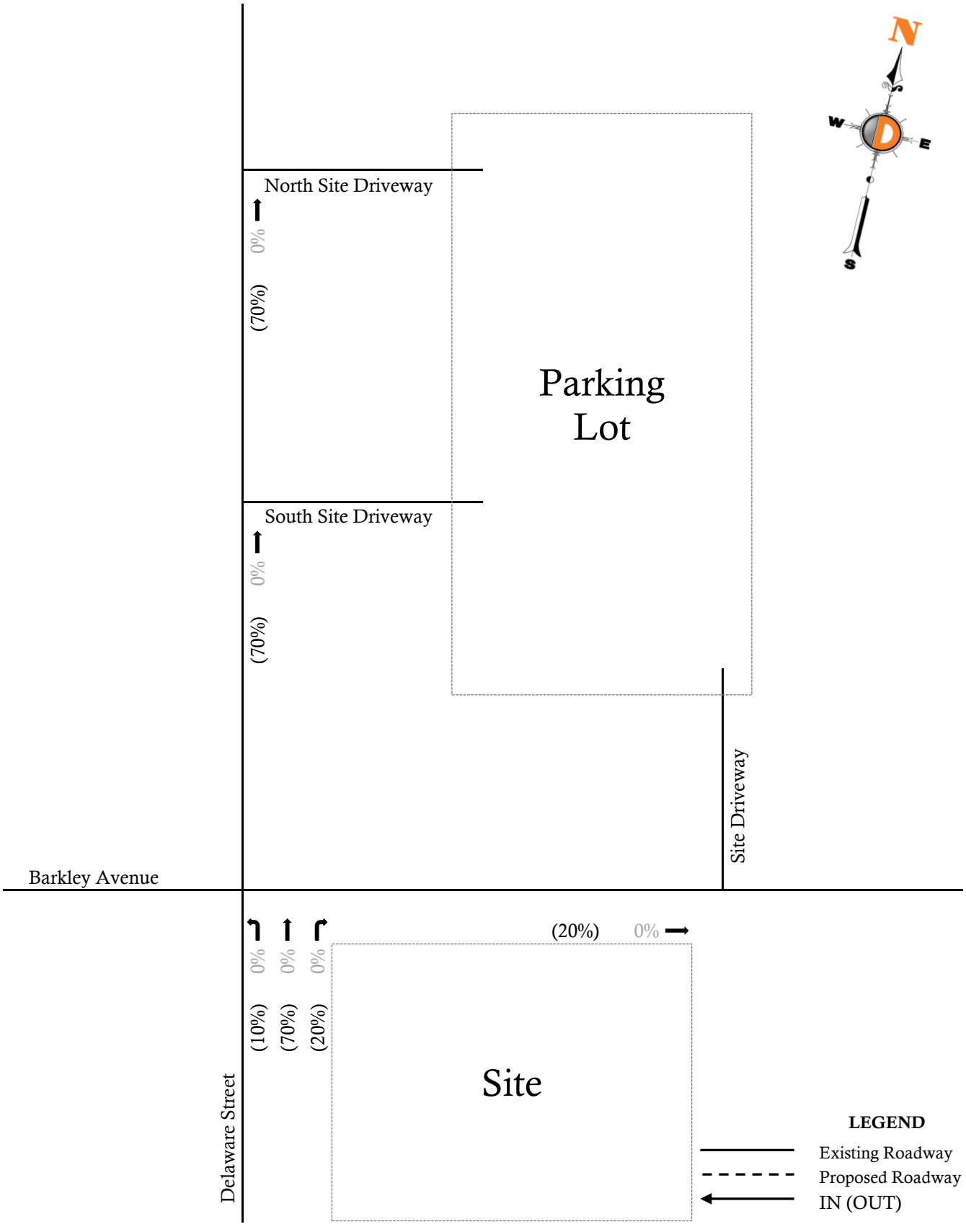

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Figure 7

Percent Distribution (Delaware Street)

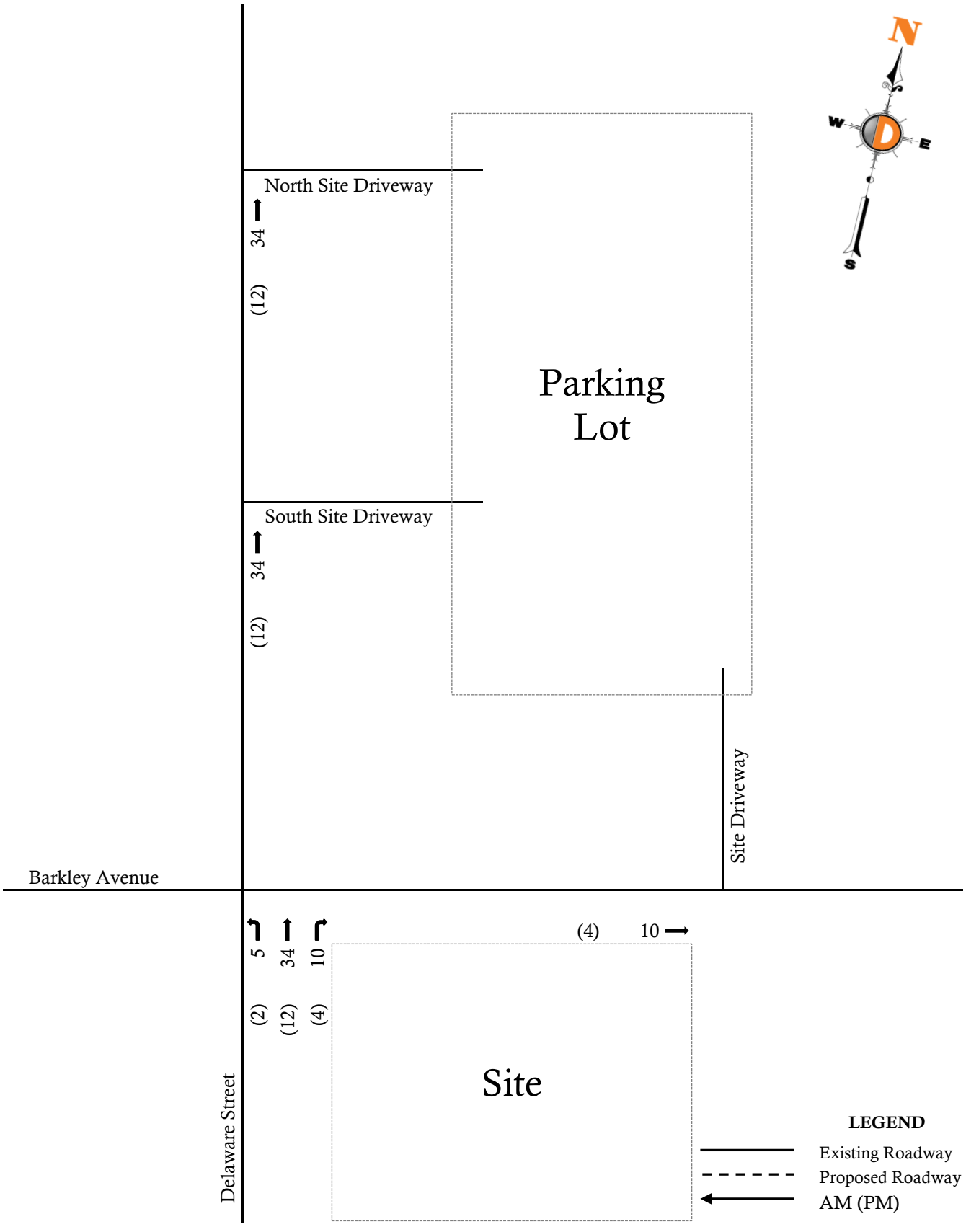

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Figure 8

Site Generated Trips - Delaware Street

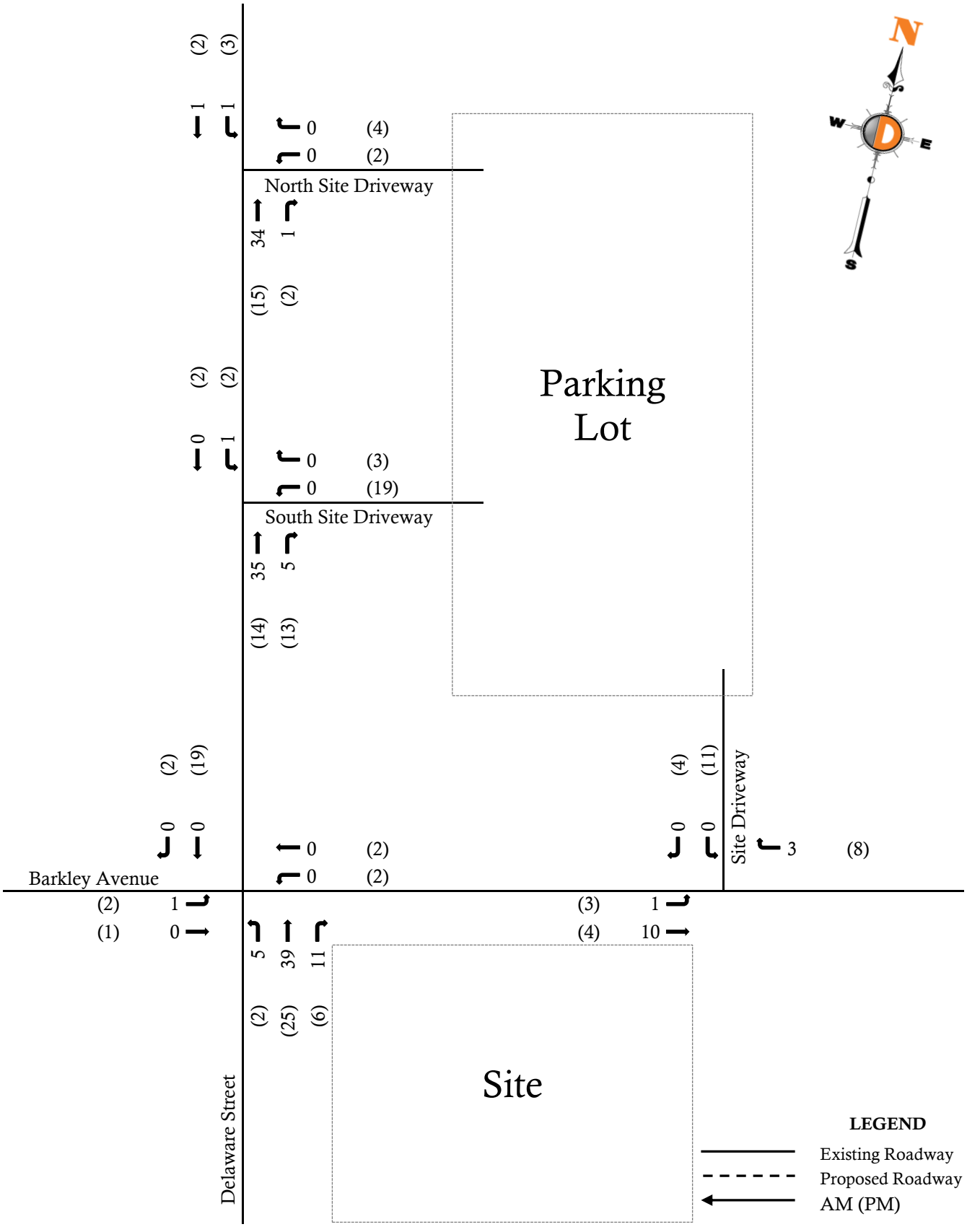

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Figure 9

Total Site Generated Trips

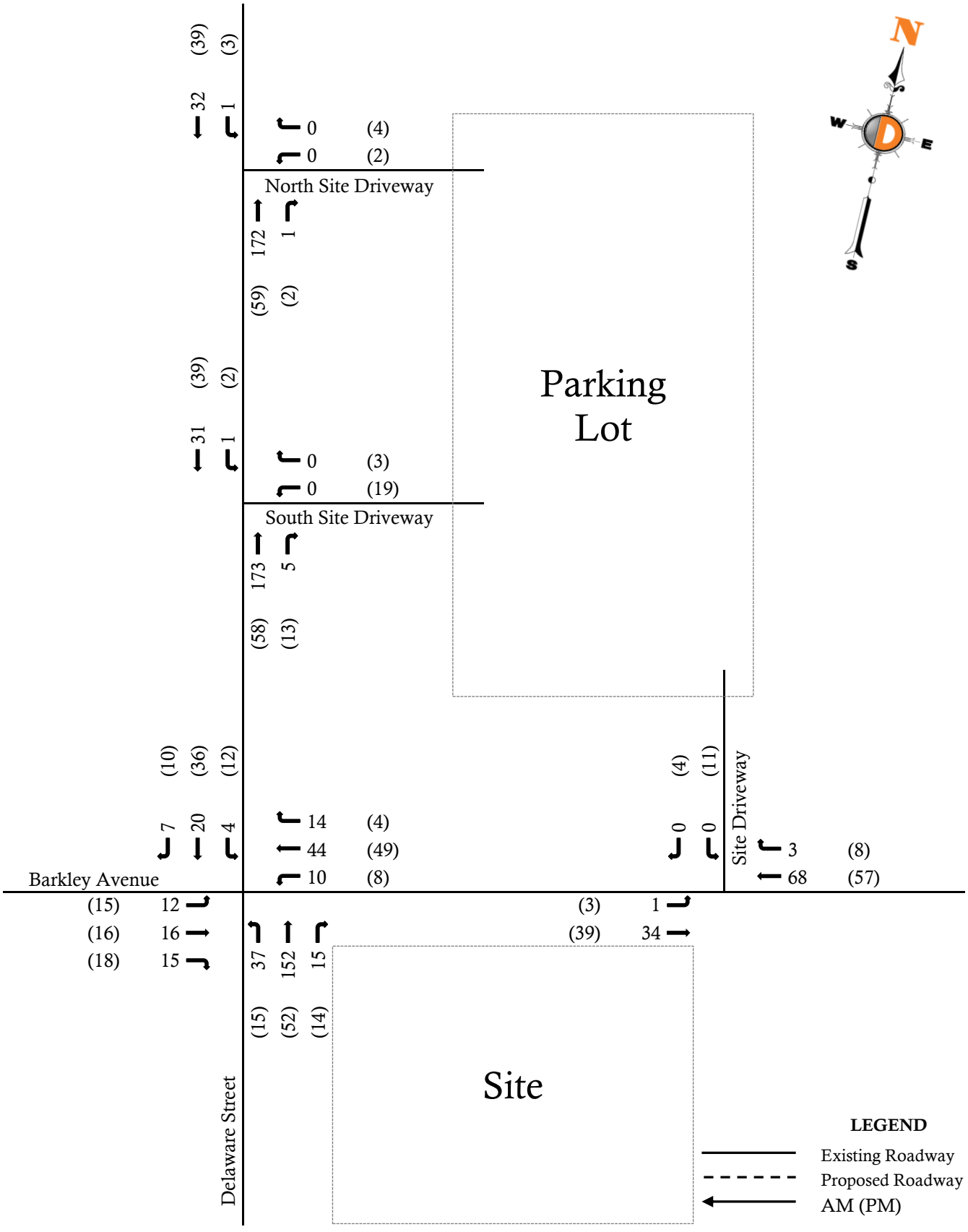

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Figure 10

Build Traffic Volumes

Appendix B
Project Information

Dynamic Traffic, LLC

1904 Main Street, Lake Como, NJ 07719
245 Main Street - Suite #110, Chester, NJ 07930
732-681-0760

E/W: Barkley Avenue
N/S: Delaware Street
Town/County: Clifton/Passaic
Job #: 2072 23-01158

File Name : Delaware St and Barkley Ave - AMPM
Site Code : 00000000
Start Date : 4/19/2023
Page No : 1

Groups Printed- Cars - Trucks (SU) - Trucks (TT)

	Barkley Avenue Eastbound					Barkley Avenue Westbound					Delaware Street Northbound					Delaware Street Southbound					
Start Time			Right	Peds	App. Total	Left	Thru	Right	Peds	App. Total	Left	Thru	Right	Peds	App. Total	Left	Thru	Right	Peds	App. Total	Int. Total
07:00 AM	1	1	2	0	4	1	2	1	0	4	0	13	1	0	14	0	2	1	1	4	26
07:15 AM	1	0	2	0	3	1	9	3	0	13	3	21	0	3	27	0	1	1	0	2	45
07:30 AM	1	5	7	0	13	6	7	3	0	16	19	71	3	0	93	2	3	2	1	8	130
07:45 AM	3	4	5	0	12	2	16	7	1	26	9	25	0	1	35	1	9	1	0	11	84
Total	6	10	16	0	32	10	34	14	1	59	31	130	4	4	169	3	15	5	2	25	285
08:00 AM	4	2	0	0	6	0	8	0	1	9	5	11	1	5	22	0	5	1	0	6	43
08:15 AM	2	4	2	0	8	1	10	3	1	15	2	15	1	1	19	1	1	3	1	6	48
08:30 AM	4	2	0	0	6	1	6	0	0	7	4	6	3	0	13	1	2	0	1	4	30
08:45 AM	1	2	3	0	6	3	3	0	0	6	4	9	3	0	16	1	2	1	0	4	32
Total	11	10	5	0	26	5	27	3	2	37	15	41	8	6	70	3	10	5	2	20	153
09:00 AM	1	2	4	0	7	0	10	2	0	12	2	8	2	1	13	0	1	4	0	5	37
09:15 AM	1	4	1	0	6	0	12	0	0	12	2	6	1	0	9	1	4	3	0	8	35
09:30 AM	2	1	3	0	6	1	3	0	0	4	0	4	0	0	4	3	3	2	1	9	23
09:45 AM	4	3	2	0	9	0	4	1	0	5	1	3	0	0	4	1	0	1	0	2	20
Total	8	10	10	0	28	1	29	3	0	33	5	21	3	1	30	5	8	10	1	24	115
10:00 AM	2	3	1	0	6	2	3	3	0	8	1	3	1	0	5	0	3	1	1	5	24
10:15 AM	2	6	2	0	10	1	5	0	0	6	0	4	1	1	6	1	2	1	0	4	26
*** BREAK ***																					
Total	4	9	3	0	16	3	8	3	0	14	1	7	2	1	11	1	5	2	1	9	50
*** BREAK ***																					
03:30 PM	3	2	1	0	6	0	9	1	0	10	4	6	0	1	11	3	9	3	1	16	43
03:45 PM	1	5	2	0	8	1	8	2	0	11	2	7	1	0	10	3	4	3	3	13	42
Total	4	7	3	0	14	1	17	3	0	21	6	13	1	1	21	6	13	6	4	29	85
04:00 PM	4	3	3	0	10	0	9	2	0	11	3	3	0	1	7	1	5	2	1	9	37
04:15 PM	4	5	2	0	11	0	11	1	0	12	2	8	4	1	15	0	4	4	0	8	46
04:30 PM	2	5	2	0	9	3	21	0	0	24	3	3	4	0	10	0	5	1	0	6	49
04:45 PM	3	2	4	0	9	4	12	3	0	19	4	13	2	0	19	1	2	3	0	6	53
Total	13	15	11	0	39	7	53	6	0	66	12	27	10	2	51	2	16	10	1	29	185
05:00 PM	4	1	0	0	5	0	7	1	2	10	2	9	3	0	14	3	4	1	0	8	37
05:15 PM	1	3	2	0	6	1	9	0	0	10	6	9	2	2	19	7	6	2	1	16	51
05:30 PM	4	8	11	0	23	1	16	0	0	17	9	10	6	1	26	0	4	2	2	8	74
05:45 PM	2	5	2	4	13	1	4	2	0	7	3	6	1	2	12	3	4	3	2	12	44
Total	11	17	15	4	47	3	36	3	2	44	20	34	12	5	71	13	18	8	5	44	206
06:00 PM	0	7	2	2	11	1	14	1	0	16	3	3	2	0	8	4	5	2	0	11	46
06:15 PM	1	1	0	0	2	0	14	0	0	14	6	7	0	0	13	1	3	1	1	6	35
Grand Total	58	86	65	6	215	31	232	36	5	304	99	283	42	20	444	38	93	49	17	197	1160
Apprch %	27	40	30.2	2.8		10.2	76.3	11.8	1.6		22.3	63.7	9.5	4.5		19.3	47.2	24.9	8.6		
Total %	5	7.4	5.6	0.5	18.5	2.7	20	3.1	0.4	26.2	8.5	24.4	3.6	1.7	38.3	3.3	8	4.2	1.5	17	
Cars	54	86	65	6	211	31	226	35	5	297	99	279	40	20	438	37	92	47	17	193	1139
% Cars	93.1	100	100	100	98.1	100	97.4	97.2	100	97.7	100	98.6	95.2	100	98.6	97.4	98.9	95.9	100	98	98.2
Trucks (SU)	4	0	0	0	4	0	6	1	0	7	0	4	2	0	6	1	1	2	0	4	21
% Trucks (SU)	6.9	0	0	0	1.9	0	2.6	2.8	0	2.3	0	1.4	4.8	0	1.4	2.6	1.1	4.1	0	2	1.8
Trucks (TT)	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
% Trucks (TT)	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0

TRAFFIC & PARKING SURVEY
Clifton Cheder School - 1333 Broad Street, Clifton, NJ

Start Time	Enter	Exit	Max Queue
3:30 PM	0	0	0
3:35 PM	0	0	0
3:40 PM	0	0	0
3:45 PM	4	0	4
3:50 PM	7	2	7
3:55 PM	10	4	15
4:00 PM	5	6	11
4:05 PM	12	7	16
4:10 PM	7	11	17
4:15 PM	0	6	11
4:20 PM	0	6	6
4:25 PM	0	0	0
4:30 PM	0	0	0
4:35 PM	0	0	0
4:40 PM	0	0	0
4:45 PM	0	0	0
4:50 PM	0	0	0
4:55 PM	10	0	10
5:00 PM	5	5	13
5:05 PM	4	10	12
5:10 PM	0	1	1
5:15 PM	3	3	3
5:20 PM	0	0	0
5:25 PM	0	0	0
Total	**67**	**61**	

TRAFFIC & PARKING SURVEY
ABC Learning Center - 18 Delaware Street, Clifton, NJ

Start Time	Enter	Exit	Max Queue
7:00 AM	3	3	1
7:15 AM	3	3	2
7:30 AM	3	3	3
7:45 AM	5	4	3
8:00 AM	**5**	**5**	4
8:15 AM	**4**	**2**	4
8:30 AM	**7**	**9**	**6**
8:45 AM	**7**	**7**	3
9:00 AM	1	1	1
9:15 AM	4	4	4
9:30 AM	0	0	0
9:45 AM	1	1	1
10:00 AM	4	4	2
10:15 AM	0	0	0

Start Time	Enter	Exit	Max Queue
3:30 PM	1	1	1
3:45 PM	0	0	0
4:00 PM	3	1	2
4:15 PM	2	2	2
4:30 PM	6	3	3
4:45 PM	**5**	**6**	6
5:00 PM	**7**	**7**	5
5:15 PM	**9**	**9**	**9**
5:30 PM	**8**	**10**	**9**
5:45 PM	**4**	**3**	6
6:00 PM	3	3	5
6:15 PM	3	3	5

Appendix C
Capacity Analysis

Intersection	
Int Delay, s/veh	5.4

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↕			↕			↕			↕	
Traffic Vol, veh/h	10	15	14	9	41	13	35	122	5	4	18	7
Future Vol, veh/h	10	15	14	9	41	13	35	122	5	4	18	7
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	-	-	-	-	-	-	-	-	-	-	-	-
Veh in Median Storage, #	-	0	-	-	0	-	-	0	-	-	0	-
Grade, %	-	-1	-	-	1	-	-	1	-	-	1	-
Peak Hour Factor	59	59	59	59	59	59	59	59	59	59	59	59
Heavy Vehicles, %	10	0	0	0	5	8	0	1	0	0	0	29
Mvmt Flow	17	25	24	15	69	22	59	207	8	7	31	12

Major/Minor	Minor2			Minor1			Major1			Major2		
Conflicting Flow All	426	384	37	405	386	211	43	0	0	215	0	0
Stage 1	51	51	-	329	329	-	-	-	-	-	-	-
Stage 2	375	333	-	76	57	-	-	-	-	-	-	-
Critical Hdwy	7	6.3	6.1	7.3	6.75	6.38	4.1	-	-	4.1	-	-
Critical Hdwy Stg 1	6	5.3	-	6.3	5.75	-	-	-	-	-	-	-
Critical Hdwy Stg 2	6	5.3	-	6.3	5.75	-	-	-	-	-	-	-
Follow-up Hdwy	3.59	4	3.3	3.5	4.045	3.372	2.2	-	-	2.2	-	-
Pot Cap-1 Maneuver	538	565	1042	547	532	810	1579	-	-	1367	-	-
Stage 1	945	859	-	676	629	-	-	-	-	-	-	-
Stage 2	643	659	-	934	839	-	-	-	-	-	-	-
Platoon blocked, %								-	-		-	-
Mov Cap-1 Maneuver	452	538	1042	497	507	810	1579	-	-	1367	-	-
Mov Cap-2 Maneuver	452	538	-	497	507	-	-	-	-	-	-	-
Stage 1	905	855	-	648	603	-	-	-	-	-	-	-
Stage 2	530	631	-	881	835	-	-	-	-	-	-	-

Approach	EB	WB	NB	SB
HCM Control Delay, s	11.6	13.2	1.6	1.1
HCM LOS	B	B		

Minor Lane/Major Mvmt	NBL	NBT	NBR	EBLn1	WBLn1	SBL	SBT	SBR
Capacity (veh/h)	1579	-	-	615	548	1367	-	-
HCM Lane V/C Ratio	0.038	-	-	0.107	0.195	0.005	-	-
HCM Control Delay (s)	7.4	0	-	11.6	13.2	7.6	0	-
HCM Lane LOS	A	A	-	B	B	A	A	-
HCM 95th %tile Q(veh)	0.1	-	-	0.4	0.7	0	-	-

Intersection	
Int Delay, s/veh	6

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↕			↕			↕			↕	
Traffic Vol, veh/h	12	14	17	6	44	4	21	41	13	11	16	8
Future Vol, veh/h	12	14	17	6	44	4	21	41	13	11	16	8
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	-	-	-	-	-	-	-	-	-	-	-	-
Veh in Median Storage, #	-	0	-	-	0	-	-	0	-	-	0	-
Grade, %	-	-1	-	-	1	-	-	1	-	-	1	-
Peak Hour Factor	73	73	73	73	73	73	73	73	73	73	73	73
Heavy Vehicles, %	0	0	0	0	5	0	0	0	0	0	6	0
Mvmt Flow	16	19	23	8	60	5	29	56	18	15	22	11

Major/Minor	Minor2			Minor1			Major1			Major2		
Conflicting Flow All	214	190	28	202	186	65	33	0	0	74	0	0
Stage 1	58	58	-	123	123	-	-	-	-	-	-	-
Stage 2	156	132	-	79	63	-	-	-	-	-	-	-
Critical Hdwy	6.9	6.3	6.1	7.3	6.75	6.3	4.1	-	-	4.1	-	-
Critical Hdwy Stg 1	5.9	5.3	-	6.3	5.75	-	-	-	-	-	-	-
Critical Hdwy Stg 2	5.9	5.3	-	6.3	5.75	-	-	-	-	-	-	-
Follow-up Hdwy	3.5	4	3.3	3.5	4.045	3.3	2.2	-	-	2.2	-	-
Pot Cap-1 Maneuver	756	716	1054	752	696	1003	1592	-	-	1538	-	-
Stage 1	962	853	-	880	783	-	-	-	-	-	-	-
Stage 2	858	797	-	931	834	-	-	-	-	-	-	-
Platoon blocked, %								-	-		-	-
Mov Cap-1 Maneuver	686	695	1054	704	676	1003	1592	-	-	1538	-	-
Mov Cap-2 Maneuver	686	695	-	704	676	-	-	-	-	-	-	-
Stage 1	944	844	-	863	768	-	-	-	-	-	-	-
Stage 2	771	782	-	881	826	-	-	-	-	-	-	-

Approach	EB	WB	NB	SB
HCM Control Delay, s	9.9	10.8	2	2.3
HCM LOS	A	B		

Minor Lane/Major Mvmt	NBL	NBT	NBR	EBLn1	WBLn1	SBL	SBT	SBR
Capacity (veh/h)	1592	-	-	800	696	1538	-	-
HCM Lane V/C Ratio	0.018	-	-	0.074	0.106	0.01	-	-
HCM Control Delay (s)	7.3	0	-	9.9	10.8	7.4	0	-
HCM Lane LOS	A	A	-	A	B	A	A	-
HCM 95th %tile Q(veh)	0.1	-	-	0.2	0.4	0	-	-

Intersection	
Int Delay, s/veh	5.6

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		⇕			⇕			⇕			⇕	
Traffic Vol, veh/h	11	16	15	10	44	14	37	130	5	4	20	7
Future Vol, veh/h	11	16	15	10	44	14	37	130	5	4	20	7
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	-	-	-	-	-	-	-	-	-	-	-	-
Veh in Median Storage, #	-	0	-	-	0	-	-	0	-	-	0	-
Grade, %	-	-1	-	-	1	-	-	1	-	-	1	-
Peak Hour Factor	59	59	59	59	59	59	59	59	59	59	59	59
Heavy Vehicles, %	10	0	0	0	5	8	0	1	0	0	0	29
Mvmt Flow	19	27	25	17	75	24	63	220	8	7	34	12

Major/Minor	Minor2			Minor1			Major1			Major2		
Conflicting Flow All	454	408	40	430	410	224	46	0	0	228	0	0
Stage 1	54	54	-	350	350	-	-	-	-	-	-	-
Stage 2	400	354	-	80	60	-	-	-	-	-	-	-
Critical Hdwy	7	6.3	6.1	7.3	6.75	6.38	4.1	-	-	4.1	-	-
Critical Hdwy Stg 1	6	5.3	-	6.3	5.75	-	-	-	-	-	-	-
Critical Hdwy Stg 2	6	5.3	-	6.3	5.75	-	-	-	-	-	-	-
Follow-up Hdwy	3.59	4	3.3	3.5	4.045	3.372	2.2	-	-	2.2	-	-
Pot Cap-1 Maneuver	516	548	1038	526	515	796	1575	-	-	1352	-	-
Stage 1	941	856	-	658	615	-	-	-	-	-	-	-
Stage 2	624	646	-	929	836	-	-	-	-	-	-	-
Platoon blocked, %								-	-		-	-
Mov Cap-1 Maneuver	425	520	1038	474	489	796	1575	-	-	1352	-	-
Mov Cap-2 Maneuver	425	520	-	474	489	-	-	-	-	-	-	-
Stage 1	898	852	-	628	587	-	-	-	-	-	-	-
Stage 2	504	616	-	873	832	-	-	-	-	-	-	-

Approach	EB	WB	NB	SB
HCM Control Delay, s	11.9	13.7	1.6	1
HCM LOS	B	B		

Minor Lane/Major Mvmt	NBL	NBT	NBR	EBLn1	WBLn1	SBL	SBT	SBR
Capacity (veh/h)	1575	-	-	591	529	1352	-	-
HCM Lane V/C Ratio	0.04	-	-	0.12	0.218	0.005	-	-
HCM Control Delay (s)	7.4	0	-	11.9	13.7	7.7	0	-
HCM Lane LOS	A	A	-	B	B	A	A	-
HCM 95th %tile Q(veh)	0.1	-	-	0.4	0.8	0	-	-

Intersection	
Int Delay, s/veh	6

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↕			↕			↕			↕	
Traffic Vol, veh/h	13	15	18	6	47	4	22	44	14	12	17	8
Future Vol, veh/h	13	15	18	6	47	4	22	44	14	12	17	8
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	-	-	-	-	-	-	-	-	-	-	-	-
Veh in Median Storage, #	-	0	-	-	0	-	-	0	-	-	0	-
Grade, %	-	-1	-	-	1	-	-	1	-	-	1	-
Peak Hour Factor	73	73	73	73	73	73	73	73	73	73	73	73
Heavy Vehicles, %	0	0	0	0	5	0	0	0	0	0	6	0
Mvmt Flow	18	21	25	8	64	5	30	60	19	16	23	11

Major/Minor	Minor2			Minor1			Major1			Major2		
Conflicting Flow All	225	200	29	214	196	70	34	0	0	79	0	0
Stage 1	61	61	-	130	130	-	-	-	-	-	-	-
Stage 2	164	139	-	84	66	-	-	-	-	-	-	-
Critical Hdwy	6.9	6.3	6.1	7.3	6.75	6.3	4.1	-	-	4.1	-	-
Critical Hdwy Stg 1	5.9	5.3	-	6.3	5.75	-	-	-	-	-	-	-
Critical Hdwy Stg 2	5.9	5.3	-	6.3	5.75	-	-	-	-	-	-	-
Follow-up Hdwy	3.5	4	3.3	3.5	4.045	3.3	2.2	-	-	2.2	-	-
Pot Cap-1 Maneuver	744	707	1052	738	687	996	1591	-	-	1532	-	-
Stage 1	959	851	-	872	777	-	-	-	-	-	-	-
Stage 2	850	792	-	925	831	-	-	-	-	-	-	-
Platoon blocked, %								-	-		-	-
Mov Cap-1 Maneuver	670	685	1052	688	666	996	1591	-	-	1532	-	-
Mov Cap-2 Maneuver	670	685	-	688	666	-	-	-	-	-	-	-
Stage 1	940	842	-	855	761	-	-	-	-	-	-	-
Stage 2	758	776	-	872	822	-	-	-	-	-	-	-

Approach	EB	WB	NB	SB
HCM Control Delay, s	10	10.9	2	2.4
HCM LOS	B	B		

Minor Lane/Major Mvmt	NBL	NBT	NBR	EBLn1	WBLn1	SBL	SBT	SBR
Capacity (veh/h)	1591	-	-	788	684	1532	-	-
HCM Lane V/C Ratio	0.019	-	-	0.08	0.114	0.011	-	-
HCM Control Delay (s)	7.3	0	-	10	10.9	7.4	0	-
HCM Lane LOS	A	A	-	B	B	A	A	-
HCM 95th %tile Q(veh)	0.1	-	-	0.3	0.4	0	-	-

Intersection	
Int Delay, s/veh	5.3

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↕			↕			↕			↕	
Traffic Vol, veh/h	12	16	15	10	44	14	37	152	15	4	20	7
Future Vol, veh/h	12	16	15	10	44	14	37	152	15	4	20	7
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	-	-	-	-	-	-	-	-	-	-	-	-
Veh in Median Storage, #	-	0	-	-	0	-	-	0	-	-	0	-
Grade, %	-	-1	-	-	1	-	-	1	-	-	1	-
Peak Hour Factor	59	59	59	59	59	59	59	59	59	59	59	59
Heavy Vehicles, %	10	0	0	0	5	8	0	1	0	0	0	29
Mvmt Flow	20	27	25	17	75	24	63	258	25	7	34	12

Major/Minor	Minor2			Minor1			Major1			Major2		
Conflicting Flow All	500	463	40	477	457	271	46	0	0	283	0	0
Stage 1	54	54	-	397	397	-	-	-	-	-	-	-
Stage 2	446	409	-	80	60	-	-	-	-	-	-	-
Critical Hdwy	7	6.3	6.1	7.3	6.75	6.38	4.1	-	-	4.1	-	-
Critical Hdwy Stg 1	6	5.3	-	6.3	5.75	-	-	-	-	-	-	-
Critical Hdwy Stg 2	6	5.3	-	6.3	5.75	-	-	-	-	-	-	-
Follow-up Hdwy	3.59	4	3.3	3.5	4.045	3.372	2.2	-	-	2.2	-	-
Pot Cap-1 Maneuver	482	512	1038	489	483	748	1575	-	-	1291	-	-
Stage 1	941	856	-	619	585	-	-	-	-	-	-	-
Stage 2	591	613	-	929	836	-	-	-	-	-	-	-
Platoon blocked, %								-	-		-	-
Mov Cap-1 Maneuver	392	484	1038	438	457	748	1575	-	-	1291	-	-
Mov Cap-2 Maneuver	392	484	-	438	457	-	-	-	-	-	-	-
Stage 1	896	851	-	589	557	-	-	-	-	-	-	-
Stage 2	472	584	-	872	831	-	-	-	-	-	-	-

Approach	EB	WB	NB	SB
HCM Control Delay, s	12.5	14.5	1.3	1
HCM LOS	B	B		

Minor Lane/Major Mvmt	NBL	NBT	NBR	EBLn1	WBLn1	SBL	SBT	SBR
Capacity (veh/h)	1575	-	-	550	493	1291	-	-
HCM Lane V/C Ratio	0.04	-	-	0.133	0.234	0.005	-	-
HCM Control Delay (s)	7.4	0	-	12.5	14.5	7.8	0	-
HCM Lane LOS	A	A	-	B	B	A	A	-
HCM 95th %tile Q(veh)	0.1	-	-	0.5	0.9	0	-	-

Intersection	
Int Delay, s/veh	0.1

Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Traffic Vol, veh/h	1	34	68	3	0	0
Future Vol, veh/h	1	34	68	3	0	0
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, %	-	-1	6	-	-2	-
Peak Hour Factor	73	73	73	73	73	73
Heavy Vehicles, %	2	0	5	2	2	2
Mvmt Flow	1	47	93	4	0	0

Major/Minor	Major1		Major2		Minor2	
Conflicting Flow All	97	0	-	0	144	95
Stage 1	-	-	-	-	95	-
Stage 2	-	-	-	-	49	-
Critical Hdwy	4.12	-	-	-	6.02	6.02
Critical Hdwy Stg 1	-	-	-	-	5.02	-
Critical Hdwy Stg 2	-	-	-	-	5.02	-
Follow-up Hdwy	2.218	-	-	-	3.518	3.318
Pot Cap-1 Maneuver	1496	-	-	-	862	967
Stage 1	-	-	-	-	939	-
Stage 2	-	-	-	-	979	-
Platoon blocked, %		-	-	-		
Mov Cap-1 Maneuver	1496	-	-	-	861	967
Mov Cap-2 Maneuver	-	-	-	-	861	-
Stage 1	-	-	-	-	938	-
Stage 2	-	-	-	-	979	-

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

Minor Lane/Major Mvmt	EBL	EBT	WBT	WBR	SBLn1
Capacity (veh/h)	1496	-	-	-	-
HCM Lane V/C Ratio	0.001	-	-	-	-
HCM Control Delay (s)	7.4	0	-	-	0
HCM Lane LOS	A	A	-	-	A
HCM 95th %tile Q(veh)	0	-	-	-	-

Intersection	
Int Delay, s/veh	0

Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Traffic Vol, veh/h	0	0	172	1	1	32
Future Vol, veh/h	0	0	172	1	1	32
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, %	-2	-	0	-	-	2
Peak Hour Factor	53	53	53	53	53	53
Heavy Vehicles, %	2	2	2	2	2	7
Mvmt Flow	0	0	325	2	2	60

Major/Minor	Minor1		Major1		Major2	
Conflicting Flow All	390	326	0	0	327	0
Stage 1	326	-	-	-	-	-
Stage 2	64	-	-	-	-	-
Critical Hdwy	6.02	6.02	-	-	4.12	-
Critical Hdwy Stg 1	5.02	-	-	-	-	-
Critical Hdwy Stg 2	5.02	-	-	-	-	-
Follow-up Hdwy	3.518	3.318	-	-	2.218	-
Pot Cap-1 Maneuver	641	728	-	-	1233	-
Stage 1	758	-	-	-	-	-
Stage 2	966	-	-	-	-	-
Platoon blocked, %			-	-		-
Mov Cap-1 Maneuver	640	728	-	-	1233	-
Mov Cap-2 Maneuver	640	-	-	-	-	-
Stage 1	758	-	-	-	-	-
Stage 2	964	-	-	-	-	-

Approach	WB	NB	SB
HCM Control Delay, s	0	0	0.2
HCM LOS	A		

Minor Lane/Major Mvmt	NBT	NBR	WBLn1	SBL	SBT
Capacity (veh/h)	-	-	-	1233	-
HCM Lane V/C Ratio	-	-	-	0.002	-
HCM Control Delay (s)	-	-	0	7.9	0
HCM Lane LOS	-	-	A	A	A
HCM 95th %tile Q(veh)	-	-	-	0	-

Intersection	
Int Delay, s/veh	0

Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Traffic Vol, veh/h	0	0	173	5	1	31
Future Vol, veh/h	0	0	173	5	1	31
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, %	-1	-	-1	-	-	1
Peak Hour Factor	53	53	53	53	53	53
Heavy Vehicles, %	2	2	2	2	2	7
Mvmt Flow	0	0	326	9	2	58

Major/Minor	Minor1		Major1		Major2	
Conflicting Flow All	393	331	0	0	335	0
Stage 1	331	-	-	-	-	-
Stage 2	62	-	-	-	-	-
Critical Hdwy	6.22	6.12	-	-	4.12	-
Critical Hdwy Stg 1	5.22	-	-	-	-	-
Critical Hdwy Stg 2	5.22	-	-	-	-	-
Follow-up Hdwy	3.518	3.318	-	-	2.218	-
Pot Cap-1 Maneuver	625	717	-	-	1224	-
Stage 1	741	-	-	-	-	-
Stage 2	964	-	-	-	-	-
Platoon blocked, %			-	-		-
Mov Cap-1 Maneuver	624	717	-	-	1224	-
Mov Cap-2 Maneuver	624	-	-	-	-	-
Stage 1	741	-	-	-	-	-
Stage 2	962	-	-	-	-	-

Approach	WB	NB	SB
HCM Control Delay, s	0	0	0.2
HCM LOS	A		

Minor Lane/Major Mvmt	NBT	NBR	WBLn1	SBL	SBT
Capacity (veh/h)	-	-	-	1224	-
HCM Lane V/C Ratio	-	-	-	0.002	-
HCM Control Delay (s)	-	-	0	7.9	0
HCM Lane LOS	-	-	A	A	A
HCM 95th %tile Q(veh)	-	-	-	0	-

Intersection	
Int Delay, s/veh	5.6

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↕			↕			↕			↕	
Traffic Vol, veh/h	15	16	18	8	49	4	15	52	14	12	36	10
Future Vol, veh/h	15	16	18	8	49	4	15	52	14	12	36	10
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	-	-	-	-	-	-	-	-	-	-	-	-
Veh in Median Storage, #	-	0	-	-	0	-	-	0	-	-	0	-
Grade, %	-	-1	-	-	1	-	-	1	-	-	1	-
Peak Hour Factor	73	73	73	73	73	73	73	73	73	73	73	73
Heavy Vehicles, %	0	0	0	0	5	0	0	0	0	0	6	0
Mvmt Flow	21	22	25	11	67	5	21	71	19	16	49	14

Major/Minor	Minor2			Minor1			Major1			Major2		
Conflicting Flow All	247	220	56	235	218	81	63	0	0	90	0	0
Stage 1	88	88	-	123	123	-	-	-	-	-	-	-
Stage 2	159	132	-	112	95	-	-	-	-	-	-	-
Critical Hdwy	6.9	6.3	6.1	7.3	6.75	6.3	4.1	-	-	4.1	-	-
Critical Hdwy Stg 1	5.9	5.3	-	6.3	5.75	-	-	-	-	-	-	-
Critical Hdwy Stg 2	5.9	5.3	-	6.3	5.75	-	-	-	-	-	-	-
Follow-up Hdwy	3.5	4	3.3	3.5	4.045	3.3	2.2	-	-	2.2	-	-
Pot Cap-1 Maneuver	721	690	1018	714	667	982	1553	-	-	1518	-	-
Stage 1	929	830	-	880	783	-	-	-	-	-	-	-
Stage 2	855	797	-	892	806	-	-	-	-	-	-	-
Platoon blocked, %								-	-		-	-
Mov Cap-1 Maneuver	648	673	1018	667	650	982	1553	-	-	1518	-	-
Mov Cap-2 Maneuver	648	673	-	667	650	-	-	-	-	-	-	-
Stage 1	916	821	-	868	772	-	-	-	-	-	-	-
Stage 2	765	786	-	838	797	-	-	-	-	-	-	-

Approach	EB	WB	NB	SB
HCM Control Delay, s	10.2	11.2	1.4	1.5
HCM LOS	B	B		

Minor Lane/Major Mvmt	NBL	NBT	NBR	EBLn1	WBLn1	SBL	SBT	SBR
Capacity (veh/h)	1553	-	-	758	667	1518	-	-
HCM Lane V/C Ratio	0.013	-	-	0.089	0.125	0.011	-	-
HCM Control Delay (s)	7.3	0	-	10.2	11.2	7.4	0	-
HCM Lane LOS	A	A	-	B	B	A	A	-
HCM 95th %tile Q(veh)	0	-	-	0.3	0.4	0	-	-

Intersection	
Int Delay, s/veh	1.3

Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Traffic Vol, veh/h	3	39	57	8	11	4
Future Vol, veh/h	3	39	57	8	11	4
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, %	-	-1	6	-	-2	-
Peak Hour Factor	74	74	74	74	74	74
Heavy Vehicles, %	2	0	4	2	2	2
Mvmt Flow	4	53	77	11	15	5

Major/Minor	Major1		Major2		Minor2	
Conflicting Flow All	88	0	-	0	144	83
Stage 1	-	-	-	-	83	-
Stage 2	-	-	-	-	61	-
Critical Hdwy	4.12	-	-	-	6.02	6.02
Critical Hdwy Stg 1	-	-	-	-	5.02	-
Critical Hdwy Stg 2	-	-	-	-	5.02	-
Follow-up Hdwy	2.218	-	-	-	3.518	3.318
Pot Cap-1 Maneuver	1508	-	-	-	862	981
Stage 1	-	-	-	-	949	-
Stage 2	-	-	-	-	968	-
Platoon blocked, %		-	-	-		
Mov Cap-1 Maneuver	1508	-	-	-	859	981
Mov Cap-2 Maneuver	-	-	-	-	859	-
Stage 1	-	-	-	-	946	-
Stage 2	-	-	-	-	968	-

Approach	EB	WB	SB
HCM Control Delay, s	0.5	0	9.1
HCM LOS			A

Minor Lane/Major Mvmt	EBL	EBT	WBT	WBR	SBLn1
Capacity (veh/h)	1508	-	-	-	888
HCM Lane V/C Ratio	0.003	-	-	-	0.023
HCM Control Delay (s)	7.4	0	-	-	9.1
HCM Lane LOS	A	A	-	-	A
HCM 95th %tile Q(veh)	0	-	-	-	0.1

Intersection	
Int Delay, s/veh	0.7

Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Traffic Vol, veh/h	2	4	59	2	3	39
Future Vol, veh/h	2	4	59	2	3	39
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, %	-2	-	0	-	-	2
Peak Hour Factor	92	92	92	92	92	92
Heavy Vehicles, %	2	2	0	2	2	3
Mvmt Flow	2	4	64	2	3	42

Major/Minor	Minor1		Major1		Major2	
Conflicting Flow All	113	65	0	0	66	0
Stage 1	65	-	-	-	-	-
Stage 2	48	-	-	-	-	-
Critical Hdwy	6.02	6.02	-	-	4.12	-
Critical Hdwy Stg 1	5.02	-	-	-	-	-
Critical Hdwy Stg 2	5.02	-	-	-	-	-
Follow-up Hdwy	3.518	3.318	-	-	2.218	-
Pot Cap-1 Maneuver	895	1003	-	-	1536	-
Stage 1	965	-	-	-	-	-
Stage 2	980	-	-	-	-	-
Platoon blocked, %			-	-		-
Mov Cap-1 Maneuver	893	1003	-	-	1536	-
Mov Cap-2 Maneuver	893	-	-	-	-	-
Stage 1	965	-	-	-	-	-
Stage 2	978	-	-	-	-	-

Approach	WB	NB	SB
HCM Control Delay, s	8.8	0	0.5
HCM LOS	A		

Minor Lane/Major Mvmt	NBT	NBR	WBLn1	SBL	SBT
Capacity (veh/h)	-	-	963	1536	-
HCM Lane V/C Ratio	-	-	0.007	0.002	-
HCM Control Delay (s)	-	-	8.8	7.3	0
HCM Lane LOS	-	-	A	A	A
HCM 95th %tile Q(veh)	-	-	0	0	-

Intersection	
Int Delay, s/veh	1.6

Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Traffic Vol, veh/h	19	3	58	13	2	39
Future Vol, veh/h	19	3	58	13	2	39
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, %	-1	-	-1	-	-	1
Peak Hour Factor	92	92	92	92	92	92
Heavy Vehicles, %	2	2	0	2	2	3
Mvmt Flow	21	3	63	14	2	42

Major/Minor	Minor1		Major1		Major2	
Conflicting Flow All	116	70	0	0	77	0
Stage 1	70	-	-	-	-	-
Stage 2	46	-	-	-	-	-
Critical Hdwy	6.22	6.12	-	-	4.12	-
Critical Hdwy Stg 1	5.22	-	-	-	-	-
Critical Hdwy Stg 2	5.22	-	-	-	-	-
Follow-up Hdwy	3.518	3.318	-	-	2.218	-
Pot Cap-1 Maneuver	886	995	-	-	1522	-
Stage 1	957	-	-	-	-	-
Stage 2	979	-	-	-	-	-
Platoon blocked, %			-	-		-
Mov Cap-1 Maneuver	885	995	-	-	1522	-
Mov Cap-2 Maneuver	885	-	-	-	-	-
Stage 1	957	-	-	-	-	-
Stage 2	978	-	-	-	-	-

Approach	WB	NB	SB
HCM Control Delay, s	9.1	0	0.4
HCM LOS	A		

Minor Lane/Major Mvmt	NBT	NBR	WBLn1	SBL	SBT
Capacity (veh/h)	-	-	899	1522	-
HCM Lane V/C Ratio	-	-	0.027	0.001	-
HCM Control Delay (s)	-	-	9.1	7.4	0
HCM Lane LOS	-	-	A	A	A
HCM 95th %tile Q(veh)	-	-	0.1	0	-

Appendix D
Queue Analysis

DYNAMIC TRAFFIC

Queue Calculation - Drop-Offs

Girl's Cheder School - Clifton

Job Info	
Project Number:	2072-23-01158
Project Description:	Girl's Cheder School - Clifton
Analyst:	CGH
Date:	5/23/2023

Traffic Demand		
Hourly Demand, v	49	veh/hr
Peak Hour Factor, PHF	0.50	
Available Queue Storage	8	veh

Service Rate		
Service Time	60	sec/veh
Number of Service Lanes, s	8	

Calculations		
Pk Flow Rate, λ = v / PHF	98	veh/hr
Service Rate per Hour per Lane, μ	60.0	veh/hr
Service Rate per Hour of System, μs	480.0	veh/hr
Traffic intensity, ρ = λ / μs	0.20	

Avg. Queue, $L_q = (P\{0\} * \rho * (\lambda/\mu)^s) / (s! * (1-\rho)^2)$	0.00	veh.
Avg. System Length, $L_s = L_q + \lambda / \mu$	1.63	veh.
Avg. Queue Waiting Time, $W_q = L_q / \lambda$	0.00	min.
Avg. Time in System, $W_s = W_q + 1 / \mu$	0.02	min.
95th Percentile Queue:	4	
Probability of queue exceeding 8 vehicles:	0.01%	

Notes

1 - Queue calculations assume multiple service lanes.

2 - Queue calculations based on stochastic queueing methods as described by M/M/1 Single-Server Queue Model as presented in "Parking" as published by the ENO foundation(1) and within the Civil Engineering Reference Manual.

Probability Calculations

X' Veh. in Queue	P{X} Probability of exactly 'X' Veh. in Queue	Probability of 'X' or less Veh. in Queue	Probability of Queue Greater than 'X' Veh.	95th Percentile Queue
0	19.53%	19.53%	80.47%	
1	31.90%	51.42%	48.58%	
2	26.05%	77.47%	22.53%	
3	14.18%	91.65%	8.35%	
4	5.79%	97.44%	2.56%	4
5	1.89%	99.33%	0.67%	
6	0.51%	99.85%	0.15%	
7	0.12%	99.97%	0.03%	
8	0.02%	99.99%	0.01%	
9	0.01%	100.00%	0.00%	
10	0.00%	100.00%	0.00%	
11	0.00%	100.00%	0.00%	
12	0.00%	100.00%	0.00%	
13	0.00%	100.00%	0.00%	
14	0.00%	100.00%	0.00%	
15	0.00%	100.00%	0.00%	
16	0.00%	100.00%	0.00%	
17	0.00%	100.00%	0.00%	
18	0.00%	100.00%	0.00%	
19	0.00%	100.00%	0.00%	
20	0.00%	100.00%	0.00%	
21	0.00%	100.00%	0.00%	
22	0.00%	100.00%	0.00%	
23	0.00%	100.00%	0.00%	
24	0.00%	100.00%	0.00%	
25	0.00%	100.00%	0.00%	

DYNAMIC TRAFFIC

Queue Calculation - Pick-Ups

Girl's Cheder School - Clifton

Job Info	
Project Number:	2072-23-01158
Project Description:	Girl's Cheder School - Clifton
Analyst:	CGH
Date:	5/23/2023

Traffic Demand		
Hourly Demand, v	18	veh/hr
Peak Hour Factor, PHF	0.50	
Available Queue Storage	8	veh

Service Rate		
Service Time	180	sec/veh
Number of Service Lanes, s	8	

Calculations		
Pk Flow Rate, $\lambda = v / PHF$	36	veh/hr
Service Rate per Hour per Lane, μ	20.0	veh/hr
Service Rate per Hour of System, μs	160.0	veh/hr
Traffic intensity, $\rho = \lambda / \mu s$	0.23	

Avg. Queue, $L_q = (P\{0\} * \rho * (\lambda/\mu)^s) / (s! * (1-\rho)^2)$	0.00	veh.
Avg. System Length, $L_s = L_q + \lambda / \mu$	1.80	veh.
Avg. Queue Waiting Time, $W_q = L_q / \lambda$	0.00	min.
Avg. Time in System, $W_s = W_q + 1 / \mu$	0.05	min.
95th Percentile Queue:	4	
Probability of queue exceeding 8 vehicles:	0.01%	

Notes

1 - Queue calculations assume multiple service lanes

2 - Queue calculations based on stochastic queueing methods as described by M/M/1 Single-Server Queue Model as presented in "Parking" as published by the ENO foundation(1) and within the Civil Engineering Reference Manual.

Probability Calculations

X' Veh. in Queue	P{X} Probability of exactly 'X' Veh. in Queue	Probability of 'X' or less Veh. in Queue	Probability of Queue Greater than 'X' Veh.	95th Percentile Queue
0	16.53%	16.53%	83.47%	
1	29.75%	46.28%	53.72%	
2	26.78%	73.06%	26.94%	
3	16.07%	89.13%	10.87%	
4	7.23%	96.36%	3.64%	4
5	2.60%	98.96%	1.04%	
6	0.78%	99.74%	0.26%	
7	0.20%	99.94%	0.06%	
8	0.05%	99.99%	0.01%	
9	0.01%	100.00%	0.00%	
10	0.00%	100.00%	0.00%	
11	0.00%	100.00%	0.00%	
12	0.00%	100.00%	0.00%	
13	0.00%	100.00%	0.00%	
14	0.00%	100.00%	0.00%	
15	0.00%	100.00%	0.00%	
16	0.00%	100.00%	0.00%	
17	0.00%	100.00%	0.00%	
18	0.00%	100.00%	0.00%	
19	0.00%	100.00%	0.00%	
20	0.00%	100.00%	0.00%	
21	0.00%	100.00%	0.00%	
22	0.00%	100.00%	0.00%	
23	0.00%	100.00%	0.00%	
24	0.00%	100.00%	0.00%	
25	0.00%	100.00%	0.00%	