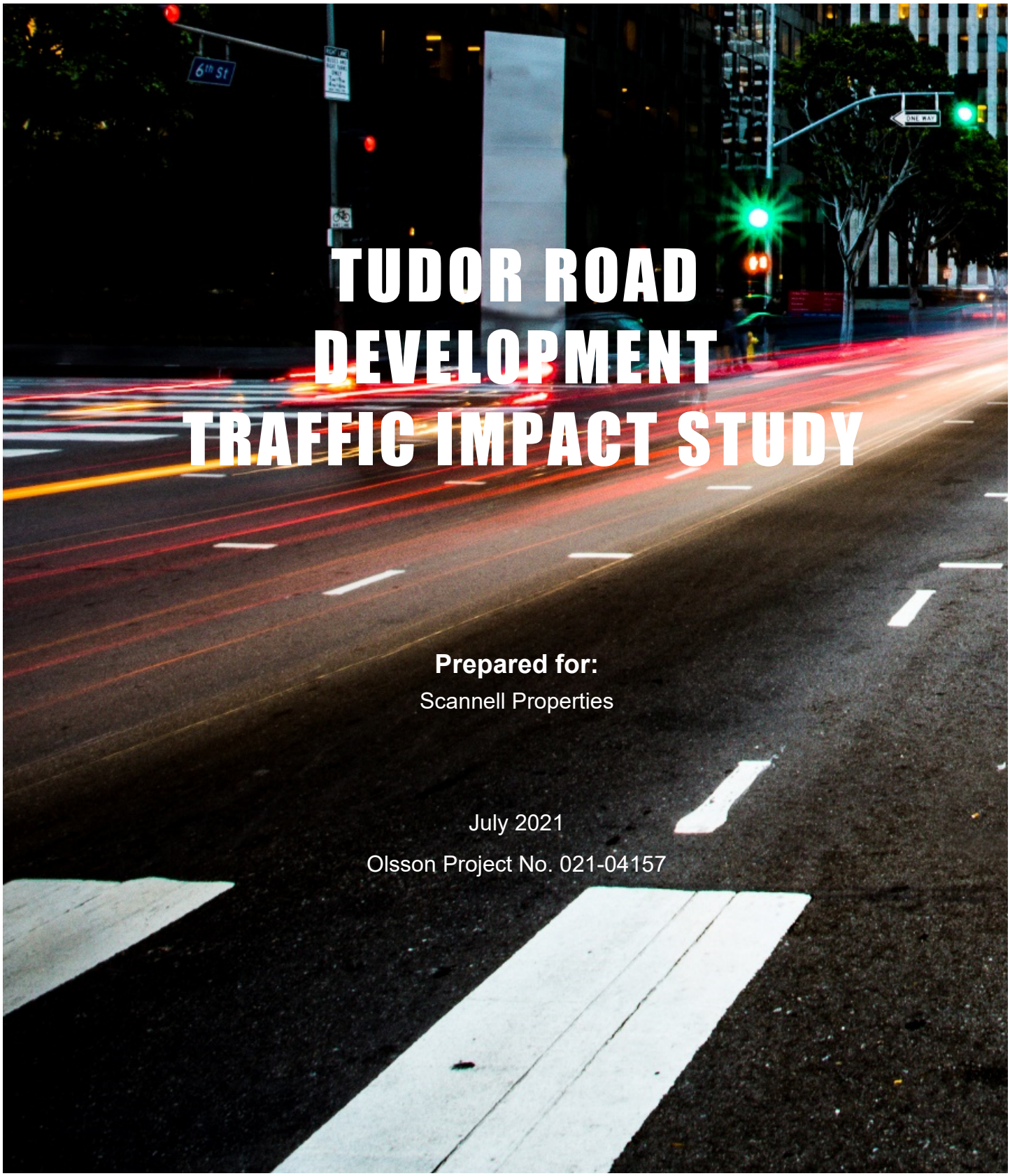


TUDOR ROAD DEVELOPMENT TRAFFIC IMPACT STUDY

Prepared for:

Scannell Properties

July 2021

Olsson Project No. 021-04157

olsson

TABLE OF CONTENTS

LIST OF FIGURES

LIST OF TABLES

APPENDICES

Appendix A: Data Collection

Appendix B: Trip Generation

Appendix C: Existing plus Approved Development Conditions

Appendix D: Existing plus Approved plus Phase 1 Development Conditions

Appendix E: Build Year 2026 plus Approved plus Full Build Development Conditions

Appendix F: Future Year 2041 plus Approved plus Full Build Development Conditions

1. INTRODUCTION

This report studies traffic impacts associated with a proposed warehouse development located in the northwest quadrant of Tudor Road and Sloan Road in Lee's Summit, Missouri.

This report will review the impacts of the proposed site on the existing roadway network and will recommend additional turn lanes, storage bays, and intersection control methods per the City of Lee's Summit *Access Management Code* for the following study intersections:

- Tudor Road and Ward Road
- Tudor Road and Main Street
- Tudor Road and Sloan Street
- Tudor Road and Douglas Street
- Douglas Street and Sycamore Street
- Proposed Site Driveways as appropriate

For this study, the following scenarios were analyzed for the AM and PM peak hour periods:

- Existing plus Approved Development Conditions
- Existing plus Approved plus Phase 1 Development Conditions
- Build Year 2026 plus Approved plus Full Build Development Conditions
- Future Year 2041 plus Approved plus Full Build Development Conditions

The approximate locations of the approved and proposed developments are shown on **Figure 1**.

FIGURE 1

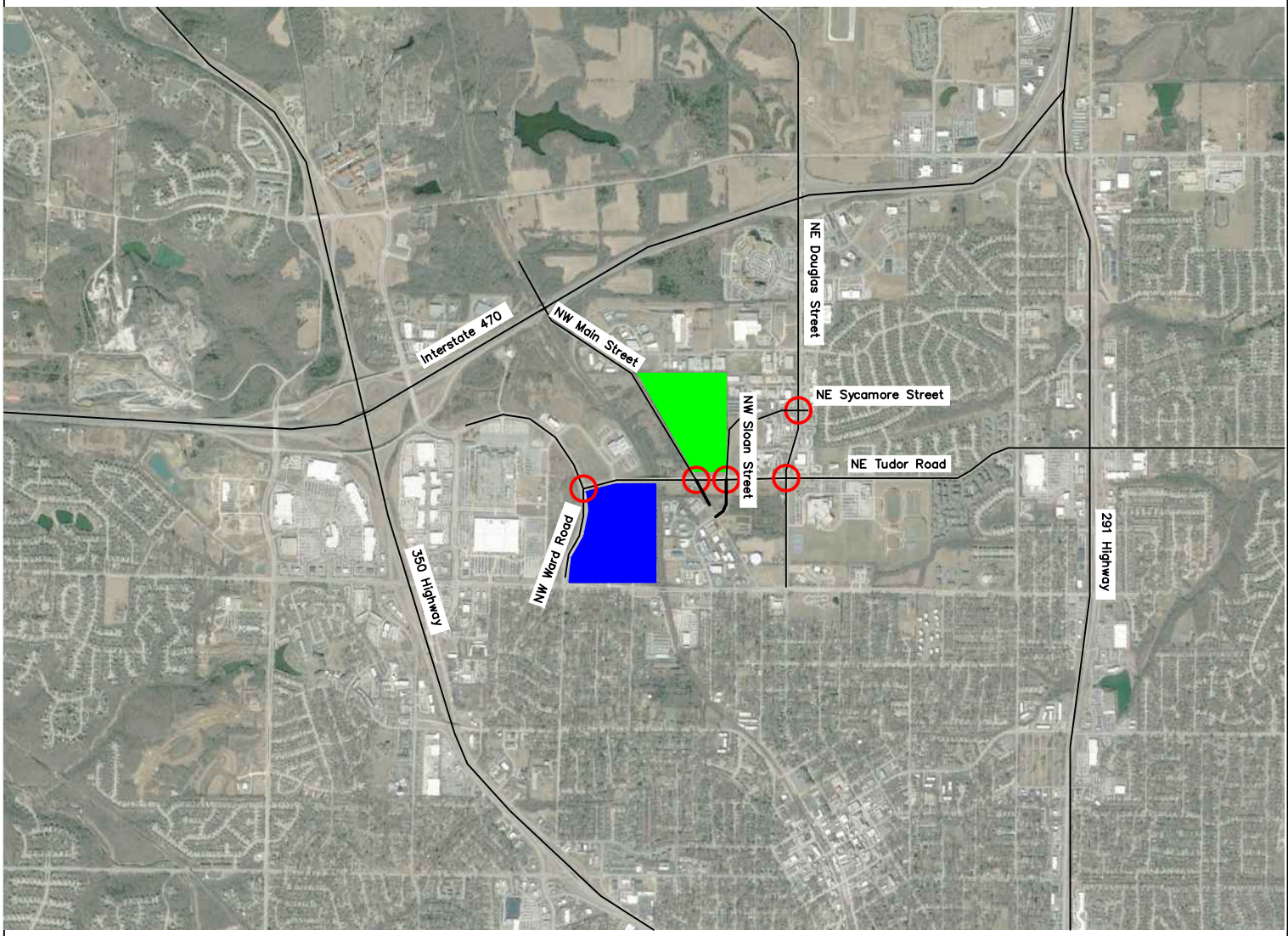
Vicinity Map

Tudor Road Development
Lee's Summit, MO

olsson

LEGEND

- Site Location
- Approved Development
- Proposed Study Intersections



Source: Google Earth

2. DATA COLLECTION

The data collection effort included acquiring traffic counts, approved development studies, signal timings, and documentation of current roadway geometrics.

Traffic counts were collected on Wednesday, June 2nd, 2021 at all study intersections with the exception of Douglas Street and Sycamore Street. Turning movement data available from a count conducted in 2019 was referenced for this intersection, with through volumes balanced from adjacent intersection counts. Turning movement traffic counts were conducted during the typical weekday AM and PM peak periods from 7:00-9:00 AM and 4:00-6:00 PM. The peak hour periods varied slightly between the study intersections. Due to the size of the study area, the peak hour of each intersection was utilized.

Data collection for this study occurred after school had been dismissed for the year. A high school is located in the southeast quadrant of the intersection of Douglas Street and Tudor Road, with additional school facilities located on the west side of the project study area. City staff requested that the existing traffic counts be reviewed and adjusted, if necessary, to accommodate increased volumes that may occur within the study area when school is in session. Data was available for the intersection of Douglas Street and Tudor Road from 2019, with counts conducted when school was in session. Count data from 2019 was compared to the 2021 count data. Individual movements were adjusted (increased) to better represent intersection volumes with school in session.

Existing signal timing information was provided by the City of Lee's Summit for the signalized intersection of Tudor Road and Ward Road. Existing signal timing information for intersections along Douglas Street were obtained from the Mid-America Regional Council's (MARC) Central Traffic Control System (TransSuite).

Traffic count and signal timing information is provided in **Appendix A**.

3. EXISTING CONDITIONS

The existing traffic conditions of the roadway network were evaluated to identify any existing deficiencies and to provide a baseline for comparative purposes. At the request of the City, a partially constructed approved development project was considered with the existing conditions. Approved development improvements recommended within this project study area have been constructed and are considered within the base scenario. The approved development will be presented further in **Section 4.0**.

3.1. Network Characteristics

Six roadways within the study area were considered during analysis: Tudor Road, Ward Road, Main Street, Sloan Street, Douglas Street and Sycamore Street. The City of Lee's Summit *Thoroughfare Master Plan* was referenced to determine existing roadway classification. Current network characteristics are summarized in **Table 1**.

Table 1. Existing Network Summary.

Roadway	Functional Classification	Typical Section	Median Type	Posted Speed
Tudor Road	Minor Arterial	4-Lane	Divided	35 mph
Ward Road	Major Arterial	4-Lane	Divided	35 mph
Main Street	Commercial/ Industrial Collector	2-Lane	None	35 mph
Sloan Street	Local	2-Lane	None	25 mph
Douglas Street	Major Arterial	4-Lane	Divided north of Tudor Road	45 mph
Sycamore Street	Local	2-Lane	None	25mph*

*No posted speed limit. Assumed speed limit of 25mph.

The Ward Road and Tudor Road intersection is signalized. A dedicated northbound right-turn lane and southbound left-turn lane is provided at the intersection. There is currently no west leg of the intersection, however a northbound turn lane is provided to accommodate U-turn movements. Pedestrian accommodations including marked crosswalks and pedestrian pushbuttons and signal heads are provided for all crossings.

The Main Street and Tudor Road intersection is unsignalized. No pedestrian accommodations are located at any crossings for the intersection. Reviewing the *Thoroughfare Master Plan* and based on discussions with City staff, Main Street is planned to be relocated to the east, intersecting Tudor Road at the current intersection of Sloan Street. Road re-alignment will be discussed later in this report.

The Sloan Street and Tudor Road intersection is unsignalized. Dedicated eastbound, westbound, and southbound left-turn lanes are provided. A dedicated westbound right-turn lane is provided. No pedestrian accommodations are located at any crossings for the intersection.

The Douglas Street and Tudor Road intersection is signalized. The signalized intersection is part of a coordinated signal system along Douglas Street. Dedicated left-turn lanes are provided for all approaches at the intersection. Eastbound and northbound right-turn lanes are provided. Pedestrian accommodations including marked crosswalks and pedestrian pushbuttons and signal heads are provided for all crossings.

The Douglas Street and Sycamore Street intersection is signalized. The signalized intersection is part of a coordinated signal system along Douglas Street. Dedicated eastbound, northbound and southbound left-turn lanes are provided. A dedicated northbound and southbound right-turn lane is provided. Pedestrian accommodations including marked crosswalks and pedestrian pushbuttons and signal heads are provided for all crossings.

Exhibit 4 – Bicycle Transportation Plan of the City's *Thoroughfare Master Plan* was reviewed to determine bicycle plans within the study area network. Tudor Road is illustrated as a planned route (path and street accommodation). Relocated Main Street is illustrated as a planned route (path).

The City of Lee's Summit has adopted an Unimproved Road Policy to provide guidance for development activity impacting roadways that are currently considered to meet unimproved/interim standards. Based on *Exhibit 6 – Existing Unimproved and Interim Roadways and Network Gaps* of the *Thoroughfare Master Plan*, Main Street is unimproved. Per the Unimproved Road Policy, Main Street should be improved to an urban standard. Main Street is proposed to be re-aligned and improved, consistent with guidance in the *Unimproved Road Policy,* within the boundaries of the project site.

4. EXISTING PLUS APPROVED DEVELOPMENT CONDITIONS

Per the request of City staff, an approved development project located southwest of the proposed project was considered with the base condition analysis. The "*Summit Orchards Traffic Impact Study"* conducted by McClure Engineering Co, dated March 2016, was referenced for the purposes of this report. The approved development is a mixed-use project that has been partially constructed. Based on information provided by the City, the development is approximately 75% built, with the buildings adjacent to Chipman Road unbuilt. Trips associated with the built portion of the development were captured within the traffic counts. To represent trips associated with un-built approved development (along Chipman Road), the approved traffic impact study was referenced. The general location of the approved development is illustrated on the vicinity map (**Figure 1**). All geometric improvements associated with the approved development that impact the study area have been constructed.

4.1. Approved Trip Generation and Distribution

The approved traffic impact study was referenced to develop trips associated with the un-built portion of the approved development. Applicable pages from the approved study are provided in **Appendix B**. Trips were distributed through the study area based on existing gravity at study intersections. The resulting existing plus approved development volumes are illustrated in **Figure 2**.

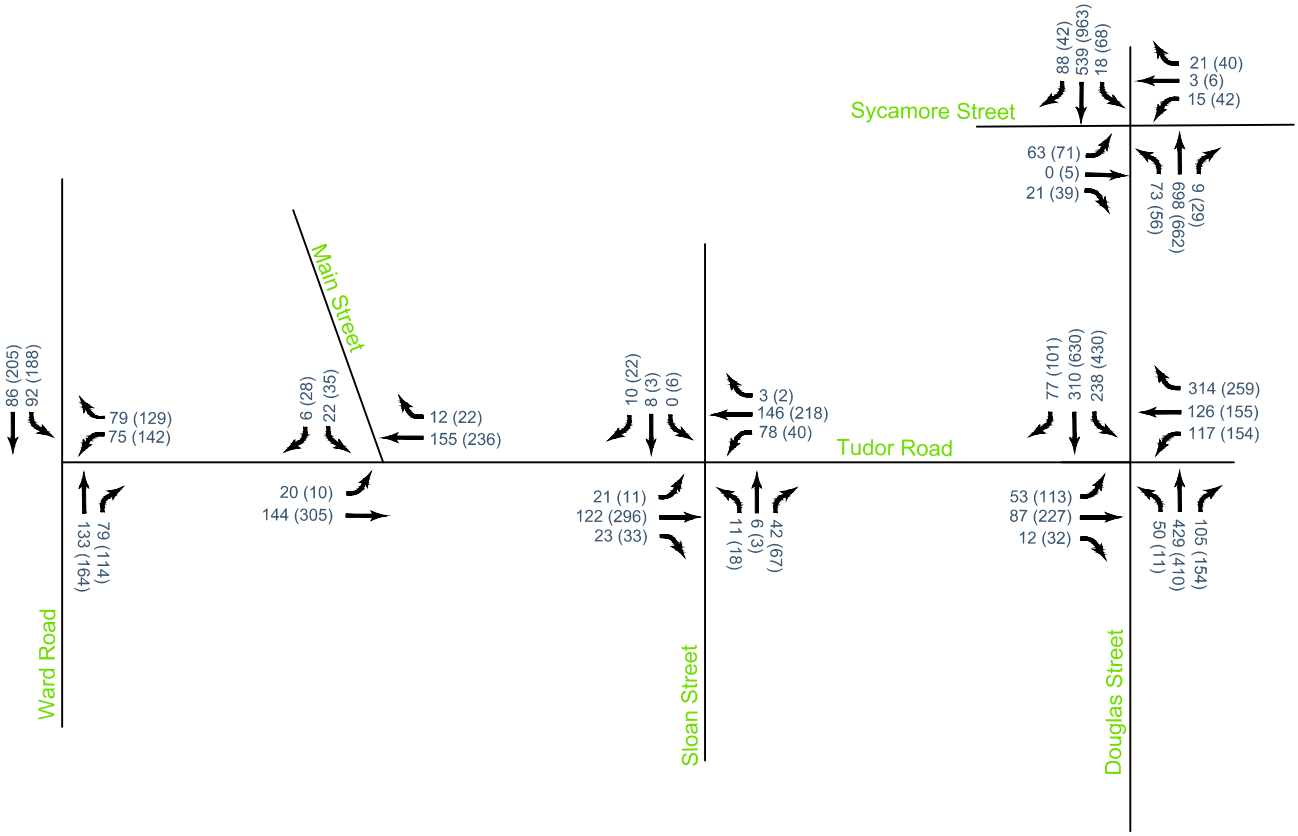
FIGURE 2

Existing plus Approved Development Conditions
Peak Hour Volumes

Tudor Road Development
Lee's Summit, MO

LEGEND

AM (PM) Peak Hour Volume



4.2. Existing plus Approved Development Warrant Analysis

Signal Warrants

A traffic signal may be justified if traffic conditions meet any of the applicable nine signal warrants described in the 2009 Manual on Uniform Traffic Control Devices (MUTCD). The MUTCD provides criteria for conducting an engineering study to determine whether a traffic signal is appropriate at an intersection.

For this study, based on the data available, the Peak Hour Signal Warrant (Warrant 3) was reviewed under existing conditions to determine if alternative control measures are warranted for the currently unsignalized intersections of Tudor Road with Main Street and Sloan Street. Based on available data, traffic signals are currently not warranted based on warrant 3 at the reviewed intersections. Signal warrant analysis sheets are provided in **Appendix B**.

Turn Lane Warrants

City of Lee's Summit Access Management Code (AMC) guidelines were reviewed for turn lanes at study intersections.

Left turn Lanes: Based on the Lee's Summit AMC, left-turn lanes shall be provided on all arterial streets at the intersection with another arterial and on non-residential connectors intersecting with minor arterial streets where the left turn volume is at least 20 vehicles per hour (vph). Left-turn lanes are also to be provided at all median openings on roadways with medians. An eastbound left-turn lane is currently not provided along Tudor Road and Main Street at the existing median break. Main Street is proposed to be re-aligned with the development of phase 1 of the proposed project, thus will be evaluated under the current lane geometrics.

Per the AMC, dual left-turn lanes should be planned for all approaches of an arterial/arterial intersection. The intersections of Douglas Street with Tudor Road and Ward Road with Tudor Road are currently serviced by single left-turn lanes for all approaches. The intersections will be evaluated under the current lane geometrics.

Per the AMC, the minimum length of a left-turn lane should be 250 feet plus taper on an arterial street intersecting another arterial street and 200 feet plus taper on an arterial street at other locations. The following turn lanes do not meet the standard turn bay lengths.

- Southbound left-turn lane with reduced storage at Ward Road and Tudor Road
- Eastbound and westbound left-turn lanes with reduced storage at Tudor Road and Sloan Street
- Eastbound, westbound and northbound left-turn lanes with reduced storage at Douglas Street and Tudor Road

Operations will be evaluated considering the current turn bay storage lengths.

Right-turn Lanes: Based on the Lee's Summit AMC, right-turn lanes shall be provided on major arterial streets at all connections with a turning volume of at least 30 vph, and along minor arterial streets at all connections with a turning volume of at least 60 vph. Right-turn lanes are provided at locations meeting these characteristics except in the westbound and southbound directions at Douglas Street and Tudor Road.

Per the AMC, the minimum length of a right-turn lane should be 250 feet plus taper on a major arterial street intersecting another arterial street, and 200 feet plus taper on a minor arterial street intersecting another arterial street. The following turn lanes do not meet the standard turn bay lengths.

- Northbound right-turn lane with reduced storage at Ward Road and Tudor Road
- Westbound right-turn lane with reduced storage at Tudor Road and Sloan Street
- Eastbound and northbound right-turn lane with reduced storage at Tudor Road and Douglas Street

Capacity and queueing analysis is presented in **Section 4.3** to determine if additional left/right-turn lanes and/or increased storage length is recommended based on existing plus approved development operations. Existing plus approved development conditions lane configurations and traffic control for the study intersections are illustrated in **Figure 3**.

4.3. Existing plus Approved Development Capacity Analysis

Capacity analysis was performed for the study intersections utilizing the existing lane configurations and traffic control. Analysis was conducted using Synchro, Version 11, based on the Highway Capacity Manual (HCM) delay methodologies. For simplicity, the amount of control delay is equated to a grade or Level of Service (LOS) based on thresholds of driver acceptance. The amount of delay is assigned a letter grade A through F, LOS A representing little or no delay and LOS F representing very high delay. **Table 2** shows the delays associated with each LOS grade for signalized and unsignalized intersections, respectively. Queuing analysis was also conducted using the 95th-percentile queue length. This represents the queue length that has a 5 percent probability of being exceeded during the peak hour period.

Table 2. Intersection LOS Criteria.

Level of Service	Average Control Delay (seconds)	
	Signalized	Unsignalized
A	< 10	< 10
B	> 10-20	> 10-15
C	> 20-35	> 15-25
D	> 35-55	> 25-35
E	> 55-80	> 35-50
F	> 80	> 50
Highway Capacity Manual (HCM 6th Edition)		

The City of Lee's Summit references a Level of Service Policy to provide guidelines for acceptable traffic operations on its roadways. According to the policy, an overall LOS C is desirable at signalized intersections, and a LOS D may be acceptable under extraordinary circumstances. Based on discussions with City staff, individual signalized movements with a LOS D or E are typically considered acceptable. A LOS C is desirable at unsignalized intersections, and lower levels of service may be acceptable depending on the situation.

Results of the analysis indicate that the signalized intersections of Tudor Road with Ward Road and Douglas Street with Sycamore Street are expected to operate at an overall LOS A or better during both peak hour periods. All individual movements are expected to operate at LOS D or better.

The signalized intersection of Douglas Street and Tudor Road is expected to operate at a LOS E during the AM peak hour period and a LOS D during the PM peak hour period. During both peak periods, the westbound right-turn movement is expected to operate at a LOS F with all other movements at the intersection expected to operate at a LOS D or better. 95th-percentile queue lengths are expected to be accommodated within available storage. It is anticipated that the westbound movement is operating at a lower level of service due to signal progression favoring the north/south movements along Douglas Street and the heavy westbound right-turn movement. This movement is currently not serviced with a dedicated right-turn lane. As this is an existing condition, analysis for subsequent scenarios will consider the existing geometrics to represent the impact of the proposed development.

All movements at the unsignalized study intersections are expected to operate at LOS C or better with acceptable queues during the peak hour periods.

The existing plus approved conditions capacity analysis summary is illustrated in **Figure 4**. Detailed results are provided in **Appendix B**.

FIGURE 3

Existing plus Approved Development Conditions
Lane Configuration and Traffic Control

Tudor Road Development
Lee's Summit, MO

N

olsson

LEGEND

- XX' → Lane Configuration & Storage Length
- Signalized Intersection
- STOP Stop Controlled Intersection
- Stop Sign

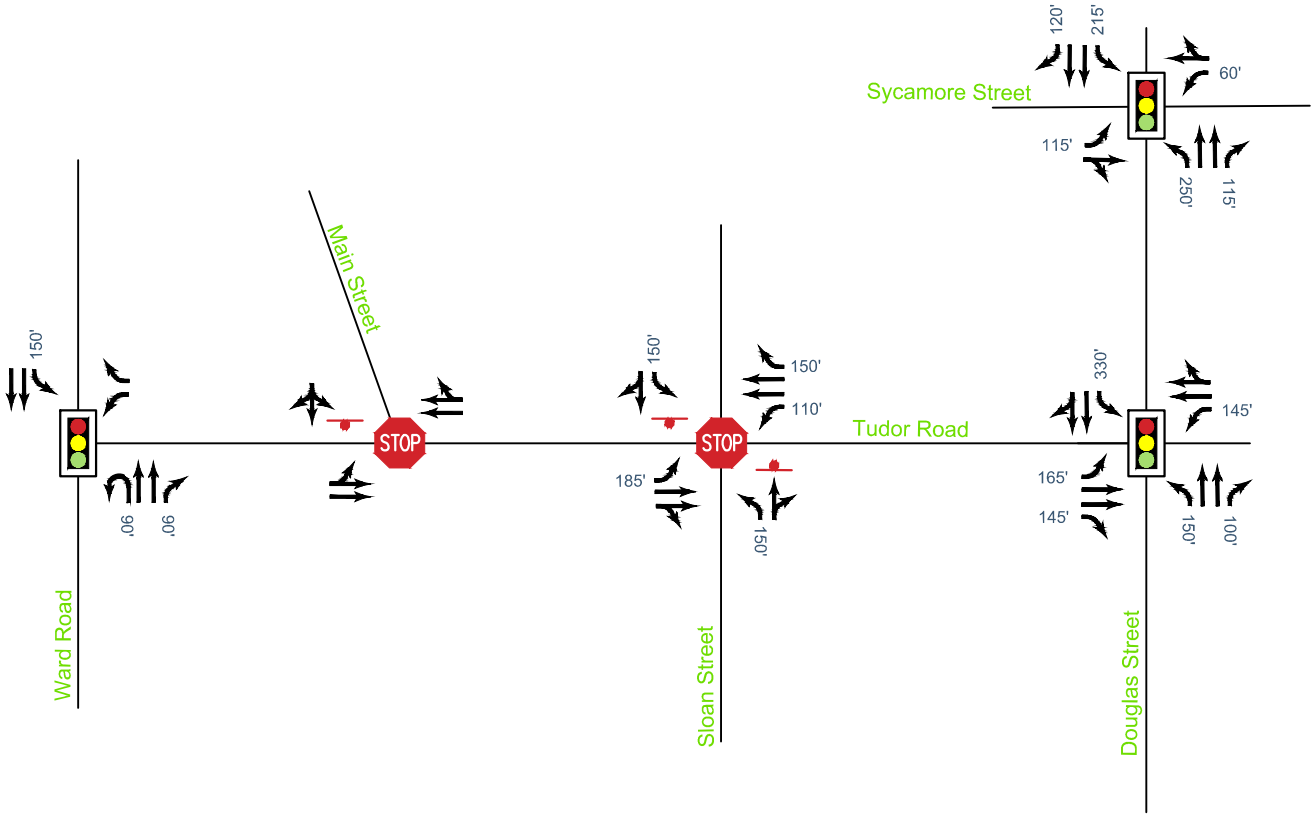


FIGURE 4

Existing plus Approved Development Conditions
Capacity Analysis

Tudor Road Development
Lee's Summit, MO

olsson

LEGEND

AM (PM) {AM (PM)} — Movement LOS & {95th Percentile Queue}

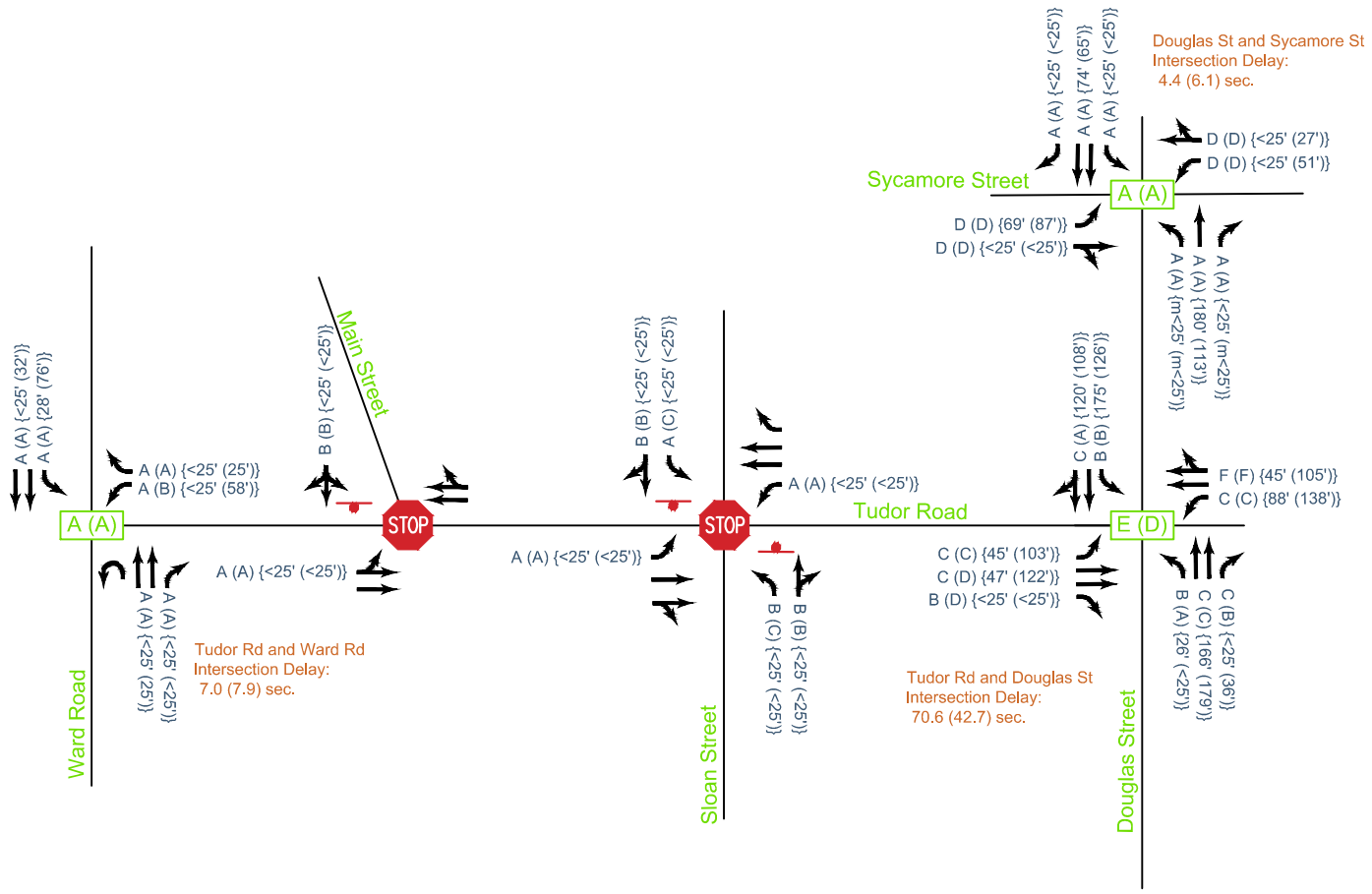
AM (PM) — Signalized Intersection LOS

Lane Geometry

m — Volume for 95th percentile queue is metered by upstream signal

STOP — Stop Controlled Intersection

Stop Sign



5. PROPOSED DEVELOPMENT

The proposed development is located in the northwest quadrant of Tudor Road and Sloan Street. The proposed development is classified as an industrial park with expected warehouse and manufacturing uses. The total square footage for the development is 795,960 square feet encompassed in three buildings. The development is expected to be constructed over a five-year period. For the purposes of this study, phase 1 will consider construction of one building. Full build analysis will consider year 2026 conditions (five-year build period). The proposed site plan is illustrated in **Figure 5**.

With the development of the proposed property, Main Street is proposed to be reconstructed as a two-lane roadway north of Tudor Road to align with the planned road network presented in the City of Lee's Summit *Thoroughfare Master Plan*. The realignment and improvement of Main Street is consistent with the *Unimproved Road Policy*. Main Street will be relocated to intersect Tudor Road and the existing Sloan Street intersection. Main Street will continue to be the major road north of Tudor Road, with Sloan Street re-aligning as a T-intersection with Main Street. Sloan Street is proposed to intersect Main Street approximately 930 feet north of Tudor Road. Stop control should be provided for Sloan Street at the intersection with Main Street.

With the relocation of Main Street, the current Main Street intersection with Tudor Road will be removed and the existing median break closed. The proposed re-alignment of Main Street and Sloan Street is illustrated on the site plan. These modifications to the roadway network will be considered under phase 1 development conditions.

5.1. Trip Generation and Distribution

To determine the impact of potential site traffic, expected trips associated with the proposed development were generated and applied to the study network. The Institute of Transportation Engineers (ITE) provides methods for estimating traffic volumes of common land uses in the Trip Generation Manual (10th Edition). The land use that most closely resembles the proposed school is Land Use Code 130 (Industrial Park). The industrial park land use represents a mix of warehouse, service and manufacturing facilities.

Trip generation characteristics expected for the site are shown in **Table 3**. Detailed ITE and expected trip generation information is provided in **Appendix C.**

Table 3. Trip Generation.

Development Phase	Land Use	Size	Average Weekday	AM Peak Hour			PM Peak Hour		
				Total	Enter	Exit	Total	Enter	Exit
Phase 1	Industrial Park	431,460 SF	2,762	173	140	33	173	36	137
Phase 2	Industrial Park	113,400 SF		46	37	9	46	10	36
Phase 2	Industrial Park	251,100 SF		101	82	19	101	21	80
Total		**795,960 SF**	**2,762**	**320**	**259**	**61**	**320**	**67**	**253**

The expected trips generated by the site were categorized by vehicle type, accounting for both passenger cars and trucks. Referencing the *Trip Generation Handbook* (3rd Edition), truck percentages for industrial park land uses range from 1 to 31%. A 20 percent truck trip percentage is provided for the warehouse land use, which corresponds to data collected at one location. ITE published a document discussing vehicle trip generation for "high-cube" warehouses and provides average truck trip percentages considering over one hundred sites. Most of these sites – which included short-term, transload, and cold storage facilities – had an average truck trip percentage between approximately 20-30 percent. While the proposed development is expected to be warehousing and manufacturing land uses (not high-cube), a truck trip percentage of 30 percent was utilized for this study based on information available and to provide a conservative analysis. An excerpt from the recent ITE publication is provided in **Appendix C**.

Trips were distributed through the network based on existing gravity, discussions with City staff, and the surrounding roadway network and land uses. A different distribution was utilized for passenger cars and for trucks. Passenger cars are anticipated to utilize all local roadways adjacent to the site to travel regionally, while truck traffic is expected to travel primarily to/from the interstate system. Directional trip distribution percentages expected for the site are illustrated in **Table 4.**

Table 4. Trip Distribution.

Direction	Passenger Vehicles	Trucks
Ward Road (North)	20%	70%
Ward Road (South)	10%	-
Main Street (North	5%	-
Sloan Street (South)	5%	-
Douglas Street (North)	25%	30%
Douglas Street (South)	20%	-
Tudor Road (East)	15%	-
TOTAL	**100%**	**100%**

Truck trip distribution was developed considering the primary travel to/from the interstate system, specifically I-470 located north of the study area. Both Ward Road and Douglas Street provide interchange access to I-470. A higher percentage of truck traffic was distributed to Ward Road for the purposes of this study. This distribution is based on consideration of the number of signals along the roadways, density of development, and volume of traffic. Douglas Street is a highly trafficked commercial corridor with dense development located along both sides of the corridor, thus a higher percentage of truck traffic was distributed to Ward Road. Trip distribution for Phase 1 and Full Build development conditions is presented in **Sections 6** and **7** (respectively) of this report.

5.2. Access Characteristics

Access to the site is proposed via five full access drives located along Main Street. Drive 1 is proposed approximately 400 feet north of Tudor Road. Drive 2 is proposed approximately 360 feet west of the T-intersection of Ward Road and Sloan Street. Drive 3 is proposed approximately 960 feet west of Drive 2. Drives 1, 2 and 3 will service phase 1 development only and will be a T-intersection with Main Street. These drives are expected to service both passenger vehicle and truck traffic associated with phase 1 development.

Drive 4 is proposed approximately 330 feet north of Drive 3. The drive will extend east and west of Main Street servicing buildings 2 and 3. Drive 4 is expected to service both passenger vehicle and truck traffic for building 2 (located along the west side of Main Street). Drive 4 is expected to service primarily passenger vehicle traffic only for building 3 (located along the east side of Main Street).

Drive 5 is proposed approximately 360 feet north of Drive 4 and 480 feet south of the intersection of Main Street and Victoria Drive. The drive will extend east and west of Main Street servicing buildings 2 and 3. Drive 5 is expected to service both passenger vehicle and truck traffic for building 2. Drive 5 is expected to service primarily truck traffic for building 3.

Access Spacing

Access is proposed along the relocated Main Street, which is expected to be a City maintained roadway. Thus, Section 15 (Connection Spacing) of the City's AMC was reviewed. Per the AMC, connections shall have a minimum spacing of 300 feet along industrial/commercial collectors, such as Main Street, and be located outside any intersection influence area and turn lanes. All proposed access points meet the minimum spacing requirement.

The posted speed limit of Main Street is expected to remain 35 mph with the relocation of the roadway. Per the AMC, the upstream intersection influence area along a 35-mph road is 370 feet (270 feet if limiting conditions) excluding storage, and the downstream influence area is 250 feet. Reviewing expected 95th-percentile queuing through all phases of development, adequate spacing is proposed considering the limiting condition for intersection influence area.

Access Geometrics

City standards outlined in the AMC and Design & Construction Manual were reviewed for drive width and throat characteristics. Section 18.1.D (Driveway Width) of the AMC provides standards for commercial/industrial driveways. **Table 5** summarizes proposed access geometrics for the proposed site drives.

Table 5. Access Characteristics

Proposed Access	Public Roadway Intersected	Access Type	Proposed Throat Length	Proposed Pavement Width	Median Divided
Drive 1	Main Street	Full Access	220 feet	30 feet	No
Drive 2	Main Street	Full Access	100 feet	30 feet	No
Drive 3	Main Street	Full Access	220 feet	30 feet	No
Drive 4	West of Main Street	Full Access	50 feet	30 feet	No
	East of Main Street	Full Access	110 feet	30 feet	No
Drive 5	West of Main Street	Full Access	325 feet	30 feet	No
	East of Main Street	Full Access	240 feet	30 feet	No

Referencing *Table 18-1* of the AMC, driveways servicing less than 150 vph during the peak hour period should have a driveway width from back-of-curb between 28 feet (striped for 2 lanes) and 42 feet (striped for 3 lanes) for two-way access. Considering the trip generation for the full build

of the site, all proposed drives are expected to service less than 150 vph during the peak hour periods.

Throat length standards are based on projected peak hour volumes, per the City of Lee's Summit AMC. Referencing *Table 18-2* of the AMC, driveways servicing between 10 – 50 vph during the peak hour period shall have a minimum throat length of 50 feet adjacent to a collector roadway. Drive 3, Drive 4 (west leg) and Drive 5 (west and east legs) are expected to service fewer than 50 vph during the peak hour periods and meet minimum throat length requirements.

Driveways servicing between 50 – 100 vph during the peak hour period shall have a minimum throat length of 75 feet adjacent to a collected roadway. Drive 1, Drive 2, and Drive 4 (east leg) are expected to service between 50 – 100 vph during the peak hour periods and meet minimum throat length requirements.

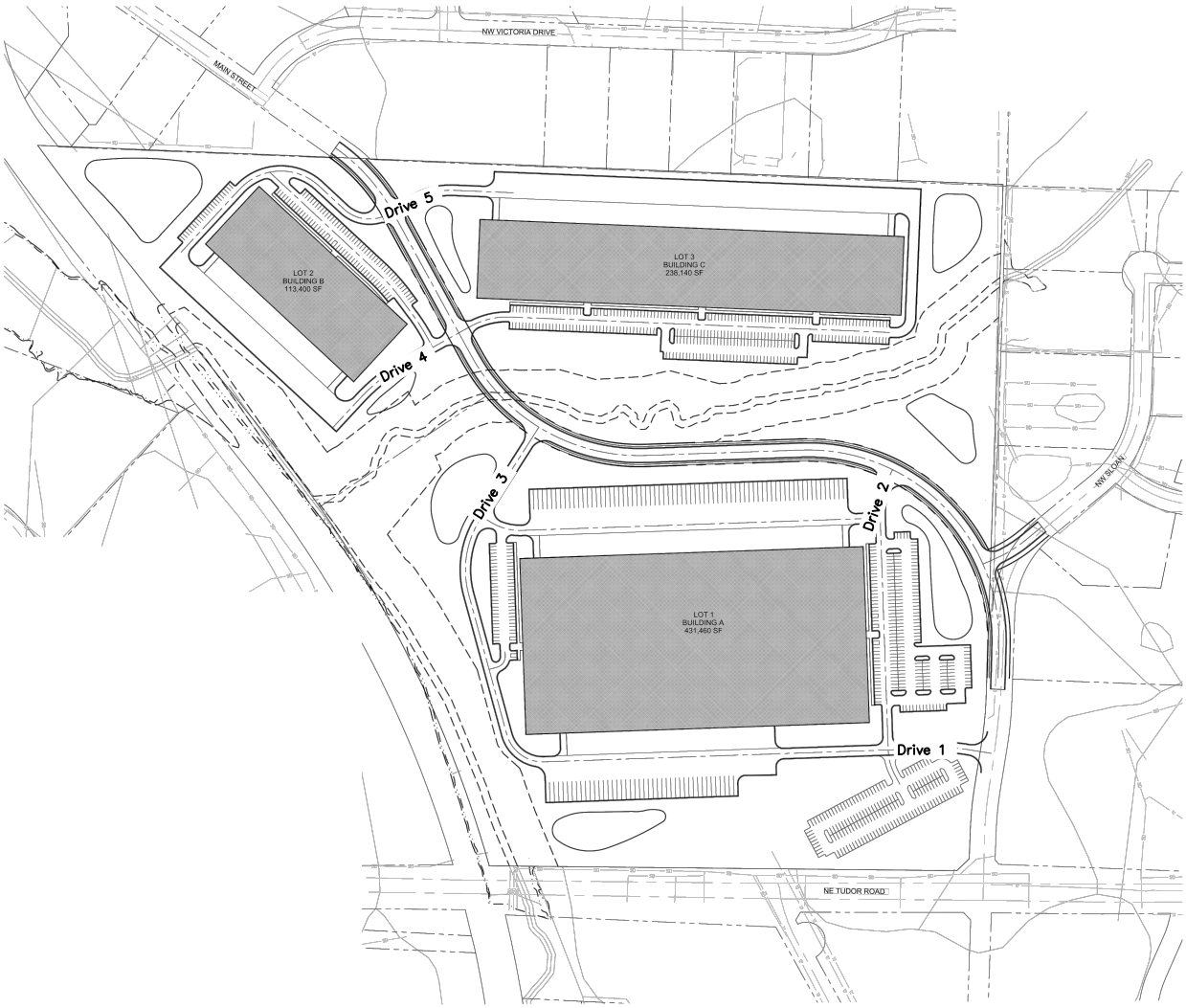
Sight Distance

Main Street is expected to be constructed with horizontal roadway curvature along the re-aligned section. During design, sight distance requirements should be reviewed such that minimum sight distance requirements are met at all proposed public roadway and private drive intersections.

FIGURE 5

Site Plan

Tudor Road Development
Lee's Summit, MO



6. EXISTING PLUS APPROVED PLUS PHASE 1 DEVELOPMENT CONDITIONS

This section presents expected operations with the construction of phase 1 of the proposed development. Phase 1 considers the construction of one building with a total development square footage of 431,460 square feet. With phase 1 development, Drives 1, 2 and 3 are proposed to be constructed along relocated Main Street.

6.1. Existing Plus Approved plus Phase 1 Development Trip Distribution

Trip generation and distribution for the proposed site was presented in **Section 5.1**. The expected trip distribution for phase 1 development of the site is shown in **Figure 6**. The resulting existing plus approved plus phase 1 development volumes are illustrated in **Figure 7**.

FIGURE 6

Phase 1
Trip Distribution
Tudor Road Development
Lee's Summit, MO

olsson

LEGEND

AM (PM) Peak Hour Vehicle Trips (Car)

[AM (PM)] Peak Hour Vehicle Trips (Truck)

XX% AM/PM Car Trip Distribution Percentages

XX% AM/PM Truck Trip Distribution Percentages

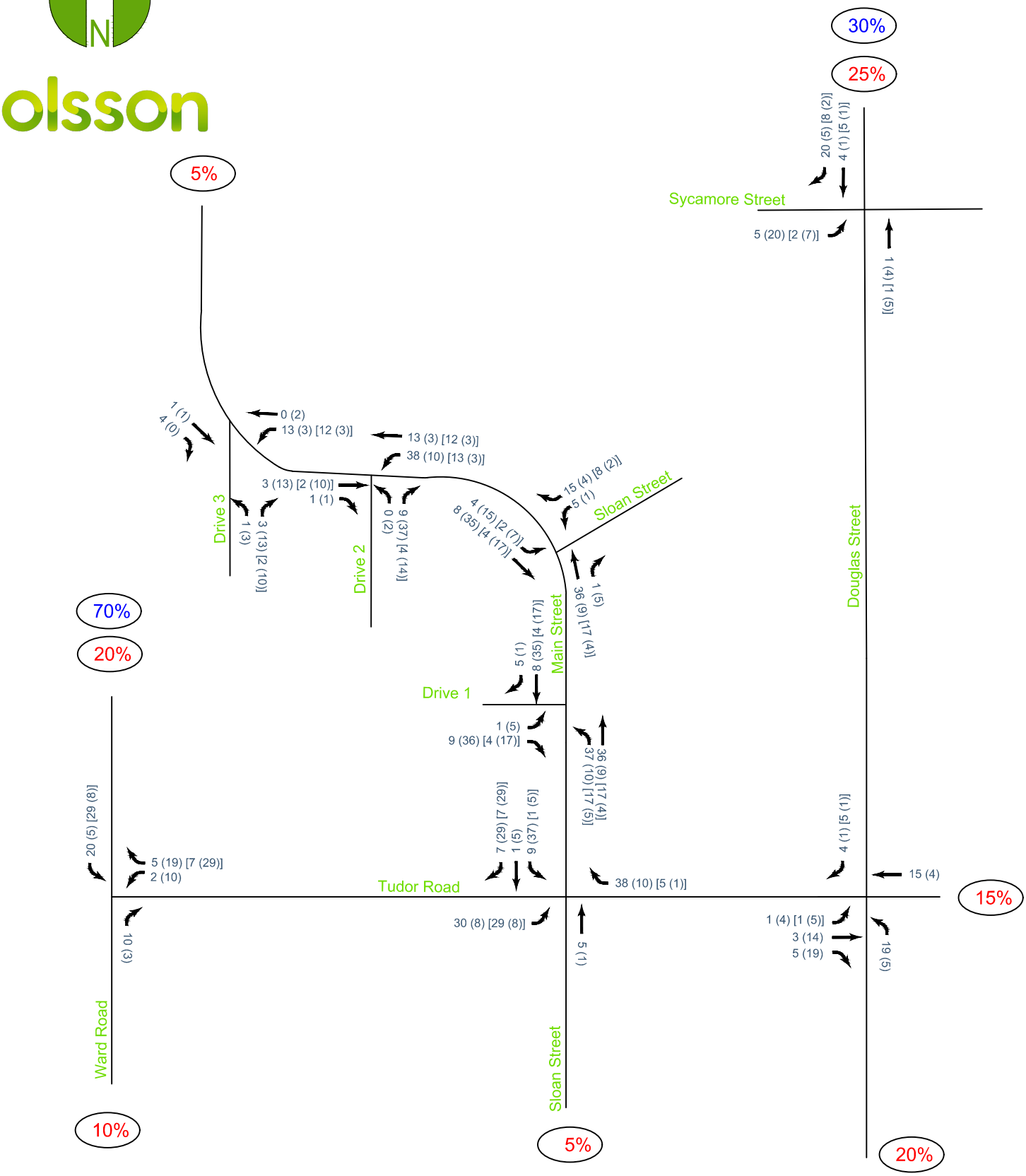


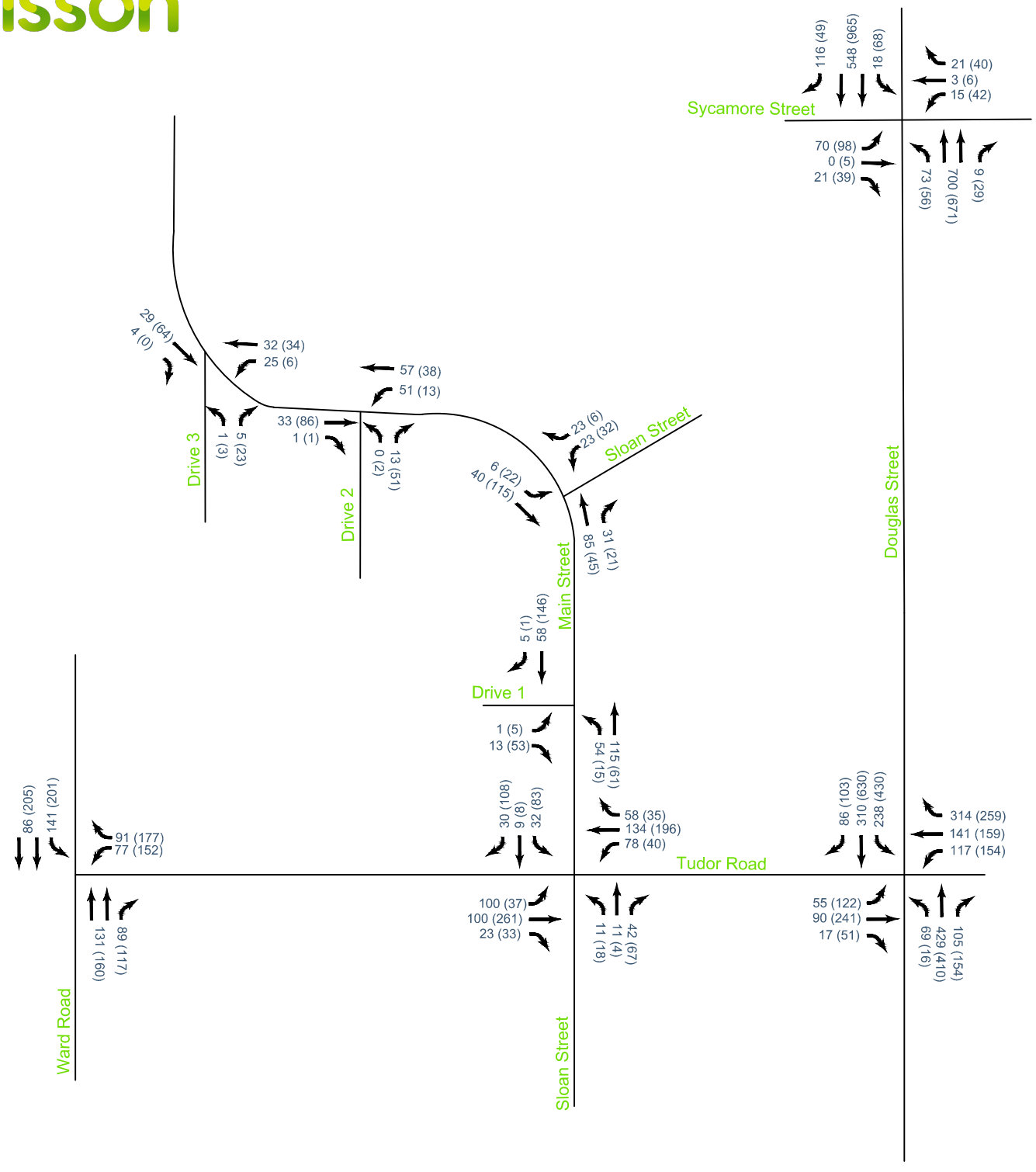
FIGURE 7

Existing plus Approved plus Phase 1 Development Conditions
Peak Hour Volumes

Tudor Road Development
Lee's Summit, MO

LEGEND

AM (PM) Peak Hour Volume



6.2. Existing Plus Approved plus Phase 1 Development Warrant Analysis

Warrant analysis was conducted using the same methodology described in **Section 4.2**.

Signal Warrants

The peak hour signal warrant (warrant 3) was reviewed for public street intersections. Due to proposed access spacing and expected low side street volumes, signal warrants were not reviewed for proposed drive locations.

Considering existing plus approved plus phase 1 development volumes, signals are not warranted at the unsignalized intersections of Tudor Road with Main Street and Main Street with Sloan Street. Signal warrant analysis sheets are provided in **Appendix D**.

Turn Lane Warrants

Existing turn lane deficiencies are unchanged for this scenario and were presented in **Section 4.2**.

Left turn Lanes: Based on the Lee's Summit AMC, left-turn lanes shall be provided on collector streets at the intersection with a connector servicing non-residential development when the left turn lane volume is at least 30 vehicles in any hour. Reviewing expected traffic volumes, a northbound left-turn lane should be provided at Drive 1. A westbound left-turn lane should be provided at Drive 2. The left-turn lanes are recommended with a length of 150 feet plus taper. Operations will be reviewed (**Section 6.3**) to confirm the recommended turn bay storage is adequate to accommodate development traffic.

Right-turn Lanes: Based on the Lee's Summit AMC, right-turn lanes shall be provided on collector streets in non-residential areas at the intersection with any street or driveway when the right turn volume on the collector street is project to be at least 100 vph in an hour. Reviewing expected traffic volumes, the southbound right- turn lane volume at the intersection of Tudor Road and Main Street slightly exceeds 100 vehicles during the PM peak hour period. Currently, the right-turn movement is proposed to share a lane with through traffic, which is expected to have a low volume. Operations will be reviewed (**Section 6.3**) to determine if a southbound right-turn lane is recommended.

Capacity and queueing analysis were also reviewed (see **Section 6.3**) to determine if additional turn lanes and/or storage length is recommended based on expected operations. Existing plus approved plus phase 1 development lane configurations and traffic control for the study network are illustrated in **Figure 8**.

6.3. Existing Plus Approved plus Phase 1 Development Capacity Analysis

Capacity analysis was performed under existing plus approved plus phase 1 development conditions using the methodologies described in **Section 4.3**. The peak hour factors observed under existing conditions were utilized for this scenario except for movements at new drive locations. At these locations, the peak hour factors were conservatively adjusted considering the Synchro suggested values and expected traffic conditions after development. Truck percentages were updated for relevant movements to represent development traffic. Signal timings from the previous analysis scenario were maintained.

Results of the analysis indicate that the signalized intersections are expected to continuing operating similar to the existing plus approved development conditions.

All movements at the unsignalized study intersections are expected to operate at LOS D or better with acceptable queues during the peak hour periods.

Several existing turn lane deficiencies were noted in **Section 4.2**. Additionally, a southbound right-turn lane slightly exceeds the warrant criteria during one peak hour period at the intersection of Tudor Road and Main Street. Reviewing operations, with the exception of the westbound movement at the intersection of Douglas Street and Tudor Road, all movements are operating at an acceptable LOS under current geometrics. Current turn bay lengths are adequate to support existing plus approved as well as phase 1 development conditions. Thus, additional turn lane improvements are not recommended with phase 1 development.

The existing operations for the westbound movement at Douglas Street and Tudor Road are poor, with the proposed development expected to have a minimal impact on operations. Improvements to address the existing deficiency are not proposed.

The following summarizes improvements recommended with phase 1 development.

- Reconstruct Main Street to intersection Tudor Road and the current Sloan Street intersection. Sloan Street should become a 'T'-intersection with Main Street. Sloan Street should be stop controlled. The current geometrics at the intersection of Tudor Road and Sloan Street should remain with the re-alignment of Main Street.
- The existing median opening at Tudor Road and the current Main Street intersection should be closed.
- Provide a 150-foot plus taper northbound left-turn lane along Main Street at Drive 1.
- Provide a 150-foot plus taper westbound left-turn lane along Main Street at Drive 2.

The existing plus approved plus phase 1 conditions capacity analysis summary is illustrated in **Figure 9**. Detailed results are provided in **Appendix D**.

FIGURE 8

Existing plus Approved plus Phase 1 Development Conditions
Lane Configuration and Traffic Control

Tudor Road Development
Lee's Summit, MO

olsson

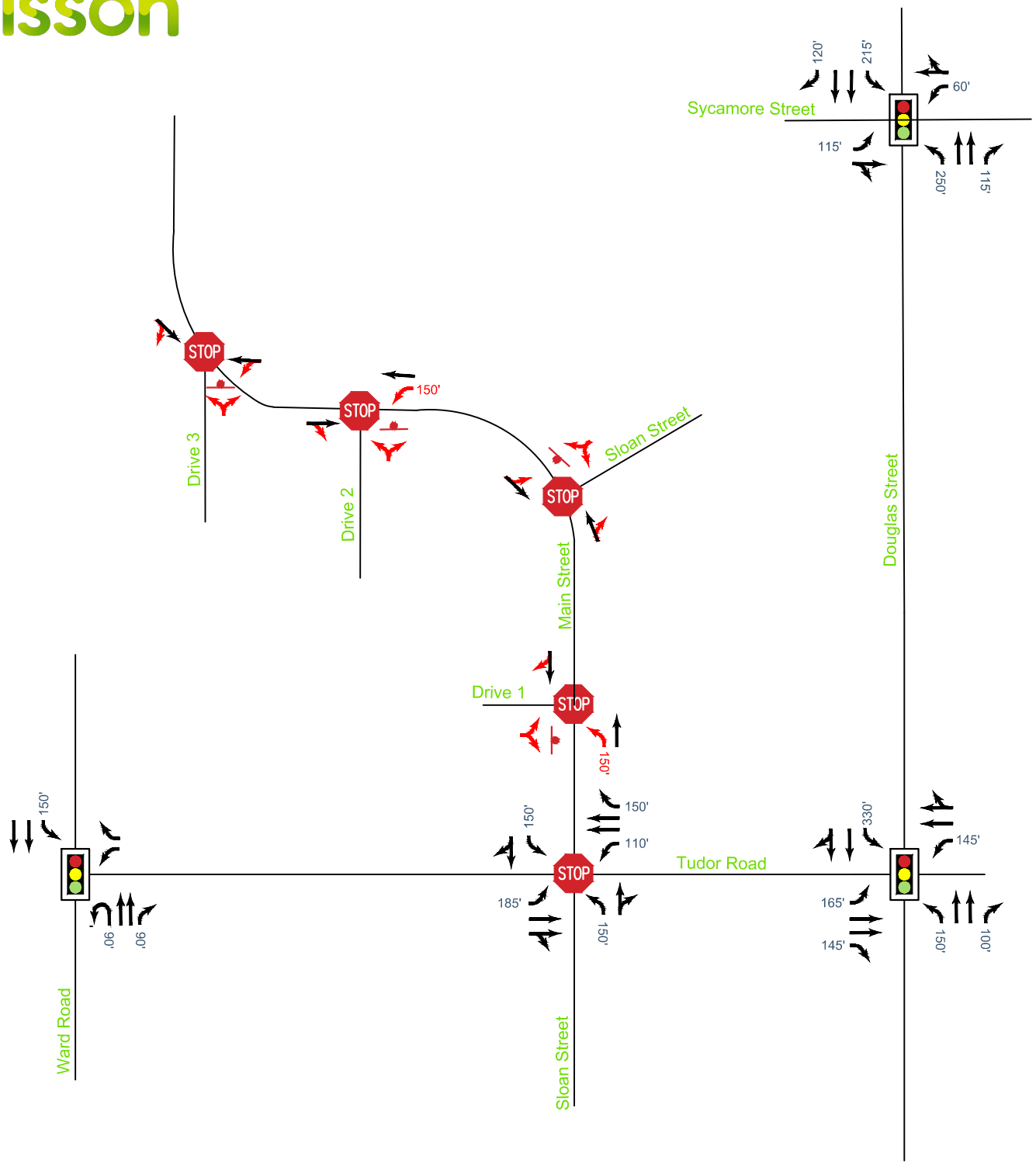


FIGURE 9

Existing plus Approved plus Phase 1 Development Conditions
Capacity Analysis

Tudor Road Development
Lee's Summit, MO

olsson

LEGEND

AM (PM) {AM (PM)} Movement LOS & {95th Percentile Queue}

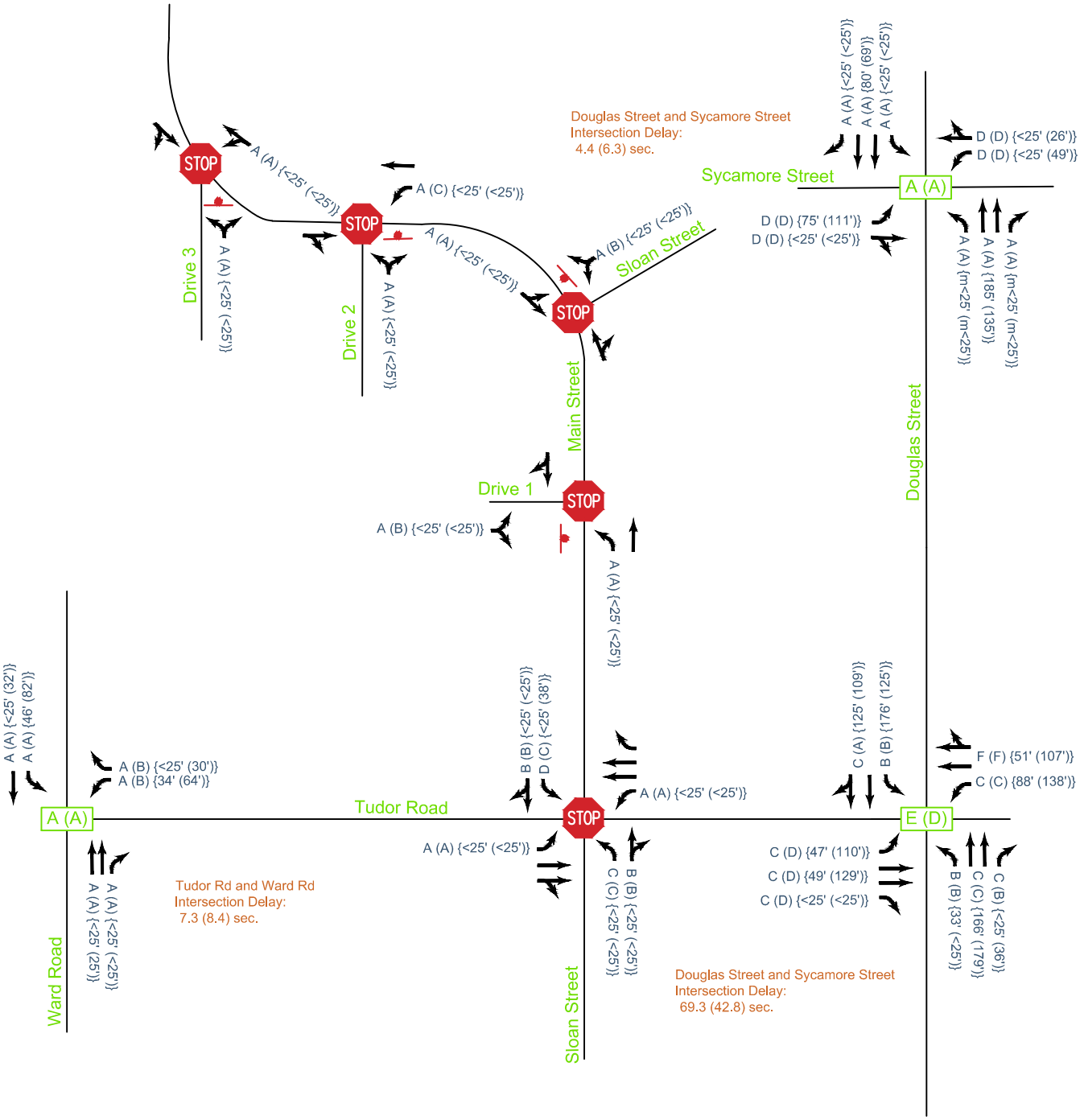
AM (PM) Signalized Intersection LOS

Lane Geometry

m Volume for 95th percentile queue is metered by upstream signal

STOP Stop Controlled Intersection

Stop Sign



7. BUILD YEAR 2026 PLUS APPROVED PLUS FULL BUILD DEVELOPMENT CONDITIONS

The proposed development is expected to be constructed over a five-year period. This scenario evaluates the full build conditions in build year 2026. Existing plus approved traffic volumes were grown at a rate of 2% per year to represent background traffic growth. The growth rate was reviewed with City staff. The growth rate was applied to through traffic volumes along Ward Road, Tudor Road, and Douglas Street and to turning volumes, as appropriate, at major intersections. Background traffic growth was not applied to Main Street or Sloan Street as future growth of traffic along these roadways is expected to be dependent on development.

Full build of the development will consist of the construction of approximately 364,500 square feet of additional development, resulting in the total development square footage of approximately 795,960 square feet. With full build development, Drives 4 and 5 are proposed to be constructed along relocated Main Street. For the purposes of this report, the additional 364,500 square feet of development will be referenced as phase 2 development.

7.1. Trip Generation and Distribution

Trip generation and distribution for the proposed site was presented in **Section 5.1**. The expected trip distribution for phase 2 development of the site is shown in **Figure 10**. Phase 1 and phase 2 development trips represent the full build development condition. The resulting build year 2026 plus approved plus full build development volumes are illustrated on **Figure 11**.

FIGURE 10

Phase 2
Trip Distribution
Tudor Road Development
Lee's Summit, MO

olsson

LEGEND

AM (PM) AM (PM) Peak Hour Car Trips

[AM (PM)] AM (PM) Peak Hour Truck Trips

XX% AM/PM Car Trip Distribution Percentages

XX% AM/PM Truck Trip Distribution Percentages

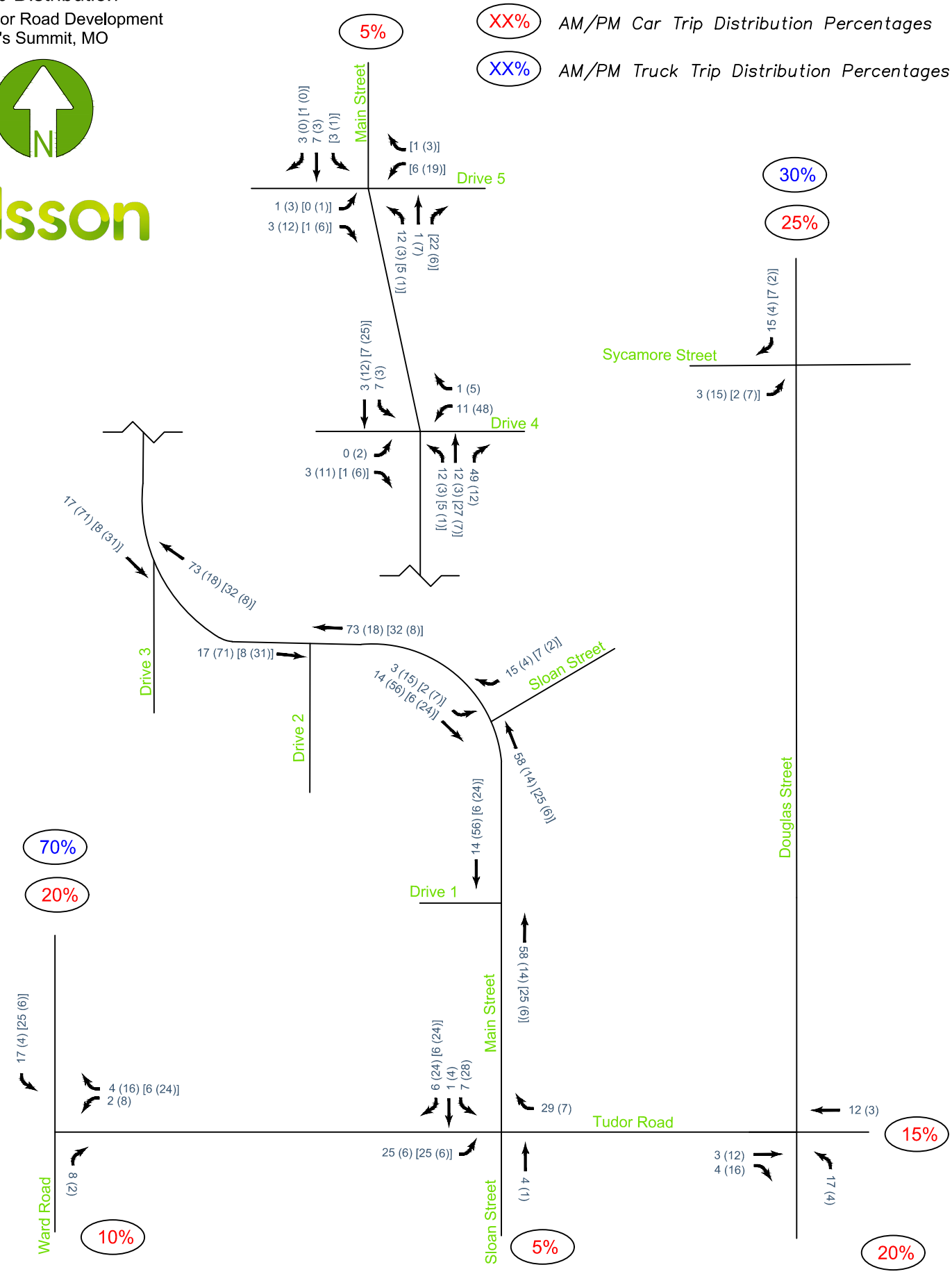


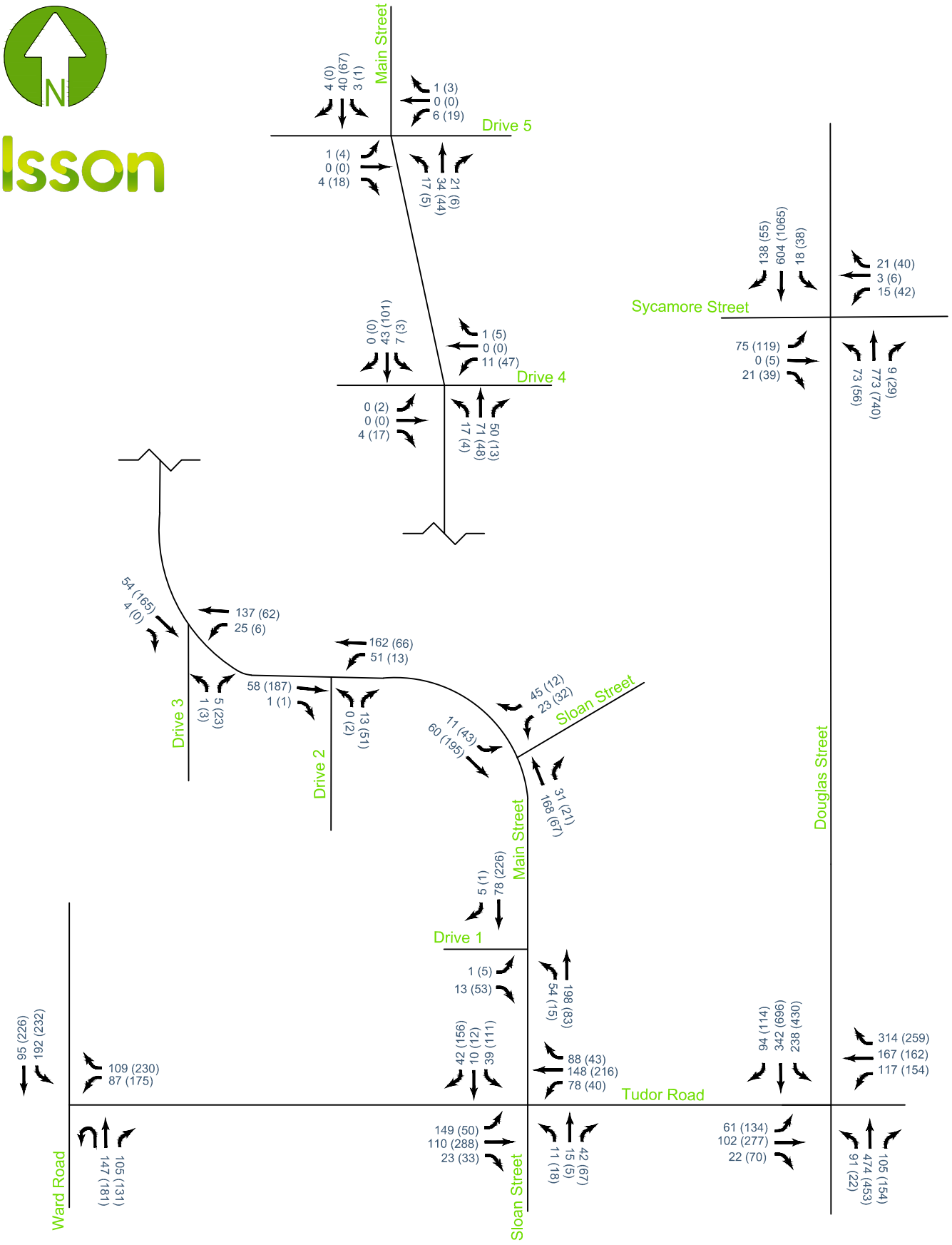
FIGURE 11

Build Year 2026 plus Approved plus Full Build Development
Peak Hour Volumes

Tudor Road Development
Lee's Summit, MO

LEGEND

AM (PM) Peak Hour Volume



7.2. Build Year 2026 plus Approved plus Full Build Development Warrant Analysis

Warrant analysis was conducted using the same methodology described in **Section 4.2**.

Signal Warrants

The peak hour signal warrant (warrant 3) was reviewed for public street intersections. Due to proposed access spacing and expected low side street volumes, signal warrants were not reviewed for proposed drive locations.

Considering build year 2026 plus approved plus full build development volumes, signals are not warranted at the unsignalized intersections of Tudor Road with Main Street and Main Street with Sloan Street. Signal warrant analysis sheets are provided in **Appendix E**.

Turn Lane Warrants

Existing turn lane deficiencies are unchanged for this scenario and were presented in **Section 4.2**.

Left turn Lanes: Based on the Lee's Summit AMC, left-turn lanes shall be provided on collector streets at the intersection with a connector servicing non-residential development when the left turn lane volume is at least 30 vehicles in any hour. Reviewing expected traffic volumes, a southbound left-turn lane should be provided at the intersection of Main Street and Sloan Street based on expected PM Peak hour volumes. The turn lane should be provided with a minimum storage length of 150 feet plus taper.

Under phase 1 development, left-turn lanes were recommended at Drives 1 and 2 along Main Street. With a left-turn lane recommended at the intersection of Main Street and Sloan Street, a three-lane road section with two-way left turn lane could be provided along Main Street from Tudor Road to Drive 2 in lieu of separate left-turn lanes along the roadway segment.

Right-turn Lanes: Based on the Lee's Summit AMC, right-turn lanes shall be provided on collector streets in non-residential areas at the intersection with any street or driveway when the right turn volume on the collector street is project to be at least 100 vph in an hour. Under full build development, the southbound right turn volume at the intersection of Tudor Road and Main Street exceeds 100 vehicles during the PM peak hour period. A southbound right-turn lane with a minimum storage length of 150 feet plus taper should be provided.

Capacity and queueing analysis were also reviewed (see **Section 6.3**) to determine if additional turn lanes and/or storage length is recommended based on expected operations. Build year 2026 plus approved plus full build development lane configurations and traffic control for the study network are illustrated in **Figure 12**.

7.3. Build Year 2026 plus Approved plus Full Build Development Capacity Analysis

Capacity analysis was performed under build year 2026 plus approved plus full build development conditions using the methodologies described in **Section 4.3**. The peak hour factors observed under previous conditions were utilized for this scenario except for movements at new drive locations. At these locations, the peak hour factors were conservatively adjusted considering the Synchro suggested values and expected traffic conditions after development. Truck percentages were updated for relevant movements to represent development traffic. Signal timings from the previous analysis scenario were maintained.

Results of the analysis indicate that the signalized intersections are expected to continuing operating similar to the previous scenarios.

All movements at the unsignalized study intersections are expected to operate at LOS D or better with acceptable queues during the peak hour periods with the exception of the southbound left turn movement at the intersection of Tudor Road and Main Street. The southbound left turn movement is expected to operate at a LOS E during the AM and PM peak hour periods with a 95th-percentile queue length of approximately 75 feet (3 vehicles) during the PM peak hour period. The provided turn lane is expected to accommodate the expected 95th-percentile queue.

Several existing turn lane deficiencies were noted in **Section 4.2**. Reviewing operations, with the exception of the westbound movement at the intersection of Douglas Street and Tudor Road, all movements are operating at an acceptable LOS under current geometrics. Current turn bay lengths are adequate to support build year plus approved plus full build development conditions. Thus, additional turn lane improvements are not recommended with full build development.

The existing operations for the westbound movement at Douglas Street and Tudor Road are poor, with the proposed development expected to have a minimal impact on operations. Improvements to address the existing deficiency are not proposed.

The following summarizes improvements recommended with phase 2 (full build) development.

- Provide a 150-foot plus taper southbound left turn lane along Main Street at Sloan Street.
- Provide a 150-foot plus taper southbound right turn lane along Main Street and Tudor Road.

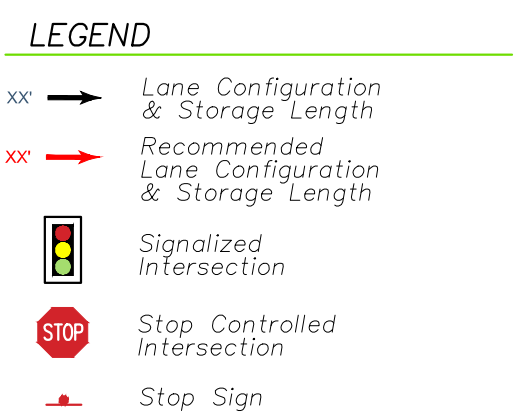
The build year 2026 plus approved plus full build development conditions capacity analysis summary is illustrated in **Figure 13**. Detailed results are provided in **Appendix E**.

FIGURE 12

Build Year 2026 plus Approved plus Full Build Development
Lane Configuration and Traffic Control

Tudor Road Development
Lee's Summit, MO

olsson



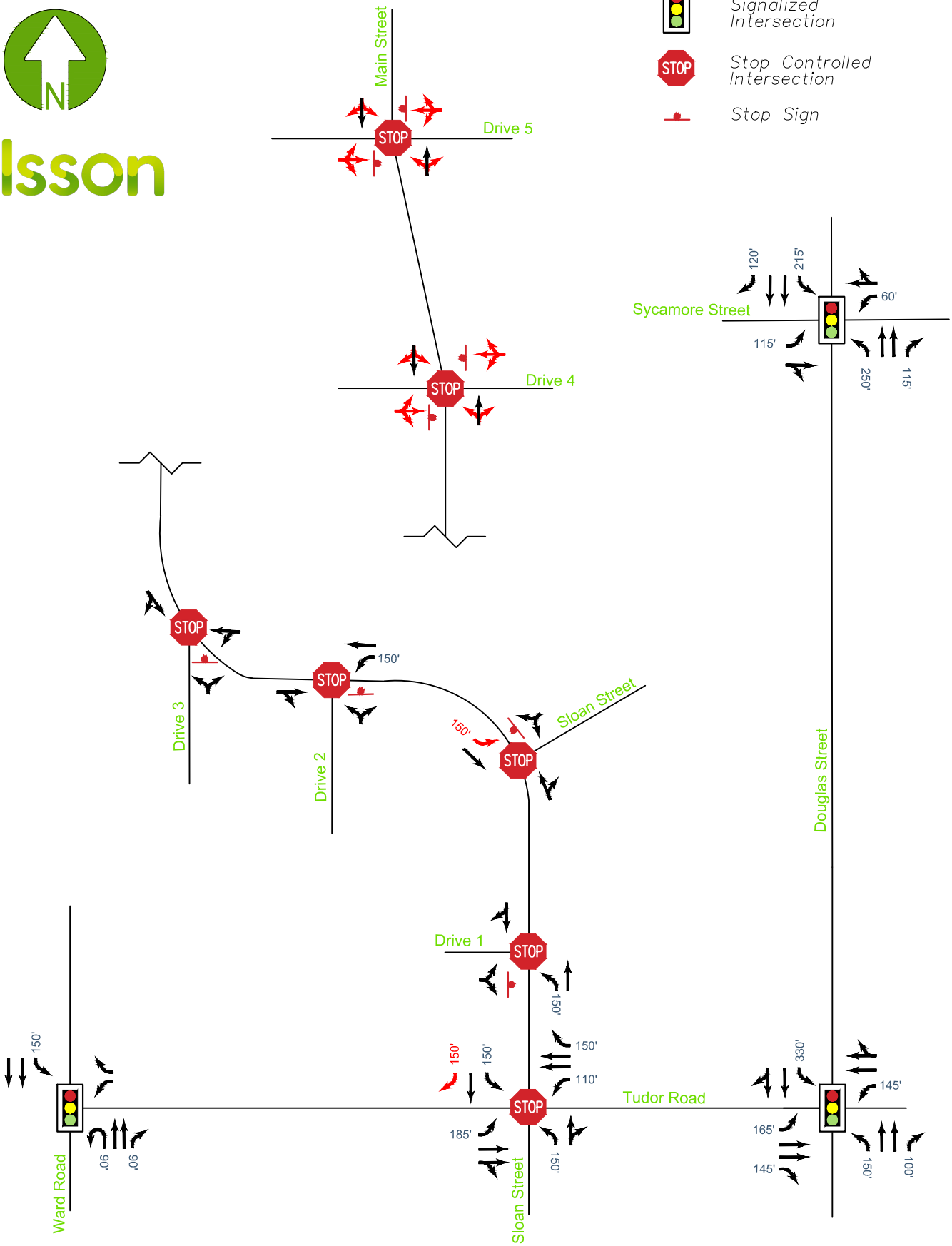


FIGURE 13

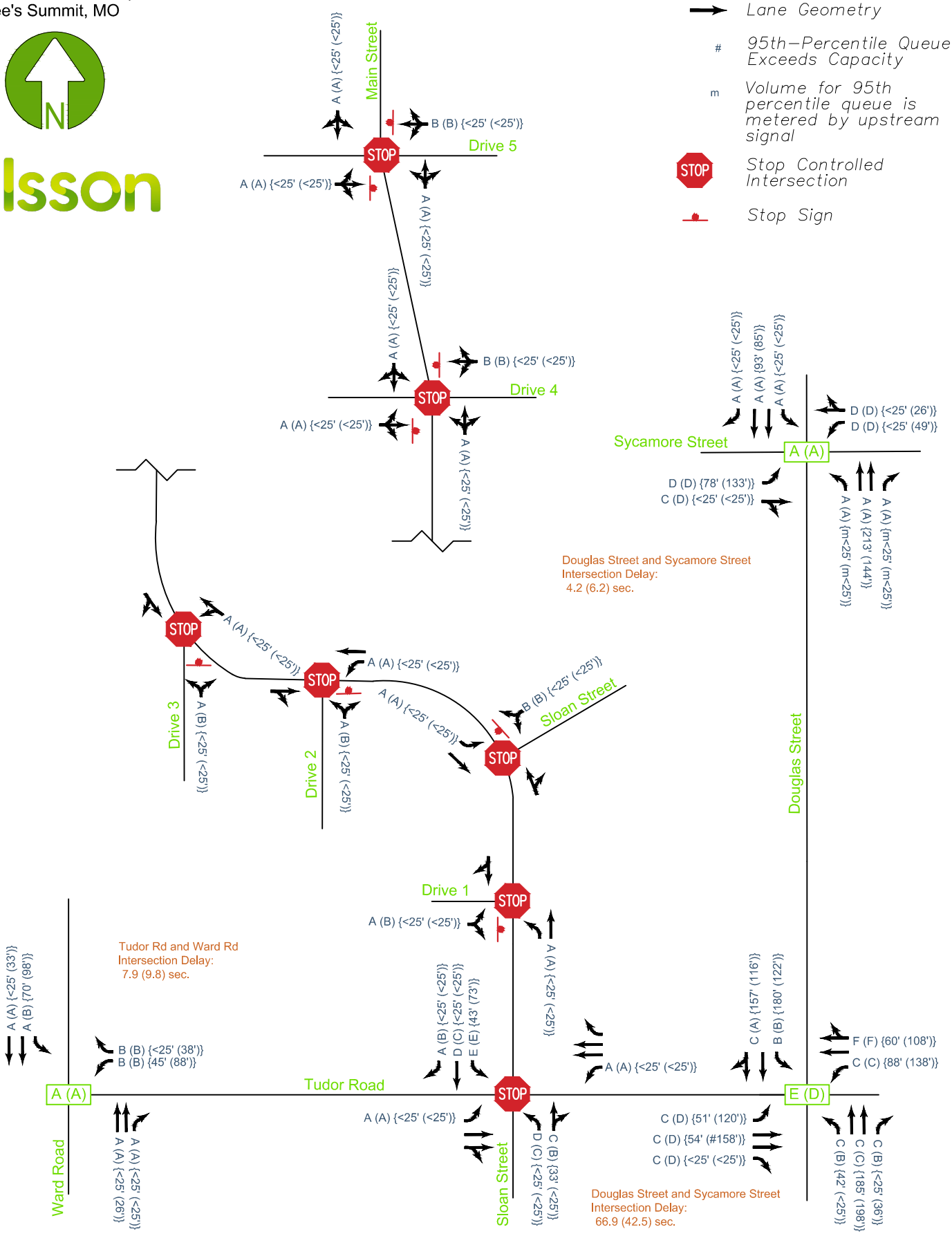
Build Year 2026 plus Approved plus Full Build Development
Capacity Analysis

Tudor Road Development
Lee's Summit, MO

olsson

LEGEND

AM (PM) {AM (PM)}	Movement LOS & {95th Percentile Queue}
AM (PM)	Signalized Intersection LOS
→	Lane Geometry
#	95th-Percentile Queue Exceeds Capacity
m	Volume for 95th percentile queue is metered by upstream signal
STOP	Stop Controlled Intersection
	Stop Sign



8. FUTURE YEAR 2041 PLUS APPROVED PLUS FULL BUILD DEVELOPMENT CONDITIONS

This scenario evaluates the full build development conditions in the future year 2041. Similar to the build year scenario, existing plus approved traffic volumes were grown at a rate of 2% per year to represent background traffic growth for the year 2041. The resulting future year 2041 plus approved plus full build development volumes are illustrated on **Figure 4**. Future volume development worksheets are provided in **Appendix F**.

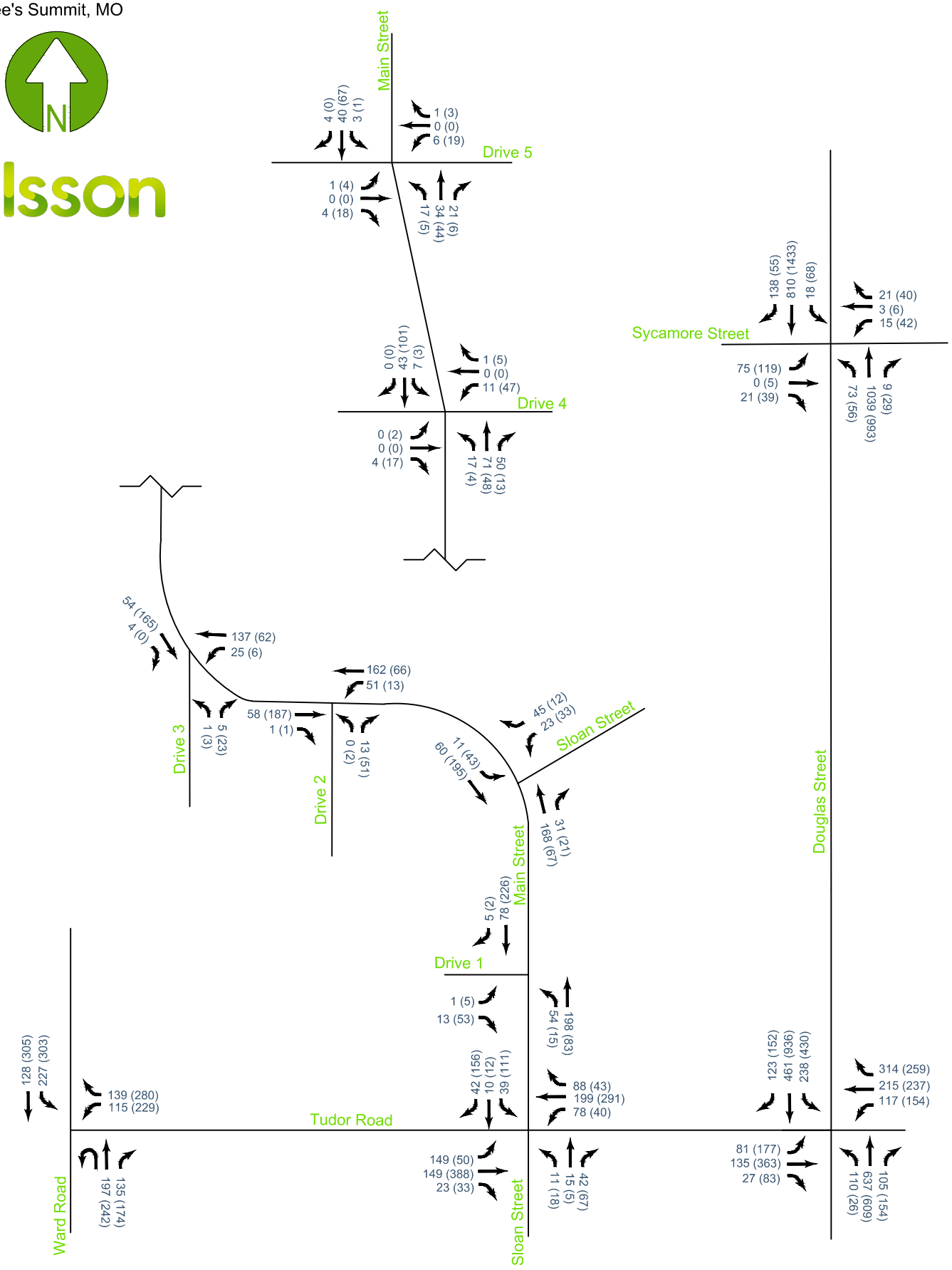
FIGURE 14

Future Year 2041 plus Approved plus Full Build Development
Peak Hour Volumes

Tudor Road Development
Lee's Summit, MO

LEGEND

AM (PM) Peak Hour Volume



8.1. Future Year 2041 plus Approved plus Full Build Development Warrant Analysis

Warrant analysis was conducted using the same methodology described in **Section 4.2**.

Signal Warrants

The peak hour signal warrant (warrant 3) was reviewed for public street intersections. Due to proposed access spacing and expected low side street volumes, signal warrants were not reviewed for proposed drive locations.

Considering future year 2041 plus approved plus full build development volumes, signals are not warranted at the unsignalized intersections of Tudor Road with Main Street and Main Street with Sloan Street. Signal warrant analysis sheets are provided in **Appendix F**.

Turn Lane Warrants

Existing turn lane deficiencies are unchanged for this scenario and were presented in **Section 4.2**.

Left turn Lanes: No additional turn lanes are warranted based on future year 2041 plus approved plus full build development conditions.

Right-turn Lanes: No additional turn lanes are warranted based on future year 2041 plus approved plus full build development conditions.

Capacity and queueing analysis were also reviewed (see **Section 6.3**) to determine if additional turn lanes and/or storage length is recommended based on expected operations. Future year 2041 plus approved plus full build development lane configurations and traffic control for the study network are illustrated in **Figure 15**.

8.2. Future Year 2041 plus Approved plus Full Build Development Capacity Analysis

Capacity analysis was performed under future year 2041 plus approved plus full build development conditions using the methodologies described in **Section 4.3**. The peak hour factors observed under the previous condition was utilized for this scenario. Signal timings from the previous analysis scenario were maintained.

Results of the analysis indicate that the signalized intersections are expected to continue operating similar to the previous scenarios. The study intersection of Douglas Street with Sycamore Street is expected to continue to operate at a LOS A during both peak hour periods, with individual movements expected to continue operating at LOS D or better. Longer north/south through queues can be expected, associated with background traffic growth.

The study intersection of Ward Road and Tudor Road is expected to operate at a LOS A during the AM peak hour period and LOS B during the PM peak hour period. Individual movements are expected to continue operating at LOS D or better. If future year volumes develop, the southbound left turn 95th-percentile queue may exceed available storage.

The signalized intersection of Douglas Street and Tudor Road is expected to continue operating similar to the previous scenarios with the same overall LOS. During both peak periods, the westbound through/right-turn movement is expected to continue operating at a LOS F. The eastbound through and right-turn movements are expected to operate at a LOS E during the PM peak hour period. All other movements are expected to operate at LOS D or better. If future year volumes develop, longer 95th-percentile queuing could be experienced at the intersection.

Signal timings were not updated for the purposes of this study. Adjustment of signal timings at study intersections to accommodate future year volumes may result in improved LOS or reduced 95th-percentile queuing. At the intersection of Douglas Street and Tudor Road, geometric improvements (specifically consideration of a westbound right-turn lane) may be needed in the future year to accommodate traffic volumes.

All movements at the unsignalized study intersections are expected to operate at LOS D or better with acceptable queues during the peak hour periods with the exception of the southbound left turn movement at the intersection of Tudor Road and Main Street. The southbound left turn movement is expected to operate at a LOS F during the AM and PM peak hour periods with a 95th-percentile queue length of approximately 125 feet (5 vehicles) during the PM peak hour period. The provided turn lane is expected to accommodate the expected 95th-percentile queue.

Several existing turn lane deficiencies were noted in **Section 4.2**. If future year traffic volumes develop, increasing existing storage lengths or providing additional turn lanes may improve operations. Future year improvements should be based on actual traffic volumes.

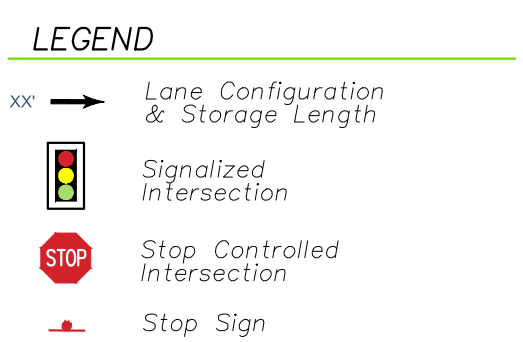
The existing operations for the westbound movement at Douglas Street and Tudor Road are poor, with the proposed development expected to have a minimal impact on operations. Improvements to address the existing deficiency are not proposed.

The future year 2041 plus approved plus full build development conditions capacity analysis summary is illustrated in **Figure 16**. Detailed results are provided in **Appendix F**.

FIGURE 15

Future Year 2041 plus Approved plus Full Build Development
Lane Configuration and Traffic Control

Tudor Road Development
Lee's Summit, MO



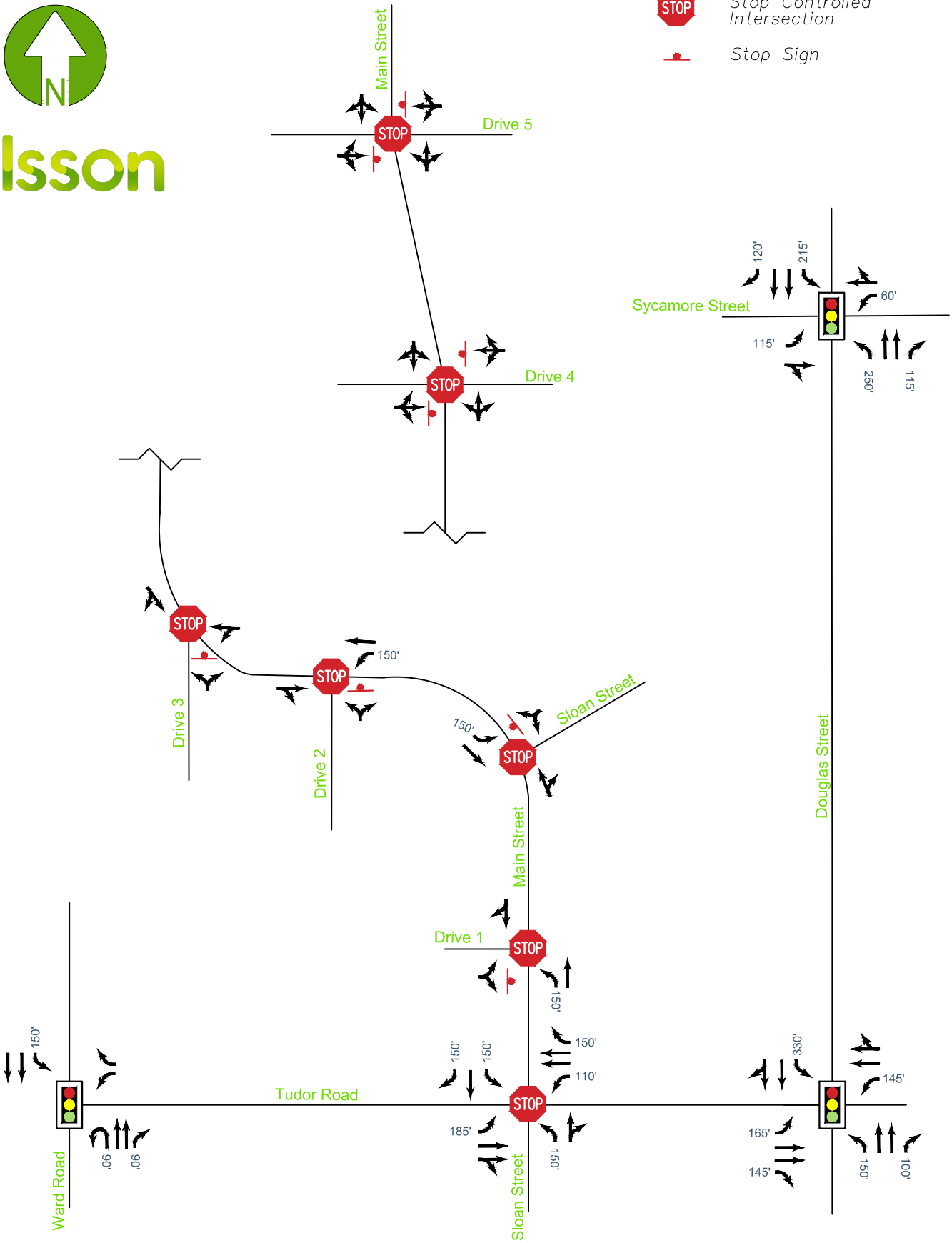
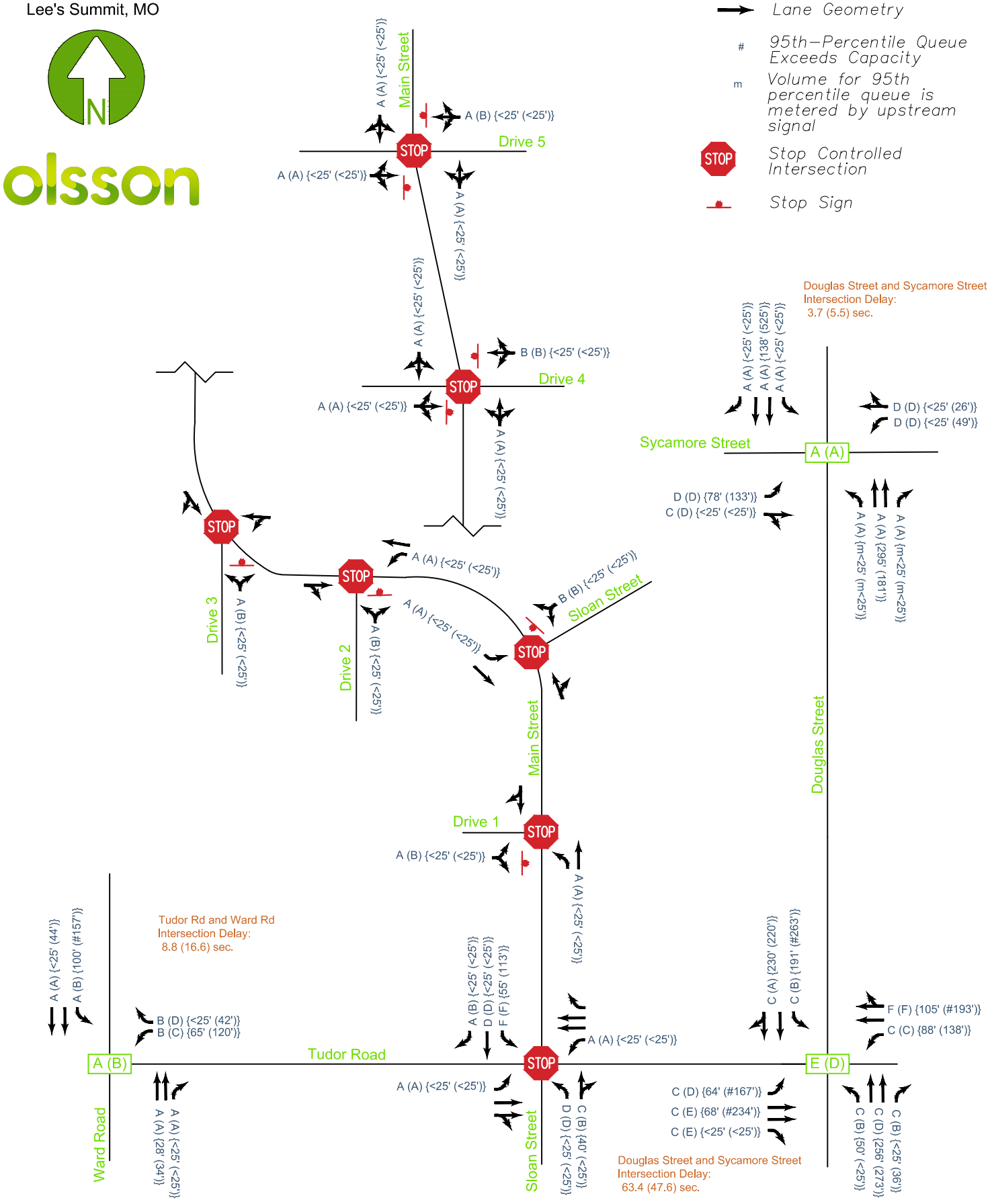


FIGURE 16

Future Year 2041 plus Approved plus Full Build Development
Capacity Analysis

Tudor Road Development
Lee's Summit, MO

olsson



9. SUMMARY

The purpose of this study was to summarize traffic impacts regarding a proposed industrial development located in the northwest quadrant of Tudor Road and Sloan Street in in Lee's Summit, Missouri.

9.1. Conclusions

The general findings of note for the traffic impact study include:

1. In addition to the proposed development, the analysis scenarios considered a partially built approved development located in the southeast quadrant of Tudor Road and Ward Road.
2. The proposed development is expected to be constructed over a five-year period. The first phase of development considers the construction of one building. The remaining facilities (three buildings total) are expected to be constructed by the build year 2026. Analysis was conducted considering an existing year scenario as well as the five-year build year scenario.
3. Several existing lane deficiencies were noted, specifically related to provided storage length. Analysis was conducted considering existing geometrics of the roadway network.
4. Main Street is proposed to be re-aligned and improved within the boundaries of the project site, consistent with the *Thoroughfare Master Plan* and the *Unimproved Road Policy*.
5. The proposed development is expected to have a minimal impact to operations within the study area network.

9.2. Recommendations

Based on review and analysis of the study area, the following action items are recommended:

<u>Existing plus Approved plus Phase 1 Development Conditions</u>

- Reconstruct Main Street to intersect Tudor Road and the current Sloan Street intersection. Sloan Street should become a 'T'-intersection with Main Street. Sloan Street should be stop controlled. The current geometrics at the intersection of Tudor Road and Sloan Street should remain with the re-alignment of Main Street.
- The existing median opening at Tudor Road and the current Main Street intersection should be closed.
- Provide a 150-foot plus taper northbound left-turn lane along Main Street at Drive 1.
- Provide a 150-foot plus taper westbound left-turn lane along Main Street at Drive 2.

- In lieu of dedicated left-turn lanes along Main Street between Tudor Road and Drive 2, consideration could be given to construction of a three-lane section with two-way left turn lane to support full build development conditions.

Build Year 2026 plus Approved plus Full Build Development Conditions

- Provide a 150-foot plus taper southbound left-turn lane along Main Street at Sloan Street.
- Provide a 150-foot plus taper southbound right-turn lane along Main Street and Tudor Road.

Future Year 2041 plus Approved plus Full Build Development Conditions

- If future year volumes develop, signal timing modifications at signalized intersections, increased turn lane storage, or other geometric improvements may be considered to address operations associated with future year conditions.

APPENDIX A

Data Collection

Traffic Counts

Study Name	Douglas & Sycamore 2017
Start Date	Thursday, September 07, 2017 6:00 AM
End Date	Thursday, September 07, 2017 7:00 PM
Site Code	

Report Summary

		Southbound						Westbound						Northbound						Eastbound								Crosswalk	
Time Period	**Class.**	**R**	**T**	**L**	**U**	**I**	**O**	**R**	**T**	**L**	**U**	**I**	**O**	**R**	**T**	**L**	**U**	**I**	**O**	**R**	**T**	**L**	**U**	**I**	**O**	**Total**		**destria**	**Total**
Peak 1	cles (no classi	94	574	71	8	747	678	26	4	53	0	83	99	27	544	83	2	656	668	39	1	100	0	140	181	1626	N	0	0
Specified Period	%	100%	100%	100%	100%	100%	100%	100%	100%	100%	0%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	0%	100%	100%	100%		0%	
6:00 AM - 12:00 PM	**Total**	**94**	**574**	**71**	**8**	**747**	**678**	**26**	**4**	**53**	**0**	**83**	**99**	**27**	**544**	**83**	**2**	**656**	**668**	**39**	**1**	**100**	**0**	**140**	**181**	**1626**	E	1	1
One Hour Peak	PHF	0.87	0.8	0.71	1	0.8	0.89	0.72	0.33	0.7	0	0.83	0.75	0.84	0.86	0.77	0.5	0.85	0.8	0.75	0.25	0.93	0	0.95	0.87	0.84		100%	
11:00 AM - 12:00 PM	Approach %					46%	42%					5%	6%					40%	41%					9%	11%		S	0	0
																												0%	
																											W	1	1
																												100%	
																												2	**2**
Peak 2	cles (no classi	42	951	61	7	1061	770	40	6	42	0	88	95	29	652	56	1	738	1033	39	5	71	0	115	104	2002	N	0	0
Specified Period	%	100%	100%	100%	100%	100%	100%	100%	100%	100%	0%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	0%	100%	100%	100%		0%	
12:00 PM - 7:00 PM	**Total**	**42**	**951**	**61**	**7**	**1061**	**770**	**40**	**6**	**42**	**0**	**88**	**95**	**29**	**652**	**56**	**1**	**738**	**1033**	**39**	**5**	**71**	**0**	**115**	**104**	**2002**	E	0	0
One Hour Peak	PHF	0.7	0.91	0.85	0.35	0.9	0.82	0.77	0.75	0.58	0	0.81	0.79	0.66	0.84	0.78	0.25	0.86	0.95	0.54	0.31	0.81	0	0.8	0.81	0.89		0%	
4:15 PM - 5:15 PM	Approach %					53%	38%					4%	5%					37%	52%					6%	5%		S	0	0
																												0%	
																											W	0	0
																												0%	
																												0	**0**

Study Name	Douglas & Tudor 2017
Start Date	Thursday, August 31, 2017 6:00 AM
End Date	Friday, September 01, 2017 6:00 AM
Site Code	

Report Summary

		Southbound						Westbound						Northbound						Eastbound								Crosswalk	
Time Period	**Class.**	**R**	**T**	**L**	**U**	**I**	**O**	**R**	**T**	**L**	**U**	**I**	**O**	**R**	**T**	**L**	**U**	**I**	**O**	**R**	**T**	**L**	**U**	**I**	**O**	**Total**		**destria**	**Total**
Peak 1	cles (no classi	53	310	238	0	601	767	314	114	117	0	545	375	105	429	42	1	577	438	10	32	24	0	66	209	1789	N	0	0
Specified Period	%	100%	100%	100%	0%	100%	100%	100%	100%	100%	0%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	0%	100%	100%	100%		0%	
6:00 AM - 12:00 PM	**Total**	**53**	**310**	**238**	**0**	**601**	**767**	**314**	**114**	**117**	**0**	**545**	**375**	**105**	**429**	**42**	**1**	**577**	**438**	**10**	**32**	**24**	**0**	**66**	**209**	**1789**	E	0	0
One Hour Peak	PHF	0.74	0.95	0.68	0	0.84	0.75	0.68	0.81	0.66	0	0.76	0.66	0.66	0.79	0.75	0.25	0.83	0.87	0.5	0.57	0.75	0	0.66	0.78	0.82		0%	
7:00 AM - 8:00 AM	Approach %					34%	43%					30%	21%					32%	24%					4%	12%		S	0	0
																												0%	
																											W	0	0
																												0%	
																												0	**0**
Peak 2	cles (no classi	52	630	430	1	1113	735	259	62	154	0	475	684	154	410	14	0	578	811	27	100	65	0	192	128	2358	N	0	0
Specified Period	%	100%	100%	100%	100%	100%	100%	100%	100%	100%	0%	100%	100%	100%	100%	100%	0%	100%	100%	100%	100%	100%	0%	100%	100%	100%		0%	
12:00 PM - 12:00 AM	**Total**	**52**	**630**	**430**	**1**	**1113**	**735**	**259**	**62**	**154**	**0**	**475**	**684**	**154**	**410**	**14**	**0**	**578**	**811**	**27**	**100**	**65**	**0**	**192**	**128**	**2358**	E	2	2
One Hour Peak	PHF	0.65	0.87	0.92	0.25	0.91	0.84	0.83	0.74	0.84	0	0.89	0.94	0.96	0.85	0.7	0	0.9	0.91	0.68	0.64	0.74	0	0.68	0.7	0.9		100%	
4:30 PM - 5:30 PM	Approach %					47%	31%					20%	29%					25%	34%					8%	5%		S	0	0
																												0%	
																											W	1	1
																												100%	
																												3	**3**

Tudor and Douglas - TMC

Wed Jun 2, 2021
Full Length (7 AM-9 AM, 4 PM-6 PM)
All Classes (Lights, Articulated Trucks, Buses and Single-Unit Trucks)
All Movements
ID: 841531, Location: 38.930632, -94.379552

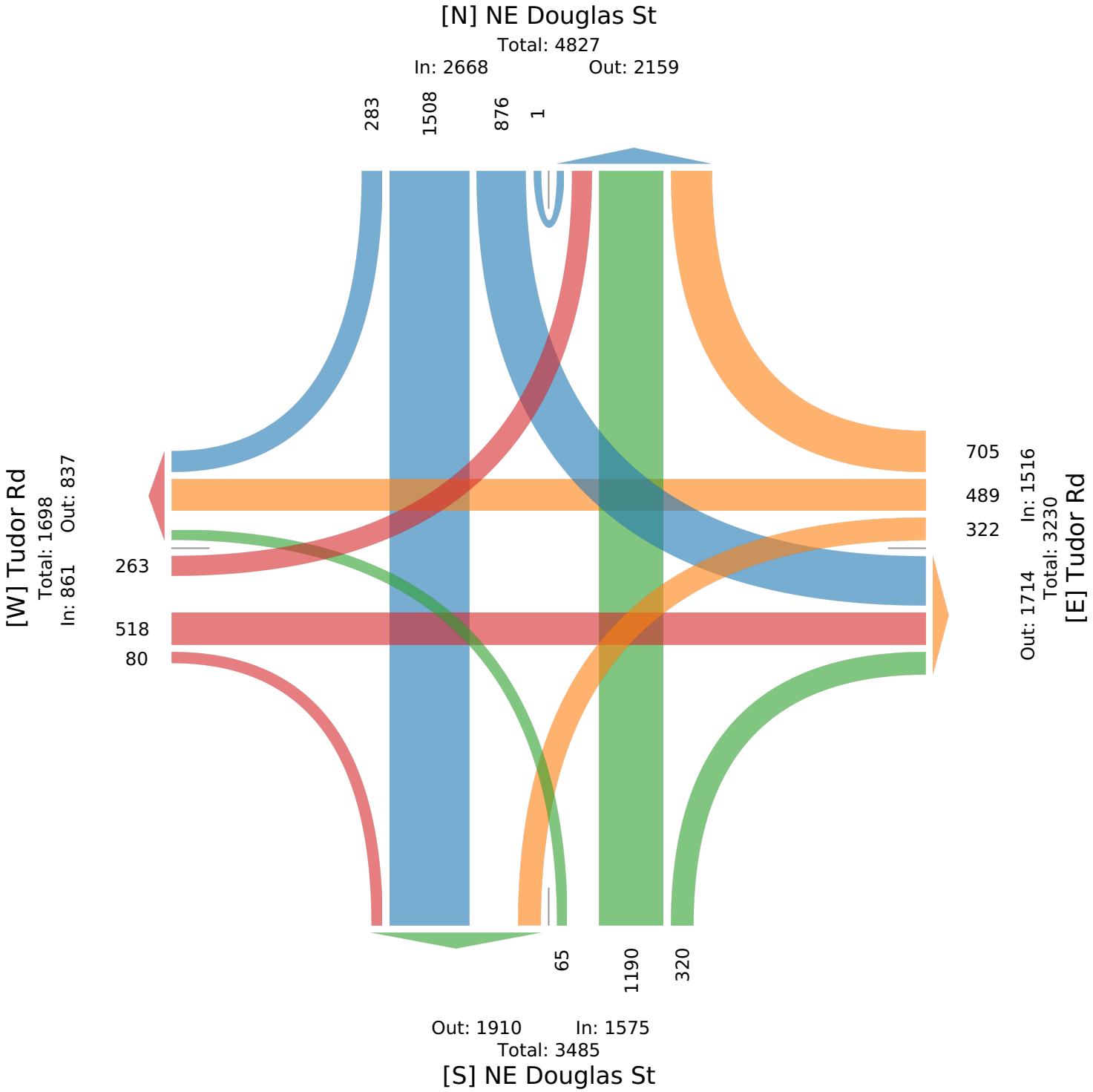
GEWALT HAMILTON ASSOCIATES, INC.
Provided by: Gewalt Hamilton Associates Inc.
625 Forest Edge Drive, Vernon Hills, IL, 60061, US

Leg	NE Douglas St					Tudor Rd					NE Douglas St					Tudor Rd					
Direction	Southbound					Westbound					Northbound					Eastbound					
Time	R	T	L	U	**App**	R	T	L	U	**App**	R	T	L	U	**App**	R	T	L	U	**App**	**Int**
2021-06-02 7:00AM	12	35	26	0	**73**	52	17	13	0	**82**	10	59	3	0	**72**	1	11	13	0	**25**	**252**
7:15AM	16	46	51	0	**113**	54	28	12	0	**94**	19	56	5	0	**80**	2	20	7	0	**29**	**316**
7:30AM	13	50	28	0	**91**	53	18	17	0	**88**	16	91	5	0	**112**	0	16	6	0	**22**	**313**
7:45AM	26	74	32	0	**132**	49	39	11	0	**99**	24	90	12	0	**126**	1	15	14	0	**30**	**387**
Hourly Total	67	205	137	0	**409**	208	102	53	0	**363**	69	296	25	0	**390**	4	62	40	0	**106**	**1268**
8:00AM	16	55	41	0	**112**	41	30	13	0	**84**	17	56	2	0	**75**	1	22	8	0	**31**	**302**
8:15AM	15	52	32	0	**99**	38	23	14	0	**75**	20	79	6	0	**105**	4	22	17	0	**43**	**322**
8:30AM	16	75	29	0	**120**	32	28	14	0	**74**	13	55	2	0	**70**	3	22	11	0	**36**	**300**
8:45AM	22	72	41	0	**135**	51	32	17	0	**100**	27	54	5	0	**86**	2	19	11	0	**32**	**353**
Hourly Total	69	254	143	0	**466**	162	113	58	0	**333**	77	244	15	0	**336**	10	85	47	0	**142**	**1277**
4:00PM	13	125	75	1	**214**	35	35	20	0	**90**	23	78	3	0	**104**	7	44	22	0	**73**	**481**
4:15PM	17	123	64	0	**204**	39	28	21	0	**88**	12	71	5	0	**88**	6	29	17	0	**52**	**432**
4:30PM	23	135	79	0	**237**	45	23	29	0	**97**	19	80	2	0	**101**	7	55	27	0	**89**	**524**
4:45PM	20	143	78	0	**241**	58	38	35	0	**131**	24	87	5	0	**116**	11	50	27	0	**88**	**576**
Hourly Total	73	526	296	1	**896**	177	124	105	0	**406**	78	316	15	0	**409**	31	178	93	0	**302**	**2013**
5:00PM	28	142	70	0	**240**	39	38	27	0	**104**	19	85	3	0	**107**	6	61	33	0	**100**	**551**
5:15PM	18	105	71	0	**194**	43	37	25	0	**105**	28	84	0	0	**112**	5	41	16	0	**62**	**473**
5:30PM	18	140	63	0	**221**	38	31	25	0	**94**	27	93	4	0	**124**	11	48	19	0	**78**	**517**
5:45PM	10	136	96	0	**242**	38	44	29	0	**111**	22	72	3	0	**97**	13	43	15	0	**71**	**521**
Hourly Total	74	523	300	0	**897**	158	150	106	0	**414**	96	334	10	0	**440**	35	193	83	0	**311**	**2062**
Total	283	1508	876	1	**2668**	705	489	322	0	**1516**	320	1190	65	0	**1575**	80	518	263	0	**861**	**6620**
% Approach	10.6%	56.5%	32.8%	0%	**-**	46.5%	32.3%	21.2%	0%	**-**	20.3%	75.6%	4.1%	0%	**-**	9.3%	60.2%	30.5%	0%	**-**	-
% Total	4.3%	22.8%	13.2%	0%	**40.3%**	10.6%	7.4%	4.9%	0%	**22.9%**	4.8%	18.0%	1.0%	0%	**23.8%**	1.2%	7.8%	4.0%	0%	**13.0%**	-
Lights	282	1493	864	1	**2640**	700	484	319	0	**1503**	318	1180	65	0	**1563**	80	514	261	0	**855**	6561
% Lights	99.6%	99.0%	98.6%	100%	**99.0%**	99.3%	99.0%	99.1%	0%	**99.1%**	99.4%	99.2%	100%	0%	**99.2%**	100%	99.2%	99.2%	0%	**99.3%**	99.1%
Articulated Trucks	1	3	2	0	**6**	2	1	0	0	**3**	0	2	0	0	**2**	0	2	2	0	**4**	15
% Articulated Trucks	0.4%	0.2%	0.2%	0%	**0.2%**	0.3%	0.2%	0%	0%	**0.2%**	0%	0.2%	0%	0%	**0.1%**	0%	0.4%	0.8%	0%	**0.5%**	0.2%
Buses and Single-Unit Trucks	0	12	10	0	**22**	3	4	3	0	**10**	2	8	0	0	**10**	0	2	0	0	**2**	44
% Buses and Single-Unit Trucks	0%	0.8%	1.1%	0%	**0.8%**	0.4%	0.8%	0.9%	0%	**0.7%**	0.6%	0.7%	0%	0%	**0.6%**	0%	0.4%	0%	0%	**0.2%**	0.7%

*L: Left, R: Right, T: Thru, U: U-Turn

Tudor and Douglas - TMC
Wed Jun 2, 2021
Full Length (7 AM-9 AM, 4 PM-6 PM)
All Classes (Lights, Articulated Trucks, Buses and Single-Unit Trucks)
All Movements
ID: 841531, Location: 38.930632, -94.379552

Provided by: Gewalt Hamilton Associates Inc.
625 Forest Edge Drive, Vernon Hills, IL, 60061, US



Tudor and Douglas - TMC

Wed Jun 2, 2021
AM Peak (7:30 AM - 8:30 AM)
All Classes (Lights, Articulated Trucks, Buses and Single-Unit Trucks)
All Movements
ID: 841531, Location: 38.930632, -94.379552

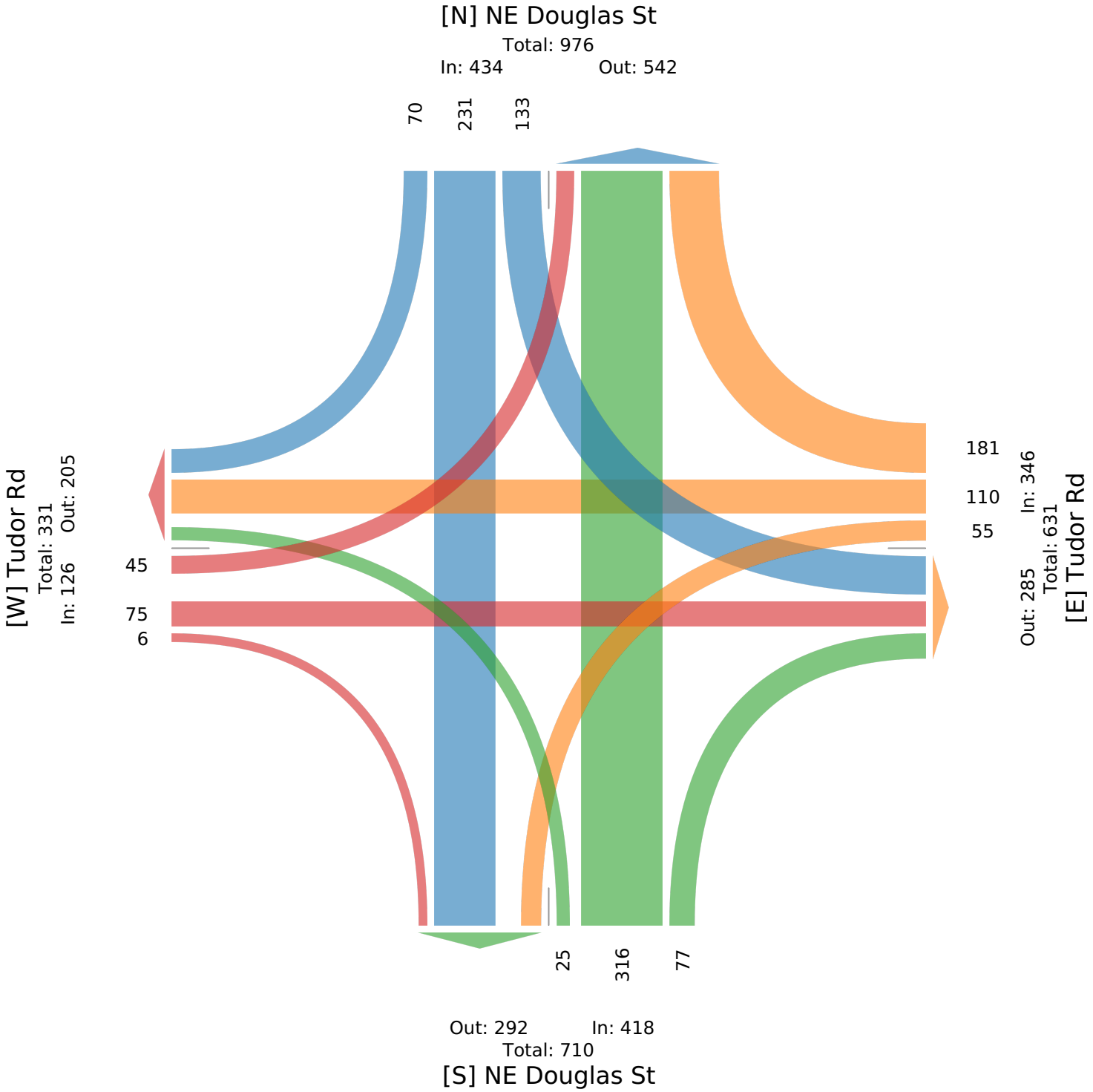
Provided by: Gewalt Hamilton Associates Inc.
625 Forest Edge Drive, Vernon Hills, IL, 60061, US

Leg	NE Douglas St					Tudor Rd					NE Douglas St					Tudor Rd					
Direction	Southbound					Westbound					Northbound					Eastbound					
Time	R	T	L	U	App	R	T	L	U	App	R	T	L	U	App	R	T	L	U	App	Int
2021-06-02 7:30AM	13	50	28	0	**91**	53	18	17	0	**88**	16	91	5	0	**112**	0	16	6	0	**22**	**313**
7:45AM	26	74	32	0	**132**	49	39	11	0	**99**	24	90	12	0	**126**	1	15	14	0	**30**	**387**
8:00AM	16	55	41	0	**112**	41	30	13	0	**84**	17	56	2	0	**75**	1	22	8	0	**31**	**302**
8:15AM	15	52	32	0	**99**	38	23	14	0	**75**	20	79	6	0	**105**	4	22	17	0	**43**	**322**
Total	70	231	133	0	**434**	181	110	55	0	**346**	77	316	25	0	**418**	6	75	45	0	**126**	**1324**
% Approach	16.1%	53.2%	30.6%	0%	-	52.3%	31.8%	15.9%	0%	-	18.4%	75.6%	6.0%	0%	-	4.8%	59.5%	35.7%	0%	-	-
% Total	5.3%	17.4%	10.0%	0%	**32.8%**	13.7%	8.3%	4.2%	0%	**26.1%**	5.8%	23.9%	1.9%	0%	**31.6%**	0.5%	5.7%	3.4%	0%	**9.5%**	-
PHF	0.673	0.780	0.811	-	**0.822**	0.854	0.705	0.809	-	**0.874**	0.802	0.868	0.521	-	**0.829**	0.375	0.852	0.662	-	**0.733**	0.855
Lights	70	228	123	0	**421**	178	109	53	0	**340**	76	312	25	0	**413**	6	73	45	0	**124**	1298
% Lights	100%	98.7%	92.5%	0%	**97.0%**	98.3%	99.1%	96.4%	0%	**98.3%**	98.7%	98.7%	100%	0%	**98.8%**	100%	97.3%	100%	0%	**98.4%**	98.0%
Articulated Trucks	0	1	1	0	**2**	1	0	0	0	**1**	0	1	0	0	**1**	0	1	0	0	**1**	5
% Articulated Trucks	0%	0.4%	0.8%	0%	**0.5%**	0.6%	0%	0%	0%	**0.3%**	0%	0.3%	0%	0%	**0.2%**	0%	1.3%	0%	0%	**0.8%**	0.4%
Buses and Single-Unit Trucks	0	2	9	0	**11**	2	1	2	0	**5**	1	3	0	0	**4**	0	1	0	0	**1**	21
% Buses and Single-Unit Trucks	0%	0.9%	6.8%	0%	**2.5%**	1.1%	0.9%	3.6%	0%	**1.4%**	1.3%	0.9%	0%	0%	**1.0%**	0%	1.3%	0%	0%	**0.8%**	1.6%

*L: Left, R: Right, T: Thru, U: U-Turn

Tudor and Douglas - TMC
Wed Jun 2, 2021
AM Peak (7:30 AM - 8:30 AM)
All Classes (Lights, Articulated Trucks, Buses and Single-Unit Trucks)
All Movements
ID: 841531, Location: 38.930632, -94.379552

Provided by: Gewalt Hamilton Associates Inc.
625 Forest Edge Drive, Vernon Hills, IL, 60061, US



Tudor and Douglas - TMC

Wed Jun 2, 2021
PM Peak (4:30 PM - 5:30 PM) - Overall Peak Hour
All Classes (Lights, Articulated Trucks, Buses and Single-Unit Trucks)
All Movements
ID: 841531, Location: 38.930632, -94.379552

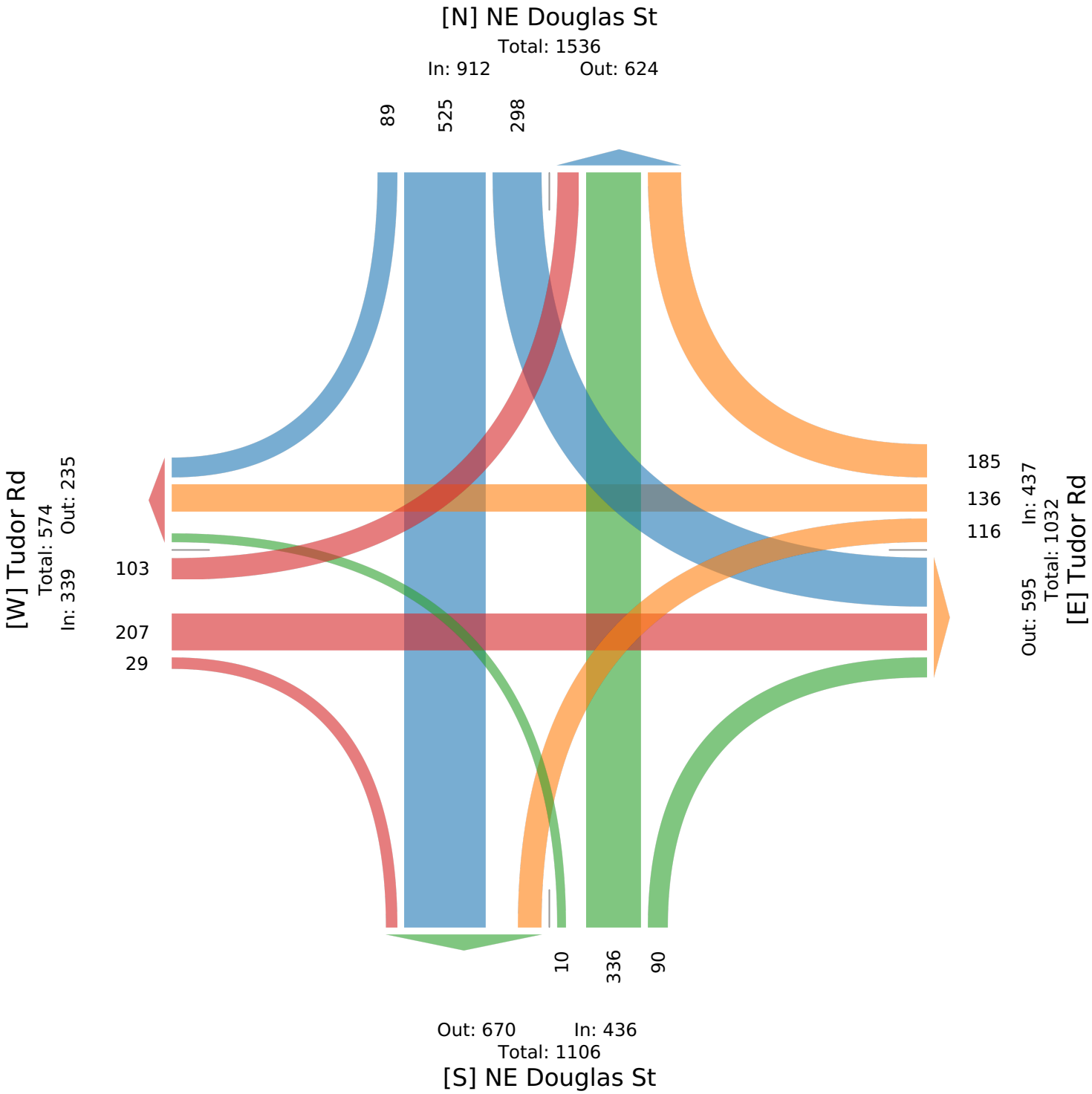
GEWALT HAMILTON ASSOCIATES, INC.
Provided by: Gewalt Hamilton Associates Inc.
625 Forest Edge Drive, Vernon Hills, IL, 60061, US

Leg	NE Douglas St					Tudor Rd					NE Douglas St					Tudor Rd					
Direction	Southbound					Westbound					Northbound					Eastbound					
Time	R	T	L	U	App	R	T	L	U	App	R	T	L	U	App	R	T	L	U	App	Int
2021-06-02 4:30PM	23	135	79	0	**237**	45	23	29	0	**97**	19	80	2	0	**101**	7	55	27	0	**89**	**524**
4:45PM	20	143	78	0	**241**	58	38	35	0	**131**	24	87	5	0	**116**	11	50	27	0	**88**	**576**
5:00PM	28	142	70	0	**240**	39	38	27	0	**104**	19	85	3	0	**107**	6	61	33	0	**100**	**551**
5:15PM	18	105	71	0	**194**	43	37	25	0	**105**	28	84	0	0	**112**	5	41	16	0	**62**	**473**
Total	89	525	298	0	**912**	185	136	116	0	**437**	90	336	10	0	**436**	29	207	103	0	**339**	**2124**
% Approach	9.8%	57.6%	32.7%	0%	**-**	42.3%	31.1%	26.5%	0%	**-**	20.6%	77.1%	2.3%	0%	**-**	8.6%	61.1%	30.4%	0%	**-**	-
% Total	4.2%	24.7%	14.0%	0%	**42.9%**	8.7%	6.4%	5.5%	0%	**20.6%**	4.2%	15.8%	0.5%	0%	**20.5%**	1.4%	9.7%	4.8%	0%	**16.0%**	-
PHF	0.795	0.918	0.943	-	**0.946**	0.797	0.895	0.829	-	**0.834**	0.804	0.966	0.500	-	**0.940**	0.659	0.848	0.780	-	**0.848**	0.922
Lights	88	522	298	0	**908**	185	136	116	0	**437**	90	336	10	0	**436**	29	207	102	0	**338**	2119
% Lights	98.9%	99.4%	100%	0%	**99.6%**	100%	100%	100%	0%	**100%**	100%	100%	100%	0%	**100%**	100%	100%	99.0%	0%	**99.7%**	99.8%
Articulated Trucks	1	0	0	0	**1**	0	0	0	0	**0**	0	0	0	0	**0**	0	0	1	0	**1**	2
% Articulated Trucks	1.1%	0%	0%	0%	**0.1%**	0%	0%	0%	0%	**0%**	0%	0%	0%	0%	**0%**	0%	0%	1.0%	0%	**0.3%**	0.1%
Buses and Single-Unit Trucks	0	3	0	0	**3**	0	0	0	0	**0**	0	0	0	0	**0**	0	0	0	0	**0**	3
% Buses and Single-Unit Trucks	0%	0.6%	0%	0%	**0.3%**	0%	0%	0%	0%	**0%**	0%	0%	0%	0%	**0%**	0%	0%	0%	0%	**0%**	0.1%

*L: Left, R: Right, T: Thru, U: U-Turn

Tudor and Douglas - TMC
Wed Jun 2, 2021
PM Peak (4:30 PM - 5:30 PM) - Overall Peak Hour
All Classes (Lights, Articulated Trucks, Buses and Single-Unit Trucks)
All Movements
ID: 841531, Location: 38.930632, -94.379552

Provided by: Gewalt Hamilton Associates Inc.
625 Forest Edge Drive, Vernon Hills, IL, 60061, US



Tudor and Sloan - TMC

Wed Jun 2, 2021
Full Length (7 AM-9 AM, 4 PM-6 PM)
All Classes (Lights, Articulated Trucks, Buses and Single-Unit Trucks)
All Movements
ID: 841530, Location: 38.930716, -94.383412

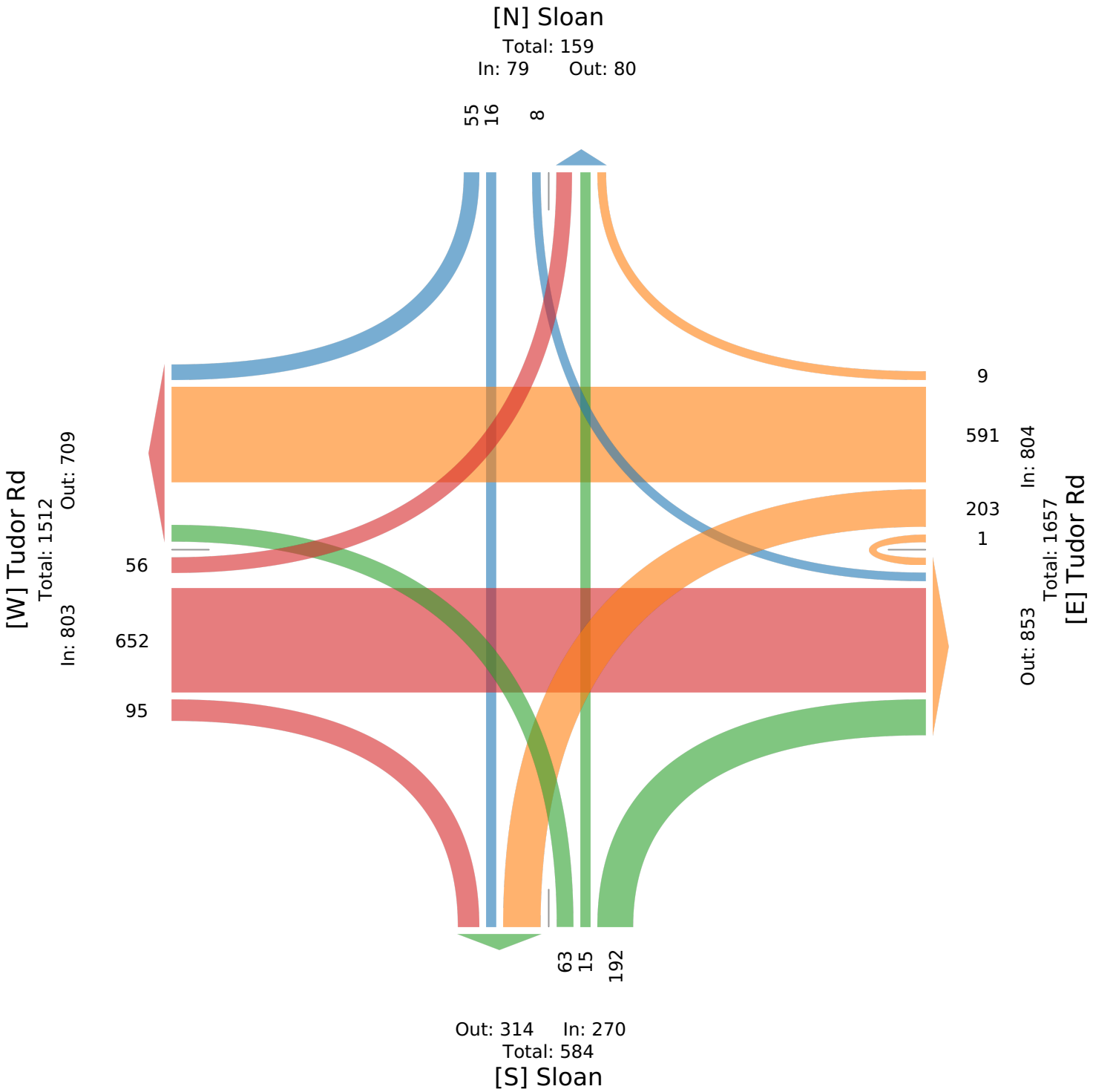
Provided by: Gewalt Hamilton Associates Inc.
625 Forest Edge Drive, Vernon Hills, IL, 60061, US

Leg	Sloan					Tudor Rd					Sloan					Tudor Rd					
Direction	Southbound					Westbound					Northbound					Eastbound					
Time	R	T	L	U	App	R	T	L	U	App	R	T	L	U	App	R	T	L	U	App	Int
2021-06-02 7:00AM	3	1	0	0	**4**	0	18	12	0	**30**	7	1	5	0	**13**	2	18	2	0	**22**	**69**
7:15AM	2	1	0	0	**3**	0	34	12	0	**46**	10	2	2	0	**14**	9	22	5	0	**36**	**99**
7:30AM	2	0	1	0	**3**	1	18	10	0	**29**	6	0	2	0	**8**	2	17	3	0	**22**	**62**
7:45AM	4	3	0	0	**7**	1	44	23	0	**68**	3	4	3	0	**10**	10	27	8	0	**45**	**130**
Hourly Total	11	5	1	0	**17**	2	114	57	0	**173**	26	7	12	0	**45**	23	84	18	0	**125**	**360**
8:00AM	3	3	0	0	**6**	0	24	24	0	**48**	10	0	4	0	**14**	5	28	2	0	**35**	**103**
8:15AM	2	0	0	0	**2**	2	23	15	0	**40**	19	0	3	0	**22**	6	21	4	0	**31**	**95**
8:30AM	1	2	0	0	**3**	0	31	16	0	**47**	10	2	1	0	**13**	2	24	7	0	**33**	**96**
8:45AM	3	0	0	0	**3**	1	34	19	0	**54**	9	0	7	0	**16**	7	20	9	0	**36**	**109**
Hourly Total	9	5	0	0	**14**	3	112	74	0	**189**	48	2	15	0	**65**	20	93	22	0	**135**	**403**
4:00PM	4	1	0	0	**5**	1	46	7	0	**54**	17	1	6	0	**24**	5	48	0	0	**53**	**136**
4:15PM	4	0	1	0	**5**	1	37	13	0	**51**	13	0	3	0	**16**	3	40	2	0	**45**	**117**
4:30PM	5	2	1	0	**8**	1	37	9	1	**48**	16	0	5	0	**21**	10	73	4	0	**87**	**164**
4:45PM	3	1	2	0	**6**	1	50	8	0	**59**	15	1	5	0	**21**	9	68	2	0	**79**	**165**
Hourly Total	16	4	4	0	**24**	4	170	37	1	**212**	61	2	19	0	**82**	27	229	8	0	**264**	**582**
5:00PM	11	0	2	0	**13**	0	59	8	0	**67**	26	1	4	0	**31**	5	65	3	0	**73**	**184**
5:15PM	3	0	1	0	**4**	0	40	14	0	**54**	10	1	4	0	**15**	9	57	2	0	**68**	**141**
5:30PM	1	2	0	0	**3**	0	48	6	0	**54**	11	1	3	0	**15**	4	67	0	0	**71**	**143**
5:45PM	4	0	0	0	**4**	0	48	7	0	**55**	10	1	6	0	**17**	7	57	3	0	**67**	**143**
Hourly Total	19	2	3	0	**24**	0	195	35	0	**230**	57	4	17	0	**78**	25	246	8	0	**279**	**611**
Total	55	16	8	0	**79**	9	591	203	1	**804**	192	15	63	0	**270**	95	652	56	0	**803**	**1956**
% Approach	69.6%	20.3%	10.1%	0%	**-**	1.1%	73.5%	25.2%	0.1%	**-**	71.1%	5.6%	23.3%	0%	**-**	11.8%	81.2%	7.0%	0%	**-**	-
% Total	2.8%	0.8%	0.4%	0%	**4.0%**	0.5%	30.2%	10.4%	0.1%	**41.1%**	9.8%	0.8%	3.2%	0%	**13.8%**	4.9%	33.3%	2.9%	0%	**41.1%**	-
Lights	54	16	7	0	**77**	9	589	202	1	**801**	190	15	61	0	**266**	92	648	54	0	**794**	1938
% Lights	98.2%	100%	87.5%	0%	**97.5%**	100%	99.7%	99.5%	100%	**99.6%**	99.0%	100%	96.8%	0%	**98.5%**	96.8%	99.4%	96.4%	0%	**98.9%**	99.1%
Articulated Trucks	0	0	1	0	**1**	0	1	1	0	**2**	1	0	0	0	**1**	2	2	0	0	**4**	8
% Articulated Trucks	0%	0%	12.5%	0%	**1.3%**	0%	0.2%	0.5%	0%	**0.2%**	0.5%	0%	0%	0%	**0.4%**	2.1%	0.3%	0%	0%	**0.5%**	0.4%
Buses and Single-Unit Trucks	1	0	0	0	**1**	0	1	0	0	**1**	1	0	2	0	**3**	1	2	2	0	**5**	10
% Buses and Single-Unit Trucks	1.8%	0%	0%	0%	**1.3%**	0%	0.2%	0%	0%	**0.1%**	0.5%	0%	3.2%	0%	**1.1%**	1.1%	0.3%	3.6%	0%	**0.6%**	0.5%

*L: Left, R: Right, T: Thru, U: U-Turn

Tudor and Sloan - TMC
Wed Jun 2, 2021
Full Length (7 AM-9 AM, 4 PM-6 PM)
All Classes (Lights, Articulated Trucks, Buses and Single-Unit Trucks)
All Movements
ID: 841530, Location: 38.930716, -94.383412

Provided by: Gewalt Hamilton Associates Inc.
625 Forest Edge Drive, Vernon Hills, IL, 60061, US



Tudor and Sloan - TMC

Wed Jun 2, 2021
AM Peak (7:45 AM - 8:45 AM)
All Classes (Lights, Articulated Trucks, Buses and Single-Unit Trucks)
All Movements
ID: 841530, Location: 38.930716, -94.383412

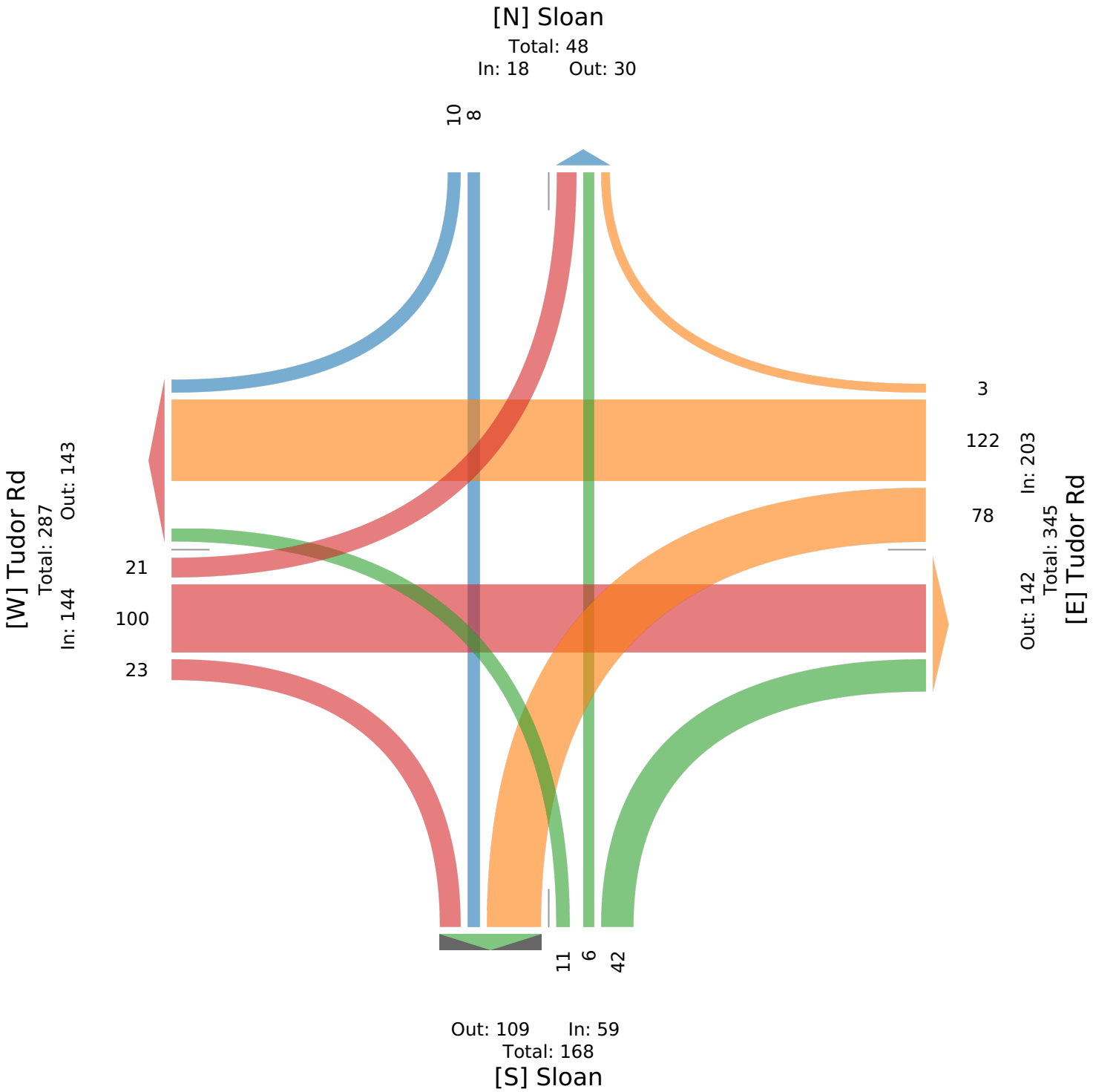
Provided by: Gewalt Hamilton Associates Inc.
625 Forest Edge Drive, Vernon Hills, IL, 60061, US

Leg	Sloan					Tudor Rd					Sloan					Tudor Rd					
Direction	Southbound					Westbound					Northbound					Eastbound					
Time	R	T	L	U	App	R	T	L	U	App	R	T	L	U	App	R	T	L	U	App	Int
2021-06-02 7:45AM	4	3	0	0	**7**	1	44	23	0	**68**	3	4	3	0	**10**	10	27	8	0	**45**	**130**
8:00AM	3	3	0	0	**6**	0	24	24	0	**48**	10	0	4	0	**14**	5	28	2	0	**35**	**103**
8:15AM	2	0	0	0	**2**	2	23	15	0	**40**	19	0	3	0	**22**	6	21	4	0	**31**	**95**
8:30AM	1	2	0	0	**3**	0	31	16	0	**47**	10	2	1	0	**13**	2	24	7	0	**33**	**96**
Total	10	8	0	0	**18**	3	122	78	0	**203**	42	6	11	0	**59**	23	100	21	0	**144**	**424**
% Approach	55.6%	44.4%	0%	0%	**-**	1.5%	60.1%	38.4%	0%	**-**	71.2%	10.2%	18.6%	0%	**-**	16.0%	69.4%	14.6%	0%	**-**	-
% Total	2.4%	1.9%	0%	0%	**4.2%**	0.7%	28.8%	18.4%	0%	**47.9%**	9.9%	1.4%	2.6%	0%	**13.9%**	5.4%	23.6%	5.0%	0%	**34.0%**	-
PHF	0.625	0.667	-	-	**0.643**	0.375	0.693	0.813	-	**0.746**	0.553	0.375	0.688	-	**0.670**	0.575	0.893	0.656	-	**0.800**	0.815
Lights	9	8	0	0	**17**	3	121	78	0	**202**	42	6	10	0	**58**	23	98	19	0	**140**	417
% Lights	90.0%	100%	0%	0%	**94.4%**	100%	99.2%	100%	0%	**99.5%**	100%	100%	90.9%	0%	**98.3%**	100%	98.0%	90.5%	0%	**97.2%**	98.3%
Articulated Trucks	0	0	0	0	**0**	0	0	0	0	**0**	0	0	0	0	**0**	0	0	0	0	**0**	0
% Articulated Trucks	0%	0%	0%	0%	**0%**	0%	0%	0%	0%	**0%**	0%	0%	0%	0%	**0%**	0%	0%	0%	0%	**0%**	0%
Buses and Single-Unit Trucks	1	0	0	0	**1**	0	1	0	0	**1**	0	0	1	0	**1**	0	2	2	0	**4**	7
% Buses and Single-Unit Trucks	10.0%	0%	0%	0%	**5.6%**	0%	0.8%	0%	0%	**0.5%**	0%	0%	9.1%	0%	**1.7%**	0%	2.0%	9.5%	0%	**2.8%**	1.7%

*L: Left, R: Right, T: Thru, U: U-Turn

Tudor and Sloan - TMC
Wed Jun 2, 2021
AM Peak (7:45 AM - 8:45 AM)
All Classes (Lights, Articulated Trucks, Buses and Single-Unit Trucks)
All Movements
ID: 841530, Location: 38.930716, -94.383412

Provided by: Gewalt Hamilton Associates Inc.
625 Forest Edge Drive, Vernon Hills, IL, 60061, US



Tudor and Sloan - TMC

Wed Jun 2, 2021
PM Peak (4:30 PM - 5:30 PM) - Overall Peak Hour
All Classes (Lights, Articulated Trucks, Buses and Single-Unit Trucks)
All Movements
ID: 841530, Location: 38.930716, -94.383412

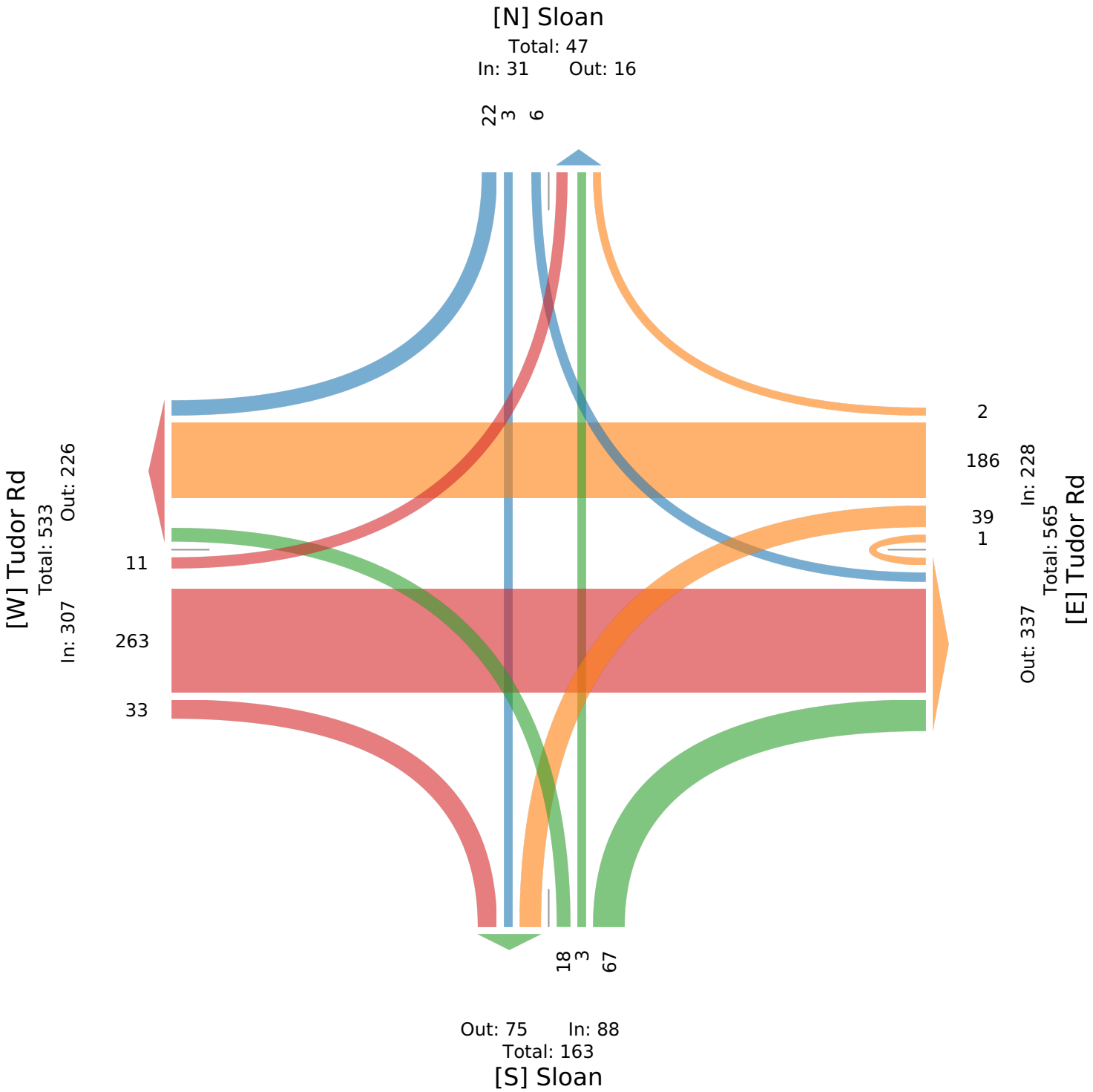
GEWALT HAMILTON ASSOCIATES, INC.
Provided by: Gewalt Hamilton Associates Inc.
625 Forest Edge Drive, Vernon Hills, IL, 60061, US

Leg	Sloan					Tudor Rd					Sloan					Tudor Rd					
Direction	Southbound					Westbound					Northbound					Eastbound					
Time	R	T	L	U	**App**	R	T	L	U	**App**	R	T	L	U	**App**	R	T	L	U	**App**	**Int**
2021-06-02 4:30PM	5	2	1	0	**8**	1	37	9	1	**48**	16	0	5	0	**21**	10	73	4	0	**87**	**164**
4:45PM	3	1	2	0	**6**	1	50	8	0	**59**	15	1	5	0	**21**	9	68	2	0	**79**	**165**
5:00PM	11	0	2	0	**13**	0	59	8	0	**67**	26	1	4	0	**31**	5	65	3	0	**73**	**184**
5:15PM	3	0	1	0	**4**	0	40	14	0	**54**	10	1	4	0	**15**	9	57	2	0	**68**	**141**
Total	22	3	6	0	**31**	2	186	39	1	**228**	67	3	18	0	**88**	33	263	11	0	**307**	**654**
% Approach	71.0%	9.7%	19.4%	0%	**-**	0.9%	81.6%	17.1%	0.4%	**-**	76.1%	3.4%	20.5%	0%	**-**	10.7%	85.7%	3.6%	0%	**-**	-
% Total	3.4%	0.5%	0.9%	0%	**4.7%**	0.3%	28.4%	6.0%	0.2%	**34.9%**	10.2%	0.5%	2.8%	0%	**13.5%**	5.0%	40.2%	1.7%	0%	**46.9%**	-
PHF	0.500	0.375	0.750		**- 0.596**	0.500	0.788	0.696	0.250	**0.851**	0.644	0.750	0.900	-	**0.710**	0.825	0.901	0.688	-	**0.882**	0.889
Lights	22	3	6	0	**31**	2	186	38	1	**227**	66	3	18	0	**87**	31	263	11	0	**305**	650
% Lights	100%	100%	100%	0%	**100%**	100%	100%	97.4%	100%	**99.6%**	98.5%	100%	100%	0%	**98.9%**	93.9%	100%	100%	0%	**99.3%**	99.4%
Articulated Trucks	0	0	0	0	**0**	0	0	1	0	**1**	1	0	0	0	**1**	1	0	0	0	**1**	3
% Articulated Trucks	0%	0%	0%	0%	**0%**	0%	0%	2.6%	0%	**0.4%**	1.5%	0%	0%	0%	**1.1%**	3.0%	0%	0%	0%	**0.3%**	0.5%
Buses and Single-Unit Trucks	0	0	0	0	**0**	0	0	0	0	**0**	0	0	0	0	**0**	1	0	0	0	**1**	1
% Buses and Single-Unit Trucks	0%	0%	0%	0%	**0%**	0%	0%	0%	0%	**0%**	0%	0%	0%	0%	**0%**	3.0%	0%	0%	0%	**0.3%**	0.2%

*L: Left, R: Right, T: Thru, U: U-Turn

Tudor and Sloan - TMC
Wed Jun 2, 2021
PM Peak (4:30 PM - 5:30 PM) - Overall Peak Hour
All Classes (Lights, Articulated Trucks, Buses and Single-Unit Trucks)
All Movements
ID: 841530, Location: 38.930716, -94.383412

Provided by: Gewalt Hamilton Associates Inc.
625 Forest Edge Drive, Vernon Hills, IL, 60061, US



Tudor and Main - TMC

Wed Jun 2, 2021
Full Length (7 AM-9 AM, 4 PM-6 PM)
All Classes (Lights, Articulated Trucks, Buses and Single-Unit Trucks)
All Movements
ID: 841529, Location: 38.930655, -94.385362

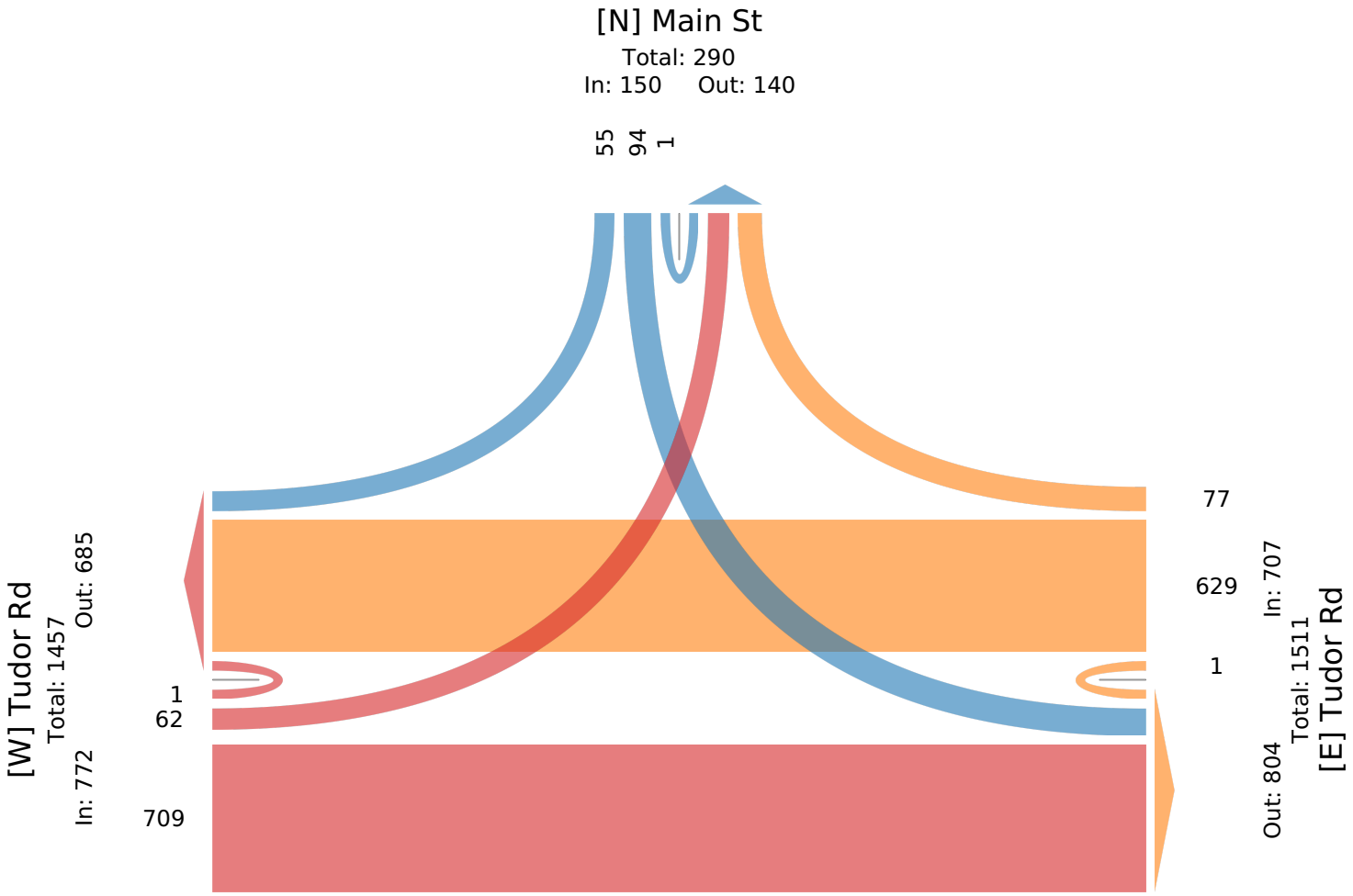
Provided by: Gewalt Hamilton Associates Inc.
625 Forest Edge Drive, Vernon Hills, IL, 60061, US

Leg	Main St				Tudor Rd				Tudor Rd				
Direction	Southbound				Westbound				Eastbound				
Time	R	L	U	**App**	R	T	U	**App**	T	L	U	**App**	**Int**
2021-06-02 7:00AM	1	3	1	**5**	4	22	0	**26**	18	3	0	**21**	**52**
7:15AM	3	6	0	**9**	7	29	0	**36**	30	1	0	**31**	**76**
7:30AM	0	1	0	**1**	1	21	0	**22**	21	3	0	**24**	**47**
7:45AM	1	6	0	**7**	2	47	0	**49**	40	8	1	**49**	**105**
Hourly Total	5	16	1	**22**	14	119	0	**133**	109	15	1	**125**	**280**
8:00AM	4	1	0	**5**	6	24	1	**31**	32	3	0	**35**	**71**
8:15AM	0	7	0	**7**	2	27	0	**29**	25	5	0	**30**	**66**
8:30AM	1	8	0	**9**	2	28	0	**30**	25	3	0	**28**	**67**
8:45AM	6	6	0	**12**	11	37	0	**48**	31	6	0	**37**	**97**
Hourly Total	11	22	0	**33**	21	116	1	**138**	113	17	0	**130**	**301**
4:00PM	5	3	0	**8**	6	50	0	**56**	51	3	0	**54**	**118**
4:15PM	2	5	0	**7**	4	38	0	**42**	40	5	0	**45**	**94**
4:30PM	5	13	0	**18**	8	40	0	**48**	75	4	0	**79**	**145**
4:45PM	4	8	0	**12**	5	54	0	**59**	70	4	0	**74**	**145**
Hourly Total	16	29	0	**45**	23	182	0	**205**	236	16	0	**252**	**502**
5:00PM	14	7	0	**21**	4	71	0	**75**	70	2	0	**72**	**168**
5:15PM	5	7	0	**12**	5	39	0	**44**	57	0	0	**57**	**113**
5:30PM	2	4	0	**6**	4	51	0	**55**	65	6	0	**71**	**132**
5:45PM	2	9	0	**11**	6	51	0	**57**	59	6	0	**65**	**133**
Hourly Total	23	27	0	**50**	19	212	0	**231**	251	14	0	**265**	**546**
Total	55	94	1	**150**	77	629	1	**707**	709	62	1	**772**	**1629**
% Approach	36.7%	62.7%	0.7%	**-**	10.9%	89.0%	0.1%	**-**	91.8%	8.0%	0.1%	**-**	-
% Total	3.4%	5.8%	0.1%	**9.2%**	4.7%	38.6%	0.1%	**43.4%**	43.5%	3.8%	0.1%	**47.4%**	-
Lights	55	92	1	**148**	76	624	1	**701**	703	59	1	**763**	1612
% Lights	100%	97.9%	100%	**98.7%**	98.7%	99.2%	100%	**99.2%**	99.2%	95.2%	100%	**98.8%**	99.0%
Articulated Trucks	0	1	0	**1**	0	1	0	**1**	3	0	0	**3**	5
% Articulated Trucks	0%	1.1%	0%	**0.7%**	0%	0.2%	0%	**0.1%**	0.4%	0%	0%	**0.4%**	0.3%
Buses and Single-Unit Trucks	0	1	0	**1**	1	4	0	**5**	3	3	0	**6**	12
% Buses and Single-Unit Trucks	0%	1.1%	0%	**0.7%**	1.3%	0.6%	0%	**0.7%**	0.4%	4.8%	0%	**0.8%**	0.7%

*L: Left, R: Right, T: Thru, U: U-Turn

Tudor and Main - TMC
Wed Jun 2, 2021
Full Length (7 AM-9 AM, 4 PM-6 PM)
All Classes (Lights, Articulated Trucks, Buses and Single-Unit Trucks)
All Movements
ID: 841529, Location: 38.930655, -94.385362

Provided by: Gewalt Hamilton Associates Inc.
625 Forest Edge Drive, Vernon Hills, IL, 60061, US



Tudor and Main - TMC

Wed Jun 2, 2021
AM Peak (7:45 AM - 8:45 AM)
All Classes (Lights, Articulated Trucks, Buses and Single-Unit Trucks)
All Movements
ID: 841529, Location: 38.930655, -94.385362

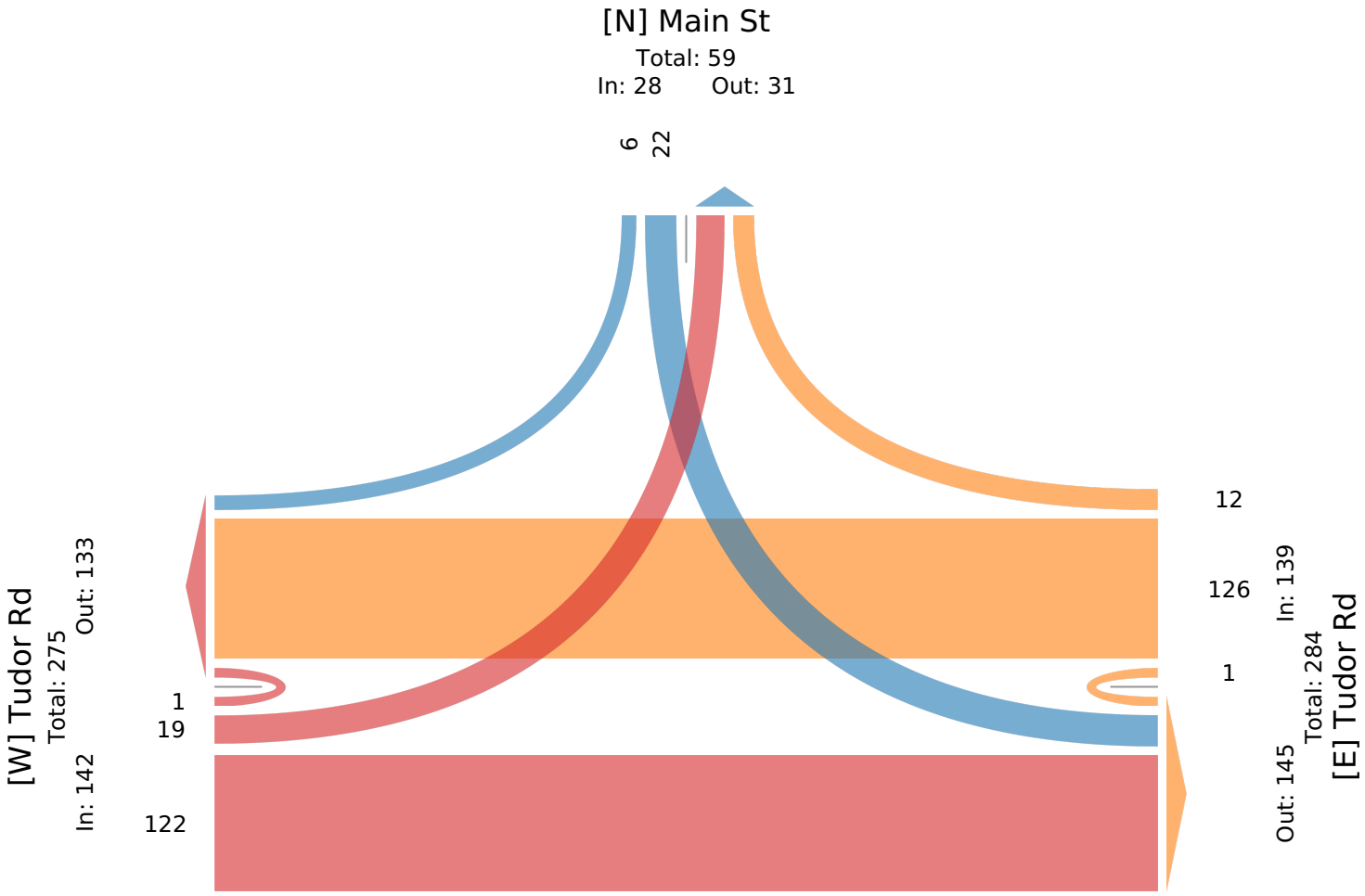
GEWALT HAMILTON ASSOCIATES, INC.
Provided by: Gewalt Hamilton Associates Inc.
625 Forest Edge Drive, Vernon Hills, IL, 60061, US

Leg	Main St				Tudor Rd				Tudor Rd				
Direction	Southbound				Westbound				Eastbound				
Time	R	L	U	**App**	R	T	U	**App**	T	L	U	**App**	**Int**
2021-06-02 7:45AM	1	6	0	**7**	2	47	0	**49**	40	8	1	**49**	**105**
8:00AM	4	1	0	**5**	6	24	1	**31**	32	3	0	**35**	**71**
8:15AM	0	7	0	**7**	2	27	0	**29**	25	5	0	**30**	**66**
8:30AM	1	8	0	**9**	2	28	0	**30**	25	3	0	**28**	**67**
Total	6	22	0	**28**	12	126	1	**139**	122	19	1	**142**	**309**
% Approach	21.4%	78.6%	0%	**-**	8.6%	90.6%	0.7%	**-**	85.9%	13.4%	0.7%	**-**	-
% Total	1.9%	7.1%	0%	**9.1%**	3.9%	40.8%	0.3%	**45.0%**	39.5%	6.1%	0.3%	**46.0%**	-
PHF	0.375	0.688	-	**0.778**	0.500	0.670	0.250	**0.709**	0.763	0.594	0.250	**0.724**	0.736
Lights	6	21	0	**27**	12	123	1	**136**	119	19	1	**139**	302
% Lights	100%	95.5%	0%	**96.4%**	100%	97.6%	100%	**97.8%**	97.5%	100%	100%	**97.9%**	97.7%
Articulated Trucks	0	0	0	**0**	0	0	0	**0**	0	0	0	**0**	0
% Articulated Trucks	0%	0%	0%	**0%**	0%	0%	0%	**0%**	0%	0%	0%	**0%**	0%
Buses and Single-Unit Trucks	0	1	0	**1**	0	3	0	**3**	3	0	0	**3**	7
% Buses and Single-Unit Trucks	0%	4.5%	0%	**3.6%**	0%	2.4%	0%	**2.2%**	2.5%	0%	0%	**2.1%**	2.3%

*L: Left, R: Right, T: Thru, U: U-Turn

Tudor and Main - TMC
Wed Jun 2, 2021
AM Peak (7:45 AM - 8:45 AM)
All Classes (Lights, Articulated Trucks, Buses and Single-Unit Trucks)
All Movements
ID: 841529, Location: 38.930655, -94.385362

Provided by: Gewalt Hamilton Associates Inc.
625 Forest Edge Drive, Vernon Hills, IL, 60061, US



Tudor and Main - TMC

Wed Jun 2, 2021
PM Peak (4:30 PM - 5:30 PM) - Overall Peak Hour
All Classes (Lights, Articulated Trucks, Buses and Single-Unit Trucks)
All Movements
ID: 841529, Location: 38.930655, -94.385362

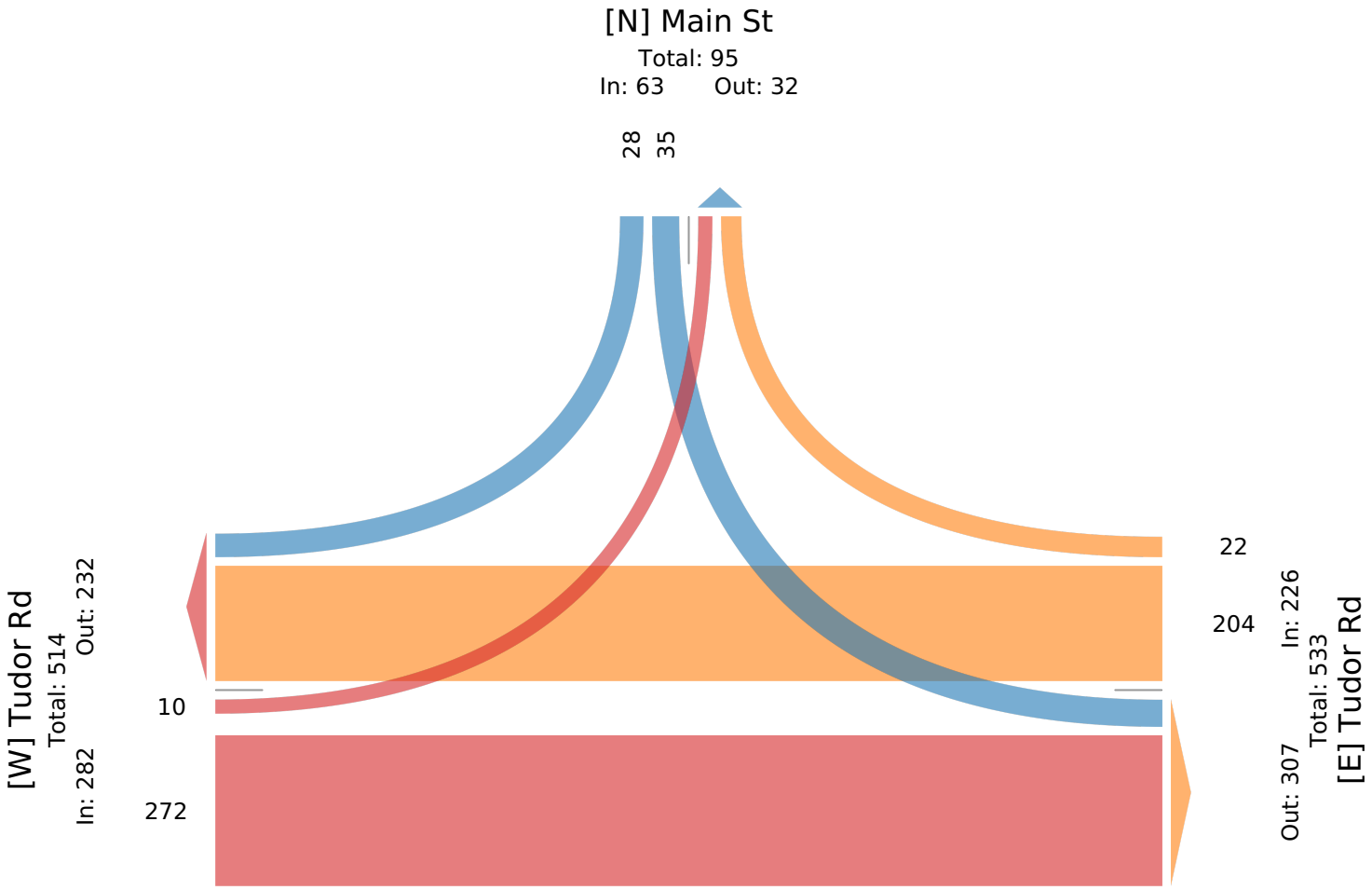
GEWALT HAMILTON ASSOCIATES, INC.
Provided by: Gewalt Hamilton Associates Inc.
625 Forest Edge Drive, Vernon Hills, IL, 60061, US

Leg	Main St				Tudor Rd				Tudor Rd				
Direction	Southbound				Westbound				Eastbound				
Time	R	L	U	**App**	R	T	U	**App**	T	L	U	**App**	**Int**
2021-06-02 4:30PM	5	13	0	**18**	8	40	0	**48**	75	4	0	**79**	**145**
4:45PM	4	8	0	**12**	5	54	0	**59**	70	4	0	**74**	**145**
5:00PM	14	7	0	**21**	4	71	0	**75**	70	2	0	**72**	**168**
5:15PM	5	7	0	**12**	5	39	0	**44**	57	0	0	**57**	**113**
Total	28	35	0	**63**	22	204	0	**226**	272	10	0	**282**	**571**
% Approach	44.4%	55.6%	0%	**-**	9.7%	90.3%	0%	**-**	96.5%	3.5%	0%	**-**	-
% Total	4.9%	6.1%	0%	**11.0%**	3.9%	35.7%	0%	**39.6%**	47.6%	1.8%	0%	**49.4%**	-
PHF	0.500	0.673	-	**0.750**	0.688	0.718	-	**0.753**	0.907	0.625	-	**0.892**	0.850
Lights	28	34	0	**62**	22	204	0	**226**	272	10	0	**282**	570
% Lights	100%	97.1%	0%	**98.4%**	100%	100%	0%	**100%**	100%	100%	0%	**100%**	99.8%
Articulated Trucks	0	1	0	**1**	0	0	0	**0**	0	0	0	**0**	1
% Articulated Trucks	0%	2.9%	0%	**1.6%**	0%	0%	0%	**0%**	0%	0%	0%	**0%**	0.2%
Buses and Single-Unit Trucks	0	0	0	**0**	0	0	0	**0**	0	0	0	**0**	0
% Buses and Single-Unit Trucks	0%	0%	0%	**0%**	0%	0%	0%	**0%**	0%	0%	0%	**0%**	0%

*L: Left, R: Right, T: Thru, U: U-Turn

Tudor and Main - TMC
Wed Jun 2, 2021
PM Peak (4:30 PM - 5:30 PM) - Overall Peak Hour
All Classes (Lights, Articulated Trucks, Buses and Single-Unit Trucks)
All Movements
ID: 841529, Location: 38.930655, -94.385362

GEWALT HAMILTON ASSOCIATES, INC.
Provided by: Gewalt Hamilton Associates Inc.
625 Forest Edge Drive, Vernon Hills, IL, 60061, US



Tudor and Ward - TMC

Wed Jun 2, 2021
Full Length (7 AM-9 AM, 4 PM-6 PM)
All Classes (Lights, Articulated Trucks, Buses and Single-Unit Trucks)
All Movements
ID: 841528, Location: 38.930405, -94.392664

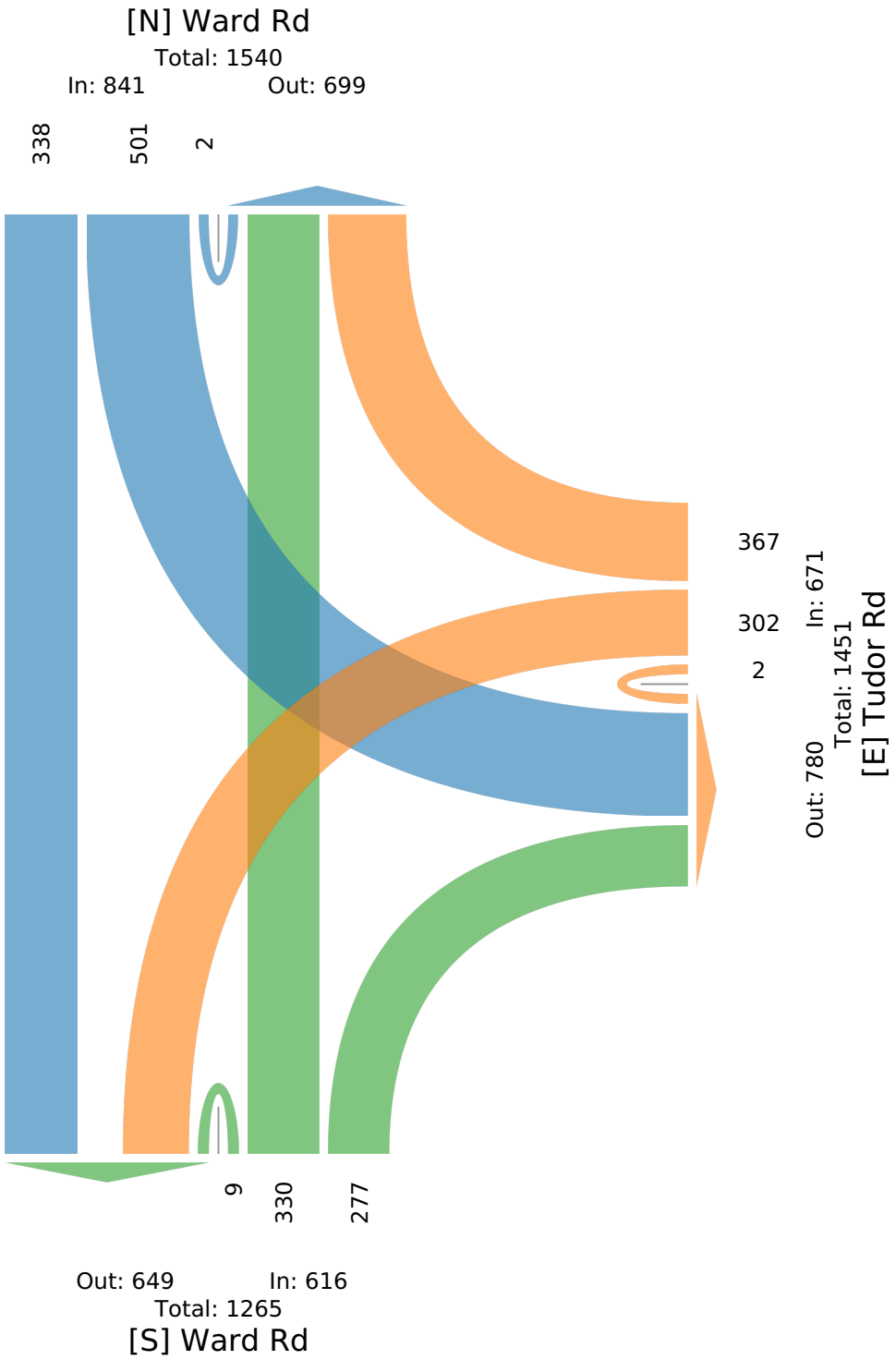
GEWALT HAMILTON ASSOCIATES, INC.
Provided by: Gewalt Hamilton Associates Inc.
625 Forest Edge Drive, Vernon Hills, IL, 60061, US

Leg	Ward Rd				Tudor Rd				Ward Rd				
Direction	Southbound				Westbound				Northbound				
Time	T	L	U	**App**	R	L	U	**App**	R	T	U	**App**	**Int**
2021-06-02 7:00AM	4	14	0	**18**	19	6	0	**25**	9	14	0	**23**	**66**
7:15AM	9	18	0	**27**	21	12	0	**33**	12	26	1	**39**	**99**
7:30AM	5	18	0	**23**	14	8	1	**23**	7	24	1	**32**	**78**
7:45AM	8	28	0	**36**	27	18	0	**45**	23	16	0	**39**	**120**
Hourly Total	26	78	0	**104**	81	44	1	**126**	51	80	2	**133**	**363**
8:00AM	13	28	0	**41**	17	12	0	**29**	15	19	0	**34**	**104**
8:15AM	7	16	0	**23**	15	8	0	**23**	19	26	0	**45**	**91**
8:30AM	12	16	0	**28**	18	12	0	**30**	10	18	0	**28**	**86**
8:45AM	15	20	0	**35**	17	19	0	**36**	16	16	0	**32**	**103**
Hourly Total	47	80	0	**127**	67	51	0	**118**	60	79	0	**139**	**384**
4:00PM	30	37	0	**67**	19	35	1	**55**	15	15	2	**32**	**154**
4:15PM	28	29	0	**57**	26	15	0	**41**	18	19	0	**37**	**135**
4:30PM	33	49	1	**83**	18	22	0	**40**	29	15	0	**44**	**167**
4:45PM	31	45	0	**76**	33	25	0	**58**	29	18	0	**47**	**181**
Hourly Total	122	160	1	**283**	96	97	1	**194**	91	67	2	**160**	**637**
5:00PM	37	45	0	**82**	38	43	0	**81**	21	24	0	**45**	**208**
5:15PM	41	46	0	**87**	30	20	0	**50**	11	32	4	**47**	**184**
5:30PM	35	52	0	**87**	28	21	0	**49**	20	25	0	**45**	**181**
5:45PM	30	40	1	**71**	27	26	0	**53**	23	23	1	**47**	**171**
Hourly Total	143	183	1	**327**	123	110	0	**233**	75	104	5	**184**	**744**
Total	338	501	2	**841**	367	302	2	**671**	277	330	9	**616**	**2128**
% Approach	40.2%	59.6%	0.2%	**-**	54.7%	45.0%	0.3%	**-**	45.0%	53.6%	1.5%	**-**	-
% Total	15.9%	23.5%	0.1%	**39.5%**	17.2%	14.2%	0.1%	**31.5%**	13.0%	15.5%	0.4%	**28.9%**	-
Lights	328	497	2	**827**	363	300	2	**665**	271	326	9	**606**	2098
% Lights	97.0%	99.2%	100%	**98.3%**	98.9%	99.3%	100%	**99.1%**	97.8%	98.8%	100%	**98.4%**	98.6%
Articulated Trucks	7	3	0	**10**	1	0	0	**1**	0	1	0	**1**	12
% Articulated Trucks	2.1%	0.6%	0%	**1.2%**	0.3%	0%	0%	**0.1%**	0%	0.3%	0%	**0.2%**	0.6%
Buses and Single-Unit Trucks	3	1	0	**4**	3	2	0	**5**	6	3	0	**9**	18
% Buses and Single-Unit Trucks	0.9%	0.2%	0%	**0.5%**	0.8%	0.7%	0%	**0.7%**	2.2%	0.9%	0%	**1.5%**	0.8%

*L: Left, R: Right, T: Thru, U: U-Turn

Tudor and Ward - TMC
Wed Jun 2, 2021
Full Length (7 AM-9 AM, 4 PM-6 PM)
All Classes (Lights, Articulated Trucks, Buses and Single-Unit Trucks)
All Movements
ID: 841528, Location: 38.930405, -94.392664

Provided by: Gewalt Hamilton Associates Inc.
625 Forest Edge Drive, Vernon Hills, IL, 60061, US



Tudor and Ward - TMC

Wed Jun 2, 2021
AM Peak (7:15 AM - 8:15 AM)
All Classes (Lights, Articulated Trucks, Buses and Single-Unit Trucks)
All Movements
ID: 841528, Location: 38.930405, -94.392664

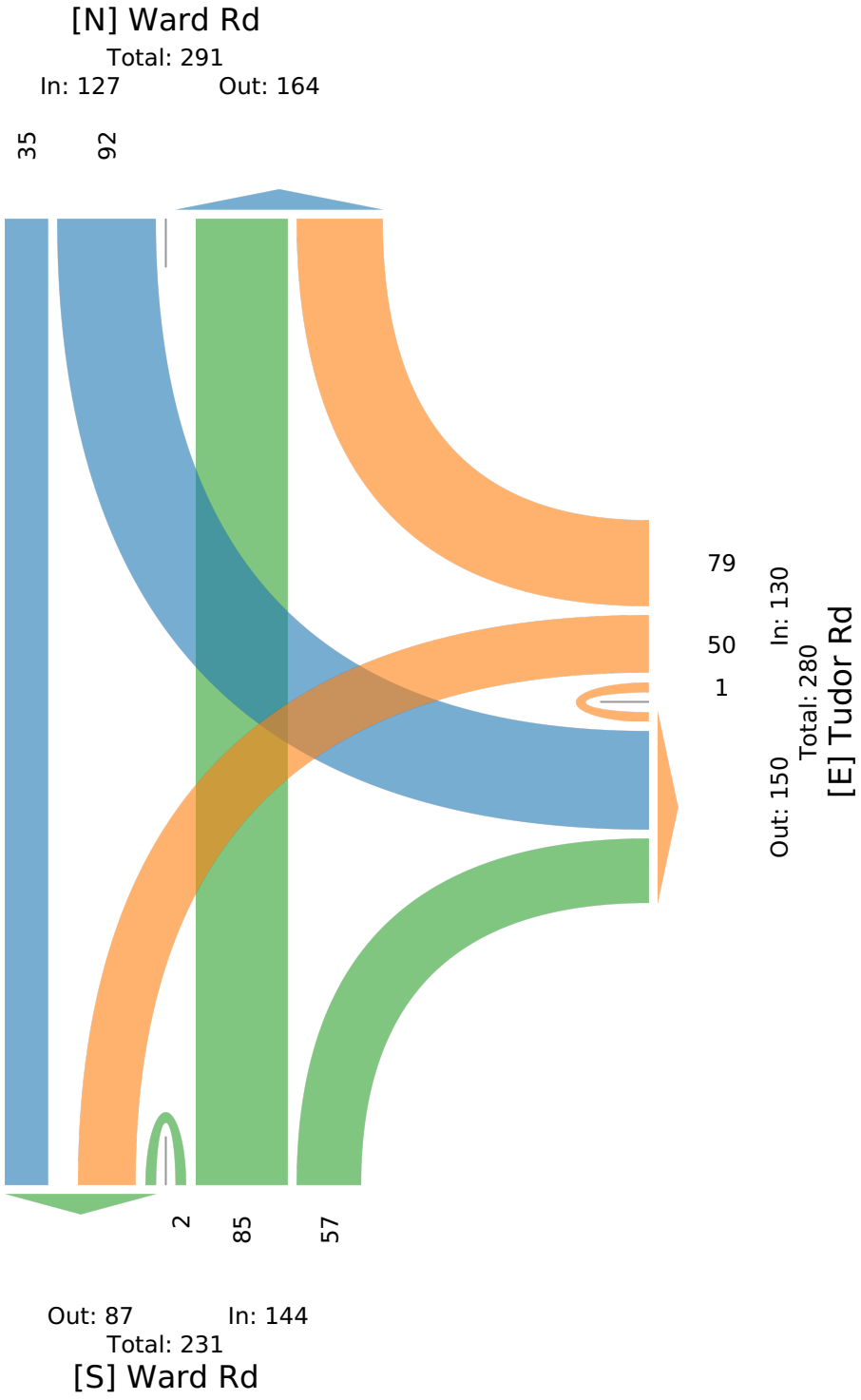
GEWALT HAMILTON ASSOCIATES, INC.
Provided by: Gewalt Hamilton Associates Inc.
625 Forest Edge Drive, Vernon Hills, IL, 60061, US

Leg	Ward Rd				Tudor Rd				Ward Rd				
Direction	Southbound				Westbound				Northbound				
Time	T	L	U	**App**	R	L	U	**App**	R	T	U	**App**	**Int**
2021-06-02 7:15AM	9	18	0	**27**	21	12	0	**33**	12	26	1	**39**	**99**
7:30AM	5	18	0	**23**	14	8	1	**23**	7	24	1	**32**	**78**
7:45AM	8	28	0	**36**	27	18	0	**45**	23	16	0	**39**	**120**
8:00AM	13	28	0	**41**	17	12	0	**29**	15	19	0	**34**	**104**
Total	35	92	0	**127**	79	50	1	**130**	57	85	2	**144**	**401**
% Approach	27.6%	72.4%	0%	**-**	60.8%	38.5%	0.8%	**-**	39.6%	59.0%	1.4%	**-**	-
% Total	8.7%	22.9%	0%	**31.7%**	19.7%	12.5%	0.2%	**32.4%**	14.2%	21.2%	0.5%	**35.9%**	-
PHF	0.673	0.821	-	**0.774**	0.731	0.694	0.250	**0.722**	0.620	0.817	0.500	**0.923**	0.835
Lights	31	90	0	**121**	77	48	1	**126**	56	85	2	**143**	390
% Lights	88.6%	97.8%	0%	**95.3%**	97.5%	96.0%	100%	**96.9%**	98.2%	100%	100%	**99.3%**	97.3%
Articulated Trucks	4	1	0	**5**	0	0	0	**0**	0	0	0	**0**	5
% Articulated Trucks	11.4%	1.1%	0%	**3.9%**	0%	0%	0%	**0%**	0%	0%	0%	**0%**	1.2%
Buses and Single-Unit Trucks	0	1	0	**1**	2	2	0	**4**	1	0	0	**1**	6
% Buses and Single-Unit Trucks	0%	1.1%	0%	**0.8%**	2.5%	4.0%	0%	**3.1%**	1.8%	0%	0%	**0.7%**	1.5%

*L: Left, R: Right, T: Thru, U: U-Turn

Tudor and Ward - TMC
Wed Jun 2, 2021
AM Peak (7:15 AM - 8:15 AM)
All Classes (Lights, Articulated Trucks, Buses and Single-Unit Trucks)
All Movements
ID: 841528, Location: 38.930405, -94.392664

GEWALT HAMILTON ASSOCIATES, INC.
Provided by: Gewalt Hamilton Associates Inc.
625 Forest Edge Drive, Vernon Hills, IL, 60061, US



Tudor and Ward - TMC

Wed Jun 2, 2021
PM Peak (4:45 PM - 5:45 PM) - Overall Peak Hour
All Classes (Lights, Articulated Trucks, Buses and Single-Unit Trucks)
All Movements
ID: 841528, Location: 38.930405, -94.392664

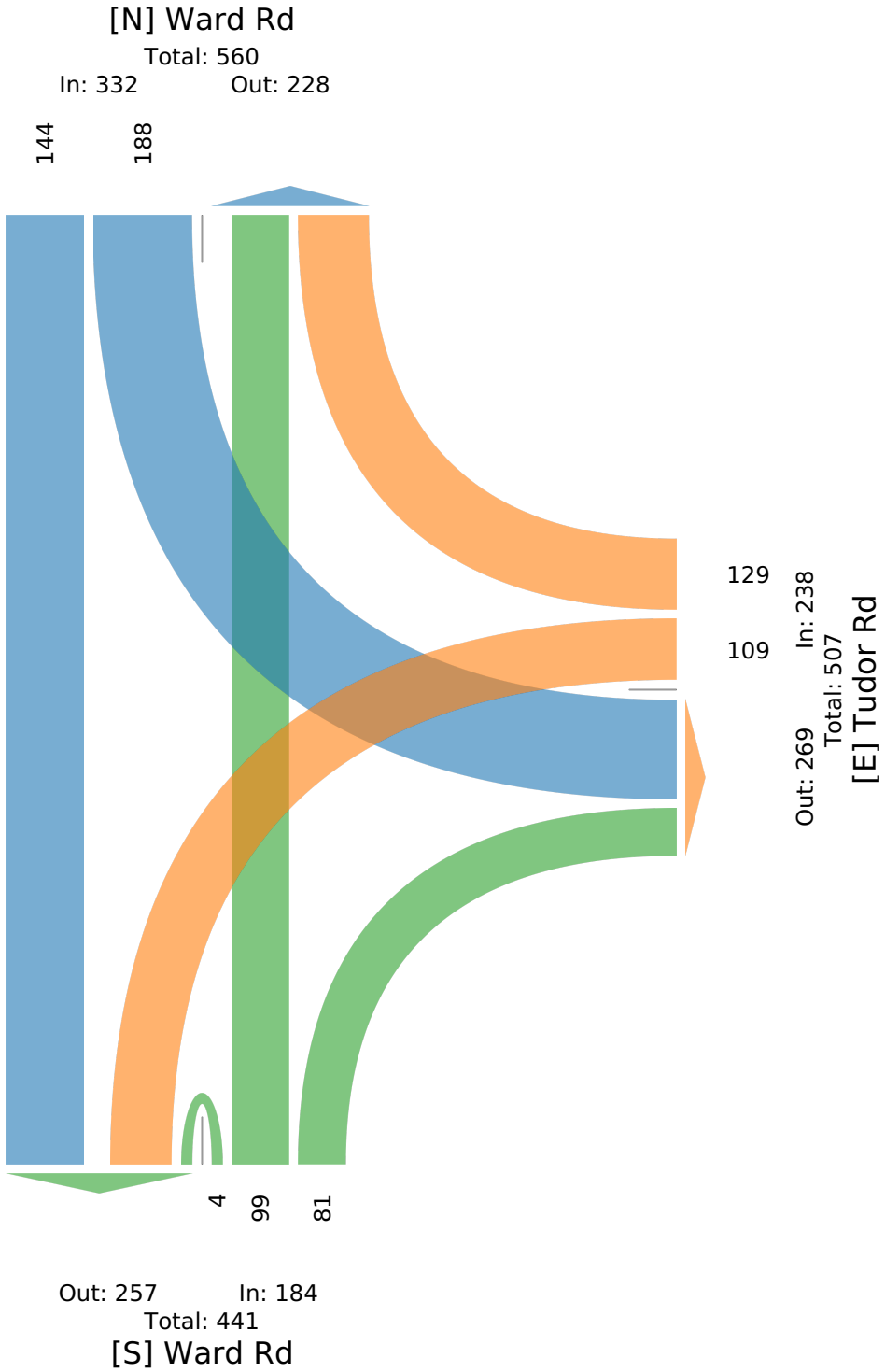
GEWALT HAMILTON ASSOCIATES, INC.
Provided by: Gewalt Hamilton Associates Inc.
625 Forest Edge Drive, Vernon Hills, IL, 60061, US

Leg	Ward Rd				Tudor Rd				Ward Rd				
Direction	Southbound				Westbound				Northbound				
Time	T	L	U	**App**	R	L	U	**App**	R	T	U	**App**	**Int**
2021-06-02 4:45PM	31	45	0	**76**	33	25	0	**58**	29	18	0	**47**	**181**
5:00PM	37	45	0	**82**	38	43	0	**81**	21	24	0	**45**	**208**
5:15PM	41	46	0	**87**	30	20	0	**50**	11	32	4	**47**	**184**
5:30PM	35	52	0	**87**	28	21	0	**49**	20	25	0	**45**	**181**
Total	144	188	0	**332**	129	109	0	**238**	81	99	4	**184**	**754**
% Approach	43.4%	56.6%	0%	**-**	54.2%	45.8%	0%	**-**	44.0%	53.8%	2.2%	**-**	-
% Total	19.1%	24.9%	0%	**44.0%**	17.1%	14.5%	0%	**31.6%**	10.7%	13.1%	0.5%	**24.4%**	-
PHF	0.878	0.904	-	**0.954**	0.849	0.634	-	**0.735**	0.698	0.773	0.250	**0.979**	0.906
Lights	143	188	0	**331**	129	109	0	**238**	79	96	4	**179**	748
% Lights	99.3%	100%	0%	**99.7%**	100%	100%	0%	**100%**	97.5%	97.0%	100%	**97.3%**	99.2%
Articulated Trucks	0	0	0	**0**	0	0	0	**0**	0	1	0	**1**	1
% Articulated Trucks	0%	0%	0%	**0%**	0%	0%	0%	**0%**	0%	1.0%	0%	**0.5%**	0.1%
Buses and Single-Unit Trucks	1	0	0	**1**	0	0	0	**0**	2	2	0	**4**	5
% Buses and Single-Unit Trucks	0.7%	0%	0%	**0.3%**	0%	0%	0%	**0%**	2.5%	2.0%	0%	**2.2%**	0.7%

*L: Left, R: Right, T: Thru, U: U-Turn

Tudor and Ward - TMC
Wed Jun 2, 2021
PM Peak (4:45 PM - 5:45 PM) - Overall Peak Hour
All Classes (Lights, Articulated Trucks, Buses and Single-Unit Trucks)
All Movements
ID: 841528, Location: 38.930405, -94.392664

GEWALT HAMILTON ASSOCIATES, INC.
Provided by: Gewalt Hamilton Associates Inc.
625 Forest Edge Drive, Vernon Hills, IL, 60061, US



Signal Timing

Vehicle Basic Timing

Phase Bank 1	NL SB -- WB SL NB------															
Phase	**1**	**2**	**3**	**4**	**5**	**6**	**7**	**8**	**9**	**10**	**11**	**12**	**13**	**14**	**15**	**16**
Min. Green	8	8	8	8	8	8	0	0	0	0	0	0	0	0	0	0
Passage	2	2	2	2	2	2	0	0	0	0	0	0	0	0	0	0
Maximum 1	25	35	25	20	25	35	0	0	0	0	0	0	0	0	0	0
Maximum 2	30	50	30	50	30	50	30	50	0	0	0	0	0	0	0	0
Dynamic Max Limit	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Dynamic Max Step	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Yellow Change	4	4	4	4	4	4	4	4	3	3	3	3	3	3	3	3
Red Clearance	1.5	1.5	1.5	1.5	1.5	1.5	1	1	0	0	0	0	0	0	0	0
Green Delay	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Yellow Delay	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Bike Green	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Bike Passage	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0

[redacted]

[redacted]

[redacted]

[redacted]

[redacted]

General Control

Phase	Initial	Non-Actuated Response	Flash Entry	Flash Exit
1	1 - Inactive	0 - None	☐	☐
2	3 - Y Chnge	0 - None	☐	☐
3	0 - Disbld	0 - None	☐	☐
4	1 - Inactive	0 - None	☐	☐
5	1 - Inactive	0 - None	☐	☐
6	3 - Y Chnge	0 - None	☐	☐
7	0 - Disbld	0 - None	☐	☐
8	1 - Inactive	0 - None	☐	☐
9	0 - Disbld	0 - None	☐	☐
10	0 - Disbld	0 - None	☐	☐
11	0 - Disbld	0 - None	☐	☐
12	0 - Disbld	0 - None	☐	☐
13	0 - Disbld	0 - None	☐	☐
14	0 - Disbld	0 - None	☐	☐
15	0 - Disbld	0 - None	☐	☐
16	0 - Disbld	0 - None	☐	☐

Phase Bank 1

Phase	Vehicle Recalls	Ped Recalls	Veh Recall Delay
1	0 - None	0 - None	0
2	2 - Min	0 - None	0
3	0 - None	0 - None	0
4	0 - None	0 - None	0
5	0 - None	0 - None	0
6	2 - Min	0 - None	0
7	0 - None	0 - None	0
8	0 - None	0 - None	0
9	0 - None	0 - None	0
10	0 - None	0 - None	0
11	0 - None	0 - None	0
12	0 - None	0 - None	0
13	0 - None	0 - None	0
14	0 - None	0 - None	0
15	0 - None	0 - None	0
16	0 - None	0 - None	0

[redacted]

[redacted]	[redacted]	[redacted]	[redacted]
[redacted]	[redacted]	[redacted]	[redacted]
[redacted]	[redacted]	[redacted]	[redacted]
[redacted]	[redacted]	[redacted]	[redacted]
[redacted]	[redacted]	[redacted]	[redacted]
[redacted]	[redacted]	[redacted]	[redacted]
[redacted]	[redacted]	[redacted]	[redacted]
[redacted]	[redacted]	[redacted]	[redacted]
[redacted]	[redacted]	[redacted]	[redacted]
[redacted]	[redacted]	[redacted]	[redacted]
[redacted]	[redacted]	[redacted]	[redacted]
[redacted]	[redacted]	[redacted]	[redacted]
[redacted]	[redacted]	[redacted]	[redacted]
[redacted]	[redacted]	[redacted]	[redacted]

APPENDIX B

Trip Generation

Approved Study

Referenced pages from *Summit Orchards Traffic Impact Study* conducted by McClure Engineering Co dated March 2016.

A Minor Plat of
SUMMIT INNOVATION CENTER - 2nd PLAT, Lots 7A and 8

A replat of Lot 7, SUMMIT INNOVATION CENTER 1st PLAT, a subdivision in Lee's Summit, Jackson County, Missouri and Lot 11B, SUMMIT FAIR , Lot 11A & Lot 11B, a subdivision in Lee's Summit, Jackson County, Missouri.

Basis of Bearings: Bearings are based on the recorded plat of SUMMIT INNOVATION CENTER - 1st PLAT, Lots 1-7, and the recorded plat of SUMMIT FAIR, LOT 11A & LOT 11B, as determined by Global Positioning System observations and referenced to the Missouri State Plane Coordinate System, West Zone (NAD83).

Per City - Development is 75% complete, buildings adjacent to Chipman have not been completed.

This is to certify that the within Minor plat of "SUMMIT INNOVATION CENTER - 2nd PLAT, Lots 7A and 8" was submitted to and duly approved by the City of Lee's Summit, Missouri, pursuant to the Unified Development Ordinance No. 5209.

Denise R. Chisum, MMC - City Clerk — Date

George M. Binger III, P.E. - City Engineer — Date

Robert G. McKay, AICP
Director of Planning & Codes Administration — Date

Jackson County Assessor / GIS Department — Date

Rev.	Date	Description	Drawn	Checked
1	2015-10-27	REVISED PER CITY COMMENTS	PJS	JMP

BHC RHODES
Civil Engineering • Surveying • Utilities
901 N. 8th Street, Suite 100
Kansas City, Kansas 66101
p. (913) 371-5300 f. (913) 371-2677
BHC RHODES is a trademark of Bonner Howerton & Company, P.A.

Client:
TOWNSEND DEVELOPMENT
1311 McCormick Road
Suite 470
Hunt Valley, Maryland, 21031

Project:
SUMMIT INNOVATION CENTER - 2nd PLAT, Lots 7A & 8
A replat of Lot 7, SUMMIT INNOVATION CENTER 1st PLAT, Lot 11B OF SUMMIT FAIR, Lot 11A & Lot 11B
Lee's Summit, Jackson County, Missouri

Drawn By:	PJS
Project No:	020790.04
Field Date:	2015-02-26
Issue Date:	2015-10-27
Sheet:	2 OF 2

Mar 03, 2016 - 2:45pm Plotted by: isav C:\Use\020_Src_Sitecres\20160302_Summit\Sitecre_V8_SitePlan.dwg

7.0 EXISTING PLUS APARTMENTS

7.1 Trip Generation, Distribution, and Projected Volumes

As stated in the Existing Conditions scenario, existing traffic volumes includes traffic from the completion of Phase 1 of the MIC site. **Table 4** shows the trip generation of the apartments from the Summit Orchards development. Concurrence on trip generation, distribution, and projected volumes for this scenario and following scenarios were reviewed by City staff prior to running any analysis.

Table 4: Apartments, Summit Orchards, Trip Generation

Phase 1 (Summit Orchards)				**AM Peak**					**PM Peak**				
Code	Use	Unit of Measure	Number	Avg Rate or Eq.	Enter		Exit		Avg Rate or Eq.	Enter		Exit	
220	Apartments	dwelling units	318	0.51	20%	32	80%	130	0.62	65%	128	35%	69
	Trip Ends					**32**		**130**			**128**		**69**

Trip distribution generally follows the accepted regional distribution below. There is some exception to specific lots on the site because of their driveway locations and logical path of travel.

Trip distribution assumes:

- 25% to/from the north via Ward Road/I-470 area;
- 30% to/from the east Tudor/Douglas area;
- 45% to/from Ward/Chipman Road.

Trip assignments for the Apartments are contained in the appendices. The projected volumes for Existing Plus Apartments are shown in **Figure 4**.

8.0 EXISTING PLUS APARTMENTS & COMMERCIAL

8.1 Trip Generation, Distribution, and Projected Volumes

The Existing Plus Apartments Plus Commercial considers the completion of the retail shopping, restaurants and convenience store in addition to the completed apartment buildings. This would involve all the commercial section being built out and the two right-in, right-out entrances constructed.

The general retail use buildings have been assigned ITE Code 820 Shopping Center for purposes of a conservative analysis.

Table 7 shows the trip generation for the Commercial part of the development.

Table 7: Commercial Trip Generation

Phase 2 (Summit Orchards)				AM Peak					PM Peak					Pass-By		Pass-By AM Peak		Pass-By PM Peak	
Code	Use	Unit of Measure	Number	Avg Rate or Eq.	Enter		Exit		Avg Rate or Eq.	Enter		Exit		AM Peak	PM Peak	Enter	Exit	Enter	Exit
820	Shopping Center (Lot 1)	GFA (1000sf)	28.5	Eq.	62%	45	38%	28	Eq.	48%	124	52%	134						
820	Shopping Center (Lot 2)	GFA (1000sf)	27	Eq.	62%	43	38%	27	Eq.	44%	110	56%	140						
932	High-turnover (Sit-down) Restaurant (Lot 3)	GFA (1000sf)	6.3	10.81	55%	37	45%	31	9.85	60%	37	40%	25						
932	High-turnover (Sit-down) Restaurant (Lot 4)	GFA (1000sf)	7.2	10.81	55%	43	45%	35	9.85	60%	42	40%	28						
945	Gasoline/Serv. Station w/Conv. Mkt. (Lot 5)	pump stations	24	10.16	50%	122	50%	122	13.51	50%	162	50%	162	50%	50%	61	61	81	81
820	Shopping Center (Lot 6)	GFA (1000sf)	14	0.96	62%	29	38%	18	3.71	44%	71	56%	90						
934	Fast-food with Drive Thru (Lot 7)	GFA (1000sf)	4.5	45.42	51%	104	49%	100	32.65	52%	76	48%	71	35%	35%	36	35	27	25
932	High-turnover (Sit-down) Restaurant (Lot 8)	GFA (1000sf)	7.5	10.81	55%	45	45%	36	9.85	60%	44	40%	30						
	Trip Ends					**468**		**396**			**666**		**679**						
	Pass-By Trips					97		96			108		106						
	New Trips					371		300			559		573						

820 Shopping Center - These are likely to be Specialty Retail or daytime use (sub shop for example) that do not have morning peak hour traffic, however to be conservative and to assign AM peak values, they are assumed as Shopping Center.

Trip Generation for the AM Peak hour is substantially less than the PM peak hour; 864 trip ends in the AM peak hour versus 1,345 PM peak trip ends. In reviewing prior traffic studies, other planned developments along Ward Road generate considerably less traffic during the AM peak hour confirming the PM peak hour to be the critical weekday analysis period. Regardless, the AM peak hour is assessed in further scenarios for peak hour traffic conditions regarding potential infrastructure improvements, but is not critical in the determinations.

Similar trip distribution as was used for the Apartments trip distribution as was used for the Commercial trips. When distributing trips, the lots were broken out into different trip patterns based on location to the various entrances. Trip assignments for the Commercial trips are contained in the appendices. Projected volumes for the combined Existing Plus Apartments & Commercial are shown in **Figure 6**.

9.0 EXISTING PLUS APARTMENTS & COMMERCIAL & OFFICES

9.1 Trip Generation, Distribution, and Projected Volumes

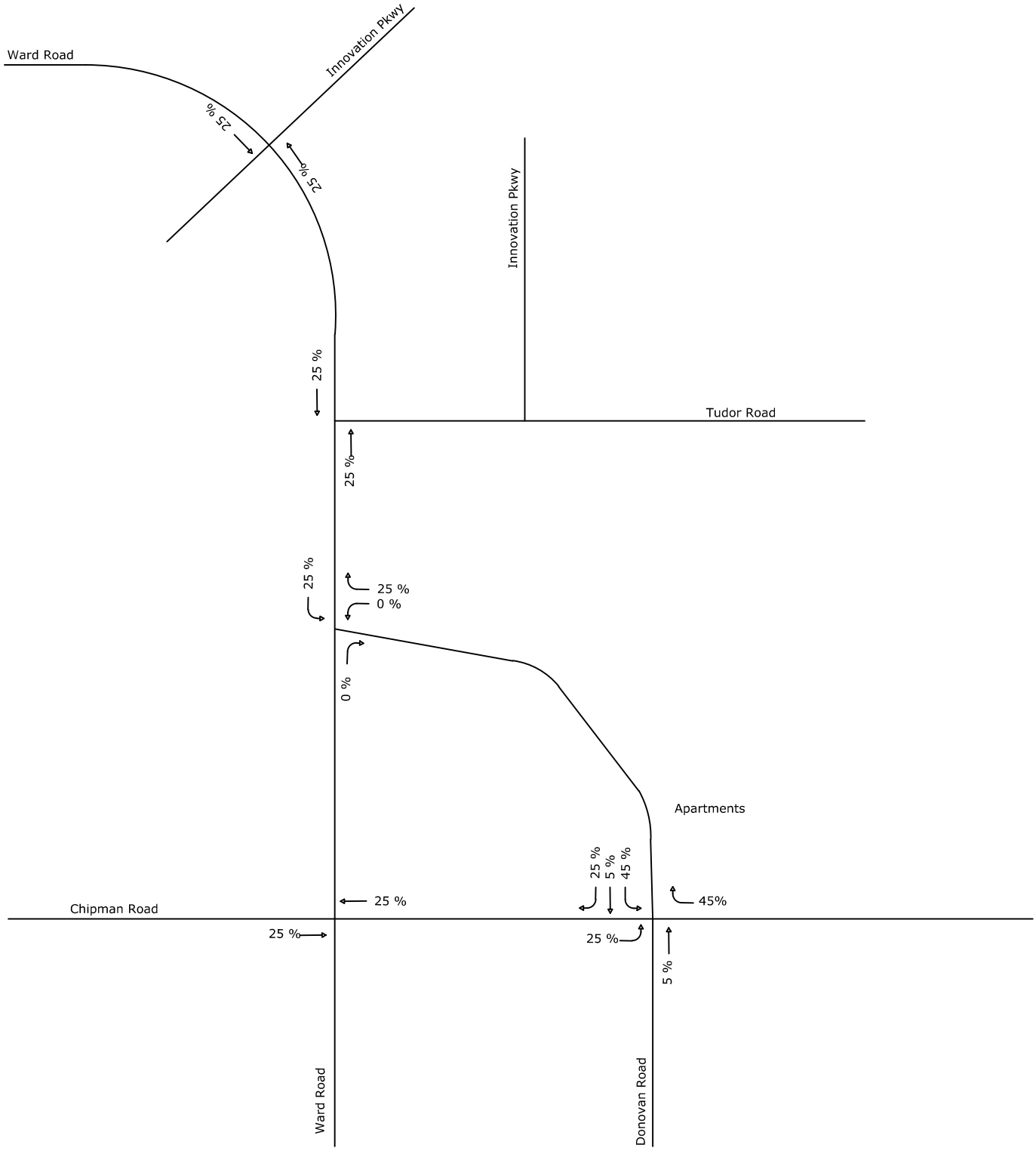
The Existing Plus Apartments & Commercial & Offices considers the completion of the office buildings in addition to the retail shopping, restaurants, convenience store and apartment buildings. This would involve full build out of the entire Summit Orchards development.

Table 10 shows the trip generation for the Offices.

Table 10: Offices Trip Generation

Phase 3 (Summit Orchards)				AM Peak					PM Peak				
Code	Use	Unit of Measure	Number	Avg Rate or Eq.	Enter		Exit		Avg Rate or Eq.	Enter		Exit	
710	General Office Building	GFA (1000sf)	105	Eq.	88%	175	12%	24	Eq.	17%	33	83%	163
710	General Office Building	GFA (1000sf)	50	Eq.	88%	97	12%	13	Eq.	17%	23	83%	112
	Trip Ends					**272**		**37**			**56**		**274**

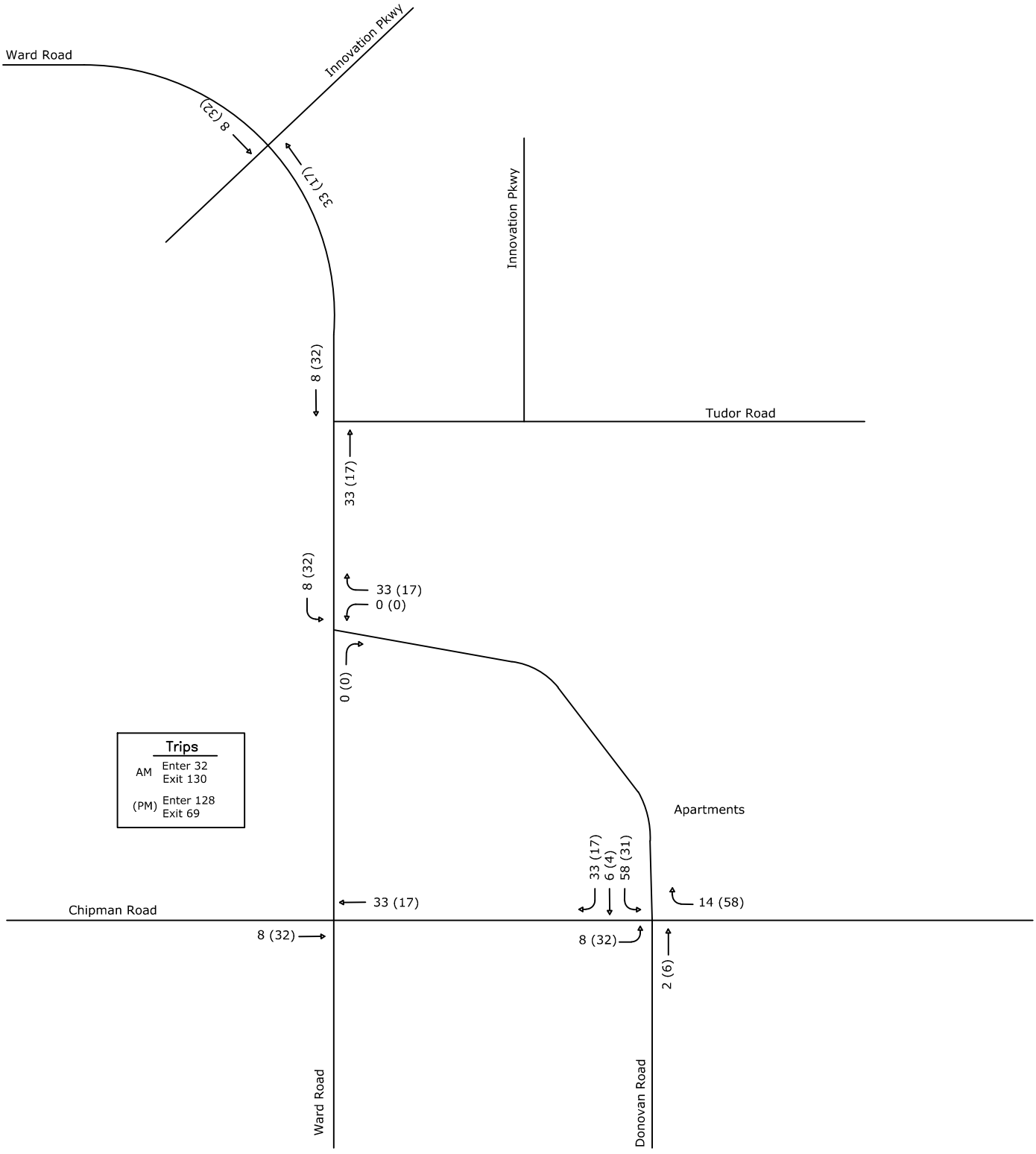
Keeping with the regional distribution, similar trip distribution was used in this phase as in the other two phases. When distributing trips, the buildings were assigned different trip patterns based on based on their available accesses. Trip assignments for Phase 3 Offices are contained in the appendices. Projected volumes for the combined Existing Plus Apartments & Commercial & Offices are shown in **Figure 8**.



McCLURE™ ENGINEERING Co.
building strong communities.

Distribution Percentages
Apartments, Summit Orchards
Traffic Impact Study
Lee's Summit, MO

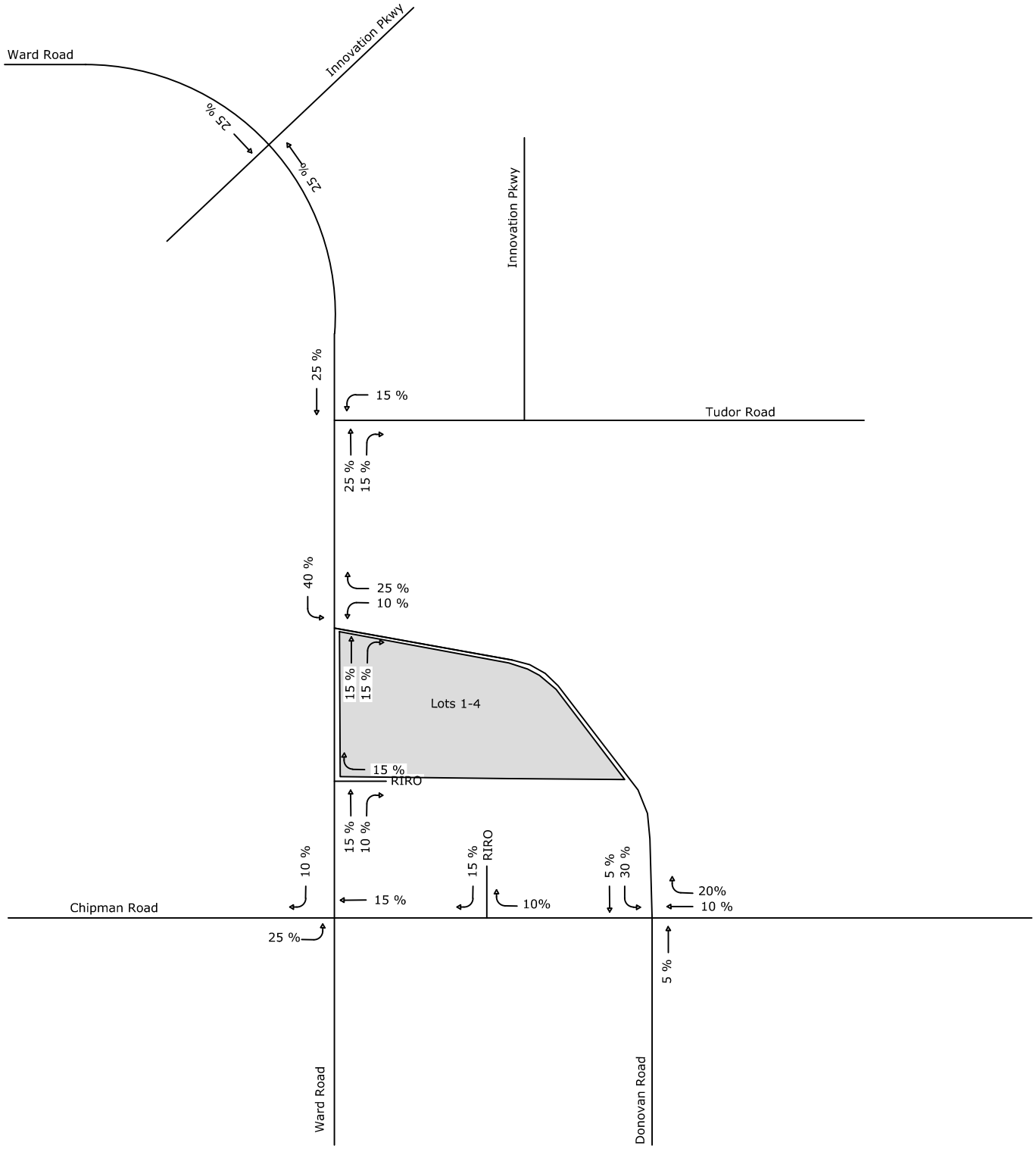
NORTH



McCLURE™ ENGINEERING Co.
building strong communities.

Trip Distribution
Apartments, Summit Orchards
Traffic Impact Study
Lee's Summit, MO

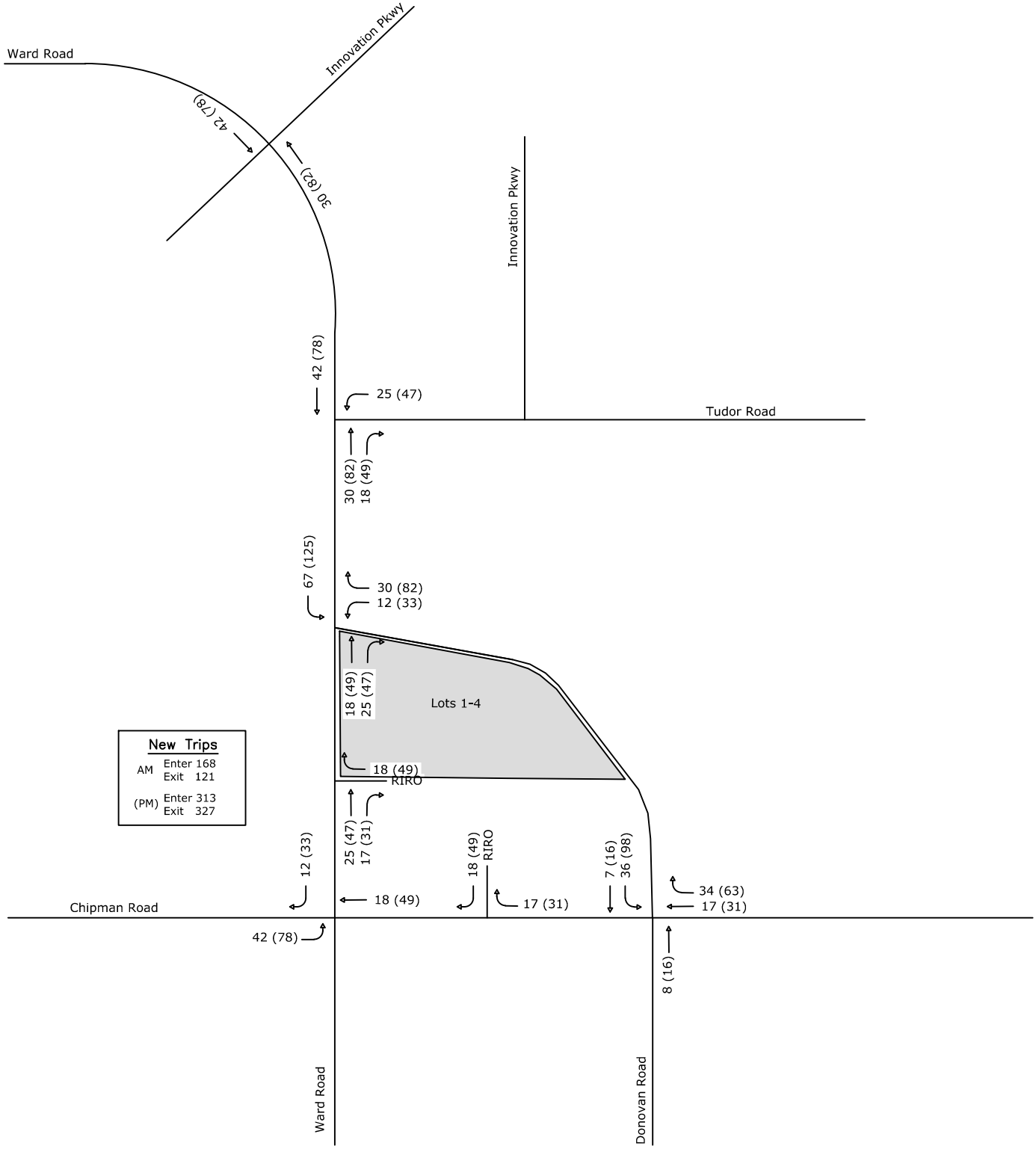
NORTH



McCLURE™ ENGINEERING Co.
building strong communities.

Distribution Percentages
Lots 1-4 Commercial, Summit Orchards
Traffic Impact Study
Lee's Summit, MO

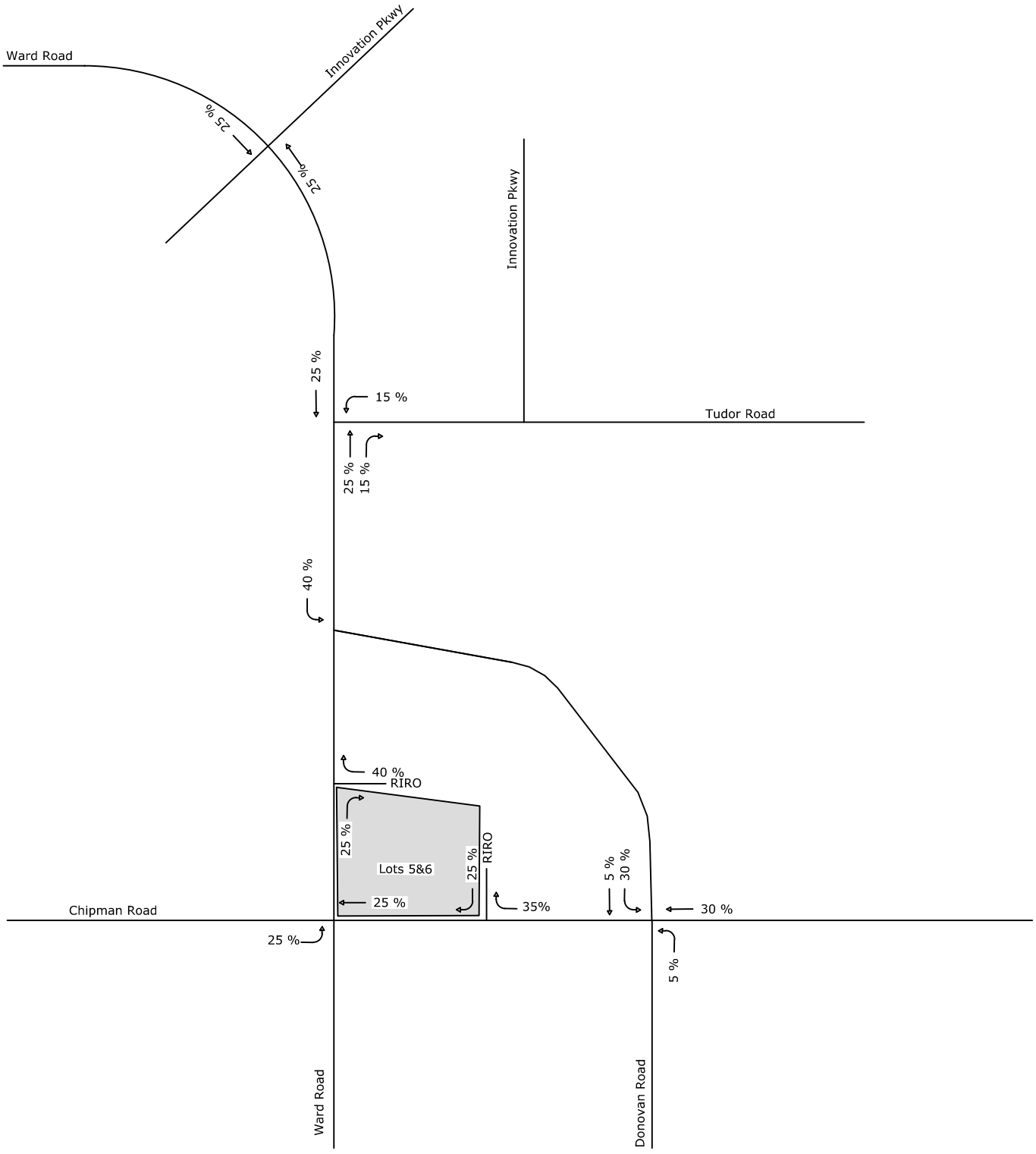
NORTH



McCLURE™ ENGINEERING Co.
building strong communities.

New Trips Distribution
Lots 1-4 Commercial, Summit Orchards
Traffic Impact Study
Lee's Summit, MO

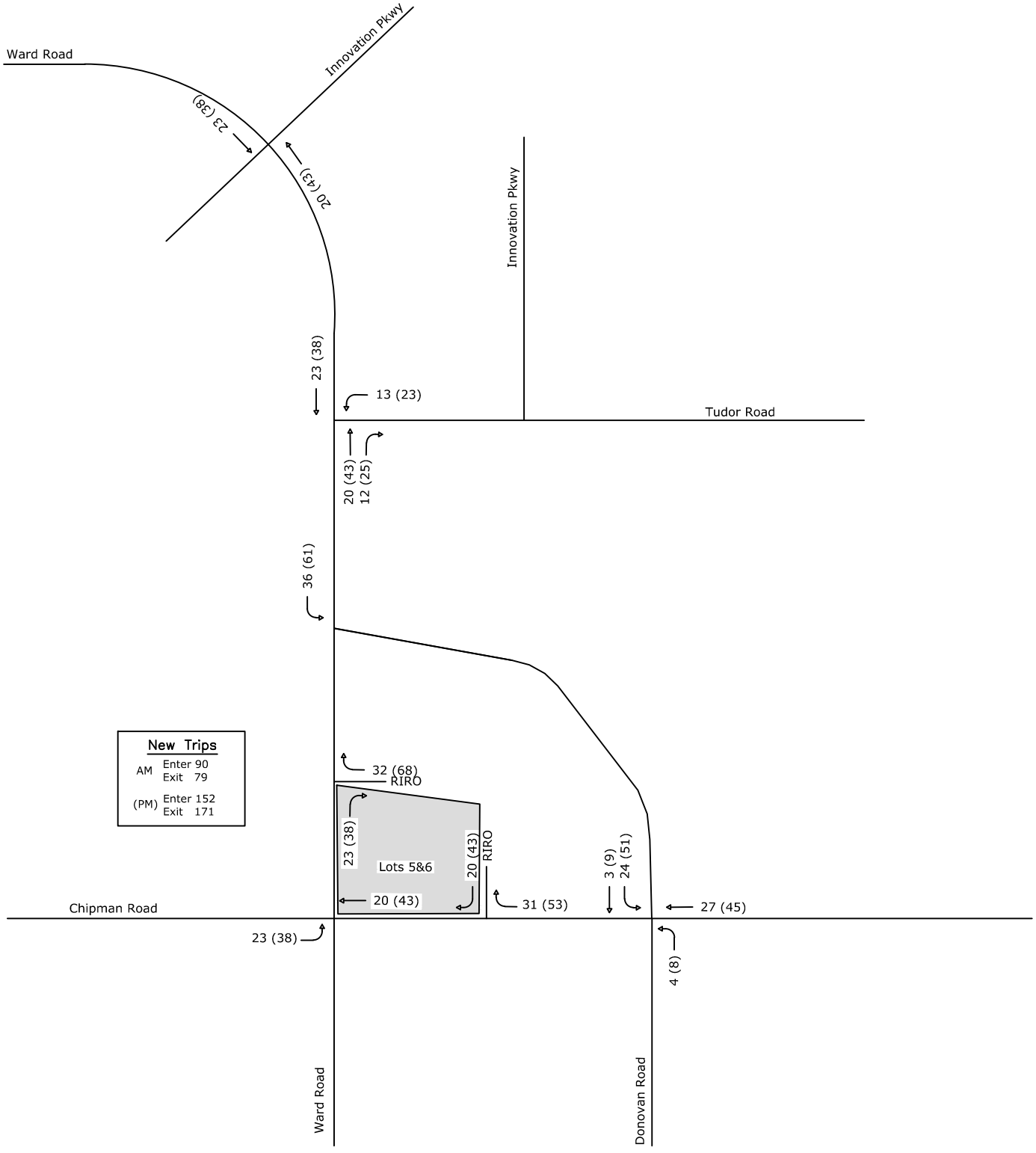
NORTH



McCLURE™ ENGINEERING Co.
building strong communities.

Distribution Percentages
Lots 5&6 Commercial, Summit Orchards
Traffic Impact Study
Lee's Summit, MO

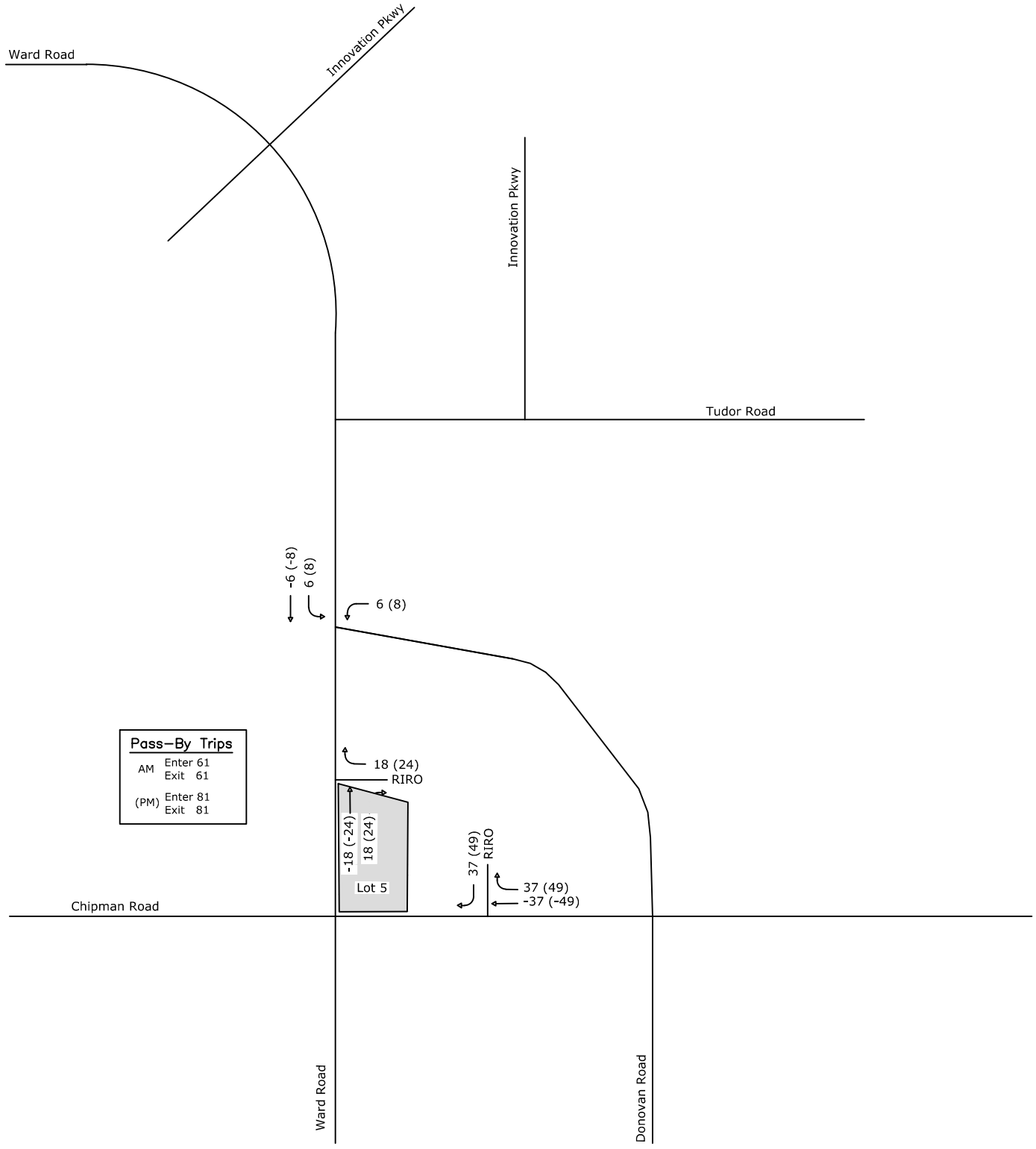
NORTH



McCLURE ENGINEERING Co.
building strong communities.

New Trips Distribution
Lots 5&6 Commercial, Summit Orchards
Traffic Impact Study
Lee's Summit, MO

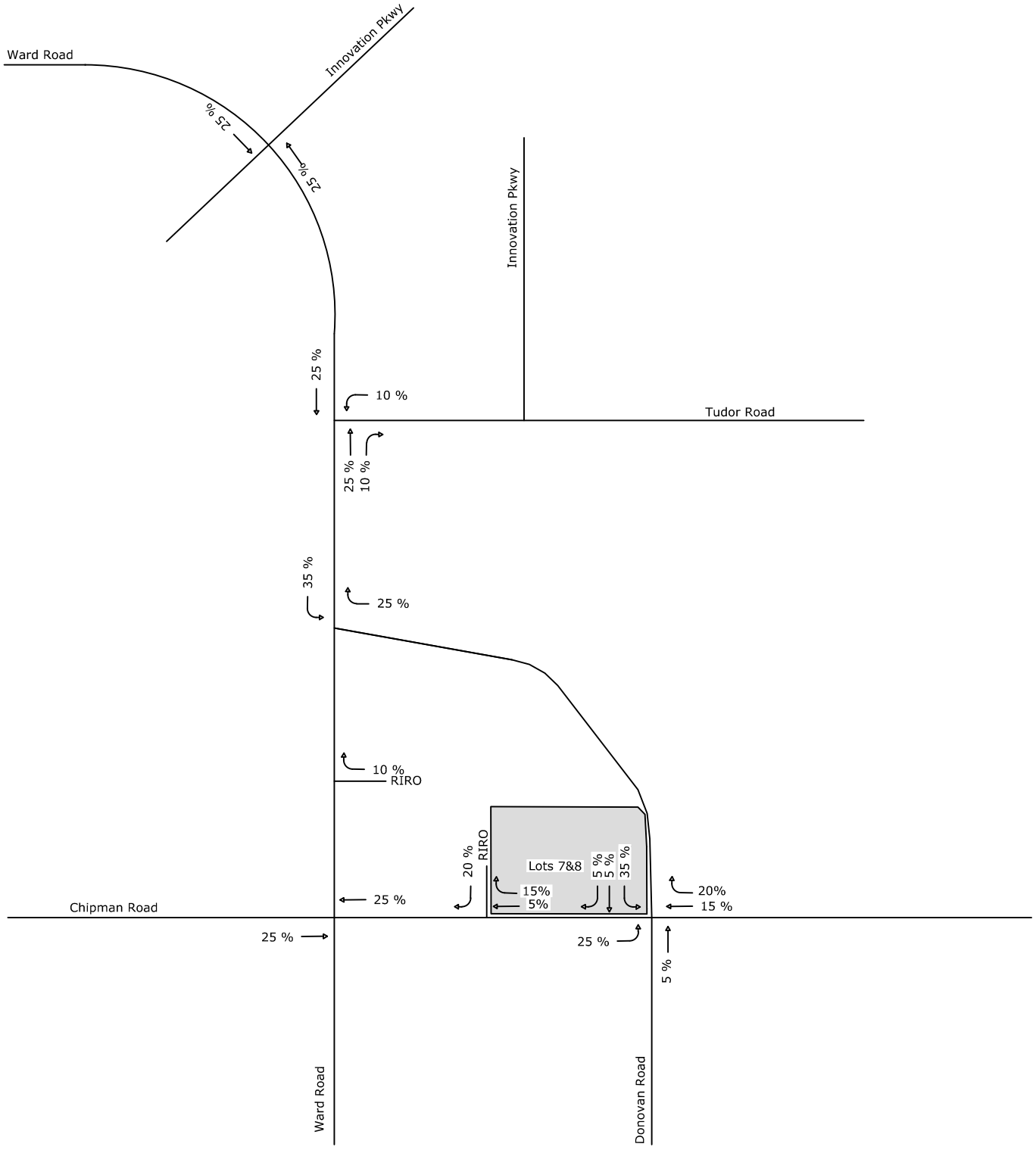
NORTH



McCLURE™ ENGINEERING Co.
building strong communities.

Pass-By Trips
Lot 5 Commercial, Summit Orchards
Traffic Impact Study
Lee's Summit, MO

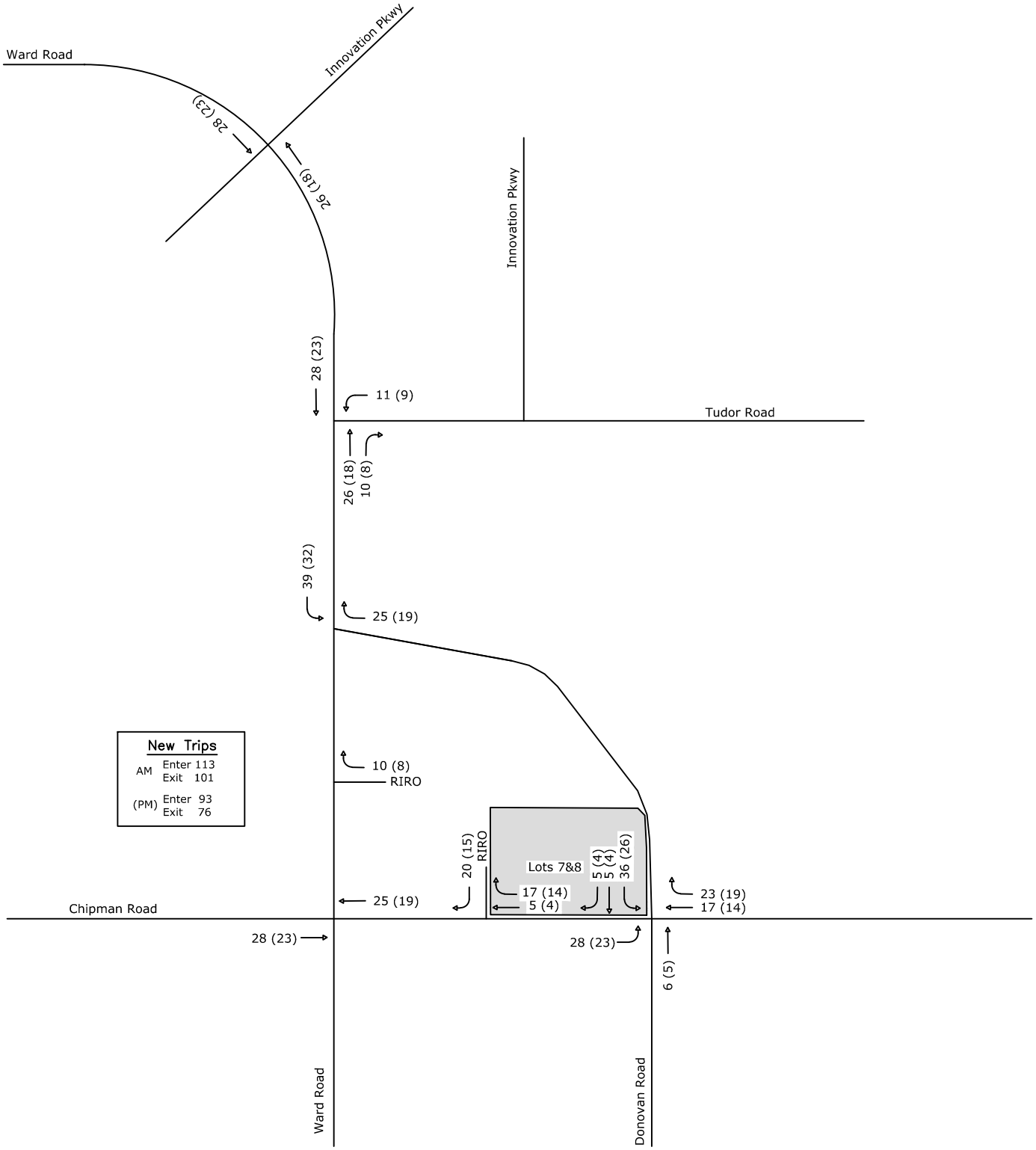
NORTH



McCLURE™ ENGINEERING Co.
building strong communities.

Distribution Percentages
Lots 7&8 Commercial, Summit Orchards
Traffic Impact Study
Lee's Summit, MO

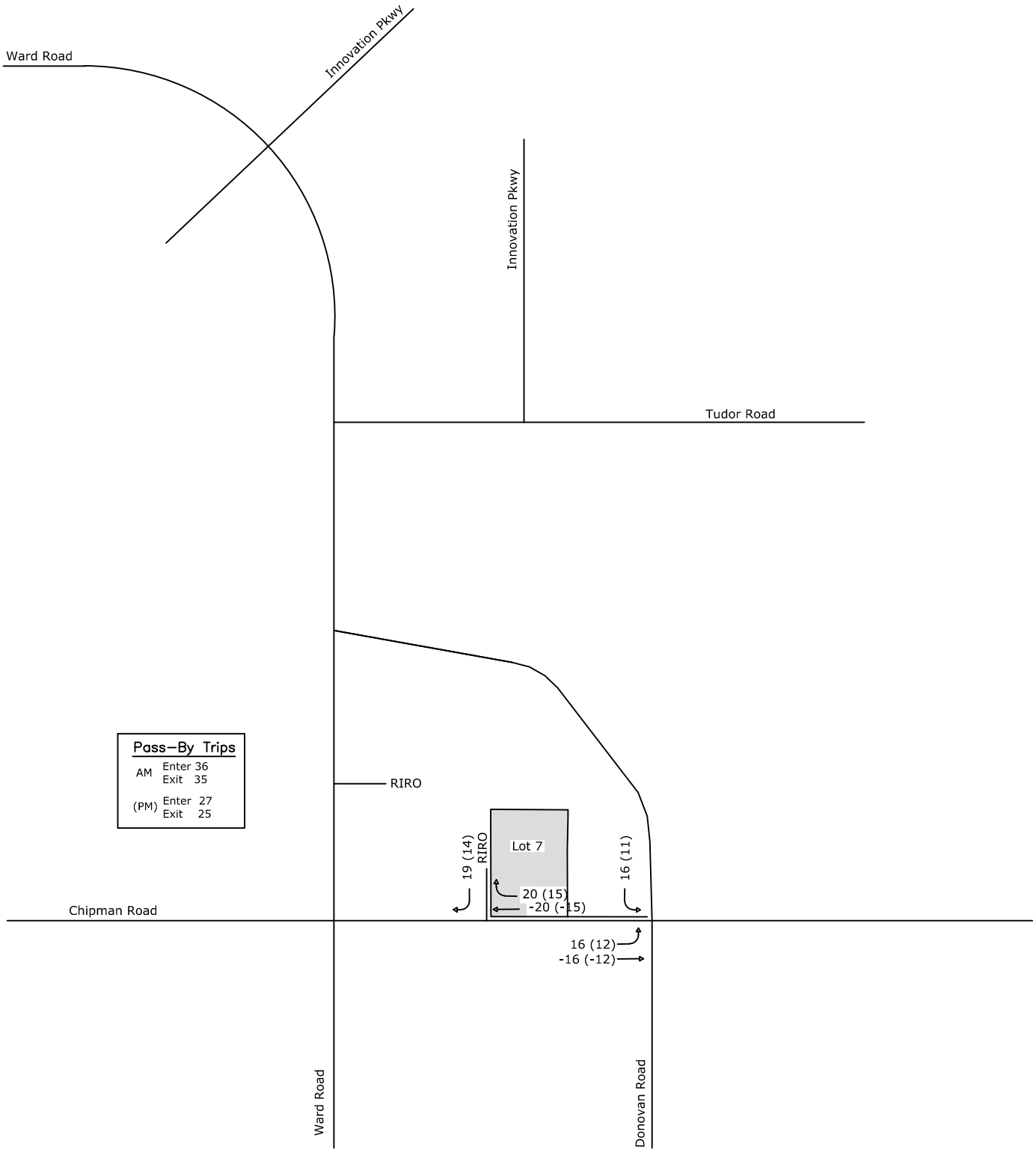
NORTH



McCLURE ENGINEERING Co.
building strong communities.

New Trips Distribution
Lots 7&8 Commercial, Summit Orchards
Traffic Impact Study
Lee's Summit, MO

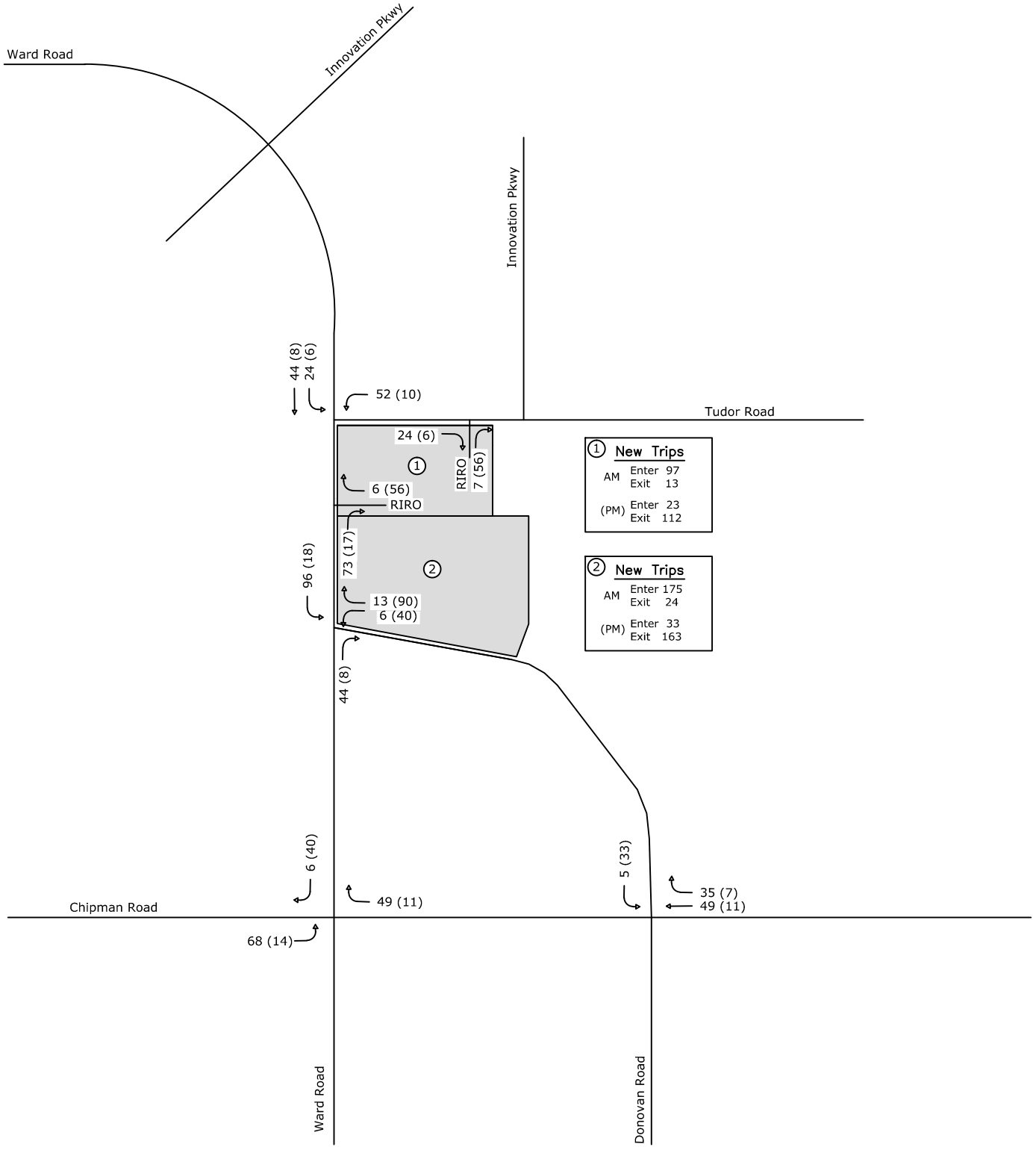
NORTH



McCLURE™ ENGINEERING Co.
building strong communities.

Pass-By Trips
Lot 7 Commercial, Summit Orchards
Traffic Impact Study
Lee's Summit, MO

NORTH



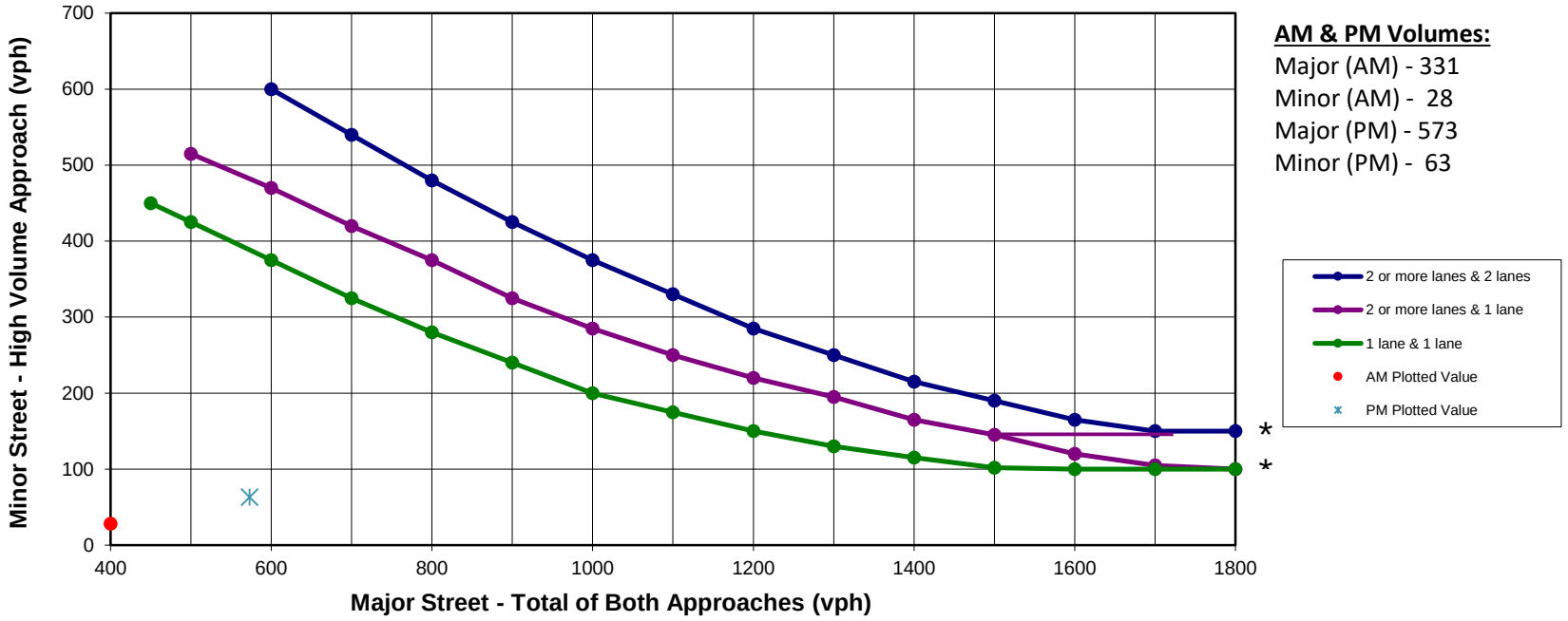
McCLURE™ ENGINEERING Co.
building strong communities.

New Trips Distribution
Office Bldgs, Summit Orchards
Traffic Impact Study
Lee's Summit, MO

NORTH

Signal Warrants

Peak Hour Volume Warrant (Existing plus Approved Conditions)
Tudor Road and Main Street

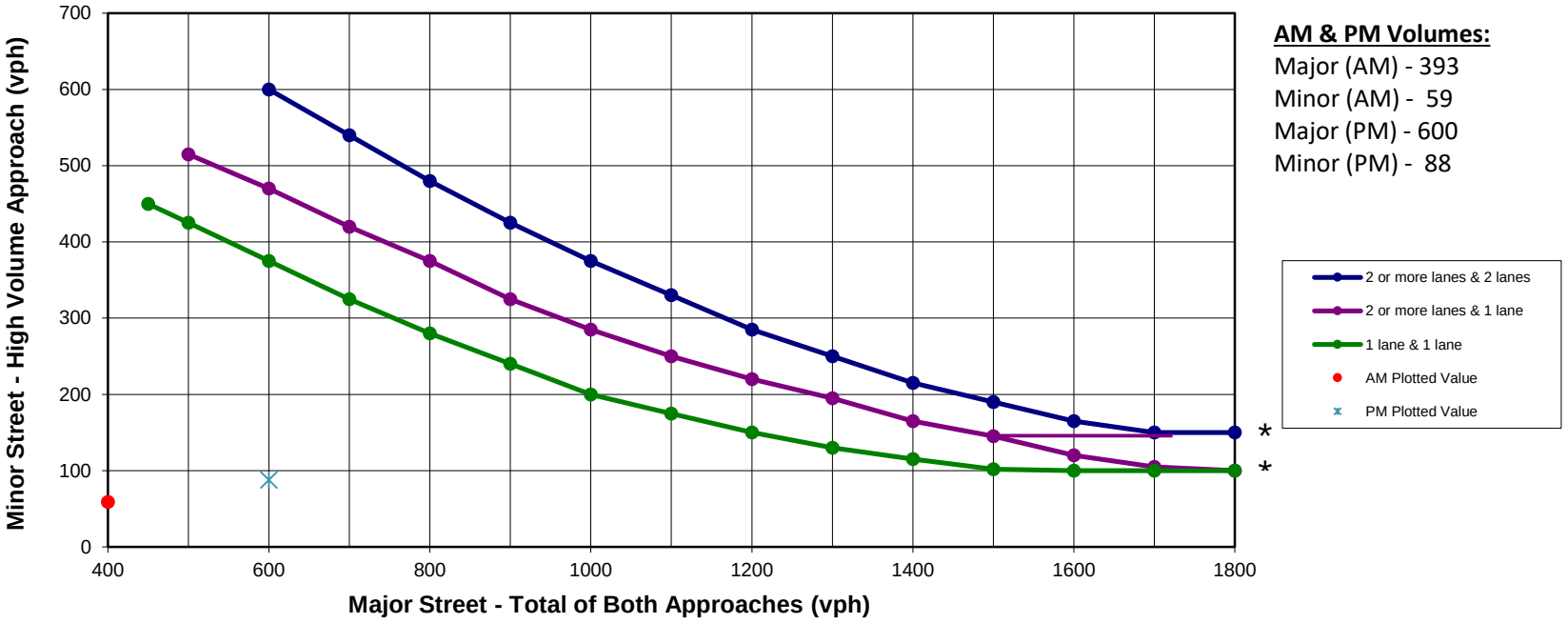


AM & PM Volumes:

Major (AM) - 331
Minor (AM) - 28
Major (PM) - 573
Minor (PM) - 63

*Note: 150 vph applies as the lower threshold volume for a minor street approach with two or more lanes and 100 vph applies as the lower threshold volume for a minor street approach with one lane.

Peak Hour Volume Warrant (Existing plus Approved Conditions)
Tudor Road and Sloan Street



AM & PM Volumes:

Major (AM) - 393
Minor (AM) - 59
Major (PM) - 600
Minor (PM) - 88

*Note: 150 vph applies as the lower threshold volume for a minor street approach with two or more lanes and 100 vph applies as the lower threshold volume for a minor street approach with one lane.

Capacity Analysis

Intersection	
Int Delay, s/veh	1.6

Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Traffic Vol, veh/h	20	144	155	12	22	6
Future Vol, veh/h	20	144	155	12	22	6
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	59	76	67	50	69	38
Heavy Vehicles, %	2	3	3	2	5	2
Mvmt Flow	34	189	231	24	32	16

Major/Minor	Major1		Major2		Minor2	
Conflicting Flow All	255	0	-	0	406	128
Stage 1	-	-	-	-	243	-
Stage 2	-	-	-	-	163	-
Critical Hdwy	4.14	-	-	-	6.9	6.94
Critical Hdwy Stg 1	-	-	-	-	5.9	-
Critical Hdwy Stg 2	-	-	-	-	5.9	-
Follow-up Hdwy	2.22	-	-	-	3.55	3.32
Pot Cap-1 Maneuver	1307	-	-	-	565	898
Stage 1	-	-	-	-	766	-
Stage 2	-	-	-	-	840	-
Platoon blocked, %		-	-	-		
Mov Cap-1 Maneuver	1307	-	-	-	549	898
Mov Cap-2 Maneuver	-	-	-	-	549	-
Stage 1	-	-	-	-	744	-
Stage 2	-	-	-	-	840	-

Approach	EB	WB	SB
HCM Control Delay, s	1.3	0	11.2
HCM LOS			B

Minor Lane/Major Mvmt	EBL	EBT	WBT	WBR	SBLn1
Capacity (veh/h)	1307	-	-	-	630
HCM Lane V/C Ratio	0.026	-	-	-	0.076
HCM Control Delay (s)	7.8	0.1	-	-	11.2
HCM Lane LOS	A	A	-	-	B
HCM 95th %tile Q(veh)	0.1	-	-	-	0.2

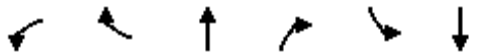
Intersection	
Int Delay, s/veh	3.9

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Vol, veh/h	21	122	23	78	146	3	11	6	42	0	8	10
Future Vol, veh/h	21	122	23	78	146	3	11	6	42	0	8	10
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	185	-	-	110	-	150	150	-	-	150	-	-
Veh in Median Storage, #	-	0	-	-	0	-	-	0	-	-	0	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	66	89	58	81	69	38	69	38	55	92	67	63
Heavy Vehicles, %	10	2	2	2	2	2	2	2	10	2	2	10
Mvmt Flow	32	137	40	96	212	8	16	16	76	0	12	16

Major/Minor	Major1			Major2			Minor1			Minor2		
Conflicting Flow All	220	0	0	177	0	0	525	633	89	545	645	106
Stage 1	-	-	-	-	-	-	221	221	-	404	404	-
Stage 2	-	-	-	-	-	-	304	412	-	141	241	-
Critical Hdwy	4.3	-	-	4.14	-	-	7.54	6.54	7.1	7.54	6.54	7.1
Critical Hdwy Stg 1	-	-	-	-	-	-	6.54	5.54	-	6.54	5.54	-
Critical Hdwy Stg 2	-	-	-	-	-	-	6.54	5.54	-	6.54	5.54	-
Follow-up Hdwy	2.3	-	-	2.22	-	-	3.52	4.02	3.4	3.52	4.02	3.4
Pot Cap-1 Maneuver	1290	-	-	1396	-	-	435	395	926	421	389	903
Stage 1	-	-	-	-	-	-	761	719	-	594	598	-
Stage 2	-	-	-	-	-	-	681	593	-	847	705	-
Platoon blocked, %		-	-		-	-						
Mov Cap-1 Maneuver	1290	-	-	1396	-	-	387	359	926	347	353	903
Mov Cap-2 Maneuver	-	-	-	-	-	-	387	359	-	347	353	-
Stage 1	-	-	-	-	-	-	742	701	-	579	557	-
Stage 2	-	-	-	-	-	-	610	552	-	741	687	-

Approach	EB	WB	NB	SB
HCM Control Delay, s	1.2	2.4	11.3	12
HCM LOS			B	B

Minor Lane/Major Mvmt	NBLn1	NBLn2	EBL	EBT	EBR	WBL	WBT	WBR	SBLn1	SBLn2
Capacity (veh/h)	387	729	1290	-	-	1396	-	-	-	541
HCM Lane V/C Ratio	0.041	0.126	0.025	-	-	0.069	-	-	-	0.051
HCM Control Delay (s)	14.7	10.7	7.9	-	-	7.8	-	-	0	12
HCM Lane LOS	B	B	A	-	-	A	-	-	A	B
HCM 95th %tile Q(veh)	0.1	0.4	0.1	-	-	0.2	-	-	-	0.2



Lane Group	WBL	WBR	NBT	NBR	SBL	SBT
Lane Group Flow (vph)	109	108	162	127	112	128
v/c Ratio	0.22	0.21	0.10	0.15	0.20	0.08
Control Delay	9.4	3.5	6.9	2.5	8.3	6.9
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	9.4	3.5	6.9	2.5	8.3	6.9
Queue Length 50th (ft)	10	0	7	0	11	6
Queue Length 95th (ft)	24	11	16	6	28	11
Internal Link Dist (ft)	1977		1483			1982
Turn Bay Length (ft)				90	150	
Base Capacity (vph)	860	831	3437	1541	1162	3130
Starvation Cap Reductn	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0
Reduced v/c Ratio	0.13	0.13	0.05	0.08	0.10	0.04

Intersection Summary

Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Traffic Volume (veh/h)	75	79	133	79	92	86
Future Volume (veh/h)	75	79	133	79	92	86
Initial Q (Qb), veh	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00	1.00		1.00	1.00	
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach	No		No			No
Adj Sat Flow, veh/h/ln	1841	1856	1870	1870	1856	1722
Adj Flow Rate, veh/h	109	108	162	127	112	128
Peak Hour Factor	0.69	0.73	0.82	0.62	0.82	0.67
Percent Heavy Veh, %	4	3	2	2	3	12
Cap, veh/h	434	389	1126	502	592	1037
Arrive On Green	0.25	0.25	0.32	0.32	0.32	0.32
Sat Flow, veh/h	1753	1572	3647	1585	1082	3358
Grp Volume(v), veh/h	109	108	162	127	112	128
Grp Sat Flow(s),veh/h/ln	1753	1572	1777	1585	1082	1636
Q Serve(g_s), s	1.3	1.4	0.8	1.5	2.1	0.7
Cycle Q Clear(g_c), s	1.3	1.4	0.8	1.5	2.9	0.7
Prop In Lane	1.00	1.00		1.00	1.00	
Lane Grp Cap(c), veh/h	434	389	1126	502	592	1037
V/C Ratio(X)	0.25	0.28	0.14	0.25	0.19	0.12
Avail Cap(c_a), veh/h	1007	903	4151	1852	1513	3822
HCM Platoon Ratio	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
Uniform Delay (d), s/veh	7.6	7.7	6.2	6.4	7.2	6.1
Incr Delay (d2), s/veh	0.3	0.4	0.1	0.3	0.2	0.1
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	0.3	0.3	0.2	0.3	0.3	0.1
Unsig. Movement Delay, s/veh						
LnGrp Delay(d),s/veh	7.9	8.1	6.2	6.7	7.4	6.2
LnGrp LOS	A	A	A	A	A	A
Approach Vol, veh/h	217		289			240
Approach Delay, s/veh	8.0		6.4			6.7
Approach LOS	A		A			A

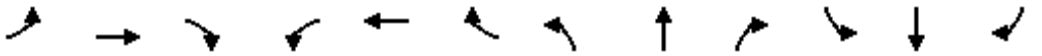
Timer - Assigned Phs		2		4		6
Phs Duration (G+Y+Rc), s		13.5		11.8		13.5
Change Period (Y+Rc), s		5.5		5.5		5.5
Max Green Setting (Gmax), s		29.5		14.5		29.5
Max Q Clear Time (g_c+I1), s		4.9		3.4		3.5
Green Ext Time (p_c), s		1.2		0.5		1.4

Intersection Summary	
HCM 6th Ctrl Delay	7.0
HCM 6th LOS	A

Lane Group	EBL	EBT	WBL	WBT	NBL	NBT	NBR	SBL	SBT	SBR
Lane Group Flow (vph)	84	36	24	48	92	841	20	24	642	104
v/c Ratio	0.46	0.07	0.13	0.19	0.14	0.32	0.02	0.05	0.27	0.10
Control Delay	43.0	0.2	33.9	14.8	1.4	3.8	0.2	0.8	4.4	0.9
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	43.0	0.2	33.9	14.8	1.4	3.8	0.2	0.8	4.4	0.9
Queue Length 50th (ft)	45	0	12	4	3	16	0	0	16	0
Queue Length 95th (ft)	69	0	23	3	m5	180	0	3	74	5
Internal Link Dist (ft)		501		409		1152			1009	
Turn Bay Length (ft)	115		60		250		115	215		120
Base Capacity (vph)	289	633	293	380	651	2643	1207	562	2347	1086
Starvation Cap Reductn	0	0	0	0	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0	0	0	0	0
Reduced v/c Ratio	0.29	0.06	0.08	0.13	0.14	0.32	0.02	0.04	0.27	0.10

Intersection Summary

m Volume for 95th percentile queue is metered by upstream signal.



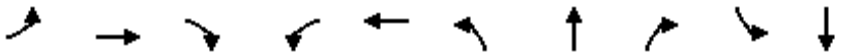
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	63	0	21	15	3	21	73	698	9	18	539	88
Future Volume (veh/h)	63	0	21	15	3	21	73	698	9	18	539	88
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		1.00	1.00		1.00	1.00		1.00	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	84	0	36	24	8	40	92	841	20	24	642	104
Peak Hour Factor	0.75	1.00	0.58	0.63	0.38	0.53	0.79	0.83	0.45	0.75	0.84	0.85
Percent Heavy Veh, %	2	2	2	2	2	2	2	2	2	2	2	2
Cap, veh/h	213	0	198	223	34	169	784	2427	1082	575	1824	814
Arrive On Green	0.12	0.00	0.11	0.12	0.12	0.11	0.39	1.00	1.00	0.07	1.00	1.00
Sat Flow, veh/h	1357	0	1585	1372	271	1355	1781	3554	1585	1781	3554	1585
Grp Volume(v), veh/h	84	0	36	24	0	48	92	841	20	24	642	104
Grp Sat Flow(s),veh/h/ln	1357	0	1585	1372	0	1626	1781	1777	1585	1781	1777	1585
Q Serve(g_s), s	5.4	0.0	1.9	1.4	0.0	2.4	0.0	0.0	0.0	0.3	0.0	0.0
Cycle Q Clear(g_c), s	7.8	0.0	1.9	3.3	0.0	2.4	0.0	0.0	0.0	0.3	0.0	0.0
Prop In Lane	1.00		1.00	1.00		0.83	1.00		1.00	1.00		1.00
Lane Grp Cap(c), veh/h	213	0	198	223	0	203	784	2427	1082	575	1824	814
V/C Ratio(X)	0.39	0.00	0.18	0.11	0.00	0.24	0.12	0.35	0.02	0.04	0.35	0.13
Avail Cap(c_a), veh/h	335	0	340	346	0	349	784	2427	1082	680	1824	814
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	2.00	2.00	2.00	2.00	2.00	2.00
Upstream Filter(I)	1.00	0.00	1.00	1.00	0.00	1.00	0.92	0.92	0.92	0.96	0.96	0.96
Uniform Delay (d), s/veh	39.0	0.0	35.9	36.8	0.0	36.0	3.5	0.0	0.0	3.7	0.0	0.0
Incr Delay (d2), s/veh	1.2	0.0	0.4	0.2	0.0	0.6	0.0	0.4	0.0	0.0	0.5	0.3
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(50%),veh/ln	1.9	0.0	0.7	0.5	0.0	1.0	0.3	0.1	0.0	0.1	0.1	0.1
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	40.2	0.0	36.3	37.0	0.0	36.6	3.5	0.4	0.0	3.7	0.5	0.3
LnGrp LOS	D	A	D	D	A	D	A	A	A	A	A	A
Approach Vol, veh/h		120			72			953			770	
Approach Delay, s/veh		39.0			36.7			0.7			0.6	
Approach LOS		D			D			A			A	

Timer - Assigned Phs	1	2		4	5	6		8				
Phs Duration (G+Y+Rc), s	23.1	51.0		15.9	7.7	66.4		15.9				
Change Period (Y+Rc), s	* 6	* 6		6.0	5.0	* 6		6.0				
Max Green Setting (Gmax), s	* 10	* 45		18.0	8.0	* 47		18.0				
Max Q Clear Time (g_c+I1), s	2.0	2.0		5.3	2.3	2.0		9.8				
Green Ext Time (p_c), s	0.0	3.5		0.2	0.0	4.3		0.2				

Intersection Summary	
HCM 6th Ctrl Delay	4.4
HCM 6th LOS	A

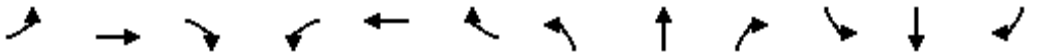
Notes

* HCM 6th computational engine requires equal clearance times for the phases crossing the barrier.



Lane Group	EBL	EBT	EBR	WBL	WBT	NBL	NBT	NBR	SBL	SBT
Lane Group Flow (vph)	80	102	32	177	639	96	543	159	350	441
v/c Ratio	0.33	0.22	0.07	0.49	0.70	0.17	0.42	0.23	0.63	0.26
Control Delay	25.9	35.8	0.3	29.1	13.9	10.4	25.7	2.5	19.2	11.1
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	25.9	35.8	0.3	29.1	13.9	10.4	25.7	2.5	19.2	11.1
Queue Length 50th (ft)	32	27	0	75	46	23	130	0	169	87
Queue Length 95th (ft)	45	47	0	88	45	26	166	0	175	120
Internal Link Dist (ft)		1034			900		1974			1152
Turn Bay Length (ft)	165		145	145		150		100	330	
Base Capacity (vph)	245	521	453	364	983	581	1282	705	627	1719
Starvation Cap Reductn	0	0	0	0	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0	0	0	0	0
Reduced v/c Ratio	0.33	0.20	0.07	0.49	0.65	0.17	0.42	0.23	0.56	0.26

Intersection Summary



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	53	87	12	117	126	314	50	429	105	238	310	77
Future Volume (veh/h)	53	87	12	117	126	314	50	429	105	238	310	77
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	1856	1870	1841	1870	1870	1870	1870	1870	1781	1870	1870
Adj Flow Rate, veh/h	80	102	32	177	177	462	96	543	159	350	326	115
Peak Hour Factor	0.66	0.85	0.38	0.66	0.71	0.68	0.52	0.79	0.66	0.68	0.95	0.67
Percent Heavy Veh, %	2	3	2	4	2	2	2	2	2	8	2	2
Cap, veh/h	238	554	214	462	344	306	534	1182	527	531	1070	371
Arrive On Green	0.09	0.16	0.13	0.13	0.19	0.17	0.10	0.33	0.33	0.06	0.14	0.13
Sat Flow, veh/h	1781	3526	1585	1753	1777	1585	1781	3554	1585	1697	2589	897
Grp Volume(v), veh/h	80	102	32	177	177	462	96	543	159	350	222	219
Grp Sat Flow(s),veh/h/ln	1781	1763	1585	1753	1777	1585	1781	1777	1585	1697	1777	1709
Q Serve(g_s), s	3.2	2.3	1.2	7.2	8.0	17.4	0.0	10.8	6.7	11.2	10.1	10.4
Cycle Q Clear(g_c), s	3.2	2.3	1.2	7.2	8.0	17.4	0.0	10.8	6.7	11.2	10.1	10.4
Prop In Lane	1.00		1.00	1.00		1.00	1.00		1.00	1.00		0.52
Lane Grp Cap(c), veh/h	238	554	214	462	344	306	534	1182	527	531	734	706
V/C Ratio(X)	0.34	0.18	0.15	0.38	0.52	1.51	0.18	0.46	0.30	0.66	0.30	0.31
Avail Cap(c_a), veh/h	246	554	214	485	344	306	534	1182	527	649	734	706
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	0.33	0.33	0.33
Upstream Filter(I)	1.00	1.00	1.00	0.96	0.96	0.96	0.75	0.75	0.75	0.97	0.97	0.97
Uniform Delay (d), s/veh	27.9	32.9	19.0	25.3	32.5	37.3	18.4	23.6	22.3	17.2	27.2	27.4
Incr Delay (d2), s/veh	0.8	0.3	0.7	0.5	1.3	244.1	0.1	1.0	1.1	1.7	1.0	1.1
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(50%),veh/ln	1.4	1.0	0.6	2.9	3.5	27.4	1.3	4.4	2.6	4.8	4.6	4.7
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	28.7	33.3	19.7	25.8	33.8	281.4	18.5	24.6	23.4	18.9	28.2	28.5
LnGrp LOS	C	C	B	C	C	F	B	C	C	B	C	C
Approach Vol, veh/h		214			816			798			791	
Approach Delay, s/veh		29.5			172.3			23.6			24.2	
Approach LOS		C			F			C			C	

Timer - Assigned Phs	1	2	3	4	5	6	7	8
Phs Duration (G+Y+Rc), s	13.4	42.0	12.6	22.0	20.8	34.6	15.9	18.7
Change Period (Y+Rc), s	6.7	* 6.8	6.6	6.6	6.8	* 6.7	6.6	6.6
Max Green Setting (Gmax), s	6.3	* 35	6.4	15.4	20.2	* 21	10.4	11.4
Max Q Clear Time (g_c+I1), s	2.0	12.4	5.2	19.4	13.2	12.8	9.2	4.3
Green Ext Time (p_c), s	0.1	1.6	0.0	0.0	0.8	2.1	0.1	0.5

Intersection Summary	
HCM 6th Ctrl Delay	70.6
HCM 6th LOS	E

Notes

* HCM 6th computational engine requires equal clearance times for the phases crossing the barrier.

Intersection	
Int Delay, s/veh	1.8

Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Traffic Vol, veh/h	10	305	236	22	35	28
Future Vol, veh/h	10	305	236	22	35	28
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	63	91	72	69	67	50
Heavy Vehicles, %	2	2	2	2	3	2
Mvmt Flow	16	335	328	32	52	56

Major/Minor	Major1		Major2		Minor2	
Conflicting Flow All	360	0	-	0	544	180
Stage 1	-	-	-	-	344	-
Stage 2	-	-	-	-	200	-
Critical Hdwy	4.14	-	-	-	6.86	6.94
Critical Hdwy Stg 1	-	-	-	-	5.86	-
Critical Hdwy Stg 2	-	-	-	-	5.86	-
Follow-up Hdwy	2.22	-	-	-	3.53	3.32
Pot Cap-1 Maneuver	1195	-	-	-	467	832
Stage 1	-	-	-	-	686	-
Stage 2	-	-	-	-	811	-
Platoon blocked, %		-	-	-		
Mov Cap-1 Maneuver	1195	-	-	-	460	832
Mov Cap-2 Maneuver	-	-	-	-	460	-
Stage 1	-	-	-	-	675	-
Stage 2	-	-	-	-	811	-

Approach	EB	WB	SB
HCM Control Delay, s	0.5	0	12.3
HCM LOS			B

Minor Lane/Major Mvmt	EBL	EBT	WBT	WBR	SBLn1
Capacity (veh/h)	1195	-	-	-	598
HCM Lane V/C Ratio	0.013	-	-	-	0.181
HCM Control Delay (s)	8.1	0.1	-	-	12.3
HCM Lane LOS	A	A	-	-	B
HCM 95th %tile Q(veh)	0	-	-	-	0.7

Intersection	
Int Delay, s/veh	3

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Vol, veh/h	11	296	33	40	218	2	18	3	67	6	3	22
Future Vol, veh/h	11	296	33	40	218	2	18	3	67	6	3	22
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	185	-	-	110	-	150	150	-	-	150	-	-
Veh in Median Storage, #	-	0	-	-	0	-	-	0	-	-	0	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	69	90	83	70	79	50	90	75	64	75	38	50
Heavy Vehicles, %	2	2	3	3	2	2	2	2	2	2	2	2
Mvmt Flow	16	329	40	57	276	4	20	4	105	8	8	44

Major/Minor	Major1			Major2			Minor1			Minor2		
Conflicting Flow All	280	0	0	369	0	0	637	775	185	589	791	138
Stage 1	-	-	-	-	-	-	381	381	-	390	390	-
Stage 2	-	-	-	-	-	-	256	394	-	199	401	-
Critical Hdwy	4.14	-	-	4.16	-	-	7.54	6.54	6.94	7.54	6.54	6.94
Critical Hdwy Stg 1	-	-	-	-	-	-	6.54	5.54	-	6.54	5.54	-
Critical Hdwy Stg 2	-	-	-	-	-	-	6.54	5.54	-	6.54	5.54	-
Follow-up Hdwy	2.22	-	-	2.23	-	-	3.52	4.02	3.32	3.52	4.02	3.32
Pot Cap-1 Maneuver	1280	-	-	1179	-	-	362	327	826	392	320	885
Stage 1	-	-	-	-	-	-	613	612	-	606	606	-
Stage 2	-	-	-	-	-	-	726	604	-	784	599	-
Platoon blocked, %		-	-		-	-						
Mov Cap-1 Maneuver	1280	-	-	1179	-	-	322	308	826	323	301	885
Mov Cap-2 Maneuver	-	-	-	-	-	-	322	308	-	323	301	-
Stage 1	-	-	-	-	-	-	606	605	-	599	577	-
Stage 2	-	-	-	-	-	-	648	575	-	672	592	-

Approach	EB	WB	NB	SB
HCM Control Delay, s	0.3	1.4	11.4	11.5
HCM LOS			B	B

Minor Lane/Major Mvmt	NBLn1	NBLn2	EBL	EBT	EBR	WBL	WBT	WBR	SBLn1	SBLn2
Capacity (veh/h)	322	778	1280	-	-	1179	-	-	323	683
HCM Lane V/C Ratio	0.062	0.14	0.012	-	-	0.048	-	-	0.025	0.076
HCM Control Delay (s)	16.9	10.4	7.8	-	-	8.2	-	-	16.4	10.7
HCM Lane LOS	C	B	A	-	-	A	-	-	C	B
HCM 95th %tile Q(veh)	0.2	0.5	0	-	-	0.2	-	-	0.1	0.2

Lane Group	WBL	WBR	NBT	NBR	SBL	SBT
Lane Group Flow (vph)	225	152	213	163	209	233
v/c Ratio	0.46	0.28	0.15	0.22	0.45	0.16
Control Delay	14.1	4.2	7.5	2.7	11.9	7.5
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	14.1	4.2	7.5	2.7	11.9	7.5
Queue Length 50th (ft)	29	0	11	0	25	13
Queue Length 95th (ft)	58	25	25	12	76	32
Internal Link Dist (ft)	1977		1483			1982
Turn Bay Length (ft)				90	150	
Base Capacity (vph)	729	742	2900	1325	952	2929
Starvation Cap Reductn	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0
Reduced v/c Ratio	0.31	0.20	0.07	0.12	0.22	0.08

Intersection Summary

Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Traffic Volume (veh/h)	142	129	164	114	188	205
Future Volume (veh/h)	142	129	164	114	188	205
Initial Q (Qb), veh	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00	1.00		1.00	1.00	
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach	No		No			No
Adj Sat Flow, veh/h/ln	1870	1870	1856	1856	1870	1870
Adj Flow Rate, veh/h	225	152	213	163	209	233
Peak Hour Factor	0.63	0.85	0.77	0.70	0.90	0.88
Percent Heavy Veh, %	2	2	3	3	2	2
Cap, veh/h	462	411	1293	577	573	1303
Arrive On Green	0.26	0.26	0.37	0.37	0.37	0.37
Sat Flow, veh/h	1781	1585	3618	1572	1007	3647
Grp Volume(v), veh/h	225	152	213	163	209	233
Grp Sat Flow(s),veh/h/ln	1781	1585	1763	1572	1007	1777
Q Serve(g_s), s	3.1	2.3	1.2	2.2	5.2	1.3
Cycle Q Clear(g_c), s	3.1	2.3	1.2	2.2	6.4	1.3
Prop In Lane	1.00	1.00		1.00	1.00	
Lane Grp Cap(c), veh/h	462	411	1293	577	573	1303
V/C Ratio(X)	0.49	0.37	0.16	0.28	0.36	0.18
Avail Cap(c_a), veh/h	878	781	3535	1577	1213	3563
HCM Platoon Ratio	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
Uniform Delay (d), s/veh	9.2	8.9	6.3	6.6	8.4	6.3
Incr Delay (d2), s/veh	0.8	0.6	0.1	0.3	0.4	0.1
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	0.9	0.6	0.2	0.4	0.7	0.3
Unsig. Movement Delay, s/veh						
LnGrp Delay(d),s/veh	10.0	9.5	6.3	6.8	8.8	6.4
LnGrp LOS	B	A	A	A	A	A
Approach Vol, veh/h	377		376			442
Approach Delay, s/veh	9.8		6.6			7.5
Approach LOS	A		A			A

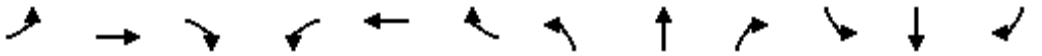
Timer - Assigned Phs		2		4		6
Phs Duration (G+Y+Rc), s		16.3		13.1		16.3
Change Period (Y+Rc), s		5.5		5.5		5.5
Max Green Setting (Gmax), s		29.5		14.5		29.5
Max Q Clear Time (g_c+I1), s		8.4		5.1		4.2
Green Ext Time (p_c), s		2.4		0.8		1.8

Intersection Summary	
HCM 6th Ctrl Delay	7.9
HCM 6th LOS	A

Lane Group	EBL	EBT	WBL	WBT	NBL	NBT	NBR	SBL	SBT	SBR
Lane Group Flow (vph)	88	88	72	60	72	788	44	80	1058	60
v/c Ratio	0.50	0.32	0.42	0.23	0.18	0.33	0.04	0.15	0.44	0.05
Control Delay	49.2	15.3	46.1	14.9	2.3	4.3	0.3	1.4	2.7	0.3
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	49.2	15.3	46.1	14.9	2.3	4.3	0.3	1.4	2.7	0.3
Queue Length 50th (ft)	53	9	43	5	2	56	0	2	55	0
Queue Length 95th (ft)	87	0	51	27	m9	113	m0	8	65	0
Internal Link Dist (ft)		501		409		1152			1009	
Turn Bay Length (ft)	115		60		250		115	215		120
Base Capacity (vph)	284	404	277	386	468	2421	1110	591	2425	1111
Starvation Cap Reductn	0	0	0	0	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0	0	0	0	0
Reduced v/c Ratio	0.31	0.22	0.26	0.16	0.15	0.33	0.04	0.14	0.44	0.05

Intersection Summary

m Volume for 95th percentile queue is metered by upstream signal.



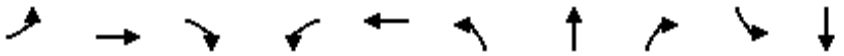
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	71	5	39	42	6	40	56	662	29	68	963	42
Future Volume (veh/h)	71	5	39	42	6	40	56	662	29	68	963	42
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		1.00	1.00		1.00	1.00		1.00	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	88	16	72	72	8	52	72	788	44	80	1058	60
Peak Hour Factor	0.81	0.31	0.54	0.58	0.75	0.77	0.78	0.84	0.66	0.85	0.91	0.70
Percent Heavy Veh, %	2	2	2	2	2	2	2	2	2	2	2	2
Cap, veh/h	213	41	184	188	30	194	500	2354	1050	607	2363	1054
Arrive On Green	0.14	0.14	0.13	0.14	0.14	0.13	0.11	1.00	1.00	0.11	1.00	1.00
Sat Flow, veh/h	1343	296	1334	1309	216	1402	1781	3554	1585	1781	3554	1585
Grp Volume(v), veh/h	88	0	88	72	0	60	72	788	44	80	1058	60
Grp Sat Flow(s),veh/h/ln	1343	0	1630	1309	0	1618	1781	1777	1585	1781	1777	1585
Q Serve(g_s), s	6.3	0.0	5.0	5.3	0.0	3.4	1.2	0.0	0.0	1.3	0.0	0.0
Cycle Q Clear(g_c), s	9.6	0.0	5.0	10.3	0.0	3.4	1.2	0.0	0.0	1.3	0.0	0.0
Prop In Lane	1.00		0.82	1.00		0.87	1.00		1.00	1.00		1.00
Lane Grp Cap(c), veh/h	213	0	225	188	0	224	500	2354	1050	607	2363	1054
V/C Ratio(X)	0.41	0.00	0.39	0.38	0.00	0.27	0.14	0.33	0.04	0.13	0.45	0.06
Avail Cap(c_a), veh/h	313	0	347	286	0	345	586	2354	1050	690	2363	1054
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	2.00	2.00	2.00	2.00	2.00	2.00
Upstream Filter(I)	1.00	0.00	1.00	1.00	0.00	1.00	0.83	0.83	0.83	0.91	0.91	0.91
Uniform Delay (d), s/veh	42.9	0.0	39.8	43.9	0.0	39.1	4.1	0.0	0.0	4.1	0.0	0.0
Incr Delay (d2), s/veh	1.3	0.0	1.1	1.3	0.0	0.6	0.0	0.3	0.1	0.0	0.6	0.1
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(50%),veh/ln	2.2	0.0	2.1	1.8	0.0	1.4	0.3	0.1	0.0	0.3	0.2	0.0
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	44.2	0.0	40.9	45.2	0.0	39.7	4.1	0.3	0.1	4.1	0.6	0.1
LnGrp LOS	D	A	D	D	A	D	A	A	A	A	A	A
Approach Vol, veh/h		176			132			904			1198	
Approach Delay, s/veh		42.5			42.7			0.6			0.8	
Approach LOS		D			D			A			A	

Timer - Assigned Phs	1	2		4	5	6		8				
Phs Duration (G+Y+Rc), s	10.2	71.3		18.5	10.3	71.1		18.5				
Change Period (Y+Rc), s	5.0	* 6		6.0	5.0	* 6		6.0				
Max Green Setting (Gmax), s	10.0	* 53		20.0	10.0	* 53		20.0				
Max Q Clear Time (g_c+I1), s	3.2	2.0		12.3	3.3	2.0		11.6				
Green Ext Time (p_c), s	0.0	6.1		0.3	0.0	4.1		0.4				

Intersection Summary	
HCM 6th Ctrl Delay	6.1
HCM 6th LOS	A

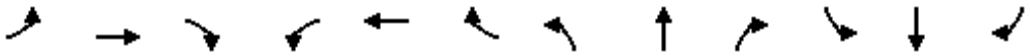
Notes

* HCM 6th computational engine requires equal clearance times for the phases crossing the barrier.



Lane Group	EBL	EBT	EBR	WBL	WBT	NBL	NBT	NBR	SBL	SBT
Lane Group Flow (vph)	145	267	48	183	486	22	482	160	467	852
v/c Ratio	0.54	0.63	0.12	0.54	0.67	0.06	0.53	0.30	0.69	0.44
Control Delay	34.8	49.7	0.7	33.7	19.2	8.5	34.7	4.6	17.6	8.9
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	34.8	49.7	0.7	33.7	19.2	8.5	34.7	4.6	17.6	8.9
Queue Length 50th (ft)	70	87	0	90	53	5	140	0	87	80
Queue Length 95th (ft)	103	122	0	138	105	8	179	36	126	108
Internal Link Dist (ft)		1034			900		1974			1152
Turn Bay Length (ft)	165		145	145		150		100	330	
Base Capacity (vph)	276	421	391	353	729	418	906	542	675	1920
Starvation Cap Reductn	0	0	0	0	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0	0	0	0	0
Reduced v/c Ratio	0.53	0.63	0.12	0.52	0.67	0.05	0.53	0.30	0.69	0.44

Intersection Summary



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	113	227	32	154	155	259	11	410	154	430	630	101
Future Volume (veh/h)	113	227	32	154	155	259	11	410	154	430	630	101
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	145	267	48	183	174	312	22	482	160	467	724	128
Peak Hour Factor	0.78	0.85	0.66	0.84	0.89	0.83	0.50	0.85	0.96	0.92	0.87	0.79
Percent Heavy Veh, %	2	2	2	2	2	2	2	2	2	2	2	2
Cap, veh/h	265	446	167	356	256	228	488	899	401	727	1549	274
Arrive On Green	0.11	0.13	0.11	0.13	0.14	0.12	0.05	0.25	0.25	0.62	1.00	0.99
Sat Flow, veh/h	1781	3554	1585	1781	1777	1585	1781	3554	1585	1781	3018	533
Grp Volume(v), veh/h	145	267	48	183	174	312	22	482	160	467	426	426
Grp Sat Flow(s),veh/h/ln	1781	1777	1585	1781	1777	1585	1781	1777	1585	1781	1777	1774
Q Serve(g_s), s	6.8	7.1	2.8	8.6	9.3	14.4	0.5	11.7	5.5	0.1	0.0	0.2
Cycle Q Clear(g_c), s	6.8	7.1	2.8	8.6	9.3	14.4	0.5	11.7	5.5	0.1	0.0	0.2
Prop In Lane	1.00		1.00	1.00		1.00	1.00		1.00	1.00		0.30
Lane Grp Cap(c), veh/h	265	446	167	356	256	228	488	899	401	727	912	911
V/C Ratio(X)	0.55	0.60	0.29	0.51	0.68	1.37	0.05	0.54	0.40	0.64	0.47	0.47
Avail Cap(c_a), veh/h	275	446	167	386	256	228	587	899	401	727	912	911
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	2.00	2.00	2.00
Upstream Filter(I)	1.00	1.00	1.00	0.99	0.99	0.99	0.57	0.57	0.57	0.90	0.90	0.90
Uniform Delay (d), s/veh	32.8	41.3	41.3	31.5	40.6	43.8	9.8	32.3	13.2	11.7	0.0	0.1
Incr Delay (d2), s/veh	2.1	3.4	2.0	1.1	7.0	190.4	0.0	1.3	1.7	1.7	1.5	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(50%),veh/ln	3.0	3.3	1.2	3.7	4.5	17.7	0.2	5.0	3.2	4.4	0.4	0.4
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	34.9	44.7	43.3	32.6	47.6	234.2	9.8	33.6	14.9	13.5	1.5	1.6
LnGrp LOS	C	D	D	C	D	F	A	C	B	B	A	A
Approach Vol, veh/h		460			669			664			1319	
Approach Delay, s/veh		41.5			130.5			28.3			5.8	
Approach LOS		D			F			C			A	

Timer - Assigned Phs	1	2	3	4	5	6	7	8
Phs Duration (G+Y+Rc), s	9.4	56.1	15.4	19.0	35.6	30.0	17.3	17.1
Change Period (Y+Rc), s	* 6.7	6.8	6.6	6.6	* 6.8	6.7	6.6	6.6
Max Green Setting (Gmax), s	* 8.3	43.2	9.4	12.4	* 28	23.3	12.4	9.4
Max Q Clear Time (g_c+I1), s	2.5	2.2	8.8	16.4	2.1	13.7	10.6	9.1
Green Ext Time (p_c), s	0.0	3.6	0.0	0.0	1.9	2.0	0.1	0.1

Intersection Summary	
HCM 6th Ctrl Delay	42.7
HCM 6th LOS	D

Notes

* HCM 6th computational engine requires equal clearance times for the phases crossing the barrier.

APPENDIX C

Existing plus Approved Development Conditions

Trip Generation

Land Use: 130
Industrial Park

Description

An industrial park contains a number of industrial or related facilities. It is characterized by a mix of manufacturing, service, and warehouse facilities with a wide variation in the proportion of each type of use from one location to another. Many industrial parks contain highly diversified facilities—some with a large number of small businesses and others with one or two dominant industries. General light industrial (Land Use 110) and manufacturing (Land Use 140) are related uses.

Additional Data

The sites were surveyed in the 1980s, the 2000s, and the 2010s in California, Georgia, New Jersey, New York, Ontario (CAN), and Pennsylvania.

Source Numbers

106, 162, 184, 251, 277, 422, 706, 747, 753, 937

Trip Generation

Daily Trip Generation

Phase	ITE Code/Page	Land Use	Size		Trip Gen. Avg. Rate/Eq.	Daily Trips	Trip Distribution Enter	Trip Distribution Exit	Daily Trips Enter	Daily Trips Exit
Full Build	130	Industrial Park	795,960	SF	Equation	2,762	50%	50%	1,381	1,381
Total						**2,762**			**1,381**	**1,381**

AM Peak Hour Trip Generation (Peak Hour of Adjacent Street Traffic, 7-9 AM)

Phase	ITE Code/Page	Land Use	Size		Trip Gen. Avg. Rate/Eq.	AM Peak Hour Trips	Trip Distribution Enter	Trip Distribution Exit	AM Peak Hour Trips Enter	AM Peak Hour Trips Exit
1	130	Industrial Park	431,460	SF	Average Rate	173	81%	19%	140	33
2	130	Industrial Park	113,400	SF	Average Rate	46	81%	19%	37	9
2	130	Industrial Park	251,100	SF	Average Rate	101	81%	19%	82	19
Total						**320**			**259**	**61**

PM Peak Hour Trip Generation (Peak Hour of Adjacent Street Traffic, 4-6 PM)

Phase	ITE Code/Page	Land Use	Size		Trip Gen. Avg. Rate/Eq.	PM Peak Hour Trips	Trip Distribution Enter	Trip Distribution Exit	PM Peak Hour Trips Enter	PM Peak Hour Trips Exit
1	130	Industrial Park	431,460	SF	Average Rate	173	21%	79%	36	137
2	130	Industrial Park	113,400	SF	Average Rate	46	21%	79%	10	36
2	130	Industrial Park	251,100	SF	Average Rate	101	21%	79%	21	80
Total						**320**			**67**	**253**

		TRIPS BY VEHICLE TYPE					
		Total		**Passenger Vehicle**		**Truck**	
		Enter	**Exit**	**Enter**	**Exit**	**Enter**	**Exit**
AM Peak Hour	Code/Page						
	130	140	33	98	23	42	10
	130	37	9	26	6	11	3
	130	82	19	57	13	25	6
	Total	**259**	**61**	**181**	**43**	**78**	**18**
PM Peak Hour	Code/Page						
	130	36	137	25	96	11	41
	130	10	36	7	25	3	11
	130	21	80	15	56	6	24
	Total	**67**	**253**	**47**	**177**	**20**	**76**

Table 4. Weighted Averages for Percentage of Total Daily Vehicles that are Cars, by Type of HCW

Type of High-Cube Warehouse	Cars as Percentage of Total Vehicles		
	Daily	AM Peak Hour	PM Peak Hour
Short-Term Storage, Transload & Cold Storage (100)	67.8%	69.2%	78.3%
Fulfillment Center (1)	91.2	97.2	98.2
Parcel Hub (1)	62.3	50.3	70.7

Note: The values in parentheses represent the number of data collection sites for HCW type.

[8] This section presents key analysis findings. Appendix A presents additional analyses of the HCW data.

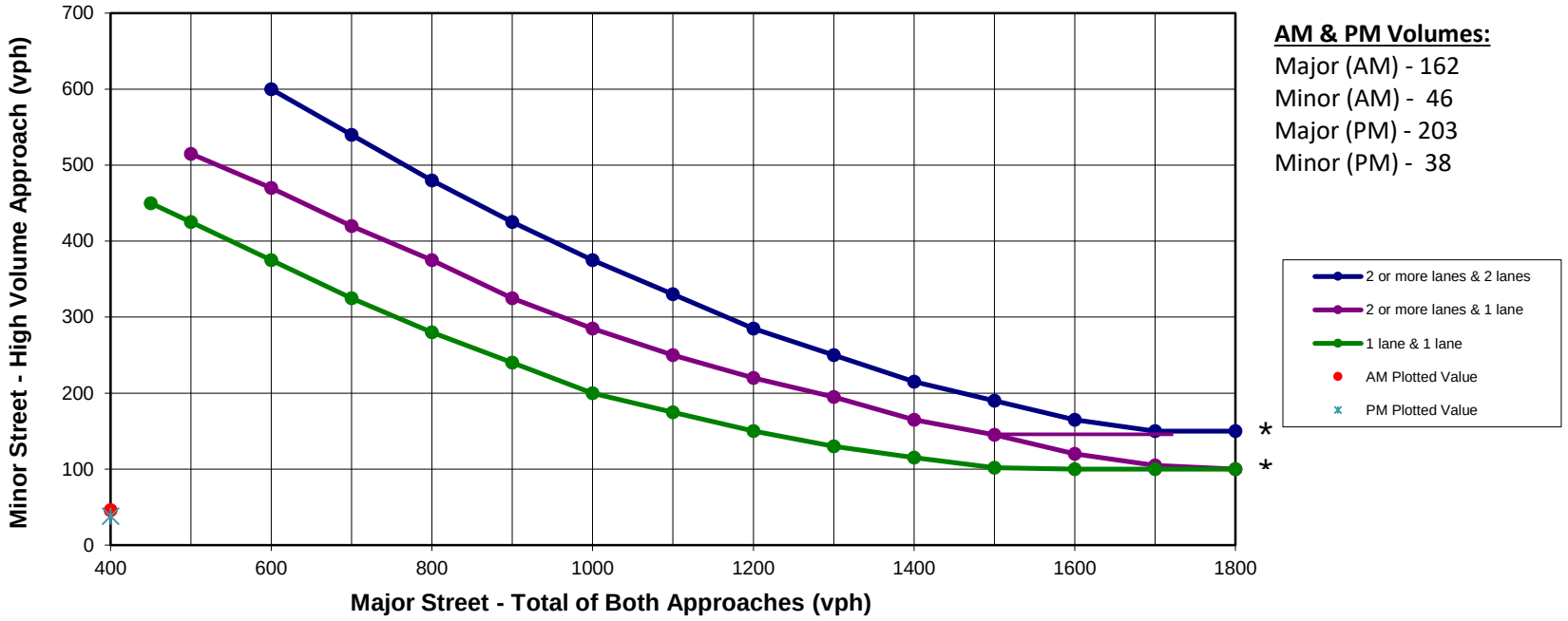
[9] Sites were classified as cold storage either through self-categorization by data submitter (e.g., Walmart), by type of tenant (e.g., Ralphs, Publix), or by online site description (e.g., Americold, Millard Refrigeration Services).

APPENDIX D

Existing Plus Approved plus Phase 1 Development Conditions

Signal Warrants

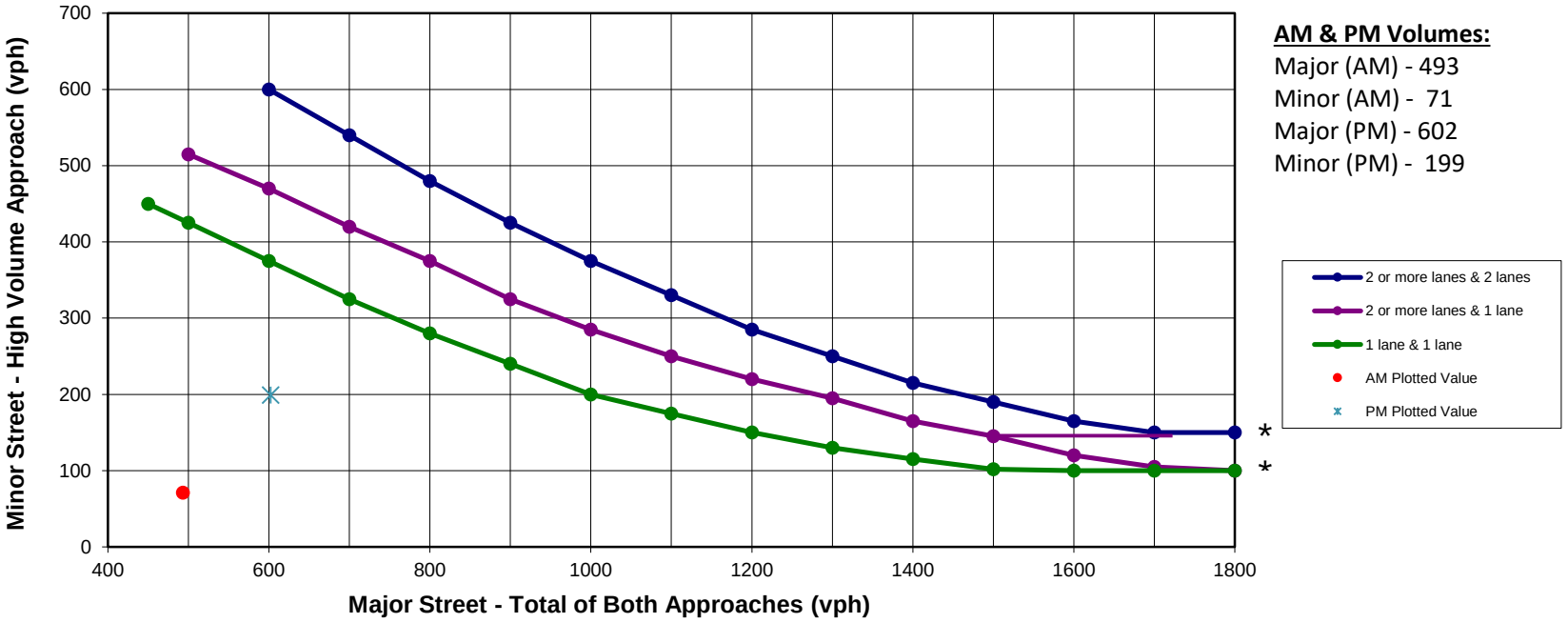
Peak Hour Volume Warrant (Existing plus Approved plus Phase 1 Conditions)
Main Street and Sloan Street



AM & PM Volumes:
Major (AM) - 162
Minor (AM) - 46
Major (PM) - 203
Minor (PM) - 38

*Note: 150 vph applies as the lower threshold volume for a minor street approach with two or more lanes and 100 vph applies as the lower threshold volume for a minor street approach with one lane.

Peak Hour Volume Warrant (Existing plus Approved plus Phase 1 Conditions)
Tudor Road and Main Street



AM & PM Volumes:

Major (AM) - 493
Minor (AM) - 71
Major (PM) - 602
Minor (PM) - 199

*Note: 150 vph applies as the lower threshold volume for a minor street approach with two or more lanes and 100 vph applies as the lower threshold volume for a minor street approach with one lane.

Capacity Analysis

Intersection	
Int Delay, s/veh	2.4

Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Traffic Vol, veh/h	23	23	85	31	6	40
Future Vol, veh/h	23	23	85	31	6	40
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Stop	Stop	Free	Free	Free	Free
RT Channelized	-	None	-	None	-	None
Storage Length	0	-	-	-	-	-
Veh in Median Storage, #	0	-	0	-	-	0
Grade, %	0	-	0	-	-	0
Peak Hour Factor	78	78	83	83	78	78
Heavy Vehicles, %	2	9	20	2	30	10
Mvmt Flow	29	29	102	37	8	51

Major/Minor	Minor1		Major1		Major2	
Conflicting Flow All	188	121	0	0	139	0
Stage 1	121	-	-	-	-	-
Stage 2	67	-	-	-	-	-
Critical Hdwy	6.42	6.29	-	-	4.4	-
Critical Hdwy Stg 1	5.42	-	-	-	-	-
Critical Hdwy Stg 2	5.42	-	-	-	-	-
Follow-up Hdwy	3.518	3.381	-	-	2.47	-
Pot Cap-1 Maneuver	801	912	-	-	1289	-
Stage 1	904	-	-	-	-	-
Stage 2	956	-	-	-	-	-
Platoon blocked, %			-	-		-
Mov Cap-1 Maneuver	796	912	-	-	1289	-
Mov Cap-2 Maneuver	796	-	-	-	-	-
Stage 1	904	-	-	-	-	-
Stage 2	950	-	-	-	-	-

Approach	WB	NB	SB
HCM Control Delay, s	9.6	0	1
HCM LOS	A		

Minor Lane/Major Mvmt	NBT	NBR	WBLn1	SBL	SBT
Capacity (veh/h)	-	-	850	1289	-
HCM Lane V/C Ratio	-	-	0.069	0.006	-
HCM Control Delay (s)	-	-	9.6	7.8	0
HCM Lane LOS	-	-	A	A	A
HCM 95th %tile Q(veh)	-	-	0.2	0	-

Intersection	
Int Delay, s/veh	2.2

Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Traffic Vol, veh/h	1	13	54	115	58	5
Future Vol, veh/h	1	13	54	115	58	5
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Stop	Stop	Free	Free	Free	Free
RT Channelized	-	None	-	None	-	None
Storage Length	0	-	150	-	-	-
Veh in Median Storage, #	0	-	-	0	0	-
Grade, %	0	-	-	0	0	-
Peak Hour Factor	78	78	86	86	79	79
Heavy Vehicles, %	2	30	30	15	30	2
Mvmt Flow	1	17	63	134	73	6

Major/Minor	Minor2		Major1		Major2	
Conflicting Flow All	336	76	79	0	-	0
Stage 1	76	-	-	-	-	-
Stage 2	260	-	-	-	-	-
Critical Hdwy	6.42	6.5	4.4	-	-	-
Critical Hdwy Stg 1	5.42	-	-	-	-	-
Critical Hdwy Stg 2	5.42	-	-	-	-	-
Follow-up Hdwy	3.518	3.57	2.47	-	-	-
Pot Cap-1 Maneuver	659	913	1360	-	-	-
Stage 1	947	-	-	-	-	-
Stage 2	783	-	-	-	-	-
Platoon blocked, %				-	-	-
Mov Cap-1 Maneuver	629	913	1360	-	-	-
Mov Cap-2 Maneuver	629	-	-	-	-	-
Stage 1	903	-	-	-	-	-
Stage 2	783	-	-	-	-	-

Approach	EB	NB	SB
HCM Control Delay, s	9.2	2.5	0
HCM LOS	A		

Minor Lane/Major Mvmt	NBL	NBT	EBLn1	SBT	SBR
Capacity (veh/h)	1360	-	884	-	-
HCM Lane V/C Ratio	0.046	-	0.02	-	-
HCM Control Delay (s)	7.8	-	9.2	-	-
HCM Lane LOS	A	-	A	-	-
HCM 95th %tile Q(veh)	0.1	-	0.1	-	-

Intersection	
Int Delay, s/veh	6.3

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Vol, veh/h	100	100	23	78	134	58	11	11	42	32	9	30
Future Vol, veh/h	100	100	23	78	134	58	11	11	42	32	9	30
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	185	-	-	110	-	150	150	-	-	150	-	-
Veh in Median Storage, #	-	0	-	-	0	-	-	0	-	-	0	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	78	89	58	81	69	78	69	38	55	67	67	67
Heavy Vehicles, %	35	2	2	2	2	9	2	2	10	6	2	25
Mvmt Flow	128	112	40	96	194	74	16	29	76	48	13	45

Major/Minor	Major1			Major2			Minor1			Minor2		
Conflicting Flow All	268	0	0	152	0	0	684	848	76	713	794	97
Stage 1	-	-	-	-	-	-	388	388	-	386	386	-
Stage 2	-	-	-	-	-	-	296	460	-	327	408	-
Critical Hdwy	4.8	-	-	4.14	-	-	7.54	6.54	7.1	7.62	6.54	7.4
Critical Hdwy Stg 1	-	-	-	-	-	-	6.54	5.54	-	6.62	5.54	-
Critical Hdwy Stg 2	-	-	-	-	-	-	6.54	5.54	-	6.62	5.54	-
Follow-up Hdwy	2.55	-	-	2.22	-	-	3.52	4.02	3.4	3.56	4.02	3.55
Pot Cap-1 Maneuver	1084	-	-	1426	-	-	335	297	945	312	319	871
Stage 1	-	-	-	-	-	-	607	607	-	598	609	-
Stage 2	-	-	-	-	-	-	688	564	-	649	595	-
Platoon blocked, %		-	-		-	-						
Mov Cap-1 Maneuver	1084	-	-	1426	-	-	264	244	945	226	263	871
Mov Cap-2 Maneuver	-	-	-	-	-	-	264	244	-	226	263	-
Stage 1	-	-	-	-	-	-	535	535	-	527	568	-
Stage 2	-	-	-	-	-	-	594	526	-	498	525	-

Approach	EB	WB	NB	SB
HCM Control Delay, s	4	2	14.3	18
HCM LOS			B	C

Minor Lane/Major Mvmt	NBLn1	NBLn2	EBL	EBT	EBR	WBL	WBT	WBR	SBLn1	SBLn2
Capacity (veh/h)	264	528	1084	-	-	1426	-	-	226	568
HCM Lane V/C Ratio	0.06	0.199	0.118	-	-	0.068	-	-	0.211	0.102
HCM Control Delay (s)	19.5	13.5	8.8	-	-	7.7	-	-	25.1	12.1
HCM Lane LOS	C	B	A	-	-	A	-	-	D	B
HCM 95th %tile Q(veh)	0.2	0.7	0.4	-	-	0.2	-	-	0.8	0.3

Intersection	
Int Delay, s/veh	3.2

Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations						
Traffic Vol, veh/h	33	1	51	57	0	13
Future Vol, veh/h	33	1	51	57	0	13
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Stop	Stop
RT Channelized	-	None	-	None	-	None
Storage Length	-	-	150	-	0	-
Veh in Median Storage, #	0	-	-	0	0	-
Grade, %	0	-	-	0	0	-
Peak Hour Factor	78	78	83	83	78	78
Heavy Vehicles, %	6	2	25	20	2	30
Mvmt Flow	42	1	61	69	0	17

Major/Minor	Major1		Major2		Minor1	
Conflicting Flow All	0	0	43	0	234	43
Stage 1	-	-	-	-	43	-
Stage 2	-	-	-	-	191	-
Critical Hdwy	-	-	4.35	-	6.42	6.5
Critical Hdwy Stg 1	-	-	-	-	5.42	-
Critical Hdwy Stg 2	-	-	-	-	5.42	-
Follow-up Hdwy	-	-	2.425	-	3.518	3.57
Pot Cap-1 Maneuver	-	-	1430	-	754	953
Stage 1	-	-	-	-	979	-
Stage 2	-	-	-	-	841	-
Platoon blocked, %	-	-		-		
Mov Cap-1 Maneuver	-	-	1430	-	722	953
Mov Cap-2 Maneuver	-	-	-	-	722	-
Stage 1	-	-	-	-	979	-
Stage 2	-	-	-	-	805	-

Approach	EB	WB	NB
HCM Control Delay, s	0	3.6	8.8
HCM LOS			A

Minor Lane/Major Mvmt	NBLn1	EBT	EBR	WBL	WBT
Capacity (veh/h)	953	-	-	1430	-
HCM Lane V/C Ratio	0.017	-	-	0.043	-
HCM Control Delay (s)	8.8	-	-	7.6	-
HCM Lane LOS	A	-	-	A	-
HCM 95th %tile Q(veh)	0.1	-	-	0.1	-

Intersection	
Int Delay, s/veh	2.6

Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations						
Traffic Vol, veh/h	29	4	25	32	1	5
Future Vol, veh/h	29	4	25	32	1	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	78	78	78	78	78	78
Heavy Vehicles, %	2	2	45	2	2	45
Mvmt Flow	37	5	32	41	1	6

Major/Minor	Major1		Major2		Minor1	
Conflicting Flow All	0	0	42	0	145	40
Stage 1	-	-	-	-	40	-
Stage 2	-	-	-	-	105	-
Critical Hdwy	-	-	4.55	-	6.42	6.65
Critical Hdwy Stg 1	-	-	-	-	5.42	-
Critical Hdwy Stg 2	-	-	-	-	5.42	-
Follow-up Hdwy	-	-	2.605	-	3.518	3.705
Pot Cap-1 Maneuver	-	-	1331	-	847	921
Stage 1	-	-	-	-	982	-
Stage 2	-	-	-	-	919	-
Platoon blocked, %	-	-		-		
Mov Cap-1 Maneuver	-	-	1331	-	826	921
Mov Cap-2 Maneuver	-	-	-	-	826	-
Stage 1	-	-	-	-	982	-
Stage 2	-	-	-	-	896	-

Approach	EB	WB	NB
HCM Control Delay, s	0	3.4	9
HCM LOS			A

Minor Lane/Major Mvmt	NBLn1	EBT	EBR	WBL	WBT
Capacity (veh/h)	904	-	-	1331	-
HCM Lane V/C Ratio	0.009	-	-	0.024	-
HCM Control Delay (s)	9	-	-	7.8	0
HCM Lane LOS	A	-	-	A	A
HCM 95th %tile Q(veh)	0	-	-	0.1	-

Lane Group	WBL	WBR	NBT	NBR	SBL	SBT
Lane Group Flow (vph)	112	125	160	144	172	128
v/c Ratio	0.24	0.26	0.09	0.16	0.33	0.08
Control Delay	11.4	4.5	6.4	2.2	9.4	6.4
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	11.4	4.5	6.4	2.2	9.4	6.4
Queue Length 50th (ft)	12	0	7	0	19	6
Queue Length 95th (ft)	34	15	17	7	46	12
Internal Link Dist (ft)	2524		1483			1982
Turn Bay Length (ft)				90	150	
Base Capacity (vph)	808	757	3314	1491	957	3018
Starvation Cap Reductn	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0
Reduced v/c Ratio	0.14	0.17	0.05	0.10	0.18	0.04

Intersection Summary

Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Traffic Volume (veh/h)	77	91	131	89	141	86
Future Volume (veh/h)	77	91	131	89	141	86
Initial Q (Qb), veh	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00	1.00		1.00	1.00	
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach	No		No			No
Adj Sat Flow, veh/h/ln	1841	1767	1870	1870	1589	1722
Adj Flow Rate, veh/h	112	125	160	144	172	128
Peak Hour Factor	0.69	0.73	0.82	0.62	0.82	0.67
Percent Heavy Veh, %	4	9	2	2	21	12
Cap, veh/h	438	374	1185	529	549	1091
Arrive On Green	0.25	0.25	0.33	0.33	0.33	0.33
Sat Flow, veh/h	1753	1497	3647	1585	913	3358
Grp Volume(v), veh/h	112	125	160	144	172	128
Grp Sat Flow(s),veh/h/ln	1753	1497	1777	1585	913	1636
Q Serve(g_s), s	1.4	1.8	0.8	1.8	4.3	0.7
Cycle Q Clear(g_c), s	1.4	1.8	0.8	1.8	5.1	0.7
Prop In Lane	1.00	1.00		1.00	1.00	
Lane Grp Cap(c), veh/h	438	374	1185	529	549	1091
V/C Ratio(X)	0.26	0.33	0.13	0.27	0.31	0.12
Avail Cap(c_a), veh/h	963	822	3971	1771	1265	3656
HCM Platoon Ratio	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
Uniform Delay (d), s/veh	7.9	8.1	6.1	6.4	7.9	6.1
Incr Delay (d2), s/veh	0.3	0.5	0.1	0.3	0.3	0.0
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	0.3	0.4	0.2	0.3	0.5	0.1
Unsig. Movement Delay, s/veh						
LnGrp Delay(d),s/veh	8.2	8.6	6.2	6.7	8.2	6.1
LnGrp LOS	A	A	A	A	A	A
Approach Vol, veh/h	237		304			300
Approach Delay, s/veh	8.4		6.4			7.3
Approach LOS	A		A			A

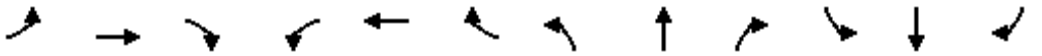
Timer - Assigned Phs		2		4		6
Phs Duration (G+Y+Rc), s		14.3		12.1		14.3
Change Period (Y+Rc), s		5.5		5.5		5.5
Max Green Setting (Gmax), s		29.5		14.5		29.5
Max Q Clear Time (g_c+I1), s		7.1		3.8		3.8
Green Ext Time (p_c), s		1.7		0.5		1.4

Intersection Summary	
HCM 6th Ctrl Delay	7.3
HCM 6th LOS	A

Lane Group	EBL	EBT	WBL	WBT	NBL	NBT	NBR	SBL	SBT	SBR
Lane Group Flow (vph)	93	36	24	48	92	843	20	24	652	136
v/c Ratio	0.51	0.07	0.12	0.18	0.15	0.32	0.02	0.05	0.28	0.13
Control Delay	44.0	0.2	32.5	14.0	1.5	4.2	0.3	1.2	4.9	1.0
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	44.0	0.2	32.5	14.0	1.5	4.2	0.3	1.2	4.9	1.0
Queue Length 50th (ft)	49	0	12	4	3	16	0	0	30	0
Queue Length 95th (ft)	75	0	22	3	m5	185	m0	4	80	6
Internal Link Dist (ft)		501		409		1152			1009	
Turn Bay Length (ft)	115		60		250		115	215		120
Base Capacity (vph)	268	629	293	380	636	2605	1190	553	2310	1070
Starvation Cap Reductn	0	0	0	0	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0	0	0	0	0
Reduced v/c Ratio	0.35	0.06	0.08	0.13	0.14	0.32	0.02	0.04	0.28	0.13

Intersection Summary

m Volume for 95th percentile queue is metered by upstream signal.



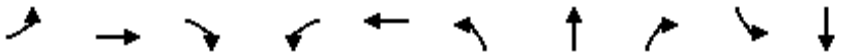
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	70	0	21	15	3	21	73	700	9	18	548	116
Future Volume (veh/h)	70	0	21	15	3	21	73	700	9	18	548	116
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		1.00	1.00		1.00	1.00		1.00	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	1752	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870	1856
Adj Flow Rate, veh/h	93	0	36	24	8	40	92	843	20	24	652	136
Peak Hour Factor	0.75	1.00	0.58	0.63	0.38	0.53	0.79	0.83	0.45	0.75	0.84	0.85
Percent Heavy Veh, %	10	2	2	2	2	2	2	2	2	2	2	3
Cap, veh/h	219	0	215	238	37	184	751	2389	1065	567	1824	807
Arrive On Green	0.14	0.00	0.12	0.14	0.14	0.12	0.36	1.00	1.00	0.07	1.00	1.00
Sat Flow, veh/h	1271	0	1585	1372	271	1355	1781	3554	1585	1781	3554	1572
Grp Volume(v), veh/h	93	0	36	24	0	48	92	843	20	24	652	136
Grp Sat Flow(s),veh/h/ln	1271	0	1585	1372	0	1626	1781	1777	1585	1781	1777	1572
Q Serve(g_s), s	6.3	0.0	1.8	1.4	0.0	2.4	0.0	0.0	0.0	0.4	0.0	0.0
Cycle Q Clear(g_c), s	8.7	0.0	1.8	3.3	0.0	2.4	0.0	0.0	0.0	0.4	0.0	0.0
Prop In Lane	1.00		1.00	1.00		0.83	1.00		1.00	1.00		1.00
Lane Grp Cap(c), veh/h	219	0	215	238	0	220	751	2389	1065	567	1824	807
V/C Ratio(X)	0.43	0.00	0.17	0.10	0.00	0.22	0.12	0.35	0.02	0.04	0.36	0.17
Avail Cap(c_a), veh/h	319	0	340	346	0	349	751	2389	1065	672	1824	807
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	2.00	2.00	2.00	2.00	2.00	2.00
Upstream Filter(I)	1.00	0.00	1.00	1.00	0.00	1.00	0.91	0.91	0.91	0.96	0.96	0.96
Uniform Delay (d), s/veh	38.5	0.0	35.0	35.9	0.0	35.1	3.9	0.0	0.0	4.0	0.0	0.0
Incr Delay (d2), s/veh	1.3	0.0	0.4	0.2	0.0	0.5	0.0	0.4	0.0	0.0	0.5	0.4
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(50%),veh/ln	2.0	0.0	0.7	0.5	0.0	1.0	0.3	0.1	0.0	0.1	0.1	0.1
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	39.9	0.0	35.4	36.0	0.0	35.6	3.9	0.4	0.0	4.0	0.5	0.4
LnGrp LOS	D	A	D	D	A	D	A	A	A	A	A	A
Approach Vol, veh/h		129			72			955			812	
Approach Delay, s/veh		38.6			35.8			0.7			0.6	
Approach LOS		D			D			A			A	

Timer - Assigned Phs	1	2		4	5	6		8				
Phs Duration (G+Y+Rc), s	22.1	51.0		16.9	7.7	65.4		16.9				
Change Period (Y+Rc), s	* 6	* 6		6.0	5.0	* 6		6.0				
Max Green Setting (Gmax), s	* 10	* 45		18.0	8.0	* 47		18.0				
Max Q Clear Time (g_c+I1), s	2.0	2.0		5.3	2.4	2.0		10.7				
Green Ext Time (p_c), s	0.0	3.7		0.2	0.0	4.3		0.3				

Intersection Summary	
HCM 6th Ctrl Delay	4.4
HCM 6th LOS	A

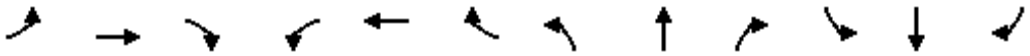
Notes

* HCM 6th computational engine requires equal clearance times for the phases crossing the barrier.



Lane Group	EBL	EBT	EBR	WBL	WBT	NBL	NBT	NBR	SBL	SBT
Lane Group Flow (vph)	83	106	45	177	661	133	543	159	350	454
v/c Ratio	0.35	0.23	0.10	0.49	0.72	0.24	0.43	0.23	0.63	0.28
Control Delay	26.3	35.7	0.5	28.9	14.9	11.4	25.8	2.5	19.5	11.1
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	26.3	35.7	0.5	28.9	14.9	11.4	25.8	2.5	19.5	11.1
Queue Length 50th (ft)	33	28	0	75	52	32	130	0	170	88
Queue Length 95th (ft)	47	49	0	88	51	33	166	0	176	125
Internal Link Dist (ft)		1034			900		1974			1152
Turn Bay Length (ft)	165		145	145		150		100	330	
Base Capacity (vph)	242	521	449	366	985	558	1276	702	625	1613
Starvation Cap Reductn	0	0	0	0	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0	0	0	0	0
Reduced v/c Ratio	0.34	0.20	0.10	0.48	0.67	0.24	0.43	0.23	0.56	0.28

Intersection Summary



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	55	90	17	117	141	314	69	429	105	238	310	86
Future Volume (veh/h)	55	90	17	117	141	314	69	429	105	238	310	86
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	1856	1856	1841	1841	1870	1870	1870	1870	1870	1781	1870	1856
Adj Flow Rate, veh/h	83	106	45	177	199	462	133	543	159	350	326	128
Peak Hour Factor	0.66	0.85	0.38	0.66	0.71	0.68	0.52	0.79	0.66	0.68	0.95	0.67
Percent Heavy Veh, %	3	3	4	4	2	2	2	2	2	8	2	3
Cap, veh/h	237	554	211	459	344	306	527	1182	527	531	1036	399
Arrive On Green	0.09	0.16	0.13	0.13	0.19	0.17	0.10	0.33	0.33	0.06	0.14	0.13
Sat Flow, veh/h	1767	3526	1560	1753	1777	1585	1781	3554	1585	1697	2507	966
Grp Volume(v), veh/h	83	106	45	177	199	462	133	543	159	350	229	225
Grp Sat Flow(s),veh/h/ln	1767	1763	1560	1753	1777	1585	1781	1777	1585	1697	1777	1696
Q Serve(g_s), s	3.3	2.4	1.7	7.2	9.2	17.4	0.0	10.8	6.7	11.2	10.5	10.8
Cycle Q Clear(g_c), s	3.3	2.4	1.7	7.2	9.2	17.4	0.0	10.8	6.7	11.2	10.5	10.8
Prop In Lane	1.00		1.00	1.00		1.00	1.00		1.00	1.00		0.57
Lane Grp Cap(c), veh/h	237	554	211	459	344	306	527	1182	527	531	734	701
V/C Ratio(X)	0.35	0.19	0.21	0.39	0.58	1.51	0.25	0.46	0.30	0.66	0.31	0.32
Avail Cap(c_a), veh/h	245	554	211	481	344	306	527	1182	527	649	734	701
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	0.33	0.33	0.33
Upstream Filter(I)	1.00	1.00	1.00	0.96	0.96	0.96	0.75	0.75	0.75	0.97	0.97	0.97
Uniform Delay (d), s/veh	28.0	33.0	19.1	25.3	33.0	37.3	19.5	23.6	22.3	17.2	27.3	27.6
Incr Delay (d2), s/veh	0.9	0.4	1.1	0.5	2.3	244.1	0.2	1.0	1.1	1.7	1.1	1.2
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(50%),veh/ln	1.4	1.0	0.9	2.9	4.0	27.4	1.8	4.4	2.6	4.8	4.8	4.8
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	28.8	33.3	20.2	25.8	35.3	281.4	19.7	24.6	23.4	18.9	28.4	28.8
LnGrp LOS	C	C	C	C	D	F	B	C	C	B	C	C
Approach Vol, veh/h		234			838			835			804	
Approach Delay, s/veh		29.2			169.0			23.6			24.4	
Approach LOS		C			F			C			C	

Timer - Assigned Phs	1	2	3	4	5	6	7	8
Phs Duration (G+Y+Rc), s	13.4	42.0	12.6	22.0	20.8	34.6	15.9	18.7
Change Period (Y+Rc), s	6.7	* 6.8	6.6	6.6	6.8	* 6.7	6.6	6.6
Max Green Setting (Gmax), s	6.3	* 35	6.4	15.4	20.2	* 21	10.4	11.4
Max Q Clear Time (g_c+I1), s	2.0	12.8	5.3	19.4	13.2	12.8	9.2	4.4
Green Ext Time (p_c), s	0.1	1.7	0.0	0.0	0.8	2.1	0.1	0.5

Intersection Summary	
HCM 6th Ctrl Delay	69.3
HCM 6th LOS	E

Notes

* HCM 6th computational engine requires equal clearance times for the phases crossing the barrier.

Intersection	
Int Delay, s/veh	2.3

Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Traffic Vol, veh/h	32	6	45	21	22	115
Future Vol, veh/h	32	6	45	21	22	115
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Stop	Stop	Free	Free	Free	Free
RT Channelized	-	None	-	None	-	None
Storage Length	0	-	-	-	-	-
Veh in Median Storage, #	0	-	0	-	-	0
Grade, %	0	-	0	-	-	0
Peak Hour Factor	78	78	79	79	84	84
Heavy Vehicles, %	2	30	10	2	30	15
Mvmt Flow	41	8	57	27	26	137

Major/Minor	Minor1		Major1		Major2	
Conflicting Flow All	260	71	0	0	84	0
Stage 1	71	-	-	-	-	-
Stage 2	189	-	-	-	-	-
Critical Hdwy	6.42	6.5	-	-	4.4	-
Critical Hdwy Stg 1	5.42	-	-	-	-	-
Critical Hdwy Stg 2	5.42	-	-	-	-	-
Follow-up Hdwy	3.518	3.57	-	-	2.47	-
Pot Cap-1 Maneuver	729	919	-	-	1354	-
Stage 1	952	-	-	-	-	-
Stage 2	843	-	-	-	-	-
Platoon blocked, %			-	-		-
Mov Cap-1 Maneuver	714	919	-	-	1354	-
Mov Cap-2 Maneuver	714	-	-	-	-	-
Stage 1	952	-	-	-	-	-
Stage 2	825	-	-	-	-	-

Approach	WB	NB	SB
HCM Control Delay, s	10.2	0	1.2
HCM LOS	B		

Minor Lane/Major Mvmt	NBT	NBR	WBLn1	SBL	SBT
Capacity (veh/h)	-	-	740	1354	-
HCM Lane V/C Ratio	-	-	0.066	0.019	-
HCM Control Delay (s)	-	-	10.2	7.7	0
HCM Lane LOS	-	-	B	A	A
HCM 95th %tile Q(veh)	-	-	0.2	0.1	-

Intersection	
Int Delay, s/veh	2.6

Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Traffic Vol, veh/h	5	53	15	61	146	1
Future Vol, veh/h	5	53	15	61	146	1
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Stop	Stop	Free	Free	Free	Free
RT Channelized	-	None	-	None	-	None
Storage Length	0	-	150	-	-	-
Veh in Median Storage, #	0	-	-	0	0	-
Grade, %	0	-	-	0	0	-
Peak Hour Factor	78	78	78	78	85	85
Heavy Vehicles, %	2	30	30	10	10	2
Mvmt Flow	6	68	19	78	172	1

Major/Minor	Minor2		Major1		Major2	
Conflicting Flow All	289	173	173	0	-	0
Stage 1	173	-	-	-	-	-
Stage 2	116	-	-	-	-	-
Critical Hdwy	6.42	6.5	4.4	-	-	-
Critical Hdwy Stg 1	5.42	-	-	-	-	-
Critical Hdwy Stg 2	5.42	-	-	-	-	-
Follow-up Hdwy	3.518	3.57	2.47	-	-	-
Pot Cap-1 Maneuver	702	803	1251	-	-	-
Stage 1	857	-	-	-	-	-
Stage 2	909	-	-	-	-	-
Platoon blocked, %				-	-	-
Mov Cap-1 Maneuver	691	803	1251	-	-	-
Mov Cap-2 Maneuver	691	-	-	-	-	-
Stage 1	844	-	-	-	-	-
Stage 2	909	-	-	-	-	-

Approach	EB	NB	SB
HCM Control Delay, s	10	1.6	0
HCM LOS	B		

Minor Lane/Major Mvmt	NBL	NBT	EBLn1	SBT	SBR
Capacity (veh/h)	1251	-	792	-	-
HCM Lane V/C Ratio	0.015	-	0.094	-	-
HCM Control Delay (s)	7.9	-	10	-	-
HCM Lane LOS	A	-	B	-	-
HCM 95th %tile Q(veh)	0	-	0.3	-	-

Intersection	
Int Delay, s/veh	5.7

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Vol, veh/h	37	261	33	40	196	35	18	4	67	83	8	108
Future Vol, veh/h	37	261	33	40	196	35	18	4	67	83	8	108
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	185	-	-	110	-	150	150	-	-	150	-	-
Veh in Median Storage, #	-	0	-	-	0	-	-	0	-	-	0	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	69	90	83	70	79	60	90	75	64	83	83	83
Heavy Vehicles, %	20	2	3	3	2	3	2	2	2	8	2	28
Mvmt Flow	54	290	40	57	248	58	20	5	105	100	10	130

Major/Minor	Major1			Major2			Minor1			Minor2		
Conflicting Flow All	306	0	0	330	0	0	661	838	165	618	800	124
Stage 1	-	-	-	-	-	-	418	418	-	362	362	-
Stage 2	-	-	-	-	-	-	243	420	-	256	438	-
Critical Hdwy	4.5	-	-	4.16	-	-	7.54	6.54	6.94	7.66	6.54	7.46
Critical Hdwy Stg 1	-	-	-	-	-	-	6.54	5.54	-	6.66	5.54	-
Critical Hdwy Stg 2	-	-	-	-	-	-	6.54	5.54	-	6.66	5.54	-
Follow-up Hdwy	2.4	-	-	2.23	-	-	3.52	4.02	3.32	3.58	4.02	3.58
Pot Cap-1 Maneuver	1131	-	-	1219	-	-	348	301	850	361	317	827
Stage 1	-	-	-	-	-	-	583	589	-	613	624	-
Stage 2	-	-	-	-	-	-	739	588	-	709	577	-
Platoon blocked, %		-	-		-	-						
Mov Cap-1 Maneuver	1131	-	-	1219	-	-	266	273	850	290	288	827
Mov Cap-2 Maneuver	-	-	-	-	-	-	266	273	-	290	288	-
Stage 1	-	-	-	-	-	-	555	561	-	584	595	-
Stage 2	-	-	-	-	-	-	584	560	-	586	549	-

Approach	EB	WB	NB	SB
HCM Control Delay, s	1.2	1.3	11.8	16.4
HCM LOS			B	C

Minor Lane/Major Mvmt	NBLn1	NBLn2	EBL	EBT	EBR	WBL	WBT	WBR	SBLn1	SBLn2
Capacity (veh/h)	266	771	1131	-	-	1219	-	-	290	732
HCM Lane V/C Ratio	0.075	0.143	0.047	-	-	0.047	-	-	0.345	0.191
HCM Control Delay (s)	19.6	10.4	8.3	-	-	8.1	-	-	23.8	11.1
HCM Lane LOS	C	B	A	-	-	A	-	-	C	B
HCM 95th %tile Q(veh)	0.2	0.5	0.1	-	-	0.1	-	-	1.5	0.7

Intersection	
Int Delay, s/veh	3.2

Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations						
Traffic Vol, veh/h	86	1	13	38	2	51
Future Vol, veh/h	86	1	13	38	2	51
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Stop	Stop
RT Channelized	-	None	-	None	-	None
Storage Length	-	-	150	-	0	-
Veh in Median Storage, #	0	-	-	0	0	-
Grade, %	0	-	-	0	0	-
Peak Hour Factor	80	80	78	78	78	78
Heavy Vehicles, %	15	2	25	10	2	30
Mvmt Flow	108	1	17	49	3	65

Major/Minor	Major1		Major2		Minor1	
Conflicting Flow All	0	0	109	0	192	109
Stage 1	-	-	-	-	109	-
Stage 2	-	-	-	-	83	-
Critical Hdwy	-	-	4.35	-	6.42	6.5
Critical Hdwy Stg 1	-	-	-	-	5.42	-
Critical Hdwy Stg 2	-	-	-	-	5.42	-
Follow-up Hdwy	-	-	2.425	-	3.518	3.57
Pot Cap-1 Maneuver	-	-	1350	-	797	874
Stage 1	-	-	-	-	916	-
Stage 2	-	-	-	-	940	-
Platoon blocked, %	-	-		-		
Mov Cap-1 Maneuver	-	-	1350	-	787	874
Mov Cap-2 Maneuver	-	-	-	-	787	-
Stage 1	-	-	-	-	916	-
Stage 2	-	-	-	-	928	-

Approach	EB	WB	NB
HCM Control Delay, s	0	2	9.5
HCM LOS			A

Minor Lane/Major Mvmt	NBLn1	EBT	EBR	WBL	WBT
Capacity (veh/h)	870	-	-	1350	-
HCM Lane V/C Ratio	0.078	-	-	0.012	-
HCM Control Delay (s)	9.5	-	-	7.7	-
HCM Lane LOS	A	-	-	A	-
HCM 95th %tile Q(veh)	0.3	-	-	0	-

Intersection	
Int Delay, s/veh	2.2

Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations						
Traffic Vol, veh/h	64	0	6	34	3	23
Future Vol, veh/h	64	0	6	34	3	23
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	78	78	78	78	78	78
Heavy Vehicles, %	2	2	50	2	2	45
Mvmt Flow	82	0	8	44	4	29

Major/Minor	Major1		Major2		Minor1	
Conflicting Flow All	0	0	82	0	142	82
Stage 1	-	-	-	-	82	-
Stage 2	-	-	-	-	60	-
Critical Hdwy	-	-	4.6	-	6.42	6.65
Critical Hdwy Stg 1	-	-	-	-	5.42	-
Critical Hdwy Stg 2	-	-	-	-	5.42	-
Follow-up Hdwy	-	-	2.65	-	3.518	3.705
Pot Cap-1 Maneuver	-	-	1261	-	851	871
Stage 1	-	-	-	-	941	-
Stage 2	-	-	-	-	963	-
Platoon blocked, %	-	-		-		
Mov Cap-1 Maneuver	-	-	1261	-	845	871
Mov Cap-2 Maneuver	-	-	-	-	845	-
Stage 1	-	-	-	-	941	-
Stage 2	-	-	-	-	956	-

Approach	EB	WB	NB
HCM Control Delay, s	0	1.2	9.3
HCM LOS			A

Minor Lane/Major Mvmt	NBLn1	EBT	EBR	WBL	WBT
Capacity (veh/h)	868	-	-	1261	-
HCM Lane V/C Ratio	0.038	-	-	0.006	-
HCM Control Delay (s)	9.3	-	-	7.9	0
HCM Lane LOS	A	-	-	A	A
HCM 95th %tile Q(veh)	0.1	-	-	0	-

Lane Group	WBL	WBR	NBT	NBR	SBL	SBT
Lane Group Flow (vph)	241	208	208	167	223	233
v/c Ratio	0.47	0.38	0.15	0.23	0.50	0.17
Control Delay	14.6	4.7	7.5	2.7	13.1	7.5
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	14.6	4.7	7.5	2.7	13.1	7.5
Queue Length 50th (ft)	32	0	11	0	28	13
Queue Length 95th (ft)	64	30	25	11	82	32
Internal Link Dist (ft)	2524		1483			1982
Turn Bay Length (ft)				90	150	
Base Capacity (vph)	748	713	2986	1360	966	3015
Starvation Cap Reductn	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0
Reduced v/c Ratio	0.32	0.29	0.07	0.12	0.23	0.08

Intersection Summary

Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Traffic Volume (veh/h)	152	177	160	117	201	205
Future Volume (veh/h)	152	177	160	117	201	205
Initial Q (Qb), veh	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00	1.00		1.00	1.00	
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach	No		No			No
Adj Sat Flow, veh/h/ln	1870	1678	1856	1856	1841	1870
Adj Flow Rate, veh/h	241	208	208	167	223	233
Peak Hour Factor	0.63	0.85	0.77	0.70	0.90	0.88
Percent Heavy Veh, %	2	15	3	3	4	2
Cap, veh/h	460	367	1334	595	575	1345
Arrive On Green	0.26	0.26	0.38	0.38	0.38	0.38
Sat Flow, veh/h	1781	1422	3618	1572	992	3647
Grp Volume(v), veh/h	241	208	208	167	223	233
Grp Sat Flow(s),veh/h/ln	1781	1422	1763	1572	992	1777
Q Serve(g_s), s	3.5	3.8	1.2	2.2	5.8	1.3
Cycle Q Clear(g_c), s	3.5	3.8	1.2	2.2	7.0	1.3
Prop In Lane	1.00	1.00		1.00	1.00	
Lane Grp Cap(c), veh/h	460	367	1334	595	575	1345
V/C Ratio(X)	0.52	0.57	0.16	0.28	0.39	0.17
Avail Cap(c_a), veh/h	853	681	3435	1532	1165	3463
HCM Platoon Ratio	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
Uniform Delay (d), s/veh	9.6	9.8	6.2	6.5	8.5	6.3
Incr Delay (d2), s/veh	0.9	1.4	0.1	0.3	0.4	0.1
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	1.0	0.9	0.2	0.4	0.8	0.3
Unsig. Movement Delay, s/veh						
LnGrp Delay(d),s/veh	10.6	11.1	6.3	6.8	8.9	6.3
LnGrp LOS	B	B	A	A	A	A
Approach Vol, veh/h	449		375			456
Approach Delay, s/veh	10.8		6.5			7.6
Approach LOS	B		A			A

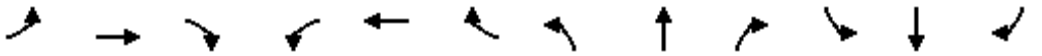
Timer - Assigned Phs		2		4		6
Phs Duration (G+Y+Rc), s		17.0		13.3		17.0
Change Period (Y+Rc), s		5.5		5.5		5.5
Max Green Setting (Gmax), s		29.5		14.5		29.5
Max Q Clear Time (g_c+I1), s		9.0		5.8		4.2
Green Ext Time (p_c), s		2.5		1.0		1.8

Intersection Summary	
HCM 6th Ctrl Delay	8.4
HCM 6th LOS	A

Lane Group	EBL	EBT	WBL	WBT	NBL	NBT	NBR	SBL	SBT	SBR
Lane Group Flow (vph)	121	88	72	60	72	799	44	80	1060	70
v/c Ratio	0.61	0.28	0.35	0.20	0.19	0.34	0.04	0.16	0.46	0.07
Control Delay	51.7	13.5	40.5	13.3	3.0	5.6	0.5	1.8	3.3	0.3
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	51.7	13.5	40.5	13.3	3.0	5.6	0.5	1.8	3.3	0.3
Queue Length 50th (ft)	72	9	41	4	6	99	0	4	58	0
Queue Length 95th (ft)	111	0	49	26	m12	135	m1	10	69	0
Internal Link Dist (ft)		501		409		1152			1009	
Turn Bay Length (ft)	115		60		250		115	215		120
Base Capacity (vph)	264	404	277	386	447	2323	1069	562	2327	1041
Starvation Cap Reductn	0	0	0	0	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0	0	0	0	0
Reduced v/c Ratio	0.46	0.22	0.26	0.16	0.16	0.34	0.04	0.14	0.46	0.07

Intersection Summary

m Volume for 95th percentile queue is metered by upstream signal.



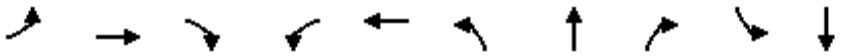
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	98	5	39	42	6	40	56	671	29	68	965	49
Future Volume (veh/h)	98	5	39	42	6	40	56	671	29	68	965	49
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		1.00	1.00		1.00	1.00		1.00	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	1752	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870	1826
Adj Flow Rate, veh/h	121	16	72	72	8	52	72	799	44	80	1060	70
Peak Hour Factor	0.81	0.31	0.54	0.58	0.75	0.77	0.78	0.84	0.66	0.85	0.91	0.70
Percent Heavy Veh, %	10	2	2	2	2	2	2	2	2	2	2	5
Cap, veh/h	235	48	216	221	35	227	485	2268	1012	587	2278	992
Arrive On Green	0.16	0.16	0.15	0.16	0.16	0.15	0.11	1.00	1.00	0.11	1.00	1.00
Sat Flow, veh/h	1258	296	1334	1309	216	1402	1781	3554	1585	1781	3554	1547
Grp Volume(v), veh/h	121	0	88	72	0	60	72	799	44	80	1060	70
Grp Sat Flow(s),veh/h/ln	1258	0	1630	1309	0	1618	1781	1777	1585	1781	1777	1547
Q Serve(g_s), s	9.3	0.0	4.8	5.2	0.0	3.3	1.3	0.0	0.0	1.4	0.0	0.0
Cycle Q Clear(g_c), s	12.5	0.0	4.8	10.0	0.0	3.3	1.3	0.0	0.0	1.4	0.0	0.0
Prop In Lane	1.00		0.82	1.00		0.87	1.00		1.00	1.00		1.00
Lane Grp Cap(c), veh/h	235	0	264	221	0	262	485	2268	1012	587	2278	992
V/C Ratio(X)	0.51	0.00	0.33	0.33	0.00	0.23	0.15	0.35	0.04	0.14	0.47	0.07
Avail Cap(c_a), veh/h	299	0	347	288	0	345	570	2268	1012	669	2278	992
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	2.00	2.00	2.00	2.00	2.00	2.00
Upstream Filter(I)	1.00	0.00	1.00	1.00	0.00	1.00	0.82	0.82	0.82	0.91	0.91	0.91
Uniform Delay (d), s/veh	41.9	0.0	37.6	41.5	0.0	37.0	4.8	0.0	0.0	4.8	0.0	0.0
Incr Delay (d2), s/veh	1.7	0.0	0.7	0.8	0.0	0.4	0.0	0.4	0.1	0.0	0.6	0.1
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(50%),veh/ln	3.0	0.0	2.0	1.7	0.0	1.3	0.4	0.1	0.0	0.4	0.2	0.0
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	43.7	0.0	38.3	42.4	0.0	37.4	4.9	0.4	0.1	4.8	0.6	0.1
LnGrp LOS	D	A	D	D	A	D	A	A	A	A	A	A
Approach Vol, veh/h		209			132			915			1210	
Approach Delay, s/veh		41.4			40.1			0.7			0.9	
Approach LOS		D			D			A			A	

Timer - Assigned Phs	1	2		4	5	6		8				
Phs Duration (G+Y+Rc), s	10.2	68.9		20.9	10.3	68.7		20.9				
Change Period (Y+Rc), s	5.0	* 6		6.0	5.0	* 6		6.0				
Max Green Setting (Gmax), s	10.0	* 53		20.0	10.0	* 53		20.0				
Max Q Clear Time (g_c+I1), s	3.3	2.0		12.0	3.4	2.0		14.5				
Green Ext Time (p_c), s	0.0	6.2		0.3	0.0	4.1		0.4				

Intersection Summary		
HCM 6th Ctrl Delay		6.3
HCM 6th LOS		A

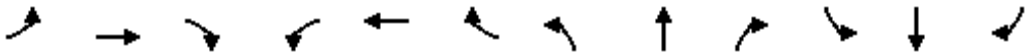
Notes

* HCM 6th computational engine requires equal clearance times for the phases crossing the barrier.



Lane Group	EBL	EBT	EBR	WBL	WBT	NBL	NBT	NBR	SBL	SBT
Lane Group Flow (vph)	156	284	77	183	491	32	482	160	467	854
v/c Ratio	0.59	0.67	0.20	0.55	0.67	0.08	0.53	0.30	0.69	0.47
Control Delay	36.9	50.9	1.1	34.0	19.5	8.7	34.8	4.6	16.7	9.8
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	36.9	50.9	1.1	34.0	19.5	8.7	34.8	4.6	16.7	9.8
Queue Length 50th (ft)	76	93	0	90	55	8	140	0	87	85
Queue Length 95th (ft)	110	129	0	138	107	11	179	36	125	109
Internal Link Dist (ft)		1034			900		1974			1152
Turn Bay Length (ft)	165		145	145		150		100	330	
Base Capacity (vph)	271	424	392	347	730	408	902	541	680	1824
Starvation Cap Reductn	0	0	0	0	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0	0	0	0	0
Reduced v/c Ratio	0.58	0.67	0.20	0.53	0.67	0.08	0.53	0.30	0.69	0.47

Intersection Summary



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	122	241	51	154	159	259	16	410	154	430	630	103
Future Volume (veh/h)	122	241	51	154	159	259	16	410	154	430	630	103
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	1841	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870
Adj Flow Rate, veh/h	156	284	77	183	179	312	32	482	160	467	724	130
Peak Hour Factor	0.78	0.85	0.66	0.84	0.89	0.83	0.50	0.85	0.96	0.92	0.87	0.79
Percent Heavy Veh, %	4	2	2	2	2	2	2	2	2	2	2	2
Cap, veh/h	271	468	177	354	256	228	490	899	401	717	1505	270
Arrive On Green	0.11	0.13	0.11	0.13	0.14	0.12	0.06	0.25	0.25	0.60	1.00	0.96
Sat Flow, veh/h	1753	3554	1585	1781	1777	1585	1781	3554	1585	1781	3010	540
Grp Volume(v), veh/h	156	284	77	183	179	312	32	482	160	467	427	427
Grp Sat Flow(s),veh/h/ln	1753	1777	1585	1781	1777	1585	1781	1777	1585	1781	1777	1773
Q Serve(g_s), s	7.4	7.5	4.5	8.5	9.6	14.4	0.8	11.7	5.5	0.7	0.0	0.6
Cycle Q Clear(g_c), s	7.4	7.5	4.5	8.5	9.6	14.4	0.8	11.7	5.5	0.7	0.0	0.6
Prop In Lane	1.00		1.00	1.00		1.00	1.00		1.00	1.00		0.30
Lane Grp Cap(c), veh/h	271	468	177	354	256	228	490	899	401	717	888	886
V/C Ratio(X)	0.57	0.61	0.44	0.52	0.70	1.37	0.07	0.54	0.40	0.65	0.48	0.48
Avail Cap(c_a), veh/h	272	468	177	386	256	228	575	899	401	717	888	886
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	2.00	2.00	2.00
Upstream Filter(I)	1.00	1.00	1.00	0.99	0.99	0.99	0.57	0.57	0.57	0.89	0.89	0.89
Uniform Delay (d), s/veh	32.1	41.0	41.5	31.0	40.7	43.8	10.1	32.3	13.2	12.2	0.0	0.3
Incr Delay (d2), s/veh	2.9	3.4	3.6	1.2	8.1	190.4	0.0	1.3	1.7	1.9	1.7	1.7
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(50%),veh/ln	3.3	3.5	1.9	3.7	4.7	17.7	0.3	5.0	3.2	4.6	0.4	0.5
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	35.1	44.4	45.1	32.2	48.8	234.2	10.1	33.6	14.9	14.1	1.7	2.0
LnGrp LOS	D	D	D	C	D	F	B	C	B	B	A	A
Approach Vol, veh/h		517			674			674			1321	
Approach Delay, s/veh		41.7			130.1			28.0			6.2	
Approach LOS		D			F			C			A	

Timer - Assigned Phs	1	2	3	4	5	6	7	8
Phs Duration (G+Y+Rc), s	10.2	54.8	16.0	19.0	35.0	30.0	17.2	17.8
Change Period (Y+Rc), s	* 6.7	6.8	6.6	6.6	* 6.8	6.7	6.6	6.6
Max Green Setting (Gmax), s	* 8.3	43.2	9.4	12.4	* 28	23.3	12.4	9.4
Max Q Clear Time (g_c+I1), s	2.8	2.6	9.4	16.4	2.7	13.7	10.5	9.5
Green Ext Time (p_c), s	0.0	3.6	0.0	0.0	1.9	2.0	0.1	0.0

Intersection Summary	
HCM 6th Ctrl Delay	42.8
HCM 6th LOS	D

Notes

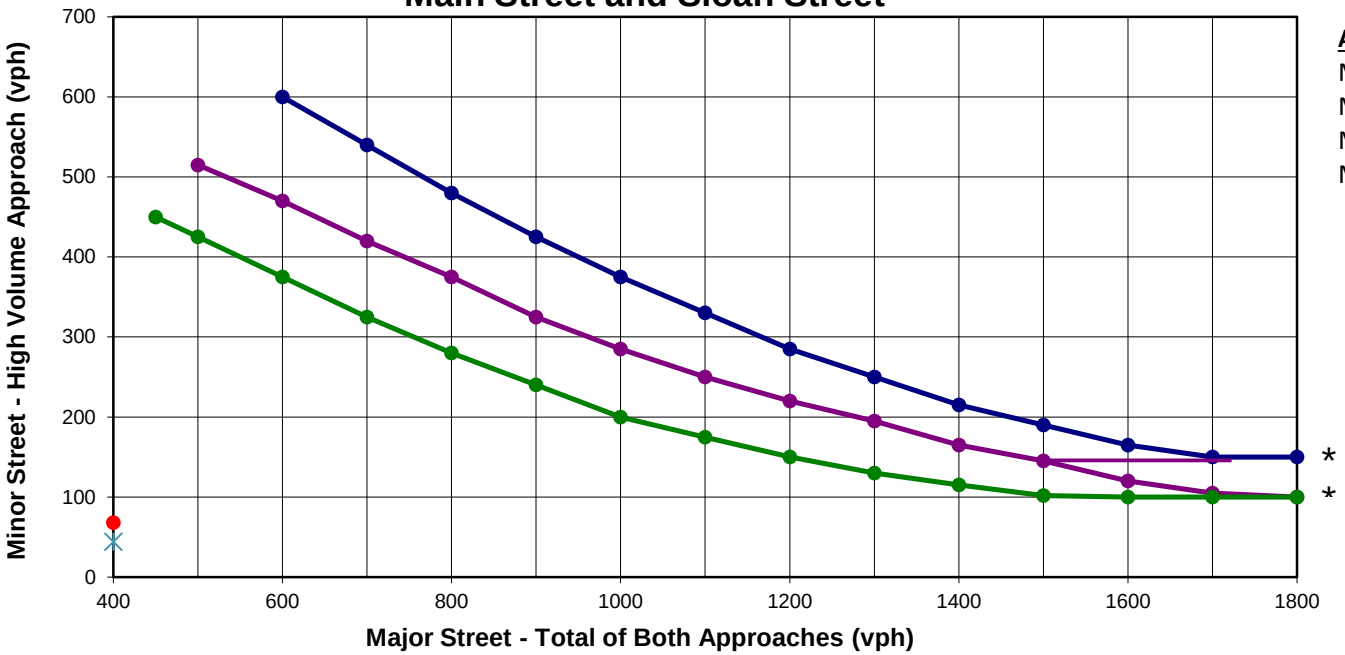
* HCM 6th computational engine requires equal clearance times for the phases crossing the barrier.

APPENDIX E

Build Year 2026 plus Approved plus Full Build Development Conditions

Signal Warrants

Peak Hour Volume Warrant (Build Year 2026 plus Approved plus Full Build Conditions)
Main Street and Sloan Street



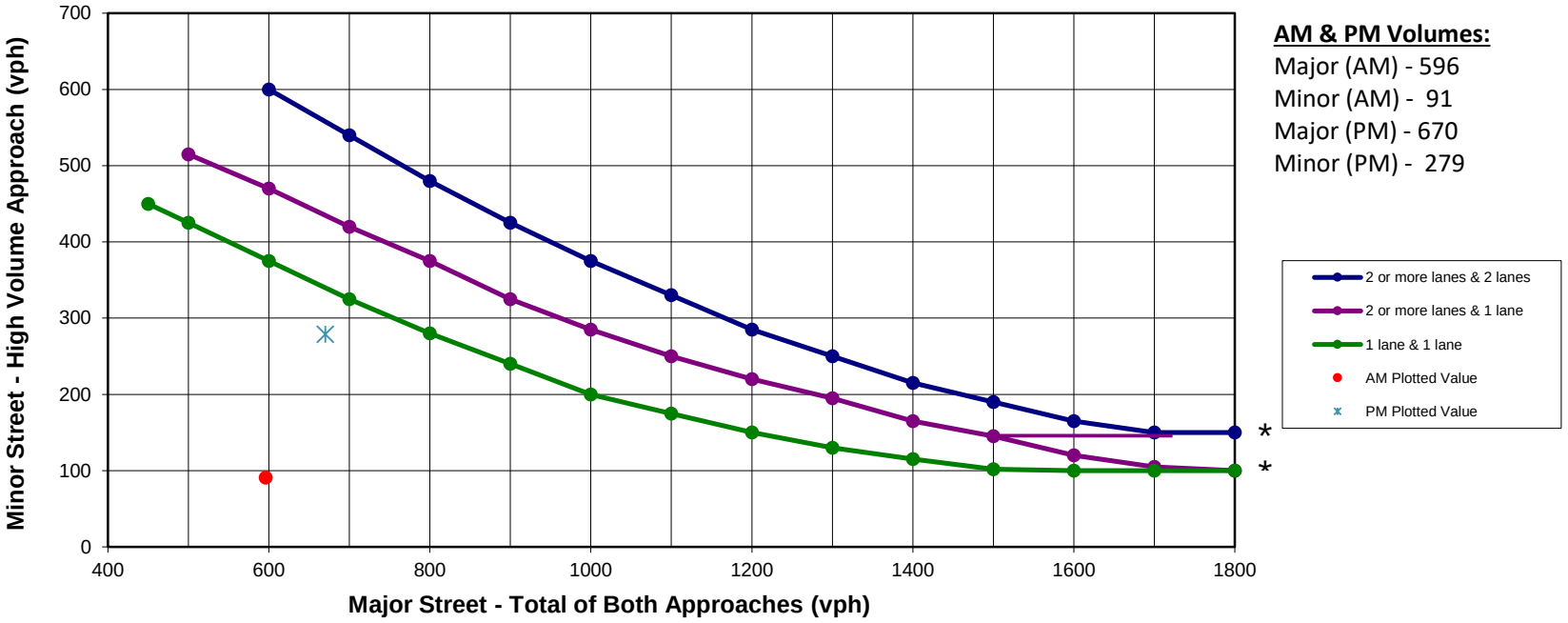
AM & PM Volumes:

Major (AM) - 270
Minor (AM) - 68
Major (PM) - 326
Minor (PM) - 44

2 or more lanes & 2 lanes
2 or more lanes & 1 lane
1 lane & 1 lane
AM Plotted Value
PM Plotted Value

*Note: 150 vph applies as the lower threshold volume for a minor street approach with two or more lanes and 100 vph applies as the lower threshold volume for a minor street approach with one lane.

Peak Hour Volume Warrant (Build Year 2026 plus Approved plus Full Build Conditions)
Tudor Road and Main Street



AM & PM Volumes:

Major (AM) - 596
Minor (AM) - 91
Major (PM) - 670
Minor (PM) - 279

*Note: 150 vph applies as the lower threshold volume for a minor street approach with two or more lanes and 100 vph applies as the lower threshold volume for a minor street approach with one lane.

Capacity Analysis

Intersection	
Int Delay, s/veh	2.5

Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Traffic Vol, veh/h	23	45	168	31	11	60
Future Vol, veh/h	23	45	168	31	11	60
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Stop	Stop	Free	Free	Free	Free
RT Channelized	-	None	-	None	-	None
Storage Length	0	-	-	-	150	-
Veh in Median Storage, #	0	-	0	-	-	0
Grade, %	0	-	0	-	-	0
Peak Hour Factor	78	78	83	83	78	78
Heavy Vehicles, %	4	10	25	2	35	15
Mvmt Flow	29	58	202	37	14	77

Major/Minor	Minor1		Major1		Major2	
Conflicting Flow All	326	221	0	0	239	0
Stage 1	221	-	-	-	-	-
Stage 2	105	-	-	-	-	-
Critical Hdwy	6.44	6.3	-	-	4.45	-
Critical Hdwy Stg 1	5.44	-	-	-	-	-
Critical Hdwy Stg 2	5.44	-	-	-	-	-
Follow-up Hdwy	3.536	3.39	-	-	2.515	-
Pot Cap-1 Maneuver	664	799	-	-	1157	-
Stage 1	811	-	-	-	-	-
Stage 2	914	-	-	-	-	-
Platoon blocked, %			-	-		-
Mov Cap-1 Maneuver	656	799	-	-	1157	-
Mov Cap-2 Maneuver	656	-	-	-	-	-
Stage 1	811	-	-	-	-	-
Stage 2	903	-	-	-	-	-

Approach	WB	NB	SB
HCM Control Delay, s	10.5	0	1.3
HCM LOS	B		

Minor Lane/Major Mvmt	NBT	NBR	WBLn1	SBL	SBT
Capacity (veh/h)	-	-	744	1157	-
HCM Lane V/C Ratio	-	-	0.117	0.012	-
HCM Control Delay (s)	-	-	10.5	8.2	-
HCM Lane LOS	-	-	B	A	-
HCM 95th %tile Q(veh)	-	-	0.4	0	-

Intersection	
Int Delay, s/veh	1.6

Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Traffic Vol, veh/h	1	13	54	198	78	5
Future Vol, veh/h	1	13	54	198	78	5
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Stop	Stop	Free	Free	Free	Free
RT Channelized	-	None	-	None	-	None
Storage Length	0	-	150	-	-	-
Veh in Median Storage, #	0	-	-	0	0	-
Grade, %	0	-	-	0	0	-
Peak Hour Factor	78	78	86	86	79	79
Heavy Vehicles, %	2	30	30	20	35	2
Mvmt Flow	1	17	63	230	99	6

Major/Minor	Minor2		Major1		Major2	
Conflicting Flow All	458	102	105	0	-	0
Stage 1	102	-	-	-	-	-
Stage 2	356	-	-	-	-	-
Critical Hdwy	6.42	6.5	4.4	-	-	-
Critical Hdwy Stg 1	5.42	-	-	-	-	-
Critical Hdwy Stg 2	5.42	-	-	-	-	-
Follow-up Hdwy	3.518	3.57	2.47	-	-	-
Pot Cap-1 Maneuver	561	882	1329	-	-	-
Stage 1	922	-	-	-	-	-
Stage 2	709	-	-	-	-	-
Platoon blocked, %				-	-	-
Mov Cap-1 Maneuver	535	882	1329	-	-	-
Mov Cap-2 Maneuver	535	-	-	-	-	-
Stage 1	879	-	-	-	-	-
Stage 2	709	-	-	-	-	-

Approach	EB	NB	SB
HCM Control Delay, s	9.4	1.7	0
HCM LOS	A		

Minor Lane/Major Mvmt	NBL	NBT	EBLn1	SBT	SBR
Capacity (veh/h)	1329	-	843	-	-
HCM Lane V/C Ratio	0.047	-	0.021	-	-
HCM Control Delay (s)	7.8	-	9.4	-	-
HCM Lane LOS	A	-	A	-	-
HCM 95th %tile Q(veh)	0.1	-	0.1	-	-

Intersection	
Int Delay, s/veh	8.4

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Vol, veh/h	149	110	23	78	148	88	11	15	42	39	10	42
Future Vol, veh/h	149	110	23	78	148	88	11	15	42	39	10	42
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	185	-	-	110	-	150	150	-	-	150	-	150
Veh in Median Storage, #	-	0	-	-	0	-	-	0	-	-	0	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	78	89	58	81	69	78	69	38	55	67	67	67
Heavy Vehicles, %	40	2	2	2	2	9	2	2	10	6	2	28
Mvmt Flow	191	124	40	96	214	113	16	39	76	58	15	63

Major/Minor	Major1			Major2			Minor1			Minor2		
Conflicting Flow All	327	0	0	164	0	0	833	1045	82	870	952	107
Stage 1	-	-	-	-	-	-	526	526	-	406	406	-
Stage 2	-	-	-	-	-	-	307	519	-	464	546	-
Critical Hdwy	4.9	-	-	4.14	-	-	7.54	6.54	7.1	7.62	6.54	7.46
Critical Hdwy Stg 1	-	-	-	-	-	-	6.54	5.54	-	6.62	5.54	-
Critical Hdwy Stg 2	-	-	-	-	-	-	6.54	5.54	-	6.62	5.54	-
Follow-up Hdwy	2.6	-	-	2.22	-	-	3.52	4.02	3.4	3.56	4.02	3.58
Pot Cap-1 Maneuver	996	-	-	1412	-	-	261	227	936	239	258	849
Stage 1	-	-	-	-	-	-	503	527	-	582	596	-
Stage 2	-	-	-	-	-	-	678	531	-	537	516	-
Platoon blocked, %		-	-		-	-						
Mov Cap-1 Maneuver	996	-	-	1412	-	-	185	171	936	147	194	849
Mov Cap-2 Maneuver	-	-	-	-	-	-	185	171	-	147	194	-
Stage 1	-	-	-	-	-	-	406	426	-	470	555	-
Stage 2	-	-	-	-	-	-	570	495	-	362	417	-

Approach	EB	WB	NB	SB
HCM Control Delay, s	5.1	1.8	19.9	26.3
HCM LOS			C	D

Minor Lane/Major Mvmt	NBLn1	NBLn2	EBL	EBT	EBR	WBL	WBT	WBR	SBLn1	SBLn2	SBLn3
Capacity (veh/h)	185	371	996	-	-	1412	-	-	147	194	849
HCM Lane V/C Ratio	0.086	0.312	0.192	-	-	0.068	-	-	0.396	0.077	0.074
HCM Control Delay (s)	26.3	19	9.5	-	-	7.7	-	-	44.7	25.1	9.6
HCM Lane LOS	D	C	A	-	-	A	-	-	E	D	A
HCM 95th %tile Q(veh)	0.3	1.3	0.7	-	-	0.2	-	-	1.7	0.2	0.2

Intersection	
Int Delay, s/veh	1.8

Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations						
Traffic Vol, veh/h	58	1	51	162	0	13
Future Vol, veh/h	58	1	51	162	0	13
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Stop	Stop
RT Channelized	-	None	-	None	-	None
Storage Length	-	-	150	-	0	-
Veh in Median Storage, #	0	-	-	0	0	-
Grade, %	0	-	-	0	0	-
Peak Hour Factor	78	78	83	83	78	78
Heavy Vehicles, %	10	2	25	25	2	30
Mvmt Flow	74	1	61	195	0	17

Major/Minor	Major1		Major2		Minor1	
Conflicting Flow All	0	0	75	0	392	75
Stage 1	-	-	-	-	75	-
Stage 2	-	-	-	-	317	-
Critical Hdwy	-	-	4.35	-	6.42	6.5
Critical Hdwy Stg 1	-	-	-	-	5.42	-
Critical Hdwy Stg 2	-	-	-	-	5.42	-
Follow-up Hdwy	-	-	2.425	-	3.518	3.57
Pot Cap-1 Maneuver	-	-	1390	-	612	914
Stage 1	-	-	-	-	948	-
Stage 2	-	-	-	-	738	-
Platoon blocked, %	-	-		-		
Mov Cap-1 Maneuver	-	-	1390	-	585	914
Mov Cap-2 Maneuver	-	-	-	-	585	-
Stage 1	-	-	-	-	948	-
Stage 2	-	-	-	-	706	-

Approach	EB	WB	NB
HCM Control Delay, s	0	1.8	9
HCM LOS			A

Minor Lane/Major Mvmt	NBLn1	EBT	EBR	WBL	WBT
Capacity (veh/h)	914	-	-	1390	-
HCM Lane V/C Ratio	0.018	-	-	0.044	-
HCM Control Delay (s)	9	-	-	7.7	-
HCM Lane LOS	A	-	-	A	-
HCM 95th %tile Q(veh)	0.1	-	-	0.1	-

Intersection	
Int Delay, s/veh	1.1

Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations						
Traffic Vol, veh/h	54	4	25	137	1	5
Future Vol, veh/h	54	4	25	137	1	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	78	78	78	78	78	78
Heavy Vehicles, %	5	2	45	25	2	45
Mvmt Flow	69	5	32	176	1	6

Major/Minor	Major1		Major2		Minor1	
Conflicting Flow All	0	0	74	0	312	72
Stage 1	-	-	-	-	72	-
Stage 2	-	-	-	-	240	-
Critical Hdwy	-	-	4.55	-	6.42	6.65
Critical Hdwy Stg 1	-	-	-	-	5.42	-
Critical Hdwy Stg 2	-	-	-	-	5.42	-
Follow-up Hdwy	-	-	2.605	-	3.518	3.705
Pot Cap-1 Maneuver	-	-	1293	-	681	883
Stage 1	-	-	-	-	951	-
Stage 2	-	-	-	-	800	-
Platoon blocked, %	-	-		-		
Mov Cap-1 Maneuver	-	-	1293	-	663	883
Mov Cap-2 Maneuver	-	-	-	-	663	-
Stage 1	-	-	-	-	951	-
Stage 2	-	-	-	-	778	-

Approach	EB	WB	NB
HCM Control Delay, s	0	1.2	9.3
HCM LOS			A

Minor Lane/Major Mvmt	NBLn1	EBT	EBR	WBL	WBT
Capacity (veh/h)	837	-	-	1293	-
HCM Lane V/C Ratio	0.009	-	-	0.025	-
HCM Control Delay (s)	9.3	-	-	7.9	0
HCM Lane LOS	A	-	-	A	A
HCM 95th %tile Q(veh)	0	-	-	0.1	-

Intersection	
Int Delay, s/veh	1.7

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↕			↕			↕			↕	
Traffic Vol, veh/h	0	0	4	11	0	1	17	71	50	7	43	0
Future Vol, veh/h	0	0	4	11	0	1	17	71	50	7	43	0
Conflicting Peds, #/hr	0	0	0	0	0	0	0	0	0	0	0	0
Sign Control	Stop	Stop	Stop	Stop	Stop	Stop	Free	Free	Free	Free	Free	Free
RT Channelized	-	-	None	-	-	None	-	-	None	-	-	None
Storage Length	-	-	-	-	-	-	-	-	-	-	-	-
Veh in Median Storage, #	-	0	-	-	0	-	-	0	-	-	0	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	78	78	78	78	78	78	84	84	84	78	78	78
Heavy Vehicles, %	2	2	25	2	2	2	30	35	2	2	20	2
Mvmt Flow	0	0	5	14	0	1	20	85	60	9	55	0

Major/Minor	Minor2			Minor1			Major1			Major2		
Conflicting Flow All	229	258	55	231	228	115	55	0	0	145	0	0
Stage 1	73	73	-	155	155	-	-	-	-	-	-	-
Stage 2	156	185	-	76	73	-	-	-	-	-	-	-
Critical Hdwy	7.12	6.52	6.45	7.12	6.52	6.22	4.4	-	-	4.12	-	-
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	3.518	4.018	3.525	3.518	4.018	3.318	2.47	-	-	2.218	-	-
Pot Cap-1 Maneuver	726	646	951	724	671	937	1389	-	-	1437	-	-
Stage 1	937	834	-	847	769	-	-	-	-	-	-	-
Stage 2	846	747	-	933	834	-	-	-	-	-	-	-
Platoon blocked, %								-	-		-	-
Mov Cap-1 Maneuver	713	632	951	708	656	937	1389	-	-	1437	-	-
Mov Cap-2 Maneuver	713	632	-	708	656	-	-	-	-	-	-	-
Stage 1	922	829	-	833	757	-	-	-	-	-	-	-
Stage 2	831	735	-	922	829	-	-	-	-	-	-	-

Approach	EB	WB	NB	SB
HCM Control Delay, s	8.8	10.1	0.9	1.1
HCM LOS	A	B		

Minor Lane/Major Mvmt	NBL	NBT	NBR	EBLn1	WBLn1	SBL	SBT	SBR
Capacity (veh/h)	1389	-	-	951	723	1437	-	-
HCM Lane V/C Ratio	0.015	-	-	0.005	0.021	0.006	-	-
HCM Control Delay (s)	7.6	0	-	8.8	10.1	7.5	0	-
HCM Lane LOS	A	A	-	A	B	A	A	-
HCM 95th %tile Q(veh)	0	-	-	0	0.1	0	-	-

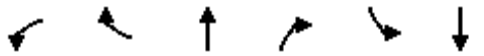
Intersection	
Int Delay, s/veh	2.1

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↕			↕			↕			↕	
Traffic Vol, veh/h	1	0	4	6	0	1	17	34	21	3	40	4
Future Vol, veh/h	1	0	4	6	0	1	17	34	21	3	40	4
Conflicting Peds, #/hr	0	0	0	0	0	0	0	0	0	0	0	0
Sign Control	Stop	Stop	Stop	Stop	Stop	Stop	Free	Free	Free	Free	Free	Free
RT Channelized	-	-	None	-	-	None	-	-	None	-	-	None
Storage Length	-	-	-	-	-	-	-	-	-	-	-	-
Veh in Median Storage, #	-	0	-	-	0	-	-	0	-	-	0	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	78	78	78	78	78	78	80	80	80	78	78	78
Heavy Vehicles, %	40	2	50	100	2	100	30	2	100	100	2	25
Mvmt Flow	1	0	5	8	0	1	21	43	26	4	51	5

Major/Minor	Minor2			Minor1			Major1			Major2		
Conflicting Flow All	161	173	54	162	162	56	56	0	0	69	0	0
Stage 1	62	62	-	98	98	-	-	-	-	-	-	-
Stage 2	99	111	-	64	64	-	-	-	-	-	-	-
Critical Hdwy	7.5	6.52	6.7	8.1	6.52	7.2	4.4	-	-	5.1	-	-
Critical Hdwy Stg 1	6.5	5.52	-	7.1	5.52	-	-	-	-	-	-	-
Critical Hdwy Stg 2	6.5	5.52	-	7.1	5.52	-	-	-	-	-	-	-
Follow-up Hdwy	3.86	4.018	3.75	4.4	4.018	4.2	2.47	-	-	3.1	-	-
Pot Cap-1 Maneuver	726	720	893	626	730	792	1387	-	-	1085	-	-
Stage 1	862	843	-	716	814	-	-	-	-	-	-	-
Stage 2	822	804	-	750	842	-	-	-	-	-	-	-
Platoon blocked, %								-	-		-	-
Mov Cap-1 Maneuver	714	706	893	613	715	792	1387	-	-	1085	-	-
Mov Cap-2 Maneuver	714	706	-	613	715	-	-	-	-	-	-	-
Stage 1	848	840	-	705	801	-	-	-	-	-	-	-
Stage 2	808	791	-	743	839	-	-	-	-	-	-	-

Approach	EB	WB	NB	SB
HCM Control Delay, s	9.3	10.8	1.8	0.5
HCM LOS	A	B		

Minor Lane/Major Mvmt	NBL	NBT	NBR	EBLn1	WBLn1	SBL	SBT	SBR
Capacity (veh/h)	1387	-	-	850	633	1085	-	-
HCM Lane V/C Ratio	0.015	-	-	0.008	0.014	0.004	-	-
HCM Control Delay (s)	7.6	0	-	9.3	10.8	8.3	0	-
HCM Lane LOS	A	A	-	A	B	A	A	-
HCM 95th %tile Q(veh)	0	-	-	0	0	0	-	-



Lane Group	WBL	WBR	NBT	NBR	SBL	SBT
Lane Group Flow (vph)	126	149	179	169	234	142
v/c Ratio	0.28	0.31	0.09	0.18	0.45	0.08
Control Delay	13.7	5.3	6.1	2.0	10.8	6.1
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	13.7	5.3	6.1	2.0	10.8	6.1
Queue Length 50th (ft)	17	0	8	0	28	6
Queue Length 95th (ft)	45	19	20	6	70	13
Internal Link Dist (ft)	2524		1483			1982
Turn Bay Length (ft)				90	150	
Base Capacity (vph)	756	695	3105	1409	852	2828
Starvation Cap Reductn	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0
Reduced v/c Ratio	0.17	0.21	0.06	0.12	0.27	0.05

Intersection Summary

Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Traffic Volume (veh/h)	87	109	147	105	192	95
Future Volume (veh/h)	87	109	147	105	192	95
Initial Q (Qb), veh	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00	1.00		1.00	1.00	
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach	No		No			No
Adj Sat Flow, veh/h/ln	1841	1678	1870	1870	1530	1722
Adj Flow Rate, veh/h	126	149	179	169	234	142
Peak Hour Factor	0.69	0.73	0.82	0.62	0.82	0.67
Percent Heavy Veh, %	4	15	2	2	25	12
Cap, veh/h	412	334	1451	647	552	1336
Arrive On Green	0.23	0.23	0.41	0.41	0.41	0.41
Sat Flow, veh/h	1753	1422	3647	1585	845	3358
Grp Volume(v), veh/h	126	149	179	169	234	142
Grp Sat Flow(s),veh/h/ln	1753	1422	1777	1585	845	1636
Q Serve(g_s), s	1.8	2.8	1.0	2.2	7.4	0.8
Cycle Q Clear(g_c), s	1.8	2.8	1.0	2.2	8.3	0.8
Prop In Lane	1.00	1.00		1.00	1.00	
Lane Grp Cap(c), veh/h	412	334	1451	647	552	1336
V/C Ratio(X)	0.31	0.45	0.12	0.26	0.42	0.11
Avail Cap(c_a), veh/h	824	669	3400	1517	1015	3131
HCM Platoon Ratio	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
Uniform Delay (d), s/veh	9.7	10.1	5.7	6.0	8.3	5.6
Incr Delay (d2), s/veh	0.4	0.9	0.0	0.2	0.5	0.0
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	0.5	0.7	0.2	0.4	0.8	0.2
Unsig. Movement Delay, s/veh						
LnGrp Delay(d),s/veh	10.1	11.0	5.7	6.3	8.8	5.7
LnGrp LOS	B	B	A	A	A	A
Approach Vol, veh/h	275		348			376
Approach Delay, s/veh	10.6		6.0			7.6
Approach LOS	B		A			A

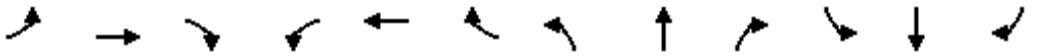
Timer - Assigned Phs		2		4		6
Phs Duration (G+Y+Rc), s		18.1		12.7		18.1
Change Period (Y+Rc), s		5.5		5.5		5.5
Max Green Setting (Gmax), s		29.5		14.5		29.5
Max Q Clear Time (g_c+I1), s		10.3		4.8		4.2
Green Ext Time (p_c), s		2.3		0.6		1.6

Intersection Summary	
HCM 6th Ctrl Delay	7.9
HCM 6th LOS	A

Lane Group	EBL	EBT	WBL	WBT	NBL	NBT	NBR	SBL	SBT	SBR
Lane Group Flow (vph)	100	36	24	48	92	931	20	24	719	162
v/c Ratio	0.53	0.07	0.12	0.17	0.16	0.36	0.02	0.05	0.31	0.15
Control Delay	44.2	0.2	31.9	13.7	1.6	4.3	0.3	1.6	5.6	1.0
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	44.2	0.2	31.9	13.7	1.6	4.3	0.3	1.6	5.6	1.0
Queue Length 50th (ft)	53	0	12	4	3	16	0	1	47	0
Queue Length 95th (ft)	78	0	22	3	m5	213	m0	4	93	6
Internal Link Dist (ft)		501		409		1152			1009	
Turn Bay Length (ft)	115		60		250		115	215		120
Base Capacity (vph)	268	608	293	380	594	2589	1184	508	2293	1073
Starvation Cap Reductn	0	0	0	0	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0	0	0	0	0
Reduced v/c Ratio	0.37	0.06	0.08	0.13	0.15	0.36	0.02	0.05	0.31	0.15

Intersection Summary

m Volume for 95th percentile queue is metered by upstream signal.



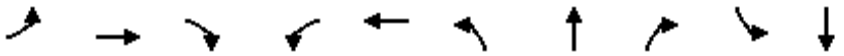
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	75	0	21	15	3	21	73	773	9	18	604	138
Future Volume (veh/h)	75	0	21	15	3	21	73	773	9	18	604	138
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		1.00	1.00		1.00	1.00		1.00	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	1752	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870	1856
Adj Flow Rate, veh/h	100	0	36	24	8	40	92	931	20	24	719	162
Peak Hour Factor	0.75	1.00	0.58	0.63	0.38	0.53	0.79	0.83	0.45	0.75	0.84	0.85
Percent Heavy Veh, %	10	2	2	2	2	2	2	2	2	2	2	3
Cap, veh/h	225	0	223	245	38	191	712	2370	1057	530	1824	807
Arrive On Green	0.14	0.00	0.13	0.14	0.14	0.13	0.35	1.00	1.00	0.07	1.00	1.00
Sat Flow, veh/h	1271	0	1585	1372	271	1355	1781	3554	1585	1781	3554	1572
Grp Volume(v), veh/h	100	0	36	24	0	48	92	931	20	24	719	162
Grp Sat Flow(s),veh/h/ln	1271	0	1585	1372	0	1626	1781	1777	1585	1781	1777	1572
Q Serve(g_s), s	6.8	0.0	1.8	1.4	0.0	2.4	0.0	0.0	0.0	0.4	0.0	0.0
Cycle Q Clear(g_c), s	9.2	0.0	1.8	3.2	0.0	2.4	0.0	0.0	0.0	0.4	0.0	0.0
Prop In Lane	1.00		1.00	1.00		0.83	1.00		1.00	1.00		1.00
Lane Grp Cap(c), veh/h	225	0	223	245	0	229	712	2370	1057	530	1824	807
V/C Ratio(X)	0.44	0.00	0.16	0.10	0.00	0.21	0.13	0.39	0.02	0.05	0.39	0.20
Avail Cap(c_a), veh/h	319	0	340	346	0	349	712	2370	1057	635	1824	807
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	2.00	2.00	2.00	2.00	2.00	2.00
Upstream Filter(I)	1.00	0.00	1.00	1.00	0.00	1.00	0.85	0.85	0.85	0.96	0.96	0.96
Uniform Delay (d), s/veh	38.3	0.0	34.6	35.4	0.0	34.7	4.1	0.0	0.0	4.1	0.0	0.0
Incr Delay (d2), s/veh	1.4	0.0	0.3	0.2	0.0	0.4	0.0	0.4	0.0	0.0	0.6	0.5
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(50%),veh/ln	2.2	0.0	0.7	0.5	0.0	1.0	0.4	0.1	0.0	0.1	0.2	0.1
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	39.7	0.0	34.9	35.6	0.0	35.2	4.1	0.4	0.0	4.1	0.6	0.5
LnGrp LOS	D	A	C	D	A	D	A	A	A	A	A	A
Approach Vol, veh/h		136			72			1043			905	
Approach Delay, s/veh		38.4			35.3			0.7			0.7	
Approach LOS		D			D			A			A	

Timer - Assigned Phs	1	2		4	5	6		8				
Phs Duration (G+Y+Rc), s	21.6	51.0		17.4	7.7	64.9		17.4				
Change Period (Y+Rc), s	* 6	* 6		6.0	5.0	* 6		6.0				
Max Green Setting (Gmax), s	* 10	* 45		18.0	8.0	* 47		18.0				
Max Q Clear Time (g_c+I1), s	2.0	2.0		5.2	2.4	2.0		11.2				
Green Ext Time (p_c), s	0.0	4.3		0.2	0.0	4.9		0.3				

Intersection Summary		
HCM 6th Ctrl Delay		4.2
HCM 6th LOS		A

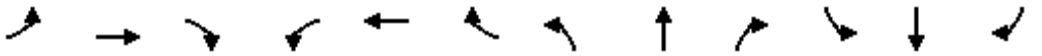
Notes

* HCM 6th computational engine requires equal clearance times for the phases crossing the barrier.



Lane Group	EBL	EBT	EBR	WBL	WBT	NBL	NBT	NBR	SBL	SBT
Lane Group Flow (vph)	92	120	58	177	697	175	600	159	350	500
v/c Ratio	0.39	0.25	0.13	0.44	0.68	0.35	0.54	0.25	0.69	0.33
Control Delay	27.0	35.9	0.6	26.6	15.0	13.7	28.8	2.7	23.3	13.1
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	27.0	35.9	0.6	26.6	15.0	13.7	28.8	2.7	23.3	13.1
Queue Length 50th (ft)	37	32	0	75	62	44	151	0	176	105
Queue Length 95th (ft)	51	54	0	88	60	42	185	0	180	157
Internal Link Dist (ft)		1034			900		1974			1152
Turn Bay Length (ft)	165		145	145		150		100	330	
Base Capacity (vph)	237	521	449	402	1039	497	1120	641	565	1499
Starvation Cap Reductn	0	0	0	0	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0	0	0	0	0
Reduced v/c Ratio	0.39	0.23	0.13	0.44	0.67	0.35	0.54	0.25	0.62	0.33

Intersection Summary



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	61	102	22	117	167	314	91	474	105	238	342	94
Future Volume (veh/h)	61	102	22	117	167	314	91	474	105	238	342	94
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	1856	1856	1841	1841	1870	1870	1870	1870	1870	1781	1870	1856
Adj Flow Rate, veh/h	92	120	58	177	235	462	175	600	159	350	360	140
Peak Hour Factor	0.66	0.85	0.38	0.66	0.71	0.68	0.52	0.79	0.66	0.68	0.95	0.67
Percent Heavy Veh, %	3	3	4	4	2	2	2	2	2	8	2	3
Cap, veh/h	237	554	211	451	344	306	504	1182	527	513	1038	398
Arrive On Green	0.09	0.16	0.13	0.13	0.19	0.17	0.10	0.33	0.33	0.06	0.14	0.13
Sat Flow, veh/h	1767	3526	1560	1753	1777	1585	1781	3554	1585	1697	2512	962
Grp Volume(v), veh/h	92	120	58	177	235	462	175	600	159	350	253	247
Grp Sat Flow(s),veh/h/ln	1767	1763	1560	1753	1777	1585	1781	1777	1585	1697	1777	1697
Q Serve(g_s), s	3.7	2.7	2.2	7.2	11.1	17.4	0.0	12.2	6.7	11.2	11.6	11.9
Cycle Q Clear(g_c), s	3.7	2.7	2.2	7.2	11.1	17.4	0.0	12.2	6.7	11.2	11.6	11.9
Prop In Lane	1.00		1.00	1.00		1.00	1.00		1.00	1.00		0.57
Lane Grp Cap(c), veh/h	237	554	211	451	344	306	504	1182	527	513	734	702
V/C Ratio(X)	0.39	0.22	0.28	0.39	0.68	1.51	0.35	0.51	0.30	0.68	0.34	0.35
Avail Cap(c_a), veh/h	245	554	211	473	344	306	504	1182	527	631	734	702
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	0.33	0.33	0.33
Upstream Filter(I)	1.00	1.00	1.00	0.96	0.96	0.96	0.75	0.75	0.75	0.96	0.96	0.96
Uniform Delay (d), s/veh	28.1	33.1	19.3	25.3	33.7	37.3	21.7	24.1	22.3	17.8	27.8	28.1
Incr Delay (d2), s/veh	1.0	0.4	1.5	0.5	5.3	244.1	0.3	1.2	1.1	2.1	1.2	1.3
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(50%),veh/ln	1.6	1.1	1.2	2.9	5.1	27.4	2.6	4.9	2.6	4.8	5.5	5.4
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	29.1	33.5	20.8	25.9	39.0	281.4	22.0	25.3	23.4	20.0	29.0	29.4
LnGrp LOS	C	C	C	C	D	F	C	C	C	B	C	C
Approach Vol, veh/h		270			874			934			850	
Approach Delay, s/veh		29.3			164.5			24.3			25.4	
Approach LOS		C			F			C			C	

Timer - Assigned Phs	1	2	3	4	5	6	7	8
Phs Duration (G+Y+Rc), s	13.4	42.0	12.6	22.0	20.8	34.6	15.9	18.7
Change Period (Y+Rc), s	6.7	* 6.8	6.6	6.6	6.8	* 6.7	6.6	6.6
Max Green Setting (Gmax), s	6.3	* 35	6.4	15.4	20.2	* 21	10.4	11.4
Max Q Clear Time (g_c+I1), s	2.0	13.9	5.7	19.4	13.2	14.2	9.2	4.7
Green Ext Time (p_c), s	0.2	1.8	0.0	0.0	0.8	2.0	0.1	0.7

Intersection Summary	
HCM 6th Ctrl Delay	66.9
HCM 6th LOS	E

Notes

* HCM 6th computational engine requires equal clearance times for the phases crossing the barrier.

Intersection	
Int Delay, s/veh	2.3

Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Traffic Vol, veh/h	32	12	67	21	43	195
Future Vol, veh/h	32	12	67	21	43	195
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Stop	Stop	Free	Free	Free	Free
RT Channelized	-	None	-	None	-	None
Storage Length	0	-	-	-	150	-
Veh in Median Storage, #	0	-	0	-	-	0
Grade, %	0	-	0	-	-	0
Peak Hour Factor	78	78	79	79	84	84
Heavy Vehicles, %	2	30	30	2	35	20
Mvmt Flow	41	15	85	27	51	232

Major/Minor	Minor1		Major1		Major2	
Conflicting Flow All	433	99	0	0	112	0
Stage 1	99	-	-	-	-	-
Stage 2	334	-	-	-	-	-
Critical Hdwy	6.42	6.5	-	-	4.45	-
Critical Hdwy Stg 1	5.42	-	-	-	-	-
Critical Hdwy Stg 2	5.42	-	-	-	-	-
Follow-up Hdwy	3.518	3.57	-	-	2.515	-
Pot Cap-1 Maneuver	580	885	-	-	1296	-
Stage 1	925	-	-	-	-	-
Stage 2	725	-	-	-	-	-
Platoon blocked, %			-	-		-
Mov Cap-1 Maneuver	557	885	-	-	1296	-
Mov Cap-2 Maneuver	557	-	-	-	-	-
Stage 1	925	-	-	-	-	-
Stage 2	697	-	-	-	-	-

Approach	WB	NB	SB
HCM Control Delay, s	11.4	0	1.4
HCM LOS	B		

Minor Lane/Major Mvmt	NBT	NBR	WBLn1	SBL	SBT
Capacity (veh/h)	-	-	620	1296	-
HCM Lane V/C Ratio	-	-	0.091	0.039	-
HCM Control Delay (s)	-	-	11.4	7.9	-
HCM Lane LOS	-	-	B	A	-
HCM 95th %tile Q(veh)	-	-	0.3	0.1	-

Intersection	
Int Delay, s/veh	2.1

Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Traffic Vol, veh/h	5	53	15	83	226	1
Future Vol, veh/h	5	53	15	83	226	1
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Stop	Stop	Free	Free	Free	Free
RT Channelized	-	None	-	None	-	None
Storage Length	0	-	150	-	-	-
Veh in Median Storage, #	0	-	-	0	0	-
Grade, %	0	-	-	0	0	-
Peak Hour Factor	78	78	78	78	85	85
Heavy Vehicles, %	2	30	30	30	30	2
Mvmt Flow	6	68	19	106	266	1

Major/Minor	Minor2		Major1		Major2	
Conflicting Flow All	411	267	267	0	-	0
Stage 1	267	-	-	-	-	-
Stage 2	144	-	-	-	-	-
Critical Hdwy	6.42	6.5	4.4	-	-	-
Critical Hdwy Stg 1	5.42	-	-	-	-	-
Critical Hdwy Stg 2	5.42	-	-	-	-	-
Follow-up Hdwy	3.518	3.57	2.47	-	-	-
Pot Cap-1 Maneuver	597	709	1151	-	-	-
Stage 1	778	-	-	-	-	-
Stage 2	883	-	-	-	-	-
Platoon blocked, %				-	-	-
Mov Cap-1 Maneuver	587	709	1151	-	-	-
Mov Cap-2 Maneuver	587	-	-	-	-	-
Stage 1	765	-	-	-	-	-
Stage 2	883	-	-	-	-	-

Approach	EB	NB	SB
HCM Control Delay, s	10.8	1.3	0
HCM LOS	B		

Minor Lane/Major Mvmt	NBL	NBT	EBLn1	SBT	SBR
Capacity (veh/h)	1151	-	697	-	-
HCM Lane V/C Ratio	0.017	-	0.107	-	-
HCM Control Delay (s)	8.2	-	10.8	-	-
HCM Lane LOS	A	-	B	-	-
HCM 95th %tile Q(veh)	0.1	-	0.4	-	-

Intersection	
Int Delay, s/veh	7.6

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Vol, veh/h	50	288	33	40	216	43	18	5	67	111	12	156
Future Vol, veh/h	50	288	33	40	216	43	18	5	67	111	12	156
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	185	-	-	110	-	150	150	-	-	150	-	150
Veh in Median Storage, #	-	0	-	-	0	-	-	0	-	-	0	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	69	90	83	70	79	60	90	75	64	83	83	83
Heavy Vehicles, %	25	2	3	3	2	3	2	2	2	8	2	30
Mvmt Flow	72	320	40	57	273	72	20	7	105	134	14	188

Major/Minor	Major1			Major2			Minor1			Minor2		
Conflicting Flow All	345	0	0	360	0	0	742	943	180	695	891	137
Stage 1	-	-	-	-	-	-	484	484	-	387	387	-
Stage 2	-	-	-	-	-	-	258	459	-	308	504	-
Critical Hdwy	4.6	-	-	4.16	-	-	7.54	6.54	6.94	7.66	6.54	7.5
Critical Hdwy Stg 1	-	-	-	-	-	-	6.54	5.54	-	6.66	5.54	-
Critical Hdwy Stg 2	-	-	-	-	-	-	6.54	5.54	-	6.66	5.54	-
Follow-up Hdwy	2.45	-	-	2.23	-	-	3.52	4.02	3.32	3.58	4.02	3.6
Pot Cap-1 Maneuver	1061	-	-	1188	-	-	304	261	832	317	280	804
Stage 1	-	-	-	-	-	-	533	550	-	592	608	-
Stage 2	-	-	-	-	-	-	724	565	-	660	539	-
Platoon blocked, %		-	-		-	-						
Mov Cap-1 Maneuver	1061	-	-	1188	-	-	204	232	832	248	248	804
Mov Cap-2 Maneuver	-	-	-	-	-	-	204	232	-	248	248	-
Stage 1	-	-	-	-	-	-	497	513	-	552	579	-
Stage 2	-	-	-	-	-	-	515	538	-	531	502	-

Approach	EB	WB	NB	SB
HCM Control Delay, s	1.4	1.2	13	21
HCM LOS			B	C

Minor Lane/Major Mvmt	NBLn1	NBLn2	EBL	EBT	EBR	WBL	WBT	WBR	SBLn1	SBLn2	SBLn3
Capacity (veh/h)	204	720	1061	-	-	1188	-	-	248	248	804
HCM Lane V/C Ratio	0.098	0.155	0.068	-	-	0.048	-	-	0.539	0.058	0.234
HCM Control Delay (s)	24.6	10.9	8.6	-	-	8.2	-	-	35.3	20.4	10.8
HCM Lane LOS	C	B	A	-	-	A	-	-	E	C	B
HCM 95th %tile Q(veh)	0.3	0.5	0.2	-	-	0.2	-	-	2.9	0.2	0.9

Intersection	
Int Delay, s/veh	2.1

Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations						
Traffic Vol, veh/h	187	1	13	66	2	51
Future Vol, veh/h	187	1	13	66	2	51
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Stop	Stop
RT Channelized	-	None	-	None	-	None
Storage Length	-	-	150	-	0	-
Veh in Median Storage, #	0	-	-	0	0	-
Grade, %	0	-	-	0	0	-
Peak Hour Factor	80	80	78	78	78	78
Heavy Vehicles, %	20	2	25	15	2	30
Mvmt Flow	234	1	17	85	3	65

Major/Minor	Major1		Major2		Minor1	
Conflicting Flow All	0	0	235	0	354	235
Stage 1	-	-	-	-	235	-
Stage 2	-	-	-	-	119	-
Critical Hdwy	-	-	4.35	-	6.42	6.5
Critical Hdwy Stg 1	-	-	-	-	5.42	-
Critical Hdwy Stg 2	-	-	-	-	5.42	-
Follow-up Hdwy	-	-	2.425	-	3.518	3.57
Pot Cap-1 Maneuver	-	-	1208	-	644	740
Stage 1	-	-	-	-	804	-
Stage 2	-	-	-	-	906	-
Platoon blocked, %	-	-		-		
Mov Cap-1 Maneuver	-	-	1208	-	635	740
Mov Cap-2 Maneuver	-	-	-	-	635	-
Stage 1	-	-	-	-	804	-
Stage 2	-	-	-	-	893	-

Approach	EB	WB	NB
HCM Control Delay, s	0	1.3	10.4
HCM LOS			B

Minor Lane/Major Mvmt	NBLn1	EBT	EBR	WBL	WBT
Capacity (veh/h)	735	-	-	1208	-
HCM Lane V/C Ratio	0.092	-	-	0.014	-
HCM Control Delay (s)	10.4	-	-	8	-
HCM Lane LOS	B	-	-	A	-
HCM 95th %tile Q(veh)	0.3	-	-	0	-

Intersection	
Int Delay, s/veh	1.2

Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations						
Traffic Vol, veh/h	165	0	6	62	3	23
Future Vol, veh/h	165	0	6	62	3	23
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	78	78	78	78	78	78
Heavy Vehicles, %	20	2	50	15	2	45
Mvmt Flow	212	0	8	79	4	29

Major/Minor	Major1		Major2		Minor1	
Conflicting Flow All	0	0	212	0	307	212
Stage 1	-	-	-	-	212	-
Stage 2	-	-	-	-	95	-
Critical Hdwy	-	-	4.6	-	6.42	6.65
Critical Hdwy Stg 1	-	-	-	-	5.42	-
Critical Hdwy Stg 2	-	-	-	-	5.42	-
Follow-up Hdwy	-	-	2.65	-	3.518	3.705
Pot Cap-1 Maneuver	-	-	1119	-	685	731
Stage 1	-	-	-	-	823	-
Stage 2	-	-	-	-	929	-
Platoon blocked, %	-	-		-		
Mov Cap-1 Maneuver	-	-	1119	-	680	731
Mov Cap-2 Maneuver	-	-	-	-	680	-
Stage 1	-	-	-	-	823	-
Stage 2	-	-	-	-	922	-

Approach	EB	WB	NB
HCM Control Delay, s	0	0.7	10.2
HCM LOS			B

Minor Lane/Major Mvmt	NBLn1	EBT	EBR	WBL	WBT
Capacity (veh/h)	725	-	-	1119	-
HCM Lane V/C Ratio	0.046	-	-	0.007	-
HCM Control Delay (s)	10.2	-	-	8.2	0
HCM Lane LOS	B	-	-	A	A
HCM 95th %tile Q(veh)	0.1	-	-	0	-

Intersection	
Int Delay, s/veh	3.3

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↕			↕			↕			↕	
Traffic Vol, veh/h	2	0	17	47	0	5	4	48	13	3	101	0
Future Vol, veh/h	2	0	17	47	0	5	4	48	13	3	101	0
Conflicting Peds, #/hr	0	0	0	0	0	0	0	0	0	0	0	0
Sign Control	Stop	Stop	Stop	Stop	Stop	Stop	Free	Free	Free	Free	Free	Free
RT Channelized	-	-	None	-	-	None	-	-	None	-	-	None
Storage Length	-	-	-	-	-	-	-	-	-	-	-	-
Veh in Median Storage, #	-	0	-	-	0	-	-	0	-	-	0	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	78	78	78	78	78	78	78	78	78	83	83	83
Heavy Vehicles, %	2	2	35	2	2	2	25	15	2	2	25	2
Mvmt Flow	3	0	22	60	0	6	5	62	17	4	122	0

Major/Minor	Minor2			Minor1			Major1			Major2		
Conflicting Flow All	214	219	122	222	211	71	122	0	0	79	0	0
Stage 1	130	130	-	81	81	-	-	-	-	-	-	-
Stage 2	84	89	-	141	130	-	-	-	-	-	-	-
Critical Hdwy	7.12	6.52	6.55	7.12	6.52	6.22	4.35	-	-	4.12	-	-
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	3.518	4.018	3.615	3.518	4.018	3.318	2.425	-	-	2.218	-	-
Pot Cap-1 Maneuver	743	679	847	734	686	991	1334	-	-	1519	-	-
Stage 1	874	789	-	927	828	-	-	-	-	-	-	-
Stage 2	924	821	-	862	789	-	-	-	-	-	-	-
Platoon blocked, %								-	-		-	-
Mov Cap-1 Maneuver	734	674	847	711	681	991	1334	-	-	1519	-	-
Mov Cap-2 Maneuver	734	674	-	711	681	-	-	-	-	-	-	-
Stage 1	871	787	-	923	825	-	-	-	-	-	-	-
Stage 2	914	818	-	837	787	-	-	-	-	-	-	-

Approach	EB	WB	NB	SB
HCM Control Delay, s	9.5	10.4	0.5	0.2
HCM LOS	A	B		

Minor Lane/Major Mvmt	NBL	NBT	NBR	EBLn1	WBLn1	SBL	SBT	SBR
Capacity (veh/h)	1334	-	-	833	731	1519	-	-
HCM Lane V/C Ratio	0.004	-	-	0.029	0.091	0.002	-	-
HCM Control Delay (s)	7.7	0	-	9.5	10.4	7.4	0	-
HCM Lane LOS	A	A	-	A	B	A	A	-
HCM 95th %tile Q(veh)	0	-	-	0.1	0.3	0	-	-

Intersection	
Int Delay, s/veh	3

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		⇕			⇕			⇕			⇕	
Traffic Vol, veh/h	4	0	18	19	0	3	5	44	6	1	67	0
Future Vol, veh/h	4	0	18	19	0	3	5	44	6	1	67	0
Conflicting Peds, #/hr	0	0	0	0	0	0	0	0	0	0	0	0
Sign Control	Stop	Stop	Stop	Stop	Stop	Stop	Free	Free	Free	Free	Free	Free
RT Channelized	-	-	None	-	-	None	-	-	None	-	-	None
Storage Length	-	-	-	-	-	-	-	-	-	-	-	-
Veh in Median Storage, #	-	0	-	-	0	-	-	0	-	-	0	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	78	78	78	78	78	78	78	78	78	80	80	80
Heavy Vehicles, %	25	2	35	100	2	100	20	2	100	100	2	2
Mvmt Flow	5	0	23	24	0	4	6	56	8	1	84	0

Major/Minor	Minor2			Minor1			Major1			Major2		
Conflicting Flow All	160	162	84	170	158	60	84	0	0	64	0	0
Stage 1	86	86	-	72	72	-	-	-	-	-	-	-
Stage 2	74	76	-	98	86	-	-	-	-	-	-	-
Critical Hdwy	7.35	6.52	6.55	8.1	6.52	7.2	4.3	-	-	5.1	-	-
Critical Hdwy Stg 1	6.35	5.52	-	7.1	5.52	-	-	-	-	-	-	-
Critical Hdwy Stg 2	6.35	5.52	-	7.1	5.52	-	-	-	-	-	-	-
Follow-up Hdwy	3.725	4.018	3.615	4.4	4.018	4.2	2.38	-	-	3.1	-	-
Pot Cap-1 Maneuver	756	730	891	618	734	787	1407	-	-	1090	-	-
Stage 1	868	824	-	742	835	-	-	-	-	-	-	-
Stage 2	881	832	-	716	824	-	-	-	-	-	-	-
Platoon blocked, %								-	-		-	-
Mov Cap-1 Maneuver	749	726	891	599	730	787	1407	-	-	1090	-	-
Mov Cap-2 Maneuver	749	726	-	599	730	-	-	-	-	-	-	-
Stage 1	865	823	-	739	832	-	-	-	-	-	-	-
Stage 2	873	829	-	697	823	-	-	-	-	-	-	-

Approach	EB	WB	NB	SB
HCM Control Delay, s	9.3	11.1	0.7	0.1
HCM LOS	A	B		

Minor Lane/Major Mvmt	NBL	NBT	NBR	EBLn1	WBLn1	SBL	SBT	SBR
Capacity (veh/h)	1407	-	-	861	619	1090	-	-
HCM Lane V/C Ratio	0.005	-	-	0.033	0.046	0.001	-	-
HCM Control Delay (s)	7.6	0	-	9.3	11.1	8.3	0	-
HCM Lane LOS	A	A	-	A	B	A	A	-
HCM 95th %tile Q(veh)	0	-	-	0.1	0.1	0	-	-

Lane Group	WBL	WBR	NBT	NBR	SBL	SBT
Lane Group Flow (vph)	278	271	235	187	258	257
v/c Ratio	0.54	0.46	0.17	0.25	0.61	0.18
Control Delay	17.6	5.4	7.3	2.4	15.9	7.3
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	17.6	5.4	7.3	2.4	15.9	7.3
Queue Length 50th (ft)	47	0	14	0	38	16
Queue Length 95th (ft)	88	38	26	10	98	33
Internal Link Dist (ft)	2524		1483			1982
Turn Bay Length (ft)				90	150	
Base Capacity (vph)	709	711	2794	1288	833	2821
Starvation Cap Reductn	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0
Reduced v/c Ratio	0.39	0.38	0.08	0.15	0.31	0.09

Intersection Summary

Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Traffic Volume (veh/h)	175	230	181	131	232	226
Future Volume (veh/h)	175	230	181	131	232	226
Initial Q (Qb), veh	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00	1.00		1.00	1.00	
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach	No		No			No
Adj Sat Flow, veh/h/ln	1870	1633	1856	1856	1752	1870
Adj Flow Rate, veh/h	278	271	235	187	258	257
Peak Hour Factor	0.63	0.85	0.77	0.70	0.90	0.88
Percent Heavy Veh, %	2	18	3	3	10	2
Cap, veh/h	471	366	1499	668	550	1511
Arrive On Green	0.26	0.26	0.43	0.43	0.43	0.43
Sat Flow, veh/h	1781	1384	3618	1572	904	3647
Grp Volume(v), veh/h	278	271	235	187	258	257
Grp Sat Flow(s),veh/h/ln	1781	1384	1763	1572	904	1777
Q Serve(g_s), s	4.8	6.3	1.5	2.7	8.7	1.6
Cycle Q Clear(g_c), s	4.8	6.3	1.5	2.7	10.2	1.6
Prop In Lane	1.00	1.00		1.00	1.00	
Lane Grp Cap(c), veh/h	471	366	1499	668	550	1511
V/C Ratio(X)	0.59	0.74	0.16	0.28	0.47	0.17
Avail Cap(c_a), veh/h	730	567	2938	1310	919	2961
HCM Platoon Ratio	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
Uniform Delay (d), s/veh	11.4	11.9	6.3	6.6	9.4	6.3
Incr Delay (d2), s/veh	1.2	3.0	0.0	0.2	0.6	0.1
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	1.5	1.7	0.3	0.6	1.2	0.4
Unsig. Movement Delay, s/veh						
LnGrp Delay(d),s/veh	12.5	14.9	6.3	6.9	10.0	6.4
LnGrp LOS	B	B	A	A	B	A
Approach Vol, veh/h	549		422			515
Approach Delay, s/veh	13.7		6.6			8.2
Approach LOS	B		A			A

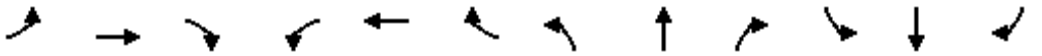
Timer - Assigned Phs		2		4		6
Phs Duration (G+Y+Rc), s		20.6		14.9		20.6
Change Period (Y+Rc), s		5.5		5.5		5.5
Max Green Setting (Gmax), s		29.5		14.5		29.5
Max Q Clear Time (g_c+I1), s		12.2		8.3		4.7
Green Ext Time (p_c), s		2.9		1.1		2.1

Intersection Summary	
HCM 6th Ctrl Delay	9.8
HCM 6th LOS	A

Lane Group	EBL	EBT	WBL	WBT	NBL	NBT	NBR	SBL	SBT	SBR
Lane Group Flow (vph)	147	88	72	60	72	881	44	45	1170	79
v/c Ratio	0.70	0.25	0.31	0.18	0.22	0.38	0.04	0.10	0.52	0.08
Control Delay	56.3	12.8	38.3	12.8	3.7	5.7	0.4	2.0	5.0	0.5
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	56.3	12.8	38.3	12.8	3.7	5.7	0.4	2.0	5.0	0.5
Queue Length 50th (ft)	88	8	40	4	8	112	1	4	73	1
Queue Length 95th (ft)	133	0	49	26	m11	144	m1	7	85	2
Internal Link Dist (ft)		501		409		1152			1009	
Turn Bay Length (ft)	115		60		250		115	215		120
Base Capacity (vph)	252	404	277	386	397	2340	1076	513	2266	1016
Starvation Cap Reductn	0	0	0	0	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0	0	0	0	0
Reduced v/c Ratio	0.58	0.22	0.26	0.16	0.18	0.38	0.04	0.09	0.52	0.08

Intersection Summary

m Volume for 95th percentile queue is metered by upstream signal.



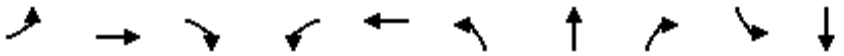
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	119	5	39	42	6	40	56	740	29	38	1065	55
Future Volume (veh/h)	119	5	39	42	6	40	56	740	29	38	1065	55
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		1.00	1.00		1.00	1.00		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	1678	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870	1826
Adj Flow Rate, veh/h	147	16	72	72	8	52	72	881	44	45	1170	79
Peak Hour Factor	0.81	0.31	0.54	0.58	0.75	0.77	0.78	0.84	0.66	0.85	0.91	0.70
Percent Heavy Veh, %	15	2	2	2	2	2	2	2	2	2	2	5
Cap, veh/h	257	55	247	253	40	260	441	2224	992	529	2195	956
Arrive On Green	0.19	0.19	0.17	0.19	0.19	0.17	0.11	1.00	1.00	0.09	1.00	1.00
Sat Flow, veh/h	1204	296	1334	1309	216	1402	1781	3554	1585	1781	3554	1547
Grp Volume(v), veh/h	147	0	88	72	0	60	72	881	44	45	1170	79
Grp Sat Flow(s),veh/h/ln	1204	0	1630	1309	0	1618	1781	1777	1585	1781	1777	1547
Q Serve(g_s), s	11.8	0.0	4.7	5.0	0.0	3.2	1.4	0.0	0.0	0.8	0.0	0.0
Cycle Q Clear(g_c), s	14.9	0.0	4.7	9.7	0.0	3.2	1.4	0.0	0.0	0.8	0.0	0.0
Prop In Lane	1.00		0.82	1.00		0.87	1.00		1.00	1.00		1.00
Lane Grp Cap(c), veh/h	257	0	302	253	0	300	441	2224	992	529	2195	956
V/C Ratio(X)	0.57	0.00	0.29	0.28	0.00	0.20	0.16	0.40	0.04	0.08	0.53	0.08
Avail Cap(c_a), veh/h	290	0	347	289	0	345	526	2224	992	631	2195	956
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	2.00	2.00	2.00	2.00	2.00	2.00
Upstream Filter(I)	1.00	0.00	1.00	1.00	0.00	1.00	0.76	0.76	0.76	0.91	0.91	0.91
Uniform Delay (d), s/veh	40.8	0.0	35.6	39.3	0.0	35.0	5.5	0.0	0.0	5.4	0.0	0.0
Incr Delay (d2), s/veh	2.1	0.0	0.5	0.6	0.0	0.3	0.0	0.4	0.1	0.0	0.8	0.2
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(50%),veh/ln	3.6	0.0	1.9	1.7	0.0	1.3	0.4	0.1	0.0	0.3	0.3	0.0
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	42.9	0.0	36.1	39.9	0.0	35.3	5.6	0.4	0.1	5.5	0.8	0.2
LnGrp LOS	D	A	D	D	A	D	A	A	A	A	A	A
Approach Vol, veh/h		235			132			997			1294	
Approach Delay, s/veh		40.3			37.8			0.8			1.0	
Approach LOS		D			D			A			A	

Timer - Assigned Phs	1	2		4	5	6		8				
Phs Duration (G+Y+Rc), s	10.2	66.6		23.2	9.3	67.5		23.2				
Change Period (Y+Rc), s	5.0	* 6		6.0	5.0	* 6		6.0				
Max Green Setting (Gmax), s	10.0	* 53		20.0	10.0	* 53		20.0				
Max Q Clear Time (g_c+I1), s	3.4	2.0		11.7	2.8	2.0		16.9				
Green Ext Time (p_c), s	0.0	7.2		0.3	0.0	4.7		0.3				

Intersection Summary	
HCM 6th Ctrl Delay	6.2
HCM 6th LOS	A

Notes

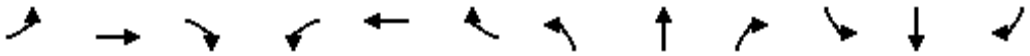
* HCM 6th computational engine requires equal clearance times for the phases crossing the barrier.



Lane Group	EBL	EBT	EBR	WBL	WBT	NBL	NBT	NBR	SBL	SBT
Lane Group Flow (vph)	172	326	106	183	494	44	533	160	467	944
v/c Ratio	0.64	0.75	0.27	0.58	0.67	0.13	0.60	0.30	0.71	0.52
Control Delay	39.6	55.1	1.7	35.0	19.7	9.1	36.1	4.6	17.9	10.1
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	39.6	55.1	1.7	35.0	19.7	9.1	36.1	4.6	17.9	10.1
Queue Length 50th (ft)	84	108	0	90	56	11	157	0	85	92
Queue Length 95th (ft)	120	#158	0	138	108	13	198	36	122	116
Internal Link Dist (ft)		1034			900		1974			1152
Turn Bay Length (ft)	165		145	145		150		100	330	
Base Capacity (vph)	271	432	395	332	733	373	895	538	657	1809
Starvation Cap Reductn	0	0	0	0	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0	0	0	0	0
Reduced v/c Ratio	0.63	0.75	0.27	0.55	0.67	0.12	0.60	0.30	0.71	0.52

Intersection Summary

95th percentile volume exceeds capacity, queue may be longer.
Queue shown is maximum after two cycles.



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	134	277	70	154	162	259	22	453	154	430	696	114
Future Volume (veh/h)	134	277	70	154	162	259	22	453	154	430	696	114
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	1841	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870
Adj Flow Rate, veh/h	172	326	106	183	182	312	44	533	160	467	800	144
Peak Hour Factor	0.78	0.85	0.66	0.84	0.89	0.83	0.50	0.85	0.96	0.92	0.87	0.79
Percent Heavy Veh, %	4	2	2	2	2	2	2	2	2	2	2	2
Cap, veh/h	272	469	177	339	256	228	467	899	401	701	1482	267
Arrive On Green	0.11	0.13	0.11	0.13	0.14	0.12	0.06	0.25	0.25	0.60	0.99	0.95
Sat Flow, veh/h	1753	3554	1585	1781	1777	1585	1781	3554	1585	1781	3008	541
Grp Volume(v), veh/h	172	326	106	183	182	312	44	533	160	467	473	471
Grp Sat Flow(s),veh/h/ln	1753	1777	1585	1781	1777	1585	1781	1777	1585	1781	1777	1773
Q Serve(g_s), s	8.2	8.8	6.4	8.5	9.8	14.4	1.1	13.2	5.5	2.6	0.8	1.5
Cycle Q Clear(g_c), s	8.2	8.8	6.4	8.5	9.8	14.4	1.1	13.2	5.5	2.6	0.8	1.5
Prop In Lane	1.00		1.00	1.00		1.00	1.00		1.00	1.00		0.31
Lane Grp Cap(c), veh/h	272	469	177	339	256	228	467	899	401	701	875	873
V/C Ratio(X)	0.63	0.70	0.60	0.54	0.71	1.37	0.09	0.59	0.40	0.67	0.54	0.54
Avail Cap(c_a), veh/h	272	469	177	371	256	228	539	899	401	701	875	873
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	2.00	2.00	2.00
Upstream Filter(I)	1.00	1.00	1.00	0.99	0.99	0.99	0.57	0.57	0.57	0.85	0.85	0.85
Uniform Delay (d), s/veh	32.4	41.5	42.3	31.2	40.8	43.8	10.2	32.8	13.2	12.7	0.4	0.7
Incr Delay (d2), s/veh	4.7	5.7	8.2	1.3	8.8	190.4	0.0	1.6	1.7	2.0	2.0	2.0
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(50%),veh/ln	3.7	4.1	2.9	3.7	4.8	17.7	0.4	5.6	3.2	4.6	0.6	0.8
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	37.1	47.2	50.4	32.5	49.6	234.2	10.2	34.5	14.9	14.7	2.4	2.7
LnGrp LOS	D	D	D	C	D	F	B	C	B	B	A	A
Approach Vol, veh/h		604			677			737			1411	
Approach Delay, s/veh		44.9			130.0			28.8			6.6	
Approach LOS		D			F			C			A	

Timer - Assigned Phs	1	2	3	4	5	6	7	8
Phs Duration (G+Y+Rc), s	10.9	54.1	16.0	19.0	35.0	30.0	17.2	17.8
Change Period (Y+Rc), s	* 6.7	6.8	6.6	6.6	* 6.8	6.7	6.6	6.6
Max Green Setting (Gmax), s	* 8.3	43.2	9.4	12.4	* 28	23.3	12.4	9.4
Max Q Clear Time (g_c+I1), s	3.1	3.5	10.2	16.4	4.6	15.2	10.5	10.8
Green Ext Time (p_c), s	0.0	4.1	0.0	0.0	1.9	2.0	0.1	0.0

Intersection Summary	
HCM 6th Ctrl Delay	42.5
HCM 6th LOS	D

Notes

* HCM 6th computational engine requires equal clearance times for the phases crossing the barrier.

APPENDIX F

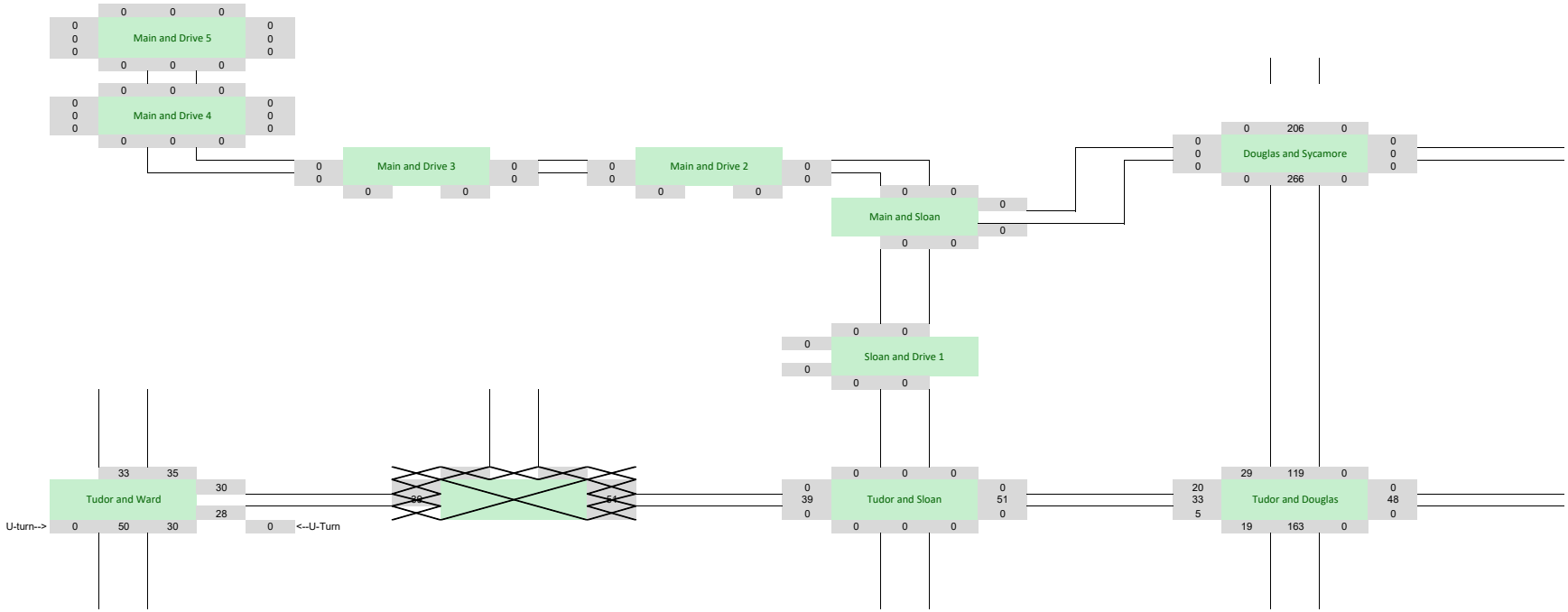
Future Year 2041 plus Approved plus Full Build Development Conditions

Future Volumes

Future Background AM
Existing plus Approved volumes grown by 2%/year

Growth Rate = 2%
Period = 20 years
1.485947

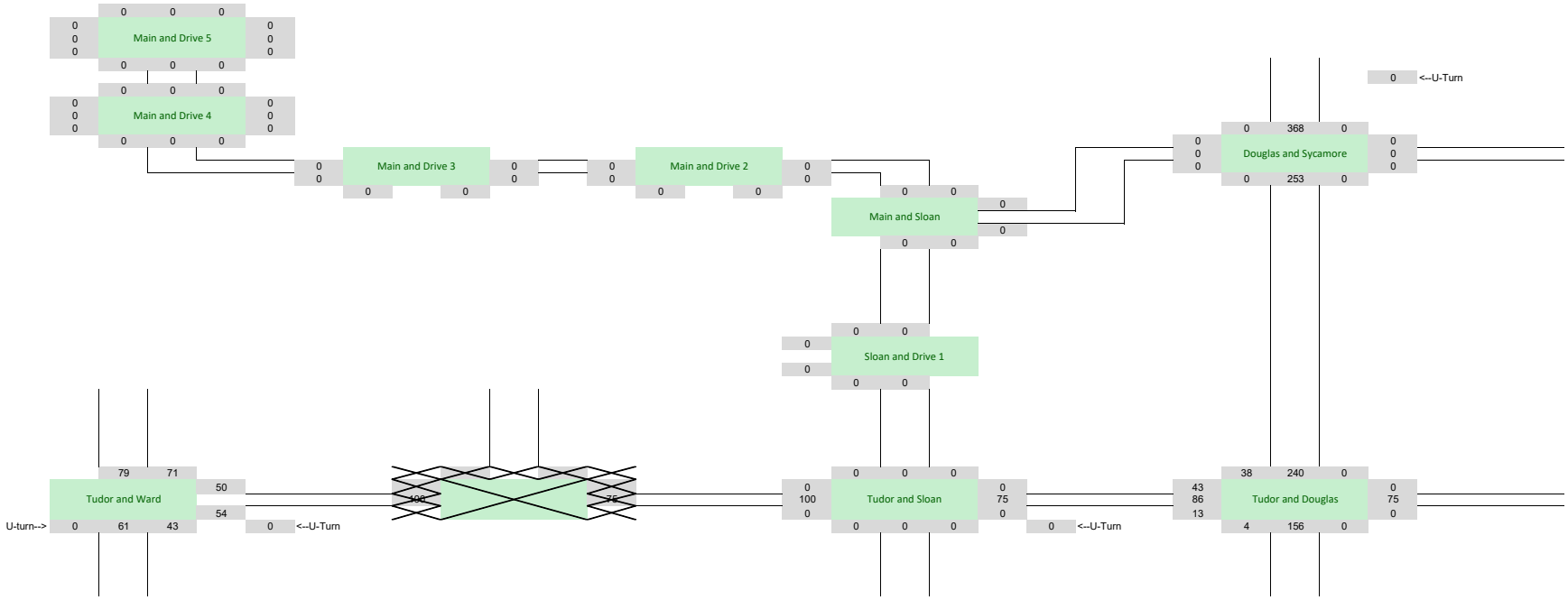
Applied to Ward T, Tudor T, Douglas T. Turning movements at Tudor/Ward and Douglas/Tudor inc to account for increased trips to Tudor.



Future Background PM
Existing plus Approved volumes grown by 2%/year

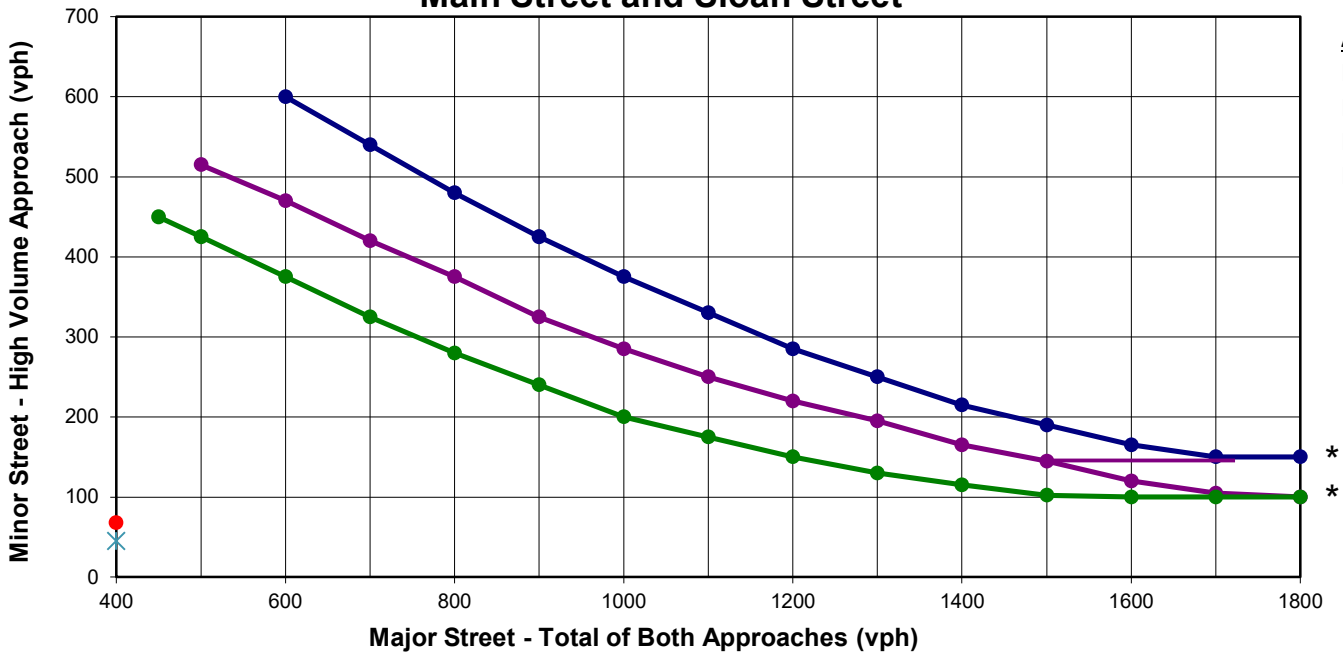
Growth Rate = 2%
Period = 20 years
1.485947

Applied to Ward T, Tudor T, Douglas T. Turning movements at Tudor/Ward and Douglas/Tudor inc to account for increased trips to Tudor.



Signal Warrants

Peak Hour Volume Warrant (Future Year 2041 plus Approved plus Full Build Conditions)
Main Street and Sloan Street



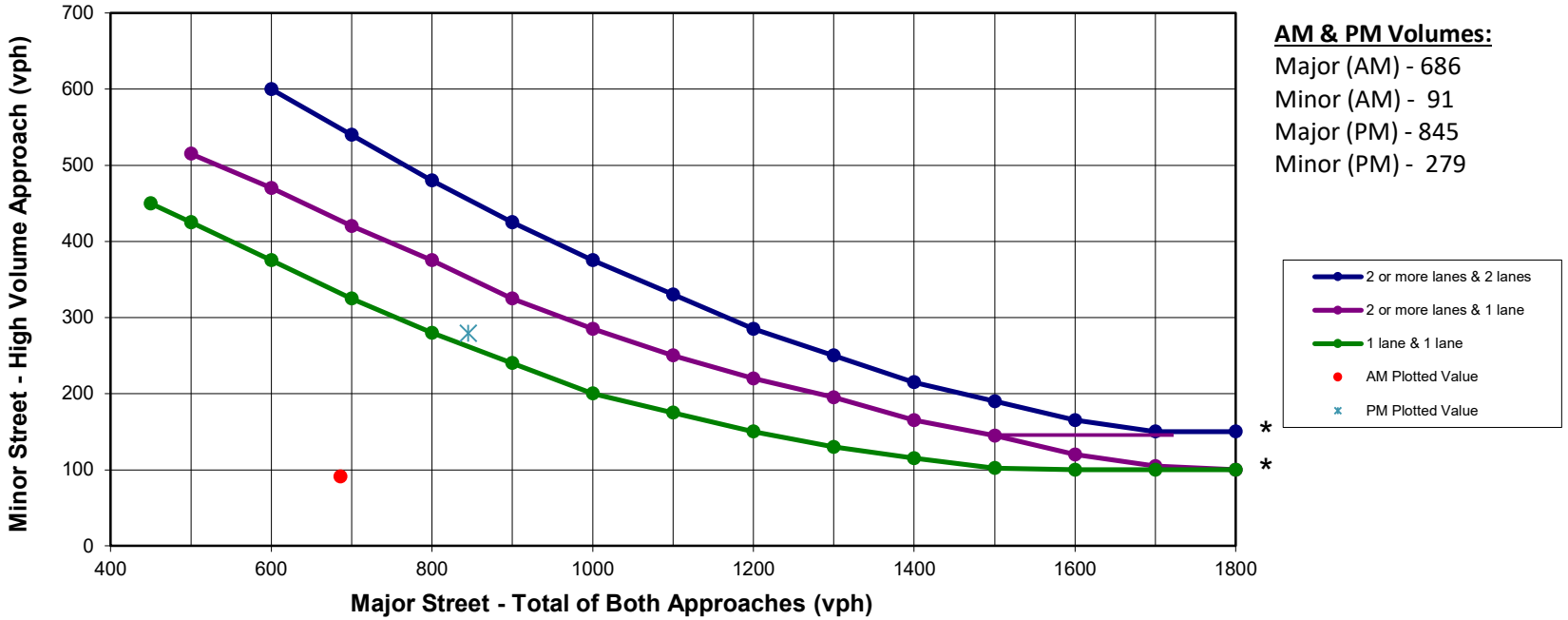
AM & PM Volumes:

Major (AM) - 270
Minor (AM) - 68
Major (PM) - 326
Minor (PM) - 45

2 or more lanes & 2 lanes
2 or more lanes & 1 lane
1 lane & 1 lane
AM Plotted Value
PM Plotted Value

*Note: 150 vph applies as the lower threshold volume for a minor street approach with two or more lanes and 100 vph applies as the lower threshold volume for a minor street approach with one lane.

Peak Hour Volume Warrant (Future Year 2041 plus Approved plus Full Build Conditions)
Tudor Road and Main Street



AM & PM Volumes:

Major (AM) - 686
Minor (AM) - 91
Major (PM) - 845
Minor (PM) - 279

*Note: 150 vph applies as the lower threshold volume for a minor street approach with two or more lanes and 100 vph applies as the lower threshold volume for a minor street approach with one lane.

Capacity Analysis

Intersection	
Int Delay, s/veh	2.5

Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Traffic Vol, veh/h	23	45	168	31	11	60
Future Vol, veh/h	23	45	168	31	11	60
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Stop	Stop	Free	Free	Free	Free
RT Channelized	-	None	-	None	-	None
Storage Length	0	-	-	-	150	-
Veh in Median Storage, #	0	-	0	-	-	0
Grade, %	0	-	0	-	-	0
Peak Hour Factor	78	78	83	83	78	78
Heavy Vehicles, %	4	10	25	2	35	15
Mvmt Flow	29	58	202	37	14	77

Major/Minor	Minor1		Major1		Major2	
Conflicting Flow All	326	221	0	0	239	0
Stage 1	221	-	-	-	-	-
Stage 2	105	-	-	-	-	-
Critical Hdwy	6.44	6.3	-	-	4.45	-
Critical Hdwy Stg 1	5.44	-	-	-	-	-
Critical Hdwy Stg 2	5.44	-	-	-	-	-
Follow-up Hdwy	3.536	3.39	-	-	2.515	-
Pot Cap-1 Maneuver	664	799	-	-	1157	-
Stage 1	811	-	-	-	-	-
Stage 2	914	-	-	-	-	-
Platoon blocked, %			-	-		-
Mov Cap-1 Maneuver	656	799	-	-	1157	-
Mov Cap-2 Maneuver	656	-	-	-	-	-
Stage 1	811	-	-	-	-	-
Stage 2	903	-	-	-	-	-

Approach	WB	NB	SB
HCM Control Delay, s	10.5	0	1.3
HCM LOS	B		

Minor Lane/Major Mvmt	NBT	NBR	WBLn1	SBL	SBT
Capacity (veh/h)	-	-	744	1157	-
HCM Lane V/C Ratio	-	-	0.117	0.012	-
HCM Control Delay (s)	-	-	10.5	8.2	-
HCM Lane LOS	-	-	B	A	-
HCM 95th %tile Q(veh)	-	-	0.4	0	-

Intersection	
Int Delay, s/veh	1.6

Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Traffic Vol, veh/h	1	13	54	198	78	5
Future Vol, veh/h	1	13	54	198	78	5
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Stop	Stop	Free	Free	Free	Free
RT Channelized	-	None	-	None	-	None
Storage Length	0	-	150	-	-	-
Veh in Median Storage, #	0	-	-	0	0	-
Grade, %	0	-	-	0	0	-
Peak Hour Factor	78	78	86	86	79	79
Heavy Vehicles, %	2	30	30	20	35	2
Mvmt Flow	1	17	63	230	99	6

Major/Minor	Minor2		Major1		Major2	
Conflicting Flow All	458	102	105	0	-	0
Stage 1	102	-	-	-	-	-
Stage 2	356	-	-	-	-	-
Critical Hdwy	6.42	6.5	4.4	-	-	-
Critical Hdwy Stg 1	5.42	-	-	-	-	-
Critical Hdwy Stg 2	5.42	-	-	-	-	-
Follow-up Hdwy	3.518	3.57	2.47	-	-	-
Pot Cap-1 Maneuver	561	882	1329	-	-	-
Stage 1	922	-	-	-	-	-
Stage 2	709	-	-	-	-	-
Platoon blocked, %				-	-	-
Mov Cap-1 Maneuver	535	882	1329	-	-	-
Mov Cap-2 Maneuver	535	-	-	-	-	-
Stage 1	879	-	-	-	-	-
Stage 2	709	-	-	-	-	-

Approach	EB	NB	SB
HCM Control Delay, s	9.4	1.7	0
HCM LOS	A		

Minor Lane/Major Mvmt	NBL	NBT	EBLn1	SBT	SBR
Capacity (veh/h)	1329	-	843	-	-
HCM Lane V/C Ratio	0.047	-	0.021	-	-
HCM Control Delay (s)	7.8	-	9.4	-	-
HCM Lane LOS	A	-	A	-	-
HCM 95th %tile Q(veh)	0.1	-	0.1	-	-

Intersection	
Int Delay, s/veh	8.9

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Vol, veh/h	149	149	23	78	199	88	11	15	42	39	10	42
Future Vol, veh/h	149	149	23	78	199	88	11	15	42	39	10	42
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	185	-	-	110	-	150	150	-	-	150	-	150
Veh in Median Storage, #	-	0	-	-	0	-	-	0	-	-	0	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	78	89	58	81	69	78	69	38	55	67	67	67
Heavy Vehicles, %	40	2	2	2	2	9	2	2	10	6	2	28
Mvmt Flow	191	167	40	96	288	113	16	39	76	58	15	63

Major/Minor	Major1			Major2			Minor1			Minor2		
Conflicting Flow All	401	0	0	207	0	0	913	1162	104	965	1069	144
Stage 1	-	-	-	-	-	-	569	569	-	480	480	-
Stage 2	-	-	-	-	-	-	344	593	-	485	589	-
Critical Hdwy	4.9	-	-	4.14	-	-	7.54	6.54	7.1	7.62	6.54	7.46
Critical Hdwy Stg 1	-	-	-	-	-	-	6.54	5.54	-	6.62	5.54	-
Critical Hdwy Stg 2	-	-	-	-	-	-	6.54	5.54	-	6.62	5.54	-
Follow-up Hdwy	2.6	-	-	2.22	-	-	3.52	4.02	3.4	3.56	4.02	3.58
Pot Cap-1 Maneuver	924	-	-	1361	-	-	228	194	906	204	220	801
Stage 1	-	-	-	-	-	-	474	504	-	525	553	-
Stage 2	-	-	-	-	-	-	645	492	-	522	494	-
Platoon blocked, %		-	-		-	-						
Mov Cap-1 Maneuver	924	-	-	1361	-	-	156	143	906	119	162	801
Mov Cap-2 Maneuver	-	-	-	-	-	-	156	143	-	119	162	-
Stage 1	-	-	-	-	-	-	376	400	-	416	514	-
Stage 2	-	-	-	-	-	-	537	457	-	342	392	-

Approach	EB	WB	NB	SB
HCM Control Delay, s	4.8	1.5	23.4	34.1
HCM LOS			C	D

Minor Lane/Major Mvmt	NBLn1	NBLn2	EBL	EBT	EBR	WBL	WBT	WBR	SBLn1	SBLn2	SBLn3
Capacity (veh/h)	156	321	924	-	-	1361	-	-	119	162	801
HCM Lane V/C Ratio	0.102	0.361	0.207	-	-	0.071	-	-	0.489	0.092	0.078
HCM Control Delay (s)	30.7	22.4	9.9	-	-	7.8	-	-	61.3	29.5	9.9
HCM Lane LOS	D	C	A	-	-	A	-	-	F	D	A
HCM 95th %tile Q(veh)	0.3	1.6	0.8	-	-	0.2	-	-	2.2	0.3	0.3

Intersection	
Int Delay, s/veh	1.8

Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations						
Traffic Vol, veh/h	58	1	51	162	0	13
Future Vol, veh/h	58	1	51	162	0	13
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Stop	Stop
RT Channelized	-	None	-	None	-	None
Storage Length	-	-	150	-	0	-
Veh in Median Storage, #	0	-	-	0	0	-
Grade, %	0	-	-	0	0	-
Peak Hour Factor	78	78	83	83	78	78
Heavy Vehicles, %	10	2	25	25	2	30
Mvmt Flow	74	1	61	195	0	17

Major/Minor	Major1		Major2		Minor1	
Conflicting Flow All	0	0	75	0	392	75
Stage 1	-	-	-	-	75	-
Stage 2	-	-	-	-	317	-
Critical Hdwy	-	-	4.35	-	6.42	6.5
Critical Hdwy Stg 1	-	-	-	-	5.42	-
Critical Hdwy Stg 2	-	-	-	-	5.42	-
Follow-up Hdwy	-	-	2.425	-	3.518	3.57
Pot Cap-1 Maneuver	-	-	1390	-	612	914
Stage 1	-	-	-	-	948	-
Stage 2	-	-	-	-	738	-
Platoon blocked, %	-	-		-		
Mov Cap-1 Maneuver	-	-	1390	-	585	914
Mov Cap-2 Maneuver	-	-	-	-	585	-
Stage 1	-	-	-	-	948	-
Stage 2	-	-	-	-	706	-

Approach	EB	WB	NB
HCM Control Delay, s	0	1.8	9
HCM LOS			A

Minor Lane/Major Mvmt	NBLn1	EBT	EBR	WBL	WBT
Capacity (veh/h)	914	-	-	1390	-
HCM Lane V/C Ratio	0.018	-	-	0.044	-
HCM Control Delay (s)	9	-	-	7.7	-
HCM Lane LOS	A	-	-	A	-
HCM 95th %tile Q(veh)	0.1	-	-	0.1	-

Intersection	
Int Delay, s/veh	0.9

Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations						
Traffic Vol, veh/h	54	4	25	137	1	5
Future Vol, veh/h	54	4	25	137	1	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	-	0	-
Veh in Median Storage, #	0	-	-	0	0	-
Grade, %	0	-	-	0	0	-
Peak Hour Factor	78	78	78	78	78	78
Heavy Vehicles, %	5	2	45	25	2	45
Mvmt Flow	69	5	32	176	1	6

Major/Minor	Major1		Minor1	
Conflicting Flow All	0	0	72	72
Stage 1	-	-	72	-
Stage 2	-	-	0	-
Critical Hdwy	-	-	6.42	6.65
Critical Hdwy Stg 1	-	-	5.42	-
Critical Hdwy Stg 2	-	-	-	-
Follow-up Hdwy	-	-	3.518	3.705
Pot Cap-1 Maneuver	-	-	932	883
Stage 1	-	-	951	-
Stage 2	-	-	-	-
Platoon blocked, %	-	-		
Mov Cap-1 Maneuver	-	-	932	883
Mov Cap-2 Maneuver	-	-	932	-
Stage 1	-	-	951	-
Stage 2	-	-	-	-

Approach	EB	NB
HCM Control Delay, s	0	9.1
HCM LOS		A

Minor Lane/Major Mvmt	NBLn1	EBT	EBR
Capacity (veh/h)	891	-	-
HCM Lane V/C Ratio	0.009	-	-
HCM Control Delay (s)	9.1	-	-
HCM Lane LOS	A	-	-
HCM 95th %tile Q(veh)	0	-	-

Intersection	
Int Delay, s/veh	1.7

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↕			↕			↕			↕	
Traffic Vol, veh/h	0	0	4	11	0	1	17	71	50	7	43	0
Future Vol, veh/h	0	0	4	11	0	1	17	71	50	7	43	0
Conflicting Peds, #/hr	0	0	0	0	0	0	0	0	0	0	0	0
Sign Control	Stop	Stop	Stop	Stop	Stop	Stop	Free	Free	Free	Free	Free	Free
RT Channelized	-	-	None	-	-	None	-	-	None	-	-	None
Storage Length	-	-	-	-	-	-	-	-	-	-	-	-
Veh in Median Storage, #	-	0	-	-	0	-	-	0	-	-	0	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	78	78	78	78	78	78	84	84	84	78	78	78
Heavy Vehicles, %	2	2	25	2	2	2	30	35	2	2	20	2
Mvmt Flow	0	0	5	14	0	1	20	85	60	9	55	0

Major/Minor	Minor2			Minor1			Major1			Major2		
Conflicting Flow All	229	258	55	231	228	115	55	0	0	145	0	0
Stage 1	73	73	-	155	155	-	-	-	-	-	-	-
Stage 2	156	185	-	76	73	-	-	-	-	-	-	-
Critical Hdwy	7.12	6.52	6.45	7.12	6.52	6.22	4.4	-	-	4.12	-	-
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	3.518	4.018	3.525	3.518	4.018	3.318	2.47	-	-	2.218	-	-
Pot Cap-1 Maneuver	726	646	951	724	671	937	1389	-	-	1437	-	-
Stage 1	937	834	-	847	769	-	-	-	-	-	-	-
Stage 2	846	747	-	933	834	-	-	-	-	-	-	-
Platoon blocked, %								-	-		-	-
Mov Cap-1 Maneuver	713	632	951	708	656	937	1389	-	-	1437	-	-
Mov Cap-2 Maneuver	713	632	-	708	656	-	-	-	-	-	-	-
Stage 1	922	829	-	833	757	-	-	-	-	-	-	-
Stage 2	831	735	-	922	829	-	-	-	-	-	-	-

Approach	EB	WB	NB	SB
HCM Control Delay, s	8.8	10.1	0.9	1.1
HCM LOS	A	B		

Minor Lane/Major Mvmt	NBL	NBT	NBR	EBLn1	WBLn1	SBL	SBT	SBR
Capacity (veh/h)	1389	-	-	951	723	1437	-	-
HCM Lane V/C Ratio	0.015	-	-	0.005	0.021	0.006	-	-
HCM Control Delay (s)	7.6	0	-	8.8	10.1	7.5	0	-
HCM Lane LOS	A	A	-	A	B	A	A	-
HCM 95th %tile Q(veh)	0	-	-	0	0.1	0	-	-

Intersection	
Int Delay, s/veh	2.1

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↕			↕			↕			↕	
Traffic Vol, veh/h	1	0	4	6	0	1	17	34	21	3	40	4
Future Vol, veh/h	1	0	4	6	0	1	17	34	21	3	40	4
Conflicting Peds, #/hr	0	0	0	0	0	0	0	0	0	0	0	0
Sign Control	Stop	Stop	Stop	Stop	Stop	Stop	Free	Free	Free	Free	Free	Free
RT Channelized	-	-	None	-	-	None	-	-	None	-	-	None
Storage Length	-	-	-	-	-	-	-	-	-	-	-	-
Veh in Median Storage, #	-	0	-	-	0	-	-	0	-	-	0	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	78	78	78	78	78	78	80	80	80	78	78	78
Heavy Vehicles, %	40	2	50	100	2	100	30	2	100	100	2	25
Mvmt Flow	1	0	5	8	0	1	21	43	26	4	51	5

Major/Minor	Minor2			Minor1			Major1			Major2		
Conflicting Flow All	161	173	54	162	162	56	56	0	0	69	0	0
Stage 1	62	62	-	98	98	-	-	-	-	-	-	-
Stage 2	99	111	-	64	64	-	-	-	-	-	-	-
Critical Hdwy	7.5	6.52	6.7	8.1	6.52	7.2	4.4	-	-	5.1	-	-
Critical Hdwy Stg 1	6.5	5.52	-	7.1	5.52	-	-	-	-	-	-	-
Critical Hdwy Stg 2	6.5	5.52	-	7.1	5.52	-	-	-	-	-	-	-
Follow-up Hdwy	3.86	4.018	3.75	4.4	4.018	4.2	2.47	-	-	3.1	-	-
Pot Cap-1 Maneuver	726	720	893	626	730	792	1387	-	-	1085	-	-
Stage 1	862	843	-	716	814	-	-	-	-	-	-	-
Stage 2	822	804	-	750	842	-	-	-	-	-	-	-
Platoon blocked, %								-	-		-	-
Mov Cap-1 Maneuver	714	706	893	613	715	792	1387	-	-	1085	-	-
Mov Cap-2 Maneuver	714	706	-	613	715	-	-	-	-	-	-	-
Stage 1	848	840	-	705	801	-	-	-	-	-	-	-
Stage 2	808	791	-	743	839	-	-	-	-	-	-	-

Approach	EB	WB	NB	SB
HCM Control Delay, s	9.3	10.8	1.8	0.5
HCM LOS	A	B		

Minor Lane/Major Mvmt	NBL	NBT	NBR	EBLn1	WBLn1	SBL	SBT	SBR
Capacity (veh/h)	1387	-	-	850	633	1085	-	-
HCM Lane V/C Ratio	0.015	-	-	0.008	0.014	0.004	-	-
HCM Control Delay (s)	7.6	0	-	9.3	10.8	8.3	0	-
HCM Lane LOS	A	A	-	A	B	A	A	-
HCM 95th %tile Q(veh)	0	-	-	0	0	0	-	-

Lane Group	WBL	WBR	NBT	NBR	SBL	SBT
Lane Group Flow (vph)	167	190	240	218	277	191
v/c Ratio	0.40	0.39	0.14	0.25	0.63	0.12
Control Delay	17.1	5.9	6.3	2.0	15.7	6.3
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	17.1	5.9	6.3	2.0	15.7	6.3
Queue Length 50th (ft)	27	0	13	0	38	10
Queue Length 95th (ft)	65	21	28	5	100	19
Internal Link Dist (ft)	2524		1483			1982
Turn Bay Length (ft)				90	150	
Base Capacity (vph)	631	631	2618	1228	678	2384
Starvation Cap Reductn	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0
Reduced v/c Ratio	0.26	0.30	0.09	0.18	0.41	0.08

Intersection Summary

Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Traffic Volume (veh/h)	115	139	197	135	227	128
Future Volume (veh/h)	115	139	197	135	227	128
Initial Q (Qb), veh	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00	1.00		1.00	1.00	
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach	No		No			No
Adj Sat Flow, veh/h/ln	1841	1678	1870	1870	1530	1722
Adj Flow Rate, veh/h	167	190	240	218	277	191
Peak Hour Factor	0.69	0.73	0.82	0.62	0.82	0.67
Percent Heavy Veh, %	4	15	2	2	25	12
Cap, veh/h	374	304	1722	768	539	1586
Arrive On Green	0.21	0.21	0.48	0.48	0.48	0.48
Sat Flow, veh/h	1753	1422	3647	1585	763	3358
Grp Volume(v), veh/h	167	190	240	218	277	191
Grp Sat Flow(s),veh/h/ln	1753	1422	1777	1585	763	1636
Q Serve(g_s), s	3.0	4.4	1.4	3.0	11.5	1.2
Cycle Q Clear(g_c), s	3.0	4.4	1.4	3.0	12.8	1.2
Prop In Lane	1.00	1.00		1.00	1.00	
Lane Grp Cap(c), veh/h	374	304	1722	768	539	1586
V/C Ratio(X)	0.45	0.63	0.14	0.28	0.51	0.12
Avail Cap(c_a), veh/h	697	566	2876	1283	787	2648
HCM Platoon Ratio	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
Uniform Delay (d), s/veh	12.5	13.0	5.2	5.6	8.7	5.1
Incr Delay (d2), s/veh	0.8	2.1	0.0	0.2	0.8	0.0
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	1.0	1.2	0.3	0.6	1.2	0.2
Unsig. Movement Delay, s/veh						
LnGrp Delay(d),s/veh	13.3	15.1	5.2	5.8	9.5	5.2
LnGrp LOS	B	B	A	A	A	A
Approach Vol, veh/h	357		458			468
Approach Delay, s/veh	14.3		5.5			7.7
Approach LOS	B		A			A

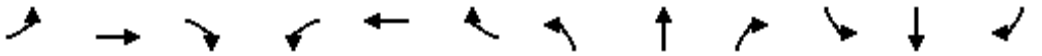
Timer - Assigned Phs		2		4		6
Phs Duration (G+Y+Rc), s		23.2		13.3		23.2
Change Period (Y+Rc), s		5.5		5.5		5.5
Max Green Setting (Gmax), s		29.5		14.5		29.5
Max Q Clear Time (g_c+I1), s		14.8		6.4		5.0
Green Ext Time (p_c), s		2.8		0.7		2.2

Intersection Summary	
HCM 6th Ctrl Delay	8.8
HCM 6th LOS	A

Lane Group	EBL	EBT	WBL	WBT	NBL	NBT	NBR	SBL	SBT	SBR
Lane Group Flow (vph)	100	36	24	48	92	1252	20	24	964	162
v/c Ratio	0.53	0.08	0.12	0.17	0.19	0.48	0.02	0.07	0.42	0.15
Control Delay	44.2	0.3	31.9	13.7	1.5	4.6	0.2	2.3	7.0	1.3
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	44.2	0.3	31.9	13.7	1.5	4.6	0.2	2.3	7.0	1.3
Queue Length 50th (ft)	53	0	12	4	2	14	0	1	89	0
Queue Length 95th (ft)	78	0	22	3	m3	295	m0	5	138	8
Internal Link Dist (ft)		501		409		1152			1009	
Turn Bay Length (ft)	115		60		250		115	215		120
Base Capacity (vph)	268	554	293	380	480	2589	1184	387	2293	1069
Starvation Cap Reductn	0	0	0	0	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0	0	0	0	0
Reduced v/c Ratio	0.37	0.06	0.08	0.13	0.19	0.48	0.02	0.06	0.42	0.15

Intersection Summary

m Volume for 95th percentile queue is metered by upstream signal.



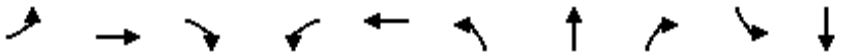
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	75	0	21	15	3	21	73	1039	9	18	810	138
Future Volume (veh/h)	75	0	21	15	3	21	73	1039	9	18	810	138
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		1.00	1.00		1.00	1.00		1.00	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	1752	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870	1856
Adj Flow Rate, veh/h	100	0	36	24	8	40	92	1252	20	24	964	162
Peak Hour Factor	0.75	1.00	0.58	0.63	0.38	0.53	0.79	0.83	0.45	0.75	0.84	0.85
Percent Heavy Veh, %	10	2	2	2	2	2	2	2	2	2	2	3
Cap, veh/h	225	0	223	245	38	191	647	2370	1057	428	1824	807
Arrive On Green	0.14	0.00	0.13	0.14	0.14	0.13	0.35	1.00	1.00	0.07	1.00	1.00
Sat Flow, veh/h	1271	0	1585	1372	271	1355	1781	3554	1585	1781	3554	1572
Grp Volume(v), veh/h	100	0	36	24	0	48	92	1252	20	24	964	162
Grp Sat Flow(s),veh/h/ln	1271	0	1585	1372	0	1626	1781	1777	1585	1781	1777	1572
Q Serve(g_s), s	6.8	0.0	1.8	1.4	0.0	2.4	0.0	0.0	0.0	0.4	0.0	0.0
Cycle Q Clear(g_c), s	9.2	0.0	1.8	3.2	0.0	2.4	0.0	0.0	0.0	0.4	0.0	0.0
Prop In Lane	1.00		1.00	1.00		0.83	1.00		1.00	1.00		1.00
Lane Grp Cap(c), veh/h	225	0	223	245	0	229	647	2370	1057	428	1824	807
V/C Ratio(X)	0.44	0.00	0.16	0.10	0.00	0.21	0.14	0.53	0.02	0.06	0.53	0.20
Avail Cap(c_a), veh/h	319	0	340	346	0	349	647	2370	1057	533	1824	807
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	2.00	2.00	2.00	2.00	2.00	2.00
Upstream Filter(I)	1.00	0.00	1.00	1.00	0.00	1.00	0.60	0.60	0.60	0.96	0.96	0.96
Uniform Delay (d), s/veh	38.3	0.0	34.6	35.4	0.0	34.7	4.2	0.0	0.0	4.1	0.0	0.0
Incr Delay (d2), s/veh	1.4	0.0	0.3	0.2	0.0	0.4	0.0	0.5	0.0	0.0	1.1	0.5
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(50%),veh/ln	2.2	0.0	0.7	0.5	0.0	1.0	0.4	0.2	0.0	0.1	0.3	0.1
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	39.7	0.0	34.9	35.6	0.0	35.2	4.2	0.5	0.0	4.1	1.1	0.5
LnGrp LOS	D	A	C	D	A	D	A	A	A	A	A	A
Approach Vol, veh/h		136			72			1364			1150	
Approach Delay, s/veh		38.4			35.3			0.8			1.0	
Approach LOS		D			D			A			A	

Timer - Assigned Phs	1	2		4	5	6		8				
Phs Duration (G+Y+Rc), s	21.6	51.0		17.4	7.7	64.9		17.4				
Change Period (Y+Rc), s	* 6	* 6		6.0	5.0	* 6		6.0				
Max Green Setting (Gmax), s	* 10	* 45		18.0	8.0	* 47		18.0				
Max Q Clear Time (g_c+I1), s	2.0	2.0		5.2	2.4	2.0		11.2				
Green Ext Time (p_c), s	0.0	5.9		0.2	0.0	7.5		0.3				

Intersection Summary	
HCM 6th Ctrl Delay	3.7
HCM 6th LOS	A

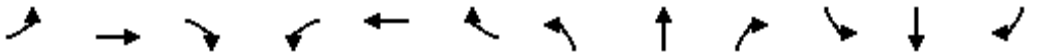
Notes

* HCM 6th computational engine requires equal clearance times for the phases crossing the barrier.



Lane Group	EBL	EBT	EBR	WBL	WBT	NBL	NBT	NBR	SBL	SBT
Lane Group Flow (vph)	123	159	71	177	765	212	806	159	350	669
v/c Ratio	0.50	0.32	0.16	0.44	0.85	0.51	0.77	0.26	0.78	0.45
Control Delay	29.5	36.2	0.8	26.2	27.6	20.0	36.1	2.8	30.2	16.7
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	29.5	36.2	0.8	26.2	27.6	20.0	36.1	2.8	30.2	16.7
Queue Length 50th (ft)	49	43	0	73	111	56	229	0	191	176
Queue Length 95th (ft)	64	68	0	88	105	50	256	0	191	230
Internal Link Dist (ft)		1034			900		1974			1152
Turn Bay Length (ft)	165		145	145		150		100	330	
Base Capacity (vph)	245	521	449	410	930	413	1049	614	490	1477
Starvation Cap Reductn	0	0	0	0	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0	0	0	0	0
Reduced v/c Ratio	0.50	0.31	0.16	0.43	0.82	0.51	0.77	0.26	0.71	0.45

Intersection Summary



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	81	135	27	117	215	314	110	637	105	238	461	123
Future Volume (veh/h)	81	135	27	117	215	314	110	637	105	238	461	123
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	1856	1856	1841	1841	1870	1870	1870	1870	1870	1781	1870	1856
Adj Flow Rate, veh/h	123	159	71	177	303	462	212	806	159	350	485	184
Peak Hour Factor	0.66	0.85	0.38	0.66	0.71	0.68	0.52	0.79	0.66	0.68	0.95	0.67
Percent Heavy Veh, %	3	3	4	4	2	2	2	2	2	8	2	3
Cap, veh/h	245	570	217	437	344	306	437	1157	516	456	1043	393
Arrive On Green	0.09	0.16	0.14	0.13	0.19	0.17	0.09	0.33	0.33	0.12	0.28	0.26
Sat Flow, veh/h	1767	3526	1560	1753	1777	1585	1781	3554	1585	1697	2524	952
Grp Volume(v), veh/h	123	159	71	177	303	462	212	806	159	350	340	329
Grp Sat Flow(s),veh/h/ln	1767	1763	1560	1753	1777	1585	1781	1777	1585	1697	1777	1699
Q Serve(g_s), s	5.0	3.6	2.8	7.2	14.9	17.4	0.0	17.8	6.8	11.4	14.3	14.6
Cycle Q Clear(g_c), s	5.0	3.6	2.8	7.2	14.9	17.4	0.0	17.8	6.8	11.4	14.3	14.6
Prop In Lane	1.00		1.00	1.00		1.00	1.00		1.00	1.00		0.56
Lane Grp Cap(c), veh/h	245	570	217	437	344	306	437	1157	516	456	734	702
V/C Ratio(X)	0.50	0.28	0.33	0.40	0.88	1.51	0.48	0.70	0.31	0.77	0.46	0.47
Avail Cap(c_a), veh/h	245	570	217	460	344	306	437	1157	516	569	734	702
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	0.67	0.67	0.67
Upstream Filter(I)	1.00	1.00	1.00	0.96	0.96	0.96	0.75	0.75	0.75	0.91	0.91	0.91
Uniform Delay (d), s/veh	28.0	33.1	19.5	25.4	35.3	37.3	26.8	26.5	22.7	18.8	24.3	24.6
Incr Delay (d2), s/veh	1.6	0.6	1.8	0.6	21.7	244.1	0.6	2.6	1.2	4.5	1.9	2.0
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(50%),veh/ln	2.2	1.5	1.5	3.0	8.3	27.4	3.8	7.3	2.6	4.8	6.5	6.4
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	29.6	33.7	21.3	25.9	57.0	281.4	27.4	29.1	23.9	23.3	26.2	26.7
LnGrp LOS	C	C	C	C	E	F	C	C	C	C	C	C
Approach Vol, veh/h		353			942			1177			1019	
Approach Delay, s/veh		29.8			161.2			28.1			25.3	
Approach LOS		C			F			C			C	

Timer - Assigned Phs	1	2	3	4	5	6	7	8
Phs Duration (G+Y+Rc), s	13.0	42.0	13.0	22.0	21.0	34.0	15.9	19.1
Change Period (Y+Rc), s	6.7	* 6.8	6.6	6.6	6.8	* 6.7	6.6	6.6
Max Green Setting (Gmax), s	6.3	* 35	6.4	15.4	20.2	* 21	10.4	11.4
Max Q Clear Time (g_c+I1), s	2.0	16.6	7.0	19.4	13.4	19.8	9.2	5.6
Green Ext Time (p_c), s	0.3	2.5	0.0	0.0	0.8	0.7	0.1	0.8

Intersection Summary	
HCM 6th Ctrl Delay	63.4
HCM 6th LOS	E

Notes

* HCM 6th computational engine requires equal clearance times for the phases crossing the barrier.

Intersection	
Int Delay, s/veh	2.3

Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Traffic Vol, veh/h	33	12	67	21	43	195
Future Vol, veh/h	33	12	67	21	43	195
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Stop	Stop	Free	Free	Free	Free
RT Channelized	-	None	-	None	-	None
Storage Length	0	-	-	-	150	-
Veh in Median Storage, #	0	-	0	-	-	0
Grade, %	0	-	0	-	-	0
Peak Hour Factor	78	78	79	79	84	84
Heavy Vehicles, %	2	30	30	2	35	20
Mvmt Flow	42	15	85	27	51	232

Major/Minor	Minor1		Major1		Major2	
Conflicting Flow All	433	99	0	0	112	0
Stage 1	99	-	-	-	-	-
Stage 2	334	-	-	-	-	-
Critical Hdwy	6.42	6.5	-	-	4.45	-
Critical Hdwy Stg 1	5.42	-	-	-	-	-
Critical Hdwy Stg 2	5.42	-	-	-	-	-
Follow-up Hdwy	3.518	3.57	-	-	2.515	-
Pot Cap-1 Maneuver	580	885	-	-	1296	-
Stage 1	925	-	-	-	-	-
Stage 2	725	-	-	-	-	-
Platoon blocked, %			-	-		-
Mov Cap-1 Maneuver	557	885	-	-	1296	-
Mov Cap-2 Maneuver	557	-	-	-	-	-
Stage 1	925	-	-	-	-	-
Stage 2	697	-	-	-	-	-

Approach	WB	NB	SB
HCM Control Delay, s	11.4	0	1.4
HCM LOS	B		

Minor Lane/Major Mvmt	NBT	NBR	WBLn1	SBL	SBT
Capacity (veh/h)	-	-	618	1296	-
HCM Lane V/C Ratio	-	-	0.093	0.039	-
HCM Control Delay (s)	-	-	11.4	7.9	-
HCM Lane LOS	-	-	B	A	-
HCM 95th %tile Q(veh)	-	-	0.3	0.1	-

Intersection	
Int Delay, s/veh	2.1

Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Traffic Vol, veh/h	5	53	15	83	226	2
Future Vol, veh/h	5	53	15	83	226	2
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Stop	Stop	Free	Free	Free	Free
RT Channelized	-	None	-	None	-	None
Storage Length	0	-	150	-	-	-
Veh in Median Storage, #	0	-	-	0	0	-
Grade, %	0	-	-	0	0	-
Peak Hour Factor	78	78	78	78	85	85
Heavy Vehicles, %	2	30	30	30	30	2
Mvmt Flow	6	68	19	106	266	2

Major/Minor	Minor2		Major1		Major2	
Conflicting Flow All	411	267	268	0	-	0
Stage 1	267	-	-	-	-	-
Stage 2	144	-	-	-	-	-
Critical Hdwy	6.42	6.5	4.4	-	-	-
Critical Hdwy Stg 1	5.42	-	-	-	-	-
Critical Hdwy Stg 2	5.42	-	-	-	-	-
Follow-up Hdwy	3.518	3.57	2.47	-	-	-
Pot Cap-1 Maneuver	597	709	1150	-	-	-
Stage 1	778	-	-	-	-	-
Stage 2	883	-	-	-	-	-
Platoon blocked, %				-	-	-
Mov Cap-1 Maneuver	587	709	1150	-	-	-
Mov Cap-2 Maneuver	587	-	-	-	-	-
Stage 1	765	-	-	-	-	-
Stage 2	883	-	-	-	-	-

Approach	EB	NB	SB
HCM Control Delay, s	10.8	1.3	0
HCM LOS	B		

Minor Lane/Major Mvmt	NBL	NBT	EBLn1	SBT	SBR
Capacity (veh/h)	1150	-	697	-	-
HCM Lane V/C Ratio	0.017	-	0.107	-	-
HCM Control Delay (s)	8.2	-	10.8	-	-
HCM Lane LOS	A	-	B	-	-
HCM 95th %tile Q(veh)	0.1	-	0.4	-	-

Intersection	
Int Delay, s/veh	9.2

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Vol, veh/h	50	388	33	40	291	43	18	5	67	111	12	156
Future Vol, veh/h	50	388	33	40	291	43	18	5	67	111	12	156
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	185	-	-	110	-	150	150	-	-	150	-	150
Veh in Median Storage, #	-	0	-	-	0	-	-	0	-	-	0	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	69	90	83	70	79	60	90	75	64	83	83	83
Heavy Vehicles, %	25	2	3	3	2	3	2	2	2	8	2	30
Mvmt Flow	72	431	40	57	368	72	20	7	105	134	14	188

Major/Minor	Major1			Major2			Minor1			Minor2		
Conflicting Flow All	440	0	0	471	0	0	900	1149	236	845	1097	184
Stage 1	-	-	-	-	-	-	595	595	-	482	482	-
Stage 2	-	-	-	-	-	-	305	554	-	363	615	-
Critical Hdwy	4.6	-	-	4.16	-	-	7.54	6.54	6.94	7.66	6.54	7.5
Critical Hdwy Stg 1	-	-	-	-	-	-	6.54	5.54	-	6.66	5.54	-
Critical Hdwy Stg 2	-	-	-	-	-	-	6.54	5.54	-	6.66	5.54	-
Follow-up Hdwy	2.45	-	-	2.23	-	-	3.52	4.02	3.32	3.58	4.02	3.6
Pot Cap-1 Maneuver	969	-	-	1080	-	-	233	197	766	246	212	746
Stage 1	-	-	-	-	-	-	458	491	-	519	552	-
Stage 2	-	-	-	-	-	-	680	512	-	612	480	-
Platoon blocked, %		-	-		-	-						
Mov Cap-1 Maneuver	969	-	-	1080	-	-	149	173	766	187	186	746
Mov Cap-2 Maneuver	-	-	-	-	-	-	149	173	-	187	186	-
Stage 1	-	-	-	-	-	-	424	455	-	481	523	-
Stage 2	-	-	-	-	-	-	469	485	-	482	444	-

Approach	EB	WB	NB	SB
HCM Control Delay, s	1.2	1	15.1	32
HCM LOS			C	D

Minor Lane/Major Mvmt	NBLn1	NBLn2	EBL	EBT	EBR	WBL	WBT	WBR	SBLn1	SBLn2	SBLn3
Capacity (veh/h)	149	636	969	-	-	1080	-	-	187	186	746
HCM Lane V/C Ratio	0.134	0.175	0.075	-	-	0.053	-	-	0.715	0.078	0.252
HCM Control Delay (s)	32.9	11.9	9	-	-	8.5	-	-	61.7	26	11.4
HCM Lane LOS	D	B	A	-	-	A	-	-	F	D	B
HCM 95th %tile Q(veh)	0.5	0.6	0.2	-	-	0.2	-	-	4.5	0.2	1

Intersection	
Int Delay, s/veh	2.1

Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations						
Traffic Vol, veh/h	187	1	13	66	2	51
Future Vol, veh/h	187	1	13	66	2	51
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Stop	Stop
RT Channelized	-	None	-	None	-	None
Storage Length	-	-	150	-	0	-
Veh in Median Storage, #	0	-	-	0	0	-
Grade, %	0	-	-	0	0	-
Peak Hour Factor	80	80	78	78	78	78
Heavy Vehicles, %	20	2	25	15	2	30
Mvmt Flow	234	1	17	85	3	65

Major/Minor	Major1		Major2		Minor1	
Conflicting Flow All	0	0	235	0	354	235
Stage 1	-	-	-	-	235	-
Stage 2	-	-	-	-	119	-
Critical Hdwy	-	-	4.35	-	6.42	6.5
Critical Hdwy Stg 1	-	-	-	-	5.42	-
Critical Hdwy Stg 2	-	-	-	-	5.42	-
Follow-up Hdwy	-	-	2.425	-	3.518	3.57
Pot Cap-1 Maneuver	-	-	1208	-	644	740
Stage 1	-	-	-	-	804	-
Stage 2	-	-	-	-	906	-
Platoon blocked, %	-	-		-		
Mov Cap-1 Maneuver	-	-	1208	-	635	740
Mov Cap-2 Maneuver	-	-	-	-	635	-
Stage 1	-	-	-	-	804	-
Stage 2	-	-	-	-	893	-

Approach	EB	WB	NB
HCM Control Delay, s	0	1.3	10.4
HCM LOS			B

Minor Lane/Major Mvmt	NBLn1	EBT	EBR	WBL	WBT
Capacity (veh/h)	735	-	-	1208	-
HCM Lane V/C Ratio	0.092	-	-	0.014	-
HCM Control Delay (s)	10.4	-	-	8	-
HCM Lane LOS	B	-	-	A	-
HCM 95th %tile Q(veh)	0.3	-	-	0	-

Intersection	
Int Delay, s/veh	1.4

Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations						
Traffic Vol, veh/h	165	0	6	62	3	23
Future Vol, veh/h	165	0	6	62	3	23
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	-	0	-
Veh in Median Storage, #	0	-	-	0	0	-
Grade, %	0	-	-	0	0	-
Peak Hour Factor	78	78	78	78	78	78
Heavy Vehicles, %	20	2	50	15	2	45
Mvmt Flow	212	0	8	79	4	29

Major/Minor	Major1		Minor1	
Conflicting Flow All	0	0	212	212
Stage 1	-	-	212	-
Stage 2	-	-	0	-
Critical Hdwy	-	-	6.42	6.65
Critical Hdwy Stg 1	-	-	5.42	-
Critical Hdwy Stg 2	-	-	-	-
Follow-up Hdwy	-	-	3.518	3.705
Pot Cap-1 Maneuver	-	-	776	731
Stage 1	-	-	823	-
Stage 2	-	-	-	-
Platoon blocked, %	-	-		
Mov Cap-1 Maneuver	-	-	776	731
Mov Cap-2 Maneuver	-	-	776	-
Stage 1	-	-	823	-
Stage 2	-	-	-	-

Approach	EB	NB
HCM Control Delay, s	0	10.1
HCM LOS		B

Minor Lane/Major Mvmt	NBLn1	EBT	EBR
Capacity (veh/h)	736	-	-
HCM Lane V/C Ratio	0.045	-	-
HCM Control Delay (s)	10.1	-	-
HCM Lane LOS	B	-	-
HCM 95th %tile Q(veh)	0.1	-	-

Intersection	
Int Delay, s/veh	3.3

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↕			↕			↕			↕	
Traffic Vol, veh/h	2	0	17	47	0	5	4	48	13	3	101	0
Future Vol, veh/h	2	0	17	47	0	5	4	48	13	3	101	0
Conflicting Peds, #/hr	0	0	0	0	0	0	0	0	0	0	0	0
Sign Control	Stop	Stop	Stop	Stop	Stop	Stop	Free	Free	Free	Free	Free	Free
RT Channelized	-	-	None	-	-	None	-	-	None	-	-	None
Storage Length	-	-	-	-	-	-	-	-	-	-	-	-
Veh in Median Storage, #	-	0	-	-	0	-	-	0	-	-	0	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	78	78	78	78	78	78	78	78	78	83	83	83
Heavy Vehicles, %	2	2	35	2	2	2	25	15	2	2	25	2
Mvmt Flow	3	0	22	60	0	6	5	62	17	4	122	0

Major/Minor	Minor2			Minor1			Major1			Major2		
Conflicting Flow All	214	219	122	222	211	71	122	0	0	79	0	0
Stage 1	130	130	-	81	81	-	-	-	-	-	-	-
Stage 2	84	89	-	141	130	-	-	-	-	-	-	-
Critical Hdwy	7.12	6.52	6.55	7.12	6.52	6.22	4.35	-	-	4.12	-	-
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	3.518	4.018	3.615	3.518	4.018	3.318	2.425	-	-	2.218	-	-
Pot Cap-1 Maneuver	743	679	847	734	686	991	1334	-	-	1519	-	-
Stage 1	874	789	-	927	828	-	-	-	-	-	-	-
Stage 2	924	821	-	862	789	-	-	-	-	-	-	-
Platoon blocked, %								-	-		-	-
Mov Cap-1 Maneuver	734	674	847	711	681	991	1334	-	-	1519	-	-
Mov Cap-2 Maneuver	734	674	-	711	681	-	-	-	-	-	-	-
Stage 1	871	787	-	923	825	-	-	-	-	-	-	-
Stage 2	914	818	-	837	787	-	-	-	-	-	-	-

Approach	EB	WB	NB	SB
HCM Control Delay, s	9.5	10.4	0.5	0.2
HCM LOS	A	B		

Minor Lane/Major Mvmt	NBL	NBT	NBR	EBLn1	WBLn1	SBL	SBT	SBR
Capacity (veh/h)	1334	-	-	833	731	1519	-	-
HCM Lane V/C Ratio	0.004	-	-	0.029	0.091	0.002	-	-
HCM Control Delay (s)	7.7	0	-	9.5	10.4	7.4	0	-
HCM Lane LOS	A	A	-	A	B	A	A	-
HCM 95th %tile Q(veh)	0	-	-	0.1	0.3	0	-	-

Intersection	
Int Delay, s/veh	3

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↕			↕			↕			↕	
Traffic Vol, veh/h	4	0	18	19	0	3	5	44	6	1	67	0
Future Vol, veh/h	4	0	18	19	0	3	5	44	6	1	67	0
Conflicting Peds, #/hr	0	0	0	0	0	0	0	0	0	0	0	0
Sign Control	Stop	Stop	Stop	Stop	Stop	Stop	Free	Free	Free	Free	Free	Free
RT Channelized	-	-	None	-	-	None	-	-	None	-	-	None
Storage Length	-	-	-	-	-	-	-	-	-	-	-	-
Veh in Median Storage, #	-	0	-	-	0	-	-	0	-	-	0	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	78	78	78	78	78	78	78	78	78	80	80	80
Heavy Vehicles, %	25	2	35	100	2	100	20	2	100	100	2	2
Mvmt Flow	5	0	23	24	0	4	6	56	8	1	84	0

Major/Minor	Minor2			Minor1			Major1			Major2		
Conflicting Flow All	160	162	84	170	158	60	84	0	0	64	0	0
Stage 1	86	86	-	72	72	-	-	-	-	-	-	-
Stage 2	74	76	-	98	86	-	-	-	-	-	-	-
Critical Hdwy	7.35	6.52	6.55	8.1	6.52	7.2	4.3	-	-	5.1	-	-
Critical Hdwy Stg 1	6.35	5.52	-	7.1	5.52	-	-	-	-	-	-	-
Critical Hdwy Stg 2	6.35	5.52	-	7.1	5.52	-	-	-	-	-	-	-
Follow-up Hdwy	3.725	4.018	3.615	4.4	4.018	4.2	2.38	-	-	3.1	-	-
Pot Cap-1 Maneuver	756	730	891	618	734	787	1407	-	-	1090	-	-
Stage 1	868	824	-	742	835	-	-	-	-	-	-	-
Stage 2	881	832	-	716	824	-	-	-	-	-	-	-
Platoon blocked, %								-	-		-	-
Mov Cap-1 Maneuver	749	726	891	599	730	787	1407	-	-	1090	-	-
Mov Cap-2 Maneuver	749	726	-	599	730	-	-	-	-	-	-	-
Stage 1	865	823	-	739	832	-	-	-	-	-	-	-
Stage 2	873	829	-	697	823	-	-	-	-	-	-	-

Approach	EB	WB	NB	SB
HCM Control Delay, s	9.3	11.1	0.7	0.1
HCM LOS	A	B		

Minor Lane/Major Mvmt	NBL	NBT	NBR	EBLn1	WBLn1	SBL	SBT	SBR
Capacity (veh/h)	1407	-	-	861	619	1090	-	-
HCM Lane V/C Ratio	0.005	-	-	0.033	0.046	0.001	-	-
HCM Control Delay (s)	7.6	0	-	9.3	11.1	8.3	0	-
HCM Lane LOS	A	A	-	A	B	A	A	-
HCM 95th %tile Q(veh)	0	-	-	0.1	0.1	0	-	-

Lane Group	WBL	WBR	NBT	NBR	SBL	SBT
Lane Group Flow (vph)	363	329	314	249	337	347
v/c Ratio	0.71	0.52	0.20	0.29	0.76	0.22
Control Delay	26.9	6.0	7.3	2.1	22.9	7.4
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	26.9	6.0	7.3	2.1	22.9	7.4
Queue Length 50th (ft)	85	0	24	0	70	27
Queue Length 95th (ft)	120	42	34	10	#157	44
Internal Link Dist (ft)	2524		1483			1982
Turn Bay Length (ft)				90	150	
Base Capacity (vph)	598	680	2411	1156	666	2435
Starvation Cap Reductn	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0
Reduced v/c Ratio	0.61	0.48	0.13	0.22	0.51	0.14

Intersection Summary

95th percentile volume exceeds capacity, queue may be longer.
Queue shown is maximum after two cycles.

Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Traffic Volume (veh/h)	229	280	242	174	303	305
Future Volume (veh/h)	229	280	242	174	303	305
Initial Q (Qb), veh	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00	1.00		1.00	1.00	
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach	No		No			No
Adj Sat Flow, veh/h/ln	1870	1633	1856	1856	1752	1870
Adj Flow Rate, veh/h	363	329	314	249	337	347
Peak Hour Factor	0.63	0.85	0.77	0.70	0.90	0.88
Percent Heavy Veh, %	2	18	3	3	10	2
Cap, veh/h	482	375	1819	811	511	1833
Arrive On Green	0.27	0.27	0.52	0.52	0.52	0.52
Sat Flow, veh/h	1781	1384	3618	1572	794	3647
Grp Volume(v), veh/h	363	329	314	249	337	347
Grp Sat Flow(s),veh/h/ln	1781	1384	1763	1572	794	1777
Q Serve(g_s), s	9.6	11.7	2.4	4.7	20.2	2.7
Cycle Q Clear(g_c), s	9.6	11.7	2.4	4.7	22.7	2.7
Prop In Lane	1.00	1.00		1.00	1.00	
Lane Grp Cap(c), veh/h	482	375	1819	811	511	1833
V/C Ratio(X)	0.75	0.88	0.17	0.31	0.66	0.19
Avail Cap(c_a), veh/h	501	389	2016	899	556	2032
HCM Platoon Ratio	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
Uniform Delay (d), s/veh	17.2	18.0	6.6	7.2	12.7	6.7
Incr Delay (d2), s/veh	6.1	19.3	0.0	0.2	2.6	0.0
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	4.2	5.2	0.7	1.2	3.0	0.7
Unsig. Movement Delay, s/veh						
LnGrp Delay(d),s/veh	23.3	37.3	6.7	7.4	15.2	6.7
LnGrp LOS	C	D	A	A	B	A
Approach Vol, veh/h	692		563			684
Approach Delay, s/veh	30.0		7.0			10.9
Approach LOS	C		A			B

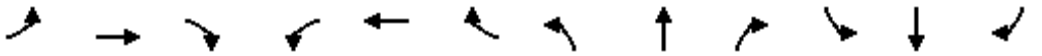
Timer - Assigned Phs		2		4		6
Phs Duration (G+Y+Rc), s		32.1		19.5		32.1
Change Period (Y+Rc), s		5.5		5.5		5.5
Max Green Setting (Gmax), s		29.5		14.5		29.5
Max Q Clear Time (g_c+I1), s		24.7		13.7		6.7
Green Ext Time (p_c), s		1.9		0.2		2.8

Intersection Summary	
HCM 6th Ctrl Delay	16.6
HCM 6th LOS	B

Lane Group	EBL	EBT	WBL	WBT	NBL	NBT	NBR	SBL	SBT	SBR
Lane Group Flow (vph)	147	88	72	60	72	1182	44	80	1575	79
v/c Ratio	0.70	0.25	0.31	0.18	0.33	0.52	0.04	0.24	0.70	0.08
Control Delay	56.3	12.8	38.3	12.8	9.8	7.3	0.3	4.1	10.6	0.5
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	56.3	12.8	38.3	12.8	9.8	7.3	0.3	4.1	10.6	0.5
Queue Length 50th (ft)	88	8	40	4	6	160	0	8	390	1
Queue Length 95th (ft)	133	0	49	26	m8	181	m0	15	525	2
Internal Link Dist (ft)		501		409		1152			1009	
Turn Bay Length (ft)	115		60		250		115	215		120
Base Capacity (vph)	252	404	277	386	287	2262	1043	396	2265	1015
Starvation Cap Reductn	0	0	0	0	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0	0	0	0	0
Reduced v/c Ratio	0.58	0.22	0.26	0.16	0.25	0.52	0.04	0.20	0.70	0.08

Intersection Summary

m Volume for 95th percentile queue is metered by upstream signal.



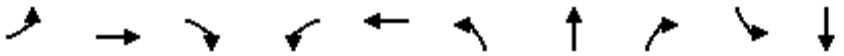
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	119	5	39	42	6	40	56	993	29	68	1433	55
Future Volume (veh/h)	119	5	39	42	6	40	56	993	29	68	1433	55
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		1.00	1.00		1.00	1.00		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	1678	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870	1826
Adj Flow Rate, veh/h	147	16	72	72	8	52	72	1182	44	80	1575	79
Peak Hour Factor	0.81	0.31	0.54	0.58	0.75	0.77	0.78	0.84	0.66	0.85	0.91	0.70
Percent Heavy Veh, %	15	2	2	2	2	2	2	2	2	2	2	5
Cap, veh/h	257	55	247	253	40	260	353	2186	975	451	2195	956
Arrive On Green	0.19	0.19	0.17	0.19	0.19	0.17	0.11	1.00	1.00	0.11	1.00	1.00
Sat Flow, veh/h	1204	296	1334	1309	216	1402	1781	3554	1585	1781	3554	1547
Grp Volume(v), veh/h	147	0	88	72	0	60	72	1182	44	80	1575	79
Grp Sat Flow(s),veh/h/ln	1204	0	1630	1309	0	1618	1781	1777	1585	1781	1777	1547
Q Serve(g_s), s	11.8	0.0	4.7	5.0	0.0	3.2	1.4	0.0	0.0	1.5	0.0	0.0
Cycle Q Clear(g_c), s	14.9	0.0	4.7	9.7	0.0	3.2	1.4	0.0	0.0	1.5	0.0	0.0
Prop In Lane	1.00		0.82	1.00		0.87	1.00		1.00	1.00		1.00
Lane Grp Cap(c), veh/h	257	0	302	253	0	300	353	2186	975	451	2195	956
V/C Ratio(X)	0.57	0.00	0.29	0.28	0.00	0.20	0.20	0.54	0.05	0.18	0.72	0.08
Avail Cap(c_a), veh/h	290	0	347	289	0	345	439	2186	975	534	2195	956
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	2.00	2.00	2.00	2.00	2.00	2.00
Upstream Filter(I)	1.00	0.00	1.00	1.00	0.00	1.00	0.48	0.48	0.48	0.91	0.91	0.91
Uniform Delay (d), s/veh	40.8	0.0	35.6	39.3	0.0	35.0	5.5	0.0	0.0	5.5	0.0	0.0
Incr Delay (d2), s/veh	2.1	0.0	0.5	0.6	0.0	0.3	0.1	0.5	0.0	0.1	1.9	0.2
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(50%),veh/ln	3.6	0.0	1.9	1.7	0.0	1.3	0.4	0.1	0.0	0.5	0.6	0.0
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	42.9	0.0	36.1	39.9	0.0	35.3	5.6	0.5	0.0	5.6	1.9	0.2
LnGrp LOS	D	A	D	D	A	D	A	A	A	A	A	A
Approach Vol, veh/h		235			132			1298			1734	
Approach Delay, s/veh		40.3			37.8			0.7			2.0	
Approach LOS		D			D			A			A	

Timer - Assigned Phs	1	2		4	5	6		8				
Phs Duration (G+Y+Rc), s	10.2	66.6		23.2	10.3	66.4		23.2				
Change Period (Y+Rc), s	5.0	* 6		6.0	5.0	* 6		6.0				
Max Green Setting (Gmax), s	10.0	* 53		20.0	10.0	* 53		20.0				
Max Q Clear Time (g_c+I1), s	3.4	2.0		11.7	3.5	2.0		16.9				
Green Ext Time (p_c), s	0.0	11.6		0.3	0.0	7.0		0.3				

Intersection Summary	
HCM 6th Ctrl Delay	5.5
HCM 6th LOS	A

Notes

* HCM 6th computational engine requires equal clearance times for the phases crossing the barrier.

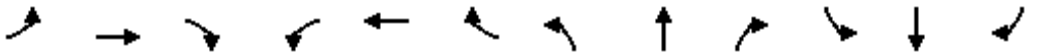


Lane Group	EBL	EBT	EBR	WBL	WBT	NBL	NBT	NBR	SBL	SBT
Lane Group Flow (vph)	227	427	126	183	578	52	716	160	467	1268
v/c Ratio	0.84	0.98	0.32	0.58	0.85	0.21	0.80	0.30	0.76	0.74
Control Delay	56.8	84.1	2.1	35.4	36.8	10.4	42.9	4.6	26.0	16.3
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	56.8	84.1	2.1	35.4	36.8	10.4	42.9	4.6	26.0	16.3
Queue Length 50th (ft)	115	~158	0	90	110	13	225	0	83	119
Queue Length 95th (ft)	#167	#234	0	138	#193	15	273	36	#263	220
Internal Link Dist (ft)		1034			900		1974			1152
Turn Bay Length (ft)	165		145	145		150		100	330	
Base Capacity (vph)	271	435	396	329	680	271	895	538	612	1716
Starvation Cap Reductn	0	0	0	0	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0	0	0	0	0
Reduced v/c Ratio	0.84	0.98	0.32	0.56	0.85	0.19	0.80	0.30	0.76	0.74

Intersection Summary

~ Volume exceeds capacity, queue is theoretically infinite.
Queue shown is maximum after two cycles.

95th percentile volume exceeds capacity, queue may be longer.
Queue shown is maximum after two cycles.



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	177	363	83	154	237	259	26	609	154	430	936	152
Future Volume (veh/h)	177	363	83	154	237	259	26	609	154	430	936	152
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	1841	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870
Adj Flow Rate, veh/h	227	427	126	183	266	312	52	716	160	467	1076	192
Peak Hour Factor	0.78	0.85	0.66	0.84	0.89	0.83	0.50	0.85	0.96	0.92	0.87	0.79
Percent Heavy Veh, %	4	2	2	2	2	2	2	2	2	2	2	2
Cap, veh/h	272	469	177	308	256	228	385	899	401	651	1474	262
Arrive On Green	0.11	0.13	0.11	0.13	0.14	0.12	0.07	0.25	0.25	0.60	0.98	0.94
Sat Flow, veh/h	1753	3554	1585	1781	1777	1585	1781	3554	1585	1781	3014	536
Grp Volume(v), veh/h	227	427	126	183	266	312	52	716	160	467	633	635
Grp Sat Flow(s),veh/h/ln	1753	1777	1585	1781	1777	1585	1781	1777	1585	1781	1777	1774
Q Serve(g_s), s	11.2	11.9	7.7	8.5	14.4	14.4	1.3	18.8	5.5	8.5	2.7	4.1
Cycle Q Clear(g_c), s	11.2	11.9	7.7	8.5	14.4	14.4	1.3	18.8	5.5	8.5	2.7	4.1
Prop In Lane	1.00		1.00	1.00		1.00	1.00		1.00	1.00		0.30
Lane Grp Cap(c), veh/h	272	469	177	308	256	228	385	899	401	651	869	868
V/C Ratio(X)	0.84	0.91	0.71	0.59	1.04	1.37	0.14	0.80	0.40	0.72	0.73	0.73
Avail Cap(c_a), veh/h	272	469	177	340	256	228	451	899	401	651	869	868
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	2.00	2.00	2.00
Upstream Filter(I)	1.00	1.00	1.00	0.99	0.99	0.99	0.57	0.57	0.57	0.68	0.68	0.68
Uniform Delay (d), s/veh	33.5	42.8	42.8	31.5	42.8	43.8	10.3	34.9	13.2	14.2	0.6	0.9
Incr Delay (d2), s/veh	19.6	22.7	15.3	2.3	66.7	190.4	0.1	4.3	1.7	2.6	3.7	3.7
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(50%),veh/ln	6.1	6.6	3.7	3.8	10.9	17.7	0.5	8.2	3.2	4.8	1.2	1.4
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	53.2	65.5	58.2	33.8	109.5	234.2	10.4	39.2	14.9	16.8	4.2	4.7
LnGrp LOS	D	E	E	C	F	F	B	D	B	B	A	A
Approach Vol, veh/h		780			761			928			1735	
Approach Delay, s/veh		60.7			142.4			33.4			7.8	
Approach LOS		E			F			C			A	

Timer - Assigned Phs	1	2	3	4	5	6	7	8
Phs Duration (G+Y+Rc), s	11.3	53.7	16.0	19.0	35.0	30.0	17.2	17.8
Change Period (Y+Rc), s	* 6.7	6.8	6.6	6.6	* 6.8	6.7	6.6	6.6
Max Green Setting (Gmax), s	* 8.3	43.2	9.4	12.4	* 28	23.3	12.4	9.4
Max Q Clear Time (g_c+I1), s	3.3	6.1	13.2	16.4	10.5	20.8	10.5	13.9
Green Ext Time (p_c), s	0.0	6.3	0.0	0.0	1.7	1.0	0.1	0.0

Intersection Summary	
HCM 6th Ctrl Delay	47.6
HCM 6th LOS	D

Notes

* HCM 6th computational engine requires equal clearance times for the phases crossing the barrier.


STATE OF MISSOURI
SHANNON
L
JEFFRIES
NUMBER
PE-2008000069
PROFESSIONAL ENGINEER
07.08.2021

TUDOR ROAD DEVELOPMENT

Lee’s Summit, Missouri

July 2021

Olsson Project No. 021-04157