



Tawny Ridge Estates - Phase 2 Niagara-on-the-Lake Transportation Impact Study

Paradigm Transportation Solutions Limited

November 2022

Project Summary



Project Number

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Tawny Ridge Estates - Phase 2, Niagara-on-the-Lake Transportation Impact Study

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Executive Summary

Content

Paradigm Transportation Solutions Limited (Paradigm) was retained to conduct this Transportation Impact Study (TIS) for a residential development located south of Warner Road and west of Tanbark Road in the Town of Niagara-on-the-Lake, Ontario.

This study aims to determine the impacts of the development traffic on the surrounding road network and identify any improvements necessary to accommodate this traffic.

Conclusions

This study evaluated the impacts of background traffic growth and the proposed 74 residential units. A new street connection proposes direct access to the development to Warner Road (Street B) that is proposed opposite Angels Drive. Secondary access is proposed through an extension of Chestnut Avenue that will connect to the development's internal roadway network. Full build-out is expected at or before 2030 for this report.

Full-build out of the development is projected to generate approximately 38-48 new vehicle trips during the weekday and Saturday peak hours.

The proposed new roadway onto Warner Road, opposite Angels Drive, will be constructed to provide a safe and efficient access point to the overall development, given its location and roadway geometry. The street connections will be designed with adequate width to provide for reasonable entry and exit from the development and accommodate emergency response vehicles; the proposed locations afford safe sight lines for all turning movements and approaches.

Detailed traffic analysis was conducted for each study area intersection under 2022 existing traffic conditions and 2030 background and total traffic conditions. Based on traffic data and analyses completed, the intersections within the study area presently operates at level of service (LOS) C or better during the weekday and Saturday peak hours. LOS D or better is generally considered a well-functioning intersection in urban environments. With additional trips generated by the development, the impact on the study area's intersections is expected to be minimal as the intersections are forecast to continue to operate at LOS C or better.

The analysis has further determined that auxiliary left turn lanes are not warranted under the 2020 total conditions along Warner Road at Street B.

Overall, the study finds that development-generated traffic should not significantly impact traffic operations within the study area and that the existing transportation infrastructure in the area can adequately



accommodate the traffic volumes projected to be generated by the proposed development.

Recommendations

Recognizing that no capacity issues are projected, off-site roadway improvements are not the applicant's responsibility, nor should any requirement for off-site roadway improvements form any condition of the draft plan of subdivision approval for Tawny Ridge Estates – Phase 2.



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1 Introduction

1.1 Overview

Paradigm Transportation Solutions Limited (Paradigm) was retained to conduct this Transportation Impact Study (TIS) for a residential development located at 170-178 Tanbark Road, which is south of Warner Road and west of Tanbark Road in the Town of Niagara-on-the-Lake, Ontario.

Figure 1.1 illustrates the location of the subject site.

1.2 Purpose and Scope

This study aims to determine the impacts of the development traffic on the surrounding road network and identify any improvements necessary to accommodate the increase in traffic generated by this development. The scope of this study is to:

- ▶ Forecast traffic from the proposed development utilizing trip generation rates from the Institute of Transportation Engineers (ITE) Trip Generation and assignment to the surrounding road network;
- ▶ Assess the impact of existing and future traffic conditions with and without the proposed development (2030); and
- ▶ Recommend any improvements required to alleviate any operational or safety concerns (if required).

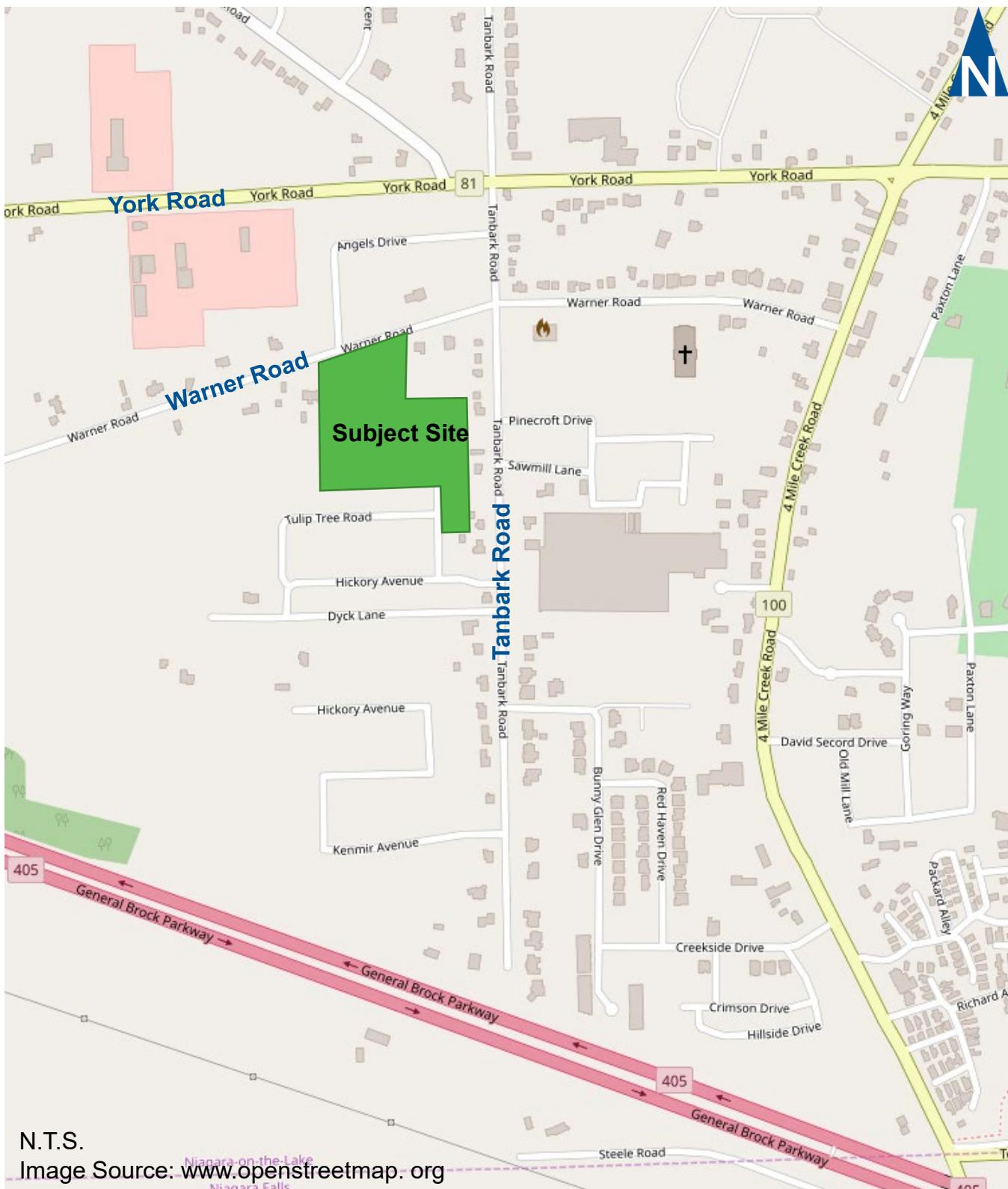
1.3 Study Area

Based on a review of the anticipated trip generation and trip distribution for the proposed development, a study area was established through consultation with the Region of Niagara and the Town of Niagara-on-the-Lake. The project study area includes the following intersections:

- ▶ York Road at Tanbark Road (unsignalized);
- ▶ Warner Road at Tanbark Road (unsignalized);
- ▶ Tanbark Road at Pinecraft Drive (unsignalized); and
- ▶ Warner Road at Angels Drive (unsignalized).

Appendix A contains the pre-study consultation material with the Region of Niagara and the Town of Niagara-On-The-Lake.





Location of Subject Site

Tawny Ridge Estates - Phase 2, Niagara-on-the-Lake TIS
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Figure 1.1

2 Existing Conditions

The existing conditions evaluation consisted of an inventory of the traffic control, roadway and intersection geometry in the study area and the collection of peak period traffic volumes.

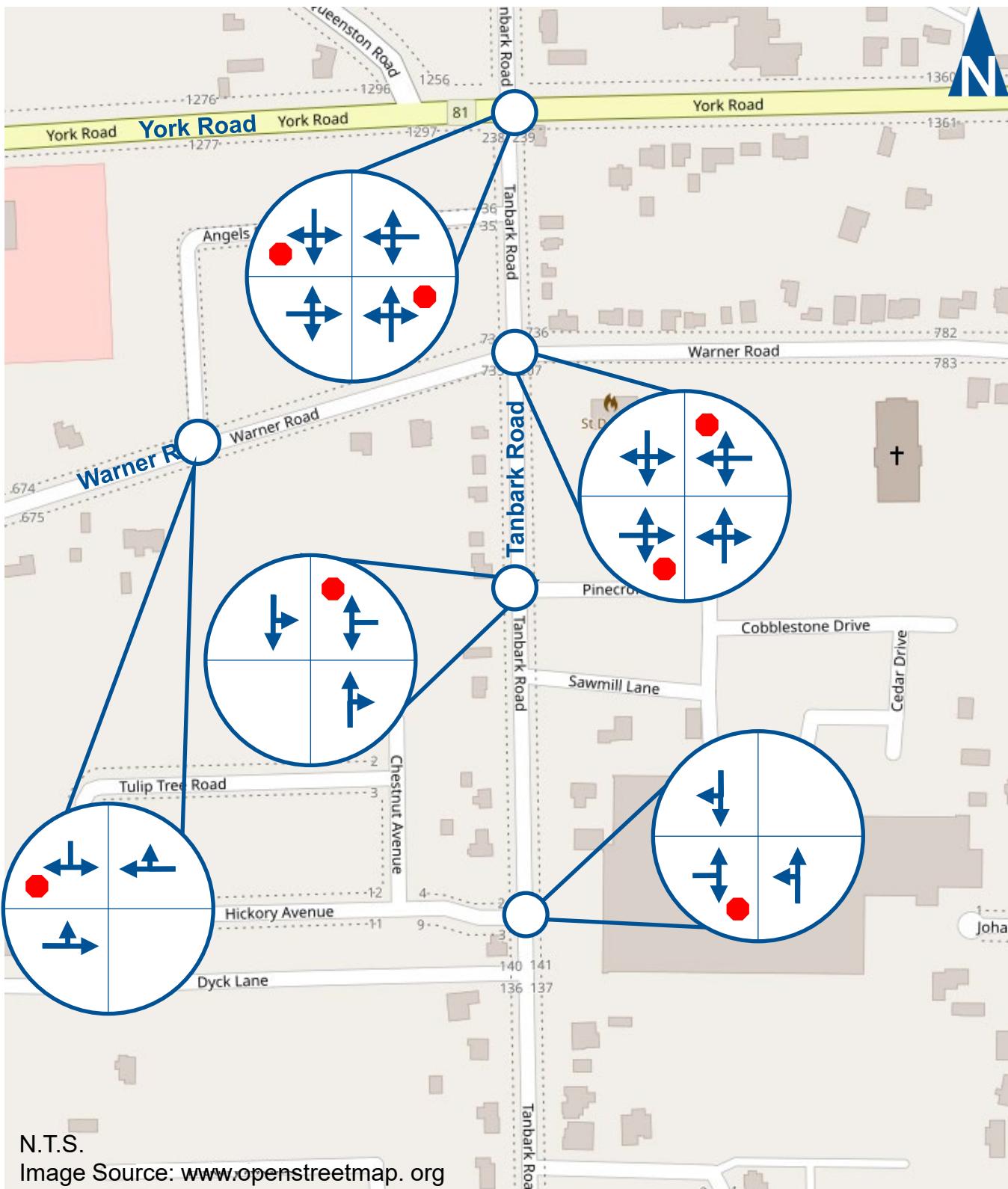
2.1 Roadway Characteristics

The main roadways near the subject site considered in assessing the traffic impacts of the development include:

- ▶ **York Road (Regional Road 81)** is an east-west arterial roadway with a basic two-lane cross-section under the Niagara Region jurisdiction. This roadway has a posted speed limit of 50 kilometres per hour within the study area. East of Tanbark Road, pedestrian facilities are provided along both sides of the roadway, whereas west of Tanbark Road, pedestrian facilities are provided on the south side only.
- ▶ **Warner Road** is an east-west local roadway with a basic two-lane cross-section under the Town of Niagara-on-the-Lake jurisdiction. This roadway has a posted speed limit of 50 kilometres per hour within the study area. Pedestrian facilities are not provided along this roadway.
- ▶ **Tanbark Road** is a north-south local roadway with a basic two-lane cross-section under the Town of Niagara-on-the-Lake jurisdiction. This roadway has a posted speed limit of 50 kilometres per hour within the study area. North of Warner Road, pedestrian facilities are provided along both sides of the roadway, whereas south of Warner Road, pedestrian facilities are only provided on the east side.
- ▶ **Hickory Avenue** is an east-west local roadway with a basic two-lane cross-section under the Town of Niagara-on-the-Lake jurisdiction. This roadway has a posted speed limit of 50 kilometres per hour within the study area. Pedestrian facilities are provided on the south side of the road.
- ▶ **Pinecroft Drive** is an east-west local roadway with a basic two-lane cross-section under the Town of Niagara-on-the-Lake jurisdiction. This roadway has a posted speed limit of 50 kilometres per hour within the study area. Pedestrian facilities are not provided along this roadway.
- ▶ **Angels Drive** is a north-south local roadway with a basic two-lane cross-section under the Town of Niagara-on-the-Lake jurisdiction. This roadway has a posted speed limit of 50 kilometres per hour within the study area. Pedestrian facilities are provided along one side of the road.

Figure 2.1 illustrates the existing lane configurations and traffic control at the study area intersections.





Existing Lane Configuration & Traffic Control

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Figure 2.1

2.2 Transit Network

There is presently no public transit provided through the Village of St. David's. The Town of Niagara-on-the-Lake operates a transit service between the Old Town and Glendale.

2.3 Pedestrian and Cycling Environment

2.3.1 Pedestrian

In the Village of St. David's, pedestrian sidewalks are provided on at least one side roadway, except Pinecroft Drive.

2.3.2 Cycling

York Road (RR81) is a Regional Bicycle Network within the immediate study area, and Four Mile Creek Road (RR100) has on-street cycling facilities. Within the study area, there are currently no visible dedicated cycling facilities. Overall, the site is well suited for bicycle transportation as road grades are minimal. The area's seasonal cycling activity is relatively high and linked to a strong tourism base.

Figure 2.2 illustrates the existing cycling network for the study area.





2.4 Traffic Volumes

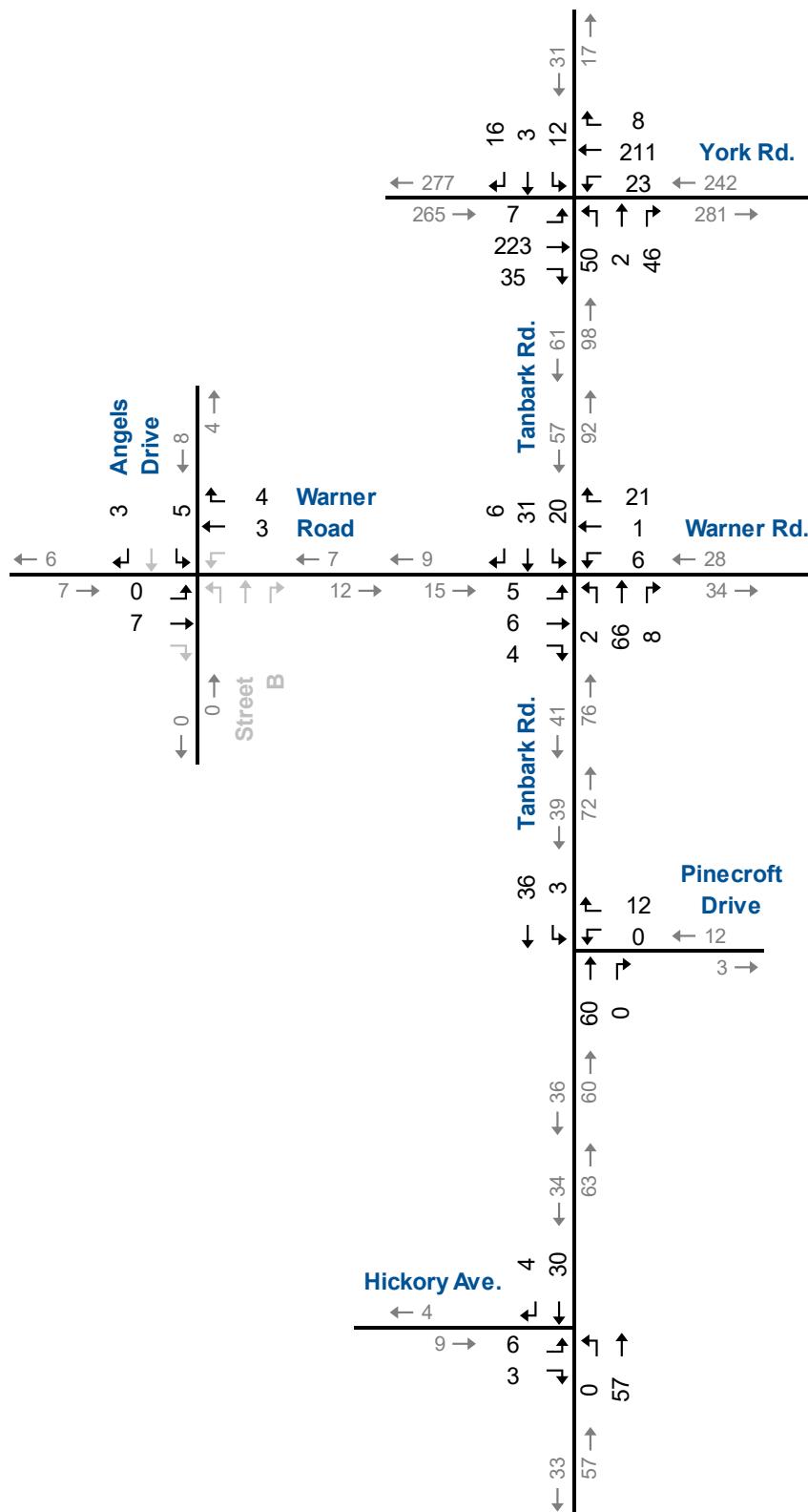
Turning Movement Counts (TMC) are used to assess intersection operations and quantify vehicle movement. The traffic counts are usually collected during peak periods at an intersection to complete the level of service analysis. Existing traffic counts at an intersection or road section form the foundation for analysis.

In discussions with the Town of Niagara-on-the-Lake Staff, it was requested that traffic counts be conducted during peak tourist season (between Victoria Day and Canadian Thanksgiving Monday).

As the study was undertaken during the fall months (i.e., outside of peak tourist season), collecting new traffic count data was not feasible at the time of writing, given the irregular traffic volumes that would be present. As a result, pre-pandemic traffic data collected in 2019 and 2022 has been relied upon. This 2019 historic count provides a sound basis for developing reasonable travel volumes for the study area. However, further refinement of the volumes is required given the count's age, which included factoring the volumes to be more in line with 2022 volumes by applying a 2% per annum growth rate.

Appendix B contains the traffic data. **Figure 2** illustrates the adjusted existing peak-hour traffic.

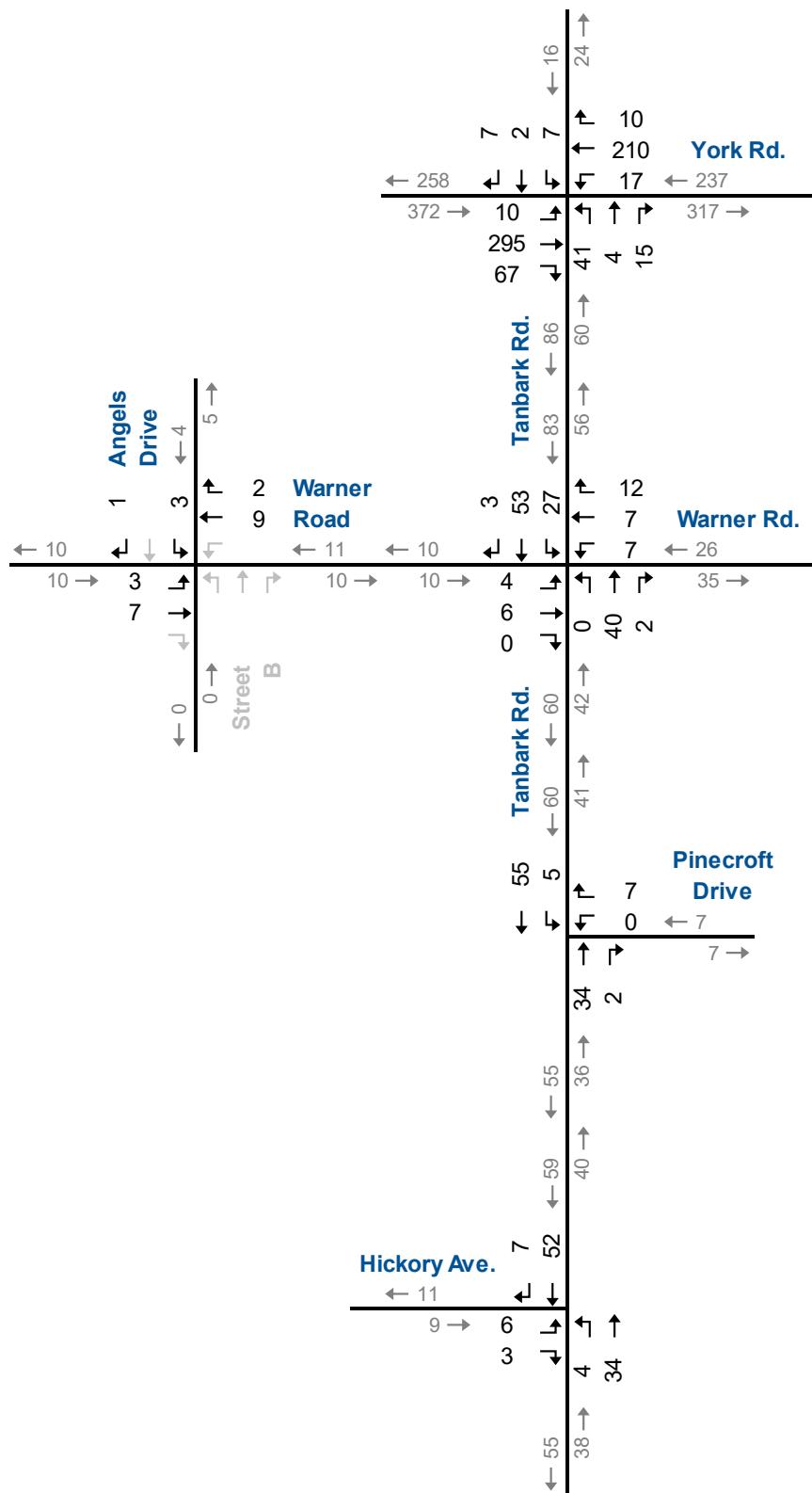




Existing Traffic Volumes AM Peak Hour

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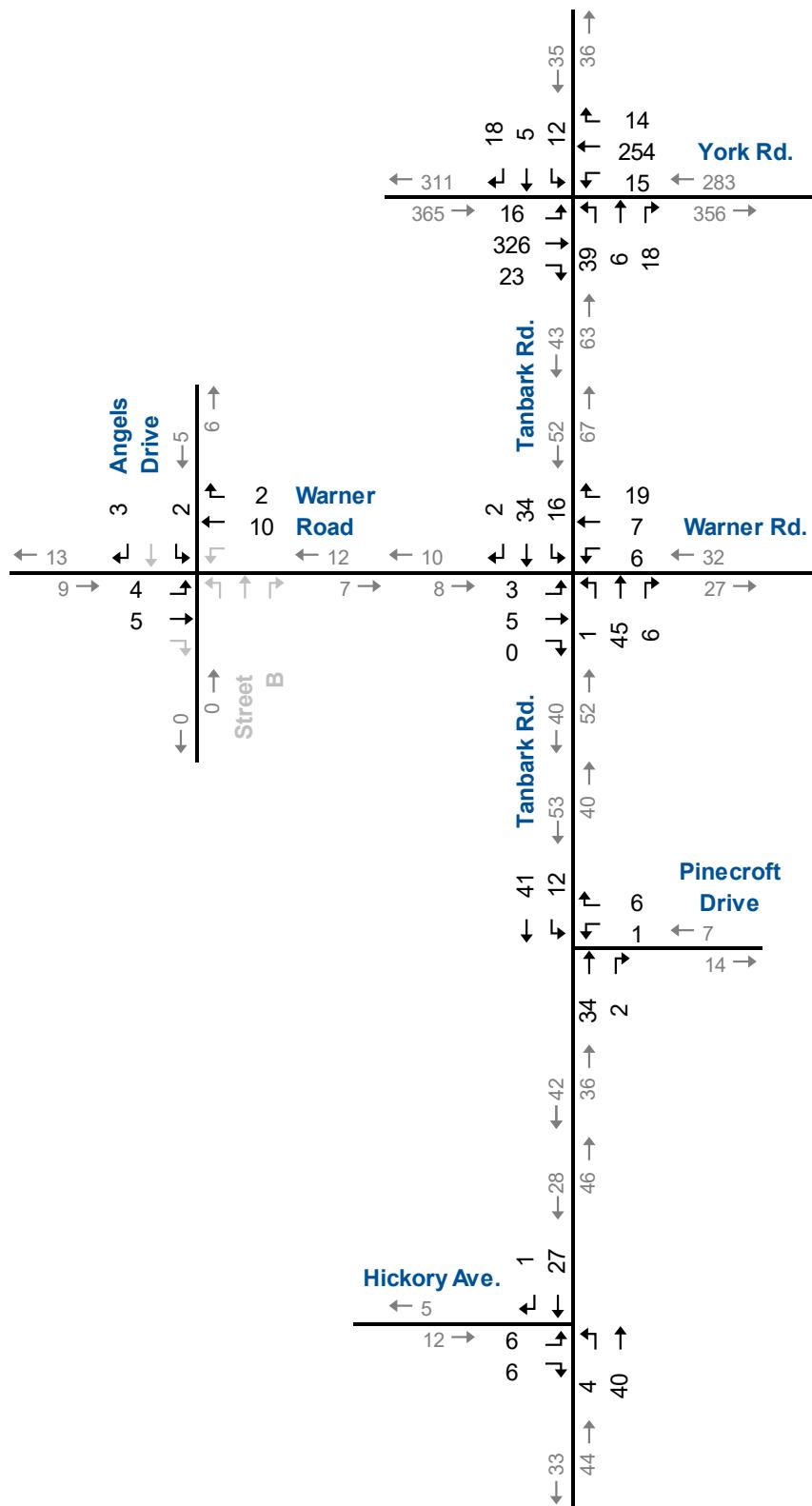
Figure 2.3A



Existing Traffic Volumes PM Peak Hour

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Figure 2.3B



Existing Traffic Volumes Saturday Peak Hour

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Figure 2.3C

3 Development Concept

3.1 Development Description

The proposed development is located on a 3.11-hectare parcel of land south of Warner Road and west of Tanbark Road. The preliminary concept plan indicates that the development will consist of 74 residential units (20 single-family, 24 townhouses and 30 medium-density units). Full build-out is expected at or before 2030.

A new street connection proposes direct access to the development to Warner Road (Street B) that is proposed opposite Angels Drive. Secondary access is proposed through an extension of Chestnut Avenue that will connect to the development's internal roadway network.

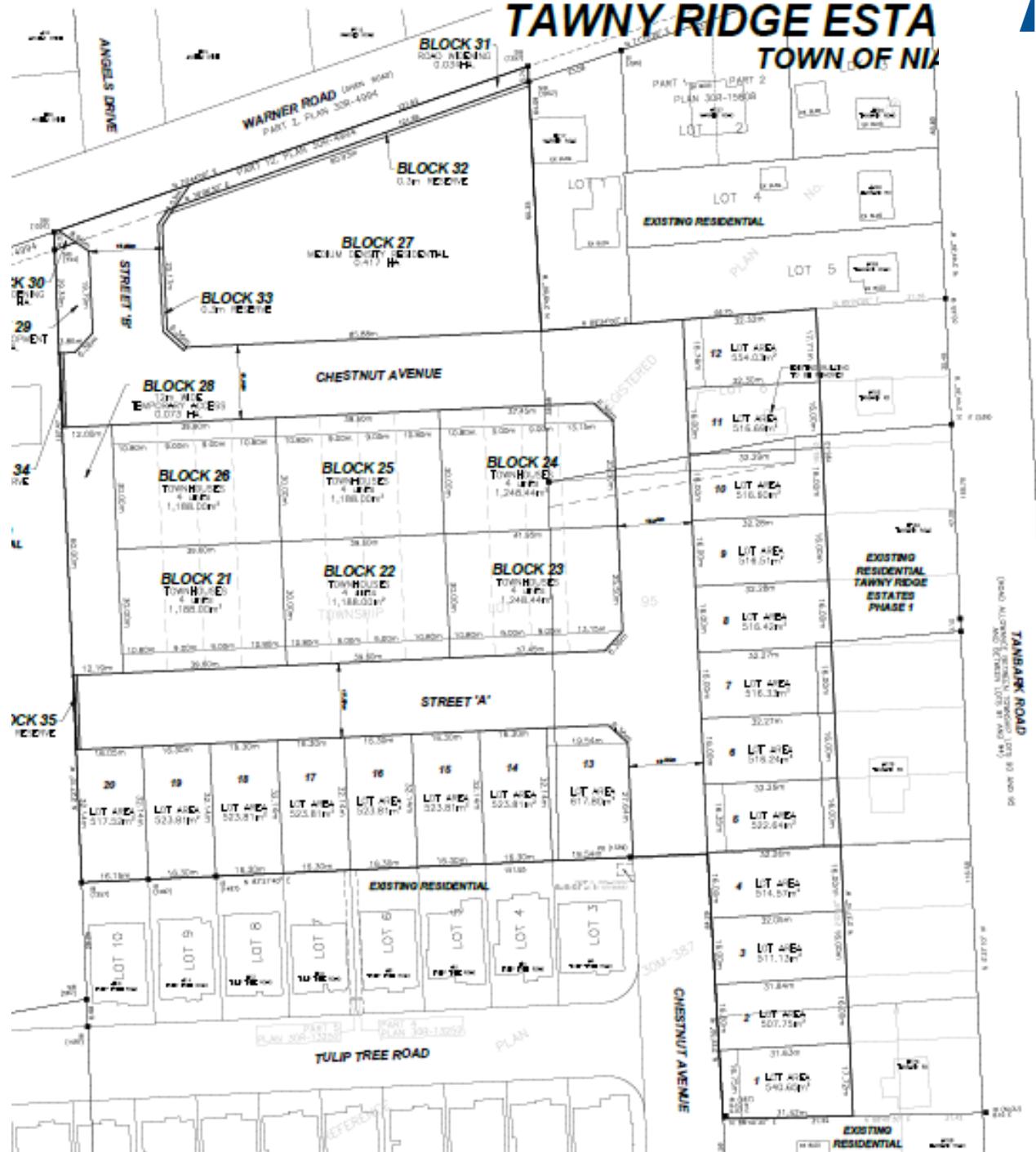
A temporary lane is proposed at the western limit of the proposed development to provide access to the adjacent landowner. However, the timing of this parcel being developed is unknown and may not occur until the proposed development is fully developed. As a result, the neighbouring parcel has not been assumed to be developed.

Figure 3.1 illustrates the conceptual site plan of the development.





TAWNY RIDGE ESTA TOWN OF NIAGARA



N.T.S.



Conceptual Site Plan

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Figure 3.1

3.2 Development Trip Generation

The Institute of Transportation Engineers (ITE) Trip Generation Manual¹ was used to estimate the peak-hour traffic volumes that this development will generate. Land Use Codes (LUC) 210 (Single-Family Detached Housing) was utilized. The estimated total trip generation is displayed in **Table 3.1**, which indicates 38-44 trips are forecast to be generated during the weekday AM, PM and Saturday peak hours, respectively.

TABLE 3.1: TRIP GENERATION

Land Use Code	Units	AM Peak Hour				PM Peak Hour				Sat. Peak Hour			
		Rate	In	Out	Total	Rate	In	Out	Total	Rate	In	Out	Total
210 Single-Family Detached	20	0.70	4	10	14	0.94	12	7	19	0.92	10	8	18
215 Single-Family Attached Housing	24	0.48	4	8	12	0.57	8	6	14	0.57	7	7	14
220 Multi-Family (Low-Rise)	30	0.40	3	9	12	0.51	9	6	15	0.41	6	6	12
Total	74	-	11	27	38	-	29	19	48	-	23	21	44

3.3 Development Trip Distribution and Assignment

The trip distribution for the site was developed based on the 2016 Transportation Tomorrow Survey (TTS)². For the Niagara-on-the-Lake zone, the trip distribution was further refined based on the existing link volumes at the external limits of the study area. **Table 3.2** summarizes the estimated trip distribution for the development.

TABLE 3.2: TRIP DISTRIBUTION

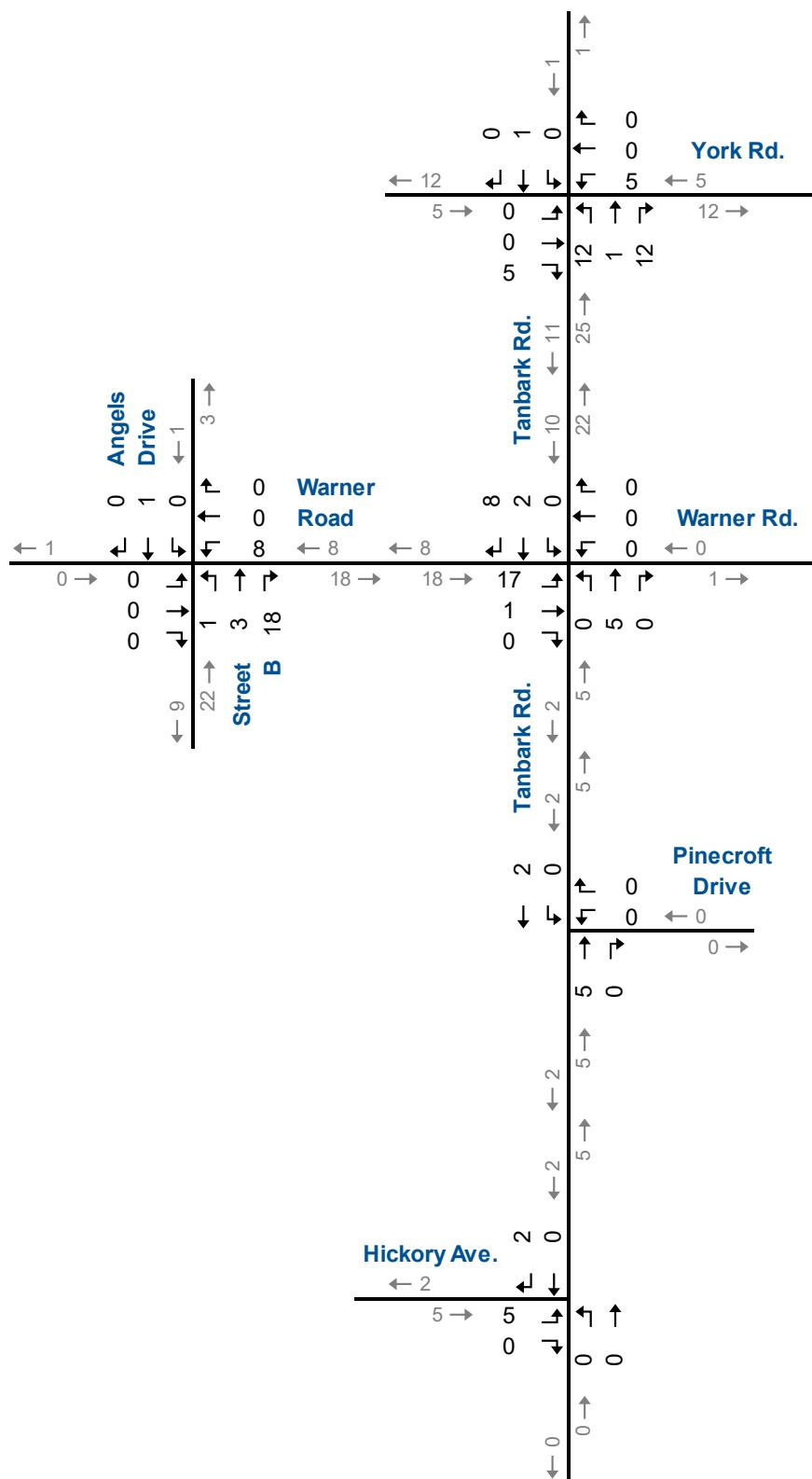
Directional Summary	Route	Percentage
North	Tanbark Road	5%
East	York Road Warner Road	43% 4%
West	York Road Warner Road	46% 2%
Total		100%

The site traffic was assigned to the adjacent road network using trip generation and distribution. **Figure 3.2** illustrates the weekday AM, PM and Saturday peak hour vehicle trips estimated to be generated by the subject site.

¹ Trip Generation Manual 11th Edition Institute of Transportation Engineers Washington DC

² Transportation Tomorrow Survey (TTS), 2016, Summary by 2006 GTA Zones, Zone 6050, Data Management Group, University of Toronto

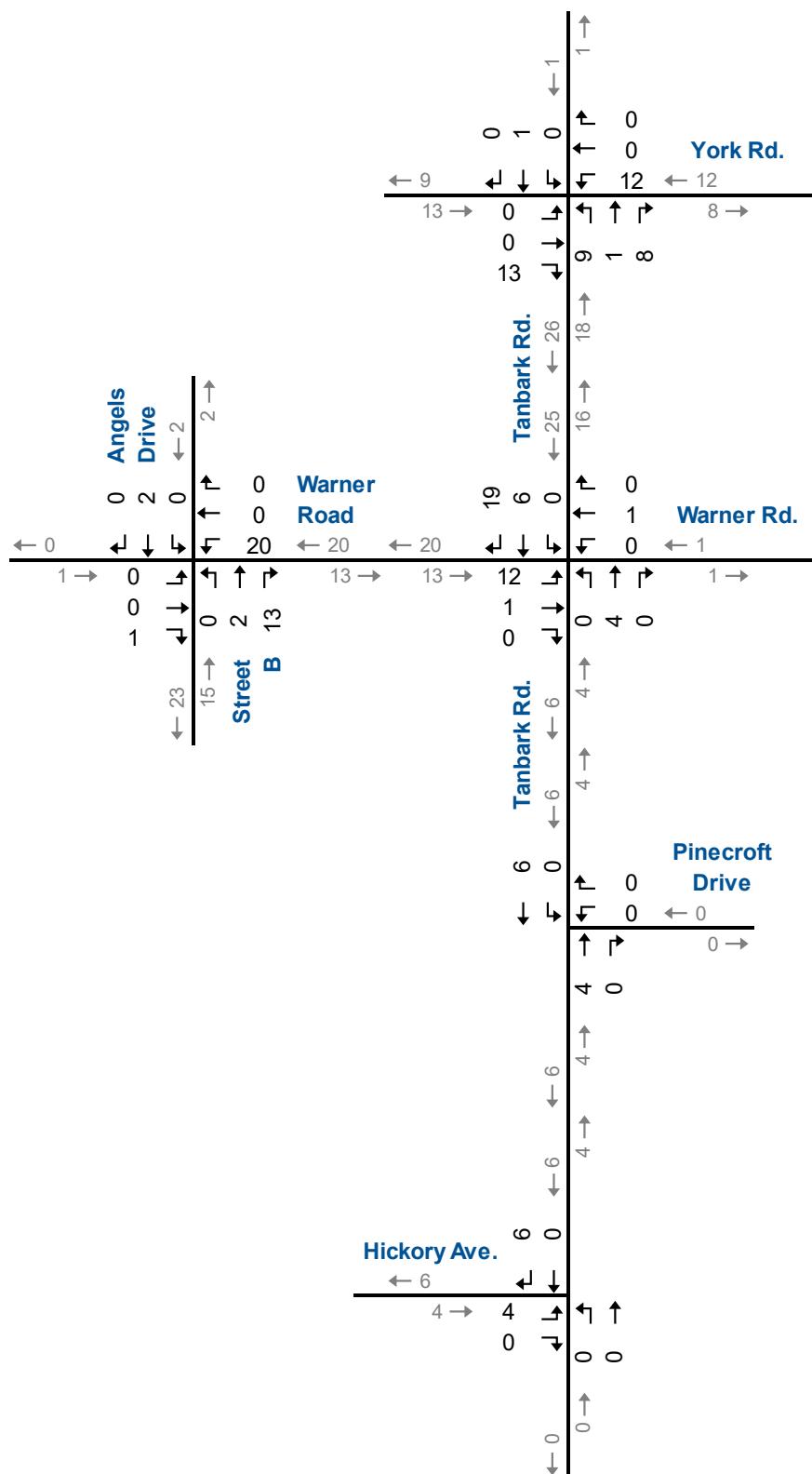




Site Generated Traffic AM Peak Hour

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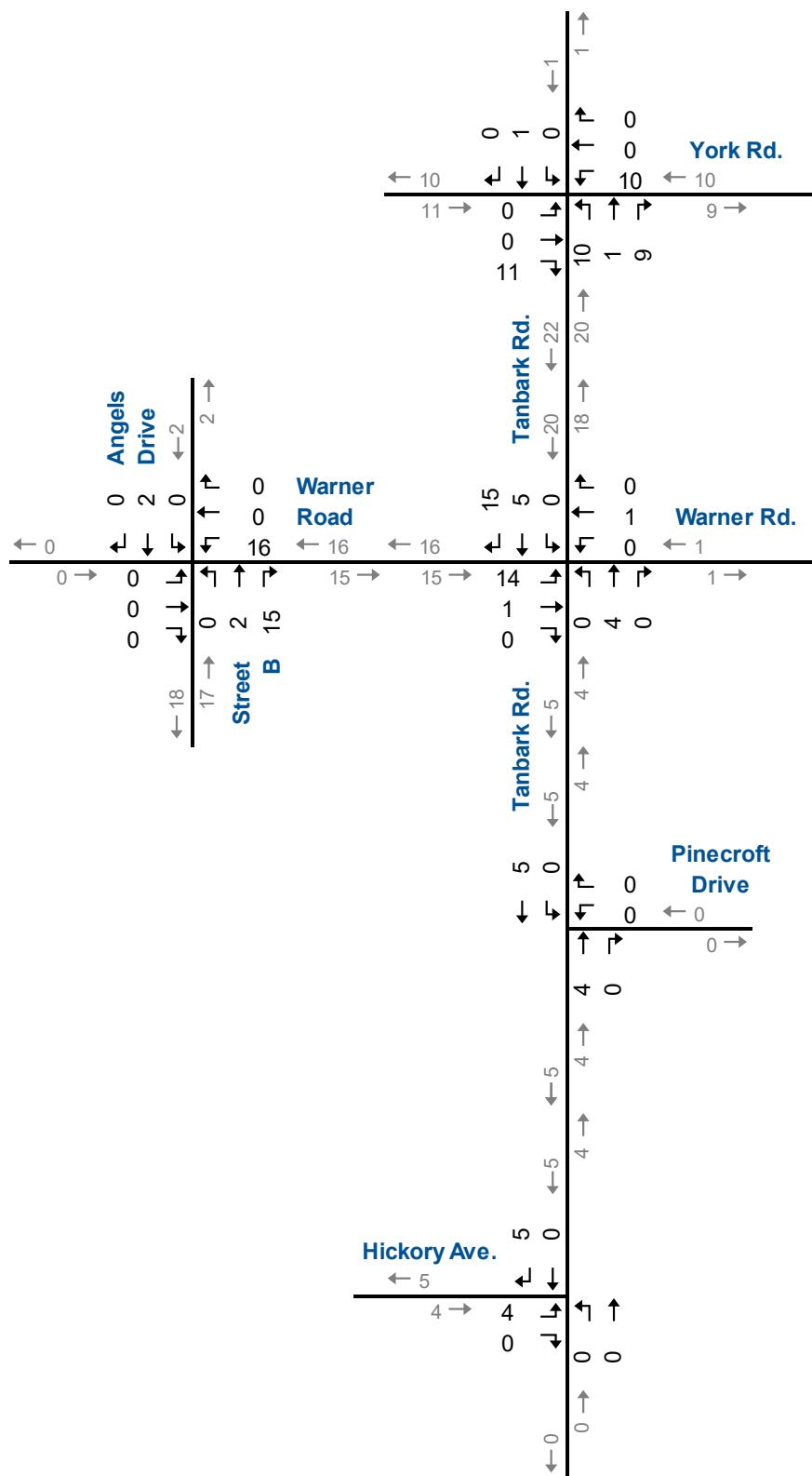
Figure 3.2A



Site Generated Traffic PM Peak Hour

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Figure 3.2B



Site Generated Traffic Saturday Peak Hour

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Figure 3.2C

4 Evaluation of Future Traffic Conditions

The assessment of the future conditions in this section includes the following components necessary to assess the traffic implications on the adjacent road network:

- ▶ Future background traffic estimates;
- ▶ Level of service analysis for background traffic (pre-development);
- ▶ Future total traffic estimates; and
- ▶ Level of service analysis for total traffic (post-development).

4.1 Traffic Forecasts

To be consistent with the Region's Traffic Impact Study Guidelines and the pre-study consultation, a five-year horizon from the date of the TIS has been forecast for analysis purposes.

The future background traffic volumes have been estimated by applying a growth rate of 2.0% compounded per annum to the existing traffic volumes. The Town provided this growth rate during the pre-study consultation.

In addition, traffic associated with the first phase of Tawny Ridge Estates has been included in the background traffic projections. The development details are noted as follows:

- ▶ Tawny Ridge Estates - Phase 1: 12 residential units.

Appendix C provides the forecasted traffic volumes for the above-noted development applications

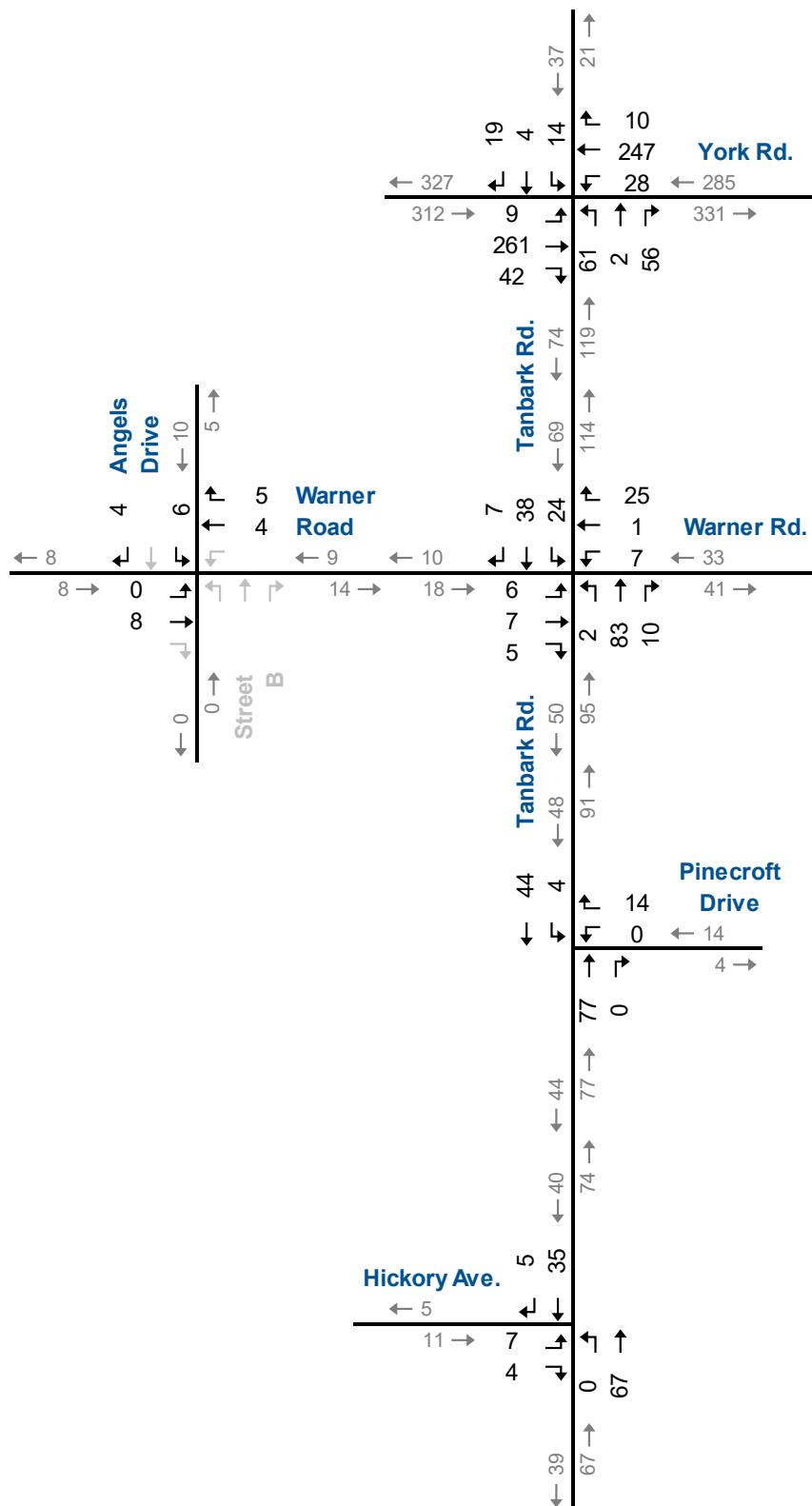
4.1.1 Background Projections

The weekday AM, PM, and Saturday peak hour background traffic volumes for the 2030 horizon are illustrated in **Figure 4.1**.

4.1.2 Total Projections

The projected site-generated traffic volumes were added to the Background projections to develop the Total traffic volumes. The weekday AM, PM, and Saturday peak hour Total traffic volumes for the 2030 horizon are illustrated in **Figure 4.2**.

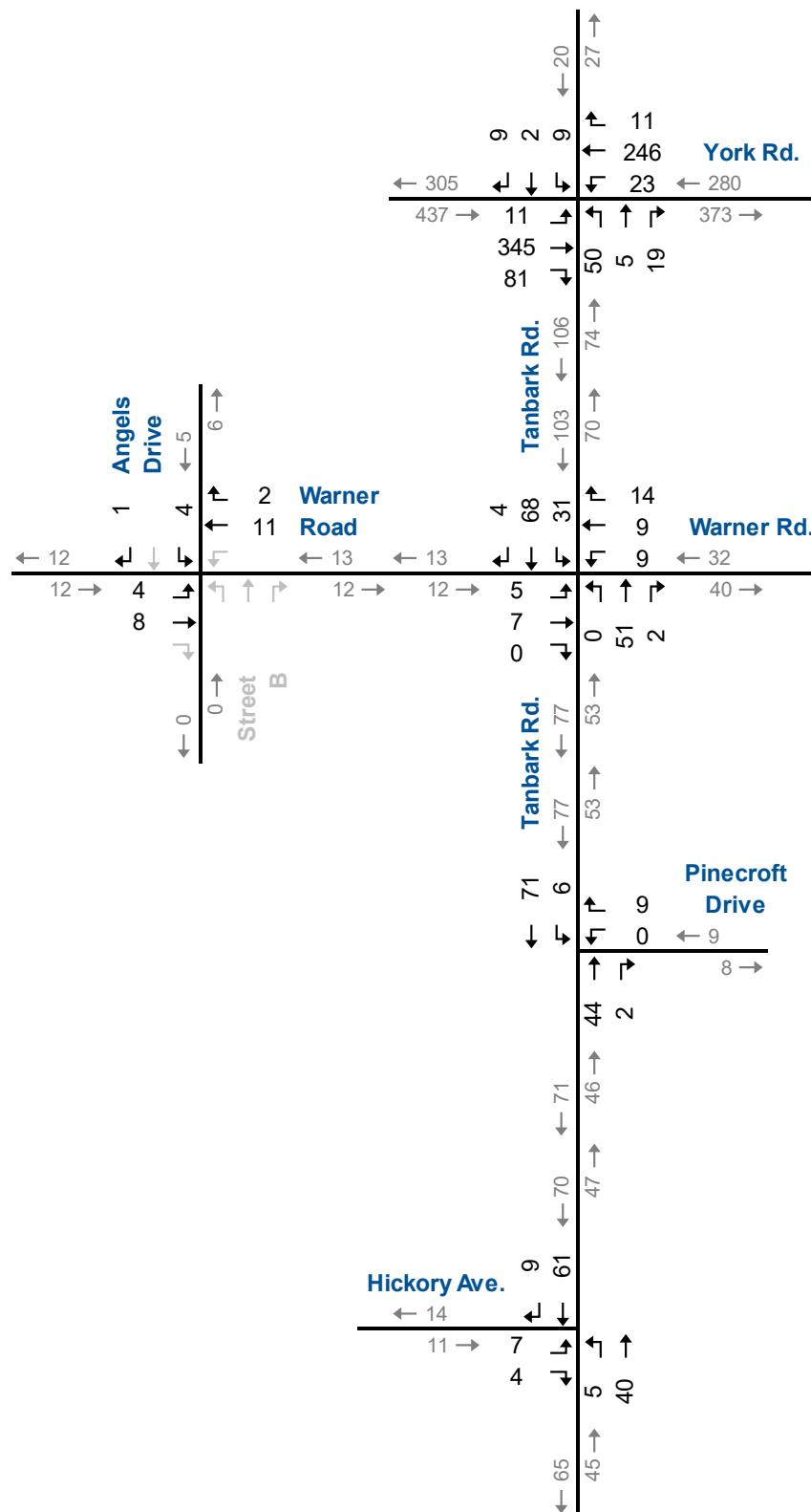




Background Traffic (2030) AM Peak Hour

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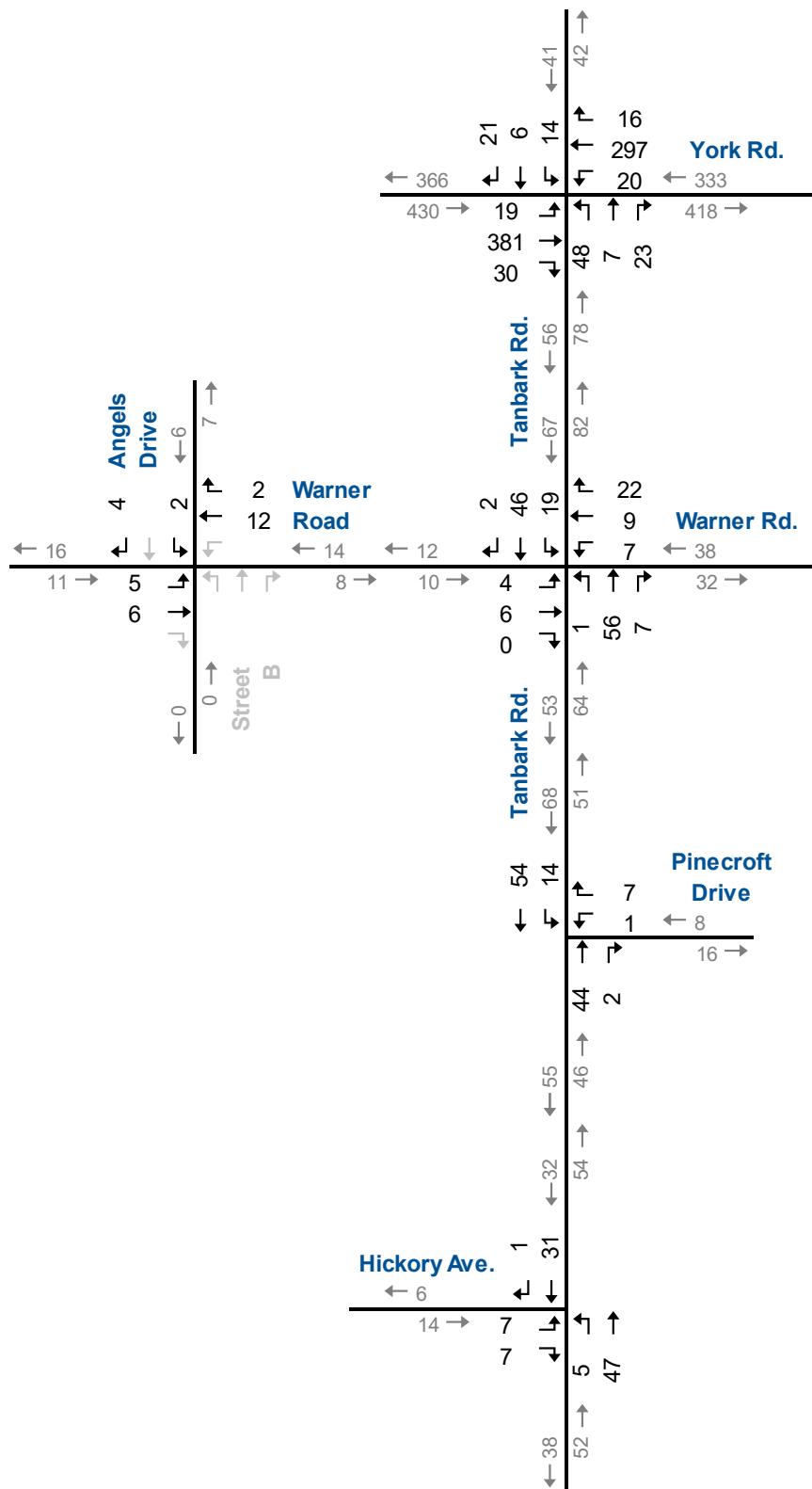
Figure 4.1A



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Background Traffic (2030) PM Peak Hour

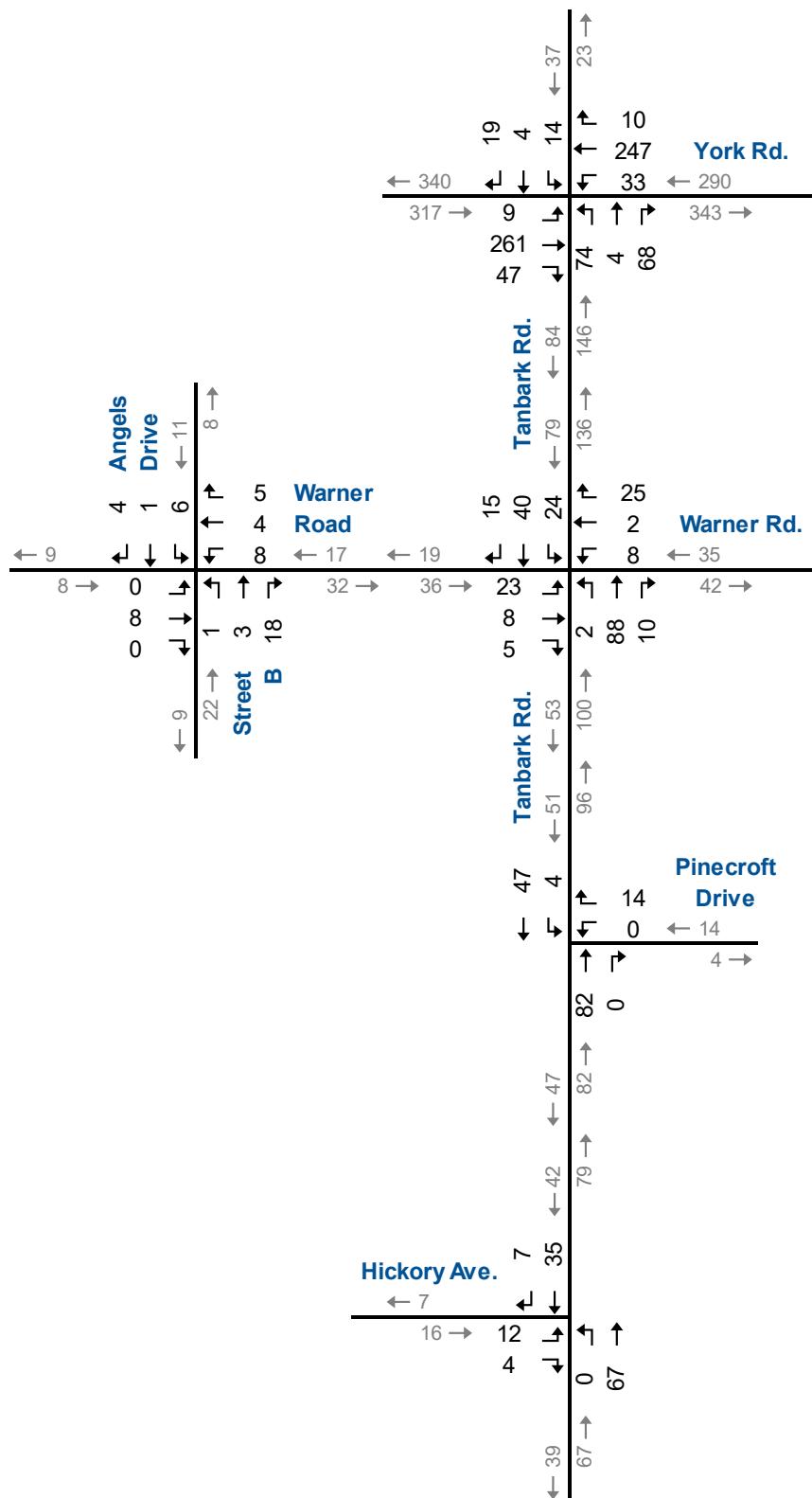
Figure 4.1B



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Background Traffic (2030) Saturday Peak Hour

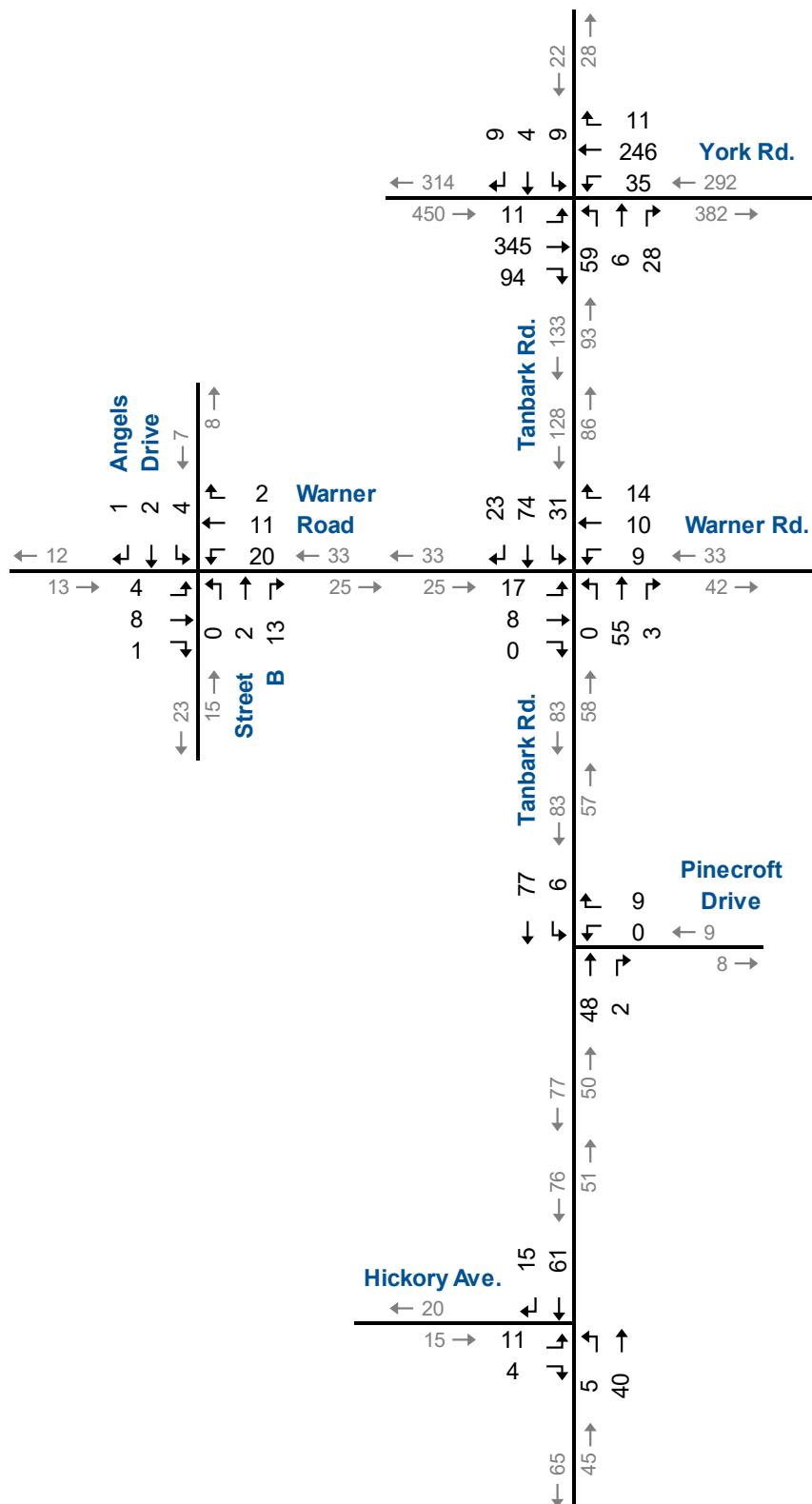
Figure 4.1C



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Total Traffic (2030) AM Peak Hour

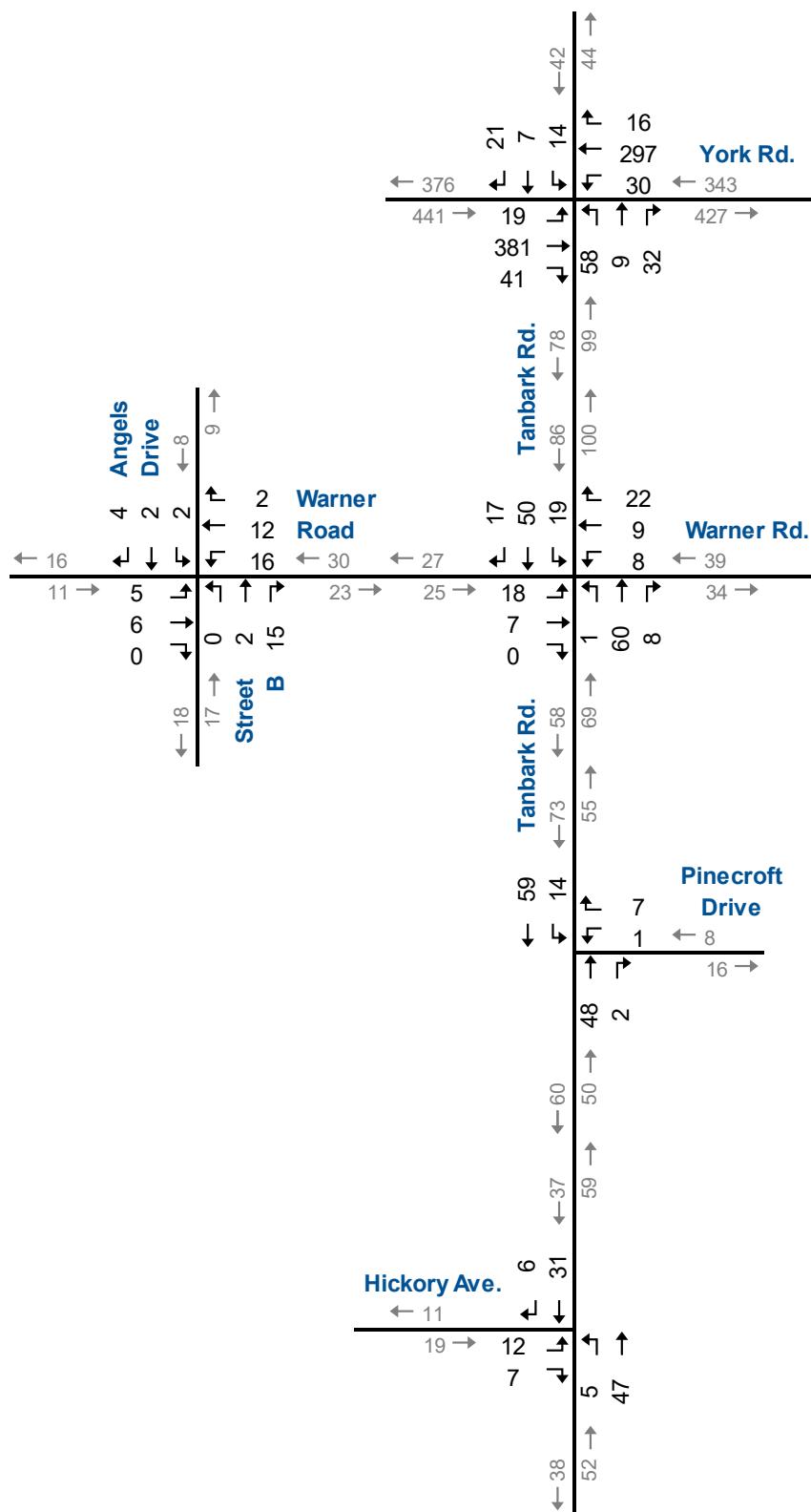
Figure 4.2A



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Total Traffic (2030) PM Peak Hour

Figure 4.2B



Tawny Ridge Estates - Phase 2, Niagara-on-the-Lake TIS
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Total Traffic (2030) Saturday Peak Hour

Figure 4.2C

5 Operational Analysis

Measuring existing traffic volumes and projecting future traffic volumes quantifies traffic within the study area. To assess the quality of flow, roadway capacity analysis was conducted with respect to base year conditions and projected background and total conditions. The capacity analysis indicates how well the roadway facilities serve the traffic demands. Calculated levels of service classify roadway operating conditions.

5.1 Level of Service Criteria

Level of service (LOS) denotes the different operating conditions on a given roadway segment under various traffic volume loads. It is a qualitative measure that provides an index to the operational qualities of a roadway segment or an intersection with designations ranging from LOS A to F, with LOS A representing the best operating conditions and LOS F representing the best-operating conditions and LOS F representing the worst operating conditions.

For unsignalized intersections, the analysis assumes that traffic on the mainline is not affected by the traffic on the side streets. The level of service is only determined for left turns from the main road and all movements from the minor street. Unsignalized intersections use conservative analysis parameters, such as high critical gaps. A "critical gap" is defined as the minimum time, in seconds, between successive major stream vehicles in which a minor-street vehicle can make a maneuver.

Actual field observations indicate that drivers on minor streets generally accept smaller gaps in traffic than those used in the analysis procedures and therefore experience less delay than reported by the analysis software. Consequently, the analysis results tend to overstate the actual delays experienced in the field. For this reason, the results of the unsignalized intersection analyses should be considered conservative.

5.2 Intersection Capacity Analysis

The evaluation criteria used to analyze signalized and unsignalized intersections are based on the 2000 Highway Capacity Manual (HCM).³ utilizing Synchro 11.

Table 5.1 summarizes the capacity analyses for the study area intersections for the base year and the 2030 future horizon years for the weekday AM, PM and Saturday peak hours, respectively. **Appendix D** includes the capacity analysis results. The results of the analyses indicate the study area

³ Transportation Research Board, Highway Capacity Manual, Washington, D.C. 2003.



intersections operate at an acceptable LOS (i.e. LOS C or better) with v/c ratios of less than 0.36. No critical movements are noted.

TABLE 5.1A: WEEKDAY AM PEAK HOUR OPERATIONS

Analysis Period	Intersection	Control Type	Horizon	MOE	Direction / Movement / Approach																Overall	
					Eastbound				Westbound				Northbound				Southbound					
					Left	Through	Right	Approach	Left	Through	Right	Approach	Left	Through	Right	Approach	Left	Through	Right	Approach		
AM Peak Hour	1 - Tanbark Road at York Road	TWSC	2022	LOS Delay V/C Q	A 0 0.01 0 0	A 0 0.01 0 0	A 0 0.01 0 0	A 0	A 1 0.02 1 1	A 1 0.02 1 1	A 1 0.02 1 1	A 1	B 14 0.21 6 6	B 14 0.21 6 6	B 14 0.21 6 6	B 14	B 13 0.07 2 2	B 13 0.07 2 2	B 13 0.07 2 2	B 13	3	
				LOS Delay V/C Q	A 0 0.01 0 0	A 0 0.01 0 0	A 0 0.01 0 0	A 0	A 1 0.02 1 1	A 1 0.02 1 1	A 1 0.02 1 1	A 1	C 16 0.29 9 9	C 16 0.29 9 9	C 16 0.29 9 9	C 16	B 14 0.09 2 2	B 14 0.09 2 2	B 14 0.09 2 2	B 14	4	
		TWSC	2030 (Total)	LOS Delay V/C Q	A 0 0.01 0 0	A 0 0.01 0 0	A 0 0.01 0 0	A 0	A 1 0.03 1 1	A 1 0.03 1 1	A 1 0.03 1 1	A 1	C 18 0.36 13 13	C 18 0.36 13 13	C 18 0.36 13 13	C 18	C 15 0.10 3 3	C 15 0.10 3 3	C 15 0.10 3 3	C 15	5	
	2 - Tanbark Road at Warner Road	TWSC	2022	LOS Delay V/C Q	A 10 0.02 1 1	A 10 0.02 1 1	A 10 0.02 1 1	A 10	A 9 0.04 1 1	A 9 0.04 1 1	A 9 0.04 1 1	A 9	0.00 0 0 0	0.00 0 0 0	0.00 0 0 0	0.00	A 0 0.02 0 0	A 3 0.02 0 0	A 3 0.02 0 0	A 3	3	
				LOS Delay V/C Q	A 10 0.03 1 1	A 10 0.03 1 1	A 10 0.03 1 1	A 10	A 10 0.04 1 1	A 10 0.04 1 1	A 10 0.04 1 1	A 10	A 0 0.00 0 0	A 0 0.00 0 0	A 0 0.00 0 0	A 0	A 0 0.02 0 0	A 3 0.02 0 0	A 3 0.02 0 0	A 3	3	
		TWSC	2030 (Total)	LOS Delay V/C Q	B 11 0.06 1 1	B 11 0.06 1 1	B 11 0.06 1 1	B 11	A 10 0.05 1 1	A 10 0.05 1 1	A 10 0.05 1 1	A 10	A 0 0.00 0 0	A 0 0.00 0 0	A 0 0.00 0 0	A 0	A 0 0.02 0 0	A 2 0.02 0 0	A 2 0.02 0 0	A 2	4	
	3 - Tanbark Road at Pinecroft Drive	TWSC	2022	LOS Delay V/C Q					A 9 0.01 0	A 9 0.01 0	A 9 0.01 0	A 9				A 0 0.04 0	A 0 0.04 0	A 1 0.00 0	A 1 0.00 0	A 1	1	
				LOS Delay V/C Q					A 9 0.02 0	A 9 0.02 0	A 9 0.02 0	A 9				A 0 0.05 0	A 0 0.05 0	A 1 0.00 0	A 1 0.00 0	A 1	1	
		TWSC	2030 (Total)	LOS Delay V/C Q					A 9 0.02 0	A 9 0.02 0	A 9 0.02 0	A 9				A 0 0.05 0	A 0 0.05 0	A 1 0.00 0	A 1 0.00 0	A 1	1	
	4 - Tanbark Road at Hickory Avenue	TWSC	2022	LOS Delay V/C Q	A 9 0.01 0	A 9 0.01 0	A 9 0.01 0	A 9					A 0 0.00 0	A 0 0.00 0	A 0 0.00 0	A 0		A 0 0.02 0	A 0 0.02 0	A 0	1	
				LOS Delay V/C Q	A 9 0.01 0	A 9 0.01 0	A 9 0.01 0	A 9					A 0 0.00 0	A 0 0.00 0	A 0 0.00 0	A 0		A 0 0.03 0	A 0 0.03 0	A 0	1	
		TWSC	2030 (Total)	LOS Delay V/C Q	A 9 0.02 1	A 9 0.02 1	A 9 0.02 1	A 9					A 0 0.00 0	A 0 0.00 0	A 0 0.00 0	A 0		A 0 0.03 0	A 0 0.03 0	A 0	1	
	5 - Warner Road at Angels Drive	TWSC	2022	LOS Delay V/C Q	A 0 0.00 0	A 0 0.00 0	A 0 0.00 0	A 0	A 0 0.00 0	A 0 0.00 0	A 0 0.00 0	A 0				A 9 0.01 0	A 9 0.01 0	A 9 0.01 0	A 9 0.01 0	A 9	3	
				LOS Delay V/C Q	A 0 0.00 0	A 0 0.00 0	A 0 0.00 0	A 0	A 0 0.00 0	A 0 0.00 0	A 0 0.00 0	A 0				A 9 0.01 0	A 9 0.01 0	A 9 0.01 0	A 9 0.01 0	A 9	3	
		TWSC	2030 (Total)	LOS Delay V/C Q	A 0 0.00 0	A 0 0.00 0	A 0 0.00 0	A 0	A 4 0.01 0	A 4 0.01 0	A 4 0.01 0	A 4	A 9 0.02 1	A 9 0.02 1	A 9 0.02 1	A 9	A 9 0.01 0	A 9 0.01 0	A 9 0.01 0	A 9 0.01 0	6	

MOE - Measure of Effectiveness

LOS - Level of Service

Delay - Average Delay per Vehicle in Seconds

Q - 95th Percentile Queue Length (m)
 Ex - Existing Available Storage (m)
 Avail. - Available Storage (m)

TCS - Traffic Control Signal
 TWSC - Two-Way Stop Control
 AWSC - All-Way Stop Control



TABLE 5.1B: WEEKDAY PM PEAK HOUR OPERATIONS

Analysis Period	Intersection	Control Type	Horizon	MOE	Direction / Movement / Approach																Overall	
					Eastbound				Westbound				Northbound				Southbound					
					Left	Through	Right	Approach	Left	Through	Right	Approach	Left	Through	Right	Approach	Left	Through	Right	Approach		
PM Peak Hour	1 - Tanbark Road at York Road	TWSC	2022	LOS Delay V/C Q	A 0 0.01 0	A 0 0.01 0	A 0 0.01 0	A 0	A 1 0.02 1	A 1 0.02 1	A 1 0.02 1	A 1	B 14 0.20 6	B 14 0.20 6	B 14 0.20 6	B 14	B 13 0.06 2	B 13 0.06 2	B 13 0.06 2	B 13	3	
				LOS Delay V/C Q	A 0 0.01 0	A 0 0.01 0	A 0 0.01 0	A 0	A 1 0.02 1	A 1 0.02 1	A 1 0.02 1	A 1	C 16 0.28 9	C 16 0.28 9	C 16 0.28 9	C 16	B 14 0.09 2	B 14 0.09 2	B 14 0.09 2	B 14	4	
		TWSC	2030 (Total)	LOS Delay V/C Q	A 0 0.01 0	A 0 0.01 0	A 0 0.01 0	A 0	A 1 0.04 1	A 1 0.04 1	A 1 0.04 1	A 1	C 20 0.30 10	C 20 0.30 10	C 20 0.30 10	C 20	C 16 0.07 2	C 16 0.07 2	C 16 0.07 2	C 16	3	
	2 - Tanbark Road at Warner Road	TWSC	2022	LOS Delay V/C Q	A 10 0.02 1	A 10 0.02 1	A 10 0.02 1	A 10	A 9 0.03 1	A 9 0.03 1	A 9 0.03 1	A 9	A 0 0.00 0	A 0 0.00 0	A 0 0.00 0	A 0	A 3 0.01 0	A 3 0.01 0	A 3 0.01 0	A 3	3	
				LOS Delay V/C Q	A 10 0.03 1	A 10 0.03 1	A 10 0.03 1	A 10	A 9 0.04 1	A 9 0.04 1	A 9 0.04 1	A 9	A 0 0.00 0	A 0 0.00 0	A 0 0.00 0	A 0	A 3 0.02 0	A 3 0.02 0	A 3 0.02 0	A 3	3	
		TWSC	2030 (Total)	LOS Delay V/C Q	B 11 0.04 1	B 11 0.04 1	B 11 0.04 1	B 11	A 10 0.05 1	A 10 0.05 1	A 10 0.05 1	A 10	A 0 0.00 0	A 0 0.00 0	A 0 0.00 0	A 0	A 2 0.02 0	A 2 0.02 0	A 2 0.02 0	A 2	3	
	3 - Tanbark Road at Pinecroft Drive	TWSC	2022	LOS Delay V/C Q					A 9 0.01 0	A 9 0.01 0	A 9 0.01 0	A 9		A 0 0.04 0	A 0 0.04 0	A 0	A 1 0.00 0	A 1 0.00 0	A 1 0.00 0	A 1	1	
				LOS Delay V/C Q					A 9 0.02 0	A 9 0.02 0	A 9 0.02 0	A 9		A 0 0.05 0	A 0 0.05 0	A 0	A 1 0.00 0	A 1 0.00 0	A 1 0.00 0	A 1	1	
		TWSC	2030 (Total)	LOS Delay V/C Q					A 9 0.01 0	A 9 0.01 0	A 9 0.01 0	A 9		A 0 0.03 0	A 0 0.03 0	A 0	A 1 0.00 0	A 1 0.00 0	A 1 0.00 0	A 1	1	
	4 - Tanbark Road at Hickory Avenue	TWSC	2022	LOS Delay V/C Q	A 9 0.01 0		A 9 0.01 0	A 9					A 0 0.00 0	A 0 0.00 0	A 0	A 0 0.02 0	A 0 0.02 0	A 0 0.02 0	A 0	1		
				LOS Delay V/C Q	A 9 0.01 0		A 9 0.01 0	A 9					A 0 0.00 0	A 0 0.00 0	A 0	A 0 0.03 0	A 0 0.03 0	A 0 0.03 0	A 0	1		
		TWSC	2030 (Total)	LOS Delay V/C Q	A 9 0.02 1		A 9 0.02 1	A 9					A 0 0.00 0	A 0 0.00 0	A 0	A 0 0.05 0	A 0 0.05 0	A 0 0.05 0	A 0	1		
	5 - Warner Road at Angels Drive	TWSC	2022	LOS Delay V/C Q	A 0 0.00 0	A 0 0.00 0		A 0	A 0 0.00 0	A 0 0.00 0	A 0 0.00 0	A 0				A 9 0.01 0	A 9 0.01 0	A 9 0.01 0	A 9	3		
				LOS Delay V/C Q	A 0 0.00 0	A 0 0.00 0		A 0	A 0 0.00 0	A 0 0.00 0	A 0 0.00 0	A 0				A 9 0.01 0	A 9 0.01 0	A 9 0.01 0	A 9	3		
		TWSC	2030 (Total)	LOS Delay V/C Q	A 2 0.00 0	A 2 0.00 0	A 2 0.00 0	A 2	A 5 0.01 0	A 5 0.01 0	A 5 0.01 0	A 5	A 9 0.02 1	A 9 0.02 1	A 9 0.02 1	A 9	A 9 0.01 0	A 9 0.01 0	A 9 0.01 0	A 9	5	

MOE - Measure of Effectiveness

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Q - 95th Percentile Queue Length (m)

Ex - Existing Available Storage (m)

Avail. - Available Storage (m)

TCS - Traffic Control Signal

TWSC - Two-Way Stop Control

AWSC - All-Way Stop Control



TABLE 5.1C: SATURDAY PEAK HOUR OPERATIONS

Analysis Period	Intersection	Control Type	Horizon	MOE	Direction / Movement / Approach																Overall	
					Eastbound				Westbound				Northbound				Southbound					
					Left	Through	Right	Approach	Left	Through	Right	Approach	Left	Through	Right	Approach	Left	Through	Right	Approach		
Sat. Peak Hour	1 - Tanbark Road at York Road	TWSC	2022	LOS Delay V/C Q	A 1 0.01	A 1 0.01	A 1 0.01	A 1	A 1 0.01	A 1 0.01	A 1 0.01	A 1	C 17 0.19	C 17 0.19	C 17 0.19	C 17	B 14 0.08	B 14 0.08	B 14 0.08	B 14	3	
				LOS Delay V/C Q	A 0 0.02	A 0 0.02	A 0 0.02	A 0	A 1 0.02	A 1 0.02	A 1 0.02	A 1	C 21 0.28	C 21 0.28	C 21 0.28	C 21	C 16 0.12	C 16 0.12	C 16 0.12	C 16	3	
		TWSC	2030 (Total)	LOS Delay V/C Q	A 0 0.02	A 0 0.02	A 0 0.02	A 0	A 1 0.03	A 1 0.03	A 1 0.03	A 1	C 24 0.37	C 24 0.37	C 24 0.37	C 24	C 17 0.13	C 17 0.13	C 17 0.13	C 17	4	
	2 - Tanbark Road at Warner Road	TWSC	2022	LOS Delay V/C Q	A 10 0.01	A 10 0.01	A 10 0.01	A 10	A 9 0.04	A 9 0.04	A 9 0.04	A 9	A 0 0.00	A 0 0.00	A 0 0.00	A 0	A 2 0.01	A 2 0.01	A 2 0.01	A 2	4	
				LOS Delay V/C Q	A 10 0.02	A 10 0.02	A 10 0.02	A 10	A 9 0.05	A 9 0.05	A 9 0.05	A 9	A 0 0.00	A 0 0.00	A 0 0.00	A 0	A 2 0.01	A 2 0.01	A 2 0.01	A 2	3	
		TWSC	2030 (Total)	LOS Delay V/C Q	A 10 0.04	A 10 0.04	A 10 0.04	A 10	A 9 0.05	A 9 0.05	A 9 0.05	A 9	A 0 0.00	A 0 0.00	A 0 0.00	A 0	A 2 0.01	A 2 0.01	A 2 0.01	A 2	4	
	3 - Tanbark Road at Pinecroft Drive	TWSC	2022	LOS Delay V/C Q					A 9 0.01	A 9 0.01	A 9 0.01	A 9	A 0 0.02	A 0 0.02	A 0 0.02	A 0	A 2 0.01	A 2 0.01	A 2 0.01	A 1	2	
				LOS Delay V/C Q					A 9 0.01	A 9 0.01	A 9 0.01	A 9	A 0 0.03	A 0 0.03	A 0 0.03	A 0	A 2 0.01	A 2 0.01	A 2 0.01	A 2	1	
		TWSC	2030 (Total)	LOS Delay V/C Q					A 9 0.01	A 9 0.01	A 9 0.01	A 9	A 0 0.03	A 0 0.03	A 0 0.03	A 0	A 2 0.01	A 2 0.01	A 2 0.01	A 2	1	
	4 - Tanbark Road at Hickory Avenue	TWSC	2022	LOS Delay V/C Q	A 9 0.01		A 9 0.01	A 9					A 0 0.00	A 0 0.00	A 0 0.00	A 0	A 0 0.02	A 0 0.02	A 0 0.02	A 0	1	
				LOS Delay V/C Q	A 9 0.02		A 9 0.02	A 9					A 1 0.00	A 1 0.00	A 1 0.00	A 0	A 0 0.02	A 0 0.02	A 0 0.02	A 0	2	
		TWSC	2030 (Total)	LOS Delay V/C Q	A 9 0.02		A 9 0.02	A 9					A 0 0.00	A 0 0.00	A 0 0.00	A 0	A 0 0.02	A 0 0.02	A 0 0.02	A 0	2	
	5 - Warner Road at Angels Drive	TWSC	2022	LOS Delay V/C Q	A 3 0.00	A 3 0.00		A 0	A 0 0.00	A 0 0.00	A 0 0.00	A 0				A 9 0.00	A 9 0.00	A 9 0.00	A 9	3		
				LOS Delay V/C Q	A 3 0.00	A 3 0.00		A 0	A 0 0.00	A 0 0.00	A 0 0.00	A 0				A 9 0.01	A 9 0.01	A 9 0.01	A 9	3		
		TWSC	2030 (Total)	LOS Delay V/C Q	A 3 0.00	A 3 0.00	A 3 0.00	A 3	A 4 0.01	A 4 0.01	A 4 0.01	A 4	A 9 0.02	A 9 0.02	A 9 0.02	A 9	A 9 0.01	A 9 0.01	A 9 0.01	A 9	6	

MOE - Measure of Effectiveness

LOS - Level of Service

Delay - Average Delay per Vehicle in Seconds

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TCS - Traffic Control Signal

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6 Mitigation Measures

As summarized in the analysis tables in the previous chapter, the study area intersections are not projected to experience any operational deficiencies. The analysis also concludes that the development would have minimal impacts on traffic conditions in the study area.

This chapter summarizes the results of the investigation to identify if improvement measures are required to accommodate the impacts of the proposed development.

6.1 Left Turn Lanes

The proposed new unsignalized intersections within the study area were assessed to determine if the future traffic volumes warrant an extension or installation of a left-turn lane along the major roadway.

The left-turn lanes warrants follow the Ministry of Transportation's (MTO) Geometric Design Standards⁴ requirements. A design speed of 20 kilometres per hour over the posted and assumed speed limit had been utilized. **Table 6.1** summarizes the results of the left-turn lane warrant analyses. The percentages of left-turning vehicles in the approaching volume were rounded to the nearest 5 percent, as nomographs are only provided for 5 percent increments. **Appendix E** contains the nomographs. The following is noted:

- ▶ A northbound left turn lane at Tanbark Road and Hickory Avenue is not warranted under the 2030 Total conditions.
- ▶ A westbound left turn lane at Warner Road and Angels Drive/Street B is not warranted under the 2030 Total conditions.

TABLE 6.1: LEFT-TURN LANE ANALYSIS

	Warner Road at Angels Drive/Street B			Tanbark Road at Hickory Avenue		
Approach Direction Design Speed	Westbound 70 km/h			Northbound 70 km/h		
Horizon	2024 Total			2024 Total		
Peak Hour	AM	PM	Saturday	AM	PM	Saturday
Advancing Volume	17	33	30	67	45	52
Opposing Volumes	8	20	11	42	76	5
Left Turning Traffic	8	13	16	0	5	37
% of Left Turning Traffic	47.1%	39.4%	53.3%	0.0%	11.1%	71.2%
Figure Used*	9A-13	9A-13	9A-13	N/A	9A-10	9A-13
Warranted	No	No	No	No	No	No
Storage Length Required	n/a	n/a	n/a	n/a	n/a	n/a

Based on MTO Design Supplement for TAC Geometric Design Guide for Canadian Road - June 2017

⁴ MTO Design Supplement for TAC Geometric Design Guide for Canadian Road, 2017



6.2 Sight Distance Evaluation

Paradigm conducted a sight distance evaluation for the proposed roadway connections to Warner Road and Tanbark Road, following guidelines provided by the Transportation Association of Canada (TAC). Sight distance considerations are divided into three categories: stopping sight distance (SSD), decision sight distance (DSD) and turning sight distance (TSD).

- ▶ SSD is the distance required for a vehicle approaching an intersection from either direction to perceive, react and come to a complete stop to avoid colliding with an object in the road. In this respect, SSD can be considered the minimum visibility criterion for the safe operation of an unsignalized intersection.
- ▶ DSD is the distance required for a vehicle approaching an intersection from either direction to perceive, react and select an appropriate speed and path, and initiate and complete the movement safely and efficiently to avoid the hazard. In this respect, DSD can be considered the preferred visibility criterion for the safe operation of an unsignalized intersection.
- ▶ TSD is based on the time required for perception, reaction and completion of the desired critical exiting maneuver (typically, a left turn) once the driver on a minor street approach (or a driveway) decides to execute the maneuver. Calculations for TSD include the time to (1) turn left and clear the near half of the intersection without conflicting with the vehicles approaching from the left; and (2), upon turning left, accelerate to the operating speed on the roadway without causing approaching vehicles on the main road to unduly reduce their speed. In this context, TSD can be considered a desirable visibility criterion for the safe operation of an unsignalized intersection.

Paradigm generally utilizes a design speed of 20 km/h over the posted speed to provide a conservative analysis in rural environments. The sight distance analysis was based on this assumption along Warner Road west of Street B.

Table 6.2 shows the available SSD, DSD and TSD to/from the west of Street B. For clarification, to the east of Street B, Warner Road is noted to be under two-way stop control at the Tanbark Road intersection. This section with unobstructed sight lines is 195 metres in length. Given the short segment length to the stop-controlled intersection with Tanbark Road, the sight distance to the east of Street B is adequate. The measurements indicate that the proposed new roadway is adequately spaced from a sight-distance perspective.



TABLE 6.2: SIGHT DISTANCE

Location	SSD (metres)		DSD (metres)		TSD (metres)	
	Required ^a	Measured ^b	Required ^a	Measured ^b	Required ^a	Measured ^b
Warner Road at Street B						
To/From the East	105	195	250	195	150	195
To/From the West	105	250+	250	250+	150	150+

a Based on guidelines established in the Geometric Design Guide for Canadian Roads, Transportation Association of Canada (TAC), 2017 for the operating speed of 70 km/h

b Field measurements taken by Paradigm

+ Field measurement exceeds what listed



7 Conclusions

7.1 Conclusions

This study evaluated the impacts of background traffic growth and the proposed 74 residential units. A new street connection proposes direct access to the development to Warner Road (Street B) that is proposed opposite Angels Drive. Secondary access is proposed through an extension of Chestnut Avenue that will connect to the development's internal roadway network. Full build-out is expected at or before 2030 for this report.

Full-build out of the development is projected to generate approximately 38-48 new vehicle trips during the weekday and Saturday peak hours.

The proposed new roadway onto Warner Road, opposite Angels Drive, will be constructed to provide a safe and efficient access point to the overall development, given its location and roadway geometry. The street connections will be designed with adequate width to provide for reasonable entry and exit from the development and accommodate emergency response vehicles; the proposed locations afford safe sight lines for all turning movements and approaches.

Detailed traffic analysis was conducted for each study area intersection under 2022 existing traffic conditions and 2030 background and total traffic conditions. Based on traffic data and analyses completed, the intersections within the study area presently operates at level of service (LOS) C or better during the weekday and Saturday peak hours. LOS D or better is generally considered a well-functioning intersection in urban environments. With additional trips generated by the development, the impact on the study area's intersections is expected to be minimal as the intersections are forecast to continue to operate at LOS C or better.

The analysis has further determined that auxiliary left turn lanes are not warranted under the 2020 total conditions along Warner Road at Street B.

Overall, the study finds that development-generated traffic should not significantly impact traffic operations within the study area and that the existing transportation infrastructure in the area can adequately accommodate the traffic volumes projected to be generated by the proposed development.

7.2 Recommendations

Recognizing that no capacity issues are projected, off-site roadway improvements are not the applicant's responsibility, nor should any requirement for off-site roadway improvements form any condition of the draft plan of subdivision approval for Tawny Ridge Estates – Phase 2.



Appendix A

Pre-Study Consultation



Andrew Brown

From: Dunsmore, Susan <Susan.Dunsmore@niagararegion.ca>
Sent: April 10, 2019 2:23 PM
To: Andrew Brown
Cc: Adam Makarewicz; MWeston@notl.org; Frost, Jordan
Subject: RE: (190242) 170-178 Tanbark Road, Niagara-on-the-Lake - TIA Scope of Work

Hi Andrew,

Thank you for circulated this Scope of Work to us. We will review the document with regards to the one Regional intersection that has been included and only have the following comments on the scope:

- ITE Trip Generation Manual, 10th Edition should be used for estimating site generated traffic
- Transportation Tomorrow Survey (TTS) 2016 data and/or existing travel patterns should be used for distributing site generated traffic

If you have any questions or concern please contact me at your convenience.

Thank you,

Susan M. Dunsmore, P. Eng.
Manager, Development Engineering
Planning and Development Services

Phone: (905) 980-6000 or 1-800-263-7215 ext 3661
Address: 1815 Sir Isaac Brock Way, Thorold ON, L2V4T7



From: Andrew Brown <abrown@ptsl.com>
Sent: Thursday, April 04, 2019 9:05 AM
To: Dunsmore, Susan <Susan.Dunsmore@niagararegion.ca>; MWeston@notl.org
Cc: Adam Makarewicz <amakarewicz@ptsl.com>
Subject: (190242) 170-178 Tanbark Road, Niagara-on-the-Lake - TIA Scope of Work

CAUTION: This email originated from outside of the Niagara Region email system. Use caution when clicking links or opening attachments unless you recognize the sender and know the content is safe.

Greetings,

Paradigm Transportation Solutions Limited (Paradigm) was retained to undertake a Transportation Impact Assessment for a residential development of 170-178 Tanbark Road in Niagara-on-the-Lake. Below is our proposed scope of work for your review and comments.

The subject site is located on the south side of Warner Road and west of Tanbark Road in Niagara on the lake. The property owner is proposing to develop the parcel into 42 single family lots. Vehicle access is proposed via a new street connection to Warner Road and Tanbark Road as well as an extension of Chestnut Avenue that will connect to the development's internal roadway network.

Based on our understanding, we have assumed preparation of a Transportation Impact Assessment (TIA) to evaluate the effects of the proposed development on the transportation system and recommend improvements, if necessary, to address potential impacts.

The study will follow the Niagara Region Guidelines for Transportation Impact Studies (May 2012). The study area will comprise the following five (5) intersections:

- York Road at Tanbark Road (unsignalized);
- Warner Road at Tanbark Road (unsignalized);
- Tanbark Road at Pinecroft Drive (unsignalized);
- Tanbark Road at Hickory Avenue (unsignalized); and
- Warner Avenue at New Roadway (unsignalized).

We will require confirmation if recent turning movement counts (last two years) are available. If no recent turning movement counts are available, we will undertake new counts.

Traffic forecasts and analysis will be completed for one (1) planning horizon (five (5) years from the date the study is commissioned) and two (2) analysis (weekday AM and PM peak hours).

Future Background volumes for the remaining horizon years will be estimated by applying a growth rate of to the Existing volumes and adding anticipated trips from nearby approved and in-stream developments. Growth rates and developments to include in the background traffic forecasts need to be confirmed by Niagara-on-the-Lake and/or Niagara Region.

We will analyze the operation of the study area intersections for the Existing, Future Background (without the development) and Future Total (with the development) traffic conditions for each horizon year and analysis period using Synchro software. Volume-to-capacity (v/c) ratios, Level of Service (LOS) and queuing will be assessed.

Based on the analysis results, we will identify any operational deficiencies as well as the net impact of the proposed development on the study area road network. The need for road improvements (e.g., auxiliary turn lanes) and/or other mitigating measures (e.g., traffic control device modifications) to address deficiencies will be determined. We will assess whether these measures are required due to non-site traffic (i.e. Existing or Future Background) or the increase in volumes resulting from the proposed development (i.e. Future Total).

If you have any questions or concerns, please contact me.

Thank you and regards,

Andrew Brown, Dipl. T., MITE
Transportation Consultant



Paradigm Transportation Solutions Limited

5A-150 Pinebush Road, Cambridge, ON N1R 8J8

p: 905.381.2229 x307

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Andrew Brown

From: Adam Makarewicz
Sent: May 21, 2019 3:43 PM
To: Marci Weston; Andrew Brown; Raymond Tung
Cc: Greg Taras; Dunsmore, Susan
Subject: RE: (190242) 170-178 Tanbark Road, Niagara-on-the-Lake - TIA Scope of Work

Importance: High

Hi Marci,

Thanks for getting back to us on the scope. A couple of additional comments for consideration:

- **Warner Road and Four Mile Creek Road** - The proposed 42-unit development is estimated to generate less than 50 peak hour vehicle trips. After the directional in/out distribution and trip assignment is completed the increased volumes at the intersections of Warner Road and Four Mile Creek Road are not likely to experience any significant change in operations.
- **Saturday Peak Hour** - Our firm completed a TIS completed in November 2016 for a development at 1397 York Road & 242/246 Four Mile Creek Road that includes an assessment of the weekday peak hours and Saturday peak hour. The volumes with the study area (including the York Road and Tanbark Road intersection) are noted to be less during the Saturday peak hour than the weekday PM peak hour. As the weekday PM peak hour has been documented to have the highest volume of traffic, it is our opinion that the need to include the Saturday analysis would be redundant and would not alter the findings of the TIS.

We respectfully request you review of the following and reconsider the need for a Saturday analysis.

Regards,

Adam J. Makarewicz, Dipl.T., C.E.T. MITE
Senior Project Manager



Paradigm Transportation Solutions Limited
5A-150 Pinebush Road, Cambridge ON N1R 8J8
p: 905.381.2229 x303
e: amakarewicz@ptsl.com
w: www.ptsl.com

From: Marci Weston <Marci.Weston@notl.com>
Sent: 21-May-19 3:01 PM
To: Andrew Brown <abrown@ptsl.com>; Raymond Tung <Raymond.Tung@notl.com>; Andrew Brown <abrown@ptsl.com>
Cc: Adam Makarewicz <amakarewicz@ptsl.com>; Greg Taras <gtaras@uemconsulting.com>; Dunsmore, Susan

<Susan.Dunsmore@niagararegion.ca>

Subject: RE: (190242) 170-178 Tanbark Road, Niagara-on-the-Lake - TIA Scope of Work

Good Morning Andrew,

Please see our comments adjacent to your proposed scope of work below. By copy of this email I will request Raymond Tung to provide you with a list of current and pending developments in the vicinity of the study area.

Regards,

Marci Weston

Engineering Technologist (Traffic and Transit)

OUR EMAILS HAVE CHANGED! Please update my contact information in your address book and direct future messages to: marci.weston@notl.com



Operations Department

3 Lorraine Street, P.O. Box 100

Virgil, Ontario. L0S 1T0

Email: marci.weston@notl.com

Direct Line: (905) 468-6486 Fax: (905) 468-1722

From: Andrew Brown <abrown@ptsl.com>

Sent: 22-Apr-19 11:12 AM

To: marci.weston@notl.com

Cc: Adam Makarewicz <amakarewicz@ptsl.com>

Subject: RE: (190242) 170-178 Tanbark Road, Niagara-on-the-Lake - TIA Scope of Work

Hi Marci,

I am following up to see if you have had a chance to review our Transportation Impact Assessment scope of work (see below) for 170-178 Tanbark Road in Niagara-on-the-Lake. The preliminary site plan is attached.

Please let me know if you have any questions or require any clarification.

Thank you very much,

Andrew Brown, Dipl. T., MITE

Transportation Consultant



Paradigm Transportation Solutions Limited

From: Andrew Brown
Sent: April 4, 2019 5:13 PM
To: 'marci.weston@notl.com' <marci.weston@notl.com>
Cc: Adam Makarewicz <amakarewicz@ptsl.com>
Subject: (190242) 170-178 Tanbark Road, Niagara-on-the-Lake - TIA Scope of Work

Greetings,

Paradigm Transportation Solutions Limited (Paradigm) was retained to undertake a Transportation Impact Assessment for a residential development of 170-178 Tanbark Road in Niagara-on-the-Lake. Below is our proposed scope of work for your review and comments.

The subject site is located on the south side of Warner Road and west of Tanbark Road in Niagara on the lake. The property owner is proposing to develop the parcel into 42 single family lots. Vehicle access is proposed via a new street connection to Warner Road and Tanbark Road as well as an extension of Chestnut Avenue that will connect to the development's internal roadway network.

Based on our understanding, we have assumed preparation of a Transportation Impact Assessment (TIA) to evaluate the effects of the proposed development on the transportation system and recommend improvements, if necessary, to address potential impacts.

We concur with the Region's comments regarding:

- ITE Trip Generation Manual, 10th Edition should be used for estimating site generated traffic
- Transportation Tomorrow Survey (TTS) 2016 data and/or existing travel patterns should be used for distributing site generated traffic

The study will follow the Niagara Region Guidelines for Transportation Impact Studies (May 2012). The study area will comprise the following five (5) intersections:

- York Road at Tanbark Road (unsignalized); **Confirmed**
- Warner Road at Tanbark Road (unsignalized); **Confirmed**
- Tanbark Road at Pinecroft Drive (unsignalized); **Confirmed**
- Tanbark Road at Hickory Avenue (unsignalized); and **Confirmed**
- Warner Avenue at New Roadway (unsignalized). **Confirmed**
- Although not under the Town's jurisdiction, it is likely that southbound traffic towards Niagara Falls and the Stanley/General Brock Parkway interchange will use the Warner Rd @ Four Mile Creek Rd. intersection to reach their destination, we would appreciate the rationale for not including this intersection in the scope of the TIA.

We will require confirmation if recent turning movement counts (last two years) are available. If no recent turning movement counts are available, we will undertake new counts. **No turning movement counts for the past two years are available from the Town of Niagara-on-the-Lake.**

Traffic forecasts and analysis will be completed for one (1) planning horizon (five (5) years from the date the study is commissioned) and two (2) analysis (weekday AM and PM peak hours). **Due to**

high seasonal tourist traffic we request the addition of a weekend day analysis (AM and PM peak hours). All traffic counts to be conducted during peak tourist season (between Victoria Day and Canadian Thanksgiving Monday), or calculated using a WADT to SADT factor. The Town does not currently operate any year-round count stations which may be useful in establishing this factor.

Future Background volumes for the remaining horizon years will be estimated by applying a growth rate of to the Existing volumes and adding anticipated trips from nearby approved and in-stream developments. Growth rates and developments to include in the background traffic forecasts need to be confirmed by Niagara-on-the-Lake and/or Niagara Region.

- Background growth rate of 2%
- Proposed municipal road improvements through 2023 (subject to budget priority)
 - Crack sealing as required, all years
 - 2022 – Warner Rd. cold mix resurfacing, Tanbark to Concession 5 to QEW

We will analyze the operation of the study area intersections for the Existing, Future Background (without the development) and Future Total (with the development) traffic conditions for each horizon year and analysis period using Synchro software. Volume-to-capacity (v/c) ratios, Level of Service (LOS) and queuing will be assessed. [Confirmed](#)

Based on the analysis results, we will identify any operational deficiencies as well as the net impact of the proposed development on the study area road network. The need for road improvements (e.g., auxiliary turn lanes) and/or other mitigating measures (e.g., traffic control device modifications) to address deficiencies will be determined. We will assess whether these measures are required due to non-site traffic (i.e. Existing or Future Background) or the increase in volumes resulting from the proposed development (i.e. Future Total). [Confirmed](#)

If you have any questions or concerns, please contact me.

Thank you and regards,

Andrew Brown, Dipl. T., MITE

Transportation Consultant



Paradigm Transportation Solutions Limited

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Appendix B

Traffic Data





Paradigm Transportation Solutions Limited
5A-150 Pinebush Rd

Cambridge, Ontario, Canada N1R 8J8
519-896-3163 cbowness@ptsl.com

Count Name: Hickory Avenue & Tanbark Road
Site Code:
Start Date: 06/05/2019
Page No: 1

Turning Movement Data

Start Time	Eastbound Approach					Tanbark Road					Tanbark Road					
	Eastbound					Northbound					Southbound					
	Left	Right	U-Turn	Peds	App. Total	Left	Thru	U-Turn	Peds	App. Total	Thru	Right	U-Turn	Peds	App. Total	Int. Total
7:00 AM	1	0	0	0	1	0	3	0	0	3	1	0	0	0	1	5
7:15 AM	1	1	0	0	2	0	7	0	0	7	3	1	0	0	4	13
7:30 AM	1	1	0	0	2	0	4	0	0	4	2	0	0	0	2	8
7:45 AM	3	1	0	0	4	0	9	0	0	9	3	2	0	0	5	18
Hourly Total	6	3	0	0	9	0	23	0	0	23	9	3	0	0	12	44
8:00 AM	1	3	0	0	4	0	7	0	0	7	6	0	0	0	6	17
8:15 AM	1	1	0	0	2	0	9	0	0	9	2	0	0	0	2	13
8:30 AM	1	1	0	0	2	0	9	0	0	9	3	1	0	0	4	15
8:45 AM	1	1	0	0	2	0	22	0	0	22	11	0	0	0	11	35
Hourly Total	4	6	0	0	10	0	47	0	0	47	22	1	0	0	23	80
9:00 AM	2	1	0	0	3	0	11	0	0	11	11	1	0	0	12	26
9:15 AM	2	0	0	0	2	0	12	0	0	12	3	2	0	0	5	19
9:30 AM	1	1	0	0	2	0	3	0	1	3	6	1	0	0	7	12
9:45 AM	2	1	0	1	3	1	7	1	0	9	8	1	0	1	9	21
Hourly Total	7	3	0	1	10	1	33	1	1	35	28	5	0	1	33	78
*** BREAK ***	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
11:30 AM	0	1	0	0	1	2	9	0	0	11	12	1	0	0	13	25
11:45 AM	1	0	0	0	1	3	5	0	0	8	14	2	0	0	16	25
Hourly Total	1	1	0	0	2	5	14	0	0	19	26	3	0	0	29	50
12:00 PM	1	3	0	0	4	1	9	0	0	10	4	4	0	0	8	22
12:15 PM	3	2	0	0	5	1	11	0	0	12	12	4	0	0	16	33
12:30 PM	3	1	0	0	4	0	6	0	0	6	7	0	0	0	7	17
12:45 PM	2	0	0	0	2	2	10	0	0	12	4	0	0	0	4	18
Hourly Total	9	6	0	0	15	4	36	0	0	40	27	8	0	0	35	90
1:00 PM	1	0	0	0	1	3	2	0	0	5	11	4	0	0	15	21
1:15 PM	2	0	0	0	2	1	5	0	0	6	8	0	0	0	8	16
*** BREAK ***	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Hourly Total	3	0	0	0	3	4	7	0	0	11	19	4	0	0	23	37
4:00 PM	1	0	0	0	1	2	7	0	0	9	13	3	0	0	16	26
4:15 PM	1	1	0	0	2	2	11	0	0	13	4	6	0	0	10	25
4:30 PM	2	0	0	0	2	0	2	0	0	2	8	0	1	0	9	13
4:45 PM	1	2	0	0	3	1	7	0	0	8	9	2	0	0	11	22
Hourly Total	5	3	0	0	8	5	27	0	0	32	34	11	1	0	46	86
5:00 PM	1	0	0	0	1	1	10	0	0	11	19	2	0	0	21	33
5:15 PM	2	1	0	0	3	1	11	0	0	12	12	0	0	0	12	27
5:30 PM	2	0	0	0	2	1	4	0	0	5	9	3	0	0	12	19
5:45 PM	0	2	0	0	2	0	3	0	0	3	3	3	1	0	7	12
Hourly Total	5	3	0	0	8	3	28	0	0	31	43	8	1	0	52	91

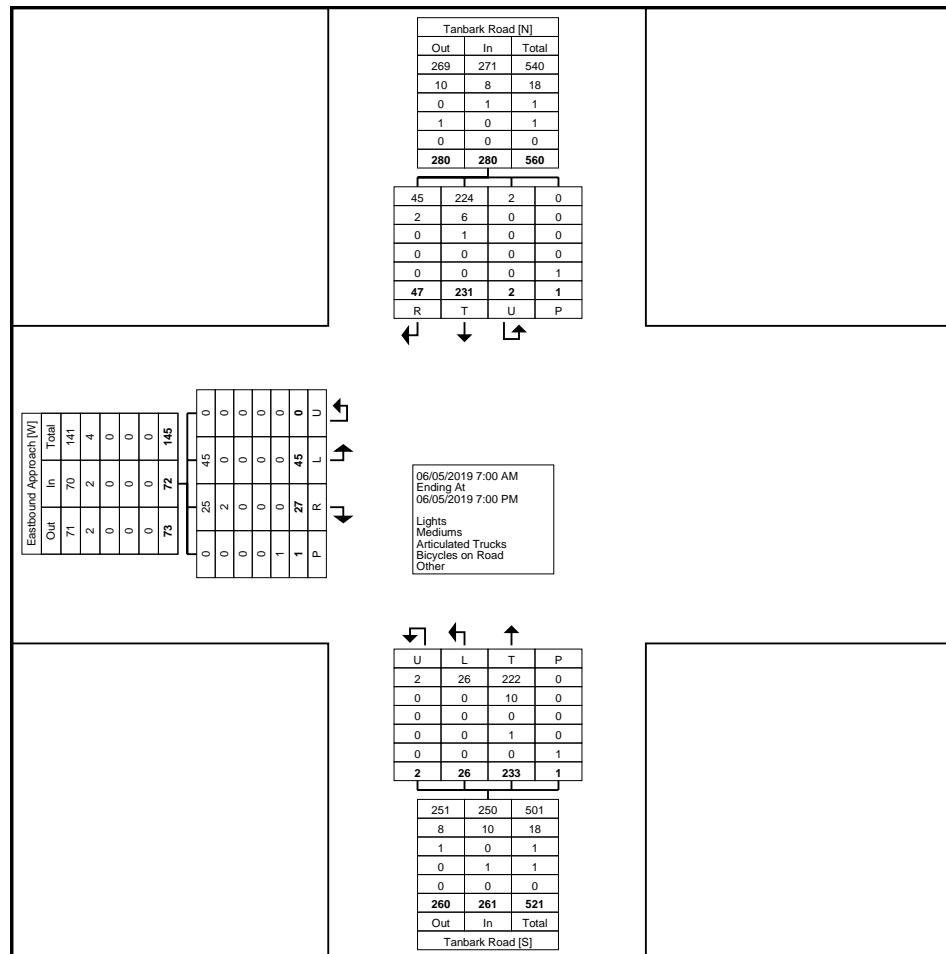
6:00 PM	1	0	0	0	1	1	8	0	0	9	7	2	0	0	9	19
6:15 PM	0	1	0	0	1	1	4	0	0	5	6	0	0	0	6	12
6:30 PM	2	1	0	0	3	1	2	1	0	4	4	1	0	0	5	12
6:45 PM	2	0	0	0	2	1	4	0	0	5	6	1	0	0	7	14
Hourly Total	5	2	0	0	7	4	18	1	0	23	23	4	0	0	27	57
Grand Total	45	27	0	1	72	26	233	2	1	261	231	47	2	1	280	613
Approach %	62.5	37.5	0.0	-	-	10.0	89.3	0.8	-	-	82.5	16.8	0.7	-	-	-
Total %	7.3	4.4	0.0	-	11.7	4.2	38.0	0.3	-	42.6	37.7	7.7	0.3	-	45.7	-
Lights	45	25	0	-	70	26	222	2	-	250	224	45	2	-	271	591
% Lights	100.0	92.6	-	-	97.2	100.0	95.3	100.0	-	95.8	97.0	95.7	100.0	-	96.8	96.4
Mediums	0	2	0	-	2	0	10	0	-	10	6	2	0	-	8	20
% Mediums	0.0	7.4	-	-	2.8	0.0	4.3	0.0	-	3.8	2.6	4.3	0.0	-	2.9	3.3
Articulated Trucks	0	0	0	-	0	0	0	0	-	0	1	0	0	-	1	1
% Articulated Trucks	0.0	0.0	-	-	0.0	0.0	0.0	0.0	-	0.0	0.4	0.0	0.0	-	0.4	0.2
Bicycles on Road	0	0	0	-	0	0	1	0	-	1	0	0	0	-	0	1
% Bicycles on Road	0.0	0.0	-	-	0.0	0.0	0.4	0.0	-	0.4	0.0	0.0	0.0	-	0.0	0.2
Bicycles on Crosswalk	-	-	-	0	-	-	-	-	0	-	-	-	-	0	-	-
% Bicycles on Crosswalk	-	-	-	0.0	-	-	-	-	0.0	-	-	-	-	0.0	-	-
Pedestrians	-	-	-	1	-	-	-	-	1	-	-	-	-	1	-	-
% Pedestrians	-	-	-	-	100.0	-	-	-	-	100.0	-	-	-	100.0	-	-



Paradigm Transportation Solutions Limited
5A-150 Pinebush Rd

Cambridge, Ontario, Canada N1R 8J8
519-896-3163 cbowness@ptsl.com

Count Name: Hickory Avenue & Tanbark Road
Site Code:
Start Date: 06/05/2019
Page No: 3



Turning Movement Data Plot



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Count Name: Hickory Avenue & Tanbark Road
Site Code:
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Page No: 4

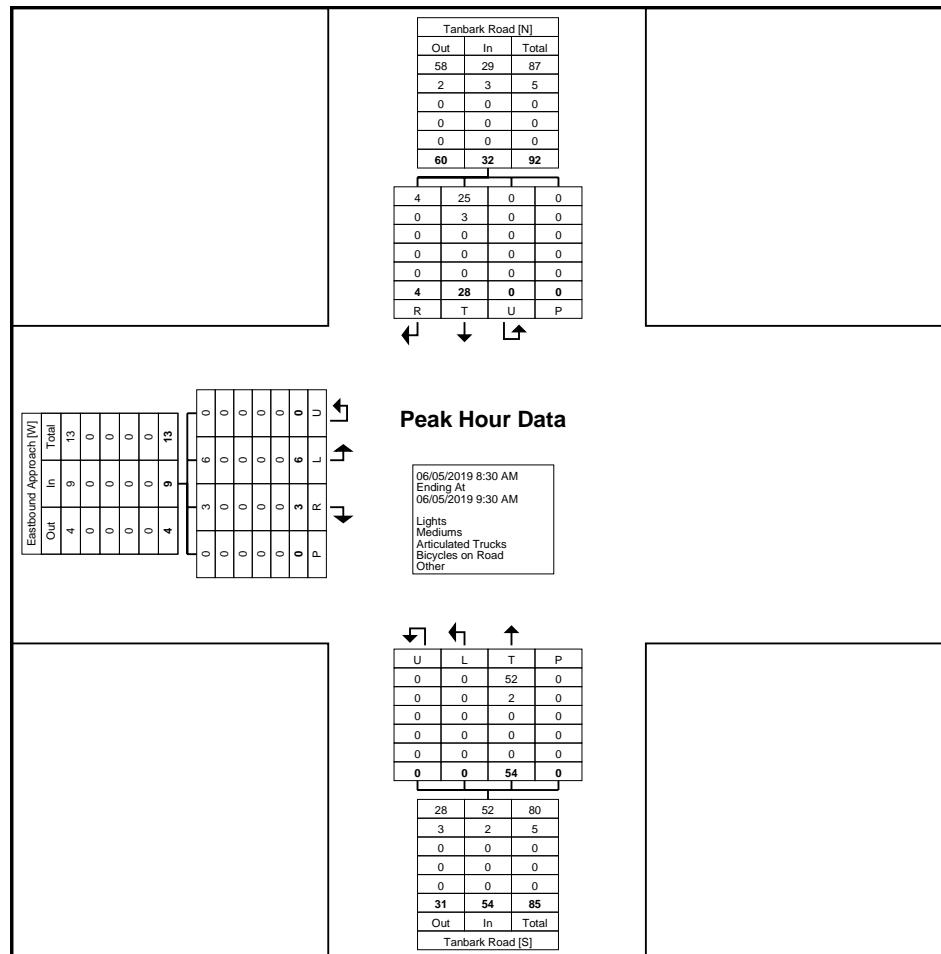
Turning Movement Peak Hour Data (8:30 AM)



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Count Name: Hickory Avenue & Tanbark Road
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Turning Movement Peak Hour Data Plot (8:30 AM)



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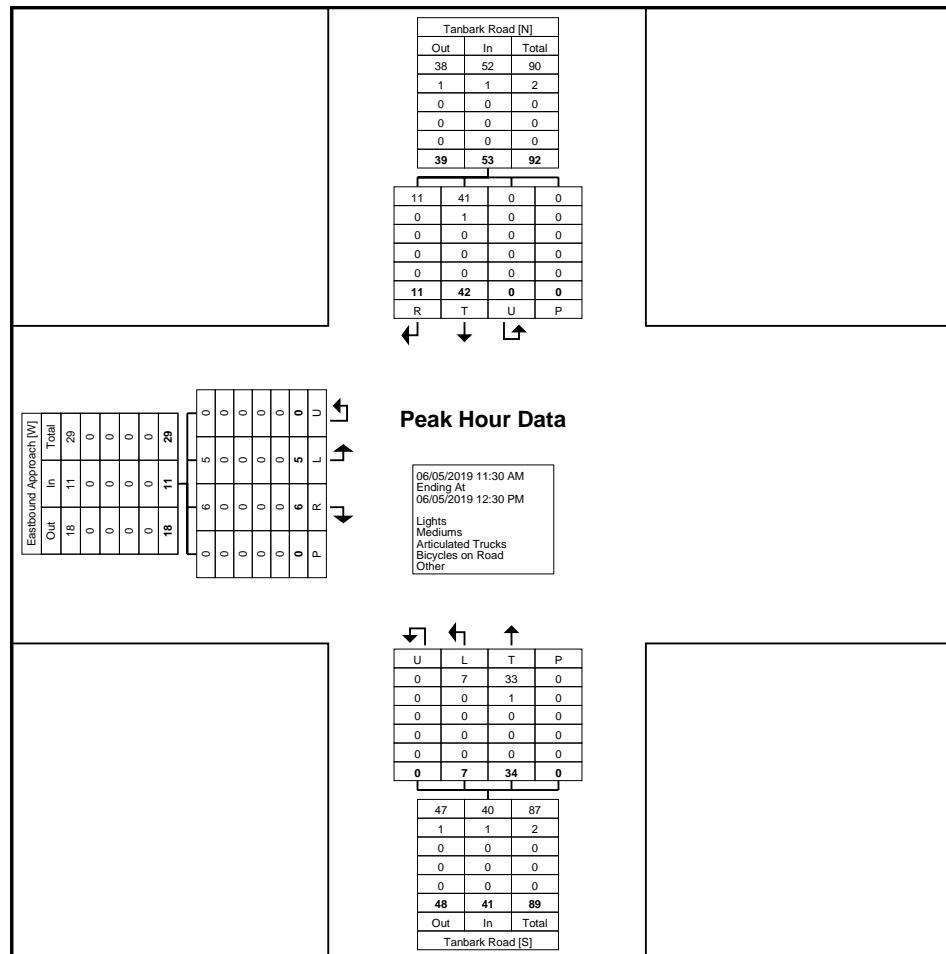
Turning Movement Peak Hour Data (11:30 AM)



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Page No: 7



Turning Movement Peak Hour Data Plot (11:30 AM)



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Count Name: Hickory Avenue & Tanbark Road
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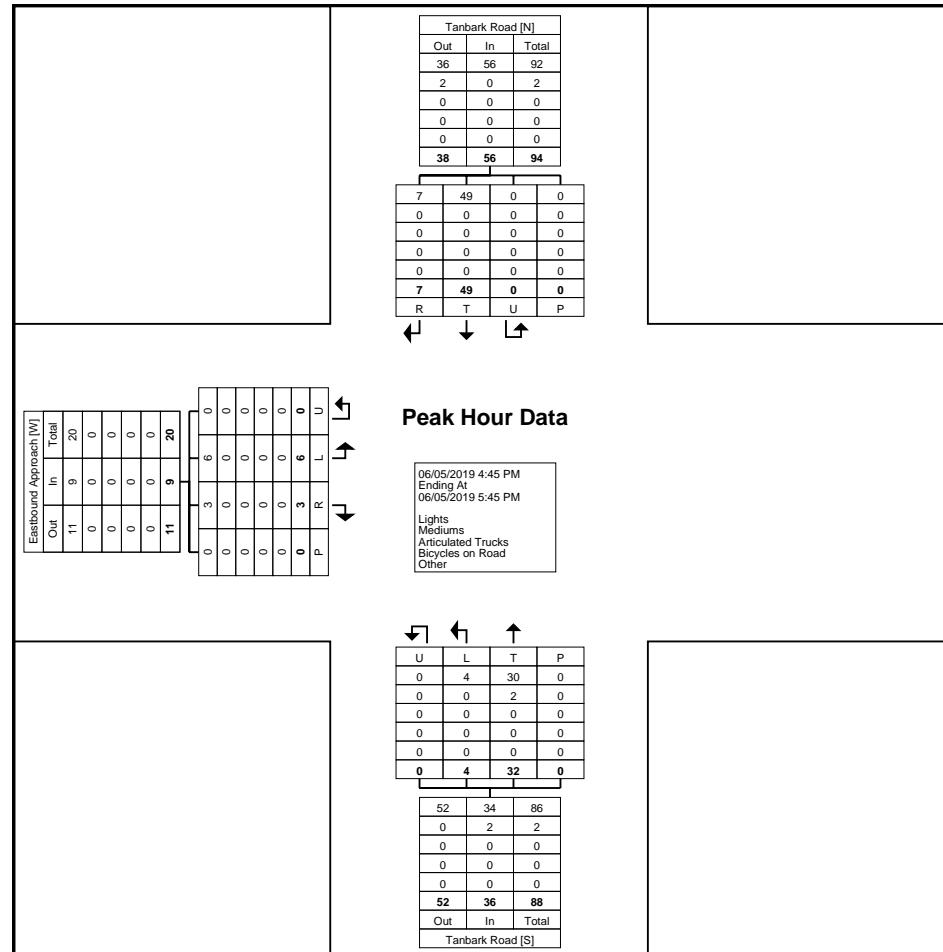
Turning Movement Peak Hour Data (4:45 PM)



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Count Name: Hickory Avenue & Tanbark Road
Site Code:
Start Date: 06/05/2019
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Turning Movement Peak Hour Data Plot (4:45 PM)



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Count Name: Hickory Avenue & Tanbark Road
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Start Date: 06/05/2019
Page No: 10



Paradigm Transportation Solutions Limited
5A-150 Pinebush Rd

Cambridge, Ontario, Canada N1R 8J8
519-896-3163 cbowness@ptsl.com

Count Name: Pinecroft Drive & Tanbark Road -
Saturday
Site Code:
Start Date: 06/08/2019
Page No: 1

Turning Movement Data

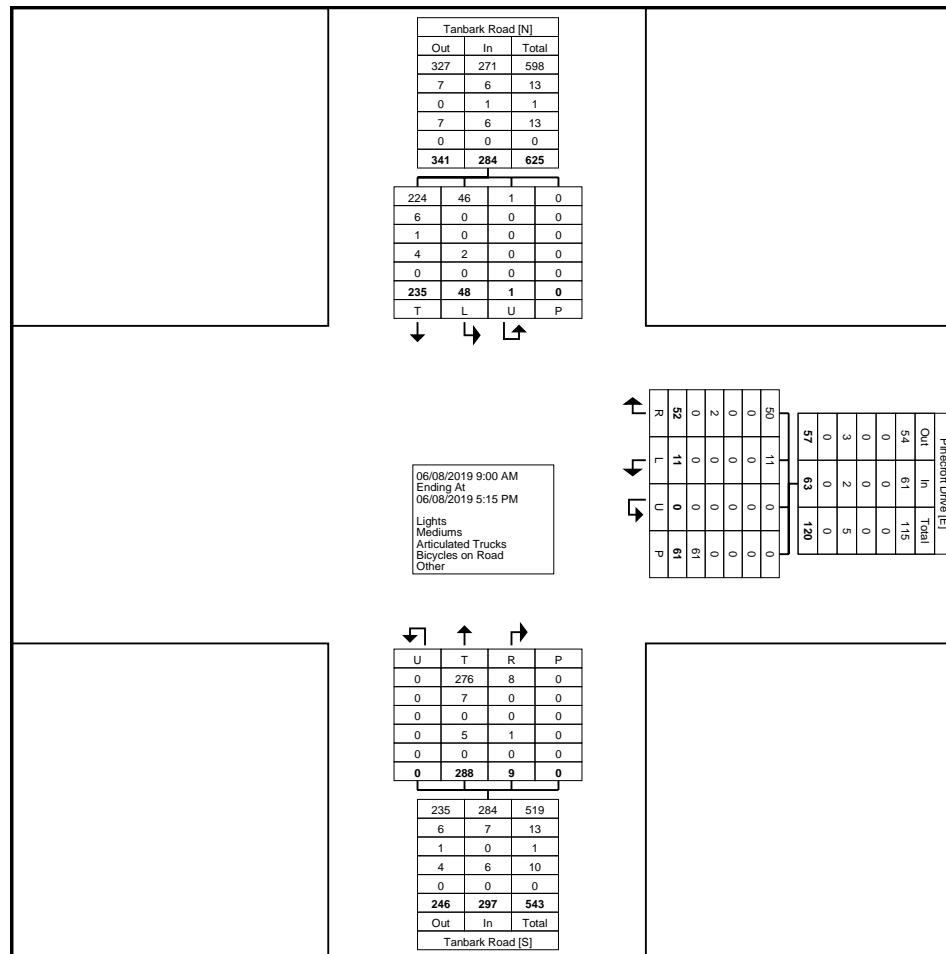
Start Time	Pinecroft Drive Westbound					Tanbark Road Northbound					Tanbark Road Southbound					Int. Total
	Left	Right	U-Turn	Peds	App. Total	Thru	Right	U-Turn	Peds	App. Total	Left	Thru	U-Turn	Peds	App. Total	
9:00 AM	1	4	0	2	5	7	0	0	0	7	0	5	0	0	5	17
9:15 AM	0	2	0	2	2	15	1	0	0	16	0	10	0	0	10	28
9:30 AM	1	2	0	5	3	11	0	0	0	11	2	9	0	0	11	25
9:45 AM	2	3	0	0	5	8	0	0	0	8	3	5	0	0	8	21
Hourly Total	4	11	0	9	15	41	1	0	0	42	5	29	0	0	34	91
10:00 AM	0	2	0	3	2	9	0	0	0	9	1	5	0	0	6	17
10:15 AM	1	2	0	2	3	10	2	0	0	12	1	6	0	0	7	22
10:30 AM	0	3	0	2	3	9	0	0	0	9	0	2	0	0	2	14
10:45 AM	0	2	0	7	2	13	1	0	0	14	2	7	0	0	9	25
Hourly Total	1	9	0	14	10	41	3	0	0	44	4	20	0	0	24	78
11:00 AM	1	0	0	0	1	13	0	0	0	13	1	10	0	0	11	25
11:15 AM	1	0	0	5	1	9	0	0	0	9	1	7	0	0	8	18
11:30 AM	2	1	0	5	3	10	1	0	0	11	1	2	0	0	3	17
11:45 AM	0	1	0	1	1	10	0	0	0	10	1	7	0	0	8	19
Hourly Total	4	2	0	11	6	42	1	0	0	43	4	26	0	0	30	79
12:00 PM	0	0	0	1	0	12	0	0	0	12	1	9	0	0	10	22
12:15 PM	0	0	0	1	0	9	0	0	0	9	1	7	0	0	8	17
12:30 PM	0	0	0	0	0	10	0	0	0	10	0	10	0	0	10	20
12:45 PM	0	2	0	0	2	8	1	0	0	9	2	8	0	0	10	21
Hourly Total	0	2	0	2	2	39	1	0	0	40	4	34	0	0	38	80
1:00 PM	0	3	0	1	3	11	0	0	0	11	2	7	0	0	9	23
1:15 PM	0	1	0	3	1	10	0	0	0	10	1	5	0	0	6	17
1:30 PM	0	1	0	4	1	8	0	0	0	8	1	4	0	0	5	14
1:45 PM	0	3	0	0	3	10	1	0	0	11	3	8	1	0	12	26
Hourly Total	0	8	0	8	8	39	1	0	0	40	7	24	1	0	32	80
2:00 PM	1	1	0	5	2	10	0	0	0	10	2	16	0	0	18	30
2:15 PM	0	2	0	0	2	4	0	0	0	4	3	7	0	0	10	16
2:30 PM	0	0	0	0	0	8	1	0	0	9	3	8	0	0	11	20
2:45 PM	0	3	0	5	3	8	0	0	0	8	0	12	0	0	12	23
Hourly Total	1	6	0	10	7	30	1	0	0	31	8	43	0	0	51	89
3:00 PM	0	1	0	0	1	10	0	0	0	10	1	6	0	0	7	18
3:15 PM	0	2	0	0	2	5	0	0	0	5	1	4	0	0	5	12
3:30 PM	0	2	0	0	2	7	0	0	0	7	3	8	0	0	11	20
3:45 PM	0	1	0	0	1	6	0	0	0	6	0	7	0	0	7	14
Hourly Total	0	6	0	0	6	28	0	0	0	28	5	25	0	0	30	64
4:00 PM	1	2	0	4	3	9	0	0	0	9	5	11	0	0	16	28
4:15 PM	0	2	0	0	2	8	0	0	0	8	3	7	0	0	10	20
4:30 PM	0	3	0	2	3	3	0	0	0	3	1	13	0	0	14	20



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Turning Movement Data Plot



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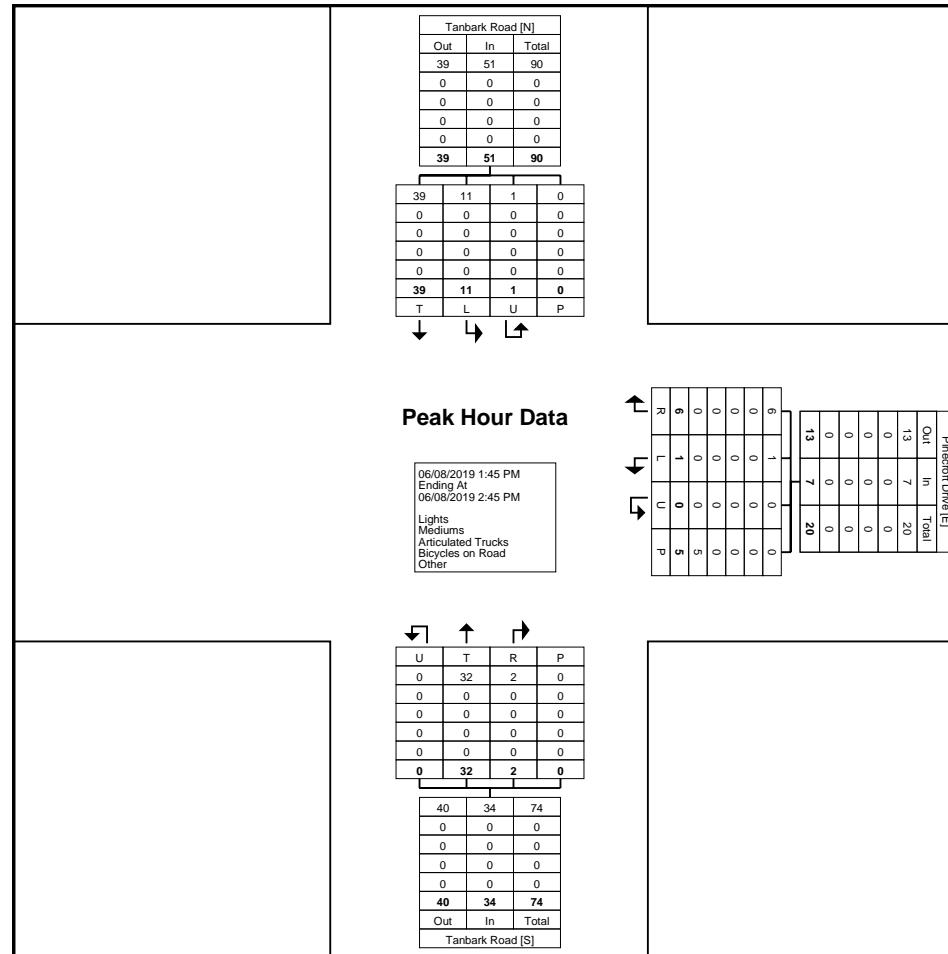
Turning Movement Peak Hour Data (1:45 PM)



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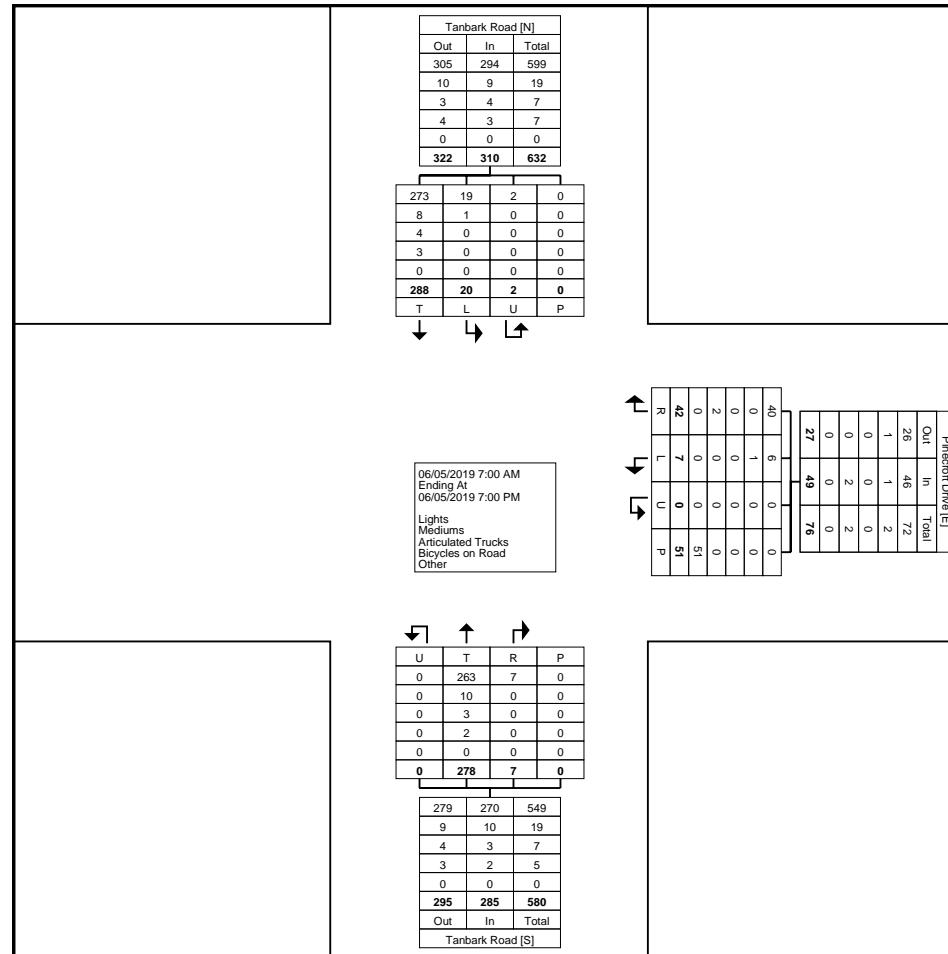
Start Time	Pinecroft Drive Westbound					Tanbark Road Northbound					Tanbark Road Southbound					Int. Total
	Left	Right	U-Turn	Peds	App. Total	Thru	Right	U-Turn	Peds	App. Total	Left	Thru	U-Turn	Peds	App. Total	
7:00 AM	0	0	0	2	0	6	0	0	0	6	0	2	0	0	2	8
7:15 AM	0	1	0	0	1	7	0	0	0	7	1	4	0	0	5	13
7:30 AM	0	4	0	1	4	5	0	0	0	5	0	2	0	0	2	11
7:45 AM	0	2	0	1	2	13	0	0	0	13	1	3	0	0	4	19
Hourly Total	0	7	0	4	7	31	0	0	0	31	2	11	0	0	13	51
8:00 AM	0	3	0	3	3	9	0	0	0	9	0	6	0	0	6	18
8:15 AM	0	6	0	0	6	10	0	0	0	10	2	2	0	0	4	20
8:30 AM	0	5	0	3	5	10	0	0	0	10	0	3	0	0	3	18
8:45 AM	0	0	0	2	0	24	0	0	0	24	0	13	0	0	13	37
Hourly Total	0	14	0	8	14	53	0	0	0	53	2	24	0	0	26	93
9:00 AM	0	0	0	2	0	13	0	0	0	13	1	16	0	0	17	30
9:15 AM	0	2	0	7	2	12	1	0	0	13	0	5	0	0	5	20
9:30 AM	0	0	0	2	0	6	0	0	0	6	0	7	1	0	8	14
9:45 AM	1	0	0	8	1	10	0	0	0	10	1	8	0	0	9	20
Hourly Total	1	2	0	19	3	41	1	0	0	42	2	36	1	0	39	84
*** BREAK ***	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
11:30 AM	0	0	0	0	0	8	1	0	0	9	1	14	0	0	15	24
11:45 AM	3	0	0	0	3	6	1	0	0	7	1	14	0	0	15	25
Hourly Total	3	0	0	0	3	14	2	0	0	16	2	28	0	0	30	49
12:00 PM	0	0	0	0	0	13	0	0	0	13	0	11	0	0	11	24
12:15 PM	2	0	0	1	2	12	0	0	0	12	0	15	0	0	15	29
12:30 PM	0	2	0	1	2	10	0	0	0	10	1	10	0	0	11	23
12:45 PM	0	2	0	0	2	11	1	0	0	12	2	6	0	0	8	22
Hourly Total	2	4	0	2	6	46	1	0	0	47	3	42	0	0	45	98
1:00 PM	1	1	0	0	2	3	0	0	0	3	0	15	0	0	15	20
1:15 PM	0	1	0	1	1	8	0	0	0	8	0	7	0	0	7	16
*** BREAK ***	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Hourly Total	1	2	0	1	3	11	0	0	0	11	0	22	0	0	22	36
4:00 PM	0	2	0	0	2	8	0	0	0	8	2	14	0	0	16	26
4:15 PM	0	1	0	0	1	11	0	0	0	11	3	14	0	0	17	29
4:30 PM	0	2	0	0	2	3	0	0	0	3	0	8	0	0	8	13
4:45 PM	0	1	0	0	1	6	1	0	0	7	1	16	1	0	18	26
Hourly Total	0	6	0	0	6	28	1	0	0	29	6	52	1	0	59	94
5:00 PM	0	3	0	0	3	12	1	0	0	13	1	14	0	0	15	31
5:15 PM	0	1	0	0	1	11	0	0	0	11	1	11	0	0	12	24
5:30 PM	0	0	0	2	0	5	0	0	0	5	0	12	0	0	12	17
5:45 PM	0	0	0	4	0	4	0	0	0	4	1	6	0	0	7	11
Hourly Total	0	4	0	6	4	32	1	0	0	33	3	43	0	0	46	83



Paradigm Transportation Solutions Limited
5A-150 Pinebush Rd

Cambridge, Ontario, Canada N1R 8J8
519-896-3163 cbowness@ptsl.com

Count Name: Pinecroft Drive & Tanbark Road
Site Code:
Start Date: 06/05/2019
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Turning Movement Data Plot



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5A-150 Pinebush Rd

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519-896-3163 cbowness@ptsl.com

Count Name: Pinecraft Drive & Tanbark Road
Site Code:
Start Date: 06/05/2019
Page No: 4

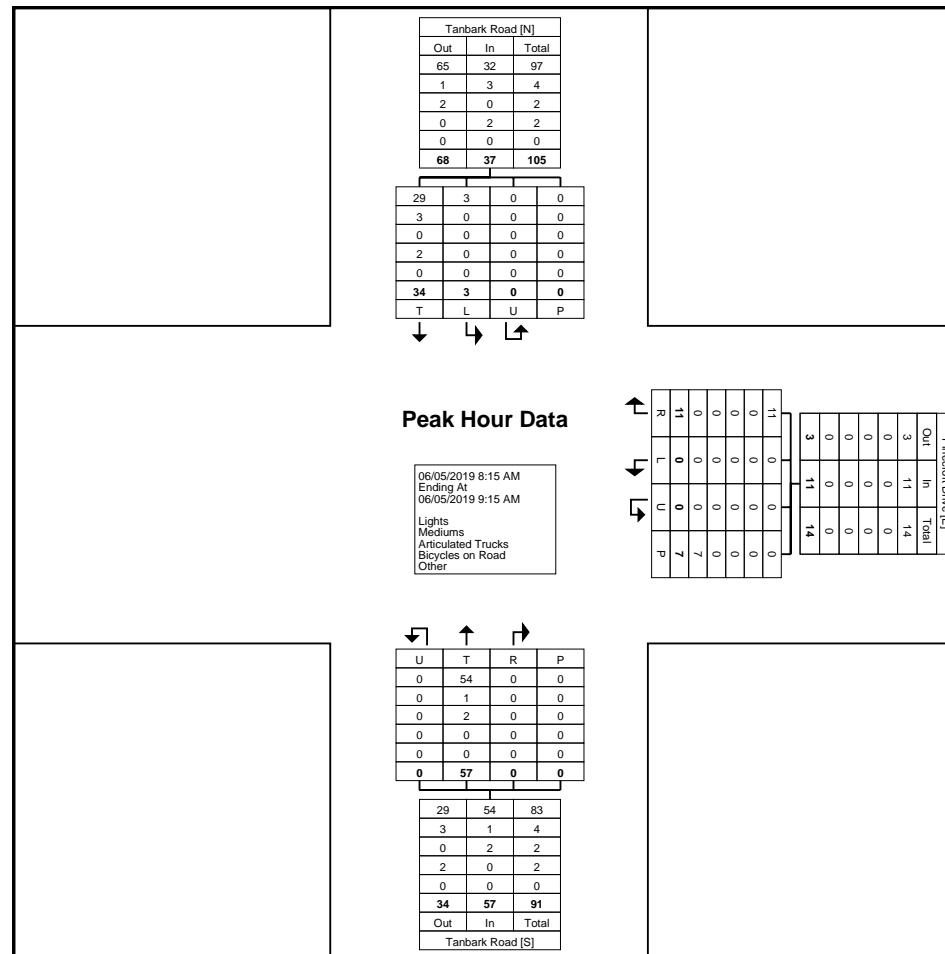
Turning Movement Peak Hour Data (8:15 AM)



Paradigm Transportation Solutions Limited
5A-150 Pinebush Rd

Cambridge, Ontario, Canada N1R 8J8
519-896-3163 cbowness@ptsl.com

Count Name: Pinecroft Drive & Tanbark Road
Site Code:
Start Date: 06/05/2019
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Turning Movement Peak Hour Data Plot (8:15 AM)



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Count Name: Pinecraft Drive & Tanbark Road
Site Code:
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Page No: 6

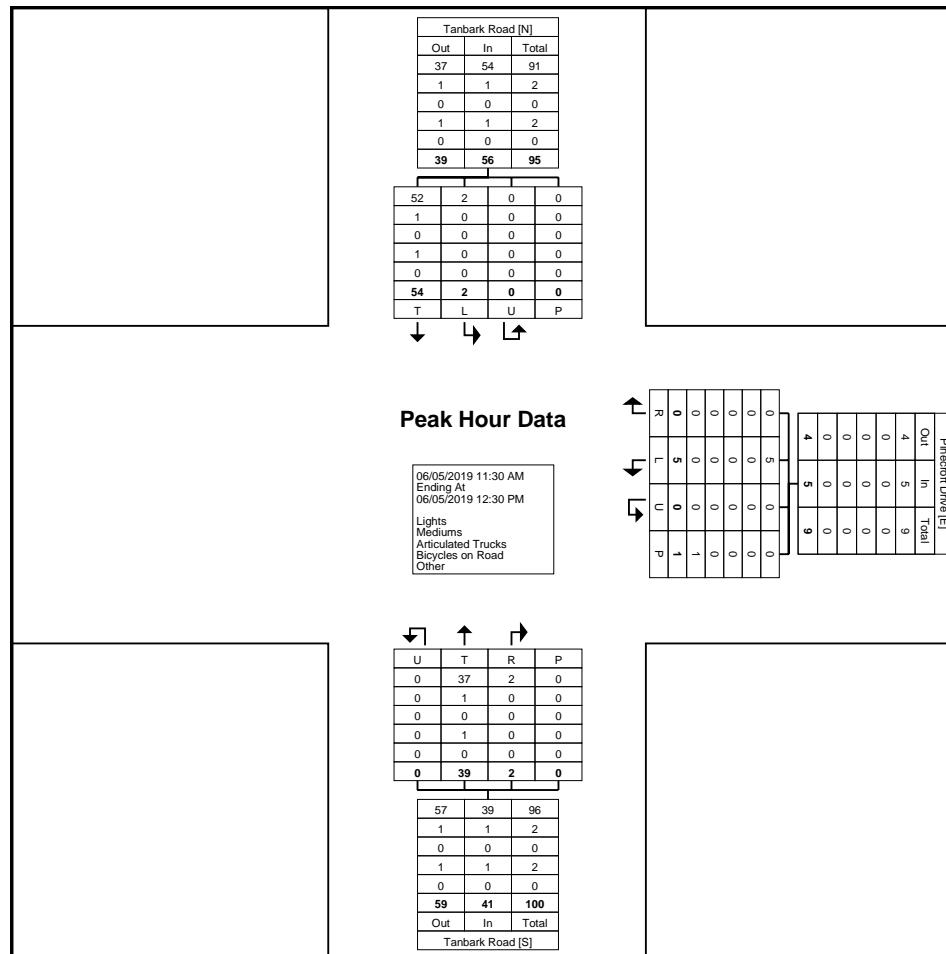
Turning Movement Peak Hour Data (11:30 AM)



Paradigm Transportation Solutions Limited
5A-150 Pinebush Rd

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Count Name: Pinecroft Drive & Tanbark Road
Site Code:
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Turning Movement Peak Hour Data Plot (11:30 AM)



Paradigm Transportation Solutions Limited
5A-150 Pinebush Rd

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Count Name: Pinecraft Drive & Tanbark Road
Site Code:
Start Date: 06/05/2019
Page No: 8

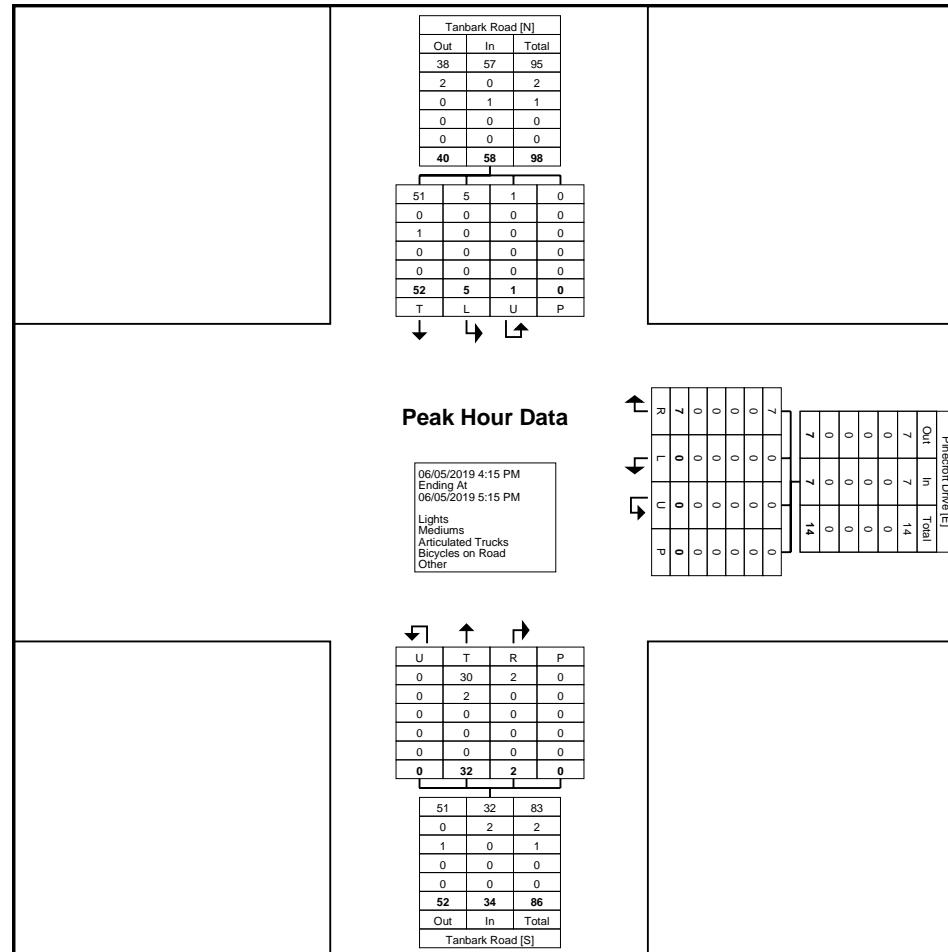
Turning Movement Peak Hour Data (4:15 PM)



Paradigm Transportation Solutions Limited
5A-150 Pinebush Rd

Cambridge, Ontario, Canada N1R 8J8
519-896-3163 cbowness@ptsl.com

Count Name: Pinecroft Drive & Tanbark Road
Site Code:
Start Date: 06/05/2019
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Turning Movement Peak Hour Data Plot (4:15 PM)



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5A-150 Pinebush Rd

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Count Name: Pinecraft Drive & Tanbark Road
Site Code:
Start Date: 06/05/2019
Page No: 10

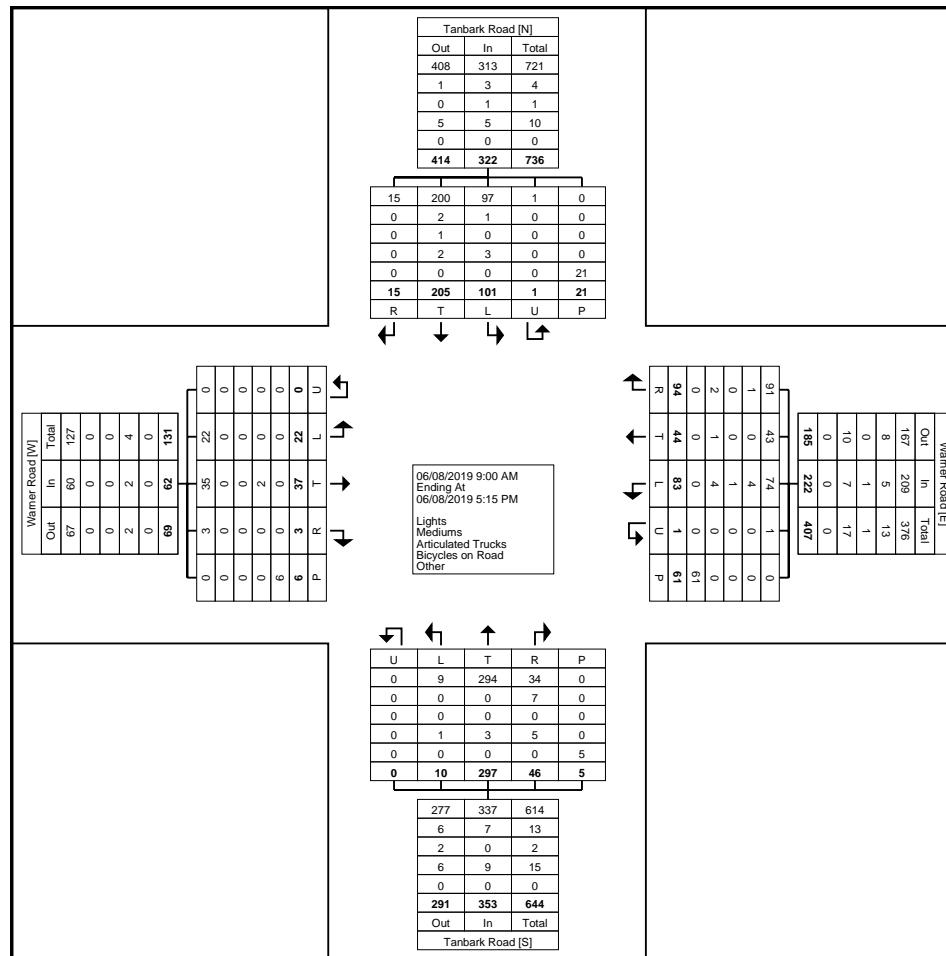
4:30 PM	3	1	0	0	0	4	4	1	5	0	2	10	0	3	1	0	0	4	8	9	0	0	0	17	35
4:45 PM	0	0	0	0	0	0	4	2	2	0	2	8	0	9	0	0	0	9	5	1	0	0	2	6	23
Hourly Total	4	5	0	0	0	9	17	7	13	1	6	38	0	30	4	0	0	34	17	24	1	1	4	43	124
5:00 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
Grand Total	22	37	3	0	6	62	83	44	94	1	61	222	10	297	46	0	5	353	101	205	15	1	21	322	959
Approach %	35.5	59.7	4.8	0.0	-	-	37.4	19.8	42.3	0.5	-	-	2.8	84.1	13.0	0.0	-	-	31.4	63.7	4.7	0.3	-	-	-
Total %	2.3	3.9	0.3	0.0	-	6.5	8.7	4.6	9.8	0.1	-	23.1	1.0	31.0	4.8	0.0	-	36.8	10.5	21.4	1.6	0.1	-	33.6	-
Lights	22	35	3	0	-	60	74	43	91	1	-	209	9	294	34	0	-	337	97	200	15	1	-	313	919
% Lights	100.0	94.6	100.0	-	-	96.8	89.2	97.7	96.8	100.0	-	94.1	90.0	99.0	73.9	-	-	95.5	96.0	97.6	100.0	100.0	-	97.2	95.8
Mediums	0	0	0	0	-	0	4	0	1	0	-	5	0	0	7	0	-	7	1	2	0	0	-	3	15
% Mediums	0.0	0.0	0.0	-	-	0.0	4.8	0.0	1.1	0.0	-	2.3	0.0	0.0	15.2	-	-	2.0	1.0	1.0	0.0	0.0	-	0.9	1.6
Articulated Trucks	0	0	0	0	-	0	1	0	0	0	-	1	0	0	0	0	-	0	0	1	0	0	-	1	2
% Articulated Trucks	0.0	0.0	0.0	-	-	0.0	1.2	0.0	0.0	0.0	-	0.5	0.0	0.0	0.0	-	-	0.0	0.0	0.5	0.0	0.0	-	0.3	0.2
Bicycles on Road	0	2	0	0	-	2	4	1	2	0	-	7	1	3	5	0	-	9	3	2	0	0	-	5	23
% Bicycles on Road	0.0	5.4	0.0	-	-	3.2	4.8	2.3	2.1	0.0	-	3.2	10.0	1.0	10.9	-	-	2.5	3.0	1.0	0.0	0.0	-	1.6	2.4
Bicycles on Crosswalk	-	-	-	-	-	2	-	-	-	-	-	8	-	-	-	-	-	0	-	-	-	-	-	0	-
% Bicycles on Crosswalk	-	-	-	-	-	33.3	-	-	-	-	-	13.1	-	-	-	-	-	0.0	-	-	-	-	-	0.0	-
Pedestrians	-	-	-	-	-	4	-	-	-	-	-	53	-	-	-	-	-	5	-	-	-	-	-	21	-
% Pedestrians	-	-	-	-	-	66.7	-	-	-	-	-	86.9	-	-	-	-	-	100.0	-	-	-	-	-	100.0	-



Paradigm Transportation Solutions Limited
5A-150 Pinebush Rd

Cambridge, Ontario, Canada N1R 8J8
519-896-3163 cbowness@ptsl.com

Count Name: Warner Road & Tanbark Road -
Saturday
Site Code:
Start Date: 06/08/2019
Page No: 3



Turning Movement Data Plot



Paradigm Transportation Solutions Limited
5A-150 Pinebush Rd

Cambridge, Ontario, Canada N1R 8J8
519-896-3163 cbowness@ptsl.com

Count Name: Warner Road & Tanbark Road -
Saturday
Site Code:
Start Date: 06/08/2019
Page No: 4

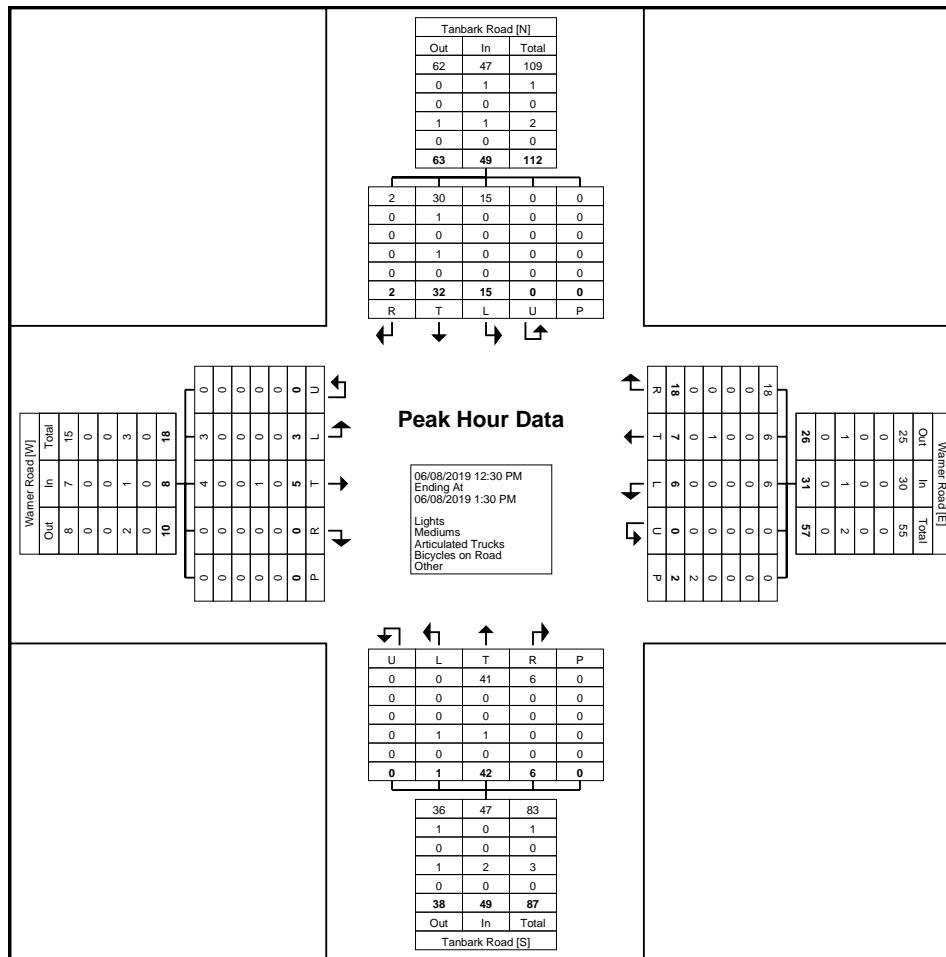
Turning Movement Peak Hour Data (12:30 PM)



Paradigm Transportation Solutions Limited
5A-150 Pinebush Rd

Cambridge, Ontario, Canada N1R 8J8
519-896-3163 cbowness@ptsl.com

Count Name: Warner Road & Tanbark Road -
Saturday
Site Code:
Start Date: 06/08/2019
Page No: 5



Turning Movement Peak Hour Data Plot (12:30 PM)



Paradigm Transportation Solutions Limited
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519-896-3163 cbowness@ptsl.com

Count Name: Warner Road & Tanbark Road -
Saturday
Site Code:
Start Date: 06/08/2019
Page No: 6

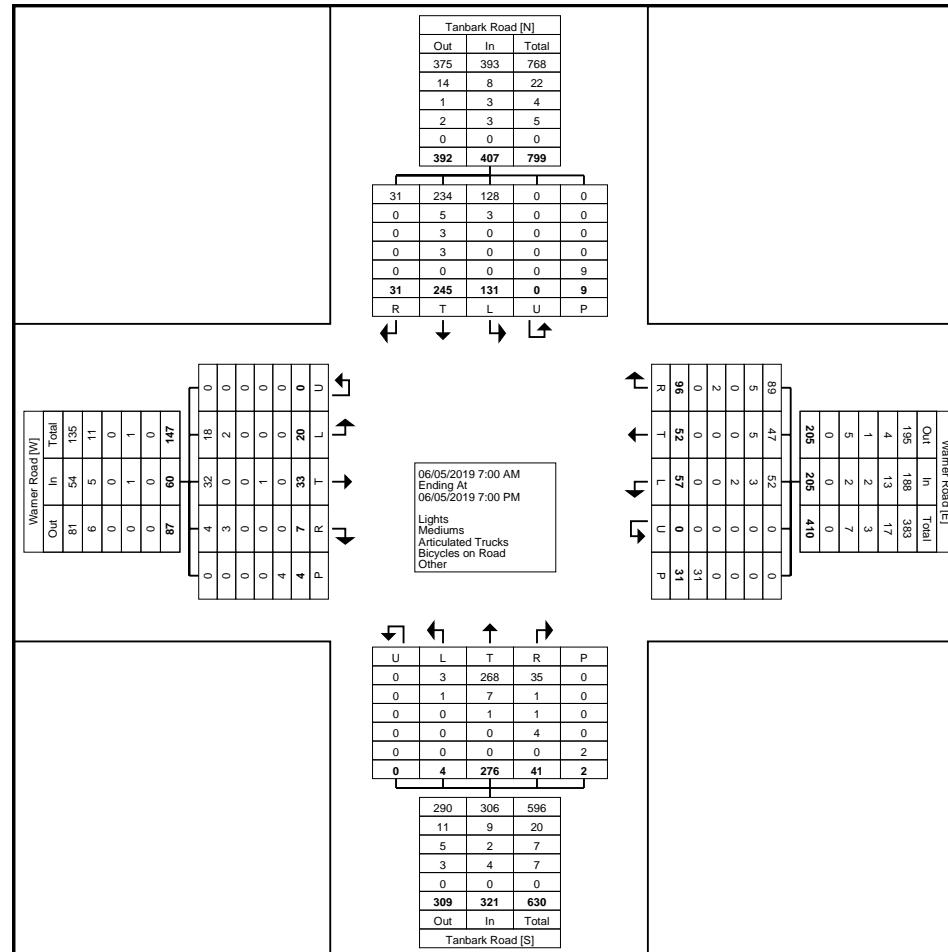
Hourly Total	3	6	0	0	0	9	6	6	14	0	1	26	0	30	5	0	0	35	8	38	2	0	1	48	118
6:00 PM	1	0	0	0	0	1	1	1	3	0	0	5	0	6	1	0	0	7	2	11	2	0	0	15	28
6:15 PM	0	0	0	0	0	0	2	3	5	0	0	10	0	3	0	0	0	3	6	4	0	0	0	10	23
6:30 PM	1	3	0	0	0	4	0	6	1	0	0	7	1	4	2	0	0	7	5	7	1	0	0	13	31
6:45 PM	0	0	0	0	0	0	1	0	4	0	1	5	0	7	0	0	0	7	4	5	1	0	0	10	22
Hourly Total	2	3	0	0	0	5	4	10	13	0	1	27	1	20	3	0	0	24	17	27	4	0	0	48	104
Grand Total	20	33	7	0	4	60	57	52	96	0	31	205	4	276	41	0	2	321	131	245	31	0	9	407	993
Approach %	33.3	55.0	11.7	0.0	-	-	27.8	25.4	46.8	0.0	-	-	1.2	86.0	12.8	0.0	-	-	32.2	60.2	7.6	0.0	-	-	-
Total %	2.0	3.3	0.7	0.0	-	6.0	5.7	5.2	9.7	0.0	-	20.6	0.4	27.8	4.1	0.0	-	32.3	13.2	24.7	3.1	0.0	-	41.0	-
Lights	18	32	4	0	-	54	52	47	89	0	-	188	3	268	35	0	-	306	128	234	31	0	-	393	941
% Lights	90.0	97.0	57.1	-	-	90.0	91.2	90.4	92.7	-	-	91.7	75.0	97.1	85.4	-	-	95.3	97.7	95.5	100.0	-	-	96.6	94.8
Mediums	2	0	3	0	-	5	3	5	5	0	-	13	1	7	1	0	-	9	3	5	0	0	-	8	35
% Mediums	10.0	0.0	42.9	-	-	8.3	5.3	9.6	5.2	-	-	6.3	25.0	2.5	2.4	-	-	2.8	2.3	2.0	0.0	-	-	2.0	3.5
Articulated Trucks	0	0	0	0	-	0	2	0	0	0	-	2	0	1	1	0	-	2	0	3	0	0	-	3	7
% Articulated Trucks	0.0	0.0	0.0	-	-	0.0	3.5	0.0	0.0	-	-	1.0	0.0	0.4	2.4	-	-	0.6	0.0	1.2	0.0	-	-	0.7	0.7
Bicycles on Road	0	1	0	0	-	1	0	0	2	0	-	2	0	0	4	0	-	4	0	3	0	0	-	3	10
% Bicycles on Road	0.0	3.0	0.0	-	-	1.7	0.0	0.0	2.1	-	-	1.0	0.0	0.0	9.8	-	-	1.2	0.0	1.2	0.0	-	-	0.7	1.0
Bicycles on Crosswalk	-	-	-	-	-	0	-	-	-	-	-	0	-	-	-	-	-	0	-	-	-	-	-	0	-
% Bicycles on Crosswalk	-	-	-	-	-	0.0	-	-	-	-	-	0.0	-	-	-	-	-	0.0	-	-	-	-	-	0.0	-
Pedestrians	-	-	-	-	-	4	-	-	-	-	-	31	-	-	-	-	-	2	-	-	-	-	-	9	-
% Pedestrians	-	-	-	-	-	100.0	-	-	-	-	-	100.0	-	-	-	-	-	100.0	-	-	-	-	-	100.0	-



Paradigm Transportation Solutions Limited
5A-150 Pinebush Rd

Cambridge, Ontario, Canada N1R 8J8
519-896-3163 cbowness@ptsl.com

Count Name: Warner Road & Tanbark Road
Site Code:
Start Date: 06/05/2019
Page No: 3



Turning Movement Data Plot



Paradigm Transportation Solutions Limited
5A-150 Pinebush Rd

Cambridge, Ontario, Canada N1R 8J8
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Count Name: Warner Road & Tanbark Road
Site Code:
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Page No: 4

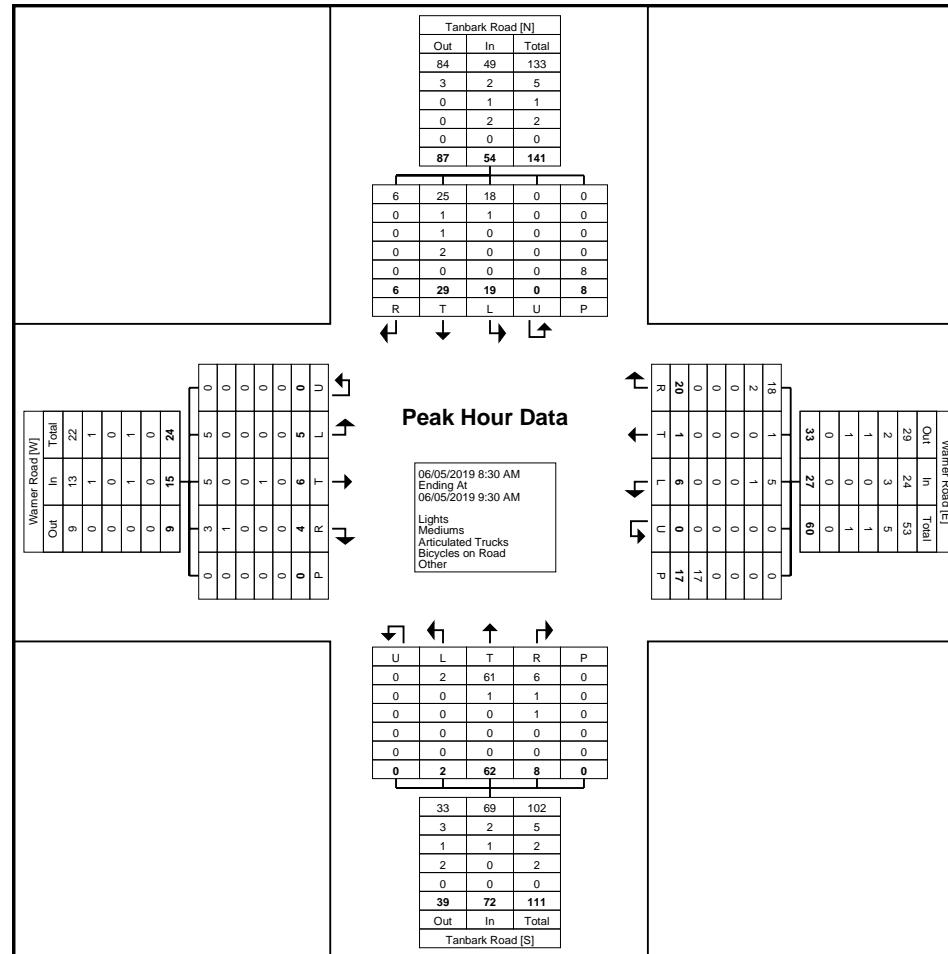
Turning Movement Peak Hour Data (8:30 AM)



Paradigm Transportation Solutions Limited
5A-150 Pinebush Rd

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Count Name: Warner Road & Tanbark Road
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Turning Movement Peak Hour Data Plot (8:30 AM)



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Count Name: Warner Road & Tanbark Road
Site Code:
Start Date: 06/05/2019
Page No: 6

Turning Movement Peak Hour Data (11:30 AM)

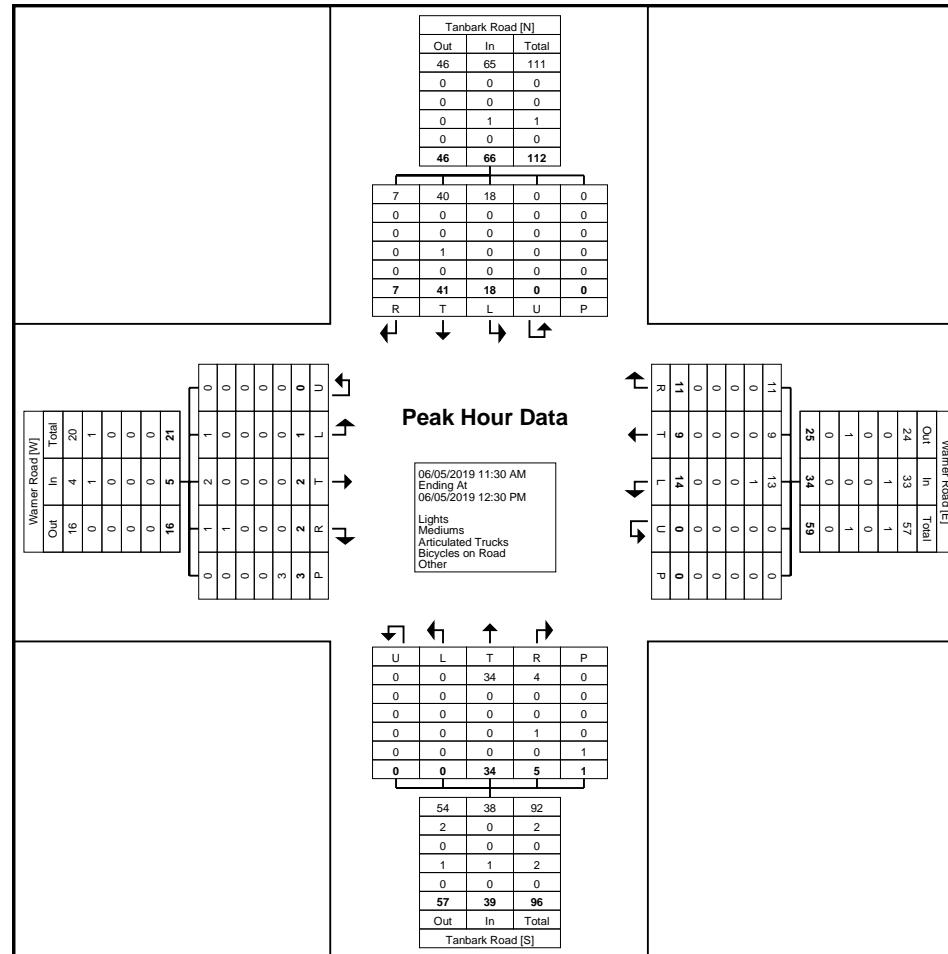
Start Time	Warner Road Eastbound						Warner Road Westbound						Tanbark Road Northbound						Tanbark Road Southbound						Int. Total
	Left	Thru	Right	U-Turn	Peds	App. Total	Left	Thru	Right	U-Turn	Peds	App. Total	Left	Thru	Right	U-Turn	Peds	App. Total	Left	Thru	Right	U-Turn	Peds	App. Total	
11:30 AM	0	1	0	0	0	1	3	1	2	0	0	6	0	8	0	0	0	8	4	11	4	0	0	19	34
11:45 AM	0	1	2	0	0	3	3	2	3	0	0	8	0	6	0	0	0	6	8	12	2	0	0	22	39
12:00 PM	1	0	0	0	2	1	1	4	5	0	0	10	0	11	4	0	0	15	4	8	0	0	0	12	38
12:15 PM	0	0	0	0	1	0	7	2	1	0	0	10	0	9	1	0	1	10	2	10	1	0	0	13	33
Total	1	2	2	0	3	5	14	9	11	0	0	34	0	34	5	0	1	39	18	41	7	0	0	66	144
Approach %	20.0	40.0	40.0	0.0	-	-	41.2	26.5	32.4	0.0	-	-	0.0	87.2	12.8	0.0	-	-	27.3	62.1	10.6	0.0	-	-	-
Total %	0.7	1.4	1.4	0.0	-	3.5	9.7	6.3	7.6	0.0	-	23.6	0.0	23.6	3.5	0.0	-	27.1	12.5	28.5	4.9	0.0	-	45.8	-
PHF	0.250	0.500	0.250	0.000	-	0.417	0.500	0.563	0.550	0.000	-	0.850	0.000	0.773	0.313	0.000	-	0.650	0.563	0.854	0.438	0.000	-	0.750	0.923
Lights	1	2	1	0	-	4	13	9	11	0	-	33	0	34	4	0	-	38	18	40	7	0	-	65	140
% Lights	100.0	100.0	50.0	-	-	80.0	92.9	100.0	100.0	-	-	97.1	-	100.0	80.0	-	-	97.4	100.0	97.6	100.0	-	-	98.5	97.2
Mediums	0	0	1	0	-	1	1	0	0	0	-	1	0	0	0	0	-	0	0	0	0	0	-	0	2
% Mediums	0.0	0.0	50.0	-	-	20.0	7.1	0.0	0.0	-	-	2.9	-	0.0	0.0	-	-	0.0	0.0	0.0	0.0	-	-	0.0	1.4
Articulated Trucks	0	0	0	0	-	0	0	0	0	0	-	0	0	0	0	0	-	0	0	0	0	0	-	0	0
% Articulated Trucks	0.0	0.0	0.0	-	-	0.0	0.0	0.0	0.0	-	-	0.0	-	0.0	0.0	-	-	0.0	0.0	0.0	0.0	-	-	0.0	0.0
Bicycles on Road	0	0	0	0	-	0	0	0	0	0	-	0	0	0	1	0	-	1	0	1	0	0	-	1	2
% Bicycles on Road	0.0	0.0	0.0	-	-	0.0	0.0	0.0	0.0	-	-	0.0	-	0.0	20.0	-	-	2.6	0.0	2.4	0.0	-	-	1.5	1.4
Bicycles on Crosswalk	-	-	-	-	-	0	-	-	-	-	-	0	-	-	-	-	-	0	-	-	-	-	-	0	-
% Bicycles on Crosswalk	-	-	-	-	-	0.0	-	-	-	-	-	-	-	-	-	-	-	0.0	-	-	-	-	-	-	-
Pedestrians	-	-	-	-	-	3	-	-	-	-	-	0	-	-	-	-	-	1	-	-	-	-	-	0	-
% Pedestrians	-	-	-	-	-	100.0	-	-	-	-	-	-	-	-	-	-	-	100.0	-	-	-	-	-	-	-



Paradigm Transportation Solutions Limited
5A-150 Pinebush Rd

Cambridge, Ontario, Canada N1R 8J8
519-896-3163 cbowness@ptsl.com

Count Name: Warner Road & Tanbark Road
Site Code:
Start Date: 06/05/2019
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Turning Movement Peak Hour Data Plot (11:30 AM)



Paradigm Transportation Solutions Limited
5A-150 Pinebush Rd

Cambridge, Ontario, Canada N1R 8J8
519-896-3163 cbowness@ptsl.com

Count Name: Warner Road & Tanbark Road
Site Code:
Start Date: 06/05/2019
Page No: 8

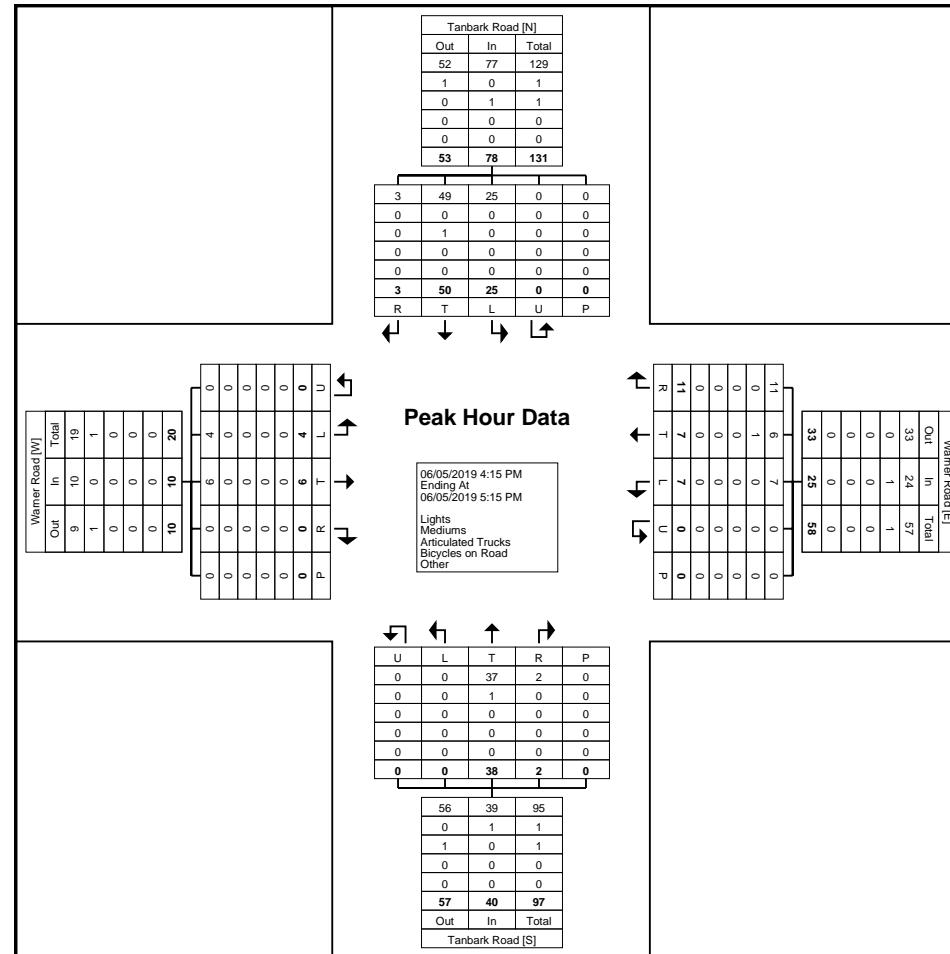
Turning Movement Peak Hour Data (4:15 PM)



Paradigm Transportation Solutions Limited
5A-150 Pinebush Rd

Cambridge, Ontario, Canada N1R 8J8
519-896-3163 cbowness@ptsl.com

Count Name: Warner Road & Tanbark Road
Site Code:
Start Date: 06/05/2019
Page No: 9



Turning Movement Peak Hour Data Plot (4:15 PM)



Paradigm Transportation Solutions Limited
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Count Name: Warner Road & Tanbark Road
Site Code:
Start Date: 06/05/2019
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Paradigm Transportation Solutions Limited
5A-150 Pinebush Rd

Cambridge, Ontario, Canada N1R 8J8
519-896-3163 cbowness@ptsl.com

Count Name: Warner Road & Angels Drive
Site Code: 210722
Start Date: 06/07/2022
Page No: 1

Turning Movement Data

Start Time	Warner Road Eastbound					Warner Road Westbound					Angels Drive Southbound					Int. Total
	Left	Thru	U-Turn	Peds	App. Total	Thru	Right	U-Turn	Peds	App. Total	Left	Right	U-Turn	Peds	App. Total	
7:00 AM	0	0	0	0	0	1	0	0	0	1	1	1	1	0	3	4
7:15 AM	0	6	0	0	6	0	1	0	0	1	0	1	0	0	1	8
7:30 AM	0	0	0	0	0	1	1	0	0	2	1	1	0	0	2	4
7:45 AM	0	1	0	0	1	1	2	0	0	3	3	0	0	0	3	7
Hourly Total	0	7	0	0	7	3	4	0	0	7	5	3	1	0	9	23
8:00 AM	0	0	0	0	0	0	1	0	0	1	1	0	0	0	1	2
8:15 AM	0	2	0	0	2	1	0	0	0	1	1	0	0	0	1	4
8:30 AM	0	3	0	0	3	2	0	0	0	2	0	0	0	0	0	5
8:45 AM	0	1	0	0	1	0	0	0	0	0	3	0	0	0	3	4
Hourly Total	0	6	0	0	6	3	1	0	0	4	5	0	0	0	5	15
*** BREAK ***	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
11:00 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0
11:15 AM	0	2	0	0	2	2	2	0	0	4	1	0	0	0	1	7
11:30 AM	0	0	0	0	0	0	0	0	0	0	1	0	0	0	1	1
11:45 AM	0	0	0	0	0	2	3	0	0	5	1	1	0	8	2	7
Hourly Total	0	2	0	0	2	4	5	0	0	9	3	1	0	9	4	15
12:00 PM	0	1	0	0	1	0	0	0	0	0	3	0	0	1	3	4
12:15 PM	1	2	0	0	3	2	0	0	0	2	0	0	0	0	0	5
12:30 PM	0	1	0	0	1	2	2	0	0	4	0	0	0	0	0	5
12:45 PM	0	3	0	0	3	3	0	0	0	3	0	0	0	0	0	6
Hourly Total	1	7	0	0	8	7	2	0	0	9	3	0	0	1	3	20
1:00 PM	2	0	0	1	2	0	0	0	0	0	0	2	0	0	2	4
1:15 PM	0	0	0	0	0	1	0	0	0	1	2	0	0	0	2	3
1:30 PM	1	0	0	1	1	2	1	0	0	3	0	0	0	0	0	4
1:45 PM	1	1	0	0	2	1	0	0	0	1	0	0	0	0	0	3
Hourly Total	4	1	0	2	5	4	1	0	0	5	2	2	0	0	4	14
*** BREAK ***	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
3:00 PM	0	1	0	1	1	1	1	0	0	2	0	0	0	6	0	3
3:15 PM	0	3	0	0	3	2	1	0	0	3	2	0	0	0	2	8
3:30 PM	0	2	0	0	2	2	2	0	0	4	0	0	0	2	0	6
3:45 PM	0	0	0	0	0	1	1	0	1	2	1	0	0	0	1	3
Hourly Total	0	6	0	1	6	6	5	0	1	11	3	0	0	8	3	20
4:00 PM	0	0	0	0	0	1	1	0	0	2	0	0	0	2	0	2
4:15 PM	0	2	0	0	2	1	1	0	0	2	0	0	0	0	0	4
4:30 PM	1	1	0	0	2	3	0	0	0	3	2	0	0	1	2	7
4:45 PM	1	3	0	0	4	3	0	0	0	3	1	0	0	0	1	8

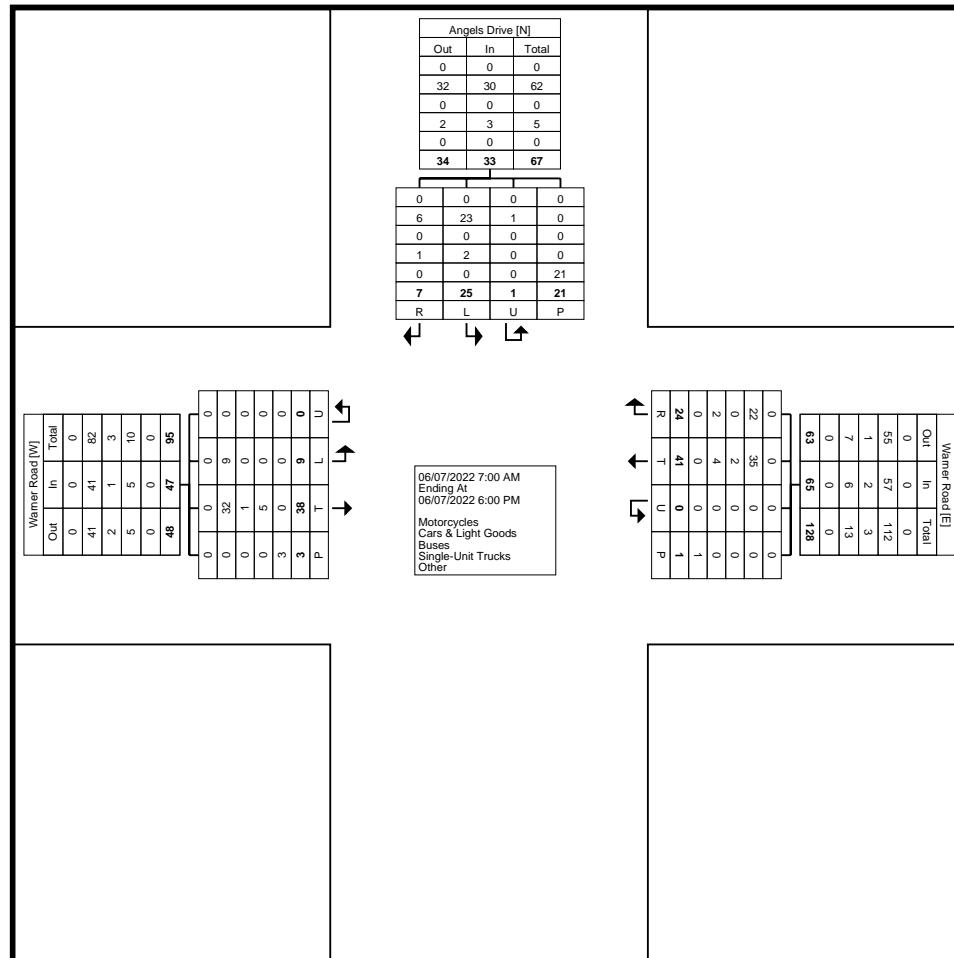
Hourly Total	2	6	0	0	8	8	2	0	0	10	3	0	0	3	3	21
5:00 PM	1	1	0	0	2	2	1	0	0	3	0	0	0	0	0	5
5:15 PM	0	2	0	0	2	1	1	0	0	2	0	1	0	0	1	5
5:30 PM	1	0	0	0	1	1	0	0	0	1	0	0	0	0	0	2
5:45 PM	0	0	0	0	0	2	2	0	0	4	1	0	0	0	1	5
Hourly Total	2	3	0	0	5	6	4	0	0	10	1	1	0	0	2	17
Grand Total	9	38	0	3	47	41	24	0	1	65	25	7	1	21	33	145
Approach %	19.1	80.9	0.0	-	-	63.1	36.9	0.0	-	-	75.8	21.2	3.0	-	-	-
Total %	6.2	26.2	0.0	-	32.4	28.3	16.6	0.0	-	44.8	17.2	4.8	0.7	-	22.8	-
Motorcycles	0	0	0	-	0	0	0	0	-	0	0	0	0	-	0	0
% Motorcycles	0.0	0.0	-	-	0.0	0.0	0.0	-	-	0.0	0.0	0.0	-	0.0	0.0	0.0
Cars & Light Goods	9	32	0	-	41	35	22	0	-	57	23	6	1	-	30	128
% Cars & Light Goods	100.0	84.2	-	-	87.2	85.4	91.7	-	-	87.7	92.0	85.7	100.0	-	90.9	88.3
Buses	0	1	0	-	1	2	0	0	-	2	0	0	0	-	0	3
% Buses	0.0	2.6	-	-	2.1	4.9	0.0	-	-	3.1	0.0	0.0	0.0	-	0.0	2.1
Single-Unit Trucks	0	5	0	-	5	4	2	0	-	6	2	1	0	-	3	14
% Single-Unit Trucks	0.0	13.2	-	-	10.6	9.8	8.3	-	-	9.2	8.0	14.3	0.0	-	9.1	9.7
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	0.0	0.0	-	0.0	0.0	0.0
Bicycles on Road	0	0	0	-	0	0	0	0	-	0	0	0	0	-	0	0
% Bicycles on Road	0.0	0.0	-	-	0.0	0.0	0.0	-	-	0.0	0.0	0.0	-	0.0	0.0	0.0
Bicycles on Crosswalk	-	-	-	0	-	-	-	-	0	-	-	-	-	0	-	-
% Bicycles on Crosswalk	-	-	-	0.0	-	-	-	-	0.0	-	-	-	-	0.0	-	-
Pedestrians	-	-	-	3	-	-	-	-	1	-	-	-	-	21	-	-
% Pedestrians	-	-	-	100.0	-	-	-	-	100.0	-	-	-	-	100.0	-	-



Paradigm Transportation Solutions Limited
5A-150 Pinebush Rd

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Count Name: Warner Road & Angels Drive
Site Code: 210722
Start Date: 06/07/2022
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Turning Movement Data Plot



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Count Name: Warner Road & Angels Drive
Site Code: 210722
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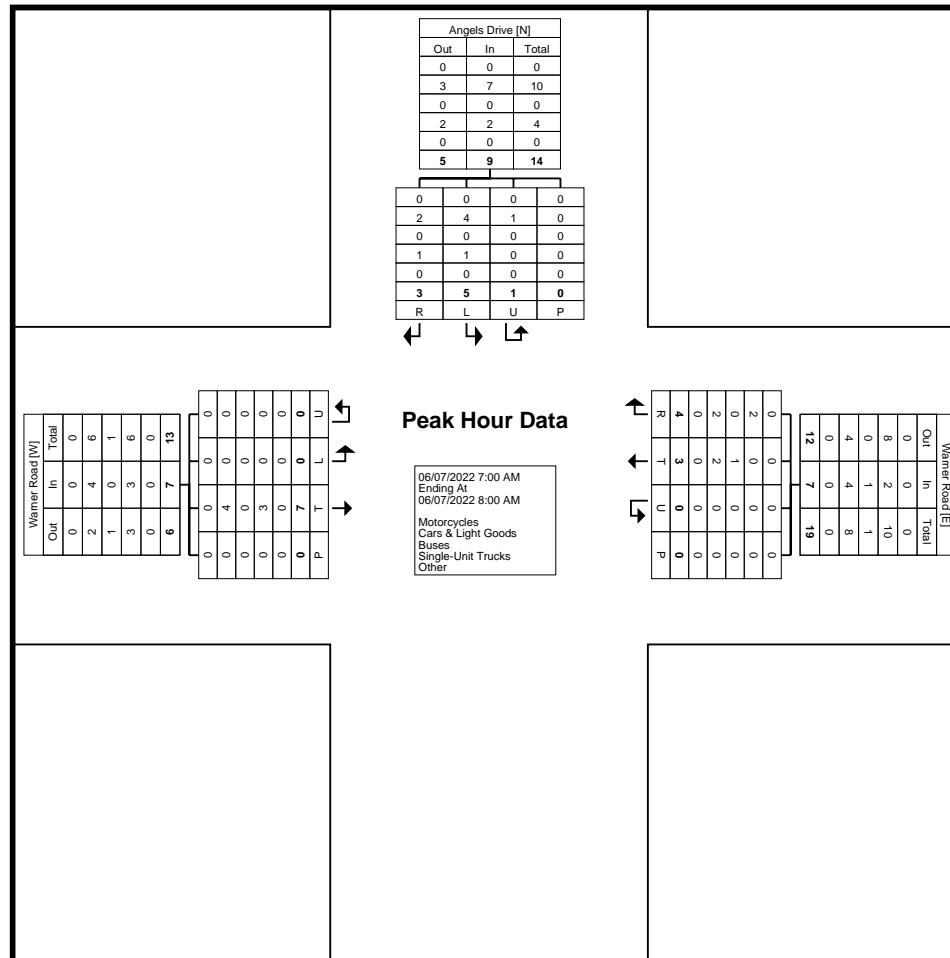
Turning Movement Peak Hour Data (7:00 AM)



Paradigm Transportation Solutions Limited
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Count Name: Warner Road & Angels Drive
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Turning Movement Peak Hour Data Plot (7:00 AM)



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Count Name: Warner Road & Angels Drive
Site Code: 210722
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Turning Movement Peak Hour Data (11:45 AM)

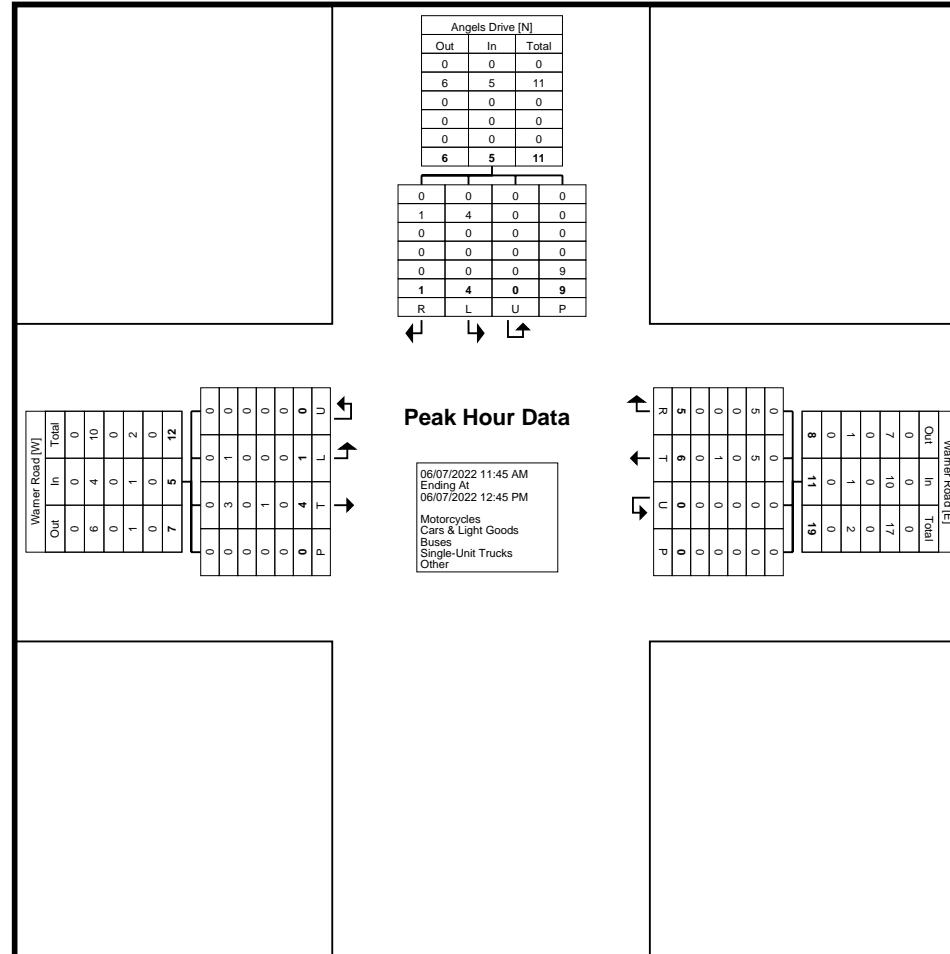
Start Time	Warner Road Eastbound					Warner Road Westbound					Angels Drive Southbound					Int. Total
	Left	Thru	U-Turn	Peds	App. Total	Thru	Right	U-Turn	Peds	App. Total	Left	Right	U-Turn	Peds	App. Total	
11:45 AM	0	0	0	0	0	2	3	0	0	5	1	1	0	8	2	7
12:00 PM	0	1	0	0	1	0	0	0	0	0	3	0	0	1	3	4
12:15 PM	1	2	0	0	3	2	0	0	0	2	0	0	0	0	0	5
12:30 PM	0	1	0	0	1	2	2	0	0	4	0	0	0	0	0	5
Total	1	4	0	0	5	6	5	0	0	11	4	1	0	9	5	21
Approach %	20.0	80.0	0.0	-	-	54.5	45.5	0.0	-	-	80.0	20.0	0.0	-	-	-
Total %	4.8	19.0	0.0	-	23.8	28.6	23.8	0.0	-	52.4	19.0	4.8	0.0	-	23.8	-
PHF	0.250	0.500	0.000	-	0.417	0.750	0.417	0.000	-	0.550	0.333	0.250	0.000	-	0.417	0.750
Motorcycles	0	0	0	-	0	0	0	0	-	0	0	0	0	-	0	0
% Motorcycles	0.0	0.0	-	-	0.0	0.0	0.0	-	-	0.0	0.0	0.0	-	-	0.0	0.0
Cars & Light Goods	1	3	0	-	4	5	5	0	-	10	4	1	0	-	5	19
% Cars & Light Goods	100.0	75.0	-	-	80.0	83.3	100.0	-	-	90.9	100.0	100.0	-	-	100.0	90.5
Buses	0	0	0	-	0	0	0	0	-	0	0	0	0	-	0	0
% Buses	0.0	0.0	-	-	0.0	0.0	0.0	-	-	0.0	0.0	0.0	-	-	0.0	0.0
Single-Unit Trucks	0	1	0	-	1	1	0	0	-	1	0	0	0	-	0	2
% Single-Unit Trucks	0.0	25.0	-	-	20.0	16.7	0.0	-	-	9.1	0.0	0.0	-	-	0.0	9.5
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	0.0	0.0	-	-	0.0	0.0
Bicycles on Road	0	0	0	-	0	0	0	0	-	0	0	0	0	-	0	0
% Bicycles on Road	0.0	0.0	-	-	0.0	0.0	0.0	-	-	0.0	0.0	0.0	-	-	0.0	0.0
Bicycles on Crosswalk	-	-	-	0	-	-	-	-	0	-	-	-	-	0	-	-
% Bicycles on Crosswalk	-	-	-	-	-	-	-	-	-	-	-	-	-	0.0	-	-
Pedestrians	-	-	-	0	-	-	-	-	0	-	-	-	-	9	-	-
% Pedestrians	-	-	-	-	-	-	-	-	-	-	-	-	-	100.0	-	-



Paradigm Transportation Solutions Limited
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Count Name: Warner Road & Angels Drive
Site Code: 210722
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Turning Movement Peak Hour Data Plot (11:45 AM)



Paradigm Transportation Solutions Limited
5A-150 Pinebush Rd

Cambridge, Ontario, Canada N1R 8J8
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Count Name: Warner Road & Angels Drive
Site Code: 210722
Start Date: 06/07/2022
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Turning Movement Peak Hour Data (4:30 PM)

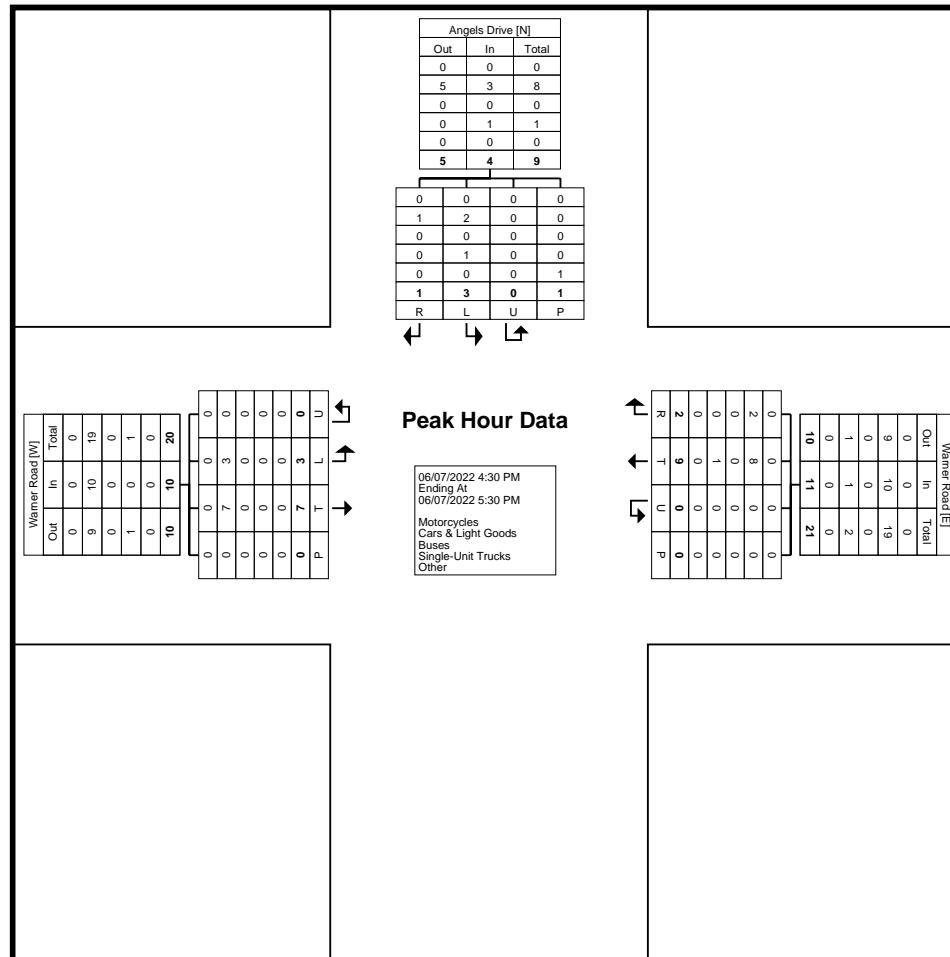
Start Time	Warner Road Eastbound					Warner Road Westbound					Angels Drive Southbound					Int. Total
	Left	Thru	U-Turn	Peds	App. Total	Thru	Right	U-Turn	Peds	App. Total	Left	Right	U-Turn	Peds	App. Total	
4:30 PM	1	1	0	0	2	3	0	0	0	3	2	0	0	1	2	7
4:45 PM	1	3	0	0	4	3	0	0	0	3	1	0	0	0	1	8
5:00 PM	1	1	0	0	2	2	1	0	0	3	0	0	0	0	0	5
5:15 PM	0	2	0	0	2	1	1	0	0	2	0	1	0	0	1	5
Total	3	7	0	0	10	9	2	0	0	11	3	1	0	1	4	25
Approach %	30.0	70.0	0.0	-	-	81.8	18.2	0.0	-	-	75.0	25.0	0.0	-	-	-
Total %	12.0	28.0	0.0	-	40.0	36.0	8.0	0.0	-	44.0	12.0	4.0	0.0	-	16.0	-
PHF	0.750	0.583	0.000	-	0.625	0.750	0.500	0.000	-	0.917	0.375	0.250	0.000	-	0.500	0.781
Motorcycles	0	0	0	-	0	0	0	0	-	0	0	0	0	-	0	0
% Motorcycles	0.0	0.0	-	-	0.0	0.0	0.0	-	-	0.0	0.0	0.0	-	-	0.0	0.0
Cars & Light Goods	3	7	0	-	10	8	2	0	-	10	2	1	0	-	3	23
% Cars & Light Goods	100.0	100.0	-	-	100.0	88.9	100.0	-	-	90.9	66.7	100.0	-	-	75.0	92.0
Buses	0	0	0	-	0	0	0	0	-	0	0	0	0	-	0	0
% Buses	0.0	0.0	-	-	0.0	0.0	0.0	-	-	0.0	0.0	0.0	-	-	0.0	0.0
Single-Unit Trucks	0	0	0	-	0	1	0	0	-	1	1	0	0	-	1	2
% Single-Unit Trucks	0.0	0.0	-	-	0.0	11.1	0.0	-	-	9.1	33.3	0.0	-	-	25.0	8.0
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	0.0	0.0	-	-	0.0	0.0
Bicycles on Road	0	0	0	-	0	0	0	0	-	0	0	0	0	-	0	0
% Bicycles on Road	0.0	0.0	-	-	0.0	0.0	0.0	-	-	0.0	0.0	0.0	-	-	0.0	0.0
Bicycles on Crosswalk	-	-	-	0	-	-	-	-	0	-	-	-	-	0	-	-
% Bicycles on Crosswalk	-	-	-	-	-	-	-	-	-	-	-	-	-	0.0	-	-
Pedestrians	-	-	-	0	-	-	-	-	0	-	-	-	-	1	-	-
% Pedestrians	-	-	-	-	-	-	-	-	-	-	-	-	-	100.0	-	-



Paradigm Transportation Solutions Limited
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Count Name: Warner Road & Angels Drive
Site Code: 210722
Start Date: 06/07/2022
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Turning Movement Peak Hour Data Plot (4:30 PM)

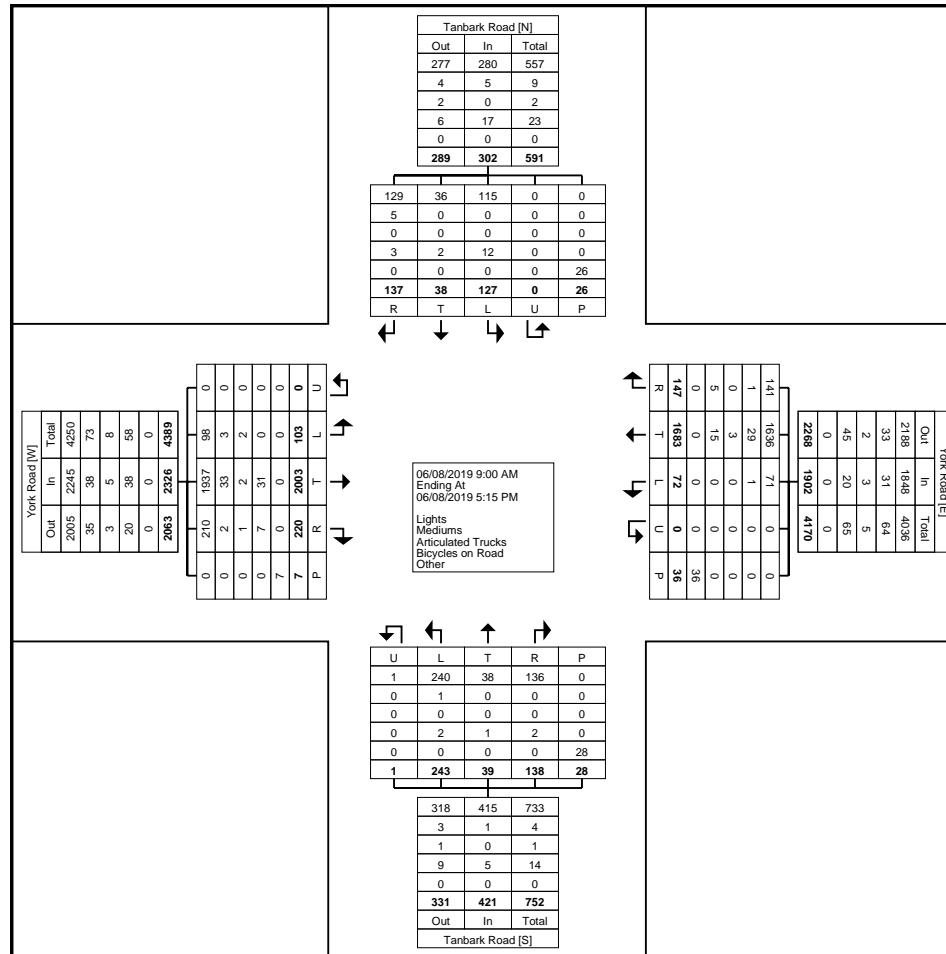
4:30 PM	3	78	10	0	0	91	2	51	4	0	1	57	4	1	4	0	0	9	4	2	2	0	1	8	165
4:45 PM	1	44	5	0	0	50	0	79	2	0	0	81	8	2	3	0	0	13	1	1	2	0	1	4	148
Hourly Total	9	261	25	0	0	295	8	249	15	0	3	272	31	6	12	0	2	49	15	7	14	0	5	36	652
5:00 PM	0	1	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	
Grand Total	103	2003	220	0	7	2326	72	1683	147	0	36	1902	243	39	138	1	28	421	127	38	137	0	26	302	4951
Approach %	4.4	86.1	9.5	0.0	-	-	3.8	88.5	7.7	0.0	-	-	57.7	9.3	32.8	0.2	-	-	42.1	12.6	45.4	0.0	-	-	-
Total %	2.1	40.5	4.4	0.0	-	47.0	1.5	34.0	3.0	0.0	-	38.4	4.9	0.8	2.8	0.0	-	8.5	2.6	0.8	2.8	0.0	-	6.1	-
Lights	98	1937	210	0	-	2245	71	1636	141	0	-	1848	240	38	136	1	-	415	115	36	129	0	-	280	4788
% Lights	95.1	96.7	95.5	-	-	96.5	98.6	97.2	95.9	-	-	97.2	98.8	97.4	98.6	100.0	-	98.6	90.6	94.7	94.2	-	-	92.7	96.7
Mediums	3	33	2	0	-	38	1	29	1	0	-	31	1	0	0	0	-	1	0	0	5	0	-	5	75
% Mediums	2.9	1.6	0.9	-	-	1.6	1.4	1.7	0.7	-	-	1.6	0.4	0.0	0.0	0.0	-	0.2	0.0	0.0	3.6	-	-	1.7	1.5
Articulated Trucks	2	2	1	0	-	5	0	3	0	0	-	3	0	0	0	0	-	0	0	0	0	-	0	0	8
% Articulated Trucks	1.9	0.1	0.5	-	-	0.2	0.0	0.2	0.0	-	-	0.2	0.0	0.0	0.0	0.0	-	0.0	0.0	0.0	-	-	0.0	0.2	
Bicycles on Road	0	31	7	0	-	38	0	15	5	0	-	20	2	1	2	0	-	5	12	2	3	0	-	17	80
% Bicycles on Road	0.0	1.5	3.2	-	-	1.6	0.0	0.9	3.4	-	-	1.1	0.8	2.6	1.4	0.0	-	1.2	9.4	5.3	2.2	-	-	5.6	1.6
Bicycles on Crosswalk	-	-	-	-	-	3	-	-	-	-	-	8	-	-	-	-	-	21	-	-	-	-	-	7	-
% Bicycles on Crosswalk	-	-	-	-	-	42.9	-	-	-	-	-	22.2	-	-	-	-	-	75.0	-	-	-	-	-	26.9	-
Pedestrians	-	-	-	-	-	4	-	-	-	-	-	28	-	-	-	-	-	7	-	-	-	-	-	19	-
% Pedestrians	-	-	-	-	-	57.1	-	-	-	-	-	77.8	-	-	-	-	-	25.0	-	-	-	-	-	73.1	-



Paradigm Transportation Solutions Limited
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Count Name: York Road & Tanbark Road -
Saturday
Site Code:
Start Date: 06/08/2019
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Turning Movement Data Plot



Paradigm Transportation Solutions Limited
5A-150 Pinebush Rd

Cambridge, Ontario, Canada N1R 8J8
519-896-3163 cbowness@ptsl.com

Count Name: York Road & Tanbark Road -
Saturday
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Turning Movement Peak Hour Data (1:00 PM)

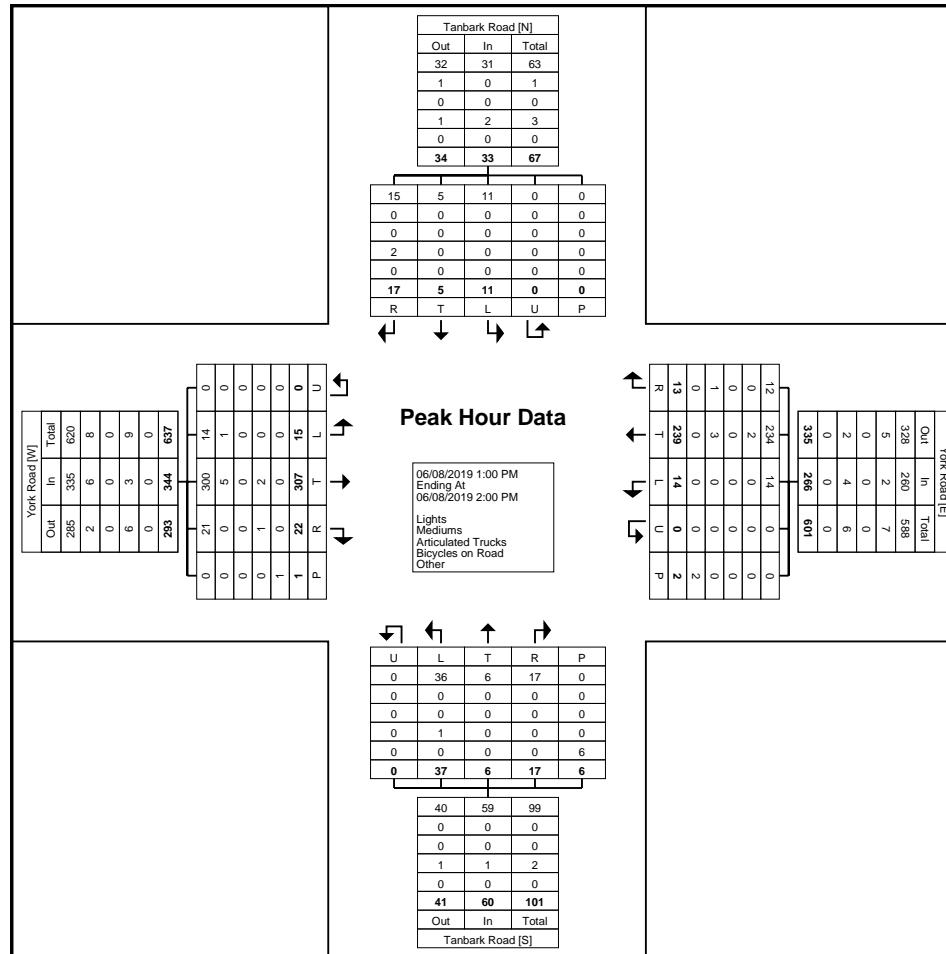
Start Time	York Road Eastbound						York Road Westbound						Tanbark Road Northbound						Tanbark Road Southbound						Int. Total
	Left	Thru	Right	U-Turn	Peds	App. Total	Left	Thru	Right	U-Turn	Peds	App. Total	Left	Thru	Right	U-Turn	Peds	App. Total	Left	Thru	Right	U-Turn	Peds	App. Total	
1:00 PM	3	83	9	0	0	95	3	65	1	0	0	69	13	2	4	0	2	19	2	1	5	0	0	8	191
1:15 PM	5	78	4	0	0	87	5	51	5	0	2	61	8	1	3	0	0	12	3	1	2	0	0	6	166
1:30 PM	5	75	3	0	0	83	2	74	4	0	0	80	10	2	2	0	0	14	2	2	6	0	0	10	187
1:45 PM	2	71	6	0	1	79	4	49	3	0	0	56	6	1	8	0	4	15	4	1	4	0	0	9	159
Total	15	307	22	0	1	344	14	239	13	0	2	266	37	6	17	0	6	60	11	5	17	0	0	33	703
Approach %	4.4	89.2	6.4	0.0	-	-	5.3	89.8	4.9	0.0	-	-	61.7	10.0	28.3	0.0	-	-	33.3	15.2	51.5	0.0	-	-	-
Total %	2.1	43.7	3.1	0.0	-	48.9	2.0	34.0	1.8	0.0	-	37.8	5.3	0.9	2.4	0.0	-	8.5	1.6	0.7	2.4	0.0	-	4.7	-
PHF	0.750	0.925	0.611	0.000	-	0.905	0.700	0.807	0.650	0.000	-	0.831	0.712	0.750	0.531	0.000	-	0.789	0.688	0.625	0.708	0.000	-	0.825	0.920
Lights	14	300	21	0	-	335	14	234	12	0	-	260	36	6	17	0	-	59	11	5	15	0	-	31	685
% Lights	93.3	97.7	95.5	-	-	97.4	100.0	97.9	92.3	-	-	97.7	97.3	100.0	100.0	-	-	98.3	100.0	100.0	88.2	-	-	93.9	97.4
Mediums	1	5	0	0	-	6	0	2	0	0	-	2	0	0	0	0	-	0	0	0	0	-	0	8	
% Mediums	6.7	1.6	0.0	-	-	1.7	0.0	0.8	0.0	-	-	0.8	0.0	0.0	0.0	-	-	0.0	0.0	0.0	0.0	-	-	0.0	1.1
Articulated Trucks	0	0	0	0	-	0	0	0	0	0	-	0	0	0	0	0	-	0	0	0	0	-	0	0	
% Articulated Trucks	0.0	0.0	0.0	-	-	0.0	0.0	0.0	0.0	-	-	0.0	0.0	0.0	0.0	-	-	0.0	0.0	0.0	0.0	-	-	0.0	0.0
Bicycles on Road	0	2	1	0	-	3	0	3	1	0	-	4	1	0	0	0	-	1	0	0	2	0	-	2	10
% Bicycles on Road	0.0	0.7	4.5	-	-	0.9	0.0	1.3	7.7	-	-	1.5	2.7	0.0	0.0	-	-	1.7	0.0	0.0	11.8	-	-	6.1	1.4
Bicycles on Crosswalk	-	-	-	-	-	0	-	-	-	-	-	2	-	-	-	-	-	6	-	-	-	-	-	0	-
% Bicycles on Crosswalk	-	-	-	-	-	0.0	-	-	-	-	-	100.0	-	-	-	-	-	100.0	-	-	-	-	-	-	-
Pedestrians	-	-	-	-	-	1	-	-	-	-	-	0	-	-	-	-	-	0	-	-	-	-	-	0	-
% Pedestrians	-	-	-	-	-	100.0	-	-	-	-	-	0.0	-	-	-	-	-	0.0	-	-	-	-	-	-	-



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Turning Movement Peak Hour Data Plot (1:00 PM)



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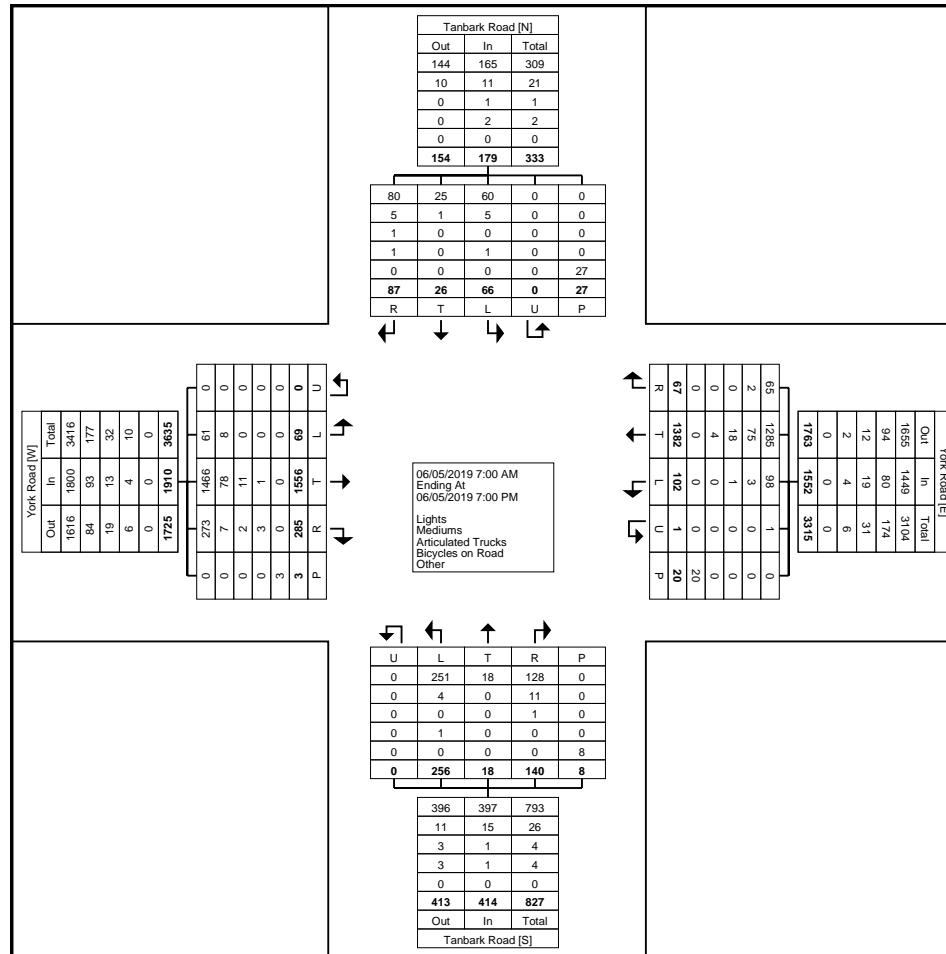
Hourly Total	14	198	38	0	0	250	11	170	9	1	1	191	33	5	14	0	0	52	5	2	7	0	2	14	507
6:00 PM	1	56	13	0	0	70	3	39	0	0	0	42	6	1	3	0	0	10	1	1	1	0	0	3	125
6:15 PM	2	39	5	0	0	46	3	26	2	0	0	31	6	2	1	0	0	9	2	0	3	0	0	5	91
6:30 PM	3	44	7	0	0	54	1	32	3	0	0	36	3	0	4	0	0	7	2	4	2	0	0	8	105
6:45 PM	4	31	9	0	1	44	3	21	1	0	1	25	3	0	7	0	1	10	2	0	1	0	3	3	82
Hourly Total	10	170	34	0	1	214	10	118	6	0	1	134	18	3	15	0	1	36	7	5	7	0	3	19	403
Grand Total	69	1556	285	0	3	1910	102	1382	67	1	20	1552	256	18	140	0	8	414	66	26	87	0	27	179	4055
Approach %	3.6	81.5	14.9	0.0	-	-	6.6	89.0	4.3	0.1	-	-	61.8	4.3	33.8	0.0	-	-	36.9	14.5	48.6	0.0	-	-	-
Total %	1.7	38.4	7.0	0.0	-	47.1	2.5	34.1	1.7	0.0	-	38.3	6.3	0.4	3.5	0.0	-	10.2	1.6	0.6	2.1	0.0	-	4.4	-
Lights	61	1466	273	0	-	1800	98	1285	65	1	-	1449	251	18	128	0	-	397	60	25	80	0	-	165	3811
% Lights	88.4	94.2	95.8	-	-	94.2	96.1	93.0	97.0	100.0	-	93.4	98.0	100.0	91.4	-	-	95.9	90.9	96.2	92.0	-	-	92.2	94.0
Mediums	8	78	7	0	-	93	3	75	2	0	-	80	4	0	11	0	-	15	5	1	5	0	-	11	199
% Mediums	11.6	5.0	2.5	-	-	4.9	2.9	5.4	3.0	0.0	-	5.2	1.6	0.0	7.9	-	-	3.6	7.6	3.8	5.7	-	-	6.1	4.9
Articulated Trucks	0	11	2	0	-	13	1	18	0	0	-	19	0	0	1	0	-	1	0	0	1	0	-	1	34
% Articulated Trucks	0.0	0.7	0.7	-	-	0.7	1.0	1.3	0.0	0.0	-	1.2	0.0	0.0	0.7	-	-	0.2	0.0	0.0	1.1	-	-	0.6	0.8
Bicycles on Road	0	1	3	0	-	4	0	4	0	0	-	4	1	0	0	0	-	1	1	0	1	0	-	2	11
% Bicycles on Road	0.0	0.1	1.1	-	-	0.2	0.0	0.3	0.0	0.0	-	0.3	0.4	0.0	0.0	-	-	0.2	1.5	0.0	1.1	-	-	1.1	0.3
Bicycles on Crosswalk	-	-	-	-	-	0	-	-	-	-	-	2	-	-	-	-	-	0	-	-	-	-	-	2	-
% Bicycles on Crosswalk	-	-	-	-	-	0.0	-	-	-	-	-	10.0	-	-	-	-	-	0.0	-	-	-	-	-	7.4	-
Pedestrians	-	-	-	-	-	3	-	-	-	-	-	18	-	-	-	-	-	8	-	-	-	-	-	25	-
% Pedestrians	-	-	-	-	-	100.0	-	-	-	-	-	90.0	-	-	-	-	-	100.0	-	-	-	-	-	92.6	-



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Turning Movement Data Plot



Paradigm Transportation Solutions Limited
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Count Name: York Road & Tanbark Road
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Page No: 4

Turning Movement Peak Hour Data (8:30 AM)

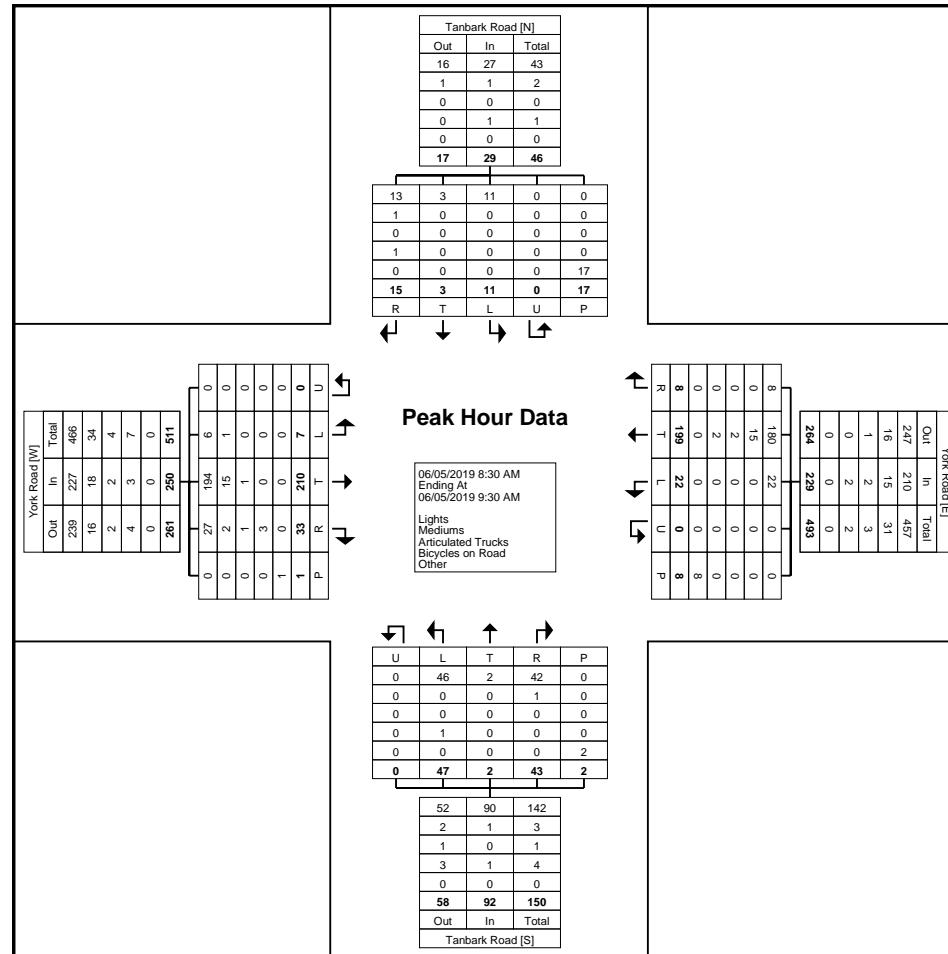
Start Time	York Road Eastbound						York Road Westbound						Tanbark Road Northbound						Tanbark Road Southbound						Int. Total
	Left	Thru	Right	U-Turn	Peds	App. Total	Left	Thru	Right	U-Turn	Peds	App. Total	Left	Thru	Right	U-Turn	Peds	App. Total	Left	Thru	Right	U-Turn	Peds	App. Total	
8:30 AM	1	64	3	0	0	68	0	44	1	0	1	45	12	0	8	0	0	20	2	1	4	0	0	7	140
8:45 AM	2	52	14	0	1	68	9	63	1	0	2	73	8	1	21	0	0	30	4	2	5	0	12	11	182
9:00 AM	4	49	9	0	0	62	9	45	3	0	3	57	8	1	5	0	0	14	1	0	2	0	5	3	136
9:15 AM	0	45	7	0	0	52	4	47	3	0	2	54	19	0	9	0	2	28	4	0	4	0	0	8	142
Total	7	210	33	0	1	250	22	199	8	0	8	229	47	2	43	0	2	92	11	3	15	0	17	29	600
Approach %	2.8	84.0	13.2	0.0	-	-	9.6	86.9	3.5	0.0	-	-	51.1	2.2	46.7	0.0	-	-	37.9	10.3	51.7	0.0	-	-	-
Total %	1.2	35.0	5.5	0.0	-	41.7	3.7	33.2	1.3	0.0	-	38.2	7.8	0.3	7.2	0.0	-	15.3	1.8	0.5	2.5	0.0	-	4.8	-
PHF	0.438	0.820	0.589	0.000	-	0.919	0.611	0.790	0.667	0.000	-	0.784	0.618	0.500	0.512	0.000	-	0.767	0.688	0.375	0.750	0.000	-	0.659	0.824
Lights	6	194	27	0	-	227	22	180	8	0	-	210	46	2	42	0	-	90	11	3	13	0	-	27	554
% Lights	85.7	92.4	81.8	-	-	90.8	100.0	90.5	100.0	-	-	91.7	97.9	100.0	97.7	-	-	97.8	100.0	100.0	86.7	-	-	93.1	92.3
Mediums	1	15	2	0	-	18	0	15	0	0	-	15	0	0	1	0	-	1	0	0	1	0	-	1	35
% Mediums	14.3	7.1	6.1	-	-	7.2	0.0	7.5	0.0	-	-	6.6	0.0	0.0	2.3	-	-	1.1	0.0	0.0	6.7	-	-	3.4	5.8
Articulated Trucks	0	1	1	0	-	2	0	2	0	0	-	2	0	0	0	0	-	0	0	0	0	-	0	4	
% Articulated Trucks	0.0	0.5	3.0	-	-	0.8	0.0	1.0	0.0	-	-	0.9	0.0	0.0	0.0	-	-	0.0	0.0	0.0	0.0	-	-	0.0	0.7
Bicycles on Road	0	0	3	0	-	3	0	2	0	0	-	2	1	0	0	0	-	1	0	0	1	0	-	1	7
% Bicycles on Road	0.0	0.0	9.1	-	-	1.2	0.0	1.0	0.0	-	-	0.9	2.1	0.0	0.0	-	-	1.1	0.0	0.0	6.7	-	-	3.4	1.2
Bicycles on Crosswalk	-	-	-	-	-	0	-	-	-	-	-	0	-	-	-	-	-	0	-	-	-	-	-	1	-
% Bicycles on Crosswalk	-	-	-	-	-	0.0	-	-	-	-	-	0.0	-	-	-	-	-	0.0	-	-	-	-	-	5.9	-
Pedestrians	-	-	-	-	-	1	-	-	-	-	-	8	-	-	-	-	-	2	-	-	-	-	-	16	-
% Pedestrians	-	-	-	-	-	100.0	-	-	-	-	-	100.0	-	-	-	-	-	100.0	-	-	-	-	-	94.1	-



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Turning Movement Peak Hour Data Plot (8:30 AM)



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Turning Movement Peak Hour Data (12:00 PM)

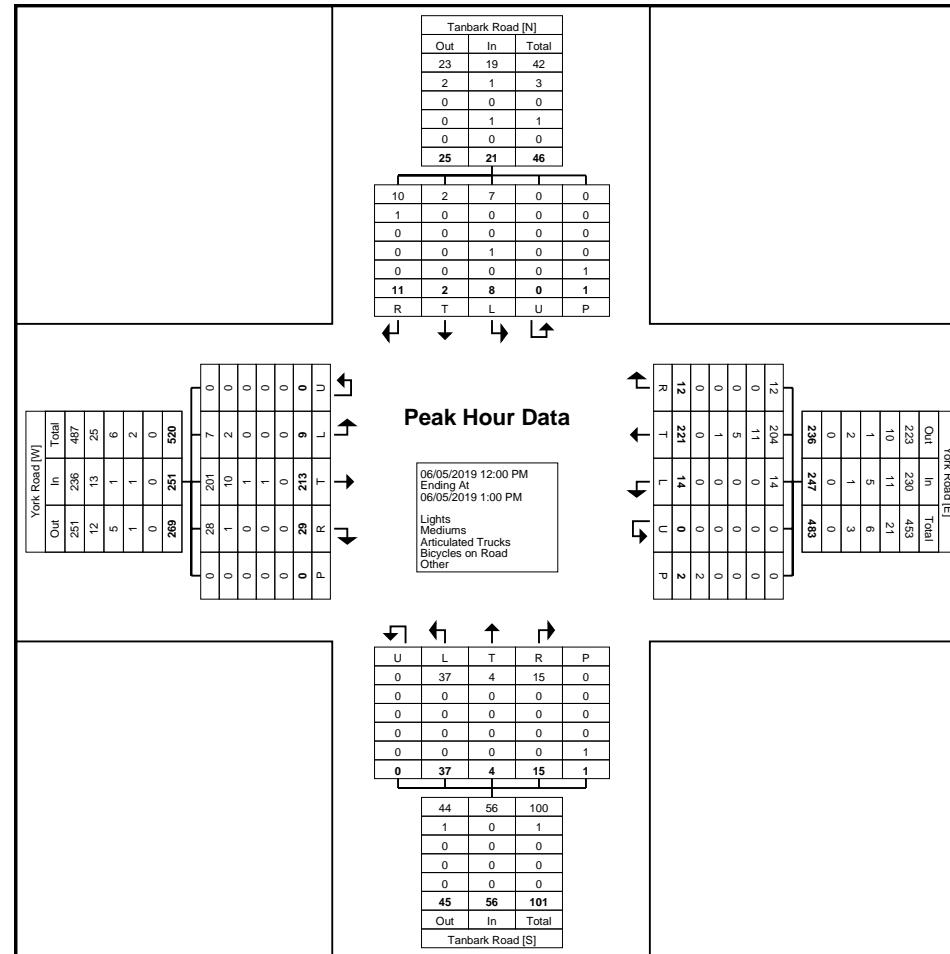
Start Time	York Road Eastbound						York Road Westbound						Tanbark Road Northbound						Tanbark Road Southbound						Int. Total
	Left	Thru	Right	U-Turn	Peds	App. Total	Left	Thru	Right	U-Turn	Peds	App. Total	Left	Thru	Right	U-Turn	Peds	App. Total	Left	Thru	Right	U-Turn	Peds	App. Total	
12:00 PM	0	52	8	0	0	60	4	63	4	0	0	71	13	1	2	0	0	16	1	1	2	0	0	4	151
12:15 PM	3	50	7	0	0	60	6	47	5	0	0	58	4	1	6	0	0	11	3	0	1	0	0	4	133
12:30 PM	2	49	7	0	0	58	3	57	1	0	2	61	8	2	5	0	0	15	2	0	2	0	1	4	138
12:45 PM	4	62	7	0	0	73	1	54	2	0	0	57	12	0	2	0	1	14	2	1	6	0	0	9	153
Total	9	213	29	0	0	251	14	221	12	0	2	247	37	4	15	0	1	56	8	2	11	0	1	21	575
Approach %	3.6	84.9	11.6	0.0	-	-	5.7	89.5	4.9	0.0	-	-	66.1	7.1	26.8	0.0	-	-	38.1	9.5	52.4	0.0	-	-	-
Total %	1.6	37.0	5.0	0.0	-	43.7	2.4	38.4	2.1	0.0	-	43.0	6.4	0.7	2.6	0.0	-	9.7	1.4	0.3	1.9	0.0	-	3.7	-
PHF	0.563	0.859	0.906	0.000	-	0.860	0.583	0.877	0.600	0.000	-	0.870	0.712	0.500	0.625	0.000	-	0.875	0.667	0.500	0.458	0.000	-	0.583	0.940
Lights	7	201	28	0	-	236	14	204	12	0	-	230	37	4	15	0	-	56	7	2	10	0	-	19	541
% Lights	77.8	94.4	96.6	-	-	94.0	100.0	92.3	100.0	-	-	93.1	100.0	100.0	100.0	-	-	100.0	87.5	100.0	90.9	-	-	90.5	94.1
Mediums	2	10	1	0	-	13	0	11	0	0	-	11	0	0	0	0	-	0	0	0	1	0	-	1	25
% Mediums	22.2	4.7	3.4	-	-	5.2	0.0	5.0	0.0	-	-	4.5	0.0	0.0	0.0	-	-	0.0	0.0	0.0	9.1	-	-	4.8	4.3
Articulated Trucks	0	1	0	0	-	1	0	5	0	0	-	5	0	0	0	0	-	0	0	0	0	0	-	0	6
% Articulated Trucks	0.0	0.5	0.0	-	-	0.4	0.0	2.3	0.0	-	-	2.0	0.0	0.0	0.0	-	-	0.0	0.0	0.0	0.0	-	-	0.0	1.0
Bicycles on Road	0	1	0	0	-	1	0	1	0	0	-	1	0	0	0	0	-	0	1	0	0	0	-	1	3
% Bicycles on Road	0.0	0.5	0.0	-	-	0.4	0.0	0.5	0.0	-	-	0.4	0.0	0.0	0.0	-	-	0.0	12.5	0.0	0.0	-	-	4.8	0.5
Bicycles on Crosswalk	-	-	-	-	-	0	-	-	-	-	-	2	-	-	-	-	-	0	-	-	-	-	-	0	-
% Bicycles on Crosswalk	-	-	-	-	-	-	-	-	-	-	-	100.0	-	-	-	-	-	0.0	-	-	-	-	-	0.0	-
Pedestrians	-	-	-	-	-	0	-	-	-	-	-	0	-	-	-	-	-	1	-	-	-	-	-	1	-
% Pedestrians	-	-	-	-	-	-	-	-	-	-	-	0.0	-	-	-	-	-	100.0	-	-	-	-	-	100.0	-



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Turning Movement Peak Hour Data Plot (12:00 PM)



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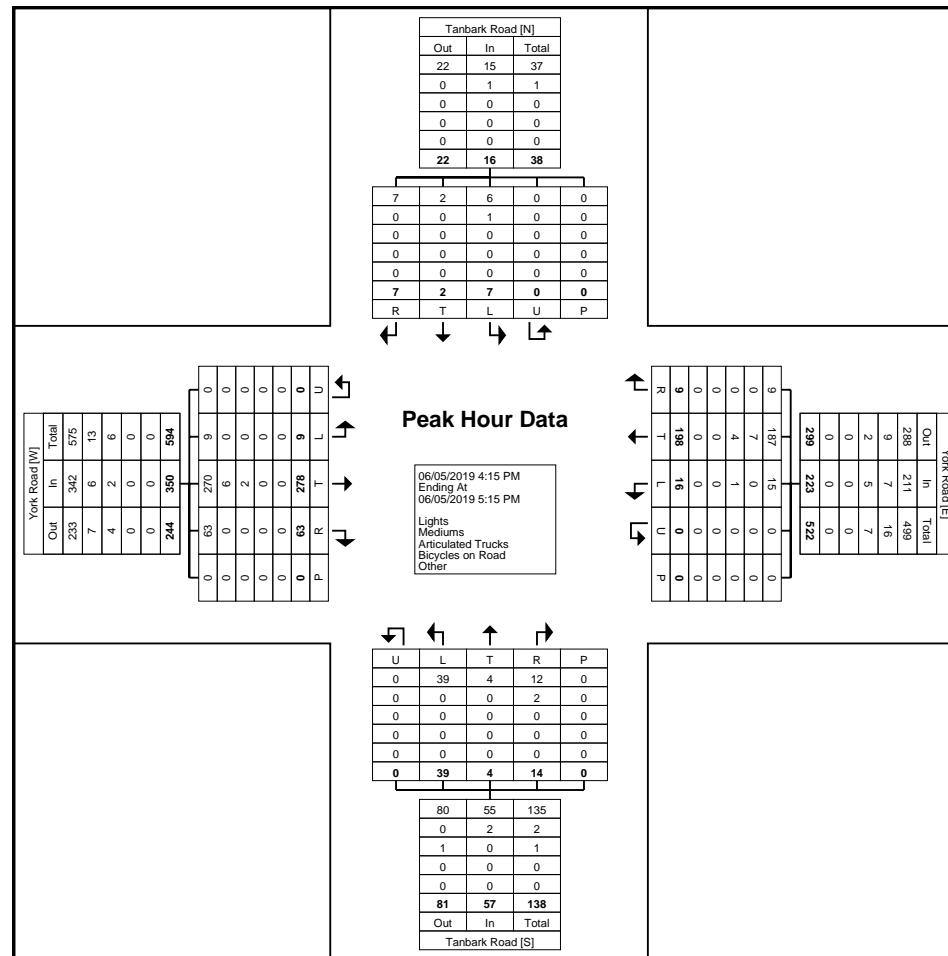
Turning Movement Peak Hour Data (4:15 PM)



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Turning Movement Peak Hour Data Plot (4:15 PM)



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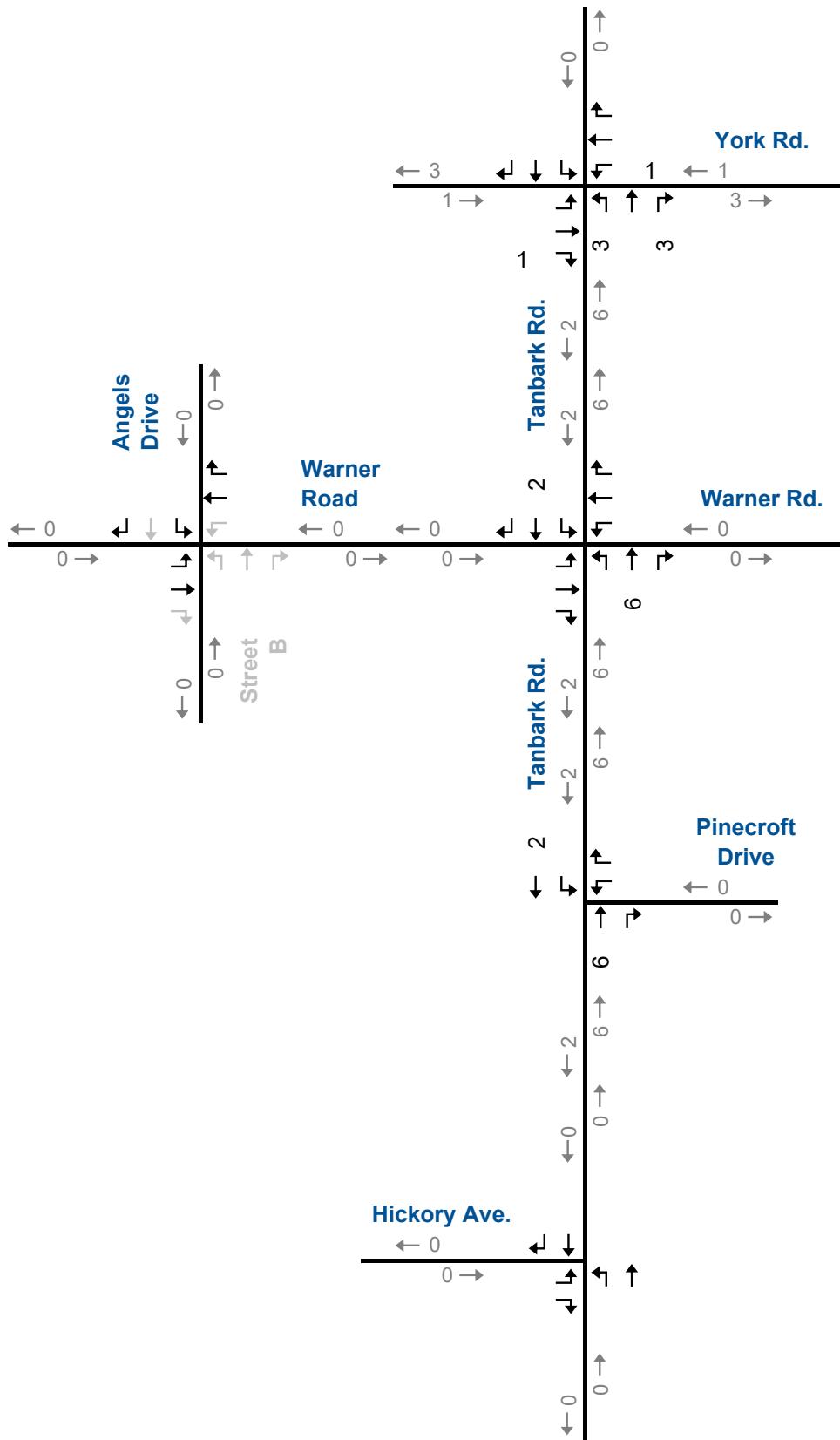
Appendix C

Forecasted Background Developments

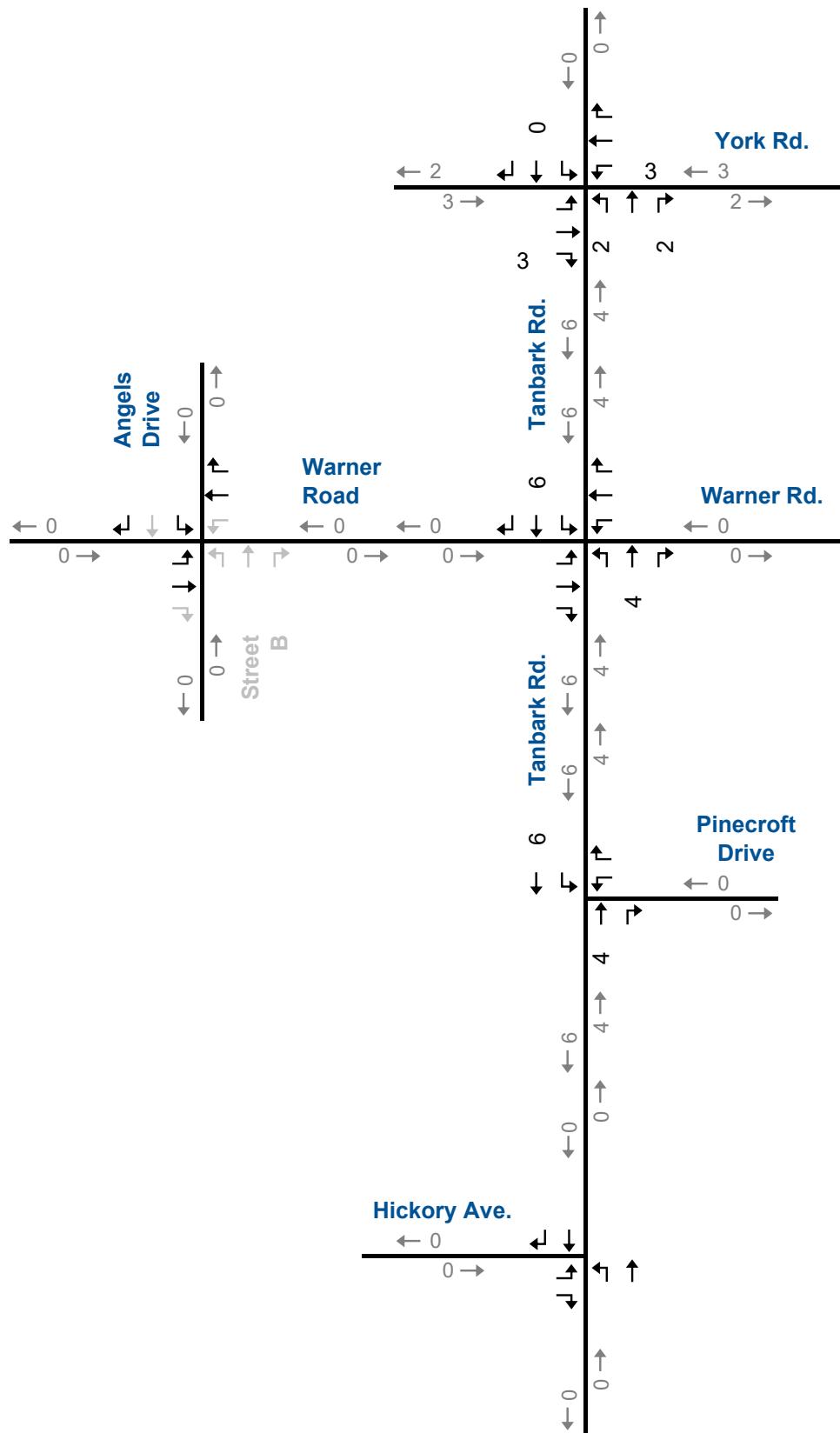


Tawny Ridge - Phase 1

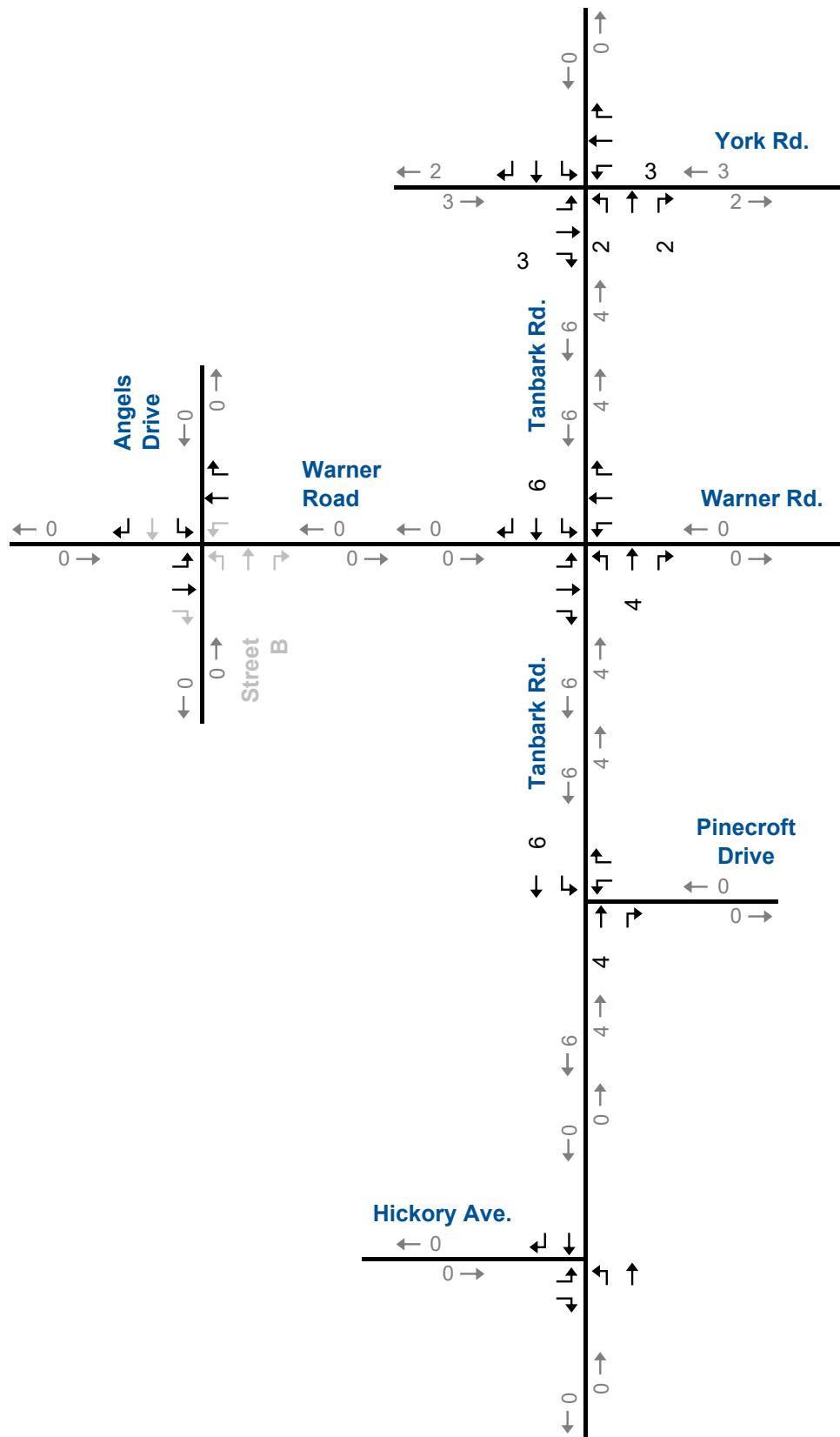
Tawny Ridge - Phase 1 AM Peak Hour



Tawny Ridge - Phase 1 PM Peak Hour



Tawny Ridge - Phase 1 SAT Peak Hour



Appendix D

Operations Reports



Lanes, Volumes, Timings
1: Tanbark Road & York Road

2022 AM Existing

11-02-2022



Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	7	223	35	23	211	8	50	2	46	12	3	16
Future Volume (vph)	7	223	35	23	211	8	50	2	46	12	3	16
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Ped Bike Factor												
Frt		0.982			0.995			0.936			0.930	
Flt Protected		0.999			0.995			0.975			0.981	
Satd. Flow (prot)	0	1721	0	0	1744	0	0	1718	0	0	1673	0
Flt Permitted		0.999			0.995			0.975			0.981	
Satd. Flow (perm)	0	1721	0	0	1744	0	0	1718	0	0	1673	0
Link Speed (k/h)		50			50			50			50	
Link Distance (m)		351.4			515.6			156.3			44.1	
Travel Time (s)		25.3			37.1			11.3			3.2	
Confl. Peds. (#/hr)	17	2	2		17	1		8	8		1	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Heavy Vehicles (%)	14%	8%	9%	0%	9%	0%	0%	0%	2%	0%	0%	7%
Adj. Flow (vph)	8	242	38	25	229	9	54	2	50	13	3	17
Shared Lane Traffic (%)												
Lane Group Flow (vph)	0	288	0	0	263	0	0	106	0	0	33	0
Enter Blocked Intersection	No	No	No	No	No	No	No	No	No	No	No	No
Lane Alignment	Left	Left	Right	Left	Left	Right	Left	Left	Right	Left	Left	Right
Median Width(m)		0.0			0.0			0.0			0.0	
Link Offset(m)		0.0			0.0			0.0			0.0	
Crosswalk Width(m)		4.8			4.8			4.8			4.8	
Two way Left Turn Lane												
Headway Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Turning Speed (k/h)	25		15	25		15	25		15	25		15
Sign Control		Free			Free			Stop			Stop	
Intersection Summary												
Area Type:	Other											
Control Type:	Unsignalized											
Intersection Capacity Utilization	39.3%				ICU Level of Service A							
Analysis Period (min)	15											

HCM Unsignalized Intersection Capacity Analysis
1: Tanbark Road & York Road

2022 AM Existing
11-02-2022

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	7	223	35	23	211	8	50	2	46	12	3	16
Future Volume (Veh/h)	7	223	35	23	211	8	50	2	46	12	3	16
Sign Control	Free				Free			Stop			Stop	
Grade	0%				0%			0%			0%	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	8	242	38	25	229	9	54	2	50	13	3	17
Pedestrians	1				8			2			17	
Lane Width (m)	3.6				3.6			3.6			3.6	
Walking Speed (m/s)	1.2				1.2			1.2			1.2	
Percent Blockage	0				1			0			1	
Right turn flare (veh)												
Median type	None				None							
Median storage veh												
Upstream signal (m)												
pX, platoon unblocked												
vC, conflicting volume	255			282			582	584	271	636	598	252
vC1, stage 1 conf vol												
vC2, stage 2 conf vol												
vCu, unblocked vol	255			282			582	584	271	636	598	252
tC, single (s)	4.2			4.1			7.1	6.5	6.2	7.1	6.5	6.3
tC, 2 stage (s)												
tF (s)	2.3			2.2			3.5	4.0	3.3	3.5	4.0	3.4
p0 queue free %	99			98			87	100	93	96	99	98
cM capacity (veh/h)	1226			1290			401	409	761	347	401	763
Direction, Lane #	EB 1	WB 1	NB 1	SB 1								
Volume Total	288	263	106	33								
Volume Left	8	25	54	13								
Volume Right	38	9	50	17								
cSH	1226	1290	517	491								
Volume to Capacity	0.01	0.02	0.21	0.07								
Queue Length 95th (m)	0.2	0.5	6.1	1.7								
Control Delay (s)	0.3	0.9	13.8	12.9								
Lane LOS	A	A	B	B								
Approach Delay (s)	0.3	0.9	13.8	12.9								
Approach LOS			B	B								
Intersection Summary												
Average Delay			3.2									
Intersection Capacity Utilization		39.3%			ICU Level of Service				A			
Analysis Period (min)			15									

Lanes, Volumes, Timings
2: Tanbark Road & Warner Road

2022 AM Existing

11-02-2022

	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	5	6	4	6	1	21	2	66	8	20	31	6
Future Volume (vph)	5	6	4	6	1	21	2	66	8	20	31	6
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Ped Bike Factor												
Frt		0.966				0.900			0.985			0.985
Flt Protected		0.985				0.989			0.999			0.983
Satd. Flow (prot)	0	1702	0	0	1520	0	0	1790	0	0	1743	0
Flt Permitted		0.985				0.989			0.999			0.983
Satd. Flow (perm)	0	1702	0	0	1520	0	0	1790	0	0	1743	0
Link Speed (k/h)		50				50			50			50
Link Distance (m)		207.8				107.8			154.0			156.3
Travel Time (s)		15.0				7.8			11.1			11.3
Confl. Peds. (#/hr)	8					8			17	17		
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Heavy Vehicles (%)	0%	0%	25%	17%	0%	10%	0%	2%	25%	5%	7%	0%
Adj. Flow (vph)	5	7	4	7	1	23	2	72	9	22	34	7
Shared Lane Traffic (%)												
Lane Group Flow (vph)	0	16	0	0	31	0	0	83	0	0	63	0
Enter Blocked Intersection	No	No	No	No	No	No	No	No	No	No	No	No
Lane Alignment	Left	Left	Right	Left	Left	Right	Left	Left	Right	Left	Left	Right
Median Width(m)		0.0				0.0			0.0			0.0
Link Offset(m)		0.0				0.0			0.0			0.0
Crosswalk Width(m)		4.8				4.8			4.8			4.8
Two way Left Turn Lane												
Headway Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Turning Speed (k/h)	25		15	25		15	25		15	25		15
Sign Control		Stop				Stop			Free			Free
Intersection Summary												
Area Type:	Other											
Control Type:	Unsignalized											
Intersection Capacity Utilization	22.1%							ICU Level of Service A				
Analysis Period (min)	15											

HCM Unsignalized Intersection Capacity Analysis
2: Tanbark Road & Warner Road

2022 AM Existing
11-02-2022

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	5	6	4	6	1	21	2	66	8	20	31	6
Future Volume (Veh/h)	5	6	4	6	1	21	2	66	8	20	31	6
Sign Control	Stop				Stop			Free			Free	
Grade	0%				0%			0%			0%	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	5	7	4	7	1	23	2	72	9	22	34	7
Pedestrians					17						8	
Lane Width (m)					3.6						3.6	
Walking Speed (m/s)					1.2						1.2	
Percent Blockage					1						1	
Right turn flare (veh)												
Median type								None			None	
Median storage veh												
Upstream signal (m)												
pX, platoon unblocked												
vC, conflicting volume	194	184	38	186	182	102	41			98		
vC1, stage 1 conf vol												
vC2, stage 2 conf vol												
vCu, unblocked vol	194	184	38	186	182	102	41			98		
tC, single (s)	7.1	6.5	6.5	7.3	6.5	6.3	4.1			4.1		
tC, 2 stage (s)												
tF (s)	3.5	4.0	3.5	3.7	4.0	3.4	2.2			2.2		
p0 queue free %	99	99	100	99	100	97	100			98		
cM capacity (veh/h)	728	693	973	706	694	913	1581			1456		
Direction, Lane #	EB 1	WB 1	NB 1	SB 1								
Volume Total	16	31	83	63								
Volume Left	5	7	2	22								
Volume Right	4	23	9	7								
cSH	759	848	1581	1456								
Volume to Capacity	0.02	0.04	0.00	0.02								
Queue Length 95th (m)	0.5	0.9	0.0	0.4								
Control Delay (s)	9.8	9.4	0.2	2.7								
Lane LOS	A	A	A	A								
Approach Delay (s)	9.8	9.4	0.2	2.7								
Approach LOS	A	A										
Intersection Summary												
Average Delay			3.3									
Intersection Capacity Utilization		22.1%			ICU Level of Service				A			
Analysis Period (min)			15									

Lanes, Volumes, Timings
3: Tanbark Road & Pinecroft Drive

2022 AM Existing

11-02-2022



Lane Group	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations	Y		Y			Y
Traffic Volume (vph)	0	12	60	0	3	36
Future Volume (vph)	0	12	60	0	3	36
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00
Ped Bike Factor						
Frt	0.865					
Flt Protected						0.996
Satd. Flow (prot)	1644	0	1810	0	0	1746
Flt Permitted						0.996
Satd. Flow (perm)	1644	0	1810	0	0	1746
Link Speed (k/h)	50		50			50
Link Distance (m)	132.9		205.1			154.0
Travel Time (s)	9.6		14.8			11.1
Confl. Peds. (#/hr)				7	7	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Heavy Vehicles (%)	0%	0%	5%	0%	0%	9%
Adj. Flow (vph)	0	13	65	0	3	39
Shared Lane Traffic (%)						
Lane Group Flow (vph)	13	0	65	0	0	42
Enter Blocked Intersection	No	No	No	No	No	No
Lane Alignment	Left	Right	Left	Right	Left	Left
Median Width(m)	3.6		0.0			0.0
Link Offset(m)	0.0		0.0			0.0
Crosswalk Width(m)	4.8		4.8			4.8
Two way Left Turn Lane						
Headway Factor	1.00	1.00	1.00	1.00	1.00	1.00
Turning Speed (k/h)	25	15		15	25	
Sign Control	Stop		Free			Free
Intersection Summary						
Area Type:	Other					
Control Type:	Unsignalized					
Intersection Capacity Utilization	15.4%				ICU Level of Service A	
Analysis Period (min)	15					

HCM Unsignalized Intersection Capacity Analysis
3: Tanbark Road & Pinecroft Drive

2022 AM Existing
11-02-2022

Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Traffic Volume (veh/h)	0	12	60	0	3	36
Future Volume (Veh/h)	0	12	60	0	3	36
Sign Control	Stop		Free			Free
Grade	0%		0%			0%
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	0	13	65	0	3	39
Pedestrians	7					
Lane Width (m)	3.6					
Walking Speed (m/s)	1.2					
Percent Blockage	1					
Right turn flare (veh)						
Median type		None		None		
Median storage veh						
Upstream signal (m)						
pX, platoon unblocked						
vC, conflicting volume	117	72		72		
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	117	72		72		
tC, single (s)	6.4	6.2		4.1		
tC, 2 stage (s)						
tF (s)	3.5	3.3		2.2		
p0 queue free %	100	99		100		
cM capacity (veh/h)	877	990		1532		
Direction, Lane #	WB 1	NB 1	SB 1			
Volume Total	13	65	42			
Volume Left	0	0	3			
Volume Right	13	0	0			
cSH	990	1700	1532			
Volume to Capacity	0.01	0.04	0.00			
Queue Length 95th (m)	0.3	0.0	0.0			
Control Delay (s)	8.7	0.0	0.5			
Lane LOS	A		A			
Approach Delay (s)	8.7	0.0	0.5			
Approach LOS	A					
Intersection Summary						
Average Delay		1.1				
Intersection Capacity Utilization		15.4%		ICU Level of Service		A
Analysis Period (min)		15				

Lanes, Volumes, Timings
4: Tanbark Road & Hickory Avenue

2022 AM Existing

11-02-2022



Lane Group	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Traffic Volume (vph)	6	3	0	57	30	4
Future Volume (vph)	6	3	0	57	30	4
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00
Fr _t	0.959			0.985		
Flt Protected	0.966					
Satd. Flow (prot)	1760	0	0	1827	1704	0
Flt Permitted	0.966					
Satd. Flow (perm)	1760	0	0	1827	1704	0
Link Speed (k/h)	50			50	50	
Link Distance (m)	129.6			65.7	205.1	
Travel Time (s)	9.3			4.7	14.8	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Heavy Vehicles (%)	0%	0%	0%	4%	11%	0%
Adj. Flow (vph)	7	3	0	62	33	4
Shared Lane Traffic (%)						
Lane Group Flow (vph)	10	0	0	62	37	0
Enter Blocked Intersection	No	No	No	No	No	No
Lane Alignment	Left	Right	Left	Left	Left	Right
Median Width(m)	3.6			0.0	0.0	
Link Offset(m)	0.0			0.0	0.0	
Crosswalk Width(m)	4.8			4.8	4.8	
Two way Left Turn Lane						
Headway Factor	1.00	1.00	1.00	1.00	1.00	1.00
Turning Speed (k/h)	25	15	25			15
Sign Control	Stop			Free	Free	

Intersection Summary

Area Type: Other

Control Type: Unsignalized

Intersection Capacity Utilization 13.3% ICU Level of Service A

Analysis Period (min) 15

HCM Unsignalized Intersection Capacity Analysis
4: Tanbark Road & Hickory Avenue

2022 AM Existing

11-02-2022



Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Traffic Volume (veh/h)	6	3	0	57	30	4
Future Volume (Veh/h)	6	3	0	57	30	4
Sign Control	Stop			Free	Free	
Grade	0%			0%	0%	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	7	3	0	62	33	4
Pedestrians						
Lane Width (m)						
Walking Speed (m/s)						
Percent Blockage						
Right turn flare (veh)						
Median type				None	None	
Median storage veh						
Upstream signal (m)						
pX, platoon unblocked						
vC, conflicting volume	97	35	37			
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	97	35	37			
tC, single (s)	6.4	6.2	4.1			
tC, 2 stage (s)						
tF (s)	3.5	3.3	2.2			
p0 queue free %	99	100	100			
cM capacity (veh/h)	907	1044	1587			
Direction, Lane #	EB 1	NB 1	SB 1			
Volume Total	10	62	37			
Volume Left	7	0	0			
Volume Right	3	0	4			
cSH	944	1587	1700			
Volume to Capacity	0.01	0.00	0.02			
Queue Length 95th (m)	0.3	0.0	0.0			
Control Delay (s)	8.9	0.0	0.0			
Lane LOS	A					
Approach Delay (s)	8.9	0.0	0.0			
Approach LOS	A					
Intersection Summary						
Average Delay		0.8				
Intersection Capacity Utilization		13.3%		ICU Level of Service		A
Analysis Period (min)		15				

Lanes, Volumes, Timings
5: Warner Road & Angels Drive

2022 AM Existing

11-02-2022



Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	0	7	0	0	3	4	0	0	0	5	0	3
Future Volume (vph)	0	7	0	0	3	4	0	0	0	5	0	3
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Fr _t						0.923						0.949
Flt Protected												0.970
Satd. Flow (prot)	0	1329	0	0	1364	0	0	1863	0	0	1401	0
Flt Permitted												0.970
Satd. Flow (perm)	0	1329	0	0	1364	0	0	1863	0	0	1401	0
Link Speed (k/h)		50				50			50			50
Link Distance (m)		191.9				207.8			98.3			131.4
Travel Time (s)		13.8				15.0			7.1			9.5
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Heavy Vehicles (%)	0%	43%	2%	2%	0%	50%	2%	2%	2%	20%	2%	33%
Adj. Flow (vph)	0	8	0	0	3	4	0	0	0	5	0	3
Shared Lane Traffic (%)												
Lane Group Flow (vph)	0	8	0	0	7	0	0	0	0	0	8	0
Enter Blocked Intersection	No	No	No	No	No	No	No	No	No	No	No	No
Lane Alignment	Left	Left	Right	Left	Left	Right	Left	Left	Right	Left	Left	Right
Median Width(m)		0.0				0.0			0.0			0.0
Link Offset(m)		0.0				0.0			0.0			0.0
Crosswalk Width(m)		4.8				4.8			4.8			4.8
Two way Left Turn Lane												
Headway Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Turning Speed (k/h)	25		100	100		15	100		100	25		15
Sign Control		Free			Free			Stop		Stop		

Intersection Summary

Area Type: Other

Control Type: Unsignalized

Intersection Capacity Utilization 13.3% ICU Level of Service A

Analysis Period (min) 15

HCM Unsignalized Intersection Capacity Analysis
5: Warner Road & Angels Drive

2022 AM Existing
11-02-2022

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	0	7	0	0	3	4	0	0	0	5	0	3
Future Volume (Veh/h)	0	7	0	0	3	4	0	0	0	5	0	3
Sign Control	Free			Free			Stop			Stop		
Grade	0%			0%			0%			0%		
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	0	8	0	0	3	4	0	0	0	5	0	3
Pedestrians												
Lane Width (m)												
Walking Speed (m/s)												
Percent Blockage												
Right turn flare (veh)												
Median type	None			None								
Median storage veh												
Upstream signal (m)												
pX, platoon unblocked												
vC, conflicting volume	7			8			16	15	8	13	13	5
vC1, stage 1 conf vol												
vC2, stage 2 conf vol												
vCu, unblocked vol	7			8			16	15	8	13	13	5
tC, single (s)	4.1			4.1			7.1	6.5	6.2	7.3	6.5	6.5
tC, 2 stage (s)												
tF (s)	2.2			2.2			3.5	4.0	3.3	3.7	4.0	3.6
p0 queue free %	100			100			100	100	100	99	100	100
cM capacity (veh/h)	1627			1612			996	879	1074	959	881	994
Direction, Lane #	EB 1	WB 1	NB 1	SB 1								
Volume Total	8	7	0	8								
Volume Left	0	0	0	5								
Volume Right	0	4	0	3								
cSH	1627	1612	1700	972								
Volume to Capacity	0.00	0.00	0.00	0.01								
Queue Length 95th (m)	0.0	0.0	0.0	0.2								
Control Delay (s)	0.0	0.0	0.0	8.7								
Lane LOS			A	A								
Approach Delay (s)	0.0	0.0	0.0	8.7								
Approach LOS			A	A								
Intersection Summary												
Average Delay			3.0									
Intersection Capacity Utilization		13.3%			ICU Level of Service				A			
Analysis Period (min)			15									

Lanes, Volumes, Timings
1: Tanbark Road & York Road

2022 PM Existing

11-02-2022

	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	7	223	35	23	211	8	50	2	46	12	3	16
Future Volume (vph)	7	223	35	23	211	8	50	2	46	12	3	16
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Fr _t		0.982			0.995			0.936			0.930	
Flt Protected		0.999			0.995			0.975			0.981	
Satd. Flow (prot)	0	1818	0	0	1778	0	0	1627	0	0	1643	0
Flt Permitted		0.999			0.995			0.975			0.981	
Satd. Flow (perm)	0	1818	0	0	1778	0	0	1627	0	0	1643	0
Link Speed (k/h)		50			50			50			50	
Link Distance (m)		351.4			515.6			156.3			44.1	
Travel Time (s)		25.3			37.1			11.3			3.2	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Heavy Vehicles (%)	0%	3%	0%	6%	6%	0%	0%	0%	14%	14%	0%	0%
Adj. Flow (vph)	8	242	38	25	229	9	54	2	50	13	3	17
Shared Lane Traffic (%)												
Lane Group Flow (vph)	0	288	0	0	263	0	0	106	0	0	33	0
Enter Blocked Intersection	No	No	No									
Lane Alignment	Left	Left	Right									
Median Width(m)		0.0			0.0			0.0			0.0	
Link Offset(m)		0.0			0.0			0.0			0.0	
Crosswalk Width(m)		4.8			4.8			4.8			4.8	
Two way Left Turn Lane												
Headway Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Turning Speed (k/h)	25		15	25		15	25		15	25		15
Sign Control		Free			Free			Stop			Stop	

Intersection Summary

Area Type: Other

Control Type: Unsignalized

Intersection Capacity Utilization 37.7% ICU Level of Service A

Analysis Period (min) 15

HCM Unsignalized Intersection Capacity Analysis
1: Tanbark Road & York Road

2022 PM Existing
11-02-2022

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	7	223		35	23	211	8	50	2	46	12	3
Future Volume (Veh/h)	7	223		35	23	211	8	50	2	46	12	3
Sign Control	Free				Free			Stop			Stop	
Grade		0%				0%			0%			0%
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	8	242		38	25	229	9	54	2	50	13	3
Pedestrians												
Lane Width (m)												
Walking Speed (m/s)												
Percent Blockage												
Right turn flare (veh)												
Median type		None				None						
Median storage veh												
Upstream signal (m)												
pX, platoon unblocked												
vC, conflicting volume	238			280			579	565	261	612	580	234
vC1, stage 1 conf vol												
vC2, stage 2 conf vol												
vCu, unblocked vol	238			280			579	565	261	612	580	234
tC, single (s)	4.1			4.2			7.1	6.5	6.3	7.2	6.5	6.2
tC, 2 stage (s)												
tF (s)	2.2			2.3			3.5	4.0	3.4	3.6	4.0	3.3
p0 queue free %	99			98			87	100	93	96	99	98
cM capacity (veh/h)	1341			1260			410	426	749	354	418	811
Direction, Lane #	EB 1	WB 1	NB 1	SB 1								
Volume Total	288	263	106	33								
Volume Left	8	25	54	13								
Volume Right	38	9	50	17								
cSH	1341	1260	522	509								
Volume to Capacity	0.01	0.02	0.20	0.06								
Queue Length 95th (m)	0.1	0.5	6.0	1.7								
Control Delay (s)	0.3	0.9	13.7	12.6								
Lane LOS	A	A	B	B								
Approach Delay (s)	0.3	0.9	13.7	12.6								
Approach LOS			B	B								
Intersection Summary												
Average Delay			3.2									
Intersection Capacity Utilization		37.7%			ICU Level of Service					A		
Analysis Period (min)			15									

Lanes, Volumes, Timings
2: Tanbark Road & Warner Road

2022 PM Existing

11-02-2022

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	5	6	4	6	1	21	2	66	8	20	31	6
Future Volume (vph)	5	6	4	6	1	21	2	66	8	20	31	6
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Fr _t		0.966			0.900			0.985			0.985	
Flt Protected		0.985			0.989			0.999			0.983	
Satd. Flow (prot)	0	1808	0	0	1684	0	0	1822	0	0	1820	0
Flt Permitted		0.985			0.989			0.999			0.983	
Satd. Flow (perm)	0	1808	0	0	1684	0	0	1822	0	0	1820	0
Link Speed (k/h)		50			50			50			50	
Link Distance (m)		207.8			107.8			154.0			156.3	
Travel Time (s)		15.0			7.8			11.1			11.3	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Heavy Vehicles (%)	0%	0%	0%	0%	14%	0%	0%	3%	0%	0%	2%	0%
Adj. Flow (vph)	5	7	4	7	1	23	2	72	9	22	34	7
Shared Lane Traffic (%)												
Lane Group Flow (vph)	0	16	0	0	31	0	0	83	0	0	63	0
Enter Blocked Intersection	No	No	No									
Lane Alignment	Left	Left	Right									
Median Width(m)		0.0			0.0			0.0			0.0	
Link Offset(m)		0.0			0.0			0.0			0.0	
Crosswalk Width(m)		4.8			4.8			4.8			4.8	
Two way Left Turn Lane												
Headway Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Turning Speed (k/h)	25		15	25		15	25		15	25		15
Sign Control		Stop			Stop			Free			Free	

Intersection Summary

Area Type: Other

Control Type: Unsignalized

Intersection Capacity Utilization 19.8% ICU Level of Service A

Analysis Period (min) 15

HCM Unsignalized Intersection Capacity Analysis
2: Tanbark Road & Warner Road

2022 PM Existing
11-02-2022

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	5	6	4	6	1	21	2	66	8	20	31	6
Future Volume (Veh/h)	5	6	4	6	1	21	2	66	8	20	31	6
Sign Control	Stop				Stop			Free			Free	
Grade	0%				0%			0%			0%	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	5	7	4	7	1	23	2	72	9	22	34	7
Pedestrians												
Lane Width (m)												
Walking Speed (m/s)												
Percent Blockage												
Right turn flare (veh)												
Median type								None			None	
Median storage veh												
Upstream signal (m)												
pX, platoon unblocked												
vC, conflicting volume	186	166	38	170	166	76	41			81		
vC1, stage 1 conf vol												
vC2, stage 2 conf vol												
vCu, unblocked vol	186	166	38	170	166	76	41			81		
tC, single (s)	7.1	6.5	6.2	7.1	6.6	6.2	4.1			4.1		
tC, 2 stage (s)												
tF (s)	3.5	4.0	3.3	3.5	4.1	3.3	2.2			2.2		
p0 queue free %	99	99	100	99	100	98	100			99		
cM capacity (veh/h)	752	718	1040	780	695	990	1581			1529		
Direction, Lane #	EB 1	WB 1	NB 1	SB 1								
Volume Total	16	31	83	63								
Volume Left	5	7	2	22								
Volume Right	4	23	9	7								
cSH	791	922	1581	1529								
Volume to Capacity	0.02	0.03	0.00	0.01								
Queue Length 95th (m)	0.5	0.8	0.0	0.4								
Control Delay (s)	9.6	9.0	0.2	2.7								
Lane LOS	A	A	A	A								
Approach Delay (s)	9.6	9.0	0.2	2.7								
Approach LOS	A	A										
Intersection Summary												
Average Delay			3.2									
Intersection Capacity Utilization		19.8%			ICU Level of Service				A			
Analysis Period (min)			15									

Lanes, Volumes, Timings
3: Tanbark Road & Pinecroft Drive

2022 PM Existing

11-02-2022



Lane Group	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations	WBL	WBR	NBT	NBR	SBL	SBT
Traffic Volume (vph)	0	12	60	0	3	36
Future Volume (vph)	0	12	60	0	3	36
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00
Fr _t	0.865					
Flt Protected						0.996
Satd. Flow (prot)	1644	0	1792	0	0	1858
Flt Permitted						0.996
Satd. Flow (perm)	1644	0	1792	0	0	1858
Link Speed (k/h)	50		50			50
Link Distance (m)	132.9		205.1			154.0
Travel Time (s)	9.6		14.8			11.1
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Heavy Vehicles (%)	0%	0%	6%	0%	0%	2%
Adj. Flow (vph)	0	13	65	0	3	39
Shared Lane Traffic (%)						
Lane Group Flow (vph)	13	0	65	0	0	42
Enter Blocked Intersection	No	No	No	No	No	No
Lane Alignment	Left	Right	Left	Right	Left	Left
Median Width(m)	3.6		0.0			0.0
Link Offset(m)	0.0		0.0			0.0
Crosswalk Width(m)	4.8		4.8			4.8
Two way Left Turn Lane						
Headway Factor	1.00	1.00	1.00	1.00	1.00	1.00
Turning Speed (k/h)	25	15		15	25	
Sign Control	Stop		Free			Free

Intersection Summary

Area Type: Other

Control Type: Unsignalized

Intersection Capacity Utilization 14.4% ICU Level of Service A

Analysis Period (min) 15

HCM Unsignalized Intersection Capacity Analysis
3: Tanbark Road & Pinecroft Drive

2022 PM Existing
11-02-2022

Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Traffic Volume (veh/h)	0	12	60	0	3	36
Future Volume (Veh/h)	0	12	60	0	3	36
Sign Control	Stop		Free			Free
Grade	0%		0%			0%
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	0	13	65	0	3	39
Pedestrians						
Lane Width (m)						
Walking Speed (m/s)						
Percent Blockage						
Right turn flare (veh)						
Median type			None			None
Median storage veh						
Upstream signal (m)						
pX, platoon unblocked						
vC, conflicting volume	110	65			65	
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	110	65			65	
tC, single (s)	6.4	6.2			4.1	
tC, 2 stage (s)						
tF (s)	3.5	3.3			2.2	
p0 queue free %	100	99			100	
cM capacity (veh/h)	890	1005			1550	
Direction, Lane #	WB 1	NB 1	SB 1			
Volume Total	13	65	42			
Volume Left	0	0	3			
Volume Right	13	0	0			
cSH	1005	1700	1550			
Volume to Capacity	0.01	0.04	0.00			
Queue Length 95th (m)	0.3	0.0	0.0			
Control Delay (s)	8.6	0.0	0.5			
Lane LOS	A		A			
Approach Delay (s)	8.6	0.0	0.5			
Approach LOS	A					
Intersection Summary						
Average Delay		1.1				
Intersection Capacity Utilization		14.4%		ICU Level of Service		A
Analysis Period (min)		15				

Lanes, Volumes, Timings
4: Tanbark Road & Hickory Avenue

2022 PM Existing

11-02-2022



Lane Group	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Traffic Volume (vph)	6	3	0	57	30	4
Future Volume (vph)	6	3	0	57	30	4
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00
Fr _t	0.959				0.985	
Flt Protected	0.966					
Satd. Flow (prot)	1760	0	0	1792	1872	0
Flt Permitted	0.966					
Satd. Flow (perm)	1760	0	0	1792	1872	0
Link Speed (k/h)	50			50	50	
Link Distance (m)	129.6			65.7	205.1	
Travel Time (s)	9.3			4.7	14.8	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Heavy Vehicles (%)	0%	0%	0%	6%	0%	0%
Adj. Flow (vph)	7	3	0	62	33	4
Shared Lane Traffic (%)						
Lane Group Flow (vph)	10	0	0	62	37	0
Enter Blocked Intersection	No	No	No	No	No	No
Lane Alignment	Left	Right	Left	Left	Left	Right
Median Width(m)	3.6			0.0	0.0	
Link Offset(m)	0.0			0.0	0.0	
Crosswalk Width(m)	4.8			4.8	4.8	
Two way Left Turn Lane						
Headway Factor	1.00	1.00	1.00	1.00	1.00	1.00
Turning Speed (k/h)	25	15	25			15
Sign Control	Stop			Free	Free	

Intersection Summary

Area Type: Other

Control Type: Unsignalized

Intersection Capacity Utilization 13.3% ICU Level of Service A

Analysis Period (min) 15

HCM Unsignalized Intersection Capacity Analysis
4: Tanbark Road & Hickory Avenue

2022 PM Existing

11-02-2022



Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Traffic Volume (veh/h)	6	3	0	57	30	4
Future Volume (Veh/h)	6	3	0	57	30	4
Sign Control	Stop			Free	Free	
Grade	0%			0%	0%	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	7	3	0	62	33	4
Pedestrians						
Lane Width (m)						
Walking Speed (m/s)						
Percent Blockage						
Right turn flare (veh)						
Median type				None	None	
Median storage veh						
Upstream signal (m)						
pX, platoon unblocked						
vC, conflicting volume	97	35	37			
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	97	35	37			
tC, single (s)	6.4	6.2	4.1			
tC, 2 stage (s)						
tF (s)	3.5	3.3	2.2			
p0 queue free %	99	100	100			
cM capacity (veh/h)	907	1044	1587			
Direction, Lane #	EB 1	NB 1	SB 1			
Volume Total	10	62	37			
Volume Left	7	0	0			
Volume Right	3	0	4			
cSH	944	1587	1700			
Volume to Capacity	0.01	0.00	0.02			
Queue Length 95th (m)	0.3	0.0	0.0			
Control Delay (s)	8.9	0.0	0.0			
Lane LOS	A					
Approach Delay (s)	8.9	0.0	0.0			
Approach LOS	A					
Intersection Summary						
Average Delay		0.8				
Intersection Capacity Utilization		13.3%		ICU Level of Service		A
Analysis Period (min)		15				

Lanes, Volumes, Timings
5: Warner Road & Angels Drive

2022 PM Existing

11-02-2022



Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	0	7	0	0	3	4	0	0	0	5	0	3
Future Volume (vph)	0	7	0	0	3	4	0	0	0	5	0	3
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Ped Bike Factor												
Frt						0.923						0.949
Flt Protected												0.970
Satd. Flow (prot)	0	1900	0	0	1682	0	0	1863	0	0	1450	0
Flt Permitted												0.970
Satd. Flow (perm)	0	1900	0	0	1682	0	0	1863	0	0	1450	0
Link Speed (k/h)		50			50			50			50	
Link Distance (m)		191.9			207.8			103.2			131.4	
Travel Time (s)		13.8			15.0			7.4			9.5	
Confl. Peds. (#/hr)	1				1							
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Heavy Vehicles (%)	0%	0%	2%	2%	10%	0%	2%	2%	2%	33%	2%	0%
Adj. Flow (vph)	0	8	0	0	3	4	0	0	0	5	0	3
Shared Lane Traffic (%)												
Lane Group Flow (vph)	0	8	0	0	7	0	0	0	0	0	8	0
Enter Blocked Intersection	No	No	No	No	No	No	No	No	No	No	No	No
Lane Alignment	Left	Left	Right	Left	Left	Right	Left	Left	Right	Left	Left	Right
Median Width(m)		0.0			0.0			0.0			0.0	
Link Offset(m)		0.0			0.0			0.0			0.0	
Crosswalk Width(m)		4.8			4.8			4.8			4.8	
Two way Left Turn Lane												
Headway Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Turning Speed (k/h)	25		15	25		15	25		15	25		15
Sign Control		Free			Free			Stop			Stop	
Intersection Summary												
Area Type:	Other											
Control Type:	Unsignalized											
Intersection Capacity Utilization	13.7%							ICU Level of Service A				
Analysis Period (min)	15											

HCM Unsignalized Intersection Capacity Analysis
5: Warner Road & Angels Drive

2022 PM Existing
11-02-2022

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	0	7	0	0	3	4	0	0	0	5	0	3
Future Volume (Veh/h)	0	7	0	0	3	4	0	0	0	5	0	3
Sign Control	Free			Free			Stop			Stop		
Grade	0%			0%			0%			0%		
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	0	8	0	0	3	4	0	0	0	5	0	3
Pedestrians												1
Lane Width (m)												3.6
Walking Speed (m/s)												1.2
Percent Blockage												0
Right turn flare (veh)												
Median type	None			None								
Median storage veh												
Upstream signal (m)												
pX, platoon unblocked												
vC, conflicting volume	8			8			16	16	8	14	14	6
vC1, stage 1 conf vol												
vC2, stage 2 conf vol												
vCu, unblocked vol	8			8			16	16	8	14	14	6
tC, single (s)	4.1			4.1			7.1	6.5	6.2	7.4	6.5	6.2
tC, 2 stage (s)												
tF (s)	2.2			2.2			3.5	4.0	3.3	3.8	4.0	3.3
p0 queue free %	100			100			100	100	100	99	100	100
cM capacity (veh/h)	1624			1612			996	877	1074	927	880	1082
Direction, Lane #	EB 1	WB 1	NB 1	SB 1								
Volume Total	8	7	0	8								
Volume Left	0	0	0	5								
Volume Right	0	4	0	3								
cSH	1624	1612	1700	979								
Volume to Capacity	0.00	0.00	0.00	0.01								
Queue Length 95th (m)	0.0	0.0	0.0	0.2								
Control Delay (s)	0.0	0.0	0.0	8.7								
Lane LOS			A	A								
Approach Delay (s)	0.0	0.0	0.0	8.7								
Approach LOS			A	A								
Intersection Summary												
Average Delay			3.0									
Intersection Capacity Utilization		13.7%			ICU Level of Service				A			
Analysis Period (min)			15									

Lanes, Volumes, Timings
1: Tanbark Road & York Road

2022 Sat. Existing

11-02-2022



Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	16	326	23	15	254	14	39	6	18	12	5	18
Future Volume (vph)	16	326	23	15	254	14	39	6	18	12	5	18
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Ped Bike Factor												
Frt		0.991			0.993			0.961			0.929	
Flt Protected		0.998			0.997			0.970			0.983	
Satd. Flow (prot)	0	1841	0	0	1864	0	0	1771	0	0	1735	0
Flt Permitted		0.998			0.997			0.970			0.983	
Satd. Flow (perm)	0	1841	0	0	1864	0	0	1771	0	0	1735	0
Link Speed (k/h)		50			50			50			50	
Link Distance (m)		351.4			515.6			156.3			44.1	
Travel Time (s)		25.3			37.1			11.3			3.2	
Confl. Peds. (#/hr)		6	6				1		2	2		1
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Heavy Vehicles (%)	7%	2%	0%	0%	1%	0%	0%	0%	0%	0%	0%	0%
Adj. Flow (vph)	17	354	25	16	276	15	42	7	20	13	5	20
Shared Lane Traffic (%)												
Lane Group Flow (vph)	0	396	0	0	307	0	0	69	0	0	38	0
Enter Blocked Intersection	No	No	No	No	No	No	No	No	No	No	No	No
Lane Alignment	Left	Left	Right	Left	Left	Right	Left	Left	Right	Left	Left	Right
Median Width(m)		0.0			0.0			0.0			0.0	
Link Offset(m)		0.0			0.0			0.0			0.0	
Crosswalk Width(m)		4.8			4.8			4.8			4.8	
Two way Left Turn Lane												
Headway Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Turning Speed (k/h)	25		15	25		15	25		15	25		15
Sign Control		Free			Free			Stop			Stop	
Intersection Summary												
Area Type:	Other											
Control Type:	Unsignalized											
Intersection Capacity Utilization	37.3%				ICU Level of Service A							
Analysis Period (min)	15											

HCM Unsignalized Intersection Capacity Analysis
1: Tanbark Road & York Road

2022 Sat. Existing
11-02-2022

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	16	326	23	15	254	14	39	6	18	12	5	18
Future Volume (Veh/h)	16	326	23	15	254	14	39	6	18	12	5	18
Sign Control	Free				Free			Stop			Stop	
Grade	0%				0%			0%			0%	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	17	354	25	16	276	15	42	7	20	13	5	20
Pedestrians	1				2			6				
Lane Width (m)	3.6				3.6			3.6				
Walking Speed (m/s)	1.2				1.2			1.2				
Percent Blockage	0				0			1				
Right turn flare (veh)												
Median type	None				None							
Median storage veh												
Upstream signal (m)												
pX, platoon unblocked												
vC, conflicting volume	291			385			746	730	374	742	734	284
vC1, stage 1 conf vol												
vC2, stage 2 conf vol												
vCu, unblocked vol	291			385			746	730	374	742	734	284
tC, single (s)	4.2			4.1			7.1	6.5	6.2	7.1	6.5	6.2
tC, 2 stage (s)												
tF (s)	2.3			2.2			3.5	4.0	3.3	3.5	4.0	3.3
p0 queue free %	99			99			86	98	97	96	99	97
cM capacity (veh/h)	1243			1179			310	341	672	311	338	759
Direction, Lane #	EB 1	WB 1	NB 1	SB 1								
Volume Total	396	307	69	38								
Volume Left	17	16	42	13								
Volume Right	25	15	20	20								
cSH	1243	1179	372	458								
Volume to Capacity	0.01	0.01	0.19	0.08								
Queue Length 95th (m)	0.3	0.3	5.4	2.2								
Control Delay (s)	0.5	0.5	16.9	13.6								
Lane LOS	A	A	C	B								
Approach Delay (s)	0.5	0.5	16.9	13.6								
Approach LOS			C	B								
Intersection Summary												
Average Delay			2.5									
Intersection Capacity Utilization			37.3%			ICU Level of Service						
Analysis Period (min)			15									

Lanes, Volumes, Timings
2: Tanbark Road & Warner Road

2022 Sat. Existing

11-02-2022



Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	3	5	0	6	7	19	1	45	6	16	34	2
Future Volume (vph)	3	5	0	6	7	19	1	45	6	16	34	2
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Ped Bike Factor												
Frt						0.921			0.983			0.995
Flt Protected						0.990			0.999			0.985
Satd. Flow (prot)	0	1866	0	0	1732	0	0	1866	0	0	1826	0
Flt Permitted		0.982			0.990			0.999			0.985	
Satd. Flow (perm)	0	1866	0	0	1732	0	0	1866	0	0	1826	0
Link Speed (k/h)		50			50			50			50	
Link Distance (m)		207.8			107.8			154.0			156.3	
Travel Time (s)		15.0			7.8			11.1			11.3	
Confl. Peds. (#/hr)									2	2		
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Heavy Vehicles (%)	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	3%	0%
Adj. Flow (vph)	3	5	0	7	8	21	1	49	7	17	37	2
Shared Lane Traffic (%)												
Lane Group Flow (vph)	0	8	0	0	36	0	0	57	0	0	56	0
Enter Blocked Intersection	No	No	No	No	No	No	No	No	No	No	No	No
Lane Alignment	Left	Left	Right	Left	Left	Right	Left	Left	Right	Left	Left	Right
Median Width(m)		0.0			0.0			0.0			0.0	
Link Offset(m)		0.0			0.0			0.0			0.0	
Crosswalk Width(m)		4.8			4.8			4.8			4.8	
Two way Left Turn Lane												
Headway Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Turning Speed (k/h)	25		15	25		15	25		15	25		15
Sign Control		Stop			Stop			Free			Free	
Intersection Summary												
Area Type:	Other											
Control Type:	Unsignalized											
Intersection Capacity Utilization	19.5%							ICU Level of Service A				
Analysis Period (min)	15											

HCM Unsignalized Intersection Capacity Analysis
2: Tanbark Road & Warner Road

2022 Sat. Existing
11-02-2022

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	3	5	0	6	7	19	1	45	6	16	34	2
Future Volume (Veh/h)	3	5	0	6	7	19	1	45	6	16	34	2
Sign Control	Stop				Stop			Free			Free	
Grade	0%				0%			0%			0%	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	3	5	0	7	8	21	1	49	7	17	37	2
Pedestrians					2							
Lane Width (m)					3.6							
Walking Speed (m/s)					1.2							
Percent Blockage					0							
Right turn flare (veh)												
Median type								None			None	
Median storage veh												
Upstream signal (m)												
pX, platoon unblocked												
vC, conflicting volume	152	132	38	131	130	54	39			58		
vC1, stage 1 conf vol												
vC2, stage 2 conf vol												
vCu, unblocked vol	152	132	38	131	130	54	39			58		
tC, single (s)	7.1	6.5	6.2	7.1	6.5	6.2	4.1			4.1		
tC, 2 stage (s)												
tF (s)	3.5	4.0	3.3	3.5	4.0	3.3	2.2			2.2		
p0 queue free %	100	99	100	99	99	98	100			99		
cM capacity (veh/h)	789	752	1040	832	755	1016	1584			1556		
Direction, Lane #	EB 1	WB 1	NB 1	SB 1								
Volume Total	8	36	57	56								
Volume Left	3	7	1	17								
Volume Right	0	21	7	2								
cSH	766	907	1584	1556								
Volume to Capacity	0.01	0.04	0.00	0.01								
Queue Length 95th (m)	0.3	1.0	0.0	0.3								
Control Delay (s)	9.8	9.1	0.1	2.3								
Lane LOS	A	A	A	A								
Approach Delay (s)	9.8	9.1	0.1	2.3								
Approach LOS	A	A										
Intersection Summary												
Average Delay		3.5										
Intersection Capacity Utilization		19.5%			ICU Level of Service					A		
Analysis Period (min)			15									

Lanes, Volumes, Timings
3: Tanbark Road & Pinecroft Drive

2022 Sat. Existing

11-02-2022



Lane Group	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Traffic Volume (vph)	6	1	34	2	12	41
Future Volume (vph)	6	1	34	2	12	41
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00
Ped Bike Factor						
Frt	0.983		0.993			
Flt Protected	0.958				0.989	
Satd. Flow (prot)	1789	0	1887	0	0	1879
Flt Permitted	0.958				0.989	
Satd. Flow (perm)	1789	0	1887	0	0	1879
Link Speed (k/h)	50		50		50	
Link Distance (m)	132.9		205.1		154.0	
Travel Time (s)	9.6		14.8		11.1	
Confl. Peds. (#/hr)				5	5	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Heavy Vehicles (%)	0%	0%	0%	0%	0%	0%
Adj. Flow (vph)	7	1	37	2	13	45
Shared Lane Traffic (%)						
Lane Group Flow (vph)	8	0	39	0	0	58
Enter Blocked Intersection	No	No	No	No	No	No
Lane Alignment	Left	Right	Left	Right	Left	Left
Median Width(m)	3.6		0.0		0.0	
Link Offset(m)	0.0		0.0		0.0	
Crosswalk Width(m)	4.8		4.8		4.8	
Two way Left Turn Lane						
Headway Factor	1.00	1.00	1.00	1.00	1.00	1.00
Turning Speed (k/h)	25	15		15	25	
Sign Control	Stop		Free		Free	
Intersection Summary						
Area Type:	Other					
Control Type:	Unsignalized					
Intersection Capacity Utilization	19.5%			ICU Level of Service A		
Analysis Period (min)	15					

HCM Unsignalized Intersection Capacity Analysis
3: Tanbark Road & Pinecroft Drive

2022 Sat. Existing
11-02-2022

Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Traffic Volume (veh/h)	6	1	34	2	12	41
Future Volume (Veh/h)	6	1	34	2	12	41
Sign Control	Stop		Free			Free
Grade	0%		0%			0%
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	7	1	37	2	13	45
Pedestrians	5					
Lane Width (m)	3.6					
Walking Speed (m/s)	1.2					
Percent Blockage	0					
Right turn flare (veh)						
Median type		None			None	
Median storage veh						
Upstream signal (m)						
pX, platoon unblocked						
vC, conflicting volume	114	43			44	
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	114	43			44	
tC, single (s)	6.4	6.2			4.1	
tC, 2 stage (s)						
tF (s)	3.5	3.3			2.2	
p0 queue free %	99	100			99	
cM capacity (veh/h)	876	1029			1571	
Direction, Lane #	WB 1	NB 1	SB 1			
Volume Total	8	39	58			
Volume Left	7	0	13			
Volume Right	1	2	0			
cSH	893	1700	1571			
Volume to Capacity	0.01	0.02	0.01			
Queue Length 95th (m)	0.2	0.0	0.2			
Control Delay (s)	9.1	0.0	1.7			
Lane LOS	A		A			
Approach Delay (s)	9.1	0.0	1.7			
Approach LOS	A					
Intersection Summary						
Average Delay		1.6				
Intersection Capacity Utilization		19.5%		ICU Level of Service		A
Analysis Period (min)		15				

Lanes, Volumes, Timings
4: Tanbark Road & Hickory Avenue

2022 Sat. Existing

11-02-2022



Lane Group	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Traffic Volume (vph)	6	6	4	40	27	1
Future Volume (vph)	6	6	4	40	27	1
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00
Ped Bike Factor						
Frt	0.932				0.995	
Flt Protected	0.976			0.996		
Satd. Flow (prot)	1728	0	0	1892	1890	0
Flt Permitted	0.976			0.996		
Satd. Flow (perm)	1728	0	0	1892	1890	0
Link Speed (k/h)	50			50	50	
Link Distance (m)	129.6			65.7	205.1	
Travel Time (s)	9.3			4.7	14.8	
Confl. Peds. (#/hr)	2					
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Heavy Vehicles (%)	0%	0%	0%	0%	0%	0%
Adj. Flow (vph)	7	7	4	43	29	1
Shared Lane Traffic (%)						
Lane Group Flow (vph)	14	0	0	47	30	0
Enter Blocked Intersection	No	No	No	No	No	No
Lane Alignment	Left	Right	Left	Left	Left	Right
Median Width(m)	3.6			0.0	0.0	
Link Offset(m)	0.0			0.0	0.0	
Crosswalk Width(m)	4.8			4.8	4.8	
Two way Left Turn Lane						
Headway Factor	1.00	1.00	1.00	1.00	1.00	1.00
Turning Speed (k/h)	25	15	25			15
Sign Control	Stop			Free	Free	
Intersection Summary						
Area Type:	Other					
Control Type:	Unsignalized					
Intersection Capacity Utilization	15.4%			ICU Level of Service A		
Analysis Period (min)	15					

HCM Unsignalized Intersection Capacity Analysis
4: Tanbark Road & Hickory Avenue

2022 Sat. Existing

11-02-2022



Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Traffic Volume (veh/h)	6	6	4	40	27	1
Future Volume (Veh/h)	6	6	4	40	27	1
Sign Control	Stop			Free	Free	
Grade	0%			0%	0%	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	7	7	4	43	29	1
Pedestrians					2	
Lane Width (m)					3.6	
Walking Speed (m/s)					1.2	
Percent Blockage					0	
Right turn flare (veh)						
Median type				None	None	
Median storage veh						
Upstream signal (m)						
pX, platoon unblocked						
vC, conflicting volume	82	30	30			
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	82	30	30			
tC, single (s)	6.4	6.2	4.1			
tC, 2 stage (s)						
tF (s)	3.5	3.3	2.2			
p0 queue free %	99	99	100			
cM capacity (veh/h)	921	1051	1596			
Direction, Lane #	EB 1	NB 1	SB 1			
Volume Total	14	47	30			
Volume Left	7	4	0			
Volume Right	7	0	1			
cSH	981	1596	1700			
Volume to Capacity	0.01	0.00	0.02			
Queue Length 95th (m)	0.3	0.1	0.0			
Control Delay (s)	8.7	0.6	0.0			
Lane LOS	A	A				
Approach Delay (s)	8.7	0.6	0.0			
Approach LOS	A					
Intersection Summary						
Average Delay		1.7				
Intersection Capacity Utilization		15.4%		ICU Level of Service		A
Analysis Period (min)		15				

Lanes, Volumes, Timings
5: Warner Road & Angels Drive

2022 Sat. Existing

11-02-2022



Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	4	5	0	0	10	2	0	0	0	2	0	3
Future Volume (vph)	4	5	0	0	10	2	0	0	0	2	0	3
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Fr _t						0.979					0.919	
Flt Protected												0.980
Satd. Flow (prot)	0	1822	0	0	1824	0	0	1863	0	0	1678	0
Flt Permitted												0.980
Satd. Flow (perm)	0	1822	0	0	1824	0	0	1863	0	0	1678	0
Link Speed (k/h)						50						50
Link Distance (m)						207.8						131.4
Travel Time (s)						15.0						9.5
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	4	5	0	0	11	2	0	0	0	2	0	3
Shared Lane Traffic (%)												
Lane Group Flow (vph)	0	9	0	0	13	0	0	0	0	0	5	0
Enter Blocked Intersection	No	No	No	No	No	No	No	No	No	No	No	No
Lane Alignment	Left	Left	Right	Left	Left	Right	Left	Left	Right	Left	Left	Right
Median Width(m)						0.0						0.0
Link Offset(m)						0.0						0.0
Crosswalk Width(m)						4.8						4.8
Two way Left Turn Lane												
Headway Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Turning Speed (k/h)	25		15	25		15	25		15	25		15
Sign Control			Free			Free			Stop		Stop	

Intersection Summary

Area Type: Other

Control Type: Unsignalized

Intersection Capacity Utilization 13.8%

ICU Level of Service A

Analysis Period (min) 15

HCM Unsignalized Intersection Capacity Analysis
5: Warner Road & Angels Drive

2022 Sat. Existing

11-02-2022

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	4	5	0	0	10	2	0	0	0	2	0	3
Future Volume (Veh/h)	4	5	0	0	10	2	0	0	0	2	0	3
Sign Control	Free				Free			Stop			Stop	
Grade	0%				0%			0%			0%	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	4	5	0	0	11	2	0	0	0	2	0	3
Pedestrians												
Lane Width (m)												
Walking Speed (m/s)												
Percent Blockage												
Right turn flare (veh)												
Median type	None				None							
Median storage veh												
Upstream signal (m)												
pX, platoon unblocked												
vC, conflicting volume	13				5			28	26	5	25	25
vC1, stage 1 conf vol												
vC2, stage 2 conf vol												
vCu, unblocked vol	13				5			28	26	5	25	25
tC, single (s)	4.1				4.1			7.1	6.5	6.2	7.1	6.5
tC, 2 stage (s)												
tF (s)	2.2				2.2			3.5	4.0	3.3	3.5	4.0
p0 queue free %	100				100			100	100	100	100	100
cM capacity (veh/h)	1606				1616			977	865	1078	984	866
Direction, Lane #	EB 1	WB 1	NB 1	SB 1								
Volume Total	9	13	0	5								
Volume Left	4	0	0	2								
Volume Right	0	2	0	3								
cSH	1606	1616	1700	1033								
Volume to Capacity	0.00	0.00	0.00	0.00								
Queue Length 95th (m)	0.1	0.0	0.0	0.1								
Control Delay (s)	3.2	0.0	0.0	8.5								
Lane LOS	A		A	A								
Approach Delay (s)	3.2	0.0	0.0	8.5								
Approach LOS			A	A								
Intersection Summary												
Average Delay			2.7									
Intersection Capacity Utilization		13.8%			ICU Level of Service				A			
Analysis Period (min)			15									

Lanes, Volumes, Timings
1: Tanbark Road & York Road

2030 AM Background

11-02-2022



Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	9	261	42	28	247	10	61	2	56	14	4	19
Future Volume (vph)	9	261	42	28	247	10	61	2	56	14	4	19
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Ped Bike Factor												
Frt		0.982			0.995			0.936			0.929	
Flt Protected		0.999			0.995			0.975			0.982	
Satd. Flow (prot)	0	1721	0	0	1745	0	0	1718	0	0	1672	0
Flt Permitted		0.999			0.995			0.975			0.982	
Satd. Flow (perm)	0	1721	0	0	1745	0	0	1718	0	0	1672	0
Link Speed (k/h)		50			50			50			50	
Link Distance (m)		351.4			515.6			156.3			44.1	
Travel Time (s)		25.3			37.1			11.3			3.2	
Confl. Peds. (#/hr)	17	2	2		17	1		8	8		1	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Heavy Vehicles (%)	14%	8%	9%	0%	9%	0%	0%	0%	2%	0%	0%	7%
Adj. Flow (vph)	10	284	46	30	268	11	66	2	61	15	4	21
Shared Lane Traffic (%)												
Lane Group Flow (vph)	0	340	0	0	309	0	0	129	0	0	40	0
Enter Blocked Intersection	No	No	No	No	No	No	No	No	No	No	No	No
Lane Alignment	Left	Left	Right	Left	Left	Right	Left	Left	Right	Left	Left	Right
Median Width(m)		0.0			0.0			0.0			0.0	
Link Offset(m)		0.0			0.0			0.0			0.0	
Crosswalk Width(m)		4.8			4.8			4.8			4.8	
Two way Left Turn Lane												
Headway Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Turning Speed (k/h)	25		15	25		15	25		15	25		15
Sign Control		Free			Free			Stop			Stop	
Intersection Summary												
Area Type:	Other											
Control Type:	Unsignalized											
Intersection Capacity Utilization	44.8%				ICU Level of Service A							
Analysis Period (min)	15											

HCM Unsignalized Intersection Capacity Analysis
1: Tanbark Road & York Road

2030 AM Background
11-02-2022

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	9	261	42	28	247	10	61	2	56	14	4	19
Future Volume (Veh/h)	9	261	42	28	247	10	61	2	56	14	4	19
Sign Control	Free				Free			Stop			Stop	
Grade	0%				0%			0%			0%	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	10	284	46	30	268	11	66	2	61	15	4	21
Pedestrians	1				8			2			17	
Lane Width (m)	3.6				3.6			3.6			3.6	
Walking Speed (m/s)	1.2				1.2			1.2			1.2	
Percent Blockage	0				1			0			1	
Right turn flare (veh)												
Median type	None				None							
Median storage veh												
Upstream signal (m)												
pX, platoon unblocked												
vC, conflicting volume	296			332			686	685	317	748	702	292
vC1, stage 1 conf vol												
vC2, stage 2 conf vol												
vCu, unblocked vol	296			332			686	685	317	748	702	292
tC, single (s)	4.2			4.1			7.1	6.5	6.2	7.1	6.5	6.3
tC, 2 stage (s)												
tF (s)	2.3			2.2			3.5	4.0	3.3	3.5	4.0	3.4
p0 queue free %	99			98			80	99	91	95	99	97
cM capacity (veh/h)	1183			1237			337	355	718	285	347	725
Direction, Lane #	EB 1	WB 1	NB 1	SB 1								
Volume Total	340	309	129	40								
Volume Left	10	30	66	15								
Volume Right	46	11	61	21								
cSH	1183	1237	450	429								
Volume to Capacity	0.01	0.02	0.29	0.09								
Queue Length 95th (m)	0.2	0.6	9.4	2.4								
Control Delay (s)	0.3	1.0	16.2	14.2								
Lane LOS	A	A	C	B								
Approach Delay (s)	0.3	1.0	16.2	14.2								
Approach LOS			C	B								
Intersection Summary												
Average Delay			3.8									
Intersection Capacity Utilization		44.8%			ICU Level of Service				A			
Analysis Period (min)			15									

Lanes, Volumes, Timings
2: Tanbark Road & Warner Road

2030 AM Background

11-02-2022



Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	6	7	5	7	1	25	2	83	10	24	38	7
Future Volume (vph)	6	7	5	7	1	25	2	83	10	24	38	7
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Ped Bike Factor												
Frt		0.966				0.899			0.986			0.986
Flt Protected		0.983				0.989			0.999			0.983
Satd. Flow (prot)	0	1698	0	0	1518	0	0	1792	0	0	1745	0
Flt Permitted		0.983				0.989			0.999			0.983
Satd. Flow (perm)	0	1698	0	0	1518	0	0	1792	0	0	1745	0
Link Speed (k/h)		50				50			50			50
Link Distance (m)		207.8				107.8			154.0			156.3
Travel Time (s)		15.0				7.8			11.1			11.3
Confl. Peds. (#/hr)	8					8			17	17		
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Heavy Vehicles (%)	0%	0%	25%	17%	0%	10%	0%	2%	25%	5%	7%	0%
Adj. Flow (vph)	7	8	5	8	1	27	2	90	11	26	41	8
Shared Lane Traffic (%)												
Lane Group Flow (vph)	0	20	0	0	36	0	0	103	0	0	75	0
Enter Blocked Intersection	No	No	No	No	No	No	No	No	No	No	No	No
Lane Alignment	Left	Left	Right	Left	Left	Right	Left	Left	Right	Left	Left	Right
Median Width(m)		0.0			0.0			0.0			0.0	
Link Offset(m)		0.0			0.0			0.0			0.0	
Crosswalk Width(m)		4.8			4.8			4.8			4.8	
Two way Left Turn Lane												
Headway Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Turning Speed (k/h)	25		15	25		15	25		15	25		15
Sign Control		Stop				Stop			Free			Free
Intersection Summary												
Area Type:	Other											
Control Type:	Unsignalized											
Intersection Capacity Utilization	22.8%							ICU Level of Service A				
Analysis Period (min)	15											

HCM Unsignalized Intersection Capacity Analysis
2: Tanbark Road & Warner Road

2030 AM Background
11-02-2022

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	6	7	5	7	1	25	2	83	10	24	38	7
Future Volume (Veh/h)	6	7	5	7	1	25	2	83	10	24	38	7
Sign Control	Stop				Stop			Free			Free	
Grade	0%				0%			0%			0%	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	7	8	5	8	1	27	2	90	11	26	41	8
Pedestrians					17						8	
Lane Width (m)					3.6						3.6	
Walking Speed (m/s)					1.2						1.2	
Percent Blockage					1						1	
Right turn flare (veh)												
Median type								None			None	
Median storage veh												
Upstream signal (m)												
pX, platoon unblocked												
vC, conflicting volume	232	219	45	222	218	120	49			118		
vC1, stage 1 conf vol												
vC2, stage 2 conf vol												
vCu, unblocked vol	232	219	45	222	218	120	49			118		
tC, single (s)	7.1	6.5	6.5	7.3	6.5	6.3	4.1			4.1		
tC, 2 stage (s)												
tF (s)	3.5	4.0	3.5	3.7	4.0	3.4	2.2			2.2		
p0 queue free %	99	99	99	99	100	97	100			98		
cM capacity (veh/h)	682	660	963	665	661	891	1571			1431		
Direction, Lane #	EB 1	WB 1	NB 1	SB 1								
Volume Total	20	36	103	75								
Volume Left	7	8	2	26								
Volume Right	5	27	11	8								
cSH	725	821	1571	1431								
Volume to Capacity	0.03	0.04	0.00	0.02								
Queue Length 95th (m)	0.7	1.1	0.0	0.4								
Control Delay (s)	10.1	9.6	0.2	2.7								
Lane LOS	B	A	A	A								
Approach Delay (s)	10.1	9.6	0.2	2.7								
Approach LOS	B	A										
Intersection Summary												
Average Delay			3.3									
Intersection Capacity Utilization		22.8%			ICU Level of Service					A		
Analysis Period (min)			15									

Lanes, Volumes, Timings
3: Tanbark Road & Pinecroft Drive

2030 AM Background

11-02-2022



Lane Group	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations	Y		Y			Y
Traffic Volume (vph)	0	14	77	0	4	44
Future Volume (vph)	0	14	77	0	4	44
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00
Ped Bike Factor						
Frt	0.865					
Flt Protected						0.996
Satd. Flow (prot)	1644	0	1810	0	0	1747
Flt Permitted						0.996
Satd. Flow (perm)	1644	0	1810	0	0	1747
Link Speed (k/h)	50		50			50
Link Distance (m)	132.9		205.1			154.0
Travel Time (s)	9.6		14.8			11.1
Confl. Peds. (#/hr)				7	7	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Heavy Vehicles (%)	0%	0%	5%	0%	0%	9%
Adj. Flow (vph)	0	15	84	0	4	48
Shared Lane Traffic (%)						
Lane Group Flow (vph)	15	0	84	0	0	52
Enter Blocked Intersection	No	No	No	No	No	No
Lane Alignment	Left	Right	Left	Right	Left	Left
Median Width(m)	3.6		0.0			0.0
Link Offset(m)	0.0		0.0			0.0
Crosswalk Width(m)	4.8		4.8			4.8
Two way Left Turn Lane						
Headway Factor	1.00	1.00	1.00	1.00	1.00	1.00
Turning Speed (k/h)	25	15		15	25	
Sign Control	Stop		Free			Free
Intersection Summary						
Area Type:	Other					
Control Type:	Unsignalized					
Intersection Capacity Utilization	16.0%				ICU Level of Service A	
Analysis Period (min)	15					

HCM Unsignalized Intersection Capacity Analysis
3: Tanbark Road & Pinecroft Drive

2030 AM Background
11-02-2022

Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Traffic Volume (veh/h)	0	14	77	0	4	44
Future Volume (Veh/h)	0	14	77	0	4	44
Sign Control	Stop		Free			Free
Grade	0%		0%			0%
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	0	15	84	0	4	48
Pedestrians	7					
Lane Width (m)	3.6					
Walking Speed (m/s)	1.2					
Percent Blockage	1					
Right turn flare (veh)						
Median type		None		None		
Median storage veh						
Upstream signal (m)						
pX, platoon unblocked						
vC, conflicting volume	147	91		91		
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	147	91		91		
tC, single (s)	6.4	6.2		4.1		
tC, 2 stage (s)						
tF (s)	3.5	3.3		2.2		
p0 queue free %	100	98		100		
cM capacity (veh/h)	843	966		1508		
Direction, Lane #	WB 1	NB 1	SB 1			
Volume Total	15	84	52			
Volume Left	0	0	4			
Volume Right	15	0	0			
cSH	966	1700	1508			
Volume to Capacity	0.02	0.05	0.00			
Queue Length 95th (m)	0.4	0.0	0.1			
Control Delay (s)	8.8	0.0	0.6			
Lane LOS	A		A			
Approach Delay (s)	8.8	0.0	0.6			
Approach LOS	A					
Intersection Summary						
Average Delay		1.1				
Intersection Capacity Utilization		16.0%		ICU Level of Service		A
Analysis Period (min)		15				



Lane Group	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Traffic Volume (vph)	7	4	0	67	35	5
Future Volume (vph)	7	4	0	67	35	5
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00
Fr _t	0.955			0.984		
Flt Protected	0.968					
Satd. Flow (prot)	1756	0	0	1827	1704	0
Flt Permitted	0.968					
Satd. Flow (perm)	1756	0	0	1827	1704	0
Link Speed (k/h)	50			50	50	
Link Distance (m)	129.6			65.7	205.1	
Travel Time (s)	9.3			4.7	14.8	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Heavy Vehicles (%)	0%	0%	0%	4%	11%	0%
Adj. Flow (vph)	8	4	0	73	38	5
Shared Lane Traffic (%)						
Lane Group Flow (vph)	12	0	0	73	43	0
Enter Blocked Intersection	No	No	No	No	No	No
Lane Alignment	Left	Right	Left	Left	Left	Right
Median Width(m)	3.6			0.0	0.0	
Link Offset(m)	0.0			0.0	0.0	
Crosswalk Width(m)	4.8			4.8	4.8	
Two way Left Turn Lane						
Headway Factor	1.00	1.00	1.00	1.00	1.00	1.00
Turning Speed (k/h)	25	15	25			15
Sign Control	Stop			Free	Free	

Intersection Summary

Area Type: Other

Control Type: Unsignalized

Intersection Capacity Utilization 13.5% ICU Level of Service A

Analysis Period (min) 15

HCM Unsignalized Intersection Capacity Analysis
4: Tanbark Road & Hickory Avenue

2030 AM Background

11-02-2022



Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Traffic Volume (veh/h)	7	4	0	67	35	5
Future Volume (Veh/h)	7	4	0	67	35	5
Sign Control	Stop			Free	Free	
Grade	0%			0%	0%	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	8	4	0	73	38	5
Pedestrians						
Lane Width (m)						
Walking Speed (m/s)						
Percent Blockage						
Right turn flare (veh)						
Median type				None	None	
Median storage veh						
Upstream signal (m)						
pX, platoon unblocked						
vC, conflicting volume	114	40	43			
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	114	40	43			
tC, single (s)	6.4	6.2	4.1			
tC, 2 stage (s)						
tF (s)	3.5	3.3	2.2			
p0 queue free %	99	100	100			
cM capacity (veh/h)	888	1036	1579			
Direction, Lane #	EB 1	NB 1	SB 1			
Volume Total	12	73	43			
Volume Left	8	0	0			
Volume Right	4	0	5			
cSH	932	1579	1700			
Volume to Capacity	0.01	0.00	0.03			
Queue Length 95th (m)	0.3	0.0	0.0			
Control Delay (s)	8.9	0.0	0.0			
Lane LOS	A					
Approach Delay (s)	8.9	0.0	0.0			
Approach LOS	A					
Intersection Summary						
Average Delay		0.8				
Intersection Capacity Utilization		13.5%		ICU Level of Service		A
Analysis Period (min)		15				

Lanes, Volumes, Timings
5: Warner Road & Angels Drive

2030 AM Background

11-02-2022

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR	
Lane Configurations													
Traffic Volume (vph)	0	8	0	0	4	5	0	0	0	6	0	4	
Future Volume (vph)	0	8	0	0	4	5	0	0	0	6	0	4	
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	
Fr _t						0.925						0.951	
Flt Protected												0.969	
Satd. Flow (prot)	0	1329	0	0	1375	0	0	1863	0	0	1404	0	
Flt Permitted												0.969	
Satd. Flow (perm)	0	1329	0	0	1375	0	0	1863	0	0	1404	0	
Link Speed (k/h)		50				50						50	
Link Distance (m)		191.9				207.8						131.4	
Travel Time (s)		13.8				15.0						9.5	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	
Heavy Vehicles (%)	0%	43%	2%	2%	0%	50%	2%	2%	2%	20%	2%	33%	
Adj. Flow (vph)	0	9	0	0	4	5	0	0	0	7	0	4	
Shared Lane Traffic (%)													
Lane Group Flow (vph)	0	9	0	0	9	0	0	0	0	0	11	0	
Enter Blocked Intersection	No	No	No	No	No	No	No	No	No	No	No	No	
Lane Alignment	Left	Left	Right	Left	Left	Right	Left	Left	Right	Left	Left	Right	
Median Width(m)		0.0				0.0						0.0	
Link Offset(m)		0.0				0.0						0.0	
Crosswalk Width(m)		4.8				4.8						4.8	
Two way Left Turn Lane													
Headway Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	
Turning Speed (k/h)	25		100	100		15	100			100	25	15	
Sign Control		Free				Free			Stop			Stop	

Intersection Summary

Area Type: Other

Control Type: Unsignalized

Intersection Capacity Utilization 13.3% ICU Level of Service A

Analysis Period (min) 15

HCM Unsignedized Intersection Capacity Analysis
5: Warner Road & Angels Drive

2030 AM Background

11-02-2022

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	0	8	0	0	4	5	0	0	0	6	0	4
Future Volume (Veh/h)	0	8	0	0	4	5	0	0	0	6	0	4
Sign Control	Free			Free			Stop			Stop		
Grade	0%			0%			0%			0%		
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	0	9	0	0	4	5	0	0	0	7	0	4
Pedestrians												
Lane Width (m)												
Walking Speed (m/s)												
Percent Blockage												
Right turn flare (veh)												
Median type	None			None								
Median storage veh												
Upstream signal (m)												
pX, platoon unblocked												
vC, conflicting volume	9			9			20	18	9	16	16	6
vC1, stage 1 conf vol												
vC2, stage 2 conf vol												
vCu, unblocked vol	9			9			20	18	9	16	16	6
tC, single (s)	4.1			4.1			7.1	6.5	6.2	7.3	6.5	6.5
tC, 2 stage (s)												
tF (s)	2.2			2.2			3.5	4.0	3.3	3.7	4.0	3.6
p0 queue free %	100			100			100	100	100	99	100	100
cM capacity (veh/h)	1624			1611			990	876	1073	956	879	992
Direction, Lane #	EB 1	WB 1	NB 1	SB 1								
Volume Total	9	9	0	11								
Volume Left	0	0	0	7								
Volume Right	0	5	0	4								
cSH	1624	1611	1700	969								
Volume to Capacity	0.00	0.00	0.00	0.01								
Queue Length 95th (m)	0.0	0.0	0.0	0.3								
Control Delay (s)	0.0	0.0	0.0	8.8								
Lane LOS			A	A								
Approach Delay (s)	0.0	0.0	0.0	8.8								
Approach LOS			A	A								
Intersection Summary												
Average Delay			3.3									
Intersection Capacity Utilization		13.3%			ICU Level of Service				A			
Analysis Period (min)			15									

Lanes, Volumes, Timings
1: Tanbark Road & York Road

2030 PM Background

11-02-2022



Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	9	261	42	28	247	10	61	2	56	14	4	19
Future Volume (vph)	9	261	42	28	247	10	61	2	56	14	4	19
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Fr _t		0.982			0.995			0.936			0.929	
Flt Protected		0.999			0.995			0.975			0.982	
Satd. Flow (prot)	0	1818	0	0	1778	0	0	1626	0	0	1647	0
Flt Permitted		0.999			0.995			0.975			0.982	
Satd. Flow (perm)	0	1818	0	0	1778	0	0	1626	0	0	1647	0
Link Speed (k/h)		50			50			50			50	
Link Distance (m)		351.4			515.6			156.3			44.1	
Travel Time (s)		25.3			37.1			11.3			3.2	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Heavy Vehicles (%)	0%	3%	0%	6%	6%	0%	0%	0%	14%	14%	0%	0%
Adj. Flow (vph)	10	284	46	30	268	11	66	2	61	15	4	21
Shared Lane Traffic (%)												
Lane Group Flow (vph)	0	340	0	0	309	0	0	129	0	0	40	0
Enter Blocked Intersection	No	No	No									
Lane Alignment	Left	Left	Right									
Median Width(m)		0.0			0.0			0.0			0.0	
Link Offset(m)		0.0			0.0			0.0			0.0	
Crosswalk Width(m)		4.8			4.8			4.8			4.8	
Two way Left Turn Lane												
Headway Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Turning Speed (k/h)	25		15	25		15	25		15	25		15
Sign Control		Free			Free			Stop			Stop	

Intersection Summary

Area Type: Other

Control Type: Unsignalized

Intersection Capacity Utilization 43.7% ICU Level of Service A

Analysis Period (min) 15

HCM Unsignalized Intersection Capacity Analysis
1: Tanbark Road & York Road

2030 PM Background

11-02-2022

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	9	261	42	28	247	10	61	2	56	14	4	19
Future Volume (Veh/h)	9	261	42	28	247	10	61	2	56	14	4	19
Sign Control	Free				Free			Stop			Stop	
Grade	0%				0%			0%			0%	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	10	284	46	30	268	11	66	2	61	15	4	21
Pedestrians												
Lane Width (m)												
Walking Speed (m/s)												
Percent Blockage												
Right turn flare (veh)												
Median type		None				None						
Median storage veh												
Upstream signal (m)												
pX, platoon unblocked												
vC, conflicting volume	279			330			684	666	307	722	684	274
vC1, stage 1 conf vol												
vC2, stage 2 conf vol												
vCu, unblocked vol	279			330			684	666	307	722	684	274
tC, single (s)	4.1			4.2			7.1	6.5	6.3	7.2	6.5	6.2
tC, 2 stage (s)												
tF (s)	2.2			2.3			3.5	4.0	3.4	3.6	4.0	3.3
p0 queue free %	99			98			81	99	91	95	99	97
cM capacity (veh/h)	1295			1207			344	370	706	290	362	770
Direction, Lane #	EB 1	WB 1	NB 1	SB 1								
Volume Total	340	309	129	40								
Volume Left	10	30	66	15								
Volume Right	46	11	61	21								
cSH	1295	1207	455	444								
Volume to Capacity	0.01	0.02	0.28	0.09								
Queue Length 95th (m)	0.2	0.6	9.2	2.4								
Control Delay (s)	0.3	1.0	16.0	13.9								
Lane LOS	A	A	C	B								
Approach Delay (s)	0.3	1.0	16.0	13.9								
Approach LOS			C	B								
Intersection Summary												
Average Delay			3.7									
Intersection Capacity Utilization		43.7%			ICU Level of Service				A			
Analysis Period (min)			15									

Lanes, Volumes, Timings
2: Tanbark Road & Warner Road

2030 PM Background

11-02-2022

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	6	7	5	7	1	25	2	83	10	24	38	7
Future Volume (vph)	6	7	5	7	1	25	2	83	10	24	38	7
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Fr _t		0.966			0.899			0.986			0.986	
Flt Protected		0.983			0.989			0.999			0.983	
Satd. Flow (prot)	0	1804	0	0	1683	0	0	1824	0	0	1822	0
Flt Permitted		0.983			0.989			0.999			0.983	
Satd. Flow (perm)	0	1804	0	0	1683	0	0	1824	0	0	1822	0
Link Speed (k/h)		50			50			50			50	
Link Distance (m)		207.8			107.8			154.0			156.3	
Travel Time (s)		15.0			7.8			11.1			11.3	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Heavy Vehicles (%)	0%	0%	0%	0%	14%	0%	0%	3%	0%	0%	2%	0%
Adj. Flow (vph)	7	8	5	8	1	27	2	90	11	26	41	8
Shared Lane Traffic (%)												
Lane Group Flow (vph)	0	20	0	0	36	0	0	103	0	0	75	0
Enter Blocked Intersection	No	No	No									
Lane Alignment	Left	Left	Right									
Median Width(m)		0.0			0.0			0.0			0.0	
Link Offset(m)		0.0			0.0			0.0			0.0	
Crosswalk Width(m)		4.8			4.8			4.8			4.8	
Two way Left Turn Lane												
Headway Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Turning Speed (k/h)	25		15	25		15	25		15	25		15
Sign Control		Stop			Stop			Free			Free	

Intersection Summary

Area Type: Other

Control Type: Unsignalized

Intersection Capacity Utilization 20.4% ICU Level of Service A

Analysis Period (min) 15

HCM Unsignalized Intersection Capacity Analysis
2: Tanbark Road & Warner Road

2030 PM Background

11-02-2022

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	6	7	5	7	1	25	2	83	10	24	38	7
Future Volume (Veh/h)	6	7	5	7	1	25	2	83	10	24	38	7
Sign Control	Stop				Stop			Free			Free	
Grade	0%				0%			0%			0%	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	7	8	5	8	1	27	2	90	11	26	41	8
Pedestrians												
Lane Width (m)												
Walking Speed (m/s)												
Percent Blockage												
Right turn flare (veh)												
Median type								None			None	
Median storage veh												
Upstream signal (m)												
pX, platoon unblocked												
vC, conflicting volume	224	202	45	206	200	96	49			101		
vC1, stage 1 conf vol												
vC2, stage 2 conf vol												
vCu, unblocked vol	224	202	45	206	200	96	49			101		
tC, single (s)	7.1	6.5	6.2	7.1	6.6	6.2	4.1			4.1		
tC, 2 stage (s)												
tF (s)	3.5	4.0	3.3	3.5	4.1	3.3	2.2			2.2		
p0 queue free %	99	99	100	99	100	97	100			98		
cM capacity (veh/h)	704	685	1031	736	662	967	1571			1504		
Direction, Lane #	EB 1	WB 1	NB 1	SB 1								
Volume Total	20	36	103	75								
Volume Left	7	8	2	26								
Volume Right	5	27	11	8								
cSH	756	893	1571	1504								
Volume to Capacity	0.03	0.04	0.00	0.02								
Queue Length 95th (m)	0.7	1.0	0.0	0.4								
Control Delay (s)	9.9	9.2	0.2	2.7								
Lane LOS	A	A	A	A								
Approach Delay (s)	9.9	9.2	0.2	2.7								
Approach LOS	A	A										
Intersection Summary												
Average Delay			3.2									
Intersection Capacity Utilization		20.4%			ICU Level of Service				A			
Analysis Period (min)			15									



Lane Group	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations	Y		Y		Y	
Traffic Volume (vph)	0	14	77	0	4	44
Future Volume (vph)	0	14	77	0	4	44
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00
Fr _t	0.865					
Flt Protected						0.996
Satd. Flow (prot)	1644	0	1792	0	0	1858
Flt Permitted						0.996
Satd. Flow (perm)	1644	0	1792	0	0	1858
Link Speed (k/h)	50		50			50
Link Distance (m)	132.9		205.1			154.0
Travel Time (s)	9.6		14.8			11.1
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Heavy Vehicles (%)	0%	0%	6%	0%	0%	2%
Adj. Flow (vph)	0	15	84	0	4	48
Shared Lane Traffic (%)						
Lane Group Flow (vph)	15	0	84	0	0	52
Enter Blocked Intersection	No	No	No	No	No	No
Lane Alignment	Left	Right	Left	Right	Left	Left
Median Width(m)	3.6		0.0			0.0
Link Offset(m)	0.0		0.0			0.0
Crosswalk Width(m)	4.8		4.8			4.8
Two way Left Turn Lane						
Headway Factor	1.00	1.00	1.00	1.00	1.00	1.00
Turning Speed (k/h)	25	15		15	25	
Sign Control	Stop		Free			Free

Intersection Summary

Area Type: Other

Control Type: Unsignalized

Intersection Capacity Utilization 15.6% ICU Level of Service A

Analysis Period (min) 15

HCM Unsignalized Intersection Capacity Analysis
3: Tanbark Road & Pinecroft Drive

2030 PM Background
11-02-2022

Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Traffic Volume (veh/h)	0	14	77	0	4	44
Future Volume (Veh/h)	0	14	77	0	4	44
Sign Control	Stop		Free			Free
Grade	0%		0%			0%
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	0	15	84	0	4	48
Pedestrians						
Lane Width (m)						
Walking Speed (m/s)						
Percent Blockage						
Right turn flare (veh)						
Median type			None			None
Median storage veh						
Upstream signal (m)						
pX, platoon unblocked						
vC, conflicting volume	140	84			84	
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	140	84			84	
tC, single (s)	6.4	6.2			4.1	
tC, 2 stage (s)						
tF (s)	3.5	3.3			2.2	
p0 queue free %	100	98			100	
cM capacity (veh/h)	856	981			1526	
Direction, Lane #	WB 1	NB 1	SB 1			
Volume Total	15	84	52			
Volume Left	0	0	4			
Volume Right	15	0	0			
cSH	981	1700	1526			
Volume to Capacity	0.02	0.05	0.00			
Queue Length 95th (m)	0.4	0.0	0.1			
Control Delay (s)	8.7	0.0	0.6			
Lane LOS	A		A			
Approach Delay (s)	8.7	0.0	0.6			
Approach LOS	A					
Intersection Summary						
Average Delay		1.1				
Intersection Capacity Utilization		15.6%		ICU Level of Service		A
Analysis Period (min)		15				

Lanes, Volumes, Timings
4: Tanbark Road & Hickory Avenue

2030 PM Background

11-02-2022



Lane Group	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Traffic Volume (vph)	7	4	0	67	35	5
Future Volume (vph)	7	4	0	67	35	5
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00
Fr _t	0.955				0.984	
Flt Protected	0.968					
Satd. Flow (prot)	1756	0	0	1792	1870	0
Flt Permitted	0.968					
Satd. Flow (perm)	1756	0	0	1792	1870	0
Link Speed (k/h)	50			50	50	
Link Distance (m)	129.6			65.7	205.1	
Travel Time (s)	9.3			4.7	14.8	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Heavy Vehicles (%)	0%	0%	0%	6%	0%	0%
Adj. Flow (vph)	8	4	0	73	38	5
Shared Lane Traffic (%)						
Lane Group Flow (vph)	12	0	0	73	43	0
Enter Blocked Intersection	No	No	No	No	No	No
Lane Alignment	Left	Right	Left	Left	Left	Right
Median Width(m)	3.6			0.0	0.0	
Link Offset(m)	0.0			0.0	0.0	
Crosswalk Width(m)	4.8			4.8	4.8	
Two way Left Turn Lane						
Headway Factor	1.00	1.00	1.00	1.00	1.00	1.00
Turning Speed (k/h)	25	15	25			15
Sign Control	Stop			Free	Free	

Intersection Summary

Area Type: Other

Control Type: Unsignalized

Intersection Capacity Utilization 13.5% ICU Level of Service A

Analysis Period (min) 15

HCM Unsignalized Intersection Capacity Analysis
4: Tanbark Road & Hickory Avenue

2030 PM Background
11-02-2022

Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Traffic Volume (veh/h)	7	4	0	67	35	5
Future Volume (Veh/h)	7	4	0	67	35	5
Sign Control	Stop			Free	Free	
Grade	0%			0%	0%	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	8	4	0	73	38	5
Pedestrians						
Lane Width (m)						
Walking Speed (m/s)						
Percent Blockage						
Right turn flare (veh)						
Median type				None	None	
Median storage veh						
Upstream signal (m)						
pX, platoon unblocked						
vC, conflicting volume	114	40	43			
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	114	40	43			
tC, single (s)	6.4	6.2	4.1			
tC, 2 stage (s)						
tF (s)	3.5	3.3	2.2			
p0 queue free %	99	100	100			
cM capacity (veh/h)	888	1036	1579			
Direction, Lane #	EB 1	NB 1	SB 1			
Volume Total	12	73	43			
Volume Left	8	0	0			
Volume Right	4	0	5			
cSH	932	1579	1700			
Volume to Capacity	0.01	0.00	0.03			
Queue Length 95th (m)	0.3	0.0	0.0			
Control Delay (s)	8.9	0.0	0.0			
Lane LOS	A					
Approach Delay (s)	8.9	0.0	0.0			
Approach LOS	A					
Intersection Summary						
Average Delay		0.8				
Intersection Capacity Utilization		13.5%		ICU Level of Service		A
Analysis Period (min)		15				

Lanes, Volumes, Timings
5: Warner Road & Angels Drive

2030 PM Background

11-02-2022



Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	0	8	0	0	4	5	0	0	0	6	0	4
Future Volume (vph)	0	8	0	0	4	5	0	0	0	6	0	4
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Ped Bike Factor												
Frt						0.925						0.951
Flt Protected												0.969
Satd. Flow (prot)	0	1900	0	0	1683	0	0	1863	0	0	1447	0
Flt Permitted												0.969
Satd. Flow (perm)	0	1900	0	0	1683	0	0	1863	0	0	1447	0
Link Speed (k/h)		50			50			50			50	
Link Distance (m)		191.9			207.8			103.2			131.4	
Travel Time (s)		13.8			15.0			7.4			9.5	
Confl. Peds. (#/hr)	1				1							
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Heavy Vehicles (%)	0%	0%	2%	2%	10%	0%	2%	2%	2%	33%	2%	0%
Adj. Flow (vph)	0	9	0	0	4	5	0	0	0	7	0	4
Shared Lane Traffic (%)												
Lane Group Flow (vph)	0	9	0	0	9	0	0	0	0	0	11	0
Enter Blocked Intersection	No	No	No	No	No	No	No	No	No	No	No	No
Lane Alignment	Left	Left	Right	Left	Left	Right	Left	Left	Right	Left	Left	Right
Median Width(m)		0.0			0.0			0.0			0.0	
Link Offset(m)		0.0			0.0			0.0			0.0	
Crosswalk Width(m)		4.8			4.8			4.8			4.8	
Two way Left Turn Lane												
Headway Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Turning Speed (k/h)	25		100	100		15	100		100	25		15
Sign Control		Free			Free			Stop			Stop	
Intersection Summary												
Area Type:	Other											
Control Type:	Unsignalized											
Intersection Capacity Utilization	13.7%							ICU Level of Service A				
Analysis Period (min)	15											

HCM Unsignalized Intersection Capacity Analysis
5: Warner Road & Angels Drive

2030 PM Background
11-02-2022

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	0	8	0	0	4	5	0	0	0	6	0	4
Future Volume (Veh/h)	0	8	0	0	4	5	0	0	0	6	0	4
Sign Control	Free			Free			Stop			Stop		
Grade	0%			0%			0%			0%		
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	0	9	0	0	4	5	0	0	0	7	0	4
Pedestrians												1
Lane Width (m)												3.6
Walking Speed (m/s)												1.2
Percent Blockage												0
Right turn flare (veh)												
Median type	None			None								
Median storage veh												
Upstream signal (m)												
pX, platoon unblocked												
vC, conflicting volume	10			9			20	19	9	16	16	8
vC1, stage 1 conf vol												
vC2, stage 2 conf vol												
vCu, unblocked vol	10			9			20	19	9	16	16	8
tC, single (s)	4.1			4.1			7.1	6.5	6.2	7.4	6.5	6.2
tC, 2 stage (s)												
tF (s)	2.2			2.2			3.5	4.0	3.3	3.8	4.0	3.3
p0 queue free %	100			100			100	100	100	99	100	100
cM capacity (veh/h)	1621			1611			990	874	1073	923	877	1080
Direction, Lane #	EB 1	WB 1	NB 1	SB 1								
Volume Total	9	9	0	11								
Volume Left	0	0	0	7								
Volume Right	0	5	0	4								
cSH	1621	1611	1700	974								
Volume to Capacity	0.00	0.00	0.00	0.01								
Queue Length 95th (m)	0.0	0.0	0.0	0.3								
Control Delay (s)	0.0	0.0	0.0	8.7								
Lane LOS			A	A								
Approach Delay (s)	0.0	0.0	0.0	8.7								
Approach LOS			A	A								
Intersection Summary												
Average Delay			3.3									
Intersection Capacity Utilization		13.7%			ICU Level of Service				A			
Analysis Period (min)			15									

Lanes, Volumes, Timings
1: Tanbark Road & York Road

2030 Sat. Background

11-02-2022



Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	19	381	30	20	297	16	48	7	23	14	6	21
Future Volume (vph)	19	381	30	20	297	16	48	7	23	14	6	21
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Ped Bike Factor												
Frt		0.990				0.994			0.960			0.931
Flt Protected		0.998				0.997			0.970			0.984
Satd. Flow (prot)	0	1839	0	0	1866	0	0	1769	0	0	1741	0
Flt Permitted		0.998				0.997			0.970			0.984
Satd. Flow (perm)	0	1839	0	0	1866	0	0	1769	0	0	1741	0
Link Speed (k/h)		50			50			50			50	
Link Distance (m)		351.4			515.6			156.3			44.1	
Travel Time (s)		25.3			37.1			11.3			3.2	
Confl. Peds. (#/hr)		6	6				1		2	2		1
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Heavy Vehicles (%)	7%	2%	0%	0%	1%	0%	0%	0%	0%	0%	0%	0%
Adj. Flow (vph)	21	414	33	22	323	17	52	8	25	15	7	23
Shared Lane Traffic (%)												
Lane Group Flow (vph)	0	468	0	0	362	0	0	85	0	0	45	0
Enter Blocked Intersection	No	No	No	No	No	No	No	No	No	No	No	No
Lane Alignment	Left	Left	Right	Left	Left	Right	Left	Left	Right	Left	Left	Right
Median Width(m)		0.0			0.0			0.0			0.0	
Link Offset(m)		0.0			0.0			0.0			0.0	
Crosswalk Width(m)		4.8			4.8			4.8			4.8	
Two way Left Turn Lane												
Headway Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Turning Speed (k/h)	25		15	25		15	25		15	25		15
Sign Control		Free			Free			Stop			Stop	
Intersection Summary												
Area Type:	Other											
Control Type:	Unsignalized											
Intersection Capacity Utilization	42.5%				ICU Level of Service A							
Analysis Period (min)	15											

HCM Unsignalized Intersection Capacity Analysis
1: Tanbark Road & York Road

2030 Sat. Background
11-02-2022

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	19	381	30	20	297	16	48	7	23	14	6	21
Future Volume (Veh/h)	19	381	30	20	297	16	48	7	23	14	6	21
Sign Control	Free				Free			Stop			Stop	
Grade	0%				0%			0%			0%	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	21	414	33	22	323	17	52	8	25	15	7	23
Pedestrians	1				2			6				
Lane Width (m)	3.6				3.6			3.6				
Walking Speed (m/s)	1.2				1.2			1.2				
Percent Blockage	0				0			1				
Right turn flare (veh)												
Median type	None				None							
Median storage veh												
Upstream signal (m)												
pX, platoon unblocked												
vC, conflicting volume	340			453			882	862	438	879	870	332
vC1, stage 1 conf vol												
vC2, stage 2 conf vol												
vCu, unblocked vol	340			453			882	862	438	879	870	332
tC, single (s)	4.2			4.1			7.1	6.5	6.2	7.1	6.5	6.2
tC, 2 stage (s)												
tF (s)	2.3			2.2			3.5	4.0	3.3	3.5	4.0	3.3
p0 queue free %	98			98			79	97	96	94	97	97
cM capacity (veh/h)	1192			1113			246	282	618	245	279	713
Direction, Lane #	EB 1	WB 1	NB 1	SB 1								
Volume Total	468	362	85	45								
Volume Left	21	22	52	15								
Volume Right	33	17	25	23								
cSH	1192	1113	303	380								
Volume to Capacity	0.02	0.02	0.28	0.12								
Queue Length 95th (m)	0.4	0.5	9.0	3.2								
Control Delay (s)	0.5	0.7	21.4	15.7								
Lane LOS	A	A	C	C								
Approach Delay (s)	0.5	0.7	21.4	15.7								
Approach LOS			C	C								
Intersection Summary												
Average Delay			3.2									
Intersection Capacity Utilization		42.5%			ICU Level of Service					A		
Analysis Period (min)			15									

Lanes, Volumes, Timings
2: Tanbark Road & Warner Road

2030 Sat. Background

11-02-2022



Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	4	6	0	7	9	22	1	56	7	19	46	2
Future Volume (vph)	4	6	0	7	9	22	1	56	7	19	46	2
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Ped Bike Factor												
Frt						0.923			0.985			0.996
Flt Protected						0.991			0.999			0.986
Satd. Flow (prot)	0	1866	0	0	1738	0	0	1870	0	0	1828	0
Flt Permitted		0.982			0.991			0.999			0.986	
Satd. Flow (perm)	0	1866	0	0	1738	0	0	1870	0	0	1828	0
Link Speed (k/h)		50			50			50			50	
Link Distance (m)		207.8			107.8			154.0			156.3	
Travel Time (s)		15.0			7.8			11.1			11.3	
Confl. Peds. (#/hr)									2	2		
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Heavy Vehicles (%)	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	3%	0%
Adj. Flow (vph)	4	7	0	8	10	24	1	61	8	21	50	2
Shared Lane Traffic (%)												
Lane Group Flow (vph)	0	11	0	0	42	0	0	70	0	0	73	0
Enter Blocked Intersection	No	No	No	No	No	No	No	No	No	No	No	No
Lane Alignment	Left	Left	Right	Left	Left	Right	Left	Left	Right	Left	Left	Right
Median Width(m)		0.0			0.0			0.0			0.0	
Link Offset(m)		0.0			0.0			0.0			0.0	
Crosswalk Width(m)		4.8			4.8			4.8			4.8	
Two way Left Turn Lane												
Headway Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Turning Speed (k/h)	25		15	25		15	25		15	25		15
Sign Control		Stop			Stop			Free			Free	
Intersection Summary												
Area Type:	Other											
Control Type:	Unsignalized											
Intersection Capacity Utilization	20.3%							ICU Level of Service A				
Analysis Period (min)	15											

HCM Unsignalized Intersection Capacity Analysis
2: Tanbark Road & Warner Road

2030 Sat. Background
11-02-2022

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	4	6	0	7	9	22	1	56	7	19	46	2
Future Volume (Veh/h)	4	6	0	7	9	22	1	56	7	19	46	2
Sign Control	Stop				Stop			Free			Free	
Grade	0%				0%			0%			0%	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	4	7	0	8	10	24	1	61	8	21	50	2
Pedestrians					2							
Lane Width (m)					3.6							
Walking Speed (m/s)					1.2							
Percent Blockage					0							
Right turn flare (veh)												
Median type								None			None	
Median storage veh												
Upstream signal (m)												
pX, platoon unblocked												
vC, conflicting volume	189	166	51	166	163	67	52			71		
vC1, stage 1 conf vol												
vC2, stage 2 conf vol												
vCu, unblocked vol	189	166	51	166	163	67	52			71		
tC, single (s)	7.1	6.5	6.2	7.1	6.5	6.2	4.1			4.1		
tC, 2 stage (s)												
tF (s)	3.5	4.0	3.3	3.5	4.0	3.3	2.2			2.2		
p0 queue free %	99	99	100	99	99	98	100			99		
cM capacity (veh/h)	740	719	1023	786	721	1001	1567			1540		
Direction, Lane #	EB 1	WB 1	NB 1	SB 1								
Volume Total	11	42	70	73								
Volume Left	4	8	1	21								
Volume Right	0	24	8	2								
cSH	726	875	1567	1540								
Volume to Capacity	0.02	0.05	0.00	0.01								
Queue Length 95th (m)	0.4	1.2	0.0	0.3								
Control Delay (s)	10.0	9.3	0.1	2.2								
Lane LOS	B	A	A	A								
Approach Delay (s)	10.0	9.3	0.1	2.2								
Approach LOS	B	A										
Intersection Summary												
Average Delay		3.4										
Intersection Capacity Utilization		20.3%			ICU Level of Service					A		
Analysis Period (min)			15									



Lane Group	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations	Y		Y			Y
Traffic Volume (vph)	1	7	44	2	14	54
Future Volume (vph)	1	7	44	2	14	54
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00
Ped Bike Factor						
Frt	0.880		0.995			
Flt Protected	0.994				0.990	
Satd. Flow (prot)	1662	0	1890	0	0	1881
Flt Permitted	0.994				0.990	
Satd. Flow (perm)	1662	0	1890	0	0	1881
Link Speed (k/h)	50		50		50	
Link Distance (m)	132.9		205.1		154.0	
Travel Time (s)	9.6		14.8		11.1	
Confl. Peds. (#/hr)				5	5	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Heavy Vehicles (%)	0%	0%	0%	0%	0%	0%
Adj. Flow (vph)	1	8	48	2	15	59
Shared Lane Traffic (%)						
Lane Group Flow (vph)	9	0	50	0	0	74
Enter Blocked Intersection	No	No	No	No	No	No
Lane Alignment	Left	Right	Left	Right	Left	Left
Median Width(m)	3.6		0.0		0.0	
Link Offset(m)	0.0		0.0		0.0	
Crosswalk Width(m)	4.8		4.8		4.8	
Two way Left Turn Lane						
Headway Factor	1.00	1.00	1.00	1.00	1.00	1.00
Turning Speed (k/h)	25	15		15	25	
Sign Control	Stop		Free		Free	
Intersection Summary						
Area Type:	Other					
Control Type:	Unsignalized					
Intersection Capacity Utilization	20.3%			ICU Level of Service A		
Analysis Period (min)	15					

HCM Unsignalized Intersection Capacity Analysis
3: Tanbark Road & Pinecroft Drive

2030 Sat. Background
11-02-2022

Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Traffic Volume (veh/h)	1	7	44	2	14	54
Future Volume (Veh/h)	1	7	44	2	14	54
Sign Control	Stop		Free			Free
Grade	0%		0%			0%
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	1	8	48	2	15	59
Pedestrians	5					
Lane Width (m)	3.6					
Walking Speed (m/s)	1.2					
Percent Blockage	0					
Right turn flare (veh)						
Median type		None			None	
Median storage veh						
Upstream signal (m)						
pX, platoon unblocked						
vC, conflicting volume	143	54			55	
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	143	54			55	
tC, single (s)	6.4	6.2			4.1	
tC, 2 stage (s)						
tF (s)	3.5	3.3			2.2	
p0 queue free %	100	99			99	
cM capacity (veh/h)	843	1015			1556	
Direction, Lane #	WB 1	NB 1	SB 1			
Volume Total	9	50	74			
Volume Left	1	0	15			
Volume Right	8	2	0			
cSH	992	1700	1556			
Volume to Capacity	0.01	0.03	0.01			
Queue Length 95th (m)	0.2	0.0	0.2			
Control Delay (s)	8.7	0.0	1.5			
Lane LOS	A		A			
Approach Delay (s)	8.7	0.0	1.5			
Approach LOS	A					
Intersection Summary						
Average Delay		1.4				
Intersection Capacity Utilization		20.3%		ICU Level of Service		A
Analysis Period (min)		15				

Lanes, Volumes, Timings
4: Tanbark Road & Hickory Avenue

2030 Sat. Background

11-02-2022



Lane Group	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Traffic Volume (vph)	7	7	5	47	31	1
Future Volume (vph)	7	7	5	47	31	1
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00
Ped Bike Factor						
Frt	0.932				0.996	
Flt Protected	0.976			0.996		
Satd. Flow (prot)	1728	0	0	1892	1892	0
Flt Permitted	0.976			0.996		
Satd. Flow (perm)	1728	0	0	1892	1892	0
Link Speed (k/h)	50			50	50	
Link Distance (m)	129.6			65.7	205.1	
Travel Time (s)	9.3			4.7	14.8	
Confl. Peds. (#/hr)	2					
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Heavy Vehicles (%)	0%	0%	0%	0%	0%	0%
Adj. Flow (vph)	8	8	5	51	34	1
Shared Lane Traffic (%)						
Lane Group Flow (vph)	16	0	0	56	35	0
Enter Blocked Intersection	No	No	No	No	No	No
Lane Alignment	Left	Right	Left	Left	Left	Right
Median Width(m)	3.6			0.0	0.0	
Link Offset(m)	0.0			0.0	0.0	
Crosswalk Width(m)	4.8			4.8	4.8	
Two way Left Turn Lane						
Headway Factor	1.00	1.00	1.00	1.00	1.00	1.00
Turning Speed (k/h)	25	15	25			15
Sign Control	Stop			Free	Free	
Intersection Summary						
Area Type:	Other					
Control Type:	Unsignalized					
Intersection Capacity Utilization	16.6%			ICU Level of Service A		
Analysis Period (min)	15					

HCM Unsignalized Intersection Capacity Analysis
4: Tanbark Road & Hickory Avenue

2030 Sat. Background

11-02-2022



Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Traffic Volume (veh/h)	7	7	5	47	31	1
Future Volume (Veh/h)	7	7	5	47	31	1
Sign Control	Stop			Free	Free	
Grade	0%			0%	0%	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	8	8	5	51	34	1
Pedestrians					2	
Lane Width (m)					3.6	
Walking Speed (m/s)					1.2	
Percent Blockage					0	
Right turn flare (veh)						
Median type				None	None	
Median storage veh						
Upstream signal (m)						
pX, platoon unblocked						
vC, conflicting volume	98	34	35			
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	98	34	35			
tC, single (s)	6.4	6.2	4.1			
tC, 2 stage (s)						
tF (s)	3.5	3.3	2.2			
p0 queue free %	99	99	100			
cM capacity (veh/h)	902	1044	1589			
Direction, Lane #	EB 1	NB 1	SB 1			
Volume Total	16	56	35			
Volume Left	8	5	0			
Volume Right	8	0	1			
cSH	968	1589	1700			
Volume to Capacity	0.02	0.00	0.02			
Queue Length 95th (m)	0.4	0.1	0.0			
Control Delay (s)	8.8	0.7	0.0			
Lane LOS	A	A				
Approach Delay (s)	8.8	0.7	0.0			
Approach LOS	A					
Intersection Summary						
Average Delay		1.7				
Intersection Capacity Utilization		16.6%		ICU Level of Service		A
Analysis Period (min)		15				

Lanes, Volumes, Timings
5: Warner Road & Angels Drive

2030 Sat. Background

11-02-2022



Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	5	6	0	0	12	2	0	0	0	2	0	4
Future Volume (vph)	5	6	0	0	12	2	0	0	0	2	0	4
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Fr _t						0.982					0.910	
Flt Protected					0.980							0.984
Satd. Flow (prot)	0	1825	0	0	1829	0	0	1863	0	0	1668	0
Flt Permitted					0.980							0.984
Satd. Flow (perm)	0	1825	0	0	1829	0	0	1863	0	0	1668	0
Link Speed (k/h)					50	50			50			50
Link Distance (m)					191.9	207.8			92.6			131.4
Travel Time (s)					13.8	15.0			6.7			9.5
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	5	7	0	0	13	2	0	0	0	2	0	4
Shared Lane Traffic (%)												
Lane Group Flow (vph)	0	12	0	0	15	0	0	0	0	0	6	0
Enter Blocked Intersection	No	No	No	No	No	No	No	No	No	No	No	No
Lane Alignment	Left	Left	Right	Left	Left	Right	Left	Left	Right	Left	Left	Right
Median Width(m)					0.0	0.0			0.0			0.0
Link Offset(m)					0.0	0.0			0.0			0.0
Crosswalk Width(m)					4.8	4.8			4.8			4.8
Two way Left Turn Lane												
Headway Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Turning Speed (k/h)	25		100	100		15	100		100	25		15
Sign Control			Free			Free			Stop		Stop	

Intersection Summary

Area Type: Other

Control Type: Unsignalized

Intersection Capacity Utilization 14.8%

ICU Level of Service A

Analysis Period (min) 15

HCM Unsignalized Intersection Capacity Analysis
5: Warner Road & Angels Drive

2030 Sat. Background
11-02-2022

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	5	6	0	0	12	2	0	0	0	2	0	4
Future Volume (Veh/h)	5	6	0	0	12	2	0	0	0	2	0	4
Sign Control	Free				Free			Stop			Stop	
Grade		0%				0%			0%		0%	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	5	7	0	0	13	2	0	0	0	2	0	4
Pedestrians												
Lane Width (m)												
Walking Speed (m/s)												
Percent Blockage												
Right turn flare (veh)												
Median type		None				None						
Median storage veh												
Upstream signal (m)												
pX, platoon unblocked												
vC, conflicting volume	15				7			35	32	7	31	31
vC1, stage 1 conf vol												
vC2, stage 2 conf vol												
vCu, unblocked vol	15				7			35	32	7	31	31
tC, single (s)	4.1				4.1			7.1	6.5	6.2	7.1	6.5
tC, 2 stage (s)												
tF (s)	2.2				2.2			3.5	4.0	3.3	3.5	4.0
p0 queue free %	100				100			100	100	100	100	100
cM capacity (veh/h)	1603				1614			965	858	1075	975	859
Direction, Lane #	EB 1	WB 1	NB 1	SB 1								
Volume Total	12	15	0	6								
Volume Left	5	0	0	2								
Volume Right	0	2	0	4								
cSH	1603	1614	1700	1034								
Volume to Capacity	0.00	0.00	0.00	0.01								
Queue Length 95th (m)	0.1	0.0	0.0	0.1								
Control Delay (s)	3.0	0.0	0.0	8.5								
Lane LOS	A		A	A								
Approach Delay (s)	3.0	0.0	0.0	8.5								
Approach LOS			A	A								
Intersection Summary												
Average Delay			2.6									
Intersection Capacity Utilization		14.8%			ICU Level of Service				A			
Analysis Period (min)			15									

Lanes, Volumes, Timings
1: Tanbark Road & York Road

2030 AM Total

11-02-2022



Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	9	264		47	33	247	10	74	4	68	14	4
Future Volume (vph)	9	264		47	33	247	10	74	4	68	14	4
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Ped Bike Factor												
Frt		0.980				0.995			0.937		0.929	
Flt Protected		0.999				0.994			0.975		0.982	
Satd. Flow (prot)	0	1717	0	0	1746		0	0	1720	0	0	1672
Flt Permitted		0.999				0.994			0.975		0.982	
Satd. Flow (perm)	0	1717	0	0	1746		0	0	1720	0	0	1672
Link Speed (k/h)		50			50			50		50		
Link Distance (m)		351.4			515.6			156.3			44.1	
Travel Time (s)		25.3			37.1			11.3			3.2	
Confl. Peds. (#/hr)	17		2	2		17	1		8	8		1
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Heavy Vehicles (%)	14%	8%	9%	0%	9%	0%	0%	0%	2%	0%	0%	7%
Adj. Flow (vph)	10	287	51	36	268	11	80	4	74	15	4	21
Shared Lane Traffic (%)												
Lane Group Flow (vph)	0	348	0	0	315	0	0	158	0	0	40	0
Enter Blocked Intersection	No	No	No	No	No	No	No	No	No	No	No	No
Lane Alignment	Left	Left	Right	Left	Left	Right	Left	Left	Right	Left	Left	Right
Median Width(m)		0.0			0.0			0.0			0.0	
Link Offset(m)		0.0			0.0			0.0			0.0	
Crosswalk Width(m)		4.8			4.8			4.8			4.8	
Two way Left Turn Lane												
Headway Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Turning Speed (k/h)	25		15	25		15	25		15	25		15
Sign Control		Free			Free			Stop			Stop	
Intersection Summary												
Area Type:	Other											
Control Type:	Unsignalized											
Intersection Capacity Utilization	49.2%				ICU Level of Service A							
Analysis Period (min)	15											

HCM Unsignalized Intersection Capacity Analysis
1: Tanbark Road & York Road

2030 AM Total
11-02-2022

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	9	264	47	33	247	10	74	4	68	14	4	19
Future Volume (Veh/h)	9	264	47	33	247	10	74	4	68	14	4	19
Sign Control	Free				Free			Stop			Stop	
Grade	0%				0%			0%			0%	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	10	287	51	36	268	11	80	4	74	15	4	21
Pedestrians	1				8			2			17	
Lane Width (m)	3.6				3.6			3.6			3.6	
Walking Speed (m/s)	1.2				1.2			1.2			1.2	
Percent Blockage	0				1			0			1	
Right turn flare (veh)												
Median type	None				None							
Median storage veh												
Upstream signal (m)												
pX, platoon unblocked												
vC, conflicting volume	296			340			704	702	322	779	722	292
vC1, stage 1 conf vol												
vC2, stage 2 conf vol												
vCu, unblocked vol	296			340			704	702	322	779	722	292
tC, single (s)	4.2			4.1			7.1	6.5	6.2	7.1	6.5	6.3
tC, 2 stage (s)												
tF (s)	2.3			2.2			3.5	4.0	3.3	3.5	4.0	3.4
p0 queue free %	99			97			75	99	90	94	99	97
cM capacity (veh/h)	1183			1228			326	345	712	263	336	725
Direction, Lane #	EB 1	WB 1	NB 1	SB 1								
Volume Total	348	315	158	40								
Volume Left	10	36	80	15								
Volume Right	51	11	74	21								
cSH	1183	1228	438	409								
Volume to Capacity	0.01	0.03	0.36	0.10								
Queue Length 95th (m)	0.2	0.7	12.9	2.6								
Control Delay (s)	0.3	1.2	17.8	14.8								
Lane LOS	A	A	C	B								
Approach Delay (s)	0.3	1.2	17.8	14.8								
Approach LOS			C	B								
Intersection Summary												
Average Delay			4.5									
Intersection Capacity Utilization		49.2%			ICU Level of Service					A		
Analysis Period (min)			15									

Lanes, Volumes, Timings
2: Tanbark Road & Warner Road

2030 AM Total

11-02-2022



Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	23	8	5	8	2	25	2	88	10	24	40	15
Future Volume (vph)	23	8	5	8	2	25	2	88	10	24	40	15
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Ped Bike Factor												
Frt		0.983				0.904			0.986			0.975
Flt Protected		0.969				0.988			0.999			0.985
Satd. Flow (prot)	0	1754	0	0	1527	0	0	1795	0	0	1737	0
Flt Permitted		0.969				0.988			0.999			0.985
Satd. Flow (perm)	0	1754	0	0	1527	0	0	1795	0	0	1737	0
Link Speed (k/h)		50			50			50			50	
Link Distance (m)		207.8			107.8			154.0			156.3	
Travel Time (s)		15.0			7.8			11.1			11.3	
Confl. Peds. (#/hr)	8					8			17	17		
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Heavy Vehicles (%)	0%	0%	25%	17%	0%	10%	0%	2%	25%	5%	7%	0%
Adj. Flow (vph)	25	9	5	9	2	27	2	96	11	26	43	16
Shared Lane Traffic (%)												
Lane Group Flow (vph)	0	39	0	0	38	0	0	109	0	0	85	0
Enter Blocked Intersection	No	No	No	No	No	No	No	No	No	No	No	No
Lane Alignment	Left	Left	Right	Left	Left	Right	Left	Left	Right	Left	Left	Right
Median Width(m)		0.0			0.0			0.0			0.0	
Link Offset(m)		0.0			0.0			0.0			0.0	
Crosswalk Width(m)		4.8			4.8			4.8			4.8	
Two way Left Turn Lane												
Headway Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Turning Speed (k/h)	25		15	25		15	25		15	25		15
Sign Control		Stop			Stop			Free			Free	
Intersection Summary												
Area Type:	Other											
Control Type:	Unsignalized											
Intersection Capacity Utilization	23.4%							ICU Level of Service A				
Analysis Period (min)	15											

HCM Unsignalized Intersection Capacity Analysis
2: Tanbark Road & Warner Road

2030 AM Total
11-02-2022

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	23	8	5	8	2	25	2	88	10	24	40	15
Future Volume (Veh/h)	23	8	5	8	2	25	2	88	10	24	40	15
Sign Control	Stop				Stop			Free			Free	
Grade	0%				0%			0%			0%	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	25	9	5	9	2	27	2	96	11	26	43	16
Pedestrians					17						8	
Lane Width (m)					3.6						3.6	
Walking Speed (m/s)					1.2						1.2	
Percent Blockage					1						1	
Right turn flare (veh)												
Median type								None			None	
Median storage veh												
Upstream signal (m)												
pX, platoon unblocked												
vC, conflicting volume	244	231	51	235	234	126	59			124		
vC1, stage 1 conf vol												
vC2, stage 2 conf vol												
vCu, unblocked vol	244	231	51	235	234	126	59			124		
tC, single (s)	7.1	6.5	6.5	7.3	6.5	6.3	4.1			4.1		
tC, 2 stage (s)												
tF (s)	3.5	4.0	3.5	3.7	4.0	3.4	2.2			2.2		
p0 queue free %	96	99	99	99	100	97	100			98		
cM capacity (veh/h)	668	650	956	652	648	884	1558			1424		
Direction, Lane #	EB 1	WB 1	NB 1	SB 1								
Volume Total	39	38	109	85								
Volume Left	25	9	2	26								
Volume Right	5	27	11	16								
cSH	690	801	1558	1424								
Volume to Capacity	0.06	0.05	0.00	0.02								
Queue Length 95th (m)	1.4	1.2	0.0	0.4								
Control Delay (s)	10.5	9.7	0.1	2.4								
Lane LOS	B	A	A	A								
Approach Delay (s)	10.5	9.7	0.1	2.4								
Approach LOS	B	A										
Intersection Summary												
Average Delay			3.7									
Intersection Capacity Utilization		23.4%			ICU Level of Service					A		
Analysis Period (min)			15									

Lanes, Volumes, Timings
3: Tanbark Road & Pinecroft Drive

2030 AM Total
11-02-2022



Lane Group	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations	Y		Y			Y
Traffic Volume (vph)	0	14	82	0	4	47
Future Volume (vph)	0	14	82	0	4	47
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00
Ped Bike Factor						
Frt	0.865					
Flt Protected						0.996
Satd. Flow (prot)	1644	0	1810	0	0	1747
Flt Permitted						0.996
Satd. Flow (perm)	1644	0	1810	0	0	1747
Link Speed (k/h)	50		50			50
Link Distance (m)	132.9		205.1			154.0
Travel Time (s)	9.6		14.8			11.1
Confl. Peds. (#/hr)				7	7	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Heavy Vehicles (%)	0%	0%	5%	0%	0%	9%
Adj. Flow (vph)	0	15	89	0	4	51
Shared Lane Traffic (%)						
Lane Group Flow (vph)	15	0	89	0	0	55
Enter Blocked Intersection	No	No	No	No	No	No
Lane Alignment	Left	Right	Left	Right	Left	Left
Median Width(m)	3.6		0.0			0.0
Link Offset(m)	0.0		0.0			0.0
Crosswalk Width(m)	4.8		4.8			4.8
Two way Left Turn Lane						
Headway Factor	1.00	1.00	1.00	1.00	1.00	1.00
Turning Speed (k/h)	25	15		15	25	
Sign Control	Stop		Free			Free
Intersection Summary						
Area Type:	Other					
Control Type:	Unsignalized					
Intersection Capacity Utilization	16.2%				ICU Level of Service A	
Analysis Period (min)	15					

HCM Unsignalized Intersection Capacity Analysis
3: Tanbark Road & Pinecroft Drive

2030 AM Total
11-02-2022



Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Traffic Volume (veh/h)	0	14	82	0	4	47
Future Volume (Veh/h)	0	14	82	0	4	47
Sign Control	Stop		Free			Free
Grade	0%		0%			0%
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	0	15	89	0	4	51
Pedestrians	7					
Lane Width (m)	3.6					
Walking Speed (m/s)	1.2					
Percent Blockage	1					
Right turn flare (veh)						
Median type		None			None	
Median storage veh						
Upstream signal (m)						
pX, platoon unblocked						
vC, conflicting volume	155	96			96	
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	155	96			96	
tC, single (s)	6.4	6.2			4.1	
tC, 2 stage (s)						
tF (s)	3.5	3.3			2.2	
p0 queue free %	100	98			100	
cM capacity (veh/h)	834	960			1502	
Direction, Lane #	WB 1	NB 1	SB 1			
Volume Total	15	89	55			
Volume Left	0	0	4			
Volume Right	15	0	0			
cSH	960	1700	1502			
Volume to Capacity	0.02	0.05	0.00			
Queue Length 95th (m)	0.4	0.0	0.1			
Control Delay (s)	8.8	0.0	0.6			
Lane LOS	A		A			
Approach Delay (s)	8.8	0.0	0.6			
Approach LOS	A					
Intersection Summary						
Average Delay		1.0				
Intersection Capacity Utilization		16.2%		ICU Level of Service		A
Analysis Period (min)		15				

Lanes, Volumes, Timings
4: Tanbark Road & Hickory Avenue

2030 AM Total

11-02-2022



Lane Group	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Traffic Volume (vph)	12	4	0	67	35	7
Future Volume (vph)	12	4	0	67	35	7
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00
Fr _t	0.968			0.977		
Flt Protected	0.963					
Satd. Flow (prot)	1771	0	0	1827	1702	0
Flt Permitted	0.963					
Satd. Flow (perm)	1771	0	0	1827	1702	0
Link Speed (k/h)	50			50	50	
Link Distance (m)	129.6			65.7	205.1	
Travel Time (s)	9.3			4.7	14.8	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Heavy Vehicles (%)	0%	0%	0%	4%	11%	0%
Adj. Flow (vph)	13	4	0	73	38	8
Shared Lane Traffic (%)						
Lane Group Flow (vph)	17	0	0	73	46	0
Enter Blocked Intersection	No	No	No	No	No	No
Lane Alignment	Left	Right	Left	Left	Left	Right
Median Width(m)	3.6			0.0	0.0	
Link Offset(m)	0.0			0.0	0.0	
Crosswalk Width(m)	4.8			4.8	4.8	
Two way Left Turn Lane						
Headway Factor	1.00	1.00	1.00	1.00	1.00	1.00
Turning Speed (k/h)	25	15	25			15
Sign Control	Stop			Free	Free	

Intersection Summary

Area Type: Other

Control Type: Unsignalized

Intersection Capacity Utilization 13.5% ICU Level of Service A

Analysis Period (min) 15

HCM Unsignalized Intersection Capacity Analysis

2030 AM Total

4: Tanbark Road & Hickory Avenue

11-02-2022



Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Traffic Volume (veh/h)	12	4	0	67	35	7
Future Volume (Veh/h)	12	4	0	67	35	7
Sign Control	Stop			Free	Free	
Grade	0%			0%	0%	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	13	4	0	73	38	8
Pedestrians						
Lane Width (m)						
Walking Speed (m/s)						
Percent Blockage						
Right turn flare (veh)						
Median type				None	None	
Median storage veh						
Upstream signal (m)						
pX, platoon unblocked						
vC, conflicting volume	115	42	46			
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	115	42	46			
tC, single (s)	6.4	6.2	4.1			
tC, 2 stage (s)						
tF (s)	3.5	3.3	2.2			
p0 queue free %	99	100	100			
cM capacity (veh/h)	886	1034	1575			
Direction, Lane #	EB 1	NB 1	SB 1			
Volume Total	17	73	46			
Volume Left	13	0	0			
Volume Right	4	0	8			
cSH	917	1575	1700			
Volume to Capacity	0.02	0.00	0.03			
Queue Length 95th (m)	0.5	0.0	0.0			
Control Delay (s)	9.0	0.0	0.0			
Lane LOS	A					
Approach Delay (s)	9.0	0.0	0.0			
Approach LOS	A					
Intersection Summary						
Average Delay		1.1				
Intersection Capacity Utilization		13.5%		ICU Level of Service		A
Analysis Period (min)		15				

Lanes, Volumes, Timings
5: Warner Road & Angels Drive

2030 AM Total

11-02-2022

	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	0	8	0	8	4	5	1	3	18	6	1	4
Future Volume (vph)	0	8	0	8	4	5	1	3	18	6	1	4
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Fr _t					0.962			0.887			0.955	
Flt Protected					0.976			0.998			0.972	
Satd. Flow (prot)	0	1329	0	0	1553	0	0	1649	0	0	1436	0
Flt Permitted					0.976			0.998			0.972	
Satd. Flow (perm)	0	1329	0	0	1553	0	0	1649	0	0	1436	0
Link Speed (k/h)		50			50			50			50	
Link Distance (m)		191.9			207.8			98.3			131.4	
Travel Time (s)		13.8			15.0			7.1			9.5	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Heavy Vehicles (%)	0%	43%	2%	2%	0%	50%	2%	2%	2%	20%	2%	33%
Adj. Flow (vph)	0	9	0	9	4	5	1	3	20	7	1	4
Shared Lane Traffic (%)												
Lane Group Flow (vph)	0	9	0	0	18	0	0	24	0	0	12	0
Enter Blocked Intersection	No	No	No									
Lane Alignment	Left	Left	Right									
Median Width(m)		0.0			0.0			0.0			0.0	
Link Offset(m)		0.0			0.0			0.0			0.0	
Crosswalk Width(m)		4.8			4.8			4.8			4.8	
Two way Left Turn Lane												
Headway Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Turning Speed (k/h)	25		15	25		15	25		15	25		15
Sign Control		Free			Free			Stop			Stop	

Intersection Summary

Area Type: Other

Control Type: Unsignalized

Intersection Capacity Utilization 17.6% ICU Level of Service A

Analysis Period (min) 15

HCM Unsignalized Intersection Capacity Analysis
5: Warner Road & Angels Drive

2030 AM Total
11-02-2022

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	0	8	0	8	4	5	1	3	18	6	1	4
Future Volume (Veh/h)	0	8	0	8	4	5	1	3	18	6	1	4
Sign Control	Free			Free			Stop			Stop		
Grade	0%			0%			0%			0%		
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	0	9	0	9	4	5	1	3	20	7	1	4
Pedestrians												
Lane Width (m)												
Walking Speed (m/s)												
Percent Blockage												
Right turn flare (veh)												
Median type	None			None								
Median storage veh												
Upstream signal (m)												
pX, platoon unblocked												
vC, conflicting volume	9			9			38	36	9	55	34	6
vC1, stage 1 conf vol												
vC2, stage 2 conf vol												
vCu, unblocked vol	9			9			38	36	9	55	34	6
tC, single (s)	4.1			4.1			7.1	6.5	6.2	7.3	6.5	6.5
tC, 2 stage (s)												
tF (s)	2.2			2.2			3.5	4.0	3.3	3.7	4.0	3.6
p0 queue free %	100			99			100	100	98	99	100	100
cM capacity (veh/h)	1624			1611			958	852	1073	877	854	992
Direction, Lane #	EB 1	WB 1	NB 1	SB 1								
Volume Total	9	18	24	12								
Volume Left	0	9	1	7								
Volume Right	0	5	20	4								
cSH	1624	1611	1034	910								
Volume to Capacity	0.00	0.01	0.02	0.01								
Queue Length 95th (m)	0.0	0.1	0.6	0.3								
Control Delay (s)	0.0	3.6	8.6	9.0								
Lane LOS		A	A	A								
Approach Delay (s)	0.0	3.6	8.6	9.0								
Approach LOS		A	A									
Intersection Summary												
Average Delay		6.0										
Intersection Capacity Utilization		17.6%		ICU Level of Service								
Analysis Period (min)		15										

Lanes, Volumes, Timings
1: Tanbark Road & York Road

2030 PM Total

11-02-2022

	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	11	345	94	35	246	11	59	6	28	9	4	9
Future Volume (vph)	11	345	94	35	246	11	59	6	28	9	4	9
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Fr _t		0.972			0.995			0.960			0.944	
Flt Protected		0.999			0.994			0.969			0.980	
Satd. Flow (prot)	0	1803	0	0	1777	0	0	1697	0	0	1661	0
Flt Permitted		0.999			0.994			0.969			0.980	
Satd. Flow (perm)	0	1803	0	0	1777	0	0	1697	0	0	1661	0
Link Speed (k/h)		50			50			50			50	
Link Distance (m)		351.4			515.6			156.3			44.1	
Travel Time (s)		25.3			37.1			11.3			3.2	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Heavy Vehicles (%)	0%	3%	0%	6%	6%	0%	0%	0%	14%	14%	0%	0%
Adj. Flow (vph)	12	375	102	38	267	12	64	7	30	10	4	10
Shared Lane Traffic (%)												
Lane Group Flow (vph)	0	489	0	0	317	0	0	101	0	0	24	0
Enter Blocked Intersection	No	No	No									
Lane Alignment	Left	Left	Right									
Median Width(m)		0.0			0.0			0.0			0.0	
Link Offset(m)		0.0			0.0			0.0			0.0	
Crosswalk Width(m)		4.8			4.8			4.8			4.8	
Two way Left Turn Lane												
Headway Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Turning Speed (k/h)	25		15	25		15	25		15	25		15
Sign Control		Free			Free			Stop			Stop	

Intersection Summary

Area Type: Other

Control Type: Unsignalized

Intersection Capacity Utilization 46.6% ICU Level of Service A

Analysis Period (min) 15

HCM Unsignalized Intersection Capacity Analysis
1: Tanbark Road & York Road

2030 PM Total
11-02-2022

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	11	345	94	35	246	11	59	6	28	9	4	9
Future Volume (Veh/h)	11	345	94	35	246	11	59	6	28	9	4	9
Sign Control	Free				Free			Stop			Stop	
Grade		0%				0%			0%		0%	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	12	375	102	38	267	12	64	7	30	10	4	10
Pedestrians												
Lane Width (m)												
Walking Speed (m/s)												
Percent Blockage												
Right turn flare (veh)												
Median type		None				None						
Median storage veh												
Upstream signal (m)												
pX, platoon unblocked												
vC, conflicting volume	279			477			811	805	426	832	850	273
vC1, stage 1 conf vol												
vC2, stage 2 conf vol												
vCu, unblocked vol	279			477			811	805	426	832	850	273
tC, single (s)	4.1			4.2			7.1	6.5	6.3	7.2	6.5	6.2
tC, 2 stage (s)												
tF (s)	2.2			2.3			3.5	4.0	3.4	3.6	4.0	3.3
p0 queue free %	99			96			77	98	95	96	99	99
cM capacity (veh/h)	1295			1065			283	304	604	248	286	771
Direction, Lane #	EB 1	WB 1	NB 1	SB 1								
Volume Total	489	317	101	24								
Volume Left	12	38	64	10								
Volume Right	102	12	30	10								
cSH	1295	1065	338	357								
Volume to Capacity	0.01	0.04	0.30	0.07								
Queue Length 95th (m)	0.2	0.9	9.8	1.7								
Control Delay (s)	0.3	1.3	20.1	15.8								
Lane LOS	A	A	C	C								
Approach Delay (s)	0.3	1.3	20.1	15.8								
Approach LOS			C	C								
Intersection Summary												
Average Delay		3.2										
Intersection Capacity Utilization		46.6%			ICU Level of Service					A		
Analysis Period (min)			15									

Lanes, Volumes, Timings
2: Tanbark Road & Warner Road

2030 PM Total

11-02-2022

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	17	8	0	9	10	14	0	55	3	31	74	23
Future Volume (vph)	17	8	0	9	10	14	0	55	3	31	74	23
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Fr _t					0.944			0.994			0.976	
Flt Protected		0.968			0.986						0.988	
Satd. Flow (prot)	0	1839	0	0	1696	0	0	1836	0	0	1811	0
Flt Permitted		0.968			0.986						0.988	
Satd. Flow (perm)	0	1839	0	0	1696	0	0	1836	0	0	1811	0
Link Speed (k/h)		50			50			50			50	
Link Distance (m)		207.8			107.8			154.0			156.3	
Travel Time (s)		15.0			7.8			11.1			11.3	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Heavy Vehicles (%)	0%	0%	0%	0%	14%	0%	0%	3%	0%	0%	2%	0%
Adj. Flow (vph)	18	9	0	10	11	15	0	60	3	34	80	25
Shared Lane Traffic (%)												
Lane Group Flow (vph)	0	27	0	0	36	0	0	63	0	0	139	0
Enter Blocked Intersection	No	No	No									
Lane Alignment	Left	Left	Right									
Median Width(m)		0.0			0.0			0.0			0.0	
Link Offset(m)		0.0			0.0			0.0			0.0	
Crosswalk Width(m)		4.8			4.8			4.8			4.8	
Two way Left Turn Lane												
Headway Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Turning Speed (k/h)	25		15	25		15	25		15	25		15
Sign Control		Stop			Stop			Free			Free	

Intersection Summary

Area Type: Other

Control Type: Unsignalized

Intersection Capacity Utilization 23.7% ICU Level of Service A

Analysis Period (min) 15

HCM Unsignalized Intersection Capacity Analysis
2: Tanbark Road & Warner Road

2030 PM Total
11-02-2022

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	17	8	0	9	10	14	0	55	3	31	74	23
Future Volume (Veh/h)	17	8	0	9	10	14	0	55	3	31	74	23
Sign Control	Stop				Stop			Free			Free	
Grade	0%				0%			0%			0%	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	18	9	0	10	11	15	0	60	3	34	80	25
Pedestrians												
Lane Width (m)												
Walking Speed (m/s)												
Percent Blockage												
Right turn flare (veh)												
Median type								None			None	
Median storage veh												
Upstream signal (m)												
pX, platoon unblocked												
vC, conflicting volume	242	224	92	226	234	62	105			63		
vC1, stage 1 conf vol												
vC2, stage 2 conf vol												
vCu, unblocked vol	242	224	92	226	234	62	105			63		
tC, single (s)	7.1	6.5	6.2	7.1	6.6	6.2	4.1			4.1		
tC, 2 stage (s)												
tF (s)	3.5	4.0	3.3	3.5	4.1	3.3	2.2			2.2		
p0 queue free %	97	99	100	99	98	99	100			98		
cM capacity (veh/h)	684	664	970	713	631	1009	1499			1553		
Direction, Lane #	EB 1	WB 1	NB 1	SB 1								
Volume Total	27	36	63	139								
Volume Left	18	10	0	34								
Volume Right	0	15	3	25								
cSH	677	778	1499	1553								
Volume to Capacity	0.04	0.05	0.00	0.02								
Queue Length 95th (m)	1.0	1.2	0.0	0.5								
Control Delay (s)	10.5	9.9	0.0	1.9								
Lane LOS	B	A		A								
Approach Delay (s)	10.5	9.9	0.0	1.9								
Approach LOS	B	A										
Intersection Summary												
Average Delay			3.4									
Intersection Capacity Utilization		23.7%			ICU Level of Service				A			
Analysis Period (min)			15									

Lanes, Volumes, Timings
3: Tanbark Road & Pinecroft Drive

2030 PM Total
11-02-2022



Lane Group	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations	↔	↔	↑	↗	↙	↓
Traffic Volume (vph)	0	9	48	2	6	77
Future Volume (vph)	0	9	48	2	6	77
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00
Fr _t	0.865		0.995			
Flt Protected						0.996
Satd. Flow (prot)	1644	0	1787	0	0	1858
Flt Permitted						0.996
Satd. Flow (perm)	1644	0	1787	0	0	1858
Link Speed (k/h)	50		50			50
Link Distance (m)	132.9		205.1			154.0
Travel Time (s)	9.6		14.8			11.1
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Heavy Vehicles (%)	0%	0%	6%	0%	0%	2%
Adj. Flow (vph)	0	10	52	2	7	84
Shared Lane Traffic (%)						
Lane Group Flow (vph)	10	0	54	0	0	91
Enter Blocked Intersection	No	No	No	No	No	No
Lane Alignment	Left	Right	Left	Right	Left	Left
Median Width(m)	3.6		0.0			0.0
Link Offset(m)	0.0		0.0			0.0
Crosswalk Width(m)	4.8		4.8			4.8
Two way Left Turn Lane						
Headway Factor	1.00	1.00	1.00	1.00	1.00	1.00
Turning Speed (k/h)	25	15		15	25	
Sign Control	Stop		Free			Free

Intersection Summary

Area Type: Other

Control Type: Unsignalized

Intersection Capacity Utilization 19.0% ICU Level of Service A

Analysis Period (min) 15

HCM Unsignalized Intersection Capacity Analysis
3: Tanbark Road & Pinecroft Drive

2030 PM Total
11-02-2022



Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Traffic Volume (veh/h)	0	9	48	2	6	77
Future Volume (Veh/h)	0	9	48	2	6	77
Sign Control	Stop		Free			Free
Grade	0%		0%			0%
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	0	10	52	2	7	84
Pedestrians						
Lane Width (m)						
Walking Speed (m/s)						
Percent Blockage						
Right turn flare (veh)						
Median type			None			None
Median storage veh						
Upstream signal (m)						
pX, platoon unblocked						
vC, conflicting volume	151	53			54	
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	151	53			54	
tC, single (s)	6.4	6.2			4.1	
tC, 2 stage (s)						
tF (s)	3.5	3.3			2.2	
p0 queue free %	100	99			100	
cM capacity (veh/h)	842	1020			1564	
Direction, Lane #	WB 1	NB 1	SB 1			
Volume Total	10	54	91			
Volume Left	0	0	7			
Volume Right	10	2	0			
cSH	1020	1700	1564			
Volume to Capacity	0.01	0.03	0.00			
Queue Length 95th (m)	0.2	0.0	0.1			
Control Delay (s)	8.6	0.0	0.6			
Lane LOS	A		A			
Approach Delay (s)	8.6	0.0	0.6			
Approach LOS	A					
Intersection Summary						
Average Delay		0.9				
Intersection Capacity Utilization		19.0%		ICU Level of Service		A
Analysis Period (min)		15				

Lanes, Volumes, Timings
4: Tanbark Road & Hickory Avenue

2030 PM Total

11-02-2022



Lane Group	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Traffic Volume (vph)	11	4	5	40	61	15
Future Volume (vph)	11	4	5	40	61	15
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00
Fr _t	0.966				0.974	
Flt Protected	0.964			0.995		
Satd. Flow (prot)	1769	0	0	1794	1851	0
Flt Permitted	0.964			0.995		
Satd. Flow (perm)	1769	0	0	1794	1851	0
Link Speed (k/h)	50			50	50	
Link Distance (m)	129.6			65.7	205.1	
Travel Time (s)	9.3			4.7	14.8	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Heavy Vehicles (%)	0%	0%	0%	6%	0%	0%
Adj. Flow (vph)	12	4	5	43	66	16
Shared Lane Traffic (%)						
Lane Group Flow (vph)	16	0	0	48	82	0
Enter Blocked Intersection	No	No	No	No	No	No
Lane Alignment	Left	Right	Left	Left	Left	Right
Median Width(m)	3.6			0.0	0.0	
Link Offset(m)	0.0			0.0	0.0	
Crosswalk Width(m)	4.8			4.8	4.8	
Two way Left Turn Lane						
Headway Factor	1.00	1.00	1.00	1.00	1.00	1.00
Turning Speed (k/h)	25	15	25			15
Sign Control	Stop			Free	Free	

Intersection Summary

Area Type: Other

Control Type: Unsignalized

Intersection Capacity Utilization 16.3% ICU Level of Service A

Analysis Period (min) 15

HCM Unsignalized Intersection Capacity Analysis

2030 PM Total

4: Tanbark Road & Hickory Avenue

11-02-2022



Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Traffic Volume (veh/h)	11	4	5	40	61	15
Future Volume (Veh/h)	11	4	5	40	61	15
Sign Control	Stop			Free	Free	
Grade	0%			0%	0%	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	12	4	5	43	66	16
Pedestrians						
Lane Width (m)						
Walking Speed (m/s)						
Percent Blockage						
Right turn flare (veh)						
Median type				None	None	
Median storage veh						
Upstream signal (m)						
pX, platoon unblocked						
vC, conflicting volume	127	74	82			
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	127	74	82			
tC, single (s)	6.4	6.2	4.1			
tC, 2 stage (s)						
tF (s)	3.5	3.3	2.2			
p0 queue free %	99	100	100			
cM capacity (veh/h)	870	993	1528			
Direction, Lane #	EB 1	NB 1	SB 1			
Volume Total	16	48	82			
Volume Left	12	5	0			
Volume Right	4	0	16			
cSH	898	1528	1700			
Volume to Capacity	0.02	0.00	0.05			
Queue Length 95th (m)	0.4	0.1	0.0			
Control Delay (s)	9.1	0.8	0.0			
Lane LOS	A	A				
Approach Delay (s)	9.1	0.8	0.0			
Approach LOS	A					
Intersection Summary						
Average Delay		1.3				
Intersection Capacity Utilization		16.3%		ICU Level of Service		A
Analysis Period (min)		15				

Lanes, Volumes, Timings
5: Warner Road & Angels Drive

2030 PM Total

11-02-2022



Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	4	8	1	20	11	2	0	2	13	4	2	1
Future Volume (vph)	4	8	1	20	11	2	0	2	13	4	2	1
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Ped Bike Factor												
Frt		0.990			0.992			0.882			0.981	
Flt Protected		0.986			0.970						0.972	
Satd. Flow (prot)	0	1852	0	0	1749	0	0	1643	0	0	1517	0
Flt Permitted		0.986			0.970						0.972	
Satd. Flow (perm)	0	1852	0	0	1749	0	0	1643	0	0	1517	0
Link Speed (k/h)		50			50			50			50	
Link Distance (m)		191.9			207.8			103.2			131.4	
Travel Time (s)		13.8			15.0			7.4			9.5	
Confl. Peds. (#/hr)	1				1							
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Heavy Vehicles (%)	0%	0%	2%	2%	10%	0%	2%	2%	2%	33%	2%	0%
Adj. Flow (vph)	4	9	1	22	12	2	0	2	14	4	2	1
Shared Lane Traffic (%)												
Lane Group Flow (vph)	0	14	0	0	36	0	0	16	0	0	7	0
Enter Blocked Intersection	No	No	No	No	No	No	No	No	No	No	No	No
Lane Alignment	Left	Left	Right	Left	Left	Right	Left	Left	Right	Left	Left	Right
Median Width(m)		0.0			0.0			0.0			0.0	
Link Offset(m)		0.0			0.0			0.0			0.0	
Crosswalk Width(m)		4.8			4.8			4.8			4.8	
Two way Left Turn Lane												
Headway Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Turning Speed (k/h)	25		100	100		15	100		100	25		15
Sign Control		Free			Free			Stop			Stop	
Intersection Summary												
Area Type:	Other											
Control Type:	Unsignalized											
Intersection Capacity Utilization	14.2%				ICU Level of Service A							
Analysis Period (min)	15											

HCM Unsignalized Intersection Capacity Analysis
5: Warner Road & Angels Drive

2030 PM Total
11-02-2022

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	4	8	1	20	11	2	0	2	13	4	2	1
Future Volume (Veh/h)	4	8	1	20	11	2	0	2	13	4	2	1
Sign Control	Free				Free			Stop			Stop	
Grade	0%				0%			0%			0%	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	4	9	1	22	12	2	0	2	14	4	2	1
Pedestrians												1
Lane Width (m)												3.6
Walking Speed (m/s)												1.2
Percent Blockage												0
Right turn flare (veh)												
Median type	None				None							
Median storage veh												
Upstream signal (m)												
pX, platoon unblocked												
vC, conflicting volume	15			10			76	76	10	90	76	14
vC1, stage 1 conf vol												
vC2, stage 2 conf vol												
vCu, unblocked vol	15			10			76	76	10	90	76	14
tC, single (s)	4.1			4.1			7.1	6.5	6.2	7.4	6.5	6.2
tC, 2 stage (s)												
tF (s)	2.2			2.2			3.5	4.0	3.3	3.8	4.0	3.3
p0 queue free %	100			99			100	100	99	100	100	100
cM capacity (veh/h)	1615			1610			899	800	1072	801	801	1071
Direction, Lane #	EB 1	WB 1	NB 1	SB 1								
Volume Total	14	36	16	7								
Volume Left	4	22	0	4								
Volume Right	1	2	14	1								
cSH	1615	1610	1028	831								
Volume to Capacity	0.00	0.01	0.02	0.01								
Queue Length 95th (m)	0.1	0.3	0.4	0.2								
Control Delay (s)	2.1	4.5	8.6	9.4								
Lane LOS	A	A	A	A								
Approach Delay (s)	2.1	4.5	8.6	9.4								
Approach LOS			A	A								
Intersection Summary												
Average Delay			5.4									
Intersection Capacity Utilization		14.2%			ICU Level of Service					A		
Analysis Period (min)			15									

Lanes, Volumes, Timings
1: Tanbark Road & York Road

2030 Sat. Total

11-02-2022



Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	19	381	41	30	297	16	58	9	32	14	7	21
Future Volume (vph)	19	381	41	30	297	16	58	9	32	14	7	21
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Ped Bike Factor												
Frt		0.987			0.994			0.956			0.932	
Flt Protected		0.998			0.996			0.972			0.984	
Satd. Flow (prot)	0	1834	0	0	1865	0	0	1766	0	0	1742	0
Flt Permitted		0.998			0.996			0.972			0.984	
Satd. Flow (perm)	0	1834	0	0	1865	0	0	1766	0	0	1742	0
Link Speed (k/h)		50			50			50			50	
Link Distance (m)		351.4			515.6			156.3			44.1	
Travel Time (s)		25.3			37.1			11.3			3.2	
Confl. Peds. (#/hr)		6	6				1		2	2		1
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Heavy Vehicles (%)	7%	2%	0%	0%	1%	0%	0%	0%	0%	0%	0%	0%
Adj. Flow (vph)	21	414	45	33	323	17	63	10	35	15	8	23
Shared Lane Traffic (%)												
Lane Group Flow (vph)	0	480	0	0	373	0	0	108	0	0	46	0
Enter Blocked Intersection	No	No	No	No	No	No	No	No	No	No	No	No
Lane Alignment	Left	Left	Right	Left	Left	Right	Left	Left	Right	Left	Left	Right
Median Width(m)		0.0			0.0			0.0			0.0	
Link Offset(m)		0.0			0.0			0.0			0.0	
Crosswalk Width(m)		4.8			4.8			4.8			4.8	
Two way Left Turn Lane												
Headway Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Turning Speed (k/h)	25		15	25		15	25		15	25		15
Sign Control		Free			Free			Stop			Stop	
Intersection Summary												
Area Type:	Other											
Control Type:	Unsignalized											
Intersection Capacity Utilization	44.8%				ICU Level of Service A							
Analysis Period (min)	15											

HCM Unsignalized Intersection Capacity Analysis
1: Tanbark Road & York Road

2030 Sat. Total
11-02-2022

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	19	381	41	30	297	16	58	9	32	14	7	21
Future Volume (Veh/h)	19	381	41	30	297	16	58	9	32	14	7	21
Sign Control	Free				Free			Stop			Stop	
Grade	0%				0%			0%			0%	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	21	414	45	33	323	17	63	10	35	15	8	23
Pedestrians	1				2			6				
Lane Width (m)	3.6				3.6			3.6				
Walking Speed (m/s)	1.2				1.2			1.2				
Percent Blockage	0				0			1				
Right turn flare (veh)												
Median type	None				None							
Median storage veh												
Upstream signal (m)												
pX, platoon unblocked												
vC, conflicting volume	340			465			910	890	444	918	904	332
vC1, stage 1 conf vol												
vC2, stage 2 conf vol												
vCu, unblocked vol	340			465			910	890	444	918	904	332
tC, single (s)	4.2			4.1			7.1	6.5	6.2	7.1	6.5	6.2
tC, 2 stage (s)												
tF (s)	2.3			2.2			3.5	4.0	3.3	3.5	4.0	3.3
p0 queue free %	98			97			73	96	94	93	97	97
cM capacity (veh/h)	1192			1101			233	269	614	223	264	713
Direction, Lane #	EB 1	WB 1	NB 1	SB 1								
Volume Total	480	373	108	46								
Volume Left	21	33	63	15								
Volume Right	45	17	35	23								
cSH	1192	1101	296	355								
Volume to Capacity	0.02	0.03	0.37	0.13								
Queue Length 95th (m)	0.4	0.7	12.9	3.5								
Control Delay (s)	0.5	1.0	24.0	16.7								
Lane LOS	A	A	C	C								
Approach Delay (s)	0.5	1.0	24.0	16.7								
Approach LOS			C	C								
Intersection Summary												
Average Delay			4.0									
Intersection Capacity Utilization		44.8%			ICU Level of Service					A		
Analysis Period (min)			15									

Lanes, Volumes, Timings
2: Tanbark Road & Warner Road

2030 Sat. Total

11-02-2022



Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	18	7	0	8	9	22	1	60	8	19	50	17
Future Volume (vph)	18	7	0	8	9	22	1	60	8	19	50	17
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Ped Bike Factor												
Frt					0.925			0.984			0.974	
Flt Protected		0.966			0.990			0.999			0.989	
Satd. Flow (prot)	0	1835	0	0	1740	0	0	1868	0	0	1799	0
Flt Permitted		0.966			0.990			0.999			0.989	
Satd. Flow (perm)	0	1835	0	0	1740	0	0	1868	0	0	1799	0
Link Speed (k/h)		50			50			50			50	
Link Distance (m)		207.8			107.8			154.0			156.3	
Travel Time (s)		15.0			7.8			11.1			11.3	
Confl. Peds. (#/hr)									2	2		
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Heavy Vehicles (%)	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	3%	0%
Adj. Flow (vph)	20	8	0	9	10	24	1	65	9	21	54	18
Shared Lane Traffic (%)												
Lane Group Flow (vph)	0	28	0	0	43	0	0	75	0	0	93	0
Enter Blocked Intersection	No	No	No	No	No	No	No	No	No	No	No	No
Lane Alignment	Left	Left	Right	Left	Left	Right	Left	Left	Right	Left	Left	Right
Median Width(m)		0.0			0.0			0.0			0.0	
Link Offset(m)		0.0			0.0			0.0			0.0	
Crosswalk Width(m)		4.8			4.8			4.8			4.8	
Two way Left Turn Lane												
Headway Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Turning Speed (k/h)	25		15	25		15	25		15	25		15
Sign Control		Stop			Stop			Free			Free	
Intersection Summary												
Area Type:	Other											
Control Type:	Unsignalized											
Intersection Capacity Utilization	21.9%							ICU Level of Service A				
Analysis Period (min)	15											

HCM Unsignalized Intersection Capacity Analysis
2: Tanbark Road & Warner Road

2030 Sat. Total

11-02-2022

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	18	7	0	8	9	22	1	60	8	19	50	17
Future Volume (Veh/h)	18	7	0	8	9	22	1	60	8	19	50	17
Sign Control	Stop				Stop			Free			Free	
Grade	0%				0%			0%			0%	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	20	8	0	9	10	24	1	65	9	21	54	18
Pedestrians					2							
Lane Width (m)					3.6							
Walking Speed (m/s)					1.2							
Percent Blockage					0							
Right turn flare (veh)												
Median type								None			None	
Median storage veh												
Upstream signal (m)												
pX, platoon unblocked												
vC, conflicting volume	206	183	63	182	188	72	72			76		
vC1, stage 1 conf vol												
vC2, stage 2 conf vol												
vCu, unblocked vol	206	183	63	182	188	72	72			76		
tC, single (s)	7.1	6.5	6.2	7.1	6.5	6.2	4.1			4.1		
tC, 2 stage (s)												
tF (s)	3.5	4.0	3.3	3.5	4.0	3.3	2.2			2.2		
p0 queue free %	97	99	100	99	99	98	100			99		
cM capacity (veh/h)	721	703	1007	766	699	995	1541			1533		
Direction, Lane #	EB 1	WB 1	NB 1	SB 1								
Volume Total	28	43	75	93								
Volume Left	20	9	1	21								
Volume Right	0	24	9	18								
cSH	716	857	1541	1533								
Volume to Capacity	0.04	0.05	0.00	0.01								
Queue Length 95th (m)	1.0	1.3	0.0	0.3								
Control Delay (s)	10.2	9.4	0.1	1.7								
Lane LOS	B	A	A	A								
Approach Delay (s)	10.2	9.4	0.1	1.7								
Approach LOS	B	A										
Intersection Summary												
Average Delay		3.6										
Intersection Capacity Utilization		21.9%			ICU Level of Service					A		
Analysis Period (min)			15									

Lanes, Volumes, Timings
3: Tanbark Road & Pinecroft Drive

2030 Sat. Total

11-02-2022



Lane Group	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Traffic Volume (vph)	1	7	48	2	14	59
Future Volume (vph)	1	7	48	2	14	59
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00
Ped Bike Factor						
Frt	0.880		0.995			
Flt Protected	0.994				0.991	
Satd. Flow (prot)	1662	0	1890	0	0	1883
Flt Permitted	0.994				0.991	
Satd. Flow (perm)	1662	0	1890	0	0	1883
Link Speed (k/h)	50		50		50	
Link Distance (m)	132.9		205.1		154.0	
Travel Time (s)	9.6		14.8		11.1	
Confl. Peds. (#/hr)				5	5	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Heavy Vehicles (%)	0%	0%	0%	0%	0%	0%
Adj. Flow (vph)	1	8	52	2	15	64
Shared Lane Traffic (%)						
Lane Group Flow (vph)	9	0	54	0	0	79
Enter Blocked Intersection	No	No	No	No	No	No
Lane Alignment	Left	Right	Left	Right	Left	Left
Median Width(m)	3.6		0.0		0.0	
Link Offset(m)	0.0		0.0		0.0	
Crosswalk Width(m)	4.8		4.8		4.8	
Two way Left Turn Lane						
Headway Factor	1.00	1.00	1.00	1.00	1.00	1.00
Turning Speed (k/h)	25	15		15	25	
Sign Control	Stop		Free		Free	
Intersection Summary						
Area Type:	Other					
Control Type:	Unsignalized					
Intersection Capacity Utilization	20.5%			ICU Level of Service A		
Analysis Period (min)	15					

HCM Unsignalized Intersection Capacity Analysis
3: Tanbark Road & Pinecroft Drive

2030 Sat. Total
11-02-2022



Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Traffic Volume (veh/h)	1	7	48	2	14	59
Future Volume (Veh/h)	1	7	48	2	14	59
Sign Control	Stop		Free			Free
Grade	0%		0%			0%
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	1	8	52	2	15	64
Pedestrians	5					
Lane Width (m)	3.6					
Walking Speed (m/s)	1.2					
Percent Blockage	0					
Right turn flare (veh)						
Median type			None			None
Median storage veh						
Upstream signal (m)						
pX, platoon unblocked						
vC, conflicting volume	152	58			59	
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	152	58			59	
tC, single (s)	6.4	6.2			4.1	
tC, 2 stage (s)						
tF (s)	3.5	3.3			2.2	
p0 queue free %	100	99			99	
cM capacity (veh/h)	833	1009			1551	
Direction, Lane #	WB 1	NB 1	SB 1			
Volume Total	9	54	79			
Volume Left	1	0	15			
Volume Right	8	2	0			
cSH	986	1700	1551			
Volume to Capacity	0.01	0.03	0.01			
Queue Length 95th (m)	0.2	0.0	0.2			
Control Delay (s)	8.7	0.0	1.5			
Lane LOS	A		A			
Approach Delay (s)	8.7	0.0	1.5			
Approach LOS	A					
Intersection Summary						
Average Delay		1.4				
Intersection Capacity Utilization		20.5%		ICU Level of Service		A
Analysis Period (min)		15				

Lanes, Volumes, Timings
4: Tanbark Road & Hickory Avenue

2030 Sat. Total

11-02-2022



Lane Group	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Traffic Volume (vph)	12	7	5	47	31	6
Future Volume (vph)	12	7	5	47	31	6
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00
Ped Bike Factor						
Frt	0.949				0.977	
Flt Protected	0.970			0.996		
Satd. Flow (prot)	1749	0	0	1892	1856	0
Flt Permitted	0.970			0.996		
Satd. Flow (perm)	1749	0	0	1892	1856	0
Link Speed (k/h)	50			50	50	
Link Distance (m)	129.6			65.7	205.1	
Travel Time (s)	9.3			4.7	14.8	
Confl. Peds. (#/hr)	2					
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Heavy Vehicles (%)	0%	0%	0%	0%	0%	0%
Adj. Flow (vph)	13	8	5	51	34	7
Shared Lane Traffic (%)						
Lane Group Flow (vph)	21	0	0	56	41	0
Enter Blocked Intersection	No	No	No	No	No	No
Lane Alignment	Left	Right	Left	Left	Left	Right
Median Width(m)	3.6			0.0	0.0	
Link Offset(m)	0.0			0.0	0.0	
Crosswalk Width(m)	4.8			4.8	4.8	
Two way Left Turn Lane						
Headway Factor	1.00	1.00	1.00	1.00	1.00	1.00
Turning Speed (k/h)	25	15	25			15
Sign Control	Stop			Free	Free	
Intersection Summary						
Area Type:	Other					
Control Type:	Unsignalized					
Intersection Capacity Utilization	16.6%			ICU Level of Service A		
Analysis Period (min)	15					

HCM Unsignalized Intersection Capacity Analysis
4: Tanbark Road & Hickory Avenue

2030 Sat. Total

11-02-2022



Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Traffic Volume (veh/h)	12	7	5	47	31	6
Future Volume (Veh/h)	12	7	5	47	31	6
Sign Control	Stop			Free	Free	
Grade	0%			0%	0%	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	13	8	5	51	34	7
Pedestrians					2	
Lane Width (m)					3.6	
Walking Speed (m/s)					1.2	
Percent Blockage					0	
Right turn flare (veh)						
Median type				None	None	
Median storage veh						
Upstream signal (m)						
pX, platoon unblocked						
vC, conflicting volume	100	38	41			
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	100	38	41			
tC, single (s)	6.4	6.2	4.1			
tC, 2 stage (s)						
tF (s)	3.5	3.3	2.2			
p0 queue free %	99	99	100			
cM capacity (veh/h)	899	1040	1581			
Direction, Lane #	EB 1	NB 1	SB 1			
Volume Total	21	56	41			
Volume Left	13	5	0			
Volume Right	8	0	7			
cSH	948	1581	1700			
Volume to Capacity	0.02	0.00	0.02			
Queue Length 95th (m)	0.5	0.1	0.0			
Control Delay (s)	8.9	0.7	0.0			
Lane LOS	A	A				
Approach Delay (s)	8.9	0.7	0.0			
Approach LOS	A					
Intersection Summary						
Average Delay		1.9				
Intersection Capacity Utilization		16.6%		ICU Level of Service		A
Analysis Period (min)		15				

Lanes, Volumes, Timings
5: Warner Road & Angels Drive

2030 Sat. Total

11-02-2022



Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	5	6	0	16	12	2	0	2	15	2	2	4
Future Volume (vph)	5	6	0	16	12	2	0	2	15	2	2	4
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Fr _t					0.992			0.880			0.932	
Flt Protected		0.980			0.974						0.988	
Satd. Flow (prot)	0	1825	0	0	1800	0	0	1639	0	0	1715	0
Flt Permitted		0.980			0.974						0.988	
Satd. Flow (perm)	0	1825	0	0	1800	0	0	1639	0	0	1715	0
Link Speed (k/h)		50			50			50			50	
Link Distance (m)		191.9			207.8			92.6			131.4	
Travel Time (s)		13.8			15.0			6.7			9.5	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	5	7	0	17	13	2	0	2	16	2	2	4
Shared Lane Traffic (%)												
Lane Group Flow (vph)	0	12	0	0	32	0	0	18	0	0	8	0
Enter Blocked Intersection	No	No	No									
Lane Alignment	Left	Left	Right									
Median Width(m)		0.0			0.0			0.0			0.0	
Link Offset(m)		0.0			0.0			0.0			0.0	
Crosswalk Width(m)		4.8			4.8			4.8			4.8	
Two way Left Turn Lane												
Headway Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Turning Speed (k/h)	25		100	100		15	100		100	25		15
Sign Control		Free			Free			Stop		Stop		

Intersection Summary

Area Type: Other

Control Type: Unsignalized

Intersection Capacity Utilization 13.3%

ICU Level of Service A

Analysis Period (min) 15

HCM Unsignalized Intersection Capacity Analysis
5: Warner Road & Angels Drive

2030 Sat. Total

11-02-2022



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	5	6	0	16	12	2	0	2	15	2	2	4
Future Volume (Veh/h)	5	6	0	16	12	2	0	2	15	2	2	4
Sign Control	Free			Free			Stop			Stop		
Grade	0%			0%			0%			0%		
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	5	7	0	17	13	2	0	2	16	2	2	4
Pedestrians												
Lane Width (m)												
Walking Speed (m/s)												
Percent Blockage												
Right turn flare (veh)												
Median type		None			None							
Median storage veh												
Upstream signal (m)												
pX, platoon unblocked												
vC, conflicting volume	15			7			70	66	7	82	65	14
vC1, stage 1 conf vol												
vC2, stage 2 conf vol												
vCu, unblocked vol	15			7			70	66	7	82	65	14
tC, single (s)	4.1			4.1			7.1	6.5	6.2	7.1	6.5	6.2
tC, 2 stage (s)												
tF (s)	2.2			2.2			3.5	4.0	3.3	3.5	4.0	3.3
p0 queue free %	100			99			100	100	99	100	100	100
cM capacity (veh/h)	1603			1614			907	813	1075	881	814	1066
Direction, Lane #	EB 1	WB 1	NB 1	SB 1								
Volume Total	12	32	18	8								
Volume Left	5	17	0	2								
Volume Right	0	2	16	4								
cSH	1603	1614	1038	944								
Volume to Capacity	0.00	0.01	0.02	0.01								
Queue Length 95th (m)	0.1	0.3	0.4	0.2								
Control Delay (s)	3.0	3.9	8.5	8.8								
Lane LOS	A	A	A	A								
Approach Delay (s)	3.0	3.9	8.5	8.8								
Approach LOS			A	A								
Intersection Summary												
Average Delay			5.5									
Intersection Capacity Utilization		13.3%			ICU Level of Service					A		
Analysis Period (min)			15									

Appendix E

Left-Turn Lane Nomographs



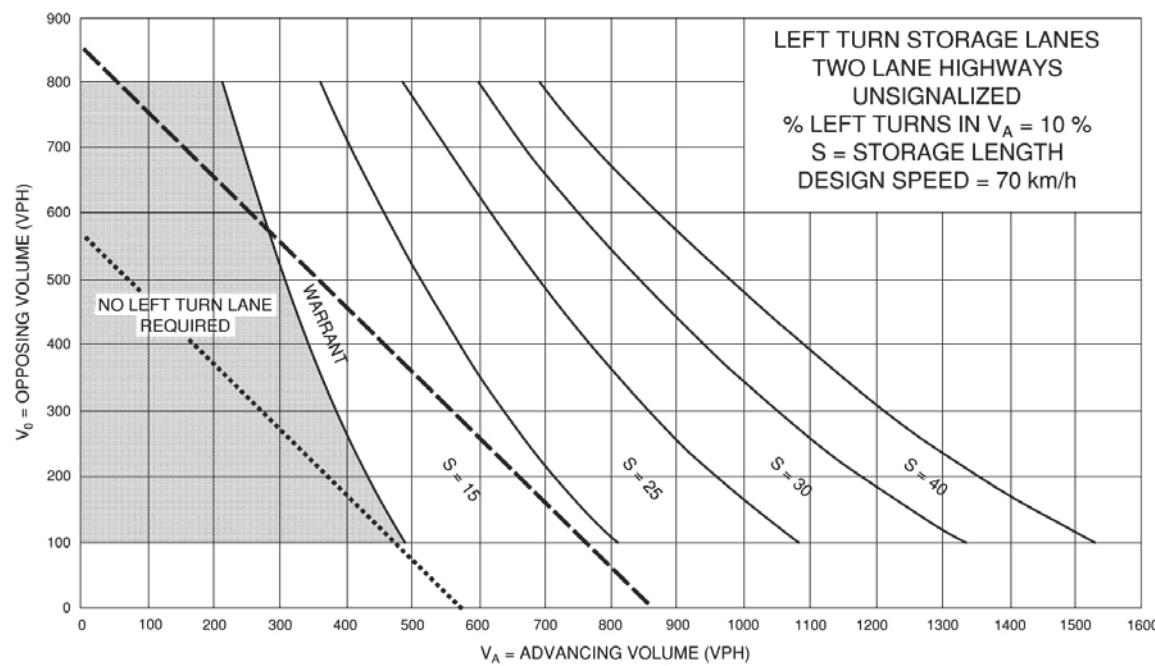
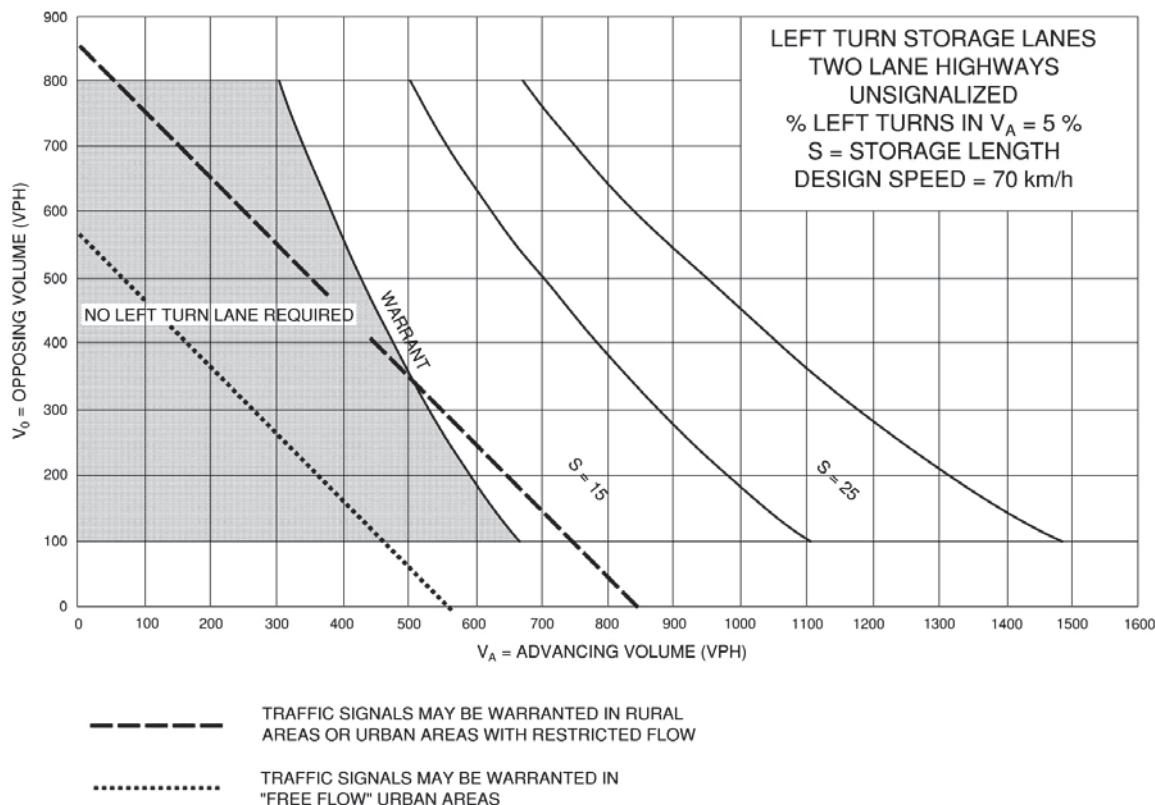
Exhibit 9A-10

Exhibit 9A-13