

# Traffic and Parking Impact Study Proposed CityGate Apartments and Event Center

Naperville, Illinois



Prepared For:

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August 1, 2019

# 1. Introduction

This report summarizes the methodologies, results, and findings of a traffic and parking impact study conducted by Kenig, Lindgren, O'Hara, Aboona, Inc. (KLOA, Inc.) for the proposed apartment and Event Center development within the CityGate Centre which is located in the southeast quadrant of the intersection of IL Route 59 with Ferry Road in Naperville, Illinois. As proposed, the site which is currently vacant, will be developed with an apartment building containing approximately 285 units, an approximately 34,000 square-foot of Event Center (with a max capacity of 800 people), a parking garage with approximately 429 parking spaces for residents, and a surface parking lot containing approximately 416 parking spaces for guests of the apartment units and attendees of the Event Center. Access to the proposed residential parking garage will be provided via a full movement access drive off Westings Avenue and access to the surface parking lot will be provided via two full movement access drives off City Gate Lane and via a single access drive off Comfort Drive.

The purpose of this study was to examine background traffic conditions, assess the impact that the proposed development will have on traffic conditions in the area, determine if any roadway or access improvements are necessary to accommodate traffic generated by the proposed development and to evaluate the adequacy of the proposed parking supply in accommodating the projected parking demand of the proposed apartment development and Event Center.

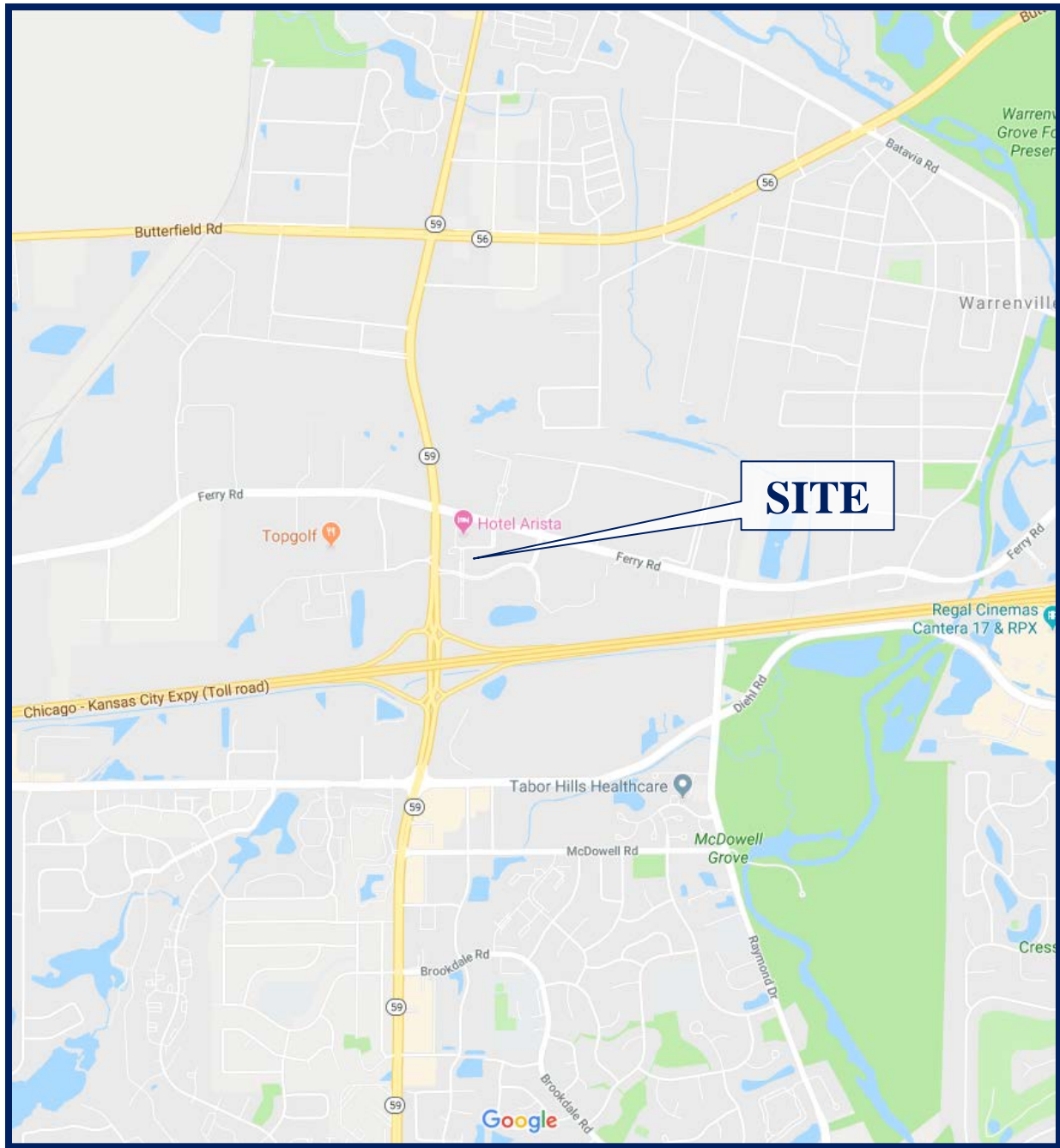
**Figure 1** shows the location of the site in relation to the area roadway system. **Figure 2** shows an aerial view of the site area.

The sections of this report present the following:

- Existing roadway conditions
- A description of the proposed development
- Directional distribution of the development traffic
- Vehicle trip generation for the development
- Future traffic conditions including access to the development
- Traffic analyses for the weekday morning and weekday evening peak hours
- Recommendations with respect to adequacy of the site access and adjacent roadway system
- Evaluation of the proposed parking supply

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

1. Existing Condition - Analyzes the capacity of the existing roadway system using existing peak hour traffic volumes in the surrounding area.
2. Future Condition - The future projected traffic volumes include the existing traffic volumes increased by an ambient area growth factor (growth not attributable to any particular development), and the traffic estimated to be generated by the proposed subject development. Furthermore, the future traffic volumes were analyzed including the traffic projected to be generated by the proposed Sports Arena to be located on the north side of Ferry Road.



**Site Location**

**Figure 1**





**Aerial View of Site Location**

**Figure 2**

## 2. Existing Conditions

Existing transportation conditions in the vicinity of the site were documented based on field visits conducted by KLOA, Inc. in order to obtain a database for projecting future conditions. The following provides a description of the geographical location of the site, physical characteristics of the area roadway system including lane usage and traffic control devices and existing peak hour traffic volumes.

### Site Location

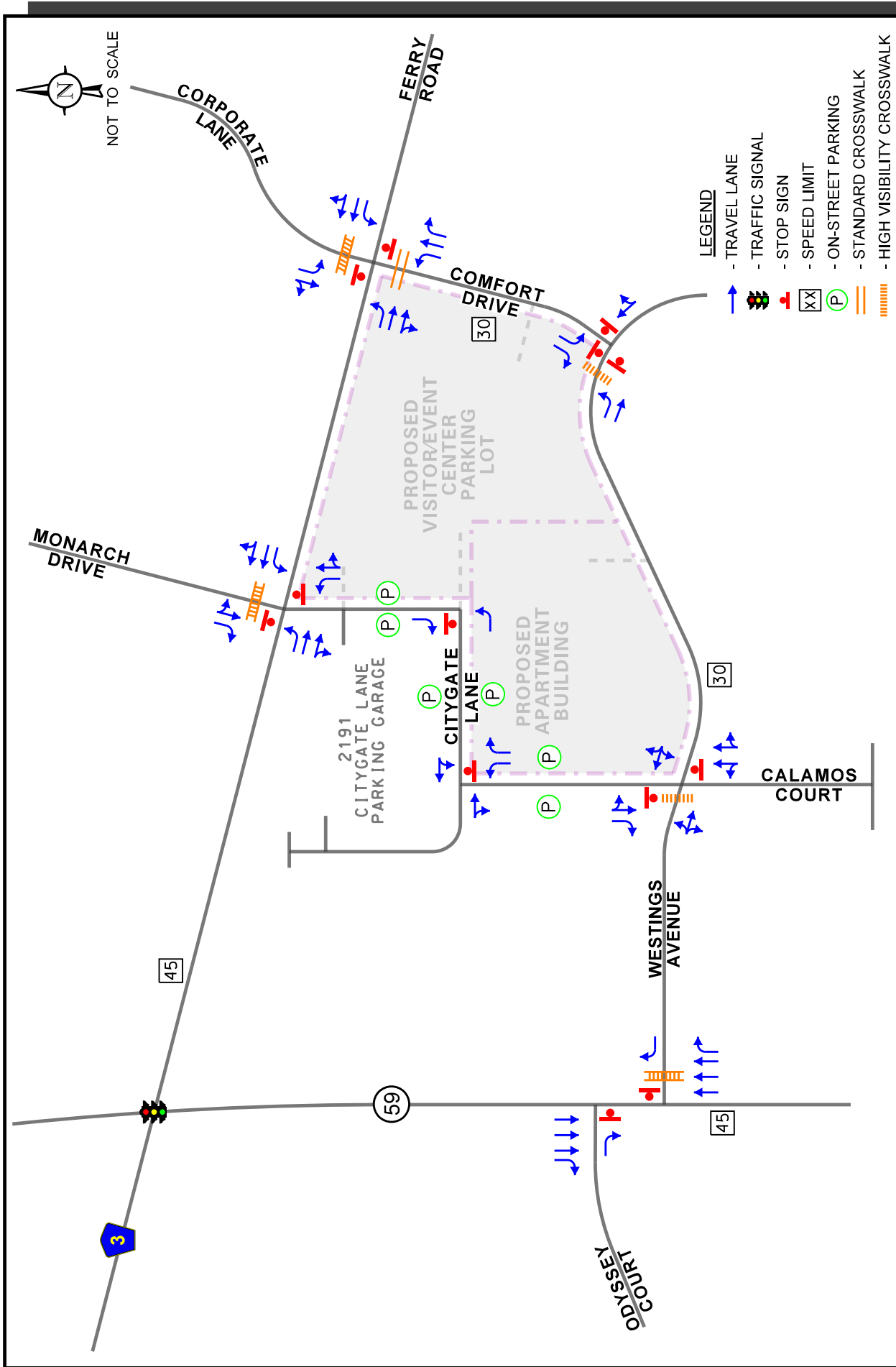
The site, which is currently vacant, is located in the northeast quadrant of the intersection of Westings Avenue with CityGate Lane within the CityGate Centre. Land uses in the vicinity of the include Calamos corporate headquarters to the south, Hotel Arista, Che Figata, Lavazza, Tap In Pub & Carvery and Monarch Landing to the north and Dart Warehouse Corporation to the northeast.

### Existing Roadway System Characteristics

The characteristics of the existing roadways near the development are described below. **Figure 3** illustrates the existing roadway characteristics.

*IL Route 59* is a north-south Strategic Regional Arterial (SRA) that carries approximately 37,100 vehicles per day (IDOT AADT 2017) and provides access to the Ronald Reagan Memorial Tollway (Interstate 88) immediately south of the site. IL 59 is under the jurisdiction of the Illinois Department of Transportation (IDOT) and is a posted Class II truck route. Adjacent to the site, IL 59 is a six-lane roadway with three lanes in each direction, a center median, and turn lanes at roadway intersections. The posted speed limit on IL 59 is 45 miles per hour (mph) and parking is not permitted on the roadway.

*Ferry Road* is a major arterial roadway that is oriented in the east-west direction and is under the jurisdiction of the DuPage County Division of Transportation (County Highway 3). In the vicinity of the site, Ferry Road carries approximately 15,100 vehicles per day (IDOT AADT 2016) and is a four-lane roadway with two lanes in each direction, a center median, and left-turn lanes at roadway intersections. The intersection of Ferry Road with IL 59 is under traffic signal control and there are crosswalks and pedestrian signals on all approaches of the intersection. The traffic signal is part of the six-signal system that extends from Ferry Road south to North Aurora Road. There is a continuous sidewalk along the south side of Ferry Road and a continuous multi-use path along the north side of the roadway, both of which connect with the Illinois Prairie Path approximately 1,000 feet to the west of IL 59. The posted speed limit on Ferry Road is 45 mph and parking is not permitted on the roadway.



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Existing Roadway Characteristics



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Figure: 3

*Westings Avenue* is a collector street that extends in an east-west orientation from IL 59 east approximately 2,000 feet to a cul-de-sac within the Westings Corporate Center. The street is under the jurisdiction of the City of Naperville and has a two-lane divided cross section with one approximately 20-foot lane in each direction and a landscaped median. Its intersection with IL 59 is restricted to right turn movements only to and from Westings Avenue, with the Westings Avenue approach under stop control. There is a sidewalk along both sides of Westings Avenue between IL 59 and Comfort Drive, and along the south/west side only between Comfort Drive and the cul-de-sac. The posted speed limit on Westings Avenue is 30 mph and parking is not permitted on the street.

*Comfort Drive* is a collector street that extends from Ferry Road (opposite Corporate Lane) south to Westings Avenue. Its intersection with Ferry Road is under stop control on Comfort Drive and Corporate Lane. Its intersection with Westings Avenue is under multiway stop control. The street is under the jurisdiction of the City of Naperville and has one lane in each direction that widens to provide a separate left-turn lane at Westings Avenue and separate left- and right-turn lanes at Ferry Road. There is a sidewalk along the west side of Comfort Drive. The posted speed limit on Comfort Drive is 30 mph and parking is not permitted on the street.

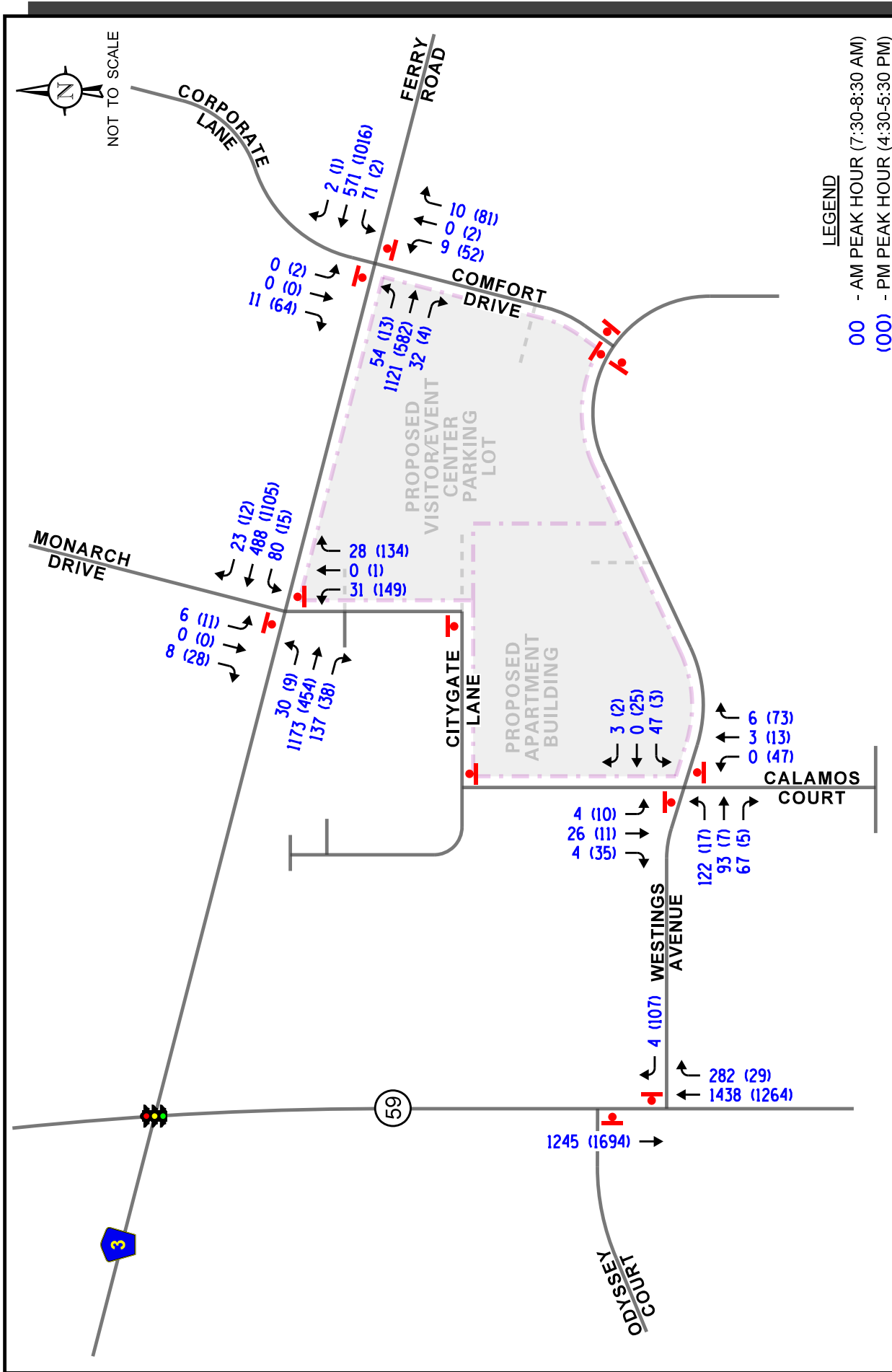
*CityGate Lane* is a private drive that extends from Westings Avenue north through the CityGate Centre complex to Ferry Road (opposite Monarch Drive) and from Westings Avenue south to the Calamos Corporate Center complex. CityGate Lane has one travel lane in each direction with parallel parking permitted on both sides of several segments of the street. Its intersection with Ferry Road is under stop control on CityGate Lane and Monarch Drive. Its intersection with Westings Avenue is under stop control on CityGate Lane. There is also an internal intersection between the north-south and east-west sections of CityGate Lane in front of the Hotel Arista that is under stop control on the north-south segment of the street. There is a sidewalk along the west side of Comfort Drive. The posted speed limit on Comfort Drive is 30 mph.

## Existing Traffic Volumes

In order to determine current traffic conditions in the vicinity of the site, KLOA, Inc. conducted peak period traffic counts using Miovision Scout Video Collection Units on Thursday, February 7, 2019 during the weekday morning (6:30 A.M. to 9:00 A.M.) and weekday evening (4:00 P.M. to 6:30 P.M.) peak periods at the following intersections:

- Ferry Road with Comfort Drive/Corporate Lane
- Ferry Road with CityGate Lane
- Westings Avenue with CityGate Lane/Calamos Court
- Westings Avenue with IL Route 59

The results of the traffic counts showed that the weekday morning peak hour of traffic occurs from 7:30 A.M. to 8:30 A.M. and the weekday evening peak hour of traffic occurs from 4:30 P.M. to 5:30 P.M. **Figure 4** illustrates the existing peak hour traffic volumes. Copies of the traffic count summary sheets are included in the Appendix.





### 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 Development Plan

As proposed, the plans call developing the site with an apartment building containing approximately 285 units, approximately 34,000 square-feet of Event Center (with a capacity of approximately 800 people), an approximately 429-space parking garage for residents of the apartment units and an approximately 416-space surface parking lot for apartment guests and attendees for the Event Center of which 36 parking spaces will be utilized for apartment guests and the remaining spaces will be utilized for the Event Center.

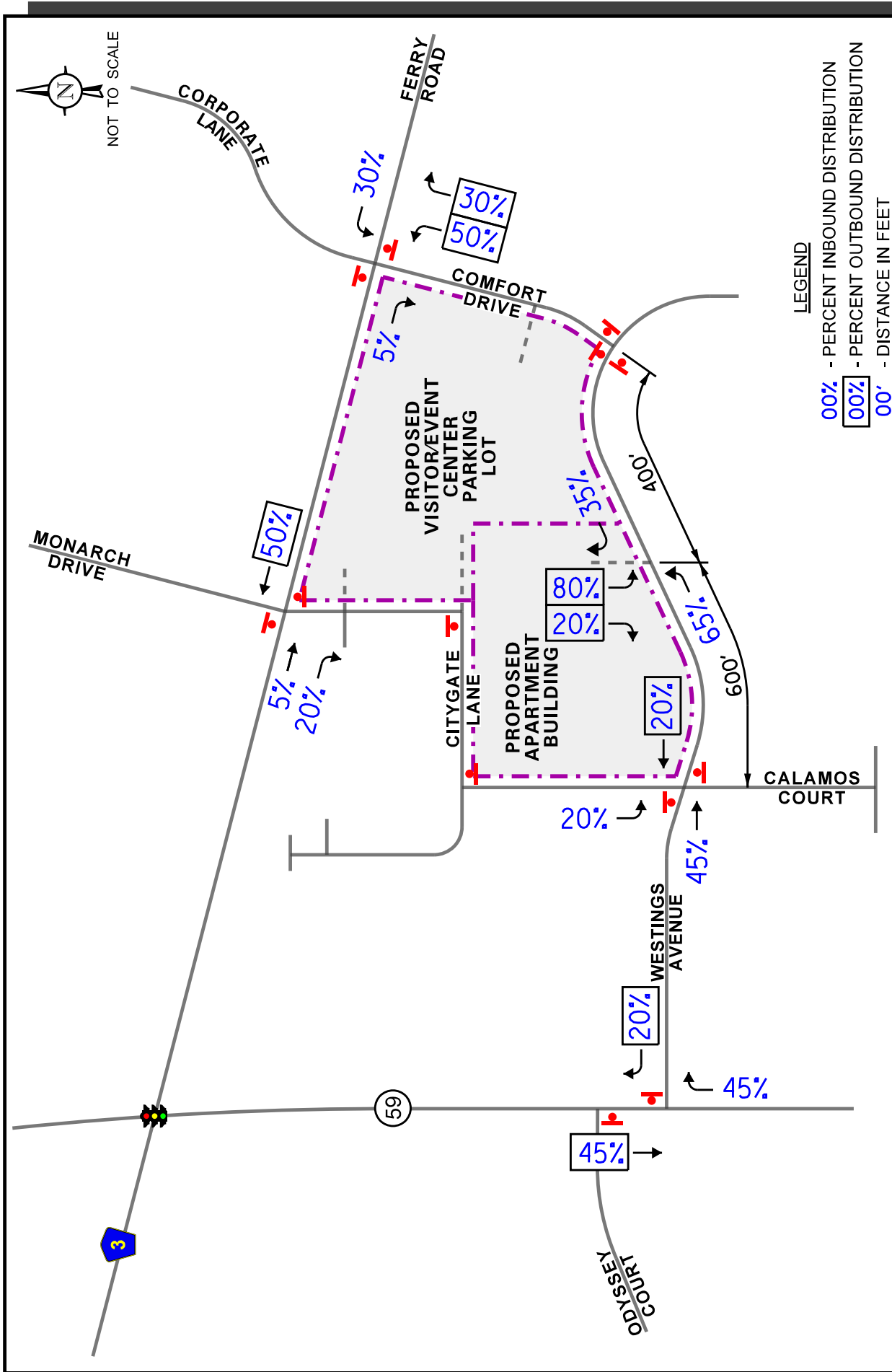
Access to the residential parking garage will be provided via a full movement access drive off Westings Avenue approximately 600 feet east of City Gate Lane. This access drive will provide one inbound lane and one outbound lane. Outbound movements should be under stop-sign control. Additionally, it should be noted that the existing landscaped median on Westings Avenue will need to be modified/shortened to allow for eastbound left-turning movements onto the access drive.

Access to the guest parking lot will be provided via two full movement access drives off City Gate Lane. Additional access will be provided via a single access drive off Comfort Drive located approximately 300 feet south of Ferry Road. This access drive will be restricted to right-turning movements only due to the existing raised median along Comfort Drive. All three access drives will provide one inbound land and one outbound lane. Outbound movements from the access drives should be under stop-sign control.

A copy of the site plan sheets depicting the proposed development and pedestrian and vehicle access is included in the Appendix.

#### Directional Distribution

The directions from which residents of the apartment development and attendees of the Event Center will approach and depart the site were estimated based on existing travel patterns, as determined from the traffic counts. **Figure 5** illustrates the directional distribution of the apartment development-generated traffic and **Figure 6** illustrates the directional distribution of the Event Center generated traffic.



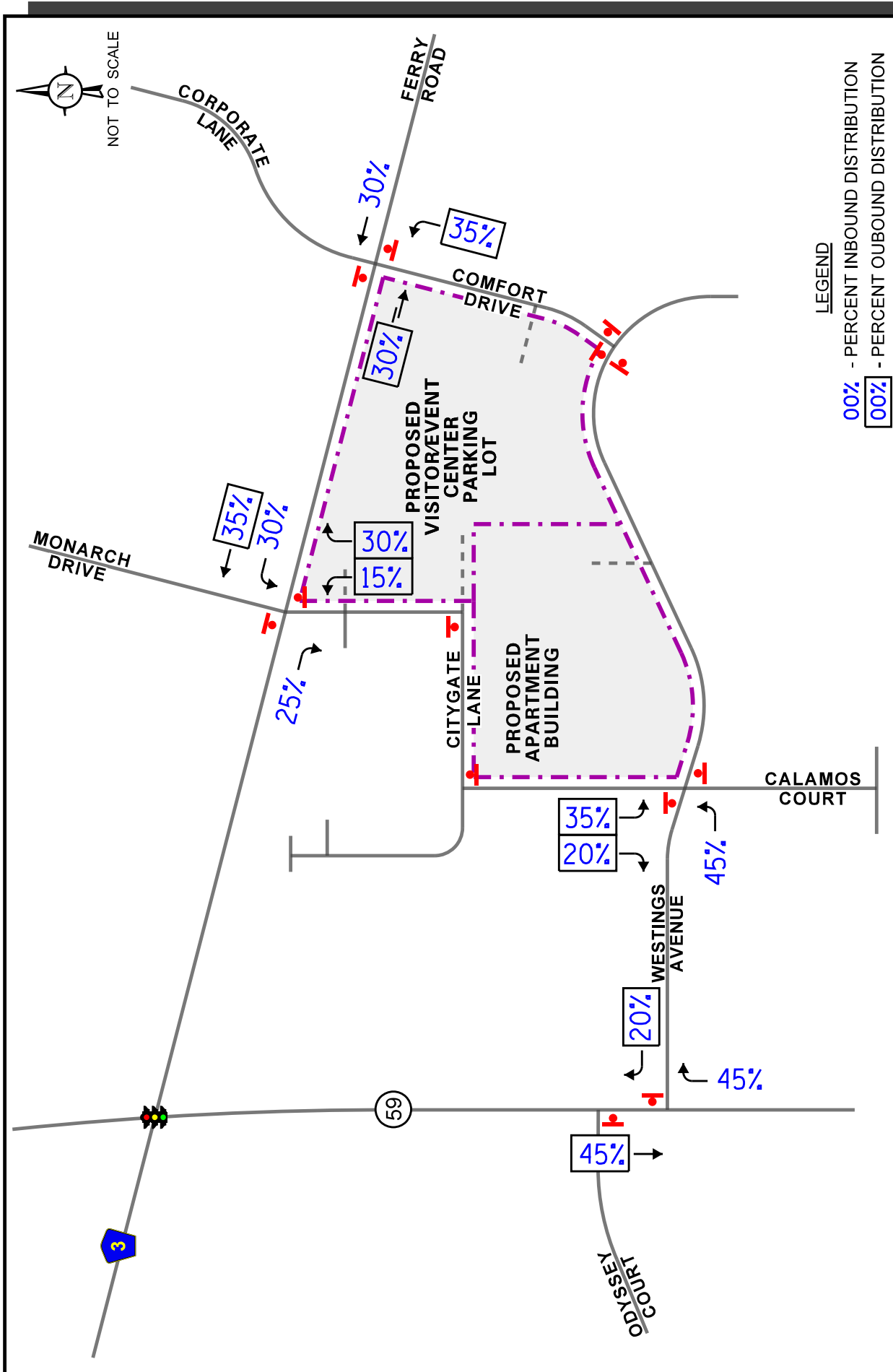
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Estimated Directional Distribution  
Apartment Development



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Figure: 5



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Estimated Directional Distribution  
Event Center



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Figure: 6

## Estimated Site Traffic Generation

The volume of traffic generated for the apartment development were estimated using data published in the Institute of Transportation Engineers (ITE) *Trip Generation Manual*, 10<sup>th</sup> Edition for Land-Use Code 221 (Multifamily Housing – Mid-Rise).

It should be noted that the ITE *Trip Generation Manual*, 10<sup>th</sup> Edition does not have trip rates for a banquet facilities/Event Center. Based on information provided by the operator, the proposed Event Center will be available for use seven days a week and will be utilized for all types of events including corporate/social events, Expo/Trade Show events, all day events, and evening events such as galas, weddings and not-for profit fundraisers, corporate dinners and social events. This operation is similar to the existing operation of the banquet and meeting space located within Hotel Arista.

The volume of traffic generated for the proposed Event Center was estimated based on trip generation surveys previously conducted by KLOA, Inc. at similar type of land uses in the Chicagoland area and based on survey data by Hamilton Associates of four different sites in Vancouver, BC. (summaries of the trip generation data are included in the Appendix). The results of the trip generation surveys indicated that the average trip rate for a banquet facility was 0.25 trips per seat. As such, the proposed Event Center is projected to generate approximately 200 trips during the peak inbound and outbound activity at maximum capacity and this trip generation utilized for the purposes of this evaluation. However, it was assumed that approximately 10 percent of inbound trips would be made by vehicles dropping off/picking-up event attendees, resulting in outbound trips. Additionally, since corporate events typically end prior to the weekday evening peak hour, the outbound trip generation by the proposed Event Center was assumed to be reduced by 20 percent

It should be noted that the trip generation methodology for the Event Center is conservative as it assumes it will be operating at maximum occupancy and that the inbound trips and outbound trips will occur during the weekday morning and weekday evening peak hours whereas these events will usually be held by multiple groups with events occurring at various times of the day. Additionally, the trip generation estimates do not include any internal capture of trips of event attendees who may also be staying at Hotel Arista or associated with any of the other office/commercial developments within City Gate Centre. **Table 1** summarizes the estimated peak hour trips anticipated for the proposed apartments and Event Center.

Table 1  
ESTIMATED SITE-GENERATED TRAFFIC VOLUMES

ITE Land-Use Code	Type/Size	Weekday Morning Peak Hour			Weekday Evening Peak Hour			Daily Two-Way Traffic
		In	Out	Total	In	Out	Total	
221	Apartments (285 Units)	25	72	97	75	48	123	1,574
--	Event Center (800 people)	<u>200</u>	<u>20</u>	<u>220</u>	<u>16</u>	<u>160</u>	<u>176</u>	--
<b>Total</b>		225	92	317	91	208	299	--



## 4. Projected Traffic Conditions

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

### Development Traffic Assignment

The estimated weekday morning and weekday evening peak hour traffic volumes that will be generated by the proposed development were assigned to the roadway system in accordance with the previously described directional distribution (Figure 5). The total new traffic assignment for the proposed apartment units is illustrated in **Figure 7** and the total new traffic assignment for the proposed Event Center is illustrated in **Figure 8**.

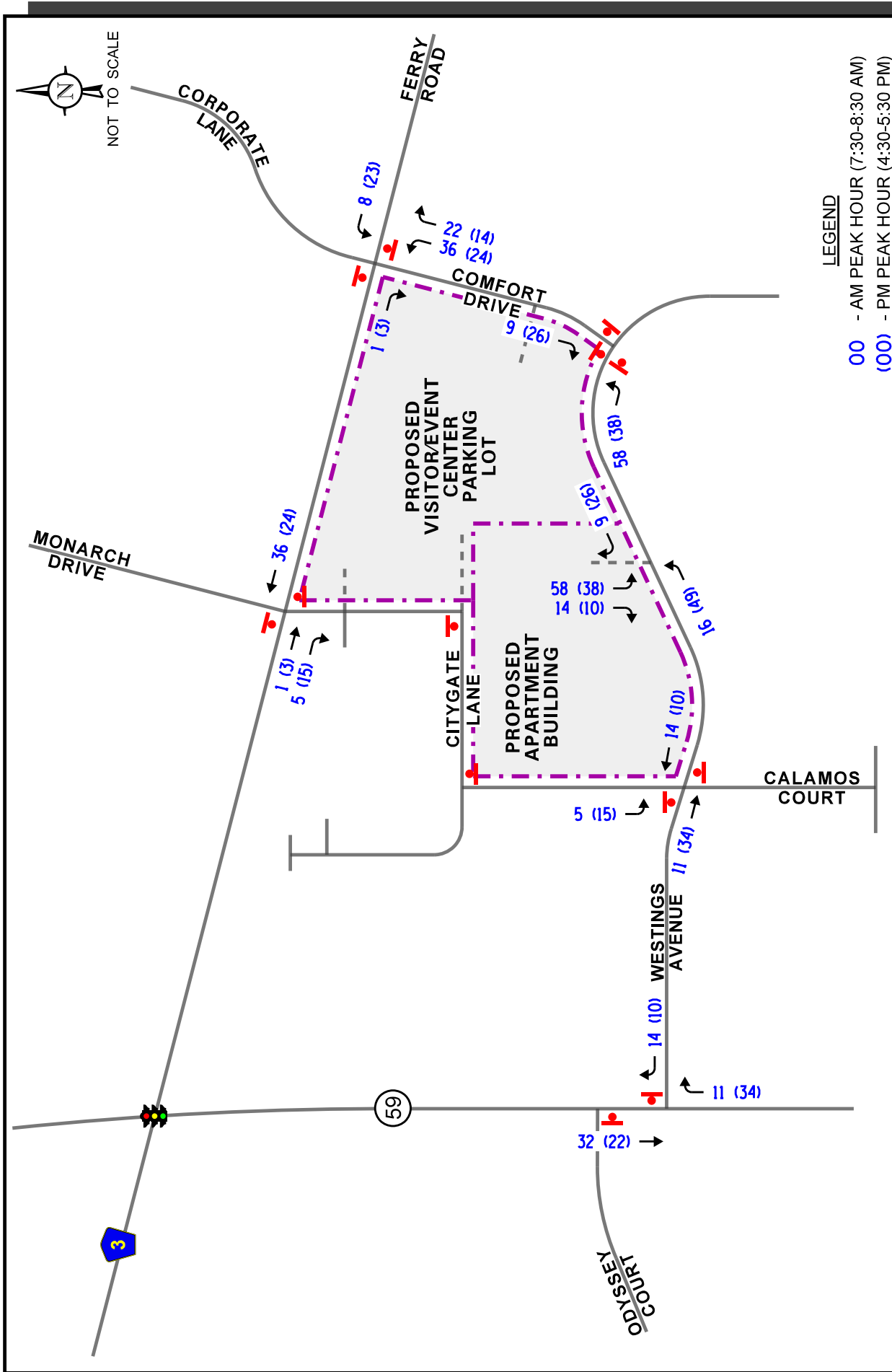
### Background Traffic Conditions

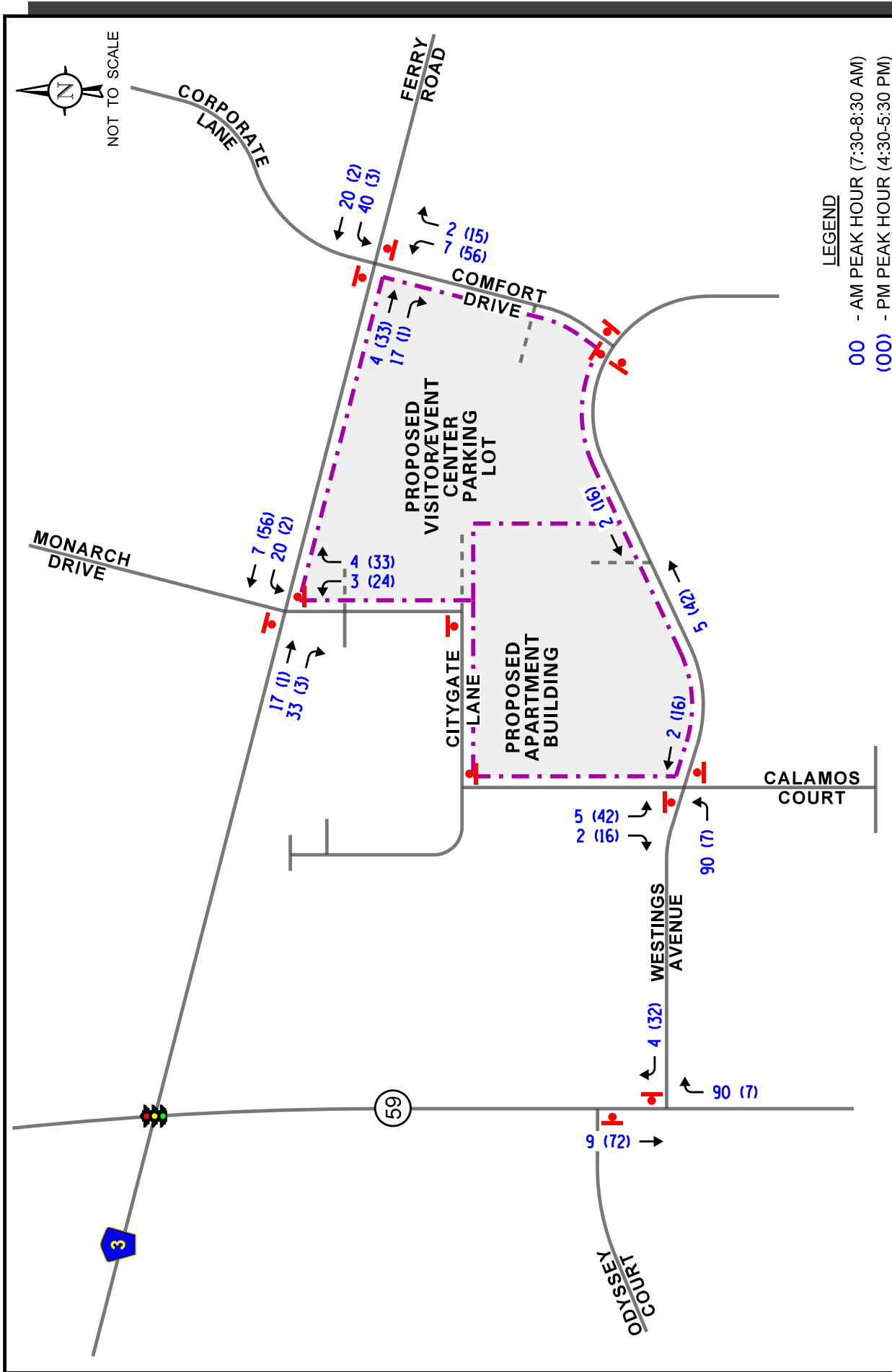
The existing traffic volumes (Figure 4) were increased by a regional growth factor to account for the increase in existing traffic related to regional growth in the area (i.e., not attributable to any particular planned development). Based on ADT projections provided by the Chicago Metropolitan Agency for Planning (CMAP) in a letter dated February 14, 2019, the existing traffic volumes are projected to increase by a compound annual growth rate of 0.7 percent per year. As such, traffic volumes were increased by four percent total over six years (buildout year plus five years) to project Year 2025 conditions. A copy of the CMAP 2050 projections letter is included in the Appendix. It should be noted that this background growth was only applied to the through volumes along Ferry Road and IL Route 59. The Year 2025 Background Traffic Volumes are illustrated in **Figure 9**.

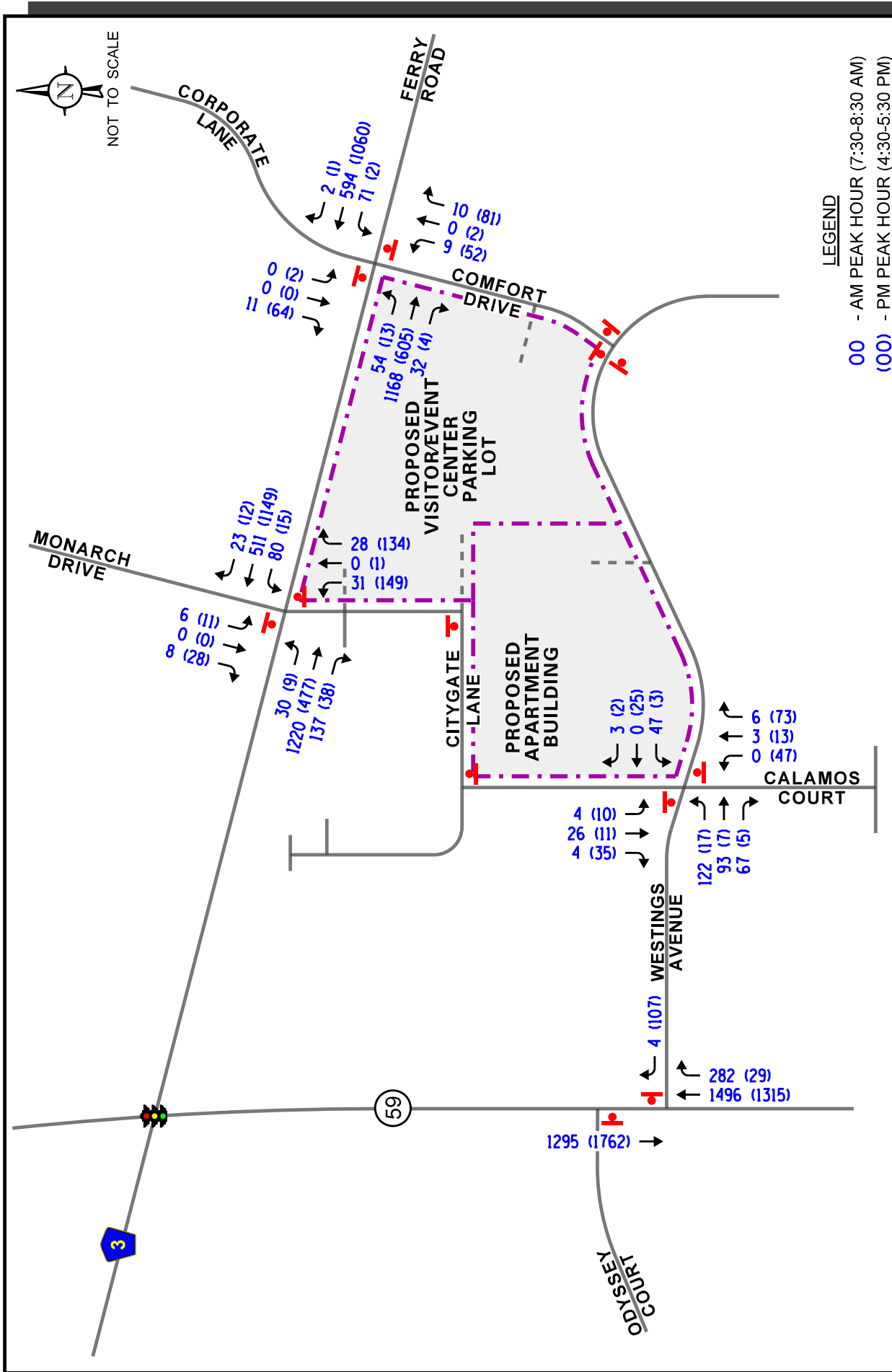
### Total Projected Traffic Volumes

The development-generated traffic was added to the existing traffic volumes accounting for background growth to determine the Year 2025 total projected traffic volumes, as illustrated in **Figure 10**.

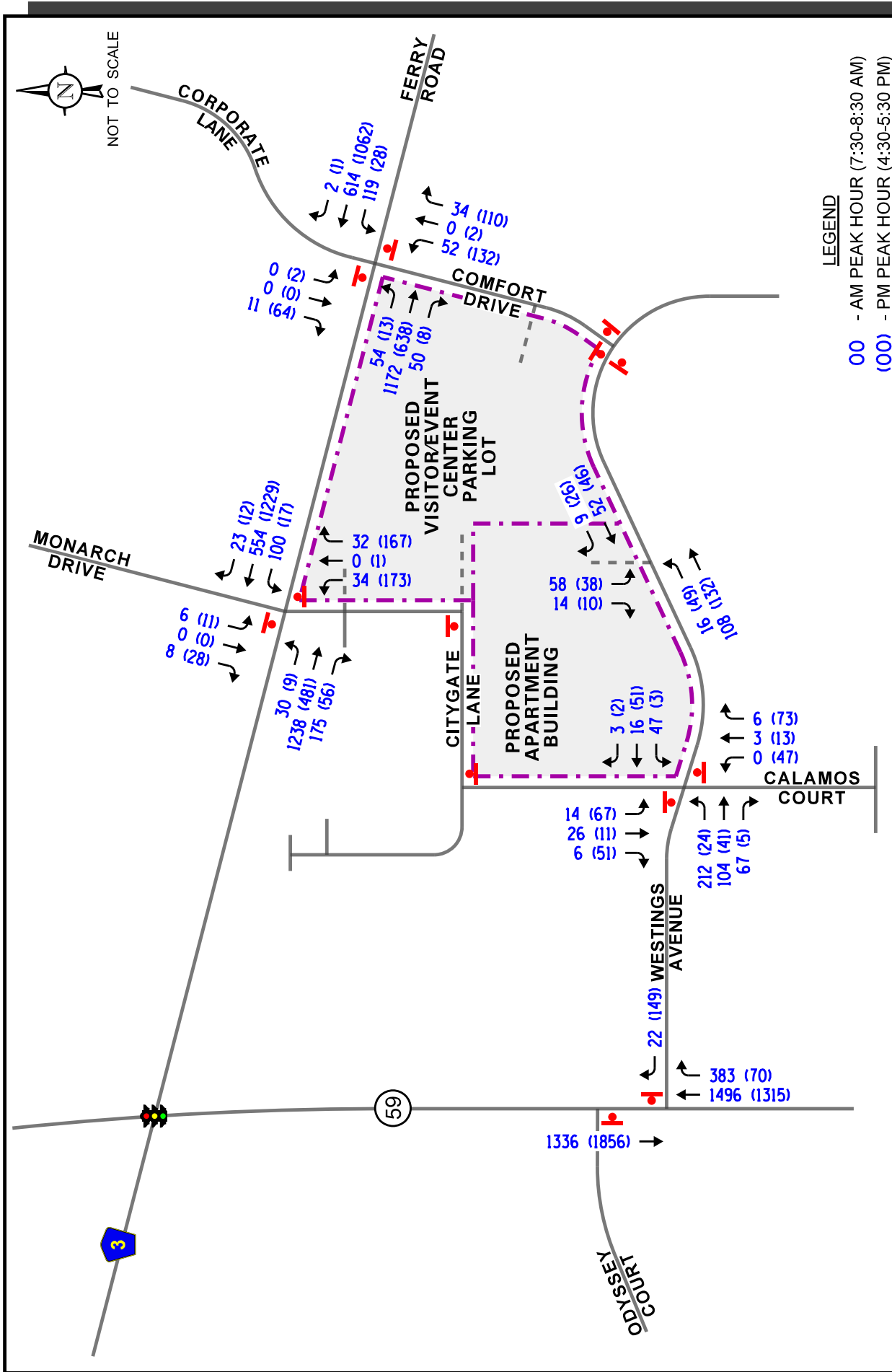
It should be noted that there are currently plans for a proposed Sports Arena that will be located on the north side of Ferry Road between Corporate Lane and Monarch Drive. As part of the Sports Arena, the intersection of Ferry Road with Comfort Drive/Corporate Lane will be signalized, and high visibility crosswalks will be added to the west and north legs of the intersection. The traffic estimated to be generated by the Sports Arena was added to the Year 2025 total projected traffic volumes determine the Year 2025 projected conditions with the development of the proposed Sports Arena as summarized in **Figure 11**.











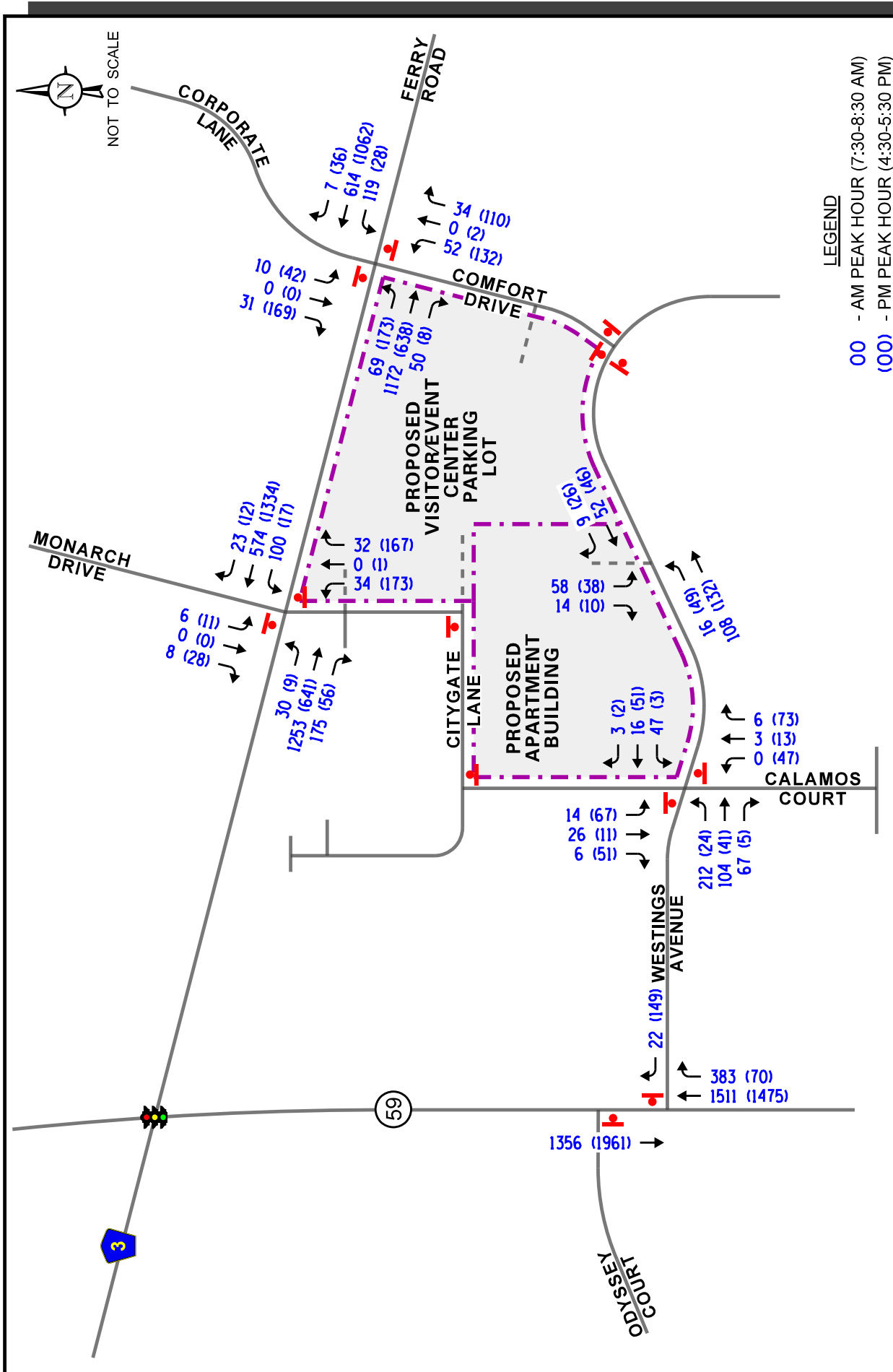
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Year 2025 Total Projected Traffic Volumes



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Figure: 10



## 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 modification are required.

### Traffic Analyses

Roadway and adjacent or nearby intersection analyses were performed for the weekday morning and weekday evening peak hours for the existing (Year 2019), future projected (Year 2025) and future projected traffic volumes taking into consideration the development of the proposed Sports Arena.

The traffic analyses were performed using the methodologies outlined in the Transportation Research Board's *Highway Capacity Manual (HCM)*, 6<sup>th</sup> Edition and analyzed using the Synchro/SimTraffic 10 computer software. Synchro/SimTraffic 10 was utilized due to the proximity of the access roadways serving CityGate Centre to the signalized intersection of IL Route 59 with Ferry Road.

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 and overall intersection delay (measured in seconds) for the existing and Year 2025 total projected conditions are presented in **Tables 2** through **4**, respectively. A discussion of the intersections follows. Summary sheets for the capacity analyses are included in the Appendix.

Table 2  
CAPACITY ANALYSIS RESULTS  
UNSIGNALIZED – EXISTING CONDITIONS

Intersection	Weekday Morning Peak Hour		Weekday Evening Peak Hour	
	LOS	Delay	LOS	Delay
<b>Ferry Road with Corporate Lane/Comfort Drive</b>				
• Northbound Left Turn	F	99+	F	52.9
• Northbound Through	--	--	E	45.9
• Northbound Right Turn	B	13.3	B	10.9
• Southbound Left Turn	--	--	E	47.4
• Southbound Through/Right Turn	B	10.6	B	13.6
• Eastbound Left Turn	A	9.1	B	13.9
• Westbound Left Turn	B	12.1	A	8.7
<b>Ferry Road with CityGate Lane/Monarch Drive</b>				
• Northbound Left Turn	F	99+	F	99+
• Northbound Through/Right Turn	C	15.5	B	11.6
• Southbound Left Turn/Through	F	79.2	F	71.2
• Southbound Right Turn	B	10.3	B	13.7
• Eastbound Left Turn	A	8.7	B	11.3
• Westbound Left Turn	B	14.2	A	8.5
<b>Westings Avenue with CityGate Lane/Calamos Court</b>				
• Northbound Left Turn/Through	B	14.4	B	10.2
• Northbound Through/Right Turn	A	9.2	A	8.7
• Southbound Left Turn/Through	C	15.9	B	10.0
• Southbound Right Turn	A	8.3	A	8.6
• Eastbound Left Turn	A	7.4	A	7.4
• Westbound Left Turn	A	7.7	A	7.2
<b>Westings Avenue with IL Route 59</b>				
• Westbound Right Turn	C	15.7	C	18.2
LOS = Level of Service Delay is measured in seconds.				



Table 3

## CAPACITY ANALYSIS RESULTS – UNSIGNALIZED – PROJECTED CONDITIONS

Intersection	Weekday Morning Peak Hour		Weekday Evening Peak Hour	
	LOS	Delay	LOS	Delay
<b>Ferry Road with Corporate Lane/Comfort Drive</b>				
• Northbound Left Turn	F	99+	F	99+
• Northbound Through	--	--	F	58.8
• Northbound Right Turn	B	14.3	B	11.4
• Southbound Left Turn	--	--	F	62.2
• Southbound Through/Right Turn	B	10.9	B	14.0
• Eastbound Left Turn	A	9.2	B	14.4
• Westbound Left Turn	B	13.5	A	9.0
<b>Ferry Road with CityGate Lane/Monarch Drive</b>				
• Northbound Left Turn	F	99+	F	99+
• Northbound Through/Right Turn	C	16.6	B	12.4
• Southbound Left Turn/Through	F	99+	F	99+
• Southbound Right Turn	B	10.6	B	14.7
• Eastbound Left Turn	A	9.0	B	12.1
• Westbound Left Turn	C	16.1	A	8.7
<b>Westings Avenue with CityGate Lane/Calamos Court</b>				
• Northbound Left Turn/Through	C	19.3	B	11.3
• Northbound Through/Right Turn	A	9.3	A	8.9
• Southbound Left Turn/Through	C	20.2	B	12.1
• Southbound Right Turn	A	8.4	A	8.9
• Eastbound Left Turn	A	7.7	A	7.5
• Westbound Left Turn	A	7.7	A	7.3
<b>Westings Avenue with IL Route 59</b>				
• Westbound Right Turn	C	19.1	D	27.5
<b>Westings Avenue with Proposed Access Drive</b>				
• Southbound Approach	A	9.9	B	10.4
• Eastbound Left Turn	A	7.4	A	7.4
LOS = Level of Service Delay is measured in seconds.				

Table 4

## CAPACITY ANALYSIS RESULTS – FERRY ROAD WITH CORPORATE LANE/COMFORT DRIVE – SIGNALIZED

Peak Hour	Eastbound			Westbound			Northbound			Southbound			Overall
	L	T	R	L	T	R	L	T	R	L	T	R	
Year 2025 Projected Conditions	A 2.7	A 8.3	A	A 5.3	A 5.4	A	D 46.2	--	A 0.7	--	A 0.1		A – 7.9
	A – 8.0			A – 5.4			C – 28.8			A – 0.1			
	A 3.8	A 6.7	A	A 3.6	A 7.4	A	E 72.1	E 60.5	B 15.1	D 54.0	A 1.2		
Weekday Evening Peak Hour	A – 6.6			A – 7.3			D – 48.4			A – 2.7			
Year 2025 Projected Conditions with Sports Arena	A 3.6	A 9.8	A	A 6.4	A 6.2	A	D 47.1	--	A 0.7	D 35.6	A 0.4		A – 9.1
	A – 9.5			A – 6.2			C – 28.7			A – 9.2			
	B 19.9	A 8.0	A	A 5.6	B 17.3	B	F 82.1	E 64.5	B 18.0	D 54.7	A 5.7		
Weekday Evening Peak Hour	B – 10.5			B – 17.0			D – 53.1			B – 15.5			
Letter denotes Level of Service Delay is measured in seconds.													
L – Left-Turns T – Through						R – Right-Turns							

## Discussion and Recommendations

The following summarizes how the intersections are projected to operate and identify any roadway and traffic control improvements to accommodate the development traffic.

### *Ferry Road with Comfort Drive/Corporate Lane*

The results of the capacity analysis indicate that the northbound left turning movement currently operates at LOS F during the weekday morning and evening peak hours, the northbound through movement operates at LOS E during the weekday evening peak hour and the northbound right-turning movement operates at LOS B during the weekday morning and weekday evening peak hour. The southbound left turning movement currently operate at LOS E during the weekday evening peak hour and the southbound right-turning movement currently operate at LOS B during the weekday morning and evening peak hours.

Under Year 2025 conditions, taking into consideration the traffic only projected to be generated by the proposed subject development, northbound left turning movements are projected to continue operating at LOS F during the weekday morning and weekday evening peak hours, the northbound through movement its projected to operate at LOS F during the weekday evening peak hour and the northbound right-turning movements are projected to continue operating at LOS B during the peak hours. The southbound left-turning movement is projected to operate a LOS F during the weekday evening peak hour and the southbound right-turning movements are projected to continue operating at LOS B during the peak hours. As discussed in the following section, when the projected traffic volumes are compared to the peak hour traffic signal warrant (Warrant 3) criteria published in the MUTCD, a traffic signal is warranted at this intersection during the weekday evening peak hour

When analyzed with the provision of a traffic signal at this intersection, this intersection overall is projected to operate at LOS A during the weekday morning peak hour and at LOS B during the weekday evening peak hour and all of the approaches are projected to operate at LOS D or better during the peak hours. Furthermore, the 95<sup>th</sup> percentile queues for the southbound, eastbound and westbound left-turning movements are projected to be contained within the existing left-turn lane storage provided. The 95<sup>th</sup> percentile queues for the northbound approach are projected to be approximately 190 feet during the weekday evening peak hour which will extend beyond the approximately 140 feet of storage, however, this queue will not prohibit vehicles from accessing the northbound through and right-turn lanes given the existing width of the roadway. It should be noted that the turn lane storage lengths are not projected to change with the installation of the traffic signal.

Under Year 2025 conditions, taking into consideration the traffic estimated to be generated by the proposed Sports Arena and the provision of a traffic signal at this intersection, this intersection overall is projected to continue operating at LOS A during the weekday morning peak hour and at LOS B during the weekday evening peak hour and all of the approaches are projected to continue operating at LOS D or better during the peak hours. It should be noted that the northbound left-turning movement which is projected to operate on the threshold of LOS E/F and the northbound through movement is projected to operate at LOS E during the weekday evening peak hour.

Furthermore, the 95<sup>th</sup> percentile queues for the southbound, eastbound and westbound left-turning movements are projected to be contained within the existing left-turn lane storage provided. The 95<sup>th</sup> percentile queues for the northbound approach are projected to be approximately 190 feet during the weekday evening peak hour which will extend beyond the approximately 140 feet of storage, however, this queue will not prohibit vehicles from accessing the northbound through and right-turn lanes given the existing width of the roadway. It should be noted that the turn lane storage lengths are not projected to change with the installation of the traffic signal.

As such, this intersection with the proposed improvements, is generally projected to operate at acceptable levels of service during the peak hours. However, this intersection should be monitored in the future to determine (should the projected traffic volumes be realized) whether additional green time be allocated to the northbound left-turning movements. As previously indicated, the results of the capacity analyses are conservative as it assumes maximum occupancy at the proposed Event Center. Overall, the traffic projected to be generated by the proposed development will have a limited impact on the operations of this intersection and no additional intersection improvements will be required.

#### *Ferry Road with CityGate Lane/Monarch Drive*

The results of the capacity analysis indicate that the northbound and southbound left-turning movements from CityGate Lane and Monarch Drive onto Ferry Road currently operate at LOS F during the weekday morning and weekday evening peak hours. Furthermore, the northbound and southbound right-turning movements currently operate at LOS C or better during the peak hours.

Under Year 2025 conditions, taking into consideration the traffic only projected to be generated by the proposed subject development, the northbound and southbound left-turning movements are projected to continue operating at LOS F during the peak hours and the northbound and southbound right-turning movements are projected to operate at LOS C or better during the peak hours with increase in delay of approximately one second or less. Furthermore, eastbound and westbound left-turning movements from Ferry Road onto CityGate Lane/Monarch Drive are projected to operate at LOS C or better during the peak hours with increases in delay of approximately two seconds or less.

It should be noted that the increases in delay experienced at this intersection are primarily attributed to the existing traffic and background growth as the proposed development is only projected to increase the traffic traversing this intersection by approximately eight percent of which the majority of the new development's trips will be made in the eastbound and westbound directions along Ferry Road. Due to the location of the proposed residential access drive off Westings Avenue, it is anticipated that outbound vehicles from the residential parking garage that are destined to the west on Ferry Road will find it more convenient to utilize the intersection of Ferry Road with Comfort Drive, particularly with the provision of a traffic signal at this intersection, rather than utilizing the unsignalized intersection of Ferry Road with CityGate Lane. Therefore, no apartment generated traffic projected to make a northbound left-turn from CityGate Lane onto Ferry Road.



Additionally, the provision of a traffic signal at the intersection of Ferry Road with Comfort Drive/Corporate Lane may draw vehicles that currently perform northbound left-turning movements at this intersection (particularly vehicles who utilize CityGate Lane to travel from Calamos Court to Ferry Road) and the projected Event Center generated vehicles egressing the proposed garage may opt to utilize the proposed traffic signal at Ferry Road with Comfort Drive, reducing the overall northbound left-turning movements from CityGate Lane onto Ferry Road. Furthermore, the provision of this signal at this intersection in combination with the existing traffic signal at the intersection of IL Route 59 with Ferry Road will create additional gaps in the Ferry Road traffic stream which will likely reduce the delays experienced by existing northbound and southbound traffic. When a traffic signal is provided at the intersection of Ferry Road with Comfort Drive, in order to help encourage attendees of the proposed Event Center to utilize the proposed traffic signal at Ferry Road with Comfort Drive, wayfinding signage should be provided directing vehicles to this traffic signal.

#### *Westings Avenue with CityGate Lane/Calamos Court*

The results of the capacity analysis indicate that the northbound and southbound approaches currently operate at LOS C or better during the weekday morning and weekday evening peak hours. Under Year 2025 projected conditions, the northbound and southbound approaches are projected to continue operating at LOS C or better during the peak hours with increases in delay of approximately five seconds or less. Additionally, the eastbound and westbound left-turning movements are projected to continue operating at LOS A during the peak hours with increases in delay of less than one second and 95<sup>th</sup> percentile queues of one to two vehicles. As such, the traffic projected to be generated by the proposed development will have a limited impact on the operations of this intersection and no roadway or traffic control improvements will be required.

#### *Westings Avenue with IL Route 59*

The results of the capacity analysis indicate that the westbound approach currently operates at LOS C during the weekday morning and weekday evening peak hours. Under Year 2025 conditions, the westbound approach is projected to operate at LOS C during the weekday morning peak hour and at LOS D during the weekday evening peak hour with increases in delay of approximately four and nine seconds, respectively and 95<sup>th</sup> percentile queues of two to three vehicles. As such, the traffic projected to be generated by the proposed development will have a limited impact on the operations of this intersection and no roadway or traffic control improvements will be required.

#### *Westings Avenue with Proposed Access Drive*

The results of the capacity analyses indicate that outbound movements from the access drive onto Westings Avenue are projected to operate at LOS A during the weekday morning peak hour and at LOS B during the weekday evening peak hours. Furthermore, eastbound left-turning movements from Westings Avenue onto the access drive are projected to operate at LOS A during both peak hours with 95<sup>th</sup> percentile queues of one to two vehicles.

As previously indicated, the existing landscaped median along Westings Avenue in the vicinity of the site will be modified/shortened by approximately 25 feet to allow for eastbound left-turn movements onto the access drive. However, the median will not need to be modified to provide an exclusive left-turn lane based on the following:

- The results of the capacity analyses indicated eastbound left-turns onto the access drive are projected to operate an acceptable level of service with limited delays and queueing.
- A review of the simulation showed that eastbound left-turning vehicles are projected to wait for an opposing vehicle one time during the weekday morning peak hour and one time during the weekday evening peak hour. Both instances resulted in a queue of just one vehicle (vehicle waiting to turn)
- The eastbound left-turning movements onto the access drive are only opposed by 61 vehicles during the weekday morning peak hour and 72 vehicles during the weekday evening peak hour equating to approximately one vehicle per minute.
- The analysis of the proposed access drive utilizing the Highway Capacity Software (HCS) 7 indicated that the eastbound left-turning movement is projected to operate queue free for approximately over 95 percent of the peak hour.

Should an eastbound left-turning vehicle need to stop within the roadway to wait for a westbound vehicle, this vehicle can stack within the median break which will not obstruct eastbound through movements.

As such, this access drive will be adequate in accommodating the traffic projected to be generated by the proposed development and left-turns from Westings Avenue can be accommodated by the existing roadway network.

## Traffic Signal Warrant Evaluation

The existing and projected weekday morning and weekday evening peak hour were compared to the peak hour traffic signal warrant (Warrant 3) criteria published in the Manual on Uniform Traffic Control Devices (MUTCD) to determine if a traffic signal is warranted during either peak hour. It should be noted that since Ferry Road has a posted speed limit of 45 miles per hour. The traffic signal warrant criteria reflecting the 70 percent factor was utilized. Additionally, the minor approach right-turning movements were reduced based on Pagones Theorem to account for right-turn on red maneuvers. **Table 5** summarizes the traffic signal warrant evaluation for existing and projected conditions.

As can be seen from Table 5, when the existing traffic volumes are compared to the peak hour traffic signal warrant (Warrant 3) criteria published in the MUTCD, taking into consideration a reduction in the right-turning movements based on Pagones Theorem, a traffic signal is not warranted at this intersection during either peak hour. However, a traffic signal is warranted under projected conditions during the weekday evening peak hour.

Table 5

## PEAK HOUR TRAFFIC SIGNAL WARRANT – FERRY ROAD WITH COMFORT DRIVE

	Time Period	Major Approach Total Volume	Minor Approach Volume		Peak Hour Warrant Met?
			Northbound	Southbound	
Existing Conditions	Weekday Morning Peak Hour	1851	12	5	No
	Weekday Evening Peak Hour	1618	75	28	No
Projected Conditions	Weekday Morning Peak Hour	2011	61	5	No
	Weekday Evening Peak Hour	1764	162	28	Yes (NB Approach)
Note: Northbound right turns reduced by 75 percent and southbound right turns reduced by 60 percent					

## 6. Parking Evaluation

The following provides an evaluation of the proposed residential parking garage, proposed guest parking lot and existing parking locations serving City Gate Center in accommodating the parking projected to be generated by the proposed development.

### Evaluation of the Residential Parking Supply

For multiple family dwelling uses, the City of Naperville requires two parking spaces per dwelling unit and 0.25 parking guest parking spaces per unit, thereby requiring 642 parking spaces.

As previously indicated, the proposed development will provide a residential parking garage containing approximately 429 parking spaces. Additionally, a surface guest parking lot will be developed providing 36 parking spaces for a total of 465 parking spaces provided. With the proposed 285 units, the resulting parking ratio will be 1.63 parking spaces per unit. With a total of 371 bedrooms proposed, the resulting parking ratio will be 1.25 parking spaces per bedroom. The total 465 parking spaces, when compared to the City code of 633 parking spaces results in a deficit of 168 parking spaces.

However, the proposed parking ratio of 1.63 parking spaces per unit will be adequate based on parking occupancy surveys of an existing, similar residential development in Vernon Hills, published parking demand data by the Institute of Transportation Engineers (ITE), census tract information, and similar developments in the area that have been approved and are operating with similar parking ratios as the proposed CityGate Apartment development. A description of each of the supporting methodologies follows.

### Parking Occupancy of AMLI – Vernon Hills Development

A parking occupancy survey was conducted at the existing AMLI Museum Gardens luxury apartment development located at 1175 Museum Boulevard in Vernon Hills, Illinois. The apartment development, which was constructed in 2004, contains 294-units (576 bedrooms) and provides a total of approximately 599 parking spaces (mixture of 189 parking garage spaces, 56 parking spaces in detached garages throughout the campus, and 354 surface parking spaces around the perimeter. The results of the parking occupancy survey indicated that the apartment development experienced a peak parking occupancy of 397 spaces at 10:00 P.M. which is a parking ratio of 1.45 spaces per occupied unit and 0.74 parking spaces per occupied bedroom. This parking ratio is inclusive of all resident and guest parking. It should be noted that at the time the parking occupancy surveys were conducted that the apartment units were 93 percent occupied (273 occupied units and approximately 536 occupied bedrooms).

## Parking Based on ITE Parking Demand Data

In reviewing the survey data published in the *ITE Parking Generation Manual*, 5<sup>th</sup> Edition for Land Use Code 221 (Mid-Rise Apartments), the following was determined:

- The average peak parking demand ratio is 1.31 spaces per dwelling unit
- The 85<sup>th</sup> percentile peak parking demand ratio is 1.47 spaces per dwelling unit
- The average peak parking demand ratio is 0.75 spaces per bedroom
- The 85<sup>th</sup> percentile peak parking demand ratio is 0.87 spaces per bedroom

As can be seen, the average and 85<sup>th</sup> percentile parking supply ratios, which account for both resident and guest parking, provided by the proposed apartment building are greater than the average and 85<sup>th</sup> percentile parking demands per dwelling unit and bedroom based on information published in the *ITE Parking Generation Manual*, 5<sup>th</sup> Edition.

## Parking Based on U.S. Census Bureau Information

U.S. Census Bureau information reported between 2013 and 2017 shows that renter occupied households within the subject area in the area of the subject development, approximately 70 percent of renter occupied residences have zero or one vehicle available, 28 percent of renter occupied residences have two vehicles available and two percent of renter occupied residences have three vehicles available. This survey includes multi-family developments as well as single-family homes, both with one to several bedrooms in each unit.

It should be noted that these percentages are consistent with the characteristics of the proposed development which will provide 199 studio/one-bedroom units (approximately 70 percent of the total) and 86 two-bedroom units (approximately 30 percent of the total). Applying these percentage to the proposed 285-unit development assumes approximately 378 parking spaces will be required. With 465 parking spaces provided, there will be a surplus of 87 parking spaces to be utilized by residents and guests. Therefore, based on census data of the immediate area, the proposed 465 parking spaces are adequate to accommodate the residential peak parking demand.

## Comparison of Parking Ratios of Similar Apartment Developments

A comparison of parking ratios of similar apartment developments in the Chicagoland area is summarized in **Table 5**. Table 5 shows the number of units, bedrooms and parking spaces as well as the parking space per unit ratio, as well as the parking space per bedroom ratio. It should be noted that these apartments do have access to nearby bus routes but are not within walking distance of railway stations. As shown in Table 2, the proposed apartment development parking ratio is similar to the average of the other similar developments. The proposed development is providing 1.63 parking spaces per unit and 1.25 spaces per bedroom. The ten other similar developments are providing parking at an average ratio of 1.65 spaces per unit and 1.14 spaces per bedroom. Based on the above, the proposed 465 parking spaces are adequate to accommodate residential peak parking demands.

Table 5

## COMPARISON OF PARKING RATIOS AT SIMILAR DEVELOPMENTS

Development Name	Number of Units	Number of Bedrooms	Number of Parking Spaces	Spaces/Unit	Spaces/Bedroom
AMLI – Deerfield	240	329	396	1.65	1.2
8700 Waukegan - Morton Grove	184	258	276	1.50	1.1
Tapestry – Glenview	290	403	490	1.69	1.2
Northshore 770 - Northbrook	347	545	571	1.65	1.0
Woodview - Deerfield	248	369	412	1.49	1.1
Mellody Farms – Vernon Hills	260	388	485	1.76	1.2
IL 62/Plum Grove Road - Schaumburg	372	--	635	1.71	--
Cedarlake – Plainfield	284	--	443	1.56	--
404 Social - Lincolnshire	302	458	534	1.77	1.2
The Elaine – Northbrook	338	--	580	1.72	--
<b>Average:</b>				<b>1.65</b>	<b>1.14</b>
Proposed Apartment Development	281	371	464	1.63	1.25



## Evaluation of Guest Parking Supply

It should be noted that all of the above parking demand comparison methodologies include the parking demand for both resident and guest parking. However, information regarding the separate parking demands for resident versus guest parking is not available. As can be seen from the above methodologies, the proposed development will have a projected peak parking demand of 419 spaces (85<sup>th</sup> percentile parking demand based on information published by ITE).

This peak parking demand can be accommodated by the proposed 429 parking spaces within the parking garage with a surplus of 10 parking spaces. However, in order to ensure adequate guest parking is provided and to increase the overall parking supply, the proposed development will provide an additional 36 parking spaces within the proposed 416 space surface parking lot located to the northeast of the proposed apartment building. In the unlikely event additional guest parking is required, arrangements could be made for that to be accommodated within the proposed residential parking garage which is projected to have a surplus of up to 21 additional parking spaces during times of peak resident parking demand.

As such, the 36 apartment guest parking spaces that will be located within the proposed surface parking lot will be adequate in providing separate resident and guest parking locations and will overall increase the number of parking spaces provided by the proposed development.

## Evaluation of Event Center Parking Supply

As previously indicated, the proposed Event Center will be available for use seven days a week and will be utilized for all types of events including corporate/social events, Expo/Trade Show events, all day events, evening events such as galas, weddings and not-for profit fundraisers, corporate dinners and social events. For meeting space, the City of Naperville require ten parking spaces per 1,000 square-feet of growth floor area, thereby requiring 340 parking spaces.

Parking for the proposed Event Center will be accommodated within the proposed 416-space surface parking lot. As previously indicated, 36 of the parking spaces will be reserved for guest parking for the proposed apartment units, resulting in 380 parking spaces for use of the proposed Event Center which is 40 spaces greater than the City of Naperville requirement.

As such, the proposed surface parking lot will be adequate in accommodating the parking estimated to be generated by the proposed Event Center and will provide sufficient parking for both apartment guest parking and attendees of the Event Center. It should be noted that as part of the proposed development, approximately eight on-street parking spaces will be eliminated along the south side of City Gate Lane to accommodate a proposed drop-off/pick-up/valet loading zone as well as the loading bays for the proposed apartment units and Event Center.

## Parking Occupancy Surveys

In order to determine the existing parking demand of the City Gate Centre, parking occupancy surveys were conducted hourly at the existing parking locations (as previously described) on Wednesday, May 8, 2019 between 7:00 A.M. and 9:00 P.M. and on Saturday, May 11, 2019 between 11:00 A.M. and 10:00 P.M. These days were chosen to encompass a weekday in which events were occurring at the hotel between 7:00 A.M. and 6:00 P.M. and a Saturday in which a wedding that utilized several of the different hotel spaces occurred between 5:00 P.M. and 11:00 P.M. The results of the parking occupancy surveys are summarized in **Tables 6** through **9**.

As can be seen from Tables 6 and 7, the parking spaces serving the City Gate Centre had the following peak parking demands:

- The peak parking demand on the weekday was 951 parking spaces (52 percent occupied) occurring at 12:00 Noon resulting in a surplus of 894 spaces.
- The peak parking demand on Saturday was 297 spaces (16 percent occupied) occurring at 7:00 P.M. resulting in a surplus of 1,518 parking spaces.
- Looking specifically at the 2191 City Gate Lane parking garage, the peak parking demand on the weekday was 580 parking spaces (55 percent occupied) occurring at 1:00 P.M. resulting in a surplus of 471 spaces.
- Looking specifically at the 2191 City Gate Lane parking garage, the peak parking demand on Saturday was 191 spaces (18 percent occupied) occurring at 3:00 P.M. resulting in a surplus of 860 parking spaces.

As such, the existing parking locations within the City Gate Center have sufficient capacity to accommodate its existing parking demand.

Table 6  
PARKING OCCUPANCY SURVEYS - WEEKDAY

Time	2191 City Gate Lane Garage	On-Street Parking	2135 City Gate Lane Surface Parking Lot	2035 Calamos Court Garage	Calamos Court East Surface Lot	Calamos Court West Surface Lot	Total
7:00 A.M.	193	43	5	25	1	0	267
8:00 A.M.	350	50	9	106	2	0	517
9:00 A.M.	520	55	34	246	0	0	855
10:00 A.M.	547	61	30	271	3	0	912
11:00 A.M.	559	59	32	285	1	0	936
12:00 P.M.	572	57	32	286	4	0	951
1:00 P.M.	580	73	32	257	5	1	948
2:00 P.M.	534	68	31	272	6	0	911
3:00 P.M.	486	67	30	271	2	0	856
4:00 P.M.	447	59	27	224	7	0	764
5:00 P.M.	343	49	9	99	12	0	512
6:00 P.M.	257	42	9	59	17	0	384
7:00 P.M.	162	43	7	27	9	0	248
8:00 P.M.	143	44	7	27	14	0	235
9:00 P.M.	120	45	5	23	4	0	197
<b>Inventory</b>	<b>1051</b>	<b>77</b>	<b>34</b>	<b>613</b>	<b>33</b>	<b>37</b>	<b>1,845</b>

Table 7

## PARKING OCCUPANCY SURVEYS - SATURDAY

Time	2191 City Gate Lane Garage	On-Street Parking	2135 City Gate Lane Surface Parking Lot	2035 Calamos Court Garage	Calamos Court East Surface Lot	Calamos Court West Surface Lot	Total
11:00 A.M.	157	25	7	4	0	0	193
12:00 P.M.	158	32	6	6	0	0	202
1:00 P.M.	165	31	5	5	0	0	206
2:00 P.M.	181	26	8	9	0	0	224
3:00 P.M.	191	31	4	11	0	0	237
4:00 P.M.	186	41	8	23	3	0	261
5:00 P.M.	181	46	9	34	4	0	274
6:00 P.M.	173	58	15	37	11	0	294
7:00 P.M.	149	72	14	38	24	0	297
8:00 P.M.	148	63	12	39	23	0	285
9:00 P.M.	137	49	11	32	17	0	246
10:00 P.M.	123	42	10	23	0	0	198
<b>Inventory</b>	<b>1051</b>	<b>77</b>	<b>34</b>	<b>613</b>	<b>33</b>	<b>37</b>	<b>1,845</b>

Table 8

## PARKING OCCUPANCY PERCENTAGES – WEEKDAY

Time	2191 City Gate Lane Garage	On-Street Parking	2135 City Gate Lane Surface Parking Lot	2035 Calamos Court Garage	Calamos Court East Surface Lot	Calamos Court West Surface Lot	Total
7:00 A.M.	18%	56%	15%	3%	3%	0%	14%
8:00 A.M.	33%	65%	26%	6%	6%	0%	28%
9:00 A.M.	49%	71%	100%	0%	0%	0%	46%
10:00 A.M.	52%	79%	88%	9%	9%	0%	49%
11:00 A.M.	53%	77%	94%	3%	3%	0%	51%
12:00 P.M.	54%	74%	94%	12%	12%	0%	52%
1:00 P.M.	55%	95%	94%	15%	15%	3%	51%
2:00 P.M.	51%	88%	91%	18%	18%	0%	49%
3:00 P.M.	46%	87%	88%	6%	6%	0%	46%
4:00 P.M.	43%	77%	79%	21%	21%	0%	41%
5:00 P.M.	33%	64%	26%	36%	36%	0%	28%
6:00 P.M.	24%	55%	26%	52%	52%	0%	21%
7:00 P.M.	15%	56%	21%	27%	27%	0%	13%
8:00 P.M.	14%	57%	21%	42%	42%	0%	13%
9:00 P.M.	11%	58%	15%	12%	12%	0%	11%

Table 9

## PARKING OCCUPANCY PERCENTAGES – SATURDAY

Time	2191 City Gate Lane Garage	On-Street Parking	2135 City Gate Lane Surface Parking Lot	2035 Calamos Court Garage	Calamos Court East Surface Lot	Calamos Court West Surface Lot	Total
11:00 A.M.	15%	32%	21%	0%	0%	0%	10%
12:00 P.M.	15%	42%	18%	0%	0%	0%	11%
1:00 P.M.	16%	40%	15%	0%	0%	0%	11%
2:00 P.M.	17%	34%	24%	0%	0%	0%	12%
3:00 P.M.	18%	40%	12%	0%	0%	0%	13%
4:00 P.M.	18%	53%	24%	0%	9%	0%	14%
5:00 P.M.	17%	60%	26%	1%	12%	0%	15%
6:00 P.M.	16%	75%	44%	2%	33%	0%	16%
7:00 P.M.	14%	94%	41%	4%	73%	0%	16%
8:00 P.M.	14%	82%	35%	4%	70%	0%	15%
9:00 P.M.	13%	64%	32%	3%	52%	0%	13%
10:00 P.M.	12%	55%	29%	0%	0%	0%	11%



## 7. Conclusion

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

- A traffic signal is warranted at the intersection of Ferry Road with Comfort Drive/Corporate Lane during the weekday evening peak hour under Year 2025 projected conditions.
- The traffic that will be generated by the proposed development can be accommodated by the area roadway system with the provision of a traffic signal at the intersection of Ferry Road with Comfort Drive/Corporate Lane.
- The proposed traffic signal should be monitored in the future to determine if additional green time should be allocated to the northbound left-turning movement.
- The proposed residential site access will be adequate in accommodating the projected traffic volumes entering and exiting the proposed development. The existing landscaped median along Westings Avenue in the vicinity of the site will need to be modified to allow for eastbound left-turn movements onto the access drive or the access drive will need to be modified to align with the existing median break along the roadway
- The proposed residential parking ratio of 1.63 parking spaces per apartment unit will be adequate based on the following:
  - Parking occupancy surveys of an existing, similar residential development in Vernon Hills.
  - Published parking demand data by the Institute of Transportation Engineers (ITE) in the Parking Generation Manual 5<sup>th</sup> Edition.
  - Census tract information regarding the number of vehicles available per renter occupied household within the vicinity of the site.
  - The parking supplies provided at similar developments in the area that have been approved and are operating with similar parking ratios as the proposed CityGate Apartment development.
- The proposed 416 space surface parking lot will be adequate in accommodating the parking for guests of the proposed apartment development as well as attendees of the proposed Event Center

# Appendix

Traffic Count Summary Sheets

Site Plan

CMAP 2050 Projections Letter

Level of Service Criteria

Capacity Analysis Summary Sheets

## Traffic Count Summary Sheets



Kenig Lindgren O'Hara Aboona, Inc.  
9575 W. Higgins Rd., Suite 400

Rosemont, Illinois, United States 60018  
(847)518-9990

Count Name: Ferry Road with Corporate Lane  
Site Code:  
Start Date: 02/07/2019  
Page No: 1

## Turning Movement Data

Start Time	Ferry Road Eastbound					Ferry Road Westbound					Comfort Drive Northbound					Corporate Lane Southbound					Int. Total			
	U-Turn	Left	Thru	Right	Peds	App. Total	U-Turn	Left	Thru	Right	Peds	App. Total	U-Turn	Left	Thru	Right	Peds	App. Total						
6:30 AM	0	10	140	6	0	156	0	1	83	0	0	84	0	0	0	0	1	0	1	241				
6:45 AM	0	19	154	3	0	176	0	7	71	0	0	78	0	0	0	1	0	1	0	256				
Hourly Total	0	29	294	9	0	332	0	8	154	0	0	162	0	0	0	2	0	2	0	497				
7:00 AM	1	17	191	8	0	217	0	5	101	0	0	106	0	0	0	0	0	3	0	326				
7:15 AM	0	9	221	6	0	236	0	3	124	0	0	127	0	0	0	2	0	3	0	367				
7:30 AM	0	9	313	9	0	331	0	15	137	0	0	152	0	0	0	2	0	2	0	488				
7:45 AM	0	12	283	9	0	304	0	18	162	0	0	180	0	0	0	3	0	3	0	492				
Hourly Total	1	47	1008	32	0	1088	0	41	524	0	0	565	0	1	0	10	0	11	0	1673				
8:00 AM	1	18	302	8	0	329	0	19	132	2	0	153	0	0	0	4	0	4	0	492				
8:15 AM	0	14	223	6	0	243	0	19	130	0	0	149	0	0	0	2	0	2	0	399				
8:30 AM	0	18	219	5	0	242	0	4	117	0	0	121	0	0	0	2	0	2	0	369				
8:45 AM	1	8	229	7	0	245	0	8	106	0	0	114	0	0	0	4	0	4	0	365				
Hourly Total	2	58	973	26	0	1059	0	50	485	2	0	537	0	0	0	12	0	12	0	1625				
*** BREAK ***	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-				
4:00 PM	0	3	91	0	0	94	0	2	212	2	0	216	0	13	0	18	0	31	0	353				
4:15 PM	0	4	109	1	0	114	0	1	260	1	0	262	0	8	0	14	0	22	0	410				
4:30 PM	0	5	135	2	0	142	0	0	265	0	0	265	0	23	0	13	0	36	0	462				
4:45 PM	0	4	155	2	0	161	0	0	247	0	0	247	0	7	0	19	0	26	0	446				
Hourly Total	0	16	490	5	0	511	0	3	984	3	0	990	0	51	0	64	0	115	0	1671				
5:00 PM	0	3	150	0	0	153	0	1	251	1	0	253	0	16	2	25	0	43	0	473				
5:15 PM	0	1	142	0	0	143	0	1	253	0	0	254	0	6	0	24	0	30	0	438				
5:30 PM	0	2	124	1	0	127	0	1	255	1	0	257	0	9	0	22	0	31	0	428				
5:45 PM	0	4	126	1	0	131	0	2	204	1	0	207	0	4	0	11	0	15	0	361				
Hourly Total	0	10	542	2	0	554	0	5	963	3	0	971	0	35	2	82	0	119	0	1700				
6:00 PM	0	5	112	1	0	118	0	1	182	0	0	183	0	11	0	9	0	20	0	332				
6:15 PM	0	2	96	0	0	98	0	2	124	0	0	126	0	1	0	8	0	9	0	239				
Grand Total	3	167	3515	75	0	3760	0	110	3416	8	0	3534	0	108	2	180	0	290	0	7737				
Approach %	0.1	4.4	93.5	2.0	-	-	0.0	3.1	96.7	0.2	-	-	0.0	37.2	0.7	62.1	-	-	0.0	3.9	0.0	96.1	-	-
Total %	0.0	2.2	45.4	1.0	-	48.6	0.0	1.4	44.2	0.1	-	45.7	0.0	1.4	0.0	2.3	-	3.7	0.0	0.1	0.0	1.9	-	2.0
Lights	3	143	3463	75	-	3684	0	110	3359	4	-	3473	0	106	2	178	-	286	0	6	0	132	-	138
% Lights	100.0	85.6	98.5	100.0	-	98.0	-	100.0	98.3	50.0	-	98.3	-	98.1	100.0	98.9	-	98.6	-	100.0	-	89.8	-	90.2
Buses	0	11	6	0	-	17	0	0	7	0	-	7	0	0	0	0	-	0	0	0	0	-	0	24
% Buses	0.0	6.6	0.2	0.0	-	0.5	-	0.0	0.2	0.0	-	0.2	-	0.0	0.0	0.0	-	0.0	-	0.0	-	0.0	-	0.3
Single-Unit Trucks	0	3	31	0	-	34	0	0	35	0	-	35	0	2	0	2	-	4	0	0	0	4	-	77
% Single-Unit Trucks	0.0	1.8	0.9	0.0	-	0.9	-	0.0	1.0	0.0	-	1.0	-	1.9	0.0	1.1	-	1.4	-	0.0	-	2.7	-	2.6
Articulated Trucks	0	10	15	0	-	25	0	0	15	4	-	19	0	0	0	0	-	0	0	0	0	11	-	55

[illegible]

Rosemont, Illinois, United States 60018  
(847)518-9990

Site Code: \_\_\_\_\_  
Start Date: 02/07/2019  
Page No: 3

## Turning Movement Peak Hour Data (7:30 AM)

[illegible]



Rosemont, Illinois, United States 60018  
(847)518-9990

Site Code:  
Start Date: 02/07/2019  
Page No: 4

## Turning Movement Peak Hour Data (4:30 PM)

[illegible]



Kenig Lindgren O'Hara Aboona, Inc.  
9575 W. Higgins Rd., Suite 400

Rosemont, Illinois, United States 60018  
(847)518-9990

Count Name: Ferry Road with City Gate Lane  
Site Code:  
Start Date: 02/07/2019  
Page No: 1

### Turning Movement Data

Start Time	Ferry Road Eastbound					Ferry Road Westbound					City Gate Lane Northbound					Monarch Drive Southbound				
	U-Turn	Left	Thru	Right	Peds	App. Total	U-Turn	Left	Thru	Right	Peds	App. Total	U-Turn	Left	Thru	Right	Peds	App. Total	Int. Total	
6:30 AM	0	9	154	9	0	172	0	5	79	4	0	88	0	2	0	2	0	0	4	264
6:45 AM	0	5	186	12	0	203	0	10	65	1	0	76	0	3	0	2	0	0	5	285
Hourly Total	0	14	340	21	0	375	0	15	144	5	0	164	0	5	0	4	0	0	9	549
7:00 AM	0	4	196	14	0	214	0	6	94	1	0	101	0	4	0	4	0	0	8	328
7:15 AM	0	3	256	19	0	278	0	17	101	6	0	124	0	4	0	2	0	0	6	411
7:30 AM	0	4	309	19	0	332	0	15	121	5	0	141	0	7	0	6	0	0	13	488
7:45 AM	0	7	301	46	0	354	0	28	141	7	0	176	0	4	0	7	0	0	11	545
Hourly Total	0	18	1062	98	0	1178	0	66	457	19	0	542	0	19	0	19	0	9	38	1772
8:00 AM	1	7	310	36	0	354	1	19	112	7	0	139	0	9	0	8	0	0	17	515
8:15 AM	0	11	236	36	0	283	0	17	114	4	0	135	0	11	0	7	0	0	18	439
8:30 AM	0	9	235	21	1	265	0	16	98	2	0	116	0	5	0	7	0	0	12	400
8:45 AM	0	12	225	17	0	254	0	17	93	2	0	112	0	3	0	6	0	0	9	377
Hourly Total	1	39	1006	110	1	1156	1	69	417	15	0	502	0	28	0	28	0	0	56	1731
*** BREAK ***	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
4:00 PM	2	7	86	9	0	104	0	7	235	3	0	245	0	23	0	11	0	0	34	392
4:15 PM	0	3	98	10	0	111	0	3	282	1	0	286	0	19	0	15	0	0	34	434
4:30 PM	0	3	99	5	0	107	0	1	298	4	0	303	0	35	0	39	0	0	74	496
4:45 PM	0	4	117	14	0	135	0	5	239	4	0	248	0	25	1	38	0	0	64	452
Hourly Total	2	17	400	38	0	457	0	16	1054	12	0	1082	0	102	1	103	0	0	206	1774
5:00 PM	0	2	109	9	0	120	0	3	290	3	0	296	0	56	0	40	0	0	96	526
5:15 PM	0	0	121	10	0	131	0	6	263	1	0	270	0	33	0	17	0	0	50	459
5:30 PM	0	2	112	8	0	122	0	7	268	2	0	277	0	18	0	11	0	0	29	433
5:45 PM	1	0	116	7	0	124	0	8	200	2	0	210	0	12	0	12	0	0	24	360
Hourly Total	1	4	458	34	0	497	0	24	1021	8	0	1053	0	119	0	80	0	0	199	1778
6:00 PM	0	2	102	6	0	110	0	2	197	0	0	199	0	21	0	9	0	0	30	344
6:15 PM	1	1	90	13	0	105	0	2	126	0	0	128	0	21	1	5	0	0	27	261
Grand Total	5	95	3458	320	1	3878	1	194	3416	59	0	3670	0	315	2	248	0	0	565	8209
Approach %	0.1	2.4	89.2	8.3	-	-	0.0	5.3	93.1	1.6	-	-	0.0	55.8	0.4	43.9	-	-	-	-
Total %	0.1	1.2	42.1	3.9	-	47.2	0.0	2.4	41.6	0.7	-	44.7	0.0	3.8	0.0	3.0	-	6.9	0.0	1.2
Lights	4	93	3380	318	-	3795	1	193	3343	57	-	3594	0	314	2	246	-	562	-	92
% Lights	80.0	97.9	97.7	99.4	-	97.9	100.0	99.5	97.9	96.6	-	97.9	-	99.7	100.0	99.2	-	99.5	-	95.8
Buses	0	0	20	0	-	20	0	0	7	0	-	7	0	1	0	0	-	1	0	28
% Buses	0.0	0.0	0.6	0.0	-	0.5	0.0	0.0	0.2	0.0	-	0.2	-	0.3	0.0	0.0	-	0.2	-	0.3
Single-Unit Trucks	1	1	33	2	-	37	0	1	37	2	-	40	0	0	0	2	-	2	0	82
% Single-Unit Trucks	20.0	1.1	1.0	0.6	-	1.0	0.0	0.5	1.1	3.4	-	1.1	-	0.0	0.0	0.8	-	0.4	-	1.0
Articulated Trucks	0	1	25	0	-	26	0	0	28	0	-	28	0	0	0	0	-	0	0	55

% Articulated Trucks	0.0	1.1	0.7	0.0	-	0.7	0.0	0.0	0.8	0.0	-	0.8	-	0.0	0.0	0.0	0.0	0.0	0.0	-	0.0	1.6	-	1.0	0.7
Bicycles on Road	0	0	0	0	-	0	0	0	1	0	-	1	-	0	0	0	0	0	0	0	0	0	-	0	1
% Bicycles on Road	0.0	0.0	0.0	0.0	-	0.0	0.0	0.0	0.0	0.0	-	0.0	-	0.0	0.0	0.0	0.0	0.0	0.0	-	0.0	0.0	-	0.0	0.0
Pedestrians	-	-	-	-	1	-	-	-	-	0	0	-	-	-	-	-	-	-	-	-	-	-	2	-	-
% Pedestrians	-	-	-	-	100.0	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	100.0	-	-

## Turning Movement Peak Hour Data (7:30 AM)

[illegible]

Count Name: Ferry Road with City Gate Lane  
Site Code:  
Start Date: 02/07/2019  
Page No: 4

[illegible]



Kenig Lindgren O'Hara Aboona, Inc.  
9575 W. Higgins Rd., Suite 400

Rosemont, Illinois, United States 60018  
(847)518-9990

Count Name: Westings Avenue with City Gate Lane  
Site Code:  
Start Date: 02/07/2019  
Page No: 1

## Turning Movement Data

Start Time	Westings Avenue Eastbound						Westings Avenue Westbound						Calamos Court Northbound						City Gate Lane Southbound							
	U-Turn	Left	Thru	Right	Peds	App. Total	U-Turn	Left	Thru	Right	Peds	App. Total	U-Turn	Left	Thru	Right	Peds	App. Total	U-Turn	Left	Thru	Right	Peds	App. Total	Int. Total	
6:30 AM	0	6	17	2	0	25	0	1	0	0	0	1	0	1	0	0	0	0	1	0	0	3	0	0	3	30
6:45 AM	0	12	23	7	0	42	0	4	0	1	0	5	0	1	0	0	0	0	1	0	1	1	1	0	3	51
Hourly Total	0	18	40	9	0	67	0	5	0	1	0	6	0	2	0	0	0	0	2	0	4	4	1	0	6	81
7:00 AM	0	8	14	9	0	31	0	4	0	0	0	4	0	1	0	0	0	0	1	0	0	3	0	0	3	39
7:15 AM	0	13	19	10	0	42	0	4	0	0	0	4	0	0	1	0	0	0	1	0	2	6	0	0	8	55
7:30 AM	0	27	21	12	0	60	0	8	0	0	0	8	0	0	1	0	0	0	1	1	0	5	1	0	7	76
7:45 AM	0	41	29	15	0	85	0	11	0	2	0	13	0	0	0	2	0	0	2	0	2	8	1	0	11	111
Hourly Total	0	89	83	46	0	218	0	27	0	2	0	29	0	1	2	2	0	0	5	1	4	22	2	0	29	281
8:00 AM	0	30	29	15	0	74	0	16	0	0	0	16	0	0	0	2	0	0	2	0	1	5	2	0	8	100
8:15 AM	0	24	14	25	0	63	0	12	0	1	0	13	0	0	2	2	0	0	4	0	1	8	0	0	9	89
8:30 AM	0	14	14	17	1	45	0	3	0	0	0	3	0	1	0	2	0	0	3	1	1	7	1	0	10	61
8:45 AM	0	14	13	15	1	42	0	8	0	1	0	9	0	0	0	1	0	0	1	0	1	4	1	0	6	58
Hourly Total	0	82	70	72	2	224	0	39	0	2	0	41	0	1	2	7	0	0	10	1	4	24	4	0	33	308
*** BREAK ***	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
4:00 PM	0	9	1	1	0	11	0	1	6	0	0	7	0	5	8	5	0	0	18	0	0	1	3	0	4	40
4:15 PM	0	4	2	1	2	7	0	1	4	0	0	5	0	5	0	9	0	0	14	0	2	1	0	0	3	29
4:30 PM	0	0	2	0	1	2	0	0	6	0	0	6	0	13	0	12	0	0	25	0	2	0	8	0	10	43
4:45 PM	0	3	2	1	0	6	0	1	9	2	0	12	0	6	1	19	0	0	26	0	2	3	4	0	9	53
Hourly Total	0	16	7	3	3	26	0	3	25	2	0	30	0	29	9	45	0	0	83	0	6	5	15	0	26	165
5:00 PM	0	6	2	2	0	10	0	0	4	0	0	4	0	17	9	17	0	0	43	1	2	3	19	0	25	82
5:15 PM	1	7	1	2	0	11	0	2	2	0	0	4	0	11	3	25	0	0	39	0	3	5	4	0	12	66
5:30 PM	0	3	1	3	0	7	0	1	2	0	0	3	0	7	4	17	0	0	28	0	1	3	2	0	6	44
5:45 PM	0	4	0	3	0	7	0	2	0	1	0	3	0	4	2	10	0	0	16	0	0	2	3	0	5	31
Hourly Total	1	20	4	10	0	35	0	5	8	1	0	14	0	39	18	69	0	0	126	1	6	13	28	0	48	223
6:00 PM	0	6	0	2	0	8	0	1	2	0	0	3	0	1	5	5	0	0	11	1	0	0	2	0	3	25
6:15 PM	0	5	1	1	0	7	0	2	1	0	0	3	0	6	5	5	0	0	16	0	1	9	2	0	12	38
Grand Total	1	236	205	143	5	585	0	82	36	8	0	126	0	79	41	133	0	0	253	4	22	77	54	0	157	1121
Approach %	0.2	40.3	35.0	24.4	-	-	0.0	65.1	28.6	6.3	-	-	0.0	31.2	16.2	52.6	-	-	-	2.5	14.0	49.0	34.4	-	-	-
Total %	0.1	21.1	18.3	12.8	-	52.2	0.0	7.3	3.2	0.7	-	11.2	0.0	7.0	3.7	11.9	-	22.6	0.4	2.0	6.9	4.8	-	-	14.0	-
Lights	1	232	203	142	-	578	0	82	36	8	-	126	0	79	41	131	-	251	4	22	75	54	-	155	1110	
% Lights	100.0	98.3	99.0	99.3	-	98.8	-	100.0	100.0	100.0	-	100.0	-	100.0	100.0	98.5	-	99.2	100.0	100.0	97.4	100.0	-	-	98.7	99.0
Buses	0	0	0	1	-	1	0	0	0	0	-	0	0	0	0	0	-	0	0	0	0	0	-	-	0	1
% Buses	0.0	0.0	0.0	0.7	-	0.2	-	0.0	0.0	0.0	-	0.0	-	0.0	0.0	0.0	-	0.0	0.0	0.0	0.0	0.0	-	-	0.0	0.1
Single-Unit Trucks	0	3	2	0	-	5	0	0	0	0	-	0	0	0	0	2	-	2	0	0	0	1	0	-	1	8
% Single-Unit Trucks	0.0	1.3	1.0	0.0	-	0.9	-	0.0	0.0	0.0	-	0.0	-	0.0	0.0	1.5	-	0.8	0.0	0.0	1.3	0.0	-	-	0.6	0.7
Articulated Trucks	0	1	0	0	-	1	0	0	0	0	-	0	0	0	0	0	-	0	0	0	0	1	0	-	1	2



[illegible]



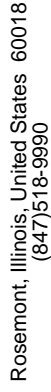
Kenig Lindgren O'Hara Aboona, Inc.  
9575 W. Higgins Rd., Suite 400

Rosemont, Illinois, United States 60018  
(847)518-9990

Count Name: Westings Avenue with City Gate Lane  
Site Code:  
Start Date: 02/07/2019  
Page No: 3

### Turning Movement Peak Hour Data (7:30 AM)

Start Time	Westings Avenue Eastbound						Westings Avenue Westbound						Calamos Court Northbound						City Gate Lane Southbound						
	U-Turn	Left	Thru	Right	Peds	App. Total	U-Turn	Left	Thru	Right	Peds	App. Total	U-Turn	Left	Thru	Right	Peds	App. Total	U-Turn	Left	Thru	Right	Peds	App. Total	Int. Total
7:30 AM	0	27	21	12	0	60	0	8	0	0	0	8	0	0	1	0	0	1	1	0	5	1	0	7	76
7:45 AM	0	41	29	15	0	85	0	11	0	2	0	13	0	0	0	2	0	11	0	2	8	1	0	11	111
8:00 AM	0	30	29	15	0	74	0	16	0	0	0	16	0	0	0	2	0	2	0	1	5	2	0	8	100
8:15 AM	0	24	14	25	0	63	0	12	0	1	0	13	0	0	2	2	0	9	0	1	8	0	0	9	89
Total	0	122	93	67	0	282	0	47	0	3	0	50	0	0	3	6	0	9	1	4	26	4	0	35	376
Approach %	0.0	43.3	33.0	23.8	-	-	0.0	94.0	0.0	6.0	-	-	0.0	0.0	33.3	66.7	-	-	2.9	11.4	74.3	11.4	-	-	-
Total %	0.0	32.4	24.7	17.8	-	75.0	0.0	12.5	0.0	0.8	-	13.3	0.0	0.0	0.8	1.6	-	2.4	0.3	1.1	6.9	1.1	-	9.3	-
PHF	0.000	0.744	0.802	0.670	-	0.829	0.000	0.734	0.000	0.375	-	0.781	0.000	0.000	0.375	0.750	-	0.563	0.250	0.500	0.813	0.500	-	0.795	0.847
Lights	0	121	93	66	-	280	0	47	0	3	-	50	0	0	3	5	-	8	1	4	25	4	-	34	372
% Lights	-	99.2	100.0	98.5	-	99.3	-	100.0	-	100.0	-	100.0	-	-	100.0	83.3	-	88.9	100.0	100.0	96.2	100.0	-	97.1	98.9
Buses	0	0	0	1	-	1	0	0	0	0	-	0	0	0	0	0	-	0	0	0	0	0	-	0	1
% Buses	-	0.0	0.0	1.5	-	0.4	-	0.0	-	0.0	-	0.0	-	-	0.0	0.0	-	0.0	0	0.0	0.0	0.0	-	0.0	0.3
Single-Unit Trucks	0	1	0	0	-	1	0	0	0	0	-	0	0	0	0	1	-	1	0	0	1	0	-	1	3
% Single-Unit Trucks	-	0.8	0.0	0.0	-	0.4	-	0.0	-	0.0	-	0.0	-	-	0.0	16.7	-	11.1	0.0	0.0	3.8	0.0	-	2.9	0.8
Articulated Trucks	0	0	0	0	-	0	0	0	0	0	-	0	0	0	0	0	-	0	0	0	0	0	-	0	0
% Articulated Trucks	-	0.0	0.0	0.0	-	0.0	-	0.0	-	0.0	-	0.0	-	-	0.0	0.0	-	0.0	0.0	0.0	0.0	0.0	-	0.0	0.0
Bicycles on Road	0	0	0	0	-	0	0	0	0	0	-	0	0	0	0	0	-	0	0	0	0	0	-	0	0
% Bicycles on Road	-	0.0	0.0	0.0	-	0.0	-	0.0	-	0.0	-	0.0	-	-	0.0	0.0	-	0.0	0.0	0.0	0.0	0.0	-	0.0	0.0
Pedestrians	-	-	-	-	0	-	-	-	-	-	-	0	-	-	-	-	-	0	-	-	-	-	0	-	-
% Pedestrians	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-



Site Code:  
Start Date: 02/07/2019  
Page No: 4

## Turning Movement Peak Hour Data (4:30 PM)

[illegible]



Kenig Lindgren O'Hara Aboona, Inc.  
9575 W. Higgins Rd., Suite 400

Rosemont, Illinois, United States 60018  
(847)518-9990

Count Name: IL Route 59 with Right-In/Right-Out  
Site Code:  
Start Date: 02/07/2019  
Page No: 1

## Turning Movement Data

Start Time	Westings Avenue Westbound					IL 59 Northbound					IL 59 Southbound				
	U-Turn	Left	Right	Peds	App. Total	U-Turn	Thru	Right	Peds	App. Total	U-Turn	Left	Thru	Peds	Int. Total
6:30 AM	0	0	1	0	1	0	360	22	0	382	0	0	254	0	637
6:45 AM	0	0	2	0	2	0	324	42	0	366	0	0	269	0	637
Hourly Total	0	0	3	0	3	0	684	64	0	748	0	0	523	0	1274
7:00 AM	0	0	0	0	0	0	377	34	0	411	0	0	247	0	658
7:15 AM	0	0	0	0	0	0	358	46	0	404	0	0	288	0	692
7:30 AM	0	0	1	0	1	0	351	59	0	410	0	0	326	0	737
7:45 AM	0	0	1	0	1	0	373	83	0	456	0	0	347	0	804
Hourly Total	0	0	2	0	2	0	1459	222	0	1681	0	0	1208	0	2891
8:00 AM	0	0	2	1	2	0	345	76	0	421	0	0	270	0	693
8:15 AM	0	0	0	0	0	0	369	60	0	429	0	0	302	0	731
8:30 AM	0	0	3	0	3	0	357	45	0	402	0	0	280	0	685
8:45 AM	0	0	1	0	1	0	339	47	0	386	0	0	241	0	628
Hourly Total	0	0	6	1	6	0	1410	228	0	1638	0	0	1093	0	2737
*** BREAK ***	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
4:00 PM	0	0	13	0	13	0	286	9	0	295	0	0	392	0	700
4:15 PM	0	0	9	0	9	0	333	8	0	341	0	0	372	0	722
4:30 PM	0	0	29	0	29	0	305	1	0	306	0	0	427	0	762
4:45 PM	0	0	19	0	19	0	303	6	0	309	0	0	385	0	713
Hourly Total	0	0	70	0	70	0	1227	24	0	1251	0	0	1576	0	2897
5:00 PM	0	0	41	0	41	0	345	10	0	355	0	0	452	0	848
5:15 PM	0	0	18	0	18	0	311	11	0	322	0	0	430	0	770
5:30 PM	0	0	10	0	10	0	310	7	0	317	0	0	405	0	732
5:45 PM	0	0	7	0	7	0	275	7	0	282	0	0	379	0	668
Hourly Total	0	0	76	0	76	0	1241	35	0	1276	0	0	1666	0	3018
6:00 PM	0	0	5	0	5	0	271	9	0	280	0	0	301	0	586
6:15 PM	0	0	9	0	9	0	239	6	0	245	0	0	321	0	575
Grand Total	0	0	171	1	171	0	6531	588	0	7119	0	0	6688	0	13978
Approach %	0.0	0.0	100.0	-	-	0.0	91.7	8.3	-	-	0.0	0.0	100.0	-	-
Total %	0.0	0.0	1.2	-	1.2	0.0	46.7	4.2	-	50.9	0.0	0.0	47.8	-	47.8
Lights	0	0	171	-	171	0	5968	581	-	6549	0	0	6206	-	6206
% Lights	-	-	100.0	-	100.0	-	91.4	98.8	-	92.0	-	-	92.8	-	92.8
Buses	0	0	0	-	0	0	27	1	-	28	0	0	21	-	49
% Buses	-	-	0.0	-	0.0	-	0.4	0.2	-	0.4	-	-	0.3	-	0.4
Single-Unit Trucks	0	0	0	-	0	0	146	5	-	151	0	0	162	-	313
% Single-Unit Trucks	-	-	0.0	-	0.0	-	2.2	0.9	-	2.1	-	-	2.4	-	2.2
Articulated Trucks	0	0	0	-	0	0	390	1	-	391	0	0	299	-	690
% Articulated Trucks	-	-	0.0	-	0.0	-	6.0	0.2	-	5.5	-	-	4.5	-	4.9
Bicycles on Road	0	0	0	-	0	0	0	0	-	0	0	0	0	-	0

% Bicycles on Road	-	-	0.0	-	0.0	-	0.0	-	0.0
Pedestrians	-	-	1	-	-	0	-	0	-
% Pedestrians	-	-	100.0	-	-	-	-	-	-

Rosemont, Illinois, United States 60018  
(847)518-9990

Site Code:  
Start Date: 02/07/2019  
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## Turning Movement Peak Hour Data (7:30 AM)

Start Time	Westings Avenue Westbound						IL 59 Northbound				IL 59 Southbound				Int. Total			
	U-Turn	Left	Right	Peds	App. Total		U-Turn	Thru	Right	Peds	App. Total		U-Turn	Left		Thru	Peds	App. Total
7:30 AM	0	0	1	0	1		0	351	59	0	410		0	0	326	0	326	737
7:45 AM	0	0	1	0	1		0	373	83	0	456		0	0	347	0	347	804
8:00 AM	0	0	2	1	2		0	345	76	0	421		0	0	270	0	270	693
8:15 AM	0	0	0	0	0		0	369	60	0	429		0	0	302	0	302	731
Total	0	0	4	1	4		0	1438	278	0	1716		0	0	1245	0	1245	2965
Approach %	0.0	0.0	100.0	-	-		0.0	83.8	16.2	-	-		0.0	0.0	100.0	-	-	-
Total %	0.0	0.0	0.1	-	0.1		0.0	48.5	9.4	-	57.9		0.0	0.0	42.0	-	42.0	-
PHF	0.000	0.000	0.500	-	0.500		0.000	0.964	0.837	-	0.941		0.000	0.000	0.897	-	0.897	0.922
Lights	0	0	4	-	4		0	1304	276	-	1580		0	0	1130	-	1130	2714
% Lights	-	-	100.0	-	100.0		-	90.7	99.3	-	92.1		-	-	90.8	-	90.8	91.5
Buses	0	0	0	-	0		0	7	0	-	7		0	0	10	-	10	17
% Buses	-	-	0.0	-	0.0		-	0.5	0.0	-	0.4		-	-	0.8	-	0.8	0.6
Single-Unit Trucks	0	0	0	-	0		0	32	2	-	34		0	0	38	-	38	72
% Single-Unit Trucks	-	-	0.0	-	0.0		-	2.2	0.7	-	2.0		-	-	3.1	-	3.1	2.4
Articulated Trucks	0	0	0	-	0		0	95	0	-	95		0	0	67	-	67	162
% Articulated Trucks	-	-	0.0	-	0.0		-	6.6	0.0	-	5.5		-	-	5.4	-	5.4	5.5
Bicycles on Road	0	0	0	-	0		0	0	0	-	0		0	0	0	-	0	0
% Bicycles on Road	-	-	0.0	-	0.0		-	0.0	0.0	-	0.0		-	-	0.0	-	0.0	0.0
Pedestrians	-	-	-	1	-		-	-	-	0	-		-	-	-	0	-	-
% Pedestrians	-	-	-	100.0	-		-	-	-	-	-		-	-	-	-	-	-

Rosemont, Illinois, United States 60018  
(847)518-9990

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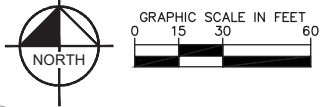
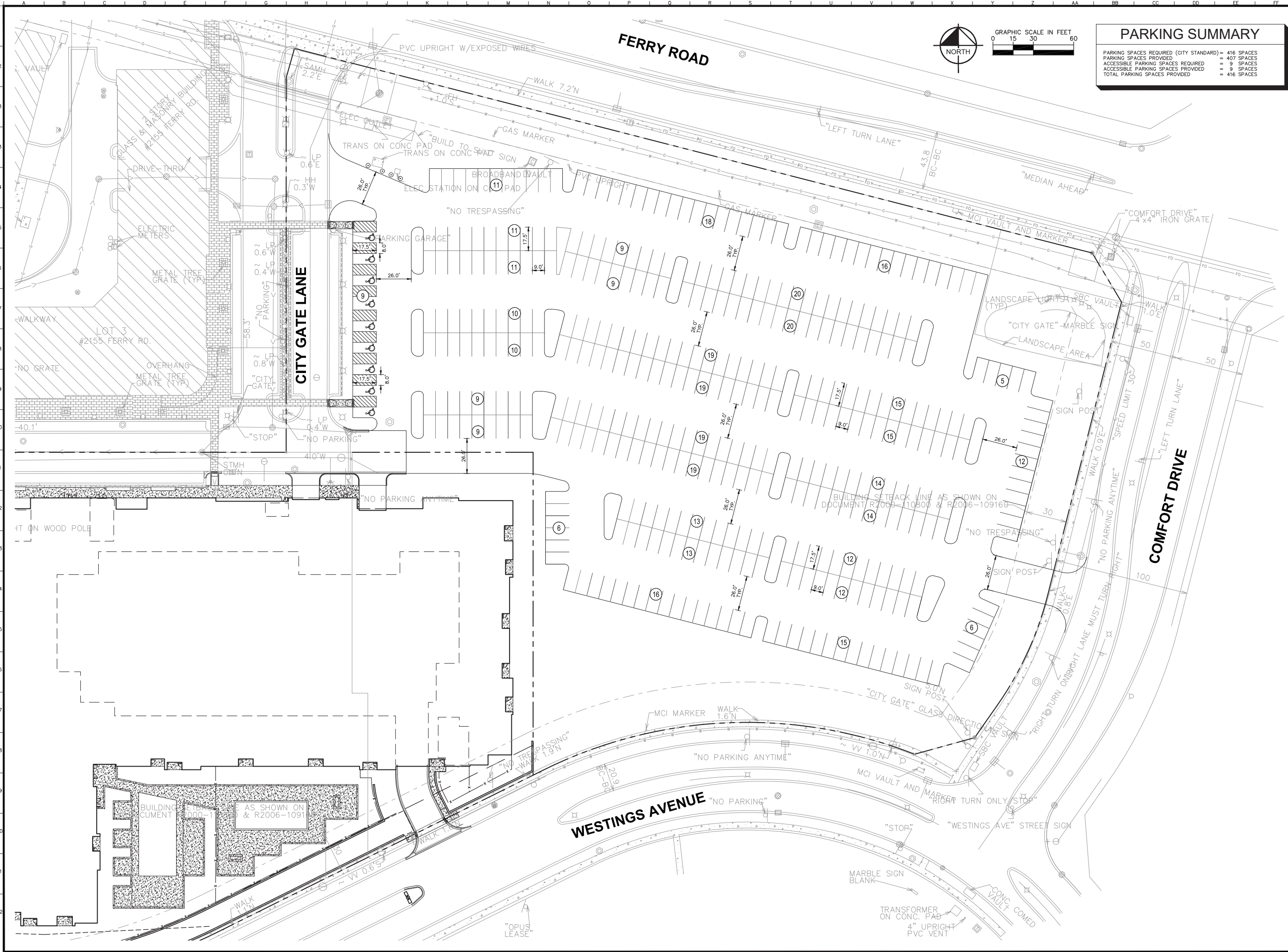
## IL 59

Start Time	Westings Avenue Westbound						IL 59 Northbound						IL 59 Southbound					
	U-Turn	Left	Right	Peds	App. Total		U-Turn	Thru	Right	Peds	App. Total		U-Turn	Left	Thru	Peds	App. Total	Int. Total
4:30 PM	0	0	29	0	29		0	305	1	0	306		0	0	427	0	427	762
4:45 PM	0	0	19	0	19		0	303	6	0	309		0	0	385	0	385	713
5:00 PM	0	0	41	0	41		0	345	10	0	355		0	0	452	0	452	848
5:15 PM	0	0	18	0	18		0	311	11	0	322		0	0	430	0	430	770
Total	0	0	107	0	107		0	1264	28	0	1292		0	0	1694	0	1694	3093
Approach %	0.0	0.0	100.0	-	-		0.0	97.8	2.2	-	-		0.0	0.0	100.0	-	-	-
Total %	0.0	0.0	3.5	-	3.5		0.0	40.9	0.9	-	41.8		0.0	0.0	54.8	-	54.8	-
PHF	0.000	0.000	0.652	-	0.652		0.000	0.916	0.636	-	0.910		0.000	0.000	0.937	-	0.937	0.912
Lights	0	0	107	-	107		0	1176	26	-	1202		0	0	1595	-	1595	2904
% Lights	-	-	100.0	-	100.0		-	93.0	92.9	-	93.0		-	-	94.2	-	94.2	93.9
Buses	0	0	0	-	0		0	5	0	-	5		0	0	0	-	0	5
% Buses	-	-	0.0	-	0.0		-	0.4	0.0	-	0.4		-	-	0.0	-	0.0	0.2
Single-Unit Trucks	0	0	0	-	0		0	29	2	-	31		0	0	29	-	29	60
% Single-Unit Trucks	-	-	0.0	-	0.0		-	2.3	7.1	-	2.4		-	-	1.7	-	1.7	1.9
Articulated Trucks	0	0	0	-	0		0	54	0	-	54		0	0	70	-	70	124
% Articulated Trucks	-	-	0.0	-	0.0		-	4.3	0.0	-	4.2		-	-	4.1	-	4.1	4.0
Bicycles on Road	0	0	0	-	0		0	0	0	-	0		0	0	0	-	0	0
% Bicycles on Road	-	-	0.0	-	0.0		-	0.0	0.0	-	0.0		-	-	0.0	-	0.0	0.0
Pedestrians	-	-	-	0	-		-	-	-	0	-		-	-	-	0	-	-
% Pedestrians	-	-	-	-	-		-	-	-	-	-		-	-	-	-	-	-



## Site Plan

Drawing name: K:\CHS\_DEV\168709000\_Lincoln Prop\_Citygate Centre\_Naserville\_IL\2 Design\CAD\Exhibits\Lot 3 Parking Lot Exhibit\Lot 3 Parking Lot Exhibit.dwg Layout Jul 11, 2019 7:20pm by: Taylor Eschbach  
This document, together with the concepts and designs presented herein, is an instrument of service and is intended only for the specific purpose and client for which it was prepared. No part of this document shall be without liability to Kimley-Horn and Associates, Inc.



PARKING SUMMARY	
PARKING SPACES REQUIRED (CITY STANDARD)	= 416 SPACES
PARKING SPACES PROVIDED	= 407 SPACES
ACCESSIBLE PARKING SPACES REQUIRED	= 9 SPACES
ACCESSIBLE PARKING SPACES PROVIDED	= 9 SPACES
TOTAL PARKING SPACES PROVIDED	= 416 SPACES

KIMLEY HORN		CALAMOS INVESTMENTS		LINCOLN AT CITYGATE CENTRE		LOT 3 PARKING LOT EXHIBIT	
DESIGNED BY: IRC		DRAWN BY: JIU		CHECKED BY: IRC		ORIGINAL ISSUE: 7/11/19	
SCALE: 1"=30'		DESIGNED BY: IRC		DRAWN BY: JIU		KHA PROJECT NO. 168709000	
CHECKED BY: IRC		DATE		REVISIONS		SHEET NUMBER	
No.		DATE		REVISIONS		EX 1	

# CMAP 2050 Projections Letter



## Chicago Metropolitan Agency for Planning

233 South Wacker Drive  
Suite 800  
Chicago, Illinois 60606  
  
312 454 0400  
[www.cmap.illinois.gov](http://www.cmap.illinois.gov)

February 14, 2019

Brendan S. May  
Consultant  
Kenig, Lindgren, O'Hara and Aboona, Inc.  
9575 West Higgins Road  
Suite 400  
Rosemont, IL 60018

**Subject: *Ferry Road @ IL 59***  
IDOT

Dear Mr. May:

In response to a request made on your behalf and dated February 13, 2019, we have developed year 2050 average daily traffic (ADT) projections for the subject location.

ROAD SEGMENT	Current Volume	Year 2050 ADT
Ferry Rd east of IL 59	15,100	19,100
IL 59 south of Ferry Rd	37,100	46,900

Traffic projections are developed using existing ADT data provided in the request letter and the results from the October 2018 CMAP Travel Demand Analysis. The regional travel model uses CMAP 2050 socioeconomic projections and assumes the implementation of the ON TO 2050 Comprehensive Regional Plan for the Northeastern Illinois area. The provision of this data in support of your request does not constitute a CMAP endorsement of the proposed development or any subsequent developments.

If you have any questions, please call me at (312) 386-8806.

Sincerely,

A handwritten signature in black ink, appearing to read "Jose Rodriguez".

Jose Rodriguez, PTP, AICP  
Senior Planner, Research & Analysis

cc: Quigley (IDOT)  
S:\AdminGroups\ResearchAnalysis\2019\_ForecastsTraffic\Naperville\du-08-19\du-08-19.docx

## 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.	>80.0
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: <i>Highway Capacity Manual</i> , 6 <sup>th</sup> Edition.		

## Capacity Analysis Summary Sheets

## 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	30	1173	137	80	488	23	31	0	28	6	0	8
Future Vol, veh/h	30	1173	137	80	488	23	31	0	28	6	0	8
Conflicting Peds, #/hr	0	0	0	0	0	0	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Free	Free	Stop	Stop	Stop	Stop	Stop	Stop
RT Channelized	-	-	None	-	-	None	-	-	None	-	-	None
Storage Length	220	-	-	200	-	-	0	-	-	-	-	0
Veh in Median Storage, #	-	0	-	-	0	-	-	0	-	-	0	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	91	91	91	91	91	91	91	91	91	91	91	91
Heavy Vehicles, %	3	2	1	0	3	9	0	0	0	33	0	13
Mvmt Flow	33	1289	151	88	536	25	34	0	31	7	0	9

Major/Minor	Major1			Major2			Minor1			Minor2		
Conflicting Flow All	561	0	0	1440	0	0	1875	2168	720	1436	2231	281
Stage 1	-	-	-	-	-	-	1431	1431	-	725	725	-
Stage 2	-	-	-	-	-	-	444	737	-	711	1506	-
Critical Hdwy	4.16	-	-	4.1	-	-	7.5	6.5	6.9	8.16	6.5	7.16
Critical Hdwy Stg 1	-	-	-	-	-	-	6.5	5.5	-	7.16	5.5	-
Critical Hdwy Stg 2	-	-	-	-	-	-	6.5	5.5	-	7.16	5.5	-
Follow-up Hdwy	2.23	-	-	2.2	-	-	3.5	4	3.3	3.83	4	3.43
Pot Cap-1 Maneuver	999	-	-	477	-	-	45	48	375	71	43	684
Stage 1	-	-	-	-	-	-	144	202	-	319	433	-
Stage 2	-	-	-	-	-	-	568	428	-	326	186	-
Platoon blocked, %	-	-	-	-	-	-	-	-	-	-	-	-
Mov Cap-1 Maneuver	999	-	-	477	-	-	37	38	375	55	34	684
Mov Cap-2 Maneuver	-	-	-	-	-	-	37	38	-	55	34	-
Stage 1	-	-	-	-	-	-	139	195	-	308	353	-
Stage 2	-	-	-	-	-	-	457	349	-	289	180	-

Approach	EB	WB	NB	SB
HCM Control Delay, s	0.2	1.9	157.6	39.8
HCM LOS			F	E

Minor Lane/Major Mvmt	NBLn1	NBLn2	EBL	EBT	EBR	WBL	WBT	WBR	SBLn1	SBLn2
Capacity (veh/h)	37	375	999	-	-	477	-	-	55	684
HCM Lane V/C Ratio	0.921	0.082	0.033	-	-	0.184	-	-	0.12	0.013
HCM Control Delay (s)	286	15.5	8.7	-	-	14.2	-	-	79.2	10.3
HCM Lane LOS	F	C	A	-	-	B	-	-	F	B
HCM 95th %tile Q(veh)	3.4	0.3	0.1	-	-	0.7	-	-	0.4	0



Intersection												
Int Delay, s/veh	1.5											
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Vol, veh/h	54	1121	32	71	571	2	9	1	10	0	0	11
Future Vol, veh/h	54	1121	32	71	571	2	9	1	10	0	0	11
Conflicting Peds, #/hr	0	0	0	0	0	0	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Free	Free	Stop	Stop	Stop	Stop	Stop	Stop
RT Channelized	-	-	None	-	-	None	-	-	None	-	-	None
Storage Length	150	-	-	230	-	-	140	-	140	100	-	-
Veh in Median Storage, #	-	0	-	-	0	-	-	0	-	-	0	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	95	95	95	95	95	95	95	95	95	95	95	95
Heavy Vehicles, %	6	2	0	0	2	0	22	0	0	0	0	18
Mvmt Flow	57	1180	34	75	601	2	9	1	11	0	0	12

Major/Minor	Major1			Major2			Minor1			Minor2		
Conflicting Flow All	603	0	0	1214	0	0	1762	2064	607	1457	2080	302
Stage 1	-	-	-	-	-	-	1311	1311	-	752	752	-
Stage 2	-	-	-	-	-	-	451	753	-	705	1328	-
Critical Hdwy	4.22	-	-	4.1	-	-	7.94	6.5	6.9	7.5	6.5	7.26
Critical Hdwy Stg 1	-	-	-	-	-	-	6.94	5.5	-	6.5	5.5	-
Critical Hdwy Stg 2	-	-	-	-	-	-	6.94	5.5	-	6.5	5.5	-
Follow-up Hdwy	2.26	-	-	2.2	-	-	3.72	4	3.3	3.5	4	3.48
Pot Cap-1 Maneuver	944	-	-	582	-	-	43	55	444	92	54	649
Stage 1	-	-	-	-	-	-	141	231	-	373	421	-
Stage 2	-	-	-	-	-	-	508	420	-	398	226	-
Platoon blocked, %	-	-	-	-	-	-	-	-	-	-	-	-
Mov Cap-1 Maneuver	944	-	-	582	-	-	36	45	444	76	44	649
Mov Cap-2 Maneuver	-	-	-	-	-	-	36	45	-	76	44	-
Stage 1	-	-	-	-	-	-	133	217	-	351	367	-
Stage 2	-	-	-	-	-	-	435	366	-	363	212	-

Approach	EB	WB	NB	SB
HCM Control Delay, s	0.4	1.3	72.9	10.6
HCM LOS			F	B

Minor Lane/Major Mvmt	NBLn1	NBLn2	NBLn3	EBL	EBT	EBR	WBL	WBT	WBR	SBLn1	SBLn2
Capacity (veh/h)	36	45	444	944	-	-	582	-	-	-	649
HCM Lane V/C Ratio	0.263	0.023	0.024	0.06	-	-	0.128	-	-	-	0.018
HCM Control Delay (s)	137.5	86.9	13.3	9.1	-	-	12.1	-	-	0	10.6
HCM Lane LOS	F	F	B	A	-	-	B	-	-	A	B
HCM 95th %tile Q(veh)	0.9	0.1	0.1	0.2	-	-	0.4	-	-	-	0.1

Intersection

Int Delay, s/veh 5

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↕			↕			↕	↕		↕	↕
Traffic Vol, veh/h	122	93	67	47	0	3	0	3	6	4	26	4
Future Vol, veh/h	122	93	67	47	0	3	0	3	6	4	26	4
Conflicting Peds, #/hr	0	0	0	0	0	0	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Free	Free	Stop	Stop	Stop	Stop	Stop	Stop
RT Channelized	-	-	None	-	-	None	-	-	None	-	-	None
Storage Length	-	-	-	-	-	-	-	-	50	-	-	90
Veh in Median Storage, #	-	0	-	-	0	-	-	0	-	-	0	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	85	85	85	85	85	85	85	85	85	85	85	85
Heavy Vehicles, %	1	0	2	0	0	0	0	0	17	0	3	0
Mvmt Flow	144	109	79	55	0	4	0	4	7	5	31	5

Major/Minor	Major1			Major2			Minor1			Minor2		
Conflicting Flow All	4	0	0	188	0	0	567	551	149	554	588	2
Stage 1	-	-	-	-	-	-	437	437	-	112	112	-
Stage 2	-	-	-	-	-	-	130	114	-	442	476	-
Critical Hdwy	4.11	-	-	4.1	-	-	7.1	6.5	6.37	7.1	6.53	6.2
Critical Hdwy Stg 1	-	-	-	-	-	-	6.1	5.5	-	6.1	5.53	-
Critical Hdwy Stg 2	-	-	-	-	-	-	6.1	5.5	-	6.1	5.53	-
Follow-up Hdwy	2.209	-	-	2.2	-	-	3.5	4	3.453	3.5	4.027	3.3
Pot Cap-1 Maneuver	1624	-	-	1398	-	-	437	445	860	446	420	1088
Stage 1	-	-	-	-	-	-	602	583	-	898	801	-
Stage 2	-	-	-	-	-	-	878	805	-	598	555	-
Platoon blocked, %	-	-	-	-	-	-	-	-	-	-	-	-
Mov Cap-1 Maneuver	1624	-	-	1398	-	-	365	385	860	394	363	1088
Mov Cap-2 Maneuver	-	-	-	-	-	-	365	385	-	394	363	-
Stage 1	-	-	-	-	-	-	542	525	-	808	770	-
Stage 2	-	-	-	-	-	-	807	774	-	530	500	-

Approach	EB	WB	NB	SB
HCM Control Delay, s	3.2	7.2	10.9	15
HCM LOS			B	C





Minor Lane/Major Mvmt	NBLn1	NBLn2	EBL	EBT	EBR	WBL	WBT	WBR	SBLn1	SBLn2
Capacity (veh/h)	385	860	1624	-	-	1398	-	-	367	1088
HCM Lane V/C Ratio	0.009	0.008	0.088	-	-	0.04	-	-	0.096	0.004
HCM Control Delay (s)	14.4	9.2	7.4	0	-	7.7	0	-	15.9	8.3
HCM Lane LOS	B	A	A	A	-	A	A	-	C	A
HCM 95th %tile Q(veh)	0	0	0.3	-	-	0.1	-	-	0.3	0

HCM 6th TWSC  
4: Rt 59 & Westings Avenue

02/15/2019

Intersection

Int Delay, s/veh 0

Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Traffic Vol, veh/h	0	4	1438	282	0	1245
Future Vol, veh/h	0	4	1438	282	0	1245
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Stop	Stop	Free	Free	Free	Free
RT Channelized	-	Stop	-	Free	-	None
Storage Length	-	0	-	155	-	-
Veh in Median Storage, #	0	-	0	-	-	0
Grade, %	0	-	0	-	-	0
Peak Hour Factor	92	92	92	92	92	92
Heavy Vehicles, %	0	0	9	1	0	9
Mvmt Flow	0	4	1563	307	0	1353

Major/Minor	Minor1	Major1	Major2
Conflicting Flow All	-	782	0
Stage 1	-	-	-
Stage 2	-	-	-
Critical Hdwy	-	6.9	-
Critical Hdwy Stg 1	-	-	-
Critical Hdwy Stg 2	-	-	-
Follow-up Hdwy	-	3.3	-
Pot Cap-1 Maneuver	0	341	-
Stage 1	0	-	-
Stage 2	0	-	-
Platoon blocked, %	-	-	-
Mov Cap-1 Maneuver	-	341	-
Mov Cap-2 Maneuver	-	-	-
Stage 1	-	-	-
Stage 2	-	-	-









Approach	WB	NB	SB
HCM Control Delay, s	15.7	0	0
HCM LOS	C		

Minor Lane/Major Mvmt	NBTWBLn1	SBT
Capacity (veh/h)	- 341	-
HCM Lane V/C Ratio	- 0.013	-
HCM Control Delay (s)	- 15.7	-
HCM Lane LOS	- C	-
HCM 95th %tile Q(veh)	- 0	-

# HCM 6th TWSC










## 1: City Gate Lane/Monarch Drive & Ferry Road

02/15/2019

Intersection												
Int Delay, s/veh	16.5											
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Vol, veh/h	9	454	38	15	1105	12	149	1	134	11	0	28
Future Vol, veh/h	9	454	38	15	1105	12	149	1	134	11	0	28
Conflicting Peds, #/hr	0	0	0	0	0	0	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Free	Free	Stop	Stop	Stop	Stop	Stop	Stop
RT Channelized	-	-	None	-	-	None	-	-	None	-	-	None
Storage Length	220	-	-	200	-	-	0	-	-	-	-	0
Veh in Median Storage, #	-	0	-	-	0	-	-	0	-	-	0	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	92	92	92	92	92	92	92	92	92	92	92	92
Heavy Vehicles, %	0	3	0	0	2	0	0	0	1	0	0	0
Mvmt Flow	10	493	41	16	1201	13	162	1	146	12	0	30
Major/Minor	Major1			Major2			Minor1			Minor2		
Conflicting Flow All	1214	0	0	534	0	0	1167	1780	267	1507	1794	607
Stage 1	-	-	-	-	-	-	534	534	-	1240	1240	-
Stage 2	-	-	-	-	-	-	633	1246	-	267	554	-
Critical Hdwy	4.1	-	-	4.1	-	-	7.5	6.5	6.92	7.5	6.5	6.9
Critical Hdwy Stg 1	-	-	-	-	-	-	6.5	5.5	-	6.5	5.5	-
Critical Hdwy Stg 2	-	-	-	-	-	-	6.5	5.5	-	6.5	5.5	-
Follow-up Hdwy	2.2	-	-	2.2	-	-	3.5	4	3.31	3.5	4	3.3
Pot Cap-1 Maneuver	582	-	-	1044	-	-	~ 151	83	734	85	81	444
Stage 1	-	-	-	-	-	-	503	528	-	189	249	-
Stage 2	-	-	-	-	-	-	439	248	-	721	517	-
Platoon blocked, %		-	-		-	-						
Mov Cap-1 Maneuver	582	-	-	1044	-	-	~ 137	80	734	66	78	444
Mov Cap-2 Maneuver	-	-	-	-	-	-	~ 137	80	-	66	78	-
Stage 1	-	-	-	-	-	-	494	519	-	186	245	-
Stage 2	-	-	-	-	-	-	403	244	-	567	508	-
Approach	EB			WB			NB			SB		
HCM Control Delay, s	0.2			0.1			109.1			29.9		
HCM LOS							F			D		
Minor Lane/Major Mvmt	NBLn1 NBLn2		EBL	EBT	EBR	WBL	WBT	WBR	SBLn1	SBLn2		
Capacity (veh/h)	137 692		582	-	-	1044	-	-	66	444		
HCM Lane V/C Ratio	1.182 0.212		0.017	-	-	0.016	-	-	0.181	0.069		
HCM Control Delay (s)	197.4 11.6		11.3	-	-	8.5	-	-	71.2	13.7		
HCM Lane LOS	F B		B	-	-	A	-	-	F B			
HCM 95th %tile Q(veh)	9.5 0.8		0.1	-	-	0	-	-	0.6	0.2		
Notes												
~: Volume exceeds capacity		\$: Delay exceeds 300s			+: Computation Not Defined				*: All major volume in platoon			

Intersection

Int Delay, s/veh 2.7

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Vol, veh/h	13	582	4	2	1016	1	52	2	81	2	0	64
Future Vol, veh/h	13	582	4	2	1016	1	52	2	81	2	0	64
Conflicting Peds, #/hr	0	0	0	0	0	0	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Free	Free	Stop	Stop	Stop	Stop	Stop	Stop
RT Channelized	-	-	None	-	-	None	-	-	None	-	-	None
Storage Length	150	-	-	230	-	-	140	-	140	100	-	-
Veh in Median Storage, #	-	0	-	-	0	-	-	0	-	-	0	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	96	96	96	96	96	96	96	96	96	96	96	96
Heavy Vehicles, %	54	1	0	0	1	0	0	0	0	0	0	6
Mvmt Flow	14	606	4	2	1058	1	54	2	84	2	0	67







Major/Minor	Major1			Major2			Minor1			Minor2		
Conflicting Flow All	1059	0	0	610	0	0	1169	1699	305	1395	1701	530
Stage 1	-	-	-	-	-	-	636	636	-	1063	1063	-
Stage 2	-	-	-	-	-	-	533	1063	-	332	638	-
Critical Hdwy	5.18	-	-	4.1	-	-	7.5	6.5	6.9	7.5	6.5	7.02
Critical Hdwy Stg 1	-	-	-	-	-	-	6.5	5.5	-	6.5	5.5	-
Critical Hdwy Stg 2	-	-	-	-	-	-	6.5	5.5	-	6.5	5.5	-
Follow-up Hdwy	2.74	-	-	2.2	-	-	3.5	4	3.3	3.5	4	3.36
Pot Cap-1 Maneuver	417	-	-	979	-	-	151	93	697	103	93	483
Stage 1	-	-	-	-	-	-	437	475	-	242	302	-
Stage 2	-	-	-	-	-	-	503	302	-	661	474	-
Platoon blocked, %	-	-	-	-	-	-	-	-	-	-	-	-
Mov Cap-1 Maneuver	417	-	-	979	-	-	127	90	697	87	90	483
Mov Cap-2 Maneuver	-	-	-	-	-	-	127	90	-	87	90	-
Stage 1	-	-	-	-	-	-	422	459	-	234	301	-
Stage 2	-	-	-	-	-	-	433	301	-	559	458	-

Approach	EB	WB	NB	SB
HCM Control Delay, s	0.3	0	27.6	14.6
HCM LOS			D	B

Minor Lane/Major Mvmt	NBLn1	NBLn2	NBLn3	EBL	EBT	EBR	WBL	WBT	WBR	SBLn1	SBLn2
Capacity (veh/h)	127	90	697	417	-	-	979	-	-	87	483
HCM Lane V/C Ratio	0.427	0.023	0.121	0.032	-	-	0.002	-	-	0.024	0.138
HCM Control Delay (s)	52.9	45.9	10.9	13.9	-	-	8.7	-	-	47.4	13.6
HCM Lane LOS	F	E	B	B	-	-	A	-	-	E	B
HCM 95th %tile Q(veh)	1.9	0.1	0.4	0.1	-	-	0	-	-	0.1	0.5

Intersection

Int Delay, s/veh 7.7

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Vol, veh/h	17	7	5	3	25	2	47	13	73	10	11	35
Future Vol, veh/h	17	7	5	3	25	2	47	13	73	10	11	35
Conflicting Peds, #/hr	0	0	0	0	0	0	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Free	Free	Stop	Stop	Stop	Stop	Stop	Stop
RT Channelized	-	-	None	-	-	None	-	-	None	-	-	None
Storage Length	-	-	-	-	-	-	-	-	50	-	-	90
Veh in Median Storage, #	-	0	-	-	0	-	-	0	-	-	0	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	74	74	74	74	74	74	74	74	74	74	74	74
Heavy Vehicles, %	13	0	0	0	0	0	0	0	0	0	0	0
Mvmt Flow	23	9	7	4	34	3	64	18	99	14	15	47

Major/Minor	Major1			Major2			Minor1			Minor2		
Conflicting Flow All	37	0	0	16	0	0	134	104	13	161	106	36
Stage 1	-	-	-	-	-	-	59	59	-	44	44	-
Stage 2	-	-	-	-	-	-	75	45	-	117	62	-
Critical Hdwy	4.23	-	-	4.1	-	-	7.1	6.5	6.2	7.1	6.5	6.2
Critical Hdwy Stg 1	-	-	-	-	-	-	6.1	5.5	-	6.1	5.5	-
Critical Hdwy Stg 2	-	-	-	-	-	-	6.1	5.5	-	6.1	5.5	-
Follow-up Hdwy	2.317	-	-	2.2	-	-	3.5	4	3.3	3.5	4	3.3
Pot Cap-1 Maneuver	1505	-	-	1615	-	-	842	790	1073	809	788	1042
Stage 1	-	-	-	-	-	-	958	850	-	975	862	-
Stage 2	-	-	-	-	-	-	939	861	-	892	847	-
Platoon blocked, %	-	-	-	-	-	-	-	-	-	-	-	-
Mov Cap-1 Maneuver	1505	-	-	1615	-	-	781	776	1073	712	774	1042
Mov Cap-2 Maneuver	-	-	-	-	-	-	781	776	-	712	774	-
Stage 1	-	-	-	-	-	-	944	837	-	960	859	-
Stage 2	-	-	-	-	-	-	878	858	-	781	834	-

Approach	EB	WB	NB	SB
HCM Control Delay, s	4.4	0.7	9.4	9.1
HCM LOS			A	A





Minor Lane/Major Mvmt	NBLn1	NBLn2	EBL	EBT	EBR	WBL	WBT	WBR	SBLn1	SBLn2
Capacity (veh/h)	780	1073	1505	-	-	1615	-	-	743	1042
HCM Lane V/C Ratio	0.104	0.092	0.015	-	-	0.003	-	-	0.038	0.045
HCM Control Delay (s)	10.2	8.7	7.4	0	-	7.2	0	-	10	8.6
HCM Lane LOS	B	A	A	A	-	A	A	-	B	A
HCM 95th %tile Q(veh)	0.3	0.3	0	-	-	0	-	-	0.1	0.1

HCM 6th TWSC  
4: Rt 59 & Westings Avenue

02/15/2019

Intersection

Int Delay, s/veh 0.6

Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Traffic Vol, veh/h	0	107	1264	29	0	1694
Future Vol, veh/h	0	107	1264	29	0	1694
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Stop	Stop	Free	Free	Free	Free
RT Channelized	-	Stop	-	Free	-	None
Storage Length	-	0	-	155	-	-
Veh in Median Storage, #	0	-	0	-	-	0
Grade, %	0	-	0	-	-	0
Peak Hour Factor	91	91	91	91	91	91
Heavy Vehicles, %	0	0	7	7	0	6
Mvmt Flow	0	118	1389	32	0	1862

Major/Minor	Minor1	Major1	Major2
Conflicting Flow All	-	695	0
Stage 1	-	-	-
Stage 2	-	-	-
Critical Hdwy	-	6.9	-
Critical Hdwy Stg 1	-	-	-
Critical Hdwy Stg 2	-	-	-
Follow-up Hdwy	-	3.3	-
Pot Cap-1 Maneuver	0	389	-
Stage 1	0	-	-
Stage 2	0	-	-
Platoon blocked, %		-	-
Mov Cap-1 Maneuver	-	389	-
Mov Cap-2 Maneuver	-	-	-
Stage 1	-	-	-
Stage 2	-	-	-









Approach	WB	NB	SB
HCM Control Delay, s	18.2	0	0
HCM LOS	C		

Minor Lane/Major Mvmt	NBTWBLn1	SBT
Capacity (veh/h)	- 389	-
HCM Lane V/C Ratio	- 0.302	-
HCM Control Delay (s)	- 18.2	-
HCM Lane LOS	- C	-
HCM 95th %tile Q(veh)	- 1.3	-

# HCM 6th TWSC

## 1: City Gate Lane/Monarch Drive & Ferry Road

07/30/2019

Intersection												
Int Delay, s/veh	10.1											
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Vol, veh/h	30	1238	175	100	554	23	34	0	32	6	0	8
Future Vol, veh/h	30	1238	175	100	554	23	34	0	32	6	0	8
Conflicting Peds, #/hr	0	0	0	0	0	0	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Free	Free	Stop	Stop	Stop	Stop	Stop	Stop
RT Channelized	-	-	None	-	-	None	-	-	None	-	-	None
Storage Length	220	-	-	200	-	-	0	-	-	-	-	0
Veh in Median Storage, #	-	0	-	-	0	-	-	0	-	-	0	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	91	91	91	91	91	91	91	91	91	91	91	91
Heavy Vehicles, %	3	2	1	0	3	9	0	0	0	33	0	13
Mvmt Flow	33	1360	192	110	609	25	37	0	35	7	0	9
Major/Minor	Major1			Major2			Minor1			Minor2		
Conflicting Flow All	634	0	0	1552	0	0	2047	2376	776	1588	2460	317
Stage 1	-	-	-	-	-	-	1522	1522	-	842	842	-
Stage 2	-	-	-	-	-	-	525	854	-	746	1618	-
Critical Hdwy	4.16	-	-	4.1	-	-	7.5	6.5	6.9	8.16	6.5	7.16
Critical Hdwy Stg 1	-	-	-	-	-	-	6.5	5.5	-	7.16	5.5	-
Critical Hdwy Stg 2	-	-	-	-	-	-	6.5	5.5	-	7.16	5.5	-
Follow-up Hdwy	2.23	-	-	2.2	-	-	3.5	4	3.3	3.83	4	3.43
Pot Cap-1 Maneuver	938	-	-	433	-	-	~ 33	35	345	53	31	647
Stage 1	-	-	-	-	-	-	126	182	-	267	383	-
Stage 2	-	-	-	-	-	-	509	378	-	309	164	-
Platoon blocked, %		-	-		-	-						
Mov Cap-1 Maneuver	938	-	-	433	-	-	~ 26	25	345	37	22	647
Mov Cap-2 Maneuver	-	-	-	-	-	-	~ 26	25	-	37	22	-
Stage 1	-	-	-	-	-	-	122	176	-	258	286	-
Stage 2	-	-	-	-	-	-	375	282	-	268	158	-
Approach	EB			WB			NB			SB		
HCM Control Delay, s	0.2			2.4			294.9			58.5		
HCM LOS							F			F		
Minor Lane/Major Mvmt	NBLn1 NBLn2		EBL	EBT	EBR	WBL	WBT	WBR	SBLn1	SBLn2		
Capacity (veh/h)	26 345		938	-	-	433	-	-	37	647		
HCM Lane V/C Ratio	1.437 0.102		0.035	-	-	0.254	-	-	0.178	0.014		
HCM Control Delay (s)	\$ 556.8 16.6		9	-	-	16.1	-	-	122.3	10.6		
HCM Lane LOS	F C		A	-	-	C	-	-	F	B		
HCM 95th %tile Q(veh)	4.5 0.3		0.1	-	-	1	-	-	0.6	0		
Notes												
~: Volume exceeds capacity		\$: Delay exceeds 300s			+: Computation Not Defined				*: All major volume in platoon			



# HCM 6th TWSC

## 2: Comfort Drive/Corporate Lane & Ferry Road

07/30/2019

Intersection												
Int Delay, s/veh	24.2											
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	↰	↰↱		↰	↰↱		↰	↱	↰	↰	↱	
Traffic Vol, veh/h	54	1172	50	119	614	2	52	0	32	0	0	11
Future Vol, veh/h	54	1172	50	119	614	2	52	0	32	0	0	11
Conflicting Peds, #/hr	0	0	0	0	0	0	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Free	Free	Stop	Stop	Stop	Stop	Stop	Stop
RT Channelized	-	-	None	-	-	None	-	-	None	-	-	None
Storage Length	150	-	-	230	-	-	140	-	140	100	-	-
Veh in Median Storage, #	-	0	-	-	0	-	-	0	-	-	0	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	95	95	95	95	95	95	95	95	95	95	95	95
Heavy Vehicles, %	6	2	0	0	2	0	22	0	0	0	0	18
Mvmt Flow	57	1234	53	125	646	2	55	0	34	0	0	12
Major/Minor	Major1			Major2			Minor1			Minor2		
Conflicting Flow All	648	0	0	1287	0	0	1948	2273	644	1628	2298	324
Stage 1	-	-	-	-	-	-	1375	1375	-	897	897	-
Stage 2	-	-	-	-	-	-	573	898	-	731	1401	-
Critical Hdwy	4.22	-	-	4.1	-	-	7.94	6.5	6.9	7.5	6.5	7.26
Critical Hdwy Stg 1	-	-	-	-	-	-	6.94	5.5	-	6.5	5.5	-
Critical Hdwy Stg 2	-	-	-	-	-	-	6.94	5.5	-	6.5	5.5	-
Follow-up Hdwy	2.26	-	-	2.2	-	-	3.72	4	3.3	3.5	4	3.48
Pot Cap-1 Maneuver	907	-	-	546	-	-	~ 31	41	420	69	39	627
Stage 1	-	-	-	-	-	-	128	215	-	305	361	-
Stage 2	-	-	-	-	-	-	425	361	-	384	209	-
Platoon blocked, %	-	-	-	-	-	-	-	-	-	-	-	-
Mov Cap-1 Maneuver	907	-	-	546	-	-	~ 24	30	420	50	28	627
Mov Cap-2 Maneuver	-	-	-	-	-	-	~ 24	30	-	50	28	-
Stage 1	-	-	-	-	-	-	120	201	-	286	278	-
Stage 2	-	-	-	-	-	-	322	278	-	331	196	-
Approach	EB			WB			NB			SB		
HCM Control Delay, s	0.4			2.2			\$ 581.2			10.9		
HCM LOS							F			B		
Minor Lane/Major Mvmt	NBLn1	NBLn2	NBLn3	EBL	EBT	EBR	WBL	WBT	WBR	SBLn1	SBLn2	
Capacity (veh/h)	24	-	420	907	-	-	546	-	-	-	-	627
HCM Lane V/C Ratio	2.281	-	0.08	0.063	-	-	0.229	-	-	-	-	0.018
HCM Control Delay (s)	\$ 930	0	14.3	9.2	-	-	13.5	-	-	0	10.9	
HCM Lane LOS	F	A	B	A	-	-	B	-	-	A	B	
HCM 95th %tile Q(veh)	6.8	-	0.3	0.2	-	-	0.9	-	-	-	0.1	
Notes												
-: Volume exceeds capacity    \$: Delay exceeds 300s    +: Computation Not Defined    *: All major volume in platoon												

Intersection

Int Delay, s/veh 5.1

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↕			↕			↕	↕		↕	↕
Traffic Vol, veh/h	212	104	67	47	16	3	0	3	6	14	0	6
Future Vol, veh/h	212	104	67	47	16	3	0	3	6	14	0	6
Conflicting Peds, #/hr	0	0	0	0	0	0	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Free	Free	Stop	Stop	Stop	Stop	Stop	Stop
RT Channelized	-	-	None	-	-	None	-	-	None	-	-	None
Storage Length	-	-	-	-	-	-	-	-	50	-	-	90
Veh in Median Storage, #	-	0	-	-	0	-	-	0	-	-	0	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	85	85	85	85	85	85	85	85	85	85	85	85
Heavy Vehicles, %	1	0	2	0	0	0	0	0	17	0	3	0
Mvmt Flow	249	122	79	55	19	4	0	4	7	16	0	7

Major/Minor	Major1			Major2			Minor1			Minor2		
Conflicting Flow All	23	0	0	201	0	0	795	793	162	796	830	21
Stage 1	-	-	-	-	-	-	660	660	-	131	131	-
Stage 2	-	-	-	-	-	-	135	133	-	665	699	-
Critical Hdwy	4.11	-	-	4.1	-	-	7.1	6.5	6.37	7.1	6.53	6.2
Critical Hdwy Stg 1	-	-	-	-	-	-	6.1	5.5	-	6.1	5.53	-
Critical Hdwy Stg 2	-	-	-	-	-	-	6.1	5.5	-	6.1	5.53	-
Follow-up Hdwy	2.209	-	-	2.2	-	-	3.5	4	3.453	3.5	4.027	3.3
Pot Cap-1 Maneuver	1599	-	-	1383	-	-	308	323	845	307	305	1062
Stage 1	-	-	-	-	-	-	455	463	-	877	786	-
Stage 2	-	-	-	-	-	-	873	790	-	453	440	-
Platoon blocked, %	-	-	-	-	-	-	-	-	-	-	-	-
Mov Cap-1 Maneuver	1599	-	-	1383	-	-	257	255	845	253	241	1062
Mov Cap-2 Maneuver	-	-	-	-	-	-	257	255	-	253	241	-
Stage 1	-	-	-	-	-	-	374	381	-	722	755	-
Stage 2	-	-	-	-	-	-	833	758	-	366	362	-

Approach	EB	WB	NB	SB
HCM Control Delay, s	4.2	5.5	12.6	16.7
HCM LOS			B	C





Minor Lane/Major Mvmt	NBLn1	NBLn2	EBL	EBT	EBR	WBL	WBT	WBR	SBLn1	SBLn2
Capacity (veh/h)	255	845	1599	-	-	1383	-	-	253	1062
HCM Lane V/C Ratio	0.014	0.008	0.156	-	-	0.04	-	-	0.065	0.007
HCM Control Delay (s)	19.3	9.3	7.7	0	-	7.7	0	-	20.2	8.4
HCM Lane LOS	C	A	A	A	-	A	A	-	C	A
HCM 95th %tile Q(veh)	0	0	0.6	-	-	0.1	-	-	0.2	0

HCM 6th TWSC  
4: Rt 59 & Westings Avenue

07/30/2019

Intersection

Int Delay, s/veh 0.1

Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Traffic Vol, veh/h	0	22	1496	383	0	1336
Future Vol, veh/h	0	22	1496	383	0	1336
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Stop	Stop	Free	Free	Free	Free
RT Channelized	-	Stop	-	Free	-	None
Storage Length	-	0	-	155	-	-
Veh in Median Storage, #	0	-	0	-	-	0
Grade, %	0	-	0	-	-	0
Peak Hour Factor	92	92	92	92	92	92
Heavy Vehicles, %	0	0	9	1	0	9
Mvmt Flow	0	24	1626	416	0	1452

Major/Minor	Minor1	Major1	Major2
Conflicting Flow All	-	813	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	279	-
Stage 1	0	-	-
Stage 2	0	-	-
Platoon blocked, %	-	-	-
Mov Cap-1 Maneuver	-	279	-
Mov Cap-2 Maneuver	-	-	-
Stage 1	-	-	-
Stage 2	-	-	-

Approach	WB	NB	SB
HCM Control Delay, s	19.1	0	0
HCM LOS	C		

Minor Lane/Major Mvmt	NBTWBLn1	SBT
Capacity (veh/h)	- 279	-
HCM Lane V/C Ratio	- 0.086	-
HCM Control Delay (s)	- 19.1	-
HCM Lane LOS	- C	-
HCM 95th %tile Q(veh)	- 0.3	-




# HCM 6th TWSC

## 5: Westings Avenue & Proposed Access Drive

07/30/2019

### Intersection

Int Delay, s/veh 3.3

Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Traffic Vol, veh/h	16	108	52	9	58	14
Future Vol, veh/h	16	108	52	9	58	14
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, %	2	2	2	2	2	2
Mvmt Flow	17	114	55	9	61	15

Major/Minor	Major1	Major2	Minor2
Conflicting Flow All	64	0	0 208 60
Stage 1	-	-	- 60 -
Stage 2	-	-	- 148 -
Critical Hdwy	4.12	-	- 6.42 6.22
Critical Hdwy Stg 1	-	-	- 5.42 -
Critical Hdwy Stg 2	-	-	- 5.42 -
Follow-up Hdwy	2.218	-	- 3.518 3.318
Pot Cap-1 Maneuver	1538	-	- 780 1005
Stage 1	-	-	- 963 -
Stage 2	-	-	- 880 -
Platoon blocked, %	-	-	-
Mov Cap-1 Maneuver	1538	-	- 771 1005
Mov Cap-2 Maneuver	-	-	- 771 -
Stage 1	-	-	- 951 -
Stage 2	-	-	- 880 -









Approach	EB	WB	SB
HCM Control Delay, s	1	0	9.9
HCM LOS			A

Minor Lane/Major Mvmt	EBL	EBT	WBT	WBR	SBLn1
Capacity (veh/h)	1538	-	-	-	808
HCM Lane V/C Ratio	0.011	-	-	-	0.094
HCM Control Delay (s)	7.4	0	-	-	9.9
HCM Lane LOS	A	A	-	-	A
HCM 95th %tile Q(veh)	0	-	-	-	0.3

# HCM 6th TWSC

## 1: City Gate Lane/Monarch Drive & Ferry Road

07/30/2019

Intersection												
Int Delay, s/veh	34.1											
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Vol, veh/h	9	481	56	17	1229	12	173	1	167	11	0	28
Future Vol, veh/h	9	481	56	17	1229	12	173	1	167	11	0	28
Conflicting Peds, #/hr	0	0	0	0	0	0	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Free	Free	Stop	Stop	Stop	Stop	Stop	Stop
RT Channelized	-	-	None	-	-	None	-	-	None	-	-	None
Storage Length	220	-	-	200	-	-	0	-	-	-	-	0
Veh in Median Storage, #	-	0	-	-	0	-	-	0	-	-	0	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	92	92	92	92	92	92	92	92	92	92	92	92
Heavy Vehicles, %	0	3	0	0	2	0	0	0	1	0	0	0
Mvmt Flow	10	523	61	18	1336	13	188	1	182	12	0	30
Major/Minor	Major1			Major2			Minor1			Minor2		
Conflicting Flow All	1349	0	0	584	0	0	1278	1959	292	1661	1983	675
Stage 1	-	-	-	-	-	-	574	574	-	1379	1379	-
Stage 2	-	-	-	-	-	-	704	1385	-	282	604	-
Critical Hdwy	4.1	-	-	4.1	-	-	7.5	6.5	6.92	7.5	6.5	6.9
Critical Hdwy Stg 1	-	-	-	-	-	-	6.5	5.5	-	6.5	5.5	-
Critical Hdwy Stg 2	-	-	-	-	-	-	6.5	5.5	-	6.5	5.5	-
Follow-up Hdwy	2.2	-	-	2.2	-	-	3.5	4	3.31	3.5	4	3.3
Pot Cap-1 Maneuver	517	-	-	1001	-	-	~ 125	64	707	65	62	401
Stage 1	-	-	-	-	-	-	476	506	-	155	214	-
Stage 2	-	-	-	-	-	-	398	213	-	707	491	-
Platoon blocked, %		-	-		-	-						
Mov Cap-1 Maneuver	517	-	-	1001	-	-	~ 112	62	707	46	60	401
Mov Cap-2 Maneuver	-	-	-	-	-	-	~ 112	62	-	46	60	-
Stage 1	-	-	-	-	-	-	467	496	-	152	210	-
Stage 2	-	-	-	-	-	-	361	209	-	514	482	-
Approach	EB			WB			NB			SB		
HCM Control Delay, s	0.2			0.1			213.2			41.2		
HCM LOS							F			E		
Minor Lane/Major Mvmt	NBLn1 NBLn2		EBL	EBT	EBR	WBL	WBT	WBR	SBLn1	SBLn2		
Capacity (veh/h)	112	666	517	-	-	1001	-	-	46	401		
HCM Lane V/C Ratio	1.679	0.274	0.019	-	-	0.018	-	-	0.26	0.076		
HCM Control Delay (s)	\$ 408.1	12.4	12.1	-	-	8.7	-	-	108.8	14.7		
HCM Lane LOS	F	B	B	-	-	A	-	-	F	B		
HCM 95th %tile Q(veh)	14.4	1.1	0.1	-	-	0.1	-	-	0.9	0.2		
Notes												
~: Volume exceeds capacity		\$: Delay exceeds 300s			+: Computation Not Defined				*: All major volume in platoon			










# HCM 6th TWSC

## 2: Comfort Drive/Corporate Lane & Ferry Road

07/30/2019

### Intersection

Int Delay, s/veh 21.7

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Vol, veh/h	13	638	8	28	1062	1	132	2	95	2	0	64
Future Vol, veh/h	13	638	8	28	1062	1	132	2	95	2	0	64
Conflicting Peds, #/hr	0	0	0	0	0	0	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Free	Free	Stop	Stop	Stop	Stop	Stop	Stop
RT Channelized	-	-	None	-	-	None	-	-	None	-	-	None
Storage Length	150	-	-	230	-	-	140	-	140	100	-	-
Veh in Median Storage, #	-	0	-	-	0	-	-	0	-	-	0	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	96	96	96	96	96	96	96	96	96	96	96	96
Heavy Vehicles, %	54	1	0	0	1	0	0	0	0	0	0	6
Mvmt Flow	14	665	8	29	1106	1	138	2	99	2	0	67

Major/Minor	Major1			Major2			Minor1			Minor2		
Conflicting Flow All	1107	0	0	673	0	0	1308	1862	337	1527	1866	554
Stage 1	-	-	-	-	-	-	697	697	-	1165	1165	-
Stage 2	-	-	-	-	-	-	611	1165	-	362	701	-
Critical Hdwy	5.18	-	-	4.1	-	-	7.5	6.5	6.9	7.5	6.5	7.02
Critical Hdwy Stg 1	-	-	-	-	-	-	6.5	5.5	-	6.5	5.5	-
Critical Hdwy Stg 2	-	-	-	-	-	-	6.5	5.5	-	6.5	5.5	-
Follow-up Hdwy	2.74	-	-	2.2	-	-	3.5	4	3.3	3.5	4	3.36
Pot Cap-1 Maneuver	395	-	-	927	-	-	~ 119	74	665	82	73	466
Stage 1	-	-	-	-	-	-	402	446	-	210	271	-
Stage 2	-	-	-	-	-	-	453	271	-	635	444	-
Platoon blocked, %		-	-		-	-						
Mov Cap-1 Maneuver	395	-	-	927	-	-	~ 97	69	665	65	68	466
Mov Cap-2 Maneuver	-	-	-	-	-	-	~ 97	69	-	65	68	-
Stage 1	-	-	-	-	-	-	388	430	-	203	263	-
Stage 2	-	-	-	-	-	-	376	263	-	519	428	-

Approach	EB	WB	NB	SB
HCM Control Delay, s	0.3	0.2	187.6	15.5
HCM LOS			F	C

Minor Lane/Major Mvmt	NBLn1	NBLn2	NBLn3	EBL	EBT	EBR	WBL	WBT	WBR	SBLn1	SBLn2
Capacity (veh/h)	97	69	665	395	-	-	927	-	-	65	466
HCM Lane V/C Ratio	1.418	0.03	0.149	0.034	-	-	0.031	-	-	0.032	0.143
HCM Control Delay (s)	\$ 316.3	58.8	11.4	14.4	-	-	9	-	-	62.2	14
HCM Lane LOS	F	F	B	B	-	-	A	-	-	F	B
HCM 95th %tile Q(veh)	10.1	0.1	0.5	0.1	-	-	0.1	-	-	0.1	0.5

### Notes

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





Intersection												
Int Delay, s/veh	7.5											
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↕			↕			↕	↕		↕	↕
Traffic Vol, veh/h	24	41	5	3	51	2	47	13	73	67	11	51
Future Vol, veh/h	24	41	5	3	51	2	47	13	73	67	11	51
Conflicting Peds, #/hr	0	0	0	0	0	0	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Free	Free	Stop	Stop	Stop	Stop	Stop	Stop
RT Channelized	-	-	None	-	-	None	-	-	None	-	-	None
Storage Length	-	-	-	-	-	-	-	-	50	-	-	90
Veh in Median Storage, #	-	0	-	-	0	-	-	0	-	-	0	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	74	74	74	74	74	74	74	74	74	74	74	74
Heavy Vehicles, %	13	0	0	0	0	0	0	0	0	0	0	0
Mvmt Flow	32	55	7	4	69	3	64	18	99	91	15	69
Major/Minor	Major1			Major2			Minor1			Minor2		
Conflicting Flow All	72	0	0	62	0	0	244	203	59	260	205	71
Stage 1	-	-	-	-	-	-	123	123	-	79	79	-
Stage 2	-	-	-	-	-	-	121	80	-	181	126	-
Critical Hdwy	4.23	-	-	4.1	-	-	7.1	6.5	6.2	7.1	6.5	6.2
Critical Hdwy Stg 1	-	-	-	-	-	-	6.1	5.5	-	6.1	5.5	-
Critical Hdwy Stg 2	-	-	-	-	-	-	6.1	5.5	-	6.1	5.5	-
Follow-up Hdwy	2.317	-	-	2.2	-	-	3.5	4	3.3	3.5	4	3.3
Pot Cap-1 Maneuver	1461	-	-	1554	-	-	714	697	1012	697	695	997
Stage 1	-	-	-	-	-	-	886	798	-	935	833	-
Stage 2	-	-	-	-	-	-	888	832	-	825	796	-
Platoon blocked, %	-	-	-	-	-	-	-	-	-	-	-	-
Mov Cap-1 Maneuver	1461	-	-	1554	-	-	640	679	1012	604	677	997
Mov Cap-2 Maneuver	-	-	-	-	-	-	640	679	-	604	677	-
Stage 1	-	-	-	-	-	-	866	780	-	913	831	-
Stage 2	-	-	-	-	-	-	809	830	-	711	778	-
Approach	EB			WB			NB			SB		
HCM Control Delay, s	2.6			0.4			10			10.8		
HCM LOS							B			B		
Minor Lane/Major Mvmt	NBLn1 NBLn2		EBL	EBT	EBR	WBL	WBT	WBR	SBLn1	SBLn2		
Capacity (veh/h)	648	1012	1461	-	-	1554	-	-	613	997		
HCM Lane V/C Ratio	0.125	0.097	0.022	-	-	0.003	-	-	0.172	0.069		
HCM Control Delay (s)	11.3	8.9	7.5	0	-	7.3	0	-	12.1	8.9		
HCM Lane LOS	B	A	A	A	-	A	A	-	B	A		
HCM 95th %tile Q(veh)	0.4	0.3	0.1	-	-	0	-	-	0.6	0.2		

HCM 6th TWSC  
4: Rt 59 & Westings Avenue

07/30/2019

Intersection

Int Delay, s/veh 1.2

Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Traffic Vol, veh/h	0	149	1315	70	0	1856
Future Vol, veh/h	0	149	1315	70	0	1856
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Stop	Stop	Free	Free	Free	Free
RT Channelized	-	Stop	-	Free	-	None
Storage Length	-	0	-	155	-	-
Veh in Median Storage, #	0	-	0	-	-	0
Grade, %	0	-	0	-	-	0
Peak Hour Factor	91	91	91	91	91	91
Heavy Vehicles, %	0	0	7	7	0	6
Mvmt Flow	0	164	1445	77	0	2040

Major/Minor	Minor1	Major1	Major2
Conflicting Flow All	-	723	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	320	-
Stage 1	0	-	-
Stage 2	0	-	-
Platoon blocked, %	-	-	-
Mov Cap-1 Maneuver	-	320	-
Mov Cap-2 Maneuver	-	-	-
Stage 1	-	-	-
Stage 2	-	-	-




Approach	WB	NB	SB
HCM Control Delay, s	27.5	0	0
HCM LOS	D		

Minor Lane/Major Mvmt	NBTWBLn1	SBT
Capacity (veh/h)	- 320	-
HCM Lane V/C Ratio	- 0.512	-
HCM Control Delay (s)	- 27.5	-
HCM Lane LOS	- D	-
HCM 95th %tile Q(veh)	- 2.8	-



Intersection

Int Delay, s/veh 2.9

Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Traffic Vol, veh/h	49	132	46	26	38	10
Future Vol, veh/h	49	132	46	26	38	10
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, %	2	2	2	2	2	2
Mvmt Flow	52	139	48	27	40	11

Major/Minor	Major1	Major2	Minor2
Conflicting Flow All	75	0	0 305 62
Stage 1	-	-	- 62 -
Stage 2	-	-	- 243 -
Critical Hdwy	4.12	-	- 6.42 6.22
Critical Hdwy Stg 1	-	-	- 5.42 -
Critical Hdwy Stg 2	-	-	- 5.42 -
Follow-up Hdwy	2.218	-	- 3.518 3.318
Pot Cap-1 Maneuver	1524	-	- 687 1003
Stage 1	-	-	- 961 -
Stage 2	-	-	- 797 -
Platoon blocked, %	-	-	-
Mov Cap-1 Maneuver	1524	-	- 662 1003
Mov Cap-2 Maneuver	-	-	- 662 -
Stage 1	-	-	- 925 -
Stage 2	-	-	- 797 -























Approach	EB	WB	SB
HCM Control Delay, s	2	0	10.4
HCM LOS			B

Minor Lane/Major Mvmt	EBL	EBT	WBT	WBR	SBLn1
Capacity (veh/h)	1524	-	-	-	712
HCM Lane V/C Ratio	0.034	-	-	-	0.071
HCM Control Delay (s)	7.4	0	-	-	10.4
HCM Lane LOS	A	A	-	-	B
HCM 95th %tile Q(veh)	0.1	-	-	-	0.2

# Lanes, Volumes, Timings

## 2: Comfort Drive/Corporate Lane & Ferry Road













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Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	54	1172	50	119	614	2	52	0	32	0	0	11
Future Volume (vph)	54	1172	50	119	614	2	52	0	32	0	0	11
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	2000	1900	1900	1900	1900
Lane Width (ft)	11	12	12	11	12	12	12	12	12	12	12	12
Grade (%)		0%			0%			0%			0%	
Storage Length (ft)	150		0	230		0	140		140	100		0
Storage Lanes	1		0	1		0	1		1	1		0
Taper Length (ft)	175			170			100			100		
Lane Util. Factor	1.00	0.95	0.95	1.00	0.95	0.95	1.00	1.00	1.00	1.00	1.00	1.00
Ped Bike Factor												
Frt		0.994							0.850		0.850	
Flt Protected	0.950			0.950			0.950					
Satd. Flow (prot)	1646	3521	0	1745	3539	0	1480	2000	1615	1900	1369	0
Flt Permitted	0.406			0.162			0.784					
Satd. Flow (perm)	703	3521	0	298	3539	0	1221	2000	1615	1900	1369	0
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)		8			1				182		361	
Link Speed (mph)		45			45			30			30	
Link Distance (ft)		689			575			501			334	
Travel Time (s)		10.4			8.7			11.4			7.6	
Confl. Peds. (#/hr)												
Confl. Bikes (#/hr)												
Peak Hour Factor	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Growth Factor	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%
Heavy Vehicles (%)	6%	2%	0%	0%	2%	0%	22%	0%	0%	0%	0%	18%
Bus Blockages (#/hr)	0	0	0	0	0	0	0	0	0	0	0	0
Parking (#/hr)												
Mid-Block Traffic (%)		0%			0%			0%			0%	
Shared Lane Traffic (%)												
Lane Group Flow (vph)	57	1287	0	125	648	0	55	0	34	0	12	0
Turn Type	pm+pt	NA		pm+pt	NA		pm+pt		Perm	pm+pt	NA	
Protected Phases	5	2		1	6		3	8		7	4	
Permitted Phases	2			6			8		8	4		
Detector Phase	5	2		1	6		3	8	8	7	4	
Switch Phase												
Minimum Initial (s)	3.0	15.0		3.0	15.0		3.0	8.0	8.0	3.0	8.0	
Minimum Split (s)	7.0	22.0		8.0	22.0		7.0	14.0	14.0	7.0	14.0	
Total Split (s)	7.0	69.0		10.0	72.0		7.0	14.0	14.0	7.0	14.0	
Total Split (%)	7.0%	69.0%		10.0%	72.0%		7.0%	14.0%	14.0%	7.0%	14.0%	
Yellow Time (s)	3.5	4.5		3.5	4.5		3.5	4.5	4.5	3.5	4.5	
All-Red Time (s)	0.0	1.5		0.0	1.5		0.0	1.5	1.5	0.0	1.5	
Lost Time Adjust (s)	0.0	0.0		0.0	0.0		0.0	0.0	0.0	0.0	0.0	
Total Lost Time (s)	3.5	6.0		3.5	6.0		3.5	6.0	6.0	3.5	6.0	
Lead/Lag	Lead	Lag		Lead	Lag		Lead	Lag	Lag	Lead	Lag	
Lead-Lag Optimize?	Yes	Yes		Yes	Yes		Yes	Yes	Yes	Yes	Yes	
Recall Mode	None	C-Min		None	C-Min		None	None	None	None	None	
Act Effect Green (s)	79.4	71.4		82.1	75.4		10.9		9.4		8.0	
Actuated g/C Ratio	0.79	0.71		0.82	0.75		0.11		0.09		0.08	

# Lanes, Volumes, Timings

## 2: Comfort Drive/Corporate Lane & Ferry Road

07/30/2019

												
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
v/c Ratio	0.09	0.51		0.37	0.24		0.36		0.11		0.03	
Control Delay	2.7	8.3		5.3	5.4		46.2		0.7		0.1	
Queue Delay	0.0	0.0		0.0	0.0		0.0		0.0		0.0	
Total Delay	2.7	8.3		5.3	5.4		46.2		0.7		0.1	
LOS	A	A		A	A		D		A		A	
Approach Delay		8.0			5.4			28.8			0.1	
Approach LOS		A			A			C			A	
Queue Length 50th (ft)	5	178		11	68		33		0		0	
Queue Length 95th (ft)	17	286		31	107		66		0		0	
Internal Link Dist (ft)		609			495			421			254	
Turn Bay Length (ft)	150			230			140		140			
Base Capacity (vph)	609	2517		341	2670		154		316		441	
Starvation Cap Reductn	0	0		0	0		0		0		0	
Spillback Cap Reductn	0	0		0	0		0		0		0	
Storage Cap Reductn	0	0		0	0		0		0		0	
Reduced v/c Ratio	0.09	0.51		0.37	0.24		0.36		0.11		0.03	

### Intersection Summary

Area Type: Other

Cycle Length: 100

Actuated Cycle Length: 100

Offset: 0 (0%), Referenced to phase 2:EBTL and 6:WBTL, Start of Green

Natural Cycle: 60

Control Type: Actuated-Coordinated

Maximum v/c Ratio: 0.51

Intersection Signal Delay: 7.9












Intersection LOS: A

Intersection Capacity Utilization 63.5%

ICU Level of Service B

Analysis Period (min) 15























Splits and Phases: 2: Comfort Drive/Corporate Lane & Ferry Road

														
Ø1	Ø2 (R)					Ø3	Ø4							
10 s	69 s					7 s	14 s							
														
Ø5	Ø6 (R)					Ø7	Ø8							
7 s	72 s					7 s	14 s							

# Lanes, Volumes, Timings

## 2: Comfort Drive/Corporate Lane & Ferry Road













07/30/2019

												
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	13	638	8	28	1062	1	132	2	95	2	0	64
Future Volume (vph)	13	638	8	28	1062	1	132	2	95	2	0	64
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	2000	1900	1900	1900	1900
Lane Width (ft)	11	12	12	11	12	12	12	12	12	12	12	12
Grade (%)		0%			0%			0%			0%	
Storage Length (ft)	150		0	230		0	140		140	100		0
Storage Lanes	1		0	1		0	1		1	1		0
Taper Length (ft)	175			170			100			100		
Lane Util. Factor	1.00	0.95	0.95	1.00	0.95	0.95	1.00	1.00	1.00	1.00	1.00	1.00
Ped Bike Factor												
Frt		0.998							0.850		0.850	
Flt Protected	0.950			0.950			0.950			0.950		
Satd. Flow (prot)	1133	3568	0	1745	3574	0	1805	2000	1615	1805	1524	0
Flt Permitted	0.230			0.376			0.713			0.757		
Satd. Flow (perm)	274	3568	0	691	3574	0	1355	2000	1615	1438	1524	0
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)		1							99		288	
Link Speed (mph)		45			45			30			30	
Link Distance (ft)		689			575			501			334	
Travel Time (s)		10.4			8.7			11.4			7.6	
Confl. Peds. (#/hr)												
Confl. Bikes (#/hr)												
Peak Hour Factor	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96
Growth Factor	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%
Heavy Vehicles (%)	54%	1%	0%	0%	1%	0%	0%	0%	0%	0%	0%	6%
Bus Blockages (#/hr)	0	0	0	0	0	0	0	0	0	0	0	0
Parking (#/hr)												
Mid-Block Traffic (%)		0%			0%			0%			0%	
Shared Lane Traffic (%)												
Lane Group Flow (vph)	14	673	0	29	1107	0	138	2	99	2	67	0
Turn Type	pm+pt	NA		pm+pt	NA		pm+pt	NA	Perm	pm+pt	NA	
Protected Phases	5	2		1	6		3	8		7	4	
Permitted Phases	2			6			8		8	4		
Detector Phase	5	2		1	6		3	8	8	7	4	
Switch Phase												
Minimum Initial (s)	3.0	15.0		3.0	15.0		3.0	8.0	8.0	3.0	8.0	
Minimum Split (s)	7.0	22.0		7.0	22.0		7.0	14.0	14.0	7.0	14.0	
Total Split (s)	26.0	95.0		7.0	76.0		13.0	36.0	36.0	12.0	35.0	
Total Split (%)	17.3%	63.3%		4.7%	50.7%		8.7%	24.0%	24.0%	8.0%	23.3%	
Yellow Time (s)	3.5	4.5		3.5	4.5		3.5	4.5	4.5	3.5	4.5	
All-Red Time (s)	0.0	1.5		0.0	1.5		0.0	1.5	1.5	0.0	1.5	
Lost Time Adjust (s)	0.0	0.0		0.0	0.0		0.0	0.0	0.0	0.0	0.0	
Total Lost Time (s)	3.5	6.0		3.5	6.0		3.5	6.0	6.0	3.5	6.0	
Lead/Lag	Lead	Lag		Lead	Lag		Lag	Lead	Lead	Lag	Lead	
Lead-Lag Optimize?	Yes	Yes		Yes	Yes		Yes	Yes	Yes	Yes	Yes	
Recall Mode	None	C-Min		None	C-Min		None	None	None	None	None	
Act Effect Green (s)	119.2	113.0		120.0	114.9		21.7	16.9	16.9	14.4	8.0	
Actuated g/C Ratio	0.79	0.75		0.80	0.77		0.14	0.11	0.11	0.10	0.05	

# Lanes, Volumes, Timings

## 2: Comfort Drive/Corporate Lane & Ferry Road

07/30/2019

												
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
v/c Ratio	0.06	0.25		0.05	0.40		0.61	0.01	0.37	0.01	0.19	
Control Delay	3.8	6.7		3.6	7.4		72.1	60.5	15.1	54.0	1.2	
Queue Delay	0.0	0.0		0.0	0.0		0.0	0.0	0.0	0.0	0.0	
Total Delay	3.8	6.7		3.6	7.4		72.1	60.5	15.1	54.0	1.2	
LOS	A	A		A	A		E	E	B	D	A	
Approach Delay		6.6			7.3			48.4			2.7	
Approach LOS		A			A			D			A	
Queue Length 50th (ft)	2	102		5	144		128	2	0	2	0	
Queue Length 95th (ft)	8	149		13	277		194	11	59	10	0	
Internal Link Dist (ft)		609			495			421			254	
Turn Bay Length (ft)	150			230			140		140	100		
Base Capacity (vph)	350	2687		595	2737		235	400	402	182	526	
Starvation Cap Reductn	0	0		0	0		0	0	0	0	0	
Spillback Cap Reductn	0	0		0	0		0	0	0	0	0	
Storage Cap Reductn	0	0		0	0		0	0	0	0	0	
Reduced v/c Ratio	0.04	0.25		0.05	0.40		0.59	0.01	0.25	0.01	0.13	

### Intersection Summary

Area Type: Other

Cycle Length: 150

Actuated Cycle Length: 150

Offset: 0 (0%), Referenced to phase 2:EBTL and 6:WBTL, Start of Green

Natural Cycle: 55

Control Type: Actuated-Coordinated

Maximum v/c Ratio: 0.61

Intersection Signal Delay: 11.5

Intersection LOS: B

Intersection Capacity Utilization 53.4%

ICU Level of Service A

Analysis Period (min) 15























Splits and Phases: 2: Comfort Drive/Corporate Lane & Ferry Road



# Lanes, Volumes, Timings

## 2: Comfort Drive/Corporate Lane & Ferry Road













07/30/2019

												
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	69	1172	50	119	614	7	52	0	34	10	0	31
Future Volume (vph)	69	1172	50	119	614	7	52	0	34	10	0	31
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	2000	1900	1900	1900	1900
Lane Width (ft)	11	12	12	11	12	12	12	12	12	12	12	12
Grade (%)		0%			0%			0%			0%	
Storage Length (ft)	150		0	230		0	140		140	100		0
Storage Lanes	1		0	1		0	1		1	1		0
Taper Length (ft)	175			170			100			100		
Lane Util. Factor	1.00	0.95	0.95	1.00	0.95	0.95	1.00	1.00	1.00	1.00	1.00	1.00
Ped Bike Factor												
Frt		0.994			0.998				0.850		0.850	
Flt Protected	0.950			0.950			0.950			0.950		
Satd. Flow (prot)	1646	3521	0	1745	3533	0	1480	2000	1615	1805	1369	0
Flt Permitted	0.404			0.157			0.456			0.757		
Satd. Flow (perm)	700	3521	0	288	3533	0	710	2000	1615	1438	1369	0
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)		8			2				175		354	
Link Speed (mph)		45			45			30			30	
Link Distance (ft)		689			575			501			334	
Travel Time (s)		10.4			8.7			11.4			7.6	
Confl. Peds. (#/hr)												
Confl. Bikes (#/hr)												
Peak Hour Factor	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Growth Factor	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%
Heavy Vehicles (%)	6%	2%	0%	0%	2%	0%	22%	0%	0%	0%	0%	18%
Bus Blockages (#/hr)	0	0	0	0	0	0	0	0	0	0	0	0
Parking (#/hr)												
Mid-Block Traffic (%)		0%			0%			0%			0%	
Shared Lane Traffic (%)												
Lane Group Flow (vph)	73	1287	0	125	653	0	55	0	36	11	33	0
Turn Type	pm+pt	NA		pm+pt	NA		pm+pt		Perm	pm+pt	NA	
Protected Phases	5	2		1	6		3	8		7	4	
Permitted Phases	2			6			8		8	4		
Detector Phase	5	2		1	6		3	8	8	7	4	
Switch Phase												
Minimum Initial (s)	3.0	15.0		3.0	15.0		3.0	8.0	8.0	3.0	8.0	
Minimum Split (s)	7.0	22.0		8.0	22.0		7.0	14.0	14.0	7.0	14.0	
Total Split (s)	7.0	69.0		10.0	72.0		7.0	14.0	14.0	7.0	14.0	
Total Split (%)	7.0%	69.0%		10.0%	72.0%		7.0%	14.0%	14.0%	7.0%	14.0%	
Yellow Time (s)	3.5	4.5		3.5	4.5		3.5	4.5	4.5	3.5	4.5	
All-Red Time (s)	0.0	1.5		0.0	1.5		0.0	1.5	1.5	0.0	1.5	
Lost Time Adjust (s)	0.0	0.0		0.0	0.0		0.0	0.0	0.0	0.0	0.0	
Total Lost Time (s)	3.5	6.0		3.5	6.0		3.5	6.0	6.0	3.5	6.0	
Lead/Lag	Lead	Lag		Lead	Lag		Lead	Lag	Lag	Lead	Lag	
Lead-Lag Optimize?	Yes	Yes		Yes	Yes		Yes	Yes	Yes	Yes	Yes	
Recall Mode	None	C-Min		None	C-Min		None	None	None	None	None	
Act Effect Green (s)	75.7	68.8		80.2	73.7		13.0		10.8	10.2	8.0	
Actuated g/C Ratio	0.76	0.69		0.80	0.74		0.13		0.11	0.10	0.08	

# Lanes, Volumes, Timings

## 2: Comfort Drive/Corporate Lane & Ferry Road

07/30/2019

												
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
v/c Ratio	0.13	0.53		0.39	0.25		0.41		0.11	0.07	0.08	
Control Delay	3.6	9.8		6.4	6.2		47.1		0.7	35.6	0.4	
Queue Delay	0.0	0.0		0.0	0.0		0.0		0.0	0.0	0.0	
Total Delay	3.6	9.8		6.4	6.2		47.1		0.7	35.6	0.4	
LOS	A	A		A	A		D		A	D	A	
Approach Delay		9.5			6.2			28.7			9.2	
Approach LOS		A			A			C			A	
Queue Length 50th (ft)	10	228		17	81		30		0	6	0	
Queue Length 95th (ft)	20	286		31	107		66		0	22	0	
Internal Link Dist (ft)		609			495			421			254	
Turn Bay Length (ft)	150			230			140		140	100		
Base Capacity (vph)	571	2425		325	2604		133		330	161	435	
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	0.13	0.53		0.38	0.25		0.41		0.11	0.07	0.08	

### Intersection Summary

Area Type: Other

Cycle Length: 100

Actuated Cycle Length: 100

Offset: 0 (0%), Referenced to phase 2:EBTL and 6:WBTL, Start of Green

Natural Cycle: 60

Control Type: Actuated-Coordinated

Maximum v/c Ratio: 0.53

Intersection Signal Delay: 9.1








Intersection LOS: A

Intersection Capacity Utilization 63.5%

ICU Level of Service B

Analysis Period (min) 15






















Splits and Phases: 2: Comfort Drive/Corporate Lane & Ferry Road

 Ø1	 Ø2 (R)	 Ø3	 Ø4
10 s	69 s	7 s	14 s
 Ø5	 Ø6 (R)	 Ø7	 Ø8
7 s	72 s	7 s	14 s

# Lanes, Volumes, Timings

## 2: Comfort Drive/Corporate Lane & Ferry Road

07/30/2019













												
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	173	638	8	28	1062	36	132	2	110	42	0	169
Future Volume (vph)	173	638	8	28	1062	36	132	2	110	42	0	169
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	2000	1900	1900	1900	1900
Lane Width (ft)	11	12	12	11	12	12	12	12	12	12	12	12
Grade (%)		0%			0%			0%			0%	
Storage Length (ft)	150		0	230		0	140		140	100		0
Storage Lanes	1		0	1		0	1		1	1		0
Taper Length (ft)	175			170			100			100		
Lane Util. Factor	1.00	0.95	0.95	1.00	0.95	0.95	1.00	1.00	1.00	1.00	1.00	1.00
Ped Bike Factor												
Frt		0.998			0.995				0.850		0.850	
Flt Protected	0.950			0.950			0.950			0.950		
Satd. Flow (prot)	1133	3568	0	1745	3558	0	1805	2000	1615	1805	1524	0
Flt Permitted	0.183			0.396			0.333			0.757		
Satd. Flow (perm)	218	3568	0	727	3558	0	633	2000	1615	1438	1524	0
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)		1			3				115		271	
Link Speed (mph)		45			45			30			30	
Link Distance (ft)		689			575			501			334	
Travel Time (s)		10.4			8.7			11.4			7.6	
Confl. Peds. (#/hr)												
Confl. Bikes (#/hr)												
Peak Hour Factor	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96
Growth Factor	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%
Heavy Vehicles (%)	54%	1%	0%	0%	1%	0%	0%	0%	0%	0%	0%	6%
Bus Blockages (#/hr)	0	0	0	0	0	0	0	0	0	0	0	0
Parking (#/hr)												
Mid-Block Traffic (%)		0%			0%			0%			0%	
Shared Lane Traffic (%)												
Lane Group Flow (vph)	180	673	0	29	1144	0	138	2	115	44	176	0
Turn Type	pm+pt	NA		pm+pt	NA		pm+pt	NA	Perm	pm+pt	NA	
Protected Phases	5	2		1	6		3	8		7	4	
Permitted Phases	2			6			8		8	4		
Detector Phase	5	2		1	6		3	8	8	7	4	
Switch Phase												
Minimum Initial (s)	3.0	15.0		3.0	15.0		3.0	8.0	8.0	3.0	8.0	
Minimum Split (s)	7.0	22.0		7.0	22.0		7.0	14.0	14.0	7.0	14.0	
Total Split (s)	26.0	95.0		7.0	76.0		13.0	36.0	36.0	12.0	35.0	
Total Split (%)	17.3%	63.3%		4.7%	50.7%		8.7%	24.0%	24.0%	8.0%	23.3%	
Yellow Time (s)	3.5	4.5		3.5	4.5		3.5	4.5	4.5	3.5	4.5	
All-Red Time (s)	0.0	1.5		0.0	1.5		0.0	1.5	1.5	0.0	1.5	
Lost Time Adjust (s)	0.0	0.0		0.0	0.0		0.0	0.0	0.0	0.0	0.0	
Total Lost Time (s)	3.5	6.0		3.5	6.0		3.5	6.0	6.0	3.5	6.0	
Lead/Lag	Lead	Lag		Lead	Lag		Lag	Lead	Lead	Lag	Lead	
Lead-Lag Optimize?	Yes	Yes		Yes	Yes		Yes	Yes	Yes	Yes	Yes	
Recall Mode	None	C-Min		None	C-Min		None	None	None	None	None	
Act Effect Green (s)	117.0	108.6		103.3	94.7		24.1	12.0	12.0	20.3	8.0	
Actuated g/C Ratio	0.78	0.72		0.69	0.63		0.16	0.08	0.08	0.14	0.05	



# Lanes, Volumes, Timings

## 2: Comfort Drive/Corporate Lane & Ferry Road

07/30/2019

												
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
v/c Ratio	0.67	0.26		0.05	0.51		0.71	0.01	0.49	0.20	0.52	
Control Delay	19.9	8.0		5.6	17.3		82.1	64.5	18.0	54.7	5.7	
Queue Delay	0.0	0.0		0.0	0.0		0.0	0.0	0.0	0.0	0.0	
Total Delay	19.9	8.0		5.6	17.3		82.1	64.5	18.0	54.7	5.7	
LOS	B	A		A	B		F	E	B	D	A	
Approach Delay		10.5			17.0			53.1			15.5	
Approach LOS		B			B			D			B	
Queue Length 50th (ft)	40	116		5	290		123	2	0	37	0	
Queue Length 95th (ft)	103	162		14	463		189	11	63	73	0	
Internal Link Dist (ft)		609			495			421			254	
Turn Bay Length (ft)	150			230			140		140	100		
Base Capacity (vph)	313	2584		541	2248		196	400	415	225	513	
Starvation Cap Reductn	0	0		0	0		0	0	0	0	0	
Spillback Cap Reductn	0	0		0	0		0	0	0	0	0	
Storage Cap Reductn	0	0		0	0		0	0	0	0	0	
Reduced v/c Ratio	0.58	0.26		0.05	0.51		0.70	0.01	0.28	0.20	0.34	

### Intersection Summary

Area Type: Other

Cycle Length: 150

Actuated Cycle Length: 150

Offset: 0 (0%), Referenced to phase 2:EBTL and 6:WBTL, Start of Green

Natural Cycle: 60

Control Type: Actuated-Coordinated

Maximum v/c Ratio: 0.71

Intersection Signal Delay: 18.3

Intersection LOS: B

Intersection Capacity Utilization 74.5%

ICU Level of Service D

Analysis Period (min) 15

Splits and Phases: 2: Comfort Drive/Corporate Lane & Ferry Road



## HCS7 Two-Way Stop-Control Text Report

## TWO-WAY STOP CONTROL (TWSC) Analysis

File Name: AMPR.xtw  
 Analyst: BSM  
 Agency: KLOA, Inc.  
 Date Performed: 6/20/2019  
 Time Analyzed: AM Peak Hour  
 Jurisdiction: Naperville  
 Analysis Year: 2025  
 Project Description: 19-032  
 Units: U.S. Customary  
 Intersection Name: Westings with Access  
 Major Street Direction: East-West  
 East/West Street Name: Westings Avenue  
 North/South Street Name: Proposed Access Drive  
 Analysis Time Period (hrs): 0.25

## Vehicle Volumes and Adjustments

Major Street:								
Approach	EastBound				WestBound			
Movement	1U	1	2	3	4U	4	5	6
	U	L	T	R	U	L	T	R
Volume		16	108				52	9
Peak Hour Factor, PHF					0.95			
Hourly Flow Rtae, HFR		17	114				55	9
Percent Heavy Vehicles		0						
Number of Lanes	0	0	1	0	0	0	1	0
Lane Configuration		LT						TR
Median Type					Undivided			
Median Storage								
RT channelized?								
Left-Turn Lane Storage								
Upstream Signal?					Not Present			

Minor Street:								
Approach	NorthBound				SouthBound			
Movement		7	8	9		10	11	12
		L	T	R		L	T	R
Volume						58		14
Peak Hour Factor, PHF					0.95			
Hourly Flow Rtae, HFR						61		15
Percent Heavy Vehicles						0		0
Number of Lanes		0	0	0		0	1	0
Lane Configuration							LR	
RT channelized?								
Flared Approach   Storage						No		
Percent Grade							0	

## Pedestrian Volumes and Adjustments

Approach	EB		WB		NB		SB	
Movement	13		14		15		16	
Flow (ped/hr)	0		0				0	
Lane width (ft)								
walking Speed (ft/sec)								
Pedestrian Blockage Factor, f_pb								

## Delay, Queue Length, and Level of Service

Approach	EB		WB		NorthBound		SouthBound	
Movement	1U	1	4U	4	7	8	9	10
Lane Configuration		LT						11
								LR
Flow Rate		17						76
Lane Capacity		1551						814
v/c		0.01						0.09
95% Queue Length		0.0						0.3
Control Delay		7.3						9.9
LOS		A						A
Approach Delay		1.0						9.9
Approach LOS								A
Intersction Delay		3.3						

## Step 1: MOVEMENT PRIORITIES

Major Street:								
Approach	EastBound				WestBound			
Priority	1U	1	2	3	4U	4	5	6
Movement	U	L	T	R	U	L	T	R

Minor Street:

Approach	NorthBound			SouthBound		
Priority	7	8	9	10	11	12
Movement	L	T	R	L	T	R

## Step 2: MOVEMENT DEMAND VOLUMES AND FLOW RATES

Step 2: MOVEMENT DEMAND VOLUMES AND FLOW RATES									
Major Street: Approach Movement	1U U	EastBound 1 L	2 T	3 R		4U U	WestBound 4 L	5 T	6 R
Volume, V_x		16	108					52	9
Flow Rate, v_x		17	114					55	9

Minor Street: Approach Movement	NorthBound 7 L	8 T	9 R		SouthBound 10 L	11 T	12 R
Volume, V_x						58	14
Flow Rate, v_x						61	15

### Step 3: CONFLICTING FLOW RATES.

Step 3: CONFLICTING FLOW RATES									
Major Street:	1U		EastBound		2	3		4U	WestBound
Approach	U		L		T	R		U	4
Movement	U		L		T	R		U	4 L T R
Flow Rate, v_x			17		114				55
Conflicting Flow, v_c,x			64						9

Minor Street: Approach Movement	NorthBound 7 L	8 T	9 R		SouthBound 10 L	11 T	12 R
Flow Rate, $v_x$ Conflicting Flow, $v_{c,x}$					61 207	15 59	

#### Step 4: CRITICAL HEADWAYS and FOLLOW-UP HEADWAYS

[illegible]

FOLLOW-UP HEADWAYS										
Approach	EB		WB		NorthBound			SouthBound		
Movement	1U	1	4U	4	7	8	9	10	11	12
	U	L	U	L	L	T	R	L	T	R
t_f,base		2.2						3.5		3.3
t_f,HV		0.9						0.9		0.9
P_HV		0.00						0.00		0.00
t_f		2.20						3.50		3.30

## Step 5: POTENTIAL CAPACITIES

Step 5: POTENTIAL CAPACITIES											
NO UPSTREAM SIGNAL EFFECTS PRESENT Approach Movement	EB		WB		NorthBound			SouthBound			
	1U	1	4U	4	7	8	9	10	11	12	
	U	L	U	L	L	T	R	L	T	R	
V_c,x		64						207		59	
t_c,x		4.10						6.40		6.20	
t_f,x		2.20						3.50		3.30	
C_p,x		1551						786		1012	

## Steps 6 - 9: MOVEMENT CAPACITIES.

37. MOVEMENT CAPACITIES				
Pedestrian Impedance Approach	EB	WB	NB	SB

Movement	13	14	15	16
Pedestrian Flow Rate $v_x$	0	0		0
Lane Width, $w$				
walking Speed, $S_p$				
Pedestrian Blockage Factor, $f_{pb}$				
Major-Street Left-Turn Movements		1	4	
Conflicting Flow, $v_{c,x}$		64		
Potential Capacity, $c_{p,x}$		1551		
Pedestrian Impedance Factor, $p_{p,x}$		1.000		
Movement Capacity, $c_{m,x}$		1551		
Probability of Queue-free State, $p_{0,j}$		0.989		
Major L-Shared Probability Queue-free State, $p^*_{0,j}$		0.988		
Minor-Street Right-Turn Movements		9	12	
Conflicting Flow, $v_{c,x}$			59	
Potential Capacity, $c_{p,x}$			1012	
Pedestrian Impedance Factor, $p_{p,x}$			1.000	
Movement Capacity, $c_{m,x}$			1012	
Probability of Queue-free State, $p_{0,j}$			0.985	
Major-Street U-Turn Movements		1U	4U	
Conflicting Flow, $v_{c,x}$				
Potential Capacity, $c_{p,x}$				
Capacity Adjustment Factor, $f_x$				
Movement Capacity, $c_{m,x}$				
Shared L/U Capacity, $c_{SH}$				
Probability of Queue-free State, $p_{0,j}$				
Minor-Street Through Movements		8	11	
Conflicting Flow, $v_{c,x}$				
Potential Capacity, $c_{p,x}$				
Pedestrian Impedance Factor, $p_{p,x}$				
Capacity Adjustment Factor, $f_x$				
Movement Capacity, $c_{m,x}$				
Probability of Queue-free State, $p_{0,j}$				
Minor-Street Left-Turn Movements		7	10	
Conflicting Flow, $v_{c,x}$			207	
Potential Capacity, $c_{p,x}$			786	
Pedestrian Impedance Factor, $p_{p,x}$			1.000	
Major L, Minor T Adjusted Impedance Factor, $p''$				
Major L, Minor T Impedance Factor, $p'$				
Capacity Adjustment Factor, $f_x$			0.988	
Movement Capacity, $c_{m,x}$			777	
Step 10: FINAL CAPACITY ADJUSTMENTS				
SHARED-LANE CAPACITY OF MINOR STREET APPROACHES				
Approach	NorthBound			SouthBound
Movement	7	8	9	10 11 12
Lane Configuration				LR
Shared Flow Rate, $v_y$				76
Movement Capacity, $c_{m,x}$				777
Shared Capacity, $c_{SH}$				814
Step 11: CONTROL DELAY				
CONTROL DELAY TO RANK 2 THROUGH 4 MOVEMENTS				
Approach	EB			WB
Movement	1U	1	4U	4
			7	NorthBound 8 9
				10 SouthBound 11 12
Flow Rate		17		61
Movement Capacity		1551		777
Lane Configuration		LT		
Shared Capacity				LR
Control Delay		7.3		814 9.9
CONTROL DELAY TO RANK 1 MOVEMENTS				
Approach			EB	WB
Movement			2	5
Number of Major Street Through Lanes, $N$			1	1
Proportion of Rank 1 vehicles not blocked, $p^*_{0,j}$			0.988	
Delay to Major Left-turning Vehicles, $d_{MLT}$			7.3	
Major Street Through Vehicles in Shared Lane, $v_{i1}$			114	
Major Street Turning Vehicles in Shared Lane, $v_{i2}$			17	
Saturation Flow Rate for Major Street Through, $s_{i1}$			1800	1800

Saturation Flow Rate for Major Street Right-Turn, s\_i21500  
Delay to Rank 1 Vehicles, d\_Rank10.1

Steps 12 - 13: APPROACH/INTERSECTION CONTROL DELAY and 95% QUEUE LENGTHS											
Approach	EB		WB		NorthBound		SouthBound				
Movement	1U	1	4U	4	7	8	9	10	11	12	
Lane Configuration		LT							LR		
Flow Rate		17							76		
Lane Capacity		1551							814		
v/c		0.01							0.09		
95% Queue Length		0.0							0.3		
Control Delay		7.3							9.9		
LOS		A							A		
Approach Delay		1.0							9.9		
Approach LOS									A		
Intersction Delay		3.3									

## HCS7 Two-Way Stop-Control Text Report

## TWO-WAY STOP CONTROL (TWSC) Analysis

File Name: PMPR.xtw  
 Analyst: BSM  
 Agency: KLOA, Inc.  
 Date Performed: 6/20/2019  
 Time Analyzed: PM Peak Hour  
 Jurisdiction: Naperville  
 Analysis Year: 2025  
 Project Description: 19-032  
 Units: U.S. Customary  
 Intersection Name: Westings with Access  
 Major Street Direction: East-West  
 East/West Street Name: Westings Avenue  
 North/South Street Name: Proposed Access Drive  
 Analysis Time Period (hrs): 0.25

## Vehicle Volumes and Adjustments

Major Street:								
Approach	EastBound				WestBound			
Movement	1U	1	2	3	4U	4	5	6
	U	L	T	R	U	L	T	R
Volume		49	132				46	26
Peak Hour Factor, PHF					0.95			
Hourly Flow Rtae, HFR		52	139				48	27
Percent Heavy Vehicles		0						
Number of Lanes	0	0	1	0	0	0	1	0
Lane Configuration		LT						TR
Median Type					Undivided			
Median Storage								
RT channelized?								
Left-Turn Lane Storage								
Upstream Signal?					Not Present			

Minor Street:								
Approach	NorthBound				SouthBound			
Movement		7	8	9		10	11	12
		L	T	R		L	T	R
Volume						38		10
Peak Hour Factor, PHF					0.95			
Hourly Flow Rtae, HFR						40		11
Percent Heavy Vehicles						0		0
Number of Lanes		0	0	0		0	1	0
Lane Configuration							LR	
RT channelized?								
Flared Approach   Storage						No		
Percent Grade							0	

## Pedestrian Volumes and Adjustments

Approach	EB		WB		NB		SB	
Movement	13		14		15		16	
Flow (ped/hr)	0		0				0	
Lane width (ft)								
walking Speed (ft/sec)								
Pedestrian Blockage Factor, f_pb								

## Delay, Queue Length, and Level of Service

Approach	EB		WB		NorthBound		SouthBound	
Movement	1U	1	4U	4	7	8	9	10
Lane Configuration		LT						11
								LR
Flow Rate		52						51
Lane Capacity		1536						717
v/c		0.03						0.07
95% Queue Length		0.1						0.2
Control Delay		7.4						10.4
LOS		A						B
Approach Delay		2.2						10.4
Approach LOS								B
Intersction Delay		3.0						

## Step 1: MOVEMENT PRIORITIES

Major Street:								
Approach	EastBound				WestBound			
Priority	1U	1	2	3	4U	4	5	6
Movement	U	L	T	R	U	L	T	R

Minor Street:

Approach	NorthBound				SouthBound		
Priority	7	8	9		10	11	12
Movement	L	T	R		L	T	R

## Step 2: MOVEMENT DEMAND VOLUMES AND FLOW RATES

Step 2: MOVEMENT DEMAND VOLUMES AND FLOW RATES									
Major Street: Approach Movement	1U U	EastBound 1 L	2 T	3 R		4U U	WestBound 4 L	5 T	6 R
Volume, V_x		49	132					46	26
Flow Rate, v_x		52	139					48	27

Minor Street:								
Approach	NorthBound				SouthBound			
Movement	7 L	8 T	9 R	 	10 L	11 T	12 R	
Volume, V_x					38			
Flow Rate, v_x					40			
					10			
					11			

### Step 3: CONFLICTING FLOW RATES.

Step 5: CONFLICTING FLOW RATES										
Major Street:			EastBound				WestBound			
Approach	1U		2		3		4U		5	
Movement	U	L	T	R			U	L	T	R
Flow Rate, v_x			52	139					48	27
Conflicting Flow, v_c,x			76							

Minor Street: Approach Movement	NorthBound 7 L	8 T	9 R	 	SouthBound 10 L	11 T	12 R
Flow Rate, v_x					40	11	
Conflicting Flow, v_c,x					304	62	

#### Step 4: CRITICAL HEADWAYS and FOLLOW-UP HEADWAYS

[illegible]

FOLLOW-UP Approach Movement	HEADWAYS									
	EB		WB		NorthBound			SouthBound		
	1U U	1 L	4U U	4 L	7 L	8 T	9 R	10 L	11 T	12 R
t_f,base		2.2						3.5		3.3
t_f,HV		0.9						0.9		0.9
P_HV		0.00						0.00		0.00
t_f		2.20						3.50		3.30

## Step 5: POTENTIAL CAPACITIES

Step 5: Potential Capacities										
NO UPSTREAM SIGNAL EFFECTS PRESENT Approach Movement	EB		WB		NorthBound			SouthBound		
	1U	1	4U	4	7	8	9	10	11	12
	U	L	U	L	L	T	R	L	T	R
V_c,x		76						304		62
t_c,x		4.10						6.40		6.20
t_f,x		2.20						3.50		3.30
C_p,x		1536						692		1008

## Steps 6 - 9: MOVEMENT CAPACITIES.

37. MOVEMENT CAPACITIES				
Pedestrian Impedance Approach	EB	WB	NB	SB

Movement	13	14	15	16
Pedestrian Flow Rate $v_x$	0	0		0
Lane Width, $w$				
walking Speed, $S_p$				
Pedestrian Blockage Factor, $f_{pb}$				
Major-Street Left-Turn Movements		1	4	
Conflicting Flow, $v_{c,x}$		76		
Potential Capacity, $c_{p,x}$		1536		
Pedestrian Impedance Factor, $p_{p,x}$		1.000		
Movement Capacity, $c_{m,x}$		1536		
Probability of Queue-free State, $p_{0,j}$		0.966		
Major L-Shared Probability Queue-free State, $p^*_{0,j}$		0.964		
Minor-Street Right-Turn Movements		9	12	
Conflicting Flow, $v_{c,x}$			62	
Potential Capacity, $c_{p,x}$			1008	
Pedestrian Impedance Factor, $p_{p,x}$			1.000	
Movement Capacity, $c_{m,x}$			1008	
Probability of Queue-free State, $p_{0,j}$			0.990	
Major-Street U-Turn Movements		1U	4U	
Conflicting Flow, $v_{c,x}$				
Potential Capacity, $c_{p,x}$				
Capacity Adjustment Factor, $f_x$				
Movement Capacity, $c_{m,x}$				
Shared L/U Capacity, $c_{SH}$				
Probability of Queue-free State, $p_{0,j}$				
Minor-Street Through Movements		8	11	
Conflicting Flow, $v_{c,x}$				
Potential Capacity, $c_{p,x}$				
Pedestrian Impedance Factor, $p_{p,x}$				
Capacity Adjustment Factor, $f_x$				
Movement Capacity, $c_{m,x}$				
Probability of Queue-free State, $p_{0,j}$				
Minor-Street Left-Turn Movements		7	10	
Conflicting Flow, $v_{c,x}$			304	
Potential Capacity, $c_{p,x}$			692	
Pedestrian Impedance Factor, $p_{p,x}$			1.000	
Major L, Minor T Adjusted Impedance Factor, $p''$				
Major L, Minor T Impedance Factor, $p'$				
Capacity Adjustment Factor, $f_x$			0.964	
Movement Capacity, $c_{m,x}$			667	
Step 10: FINAL CAPACITY ADJUSTMENTS				
SHARED-LANE CAPACITY OF MINOR STREET APPROACHES				
Approach	NorthBound			SouthBound
Movement	7	8	9	10 11 12
Lane Configuration				LR
Shared Flow Rate, $v_y$				51
Movement Capacity, $c_{m,x}$				667
Shared Capacity, $c_{SH}$				717
				1008
Step 11: CONTROL DELAY				
CONTROL DELAY TO RANK 2 THROUGH 4 MOVEMENTS				
Approach	EB			WB
Movement	1U	1	4U	4 7 8 9 10 11 12
Flow Rate		52		40
Movement Capacity		1536		667
Lane Configuration		LT		
Shared Capacity				LR
Control Delay		7.4		717
				10.4
CONTROL DELAY TO RANK 1 MOVEMENTS				
Approach			EB	WB
Movement			2	5
Number of Major Street Through Lanes, $N$			1	1
Proportion of Rank 1 vehicles not blocked, $p^*_{0,j}$			0.964	
Delay to Major Left-turning Vehicles, $d_{MLT}$			7.4	
Major Street Through Vehicles in Shared Lane, $v_{i1}$			139	
Major Street Turning Vehicles in Shared Lane, $v_{i2}$			52	
Saturation Flow Rate for Major Street Through, $s_{i1}$			1800	1800



Saturation Flow Rate for Major Street Right-Turn, s\_i21500

Delay to Rank 1 Vehicles, d\_Rank10.3

Steps 12 - 13: APPROACH/INTERSECTION CONTROL DELAY and 95% QUEUE LENGTHS											
Approach	EB		WB		NorthBound		SouthBound				
Movement	1U	1	4U	4	7	8	9	10	11	12	
Lane Configuration		LT							LR		
Flow Rate		52							51		
Lane Capacity		1536							717		
v/c		0.03							0.07		
95% Queue Length		0.1							0.2		
Control Delay		7.4							10.4		
LOS		A							B		
Approach Delay		2.2							10.4		
Approach LOS									B		
Intersction Delay		3.0									