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Transportation

Civil

Construction

Environmental

Water Resources

Structural

Appraisal

Technical Memorandum

Date: December 18, 2019

To: Mr. Andy Hynes, P.E., PTOE
Deputy City Engineer
City of Naperville

From: Steven A. Pautsch, P.E., PTOE
Anmol Shrivastava, P.E., PTOE
Civiltech Engineering, Inc.

Re: Intersection Traffic Analysis
119th Street and IL Route 59

Civiltech was retained by the City of Naperville to study the intersection of IL Route 59 and 119th Street. Analyses at this intersection and other nearby intersections were performed as part of a traffic impact study conducted by Gewalt Hamilton Associates (GHA) as part of the development review process for a new residential development known as the Polo Club, but a supplemental analysis was requested to examine operations on the westbound approach of 119th Street in more detail. Specific issues examined in this memorandum include:

1. Whether the left turn lane on the east leg of 119th Street should be lengthened to increase storage.
2. Whether this left turn lane should be extended east to South Wolf Drive.
3. A recommendation to facilitate left turns from northbound South Wolf Drive onto westbound 119th Street.

I. EXISTING AND PROPOSED INTERSECTION CONFIGURATION

Illinois Route 59 and 119th Street is a signalized intersection under the jurisdiction of the Illinois Department of Transportation. The IL Route 59 approaches consist of two through lanes and a left turn lane in both the northbound and southbound directions. The west leg of 119th Street has a single through, left, and right turn lane while only a left turn and shared through/right turn lane are present on the east leg. The left turn lane on the east approach provides 125 feet of storage and has a 150-foot taper.

As part of the Polo Club project, the developer is proposing to widen the north side of 119th Street to add a 125-foot westbound right turn lane. Additionally, the existing left turn lane is proposed to be lengthened via restriping to 185 feet of storage with a 140-foot taper. These left turn lane dimensions may have been chosen because this is the maximum left turn lane and taper length that can be provided without widening 119th Street beyond what is needed to provide a right turn lane.

II. QUEUE LENGTH REVIEW METHODOLOGY

A traffic impact study was prepared by Gewalt Hamilton Associates to review the traffic impacts the Polo Club, a proposed 480 unit residential development, would

have on the surrounding street network. In this report, intersections were analyzed using Synchro software. The traffic studies were reviewed by Civiltech with comments sent to the City of Naperville on June 27, 2019 and December 10, 2019. The Synchro files developed by GHA were obtained and used to perform a more detailed review of the traffic operations on the westbound 119th Street approach to IL Route 59.

Civiltech used three methods to evaluate queuing in the 119th Street westbound left turn lane at IL Route 59. These were:

- 95th Percentile Queue Length (Synchro) - This is defined as the queue length that only has a five percent probability of being exceeded during the analysis time period. In other words, if traffic were observed for 100 cycles, the 95th percentile queue would be experienced with the 95th busiest cycle. This is one of the most commonly used metrics to evaluate the potential length of turn lanes on signalized approaches. The 95th percentile queue length is calculated by Synchro using equations from the Highway Capacity Manual. These values were taken directly from GHA's Polo Club TIS (included in **Appendix A**).
- 95th Percentile Queue Length (SimTraffic) – Queue lengths in SimTraffic, which is a companion software module to Synchro, are developed by modeling the behavior of individual vehicles and simulating their positioning on the street network. Results can be different from those reported in Synchro, especially in congested conditions, because it accounts for interactions between intersections and blockages caused by queues that exceed the length of the turn bays. The 95th percentile queues were calculated by GHA for the 2028 build condition but not for the existing conditions, so Civiltech used SimTraffic to develop the 95th percentile queue length by averaging queue lengths from ten different model runs. The technical printouts from Civiltech's analysis are included in **Appendix B**.
- Red Time Queue Length – This is an equation for determining queues that is often used by IDOT when evaluating storage requirements for turn lanes at signalized intersections. Civiltech calculated this metric using traffic volumes and traffic signal timings shown in the Polo Club TIS. The red time calculations for the east leg of 119th Street are shown in **Appendix C**.

III. WESTBOUND 119TH STREET LEFT TURN LANE LENGTH

Using the methodologies explained above, queue lengths were calculated and are summarized below in **Table 1**.

Table 1 – Westbound Left Turn Length Queues (119th Street & IL Route 59)

Method	Existing		2028 Build	
	AM	PM	AM	PM
Synchro 95th Percentile Queue Length (ft)	130	90	133	150
SimTraffic 95th Percentile Queue Length (ft)	129	370	203	355
Red Time Queue Length (ft)	160	305	220	360

Given the increased development and background growth volumes, queues in the westbound left turn lane are generally projected to lengthen by about 60 feet. The proposed 185-foot left turn lane is sufficient to satisfy future stacking requirements when compared to the Synchro 95th percentile queue outputs but not with respect to the SimTraffic's 95th percentile or red time formula queue lengths, especially during the evening peak. SimTraffic animations were also reviewed with respect to the impact the left turn queue has on intersection operations. This simulation shows that, for the majority of the AM and PM peak signal cycles, left turn queues clear and do no back up to an extent where they block through traffic. The animation also shows that cars use the taper while waiting to turn left, illustrating that the effective storage need is longer than the length of the turn bay. Finally, SimTraffic shows that frequently during the PM peak period, lengthy through lane queues prevent entry to the left turn lane, and as a result, the storage is underutilized for many cycles.

Based on the queuing analysis and the SimTraffic review, it is our opinion that increasing the storage of the left turn lane to the AM Peak 2028 Build Red Time Queue Length of 220 feet would have minor benefits during the AM peak hour, as there may be a few cycles during the hour when queuing exceeds the proposed 185-foot length of the left turn lane by one or two vehicles. However, lengthening the left turn lane beyond this would not substantially improve operations on the westbound approach to IL Route 59 during the PM peak because the turn lane would still be blocked by the through queues during the busiest parts of the evening rush hour, preventing the storage from being fully utilized during many signal cycles.

IV. WESTBOUND DELAY ANALYSIS

In addition to reviewing queue lengths on westbound 119th Street at IL Route 59, Civiltech compared the existing and 2028 build condition Synchro output delay results for the westbound approach. These metrics were derived directly from the Polo Club TIS. The results of this analysis are summarized below in **Table 2**. Because Synchro is a macroscopic software, it does not take into account the storage capacity of turn bays (i.e., it only accounts for the presence of the turn bay, not the length of it), thus the revision from a 185-foot to 220-foot westbound left turn lane would not change the delays calculated from Synchro for the 2028 build condition.

Table 2 – 119th Street (East Leg) Traffic Operations at IL Route 59

Movement	Delay and Level of Service (sec/veh)			
	Existing		2028 Build	
	AM	PM	AM	PM
Left	50 (D)	51 (D)	91 (F)	62 (E)
Through	67 (E)	200 (F)	55 (D)	126 (F)
Right	N/A	N/A	53 (D)	46 (D)
Overall WB	61 (E)	154 (F)	65 (E)	98 (F)

This Synchro results above do show that with added traffic from the proposed development as well as that stemming from background growth, the provision of a westbound right turn lane reduces the delay experienced by drivers heading through the intersection by 12 seconds during the morning peak and by 74 seconds during the PM rush. The westbound approach delay increases slightly to 65 seconds from 61 seconds, remaining at Level of Service E during the morning rush hour. The proposed right turn lane has the most benefit during the evening peak period, where the overall westbound approach delay drops from 154 seconds to 98 seconds. Given the significant decrease in overall delays, Civiltech concurs that the provision of a westbound right turn lane is an appropriate improvement to accommodate the development traffic. While the delay for the westbound left turn lane does increase, the extension of the left turn as recommended above should help mitigate the longer queues that will result from the increased traffic volumes.

Civiltech also used the Synchro files to run a SimTraffic Arterial Level of Service report during the PM peak period using the 2028 Build volumes. Unlike Synchro, SimTraffic *does* consider effects associated with changing storage bay lengths. This report (contained in **Appendix D**) compares the westbound travel times between a 185-foot left turn lane and 220-foot left turn lane on the east leg of 119th Street at IL Route 59. The analysis showed that the westbound through travel time decreased by a negligible amount (about 0.1 second) with this increased storage. This confirms our observations of the SimTraffic simulation which indicate that further lengthening of the left turn lane would have minimal benefits since it would normally be blocked by a much longer through queue during the PM peak.

V. NORTHBOUND WOLF DRIVE LEFT TURNS

Heavy traffic volumes and westbound queues on 119th Street make turning left from Wolf Drive difficult, especially during the evening rush hour. Based on the low volumes on South Wolf Drive, changes to traffic control on Wolf Drive (e.g., installation of a traffic signal) are not warranted. Another way to improve the safety and operation of this left turn movement is to provide space within the middle of the roadway to allow northbound drivers to make two-stage left turns by waiting for gaps in eastbound traffic, crossing to the middle of the roadway, and then waiting for a gap in westbound traffic to complete their turn.

According to plans received by Civiltech, the developer is proposing a widened cross-section on 119th Street from Book Road to a point about 300 feet west of Wolf Drive. These plans can be revised to designate a center turn lane instead of a striped median from Wolf Drive to a point about 300 feet to the west, where the taper back to the existing cross-section begins (approximately between Sta. 66+75 and Sta. 69+60). This center lane would be delineated by a double yellow line (the outer one solid and the inner one broken) on each side adjacent to the through lanes. These pavement markings will provide a designated space within the middle of the roadway for westbound left-turning motorists to make two-stage left turns.

VI. EXTENSION OF LEFT TURN LANE TO WOLF DRIVE

Per the City's request, Civiltech evaluated the potential to extend the westbound left turn lane from IL Route 59 east to South Wolf Drive, a distance of approximately 2,100 feet. The intent of this request is to further improve traffic operations at 119th Street/Wolf Drive, which is blocked by westbound queues that extend well east of South Wolf Drive. In general terms, there are undoubtedly safety and capacity benefits to widening two-lane roadways with a number of intersecting driveways or cross streets to three lanes to provide left turn lanes. However, it is our opinion that a continuous three lane cross-section on 119th between South Wolf Drive and IL Route 59 could be problematic. First, given the extent of westbound delays, it is likely that aggressive drivers would attempt to bypass the queue and use the center lane as a through lane, traveling long distances prior to making left turns or merging with the through queue. This could lead to safety issues as well as additional driver frustration. Secondly, this left turn lane would be problematic if and when the parcel on the northeast quadrant of IL Route 59 and 119th Street develops. It would preclude the ability to provide an eastbound left turn lane into a future development. Therefore, it is not recommended to provide a continuous left turn lane between IL Route 59 and South Wolf Drive as part of the Polo Club redevelopment.

VII. CONCLUSION

The findings of this study can be summarized as follows:

- The proposed 185-foot westbound left turn lane at IL Route 59 will be long enough to handle traffic demands during most hours of the day but should be extended to provide 220 feet of storage to accommodate queuing during the AM peak. While there may be marginal benefits obtained during the PM rush by lengthening it further, the left turn lane will continue to be blocked by through queues during the evening peak hour which would prevent it from being fully utilized during many signal cycles and would not decrease westbound delay significantly. Therefore, any further expansion of this turn lane should be considered in conjunction with a major intersection capacity improvement project.
- Installation of a westbound right turn lane on 119th Street at IL Route 59 should significantly reduce delays on westbound 119th Street and is an appropriate mitigation measure to handle the Polo Club development traffic.
- The developer's plans are recommended to be modified to include a 300-foot center turn lane to the west of South Wolf Drive.

- A continuous left turn lane is not recommended on 119th between IL Route 59 and South Wolf Drive as this would likely induce aggressive drivers to bypass the westbound back-ups and use it as a second through lane, which could lead to safety issues. The left turn lane would also complicate access to a future development on the northeast quadrant of the IL Route 59 intersection.

APPENDIX A
Gewalt Hamilton Traffic Study

Traffic Impact Study

Naperville Polo Club

Naperville, Illinois

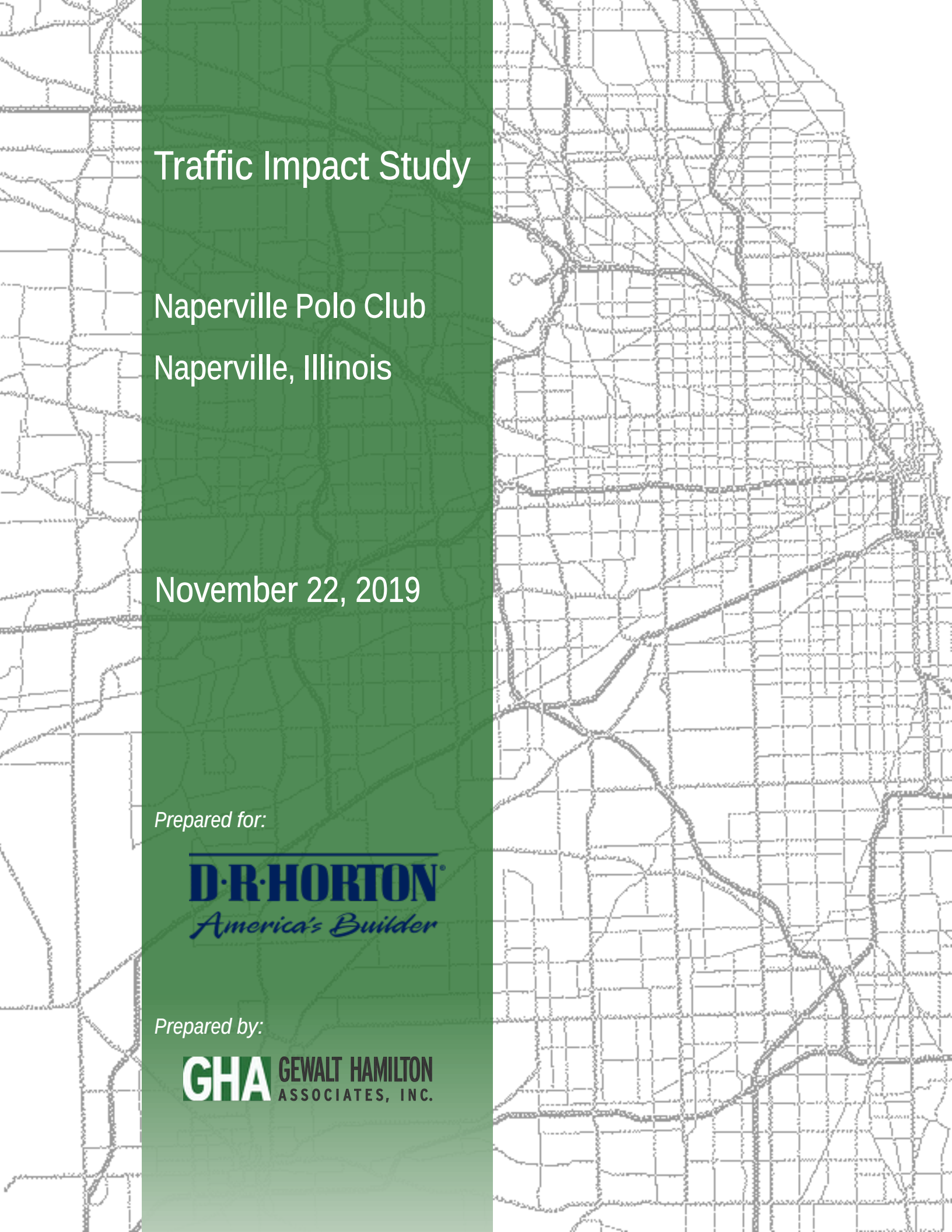
November 22, 2019

Prepared for:

D·R·HORTON
America's Builder

Prepared by:

GHA GEWALT HAMILTON ASSOCIATES, INC.



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Traffic Impact Study

To: **Danielle Dash and Bruce Mellen**
DR Horton, Inc.

From: Bill Grieve, P.E., PTOE
Senior Transportation Engineer

Justin Opitz, AICP
Transportation Planner

Date: November 22, 2019

Subject: ***Naperville Polo Club***

Part I. Project Context and Summary Statement

Gewalt Hamilton Associates, Inc. (GHA) has conducted a Traffic Impact Study (TIS) for the proposed Naperville Polo Club residential development located along the north side of 119th Street at Book Road. The 110-acre site is currently used for recreation, such as youth and adult soccer.

As proposed, the residential development will include age-targeted and non-age targeted single-family homes and townhomes, totaling 480 dwellings. The following provides a summary of existing conditions, site traffic characteristics, and the analyses conducted of the development's impact on the surrounding roadway network. *Exhibits* and *Appendices* referenced are located at the end of this document.

Briefly summarizing, we believe that traffic generated by the Polo Club can be integrated into the area roadway system. Reasons include:

- The Polo Club site has excellent road system accessibility via IL 59, 119th Street, Book Road and Plainfield-Naperville Road.
- Although roughly one-third of the development will be age targeted, the available trip generation discounts were not taken in the analyses, to ensure that the maximum site impacts were tested.
- The proposed addition of a westbound right turn lane on 119th Street at IL 59, and restriping the existing westbound left turn lane to provide additional stacking, will significantly improve traffic operations, especially during the evening peak period when westbound traffic on 119th Street currently has a very long queue.
- Multi-use paths and sidewalks along 119th Street and Book Road, as well as sidewalks throughout the development will be provided to promote pedestrian mobility and help to reduce vehicular travel.

Part II. Background Information

Site Location Map, Existing Traffic Operations, and Roadway Inventory

Exhibit 1 provides a site location map, *Exhibit 2* illustrates the existing roadway traffic operations, and *Appendix A* provides a photo inventory of the site vicinity. Pertinent comments regarding land-uses in the site vicinity and transportation components, both vehicular and non-auto mobility include:

Land Uses

- The South Pointe and High Meadow residential subdivisions lie to the north of the site. Hawkweed Drive in South Pointe is planned by the City to connect to the Polo Club development.
- A residential neighborhood, Wolf Creek, lies to the south along Wolf Drive.
- Commercial uses are located in the northwest and southwest corners of the IL 59 / 119th Street intersection. Businesses are located along Aero Drive and Spaulding School Drive, east of IL 59.
- Plainfield East High School is located in the southeast corner of the 119th Street / Plainfield-Naperville Road intersection.
- Plainfield North High School is located in the southeast corner of the 119th Street / 248th Avenue intersection, about one mile west of IL 59.

Roadway System

119th Street

- 119th Street is currently under the jurisdiction of the Wheatland Township Road Commissioner. It provides one travel lane in each direction. 119th Street changes name to Rodeo Drive east of Plainfield-Naperville Road.
- 119th Street is classified as a "Minor Arterial" on the Illinois Department of Transportation (IDOT) Functional Classification Map east of IL 59 and as "Major Collector" west of IL 59. 119th Street is also designated as a Strategic Regional Arterial (SRA) route.
- At its signalized intersection with IL 59, a separate westbound left turn lane is provided, as are separate eastbound left and right turn lanes.
- At its signalized intersection with Plainfield-Naperville Road, 119th Street widens to provide two through travel lanes in each direction and separate left turn lanes.
- In the westbound direction, the posted speed limit is 45 miles per hour (mph) east of the DuPage River and then increases to 50-mph in the site vicinity until approximately 500 feet east of an existing parking lot access drive, where it becomes 35-mph. In the eastbound direction, the posted speed limit is 35-mph just east of IL 59 and in the site vicinity until approximately 2,000 feet west of Book Road where it becomes 50-mph. The speed limit returns to 45-mph once east of the DuPage River.

IL 59

- IL 59 is under the jurisdiction of IDOT and is designated as a SRA route. It is classified as an "Other Principal Arterial" on the IDOT Functional Classification Map.
- IL 59 has two through travel lanes in each direction. Separate left turn lanes are also provided at its signalized intersection with 119th Street, as well as its unsignalized intersection with Champion Road / Champion Drive
- IL 59 has been designed to provide dual left turn lanes on both approaches at its signalized intersection with 119th Street. However, because 119th Street currently has only one receiving lane, only one turn lane is marked.
- The posted speed limit on IL 59 is 45-mph.

Wolf Drive

- Wolf Drive is a local street that has its northern terminus at 119th Street and has no outlet at its south end.
- It has one travel lane in each direction and has Stop control at 119th Street.

Book Road

- Book Road is classified as a "Minor Arterial" on the City of Naperville Master Thoroughfare Plan. It intersects 119th Street at the east end of the site and dead ends north of 119th Street.
- Book Road is classified as a "Major Collector" on the IDOT Functional Classification Map.
- One unstriped travel lane is provided in each direction. The Book Road approaches at 119th Street have Stop control.
- Book Road continues north of 111th Street from their signalized intersection and has a three-lane pavement section. It is classified as a "Major Collector" on the IDOT Functional Classification Map.
- The posted speed limit is 40-mph north of 111th Street.

Plainfield-Naperville Road

- Plainfield-Naperville Road is a north-south route that is under Will County Division of Transportation (WCDOT) jurisdiction and is designated as Highway Route 14.
- Plainfield-Naperville Road is classified as a "Major Collector" on the IDOT Functional Classification Map.
- One travel lane is generally provided but widens at its signalized intersection with 119th Street to provide two through travel lanes and a separate left turn lane in each direction.
- Plainfield-Naperville Road has a posted speed limit of 45-mph.

Planned Roadway System Changes

- As part of the Polo Club proposed Improvements, Book Road is to be relocated about 380 feet to the west in an established 100-foot right-of-way (ROW) in the City of Naperville. The City will make the determination when new Book Road will be extended north to 111th Street through a separate project outside of the purview of this development.
- The IL 59 intersection with Champion Road, located about ½ mile north of 119th Street and ½ mile south of 111th Street is planned for traffic signal control. This project is both scheduled and funded on the current IDOT multi-year plan and is not part of this development.

Non-Auto Mobility

- There is no Pace bus service in the site vicinity. The closest Pace stop is for Route 559 at the IL 59 / 111th Street intersection.
- There are no sidewalks along 119th Street.
- Sidewalks are provided on both sides of the neighborhood streets in the South Pointe subdivision.
- The IL 59 Metra commuter station is about 9 miles away to the north.
- The Riverview Farm Forest Preserve is along the west bank of the DuPage River. The Forest Preserve District also controls the property on the south side of 119th Street along the DuPage River.

Existing and Year 2028 "No-Build" Traffic

Existing Traffic

GHA conducted weekday morning and evening peak period traffic counts on Thursday, September 19, 2019. Our miovision cameras were used and provide both summary data tables as well as video backup for viewing operations.

Exhibit 3 summarizes the peak hour traffic volumes, as well as the Annual Average Daily Traffic (AADT) 24-hour volumes that were obtained from the IDOT website. Summaries of the existing peak period traffic counts can be found in *Appendix B*. No unusual activities (e.g. roadway construction, inclement weather, or excessive emergency vehicle activity) were observed during our counts that would be expected to impact traffic volumes or travel patterns in the site vicinity.

Discussion Points.

1. To provide a conservative case scenario, the individual peak hours were used for each intersection. Additionally, the highest approach volumes were used to balance between the intersections.
2. The traffic volumes on 119th Street do not balance between IL 59 and Wolf Drive, as there are various street and access intersections between them.

Pertinent observations made from reviewing the miovision traffic counts and during site visits include:

- Traffic on IL 59 experiences strong directional splits. During the morning peak hour, there is over twice as much traffic traveling northbound on IL 59. During the evening peak hour, about 35% more traffic travels southbound.
- Traffic on 119th Street also experiences a strong directional split. During the morning peak hour, there is almost three times the traffic traveling eastbound on 119th Street. During the evening peak hour, about 25% more traffic travels westbound.
- As an SRA route, IL 59 is provided the vast majority of traffic signal "green time". Even so, through traffic on IL 59 backs up frequently northbound during the morning peak hour and southbound during the evening peak hour.
- Very long queues are experienced on 119th Street and in particular westbound in the evening peak hour. It is not uncommon to have a westbound queue that extends ½ mile past Wolf Drive.
- Traffic traveling through the 119th Street intersection with Plainfield-Naperville Road during both peak hours did not experience excessive delays or queues.

"No-Build" Traffic

Typical industry practice suggests that other area development growth be considered to project volumes to test for an analysis horizon that is "build-out + 5-years". The Chicago Metropolitan Agency for Planning (CMAP) was contacted for their Year 2050 traffic projections, which are provided in *Appendix C*. Build-out is expected to be completed in 2023. Thus, the future analysis horizon becomes the Year 2028. *Exhibit 4* illustrates the Year 2028 No-Build traffic assignment, which considers the following total growth on the area roads over existing (year 2019) conditions:

- IL 59 = 3%
- 119th Street = 11% west of IL 59, 12% between IL 59 and Plainfield-Naperville Road, and 9% east of Plainfield-Naperville Road
- Book Road south of 119th Street = 22%
- Plainfield-Naperville Road = 10% north of 119th Street and 11% south of 119th Street

Part III. Project Traffic Characteristics

Site Plan

Attached as *Exhibit 5* is the site plan for the Polo Club prepared by Gary R. Weber Associates, Inc. (GRWA) dated October 18, 2019. As proposed, the development consists of constructing 480 residential units:

- 112 "Freedom" single family homes that are age targeted.
- 57 "Freedom" ranch townhomes that are age targeted.
- 43 traditional single-family homes.
- 268 "Seaboard" 3-story townhomes.

The Polo Club access system will include:

- A street intersection (Hawkweed Drive) for the homes and townhomes on relocated Book Road.
- A street intersection (Polo Club Drive) on 119th Street for the homes and townhomes.
- A right-in/right-out intersection on 119th Street for the homes and townhomes.
- A street connection to the north at Hawkweed Drive, south of Rosinweed Lane, in the South Pointe subdivision.

Trip Generations and Trip Distribution

Polo Club Trip Generations
Exhibit 6A – tabulates the traffic generation calculations for the proposed development. Traffic generations are based on historically observed trip rate data published by the Institute of Transportation Engineers (ITE) in the most recent, 10th Edition of the manual *Trip Generation*. The pertinent trip generation pages for the various residential land uses are included as *Appendix D*.

Trip Generation Comparisons
Even though more than one-third of the dwellings will be "age-targeted", the standard higher generation rates for single and multi-family dwellings were used. The actual traffic generations for the age-targeted residences may be 45-55% lower, as calculated and shown on *Exhibits 6A and 6B*. This will help ensure that the maximum potential site traffic impacts are tested.

Trip Distribution
Exhibit 7 presents the anticipated trip distribution, which is primarily based on the expected vehicle patterns, the street system characteristics, as well as the proposed access system. Our estimated trip distribution reflects the congestion along IL 59.

Site and Year 2028 Total Traffic Assignments

Exhibit 7 illustrates the Site Traffic assignment during the weekday morning and weekday evening peak hours, which are based on the trip generation calculations summarized in *Exhibit 6A* and the trip distribution shown on *Exhibit 7*. Also shown on *Exhibit 7* are the approximate distances of the access intersections along 119th Street from IL 59 to Plainfield-Naperville Road.

Site traffic (see *Exhibit 7*) and the Year 2028 No-Build volumes (see *Exhibit 4*) were combined to produce the Year 2028 Total Traffic assignment, which is presented on *Exhibit 8*.

Part IV. Traffic Evaluation and Recommendations

Intersection Capacity and Queue Analyses

Highway Capacity Manual / Synchro Traffic Model

Capacity analyses are a standard measurement in the transportation industry that identifies how an intersection operates. *Exhibit 9 – Part A* lists the analysis parameters, as published in the Transportation Research Board's (TRB) Highway Capacity Manual – 6th Edition, 2016 (HCM). They are measured in terms of level of service (LOS). LOS A is the best rating, with LOS F being the worst. LOS C is considered appropriate for "design" purposes and LOS D is usually considered as providing the lower threshold of "acceptable" operations. LOS E and F are usually considered unacceptable.

The capacity analyses were modeled using the Synchro v10 software. Synchro is a traffic model that provides a visual representation of traffic flow. *Exhibit 9 - Part B* summarizes the intersection capacity and queue analysis results. The capacity analysis summary printouts are provided in *Appendix E*. It should be noted that when over saturated conditions exist, Synchro software often does not effectively represent real-time delays and queues.

> *Key Finding*. All intersections tested other than 119th Street at IL 59 will operate at or better than the "design" LOS C for the Year 2028 Total Traffic planning horizon that includes full build-out of the Polo Club development.

SimTraffic Model

SimTraffic is a dynamic modeling program that works with a Synchro model of a roadway network. It animates the roadway and models the interactions between each individual vehicle on the roadway. This animated model is better at displaying the full extent of traffic backups and delays at intersections such as IL 59 at 119th Street, as it considers traffic spillback between intersections and beyond turning bays, unbalanced lane use, and other subtle traffic flow interactions. This can lead to potential discrepancies between the Synchro and SimTraffic modeling results.

As this is a model that iteratively generates traffic on the roadway network, each simulation "run" can give slightly different values for delays and queue lengths. To account for outliers, these final numbers, as reported in *Exhibits 10A and 10B*, are an average of 10 SimTraffic runs. While the HCM / Synchro queue lengths and delay times are a useful tool for comparing relative changes among different conditions, the values from the SimTraffic module, when "running" are more representative of how actual vehicles will behave on the roadway.

IL 59 @119th Street

Traffic Signal Timings

Adjusting the signal timings improves operations at the IL 59 / 119th Street intersection. The potential changes, which should be coordinated with IDOT, include:

- In the morning peak hour, 3 seconds was taken away from the westbound left turn phase and added to the eastbound through phase.
- In the evening peak hour, 2 seconds was taken from the eastbound through phase and given to the westbound left turn phase. And, 3 seconds was taken from the eastbound left turn phase and given to the westbound through phase.

- In the evening peak hour, 3 seconds was taken from the northbound through phase and given to the southbound left turn phase.

Key Finding. At the 119th Street / IL 59 intersection, the adjustments in traffic signal timings will result in the Year 2028 total traffic volumes, which includes full build-out of the Polo Club, having similar delays than that of the Year 2028 "No-Build" analysis.

Westbound Right Turn Lane

A westbound right turn lane on 119th Street at IL 59 is proposed to be constructed with the Polo Club development. Pertinent comments on operations from *10A and 10B* include:

- In the morning peak hour (see *Exhibit 10A*), the westbound queue on 119th Street shortens from 336 feet to 252 feet or from 14 cars to 10 cars (assumes 25 feet per vehicle). Furthermore, the average delay for westbound vehicles on 119th Street drops from 56 seconds to 50 seconds.
- In the evening peak hour (see *Exhibit 10B*), the westbound queue on 119th Street shortens in more than half, from 4032 feet to 1902 feet or from 161 cars to 76 cars (assumes 25 feet per vehicle). Additionally, the average delay for westbound vehicles on 119th Street drops significantly from 14.5 minutes to 3.1 minutes.

Key Finding. As can be seen from *Exhibits 10A and 10B*, the addition of a westbound right turn lane on 119th Street at IL 59 and restriping the existing westbound left turn lane to provide more stacking, would significantly improve traffic operations.

Roadway and Site Access Operations

Exhibit 11 illustrates the Recommended Traffic Operations Plan. Its components include:

119th Street

- The preliminary plan prepared by GRWA indicates that 119th Street (see *Exhibit 12*) will be widened along the site frontage to provide a 3-lane pavement section within a 90-100 foot right-of-way (ROW). The pavement section will be designed so as to be readily expanded to provide the anticipated ultimate 5-lane pavement section.
- The posted speed limit on 119th Street along the site frontage may initially be 45-mph. As the Polo Club development becomes built-out, a speed study should be conducted along 119th Street to determine if the posted limit can be reduced.
- A 10-foot wide shared use path will be constructed on the north side of 119th Street.

119th Street @ Plainfield-Naperville Road

- No intersection improvements are proposed, nor are any required to accommodate Polo Club traffic.

Relocated Book Road

- Book Road (relocated) will be constructed as a 2-lane pavement section along the site within a 100-foot ROW and will terminate at Hawkweed Drive.
- A separate left turn lane will be provided southbound at 119th Street.
- The posted speed limit on Book Road north of 111th Street is 40-mph but may be lowered to 30-mph along the site until it is extended further north.

- A shared use path will be constructed in the old Book Road ROW north of 119th Street to connect the Riverview Farm Forest Preserve.
- A sidewalk will be provided on the west side of new Book Road.

119th Street @ Book Road (Existing)

- No intersection improvements are proposed, nor are any required to accommodate Polo Club traffic.

119th Street @ Book Road (Relocated)

- A separate eastbound left turn lane is to be provided. Per the IDOT Bureau of Design and Environment (BDE) Manual for a posted speed limit of 45-mph, 215 feet of storage and 220 feet of taper should be provided.
- Two southbound lanes, striped for separate left and right turns, are to be provided.
- Book Road should have Stop control.
- Traffic should be monitored over time to determine if or when traffic signals may be warranted.

Book Road @ Hawkweed Drive

- Based on the site traffic assignment (see *Exhibit 7*), one eastbound lane should be adequate.
- The site access may have a landscape median separating the inbound and outbound lanes.
- Exiting site traffic should have Stop control.
- Signage indicating that "Road Ends" should be posted so that motorists don't unexpectedly travel north of Hawkweed Drive on Book Road.

119th Street @ Polo Club Drive

- A separate eastbound left turn lane will be provided. Per the IDOT BDE Manual for a posted speed limit of 45-mph, 215 feet of storage and 220 feet of taper should be provided.
- Two southbound lanes will be provided and striped for separate left and right turns.
- A landscaped median may separate the inbound and outbound lanes.
- Southbound Polo Club Drive traffic should have Stop control at 119th Street.

Polo Club Drive @ Hawkweed Drive

- One travel lane should be provided on all intersection approaches.
- All-way Stop control should be considered at this on-site intersection.
- Other Polo Club streets, driveways, and parking lots should have Stop control at Polo Club Drive and Hawkweed Drive.

119th Street @ Wolf Drive

- A separate westbound left turn lane is to be provided to promote operational safety for Wolf Creek residents. Per the IDOT BDE Manual for a posted speed limit of 45-mph, 215 feet of storage and 220 feet of taper should be provided.

119th Street @ IL 59

- A separate westbound right turn lane should be provided.
- A 125-foot long westbound right turn lane with a 155-foot long taper was used in the Synchro/SimTraffic model.
- The existing westbound left-turn lane striping will be changed to provide 185-foot storage and 140-foot taper. These dimensions were also used in the Synchro/SimTraffic model.

- With the construction of the westbound right turn lane, the traffic signal should be modified to provide for a right turn "overlap" when the lead left turn phase on IL 59 is operating.
- The actual westbound right turn lane dimensions and the changes in traffic signal phasing should be coordinated with IDOT during the preparation of an Intersection Design Study (IDS).

IL 59 @ Champion Road / Drive

- A traffic signal is to be installed by a separate project. It has been approved by IDOT and is funded.

Part V. Technical Addendum

The following *Exhibits* and *Appendices* were previously referenced. They provide technical support for our observations, findings and recommendations discussed in the text.

Exhibits

1. Site Location Map
2. Existing Traffic Operations
3. Existing Traffic
4. No-Build Traffic – Year 2028
5. Site Plan

6A. Trip Generation Calculations
6B. Trip Generation Comparisons

7. Trip Distribution and Site Traffic
8. Total Traffic – Year 2028
9. Intersection Capacity and Queue Analyses

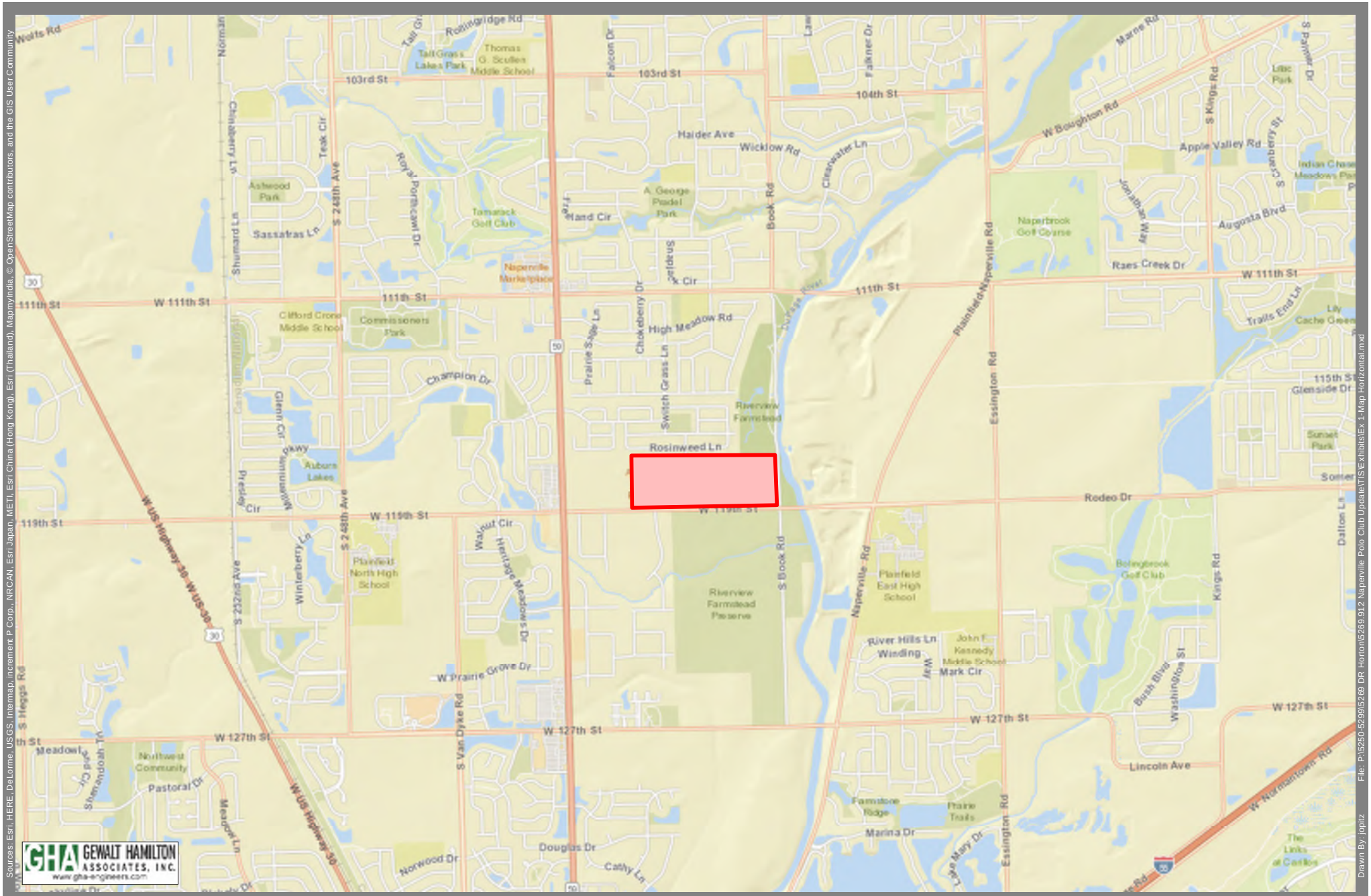
10A. Queuing Comparison Diagram – AM Peak
10B. Queuing Comparison Diagram – PM Peak

11. Recommended Traffic Operations Plan
12. 119th Street Improvements

Appendices

A. Photo Inventory
B. Existing Traffic Count Summaries
C. CMAP Correspondence
D. ITE Trip Generation Manual - 10th Edition Land Use Excerpts
E. Capacity Analyses Printouts

EXHIBITS



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N

1 inch = 4,200 Feet

Exhibit 1 - Location Map

Polo Club - Naperville, IL

Map Center: -88.19314 41.67010

Date: 1/2/2019 Project:

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N

Not to Scale

Exhibit 2
Existing Traffic Operations

Legend:

- XX – AM Peak Hour
  - 119th St at IL 59 (7:00–8:00 AM)
  - 119th St at Wolf Dr (7:00–8:00 AM)
  - 119th St at Book Rd (7:00–8:00 AM)
  - 119th St at Plainfield–Naperville Rd (6:45–7:45 AM)
- (XX) – PM Peak Hour
  - 119th St at IL 59 (4:45–5:45 PM)
  - 119th St at Wolf Dr (4:00–5:00 PM)
  - 119th St at Book Rd (4:15–5:15 PM)
  - 119th St at Plainfield–Naperville Rd (4:15–5:15 PM)
- XX – Annual Average Daily Traffic (AADT)
- – Existing Traffic Signal
- – Existing Stop Sign

N

Not to Scale

Hawkweed Dr

Site

Plainfield-Naperville Rd

10,350

32,400

119th St

44 (211)
688 (1455)
67 (82)

71 (66)
120 (361)
88 (188)

276 (497)
2 (9)

0 (2)
0 (1)
0 (1)

0 (0)
275 (502)
1 (59)

98 (199)
173 (449)
48 (39)

78 (76)
144 (330)
85 (64)

9,200

9,750

(195) 294
(187) 383
(114) 83

(181) 77
(1029) 1358
(99) 203

(402) 580
(29) 5

8,450

(14) 15
(5) 10

(2) 1
(403) 589
(2) 0

(2) 3
(0) 0
(1) 30

(107) 267
(242) 327
(56) 25

(32) 34
(339) 546
(36) 113

29,800

325

8,800

IL 59

Wolf Dr

Book Rd

DuPage River

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Exhibit 3
Existing Traffic

Sources: 1) GHA September 19, 2019 2) IDOT 2016/2017 AADT

Legend:

XX – AM Peak Hour
(XX) – PM Peak Hour
– Existing Traffic Signal
– Existing Stop Sign

N
Not to Scale

Hawkweed Dr

Site

Plainfield-Naperville Rd

119th St

45 (218)
711 (1504)
69 (85)

73 (68)
135 (405)
91 (195)

310 (558)
2 (9)

(2) 0
(1) 0
(1) 0

0 (0)
308 (563)
1 (66)

110 (224)
190 (493)
53 (43)

85 (83)
160 (368)
92 (70)

(202) 304
(208) 426
(118) 86

(188) 80
(1068) 1410
(103) 211

(451) 651
(29) 5

(14) 15
(5) 10

(2) 1
(452) 660
(2) 0

(2) 4
(0) 0
(1) 37

(120) 300
(271) 369
(63) 28

(37) 39
(377) 607
(40) 126

IL 59

Wolf Dr

Book Rd

DuPage River

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Exhibit 4
Year 2028 No-Build Traffic

SITE DATA

LAND USE	UNITS	ACRES
AGE-TARGETED SINGLE FAMILY	112	28.3 AC.
AGE-TARGETED RANCH TOWNHOMES	57	11.2 AC.
TRADITIONAL SINGLE FAMILY	43	15.3 AC.
TRADITIONAL TOWNHOMES	268	22.3 AC.
CLUB/H.O.A. PARK/DETENTION	-	20.8 AC.
DEDICATED PARKS	-	3.0 AC.
FOREST PRESERVE CONVEYED LAND	-	1.0 AC.
POLO CLUB DRIVE ENTRY ROW	-	1.1 AC.
BOOK ROAD ROW	-	3.4 AC.
119TH STREET 1/2 ROW	-	4.2 AC.
TOTAL	480	110.6 AC.

ILLUSTRATIVE SITE PLAN (Exhibit 5)

POLO CLUB
NAPERVILLE, IL

10/29/2019

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L:\Projects\DR1705\Acad\DR1705_LO7_01SP.dwg

Exhibit 6A
Trip Generation Calculations
Polo Club Subdivision - Naperville, IL.

			Weekday Peak Hours						
		ITE	Morning			Evening			Daily
	Size	Code	In	Out	Sum	In	Out	Sum	Sum
Step 1. Calculate Age Targeted Trips									
Option A. Senior Adult Housing - Trip Discount									
Age Targeted									
Single Family	112 Dwellings	#251	15	30	45	32	20	52	622
Townhomes - Ranch	57 Dwellings	#252	4	7	11	9	7	16	204
		Subtotals =	19	37	56	41	27	68	826
Compare To:									
Option B. Senior Adult Housing - No Trip Discount									
Age Targeted									
Single Family	112 Dwellings	#210	21	63	84	71	42	113	1154
Townhomes - Ranch	57 Dwellings	#220	6	22	28	23	13	36	390
		Subtotals =	27	85	112	94	55	149	1544

Discussion: Don't use available ITE trip discounts (Option 1) to help ensure that the maximum Polo Club traffic imapcts are tested.

Step 2. Calculate Non-Age Targeted Trips									
Non-Age Targeted									
Single Family	43 Dwellings	#210	9	26	35	28	17	45	478
Townhomes - 3 Story	268 Dwellings	#221	23	67	90	69	45	114	1,460
		Subtotals =	32	93	125	97	62	159	1938
Step 3. Combine Age-Targeted and Non-Age Targeted Trips									
Totals =	**480 Dwellings**		**59**	**178**	**237**	**191**	**117**	**308**	**3,482**

Source:

1) Source: Institute of Transportation Engineers (ITE) Trip Generation Manual (10th Edition).

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Exhibit 6B

Trip Generation Comparisons

Polo Club Subdivision - Naperville, IL.

Test 1. Age Targeted Versus Non-Age Targeted

Option A. Senior Adult Housing - Trip Discount

	Weekday Peak Hours		
	Morning	Evening	Daily
Size	Sum	Sum	Sum
Totals = 169 Dwelling Units	**56**	**68**	**826**

Option B. Senior Adult Housing - No Trip Discount

	Weekday Peak Hours		
	Morning	Evening	Daily
Size	Sum	Sum	Sum
Totals = 169 Dwelling Units	**112**	**149**	**1,544**
Increments (Option A. - Option B.)	***-56***	***-81***	***-718***
(% Decrease)	*-50%*	*-54%*	*-47%*

Notes:

1) Source: Institute of Transportation Engineers (ITE) Trip Generation Manual (10th Edition).

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Legend:

- XX – AM Peak Hour
- (XX) – PM Peak Hour
- – Existing Traffic Signal
- – Existing Stop Sign
- – Proposed Stop Sign
- XX% – Trip Distribution
- xx' – Access Distance

N

Not to Scale

Hawkweed Dr

The Polo Club

Polo Club Dr

New Book Rd

Plainfield-Naperville Rd

119th St

IL 59

Wolf Dr

Book Rd

DuPage River

10%

15%

20%

Negligible

5%

1830'

410'

840'

1680'

360'

2300'

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Exhibit 7
Trip Distribution and Site Traffic

Legend:

XX – AM Peak Hour
(XX) – PM Peak Hour
– Existing Traffic Signal
– Existing Stop Sign
– Proposed Stop Sign

N

Not to Scale

Hawkweed Dr

The Polo Club

Polo Club Dr

New Book Rd

Plainfield-Naperville Rd

119th St

IL 59

Wolf Dr

Book Rd

DuPage River

6 (19)
17 (11)
(44) 63
18 (62)
45 (218)
711 (1504)
78 (114)
100 (86)
153 (417)
118 (213)
27 (18)
9 (28)
370 (600)
364 (614)
2 (9)
27 (16)
44 (28)
9 (28)
339 (607)
18 (14)
45 (30)
11 (39)
330 (621)
335 (649)
1 (66)
122 (262)
190 (493)
53 (43)
85 (83)
169 (397)
92 (70)
(202) 304
(227) 432
(118) 86
(188) 80
(1068) 1410
(132) 220
(527) 674
(29) 5
(14) 15
(5) 10
(54) 17
(478) 667
(23) 7
(483) 704
(505) 740
(8) 9
(11) 6
(1) 37
(142) 335
(289) 396
(75) 46
(56) 45
(377) 607
(40) 126

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Exhibit 8
Year 2028 Total Traffic

Exhibit 9
Intersection Capacity and Queue Analyses
Polo Club - Naperville, Illinois

Part A. Parameters - Type of Traffic Control *(Source: Highway Capacity Manual 6th Edition)*

I. Traffic Signals

LOS	Delay (sec / veh)	Description
A	<10	All signal phases clear waiting vehicles without delay
B	>10 and < 20	Minimal delay experienced on select signal phases
C	>20 and < 35	Some delay experienced on several phases; often used as design criteria
D	>35 and < 55	Usually considered as the acceptable delay standard
E	>55 and < 80	Very long delays experienced during the peak hours
F	>80	Unacceptable delays experienced throughout the peak hours

II. Stop Sign

LOS	Delay (sec / veh)
A	< 10
B	>10 and < 15
C	>15 and < 25
D	>25 and < 35
E	>35 and < 50
F	>50

Part B. Results

	Roadway Conditions	LOS Per Movement By Approach (> = Shared Lane, - = Non Critical or not Allowed Movement)												Intersection / Approach	
		Eastbound			Westbound			Northbound			Southbound			Delay	
		LT	TH	RT	LT	TH	RT	LT	TH	RT	LT	TH	RT	(sec / veh)	LOS
1. IL 59 & 119th St	**Signalized**	Eastbound			Westbound			Northbound			Southbound			**Intersection Delay**	
A. Weekday Morning Peak Hour															
Existing Traffic (See Exhibit 3)	• Current	E	F	D	D	E	<	F	D	<	F	C	<	52.0	D
	• 95th Queue Length (ft)	448	618	118	130	308	-	163	980	-	140	333	-	-	-
	• Delay (sec/veh)	77	84	44	50	67	-	88	50	-	88	23	-	-	-
2028 No-Build (See Exhibit 4)	• Current	F	F	D	D	E	<	F	E	<	F	C	<	61.1	E
	• 95th Queue Length (ft)	280	765	123	138	340	-	170	1105	-	145	348	-	-	-
	• Delay (sec/veh)	93	110	44	52	71	-	90	60	-	89	24	-	-	-
2028 Total Traffic (See Exhibit 8)	• As Planned	E	F	D	F	D	D	F	E	<	F	C	<	61.5	E
-WB RT Lane & Adjusted Timings	• 95th Queue Length (ft)	153	678	118	133	233	158	170	1220	-	170	358	-	-	-
-WB RT Lane & Adjusted Timings	• Delay (sec/veh)	57	81	41	91	55	53	90	76	-	94	26	-	-	-
B. Weekday Evening Peak Hour															
Existing Traffic (See Exhibit 3)	• Current	F	D	D	D	F	<	F	C	<	F	F	<	86.6	F
	• 95th Queue Length (ft)	393	265	175	90	1010	-	390	548	-	173	1428	-	-	-
	• Delay (sec/veh)	130	52	49	51	200	-	126	29	-	90	104	-	-	-
2028 No-Build (See Exhibit 4)	• Current	F	D	D	E	F	<	F	C	<	F	F	<	100.5	F
	• 95th Queue Length (ft)	420	295	180	125	1245	-	415	580	-	180	1575	-	-	-
	• Delay (sec/veh)	142	54	49	56	256	-	136	30	-	91	119	-	-	-
2028 Total Traffic (See Exhibit 8)	• As Planned	F	E	D	E	F	D	F	C	<	F	F	<	91.2	F
-WB RT Lane & Adjusted Timings	• 95th Queue Length (ft)	433	335	185	150	803	125	415	628	-	230	1575	-	-	-
-WB RT Lane & Adjusted Timings	• Delay (sec/veh)	253	59	52	62	126	46	136	34	-	90	119	-	-	-

Part B. Results

	Roadway Conditions	LOS Per Movement By Approach (> = Shared Lane; - = Non Critical or not Allowed Movement)												Intersection / Approach	
		Eastbound			Westbound			Northbound			Southbound			Delay	
		LT	TH	RT	LT	TH	RT	LT	TH	RT	LT	TH	RT	(sec / veh)	LOS
2. Plainfield-Naperville Rd & 119th St	**Signalized**	Eastbound			Westbound			Northbound			Southbound			**Intersection Delay**	
A. Weekday Morning Peak Hour															
Existing Traffic (See Exhibit 3)	• Current	B	C	<	C	C	<	B	B	<	B	B	<	20.3	C
	• 95th Queue Length (ft)	145	113	-	50	85	-	13	183	-	18	63	-	-	-
2028 No-Build (See Exhibit 4)	• Current	C	C	<	C	C	<	B	C	<	B	B	<	22.6	C
	• 95th Queue Length (ft)	220	169	-	79	109	-	55	189	-	47	111	-	-	-
2028 Total Traffic (See Exhibit 8)	• Current	C	C	<	C	D	<	B	C	<	B	B	<	23.8	C
	• 95th Queue Length (ft)	225	163	-	65	113	-	20	235	-	25	88	-	-	-
B. Weekday Evening Peak Hour															
Existing Traffic (See Exhibit 3)	• Current	B	C	<	B	C	<	B	B	<	B	B	<	19.2	B
	• 95th Queue Length (ft)	96	124	-	68	173	-	43	127	-	41	159	-	-	-
2028 No-Build (See Exhibit 4)	• Current	B	C	<	B	C	<	B	B	<	B	B	<	20.8	C
	• 95th Queue Length (ft)	105	154	-	66	196	-	47	141	-	46	182	-	-	-
2028 Total Traffic (See Exhibit 8)	• Current	C	C	<	C	C	<	B	B	<	B	C	<	22.6	C
	• 95th Queue Length (ft)	127	166	-	233	951	-	96	153	-	42	306	-	-	-
3. 119th St & Wolf Dr	**TWSC - NB Stops**	Eastbound			Westbound			Northbound			Southbound			**NB Approach Delay**	
A. Weekday Morning Peak Hour															
Existing Traffic (See Exhibit 3)	• Current	-	-	-	>	A	-	>	C	<	-	-	-	16.3	C
	• 95th Queue Length (ft)	-	-	-	-	0	-	-	8	-	-	-	-	-	-
2028 No-Build (See Exhibit 4)	• Current	-	-	-	>	A	-	>	C	<	-	-	-	18.1	C
	• 95th Queue Length (ft)	-	-	-	-	0	-	-	8	-	-	-	-	-	-
2028 Total Traffic (See Exhibit 8)	• As Planned	-	-	-	A	-	-	>	C	<	-	-	-	15.3	C
	• 95th Queue Length (ft)	-	-	-	0	-	-	-	5	-	-	-	-	-	-
B. Weekday Evening Peak Hour															
Existing Traffic (See Exhibit 3)	• Current	-	-	-	>	A	-	>	C	<	-	-	-	17.5	C
	• 95th Queue Length (ft)	-	-	-	-	0	-	-	5	-	-	-	-	-	-
2028 No-Build (See Exhibit 4)	• Current	-	-	-	>	A	-	>	C	<	-	-	-	19.9	C
	• 95th Queue Length (ft)	-	-	-	-	0	-	-	8	-	-	-	-	-	-
2028 Total Traffic (See Exhibit 8)	• As Planned	-	-	-	A	-	-	>	C	<	-	-	-	15.8	C
	• 95th Queue Length (ft)	-	-	-	0	-	-	-	5	-	-	-	-	-	-

Part B. Results

	Roadway Conditions	LOS Per Movement By Approach (> = Shared Lane; - = Non Critical or not Allowed Movement)												Intersection / Approach	
		Eastbound			Westbound			Northbound			Southbound			Delay	
		LT	TH	RT	LT	TH	RT	LT	TH	RT	LT	TH	RT	(sec / veh)	LOS
4. 119th St & Book Rd	**TWSC - NB/SB Stops**	Eastbound			Westbound			Northbound			Southbound			**NB Approach Delay**	
A. Weekday Morning Peak Hour															
Existing Traffic (See Exhibit 3)	• Current	>	A	<	>	A	<	>	B	<	>	A	<	14.0	B
	• 95th Queue Length (ft)	-	0	-	-	0	-	-	8	-	-	0	-	-	-
2028 No-Build (See Exhibit 4)	• Current	>	A	<	>	A	<	>	C	<	>	A	<	15.5	C
	• 95th Queue Length (ft)	-	0	-	-	0	-	-	10	-	-	0	-	-	-
2028 Total Traffic (See Exhibit 8)	• As Planned	-	-	-	>	A	-	>	C	<	-	-	-	17.2	C
-Old Book Road	• 95th Queue Length (ft)	-	-	-	-	0	-	-	13	-	-	-	-	-	-
2028 Total Traffic (See Exhibit 8)	• As Planned	>	A	-	-	-	-	-	-	-	D	-	B	21.7	C
-New Book Road	• 95th Queue Length (ft)	-	0	-	-	-	-	-	-	-	20	-	3	SB Delay	-
B. Weekday Evening Peak Hour															
Existing Traffic (See Exhibit 3)	• Current	>	A	<	>	A	<	>	C	<	>	C	<	21.2	C
	• 95th Queue Length (ft)	-	0	-	-	0	-	-	5	-	-	0	-	-	-
2028 No-Build (See Exhibit 4)	• Current	>	A	<	>	A	<	>	D	<	>	C	<	25.1	D
	• 95th Queue Length (ft)	-	0	-	-	5	-	-	3	-	-	3	-	-	-
2028 Total Traffic (See Exhibit 8)	• As Planned	-	-	-	>	A	-	>	D	<	-	-	-	32.3	D
-Old Book Road	• 95th Queue Length (ft)	-	-	-	-	5	-	-	8	-	-	-	-	-	-
2028 Total Traffic (See Exhibit 8)	• As Planned	>	A	-	-	-	-	-	-	-	D	-	B	24.3	C
-New Book Road	• 95th Queue Length (ft)	-	3	-	-	-	-	-	-	-	15	-	3	SB Delay	-
5. 119th St & Polo Club Dr	**TWSC - SB Stops**	Eastbound			Westbound			Northbound			Southbound			**SB Approach Delay**	
A. Weekday Morning Peak Hour															
2028 Total Traffic (See Exhibit 8)	• As Planned	>	A	-	-	-	-	-	-	-	C	-	B	14.6	B
	• 95th Queue Length (ft)	-	0	-	-	-	-	-	-	-	13	-	3	-	
B. Weekday Evening Peak Hour															
2028 Total Traffic (See Exhibit 8)	• As Planned	>	A	-	-	-	-	-	-	-	C	-	B	16.4	C
	• 95th Queue Length (ft)	-	5	-	-	-	-	-	-	-	8	-	3	-	-
6. 119th St & Tailshot Circle	**TWSC - SB Stops**	Eastbound			Westbound			Northbound			Southbound			**SB Approach Delay**	
A. Weekday Morning Peak Hour															
2028 Total Traffic (See Exhibit 8)	• As Planned	-	-	-	-	-	-	-	-	-	-	-	B	10.9	B
	• 95th Queue Length (ft)	-	-	-	-	-	-	-	-	-	-	-	3	-	
B. Weekday Evening Peak Hour															
2028 Total Traffic (See Exhibit 8)	• As Planned	-	-	-	-	-	-	-	-	-	-	-	B	13.2	B
	• 95th Queue Length (ft)	-	-	-	-	-	-	-	-	-	-	-	3	-	
7. Book Rd & Hawkweed Dr	**TWSC - EB Stops**	Eastbound			Westbound			Northbound			Southbound			**EB Approach Delay**	
A. Weekday Morning Peak Hour															
2028 Total Traffic (See Exhibit 8)	• As Planned	-	-	A	-	-	-	A	-	-	-	-	-	8.5	A
	• 95th Queue Length (ft)	-	-	0	-	-	-	5	-	-	-	-	-	-	
B. Weekday Evening Peak Hour															
2028 Total Traffic (See Exhibit 8)	• As Planned	-	-	A	-	-	-	A	-	-	-	-	-	8.5	A
	• 95th Queue Length (ft)	-	-	0	-	-	-	3	-	-	-	-	-	-	

Queueing Comparison Diagrams – AM Peak

Westbound through: 119th & IL 59

	2028 No Build	2028 Total
Avg. Delay	56s	50s
Queue (ft)	336 ft	252 ft
Queue (cars)	14 cars	10 cars

2028 No-Build Scenario

2028 Total Scenario (with WBRT)

Exhibit 10A

GEWALT HAMILTON ASSOCIATES, INC.

Queueing Comparison Diagrams – PM Peak

Westbound through: 119th & IL 59

	2028 No Build	2028 Total
Avg. Delay	14.5min	3.1min
Queue (ft)	4032 ft	1902 ft
Queue (cars)	161 cars	76 cars

2028 No-Build Scenario

2028 Total Scenario (with WBRT & Timings)

Exhibit 10B

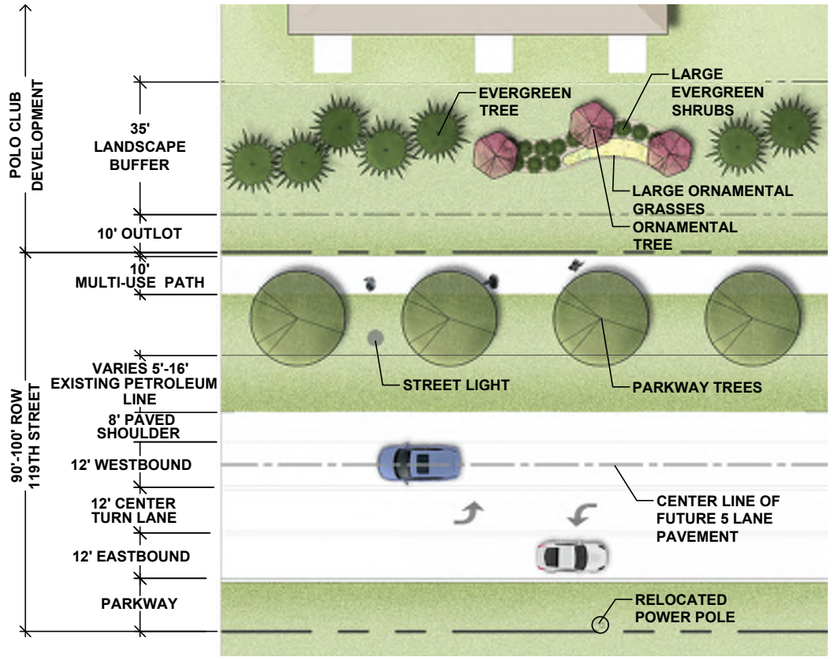
GHA GEWALT HAMILTON ASSOCIATES, INC.

GHA GEWALT HAMILTON ASSOCIATES, INC.

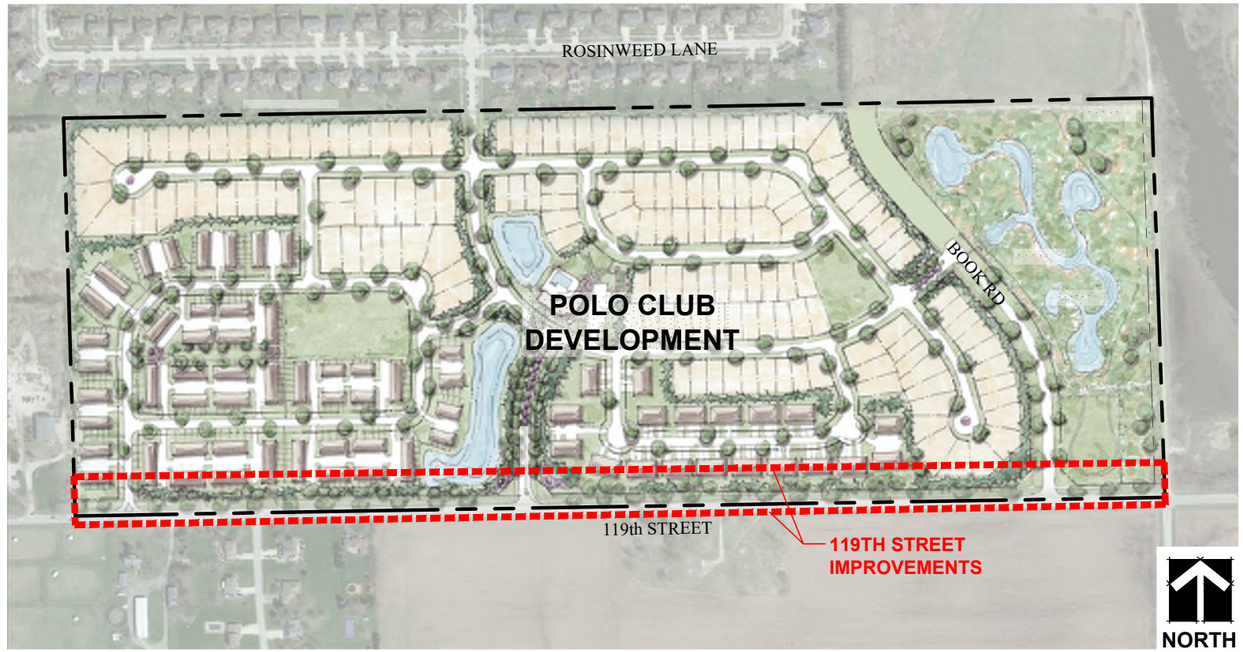
N

Not to Scale

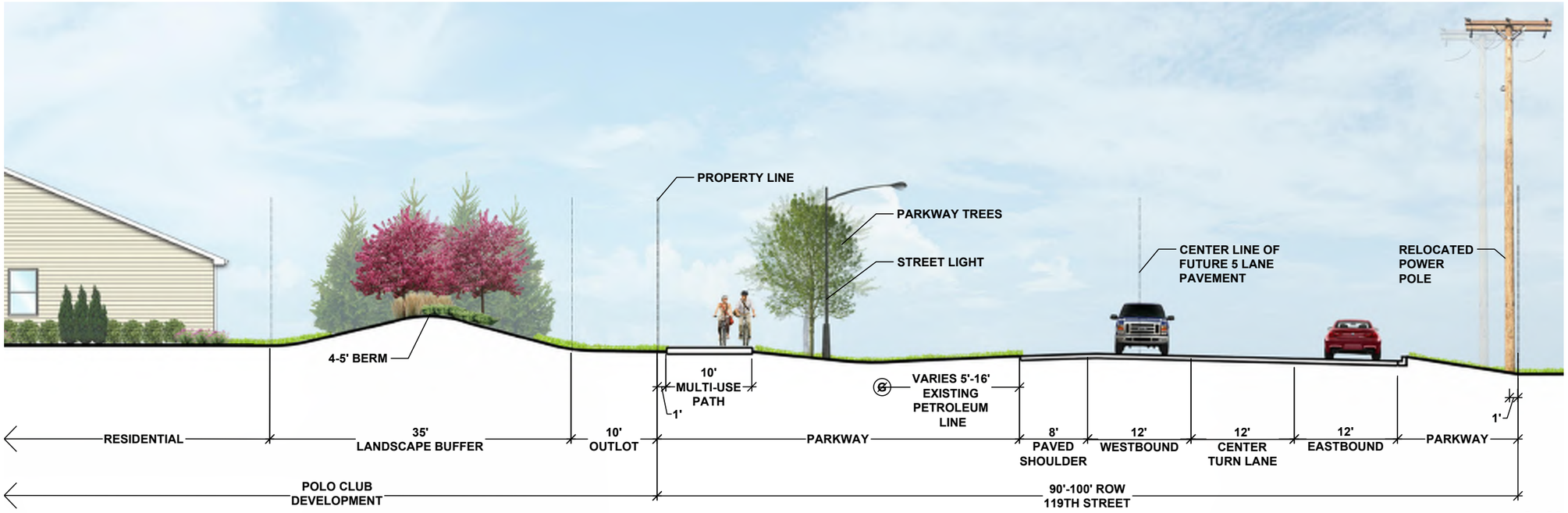
Exhibit 11
Recommended Traffic Operations Plan



PLAN VIEW
SCALE: NTS



LOCATOR KEY
SCALE: NTS



CROSS SECTION
SCALE: NTS

Exhibit 12

119TH STREET IMPROVEMENTS

POLO CLUB
NAPERVILLE, ILLINOIS

10/9/2019

L:\Projects\DR1705\Acad\DR1705_R01_01IL.dwg

D·R·HORTON® America's Builder

GARY R. WEBER ASSOCIATES, INC.
LAND PLANNING
BIOLOGICAL CONSULTING
LANDSCAPE ARCHITECTURE
402 WEST LIBERTY DRIVE
WHEATON, ILLINOIS 60187
PHONE: 630/668-7197

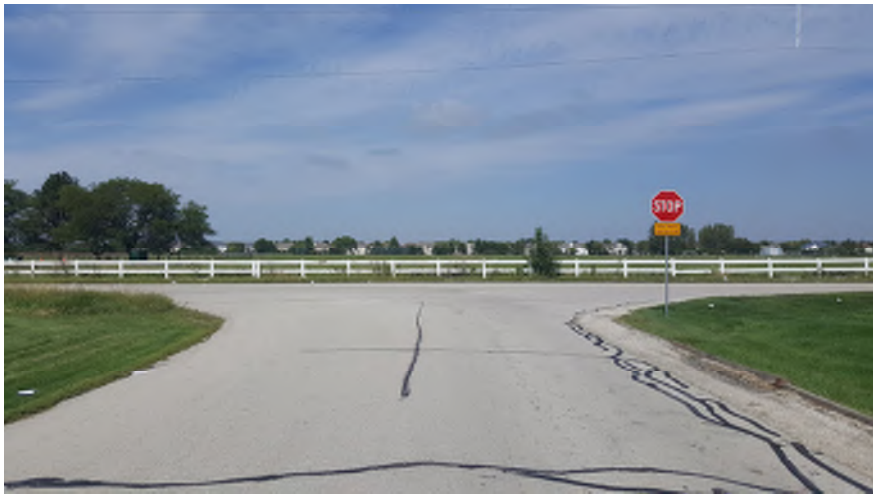
APPENDIX A
Photo Inventory

Northbound IL 59
(119th St intersection)

Southbound IL 59
(119th St intersection)

Eastbound 119th St
(IL 59 intersection)

Westbound 119th St
(IL 59 intersection)



Northbound Wolf Dr
(119th St intersection)

Southbound Wolf Dr
(South of 119th St)

Eastbound 119th St
(Wolf Dr intersection)

Westbound 119th St
(Wolf Dr intersection)

Northbound Book Rd
(119th St intersection)

Southbound Book Rd
(119th St intersection)

Eastbound 119th St
(Book Rd intersection)

Westbound 119th St
(Book Rd intersection)

Northbound Plainfield-Naperville Rd
(119th St intersection)

Southbound Plainfield-Naperville Rd
(119th St intersection)

Eastbound 119th St
(Plainfield-Naperville Rd intersection)

Westbound 119th St
(Plainfield-Naperville Rd intersection)

Northbound IL 59
(Champion Rd / Champion Dr intersection)

Southbound IL 59
(Champion Rd / Champion Dr intersection)

Flashing beacon signage along Southbound IL 59
(North of Champion Rd / Champion Dr)

Westbound Champion Rd
(IL 59 intersection)

Eastbound 119th St
(South of Site, midway between Wolf Dr and Book Rd)

Westbound 119th St
(South of Site, midway between Wolf Dr and Book Rd)

Southbound Book Rd
(East of Site)

Southbound Hawkweed Dr
(Rosinweed Ln intersection, North of Site)

APPENDIX B

Existing Traffic Count Summaries

Gewalt Hamilton Associates Inc.
625 Forest Edge Drive

Vernon Hills, Illinois, United States 60061
(847) 478-9700 poster@gha-engineers.com

Count Name: 119th & Book Rd
Site Code:
Start Date: 09/19/2019

Turning Movement Data

Start Time	Book Rd Southbound						119th St Westbound						Book Rd Northbound						119th St Eastbound						Int. Total
	Right	Thru	Left	U-Turn	Peds	App. Total	Right	Thru	Left	U-Turn	Peds	App. Total	Right	Thru	Left	U-Turn	Peds	App. Total	Right	Thru	Left	U-Turn	Peds	App. Total	
6:00 AM	0	0	0	0	0	0	1	40	0	0	0	41	0	0	0	0	0	0	0	73	0	0	0	73	114
6:15 AM	0	0	0	0	0	0	0	47	0	0	0	47	0	0	0	0	0	0	0	113	0	0	0	113	160
6:30 AM	0	0	0	0	0	0	0	58	0	0	0	58	0	0	0	0	0	0	0	140	0	0	0	140	198
6:45 AM	0	0	0	0	0	0	0	43	1	0	0	44	17	0	0	0	0	17	0	155	0	0	0	155	216
Hourly Total	0	0	0	0	0	0	1	188	1	0	0	190	17	0	0	0	0	17	0	481	0	0	0	481	688
7:00 AM	0	0	0	0	1	0	0	62	0	0	0	62	8	0	0	0	0	8	0	124	0	0	0	124	194
7:15 AM	0	0	0	0	1	0	0	55	0	0	0	55	11	0	0	0	0	11	0	141	0	0	0	141	207
7:30 AM	0	0	0	0	0	0	0	77	1	0	0	78	5	0	2	0	0	7	0	148	1	0	0	149	234
7:45 AM	0	0	0	0	0	0	0	67	0	0	0	67	6	0	1	0	0	7	0	149	0	0	0	149	223
Hourly Total	0	0	0	0	2	0	0	261	1	0	0	262	30	0	3	0	0	33	0	562	1	0	0	563	858
8:00 AM	0	0	0	0	0	0	0	68	0	0	0	68	0	0	1	0	0	1	0	113	0	0	0	113	182
8:15 AM	0	1	0	0	0	1	0	75	2	0	0	77	3	0	0	0	0	3	0	107	0	0	0	107	188
8:30 AM	0	0	0	0	0	0	0	65	0	0	0	65	1	0	1	0	0	2	0	98	0	0	0	98	165
8:45 AM	0	0	0	0	0	0	0	62	0	0	0	62	0	0	0	0	0	0	0	81	0	0	0	81	143
Hourly Total	0	1	0	0	0	1	0	270	2	0	0	272	4	0	2	0	0	6	0	399	0	0	0	399	678
*** BREAK ***	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
3:00 PM	0	0	0	0	0	0	0	90	2	0	0	92	0	0	0	0	0	0	0	71	0	0	0	71	163
3:15 PM	0	0	0	0	0	0	0	104	3	0	0	107	0	0	0	0	0	0	1	80	0	0	0	81	188
3:30 PM	0	0	0	0	1	0	0	108	4	0	0	112	1	0	1	0	0	2	0	65	0	0	0	65	179
3:45 PM	0	0	0	0	0	0	0	130	5	0	0	135	0	0	1	0	0	1	0	81	0	0	0	81	217
Hourly Total	0	0	0	0	1	0	0	432	14	0	0	446	1	0	2	0	0	3	1	297	0	0	0	298	747
4:00 PM	1	0	0	0	0	1	1	119	6	0	0	126	0	0	0	0	0	0	0	98	0	0	0	98	225
4:15 PM	1	1	0	0	0	2	0	115	11	0	0	126	0	0	1	0	0	1	1	115	1	0	1	117	246
4:30 PM	1	0	1	0	0	2	0	126	22	0	0	148	0	0	0	0	0	0	0	98	1	0	0	99	249
4:45 PM	0	0	0	0	0	0	0	125	14	0	0	139	0	0	0	0	0	0	0	93	0	0	0	93	232
Hourly Total	3	1	1	0	0	5	1	485	53	0	0	539	0	0	1	0	0	1	1	404	2	0	1	407	952
5:00 PM	0	0	0	0	0	0	0	136	12	0	0	148	1	0	1	0	0	2	1	84	0	0	0	85	235
5:15 PM	0	0	0	0	0	0	0	135	10	0	0	145	0	0	0	0	0	0	1	91	0	0	0	92	237
5:30 PM	0	0	0	0	0	0	0	92	17	0	0	109	0	0	0	0	0	0	1	99	0	0	0	100	209
5:45 PM	0	0	0	0	0	0	0	89	4	0	0	93	1	0	0	0	0	1	0	70	0	0	0	70	164
Hourly Total	0	0	0	0	0	0	0	452	43	0	0	495	2	0	1	0	0	3	3	344	0	0	0	347	845
Grand Total	3	2	1	0	3	6	2	2088	114	0	0	2204	54	0	9	0	0	63	5	2487	3	0	1	2495	4768
Approach %	50.0	33.3	16.7	0.0	-	-	0.1	94.7	5.2	0.0	-	-	85.7	0.0	14.3	0.0	-	-	0.2	99.7	0.1	0.0	-	-	-
Total %	0.1	0.0	0.0	0.0	-	0.1	0.0	43.8	2.4	0.0	-	46.2	1.1	0.0	0.2	0.0	-	1.3	0.1	52.2	0.1	0.0	-	52.3	-
Lights	3	2	1	0	-	6	2	2031	114	0	-	2147	54	0	9	0	-	63	5	2418	3	0	-	2426	4642
% Lights	100.0	100.0	100.0	-	-	100.0	100.0	97.3	100.0	-	-	97.4	100.0	-	100.0	-	-	100.0	100.0	97.2	100.0	-	-	97.2	97.4
Mediums	0	0	0	0	-	0	0	51	0	0	-	51	0	0	0	0	-	0	0	59	0	0	-	59	110
% Mediums	0.0	0.0	0.0	-	-	0.0	0.0	2.4	0.0	-	-	2.3	0.0	-	0.0	-	-	0.0	0.0	2.4	0.0	-	-	2.4	2.3

Articulated Trucks	0	0	0	0	-	0	0	6	0	0	-	6	0	0	0	0	-	0	0	10	0	0	-	10	16
% Articulated Trucks	0.0	0.0	0.0	-	-	0.0	0.0	0.3	0.0	-	-	0.3	0.0	-	0.0	-	-	0.0	0.0	0.4	0.0	-	-	0.4	0.3
Bicycles on Crosswalk	-	-	-	-	0	-	-	-	-	-	0	-	-	-	-	-	0	-	-	-	-	-	0	-	-
% Bicycles on Crosswalk	-	-	-	-	0.0	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	0.0	-	-
Pedestrians	-	-	-	-	3	-	-	-	-	-	0	-	-	-	-	-	0	-	-	-	-	-	1	-	-
% Pedestrians	-	-	-	-	100.0	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	100.0	-	-

Gewalt Hamilton Associates Inc.
625 Forest Edge Drive

Vernon Hills, Illinois, United States 60061
(847) 478-9700 poster@gha-engineers.com

Count Name: 119th & Book Rd
Site Code:
Start Date: 09/19/2019

Turning Movement Peak Hour Data (7:00 AM)

Start Time	Book Rd Southbound						119th St Westbound						Book Rd Northbound						119th St Eastbound						Int. Total
	Right	Thru	Left	U-Turn	Peds	App. Total	Right	Thru	Left	U-Turn	Peds	App. Total	Right	Thru	Left	U-Turn	Peds	App. Total	Right	Thru	Left	U-Turn	Peds	App. Total	
7:00 AM	0	0	0	0	1	0	0	62	0	0	0	62	8	0	0	0	0	8	0	124	0	0	0	124	194
7:15 AM	0	0	0	0	1	0	0	55	0	0	0	55	11	0	0	0	0	11	0	141	0	0	0	141	207
7:30 AM	0	0	0	0	0	0	0	77	1	0	0	78	5	0	2	0	0	7	0	148	1	0	0	149	234
7:45 AM	0	0	0	0	0	0	0	67	0	0	0	67	6	0	1	0	0	7	0	149	0	0	0	149	223
Total	0	0	0	0	2	0	0	261	1	0	0	262	30	0	3	0	0	33	0	562	1	0	0	563	858
Approach %	0.0	0.0	0.0	0.0	-	-	0.0	99.6	0.4	0.0	-	-	90.9	0.0	9.1	0.0	-	-	0.0	99.8	0.2	0.0	-	-	-
Total %	0.0	0.0	0.0	0.0	-	0.0	0.0	30.4	0.1	0.0	-	30.5	3.5	0.0	0.3	0.0	-	3.8	0.0	65.5	0.1	0.0	-	65.6	-
PHF	0.000	0.000	0.000	0.000	-	0.000	0.000	0.847	0.250	0.000	-	0.840	0.682	0.000	0.375	0.000	-	0.750	0.000	0.943	0.250	0.000	-	0.945	0.917
Lights	0	0	0	0	-	0	0	253	1	0	-	254	30	0	3	0	-	33	0	542	1	0	-	543	830
% Lights	-	-	-	-	-	-	-	96.9	100.0	-	-	96.9	100.0	-	100.0	-	-	100.0	-	96.4	100.0	-	-	96.4	96.7
Mediums	0	0	0	0	-	0	0	8	0	0	-	8	0	0	0	0	-	0	0	16	0	0	-	16	24
% Mediums	-	-	-	-	-	-	-	3.1	0.0	-	-	3.1	0.0	-	0.0	-	-	0.0	-	2.8	0.0	-	-	2.8	2.8
Articulated Trucks	0	0	0	0	-	0	0	0	0	0	-	0	0	0	0	0	-	0	0	4	0	0	-	4	4
% Articulated Trucks	-	-	-	-	-	-	-	0.0	0.0	-	-	0.0	0.0	-	0.0	-	-	0.0	-	0.7	0.0	-	-	0.7	0.5
Bicycles on Crosswalk	-	-	-	-	0	-	-	-	-	-	0	-	-	-	-	-	0	-	-	-	-	-	0	-	-
% Bicycles on Crosswalk	-	-	-	-	0.0	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Pedestrians	-	-	-	-	2	-	-	-	-	-	0	-	-	-	-	-	0	-	-	-	-	-	0	-	-
% Pedestrians	-	-	-	-	100.0	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-

Gewalt Hamilton Associates Inc.
625 Forest Edge Drive

Vernon Hills, Illinois, United States 60061
(847) 478-9700 poster@gha-engineers.com

Count Name: 119th & Book Rd
Site Code:
Start Date: 09/19/2019

Turning Movement Peak Hour Data (4:15 PM)

Start Time	Book Rd Southbound						119th St Westbound						Book Rd Northbound						119th St Eastbound						Int. Total
	Right	Thru	Left	U-Turn	Peds	App. Total	Right	Thru	Left	U-Turn	Peds	App. Total	Right	Thru	Left	U-Turn	Peds	App. Total	Right	Thru	Left	U-Turn	Peds	App. Total	
4:15 PM	1	1	0	0	0	2	0	115	11	0	0	126	0	0	1	0	0	1	1	115	1	0	1	117	246
4:30 PM	1	0	1	0	0	2	0	126	22	0	0	148	0	0	0	0	0	0	0	98	1	0	0	99	249
4:45 PM	0	0	0	0	0	0	0	125	14	0	0	139	0	0	0	0	0	0	0	93	0	0	0	93	232
5:00 PM	0	0	0	0	0	0	0	136	12	0	0	148	1	0	1	0	0	2	1	84	0	0	0	85	235
Total	2	1	1	0	0	4	0	502	59	0	0	561	1	0	2	0	0	3	2	390	2	0	1	394	962
Approach %	50.0	25.0	25.0	0.0	-	-	0.0	89.5	10.5	0.0	-	-	33.3	0.0	66.7	0.0	-	-	0.5	99.0	0.5	0.0	-	-	-
Total %	0.2	0.1	0.1	0.0	-	0.4	0.0	52.2	6.1	0.0	-	58.3	0.1	0.0	0.2	0.0	-	0.3	0.2	40.5	0.2	0.0	-	41.0	-
PHF	0.500	0.250	0.250	0.000	-	0.500	0.000	0.923	0.670	0.000	-	0.948	0.250	0.000	0.500	0.000	-	0.375	0.500	0.848	0.500	0.000	-	0.842	0.966
Lights	2	1	1	0	-	4	0	494	59	0	-	553	1	0	2	0	-	3	2	380	2	0	-	384	944
% Lights	100.0	100.0	100.0	-	-	100.0	-	98.4	100.0	-	-	98.6	100.0	-	100.0	-	-	100.0	100.0	97.4	100.0	-	-	97.5	98.1
Mediums	0	0	0	0	-	0	0	4	0	0	-	4	0	0	0	0	-	0	0	10	0	0	-	10	14
% Mediums	0.0	0.0	0.0	-	-	0.0	-	0.8	0.0	-	-	0.7	0.0	-	0.0	-	-	0.0	0.0	2.6	0.0	-	-	2.5	1.5
Articulated Trucks	0	0	0	0	-	0	0	4	0	0	-	4	0	0	0	0	-	0	0	0	0	0	-	0	4
% Articulated Trucks	0.0	0.0	0.0	-	-	0.0	-	0.8	0.0	-	-	0.7	0.0	-	0.0	-	-	0.0	0.0	0.0	0.0	-	-	0.0	0.4
Bicycles on Crosswalk	-	-	-	-	0	-	-	-	-	-	0	-	-	-	-	-	0	-	-	-	-	-	0	-	-
% Bicycles on Crosswalk	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	0.0	-	-
Pedestrians	-	-	-	-	0	-	-	-	-	-	0	-	-	-	-	-	0	-	-	-	-	-	1	-	-
% Pedestrians	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	100.0	-	-

Gewalt Hamilton Associates Inc.
625 Forest Edge Drive

Vernon Hills, Illinois, United States 60061
(847) 478-9700 poster@gha-engineers.com

Count Name: 119th & Plainfield/Naperville Rd
Site Code:
Start Date: 09/19/2019

Turning Movement Data

Start Time	Plainfield/Naperville Rd Southbound						Rodeo Dr Westbound						Plainfield/Naperville Rd Northbound						119th St Eastbound						Int. Total
	Right	Thru	Left	U-Turn	Peds	App. Total	Right	Thru	Left	U-Turn	Peds	App. Total	Right	Thru	Left	U-Turn	Peds	App. Total	Right	Thru	Left	U-Turn	Peds	App. Total	
6:00 AM	8	16	1	0	0	25	3	31	6	0	0	40	12	68	3	0	0	83	1	45	19	0	0	65	213
6:15 AM	15	18	5	0	0	38	13	32	6	0	0	51	20	99	2	0	0	121	1	80	25	0	0	106	316
6:30 AM	14	39	7	0	0	60	8	38	33	0	0	79	30	110	12	0	0	152	6	106	44	0	0	156	447
6:45 AM	19	52	17	0	0	88	9	17	41	0	0	67	50	89	14	3	0	156	12	112	55	0	0	179	490
Hourly Total	56	125	30	0	0	211	33	118	86	0	0	237	112	366	31	3	0	512	20	343	143	0	0	506	1466
7:00 AM	21	34	12	0	0	67	21	35	20	0	0	76	32	158	12	1	0	203	5	57	74	0	0	136	482
7:15 AM	29	38	6	0	0	73	21	39	15	0	0	75	22	134	4	0	0	160	3	67	75	0	0	145	453
7:30 AM	29	49	13	0	0	91	27	53	9	1	0	90	9	165	4	0	0	178	5	91	63	0	0	159	518
7:45 AM	25	45	10	0	0	80	15	39	14	0	0	68	13	125	7	0	0	145	5	88	72	0	0	165	458
Hourly Total	104	166	41	0	0	311	84	166	58	1	0	309	76	582	27	1	0	686	18	303	284	0	0	605	1911
8:00 AM	31	43	2	0	0	76	15	42	7	0	0	64	19	102	4	0	0	125	3	79	40	0	0	122	387
8:15 AM	24	49	7	0	0	80	17	59	8	0	0	84	16	121	4	0	0	141	4	61	51	0	0	116	421
8:30 AM	21	50	9	0	0	80	15	40	7	0	0	62	10	94	3	0	0	107	9	54	36	0	0	99	348
8:45 AM	14	46	13	0	0	73	15	42	5	0	0	62	8	101	8	0	0	117	3	57	34	0	0	94	346
Hourly Total	90	188	31	0	0	309	62	183	27	0	0	272	53	418	19	0	0	490	19	251	161	0	0	431	1502
*** BREAK ***	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
3:00 PM	22	81	10	0	0	113	18	66	5	0	0	89	10	52	6	0	0	68	7	38	30	0	0	75	345
3:15 PM	38	80	13	1	0	132	20	62	16	0	0	98	12	68	5	0	0	85	10	44	26	0	0	80	395
3:30 PM	34	79	10	0	0	123	14	79	19	0	0	112	18	78	4	0	0	100	5	48	25	0	0	78	413
3:45 PM	46	117	7	0	0	170	17	80	15	1	0	113	11	66	9	0	0	86	10	50	23	0	0	83	452
Hourly Total	140	357	40	1	0	538	69	287	55	1	0	412	51	264	24	0	0	339	32	180	104	0	0	316	1605
4:00 PM	44	100	9	0	0	153	23	66	12	0	0	101	15	68	10	0	0	93	21	51	29	0	0	101	448
4:15 PM	50	103	11	0	0	164	19	73	19	0	0	111	16	95	3	0	0	114	17	65	22	0	0	104	493
4:30 PM	49	112	13	0	0	174	13	77	11	0	0	101	6	90	15	0	0	111	17	55	35	0	0	107	493
4:45 PM	60	126	6	0	0	192	17	73	16	0	0	106	4	81	9	0	0	94	12	59	20	1	0	92	484
Hourly Total	203	441	39	0	0	683	72	289	58	0	0	419	41	334	37	0	0	412	67	230	106	1	0	404	1918
5:00 PM	40	108	9	0	0	157	27	95	18	0	0	140	10	73	5	0	0	88	10	50	30	0	0	90	475
5:15 PM	48	101	15	0	0	164	20	88	17	0	0	125	13	72	14	0	0	99	17	49	31	0	0	97	485
5:30 PM	33	147	13	0	0	193	12	62	18	0	0	92	17	91	3	0	0	111	13	57	25	0	0	95	491
5:45 PM	42	123	11	0	0	176	14	47	14	1	0	76	14	80	6	0	0	100	8	49	18	0	0	75	427
Hourly Total	163	479	48	0	0	690	73	292	67	1	0	433	54	316	28	0	0	398	48	205	104	0	0	357	1878
Grand Total	756	1756	229	1	0	2742	393	1335	351	3	0	2082	387	2280	166	4	0	2837	204	1512	902	1	0	2619	10280
Approach %	27.6	64.0	8.4	0.0	-	-	18.9	64.1	16.9	0.1	-	-	13.6	80.4	5.9	0.1	-	-	7.8	57.7	34.4	0.0	-	-	-
Total %	7.4	17.1	2.2	0.0	-	26.7	3.8	13.0	3.4	0.0	-	20.3	3.8	22.2	1.6	0.0	-	27.6	2.0	14.7	8.8	0.0	-	25.5	-
Lights	670	1740	202	1	-	2613	374	1293	338	3	-	2008	375	2257	160	4	-	2796	195	1468	816	1	-	2480	9897
% Lights	88.6	99.1	88.2	100.0	-	95.3	95.2	96.9	96.3	100.0	-	96.4	96.9	99.0	96.4	100.0	-	98.6	95.6	97.1	90.5	100.0	-	94.7	96.3
Mediums	59	12	15	0	-	86	5	42	12	0	-	59	11	19	6	0	-	36	8	38	36	0	-	82	263
% Mediums	7.8	0.7	6.6	0.0	-	3.1	1.3	3.1	3.4	0.0	-	2.8	2.8	0.8	3.6	0.0	-	1.3	3.9	2.5	4.0	0.0	-	3.1	2.6

Articulated Trucks	27	4	12	0	-	43	14	0	1	0	-	15	1	4	0	0	-	5	1	6	50	0	-	57	120
% Articulated Trucks	3.6	0.2	5.2	0.0	-	1.6	3.6	0.0	0.3	0.0	-	0.7	0.3	0.2	0.0	0.0	-	0.2	0.5	0.4	5.5	0.0	-	2.2	1.2
Bicycles on Crosswalk	-	-	-	-	0	-	-	-	-	-	0	-	-	-	-	-	0	-	-	-	-	-	0	-	-
% Bicycles on Crosswalk	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Pedestrians	-	-	-	-	0	-	-	-	-	-	0	-	-	-	-	-	0	-	-	-	-	-	0	-	-
% Pedestrians	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-

Gewalt Hamilton Associates Inc.
625 Forest Edge Drive

Vernon Hills, Illinois, United States 60061
(847) 478-9700 poster@gha-engineers.com

Count Name: 119th & Plainfield/Naperville Rd
Site Code:
Start Date: 09/19/2019

Turning Movement Peak Hour Data (6:45 AM)

Start Time	Plainfield/Naperville Rd Southbound						Rodeo Dr Westbound						Plainfield/Naperville Rd Northbound						119th St Eastbound						Int. Total
	Right	Thru	Left	U-Turn	Peds	App. Total	Right	Thru	Left	U-Turn	Peds	App. Total	Right	Thru	Left	U-Turn	Peds	App. Total	Right	Thru	Left	U-Turn	Peds	App. Total	
6:45 AM	19	52	17	0	0	88	9	17	41	0	0	67	50	89	14	3	0	156	12	112	55	0	0	179	490
7:00 AM	21	34	12	0	0	67	21	35	20	0	0	76	32	158	12	1	0	203	5	57	74	0	0	136	482
7:15 AM	29	38	6	0	0	73	21	39	15	0	0	75	22	134	4	0	0	160	3	67	75	0	0	145	453
7:30 AM	29	49	13	0	0	91	27	53	9	1	0	90	9	165	4	0	0	178	5	91	63	0	0	159	518
Total	98	173	48	0	0	319	78	144	85	1	0	308	113	546	34	4	0	697	25	327	267	0	0	619	1943
Approach %	30.7	54.2	15.0	0.0	-	-	25.3	46.8	27.6	0.3	-	-	16.2	78.3	4.9	0.6	-	-	4.0	52.8	43.1	0.0	-	-	-
Total %	5.0	8.9	2.5	0.0	-	16.4	4.0	7.4	4.4	0.1	-	15.9	5.8	28.1	1.7	0.2	-	35.9	1.3	16.8	13.7	0.0	-	31.9	-
PHF	0.845	0.832	0.706	0.000	-	0.876	0.722	0.679	0.518	0.250	-	0.856	0.565	0.827	0.607	0.333	-	0.858	0.521	0.730	0.890	0.000	-	0.865	0.938
Lights	72	173	37	0	-	282	73	138	78	1	-	290	110	543	33	4	-	690	23	316	245	0	-	584	1846
% Lights	73.5	100.0	77.1	-	-	88.4	93.6	95.8	91.8	100.0	-	94.2	97.3	99.5	97.1	100.0	-	99.0	92.0	96.6	91.8	-	-	94.3	95.0
Mediums	16	0	7	0	-	23	2	6	7	0	-	15	3	3	1	0	-	7	2	9	9	0	-	20	65
% Mediums	16.3	0.0	14.6	-	-	7.2	2.6	4.2	8.2	0.0	-	4.9	2.7	0.5	2.9	0.0	-	1.0	8.0	2.8	3.4	-	-	3.2	3.3
Articulated Trucks	10	0	4	0	-	14	3	0	0	0	-	3	0	0	0	0	-	0	0	2	13	0	-	15	32
% Articulated Trucks	10.2	0.0	8.3	-	-	4.4	3.8	0.0	0.0	0.0	-	1.0	0.0	0.0	0.0	0.0	-	0.0	0.0	0.6	4.9	-	-	2.4	1.6
Bicycles on Crosswalk	-	-	-	-	0	-	-	-	-	-	0	-	-	-	-	-	0	-	-	-	-	-	0	-	-
% Bicycles on Crosswalk	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Pedestrians	-	-	-	-	0	-	-	-	-	-	0	-	-	-	-	-	0	-	-	-	-	-	0	-	-
% Pedestrians	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-

Gewalt Hamilton Associates Inc.
625 Forest Edge Drive

Vernon Hills, Illinois, United States 60061
(847) 478-9700 poster@gha-engineers.com

Count Name: 119th & Plainfield/Naperville Rd
Site Code:
Start Date: 09/19/2019

Turning Movement Peak Hour Data (4:15 PM)

Start Time	Plainfield/Naperville Rd Southbound						Rodeo Dr Westbound						Plainfield/Naperville Rd Northbound						119th St Eastbound						Int. Total
	Right	Thru	Left	U-Turn	Peds	App. Total	Right	Thru	Left	U-Turn	Peds	App. Total	Right	Thru	Left	U-Turn	Peds	App. Total	Right	Thru	Left	U-Turn	Peds	App. Total	
4:15 PM	50	103	11	0	0	164	19	73	19	0	0	111	16	95	3	0	0	114	17	65	22	0	0	104	493
4:30 PM	49	112	13	0	0	174	13	77	11	0	0	101	6	90	15	0	0	111	17	55	35	0	0	107	493
4:45 PM	60	126	6	0	0	192	17	73	16	0	0	106	4	81	9	0	0	94	12	59	20	1	0	92	484
5:00 PM	40	108	9	0	0	157	27	95	18	0	0	140	10	73	5	0	0	88	10	50	30	0	0	90	475
Total	199	449	39	0	0	687	76	318	64	0	0	458	36	339	32	0	0	407	56	229	107	1	0	393	1945
Approach %	29.0	65.4	5.7	0.0	-	-	16.6	69.4	14.0	0.0	-	-	8.8	83.3	7.9	0.0	-	-	14.2	58.3	27.2	0.3	-	-	-
Total %	10.2	23.1	2.0	0.0	-	35.3	3.9	16.3	3.3	0.0	-	23.5	1.9	17.4	1.6	0.0	-	20.9	2.9	11.8	5.5	0.1	-	20.2	-
PHF	0.829	0.891	0.750	0.000	-	0.895	0.704	0.837	0.842	0.000	-	0.818	0.563	0.892	0.533	0.000	-	0.893	0.824	0.881	0.764	0.250	-	0.918	0.986
Lights	196	444	39	0	-	679	75	313	64	0	-	452	35	338	31	0	-	404	52	227	103	1	-	383	1918
% Lights	98.5	98.9	100.0	-	-	98.8	98.7	98.4	100.0	-	-	98.7	97.2	99.7	96.9	-	-	99.3	92.9	99.1	96.3	100.0	-	97.5	98.6
Mediums	3	5	0	0	-	8	1	5	0	0	-	6	1	0	1	0	-	2	4	2	3	0	-	9	25
% Mediums	1.5	1.1	0.0	-	-	1.2	1.3	1.6	0.0	-	-	1.3	2.8	0.0	3.1	-	-	0.5	7.1	0.9	2.8	0.0	-	2.3	1.3
Articulated Trucks	0	0	0	0	-	0	0	0	0	0	-	0	0	1	0	0	-	1	0	0	1	0	-	1	2
% Articulated Trucks	0.0	0.0	0.0	-	-	0.0	0.0	0.0	0.0	-	-	0.0	0.0	0.3	0.0	-	-	0.2	0.0	0.0	0.9	0.0	-	0.3	0.1
Bicycles on Crosswalk	-	-	-	-	0	-	-	-	-	-	0	-	-	-	-	-	0	-	-	-	-	-	0	-	-
% Bicycles on Crosswalk	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Pedestrians	-	-	-	-	0	-	-	-	-	-	0	-	-	-	-	-	0	-	-	-	-	-	0	-	-
% Pedestrians	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-

Gewalt Hamilton Associates Inc.
625 Forest Edge Drive

Vernon Hills, Illinois, United States 60061
(847) 478-9700 poster@gha-engineers.com

Count Name: 119th St & Wolf Dr
Site Code:
Start Date: 09/19/2019

Turning Movement Data

Start Time	119th St Westbound					Wolf Dr Northbound					119th St Eastbound					Int. Total
	Thru	Left	U-Turn	Peds	App. Total	Right	Left	U-Turn	Peds	App. Total	Right	Thru	U-Turn	Peds	App. Total	
6:00 AM	39	1	0	0	40	5	6	0	0	11	1	69	0	0	70	121
6:15 AM	44	0	0	0	44	0	1	0	0	1	1	114	0	0	115	160
6:30 AM	57	1	0	0	58	4	4	0	0	8	0	151	0	0	151	217
6:45 AM	42	0	0	0	42	6	7	0	0	13	0	137	0	0	137	192
Hourly Total	182	2	0	0	184	15	18	0	0	33	2	471	0	0	473	690
7:00 AM	59	0	0	0	59	1	5	0	0	6	0	123	0	0	123	188
7:15 AM	60	0	0	0	60	1	3	0	0	4	2	141	0	0	143	207
7:30 AM	74	1	0	0	75	4	3	0	0	7	1	141	0	0	142	224
7:45 AM	72	1	0	0	73	4	4	0	0	8	2	148	0	0	150	231
Hourly Total	265	2	0	0	267	10	15	0	0	25	5	553	0	0	558	850
8:00 AM	58	0	0	0	58	1	5	0	1	6	0	110	0	0	110	174
8:15 AM	81	0	0	0	81	5	6	0	0	11	0	104	0	0	104	196
8:30 AM	66	0	1	0	67	2	6	0	0	8	4	90	0	0	94	169
8:45 AM	59	0	0	0	59	2	5	0	0	7	2	87	0	0	89	155
Hourly Total	264	0	1	0	265	10	22	0	1	32	6	391	0	0	397	694
*** BREAK ***	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
3:00 PM	89	3	0	0	92	0	4	0	0	4	6	81	0	0	87	183
3:15 PM	98	3	0	0	101	0	0	0	0	0	9	77	0	0	86	187
3:30 PM	110	2	0	0	112	0	2	0	0	2	3	73	0	0	76	190
3:45 PM	119	1	0	0	120	0	2	0	0	2	7	75	0	0	82	204
Hourly Total	416	9	0	0	425	0	8	0	0	8	25	306	0	0	331	764
4:00 PM	133	4	0	0	137	0	5	0	0	5	7	95	0	0	102	244
4:15 PM	111	2	0	0	113	1	6	0	0	7	9	119	0	0	128	248
4:30 PM	127	3	0	0	130	2	1	0	0	3	4	96	0	0	100	233
4:45 PM	123	0	0	0	123	2	2	0	0	4	9	92	0	0	101	228
Hourly Total	494	9	0	0	503	5	14	0	0	19	29	402	0	0	431	953
5:00 PM	134	7	0	0	141	1	6	0	0	7	5	84	0	0	89	237
5:15 PM	135	2	0	0	137	2	5	0	0	7	2	95	0	0	97	241
5:30 PM	87	3	0	0	90	2	2	0	0	4	2	94	0	0	96	190
5:45 PM	91	0	0	0	91	1	4	0	0	5	7	74	0	0	81	177
Hourly Total	447	12	0	0	459	6	17	0	0	23	16	347	0	0	363	845
Grand Total	2068	34	1	0	2103	46	94	0	1	140	83	2470	0	0	2553	4796
Approach %	98.3	1.6	0.0	-	-	32.9	67.1	0.0	-	-	3.3	96.7	0.0	-	-	-
Total %	43.1	0.7	0.0	-	43.8	1.0	2.0	0.0	-	2.9	1.7	51.5	0.0	-	53.2	-
Lights	2012	33	1	-	2046	46	87	0	-	133	78	2407	0	-	2485	4664
% Lights	97.3	97.1	100.0	-	97.3	100.0	92.6	-	-	95.0	94.0	97.4	-	-	97.3	97.2
Mediums	52	1	0	-	53	0	6	0	-	6	5	56	0	-	61	120
% Mediums	2.5	2.9	0.0	-	2.5	0.0	6.4	-	-	4.3	6.0	2.3	-	-	2.4	2.5
Articulated Trucks	4	0	0	-	4	0	1	0	-	1	0	7	0	-	7	12

% Articulated Trucks	0.2	0.0	0.0	-	0.2	0.0	1.1	-	-	0.7	0.0	0.3	-	-	0.3	0.3
Bicycles on Crosswalk	-	-	-	0	-	-	-	-	0	-	-	-	-	0	-	-
% Bicycles on Crosswalk	-	-	-	-	-	-	-	-	0.0	-	-	-	-	-	-	-
Pedestrians	-	-	-	0	-	-	-	-	1	-	-	-	-	0	-	-
% Pedestrians	-	-	-	-	-	-	-	-	100.0	-	-	-	-	-	-	-

Gewalt Hamilton Associates Inc.
625 Forest Edge Drive

Vernon Hills, Illinois, United States 60061
(847) 478-9700 poster@gha-engineers.com

Count Name: 119th St & Wolf Dr
Site Code:
Start Date: 09/19/2019

Turning Movement Peak Hour Data (7:00 AM)

Start Time	119th St Westbound					Wolf Dr Northbound					119th St Eastbound					
	Thru	Left	U-Turn	Peds	App. Total	Right	Left	U-Turn	Peds	App. Total	Right	Thru	U-Turn	Peds	App. Total	Int. Total
7:00 AM	59	0	0	0	59	1	5	0	0	6	0	123	0	0	123	188
7:15 AM	60	0	0	0	60	1	3	0	0	4	2	141	0	0	143	207
7:30 AM	74	1	0	0	75	4	3	0	0	7	1	141	0	0	142	224
7:45 AM	72	1	0	0	73	4	4	0	0	8	2	148	0	0	150	231
Total	265	2	0	0	267	10	15	0	0	25	5	553	0	0	558	850
Approach %	99.3	0.7	0.0	-	-	40.0	60.0	0.0	-	-	0.9	99.1	0.0	-	-	-
Total %	31.2	0.2	0.0	-	31.4	1.2	1.8	0.0	-	2.9	0.6	65.1	0.0	-	65.6	-
PHF	0.895	0.500	0.000	-	0.890	0.625	0.750	0.000	-	0.781	0.625	0.934	0.000	-	0.930	0.920
Lights	257	2	0	-	259	10	13	0	-	23	4	534	0	-	538	820
% Lights	97.0	100.0	-	-	97.0	100.0	86.7	-	-	92.0	80.0	96.6	-	-	96.4	96.5
Mediums	8	0	0	-	8	0	1	0	-	1	1	15	0	-	16	25
% Mediums	3.0	0.0	-	-	3.0	0.0	6.7	-	-	4.0	20.0	2.7	-	-	2.9	2.9
Articulated Trucks	0	0	0	-	0	0	1	0	-	1	0	4	0	-	4	5
% Articulated Trucks	0.0	0.0	-	-	0.0	0.0	6.7	-	-	4.0	0.0	0.7	-	-	0.7	0.6
Bicycles on Crosswalk	-	-	-	0	-	-	-	-	0	-	-	-	-	0	-	-
% Bicycles on Crosswalk	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Pedestrians	-	-	-	0	-	-	-	-	0	-	-	-	-	0	-	-
% Pedestrians	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-

Gewalt Hamilton Associates Inc.
625 Forest Edge Drive

Vernon Hills, Illinois, United States 60061
(847) 478-9700 poster@gha-engineers.com

Count Name: 119th St & Wolf Dr
Site Code:
Start Date: 09/19/2019

Turning Movement Peak Hour Data (4:00 PM)

Start Time	119th St Westbound					Wolf Dr Northbound					119th St Eastbound					
	Thru	Left	U-Turn	Peds	App. Total	Right	Left	U-Turn	Peds	App. Total	Right	Thru	U-Turn	Peds	App. Total	Int. Total
4:00 PM	133	4	0	0	137	0	5	0	0	5	7	95	0	0	102	244
4:15 PM	111	2	0	0	113	1	6	0	0	7	9	119	0	0	128	248
4:30 PM	127	3	0	0	130	2	1	0	0	3	4	96	0	0	100	233
4:45 PM	123	0	0	0	123	2	2	0	0	4	9	92	0	0	101	228
Total	494	9	0	0	503	5	14	0	0	19	29	402	0	0	431	953
Approach %	98.2	1.8	0.0	-	-	26.3	73.7	0.0	-	-	6.7	93.3	0.0	-	-	-
Total %	51.8	0.9	0.0	-	52.8	0.5	1.5	0.0	-	2.0	3.0	42.2	0.0	-	45.2	-
PHF	0.929	0.563	0.000	-	0.918	0.625	0.583	0.000	-	0.679	0.806	0.845	0.000	-	0.842	0.961
Lights	484	9	0	-	493	5	13	0	-	18	28	391	0	-	419	930
% Lights	98.0	100.0	-	-	98.0	100.0	92.9	-	-	94.7	96.6	97.3	-	-	97.2	97.6
Mediums	8	0	0	-	8	0	1	0	-	1	1	11	0	-	12	21
% Mediums	1.6	0.0	-	-	1.6	0.0	7.1	-	-	5.3	3.4	2.7	-	-	2.8	2.2
Articulated Trucks	2	0	0	-	2	0	0	0	-	0	0	0	0	-	0	2
% Articulated Trucks	0.4	0.0	-	-	0.4	0.0	0.0	-	-	0.0	0.0	0.0	-	-	0.0	0.2
Bicycles on Crosswalk	-	-	-	0	-	-	-	-	0	-	-	-	-	0	-	-
% Bicycles on Crosswalk	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Pedestrians	-	-	-	0	-	-	-	-	0	-	-	-	-	0	-	-
% Pedestrians	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-

Gewalt Hamilton Associates Inc.
625 Forest Edge Drive

Vernon Hills, Illinois, United States 60061
(847) 478-9700 poster@gha-engineers.com

Count Name: Illinois 59 & 119th Street
Site Code:
Start Date: 09/19/2019

Turning Movement Data

Start Time	IL-59 Southbound						119th St Westbound						IL-59 Northbound						119th St Eastbound						Int. Total
	Right	Thru	Left	U-Turn	Peds	App. Total	Right	Thru	Left	U-Turn	Peds	App. Total	Right	Thru	Left	U-Turn	Peds	App. Total	Right	Thru	Left	U-Turn	Peds	App. Total	
6:00 AM	3	78	6	0	0	87	15	12	13	0	0	40	6	263	17	0	0	286	10	50	41	0	0	101	514
6:15 AM	9	115	16	0	0	140	10	24	12	0	0	46	19	279	17	2	0	317	13	92	71	0	0	176	679
6:30 AM	27	137	23	0	0	187	11	32	20	0	0	63	48	367	23	0	0	438	13	92	67	0	0	172	860
6:45 AM	17	134	22	0	0	173	10	18	20	0	0	48	60	423	19	2	0	504	12	79	75	0	0	166	891
Hourly Total	56	464	67	0	0	587	46	86	65	0	0	197	133	1332	76	4	0	1545	48	313	254	0	0	615	2944
7:00 AM	5	158	16	0	0	179	11	26	24	0	0	61	50	353	20	1	0	424	26	86	58	0	0	170	834
7:15 AM	10	169	9	0	0	188	14	31	20	0	0	65	51	351	16	0	0	418	17	87	73	0	0	177	848
7:30 AM	16	187	15	1	1	219	20	29	22	0	0	71	38	307	23	1	0	369	18	125	83	0	0	226	885
7:45 AM	13	174	27	1	0	215	26	34	22	0	0	82	64	347	18	0	0	429	22	85	80	0	0	187	913
Hourly Total	44	688	67	2	1	801	71	120	88	0	0	279	203	1358	77	2	0	1640	83	383	294	0	0	760	3480
8:00 AM	10	182	15	0	0	207	30	20	27	0	0	77	22	289	20	1	0	332	23	86	67	0	0	176	792
8:15 AM	11	209	17	0	0	237	29	39	30	0	0	98	29	298	14	3	0	344	27	58	45	0	0	130	809
8:30 AM	8	144	12	0	0	164	27	33	14	0	0	74	19	283	20	1	0	323	15	85	80	0	0	180	741
8:45 AM	16	181	19	0	0	216	20	28	25	0	0	73	19	245	22	1	0	287	27	64	47	0	0	138	714
Hourly Total	45	716	63	0	0	824	106	120	96	0	0	322	89	1115	76	6	0	1286	92	293	239	0	0	624	3056
*** BREAK ***	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
3:00 PM	33	314	11	1	0	359	14	49	38	0	0	101	28	251	32	1	0	312	21	43	49	0	0	113	885
3:15 PM	25	284	19	0	1	328	16	62	31	0	0	109	24	221	31	2	0	278	13	54	46	0	0	113	828
3:30 PM	42	311	19	1	0	373	10	62	29	0	0	101	16	214	42	2	0	274	21	35	36	0	0	92	840
3:45 PM	52	328	18	0	0	398	14	70	61	0	0	145	27	196	33	0	0	256	20	45	50	0	0	115	914
Hourly Total	152	1237	67	2	1	1458	54	243	159	0	0	456	95	882	138	5	0	1120	75	177	181	0	0	433	3467
4:00 PM	45	337	30	2	0	414	28	72	47	0	0	147	22	252	46	1	0	321	26	47	45	0	0	118	1000
4:15 PM	51	366	27	1	0	445	10	74	39	0	0	123	26	264	38	0	0	328	24	56	50	0	0	130	1026
4:30 PM	45	332	13	1	0	391	19	84	43	0	0	146	25	279	33	0	0	337	31	62	45	0	0	138	1012
4:45 PM	56	400	23	1	0	480	20	70	40	0	0	130	26	269	42	1	0	338	34	47	48	0	0	129	1077
Hourly Total	197	1435	93	5	0	1730	77	300	169	0	0	546	99	1064	159	2	0	1324	115	212	188	0	0	515	4115
5:00 PM	52	343	22	0	0	417	18	86	53	0	0	157	26	239	49	0	0	314	20	45	50	0	0	115	1003
5:15 PM	50	358	22	0	0	430	13	101	52	0	0	166	28	246	54	2	0	330	30	43	48	0	0	121	1047
5:30 PM	53	354	15	1	0	423	15	104	43	0	0	162	19	275	36	0	0	330	30	52	49	0	0	131	1046
5:45 PM	38	321	27	1	0	387	6	65	32	0	0	103	22	222	41	0	0	285	27	41	33	0	0	101	876
Hourly Total	193	1376	86	2	0	1657	52	356	180	0	0	588	95	982	180	2	0	1259	107	181	180	0	0	468	3972
Grand Total	687	5916	443	11	2	7057	406	1225	757	0	0	2388	714	6733	706	21	0	8174	520	1559	1336	0	0	3415	21034
Approach %	9.7	83.8	6.3	0.2	-	-	17.0	51.3	31.7	0.0	-	-	8.7	82.4	8.6	0.3	-	-	15.2	45.7	39.1	0.0	-	-	-
Total %	3.3	28.1	2.1	0.1	-	33.6	1.9	5.8	3.6	0.0	-	11.4	3.4	32.0	3.4	0.1	-	38.9	2.5	7.4	6.4	0.0	-	16.2	-
Lights	682	5596	421	11	-	6710	366	1190	717	0	-	2273	681	6339	677	21	-	7718	495	1520	1316	0	-	3331	20032
% Lights	99.3	94.6	95.0	100.0	-	95.1	90.1	97.1	94.7	-	-	95.2	95.4	94.1	95.9	100.0	-	94.4	95.2	97.5	98.5	-	-	97.5	95.2
Mediums	5	135	17	0	-	157	24	31	32	0	-	87	31	148	17	0	-	196	21	34	20	0	-	75	515
% Mediums	0.7	2.3	3.8	0.0	-	2.2	5.9	2.5	4.2	-	-	3.6	4.3	2.2	2.4	0.0	-	2.4	4.0	2.2	1.5	-	-	2.2	2.4

Articulated Trucks	0	185	5	0	-	190	16	4	8	0	-	28	2	246	12	0	-	260	4	5	0	0	-	9	487
% Articulated Trucks	0.0	3.1	1.1	0.0	-	2.7	3.9	0.3	1.1	-	-	1.2	0.3	3.7	1.7	0.0	-	3.2	0.8	0.3	0.0	-	-	0.3	2.3
Bicycles on Crosswalk	-	-	-	-	0	-	-	-	-	-	0	-	-	-	-	-	0	-	-	-	-	-	0	-	-
% Bicycles on Crosswalk	-	-	-	-	0.0	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Pedestrians	-	-	-	-	2	-	-	-	-	-	0	-	-	-	-	-	0	-	-	-	-	-	0	-	-
% Pedestrians	-	-	-	-	100.0	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-

Gewalt Hamilton Associates Inc.
625 Forest Edge Drive

Vernon Hills, Illinois, United States 60061
(847) 478-9700 poster@gha-engineers.com

Count Name: Illinois 59 & 119th Street
Site Code:
Start Date: 09/19/2019

Turning Movement Peak Hour Data (7:00 AM)

Start Time	IL-59 Southbound						119th St Westbound						IL-59 Northbound						119th St Eastbound						Int. Total
	Right	Thru	Left	U-Turn	Peds	App. Total	Right	Thru	Left	U-Turn	Peds	App. Total	Right	Thru	Left	U-Turn	Peds	App. Total	Right	Thru	Left	U-Turn	Peds	App. Total	
7:00 AM	5	158	16	0	0	179	11	26	24	0	0	61	50	353	20	1	0	424	26	86	58	0	0	170	834
7:15 AM	10	169	9	0	0	188	14	31	20	0	0	65	51	351	16	0	0	418	17	87	73	0	0	177	848
7:30 AM	16	187	15	1	1	219	20	29	22	0	0	71	38	307	23	1	0	369	18	125	83	0	0	226	885
7:45 AM	13	174	27	1	0	215	26	34	22	0	0	82	64	347	18	0	0	429	22	85	80	0	0	187	913
Total	44	688	67	2	1	801	71	120	88	0	0	279	203	1358	77	2	0	1640	83	383	294	0	0	760	3480
Approach %	5.5	85.9	8.4	0.2	-	-	25.4	43.0	31.5	0.0	-	-	12.4	82.8	4.7	0.1	-	-	10.9	50.4	38.7	0.0	-	-	-
Total %	1.3	19.8	1.9	0.1	-	23.0	2.0	3.4	2.5	0.0	-	8.0	5.8	39.0	2.2	0.1	-	47.1	2.4	11.0	8.4	0.0	-	21.8	-
PHF	0.688	0.920	0.620	0.500	-	0.914	0.683	0.882	0.917	0.000	-	0.851	0.793	0.962	0.837	0.500	-	0.956	0.798	0.766	0.886	0.000	-	0.841	0.953
Lights	42	636	66	2	-	746	55	110	78	0	-	243	198	1239	65	2	-	1504	78	372	289	0	-	739	3232
% Lights	95.5	92.4	98.5	100.0	-	93.1	77.5	91.7	88.6	-	-	87.1	97.5	91.2	84.4	100.0	-	91.7	94.0	97.1	98.3	-	-	97.2	92.9
Mediums	2	23	0	0	-	25	5	10	10	0	-	25	5	52	7	0	-	64	5	9	5	0	-	19	133
% Mediums	4.5	3.3	0.0	0.0	-	3.1	7.0	8.3	11.4	-	-	9.0	2.5	3.8	9.1	0.0	-	3.9	6.0	2.3	1.7	-	-	2.5	3.8
Articulated Trucks	0	29	1	0	-	30	11	0	0	0	-	11	0	67	5	0	-	72	0	2	0	0	-	2	115
% Articulated Trucks	0.0	4.2	1.5	0.0	-	3.7	15.5	0.0	0.0	-	-	3.9	0.0	4.9	6.5	0.0	-	4.4	0.0	0.5	0.0	-	-	0.3	3.3
Bicycles on Crosswalk	-	-	-	-	0	-	-	-	-	-	0	-	-	-	-	-	0	-	-	-	-	-	0	-	-
% Bicycles on Crosswalk	-	-	-	-	0.0	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Pedestrians	-	-	-	-	1	-	-	-	-	-	0	-	-	-	-	-	0	-	-	-	-	-	0	-	-
% Pedestrians	-	-	-	-	100.0	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-

Gewalt Hamilton Associates Inc.
625 Forest Edge Drive

Vernon Hills, Illinois, United States 60061
(847) 478-9700 poster@gha-engineers.com

Count Name: Illinois 59 & 119th Street
Site Code:
Start Date: 09/19/2019

Turning Movement Peak Hour Data (4:45 PM)

Start Time	IL-59 Southbound						119th St Westbound						IL-59 Northbound						119th St Eastbound						Int. Total
	Right	Thru	Left	U-Turn	Peds	App. Total	Right	Thru	Left	U-Turn	Peds	App. Total	Right	Thru	Left	U-Turn	Peds	App. Total	Right	Thru	Left	U-Turn	Peds	App. Total	
4:45 PM	56	400	23	1	0	480	20	70	40	0	0	130	26	269	42	1	0	338	34	47	48	0	0	129	1077
5:00 PM	52	343	22	0	0	417	18	86	53	0	0	157	26	239	49	0	0	314	20	45	50	0	0	115	1003
5:15 PM	50	358	22	0	0	430	13	101	52	0	0	166	28	246	54	2	0	330	30	43	48	0	0	121	1047
5:30 PM	53	354	15	1	0	423	15	104	43	0	0	162	19	275	36	0	0	330	30	52	49	0	0	131	1046
Total	211	1455	82	2	0	1750	66	361	188	0	0	615	99	1029	181	3	0	1312	114	187	195	0	0	496	4173
Approach %	12.1	83.1	4.7	0.1	-	-	10.7	58.7	30.6	0.0	-	-	7.5	78.4	13.8	0.2	-	-	23.0	37.7	39.3	0.0	-	-	-
Total %	5.1	34.9	2.0	0.0	-	41.9	1.6	8.7	4.5	0.0	-	14.7	2.4	24.7	4.3	0.1	-	31.4	2.7	4.5	4.7	0.0	-	11.9	-
PHF	0.942	0.909	0.891	0.500	-	0.911	0.825	0.868	0.887	0.000	-	0.926	0.884	0.935	0.838	0.375	-	0.970	0.838	0.899	0.975	0.000	-	0.947	0.969
Lights	211	1428	78	2	-	1719	63	360	186	0	-	609	98	997	180	3	-	1278	114	184	195	0	-	493	4099
% Lights	100.0	98.1	95.1	100.0	-	98.2	95.5	99.7	98.9	-	-	99.0	99.0	96.9	99.4	100.0	-	97.4	100.0	98.4	100.0	-	-	99.4	98.2
Mediums	0	9	4	0	-	13	3	1	1	0	-	5	0	7	1	0	-	8	0	2	0	0	-	2	28
% Mediums	0.0	0.6	4.9	0.0	-	0.7	4.5	0.3	0.5	-	-	0.8	0.0	0.7	0.6	0.0	-	0.6	0.0	1.1	0.0	-	-	0.4	0.7
Articulated Trucks	0	18	0	0	-	18	0	0	1	0	-	1	1	25	0	0	-	26	0	1	0	0	-	1	46
% Articulated Trucks	0.0	1.2	0.0	0.0	-	1.0	0.0	0.0	0.5	-	-	0.2	1.0	2.4	0.0	0.0	-	2.0	0.0	0.5	0.0	-	-	0.2	1.1
Bicycles on Crosswalk	-	-	-	-	0	-	-	-	-	-	0	-	-	-	-	-	0	-	-	-	-	-	0	-	-
% Bicycles on Crosswalk	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Pedestrians	-	-	-	-	0	-	-	-	-	-	0	-	-	-	-	-	0	-	-	-	-	-	0	-	-
% Pedestrians	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-

APPENDIX C
CMAP Correspondence

Chicago Metropolitan Agency for Planning

233 South Wacker Drive
Suite 800
Chicago, Illinois 60606

312 454 0400
www.cmap.illinois.gov

September 26, 2019

William C. Grieve, P.E., PTOE
Senior Transportation Engineer
Gewalt Hamilton Associates
625 Forest Edge Drive
Vernon Hills, IL 60061

Subject: ***Naperville Polo Club***
IDOT

Dear Mr. Grieve:

In response to a request made on your behalf and dated September 24, 2019, we have developed year 2050 average daily traffic (ADT) projections for the subject location.

ROAD SEGMENT	Current Volumes	Year 2050 ADT
IL 59 north of 119th St	32,400	36,600
IL 59 south of 119th St	29,800	34,200
119th St West of IL 59	9,750	14,500
119th St from IL 59 to Naperville Rd	8,450	13,000
119th St east of Plainfd-Naperville Rd	9,200	12,600
Book Rd south of 119th St	325	700
Plainfd-Naperville Rd north of 119th St	10,350	14,800
Plainfd-Naperville Rd south of 119th St	8,800	13,100

Traffic projections are developed using existing ADT data provided in the request letter and the results from the March 2019 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,

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

cc: Quigley (IDOT)
S:\AdminGroups\ResearchAnalysis\2019_ForecastsTraffic\Naperville\wi-22-19\wi-22-19.docx

APPENDIX D

ITE Trip Generation Excerpts – 10th Edition

Land Use: 210
Single-Family Detached Housing

Description

Single-family detached housing includes all single-family detached homes on individual lots. A typical site surveyed is a suburban subdivision.

Additional Data

The number of vehicles and residents had a high correlation with average weekday vehicle trip ends. The use of these variables was limited, however, because the number of vehicles and residents was often difficult to obtain or predict. The number of dwelling units was generally used as the independent variable of choice because it was usually readily available, easy to project, and had a high correlation with average weekday vehicle trip ends.

This land use included data from a wide variety of units with different sizes, price ranges, locations, and ages. Consequently, there was a wide variation in trips generated within this category. Other factors, such as geographic location and type of adjacent and nearby development, may also have had an effect on the site trip generation.

Single-family detached units had the highest trip generation rate per dwelling unit of all residential uses because they were the largest units in size and had more residents and more vehicles per unit than other residential land uses; they were generally located farther away from shopping centers, employment areas, and other trip attractors than other residential land uses; and they generally had fewer alternative modes of transportation available because they were typically not as concentrated as other residential land uses.

Time-of-day distribution data for this land use are presented in Appendix A. For the six general urban/suburban sites with data, the overall highest vehicle volumes during the AM and PM on a weekday were counted between 7:15 and 8:15 a.m. and 4:00 and 5:00 p.m., respectively. For the two sites with Saturday data, the overall highest vehicle volume was counted between 3:00 and 4:00 p.m. For the one site with Sunday data, the overall highest vehicle volume was counted between 10:15 and 11:15 a.m.

The sites were surveyed in the 1980s, the 1990s, the 2000s, and the 2010s in California, Connecticut, Delaware, Illinois, Indiana, Maryland, Minnesota, Montana, New Jersey, North Carolina, Ohio, Oregon, Pennsylvania, South Carolina, South Dakota, Tennessee, Vermont, and Virginia.

Source Numbers

100, 105, 114, 126, 157, 167, 177, 197, 207, 211, 217, 267, 275, 293, 300, 319, 320, 356, 357, 367, 384, 387, 407, 435, 522, 550, 552, 579, 598, 601, 603, 614, 637, 711, 716, 720, 728, 735, 868, 903, 925, 936

Single-Family Detached Housing
(210)

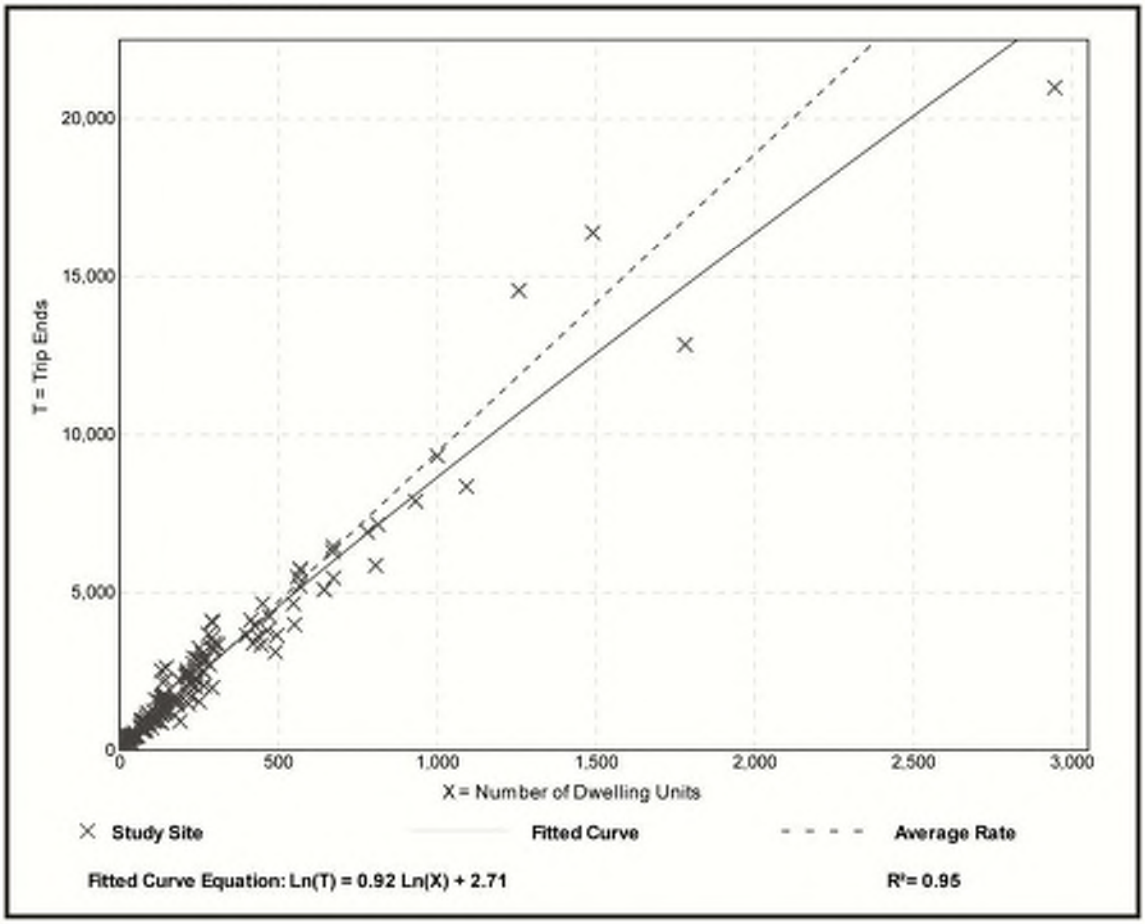
Vehicle Trip Ends vs: **Dwelling Units**
On a: **Weekday**

Setting/Location: **General Urban/Suburban**
Number of Studies: 159
Avg. Num. of Dwelling Units: 264
Directional Distribution: 50% entering, 50% exiting

Vehicle Trip Generation per Dwelling Unit

Average Rate	Range of Rates	Standard Deviation
9.44	4.81 - 19.39	2.10

Data Plot and Equation



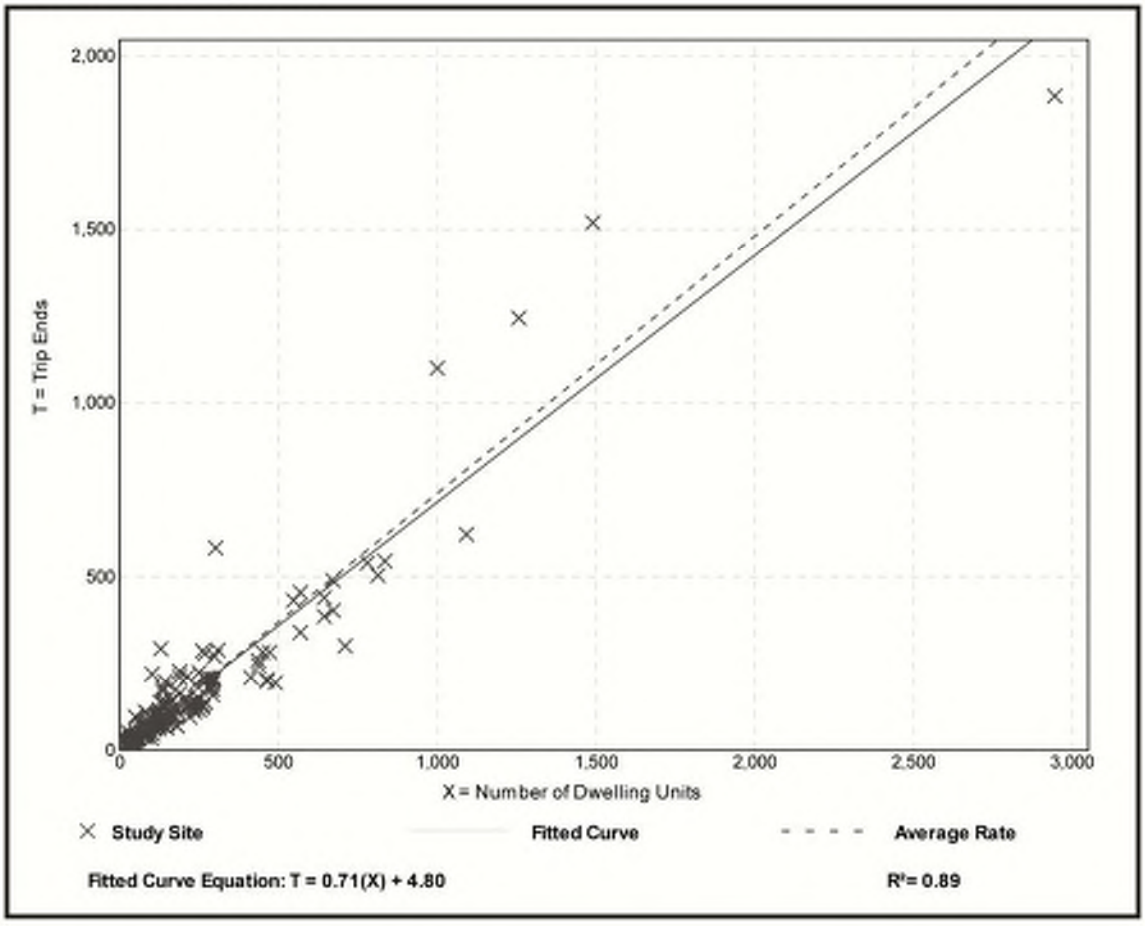
Single-Family Detached Housing
(210)

Vehicle Trip Ends vs: **Dwelling Units**
On a: **Weekday,**
Peak Hour of Adjacent Street Traffic,
One Hour Between 7 and 9 a.m.
Setting/Location: **General Urban/Suburban**
Number of Studies: 173
Avg. Num. of Dwelling Units: 219
Directional Distribution: 25% entering, 75% exiting

Vehicle Trip Generation per Dwelling Unit

Average Rate	Range of Rates	Standard Deviation
0.74	0.33 - 2.27	0.27

Data Plot and Equation



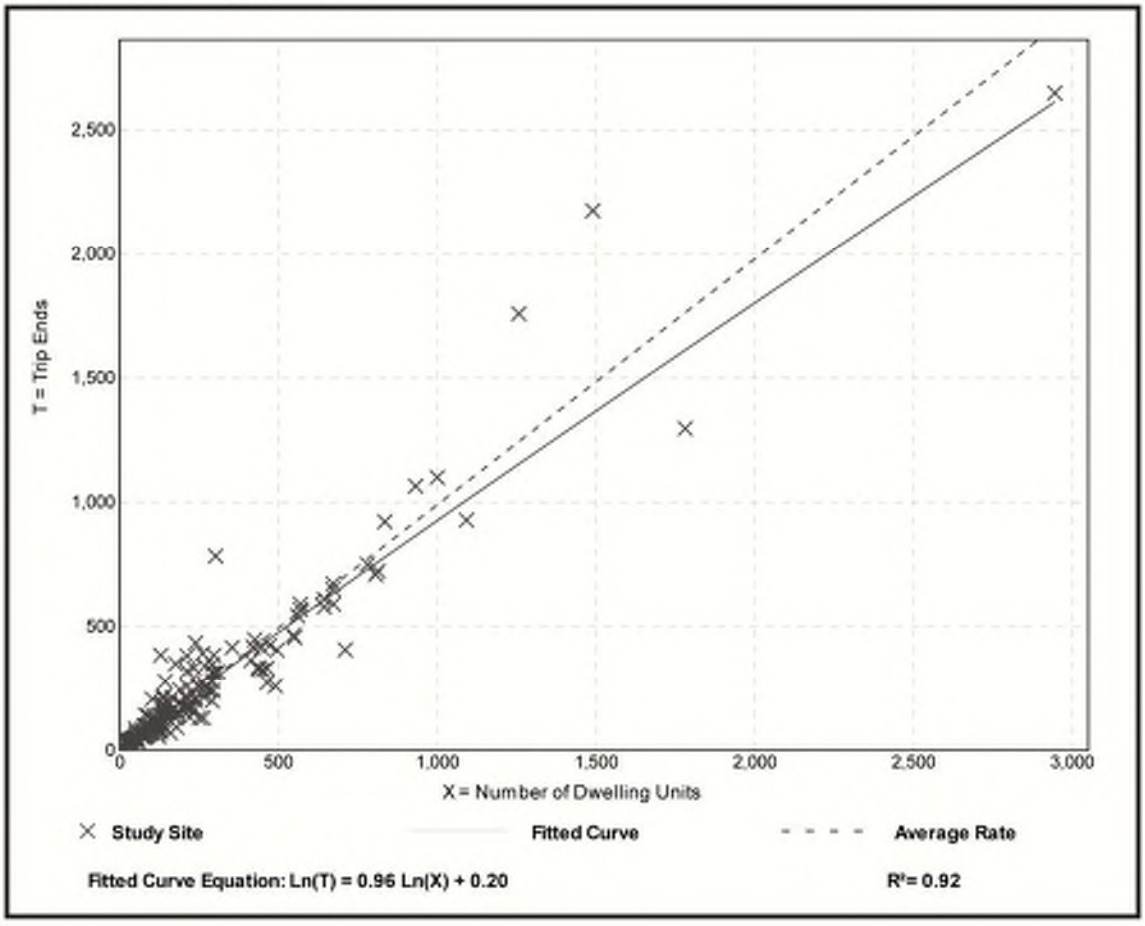
Single-Family Detached Housing
(210)

Vehicle Trip Ends vs: **Dwelling Units**
On a: **Weekday,**
Peak Hour of Adjacent Street Traffic,
One Hour Between 4 and 6 p.m.
Setting/Location: **General Urban/Suburban**
Number of Studies: 190
Avg. Num. of Dwelling Units: 242
Directional Distribution: 63% entering, 37% exiting

Vehicle Trip Generation per Dwelling Unit

Average Rate	Range of Rates	Standard Deviation
0.99	0.44 - 2.98	0.31

Data Plot and Equation



Land Use: 220
Multifamily Housing (Low-Rise)

Description

Low-rise multifamily housing includes apartments, townhouses, and condominiums located within the same building with at least three other dwelling units and that have one or two levels (floors). Multifamily housing (mid-rise) (Land Use 221), multifamily housing (high-rise) (Land Use 222), and off-campus student apartment (Land Use 225) are related land uses.

Additional Data

In prior editions of *Trip Generation Manual*, the low-rise multifamily housing sites were further divided into rental and condominium categories. An investigation of vehicle trip data found no clear differences in trip making patterns between the rental and condominium sites within the ITE database. As more data are compiled for future editions, this land use classification can be reinvestigated.

For the three sites for which both the number of residents and the number of occupied dwelling units were available, there were an average of 2.72 residents per occupied dwelling unit.

For the two sites for which the numbers of both total dwelling units and occupied dwelling units were available, an average of 96.2 percent of the total dwelling units were occupied.

This land use included data from a wide variety of units with different sizes, price ranges, locations, and ages. Consequently, there was a wide variation in trips generated within this category. Other factors, such as geographic location and type of adjacent and nearby development, may also have had an effect on the site trip generation.

Time-of-day distribution data for this land use are presented in Appendix A. For the 10 general urban/suburban sites with data, the overall highest vehicle volumes during the AM and PM on a weekday were counted between 7:15 and 8:15 a.m. and 4:45 and 5:45 p.m., respectively. For the one site with Saturday data, the overall highest vehicle volume was counted between 9:45 and 10:45 a.m. For the one site with Sunday data, the overall highest vehicle volume was counted between 11:45 a.m. and 12:45 p.m.

For the one dense multi-use urban site with 24-hour count data, the overall highest vehicle volumes during the AM and PM on a weekday were counted between 7:00 and 8:00 a.m. and 6:15 and 7:15 p.m., respectively.

For the three sites for which data were provided for both occupied dwelling units and residents, there was an average of 2.72 residents per occupied dwelling unit.

The average numbers of person trips per vehicle trip at the five general urban/suburban sites at which both person trip and vehicle trip data were collected were as follows:

- 1.13 during Weekday, Peak Hour of Adjacent Street Traffic, one hour between 7 and 9 a.m.
- 1.21 during Weekday, Peak Hour of Adjacent Street Traffic, one hour between 4 and 6 p.m.

The sites were surveyed in the 1980s, the 1990s, the 2000s, and the 2010s in British Columbia (CAN), California, District of Columbia, Florida, Georgia, Illinois, Indiana, Maine, Maryland, Minnesota, New Jersey, New York, Ontario, Oregon, Pennsylvania, South Dakota, Tennessee, Texas, Utah, Virginia, and Washington.

It is expected that the number of bedrooms and number of residents are likely correlated to the number of trips generated by a residential site. Many of the studies included in this land use did not indicate the total number of bedrooms. To assist in the future analysis of this land use, it is important that this information be collected and included in trip generation data submissions.

Source Numbers

168, 187, 188, 204, 211, 300, 305, 306, 319, 320, 321, 357, 390, 412, 418, 525, 530, 571, 579, 583, 864, 868, 869, 870, 896, 903, 918, 946, 947, 948, 951

Multifamily Housing (Low-Rise)
(220)

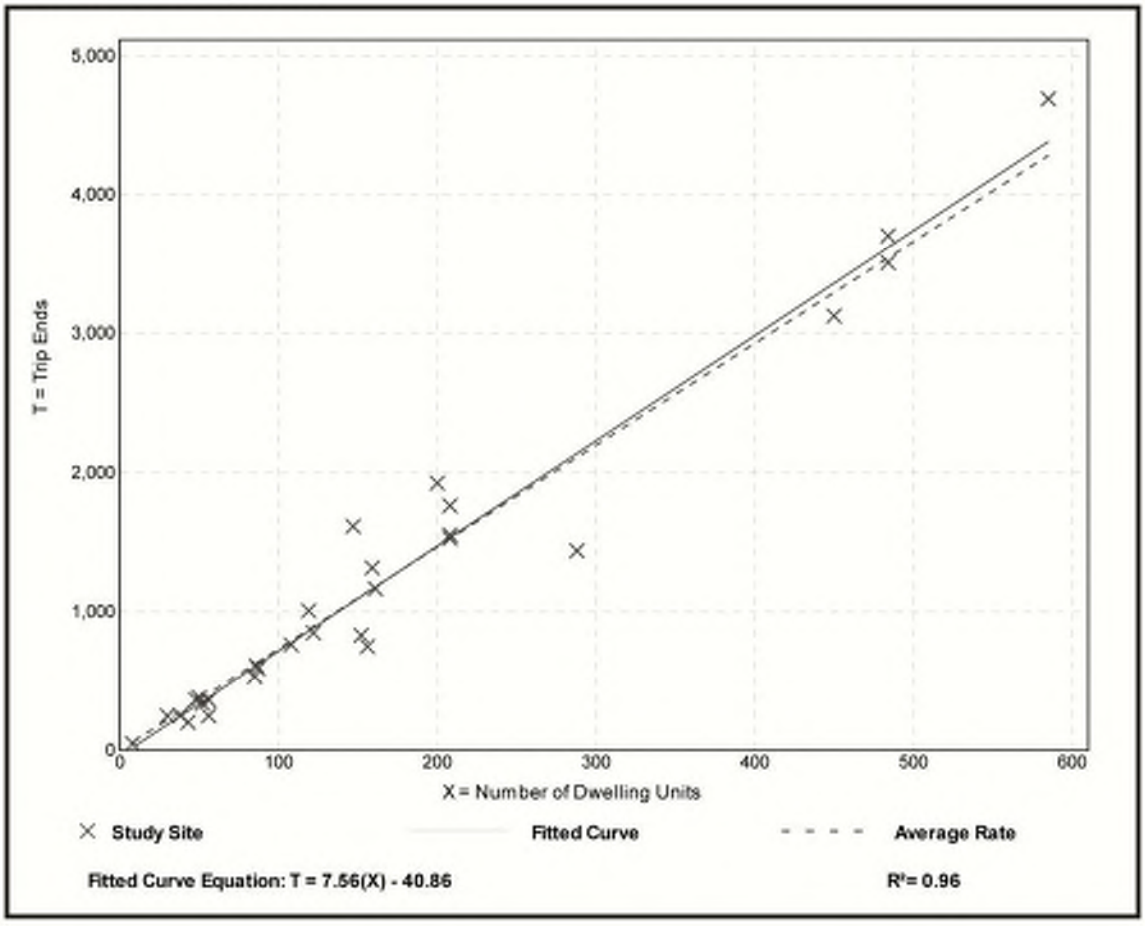
Vehicle Trip Ends vs: **Dwelling Units**
On a: **Weekday**

Setting/Location: **General Urban/Suburban**
Number of Studies: 29
Avg. Num. of Dwelling Units: 168
Directional Distribution: 50% entering, 50% exiting

Vehicle Trip Generation per Dwelling Unit

Average Rate	Range of Rates	Standard Deviation
7.32	4.45 - 10.97	1.31

Data Plot and Equation



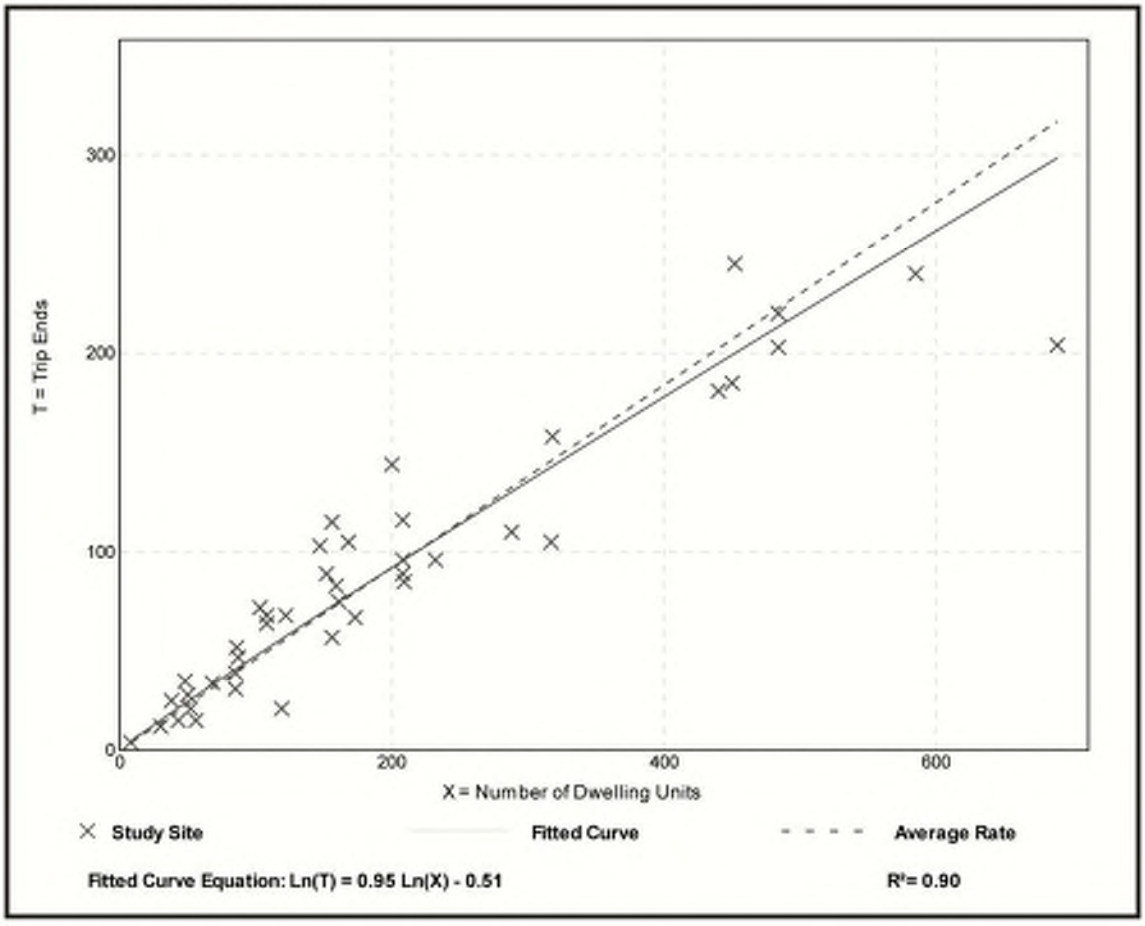
Multifamily Housing (Low-Rise)
(220)

Vehicle Trip Ends vs: **Dwelling Units**
On a: **Weekday,**
Peak Hour of Adjacent Street Traffic,
One Hour Between 7 and 9 a.m.
Setting/Location: **General Urban/Suburban**
Number of Studies: 42
Avg. Num. of Dwelling Units: 199
Directional Distribution: 23% entering, 77% exiting

Vehicle Trip Generation per Dwelling Unit

Average Rate	Range of Rates	Standard Deviation
0.46	0.18 - 0.74	0.12

Data Plot and Equation



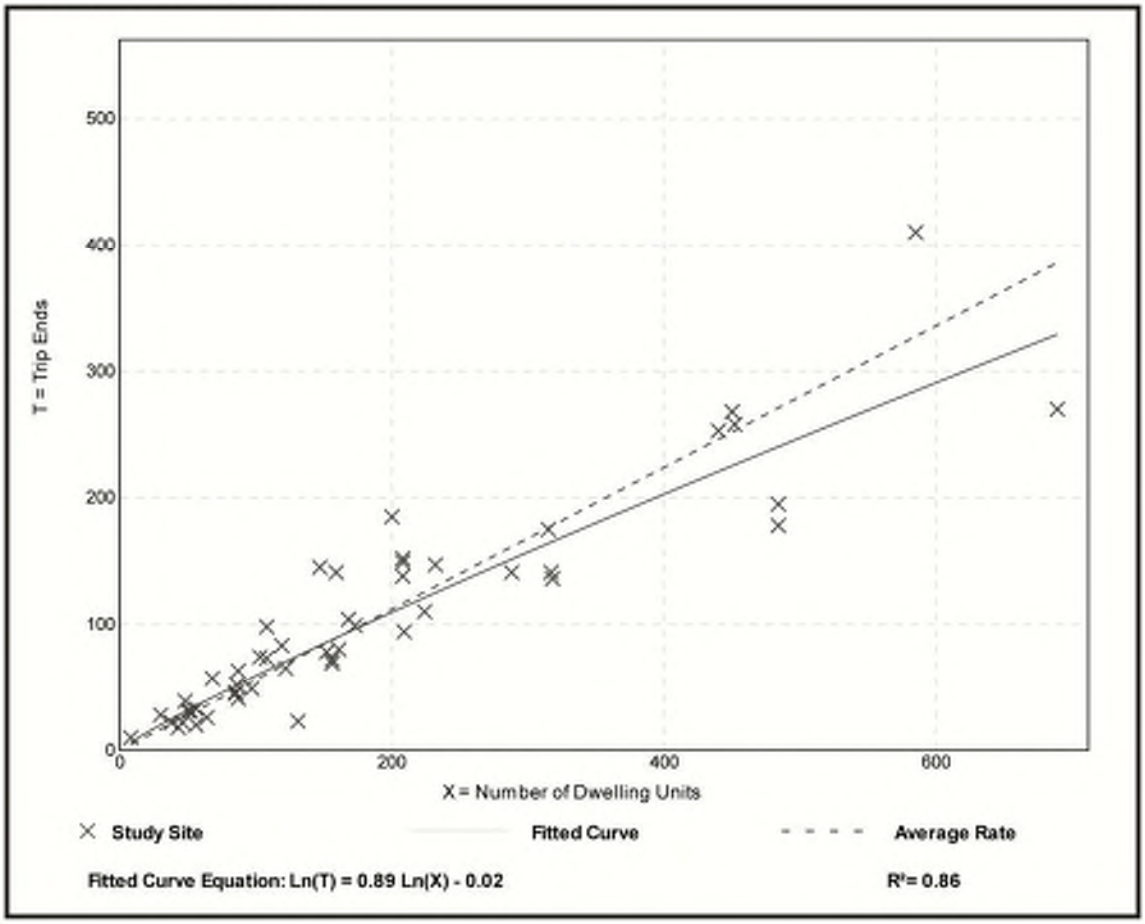
Multifamily Housing (Low-Rise)
(220)

Vehicle Trip Ends vs: **Dwelling Units**
On a: **Weekday,**
Peak Hour of Adjacent Street Traffic,
One Hour Between 4 and 6 p.m.
Setting/Location: **General Urban/Suburban**
Number of Studies: 50
Avg. Num. of Dwelling Units: 187
Directional Distribution: 63% entering, 37% exiting

Vehicle Trip Generation per Dwelling Unit

Average Rate	Range of Rates	Standard Deviation
0.56	0.18 - 1.25	0.16

Data Plot and Equation



Land Use: 221
Multifamily Housing (Mid-Rise)

Description

Mid-rise multifamily housing includes apartments, townhouses, and condominiums located within the same building with at least three other dwelling units and that have between three and 10 levels (floors). Multifamily housing (low-rise) (Land Use 220), multifamily housing (high-rise) (Land Use 222), off-campus student apartment (Land Use 225), and mid-rise residential with 1st-floor commercial (Land Use 231) are related land uses.

Additional Data

In prior editions of *Trip Generation Manual*, the mid-rise multifamily housing sites were further divided into rental and condominium categories. An investigation of vehicle trip data found no clear differences in trip making patterns between the rental and condominium sites within the ITE database. As more data are compiled for future editions, this land use classification can be reinvestigated.

For the six sites for which both the number of residents and the number of occupied dwelling units were available, there were an average of 2.46 residents per occupied dwelling unit.

For the five sites for which the numbers of both total dwelling units and occupied dwelling units were available, an average of 95.7 percent of the total dwelling units were occupied.

Time-of-day distribution data for this land use are presented in Appendix A. For the eight general urban/suburban sites with data, the overall highest vehicle volumes during the AM and PM on a weekday were counted between 7:00 and 8:00 a.m. and 4:45 and 5:45 p.m., respectively.

For the four dense multi-use urban sites with 24-hour count data, the overall highest vehicle volumes during the AM and PM on a weekday were counted between 7:15 and 8:15 a.m. and 4:15 and 5:15 p.m., respectively. For the three center city core sites with 24-hour count data, the overall highest vehicle volumes during the AM and PM on a weekday were counted between 6:45 and 7:45 a.m. and 5:00 and 6:00 p.m., respectively.

For the six sites for which data were provided for both occupied dwelling units and residents, there was an average of 2.46 residents per occupied dwelling unit.

For the five sites for which data were provided for both occupied dwelling units and total dwelling units, an average of 95.7 percent of the units were occupied.

The average numbers of person trips per vehicle trip at the five center city core sites at which both person trip and vehicle trip data were collected were as follows:

- 1.84 during Weekday, Peak Hour of Adjacent Street Traffic, one hour between 7 and 9 a.m.
- 1.94 during Weekday, AM Peak Hour of Generator
- 2.07 during Weekday, Peak Hour of Adjacent Street Traffic, one hour between 4 and 6 p.m.
- 2.59 during Weekday, PM Peak Hour of Generator

The average numbers of person trips per vehicle trip at the 32 dense multi-use urban sites at which both person trip and vehicle trip data were collected were as follows:

- 1.90 during Weekday, Peak Hour of Adjacent Street Traffic, one hour between 7 and 9 a.m.
- 1.90 during Weekday, AM Peak Hour of Generator
- 2.00 during Weekday, Peak Hour of Adjacent Street Traffic, one hour between 4 and 6 p.m.
- 2.08 during Weekday, PM Peak Hour of Generator

The average numbers of person trips per vehicle trip at the 13 general urban/suburban sites at which both person trip and vehicle trip data were collected were as follows:

- 1.56 during Weekday, Peak Hour of Adjacent Street Traffic, one hour between 7 and 9 a.m.
- 1.88 during Weekday, AM Peak Hour of Generator
- 1.70 during Weekday, Peak Hour of Adjacent Street Traffic, one hour between 4 and 6 p.m.
- 2.07 during Weekday, PM Peak Hour of Generator

The sites were surveyed in the 1980s, the 1990s, the 2000s, and the 2010s in Alberta (CAN), British Columbia (CAN), California, Delaware, District of Columbia, Florida, Georgia, Illinois, Maryland, Massachusetts, Minnesota, New Hampshire, New Jersey, Ontario, Oregon, Pennsylvania, South Carolina, South Dakota, Tennessee, Utah, Virginia, and Wisconsin.

Source Numbers

168, 188, 204, 305, 306, 321, 357, 390, 436, 525, 530, 579, 638, 818, 857, 866, 901, 904, 910, 912, 918, 934, 936, 939, 944, 947, 948, 949, 959, 963, 964, 966, 967, 969, 970

Multifamily Housing (Mid-Rise)
(221)

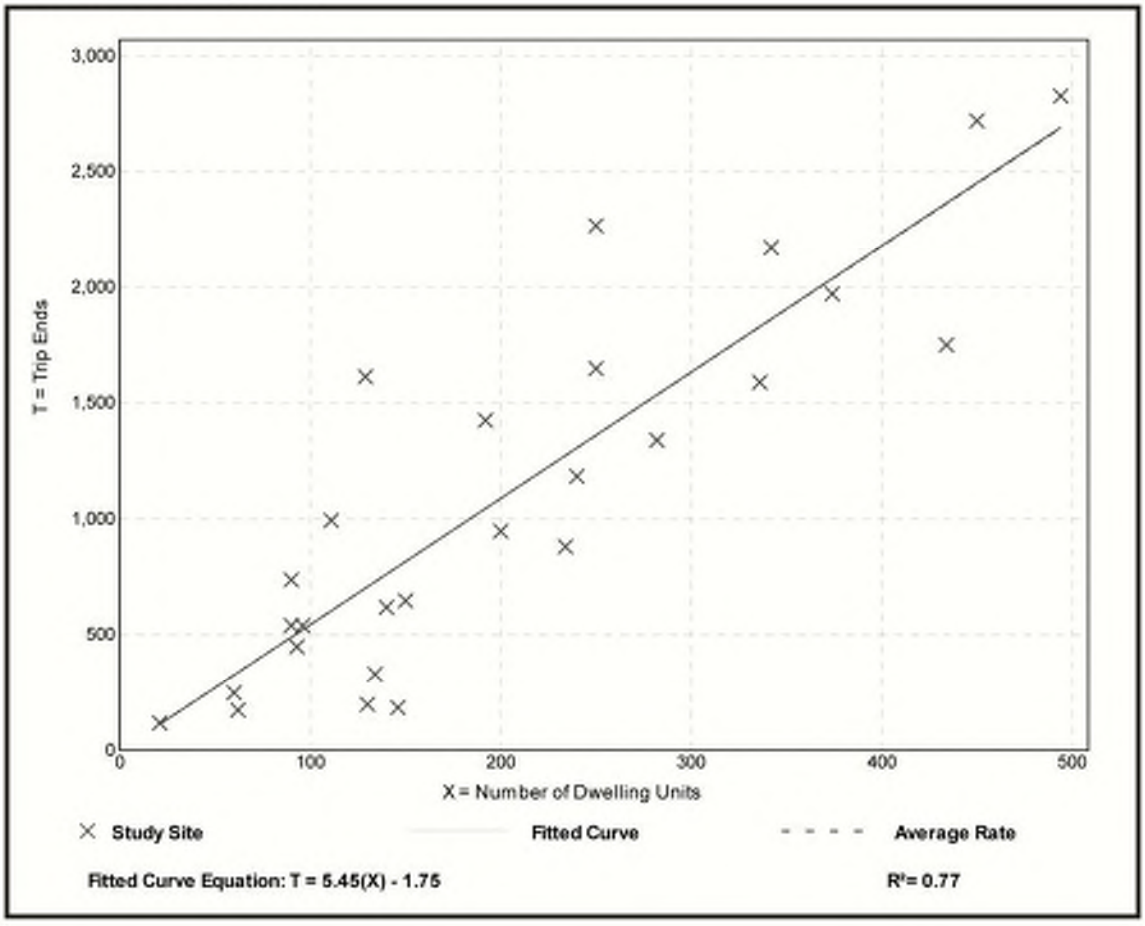
Vehicle Trip Ends vs: **Dwelling Units**
On a: **Weekday**

Setting/Location: **General Urban/Suburban**
Number of Studies: 27
Avg. Num. of Dwelling Units: 205
Directional Distribution: 50% entering, 50% exiting

Vehicle Trip Generation per Dwelling Unit

Average Rate	Range of Rates	Standard Deviation
5.44	1.27 - 12.50	2.03

Data Plot and Equation



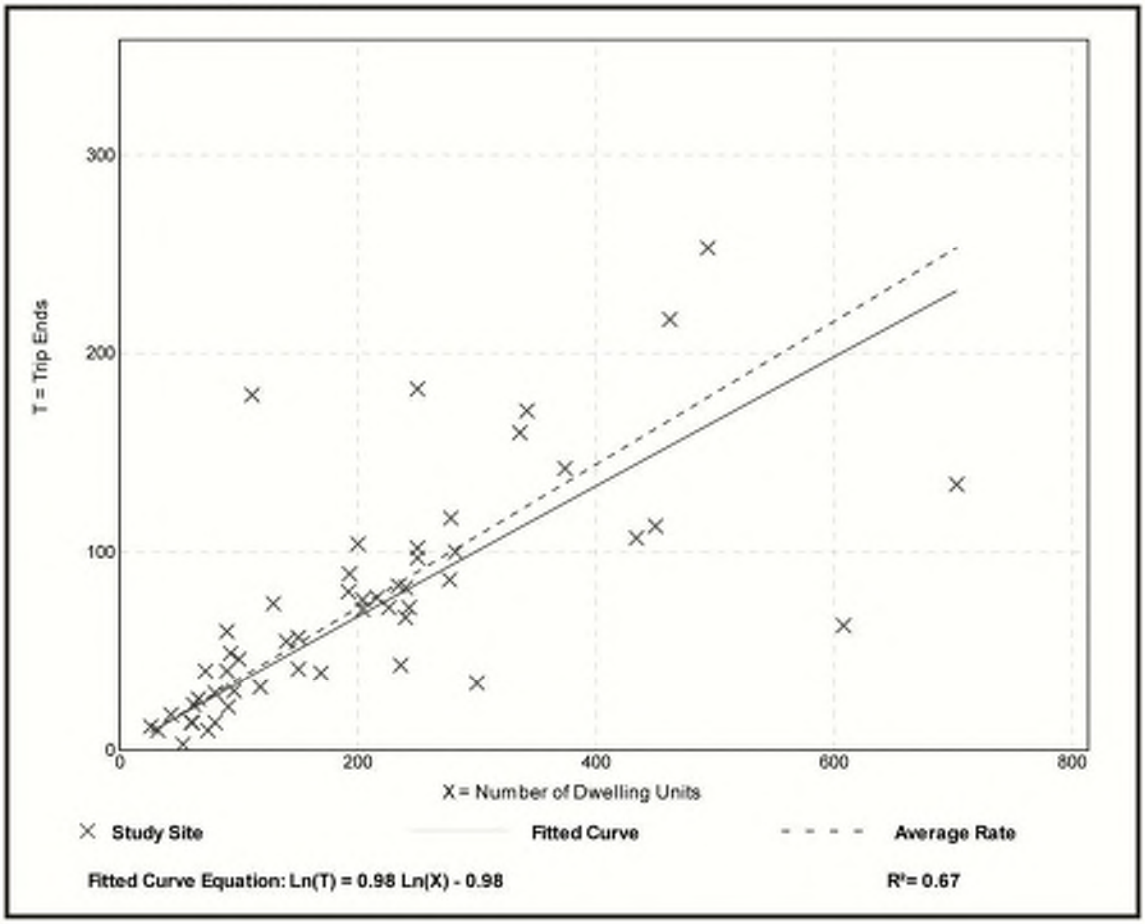
Multifamily Housing (Mid-Rise)
(221)

Vehicle Trip Ends vs: **Dwelling Units**
On a: **Weekday,**
Peak Hour of Adjacent Street Traffic,
One Hour Between 7 and 9 a.m.
Setting/Location: **General Urban/Suburban**
Number of Studies: 53
Avg. Num. of Dwelling Units: 207
Directional Distribution: 26% entering, 74% exiting

Vehicle Trip Generation per Dwelling Unit

Average Rate	Range of Rates	Standard Deviation
0.36	0.06 - 1.61	0.19

Data Plot and Equation



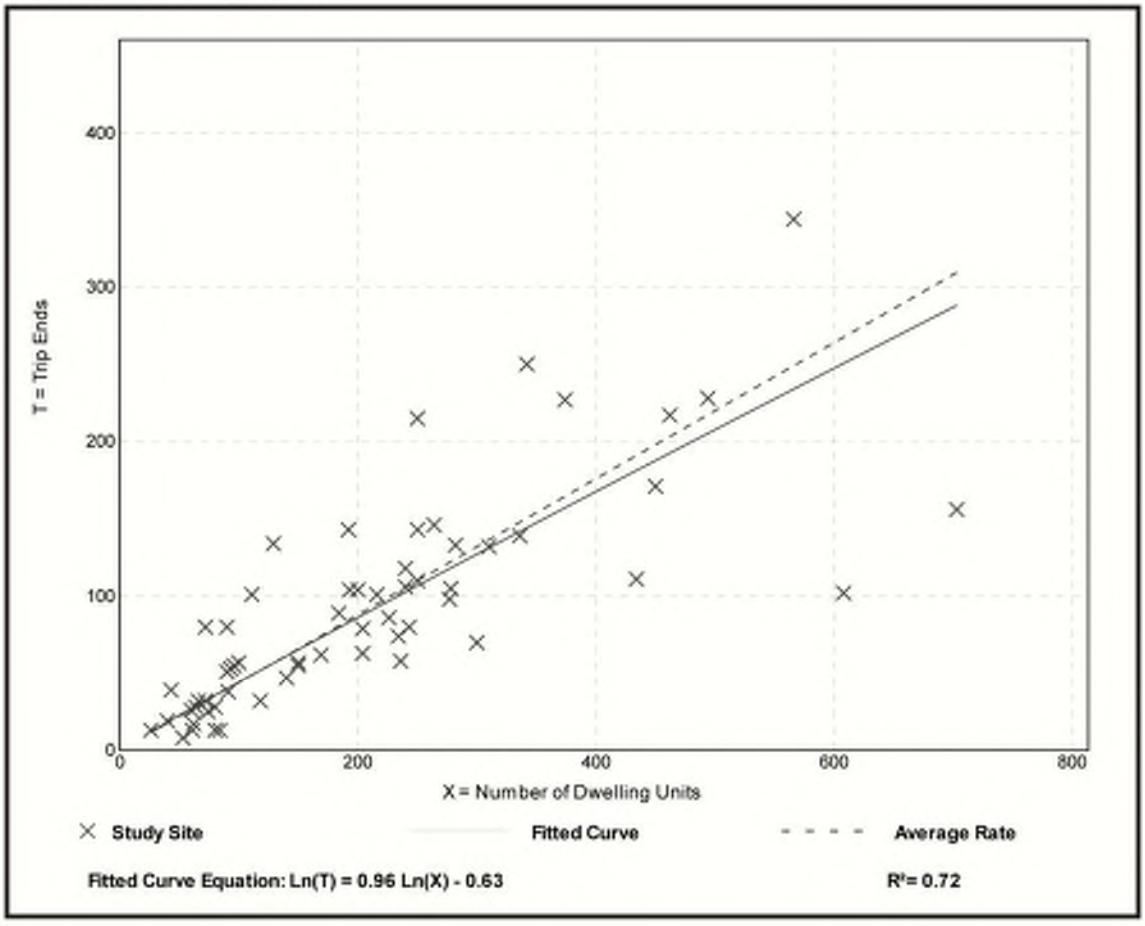
Multifamily Housing (Mid-Rise)
(221)

Vehicle Trip Ends vs: **Dwelling Units**
On a: **Weekday,**
Peak Hour of Adjacent Street Traffic,
One Hour Between 4 and 6 p.m.
Setting/Location: **General Urban/Suburban**
Number of Studies: 60
Avg. Num. of Dwelling Units: 208
Directional Distribution: 61% entering, 39% exiting

Vehicle Trip Generation per Dwelling Unit

Average Rate	Range of Rates	Standard Deviation
0.44	0.15 - 1.11	0.19

Data Plot and Equation



Land Use: 251
Senior Adult Housing—Detached

Description

Senior adult housing consists of detached independent living developments, including retirement communities, age-restricted housing, and active adult communities. These developments may include amenities such as golf courses, swimming pools, 24-hour security, transportation, and common recreational facilities. However, they generally lack centralized dining and on-site health facilities. Detached senior adult housing communities may or may not be gated. Residents in these communities are typically active (requiring little to no medical supervision). The percentage of retired residents varies by development. Senior adult housing—attached (Land Use 252), congregate care facility (Land Use 253), assisted living (Land Use 254), and continuing care retirement community (Land Use 255) are related land uses.

Additional Data

Caution should be used when applying trip rates for this land use as it may contain a wide variety of studies ranging from communities with very active, working residents to communities with older, retired residents. As more data becomes available, consideration will be given to future stratification of this land use.

Many factors affected the trip rates for detached senior adult housing. Factors such as the average age of residents, development location and size, affluence of residents, employment status, and vehicular access should be taken into consideration when conducting an analysis. Some developments were located within close proximity to medical facilities, restaurants, shopping centers, banks, and recreational activities.

For the six sites for which the numbers of both total dwelling units and occupied dwelling units were available, an average of 98.5 percent of the total dwelling units were occupied.

Time-of-day distribution data for this land use are presented in Appendix A. For the six general urban/suburban sites with data, the overall highest vehicle volumes during the AM and PM on a weekday were counted between 11:45 a.m. and 12:45 p.m. and 5:00 and 6:00 p.m., respectively.

For the six sites for which data were provided for both occupied dwelling units and total dwelling units, an average of 98.5 percent of the units were occupied.

The sites were surveyed in the 1980s, the 1990s, the 2000s, and the 2010s in Alberta (CAN), California, Delaware, Florida, New Hampshire, New Jersey, and Pennsylvania.

Source Numbers

221, 289, 398, 421, 500, 550, 598, 601, 629, 734, 930

Senior Adult Housing - Detached
(251)

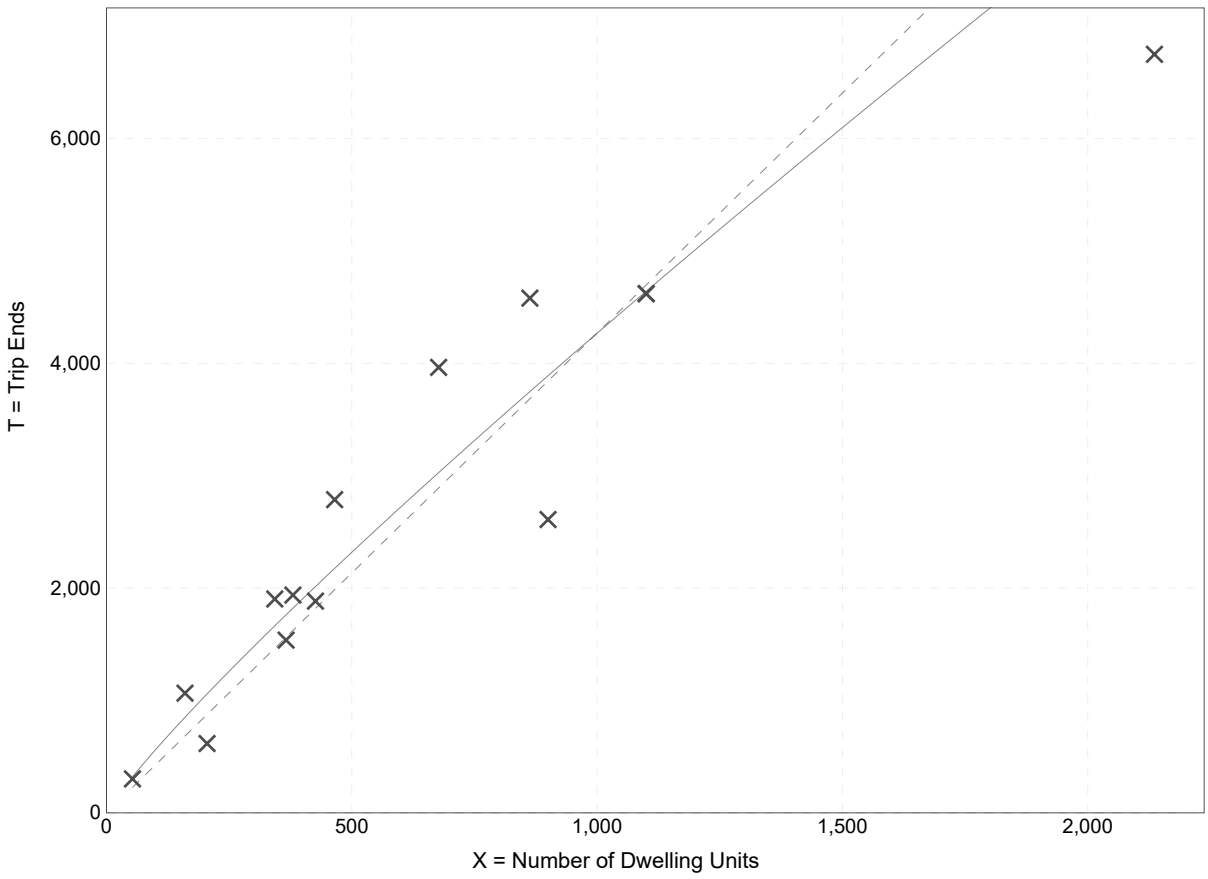
Vehicle Trip Ends vs: **Dwelling Units**
On a: **Weekday**

Setting/Location: **General Urban/Suburban**
Number of Studies: 14
Avg. Num. of Dwelling Units: 655
Directional Distribution: 50% entering, 50% exiting

Vehicle Trip Generation per Dwelling Unit

Average Rate	Range of Rates	Standard Deviation
4.27	2.90 - 6.66	1.11

Data Plot and Equation



Fitted Curve Equation: Ln(T) = 0.88 Ln(X) + 2.28 **R^2= 0.92**

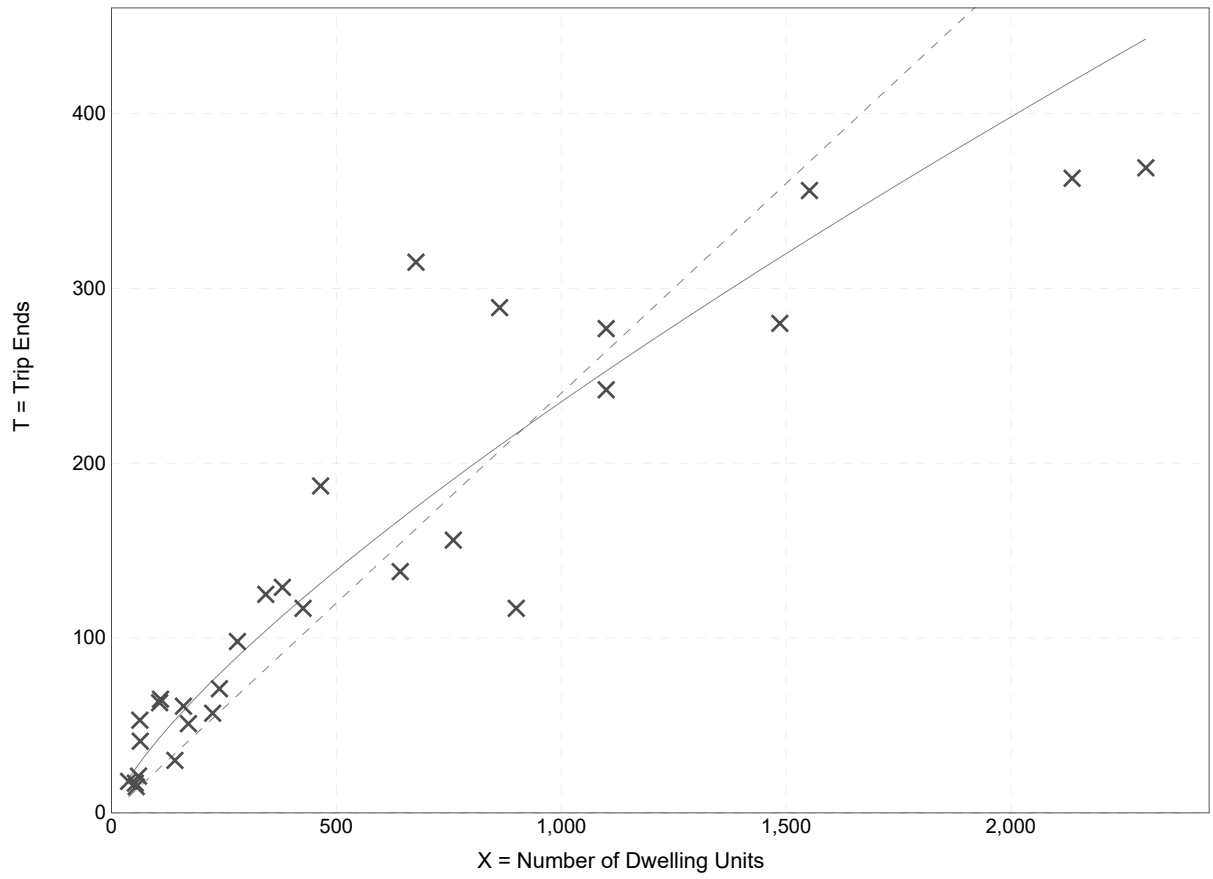
Senior Adult Housing - Detached
(251)

Vehicle Trip Ends vs:	**Dwelling Units**
On a:	**Weekday,**
	Peak Hour of Adjacent Street Traffic,
	One Hour Between 7 and 9 a.m.
Setting/Location:	**General Urban/Suburban**
Number of Studies:	29
Avg. Num. of Dwelling Units:	583
Directional Distribution:	33% entering, 67% exiting

Vehicle Trip Generation per Dwelling Unit

Average Rate	Range of Rates	Standard Deviation
0.24	0.13 - 0.84	0.10

Data Plot and Equation



Fitted Curve Equation: Ln(T) = 0.76 Ln(X) + 0.21

R^2= 0.89

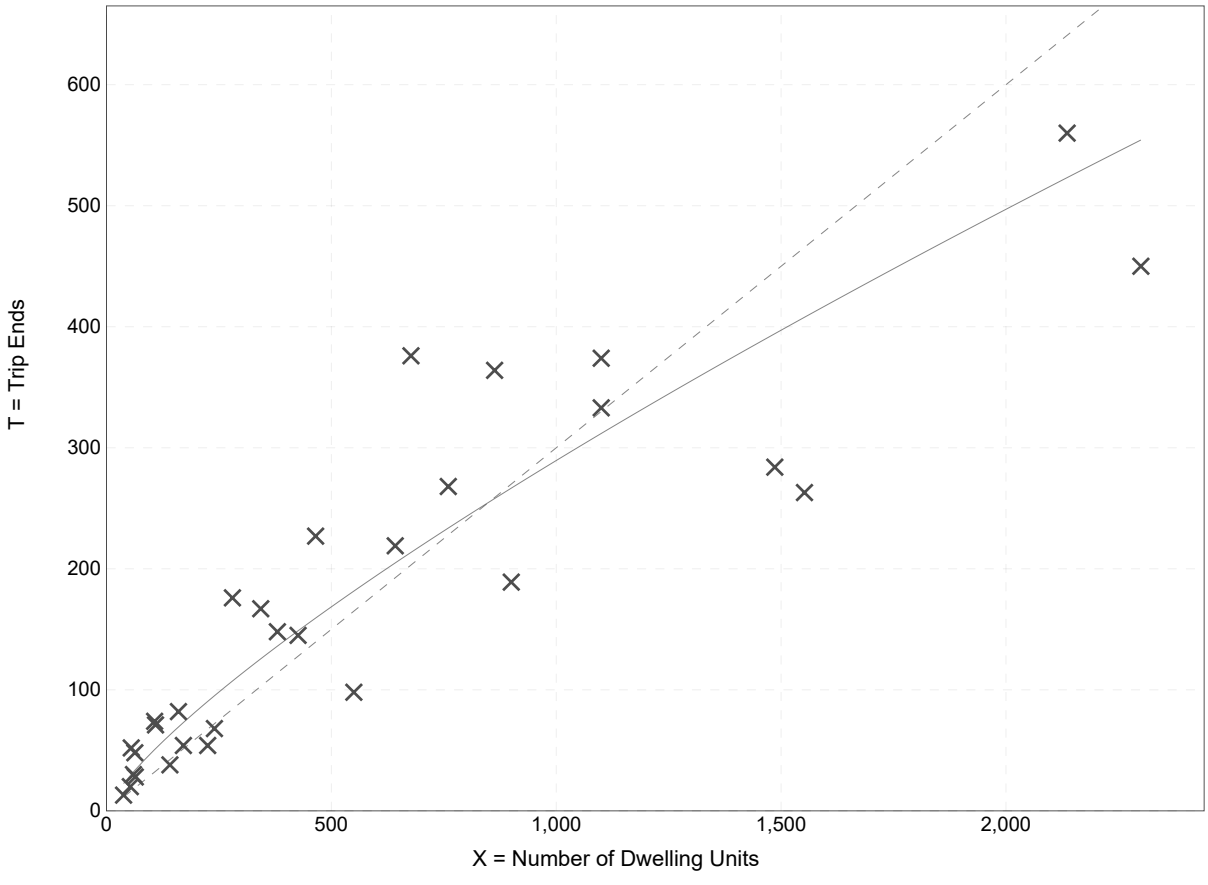
Senior Adult Housing - Detached
(251)

Vehicle Trip Ends vs:	**Dwelling Units**
On a:	**Weekday,**
	Peak Hour of Adjacent Street Traffic,
	One Hour Between 4 and 6 p.m.
Setting/Location:	**General Urban/Suburban**
Number of Studies:	30
Avg. Num. of Dwelling Units:	582
Directional Distribution:	61% entering, 39% exiting

Vehicle Trip Generation per Dwelling Unit

Average Rate	Range of Rates	Standard Deviation
0.30	0.17 - 0.95	0.13

Data Plot and Equation



Fitted Curve Equation: Ln(T) = 0.78 Ln(X) + 0.28

R^2= 0.87

Land Use: 252
Senior Adult Housing—Attached

Description

Senior adult housing consists of attached independent living developments, including retirement communities, age-restricted housing, and active adult communities. These developments may include limited social or recreational services. However, they generally lack centralized dining and onsite medical facilities. Residents in these communities live independently, are typically active (requiring little to no medical supervision) and may or may not be retired. Senior adult housing—detached (Land Use 251), congregate care facility (Land Use 253), assisted living (Land Use 254), and continuing care retirement community (Land Use 255) are related uses.

Additional Data

Time-of-day distribution data for this land use are presented in Appendix A. For the one general urban/suburban site with data, the overall highest vehicle volumes during the AM and PM on a weekday were counted between 11:45 a.m. and 12:45 p.m. and 12:00 and 1:00 p.m., respectively.

The sites were surveyed in the 1980s, the 1990s, and the 2000s in Alberta (CAN), California, Illinois, New Hampshire, New Jersey, New York, and Pennsylvania.

Source Numbers

272, 501, 576, 602, 703, 734, 741, 902, 970

Senior Adult Housing - Attached
(252)

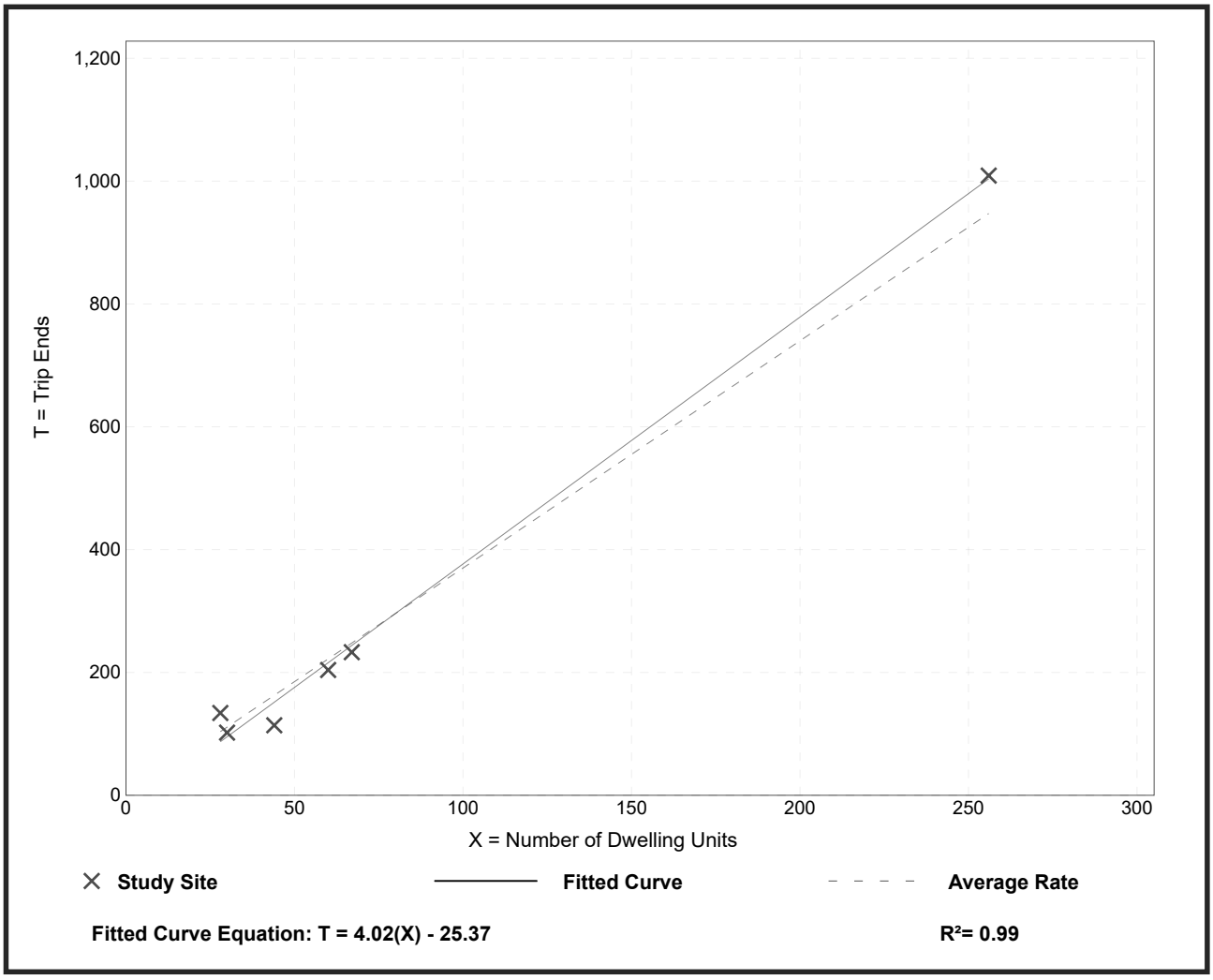
Vehicle Trip Ends vs: **Dwelling Units**
On a: **Weekday**

Setting/Location: **General Urban/Suburban**
Number of Studies: 6
Avg. Num. of Dwelling Units: 81
Directional Distribution: 50% entering, 50% exiting

Vehicle Trip Generation per Dwelling Unit

Average Rate	Range of Rates	Standard Deviation
3.70	2.59 - 4.79	0.53

Data Plot and Equation



Fitted Curve Equation: T = 4.02(X) - 25.37

R^2= 0.99

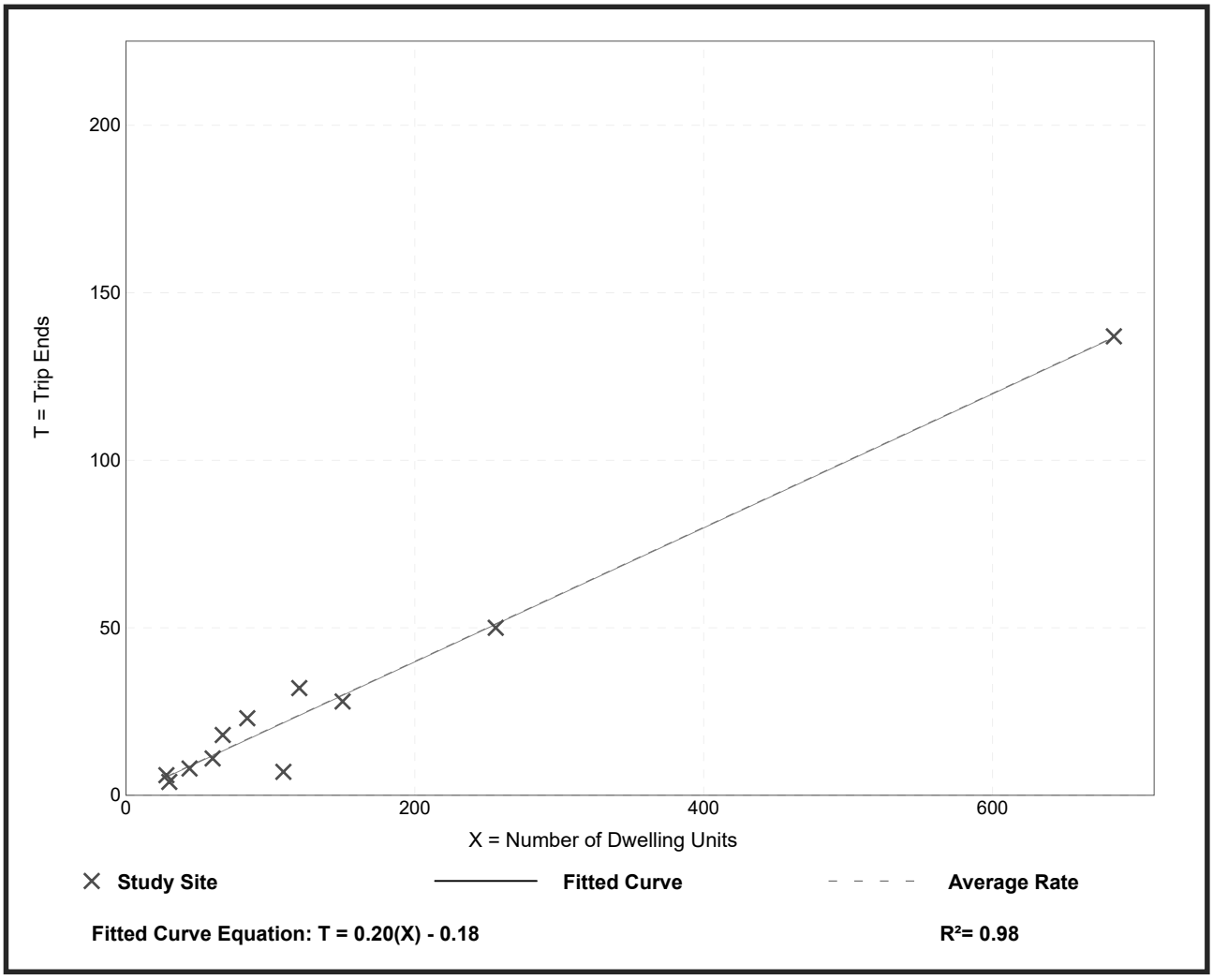
Senior Adult Housing - Attached
(252)

Vehicle Trip Ends vs:	**Dwelling Units**
On a:	**Weekday,**
	Peak Hour of Adjacent Street Traffic,
	One Hour Between 7 and 9 a.m.
Setting/Location:	**General Urban/Suburban**
Number of Studies:	11
Avg. Num. of Dwelling Units:	148
Directional Distribution:	35% entering, 65% exiting

Vehicle Trip Generation per Dwelling Unit

Average Rate	Range of Rates	Standard Deviation
0.20	0.06 - 0.27	0.05

Data Plot and Equation



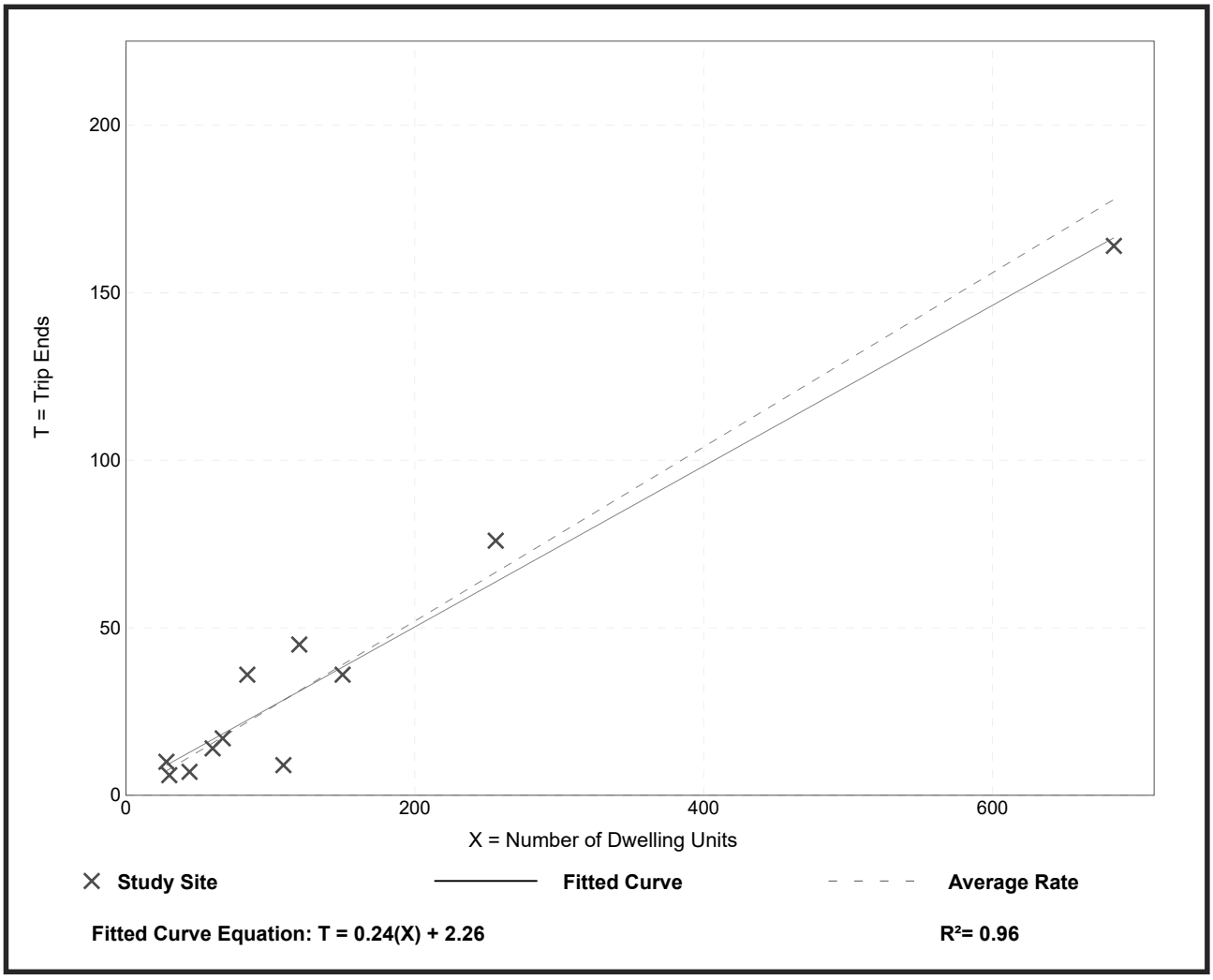
Senior Adult Housing - Attached
(252)

Vehicle Trip Ends vs:	**Dwelling Units**
On a:	**Weekday,**
	Peak Hour of Adjacent Street Traffic,
	One Hour Between 4 and 6 p.m.
Setting/Location:	**General Urban/Suburban**
Number of Studies:	11
Avg. Num. of Dwelling Units:	148
Directional Distribution:	55% entering, 45% exiting

Vehicle Trip Generation per Dwelling Unit

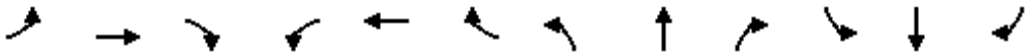
Average Rate	Range of Rates	Standard Deviation
0.26	0.08 - 0.43	0.08

Data Plot and Equation



APPENDIX E

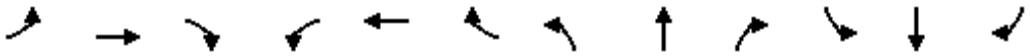
Capacity Analysis Printouts



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	294	383	83	88	120	71	77	1358	203	67	688	44
Future Volume (veh/h)	294	383	83	88	120	71	77	1358	203	67	688	44
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		1.00	1.00		1.00	1.00		1.00	1.00		1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach		No			No			No			No	
Adj Sat Flow, veh/h/ln	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870
Adj Flow Rate, veh/h	320	416	90	96	130	77	84	1476	221	73	748	48
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Percent Heavy Veh, %	2	2	2	2	2	2	2	2	2	2	2	2
Cap, veh/h	343	438	372	168	176	104	105	1594	235	92	1717	110
Arrive On Green	0.13	0.23	0.23	0.06	0.16	0.16	0.06	0.51	0.51	0.05	0.51	0.51
Sat Flow, veh/h	1781	1870	1585	1781	1101	652	1781	3106	459	1781	3391	217
Grp Volume(v), veh/h	320	416	90	96	0	207	84	835	862	73	392	404
Grp Sat Flow(s),veh/h/ln	1781	1870	1585	1781	0	1753	1781	1777	1788	1781	1777	1831
Q Serve(g_s), s	18.5	30.7	6.5	6.2	0.0	15.7	6.5	60.5	63.4	5.7	19.6	19.6
Cycle Q Clear(g_c), s	18.5	30.7	6.5	6.2	0.0	15.7	6.5	60.5	63.4	5.7	19.6	19.6
Prop In Lane	1.00		1.00	1.00		0.37	1.00		0.26	1.00		0.12
Lane Grp Cap(c), veh/h	343	438	372	168	0	280	105	912	918	92	900	927
V/C Ratio(X)	0.93	0.95	0.24	0.57	0.00	0.74	0.80	0.92	0.94	0.79	0.44	0.44
Avail Cap(c_a), veh/h	343	441	374	199	0	313	134	912	918	121	900	927
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	1.00	1.00	1.00	0.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Uniform Delay (d), s/veh	44.7	52.8	43.5	46.9	0.0	56.0	65.1	31.3	32.0	65.6	21.9	21.9
Incr Delay (d2), s/veh	32.1	30.7	0.7	3.0	0.0	10.6	23.2	15.3	18.1	22.7	1.5	1.5
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(95%),veh/ln	17.9	24.7	4.7	5.2	0.0	12.3	6.5	36.8	39.2	5.6	13.0	13.3
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	76.7	83.5	44.2	50.0	0.0	66.6	88.3	46.6	50.2	88.3	23.4	23.4
LnGrp LOS	E	F	D	D	A	E	F	D	D	F	C	C
Approach Vol, veh/h		826			303			1781			869	
Approach Delay, s/veh		76.6			61.3			50.3			28.9	
Approach LOS		E			E			D			C	

Timer - Assigned Phs	1	2	3	4	5	6	7	8
Phs Duration (G+Y+Rc), s	11.7	77.9	11.6	38.8	12.7	76.9	22.0	28.4
Change Period (Y+Rc), s	4.5	6.0	3.5	6.0	4.5	6.0	3.5	6.0
Max Green Setting (Gmax), s	9.5	67.0	10.5	33.0	10.5	66.0	18.5	25.0
Max Q Clear Time (g_c+I1), s	7.7	65.4	8.2	32.7	8.5	21.6	20.5	17.7
Green Ext Time (p_c), s	0.0	1.6	0.0	0.2	0.0	18.7	0.0	1.0

Intersection Summary	
HCM 6th Ctrl Delay	52.0
HCM 6th LOS	D



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	267	327	25	85	144	78	34	546	113	48	173	98
Future Volume (veh/h)	267	327	25	85	144	78	34	546	113	48	173	98
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		1.00	1.00		1.00	1.00		1.00	1.00		1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach		No			No			No			No	
Adj Sat Flow, veh/h/ln	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870
Adj Flow Rate, veh/h	290	355	27	92	157	85	37	593	123	52	188	107
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Percent Heavy Veh, %	2	2	2	2	2	2	2	2	2	2	2	2
Cap, veh/h	477	796	60	353	307	158	510	1131	234	330	874	475
Arrive On Green	0.16	0.24	0.24	0.06	0.14	0.14	0.02	0.39	0.39	0.03	0.39	0.39
Sat Flow, veh/h	1781	3348	253	1781	2269	1168	1781	2931	607	1781	2222	1208
Grp Volume(v), veh/h	290	188	194	92	121	121	37	359	357	52	149	146
Grp Sat Flow(s),veh/h/ln	1781	1777	1825	1781	1777	1660	1781	1777	1761	1781	1777	1653
Q Serve(g_s), s	8.7	6.0	6.1	2.9	4.2	4.5	0.8	10.4	10.4	1.2	3.7	3.9
Cycle Q Clear(g_c), s	8.7	6.0	6.1	2.9	4.2	4.5	0.8	10.4	10.4	1.2	3.7	3.9
Prop In Lane	1.00		0.14	1.00		0.70	1.00		0.34	1.00		0.73
Lane Grp Cap(c), veh/h	477	422	434	353	240	224	510	686	680	330	699	650
V/C Ratio(X)	0.61	0.44	0.45	0.26	0.50	0.54	0.07	0.52	0.53	0.16	0.21	0.23
Avail Cap(c_a), veh/h	572	906	930	630	906	846	778	1092	1082	584	1092	1016
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Uniform Delay (d), s/veh	18.3	21.7	21.7	22.7	26.8	26.9	12.0	15.8	15.8	12.6	13.4	13.5
Incr Delay (d2), s/veh	1.3	1.6	1.5	0.4	3.5	4.2	0.1	2.8	2.9	0.2	0.7	0.8
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(95%),veh/ln	5.8	4.3	4.5	2.0	3.3	3.4	0.5	7.3	7.3	0.7	2.5	2.5
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	19.7	23.2	23.2	23.1	30.2	31.1	12.1	18.6	18.7	12.8	14.1	14.3
LnGrp LOS	B	C	C	C	C	C	B	B	B	B	B	B
Approach Vol, veh/h		672			334			753			347	
Approach Delay, s/veh		21.7			28.6			18.3			14.0	
Approach LOS		C			C			B			B	

Timer - Assigned Phs	1	2	3	4	5	6	7	8
Phs Duration (G+Y+Rc), s	5.5	31.7	7.6	21.9	5.0	32.2	14.5	15.0
Change Period (Y+Rc), s	3.5	6.0	3.5	6.0	3.5	6.0	3.5	6.0
Max Green Setting (Gmax), s	11.5	41.0	14.5	34.0	11.5	41.0	14.5	34.0
Max Q Clear Time (g_c+I1), s	3.2	12.4	4.9	8.1	2.8	5.9	10.7	6.5
Green Ext Time (p_c), s	0.0	13.3	0.1	4.0	0.0	5.5	0.3	2.5

Intersection Summary	
HCM 6th Ctrl Delay	20.3
HCM 6th LOS	C

Intersection	
Int Delay, s/veh	0.5

Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations						
Traffic Vol, veh/h	580	5	2	276	15	10
Future Vol, veh/h	580	5	2	276	15	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	92	92	92	92	92	92
Heavy Vehicles, %	2	2	2	2	2	2
Mvmt Flow	630	5	2	300	16	11

Major/Minor	Major1		Major2		Minor1	
Conflicting Flow All	0	0	635	0	937	633
Stage 1	-	-	-	-	633	-
Stage 2	-	-	-	-	304	-
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	-	-	948	-	294	480
Stage 1	-	-	-	-	529	-
Stage 2	-	-	-	-	748	-
Platoon blocked, %	-	-		-		
Mov Cap-1 Maneuver	-	-	948	-	293	480
Mov Cap-2 Maneuver	-	-	-	-	293	-
Stage 1	-	-	-	-	529	-
Stage 2	-	-	-	-	746	-

Approach	EB	WB	NB
HCM Control Delay, s	0	0.1	16.3
HCM LOS			C

Minor Lane/Major Mvmt	NBLn1	EBT	EBR	WBL	WBT
Capacity (veh/h)	347	-	-	948	-
HCM Lane V/C Ratio	0.078	-	-	0.002	-
HCM Control Delay (s)	16.3	-	-	8.8	0
HCM Lane LOS	C	-	-	A	A
HCM 95th %tile Q(veh)	0.3	-	-	0	-

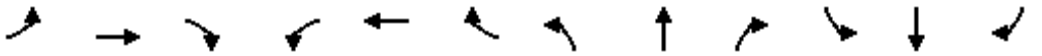
Intersection	
Int Delay, s/veh	0.5

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		⇕			⇕			⇕			⇕	
Traffic Vol, veh/h	1	589	0	1	275	0	3	0	30	0	0	0
Future Vol, veh/h	1	589	0	1	275	0	3	0	30	0	0	0
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	-	-	-	-	-	-	-	-	-	-	-	-
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, %	2	2	2	2	2	2	2	2	2	2	2	2
Mvmt Flow	1	640	0	1	299	0	3	0	33	0	0	0

Major/Minor	Major1			Major2			Minor1			Minor2		
Conflicting Flow All	299	0	0	640	0	0	943	943	640	960	943	299
Stage 1	-	-	-	-	-	-	642	642	-	301	301	-
Stage 2	-	-	-	-	-	-	301	301	-	659	642	-
Critical Hdwy	4.12	-	-	4.12	-	-	7.12	6.52	6.22	7.12	6.52	6.22
Critical Hdwy Stg 1	-	-	-	-	-	-	6.12	5.52	-	6.12	5.52	-
Critical Hdwy Stg 2	-	-	-	-	-	-	6.12	5.52	-	6.12	5.52	-
Follow-up Hdwy	2.218	-	-	2.218	-	-	3.518	4.018	3.318	3.518	4.018	3.318
Pot Cap-1 Maneuver	1262	-	-	944	-	-	243	263	475	236	263	741
Stage 1	-	-	-	-	-	-	463	469	-	708	665	-
Stage 2	-	-	-	-	-	-	708	665	-	453	469	-
Platoon blocked, %		-	-		-	-						
Mov Cap-1 Maneuver	1262	-	-	944	-	-	243	262	475	219	262	741
Mov Cap-2 Maneuver	-	-	-	-	-	-	243	262	-	219	262	-
Stage 1	-	-	-	-	-	-	463	469	-	707	664	-
Stage 2	-	-	-	-	-	-	707	664	-	421	469	-

Approach	EB	WB	NB	SB
HCM Control Delay, s	0	0	14	0
HCM LOS			B	A

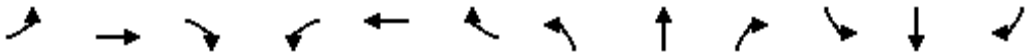
Minor Lane/Major Mvmt	NBLn1	EBL	EBT	EBR	WBL	WBT	WBR	SBLn1
Capacity (veh/h)	437	1262	-	-	944	-	-	-
HCM Lane V/C Ratio	0.082	0.001	-	-	0.001	-	-	-
HCM Control Delay (s)	14	7.9	0	-	8.8	0	-	0
HCM Lane LOS	B	A	A	-	A	A	-	A
HCM 95th %tile Q(veh)	0.3	0	-	-	0	-	-	-



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	195	187	114	188	361	66	181	1029	99	82	1455	211
Future Volume (veh/h)	195	187	114	188	361	66	181	1029	99	82	1455	211
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		1.00	1.00		1.00	1.00		1.00	1.00		1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach		No			No			No			No	
Adj Sat Flow, veh/h/ln	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870
Adj Flow Rate, veh/h	212	203	124	204	392	72	197	1118	108	89	1582	229
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Percent Heavy Veh, %	2	2	2	2	2	2	2	2	2	2	2	2
Cap, veh/h	198	387	328	301	307	56	197	1680	162	110	1450	206
Arrive On Green	0.08	0.21	0.21	0.08	0.20	0.20	0.11	0.51	0.51	0.06	0.46	0.46
Sat Flow, veh/h	1781	1870	1585	1781	1537	282	1781	3274	316	1781	3123	444
Grp Volume(v), veh/h	212	203	124	204	0	464	197	606	620	89	887	924
Grp Sat Flow(s),veh/h/ln	1781	1870	1585	1781	0	1820	1781	1777	1813	1781	1777	1790
Q Serve(g_s), s	11.5	13.5	9.4	10.5	0.0	28.0	15.5	35.3	35.4	6.9	65.0	65.0
Cycle Q Clear(g_c), s	11.5	13.5	9.4	10.5	0.0	28.0	15.5	35.3	35.4	6.9	65.0	65.0
Prop In Lane	1.00		1.00	1.00		0.16	1.00		0.17	1.00		0.25
Lane Grp Cap(c), veh/h	198	387	328	301	0	364	197	912	931	110	825	831
V/C Ratio(X)	1.07	0.52	0.38	0.68	0.00	1.28	1.00	0.66	0.67	0.81	1.08	1.11
Avail Cap(c_a), veh/h	198	387	328	301	0	364	197	912	931	134	825	831
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	1.00	1.00	1.00	0.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Uniform Delay (d), s/veh	45.0	49.4	47.7	44.7	0.0	56.0	62.2	25.2	25.2	64.9	37.5	37.5
Incr Delay (d2), s/veh	84.4	2.5	1.5	5.9	0.0	143.5	63.8	3.8	3.8	25.4	53.7	66.3
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(95%),veh/ln	15.7	10.6	7.0	3.6	0.0	40.4	15.6	21.5	21.9	6.9	52.0	57.1
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	129.5	51.8	49.3	50.6	0.0	199.5	126.0	29.0	29.0	90.3	91.2	103.8
LnGrp LOS	F	D	D	D	A	F	F	C	C	F	F	F
Approach Vol, veh/h		539			668			1423			1900	
Approach Delay, s/veh		81.8			154.1			42.4			97.3	
Approach LOS		F			F			D			F	

Timer - Assigned Phs	1	2	3	4	5	6	7	8
Phs Duration (G+Y+Rc), s	13.2	77.8	14.0	35.0	20.0	71.0	15.0	34.0
Change Period (Y+Rc), s	4.5	6.0	3.5	6.0	4.5	6.0	3.5	6.0
Max Green Setting (Gmax), s	10.5	70.0	10.5	29.0	15.5	65.0	11.5	28.0
Max Q Clear Time (g_c+I1), s	8.9	37.4	12.5	15.5	17.5	67.0	13.5	30.0
Green Ext Time (p_c), s	0.0	24.7	0.0	2.3	0.0	0.0	0.0	0.0

Intersection Summary	
HCM 6th Ctrl Delay	86.6
HCM 6th LOS	F



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	107	242	56	64	330	76	32	339	36	39	449	199
Future Volume (veh/h)	107	242	56	64	330	76	32	339	36	39	449	199
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		1.00	1.00		1.00	1.00		1.00	1.00		1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach		No			No			No			No	
Adj Sat Flow, veh/h/ln	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870
Adj Flow Rate, veh/h	116	263	61	70	359	83	35	368	39	42	488	216
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Percent Heavy Veh, %	2	2	2	2	2	2	2	2	2	2	2	2
Cap, veh/h	339	704	160	368	624	143	327	1267	133	461	945	416
Arrive On Green	0.07	0.25	0.25	0.04	0.22	0.22	0.02	0.39	0.39	0.02	0.39	0.39
Sat Flow, veh/h	1781	2874	655	1781	2873	656	1781	3244	342	1781	2401	1056
Grp Volume(v), veh/h	116	161	163	70	220	222	35	201	206	42	360	344
Grp Sat Flow(s),veh/h/ln	1781	1777	1752	1781	1777	1752	1781	1777	1809	1781	1777	1680
Q Serve(g_s), s	3.2	4.8	5.0	1.9	7.1	7.3	0.8	5.0	5.1	0.9	9.9	10.0
Cycle Q Clear(g_c), s	3.2	4.8	5.0	1.9	7.1	7.3	0.8	5.0	5.1	0.9	9.9	10.0
Prop In Lane	1.00		0.37	1.00		0.37	1.00		0.19	1.00		0.63
Lane Grp Cap(c), veh/h	339	435	429	368	386	381	327	694	706	461	699	661
V/C Ratio(X)	0.34	0.37	0.38	0.19	0.57	0.58	0.11	0.29	0.29	0.09	0.52	0.52
Avail Cap(c_a), veh/h	612	939	926	690	939	926	607	1132	1152	735	1132	1070
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Uniform Delay (d), s/veh	17.7	20.2	20.2	18.3	22.5	22.6	12.1	13.5	13.5	11.5	14.9	14.9
Incr Delay (d2), s/veh	0.6	1.1	1.2	0.2	2.8	3.0	0.1	1.1	1.0	0.1	2.7	2.9
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(95%),veh/ln	2.1	3.4	3.5	1.3	5.3	5.3	0.5	3.3	3.4	0.5	6.9	6.6
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	18.3	21.3	21.4	18.6	25.3	25.6	12.3	14.5	14.5	11.6	17.6	17.8
LnGrp LOS	B	C	C	B	C	C	B	B	B	B	B	B
Approach Vol, veh/h		440			512			442			746	
Approach Delay, s/veh		20.5			24.5			14.4			17.3	
Approach LOS		C			C			B			B	

Timer - Assigned Phs	1	2	3	4	5	6	7	8
Phs Duration (G+Y+Rc), s	5.1	31.1	6.4	21.8	4.9	31.3	8.2	20.0
Change Period (Y+Rc), s	3.5	6.0	3.5	6.0	3.5	6.0	3.5	6.0
Max Green Setting (Gmax), s	11.5	41.0	14.5	34.0	11.5	41.0	14.5	34.0
Max Q Clear Time (g_c+I1), s	2.9	7.1	3.9	7.0	2.8	12.0	5.2	9.3
Green Ext Time (p_c), s	0.0	7.6	0.1	3.4	0.0	13.3	0.2	4.7

Intersection Summary	
HCM 6th Ctrl Delay	19.1
HCM 6th LOS	B

Intersection	
Int Delay, s/veh	0.4

Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations						
Traffic Vol, veh/h	402	29	9	497	14	5
Future Vol, veh/h	402	29	9	497	14	5
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Stop	Stop
RT Channelized	-	None	-	None	-	None
Storage Length	-	-	-	-	0	-
Veh in Median Storage, #	0	-	-	0	0	-
Grade, %	0	-	-	0	0	-
Peak Hour Factor	92	92	92	92	92	92
Heavy Vehicles, %	2	2	2	2	2	2
Mvmt Flow	437	32	10	540	15	5

Major/Minor	Major1		Major2		Minor1	
Conflicting Flow All	0	0	469	0	1013	453
Stage 1	-	-	-	-	453	-
Stage 2	-	-	-	-	560	-
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	-	-	1093	-	265	607
Stage 1	-	-	-	-	640	-
Stage 2	-	-	-	-	572	-
Platoon blocked, %	-	-		-		
Mov Cap-1 Maneuver	-	-	1093	-	262	607
Mov Cap-2 Maneuver	-	-	-	-	262	-
Stage 1	-	-	-	-	640	-
Stage 2	-	-	-	-	565	-

Approach	EB	WB	NB
HCM Control Delay, s	0	0.1	17.5
HCM LOS			C

Minor Lane/Major Mvmt	NBLn1	EBT	EBR	WBL	WBT
Capacity (veh/h)	308	-	-	1093	-
HCM Lane V/C Ratio	0.067	-	-	0.009	-
HCM Control Delay (s)	17.5	-	-	8.3	0
HCM Lane LOS	C	-	-	A	A
HCM 95th %tile Q(veh)	0.2	-	-	0	-

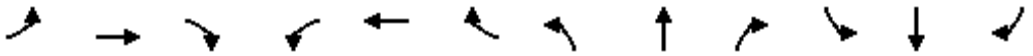
Intersection	
Int Delay, s/veh	0.7

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		⇕			⇕			⇕			⇕	
Traffic Vol, veh/h	2	403	2	59	502	0	2	0	1	1	1	2
Future Vol, veh/h	2	403	2	59	502	0	2	0	1	1	1	2
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	-	-	-	-	-	-	-	-	-	-	-	-
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, %	2	2	2	2	2	2	2	2	2	2	2	2
Mvmt Flow	2	438	2	64	546	0	2	0	1	1	1	2

Major/Minor	Major1			Major2			Minor1			Minor2		
Conflicting Flow All	546	0	0	440	0	0	1119	1117	439	1118	1118	546
Stage 1	-	-	-	-	-	-	443	443	-	674	674	-
Stage 2	-	-	-	-	-	-	676	674	-	444	444	-
Critical Hdwy	4.12	-	-	4.12	-	-	7.12	6.52	6.22	7.12	6.52	6.22
Critical Hdwy Stg 1	-	-	-	-	-	-	6.12	5.52	-	6.12	5.52	-
Critical Hdwy Stg 2	-	-	-	-	-	-	6.12	5.52	-	6.12	5.52	-
Follow-up Hdwy	2.218	-	-	2.218	-	-	3.518	4.018	3.318	3.518	4.018	3.318
Pot Cap-1 Maneuver	1023	-	-	1120	-	-	184	207	618	184	207	538
Stage 1	-	-	-	-	-	-	594	576	-	444	454	-
Stage 2	-	-	-	-	-	-	443	454	-	593	575	-
Platoon blocked, %		-	-		-	-						
Mov Cap-1 Maneuver	1023	-	-	1120	-	-	171	189	618	172	189	538
Mov Cap-2 Maneuver	-	-	-	-	-	-	171	189	-	172	189	-
Stage 1	-	-	-	-	-	-	592	574	-	443	417	-
Stage 2	-	-	-	-	-	-	404	417	-	590	573	-

Approach	EB	WB	NB	SB
HCM Control Delay, s	0	0.9	21.2	18.6
HCM LOS			C	C

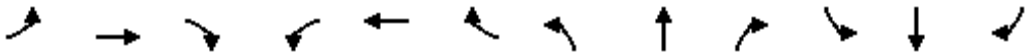
Minor Lane/Major Mvmt	NBLn1	EBL	EBT	EBR	WBL	WBT	WBR	SBLn1
Capacity (veh/h)	225	1023	-	-	1120	-	-	270
HCM Lane V/C Ratio	0.014	0.002	-	-	0.057	-	-	0.016
HCM Control Delay (s)	21.2	8.5	0	-	8.4	0	-	18.6
HCM Lane LOS	C	A	A	-	A	A	-	C
HCM 95th %tile Q(veh)	0	0	-	-	0.2	-	-	0



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	304	426	86	91	135	73	80	1410	211	69	711	45
Future Volume (veh/h)	304	426	86	91	135	73	80	1410	211	69	711	45
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		1.00	1.00		1.00	1.00		1.00	1.00		1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach		No			No			No			No	
Adj Sat Flow, veh/h/ln	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870
Adj Flow Rate, veh/h	330	463	93	99	147	79	87	1533	229	75	773	49
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Percent Heavy Veh, %	2	2	2	2	2	2	2	2	2	2	2	2
Cap, veh/h	332	441	374	157	186	100	108	1583	233	94	1703	108
Arrive On Green	0.13	0.24	0.24	0.06	0.16	0.16	0.06	0.51	0.51	0.05	0.50	0.50
Sat Flow, veh/h	1781	1870	1585	1781	1145	615	1781	3108	457	1781	3393	215
Grp Volume(v), veh/h	330	463	93	99	0	226	87	865	897	75	405	417
Grp Sat Flow(s),veh/h/ln	1781	1870	1585	1781	0	1760	1781	1777	1788	1781	1777	1832
Q Serve(g_s), s	18.5	33.0	6.7	6.4	0.0	17.3	6.8	65.2	69.1	5.8	20.6	20.6
Cycle Q Clear(g_c), s	18.5	33.0	6.7	6.4	0.0	17.3	6.8	65.2	69.1	5.8	20.6	20.6
Prop In Lane	1.00		1.00	1.00		0.35	1.00		0.26	1.00		0.12
Lane Grp Cap(c), veh/h	332	441	374	157	0	286	108	905	911	94	892	919
V/C Ratio(X)	0.99	1.05	0.25	0.63	0.00	0.79	0.81	0.96	0.98	0.79	0.45	0.45
Avail Cap(c_a), veh/h	332	441	374	185	0	314	134	905	911	121	892	919
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	1.00	1.00	1.00	0.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Uniform Delay (d), s/veh	45.4	53.5	43.4	46.7	0.0	56.3	64.9	32.8	33.8	65.5	22.5	22.5
Incr Delay (d2), s/veh	47.6	56.6	0.7	5.2	0.0	14.3	24.6	21.0	26.3	23.7	1.7	1.6
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(95%),veh/ln	11.2	30.6	4.9	5.5	0.0	13.6	6.8	40.7	44.2	5.8	13.5	13.9
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	92.9	110.1	44.2	51.9	0.0	70.6	89.5	53.8	60.1	89.3	24.2	24.1
LnGrp LOS	F	F	D	D	A	E	F	D	E	F	C	C
Approach Vol, veh/h		886			325			1849			897	
Approach Delay, s/veh		96.8			64.9			58.6			29.6	
Approach LOS		F			E			E			C	

Timer - Assigned Phs	1	2	3	4	5	6	7	8
Phs Duration (G+Y+Rc), s	11.9	77.3	11.8	39.0	13.0	76.2	22.0	28.8
Change Period (Y+Rc), s	4.5	6.0	3.5	6.0	4.5	6.0	3.5	6.0
Max Green Setting (Gmax), s	9.5	67.0	10.5	33.0	10.5	66.0	18.5	25.0
Max Q Clear Time (g_c+I1), s	7.8	71.1	8.4	35.0	8.8	22.6	20.5	19.3
Green Ext Time (p_c), s	0.0	0.0	0.0	0.0	0.0	19.3	0.0	0.9

Intersection Summary	
HCM 6th Ctrl Delay	61.1
HCM 6th LOS	E



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	300	369	28	92	160	85	39	607	126	53	190	110
Future Volume (veh/h)	300	369	28	92	160	85	39	607	126	53	190	110
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		1.00	1.00		1.00	1.00		1.00	1.00		1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach		No			No			No			No	
Adj Sat Flow, veh/h/ln	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870
Adj Flow Rate, veh/h	326	401	30	100	174	92	42	660	137	58	207	120
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Percent Heavy Veh, %	2	2	2	2	2	2	2	2	2	2	2	2
Cap, veh/h	484	835	62	349	317	160	496	1155	240	304	888	493
Arrive On Green	0.18	0.25	0.25	0.07	0.14	0.14	0.02	0.39	0.39	0.03	0.40	0.40
Sat Flow, veh/h	1781	3352	250	1781	2286	1154	1781	2930	608	1781	2203	1224
Grp Volume(v), veh/h	326	212	219	100	133	133	42	400	397	58	165	162
Grp Sat Flow(s),veh/h/ln	1781	1777	1825	1781	1777	1663	1781	1777	1761	1781	1777	1650
Q Serve(g_s), s	10.9	7.5	7.6	3.5	5.2	5.5	1.0	13.0	13.0	1.4	4.5	4.8
Cycle Q Clear(g_c), s	10.9	7.5	7.6	3.5	5.2	5.5	1.0	13.0	13.0	1.4	4.5	4.8
Prop In Lane	1.00		0.14	1.00		0.69	1.00		0.35	1.00		0.74
Lane Grp Cap(c), veh/h	484	443	455	349	247	231	496	701	694	304	716	665
V/C Ratio(X)	0.67	0.48	0.48	0.29	0.54	0.57	0.08	0.57	0.57	0.19	0.23	0.24
Avail Cap(c_a), veh/h	519	819	841	581	819	766	731	988	979	524	988	917
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Uniform Delay (d), s/veh	20.1	23.6	23.6	24.7	29.6	29.7	12.9	17.5	17.5	13.8	14.5	14.6
Incr Delay (d2), s/veh	3.1	1.7	1.7	0.4	3.9	4.7	0.1	3.4	3.4	0.3	0.8	0.9
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(95%),veh/ln	7.8	5.5	5.7	2.5	4.1	4.2	0.7	9.0	8.9	0.9	3.1	3.1
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	23.2	25.3	25.3	25.1	33.5	34.5	13.0	20.8	20.9	14.1	15.2	15.4
LnGrp LOS	C	C	C	C	C	C	B	C	C	B	B	B
Approach Vol, veh/h		757			366			839			385	
Approach Delay, s/veh		24.4			31.6			20.5			15.2	
Approach LOS		C			C			C			B	

Timer - Assigned Phs	1	2	3	4	5	6	7	8
Phs Duration (G+Y+Rc), s	5.9	35.1	8.4	24.4	5.3	35.7	16.5	16.2
Change Period (Y+Rc), s	3.5	6.0	3.5	6.0	3.5	6.0	3.5	6.0
Max Green Setting (Gmax), s	11.5	41.0	14.5	34.0	11.5	41.0	14.5	34.0
Max Q Clear Time (g_c+I1), s	3.4	15.0	5.5	9.6	3.0	6.8	12.9	7.5
Green Ext Time (p_c), s	0.1	14.1	0.1	4.5	0.0	6.1	0.2	2.7

Intersection Summary	
HCM 6th Ctrl Delay	22.6
HCM 6th LOS	C

Intersection	
Int Delay, s/veh	0.5

Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations						
Traffic Vol, veh/h	651	5	2	310	15	10
Future Vol, veh/h	651	5	2	310	15	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	92	92	92	92	92	92
Heavy Vehicles, %	2	2	2	2	2	2
Mvmt Flow	708	5	2	337	16	11

Major/Minor	Major1		Major2		Minor1	
Conflicting Flow All	0	0	713	0	1052	711
Stage 1	-	-	-	-	711	-
Stage 2	-	-	-	-	341	-
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	-	-	887	-	251	433
Stage 1	-	-	-	-	487	-
Stage 2	-	-	-	-	720	-
Platoon blocked, %	-	-		-		
Mov Cap-1 Maneuver	-	-	887	-	250	433
Mov Cap-2 Maneuver	-	-	-	-	250	-
Stage 1	-	-	-	-	487	-
Stage 2	-	-	-	-	718	-

Approach	EB	WB	NB
HCM Control Delay, s	0	0.1	18.1
HCM LOS			C

Minor Lane/Major Mvmt	NBLn1	EBT	EBR	WBL	WBT
Capacity (veh/h)	301	-	-	887	-
HCM Lane V/C Ratio	0.09	-	-	0.002	-
HCM Control Delay (s)	18.1	-	-	9.1	0
HCM Lane LOS	C	-	-	A	A
HCM 95th %tile Q(veh)	0.3	-	-	0	-

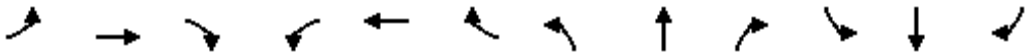
Intersection	
Int Delay, s/veh	0.6

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		⇕			⇕			⇕			⇕	
Traffic Vol, veh/h	1	660	0	1	308	0	4	0	37	0	0	0
Future Vol, veh/h	1	660	0	1	308	0	4	0	37	0	0	0
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	-	-	-	-	-	-	-	-	-	-	-	-
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, %	2	2	2	2	2	2	2	2	2	2	2	2
Mvmt Flow	1	717	0	1	335	0	4	0	40	0	0	0

Major/Minor	Major1			Major2			Minor1			Minor2		
Conflicting Flow All	335	0	0	717	0	0	1056	1056	717	1076	1056	335
Stage 1	-	-	-	-	-	-	719	719	-	337	337	-
Stage 2	-	-	-	-	-	-	337	337	-	739	719	-
Critical Hdwy	4.12	-	-	4.12	-	-	7.12	6.52	6.22	7.12	6.52	6.22
Critical Hdwy Stg 1	-	-	-	-	-	-	6.12	5.52	-	6.12	5.52	-
Critical Hdwy Stg 2	-	-	-	-	-	-	6.12	5.52	-	6.12	5.52	-
Follow-up Hdwy	2.218	-	-	2.218	-	-	3.518	4.018	3.318	3.518	4.018	3.318
Pot Cap-1 Maneuver	1224	-	-	884	-	-	203	225	430	197	225	707
Stage 1	-	-	-	-	-	-	420	433	-	677	641	-
Stage 2	-	-	-	-	-	-	677	641	-	409	433	-
Platoon blocked, %		-	-		-	-						
Mov Cap-1 Maneuver	1224	-	-	884	-	-	203	225	430	178	225	707
Mov Cap-2 Maneuver	-	-	-	-	-	-	203	225	-	178	225	-
Stage 1	-	-	-	-	-	-	420	433	-	676	640	-
Stage 2	-	-	-	-	-	-	676	640	-	370	433	-

Approach	EB	WB	NB	SB
HCM Control Delay, s	0	0	15.5	0
HCM LOS			C	A

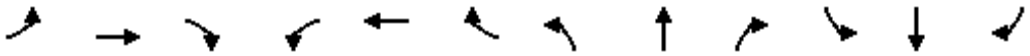
Minor Lane/Major Mvmt	NBLn1	EBL	EBT	EBR	WBL	WBT	WBR	SBLn1
Capacity (veh/h)	388	1224	-	-	884	-	-	-
HCM Lane V/C Ratio	0.115	0.001	-	-	0.001	-	-	-
HCM Control Delay (s)	15.5	7.9	0	-	9.1	0	-	0
HCM Lane LOS	C	A	A	-	A	A	-	A
HCM 95th %tile Q(veh)	0.4	0	-	-	0	-	-	-



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	202	208	118	195	405	68	188	1068	103	85	1504	218
Future Volume (veh/h)	202	208	118	195	405	68	188	1068	103	85	1504	218
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		1.00	1.00		1.00	1.00		1.00	1.00		1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach		No			No			No			No	
Adj Sat Flow, veh/h/ln	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870
Adj Flow Rate, veh/h	220	226	128	212	440	74	204	1161	112	92	1635	237
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Percent Heavy Veh, %	2	2	2	2	2	2	2	2	2	2	2	2
Cap, veh/h	198	387	328	286	312	52	197	1675	161	113	1450	206
Arrive On Green	0.08	0.21	0.21	0.08	0.20	0.20	0.11	0.51	0.51	0.06	0.46	0.46
Sat Flow, veh/h	1781	1870	1585	1781	1561	262	1781	3275	315	1781	3124	443
Grp Volume(v), veh/h	220	226	128	212	0	514	204	629	644	92	915	957
Grp Sat Flow(s),veh/h/ln	1781	1870	1585	1781	0	1823	1781	1777	1814	1781	1777	1791
Q Serve(g_s), s	11.5	15.3	9.8	10.5	0.0	28.0	15.5	37.5	37.7	7.1	65.0	65.0
Cycle Q Clear(g_c), s	11.5	15.3	9.8	10.5	0.0	28.0	15.5	37.5	37.7	7.1	65.0	65.0
Prop In Lane	1.00		1.00	1.00		0.14	1.00		0.17	1.00		0.25
Lane Grp Cap(c), veh/h	198	387	328	286	0	365	197	909	927	113	825	831
V/C Ratio(X)	1.11	0.58	0.39	0.74	0.00	1.41	1.03	0.69	0.69	0.81	1.11	1.15
Avail Cap(c_a), veh/h	198	387	328	286	0	365	197	909	927	134	825	831
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	1.00	1.00	1.00	0.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Uniform Delay (d), s/veh	45.0	50.1	47.9	46.0	0.0	56.0	62.3	25.9	25.9	64.7	37.5	37.5
Incr Delay (d2), s/veh	97.4	3.5	1.6	9.9	0.0	200.0	73.4	4.3	4.3	26.7	65.7	81.7
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(95%),veh/ln	16.8	11.8	7.2	5.0	0.0	49.8	16.6	22.7	23.2	7.2	56.5	63.0
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	142.4	53.6	49.5	55.9	0.0	256.0	135.6	30.2	30.2	91.4	103.2	119.2
LnGrp LOS	F	D	D	E	A	F	F	C	C	F	F	F
Approach Vol, veh/h		574			726			1477			1964	
Approach Delay, s/veh		86.7			197.6			44.8			110.5	
Approach LOS		F			F			D			F	

Timer - Assigned Phs	1	2	3	4	5	6	7	8
Phs Duration (G+Y+Rc), s	13.4	77.6	14.0	35.0	20.0	71.0	15.0	34.0
Change Period (Y+Rc), s	4.5	6.0	3.5	6.0	4.5	6.0	3.5	6.0
Max Green Setting (Gmax), s	10.5	70.0	10.5	29.0	15.5	65.0	11.5	28.0
Max Q Clear Time (g_c+I1), s	9.1	39.7	12.5	17.3	17.5	67.0	13.5	30.0
Green Ext Time (p_c), s	0.0	24.0	0.0	2.3	0.0	0.0	0.0	0.0

Intersection Summary	
HCM 6th Ctrl Delay	100.5
HCM 6th LOS	F



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	120	271	63	70	368	83	37	377	40	43	493	224
Future Volume (veh/h)	120	271	63	70	368	83	37	377	40	43	493	224
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		1.00	1.00		1.00	1.00		1.00	1.00		1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach		No			No			No			No	
Adj Sat Flow, veh/h/ln	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870
Adj Flow Rate, veh/h	130	295	68	76	400	90	40	410	43	47	536	243
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Percent Heavy Veh, %	2	2	2	2	2	2	2	2	2	2	2	2
Cap, veh/h	333	740	168	362	655	146	301	1295	135	442	957	433
Arrive On Green	0.08	0.26	0.26	0.05	0.23	0.23	0.02	0.40	0.40	0.03	0.40	0.40
Sat Flow, veh/h	1781	2877	653	1781	2888	644	1781	3247	339	1781	2379	1075
Grp Volume(v), veh/h	130	180	183	76	245	245	40	223	230	47	400	379
Grp Sat Flow(s),veh/h/ln	1781	1777	1753	1781	1777	1755	1781	1777	1809	1781	1777	1677
Q Serve(g_s), s	3.8	5.9	6.1	2.3	8.7	8.9	0.9	6.1	6.2	1.1	12.3	12.3
Cycle Q Clear(g_c), s	3.8	5.9	6.1	2.3	8.7	8.9	0.9	6.1	6.2	1.1	12.3	12.3
Prop In Lane	1.00		0.37	1.00		0.37	1.00		0.19	1.00		0.64
Lane Grp Cap(c), veh/h	333	457	451	362	403	398	301	709	722	442	715	675
V/C Ratio(X)	0.39	0.39	0.40	0.21	0.61	0.62	0.13	0.32	0.32	0.11	0.56	0.56
Avail Cap(c_a), veh/h	560	856	844	642	856	845	550	1032	1051	684	1032	974
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Uniform Delay (d), s/veh	18.6	21.7	21.7	19.5	24.5	24.5	13.2	14.6	14.6	12.2	16.3	16.3
Incr Delay (d2), s/veh	0.7	1.2	1.3	0.3	3.1	3.3	0.2	1.2	1.2	0.1	3.1	3.4
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(95%),veh/ln	2.6	4.2	4.3	1.6	6.5	6.6	0.6	4.2	4.3	0.7	8.4	8.1
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	19.4	22.9	23.0	19.8	27.6	27.8	13.4	15.8	15.8	12.3	19.4	19.6
LnGrp LOS	B	C	C	B	C	C	B	B	B	B	B	B
Approach Vol, veh/h		493			566			493			826	
Approach Delay, s/veh		22.0			26.6			15.6			19.1	
Approach LOS		C			C			B			B	

Timer - Assigned Phs	1	2	3	4	5	6	7	8
Phs Duration (G+Y+Rc), s	5.4	34.1	6.9	24.2	5.1	34.4	9.0	22.0
Change Period (Y+Rc), s	3.5	6.0	3.5	6.0	3.5	6.0	3.5	6.0
Max Green Setting (Gmax), s	11.5	41.0	14.5	34.0	11.5	41.0	14.5	34.0
Max Q Clear Time (g_c+I1), s	3.1	8.2	4.3	8.1	2.9	14.3	5.8	10.9
Green Ext Time (p_c), s	0.0	8.5	0.1	3.8	0.0	14.1	0.2	5.1

Intersection Summary	
HCM 6th Ctrl Delay	20.8
HCM 6th LOS	C

Intersection	
Int Delay, s/veh	0.4

Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations						
Traffic Vol, veh/h	451	29	9	558	14	5
Future Vol, veh/h	451	29	9	558	14	5
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Stop	Stop
RT Channelized	-	None	-	None	-	None
Storage Length	-	-	-	-	0	-
Veh in Median Storage, #	0	-	-	0	0	-
Grade, %	0	-	-	0	0	-
Peak Hour Factor	92	92	92	92	92	92
Heavy Vehicles, %	2	2	2	2	2	2
Mvmt Flow	490	32	10	607	15	5

Major/Minor	Major1		Major2		Minor1	
Conflicting Flow All	0	0	522	0	1133	506
Stage 1	-	-	-	-	506	-
Stage 2	-	-	-	-	627	-
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	-	-	1044	-	224	566
Stage 1	-	-	-	-	606	-
Stage 2	-	-	-	-	532	-
Platoon blocked, %	-	-		-		
Mov Cap-1 Maneuver	-	-	1044	-	221	566
Mov Cap-2 Maneuver	-	-	-	-	221	-
Stage 1	-	-	-	-	606	-
Stage 2	-	-	-	-	525	-

Approach	EB	WB	NB
HCM Control Delay, s	0	0.1	19.9
HCM LOS			C

Minor Lane/Major Mvmt	NBLn1	EBT	EBR	WBL	WBT
Capacity (veh/h)	263	-	-	1044	-
HCM Lane V/C Ratio	0.079	-	-	0.009	-
HCM Control Delay (s)	19.9	-	-	8.5	0
HCM Lane LOS	C	-	-	A	A
HCM 95th %tile Q(veh)	0.3	-	-	0	-

Intersection	
Int Delay, s/veh	0.7

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		⇕			⇕			⇕			⇕	
Traffic Vol, veh/h	2	452	2	66	563	0	2	0	1	1	1	2
Future Vol, veh/h	2	452	2	66	563	0	2	0	1	1	1	2
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	-	-	-	-	-	-	-	-	-	-	-	-
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, %	2	2	2	2	2	2	2	2	2	2	2	2
Mvmt Flow	2	491	2	72	612	0	2	0	1	1	1	2

Major/Minor	Major1			Major2			Minor1			Minor2		
Conflicting Flow All	612	0	0	493	0	0	1254	1252	492	1253	1253	612
Stage 1	-	-	-	-	-	-	496	496	-	756	756	-
Stage 2	-	-	-	-	-	-	758	756	-	497	497	-
Critical Hdwy	4.12	-	-	4.12	-	-	7.12	6.52	6.22	7.12	6.52	6.22
Critical Hdwy Stg 1	-	-	-	-	-	-	6.12	5.52	-	6.12	5.52	-
Critical Hdwy Stg 2	-	-	-	-	-	-	6.12	5.52	-	6.12	5.52	-
Follow-up Hdwy	2.218	-	-	2.218	-	-	3.518	4.018	3.318	3.518	4.018	3.318
Pot Cap-1 Maneuver	967	-	-	1071	-	-	149	172	577	149	172	493
Stage 1	-	-	-	-	-	-	556	545	-	400	416	-
Stage 2	-	-	-	-	-	-	399	416	-	555	545	-
Platoon blocked, %		-	-		-	-						
Mov Cap-1 Maneuver	967	-	-	1071	-	-	136	154	577	137	154	493
Mov Cap-2 Maneuver	-	-	-	-	-	-	136	154	-	137	154	-
Stage 1	-	-	-	-	-	-	554	543	-	399	374	-
Stage 2	-	-	-	-	-	-	356	374	-	552	543	-

Approach	EB	WB	NB	SB
HCM Control Delay, s	0	0.9	25.1	21.4
HCM LOS			D	C

Minor Lane/Major Mvmt	NBLn1	EBL	EBT	EBR	WBL	WBT	WBR	SBLn1
Capacity (veh/h)	182	967	-	-	1071	-	-	224
HCM Lane V/C Ratio	0.018	0.002	-	-	0.067	-	-	0.019
HCM Control Delay (s)	25.1	8.7	0	-	8.6	0	-	21.4
HCM Lane LOS	D	A	A	-	A	A	-	C
HCM 95th %tile Q(veh)	0.1	0	-	-	0.2	-	-	0.1

Intersection	
Int Delay, s/veh	0.4

Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations						
Traffic Vol, veh/h	674	5	2	364	15	10
Future Vol, veh/h	674	5	2	364	15	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	-	-	215	-	0	-
Veh in Median Storage, #	0	-	-	0	0	-
Grade, %	0	-	-	0	0	-
Peak Hour Factor	92	92	92	92	92	92
Heavy Vehicles, %	2	2	2	2	2	2
Mvmt Flow	733	5	2	396	16	11

Major/Minor	Major1		Major2		Minor1	
Conflicting Flow All	0	0	738	0	1136	736
Stage 1	-	-	-	-	736	-
Stage 2	-	-	-	-	400	-
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	-	-	868	-	223	419
Stage 1	-	-	-	-	474	-
Stage 2	-	-	-	-	677	-
Platoon blocked, %	-	-		-		
Mov Cap-1 Maneuver	-	-	868	-	223	419
Mov Cap-2 Maneuver	-	-	-	-	351	-
Stage 1	-	-	-	-	474	-
Stage 2	-	-	-	-	676	-

Approach	EB	WB	NB
HCM Control Delay, s	0	0.1	15.3
HCM LOS			C

Minor Lane/Major Mvmt	NBLn1	EBT	EBR	WBL	WBT
Capacity (veh/h)	375	-	-	868	-
HCM Lane V/C Ratio	0.072	-	-	0.003	-
HCM Control Delay (s)	15.3	-	-	9.2	-
HCM Lane LOS	C	-	-	A	-
HCM 95th %tile Q(veh)	0.2	-	-	0	-

Intersection	
Int Delay, s/veh	8.1

Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Traffic Vol, veh/h	0	63	18	0	0	0
Future Vol, veh/h	0	63	18	0	0	0
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Stop	Stop	Free	Free	Free	Free
RT Channelized	-	None	-	None	-	None
Storage Length	0	-	100	-	-	-
Veh in Median Storage, #	0	-	-	0	0	-
Grade, %	0	-	-	0	0	-
Peak Hour Factor	92	92	92	92	92	92
Heavy Vehicles, %	2	2	2	2	2	2
Mvmt Flow	0	68	20	0	0	0

Major/Minor	Minor2		Major1		Major2	
Conflicting Flow All	41	1	1	0	-	0
Stage 1	1	-	-	-	-	-
Stage 2	40	-	-	-	-	-
Critical Hdwy	6.42	6.22	4.12	-	-	-
Critical Hdwy Stg 1	5.42	-	-	-	-	-
Critical Hdwy Stg 2	5.42	-	-	-	-	-
Follow-up Hdwy	3.518	3.318	2.218	-	-	-
Pot Cap-1 Maneuver	970	1084	1622	-	-	-
Stage 1	1022	-	-	-	-	-
Stage 2	982	-	-	-	-	-
Platoon blocked, %				-	-	-
Mov Cap-1 Maneuver	958	1084	1622	-	-	-
Mov Cap-2 Maneuver	958	-	-	-	-	-
Stage 1	1010	-	-	-	-	-
Stage 2	982	-	-	-	-	-

Approach	EB	NB	SB
HCM Control Delay, s	8.5	7.2	0
HCM LOS	A		

Minor Lane/Major Mvmt	NBL	NBT	EBLn1	SBT	SBR
Capacity (veh/h)	1622	-	1084	-	-
HCM Lane V/C Ratio	0.012	-	0.063	-	-
HCM Control Delay (s)	7.2	-	8.5	-	-
HCM Lane LOS	A	-	A	-	-
HCM 95th %tile Q(veh)	0	-	0.2	-	-

Intersection	
Int Delay, s/veh	0.7

Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations						
Traffic Vol, veh/h	740	9	1	335	6	37
Future Vol, veh/h	740	9	1	335	6	37
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Stop	Stop
RT Channelized	-	None	-	None	-	None
Storage Length	-	-	-	-	0	-
Veh in Median Storage, #	0	-	-	0	0	-
Grade, %	0	-	-	0	0	-
Peak Hour Factor	92	92	92	92	92	92
Heavy Vehicles, %	2	2	2	2	2	2
Mvmt Flow	804	10	1	364	7	40

Major/Minor	Major1		Major2		Minor1	
Conflicting Flow All	0	0	814	0	1175	809
Stage 1	-	-	-	-	809	-
Stage 2	-	-	-	-	366	-
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	-	-	813	-	212	380
Stage 1	-	-	-	-	438	-
Stage 2	-	-	-	-	702	-
Platoon blocked, %	-	-		-		
Mov Cap-1 Maneuver	-	-	813	-	212	380
Mov Cap-2 Maneuver	-	-	-	-	212	-
Stage 1	-	-	-	-	438	-
Stage 2	-	-	-	-	701	-

Approach	EB	WB	NB
HCM Control Delay, s	0	0	17.2
HCM LOS			C

Minor Lane/Major Mvmt	NBLn1	EBT	EBR	WBL	WBT
Capacity (veh/h)	342	-	-	813	-
HCM Lane V/C Ratio	0.137	-	-	0.001	-
HCM Control Delay (s)	17.2	-	-	9.4	0
HCM Lane LOS	C	-	-	A	A
HCM 95th %tile Q(veh)	0.5	-	-	0	-

Intersection	
Int Delay, s/veh	1.1

Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Traffic Vol, veh/h	17	667	339	9	44	27
Future Vol, veh/h	17	667	339	9	44	27
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Stop	Stop
RT Channelized	-	None	-	None	-	None
Storage Length	215	-	-	-	100	0
Veh in Median Storage, #	-	0	0	-	0	-
Grade, %	-	0	0	-	0	-
Peak Hour Factor	92	92	92	92	92	92
Heavy Vehicles, %	2	2	2	2	2	2
Mvmt Flow	18	725	368	10	48	29

Major/Minor	Major1		Major2		Minor2	
Conflicting Flow All	378	0	-	0	1134	373
Stage 1	-	-	-	-	373	-
Stage 2	-	-	-	-	761	-
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	1180	-	-	-	224	673
Stage 1	-	-	-	-	696	-
Stage 2	-	-	-	-	461	-
Platoon blocked, %			-	-	-	
Mov Cap-1 Maneuver	1180	-	-	-	221	673
Mov Cap-2 Maneuver	-	-	-	-	346	-
Stage 1	-	-	-	-	686	-
Stage 2	-	-	-	-	461	-

Approach	EB	WB	SB
HCM Control Delay, s	0.2	0	14.6
HCM LOS			B

Minor Lane/Major Mvmt	EBL	EBT	WBT	WBR	SBLn1	SBLn2
Capacity (veh/h)	1180	-	-	-	346	673
HCM Lane V/C Ratio	0.016	-	-	-	0.138	0.044
HCM Control Delay (s)	8.1	-	-	-	17.1	10.6
HCM Lane LOS	A	-	-	-	C	B
HCM 95th %tile Q(veh)	0	-	-	-	0.5	0.1

Intersection	
Int Delay, s/veh	1.3

Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Traffic Vol, veh/h	7	704	330	11	45	18
Future Vol, veh/h	7	704	330	11	45	18
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Stop	Stop
RT Channelized	-	None	-	None	-	None
Storage Length	215	-	-	-	100	0
Veh in Median Storage, #	-	0	0	-	0	-
Grade, %	-	0	0	-	0	-
Peak Hour Factor	92	92	92	92	92	92
Heavy Vehicles, %	2	2	2	2	2	2
Mvmt Flow	8	765	359	12	49	20

Major/Minor	Major1		Major2		Minor2	
Conflicting Flow All	371	0	-	0	1146	365
Stage 1	-	-	-	-	365	-
Stage 2	-	-	-	-	781	-
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	1188	-	-	-	220	680
Stage 1	-	-	-	-	702	-
Stage 2	-	-	-	-	451	-
Platoon blocked, %			-	-	-	
Mov Cap-1 Maneuver	1188	-	-	-	218	680
Mov Cap-2 Maneuver	-	-	-	-	218	-
Stage 1	-	-	-	-	697	-
Stage 2	-	-	-	-	451	-

Approach	EB	WB	SB
HCM Control Delay, s	0.1	0	21.7
HCM LOS			C

Minor Lane/Major Mvmt	EBL	EBT	WBT	WBR	SBLn1	SBLn2
Capacity (veh/h)	1188	-	-	-	218	680
HCM Lane V/C Ratio	0.006	-	-	-	0.224	0.029
HCM Control Delay (s)	8.1	-	-	-	26.2	10.5
HCM Lane LOS	A	-	-	-	D	B
HCM 95th %tile Q(veh)	0	-	-	-	0.8	0.1

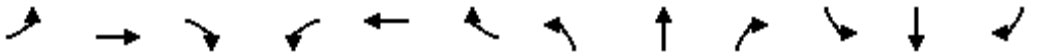
Intersection	
Int Delay, s/veh	0.3

Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Traffic Vol, veh/h	0	679	370	9	0	27
Future Vol, veh/h	0	679	370	9	0	27
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Stop	Stop
RT Channelized	-	None	-	None	-	Stop
Storage Length	-	-	-	-	-	0
Veh in Median Storage, #	-	0	0	-	0	-
Grade, %	-	0	0	-	0	-
Peak Hour Factor	92	92	92	92	92	92
Heavy Vehicles, %	2	2	2	2	2	2
Mvmt Flow	0	738	402	10	0	29

Major/Minor	Major1		Major2		Minor2	
Conflicting Flow All	-	0	-	0	-	407
Stage 1	-	-	-	-	-	-
Stage 2	-	-	-	-	-	-
Critical Hdwy	-	-	-	-	-	6.22
Critical Hdwy Stg 1	-	-	-	-	-	-
Critical Hdwy Stg 2	-	-	-	-	-	-
Follow-up Hdwy	-	-	-	-	-	3.318
Pot Cap-1 Maneuver	0	-	-	-	0	644
Stage 1	0	-	-	-	0	-
Stage 2	0	-	-	-	0	-
Platoon blocked, %		-	-	-		
Mov Cap-1 Maneuver	-	-	-	-	-	644
Mov Cap-2 Maneuver	-	-	-	-	-	-
Stage 1	-	-	-	-	-	-
Stage 2	-	-	-	-	-	-

Approach	EB	WB	SB
HCM Control Delay, s	0	0	10.9
HCM LOS			B

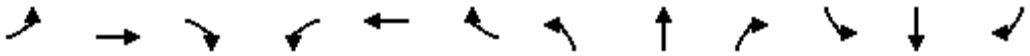
Minor Lane/Major Mvmt	EBT	WBT	WBR	SBLn1
Capacity (veh/h)	-	-	-	644
HCM Lane V/C Ratio	-	-	-	0.046
HCM Control Delay (s)	-	-	-	10.9
HCM Lane LOS	-	-	-	B
HCM 95th %tile Q(veh)	-	-	-	0.1



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	304	432	86	118	153	100	80	1410	220	78	711	45
Future Volume (veh/h)	304	432	86	118	153	100	80	1410	220	78	711	45
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		1.00	1.00		1.00	1.00		1.00	1.00		1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach		No			No			No			No	
Adj Sat Flow, veh/h/ln	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870
Adj Flow Rate, veh/h	330	470	93	128	166	109	87	1533	239	85	773	49
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Percent Heavy Veh, %	2	2	2	2	2	2	2	2	2	2	2	2
Cap, veh/h	394	492	417	147	332	281	108	1509	231	106	1653	105
Arrive On Green	0.13	0.26	0.26	0.05	0.18	0.18	0.06	0.49	0.49	0.06	0.49	0.49
Sat Flow, veh/h	1781	1870	1585	1781	1870	1585	1781	3089	473	1781	3393	215
Grp Volume(v), veh/h	330	470	93	128	166	109	87	870	902	85	405	417
Grp Sat Flow(s),veh/h/ln	1781	1870	1585	1781	1870	1585	1781	1777	1785	1781	1777	1832
Q Serve(g_s), s	18.5	34.6	6.4	6.5	11.2	8.5	6.8	68.4	68.4	6.6	21.2	21.2
Cycle Q Clear(g_c), s	18.5	34.6	6.4	6.5	11.2	8.5	6.8	68.4	68.4	6.6	21.2	21.2
Prop In Lane	1.00		1.00	1.00		1.00	1.00		0.26	1.00		0.12
Lane Grp Cap(c), veh/h	394	492	417	147	332	281	108	868	872	106	866	892
V/C Ratio(X)	0.84	0.96	0.22	0.87	0.50	0.39	0.81	1.00	1.03	0.81	0.47	0.47
Avail Cap(c_a), veh/h	394	494	419	147	334	283	134	868	872	121	866	892
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Uniform Delay (d), s/veh	42.1	50.8	40.4	51.8	52.0	50.9	64.9	35.8	35.8	65.1	23.8	23.8
Incr Delay (d2), s/veh	14.6	29.9	0.6	38.7	2.5	1.9	24.6	31.2	39.6	28.5	1.8	1.8
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(95%),veh/ln	6.1	27.1	4.7	5.3	9.3	6.3	6.8	45.1	48.8	6.8	13.9	14.3
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	56.7	80.7	41.0	90.5	54.5	52.7	89.5	67.0	75.5	93.5	25.7	25.6
LnGrp LOS	E	F	D	F	D	D	F	F	F	F	C	C
Approach Vol, veh/h		893			403			1859			907	
Approach Delay, s/veh		67.7			65.4			72.1			32.0	
Approach LOS		E			E			E			C	

Timer - Assigned Phs	1	2	3	4	5	6	7	8
Phs Duration (G+Y+Rc), s	12.8	74.4	10.0	42.8	13.0	74.2	22.0	30.8
Change Period (Y+Rc), s	4.5	6.0	3.5	6.0	4.5	6.0	3.5	6.0
Max Green Setting (Gmax), s	9.5	67.0	6.5	37.0	10.5	66.0	18.5	25.0
Max Q Clear Time (g_c+I1), s	8.6	70.4	8.5	36.6	8.8	23.2	20.5	13.2
Green Ext Time (p_c), s	0.0	0.0	0.0	0.2	0.0	19.1	0.0	1.8

Intersection Summary	
HCM 6th Ctrl Delay	61.5
HCM 6th LOS	E



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	335	396	46	92	169	85	45	607	126	53	190	122
Future Volume (veh/h)	335	396	46	92	169	85	45	607	126	53	190	122
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		1.00	1.00		1.00	1.00		1.00	1.00		1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach		No			No			No			No	
Adj Sat Flow, veh/h/ln	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870
Adj Flow Rate, veh/h	364	430	50	100	184	92	49	660	137	58	207	133
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Percent Heavy Veh, %	2	2	2	2	2	2	2	2	2	2	2	2
Cap, veh/h	504	850	98	341	328	157	480	1133	235	295	828	509
Arrive On Green	0.19	0.26	0.26	0.07	0.14	0.14	0.03	0.39	0.39	0.03	0.39	0.39
Sat Flow, veh/h	1781	3209	371	1781	2330	1116	1781	2930	608	1781	2115	1299
Grp Volume(v), veh/h	364	237	243	100	138	138	49	400	397	58	172	168
Grp Sat Flow(s),veh/h/ln	1781	1777	1804	1781	1777	1669	1781	1777	1761	1781	1777	1637
Q Serve(g_s), s	12.6	8.6	8.7	3.6	5.5	5.9	1.3	13.6	13.6	1.5	5.0	5.3
Cycle Q Clear(g_c), s	12.6	8.6	8.7	3.6	5.5	5.9	1.3	13.6	13.6	1.5	5.0	5.3
Prop In Lane	1.00		0.21	1.00		0.67	1.00		0.35	1.00		0.79
Lane Grp Cap(c), veh/h	504	471	478	341	250	235	480	687	681	295	696	641
V/C Ratio(X)	0.72	0.50	0.51	0.29	0.55	0.59	0.10	0.58	0.58	0.20	0.25	0.26
Avail Cap(c_a), veh/h	504	793	805	562	793	745	699	956	948	505	956	881
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Uniform Delay (d), s/veh	20.4	23.8	23.8	25.4	30.5	30.7	13.6	18.5	18.5	14.6	15.6	15.7
Incr Delay (d2), s/veh	5.1	1.8	1.8	0.5	4.0	4.9	0.1	3.6	3.6	0.3	0.8	1.0
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(95%),veh/ln	9.0	6.3	6.5	2.6	4.5	4.5	0.8	9.4	9.4	1.0	3.5	3.5
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	25.5	25.5	25.6	25.9	34.6	35.5	13.7	22.1	22.1	14.9	16.5	16.7
LnGrp LOS	C	C	C	C	C	D	B	C	C	B	B	B
Approach Vol, veh/h		844			376			846			398	
Approach Delay, s/veh		25.5			32.6			21.6			16.3	
Approach LOS		C			C			C			B	

Timer - Assigned Phs	1	2	3	4	5	6	7	8
Phs Duration (G+Y+Rc), s	6.0	35.5	8.5	26.2	5.6	35.8	18.0	16.7
Change Period (Y+Rc), s	3.5	6.0	3.5	6.0	3.5	6.0	3.5	6.0
Max Green Setting (Gmax), s	11.5	41.0	14.5	34.0	11.5	41.0	14.5	34.0
Max Q Clear Time (g_c+I1), s	3.5	15.6	5.6	10.7	3.3	7.3	14.6	7.9
Green Ext Time (p_c), s	0.1	13.9	0.1	5.0	0.0	6.3	0.0	2.8

Intersection Summary	
HCM 6th Ctrl Delay	23.8
HCM 6th LOS	C

Intersection	
Int Delay, s/veh	0.3

Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations						
Traffic Vol, veh/h	527	29	9	614	14	5
Future Vol, veh/h	527	29	9	614	14	5
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Stop	Stop
RT Channelized	-	None	-	None	-	None
Storage Length	-	-	215	-	0	-
Veh in Median Storage, #	0	-	-	0	0	-
Grade, %	0	-	-	0	0	-
Peak Hour Factor	92	92	92	92	92	92
Heavy Vehicles, %	2	2	2	2	2	2
Mvmt Flow	573	32	10	667	15	5

Major/Minor	Major1		Major2		Minor1	
Conflicting Flow All	0	0	605	0	1276	589
Stage 1	-	-	-	-	589	-
Stage 2	-	-	-	-	687	-
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	-	-	973	-	184	508
Stage 1	-	-	-	-	554	-
Stage 2	-	-	-	-	499	-
Platoon blocked, %	-	-		-		
Mov Cap-1 Maneuver	-	-	973	-	182	508
Mov Cap-2 Maneuver	-	-	-	-	321	-
Stage 1	-	-	-	-	554	-
Stage 2	-	-	-	-	494	-

Approach	EB	WB	NB
HCM Control Delay, s	0	0.1	15.8
HCM LOS			C

Minor Lane/Major Mvmt	NBLn1	EBT	EBR	WBL	WBT
Capacity (veh/h)	355	-	-	973	-
HCM Lane V/C Ratio	0.058	-	-	0.01	-
HCM Control Delay (s)	15.8	-	-	8.7	-
HCM Lane LOS	C	-	-	A	-
HCM 95th %tile Q(veh)	0.2	-	-	0	-

Intersection	
Int Delay, s/veh	7.7

Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Traffic Vol, veh/h	0	44	62	0	0	0
Future Vol, veh/h	0	44	62	0	0	0
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Stop	Stop	Free	Free	Free	Free
RT Channelized	-	None	-	None	-	None
Storage Length	0	-	100	-	-	-
Veh in Median Storage, #	0	-	-	0	0	-
Grade, %	0	-	-	0	0	-
Peak Hour Factor	92	92	92	92	92	92
Heavy Vehicles, %	2	2	2	2	2	2
Mvmt Flow	0	48	67	0	0	0

Major/Minor	Minor2		Major1		Major2	
Conflicting Flow All	135	1	1	0	-	0
Stage 1	1	-	-	-	-	-
Stage 2	134	-	-	-	-	-
Critical Hdwy	6.42	6.22	4.12	-	-	-
Critical Hdwy Stg 1	5.42	-	-	-	-	-
Critical Hdwy Stg 2	5.42	-	-	-	-	-
Follow-up Hdwy	3.518	3.318	2.218	-	-	-
Pot Cap-1 Maneuver	859	1084	1622	-	-	-
Stage 1	1022	-	-	-	-	-
Stage 2	892	-	-	-	-	-
Platoon blocked, %				-	-	-
Mov Cap-1 Maneuver	824	1084	1622	-	-	-
Mov Cap-2 Maneuver	824	-	-	-	-	-
Stage 1	980	-	-	-	-	-
Stage 2	892	-	-	-	-	-

Approach	EB	NB	SB
HCM Control Delay, s	8.5	7.3	0
HCM LOS	A		

Minor Lane/Major Mvmt	NBL	NBT	EBLn1	SBT	SBR
Capacity (veh/h)	1622	-	1084	-	-
HCM Lane V/C Ratio	0.042	-	0.044	-	-
HCM Control Delay (s)	7.3	-	8.5	-	-
HCM Lane LOS	A	-	A	-	-
HCM 95th %tile Q(veh)	0.1	-	0.1	-	-

Intersection	
Int Delay, s/veh	0.8

Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations						
Traffic Vol, veh/h	505	8	66	649	11	1
Future Vol, veh/h	505	8	66	649	11	1
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Stop	Stop
RT Channelized	-	None	-	None	-	None
Storage Length	-	-	-	-	0	-
Veh in Median Storage, #	0	-	-	0	0	-
Grade, %	0	-	-	0	0	-
Peak Hour Factor	92	92	92	92	92	92
Heavy Vehicles, %	2	2	2	2	2	2
Mvmt Flow	549	9	72	705	12	1

Major/Minor	Major1		Major2		Minor1	
Conflicting Flow All	0	0	558	0	1403	554
Stage 1	-	-	-	-	554	-
Stage 2	-	-	-	-	849	-
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	-	-	1013	-	154	532
Stage 1	-	-	-	-	575	-
Stage 2	-	-	-	-	419	-
Platoon blocked, %	-	-		-		
Mov Cap-1 Maneuver	-	-	1013	-	136	532
Mov Cap-2 Maneuver	-	-	-	-	136	-
Stage 1	-	-	-	-	575	-
Stage 2	-	-	-	-	370	-

Approach	EB	WB	NB
HCM Control Delay, s	0	0.8	32.3
HCM LOS			D

Minor Lane/Major Mvmt	NBLn1	EBT	EBR	WBL	WBT
Capacity (veh/h)	145	-	-	1013	-
HCM Lane V/C Ratio	0.09	-	-	0.071	-
HCM Control Delay (s)	32.3	-	-	8.8	0
HCM Lane LOS	D	-	-	A	A
HCM 95th %tile Q(veh)	0.3	-	-	0.2	-

Intersection	
Int Delay, s/veh	1

Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Traffic Vol, veh/h	54	478	607	28	28	16
Future Vol, veh/h	54	478	607	28	28	16
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Stop	Stop
RT Channelized	-	None	-	None	-	None
Storage Length	215	-	-	-	100	0
Veh in Median Storage, #	-	0	0	-	0	-
Grade, %	-	0	0	-	0	-
Peak Hour Factor	92	92	92	92	92	92
Heavy Vehicles, %	2	2	2	2	2	2
Mvmt Flow	59	520	660	30	30	17

Major/Minor	Major1		Major2		Minor2	
Conflicting Flow All	690	0	-	0	1313	675
Stage 1	-	-	-	-	675	-
Stage 2	-	-	-	-	638	-
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	905	-	-	-	175	454
Stage 1	-	-	-	-	506	-
Stage 2	-	-	-	-	526	-
Platoon blocked, %			-	-	-	
Mov Cap-1 Maneuver	905	-	-	-	164	454
Mov Cap-2 Maneuver	-	-	-	-	302	-
Stage 1	-	-	-	-	473	-
Stage 2	-	-	-	-	526	-

Approach	EB	WB	SB
HCM Control Delay, s	0.9	0	16.4
HCM LOS			C

Minor Lane/Major Mvmt	EBL	EBT	WBT	WBR	SBLn1	SBLn2
Capacity (veh/h)	905	-	-	-	302	454
HCM Lane V/C Ratio	0.065	-	-	-	0.101	0.038
HCM Control Delay (s)	9.3	-	-	-	18.3	13.2
HCM Lane LOS	A	-	-	-	C	B
HCM 95th %tile Q(veh)	0.2	-	-	-	0.3	0.1

Intersection	
Int Delay, s/veh	1.1

Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Traffic Vol, veh/h	23	483	621	39	30	14
Future Vol, veh/h	23	483	621	39	30	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	215	-	-	-	100	0
Veh in Median Storage, #	-	0	0	-	0	-
Grade, %	-	0	0	-	0	-
Peak Hour Factor	92	92	92	92	92	92
Heavy Vehicles, %	2	2	2	2	2	2
Mvmt Flow	25	525	675	42	33	15

Major/Minor	Major1		Major2		Minor2	
Conflicting Flow All	717	0	-	0	1271	696
Stage 1	-	-	-	-	696	-
Stage 2	-	-	-	-	575	-
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	884	-	-	-	185	442
Stage 1	-	-	-	-	495	-
Stage 2	-	-	-	-	563	-
Platoon blocked, %		-	-	-		
Mov Cap-1 Maneuver	884	-	-	-	180	442
Mov Cap-2 Maneuver	-	-	-	-	180	-
Stage 1	-	-	-	-	481	-
Stage 2	-	-	-	-	563	-

Approach	EB	WB	SB
HCM Control Delay, s	0.4	0	24.3
HCM LOS			C

Minor Lane/Major Mvmt	EBL	EBT	WBT	WBR	SBLn1	SBLn2
Capacity (veh/h)	884	-	-	-	180	442
HCM Lane V/C Ratio	0.028	-	-	-	0.181	0.034
HCM Control Delay (s)	9.2	-	-	-	29.4	13.4
HCM Lane LOS	A	-	-	-	D	B
HCM 95th %tile Q(veh)	0.1	-	-	-	0.6	0.1

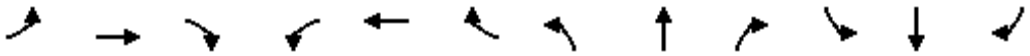
Intersection	
Int Delay, s/veh	0.2

Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Traffic Vol, veh/h	0	556	600	28	0	18
Future Vol, veh/h	0	556	600	28	0	18
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Stop	Stop
RT Channelized	-	None	-	None	-	Stop
Storage Length	-	-	-	-	-	0
Veh in Median Storage, #	-	0	0	-	0	-
Grade, %	-	0	0	-	0	-
Peak Hour Factor	92	92	92	92	92	92
Heavy Vehicles, %	2	2	2	2	2	2
Mvmt Flow	0	604	652	30	0	20

Major/Minor	Major1		Major2		Minor2	
Conflicting Flow All	-	0	-	0	-	667
Stage 1	-	-	-	-	-	-
Stage 2	-	-	-	-	-	-
Critical Hdwy	-	-	-	-	-	6.22
Critical Hdwy Stg 1	-	-	-	-	-	-
Critical Hdwy Stg 2	-	-	-	-	-	-
Follow-up Hdwy	-	-	-	-	-	3.318
Pot Cap-1 Maneuver	0	-	-	-	0	459
Stage 1	0	-	-	-	0	-
Stage 2	0	-	-	-	0	-
Platoon blocked, %		-	-	-		
Mov Cap-1 Maneuver	-	-	-	-	-	459
Mov Cap-2 Maneuver	-	-	-	-	-	-
Stage 1	-	-	-	-	-	-
Stage 2	-	-	-	-	-	-

Approach	EB	WB	SB
HCM Control Delay, s	0	0	13.2
HCM LOS			B

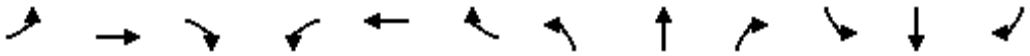
Minor Lane/Major Mvmt	EBT	WBT	WBR	SBLn1
Capacity (veh/h)	-	-	-	459
HCM Lane V/C Ratio	-	-	-	0.043
HCM Control Delay (s)	-	-	-	13.2
HCM Lane LOS	-	-	-	B
HCM 95th %tile Q(veh)	-	-	-	0.1



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	202	227	118	213	417	86	188	1068	132	114	1504	218
Future Volume (veh/h)	202	227	118	213	417	86	188	1068	132	114	1504	218
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		1.00	1.00		1.00	1.00		1.00	1.00		1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach		No			No			No			No	
Adj Sat Flow, veh/h/ln	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870
Adj Flow Rate, veh/h	220	247	128	232	453	93	204	1161	143	124	1635	237
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Percent Heavy Veh, %	2	2	2	2	2	2	2	2	2	2	2	2
Cap, veh/h	160	361	306	281	414	351	197	1568	193	147	1450	206
Arrive On Green	0.06	0.19	0.19	0.09	0.22	0.22	0.11	0.49	0.49	0.08	0.46	0.46
Sat Flow, veh/h	1781	1870	1585	1781	1870	1585	1781	3185	391	1781	3124	443
Grp Volume(v), veh/h	220	247	128	232	453	93	204	646	658	124	915	957
Grp Sat Flow(s),veh/h/ln	1781	1870	1585	1781	1870	1585	1781	1777	1800	1781	1777	1791
Q Serve(g_s), s	8.5	17.2	9.9	12.5	31.0	6.8	15.5	40.6	40.9	9.6	65.0	65.0
Cycle Q Clear(g_c), s	8.5	17.2	9.9	12.5	31.0	6.8	15.5	40.6	40.9	9.6	65.0	65.0
Prop In Lane	1.00		1.00	1.00		1.00	1.00		0.22	1.00		0.25
Lane Grp Cap(c), veh/h	160	361	306	281	414	351	197	875	886	147	825	831
V/C Ratio(X)	1.38	0.68	0.42	0.83	1.09	0.26	1.03	0.74	0.74	0.84	1.11	1.15
Avail Cap(c_a), veh/h	160	361	306	281	414	351	197	875	886	172	825	831
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Uniform Delay (d), s/veh	48.8	52.5	49.6	44.3	54.5	45.1	62.3	28.3	28.4	63.3	37.5	37.5
Incr Delay (d2), s/veh	204.6	6.8	1.9	17.9	71.9	0.9	73.4	5.6	5.6	26.8	65.7	81.7
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(95%),veh/ln	17.3	13.4	7.4	6.0	32.1	5.0	16.6	24.7	25.1	9.2	56.5	63.0
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	253.4	59.4	51.6	62.3	126.4	45.9	135.6	33.9	34.0	90.1	103.2	119.2
LnGrp LOS	F	E	D	E	F	D	F	C	C	F	F	F
Approach Vol, veh/h		595			778			1508			1996	
Approach Delay, s/veh		129.4			97.7			47.7			110.1	
Approach LOS		F			F			D			F	

Timer - Assigned Phs	1	2	3	4	5	6	7	8
Phs Duration (G+Y+Rc), s	16.1	74.9	16.0	33.0	20.0	71.0	12.0	37.0
Change Period (Y+Rc), s	4.5	6.0	3.5	6.0	4.5	6.0	3.5	6.0
Max Green Setting (Gmax), s	13.5	67.0	12.5	27.0	15.5	65.0	8.5	31.0
Max Q Clear Time (g_c+I1), s	11.6	42.9	14.5	19.2	17.5	67.0	10.5	33.0
Green Ext Time (p_c), s	0.0	20.1	0.0	1.9	0.0	0.0	0.0	0.0

Intersection Summary	
HCM 6th Ctrl Delay	91.2
HCM 6th LOS	F



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	142	289	75	70	397	83	56	377	40	43	493	262
Future Volume (veh/h)	142	289	75	70	397	83	56	377	40	43	493	262
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		1.00	1.00		1.00	1.00		1.00	1.00		1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach		No			No			No			No	
Adj Sat Flow, veh/h/ln	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870
Adj Flow Rate, veh/h	154	314	82	76	432	90	61	410	43	47	536	285
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Percent Heavy Veh, %	2	2	2	2	2	2	2	2	2	2	2	2
Cap, veh/h	336	758	195	354	676	140	295	1320	138	442	895	475
Arrive On Green	0.09	0.27	0.27	0.05	0.23	0.23	0.03	0.41	0.41	0.03	0.40	0.40
Sat Flow, veh/h	1781	2798	719	1781	2932	606	1781	3247	339	1781	2243	1190
Grp Volume(v), veh/h	154	198	198	76	261	261	61	223	230	47	424	397
Grp Sat Flow(s),veh/h/ln	1781	1777	1741	1781	1777	1761	1781	1777	1809	1781	1777	1656
Q Serve(g_s), s	4.8	7.0	7.2	2.5	10.1	10.3	1.5	6.5	6.6	1.2	14.4	14.5
Cycle Q Clear(g_c), s	4.8	7.0	7.2	2.5	10.1	10.3	1.5	6.5	6.6	1.2	14.4	14.5
Prop In Lane	1.00		0.41	1.00		0.34	1.00		0.19	1.00		0.72
Lane Grp Cap(c), veh/h	336	481	472	354	410	406	295	722	736	442	709	661
V/C Ratio(X)	0.46	0.41	0.42	0.21	0.64	0.64	0.21	0.31	0.31	0.11	0.60	0.60
Avail Cap(c_a), veh/h	516	789	773	606	789	782	502	952	969	662	952	887
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Uniform Delay (d), s/veh	19.4	22.9	23.0	20.9	26.6	26.6	14.2	15.4	15.4	13.2	18.2	18.2
Incr Delay (d2), s/veh	1.0	1.2	1.3	0.3	3.5	3.6	0.3	1.1	1.1	0.1	3.7	4.0
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(95%),veh/ln	3.3	5.1	5.1	1.7	7.7	7.8	1.0	4.6	4.7	0.8	9.8	9.4
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	20.4	24.1	24.2	21.2	30.0	30.2	14.6	16.5	16.5	13.3	21.9	22.2
LnGrp LOS	C	C	C	C	C	C	B	B	B	B	C	C
Approach Vol, veh/h		550			598			514			868	
Approach Delay, s/veh		23.1			29.0			16.3			21.5	
Approach LOS		C			C			B			C	

Timer - Assigned Phs	1	2	3	4	5	6	7	8
Phs Duration (G+Y+Rc), s	5.5	37.1	7.1	26.7	6.1	36.6	10.2	23.7
Change Period (Y+Rc), s	3.5	6.0	3.5	6.0	3.5	6.0	3.5	6.0
Max Green Setting (Gmax), s	11.5	41.0	14.5	34.0	11.5	41.0	14.5	34.0
Max Q Clear Time (g_c+I1), s	3.2	8.6	4.5	9.2	3.5	16.5	6.8	12.3
Green Ext Time (p_c), s	0.0	8.4	0.1	4.2	0.1	14.1	0.2	5.4

Intersection Summary	
HCM 6th Ctrl Delay	22.6
HCM 6th LOS	C

3: IL 59 & 119th St Performance by movement

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Denied Del/Veh (s)	4.7	2.1	4.6	0.0	0.0	0.0	2.0	0.3	0.4	2.6	0.2	0.2
Total Del/Veh (s)	123.7	131.3	60.5	43.6	56.2	50.8	72.0	51.6	47.4	68.3	25.2	15.5

3: IL 59 & 119th St Performance by movement

Movement	All
Denied Del/Veh (s)	1.0
Total Del/Veh (s)	62.7

6: Wolf Dr & 119th St Performance by movement

Movement	EBT	EBR	WBL	WBT	NBL	NBR	All
Denied Del/Veh (s)	0.0	0.0	0.0	0.0	0.1	0.1	0.0
Total Del/Veh (s)	2.4	0.2	0.2	3.4	10.6	9.1	2.8

8: Book Rd & 119th St Performance by movement

Movement	EBL	EBT	WBL	WBT	NBL	NBR	All
Denied Del/Veh (s)	0.0	0.0	0.0	0.0	0.1	0.1	0.0
Total Del/Veh (s)	11.0	4.7	0.2	0.6	10.6	6.2	3.4

11: Naperville Rd & 119th St Performance by movement

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Denied Del/Veh (s)	0.0	0.0	0.0	3.7	0.3	0.1	3.0	0.2	0.2	3.3	0.1	0.3
Total Del/Veh (s)	27.2	25.0	10.0	22.2	29.4	6.8	19.9	20.9	10.8	17.5	18.8	5.3

11: Naperville Rd & 119th St Performance by movement

Movement	All
Denied Del/Veh (s)	0.4
Total Del/Veh (s)	20.9

Total Network Performance

Denied Del/Veh (s)	1.0
Total Del/Veh (s)	62.2

Intersection: 3: IL 59 & 119th St

Movement	EB	EB	EB	WB	WB	NB	NB	NB	SB	SB	SB
Directions Served	L	T	R	L	TR	L	T	TR	L	T	TR
Maximum Queue (ft)	365	1320	365	274	462	131	683	717	138	284	272
Average Queue (ft)	336	806	129	91	200	66	486	471	56	181	167
95th Queue (ft)	420	1392	367	203	336	125	688	693	115	253	247
Link Distance (ft)		1305			542		1387	1387		1500	1500
Upstream Blk Time (%)		5									
Queuing Penalty (veh)		0									
Storage Bay Dist (ft)	215		215	125		475			475		
Storage Blk Time (%)	37	58		1	29		13				
Queuing Penalty (veh)	187	225		1	27		11				

Intersection: 6: Wolf Dr & 119th St

Movement	NB
Directions Served	LR
Maximum Queue (ft)	31
Average Queue (ft)	13
95th Queue (ft)	37
Link Distance (ft)	950
Upstream Blk Time (%)	
Queuing Penalty (veh)	
Storage Bay Dist (ft)	
Storage Blk Time (%)	
Queuing Penalty (veh)	

Intersection: 8: Book Rd & 119th St

Movement	NB
Directions Served	LTR
Maximum Queue (ft)	78
Average Queue (ft)	30
95th Queue (ft)	53
Link Distance (ft)	717
Upstream Blk Time (%)	
Queuing Penalty (veh)	
Storage Bay Dist (ft)	
Storage Blk Time (%)	
Queuing Penalty (veh)	

Intersection: 11: Naperville Rd & 119th St

Movement	EB	EB	EB	WB	WB	WB	NB	NB	NB	SB	SB	SB
Directions Served	L	T	TR	L	T	TR	L	T	TR	L	T	TR
Maximum Queue (ft)	274	180	179	106	130	116	67	230	182	62	80	206
Average Queue (ft)	140	78	97	40	69	43	23	120	105	20	42	34
95th Queue (ft)	220	152	169	79	109	89	55	189	176	47	86	111
Link Distance (ft)		758	758		1376	1376		1267	1267		836	836
Upstream Blk Time (%)												
Queuing Penalty (veh)												
Storage Bay Dist (ft)	180			180			180			200		
Storage Blk Time (%)	4	0						1				
Queuing Penalty (veh)	7	1						0				

Network Summary

Network wide Queuing Penalty: 459

3: IL 59 & 119th St Performance by movement

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Denied Del/Veh (s)	3.4	1.0	3.4	459.7	445.4	500.0	2.4	0.4	0.4	132.9	132.0	132.9
Total Del/Veh (s)	121.5	60.1	27.2	213.6	243.0	233.8	365.9	31.8	23.8	177.3	204.6	208.4

3: IL 59 & 119th St Performance by movement

Movement	All
Denied Del/Veh (s)	120.0
Total Del/Veh (s)	149.1

6: Wolf Dr & 119th St Performance by movement

Movement	EBT	EBR	WBL	WBT	NBL	NBR	All
Denied Del/Veh (s)	0.1	0.1	0.0	0.0	0.1	0.1	0.1
Total Del/Veh (s)	2.2	1.6	202.6	179.1	372.8	176.2	101.8

8: Book Rd & 119th St Performance by movement

Movement	EBL	EBT	EBR	WBL	WBT	NBL	NBR	SBL	SBT	SBR	All
Denied Del/Veh (s)	0.0	0.0	0.0	0.0	0.0	0.1	0.1		0.1	0.1	0.0
Total Del/Veh (s)	6.5	3.5	2.2	5.4	4.8	11.5	3.0		16.6	8.1	4.4

11: Naperville Rd & 119th St Performance by movement

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Denied Del/Veh (s)	0.0	0.0	0.0	3.2	0.3	0.2	3.3	0.1	0.2	2.8	0.2	0.3
Total Del/Veh (s)	23.5	23.9	13.6	21.5	28.8	7.2	19.0	17.5	6.6	17.6	19.5	10.1

11: Naperville Rd & 119th St Performance by movement

Movement	All
Denied Del/Veh (s)	0.4
Total Del/Veh (s)	19.6

Total Network Performance

Denied Del/Veh (s)	91.1
Total Del/Veh (s)	174.1

Intersection: 3: IL 59 & 119th St

Movement	EB	EB	EB	WB	WB	B16	NB	NB	NB	SB	SB	SB
Directions Served	L	T	R	L	TR	T	L	T	TR	L	T	TR
Maximum Queue (ft)	344	580	220	275	818	1443	585	808	740	700	1547	1546
Average Queue (ft)	210	233	59	228	786	1325	457	539	450	373	1503	1500
95th Queue (ft)	361	574	140	355	802	1744	812	1121	1033	889	1617	1625
Link Distance (ft)		1305			711	1428		1387	1387		1500	1500
Upstream Blk Time (%)		0			81	30		1	0		57	63
Queuing Penalty (veh)		0			461	170		0	0		0	0
Storage Bay Dist (ft)	215		215	125			475			475		
Storage Blk Time (%)	27	3	0	21	81		46	0			57	
Queuing Penalty (veh)	87	9	0	98	158		247	0			49	

Intersection: 6: Wolf Dr & 119th St

Movement	WB	NB
Directions Served	LT	LR
Maximum Queue (ft)	1626	153
Average Queue (ft)	725	50
95th Queue (ft)	1893	147
Link Distance (ft)	2998	950
Upstream Blk Time (%)	1	
Queuing Penalty (veh)	3	
Storage Bay Dist (ft)		
Storage Blk Time (%)		
Queuing Penalty (veh)		

Intersection: 8: Book Rd & 119th St

Movement	EB	WB	B14	NB	SB
Directions Served	LTR	LTR	T	LTR	LTR
Maximum Queue (ft)	25	183	14	30	33
Average Queue (ft)	1	34	0	3	5
95th Queue (ft)	12	179	14	18	23
Link Distance (ft)	2998	885	461	717	814
Upstream Blk Time (%)		0			
Queuing Penalty (veh)		1			
Storage Bay Dist (ft)					
Storage Blk Time (%)					
Queuing Penalty (veh)					

Intersection: 11: Naperville Rd & 119th St

Movement	EB	EB	EB	WB	WB	WB	NB	NB	NB	SB	SB	SB
Directions Served	L	T	TR	L	T	TR	L	T	TR	L	T	TR
Maximum Queue (ft)	133	139	174	84	236	191	61	161	141	62	214	208
Average Queue (ft)	55	65	86	29	128	75	19	83	47	18	107	88
95th Queue (ft)	105	120	154	66	196	162	47	141	110	46	182	178
Link Distance (ft)		758	758		1376	1376		1267	1267		836	836
Upstream Blk Time (%)												
Queuing Penalty (veh)												
Storage Bay Dist (ft)	180			180			180			200		
Storage Blk Time (%)		0			1			0			0	
Queuing Penalty (veh)		0			1			0			0	

Network Summary

Network wide Queuing Penalty: 1286

3: IL 59 & 119th St Performance by movement

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Denied Del/Veh (s)	3.2	1.4	3.0	0.0	0.0	0.0	2.2	0.3	0.5	2.9	0.2	0.2
Total Del/Veh (s)	108.2	98.0	36.2	57.3	49.9	21.3	69.8	61.3	59.3	83.7	24.8	15.9

3: IL 59 & 119th St Performance by movement

Movement	All
Denied Del/Veh (s)	0.8
Total Del/Veh (s)	59.9

6: Wolf Dr & 119th St Performance by movement

Movement	EBT	EBR	WBL	WBT	NBL	NBR	All
Denied Del/Veh (s)	0.0	0.0	0.0	0.0	0.1	0.1	0.0
Total Del/Veh (s)	1.0	0.4	5.7	1.1	10.9	7.8	1.3

8: Book Rd & Hawkweed Dr Performance by movement

Movement	EBR	NBL	All
Denied Del/Veh (s)	0.2	0.0	0.1
Total Del/Veh (s)	2.8	2.0	2.6

9: Book Rd & 119th St Performance by movement

Movement	EBT	EBR	WBT	NBL	NBR	All
Denied Del/Veh (s)	0.0	0.0	0.0	0.1	0.1	0.0
Total Del/Veh (s)	1.2	0.6	0.9	7.7	5.3	1.2

10: 119th St & Polo Club Dr Performance by movement

Movement	EBL	EBT	WBT	WBR	SBL	SBR	All
Denied Del/Veh (s)	0.0	0.0	0.0	0.0	4.2	0.1	0.2
Total Del/Veh (s)	3.3	1.7	1.8	1.0	12.0	3.9	2.2

11: Naperville Rd & 119th St Performance by movement

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Denied Del/Veh (s)	0.0	0.0	0.0	3.5	0.3	0.2	2.9	0.2	0.3	3.2	0.2	0.2
Total Del/Veh (s)	30.0	23.1	19.5	22.7	32.0	5.7	14.2	22.6	13.6	25.4	19.0	5.7

11: Naperville Rd & 119th St Performance by movement

Movement	All
Denied Del/Veh (s)	0.4
Total Del/Veh (s)	22.0

14: 119th St & Book Rd Performance by movement

Movement	EBL	EBT	WBT	WBR	SBL	SBR	All
Denied Del/Veh (s)	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Del/Veh (s)	6.2	3.4	0.3	0.2	17.5	4.3	2.9

20: 119th St & Tailshot Performance by movement

Movement	EBT	WBT	WBR	SBR	All
Denied Del/Veh (s)	0.0	0.0	0.0	0.1	0.0
Total Del/Veh (s)	0.4	0.6	0.2	1.2	0.5

Total Network Performance

Denied Del/Veh (s)	0.8
Total Del/Veh (s)	60.2

Intersection: 3: IL 59 & 119th St

Movement	EB	EB	EB	WB	WB	WB	NB	NB	NB	SB	SB	SB
Directions Served	L	T	R	L	T	R	L	T	TR	L	T	TR
Maximum Queue (ft)	365	1139	365	181	330	280	698	774	778	178	234	298
Average Queue (ft)	296	585	115	85	141	63	84	541	542	79	170	161
95th Queue (ft)	426	1067	341	143	252	148	277	756	752	140	234	245
Link Distance (ft)		1305			461			1387	1387		1489	1489
Upstream Blk Time (%)												
Queuing Penalty (veh)												
Storage Bay Dist (ft)	215		215	185		125	475			475		
Storage Blk Time (%)	36	42		0	16	0		18				
Queuing Penalty (veh)	185	163		0	35	0		14				

Intersection: 6: Wolf Dr & 119th St

Movement	WB	NB
Directions Served	L	LR
Maximum Queue (ft)	29	53
Average Queue (ft)	1	22
95th Queue (ft)	9	48
Link Distance (ft)		944
Upstream Blk Time (%)		
Queuing Penalty (veh)		
Storage Bay Dist (ft)	215	
Storage Blk Time (%)		
Queuing Penalty (veh)		

Intersection: 8: Book Rd & Hawkweed Dr

Movement	EB
Directions Served	LR
Maximum Queue (ft)	55
Average Queue (ft)	27
95th Queue (ft)	51
Link Distance (ft)	290
Upstream Blk Time (%)	
Queuing Penalty (veh)	
Storage Bay Dist (ft)	
Storage Blk Time (%)	
Queuing Penalty (veh)	

Intersection: 9: Book Rd & 119th St

Movement	NB
Directions Served	LR
Maximum Queue (ft)	31
Average Queue (ft)	20
95th Queue (ft)	43
Link Distance (ft)	731
Upstream Blk Time (%)	
Queuing Penalty (veh)	
Storage Bay Dist (ft)	
Storage Blk Time (%)	
Queuing Penalty (veh)	

Intersection: 10: 119th St & Polo Club Dr

Movement	EB	SB	SB
Directions Served	L	L	R
Maximum Queue (ft)	29	50	49
Average Queue (ft)	2	23	21
95th Queue (ft)	14	49	46
Link Distance (ft)			542
Upstream Blk Time (%)			
Queuing Penalty (veh)			
Storage Bay Dist (ft)	215	100	
Storage Blk Time (%)			
Queuing Penalty (veh)			

Intersection: 11: Naperville Rd & 119th St

Movement	EB	EB	EB	WB	WB	WB	NB	NB	NB	SB	SB	SB
Directions Served	L	T	TR	L	T	TR	L	T	TR	L	T	TR
Maximum Queue (ft)	249	174	194	82	173	140	65	223	229	85	141	143
Average Queue (ft)	150	76	108	28	82	44	20	131	124	25	42	35
95th Queue (ft)	251	159	184	61	144	93	51	207	208	55	94	91
Link Distance (ft)		758	758		1376	1376		1267	1267		836	836
Upstream Blk Time (%)												
Queuing Penalty (veh)												
Storage Bay Dist (ft)	180			180			180			200		
Storage Blk Time (%)	5	0			0			2				
Queuing Penalty (veh)	10	0			0			1				

Intersection: 14: 119th St & Book Rd

Movement	EB	SB	SB
Directions Served	L	L	R
Maximum Queue (ft)	29	74	30
Average Queue (ft)	3	24	14
95th Queue (ft)	17	59	37
Link Distance (ft)			874
Upstream Blk Time (%)			
Queuing Penalty (veh)			
Storage Bay Dist (ft)	215	100	
Storage Blk Time (%)			
Queuing Penalty (veh)			

Intersection: 20: 119th St & Tailshot

Movement	SB
Directions Served	R
Maximum Queue (ft)	80
Average Queue (ft)	3
95th Queue (ft)	26
Link Distance (ft)	347
Upstream Blk Time (%)	
Queuing Penalty (veh)	
Storage Bay Dist (ft)	
Storage Blk Time (%)	
Queuing Penalty (veh)	

Network Summary

Network wide Queuing Penalty: 408

3: IL 59 & 119th St Performance by movement

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Denied Del/Veh (s)	195.0	199.2	205.0	14.1	12.1	12.6	3.3	1.2	1.7	188.2	186.6	187.1
Total Del/Veh (s)	500.5	275.9	237.5	125.1	136.5	62.5	340.1	33.8	26.3	170.3	204.2	206.1

3: IL 59 & 119th St Performance by movement

Movement	All
Denied Del/Veh (s)	104.7
Total Del/Veh (s)	167.0

6: Wolf Dr & 119th St Performance by movement

Movement	EBT	EBR	WBL	WBT	NBL	NBR	All
Denied Del/Veh (s)	0.0	0.0	0.0	0.0	0.1	0.1	0.0
Total Del/Veh (s)	1.3	0.6	11.4	17.5	75.1	32.1	10.9

8: Book Rd & Hawkweed Dr Performance by movement

Movement	EBR	NBL	All
Denied Del/Veh (s)	0.1	0.0	0.1
Total Del/Veh (s)	2.6	2.0	2.3

9: Book Rd & 119th St Performance by movement

Movement	EBT	EBR	WBL	WBT	NBL	NBR	All
Denied Del/Veh (s)	0.0	0.0	0.0	0.0	0.1	0.1	0.0
Total Del/Veh (s)	0.8	0.3	4.6	3.7	15.6	4.5	2.7

10: 119th St & Polo Club Dr Performance by movement

Movement	EBL	EBT	WBT	WBR	SBL	SBR	All
Denied Del/Veh (s)	0.0	0.0	0.0	0.0	4.1	0.2	0.1
Total Del/Veh (s)	6.5	1.3	9.5	8.3	16.6	21.3	6.6

11: Naperville Rd & 119th St Performance by movement

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Denied Del/Veh (s)	0.0	0.0	0.0	3.2	0.3	0.2	3.3	0.1	0.1	3.0	0.2	0.3
Total Del/Veh (s)	26.6	23.6	13.2	23.1	30.3	9.6	19.9	18.6	7.4	18.8	21.5	12.0

11: Naperville Rd & 119th St Performance by movement

Movement	All
Denied Del/Veh (s)	0.4
Total Del/Veh (s)	21.0

14: 119th St & Book Rd Performance by movement

Movement	EBL	EBT	WBT	WBR	SBL	SBR	All
Denied Del/Veh (s)	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Del/Veh (s)	7.7	2.5	1.4	0.6	16.1	5.8	2.3

23: 119th St & Tailshot Performance by movement

Movement	EBT	WBT	WBR	SBR	All
Denied Del/Veh (s)	0.0	0.2	0.0	0.1	0.1
Total Del/Veh (s)	0.5	16.6	14.9	1.3	9.1

Total Network Performance

Denied Del/Veh (s)	78.9
Total Del/Veh (s)	157.6

Intersection: 3: IL 59 & 119th St

Movement	EB	EB	EB	WB	WB	WB	B21	B22	NB	NB	NB	SB
Directions Served	L	T	R	L	T	R	T	T	L	T	TR	L
Maximum Queue (ft)	365	1355	338	325	556	280	1049	118	590	748	681	700
Average Queue (ft)	359	1161	65	275	522	166	677	31	429	461	384	484
95th Queue (ft)	409	1702	211	414	611	367	1360	135	750	904	803	961
Link Distance (ft)		1305			461		1055	130		1387	1387	
Upstream Blk Time (%)		65			61		19	8				
Queuing Penalty (veh)		0			376		116	50				
Storage Bay Dist (ft)	215		215	185		125			475			475
Storage Blk Time (%)	97	7		25	77	0			35	0		
Queuing Penalty (veh)	334	21		128	230	1			185	0		

Intersection: 3: IL 59 & 119th St

Movement	SB	SB
Directions Served	T	TR
Maximum Queue (ft)	1534	1541
Average Queue (ft)	1505	1506
95th Queue (ft)	1560	1562
Link Distance (ft)	1489	1489
Upstream Blk Time (%)	61	66
Queuing Penalty (veh)	0	0
Storage Bay Dist (ft)		
Storage Blk Time (%)	57	
Queuing Penalty (veh)	65	

Intersection: 6: Wolf Dr & 119th St

Movement	EB	WB	WB	NB
Directions Served	TR	L	T	LR
Maximum Queue (ft)	2	77	140	50
Average Queue (ft)	0	11	63	18
95th Queue (ft)	2	103	417	55
Link Distance (ft)	393		832	944
Upstream Blk Time (%)			2	
Queuing Penalty (veh)			13	
Storage Bay Dist (ft)		215		
Storage Blk Time (%)			6	
Queuing Penalty (veh)			1	

Intersection: 8: Book Rd & Hawkweed Dr

Movement	EB
Directions Served	LR
Maximum Queue (ft)	55
Average Queue (ft)	26
95th Queue (ft)	49
Link Distance (ft)	290
Upstream Blk Time (%)	
Queuing Penalty (veh)	
Storage Bay Dist (ft)	
Storage Blk Time (%)	
Queuing Penalty (veh)	

Intersection: 9: Book Rd & 119th St

Movement	EB	WB	NB
Directions Served	TR	LT	LR
Maximum Queue (ft)	3	169	44
Average Queue (ft)	0	29	11
95th Queue (ft)	2	107	35
Link Distance (ft)	324	880	746
Upstream Blk Time (%)			
Queuing Penalty (veh)			
Storage Bay Dist (ft)			
Storage Blk Time (%)			
Queuing Penalty (veh)			

Intersection: 10: 119th St & Polo Club Dr

Movement	EB	WB	SB	SB
Directions Served	L	TR	L	R
Maximum Queue (ft)	58	178	62	44
Average Queue (ft)	18	49	22	15
95th Queue (ft)	49	384	53	47
Link Distance (ft)		1700		542
Upstream Blk Time (%)				
Queuing Penalty (veh)				
Storage Bay Dist (ft)	215		100	
Storage Blk Time (%)			0	1
Queuing Penalty (veh)			0	0

Intersection: 11: Naperville Rd & 119th St

Movement	EB	EB	EB	WB	WB	WB	NB	NB	NB	SB	SB	SB
Directions Served	L	T	TR	L	T	TR	L	T	TR	L	T	TR
Maximum Queue (ft)	144	147	172	89	227	205	85	147	129	49	208	218
Average Queue (ft)	63	66	88	30	138	97	27	79	49	15	117	107
95th Queue (ft)	120	124	157	69	214	191	62	135	108	36	190	194
Link Distance (ft)		758	758		1376	1376		1267	1267		836	836
Upstream Blk Time (%)												
Queuing Penalty (veh)												
Storage Bay Dist (ft)	180			180			180			200		
Storage Blk Time (%)	0	0			3			0			0	
Queuing Penalty (veh)	0	0			2			0			0	

Intersection: 14: 119th St & Book Rd

Movement	EB	SB	SB
Directions Served	L	L	R
Maximum Queue (ft)	34	67	33
Average Queue (ft)	9	23	11
95th Queue (ft)	32	52	33
Link Distance (ft)			874
Upstream Blk Time (%)			
Queuing Penalty (veh)			
Storage Bay Dist (ft)	215	100	
Storage Blk Time (%)		0	
Queuing Penalty (veh)		0	

Intersection: 23: 119th St & Tailshot

Movement	EB	WB	SB
Directions Served	T	TR	R
Maximum Queue (ft)	26	169	20
Average Queue (ft)	1	50	1
95th Queue (ft)	12	256	12
Link Distance (ft)	130	393	517
Upstream Blk Time (%)		4	
Queuing Penalty (veh)		22	
Storage Bay Dist (ft)			
Storage Blk Time (%)			
Queuing Penalty (veh)			

Network Summary

Network wide Queuing Penalty: 1545

APPENDIX B
Existing Conditions
SimTraffic Output

3: IL 59 & 119th St Performance by movement

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Denied Del/Veh (s)	3.2	1.2	3.0	0.0	0.0	0.0	2.2	0.4	0.4	2.6	0.2	0.1
Total Del/Veh (s)	64.1	59.8	11.1	36.1	50.5	43.3	61.0	48.6	46.6	80.6	23.6	16.4

3: IL 59 & 119th St Performance by movement

Movement	All
Denied Del/Veh (s)	0.8
Total Del/Veh (s)	45.5

Intersection: 3: IL 59 & 119th St

Movement	EB	EB	EB	WB	WB	NB	NB	NB	SB	SB	SB
Directions Served	L	T	R	L	TR	L	T	TR	L	T	TR
Maximum Queue (ft)	364	490	365	272	260	132	665	691	172	274	259
Average Queue (ft)	250	311	50	57	154	65	472	458	69	187	163
95th Queue (ft)	368	457	189	129	235	116	602	587	130	262	249
Link Distance (ft)		1305			542		1387	1387		1500	1500
Upstream Blk Time (%)											
Queuing Penalty (veh)											
Storage Bay Dist (ft)	215		215	125		475			475		
Storage Blk Time (%)	16	26			19		7				
Queuing Penalty (veh)	73	100			17		6				

3: IL 59 & 119th St Performance by movement

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Denied Del/Veh (s)	3.3	1.0	3.5	394.5	394.4	462.2	2.3	0.3	0.5	31.3	51.3	44.5
Total Del/Veh (s)	66.4	54.2	20.1	176.2	212.3	182.6	123.1	24.7	19.9	135.2	159.9	161.8

3: IL 59 & 119th St Performance by movement

Movement	All
Denied Del/Veh (s)	81.6
Total Del/Veh (s)	111.1

Intersection: 3: IL 59 & 119th St

Movement	EB	EB	EB	WB	WB	B16	NB	NB	NB	SB	SB	SB
Directions Served	L	T	R	L	TR	T	L	T	TR	L	T	TR
Maximum Queue (ft)	292	302	162	275	783	282	386	350	347	700	1534	1539
Average Queue (ft)	149	152	57	215	750	74	217	229	224	287	1193	1187
95th Queue (ft)	251	258	116	370	849	191	327	329	340	772	1808	1809
Link Distance (ft)		1346			711	1428		1387	1387		1500	1500
Upstream Blk Time (%)					38						31	33
Queuing Penalty (veh)					195						0	0
Storage Bay Dist (ft)	215		215	125			475			475		
Storage Blk Time (%)	6	2		27	81						52	
Queuing Penalty (veh)	17	5		115	152						43	

APPENDIX C
Red Time Queue Summary

RED TIME WESTBOUND QUEUE LENGTH SUMMARY

IL 59 and 119th Street

Inputs	**A.M.**	**P.M.**
Left Turn Volume:	88	188
Through Volume:	191	427
Right Turn Volume:	71	66
Left Turn Percent Trucks:	2	2
Through Percent Trucks:	2	2
Right Turn Percent Trucks:	2	2
Cycle Length:	140.0	140.0
Left Turn Protected Green Time (g):	10.5	10.5
Left Turn Permitted Green Time (g_u):	2.2	15.5
Through Green Time:	15.7	28.0
Right Turn Green Time:	15.7	28.0
Number of Left Turn Lanes:	1	1
Number of Through Lanes:	1	1
Number of Right Turn Lanes:	0	0

Required Storage		
Left Turn:	160 ft.	305 ft.
Through:	335 ft.	680 ft.

$$StorageLength(ft) = \frac{(1 - G/C)(DHV)(1 + \frac{\%trucks}{100})(2 \times 25)}{(\#cyclesperhour)(\#trafficlanes)}$$

Notes:
$G_{(LT)} = g + g_u$
$G_{(LT/TH)} = g_u$ for **shared** left

Source: *Bureau of Design and Environment Manual,* IDOT, September 2010
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RED TIME WESTBOUND QUEUE LENGTH SUMMARY

IL 59 and 119th Street

Inputs	**A.M.**	**P.M.**
Left Turn Volume:	118	213
Through Volume:	153	417
Right Turn Volume:	100	86
Left Turn Percent Trucks:	2	2
Through Percent Trucks:	2	2
Right Turn Percent Trucks:	2	2
Cycle Length:	140.0	140.0
Left Turn Protected Green Time (g):	6.5	12.5
Left Turn Permitted Green Time (g_u):	2.2	9.8
Through Green Time:	11.2	31.0
Right Turn Green Time:	11.2	31.0
Number of Left Turn Lanes:	1	1
Number of Through Lanes:	1	1
Number of Right Turn Lanes:	1	1

Required Storage		
Left Turn:	220 ft.	360 ft.
Through:	280 ft.	645 ft.
Right:	180 ft.	135 ft.

$$StorageLength(ft) = \frac{(1 - G/C)(DHV)(1 + \frac{\%trucks}{100})(2 \times 25)}{(\#cyclesperhour)(\#trafficlanes)}$$

Notes:
$G_{(LT)} = g + g_u$
$G_{(LT/TH)} = g_u$ for **shared** left

Source: *Bureau of Design and Environment Manual,* IDOT, September 2010
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APPENDIX D
SimTraffic Arterial Level of Service Reports

Arterial Level of Service: EB 119th St

Cross Street	Node	Delay (s/veh)	Travel time (s)	Dist (mi)	Arterial Speed
IL 59	3	202.9	334.6	0.3	4
	21	2.9	13.9	0.1	27
	22	1.2	22.9	0.2	33
Tailshot	23	0.5	3.9	0.0	31
Wolf Dr	6	1.2	9.8	0.1	32
Polo Club Dr	10	1.2	18.7	0.2	32
Book Rd	14	2.4	36.8	0.3	33
Book Rd	9	0.7	8.4	0.1	32
	25	1.3	16.1	0.2	39
	15	0.6	8.6	0.1	42
Naperville Rd	11	23.8	36.1	0.2	16
Total		238.7	509.8	1.7	15

Arterial Level of Service: WB 119th St

Cross Street	Node	Delay (s/veh)	Travel time (s)	Dist (mi)	Arterial Speed
Naperville Rd	11	30.2	51.4	0.3	19
	15	8.0	21.2	0.2	27
	25	0.5	8.6	0.1	42
Book Rd	9	3.5	17.8	0.2	36
Book Rd	14	1.3	8.8	0.1	31
Polo Club Dr	10	7.4	41.8	0.3	29
Wolf Dr	6	13.1	30.7	0.2	20
Tailshot	23	17.9	26.8	0.1	12
	22	9.8	13.2	0.0	9
	21	155.2	176.1	0.2	4
IL 59	3	141.6	167.0	0.1	2
Total		388.5	563.2	1.7	11

Note: Distance from Node 22 to IL Route 59 is approx. 1,650 feet.

Arterial Level of Service: EB 119th St

Cross Street	Node	Delay (s/veh)	Travel time (s)	Dist (mi)	Arterial Speed
IL 59	3	251.7	457.7	0.3	3
	21	2.8	13.8	0.1	27
	22	1.2	22.9	0.2	33
Tailshot	23	0.5	3.9	0.0	31
Wolf Dr	6	1.2	9.8	0.1	32
Polo Club Dr	10	1.2	18.7	0.2	32
Book Rd	14	2.4	36.8	0.3	33
Book Rd	9	0.8	8.4	0.1	32
	25	1.3	16.1	0.2	39
	15	0.6	8.6	0.1	42
Naperville Rd	11	23.5	35.7	0.2	16
Total		287.3	632.5	1.7	14

Arterial Level of Service: WB 119th St

Cross Street	Node	Delay (s/veh)	Travel time (s)	Dist (mi)	Arterial Speed
Naperville Rd	11	30.3	51.5	0.3	19
	15	7.8	21.0	0.2	27
	25	0.5	8.6	0.1	42
Book Rd	9	3.6	17.8	0.2	36
Book Rd	14	1.6	9.1	0.1	30
Polo Club Dr	10	8.6	42.8	0.3	28
Wolf Dr	6	18.5	36.0	0.2	17
Tailshot	23	18.9	28.0	0.1	11
	22	8.8	12.2	0.0	10
	21	150.9	171.7	0.2	4
IL 59	3	145.8	187.5	0.1	2
Total		395.3	586.2	1.7	11

Note: Distance from Node 22 to IL Route 59 is approx. 1,650 feet.